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DaqLink 4 Channel Multi-probe Data Logger

4 external inputs + internal humidity and temperature sensors

User Guide

For DBSA710 and DBSA720

fourier

DaqLink
User Guide

Supporting DaqLink v1.2.2.1
November 2009
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To download updated versions of the DaqLink User Guide and DaqLink software/firmware visit:
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Chapter 1:
DaqLink Overview

This chapter provides a general overview of the DaqLink system.

1.1. DaqLink Introduction

Light, Portable and Independent Logging

With built-in temperature and humidity sensors, plus four external probe inputs the DaqLink standalone data logger ensures a low cost, reliable and accurate solution. The DaqLink logger is a 16-bit, mobile data acquisition device for continuous indoor or outdoor data monitoring.

The DaqLink system is comprised of two data logger models, measuring a broad range of parameters on four external inputs for direct measurement and recording of PT-100, thermocouple, 0 to 1 V, 4 to 20 mA, contact, frequency and pulse sensors, as well as internal temperature and relative humidity sensors.

With its high resolution and fast Analog to Digital converter (ADC), DaqLink data loggers meet the majority of data acquisition requirements in most industrial applications. Every DaqLink logger unit is embedded with a unique serial number and can be loaded with a descriptive comment for safe identification. An internal clock and calendar keeps track of the time and date of every sample measured.

DaqLink loggers can automatically activate external alarm events when data is outside a specified range. Email and SMS notifications can be sent to predefined contacts.

The DaqLink system is powered by the powerful DaqLink software. The Windows ™ based software is the central management interface of the DaqLink network. When connected via USB cable to the PC, DaqLink data can be monitored online and displayed in real-time graphs or tables. Analyze data with various mathematical tools, or export data to a spreadsheet.

The software also enables you to configure, calibrate or update the firmware of DaqLink units via direct USB connection.

Key DaqLink benefits include:

- Real-time logging - Online operation with data results on screen
- Independence - Manual or PC operation with on-site monitoring via two-row LCD display
- Intuitively - Simple keypad and easy-to-navigate menus
- Long life - Low-power consumption and rechargeable battery lasting up to six months
- Flexibility - Four alarm levels with visual LCD, and audible alarms
- Non-stop logging - Continuous data storage to large onboard memory and periodic USB downloads

1.2. The DaqLink System

The basic DaqLink system will contain at least one of the following units:

- DaqLink data logger – Part Number DBSA710 or DBSA720
- Mini-USB communication cable
- Power adapter (one per DaqLink unit ordered)

- DaqLink software CD containing user guide

1.2.1. The Data Logger

There are two data logger models compatible with the DaqLink system. These loggers support up to four external sensors and two internal sensors, temperature and humidity, depending on the specific model. Data is recorded and stored to the logger's internal memory and transmitted over the network to the DaqLink software running on the PC.

The data logger is programmed to consume as little power as possible during operation, in order to conserve the battery life. When not transmitting or recording data the units are in *sleep* mode and they *wake up* when needed.

The battery for the DBSA710 and DBSA720 is rechargeable and can run up to several months on one charge, depending on the logger configuration.

Refer to section 3.5.3 for more information.

Note: Battery life depends on the logger sampling rate, transmission rate, type of sensor, and number of measured sensors.

DaqLink Data Loggers

Part Number: DBSA720

Four external channel data logger with two internal sensors, Humidity and Temperature

Memory Capacity: ~59,000 samples

Power supply: AC or battery operated

Part Number: DBSA710

Four external channel data logger with internal Temperature sensor

Memory Capacity: ~59,000 samples

Power supply: AC or battery operated

1.2.2. Hardware Accessories

The DaqLink system includes the following accessories:

- Mini-USB cable for connecting data logger to PC
- Power adapter to power the data logger

1.2.3. DaqLink Software

The user interface for the DaqLink system, the DaqLink software CD is provided together with the DaqLink hardware and includes the following features:

- Data display, management, storage and data diagnostics
- Alarm settings: Email and SMS notifications, visual and audible alarms
- Sensor definition
- Sensor calibration
- Firmware update
- Automatic software update (via Fourier server)

The software interface is described in detail in Chapter 4.

Chapter 2:
DaqLink Implementation Guide

Fourier Systems suggests first time users of the DaqLink system read this chapter before drilling down into the many features of the system described later in the user guide. The Implementation Guide will give you a clear understanding of the basic aspects of setting up the system, and getting the data logger up and running.

2.1. Pre-setup Requirements

Prior to commencing with the DaqLink implementation you must have the following requirements in place:

PC

- 24/7 availability, if online data monitoring is required
- Reliable AC power
- Sufficient hard disk space to store loggers' data
- One free USB port

DaqLink devices

At least one DaqLink logger DBSA710 or DBSA720

Mini-USB cable

The mini-USB cable connects the data logger to the PC for logger configuration and data download (and is supplied with the PC Suite software kit).

2.2. Launching the Software

1. Install the DaqLink software on the PC workstation. Refer to section 4.1: Installing DaqLink Software on page 38 for more details.

2. Once the software and associated components have been installed, launch DaqLink from your DaqLink desktop shortcut 

.

3. The main DaqLink window is launched. The default view is called **Map View**.

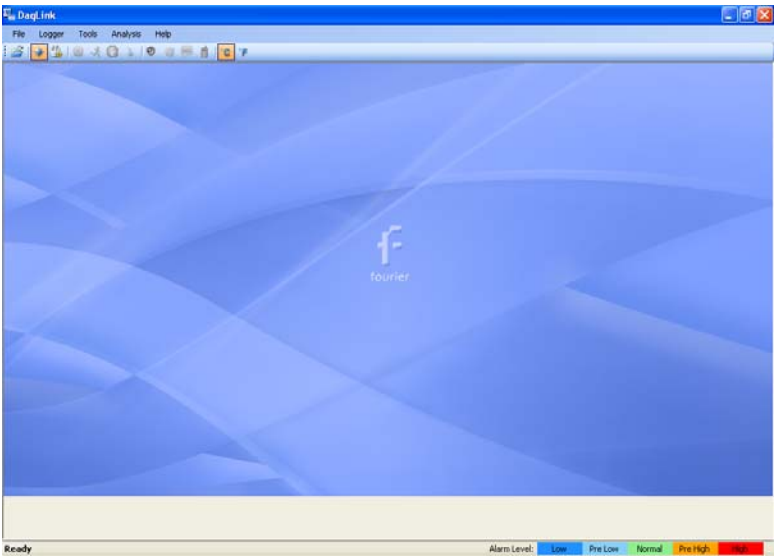


Figure 1: Main DaqLink window

4. Check for DaqLink updates. Go to **Help > Check for Updates** from the DaqLink main menu to check for newer versions of DaqLink software and firmware released since you purchased your system. For more details on the Update feature go to Chapter 5: Updating DaqLink Software and Firmware.

2.3. Connecting the Logger

Note: Only one DaqLink logger will be detected by the PC at a time.

1. Only once the DaqLink software and USB driver have been installed, connect the DaqLink data logger (DBSA710 or DBSA720) to the Fourier-supplied power adapter.

Note: Only use adapters provided by Fourier Systems. Use of the wrong adapter could damage your DaqLink units.

2. Turn on the unit by pressing the **Scroll** button  on the front keypad. The unit will beep when turned on.
3. Connect the mini-USB cable to the computer and to the data logger's mini-USB port.
4. From the DaqLink main menu, go to **Logger > Detect Logger**. The data logger icon will appear in the Map View indicating that the logger is detected.

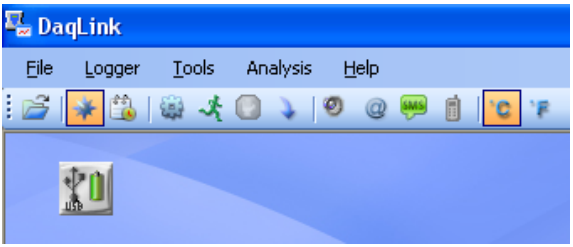


Figure 2: Adding data logger icon to Map View

Note: If the logger is not recognized by the software try connecting the mini-USB cable to another USB port on the PC. Or select **Logger > Detect Logger** again in the main menu.

Should you disconnect the logger's USB cable or power adapter (and the battery eventually dies), the logger icon will be grayed out: 

Note: You can move the logger icon elsewhere on the screen by going to **Tools > Lock Map View** and unselecting this option.

2.4. Charging DaqLink Loggers

This section refers to charging the DBSA710 or DBSA720 loggers.

Note: Only use adapters provided by Fourier Systems. Use of the wrong adapter could damage your DaqLink units.

If the loggers will run from the battery supply make sure to first charge each of the loggers for 16 hours before use in order maximize the battery life. A fully charged battery can last several months, depending on your logger configuration.

If the loggers will run from the AC power supply, when first connected to the AC adapter the logger will always initiate the 16 hour charge cycle.

Note: For loggers measuring data with the internal temperature sensor, it is critical to note that during the charge cycle the logger will heat up thereby causing the internal temperature sensor reading to rise up to 10 ˚C above ambient temperature. Once the charging process is complete, the logger will cool down and the internal temperature sensor readings will return to normal.

For loggers remaining connected to AC power, to prevent the logger from heating up again following the initial charge cycle, the logger will receive a one minute *trickle charge* each day rather than stay continually charged. This is sufficient to ensure the logger doesn't self-discharge and will maintain the logger's full charge status.

Refer to section 3.5.1 for more details on the DaqLink loggers' power supply.

2.5. Loading Map View Background

Load an image into the DaqLink software showing a map of your facility in order to place the Logger icons in their relative positions. As you deploy more standalone loggers, this will prove very helpful.

- Double click the Map View background to browse to the image directory and load the image. Remember to unlock the Map View in order to move the icons around.
- Right-click the Map View background and two options will be available: **Load Wallpaper** and **Reset Wallpaper**, which resets to the default Fourier wallpaper.

2.6. Configuring the Logger

Once the software has detected the DaqLink logger, you must configure the unit in order to start acquiring data.

5. Right-click on the Logger icon. Select **Setup** from the context menu.

   The Setup window will be launched.

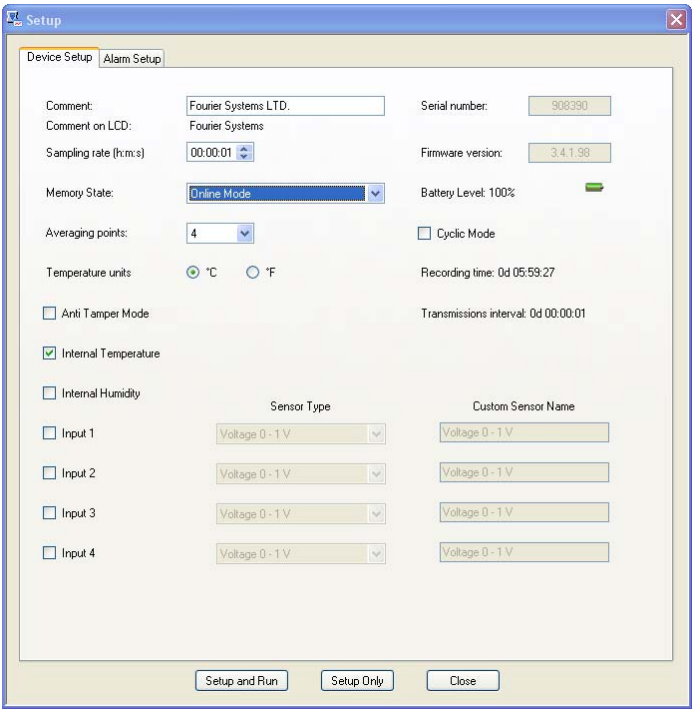


Figure 3: Logger Setup window

This dialog provides non-editable information such as the serial number, battery level, and firmware version of the current unit.

On the **Device Setup** and **Alarm Setup** tabs, the user is able to configure the following parameters:

- Unit's comment
- Sampling rate
- Memory State
- Averaging points
- Temperature units °C/°F (on the logger LCD)
- Anti-tamper mode
- Active sensors
- Custom sensors' names
- Alarm levels
- Alarm duration
- Alarm delay
- Alarm pre delay

6. Select the Memory State, **Online** or **Optimized Memory Modes**.
7. Select the sensors you wish to connect to the logger for data acquisition. It doesn't matter which order you select the sensors. You may only have Input 4 selected, for example, and Inputs 1 to 3 left unselected.
8. Select the sampling rate anywhere from 1 every second to 1 every 18 hours.
9. Unless you have Alarm levels you wish to edit (see the Alarms Setup tab), click either **Setup and Run** (to send the setup and immediately log data), or **Setup Only** (to send the setup but only log data at your command).
10. If you selected **Setup Only** in step 5, right-click the Logger icon and select **Run** from the context menu to start logging data or click  in the main tool bar.

The Logger icon will appear as follows when in Run mode:  .

11. To stop the logger, right-click the Logger icon and select **Stop** from the context menu.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

2.7. Viewing Data

Once you run the logger, you have several ways of viewing the online data that is being acquired.

- Online graph/table/statistics views
- Logger icon tooltip
- Sensor view

2.7.1. Online Data Views

Double clicking the Logger icon or selecting **Display Data** in the Logger icon context menu will open the online graph.

This graph is updated in real-time with the newly recorded data.

You can switch between Graph, Table and Statistics views to view the data in different formats.

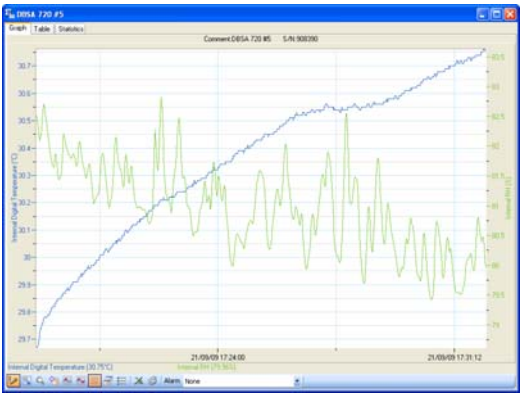


Figure 4: Online data – Graph view

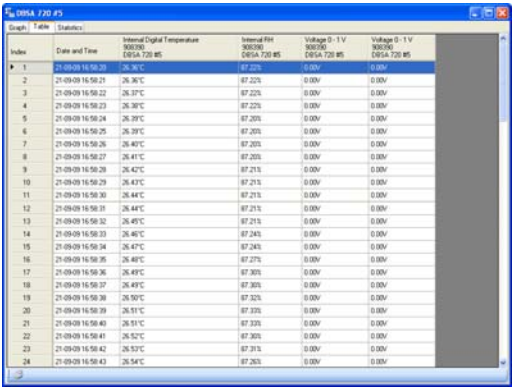


Figure 5: Online data – Table view

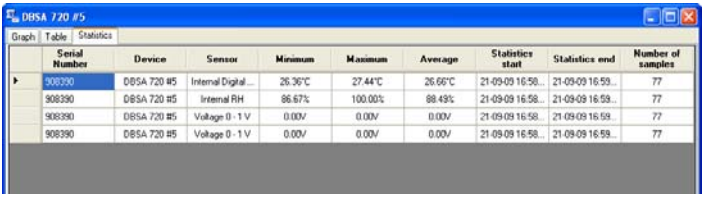


Figure 6: Online data – Statistics view

2.7.2. Logger Tooltip

Close the online data window and return to Map View. Scroll over the Logger icon and you will see a tooltip displaying the relevant logger information, including real-time data.

