Using Motec Hundred Series ECU's with AEM CD-7 Displays

Supported Motec Hardware

M400, M600, M800, M880 Transmitting Data Set #1

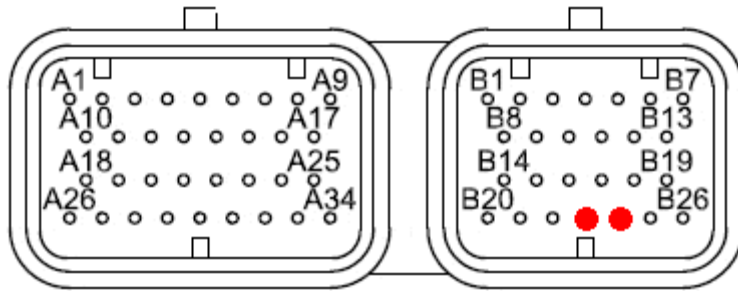### M84, M400, M600, M800, M880 Transmitting Data Set #3

CAN Bus Wiring

M84, M400, M600, M800 Wiring:
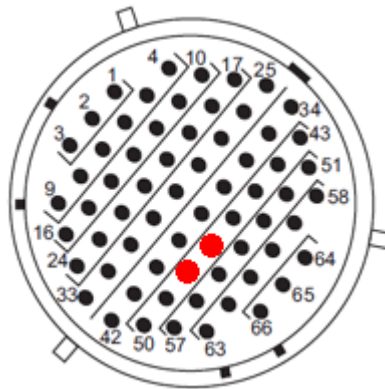CAN LOW = Pin B24
CAN HIGH = Pin B23

M84, M400, M600, M800
Looking into Connector on ECU

M880 Wiring:
CAN LOW = Pin 47
CAN HIGH = Pin 48

M880
Looking into Connector on ECU

AEM CD7 has 2 separate CAN ports and for 3rd party devices, AEM recommends you use AEM CAN BUS 2, whose connections are contained in an unterminated twisted/shielded flying lead in the dash harness

Motec CAN HIGH ➔ AEM CD7 Pin 5 (CAN 2+), Gray wire in twisted/shielded pair
Motec CAN LOW ➔ AEM CD7 Pin 6 (CAN 2-), Black wire in twisted/shielded pair

Terminating Resistor

All CAN networks require 2 terminating resistors, one located at each physical end of the network. You must determine how many and where your terminations are located. If the 2 are not properly installed you will have network drop outs. 3 won't work, neither will 1. There has to be 2. The AEM CD-7 has a software selectable Terminating resistor within the display. If the CD-7 is located at one end of the network then you can use this internal terminating resistor, otherwise you will need to install them externally.

Motec ECU Setup

The Motec ECU CAN configuration is set in the "Motec ECU Manager" software under the Adjust-General Setup-Communications-CAN Setup" menu option.

The AEM CD-7 supports both Motec Dataset 1 and Dataset 3

Dataset 1:
CAN 0 Data = 1
CAN 0 Address = 1520 (decimal)
CAN 0 Transfer Rate = 50 (hz)

Dataset 1 is the larger of the two and is primarily used for the ADL. It contains ~220 items.

Dataset 1 is supported by the M400, M600, M800 and M880 ECU's only. *The M84 does not support Dataset 1.*

Dataset 3:
CAN 0 Data = 3
CAN 0 Address = 232 (decimal)
CAN 0 Transfer Rate = 50 (hz)

Dataset 3 is primarily used for the MDD and contains ~197 items.

Dataset 3 is supported by the M84, M400, M600, M800 and M880 ECU's.

Dataset 1 and Dataset 3 share most of the same channels and both will likely meet all your needs.

Supported Channels – Dataset 1

Dataset 1 contains 220 specific functions and all have been mapped to the CD-7 and can be accessed for display or logging.

