

Description

The DZRALTE-012L080 digital servo drive is designed to drive brushed and brushless servomotors from a compact form factor ideal for embedded applications. This fully digital drive operates in torque, velocity, or position mode and employs Space Vector Modulation (SVM), which results in higher bus voltage utilization and reduced heat dissipation compared to traditional PWM. The command source can be generated internally or can be supplied externally. In addition to motor control, this drive features dedicated and programmable digital and analog inputs and outputs to enhance interfacing with external controllers and devices.

The DZRALTE-012L080 features a RS-232 interface for drive configuration and setup as well as a RS-485 interface for drive networking. Drive commissioning is accomplished using DriveWare300 available at www.a-m-c.com.

All drive and motor parameters are stored in non-volatile memory.

Power Range

Peak Current	12 A (8.5 A _{RMS})
Continuous Current	6 A (4.2 A _{RMS})
Supply Voltage	20 - 80 VDC


Features

- ▲ Four quadrant regenerative operation
- ▲ Space vector modulation (SVM) technology
- ▲ Fully digital state-of-the-art design
- ▲ Programmable gain settings
- ▲ Fully configurable current, voltage, velocity and position limits
- ▲ PIDF velocity loop
- ▲ PID + FF position loop
- ▲ Compact size, high power density

MODES OF OPERATION

- Current
- Position
- Velocity

COMMAND SOURCE

- Encoder Following
- ±10 V Analog
- 5 V Step & Direction

FEEDBACK SUPPORTED

- Halls
- Incremental Encoder
- ±10 V Analog
- Auxiliary Incremental Encoder

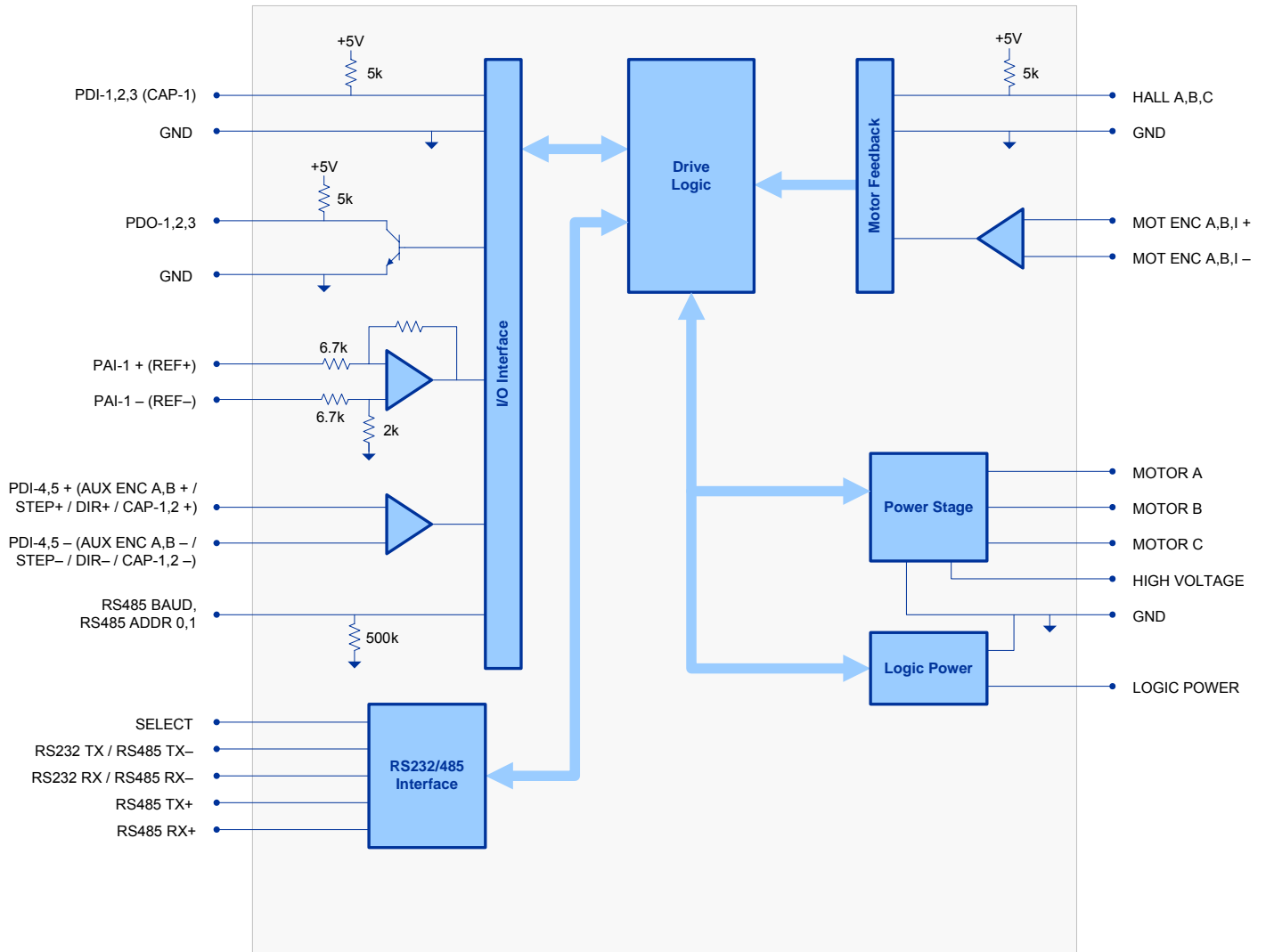
INPUTS/OUTPUTS

- 2 High Speed Captures
- 1 Programmable Analog Input (12-bit Resolution)
- 2 Programmable Digital Inputs (Differential)
- 3 Programmable Digital Inputs (Single-Ended)
- 3 Programmable Digital Outputs (Single-Ended)




COMPLIANCES & AGENCY APPROVALS

- RoHS
- UL/cUL Pending
- CE Pending

BLOCK DIAGRAM



Approvals and Compliances

	<p>US and Canadian safety compliance with UL 508c, the industrial standard for power conversion electronics. UL registered under file number E140173. Note that machine components compliant with UL are considered UL registered as opposed to UL listed as would be the case for commercial products.</p>
