IMPORTANT READ THIS

READ THE MANUAL. READ IT AGAIN.

MODIFYING CARS CAN RESULT IN REDUCED RELIABILITY AND POSSIBLE DAMAGE.

THE UTEC PROVIDES MORE THAN ENOUGH CONTROL FOR YOU TO DESTROY YOUR ENGINE!

USE CAUTION AND COMMON SENSE WHEN MODIFYING YOUR CAR.

350Z UTEC Users Manual V2.3

TURBOXS TECHNICAL SUPPORT

301.977.4727 (Also see our web site at www.turboxs.com)

TIPS

1. UNDERSTAND WHAT YOU ARE DOING.
2. UNDERSTAND WHAT YOU ARE CHANGING.
3. UNDERSTAND WHY YOU ARE CHANGING IT.
4. TUNE IN SMALL STEPS, CHANGING ONE PARAMETER AT A TIME.
5. APPLY INCREASING LOADS GRADUALLY.
6. START ON THE RICH SIDE AND WITH CONSERVATIVE TIMING AND BOOST.
7. LEAN MIXTURES AND DETONATION CAN BE FATAL.
8. USE GOOD TUNING TOOLS SUCH AS BOOST GAUGE, AFR METER, ETC.
9. NEVER TUNE ALONE, ESPECIALLY WHILE ROAD TESTING. BE RESPONSIBLE ON THE ROAD.
10. ALWAYS HAVE A WORKING MAP IN ALL MAP SPOTS; THIS PREVENTS ANY DANGER OF YOU SWITCHING TO AN INVALID MAP ON THE FLY CAUSING DAMAGE TO YOUR CAR.
11. IF THE CAR DOESN'T RUN WELL. DON'T TRY TO DRIVE THROUGH THE PROBLEM TO CLEAR THE ENGINE OUT.
12. ALWAYS QUESTION ADVICE FROM THE INTERNET, MAGAZINES, BOOKS, NEIGHBOURS, SPECTATORS, ETC.
13. READ THE MANUAL.

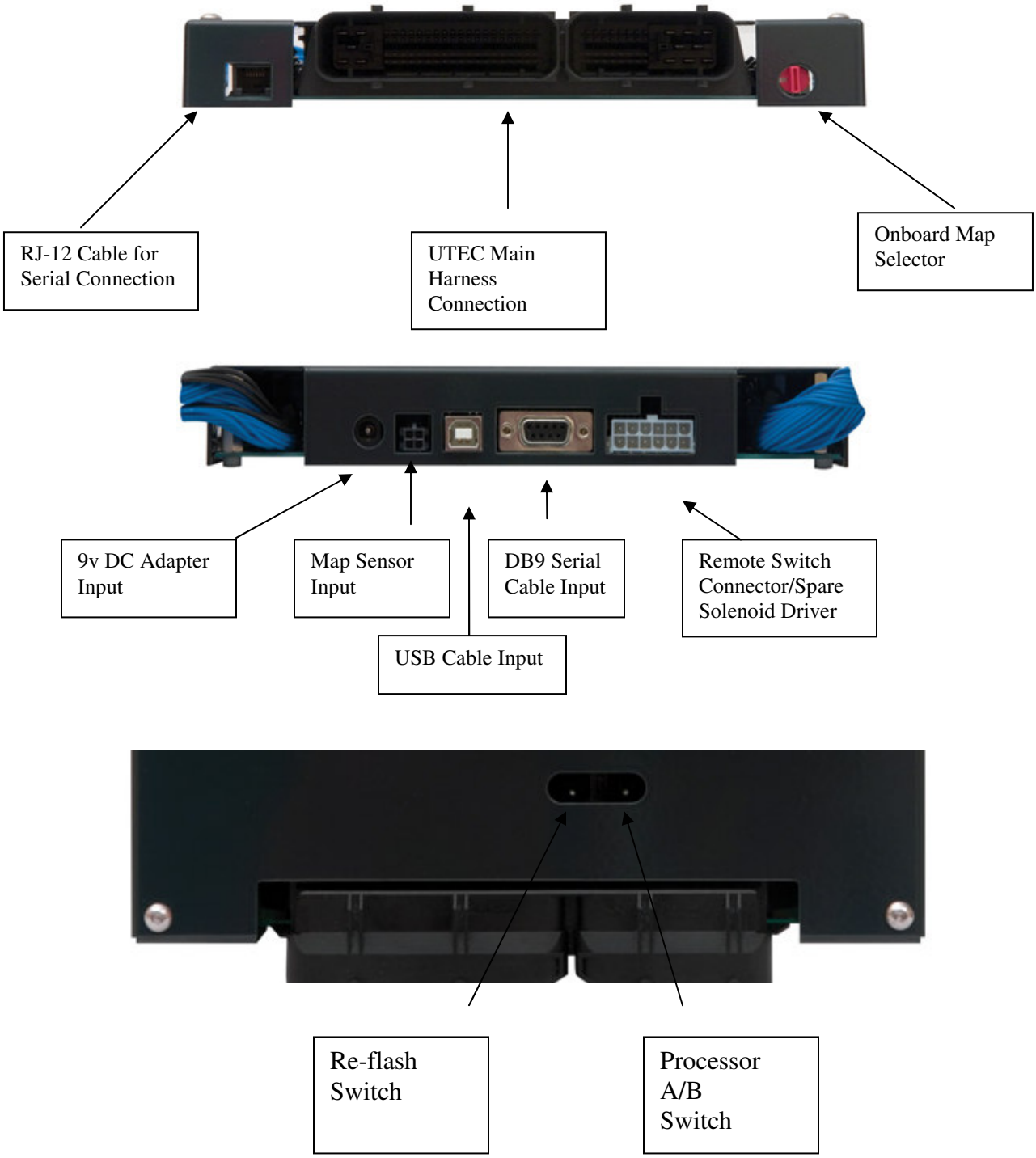
Table of contents

UTEC Package Contents:

- One Z UTEC
- One Serial Cable
- One 9v Batter Adapter
- One Spare Solenoid Connection (molex)
- Three Brass ECU Standoffs
- Five Nuts & Washers

UTEC Layout

Take a few moments to familiarize yourself with the basic layout of the UTEC as shown in the picture below. This information will come in handy when it's time to actually install the UTEC.



ESD (Electrostatic Discharge) Precautions

ESD is the multi thousand volt "zap" you feel when get out of your car on a dry day. This ESD zap can damage electronic devices and should ideally be discharged prior to handling any electronic device. To prevent ESD, follow the steps below when installing, removing or handling the UTEC or the factory ECU:

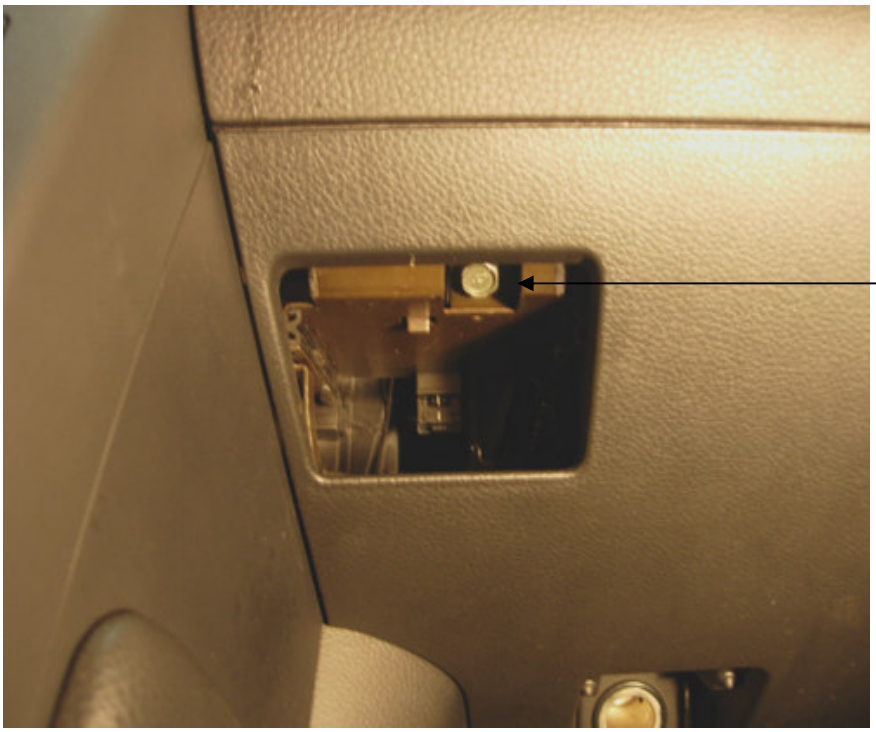
1. Always turn off the ignition before removing or installing the ECU or the UTEC.
2. Handle the ECU and the UTEC as little as possible.
3. Transport and store the UTEC in a static-protected bag or container.
4. Do not slide the UTEC or the ECU over any surface.
5. Discharge yourself by touching an exposed metal chassis point before installing or removing the ECU or the UTEC when connecting the UTEC to a laptop. Alternatively, wear a grounded antistatic wrist strap to discharge the static voltage from your body.
6. Do not touch the connector pins of the ECU or the UTEC.
7. Avoid handling the ECU or the UTEC in areas that have floor or work-surface capable of generating a static charge.

INSTALLING THE UTEC

1. The factory ECU is found on the passenger side of the car. There is a panel that needs to be removed in order to access your ECU.

2. Use a long flat head screwdriver to lightly press the tab behind the cup holder. Gently pull the cup holder out of the locked position.

3. Once you have removed the cup holder you will have access to a 10mm bolt that you will need to remove.



4. The 2nd 10mm bolt that needs to be removed is located in the DC power source adapter (located below the cup holder).

5.

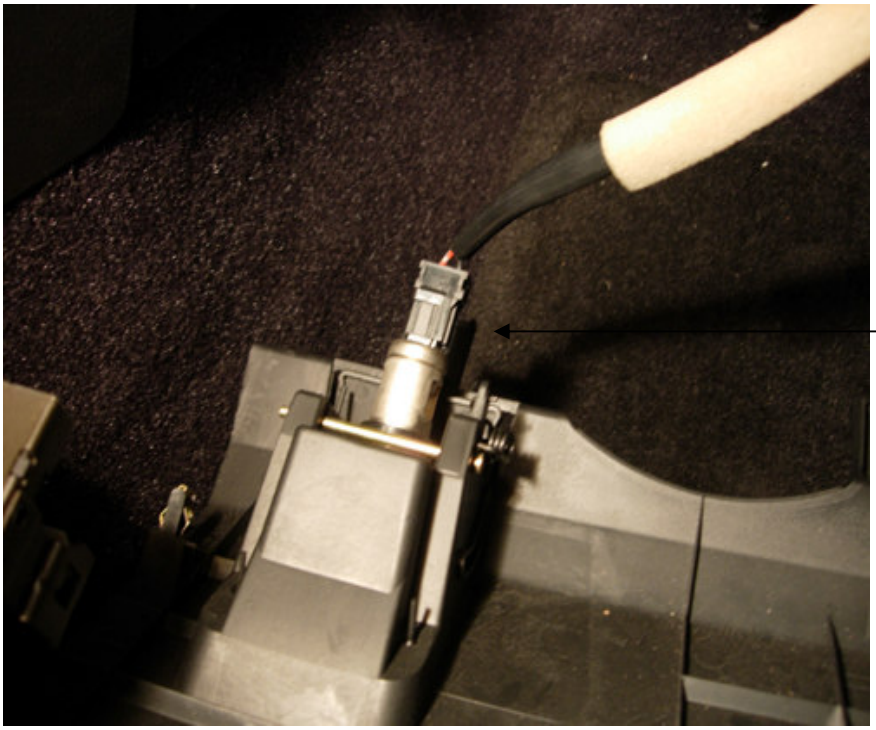
6. Next to the passenger seat there is a plastic door sill that you will need to remove. Gently pull up starting from the back working your way to the front. DO NOT USE TOOLS. You should be careful not to pull too hard it is very easy to break the plastic clips.

Remove this plastic door sill.

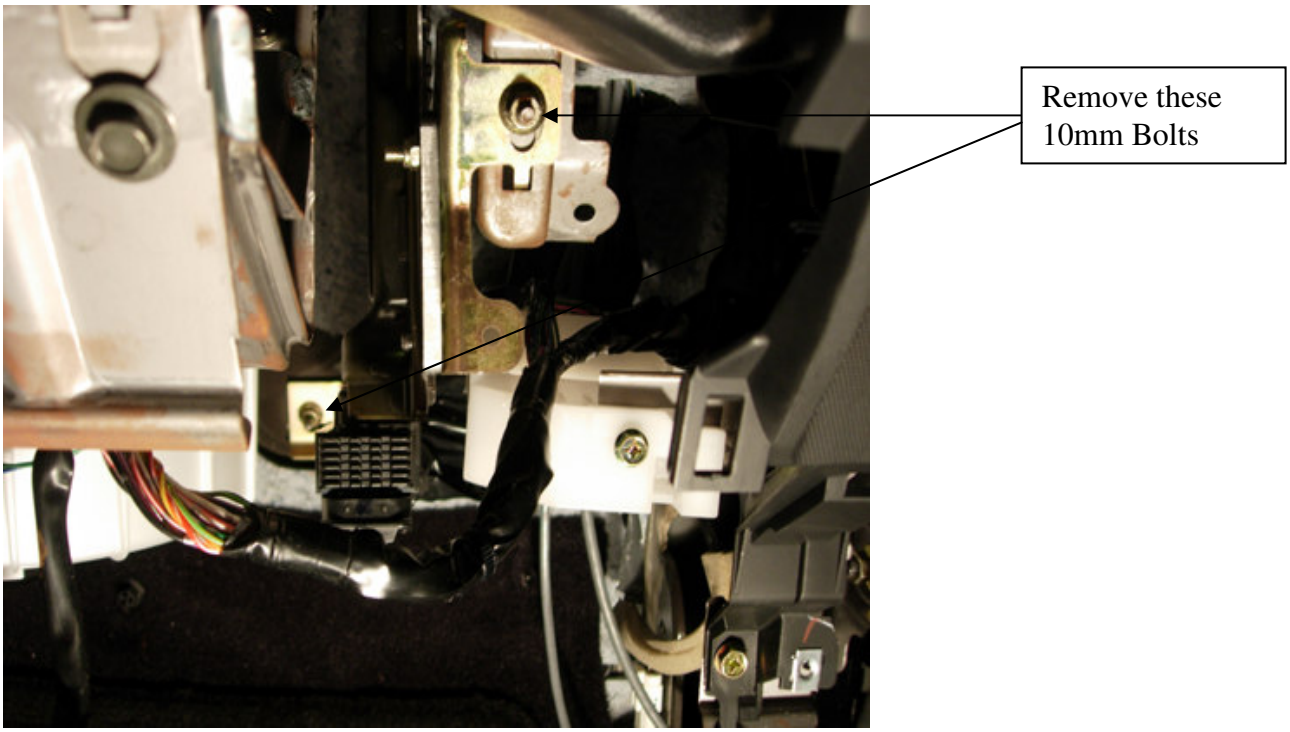
7. After the door sill is removed you should remove the passenger kick panel. You will need to remove the nut and pull the kick panel off. Remember it uses plastic clips so be careful.

8. Once the panel is removed you will have access to the last front panel screw. Remove the Phillips head screw and gently pull the plastic front panel away from your dashboard.

9. After you remove the panel from the dash, you will need to disconnect the DC adapter to move the panel safely out of your way.

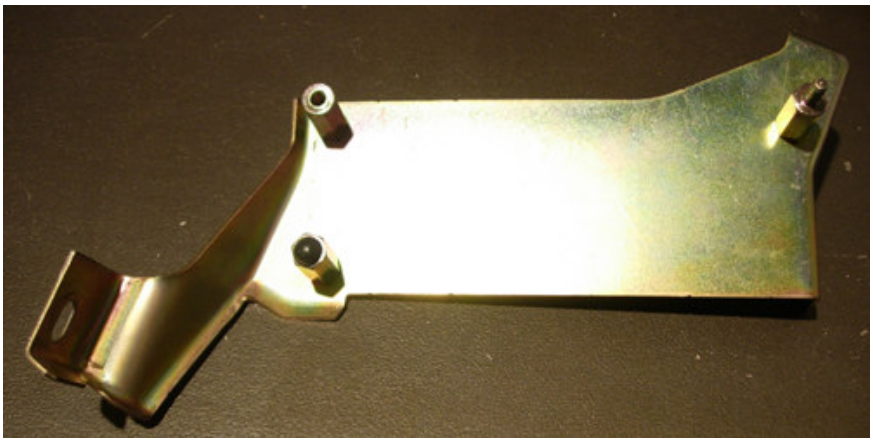


10. Now with the front panel removed you should be able to access your factory ECU in the mounting bracket. Remove the two 10mm Bolts and disconnect the factory ECU harness.



11. Your ECU outside of the car should look similar to this. Remove the 10mm mounting nuts and separate the ECU from the mounting bracket.

12. With the ECU and bracket separated apply the mounting standoffs as illustrated in the picture. Make sure each standoff is snug, do not over tighten.



13. Attach the factory ECU to the back side of the UTEC. It should look like the picture below; if it is not exactly the same it will not mount correctly.

14. Now that you have the UTEC and the ECU securely mounted. Place the mounting bracket on top of the factory ECU. You will need to flip the UTEC and ECU over to secure the 10mm nut. The bolt studs should line up with the appropriate standoff allowing you to screw in the 4mm Hex key.

15. Your end result should look like this:

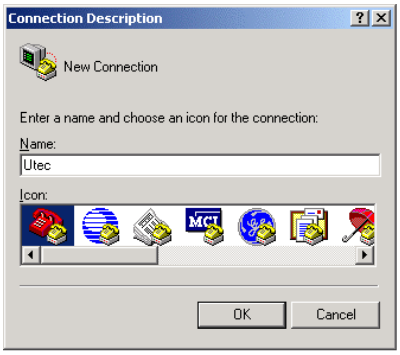
16. Once you have the Z UTEC properly assembled you can reverse the installation steps to complete the install.

SOFTWARE SETUP

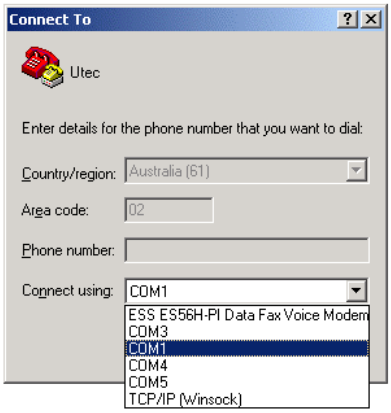
1. Ensure that HyperTerminal™ or a VT100 emulator program is installed on your PC or laptop. If you are using HyperTerminal™, it is typically located in the Programs\Accessories\Communications folder that is accessed from the Start menu. HyperTerminal™ is included as part of your Windows™ Operating System. If it is not installed, you may need to install it from your Windows™ CD.
2. Start up HyperTerminal™ from the Start menu as shown in the following figure.

