





MoTeC PLM CAN Interface to CD Dash

Supported Devices

MoTeC PLM

CAN Bus Wiring

AEM CD has 2 separate CAN ports. For 3rd party devices, AEM recommends you use AEM CAN Bus 2, whose connections are contained in a 2 pin Deutsch DTM connector. On older harnesses it may be in an unterminated, twisted/shielded flying lead in the dash harness.

PLM Auxiliary Connector – Female D9 Pin 1 (CAN Hi) → AEM CD Dash "CAN 2" 2 Pin DTM Pin 1 (CAN 2+), Gray wire in twisted/shielded pair

PLM Auxiliary Connector – Female D9 Pin 6 (CAN Lo) \rightarrow AEM CD Dash "CAN 2" 2 Pin DTM Pin 2 (CAN 2-), Black wire in twisted/shielded pair

The CD Dash has a software selectable CAN termination resistor. Each network needs 2 terminating resistors with one at each end. The PLM wideband does not have an internal terminating resistor and relies on external terminating plugs. You must have 2 in total, one at each end of the network.

MoTeC PLM Software Setup

The MoTeC PLM Manager software is not required if using a single PLM unit pre-configured by MoTeC. The .aemcan file provided for the PLM by AEM matches this default configuration.



Supported Channels

The AEM CD Dash supports 48 unique channels transmitted from the MoTeC PLM.

С	D Dash CHANNEL NAME	СН	CD Dash CHANNEL NAME
PLM	1_ADCRefFault_raw	25	PLM2_ADCRefFault_raw
PLM1	_AnalogOutNeg_raw	26	PLM2_AnalogOutNeg_raw
PLM	11_AnalogOutPos_raw	27	PLM2_AnalogOutPos_raw
Pl	LM1_BattVolts_raw	28	PLM2_BattVolts_raw
F	PLM1_BoschCalResistor_raw	29	PLM2_BoschCalResistor_raw
F	PLM1_ExternalReset_raw	30	PLM2_ExternalReset_raw
	PLM1_Firmw areVersion_raw	31	PLM2_Firmw areVersion_raw
	PLM1_HeaterDuty_raw	32	PLM2_HeaterDuty_raw
	PLM1_IllegalAddressReset_raw	33	PLM2_IllegalAddressReset_raw
	PLM1_IllegalOperationReset_raw	34	PLM2_IllegalOperationReset_raw
	PLM1_Index_raw	35	PLM2_Index_raw
	PLM1_InternalTemp_raw	36	PLM2_InternalTemp_raw
	PLM1_Lambda_raw	37	PLM2_Lambda_raw
	PLM1_Low VoltageReset_raw	38	PLM2_Low VoltageReset_raw
	PLM1_NTKCalResistor_raw	39	PLM2_NTKCalResistor_raw
	PLM1_RPM_raw	40	PLM2_RPM_raw
	PLM1_SensorCOLD_raw	41	PLM2_SensorCOLD_raw
	PLM1_SensorFAULT_raw	42	PLM2_SensorFAULT_raw
)	PLM1_SensorRUN_raw	43	PLM2_SensorRUN_raw
)	PLM1_SensorState_raw	44	PLM2_SensorState_raw
	PLM1_SensorType_raw	45	PLM2_SensorType_raw
2	PLM1_SensorWARMUP_raw	46	PLM2_SensorWARMUP_raw
	PLM1_WatchdogTimerReset_raw	47	PLM2_WatchdogTimerReset_raw
	PLM1_Zp_raw	48	PLM2_Zp_raw



AEM Setup in DashDesign

AEM provides pre-configured layouts that can be easily adapted to accept, display and log (if using a logging CD Dash) the CAN bus channel data from a MoTeC PLM. The following steps will show you how to quickly setup your PLM to work with an existing AEM DashDesign layout.

- 1. Visit <u>www.aemelectronics.com/forum</u> and scroll down to the CD Dash forum. This is a great place to find answers to all AEM Dash related questions you may have.
- 2. Open your layout in AEM dashdesignDashDesign.
- 3. Click the "Setup" drop down and then select "Display..." 🟴 AEM DashDesign - AEM 5 Gauge Infinity Default temp and pressure sens added (4).aemcd File Display Setup Edit Gauge Color Tools Window Help Display... 7 -0 🚽 🐞 👉 🕂 🔟 🚳 1 Logging... Screen 4 - - -Odometer... 12 Lap Timing... CD-7/ CD-7L Settings ... Brightness... 0 5 6 7 8 9 Shift Lights and LEDs... Alarm Page ... MAP PS FUEL PS1 OILP On Change Page... AFRTRIM% THROTTLE AIF INJ INJ PUms DUT IDLE SPEEDN
- 4. Under the "CAN Receive" tab, click the drop down next to "Show" and select "Port 2"

