Using IOtech Data Acquisition Products with DASY*Lab*®

the smart approach to instrumentation ™

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Using IOtech Data Acquisition Products with DASY*Lab*

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About this Document

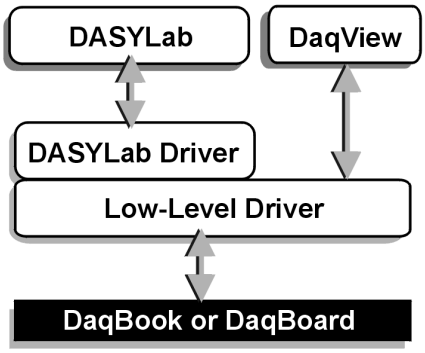
This document serves as a supplement to both your DASY*Lab* and specific data acquisition device user's manuals. It is intended to help you with your initial setup of IOtech data acquisition hardware in DASY*Lab*.

The document steps through software installation configuration issues and provides screen shots so you can more easily setup and use your equipment.

Since the document covers several different types of hardware, for example, DaqBoard/2000, WaveBook, and DynaRes; please look over the table of contents and refer only to those sections that apply to your specific device.

Table of Contents

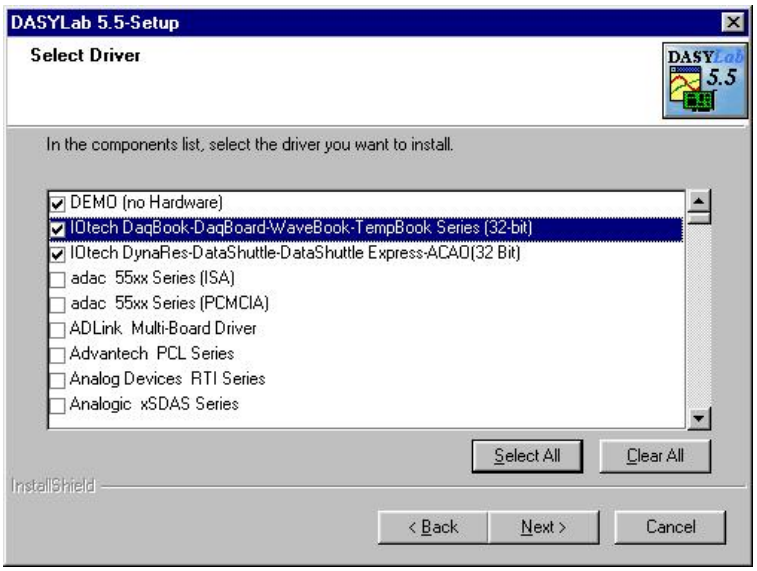
Configuring DASY*Lab* for DaqBook or DaqBoard 1



Software Support Structure

Install DASY*Lab*

1. Launch DASY*Lab* installation from the **DASY*Lab* CD**. Note that the CD should *auto-start*. If the CD does not auto-start, run the CD **start.exe** from the Windows Desktop.
2. Select "Installation," then "Full Version." The actual installation process begins.
3. When prompted for your *name*, *company* and *serial number*, enter the requested data. Obtain the serial number from the CD jacket. Keep the number in a safe place for future installations and upgrades.
4. When prompted for the installation directory and program folder, use the default selection, or choose another. We recommend that the default directory and location be used.
5. When prompted for **Setup Type,** choose from the available options. We recommend that you select ***Typical***.
6. When prompted to select the Hardware Driver, check the entry:
IOtech DaqBook-DaqBoard-WaveBook-TempBook series (32-bit).
You may also select other drivers [for any other supported hardware you have] at this time.



Selecting: IOtech DaqBook-DaqBoard-WaveBook-TempBook Series [32-bit]. Other device drivers are to be selected only if applicable.

Make sure a check mark appears next to your selection(s). Choices that are merely highlighted and not checked will not be installed.

Note: If you allowed the IEEE488 (GPIB) drivers to be installed, you will be able to select the vendor.

A final screen displays the selected options about to be installed. Be sure the report matches your intended choices. Step back to modify settings if needed.

Note: After ***software installation*** is complete, you may be required to restart Windows. After restart, continue with the following section, ***Install Low-Level Hardware Driver***.

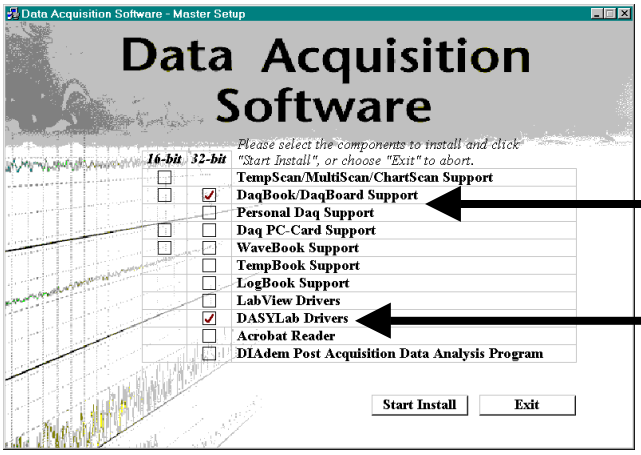
Install Low-Level Hardware Driver

If the hardware drivers for your device are not installed, or if you have received a new IOtech Data Acquisition CD, follow these steps.

Both the low-level drivers, installed from the Data Acquisition CD, and the DASY*Lab* drivers, installed from the DASY*Lab* CD, are required for DASY*Lab* operation.

Note: The installation will automatically perform version verification to ensure that only newer support is installed.

1. Launch the **IOtech Data Acquisition Software CD**. Note that the CD should *auto-start*. If the CD does not auto-start, run the CD **start.exe** from the Windows Desktop.
2. Select the 32-bit drivers for all hardware models that you will be using.
3. Select **DASY*Lab* Drivers**, if you did not do so in step 2.
4. Click the **Start Install** button.



IOtech's Data Acquisition Software -Master Setup Screen

Note: When the low-level drivers are installed, *DaqView* (an out-of-the-box, data collection application) is also installed.

Use DaqView to verify connections and configurations. This use of DaqView can be very beneficial, especially in applications making use of DBK signal conditioning cards and expansion modules.

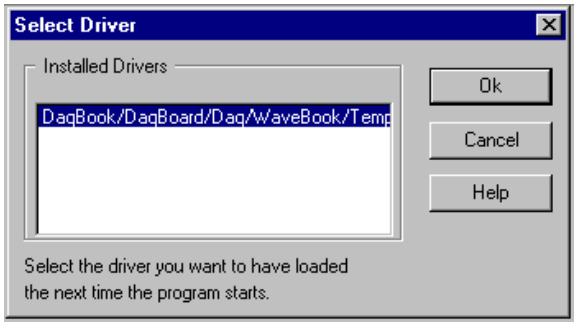
Verify your hardware installation using the Resource Test in the *Daq* Configuration Control Panel Applet*. Refer to the data acquisition user's manual for instructions on using the applet and configuring device names.

Selecting the Daq* Configuration Control Panel Applet

You can download the latest hardware and DASY*Lab* drivers from our web site at **www.iotech.com.**

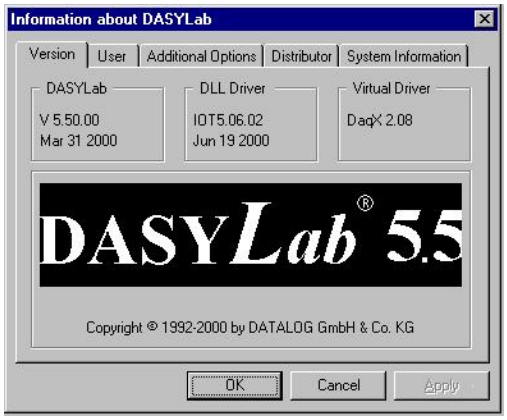
Select the Driver

1. Start DASY*Lab* and go to **Experiment ⇒ Select Driver** (see following figure).



Experiment / Select Driver Window

2. When the driver selection menu is presented, select the desired IOtech hardware products from the list. You may be prompted to restart DASY*Lab* for the changes to take effect. If so, exit and restart DASY*Lab* before continuing.
3. Click Help ⇒ About DASY*Lab*. The Information about screen will appear (following figure).



Information Screen

If you did not receive the version listed on your purchase order, contact IOtech's Technical Support Department at **productsupport@iotech.com**

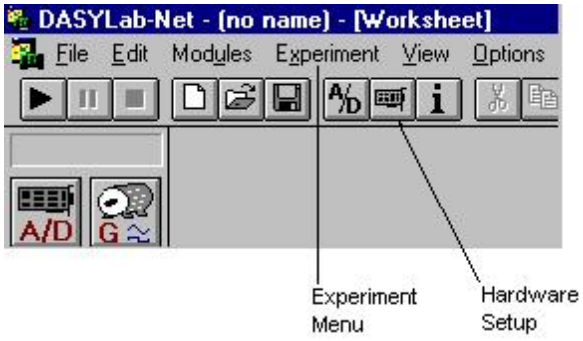
4. In the DLL Driver frame, make sure you have version IOT5.06 or higher.
5. In the Virtual Driver frame, make sure you have DaqX 2.09 or higher.
6. Use the Additional Options tab to confirm that the options you purchased have been properly installed.
    - DASY*Lab*+ is called **Full**
    - *Basic* is called **Basic**
    - *Lite* is called **LE**
7. Click OK to close the Additional Options window.

Configure the Hardware

Before configuring DASY*Lab*'s hardware settings, make sure the hardware is setup properly. Checking for valid readings with DaqView first is recommended. If the hardware has jumpers, make sure they are in the desired positions.

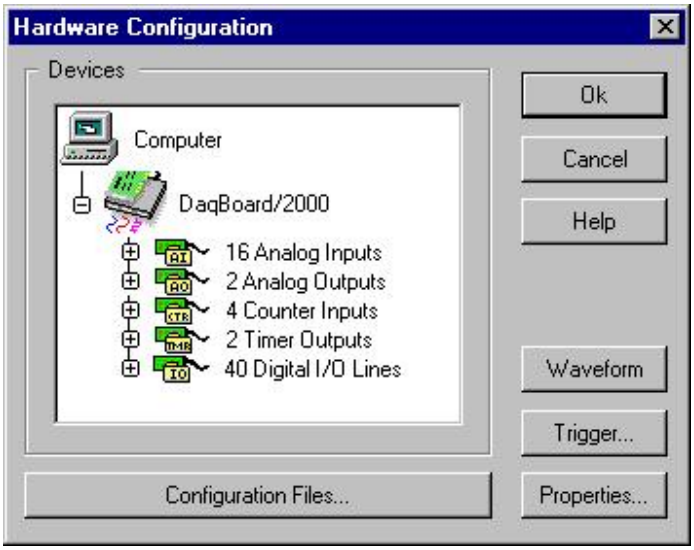
Use the following steps to setup DASY*Lab* to work properly with your hardware.

1. Launch the DASY*Lab* application.
2. Open the **Hardware Configuration** dialog box in either of two ways:
   (a) click on the circuit board in the horizontal toolbar, or
   (b) click on Experiment in the menu bar and then click on Hardware Setup.



Toolbar showing Experiment Menu and Hardware Setup Button

A dialog box similar to the following will appear:



Hardware Configuration Dialog Box

The **Hardware Configuration** *Devices* region (see above figure) shows the hardware configuration as defined in the current configuration file.

Notes:

- Waveform control is only available for DaqBoard/2000 users.
- Trigger Settings are configured from the Hardware Configuration dialog box.
- The Configuration file stores all current hardware settings (see following reference note).

Reference Note:
Refer to the upcoming Configuration Files section for details regarding the Configuration File and its storing of hardware settings.

3. To change the acquisition device:

   (a) select the present acquisition device [in the tree]
   (b) click on **Properties**

   The **Card Setup** dialog box will appear.

Card Setup Dialog Box

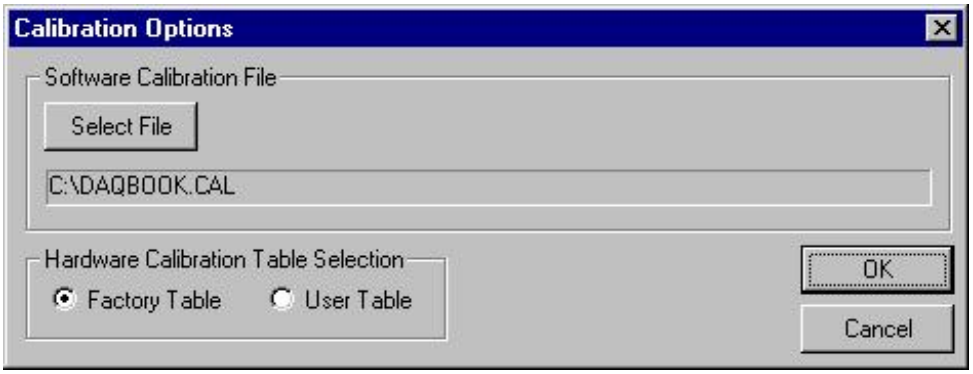
The **Card Setup** dialog box handles the selection of the main unit hardware and it's configuration.

4. To select the device, simply scroll through the Device window and highlight the appropriate hardware.

Note: The hardware type selected must exactly match hardware configured through the Control Panel. If the device is not configured or properly installed, worksheets will not run, although they can still be created and modified.

Additional Comments

- In the Configuration window, the Single-Ended/Differential and Unipolar/Bipolar selections must match the jumper settings on DaqBook/100/112/120 and TempBook. All other units are software programmable or fixed.
- The Clock Settings control allows DaqBoard/2000 users to select the available timing options.
- TempBook/66, DBK19, and DBK52 users may wish to use the software calibration file for thermocouple measurements. To select a file, click on the Calibration button. You will be warned if the file does not exist or contains invalid values. DBK19 and DBK52 channels will only use the calibration file if <Use calibration functions> is checked in the DBK Expansion dialog for each DBK card.
- DaqBoard/2000 users will also be allowed to select a Hardware Calibration Table (see following figure).

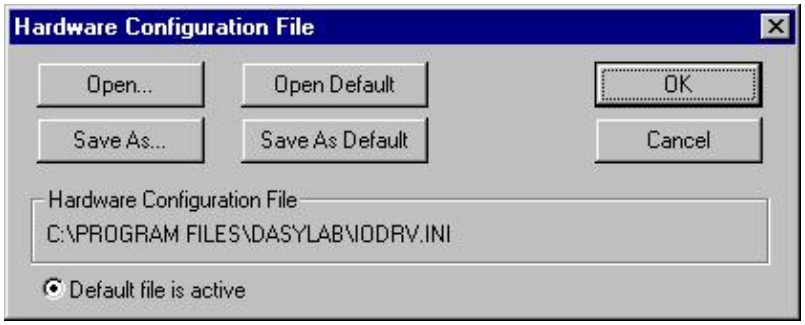


Calibration Options

These settings are saved in the Configuration File, but not with the worksheet.

Configuration Files

The Hardware Configuration File saves ALL hardware settings not saved with the worksheet. Including the main unit type, DBK expansion options, trigger settings, etc. Note that the worksheet only saves the channel number and gain. The default configuration file is loaded when DASY*Lab* first loads.



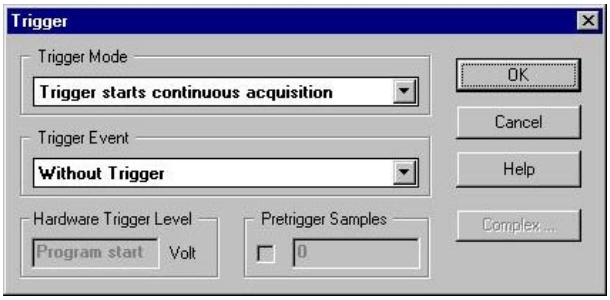
Hardware Configuration File

The configuration file PATH and NAME is saved with every worksheet. When a saved worksheet is loaded, the hardware configuration file is read. If the file does not exist there will be an opportunity to load another. The default file is used when DASY*Lab* loads.

- **The configuration file is updated whenever any setting is accepted, i.e., OK is clicked.**
- **When creating a new configuration file, change the name before changing any settings.**
- **When sharing worksheets include the configuration file.**

Trigger Settings

The trigger setup is done in the **Hardware Setup / Hardware Configuration** dialog box. Clicking on the **Trigger** button brings up the following dialog box:



Trigger Dialog Box

The Trigger Mode selects how the acquisition will run. The default**, "*Trigger starts a continuous acquisition*"** means that once the trigger event occurs, the acquisition will begin and will not stop until the acquisition is manually terminated.

DaqBook, Board/100/112/120/200/216/260 users can also select "***One Conversion per trigger."***
In this mode, 1 scan is taken per trigger. It can be used with TTL Trigger Event to simulate external clock. DaqBoard/2000 users have true external clock mode available. Supported DaqBoard and DaqBook Trigger Events are listed on the following page.

The ***Trigger Event*** is what will cause the acquisition to begin. If "***Without Trigger***" is selected, the start button in DASY*Lab* begins the acquisition immediately. DASY*Lab* software trigger modules can then be used for event detection. The DASY*Lab* trigger modules are much more flexible than the Hardware Triggers.

If a *level* is selected (above, below, positive, or negative), then the signal on the first activated channel in DASY*Lab* will begin the acquisition. The level can be between -10V and +10V. Once the signal crosses the level in the appropriate direction, the acquisition will start. Setting the trigger to a TTL edge will begin an acquisition on a rising or falling edge of the TTL trigger input.

Note: For Daq* series devices, TTL trigger inputs are located on P1.
The TTL triggers are hardware triggers.

Hardware Level Trigger Details:

For "True" oscilloscope simulation, *software triggering* with DASY*Lab* modules is recommended, as opposed to *hardware triggering*.

Note: Hardware triggering is only meaningful when in ***Series Mode***.

- The first channel in the scan list is used (i.e. lowest channel number; main unit = 0-15, DBK on 0 = 16-31, DBK on 1 = 32-47, etc.)
- DBK7, DBK9, DBK19, DBK42, DBK44, DBK52 excluded.
- Voltage level must equal actual voltage input, not sensor units.

Note: DASY*Lab* modules can also be used to set up software triggers of an infinite variety. You can set the trigger event to start a continuous measurement, or to perform one conversion for each channel.

➢ **When waiting for a hardware trigger DASY*Lab* will appear frozen until the trigger event occurs.**

➢ **Trigger settings are saved in the Configuration File, but not with the worksheet.**

DaqBoards and DaqBooks support the following trigger events:

- Immediate
- TTL edge
- Voltage Level on 1st (lowest) channel in scan

In regard to Voltage Level on 1st (lowest) channel in scan.

◊ TCs and RTDs are excluded.

◊ The value of the Voltage Level entered must be analog.

