

## **MAP-ECU2 V3.1.0 Enhancements**

### ***Second NOS Channel***

A second independent NOS channel with independent RPM Min/Max and TPS Min % has been added.

### ***Base Timing Display and Logging using KVF Input***

The KVF Input can be configured to accept a Top Dead Centre (TDC) crankshaft position sensor input which is used to calculate base timing. Hall Effect sensors can be connected directly to the KVF Input while Reluctor sensors require hardware adaptor.

### ***Late model Wideband AFR Sensor support***

Support for late model OEM Air/Fuel Ratio (AFR) Sensors (current based rather than voltage) within O2 Adjust using an external MAP-ECU2 AFR Sensor Calibrator module.

### ***Knock Support***

The KVF Input can be configured as a digital Knock input suitable for a GM™ Knock Processor. The MAP-ECU2 can retard timing for a period of time if knock reaches a user defined threshold. A GM™ Knock Processor and Knock Sensor are required for this function. The input cannot be connected directly to a Knock Sensor.

### ***Electronic Boost Control (EBC) Enhancements***

The EBC has been enhanced with a Duty Cycle only mode where the EBC operates in open-loop mode, i.e. no pressure feedback.

A new EBC Fast Spool mode for Internal Wastegate turbos has been added to eliminate wastegate creep. Fast Spool mode diverts pressure from the wastegate actuator until a user configured point, usually 80% of target boost, is reached.

### ***Additional modes of operation***

There are sixteen (16) Elimination and Intercept modes available with V3.1 of MAP-ECU2, as follows:

1. MAF Elimination
2. MAP Replacement
3. MAF Intercept, MAP Y-axis
4. MAF Intercept, MAF Y-axis
5. KVF Elimination
6. HF KVF Elimination
7. KVF Intercept, MAP Y-axis
8. HF KVF Intercept, MAP Y-axis
9. KVF Intercept, KVF Y-axis
10. HF KVF Intercept, KVF Y-axis
11. MAF Elimination, TPS Y-axis
12. KVF Elimination, TPS Y-axis
13. HF KVF Elimination, TPS Y-axis
14. MAF Intercept, TPS Y-axis
15. KVF Intercept, TPS Y-axis

## 16. HF KVF Intercept, TPS Y-axis

### **MAF Elimination**

MAF Elimination mode removes the restrictive OEM voltage based air flow meter using the MAP-ECU2 fuel table.

### **MAP Replacement**

MAP Replacement mode replaces the OEM voltage based MAP sensor using the MAP-ECU2 fuel table.

### **MAF Intercept, MAP Y-axis**

This mode retains the OEM MAF sensor and uses the fuel table to adjust the MAF sensor voltage by up to +/-2.50V. The load axis of the fuel table (Y-axis) is driven by the MAP-ECU2 MAP sensor.

### **MAF Intercept, MAF Y-axis**

This mode retains the OEM MAF sensor and uses the fuel table to adjust the MAF sensor voltage by up to +/-2.50V. The load axis of the fuel table (Y-axis) is driven by the MAF sensor input voltage.

### **KVF Elimination**

KVF Elimination mode removes the restrictive OEM frequency based Karman Vortex air flow meter using the MAP-ECU2 fuel table. Output frequency range is 16Hz-3400Hz in 1Hz steps.

### **HF KVF Elimination**

HF KVF Elimination mode removes the restrictive OEM frequency based air flow meter using the MAP-ECU2 fuel table. Some modern vehicles, e.g. BMW™ Mini™, use traditional Hotwire MAF's but instead of a voltage output, have a digital frequency output. Output frequency range is 48Hz-9999Hz in 3Hz steps.

### **KVF Intercept, MAP Y-axis**

This mode retains the OEM Karman Vortex air flow meter and uses the fuel table to adjust the KVF frequency by up to +/-1700Hz in 1Hz steps. The load axis of the fuel table (Y-axis) is driven by the MAP-ECU2 MAP sensor.

### **HF KVF Intercept, MAP Y-axis**

This mode retains the OEM High Frequency air flow meter and uses the fuel table to adjust the output frequency by up to +/-4998Hz in 3Hz steps. The load axis of the fuel table (Y-axis) is driven by the MAP-ECU2 MAP sensor.

### **KVF Intercept, KVF Y-axis**

This mode retains the OEM Karman Vortex air flow meter and uses the fuel table to adjust the KVF frequency by up to +/-1700Hz in 1Hz steps. The load axis of the fuel table (Y-axis) is driven by the KVF sensor.

### **HF KVF Intercept, KVF Y-axis**

This mode retains the OEM High Frequency air flow meter and uses the fuel table to adjust the output frequency by up to +/-4998Hz in 3Hz steps. The load axis of the fuel table (Y-axis) is driven by the input frequency.

### **MAF Elimination, TPS Y-axis**

MAF Elimination mode removes the restrictive OEM voltage based air flow meter using the MAP-ECU2 fuel table, but uses the TPS input as the load input of the fuel table, i.e. Y-axis. This mode is designed for Naturally Aspirated engines that do not have reliable vacuum for MAP based load sensing due to a large cam, etc.

