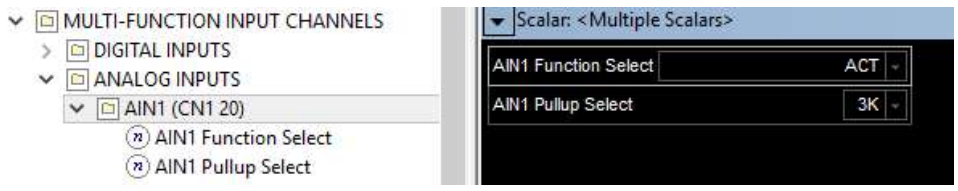
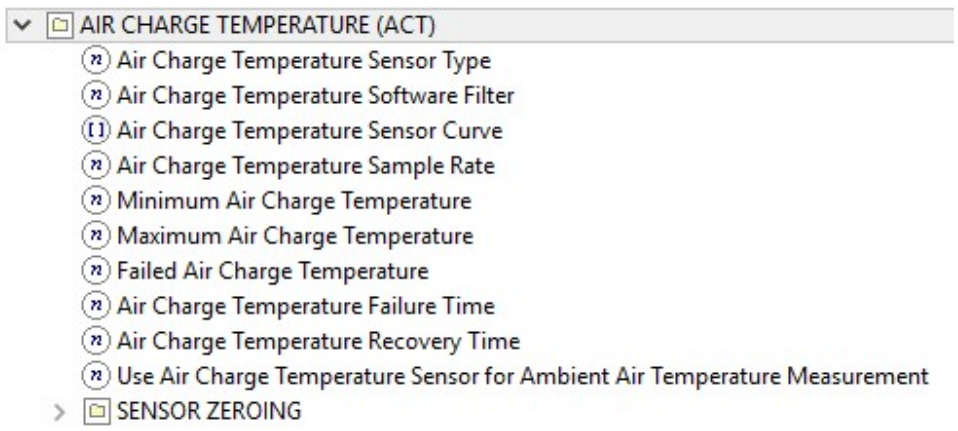
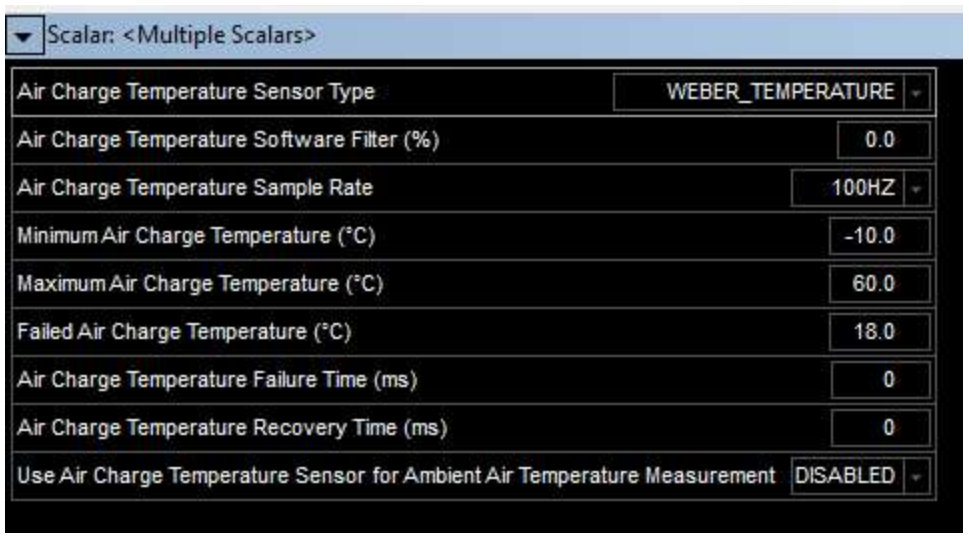
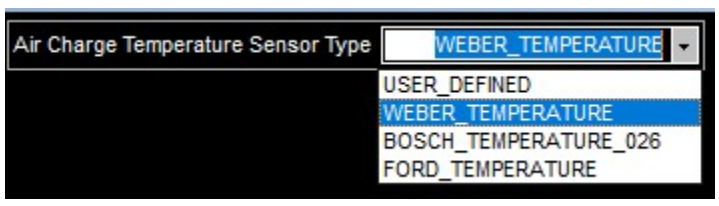
VEMS Advanced hardware

