



RaceGrade RG EGT-8 Interface to CD Dash

Supported Devices

RaceGrade RG EGT-8

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.

RaceGrade RG-TC8 (CAN HIGH) \rightarrow AEM CD Dash "CAN 2" Pin 1 (CAN 2+), Gray wire in twisted/shielded pair RaceGrade RG-TC8 (CAN LOW) \rightarrow AEM CD Dash "CAN 2" Pin 2 (CAN 2-), Black wire in twisted/shielded pair

The AEM CD Dash has a software selectable CAN termination resistor. Each CAN network needs 2 terminating resistors, one at each end. The RaceGrade RG-TC8 does not have an internal terminating resistor and relies on external terminating plugs. If your CD Dash is located at one end of your CAN network simply activate the CD Dash's internal resistor in the AEM DashDesign software. If the CD Dash is not located at one end of the CAN network use external terminating resistors with one placed at either end of the CAN network.

RaceGrade RG-TC8 Software Setup

The RaceGrade Manager Suite software is not required if using a single RaceGrade RG-TC8 unit in its default configuration. The DBC file provided for the RG-TC8 by AEM matches this default configuration.



Supported Channels

СН	CD Dash CHANNEL NAME
1	Index_raw
2	TC1_raw
3	TC2_raw
4	TC3_raw
5	TC4_raw
6	TC5_raw
7	TC6_raw
8	TC7_raw
9	TC8_raw

Setup in AEM DashDesign

AEM has provided some pre-configured layouts that can be easily adapted to accept, display, and log (if using CD Dash that supports logging) the CANbus channel data from the RaceGrade RG-TC8. The following steps will show you how to quickly setup your TC8 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 DashDe	sign - AEM 5 Gauge Infinity Defa	ult temp and pressure sens ad	ded (4).aemcd7	
File Display	Setup Edit Gauge Color T	ools Window Help		
1 7 -	Display	💶 🏛 🛃 🔶	<u>#</u>	
Screen 4	Logging			
12:1	Odometer			
r	Lap Timing			- APM
	CD-7/ CD-7L Settings			
0	Brightness	56	789	
	Shift Lights and LEDs		947 - 2442 - 607 No	
	Alarm Page	MAP P51	FUELPSI	DILPSI
	On Change Page			
	\cup	- D	\mathbf{D}	
	AFR	AFRTRIM%	THROTTLE%	AIR [°] F
	<u>0</u> .0	0	0	0
	BATTERY	VE	INJ PWm5	INJ DUTY%
	<u>0.0</u>	0	<u>0</u> .0	O
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4. Under the "CAN Receive" tab, click the drop down next to "Show" and select "Port 2"

ID	Ext	Chart Dit	1				
0.000		JUDIC	Length	Value Type	Byte Order	Multiplex	1
UXUUU	X	8	16	Unsigned Integer	BE/Motorola	Off	[]
					Delete	Ir	nsert
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5. Under the "CAN Receive" tab, select "Import CAN ... "