- OLN D		1	1		1	1	1	1	
Outputs CAN Re	ceive CAN Request Scalars Fur	nctions Rate Fi	Iters L	imit Filters.	Time Filte	ers ECU Text Bit	tmasks Bit Te:	xt Graphic S	Select
Show Port 2	▼ Baudrate 500 kbit/s ▼	✓ Termination	. Davia	For Port I					
Det 1		j♥ reminatio	nnesis	• • N	lormal		C OBDII		
Addres Port 2		Motec M800 Su	ipport						
Enabled	Ext Mask Ox1FFFFFFF	● Off ⊂ S	et1 (C Set 3	ID 0x10	0			
Name ^		ID	Ext	Start Bit	Length	Value Type	Byte Order	Multiplex	1
CAN2_1		0x000	×		16	Unsigned Integer	BE/Motorola	the second se	(

5. Under the "CAN Receive" tab, select "Import CAN..."



Show Port 2 💌	Baudrate 500 kbit/s 💌	V T	ermination Re	esistor	Port Mod			C OBDII		
Address Mask		Motec	M800 Suppo	ort						
Enabled 🔽 Est	Mask 0x1FFFFFFF	€ Off	C Set 1	С	Set 3 ID	0x100				
Name ^			D	Ext	Start Bit		Value Type	Byte Order	Multiplex	
AN2_1		0	x000	X	8	16	Unsigned Integer	BE/Motorola	Off	()

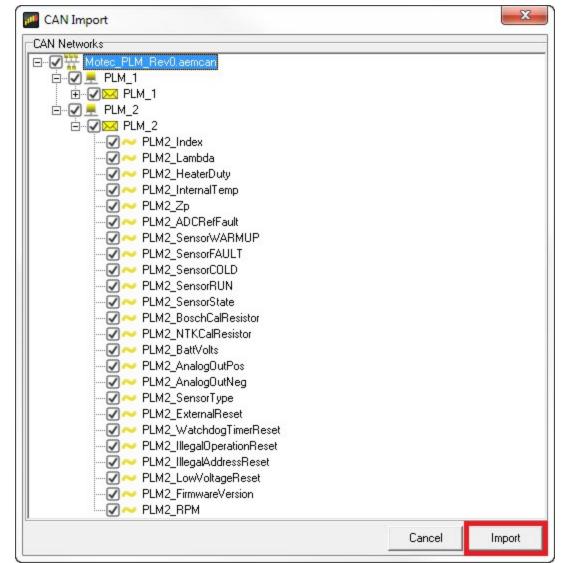
6. Navigate to the .aemcan file you downloaded in step twofor your application. Select the file and click "Open".



Open	a na protocore		-	X
Look in: 📙 CAN DBC FILES 💌	← 🗈 💣 🎟 -			
Name	Date modified	Туре	Size	
Motec_LTC_Rev1.aemcan	10/12/2017 4:30 PM	AEMCAN File	9	Э КВ
Motec_LTCD_Rev1.aemcan	10/12/2017 3:11 PM	AEMCAN File	14	4 KB
File name: Motec_LTC_Rev1				Open
Files of type: All CAN Database Files			•	Cancel
Setup Editor Dutputs CAN Request Scalars Functions Rate	e Filters Limit Filters Time Fi	lters ECU Text Bitmask	s Bit Text Graph	ic Selector
Show Port 2 Baudrate 500 kbit/s Formina	ation Resistor Poit Mode Normal 	C	OBDII	
Address Mask Motec M800	Support			
Enabled V Ext Mask 0x1FFFFFFF Off C	Set 1 C Set 3 ID 0x1	00		
Name ^ 🗾 Open	the linething	at Interim 1	X	Dex []
CAN2 1	▼ ← 🗈 💣 📰▼			()
Name		Type Size	^	
Motec_E8XX_16A_0TC_Rev1.aemcan	6/6/2017 4:34 PM		0 KB	
Motec_LTC_Rev1.aemcan Motec_LTCD_Rev1.aemcan	6/6/2017 4:34 PM 6/6/2017 4:34 PM		9 KB 4 KB	
Motec_LICD_Rev1.aemcan	6/6/2017 4:34 PM		4 KB 6 KB	
Motec_PDM15_Rev1.dbc	7/14/2017 12:58 PM		2 KB	
Motec_PDM16_Rev1.dbc	7/14/2017 12:58 PM		2 KB	
Motec_PDM30_Rev1.dbc	7/14/2017 12:58 PM		O KB	
Motec PDM32 Rev1.dbc			1 KB	
Motec_PLM_Rev0.aemcan			2 KB	
MSD_AtomicTBI_Rev0.aemcan	7/14/2017 12:58 PM		1 KB	
MSD_GRID_VNET_Rev0.aemcan	6/6/2017 4:34 PM		1 KB 🚽	
File name: Motec_PLM_Rev0			Open	
Files of type: All CAN Database Files		-	Cancel	
			/	
<u></u>				
			194	
Import CAN			Delete	Insert
Import CAN			Delete	Insert