### **KVF Elimination, TPS Y-axis**

KVF Elimination mode removes the restrictive OEM frequency based air flow meter using the MAP-ECU2 fuel table, but uses the TPS input as the load input of the fuel table, i.e. Y-axis. This mode is designed for Naturally Aspirated engines that do not have reliable vacuum for MAP based load sensing due to a large cam, etc.

### **HF KVF Elimination, TPS Y-axis**

HF KVF Elimination mode removes the restrictive OEM High Frequency based air flow meter using the MAP-ECU2 fuel table, but uses the TPS input as the load input of the fuel table, i.e. Y-axis. This mode is designed for Naturally Aspirated engines that do not have reliable vacuum for MAP based load sensing due to a large cam, etc.

### **MAF Intercept, TPS Y-axis**

This mode retains the OEM MAF sensor and uses the fuel table to adjust the MAF sensor voltage by up to +/-2.50V. The load axis of the fuel table (Y-axis) is driven by the TPS input and is designed for Naturally Aspirated engines that do not have reliable vacuum for MAP based load sensing due to a large cam, etc.

### **KVF Intercept, TPS Y-axis**

This mode retains the OEM Frequency based air flow meter and uses the fuel table to adjust the output frequency by up to +/-1700Hz. The load axis of the fuel table (Y-axis) is driven by the TPS input and is designed for Naturally Aspirated engines that do not have reliable vacuum for MAP based load sensing due to a large cam, etc.

### **HF KVF Intercept, TPS Y-axis**

This mode retains the OEM High Frequency based air flow meter and uses the fuel table to adjust the output frequency by up to +/-4998Hz. The load axis of the fuel table (Y-axis) is driven by the TPS input and is designed for Naturally Aspirated engines that do not have reliable vacuum for MAP based load sensing due to a large cam, etc.

### ***Dual Fuel table mode***

MAP-ECU2 can be configured to use the primary and secondary fuel tables simultaneously where dual independent MAF outputs are required. Applications include vehicles with dual MAF or MAP sensors, especially where the sensors have different operational ranges. For example, the R56 BMW™ Mini™ runs two (2) MAP sensors. One sensor is 1-Bar and the other is 2-Bar therefore requiring quite different fuel tables for MAP replacement.

### ***Auxiliary RPM input***

The KVF Input can be configured to operate as the RPM input if the Ignition channels cannot be used.

### ***Independent Wideband input***

The MAP-ECU2 can be configured to use a free analog voltage input as the Wideband AFR meter input. This allows an external Wideband unit to be connected to the MAP-ECU2 as well as dedicating O2 and O2B to OEM O2 sensors and O2 Adjust functions.

### ***Additional Auxiliary Injector outputs***

Switched Outputs #1, #2 and #3 can be configured to operate as Auxiliary Injector drivers to drive up to six (6) high impedance injectors directly. Two (2) high impedance saturation-type fuel injectors can be operated in parallel from each output.

### ***FCD Enhancements***

An additional FCD channel has been added to provide a total of two (2) independent FCD channels. Both FCD's have been enhanced to include a pressure release setting allowing the user to configure a new, higher fuel cut instead of eliminating it completely. This adds a level of safety not normally found for traditional FCD's.

### ***High Frequency KVF Support***

The KVF Output has been enhanced to allow frequencies up to 9999Hz in 3Hz steps.

### ***Launch Control Enhanced***

The Launch Control algorithm has been enhanced to fire at least one (1) cylinder per 720° of crankshaft rotation for an improved 'sound' on the rev limiter.

### ***Primary/Secondary Switch Override***

The MAP-ECU2 can be configured to either hand over control of Primary/Secondary table selection to MAP-CAL2 when connected or ignore MAP-CAL2 and read the configured Primary/Secondary switch.

### ***MAF/KVF Clamp***

The MAP-ECU2 can be configured to clamp the MAF voltage or KVF frequency fuel output regardless of fuel table entries. The MAF voltage can be clamped to any voltage between 0.0 and 5.0 volts in 0.1 volt steps. KVF output frequency can be clamped between 100Hz and 10,000Hz in 100Hz steps. This feature effectively integrates a Fuel Cut Defeat function with the fuel table without using either of the FCD functions or requiring additional devices or wiring.

### ***Speed Cut Defeat Enhancement***

The Speed Cut Defeat (SCD) had been enhanced to include a low frequency mode for frequencies in the range 16Hz to 250Hz in steps of 1Hz for vehicles whose speed signal is a low range. High range remains for frequencies of 100Hz to 10,000Hz in 100Hz steps.

### ***MAP-CAL2 New Features***

- Selectable Grid Lines on Log

- Faster Cursor positioning in the Log using the mouse
- Log displays zones selected by cursor
- Extended Air/Fuel Ratio Display to 8:1 and 25:1
- Firmware download only allowed when RPM=0
- Imports and converts MAP-CAL2 V3.0.3 file formats