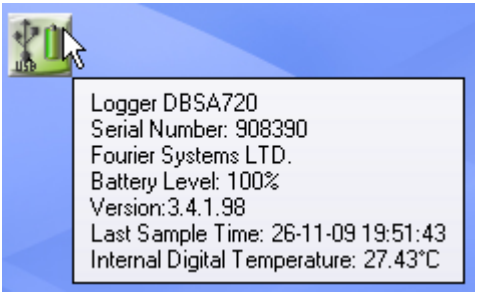


Figure 7: Logger tooltip

This tool-tip is updated with every newly recorded sample.

2.7.3. Sensor View

You can monitor data by viewing the data display of each individual sensor, rather than using the Graph or Table views. When the logger is running, the individual sensor data is displayed in a box in the bottom pane of the main Map View.

Figure 8: Sensor view

- If the sensor is in alarm, the sensor box will change color from green to red (just as the Logger icon would).

- Double-clicking the individual sensor box will open the data in the online Graph view.

2.8. Downloading Data

If the logger is being used as a standalone device you will have to connect it to the computer via USB cable in order to download the data to the software.

1. Connect logger to PC and go to **Logger > Detect Logger** in the main menu.
2. To download data:
   - Click the **Download** icon  in the upper toolbar, or
   - Go to **Logger > Download Logger**, or
   - Right-click the logger icon and select **Download Data**
3. View the downloaded data by double-clicking the logger icon.

Chapter 3:
DaqLink Hardware Overview

This chapter details the hardware features of the DaqLink data loggers.

3.1. Data Logger Front Panel Layout

3.1.1. DBSA710 and DBSA720

Apart from the color scheme, the DBSA710 and DBSA720 data logger models have the same front panel design.

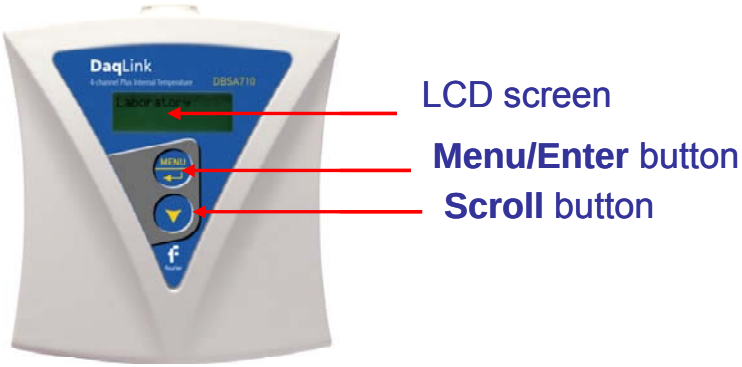


Figure 9: DBSA710 data logger front panel

LCD screen

Displays logger status, logger data, and Min/Max values.

Menu/Enter button

Use to enter logger menu options and to execute logger commands.

Scroll button

Use to scroll though menu items and to power on unit.

3.2. Data Logger External Connections

3.2.1. DBSA710 and DBSA720

External connections of the DBSA710 and DBSA720 are exactly the same.

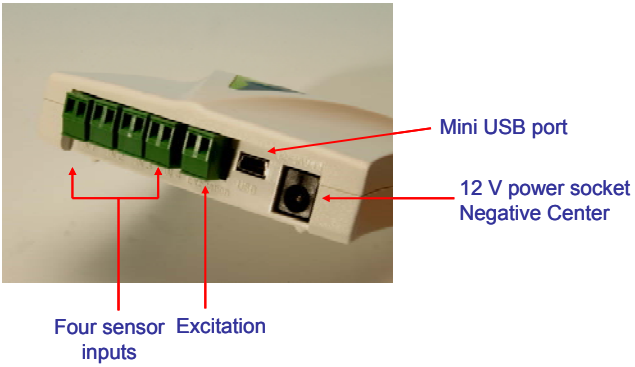


Figure 10: DBSA720 data logger external connections

Mini USB Port

To enable communication between logger and PC, for configuration and data download.

12 V Power Socket

To connect logger to external power supply (negative center).

Sensor Inputs

Pluggable screw terminal blocks marked In-1 to In-4 (from left to right), to connect wide range of sensor types for data acquisition. All four inputs can be used simultaneously. Sensors can be connected in any order.

To connect a sensor to the DaqLink data logger, unplug the screw terminal, connect the sensor's wires to the terminals, and then plug the terminal back to the corresponding socket on the input block.

Excitation socket

Output power socket used to power external sensors, power derived directly from the external power supply adaptor.

3.3. Data Logger Sensor Overview

This section provides an overview of the hardware specifications of the DaqLink data loggers.

3.3.1. Internal Sensor Types

The DBSA710 and DBSA720 loggers include internal sensors, depending on the logger model.

Sensor	Measurement Range	Accuracy	Logger Model
Digital Humidity	5% to 95%	±3% (in DaqLink software) ±4% (on logger LCD)	DBSA720

Sensor	Measurement Range	Accuracy	Logger Model
Digital Temperature	-20 ºC to 50 ºC	±0.5 ºC	DBSA720
Temperature PT100	-20 ºC to 50 ºC	±0.3 ºC	DBSA710

3.3.2. External Sensor Types

DBSA710 and DBSA720

Each of the four input channels of these data logger models are multi-purpose and can be individually configured to any of the following types and ranges.

Sensor	Measurement Range	Accuracy	Available Inputs
Current	4 to 20 mA	± 0.5 %	In-1 to In-4
Contact	Open (0) / Close (1)	N/A	In-1 to In-4
Frequency	20 Hz to 4 KHz	N/A	In-4 only
Pulse Counter	1 to 65,536 pulses 0 to 4 KHz	N/A	In-4 only
Temperature PT100 (2-wire)	-200 to 400 ºC	-200 to -60 ºC ±0.5 % -60 to 60 ºC ±0.3 ˚C 60 to 400 ºC ±0.5 %	In-1 to In-4
Temperature TC-J	-200 ºC to 1,000 ºC	-200 to -60 ºC ±0.5 % -60 to 60 ºC ±0.5 ˚C 60 to 1,000 ºC ±0.5 %	In-1 to In-4
Temperature TC-K	-200 ºC to 1,000 ºC	-200 to -60 ºC ±0.5 %	In-1 to In-4

Sensor	Measurement Range	Accuracy	Available Inputs
		-60 to 60 ºC ±0.5 ˚C 60 to 1,000 ºC ±0.5 %	
Temperature TC-T	-200 ºC to 400 ºC	-200 to -60 ºC ±0.5 % -60 to 60 ºC ±0.5 ˚C 60 to 400 ºC ±0.5 %	In-1 to In-4
Voltage	0 to 1 V	± 0.5 %	In-1 to In-4
Voltage	0 to 50 mV	± 0.5 %	In-1 to In-4

3.3.3. Sensor Connection

Connect the sensor/s to the terminal block/s at the top of data logger:

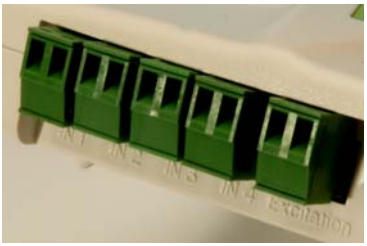


Figure 11: DaqLink logger sensor inputs

Sensors do not have to be added successively. You may only configure In-4, or configure In-1 and In-3, for example, when setting up the logger via the software.

3.3.4. External PT-100 Sensor Connection

The PT-100 sensor, as supplied by Fourier Systems, comes pre-wired to the data logger's terminal block.

The PT-100 positive polarity (red) and ground (white) wires are connected to the + input of the terminal block. The negative polarity (black) wire is connected to the – input on the terminal block.

3.3.5. Programming Limitations for DBSA710 and DBSA720

The standard sampling rate for all sensors on all inputs is from a maximum of one sample every second to a minimum of one sample every 18 hours. However, there are certain limitations using a specific combination of sensors, which must be taken into account when programming the DaqLink data loggers.

Note: The software integrates all programming limitations automatically when configuring the loggers.

Please refer to the table below for DaqLink programming limitations, where:

PT100, Thermocouple J, K or T	=	A
Internal Digital Temperature (on DBSA720)	=	B

Sensor Combination	Maximum Sampling Rate	Example Setup
3 x A 4 x A A + B	One sample every three seconds	**In-1:** PT-100 **In-2:** TC-J **In-3:** TC-J

Sensor Combination	Maximum Sampling Rate	Example Setup
(2 x A) + B (3 x A) + B	One sample every four seconds	**Internal:** Temp **In-1:** TC-T **In-2:** PT-100
(4 x A) + B	One sample every five seconds	**Internal:** Temp **In-1:** TC-T **In-2:** TC-J **In-3:** PT-100 **In-4:** PT-100

Table 1: Data Logger programming limitations

3.3.6. External Alarm Output

The DaqLink system supports connection of an external alarm e.g. siren, audible alarm, to In-1 of the DBSA710 and DBSA720 data loggers.

When connected to the logger, the external alarm will be activated only when that logger is in alarm status.

Once there is no alarm status, the external alarm will be deactivated.

Data Logger External Alarm

In-1 of the DBSA710 and DBSA720 serves either as a standard sensor input or as an external alarm output. Ensure the logger is connected to AC power if connected to an external alarm.

Configure In-1 as **Alarm Normally Open** or **Alarm Normally Closed** in the logger Setup window in the DaqLink software.

Normally Open will result in the alarm being activated during alarm status (the circuit will be closed).

Normally Closed will result in the alarm being activated when logger is not in alarm and therefore deactivated when there is an alarm (the circuit will be opened).

Connect In-1 to your external alarm device and connect the logger to AC power.

Use the **Alarm Setup** tab in the Setup dialog to define the logger alarm settings. If these settings are breached then the alarm will be activated.

External Alarm Schematic

See the schematic below explaining how to hook up an external alarm to the DaqLink unit.

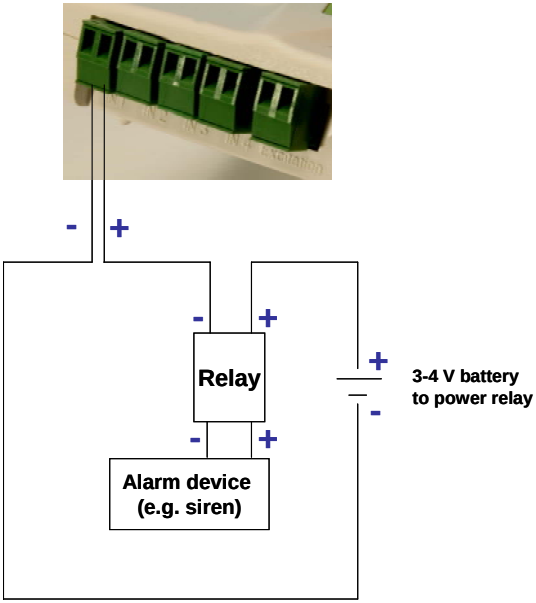


Figure 12: External alarm schematic

- + from DBSA710/720 goes to – of the Relay inputs
- + of Relay input goes to battery that powers the Relay
- Load inputs of the Relay go to the Alarm device e.g. siren, lights, etc.
- - of the battery goes to – of DBSA710/720.

Note: Maximum load of the Relay is 50 mA, 3 V.

Refer to Appendix A: DaqLink Specifications for the full external alarm output specification.

3.3.7. Polarity

Current, voltage, thermocouples and user defined sensors have distinct polarity. Be careful to connect them in the right polarity.

3.3.8. Frequency / Pulse Counter

Connect the signal wires to In-4 terminal blocks, and select **Frequency** or **Pulse counter** for **Input 4** from the logger Setup window in the DaqLink software. Inputs 1 to 3 are still available for other sensors.

The Frequency/Pulse counter is optically isolated from the internal circuitry and can simultaneously measure a signal source, together with another input.

3.3.9. User Defined Sensors

DaqLink provides a simple and straightforward tool for defining a limited number of custom sensors. Almost any sensor or transducer with 0 – 1 V or 4 – 20 mA output is

accepted by the DaqLink logger and its electrical units are automatically scaled to meaningful user-defined engineering units.

The sensor definitions are stored in the logger's memory and are added to the sensors list. The sensor's readings are displayed in the user defined units only in the DaqLink software. Future versions will also support displaying the user defined engineering units on the logger LCD.

Refer to section 4.5.1 for more details.

3.3.10. Sensor Alarms

Via the software, users can define minimum and maximum alarm levels for each input individually. Users can define pre-low and pre-high alarm levels, for an additional level of safety in case the logger is approaching an actual breach of alarm.

The DaqLink logger display indicates when the sensor reading is in alarm of any type. The symbols AL-H, AL-L, AL-P-H or AL-P-L are visible next to the corresponding input readings.

Refer to section 4.12 for more details.

3.3.11. Sensor Calibration

The DaqLink data logger is shipped fully calibrated. However, further calibration can be applied via the DaqLink software. The calibration parameters are sent to the data loggers via USB connection and stored in the logger's memory.
Users may calibrate individual inputs as well as all inputs at once. Calibration settings may be saved and then loaded into the logger at a later date if the calibration settings have changed.

Refer to section 4.12.4 for more details.

3.4. Unit Serial Number and Comment

Every DaqLink data logger unit is embedded with a unique serial number.

The data logger only can be loaded with a descriptive comment to identify its task and location. You may add or edit the logger comment via the DaqLink software.

Every time data is transferred to the computer it is labeled both with the logger's serial number and comment and is displayed in the graph or data table view.

The unit serial number is also marked on a sticker on the back of the product.

3.5. Power Supply

3.5.1. DBSA710 and DBSA720 Data Loggers

The DBSA710 and DBSA720 data loggers run from an internal NiMh rechargeable battery as well as from external AC power supply. Depending on the logger configuration, from a fully charged battery, the data logger can run for up to several months. Refer to section 3.5.3 for more details on battery life.

Note: Charge the data logger units for 16 hours before using them for the first time.

When connected to external power supply, the data logger battery will not be charged when the unit is turned off. This will allow the system to protect the battery from overheating.

First Time Charging

From a fully drained battery, you must charge the battery for **16 hours** to bring it to a full charge. Once the charge cycle is complete, the logger will run from the external power supply, without draining (or charging) the internal battery. In order to maintain a fully charged battery and ensure the battery doesn't self-discharge, the battery charger will daily charge the unit for one minute to maintain the battery capacity.

Note: Before storing the DaqLink units make sure you have unplugged all the sensors and turned the units off via the keypad.

Standard Charging

Whenever a logger is reconnected to the charger it will begin the 16-hour charge cycle, no matter what the status of the battery. Once the charging cycle is complete the logger will run from external power supply.

Effect of Charging Battery on Temperature Sensor

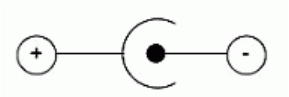
For loggers measuring data with the internal temperature sensor, it is critical to note that during the charge cycle the logger will heat up thereby causing the internal temperature sensor reading to rise by up to 10 ˚C above ambient temperature. Once the charging process is complete, the logger will cool down and the internal temperature sensor readings will return to normal.

For loggers remaining connected to AC power, to prevent the logger from heating up again following the initial charge cycle, the logger will receive a one minute *trickle charge* each day rather than stay continually charged. This is sufficient to ensure the logger doesn't self-discharge and will maintain the logger's full charge status.

