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DT300 Series Specifications

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Analog Input Specifications

Table 1 lists the specifications for the A/D subsystem.

Table 1: A/D Subsystem Specifications

Feature	DT301/302 Specifications	DT303/304 Specifications	DT321/322 Specifications
Number of analog inputs Single-ended/ pseudo-differential: Differential:	16 8		
Number of gains	4 (1, 2, 4, 8)		
Resolution	12 bits	12 bits	16 bits
Data encoding	Offset binary		
System accuracy (full-scale) Gain = 1: Gain = 2: Gain = 4: Gain = 8:	 0.03% 0.04% 0.05% 0.05%	 0.03% 0.04% 0.05% 0.05%	 0.01% 0.02% 0.03% 0.03%
Nonlinearity (integral)	±1.0 LSB	±1.0 LSB	±4.0 LSB
Differential linearity	±0.5 LSB (no missing codes)	±0.5 LSB (no missing codes)	±1.2 LSB (no missing codes to 15 bits)
Range (V) Bipolar: Unipolar:	 ±1.25, 2.5, 5, 10 0 to 1.25, 0 to 2.5, 0 to 5, 0 to 10	 ±1.25, 2.5, 5, 10 0 to 1.25, 0 to 2.5, 0 to 5, 0 to 10	 ±1.25, 2.5, 5, 10

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Table 1: A/D Subsystem Specifications (cont.)

Feature	DT301/302 Specifications	DT303/304 Specifications	DT321/322 Specifications
Drift Zero: Gain:	±30 µV+ (+20 µV * Gain)/° C ±30 ppm/° C	±30 µV+ (+20 µV * Gain)/° C ±30 ppm/° C	±25 µV+ (+10 µV*Gain)° C ±20 ppm/° C
Input impedance Off: On:	100 MΩ, 10 pF 100 MΩ, 100 pF		
Input bias current	±20 nA		
Common mode voltage	±11 V maximum (operational)		
Maximum input voltage	±40 V maximum (protection)		
A/D converter noise	0.3 LSB rms		
Amplifier input noise	20 µV rms + (10 µV rms*gain) 200 pA rms (current)	20 µV rms + (10 µV rms*gain) 200 pA rms (current)	15 µV rms + (10 µV rms*gain) 100 pA rms (current)
Channel-to-channel offset	±40.0 µV		
Channel acquisition time	3 µs	1 µs	1 µs
A/D conversion time	4.4 µs	2.5 µs	4 µs
Effective number of bits (ENOB)	11.5 bits	11.5 bits	13.5 bits
Total Harmonic Distortion	–80 dB typical	–80 dB typical	–90 dB typical
Channel crosstalk	–80 dB @ 1 kHz		

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Table 1: A/D Subsystem Specifications (cont.)

Feature	DT301/302 Specifications	DT303/304 Specifications	DT321/322 Specifications
Data throughput			
Single analog channel:	225 kSamples/s (0.03% accuracy)	400 kSamples/s (0.03% accuracy)	250 kSamples/s (0.01% accuracy)
Multiple channels (scan):	225 kSamples/s (0.05% accuracy)	400 kSamples/s (0.05% accuracy)	250 kSamples/s (0.03% accuracy)
	200 kSamples/s (.03% accuracy)	360 kSamples/s (.03% accuracy)	150 kSamples/s (.01% accuracy)
Single digital channel:	3 MSamples/s	3 MSamples/s	3 MSamples/s
External A/D sample clock			
Input type:	Schmitt trigger, falling-edge sensitive		
Input load:	1 HCT14 (TTL)		
High-level input voltage:	2.0 V minimum		
Low-level input voltage:	0.8 V maximum		
Hysteresis:	0.4 V (minimum); 1.5 V (maximum)		
High-level input current:	1.0 µA		
Low-level input current:	–1.0 µA		
Minimum pulse width:	100 ns (high); 100 ns (low)		
Maximum frequency:	See Data Throughput spec above		
Termination:	33 Ω series resistor		

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Table 1: A/D Subsystem Specifications (cont.)

Feature	DT301/302 Specifications	DT303/304 Specifications	DT321/322 Specifications
External A/D digital (TTL) trigger			
Input type:	Schmitt trigger, edge sensitive		
Input load:	1 HCT14 (TTL)		
High-level input voltage:	2.0 V minimum		
Low-level input voltage:	0.8 V maximum		
Hysteresis:	0.4 V (minimum); 1.5 V (maximum)		
High-level input current:	1.0 µA		
Low-level input current:	–1.0 µA		
Minimum pulse width:	100 ns (high); 100 ns (low)		
Termination:	33 Ω series resistor		

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Analog Ouput Specifications

Table 2 lists the specifications for the D/A subsystem.

Table 2: D/A Subsystem Specifications

Feature	Specifications
Number of analog output channels (DT302, DT304, and DT322 only)	2
Resolution DT302, DT304: DT322:	 12 bits 16 bits
Data encoding (input)	Offset binary
Nonlinearity (integral) DT302, DT304: DT322:	 ±1 LSB ±4 LSB
Differential linearity DT302, DT304: DT322:	 ±0.5 LSB (monotonic) ±1 LSB (monotonic)
Output range DT302, DT304: DT322:	 ±10 V, 0 to 10 V, ±5 V, 0 to 5 V ±10 V
Zero Error:	Software-adjustable to zero
Gain Error DT302, DT304: DT322:	 ±2 LSB + reference ±6 LSB + reference
Current output	±5 mA minimum (10 V/ 2 kΩ)
Output impedance	0.3 Ω typical
Capacitive drive capability	0.001 µF minimum (no oscillations)
Protection	Short circuit to Analog Common

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Table 2: D/A Subsystem Specifications (cont.)

