HW4 Software version 3

HygroLog NT functions

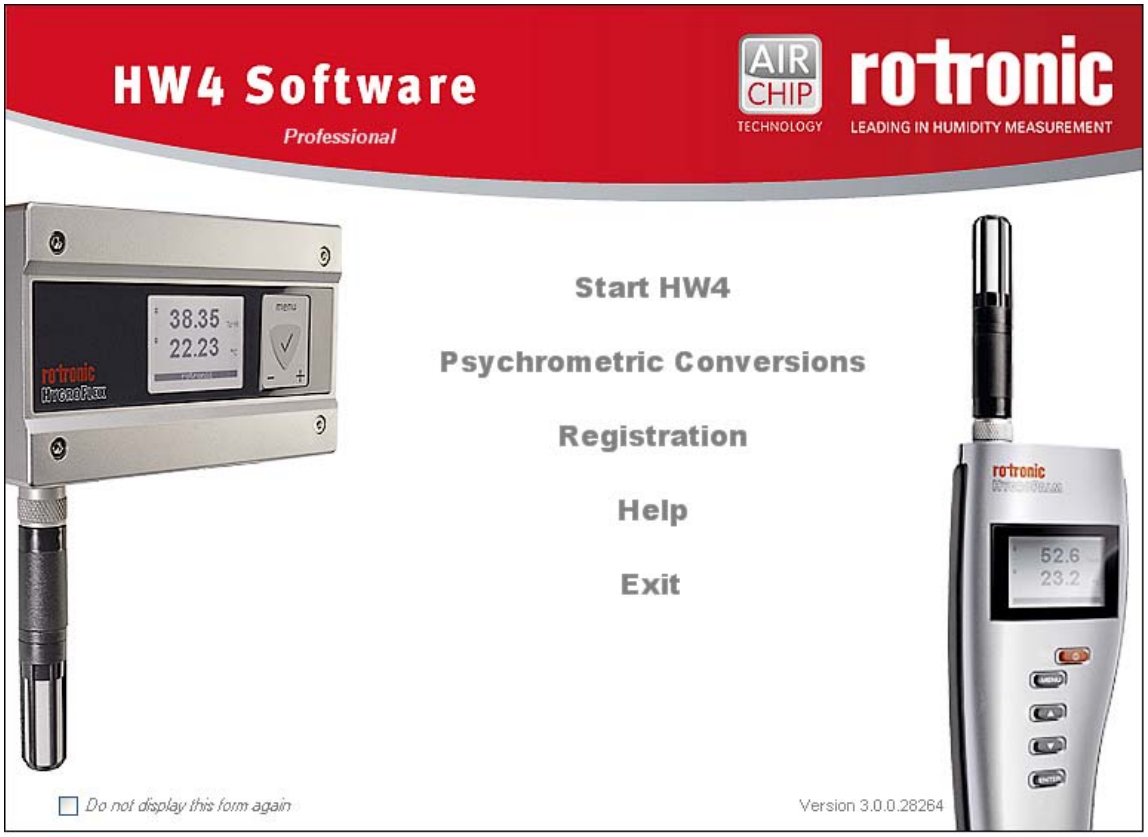


Table of contents

1 ORGANIZATION OF THE HW4 MANUALS

The HW4 manuals are organized in separate books so as to limit the size of the individual documents. A list of the HW4 manuals is provided in document **E-M-HW4v3-DIR**

HW4 Manuals	Contents
HW4 Main Book	General software description Installation, start-up and settings Device connection methods Functions common to all devices used with HW4
Device Specific Functions 1 (separate book for each device type or model)	Legacy devices (original HygroClip technology): o HygroLog NT data logger o HygroFlex 2, HygroFlex 3 and M3 transmitters o HygroLab 2 and HygroLab 3 bench indicators o HygroPalm 2 and HygroPalm 3 portable indicators o HygroClip DI digital interface o HygroClip Alarm programmable logic o HygroStat MB Device Manager (device configuration) and other device specific functions
Probe Adjustment 1	Humidity and temperature adjustment function common to all legacy devices (original HygroClip technology)
Device Specific Functions 2 (separate book for each device type or model)	Devices based on the AirChip 3000 technology: o HygroClip 2 (HC2) probes o HF3 transmitters and thermo-hygrostats o HF4 transmitters o HF5 transmitters o HF6 transmitters o HF7 transmitters o HL20 and HL21 data loggers o HP21, HP22 and HP23 hand-held indicators o Custom designed OEM products Device Manager (device configuration) and AirChip 3000 functions
Probe Adjustment 2	Humidity and temperature adjustment function common to all devices based on the AirChip 3000 technology
Data Recording Function	Data recording function common to all devices based on the AirChip 3000 technology

Both the HW4 manuals (software) and device specific manuals (hardware) are available on the HW4 CD. The manuals can also be downloaded from several of the ROTRONIC web sites.

2 OVERVIEW

This section of the HW4 manual covers only the HW4 functions that are unique to the HygroLog NT data logger. HW4 functions that are not device dependent are covered in document E-IN-HW4v3-Main.

3 DEVICE MANAGER – HygroLog NT

When HW4 has detected a HygroLog NT, the device appears in the left pane of the HW4 main screen. Expanding the device displays a list of the available device functions.

To select the Device Manager function, click on it with the left mouse button. HW4 opens the Device Manager form.

The Device Manager form is used to configure the HygroLog NT and to read instrument specific information (but not the data recorded by the logger). When Device Manager is started, it automatically interrogates the instrument and downloads its current configuration.

The different forms that are available within the Device Manager form are listed in a tree located on the left pane of the form. To select a form, click on it with the left mouse button.

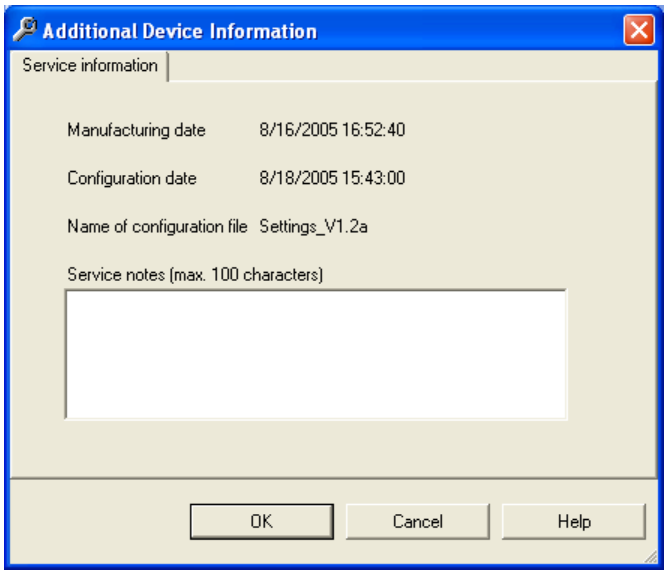
3.1 *Device Manager Menu Bar*

The Device manager menu bar is located at the top of the form.

File

- **Open:** opens the device configuration directory specified in the HW4 Settings Form - File Locations Tab - and displays all available device configuration files (extension .DAT). Any device configuration file that was previously saved can be opened to quickly configure an instrument. If so desired, any directory and any file type may be opened.
- **Save As:** saves the current configuration to a file (extension .DAT) in the device configuration directory specified in the HW4 Settings Form - File Locations Tab. If so desired, any directory and any file type may be specified.
- **Exit:** exits Device Manager

Device Info



This form provides additional product information that may have been entered by the factory.

Help

The Help menu consists of:

- **HW4 Help:** Opens HW4 Help
- **About HW4:** Displays the version number and ID number of HW4

3.2 *Device Owner*

User information will be included in the log file when the corresponding box is checked. This is an ERES regulatory requirement.

3.3 *Device Information*

- **Device name**: this text will be displayed next to the instrument model information. As far as possible use a unique device name.

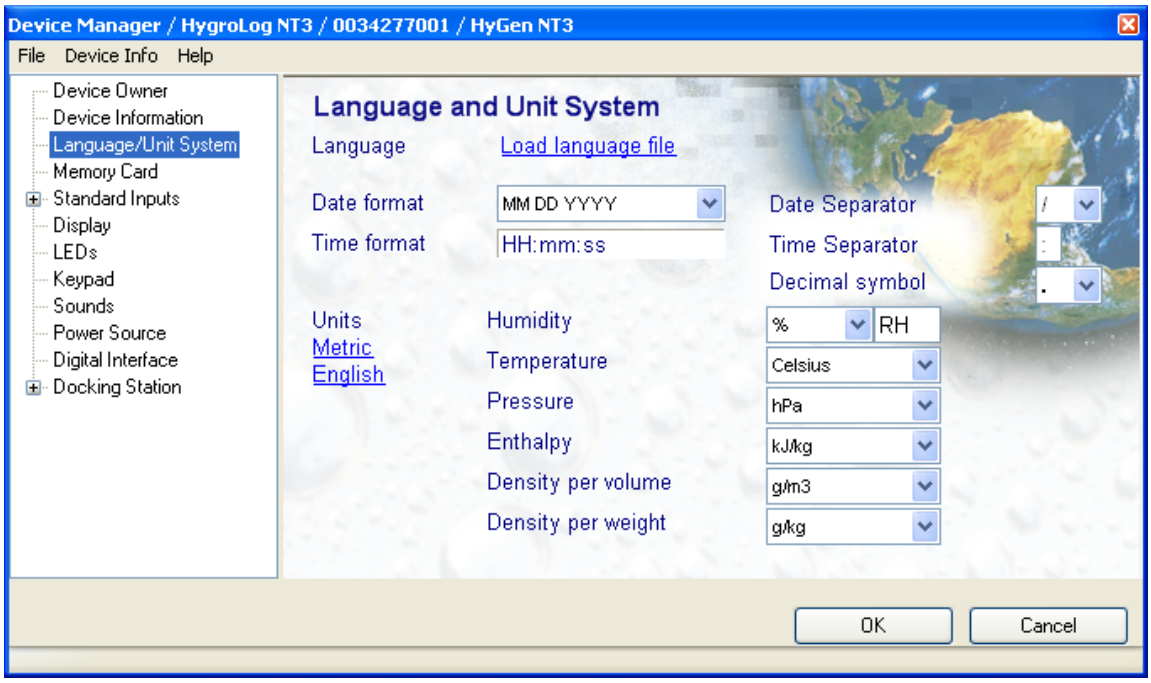
- **RS485 address**: click on the underlined link to change the instrument address to be used in conjunction with an RS-485 network (multi-drop). Each network address should be unique and within the values of 0 to 63. Note: the default factory RS-485 address is 0. Unless necessary, do not manually modify this address. HW4 will automatically change the RS-485 address of the device, if so required.

- **Synchronize with PC clock**: click on the underlined link to set the instrument date and time to match the PC clock.

  Note: the device date and time are automatically synchronized with the PC each time that the log function is being programmed.

- **Device Protection**: this function is available from firmware version 1.2b. For a description, see document E-IN-HW4v2.1-Main

3.4 *Language / Unit System*



- **Language**: click on the underlined link to change the language used in the device local menus and files to one of the available languages. The link opens the folder where the language files are located (these files have the extension .LNG as in English.LNG). To change the language, simply click on the appropriate file.

- **Units**: use the underlined links to the right of the form to globally change the unit system used by the instrument. If the unit system offers several choices such as In Hg or PSI for pressure, choose a unit by left clicking on the arrow to the right of each text box.

  Humidity: the symbol to be used after the % symbol (RH) should be typed in the text box.

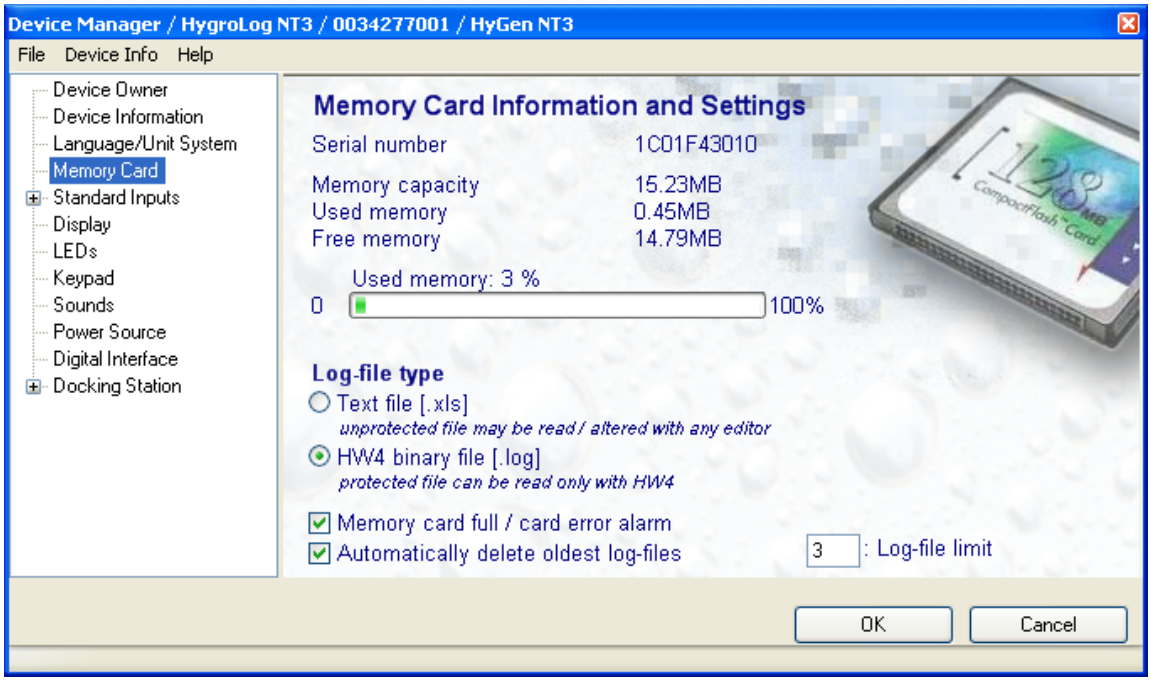
  Note: the units selected for density per volume and density per weight also apply to vapor concentration and specific humidity.

IMPORTANT:

- Do not change the language / units settings while either the logger or the PC is recording data.

- Make sure that the date format and separator symbols are identical to the format and separators used on the PC (Windows Control Panel, Regional and Language Options, Regional Options tab, Customize button, Time and Date tabs). Not doing so may prevent you from reading log files.

3.5 *Memory Card*



● Log-file type:

Text file (XLS): HW4 does not verify this type of file when opening the file.

HW4 binary file (LOG): files of this type can be opened with HW4 but not with an editor or with Microsoft Excel. When opening a protected file, HW4 verifies that the file has not been tampered with. Note that protected binary files use less disk space than unprotected files.

Select HW4 binary file to meet the ERES regulatory requirements.

