

Revision	Date
Initial Release	Jan 4, 2019
Updated Images to DD2	Feb 6, 2019



# MOTEC M4 based ECU's to AEM CD-5 & CD-7 Displays

#### **Supported Devices**

M4 ECU's M48 ECU's M8 ECU's M2R ECU's MLS ECU's

**Running Hex Version V5.50 and later** 

## **Required Interface Device**



Motec ECU	AEM Serial2CAN Adaptor				
M4 early (s/n 0-2999) M48 (all) M8 (all)	AEM 30-2230 Motec M4 Early				
M4 late (s/n 3000+) MLS (all) M2R (all)	AEM 30-2231 Motec M4 Late				

## **Supported Channels**

The CD-5 & CD-7 displays support the following 37 parameter channels and 32 State Channels transmitted by the M4/M48/M8 based ECU's:

EngineSpeed (rpm)	FuelInjDuty (%)
ThrottlePos (%)	FuelInjAccelEnrichment (mS)
IntakeManifoldAirPress (kPa)	AFRErrorState (OK/Error)
IntakeManifoldAirTemp (C)	REF_ErrorState (OK/Error)
CoolantTemp (C)	BrakeSwitchState (On/Off)
AFR (LA)	SYNC_ErrorState (OK/Error)
IgnitionTiming (deg)	ECU_AUXTDecPtState (On/Off)
FuelUsed (L)	ECU_AUXVDecPtState (On/Off)
ECUBatteryVoltage (V)	NOREF_ErrorState (OK/Error)
ECUTemp (C)	ECUTempErrorState (OK/Error)
BaroPress (kPa)	NOSYNC_ErrorState (OK/Error)
WheelSpeedDig1 (km/h)	ECU_DigitalIn2State (On/Off)
WheelSpeedDig2 (km/h)	ECU_DigitalIn1State (On/Off)
WheelSpeedNonDriven (km/h)	FuelInj4ErrorState (OK/Error)
WheelSpeedDriven (km/h)	FuelInj3ErrorState (OK/Error)
WheelSlip (km/h)	FuelInj2ErrorState (OK/Error)
GearPosnCalculated	FuelInj1ErrorState (OK/Error)
ECU_LoadPoint	RPMLimitAlarmState (OK/Error)
ECU_SyncPosition (%)	OverBoostAlarmState (OK/Error)
FuelInjCompAuxTemp (%)	WheelSpeed2DecPtState (On/Off)
FuelInjCompAuxVolt (%)	WheelSpeed1DecPtState (On/Off)
ECU_AuxiliaryTemp (C)	InjectorSprayBarState (On/Off)
ECU_AuxiliaryVoltage (C)	ECU_AuxTempErrorState (OK/Error)
IgnitionCutLevel (%)	CoolantTempErrorState (OK/Error)
FuelCutLevel (%)	ThrottlePosErrorState (OK/Error)
ECU_EfficiencyPoint	ECU_AuxVoltsErrorState (OK/Error)
ECU_EfficiencyPoint2	BatteryVoltsErrorState (OK/Error)
ECU_AuxOutputDuty1 (%)	GearShiftCutIgnState (Cut/No Cut)
ECU_AuxOutputDuty2 (%)	FuelInjMaxDutyErrorState (OK/Error)
ECU_AuxOutputDuty3 (%)	MemoryInternalErrorState (OK/Error)
ECU_AuxOutputDuty4 (%)	BatteryVoltsLowAlarmState (OK/Error)
AFRShortTermFuelTrim (%)	BatteryVoltsDeltaErrorState (OK/Error)
AFRLongTermFuelTrim (%)	IntakeManAirTempErrorState (OK/Error)
FuelInjActualPulsewidth (mS)	IntakeManAirPressErrorState (OK/Error)
FuelInjEffectivePulsewidth (mS)	

### **CAN Bus Wiring**

The AEM Serial2CAN adaptor is designed to be a permanent installation in your vehicle and allows the serial output from your ECU to be used with devices that require CAN based communications and is designed to be the only device you need to convert the serial signals from your M4 based ECU into a CAN signal, even if you have an early M4 (or any M48/M8) based unit that requires a CIM to talk to a PC.

On early ECU's, as long as the proper AEM Serial2CAN adaptor is used (AEM 30-2230), no other comms devices are required. Early Motec ECU's that normally require a CIM to communicate with a laptop DO NOT need to use the CIM to connect to the AEM Serial2CAN adaptor. The CIM functionality is built into the AEM 30-2230 Adaptor and the adaptor has the correct DB9 connector gender and pinout to replace the CIM in this permanent installation. This allows you to keep the CIM with your laptop rather than being forced to leave it with the car as part of a permanent dash installation.

