

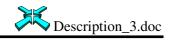
SRT / SRAE SOFTWARE DOCUMENTATION SUPER-USER

1. DESCRIPTION

chapter 1

Release: 2.1

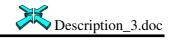




REVISIONS DOCUMENT

Release	Author	Date		Modifications
1.0	M.Mersier	06/22/2005	•	Creation (SRA)
2.0	M.Mersier	09/11/2006	•	Update (SRT)
2.1	O.Nazorek	11/12/2006	•	Update (SRAE)





1.1 SRT box unit

1.1.1 Pin out

	CT AS218-35PA DEUTSCH		
Pin	Signal	Description	
1	RX_ETH_N	RX N Ethernet 10/100 Base T	
2	VBATT AUX	Positive Supply Aux	
3	VBATT_AUX	Positive Supply Aux	
4	TX_ETH_P	TX_P Ethernet 10/100 Base T	
5	RX_ETH_P	RX_P Ethernet 10/100 Base T	
6	VBATT_AUX	Positive Supply Aux	
7	VBATT_AUX	Positive Supply Aux	
8	OUT_PELV3	Proportional Electro valve Output 3	
9	OUT_PELV4	Proportional Electro valve Output 4	
10	TX_ETH_N	TX_N Ethernet 10/100 Base T	
11	IN_PKUP2P	Electromagnetic Pick-up Input 2 Positive	
12	IN_PKUP2_3N	Electromagnetic Pick-up 4 Negative	
13	I_O_SYNCRO	Digital Input Iso9141	
14	RX	RS232 loop current RX	
15	IN_LAP_TRIGGER	Digital Input for Lap Trigger	
16	OUT_PELV1	Proportional Electro valve Output 1	
17	INP_KNOCK_2N	Knock 2 Input negative	
18	INP_KNOCK_2P	Knock 2 Input positive	
19	IN_PKUP3P	Electromagnetic Pick-up Input 3 Positive	
20	TX	RS232 loop current TX	
21	CAN1_H	CAN1 Serial Line (H)	
22	IN_HALL4	Hall Effect Sensors Input 4	
23	IN_HALL6	Hall Effect Sensors Input 6	
24	OUT_PELV2	Proportional Electro valve Output 2	
25	INP_KNOCK_1P	Knock 1 Input positive	
26	INP_KNOCK_1N	Knock 1 Input negative	
27	IN_AN13	Single Ended Input 13 (0-5V)	
28	IN_ENCP	Enable Code Programming	
29	CAN1_L	CAN1 Serial Line (L)	
30	CAN0_L	CAN0 Serial Line (L)	
31	IN_HALL5	Hall Effect Sensors Input 5	
32	IN_HALL2	Hall Effect Sensors Input 2	
33	OUT2_HB1	Output H Bridge1	
34	IN_LAMBDA2_VS-	Input Vs- Lambda 2	
35	IN_LAMBDA2_VS+	Input Vs+ Lambda 2	
36	IN_VBINJ	Input Injector battery Supply	
37	IN_AN14	Single Ended Input 14 (0-5V)	
38	IN_LAMBDA1_VS+	Input Vs+ Lambda 1	
39	IN_TC2N	Differential input 2 Negative	
40	CAN0_H	CAN0 Serial Line (H)	
41	IN_HALL3	Hall Effect Sensors Input 3	





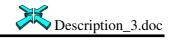


40	OUTO UD4	Outrout II Delate of
42	OUT2_HB1	Output H Bridge1
43	IN_LAMBDA2_IP+	Input Ip+ Lambda 2
44	GND_TEMP3_4	Analog Ground Temp3_4 (Vref)
45	IN_TEMP4	NTC-PT1000 Input 4
46	IN_LAMBDA1_VS-	Input Vs- Lambda 1
47	IN_LAMBDA1_IP+	Input Ip+ Lambda 1
48	IN_TC2P	Differential input 2 Positive
49	IN_HALL1	Hall Effect Sensors Input 1
50	OUT1_HB1	Output H Bridge1
51	EXTGNDMA3	External GNDMA
52	IN_TEMP3	NTC-PT1000 Input 3
53	GND_POWER_AUX	Ground Power Aux (PWR3)
54	IN_TC1N	Differential input 1 Negative
55	EXTGNDMS	Digital Output Ground
56	SHIELD1	Wiring Shield PK
57	OUT1_HB1	Output H Bridge1
58	EXTVREF3	External Reference Supply 3 (5V)
59	GND_POWER_AUX	Ground Power Aux (PWR3)
60	GND_POWER_AUX	Ground Power Aux (PWR3)
61	IN_TC1P	Differential input 1 Positive
62	OUT2_HB2	Output H Bridge2
63	OUT2_HB2	Output H Bridge2
64	GND_POWER_AUX	Ground Power Aux (PWR3)
65	OUT1_HB2	Output H Bridge2
66	OUT1_HB2	Output H Bridge2

