TC-Link®

2.4 GHz Wireless Thermocouple Node

Introduction

Combining full thermocouple conditioning with MicroStrain's award-winning wireless systems, TC-Link® is a complete wireless thermocouple node, designed for integration with wireless sensor networks.

TC-Link® features six standard thermocouple input connectors with an embedded cold junction temperature sensor. On-board linearization algorithms are software programmable to support a wide range of thermocouple types (J, K, R, S, T, E, B).

The TC-Link® can log data to internal memory or transmit real-time data to a base station transceiver at a pre-programmed rate, where data is displayed and logged for further analysis. Featuring programmable sweep rates, these little nodes pack a lot of power in a small package; and since each node has a unique address, a single host transceiver can address thousands of sensor nodes.

Embedded software provides wireless transmission at user-programmable rates from two samples per second to one sample every seventeen minutes, and the processor conserves battery power by using micropower sleep modes in between samples.

Enclosures include thin, rechargeable Lithium batteries. TC-Link® features an open-architecture bidirectional communications standard (IEEE 802.15.4 spread spectrum 2.4 GHz), which supports license-free operation worldwide. Starter kits include two TC-Link® wireless thermocouple nodes, one USB base station, and PC software for wireless node configuration, data acquisition, and data display.

Features & Benefits

- 2.4 GHz direct sequence spread spectrum radio is license free worldwide
- IEEE 802.15.4 open communication architecture
- 6 thermocouples per node provides low cost per channel
- supports simultaneous data transmission from multiple sensors
- internal memory stores up to 300,000 data points
- sample rates from 2 samples per second to 1 sample every seventeen minutes
- communication range up to 70m line-of-sight, 100m with high gain antenna on base station
- supports type J, K, R, S, T, E, B thermocouples
- optional relative-humidity sensor
- includes on-board cold junction compensation
- on-board real-time clock
- low-power consumption for extended use

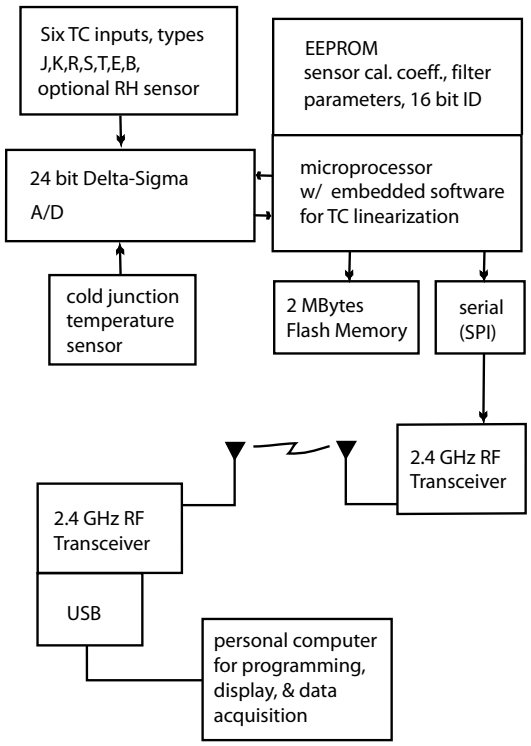
Applications

- civil structures sensing: concrete maturation
- industrial sensing networks: machine thermal management
- food and transportation systems: refrigeration, freezer performance monitoring
- advanced manufacturing: plastics processing, composite cure monitoring
- assembly line testing with smart packaging

Specifications

Thermocouple inputs supported	software selectable: Type J, K, R, S, T, E, B six input channel, one ambient CJC channel. Optional internal relative humidity sensor. Single channel unit available on request
Standard thermocouple measurement range	J 0 to 760 ˚C K 0 to 1370˚C R 0 to 1000˚C S 0 to 1750˚C T -160 to 400˚C E -100 to 1000 ˚C B 200 to 2000 ˚C
Temperature measurement accuracy	± 0.1% full scale or ±0.5˚C whichever is greater (does not include errors due to TC wire or transducer)
Temperature repeatability	0.1˚C (does not include errors due to TC wire or transducer)
Temperature resolution	0.0625˚C
Cold junction compensation range	-20 to 85˚C
Thermocouple connector	six type 1 standard mini (SM) connectors for flat pin TC inputs
Optional relative humidity (RH) sensor	range 0 to 100% RH, accuracy ± 2% RH (from 10 to 90% RH), repeatability ± 0.1% RH
Analog to digital (A/D) converter	24 bit Delta-Sigma A/D
Sample Rate	programmable from 2 samples/second to 1 sample/17 minutes for datalogging or LDC modes
Datalogging mode	log up to 300,000 datapoints
Low Duty Cycle mode	supports multiple nodes on single RF channel, total update bandwidth of 500Hz divided by number of nodes
Synchronization between nodes	datalogging 100 µsec ±50 ppm LDC mode <±1 sec
Sample rate stability	datalogging and LDC modes ±25 ppm (90 msec/hour)
Radio frequency (RF) transceiver carrier	2.4 GHz, direct sequence spread spectrum, license free worldwide (2.450 to 2.490 GHz - 16 channels
RF output power	0dBm (1 mW)
Range of RF link	up to 70m line of sight, up to 100m with high gain antenna on base station
RF data packet standard	IEEE 802.15.4, open communication architecture
USB programming and download	115,200 baud
Internal Li-ion battery	rechargeable 3.7 volt lithium ion, 600 mAh capacity. Customer may also supply external power from 3.1 to 9 volts
Power consumption (battery life)	2 samples per second - 0.8 mA (1 month) 1 sample per second - 0.48 mA (2 months) 3 samples per minute - 0.1 mA (8 months) 1 sample per minute - 0.09 mA (10 months)
Operating temperature	-20 to +60˚C with standard internal battery and enclosure, extended temperature range optional with custom battery and enclosure. -20 to +85˚C for electronics only
Dimensions*	110 mm x 62 mm x 28 mm (board only 76 mm x 58 mm x 23mm)
Weight	116 grams
Case	ABS plastic

*For dimensioned print go to www.microstrain.com



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Patents Pending