



## XRT Hydra Nemesis 2.6 EMS Software Programmable Features

- ❖ New Extruded Aluminium Enclosure with updated software.
- ❖ Dual 16bit 25MHz Processors
- ❖ Plug and Play
- ❖ Windows programmable Software w/ Direct Serial cable Connection
- ❖ Uses All Factory Sensors (Might need additional sensors, e.g.: 1990 to 1993 Miata will need air temp sensor and knock sensor)

### Retains all factory functions

- EGR
- Purge Control
- Power Steering
- Coolant and AC Control
- Factory Intercooler Spray, EVOVIII and Sti
- Air Conditioning
- Boost Control
- Idle Speed ( Both Solenoid and Stepper Types)
- Cold Start Compensation
- Acceleration and Deceleration Enrichment
- Wideband - 2 Air/fuel Long and Short term Control
- Programmable Closed Loop Knock Control
- Check Engine Light Control
- Backup Spark tables for Limp mode



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## Fuel

- Injector Phasing
- Individual Fuel Injector Trim
- Full Sequential Fuel injection for up to 8 cylinders
- Drives all types of injectors without the need of a ballast box (peak & hold and Saturated)
- 3D Fuel map 32 by 32 Grid styled
- Aux 3D Fuel Map 32 by 32 Grid Styled with switched input (For Dry NOS or Race Gas)
- **Lower Fuel Limits - Safety added in case bad entries or wrong program values**
- Wide Band Closed Loop Lambda Control for true Auto mapping of Air / Fuel 32 by 32 Grid Style (requires Optional software upgrade and NTK L2H2 Wideband Oxygen Sensor)
- **Continuous Closed Loop Air / Fuel Correction 32 by 32 Grid Style (requires Optional software upgrade and NTK L2H2 Wideband Oxygen Sensor)**
- **Short Term Trim Ignition Trim - Adjust ignition in close loop operation of fuelling - Enhance street operation**
- Coolant temperature and Air Temperature correction for Fuel

## Ignition

- **Individual Cylinder Ignition Trim**
- Ignition control for up to 8 cylinders
- 3D Ignition Map 32 by 32 grid styled
- Aux 3D Ignition Map 32 by 32 Grid Styled with switched input (For dry NOS or Race Gas)
- **Upper and Lower Ignition limits - Safety added in case bad entries or wrong program values**
- **3D Backup Spark map 32 by 32 grid styled strategy when excessive lean condition or detonation is detected**

## Knock

- Coolant temperature and Air Temperature correction for Ignition
- Maximum Knock Retard Setting
- Knock Retard Degree per Incident Setting
- Excessive Knock Events
- **Definable Knock Control (two setting amplification with definable threshold) with adjustable fuel compensation**
- **3D Backup Spark Map 32 by 32 grid styled strategy when excessive detonation is detected**



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### Antilag

- \*Antilag Control
- Antilag Timeout
- Antilag use of ISC
- \*3D Antilag Fuel Map 32 by 32 Grid Styled with switched input
- \*3D Antilag Ignition Map 32 by 32 Grid Styled with switched input
- 3D Antilag Fuel Cut (%) Map 32 by 32 Grid Styled based of Throttle vs RPM with switched input
- 3D Antilag Ignition Cut (%) Map 32 by 32 Grid Styled based of Throttle vs RPM with switched input
- Meets Group N specifications

\*May require Additional Hardware, e.g. Idle Bypass valve, etc...

### Boost

- Electronic Boost Control
- 2D 16 Zone Map Boost compensation based on Coolant and Air Temperature
- 2D 16 Zone Map Boost Compensation based on Throttle Position
- 2D 16 Zone Map Boost Upper Learn Limit - Control of the Waste-gate base on the function of RPM, Boost and Boost error
- 2D 16 Zone Map Maximum boost per RPM
- Barometric Compensation for normally aspirated cars(with optional 1 bar map sensor)

### Variable Cam Timing

- Closed Loop Variable Cam Timing 3D Maps for Intake & Exhaust Cams (VTC/AVCS/VVTi/Vanos) 32 by 32 grid styled
- Closed Loop Quad Variable Cam Support for both intake& Exhaust cam

