

## SERIAL DATA STREAM PROTOCOL

### SM2 v1.93 & 1.95 rev 29 Aug 2016

**BAUD RATE:** 9600 baud  
**PROTOCOL:** RS232 Async, 10 bits, comprising 1 start bit, 8 data bits (LSB first) and 1 stop bit .  
**UPDATE RATE:** 20Hz

- Notes:**
1. Data uses INTEL byte ordering (low byte first)
  2. Checksum uses MOTOROLA byte ordering (high byte first)
- CHECKSUM (16 bit) = -( DATA LENGTH +  $\sum$  data bytes)

BYTE NO.	SIZE	TYPE	DESCRIPTION	SCALING
1	8 bit		PACKET I.D. = 24 hex (36 decimal)	ASCII "\$"
2	8 bit	unsigned	DATA LENGTH = 21 hex (33 decimal)	No. data bytes
3-4	16 bit	signed	BATTERY VOLTAGE	1 count = 0.01 volts
5-6	16 bit	signed	COOLANT TEMP	1 count = 0.1 degC
7-8	16 bit	signed	CHARGE TEMP	1 count = 0.1 degC
9-10	16 bit	signed	INTAKE TEMP	1 count = 0.1 degC
11-12	16 bit	signed	DRIVEN WHEEL SPEED	1 count = 0.1 KPH
13-14	16 bit	signed	VEHICLE SPEED	1 count = 0.1 KPH
15-16	16 bit	signed	EXHAUST BACK PRESSURE	1 count = 0.1 kPa ABSOLUTE
17-18	16 bit	signed	MANIFOLD ABS PRESS	1 count = 0.1 kPa ABSOLUTE
19-20	16 bit	signed	THROTTLE POSN	1 count = 0.1%
21-22	16 bit	signed	ENGINE SPEED	1 count = 1 RPM
23-24	16 bit	signed	AF RATIO	1 count = 0.01 A/F
25-26	16 bit	unsigned	INJECTION TIME	1 count = 1 uSEC
27-28	16 bit	signed	AUX TEMP 1	1 count = 0.1 degC
29-30	16 bit	signed	AUX TEMP 2	1 count = 0.1 degC
31-32	16 bit	signed	AUX TEMP 3	1 count = 0.1 degC
33-34	16 bit	signed	AUX TEMP 4	1 count = 0.1 degC
35	8 bit	signed	IGNITION ANGLE	1 count = 0.5 deg
36-37	16 bit	unsigned	DATA CHECKSUM (note 2)	