

Features

- Operates without a PC at the test site
- 16-bit, 100 kHz analog and digital sampling
- Compact yet expandable architecture can accommodate over 400 channels of analog, digital, and frequency I/O
- Stand-alone nonvolatile storage of over 500 million samples via removable memory card
- Card swapping and uploading during acquisition allows continuous data acquisition
- Communication with PC via RS-232, modem, or a memory card
- RS-232 to USB interface available
- Built-in analog inputs support 14 programmable ranges up to 20V
- Synchronous, mixed signal acquisition of analog, digital, and counter inputs
- GPS support (LogBook/360 only) logs location information
- Optional control terminal provides channel inspection, and acquisition queries
- AC or DC powerable

Signal Conditioning Options

- Expansion cards and modules for high-voltage/current, strain gages, thermocouples, isolation, relays, accelerometers, filtering, simultaneous sample & hold, vehicle network measurements, and more

Software

- Includes LogView *Out-of-the-Box* software for easy setup, calibration, and more – *No programming required!*
- Simple spreadsheet-style interface provides powerful setup features for immediate startup
- Acquisition configurations can be transported to the LogBook via the memory card or the included USB cable
- Provides direct support for a wide variety of transducers
- Includes PostView for post-acquisition data viewing
- Supported Operating Systems: Windows 2000®, Windows Vista® x86 (32-bit), and Windows XP®



*No programming
required with included
LogView software!*

The LogBook/360 data acquisition system includes an expansion bay for up to three signal conditioning cards

The LogBook/300 and LogBook/360 are portable data acquisition systems that can be used for remote, portable, and unattended operation.

The LogBook combines on-board intelligence and a large capacity removable memory card, with the industry's easiest and most powerful data logging software. Its 16-bit, 100 kHz A/D and triggering capabilities make it ideal for collecting high and low speed phenomena. A comprehensive array of signal conditioning expansion cards and modules are offered that allow the

LogBook to take measurements from virtually any transducer, from thermocouples to accelerometers.

The LogBook data acquisition system includes LogView *Out-of-the-Box* graphical display and acquisition software, which allows for fast setup and easy use, with no programming required. LogView software uses a spreadsheet metaphor rather than programming to configure the channels and the acquisition parameters.

*The LogBook/300 data
acquisition system with
memory and Remote
Operation Terminal*



LogBook

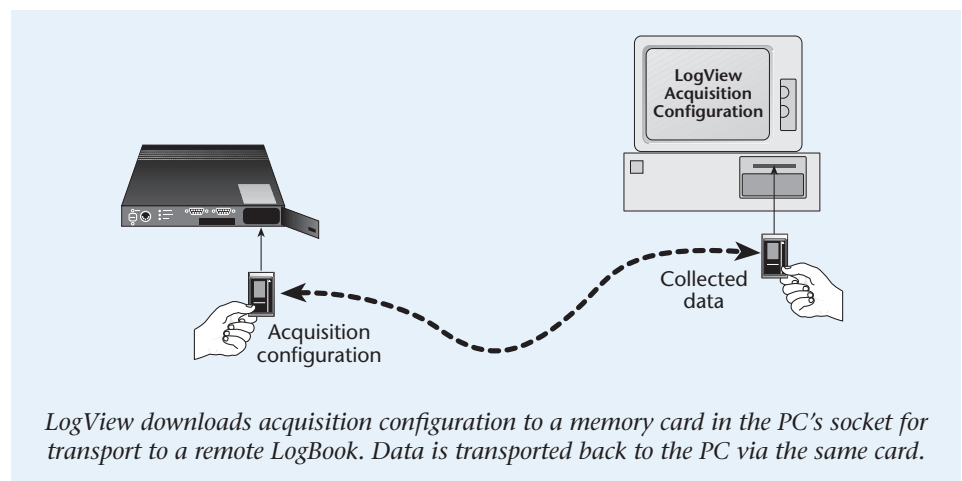
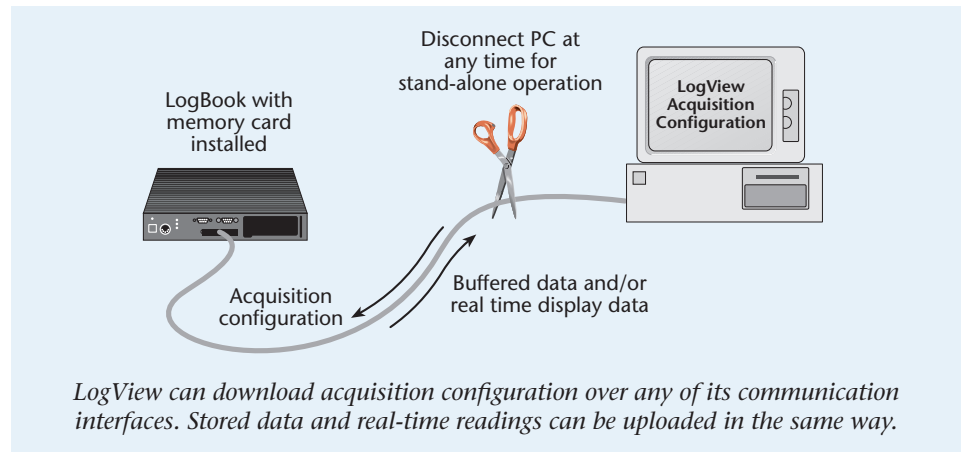
General Information

Operating Modes

Once an acquisition configuration has been developed, it can be downloaded to a memory card for transport to a remote LogBook, or it can be directly downloaded to an attached LogBook via a serial port. The LogBook can also be used in a stand-alone mode where no PC is present.

