LogBox-DA

ELECTRONIC DATA LOGGER - MANUAL V1.1x B

PRESENTATION

LogBox-DA is an electronic data logger with two input channels, one analog and one digital. Input data is stored in the logger internal memory, for later download to a PC for visualization and analysis in the form of tables or graphs. The data is easily exported to spreadsheets.

The **LogChart-II** is the software used to configure the logger, download and visualize data. The logger configuration allows defining the logger operation mode, including programming the start/stop time of data acquisition. Other parameters such as signal input type, logging interval, multiplication factor, scale range, etc, are easily selected through the **LogChart-II** software.

The LogBox-DA also provides a signal for commanding an external power supply (battery) of a device connected to the logger. This feature allows that external devices, such as a transmitter, be powered only during the measurement sample time, thus extending the autonomy of these external batteries.

MEMORY CAPACITY

Two memory storage capacities are offered: 32K or 64K records:

- 32k Model: Allows up to 32,000 records;
- 64k Model: Allows up to 64,000 records (It is not PALM compatible);

Memory capacity is always shared between enabled channels. In case there are two channels enabled, each gets 50 percent of the memory available. When only a single channel is enabled, it has the entire memory at its disposal.

Memory capacity is indicated on the identification label placed on the logger case.

Example:

LOGBOX-DA IP65 CE
ELECTRONIC DATALOGGER
MEMORY: 32.000 LOGGINGS

XXXXXXXX www.novusautomation.com

Figure 1 – Lateral identification label

INPUT SIGNALS

Channel 1 (IN 1) counts electric pulse signals. They can be voltage pulses, a dry contact (switch) or open collector signals, as selected in the configuration.

Channel 2 (IN 2) measures linear analog signals, which can be 0-20mA, 4-20mA, 0-50mV or 0-5V, user defined.

Note: For the channel 2, depending on the input signal selected, it may be necessary to configure an internal jumper.

DATA ACQUISITION (LOGGING)

Data can be acquired by means of two different modes.

In channel 1, which counts pulses, the number of input pulses counted in the logging time interval is stored in the logger memory at the end of the interval. The maximum number of loggings that can be stored depends on the memory capacity of the device model.

In channel 2, specific for analog signals, the logger can be configured to perform a single measurement at the end of the selected time interval storing the value read; 10 measurements within the time interval and store the mean of values read, or, yet, record the minimum or maximum values read in the interval.

OPERATION

The logger operation mode is user-defined in the **LogChart-II** software**.** To access or change this configuration, the **IR-LINK3** interface is required**.** The user must install the LogChart-II software in a computer and run the logger configuration according to instructions defined in the LogChart-II installation section of this manual.

After configuration and input electric connections made, the device is ready to measure and log input signals. The status indicators show the logger current status.

STATUS INDICATORS (LEDS)

The Status Indicators (see Figure 2) are located in the logger front panel. They indicate the current working conditions of the unit.

LOG Indicator (*Logging*****):** While in stand-by (not logging) or after a series of acquisitions is ended, it flashes once at every four seconds. While logging is active, it flashes twice every four seconds.

ALM Indicator (*alarm***):** Alerts the user regarding alarm conditions. Once triggered, the alarm LED keeps flashing once at every four seconds until a new configuration is entered.
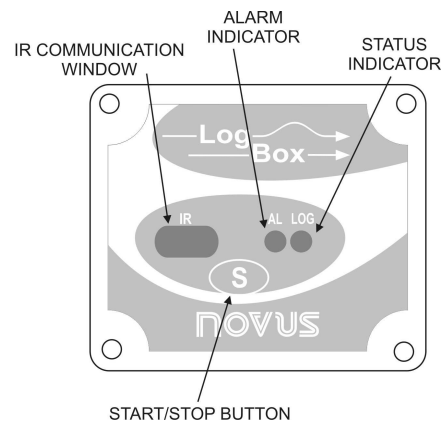

Figure 2 – LED Indicators and IR communication

CHANNEL 1 MULTIPLICATION FACTOR

Channel 1 was designed to count electric pulses from liquid flow meters (litters per pulse, for example). The amount of liquid corresponding to each pulse and the unit of flow can be easily configured.

Although suited to flow measurements, channel 1 can measure any variable whose signal is an electric pulse (energy, production batches, etc). The user can define a new unit by typing it in the corresponding text box. The expression **l/pulse** in the multiplication factor is meaningless in this case, so please disregard it.

LOGCHART-II

INSTALLING LOGCHART-II

Note: Be sure your Windows date separator is configured as a slash: dd/mm/yy or dd/mm/yyyy.

To install the LogChart II, execute the **LC_II_Setup.exe** program provided in the CD. The installation wizard will then guide you throughout the installation process.