### Gear Related

- Boost, Fuel and Spark Trim
- Gear Identification Selection
- Traction Ignition and Fuel Cut Cycles
- Boost Trim



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- Enhance Idle Speed Control - Enhance the operation of AC and idle related factors for road going cars
- Soft-Cut Rev Limits
- Hard-Cut Rev Limit
- Turbo Timer setting
- Sensor Calibrations (example Throttle Position sensor, Wide Band
- 2-step launch control (Switched Input)
- Flat Shift
- Tachometer Drive
- Limited Onboard Data logging (Unlimited data logging through PC)
- Password Protection for Intellectual Property
- Many Programmable 2D outputs (Staged injection, intercooler spray, water spray, turbo timer, shift light, VTEC, fuel pump, etc...)
- New 2.6 ECU Hardware provides quicker starts
- New decel cut strategy
- Many User Logic Feature (OR, AND, ANDOR)



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### Hardware

#### **Auxiliary outputs: 14**

PWM 1 - 4, 9 - 14 and 16 are general purpose switch to ground 1A current limited outputs. PWM 1 - 4 have optional free-wheeling diodes for linear control of variable solenoids. PWM 5,6 and 8 are general purpose switch to power 1A current limited outputs. All PWM channels have 33V flyback limiting. PWM 1 is not available for DBW Cars. PWM 7 and PWM 15 are currently not available.

#### **NTK L2H2 Wideband Closed Loop Autotune:**

All Nemesis 2.6 ECUs have an L2H21 driver as standard equipment. There is no need to use an external uego driver module. The L2H2, a newer more robust version of the L1H1 Sensor is a state-of-the-art Nernst Cell sensor with a rapid response and far more useful rich end output characteristics than older, non-planar sensors. Heater current is limited for a controlled warm up, and voltage limited for constant temperature.

#### **Ignition:**

Igniter signals are fully sequential 5V ignition triggers. Firing mode is positive only (voltage output to charge coil). Output options are direct fire, wasted spark and distributor signal.

#### **Support:**

Nemesis 2.6 includes many support options that make seamless plug-and-play possible, and wire in trouble free. Advanced support features include a dedicated variable speed fuel pump signal for the WRX, Honda multiplex bus support (for climate control and gauges), dedicated circuit opening relay ground signal and dedicated sensor ground connections that reduce harness ground wire splicing.

#### **Auxiliary inputs: 10**

Aux 1, 2 and 3 are 0 - 5V analog or 0 - 12V digital inputs. In digital mode, the switch point is 2.5V. Aux 3, 4 and 5 are digital only inputs, with a switch point of 2.5V.

#### **Injectors:**

The Nemesis 2.6 is capable of running cars up to 8 Cylinders sequentially. Injection modes are sequential, batch fire and throttle body injection. When not used for injection, outputs 2 - 8 can be used for staged injection or general purpose switching, and outputs 2 - 5 can be used for PWM control.

#### **Sensors:**

Analog sensor inputs are coolant temp, air temp, throttle position, twin knock sensor, twin ego sensor and on-board 3 bar map sensor. Temperature sensors can be configured for the 2 most common types, and knock sensor inputs can be amplified.

Digital trigger inputs are vss, trig and sync. These inputs are magnetic retractor, Hall Effect or optical sensor compatible.



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#### Advanced features:

Nemesis 2.6 has many advanced features to make tuning easier and ECU performance just like stock. On the programming software end, all 3D maps can be rotated in both axes for a better viewing angle, and the colours of the map can be altered to suit the user. A change injector flow utility allows for a global change of the fuel map based on the old and new injector flows. When viewing the 2D knock threshold table, the current knocking detected by the ECU is superimposed on the curve, allowing the user to define the knocking threshold just above the background noise. If the knock background noise becomes excessive at high rpm (it often does), then the feedback will show this and the threshold can be set above this noise at only the rpm where it occurs.

The Nemesis 2.6 ECU has both short and long term trim for the narrow band closed loop system. If the ECU must consistently add or subtract more than 8% fuel from the base value in order to reach 14.7 AFR, then the long term trim table can 'learn' this tendency and correct for it for the duration of the drive cycle.