A PC running LogView can interact with an attached LogBook at any time, both during the setup and/or while the acquisition is taking place. To observe acquired data, channel values can be displayed in any or all of LogView's many real-time indicators.

LogBook/300 Operating Modes



Removable Nonvolatile Memory

The cards can transport acquisition configurations and collected data between the PC and the LogBook. Using a 1 Gbyte memory card, for example, up to 500 million samples can be stored, equating to more than forty minutes of recording time at the full 100 kHz acquisition rate. The LogBook/300 and LogBook/360 support standard ATA memory cards, as well as CompactFlash® memory with an ATA adapter.



One memory card can be removed and another inserted without causing a gap in the acquired data

LogBook

General Information

During the card swapping process, acquired data is temporarily stored in the LogBook's internal 4 Mbytes of RAM. At 100 kHz sampling, the standard 4 Mbytes of RAM memory provides approximately 10 seconds to swap cards. At slower acquisition speeds, there is even more time to swap cards. At 10 kHz, the standard memory provides approximately 1.5 minutes of swap time.

I/O, Expansion and Signal Conditioning

The LogBook data acquisition system is equipped with the following I/O:

- 16 single-ended or eight differential analog inputs, with seven bipolar or unipolar programmable ranges
- 40 lines of general purpose digital I/O
- Four pulse counting channels for totalizing
- Two pulse train outputs

The system can be expanded using a comprehensive line of DBK signal conditioning and expansion options. The LogBook is expandable to up to 256 analog inputs and 208 digital I/O lines. Economical signal conditioning hardware includes thermocouple, RTD, high gain, high voltage, current, strain gage, accelerometer, filter, and simultaneous sample and hold.

The LogBook/300 attaches to DBK options externally, via a simple ribbon cable connection. The LogBook/360 provides added functionality by providing space for up to three DBK signal conditioning cards housed internally.

User-selectable termination panels offer a choice of connector types including BNC, removable screw terminal, thermocouple, and safety jack. Each panel includes pre-stripped wires by which the user can connect to any of the three DBK cards installed in the LogBook/360 enclosure. A user-customizable blank termination panel is also available for custom applications.

The LogBook/360's drawer-style architecture supports up to three DBK signal conditioning cards



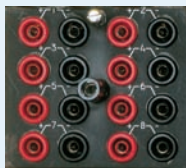
LogBook/360 Termination Panels



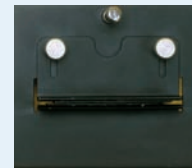
BNC termination panel (DBK602) features 16 BNC connectors



Removable-block screw-terminal termination panel (DBK606) offers 48 convenient connections



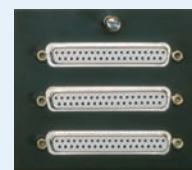
Safety-jack termination panel offers 16 connectors (Red and black jack-pairs, DBK604 shown)



Slotted panel with adjustable clamp that holds wires in place (DBK607)



Thermocouple termination panel (DBK605) features 14 connectors for types J, K, and T thermocouples



DB37-style termination panel (DBK608) features three standard 37-pin female connectors

Note: DBK601 and DBK603 not shown.

All of the channels in a LogBook system, including the base I/O and expansion channels, are sampled synchronously, providing time correlation of all collected data. The LogBook provides both internal and external pacer clock control so that scans can be collected using the LogBook's internal programmable oscillator or an externally supplied custom frequency clock. Users have bit-wise control of digital I/O.

Unlike many multiplexed input data loggers, the LogBook's base analog input channels have a unique buffer-amplifier-per-channel design to eliminate noise and channel-to-channel crosstalk while maximizing accuracy — even with high-impedance transducers. For ease of use, all of the LogBook's settings are software controlled, eliminating the need for switches and jumpers. Each channel is digitally calibrated, eliminating drift-prone potentiometers.

Triggering and Sampling

Along with simple triggering and continuous data logging, the LogBook can be configured to collect only the data you want. For sophisticated triggering, a calculated channel can be specified as the trigger or the stop event. A calculated channel can describe virtually any combination of channel conditions. For example, you can develop a calculated channel called TRIG and specify it as the trigger channel. If the channel's equation is $TRIG = (Temp1 - Temp2) > 50.0$, the data collection process will be triggered when the difference between the 2 temperature channels is above 50.0 degrees.

The LogBook is capable of continuous, gapless data collection or exception capturing using triggering.

If data collection is only desired under specific conditions, an appropriate trigger can be specified. When using a trigger to start the acquisition, a pre-trigger count can be supplied so that information just before the trigger can be collected and saved. The stop event definition specifies when the data collection activity should end. A wide variety of trigger sources and stop event choices provide a high degree of exception capture flexibility. For example, the LogBook can be configured to capture all data from all input channels for as long as the temperature difference between channels 1 and 2 is greater than 50 degrees.

