Quick Tune

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Quick Tune provides assisted or fully automated tuning of the main fuel table. This feature greatly reduces fuel tuning time.

NOTE: There are some important things to note about Quick tune:
- Quick Tune only tunes fueling. It does NOT tune ignition.
- Quick Tune is designed to assist professional tuners not to substitute the use of professional tuners.
- All other ECU functions including ignition and boost control should be tuned before using Quick Tune.

Quick Tune Operation

Quick Tune is an interactive tuning tool that assists in time efficient tuning of the main fuel table. A graphical display of Target AFR (desired AFR) and Actual AFR (measured AFR) is provided. A dual pointer gauge allows the tuner to quickly see how close Actual AFR is to the Target AFR. Quick Tune can be setup to operate over the entire fuel table or just over a particular area. Quick Tune can be used in Manual or Automatic modes. In Manual mode, Quick Tune guides you to cell centering and advises you when is is a suitable time to make a fuel table adjustment. With the press of a key a calculated adjustment is made. Often only one or two adjustments are required to tune each cell.   In Automatic mode Quick Tune does all the adjustment work for you. This leaves the tuner free to operate the Dyno or perform other tuning work such as making ignition table adjustments.

Quick Tune Shortcut Keys

- F10 - Display Quick Tune Window if not visible
- F10 - Make a fuel table adjustment in Manual Mode
- F10 - Start/Stop Quick Tune in Auto Mode
- F11 - Reset the current cells tune state

The Quick Tune Display
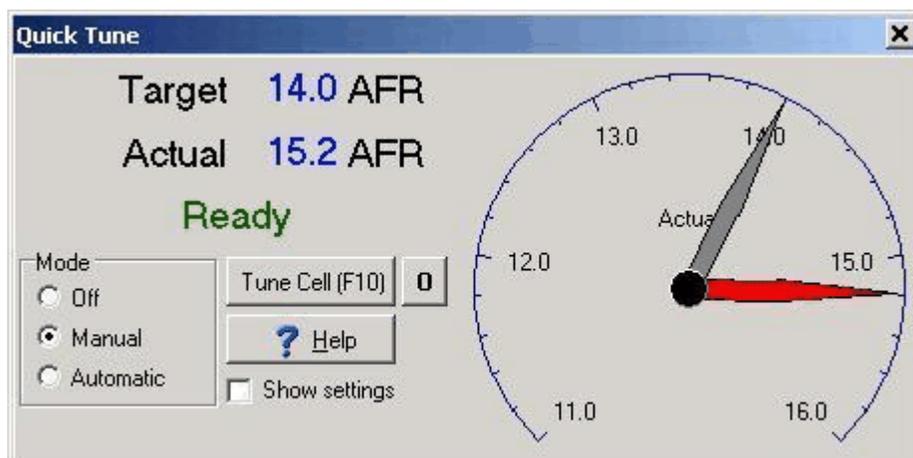
The Quick tune panel provides the following controls:

- **Target AFR** - This is the desired AFR from the AFR Target Table.

- **Actual AFR** - This is the average and filtered AFR as measured from the selected wideband oxygen sensor sources. See below for more details.
- **Status** - This provides information about the state of Quick Tune operation. The following status information may be displayed:
    - **Ready** - The cell is centered and and adjustment can be made.
    - **Target Reached** - The cell has been tuned (automatic mode). Pressing the 0 Button (or F11) will reset this state.
    - **Not in Cell Centre** - The engine is not operating near enough to a cell centre to make an adjustment. How close you need to be to a cell centre can be adjusted in the setting panel. See below.
    - **Waiting** - Waiting for AFR to stabilise before determining if it is correct. The wait time can be defined in the settings panel.
    - **No WB Source** - WB channels are not set up correctly.
    - **ECT Lockout** - ECT is not above the lockout value in the settings panel.
    - **Load Lockout** - Load (MAP, MGP, TPS) is not within the range set in the settings panel.
    - **RPM Lockout** - RPM (MAP, MGP, TPS) is not within the range set in the settings panel.
- **Gauge** - The gauge shows the relationship between target and actual AFR. The red pointer shows actual measured AFR while the grey pointer shows target AFR. The idea is that when fueling is tuned, the two pointers will be in the same place.
- **Mode** - This selects the operating mode of Quick Tune.
    - Off - Quick Tune will not operate at all.
    - Manual - Quick tune will guide you to cell centering but an adjustment will not be made until the "Tune Active Cell" button (or F10) is pressed.
    - Automatic - In automatic mode Quick Tune takes over adjustment of the fuel table. Pressing F10 will start and stop tuning.
- **Tune Cell / Start Tune Button** - The function of this button changes depending on the current mode. In Automatic mode this buton starts and stops the automated tuning process. In Manual mode, this button will make an adjustment to the main fuel table in an attempt to make the target and actual AFRs match.
- **0 Button** - This is used to zero any adjustment to a fuel table cell allowing Quick Tune to have another attempt at tuning that cell.
- **Help** - This help page
- **Show Settings** - Makes the setup information visible or hidden. See below for details on the setup options.