RUNNING LOGCHART-II

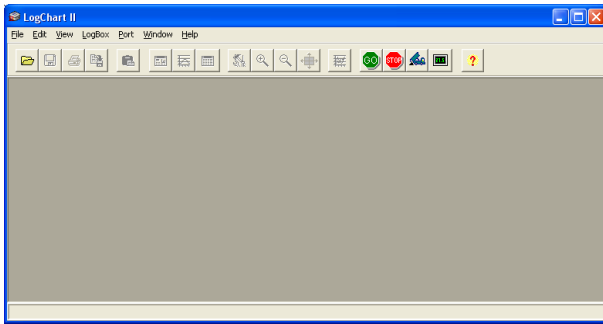Start the program. The main window will appear on the screen, as in Figure 3.

Figure 3 – LogChart-II main window

The LogChart II requires a communication port to talk to the logger. Clicking on the menu **Port**, all free communication ports available in the computer will be listed, including the USB port if the driver is installed. Select one and connect the corresponding wand (IR-LINK3/RS232 or IR-LINK3/USB) to it. The chosen port will be remembered next times the LogChart II is initiated.

When the selected port is successfully opened, the LogChart II initial screen is opened, enabling the buttons below:

Figure 4 – Buttons enabled when the communication port of choice is valid

OPTIC INTERFACE IR-LINK3

Configuring, monitoring or downloading data from the logger through LogChart-II requires that the IR-LINK3 communication interface be connected to your PC. This interface is sold separately.

The IR-LINK3 interface sends and receives data to/from the logger through infrared signals. There are 2 models of interface:

IR-LINK3 FOR RS232

This interface has a DB9 terminal that must be connected to the PC serial port. In the "Port" menu, select the port which corresponds to the physical port where the interface is connected.

IR-LINK3 FOR USB

Plugging this USB interface to the PC, the Windows wizard for new USB devices pops-up automatically. Select then the *IRLink* driver provided in **d:\IRLink_Driver**. (**d:** is the driver used in the installation). After installation is completed, the IR-LINK3 interface is recognized whenever it is connected to the PC.

NOTE: After the USB driver installation, the LogChart II must be opened again. In the "Port" menu, choose the same port selected for the optical interface communication (COM1, COM2,…or USB).

CONFIGURING THE LOGGER

Make sure the IR-LINK3 wand is connected to the PC port selected. The interface must be pointed towards the logger communication window (see Figure below) at a distance of about 15 cm.
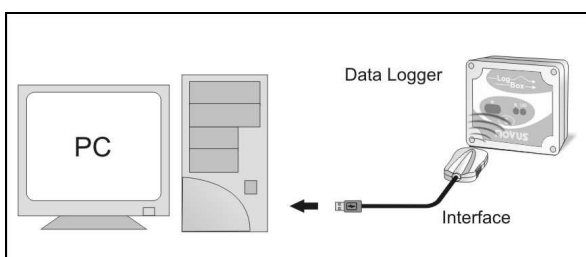

Figure 5 – Infrared interface position

Click the button to start the communication between the logger and the software; the **Parameters Configuration** window is then displayed (Figure 6), showing the current configuration and information about the logger. New configuration parameters defining the operation mode for a new application can be entered. The fields of the configuration window are described bellow.
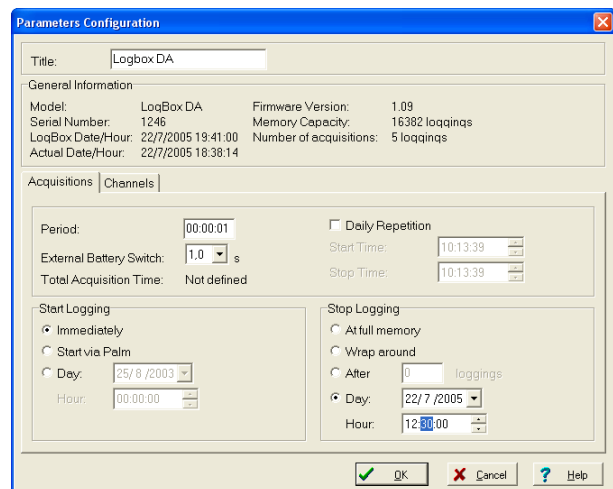

Figure 6 – Configuration window

GENERAL INFORMATION

General information on the top of the screen informs the model, serial number, logger current date/time, PC date/time, firmware version (logger model version), memory capacity and used memory.

The time is constantly updated in this screen, provided that the logger and the PC are communicating.

ACQUISITIONS

Interval: It determines the interval between readings in the hh:mm:ss format. New data is stored in the logger memory after each time interval.

External Battery Switch time**:** Defines an interval of time preceding each measurement for turning on the power supply of external devices (4-20 mA transmitters, for example). This feature is intended for saving power when the external power supply is battery powered and the logging interval is long. This signal is disabled when a measurement is completed.

This time is limited to 10 seconds and must be less than half of the interval between readings.

When channel 2 (analog input) is configured to **Instantaneous** readings, the measurements are taken at the end of the defined interval between readings. For **Average, Minimum** and **Maximum** readings, the logger executes 10 readings within this interval. This must be taken into account when defining the time to active the external power supply (1/2 of interval/10).