3.5.2. Power Adapter

The DaqLink power adapter is used to power the DBSA710 and DBSA720 units. The mains adaptor (AC/DC adaptor) converts mains power (from a wall outlet) to a voltage suitable to the DaqLink hardware unit.

- Output: Capacitor filtered 9 to 12 VDC, 300 mA
- Female plug, center negative



Note: Only use Fourier-supplied power adapters to avoid damaging the units with incorrect power supply.

3.5.3. Data Logger Battery Life

Battery life depends on the logger sampling rate, type of sensor, and number of measured sensors.

DBSA710 and DBSA720 can last up to six months on a charged battery depending on logger configuration.

3.6. USB Communication Cable

A mini USB communication cable is supplied as part of the DaqLink PC Suite. This cable connects the DaqLink data logger to the DaqLink PC workstation. When connected to the PC the logger can communicate with the software for configuration and data download purposes, for example.

The USB cable also powers the logger when connected to the PC but it does not charge the internal battery.

Note: The USB driver is installed as part of the software installation process. Without this driver the PC won't detect the logger. To avoid compatibility problems do not connect the logger to the PC before installing the USB driver.

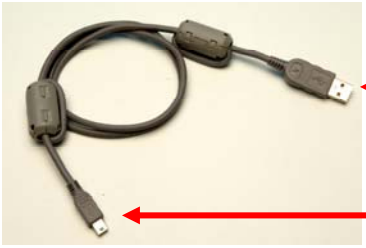


Figure 13: USB communication cable

3.7. DaqLink Keypad Overview

3.7.1. DBSA710 and DBSA720 Keypad

The DBSA710 and DBSA720 units each have two buttons on the keypad, which are used to navigate through the LCD menu options, as well as turn on the units.

Refer to section 3.8 to learn how to operate the data loggers.

The **Menu** button 

has two functionalities:

Navigate to the main menu. When pressed from within a submenu, the display will take you back to the main menu.

Selecting an option from one of the menus. When pressed on one of the

main menu items, it will take you to the sub menu options.

The **Scroll** button  has two functionalities:

When the unit is off, pressing this button will power the unit on.

Scrolls through the menu options.

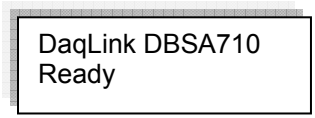
3.8. Operating the DBSA710 and DBSA720

This section explains how to operate the DBSA710 and DBSA720 loggers and provides an overview of the menu options on the units' LCD screen.

3.8.1. Turning on the Unit

In order to view the logger menu options, the unit must be powered on by pressing the **Scroll** button  on the keypad. Ensure the logger is charged or connected to the AC adapter.

Once the unit is switched on it will emit a short beep and the screen will display a welcome message:



3.8.2. Display Shutdown

If the logger screen is inactive for thirty seconds it will turn off. However the logger will continue to operate in the background. Press the **Scroll** button to enable the LCD screen again. The screen will not turn off during firmware upgrade.

3.8.3. Main Menu Options

There are three menu categories on the data logger:

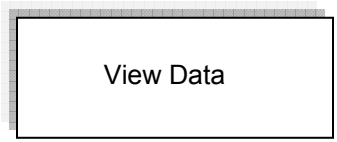
- View Data
- Status
- Min/Max Values

Note: If the unit is not in Run mode only the Status menu options will be available.

Press the **Menu** 

button to reach the main menu display. Scroll through the main menu options (View Data, Status and Min/Max Values) using the **Scroll** button. Once you reach the main menu option you need, press **Enter** to select that option and enter the sub menus.

View Data Menu



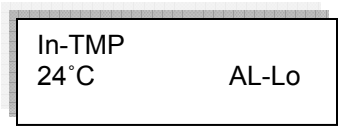
Note: View Data is the default page *when the unit is running.*

If there is more than one sensor running, the screen will auto scroll between the sensors showing the sensor name and senor value. These are real-time displays.

The display will switch back to the View Data screen after five minutes if none of logger buttons have been pressed.

If the sensor breached any of the predefined alarm levels, then the alarm symbol will be displayed alongside the data reading.

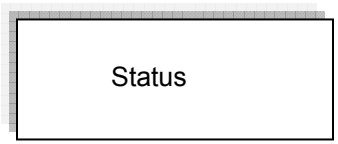
For example:



The logger display alarm symbols are:

- **AL-HI** : Alarm High
- **AL-Lo** : Alarm Low
- **AL-P-H** : Pre Alarm High
- **AL-P-L** : Pre Alarm Low

Status Menu



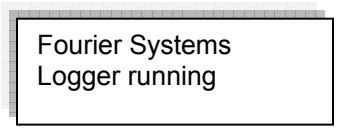
The Status menu contains the following sub menus, all reachable by using the **Scroll** button.

The sub menus are outlined below in the order in which they appear on the logger display.

Name and Status

As explained previously, the unit name (or Comment) is displayed on the first row and the second row indicates the logger status.

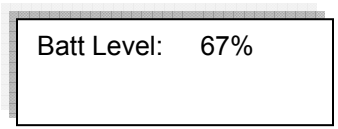
If the logger is running, then the following screen is displayed.

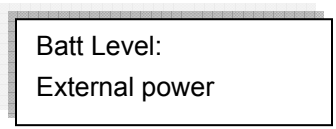


Batt Level (battery level)

If the power adapter is not connected the battery percentage will be displayed.

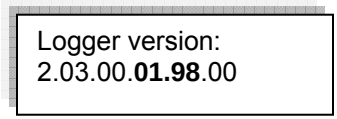
If the power adapter is connected **External power** will be displayed.





Logger Version

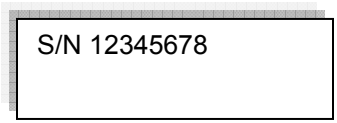
This menu informs the user of the logger firmware version. This is helpful when you need to upgrade the system firmware, to check the current version. Or when contacting Fourier technical support, with any technical issues.



The firmware version is commonly referred to by the numbers in bold in the screen above. For example, the firmware version which is supported by this user guide is v1.98.

S/N

This menu displays the unit's eight digit SN.



Memory Mode

There are two possible device modes:

- Stop when full – when the logger memory is full the logger will stop logging.
- Cyclic mode – for continuous logging. The logger will continue to log once the memory is full by writing over the first recorded samples.

The memory mode is toggled in the Setup dialog, using the Cyclic Mode checkbox.

When the logger memory is full, the LCD will display **Memory Full**.

Press Menu to pause logger (when logger is in Run mode)

By pressing the Menu button, the logger will cease to log data until the Menu button is pressed again from the same screen.

When in *Paused* mode, the user can still scroll through the logger menu screens and use other features. The user must scroll back to the Pause Logger menu in order to resume the logger operation.

Reset Unit

When the unit is reset, upon start up it will automatically reconnect to the DaqLink software if a USB connection is

established. In addition, if the logger will continue to operate according to its last set up instruction. For example, if the logger was in Run mode, then after reset it will continue to run and record data.

Turn Off Unit / Stop and turn off

Selecting this option will shut the unit down. You can turn the unit on again by pressing the **Scroll** button.

If the logger is in Run mode, selecting this option will first stop the logger, and then turn it off.

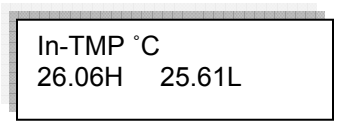
It is recommended to turn off the unit when it is not in use.

Min / Max Values Menu

Each sensor's minimum/maximum readings (taken from the current logging session) will be displayed on two rows.

The first row indicates the sensor type, along with the measurement units e.g. V, and the alarm indication if there is an active alarm on this sensor.

The second row indicates the minimum and maximum measured value and the units. H and L represent High and Low values, respectively.



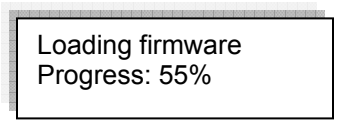
3.8.4. Additional Logger Screens

Loading Firmware

When updating the firmware of the data logger via the software's Firmware Update Center, the logger screen will

display the update progress. When complete the main logger status screen will be displayed.

Also refer to Chapter 5: Updating DaqLink Software and Firmware.



Note: Logger must be in Stop mode before firmware can be updated.

Chapter 4:
Using the DaqLink Software

This chapter provides detailed description of the DaqLink software features, allowing you to manage your DaqLink network and perform a variety of actions on your data loggers, such as setup, calibration, defining new sensors, managing Email and SMS notifications, firmware updates and so on.

4.1. Installing DaqLink Software

Part of your DaqLink package includes a DaqLink software CD. Follow the software installation instructions provided below.

4.1.1. System Requirements

To work with DaqLink your system should be configured according to the following specifications:

Software

- Windows 2000 SP3, Windows 2003, Windows XP SP2, and Windows Vista
- Internet Explorer 5.01 or higher
- Minimum screen resolution: 1024 x 768 (800 x 600 not supported)

Hardware

- Pentium 800 MHz or higher
- 256 MB RAM
- 250 MB available disk space for the DaqLink application

4.1.2. Installation Procedure

Please read these instructions before proceeding with the installation process.

1. Insert the DaqLink software CD into your computer's CD drive. The DaqLink Installation Wizard automatically starts running.
2. The Wizard first installs **Microsoft .NET Framework 2.0**. The DaqLink software requires this platform in order to run. Follow the installation instructions to install the .NET Framework on your PC. This step can take up to two minutes to complete. Click **Finish** once installation is complete.
3. The Silicon Laboratories USB driver installation will now launch. The driver is necessary for the computer to detect the DaqLink data logger hardware.
4. Follow the on-screen instructions to continue the installation process. The default installation location is *C:\SiLabs*.

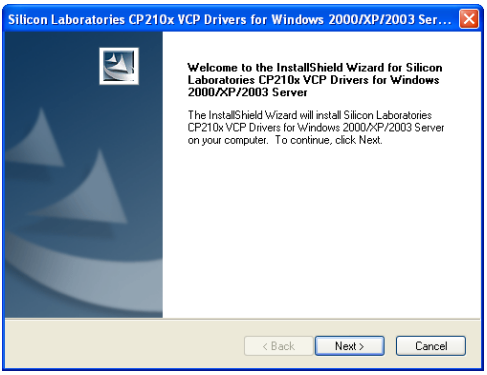


Figure 14: Installing Silicon Labs USB driver – Step 1

5. The following window will pop up. Make sure to select the checkbox to launch the driver installer, and click **Finish**.

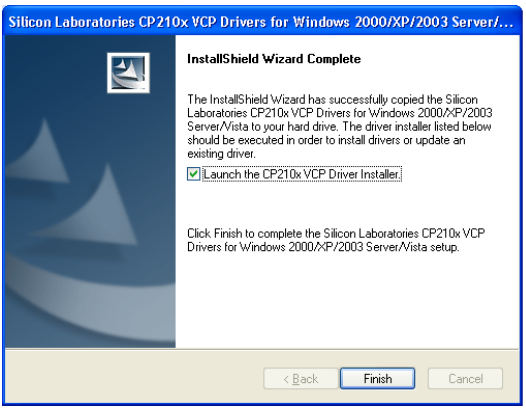


Figure 15: Installing Silicon Labs USB driver – Step 2

6. In the subsequent window, click **Install** to install the driver.

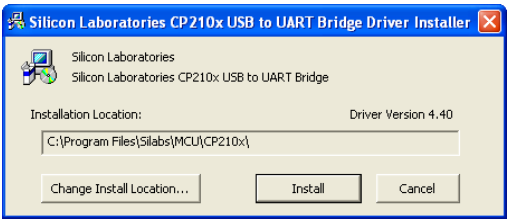


Figure 16: Installing Silicon Labs USB driver – Step 3

The installation of the driver could take up to one minute or more, depending on the system.

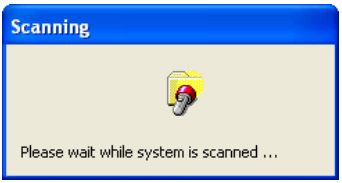


Figure 17: Installing Silicon Labs USB driver – Step 4

7. Once installed click **Finish** to close the USB driver Install Wizard dialog.
8. The main DaqLink Installation Wizard now resumes. Follow the installation instructions to install DaqLink on your computer. Once the installation process is completed click **Finish**.
9. The DaqLink software and components have now been installed. Double click the DaqLink shortcut on your desktop to launch the software.
10. Connect the DaqLink data logger to a USB port on your computer. It will automatically detect the logger as new hardware. After a few seconds you will see a message

stating that the device is ready for use. You may now begin to configure your DaqLink units.

4.1.3. Installation Troubleshooting

When connected to the PC USB port the logger was not detected by the software.

Ensure that the USB driver was installed properly.

Go to **Control Panel > Add/Remove Programs** (in WinXP), and check that the driver is installed:

If not, you should run the Silicon Labs setup file to install the USB driver: CP210x_VCP_Win2K_XP_S2K3.exe setup.exe to install the driver.

If the driver is installed, ensure that there is no other device sharing the USB com port with the DaqLink data logger.

If you didn't select the **Launch CP210x VCP Driver Installer** checkbox during step 2 of the driver installation wizard (see section 4.1.2), then the driver wasn't installed. Run the wizard again and be sure to select the checkbox.

4.2. DaqLink Software Layout

This section provides an overview of the default DaqLink window view as well as a guide to all of the icons available throughout the software.

The most commonly used tools and commands are displayed on two toolbars. Tools that relate to all aspects of the program

are located in the main (upper) toolbar. Tools specific to the graphs are located on the graph (lower) toolbar.

Refer to section 4.2.5 for a description of these toolbars

4.2.1. Map View

When DaqLink is first launched, the default window that is opened is the Map View (see screenshot below).

You can also switch to Map View at any time by clicking the **Map View** button  in the main toolbar.

This view is used to monitor the location of all of the data loggers deployed as well as the data recorded by each sensor input when working in Online mode.

Icons are used to represent each of the DaqLink units, and using the mouse the user can select specific actions to be performed on the unit.

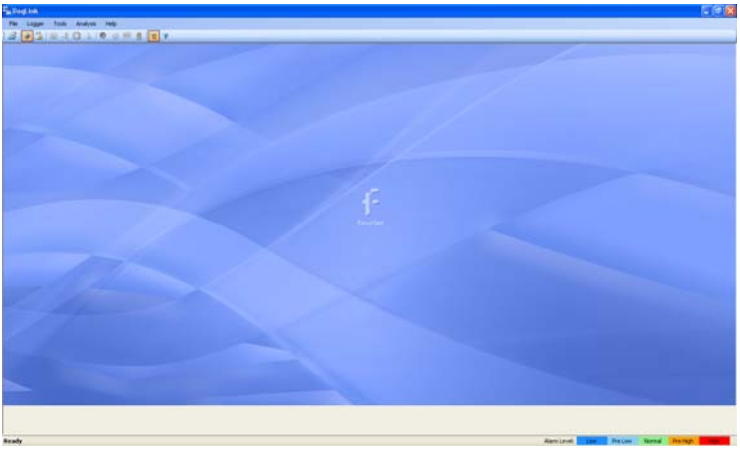


Figure 18: Main window - Map View

Refer to section 4.10 for more details on working in Map View.

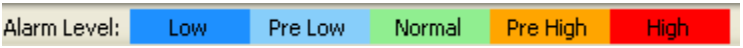
4.2.2. Viewing Sensor Data in Map View

When the logger is in Run mode and connected to the DaqLink software the sensor data is represented in individual windows at the bottom of the Map View window. All sensors which are currently online will be displayed in this view. If a logger is currently offline then its data will not be visible.

