Nomad-*Touch*™

Portable Fiber Optic Thermometer Instrument

1-Channel System
OptiLink and OptiLink-II Software

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Proprietary notice:

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Warning

Permanent damage may be done to the thermometer if the power supply connections are not done correctly. Only approved 5 VDC USB power supply modules should be used to operate this Nomad-*Touch*. 1 A power supplies are recommended; one such power supply is included with your new unit.

This product does not contain any user-serviceable parts. Although the battery case is user accessible, the battery itself is not user replaceable. Opening this precision instrument will void its warranty and may disturb its factory calibration. Always seek servicing from an authorized Neoptix service depot.

To assure cleanliness of optical connectors, keep caps on unused connectors at all time. This is also required during operation, as parasitic light entering into the Nomad may cause false temperature readings.

Fiber optic probes and extension cables are fragile, and will break if the bending radius becomes less than ~1 cm, even temporarily. Probe and extension cable breakages are not covered under the standard Neoptix warranty. Do not bend the last 1 cm of the probes!

The Neoptix Nomad products are CE marking certified.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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1.1   Neoptix Nomad-Touch and Probe Warranty Notice

Your Nomad-*Touch* unit is guaranteed (Parts and Workmanship) for one full year from the date of purchase. Upon written notification of any defect, Neoptix will either repair or replace any faulty product or components thereof. A Return Authorization Number (RMA) must be obtained from Neoptix Canada LP or authorized distributor prior to any merchandise return.

Due to the unique nature of the fiber optic probes that are used with this Neoptix Conditioner system, probes and extension cables are not guaranteed.

When using any electrical appliance, basic safety precautions should be followed, including the following:
- Do not operate in wet / damp environments
- Do not operate in explosive atmospheres
- Keep product surface dry and clean.

Always make sure all electrical installations are made in accordance with local authorities' regulations and laws.

2 INTRODUCTION

Congratulations on the purchase of your Nomad-*Touch*™ thermometer product! Your new temperature-sensing instrument will soon allow you to take full advantage of the benefits inherent to fiber optic sensing technology. It offers accurate and reliable temperature measurements, combined with extraordinary insensitivity to EMI/RFI, high voltage insulation and disturbance free sensing due to the non-electrical nature of the sensor element used.

Not only does the Nomad family of products gives access to reliable measurements, but it also offers a simple user interface that makes the technology easy to use. Moreover, no special calibration is required when changing the fiber optic sensor elements.

The thermometer is packaged in a small hand-held package, which is ideally suited for portable applications. This model does not feature an analog output option nor a through RS485 serial port; the Neoptix model T/Guard-405 is recommended when these options are required.

The standard configuration is offered with a USB interface. In addition, a large color touch LCD graphical display (QVGA, 320 x 240 pixels) makes it easy to see the temperature, either in Celsius (^{o}C) or in Fahrenheit (^{o}F), even in dark areas (by activating the back light); menu selections are all made by touching icons on the display; these standard features are great for laboratory and field applications. Furthermore, a convenient data-logging feature is included; logging is done directly to an internal 32 MB memory, allowing saving almost 400,000 temperature events.

This newly designed thermometer includes the latest developments in fiber optic temperature measurement technologies. Most types of GaAs-based probes now available on the market are supported, even probes manufactured by Neoptix' competitors. It will also interface with and read marginal probes, or probes with dirty connectors, and so forth. It will give you years of excellent service.