	<p>Compliant with European CE for both the Class A EMC Directive 89/336/EEC on Electromagnetic Compatibility (specifically EN 61000-6-4:2001, EN 61000-6-2:2001, EN 61000-3-2:2000, and EN 61000-3-3:1995/A1:2001) and LVD requirements of directive 73/23/EEC (specifically EN 60204-1), a low voltage directive to protect users from electrical shock.</p>
	<p>RoHS (Reduction of Hazardous Substances) is intended to prevent hazardous substances such as lead from being manufactured in electrical and electronic equipment.</p>

SPECIFICATIONS

Power Stage Specifications		
Description	Units	Value
DC Supply Voltage	VDC	20 - 80
Over Voltage Limit	VDC	86
Under Voltage Limit	VDC	17
Logic Supply Voltage	VDC	5
Peak Output Current	A	12
Maximum Continuous Output Current	A	6
Maximum Continuous Output Power	W	480
Maximum Power Dissipation at Continuous Current	W	24
Internal Bus Capacitance	µF	33
Minimum Load Inductance (Line-To-Line) ¹	µH	250
Switching Frequency	kHz	20
Control Specifications		
Description	Units	Value
Communication Interfaces	-	RS-232, RS-485
Command Sources	-	5 V Step & Direction, ±10 V Analog, Encoder Following
Feedback Supported	-	±10 V Analog, Auxiliary Incremental Encoder, Halls, Incremental Encoder
Commutation Methods	-	Sinusoidal, Trapezoidal
Modes of Operation	-	Current, Position, Velocity
Motors Supported	-	Brushed, Brushless, Induction, Voice Coil
Hardware Protection	-	40+ Configurable Functions, Over Current, Over Temperature (Drive & Motor), Over Voltage, Short Circuit (Phase-Phase & Phase-Ground), Under Voltage
Programmable Digital Inputs/Outputs (PDIs/PDOs)	-	5/3
Programmable Analog Inputs/Outputs (PAIs/PAOs)	-	1/0
Current Loop Sample Time	µs	50
Velocity Loop Sample Time	µs	100
Position Loop Sample Time	µs	100
Maximum Encoder Frequency	MHz	16 (4 pre-quadrature)
Mechanical Specifications		
Description	Units	Value
Size (H x W x L)	mm (in)	18.5 x 50.8 x 63.5 (0.7 x 2 x 2.5)
Weight	g (oz)	95.2 (3.4)
Heatsink (Base) Temperature Range ²	°C (°F)	0 - 65 (32 - 149)
Storage Temperature Range	°C (°F)	-40 - 85 (-40 - 185)
Cooling System	-	Natural Convection
Form Factor	-	PCB Mounted
P1 Connector	-	30-pin, 2.54 mm spaced, dual-row header
P2 Connector	-	12-pin, 2.54 mm spaced header

Notes

1. Low inductance motors, such as 'pancake' and 'basket-wound', require external inductors. The Minimum Load Inductance provided assumes the highest allowed bus voltage. Lower inductances are acceptable for lower bus voltages.
2. Additional cooling and/or heatsink may be required to achieve rated performance.