● Memory card full / card error alarm:

Check this box to have the HygroLog NT issue an error warning when the memory card is full or has a problem. All versions of HW4 will show a memory card alarm condition in red on the monitor screen. HW4 Professional can also be configured (HW4 global settings - Alarm settings tab) to display an alarm table and generate a report whenever any alarm or error condition issued by the HygroLog NT.

● Automatically delete oldest log files:

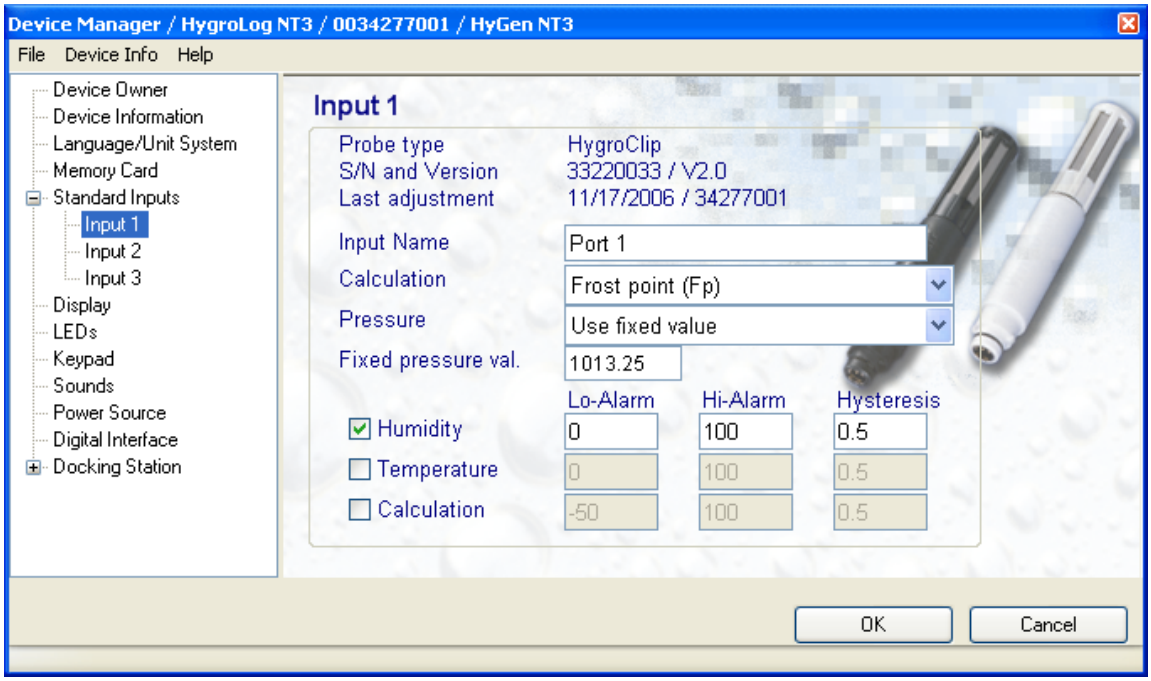
This option works only when the logger automatically closes the current log file and starts a new file because the current log file has reached a size limit before the logging stop time. The size of log files can be limited when programming the log function of the logger. For example, the logger can be programmed to close the current log file and to start a new one at the top of each hour, until the logging stop time has been reached.

Enter the maximum number of full size files to be retained in the text box labeled Log-file limit. In practice, this number will be exceeded by one, unless all files created during the logging process happen to have exactly the maximum file size limit.

3.6 *Standard Inputs*

Clicking on the plus sign to the left of “Standard Inputs” expands the tree and displays probe inputs 1 to 3. Inputs 1 to 3 are listed whether or not they actually exist on the logger.

Only those inputs selected in the View Tab are visible in Device Manager. When the list is either empty or incomplete, please exit Device manager and check the selections made in the View Tab (see Right Pane: Device View Mode).



- **Input Name**: use a maximum of 12 characters

- **Calculation**: left click on the arrow to the right of the list box and select the parameter to be calculated by the HygroLog NT for this particular probe. This is also the calculated parameter that HW4 will display for this probe

  Dew point (Dp) or Frost point (Fp): depending on the selection made here, both the HygroLog NT and HW4 will display either the symbol Dp or the symbol Fp. The symbol Fp indicates that any value below freezing is a frost point as opposed to a dew point. When selected, the symbol Fp is also be displayed for values above freezing. This of course is to be understood as being the same as dew point.

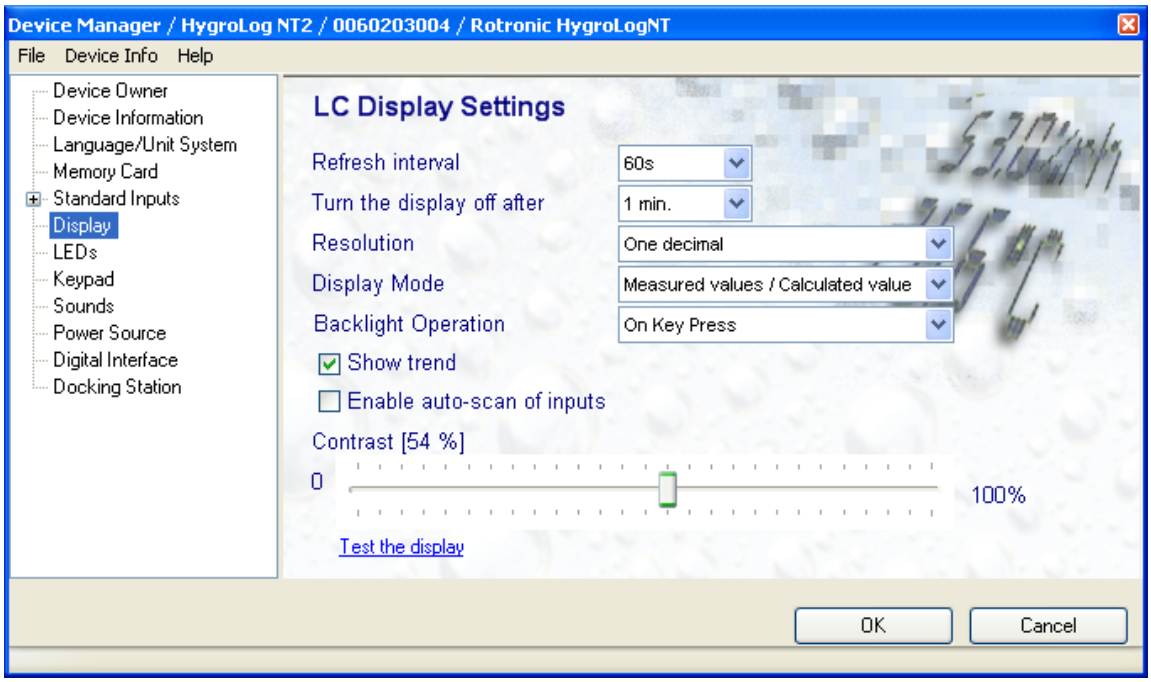
- **Pressure**: left click on the arrow to the right of the list box and select which barometric pressure will be used by the HygroLog NT to compute parameters such as wet-bulb, mixing ratio, etc. The HygroLog NT can use a fixed pressure value or use a measurement of the actual barometric pressure when an analog pressure probe is connected to the optional docking station.

- **Fixed pressure value**: enter here the fixed pressure value that will be used by the HygroLog NT. Note that this numerical value should be consistent with the pressure unit that was selected under Language / Unit System.

- **Alarm**: alarm conditions can be defined for humidity, temperature and the calculated parameter. Values that are below the low alarm value or above the high alarm value will trigger an alarm. A value can be specified for the alarm function hysteresis. This value is used for both the low and the high alarm. To

trigger an alarm only in the event that a probe is missing, disconnected or not transmitting data, simply enable the alarm for one of the parameters and set the Hi and Lo values to the range of the probe (for example 0 and 100 for humidity). All versions of HW4 will show an out-of-limits value alarm in red on the monitor screen. HW4 Professional can also be configured (HW4 global settings - Alarm settings tab) to display an alarm table and generate a report whenever an of-of-limits condition occurs.

3.7 *Display*



- **Refresh interval**: left click on the arrow to the right of the list box and select the refresh interval for the display of the HygroLog NT. Values range from 5 seconds to 60 minutes. To conserve battery power, use a high setting.

- **Turn the display off after**: use this item enable the Display Sleep function so as to extend the battery lifetime. Left click with the mouse on the arrow to the right of the list box and select one of the available choices. The display of the HygroLog NT goes blank after the specified time period, when no key is being pressed or when there is no communication with the PC.

- **Resolution**: left click on the arrow to the right of the list box and select the number of decimals to be used on the display of the HygroLog NT.

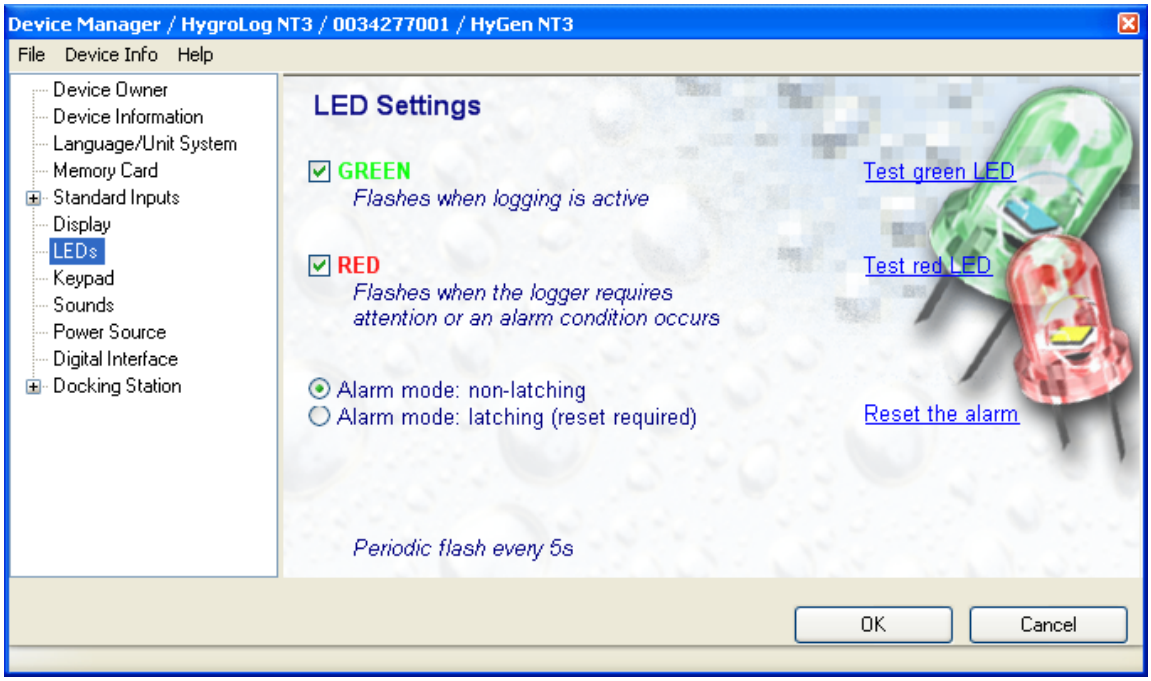
- **Display mode**: left click on the arrow to the right of the list box and select the type of contents for the display of the HygroLog NT. Status line causes the HygroLog NT to display the date and time as well as which input source is providing the displayed data.

- **Backlight operation**: left click on the arrow to the right of the list box and select between Always off, Always on and On key press (default).

- **Show trend**: when this box is checked a trend indicator is displayed to the left of the measured values and calculated parameter. This indicator shows if the values are increasing, decreasing or stable. The status of each trend indicator is read directly from the HygroLog NT.

- **Enable auto-scan of probe inputs**: check this box to make the display automatically switch between probe inputs every 5 seconds.
- **Contrast**: drag the slider to adjust the contrast of the display
- **Test the display**: click on the underline link to turn on all pixels. If the LC display is good, this should cause the display to become uniformly black (no white areas) for a few seconds.

3.8 *LEDs*



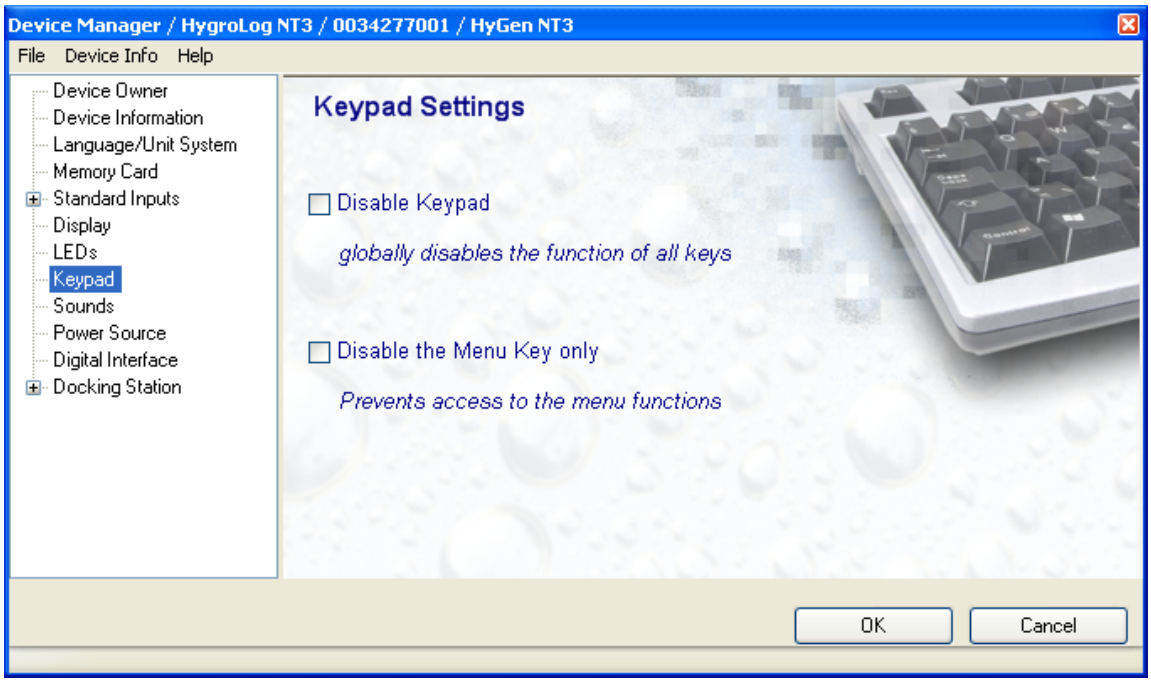
Each of the two LEDs of the HygroLog NT can be enabled or disabled. Each LED can be tested by clicking on the corresponding underlined link. During the test, the LED stays on for a few seconds.

The red LED can be programmed to flash when there is an out-of-limits value and / or when the logger requires attention (low battery, memory card full, etc.).