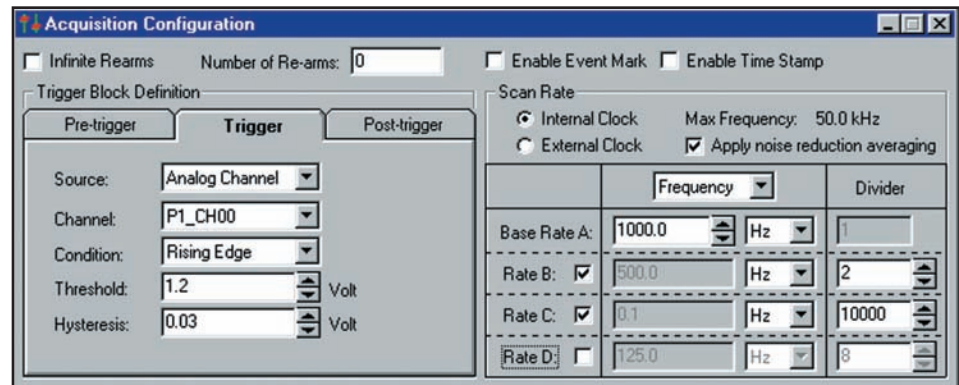
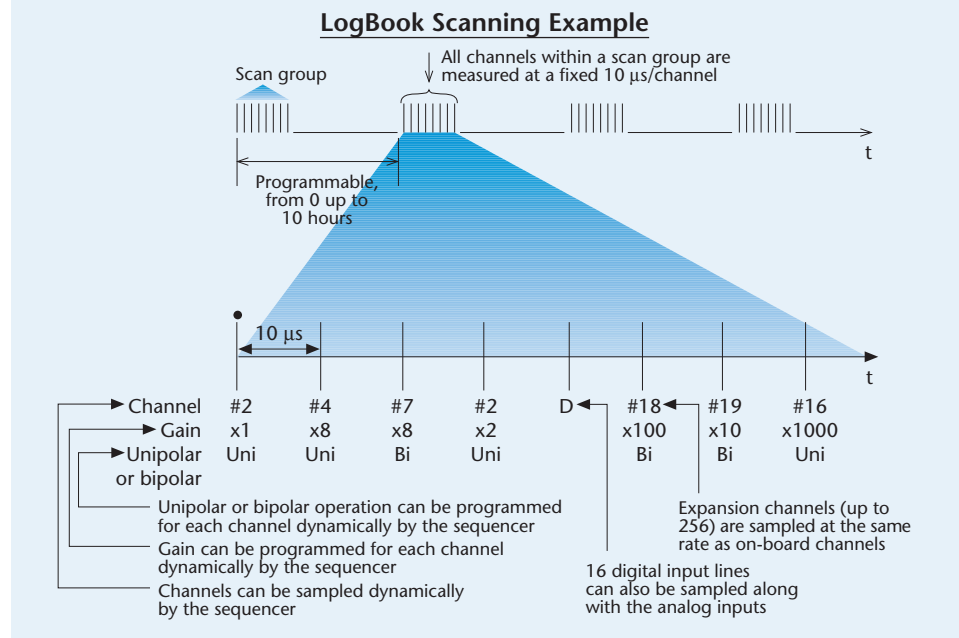
The LogBook offers significant channel scanning flexibility to accommodate the wide variety of signals and sensors that can be measured. The channel scanning capability applies to all signals attached to the LogBook, including analog inputs, digital inputs, frequency inputs*, and all signals attached to expansion and signal conditioning options.

The user first selects the fastest rate at which any channel will be measured. This can range from once per hour to 100 kS/s. They can then select up to four lower sampling rates that can be assigned to any channel.

* For mixed signal applications requiring frequency measurement along with high-speed analog inputs, see DBK7

Channel-Scanning Flexibility

The LogBook offers a 512-location scan sequencer that allows you to select each channel and associated input amplifier gain at random. The sequencer circuitry circumvents a major limitation encountered with many plug-in data acquisition boards—a drastic reduction in the scan rate for external expansion channels. All LogBook channels, including the 256 potential expansion channels, are scanned at 100 kHz (10 μ s/channel). In addition, the LogBooks' digital and counter inputs can be scanned using the same scan sequence employed for analog inputs, enabling the time correlation of acquired digital data to acquired analog data. The LogBook permits each scan group, which can contain up to 512 channel/gain combinations, to be repeated immediately or at programmable intervals of up to 10 hours. Within each scan group, consecutive channels are measured at a fixed 10 μ s/channel rate.



The acquisition configuration dialog box allows the selection of trigger and scanning specifics

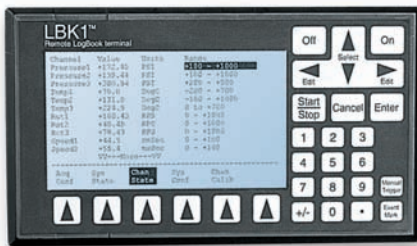
LogBook

General, Modem, & GPS Information



These “sub-rates” are integer sub-multiples of the fastest rate. For example, if the fastest desired sample rate is 10 kHz, then four sub-rates of 10 kHz/n, where n is an integer, can be selected. This feature allows slower-changing signals, such as temperature from a thermocouple, to be sampled at a much lower rate, and thereby consume less storage space in the memory card.

Remote Operation Terminal



The optional LBK1 Remote Operation Terminal provides control of the LogBook system in the field when no PC is present

The optional LBK1 Remote Operation Terminal connects directly to the LogBook, providing control of the LogBook without a computer. Without the terminal, the LogBook is immediately armed once power is applied and a programmed memory card is present. With the terminal connected, operation can be started and stopped with a push of a button.

The rugged terminal provides many useful functions including the ability to:

- Inspect channel values
- Check acquisition and storage status
- Trigger the acquisition when “Manual Trigger” is the selected trigger source
- Manually mark events using the keyboard, tagging a location in the file
- Query acquisition settings and disk status
- Set terminal parameters

* Only the LogBook/360 has the necessary serial ports (two RS-232C ports) to accommodate GPS support

Modem Communicaitons

The LogBook/300 and LogBook/360 can be interfaced to a user supplied modem for remote communications to a PC using LogView software. The user supplied modem interfaces directly to the LogBook RS-232 serial communications port. LogView software provides an interface for configuring standard modem parameters, which allows the LogBook to interface to the connected modem on power up. A Hayes™ compatible modem is required for this configuration and the modem must be configurable for auto-answer mode. Cellular-based modems can only be used if they are 100% Hayes compatible over the RS-232 serial port and have auto-answer capability.