To connect the Serial2CAN adaptor to the dash, plug the adaptor into the 4 pin connector on the main harness supplied with the dash and the other 4 pin connector into the power harness supplied with the dash. The Red & Black wires from the power harness should be connected to switched, fused 12V power and ground, respectively.



The AEM Serial2CAN adaptor has an internal terminating resistor. As long as the adaptor 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 on this port.

#### **Motec ECU Setup**

The ECU must be running a Hex version of at least V5.50.

The Telemetry Data Set and Telemetry Baud Rate must be set in the Motec calibration software. All ECU's (M4, M48, M8, MLS, M2R) are set the same way and output the same format.

From the main Menu, select "Adjust" to enter the editor;

MoTeC ECU Menu		- 🗆 ×
03050801 / 002	✓ MoTeC Advanced Tuning	ECU NOT Connected
MoTeC - M4 -	ENGINE MANAGEMENT PROGRAM (EMP6.20) - Main Menu - ECU Not Connected Adjust File Encryption Help Quit Alt X	Hex Version V6.20
F1-Help ↑↓-Move Mer	nu Bar <del>(Enter)</del> -Select <del>(Esc)</del> -Previous Men	u F9-Color/Mono

From the Tuning menu, Select "General Setup" then "Miscellaneous Setup 2";



From the "Miscellaneous Setup 2" menu, select the "Telemetry Baud Rate" and set it to "19201"

🚾 MoTeC ECU Menu		_ 🗆 🗙
03050801 / 002 / MoTeC (	Advanced Tuning	f ECU NOT Connected
Miscellaneous Setup 2 Diag Error Hold Time Telemetry Baud Rate Telemetry Data Set Internal Log Set Internal Logging Rate Advanced Tuning	Ualue     TE       *     2       *19201     3       0     5       *     1       19       *     1       96       *     1       97       *     1       98       99       90       91       91       92       93       94       94       95       96       97       98       99       91       91       92       93       94       94       94       95       96       96       97       91       91       92       94       95       96       97       97       98       99       91       91       92       93       94       94       95       96       97       98       99       91       91       92       94       94	ELEMETRY BAUD RATE and Rate for Telemetry Link 201 1 1200 Baud 501 9600 Baud 502 9600 Baud (2 Stop Bits) 201 19200 Baud 202 19200 Baud (2 Stop Bits)
I nerp ry runceron rgop	In nuj ouri-ra	ISC LICCT OCC LSC OUTCONVENU

Next, set the Telemetry Data Set to "5"

🚾 MoTeC ECU Menu		_ 🗆 🗙
03050801 / 002 / MoTeC A	dvanced Tu	ning ECU NOT Connected
Miscellaneous Setup 2 Diag Error Hold Time Telemetry Baud Rate Telemetry Data Set Internal Log Set Internal Logging Rate Advanced Tuning	Ualue * 2 *19201 * 5 0 5 * 1	TELEMETRY DATA SET Data set for telemetry Ø I Large Set 1 Meter Set 2 Short Set 3 Standard Tuning Large Set 4 PI 5 ADL Dash Logger I Note that the ECU 'Telemetry Baud Rate' setup parameter should be set to 19201 6 I Telemetry Monitor I Requires the Telemetry option 7 I Same as 5 except better (32 bit) error checking Press F1 for more help
F1-Help F9-Function PgUp/	Dn-Adj Ctr	1-Fast Enter-Set Esc-Screen∕End

Exit this menu, save the file and upload it to the ECU as normal.

#### **AEM Setup in DashDesign**

The fastest way to get something working is to start with an AEM created setup for the M4/M48 ECU's using the Serial2CAN adaptor. These are installed with DashDesign on your computer and can be found at:

...\AEM\DashDesign\Setups\App Specific

#### STOP HERE

You only need to continue if you choose to not use the AEM supplied layout and wish to import M4/M48 Serial2CAN support to custom or other existing layouts.

#### Adding Serial2CAN M4 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 Serial2CAN Motec M4/M48 CAN configuration into your setup you select the CAN tab from within Dash Design and choose the CAN Receive tab.

