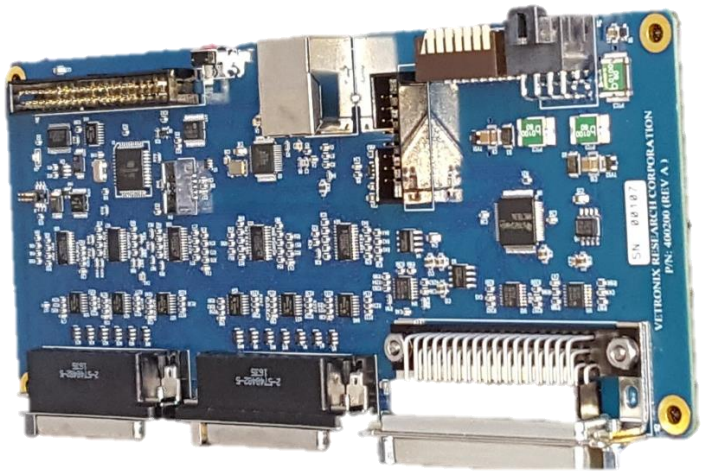
Distributive Input/Output Controller Board (DIOCB)



The Distributive I/O Controller Board (P/N 400200) supports a wide variety of analog and digital signals and has a unique capability to process digital inputs and outputs simultaneously over the same line. The DIOCB communicates to a host processing system via Ethernet using a defined Interface Control Protocol. The board is ideally suited for large distributed communications applications as it supports multiple I/O board synchronization monitoring.

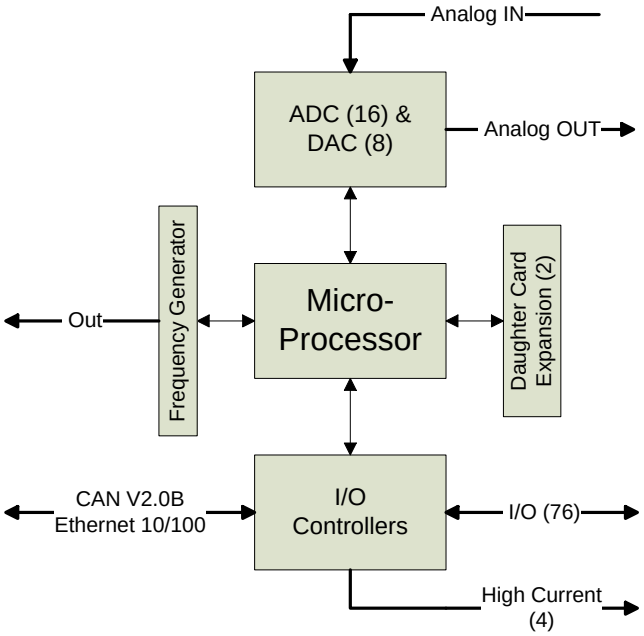
FEATURES

- 76 Digital I/O lines
  - Can be configured as an input, output, and is capable of supporting both inputs and outputs at the same time
  - Can sink up to 180mA each with weak pull up to 12VDC
  - 256 steps PWM in group/individual with adjustable duty cycle
- 4 high current Digital Outputs capable of sinking up to 1 amp each at up to 35VDC
- 8 channels of 12-bit Digital to Analog outputs (0-10VDC, up to 1mA each)
- 16 channels of 12-bit Analog to Digital inputs (-12VDC to +12VDC on-board reference)
- One Frequency Generator output (0 to 6400Hz at 50% duty cycle)
- CAN Bus (support for J1939 message transmission)
- Two daughter board interfaces for added capabilities (one supports I^2C and SPI bus traffic)
- One sync input and output for synchronizing multiple I/O boards
- Support for up to 128 addresses via an on-board dip switch

INTERFACE

- RJ45 10/100 Ethernet Interface
- Two 44-pin connectors and one 50-pin connector for I/O
- 40-pin daughter board connector (addressed latched parallel output)
- 16-pin daughter board connector with I^2C and SPI (3 slaves supported) serial bus
- Power input of +5VDC and +/-15VDC
- Dimensions: 3.325” x 8.2”