Remote modem configurations provide the same functionality as a system using direct serial port cable communications, including system configuration and data collection. Communication performance in remote modem applications may vary due to modem connection quality. Because of the many types of modems and modem technologies that are available, IOtech cannot guarantee compatibility with all modems. In addition, modem setup and configuration changes may be required by the end-user for proper modem interfacing to the LogBook system. Contact IOtech for complete information. An automatic scheduler utility is also provided with LogView software which allows the PC to perform unattended dial-out and data collection of multiple modem equipped LogBook systems.

Global Positionng System (GPS) & Serial Instrument Support for the LogBook/360

Features

- Allows the LogBook/360 to record GPS and/or serial instrument data along with regular measurements
- Allows the LogBook/360 to record GPS longitude, latitude, altitude, fix quality, and UTC as independent data channels
- Collects and records data from any serial instrument that transmits ASCII data
- Easy channel configuration, without programming, via LogView Out-of-the-Box software

The LogBook/GPS software adds Global Positioning System (GPS) and serial instrument data collection capability to the LogBook/360* data acquisition system.

When connected to a user-supplied GPS receiver, a LogBook/360 with LogBook/GPS support can store latitude, longitude, and altitude coordinates along with the analog and digital data from the attached transducers. LogBook/GPS support provides direct support for any GPS receiver that conforms to the NMEA 0183 protocol standard. No programming or string manipulation is required. The captured coordinates are recorded in units of degrees for latitude and longitude, and meters for altitude. In addition to the position coordinates, the quality of the fix can also be recorded showing the validity of the coordinates. If the GPS receiver loses its fix, it will be reflected in the Quality channel.

LogBook/GPS support also enables data collection from any serial device (RS-232C) that transmits ASCII strings. This includes specialized instruments like navigational devices and weight scales. A virtually unlimited number of channels can be defined in LogView, each describing the criteria for selecting the string segment of interest within the ASCII sentence, and the instructions for converting it into a numeric or character value.

A GPS receiver and serial instrument channels can be concurrently recorded with transducer and voltage channels at up to 4 unique timebases.

Module-to-Module Connection for LogBook Systems

Assembling a LogBook system is easy with our module-to-module connection system. Every LogBook and DBK option is housed in an all-metal enclosure, and is encased with rugged molded bumpers on all corners. The bumpers serve to protect the connectors as well as to attach multiple modules together. Within each bumper is a tab which can be rotated 90° to lock with other modules attached to either the top or bottom of each module.

One handle is included with each LogBook, and additional handles can be purchased for in-vehicle applications where a handle on both sides of the system is desirable for securing the system to the vehicle. When multiple modules are attached in a system, the handle can be easily moved from the LogBook to any other module in the system.



An assembled system consisting of a LogBook/360 plus one DBK60 3-slot expansion option



Built-in connection tabs in every expansion module make assembling a system easy – above illustrates how a DBK84 thermocouple option would attach to a LogBook/300



An assembled system consisting of a LogBook/360 plus a DBK84 thermocouple option, and a DBK50 isolated voltage input option

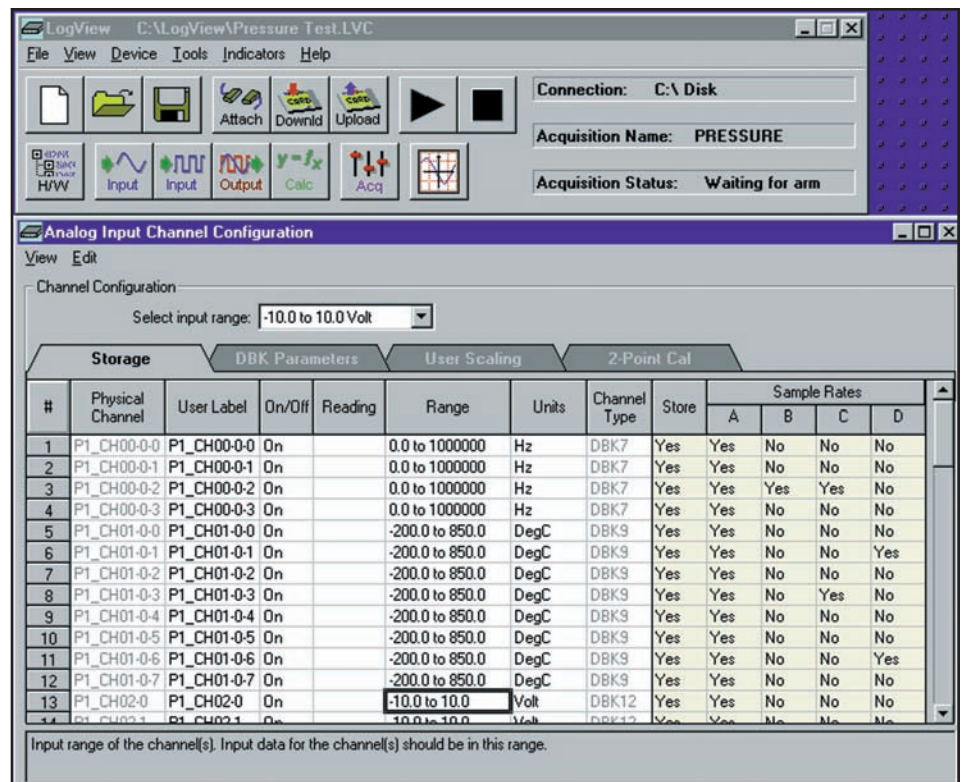


An assembled system consisting of a LogBook/300 plus one DBK84 thermocouple option, and a DBK50 isolated voltage input option

LogView Software Simplifies Setup

LogView* uses a series of spreadsheets to allow simple setup and display of all channel parameters. No auxiliary dialog boxes, configurable block diagrams, or programming methodologies are employed.

