Pharmaceutical Control Testing

using the WaveBook

Industrial

Application Note #26

Production line monitoring is critical to the operation of a large international pharmaceutical company. Its process control engineers selected a portable, PC-based digitizer as the primary production line monitoring tool for the startup, optimization, and maintenance of a new production line process. This 1-MHz digitizer collects data from several production process parameters. After analyzing the data, the process control engineers tweak these parameters to obtain maximum throughput and efficiency, and they continue to monitor the parameters to predict production line maintenance.

Application Summary

To monitor their production line effectively, the process control engineers required a versatile data acquisition solution capable of monitoring several key parameters, including the vacuum pressure occurring along the production line, the pressure applied by the injection molding machines used to encapsulate drugs, and the amount and timing of liquid dispensation. Portability was also important as the production maintenance people needed to walk up and down a long production line to acquire data without being encumbered by an AC power cord. Finally, large amounts of data needed to be collected on 8 channels at rates up to 120 kHz and saved in a PC-compatible data file for analysis.

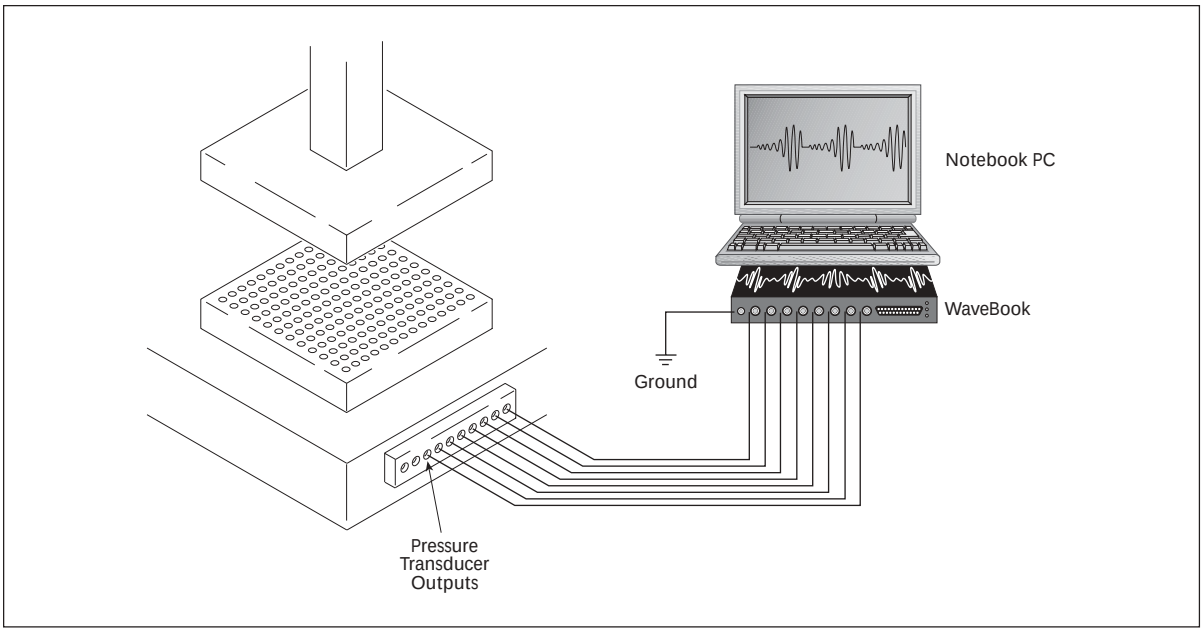
Software also played a key role. With time at a premium during the startup phase of the production line, software development using a programming language was out of the question. A software solution that produced immediate results was an absolute requirement.

Potential Solutions

The production engineers initially considered an oscilloscope because it easily met their acquisition speed requirement. However, they rejected this approach because of a scope's bulky size and weight, limited expansion capability, AC power requirements, limited data storage capacity, and awkward interface to the PC.

IOtech's Solution

In contrast, the WaveBook™ had none of these limitations. The same size as a notebook PC, its size and weight make it easy to carry up and down a production line. Its ability to operate from DC power freed the production engineers from the restraints of an AC power cord. Also, the WaveBook's simultaneous sample and hold (SS&H), low pass filter, and expansion options assured the engineers that the system could satisfy their future needs.



Process-control set-up

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Even more importantly, IOtech's WaveView™ software, with its *Out-of-the-Box*™ functionality, delivered immediate results in the timing-critical start-up phase of the production line.

WaveView easily saved data on the PC's hard disk at the required 120-kHz acquisition rate. Unlike the case with scopes, there was no need to worry whether the entire acquisition would fit on the limited disk space provided. What's more, WaveView's data files are limited in size only by the PC's hard disk. Also in contrast to scopes, WaveView's data is immediately available for analysis on the PC and required no awkward transfer of data from the scope to the PC.

The actual process parameters were derived offline using software that performed statistical and frequency (FFT) calculations on the acquired data. Because of the vast amount of data, using a conventional spreadsheet package such as Microsoft® Excel was not feasible. Therefore, the production engineers turned to DASYLab® to read the previously acquired data and calculate the necessary process parameters.

Pleased with its ease of use, they also later used DASYLab for the entire data acquisition and analysis task: acquiring the data, calculating the necessary process parameters, and saving them to a file. Like WaveView, DASYLab provided a complete software solution without the burden of programming.

Conclusion

The WaveBook's small size and light weight coupled with its speed, expandability, and PC compatibility are unmatched by any other solution on the market. Further, WaveView's no programming approach delivers immediate results. Also, software options, such as DASYLab, exist for more demanding applications which require both acquisition and analysis.

WaveBook Series

The WaveBook™ series of portable and desktop digitizers offer multi-channel waveform acquisition and analysis for portable or laboratory applications. All WaveBook models include 8 built-in channels expandable up to 72 channels of voltage, accelerometer, microphone, strain gage, thermocouple, position encoder, frequency, high voltage, and other signal types. For applications beyond 72 channels, up to four WaveBooks can be combined within one measurement system, for a total capacity of 288 channels. WaveBooks are available with either an Ethernet or parallel connection to a PC.

Features

- PC connection via Ethernet, parallel, PC-Card, or PCI card
- 1 µs/channel scanning of any combination of channels
- Expandable up to 288 high-speed channels
- SYNC connection allows multiple units to measure synchronously
- Add up to 224 lower-speed thermocouple channels
- DSP-based design provides real-time digital calibration on all channels
- Single and multichannel analog triggering with programmable level and slope
- Digital TTL-level and pattern triggering
- Pulse trigger and external clock
- Programmable pre- and post-trigger sampling rates
- Sixteen 1-MHz digital inputs
- Operable from AC line, a 10 to 30 VDC source, such as a car battery, or optional compact rechargeable battery module

Using WaveView software's spreadsheet-style interface, you can easily set up your application and begin taking data within minutes of connecting your hardware, with no programming required.

Included Software

- WaveView™ for *Out-of-the-Box*™ setup, acquisition, and real-time display:
  - Scope mode for real-time waveform display
  - Logger mode for continuous streaming to disk
- eZ-Analyst™ for real-time spectrum analysis
- Export data in third-party formats
- Includes drivers for Visual Basic®, Delphi™, C++ for Windows®; DASYLab®, and LabVIEW®
- ActiveX/COM development tools

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