- Alarm mode:

In the non-latching mode, the red LED flashes for only as long as the data from a probe corresponds to an alarm condition. In the latching alarm mode, the red LED stays on even after the alarm condition has disappeared. When the LED is set to provide a latching alarm, it can be reset by clicking on the underlined link Reset the alarm.

3.9 *Keypad*



To prevent tampering with the logger or to prevent changes resulting from the accidental pressing of keys, the keypad can be completely disabled.

As an alternative, only the menu key may be disabled to protect both the logger and its probes.

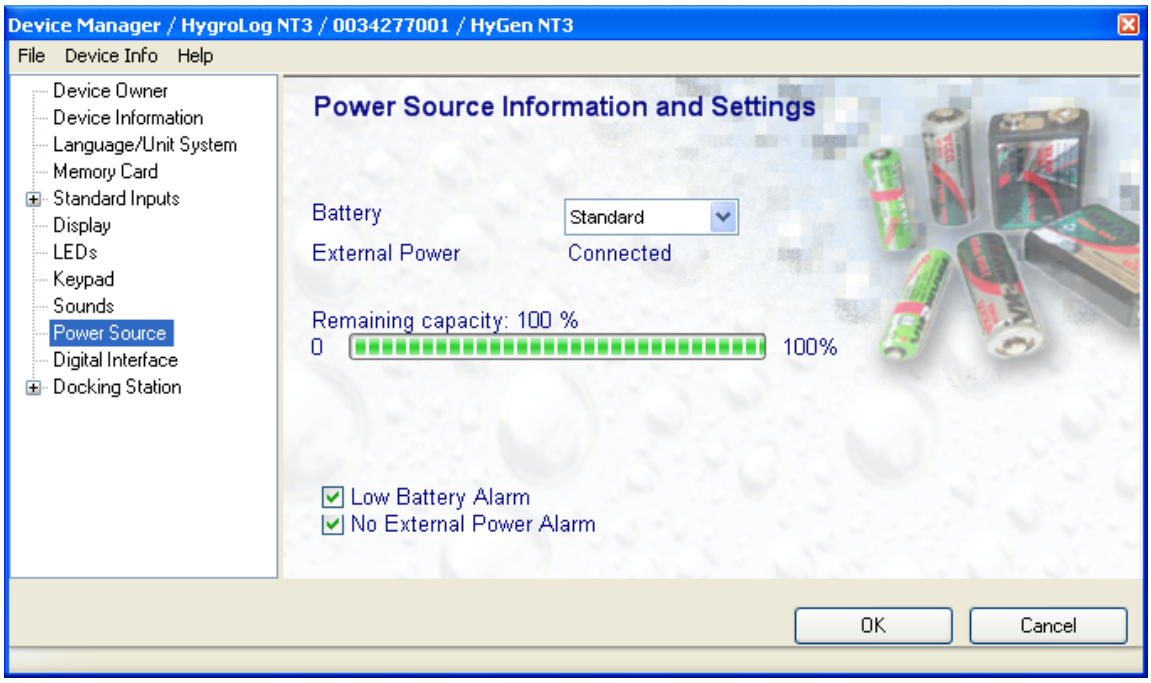
IMPORTANT: you should at least disable the MENU key to comply with FDA CFR21 Part II.

3.10 *Sounds*

- **Keystroke**: check this box to enable a clicking feedback sound when pressing any key of the keypad.
- **System Error**: check this box to have the HygroLog NT emit a non-repeating 5 seconds sound in the event of an internal error in the HygroLog NT.
- **Alarm**: check this box to have the HygroLog NT emit a non-repeating 5 seconds sound when an alarm condition occurs.

The pitch of the sound can be set by left clicking on the arrow located to the right of the list box and by selecting the desired pitch. To test the sound function, click on the underlined link.

3.11 *Power Source*



- Type of internal power source: click on the arrow located to the right of the list box and choose between battery and accumulator (rechargeable battery). Note that trying to recharge a regular battery is potentially dangerous and may damage the instrument.

  Do not select accumulator if using a regular battery since this would allow the HygroLog NT to attempt recharging the battery when an external power source is connected.

  Note: the only way to totally power down the HygroLog NT is to disconnect the battery.

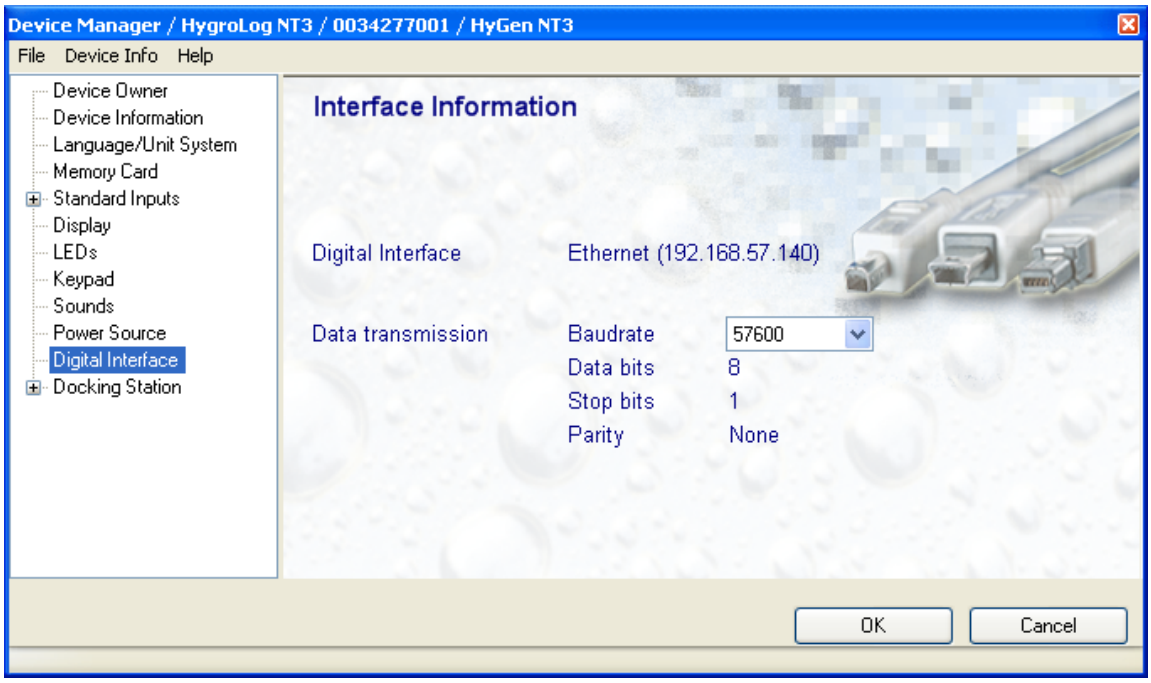
- External Power Source: an external power source is automatically detected by the HygroLog NT

- Trigger an alarm when the battery is low: see note 1 below

- Trigger an alarm when there is no external power (AC power failure or disconnected / malfunctioning AC adapter): see note 1 below

[1] All versions of HW4 will show a power source alarm in red on the monitor screen. HW4 Professional can also be configured (HW4 global settings - Alarm settings tab) to display an alarm table and generate a report whenever any alarm or error condition issued by the HygroLog NT.

3.12 *Digital Interface*



This form is used to select the RS-232 / RS-485 baud rate between 57600 (factory default) and 19200. Other data cannot be changed from within the form. Generally, leave the baud rate at 57600. Select 19200 when you plan on connecting a mix of HygroLog NT and other devices such as the HygroFlex transmitter to an RS-485 multi-drop.

IMPORTANT:

All devices within an RS-485 multi-drop should use the same baud rate. Communication within the RS-485 multi-drop will not work when the devices are configured with different baud rates.

Docking station with wired or wireless Ethernet connection: after changing the baud rate in Device Manager, you should also reflect the change in the configuration of the internal Digi International module used by the device to connect to the LAN. See: **Changing the baud rate of an Ethernet device** in document E-IN-HW4v2.1-Main.

3.13 *Docking Station*

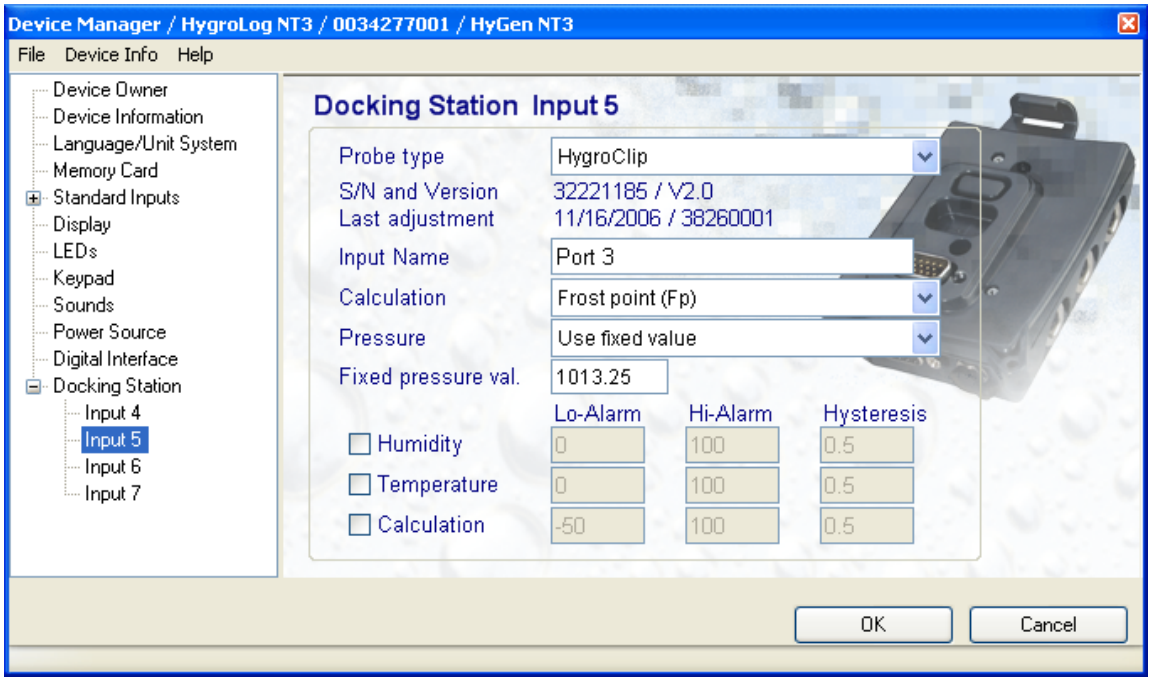
Clicking on the plus sign to the left of "Docking Station" expands the tree and displays a list of optional docking station inputs (inputs 4 to 7), logical inputs and relays. These items are listed whether or not they actually exist on the docking station. Only those items selected in the View Tab are visible in Device Manager. When the list is either empty or incomplete, please exit Device manager and check the selections made in the View Tab (see Right Pane: Device View Mode). Depending on the model of docking station the following probe types may be used:

- HygroClip probe
- RTD probe (direct 4-wire connection)
- Analog probe [1]
- Pressure probe [1]

[1] Must be compatible with the requirements specified in the HygroLog NT instruction manual.

3.13.1 Probe type: HygroClip

Note: this probe type selection is also used in the case of docking station DS-PT-2 (Pt100 RTD probes) - for more information, see Pt100 RTD probes below.



- **Input Name**: use a maximum of 12 characters

- **Calculation**: left click on the arrow to the right of the list box and select the parameter to be calculated by the HygroLog NT for this particular probe. This is also the calculated parameter that HW4 will display for this probe

  Dew point (Dp) or Frost point (Fp): depending on the selection made here, both the HygroLog NT and HW4 will display either the symbol Dp or the symbol Fp. The symbol Fp indicates that any value below

freezing is a frost point as opposed to a dew point. When selected, the symbol Fp is also be displayed for values above freezing. This of course is to be understood as being the same as dew point.

- **Pressure**: left click on the arrow to the right of the list box and select which barometric pressure will be used by the HygroLog NT to compute parameters such as wet-bulb, mixing ratio, etc. The HygroLog NT can use a fixed pressure value or use a measurement of the actual barometric pressure when an analog pressure probe is connected to the docking station.

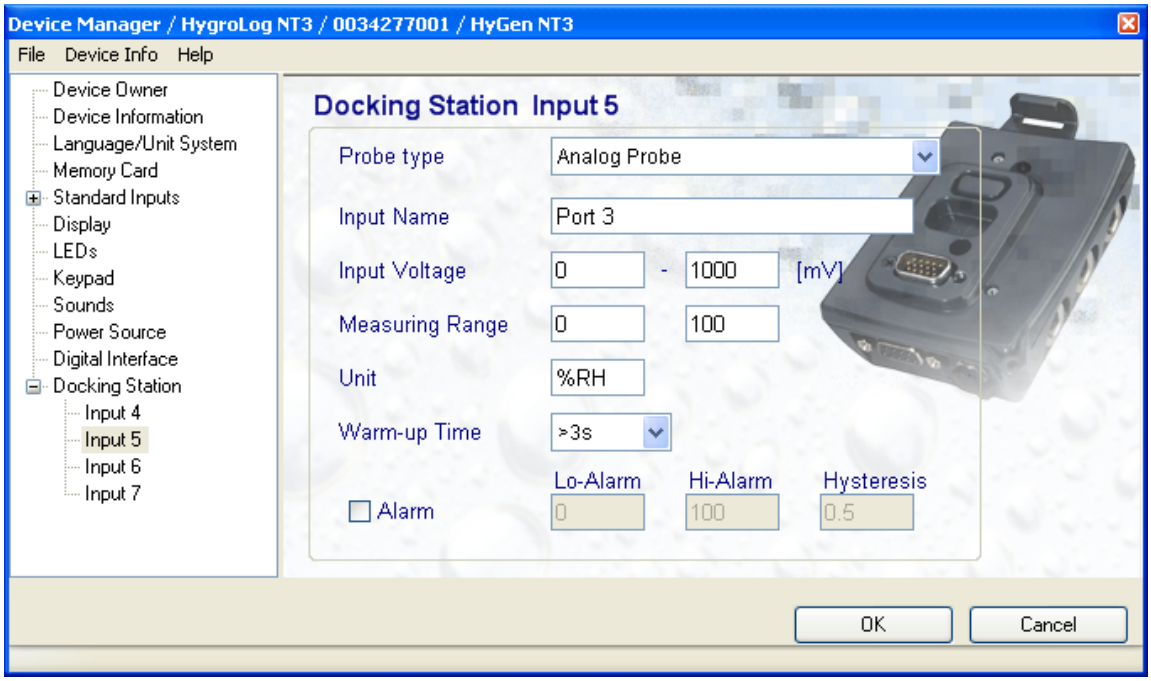
- **Fixed pressure value**: enter here the fixed pressure value that will be used by the HygroLog NT.