3. HyperTerminal™ should ask you whether you want to create a "new connection" as shown in the following figure.

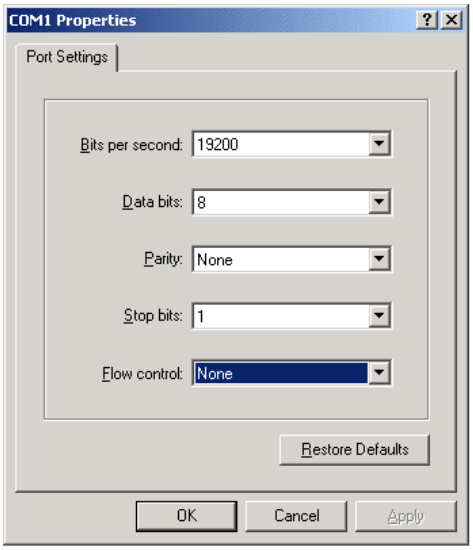
4. Enter a name for the "new connection" as shown in the following figure.



5. HyperTerminal™ will ask you what you want to "connect to". Select the appropriate serial communications port as shown in the following figure and click "OK".



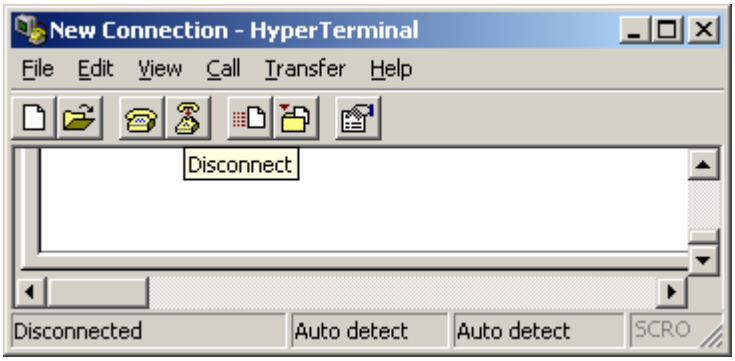
6. Configure the serial port to 19200 bits per second, 8 bit, no parity, one stop bits, no flow control as shown in the following figure.



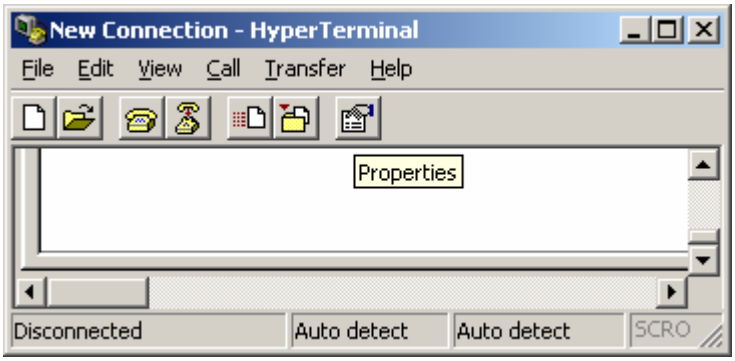
7. Save this setup by using the "File" menu. If you save it onto your desktop or place a shortcut to this on your desktop then you will be able to easily access this in the future.

CHANGING THE SOFTWARE SETUP

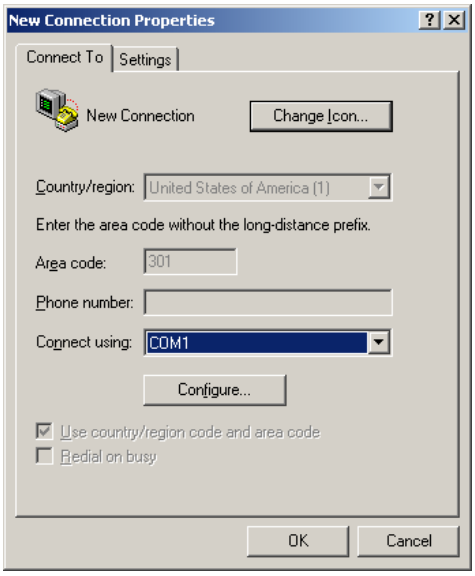
1. If you want to change the settings then click on "Disconnect" on HyperTerminal™ as shown in the following figure.



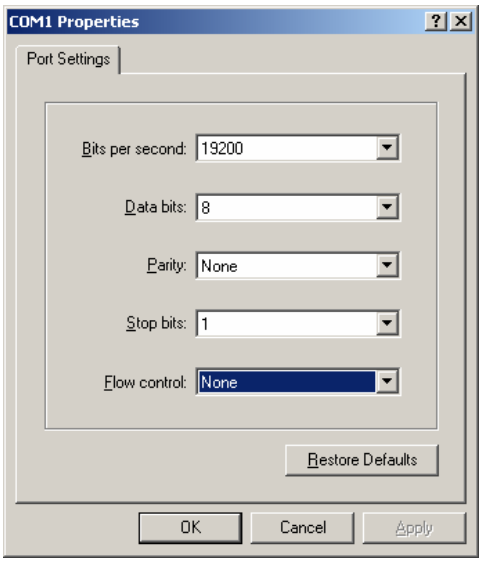
2. Click on "properties" as shown in the following figure.

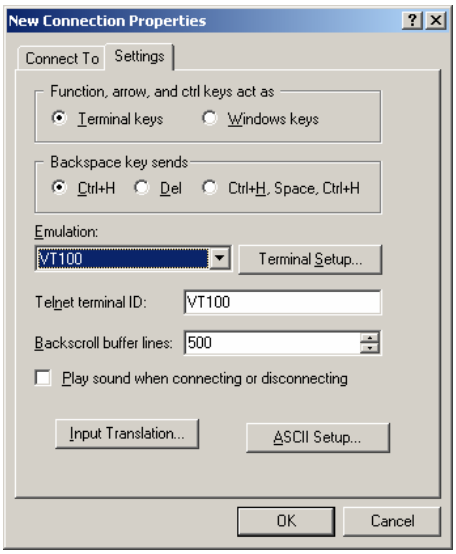


3. Change "Connect using" from COM1 to your desired COM port as shown in the following figure.

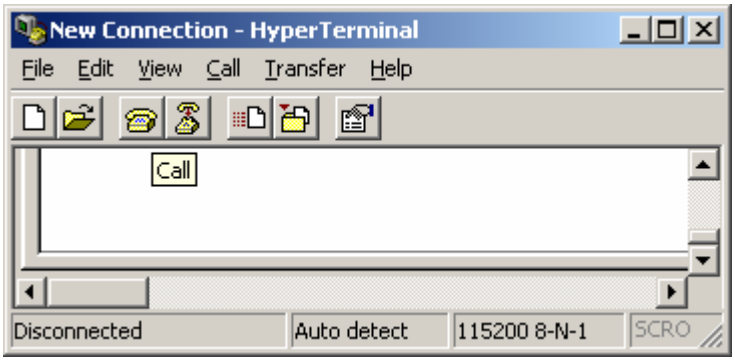


4. The COM port properties should be as shown in the following figure.





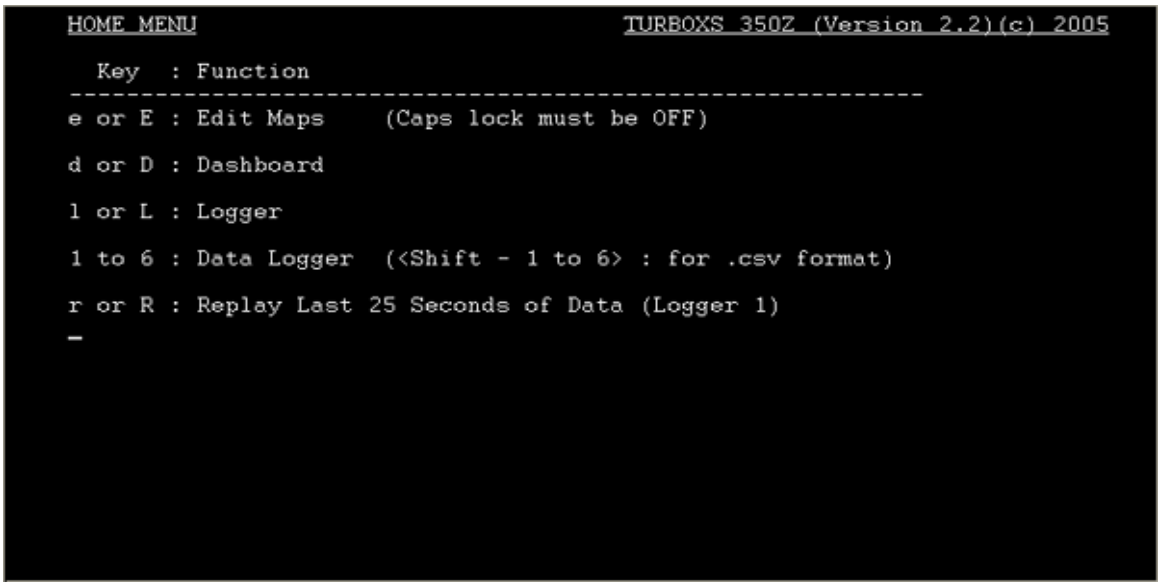
5. Click on “Call” on HyperTerminal™ as shown in the following figure to re-establish contact.



FIRST START UP

1. Connect the serial cable attached to the UTEC to the serial connector on the PC or Laptop taking ESD precautions (discharge to ground first).
2. Turn the UTEC map switch (rotary or remote) to the position of the UTEC map you wish to run.
3. Turn ON the ignition to the car. If you have the UTEC exposed you should be able to see a small red light indicating power is available. It is recommended that you allow a few seconds for the UTEC and ECU to start up and for your fuel system to prime.
4. The following screen should appear on HyperTerminal™.

NOTE: The screen may look slightly different depending on the software version you are running.

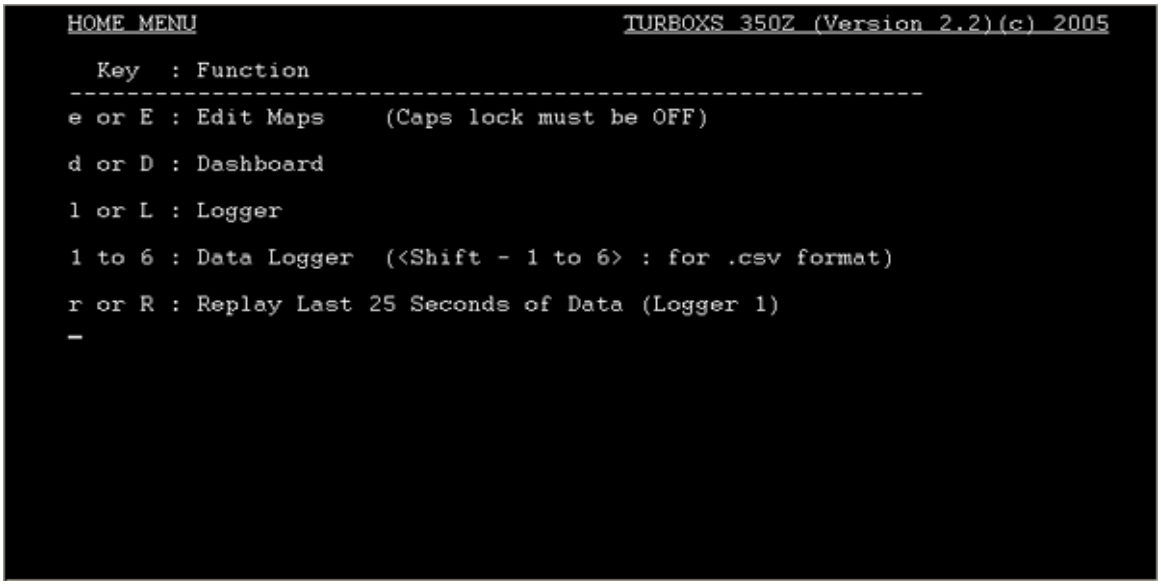


5. Start the car and check that it idles and runs okay. If not, double-check the installation. If the installation appears to be correct and the car still does not start or run properly, **stop and call TurboXS for technical support toll free at 877.887.2679**. If we are closed, remove the UTEC and call us M-F, 9am-5pm EST.
6. MAPs are selected using the rotary switch at the rear of the UTEC or with the remote switch. If you are using the remote switch, you must have the UTEC rotary switch set to position "0."

GENERAL INFORMATION

1. Stock mode is selected with the rotary switch at the rear of the UTEC set to "0". If the remote switch is fitted this should also be set to "0". **You can not run stock mode if you have upgraded your injectors!**
2. Maps 1 through 5 are selected by turning the rotary switch at the rear of the UTEC to "1" to "5". If the remote switch is installed, ensure that the rotary switch at the rear of the UTEC is set to "0" and select the map you want using the remote switch. **Switching between maps will take effect only when the engine is below 1600 rpm.** Use caution when switching maps.

   The UTEC Dashboard will show both the number of the Map and the switch position that is selected once the car is running. If the car is not running the UTEC may revert back to stock mode. Valet mode is selected by turning the switch to Map 6. If your Z is turbocharged and you are using the UTEC for boost control, this mode lowers maximum boost to your wastegate setting, runs limited timing and uses your Map 1 fuel map (note this is why we recommend placing your conservative street map in Map 1). The valet will have no fun hotrodding in your Z!
3. Security mode is selected by turning the switch to Map 7. This only disables the engine once the ECU and UTEC have been powered down. If activated, the security mode will continuously flash the CEL. To exit the security mode select an alternative Map.
4. Switch position 8 = stock mode (repeated)
5. Switch position 9 = Map 1 (repeated)
6. The UTEC HOME MENU is shown in the following figure. From here you can access the Edit Map functions for modifying Maps and Parameters, the Dashboard for real time data viewing, the main Logger screen or the Data Logger screens.



7. The UTEC comes pre-programmed with a base map on Map 1 (switch position 1). Other base maps may be downloaded off our website at www.turboxs.com under the software section.
8. The UTEC monitors the factory knock sensor and can retard UTEC ignition timing when knock is detected. Knock events are logged on the Dashboard as well. If you have a knock event, it will be displayed on the UTEC Dashboard as well as in some of the data loggers. Logger 1 will also display the rpm and map load site where the knock event occurred so that you can edit the correct part of the map to eliminate knock. However, this only applies when the UTEC is controlling the timing. **If the UTEC is in stock mode or if the programmed timing is set to "ECU", the UTEC will not retard timing if knock is detected.**
9. If the engine should stall or has been stopped, it is good practice to turn OFF the ignition and then turn it ON before restarting. This ensures that both the UTEC and the ECU restart in an orderly manner.

EDITING INFORMATION

1. Editing maps may be performed while the ignition key is in the "ON" position with or without the car running. Maps must be saved in order to retain any changes you make. Maps can be saved under the same conditions as editing (ignition key must be in the "ON" position, car running or not). You can only save maps while idling, not while moving. If the car is on when you save a Map, the car will run rough for the brief moment that the changes are being saved. In some cases, the car may even shut off. However, as long as the ignition key remains in the "ON" position, the changes will be saved.
2. Auxiliary power can be supplied to the UTEC via a 9V battery using the supplied 9V battery power cable. This will allow you to access the UTEC using a standalone PC while the UTEC is not installed in the car. You can edit maps, copy maps from your PC to your UTEC, upgrade software, etc. from the comfort of your office chair instead of the driver's seat. We recommend the use of a good quality alkaline battery. The 9V battery should last a few hours so it is only meant as a means to allow you to download and upload programs and maps.
3. Menus can be selected using the keyboard on your PC or laptop in HyperTerminal™. Command prompts are at the bottom of each screen with brief descriptions.
4. The same keys are generally used for moving the cursor around the UTEC screens. The "**wasd**" key cluster or the "**ijkl**" cluster can be used to move the cursor:

ALWAYS ENSURE THAT CAPS LOCK IS OFF!!

"w" or "i" moves cursor up

"a" or "j" moves cursor left

"d" or "l" moves cursor right

"s" or "k" moves cursor down

"TAB" moves cursor down

"ENTER" selects or inserts

"CTRL" and "SHIFT" plus other keys are used for several functions

"CTRL and x" typically exits the Menu

"ESC" typically cancels a selection

"SPACE" starts and stops the data logger

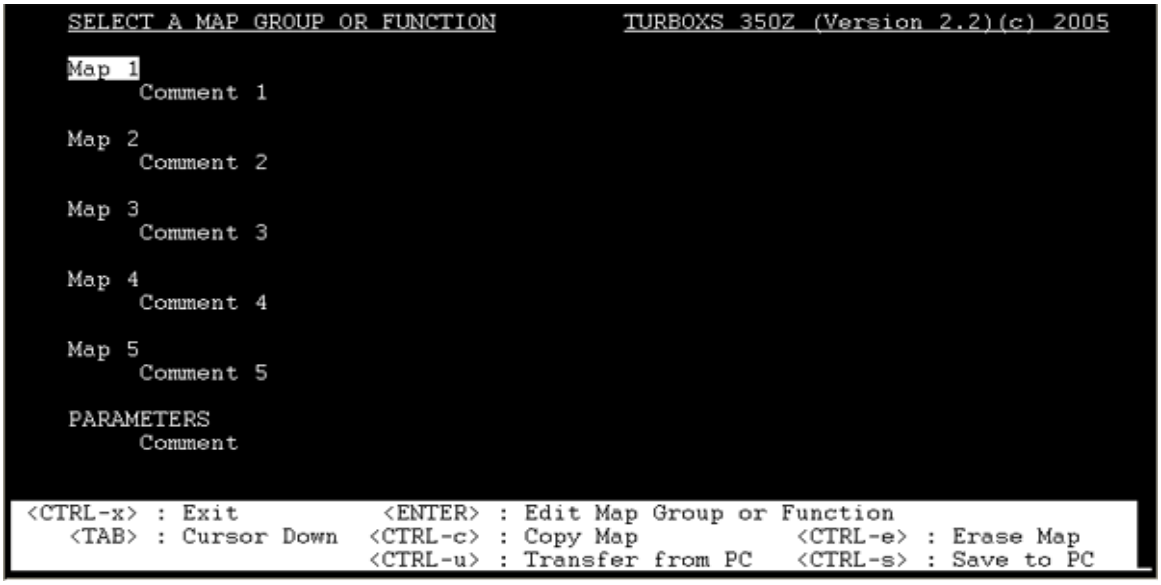
Possible keystroke commands are displayed at the bottom of each screen along with brief explanation prompts for each keystroke.