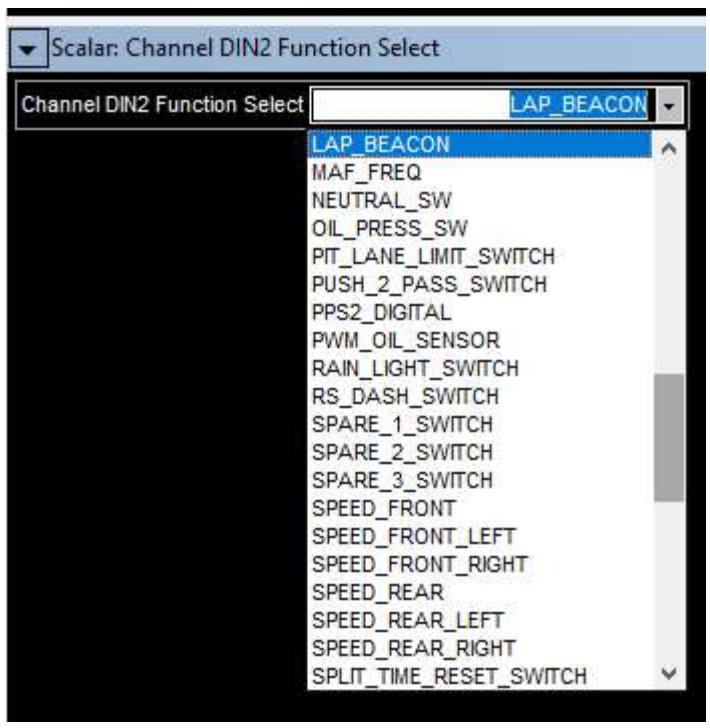
Monday, December 11, 2017 3:53 PM





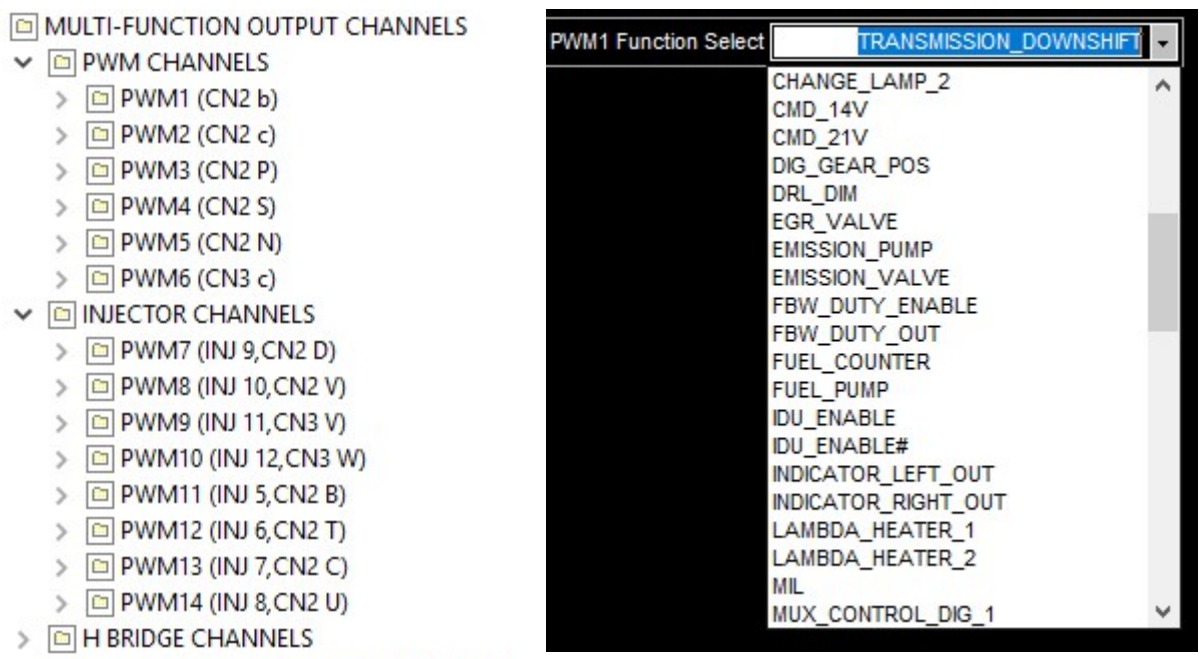