Aim Lambda 1	Aim Lambda 2	Aim Slip
Air Temperature	Auxiliary O/P 1 Duty Cycle	Auxiliary O/P 2 Duty Cycle
Auxiliary O/P 3 Duty Cycle	Auxiliary O/P 4 Duty Cycle	Auxiliary O/P 5 Duty Cycle
Auxiliary O/P 6 Duty Cycle	Auxiliary O/P 7 Duty Cycle	Auxiliary O/P 8 Duty Cycle
Battery Voltage	Diag_AT_ERR	Diag_BARO_ERR
Diag_BATV_ERR	Diag_DBW_AIM	Diag_DBW_CONT
Diag_DBW_ERR	Diag_DBW_FB	Diag_DCSERVO_CONT
Diag_DCSERVO_POS_ER	Diag_DELTA_BAT	Diag_ECUT_ERR
Diag_EGT1_ERR	Diag_EGT2_ERR	Diag_EGT3_ERR
Diag_EGT4_ERR	Diag_EGT5_ERR	Diag_EGT6_ERR
Diag_EGT7_ERR	Diag_EGT8_ERR	Diag_EMAP_ERR
Diag_ET_ERR	Diag_FP_ERR	Diag_FT_ERR
Diag_GEAR_FORCE_ERR	Diag_GEAR_V_ERR	Diag_INJ_MAX_DTY_ERR
Diag_INJ1_ERR	Diag_INJ1_OPEN	Diag_INJ1_PEAK
Diag_INJ1_SHORT	Diag_INJ2_ERR	Diag_INJ2_OPEN
Diag_INJ2_PEAK	Diag_INJ2_SHORT	Diag_INJ3_ERR
Diag_INJ3_OPEN	Diag_INJ3_PEAK	Diag_INJ3_SHORT
Diag_INJ4_ERR	Diag_INJ4_OPEN	Diag_INJ4_PEAK
Diag_INJ4_SHORT	Diag_INJ5_ERR	Diag_INJ5_OPEN
Diag_INJ5_PEAK	Diag_INJ5_SHORT	Diag_INJ6_ERR
Diag_INJ6_OPEN	Diag_INJ6_PEAK	Diag_INJ6_SHORT
Diag_INJ7_ERR	Diag_INJ7_OPEN	Diag_INJ7_PEAK
Diag_INJ7_SHORT	Diag_INJ8_ERR	Diag_INJ8_OPEN
Diag_INJ8_PEAK	Diag_INJ8_SHORT	Diag_KNOCK_ERR
Diag_LA1_ERR	Diag_LA1_HEATER_ERR	Diag_LA1_OT
Diag_LA1_SENS_ERR	Diag_LA2_ERR	Diag_LA2_HEATER_ERR
Diag_LA2_OT	Diag_LA2_SENS_ERR	Diag_LAT_G_ERR
Diag_LONG_G_ERR	Diag_LOW_BAT_ERR	Diag_MAF_ERR
Diag_MAP_ERR	Diag_MEM_ERR	Diag_NO_REF_ERR
Diag_NO_SYNC_ERR	Diag_OP_ERR	Diag_OT_ERR
Diag_OVER_BOOST_ERR	Diag_REF_ARM	Diag_REF_ERR
Diag_REF_LOW	Diag_REF_RNT	Diag_REF_TRIG
Diag_RESET_EXT	Diag_RESET_HALTMON	Diag_RESET_NOXTAL
Diag_RESET_SYS	Diag_RESET_TESTMOD	Diag_RPM_OVER_ERR
Diag_SLIP_V_ERR	Diag_STEMP_OMP_CONT	Diag_STEP_SERV_CONT
Diag_STEP_SERV_POS_ERR	Diag_SYNC_ARM	Diag_SYNC_ERR
Diag_SYNC_LOW	Diag_SYNC_RNT	Diag_SYNC_TRIG
Diag_TP_ERR	Diag_TP2_ERR	Diag_TPD_ERR
Diag_TPD2_ERR	Diag_USER1_ERR	Diag_USER2_ERR

