



Series 2 EMS Notes: Advanced Boost Control

Boost Control has been revised in the Series 2 EMS. This document is intended to outline the additional settings available in the 01v12 firmware and provide a few examples to help show how the new Boost Target Tables can be used.

The main difference from 01v11 and earlier firmware is that the desired Boost Target can now be adjusted based on a combination of Gear, Throttle, Vehicle Speed, and RPM.

Additionally, the Boost Target Comp table now allows for values from +/-100%, which can simplify the interaction between the Boost Target Comp table and the Boost WG Base Duty map.

WARNING:



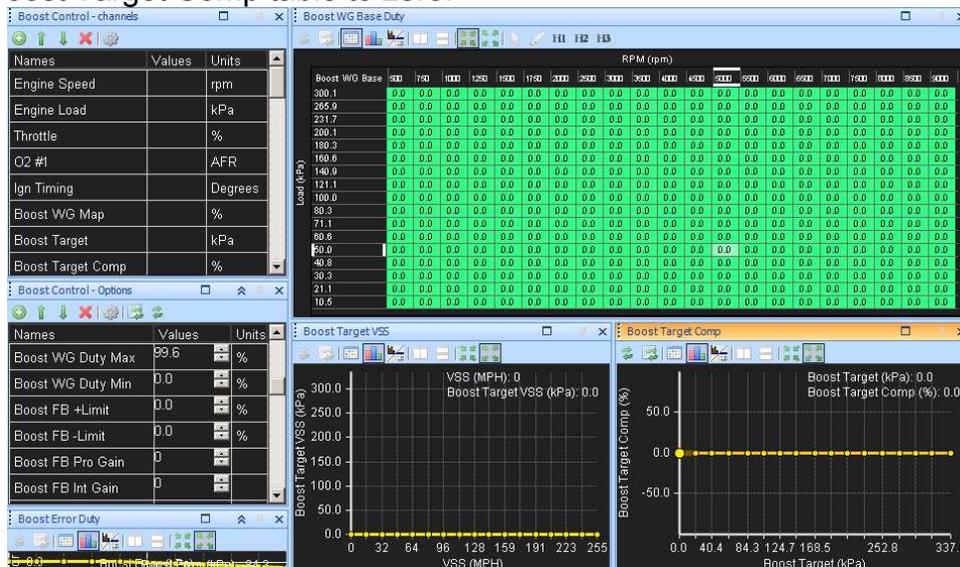
This installation is not for the tuning novice nor the PC illiterate! Use this system with EXTREME caution! The AEM EMS System allows for total flexibility in engine tuning. Misuse of this product can destroy your engine! If you are not well versed in engine dynamics and the tuning of management systems or are not PC literate, please do not attempt the installation. Refer the installation to a AEM trained tuning shop or call 800-423-0046 for technical assistance. You should also visit the AEM EMS Tech Forum at <http://www.aempower.com>

NOTE: AEM holds no responsibility for any engine damage that results from the misuse of this product!

This product is legal in California for racing vehicles only and should never be used on public highways.

ADVANCED ENGINE MANAGEMENT INC.
2205 126th Street Unit A Hawthorne, CA. 90250
Phone: (310) 484-2322 Fax: (310) 484-0152
<http://www.aempower.com>
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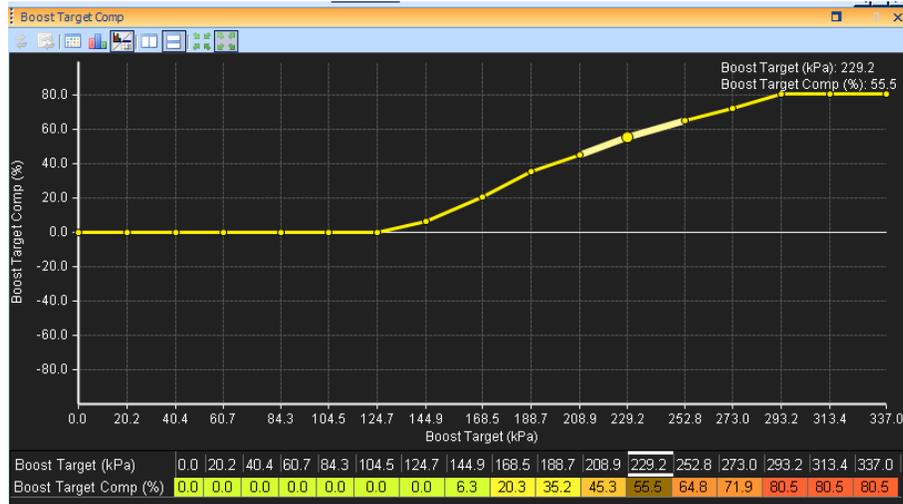
1. It is recommended that the engine be tuned at the lowest boost level allowed by the wastegate spring before attempting to adjust boost control settings. Disable boost feedback (set Boost FB + Limit, Boost FB – Limit, Boost FB Pro Gain, and Boost FB Int Gain to zero). Set the entire Boost WG Base Duty map to zero, and set the entire Boost Target Comp table to zero.