Estimated Time: It informs the estimated time for the accomplishment of programmed readings based on the logging "**Interval**" and on the number of programmed readings.

Daily Repetition: Allows loggings to be repeated everyday, for example, recording data from 8 AM to 5 PM day after day.
The start and stop times are defined in the fields "**Start time**" and "**Stop time.**"

START LOGGINGS

Immediately: The logger starts logging as soon as the configuration is applied. Not valid when the option 'Daily Repetition' is selected.

Start via Palm: Logging is started via Palm. The LogPalm software must be installed in the PDA.

Day / Hour: Logging starts at a defined date and time. The date defined is used for the Daily Repetitions option as well.

STOP LOGGINGS

At Full Memory: Loggings can be stored up to the full memory capacity is reached.

Wrap around: Logging never stops. The LogBox-DA will keep on recording the readings and when the memory is full it will overwrite the oldest record in a circular or wrap around manner.

After a defined number of readings: The logger will stop logging after the number of readings here defined is reached. Not valid when the option Daily Readings is selected.

Day / Hour: The LogBox-DA will stop logging at the user-defined date and time. Not valid when the option 'Daily Repetition' is selected.

CHANNELS

By selecting the "**Channels**" tab, the user is able to choose the individual settings for each input channel, as Figure 7 shows.
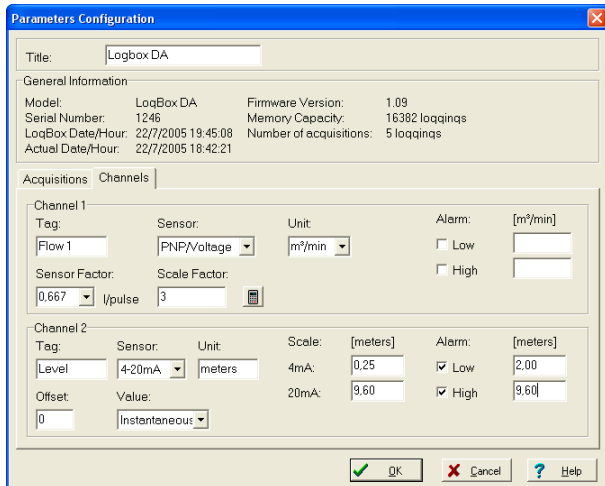

Figure 7 – Parameters for Input Channels Configuration

CHANNEL 1 – DIGITAL PULSE LOGGINGS

Configuration options provided for Channel 1 are:

Tag: Defines a name (up to 8 characters) for identifying the variable to be measured.

Sensor: selects the input type of the channel: *Unabled, PNP/Voltage, NPN, Dry Contact*

Unit: Defines the input variable unit. Flow measurement is default, however, other units can be defined by typing the unit in the text box.

Sensor Factor: Defines the amount of input per pulse. Liquids flow measurement is default (liters per pulse.) It can assume any value between 0.000001 and 16383.

Scale Factor: Adjusts the readings such as to represent a particular flow measurement unit. This factor can be automatically calculated (the software computes the value taking into account the interval between loggings and the sensor factor) by using the button:

It can assume values between 0,000001 and 65535.

Alarm: The routines for alarms **LOW** and **HIGH** are executed at the end of the logging period, informing the occurrence of an alarm by flashing the alarm LED in the front panel.

LOW defines the minimum value under which the alarm is triggered; **HIGH** defines the maximum value above which the alarm is triggered. Once activated, the alarm LED indicator stays so even after the alarm-triggering situation has ceased.

CHANNEL 2 – ANALOG INPUT

The options provided for Channel 2 configurations are:

Tag: Defines a name (up to 8 characters) for identifying the variable to be measured.

Input: The signal applied to the logger second input is defined here. The following options are offered: *None* (disabled), *4-20 mA, 0-20 mA, 0-50 mV, 0-10 V*. The option selected must be compatible with the LogBox internal jumper configuration. See configurations on Table 1.

Unit: Defines the variable unit.

Scale: Defines the range, in engineering units, for representing the input variable measured in input 2. Adjustable from –32000 to +32000.

**Offset**: Allows fine offset corrections on the measured value.

Value: Defines readings recording mode:

- **Instantaneous:** The instant value read at the logging time;

- **Average:** Arithmetic average of 10 consecutive samples equally spaced over the logging interval.;

- **Minimum:** Records in memory the minimum value of 10 consecutive readings in the logging interval;

- **Maximum:** Records in memory the minimum value of 10 consecutive readings in the logging interval;

Alarm: The routines for alarms **LOW** and **HIGH** are executed every time the logger samples the inputs, informing the occurrence of an alarm by flashing the alarm LED in the front panel.

LOW defines the minimum value under which the alarm is triggered; **HIGH** defines the maximum value above which the alarm sensor is triggered. Once activated, the alarm LED indicator stays so even after the alarm-triggering situation has ceased.

After filling all the fields, send the configuration to the logger by clicking on the button
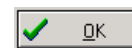
To stop loggings, click on the button:

ELECTRICAL CONNECTIONS

Only the input channels connections and the External Battery Switch (when used) are needed. The logger is exclusively powered by its internal battery.