  IMPORTANT: Be sure to verify that the numerical value of the fixed pressure is consistent with the unit system of the instrument (see Language / Unit System). Neglecting to do so may result in an error on the value of any parameter that uses barometric pressure as a calculation input.

- **Alarm**: alarm conditions can be defined for humidity, temperature and the calculated parameter. Values that are below the low alarm value or above the high alarm value will trigger an alarm. A value can be specified for the alarm function hysteresis. This value is used for both the low and the high alarm. To trigger an alarm only in the event that a probe is missing, disconnected or not transmitting data, simply enable the alarm for one of the parameters and set the Hi and Lo values to the range of the probe (for example 0 and 100 for humidity). All versions of HW4 will show an out-of-limits value alarm in red on the monitor screen. HW4 Professional can also be configured (HW4 global settings - Alarm settings tab) to display an alarm table and generate a report whenever an out-of-limits condition occurs.

Pt100 RTD probes: When using a docking station compatible with RTD probes, select HygroClip as the probe type. By default, temperature conditions within the range of -100 to 600°C can be measured. Enter a description for each Pt100 probe and set alarm values for temperature in the same way as for a HygroClip probe. Entries made in other fields of the form have no effect.

3.13.2 Probe type: Analog probe (single channel)

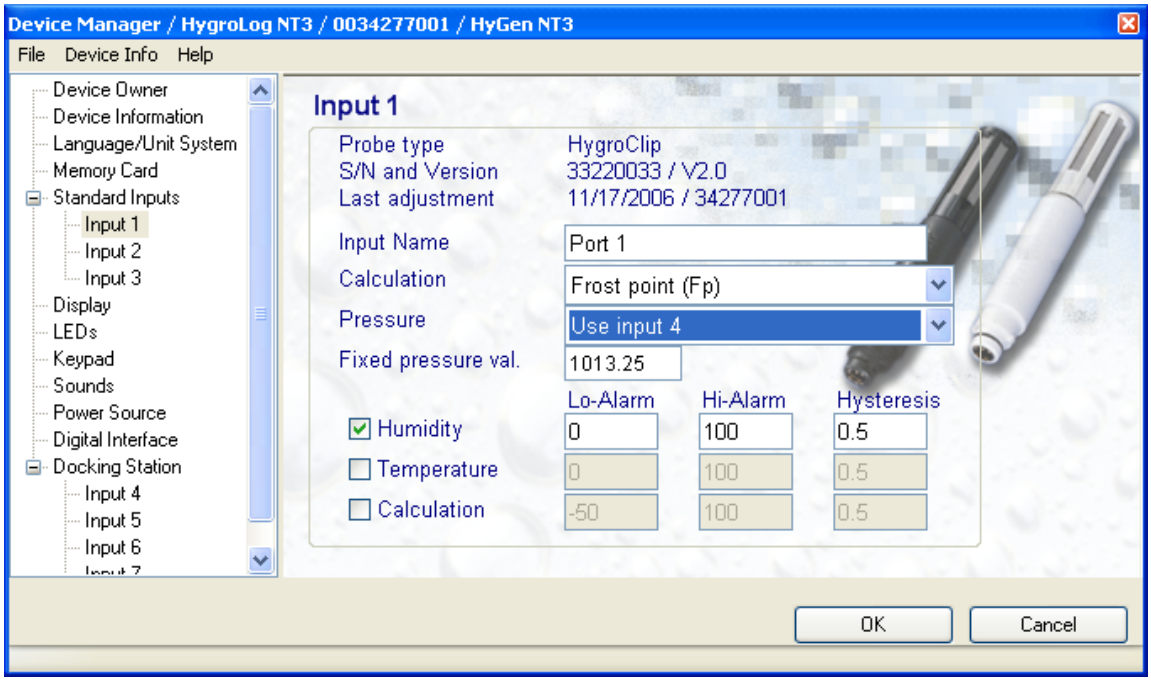


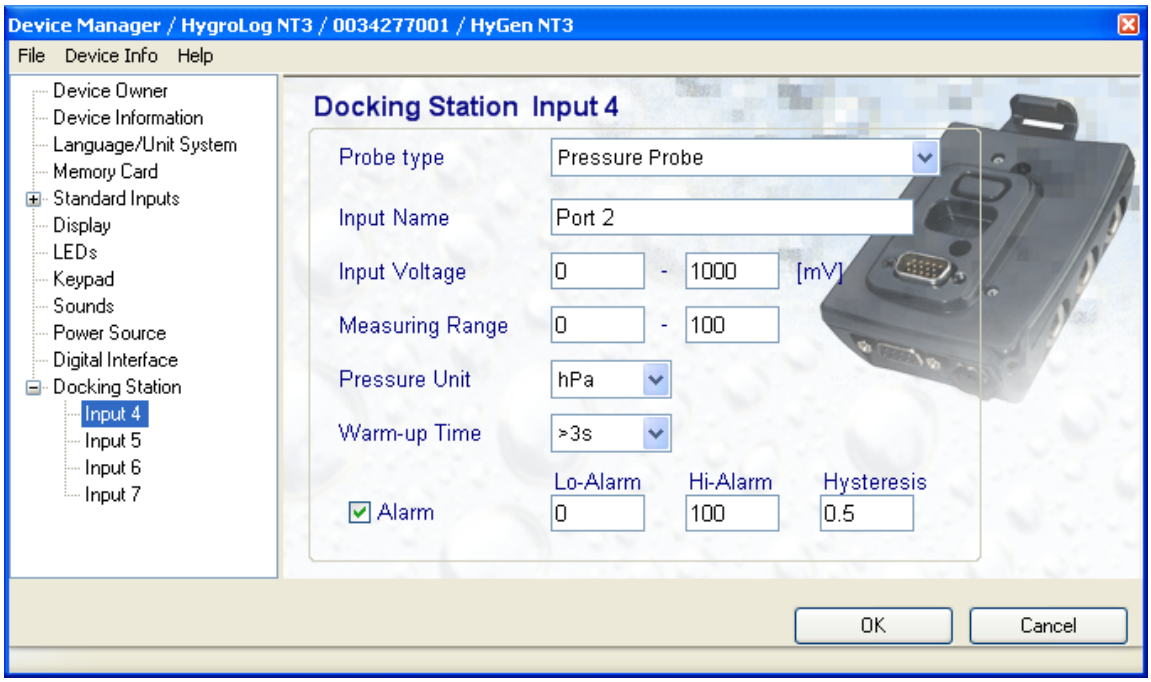
Enter a description for the probe. Specify the range of the input voltage, the measuring range of the probe, the engineering unit of the parameter measured by the probe, the time required by the probe to warm-up, and any alarm values that you may want to use.

Note: The probe inputs of docking station DS-U4-4-20 are designed for a current signal as opposed to a voltage signal. Each probe input uses a 150 Ohm resistor to convert 4…20 mA into 600…3000 mV (nominal). To compensate for tolerances on the 150 Ohm resistor, begin by entering the values 600 and 3000 for the input voltage, and the values 4 and 20 for the measuring range. If HW4 (Current Values Tab) displays the value 3.90 when the input current is set to 4.00 mA, change the input voltage value 600 to 585 (600 x 3.90 / 4.00). Proceed in a similar manner with 20 mA and 3000 mV. When done, replace the values 4 and 20 in the measuring range with values corresponding to the range of the physical parameter being measured. For example, if 4…20 mA = 0…100 PSI, enter 0 and 100 as the measuring range and enter the letters PSI in the unit box.

3.13.3 Probe type: Pressure probe

The analog pressure probe is a particular case of the single channel analog probe. The difference is that the signal from the analog pressure probe can be used as an input by another probe input when calculating a psychrometric parameter that depends on the value of barometric pressure. See example below:

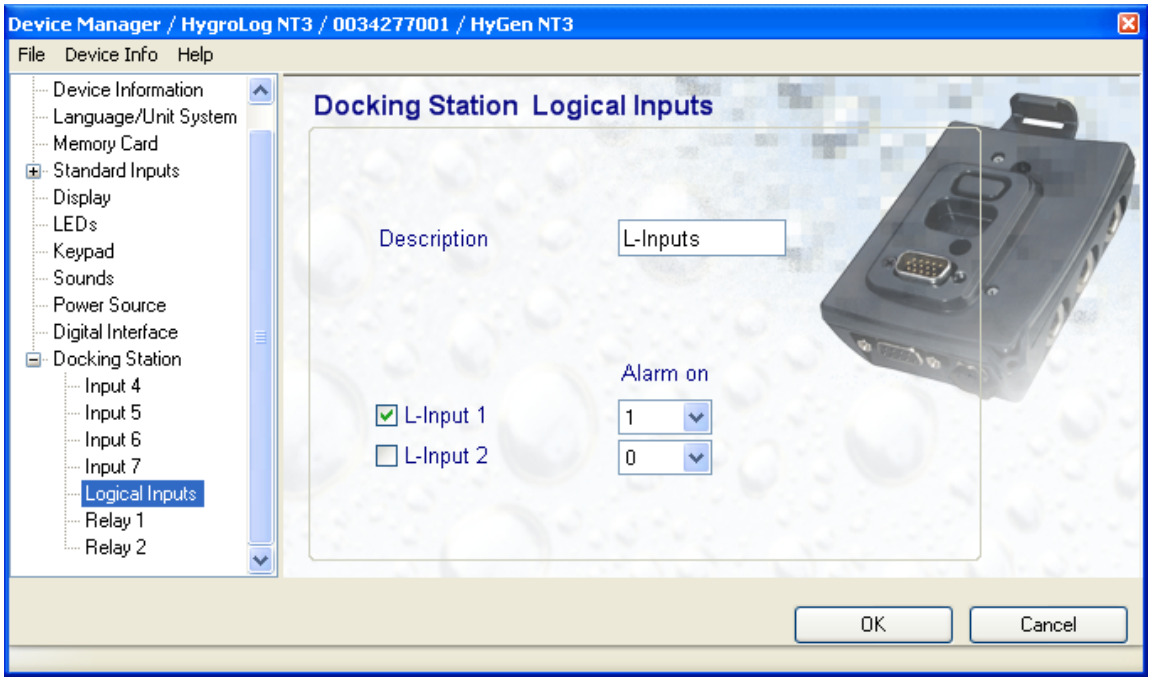




Enter a description for the probe. Specify the range of the input voltage, the measuring range of the probe, the engineering unit used for pressure, the time required by the probe to warm-up, and any alarm values that you may want to use.

3.13.4 Logical Inputs

Some models of docking station feature two logical inputs that can be used to monitor external contacts such as may be attached to a door (see separate HygroLog NT manual). When an external contact is open, the corresponding logical output takes the value 0.



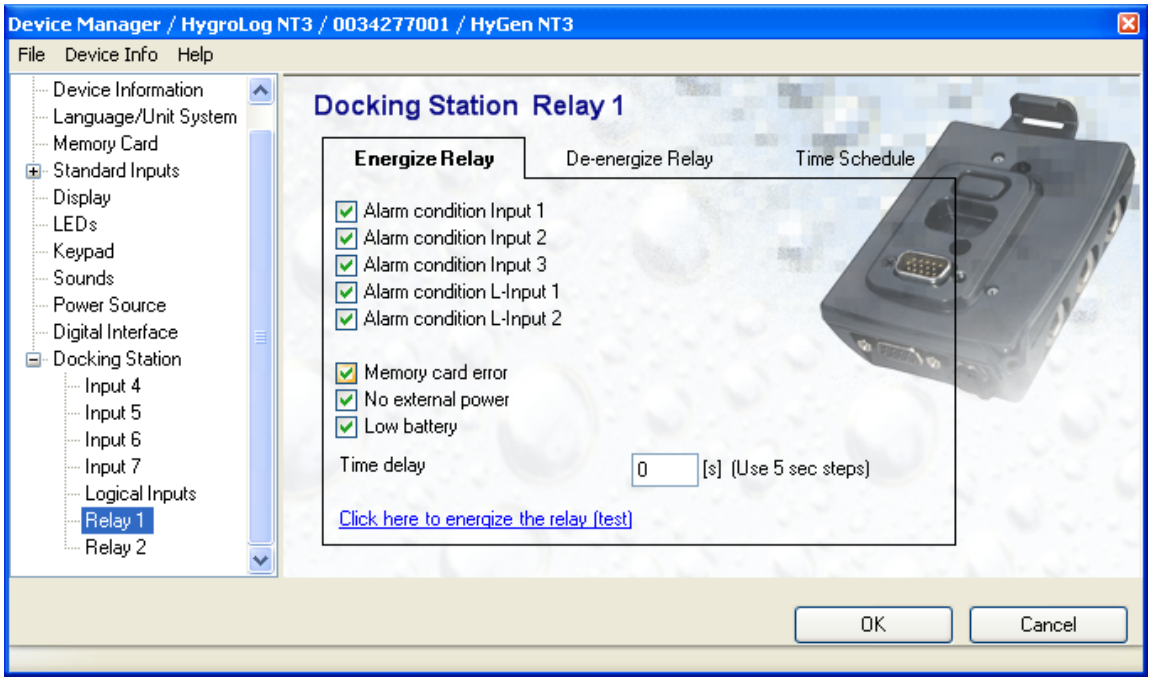
Enter a global description for the two logical inputs and define any condition that you may want to monitor for the purpose of providing an alarm.

3.13.5 Relay 1 / Relay 2 (docking station DS-R-1)

Docking station DS-R-1 is available for use with the HygroLog NT and features two independent relay outputs: Relay 1 and Relay 2 (see separate HygroLog NT manual). The following form is used to program the function of each relay and has 3 tabs: Energize Relay, De-energize Relay and Time Schedule. To select any tab, click with the mouse on the tab name with the mouse.

Note: when a relay is energized, the normally closed relay contact changes from closed to open and the normally open relay contact changes from open to closed.