All of the parameters for the analog I/O, digital I/O, counter/timers, and calculated channels can be viewed and adjusted through LogView's unique spreadsheet interface. The spreadsheets make it possible to see and adjust the parameters of many channels concurrently, unlike typical data logging software that requires channels to be set up one at a time through auxiliary dialog boxes.



LogView's analog input spreadsheet makes viewing and adjusting many channels easy

Channel parameters are independent of one another and include:

- Turning the channel on or off
- Programmable input range for analog input channels
- Scaling and offset for engineering units conversion
- Any or all of four timebases to log the channel
- The equation that defines the calculated channel
- The physical output channel to direct a calculated or input channel
- Special parameters specific to certain signal conditioning modules

All inputs including analog, digital, frequency and calculated channels are collected synchronously so that data from widely dissimilar inputs can be correlated in time.

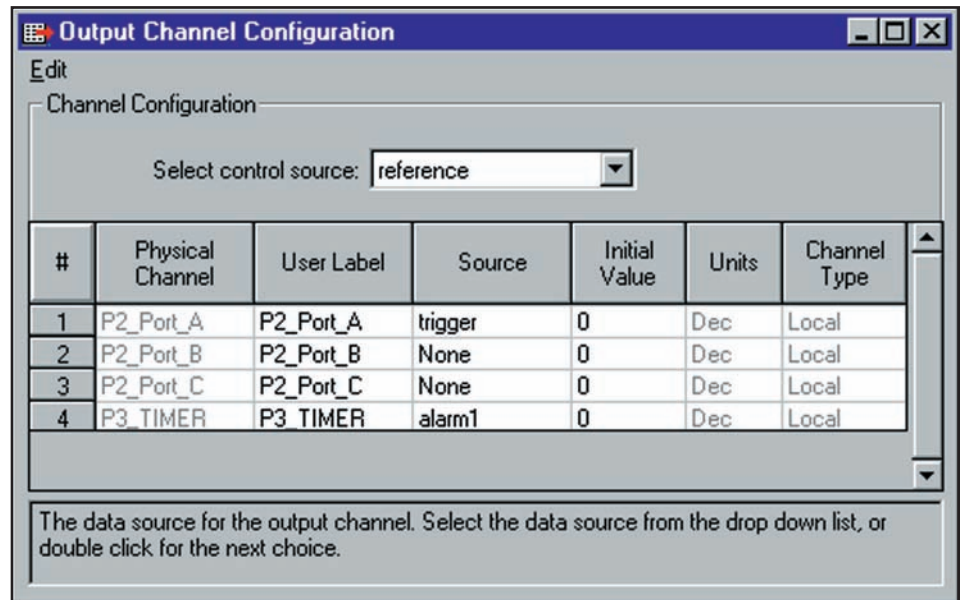
Within the analog spreadsheet, an offset adjustment or 2-point calibration can be performed for each channel. This function compensates for inaccuracies in signal conditioning circuitry and sensors.

LogView provides a file concatenate feature for combining separately uploaded data segments, from the same trigger block, into one file.

* Supported Operating Systems: Windows 2000®, Windows Vista® x86 (32-bit), and Windows XP®

Digital Outputs

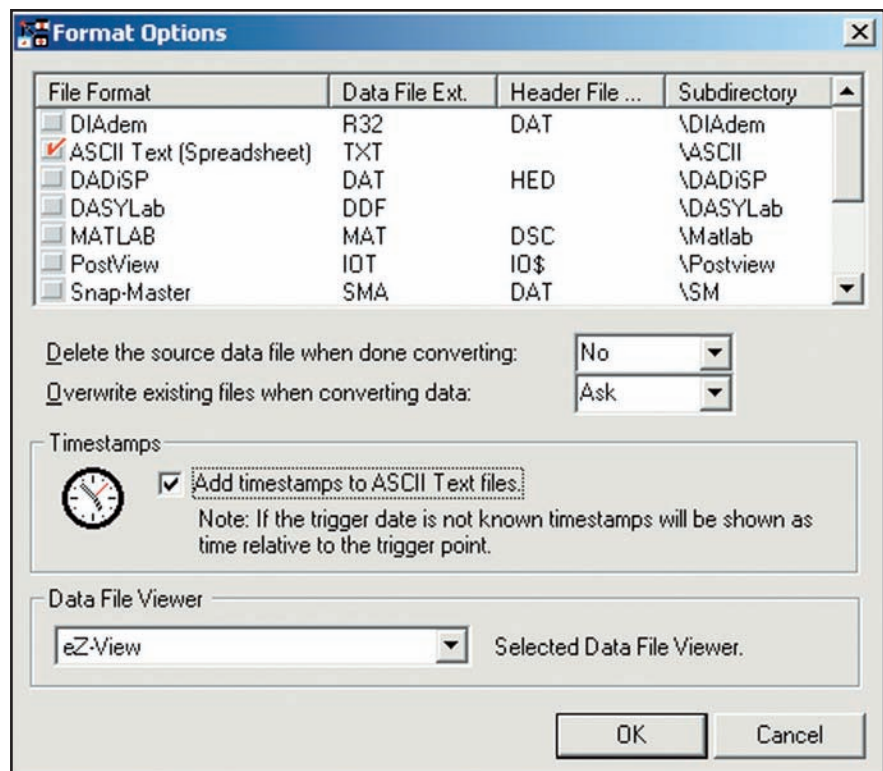
The LogBook's digital outputs allow it to control external devices and/or stimulate the unit under test. Using LogView's calculated channels, equations can be derived that can be used to stimulate digital outputs for use as alarms or for on/off control*. For example, the equation $DIG1 = (CH1 - CH2) < 20$ turns on digital output 1 if the difference between channels 1 and 2 is less than 20.



