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for Automotive and Motorsport

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PDUX4
Datasheet

The PDUX4 is a high-performance solid state power distribution unit with a total of 48 powered output channels and maximum current capacity of 350A.

This includes 10 flexible output drivers which may be configured as high side, low side, or high side PWM, with the ability to soft start electrical loads with closed loop current limitation.

Using logical or numerical inputs from its 16 analogue inputs or from any of 3 CAN buses the PDUX4 is calibrated using a clear graphical interface with full logic simulation ability and live monitoring.

The PDUX4 is able to operate in a low power standby state, drawing <2mA, with configurable activation based on physical or CAN input.

Additionally, the PDUX4 may be paired with a Life Racing ECU to expand input and output functionality through the 'slave-link' feature.

Multiple variants of the PDUX4 are available – 12V/350A, 12V/200A and 24V/300A – as detailed in the 'Ordering Information' section.

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Features:

- Schematic based calibration including logic simulation tool
- Numerical arithmetic including handling of analogue inputs
- Fully custom CAN across 3 buses including mux frames and retransmission (gateway), configured with the help of a graphical display and import/export tool
- Low power state woken on physical input, CAN activity, or specific CAN frame
- Optional I/O slaving to an LR ECU

Outputs:

- 48 main Power Outputs
  - 10 multifunction high side, low side, high side PWM (fixed 20kHz) outputs (40A continuous, soft-start inrush limiting 40A, hard-start inrush 60A)
  - 10 high side outputs (40A continuous, hard-start inrush 60A)
  - 28 high side outputs (15A continuous, hard-start inrush 17.5A)
- Output linking ('teaming') to support very high current devices
- 4 additional low side outputs (125Hz PWM)
- All outputs short circuit and thermally protected with multi-stage in-rush control
- All outputs additionally protected by physical fuses as required by worldwide regulations
- Combined diagnostic output with reset input
- 128 scaleable CAN ('soft') outputs
- Custom datastream (CAN) – i.e. customisable channel current, channel state and device information

Inputs:

- 16 physical switch / analogue sensor inputs including software selectable 3k ohm pull-up resistors and 4x inputs capable of programmable "wake up" functionality
- Analogue inputs may be transformed into engineering units for use in schematic
- Dedicated wake pin
- 128 CAN 'soft' inputs with configurable scaling, validation and debounce time

Interfaces:

- 2x 100Mbit/s full duplex Ethernet (can be used as Ethernet switch)
- 3x CAN 2.0B – fully flexible
- *Option for galvanically isolated CAN bus (custom projects only)*
- *RS232C serial interface (custom projects only)*
- *LIN Bus (custom projects only)*

Power Supply:

- 6V to 20V input voltage (12V option) or 6V to 30V input voltage (24V option)
- Dedicated logic power input
- Regulated 5V sensor supply output with full circuit protection

Sleep State:

- Low power standby state with configurable wake options:
  - Wake by voltage signal (1.6mA)
  - Wake by any CAN activity (CAN1 only) (2mA)
  - Wake by specific CAN frame (two frames required, CAN1 only) (2mA)
  - Wake by CAN specific CAN frame with low latency (one frame required, CAN1 only) (10mA)

ECU Slaving:

- Allows a Life Racing ECU to "claim" unused pins across a dedicated CAN bus utilising the following PDU I/O:
- Outputs 1..10 with additional functionality including H-Bridge pairing and configurable PWM frequencies
- Low Outputs 11..14 with configurable PWM frequencies
- All 16 inputs, including 8 frequency capable (4 optionally bipolar), and all with software selectable 3k ohm pull-up resistors

Physical:

- 2 Leavyseal connectors with a total of 113 pins
- Amphenol SurLok Power Stud
- Machined Aluminium enclosure
- 210x130x57mm (including connectors)
- 1090 grams
- Operating Temperature -40C to +85C

Ordering Information:

Description	Part number
PDUX4 350A (10mm main power stud)	PDU-C02
PDUX4 200A (8mm main power stud)	PDU-C05
PDUX4 350A 24V (10mm main power stud)	PDU-E02
PDUX4 200A 24V (8mm main power stud)	PDU-E05
PDUx 350A Connector Kit	CON-B10
PDUx 200A Connector Kit	CON-B11

Wiring Information:

Power Stud

Mating connector (350A): Surlok SLPPCxxBSR
Mating connector (200A): Surlok SLPPBxxBSR
(xx=size: 35 150A, 50 200A, 70 300A, 85 350A)