ALWAYS ENSURE THAT CAPS LOCK IS OFF!!

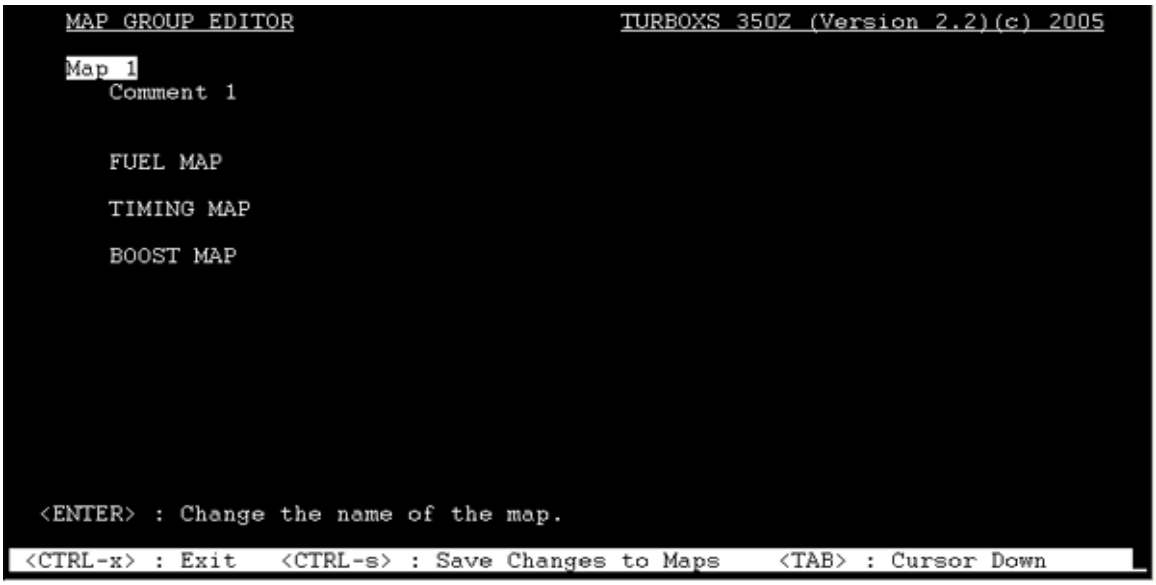
EDIT MAPS AND PARAMETERS

IMPORTANT: THE VALUES IN MAPS DEPENDS ON CERTAIN PARAMETER CONSTANTS. WHENEVER MODIFYING OR LOADING MAPS YOU SHOULD ENSURE THAT THE CORRECT PARAMETERS CONSTANTS ARE USED.

1. From the "HOME MENU", move down to "EDIT MAPS" and hit ENTER to access the "SELECT A MAP GROUP OR FUNCTION" screen shown below. This is where all tuning gets done. You can select from any of the 5 Map groups ("MAP 1" through "MAP 5") to individually edit that group's fuel, timing, and boost tables. Alternatively, you can select "PARAMETERS" and edit the variables and functions that are applied to all Map groups globally. Move the cursor to what you want to edit (Map # or PARAMETERS) and select it with the ENTER key as shown in the following figure.



1. This will bring you to the MAP GROUP EDITOR screen shown in the following figure.



2. From this screen you can select the FUEL MAP, TIMING MAP, or BOOST MAP for editing.
3. In addition to the keystrokes described above, there are some keystroke combinations that can be used in the Fuel, Ignition Timing and Boost maps to speed the tuning process:

"SHIFT <wasd> or <ijkl>" lets you select a large block or RPM/Load points

"CTRL and f" allows you to fill in the same value in the entire block

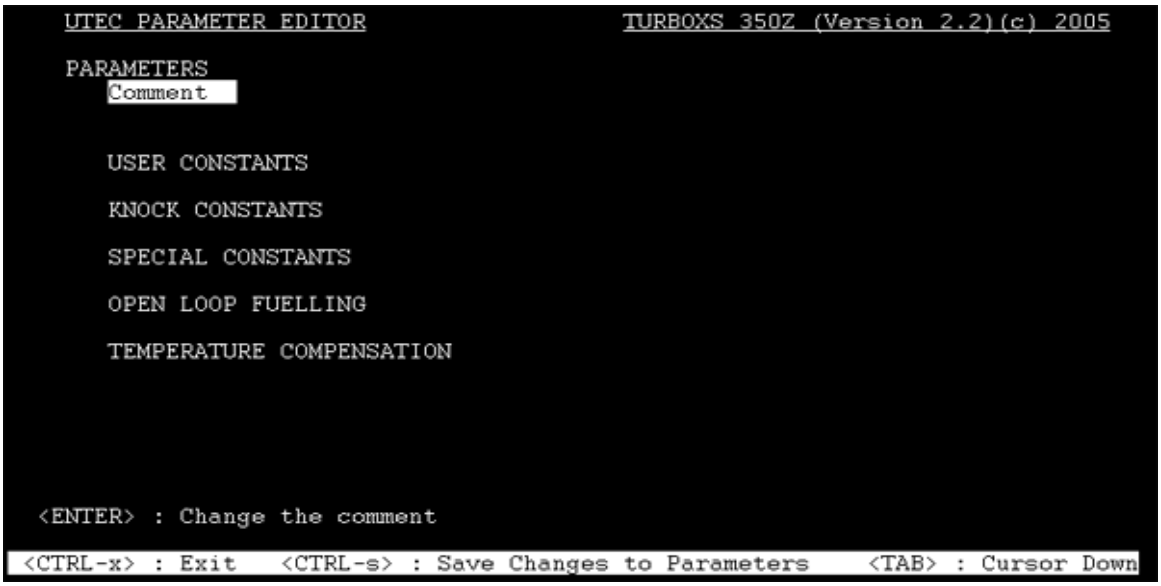
"CTRL and c" lets you copy an entire block into another area of the map

"CTRL and u" lets you add or subtract from an entire block by any value up to 1 decimal place (use this with care!)

PARAMETERS

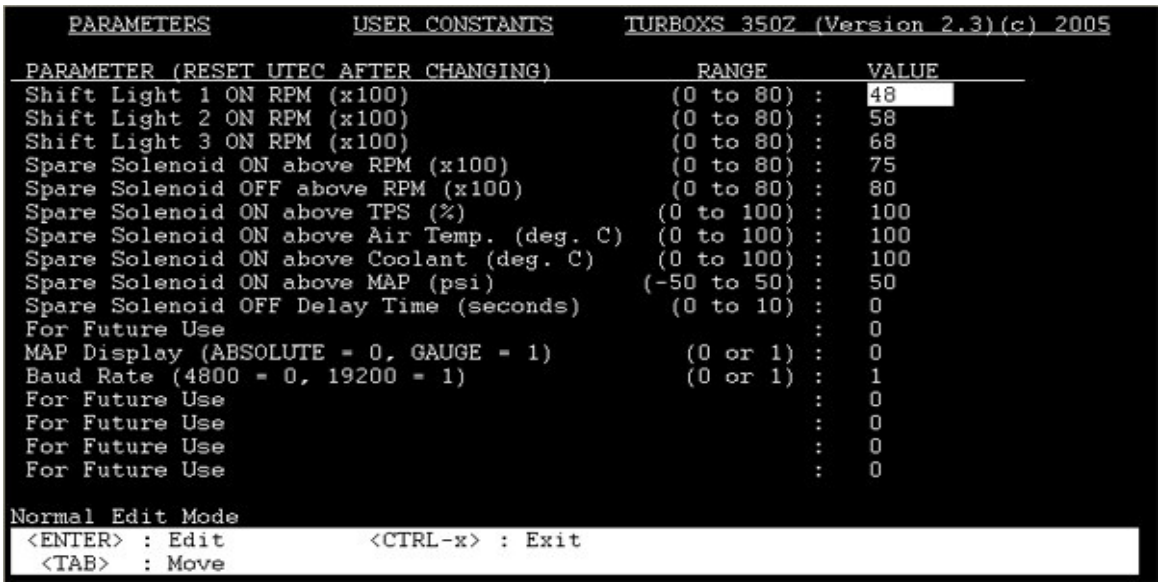
There are three sub-menus for Parameter Tuning:

- User Constants
- Knock Constants
- Special Constants
- Open Loop Fuelling
- Temperature Compensation



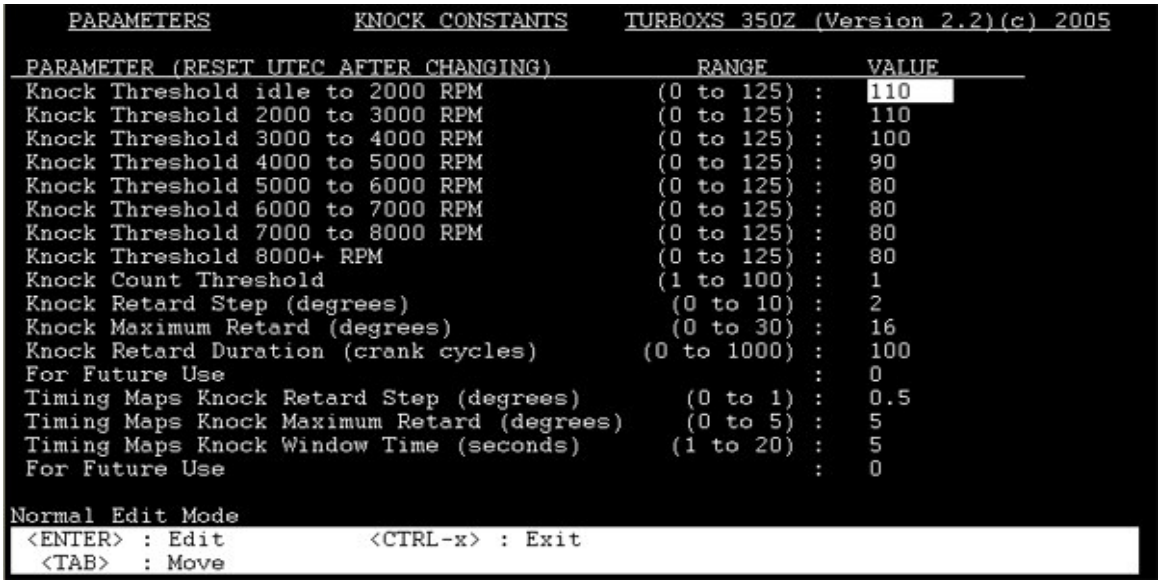
USER CONSTANTS

User constants let you tune some of the basic and auxiliary functions of the UTEC.



1. **Shift Light** lets you set the 3 RPM points at which to turn on the optional three color shift light. Shift point 1 should be less than shift point 2 and shift point 2 should be less than shift point 3. The RPM setting is in x100, e.g. 65 is 6500 rpm.
2. **Spare Solenoid** lets you program the conditions at which you want to switch on the spare solenoid. You can set values for RPM, Throttle Position, Intake Air Temperature, Coolant Temperature, or Manifold Absolute Pressure. The spare solenoid uses "AND" logic. That is, all values must be above the setpoints for the spare solenoid to switch ON. For example, if you want to turn the Spare Solenoid when RPM is greater than 3000 rpm and TPS is greater than 50% then set RPM to 65, TPS % to 50. Set the other parameters to a low value such as Intake Air Temperature to 0, Coolant Temperature to 0 and Manifold Absolute Pressure to –50.
3. **Spare Solenoid Off Delay** lets you set the time that the spare solenoid will remain on after the conditions are no longer met. This may be used to keep the spare solenoid on during a gear change.
4. **MAP Display** allows you to select whether you wish to display the absolute pressure relative to 1 atmosphere or gauge pressure. **NOTE: This ONLY applies to the logger and dashboard MAP readings. Load points are always in absolute pressure.**
5. **Baud rate** lets you set the communication speed of the UTEC. The default is 19200 but some older PC may have serial ports that can only support a 4800 baud rate.

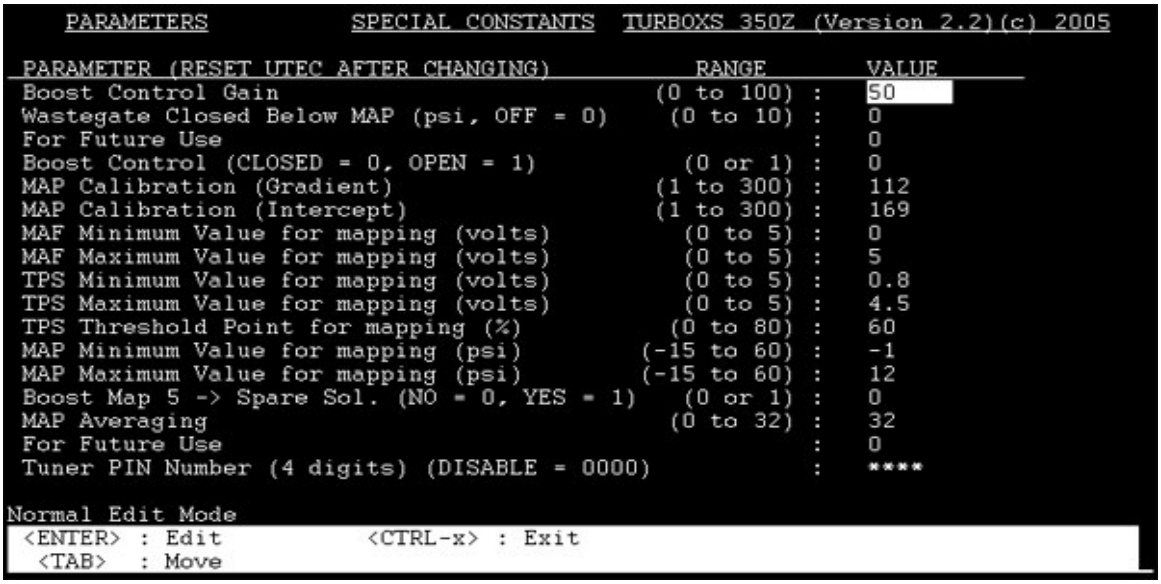
KNOCK CONSTANTS



NOTE: **Use caution when modifying the Knock Constants. Normally there should be no need to change these values. Ensure you understand what and why you are changing these values.**

1. **Knock Thresholds** are set for eight (8) different RPM ranges. Lower numbers reduce sensitivity. Therefore, for a more conservative knock correction setting, increase the threshold value.
2. **Knock Count Threshold** sets the number of Knock Counts required to retard ignition timing. Normally this should be kept a low number to quickly catch any knock.
3. **Knock Retard Step** is the number of degrees the UTEC will retard ignition timing for each crank cycle that the Knock Count is greater than the Knock Count Threshold.
4. **Knock Maximum Retard** is the maximum amount of degrees the UTEC will retard ignition timing.
5. **Knock Retard Duration** is the number of crank cycles the UTEC will retard ignition timing for each knock count.
6. **Timing Maps Knock retard Step** is the amount of timing the UTEC will pull as a global correction to the active timing map when a knock event is recorded
7. **Timing Maps Knock Maximum Retard** is the value that determines the UTEC's authority range for retarding timing from the programmed map.
8. **Timing Map Knock Window Time** determines how long the UTEC will wait before making another global timing adjustment.

SPECIAL CONSTANTS



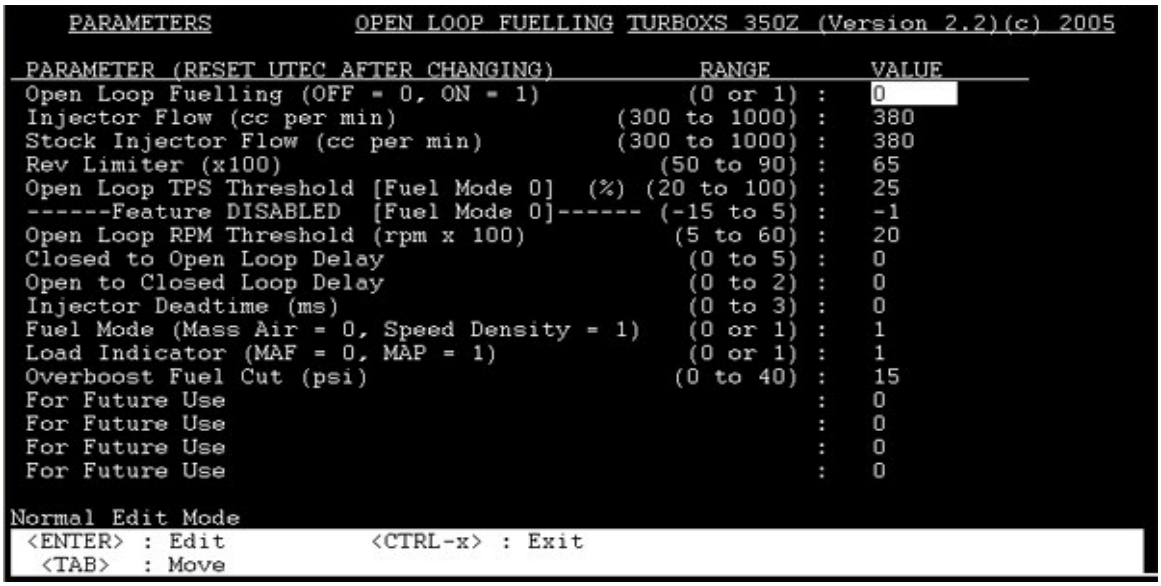
IMPORTANT: Use extreme caution when modifying these parameters as mistakes can result in major engine damage. TurboXS Base Maps are tied to a specific Parameter Map. Be sure to load the correct Parameter Map when you load the Base Map.

1. **Boost Control Gain** is used to adjust the ramp up rate of the boost controller while in Closed Loop Boost control. Lower numbers mean faster spool-up but a higher risk of over-boosting. Higher numbers slow spool-up but reduce risk of over-boosting. Tuning is required to find the best compromise for your particular setup.
2. **Wastegate Closed Below** parameter holds the wastegate solenoid fully open while the MAP is below the user set level and the TPS is greater than 80%. This allows for a faster spool up of the turbo. The level must be set so that it is below the tuned boost level including any intentional reduction in boost at high RPMs. As a starting point it is suggested that this parameter be set at 6 psi less than the minimum boost setting. The use of this parameter may also allow the lowering of the Boost Gain value.
3. **Boost Control (Closed or Open)** is used to select the type of boost control. Closed loop boost control uses totally different values to the open loop boost control and so a new boost map must be used whenever this parameter is changed. Remember, the values in the closed loop boost map are unit-less values that **do not** represent psi, kPa or Bar. Open Loop boost map values represent Boost Control Solenoid percent duty cycle.
4. **MAP Calibration (Gradient) and (Intercept)** are used to calibrate the MAP (**M**anifold **A**bsolute **P**ressure) sensor. These values are provided on a card included with each TurboXS MAP Sensor.

