Lawson Labs, Inc.

MODEL 201
24-Bit Serial Data Acquisition System

Exceptional resolution, benchmark stability, and remarkable noise rejection make the Lawson Labs Model 201 Data Acquisition System the best choice for high-resolution applications. The Model 201 is a 24-Bit Delta-Sigma Acquisition System that can extract highly accurate data, even from noisy sources with imperfect signal conditioning in electrically harsh environments. The Model 201 has 256 times the resolution of 16-bit products, yet costs about the same. Lawson Labs continues to establish the price/performance standard for high-resolution data acquisition systems.

Unsurpassed Resolution

The Model 201's resolution, stability, noise rejection, and flexibility are achieved by combining an accurate, but complex, delta-sigma A/D converter with a RISC microcontroller supervisor. Our RISC microcontroller harnesses the sophisticated delta-sigma technology and makes it easy to use. The Model 201 is intended primarily for DC and low-frequency applications. The data rate is programmable from under 1 to over 300 samples/second. At a data rate of one sample/second, the RMS noise approaches two counts, providing an incredible 23 bits effective resolution (1 part in 8,388,608). The converter is guaranteed monotonic to 24 bits.

Extensive Input and Output

The Model 201 has six true-differential, overvoltage-protected, high-impedance analog input channels with extended DC common mode range. It can be expanded to a total of 96 channels using Lawson Labs Model 17B Differential Multiplexers. There are 20 digital I/O lines. Eight lines are general purpose digital outputs, four are optically isolated outputs, and eight are digital inputs. A 32-pin expansion port provides for future options.

Choice of Operating Modes

The Model 201 has been designed to operate in either polled or scanning mode. In polled mode, individual conversions are sent upon request. In scanning mode, the Model 201 maintains its own precise time base and transmits a predefined scan at a preset interval. Scanning rates from under 1 per day to over 300 per second are supported. Using external multiplexers up to 96 channels can be sequentially scanned. Other features under software control include self-calibration, variable input filtration, programmable gain, and bipolar or unipolar input ranges.

Serial Port Interface

The Model 201 communicates with the host PC over an optically isolated RS-232 serial link. Optical isolation provides both fault protection and flexibility in avoiding ground loops. The transmission rate is programmable from 300 to 9600 Baud. For extra reliability, error checking can be used to ensure the integrity of your data.

Low Power

The Model 201 is well suited for battery-powered field use. It requires only a single DC supply in the range of 11.5 to 50 volts. All ten power supply and reference voltages used internally by the Model 201 are derived from that single supply voltage. Current draw is typically 18 milliamps in normal operation and only 2 milliamps in "sleep" mode.
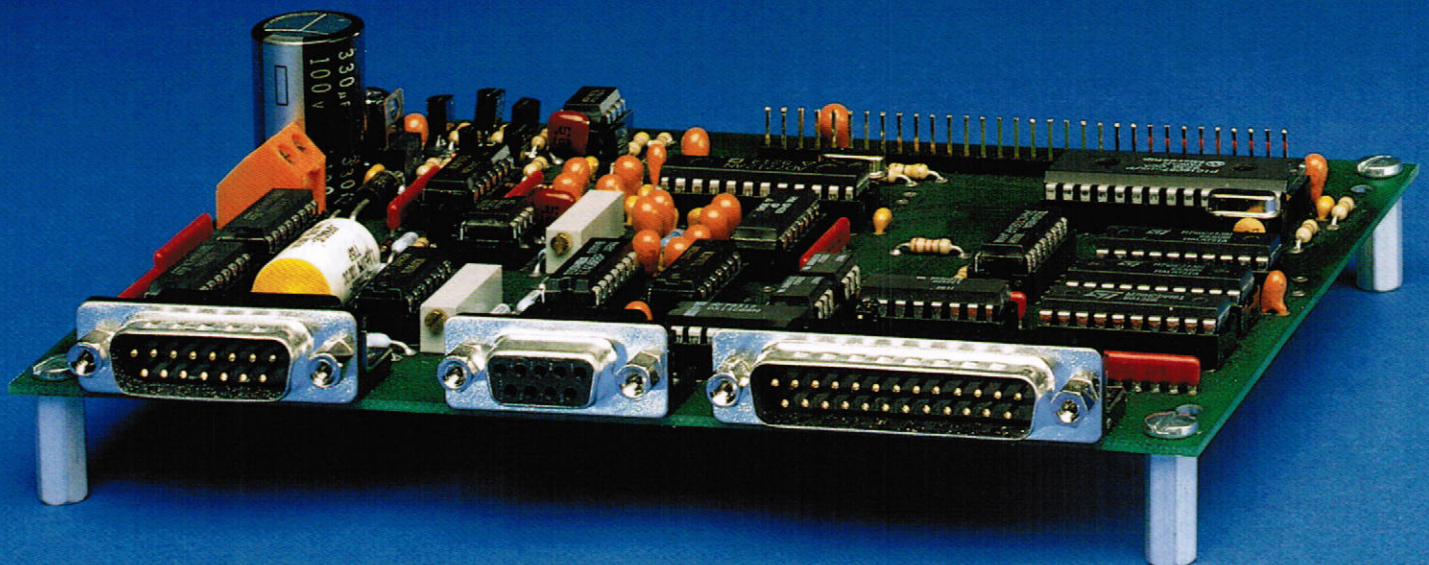
AnaLog for Windows™

