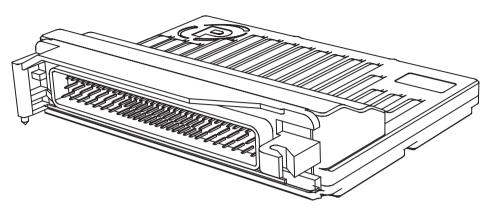
Pectel SQ6 ECU



Introduction

The Pectel SQ6 sets the benchmark for high-performance engine management systems. Its Freescale MPC565 microprocessor and dedicated timer co-processor bring class leading performance in a cost-effective package. No other ECU offers the same combination of price, power, performance and flexibility.

Twelve configurable injector drivers combined with eight IGBT ignition outputs AND eight logic level coil driving outputs make this ECU capable of fully sequential fuelling on normally aspirated, turbo and supercharged engines from one to twelve cylinders. Fly-by-wire capability is included, with Stepper and DC motors catered for.

Put all of this functionality in one small light box and you have an ECU capable of working with almost any combination of coil, injector, OEM sensor and actuator.

An all new crank and camshaft pattern recognition system allows the SQ6 to be used with virtually any OEM timing wheel. This sophisticated pattern recognition algorithm also facilitates synchronisation during slow and uneven cranking conditions.

Hugely flexible, the SQ6 has two, and sometimes three functions on many of its pins:

- unused injector and IGBT ignition outputs can be used as digital outputs,
- unused digital inputs can be used as 10 bit analogue inputs,
- H-bridge outputs can be used in either full or half bridge mode, H-bridge outputs can be combined to drive a stepper motor or used to provide additional high or low-side drive capability.

All of these features are enabled by software.

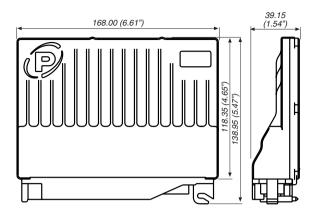
Designed to be robust, the SQ6 has reverse-battery, over-voltage and load dump protection built in as standard. Sensor supply and signal ground pins are also protected against shorts to battery positive and negative.

Advanced software features include traction control, launch control, gearshift strategies, variable valve timing of up to 4 camshafts (including BMW VANOS), high speed data logging and scrutineering modes for single make championship.

The ECU has optional highly advanced control strategies for semi-automatic/paddle-shift gearboxs which include FBW throttle blip and over rev protection. Customers who have used this have extended gearbox life by 100%.

OE Calibrated with calibration support available on quotation.

Dimensions



Dimensions in millimetres (and inches)

Specifications

Description	Value
Processor	Freescale MPC565 @ 56MHz, 5MB flash memory and 4MB non-volatile RAM
Supply Voltage	8V to 18V reverse battery, over-voltage and load dump protection
Engine Configuration	1 to 12 cylinders 2/4 stroke or rotary Natural/Forced induction
Digital Outputs	6 PWM dedicated. (10A peak) 8 PWM alternate. (5A peak) 16 Relay alternate function
Data Logging	1MB standard (Upgrade to 2MB available) 2000 samples/second
Digital Inputs 8 dedicated	
Crank & Cam Sensor	3 Hall Effect/Inductive
Injector Drivers	12 peak and hold (0-5A)
Note: Quoted cu	urrents are peak rating

Description	Value	
Analogue Inputs	10 dedicated (12 bit) 2 x Wide band lambda (12 bit) 2 x Knock sensor (12 bit) 2 x K-type thermocouple (12 bit) 8 alternate function (10 bit)	
Internal Sensors	ECU Internal Temperature x 4 Battery Voltage	
Ignition Drivers	8 IGBT Internal Clamp (400V, 20A peak) 8 Logic Level driven (5 or 12 V)	
Auxiliary Out- puts	1 Full Bridge (10A peak) 2 Full Bridge (5A peak) OR 1 Stepper Motor alternate function	
Communication	1 RS232 2 CAN 2.0B 1 Ethernet (10MBit)	
Case Operating Temp.	-40°C to +70°C	
Environmental	IP40	
Weight	500g	

Ordering Information

Product	Part number
Pectel SQ6 ECU	01E-500700
Pectel SQ6 ECU with	01E-500700-E011
gearbox upgrade	
Pectel download,	60E-500905
Autosport to Ethernet 1.5m	
Pectel download,	60E-500906
Autosport to Ethernet 10m	
Pectel download,	60E-500909
Autosport to Serial COM port	

Connector Details

ECU Connector	Mating Connector	
88 way	88 way	

See below for pinout information

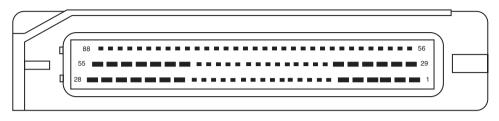


The following options are also available:

- Second Wideband Lambda Input
- Traction control

- 2 MB memory upgrade Fly by wire Throttle
- Gearbox control upgrade
- Fly by wire Th

88 Way Connector Pinout Details



View looking into the 88 way connector

Grey shading in the following table indicates pins which have a higher current rating than the other pins.