PIN FUNCTIONS

P1 - Signal Connector			
Pin	Name	Description / Notes	I/O
1	RS485 ADDR 0	RS-485 Network Address Selector	I
2	RS485 ADDR 1		I
3	PAI-1 - (REF-)	Differential Programmable Analog Input or Reference Signal Input (12-bit Resolution)	I
4	PAI-1 + (REF+)		I
5	GND	Ground	GND
6	RS485 BAUD	RS-485 Baud Rate Selector	I
7	PDO-1	Programmable Digital Output	O
8	PDO-2	Programmable Digital Output	O
9	PDO-3	Programmable Digital Output	O
10	PDI-1	Programmable Digital Input	I
11	PDI-2	Programmable Digital Input	I
12	PDI-3 (CAP-1)	Programmable Digital Input or High Speed Capture	I
13	RS232 RX / RS485 RX-	Receive Line (RS-232 or RS-485)	I
14	RS485 RX+	Receive Line (RS-485)	I
15	RS232 TX / RS485 TX-	Transmit Line (RS-232 or RS-485)	O
16	RS485 TX+	Transmit Line (RS-485)	O
17	PDI-4 + (STEP+ / AUX ENC A+ / CAP-2)	Programmable Digital Input or Step+ or Auxiliary Encoder or High Speed Capture	I
18	PDI-4 - (STEP- / AUX ENC A-)	Programmable Digital Input or Step- or Auxiliary Encoder (For Differential Signals Only)	I
19	PDI-5 + (DIR+ / AUX ENC B+ / CAP-3)	Programmable Digital Input or Direction+ or Auxiliary Encoder or High Speed Capture	I
20	PDI-5 - (DIR- / AUX ENC B-)	Programmable Digital Input or Direction- or Auxiliary Encoder (For Differential Signals Only)	I
21	GND	Ground	GND
22	HALL A	Single-ended Commutation Sensor Input (For Differential Inputs See MC1XZDCR Datasheet For Recommended Signal Conditioning)	I
23	HALL B		I
24	HALL C		I
25	MOT ENC I+	Differential Encoder Index Input (See MC1XZDCR Datasheet For Recommended Signal Conditioning)	I
26	MOT ENC I-		I
27	MOT ENC A+	Differential Encoder A Channel Input (See MC1XZDCR Datasheet For Recommended Signal Conditioning)	I
28	MOT ENC A-		I
29	MOT ENC B+	Differential Encoder B Channel Input (See MC1XZDCR Datasheet For Recommended Signal Conditioning)	I
30	MOT ENC B-		I

P2 - Power Connector			
Pin	Name	Description / Notes	I/O
1	LOGIC PWR	Logic Supply Input	I
2	GND	Ground	GND
3	GND	Ground	GND
4	HIGH VOLTAGE	DC Power Input	I
5	HIGH VOLTAGE	DC Power Input	I
6	RESERVED	Reserved	-
7	MOTOR C	Motor Phase C	O
8	MOTOR C	Motor Phase C	O
9	MOTOR B	Motor Phase B	O
10	MOTOR B	Motor Phase B	O
11	MOTOR A	Motor Phase A	O
12	MOTOR A	Motor Phase A	O

Pin Details
RS485 ADDR 0 (P1-1)

This pin, RS485 ADDR 0, as well as RS485 ADDR 1, are used for RS-485 network addressing. To set the address of a drive, use the formula

$$RS485Address = \frac{7 * Addr0}{3} + 8 * \frac{7 * Addr1}{3},$$

where *RS485Address* is the desired node address and *Addr0* and *Addr1* represent the voltage that should be applied to pins RS485 ADDR 0 and RS485 ADDR 1, respectively. The values for *Addr0* and *Addr1* are always integer multiples of 3/7 V within the range 0-3 V. Examples of the voltages required to set certain node addresses are given in the table below. Note that setting a drive address of 0 will utilize the address stored in non-volatile memory.