	CT2 AS218-35PN DEUTSCH			
Pin	Signal	Description		
1	OUT_LAMBDA1	Lambda1 Heater Output		
2	OUT_IGN4	Ignition Output 4		
3	OUT_IGN4	Ignition Output 4		
4	EXTVREF1	External Reference Supply 1 (5V)		
5	OUT_LAMBDA2	Lambda2 Heater Output		
6	IN_AN8	Single Ended Input 8 (0-5V)		
7	OUT_IGN4	Ignition Output 4		
8	OUT_IGN6	Ignition Output 6		
9	OUT_IGN6	Ignition Output 6		
10	EXTGNDMA1	External GNDMA1		
11	IN_AN10	Single Ended Input 10 (0-5V)		
12	IN_AN2	Single Ended Input 2 (0-5V)		
13	IN_AN7	Single Ended Input 7 (0-5V)		
14	IN_PKUP1N	Electromagnetic Pick-up 1 Negative		
15	OUT_IGN6	Ignition Output 6		
16	OUT_IGN5	Ignition Output 5		
17	EXTVREF2	External Reference Supply 2 (5V)		
18	EXTGNDMA2	External GNDMA2		
19	IN_AN11	Single Ended Input 11 (0-5V)		
20	IN_AN5	Single Ended Input 5 (0-5V)		
21	IN_PKUP1P	Electromagnetic Pick-up Input 1 Positive		
22	IN_TEMP1	NTC-PT1000 Input 1		



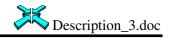




23	OUT IGN5	Ignition Output 5
24	OUT IGN5	Ignition Output 5
25	OUT INJ5	Injector Output 5 (fuel)
26	IN AN6	Single Ended Input 6 (0-5V)
27	IN AN4	Single Ended Input 6 (0-5V) Single Ended Input 4 (0-5V)
28	IN AN3	Single Ended Input 4 (0-5V)
29	IN AN9	Single Ended Input 9 (0-5V)
30	GND TEMP1 2	Analog Ground Temp1_2 (Vref)
31	IN TEMP2	NTC-PT1000 Input 2
32	IN_TEMP2	Single Ended Input 12 (0-5V)
33	OUT IGN2	Ignition Output 2
34	OUT_IGN2 OUT_INJ2	
	VBATTP	Injector Output 2 (fuel)
35 36	VBATTP	Positive Battery Supply
37		Positive Battery Supply
38	IN_AN1 SHIELD2	Single Ended Input 1 (0-5V)
38		Wiring Shield PK
	VBATTN	Negative Battery Supply
40	VBATTN	Negative Battery Supply
41	OUT_IGN2	Ignition Output 2
42	OUT_IGN2	Ignition Output 2
43	OUT_INJ4	Injector Output 4 (fuel)
44	PWR_GND_INJECTOR	Power Output Ground Injector (PWR2)
45	PWR_GND_INJECTOR	Power Output Ground Injector (PWR2)
46	PWR_GND_INJECTOR	Power Output Ground Injector (PWR2)
47	PWR_GND_INJECTOR	Power Output Ground Injector (PWR2)
48	PWR_GND_IGNITION	PWR_GND_IGNITION
49	OUT_IGN3	Ignition Output 3
50	OUT_IGN3	Ignition Output 3
51	OUT_INJ3	Injector Output 3 (fuel)
52	PWR_GND_IGNITION	Power Output Ground Ignition (PWR1)
53	PWR_GND_IGNITION	Power Output Ground Ignition (PWR1)
54	PWR_GND_IGNITION PWR GND IGNITION	Power Output Ground Ignition (PWR1)
55		Power Output Ground Ignition (PWR1)
56	OUT_IGN1	Ignition Output 1
57	OUT_IGN3	Ignition Output 3
58	OUT_INJ8	Injector Output 8 (fuel)
59	OUT_INJ7	Injector Output 7 (fuel)
60	PWR_GND_IGNITION	Power Output Ground Ignition (PWR1)
61	GND_POWER_AUX	Ground Power Aux (PWR3)
62	OUT_IGN1	Ignition Output 1
63	OUT_IGN1	Ignition Output 1
64	OUT_INJ6	Injector Output 6 (fuel)
65	OUT_INJ1	Injector Output 1 (fuel)
66	GND_POWER_AUX	Ground Power Aux (PWR3)