Output values are easily computed using calculated channels

Data Formats and Data Files

Data collected with the LogBook can be uploaded to your PC's hard disk in any or all of several data formats for post acquisition analysis. Some of the available file formats include ASCII Text, DASyLab®, DADiSP™, MATLAB®, DIAdem, .WAV, UF-F58A, and UFF58B, which are compatible with virtually all post acquisition analysis software. LogView creates the necessary headers for each data format so that the post acquisition analysis software can use the channel labels, the acquisition time-base information, and other necessary parameters.

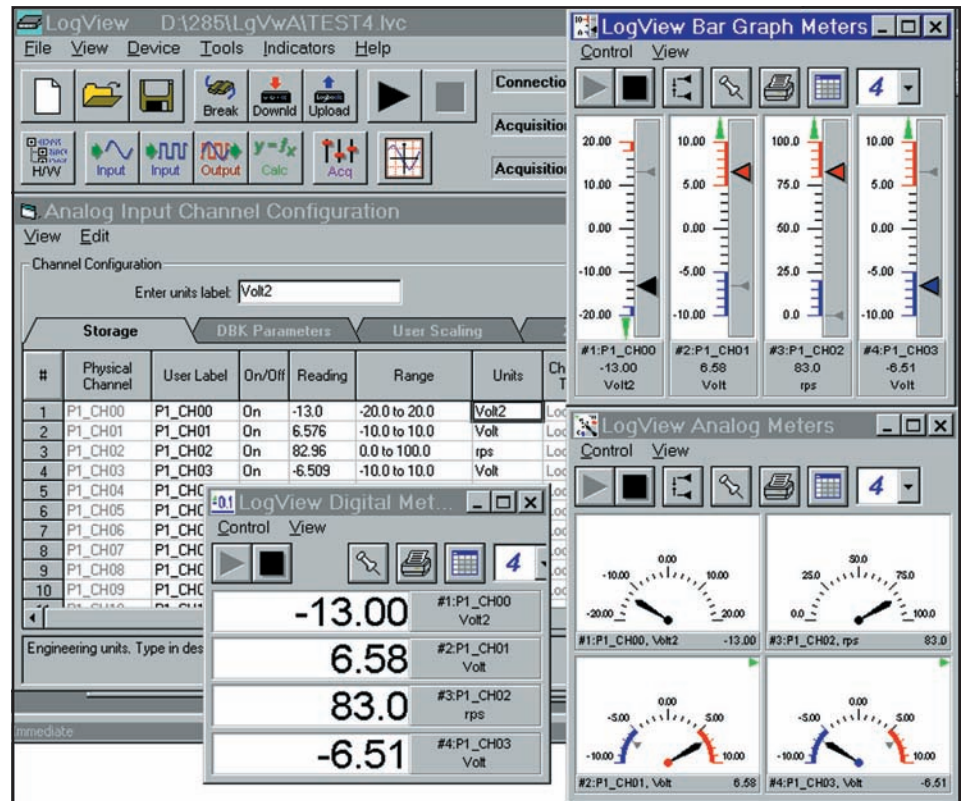


LogView can convert collected data to several file formats

* Not for PID specific control applications

Auxiliary Real-Time Indicators

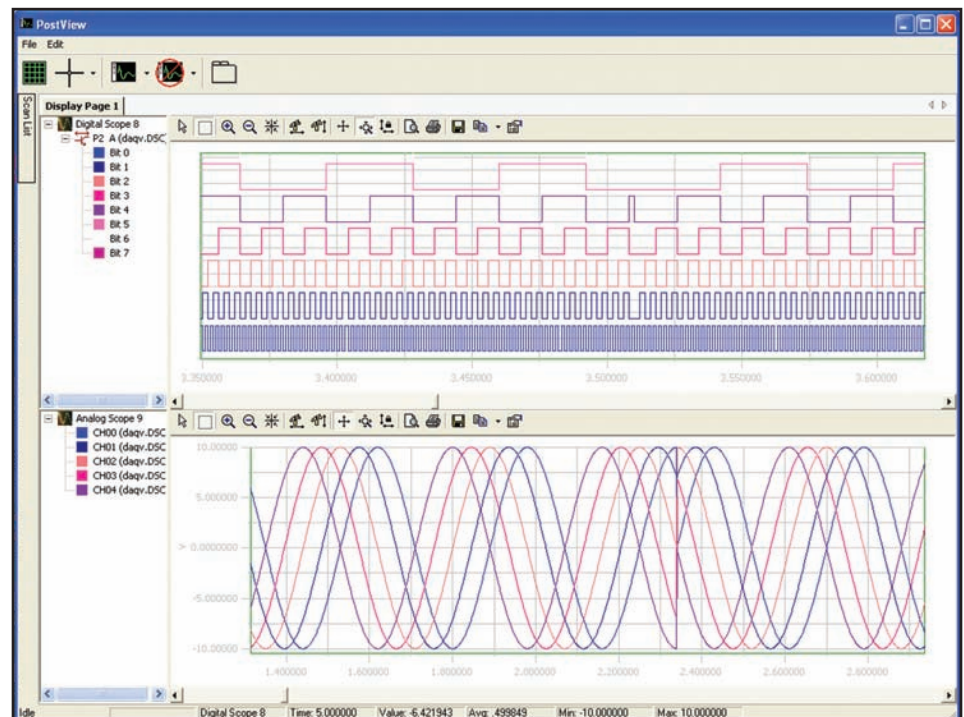
Along with displaying channel data from an attached LogBook in real time in the setup spreadsheets, LogView also provides real-time indicators. These indicators provide a means of monitoring the real-time channel values so that signals can be verified. Each indicator provides a high degree of setup flexibility to customize your display.