**The Nemesis 2.6 also has factory like features such as flashing check engine light diagnostics for conditions such as lean under load, excessive knock and barometer out of range. A flashing check engine light can alert the user to a potential problem before it causes driving problems or engine damage.**



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## New to Version 2.6

### **Fueling Strategies:**

Fuelling strategy can now be speed density, alpha-n or any imaginable blend of these using two new maps.

Fuel maps can now be defined either in injector pulse width or volumetric efficiency.

### **Autotune Mapping Strategy:**

Using our NTK L2h2 Sensor autotune is now handled through a VE map for faster map setup

### **True Antilag Capabilities:**

Three new maps and setups are added to the Antilag fuel and Timing maps for a total of 5 maps for true Antilag Control including meeting Group N specifications

### **Closed Loop Variable Cam Control for Intake and Exhaust:**

Variable cam maps are now in Full 32 by 32 resolution, same as the fuel and ignition maps. Closed loop Variable cam support available for both input and exhausts cams in Crank degrees.

### **Idle Control Strategies:**

7 Additional maps used for finer Idle Control including Power steering input

### **Traction Control:**

Programmable traction control based on maximum vehicle speed acceleration per gear with fuel and ignition cut maps.

### **Configurable Boost Control**

Boost control with engine speed, throttle position, gear, coolant temperature, air temperature and external input select trim.

### **Password Protection:**

New user configurable Password protection capability allows dealers the capability to lock out various maps and setting either to reduce potential support overhead or protect intellectual property. Users now have capability to reset all passwords and build your own map from scratch.

### **Launch and Flatshifting Control:**

You can now have both Launch control and Flat shift control through switchable inputs. Launch Control and Flatshifting are handled through their own configurable 32x32 resolution fuel and spark maps.

### **Support for AIM Sport dashboards and Dashdaq Dashboards:**

Full compatibility with the Aimsports MXL line and dashdaq

<http://www.aimsports.com>

<http://www.dashdaq.com>



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**Configurable data logging capability:**

New data logging capability with spreadsheet and graphs

Internal or external map sensor:

Onboard Internal MAP sensor now supports up to 45psi (60psi absolute)

New optional 5 bar External Map sensor supports up to 60psi (75psi absolute)

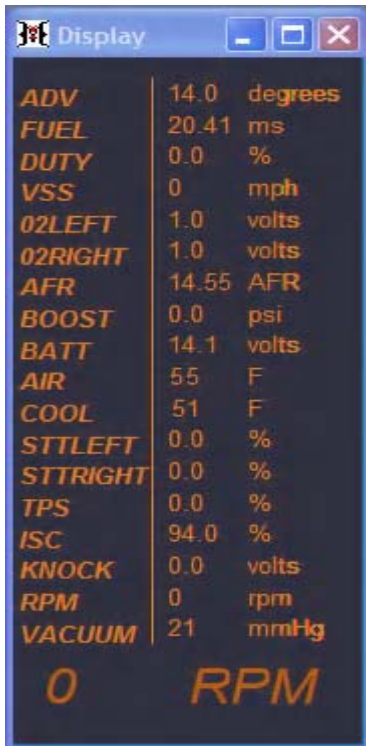
**Configurable Auxiliary outputs:**

Fourteen configurable outputs with up to 4 different configurable variables using "and", "or", or "nor" choices.

Unused Injector drivers can also be used for auxiliary outputs. Outputs 2 - 8 can be used for staged injection or general purpose switching, and outputs 2 - 5 can be used for PWM control

**Auxiliary inputs:**

Now ten configurable inputs are available to request various functions. (\*Cars with Stepper motor idle control still only has 6 inputs)