1.1.2 Characteristics.





1.1.2.1 Analog Inputs.

- Number of Inputs = 14.
- Range 0-5V
- 10 bit A/D converter
- Input resistance 383kΩ (pull up 5 V)
- Analogic anti aliasing filter 1 pole. (f_{cut} 240 Hz)
- Protection to short circuit to ground and battery, open circuit diagnostic

1.1.2.2 Temperature inputs.

- Number of Inputs = 4.
- In block selectable NTC/PT1000
- 10 bit A/D converter
- Temperature Range –30 °C ... +200 °C
- Analogic anti aliasing filter 1 real pole. (f_{cut} 5 Hz)
- Protection to short circuit to ground and battery, open circuit diagnostic

1.1.2.3 Thermo Couple input.

- Number of Inputs = 2.
- Differential Input with gain 105
- 10 bit A/D converter
- Analogic anti aliasing filter 1 real pole. (f_{cut} 117 Hz), (one filter a input and one filter a output)
- Protection to short circuit to ground and battery, open circuit diagnostic

1.1.2.4 Linear Lambda (UEGO).

- Number of Inputs = 2.
- Manage Vs and Ip cell.
- Vs cell polarization 30 uA.
- Analogic anti aliasing filter. (fcut 20 Hz)
- Stoichiometric ratio 4 V output.
- Open load reading 4 V.
- 10 bit A/D converter.

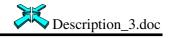
1.1.2.5 Speed Inputs

- Inputs PK1 to PK3 are electromagnetic or Hall Effect type according to the use input.
- Inputs Hall4 to Hall6 are Hall effect type input..

1.1.2.6 Knock Inputs

• 2 differential input piezo sensor interface with direct logic selection





1.1.2.7 Injectors Outputs

- Number of outputs = 8.
- Max. current (permanent) = 4A.
- Clamp = 60 V.

1.1.2.8 Ignition Coils Outputs

- Number of outputs = 6.
- Max. current (permanent) = 15A.
- Feedback control software selectable = 3 / 6 A.

1.1.2.9 Electro valve Outputs

- Number of outputs = 4.
- Max. current (permanent) = 5A.

1.1.2.10 Lambda Heater Output

- Number of outputs = 2.
- Max. current (permanent) = 3A.

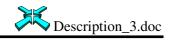
1.1.2.11 Full H-Bridge Outputs

- Number of outputs = 2.
- Max. current (permanent) = 7A.

1.1.2.12 Communication

- Asynchronous serial Line (current loop 20mA).
- CAN Line 1Mbit/sec ended or not by electric beam.
- CAN Line for client use, with software programmable speed (min 125 Kbit/sec) ended or not by electrical beam.
- ETH Line for vision and/or Telemetry





