



Revision	Date
Initial Release	Mar 15, 2018



**CAN
data**



***Engine Management Systems
EM-Tech ECU CAN to AEM CD-5 & CD-7 Displays***

Supported Devices

- EM-Tech EM-70***
- EM-Tech EM-80***
- EM-Tech EM-140***
- EM-Tech EM-160***
- EM-Tech EM-180***

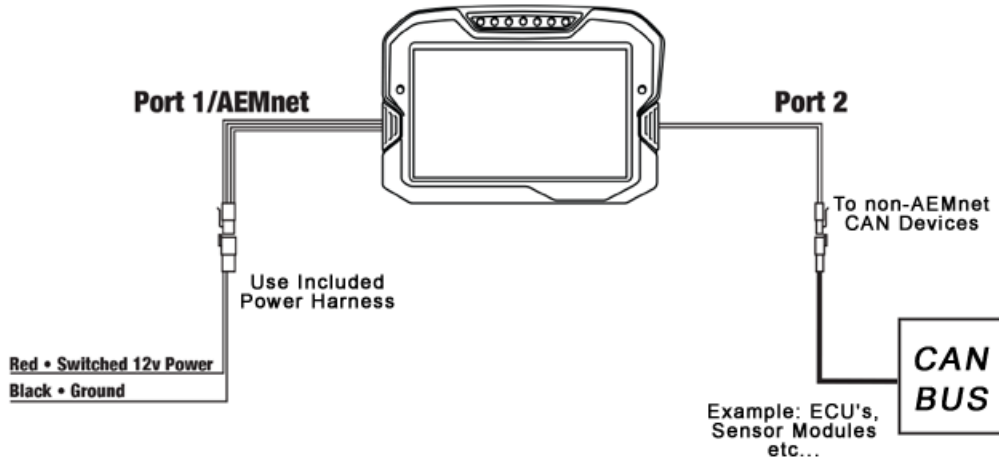
Supported Channels

The CD-5 & CD-7 displays support all the 85 channels transmitted by the EMS EM-Tech ECUs:

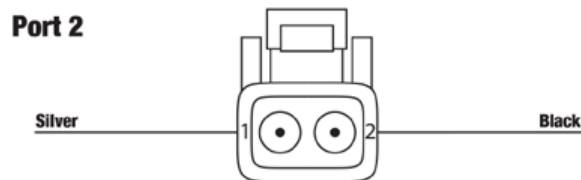
EngineSpeed (rpm)	ECUAnalogInput01Voltage (V)	KnockLevelCyl01
IntakeManifoldAirPress (psi)	ECUAnalogInput02Voltage (V)	KnockLevelCyl02
ThrottlePos (%)	ECUAnalogInput03Voltage (V)	KnockLevelCyl03
IntakeManifoldAirTemp (F)	ECUAnalogInput04Voltage (V)	KnockLevelCyl04
CoolantTemp (F)	ECUAnalogInput05Voltage (V)	KnockLevelCyl05
FuelTemp (F)	ECUAnalogInput06Voltage (V)	KnockLevelCyl06
ECUBatteryVoltage (volts)	ECUAnalogInput07Voltage (V)	KnockLevelCyl07
FuelEthanolContent (%)	ECUAnalogInput08Voltage (V)	KnockLevelCyl08
AFR1 (gas)	ECUAnalogInput09Voltage (V)	KnockLevelCyl09
AFR2 (gas)	ECUAnalogInput10Voltage (V)	KnockLevelCyl10
BaroPress (mBar)	ECUAnalogInput11Voltage (V)	KnockLevelCyl11
FuellnjStartAngle (deg)	ECUAnalogInput12Voltage (V)	KnockLevelCyl12
IgnitionTiming (deg)	ECUAnalogInput13Voltage (V)	KnockCountCyl01
IgnitionTiming_Trailing (deg)	ECUDigitalInput1State (On/Off)	KnockCountCyl02
FuellnjPulsewidth (mS)	ECUDigitalInput2State (On/Off)	KnockCountCyl03
Fuellnj1Pulsewidth (mS)	ECUDigitalInput3State (On/Off)	KnockCountCyl04
Fuellnj2Pulsewidth (mS)	ECUDigitalInput4State (On/Off)	KnockCountCyl05
Fuellnj3Pulsewidth (mS)	ECUDigitalInput5State (On/Off)	KnockCountCyl06
Fuellnj4Pulsewidth (mS)	ECUDigitalInput6State (On/Off)	KnockCountCyl07
Fuellnj5Pulsewidth (mS)	ECU_AuxiliaryOP1DutyCycle (%)	KnockCountCyl08
Fuellnj6Pulsewidth (mS)	ECU_AuxiliaryOP2DutyCycle (%)	KnockCountCyl09
Fuellnj7Pulsewidth (mS)	ECU_AuxiliaryOP3DutyCycle (%)	KnockCountCyl10
Fuellnj8Pulsewidth (mS)	ECU_AuxiliaryOP4DutyCycle (%)	KnockCountCyl11
IgnitionTimingCyl1 (deg)	ECU_AuxiliaryOP5DutyCycle (%)	KnockCountCyl12
IgnitionTimingCyl2 (deg)	ECU_AuxiliaryOP6DutyCycle (%)	VehicleAccelXAxis (G)
IgnitionTimingCyl3 (deg)	ECU_AuxiliaryOP7DutyCycle (%)	VehicleAccelYAxis (G)
IgnitionTimingCyl4 (deg)	ECU_AuxiliaryOP8DutyCycle (%)	VehicleAccelZAxis (G)
IgnitionTimingCyl5 (deg)	IgnitionTimingCyl7 (deg)	
IgnitionTimingCyl6 (deg)	IgnitionTimingCyl8 (deg)	