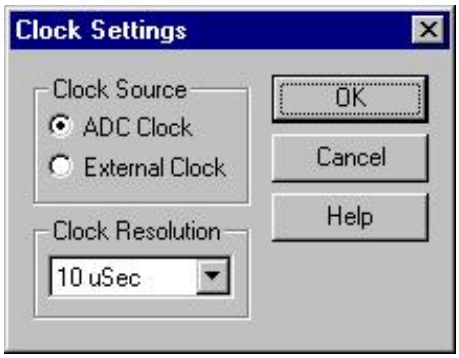
◊ During measurement, signals from the first activated DASY*Lab* channel will be compared to the entered analog value.

◊ If the signal value rises above [or falls below] the entered analog value, a trigger event occurs.

Clock Settings (DaqBoard/2000 only)

The Clock Settings control allows DaqBoard/2000 users to select the available timing options.

For DaqBook/2000 users; the External Clock on P1 can be selected or the A/D settle time can be changed from 5uSec (200Khz max) to 10uSec (100Khz max). 10usec is recommended for high gain applications including DBK19, 52, and 13.



Clock Settings, DaqBoard/2000 Only

Clock settings are saved in the Configuration File, but not with the worksheet.

Waveform Output (DaqBoard/2000 only)

Waveform Output Control enables waveform output (streaming) from the DACs and/or the P3 digital port. Selected channels are placed into ***waveform mode***, while those not selected remain in ***direct output mode*** (P3 Digital could also be input) and can be accessed via the standard D/A module.

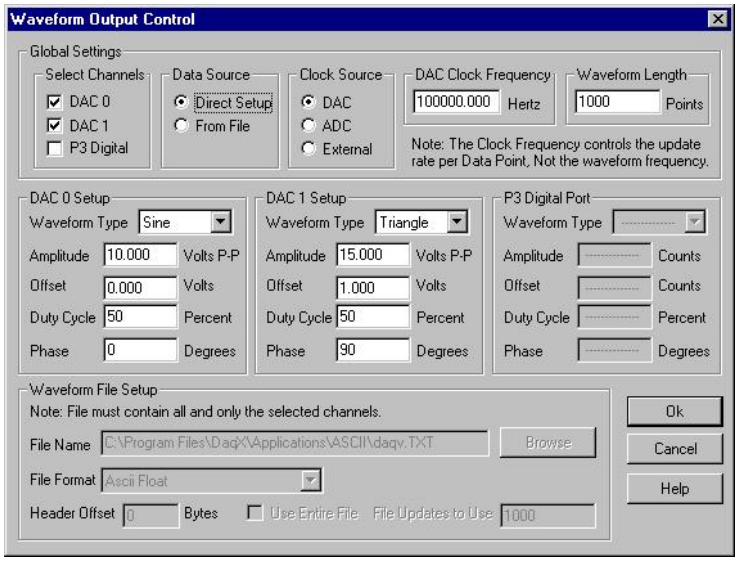
Notes Regarding Waveform Output:

- When using Waveform Output there is no additional module placed onto the worksheet.
- Waveform output start is synchronized to the ADC trigger (acquisition start).
- Waveforms continue to output until the worksheet ends.
- In ***series mode*** the waveforms restart each series.
- If ADC clock is selected as the source then each output update is synchronized with an analog scan

Waveform settings are saved in the Configuration File, but not with the worksheet.

Data Source: Direct Setup

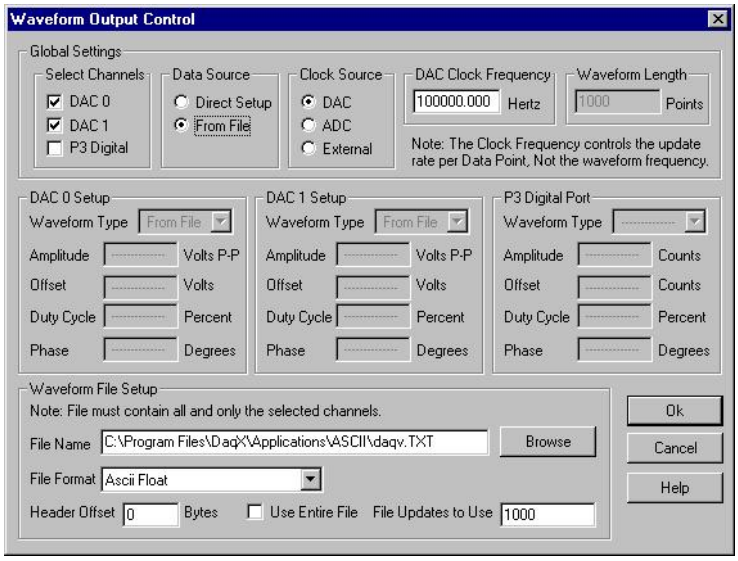
In this mode, 1 wavelength per channel is created as specified. The Frequency of the actual waveforms are Clock Frequency / Waveform Length. The Waveform Length multiplied by the number of enabled channels must be less than 100,000.



Waveform Output Control, Direct Setup

Data Source: From File

The **From File** data source must contain *only interleaved data* for the exact number of enabled channels. The file will play out repeatedly. You can specify a section of the file via Header Offset Bytes and the Number of File Updates to Use (aggregate), or the entire file can be used.



Waveform Output Control, From File

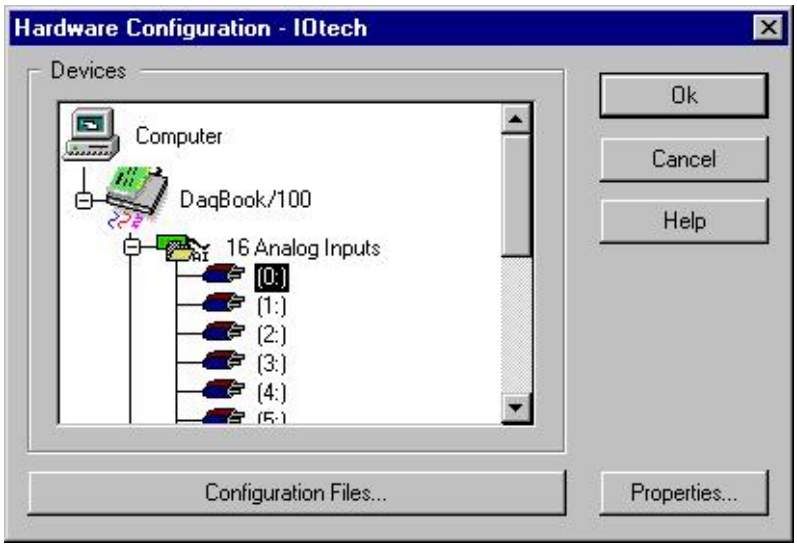
Waveform settings are saved in the Configuration File, but not with the worksheet.

DBK Card Configuration

For DASY*Lab* to properly operate DBK modules, they must be configured through the Hardware Configuration dialog box. Also each DBK card connected must have its jumpers/switches properly set to match the configuration.

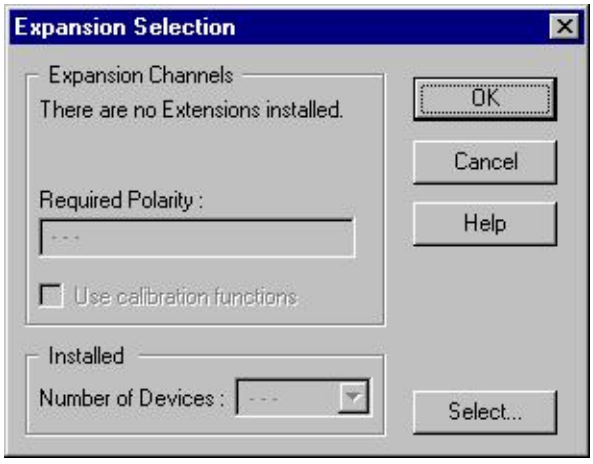
Reference Note:
Consult the hardware manual (p/n 457-0901) in regard to connecting, configuring, and powering each DBK card or module.

1. Click on Experiment and Hardware Setup or the Circuit board tool in the toolbar  to open the Hardware Configuration dialog box.
2. To add Analog DBK cards, double click on the Analog Inputs card branching off the main unit. The card will expand into 16 connectors for the analog inputs.



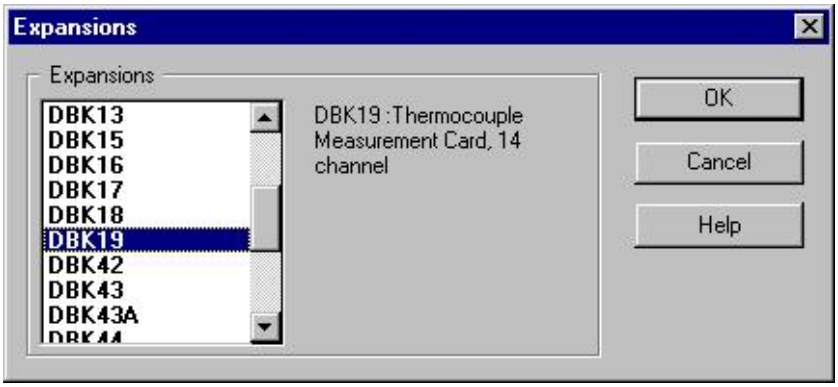
Hardware Configuration Dialog Box

3. Click on the first available connector (0:) and then click on Properties.
A dialog box appears with a list of installed expansion channels (if applicable).



Expansion Selection Dialog Box

4. Click on the Select button (previous figure). An Expansions dialog box (following figure) appears with a list of DBK cards that are available for the particular channel. Scroll through the selections and highlight the card that is in your system, then click the OK button.



Expansions Dialog Box, Selecting DBK19

5. If the expansion card you selected can have multiple cards on the same main unit channel (like the DBK4, 17, or 43), then:

   (a) Adjust the Number of Devices in the Installed area of the Expansion Selection dialog box [see figure in step 3]. Set the number equal to the number of cards you will have on the same main unit channel.

   (b) Click the OK button.

6. DBK19 and DBK52 users can select to use the calibration file.
   Be sure the correct file is selected in the Configuration.

Reference Note:
DBK19 and DBK52 users: Refer to the *DBK19 and DBK52 Calibration File* section (at the end of this chapter) for important information regarding a file that must be configured and located on your hard drive.

7. Repeat the process for any remaining cards as needed.

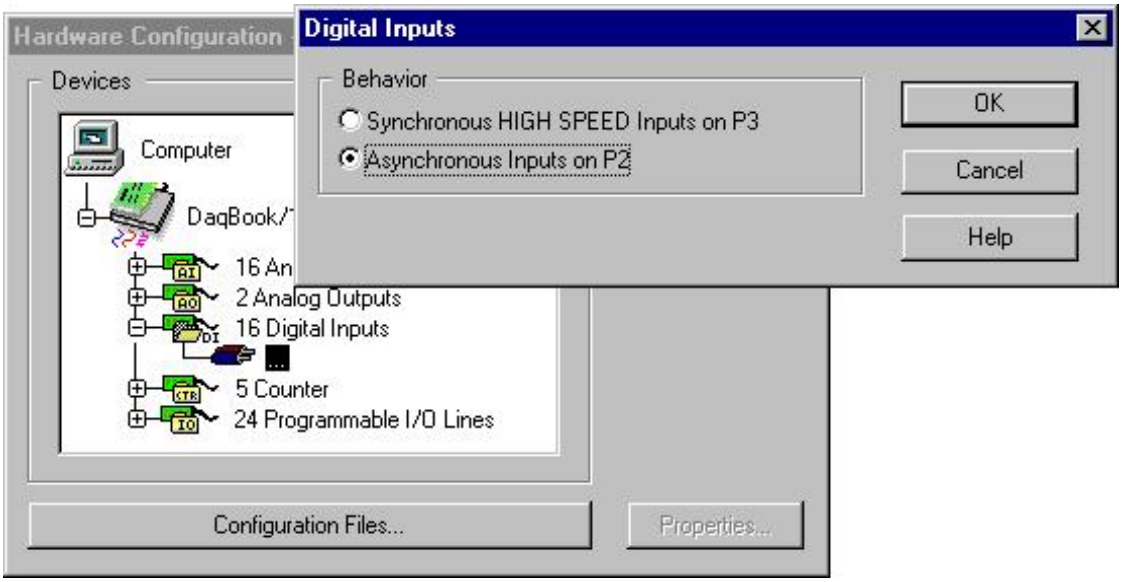
DBK expansion cards must be installed sequentially without gaps.

DASY*Lab* stores all the details concerning the hardware setup including DBK options that are in the Configuration File (but not with the worksheet). The worksheet file contains the name and path of the configuration file. If this file is deleted the worksheet may not load correctly. If a worksheet contains more channels than are configured (via DBKs) it will not load. If you have a worksheet that will not load, increase the number of DBK options installed until it loads.

Digital DBK Expansion

The DBK digital expansion option cards must be configured sequentially, just like analog expansion cards. Since the various boards have differing bit counts and addressing, great care must be taken when installing these options.

For units other than the DaqBoard/2000, Digital Input on P2 requires that the P3 High-Speed Inputs be disabled.



Hardware Configuration Digital Inputs

Add the digital DBK modules to the empty connector in the "Programmable I/O Lines" section. Add them in order of largest to smallest channel count (DBK20/21 then DBK23/24 then DBK25s). Then adjust the switches on the DBK cards such that the addresses are sequential.

Configure Digital DBK expansion cards from largest channel count down; for example:

DBK20/21 ⟹ DBK23/24 ⟹ DBK25

Note that these settings are saved in the Configuration File, but not with the worksheet.

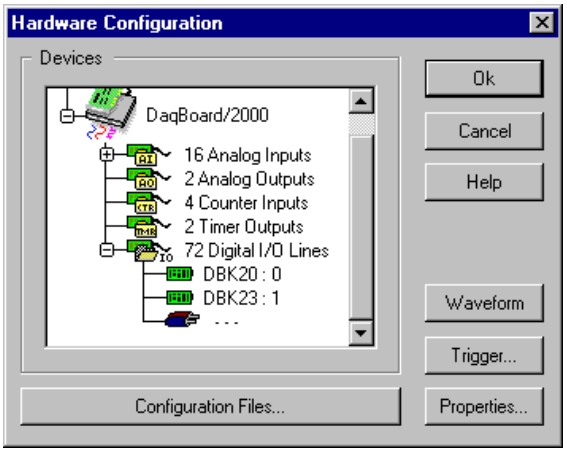
Note that during the configuring process, you will see the correct address setting for each DBK card.

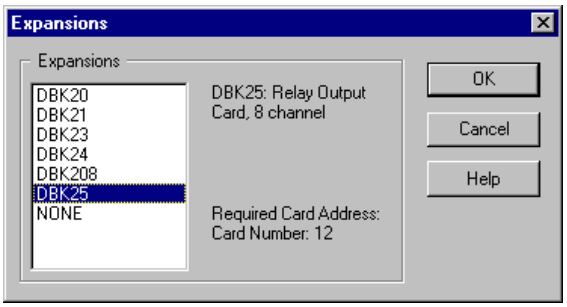
Good and bad setup examples follow.

Setup Examples

Good

- DBK20 set to A
- DBK23 set to 2
- DBK25 set to 12





Hardware Configuration – Example of a Good Setup

Bad
- DBK20 set to A
- DBK23 set to 0
- DBK25 set to 0

They all would be occupying the same address (60H)

Bad
- DBK25 set to 12
- DBK23 set to 2
- DBK20 set to A

They are in the wrong order

Bad
- DBK20 set to A
- DBK23 set to 3
- DBK25 set to 18

Address "gaps" between the cards

Bad
- DBK25 set to 0
- DBK23 set to 1
- DBK20 set to C

Address "gaps" between the cards

Bad
- DBK25 set to 0
- DBK25 set to 1
- DBK25 set to 2
- DBK25 set to 3

Setting "3" not allowed

Good
- DBK25 set to 0
- DBK25 set to 1
- DBK25 set to 2
- DBK25 set to 4

Setting "3" is skipped correctly

Supplemental Information for DaqBook and DaqBoard

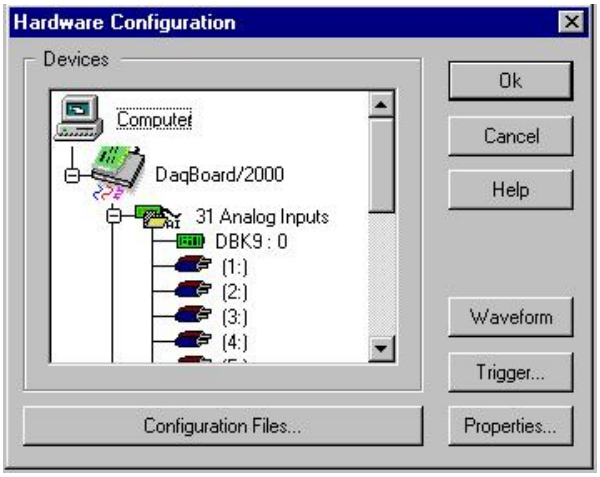
Some of the material presented in this section is redundant. The material is included to provide a better understanding of hardware setup through use of screen images.

Using P1 Analog Inputs and DBK Signal Conditioning

An example using a DaqBoard/2000 and a DBK9

1. Select **Experiment ⟹ Hardware setup.** This displays the current setup of the hardware
2. Double click the **Analog Inputs** icon for the device. Connector images appear, each image represents one single-ended analog input on the P1 port.
3. To place a DBK module on a P1 Analog Input connector:
   (a) Double-click the applicable connector image (such as "0").
   (b) Click the **Select** button.
   (c) Select the desired DBK module from the list provided. If DBK9 were selected we would end up with a screen image similar to that shown in the following figure.

When adding a DBK module, the DBK modules must be added in sequential order with no gaps.

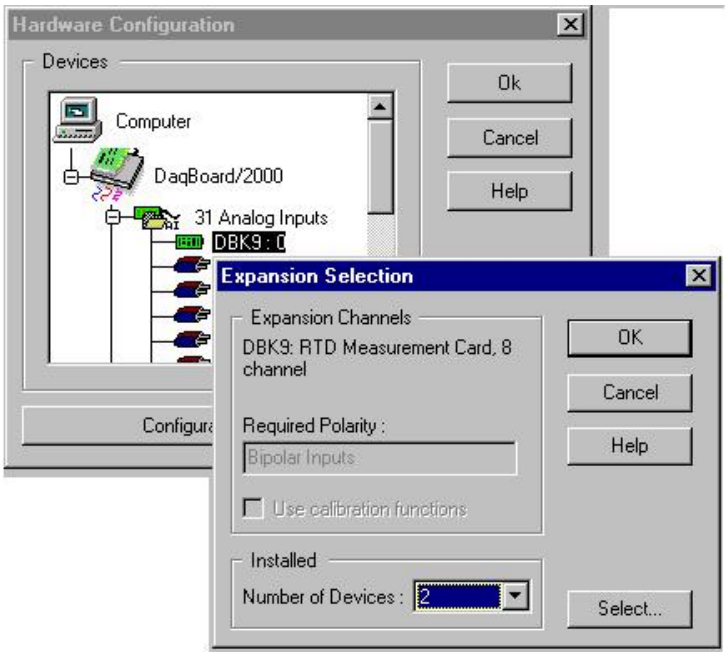


Double-Clicking on the "DBK9: 0" Will Allow you to Configure the Card

All sub-addresses of a base system channel must be occupied, regardless of whether or not a DBK is actually present. If this is not performed, the program will not properly handle communication with cards on higher address numbers.