SIMPLIFED BLOCK DIAGRAM



ELECTRICAL CONNECTIONS

Table 1. Connectors

Connector	Function Descriptions
J1	Input Power (Molex 172316-1108)
J2	Ethernet 10/100 RJ45
J3, J4	I/O Signal Interface (44-Pin Female HD D-Sub)
J5	Analog Signal Interface (50-Pin Female HD D-Sub)
J6	Expansion 1 (40-Pin Header dual row 0.1” pitch)
J7	Expansion 2 (16-Pin Header dual row 0.1” pitch)
J8	Processor JTAG (10-Pin Header dual row 0.05” pitch)
J9	Frequency Generator (6-Pin Header dual row 0.05” pitch)

Connector Pin Description

Detailed pin out assignments for each connector are shown in the Table 2 through Table 9. Each of the three input voltages at J1 has a PTC (2A) in series for short circuit protection. The digital I/O signals can be used as an output control for LED dimming and blinking by connecting to ground when each signal is externally limited to less than 180mA. As an input I/O signal it can be connected to external switches to provide input statuses.

Table 2. Connector J1 Pinout

Pin Number	Signal Name	Function Descriptions
1	-15VDC	Power Input (+/-5%)
4	+15VDC	Power Input (+/-5%)
5	5VDC	Power Input (+/-5%)
2,3,6,7	GND	Ground
8	CGND	Chassis Ground

Table 3. Connector J3 Pinout

Pin Number	Signal Name	Function Descriptions
1	CANL	CAN Bus Low
2	IO15	Digital I/O
3	IO12	Digital I/O
4	IO9	Digital I/O
5	IO6	Digital I/O
6	IO3	Digital I/O
7	IO1	Digital I/O
8	IO30	Digital I/O
9	IO27	Digital I/O
10	IO24	Digital I/O
11	IO21	Digital I/O
12	IO18	Digital I/O
13	IO47	Digital I/O
14	IO44	Digital I/O
15	HCS2	High Current Sink (1 Amp Max)
16	CANH	CAN Bus High
17	SYNC_IN	SYNC Input 5V signal
18	IO14	Digital I/O
19	IO11	Digital I/O
20	IO8	Digital I/O
21	IO5	Digital I/O
22	IO2	Digital I/O
23	IO31	Digital I/O
24	IO28	Digital I/O
25	IO25	Digital I/O
26	IO22	Digital I/O
27	IO19	Digital I/O
28	IO48	Digital I/O
29	IO45	Digital I/O
30	HCS1	High Current Sink (1 Amp Max)
31	GND	Ground
32	IO16	Digital I/O
33	IO13	Digital I/O
34	IO10	Digital I/O
35	IO7	Digital I/O
36	IO4	Digital I/O
37	IO32	Digital I/O
38	IO29	Digital I/O
39	IO26	Digital I/O
40	IO23	Digital I/O
41	IO20	Digital I/O
42	IO17	Digital I/O
43	IO46	Digital I/O
44	IO43	Digital I/O

Table 4. Connector J4 Pinout

Pin Number	Signal Name	Function Descriptions
1	FREQ_OUT	Frequency Output 5V Signal
2	IO41	Digital I/O
3	IO38	Digital I/O
4	IO35	Digital I/O
5	IO64	Digital I/O
6	IO61	Digital I/O
7	IO58	Digital I/O
8	IO55	Digital I/O
9	IO52	Digital I/O
10	IO49	Digital I/O
11	IO74	Digital I/O
12	IO71	Digital I/O
13	IO68	Digital I/O
14	IO65	Digital I/O
15	HCS4	High Current Sink (1 Amp Max)
16	SYNC_OUT	SYNC Output 5V Signal
17	GND	Ground
18	IO40	Digital I/O
19	IO37	Digital I/O
20	IO34	Digital I/O
21	IO63	Digital I/O
22	IO60	Digital I/O
23	IO57	Digital I/O
24	IO54	Digital I/O
25	IO51	Digital I/O
26	IO76	Digital I/O
27	IO73	Digital I/O
28	IO70	Digital I/O
29	IO67	Digital I/O
30	HCS3	High Current Sink (1 Amp Max)
31	GND	Ground
32	IO42	Digital I/O
33	IO39	Digital I/O
34	IO36	Digital I/O
35	IO33	Digital I/O
36	IO62	Digital I/O
37	IO59	Digital I/O
38	IO56	Digital I/O
39	IO53	Digital I/O
40	IO50	Digital I/O
41	IO75	Digital I/O
42	IO72	Digital I/O
43	IO69	Digital I/O
44	IO66	Digital I/O