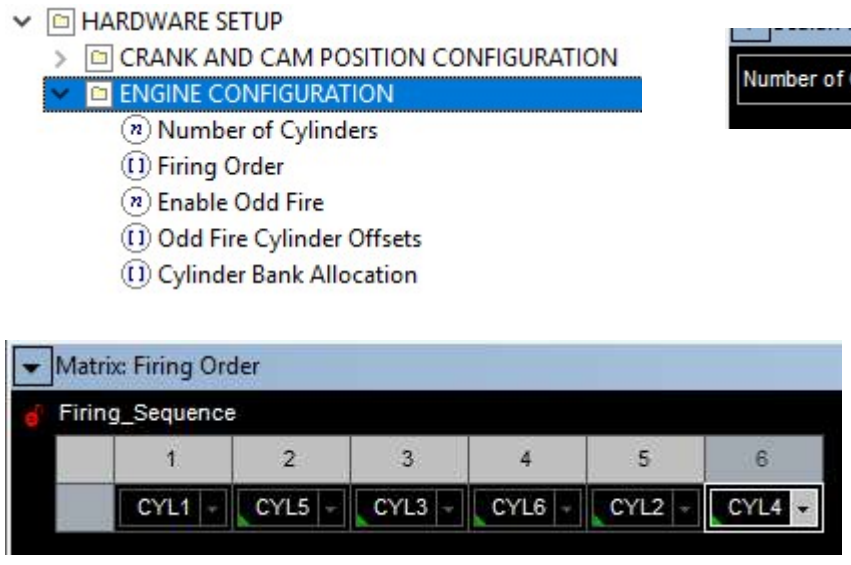


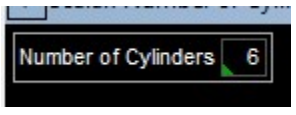


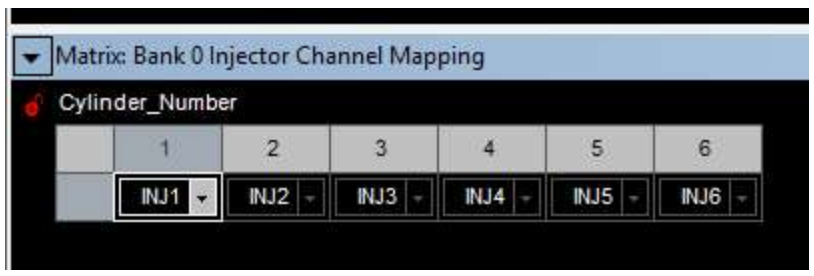
Inputs:

