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PDUX4B (48V)
Datasheet

The PDUX4B (48V) is a high-performance solid state power distribution unit with a total of 48 powered output channels and maximum current capacity of 200A.

This includes 10 flexible 20A output drivers which may be configured as half-bridge, high side, high side PWM (configurable frequency), with the ability to soft start electrical loads with closed loop current limitation.

In addition, two 20A capable output drivers, high side and high side PWM (configurable frequency) with the ability to soft start electrical loads and eight 20A capable output drives, high side and high side PWM (configurable frequency) with the ability to soft start electrical loads.

Using digitised, voltage, or linearised values from its 16 analogue inputs and from any of 3 CAN buses the PDUX4B is calibrated using a clear graphical interface with full logic simulation ability and live monitoring.

The PDUX4B is able to operate in a low power standby state, drawing <2mA, with configurable activation based on physical or CAN input.

Additionally, the PDUX4B may be used to expand input and output functionality of any Life Racing ECU.

The PDUX4B is available as 12V, 24V and 48V variants as well as an internal IMU option.

LIN bus support for Bosch WDA wiper and Pierburg CWA400 pump devices.

Features:

- Schematic based calibration including logic simulation tool
- Custom CAN across 3 buses including mux frames and retransmission (gateway) features, 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
- Configurable evaluation frequency operation of schematic components in circuitry – "Expert Frequency Mode"
- Optional internal IMU (Inertial Measurement Unit) feature offers a six-axis gyro and accelerometer which can be processed internally or transmitted over CAN.

Outputs:

- 48 main Power Outputs
  - 10 multifunction outputs configurable as either half-bridge, high side, low side, high side PWM (100Hz-2kHz) outputs
    (20A continuous, soft-start inrush limiting 50A, hard-start inrush 50A)
  - 10 high side, 2 of which can be high side PWM (100Hz-20kHz) outputs
    (20A continuous, hard-start inrush 50A)
  - 28 high side, 8 of which can be high side PWM (100Hz-20kHz) outputs
    (10A continuous, hard-start inrush 20A)
- Output linking ('teaming') to support very high current devices
- All high-side outputs are capacitive load starting sequence capable
- 4 additional low side outputs with configurable PWM (10Hz-10kHz, 5A maximum)
- 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 scalable CAN ('soft') outputs
- Custom datastream (CAN) – i.e. customisable channel current, channel state and device information

Inputs:

- 16 physical 0-5V inputs, including software selectable 3k ohm pull-up resistors
- 4x inputs capable of programmable "wake" functionality
- Comparing and manipulating real numbers (floating point decimal) in schematic
- Analogue inputs can be linearised, viewed as raw voltage or Boolean value
- Dedicated wake pin
- 128 CAN 'soft' inputs with configurable scaling

Interfaces:

- 2x 100Mbit/s full duplex Ethernet (can be used as Ethernet switch)
- 3x CAN 2.0B – fully flexible
- Option for one galvanically isolated CAN bus (CAN3 - custom projects only)
- RS232C serial interface (custom projects only)
- LIN Bus – current support for Bosch WDA wiper and Pierburg CWA400 pump devices.

Power Supply:

- 6V to 20V input voltage (12V option), 6V to 30V input voltage (24V option), 6V to 60V (48V option
- Dedicated logic power input
- 200mA regulated 5V sensor reference 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 or content (two frames required, CAN1 only) (2mA)
  - Wake by CAN specific CAN frame or content 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 Full-Bridge pairing and configurable PWM frequencies
- Low Outputs 11-14 with configurable PWM frequencies and internal pull up resistors
- All 16 inputs, including eight frequency capable, and all with software selectable 3k Ohm pull-up resistors.
- Slaved frequency Inputs 1-4 can be modified for active 2 wire sensors found in OEM applications (See ordering Information)

Physical:

- Two Leavyseal connectors with a total of 113 pins
- Amphenol SurLok Power Stud
- Machined Aluminium enclosure
- Meets IP67 standard
- 210x130x57mm (including connectors)
- 1090 grams
- Operating Temperature -40C to +85C
- M4 mounting threads.