Energize Relay Tab:

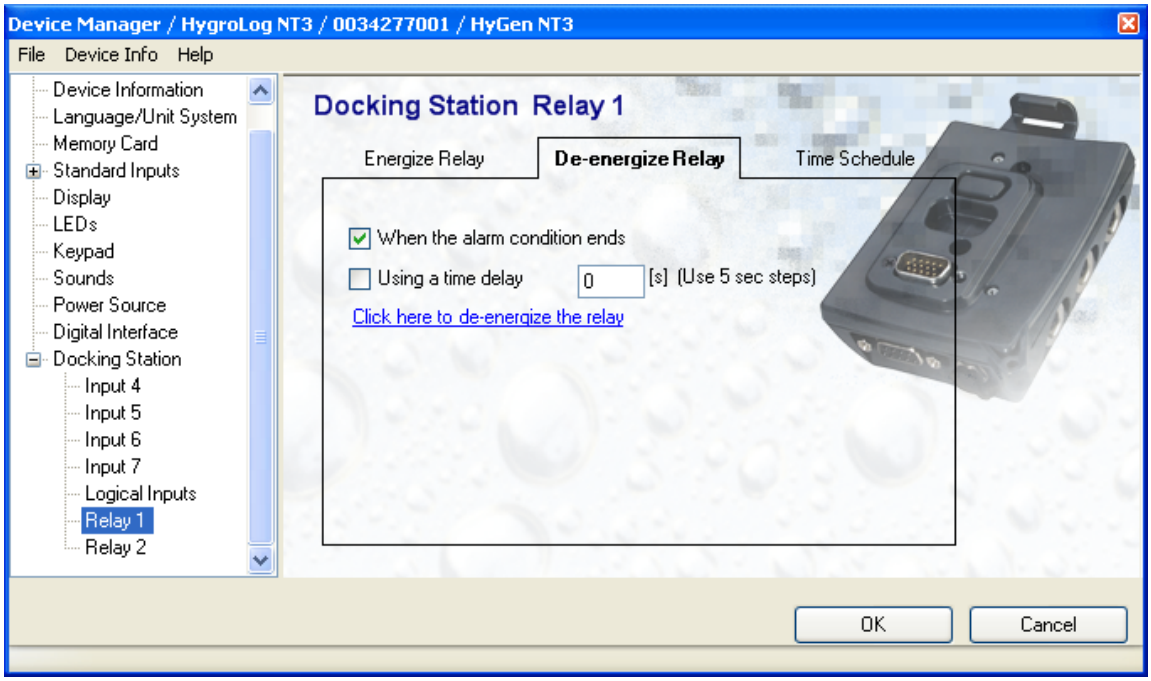


Use this tab to select from the list one or several alarm conditions that will cause the relay to be energized. Alarm conditions for probe inputs 1 to 3 and logical inputs 1 and 2 are defined in Device Manager under “Input” and “Logical Inputs”. To associate an alarm condition with the relay, click on the corresponding check box. A check mark symbol appears. Click again on the box to remove the check mark and deselect the condition.

If so desired, specify a time delay in seconds by typing a number in the time delay text box (use multiples of 5 seconds). When any of the selected conditions occurs, the relay will be energized after the time delay specified here, provided that the alarm condition still exists.

When the relay is not energized, click with the mouse on “Click here to energize the relay (test)” to energize and test the relay. Note: this link is not visible when the user does not have the “Device configuration / log function” right.

De-energize Relay Tab:



Use this tab to define how the relay behaves when the alarm condition(s) ends.

For a latching relay action (relay remains energized after the alarm condition has ended), do not put a check mark in any of the boxes on the form.

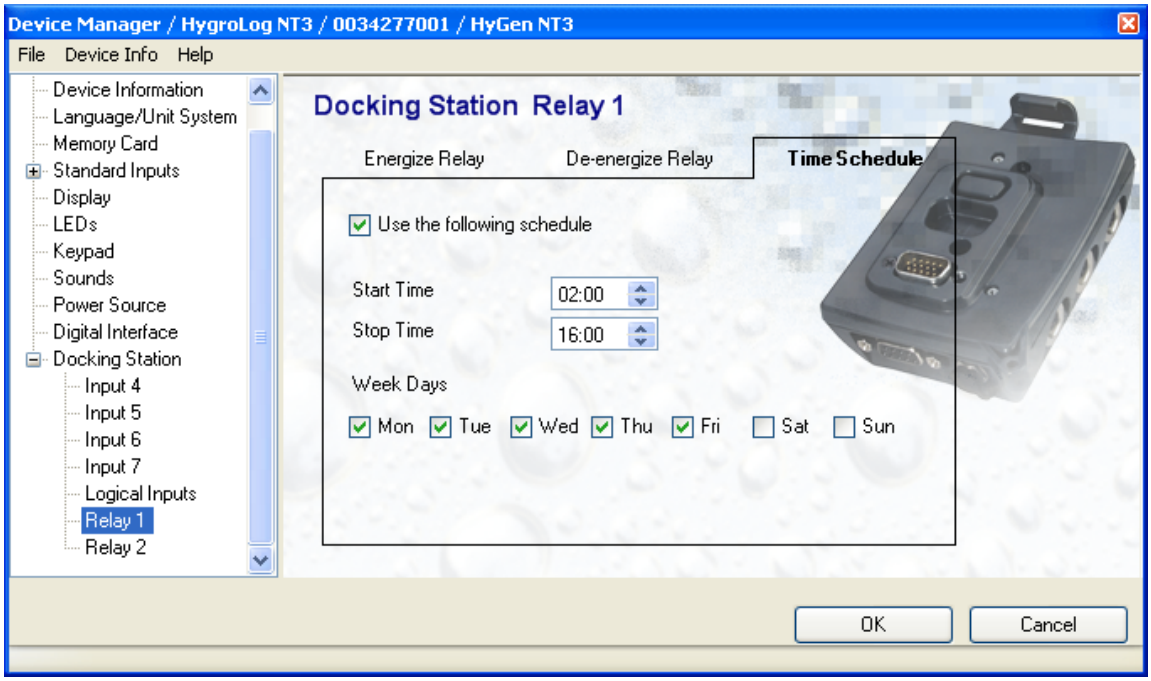
For a non-latching relay action, place a check mark in one of the following boxes by left clicking with the mouse while the mouse cursor is on top of the box:

- When the alarm condition ends: the relay is automatically de-energized as soon as the alarm condition ends
- Using a time delay: the relay is automatically de-energized after the specified time delay regardless of the status of the alarm condition that caused the relay to be energized (use multiples of 5 seconds).

Note: when both boxes are check-marked, the relay is automatically de-energized depending on whichever condition occurs first.

To de-energize the relay, click with the mouse on “click here to de-energize the relay”. The relay will not be energized unless a new alarm condition occurs. Note: this link is not visible when the user does not have the “Device configuration / log function” right.

Time Schedule Tab:



Use this tab to define when the relay is used to monitor the alarm conditions selected in the Energize Relay Tab.

If you do not wish to use the relay to monitor alarm conditions 7 days a week and 24 hours a day, place a check mark next to “Use the following schedule” and define a time schedule. Both the start and stop time are common to all days of the week.

4 DATA LOGGING – with the HygroLog NT

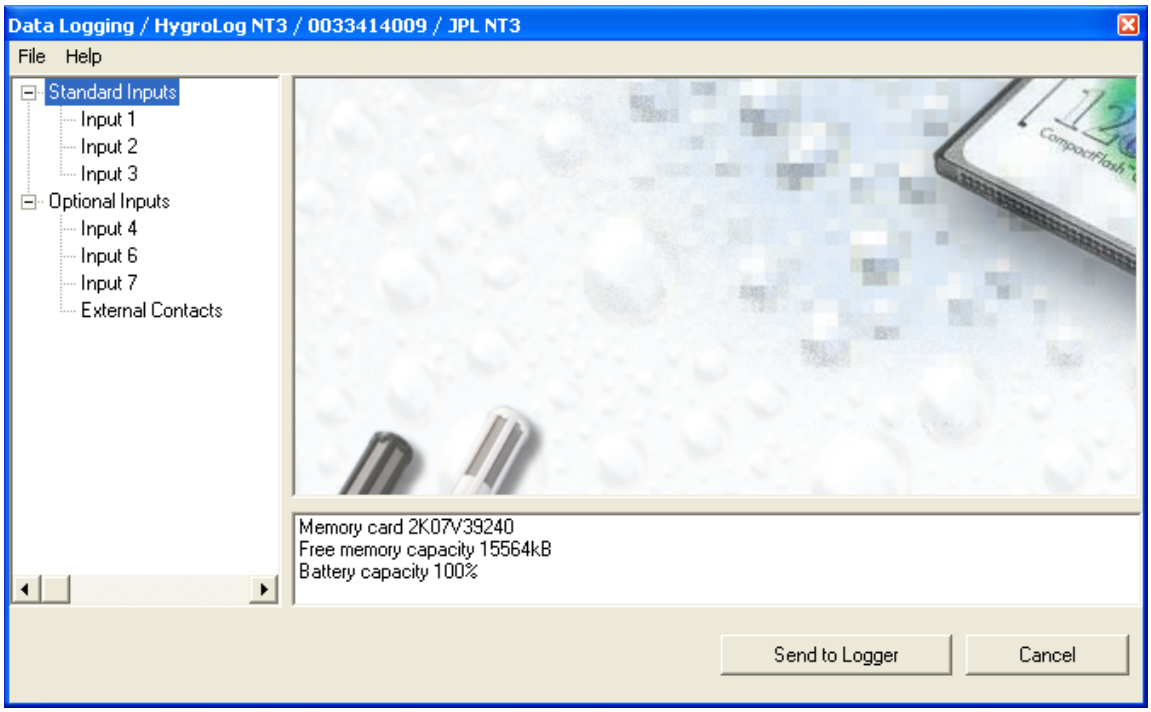
When HW4 has detected a HygroLog NT, the device appears in the left pane of the HW4 main screen. Expanding the device displays a list of the available device functions.

To select the Data Logging function, click on it with the left mouse button. HW4 opens the Data Logging form.

The Data Logging form is used to set the date and time to start and stop logging data for each individual input of the HygroLog NT and docking station. Other settings such as the log interval and file management are also defined with this form.

Clicking on the plus sign to the left of “Standard Inputs” or “Optional Inputs” expands the tree and displays a list of probe and logical inputs. Inputs are listed regardless of whether or not they do exist on the actual logger and docking station being used. Only those items selected in the View Tab are visible in Device Manager. When the list is either empty or incomplete, please exit Data Logging and check the selections made in the View Tab (see Right Pane: Device View Mode). To select an input, click on it with the left mouse button.

Clicking on Standard Inputs, displays information on the memory card and battery at the bottom of the form.



Note: the Data Logging form is not used to define the type of log file (text or binary). The type of log file is common to all probes and inputs and is defined from within Device Manager / Memory Card.

4.1 *Menu Bar*

The menu bar is located at the top of the form.

File

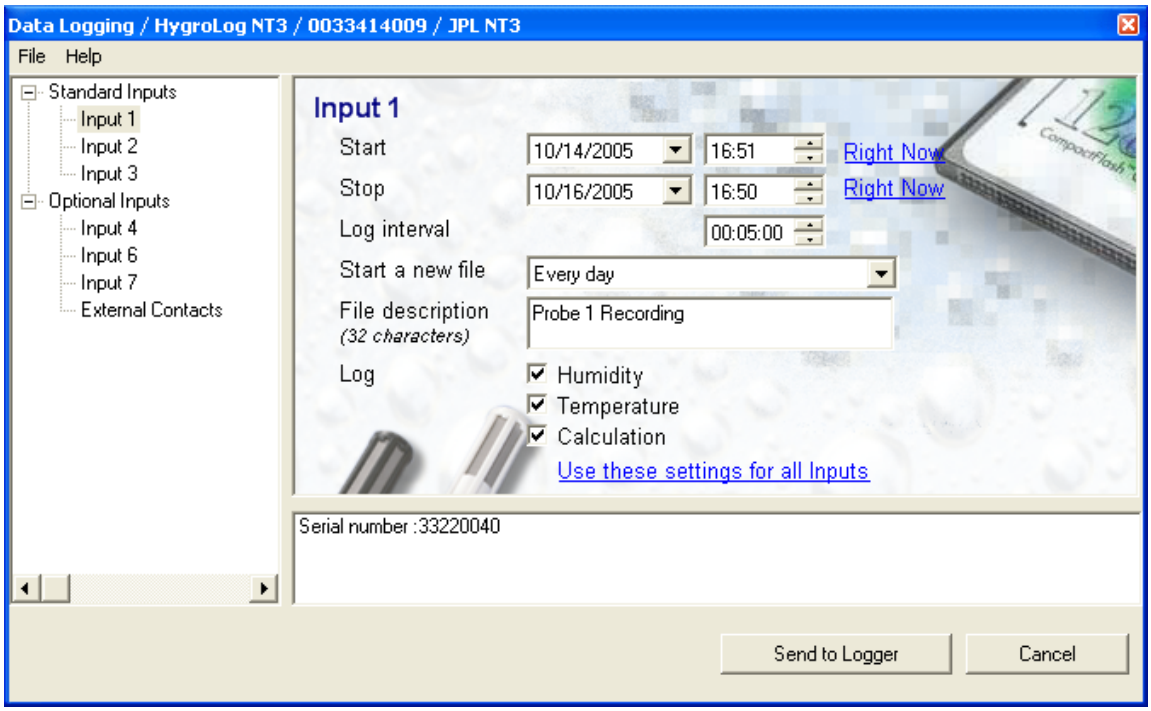
- **Exit:** closes the Data Logging form without making any changes.

Help

- **HW4 Help:** Opens HW4 Help
- **About HW4:** Displays the version number and ID number of HW4

4.2 *Programming the HygroLog NT for data logging*

To program the HygroLog NT for logging data, select first an input with the mouse.



● **Start**: enter the start date and the start time in each text box. To copy the current date and time from the PC, click on the “Right Now” blue link.

● **Stop**: enter the stop date and the stop time in each text box. To copy the current date and time from the PC, click on the “Right Now” blue link. **To stop logging immediately, click on this link, click on “Use these settings for all inputs” (only if you want to stop all other inputs) and click on the Send to Logger button.**

● **Log interval**: use the mouse to highlight any of the following: hours, minutes or seconds. Use the up or the down arrow to set the log interval to the desired value.

● **Start a new file**: The “Start a new file” list box is used to tell the logger when to finish logging to the current file and when to start a new file. Click on the arrow located to the right of the list box to display a list of available options. The default setting is to close the file and start a new one after 200,000 data points but it is usually better to start a new file sooner (see NOTE below).

Every hour : a new file is created at the top of each hour (local logger time)
Every day : a new file is created at 00:00 (midnight, local logger time)
Every week : a new file is created at 00:00 on Mondays
Every month : a new file is created on the first day of each month at 00:00

Note: the HygroLog NT creates a separate log file for each probe or input to be logged.

NOTE: It is strongly recommended to limit the size of log files to the minimum allowed by your application. Unless necessary, do not use a very short log interval. As far as possible start a new file every day. Following these recommendations ensures that each file download from the data logger to the HW4 PC takes as little time as possible.

● **Description**: use up to 32 characters to enter a description / identification for the log file. This will be part of the file header.

● **Log**: check the box corresponding to each parameter to be logged (up to 3 parameters). In the case of an input with a single channel analog probe or with a pressure probe, you only need to check the top box. In the case of an RTD probe, you only need to check the Temperature box. In any case, no harm is done when the other boxes are also checked.

Notes:

● The selections made for one input can be transferred to all other inputs (except External Contacts) by clicking on **"Use these settings for all inputs"**. This includes the log file description. Alternatively, each probe or input can be individually programmed, using different settings.

● When a digital HygroClip probe is connected to the input, the serial number of the probe is displayed at the bottom of the form.