Real-time indicators provide channel feedback from an attached LogBook

PostView

PostView is a time-domain post-acquisition data viewing package which is integrated and ready to use from within your View package when you install it. PostView provides easy to use basic time-domain data viewing for IOtech data acquisition Out-of-the-Box View packages.



PostView for post-acquisition viewing

Specifications

General

Power Consumption: 0.9A @ 15VDC
Operating Temperature: -40 to +60 °C
Storage Temperature: -40 to 80 °C
Shock and Vibration: MIL-STD-810E
Humidity: 0 to 95% RH, non-condensing

Dimensions
 /300: 280 mm W x 216 mm D x 44 mm H
 (11" x 8.5" x 1.75")
 /360: 280 mm W x 356 mm D x 89 mm H
 (11" x 14" x 3.5")

Weight

/300: 1.8 kg (4 lbs)
 /360: 4.1 kg (9 lbs)

Memory Card: Standard ATA Type

A/D Specifications

Type: Successive approximation
Resolution: 16 bit
Conversion Time: 10 µs
Monotonicity: No missing codes
Linearity: ±1 bit

Analog Inputs

Channels: 16 single-ended, 8 differential, expandable to 256 differential; single-ended or differential operation is software programmable

Connector: DB37 male, P1

Resolution: 16 bits

Accuracy

Range	±(% Reading + µV)
±10V	0.015 + 500
±5V	0.015 + 500
±2.5V	0.015 + 300
±1.25V	0.015 + 250
±0.625V	0.015 + 150
±0.3125V	0.020 + 150
±0.15625V	0.050 + 100
0 to +20V	0.015 + 500
0 to +10V	0.015 + 500
0 to +5V	0.015 + 300
0 to +2.5V	0.015 + 250
0 to +1.25V	0.015 + 150
0 to +0.625V	0.020 + 150
0 to +0.3125V	0.050 + 100

Ranges

Unipolar/bipolar operation is switch selectable

Unipolar: 0 to +20V, 0 to +10V,
 0 to +5V, 0 to +2.5V, 0 to +1.25V,
 0 to +0.625V, 0 to +0.3125V

Bipolar: ±10V, ±5V, ±2.5V, ±1.25V,
 ±0.625V, ±0.3125V, ±0.15625V

Maximum Overvoltage: -35V to +45V

Input Current

Differential: 0.4 µA typ
 0.7 µA max

Single-Ended: 0.2 µA typ
 0.35 µA max

Input Impedance

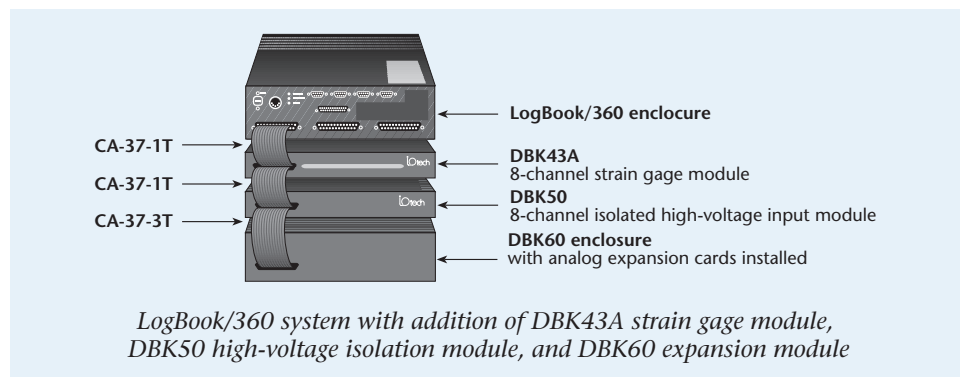
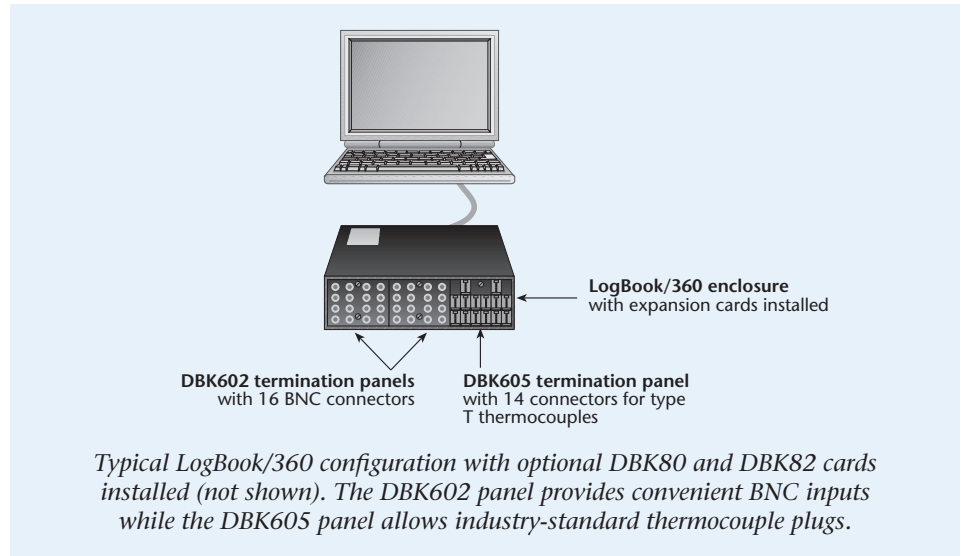
Single-Ended: 5M Ohm in parallel with 30 pF

