



<b>CUSTOMER DOCUMENTATION</b>	<b>04/08/2004</b>	<b>ECUs</b>	<b>AIM RS232 / CAN communication protocol</b>
NOTE: Standard communication protocol (RS232 / CAN) for AIM dataloggers			

## AIM Protocol for ECU Communications

### 1) CAN Asynchronous Messaging

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	Water Temperature	Deg C	0.1Deg C
10:11	Fuel Pressure	Bar	0.1Bar
12:13	Battery Voltage	Volts	0.01Volts
14:15	Throttle Angle	%	0.1%
16:17	Manifold Pressure	mBar	1mBar
18:19	Air Charge Temperature	Deg C	0.1Deg C
20:21	Exhaust Gas Temperature	Deg C	1Deg C
22:23	Lambda	Lambda	0.001 La
24:25	Fuel Temperature	Deg C	0.1Deg C
26:27	Gear	0=neutral,1=first,2=second,etc	
28:29	Errors	ECU-specific error flags	
30	Number of Data Bytes	30	
31	Marker Byte 1	FC	
32	Marker Byte 2	FB	
33	Marker Byte 3	FA	
34	Checksum		

Checksum is the sum of all bytes of the structure up to and including marker byte 3.

## 2) RS232 – Serial protocol

The datastream is standard RS232 at 19200,n,8,1. It consists of a number of short packets. Packets are sent on 10 ms ticks. Note that this does not mean that there is a packet sent every 10 ms tick – there is a pattern which repeats once a second to achieve 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<sub>H</sub>, the third and fourth are the channel value, high byte first. The fifth is the sum of the preceding 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 temp	13	2	$y=x/10-100$	Deg C
Water temp	17	2	$y=x/10-100$	Deg C
Fuel pressure	21	5	$y=x/1000$	Bar
Battery voltage	33	5	$y=x/100$	Volts
Throttle angle	45	10	$y=x/10$	Deg
Manifold press	69	10	$y=x$	mBar
Air charge temp	97	2	$y=x/10-100$	Deg C
Exhaust temp	101	2	$y=x/10-100$	Deg C
Lambda Sensor	105	10	$y=x/1000$	Lambda
Fuel temp	109	2	$y=x/10-100$	Deg C
Gear	113	5	$y=x$	0=rev, 1=neutral, 2=first, 3=second, etc
Errors	125	2	-	ECU-specific error flags