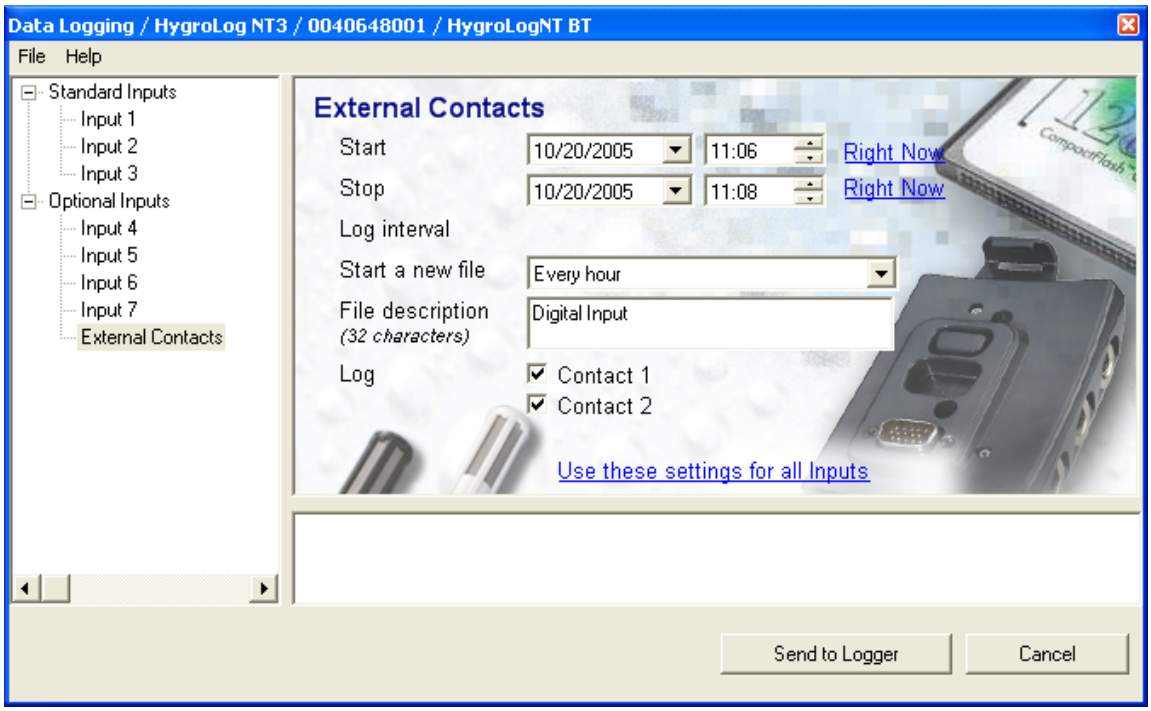
● When done, click with the mouse on the **Send to Logger** button. The HygroLog NT will start executing the log commands.

● The HygroLog NT automatically gives each log file a name comprised of the last 4 digits of the logger serial number, followed by the input number and a sequential run number.

4.2.1 Recording the status of external contacts (logical inputs)

Logical inputs are used to monitor the status of up to two external contacts, such as a door contact.

The HygroLog NT records the status of the logical inputs in a different manner as used for other input types. Recording is not based on a log interval. When a check mark is placed in one or two of the "Contact" boxes, data logging is triggered automatically each time that a logical input changes its value from 0 to 1 or from 1 to 0, and holds the new value for 5 or more seconds. In the situation where a logical input has either the value 0 or the value 1 during the entire recording time, the log file does not record any data.



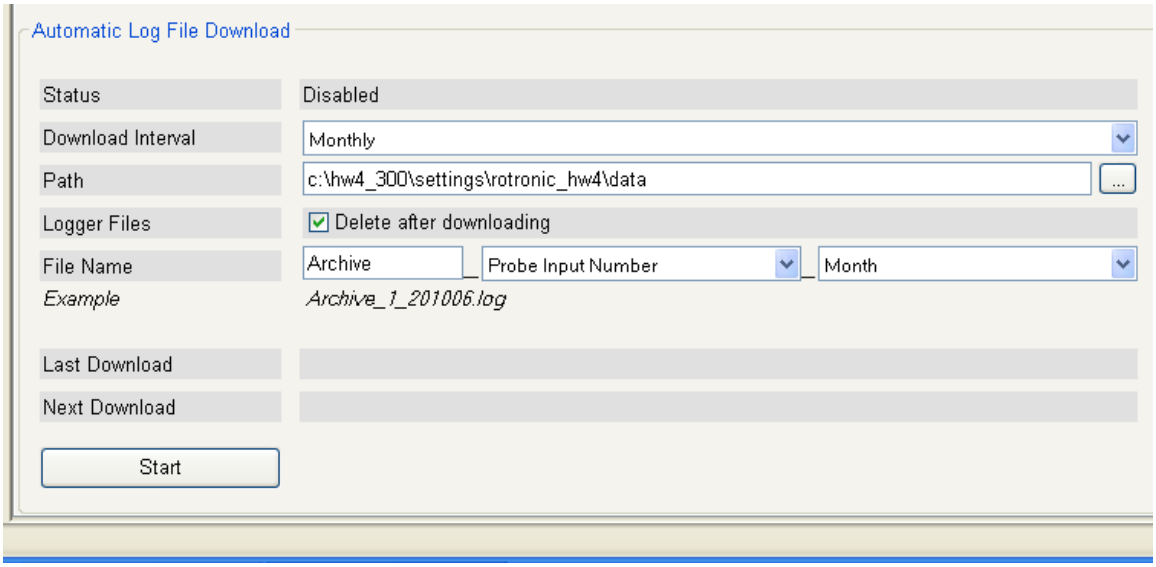
5 AUTOMATIC LOG FILE DOWNLOAD

Note: this function is available only with HW4 Professional.

The automatic log file download function is used to copy the log files present on the memory card of one or more HygroLog NT data loggers to a specific directory of the HW4 PC (including network drives). A different drive and/or directory can be assigned to each data logger.

Depending on the selected interval, the function executes daily, weekly (Monday) or monthly (first day of the month) at 02:00 (2:00 am). The actual time may vary slightly, depending on factors such as network traffic, the number of data loggers and the number of files to be downloaded. The function can be configured to either delete the downloaded files from the logger memory card or to leave them on the memory card. The exact effects of the function depend both on the configuration of the function and on the programming of data logging on the data logger (see Example further down)

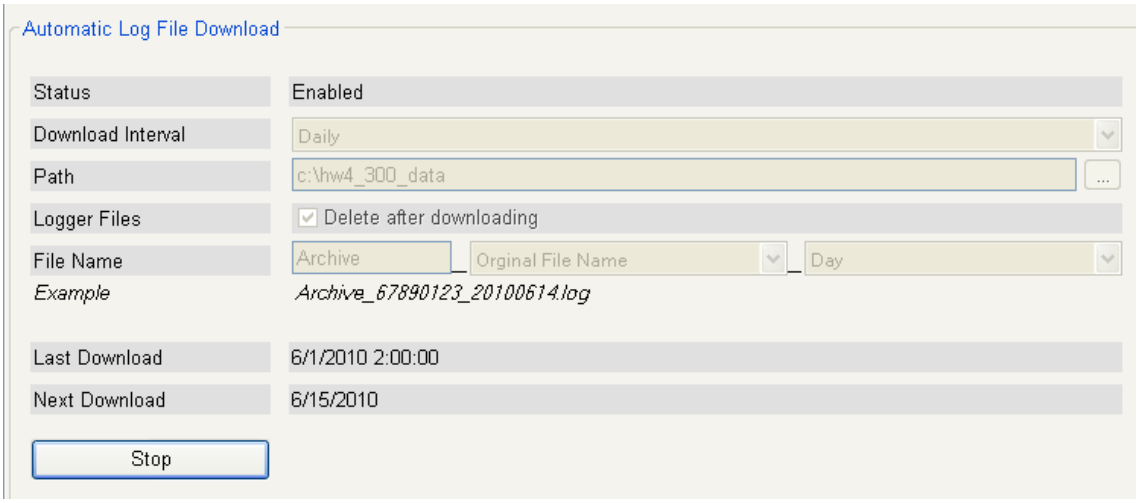
IMPORTANT: File download operations take precedence over the automatic polling of devices. Consequently, the automatic polling of devices is suspended whenever a file download operation is in progress. It is good practice to ensure that each file download takes as little time as possible. To this purpose, the size of log files should be limited to the minimum allowed by your application.



► **Procedure**:

- Select the HygroLog NT in the device tree (left pane of the HW4 main screen).
- Select the Log to PC tab in the right pane of the HW4 main screen. The automatic log file function can be enabled and configured using the controls located at the bottom of the Log to PC tab
- Click with the mouse on the arrow located to the right of the box labeled Download Interval and select one of the available options from the drop down menu.
- Select a path where to download the files (click on the button to the right of the path field to display drives and folders)
- Enable or disable the file automatic deletion from the logger memory card
- Define a file name structure (3 fields are available for this). The file type is the same as on the logger (file extension XLS or LOG)
- Click on the “Start” button

HW4 confirms that the function is enabled:



After each file download, HW4 refreshes the Last Download and Next Download fields:

To disable the function, click with the mouse on the End button. The screen reverts to its default

5.1 *Examples*

The following examples illustrate which results to expect from the automatic log file download function under different circumstances. All times are in the 24 hour format.

Notes:

- When a file is deleted from the logger memory card while logging is active, the HygroLog NT automatically recreates the file under the same name as soon as it writes the next data point. The data that was present before deletion is no longer part of the file.
- New files started by the data logger (configuration of the data logging function):

  Every hour : a new file is created at the top of each hour (local logger time)
  Every day : a new file is created at 00:00 (midnight, local logger time)
  Every week : a new file is created at 00:00 on Mondays
  Every month : a new file is created on the first day of each month at 00:00

- HW4 will not copy twice the exact same file to the PC

Example 1

- Logger settings for input 1:

Start time : 06/19/10 11:39
End time : 06/22/10 11:39
Log interval : 10 minutes
Start a new file : Every day

- Automatic download function settings:

Download interval : Daily
Downloaded files : Delete from logger memory card

- Situation on 06/23/10 after completing the last automatic download:

Number of files generated by the data logger: **4**

Number of files present on the data logger memory card: **0**

Number of files present on the HW4 PC: **7**

File 1: 06/19/10 11:39 to 06/19/10 23:59
File 2: 06/20/10 00:09 to 06/20/10 01:59
File 3: 06/20/60 02:09 to 06/20/10 23:59
File 4: 06/21/10 00:09 to 06/21/10 01:59
File 5: 06/21/10 02:09 to 06/21/10 23:59
File 6: 06/22/10 00:09 to 06/22/10 01:59
File 7: 06/22/10 02:09 to 06/22/10 11:39

Notes

File 1 is the same as the original logger file
Files 2 and 3 correspond to an original logger file split in two, etc.

Example 2

- Logger settings for input 1:

Start time : 06/20/10 10:12
End time : 06/23/10 11:39 (stopped manually)
Log interval : 5 minutes
Start a new file : Every day

- Automatic download function settings:

Download interval : Daily
Downloaded files : Keep on memory card after downloading

- Situation on 06/23/10 after completing the last automatic download:

Number of files generated by the data logger: **4**

Number of files present on the data logger memory card: **4**

File 1: 06/20/10 10:12 to 06/20/10 23:57
File 2: 06/21/10 00:02 to 06/21/10 23:57
File 3: 06/22/10 00:02 to 06/22/10 23:57
File 4: 06/23/10 00:02 to 06/23/10 11:39

Number of files present on the HW4 PC: **7**

File 1: 06/20/10 10:12 to 06/20/10 23:57
File 2: 06/21/10 00:02 to 06/21/10 01:57
File 3: 06/21/10 00:02 to 06/21/10 23:57
File 4: 06/22/10 00:02 to 06/22/10 01:57
File 5: 06/22/10 00:02 to 06/22/10 23:57

File 6: 06/23/10 00:02 to 06/22/10 01:57
File 7: 06/23/10 00:02 to 06/23/10 11:37

Notes

File 1 is the same as the original logger file
Files 2 and 3 correspond to file 2 on the logger memory card, split in two, etc.

Example 3

- Logger settings for input 1:

Start time : 06/20/10 10:12
End time : 06/23/10 11:39 (stopped manually)
Log interval : 5 minutes
Start a new file : Every week

- Automatic download function settings:

Download interval : Daily
Downloaded files : Keep on memory card after downloading

- Situation on 06/23/10 after completing the last automatic download:

Number of files generated by the data logger: **1**

Number of files present on the data logger memory card: **1**

File 1: 06/20/10 10:12 to 06/23/10 11:37

Number of files present on the HW4 PC: **5**

File 1: 06/20/10 10:12 to 06/20/10 01:58
File 2: 06/20/10 10:12 to 06/21/10 01:58
File 3: 06/20/10 10:12 to 06/22/10 01:58
File 4: 06/20/10 10:12 to 06/23/10 01:58
File 5: 06/20/10 10:12 to 06/23/10 11:37

Notes

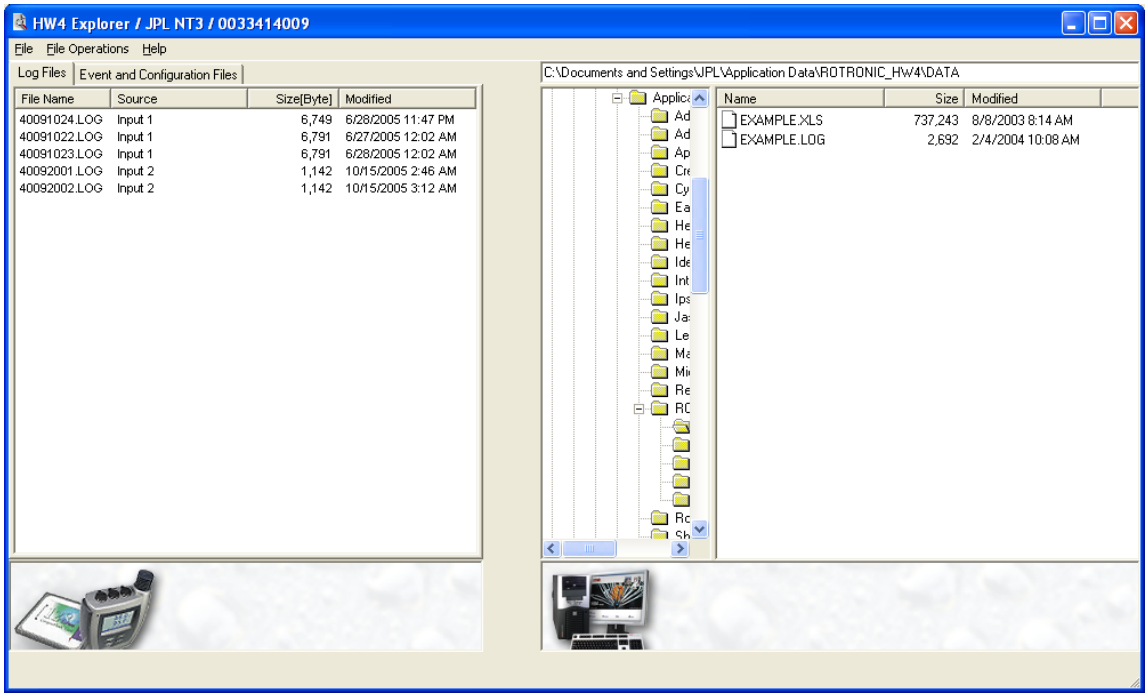
File 1 (data logger) grows larger every day
Files 1 to 5 (PC) these files contain ever increasing amounts of duplicated data.

