Description

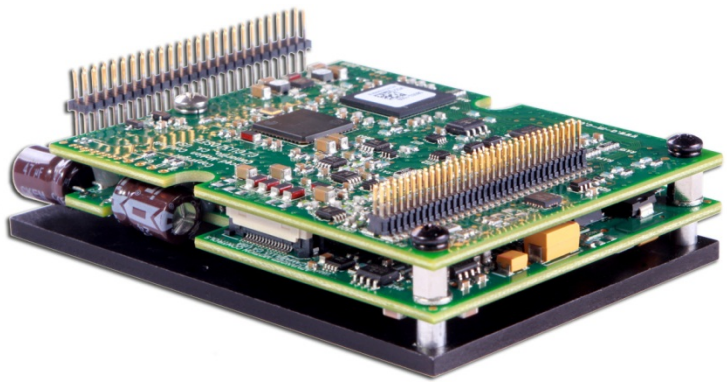
The DZCANTU-020B200 digital servo drive is designed to drive brushed and brushless servomotors from a compact form factor ideal for embedded applications. This fully digital drive operates in torque, velocity, or position mode and employs Space Vector Modulation (SVM), which results in higher bus voltage 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 DZCANTU-020B200 features a CANopen interface for networking, and a USB interface for drive configuration and setup. Drive commissioning is accomplished using DriveWare® 7, available for download at www.a-m-c.com.

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

Power Range

Peak Current	20 A (14.1 A_{RMS})
Continuous Current	10 A (10 A_{RMS})
Supply Voltage	40 - 175 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
- 12-bit Analog to Digital Hardware
- On-the-Fly Mode Switching
- On-the-Fly Gain Set Switching

MODES OF OPERATION
- Profile Current
- Profile Velocity
- Profile Position
- Cyclic Synchronous Current Mode
- Cyclic Synchronous Velocity Mode
- Cyclic Synchronous Position Mode

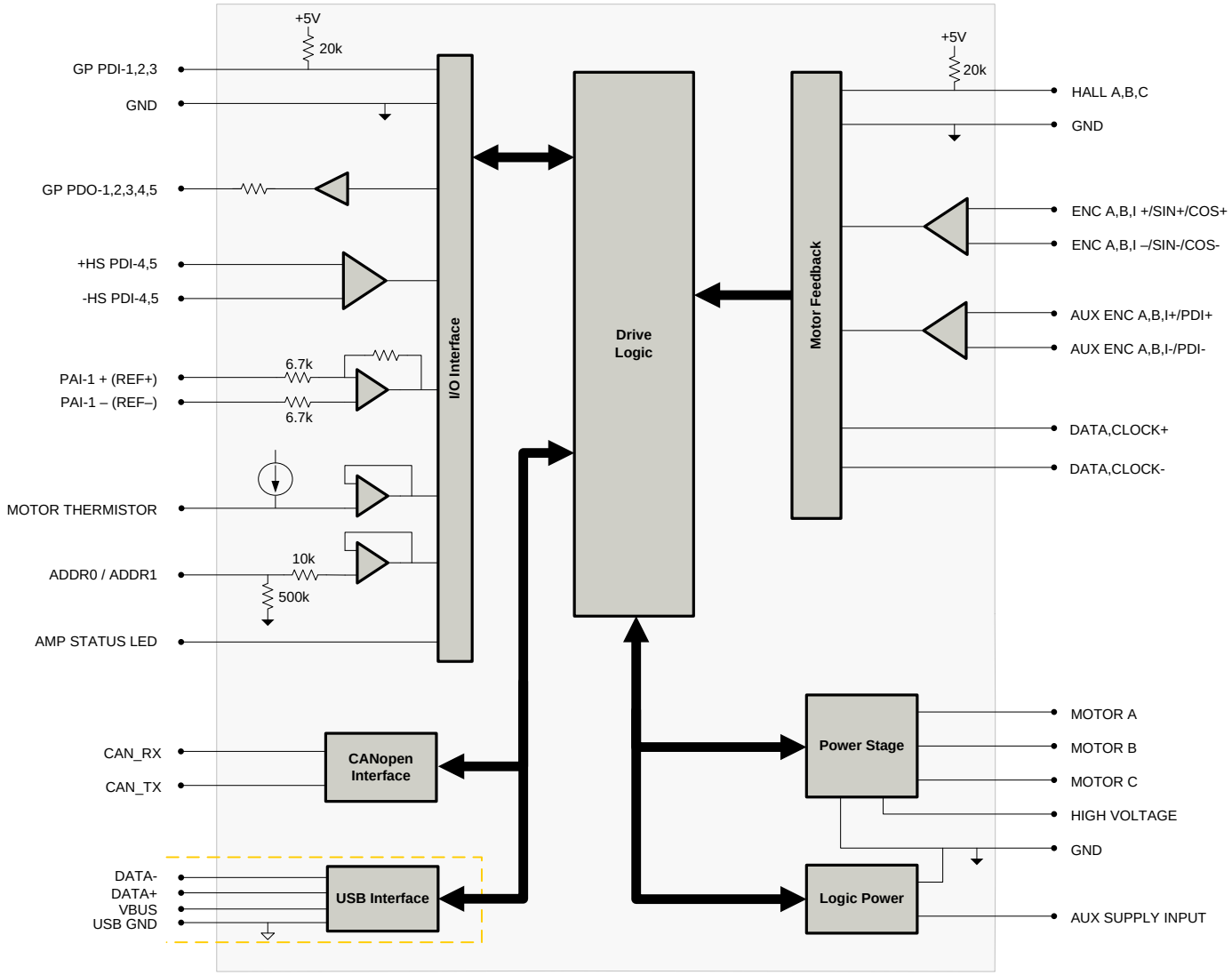
COMMAND SOURCE
- ±10 V Analog
- Encoder Following
- Over the Network
- Sequencing
- Indexing
- Jogging