1.2 SRAE box unit

1.2.1 Pin out

	TYCO AMP		
Pin	Signal	 Description	
1	OUT GND AUX	Power Output Ground Aux (PWR3) (20A with 2.5mm)	
2	OUT GND AUX	Power Output Ground Aux (PWR3) (20A with 2.5mm)	
3	OUT_GND_AUX	Power Output Ground Aux (PWR3) (20A with 2.5mm)	
4	OUT_GND_AUX	Power Output Ground Aux (PWR3) (20A with 2.5mm)	
5	VBATT_AUX	Positive Supply Aux (20A with 2.5mm)	
6	VBATT_AUX	Positive Supply Aux (20A with 2.5mm)	
7	OUT2_HB	Output Hbridge (9A with 0.75mm)	
8	VBATTN	Negative Battery Sypply (3.5A with 0.35mm)	
9	SHIELD_PK1	Wiring Shield PK (3.5A with 0.35mm)	
10	IN_DELPHIA_GND	Digital Output Ground Delphia GNDMS	
11	IN_HALL_GND1	Digital Output Ground Hall1-2-3 (Vcc)	
12	SHIELD_PK2	Wiring Shield PK (3.5A with 0.35mm)	
13	IN_HALL4	Hall Effect Sensor Input 4 (3.5A with 0.35mm)	
14	IN_LAMBDA1_VS-	Input Vs- Lambda 1	
15	IN_PKUP3P	Electromagnetic Pick-up 3 Positive (3.5A with 0.35mm)	
16	IN_PKUP4N	Electromagnetic Pick-up 4 Negative (3.5A with 0.35mm)	
17	IN_PKUP6P	Electromagnetic Pick-up 6 Positive (3.5A with 0.35mm)	
18	INP_KNOCK_2N	Knock Input 2 Negative (3.5A with 0.35mm)	
19	INP_KNOCK_1N	Knock Input 1 Negative (3.5A with 0.35mm)	
20	IN_LAMBDA_ON/OFF_AGND	Analog Groung Lambda On/off (3.5A with 0.35mm)	
21	IN_LAMBDA_ON/OFF	Lambda On/off Input (3.5A with 0.35mm)	
22	VBINJ	Injector Battery Supply (3.5A with 0.35mm)	
23	IN_AN1	Single Ended Input 1 (0-5V) (3.5A with 0.35mm)	
24	IN_AN8	Single Ended Input 8 (0-5V) (3.5A with 0.35mm)	
25	IN_AN3	Single Ended Input 3 (0-5V) (3.5A with 0.35mm)	
26	IN_TC2P	Differential Input 2 Positive (3.5A with 0.35mm)	
27	IN_TC1P	Differential Input 2 Positive (3.5A with 0.35mm)	
28	IN_TEMP1	Analog Ground Temp1 (Vref) (3.5A with 0.35mm)	
29	OUT1_HB	Output Hbridge (9A with 0.75mm)	
30	VBATTP	Positive Battery Supply (3.5A with 0.35mm)	
31	SHIELD_PK3-PK4	Wiring Shield PK (3.5A with 0.35mm)	
32	N.C	not connected	
33	IN_HALL_GND2	Digital Output Ground Hall4-5-6 (Vcc)	
34	IN_HALL2	Hall Effect Sensor Input 2 (3.5A with 0.35mm)	
35	IN_LAMBDA1_IP+	Input Ip+ Lambda 1	
36	IN_LAMBDA1_VS+	Input Vs+ Lambda 1	
37	IN_PKUP3N	Electromagnetic Pick-up 3 Negative (3.5A with 0.35mm)	
38	IN_PKUP4P	Electromagnetic Pick-up 4 Positive (3.5A with 0.35mm)	
39	IN_PKUP6N	Electromagnetic Pick-up 6 Negative (3.5A with 0.35mm)	
40	INP_KNOCK_2P	Knock Input 2 Positive (3.5A with 0.35mm)	
41	INP_KNOCK_1P	Knock Input 1 Positive (3.5A with 0.35mm)	