Dutputs CAN Receive CAN Request Scalars Functions Rate Filters Limit Filters Time Fil	ters ECU Text Bitmasks	Bit Te	xt Graphic	Selector				
Show Port 1 Baudrate 500 kbit/s Fort Termination Resistor Normal				C 08	IDII			
Address Mask Motec M800 Support								
Enabled V Ext Mask Ox1FFFFFFF Off C Set 1 C Set 3 ID Ox1	00							
Name ^	Lin	Fut	Start Bit	Length	Value Turce	Bute Order	Multiplex	1.1
AFB1 raw	0x01E0A003		n n	8	Unsigned Integer	BE/Motorola	Off	()
EB1ControlTrim raw	0x01E0A006	1	8	8	Unsigned Integer	BE/Motorola	Off	()
FBTarget raw	0x01F0A004	1	40	8	Unsigned Integer	BE/Motorola	Off	(.)
costControlTarget_raw	0x01E0A00B	1	8	16	Unsigned Integer	BE/Motorola	Off	()
ioolantFan1State raw	0x01F04004	1	49	1	Unsigned Integer	BE/Motorola	Off	()
CoolantTemp raw	0x01F0A000	1	56	8	Signed Integer	BE/Motorola	Off	()
colantTempErrorState raw	0x01F0A008	1	57	1	Unsigned Integer	BE/Motorola	Off	(_)
CUBattervVoltage_raw	0x01F0A003	1	56	16	Unsigned Integer	BE/Motorola	Off	(.)
ngineSpeed raw	0x01F0A000	1	8	16	Unsigned Integer	BE/Motorola	Off	[]
ngineVolumetricEfficency raw	0x01F0A004	1	16	8	Unsigned Integer	BE/Motorola	Off	[]
uellni1Pulsewidth raw	0x01F0A006	1	0	8	Unsigned Integer	BE/Motorola	Off	[]
uellniDutyPrimary raw	0x01F0A006	1	16	8	Unsigned Integer	BE/Motorola	Off	[]
uelPresErrorState raw	0x01F0A008	1	58	1	Unsigned Integer	BE/Motorola	Off	[]
uelPress_raw	0x01F0A004	1	24	8	Unsigned Integer	BE/Motorola	Off	[]
earPosCalculated_raw	0x01F0A003	1	32	8	Unsigned Integer	BE/Motorola	Off	[]
PS_Altitude_raw	0x000C0001	1	24	16	Signed Integer	BE/Motorola	Off	[]
PS Course raw	0x000C0001	1	40	16	Unsigned Integer	BE/Motorola	Off	[]
PS_Latitude_raw	0x000C0000	1	24	32	IEEE Float	BE/Motorola	Off	()
PS_Longitude_raw	0x000C0000	1	56	32	IEEE Float	BE/Motorola	Off	()
PS_SatelliteCount_raw	0x000C0001	1	48	8	Unsigned Integer	BE/Motorola	Off	()
PS_Speed_raw	0x000C0001	1	8	16	Unsigned Integer	BE/Motorola	Off	()
PS_Valid_raw	0x000C0001	1	56	8	Unsigned Integer	BE/Motorola	Off	()
gnitionTiming_raw	0x01F0A003	1	40	8	Unsigned Integer	BE/Motorola	Off	()
ntakeManifoldAirPress_raw	0x01F0A004	1	8	16	Unsigned Integer	BE/Motorola	Off	()
ntakeManifoldAirPressErrorState_raw	0x01F0A008	1	61	1	Unsigned Integer	BE/Motorola	Off	()
ntakeManifoldAirTemp_raw	0x01F0A000	1	48	8	Signed Integer	BE/Motorola	Off	()
ntakeManifoldAirTempErrorState_raw	0x01F0A008	\checkmark	62	1	Unsigned Integer	BE/Motorola	Off	()
Import CAN						Delete		Insert
Z Shaw CAN IDa as Hausdaainal				_			8	Close

PERFORMANCE	ELECTRONICS

Jutputs CAN H	eceive	LAN Request	Scalars F	unctions Hate Filt	ters Limit	Eniters Ti □ Port Mor	ime Filters de	ECU Text Bitma	isks Bit Lext	Graphic Sel	ector
Show Port 2	•	Baudrate 50	0 kbit/s 💌	🛛 🔽 Termination	Resistor	 Norn 	nal		C OBDII		
Address Mask				Motec M800 Sup	pport						
Enabled	🔽 Ext	Mask Ox1FF	FFFFF	● Off ⊂ Se	et1 O	Set 3 ID	0x100				
Name ^				ID	Ext	Start Bit	Length	Value Type	Byte Order	Multiplex	
AN2_1				0x000	×	8	16	Unsigned Integer	BE/Motorola	Off	()

6. Navigate to the .aemcan (dbc.aemcan file for your application.) file you downloaded in step two. Select the file file and click "**Open**".