Ordering Information:

Description	Part number
PDUX4B 48V	PDU-
PDUX 200A Connector Kit	CON-B11
3-axis accelerometer and 3-axis gyroscope	PDU-FEAT-IMU
Required for active 2 wire sensors found in OEM applications	PDU-BTC-WS

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. Must be connected
2	20-12AWG	Output 20	High Side 20A
3	20-12AWG	Output 19	High Side 20A
4	20-12AWG	Output 18	High Side 20A
5	20-12AWG	Output 17	High Side 20A
6	20-12AWG	Output 16	High Side 20A
7	20-12AWG	Output 15	High Side 20A
8	20-12AWG	Output 14	High Side 20A
9	20-12AWG	Output 13	High Side 20A
10	20-12AWG	Output 12	High Side/High Side PWM (configurable Hz), Soft start, 20A(1)
11	20-12AWG	Output 11	High Side/High Side PWM (configurable Hz), Soft start, 20A(1)
12	20-12AWG	Output 10	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 9, Low Side, PWM
13	20-12AWG	Output 9	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 10, Low Side, PWM
14	20-12AWG	Output 8	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 7, Low Side, PWM
15	20-12AWG	Output 7	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 8, Low Side, PWM
16	20-12AWG	Output 6	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 5, Low Side, PWM
17	20-12AWG	Output 5	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 6, Low Side, PWM
18	20-12AWG	Output 4	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 3, Low Side, PWM
19	20-12AWG	Output 3	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 4, Low Side, PWM
20	20-12AWG	Output 2	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 1, Low Side, PWM
21	20-12AWG	Output 1	High Side/Low Side/High Side PWM (configurable Hz), Soft start, 20A(1) SLAVED: Half Bridge, Full Bridge paired with Output 2, Low Side, 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 10A
10	24-16AWG	Output 46	High Side 10A
11	24-16AWG	Output 44	High Side 10A
12	24-16AWG	Output 42	High Side 10A
13	24-16AWG	Output 40	High Side 10A
14	24-16AWG	Output 38	High Side 10A
15	24-16AWG	Output 36	High Side 10A
16	24-16AWG	Output 34	High Side 10A
17	24-16AWG	Output 32	High Side 10A
18	24-16AWG	Output 30	High Side 10A
19	24-16AWG	Output 28	High Side, High Side PWM (configurable Hz), Soft Start, 10A(1)
20	24-16AWG	Output 26	High Side, High Side PWM (configurable Hz), Soft Start, 10A(1)
21	24-16AWG	Output 24	High Side, High Side PWM (configurable Hz), Soft Start, 10A(1)
22	24-16AWG	Output 22	High Side, High Side PWM (configurable Hz), Soft Start, 10A(1)
23	24-16AWG	Low Output 11	Low Side, Low Side PWM (configurable Hz, 5A maximum)(3) SLAVED: Low Side PWM configurable 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 10A
33	24-16AWG	Output 45	High Side 10A
34	24-16AWG	Output 43	High Side 10A
35	24-16AWG	Output 41	High Side 10A
36	24-16AWG	Output 39	High Side 10A
37	24-16AWG	Output 37	High Side 10A
38	24-16AWG	Output 35	High Side 10A
39	24-16AWG	Output 33	High Side 10A
40	24-16AWG	Output 31	High Side 10A

Connector 2

Continued...