Setting up Quick Tune
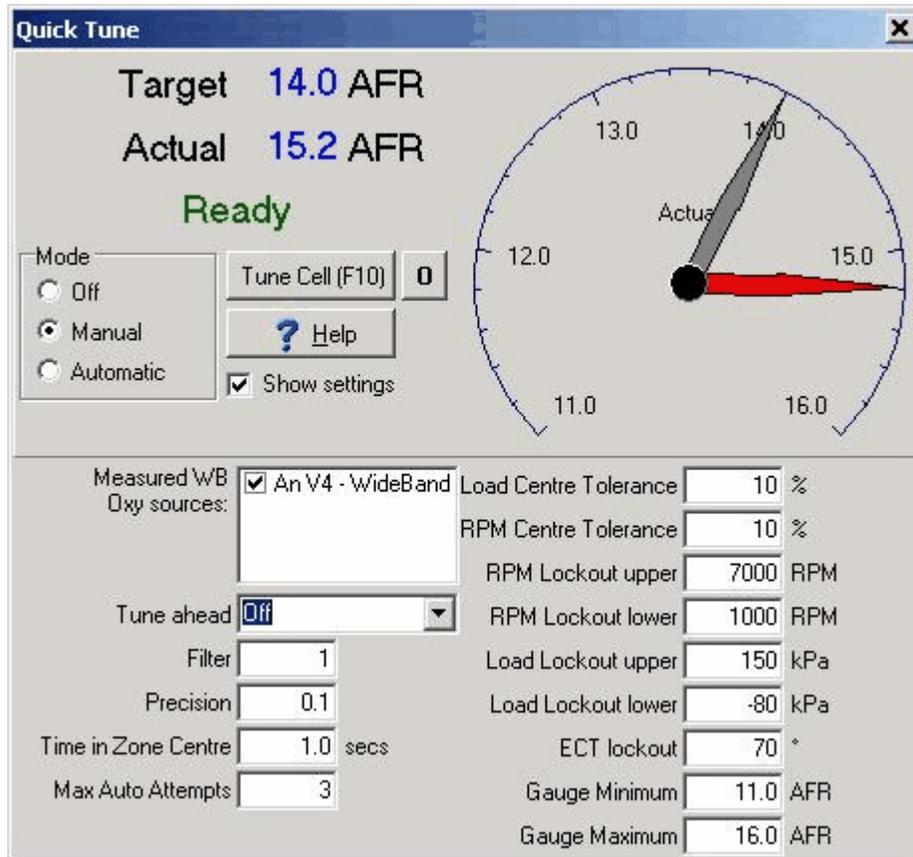
Before Quick Tune can be used it must be configured for the particular application. Configuration settings can be hidden away once sorted to allow a smaller Quick Tune panel for more efficient use of the screen. To make the Quick Tune settings visible click on the Show Settings check box below the Help button. The following list details each adjustment:

- **Measured WB Oxy Sources** - This list shows all the <u>Analog Voltage Channels</u> currently configured as Wideband. Confirm that each wideband channel is reading by checking its runtime value found under Analog Inputs. If more than one wideband source is used multiple options can be ticked. The Actual AFR value will be the average of the selected channels.
- **Load Centre Tolerance** - This is how close the load value (usually Manifold Gauge Pressure) must be to the centre of the cell before Quick Tune considers the cell to be within its tuneable range.
- **RPM Centre Tolerance** - This is how close engine RPM must be to the centre of the cell before Quick Tune considers the cell to be within its tuneable range.
- **RPM Lockout Lower** - Quick Tune will not operate below this RPM. eg to avoid Quick Tune working at idle, set this value above idle, say 1000 RPM.
- **RPM Lockout Upper** - Quick Tune will not operate above this RPM.
- **Load Lockout Lower** - Quick Tune will not operate below this load. eg to avoid Quick Tune working in the overrun row set to -80 kPa MGP or (20 kPa MAP) to make it work to full vacuum, set to -100 kPa MGP (or 0 kPa MAP).
- **Load Lockout Upper** - Quick Tune will not operate above this load.
- **ECT Lockout** - Sets the lowest engine temperature that Quick Tune will operate. Set this to a high enough temperature that all warm up enrichment fuel will be 0%.
- **Precision** - Sets how close in AFR a cell needs to be to its target value to be considered tuned. eg If target is 14.7 and Precision is 0.2 Quick tune will consider the cell tuned if actual

AFR is within 14.5 to 14.9 AFR.

- **Time in Zone Centre** - This is the stabilising time in seconds. This sets how long Quick Tune will wait for the mixture to stabilise once all other conditions are met.
- **Filter** - Used to dampen fluctuation or noisy AFR signals. A higher number will result in more damping. A filter number of 1 means no damping.
- **Max Auto Attempts** - This is the number of times Quick Tune will try to adjust a cell before giving up. Usually on one to three attempts are required.
- **Tune Ahead** - This setting instructs Quick Tune to copy the tuned cell numbers to other cells. This allows number to be copied down, right or both. This creates a closer number in un-tuned cells and provides a flatter fuel table while tuning for more precision.
- **Gauge Maximum** - the maximum value displayed by the gauge.
- **Gauge Minimum** - The minimum value displayed by the gauge.