Pin	Dir	Function	Function	Notes
12	I	AIN1		
13	I	AIN2		
72	I	AIN3		
73	I	AIN4	12bit Analogue Inputs	Software pullups
40	1	AIN5		3k Ohms & 33k Ohms
42		AIN6		
43	1	AIN7		
14	1	AIN8		
15		AIN9	12bit Analogue Inputs	Software pullups
16		AIN10		3k Ohms & 240 Ohms
71	I	TC1 POS	Thermocouple Positive (12bit)	
41	I	TC2 POS		
70	I	TC NEG	Thermocouple Negative	
68	I	LAMV1	Lambda	
38	0	LAMI1	Lambda Current Pump	
69	I	LAMV2	Lambda	
39	0	LAMI2	Lambda Current Pump	
10	I	DET1		
11	I	DET2	Knock Sensors	
46	1	CRANK1		
18	I	CRANK2	Crank Inputs	Software Pullup 3k Ohms
17	I	CAM	CAM Input	
78	I	DIN1		
77	I	DIN2		
48	I	DIN3		
21	I	DIN4		
20	I	DIN5	Digital Inputs	Software Pullup 3k Ohms
47	I	DIN6		
19	I	DIN7		
76	1	DIN8		

Pin	Dir	Function	Function	Notes
36	0	RS232TX		
66	I	RS232RX	RS232 port	
75	0	ETHER TXPOS		
45	0	ETHER TXNEG		
74	I	ETHER RXPOS	Ethernet PC comms	
44	I	ETHER RXNEG		
37	I/O	CAN1 LOW		
67	I/O	CAN1 HIGH		Toursiantal
8	I/O	CAN2 LOW	CAN Communication ports	Terminated
9	I/O	CAN2 HIGH		
55	0	INJ1		
88	0	INJ2		
87	0	INJ3		
86	0	INJ4		
85	0	INJ5		
54	0	INJ6		
84	0	INJ7	Injector Outputs	100V, 5A peak, 2.5A hold
52	0	INJ8		
83	0	INJ9		
82	0	INJ10		
81	0	INJ11		
80	0	INJ12		
26	0	IGN1		
25	0	IGN2		
22	0	IGN3		
28	0	IGN4	Ignition Coile	400V/ 204 pook
27	0	IGN5	Ignition Coils	400V, 20A peak
53	0	IGN6		
51	0	IGN7		
50	0	IGN8		
56	0	IGNT1		
57	0	IGNT2		
58	0	IGNT3		
59	0	IGNT4		
60	0	IGNT5	"TTL" Ignitions	5V, 20mA cont.
61	0	IGNT6		
62	0	IGNT7		
63	0	IGNT8		

Grey shading in the following table indicates pins which have a higher current rating than the other pins.



Grey shading in the	following table indicat	es pins which have	a higher current	rating than the c	other pins.

Pin	Dir	Function	Function	Notes
34	0	PWM1		
6	0	PWM2	_	
33	0	PWM3		20V, 10A peak.
2	0	PWM4	PWM Outputs	10k Ohms Pullup to VBAT
4	0	PWM5	_	
31	0	PWM6	_	
30	0	HB1A		
5	0	HB1B	2 Full Bridge (5A) OR	
1	0	HB2A	1 Stepper Motor alternate function	20V, 5A peak.
29	0	HB2B		
32	0	НВЗА	DC Matan driver	
3	0	HB3B	DC Motor driver	20V, 10A peak.
65	0	OUT 5V0 / 12V	Programmable Sensor Supply	
64	0	OUT 5V0 / 12V	Outputs	5V, 50mA or 12V, 1A
35	I/O	ANG GND		
7	I/O	CRANK/CAM GND	Protected Sensor Grounds	20V, 1A cont.
79	I/O	DIG GND		
24	Battery	ECU GND		20V, 10A cont. (per pin)
23	Battery	ECU GND	ECU Battery Negatives	Must be Engine Ground
49	Battery	VBAT	ECU Battery Positive	20V, 10A cont.

Recycling and Environmental Protection

Cosworth Electronics is committed to conducting its business in an environmentally responsible manner and to strive for high environmental standards.

Manufacture

Cosworth products comply with the appropriate requirements of the Restriction of Hazardous Substances (RoHS) directive (where applicable).

Disposal

Electronic equipment should be disposed of in accordance with regulations in force and in particular in accordance with the Waste in Electrical and Electronic Equipment directive. (WEEE)

Battery

This equipment contains a battery. (Lithium Thionylchloride)

The equipment may be returned to Cosworth Electronics for a replacement battery. (A charge may be made for this service)

Removal of the battery by the user may void any warranty on the equipment.

To remove the battery for recycling:

- Remove the case cover(s).
- Remove the printed circuit boards from the case.
- Remove the battery from the printed circuit board.

Dispose of the battery in accordance with regulations in force.

Declaratio	n of Conformity
We, the undersi	gned,
Pi Research Brookfield Moto Cottenham, Cambridgeshire United Kingdom	, CB4 8PS
Certify and decl	are under our sole responsibility that the following equipment
SQ6 – part num An ECU for use	ber 500700 only in motorsport applications
Conforms to the	following EC directives including applicable amendments:
EMC Directive 8	39/336/EEC, 72/245/EEC (last amended 2004/104/EC)
The following st	andards have been applied:
2004/104/EC	
Cottenham, 27 th	February 2006
G.L.	