Sciemetric EDGE 422

125 MS/s 14-bit Analog Input Module

sciemetric EDGE

Product Specifications

High speed multi-buffer analog sampling for demanding industrial applications

The Sciemetric EDGE 422 is a high-speed data acquisition device that can be used whenever accurate time-critical measurements are required. The all-in-one system contains its own processor as well as analog and digital functions in an ultra-compact form factor.

Highlights

- On board 32 bit processor with real time operating system
- Stand-alone operation for measurement, control, signature analysis and data storage
- 14-bit A/D with 16 bit signal averaging at lower sample rates
- 125 MS/s sample rate
- ±0.6V to ±60V analog input ranges
- Advanced triggering capabilities
- Automatic trigger re-arm allowing capture of multiple high-speed events
- High-speed signal averaging for low noise measurements

Sciemetric EDGE 422

Applications:

- ✔ High-speed data collection
- ✔ General oscilloscope measurements for debug
- ✔ Testing or development
- ✔ Ignition or injection system testing or development
- ✔ Serial bus testing and debugging

The Sciemetric EDGE platform

Sciemetric EDGE is a universal industrial analytics platform to help you perfect your process in record time. This distributed data analytics system removes barriers to collecting data, driving productivity improvements and cost savings.

The platform performs digital signal processing and signature analysis to offer in-depth insight into the performance, reliability and repeatability of a broad range of applications. Processing, analytics and control functions are remotely configurable, giving you a centralized management of your distributed operations. It provides industrial operations with a sophisticated, exciting, new way to monitor a process, perform real-time pass/fail control, and gain the visibility needed to optimize and control the overall process.

Overview

The Sciemetric EDGE 422 consists of a high-speed analog front end, a real-time digital processor, and a runtime processor for scripting, analysis and handshaking. The analog front end includes input protection, AC or DC coupling, three gain stages, self-calibration, analog offset, and a switchable anti-aliasing filter before the analog-to-digital converter.

The digital processor handles signal averaging, analog and digital triggering from either the digital I/O or the synchronization bus, and high-speed data FIFO buffers. The runtime processor manages configuration, data analysis, and external handshaking.
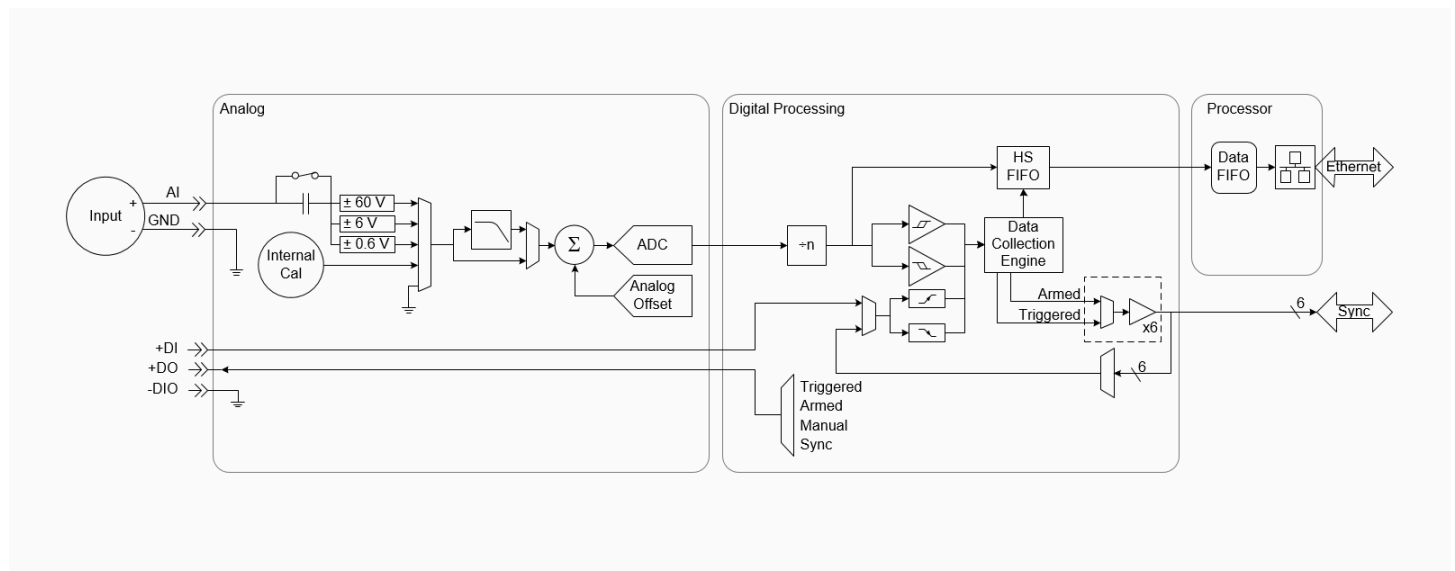
Technical Specifications

