ICM-01 Kit: Versatile 20-Channel Temperature Sensing Reference Platform

Based on Analog Devices Isolation, Power and Multi-Sensor High Accuracy Digital Temperature Measurement Technologies

The ICM-01 is an evaluation board based on the LTC2983 temperature measurement system. It enables both configuration and reading measurement results over a standard RS485 channel. The LTC2983 acquires data from a wide variety of temperature sensors and digitally outputs the result, in °C or °F, with 0.1°C accuracy and 0.001°C resolution. The LTC2983 can measure the temperature of virtually all standard (type B, E, J, K, N, S, R, T) or custom thermocouples, automatically compensate for cold junction temperatures, and linearize the results.

Configuration modes are accessed using on-board switches. Additional information on the state of the system is offered by colored LEDs on board. In the default configuration, the system periodically measures temperature using a K-type thermocouple, with a cold junction compensation on board.

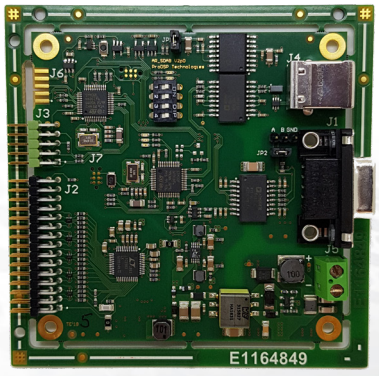
Applications

- Industrial control systems
- Instrumentation & measurement
- Wide range of high-accuracy temperature sensing applications
- Other sensing applications where the signal change is slow (strain gauge, pressure, etc.)

Benefits of the ICM-01

- **Supports multiple temperature sensor types:** Resistance Temperature Detector (RTD), thermocouple, thermistor, or diode
- **Multi-sensing capabilities:** Other sensor types where the rate of signal change is low can be connected (ex: pressure, strain gauge)
- **Fully isolated power and signal paths:** Good reference design or starting point for industrial control systems
- **Standards based:** STM32 microcontroller with Mbed development environment
- **Expansion:** Optional connector for RF connectivity

20-Channel Temperature Sensing Reference Platform

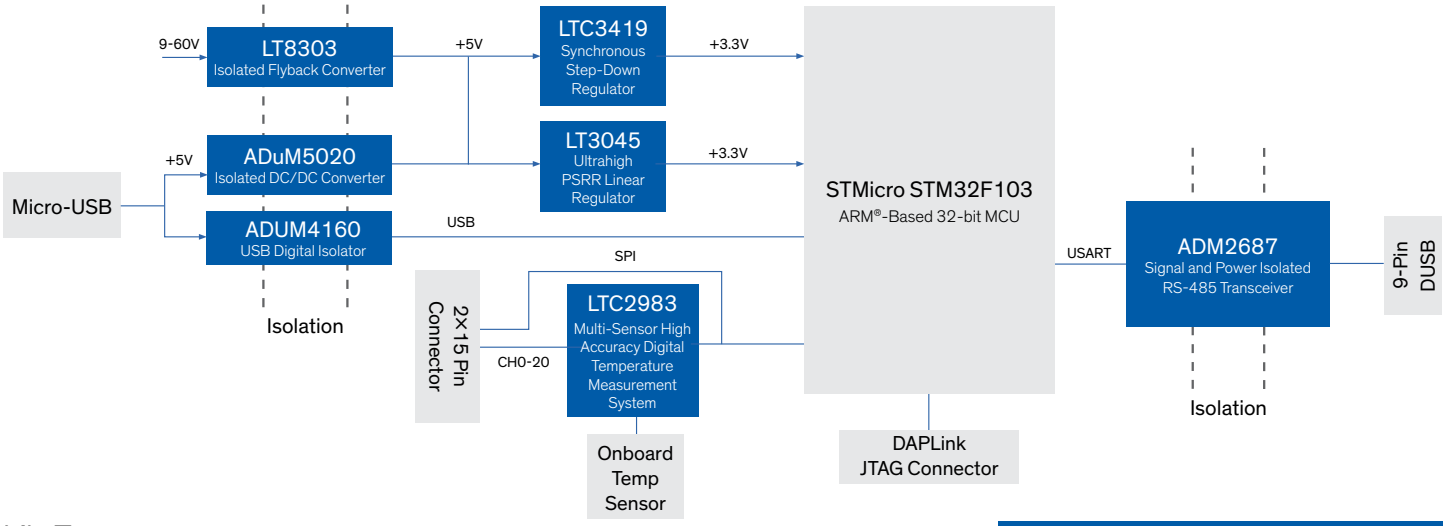


User Experience and Demo:

- Out-of-the-box demo pre-programmed for K-Type thermocouple
- Proven firmware for easy start-up
- Includes onboard sensor for built-in cold junction compensation

Contact your local Arrow FAE for getting access to the ICM-01 Kit.

ICM-01 Block Diagram



Kit Features

- Flexible temperature sensing reference kit that supports a wide range of input types (based on LTC2983)
- Based on the widely adopted STMicro STM32F103 MCU, and the Mbed development environment
- Isolated RS485 interface to host with 120 Ohm termination configurable by jumper
- Isolated USB interface for programming and software updates
- 2×15 pin connector for adding sensor inputs (temperature, pressure, strain gauge, etc.)
- Onboard DAPLink device
- Input: External 24VDC power supply-input meets 60V industrial power rail standards
- 4× DIP switch offers predefined default demo or user configurable modes
- Onboard single-ended diode for measuring board temperature
- Optional output: 3.3V to RF board
- Size: Compact 85 mm x 85 mm board suitable for MicroPLC and other space-constrained applications

Features of LTC2983:

- Single 2.85V to 5.25V supply
- Results reported in °C or °F
- Configurable 2-, 3- or 4-wire RTD configurations
- Measures negative thermocouple voltages
- Automatic burn-out, short-circuit and fault detection
- Simultaneous 50Hz/60Hz rejection

Getting started instructions, software and documentation available on GitHub

Key Components

Sensor

- LTC2983: Multi-sensor high accuracy digital temperature measurement system

MCU

- STM32F103: ARM®-based 32-bit MCU

Power

- LT3045: 20V, 500mA, ultralow noise, ultrahigh PSRR linear regulator
- LTC3419: Dual monolithic 600mA synchronous step-down regulator

Isolation and Interface

- ADM2687: 500 kbps, 5 kV rms signal & power isolated RS-485 transceiver with ±15 kV ESD protection
- LT8303: 100VIN micropower isolated flyback converter with 150V/450mA switch
- ADuM5020: Low emission 500 mW isolated DC-to-DC converter
- ADUM4160: Full/low-speed USB digital isolator

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Documentation and Instructions

github.com/ArrowElectronics/Industrial-Control-Monitoring-01/wiki

Five Years Out