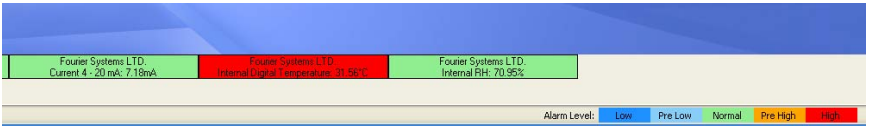
Figure 19: Main window – Sensor Data in Map View

Sensor in Alarm

When the sensor data is in alarm, the color of the sensor window will change according to the alarm type. There is a legend in the lower right corner of the main window:



For example:



This screenshot indicates that the Internal Digital Temperature reading is in High alarm, while the other sensors are reading at normal levels.

Additional Features

- The sensor windows may be dragged and rearranged anywhere on the lower pane.

- Double clicking the sensor window will open the Data Display window, where the real-time sensor data is displayed in graph or table view.

4.2.3. History View

Clicking the **History View** button  in the main toolbar will switch the main window to view archived, offline data stored in the DaqLink directory on the workstation.

You must first open the archived data file by clicking **Open File**  on the main toolbar. When you open the data file it will be displayed in the History View, otherwise, the History View window will be blank.

Refer to section 4.8: Viewing Archived (Offline) Data on page 64 for more details on opening files in History View.

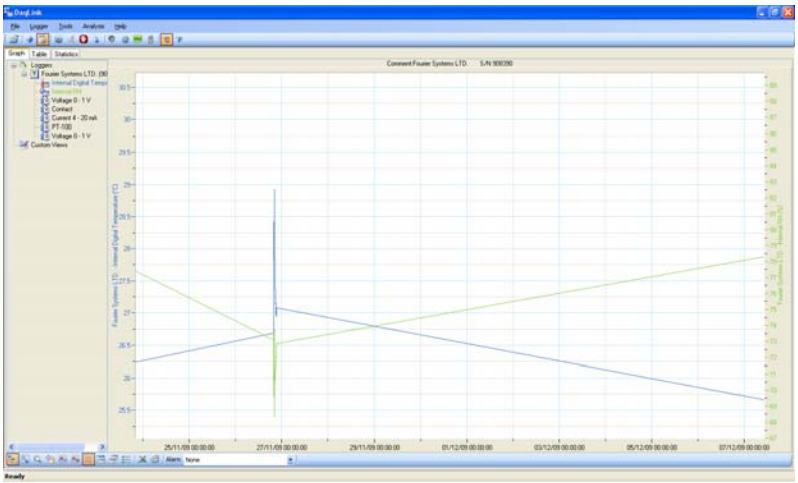


Figure 20: Main window – History View

In History View, the user may view the data in graph or table format by clicking the relevant tabs, as well as view a number of Statistics taken from the data set.

To learn the functionality of the lower graph toolbar, refer to section 4.2.5 below.

4.2.4. Data Map

The History View window also includes the Data Map pane, on the left of the window.

The Data Map displays all data sets opened in History View, saved in the current project file, and includes nodes for each sensor in the data set.

Clicking the sensor label removes the data from the graph. When the label is black, the data is not displayed on the graph. The sensor data plot color is matched to the color of the sensor label in the Data Map.

Each data set is preceded by a **Logger** icon  , which can be expanded or collapsed to display the associated sensor data.

Clicking the **Tree** icon  in the lower graph toolbar removes the Data Map pane altogether allowing a full screen graph view.

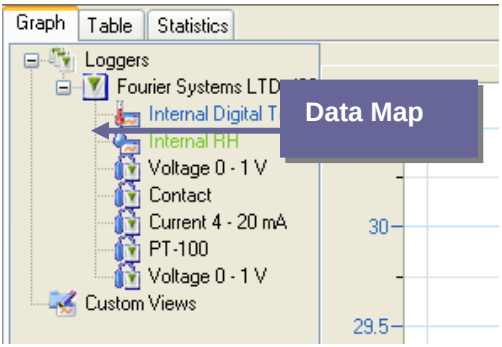


Figure 21: Data Map

4.2.5. DaqLink Toolbar Icons

This section outlines all of the toolbar icons available in the software.

Main (Upper) Toolbar Icons

Figure 22: Main toolbar icons

The main toolbar is always available at the top of the DaqLink application, no matter what window view the user is in.

This toolbar cannot be moved or hidden.

-  **Open file** - Opens archived logger data file stored on the PC
-  **Map view** - Switches main window to Map view, where the DaqLink units and sensor data are represented

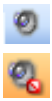
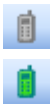
-  **History view** - Switches main window to History view, where archived logger data can be viewed and analyzed
-  **Setup** - Launches logger Setup window
-  **Run** - When logger is in Stop mode, click Run to start logging
-  **Stop** - When logger is in Run mode, click to stop logging
-  **Download** – Downloads data from logger
-  **Alarm mute/unmute** - Mutes or unmutes an audible alarm in the system when a sensor reading has breached the user-defined alarm level
-  **Email Alarm Notifications** - Configuration window for Email alarm notifications
-  **SMS Alarm Notifications** - Configuration window for SMS alarm notifications
-  **GSM Modem** - Indicates if GSM modem is connected (green icon) or disconnected (grey icon)
-  **Temperature unit toggle** - Display all data in Celsius
-  **Temperature unit toggle** - Display all data in Fahrenheit

Table 2: Main toolbar icon list

Map View Icons

The following icons representing the various statuses of the DaqLink units are viewed in Map View. Using these icons the user is able to determine the status of the logger e.g. alarm, power, and connection.

Alarm status is color-coded: **Green** = Normal ; **Red** = Alarm

-  Logger which has received its Setup but is in Stop mode.
  Running from internal battery supply.
-  Logger which has received its Setup but is in Stop mode.
  Running from external power supply.
-  Logger in Run mode and running on battery supply.
  Green indicates there are no alarms.
-  Logger in Run mode and running on external power supply.
  Green indicates there are no alarms.
-  Logger in Run mode with an alarm alert.
  Running from internal battery supply.
-  Logger in Run mode with an alarm alert.
  Running from external power supply.
-  Logger is offline and is no longer detected by the computer. Its power supply may have failed or the USB cable was disconnected.
-  Logger is processing a command sent from the software.

-  Logger is downloading data.

Table 3: Main toolbar icon list

Graph (Lower) Toolbar Icons

The graph toolbar is located at the bottom of the open graph view, when the user is either in Online Data Display:

Or History View:

The toolbar cannot be moved or hidden.

-  **Data Map** (in History View only) – Hides or shows the Data Map pane in the History View window.
-  **Plot Legend** (in Display Data View only) – Hides or shows the sensor labels from the bottom of the graph.
-  **Autoscale** - Returns the data to its default scale.
-  **Zoom in** – Zooms in on the graph data.
-  **Pan graph** – Pans the graph along the x or y axis.
-  **Select first cursor** – Adds a cursor to the designated plot on the graph
-  **Select second cursor –** Adds a second cursor to the designated plot on the graph.

-  **Grid –** Adds a grid to the graph background
-  **Add Custom View** (in History View only) **–** adds the open, customized graph view to the Data Map
-  **Copy graph** – Copies the graph to your clipboard, to be copied to a document or spreadsheet, for example.
-  **Graph properties** – Opens the Graph Properties window.
-  **Export to Excel** – Export the open data sets to Excel format.
-  **Print** – Opens the Print dialog. Available for graph, table and statistics views.

Table 4: Lower graph toolbar icon list

Data Map Icons

-  Displayed internal Temperature sensor data set
-  Hidden internal Temperature sensor data set
-  Displayed internal Humidity sensor data set
-  Hidden internal Humidity sensor data set
-  Displayed external sensor data set
-  Hidden internal sensor data set

-  Displayed graph function
-  Hidden graph function
-  Parent node for all logger data sets. Click to expand or collapse all child nodes.
-  Logger data set. Click to expand or collapse the data set containing all measured inputs of the specific logger.
-  Parent node for all custom graph views. Click to expand or collapse all child nodes.
-  Displayed custom graph view. When hidden the icon is grayed out.

Table 5: Data Map icons

4.3. File Menu Items

4.3.1. Open

Select **Open** to access archived data files for each logger you have configured.

Shortcuts: You can also click the **Open** icon  or press **Ctrl+O** to open archived files.

4.3.2. Open Project File

Opens project files of offline data, containing data from one or more loggers, as opposed to standard data files containing data from only one logger.

4.3.3. Save Project

This feature lets the user save multiple data sets and custom graph views into a single Project File. Only available in History View.

4.3.4. Save Project As

Use this feature to save an existing Project file under a different name.

4.3.5. Exit

Exits the DaqLink application.

4.4. Logger Menu Items

4.4.1. Display Data

Displays the logger's data in Graph view. The graph displays the data in real-time. There is also the option to display the data in Table view or to view the data statistics.

4.4.2. Download Data

Downloads all data in the logger memory to the DaqLink software. When logger is downloading the data, the Logger icon in Map View will appear as follows:

4.4.3. Cancel Download

When logger is downloading data you may cancel the download per logger by selecting this menu item.

Note: This feature works only if there are no other commands in the queue following the Download process.

4.4.4. Reset Alarm

When the logger is in a state of alarm, this option will reset the alarm state to normal on both the logger and the software. The visual and audible alarms will return to normal. If after reset the logger is still in alarm conditions, then the visible and audible alarms will return.

4.4.5. Calibration

Refer to section 4.12.4 on page 84 for an overview of the Calibration feature.

Note: A logger can't be calibrated while it is in **Run** mode. The option will be grayed out. You must **Stop** the logger first.

5.2 on page 107 for an overview of how to update the logger firmware.

4.4.6. Cancel Firmware Update

When a firmware update is in progress, select this option to cancel the update and continue using the previous firmware version.

4.4.7. Setup

Refer to section 4.11 on page 72 for an overview of how to setup the logger.

4.4.8. Stop

Sends a command to the logger to stop logging data.

4.4.9. Run

Sends a command to the logger to start logging data. This command will also clear the existing logger memory.

4.4.10. Detect Logger

If the logger is not automatically detected when connected to the computer via USB, use this option to detect the logger.

4.5. Tools Menu Items

4.5.1. Define Sensor

DaqLink enables the user to define custom sensors. This is a useful tool for when the data logger is communicating with many sensor types from different vendors.

Any additional sensor that you would like to connect to the logger must comply with the following restrictions:

The sensor's output must be either voltage in the range of 0 to 1 V, 0 to 50 mV, current in the range of 4 to 20 mA or Pulse in the range of 0 to 65535 pulses.

1. Click **Tools > Define New Sensor** and the Define New Sensor dialog will open.

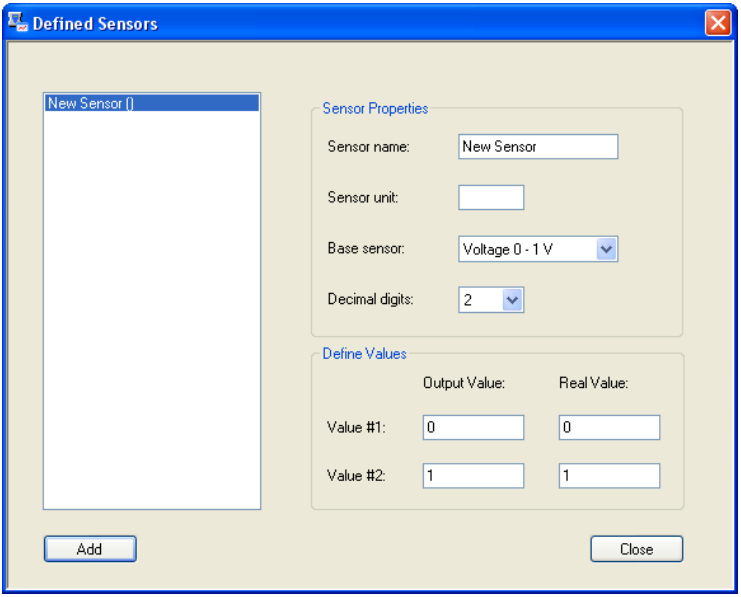


Figure 23: Define New Sensor dialog

2. Click **Add** to enable the fields.
3. Select the **Base sensor** from the drop-down menu (depending on whether your sensor's output is 0 to 1 V, 0 to 50 mV, 4 to 20mA, or measuring pulses).
4. Enter the sensor name and sensor unit.
5. Enter two calibration values (two real values and the corresponding output values of the sensor).
6. Click **Close**.

To use the custom defined sensor:

1. Enter the Setup dialog for the data logger you want to configure.
2. Select the Input you wish to use and from the **Sensor Type** drop-down menu, select the custom sensor, which now appears in this list.
3. Proceed with the setup as you would normally do.

4.5.2. Lock Map View

While in Map View, with Lock Map View selected the Map View icons are in a fixed position and can't be moved. You must unselect this option in order to freely move the icons anywhere on the screen. This is essential if working with a custom background image.

4.5.3. Options Menu

Refer to section 4.6 for more details.

4.5.4. Email Alarm Notifications

The Email Alarm Notifications dialog is where the user can configure all notifications to be sent via Email to a predefined contact list. Refer to section 4.12 for details.

4.5.5. SMS Alarm Notifications

The SMS Alarm Notifications dialog is where the user can configure all notifications to be sent via SMS to a predefined contact list. Refer to section 4.12 for details.

4.6. Tools > Options Menu Items

The Options dialog is divided into three main tabs:

- Preferences
- Email Settings
- SMS Settings

4.6.1. Preferences Tab

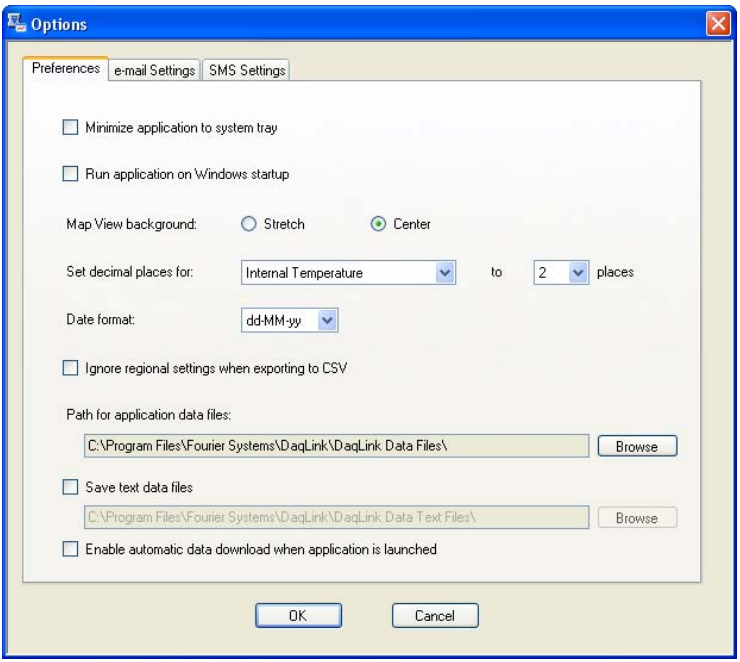


Figure 24: Options > Preferences tab

The Preferences tab includes the following options:

Minimize application to system tray

When this checkbox is selected, the DaqLink icon  will appear in the computer's system tray in the lower right of the screen when the application is minimized. Simply double-click the icon to maximize the application to full screen.