5. **MAF Minimum Value for Mapping** is the lowest MAF value in volts for the MAF referenced load columns in the fuel and timing maps (the 10% column). This parameter is only used when MAF is selected as the Load Indicator in the Open Loop fuelling Parameters menu.
6. **MAF Maximum Value for Mapping** is the highest MAF value in volts for the MAF referenced columns in the fuel and timing maps (the 100% column). This parameter is only used when MAF is selected as the Load Indicator in the Open Loop fuelling Parameters menu.
7. **TPS Minimum Value for Mapping** is used to calibrate the TPS sensor. Modify the value so that the TPS value on the Dashboard reads 0% when the throttle is not being touched.
8. **TPS Maximum Value for Mapping** is used to calibrate the TPS sensor. Modify the value so that the TPS value reads 100% when the throttle is fully depressed. You can do this using the Dashboard with the key in and in the 'ON' position but the car off. Fully depress the throttle and make modify the voltage value until it reads 100% at WOT.
9. **TPS Threshold Point for Mapping** sets the % of Throttle Position at which the UTEC switches over from using the 0% column in the Fuel and Timing Maps to the any of the 10% to 100% MAP based load columns. NOTE: When Open Loop Fuelling is enabled, this parameter has no impact.
10. **MAP Minimum Value for Mapping** is the lowest MAP value in psi for the MAP referenced load columns in the fuel and timing maps (the 10% column). This parameter is only used when MAP is selected as the Load Indicator in the Open Loop fuelling Parameters menu.
11. **MAP Maximum Value for Mapping** is the highest MAP value in psi for the MAP referenced columns in the fuel and timing maps (the 100% column). This parameter is only used when MAP is selected as the Load Indicator in the Open Loop fuelling Parameters menu.
12. **Boost Map 5-> Spare Sol.** This allows the use of Boost Map 5 to control the Spare Solenoid in a duty cycle mode (0 to 100%). The load indicator used for this map is MAP, not TPS. The selection of this option will cause a change in the Edit Map menu.
13. **MAP Averaging** allows your UTEC Datalogger display to increase or lower the amount of average done to the logged Manifold Absolute Pressure. 0 is the minimum amount of averaging and 32 is the maximum.
14. **Tuner PIN Number** is a 4 digit PIN number that can be used to prevent unauthorized users from viewing or modifying maps. Note that the number is displayed as a "****". If the PIN number is set to 0000 (default value) then the PIN number function is disabled. If an incorrect PIN number is entered, the UTEC will display an "Incorrect PIN number"

message for 5 seconds. There is no master PIN in the UTEC software, so if you set this parameter than forget the PIN the only way to edit UTEC maps again is to re-flash the UTEC with the current UTEC software. This will cause a complete loss of your UTEC maps.

Open Loop Fuelling

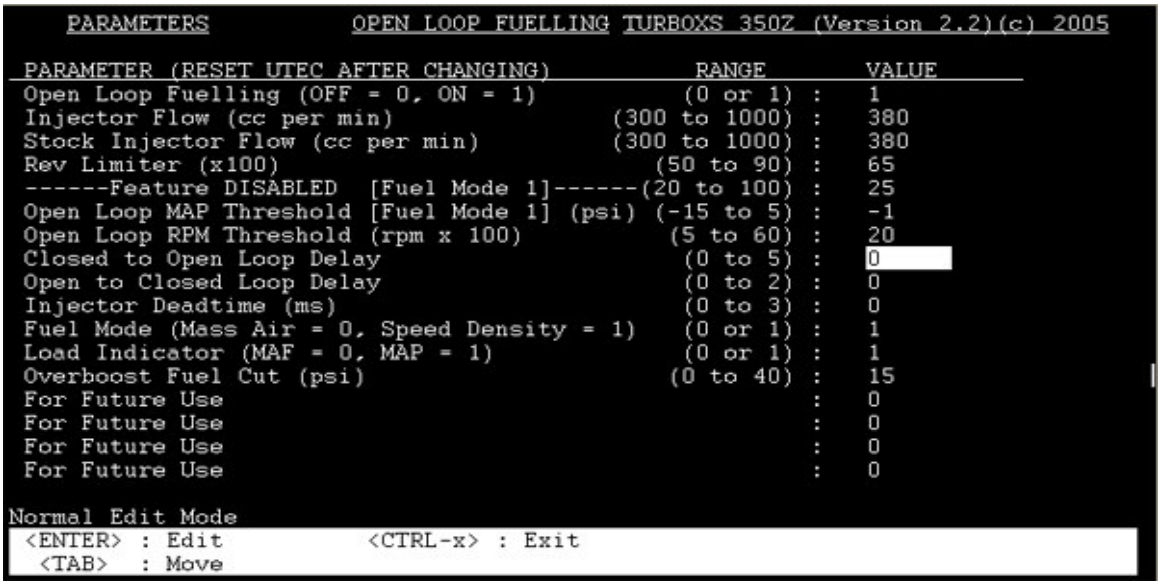


NOTE: You must reset the UTEC (power off and then back on) after making changes to this section in order for the changes to become active!

1. **Open Loop Fuelling** turns UTEC open loop fuel control on or off. When Open Loop Fuelling is enabled, the UTEC uses its own background fuel table to determine injector on-time instead of the factory ECU's fuel table once the car is past the Open Loop Threshold parameter setting. This allows the UTEC to drive the injectors completely independent from the factory ECU. This mode is active when the Open Loop Fuelling value is set to "1". Enabling *OPEN LOOP FUELLING* is recommended for more complex level of modifications such as forced induction and is REQUIRED if would like to use Rev Limiter parameter to increase the rev limit.

   Disabling *OPEN LOOP FUELLING* is recommended for less modified cars. Fuel tuning is done piggyback-style by offsetting the MAF voltage seen by the factory ECU. This mode is active when the Open Loop Fuelling value is set to "0". **NOTE: When Open Loop Fuelling is disabled all other Open Loop Fuelling Parameters will have no effect.**
2. **Injector Flow (cc per min)** allows you to scale the background Open Loop Fuel map if you have installed larger aftermarket injectors in your car. When using Speed Density Fuel Mode, this setting is only applied to your 0% column.
3. **Stock Injector Flow (cc per min)** lets you set the base injector size your stock injector size. When using Speed Density Fuel Mode, this setting is only applied to your 0% column.

4. **Rev Limiter (x100) (USE WITH CAUTION!!!)** allows you to control the RPM at which the primary rev-limiter will activate. This value can be set from 5000rpms to 9000rpms. Use extreme caution when setting the limit to higher then stock levels. You can easily damage your engine if you raise the rev-limit. We highly recommend that you keep the stock setting unless you have the required valve-train and engine components to handle your increased rev limit. There is a soft rev-limit that will kick in 250rpms before your set hard limit.
5. **Open Loop TPS Threshold/Open Loop MAP Threshold** allows you to set the cross-over point where the UTEC will switch from the 0% load column to the 10-100% load columns. When Fuel Mode parameter is set to the Speed Density option, **Open Loop TPS Threshold** is disabled and **Open Loop MAP Threshold** is enabled. The range is -15 to 5 psi. This option allows you to enter Open Loop Fuelling based upon a preset boost pressure instead of throttle position. This is recommended for Forced Induction cars. Example below:



6. **Open Loop RPM Threshold** allows you to enable an RPM threshold point to when Open Loop Fuelling will be activated.
7. **Closed Loop to Open Loop Delay**; when the UTEC transits from closed to open loop it interpolates the AFR from the last closed loop AFR to the target open loop AFR. The time it takes to do this is controlled by this parameter.
8. **Open Loop to Closed Loop Delay**; When the UTEC transits from open to closed loop it can delay the time it takes to switch. This should improve gear shift quality and reduce

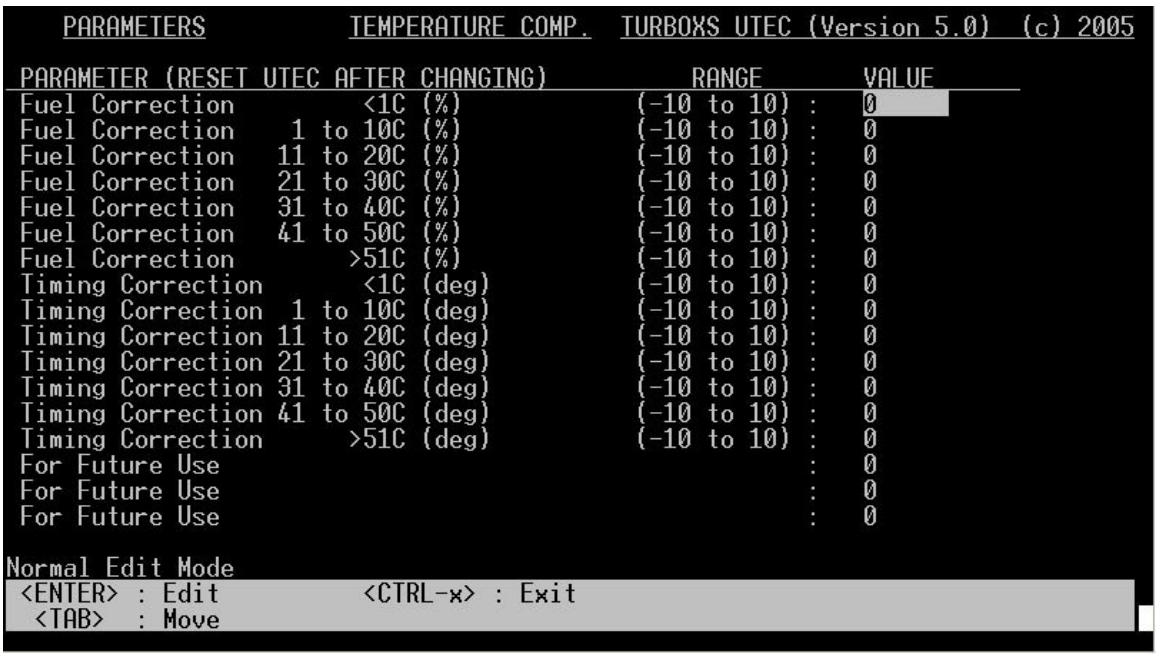
shift knock. The time it takes to do this is controlled by this parameter. On some vehicles this may cause the engine speed to "flare" during gear shift. If this occurs, set this value to 0.

9. **Injector Deadtime (ms)** lets you enter milliseconds compensations for larger injectors to operate correctly at low pulse widths.
10. **Fuel Mode** allows you to switch between *MAF* sensor based fuel tuning or *Speed Density* based fuel tuning.

    MAF fuel mode allows you to tune fuel "piggyback stye" by offsetting the incoming MAF voltage (+/-) to add or take away fuel to change the Air/Fuel Ratio (AFR). This mode works well for naturally aspirated applications.

    SPEED DENSITY fuel mode is highly recommended for all forced induction vehicles. This is because the factory Mass Air Flow sensor (MAF) will be maxed out as early as 4750rpm at 6 psi boost pressure. Once the MAF is maxed out, there is no way to control the fuelling via MAF offset. A TurboXS MAP Sensor is required to use this mode. Fuel is than tuned by entering the desired injector pulse width multiplied by ten into each cell in the UTEC fuel map. For example, if you want a 9.3 millisecond injector on time in a certain cell, you enter 9.3 x 10 or 93 into the fuel map. This allows for very precise fuel control even with large injectors at very low loads.
11. **Load Indicator** this setting allows you to specify your Fuel and Timing Table load reference. We recommend MAF as load for Naturally Aspirated vehicles and MAP as load for Forced Induction cars.
12. **Overboost Fuel Cut** lets you set your desired boost level for the UTEC to cut the injectors as a safety measure against overboost. Requires a TurboXS MAP sensor.

Temperature Compensation



The Temperature Compensation parameters allows you to enter timing and fuel corrections to be applied globally to all maps based on air temperature. You can add or subtract up to 10%.

TUNING the UTEC

The UTEC is highly configurable and can be set up to be tuned in several different ways depending on how you set the Parameters. In general, however, we recommend the following:

Naturally Aspirated 350Zs

Use MAF Mode using MAF PULL UP/DOWN for fuel tuning.

If you wish to use Rev Limit control you will be required to enable the OPEN LOOP FUELLING PARAMETER.

Forced Induction 350Zs

Use SPEED DENSITY Mode for fuel tuning.

This mode will give you complete control of injector pulse width. You need this with a Forced Induction 350Z since the factory MAF sensor is maxed out at around 4750 rpm at about 6 psi of boost. At this point you have no way to control the Air/Fuel ratio using MAF as the load reference. ***The TurboXS MAP Sensor is required to use this mode.***

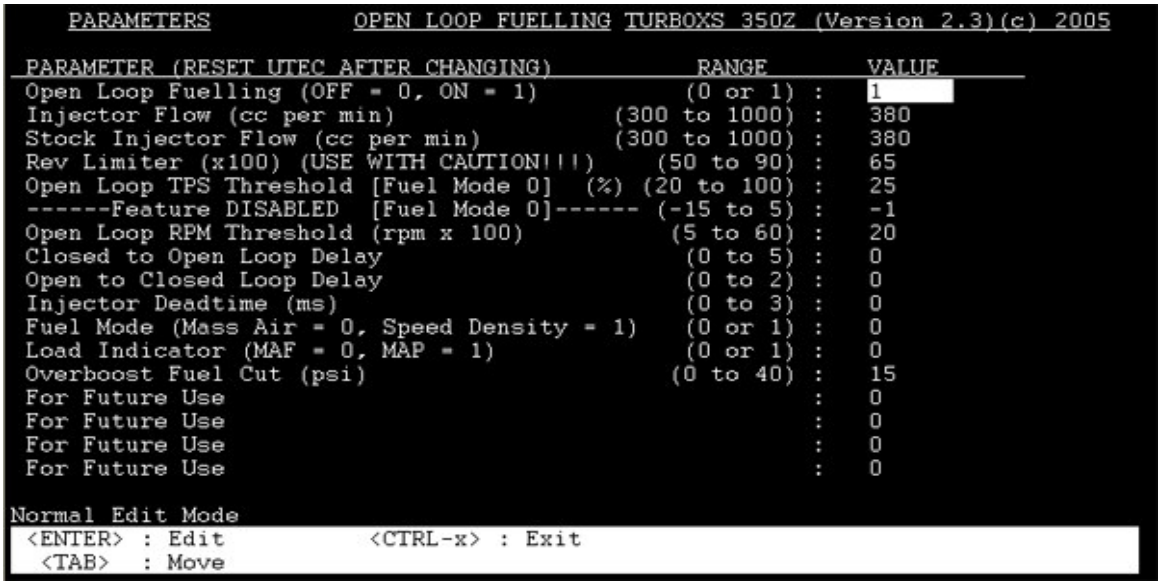
Base Maps and Parameter Files

To make the tuning process easier so you do not have to start tuning "from scratch" TurboXS has created base maps for both MAF mode and Speed Density mode. Go to www.turboxs.com and than go to the Software section. In the 350Z section there will be a Base Map and Parameter file for Naturally Aspirated cars (MAF mode) and Forced Induction cars (Speed Density mode). Download the appropriate files and upload them to your UTEC. The base map will give you starting values for Fuel and Ignition Timing and the base Parameter file will default all your parameters to the TurboXS recommended settings for an NA or Forced Induction 350Z.

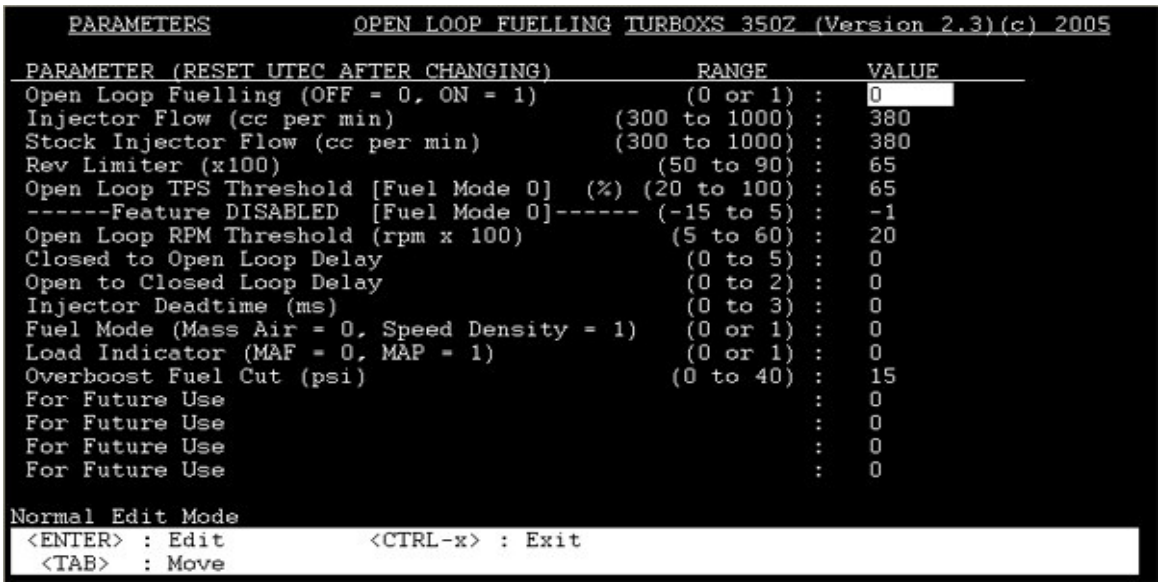
NOTE: Your actual Map values, specifically the fuel table values, may need to be changed significantly from the base map values if you have a highly modified 350Z!