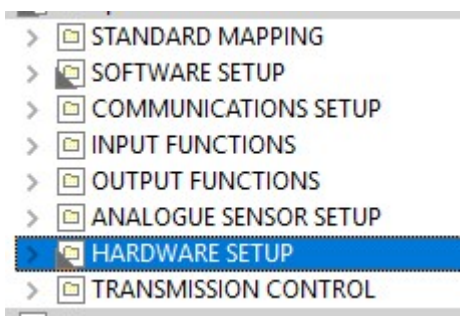
1. AIN1 or pin 20 on connector 1 can have any pre-defined analog input selected from a drop down menu, a pullup can be enabled/disabled. The ECU or Vemstune alerts if the same sensor has been selected more than once from all the analog inputs available.
2. The pre-defined sensor has specific variables associated with it, not the same on all sensors as can be seen from Air charge temp as ambient temp variable, air charge in this case refers to a intake manifold temp sensor.
3. Sensor type can be user defined using the "sensor curve" or a predefined curve already in the firmware
4. The sensor curve is a multipoint voltage curve the same as the current 17point curve.
5. Min and max readings and failure times will dictate if the output becomes the "Failed" value for this sensor, this way sensible readings can be setup for calculations in case the sensor fails, selecting the most commonly seen value here helps keep things running close to ideal.
6. Zeroing is for pressure or distance sensors so they can be offset to a target (Probably not really needed).
7. In case of output pins being able to be analogs also when not being used for outputs, then they can be set to "analog alternative" as the function for example and then an analog input in the next drop down list.
8. Digital inputs are setup much the same, i.e. the function is selected from a drop down menu, they can also be made to be analog alternatives (EOT refers to engine oil temp in this case)











Outputs:

1. Outputs are also selected from drop down menus in a way to associate pins with output functions.
2. Type of outputs are organized into groups.

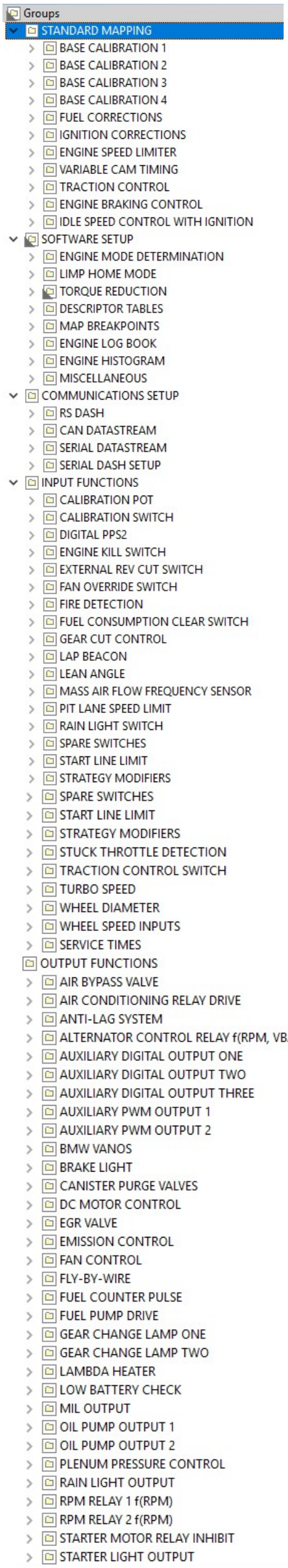
Engine setup:

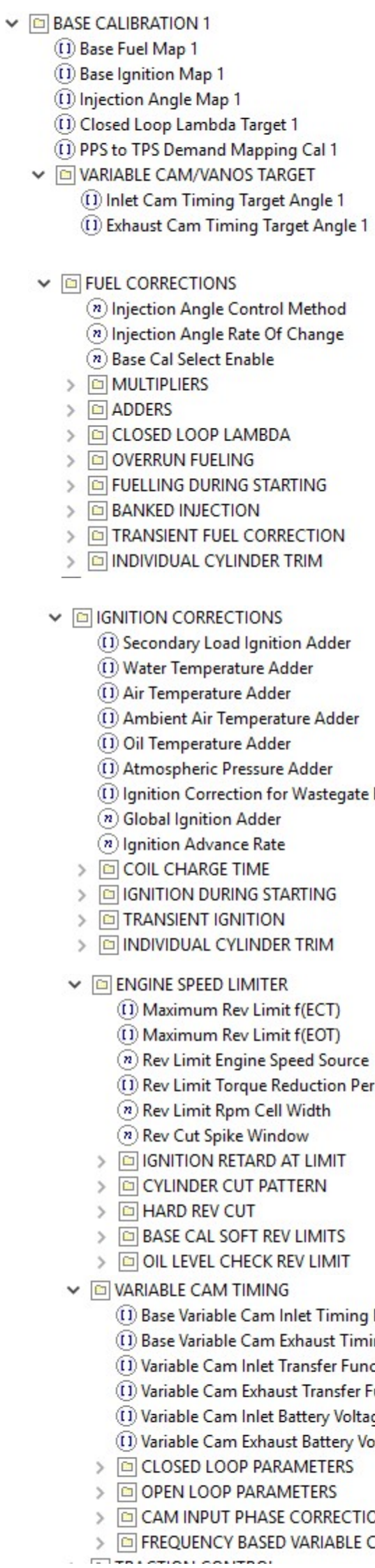
Here the firing order is setup without any reference to output pins for injectors or coils. It's imperative that cylinder controls in the calibration / tuning part of the ECU are organized without needing any referencing to their respective output pins. That is dealt with in the engine setup only. Everything else only has references to cylinder numbers.