Pin	Gauge	Signal Name	Signal Notes
1	-	+12V Supply	Positive battery supply

Connector 1

Mating connector: 1-1534127-1, Hood: 9-1394050-1

Pin	Gauge	Signal Name	Signal Notes
1	20-12AWG	Power Ground	Negative battery supply
2	20-12AWG	Output 20	High Side 40A
3	20-12AWG	Output 19	High Side 40A
4	20-12AWG	Output 18	High Side 40A
5	20-12AWG	Output 17	High Side 40A
6	20-12AWG	Output 16	High Side 40A
7	20-12AWG	Output 15	High Side 40A
8	20-12AWG	Output 14	High Side 40A
9	20-12AWG	Output 13	High Side 40A
10	20-12AWG	Output 12	High Side 40A
11	20-12AWG	Output 11	High Side 40A
12	20-12AWG	Output 10	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 9, Low Side, Variable frequency PWM
13	20-12AWG	Output 9	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 10, Low Side, Variable frequency PWM
14	20-12AWG	Output 8	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 7, Low Side, Variable frequency PWM
15	20-12AWG	Output 7	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 8, Low Side, Variable frequency PWM
16	20-12AWG	Output 6	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 5, Low Side, Variable frequency PWM
17	20-12AWG	Output 5	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 6, Low Side, Variable frequency PWM
18	20-12AWG	Output 4	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 3, Low Side, Variable frequency PWM
19	20-12AWG	Output 3	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 4, Low Side, Variable frequency PWM
20	20-12AWG	Output 2	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 1, Low Side, Variable frequency PWM
21	20-12AWG	Output 1	High Side, Low Side, High Side PWM (20kHz), Soft start 40A SLAVED: Half Bridge, Full Bridge paired with Output 2, Low Side, Variable frequency PWM

Connector 2

Mating Connector: 1703998-1, Hood 1703997-1

Pin	Gauge	Signal Name	Signal Notes
1	-	DO NOT CONNECT	LR Internal use only
2	-	DO NOT CONNECT	LR Internal use only
3	-	DO NOT CONNECT	LR Internal use only
4	-	DO NOT CONNECT	LR Internal use only
5	-	DO NOT CONNECT	LR Internal use only
6	-	DO NOT CONNECT	LR Internal use only
7	-	DO NOT CONNECT	LR Internal use only
8	-	DO NOT CONNECT	LR Internal use only
9	24-16AWG	Output 48	High Side 15A
10	24-16AWG	Output 46	High Side 15A
11	24-16AWG	Output 44	High Side 15A
12	24-16AWG	Output 42	High Side 15A
13	24-16AWG	Output 40	High Side 15A
14	24-16AWG	Output 38	High Side 15A
15	24-16AWG	Output 36	High Side 15A
16	24-16AWG	Output 34	High Side 15A
17	24-16AWG	Output 32	High Side 15A
18	24-16AWG	Output 30	High Side 15A
19	24-16AWG	Output 28	High Side 15A
20	24-16AWG	Output 26	High Side 15A
21	24-16AWG	Output 24	High Side 15A
22	24-16AWG	Output 22	High Side 15A
23	24-16AWG	Low Output 11	Low Side, Low Side PWM (125Hz) SLAVED: Low Side PWM variable frequency
24	-	DO NOT CONNECT	LR Internal use only
25	-	DO NOT CONNECT	LR Internal use only
26	-	DO NOT CONNECT	LR Internal use only
27	-	DO NOT CONNECT	LR Internal use only
28	-	DO NOT CONNECT	LR Internal use only
29	-	DO NOT CONNECT	LR Internal use only
30	-	DO NOT CONNECT	LR Internal use only
31	-	DO NOT CONNECT	LR Internal use only
32	24-16AWG	Output 47	High Side 15A
33	24-16AWG	Output 45	High Side 15A
34	24-16AWG	Output 43	High Side 15A
35	24-16AWG	Output 41	High Side 15A
36	24-16AWG	Output 39	High Side 15A
37	24-16AWG	Output 37	High Side 15A
38	24-16AWG	Output 35	High Side 15A
39	24-16AWG	Output 33	High Side 15A
40	24-16AWG	Output 31	High Side 15A

Connector 2

Continued...