The OptiLink and OptiLink-II software packages are excellent complements to your thermometer. A free "Lite" version of OptiLink is included, whereas a "Pro" version is also available for more demanding applications. This Nomad is also compatible with the more recent OptiLink-II software.
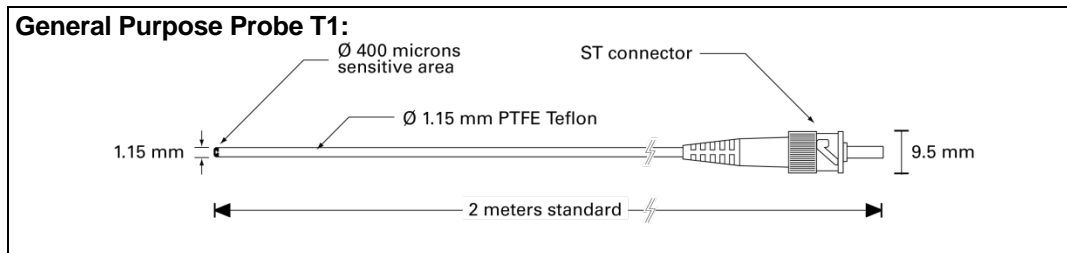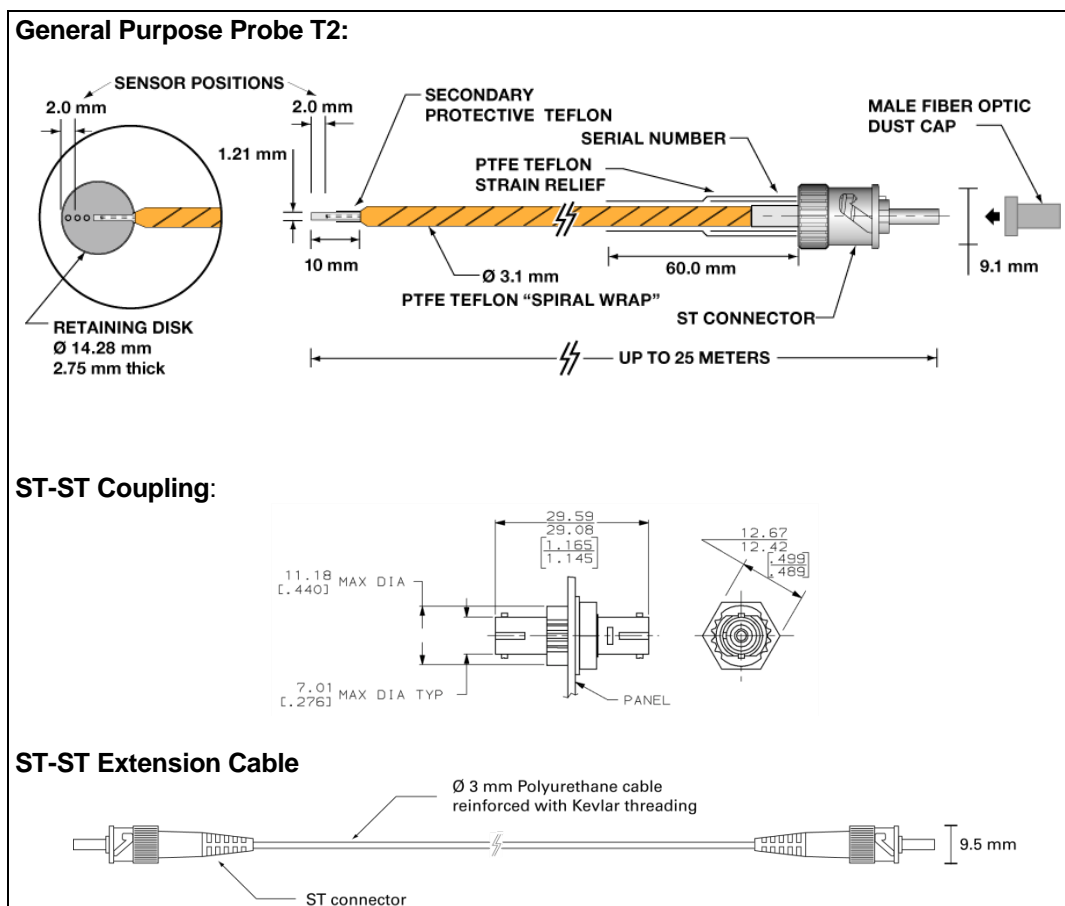
2.1 Nomad-Touch product specifications