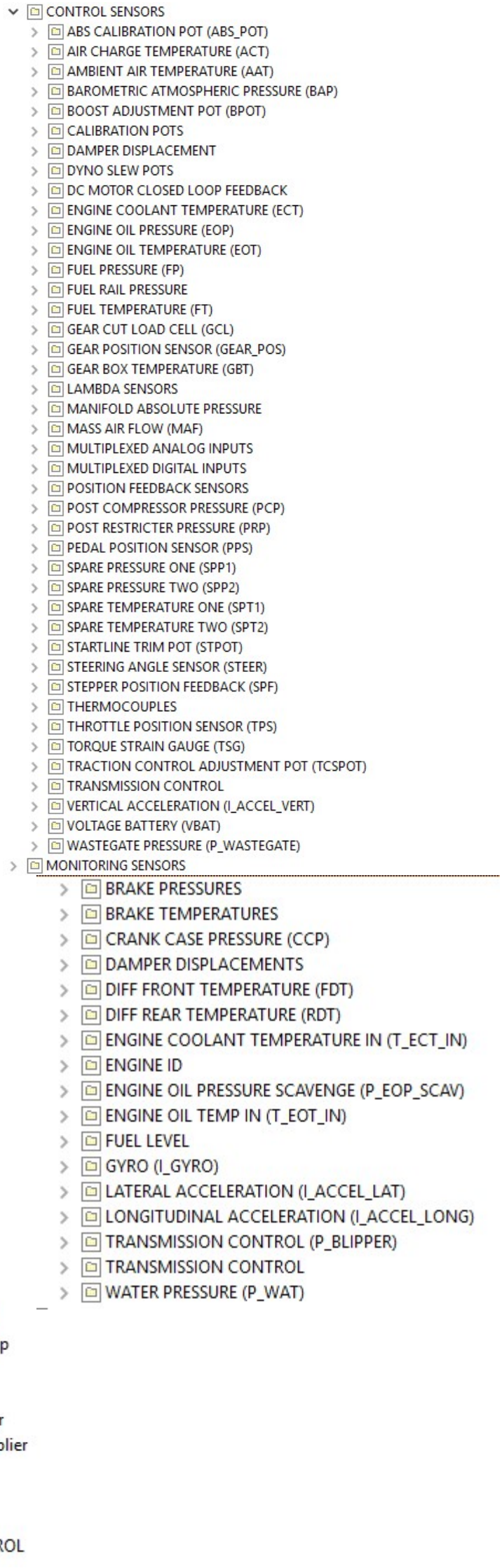
To the left here is Cylinder firing order, then below, each cylinder is associated with a injector output, the injector output is a pre-defined output pin on the ECU (references to which pins they are wouldn´t hurt). Rest of the ECU only refers to cylinder numbers in all calculations and tuning.

