DAQSensor Quick Start Guide

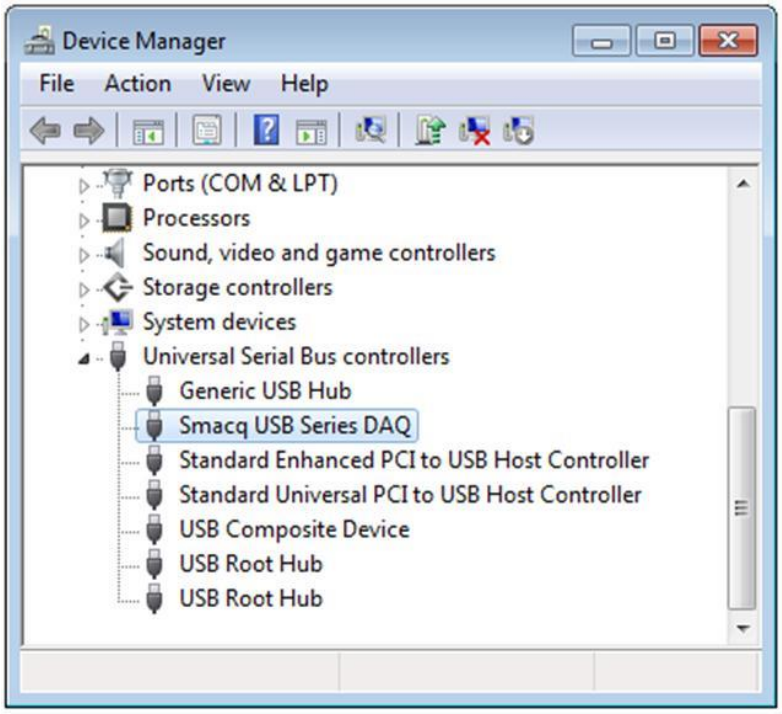
About DAQSensor

DAQSensor is data acquisition software developed by Smacq for the USB-1000 series. It helps users without programming experience quickly obtain experimental data.

The software is primarily designed for basic applications. For more complex applications, users should select an appropriate development environment and program the required functionalities. Smacq offers examples and documentation for various environments, which can be downloaded from www.smacq.cn or http://www.smacq.com/ by contacting service@smacq.com.

Driver Installation

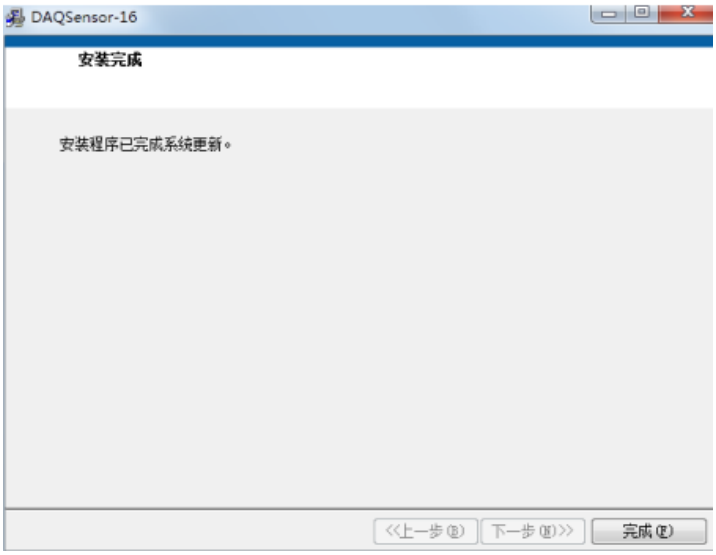
Before using the data acquisition card, connect the USB data acquisition card to a USB port and ensure that the driver is installed correctly. If the installation is successful, the Device Manager will display the device as shown below. If the driver is not installed correctly, please refer to the user manual for further instructions.



Software Installation

1. Locate the folder containing DAQSensor.
2. Double-click the setup.exe file.
3. Follow the on-screen instructions until the installation is complete.

Upon successful installation, a shortcut named DAQSensor-16 will be created on the desktop.



Opening the Software

There are two methods to open the software:

1. Double-click the DAQSensor-16 shortcut.
2. Right-click the shortcut and select Run as administrator.

Running as Administrator: This option allows you to save historical data in key directories such as the root of the C drive or the desktop.

