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DBK19™

14-Channel High-Accuracy Thermocouple Expansion Card

Features

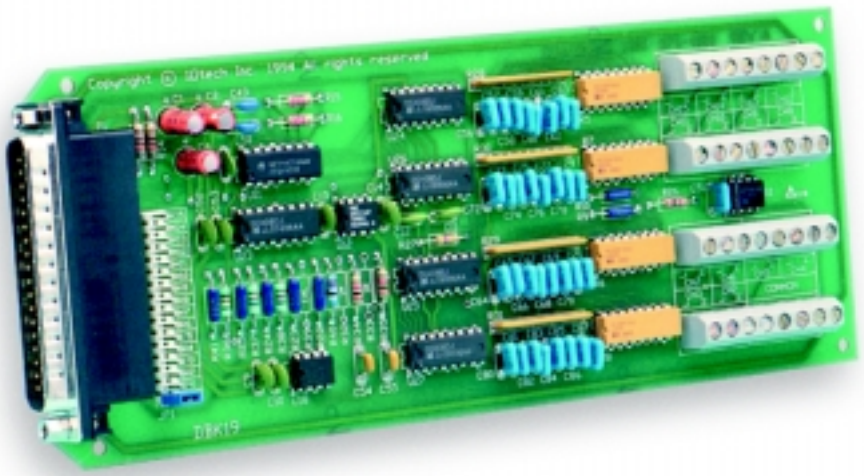
- **Provides 14 thermocouple inputs via convenient thermocouple connectors**
- **Features on-board cold-junction & off-set-drift compensation**
- **Supports type J, K, S, T, E, B, R, & N thermocouples**

The DBK19™ thermocouple-input card provides IOtech's LogBook, DaqBook, DaqBoard, and Daq PC-Card data acquisition systems with the ability to measure up to 14 thermocouple inputs. Each thermocouple input is attached to the unit via convenient screw terminal blocks.

To ensure precise measurements over a wide range of operating temperatures, two of the unit's 16 on-board channels are reserved for auto-zero and cold-junction compensation. As a result, you can attach up to 14 thermocouples of different types (J, K, S, T, E, B, R, and N) to one DBK19 card. As many as 16 DBK19 cards can be attached to one LogBook, DaqBook, DaqBoard, or Daq PC-Card, for a total of 224 channels.

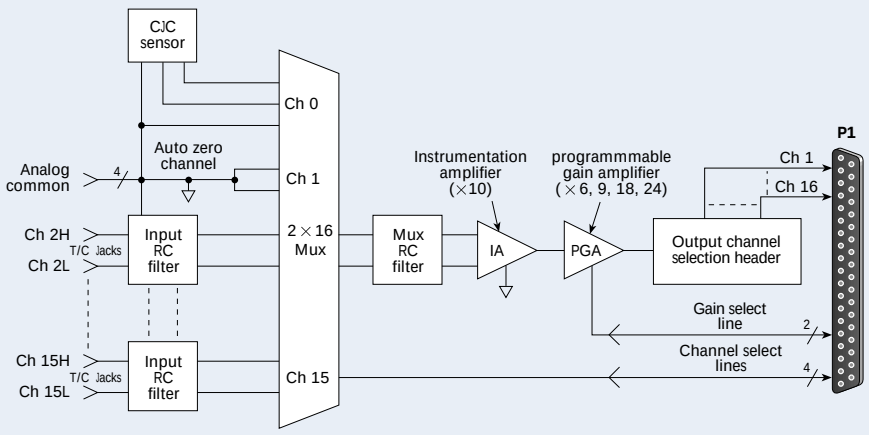
The DBK19's input stage features a 16-channel multiplexer, and a low-noise instrumentation amplifier. All thermocouple measurements are made differentially to minimize common-mode noise pick-up. The amplifier's gain is automatically selected by the software driver to maximize A/D resolution based on the type of thermocouple attached to the channel being measured.

Once the DBK19 has amplified the signal, the LogBook, DaqBook, DaqBoard, or Daq PC-Card data acquisition system's A/D converter digitizes it and passes it on to the PC for further processing. The system then automatically measures the DBK19's cold junction temperature sensor to determine the temperature of the thermocouple connection block. In addition, the LogBooks, DaqBooks, DaqBoards, and Daq PC-Cards automatically correct for system offsets by measuring the auto-zero input channel.



The DBK19 enables highly accurate thermocouple measurements

DBK19 High-Accuracy Thermocouple Expansion Card Block Diagram



After these three measurements are complete, the DBK19's software performs cold-junction compensation and zero-offset compensation to determine the actual temperature reading.

When used with the DaqBook or DaqBoard, the DBK19 derives its power from either unit's power supply (see chart on p. 91 to determine the system power capacity).