Diag_USER3_ERR	Diag_USER4_ERR	Diag_USER5_ERR
Diag_USER6_ERR	Diag_USER7_ERR	Diag_USER8_ERR
Diag_VERT_G_ERR	Drive Speed	Drive Speed Left
Drive Speed Right	ECU Temperature	Efficiency Point
Engine Temperature	Exhaust Manifold Pressure	Exhaust Temperature 1
Exhaust Temperature 2	Fuel Actual Pulse Width	Fuel Comp 1
Fuel Comp 2	Fuel Cut Level	Fuel Effective Pulse Width
Fuel Injector Duty Cycle	Fuel Pressure	Fuel Temperature
Fuel Used	Gear	Gear Shift Force
Gear Voltage	Ground Speed	Ground Speed Left
Ground Speed Right	Ignition Advance	Ignition Cut Level
Knock Voltage	Lambda 1	Lambda 1 long term trim
Lambda 1 short term trim	Lambda 2	Lambda 2 long term trim
Lambda 2 short term trim	Launch RPM	Load Point
Manifold Pressure	Mass Air Flow	Oil Pressure
Oil Temperature	RPM	Slip
Stat_Air Con Request	Stat_Alternator Off	Stat_AuxPort/Spray Bar
Stat_Beacon Mark	Stat_Brake	Stat_Closed Loop La 1
Stat_Closed Loop La 2	Stat_Clutch	Stat_Digital Input 1
Stat_Digital Input 2	Stat_Digital Input 3	Stat_Digital Input 4
Stat_Dual RPM Limit	Stat_GCIC Request	Stat_Gear Change Ign Cut
Stat_Ground Speed Limit	Stat_Ignition Switch	Stat_Lambda 1 Cold
Stat_Lambda 2 Cold	Stat_Launch Control	Stat_Logging Enable
Stat_MDD Shift Light 1	Stat_MDD Shift Light 2	Stat_MDD Shift Light 3
Stat_MDD Shift Light 4	Stat_MDD Shift Light 5	Stat_MDD Status
Stat_MDD Warn	Stat_Nitrous	Stat_OMP Status
Stat_ORB Active	Stat_ORB Enable	Stat_ORB Table 2 Active
Stat_Overrun Boost	Stat_Overrun Fuel Cut	Stat_Power Steer OvLd
Stat_REF/SYNC Synched	Stat_RPM Limit Exceeded	Stat_Shift Down
Stat_Shift Up	Stat_Spray Bar	Stat_SW Input 1
Stat_SW Input 2	Stat_SW Input 3	Stat_SW Input 4
Stat_SW Input 5	Stat_SW Input 6	Stat_Telemetry Control
Stat_Traction Ctrl Disable	Sync Position	Throttle Position
User Channel 1	User Channel 2	User Channel 3
User Channel 4		

Supported Channels – Dataset 3

Dataset 3 contains 197 specific functions and all have been mapped to the CD-7 and can be accessed for display or logging.