FEEDBACK SUPPORTED (FIRMWARE DEPENDENT)
- Halls
- Incremental Encoder
- Auxiliary Incremental Encoder
- 1Vp-p Sine/Cosine Encoder (see note 5 on page 3)
- Absolute Encoder (Heidenhain EnDat® or Stegmann Hiperface® or BiSS C-Mode)
- ±10 VDC Position
- Tachometer (±10 VDC)

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

COMPLIANCES & AGENCY APPROVALS
- RoHS
- UL/cUL Pending
- CE Pending

BLOCK DIAGRAM



Information on Approvals and Compliances	
RoHS COMPLIANCE	RoHS (Reduction of Hazardous Substances) is intended to prevent hazardous substances such as lead from being manufactured in electrical and electronic equipment.

SPECIFICATIONS

Description	Units	Value
Power Specifications		
Description	Units	Value
DC Supply Voltage Range	VDC	40 - 175
DC Bus Over Voltage Limit	VDC	190
DC Bus Under Voltage Limit	VDC	37
Logic Supply Voltage	VDC	40 - 175
Maximum Peak Output Current[1]	A (Arms)	20 (14.1)
Maximum Continuous Output Current[2]	A (Arms)	10 (10)
Maximum Continuous Output Power	W	1663
Maximum Power Dissipation at Continuous Current	W	88
Internal Bus Capacitance[3]	μF	145
Minimum Load Inductance (Line-To-Line)[4]	μH	250
Switching Frequency	kHz	20
Maximum Output PWM Duty Cycle	%	85
Control Specifications		
Description	Units	Value
Communication Interfaces	-	CANopen (USB for configuration)
Command Sources	-	±10 V Analog, Encoder Following, Over the Network, Sequencing, Indexing, Jogging
Feedback Supported (Firmware Dependent)[5]	-	Auxiliary Incremental Encoder, Halls, Incremental Encoder, 1Vp-p Sine/Cosine Encoder, Absolute Encoder (Heidenhain EnDat®, Stegmann Hiperface®, or BiSS C-Mode), ±10 VDC Position, Tachometer (±10 VDC)
Commutation Methods	-	Sinusoidal, Trapezoidal
Modes of Operation	-	Profile Current, Profile Velocity, Profile Position, Cyclic Synchronous Current, Cyclic Synchronous Velocity, Cyclic Synchronous Position
Motors Supported	-	Closed Loop Vector, Single Phase (Brushed, Voice Coil, Inductive Load), Three Phase (Brushless)
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)	-	8/5
Programmable Analog Inputs/Outputs (PAIs/PAOs)	-	1/0
Primary I/O Logic Level	-	5V TTL
Current Loop Sample Time	μs	50
Velocity Loop Sample Time	μs	100
Position Loop Sample Time	μs	100
Maximum Encoder Frequency	MHz	20 (5 pre-quadrature)
Mechanical Specifications		
Description	Units	Value
Agency Approvals	-	RoHS, UL/cUL Pending, CE Pending
Size (H x W x D)	mm (in)	88.9 x 63.5 x 23.5 (3.5 x 2.5 x 0.93)
Weight	g (oz)	126.8 (4.47)
Baseplate Operating Temperature Range[6]	°C (°F)	0 - 75 (32 - 167)
Storage Temperature Range	°C (°F)	-20 - 85 (-4 - 185)
Relative Humidity	-	0 - 90% non-condensing
Altitude	m (ft)	0 - 4000 (0 - 13123)
Cooling System	-	Natural Convection
Form Factor	-	PCB Mounted
P1 Connector	-	68-pin, 1.27 mm spaced, dual-row header
P2 Connector	-	50-pin, 2.0 mm spaced, dual-row header