FUEL TUNING - MAF Mode using MAF PULL UP/DOWN

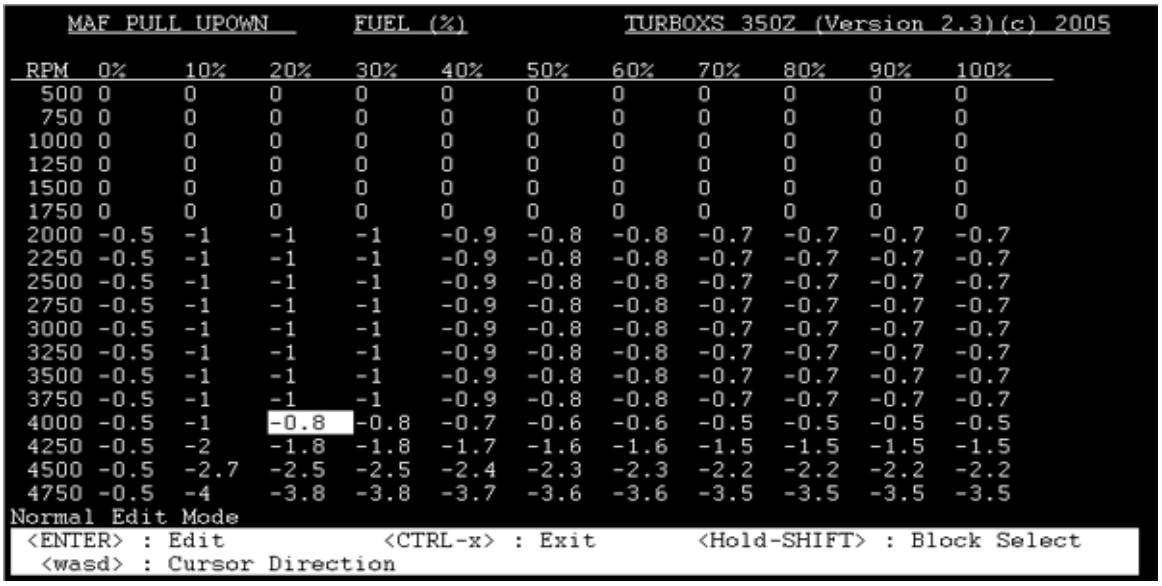
1. If you are planning to raise your rev-limit you will need to enable your Open Loop Fuelling Parameter. We recommend you set the Open Loop TPS Threshold to 65% TPS. Your Open Loop Parameters should look similar to this example.



If you are NOT going to raise your rev limit, you can disable Open Loop Fuelling. When you disable Open Loop Fuelling all of the other parameters in the Open Loop Fuelling parameter menu will have NO EFFECT on the car. Your Open Loop Fuelling parameters should look like this example:



2. Fuel tuning is done via a two-dimensional matrix of RPM vs. Load %. The matrix is made up of 36 RPM rows and 11 Load columns. The values entered in the cells represent a % increase or decrease in MAF voltage. See figure below of a MAF fuel tuning table:

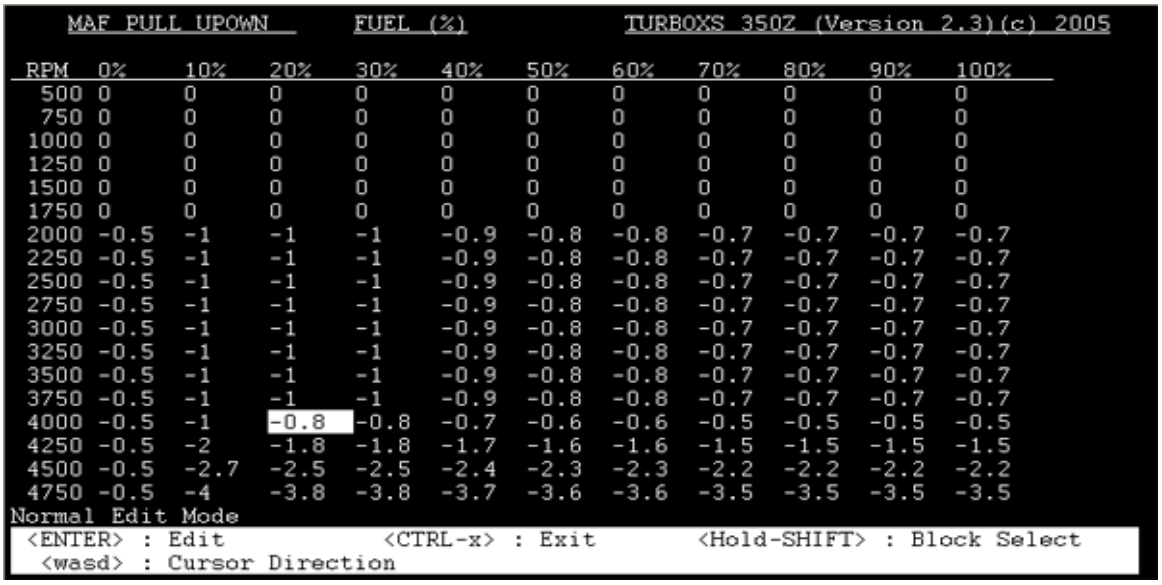


3. Your UTEC will stay in the 0% column whenever your Throttle Position Sensor (TPS) is less than your Open Loop TPS Threshold. Once your TPS value is greater than the Open Loop TPS Threshold parameter value, you will cross over into columns 10% to 100%. Remember that the Open Loop TPS Threshold value is adjustable in the Open Loop Fuelling Parameters if Open Loop Fuelling is enabled. If Open Loop Fuelling is disabled, then you will need to modify the TPS Threshold Point for Mapping found in the Special Constants menu to adjust the crossover point from the 0% column to the 10-100% columns.
4. When using MAF mode fuel tuning, the load reference for columns 10%-100% is MAF voltage. The UTEC default MAF range is from 0 volts to 5 volts. The table below shows the default minimum and maximum MAF voltage value for each load column:

Load Site	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Min MAF	0.0	0.51	1.01	1.51	2.01	2.51	3.01	3.51	4.01	4.51
Max MAF	0.5	1	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0+

5. The values that are typed into each RPM/Load point cell will increase or decrease the Mass Air Flow (MAF) sensor voltage by the percentage inserted into the cell. This will then change the look up point used in the UTEC background fuel map for injector pulse-width calculation. Increasing MAF voltage results in additional fuel being injected. Decreasing the MAF voltage will results in less fuel being injected.

6. For example, let's assume a value of -0.8% is typed into the fuel map at 4000 RPM/20% load column. If TPS is greater then the Open Loop TPS Threshold (defaulted to 65%) and MAF voltage is 0.95 volts as RPM reaches 4000, the UTEC will reduce the voltage that the ECU sees by .8% to 0.94 volts. This will result in less fuel being injected, thus a leaner Air/Fuel Ratio (AFR). In the last example, if TPS was less then 65%, the UTEC will use the value in the 4000RPM/0% column to modify the MAF signal since TPS was below the programmed Open Loop TPS Threshold (defaulted to 65%). This value is typically 0 unless larger then stock injectors are installed. A MAF Pull Up/Down Fuel Map should look similar to this sample fuel map:



MAF PULL UPOWN FUEL (%) TURBOXS 350Z (Version 2.3)(c) 2005

RPM	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
500	0	0	0	0	0	0	0	0	0	0	0
750	0	0	0	0	0	0	0	0	0	0	0
1000	0	0	0	0	0	0	0	0	0	0	0
1250	0	0	0	0	0	0	0	0	0	0	0
1500	0	0	0	0	0	0	0	0	0	0	0
1750	0	0	0	0	0	0	0	0	0	0	0
2000	-0.5	-1	-1	-1	-0.9	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
2250	-0.5	-1	-1	-1	-0.9	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
2500	-0.5	-1	-1	-1	-0.9	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
2750	-0.5	-1	-1	-1	-0.9	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
3000	-0.5	-1	-1	-1	-0.9	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
3250	-0.5	-1	-1	-1	-0.9	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
3500	-0.5	-1	-1	-1	-0.9	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
3750	-0.5	-1	-1	-1	-0.9	-0.8	-0.8	-0.7	-0.7	-0.7	-0.7
4000	-0.5	-1	-0.8	-0.8	-0.7	-0.6	-0.6	-0.5	-0.5	-0.5	-0.5
4250	-0.5	-2	-1.8	-1.8	-1.7	-1.6	-1.6	-1.5	-1.5	-1.5	-1.5
4500	-0.5	-2.7	-2.5	-2.5	-2.4	-2.3	-2.3	-2.2	-2.2	-2.2	-2.2
4750	-0.5	-4	-3.8	-3.8	-3.7	-3.6	-3.6	-3.5	-3.5	-3.5	-3.5

Normal Edit Mode

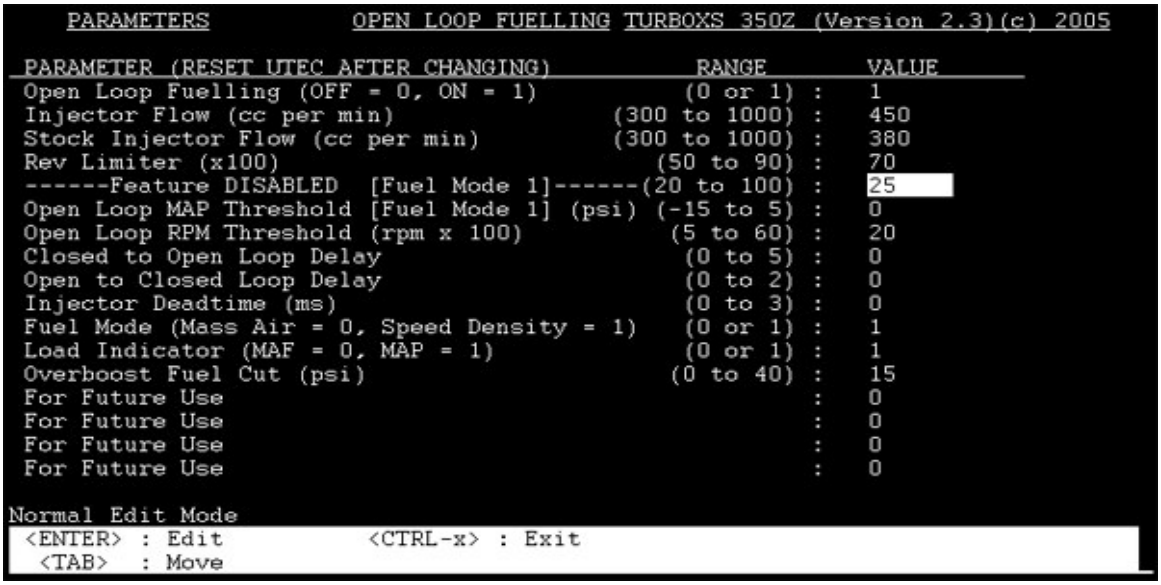
<ENTER> : Edit <CTRL-x> : Exit <Hold-SHIFT> : Block Select
<wasd> : Cursor Direction

FUEL TUNING – Speed Density Mode using Injector Pulse Width

The method is recommended for all cars with forced induction systems installed.

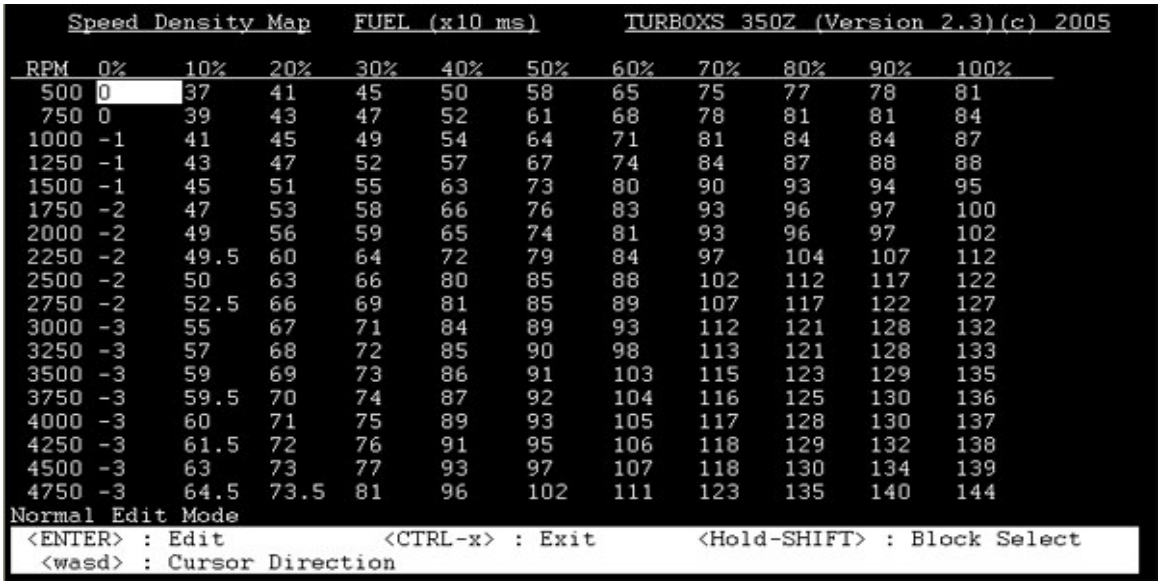
1. To tune the 350Z using Speed Density Mode, go to the Open Loop Fuelling Parameters and:
    a. Enable Open Loop Fuelling
    b. Set injector flow to match the size injectors you have installed
    c. Set your Rev Limit
    d. Set your Open Loop MAP Threshold
    e. Set Fuel Mode to Speed Density
    f. Set Load Indicator to MAP. This fuel mode requires that you purchase and install the optional TurboXS MAP sensor.
    g. Set overboost fuel cut limit

    Your Open Loop Fuelling Parameters should look similar to the example below:



    NOTE: This parameter above were set for a 350Z with a turbo kit installed. It had 450cc Injectors and a built bottom end. These setting are NOT recommended settings for all 350Zs.

2. Fuel Tuning in Speed Density Mode is done by a two dimensional table of RPM vs. Load. The matrix is made up of 36 RPM rows and 11 Load columns. With the exception of the 0% column, the values entered in the fuel map represent actual injector pulse width in milliseconds x 10. For example, a value of 49.5 in the fuel map represents 4.95 ms of injector pulse width. Below is an example of a Speed Density fuel tuning table:



Speed Density Map FUEL (x10 ms) TURBOXS 350Z (Version 2.3)(c) 2005

RPM	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
500	0	37	41	45	50	58	65	75	77	78	81
750	0	39	43	47	52	61	68	78	81	81	84
1000	-1	41	45	49	54	64	71	81	84	84	87
1250	-1	43	47	52	57	67	74	84	87	88	88
1500	-1	45	51	55	63	73	80	90	93	94	95
1750	-2	47	53	58	66	76	83	93	96	97	100
2000	-2	49	56	59	65	74	81	93	96	97	102
2250	-2	49.5	60	64	72	79	84	97	104	107	112
2500	-2	50	63	66	80	85	88	102	112	117	122
2750	-2	52.5	66	69	81	85	89	107	117	122	127
3000	-3	55	67	71	84	89	93	112	121	128	132
3250	-3	57	68	72	85	90	98	113	121	128	133
3500	-3	59	69	73	86	91	103	115	123	129	135
3750	-3	59.5	70	74	87	92	104	116	125	130	136
4000	-3	60	71	75	89	93	105	117	128	130	137
4250	-3	61.5	72	76	91	95	106	118	129	132	138
4500	-3	63	73	77	93	97	107	118	130	134	139
4750	-3	64.5	73.5	81	96	102	111	123	135	140	144

Normal Edit Mode

<ENTER> : Edit <CTRL-x> : Exit <Hold-SHIFT> : Block Select

<wasd> : Cursor Direction

3. The 0% column is tuned differently than the 10-100% columns in Speed Density Mode. The 0% column is used for tuning fuel whenever the car is below the Open Loop MAP Threshold parameter value. Fuel tuning in this column is done "piggyback style" using injector scaling and MAF voltage offset. Tuning of the 0% column is done mainly by using the Injector Flow parameter value in the Open Loop Fuelling parameters menu. If you have larger than stock injectors installed, you should set the Injector Flow value to your new injector flow rate in cc/min in order to avoid having to make large MAF corrections in the 0% column. Even if you scale the injectors using the Injector Flow parameter value in the Open Loop Fuelling parameters menu, however, you will likely need to do some fine tuning in the 0% column to improve low load driveability. Putting positive numbers in the 0% column increases MAF voltage and thus increases fuelling. Putting negative numbers in the column decreases MAF voltage and thus decreases fuelling. This method allows you to let the stock ECU handle fuelling under low load situations while still giving you complete injector control once you pass the Open Loop MAP Threshold parameter value into columns 10-100%. In the example above, the Open Loop MAP Threshold parameter value is set to 0 psi so the UTEC will stay in the 0% column until MAP pressure reaches 0psi at which time it will switch over to columns 10-100%. However, you can set the parameters in such a way that you will control injector pulse width from engine start up to peak boost/rpm like standalone ECU. In this case, the UTEC would never be in the 0% column.
4. In columns 10%-100% in the Speed Density fuel map you enter actual injector pulse width multiplied by 10 to achieve the air fuel ratio you desire for that load site. For example, if you need a pulse width of 8.90ms at 4000 RPM and load site 40% to reach

your AFR target, you would enter 89.0 into the 4000 RPM row, 40% load column cell. To achieve a richer air fuel ratio you would enter a larger pulse width. To achieve a leaner air fuel ratio you would enter a smaller pulse width. In the example above you might enter a value of 95.0 instead of 89.0 to add 0.6 ms pulse width in that load site in order to richen the air fuel ratio. If you wanted to lean the car out at that load side, you might enter a value off 85.0 to subtract 0.4 ms pulsewidth. Below is an example of a Speed Density fuel map:

Speed Density Map FUEL (x10 ms) TURBOXS 350Z (Version 2.3)(c) 2005

RPM	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
500	0	37	41	45	50	58	65	75	77	78	81
750	0	39	43	47	52	61	68	78	81	81	84
1000	-1	41	45	49	54	64	71	81	84	84	87
1250	-1	43	47	52	57	67	74	84	87	88	88
1500	-1	45	51	55	63	73	80	90	93	94	95
1750	-2	47	53	58	66	76	83	93	96	97	100
2000	-2	49	56	59	65	74	81	93	96	97	102
2250	-2	49.5	60	64	72	79	84	97	104	107	112
2500	-2	50	63	66	80	85	88	102	112	117	122
2750	-2	52.5	66	69	81	85	89	107	117	122	127
3000	-3	55	67	71	84	89	93	112	121	128	132
3250	-3	57	68	72	85	90	98	113	121	128	133
3500	-3	59	69	73	86	91	103	115	123	129	135
3750	-3	59.5	70	74	87	92	104	116	125	130	136
4000	-3	60	71	75	89	93	105	117	128	130	137
4250	-3	61.5	72	76	91	95	106	118	129	132	138
4500	-3	63	73	77	93	97	107	118	130	134	139
4750	-3	64.5	73.5	81	96	102	111	123	135	140	144

Normal Edit Mode

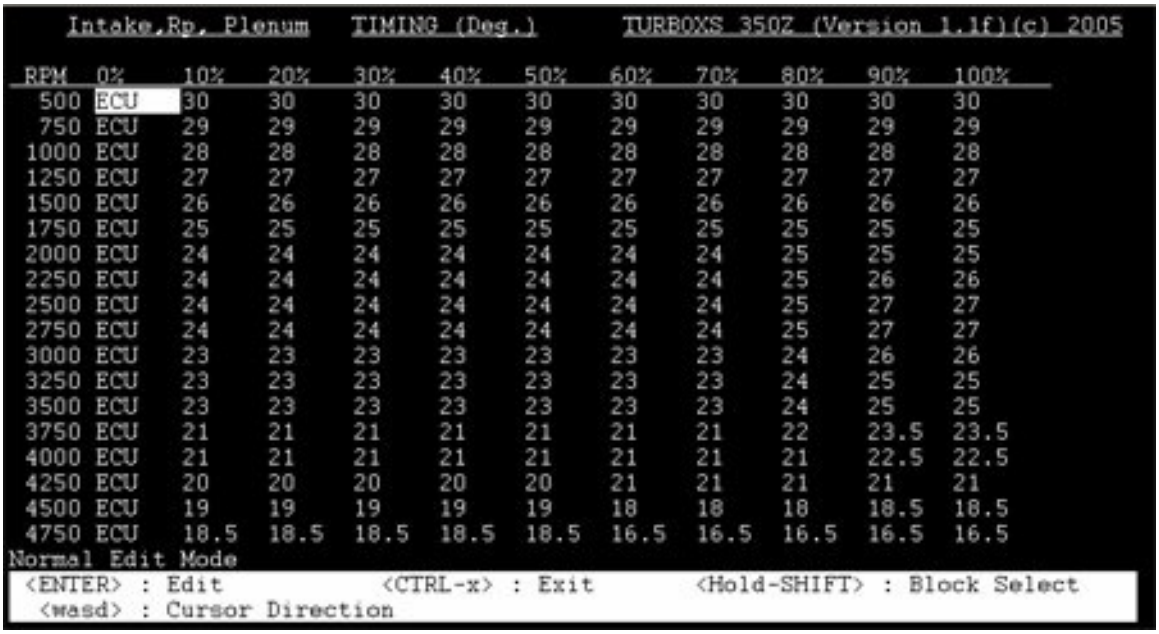
<ENTER> : Edit <CTRL-x> : Exit <Hold-SHIFT> : Block Select
<wasd> : Cursor Direction

The 0% column contains MAF offset values and the 10-100% columns contain actual injector pulse width in milliseconds x 10.