Aim Lambda 1	Aim Lambda 2	Aim Slip
Air Temperature	Auxiliary O/P 1 Duty Cycle	Auxiliary O/P 2 Duty Cycle
Auxiliary O/P 3 Duty Cycle	Auxiliary O/P 4 Duty Cycle	Auxiliary O/P 5 Duty Cycle
Auxiliary O/P 6 Duty Cycle	Auxiliary O/P 7 Duty Cycle	Auxiliary O/P 8 Duty Cycle
Battery Voltage	Diag_AT_ERR	Diag_BARO_ERR
Diag_BATV_ERR	Diag_DBW_AIM	Diag_DBW_CONT
Diag_DBW_ERR	Diag_DBW_FB	Diag_DELTA_BAT
Diag_ECUT_ERR	Diag_EGT1_ERR	Diag_EGT2_ERR
Diag_EMAP_ERR	Diag_ER_ERR	Diag_FP_ERR
Diag_FT_ERR	Diag_GEAR_FORCE_ERR	Diag_GEAR_V_ERR
Diag_INJ_MAX_DTY_ERR	Diag_INJ1_ERR	Diag_INJ1_OPEN
Diag_INJ1_PEAK	Diag_INJ1_SHORT	Diag_INJ2_ERR
Diag_INJ2_OPEN	Diag_INJ2_PEAK	Diag_INJ2_SHORT
Diag_INJ3_ERR	Diag_INJ3_OPEN	Diag_INJ3_PEAK
Diag_INJ3_SHORT	Diag_INJ4_ERR	Diag_INJ4_OPEN
Diag_INJ4_PEAK	Diag_INJ4_SHORT	Diag_INJ5_ERR
Diag_INJ5_OPEN	Diag_INJ5_PEAK	Diag_INJ5_SHORT
Diag_INJ6_ERR	Diag_INJ6_OPEN	Diag_INJ6_PEAK
Diag_INJ6_SHORT	Diag_INJ7_ERR	Diag_INJ7_OPEN
Diag_INJ7_PEAK	Diag_INJ7_SHORT	Diag_INJ8_ERR
Diag_INJ8_OPEN	Diag_INJ8_PEAK	Diag_INJ8_SHORT
Diag_KNOCK_ERR	Diag_LA1_ERR	Diag_LA1_HEATER_ERR
Diag_LA1_OT	Diag_LA1_SENS_ERR	Diag_LA2_ERR
Diag_LA2_HEATER_ERR	Diag_LA2_OT	Diag_LA2_SENS_ERR
Diag_LAT_G_ERR	Diag_LONG_G_ERR	Diag_LOW_BAT_ERR
Diag_MAF_ERR	Diag_MAP_ERR	Diag_MEM_ERR
Diag_NO_REF_ERR	Diag_NO_SYNC_ERR	Diag_OP_ERR
Diag_OT_ERR	Diag_OVER_BOOST_ERR	Diag_REF_ARM
Diag_REF_ERR	Diag_REF_LOW	Diag_REF_RNT
Diag_REF_TRIG	Diag_RESET_EXT	Diag_RESET_HALTMON
Diag_RESET_NOXTAL	Diag_RESET_SYS	Diag_RESET_TESTMOD
Diag_RPM_OVER_ERR	Diag_SLIP_V_ERR	Diag_SYNC_ARM
Diag_SYNC_ERR	Diag_SYNC_LOW	Diag_SYNC_RNT
Diag_SYNC_TRIG	Diag_TP_ERR	Diag_USER1_ERR
Diag_USER2_ERR	Diag_USER3_ERR	Diag_USER4_ERR
Diag_VERT_G_ERR	Digital Input 1 Speed	Digital Input 2 Speed
Digital Input 3 Speed	Digital Input 3 Speed	Digital Input 4 Speed
Digital Input 4 Speed	Drive Speed	ECU Temperature
Efficiency Point	Engine Temperature	Exhaust Manifold Pressure

