ERM Performance Tuning
presents
PERFORMANCE TUNING and HP Tuners Version 3.0 Made Simple

Module 1 – Electronic Fuel Injection (EFI) Discussion
- Fuel Pump and Injector capabilities and basic sizing constraints based on fuel and final power expectations
- Air Flow
  - Monitoring (MAF/VE Overview) Airflow and developing cylinder airmass; cylinder volume vs. VE; VE% vs. VVE evolution…use of coefficients after 2005
  - Review airflow and fuel flow equations/calculations to determine various needs of the PCM; how does he do it!
- Fuel Injection and Injection timing
  - Valve events vs. crank events; End of Injection Time (EOIT) determination
  - Valve timing excel diagram with embedded cam math to calculate new events and impact on EOIT….do we have enough time to squirt the right amount of fuel?
- Ignition
  - Timing and its impact on Power; what are we striving for
  - Discussion on the importance of lean fueling or correct timing for best power/torque…

Module 2 – Engine Sensors and Open vs. Closed Loop top level review
- Technical review of each of the main sensors important to our tuning process including but not limited to Crank/Cam, MAF, TPS, IAT, ECT including the Gen III to Gen IV+ evolution and differences
  - Generational differences and needs to address when utilizing different year sensors in support of a swap project; IAT, MAF Throttle body (gold vs. silver blade)
  - IAT vs. ECT bias/filter tuning
- Lengthy technical review on Narrowband and Wideband Sensors; differences and capabilities
- Technical review of the 3 ways to monitor combustion….Lambda, AFR or EQ Ratio
- Open vs. Close Loop operation including detailed review of the various years tables showing differences; LS1 to E40 to E38/E67
  - Long Term and Short term Fuel trims vs. Narrowband O2 sensor control; Fuel Trim Cell filters and their importance in street tuning

Module 3 – Wideband Sensor and interfacing to HP Tuners Version 3.0
- Detailed review of Wideband O2 sensor and the use of Lambda in open loop tuning; why it's the only way to go
- Wideband Selection guide; which wideband is right for you
- Detailed, step by step procedures on Wideband setup to the VCM scanner for both Analog and Serial
  - How to calculate transform expression and a walk through from start to finish on the AFR500 WB setup
  - PRO vs. Standard MPVI setups including bonus How To video links from the ERM Performance Video Library

Module 4 – Adaptive Idle Tutorial – Gen III and GEN IV
- Simply put, this is 23 pages of Adaptive idle theory of operation, how to log and tune and tips/tricks to help settle down your idle even with the biggest of cams
  - There is a detailed approach to tuning both the Gen III and GEN IV setups with Scanner setups and information on large cam adjustments needed from the stock settings
  - Drive by Cable (IAC) vs. Drive by Wire (ECT) review
  - Most of the idle issue I experience from my clients is due to excessive changes in the wrong places; tip #1…go back to stock and start over with this knowledge and procedures.

Module 5 – HP Tuners Version 3.0 VCM scanner Detail
- 33 pages of graphics, technical features/functions and detailed step by step procedures to use the VCM Scanner as it was designed to be used
- Designing, creating and validating Filters including the new .avg and slope based filters to give you the most usable error data yet. Makes Street tuning seem almost like Dyno's play ☺; validate your data, know when it's wrong and stop chasing your tail
- 3 bonus tutorial video's on the VCM Scanner and its controls as well as 2 detailed step by step approach to Wideband interface and error data collection
- Features to simplify your 2.24 to 3.0 migration based on old logs and histograms
- Recommended Channel lists for each of the Tuning strategies and choosing Specific Parameters vs. Generic Sensors

Module 6 – Tuning Strategies
- The 10 Phases of Tuning; from key-on to wide open throttle
- 3 Main Tuning Strategies and their 3 sub- strategies
    - MAF- VE-Blended- Open Loop- Closed Loop-Scaled
    - When is your error correction data wrong; tuning is not just a copy Paste Multiply process!!
    - Embedded MAF and VE scanner setup/operational video links
- VE tuning tips and tricks….how to fill all the boxes
- How to Scale a tune; two approaches detailed
- Wrap-up bringing all the above together as well as why and when to use which strategy

Module 7 – Fuel Delivery and Injectors
- Return and Restfulness Fuel systems
- Factory Adaptive fuel pressure control implementation; NA to LSA upgrade vs. Fuel Pressure Control Modules (FPCM)
- Fuel Injectors installed environment and impact on operational specifications
- Fuel Injector specifications detailed and how injector flow rate is determined by the PCM; iterations of manifold vacuum and pressure definitions detailed
    - Larger injector pitfalls and remedies; especially in Gen III setups
    - Injector selection criteria and recommendations flow chart
- Injector swap tutorial including excel work sheets to redefine injector flow rate based on rated fuel pressure and yours as well as converting IFR to the 3 different IFR table formats.
    - Bonus excel links to converting 4 types of Gen IV injector data (LS9, LS3, LS92 and L76) to Gen III; both HP Tuners and EFI Live formats