

IoA1 Analog Processing Module

INPUT MONITORING AND POWER CALCULATIONS

The IoA1 module serves as the analog processing node in the Callisto™ network and is capable of monitoring up to 32 physical input points. Input sources can be any combination of conventional DC transducers or directly coupled AC power system devices, including potential transformers (PTs), current transformers (CTs), and line post sensors. A single IoA1 can simultaneously monitor up to eight feeders while providing accurate power system calculations, fault detection, limit excursion reporting, metering applications, and disturbance recording. To accommodate additional analog inputs, multiple IoA1 nodes may be combined within a Callisto remote.



Offering reliable, high-speed operation, the Callisto IoA1 module collects analog data and performs a wide range of power system calculations.

KEY FEATURES

- Simultaneous processing of up to 32 analog inputs
- Fault detection, including fault direction and fault current magnitude
- Capacity to monitor up to 8 feeders
- 0.2% RMS calculation accuracy through the 15th harmonic
- Instant reporting of limit excursions
- Built-in disturbance recorder

CALCULATIONS

- Average and RMS volts and amps
- Neutral current
- Single and three phase watts, VARS, VA, PF
- Positive, negative, and zero sequence voltages
- 0 through 15th harmonic and THD for voltage and current
- Single and three phase watt hours, VAR hours, and VA hours

The IoA1 works in conjunction with analog termination cards, which provide physical connections for input wiring along with signal conditioning and protection. Each termination card has the capacity for eight distinct inputs, configurable on a per point basis. Dual high-speed analog-to-digital (A/D) converters allow for the simultaneous sampling of both voltage and current at 32 readings per cycle, eliminating the skew associated with single A/D converter designs. Harmonic content and 0.2% RMS calculation accuracy through the 15th harmonic are provided on all AC inputs physically presented at the node.



TECHNICAL SPECIFICATIONS

PROCESSING

Processors

- 12MHz Intel 80C188 Microcontroller
 - 8 bit data bus
 - 20 bit address bus
 - 2 DMA channels
 - Direct addressing to 1MB memory and 64KB I/O
- Analog Devices AD2101 40MHz DSP (Digital Signal Processor)

Analog to Digital Conversion

- Dual, high-speed ADC 1241 A/D converters
 - Resolution: 12 bit plus sign bit
 - Accuracy: 0.2% full scale (0 to 60°C)
 - Conversion time: 17 microseconds/channel
 - Sample rate: all inputs sampled 32 times per AC waveform @ 50Hz, 60Hz
 - Communication mode rej: >80db
 - Differential mode: >50db
 - Input impedance: >1M ohm

Operating System

- Industry standard Nucleus RTX real-time, multitasking system
- Simple integration of user-defined applications and algorithms

Memory

- Intel 80C188
 - 128K x 8 Flash Memory
 - 128K x 8 EPROM
 - 128K x 8 RAM
 - 1K x 1 Serial EEPROM
- AD2101 DSP
 - 96K x 8 high-speed SRAM

DIMENSIONS

Printed Circuit Board

- Standard 4-layer Double EuroCard PCB
- 6 1/4" x 9 1/4" (160mm x 235mm)

MEASUREMENTS

Analog Inputs

- Up to 32 inputs (per point definition) via termination cards
- DC instrumentation sources
 - Unipolar voltage: 0-0.5V, 0-1V, 0-5V, 0-15V, 0-30V
 - Unipolar current: 0-1mA, 0-10mA, 0-20mA, 4-20mA
 - Bipolar voltage: 0.5V, 2.5V, 5V (all -V to +V)
- AC transducerless sources
 - Current: 5A CT, via wedding ring transformer
 - Voltage: 120 (nominal) 150 (maximum) volt PT, 69 volt PT, 220 volt PT
- Line post sensors
 - Lindsey, Square D, S&C Electric, etc.

Configuration

- Via CallistoView™ software from any host node

ADDITIONAL SPECIFICATIONS

Local Area Network

- DAQ Voyager protocol operating on Callisto standard ArcNET LAN at speeds up to 2.5 megabits per second

Isolation

- Surge withstand: 5kV ANSI/IEEE C37.90.2002 SWC using IoA1, IoAT1, IoAT2
- Electrical interference
 - Insulation/isolation: IEC 255-5
 - High frequency disturbance: IEC 255-22-1
 - Fast transient/burst: IEC 801-4
 - Electrostatic discharge: IEC 801-2

Power

- 410mA @ 5VDC
- 25mA @ 12VDC
- 35mA @ -12VDC

Environmental

- Operating range: -20 to +70°C
- Storage range: -20 to +70°C
- Relative humidity: 5 to 95% non-condensing
- Vibration: 5 to 65Hz

CONTACT

DAQ Electronics, LLC
262B Old New Brunswick Road
Piscataway, NJ 08854 USA

T 732.981.0050 F 732.981.0058
www.daq.net