Make sure the port settings are as follows:

#### Show: "Port 1" Baudrate: 500 kbit/s Termination Resistor: "ON" Address Mask: "OFF" M800 Support: "OFF"

*Untitled [Modified] - AEM Dash Design										
File Edit Screen View Tools Configure Help										
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L 1: Screens 2: Channels A 3: Alarms A 4: CAN 5: Logger	r 🔨 6: Seti	up 🔛 7:	Graphics	8: Simulato	or					
CAN Receive CAN Request	CANIM	1								
	CAN Message									
Show Port 1  Baudrate 500 kbit/s  V Termination Resistor	Byte 0	-		-						
Port Mode		/	0	,	4	2	2	1		
Normal Mode	Byte 1	15	14	13	12	11	10	9	8	
MoTeC M800 Support	Byte 2	23	22	21	20	19	18	17	16	
Off ○ Set 1 ○ Set 3 ID 0x100     Ox100	Byte 3		20							
Address Mask		51	50	23	20	27	20	25	24	
Enabled Mask ext 0x1FFFFFF	Byte 4	39	38	37	36	35	34	33	32	
Show CAN IDs in Hexadecimal	Byte 5	47	46	45	44	43	42	41	40	
	Byte 6	55	54	53	52	51	50	49	48	
	Pute 7									
	one /	63	62	61	60	59	58	57	56	
	Multiplexor (	) -								
Signal ID Start Bit Length Value	Туре	Byte Order	Multiplex	Scalar	Offset R	eciprocal	Units			
F Import CAN/DBC X Clear									+ 💼	

Then click on "Import CAN" on the lower left and select the Serial2CAN Motec M4/M48 CAN setup file "**S2C\_Motec\_M4\_Rev0.dbc**".

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□ ┣ ┣   ▲   互   米 凸 泡   う (*)													
🗖 1: Screens 📈 2: Channels 🛕 3: Alarms 🙏 4: CAN 🎢 5: Logger 🔧 6: Setup 🔛 7: Graphics 🗹 8: Simulator													
CAN Receive CAN Request													
CAN Message Layout													
Show David Douvlasts [2]		FasiasFasad											
Show Port 1 V Baudrate	00 kbit/s 👻	lermination	Resistor		Byte 0	Enginespeed							
Port Mode	Mode					7	6	5	4		3 2	1	0
					Byte 1				10		1 10		
Normal Mode		📮 Im	port OBDII S	can		ThrottlePos	14	13	12	1	1 10	9	0
MoTeC M800 Support					Byte 2	4							16
		_				23	22	21	20	1	5 18	17	10
● Off ◎ Set 1 ◎ Set 3 ID	0x100				Byte 3	21	20	20	20	2	7 26	25	24
Address Mask						IntakeManifoldA	ir Press	23	20	2	/ 20	23	24
					Byte 4	+ 29	28	37	36	2	5 34	22	32
Enabled Mask ext OxLFF	FFFFF						, 30	3/	50		5 54		32
Show CAN IDs in Hexadecin	mal				Byte 5	47	46	45	44	4	3 42	41	40
						IntakeManifoldA	irTemp	15			5 12		
					Byte 6	+	54	53	52	5	1 50	49	48
										-			
		Byte 7	63	62	61	60	5	9 58	57	56			
										-			
					Multiplexor	0							
Signal	ID	Start Bit	Length	Value T	уре	Byte Order	Multiplex	Scalar	Offset F	eciprocal	Units		
EngineSpeed	0x00000800	8	16	Signed Inte	eger B	E/Motorola	Off	6 0		ā	ingular_speed:rp	m	=
∽ ThrottlePos	0x00000800	24	16	Signed Inte	eger B	E/Motorola	Off	0.1 0		f	raction:%		
∽ IntakeManifoldAirPress	0x00000800	40	16	Signed Inte	eger B	E/Motorola	Off	0.1 0		F	oressure:psi		
∽ IntakeManifoldAirTemp	0x00000800	56	16	Signed Inte	eger B	E/Motorola	Off	0.1 0		t	emperature:F		
∽ CoolantTemp	0x00000801	8	16	Signed Inte	eger B	E/Motorola	Off	0.1 0		t	emperature:F		
∽ AFR	0x00000801	24	16	Signed Inte	eger B	E/Motorola	Off	0.01 0		ē.	itr:LA		
CU_AuxiliaryTemp	0x00000801	40	10	Signed Inte	eger B	E/Motorola	Off	0.1 0		t	emperature:F		
CUPAuxinaryvoitage	0x00000801	8	16	Signed Inte	eger R	E/Motorola	Off	0.01 0		t	oltage:V		
∽ ECUTemp	0x00000802	24	16	Signed Inte	eger B	E/Motorola	Off	0.1 0		t	emperature:F		
∽ BaroPress	0x00000802	40	16	Signed Inte	eger B	E/Motorola	Off	0.1 0			pressure:psi		
∽ WheelSpeedDig1	0x00000802	56	16	Signed Inte	eger B	E/Motorola	Off	0.1 0		s	peed:mph		
o WheelSpeedDig?	0.00000000	0	16	Cianad Int	Danar D	E/Motorola	Off	0.1 0		-	needumph		<b>T</b>
import CAN/DBC	🗙 Clear												+ 💼

The new items will appear in the table. 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.