GENERAL

- Dimensions (HxWxD): 32 mm x 32 mm x 128 mm
- Connector: M12 5-pin A-code receptacle
- LED status indicator: Boot sequence, connection status, errors, etc.
- Internal Temperature: 0 °C to 70 °C
- Operating temperature: see carrier datasheet
- Ingress protection: IP65 when installed, IP20 otherwise
- Fastener screw torque: 2-4 in-lbs
- Humidity: 10 to 90% RH, non-condensing (IEC 60068-2-56)
- Shock: 150 m/s^2 per IEC 60068-2-27 Table A.2
- Vibration: IEC 60068-2-65 spectrum A.1 Category 3
- Pollution degree: 2 max
- Maximum altitude: 2000 m
- Weight: 130 g
- Approvals: CE, cNEMKOus

PROCESSOR

- CPU: 32 bit, 533 MHz
- Real Time Operating System: QNX™
- Storage: 512 MB SSD
- Memory: 512 MB DRAM
- Communications: EtherNet/IP (many types through optional gateway)
- Functions: Any Sciemetric EDGE application, measurement, control, signature analysis and data storage

ANALOG

Analog Input

- Channels: 1
- ADC resolution: 14-bit (± 8,192 counts), with 16 bit signal averaging at lower sample rates than 125 MS/s
- Maximum input voltage ± 60 V
- Input ranges (± FS): ± 60 V, ± 6 V, ± 0.6 V
- Range overhead: >2.5% FS, 7% FS typical
- Input accuracy: ± 1.5% FS
- 3 dB signal bandwidth:
  - 36 MHz typical
  - 32 MHz typical with 4-pole low-pass filter (S/W control)
- Signal to Noise (SNR):
  - 64 dBFS @ 125 MS/s
  - 67 dBFS @ 12.5 MS/s
  - 78 dBFS @ 1.25 MS/s
  - 82 dBFS @ 125 kS/s
- Coupling:
  - DC @ 1 MΩ || 50 pF input impedance
  - AC with < 12 Hz high-pass filter
- Input protection:
  - ESD protection
  - CE susceptibility

Analog Offset

- ± 60 V for 60 V range
- ± 6 V for 6 V range
- ± 0.6 V for 0.6 V range
- Offset resolution: 16-bit
- Offset accuracy: ± 1% FS

Internal Calibration & Diagnostics

- A/D patterns: Incrementing value ramp
- Internal measurements:
  - Module input power supply voltage and current
  - Processor supply voltage and current
  - Internal analog supply voltages
  - Internal temperature
- Internal input sources:
  - Ground
  - Precision voltage reference
  - 16-bit internal DAC

DATA COLLECTION & TRIGGERING

Sampling

- Max sample rate: 125 MS/s
- Min sample rate: 10 KS/s
- Sample rate resolution: 125 MS/s divided by n, where n = 1, 2, 3, ... to 12,500
- Decimation type: Average of n samples (where n is the sample divider)
- Time base accuracy: < 50 ppm
- Min samples, larger of:
  - 2 samples (data is collected in 1024 sample blocks; any unused samples are discarded)
  - Any pre-trigger offset
- Max pre-trigger samples: 8,192 samples (65.5 ms at max rate)
- Max samples:
  - If the sample rate is ≤ 10.4 MS/s, then it is the lesser of 10,000,000 samples divided by the # of buffers or 4,166,668 samples (i.e. for 10.4 MS/s with 10 buffers, max samples is 1,000,000 per buffer; for 10.4 MS/s with 1 buffer, max number of samples is 4,166,668)
  - If the sample rate is ≥ 10.4 MS/s and the aggregate sample rate (average rate considering buffer rate) is ≤ 10.4 MS/s, then max samples per buffer is 16,384 (i.e. if 125 MS/s with 32 buffers, max samples is 16,384)
  - If the sample rate is ≥ 10.4 MS/s and the aggregate sample rate (average rate considering buffer rate) is ≥ 10.4 MS/s, then 16,384 samples divided by the number of buffers (i.e. if 125 MS/s with 4 buffers, max samples is 4096)
- Max samples on module: 10,000,000 samples
- Max average sample rate: 10.4 MS/s (aggregate sample rate considering auto-triggered multi-buffer collection)

Start Trigger

- Sources: Immediate, any synchronization bus line, analog input, digital TTL input
- Analog trigger range: Full scale of analog input range
- Analog deadband: 0 to full range of input; below trigger value for rising triggers and above trigger value for falling triggers
- Hold-off[1]: – 4,294,967,295 samples (0 to 34 seconds at max sample rate)
- Time offset: 8,192 to 2,147,483,647 samples (-65.5 ms to +17.18 s at max collection rate)
- Automatic re-arm: Yes, via digital processing in high-speed logic; allows multi-buffer collection
- Min auto re-arm time: Next sample after minimum number of 1024 sample blocks have been collected
- Max data set rate: 120,000 data sets/s (waveforms/s) into high-speed memory
- Delay before re-arm: 0 – 4,294,967,295 samples (0 to 34 seconds at max sample rate)
- Max number data sets: 64 data sets (buffers of data, waveforms)

[1] The trigger hold-off is the duration that the analog trigger must stay true before a trigger can be issued. The trigger point will be when the hold-off period has completed.