5. As your engine RPM changes your engines volumetric efficiency (VE) changes. Some load site will take larger or smaller pulse width's to affect your air fuel ratio.
6. In UTEC Data Logger 1 you have access to multiple bits of information that will allow you to tune your car properly such as; RPM, MAP PSI, MAF (v), TPS, Load Site, Knock Count, Injector #1 mS, Ignition #1 Degree, Ignition #1 duty, Mod Ignition Degree, Mod Fuel%, Mod Maf V. When you use one of our Tuner Wide Band Air Fuel Ratio meters you will also get AFR in Data Logger 1. This data gives you the information you need to properly tune your vehicle.
7. When using Speed Density Mode you must enter fuelling temperature compensations in the Temperature Compensation parameter menu in order to account for the change in air density as temperature changes. TurboXS provides an Excel spreadsheet to calculate the approximate compensations needed. However, you will need to go to the UTEC Dashboard and note the Intake Air Temperature while you are tuning your fuel to use the spreadsheet correctly.

IGNITION TUNING

1. Tuning ignition timing is very similar to tuning fuel. The timing map is a two-dimensional matrix of RPM vs. Load %. The matrix is made up of 36 RPM rows and 11 Load columns. The values entered in the cells represent actual ignition timing in degrees before top dead center (BTDC). You can also enter a value of 'E' and the UTEC will run the factory ECU timing value at that load site. Below is a sample Ignition Timing tuning table for a 350Z:



Intake.Rp. Plenum TIMING (Deg.) TURBOXS 350Z (Version 1.1f)(c) 2005

RPM	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
500	ECU	30	30	30	30	30	30	30	30	30	30
750	ECU	29	29	29	29	29	29	29	29	29	29
1000	ECU	28	28	28	28	28	28	28	28	28	28
1250	ECU	27	27	27	27	27	27	27	27	27	27
1500	ECU	26	26	26	26	26	26	26	26	26	26
1750	ECU	25	25	25	25	25	25	25	25	25	25
2000	ECU	24	24	24	24	24	24	24	25	25	25
2250	ECU	24	24	24	24	24	24	24	25	26	26
2500	ECU	24	24	24	24	24	24	24	25	27	27
2750	ECU	24	24	24	24	24	24	24	25	27	27
3000	ECU	23	23	23	23	23	23	23	24	26	26
3250	ECU	23	23	23	23	23	23	23	24	25	25
3500	ECU	23	23	23	23	23	23	23	24	25	25
3750	ECU	21	21	21	21	21	21	21	22	23.5	23.5
4000	ECU	21	21	21	21	21	21	21	21	22.5	22.5
4250	ECU	20	20	20	20	20	21	21	21	21	21
4500	ECU	19	19	19	19	19	18	18	18	18.5	18.5
4750	ECU	18.5	18.5	18.5	18.5	18.5	16.5	16.5	16.5	16.5	16.5

Normal Edit Mode

<ENTER> : Edit <CTRL-x> : Exit <Hold-SHIFT> : Block Select
<wasd> : Cursor Direction

2. Just like with fuel tuning, your UTEC will stay in the 0% column whenever your Open Loop Threshold parameter is less than the programmed Open Loop Threshold value. Once the selected threshold value is greater than the Open Loop Threshold parameter value, you will cross over into columns 10% to 100%.
3. For columns 10% to 100% the load reference is either MAF voltage if you are tuning by MAF Pull Up/Down or MAP Pressure (via the optional MAP sensor) if you are tuning by Speed Density.
4. Below is a table that shows the range of each load column if you use the default Parameter files:

MAF Table (Naturally Aspirated cars)

Load Site	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Min MAF	0.0	0.51	1.01	1.51	2.01	2.51	3.01	3.51	4.01	4.51
Max MAF	0.5	1	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0+

MAP Table (Forced Induction cars)

Load Site	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Min psi	0.0	1.01	2.01	3.01	4.01	5.01	6.01	7.01	8.01	9.01
Max psi	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0+

5. The values that are entered into each RPM/Load point in the timing map are actual ignition timing in degrees "Before Top Dead Center" (BTDC). The UTEC will fire the ignition coils based on those values. If an "e" is programmed into an RPM/Load point, the map will show "ECU" in that load point and the UTEC will fire the coils at the same number of degrees BTDC that the stock ECU would. For example, let's assume a value of "20" is programmed into the map at the 5250 RPM/20% load column. If the Open Loop Threshold parameter is greater than the programmed Open Loop Threshold value the UTEC will fire the coils at 20 degrees BTDC when at that load point. If the Open Loop Threshold parameter was LESS than the programmed Open Loop Threshold value, the UTEC will use the value in the 4250 RPM/0% load column for ignition timing. Typically "ECU" will be programmed at that point.

BOOST TUNING

Boost Tuning on the 350Z UTEC requires first that you have a turbo kit installed on your car. Second, you must have a Boost Control Solenoid (BCS) wired into the UTEC.

1. Boost control tuning is done via a two-dimensional matrix of RPM vs. TPS %.
2. The UTEC can operate either in open loop or closed loop boost control.
3. If you are in open loop boost control (the default mode), the values typed into each map point range from 0-100 and represent the Boost Control Solenoid (BCS) duty cycle. For example, let's assume a value of "60" is programmed into the boost map at the 5000 RPM/100% column. If throttle position is 100%, the UTEC will cycle the BCS at 60% duty cycle.
4. If you are in closed loop boost control, the values typed into each map point range from 0-500 and represent a target boost level. The boost gain also can be modified. This can be found in the Special Constants part of the Edit Maps/Parameters menu. **NOTE: The values entered are unitless values and are NOT in psi, kPa or Bar. The larger the number, the higher the boost level.** Tuning is required to dial in your desired boost level for your particular setup. We recommend that you start your closed loop tuning at a low value such as 50 and work your way up in increments of 25.

COPYING MAPS

You can copy maps from one Map Group to another as follows:

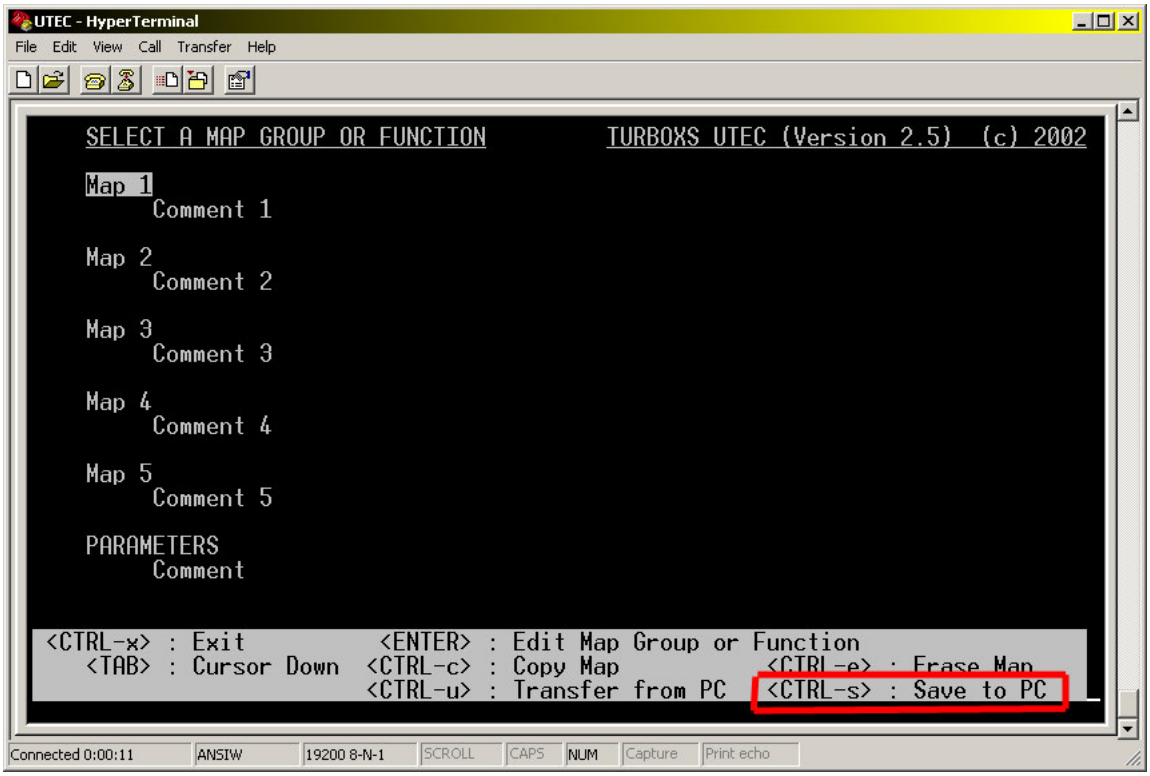
1. From SELECT MAP GROUP screen move cursor to the Map you wish to copy.
2. "CTRL and c" copies Map into memory.
3. Move cursor to the Map group you wish to copy to.
4. "ENTER" copies the Map. "ESC" cancels.

SAVING MAPS FROM THE UTEC TO YOUR PC

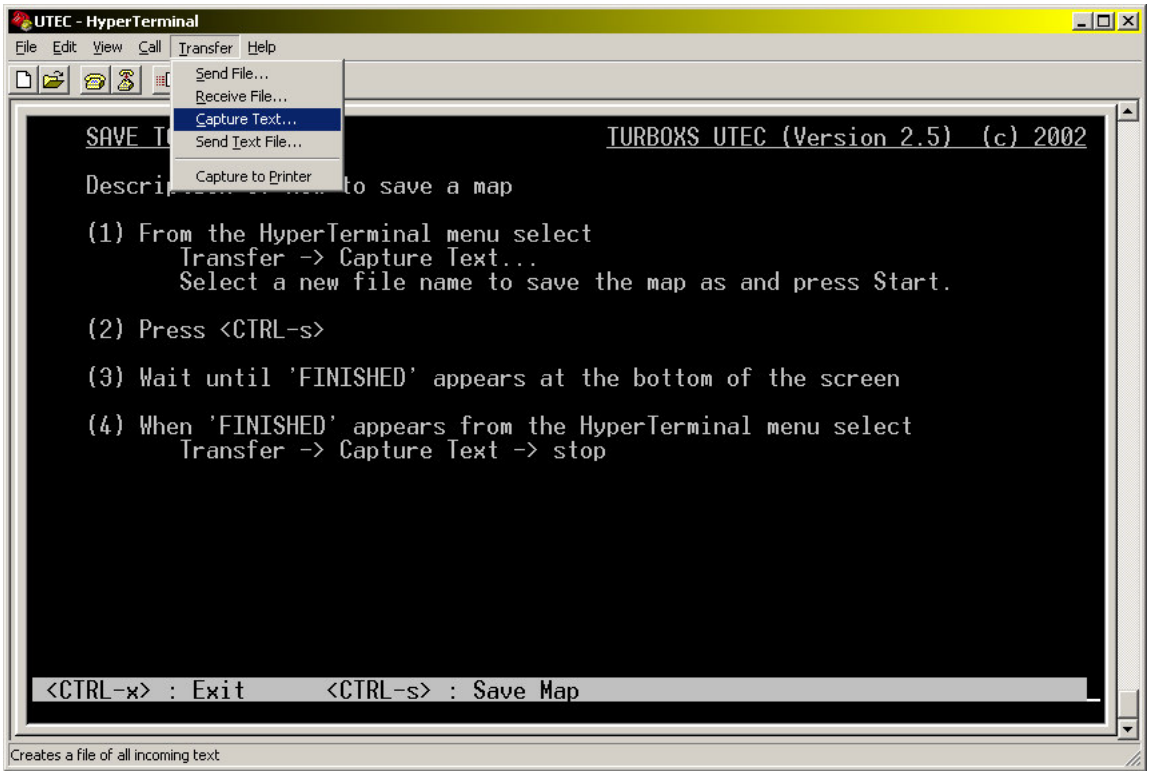
You can save Maps to your PC as follows:

Note: Screenshots are from an earlier version of UTEC software. The save maps procedure has not changed.

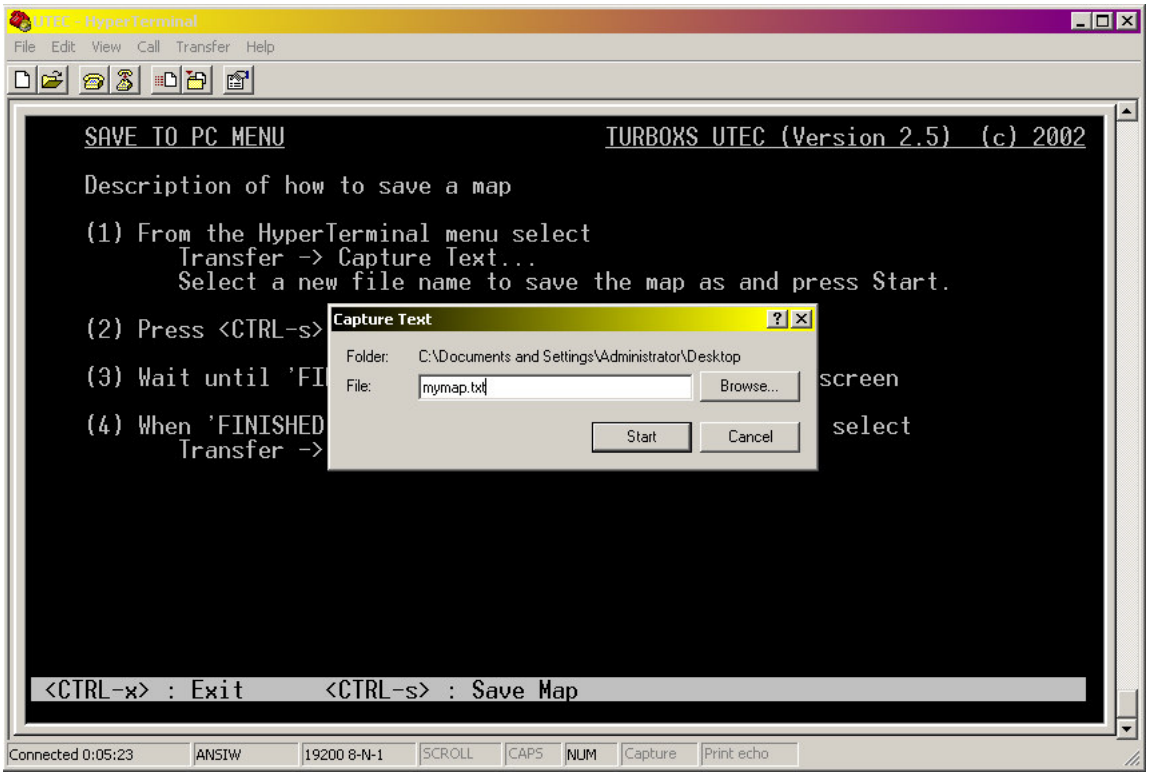
1. From the Select a Map Group screen on the UTEC use the "CTRL-S" command to get to the Save maps screen.



2. Follow the directions displayed on the UTEC screen



3. There is a known HyperTerminal bug (some would say feature) that forces you to save the map to a new file name. If you do not do this, you can get a checksum error when you try to reload these maps onto your UTEC. Therefore, we recommend you rename your map file every time you save it.



