MCM-204

Standalone Ethernet DAQ with 4-ch AI, 24-bit, 128kS/s, 4-ch DI/O

Features

- Standalone Ethernet DAQ enabling edge computing
- RESTful API for periodic machine condition polling
- Supports a C/C++ API for continuous data streaming
- Built-in web console for easy configuration and use as a portable DAQ
- Supports custom algorithms to filter data at the edge
- Supports IEPE 4mA excitation current output on each analog input to drive an accelerometer
- Two 1Gb Ethernet ports for cascading
- Supports TCP socket (client mode) to transmit data actively



Introduction

ADLINK's MCM-204 ultra-compact edge DAQ based on ARM Cortex-A9 processors and featuring built-in, four-channel, 24-bit, high-resolution analog input, can function as a standalone device without a host PC and is ideally suited for 24-hour vibration monitoring of rotating machinery and equipment. The MCM-204 delivers high-precision static and dynamic measurement performance. The 24-bit Sigma-Delta ADC supports anti-aliasing filtering, suppressing modulation and signal out-of-band noise and providing usable signal bandwidth at the Nyquist rate, making it ideal for high dynamic range signal measurement in machine condition monitoring applications. Through Gb Ethernet communication, data can be transmitted to the central site quickly. Dual Ethernet ports enable daisy-chain connections that reduce the cost of network equipment and extend the communication distance.

Monitoring of Distributed Machines

Monitoring the condition of machines in the field with compressors, vacuum pumps, motors, bearings, and generators is key to keeping factories up and running smoothy. Traditionally, operators would visit remote machines periodically to perform inspections. However, by the time an abnormality was detected, the machine may have already suffered extensive damage.

In order to provide constant machine monitoring, a DAQ system composed of an embedded system plus a DAQ card can deployed at each remote machine site. However, when remote machines are numerous and spread out geographically, the deployment of DAQ systems at each site becomes prohibitive. The MCM-204 is a standalone Ethernet DAQ system that is designed specifically to perform the tasks of a DAQ system without requiring a complicated embedded system.

Data Filtering at the Edge

The signals acquired by sensors are raw data that must be filtered and converted into usable data such as FFT, voltage, g-type array, or OA values. The MCM-204 standalone DAQ system can be deployed at each field site and perform the task of filtering raw data that was traditionally done by an embedded system. By converting and transmitting filtered, size-reduced data from the edge to the central site, network load and processing demands on backend servers are reduced dramatically.

Customized Filtering Algorithms

The MCM-204 offers flexible support options for custom filtering algorithms written in C/C++ and compiled under Linux. These valuable and confidential algorithms can be imported through a web console. The MCM-204 thus enables the migration of user-defined filtering algorithms to the edge in a cost-effective manner.

Built-in Web Console

The MCM-204's built-in web console allows configuration via web browser to make it easy to get started with machine condition monitoring and eliminate the need for application specific programming. Settings for relevant parameters and data types are presented in an intuitive dashboard format. The MCM-204 makes it quick and easy to set up a machine condition monitoring environment.

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SDK

ADLINK provides a Streaming SDK and RESTful API to assist users with integrating the MCM-204 into their system.

- Streaming SDK (with C/C++ sample code)
- RESTful API in C#, Python, and JavaScript

Ordering Information

- **MCM-204**
  Standalone Ethernet DAQ with 4-ch AI, 24-bit, 128kS/s, 4-ch DI/O

Optional Accessories

- **AC-DC ADAPTER 40W**
  MEANWELL, GST40A24-AD, Input: 90-264VAC/40W, Output: 24VDC/1.67A
- **ICP Accelerometer IMI_603C01**
  ICP Accelerometer IMI_603C01, 100mV/g, 0.5 to 10kHz, 2-pin conn. w/ 10-ft cable and magnetic mount

Product Illustration



Specifications

Model Name	MCM-204
System Specification	
Ethernet (1Gb)	2x RJ45 Ethernet ports (1 IP, Ethernet cascade supported)
MCU	ARM Cortex A9 1.0 GHz
NAND Flash (eMMC)	4GB
Memory	DDR3 RAM 1GB
USB	2x USB 2.0 (for WiFi dongle only)
Power Supply	9 to 30 VDC power input
Power Consumption	Max. 8.8 W
Isolation	1.5kV
Communication Interface	Web Console / RESTful API / Streaming SDK / TCP Socket (client mode)
Digital Temperature Sensor	-50°C to 150°C (with 3 meter cable)
Analog Input	
Number of Channels	4 (simultaneous, BNC type)
Resolution	24-bit
Maximum Sampling Rate	128kS/s and can be adjusted to 1kS, 2 kS, 4kS, 8kS, 16kS, 32kS, 64kS
Input Range (Voltage)	± 10 V, ± 1.25 V
Input Coupling	DC/AC
IEPE	4mA, compliance voltage +24V
Sensor Type	IEPE sensor (vibration detection)
Offset Error	± 0.1mV

Gain Error	± 0.05% of FSR
-3dB Bandwidth	0.43 x sampling rate
Flatness	± 0.01 dB (10Hz to 10kHz)
AC Cut-off Frequency (-3dB)	0.4Hz
AC Cut-off Frequency (-0.1dB)	2.4Hz
Trigger Sources	Software, digital trigger, analog trigger, built-in button trigger (under analog or digital trigger mode)
Overvoltage Protection	± 50V
Input Impedance	200 kΩ
Crosstalk	-100dB
Dynamic Range	- 95dB
THD (1kHz)	-100 dB
THD+N (1kHz)	-95 dB
Isolated Digital I/O	
Number of I/O	4-ch DI/O (configurable)
Digital Type	TTL input: 0-5V for DI / Open drain for DO
Input Logic Level	Logic low: VIL = 0.8 V max. / IIL = 0.2 mA max. / Logic high: VIH = 2.0 V min. / IIH = 0.2 mA max.
Overvoltage Protection	± 50V
Supported Modes	• Static digital input/output • Tachometer support (DIO 0) • External digital trigger in
Mechanical	
Dimensions	110.5 (L) x 40 (W) x 126.5 (H) mm
Connectors	4x BNC + 2x 6-pin spring-type terminal block
Front Panel LEDs	4
Housing	Metal, IP30
Mounting	DIN rail kit (wall mount kit optional)
Environmental	
Operating Temperature	0°C to 50°C (32˚F to 122˚F)
Storage Temperature	-20°C to 70°C (-4˚F to 158˚F)
Humidity	approx. 95% @ 40°C (non-condensing)
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes
Shock	Operating: 100 G, half sine 11 ms duration
EMC	EN61000-6-4/EN61000-6-2
EMI	FCC Part 15B Class A, CISPR 32
EMS	IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1.0 GHz, 10 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal 2 kV IEC 61000-4-5 Surge: Power 0.5 kV; Signal 1 kV IEC 61000-4-6 CS: 0.15 MHz to 80 MHz, 10 V IEC 61000-4-8 PFMF
Safety	IEC 61010-1, IEC 61010-2-201 (pending)

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