Run application on Windows startup

Select this checkbox to have the DaqLink application launch together with Windows start-up.

Map View background

Use this option to toggle between Stretch and Center views for the background image used in Map View.

Set decimal places for…

For each DaqLink sensor, internal or external, you may select between 0 and 6 decimal places to be used when displaying the data in the software.

Date format

Choose between four date formats to be used throughout the software when displaying data e.g. in the Graph display.

Ignore regional settings when exporting to CSV

Selecting this option will ensure that data will be corrected exported to a CSV file and will not use any custom regional settings in the Windows OS which might adversely affect the layout of the data in the CSV file.

Path for application data files

The default path for saving all data recorded by the data loggers is:

C:\Program Files\Fourier Systems\DaqLink\DaqLink data files\

Click **Browse** to change the path e.g. to a network path.

Save text data files

Select this checkbox if you would like DaqLink to also save the logger data to a text file. The default path is: C:\Program Files\Fourier Systems\DaqLink\DaqLink data text files\ and clicking **Browse** will let you change this path.

Enable automatic data download when DaqLink is launched

Select this checkbox if you want to have automatic download of data when the DaqLink software is launched. If a DaqLink logger is connected to the PC during software launch then data will be automatically downloaded.

4.6.2. Email Settings Tab

DaqLink's alarm notification feature enables sending of Emails to notify the user of any alarm in the system. This feature will only work when the DaqLink is working in **Online** mode.

First select the **Send Email notifications** check box. Fill in the fields accordingly so that DaqLink will be able to send Emails to predefined Email contacts when your loggers have breached certain alarm levels.

Make sure to enter the field correctly e.g. with no extra spaces or typos.

Refer to section 4.11.2 for setting Alarm levels on the logger and to section 4.12 for managing the Email alarm notifications.

Note: DaqLink supports SMTP and MIME encoding, and POP3 mail protocols.

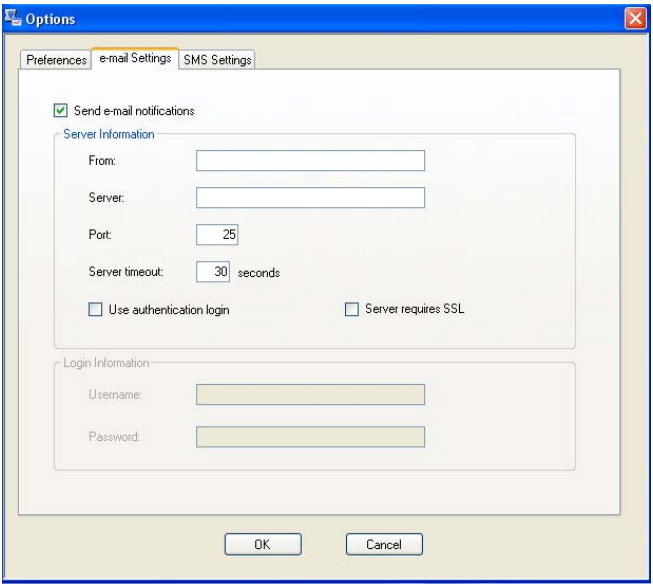


Figure 25: Options > Email Settings tab

4.6.3. SMS Settings Tab

DaqLink's alarm notification feature enables sending of SMS's to notify the user of any alarm in the system. This feature will only work when the DaqLink is working in **Online** mode.

First select the **Send SMS notifications** check box. Using the SMS feature requires connection of a GSM modem and SIM card to the DaqLink PC, or even just a cellular phone with an active SIM card.

You must select the COM port which the GSM modem/cellular phone is connected to in order for the software to detect it.

Note: When using a cellular phone as a modem, ensure that the PC software suite is disabled before connecting the phone to the PC com port. Otherwise the com port will not be available for the DaqLink software.

Once the configuration is complete, DaqLink will be able to send SMS's to predefined SMS contacts when your logger have breached certain alarm levels.

Refer to section 4.11.2 for setting Alarm levels on the logger and to section 4.12 for managing the SMS alarm notifications.

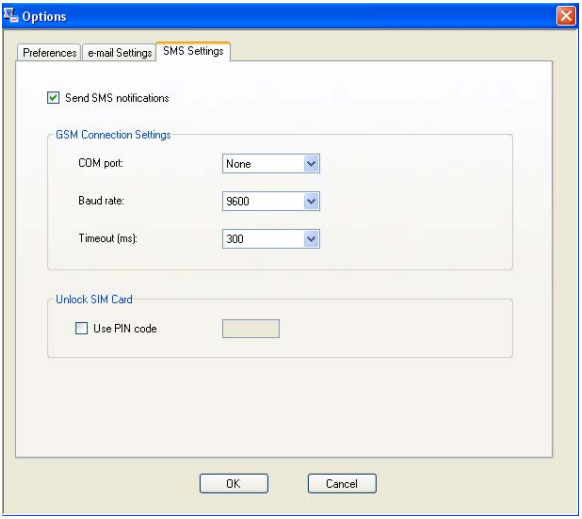


Figure 26: Options > SMS Settings tab

Note: Once the GSM modem is online you will see the green GSM icon  appear in the DaqLink upper toolbar.

4.6.4. Analysis Menu Items

The Analysis menu items are enabled when viewing offline data in History View.

The Analysis options available are:

- Functions Parameters
- Dew Point
- FO Pasteurization
- Histogram
- Export to Excel
- Export to CSV

Export to Excel

You may export offline data to Excel by selecting this menu item or by clicking the **Export to Excel** icon  in the lower graph toolbar in History View. The data is opened in an Excel worksheet and includes pertinent information such as logger name, SN, sensor names, alarm levels as well as the actual data readings.

Refer to section 4.15 for more information.

Export to CSV

You may export offline data to CSV file format by selecting this menu item. Upon selecting this option, you will be prompted to save the file either in the default DaqLink directory or in directory of your choosing. The data is opened in CSV file format and includes pertinent information such as logger name, SN, sensor names, alarm levels as well as the actual data readings.

Refer to section 4.15 for more information.

4.7. Saving Data

As soon as a logger starts to record data the software creates a data file to which it writes the logger data.

Logger data files are stored in the following default location:

C:\Program Files\Fourier Systems\DaqLink\DaqLink data files

A folder is created for each data logger and is named according to the logger Serial Number. In this folder is stored the data files. A file is created for each day that the logger is recording data. The file name format is the date followed by the file extension e.g. 2007-12-30.dat.

The data is saved automatically by the software. There is no need for the user to save the data manually. The data is saved to the data file as follows:

- Every 15 minutes
- When the software is closed
- When the user opens an archived data file, the file is updated with all data not saved to that point

You can also save the data in a text file format. Refer to section 4.6.1 for more details.

4.8. Viewing Archived (Offline) Data

The user can view the logger data online or can choose to open archived data. Archived data is all data that was logged by a specific logger and recorded by the software into the DaqLink directory on the PC.

Follow the instructions below to open archived data.

1. Click the **Open** icon to launch the **Open Data Files** dialog.
2. Select the logger from the list of loggers in the dialog. You can sort according to logger S/N or Comment.
3. Using the calendar define the date and time period for which you wish to view your data and click **OK**. Days for which data exists appear in bold.

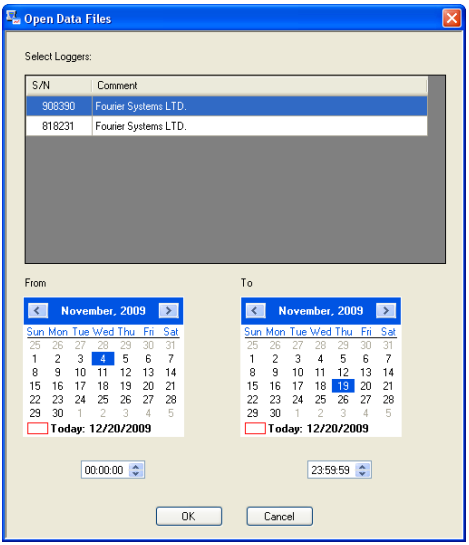


Figure 27: Open Data Files dialog

4. In the **Sync Data** dialog, you can select the sampling rate at which you wish to display the data. The default option is the original rate. Click **OK**.

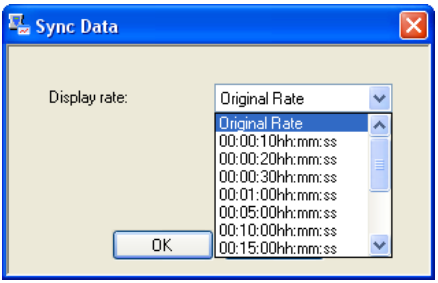


Figure 28: Sync Data dialog

The data is opened in History View. Refer to section 4.2.1 for an explanation of the History View.

You may display data sets from more than one logger and display them all in History View, using the Data Map to navigate through the data. Refer to section 4.2.4 for more details regarding the Data Map.

4.9. Viewing Online Data

When the logger is connected to the PC and detected by the DaqLink software you can view its data online in real-time, as it is being recorded and transmitted to the PC.

- While the logger is running double click the Logger icon  in the Map View.
- While the logger is running open the logger context menu and select **Display Data**.

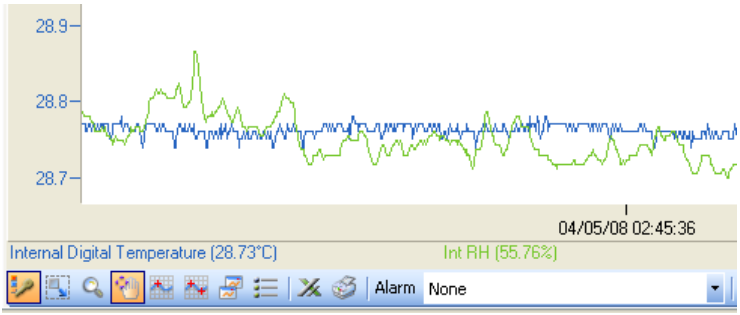
Figure 29: Online data window

The data displayed in this window is the data that was transmitted by the logger in the current software session. Data transmitted during a previous session of the software being open will not be displayed. For example, when you setup the logger it creates a new online session. This data can be viewed by opening archived data. Refer to section 4.8.

You may view the data in a graph or table by clicking the relevant tabs in the online data window. While in either or these views, the data is constantly being updated in real-time in the respective view according to the sampling rate of the logger.

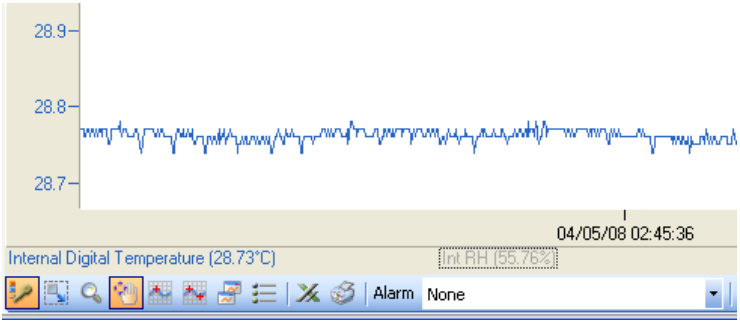
4.9.1. Showing / Hiding the Data Sets

In the online graph display, where you have data from only one logger displayed, you can show or hide the individual sensor data by using the sensor labels at the bottom of the graph.



In the screenshot above you can see two labels, *Internal Digital Temperature* and *Int RH*. At present, each label is active meaning the sensor data corresponding to the label is shown on the graph.

By clicking any of the sensor labels, you can hide the data from the graph. The label will then be grayed out. See the screenshot below:



Note: You can hide all of the sensor labels (not plots) from the graph by clicking the **Plot Legend** icon  .

4.10. Working in Map View

The Map View is the main view from which you monitor your loggers.

Refer to section 4.2.1 for a quick overview of the Map View and section 4.2.5 for a list of all the Map View icons.

4.10.1. Loading Map View Wallpaper

You can load an image file representing a map of your facility in which the loggers are deployed. You can then move the unit icons into their actual positions on the map.

- Double-click on the Map View background to go straight into the **Open** dialog and locate the image file.
- Right-click on the Map View background to open the Wallpaper dialog and have the option to either Load or Reset the wallpaper.

Note: When deploying the system for the first time it is highly recommended to use a map of the facility to make the deployment work efficiently.

4.10.2. Moving Icons around the Screen

Go to **Tools > Lock Map View** and ensure this menu item is not selected in order to freely move the unit icons around the screen. When you have finished placing the icons into

position you may then lock the Map View so as not to mistakenly place an icon out of position.

4.10.3. Logger Icon Context Menu

Right clicking the Logger icon will give the following options, which also appear in the **Logger** main menu and are detailed in section ?:

- Display Data
- Download Data
- Cancel Download
- Reset Alarm
- Calibration
- Update Firmware
- Cancel Firmware Update
- Setup
- Stop
- Run

The **Remove** option only appears in the Logger icon context menu, and only when the logger is offline. Selecting Remove will simply remove the logger icon from the Map View.

4.10.4. Viewing Logger Status

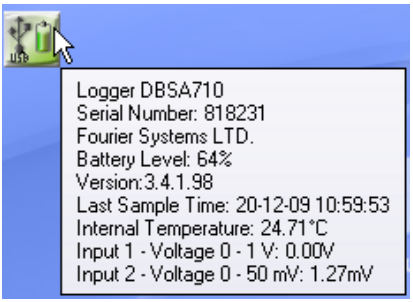
When you scroll the mouse cursor over the Logger icon a tooltip will pop up displaying data relevant to the Logger status at the time.

Logger Tooltip

The tooltip will always display the following data, even if offline:

- Model type
- Serial Number
- Logger Name/Comment

When the logger is online and running the following tooltip is displayed:



In online mode, the logger also displays:

- Power status (% Battery left or Connected to AC)
- Version number: Firmware version of the logger
- Last sample time: If logger is running, time stamp of last recorded sample.
- Real-time Sensor values: All sensor values are displayed, including sensor name and alarm status.

Command Queue Progress

The tooltip is updated with specific commands being performed by the logger. For example, if the logger is downloading data to the software you can see the progress in the tooltip. In addition, the Logger icon has a blue progress

indicator so you can monitor the progress without using the tooltip.

Common commands include Download, Setup, Stop, and Run.

4.11. Configuring the Logger

DaqLink software allows you to configure each logger when connected to the workstation.

Also refer to section 2.6 on how to configure the logger.

To configure the logger once it's detected by the DaqLink software, right-click the Logger icon in the Map View and select **Setup** or go to **Logger > Setup** from the main menu.

You have two tabs, **Device Setup** tab and **Alarm Setup**.

The main logger configuration is performed on the Device Setup tab. Any alarm levels you wish to configure is performed on the Alarm Setup tab.

4.11.1. Device Setup Tab

Comment

This is the name of the logger. It is advisable to name the logger according to the location in the facility.

Note: The Comment field in the software and on the logger display supports all standard alphanumeric characters except for the following: ', ", ~, &, \

Sampling Rate

Sampling rate is one sample per second to one sample per 18 hours. However, there are programming limitations you must be aware of when configuring the loggers. The sampling rate will vary depending on the number and type of sensors you setup. Refer to section 3.3.5 on page 22.