For example, when using a DBK9, an 8-channel card, you must select 2 as the number of devices, *even if you are using only one DBK9*. (See following figure).

A single icon handles all cards within the same base address so you need to exercise care in matching the icon software channel to the hardware sub-address and channel.

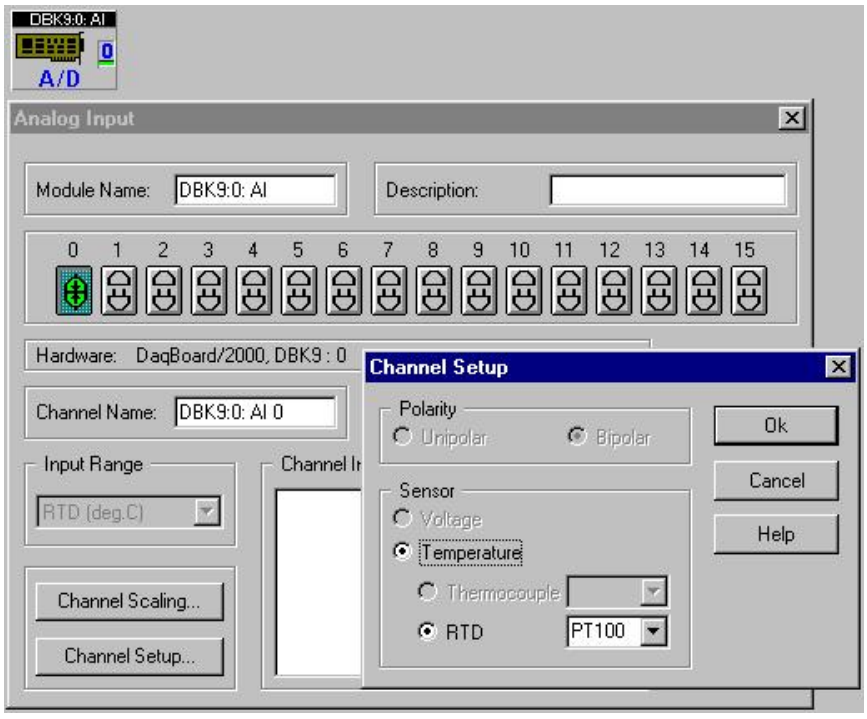


When using a DBK9, an 8-channel card, you must select 2 as the number of devices.

After adding all of your DBK cards to your hardware setup, add your analog input modules to your worksheet as follows:

1. On your DASY*Lab* Worksheet, go to **Modules,** then **Analog Input.** A selection menu that lists all hardware devices will appear.

2. After a module is added to the worksheet, double-click on it. In this example we have double-clicked on the "DBK9:0 AI" module icon. The following screen image resulted.



Setting Channel at Connector 0 as an RTD

3. Activate desired channels by *left-button clicking* them. Note that a single *right-click* deactivates the channel.

4. Click the **Channel Setup** button (see previous figure) to make channel setup selections.

   Note that conversion of voltage units to engineering units can be made using the *channel scaling* within the analog input module or the scaling module outside the analog input module.

After completing your hardware setup, you are ready to add icons to your worksheet.

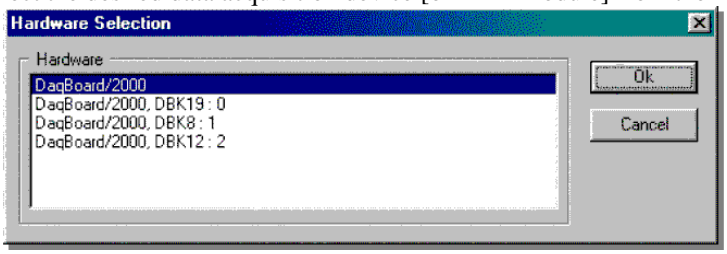
Reference Note:
DBK19 and DBK52 users: Refer to the section, *DBK19 and DBK52 Calibration File* (at the end of this chapter) for important information regarding a file that must be configured and located on your hard drive.

Worksheet Operations for Analog Input

To add an analog input to your worksheet:

1. Select **Modules** ⇒ **Input/output** ⇒ **Analog Input**.

   Select the desired data acquisition device [or DBK module] from the list.



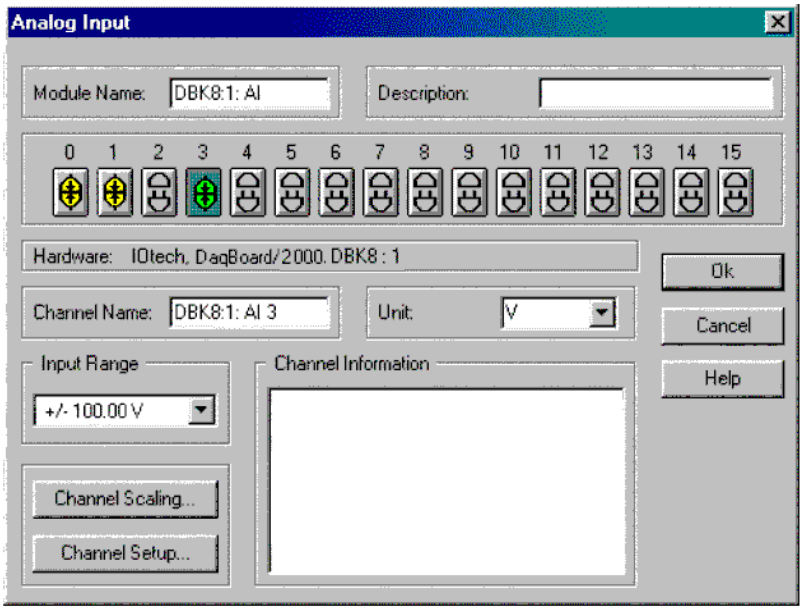
Hardware Selection, Selecting DaqBoard/2000

2. Double-click the icon to view and/or modify its channel parameters.

A/D Icon for DBK19:0 Analog Input

The row of connector images, near the top of the window, represent available channels. Double-click a connector to *enable* (turn on) the associated channel. A single right click will *disable* a channel.

Click the channel setup button to make channel setup selections. Conversion of voltage units to engineering units can be made using the channel scaling within the analog input module or the scaling module outside the analog input module. See the DASY*Lab* manual for details.



Enabled *Disabled*

Analog Input Module – Connector 3 Selected

Using P2 Digital I/O (Not available on 112 and 216 models)

If only the on-board P2 digital I/O is being used, no further configuration steps are required.

To use digital DBK expansion options:

1. Double click the **40 Digital I/O lines** icon within the **Hardware setup** window.
2. Double click the only available connector.
3. Click the ***Select*** button to view the available options.

When using cards with different channel counts, arrange the cards so that cards with more channels appear at lower address than cards with lesser channels. In other words, DBK20/21, then DBK23/24, then DBK25.

Reference Note:
Refer to DASY*Lab*'s on-line help for detailed configuration examples.

After completing your hardware setup, you are ready to add icons to your worksheet.

Digital I/O Communication Notes, DaqBoard/2000 Only:

Communication with **digital input ports** is performed in a ***synchronous*** fashion.

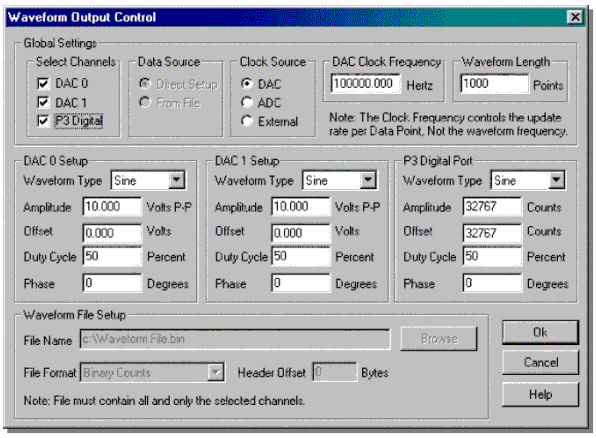
Communication with **digital output ports** is performed in an ***asynchronous*** fashion.

Reference Note:
More information regarding *Synchronous* and *Asynchronous* channels can be found on page 1-24 of this document.

Using P3 DAC Output and P3 Digital Port Control
A DaqBoard/2000 Example (not applicable to other DaqBoards or DaqBooks)

1. Open the **Hardware Setup** window.
2. Click the ***Waveform*** button. This displays the configuration menu.
3. Select the desired item(s) for use with the waveform outputs
   - DAC0
   - DAC1
   - P3 digital ports

Selecting DACs or the P3 port in Waveform Output Control (see following figure) prohibits their use for analog output control or digital output control.
Use this window to configure waveform type, frequency, and amplitude for the respective hardware choices.



Waveform Output Control Window with DACO, DAC1, P3 and Digital Channels Selected

To use the DACs for programmed control, place an *analog output icon* on your worksheet by selecting **Modules** ⇒ **Input/Outputs** ⇒ **Analog Output**.

The *analog output icon* provides the ability to connect software control icons to the channels, as long as the DACs have not been selected for waveform control.

Using P3 Counter Inputs

Because the communication with the P3 devices is synchronous, using a P3 counter is simply a matter of *adding the counter input icon to your worksheet*. Within that icon, you have the ability to configure the counters as four 16-bit counters, or as two 32-bit counters by making a selection in the **Channel Setup** window.

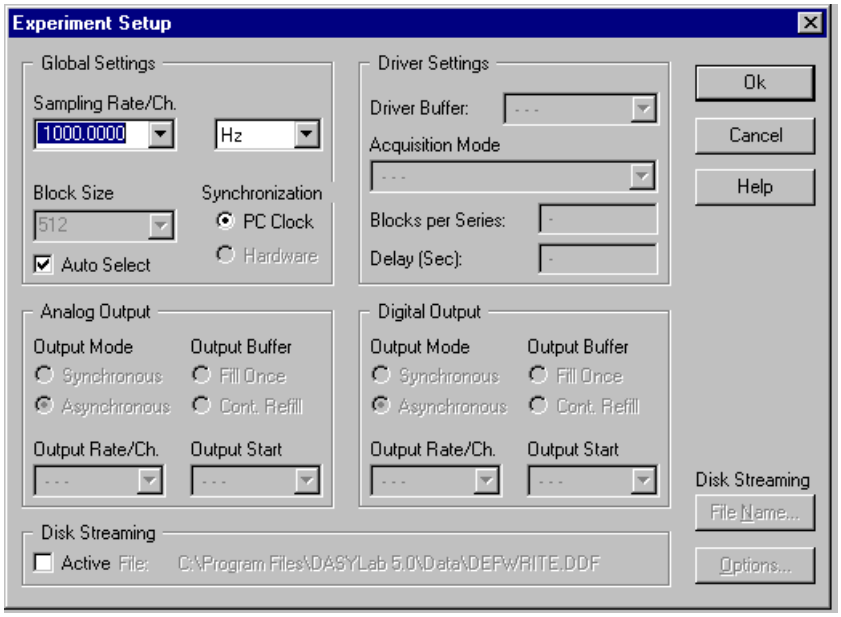
P3 counters can be configured to:

- count pulses
- totalize pulses
- calculate a frequency measurement

General Experiment Setup

The Experiment Setup regulates the general operation of the programmable hardware. These parameters affect the underlying performance of the A/D block at run-time.

To open the dialog box, select "**Experiment ⇒ Experiment Setup**." Note that you can also open the dialog box by clicking on the A/D icon in the toolbar.



Experiment Setup Window

There are five sections in the Experiment Setup window. Of these, only *Global Settings* and *Driver Settings* are used with IOtech hardware.

Global Settings

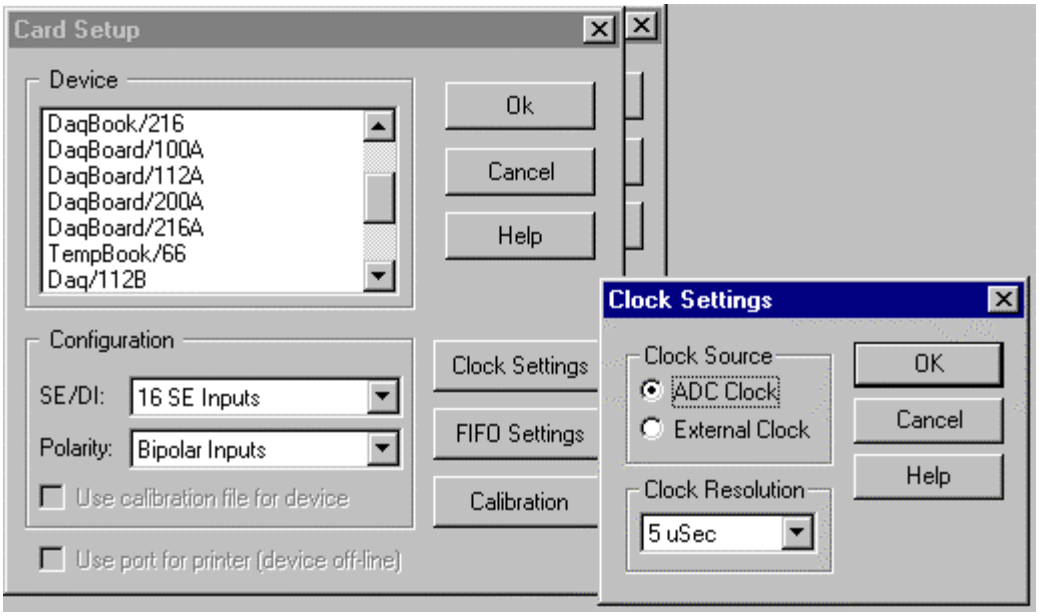
Sampling Rate – determines how fast the scans will be read

Block Size – determines how incoming data will be processed

Synchronization – sets the method of regulating system pacing

Sampling Rates

Device	**Time Between Channel Scans**
DaqBoard/2000	5 µSecs or 10 µSecs
Daq ISA-Type Devices	10 µSecs
TempBook	10 µSecs
WaveBook	1 µSec



Card Setup and Clock Settings Windows

For example: at 10 uSecs apart: if the Sampling Rate is set to 100Hz and there are 10 channels being read, then the 10 channels will be read in 100 uSec. 10 mSec later, they will be read again. The time between each channel read is fixed. The time between each scan read is adjustable using the Sampling Rate.

WaveBook:

For WaveBook, each channel in a scan is read 1 uSec apart.

For example: at 1 uSec apart if the Sampling Rate is set to 100Hz and there are 5 channels being read, the 5 channels will be read in 5 uSec. 10 mSec later, they will be read again. The time between each channel being read is fixed. The time between each scan read is adjustable using the Sampling rate.

Block Size

The Block Size determines how DASY*Lab* will process the incoming data. DASY*Lab* processes data ***n samples*** at a time (***n samples* = 1 block**). With a block size of 512, five hundred and twelve samples will be collected before DASY*Lab* processes any data. For slow acquisitions, this may be considered too long.

As a rough rule of thumb, large block sizes are suitable for high speed measurements small block sizes lead to short response times and are better suited for asynchronous output and online visualization.

Use small block sizes for slow acquisitions and large block sizes for faster acquisitions (1Hz, block size of 1; 20kHz, block size of 2048).

Sampled data can be transferred between the device and the PC in blocks of 2048 values each, or each sample can be transferred individually. In order to provide maximum performance and online visualization facilities, the appropriate transfer block size is selected automatically by the software.

Because DASY*Lab* has to split computation time for the different actions performed, the block size specified in DASY*Lab* defines how many samples are processed by DASY*Lab* in a time-step.

Synchronization

Each IOtech device makes use of its own internal pacer clock to regulate system pacing, also referred to as synchronization. Some manufacturers permit the use of the PC's internal clock for synchronization. Note that IOtech hardware pacers are more accurate than PC clocks.

Synchronous Channels are those that are scanned at the same point in time. These include:

- All analog input channels (local and DBK)
- The P3 digital channel

In addition to the above two channel types, DaqBoard/2000 includes the following synchronous channels:

- P2 digital (local or DBK)
- Counter inputs
- Waveform output when ADC clock source selected.

Asynchronous Channels are read or updated independently. This occurs at the block interval while DASY*Lab* processes data. Their timing is generally regular but is based on processing speed and can not be guaranteed. Asynchronous channels include:

- All digital outputs
- P2 digital inputs on DaqBook,Board/100/120/200/260
- Direct voltage outputs (DaqBoard/2000 Waveform excluded)
- Timer output (F Out) changes.

Note: DASY*Lab* updates the outputs between the completed scans of the analog input channels at the end of a block interval. The smaller the block size the more often the output.

For proper operation of DBK2 and DBK5, you must set the Acquisition Mode to *Running or Isolated Series* rather than the typical, *Continuous* mode. This selection is made in the "Experiment Setup" window.

Since direct analog outputs are asynchronous, they are typically not well suited for real-time waveform generation or fast process control.

For variable-frequency square-wave generation, use the frequency output module.

Care must be taken when mixing synchronous and asynchronous channels. Please ensure all channels have the same block size and sample interval when sharing a DASY*Lab* analysis, display, or file module.

Driver Settings

The Buffer Size sets the size of DASY*Lab*'s buffer. This buffer is made up of a block of the computer's memory. As a background activity, DASY*Lab* continuously collects data from the acquisition device at the programmed acquisition rate and places the data into its internal data buffer for processing.
This ensures gapless data under all conditions. Data is stored here until DASY*Lab* can process it.

The status of this buffer is shown (in bar-graph format) in the bottom right corner of the DASY*Lab* window. If DASY*Lab* is unable to process the data as fast as it is being collected, the bar graph will begin to fill red. If DASY*Lab*'s buffer completely fills, a buffer overrun error will be encountered.

The Acquisition Mode determines how DASY*Lab* will acquire data.

In ***Continuous Mode***, DASY*Lab* acquires data indefinitely without breaks.

Running Series:

- acquires the number of blocks specified in *Blocks Per Series*
- pauses for the number of seconds in Delay(Sec)
- repeats the process

The pauses are ignored and the data is seen as continuous.

Isolated Series is the same as ***Running Series***, except the delays are recorded.

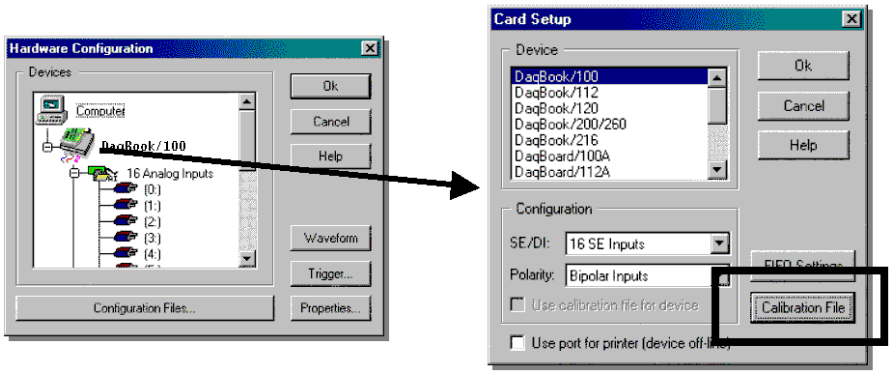
One Series acquires the specified number of blocks, then stops.