In the IP65 models, the inputs and the signal for activating the external power supply are located inside the logger case, which must be opened for accomplishing the connections.

In the IP67 and IP68 models, proper connectors are provided for this purpose, as shown in Figure 9.

CONNECTIONS IN THE IP65 MODEL

Open the logger's cover to get access to the block terminals and the configuration jumpers. Connection cables must pass through the compress fitting located at the bottom of the case. Figure 8 indicates the signals polarity.

Note: Make sure that the compress fitting is perfectly tightening the cables, thus assuring proper IP65 protection (totally dust-tight and protected against water jets).
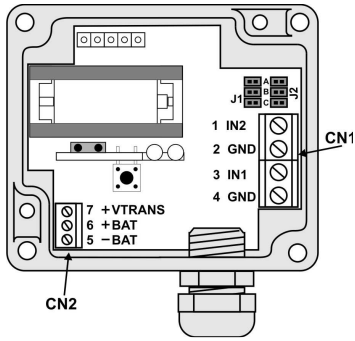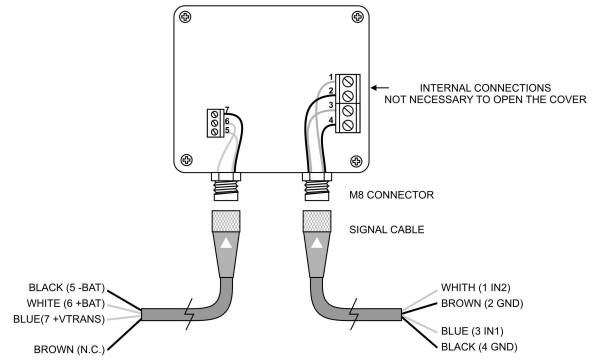
Figure 8 – IP65 connections internal view

CONNECTIONS IN THE IP67/IP68 MODEL

In theIP67/IP68 version, a M8 connector is provided for signal input, as in Figure 9. When required, a second M8 connector can be installed to output the signal for commanding the external power supply. The cables are supplied with the logger.

Note: The case cover should not be opened unless battery replacement is required. If this is the case, the cover must be properly tightened back in its place such as to assure the IP67 / 68 protection.

Figure 9 – IP67/IP68 external connectors

Wire connections

Channels cable (right)	Connection
Blue	Channel 1 – (3 IN1) – positive (+)
Black	Channel 1 – (4 GND) – negative (-)
White	Channel 2 – (1 IN2) – positive (+)
Brown	Channel 2 – (2 GND) – negative (-)

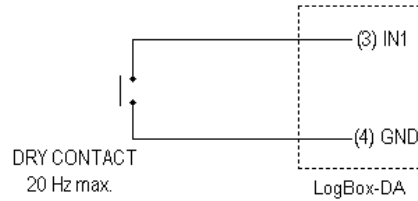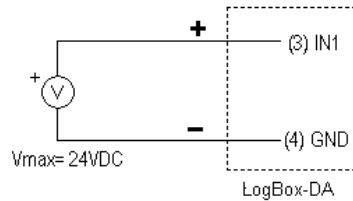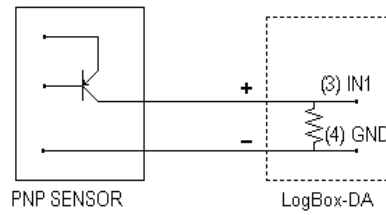| Switch cable (left)	Connection
Blue	Transducer (7 +VTRANS)
Black	External Battery (5 -BAT)
White	External Battery (6 +BAT)
Brown	Not connected

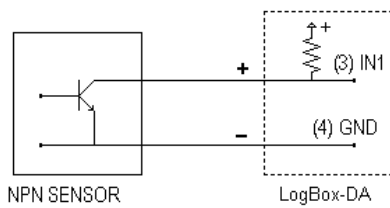Figure 10 – Voltage pulse and dry contact channel 1 input

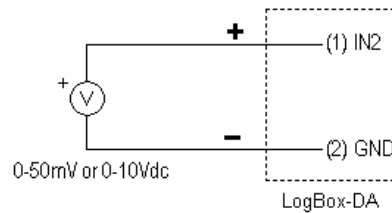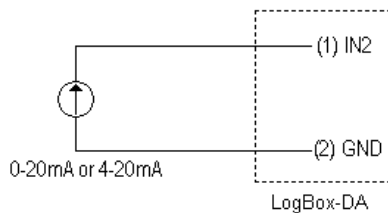Figure 11 – NPN and PNP open collector input for channel 1

Figure 12 – Current and voltage inputs for channel 2

INPUT CONNECTIONS – CHANNEL 1

The following figures show connections for the various input types accepted in channel 1. No jumper is required to adjust the channel 1 input type (the circuit is reconfigured automatically according to the input type selected).