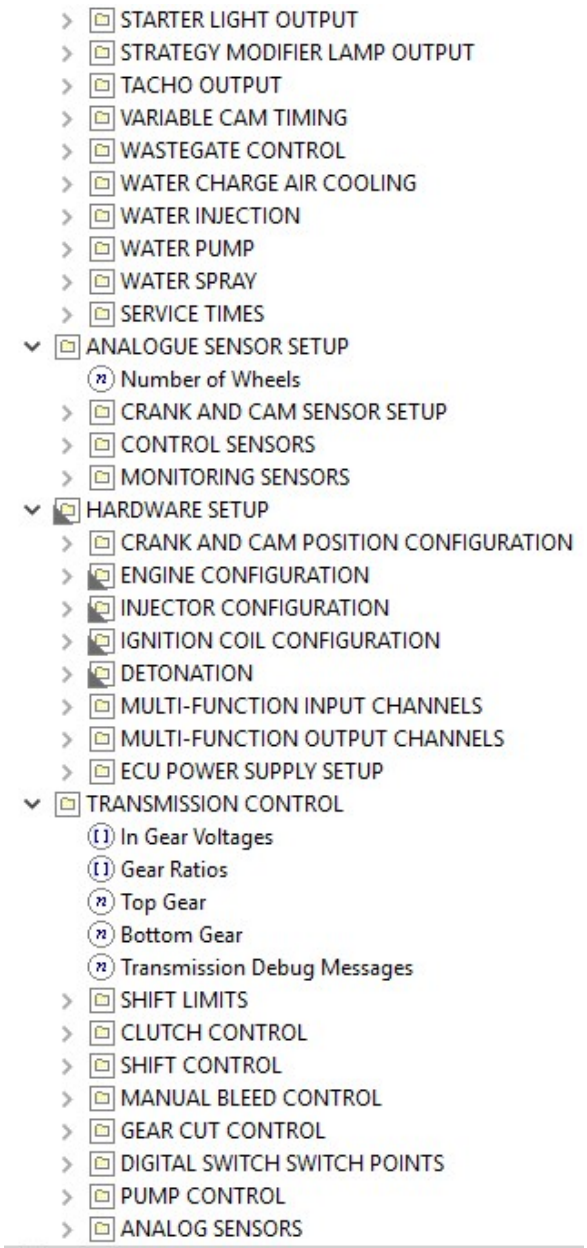
I believe this kind of organizing will help greatly in terms of keeping Vemstune menus organised and logical for setting or changing a ECU when more advanced ECU hardware is made available in the future.

The ECU setup essentially is two parts, setting up the ECU in terms of hardware association to functions(including cam and crank stuff) and then the actual calibration itself which is void of all references to the hardware interface.


Groups
STANDARD MAPPING
BASE CALIBRATION 1
BASE CALIBRATION 2
BASE CALIBRATION 3
BASE CALIBRATION 4
FUEL CORRECTIONS
IGNITION CORRECTIONS
ENGINE SPEED LIMITER
VARIABLE CAM TIMING
TRACTION CONTROL
ENGINE BRAKING CONTROL
IDLE SPEED CONTROL WITH IGNITION
SOFTWARE SETUP
ENGINE MODE DETERMINATION
LIMP HOME MODE
TORQUE REDUCTION
DESCRIPTOR TABLES
MAP BREAKPOINTS
ENGINE LOG BOOK
ENGINE HISTOGRAM
MISCELLANEOUS
COMMUNICATIONS SETUP
RS DASH
CAN DATASTREAM
SERIAL DATASTREAM
SERIAL DASH SETUP
INPUT FUNCTIONS
CALIBRATION POT
CALIBRATION SWITCH
DIGITAL PPS2
ENGINE KILL SWITCH
EXTERNAL REV CUT SWITCH
FAN OVERRIDE SWITCH
FIRE DETECTION
FUEL CONSUMPTION CLEAR SWITCH
GEAR CUT CONTROL
LAP BEACON
LEAN ANGLE
MASS AIR FLOW FREQUENCY SENSOR
PIT LANE SPEED LIMIT
RAIN LIGHT SWITCH
SPARE SWITCHES
START LINE LIMIT
STRATEGY MODIFIERS
SPARE SWITCHES
START LINE LIMIT
STRATEGY MODIFIERS
STUCK THROTTLE DETECTION
TRACTION CONTROL SWITCH
TURBO SPEED
WHEEL DIAMETER
WHEEL SPEED INPUTS
SERVICE TIMES
OUTPUT FUNCTIONS
AIR BYPASS VALVE
AIR CONDITIONING RELAY DRIVE
ANTI-LAG SYSTEM
ALTERNATOR CONTROL RELAY f(RPM, VBAT, TPS)
AUXILIARY DIGITAL OUTPUT ONE
AUXILIARY DIGITAL OUTPUT TWO
AUXILIARY DIGITAL OUTPUT THREE
AUXILIARY PWM OUTPUT 1
AUXILIARY PWM OUTPUT 2
BMW VANOS
BRAKE LIGHT
CANISTER PURGE VALVES
DC MOTOR CONTROL
EGR VALVE
EMISSION CONTROL
FAN CONTROL
FLY-BY-WIRE
FUEL COUNTER PULSE
FUEL PUMP DRIVE
GEAR CHANGE LAMP ONE
GEAR CHANGE LAMP TWO
LAMBDA HEATER
LOW BATTERY CHECK
MIL OUTPUT
OIL PUMP OUTPUT 1
OIL PUMP OUTPUT 2
PLENUM PRESSURE CONTROL
RAIN LIGHT OUTPUT
RPM RELAY 1 f(RPM)
RPM RELAY 2 f(RPM)
STARTER MOTOR RELAY INHIBIT
STARTER LIGHT OUTPUT