For WaveBook, DBK2, and DBK5 applications, Series Mode must be used with Pre-Trigger *enabled*.

DBK19 and DBK52 Calibration File

DBK19 and DBK52 are shipped with a calibration file. This file needs to be configured and located on your hard drive. Refer to the documentation included with the DBK modules.

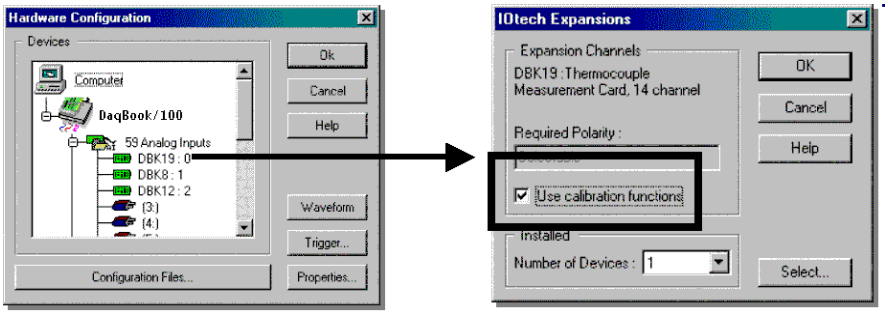
To specify the location of the calibration file, double click your acquisition device in the hardware configuration tree, then click Calibration File.



Accessing the DBK19/DBK52 Calibration File

To make use of the calibration file:

1. Double-click the DBK19 or DBK52 in the hardware configuration tree (as applicable).

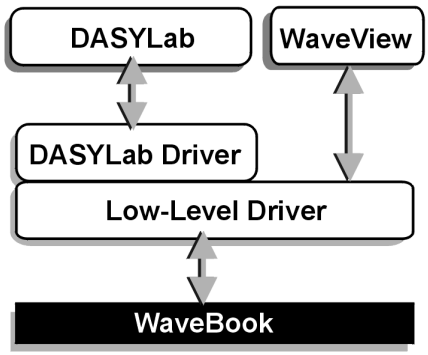


Example of Selecting the Calibration Function for use with DBK19

2. Click the **Use Calibration Function** check box.

These settings are saved in the Configuration File, but not with the worksheet.

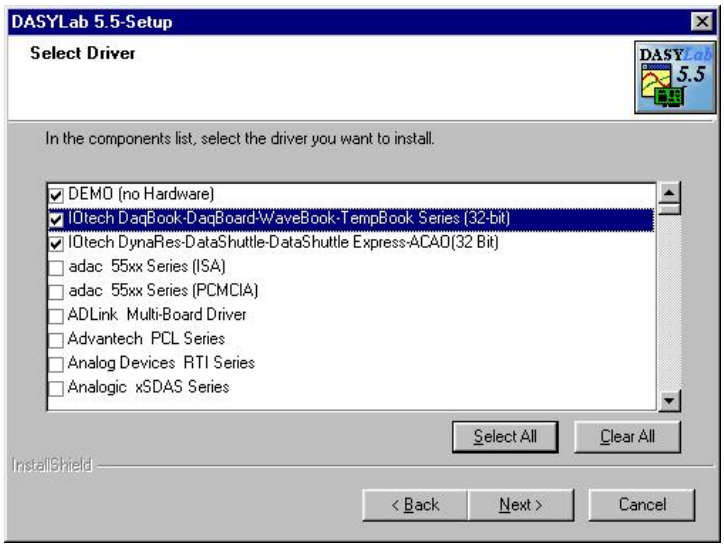
Configuring DASY*Lab* for WaveBook 2



Software Support Structure

Install DASY*Lab*

1. Launch DASY*Lab* installation from the DASY*Lab* CD. Note that the CD should *auto-start*. If the CD does not auto-start, run **start.exe** from the CD.
2. Select "Installation," then "Full Version." The actual installation process begins.
3. When prompted for your *name*, *company* and *serial number*, enter the requested data. Obtain the serial number from the CD jacket. Keep the number in a safe place for future installations and upgrades.
4. When prompted for the installation directory and program folder, use the default selection, or choose another. We recommend that the default directory and location be used.
5. When prompted for **Setup Type,** choose from the available options. We recommend that you select ***Typical***.
6. When prompted to select the **Hardware Driver**, check the entry: **IOtech DaqBook-DaqBoard-WaveBook-TempBook series (32-bit)**. You may also select other drivers [for any other supported hardware you have] at this time.



Selecting: IOtech DaqBook-DaqBoard-WaveBook-TempBook Series [32-bit].
Other device drivers are to be selected only if applicable.

Make sure a check mark appears next to your selection(s). Choices that are merely highlighted and not checked will not be installed.

Note: If you allowed the IEEE488 (GPIB) drivers to be installed, you will be able to select the vendor.

7. A final screen displays the selected options about to be installed. Be sure the report matches your intended choices. Step back to modify settings if needed.

Note: After ***software installation*** is complete you may be required to restart Windows. After restart, continue with the following section, ***Hardware Driver installation***.

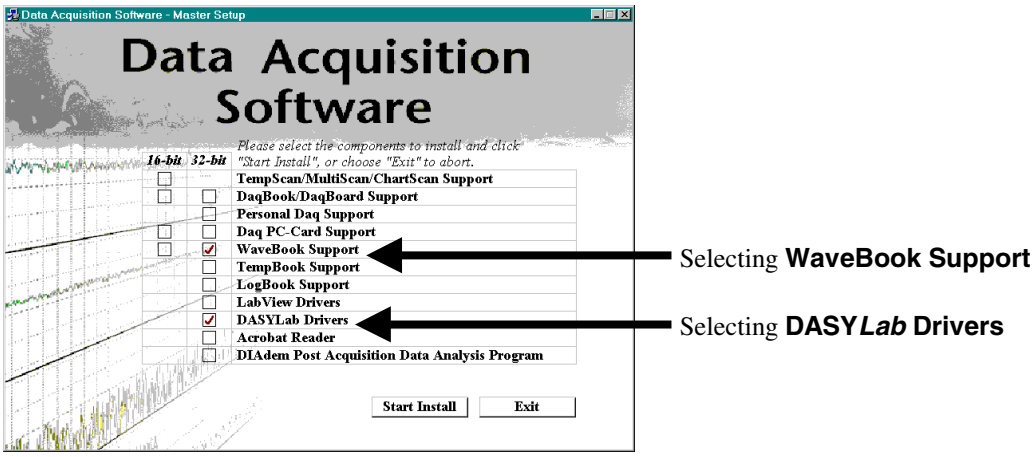
Install Low-Level Hardware Driver

If the hardware drivers for your device are not yet installed, or if you have received a new IOtech Data Acquisition CD, follow these steps.

Both the low-level drivers, installed from the Data Acquisition CD, and the DASY*Lab* drivers, installed from the DASY*Lab* CD, are required for DASY*Lab* operation.

Note: The installation will automatically perform version verification to ensure that only newer support is installed.

1. Launch the Data Acquisition Software CD. Note that the CD should *auto-start*. If not, run **start.exe** from the CD.
2. Select the 32-bit drivers for all hardware models that you will be using.
3. Select **DASY*Lab* Drivers**, if you did not do so in step 2.
4. Click the **Start Install** button.



IOtech's Data Acquisition Software -Master Setup Screen

Note: When the low-level drivers are installed, *WaveView* (an out-of-the-box data collection application) is also installed.

Use WaveView to verify connections and configurations. This use of WaveView can be very beneficial, especially in applications making use of DBK signal conditioning cards and expansion modules.

5. Verify your hardware installation using the Resource Test in the *Daq* Configuration Control Panel Applet*. Refer to the data acquisition user's manual for instructions on using the applet and configuring device names.

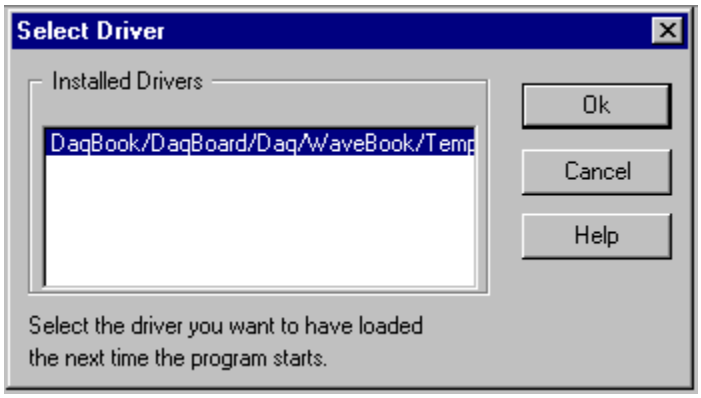
Selecting the Daq* Configuration Control Panel Applet

Note: You can download the latest hardware and DASY*Lab* drives from our web site at **www.iotech.com**.

Reference Note:
After completing the following driver-selection and hardware setup steps you will be ready to add icons to your worksheet. Refer to DASY*Lab*'s On-line *Help* for detailed information.

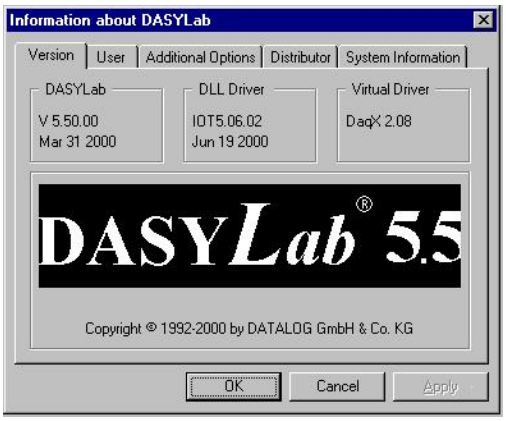
Select the Driver

1. Start DASY*Lab* and go to **Experiment / Select Driver** (see following figure).



Experiment / Select Driver Window

2. When the driver selection menu is presented, select the desired IOtech hardware products from the list. You may be prompted to restart DASY*Lab* for the changes to take effect. If so, exit and restart DASY*Lab* before continuing.
3. Click Help / About DASY*Lab*. The Information about DASY*Lab* screen will appear (see following figure).
4. In the DLL Driver frame, make sure you have version IOT5.06 or higher.
5. In the Virtual Driver frame, make sure you have DaqX 2.09 or higher.



*"**Information about** **DASY*Lab*" Screen, "Version Tab" Selected.*
Viewing Version Frames for:** **DASY*Lab*, DLL Driver, and Virtual Driver.

6. Use the Additional Options tab to confirm that the options you purchased have been properly installed.
   - DASY*Lab*+ is called **Full**
   - *Basic* is called **Basic**
   - *Lite* is called **LE**

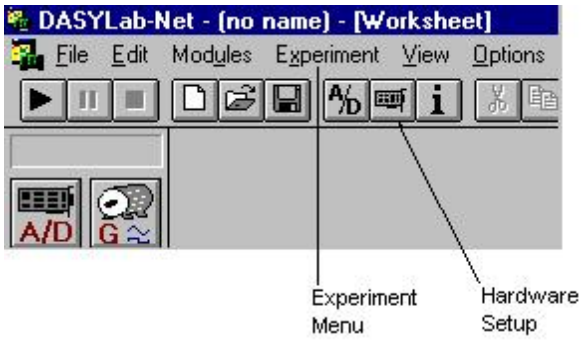
   If you did not receive the version listed on your purchase order, contact IOtech's Technical Support Department (**ProductSupport@iotech.com).**
7. Click OK to close the Additional Options window.

Configure the Hardware

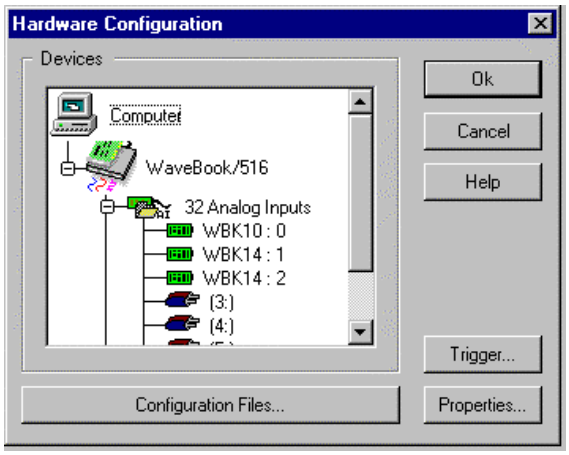
Before configuring DASY*Lab*'s hardware settings, make sure the hardware is setup properly. Checking for valid readings with WaveView first is recommended. If the hardware has jumpers, make sure they are in the desired positions.

Use the following steps to setup DASY*Lab* to work properly with your hardware.

1. Launch the DASY*Lab* application.
2. Open the **Hardware Configuration** dialog box in either of two ways:
   (a) click on the circuit board in the horizontal toolbar, or
   (b) click on Experiment in the menu bar and then click on Hardware Setup.



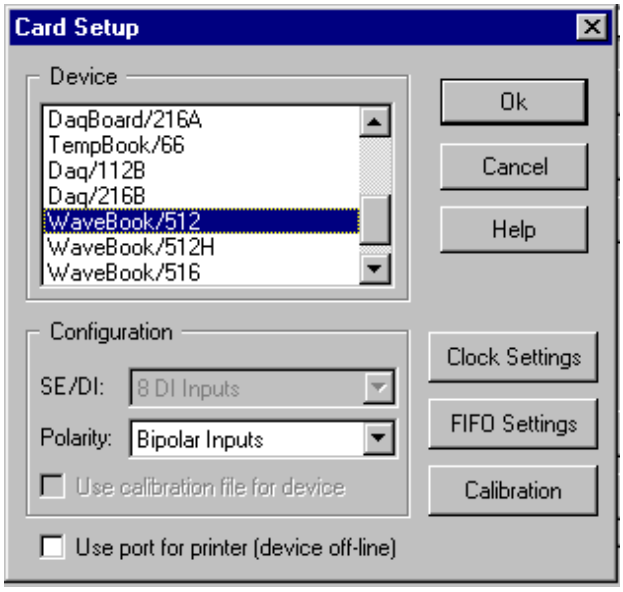
A Hardware Configuration dialog box will appear, similar to that shown in the following figure.



Hardware Configuration Dialog Box

3. To change the acquisition device:
   (a) select the present acquisition device [in the tree]
   (b) click on **Properties**

The **Card Setup** dialog box will appear.



Card Setup Dialog Box

The **Card Setup** dialog box handles the selection of the main unit hardware and it's configuration.

4. To select the device, simply scroll through the Device window and highlight the appropriate hardware.

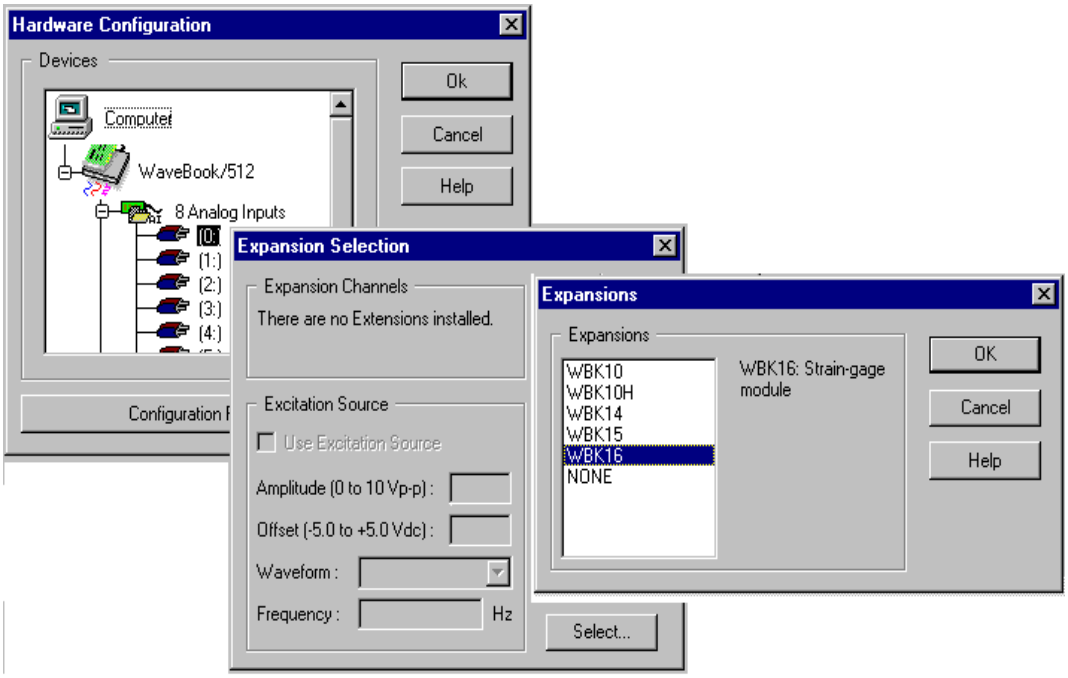
The hardware type selected must exactly match hardware configured through the Control Panel. If the device is not configured or properly installed, worksheets will not run, although they can still be created and modified.

Some Notes Regarding Daisy-Chains

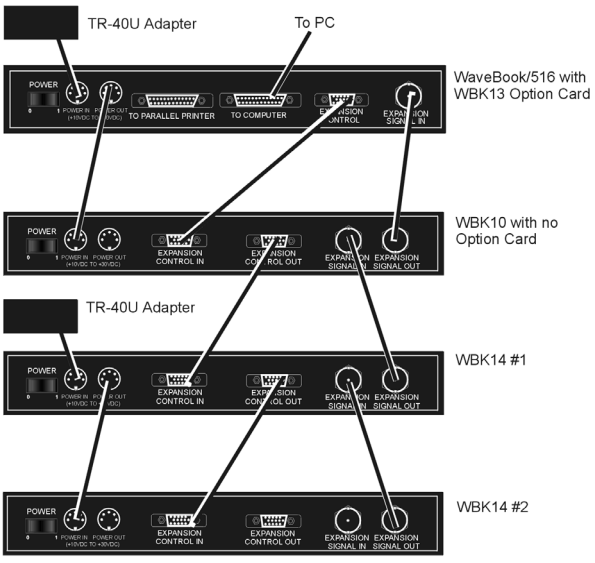
WaveBook can have up to 8 WBKs attached, each with an ID number of 0-7. The first WBK, attached directly to the WaveBook, is ID 0. The next cascaded WBK is ID 1 and so on through ID 7.

To add WBK modules to the DASY*Lab* setup, click Hardware Setup.