6 ACCESS DATA

When HW4 has discovered a HygroLog NT, the device appears in the left pane of the HW4 main screen. Expanding the device displays a list of the available device functions.

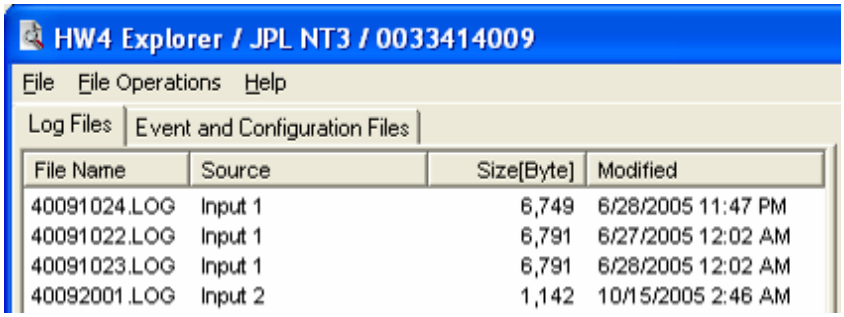
To select the Access Data function, click on it with the left mouse button. HW4 opens the **HW4 Explorer form**.

6.1 *HW4 Explorer*

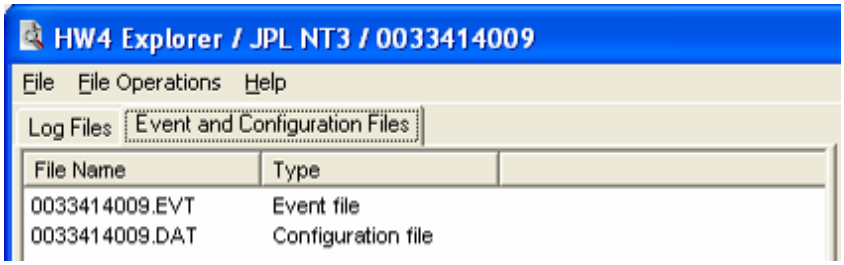


● **Left Pane**: the left pane of the HW4 Explorer form provides a list of the files currently present in the memory card of the HygroLog NT. Select the Log file tab to view log files. Select the Events and system data tab to view the logger event file (extension .EVT) and the logger configuration file (extension .DAT).

Log files

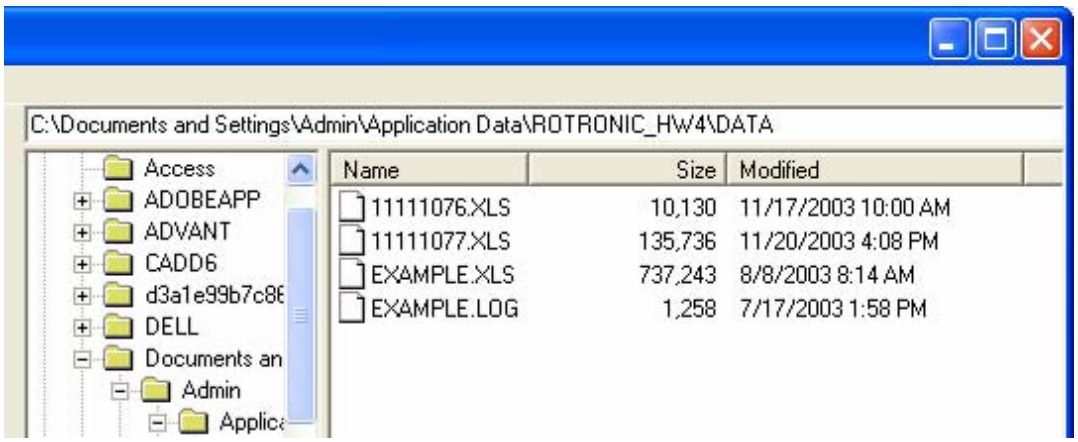


Logger event and logger configuration files



A file with the extension .EVT and one with the extension .DAT are always present in the memory card. These files cannot be deleted with HW4.

● **Right pane**: the right pane of the HW4 Explorer form provides a list of the log files, protocols, event files and configuration files currently present on the PC. The location of these files depends on the directory that was specified for each type of file in HW4 Global Settings / File Locations.



Any file present in the memory card can be opened, copied or moved to the computer, or deleted from the memory card. The logger event and logger configuration files are also present in the internal EEPROM of the HygroLog NT. If not present, these two files will be automatically written to the memory card by the logger. Files that are on the computer can be either opened or deleted. These files cannot be copied or moved to the memory card.

6.2 *Menu Bar*

The menu bar is located at the top of the HW4 Explorer form.

File

- **Open:** opens any file that is highlighted either in the left pane of the Explorer (memory card) or in the right pane (computer).

  Note: files located on the logger memory card are automatically copied to the PC before being opened.

- **Exit:** exits the HW4 Explorer

File Operations

Note: highlight the file first.

- **Move:** copies the file from the memory card to the computer and deletes the file from the memory card (except for event and configuration files).

- **Copy:** copies the file from the memory card to the computer and leaves the file in the memory card.

- **Delete:** deletes the file from the memory card or from the computer (except for event and configuration files located on the memory card). Several files may be selected at the same time for deletion.

Note: these functions are also directly available by right clicking with the mouse on the file.

IMPORTANT: File download operations take precedence over the automatic polling of devices. Consequently, the automatic polling of devices is suspended during the time that it takes for a file to be copied from the data logger to the HW4 PC. It is good practice to ensure that each file download takes as little time as possible. To this purpose, the size of log files should be limited to the minimum allowed by your application.

Help

The Help menu consists of:

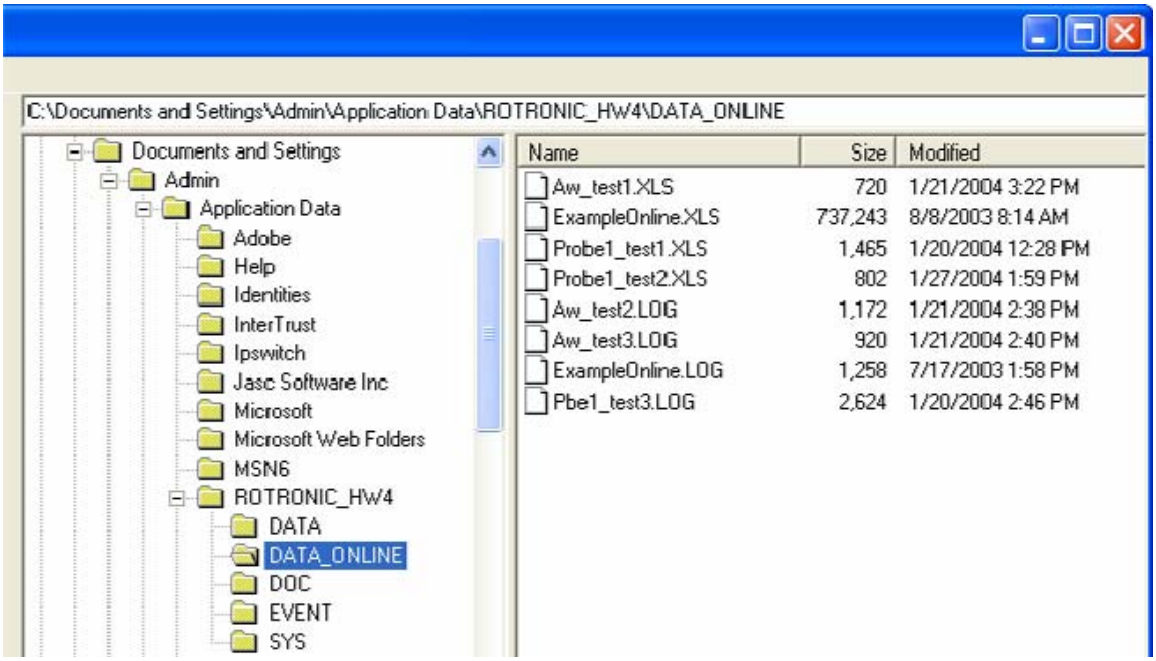
- **HW4 Help:** Opens HW4 Help

- **About HW4:** Displays the version number and ID number of HW4

6.3 *Files located on the PC*

In the right pane of HW4 Explorer, highlight the appropriate folder in C:\Documents and Settings\your Windows login name\ROTRONIC_HW4:

- DATA: this folder holds the log files that have been copied or transferred (moved) from the data logger to the PC.
- DATA_ONLINE: this folder holds the log files directly created on the PC (Log to PC).
- DOC: this folder holds protocol files (logger configuration, logger programming and probe adjustment).
- EVENT: this folder holds user event files as well as HW4 event files (used for troubleshooting software problems).
- SYS: this folder can be used to hold frequently used instrument configuration files for future use from within Device Manager



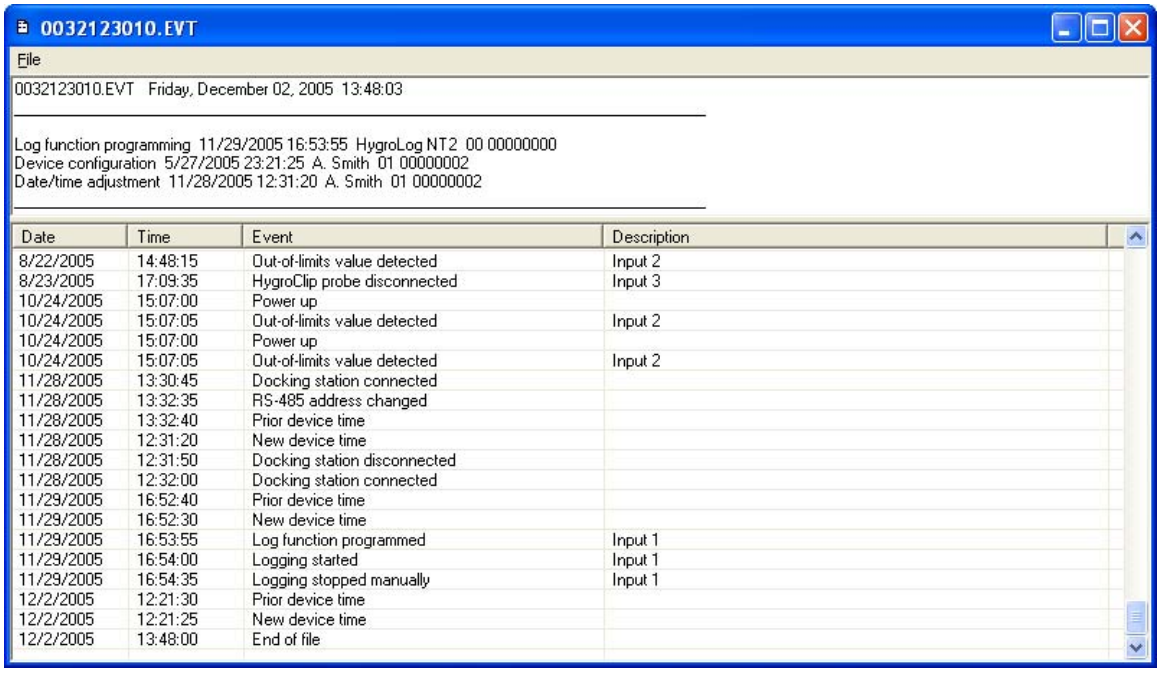
Highlight one of the files present in the folder. To open or delete the file, click on File Operations in the HW4 explorer menu bar or right click on the file to open a small menu next to the file name.

6.4 *Files located on the logger*

● **Event and Configuration files**

In the left pane of HW4 Explorer, select the Events and Configuration Files tab and right click on any file. This opens a small menu box next to the file name. Select with the mouse the desired file operation.

Example of a logger event file (file extension .EVT)

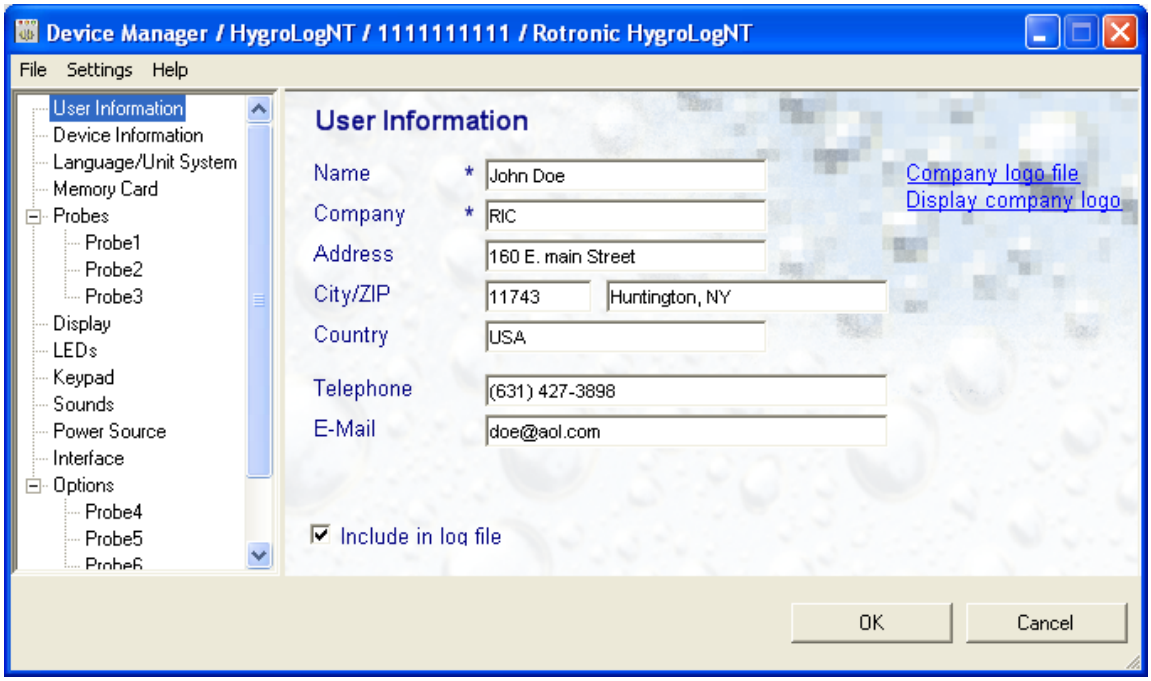


Date	Time	Event	Description
8/22/2005	14:48:15	Out-of-limits value detected	Input 2
8/23/2005	17:09:35	HygroClip probe disconnected	Input 3
10/24/2005	15:07:00	Power up	
10/24/2005	15:07:05	Out-of-limits value detected	Input 2
10/24/2005	15:07:00	Power up	
10/24/2005	15:07:05	Out-of-limits value detected	Input 2
11/28/2005	13:30:45	Docking station connected	
11/28/2005	13:32:35	RS-485 address changed	
11/28/2005	13:32:40	Prior device time	
11/28/2005	12:31:20	New device time	
11/28/2005	12:31:50	Docking station disconnected	
11/28/2005	12:32:00	Docking station connected	
11/29/2005	16:52:40	Prior device time	
11/29/2005	16:52:30	New device time	
11/29/2005	16:53:55	Log function programmed	Input 1
11/29/2005	16:54:00	Logging started	Input 1
11/29/2005	16:54:35	Logging stopped manually	Input 1
12/2/2005	12:21:30	Prior device time	
12/2/2005	12:21:25	New device time	
12/2/2005	13:48:00	End of file	

The HygroLog NT keeps internally track of the last 170 operations, events and configuration changes in its internal EEPROM memory as well as in the .EVT file located on the memory card.