CAN Bus Wiring

The AEM CD-5 & CD-7 each have 2 separate CAN ports. For 3rd party devices, AEM recommends you use AEM CAN BUS 2, whose connection can be found in the 2 pin Deutsch DTM connector with Grey and Black wires.



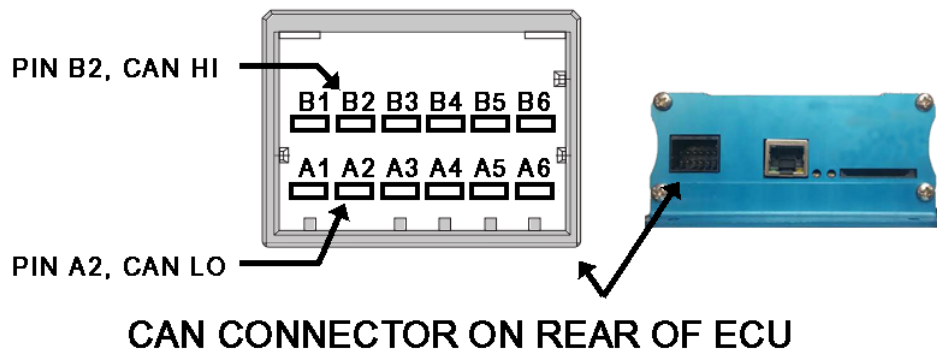
Connecting CD Dash to non-AEMnet devices requires that the included power harness be used to power the dash. Red & Black wires from the power harness should be connected to switched, fused 12V power and ground, respectively



CAN connector port 2 pinouts

PORT 2		
PIN	WIRE COLOR	FUNCTION
1	SILVER	Port 2 CAN+
2	BLACK	Port 2 CAN-

The EMS EM-Tech ECU's have a dedicated communication connector which contains the CAN Hi (CAN +) and CAN Lo (CAN -) connections.



EMS CAN HI (pin B2) → AEM CAN 2+ (pin 1, Silver wire)
EMS CAN LO (pin A2) → AEM CAN 2- (pin 2, Black wire)

The EMS EM-Tech ECU's do not have terminating resistors installed automatically but they do have a suitable resistor on the PCB that can be accessed through the CAN connector via pins A3 and B3. To use this you connect pins B2 to B3 with a short wire and pins A2 to A3 with another short wire. This adds the terminating resistor to this end of the CAN network.