Exhaust Temperature 1	Exhaust Temperature 2	Fuel Actual Pulse Width
Fuel Comp 1	Fuel Comp 2	Fuel Cut Level
Fuel Effective Pulse Width	Fuel Injector Duty Cycle	Fuel Pressure
Fuel Temperature	Fuel Used	Gear
Gear Shift Force	Gear Voltage	Ground Speed
Ignition Advance	Ignition Cut Level	Knock Voltage
Lambda 1	Lambda 1 long term trim	Lambda 1 short term trim
Lambda 2	Lambda 2 long term trim	Lambda 2 short term trim
Launch RPM	Load Point	Manifold Pressure
Mass Air Flow	Oil Pressure	Oil Temperature
RPM	Slip	Stat_Air Con Request
Stat_Alternator Off	Stat_AuxPort/Spray Bar	Stat_Beacon Mark
Stat_Brake	Stat_Closed Loop La 1	Stat_Closed Loop La 2
Stat_Clutch	Stat_Digital Input 1	Stat_Digital Input 2
Stat_Digital Input 3	Stat_Digital Input 4	Stat_Dual RPM Limit
Stat_GCIC Request	Stat_Gear Change Ign Cut	Stat_Ground Speed Limit
Stat_Ignition Switch	Stat_Lambda 1 Cold	Stat_Lambda 2 Cold
Stat_Launch Control	Stat_Logging Enable	Stat_Nitrous
Stat_OMP Status	Stat_ORB Active	Stat_ORB Enable
Stat_ORB Table 2 Active	Stat_Overrun Boost	Stat_Overrun Fuel Cut
Stat_Power Steer OvLd	Stat_REF/SYNC Synched	Stat_RPM Limit Exceeded
Stat_Shift Down	Stat_Shift Up	Stat_Spray Bar
Stat_SW Input 1	Stat_SW Input 2	Stat_SW Input 3
Stat_SW Input 4	Stat_SW Input 5	Stat_SW Input 6
Stat_Telemetry Control	Stat_Traction Ctrl Disable	Sync Position
Throttle Position	User Channel 1	User Channel 2
User Channel 3	User Channel 4	

AEM Setup in DashDesign

To use this device, the AEM display must be running firmware 13x19 or later.

You can either start with a new dash layout by selecting "File" then "New" in DashDesign or you can select from a pre-designed layout that has screens already designed and inserted but has the CAN inputs left blank. These are chosen by selecting "File" then "Open" and selecting one of the setups titled xzyblank.aemcd7 with the xyz representing a description of the layouts contained in the file.

To enable support for Motec Data Set #1 in your setup, you select "Setup" then "Display" from the main DashDesign menu then change the CAN settings to those below:
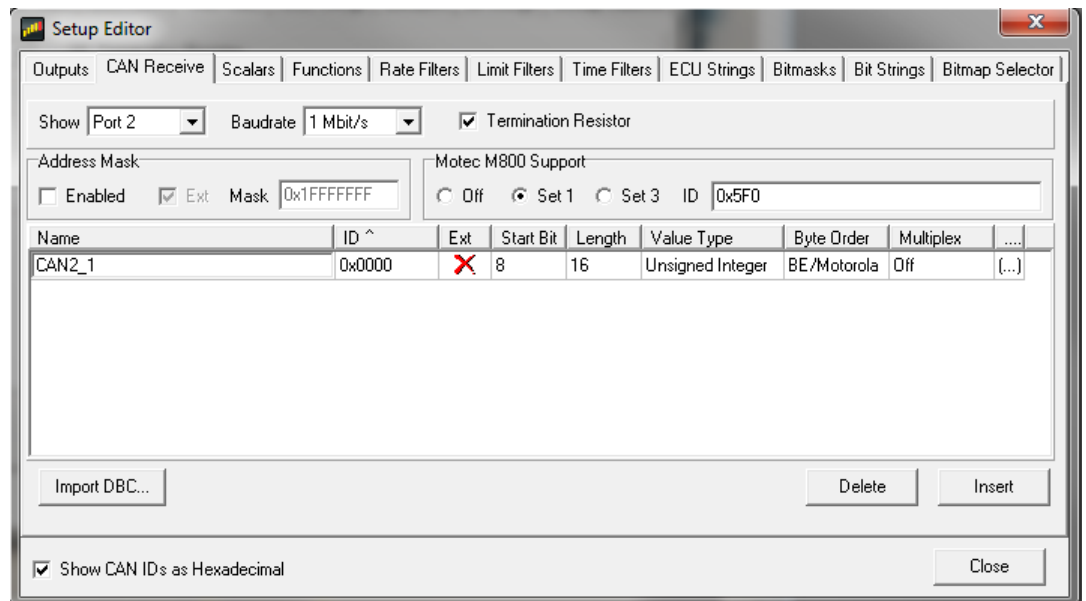
Show: **Port 2**