Memory State

From the drop-down menu you have the following options:

- **Online Mode:** *For working with logger connected to PC.* Data will be transmitted in real-time i.e. at the same time as the sampling rate.
- **Optimized Memory Mode:** *For working with the logger as a standalone device, not connected to the PC.* In this mode, the memory is more efficiently managed as the data does not need to be transmitted together with the sampling rate. Use the **Transmissions interval** parameter in the Setup window to see the rate at which the data will be displayed on the logger or in the software.

> **Note:** If used when connected to the PC, the data will not be transmitted in real-time.

Cyclic Mode

If this checkbox is not selected, the logger will stop recording data when the memory capacity is filled.

Enabling Cyclic mode will result in the oldest samples in the memory being overwritten by new samples once the memory is full. This allows continuous data logging.

Averaging Points

You can choose have online averaging of up to 10 points around the real value in order to smooth the data readings, if they are a little *noisy*. The recommended averaging is 4 samples.

Note: If configuring Alarm duration with averaging points selected, the alarm will be counted from the time of the last sampling point used to calculate the average.

Temperature Units

Toggle between °C and °F. This applies to the readings displayed on the logger LCD as well as in the software.

Anti Tamper Mode

To prevent tampering with the DaqLink logger, selecting this option will disable the following features on the logger menu:

- Pause
- Reset
- Stop and turn off unit

Active Sensors

Depending on the logger model, you can activate up to two internal sensors and four external sensors. Simply select the inputs you want to use and then select the sensor types from the adjacent drop-down menu. You don't have to select the external sensor input in any order. You may select only Input 4 if you desire.

Note: On the DBSA720 you cannot run the humidity sensor without running the temperature sensor in parallel.

This is because when using the DBSA720 data logger and selecting the internal humidity sensor in the Device Setup dialog, the internal digital temperature sensor will automatically be selected as well. This sensor provides the temperature compensation necessary for the humidity sensor to reach the 3% accuracy as stated in the sensor specifications. It is not used for recording temperature. The internal digital sensor is used to record temperature on the DBSA720.

Custom Sensor Names

You can also give the sensor a custom name, which will appear in the software when viewing the data. This is convenient when using several of the same type of sensors and you wish to differentiate between them in terms of their environment or material it is measuring.

Recording Time

This field displays the length of time the logger memory will be able to record for depending upon the number of sensors used and sampling rate.

Setup and Run

Clicking **Setup and Run** will send the setup to the logger and immediately start logging data.

Setup Only

Clicking **Setup Only** will send the setup to the logger but it will not actually start logging data. You will need to select Run from the Logger context menu or go back into the Setup dialog.

Close

Clicking **Close** will close the Setup dialog without saving any of your configurations.

Note: Running the logger clears the logger memory. All previously recorded data will be erased when you begin a new logging session.

4.11.2. Alarm Setup Tab

A major feature of the DaqLink system is the ability to configure alarm levels into the loggers so any breach of these levels as recorded on the data logger is monitored by the software, and the user is notified via Email/SMS/audible and visual indicators.

The Alarm Setup tab lets you configure each sensor for the following alarms:

- Low
- Pre-Low
- Pre-High
- High
- Contact Open / Contact Close (when the Contact sensor is selected)

Using the Pre Alarms gives the user ample warning of a possible breach of real alarm levels, so necessary measures can be taken to prevent such a breach.

Simply select the check box for the type of alarm you wish to be notified. You can select all alarms too. Enter the alarm value in the text box.

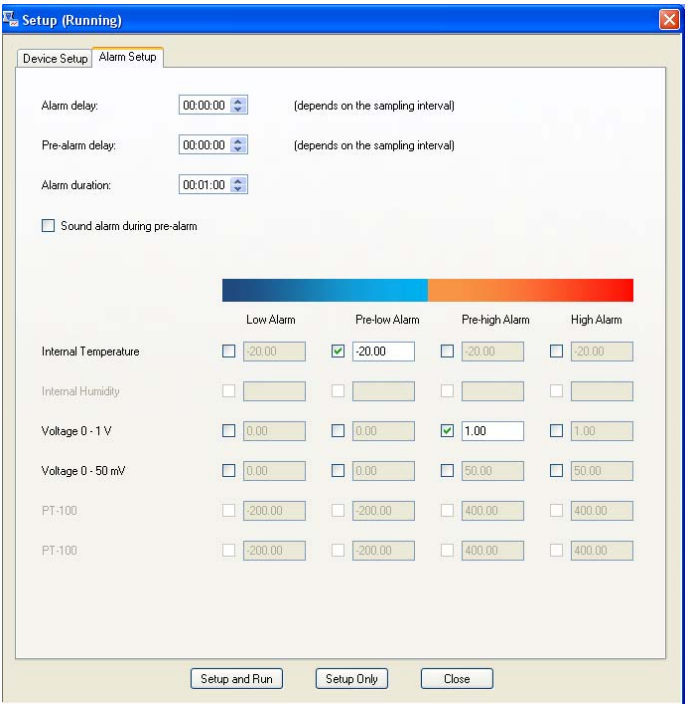


Figure 30: Alarm Setup tab

Alarm Delay and Pre-alarm Delay

The time until the alarm (or pre-alarm) is activated. You may not want to have the alarm sound immediately after the alarm level is breached as you are only interested in a condition where the alarm level lasted a certain amount of time.

For example, if monitoring change of temperature in a freezer, you would only be interested in a High alarm which lasted more than one minute as anything else could just be caused by the freezer door opening for a few seconds, as opposed to a power failure leading to rise in temperature.

Alarm Duration

The duration of the alarm that is set off by one or more sensors breaching the alarm level.

Note: Ensure **Averaging** is set to zero when enabling the Alarm Duration feature.

Sound Alarm during Pre-alarm

You also have the option to sound the alarm in the software during a pre-alarm scenario, not just for a standard alarm.

Once you have configured your alarms, you may return to the **Device Setup** tab or click one of the **Setup** buttons at the bottom of the tab.

4.12. Alarm Notifications Setup

Once you have completed the logger alarm setup in section 4.11.2 above, you can now configure DaqLink to send alarm notifications via Email or SMS.

From the **Tools** menu select one of the following options, depending on the type of notifications required:

- Email Alarm Notification
- SMS Alarm Notification

Or click the Email  or SMS  icons located in the upper toolbar in order to launch the notification dialog.

Note: To enable sending of Email or SMS first define the Email and SMS settings in the **Tools > Options** dialog. Connect a GSM modem to the PC if sending SMS's. Refer to section 4.6 on page 58 for more details.

The Alarm Notifications dialog also lets you manage your contact list of alarm notification recipients.

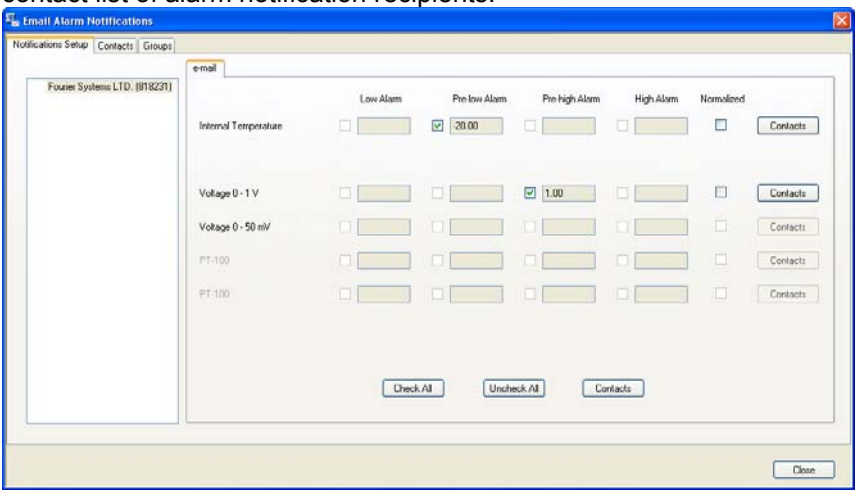


Figure 31: Alarm Notifications Setup dialog

As the Email and SMS Alarm Notifications must be defined separately, they each have separate dialogs. However the interface is identical and the contacts are stored in the same database.

The Email/SMS Notifications dialog is divided into the following tabs:

- Notifications Setup
- Contacts tab
- Groups tab

4.12.1. Contacts Tab

The first step is to create the contacts who shall be receiving the notifications. The ability to manage contacts is possible from both the Email and SMS Notifications dialogs.

1. Click the **Contacts** tab and then click **Add Contact**.

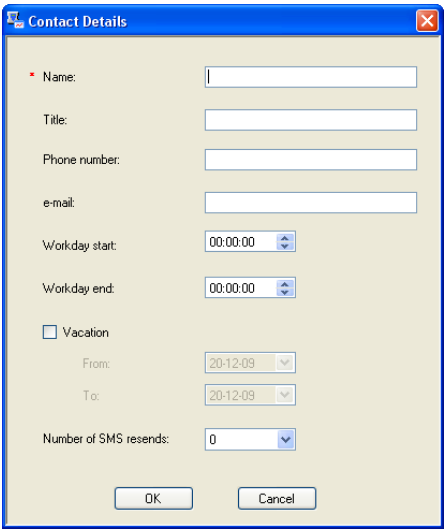


Figure 32: Adding a contact

2. In this dialog you must first enter the contact name in the **Name** field. That is the only mandatory field but if you don't enter at least the phone number or Email then they won't receive any alarm notifications.

   The other fields in the dialog are as follows:

   - **Title:** Corporate position
   - **Phone number:** The number the DaqLink software will use to send the SMS notification.

Note: The phone number field supports the following characters: 0-9, # , *, -, ( ), +

- **Email:** The address the DaqLink software will use to send the Email notification.
- **Workday Start and End:** You can define the hours in which the contact will be eligible to receive the notifications i.e. so they don't receive SMS or Email while in the office, or vice versa.
- **Vacation:** You can define when the contact is on vacation so they won't receive any notifications over this period.
- **Number of SMS resends:** The number of times DaqLink will send follow-up SMS's with the alarm notification. The maximum is nine resends per alarm. *The gap between each resend is five minutes.*

Note: In order to stop receiving SMS resends, you can simply send an SMS with 'OK' in the message body to the GSM SIM card's phone number.

3. When the contact details have been entered, click **OK**.
4. The contact will be added to the **Contacts** tab. You may choose to add another contact, edit an existing contact or remove a contact from the list.

4.12.2. Groups Tab

1. Click the **Groups** tab and then click **Add Group**. The **Group Details** dialog will open.

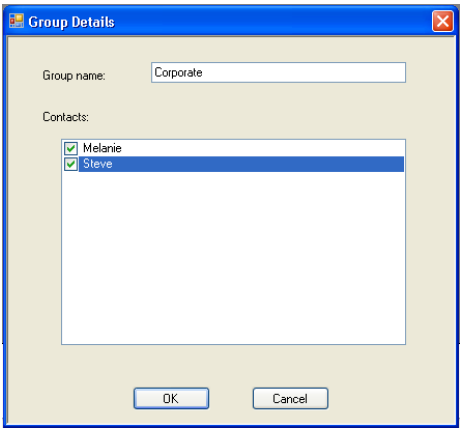


Figure 33: Adding a group

2. Enter a Group name and add your existing contacts to the group by selecting the checkbox next to the Contact name.
3. Click **OK** to create the Group. In the Groups tab you may choose to add a group, edit an existing group or remove a group from the list.

4.12.3. Notifications Setup Tab

1. Once the contacts have been created you may start defining which contacts should receive the alarm notifications.
2. The pane on the left-hand side of the **Notifications Setup** tab displays all loggers, which have been configured in your facility. You must define the alarm notifications for each unit in turn. Select the first unit you wish to define.
3. The **Email** or **SMS** tab is now active for the unit selected in step 1 above. In this tab, select the type of alarm for

which the notification should be sent in the event that the predefined alarm level is breached.

4. Only the sensors which were configured in the logger Setup, with alarms levels, are enabled in this tab.
5. Select the checkboxes according to the type of sensor alarm for which notifications should be sent.

   You may also select a **Normalized** alarm. A notification will be sent when the logger returns to normal levels having previously been in alarm state.
6. Click the **Contact** button adjacent to each of the sensors which have defined alarms. In the **Select Contact** dialog, select the contact and/or group that will receive the notification.
7. You can also click **Check All** to select all the sensor alarms for notification.

Note: In **Optimized Memory Mode**, when the logger transmission rate is slower than the sampling rate, an alarm notification is still sent even if the logger transmission time hasn't passed. For example, if the sampling rate is every 5 minutes, and the transmission rate is every 10 minutes, if a logger reaches a high alarm after 7 minutes a notification will be sent. The system won't wait until the scheduled transmission time.

4.12.4. Email and SMS Notification Formats

Email Notification Format

When the Email notification is sent the recipient receives the Email in the following format:

Email Header:

DaqLink Alarm Internal Temperature (Last recorded 25.47C) Low Alarm

Email Body:

```
DaqLink Alarm
Comment: Factory 1/F
S/N: 808932
08-07-09 13:53:41
Internal Temperature Low Alarm
Last recorded 25.47 C
```

The Email header contains the sensor type, last recorded sample, and alarm type.

In addition the Email body contains the logger comment, serial number, time stamp of last sample and value of last sample.

SMS Notification Format

When the SMS notification is sent the recipient receives the SMS in the following format. (The logger comment is displayed in the first row).

Factory 1/F

Sensor: Internal Digital Temperature – High

Alarm last recorded 29.59 C

4.13. Calibration

The DaqLink data loggers are shipped fully calibrated with a calibration certificate. However, DaqLink does provide a simple and efficient process for users wishing to calibrate the DaqLink data loggers themselves. The process itself can be performed when the logger is connected to the PC via USB. A calibrator or other type of calibration instrument is necessary.

The Calibration options are accessible via the Logger context menu in the Map View (right-clicking the Logger icon).

Before performing logger calibration, the logger must be in **Stop** mode. In addition, all of the calibration options are accessible with a password making it difficult for non-authorized users of the system to tamper with the loggers' calibration settings.

Note: The default password is 1234. The password can be changed in the password dialog box.

The Calibration option menu options are:

- **Calibration:** Opens the main Calibration dialog
- **Save Calibration:** Saves the logger's current calibration settings
- **Load Calibration:** Loads a logger's previously saved calibration settings.
- **Reset Calibration:** Resets the logger's calibration settings so that the raw hardware data is obtained, without any software calibration applied to these values.
- **Restore Factory Calibration Default:** Restores the logger's calibration settings to the factory calibration i.e.

the calibration settings it received prior to shipment from Fourier.

4.13.1. Introduction to DaqLink Calibration

Although the DaqLink data loggers come fully calibrated, the software enables you to calibrate any of the DaqLink sensors, on any input. The calibration parameters are sent to the data logger and stored in its memory.

DaqLink employs two different calibration methods: **Two-point calibration** and **Offset calibration.**

Each sensor can be calibrated using the Two-point calibration method, and then tweaked using offset calibration, except for the Thermocouples. These sensors require offset calibration only.

Sensor	Type	Calibration Method
Current	4 – 20 mA	Two-point calibration
Humidity (Internal)	Digital	Two-point calibration
Temperature (Internal)	Digital	Two-point calibration
Temperature (Internal)	PT-100	Two-point calibration and offset
Temperature	PT-100 2-wire	Two-point calibration and offset
Temperature	Thermocouple J	Offset calibration

Temperature	Thermocouple K	Offset calibration
Temperature	Thermocouple T	Offset calibration
Voltage	0 to 1 V	Two-point calibration
Voltage	0 to 50 mV	Two-point calibration

Calibration Tips

Prior to any two-point calibration it is recommended to restore factory calibration defaults.