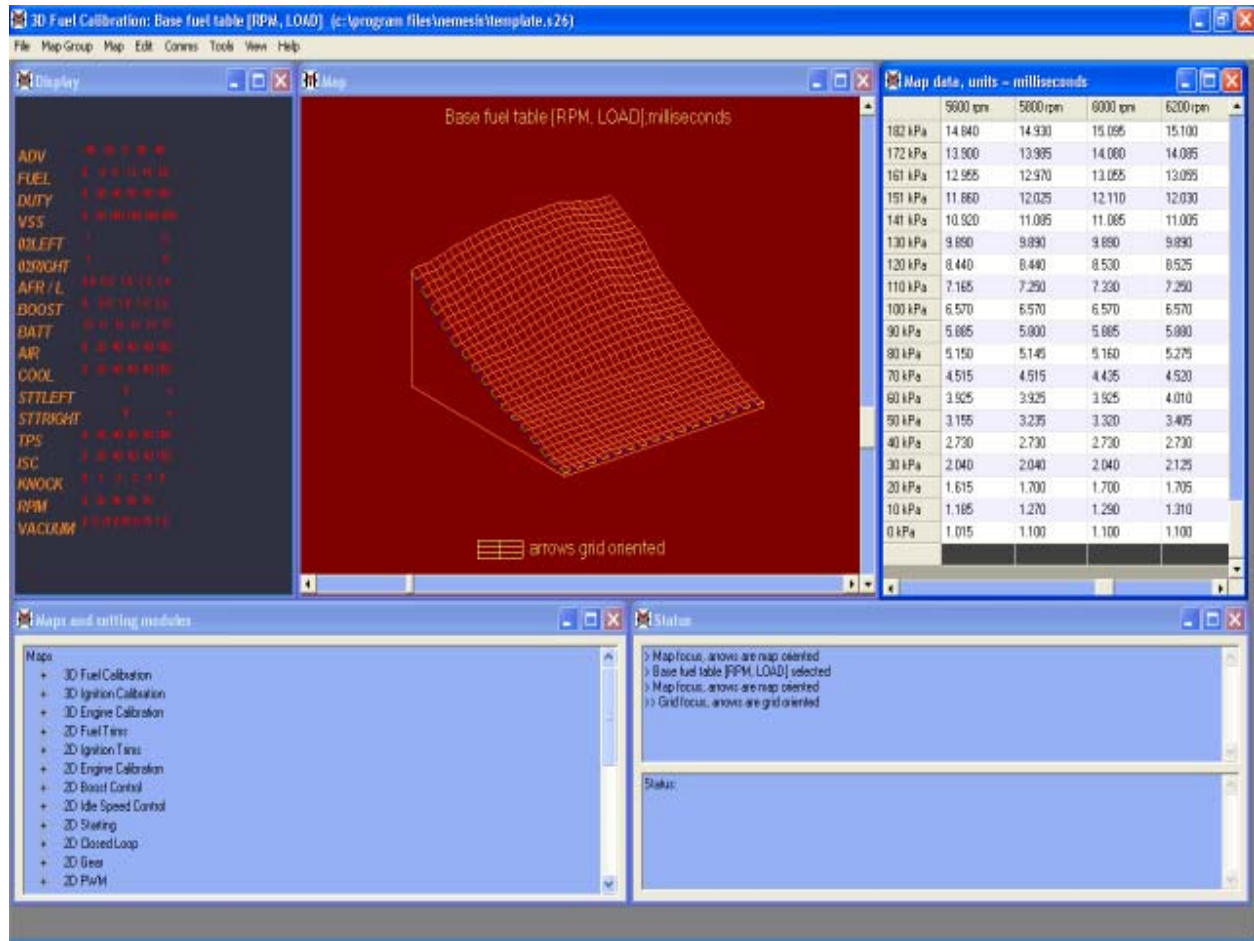


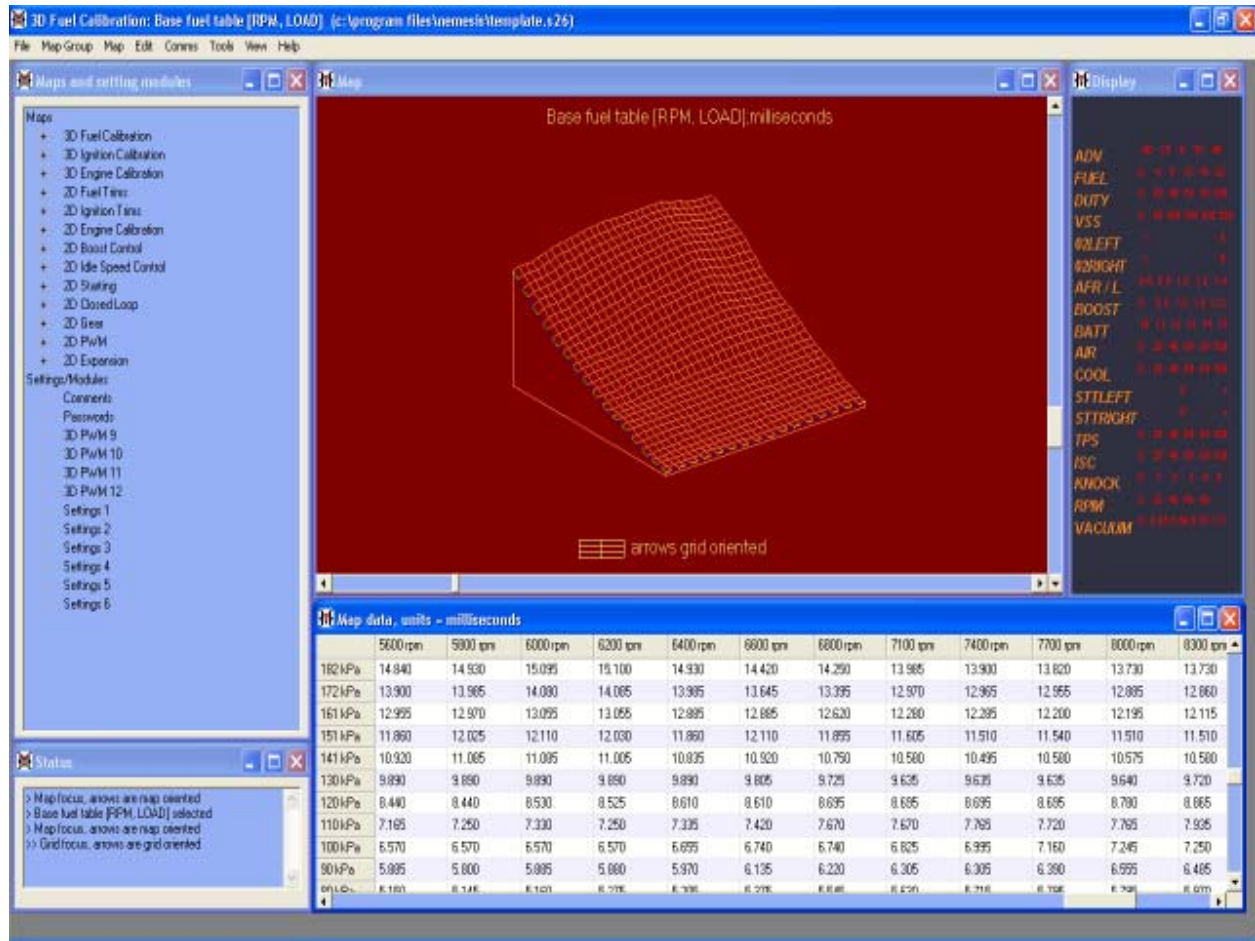
- ADV is ignition timing advance in degrees BTDC
- FUEL is injection pulse width in milliseconds
- DUTY is injector duty cycles in percent
- VSS is vehicle speed
- O2LEFT is the raw voltage from the left narrowband oxygen sensor
- O2RIGHT is the raw voltage from the right narrowband oxygen sensor
- AFR is the reading from the O2 wideband sensor
- BOOST is intake manifold boost gauge pressure
- BATT is the voltage across the Hydra Nemesis 2.6 unit's power pins
- AIR is the air temperature sensor reading
- COOL is the coolant temperature reading
- STTLEFT is the left module short-term closed loop fuel trim
- STTRIGHT is the right module short-term closed loop trim
- TPS is the throttle opening value in percent
- STTRIGHT is the right module short-term closed loop trim
- ISC is the idle speed control output in percent
- KNOCK is the knock sensor voltage
- RPM is engine speed and
- VACUUM is intake manifold absolute vacuum pressure