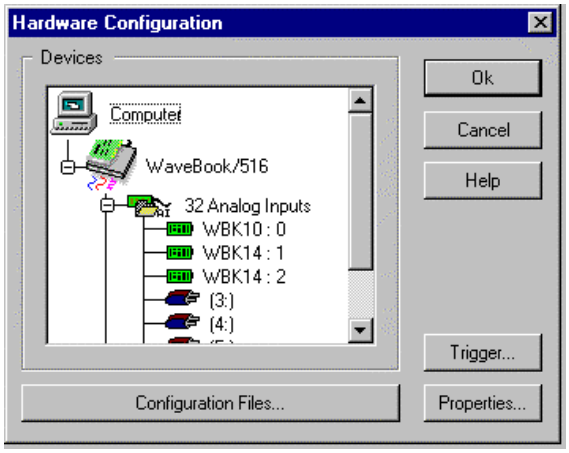
For each WBK in the system, double-click the associated connector in the tree then click the **Select** button to tell DASY*Lab* which WBK is at the associated ID.



Expansion Selection for WaveBook



Example of WaveBook Daisy-Chain



Hardware Configuration (Matches Daisy-Chain)

Always add WBK modules in sequential order. When you are finished, there should be no hole in the connector assignments. For example, if three WBKs are added, they must occupy connectors 0-2, never 0, 1, and 3.

Make sure that the WBKs in the connector list are in the same order as they appear in the physical hardware daisy chain (see previous figures).

The WBK11, WBK12, WBK13, and WBK30 options are auto detected when WaveBook is selected, and therefore require no user knowledge in DASYLab.

Putting Modules on the Worksheet

The WaveBook and WBK option modules can be found in the **Analog Input Module** menu. You can add your modules to the worksheet, as you deem appropriate.

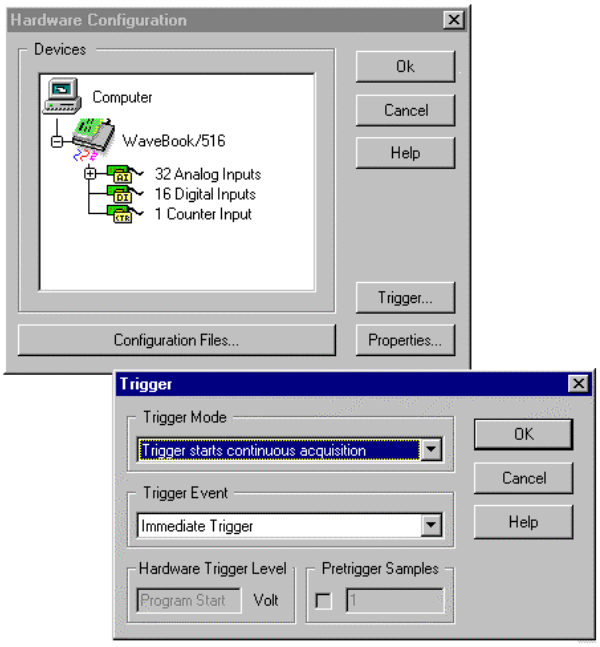
If you place an icon on the worksheet that is not physically or properly connected in the WaveBook daisy chain, your worksheet will generate an error "0x10". This is caused by assigning WBKs to connectors in the **Hardware Setup** that do not exist in the *physical setup*.

Correcting the hardware configuration so it matches your setup will eliminate the error. This means that you can't develop your worksheet without having the hardware setup actually connected to your computer's parallel port interface.

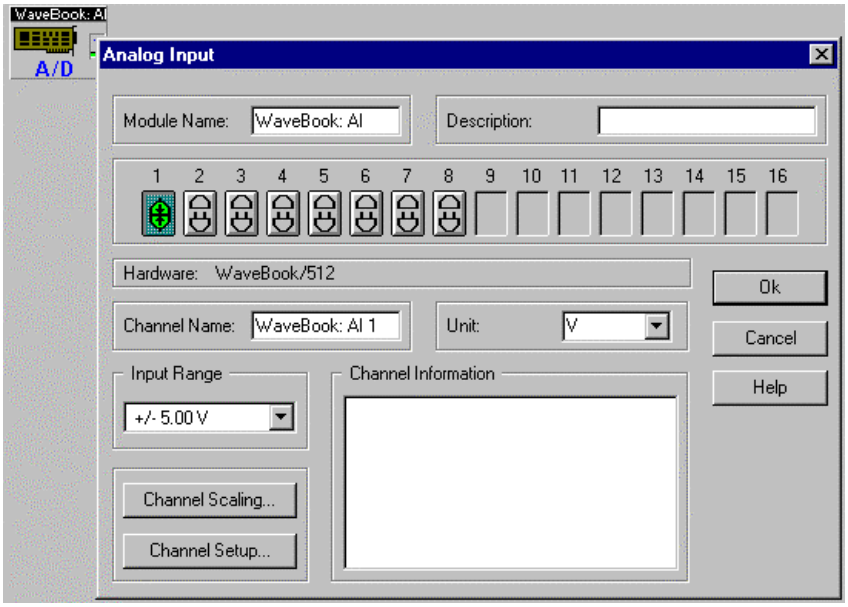
WaveBooks

To use any of the WaveBook's many triggering features, double-click your **WaveBook input** icon (in Hardware Setup) then click the **Trigger** button.

Alternatively, there are several software trigger functions that can be used on the DASY*Lab* worksheet to control data flow. In this manner, your worksheet would run in a continuous fashion while your software triggers would regulate data flow.



Configuring the Trigger for WaveBook

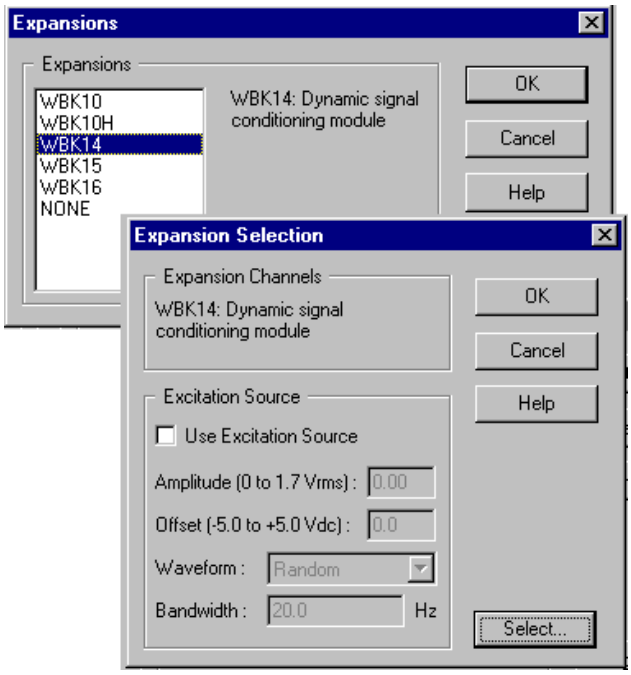


Analog Input Setup Window for WaveBook (also used for WBK10)

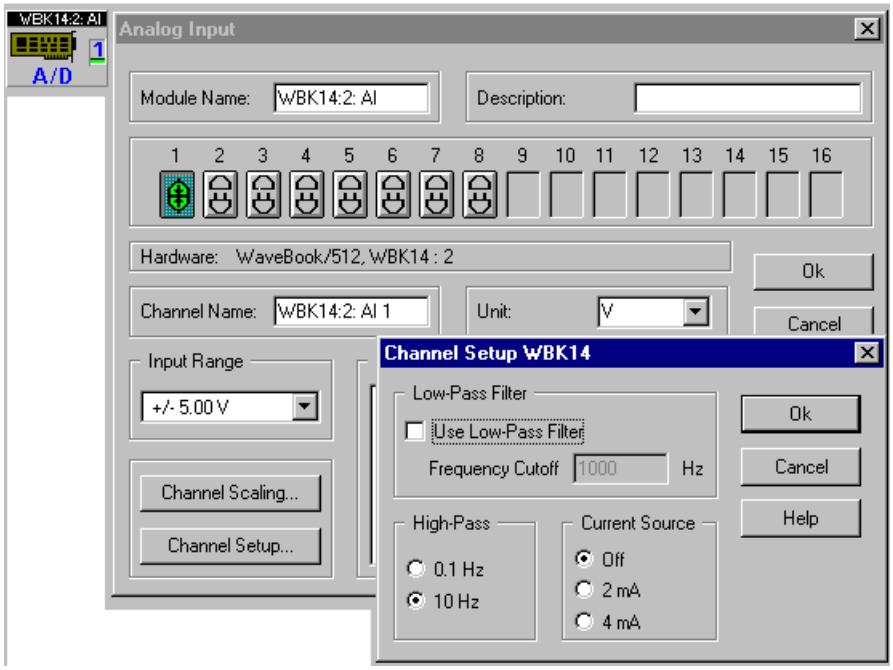
WBK14

To access the WBK14's many programmable features, double-click the **WBK14 icon** on your worksheet and click **Channel Setup**. The **Channel Scaling** button provides a means of converting the incoming voltages to engineering units. This can also be accomplished using DASY*Lab*'s scaling module. The only exception is that the configuration of the wave for m output is handled in hardware setup after selection of the WBK14.

Reference Note:
Refer to the DASY*Lab* Manual (p/n 472-0901) or DASY*Lab*'s Help menu for detailed information.

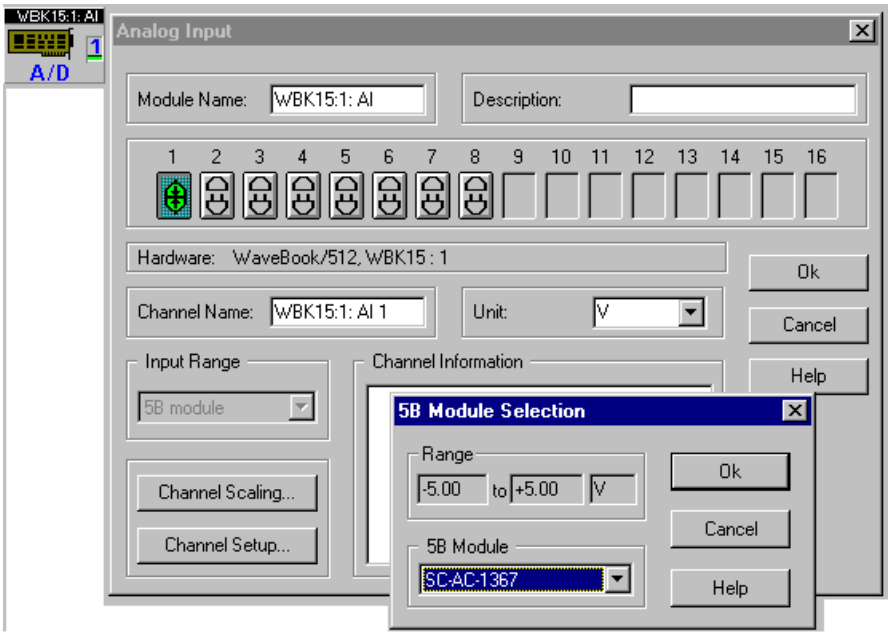


Expansion Selection



Channel Setup, Analog Input for WBK14 Module 2, Channel 1

To associate 5B modules with the channels of the WBK15, double click the **WBK15 icon** on the worksheet then click **Channel Setup**. To use a 5B that is not in the supported list, select a module from the list that has a voltage range that is similar to the one you are using.
Use the **Channel Scaling** button to correct for engineering unit conversion discrepancies.



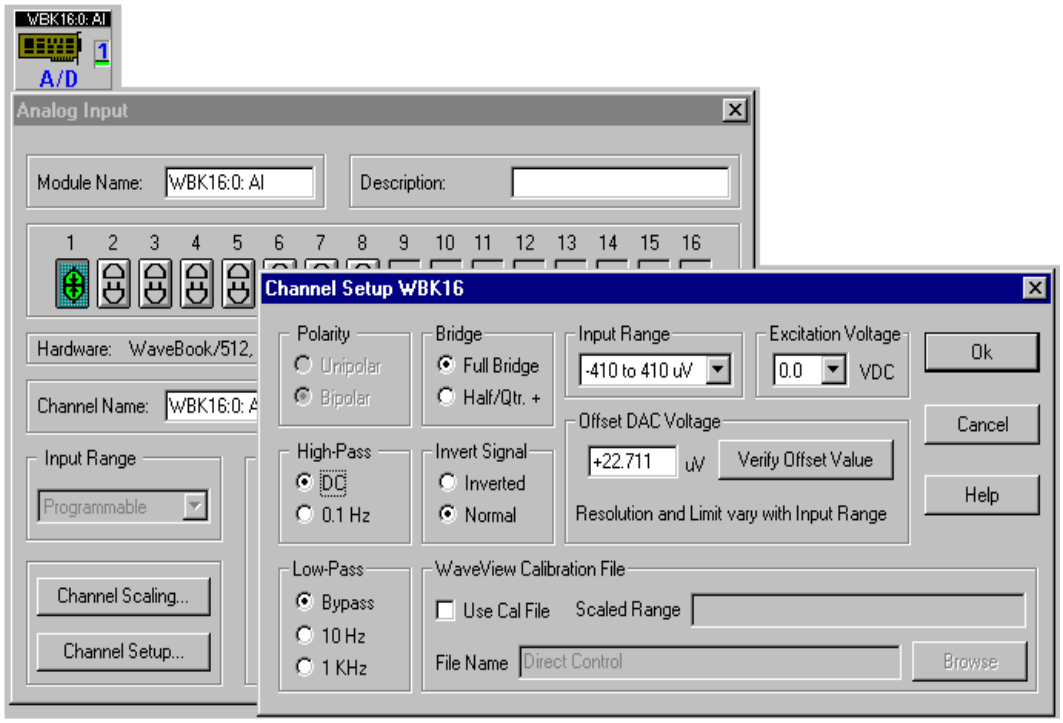
Channel Setup, Analog Input for WBK15, Module 1, Channel 1 (Using a 5B Module)

For proper operation, each WBK16 channel must be tuned through a process of calibration.

Although the DASYLab interface provides a means to manually setup the parameters of each WBK16 channel, it is highly recommended that WaveView be used to calibrate the WBK16 channels using its automated calibration feature.

During the calibration process, WaveView generates a calibration file that DASY*Lab* can use to setup all of the channels.

To perform a Shunt Calibration, WaveView *must* be used. For instructions on using WaveView, refer to the WaveBook User's Manual. (p/n 481-0901)



WBK16 Channel Configuration

In DASY*Lab*, to use a WaveView-created calibration file:

1. Double-click the **WBK16 icon** in the worksheet.
2. Click **Channel Setup**.
3. Check the box marked, *Use Calibration File*.
4. Click the **Browse** button to locate the calibration file. This is typically named **WBK16.CAL**.

   If you do not want to use the calibration file that was created by WaveView, this window provides the ability to do a *Name Plate* calibration. With *Name Plate* calibration, you manually set each of the channel's programmable parameters including:

   - engineering units
   - conversion factors
   - excitation voltage
   - bridge configuration
   - software voltage range
   - offset voltage.

FIFO Settings (for WBK30 Option)

The **FIFO Settings** control will display the FIFO type and size of the unit if it is on-line.

If a programmable FIFO is installed (WBK30) it will allow for long acquisitions at speeds greater than the port throughput. If an infinite acquisition is attempted with a slow port, a FIFO overrun will eventually occur. Fixed length acquisitions in the series modes will never overrun if they fit within the FIFO.

Note: Downloading a full 64Meg Sample FIFO with a slow 100Khz parallel port can take over 10 minutes.

The following options are available for enhanced FIFOs. Using FIFO as primary buffer will:

- prevent DASY*Lab* buffer overruns by only transferring data into DASY*Lab* when there is room for it.
- enable Pre/Post acquisitions to buffer everything on the hardware until the acquisition completes.

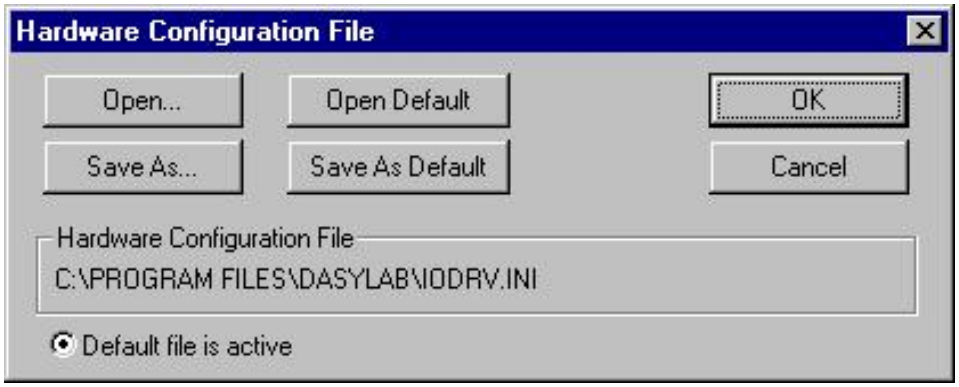
After the acquisition completes, it is downloaded as DASY*Lab* makes room for it. This allows use of the devices' maximum sample rate regardless of the port throughput or worksheet complexity.

Standard FIFO usage can cause DASYLab buffer overruns during complex worksheets. Standard Pre-Trigger acquisitions require that all data be *streamed* into DASY*Lab*, and are thus limited to the parallel port throughput speed.

In regard to transferring all good data from FIFO in event of a buffer over-run:
Notification of the over-run will be held until all data has been transferred to DASY*Lab*. Notification of the over-run will be present in DASY*Lab*'s onscreen status bar, but the worksheet *will not stop until all readings have been downloaded*. This differs from typically seen actions; i.e., immediate stop followed by an error signal and FIFO flush.

Configuration Files

The Hardware Configuration File saves ALL hardware settings not saved with the worksheet. Including the main unit type, DBK expansion options, trigger settings, etc. **The worksheet ONLY saves the channel number and the gain**. The default configuration file is loaded when DASY*Lab* first loads.



Hardware Configuration File

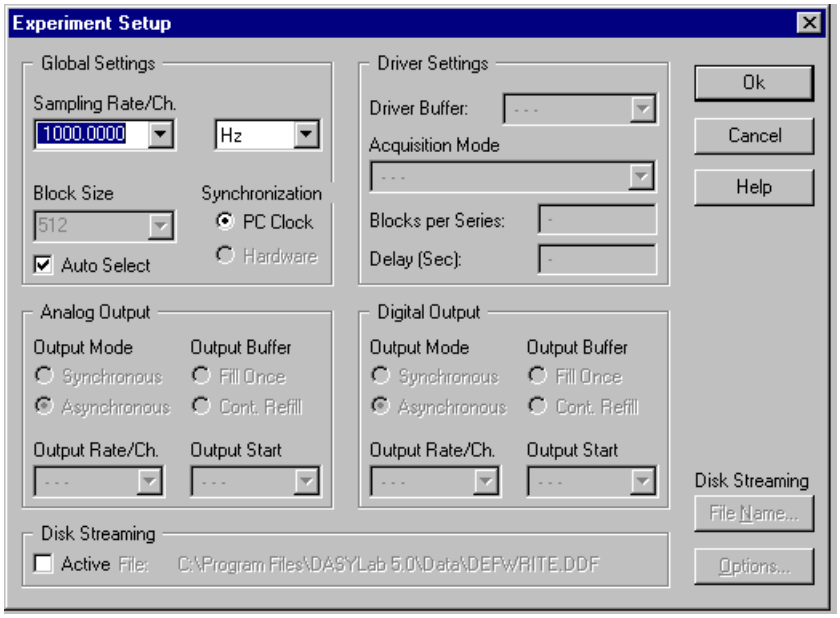
The configuration file PATH and NAME is saved with every worksheet. When a saved worksheet is loaded, the hardware configuration file is read. If the file does not exist there will be an opportunity to load another. The default file is used when DASY*Lab* loads.