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DBK19™

About Thermocouple Accuracy

The accuracy of a thermocouple measurement depends on a number of factors, including thermocouple accuracy, cold-junction sensor accuracy, A/D conversion measurement accuracy, and linearization accuracy.

The DBK19 and the LogBooks, DaqBooks, DaqBoards, and Daq PC-Cards employ accurate components and software compensation techniques to minimize or eliminate error from these sources. For example, a LogBook, DaqBook, DaqBoard, or Daq PC-Card system equipped with a DBK19 card provides ±1˚C cold junction sensor accuracy, which directly contributes to the accuracy of the overall thermocouple measurement. When the DBK19 is software calibrated, its gain and offset errors are virtually eliminated and are removed from subsequent readings as an error source. In addition, the DBK19's built-in auto-zero channel dynamically eliminates any other system offset errors.

In short, a DBK19 used in concert with a LogBook, DaqBook, DaqBoard, or Daq PC-Card provides accurate thermocouple measurements by giving the user the ability to eliminate nearly all error sources.

Specifications

Connector: DB37 male, mates with P1 pinout on the LogBook, DaqBook, DaqBoard*, or Daq PC-Card**; thermocouples attach directly to on-board screw-terminals
Power: 20 mA
Thermocouple Types: J, K, S, T, E, B, R, N
Thermocouple Wire: #16 AWG max; #26 AWG min
Gain Ranges: x60, 90, 180, 240
Inputs: 14 differential thermocouples
1 cold-junction sensor (on-board)
1 auto-zero channel
Cold Junction Sensor Output:
100 mV/˚C
Voltage Ranges Gains:
0 to 80 mV @ x60
0 to 50 mV @ x90
0 to 25 mV @ x180
0 to 20 mV @ x240
Input Impedance: 20K Ohm
Input RC Filter -3 dB Frequency: 159 kHz
Gain Accuracy
Uncalibrated: 0.15%
Calibrated: 0.02%
Maximum Input Voltage: 35 VDC
CMRR (Input Stage): 80 dB typ, DC to 60 Hz
Offset: Software compensated
Offset Drift: Software compensated
Accuracy (DBK19 @ 0 - 50˚C):

			Accuracy†	
Type	Min.	Max.	(<0˚C)	(>0˚C)
J	-200˚C	760˚C	±0.6˚C	±0.6˚C
K	-200˚C	1260˚C	±1.6˚C	±1.0˚C
T	-200˚C	400˚C	±1.4˚C	±0.8˚C
E	-270˚C	1000˚C	±1.4˚C	±0.9˚C
N28	-270˚C	400˚C	±0.8˚C	±0.8˚C
N14	0˚C	1300˚C	—	±1.0˚C
S	0˚C	1780˚C	—	±1.6˚C
R	0˚C	1780˚C	—	±1.6˚C
B	0˚C	1820˚C	—	±1.8˚C

Resolution (˚C):

Type	12 bit <0˚C	12 bit >0˚C	16 bit <0˚C	16 bit >0˚C
J	1.2˚C	0.5˚C	0.1˚C	0.1˚C
K	1.1˚C	0.8˚C	0.1˚C	0.1˚C
T	0.8˚C	0.3˚C	0.1˚C	0.1˚C
E	1.6˚C	0.7˚C	0.1˚C	0.1˚C
N28	1.0˚C	1.0˚C	0.1˚C	0.1˚C
N14	—	5.0˚C	—	0.3˚C
S	—	1.3˚C	—	0.1˚C
R	—	1.7˚C	—	0.1˚C
B	—	1.5˚C	—	0.1˚C

Note: The DBK19 is not recommended in applications where the thermocouple can float off-ground. In these applications use the DBK42 or DBK44 with 5B modules.

Ordering Information

Description	Part No.
High-accuracy thermocouple expansion card	DBK19

Expansion Cables
Use cabling specifications for the DBK10 (see p. 127), CDK10 (see p. 104), or DBK41 (see p. 150) expansion chassis

Related Products

LogBooks	p. 58
DaqBooks	p. 71
DaqBoard/2000	p. 82
ISA DaqBoards	p. 92
Daq PC-Cards	p. 101
DBK52	p. 162
Thermocouples	p. 301

Note: Buy your thermocouples direct from IOtech. See p. 301 for an overview of the various thermocouple types offered.

QUICK FIND

For up-to-date information on products, and to order online, visit the IOtech Web site and enter the corresponding page number in the QUICK FIND field.

SHOP ON LINE

* Attachment to the DaqBoard/2000 requires a DBK200, DBK201, DBK202, or DBK203 adapter
** Requires CDK10 when used with Daq PC-Card
† Accuracy based on a calibrated 16-bit DaqBook; using the LogBook's 2-point software calibration can improve accuracy

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