Resolution	0.1 °C
Accuracy	± 1 °C
Calibrated Temperature Range	-45° to 200 °C
Usable Temperature Range	-80° to 250 °C
Number of channel	1
Probe length	1 to 500 meters (and more)
Sensor	Dielectric epoxy or silicone tipped optical fiber probes Any T1 or T2 Neoptix probes Second calibration supports older Nortech Fibronic Inc. probes
Response time	Typically 0.2 to 0.5 second (Probe and setting configuration dependent) Sampling rate is ~ 5 Hz
Probe compatibility	All Neoptix probes (T1 and T2) Nortech Fibronic Inc. probes (with built-in special calibration)
Unit	User selection of °C or °F
Data logging feature	Internal 32 MB memory for readings and probe performance data
Operating temperature	-20 ° to 50 °C, non-condensing
Storage temperature	-30 ° to 50 °C **Warning**: the battery will degrade quickly at high temperature
Local display	Display of temperature readings as well as various user information Graphical resolution: QVGA 240 x 320 pixels, color Touch resistive plane
Power	5 VDC (USB port), ~350 mA
Upgradability	Main firmware: through USB port Display: through concealed USB port in battery compartment
Internal batteries	Lithium-Ion rechargeable battery Battery is *not* user replaceable Autonomy of up to 5 hours
Size	170L x 118W x 37D mm
Weight	0.7 kg
Standard interface	USB connector (type B)

All technical specifications are subject to change without notice.

The following figure gives a description of the various probe configurations that are optionally available from Neoptix.

General Purpose Probe T1:

Ø 400 microns sensitive area

ST connector

Ø 1.15 mm PTFE Teflon

1.15 mm

9.5 mm

2 meters standard

General Purpose Probe T2:

ST-ST Coupling:

ST-ST Extension Cable

2.2 Calibration

Your T/Guard thermometer comes factory-calibrated. Experience has shown that re-calibration is not required over the whole product life; however, if your ISO rules state that an annual re-calibration is required, then it is your responsibility to comply with those rules. For laboratory applications, a new calibration is standard every 12 months or whenever performance verification indicates that calibration is necessary; NIST traceable calibration certificates are available. All calibrations are performed at the factory. Contact your Neoptix Representative for further information.

2.3 Transformer applications

One of the main applications for the T/Guard product is monitoring temperature of hot spots in power transformers. Since its inception, Neoptix has developed expertise in this application, and is considered as a world leader in this field. Sister products of the T/Guard, the T/Guard-2B, T/Guard-Link, T/Guard-408, are ideal for the power transformer industry. Neoptix publishes a User Guide, called "Probe Installation Guide", totally dedicated to the power transformer industry; do not hesitate to ask for your copy if you are working in this field (Neoptix document # G1009).

3 UNPACKING

Before using your Nomad thermometer, check the box content to be sure all items have been included. Your package should normally contain:

- Nomad-*Touch* signal conditioner unit
- USB power supply module (universal input: 100-240 VAC, 50/60 Hz; output: 5 VDC 1 A).
- Short extension cord and mating sleeve (should be used to minimize damages to the connector at the Nomad interface)
- 1 m USB cable
- Neoptix OptiLink Lite software package, on the DVD
- Neoptix OptiLink-II software package, on the DVD
- User manual (this manual) (paper copy not included, supplied as a PDF document on the DVD)
- Calibration Certificate.

Options:
- Fiber optic temperature sensor probes
- Fiber optic extension cables
- Fiber optic couplings and feedthroughs
- Neoptix OptiLink Pro software package™ (DVD, with unlocking key)
- Carrying case, for Nomad and accessories.

Make sure all listed items have been received and are in good condition. Note any evidence of rough handling in transit; immediately report any damage to the shipping agent. Should a part be missing or damaged, please contact your distributor immediately. Returns must be made with the original packaging, accompanied by an authorization number (RMA). Your distributor will provide you with information concerning the return of merchandise.

The carrier will not honour damage claims unless all shipping material is saved for inspection. After examining and removing contents, save packing material and carton in the event reshipment becomes necessary.

4   QUICK INTRODUCTION

The best way to familiarize yourself with your new Nomad is, of course, to use it! This chapter shows you to prepare your unit and do some initial measurements. The detailed instructions are given in the next Chapter.

Your new Nomad comes calibrated and ready to use. This figure shows the main view of the Nomad, along with the top and bottom views.