RS485 ADDR 0 Value (V)	RS485 ADDR 1 Value (V)	RS485 ADDR Tolerance (V)	RS485 Address (Address #)
0	0	±0.1	Address stored in non-volatile memory
3/7 (0.43)	0	±0.1	1
6/7 (0.86)	0	±0.1	2
9/7 (1.3)	0	±0.1	3
...	...	±0.1	...
18/7 (2.57)	21/7 (3.0)	±0.1	62
21/7 (3.0)	21/7 (3.0)	±0.1	63

RS485 BAUD (P1-6)

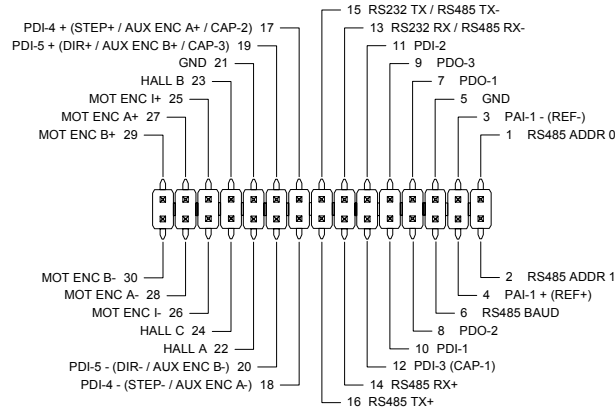
The RS-485 baud rate is set by applying the appropriate voltage to the RS485 BAUD pin as given in the table below.

RS485 BAUD Value (V)	RS485 BAUD Tolerance (V)	RS485 Baud Rate (bits/s)
0	±0.388	Bit rate stored in non-volatile memory
1	±0.388	9.6k
2	±0.388	38.4k
3	±0.388	115.2k

MECHANICAL INFORMATION

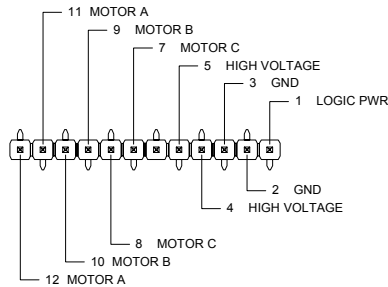
P1 - Signal Connector

Connector Information	30-pin, 2.54 mm spaced, dual-row header
Mating Connector	Samtec: SSM-115-L-DV