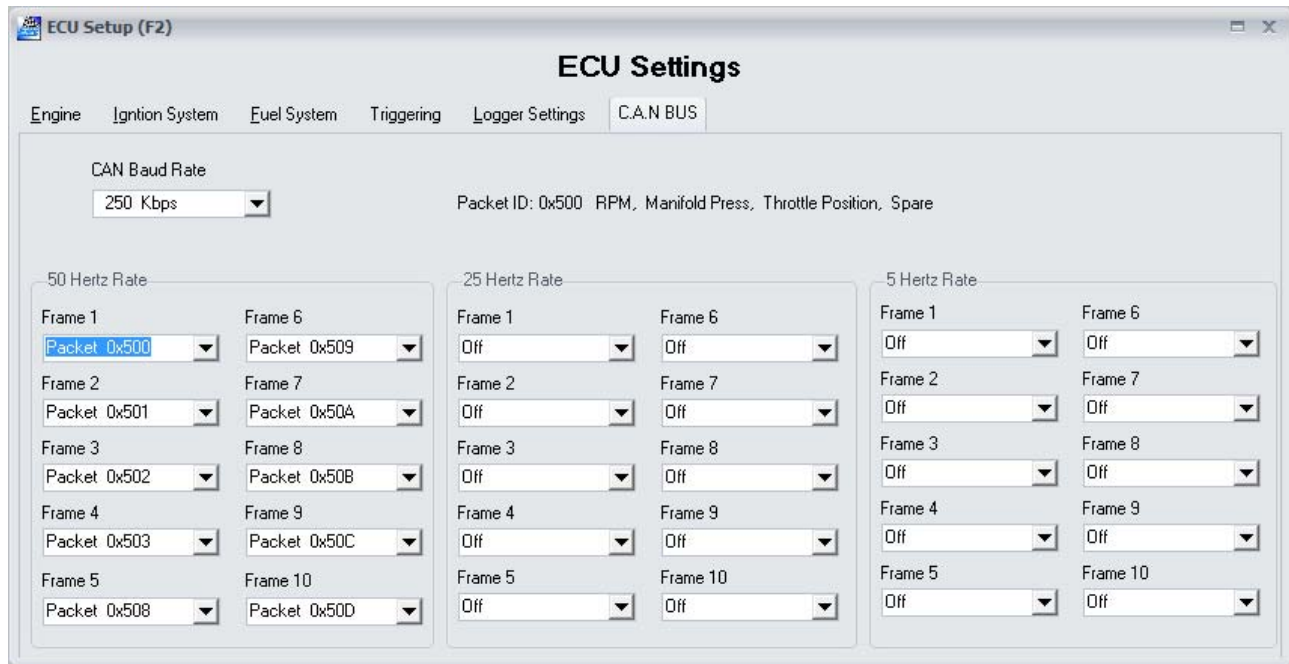


As long as the ECU is on one physical end of the CAN Network and the AEM Display is on the other with its terminating resistor activated then no further action regarding terminating resistors is required.

EMS EM-Tech ECU Setup

The CAN data channels must be enabled on the EM-Tech ECU. This is done using the EM-Tech Management Software.

While the ECU is connected to the laptop and communication with the EM-Tech Manager software go to the ECU setup screen and set the CAN Baud Rate to 250 Kbps and select the data packet for each frame. When selecting the data frames for each group, you can put any data packet in any frame but you must select each frame sequentially beginning with Frame 1 then Frame 2, Frame 3 etc. without skipping a frame number. The ECU will not transmit any frames after it encounters a frame that is "Off" (un-selected) for that particular rate group. The AEM display can receive any of the packets from 0x500 to 0x514 at any of the available transmit rates. Not all EM-Tech ECU's will have all of these packets available based on the underlying hardware capabilities. Consult with EMS if you have any questions about specific models and their capabilities.



After selecting the baud rate and data frames the ECU must be turned off and back on for the changes to take effect.

AEM Setup in DashDesign

The fastest way to get something working is to use the AEM created setup for the EM-Tech ECU's.

It is titled "**EMS_EM-Tech.aemcd7**" and can be found in the same location as this document was. This is a version of our default black layout that has the EM-Tech CAN inputs pre-configured and includes the 85 data channels listed earlier. If you choose this method then simply load this configuration into the dash and as long as the EM-Tech CAN is wired to the AEM CAN Port 2 then you are done.

STOP HERE

You only need to continue if you choose to not use the AEM supplied layout and wish to add EM-Tech CAN support to custom or other existing layouts.

Adding EM-Tech CAN support on different Layouts

If you want to create something from scratch, 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 import the EM-Tech CAN configuration into your setup you select "Setup" then "Display" from the main DashDesign menu. Once the dialog box opens you select the "CAN Receive" tab.

Make sure the port settings are as follows::

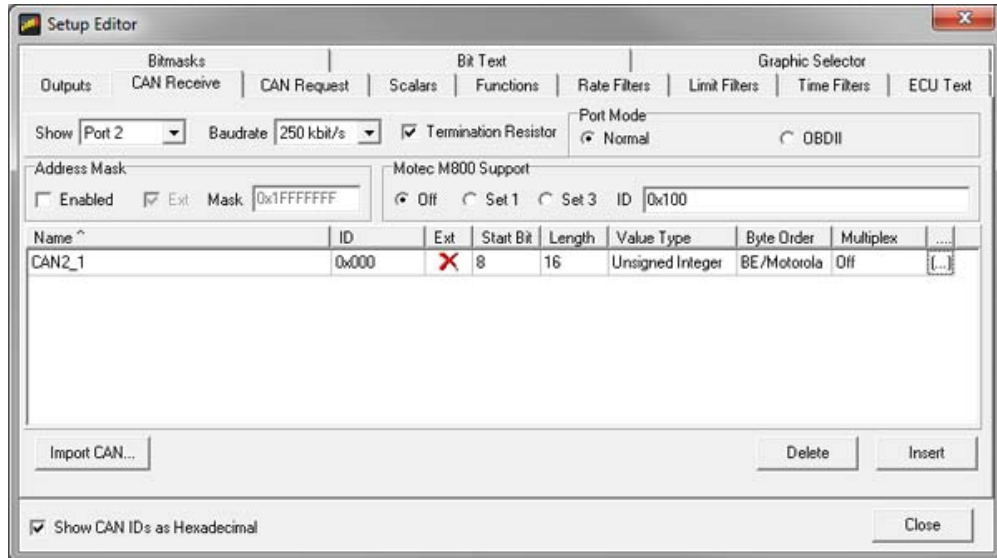
Show: “Port 2”

Baudrate: 250 kbit/s

Termination Resistor: “ON”

Address Mask: “OFF”

M800 Support: “OFF”



Then click on “Import CAN” on the lower left and select the EM-Tech CAN setup file “**EMS_EMTech_Rev0.dbc**”. The new items will appear in the Outputs tab. They can now be viewed on the display or logged. You can rename, filter, or manipulate any of these channels to make them more useful.