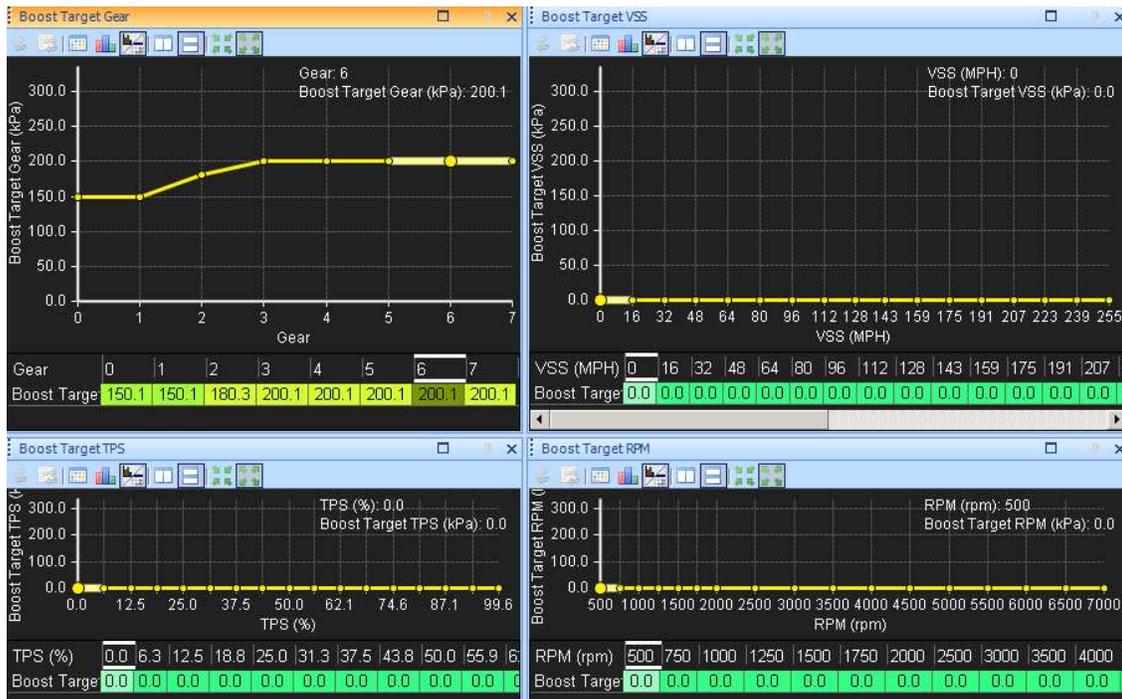
2. Set the entire Boost WG Base Duty map to 10%, perform a power pull and observe the maximum boost level that results from 10% duty cycle with your wastegate solenoid. Repeat for other duty cycles, for instance 15%, 20%, 25%, 30%, etc... until you have reached all possible boost levels you wish to run. Save datalogs of relevant data (Boost WG 1 output, Engine Load, Throttle, Gear, Engine Speed) and/or write down the maximum boost level achieved using each duty cycle (see example below).

Boost solenoid Duty cycle (changed before each run)	Max boost (measured during run)
10	150kPa
15	155kPa
20	160kPa
25	170kPa
30	180kPa
35s	190kPa
40	200kPa
45	210kPa
50	220kPa
55	230kPa
60	240kPa
65	250kPa
70	270kPa
75	275kPa
80	280kPa