INPUT CONNECTIONS – CHANNEL 2

For adequate use of channel 2, set internal J1 and J2 positioning according to the input signal chosen, as shown in the table below (factory default is 4-20mA / 0-20mA signals).

Input signal	J1 Position	J2 Position
4-20 mA / 0-20 mA	A	A
0-10V	B	B
0-50 mV	C	C

Table 1 – J1 and J2 positioning

The following figures show connections for different types of signals applied to channel 2.

EXTERNAL BATTERY SWITCH

The example below shows the usage of the external battery switch for commanding the power supply of external devices.
- Channel 2 is configured to 4-20mA input signal. A battery is used to provide power to the 4-20 mA loop. The battery switch "turns on" the power to the loop a moment (defined in the configuration) before the measurement is taken, enabling the transmitter (pressure, temperature, etc) to start up and stabilize the output. This approach saves the battery energy, as the power is turned on only when required (before each measurement).
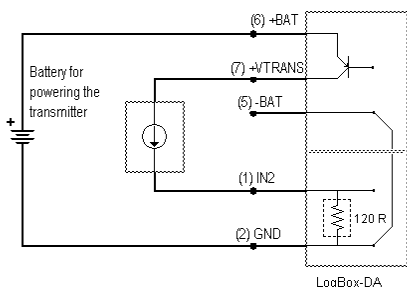

Figure 13 – Example of the battery switch powering a transmitter.

INSTALLATION RECOMMENDATIONS

- Signal wires should be installed in grounded conduits and away from power or contactor wires.
- Installing RC filters (47Ω and 100nF, serial) is strongly recommended at contactor coils or any other inductors.
- System failure should always be taken into account when designing a control panel to avoid irreversible damage to equipment or people.

OFFLOADING AND DATA VISUALIZATION

TRANSFERING RECORDS

Transferring the data to a PC is accomplished by clicking on the button in the LogChart II software. The IR wand must be pointed to the logger during the process. Data can be collected anytime and saved in files for future analysis (menu "File Save" or "File Save as").

While in offloading process, a progress bar is displayed. The offload time is proportional to the amount of data being transferred (number of records in memory).

After data transfer is completed, the *Graph* window is displayed.

NOTE: The logging is not stopped during the data offload process.

The LogChart-II software includes a help section with detailed usage information.

VISUALIZING THE DATA

Three views are provided for data visualization. The records can be analyzed in the form of Chart (graph) or Table. A third window, called **General Information** window (Figure 15), shows acquisition details and logger configuration.

A region of interest in the data can be selected (see item **Graph Window**, below). The Graph Window can be printed and the corresponding data exported as text files to other applications, such as spread sheets.

The same windows are created when the data is read from a previously saved file.

After the windows are opened, one can save the data to a file (.lch), print graphs, or export the data from the *General Information* and *Acquisitions Table* windows to a text file (.txt or .dat).

Graph window

The Graph is a convenient tool for analysis. As one moves the mouse in the chart area, the time and the value of the records of each channel are shown in the field located in the bottom of the window.

Zooming in and out are implemented. They are available in the menu "View" or in the tool bar as icons. It is possible to select an area by clicking and dragging the mouse, creating this way a zoom region, starting at the upper left position of the region of interest.

The graphs can be moved vertically by moving the mouse up or down while keeping the mouse right button pressed.

Figure 14 shows the Graph window.

The Graph window is automatically opened after the offload process. The two other windows (Table and General Information) can be opened accessing the menu or clicking on the corresponding button.
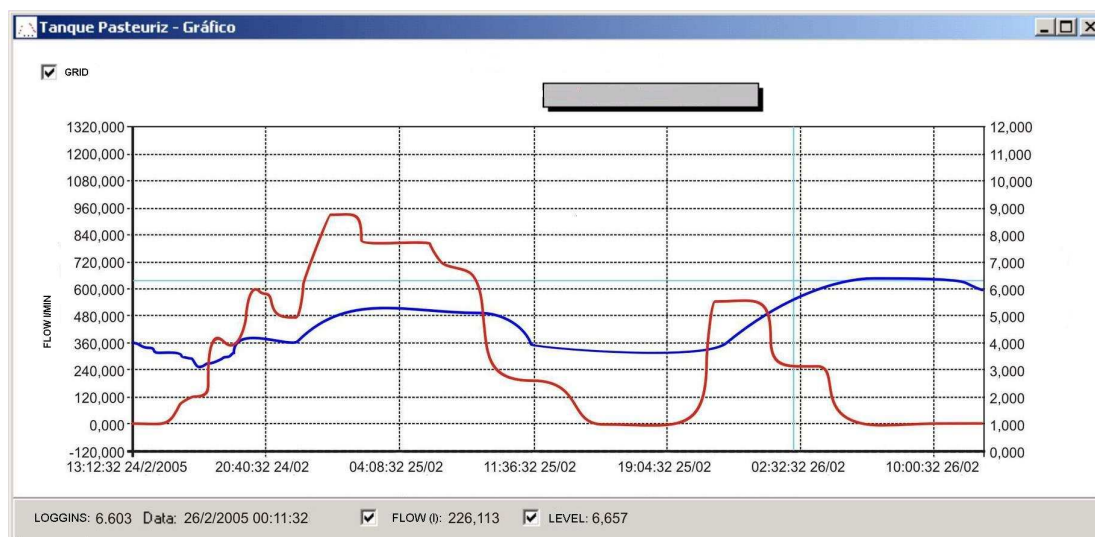