Once the software is open, select the corresponding series for your data acquisition card and click OK.

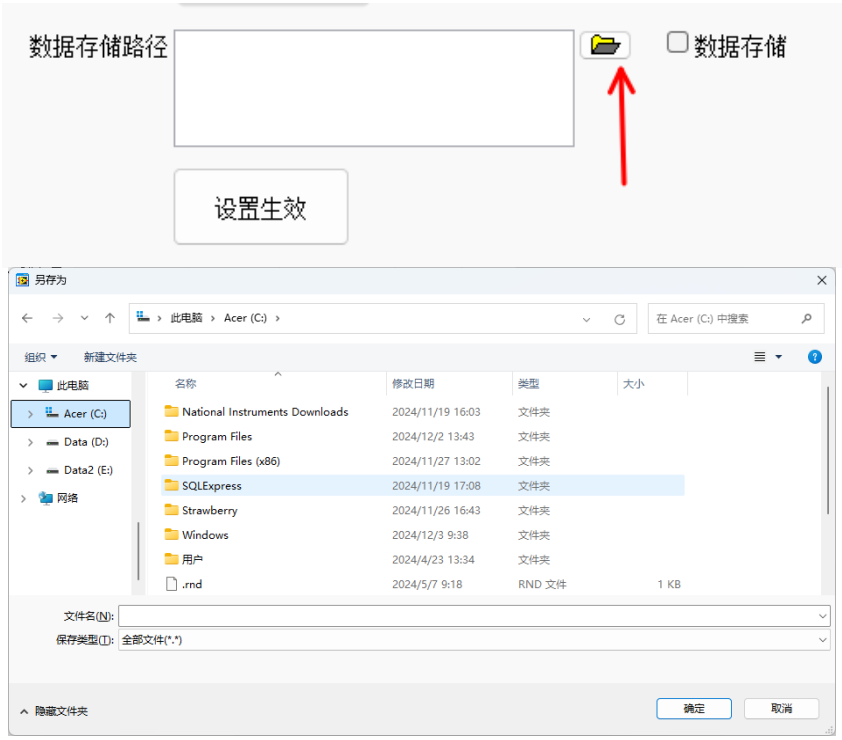
Analog Acquisition Settings

Analog input is the most commonly used feature of a data acquisition card, and DAQSensor's main functions focus on analog input. After selecting the product series, the first page displayed is the Analog Input Acquisition Settings page.

Analog Input Settings Page

- Channel Selection: Use the checkboxes to select the channels you wish to use. The software displays 16 checkboxes. If you are using an 8-channel acquisition card, you can only select the first 8 checkboxes.
- Channel Annotation: Add annotations to channels, which will appear in the legends on the analog input display page and in the historical data.
- Card Type: Choose between voltage type (V) and current type (mA) based on your data acquisition card.
- Channel Modes: Depending on the series, different modes are available, such as:
    - Differential Mode (DIFF)
    - Non-Referenced Single-Ended Mode (NRSE)
    - Referenced Single-Ended Mode (RSE) If you are unsure about the mode to use, refer to the corresponding section in the user manual.
- Input Range: Input range varies by series:
    - USB-1252: 0-10V, ±5V

- Sampling Rate: Specifies the number of samples per channel per second. The maximum value should not exceed the card's limit, and the minimum is 5 samples per second.
- Data Storage Path: Specify where to save the data by entering the file path and name or selecting it through the dialog box. The final file name will include the date and time, in the format: *[filename][date][time].smq*.



Unit Transformation for Analog Input

When using sensors with acquisition cards, the data of interest may not directly be voltage or current. For instance, when measuring pressure with a sensor, the data needed might be in MPa rather than volts. DAQSensor allows users to transform units for convenience.

- Sensor Range: Define the measurement range of the sensor (e.g., 0–50 MPa for a pressure sensor).
- Sensor Output Range: Define the sensor's voltage or current output corresponding to its range (e.g., 0–10V for a pressure sensor).
- Sensor Unit: Specify the unit (e.g., MPa). This will appear as the vertical axis label in the display.

