Paper Mill Equipment Field Service
using the DaqBook®

Application Note #17

Field-service personnel must troubleshoot problems and optimize processes while at customer sites. Increasingly sophisticated, high-tech customer equipment is rendering obsolete many tools once used in field-service work. Digital voltmeters and portable scopes formerly used to diagnose problems have proved unable to keep up with customers' advancing needs.

A field-service provider to the paper industry asked its personnel what additional tools they needed to improve service to customers. The answer was comprehensive functionality in a data acquisition package that was small enough to fit into the overhead compartment of a commercial jetliner.

Application Summary

Paper production is a sensitive process. Uniform, high-volume production is necessary to maintain profitability. During the production process, paper quality is continuously monitored with high-speed, non-contact sensors. Paper found to contain flaws in weight, moisture content, thickness, opacity, or smoothness is scrapped.

The sensors and electronics used to detect flaws are built into the monitoring equipment through which the paper passes during the production process. The accuracy of the monitoring equipment is verified by an additional external system that determines performance benchmarks, optimizes controls, locates process variations, and evaluates control loop performance.

Field Service

The service provider first attempted to develop a useful field-service tool by mounting proprietary high-speed analog cards into a custom 15" x 15" chassis. These cards fed into a data acquisition card that was plugged into an external bus expansion chassis, which, in turn, was connected to a laptop PC via the parallel port.

This tool failed to meet the service provider's needs for a variety of reasons. First, the bus expansion chassis could not withstand the rigors of frequent shipping common to field-service work. What's more, its failure was usually discovered only after field-service personnel had arrived at a customer site. Also, to increase its durability, the chassis was overdesigned, making the insertion of custom electronic cards a tedious task. Similarly, because the PC and the expansion chassis had very different form factors, packing, stacking, and setup of the equipment proved awkward. Finally, powering the system was a problem because international customers required different AC power sources than domestic customers.
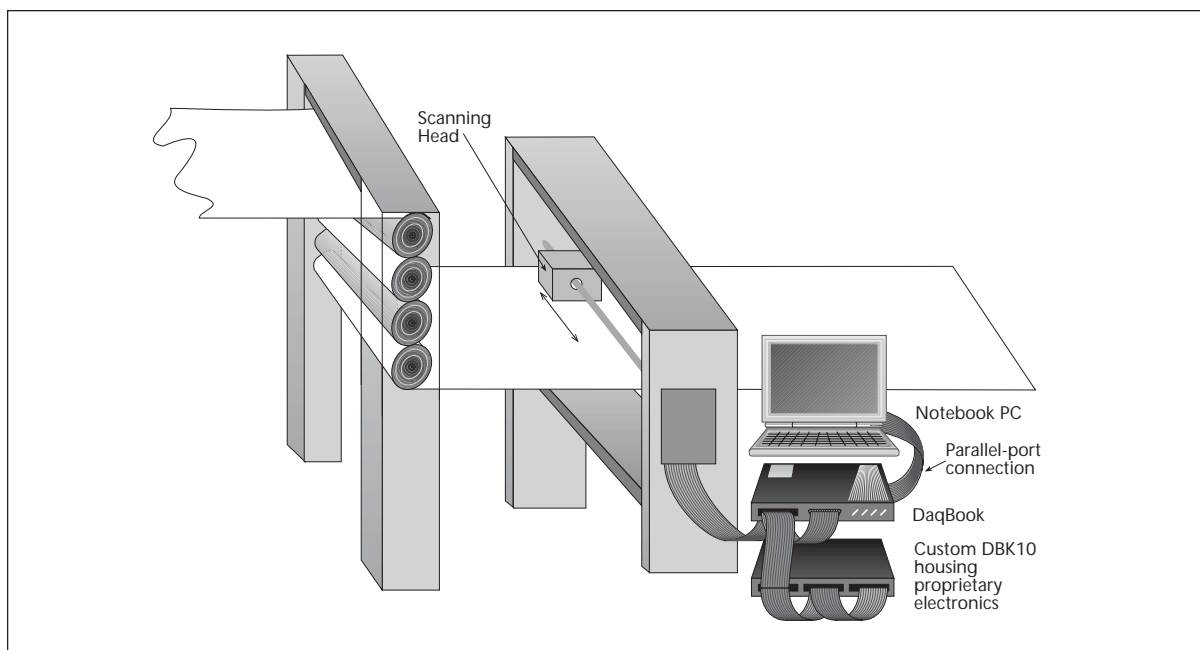
The DaqBook provides real-time data as a monitor's scanning head moves back and forth across a continuous sheet of paper