Table 5. Connector J5 Pinout

Pin Number	Signal Name	Function Descriptions
1,7	+12V	Sensor Power (< 25mA)
2	ACH3	ADC Channel Input
3	ACH2	ADC Channel Input
4	ACH7	ADC Channel Input
5	ACH6	ADC Channel Input
6,12,13,18-31,39,45,46	AGND	Analog Ground
8	ACH11	ADC Channel Input
9	ACH10	ADC Channel Input
10	ACH15	ADC Channel Input
11	ACH14	ADC Channel Input
14	DAC7	DAC Output
15	DAC5	DAC Output
16	DAC3	DAC Output
17	DAC1	DAC Output
32,33	-	*Reserved*
34,40	-12V	Sensor Power (< 25mA)
35	ACH4	ADC Channel Input
36	ACH1	ADC Channel Input
37	ACH8	ADC Channel Input
38	ACH5	ADC Channel Input
41	ACH12	ADC Channel Input
42	ACH9	ADC Channel Input
43	ACH16	ADC Channel Input
44	ACH13	ADC Channel Input
47	DAC8	DAC Output
48	DAC6	DAC Output
49	DAC4	DAC Output
50	DAC2	DAC Output

Table 6. Connector J6 Pinout

Pin Number	Signal Name	Function Descriptions
1-4	GND	Ground
5-9	5V	5VDC
10	DBUS7	Data Bus 5V signal
11	DBUS6	Data Bus 5V signal
12	DBUS5	Data Bus 5V signal
13	DBUS4	Data Bus 5V signal
14	DBUS3	Data Bus 5V signal
15	DBUS2	Data Bus 5V signal
16	DBUS1	Data Bus 5V signal
17	DBUS0	Data Bus 5V signal
18	ADR0	Address Output 5V Signal
19	ADR1	Address Output 5V Signal
20	ADR2	Address Output 5V Signal
21	ADR3	Address Output 5V Signal
22	ADR4	Address Output 5V Signal
23	/D_EN_A	Data Enable 5V Signal
24	ADR5	Address Output 5V Signal
25	/D_EN_E	Data Enable 5V Signal
26	ADR6	Address Output 5V Signal
27	GND	Ground
28	/D_EN_B	Data Enable 5V Signal
29	GND	Ground
30	/D_EN_F	Data Enable 5V Signal
31	GND	Ground
32	GND	Ground
33	/D_EN_C	Data Enable 5V Signal
34	GND	Ground
35	/D_EN_G	Data Enable 5V Signal
36	GND	Ground
37	ADR7	Address Output 5V Signal
38	/D_EN_D	Data Enable 5V Signal
39	GND	Ground
40	/D_EN_H	Data Enable 5V Signal

Table 7. Connector J7 Pinout

Pin Number	Signal Name	Function Descriptions
1	MOSI0	SPI (Mode 0)
2	MOSI1	SPI (Mode 1)
3	MISO0	SPI (Mode 0)
4	MISO1	SPI (Mode 1)
5	SCLK0	SPI (Mode 0)
6	SCLK1	SPI (Mode 1)
7	/CS1	SPI Chip Select
8	/CS2	SPI Chip Select
9	/CS3	SPI Chip Select
10	/INT	Interrupt Input
11	SCL	I2C Clock
12	SYNC_OUT	SYNC Output
13	SDA	I2C Data
14	5V	5VDC
15,16	GND	Ground

Table 8. Connector J8 Pinout

Pin Number	Signal Name	Function Descriptions
1	TCK	JTAG Signal
2	GND	Ground
3	TDO	JTAG Signal
4	5V	5VDC
5	TMS	JTAG Signal
6	/MRST	JTAG Signal
7,8	-	*Reserved*
9	TDI	JTAG Signal
10	GND	Ground

Table 9. Connector J9 Pinout

Pin Number	Signal Name	Function Descriptions
1	FGMISO	FREQ GEN PGM Data Output
2	5V	5VDC
3	FGSCK	FREQ GEN PGM Clock
4	FGMOSI	FREQ GEN PGM Data Input
5	/FGRST	FREQ GEN Reset
6	GND	Ground