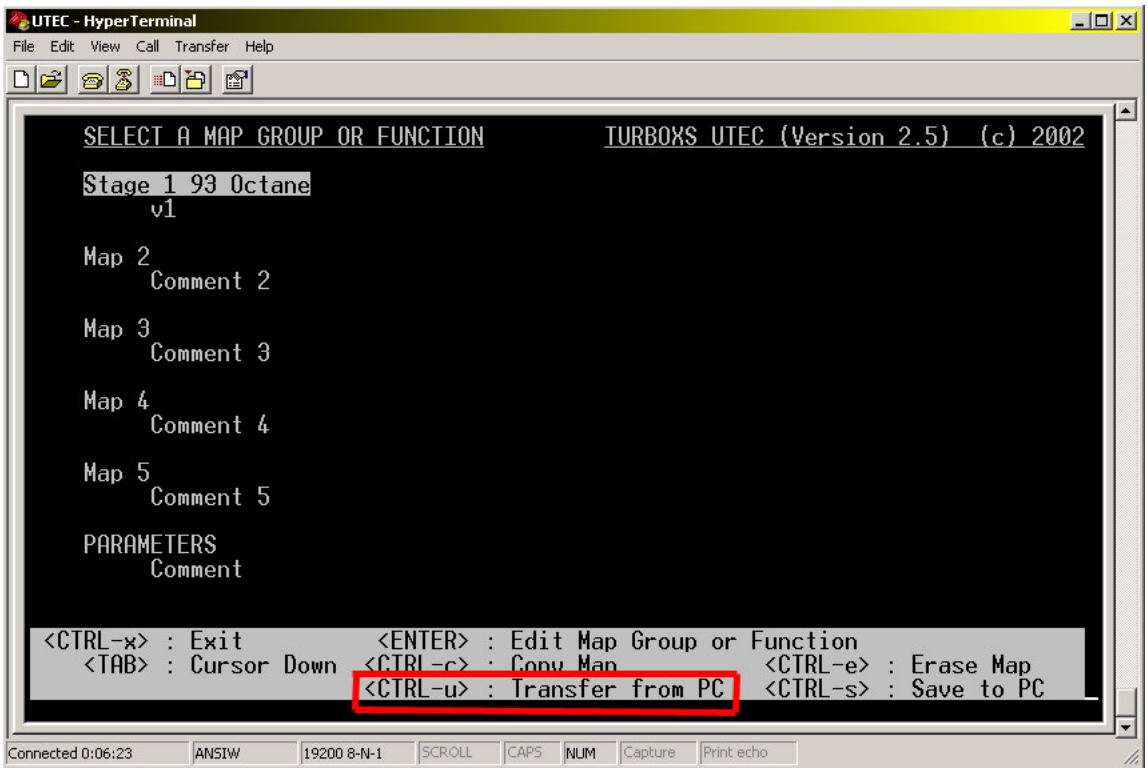
4. When the map % counter is finished select from the HyperTerminal Menu "Transfer\Capture Text\Stop".

UPLOADING MAPS FROM YOUR PC TO THE UTEC

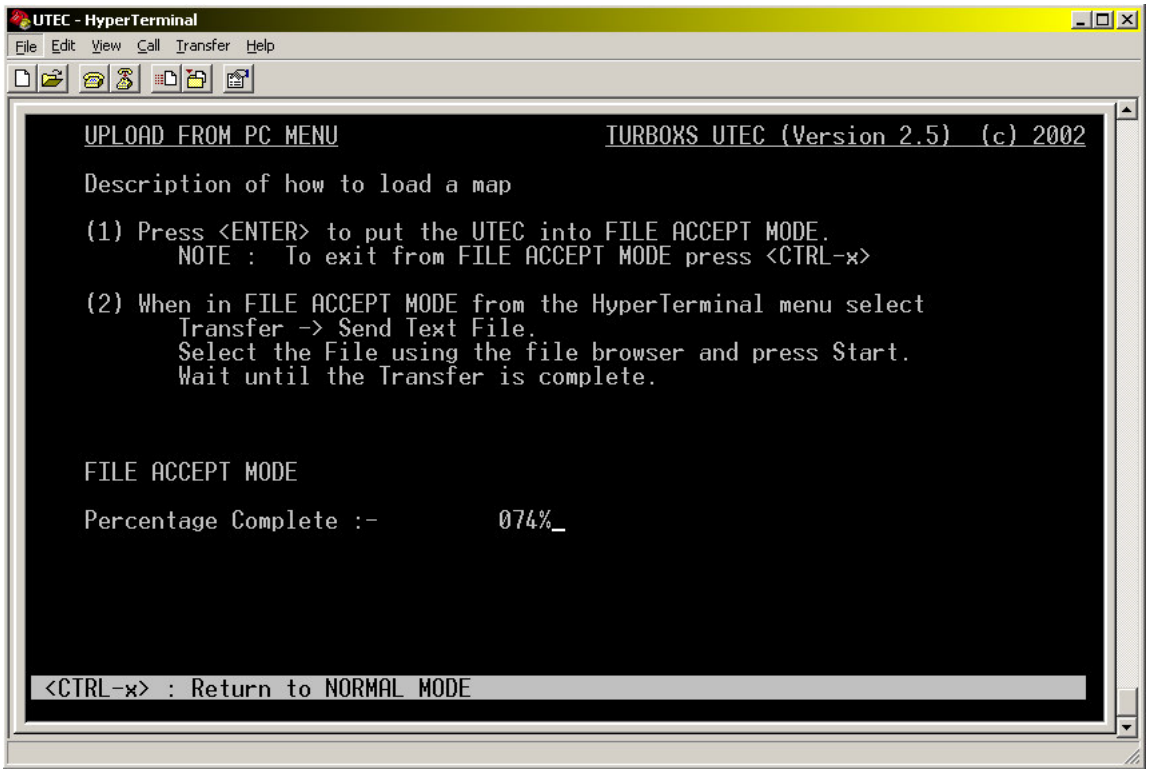
VERY IMPORTANT: A good rule of this is not to upload a parameter file made using a previous version. You should manually re-enter parameter files if you have made any changes to the default values.

1. From the Select a Map Group page of the UTEC, highlight the map location you wish to download your map to and then hit "CTRL-U".

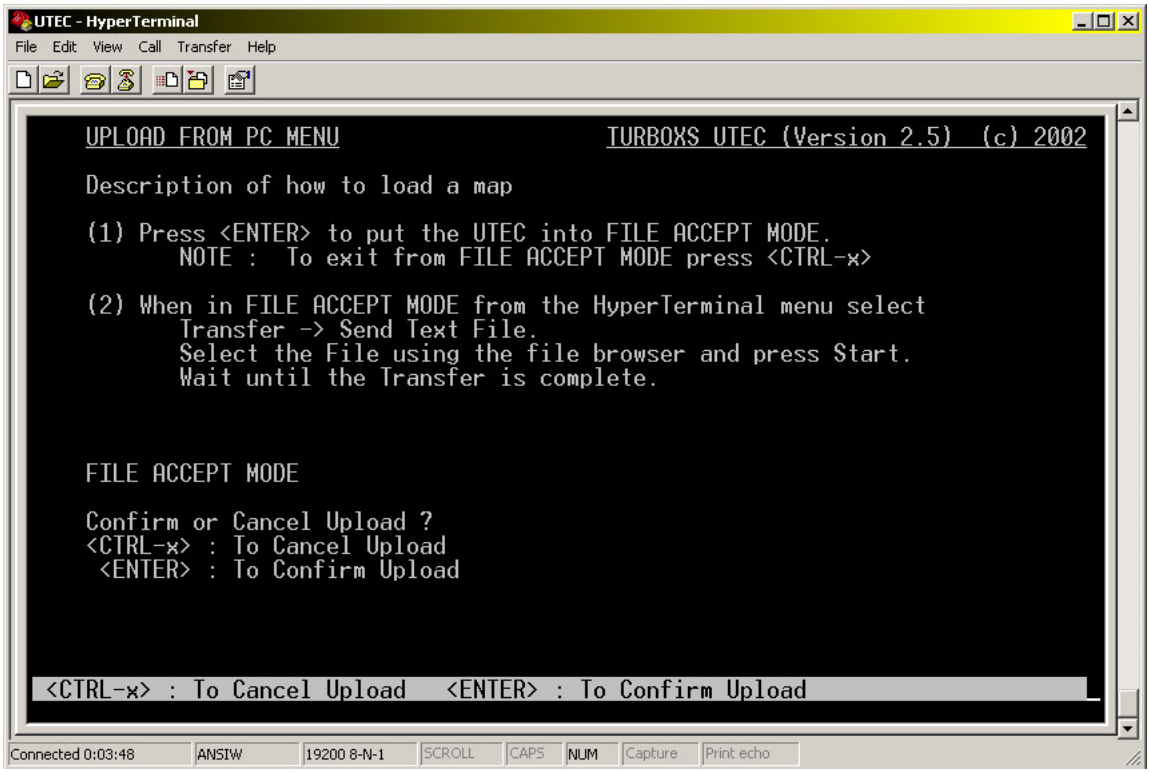
NOTE: The following screens show the 2.5 version of the UTEC software. The process is exactly the same when uploading maps using the newer software. However, your screen may look slightly different from what is shown in this manual.



1. Follow the instructions displayed on the UTEC screen.



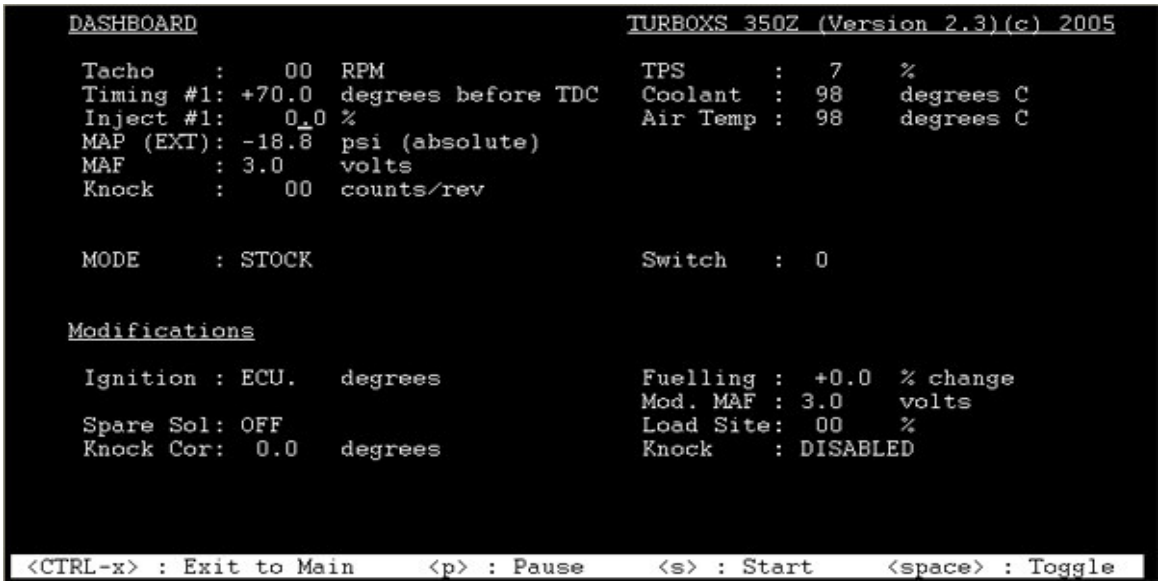
2. Once the file has been uploaded to the UTEC you will be asked to confirm if you want the UTEC to save the file. Press "ENTER" to confirm.



3. Once you have confirmed the upload you, you should see the new program listed on the Select a Map Group screen. Repeat this process to upload other maps from your PC to your UTEC.

NOTE: Be sure that the rotary switch is set to the correct map before driving the car! Your car is now ready to start.

DASHBOARD



The Dashboard is a real time display screen of various UTEC inputs and outputs:

Tacho: RPM

Timing #1: Ignition timing as selected by the factory ECU

Inject #1: Injector duty cycle

MAP: Manifold Absolute Pressure (psi)

MAF: Mass Air Flow sensor voltage (unmodified)

Knock: # of Knock Counts per crank cycle

TPS: Throttle Position Sensor %

Coolant: Engine Coolant voltage

Air Temp: Intake Air Temperature voltage

O2: Front Oxygen Sensor current

AFR: Front O2 Sensor signal converted to Air:Fuel Ratio

CEL/MIL: Displays 'ON' if the ECU turns ons the MIL/CEL

MODE: Displays Map Number

SWITCH: Displays rotary switch setting Number

Modifications:

Ignition:	UTEC programmed ignition timing
Boost:	Programmed boost map value (open loop/closed loop)
Spare Sol:	Spare Solenoid Status (ON or OFF)
Knock Cor:	shows current amount of knock correction
Launch:	Displays ‘ON’ if launch control is enabled.
Fuelling:	UTEC % fuelling Correction
Mod. MAF:	UTEC Modified MAF voltage
Load Site:	UTEC Fuel and Timing Map Referenced Load Column
Knock:	Displays KNOCK if detected
Knock event:	Displays the last knock event recorded

LOGGER

The Logger screen allows you to data log key tuning parameters:

RPM

TPS

MAP (psi)

MLP (MAP Load Point)

MOD IGN (UTEC Ignition Timing)

AFR (Air:Fuel Ratio)

Knock Count

To start Logging, simply follow the directions on the screen (or commit the following steps to memory!):

1. From the HyperTerminal™ Menu, select "Transfer\Capture Text" and Type in <filename.txt> to select the datalog filename. Note that the file must be saved directly in the HyperTerminal™ directory. If you do not want to lose old data logs, be sure to give each log file a unique name.
2. To stop Logging, select "Transfer\Capture Text\Stop". The datalog is now saved in the HyperTerminal™ folder as <filename.txt>.
3. You can use any Text Editor like Wordpad™ or Notepad™ to view logs. Or use a program like Excel™ to review and graph the data for analysis.
4. Pressing <P> Pauses the logging and <S> Starts logging again. Alternatively, the space bar will toggle the logger on and off. You can use these features to avoid logging all your time idling, waiting at stoplights, etc.

DATA LOGGER

Data Logger provides six (6) alternate sets of data, each slightly different from the Logger data. To access each set, simply type in the set number you want to log (1-6). Use the same procedure to capture the data into a text file and the same keystrokes to Start and Pause the logging. Using the <Shift – 1 to 6> keys will cause the UTEC to output a comma delimited log. If these are saved to a file with a .csv extension they can be opened directly by Excel™.

UPGRADING THE UTEC SOFTWARE VERSION

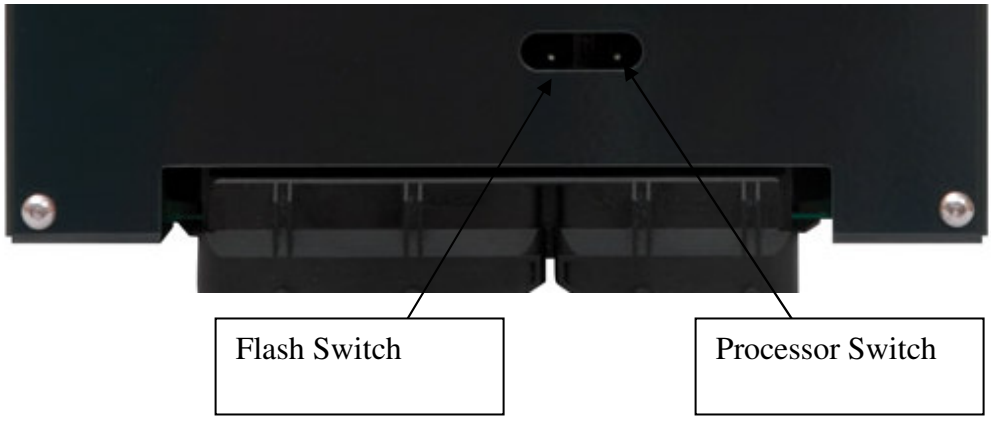
Your current software version is displayed at the top right hand portion of the UTEC Home Menu. Periodically, we will release new software versions for the UTEC. These upgrades could be to add new features or functionality or to eliminate any known software bugs.

The latest software revision will be available for download from our internet site at http://www.turboxs.com/.

4. Ensure that the UTEC is powered off.

NOTE: The ECU will stay on for an extended period of time after the car ignition switch has been moved to the "off" position. There is a red LED on the UTEC board that will shut down after the power relay has actually shut down. Please make sure this LED is off before going to the next step.

Your UTEC will have a set of two toggle switches **If you have 2 toggle switches you'll need to move the "Flash" switch to the "A" position (towards the serial TurboXS Logo).** The Proccesor switch should be in the "B" Position (towards the main connector)

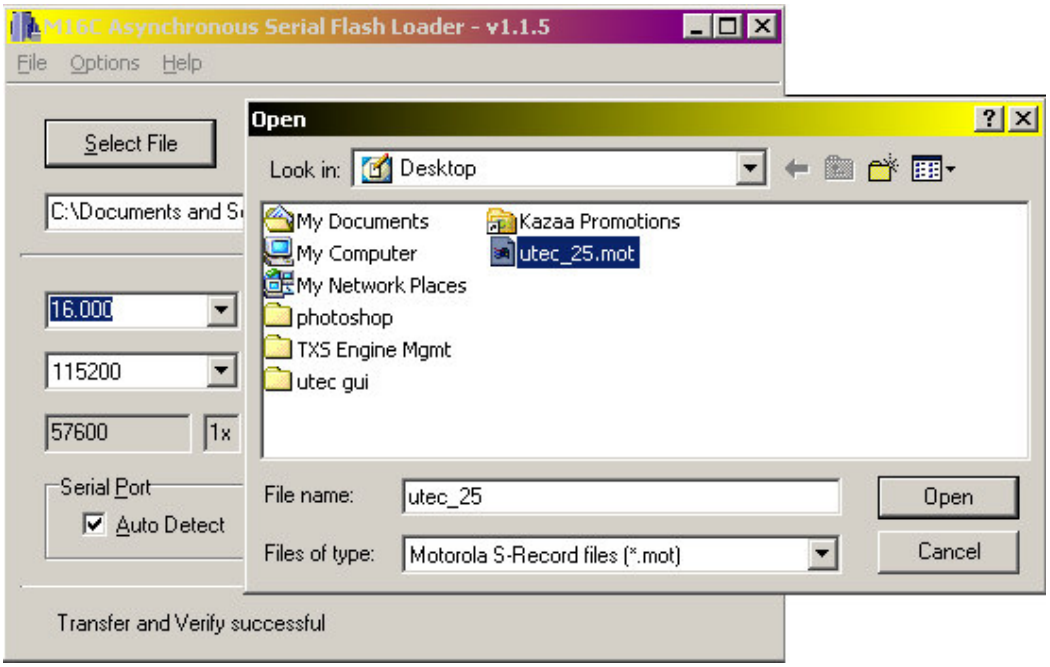


NOTE: Down is closest to the main connector where the factory harness plugs into the UTEC.