BASE CALIBRATION 1
Base Fuel Map 1
Base Ignition Map 1
Injection Angle Map 1
Closed Loop Lambda Target 1
PPS to TPS Demand Mapping Cal 1
VARIABLE CAM/VANOS TARGET
Inlet Cam Timing Target Angle 1
Exhaust Cam Timing Target Angle 1
FUEL CORRECTIONS
Injection Angle Control Method
Injection Angle Rate Of Change
Base Cal Select Enable
MULTIPLIERS
ADDERS
CLOSED LOOP LAMBDA
OVERRUN FUELING
FUELLING DURING STARTING
BANKED INJECTION
TRANSIENT FUEL CORRECTION
INDIVIDUAL CYLINDER TRIM
IGNITION CORRECTIONS
Secondary Load Ignition Adder
Water Temperature Adder
Air Temperature Adder
Ambient Air Temperature Adder
Oil Temperature Adder
Atmospheric Pressure Adder
Ignition Correction for Wastegate Error
Global Ignition Adder
Ignition Advance Rate
COIL CHARGE TIME
IGNITION DURING STARTING
TRANSIENT IGNITION
INDIVIDUAL CYLINDER TRIM
ENGINE SPEED LIMITER
Maximum Rev Limit f(ECT)
Maximum Rev Limit f(EOT)
Rev Limit Engine Speed Source
Rev Limit Torque Reduction Per Gear
Rev Limit Rpm Cell Width
Rev Cut Spike Window
IGNITION RETARD AT LIMIT
CYLINDER CUT PATTERN
HARD REV CUT
BASE CAL SOFT REV LIMITS
OIL LEVEL CHECK REV LIMIT
VARIABLE CAM TIMING
Base Variable Cam Inlet Timing Duty Map
Base Variable Cam Exhaust Timing Duty Map
Variable Cam Inlet Transfer Function
Variable Cam Exhaust Transfer Function
Variable Cam Inlet Battery Voltage Multiplier
Variable Cam Exhaust Battery Voltage Multiplier
CLOSED LOOP PARAMETERS
OPEN LOOP PARAMETERS
CAM INPUT PHASE CORRECTION
FREQUENCY BASED VARIABLE CAM CONTROL