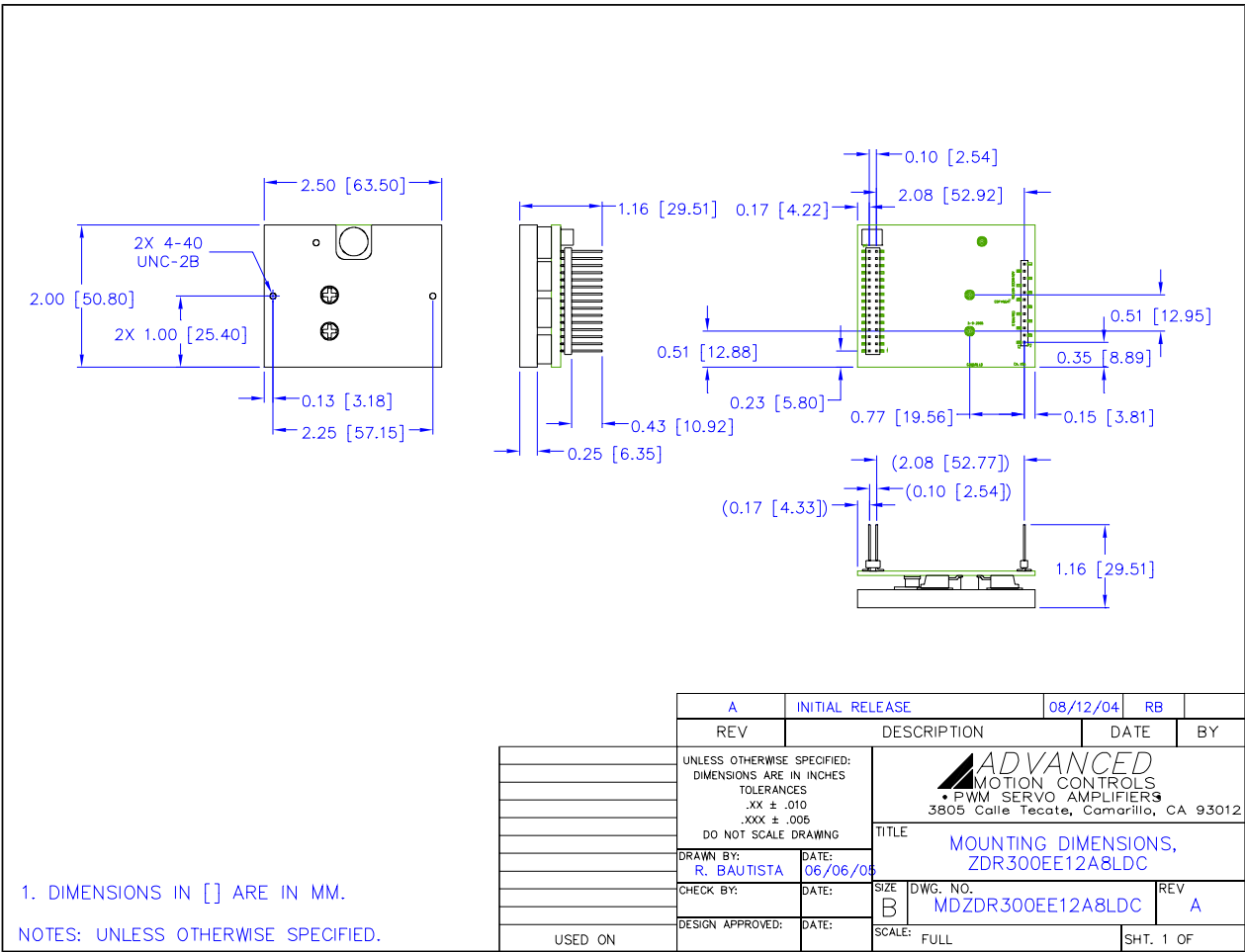


P2 - Power Connector

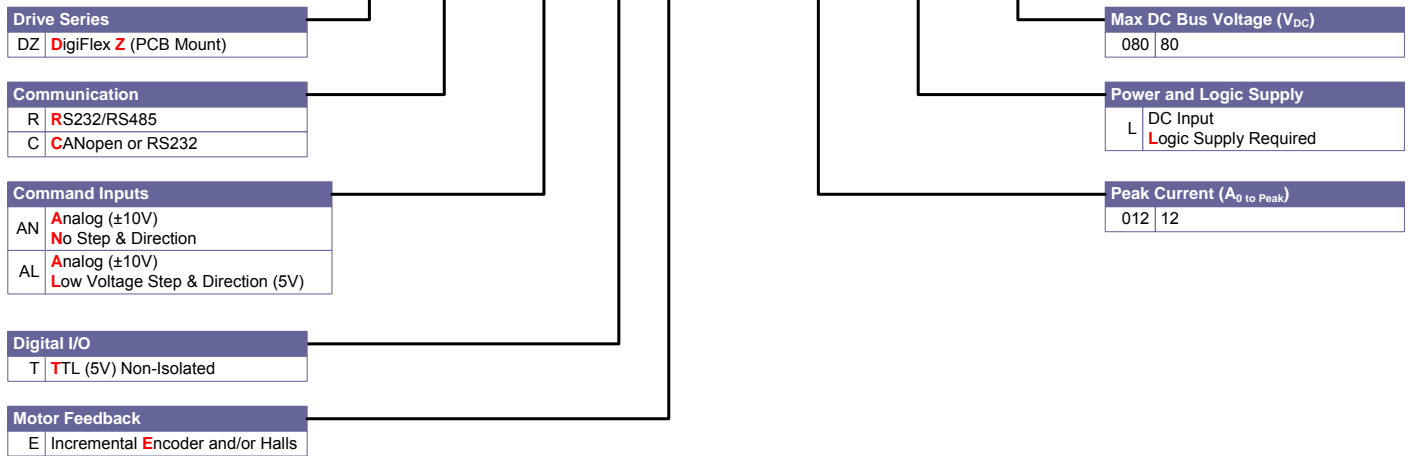
Connector Information	12-pin, 2.54 mm spaced header
Mating Connector	Samtec: BCS-112-L-S-PE



MOUNTING DIMENSIONS



PART NUMBERING INFORMATION

 Example: **D Z R A L T E - 0 1 2 L 0 8 0**


DigiFlex® Performance™ series of products are available in many configurations. All models listed on the website are readily available, standard product offerings. Other combinations or possibilities can be made available for OEMs with volume requests of 100 or more. Contact Applications Engineering for further information and details.

All specifications in this document are subject to change without written notice. Actual product may differ from pictures provided in this document.