7. In the "CAN Import" window you may expand the drop downs to see all of the available CAN channels for your device. You can import all of the channels available or you may select only the channels you wish to display. Be sure to include "PLM1_Lambda" (and "PLM2_Lambda" if applicable) as selected channels. For this example, wel will include all available channels. Unused channels can easily be deleted after you finish setting up your CD Dash. After selecting the channels you want to import, click "Import".



8. In the Setup Editor under the "**Outputs**" tab, check the channels channels that were selected to import are present. If they are not, go back to step 5 and try again. As you can see below the PLM channels are present.



Outputs CAN Receive CAN Request Scalars Functions Rate Filters Limit Filters Time Filters	: ECU Text Bitmasks	Bit Te	ext Graphic	Selector	1			
Show Port 1 Baudrate 500 kbit/s Formination Resistor Normal				C 08	3DII			
Address Mask Motec M800 Support								
Enabled V Ext Mask 0x1FFFFFFF Off C Set 1 C Set 3 ID 0x100								
	1 ID	1.5.	Lou inst		tur +	10.01	Laner	1.1
Name ^ IgnitionTiming_raw	0x01F0A003	Ext	Start Bit 40	Length 8	Value Type Unsigned Integer	Byte Order BE/Motorola	Multiplex	····
IntakeManifoldAirPress_raw	0x01F0A003	4	8	o 16	Unsigned Integer	BE/Motorola		() * ()
IntakeManifoldAirPressErrorState_raw	0x01F04004	4	61	10	Unsigned Integer	BE/Motorola		()
IntakeManifoldAirTemp_raw	0x01F04008	3	48	8	Signed Integer	BE/Motorola		[] []
IntakeManifoldAirTempErrorState_raw	0x01F0A008	4	62	o 1	Unsigned Integer	BE/Motorola		()
Tricakemanioudan emperiorstate_raw	0.01104000	V	02		onsigned megel	527MOLOIDId		Lee J
LTC1 HeaterDutyCycle raw		-	-	-				
LTC1_HeaterDutyCycle_raw								
LTC1_HeaterOpenCircuit raw				1			2	
LTC1 HeaterShorttoGND raw				1			8	
LTC1_HeaterShorttoVBATT_raw				-			2	
LTC1_Index_raw								
LTC1_InternalFault_raw								
LTC1_InternalTemp_raw				2			2	
LTC1_Ip_raw					-		-	
LTC1_lpn_raw								
LTC1_Lambda_raw				1			2	-
LTC1 Ri raw		21					2	
LTC1_SensorControlFault_raw					-			
LTC1 SensorState raw					-		-	-
LTC1 SensorWireShort raw								·
OilPress raw	0x01F0A004	1	32	8	Unsigned Integer	BE/Motorola	Off	[]
OilPressErrorState raw	0x01F0A008	1	59	1	Unsigned Integer	BE/Motorola		()
OilTemp_raw	0x01F0A007	1	48	8	Unsigned Integer	BE/Motorola		()
ThrottlePos_raw	0x01F0A000	1	40	16	Unsigned Integer	BE/Motorola		()
ThrottlePosErrorState_raw	0x01F0A008	1	56	1	Unsigned Integer	BE/Motorola		[]
VehicleSpeed_raw	0x01F0A003	1	24	16	Unsigned Integer	BE/Motorola		() +
Import CAN						Delete		Insert
Show CAN IDs as Hexadecimal							(Close