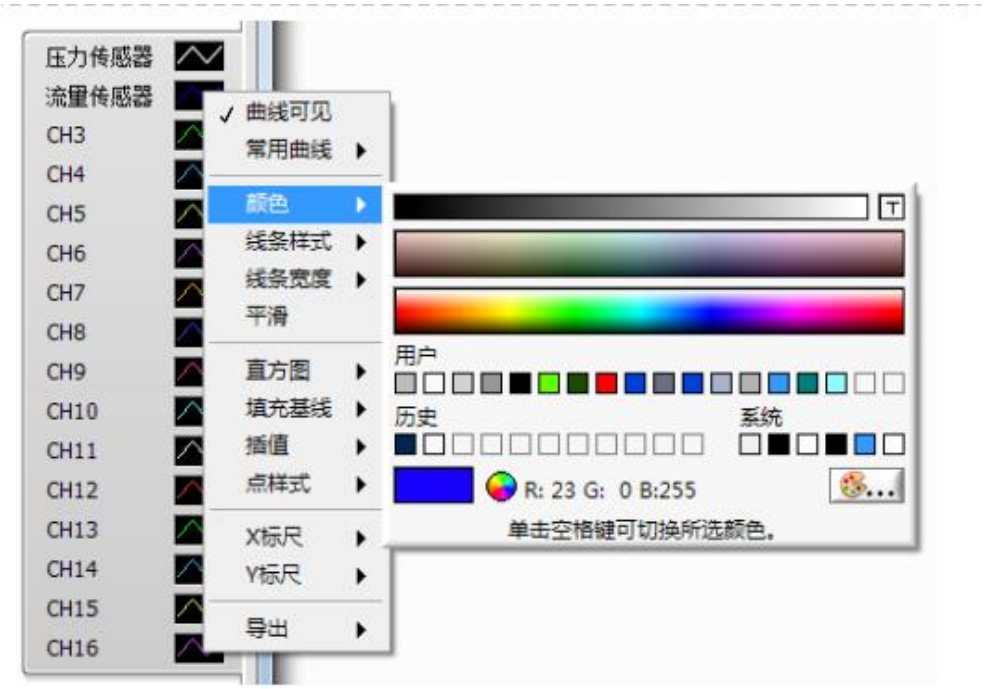
Analog Input Display

The Analog Input Display page provides the following functionalities:

- Start/Stop Button: Controls data acquisition. If the start button is grayed out, ensure that settings have been applied, and at least one channel is selected.
- Statistics: Displays statistical information, including the maximum, minimum, and average values for each channel over a given time period.

- Waveform Display: Shows collected data in a waveform format. The display length is 1 million samples per channel, with the most recent data displayed.

- Coordinate Adjustment: Adjust the X and Y axes manually or automatically to fit the display.
- Graph Tools Panel: Provides zoom, drag, and scaling options to better analyze data.



Here is the translation of the sentence you provided:

"The legend will indicate the correspondence between the channels and the waveform curves. You can also right-click on a channel's legend to adjust parameters such as the color, line style, and line width of the corresponding curve. These functions generally do not require adjustments."

The waveform display is used to show the collected analog input data in the form of a waveform. The displayed waveform data length is 1M samples per channel. If the collected data exceeds 1M samples, only the most recent 1M points will be displayed.

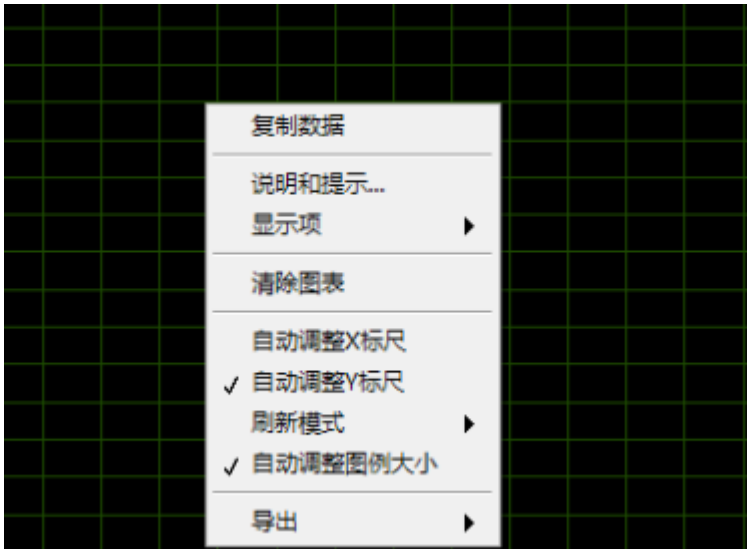
Coordinate (scale) adjustment is a commonly used function when viewing waveforms, allowing you to adjust the waveform to an appropriate size for easier viewing.