Baudrate: **1 Mbit/s**

Term Resistor: **As Need**

Address Mask: **OFF**

M800 Support: **Set 1**

ID: **0x5F0**

To enable support for Motec Data Set #3, Change the CAN settings to those below:
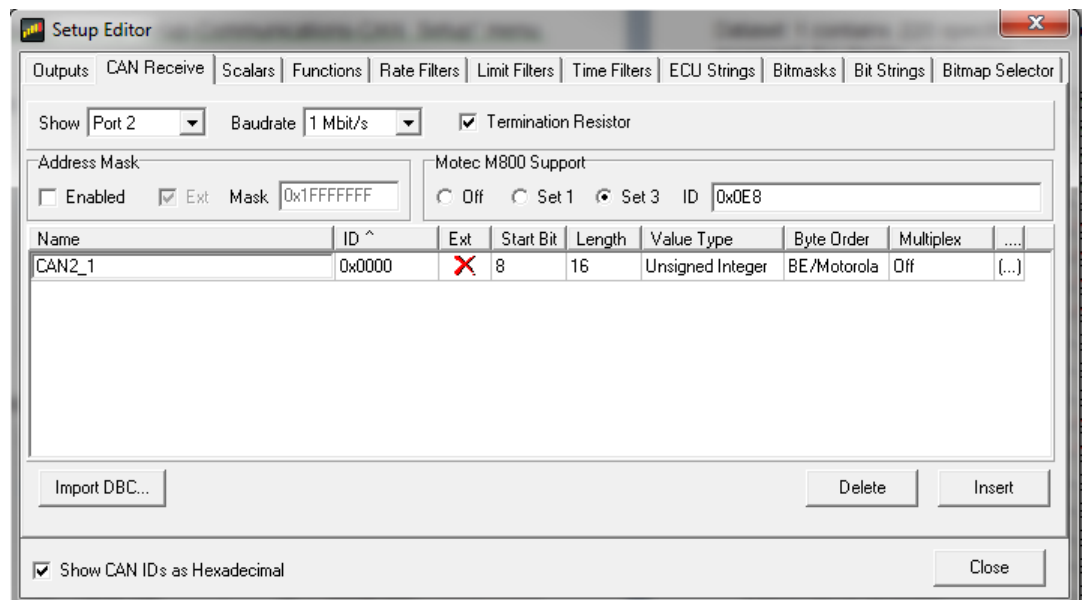
Show: **Port 2**

Baudrate: **1 Mbit/s**
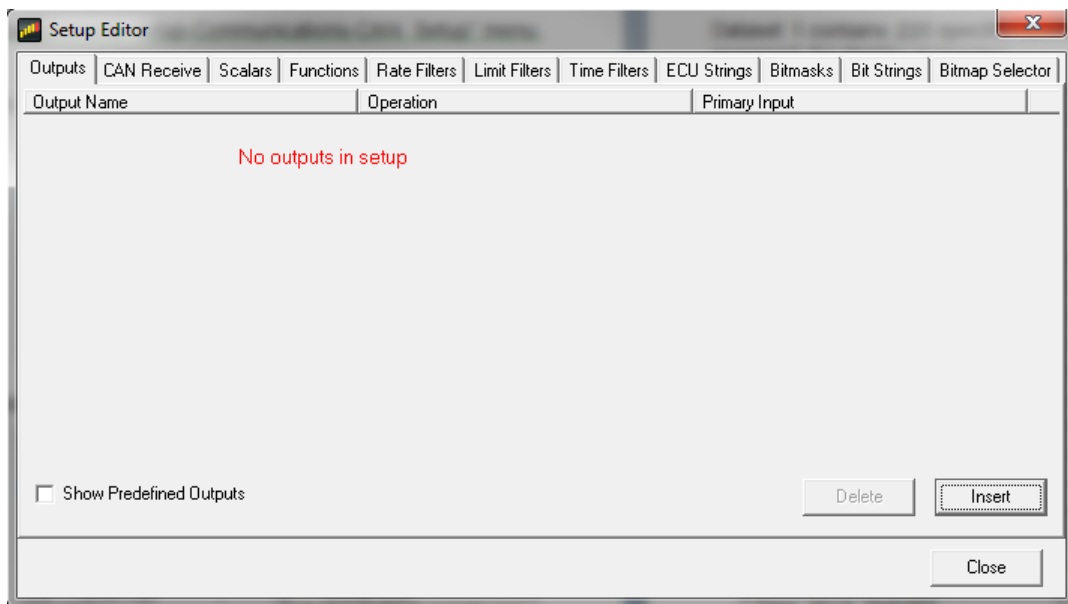
Term Resistor: **As Need**