- **The configuration file is updated whenever any setting is accepted, i.e., OK is clicked.**
- **When creating a new configuration file, change the name before changing any settings.**
- **When sharing worksheets include the configuration file.**

General Experiment Setup

The Experiment Setup regulates the general operation of the programmable hardware. These parameters affect the underlying performance of the A/D block at run-time.

To open the dialog box, select "**Experiment / Experiment Setup**." Note that you can also open the dialog box by clicking on the A/D icon in the toolbar.



Experiment Setup Window

There are five sections in the Experiment Setup window. Of these, only *Global Settings* and *Driver Settings* are used with IOtech hardware.

Global Settings

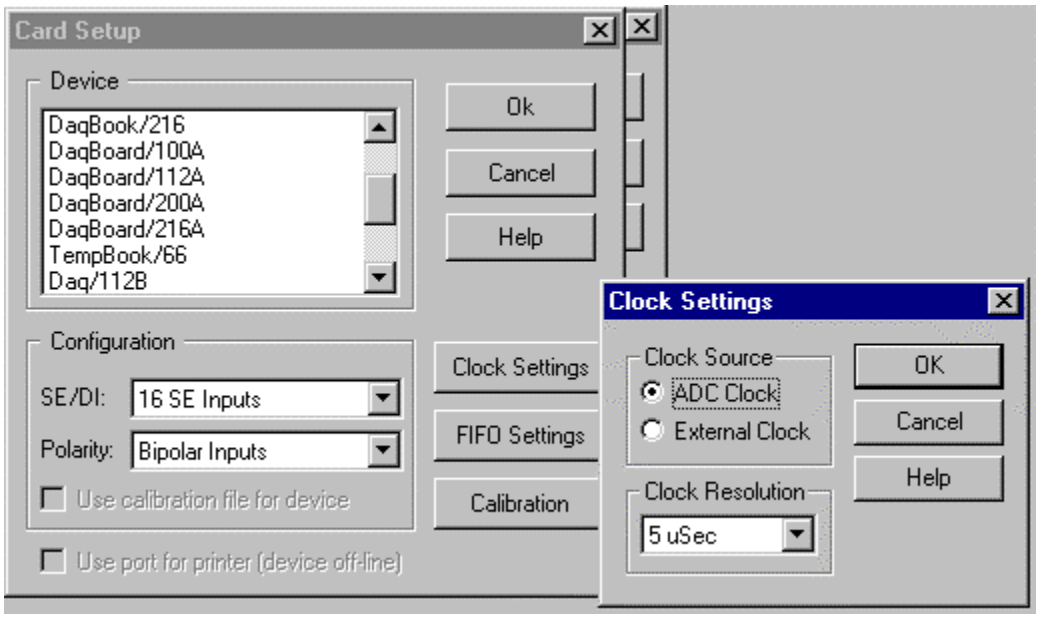
Sampling Rate – determines how fast the scans will be read

Block Size – determines how incoming data will be processed

Synchronization – sets the method of regulating system pacing

Sampling Rates

Device	Time Between Channel Scans
DaqBoard/2000	5 µSecs or 10 µSecs
Daq ISA-Type Devices	10 µSecs
TempBook	10 µSecs
WaveBook	1 µSec



Card Setup and Clock Settings Windows

For example: at 10 uSecs apart: if the Sampling Rate is set to 100Hz and there are 10 channels being read, then the 10 channels will be read in 100 uSec. 10 mSec later, they will be read again. The time between each channel read is fixed. The time between each scan read is adjustable using the Sampling Rate.

WaveBook

For WaveBook, each channel in a scan is read 1 uSec apart.

For example: at 1 uSec apart if the Sampling Rate is set to 100Hz and there are 5 channels being read, the 5 channels will be read in 5 uSec. 10 mSec later, they will be read again. The time between each channel being read is fixed. The time between each scan read is adjustable using the Sampling rate.

Block Size

The Block Size determines how DASYLab will process the incoming data. DASY*Lab* processes data ***n samples*** at a time (***n samples* = 1 block**). With a block size of 512, five hundred and twelve samples will be collected before DASY*Lab* processes any data. For slow acquisitions, this may be considered too long.

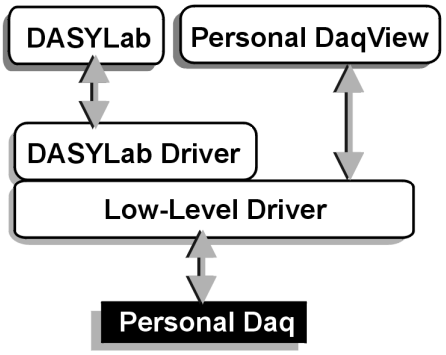
As a rough rule of thumb, large block sizes are suitable for high speed measurements small block sizes lead to short response times and are better suited for asynchronous output and online visualization.

Use small block sizes for slow acquisitions; and large block sizes for faster acquisitions (1Hz, block size of 1; 20kHz, block size of 2048).

Sampled data can be transferred between the device and the PC in blocks of 2048 values each, or each sample can be transferred individually. In order to provide maximum performance and online visualization facilities, the appropriate transfer block size is selected automatically by the software.

Because DASY*Lab* has to split computation time for the different actions performed, the block size specified in DASYLab defines how many samples are processed by DASY*Lab* in a time-step.

Configuring DASY*Lab* for Personal Daq 3



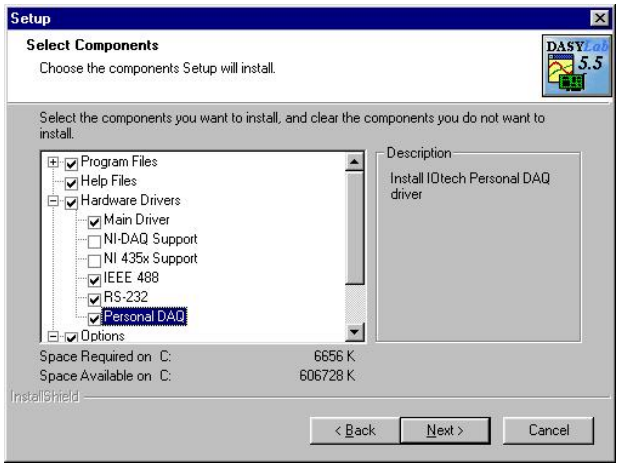
Software Support Structure

Simultaneous use of a Personal Daq and a WaveBook, DaqBook, or DaqBoard is not recommended. During the Personal Daq's calibration cycle, other data acquisition products will cease operation, causing gaps in the collected data and potential buffer overruns.

Install DASY*Lab*

1. Launch DASY*Lab* installation from the **DASY*Lab* CD**. Note that the CD should *auto-start*. If the CD does not auto-start, run the CD **start.exe** from the Windows Desktop.
2. Select "Installation," then "Full Version." The actual installation process begins.
3. When prompted for your *name*, *company* and *serial number*, enter the requested data. Obtain the serial number from the CD jacket. Keep the number in a safe place for future installations and upgrades.
4. When prompted for the installation directory and program folder, use the default selection, or choose another. We recommend that the default directory and location be used.
5. When prompted for **Setup Type,** choose from the available options. We recommend that you select ***Typical***.
6. The **Personal Daq hardware driver is already selected by default**; therefore, when prompted to select the **Hardware Driver** you can click **Next**.

Note: You can select other drivers [for any other supported hardware you have] at this time.



The Personal Daq Hardware Driver is Automatically Selected by Default
You will only see this screen if you do a "Custom" install.

Make sure a check mark appears next to your selection(s). Choices that are merely highlighted and not checked will not be installed.

Note: If you allowed the IEEE488 (GPIB) drivers to be installed, you will be able to select the vendor.

A final screen displays the selected options about to be installed. Be sure the report matches your intended choices. Step back to modify settings if needed.

Note: After ***software installation*** is complete, you may be required to restart Windows.
After restart, continue with the following section, ***Hardware Driver installation***.

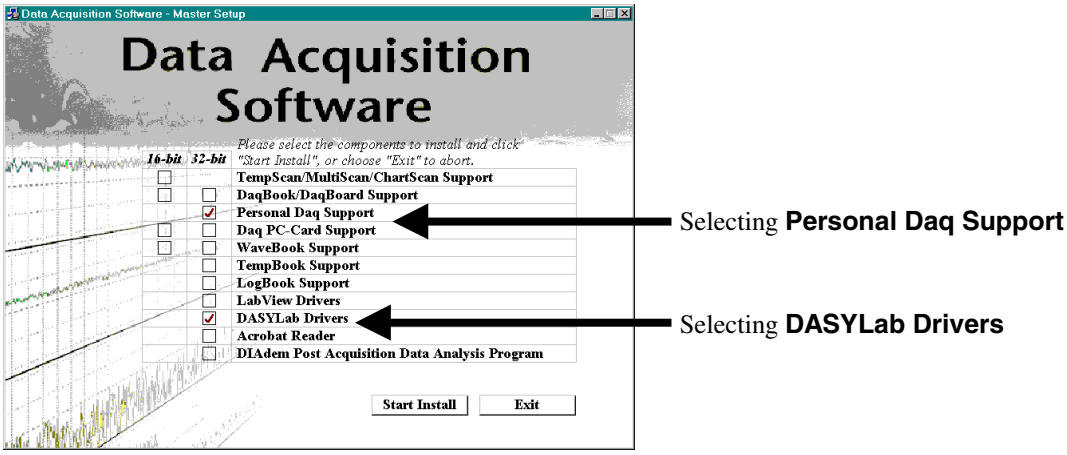
Install Low-Level Hardware Driver

If the low-level hardware drivers for your device are not installed, or if you have received a new IOtech Data Acquisition CD, follow these steps.

Both the low-level drivers, installed from the Data Acquisition CD, and the DASY*Lab* drivers, installed from the DASY*Lab* CD, are required for DASY*Lab* operation.

Note: The installation will automatically perform version verification to ensure that only newer support is installed.

1. Launch the **IOtech Data Acquisition Software CD**. Note that the CD should *auto-start*. If the CD does not auto-start, run the CD **start.exe** from the Windows Desktop.
2. Select the 32-bit drivers for all hardware models that you will be using.
3. Select **DASY*Lab* Drivers**, if you did not do so in step 2.
4. Click the **Start Install** button.



IOtech's Data Acquisition Software -Master Setup Screen

Note: When the low-level drivers are installed, *Personal DaqView* (an out-of-the-box data-collection application) is also installed.

Use Personal DaqView to verify connections and configurations. This use of Personal DaqView can be very beneficial, especially in applications making use of expansion modules.

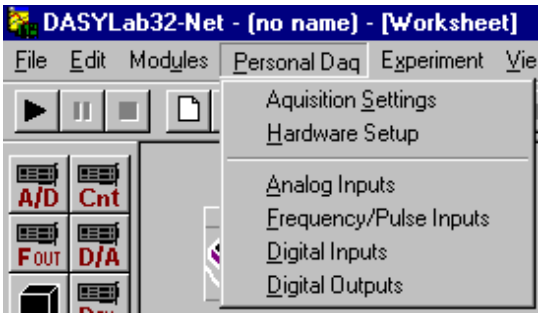
Verify your hardware installation using the Resource Test in the *Daq* Configuration Control Panel Applet*. Refer to the data acquisition user's manual for instructions on using the applet and configuring device names.

Selecting the Daq* Configuration Control Panel Applet

Note: You can download the latest hardware and DASY*Lab* drives from our web site at www.iotech.com.

Configure Personal Daq

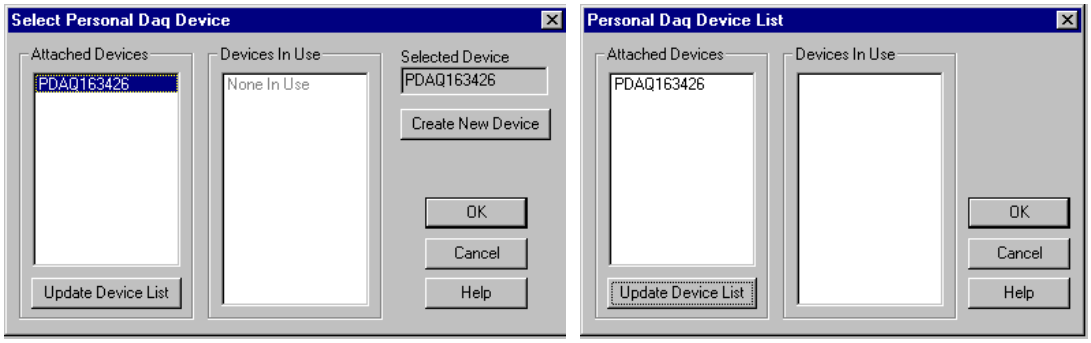
The following can be selected from within **DASY*Lab*'s Personal Daq pull-down menu**: Acquisition Settings, Hardware Setup, Analog Inputs, Frequency/Pulse Inputs, Digital Inputs, and Digital Outputs (see following figure).



DASYLab's Personal Daq Pull-down Menu

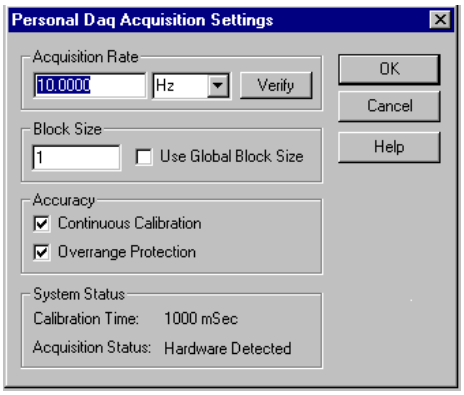
Note: Selecting Analog Inputs, Frequency/Pulse Inputs, Digital Inputs, or Digital Outputs causes the associated icon to appear on your worksheet. *Double-clicking* on a module icon [after it is added to a worksheet] reveals channel configuration options that are available in Personal DaqView, such as channel integration time and signal range.

You can verify that the DASY*Lab* software is communicating with the Personal Daq by locating the device serial number in *Hardware Setup* (in the Personal Daq menu). See following figures.



Checking the Personal Daq Device Number

DASY*Lab* does not support Personal Daq's digital output capabilities unless you have firmware revision 1.9 (or greater) and have installed Personal DaqView 1.4 (or greater). Confirm firmware revision by using personal DaqView active devices, right click on Pdaq device. Contact factory if firmware upgrade is needed.



Personal Daq Acquisition Settings

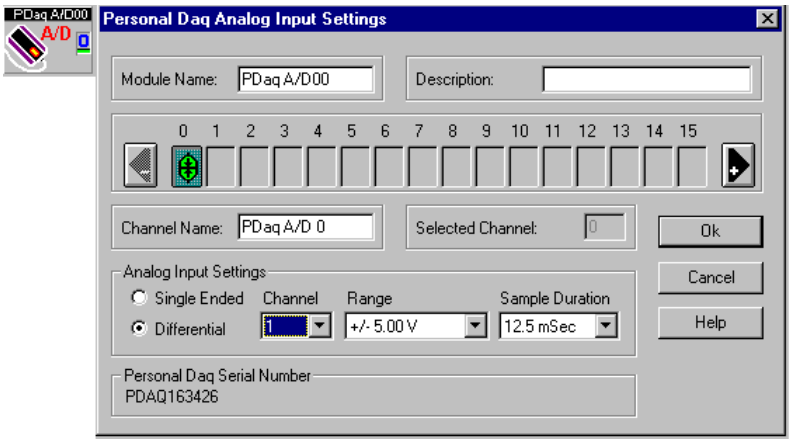
DASY*Lab*'s Personal Daq menu includes an *Acquisition Settings* item.

Acquisition Settings provides a means of selecting:

- Continuous Calibration
- Overrange Protection

The window also allows you to enter an Acquisition Rate and select the units, for example, Hz.

A screen similar to that in the following figure appears after selecting Analog Inputs and *double-clicking* on the module icon [after it is added to a worksheet]. Notice that the device serial number appears on this screen.



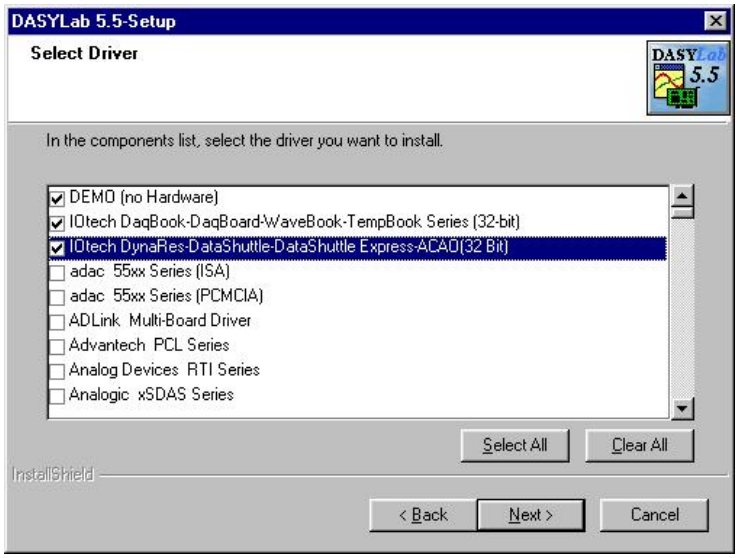
Personal Daq Analog Input Settings


Notes

Configuring DASY*Lab* for DataShuttle, DynaRes, or ACAO (32-Bit) 4

Install DASY*Lab*

1. Launch DASY*Lab* installation from the **DASY*Lab* CD**. Note that the CD should *auto-start*. If the CD does not auto-start, run the CD **start.exe** from the Windows Desktop.
2. Select "Installation," then "Full Version." The actual installation process begins.
3. When prompted for your *name*, *company,* and *serial number*, enter the requested data. Obtain the serial number from the CD jacket. Keep the number in a safe place for future installations and upgrades.
4. When prompted for the installation directory and program folder, use the default selection, or choose another. We recommend that the default directory and location be used.
5. When prompted for **Setup Type,** choose from the available options. We recommend that you select ***Typical***.
6. When prompted to select the Hardware Driver, check the entry: **IOtech DynaRes-DataShuttle Express-ACAO (32-Bit)**. You can select other drivers [for any other supported hardware you have] at this time.



Selecting: IOtech DynaRes-DataShuttle Express-ACAO(32 Bit)

Make sure a check mark appears next to your selection(s).
Choices that are merely highlighted and not checked will not be installed.