ST connector

USB port

Battery port (do not open)
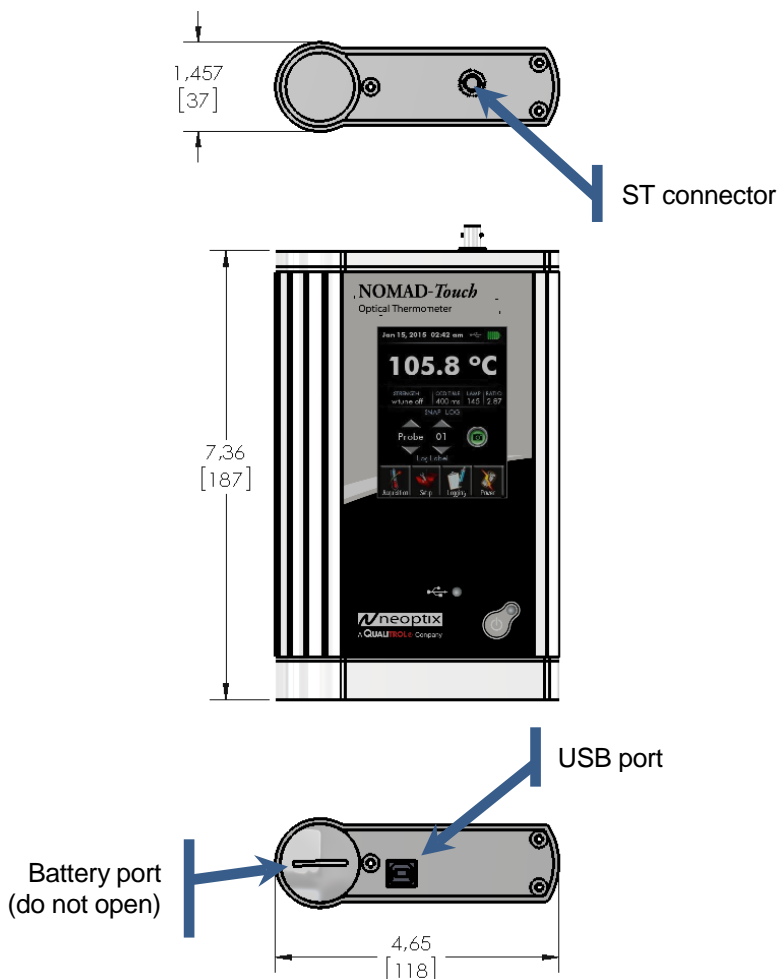
4.1   Making your first measurements

4.1.1   Installing the USB serial driver

WARNING: It is highly recommended to install the USB driver in your PC *BEFORE* you connect the Nomad-*Touch* to it. You will find the driver on the Internet and on the DVD that comes with this Nomad. This section explains how to install this driver.

You will find the driver on the DVD; you can also download it from the Internet from this site: http://www.ftdichip.com/Drivers/CDM/CDM%20v2.10.00%20WHQL%20Certified.exe. The procedure is as follows:

- Save the file on your C: hard disk, or on a local disk of your choice.
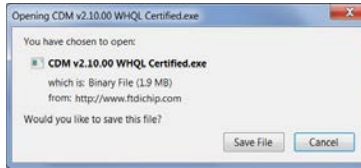
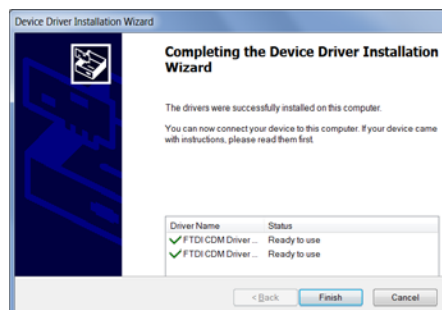- Click the file name (in Windows Explorer) to execute it.

- The installation will proceed, first with this window, click Extract:

- Then the installation proper will proceed, click Next:
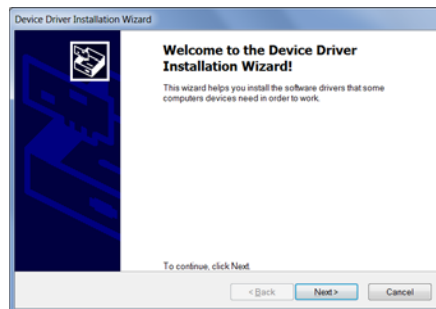
- Finally, you get this information. Click Finish.

You can now connect your Nomad-Touch to this PC. In case of problems, Section 8.7 includes some hints about possible solutions to common problems.