Pin	Gauge	Signal Name	Signal Notes
41	24-16AWG	Output 29	High Side 15A
42	24-16AWG	Output 27	High Side 15A
43	24-16AWG	Output 25	High Side 15A
44	24-16AWG	Output 23	High Side 15A
45	24-16AWG	Output 21	High Side 15A
46	24-16AWG	Low Output 12	Low Side, Low Side PWM (125Hz) SLAVED: Low Side PWM variable frequency
47	24-16AWG	INPUT #01	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, -5V to +5V, 3kΩ programmable pullup to 5V, variable frequency voltage thresholds
48	24-16AWG	INPUT #03	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, -5V to +5V, 3kΩ programmable pullup to 5V, variable frequency voltage thresholds
49	24-16AWG	INPUT #05	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V Fixed frequency voltage thresholds at 1.25 and 3.75V
50	24-16AWG	INPUT #07	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V Fixed frequency voltage thresholds at 1.25 and 3.75V
51	24-16AWG	INPUT #09	Analogue 0-5V, 3kΩ programmable pullup to 5V
52	24-16AWG	INPUT #11	Analogue 0-5V, 3kΩ programmable pullup to 5V
53	24-16AWG	INPUT #13	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake[1]
54	24-16AWG	INPUT #15	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake[1]
55	24-16AWG	SENSOR GND	Protected sensor ground
56	24-16AWG	5V OUT	Regulated 5V sensor supply rail
57	24-16AWG	LOGIC POWER IN	+12V Battery supply; recommended independent logic supply <0.5A
58	24-16AWG	WARNING AND RESET SW	Warning output for an LED to ground. Short to ground for manual reset.
59	24-16AWG	RS232 RX	RS232 receive
60	24-16AWG	CAN #03 HI	CAN communication port 120Ω software selectable termination
61	24-16AWG	CAN #02 HI	CAN communication port 120Ω software selectable termination ECU Slave – when paired with LR ECU (terminated)
62	24-16AWG	CAN #01 HI	CAN communication port 120Ω software selectable termination
63	24-16AWG	ETHERNET2 RX+	Ethernet communication port 2
64	24-16AWG	ETHERNET2 TX+	Ethernet communication port 2
65	24-16AWG	ETHERNET1 RX+	Ethernet communication port 1
66	24-16AWG	ETHERNET1 TX+	Ethernet communication port 1
67	24-16AWG	Power Ground	Negative battery supply
68	24-16AWG	Low Output 13	Low Side, Low Side PWM (125Hz) SLAVED: Low Side PWM variable frequency
69	24-16AWG	Low Output 14	Low Side, Low Side PWM (125Hz) SLAVED: Low Side PWM variable frequency
70	24-16AWG	INPUT #02	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, -5V to +5V, 3kΩ programmable pullup to 5V, variable frequency voltage thresholds
71	24-16AWG	INPUT #04	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, -5V to +5V, 3kΩ programmable pullup to 5V, variable frequency voltage thresholds

Connector 2

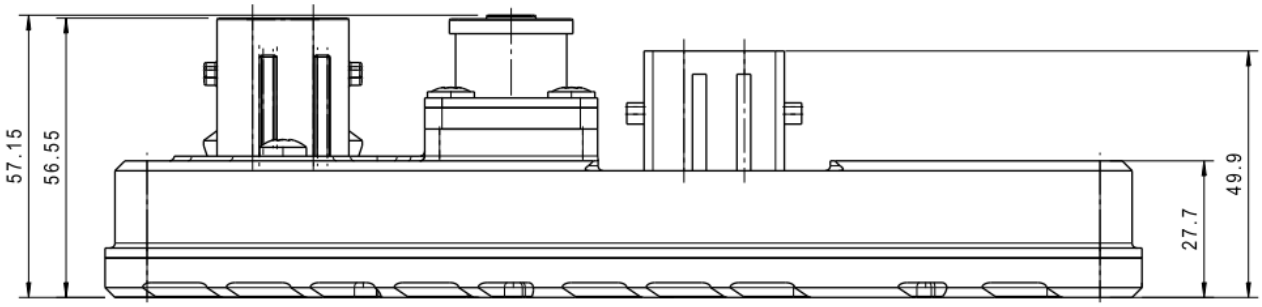
Continued...