Note: If you allowed the IEEE488 (GPIB) drivers to be installed, you will be able to select the vendor.

A final screen displays the selected options about to be installed. Be sure the report matches your intended choices. Step back to modify settings if needed.

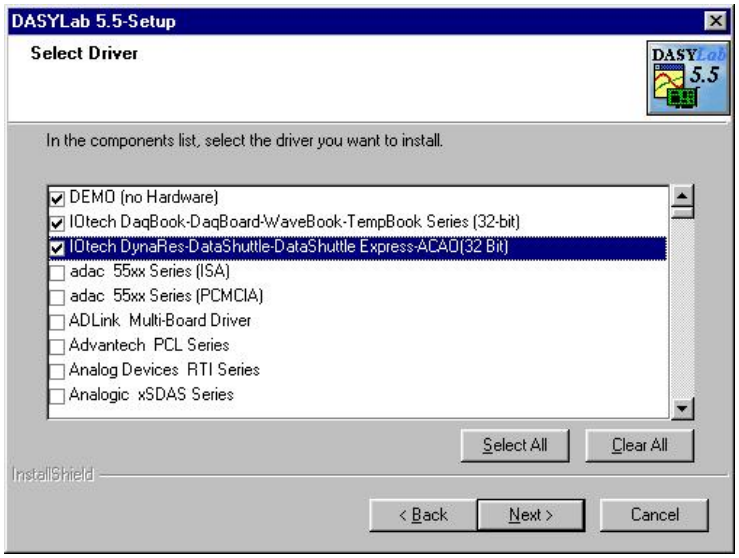
Note: After ***software installation*** is complete, you may be required to restart Windows.

Workbench Notes

Because Workbench is a *special packaged version of* DASY*Lab*, the drivers are already included in the installation process. There is a second selection for IEEE 488 support in both software packages. This selection is largely irrelevant, unless you have a particular manufacturer's IEEE device.

If you do not see the "Select Driver" window (see following figure) during the DASY*Lab* installation, you probably selected a demo version of DASY*Lab* for installation. If this is the case, cancel and restart the installation.

Note: Only single-click on the buttons.



Selecting: IOtech DynaRes-DataShuttle/DataShuttleExpress-ACAO [32-bit]

After software installation is complete, restart Windows or reboot the computer.

There is a driver conflict between QuickLog, or 16-bit Workbench / DASY*Lab* and 32-bit Workbench / DASY*Lab* applications. You can resolve this conflict as described in the following steps.

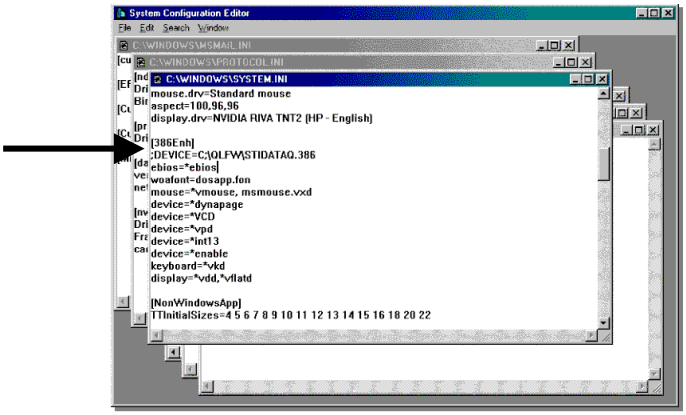
No driver conflict exists between the 16-bit application and QuickLog.
If you have installed DASY*Lab* / Workbench as a 16-bit application, the following steps are not required.

To resolve this conflict (32-bit applications only):

1. Run SYSEDIT.
2. Locate the SYSTEM.INI window.
3. Locate the following:

`[386Enh]`

[386Enh] DEVICE=C:\QLFW\STIDATAQ.386



Locating: [386Enh] DEVICE=C:\QLFW\STIDATAQ.386

4. Comment out the DEVICE line by inserting a semi colon (;) at the beginning of the line.
5. Restart Windows.

Note: You will have this conflict, if you previously installed QuickLog, 16-bit DASYLab, or Workbench; or if you accidentally selected "All Drivers" during installation:

Start DASYLab

Open **Experiment / Select Driver**

Pick correct driver

Exit DASYLab

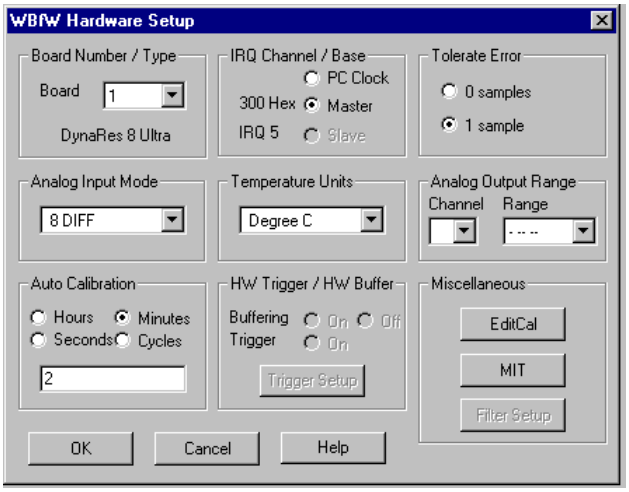
Restart DASYLab

Now communication will exist for the connected Strawberry Tree equipment and 32bit DASYLab.

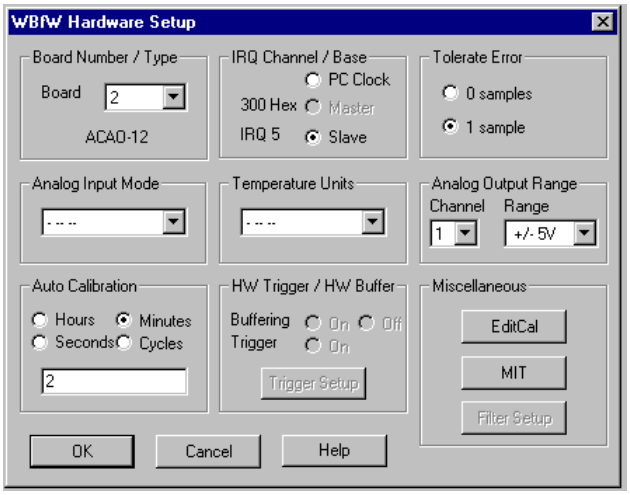
Using Experiment / Hardware Setup

There is automatic recognition of all connected devices. From WBfW Hardware Setup (see figure at right, and following two figures):

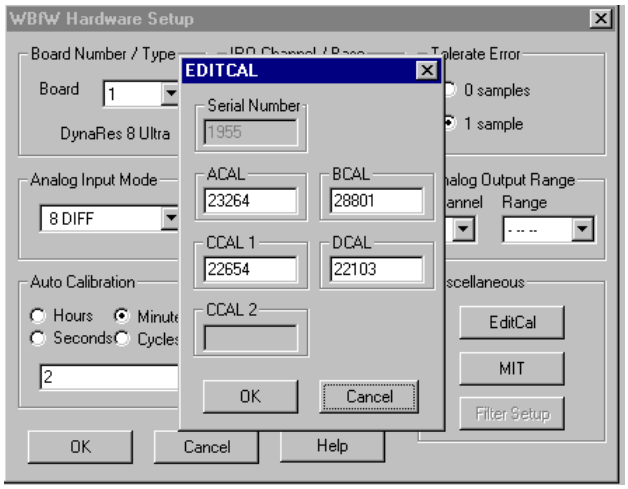
- Select board number
- Set Auto Calibration time. To disable Auto Calibration, set to 0.
- Since Auto Calibration requires 1 minute to complete, only use it for very slow acquisition scan rates.
- Specify analog output voltage ranges where appropriate. If equipment does not have this capability, then this section will be blank.



WBfW Hardware Setup,
Board #1, DynaRes 8 Ultra Selected



WBfW Hardware Setup,
Board #2, ACAO-12 Selected



Selecting EDITCAL

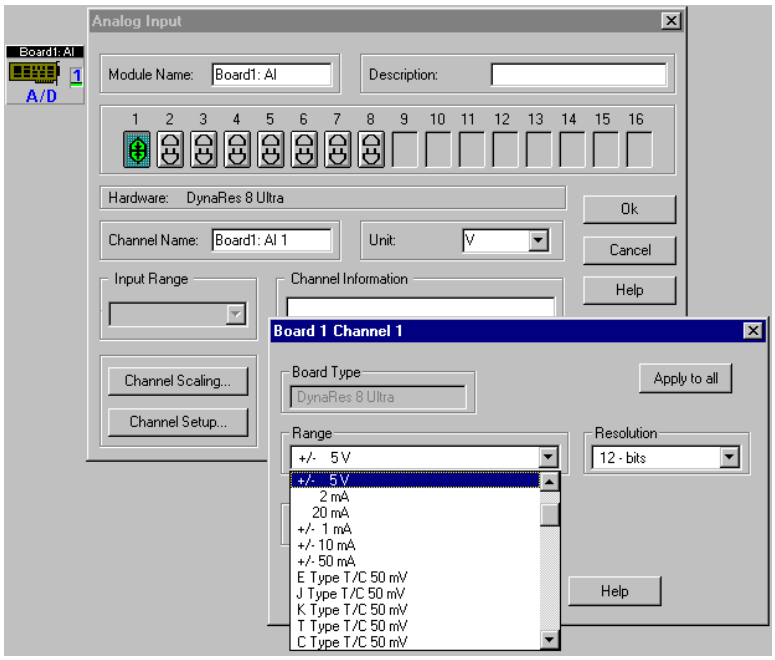
Note that you can run EDITCAL to verify the calibration numbers by comparing the values to those on your device's calibration label. You can also use EDITCAL to alter calibration of channels.

Consult your Data Shuttle/DynaRes manual for detailed information.

After adding an Analog Input or Analog Output module icon to your worksheet; double-click on the icon to access the relevant configuration screen (see following figure).

Clicking the *Channel Setup* button allows you to set signal types for the channels of a specific board.

Clicking the *Channel Scaling* button provides a means of converting signal values to "Engineering Units."



Analog Input Configuration Screen
Channel Setup is Selected for Board 1, Channel 1

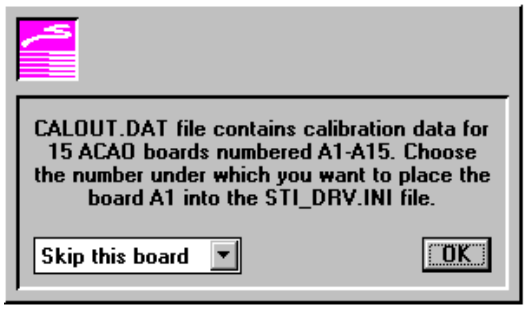
Configuring ACAO Boards

If you are using the ACAO board you must run a program called "ACAO Calibration Data Processor." This program is included in a DASY*Lab* folder and allows configuration of up to 15 ACAO boards. If you find this folder to be missing, notify IOtech's Application Department.

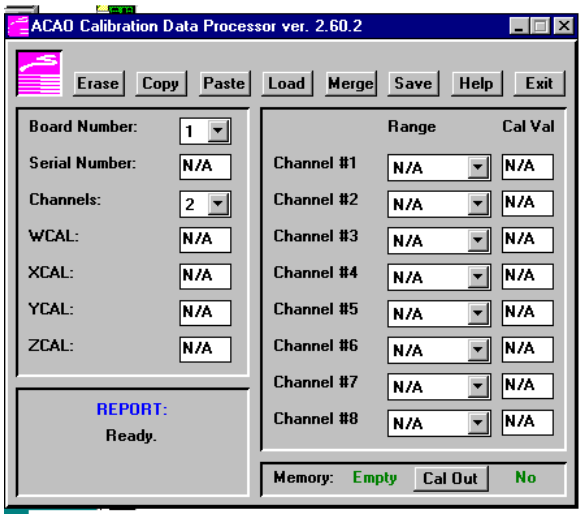
Contact information is included on the front page of this document.

Run the ACAO Calibration program and load the **calout.dat** file. **Note that you must specify the board numbers that match those specified by the hardware switch**. You need to start with board A1 and the lowest ACAO board-number, then click OK. Proceed to A2 board and the next highest board number until you have accounted for all ACAO boards.

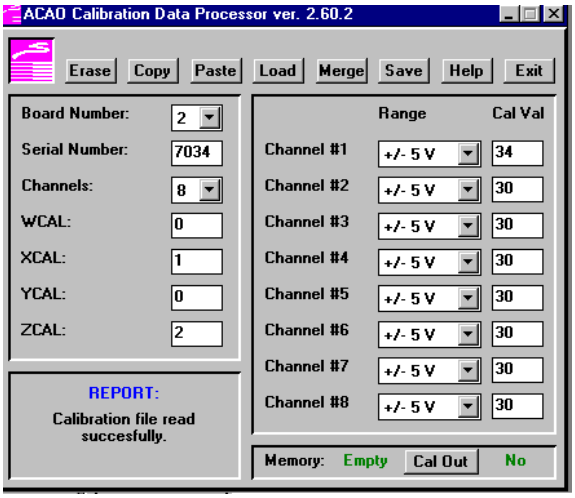
For all unused boards, click **OK** on the drop-down box showing "**Skip this board**," See the following figure.



Preparing to Skip an unused Board



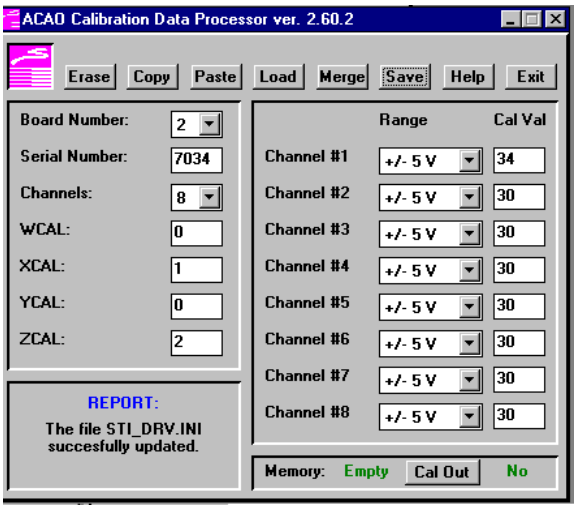
ACAO Calibration, Board 1 Selected; Ready to Enter Constants



ACAO Calibration, Board 2 Selected; Constants Entered

Change the board numbers to match the first ACAO board.

Enter the constants for Range and Cal Val, and the number of channels for that board.



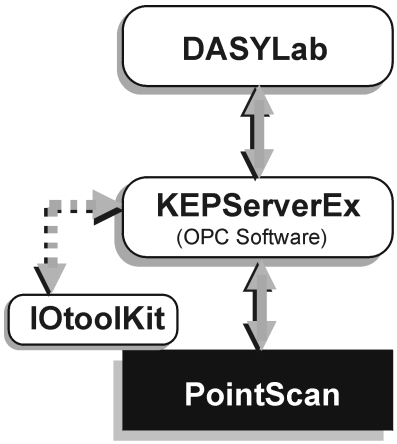
ACAO Calibration, Board 2 Selected
The STI_DRV.INI file was successfully updated after clicking "Save."

Click the ***Save*** button to update the **STI_DRV.INI** file.

Repeat these steps for all remaining ACAO boards that you have.


Notes

Configuring DASY*Lab* for PointScan 5



Software Support Structure

Overview

This chapter covers the steps necessary for a successful installation of DASY*Lab* for use in PointScan applications. The chapter sections are presented in chronological order, as indicated in the table of contents above.

In order to complete all steps successfully, you will need the following at, or above, the indicated version level.

- **IOtoolKit Installation CD**, version 1.2 (p/n 1075-0601)
- **KEPServerEx**, version 4.0 (included on the IOtoolKit CD)
- **DASY*Lab* Installation CD**, version 6.0 (p/n 472-0606)
- **Internet Explorer**, version 5.0
- PointScan/104, PointScan/204, & PointScan/443 Power Supply

IOtoolKit

Install the IOtoolKit

1. Insert the IOtoolKit CD (p/n 1075-0601) into the CD drive.

Note: The CD should *auto-start*. If the CD does not auto-start, run the CD **start.exe** from the Windows Desktop.

2. Browse to the contents of your CD drive.
3. Open the **IO Tools Install** folder.
4. Click on **setup.exe**.
5. Follow the prompts to complete the installation.
6. From the Windows Start menu select: **Programs**, and then **IO Tools**.
   The program will now load.

Reserve Addresses

After assembling the PointScan hardware, work with your network administrator to reserve a bank of network addresses for:

- the host computer
- the PointScan modules that will be connected to the Ethernet

You can use a "485 Pass-Through" connection to reduce the required number of addresses. The pass-through allows you to use a single address to connect up to eight PointScan modules to the Ethernet.

Ethernet Configuration

The Ethernet port on your PC must be configured. Windows 98 and higher includes TCP/IP (the networking protocol) for Internet access. Your PC's Ethernet port will be assigned a unique IP address [10.X.Y.Z] used to communicate with the Ethernet-based PointScan/104 module.

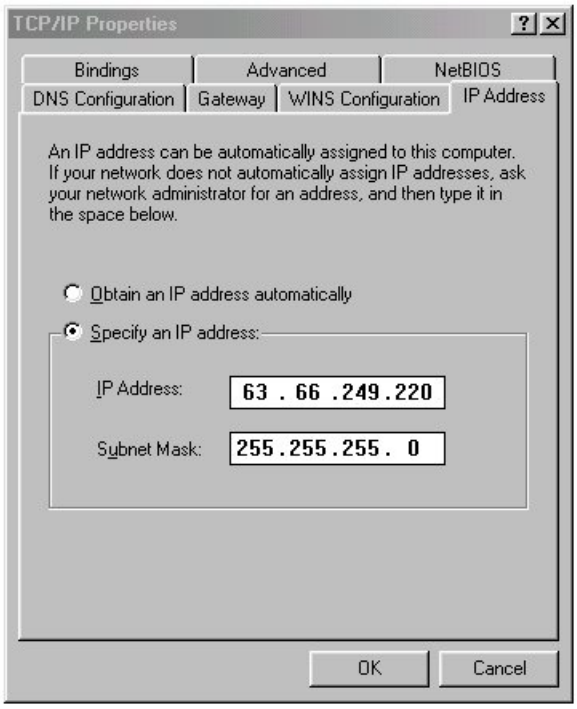
Set-up for Windows® 9x

Use the below instructions to modify existing TCP/IP settings.

1. Select Start ⇒ Settings ⇒ Control Panel ⇒ Network

   If TCP/IP does not exist in the components window Press Add ⇒ Protocol ⇒ TCP/IP.

2. Double Click on TCP/IP in the components window and select the IP Address tab.
3. Press OK to close the network dialog and reboot your computer if instructed to do so.