Pin	Gauge	Signal Name	Signal Notes
41	24-16AWG	Output 29	High Side 10A
42	24-16AWG	Output 27	High Side, High Side PWM (configurable Hz), Soft Start, 10A[1]
43	24-16AWG	Output 25	High Side, High Side PWM (configurable Hz), Soft Start, 10A[1]
44	24-16AWG	Output 23	High Side, High Side PWM (configurable Hz), Soft Start, 10A[1]
45	24-16AWG	Output 21	High Side, High Side PWM (configurable Hz), Soft Start, 10A[1]
46	24-16AWG	Low Output 12	Low Side, Low Side PWM (configurable Hz, 5A maximum)[3] SLAVED: Low Side PWM configurable 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, configurable frequency voltage thresholds. *PDU-BTC-WS required for active 2 wire sensors found in OEM applications
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, configurable frequency voltage thresholds. *PDU-BTC-WS required for active 2 wire sensors found in OEM applications
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[4]
54	24-16AWG	INPUT #15	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake[4]
55	24-16AWG	SENSOR GND	Protected sensor ground
56	24-16AWG	5V OUT	Regulated 5V sensor reference supply
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
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. Must be connected
68	24-16AWG	Low Output 13	Low Side, Low Side PWM (configurable Hz, 5A maximum)[3] SLAVED: Low Side PWM configurable frequency
69	24-16AWG	Low Output 14	Low Side, Low Side PWM (configurable Hz, 5A maximum)[3] SLAVED: Low Side PWM configurable 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, configurable frequency voltage thresholds. *PDU-BTC-WS required for active 2 wire sensors found in OEM applications
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, configurable frequency voltage thresholds. *PDU-BTC-WS required for active 2 wire sensors found in OEM applications

Connector 2

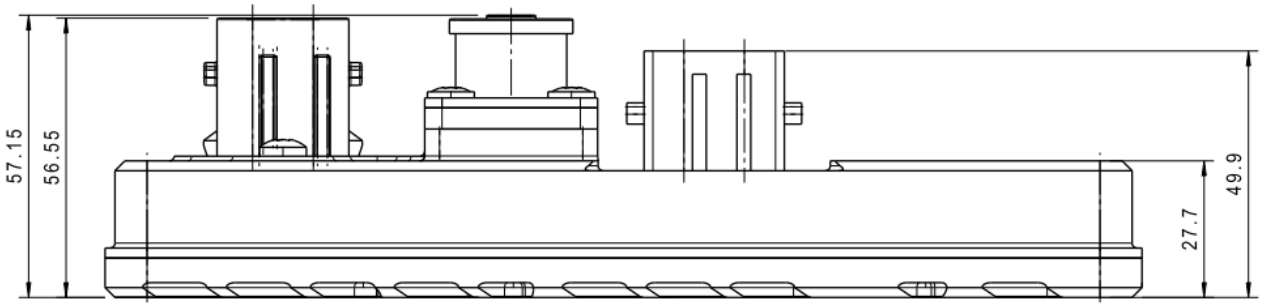
Continued...