The Model 201 is complemented by AnaLog for Windows. AnaLog is an easy-to-use, full-featured data logging software package. Real-time graphics, post-process data display, and ASCII file export are just some of the built-in tools. Additional features such as Quick Select, Smart Logging, and On-Line Help make AnaLog an exceptional value. AnaLog provides a simple and user-friendly means of setting up and operating an extremely powerful data acquisition system in the Windows environment.

Complete System

The Model 201 is electrically shielded and thermally stabilized in a rugged steel enclosure. It is shipped ready for use, complete with a six-foot serial cable, wall-mounted transformer, and software drivers for DOS or Windows. The Model 201 can be used by itself or as the heart of a larger system when combined with our analog and digital I/O expansion products. A full line of hardware and software options are offered for system design flexibility.

THE MODEL 201 24-Bit Serial Data Acquisition System shown without shielded enclosure

Type:	24-bit delta-sigma (these converters have excellent noise rejection) with optically isolated serial interface
Monotonicity:	24 bits at up to 50 Hz data rate
Linearity:	0.002% of full scale typical at up to 50 Hz data rate
Differential Input Range:	+/− 5 volts or 0 to 5 volts
DC Common Mode Range:	+/− 6 volts
DC Common Mode Rejection:	96 dB minimum
Resolution:	16 or 24 bits, software selectable
Input Impedance:	100,000 megohms typical
Programmable Gain:	1, 2, 4, 8,16, 32, 64, or 128
Analog Inputs:	6, fully differential, protected to 60 volts continuous or 150 volts transient, expandable to 96 channels using optional multiplexers
Digital Inputs:	8 bits, contact closure or 5-volt logic compatible
Digital Outputs:	4 optically isolated lines plus 8 latched logic outputs
Power Requirement:	+11.5 to +50 VDC regulated or unregulated
Power Supply Current: (typical)	up to +24 VDC power supply (add 3 milliamps to each at +50 VDC) operation . . 18 milliamps standby . . . 14 milliamps sleep . . . . 2 milliamps
Size:	6.5 x 5 x 1.2 inches
Speed:	The Model 201 has a programmable conversion rate that also determines the cut-off frequency of the low-pass filter. Representative values are given below. Effective resolution is 24 bits minus RMS noise in bits. Effective resolution may be reduced at gains above x4.

Data Rate:	10 Hz	30 Hz	100 Hz	300 Hz
Cut-Off Frequency (−3 dB):	2.6 Hz	7.9 Hz	26 Hz	79 Hz
Effective Resolution (Bits):	22	20	19	15
Settling Time (Seconds):	.4	.13	.04	.013

Serial Interface:	RS232, optically isolated, full duplex. Programmable from 300 to 9600 Baud. Checksum transmitted on request.
Optional Expansion:	A stacking expansion board can hold memory, additional A/D or D/A converters, or additional digital input and output. The Model 201 is also compatible with all Lawson Labs multiplexers and multiplexed amplifiers.
Custom Modifications:	The Model 201 can be custom programmed to perform a wide variety of tasks. If you do not see a particular feature here, call for a quotation. With a combination of custom hardware and software, the Model 201 can be optimized for process control, remote data logging, or other applications.

NEW: The Model 202 is a version of the Model 201 with two channels of 16-Bit resolution analog output added. The specifications are the same as the Model 201 with the following differences: The analog pre-filter has a non-programmable cut-off frequency. The number of digital input/output points has been reduced to 10. The external expansion connector has been removed. The 15-pin and 25-pin connectors have been replaced with screwdriver terminals. Also, the Model 202 is designed to be powered by a dual regulated supply. Because the connectors are different, the Model 202 does not fit in the Model 201 optional enclosure. The Model 202, like the Model 201, is available from stock.

Lawson Labs offers a broad line of computer-based data acquisition and control products.