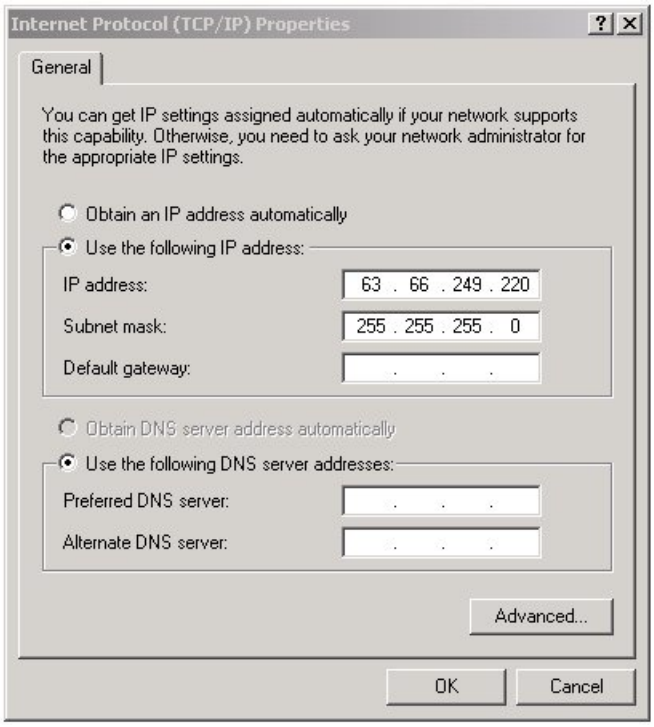
Win 9x: Example of Setting TCP/IP values

Setup for Windows™ 2000

Use the below instructions to modify existing TCP/IP settings.

1. Select Start ⇒ Settings ⇒ Network and Dial-up connections
2. Double Click on Local Area Connection and click Properties.

   If TCP/IP does not exist in the components window press Install ⇒ Protocol ⇒ TCP/IP.
3. Double Click on TCP/IP and fill in the Values and press OK
4. Press OK to close the network dialog and reboot your computer if instructed to do so.



Windows 2000: Example of Setting TCP/IP values

Configure the System via the IOtoolKit

Use the IOtoolKit software to perform the system configuration. Instructions are included on the CD (see the following reference note). Configuration includes:

- setting up the IP address for PointScan modules that have a direct Ethernet connection
- setting up the pass through communication protocol to additional devices that are using a 485 pass-through
- naming stations and channel tags
- setting measurement parameters for channels, e.g., integration time and ranges.
- saving the configuration
- verifying system communications

Reference Note:
Refer to ***Getting started with the IOtoolKit***, located within the ***IOtoolKit Help*** document, for instructions related to the above topics.

For backup purposes, save the settings as a project file.

KEPServerEx

After completing your work with the IOtoolKit, you will need to install the KEPServerEx OPC Server Software and then configure KEPServerEx. OPC stands for *OLE for Process Control*, where OLE is the acronym for *Object Linking and Embedding*.

The IOtoolKit CD (p/n 1075-0601) includes a free, unlicensed version of the KEPServerEx software, related instructions, and prompts.

Note: The free *unlicensed version* of KEPServerEx [included on the IOtoolKit CD] supports up to three hours of operation before it is necessary to re-boot the system. A licensed version of KEPServerEx software, that provides continuous operation, can be purchased through IOtech. Contact information is provided on the cover page of this manual.

Install the KEPServerEx Software

1. Insert the IOtoolKit CD (p/n 1075-0601) into the CD drive.

   Note: The CD should *auto-start*. If the CD does not auto-start, run the CD **start.exe** from the Windows Desktop.

2. Browse to the contents of your CD drive.
3. Open the **KEPServer** folder.
4. Double click on **disk1**.
5. Click on **setup.exe**.
6. Follow the prompts to complete the installation.
7. From the Windows **Start** menu: select **Programs**, then **KEPServerEX.**
   The program will now load.

Configure KEPServerEx

KEPServerEx configuration is discussed in help files that are included on the IOtoolKit CD (p/n 1057-0601). Reference notes to those documents are provided below.

DASY*Lab* can only recognize the *short* data format; thus, KEPServerEx must be configured for *short* data format.

The scan rate must be specified for a fixed scan rate, not to transmit data only when a change occurs.

Reference Notes:

Refer to the ***KEPServerEx Help*** document [located on the IOtoolKit CD] for information regarding how to:

- add station names and channel tag names
- specify device IP addresses and channel Modbus addresses
- prove the IO communication with all devices using the OPC **<QuickClient>** button
- save the configuration for backup purposes

Refer to the ***EtherTRAK Help*** document [located on the IOtech Toolkit CD] for a list of modbus addresses for each module's channel type. Channel configurations [for specific channels] require that the modbus address and the data format be specified.

After completing the KEPServer configuration, use the OPC **<QuickClient>** button to test all PointScan modules and channel configurations.

Install DASY*Lab*

DASY*Lab* software versions that precede 6.0 do not support PointScan products. If your DASY*Lab* version precedes 6.0, please contact *sales@iotech.com* for upgrade information.

For DASY*Lab* to properly install, the host computer must be using *Internet Explorer* version 5.0 or higher.

Install DASY*Lab* as follows:

1. Launch the DASY*Lab* installation from the **DASY*Lab* CD**.

   Note: The CD should *auto-start*. If the CD does not auto-start, run the CD **start.exe** from the Windows Desktop.

2. Select "Installation," then "Full Version." The actual installation process will begin.

3. When prompted for your *name*, *company* and *serial number*, enter the requested data. Obtain the serial number from the CD jacket.

Keep the serial number in a safe place. You may need to reference it for future installations and upgrades.

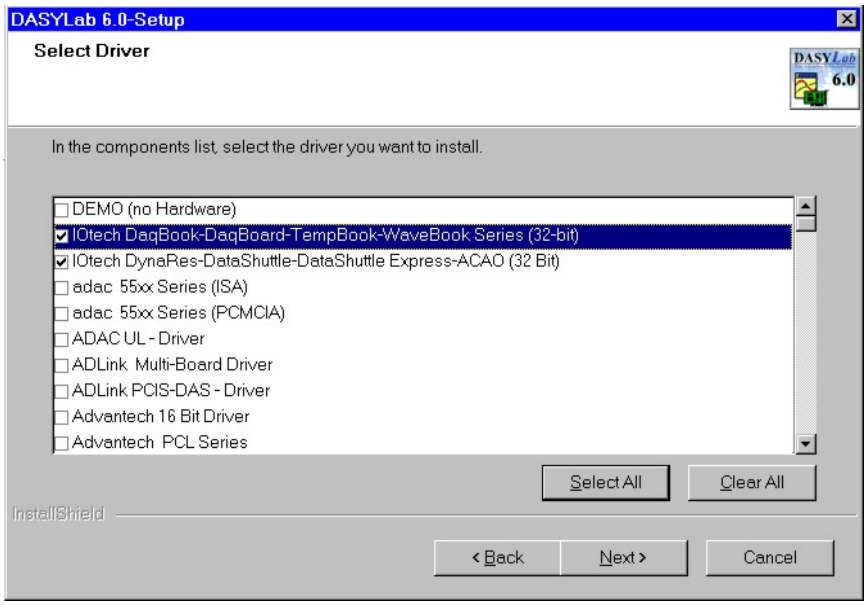
4. When prompted for the installation directory and program folder, you can use the default selection, or choose another. We recommend using the default.

5. When prompted for **Setup Type,** choose from the available options. We recommend that you select ***Typical***.

6. Select the applicable hardware drivers when prompted. See the following note and figure.

There are no PointScan related drivers to select. The drivers that are selected in step 6 are for components that are in addition to PointScan.

Be sure to place a check mark next to each of your selections. Choices that are not checked will not be installed, even if they are highlighted.



Selecting Drivers in* DASY*Lab Setup

A screen displays the selected options. If needed, use the **<Back>** button and make the appropriate changes.

In the case of IEEE488 (GPIB) drivers, be sure that the vendor identity is correct.

Windows NT/2000 may require installation of DataSocket support after installation of DASY*Lab*. You will receive a message prompt, should installation of DataSocket support be required.

Connect DASY*Lab* to the OPC Server

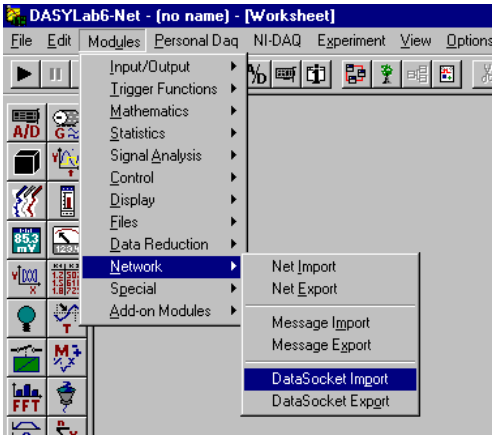
Before connecting DASY*Lab* to the OPC Server, verify that the OPC server is receiving valid readings from the PointScan device.

Complete the following steps to connect DASY*Lab* to the server.

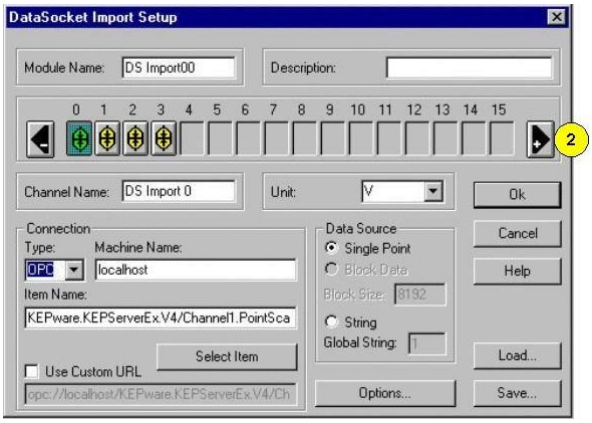
1. From a DASY*Lab* worksheet, access the ***DataSocket Import Setup*** screen by navigating as follows from the toolbar (see first figure):

   ⇒ **Modules** [pull-down menu]
   ⇒ **Network**
   ⇒ **DataSocket Import** (left-click to bring up a *DataSocket Import Icon*)

   Double-click on the *DataSocket Import* Icon (not shown) to open the ***DataSocket Import Setup*** dialog box (see second figure).



Selecting DataSocket Import

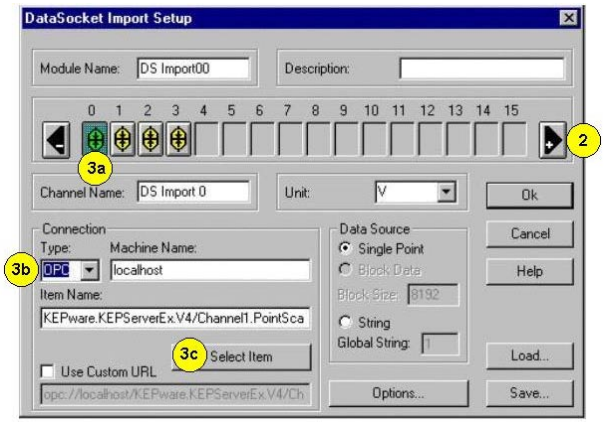


DataSocket Import Setup

2. Click on the triangular add button [item 2 in the above figure] to add the desired number of channels. Each click of the button will sequentially place a *socket image* beneath a channel. In the preceding figure *socket images* can be seen for channels 0, 1, 2, and 3.

Note: If your system has more than 16 channels, you will need to put an additional *DataSocket Import* module on your worksheet.

3. Configure a channel; steps 3(a) through (f).



DataSocket Import Setup

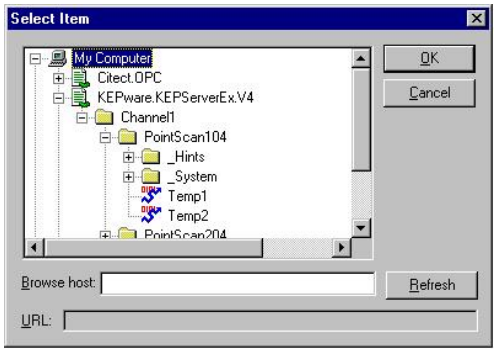
3(a) Select the channel that is to be configured. Note that a green socket indicates the channel for which selected options will be applied. In the previous figure, channel 0 is selected.

3(b) For the connection *Type*, select **OPC**.

3(c) Click on the **<Select Item>** button.

DASY*Lab* will search the computer registries and list every OPC server program that resides on your computer.

3(d) Locate and expand the OPC Server Software identifier (see following figure). In the figure we selected **KEPware.KEPServerEx** for the Kepware OPC Server Software. In addition, we expanded Channel 1 to show **PointScan104** and its associated tags (**Temp1** and **Temp2**); as well as **PointScan204** (not shown in its entirety) to show its associated channel tags (**Temp3** and **Temp4**). You would need to scroll down to see Temp3 and Temp4.

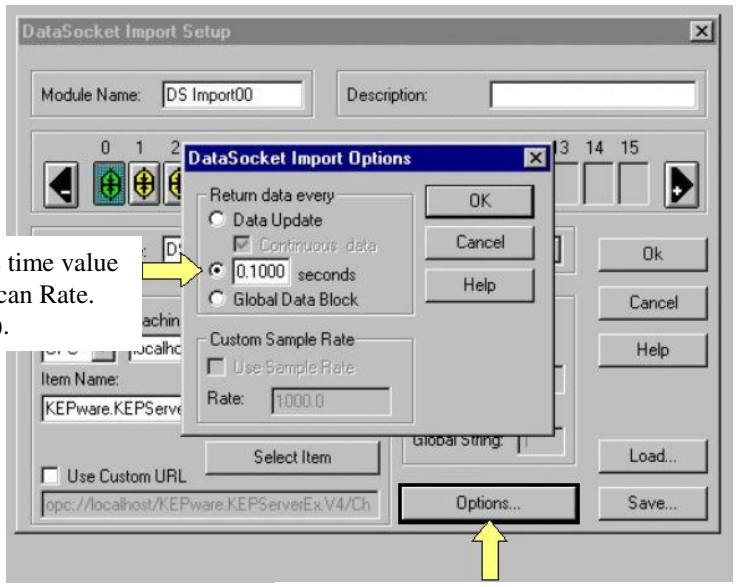


Expanding the Server Item

3(e) From the expanded list, select the channel tag that applies to the channel currently being configured.
In our example tags will be assigned to channels as follows:
PointScan104 / Temp1: Channel 0
PointScan104 / Temp2: Channel 1
PointScan204 / Temp3: Channel 2
PointScan204 / Temp4: Channel 3

3(f) For the channel that is being configured, select the desired "tag" by highlighting it; then click **<OK>**.

3(g) Click the **<Options>** button (following figure). The ***Data Socket Import Options*** box will open.



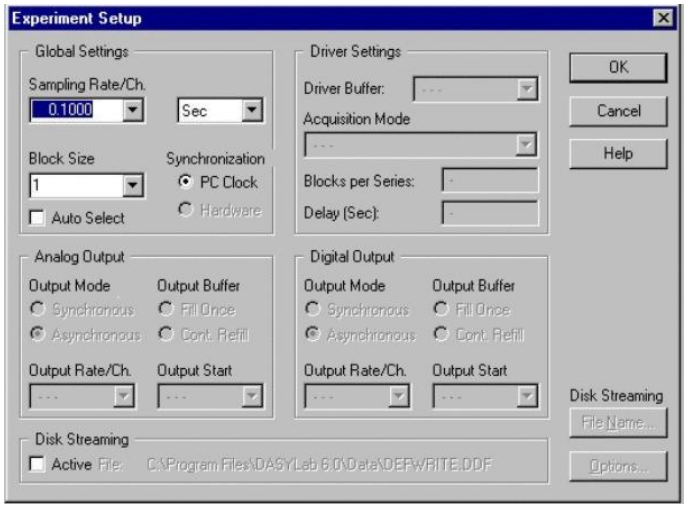
3(h) Enter the time value for the scan rate and Click **<OK>**. The resulting scan rate, i.e., *data return per unit time*, is what we want DASY*Lab* to use for the PointScan device. The previous figure indicates that we want to have data returned every 0.1000 seconds, (10 samples/sec). Note that the time factor entered here will later be entered in the *Experiment Setup* window [step 9, page 5-8].

4. Repeat step 3 for each of the remaining channels. Continue with step 5 after all channels have been configured.

5. Click the **<Save>** button and save your setup under an appropriate filename and location.

6. Close the ***DataSocket Import Setup*** box.

7. From the **Experiment** pull-down menu, select ***Experiment Setup***.
An *Experiment Setup* box will appear (following figure).



Setting Block Size and Scan Rate in Experiment Setup

8. In the ***Experiment Setup*** window, in the *Global Settings* frame (see above figure), verify that **Auto Select** is ***unchecked*** and that the **Block Size** is set to **1**.

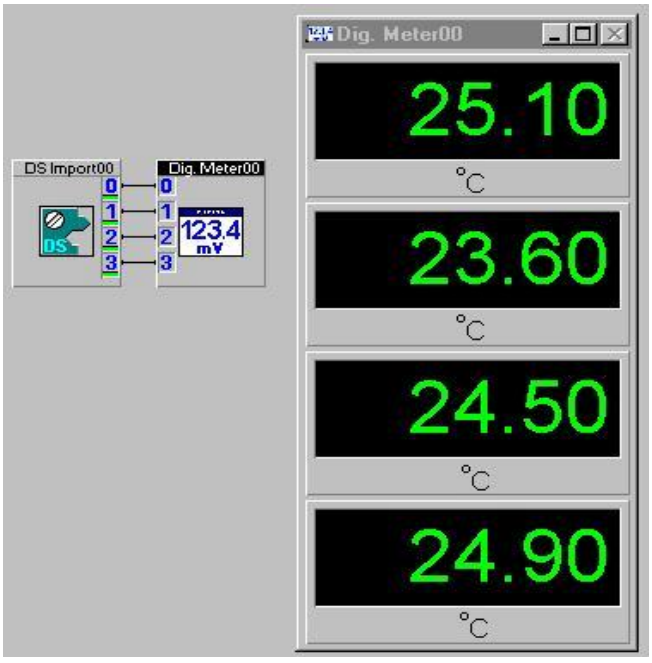
9. In the *Global Settings* frame, under *Sampling Rate/Ch,* set the time value to the match the value that was specified in the *DataSocket Import Options* box [step 3(h), page 5-7]. Set the units to **Sec**. The resulting scan rate, i.e., *data return per unit time*, is for data to be returned once every 0.1000 seconds. This is equal to 10 samples/sec.

For each DASY*Lab* worksheet *module* — in the *Experiment Setup* window, set the Block Size and the Sampling Rate to match that of the first module. This will ensure that the data from each worksheet module coincides with the data from the DataSocket Import module.

10. *Close the Experiment Setup window.*

11. From the **Module** pull-down menu, select ***Display***, then select an appropriate display module. This will allow you to see the data after the play button is clicked.

This completes the procedure for configuring DASY*Lab* for PointScan.



DataSocket Import Module attached to a Digital Meter Module