Differential: 10M Ohm in parallel with 20 pF

Gain Temp. Coefficient: ±30 ppm/°C max

Offset Temp. Coefficient: ±10 ppm/°C max

LogBook System Examples



Triggering

Analog Trigger

Programmable Level Range: Full range of specified channels

Digital Trigger

Logic Level Range: 0.8V low/2.2V high
Trigger to A/D Latency: 10 µs max

Software Trigger

Trigger to A/D Latency: Dependent on PC

Sequencer

Randomly programmable for gain

Channel-to-Channel Rate: 10 µs/channel, fixed

Maximum Repeat Rate: 100 kHz

Expansion Channel Sample Rate: Same as on-board channels, 10 µs/channel

General Purpose Digital I/O

Channels: 24 I/O channels, expandable up to 192

Connector: DB37 male, P2

Output Voltage Levels

Minimum "1" Voltage: 3.0 @ 2.5 mA sourcing

Maximum "0" Voltage: 0.4 @ 2.5 mA sinking

Output Current

Maximum Source Current: 2.5 mA

Maximum Sink Current: -2.5 mA

Input Voltage Levels

Minimum Required "1" Voltage Level: 2V

Maximum Allowed "0" Voltage Level: 0.8V

Output Float Leakage Current: 10 µA

LogBook

Specifications & Ordering Information



Pulse Counters

Channels: 4
 16 bits per channel
Connector: DB37 male, P3
Maximum Pulse Count: 16-bit binary
Maximum Input Rate: 1 MHz
Input Voltage: -15V to +15V
Threshold Voltage
 Low: 0.8V typ, 0.5V min
 High: 1.6V typ, 2.1V max
Hysteresis: 400 mV min
Pulse Width
 Low or High: 520 ns min
Input Impedance: 27 kOhm pull-up to +5V in parallel with 50 pF

Frequency/Pulse Generator

Channels: Two, 16 bits
Connector: DB37 male, P3
Frequency/Pulse Generating Mode: Input frequency divided by 1 to 65,535
Input Low Voltage: 0.8V max
Input High Voltage: 2V min
Input Low Current: -10 µA max
Input High Current: 10 µA max
Output High Voltage: 2.4V min @ -8 mA
Output Low Voltage: 0.5V max @ 8 mA
Supply Power Range: 10 to 45 VDC (90 to 240V AC adapter included)

Modem Support*

Supported Modems: Hayes-compatible
Maximum Baud Rate: 115k baud, auto answer mode required
Electrical: RS-232
Provided Connection: DB9 male connector

GPS Support

(LogBook/360 only)

Supported Protocol: NMEA 0183
Electrical: RS-232
Provided Connection: DB9 male connector
Baud Rate: 4800 baud

Ordering Information

Description	Part No.
Data acquisition system including AC adapter; LogView and PostView software; and modem software support	LogBook/300
Data acquisition system with signal conditioning bay including serial ports; LogView and PostView software; and modem and GPS software support	LogBook/360

Accessories

Memory card (required) 1 GB rotating hard drive memory	MEMCARD-10
Hand-held terminal with 2 ft. cable to LogBook (no external power required)	LBK1
Interface RS-422 and RS-485 interfaces added to existing RS-232 and parallel ports	LBK/COM/422/485
RS-232 to USB interface adapter	CA-232-USB-KIT

Termination Panels

(LogBook/360 only)

Blank termination panel	DBK601
16-connector BNC termination panel	DBK602
16-connector (8 pairs) red and black safety-jack termination panel and wiring kit	DBK604
14-connector type J thermocouple panel and wiring kit (male thermocouple connector sold separately)	DBK605-J
14-connector type K thermocouple panel and wiring kit (male thermocouple connector sold separately)	DBK605-K
14-connector type T thermocouple panel and wiring kit (male thermocouple connector sold separately)	DBK605-T
48-connector removable-block screw-terminal panel and wiring kit	DBK606
Slotted termination panel with adjustable clamp	DBK607
Three DB37 female connector termination panel and wiring kit	DBK608

Male Connectors for Subminiature TC Jacks

Description	Part No.
Type J male connector	CN-144-JM
Type K male connector	CN-144-KM
Type T male connector	CN-144-TM

Cables

Expansion cable from LogBook to DBK expansion products, 2.5 in. expansion cable	CA-37-1T
4.5 in. expansion cable	CA-37-3T
5.5 in. expansion cable	CA-37-4T
11.5 in. expansion cable	CA-37-8T
5-pin male locking DIN to automobile cigarette lighter power cable, 8 ft.	CA-171
Retractable cable from LBK1 to LogBook/300 and LogBook/360, 6 ft.	CA-173

* Compatibility with all modem types is not guaranteed