There are three ways to adjust the coordinates:

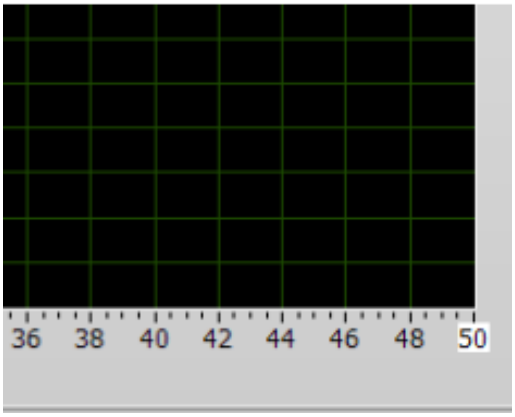
1. Automatic coordinate adjustment: The software defaults to automatically adjusting the Y-axis scale.
2. Manual coordinate adjustment: This allows you to manually set the coordinates.

3. Coordinate adjustment through the right-click menu: When viewing the waveform, right-click on the chart and select options to adjust the X/Y scales.

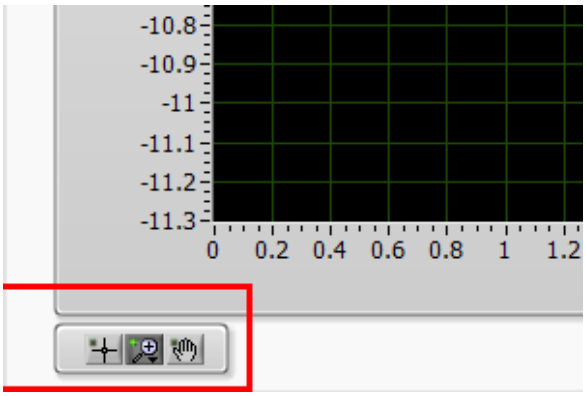
It is not recommended to use automatic X-axis scaling during high-speed sampling, as it can place higher demands on computer performance, potentially affecting the data collection. To enable or disable automatic coordinate scaling, right-click on the waveform chart and check or uncheck the option to adjust the X/Y scales automatically."



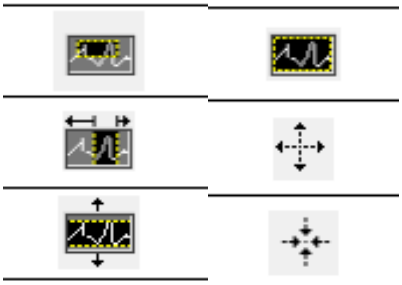
The second method is to manually adjust the coordinates. To manually adjust the coordinates, you first need to disable the automatic adjustment for the corresponding coordinate. Then, click on the coordinate you wish to modify. Once the coordinate becomes editable, as shown in the image below, enter the desired value and press the Enter key.



The third method is to adjust the coordinates using the graphic tools panel.



The graphic tools panel is located in the lower left corner of the page. It has three main functions: mouse function, zoom function, and hand-drag function. The mouse function is the standard mouse function, essentially no additional functionality. The zoom function is the main feature of the graphic tools panel. After clicking, a secondary menu with six options will appear, as shown in the image below. The functions of these options are explained in the table below."



Zoom in by Selection: This function enlarges the selected area and displays it across the entire canvas.

Horizontal Zoom: This function zooms in the selected area along the horizontal axis.

Vertical Zoom: This function zooms in the selected area along the vertical axis.