Prior to calibrating any of the thermocouple sensor types, calibrate the Voltage 50 mV sensor as this will set the gain (slope) of all thermocouple sensor types.

After calibrating 50 mV, TC-J, TC-K or TC-T sensor types for all inputs you can refine the offset calibration for each input individually.

You may calibrate all thermocouple sensor types at once, or individually.

Prior to calibrating the PT-100 input, you must first perform **Reset Calibration** in the Calibration dialog.

Two-point Calibration

The two-point calibration sets the gain (slope) and offset (intercept) of the sensor's conversion function.

Use the two-point calibration to calibrate all DaqLink sensors except for the Thermocouples. In some cases you may need to refine your calibration using the fine offset tuning tool.

Offset Calibration

To calibrate the Thermocouple temperature sensors: TC-J, TC-K and TC-T, first calibrate the 50 mV sensor type. That will set the slope for all Thermocouple temperature sensors. Then proceed to adjust the offset using the Offset calibration technique.

4.13.2. Calibrating the Data Logger

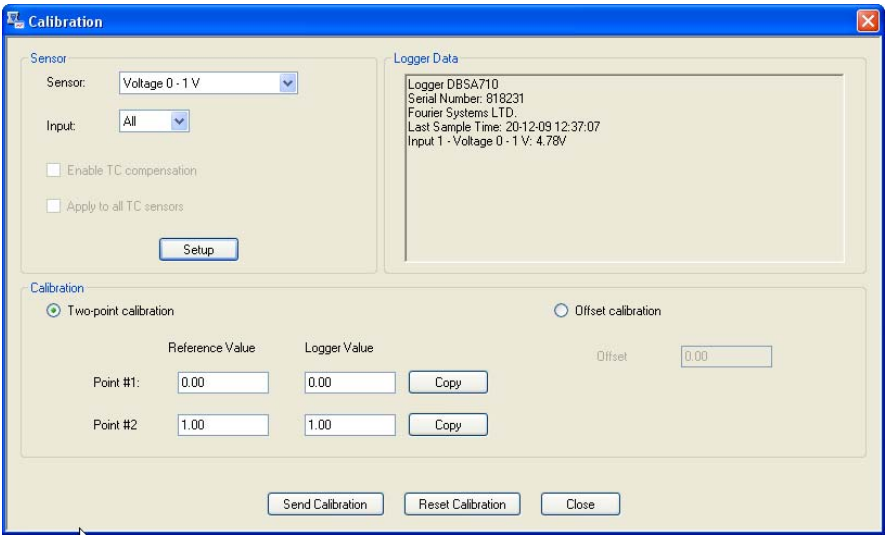


Figure 34: Calibration dialog

1. From the Map View, open the Logger context menu and select **Stop**.
2. Select **Calibration > Calibrate** and enter the password in the **Password** dialog.

3. Select the sensor you wish to calibrate from the **Sensor** drop-down menu.
4. If calibrating an external sensor, select the inputs to calibrate. Select **All** or an individual input, **1 to 4**.
5. Click **Setup** to send the sensor setup to the logger.

Note: The calibration process does not delete the logger's setup prior to calibration. Once Calibration is complete the original logger setup will be restored.

6. If you selected **All** inputs, then by default the logger will be setup to log data on **Input 1** during the calibration process. Otherwise, if you selected a specific input, it will setup the logger to calibrate on that input.

Logger Data Pane

The Logger Data pane displays real-time readings on the logger, at a default sampling rate of one per second. You can also view the logger's general status. Use the Logger Data pane to verify your logger is properly calibrated.

The Calibration dialog will enable either Two-point or Offset calibration, or both, depending on the sensor selected.

Note: The calibrated sensor parameters will be saved both in the DaqLink logger and in the software memory, so there is no need to calibrate the logger every time you run the software.

4.13.3. Performing a Two-point Calibration

To perform a two-point calibration, you must have two reference points to input against the real logger sensor values.

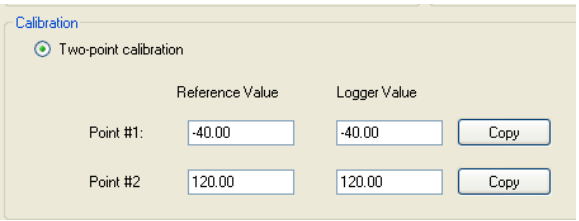


Figure 35: Two-point calibration window

1. In the **Point #1** field, enter the first **Reference Value** and the corresponding **Logger Value**.
2. In the **Point #2** field, enter the second **Reference Value** and the corresponding **Logger Value**.

Note: If you are using a calibrator and the logger is currently displaying the real value to be calibrated, press the **Copy** button to copy the real value to the **Logger Value** text box.

3. Press **Send Calibration** to send these values to the logger memory.
4. Compare the real value in the Logger Data pane to the reference value. If the values are within an acceptable margin of error you may close the Calibration window, or move on to the next sensor or input.
5. If the values are still not accurate enough, you can perform Offset calibration to tweak with values further.

Note: Fourier strongly recommends calibrating using the default Reference values that appear in the two Reference value text boxes for each sensor.

4.13.4. Performing an Offset Calibration

If, after the Two-point calibration procedure, the logger still exhibits some offset value use the Offset calibration tool to correct it.

The offset value is the difference between the value displayed by the DaqLink logger and the reference value. For example if the calibrator is set to 0 °C and the logger reads 1 °C the offset value is +1, but if the logger reads −1 °C then the offset value is −1.

To perform an Offset calibration, simply select the **Offset calibration** radio button to enable the **Offset** text box. For Thermocouples you will only have the option to perform an Offset calibration.

Enter the offset value in the text box and click **Send Calibration**. Continue to adjust the offset accordingly until satisfied with the readings.

4.13.5. Setting the Offset to a Specific Input

After setting the offset to all inputs simultaneously, you can set the offset of each input separately for even better accuracy.

To set the offset of a specific input:

1. Measure two known reference values making sure to use the input you need to calibrate.
2. Enter the offset value as described in section 4.13.4 above, making sure to select the correct input number instead of **All**.

3. You can repeat the procedure for every input.

4.13.6. Calibrating the Internal Temperature Sensor on the DBSA710

The DBSA710's internal temperature sensor is a PT-100 sensor. Calibration of this sensor is performed by calibrating the external PT-100 input i.e. two-point calibration followed by offset calibration.

1. In the Calibration dialog, select **PT-100** in the Sensor drop-down menu and select **All** inputs.
2. Press **Setup** to proceed.
3. Connect a calibrator or an actual PT-100 sensor to Input-1. Calibrate the input using the reference values.

Once this calibration procedure is complete both the logger's internal temperature sensor (PT-100) and external PT-100 inputs will be calibrated.

4.13.7. Calibrating the External PT-100 Sensor Input

PT-100 calibration is a standard 2-point calibration followed by offset calibration. Once the PT-100 sensor has been selected in the **Sensor** drop-down menu, click the **Reset Calibration** button. Then proceed with the 2-point calibration procedure.

Before each calibration this step must be performed otherwise the calibration will not be accurate.

4.13.8. Saving Calibration Settings

At any time you may manually save the logger's calibration settings locally to your PC.

1. Open the logger context menu, select **Calibration > Save Calibration** and enter the password to access this feature.
2. The **Save As** dialog will open. Name the calibration file (with extension .dcf) and save it either in the default Calibration folder in the DaqLink directory or in a folder of your choice.

4.13.9. Loading Calibration Settings

You can load a previously saved DaqLink .dcf calibration file at any time to restore a logger's specific calibration settings.

1. Open the logger context menu, select **Calibration > Load Calibration** and enter the password to access this feature.
2. In the **Open** dialog, browse to the calibration file you need and click **Open**. The logger will be updated with the new calibration settings.

4.14. Analyzing the Data

When in offline (History View) or online data displays, you have a number of features for analyzing the on-screen data. The features for analyzing data while in the graph display are practically the same when in offline or online mode.

4.14.1. Using the Graph Features

The following section explains how to use the numerous graph analysis features, including an overview of the graph toolbar options.

Please first refer to section 4.2.5: DaqLink Toolbar Icons for a full overview of the graph toolbar.

Autoscaling

Click **Autoscale**  on the graph toolbar to view the full data display, thereby restoring the axis range to its default settings.

Zooming

To zoom in to a specific area of the graph:

1. Click **Zoom in**  on the graph toolbar.
2. Drag the cursor diagonally to select the area you want to magnify. Release the mouse button to zoom in to the selected area.
3. Click **Zoom in**  a second time to disable the zoom tool.
4. Click **Autoscale** to restore the default display.

Panning

Use the **Pan** tool  to pan along the x or y axis or after zooming in, to see any part of the graph that is outside the zoomed area.

1. Click **Pan** on the graph toolbar, then click anywhere on the graph and drag the mouse to view another area.
2. Click the **Pan** icon a second time to disable the **Pan** tool.

The Cursor

You can display up to two cursors on the graph simultaneously.

Use the first cursor to display individual data recording values.

Use two cursors to display the difference between two coordinate values, to display the frequency of periodic data or to select a range of data points.

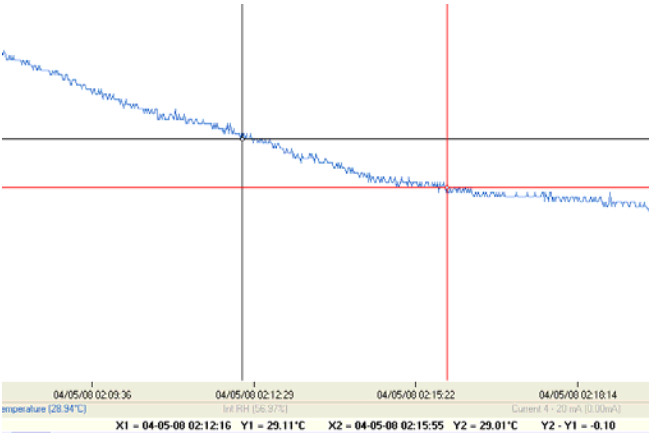


Figure 36: Example of using two cursors

When using two cursors, the Statistics feature will calculate statistics according to the data set between the two cursors.

To display the first cursor:

Click 1st **Cursor** on the graph toolbar. You can drag the cursor with the mouse onto any other point on the plot, or onto

a different plot. For finer cursor movements use the forward and backward keys on the keyboard.

The coordinate values of the selected point will appear in the information bar at the bottom of the graph window.

To display the second cursor:

Click **2nd Cursor**  and drag the cursor with the mouse onto any other point on the plot. The information bar will now display the difference between the two coordinate values.

To remove the cursors:

Click the cursor icons a second time.

Grid

Click the **Grid** icon  to add a grid to the background of the graph view. To remove the grid, click the icon again.

Figure 37: Graph with grid in background

Add Custom View

Whenever the graph in History View is modified, either by using the Zoom tool, changing the scale, panning the graph, etc. you have the option to add this customer graph view to the Data Map, under the Custom Views node. This will enable you to save projects which include the custom graph view for future reference.

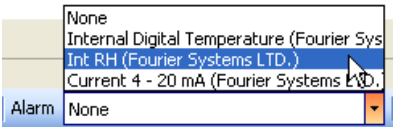
Click the **Add Custom View** icon  to perform this function.

Copying the Graph

Click the **Copy Graph** icon  to copy the graph to the clipboard, and paste it into another application, such as a word processing or spreadsheet application.

Displaying Alarm Levels

Open the Alarm drop-down menu and select the relevant sensor to display its alarm levels.



The Stretch / Compress Axis Tool

Move the cursor onto one of the graph axes. The cursor icon changes to the double arrow symbol (↔), indicating that you can stretch or compress the axis scale. Drag the cursor to the desired location. Repeat the procedure for the other axis if necessary.

To select a data set to display on the Y-axis, click on the data set's name in the Y-axis list. To display more than one curve, click on the data sets you want.

Formatting the Graph

You can change the plot line's color and width. The color of the Y-axis matches the corresponding plot's color and will automatically change with any change made to the color of the corresponding plot.

1. Click **Graph properties**  on the graph toolbar to open the **Graph properties** dialog box.
2. Select the **Style** tab, and unselect the **Use system line properties** checkbox.
3. Select the axis you want to format in the **Axis** drop-down menu.
4. Select the color and line width.
5. Click **OK**.
6. To restore the default formatting, select the **Use system line properties** checkbox again.

Manual Scaling

1. Click **Graph properties**  on the graph toolbar to open the **Graph properties** dialog.
2. Select the **Axis Scaling** tab and with the **Group plots by units** checkbox *unselected*, select the axis to manually scale from the drop-down menu e.g. Date & Time axis.
3. Uncheck the **Autoscale** check box and enter the custom values in the text box i.e. a time range, in the case of the Time & Date axis, or a set of values.
4. Click **OK**.

5. To restore auto scaling select the **Autoscale** checkbox.

Manual Scaling - Grouping Plots by Unit

You may choose to group all of the sensors measuring the same unit, to the same scale. For example, if you have several temperature sensors in your data set, all measuring Celsius, you can apply a common scale when displaying the data from these sensors.

1. Click **Graph properties** on the graph toolbar to open the **Graph properties** dialog.
2. Select the **Axis Scaling** tab and select the **Group plots by units** checkbox.
3. In the **Axis** drop-down menu select the unit by which you wish to group the plots.
4. Uncheck the **Autoscale** check box and enter the custom values in the text box.
5. Click **OK**.
6. To restore auto scaling select the **Autoscale** checkbox.

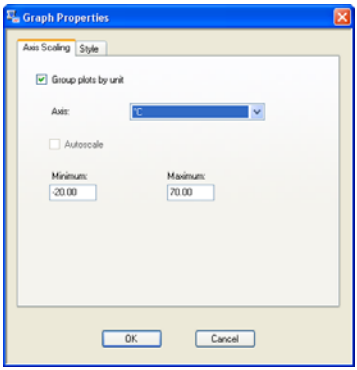


Figure 38: Grouping plots by units

4.14.2. Statistical Analysis

DaqLink also provides some basis statistics regarding the open data sets. While in History View or online Data Display view, click the **Statistics** tab.

For each of the sensors in the data set, you will have the following statistics displayed:

- Minimum / Maximum values
- Average value
- Number of samples

You will also see the Logger name and SN, as well as the start and end time of the statistics data range.

While in Online mode these statistics are updated in real-time.

If you zoom onto a section of the graph, the statistics are dynamic and will therefore display statistics of the zoomed graph, not of the whole graph.

If using the cursors, the statistics will be calculated according to the data set between the two cursors.

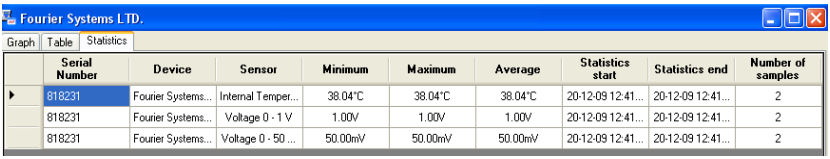


Figure 39: Statistics View

4.15. Exporting Data to Excel or CSV Formats

DaqLink supports exporting data to Excel or CSV file formats (CSV stands for *comma separated values*).