40	CHIELD DVE DVC	Wiring Chiold DK (2.5A with 0.25mm)
42	SHIELD_PK5-PK6	Wiring Shield PK (3.5A with 0.35mm)
43 44	IN_AN2	Single Ended Input 2 (0-5V) (3.5A with 0.35mm)
	IN_AN4	Single Ended Input 4 (0-5V) (3.5A with 0.35mm)
45	IN_AN5	Single Ended Input 5 (0-5V) (3.5A with 0.35mm)
46	IN_AN6	Single Ended Input 6 (0-5V) (3.5A with 0.35mm)
47	IN_AN7	Single Ended Input 7 (0-5V) (3.5A with 0.35mm)
48	IN_TC2N	Differential Input 2 Negative (3.5A with 0.35mm)
49	IN_TC1N	Differential Input 1 Negative (3.5A with 0.35mm)
50	GND_TEMP1	Analog Ground Temp1 (Vref) (3.5A with 0.35mm)
51	VBATTN	Negative Battery Supply (9A with 0.75mm)
52	TERM2_CAN0	CAN0 Terminations
53	TERM2_CAN1	CAN1 Terminations
54	TX_ETH_N	TX_N Ethernet 10/100 Base T
55	RX_ETH_N	RX_N Ethernet 10/100 Base T
56	CAN1_H	CAN1 Serial Line (H)
57	TX	RS232 loop current TX
58	CAN0_L	CAN0 Serial Line (L)
59	IN_HALL3	Hall Effect Sensor Input 3 (3.5A with 0.35mm)
60	IN_HALL5	Hall Effect Sensor Input 5 (3.5A with 0.35mm)
61	IN_PKUP1P	Electromagnetic Pick-up 1 Positive (3.5A with 0.35mm)
62	IN_PKUP2P	Electromagnetic Pick-up 2 Positive (3.5A with 0.35mm)
63	IN_PKUP5P	Electromagnetic Pick-up 5 Positive (3.5A with 0.35mm)
64	EXTVREF1	External Reference Supply 1 (5V) (3.5A with 0.35mm)
		Analog Output Ground Reference ExtVref1 (3.5A with
65	EXTGNDMA1	0.35mm)
		Analog Output Ground Reference ExtVref1 (3.5A with
66	EXTGNDMA1	0.35mm)
67	EXTVREF2	External Reference Supply 2 (5V) (3.5A with 0.35mm)
	EVE CAUDAMA	Analog Output Ground Reference ExtVref2 (3.5A with
68	EXTGNDMA2	0.35mm)
-00	EVECNENAC	Analog Output Ground Reference ExtVref2 (3.5A with
69	EXTGNDMA2	0.35mm)
70	IN_TEMP2	NTC-PT1000 Input 2 (3.5A with 0.35mm)
71	IN_TEMP3	NTC-PT1000 Input 3 (3.5A with 0.35mm)
72	GND_TEMP4	Analog Ground Temp4 (Vref) (3.5A with 0.35mm)
73	VBATTP	Positive Battery Supply (9A with 0.75mm)
74	TERM1_CAN0	CAN1 Terminations
75	TERM1_CAN1	CAN1 Terminations
76	TX_ETH_P	TX_P Ethernet 10/100 Base T
77	RX_ETH_P	RX_P Ethernet 10/100 Base T
78	CAN1_L	CAN1 Serial Line (L)
79	RX	RS232 loop current RX
80	CANO_H	CANO Serial Line (H)
81	IN_HALL1	Hall Effect Sensor Input 1 (3.5A with 0.35mm)
82	IN_HALL6	Hall Effect Sensor Input 6 (3.5A with 0.35mm)
83	IN_PKUP1N	Electromagnetic Pick-up 1 Negative (3.5A with 0.35mm)
84	IN_PKUP2N	Electromagnetic Pick-up 2 Negative (3.5A with 0.35mm)
85	IN_PKUP5N	Electromagnetic Pick-up 5 Negative (3.5A with 0.35mm)
86	EXTVREF1	External Reference Supply 1 (5V) (3.5A with 0.35mm)
87	EXTVREF1	External Reference Supply 1 (5V) (3.5A with 0.35mm)
	EVTONDAAA	Analog Output Ground Reference ExtVref1 (3.5A with
88	EXTGNDMA1	0.35mm)