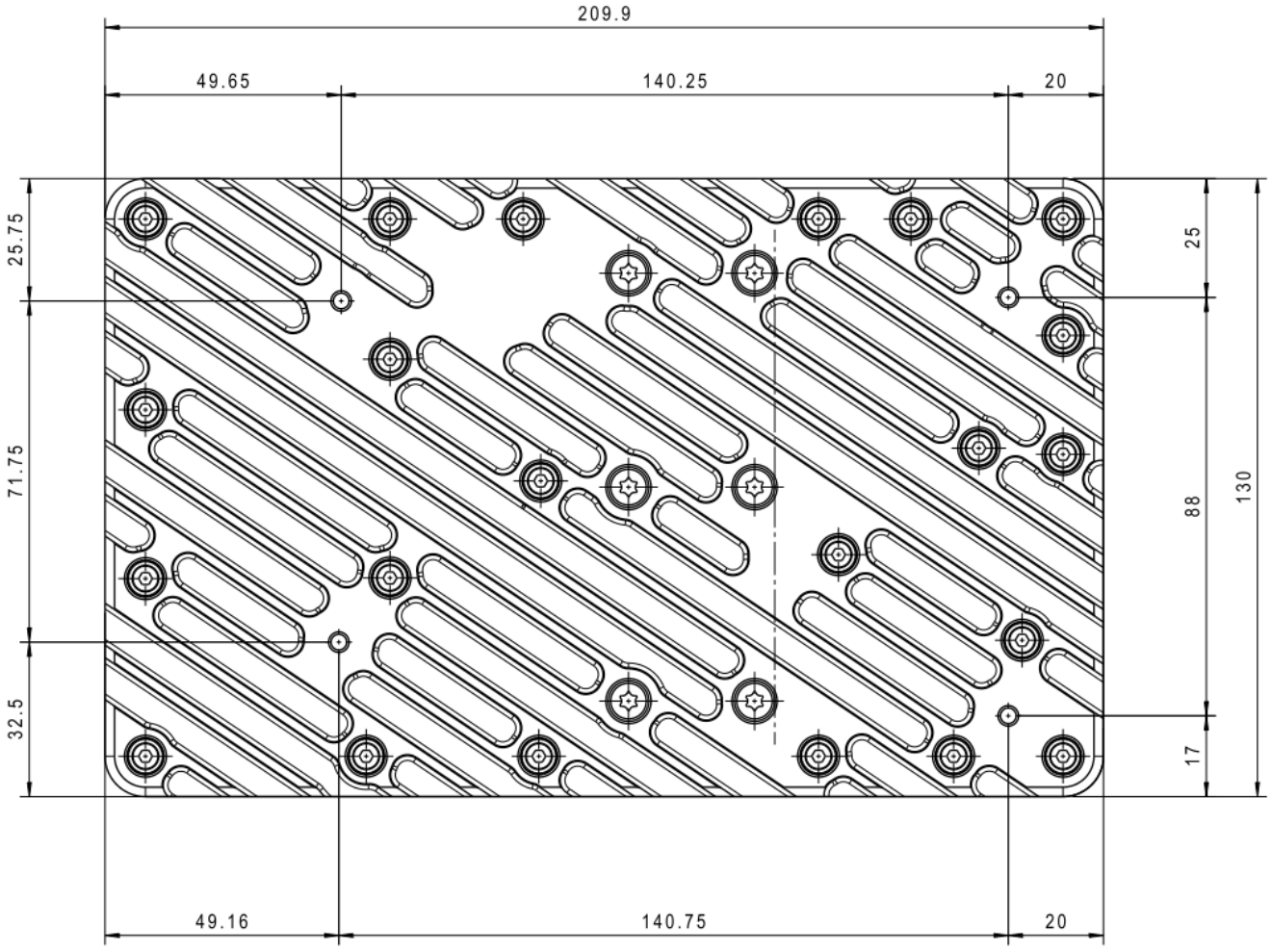
Pin	Gauge	Signal Name	Signal Notes
72	24-16AWG	INPUT #06	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V Fixed frequency voltage thresholds at 1.25 and 3.75V
73	24-16AWG	INPUT #08	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V Fixed frequency voltage thresholds at 1.25 and 3.75V
74	24-16AWG	INPUT #10	Analogue 0-5V, 3kΩ programmable pullup to 5V
75	24-16AWG	INPUT #12	Analogue 0-5V, 3kΩ programmable pullup to 5V
76	24-16AWG	INPUT #14	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake[1]
77	24-16AWG	INPUT #16	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake[1]
78	24-16AWG	SENSOR GND	Protected sensor ground
79	24-16AWG	Power Ground	Negative battery supply
80	24-16AWG	WAKEUP	Dedicated Wake[1]
81	24-16AWG	LIN	NOT CURRENTLY IN USE
82	24-16AWG	RS232 TX	RS232 transmit
83	24-16AWG	CAN #03 LO	CAN communication port 120Ω software selectable termination
84	24-16AWG	CAN #02 LO	CAN communication port 120Ω software selectable termination ECU Slave – when paired with LR ECU (terminated)
85	24-16AWG	CAN #01 LO	CAN communication port 120Ω software selectable termination
86	24-16AWG	ETHERNET2 RX-	Ethernet communication port 2
87	24-16AWG	ETHERNET2 TX-	Ethernet communication port 2
88	24-16AWG	ETHERNET1 RX-	Ethernet communication port 1
89	24-16AWG	ETHERNET1 TX-	Ethernet communication port 1
90	24-16AWG	Power Ground	Negative battery supply
91	24-16AWG	Power Ground	Negative battery supply
92	24-16AWG	Output 21D	High Side with Diode intended for wiper operation 15A

Footnotes:

[1]Can be calibrated to bring unit out of sleep mode when driven high.

Dimensions:





Warranty and Servicing:

- 1 year limited warranty when used within supplied specification.