To export to Excel, click **Export to Excel**  in the online or offline lower graph toolbar, or go to **Analysis > Export to Excel** (while viewing data in History View). The data currently displayed on the graph is exported. Data from more than one data logger may be exported simultaneously.

DaqLink will then open a new Excel workbook displaying the data as well as other pertinent information such as logger comment, serial number and the alarm level setup. Data that exceeds any of the alarm levels will be indicated.

A	B	C	D
Comment		Fourier Systems LTD.	
S/N		6666665	
Sensor		Internal Digital Temperature	
Low			
PreLow			
PreHigh			
High		20	
Date	Time	Internal Digital Temperature	Alarm Type
3/5/2008	22:49:35	29.26	High
3/5/2008	22:49:36	29.25	High
3/5/2008	22:49:37	29.26	High
3/5/2008	22:49:38	29.26	High
3/5/2008	22:49:39	29.26	High
3/5/2008	22:49:40	29.25	High
3/5/2008	22:49:41	29.25	High
3/5/2008	22:49:42	29.26	High

Figure 40: Example of data exported to Excel

Only offline data opened in History View can be exported to CSV and is available under the Analysis menu.

4.16. Printing the Data

You are able to print data by clicking the Print icon  from the lower toolbar in Graph, Table or Statistics tabs of the offline or online data displays. Clicking the Print icon will open the **Print Setup** dialog where you will need to select the printer to print to.

When printing a table, you can select the specific data range you wish to print. You are able to adjust the date and time in order to narrow the data range.

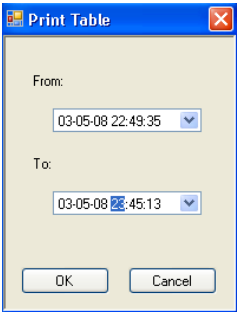


Figure 41: Printing a table

4.17. System Password

Throughout the software you will be required to enter a password to perform certain functions such as calibration or firmware update.

Note: The default password is 1234**.**

To change the password:

1. In the **Password** dialog box, click **Change Password** to open the **Change Password** dialog box.
2. Enter the current password in the **Current Password** text box.
3. Enter the new password in the **New Password** text box.
4. Enter the new password a second time in the **Confirm New Password** text box to confirm your new password.
5. Click **OK**.

Note: The password must include at least 4 characters and is case sensitive.

Chapter 5:
Updating DaqLink Software and Firmware

DaqLink supports automatic software and firmware update whenever DaqLink is launched, as long as the PC is connected to the Internet. The update process is managed by Fourier Systems' **Uptodata** client. This client checks for updated software and firmware files as well as documentation located on the Fourier Systems server, and if any have been detected they are downloaded and updated on the user's PC. The user can also have DaqLink automatically update the logger's firmware or can choose to do so manually.

In addition to automatic firmware update, the user can also manually update the firmware via the software menu or from the logger icon in Map View. Refer to the relevant sections in this chapter for more details.

5.1. Using the Uptodata Client

Use the Uptodata client to perform automatic checks for updated DaqLink software and firmware versions, including updated versions of the DaqLink user guide. Once downloaded, DaqLink software and firmware is automatically updated. However, you also have the option to manually update firmware rather than automatically.

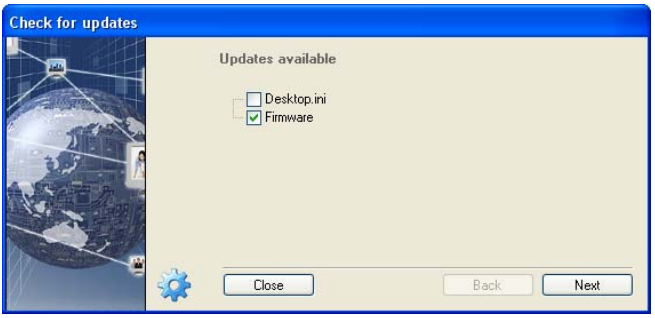
To use the Uptodata client follow the instructions below.

1. Ensure the PC is connected to the Internet and launch DaqLink.

2. Launch the **Uptodata** update client from the DaqLink main menu: **Help > Check for Updates**.
3. You will be prompted to proceed to check for new updates. Click **Next**. The client will then check for updates on the server, including updates to the Uptodata client itself.

Figure 42: Uptodata dialog

4. Once the check is complete, any new updates will be displayed in the Uptodata dialog. Select the checkbox next to the file you wish to update and click **Next**.



5. The files will be downloaded to your default application directory. Click **Finish** to close the dialog once the download is complete.

6. Click the **Options**  button in the main Uptodata dialog for further configuration options such as automatic firmware update on startup, or defining how often to check for updates.

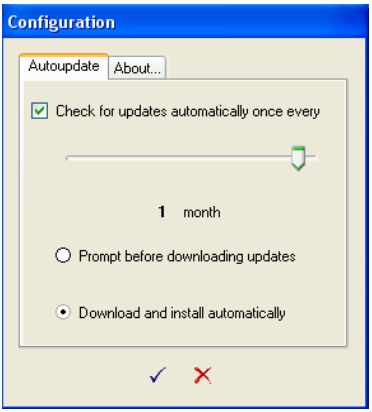


Figure 43: Uptodata configuration dialog

Note: If the update was canceled for any reason and was not completed, none of the previous installation files will be affected.

5.2. Updating DaqLink Firmware

There are several ways to update firmware for your DaqLink hardware units.

- Automatically, using the Uptodata client. Refer to section 5.1 above.
- Manually, using the context menu on the logger icon in the Map View or from the Logger main menu.

5.2.1. Downloading the Firmware File

1. There are two ways to obtain the DaqLink firmware file.
   a. Using the Uptodata client to download from the Fourier Systems server. Refer to section 5.1 above.
   b. Downloading the latest firmware version directly from the Fourier Systems Download Center.
2. Uptodata downloads the firmware file, named Firmware.dfw, to the DaqLink directory on the PC. The default path is: *C:\Program Files\Fourier Systems\DaqLink*.

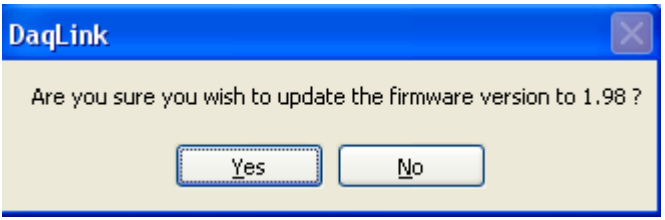
   If you download the firmware file from the Fourier Systems Download Center make sure to copy the file to the same path listed above.

Once the file is downloaded the next step is to update the DaqLink units.

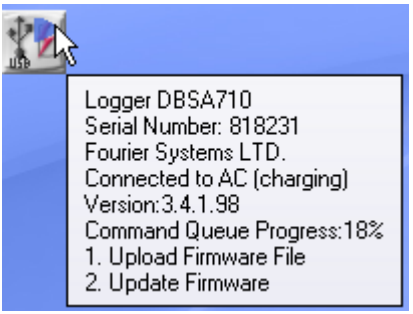
5.2.2. Firmware Update from the Map View Icon

The DaqLink data logger has the Update Firmware option in its Map View icon context menu.

1. To perform a direct update from a specific unit, open the context menu and select **Update Firmware**.
2. Enter the password in the **Password** dialog box.
3. A DaqLink system message will prompt you to confirm the update. Click **Yes**.



4. The firmware will begin updating and you can monitor its progress in the unit's tooltip.



Appendix A:
DaqLink Specifications

A.1. Data Logger Input Types

DBSA710 and DBSA720

External Inputs

Four external inputs with selectable sensor type for each input:

- 4 to 20 mA
- 0 to 1 V
- 0 to 50 mV
- PT-100 (2-wire)
- Contact (Open/Closed)
- Thermocouple J, K or T
- Pulse counter (Input 4 only)
- Frequency (Input 4 only)
- User-defined sensors

Internal Inputs

DBSA710

- PT-100 Temperature

DBSA720

- Digital Temperature
- Digital Relative Humidity

A.2. DBSA710 and DBSA720 Outputs

Alarm Output (Output 1)	External Power Excitation (transducers usage)
Open collector **Close position resistance:** 50 Ω **Max. Load:** 50 mA, 3 V DC Overload protection 50 mA reset fuse	12 VDC @ 2 A

A.3. Logger Input Specifications DBSA710 and DBSA720

Internal PT-100 Temperature (DBSA710)	Internal Digital Temperature (DBSA720)	Internal Digital Relative Humidity (DBSA720)
Type: PT-100 **Range:** -20 to 50 ˚C **Resolution:** 0.1 ˚C **Accuracy:** ±0.3 ˚C	**Type:** Digital sensor **Range:** -20 to 50 ˚C **Resolution:** 0.1 ˚C **Accuracy:** ±0.5 ˚C	**Range:** 5 to 95 % **Resolution:** 0.5% **Accuracy:** 3% (DaqLink software) 4% (Logger LCD)

Temperature Thermocouple J	Temperature Thermocouple K	Temperature Thermocouple T
Range: -200 to 1,000 ˚C **Resolution:** 0.1 ˚C **Accuracy:** -200 to – 60 ˚C ±0.5 % -60 to 60 ˚C ±0.5 ˚C 60 to 1,000 ˚C ±0.5 % **Cold junction compensation:** ±0.3 ˚C	**Range:** -200 to 1,000 ˚C **Resolution:** 0.1 ˚C **Accuracy:** -200 to – 60 ˚C ±0.5 % -60 to 60 ˚C ±0.5 ˚C 60 to 1,000 ˚C ±0.5 % **Cold junction compensation:** ±0.3 ˚C	**Range:** -200 to 400 ˚C **Resolution:** 0.1 ˚C **Accuracy:** -200 to – 60 ˚C ±0.5 % -60 to 60 ˚C ±0.5 ˚C 60 to 400 ˚C ±0.5 % **Cold junction compensation:** ±0.3 ˚C
Temperature PT-100 (2-wire)	**Pulse Counter (Input 4 only)**	**Frequency (Input 4 only)**
Range: -200 to 400 ˚C **Resolution:** 0.1 ˚C) **Accuracy:** -200 to - 60 ˚C ±0.5 % -60 to 60 ˚C ±0.3 ˚C 60 to 400 ˚C ±0.5 %	Zero crossing detector **Range:** 1 to 65,536 counts **Resolution:** 1 count **Frequency range:** 0 to 4 KHz **Input signal:** 0 to 5 V **Input impedance:** 470 Ω	Zero crossing detector **Range:** 20 Hz to 4 KHz **Input signal:** 0 to 5 V **Input impedance:** 470 Ω
4 to 20 mA	**0 to 1 V**	**0 to 50 mV**
Range: 4 to 20 mA **Resolution:** 4.76 µA **Accuracy:** ±0.5 % **Loop impedance:** 21 Ω **Maximum load:** 30 mA, 5.2 V	**Range:** 0 to 1 V **Resolution:** 200 µV **Accuracy:** ±0.5 % **Input impedance:** 25 MΩ **Maximum voltage:** 5.2 V	**Range:** 0 to 50 mV **Resolution:** 3 µV **Accuracy:** ±0.5 % **Input impedance:** 25 MΩ **Maximum voltage:** 5.2 V

Contact

Range: Open/Close

A.4. General Specifications

DaqLink Logger Sampling Features

- Memory capacity: ~59,000 samples
- Sampling rate: Once per sec to once every 18 hours
- Sampling resolution: 16-bit
- Channel separation: 80 dB

DBSA710 and DBSA720 Hardware Specifications

Display

- 2-row LCD
- 16 character display

Power Supply

- *Battery:*
  - Internal rechargeable 4.8 V, 800 mAh NiMH battery (2 batteries in series)
  - Built-in battery charger
  - Battery Life: Up to six months depending on logger configuration
- *AC Power:*
  - External 12 V DC input @ 300 mA 3.6 VA
  - Center Negative

Alarm Output

- Open collector
- Close position resistance: 50 Ω
- Max. Load: 50 mA, 3 V DC
- Overload protection
- 50mA reset fuse

Operating Temperature Range

- -20 to 50 ˚C
- Water and dust proof: IP54

Man Machine Interface

Full keyboard operation

Standards Compliance

CE, FCC

A.5. System Requirements

Software	Hardware
OS Platform: Windows 2000 SP3, Windows 2003, Windows XP SP2, and Windows Vista **Browser:** Internet Explorer 5.01 or higher **Screen Resolution:** Minimum 1024 x 768	**Processor:** Pentium 800 MHz or higher **Memory:** 256 MB RAM **Storage Memory:** 250 MB available disk space for the DaqLink application

Appendix B:
Safety Information

The DaqLink system complies with relevant safety regulations for data processing devices. Please contact Fourier Systems with any questions regarding DaqLink safety issues.

DaqLink Battery

The DaqLink DBSA710 and DBSA720 devices are supplied with internal rechargeable 4.8 V NiMH batteries as well as connection to AC power.

- Do not tamper or drop the battery to avoid leakage of hazardous chemicals contained within.
- Do not puncture, incinerate, disassemble or expose the battery to temperatures above 122 ºF (50 ºC).
- Keep the battery away from children.
- Dispose of the battery only in accordance with local regulations concerning potentially hazardous waste. Do not throw in the garbage bin.
- Remove the battery when not using the DaqLink loggers for a significant period of time e.g. when the DaqLink loggers are placed in long-term storage.

DaqLink AC Power Adapter

- Only use the AC adapter provided by Fourier Systems.
- Verify that your power outlet is suitable for the voltage of the AC adapter.

- If the AC adapter is connected to an AC outlet, make sure the area around the outlet is accessible and the adapter is not covered while in operation.
- Do not place the AC adapter on heat-sensitive material.
- Do not charge the DaqLink while situated in a carrying case or without sufficient airflow surrounding the loggers.
- Do not expose the adapter to direct sunlight or water.
- Do not tamper with the adapter components.

DaqLink Operating Environment

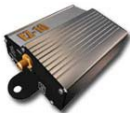
DBSA710 and DBSA720: -20 to 50 ˚C

Appendix C:
Ordering Information

For the full list of DaqLink products, and place DaqLink orders please visit www.fouriersystems.com/order or contact your local Fourier distributor:

DaqLink Product Suite

Part Number	Product Name	Product Description
DBSA710 	Data Logger	Internal Temperature PT-100 sensor Four channels: mA, V, mV, TC-K/J/T, PT-100, Pulse, Frequency, Contact
DBSA720 	Data Logger	Internal Digital RH and Temperature sensors Four channels: mA, V, mV, TC-K/J/T, PT-100, Pulse, Frequency, Contact
DQL-PCSUITE  	Software CD and Accessories	PC Suite including USB communication cable, software CD and digital user guide

Part Number	Product Name	Product Description
12504 	GSM Modem	GSM modem connecting to PC and integrates with DaqLink software to enable sending of SMS alarm notifications
12753 	PT-100 temperature sensor and cable	PT-100 temperature sensor • Range: -70 to 400 °C • 2.5 m cable length
12752 	PT-100 temperature sensor and cable	PT-100 temperature sensor • Range: -70 to 400 °C • 4 m cable length
12751 	PT-100 temperature sensor and cable	PT-100 temperature sensor • Range: -70 to 400 °C • 6 m cable length
12655 	1 m mini-USB communication cable	For connection between logger and PC
13330 	3 m mini-USB communication cable	For connection between logger and PC

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