Address Mask: **OFF**

M800 Support: **Set 3**

ID: **0x0E8**

Once you leave the CAN Receive tab, the system will auto-populate the CD-7 with the data for the chosen set but you will see no outward sign of this from within the CAN Receive tab.

If you click on the Outputs tab you will also not see any sign of the added channels.

To see the new channels, you need to check the "Show Predefined Channels" checkbox at the lower left of the outputs tab. This will show the channels that the system has defined for use. This will not only include the new Motec channels, it will also display the available global channels as well.
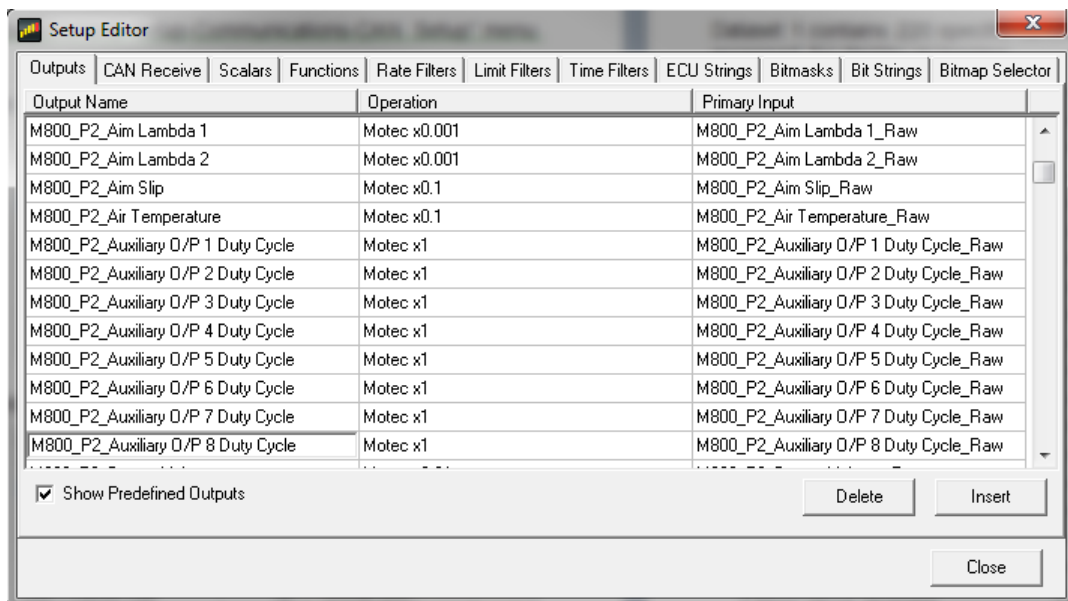
Any of these channels can be viewed on the display, logged or used as inputs to any function or alarm. You can't edit these specific predefined channels but you can use them as inputs to new channels that you could then rename, filter or manipulate.

Enabling a CAN Port to work with the Motec Hundred series adds the support to that specific port only. In addition to adding that support, that specific port can still be used for other items by importing

additional setups into it or manually adding channels. The only requirement is that the port speeds have to be the same and that there are no message addresses in conflict, but that requirement is the same for all ports and all channels. So you could add an LTC, PDM or whatever other items you have that need a 1Mbit/sec port to the same port you have enabled for the M800 series.