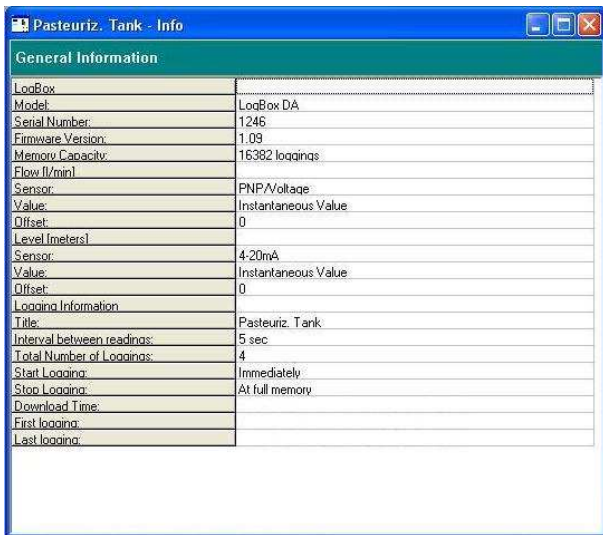Figure 14 – Screenshot showing the graphic visualization of logged data

Figure 15 - General Information window

Acquisitions Table Window

Here the data is presented in a table format, showing the date/time and the records values.

Figure 16 – Screenshot showing the acquisitions table

MONITORING ACQUISITIONS

To visualize current measurements in a graph format, use the *Monitor On-Line* command by clicking on the button

while pointing the IR-LINK3 interface to the logger.

Figure 17 – Online monitoring graph

PALMTOP USER

Most of the functionality of the LogChart II is available for the PDA Palm running the **LogChart PalmOS** software.

The user needs the Palm Desktop and the LogChart II softwares installed in his machine. It is recommended to execute the Palm HotSync before installing the LogChart PalmOS.

In the Windows, execute (from the HD, CD or diskette) the **LCP_Setup** installer. Press "OK". The software will guide you over the installation process.

Executing a new *HotSync* will install the LogChart PalmOs software in the Palm. The LogChart icon will the added to the Palm home screen. The HotSync synchronizes the data from the handheld to a desktop PC.

RUNNING LOGCHART PALM-OS

Starting the LogChart PalmOS application will display the **Recorded Data** screen on the Palm.

You are then allowed to access loggers, change their configurations and collect data, as well as to access data files stored in your PDA.
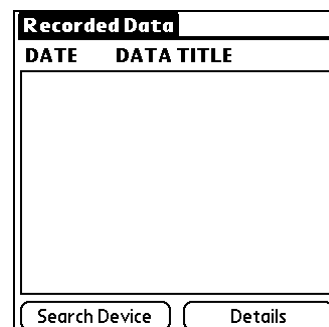

Figure 18 – Recording data screen

ACCESSING THE LOGGERS

To set up the communication between the handheld device and the logger(s), run LogChart Palm-OS, press the **Search Device** button from the **Recorded Data** screen and align the Infrared Port of the PDA to the logger(s) communication window. (See Figure 2).

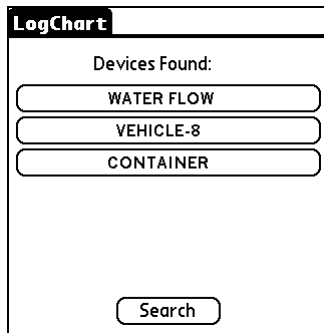If more than one logger is detected, the Devices Found screen is exhibited.

Figure 19 – Devices Found screen

The user must select a device to start the communication. The **Monitoring** screen is soon displayed.

If your Palm detects only one device, the **Devices Found** screen is skipped and the **Monitoring** screen is exhibited.
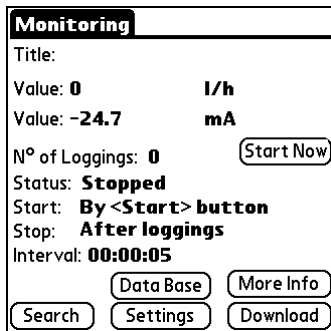

Figure 20 – Monitoring screen

The screen exhibits instant values of variables measured, configuration information and current logger status.

Buttons are assigned the following functions:

Search: It allows you to "search" for another logger or reconnect communication lost for any reason. When the handheld device finds a logger, it exhibits a new **Monitoring** screen with the logger information. When other loggers are found, the **Devices Found** screen is exhibited again.

Download: Downloads logged data. Download can be partial and it does not interfere in the ongoing acquisition process.

More Info: Displays further information on the connected logger, such as model, serial number, version and memory capacity.

