AiM Infotech

AiM Sequential
CAN+UART protocol

Release 1.00

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AiM proprietary sequential protocol

AiM has designed and developed two proprietary sequential protocols:

- AIM/PROT_CAN
- AIM/PROT_UART

They are included in Race Studio software to allow ECU Manufacturers, developing teams and technicians to connect their ECU to AiM devices.

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"AiM" "PROT_CAN" protocol

AiM technique is referred to as Asynchronous messaging, basically the whole stream of parameters (all 35 Bytes) is split up into the packets 8 bytes in length, these are sequentially inserted into CAN messages and in a given order.
The packets of data do not contain a specific identifier, they are just in a predefined order. At the receiving node the device looks for the Header information (this is a constant contained in the datastream): when this is seen the device knows that next message is the start of the datastream and all subsequent CAN messages will contain the given parameters in the predefined order.
In this way the CAN system is simply a carrier for seemingly highly variable data under a single base addresses and the software handlers at either end know how to breakdown and reassemble these separate packets of data into a continuous and complete datastream.

Byte	Signal	Units	Scaling
0:1	RPM	RPM	1RPM
2:3	Wheel Speed	Km/h	0.1km/h
4:5	Oil pressure	Bar	0.1Bar
6:7	Oil temperature	Deg C	0.1Deg C
8:9	Engine coolant temperature	Deg C	0.1Deg C
10:11	Fuel pressure	Bar	0.1Bar
12:13	Battery supply	Volts	0.01Volts
14:15	Throttle angle	%	0.1%
16:17	Manifold air pressure	mBar	1mBar

18:19	Intake air temperature	Deg C	0.1Deg C
20:21	Exhaust gas temperature	Deg C	1Deg C
22:23	Lambda value	Lambda	0.001La
24:25	Fuel temperature	Deg C	0.1Deg C
26:27	Engaged gear	0=Neutral 1=First 2=second etc…	
28:29	Errors	ECU specific error flag	
30	Number of data bytes	30	
31	Marker byte 1	FC	
32	Marker byte 2	FB	
33	Marker byte 3	FA	
34	Checksum	Is the sum of all bytes of the structure up to and including marker byte 3.	

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AiM PROT_UART protocol

The datastream is a standard RS232 at 19200,n,8,1.
It consists of a number of short packets. Packets are sent on 10 ms ticks. **Please note**: this does not mean that there is a packet sent every 10 ms tick; in fact there is a pattern which repeats once a second until it reaches the channel frequencies listed below and there are some unused ticks where nothing is transmitted.

Each packet consists of 5 bytes:

- the first byte is the channel number
- the second is always A3$_H$
- the third and fourth are the channel value, high byte first
- the fifth is the sum of the previous four bytes.

Signal	Channel	Freq [Hz]	Transform	Units
RPM	1	10	y=x	RPM
Wheel Speed	5	10	y=x/10	Km/h
Oil pressure	9	5	y=x/1000	Bar
Oil temperature	13	2	y=x/10-100	Deg C
Engine coolant temperature	17	2	y=x/10-100	Deg C
Fuel pressure	21	5	y=x/1000	Bar
Battery supply	33	5	y=x/100	Volts
Throttle angle	45	10	y=x/10	Deg
Manifold air pressure	69	10	y=x	mBar
Intake air temperature	97	2	y=x/10-100	Deg C
Exhaust gas temperature	101	2	y=x/10-100	Deg C
Lambda value	105	10	y=x/1000	Lambda
Fuel temperature	109	2	y=x/10-100	Deg C
Engaged gear	113	5	y=x	0=rev 1=Neutral 2=First 3 =Second etc...
Errors	125	2	-	ECU specific error flag

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AiM device configuration

Before connecting the device to the ECU set this up using AiM Race Studio software. The parameters to set in the device configuration are:

- ECU manufacturer "AIM"
- ECU Model
  - o "PROT_CAN" if your ECU communicates using the CAN Bus
  - o "PROT_UART" if you ECU communicates using the serial protocol

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Available channels

Channels received by AiM devices connected to "AIM" "PROT_CAN" or "PROT_UART" protocol are the same; the only differences can be found in the name of the channel; here below they are listed for PROT_CAN (PROT_UART):

ID	CHANNEL NAME	FUNCTION
ECU_1	AIM_RPM	RPM
ECU_2	AIM_WHEELSPEED (WHEELSPD)	Vehicle speed
ECU_3	AIM_OILPRESS	Oil pressure
ECU_4	AIM_OILTEMP	Oil temperature
ECU_5	AIM_WATERTEMP	Engine coolant temperature
ECU_6	AIM_FUELPRESS	Fuel pressure
ECU_7	AIM_BATTVOLT	Battery supply
ECU_8	AIM_TPS (THROTANG)	Throttle position sensor
ECU_9	AIM_MAP (MANIFPRESS)	Mainfold air pressure
ECU_10	AIM_AIRTEMP (AIRCHARGETEMP)	Intake air temperature
ECU_11	AIM_EXHAUST_TEMP (EXHTEMP)	Exhaust gas temperature
ECU_12	AIM_LAMBDA	Lambda value
ECU_13	AIM_FUELTEMP	Fuel temperature
ECU_14	AIM_GEAR	Engaged gear
ECU_15	AIM_ERRORS (ERRORFLAG)	Error signal