Notes

1. Capable of supplying drive rated peak current for 2 seconds with 10 second foldback to continuous value. Longer times are possible with lower current limits.
2. Continuous A_{rms} value attainable when RMS Charge-Based Limiting is used.
3. Additional 100 μF / 200 V external bus capacitor between High Voltage and Power Ground as close to the drive as possible required.
4. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.
5. Contact *ADVANCED* Motion Controls for 1Vp-p Sine/Cosine Encoder feedback availability.
6. Additional cooling and/or heatsink may be required to achieve rated performance.

PIN FUNCTIONS

P1 - Signal Connector

Pin	Name	Description / Notes	I/O	Pin	Name	Description / Notes	I/O
1	RESERVED	Reserved. Do not connect.	-	2	CAN BAUD	CAN Bus Bit Rate Selector	I
3	PAI-1-	Differential Programmable Analog Input or Reference Signal Input (12-bit Resolution)	I	4	ADDR1	CAN Bus Address Selector	I
5	PAI-1+		I	6	ADDR0		I
7	GROUND	Ground	GND	8	GROUND	Ground	GND
9	MOT ENC B- / COS-	Primary Incremental Encoder or Cos Input from feedback device (Absolute or Sin/Cos 1Vp-p)	I	10	MOT ENC A- / SIN-	Primary Incremental Encoder or Sin Input from feedback device (Absolute or Sin/Cos 1Vp-p)	I
11	MOT ENC B+ / COS+		I	12	MOT ENC A+ / SIN+		I
13	GROUND	Ground	GND	14	+5V OUT	+5V User Supply	O
15	MOTOR THERMISTOR	Motor Thermistor Input	I	16	GROUND	Ground	GND
17	MOT ENC CLK-	Serial Interface (RS485) for absolute feedback device	I/O	18	MOT ENC DATA-	Serial Interface (RS485) for absolute feedback device	I/O
19	MOT ENC CLK+		I/O	20	MOT ENC DATA+		I/O
21	MOT ENC I-	Differential Incremental Encoder Channel I	I	22	AUX ENC B-	Auxiliary Incremental Encoder Channel B or Differential Programmable Digital Input 7	I
23	MOT ENC I+		I	24	AUX ENC B+		I
25	AUX ENC I-	Auxiliary Incremental Encoder Channel I or Differential Programmable Digital Input 8	I	26	AUX ENC A-	Auxiliary Incremental Encoder Channel A or Differential Programmable Digital Input 6	I
27	AUX ENC I+		I	28	AUX ENC A+		I
29	+5V OUT	+5V User Supply	O	30	HALL B	Single-ended Commutation Sensor Inputs	I
31	HALL C	Single-ended Commutation Sensor Inputs	I	32	HALL A		I
33	PDI-5-	Differential Programmable Digital Input (High Speed Capture)	I	34	PDI-4-	Differential Programmable Digital Input (High Speed Capture)	I
35	PDI-5+		I	36	PDI-4+		I
37	GP PDO-5	Programmable Digital Output	O	38	GP PDI-3	Programmable Digital Input (High Speed Capture)	I
39	GP PDO-4	Programmable Digital Output	O	40	GP PDI-2	Programmable Digital Input	I
41	GP PDO-3	Programmable Digital Output	O	42	GP PDI-1	Programmable Digital Input	I
43	GP PDO-2	Programmable Digital Output	O	44	AMP STATUS LED-	AMP Status LED Output for Bi-Color LED. See Pin Details below.	O
45	GP PDO-1	Programmable Digital Output	O	46	AMP STATUS LED+		O
47	RESERVED	Reserved. Do not connect.	-	48	RESERVED	Reserved. Do not connect.	-
49	+5V USB OUT	USB Supply	O	50	DATA- USB	USB Data Channel	I/O
51	GND USB	USB Ground	UGND	52	DATA+ USB		I/O
53	GROUND	Ground	GND	54	GROUND	Ground	GND
55	RESERVED	Reserved. Do not connect.	-	56	CAN_L	CAN_L bus line (dominant low)	I/O
57	RESERVED		-	58	CAN_H	CAN_H bus line (dominant high)	I/O
59	GROUND	Ground	GND	60	RESERVED	Reserved. Do not connect.	-
61	RESERVED	Reserved. Do not connect.	-	62	RESERVED		-
63	RESERVED		-	64	RESERVED		-
65	RESERVED		-	66	RESERVED		-
67	GROUND	Ground	GND	68	GROUND	Ground	GND