Settings: Accesses the Settings screen, which allows modifying the logger configuration.

Data Base: Exhibits the **Recorded Data** screen listing all the processes stored in the PDA data base. To access the data, tap on **Details.** Information required is displayed.

View Data: displays data in a list containing date, time and measured value.
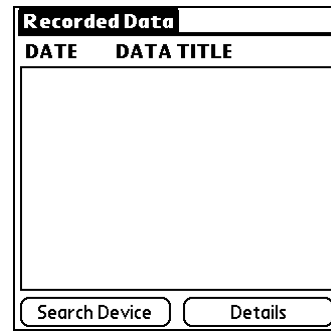

Figure 21 – Recorded Data screen

CONFIGURING THE LOGGER - SETTINGS

During configuration, the logger and the Palm ports must be aligned. Tap on **Settings**. The screen **Settings** (Figure 22) is opened and contains the required parameters for configuring the logger. Tapping on **Apply** will send the new configuration to the logger.
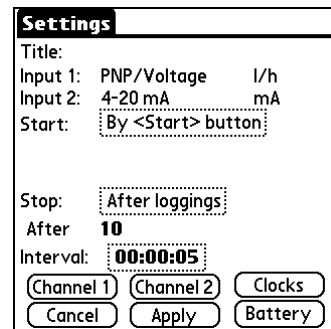

Figure 22 – Settings screen

The parameters are analogous to the LogChart II parameters. They are:

Title: Name of the process.

Input 1 and 2: Informs the inputs used by channels 1 and 2 respectively.

Start: Defines the strategy for the logging start. The options are:

Immediately: The logger starts logging as soon as configuration is sent to the logger.

By date/time: Start in defined data and time, always after current time. It is possible to perform daily repetitions. If this option is selected, a new box to define the stop logging time is displayed.

By <Start> Button: Press the **Start_Now** button from the **Monitoring** screen to start logging.

Stop: Defines logging stop mode: Options are:

Full memory: Loggings can be stored up to the logger full memory capacity is reached.

By date/time: Logging is stopped on user-defined day and time.

Wrap around: Logging never stops. The LogBox will keep on recording the readings and when the memory is full it will overwrite the oldest record in a circular or wrap around manner.

After loggings: The logging will stop after the number of readings here defined.

Interval: Defines the interval between readings: hour, minute and second. For mean, maximum and minimum values, the shortest interval between loggings is 10 seconds.

Channel 1: Opens the **Input 1 Settings** screen.

Tag: Defines a name for Channel 1.

Input: Informs the input type used in Channel 1:

Unit: Defines the variable unit. Options are set up for flow measurement, however, other units can be defined by typing the unit in the text box.

Input Factor: Defines the amount of input per pulse. It is set up to measure liquid flow (liters per pulse.) It may be a value between 0.000001 and 16383.

Scale Factor: Adjusts the readings such as to represent a particular flow measurement unit. This factor can be automatically calculated by tapping on the button **Calc.** It may be a value between 0.000001 and 65535.

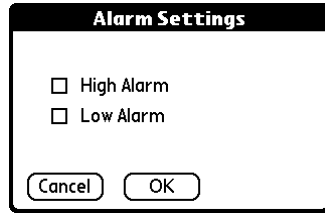**Alarms**: Configures the alarm function: HIGH, LOW and setpoint.

Figure 23 – Alarm settings screen

Cancel and **OK** buttons cancel and save configurations defined in Channel 1 screen.

Channel 2: Opens the **Input 2 Settings screen.**

Tag, Input and **Unit** fields are identical to Channel 1 definitions,

Logging Mode: It defines how the value measured will be logged. Options are:

Instantaneous: One reading and one logging at each reading "Interval";
Average: Ten readings at each reading interval. The average value of readings is the value recorded;
Minimum: Ten readings at each reading interval. The lowest value found is recorded;
Maximum: Ten readings at each reading interval. The highest value found is recorded;

Offset: allows fine offset adjustment on the measured value.

Alarms: Enables an alarm that is triggered according to user-defined parameters

Cancel and **OK** buttons cancel and save configurations defined in Channel 2 screen.

Clocks: Provides access to Logger and Palm clocks. When a new configuration is sent to the logger, clocks are updated.

After configuring clocks, click **Apply** to send this configuration to the Logger, returning to the **Monitoring** screen.

DOWNLOAD

In the **Monitoring** screen, the **Download** button performs the transfer of the data from de LogBox to the PDA. Download can be partial and it does not interfere in the ongoing acquisition process.

The data base of loggings is displayed in the **Recording Data** screen, identified with the name assigned to the process (**Title**) and the date it was downloaded.

FILES VISUALIZATION

The **Recorded Data** screen lists the data base logged and stored in the PDA. To access data, select the desired data base and tap on **Details**. **Recorded Data Details** screen shows several information about the data base.

View Data shows in table format the logged values and the date and time they were performed.

Press **Delete** to erase the selected data base.

