

# CIO-DAS-TC

## Specifications



**MEASUREMENT  
COMPUTING™**

Document Revision 1.1, February, 2010  
© Copyright 2010, Measurement Computing Corporation

# Specifications

Typical for 25 °C unless otherwise specified.

Specifications in *italic text* are guaranteed by design.

## Analog input

Table 1. Analog input specifications

A/D converter type	AD652 V/F converter
Number of channels	16 differential thermocouple inputs, 1 CJC input
Programmable ranges	-2.5 V to +10 V, -20 mV to +80 mV, -15 mV to +60 mV, -6.25 mV to 25 mV
Voltage gains	1, 125, 166.7, 400
Thermocouple types	J, K, E, T, R, S, B
A/D pacing	Continuous conversions. Software-programmable for 50 Hz, 60 Hz, or 400 Hz
A/D trigger sources	Software-triggered
Data transfer	Single I/O register transfer through dual port RAM
Conversion rates (integrating time)	50 Hz, 60 Hz, 400 Hz Software programmable
*Conversion rates (per channel)	<i>25.0 msec @ 50 Hz typical, 25.5 msec maximum 21.6 msec @ 60 Hz typical, 22.1 msec maximum 7.4 msec @ 400 Hz typical, 7.9 msec maximum</i>  <i>*This is the total time to convert the channel, process the data, and provide a delay to switch the gain and channel.</i>
Linearity error (A/D specs)	$\pm 0.05\%$ @ 4 MHz clock
Gain drift (A/D specs)	$\pm 75$ ppm/°C max
Zero drift (A/D specs)	$\pm 50$ $\mu$ V/°C max
Power supply rejection ratio	0.01 %/V
Overvoltage protection	-40 V to +55 V
CMRR @ 60 Hz	80 dB minimum
Input leakage current	$\pm 80$ nA maximum
Input impedance	100 MegOhm minimum
Absolute maximum input voltage	-40 V to +55 V
Isolation to PC	500 V min through DC/DC converter and opto-isolators

## Accuracy and resolution

Table 2. Accuracy and resolution (voltage measurements)

Gain	Range	Accuracy (Worst Case)	Resolution		
			@ 50 Hz	@ 60 Hz	@ 400 Hz
1	-2.5 to 10 V	$\pm 0.01\%$ of reading $\pm 2.5$ mV	312.5 $\mu$ V	375 $\mu$ V	2.5 mV
125	-20 to 80 mV	$\pm 0.01\%$ of reading $\pm 20$ $\mu$ V	2.5 $\mu$ V	3.0 $\mu$ V	20.0 $\mu$ V
166.7	-15 to 60 mV	$\pm 0.01\%$ of reading $\pm 15$ $\mu$ V	1.88 $\mu$ V	2.25 $\mu$ V	15.0 $\mu$ V
400	-6.25 to 25 mV	$\pm 0.02\%$ of reading $\pm 6.25$ $\mu$ V	0.781 $\mu$ V	0.938 $\mu$ V	6.25 $\mu$ V

Table 3. Accuracy and resolution (Thermocouple measurements, not including CJC errors)

TC Type	Range	Accuracy (Worst Case)	Resolution		
			@ 50Hz	@ 60Hz	@ 400Hz
J	0 to 750 °C	±0.5 °C	0.05 °C	0.05 °C	0.40 °C
K	-200 to 1250 °C	±1.4 °C	0.04 °C	0.05 °C	0.40 °C
E	-200 to 900 °C	±1.1 °C	0.03 °C	0.04 °C	0.25 °C
T	-200 to 350 °C	±0.9 °C	0.03 °C	0.04 °C	0.25 °C
R	0 to 1450 °C	±2.3 °C	0.06 °C	0.07 °C	0.44 °C
S	0 to 1450 °C	±2.3 °C	0.06 °C	0.08 °C	0.52 °C
B	0 to 1700 °C	±3.0 °C	0.07 °C	0.08 °C	0.54 °C

## Miscellaneous

Table 4. Miscellaneous specifications

Averaging	Moving average, 1 to 16 samples, software-selectable
Calibration	Calibration is performed with each channel scan to remove offset and gain error. CJC channel is also measured with each calibration.
Processor reset	On power-up, watchdog timeout, or software command. Processor boots within one second of reset. Active low.
Watchdog timer	1.6 seconds nominal. Processor generates watchdog disable signal after boot-up.
Temperature units	Programmable for conversion to °C or °F
Interrupts	2, 3, 4, 5, 6, or 7
Interrupt enable	Programmable
Interrupt sources	Dual port RAM when the processor mailbox has data.

## Crystal Oscillator

Table 5. Crystal oscillator specifications

<i>Frequency</i>	<i>32 MHz</i>
<i>Frequency accuracy</i>	<i>100 ppm</i>

## CIO-STA-TC adapter

Table 6. CIO-STA-TC adapter specifications

CJC type	AD592CN
Configuration	CJC centered in an isothermal block on which the screw terminals have been mounted.
Channels	16 (plus CJC output)

## Calibration error

Table 7. Calibration error specifications

@ 25 °C	0.3 °C typical, 0.5 °C maximum
25 °C to +105 °C	0.5 °C typical, 1.0 °C maximum

## Linearity error

Table 8. Linearity error specifications

-25 °C to +105 °C	0.1 °C typical, 0.35 °C maximum
Temperature coefficient	1 $\mu$ A/°C typical
Long term stability	0.1 °C / month
Open thermocouple detect	On/off switch selectable for each channel, full scale reading

## Power consumption

Table 9. Power consumption specifications

+5 V operating	887 mA typical, 1441 mA maximum
----------------	---------------------------------

## Environmental

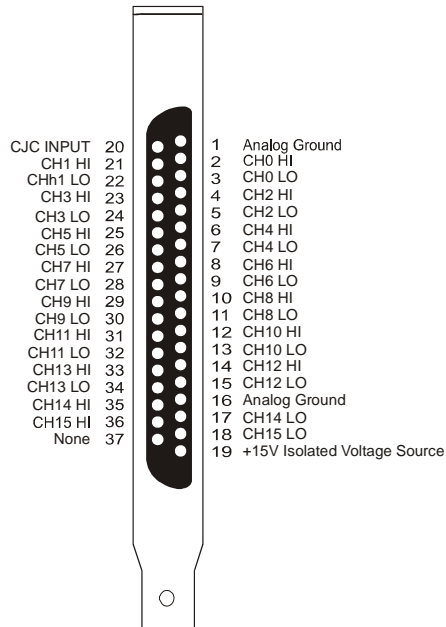
Table 10. Environmental specifications

Operating temperature range	0 to 50 °C
Storage temperature range	-20 to 70 °C
Humidity	0 to 90% non-condensing

## Main connector and pin-out

Table 11. Main connector specifications

Connector type	37-pin D-type
Compatible cable	C37FFS-x
Compatible accessory product (with C37FFS-x cable)	CIO-STA-TC screw terminal adapter board



**Measurement Computing Corporation**  
**16 Commerce Boulevard,**  
**Middleboro, Massachusetts 02346**  
**(508) 946-5100**  
**Fax: (508) 946-9500**  
**E-mail: [info@mccdaq.com](mailto:info@mccdaq.com)**  
**[www.mccdaq.com](http://www.mccdaq.com)**