P2 - Power Connector

Pin	Name	Description / Notes	I/O
1	AUX SUPPLY INPUT	Auxiliary Supply Input for Logic backup (Optional)	I
2	AUX SUPPLY INPUT		I
3-10	HIGH VOLTAGE	DC Power Input. Additional 100µF / 200V external bus capacitor required between HV and Ground.	I
11	NC	Not Connected	-
12	NC		-
13-20	GROUND	Ground connection for input power	GND
21	NC	Not Connected	-
22	NC		-
23-30	MOTOR A	Motor Phase A. Current output distributed equally across 8 pins per motor phase, 3A Continuous Current Rating Per Pin.	O
31	NC	Not Connected	-
32	NC		-
33-40	MOTOR B	Motor Phase B. Current output distributed equally across 8 pins per motor phase, 3A Continuous Current Rating Per Pin.	O
41	NC	Not Connected	-
42	NC		-
43-50	MOTOR C	Motor Phase C. Current output distributed equally across 8 pins per motor phase, 3A Continuous Current Rating Per Pin.	O

Pin Details

ADDR0 (P1-6); ADDR1 (P1-4)

ADDR0, as well as *ADDR1*, are used for CAN bus addressing. To set the CAN node address of a drive, apply a fixed voltage to the *ADDR0* and *ADDR1* pins to determine a node ID. *ADDR0* sets the lower 4 bits of the address, and *ADDR1* sets the upper 4 bits of the address. The values for *ADDR0* and *ADDR1* are always integer multiples of 1/5 V within the range 0-3 V. Examples of the voltages required to set certain node ID's are given in the table below. Note that setting the address to 000 or any addresses above 127 will utilize the address stored in non-volatile memory.

ADDR1 Voltage (Volts)	ADDR1 Value (Hex)	ADDR0 Voltage (Volts)	ADDR0 Value (Hex)	CAN Address (Node #) (Decimal)
0	0	0	0	**Address stored in non-volatile memory**
0	0	0.2	1	**001**
0	0	0.4	2	**002**
0	0	0.6	3	**003**
…	…	…	…	**…**
1.4	7	2.8	E	**126**
1.4	7	3	F	**127**
1.6	8	0	0	**Address stored in non-volatile memory**
…	…	…	…	**…**
3	F	3	F	**Address stored in non-volatile memory**

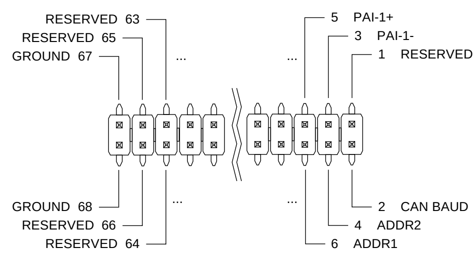
CAN BAUD (P1-2)

The CAN bitrate is set by applying the appropriate voltage to the *CAN BAUD* pin as given in the table below.