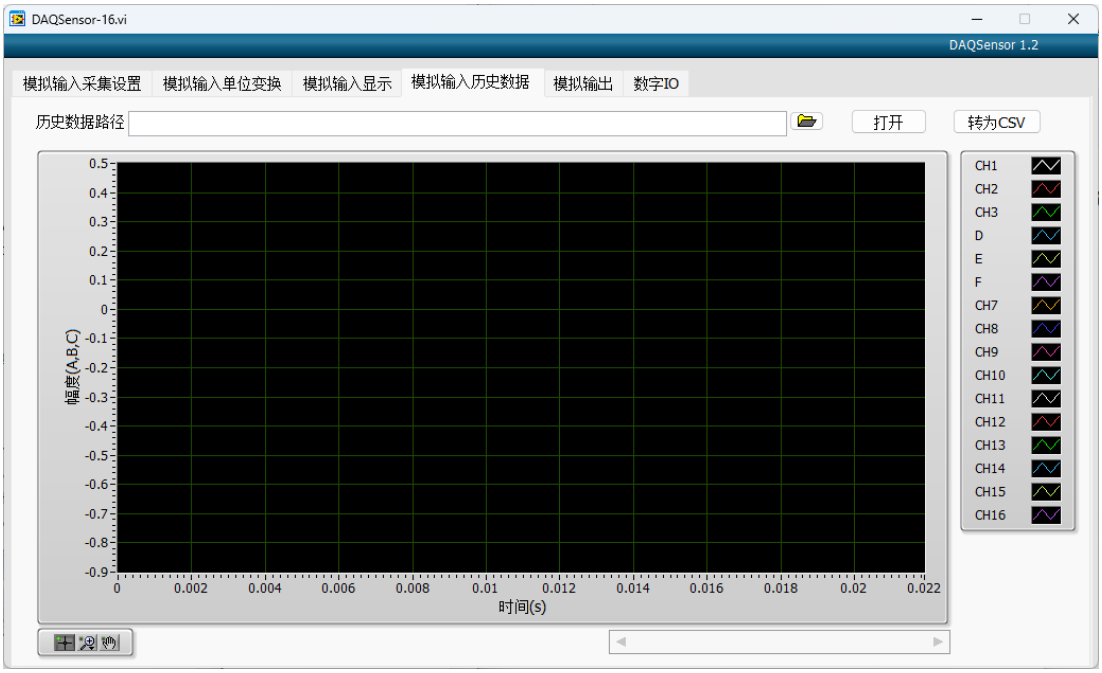
Fit to View: Clicking this option will automatically adjust the X and Y axes to display all data.

Click to Zoom In: Clicking this option will zoom in on the area centered around the point you clicked.

Click to Zoom Out: Clicking this option will zoom out from the point you clicked, reducing the display size.

Once the hand-drag function is selected, click and hold the mouse on the waveform chart to freely drag the waveform.

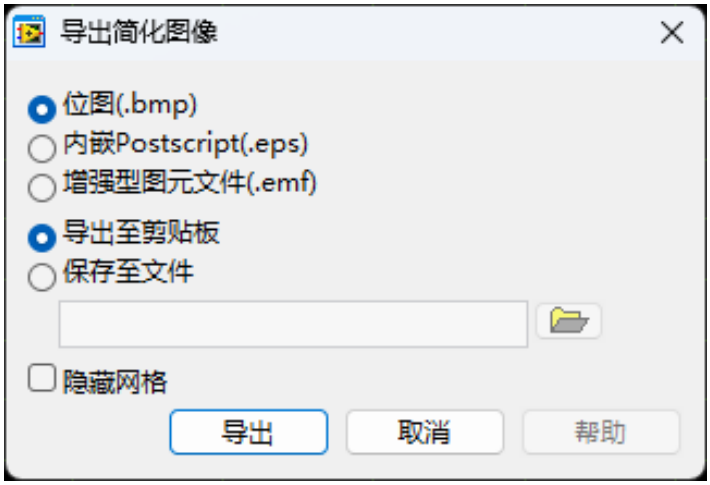
Data Storage and Export



Common data export formats include Bitmap, Excel, SMQ, and CSV.

- **Bitmap Export**: Exports the displayed waveform as an image, which can be used in reports. To export as a bitmap, right-click the waveform chart and select **Export → Export Simplified Image**, then choose **Bitmap (.bmp)**. You can export to the clipboard (for direct pasting into a document) or save the file to a specified path.

Note: Since the exported image has a white background, ensure that the waveform's line color is not white to avoid it disappearing. You can change the line color by right-clicking the legend.



- **Export to Excel**: Allows you to export the current data displayed on the waveform to an Excel file. This function works best for small datasets, as large datasets may take longer to export. To export to Excel, right-click the waveform and select **Export → Export Data to Excel**. Please ensure that Excel is installed on your computer.