CONTROL SENSORS
ABS CALIBRATION POT (ABS_POT)
AIR CHARGE TEMPERATURE (ACT)
AMBIENT AIR TEMPERATURE (AAT)
BAROMETRIC ATMOSPHERIC PRESSURE (BAP)
BOOST ADJUSTMENT POT (BPOT)
CALIBRATION POTS
DAMPER DISPLACEMENT
DYNO SLEW POTS
DC MOTOR CLOSED LOOP FEEDBACK
ENGINE COOLANT TEMPERATURE (ECT)
ENGINE OIL PRESSURE (EOP)
ENGINE OIL TEMPERATURE (EOT)
FUEL PRESSURE (FP)
FUEL RAIL PRESSURE
FUEL TEMPERATURE (FT)
GEAR CUT LOAD CELL (GCL)
GEAR POSITION SENSOR (GEAR_POS)
GEAR BOX TEMPERATURE (GBT)
LAMBDA SENSORS
MANIFOLD ABSOLUTE PRESSURE
MASS AIR FLOW (MAF)
MULTIPLEXED ANALOG INPUTS
MULTIPLEXED DIGITAL INPUTS
POSITION FEEDBACK SENSORS
POST COMPRESSOR PRESSURE (PCP)
POST RESTRICTER PRESSURE (PRP)
PEDAL POSITION SENSOR (PPS)
SPARE PRESSURE ONE (SPP1)
SPARE PRESSURE TWO (SPP2)
SPARE TEMPERATURE ONE (SPT1)
SPARE TEMPERATURE TWO (SPT2)
STARTLINE TRIM POT (STPOT)
STEERING ANGLE SENSOR (STEER)
STEPPER POSITION FEEDBACK (SPF)
THERMOCOUPLES
THROTTLE POSITION SENSOR (TPS)
TORQUE STRAIN GAUGE (TSG)
TRACTION CONTROL ADJUSTMENT POT (TCSPOT)
TRANSMISSION CONTROL
VERTICAL ACCELERATION (I_ACCEL_VERT)
VOLTAGE BATTERY (VBAT)
WASTEGATE PRESSURE (P_WASTEGATE)
MONITORING SENSORS
BRAKE PRESSURES
BRAKE TEMPERATURES
CRANK CASE PRESSURE (CCP)
DAMPER DISPLACEMENTS
DIFF FRONT TEMPERATURE (FDT)
DIFF REAR TEMPERATURE (RDT)
ENGINE COOLANT TEMPERATURE IN (T_ECT_IN)
ENGINE ID
ENGINE OIL PRESSURE SCAVENGE (P_EOP_SCAV)
ENGINE OIL TEMP IN (T_EOT_IN)
FUEL LEVEL
GYRO (I_GYRO)
LATERAL ACCELERATION (I_ACCEL_LAT)
LONGITUDINAL ACCELERATION (I_ACCEL_LONG)
TRANSMISSION CONTROL (P_BLIPPER)
TRANSMISSION CONTROL
WATER PRESSURE (P_WAT)


STARTER LIGHT OUTPUT
STRATEGY MODIFIER LAMP OUTPUT
TACHO OUTPUT
VARIABLE CAM TIMING
WASTEGATE CONTROL
WATER CHARGE AIR COOLING
WATER INJECTION
WATER PUMP
WATER SPRAY
SERVICE TIMES
ANALOGUE SENSOR SETUP
Number of Wheels
CRANK AND CAM SENSOR SETUP
CONTROL SENSORS
MONITORING SENSORS
HARDWARE SETUP
CRANK AND CAM POSITION CONFIGURATION
ENGINE CONFIGURATION
INJECTOR CONFIGURATION
IGNITION COIL CONFIGURATION
DETONATION
MULTI-FUNCTION INPUT CHANNELS
MULTI-FUNCTION OUTPUT CHANNELS
ECU POWER SUPPLY SETUP
TRANSMISSION CONTROL
In Gear Voltages
Gear Ratios
Top Gear
Bottom Gear
Transmission Debug Messages
SHIFT LIMITS
CLUTCH CONTROL
SHIFT CONTROL
MANUAL BLEED CONTROL
GEAR CUT CONTROL
DIGITAL SWITCH SWITCH POINTS
PUMP CONTROL
ANALOG SENSORS