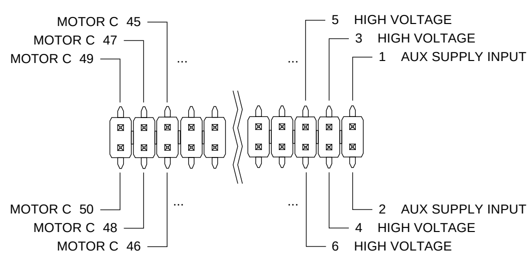
CAN BAUD Value (V)	CAN BAUD Tolerance (V)	CAN Bus Bitrate (bits/s)
0	±0.388	Bit rate stored in non-volatile memory
1	±0.388	500k
2	±0.388	250k
3	±0.388	125k

MECHANICAL INFORMATION

P1 - Signal Connector		
Connector Information		68-pin, 1.27mm spaced, dual-row header
Mating Connector	Details	Samtec: CLP-134-02-F-D-BE-A-K
	Included with Drive	No



P2 - Power Connector		
Connector Information		50-pin, 2.0mm spaced, dual-row header
Mating Connector	Details	Samtec: CLT-125-02-F-D-BE-A-K
	Included with Drive	No



PART NUMBERING INFORMATION

Example: **D Z C A N T U - 0 2 0 B 2 0 0**

Drive Series	
DZ	DigiFlex Z (PCB Mount)

Communication	
C	CANopen
E	EtherCAT
S	EtherCAT Sub-node

Command Inputs	
AN	Analog (±10V) No Step & Direction

Digital I/O	
T	TTL (5V) Non-Isolated

Motor Feedback	
U	Universal (Halls, Inc. Enc., Abs. Enc, 1Vp-p Sin/Cos Enc.)

Peak Current ($A_{0\ to\ Peak}$)	
020	20 (80V models only)
025	25 (175V models only)

Power and Logic Supply	
B	DC Input Both Logic Supply Options (Internal or User)

Max DC Bus Voltage (V_{DC})	
080	80
200	175

DigiFlex® Performance™ series of products are available in many configurations. Note that not all possible part number combinations are offered as standard drives. All models listed in the selection tables of the website are readily available, standard product offerings.

ADVANCED Motion Controls also has the capability to promptly develop and deliver specified products for OEMs with volume requests. Our Applications and Engineering Departments will work closely with your design team through all stages of development in order to provide the best servo drive solution for your system. Equipped with on-site manufacturing for quick-turn customs capabilities, *ADVANCED* Motion Controls utilizes our years of engineering and manufacturing expertise to decrease your costs and time-to-market while increasing system quality and reliability.

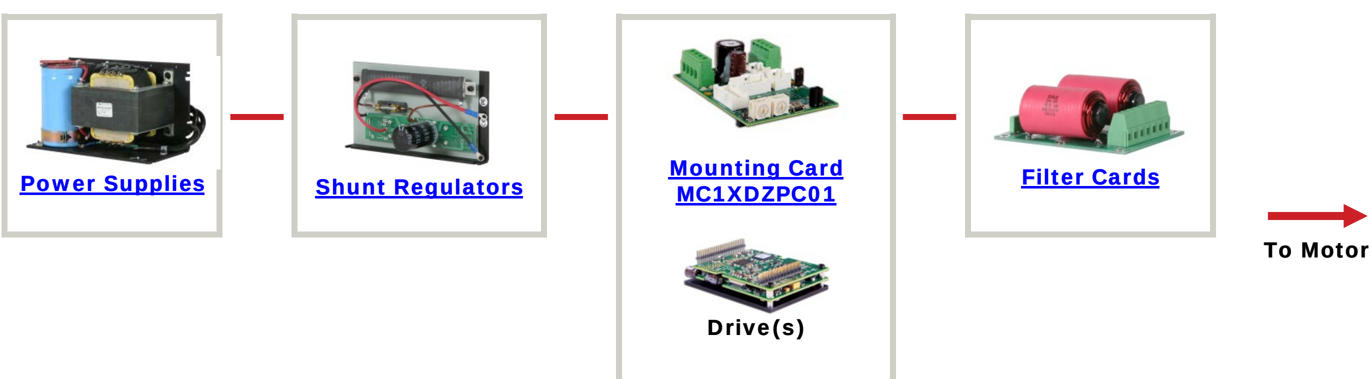
Examples of Customized Products

- Optimized Footprint
- Private Label Software
- OEM Specified Connectors
- No Outer Case
- Increased Current Resolution
- Increased Temperature Range
- Custom Control Interface
- Integrated System I/O
- Tailored Project File
- Silkscreen Branding
- Optimized Base Plate
- Increased Current Limits
- Increased Voltage Range
- Conformal Coating
- Multi-Axis Configurations
- Reduced Profile Size and Weight

Feel free to contact Applications Engineering for further information and details.

Available Accessories

ADVANCED Motion Controls offers a variety of accessories designed to facilitate drive integration into a servo system. Visit www.a-m-c.com to see which accessories will assist with your application design and implementation.



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