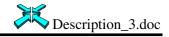




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89	EXTVREF2	External Reference Supply 2 (5V) (3.5A with 0.35mm)
90	EXTVERF2	External Reference Supply 2 (5V) (3.5A with 0.35mm)
0.4	EVECUDADA	Analog Output Ground Reference ExtVref2 (3.5A with
91	EXTGNDMA2	0.35mm)
92	GND_TEMP2	Analog Ground Temp2 (Vref) (3.5A with 0.35mm)
93	GND_TEMP3	Analog Ground Temp3 (Vref) (3.5A with 0.35mm)
94	IN_TEMP4	NTC-PT1000 Input 4 (3.5A with 0.35mm)
1A	OUT_GND_IGNITION	Power Output Ground Ignition (PWMR1) (14A with 1.5mm)
2A	OUT_GND_IGNITION	Power Output Ground Ignition (PWMR1) (14A with 1.5mm)
3A 4A	OUT_GND_INJECTOR	Power Output Ground Injector (PWMR2) (9A with 0.75mm)
	OUT_GND_INJECTOR	Power Output Ground Injector (PWMR2) (9A with 0.75mm)
5A	OUT_IGN3_LOG	Out Cmd Logic Ignition 3 (3.5A with 0.35mm)
6A	IN_DIG_GND	Digital Output Ground (Vcc) (3.5A with 0.35mm)
7A	OUT_IGN2_LOG	Out Cmd Logic Ignition 2 (3.5A with 0.35mm)
8A	OUT_IGN4_LOG	Out Cmd Logic Ignition 4 (3.5A with 0.35mm)
9A	OUT_IGN1_LOG	Out Cmd Logic Ignition 1 (3.5A with 0.35mm)
10A	OUT_IGN6_LOG	Out Cmd Logic Ignition 6 (3.5A with 0.35mm)
11A	IN_ENCP_GND	Enable Code Programming Ground (3.5A with 0.35mm)
12A	OUT_IGN5_LOG	Out Cmd Logic Ignition 5 (3.5A with 0.35mm)
13A	N.C N.C	
14A	N.C	
15A 16A	OUT IGN6	Ignition Output 6 (14A with 1.5mm)
17A	OUT GND IGNITION	Power Output Ground Ignition (PWRM1) (14A with 1.5mm)
17A 18A	OUT_GND_IGNITION OUT_INJ7	Injector Output 7 (9A with 0.75mm)
19A	OUT INJ3	Injector Output 3 (9A with 0.75mm)
20A	IN DIG3	Digital Input 3 (3.5A with 0.75hm)
21A	IN DIG7	Digital Input 7 (3.5A with 0.35mm)
22A	IN DIG2	Digital Input 2 (3.5A with 0.35mm)
23A	IN DIG6	Digital Input 6 (3.5A with 0.35mm)
24A	IN DIG4	Digital Input 4 (3.5A with 0.35mm)
25A	IN LAP TRIGGER	Digital Input Lap Trigger (3.5A with 0.35mm)
26A	IN DIG1	Digital Input 1 (3.5A with 0.35mm)
27A	IN ENCP	Enable Code Programming (3.5A with 0.35mm)
28A	N.C	Lhable Gode Frogramming (5.5A with 6.55mm)
29A	N.C	
30A	N.C	+
31A	OUT IGN1	Ignition output 1 (14A with 1.5mm)
32A	OUT GND IGNITION	Power Output Ground Ignition (PWMR1) (14A with 1.5mm)
33A	OUT GND IGNITION	Power Output Ground Ignition (PWMR1) (14A with 1.5mm)
34A	OUT GND INJECTOR	Power Output Ground Injector (PWMR2) (9A with 0.75mm)
35A	OUT GND INJECTOR	Power Output Ground Injector (PWMR2) (9A with 0.75mm)
36A	OUT GND INJECTOR	Power Output Ground Injector (PWMR2) (3.5A with 0.35mm)
37A	OUT GND INJECTOR	Power Output Ground Injector (PWMR2) (3.5A with 0.35mm)
38A	OUT GND INJECTOR	Power Output Ground Injector (PWMR2) (3.5A with 0.35mm)
39A	OUT GND INJECTOR	Power Output Ground Injector (PWMR2) (3.5A with 0.35mm)
40A	N.C	not connected
41A	N.C	not connected
42A	N.C	not connected
43A	N.C	not connected
44A	OUT LS2	Low Side Output 2 (3.5A with 0.35mm)
45A	OUT LS1	Low Side Output 1 (9A with 0.75mm)
	-	. , , , , , , , , , , , , , , , , , , ,







46A	OUT_IGN2	Ignition Output 2 (14A with 1.5mm)
47A	OUT_IGN3	Ignition Output 3 (14A with 1.5mm)
48A	OUT_IGN4	Ignition Output 4 (14A with 1.5mm)
49A	OUT_IGN5	Ignition Output 5 (9A with 0.75mm)
50A	OUT_INJ8	Injector Output 8 (9A with 0.75mm)
51A	OUT_INJ2	Injector Output 2 (6A with 0.5mm)
52A	OUT_INJ1	Injector Output 1 (6A with 0.5mm)
53A	OUT_INJ4	Injector Output 4 (6A with 0.5mm)
54A	OUT_INJ6	Injector Output 6 (6A with 0.5mm)
55A	OUT_INJ5	Injector Output 5 (6A with 0.5mm)
56A	OUT_PELV4	Proportional Electro valve Output 4 (6A with 0.5mm)
57A	OUT_LAMBDA	Lambda Heater Output (6A with 0.5mm)
58A	OUT_PELV3	Proportional Electro valve Output 3 (6A with 0.5mm)
59A	OUT_PELV1	Proportional Electro valve Output 1 (6A with 0.5mm)
60A	OUT_PELV2	Proportional Electro valve Output 2 (9A with 0.75mm)

1.2.2 Characteristics.

1.2.2.1 Analog Inputs.

- Number of Inputs = 8.
- Range 0-5V
- 10 bit A/D converter
- Input resistance $383k\Omega$ (pull up 5 V)
- Analogic anti aliasing filter 1 pole. (f_{cut} 240 Hz)
- Protection to short circuit to ground and battery, open circuit diagnostic

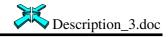
1.2.2.2 Temperature inputs.