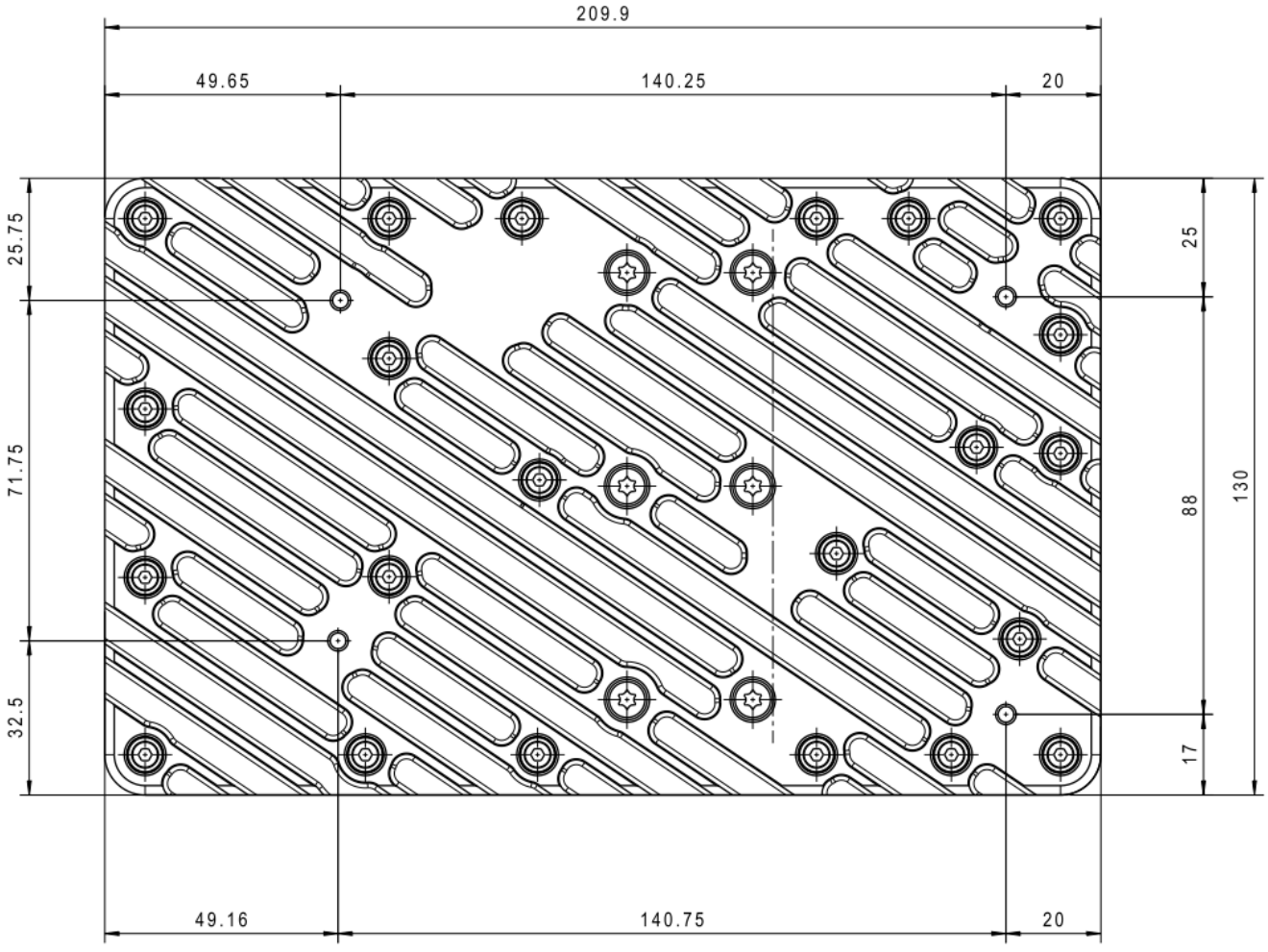
Pin	Gauge	Signal Name	Signal Notes
72	24-16AWG	INPUT #06	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue or frequency; 0-5V, 3kΩ programmable pullup to 5V Fixed frequency voltage thresholds at 1.25 and 3.75V
73	24-16AWG	INPUT #08	Analogue 0-5V, 3kΩ programmable pullup to 5V SLAVED: Analogue 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[4]
77	24-16AWG	INPUT #16	Analogue 0-5V, 3kΩ programmable pullup to 5V, Wake[4]
78	24-16AWG	SENSOR GND	Protected sensor ground
79	24-16AWG	Power Ground	Negative battery supply. Must be connected
80	24-16AWG	WAKEUP	Dedicated Wake[4]
81	24-16AWG	LIN	Bosch WDA and Pierburg CWA400 support via OEM schematic components
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
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. Must be connected
91	24-16AWG	Power Ground	Negative battery supply. Must be connected
92	24-16AWG	Output 21D	Duplicate of output 21 with Diode - intended for wiper operation 15A

Footnotes:

[1]Default PWM frequency for Outputs 1-12 is 20kHz.
[2]Default PWM frequency for Outputs 21-28 is 20kHz.
[3]Default PWM frequency for Low Side Outputs 11-14 is 125Hz.
[4]Can be calibrated to bring unit out of sleep mode.

Dimensions:





Warranty and Servicing:

- One year limited warranty when used within supplied specification.