Note: The exported data will appear in Excel with columns corresponding to the different channels and time.

- **SMQ Files**: As mentioned in the **Analog Input Settings** section, when data storage is enabled, a .smq file will automatically be generated each time you click the **Start** button. This file can be opened in the **Analog Input Historical Data** page, or exported as a CSV file.

To open an SMQ file, specify the path to the historical data file or select it via the dialog box. Once the file is opened, its waveform data will be displayed on the screen.

- **CSV Files**: A CSV file is a universal text format that can be opened by various tools, including Excel and text editors. It can also be easily processed by data analysis tools such as MATLAB.

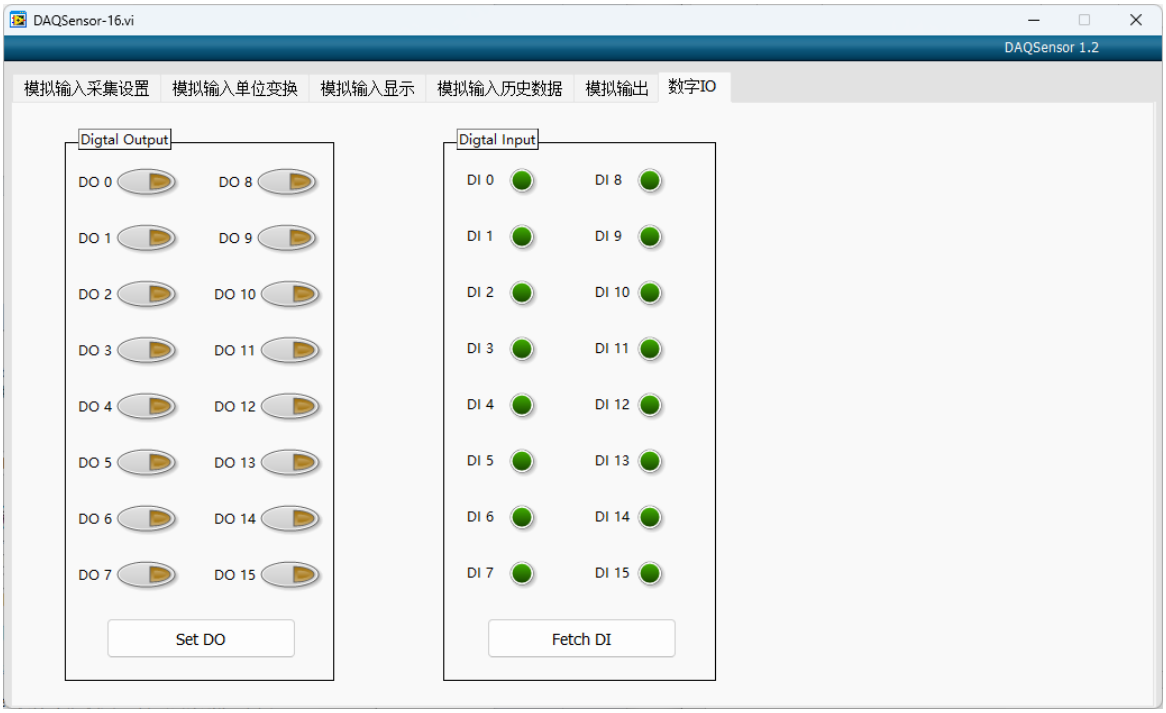
After selecting an SMQ file in the historical data path, you can click **Export as CSV** to generate a corresponding CSV file in the same directory.

Digital IO

Digital outputs are commonly used to control external devices, while digital inputs are used for reading switch states.

DAQSensor provides 16 digital input/output controls. For USB-2000 and USB-4000 users, only the first 8 channels are accessible.

- **Digital Output**: The default state is 0 (low level). You can set the output state for each channel using the toggle switches. After setting the output states, click **Apply** to save the settings.
- **Digital Input**: To read the external switch states, click the **Read** button.



Conclusion

DAQSensor is a software designed for basic applications, with a user-friendly interface. While we will continue to add features in future updates, DAQSensor may not meet the needs of all users. If you require additional features, we recommend using programming environments such as LabVIEW, Matlab, VB, or C# to implement the functionality. We provide development examples and manuals to assist with this.

If you encounter any issues, please contact us at service@smacq.com.