TRANSFERRING DATA TO YOUR DESKTOP

HotSync of data stored in a PDA to a PC is performed through a conduit installed together with the **LogChart Palm-OS.** The conduit converts the data collected by the **LogChart Palm-OS** to a file compatible with the **LogChart-II** software.

To access the conduit options, the **HotSync Manager** software must be active. Click with the right mouse button on the HotSync Manager in the Windows Taskbar. Select in the drop-down menu the option *Custom.* Select **Novus LogChart Conduit** and click *Change.* The following window will be exhibited:
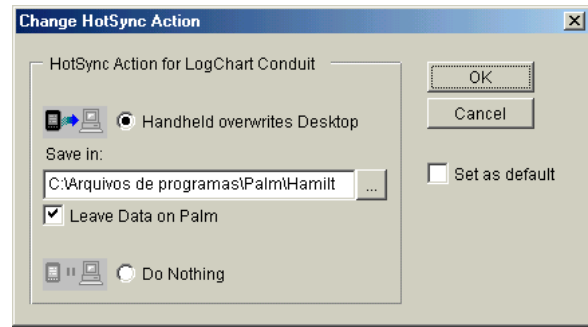

Figure 24 – LogChart Conduit options

Handheld overwrites Desktop: LogChart Palm-OS files are transferred to the Desktop.

Save in: Choose a directory to record files generated during data synchronization.

Leave Data on Palm: Option to keep or delete the data in the PDA after HotSync.

Do nothing: Data synchronization will not be performed;

Set as default: The same settings will be used in the next HotSync processes.

OBSERVATIONS

The logger is an electronic device and some basic care is required:

- When opening the device for battery replacement or connecting sensors avoid touching the circuit for not causing damages resulting from static electricity.
- When the device is opened, avoid liquid and/or dust contact.
- Use a screwdriver to open the case cover. Pay attention to batteries polarity: **The positive terminal should be placed directed towards the center of the device.**
- Worn batteries should not be recharged, dismantled or incinerated. After use, batteries must be disposed according to local legal rules or returned to Novus.
- **After placing batteries back to the logger, make sure the cover is firmly attached to the socket.**

MOST FREQUENTLY PROBLEMS

The LED is not flashing.

The LED flashing light is intentionally weak, and it can be difficult to see it in illuminated environments. Make sure it is not flashing at all.

Make sure the battery is installed correctly;

Make sure the battery is not discharged;

Communication with the logger fails

Make sure the COMM port is selected correctly and there is no other program using the same port during communication attempts;

Make sure there is no physical obstacle blocking the infrared signal;

Make sure the cable is well connected to the PC port

Make sure the port selected does not present any problem;

ADDITIONAL INFORMATION

If you have any doubt concerning this or other NOVUS products, e-mail us at info@novus.com.br or visit our home page: www.novus.com.br www.novusautomation.com

SPECIFICATIONS

Inputs:

<u>Channel 1</u>: NPN, PNP, Pulse or Dry Contact
Level 0: 0.0 up to 1.0 Volts
Level 1: 2.0 up to 24.0 Volts
Max. frequency: 4000 Hz for NPN, PNP and Pulse
20 Hz for dry-contact (internal *De-bounce*)
Input Impedance:
NPN, PNP and Pulse: 105 kΩ
Dry contact: Capacitance of 100 nF
Maximum counting: 65,535 per period.

<u>Channel 2</u>: 0-20mA, 4-20mA, 0-50mV and 0-10Vdc
Input Impedance:
0-20mA and 4-20mA: 120Ω
0-50mV: >>10MΩ
0-10Vdc: >120kΩ

Memory capacity: 32000 (32k) or 64000 (64k)

Interval between readings: Minimum: 1 second, maximum: 18 hours

External battery switch time: 0 to 10 s

Power: 3.6V lithium battery (1/2 AA)

Estimated autonomy: 200 days with one weekly download and 5 minutes measuring interval. Battery life depends heavily on data retrieval frequency.

Working temperature: From –40°C to 70°C.

Protection: IP65, IP67 and IP68 models (see lateral label on product)

Material: ABC + PC case, Polycarbonate film;

Dimensions: 60x70x35mm

PACKAGE CONTENTS

Besides this manual, the user must check if the items below accompany the product.

- The electronic logger LogBox-DA;

- The LogChart-II software installation disk. The disk includes the USB IRLink driver and the LogChart PalmOS installer;

- Two cables for sensor wiring (IP67 or IP68 models only);

- An IR-LINK3 wand (ordered separately).

WARRANTY

Novus Produtos Eletrônicos Ltda. products are covered by a 12-month warranty provided the purchaser presents the sales receipt and the following conditions are met:

- Products are covered for one year from the original date of purchase. Please retain the dated sales receipt as evidence of the date of purchase. You will need it for any warranty service

- Within this period, warranty against defects in material and workmanship under normal use is free of charge. For repair, send the product and the sales receipt to our address in Porto Alegre. Expenses and transportation risks are under the purchaser's responsibility

- This warranty does not cover any damage due to accident, misuse, abuse, or negligence.