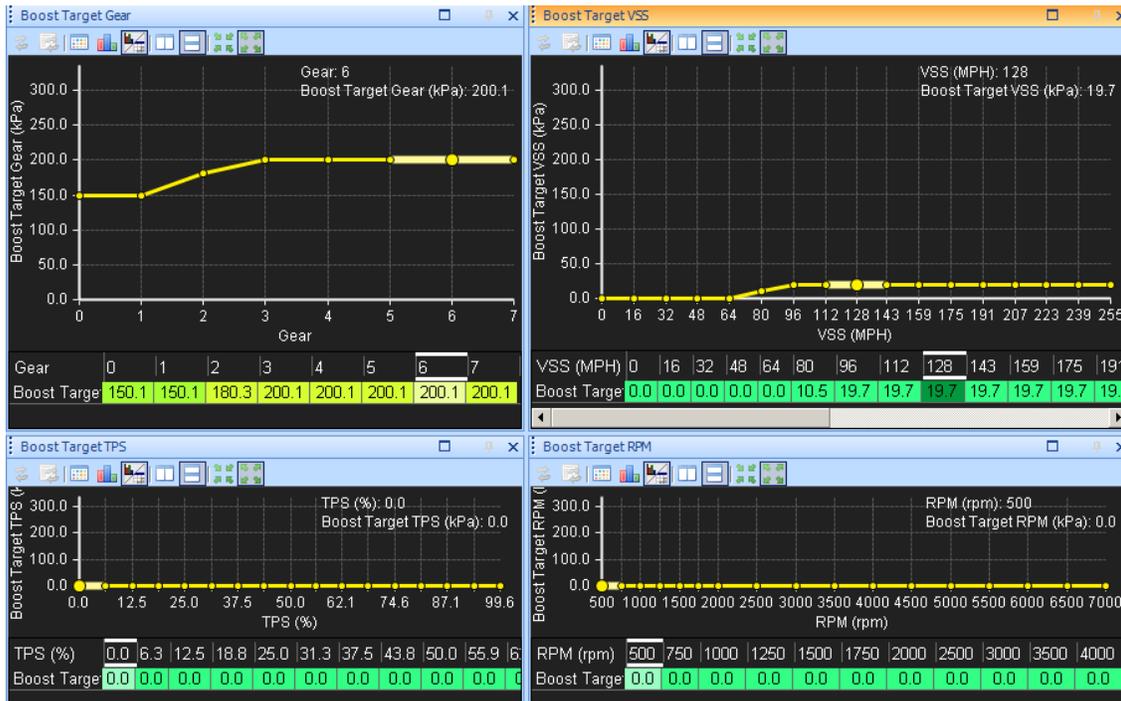
- Using the data gathered in step 2, enter the duty cycle info into the Boost Target Comp table. This table allows the EMS to use the correct duty cycle for various Boost Target levels. Set the entire WG Base Duty map to zero. In the example below, the EMS will use 55% duty cycle to when the desired Boost Target is 230kPa.



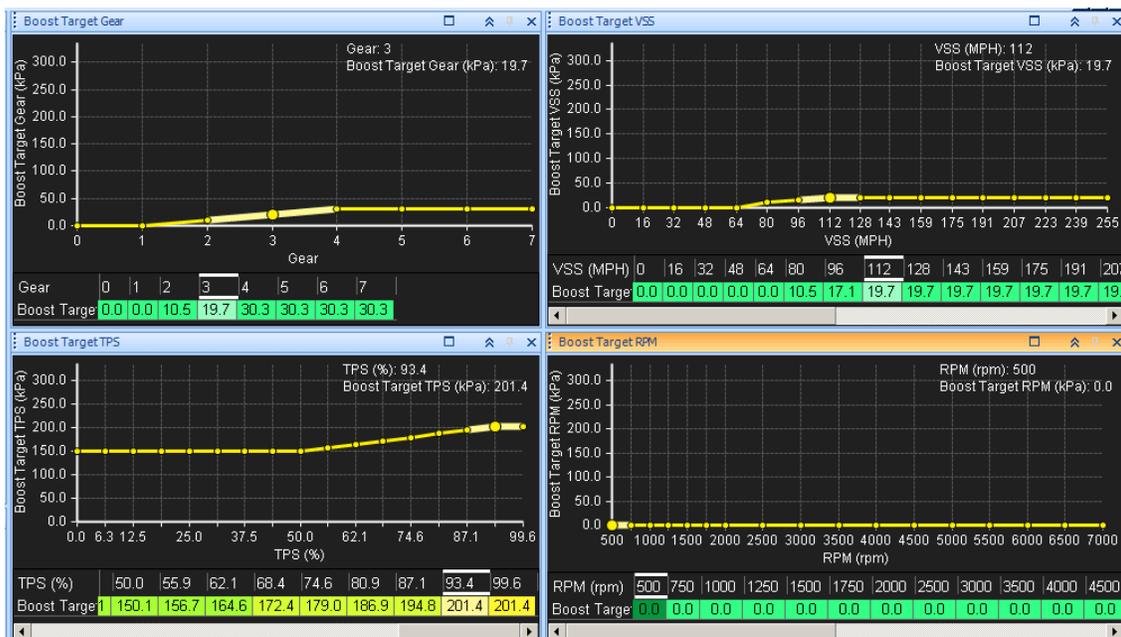
- Next, configure the Boost Target tables. There are four tables that can be used, and the values from all tables are added together at all times. The simplest method is to use only one table for adjusting the boost target, in this example the Boost Target will be 150kPa in 1st Gear, 180kPa in 2nd Gear, and 200kPa in 3rd-6th Gear. Note that all other Boost Target tables **must** be set to the minimum possible value (zero kPa in this example).