Feature	Specifications
Power-on voltage	0 V ±10 mV maximum
Settling time to 0.01% of FSR	50 µs, 20 V step; 10.0 µs, 100 mV step
Slew rate	2 V/µs
Multiplying Zero Error	±10 mV maximum
External Reference Output	+10 V ±10 mV
Reference Input Impedance	5 kΩ typical

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Digital I/O Specifications

Table 3 lists the specifications for the DIN/DOUT subsystems.

Table 3: DIN/DOUT Subsystem Specifications

Feature	Port A Specifications	Port B Specifications	Port C Specifications
Number of lines	8 (bidirectional)	8 (bidirectional)	7 (bidirectional)
Termination	47 kΩ resistor pullup to +3.3 V; 33 Ω series resistor		
Inputs			
Input type:	Level sensitive	Level sensitive	Level sensitive
Input load:	2 TTL	2 TTL	1 TTL
High-level input voltage:	2.0 V minimum	2.0 V minimum	2.0 V minimum
Low-level input voltage:	0.8 V maximum	0.8 V maximum	0.8 V maximum
High-level input current:	3 µA	3 µA	100 µA
Low-level input current:	–3 µA	–3 µA	–100 µA
Outputs			
Output driver:	TTL	TTL	TTL
Output driver high voltage:	2.4 V minimum (IOH = –15 mA)	2.4 V minimum (IOH = –15 mA)	2.4 V minimum (IOH = 4 mA)
Output driver low voltage:	0.5 V maximum (IOL = 12 mA)	0.5 V maximum (IOL = 12 mA)	0.8 V maximum (IOL = 4 mA)

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Counter/Timer Specifications

Table 4 lists the specifications for the C/T subsystems.

Table 4: C/T Subsystem Specifications

Feature	Specifications
Number of counter/timer channels	4
Clock Inputs	
Input type:	Schmitt trigger, rising-edge sensitive
Input load:	1 HCT14 (TTL)
High-level input voltage:	2.0 V minimum
Low-level input voltage:	0.8 V maximum
Hysteresis:	0.4 V (minimum); 1.5 V (maximum)
High-level input current:	1.0 µA
Low-level input current:	–1.0 µA
Minimum pulse width:	100 ns (high); 100 ns (low)
Maximum frequency:	5.0 MHz
Termination:	33 Ω series resistor
Gate Inputs	
Input type:	Schmitt trigger, level sensitive
Input load:	1 HCT14 (TTL)
High-level input voltage:	2.0 V minimum
Low-level input voltage:	0.8 V maximum
Hysteresis:	0.4 V (minimum); 1.5 V (maximum)
High-level input current:	1.0 µA
Low-level input current:	–1.0 µA
Minimum pulse width:	100 ns (high); 100 ns (low)
Termination:	33 Ω series resistor

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Table 4: C/T Subsystem Specifications (cont.)

Feature	Specifications
Counter Outputs	
Output driver:	TTL
Output driver high voltage:	2.0 V minimum (IOH = –15 mA); 2.4 V minimum (IOH = –3 mA)
Output driver low voltage:	0.5 V maximum (IOL = 24 mA); 0.4 V maximum (IOL = 12 mA)
Termination:	33 Ω series resistor

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Power, Physical, and Environmental Specifications

Table 5 lists the power, physical, and environmental specifications for the DT300 Series board.

Table 5: Power, Physical, and Environmental Specifications

Feature	Specifications
Power	
+5 V (±0.25 V):	1.2 A nominal
–5 V:	not used
+12 V:	55 mA maximum; 48 mA nominal
–12 V:	50 mA maximum; 38 mA nominal
+ 5 V Power Out (J1-1):	1 A maximum (with resettable fuse)
Physical	
Dimensions:	Length: 6.875 inches (174.63 mm) Width: 4.2 inches (106.68 mm)
Weight:	4.38 ounces (124 grams)
Environmental	
Operating temperature range:	0° C to 70° C
Storage temperature range:	–25° C to 85° C
Relative humidity:	To 95%, noncondensing

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Connector Specifications

Table 6 lists the connector specifications for the DT300 Series board.

Table 6: Connector Specifications

Feature	Specifications
Connector part number	AMP, 68-pin, 0.05 Subminiature D, #749621-7
Shielded enclosure with jack screws	AMP #750752-1
Recommended shielded cable	Madison, 28 GA, Twisted Pair, #68KDK00029

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STP300 Specifications

Table 7 lists the specifications for the STP300 screw terminal panel.

Table 7: STP300 Specifications

Feature	Specifications
Mechanical	
J1:	68-pin connector, SCSI II (AMP/ Tyco 5787170-7)
J2:	26-pin connector (3M N2526-50K2RB)
Terminal block insulator:	Polyamide 6.6 GV
Screw type:	M 2.5 x 5, Chrome-plated steel
Wire size:	14 to 28 AWG
Dimensions:	4.9 inches (W) x 6.9 inches (L) x 0.90 inches (H) on 0.062 inches G10/FR4
Terminal material:	Nickel-plated brass
Board material:	FR4
Weight:	7 ounces
Mounting:	via four, 4-40 screws
Environmental:	
Storage temperature range:	–25° C to 85° C (derated operation)
Operational:	0° C to 55° C
Relative humidity:	To 95%, noncondensing

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EP305 Cable Specifications

Table 8 lists the specifications for the cable EP305.

Table 8: EP305 Cable Specifications

Feature	Specifications
Length	2 meters
Conductors	34 twisted pairs, shielded, #28 AWG on 50 mil centers
Connectors	(1) 68-pin, self-locking receptacle (AMP/Tyco 5749621-7)

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