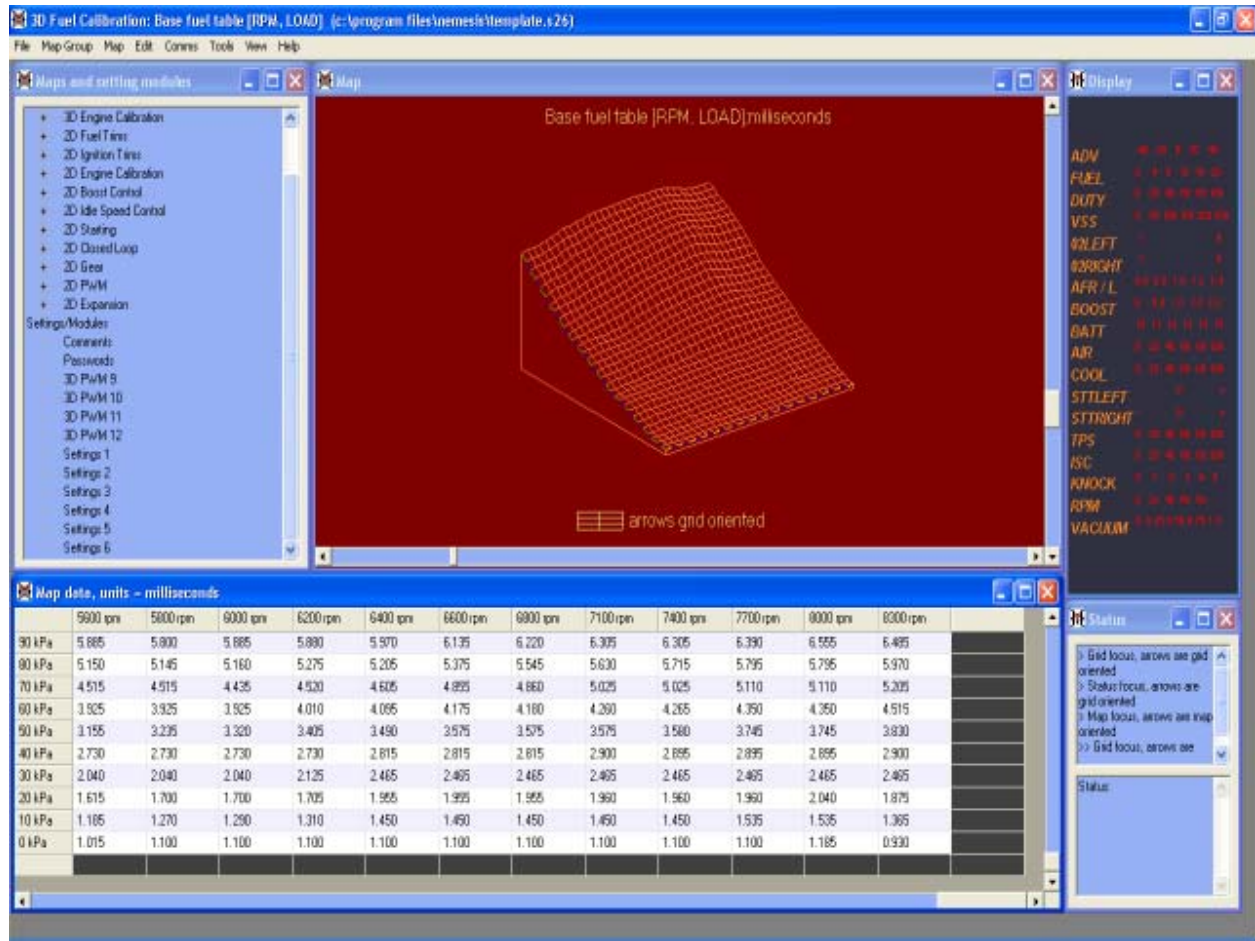


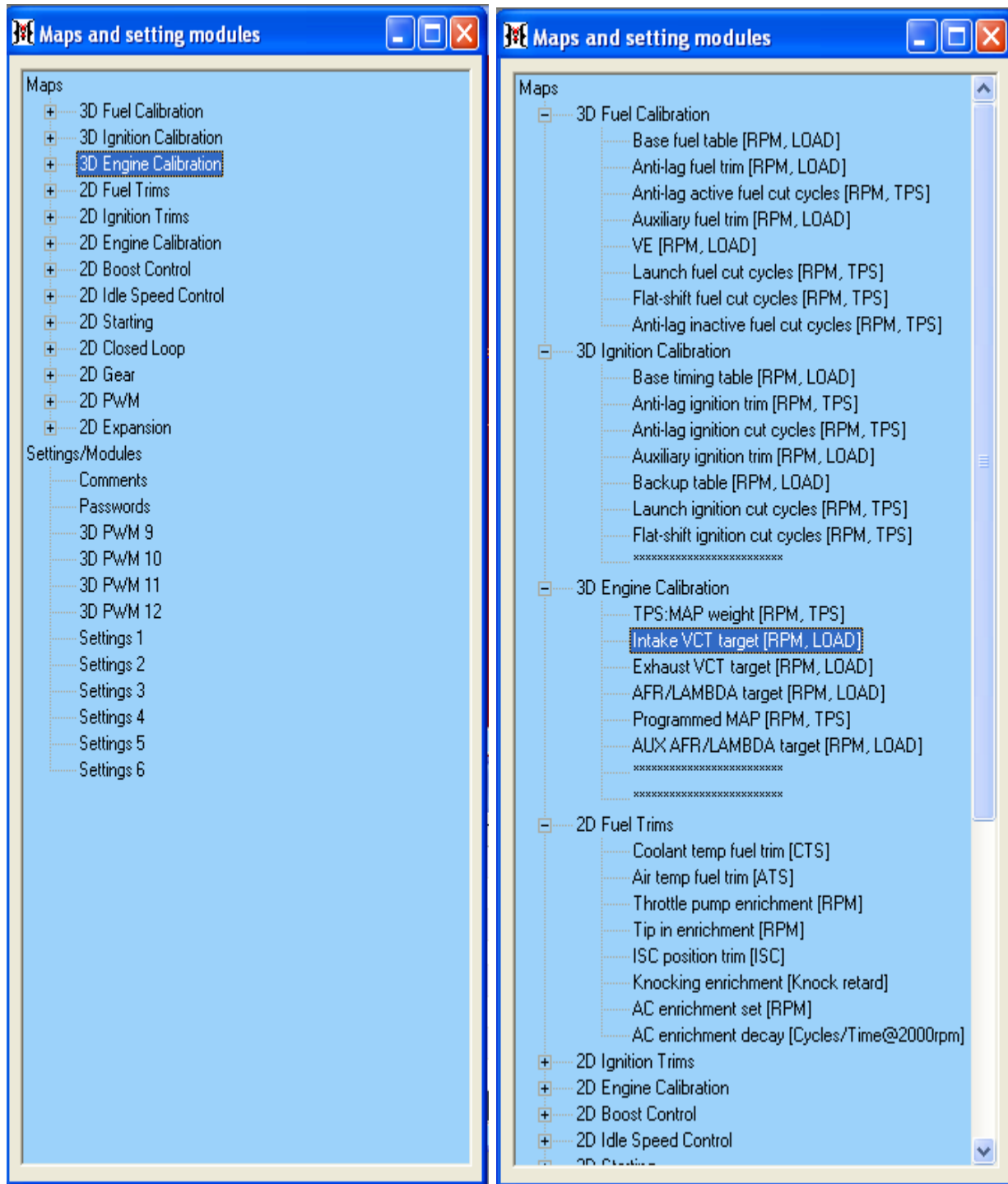
Display Status Window

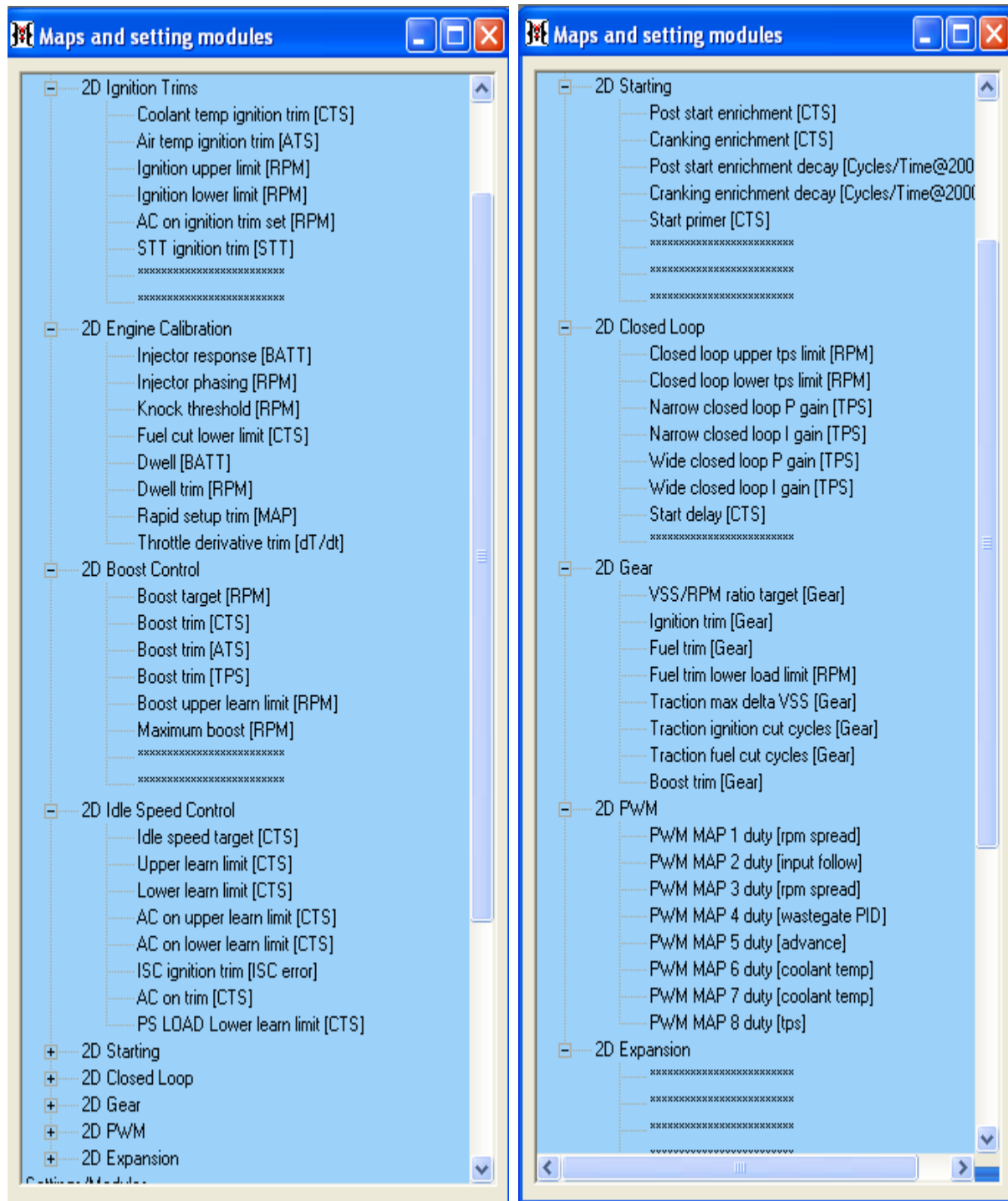
## Programming and Monitoring views













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## Accessories Supported



**Aim Sports Dash Board**

## HydraMist Water Injection Kit





W.Injection = Display's when system is on

Water Level = Illuminates when water level is low. Pump will be turned off

Flow = Shows flow from water flow sensor

B = Illuminates when Hydra Auxiliary Maps are enabled

SC = Adjusts the range of flow display

WL = Water flow low fault

WH = Water flow high fault



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## Hydramist Kit

- 150W Hydramist Pump with 125psi By-Pass valve
- 22cc Surge Arrestor Assembly
- HSV (High Speed Water Injection Valve)
- Hydramist Waterflow Guage Kit
- Water Level Sensor
- Water Jets, 0.8mm, 0.9mm and 1mm
- Water Tank Adaptor
- Hydramist Wiring Harness
- M8 Tap (For water jet)
- 5M of 6mm High Pressure Water/Methanol Line
- 2M of 4mm High Pressure Water/Methanol Line
- Stainless 100 Micron Filter
- 40A Pump Relay
- Hydramist Wiring Diagram