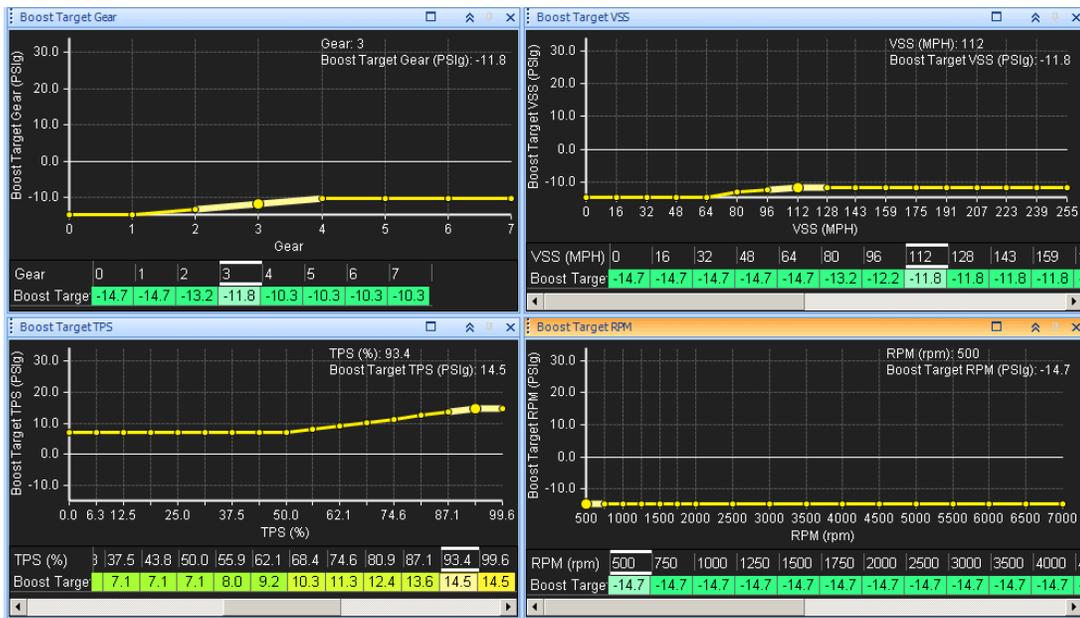
- Here is an example of a more complex Boost Target setup. Let us assume the vehicle's aero package generates significant downforce and this provides more traction at high speed. The example below will add 10kPa to the Boost Target at 80 MPH, and 20kPa to the boost target above 100MPH. This would result in a boost target of 210kPa in 5th gear at 80 MPH and 220kPa in 5th gear at 112MPH.



- All 4 tables can be used in conjunction if the tuner desires. Using the Boost Target TPS table to increase boost at high throttle percentages can make the vehicle more predictable during steady-state cornering. In the example below, the vehicle has a large throttle body which does not significantly restrict airflow to the engine between 50-100% throttle. The Boost target is increased between 50-100% throttle to provide a more linear power delivery at different throttle angles.



- Note that when using PSI for Load units, (-14.7) psi is the lowest possible value. Setting any table to 0psi (which is not the lowest possible value in the table) will cause that table to increase the Boost Target by 14.7 psi! The example below uses the exact same Boost Target settings but all tables are displayed in PSig units rather than kPa.



- The Boost Error Duty table can be used for closed-loop boost feedback. If the measured Engine Load is below the desired Boost Target, the Boost Error Duty table can increase the duty cycle of the boost solenoid to reach the desired Boost Target. It is recommended to leave this table set to zero (or very small changes such as +/-1) when configuring other boost control settings.