Example of a logger configuration file (file extension .DAT)

The contents of a logger configuration files are displayed using the Device Manager (for details, see Device Manager).



- **Log files**

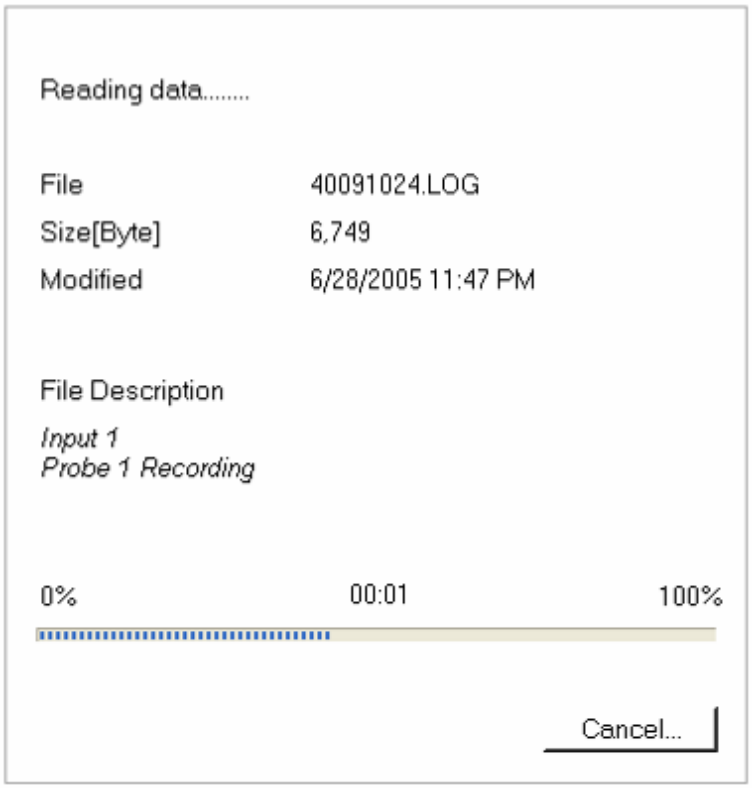
In the left pane of HW4 Explorer, select the Log Files tab and right click on the file. This opens a small menu box next to the file. Click with the mouse on Open. HW4 first downloads the file and makes a copy on the PC.

6.5 *Opening a log file in View Data*

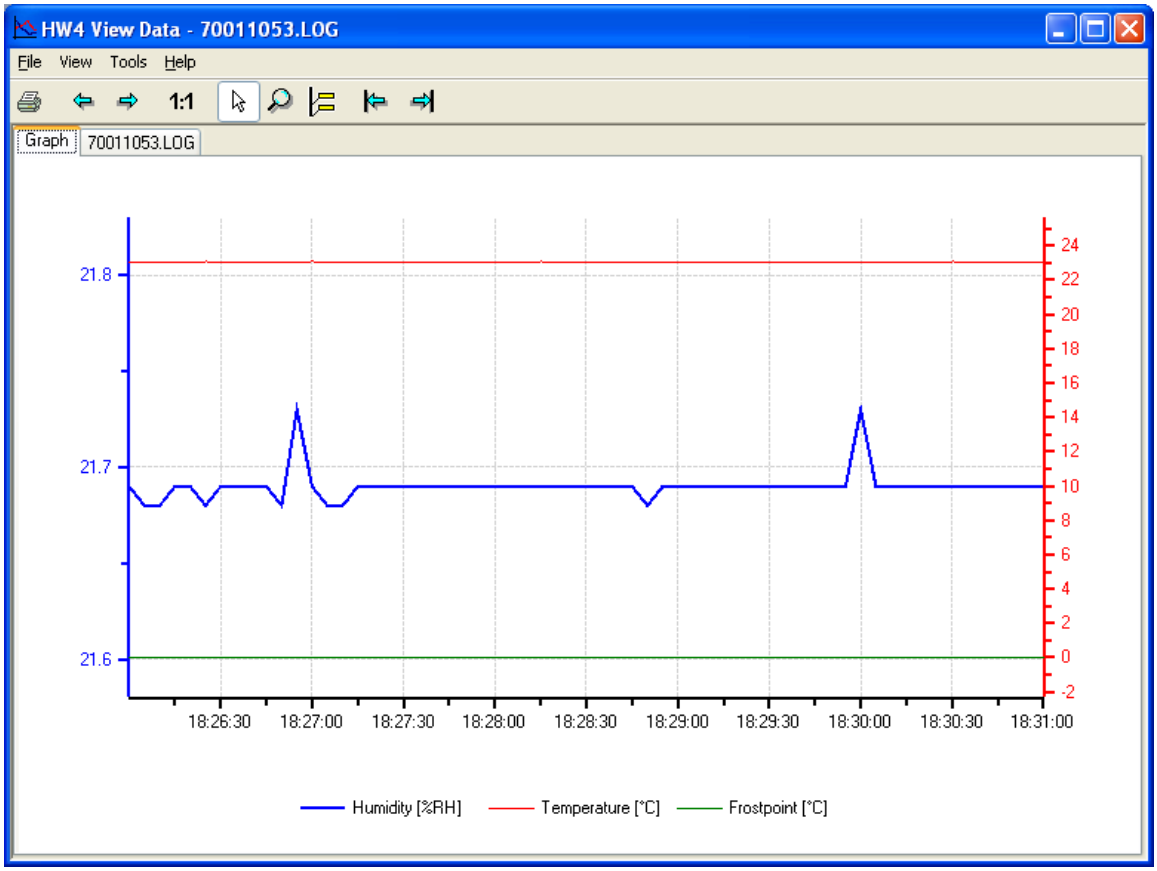
A log file can be opened in View Data from the HW4 Explorer.

In HW4 Explorer, select either a log file located on the HygroLog NT (left pane - Log Files tab) or a log file located on the PC (right pane – DATA or DATA_ONLINE folder). Use the HW4 Explorer file menu to open the file. As an alternative right click with the mouse on the file and select “Open” from the small file menu.

When the file is located on the HygroLog NT, HW4 begins by making a copy of the file to the PC, prior to opening the file in View Data:


Reading data.....
File
40091024.LOG
Size[Byte]
6,749
Modified
6/28/2005 11:47 PM
File Description
Input 1
Probe 1 Recording
0%
00:01
100%
Cancel...

After copying the file to the PC, HW4 opens the file in View Data. When the file is already located on the PC, HW4 immediately opens the file in View Data:



For more information on HW4 View Data see **View / Sign a Log File** in document E-IN-HW4v2.1-Main

7 ERES REGULATORY COMPLIANCE (HW4 Professional)

7.1 *Required settings and selections*

The following settings and selections are required in order to comply with FDA / GAMP regulatory requirements regarding electronic records, electronic signatures (ERES) and the tracking of software problems.

- **Main Screen Menu Bar – Users and Passwords**: create at least one user with administrative rights.
- **HW4 Global Settings – General Tab**: Enable system monitoring (tracking of software problems)
- **HW4 Global Settings – Events Tab**: Enable authentication stamps and enable the monitoring of user events.
- **HW4 Global Settings – Events Tab**: enable protocols (see Record keeping by HW4)
- **Device Manager – User Information Form**: put a check mark in the box labeled “include in log file”
- **Device Manager – Keypad Form**: disable the MENU key of the HygroLog NT to prevent unauthorized or undocumented operations.
- **Log file type**: select the file extension LOG for the log files (measurement data) recorded either with HW4 on the PC or with the HygroLog NT. For the HygroLog NT, the file type is selected from Device Manager – Memory Card. For the files recorded by HW4 to the PC, the selection is done in the Log to PC tab on the Main Screen at the time the file name is entered.

7.2 *Electronic records*

In compliance with regulatory requirements regarding electronic records, electronic signatures (ERES) and the tracking of software problems, HW4 maintains a number of event files and protocols. To effectively comply with ERES regulatory requirements, both types of record must be enabled in **HW4 Global Settings**. Details on the event file maintained by the HygroLog NT are provided in the “**Internal Record keeping”** section of this manual.

7.3 *Log File Format*

Both HW4 (direct data logging to the PC) and the HygroLog NT offer the choice of two different types of file format to record the measured data. Both file types have two main sections: the file header and the measurement data.

● **Binary Files (LOG)**: the header section of this type of file can be read with a regular text editor. As opposed to this, the data section is in binary format and cannot be read with a text editor or imported into a program such as Microsoft Excel. Both the header and data sections are protected against alterations. If the file contents are somehow modified, HW4 will display an error message when trying to open the file.

For maximum protection of the recorded data and to comply with ERES regulatory requirements, use the LOG file type.

● **Text Files (XLS)**: these files are entirely in text format and can be read with a regular text editor. This type of file is easily imported into Microsoft Excel. Like all the other files created by HW4, files with the XLS extension are saved with the “Read Only” attribute. This attribute provides a protection against inadvertent file operations such as file delete, file move and saving the file under the same name and location (eventually after altering the file contents). Since it is possible to remove the “Read Only” attribute, this attribute does not provide protection against intentional alterations. **HW4 does not detect alterations to a file with the XLS extension.**

As an additional protection, HW4 keeps track of the date and time when a log file is created or copied to the PC. This information is kept in the protected user event file and can be compared with the file creation / file modification date and time recorded by Windows.

Note: the HygroLog NT automatically gives each log file a name comprised of the last 4 digits of the logger serial number, followed by the input number and a sequential run number.

8 INTERNAL RECORD KEEPING – HygroLog NT

The HygroLog NT maintains an internal event file with the extension EVT. No particular configuration is required to enable this feature.

Part of the procedure to ensure conformity to ERES regulatory requirements is to disable the MENU key on the HygroLog NT keypad. The MENU key is the only one that can be used to make changes to the logger. Therefore, the events recorded by the HygroLog NT are normally the result of an interaction with the HW4 software. When the MENU key is not disabled, a limited number of events are recorded in the logger event file and no entries are made in the logger event file header. The two tables below provide a list of the events tracked by the HygroLog NT.

The logger event file is split between the internal memory of the logger (up to 170 events) and the flash memory card (practically unlimited number of events). HW4 offers the possibility of downloading, opening and printing the entire file contents (use the Access Data function). All past logger events are available to HW4 as long as the flash memory card is not removed from the logger. The serial number of the logger is used as the file name.

Example: 1111111111.EVT

The logger event file consists of a file header and a file body. The file header provides the following information:

- Most recent programming of the log function: programming date and time, user and HW4 product ID
- Most recent device configuration: date and time, user and HW4 product ID
- Most recent adjustment to the PC date and time: date and time, user and HW4 product ID

An individual record with date and time is entered in the event file body for each event listed in the table below:

Event File Text	Event (interaction with HW4)
Power up	The battery was inserted or the instrument powered down and up after an internal problem
Watchdog overflow	Internal instrument error (normally should not occur)
Writing device configuration	New or existing configuration written to logger
Memory card removed	While recording data, the logger could not find the memory card. The data was written to the EEPROM and are not yet lost
Memory card full	No free memory space on the memory card
New memory card inserted	The memory card was replaced while data was being logged. The data will be split between two different memory cards. Possibly, some data has been lost.
Humidity adjusted	Humidity adjustment of the probe connected to input #
Temperature adjusted	Temperature adjustment of the probe connected to input #
Logging started	Start recording data from input #
Logging stopped manually	Data recording of input # ended before the programmed stop time
Logging ended automatically	Data recording of input # ended at the programmed stop time
Out-of-limits value detected	An out-of-limits value was newly detected on input #
Battery almost empty	Battery voltage dropped below 6.5V
Battery empty	The battery is empty and the logger has powered itself off (keeping power up could result in erroneous data or loss of data)
Beginning accumulator charge	Starting to charge the rechargeable battery

Event File Text	Event (interaction with HW4)
Accumulator charge ended	Rechargeable battery full
MFG command	*Reserved for the factory*
Lost data, memory card not ready	While recording data, the logger could not find the memory card. The data could not be written to the EEPROM, and was lost
HygroClip probe connected [1]	A HygroClip probe was connected to input #
HygroClip probe disconnected [1]	A HygroClip probe was removed from input # or the input can no longer communicate with the probe
External power connected	The A/C adapter was connected and is being powered
External power removed or faulty	The A/C adapter was disconnected, or failed, or is not being powered
Device time changed / adjusted	Device date and time prior and after adjustment (up to firmware v1.1d only)
Prior device time	Device date and time prior to change (firmware v1.2a and up)
New device time	Device date and time after change (firmware v1.2a and up)
RS-485 address changed	The RS-485 address was changed
EEPROM erased	*Reserved for the factory*
Docking station disconnected [2]	The docking station was disconnected or there is no longer any communication with it
Docking station connected [2]	A docking station was connected and communication was established
Logger language file downloaded	A different internal language file was loaded or the same file was loaded again
Log function programmed	The log function has been programmed for input #
Event file deleted	*Reserved for the factory*

[1] connection / removal of analog probes is not recorded
[2] only when the docking station has internal electronics

Event File Text	Event (triggered from the Keypad)
Humidity adjusted	Humidity adjustment of the probe connected to input #
Temperature adjusted	Temperature adjustment of the probe connected to input #
Logging started	Start recording data from input #
Logging stopped manually	Data recording of input # ended before the programmed stop time
Prior device time	Device date and time prior to change (firmware v1.2a and up)
New device time	Device date and time after change (firmware v1.2a and up)
Log function programmed	The log function has been programmed for input #

9 DOCUMENT RELEASES

Release	Software Ver.	Date	Notes
_10	3.0.0	Jun. 14, 2010	Original release