Digital Input

- Trigger input: Rising or falling edge (or both) can trigger data collection
- Rising threshold: >2.1 V
- Falling threshold: < 1.0 V
- Hysteresis: > 0.51 V
- Over voltage protection: ± 30 VDC
- Trigger offset: ± 16 ns
- Trigger jitter: ± 8 ns for 125 MS/s or one sample period for slow sample rates

Digital Output

- Sources: Manual control, triggered, armed, synchronization bus line
- Output high: > 4.0 V
- Output low: < 0.5 V
- Output sink current: -25 mA
- Output source current: 25 mA
- Short circuit protection: Continuous
- Protection: ESD and CE susceptibility

End Trigger

- Sciemetric EDGE 422 has no end-trigger options. Data collection end is determined only by the collection duration value.

Single Software Package for Management, Setup and Analysis

Sciemetric EDGE provides a comprehensive set of capabilities for complete monitoring and control of your industrial application all in one software package: Sciemetric Studio. The System Management component includes discovery of modules across your network, sensor calibration, application deployment, and software updates. Application Management features include the ability to configure the process remotely and edit specific parameters. Finally, Data Review capabilities allow you to edit features to be monitored and to trend features and waveforms so you can apply data-driven insight for continuous improvement.
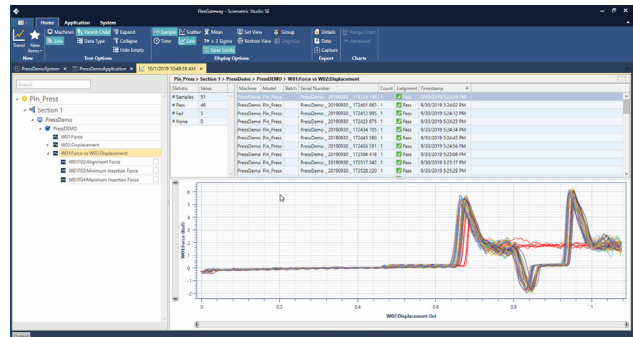
Mounting Information

The Sciemetric EDGE 422 must be installed in a 412 Dual Carrier. Please see the 412 datasheet for additional information and specifications.
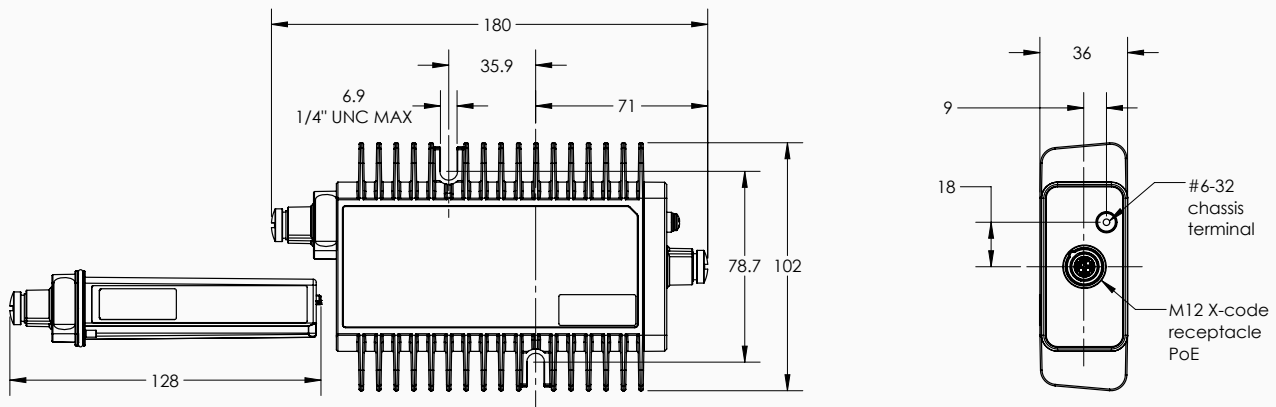
Ordering Information

Module

Item	Part number	
Sciemetric EDGE 422 module	**10400-0422-0M12**	

Accessories

Mounting

Refer to System 400 carrier datasheet(s) for mounting options	

Connectors

Item	Part number	
Male A-code 5-pin – M12 field wire-able	**10400-AX0A-MA05**	

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