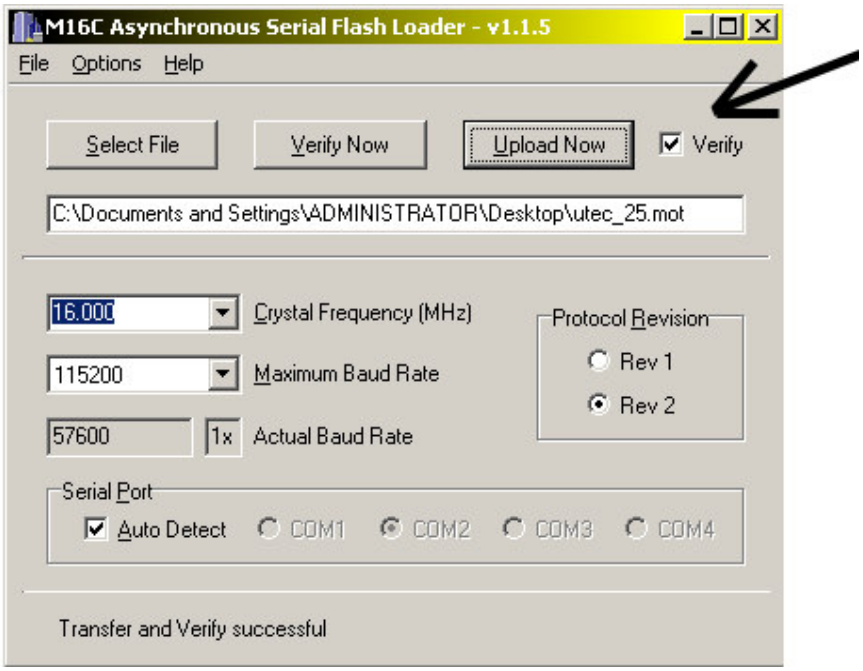
NOTE: If you do not set the dipswitches correctly you may get a CEL which will need to be cleared.

5. The new program file is 350z_utec_v2_3.mot. Download the new file at: http://www.turboxs.com. Please download and save this file to a known location on your hard drive.
6. Connect the supplied serial cable to your PC or laptop.
7. Connect the supplied serial cable to the serial port on the UTEC.

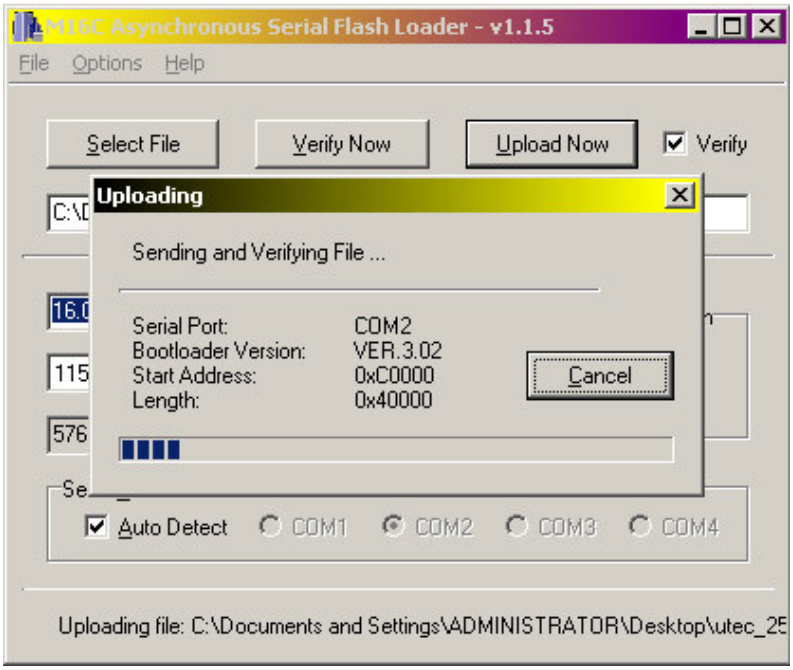
8. Turn the car ignition ON but **DO NOT START THE CAR!!** Alternatively, remove the UTEC from the car and use the DC power input and a 9V battery to power the UTEC.
9. Run the "m16c_flash_v122.exe" program. If you have not already done so, you can download the m16c_flash_v122.exe program at: http://www.turboxs.com. It is recommended to save this file to your desktop for easy access.
10. Click on "Select File" and locate the new program 350z_utec_v2_3.mot that was saved in step #8 above. Please note that these pictures were taken during the UTEC 2.5 upgrade procedure; on your screen you MUST select the new 350z_utec_v2_3.mot file. Otherwise, the process is exactly the same.



11. Tick the "Verify" box:



12. Click on the "Upload Now" button.



13. The program should now load; when complete it will tell you that you have been successful. If not, please see the trouble shooting section at the end of these instructions and repeat this process.

14. Turn the car 'OFF'. **Please note that sometimes the ECU will stay on for an extended period of time after the car ignition switch has been moved to the 'OFF' position. There is a red LED on the UTEC board that will shut down after the power relay has actually shut down. Please make sure this LED is off before going to the next step**.
15. **Set the Flash toggle switch back to the 'B' position (closest to the main connector)**.
16. The reprogramming is complete.

REPROGRAMMING TROUBLESHOOTING

1. Most programming errors are due to the following:

A. The serial cable being loose or defective. Replace or secure cable.

B. Another program, such as Hyperterminal™, HotSync, M16 Flash or other communication program is using the serial port. Close all other programs before trying to reprogram your UTEC.

C. The "Flash" toggle switch has not been returned to the 'B' position or Dipswitch 1 has not been switched to the DOWN position prior to power up. Shut car off, reset dipswitch, restart reprogramming.

2. If the program fails to load the program, try reducing the maximum baud rate on the serial flash loader program.
3. If the new program does not run the car, check that the "Flash" toggle switch has been returned to the 'B' position or that Dipswitch 1 is back in the UP position and that power to the UTEC has been turned OFF before restarting (red LED on UTEC will turn off when power to the UTEC is turned off).
4. If an immediate check engine light (CEL) occurs, reload the program and make sure that Dipswitch 7 was placed in the UP position during reprogramming.

Appendix A: TPS and MAP Calibration

TPS Calibration

1. To calibrate the TPS you need a UTEC and a PC.
2. Turn ON the ignition but do not start the car. With no pressure on the throttle pedal record the TPS value (T0) under logger #4.
3. With the throttle pedal fully depressed record the TPS value (T1) under logger #4.
4. Min TPS = T0 / 51
5. Max TPS = T1 / 51

Note that these numbers are rounded off to one decimal place.

MAP Calibration

1. To calibrate the MAP sensor you need an accurate boost/vacuum gauge (note that 0 psi is atmospheric pressure), a UTEC and a PC.
2. Turn ON the ignition but do not start the car. Record the pressure reading (P0) in psi on the gauge and the MAP value (M0) under logger #4.
3. Start the car.
4. As an alternative measurement for P0. Place the engine under vacuum and record the pressure reading (P0) in psi on the gauge and the MAP value (M0) under logger #4.
5. Place the engine under boost and record the pressure reading (P1) in psi on the gauge and the MAP value (M1) under logger #4. Try to find a stable reading for this in boost.
6. Ideally the two measurement points should be as far apart as possible.
7. The gradient is calculated as follows;

Gradient = 1000 * (P1 – P0) / (M1 – M0)

Note that this number is rounded off to the nearest whole number.

8. The intercept is calculated as follows;

Intercept = ((Gradient * M0) - (1000 * P0)) / 100

Note that this number is rounded off to the nearest whole number.

Appendix B: UTEC Hardware Details

SWITCH For Revision 2 UTECs

SWITCH	DESCRIPTION	DEFAULT	A	B
Flash	FLASH PROGRAM	B	Program	Normal
Processor	Processor Selector	B	Main Processor	DBW Processor

DC Socket

2.5mm x 10mm long

Centre positive

9V to 12V DC

Serial Connector

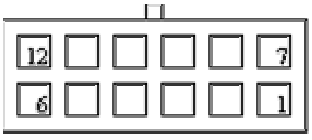
9 way D type socket

Pin 2 TxD

Pin 3 RxD

Pin 5 GND

Accessory Plug



Accessory Plug (Fitted to UTEC)

The previous figure shows the pinout of the Accessory Plug as viewed from the rear of the UTEC (front of the plug).

Pin 1 Ground

Pin 2 Boost Control Solenoid Output

Pin 3 Knock Light

Pin 4 Ground

Pin 5 Remote Map Switch bit-3/Clutch Switch

Pin 6 Remote Map Switch bit-2

Pin 7 Spare Solenoid 1

Pin 8 Shift Light Output

Pin 9 Spare Solenoid 2

Pin 10 +12V Output

Pin 11 Remote Map Switch bit-1

Pin 12 Remote Map Switch bit-0

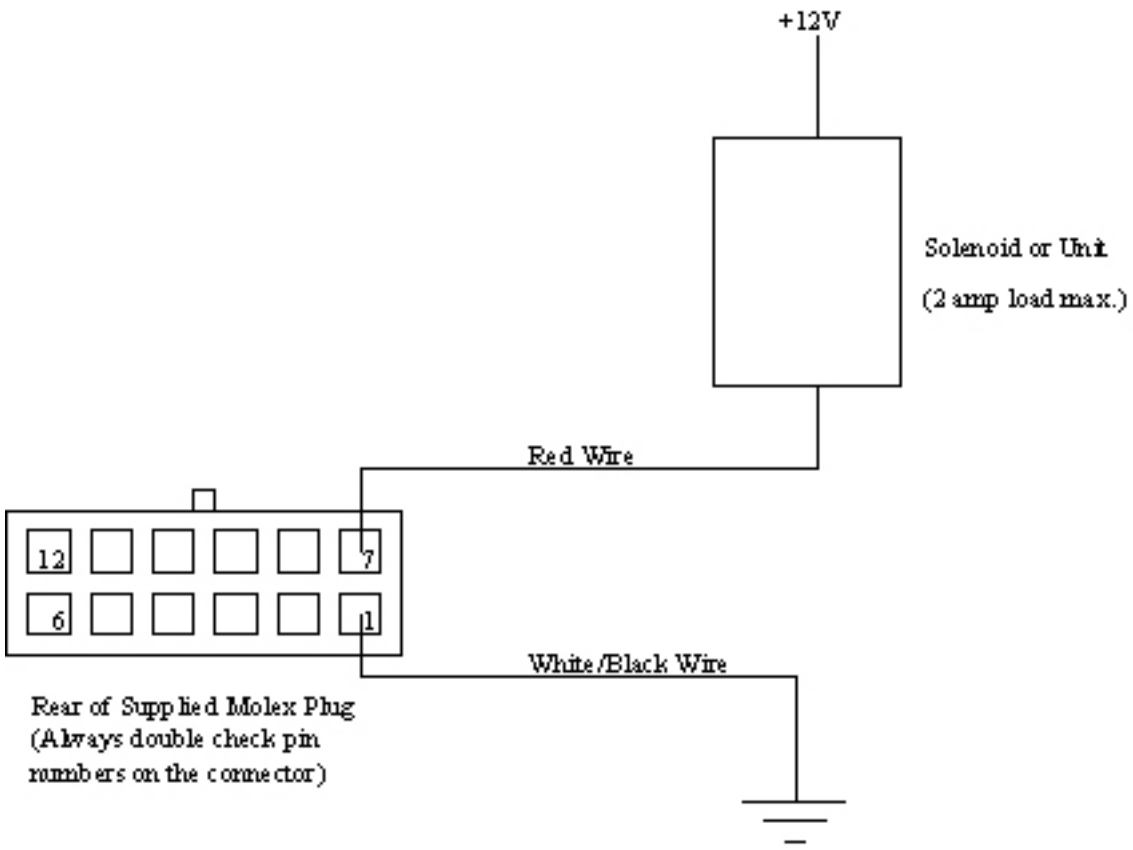
NOTE: Shift light sequence is

None	ON
Shift Light Output 1	ON
Shift Light Output 1 & 2	ON
Shift Light Output 1, 2 & 3	ON

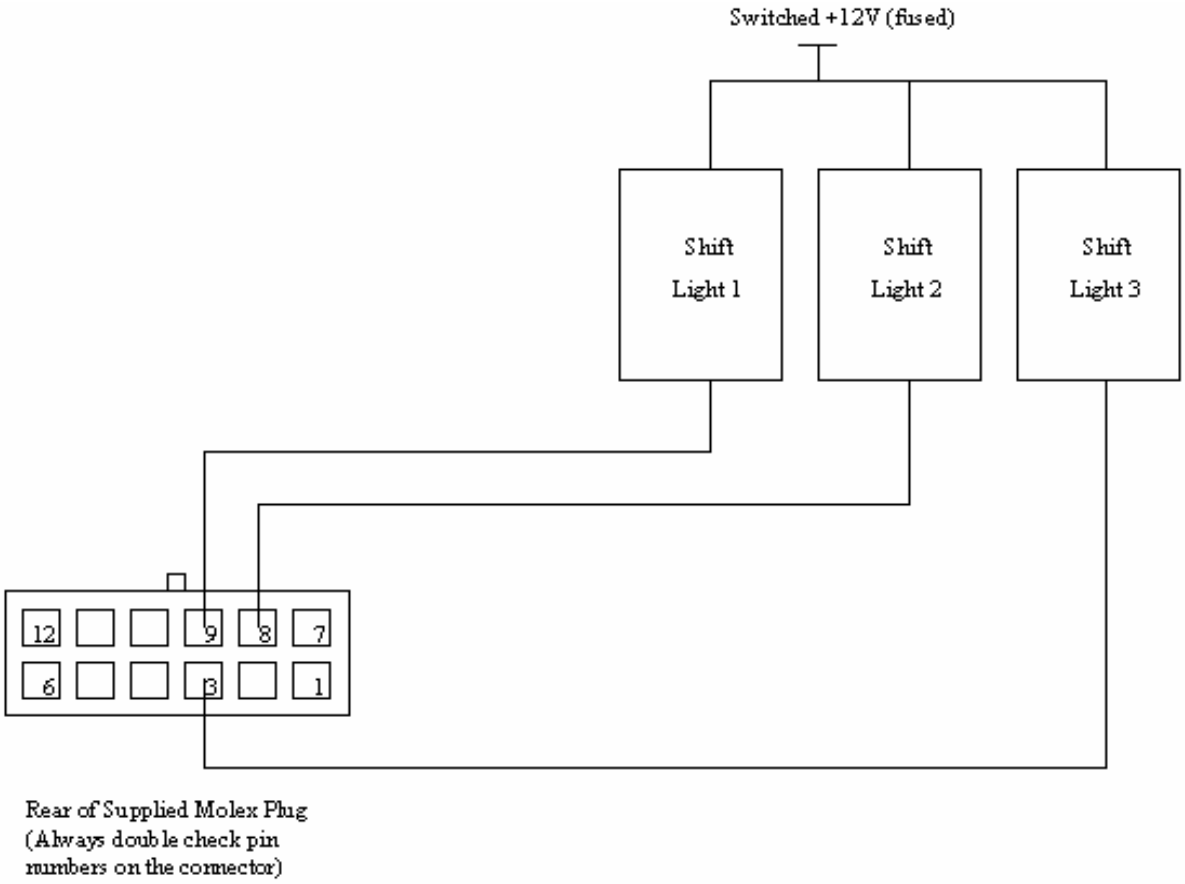
Appendix C: Spare Solenoid Information

To use the spare solenoid you need to:

1. Connect the white/black wire to a ground point on the chassis.
2. Connect the red wire to the solenoid or device you want to control.
3. Connect a +12V supply to the device.



Appendix D: Shift Light information



Note: Shift light sequence is:

None	ON
Shift Light Output 1	ON
Shift Light Output 1 & 2	ON
Shift Light Output 1, 2 & 3	ON

Appendix E: Open Loop Fuel Control

It is important to note that software version 4.0 is the first version of UTEC software that has the UTEC actually making fuelling decisions in a stand-alone fashion. It is important for the end user to understand some of the basics of how this is implemented. This appendix should serve as a rough guide.

Warning: Open Loop Fuel Control allows for a higher than stock rev-limit. It is highly recommended that you not exceed stock RPM limits. If you fail to heed this warning it is highly likely that your car will experience valve train related failure. Further please note that higher PRM limits place extreme loads on connecting rods. At high RPMs it is extremely likely that you will break a connecting rod on the exhaust stroke of the motor. When a connecting rod breaks the resulting damage is catastrophic.

1. Open Loop Fuelling MAF Based is a background fuel table (to which the end user doesn't have access) that is based off a similar fuel table in the stock ECU.
2. This Fuel table is used for the 10%-100% load sites in the UTEC.
3. This table uses a combination of MAF voltage and RPM as a load reference
4. Each MLP (map load point) in the background map is filled with a desired AFR.

Using the information from the calibration of the MAF sensor and the size of the injectors the UTEC determines the proper amount of fuel to add to achieve the desired AFR.

FAQ Section

1. I connected my laptop to the UTEC but nothing comes up on HyperTerminal. What should I do?
    a. Try hitting your ESC button to refresh your screen.
    b. There are a few common causes for the UTEC to experience communication problems;
        i. incorrect port settings
        ii. Check your settings against those listed earlier in the manual
        iii. Ensure that you are using the correct Com port. If your serial cable is on port #2 you'll have to change the settings to reflect this.
        iv. another program is open in the background that is using the communications port
            1. Hotsync
            2. Activesync
            3. Or any other program that can use the com port
        v. Serial port problems.
            1. try another serial cable
            2. try another laptop
2. I have a miss at high RPMs. Is this bad? Yes
    a. You should check the condition of your spark plugs for;
        i. proper gap
        ii. worn electrodes
3. My remote switch doesn't switch to the right map
    a. Check to see that it is plugged in
    b. Make sure the UTEC rotary switch is set to position "0"
4. Why is my MAP value different than my boost gauge?
    a. MAP = Manifold Absolute Pressure. 14.7Psi is typically considered normal atmospheric conditions; if you add 14.7 psi to this you have 29.4psi absolute pressure in your manifold. The UTEC will display this as 14.7psi absolute. If your atmospheric condition is lower than standard pressure this will show up in the absolute reading
    b. Boost gauges typically only show pressure above ambient. This accounts for the difference between the 2 readings.
5. The spare solenoid will not turn on. What should I do?
    a. Check the wiring against the provided diagram
    b. The logic in the controller is "AND" logic, ensure that all conditions are being met.
    c. Make sure that the "off" settings are not being met.
6. Is stage 1 map in map position 1? Stage two in map 2? Etc...
    a. Typically if you ordered a stage1 map this will be in map position one.
    b. We do not fill the rest of the maps with our "staged" maps
7. Why are TurboXS maps so rich?
    a. For added safety our base-maps (especially stage4+) are left a bit rich.
    b. This gives you the chance to fine tune the base-maps to your modifications.
8. Will this void my warranty?
    a. Yes! If you alter your engine management parameters from the factory ECU you dealer will, and rightly so, void your power train warranty. No! They can't refuse to cover anything that is un-related to the changes you've made. If your AC system fails, they must cover it no matter how many additional power modifications you've made unless they can prove that your modifications are the direct cause of the failure.

Notes

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