Look in: 📙 CAN DBC FILES	• 🗕 🖆 📰 •		
Name	Date modified	Туре	Size
Motec_LTC_Rev1.aemcan	10/12/2017 4:30 PM	AEMCAN File	9 KB
Motec_LTCD_Rev1.aemcan	10/12/2017 3:11 PM	AEMCAN File	14 KB
RaceGrade_TC8_Mode0_Rev0.aemcan	10/20/2017 4:16 PM	AEMCAN File	5 KB
			Open
rile name: RaceGrade C8 ModeU Revu			
rile name. RaceGrade_IC8_ModeU_Revu			



nw Port 2 ▼ Baudrate 500 kbit/s ▼ ▼ Termin	ation Besistor	de		0004
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dress Mask Motec M80	D Support			
Enabled V Ext Mask 0x1FFFFFFF 0 Off (<u>Set 1 C Set 3 ID</u>	0x100		
me Open	241 24	a lineateria	and interime.	
Look in: 🕕 CAN 💌	- 🗈 📸 🖬 🕇			
Name	Date modified	Туре	Size	
Polaris RZR J1939 US.dbc	9/12/2017 1:26 PM	DBC File	3 KB	
ProEFI.aemcan	7/14/2017 12:58 PM	AEMCAN	95 KB	
RaceGrade_KeyPad8_Rev0.aemcan	6/6/2017 4:34 PM	AEMCAN	11 KB	
RaceGrade KeyPad15 Rev0.aemcan	6/6/2017 4:34 PM	AEMCAN	18 KB	
RaceGrade_TC8_Mode0_Rev0.aemcan	6/6/2017 4:34 PM	AEMCAN	5 KB	
Racepak_GPS_Rev0.aemcan	7/14/2017 12:58 PM	AEMCAN	4 KB	
Racepak_SmartWire_SP1_Rev0.aemcan	6/6/2017 4:34 PM	AEMCAN	6 KB	
Racepak_VNet_Rev2.aemcan	6/6/2017 4:34 PM	AEMCAN	76 KB	
Stack_TPMS_Rev0.dbc	6/6/2017 4:34 PM	DBC File	4 KB	-
File name: RaceGrade_TC8_Mode0_Rev0				Open
Files of type: All CAN Database Files				✓ Cancel
mport CAN				Delete Insert

7. In the "CAN Import" window you can may expand the drop downs and see all of the available CAN channels for your device. You may can choose to import all of the channels available or you may select only the channels you wish to display. For this example, I will include all available channels are selected. Unused channels can easily be deleted after completing the setup of your CD Dash. Once you have selected the channels you wish to import, click "Import".

CAN Import		×
CAN Networks		
⊡🖌 ₩ RaceGrade_TC8_Mode0_Rev0.aemcan		
🗄 🕢 💻 RaceGrade_TC8		
🗄 🖓 🖂 Temps		
🗹 🚧 TC4		
🗹 🛹 TC5		
🗹 🚧 TC6		
🗹 🚧 TC7		
	Cancel	Import



8. In the "Setup Editor" under the "Outputs" tab, check to make sure the channels you selected to import are present. If they are not, go back to step 4 and try again.

Jutput Name	Operation					
	operation	Primary Input				
ilPressErrorState_string C	DilPressErrorState_bit string	OilPressErrorState_raw				
ilTemp C	DilTemp_scalar	OilTemp_raw				
redictedFastestDeltaSeconds x	1000 scalar</td <td>Predicted Fastest Delta</td> <td></td>	Predicted Fastest Delta				
C1 T	[C1_scalar	TC1_raw	1			
C2 T	fC2_scalar	TC2_raw	1			
С3 Т	fC3_scalar	TC3_raw	1			
C4 T	fC4_scalar	TC4_raw	1			
С5 Т	fC5_scalar	TC5_raw	1			
С6 Т	fC6_scalar	TC6_raw	1			
С7 Т	fC7_scalar	TC7_raw	1			
С8 Т	fC8_scalar	TC8_raw	1			
hrottlePos T	fhrottlePos_scalar	ThrottlePos_raw				
hrottlePosErrorState x	(1 scalar	ThrottlePosErrorState_raw				
hrottlePosErrorState_string T	fhrottlePosErrorState_bit string	ThrottlePosErrorState_raw				
abioleSpeed V	/ahiclaShaad scalar	VahicleSpeed raw	1			
Show Predefined Outputs		Delete Insert				

9. Find the output "TC1" and check that the Primary Input is "TC1_raw". If it is not, change it now. If setting up "TC2" the input should be "TC2_raw" and so on.