Bitmasks Outputs CAN Receive CAN Reques	t Scalars		l'ext iunctions	Rate F	Filters Limit F	Graphic Se Filters Time		CU 1	ex
Show Port 2 Baudrate 500 kbit/s	▼ ▼ Ter	mination	Resistor	Port Mod • Norm	5	C OBDI	6		
Address Mask	Motec M	800 Suj	oport						_
Enabled 🔽 Ext Mask Ox1FFFFFF	C Off	C Se	et1 C S	et3 ID	0x100				
Name ^	1 ID	Ext	Start Bit	Length	Value Type	Byte Order	Multiplex		
PLM1_ADCRefFault_raw	-	1.	-			-	-	-	-
PLM1_AnalogOutNeg_raw		•2	-	-			-	-	
PLM1_AnalogOutPos_raw			-	-	-	-	-		
PLM1_BattVolts_raw		18	2	-		-	2	2	
PLM1_BoschCalResistor_raw		-	-	-		-	-		
PLM1_ExternalReset_raw			-	-		-	-	-	
PLM1_FirmwareVersion_raw		•	-	-	-				
PLM1_HeaterDuty_raw	-		-		-0	-	-		
PLM1_IllegalAddressReset_raw		-	2	-	- 2	-	-		
PLM1_IllegalOperationReset_raw			•		-	-	-		
PLM1_Index_raw		-2	-	-	- 3	-	-		
PLM1_InternalTemp_raw		1.00	-	-	- <u>-</u>	1	2	2	-
PLM1_Lambda_raw					• 5		-	•	
PLM1_LowVoltageReset_raw	-				-2	-	-	1	
PLM1_NTKCalResistor_raw		•						•	
PLM1_RPM_raw	-	-			- 3	-	-	•	
PLM1_SensorCOLD_raw	1		2		- 1	-	-		
Import CAN						Delete	e	nsert	

 Find the output "AFR1" and set its Primary Input to "PLM1_Lambda" or select "Insert" at the bottom of the window to create a new channel. Name your new channel PLM1_AFR or similar so it is easy to keep track of. Set the Primary Input to "PLM1_Lambda".

Setup Editor		
Outputs CAN Receive CAN Request Scalars	Functions Rate Filters Limit Filters Time Filters E Operation	CU Text Bitmasks Bit Text Graphic Selector Primary Input
AFR1	AFR1_scalar	PLM1_Lambda
AFRTarget Auto_Shift_Light_1	AFRTarget_scalar Alarm	PLM1_Lambda PLM1_Lambda_raw
Auto_Shift_Light_2	Alarm	PLM1_LowVoltageReset PLM1_LowVoltageReset_raw PLM1_NTKCalResistor
Auto_Shift_Light_3 Auto_Shift_Light_4	Alarm Alarm	PLM1_NTKCalResistor_raw PLM1_RPM
Auto_Shift_Light_5 Auto_Shift_Light_6	Alarm Alarm	PLM1_RPM_raw
Auto Shift Light 7	Δlarm	EngineSpeed

10. Now select the correct conversion for your fuel type and preferred display units. Select the drop down under the "Operation" column for AFR1 (or your new channel) and scroll down to "Convert Lambda to AFR Gas (Stoich 14.65)" or whichever one matches the Stoich ratio of your fuel.



Setup Editor		
Uutputs CAN Receive CAN Request S	Scalars Functions Rate Filters Limit Filters Time Filters ECU Text Bitmasks Bit Text Graphic Sek	ector
Output Name	Operation Primary Input	
AFR	Convert AFR Gas (Stoich 14.65) to Lambda 🚽 PLM1_Lambda	
AFRControlGain	Convert AFR Gas (Stoich 14.65) to Lambda	
AFRControlTrim	Convert AFR Gas (Stoich 14.70) to Lambda Convert AFR Methanol (Stoich 6.47) to Lambda	
AFRErrorState	Convert Bar to kPa	
AFRErrorState_string	Convert Bar to PSIg	
AFRSensorPresent	Convert Deg C to Deg F Convert Deg C to Deg C	
AFRSensorPresent_string	Convert Foot to Meter	
AFRTarget	AFRTarget_scalar	
AirConOutputState	x1 scalar	

11. Next, open a page in your layout that displays AFR. Double click on the AFR value or on the needle/bar graph you wish to use to display AFR. This should open the "Value Editor", "Dynamic Needle Gauge Editor" or "Bar Editor" " window. Click on the "Input" drop down and select the channel "AFR1" or the channel you created. Click "Ok".

12:mm:ss	
0 1 2 3 4	Value Editor
COOLANT'F O O BATTERY O IGN TIMING	Name Value: AFR1 Input AFF1 Format #.# Label Font Oloron Label Font Size 80 X Position 230 Y Position 214 Text Color
U WATEA	C Warning

12. Save your the layout. Once the layout has been saved, connect the dash to your computer and press "Ctrl+U" or "File>Upload to Display..." Once the upload has completed you may unplug the dash from the computer. You should now be able to view the AFR from your MoTeC PLM on the AEM CD Dash.