A Truly Portable Solution

The service provider began to search for a more compact and reliable system. After examining several options, it chose IOtech's DaqBook portable data acquisition system. The DaqBook proved an ideal fit for several reasons:

- Its light weight, small footprint, and all-metal construction make it ideal for service work, in which transportability and durability are critical. The DaqBook with DBK10 expansion chassis measures a mere 8" x 11" x 3".

- It is operable via DC volts or with an optional universal power adapter, and can be powered from 100 to 240 VAC at 50/60 Hz, allowing it to plug into virtually any AC source in the world.

- It is designed for expansion using IOtech's complete line of signal conditioners. As such, power usually available for these cards is also available for customer specific hardware.

- Its complete line of signal conditioning options facilitates future system expansion.

- The DBK10 expansion chassis was easily modified to accommodate the service provider's proprietary cards. Also, its footprint is identical to the DaqBook and the notebook PC's. Consequently, the system is easy to pack and occupies very little space when assembled at the customer's site. In addition, the DBK10's open-slot design allows quick and easy card substitution without the need to dismantle the entire system.

- The DaqView display software included with the DaqBook scrolls waveforms in real time. This enables quick display, permitting the field-service technician to verify connections prior to running specialty software.

Conclusion

The DaqBook system is flexible, provides an excellent expansion platform, and, with its rugged metal construction, can withstand the rigors typical of field-service environments. These features make the DaqBook and the DBK series of expansion products an ideal solution for an array of field service applications.

DaqBook/2000 Series

The DaqBook/2000® series of portable data acquisition devices are available with either a built-in Ethernet interface (model /2000E), or a parallel-port interface (model /2000A or /2000X). The Ethernet-based DaqBook/2000E can attach directly to the Ethernet port of a PC, or to an installed Ethernet network. The DaqBook/2000E also contains three parallel expansion ports, which can attach to an additional three parallel DaqBooks, thereby quadrupling the channel capacity of a single Ethernet link to the PC.

Features

- Analog input, frequency input, timer output, digital I/O, and analog output; all in one compact and portable enclosure
- Available with either an Ethernet PC connection, or a parallel port which can link directly to a PC parallel port, or with an interface to PCI bus, PC-Card slot, or ISA slot
- 16-bit, 200-kHz A/D converter
- Synchronous analog, digital, and frequency measurements
- 8 differential or 16 single-ended analog inputs (software selectable per channel)
- Expandable up to 256 analog input channels, while maintaining 200-kHz (5 µs per channel) scan rate
- Expandable up to 1024 analog inputs with DaqBook/2000E plus three slave parallel DaqBooks
- 512 location channel/gain FIFO, capable of scanning all channels, including expansion channels and digital/counter channels, at 5 µs per channel
- Trigger modes include analog, digital, & software, with <5 µs latency
- Virtually infinite pre-trigger buffer
- Optional four channel, 16-bit, 100-kHz analog output card installs internally
- 40 digital I/O lines scanned synchronously or asynchronously with analog inputs
- Digital I/O is expandable up to 272 lines, including isolation and relay closure options
- Four cascadable counter/pulse input channels scanned synchronously or asynchronously with analog inputs
- Two timer/pulse output channels
- Digital calibration — no potentiometers
- Multi-unit scan synchronization
- Vehicle network interface option

Signal Conditioning Options

- Signal conditioning and expansion options for thermocouples, strain gages, accelerometers, isolation, RTDs, etc.—over 40 DBK I/O expansion options in all

Software

- DaqView™ software with eZ-PostView™
- Included drivers for Visual Basic®, Delphi™ and C++ for Windows®; DASYLab®, TestPoint®, and LabVIEW®

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