Output Name	Operation	Primary Input	
GPS_Speed	GPS_Speed_scalar	GPS_Speed_raw	
GPS_Valid	x1 scalar	GPS_Valid_raw	
Index	x1 scalar	Index_raw	
IndicatorGPSValid	Single Icon Toggle	GPS_Valid	
IntakeManifoldAirPress	IntakeManifoldAirPress_scalar	IntakeManifoldAirPress_raw	
IntakeManifoldAirTemp	IntakeManifoldAirTemp_scalar	IntakeManifoldAirTemp_raw	
TC1	TC1_scalar	TC1_raw	
TC2	TC2_scalar	TC2_raw	
TC3	TC3_scalar	TC3_raw	
TC4	TC4_scalar	TC4_raw	
TC5	TC5_scalar	TC5_raw	
TC6	TC6_scalar	TC6_raw	
Show Predefined Outputs	· ·	Delete	

10. The correct scalar should be automatically set when you imported the .aemcan file. If you want to use the default scalar and not create a custom one, skip ahead to step 11. The software automatically creates one scalar for each of the TC8's channels when the .aemcan file is imported. If the selected scalars are not correct for your application you may change the scalar to a custom one. To create a custom scalar, go to the "Scalars" tab in the "Setup Editor" window. Select "Insert" and create a name for your new scalar. Once named, enter the correct scalar value and offset.



Name	Gain	Signed	Scalar	Offset	Reciprocal	
EngineSpeed_scalar		×	0.39063	0	X	
GPS_Course_scalar		X	0.01	0	X	
GPS_Speed_scalar		×	0.01	0	X	
IntakeManifoldAirPress_scalar		×	0.014504	-14.696	×	
IntakeManifoldAirTemp_scalar		X	1.8	32	X	
TC1_scalar		X	0.25	0	X	
TC2_scalar		×	0.25	0	X	
TC3_scalar		X	0.25	0	X	
TC4_scalar		×	0.25	0	X	
TC5_scalar		X	0.25	0	×	
TC6_scalar		×	0.25	0	X	
TC7_scalar		X	0.25	0	X	
				-		
				Delete	Insert	

11. Select the scalar you created for the channels you wish to apply it to. Go to the "**Outputs**" tab. Under the "**Operation**" column for your channel, select the new scalar. You do not need to make a different scalar for each channel. Simply Sselect the scalar for each output you wish to apply it to.

utput Name	Operation	Primary Input
PS_Speed	GPS_Speed_scalar	GPS_Speed_raw
PS_Valid	x1 scalar	GPS_Valid_raw
dex	x1 scalar	Index_raw
dicatorGPSValid	Single Icon Toggle	GPS_Valid
takeManifoldAirPress	IntakeManifoldAirPress_scalar	IntakeManifoldAirPress_raw
takeManifoldAirTemp	IntakeManifoldAirTemp_scalar	IntakeManifoldAirTemp_raw
51	TC1_scalar	▼ TC1_raw
2	TC1_scalar	TC2_raw
3	TC2_scalar	TC3_raw
C4	TC4_scalar	TC4_raw
05	TC5_scalar	TC5_raw
26	TC7 scalar	TC6_raw
	TC8 scalar	×

12. Open a page in your layout that displays EGT. Double click on the EGT value or on the needle/bar graph associated with the data from the TC8. This will open the "Value Editor", "Dynamic Needle Gauge Editor" or "Bar Editor" window depending on how you wish to display the data. Click on the "Input" drop down and select the channel "TC1" or the channel you created. Click "OK".



Screen 3	Value Editor Name Input Format Label Font Size X Position Y Position Text Color Justify Warning Mode (© Off C Warning	Value: TC4 TC4 TC4 TC4 TC5 TC5 TC6 TC7 TC8 Trome VehicleSpeed Z37 TC9 TC9 TC9 TC9 TC9 TC9 TC9 TC9
Screen 3	Value Editor	<u>Dk</u>
EGT 0000	Name Input Format Label Font Label Font Size	Value: TC4 TC4 TC4 TC5 TC5 TC6 TC7 TC7 TC8 TC8



13. Save 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 complete, you may unplug the CD dash from the computer. You should now be able to view the EGT values reported by your RaceGrade TC8 on the AEM CD-7 Dash display.