- Number of Inputs = 4.
- In block selectable NTC/PT1000
- 10 bit A/D converter
- Temperature Range –30 °C ... +200 °C
- Analogic anti aliasing filter 1 real pole. (f_{cut} 5 Hz)
- Protection to short circuit to ground and battery, open circuit diagnostic

1.2.2.3 Thermo Couple inputs.

- Number of Inputs = 2.
- Differential Input with gain 105
- 10 bit A/D converter
- Analogic anti aliasing filter 1 real pole. (f_{cut} 117 Hz), (one filter a input and one filter a output)
- Protection to short circuit to ground and battery, open circuit diagnostic





1.2.2.4 Lambda ON/OFF

- Number of input = 1
- Not differential Input (Same ground as all other analogue inputs)
- Input with very high input impedance dedicated to ON/OFF oxygen sensor
- Analog anti aliasing filter 1 real pole (f_{cut} 117Hz)
- Open load detection reading 0.45V
- 10 bit A/D converter

1.2.2.5 Linear Lambda (UEGO).

- Number of Inputs = 1.
- Manage Vs and Ip cell.
- Vs cell polarization 30 uA.
- Analogic anti aliasing filter. (fcut 20 Hz)
- Stoichiometric ratio 4 V output.
- Open load reading 4 V.
- 10 bit A/D converter.

1.2.2.6 Variable reluctance frequency inputs

- Number of inputs = 6
- From 100mV to 60V with commutation to zero crossing and rearmament to ½ of crest signal
- Highest frequency of the impulses 10KHz

1.2.2.7 Hall frequency Inputs

- Number of Inputs = 6
- Interface for Hall Effect sensor is composed by a filtered resistive circuit and a pull up to 5V.
- Signal varying from 0 to 18V with a 2.5V commutation threshold
- Hall 2 input can be customized for Delphia sensor:
 RF capacitor 470pF, pull down 3.92KOhm, resistor divider 26.7 KOhm and 68.1 KOhm (1nF in parallel) to GND. Signal clamped to 5V

1.2.2.8 Knock Inputs

• 1 differential input piezo sensor interface with direct logic selection

1.2.2.9 Digital Input

- Number of inputs = 6
- 4 acquiered by A/D converter and 2 by digital input
- Input resistance 4.75 KOhm (pull up 5V)
- Analogic anti aliasing filter 1 real pole (f_{cut} 80Hz)
- Protection to short circuit to ground and battery



1.2.2.10 Lap Trigger input

- Number of input = 1
- Input resistance 4.75 KOhm (pull down or pull up hardware selectable)
- Analogic anti aliasing filter 1 real pole (f_{cut} 1.5 MHz)
- Protection to short circuit to ground and battery

1.2.2.11 Injectors Outputs

- Number of outputs = 8.
- Max. current (permanent) = 4A.
- Clamp = 60 V.

1.2.2.12 Ignition Coils Outputs

- Number of outputs = 6.
- Max. current (permanent) = 15A.
- Feedback control software selectable = 3 / 6 A.

1.2.2.13 Command logic Ignition

• Number of output = 6

1.2.2.14 Low Side

- Number of output = 2
- Up to 2A

1.2.2.15 Electro valve Outputs

- Number of outputs = 4.
- Max. current (permanent) = 5A.

1.2.2.16 Lambda Heater Output

- Number of outputs = 1.
- Max. current (permanent) = 3A.

1.2.2.17 H-Bridge Outputs

- Number of outputs = 1.
- Max. current (permanent) = 7A.

1.2.2.18 Communication

- Asynchronous serial Line (current loop 20mA).
- CAN Line 1Mbit/sec ended or not by electric beam.



- CAN Line for client use, with software programmable speed (min 125 Kbit/sec) ended or not by electrical beam.
- ETH Line for vision and/or Telemetry