Before Using Quick Tune

Before using Quick Tune the following checks must be done:

1. Set up the Target AFR table as required. Make sure the following items are correct:
   - The table axis parameters. These are typically RPM on the X axis and MGP on the Y axis.
   - The table has the appropriate rows and columns required to allow it to cover all areas the motor may operate in.
   - Enter appropriate Target AFRs in all cells.
2. Install, wire and calibrate wideband oxygen sensors. This includes assigning an Analog Channel and setting up that channels calibration. Quick Tune relies heavily on this input being correct. Only Analog Channels assigned as *Wideband (Ext Controller)* will be available to Quick Tune.
3. Open the setup panel and adjust all settings to suitable values before switching Quick Tune to Manual or Automatic modes.
4. Select the required wideband channels in the Measured WB Oxy Sources list. Check that the Actual AFR number and gauge show the correct reading.

Operating Quick Tune in Manual Mode

Manual mode is designed to assist the tuner in tuning the fuel table while completely under their control. No adjustments are made to the fuel table without the tuners say so. Manual mode greatly reduces the time taken to tune individual cells and also allows the tuner to be working on other areas such as ignition timing while still being able to adjust fueling.

To operate Quick Tune in Manual mode:

1. Carefully read and understand all information further up this page. Set all Quick Tune settings appropriately before starting.
2. Display the main fuel table.
3. Press F10 to open the Quick Tune window if it is not already displayed.
4. Press F6 to set the cross hairs/box to your favourite option.
5. Ensure that the engine is operating above the ECT Lockout value.
6. Under controlled conditions (eg on a Dyno) run the engine so that load and RPM are within the range specified in the setup panel.
7. Select Manual Mode in the Quick Tune window.
8. If everything is operating correctly you should see the status alternating between **Not in Cell Centre,** **Waiting** and **Ready** as the cross hairs move around the table.
9. Centre the cross hairs in a cell so the status says **Ready**.
10. Press F10 to make and adjustment. The cell will change to a blue colour to indicate its value has been changed and the status will say **Waiting** while the mixture is allowed to stabilise.

11. At the end of the **Waiting** time if the AFR is close to the target (within the range set by the precision adjustment) the cell will go green to indicate that it is tuned.
12. Repeat steps 9 and 10 until the cell has gone green. It will typically only take one to three adjustments.
13. Move on to the next cell and repeat steps 9 onwards.

Operating Quick Tune in Automatic Mode

   Automatic mode is designed to automate the fuel table tuning process. It is not designed to replace an experienced tuner, nor is it designed to completely tune the engine (as it does fuel only). Quick Tune can be used to tune the fuel table from one cell to the next in any direction but is essentially designed to tune from the top left to the bottom right of the fuel table going across the rows or down the columns. Automatic mode works exactly the same as Manual mode except that the tuner is not required to indicate when an adjustment should be made, Quick Tune does this for you.

   To operate Quick Tune in Automatic mode:

1. Carefully read and understand all information further up this page. Set all Quick Tune settings appropriately before starting.
2. Display the main fuel table.
3. Press F10 to open the Quick Tune window if it is not already displayed.
4. Press F6 to set the cross hairs/box to your favourite option.
5. Ensure that the engine is operating above the ECT Lockout value.
6. Under controlled conditions (eg on a Dyno) run the engine so that load and RPM are within the range specified in the setup panel.
7. Select Automatic Mode in the Quick Tune window.
8. If everything is operating correctly you should see the status alternating between **Not in Cell Centre, Waiting** and **Ready** as the cross hairs move around the table.
9. Press F10 to start automatic mode.
10. Centre the cross hairs in a cell. Quick Tune will adjust the cells value until the target AFR is reached. It may be necessary to change the Precision, Time in Zone Centre, Filter and Max Auto Attempts setting to achieve the best Quick Tune operation for your application.
11. Once the state shows **Target Reached**, move on to the next cell. The tune process will repeat.
12. If for some reason you want a cell to be retuned, centre the cross hairs in that cell and press F11.

Other Quick Tune Notes

- In automatic mode when a full fuel table is to be tuned, it is most efficient to use the Tune Ahead setting set to 'Copy across and down'. When this setting is on, hold the engine speed constant and tune down each RPM column by adjusting the load.
- If the fuel table numbers are a long way from ideal, Quick Tune will need to make large adjustments to the fuel table numbers. This may result in large number changes between adjacent cells. To prevent the engine moving into cells that are a long way from tuned (potentially harmfully lean), use the Tune Ahead function as described above.
- The required Time in Zone Centre depends on the placement of the wideband sensor and the type of sensor/controller used.