4.1.2 Charging the internal batteries

Before using the unit, you will need to connect it to a suitable USB power source; with the included 1 A power module, you should wait about 5 hours to fully charge the internal battery.

If you connect it to a PC USB port, a full charge may be as long as 10 to 15 hours. It will take longer if the unit is on during the charging process and also much longer if the FTDI serial driver has not been installed on that PC (see previous section on how to install the serial driver driver).

4.1.3 Using the Nomad-*Touch*

To make your first temperature measurement, do as follows:

- Remove the dust cap on the optical connector of the Nomad (located on the top of the Nomad).

- Remove the dust cap on the probe connector.

- Insert the connector from your probe into the sensor connector of the Nomad. Make sure the two mating parts are properly aligned and twist the connector clockwise to fasten it securely.

- Turn your Nomad on by pressing for at least one second. After a few seconds, a "splash" screen with the some software version information will be displayed. Then the temperature is immediately displayed, along with the date and time, and probe performance data. This is shown here:

- Place the sensor tip on a warmer surface (such as your hand): you can observe the temperature variation on the display.

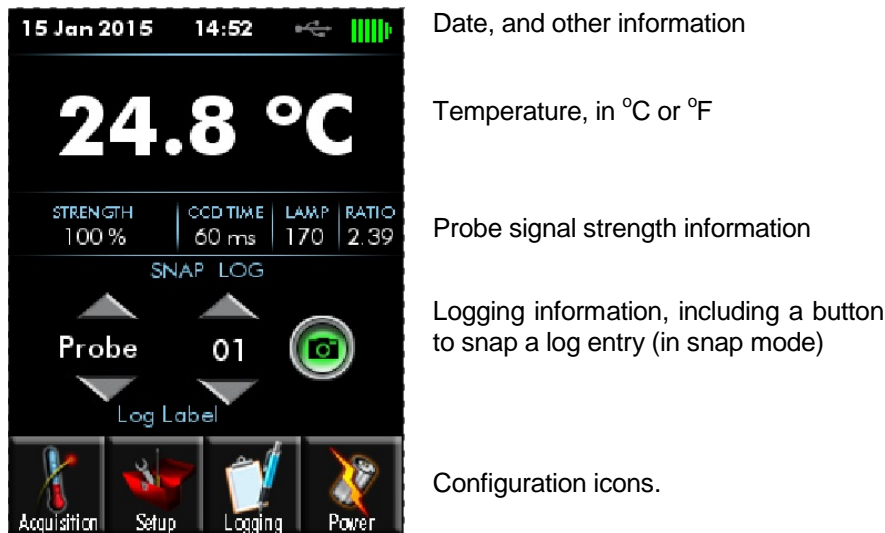- You can power it down by pressing again this key, for a minimum of one second: .

5 NOMAD™ THERMOMETER HARDWARE REFERENCE

5.1 Display description

The display is organized in 5 logical horizontal regions:

- The top portion gives general information to the user about the unit current status, such as battery condition, USB connection status, and time and date.
- Then you have the temperature number, in Celsius or Fahrenheit.
- Immediately below the temperature, you get some information about your probe optical performance. See section 6.6 for a discussion on probe performance.
- The next portion gives information about temperature logging. Logging can occur in two ways: 1) snap logging which is manual, and 2) automated logging done at regular time interval.
- The bottom portion shows four icons that can be invoked to further configure your thermometer, or to give you access to more advanced menus.

The display is illustrated below:

Date, and other information

Temperature, in ^{o}C or ^{o}F

Probe signal strength information

Logging information, including a button to snap a log entry (in snap mode)

Configuration icons.

The Nomad-*Touch* front panel includes an on/off button, with a red LED on indicator. Furthermore, a status USB LED gives the following information:

- Off: The Nomad is not connected to any USB supply.
- Yellow-green: The unit is connected to a USB 5 VDC power supply, and the battery is being charged.
- Green: The unit is connected to a USB power supply, and the battery is fully charged.

Note: This LED gives a status on the 5 VDC power supply. It does not give a status about any software link to a PC.

5.2 Touch screen operation

The touch screen is very simple to use. The touch technology used for the Nomad-*Touch* is resistive touch layer. This means that the menu selection can be done by anything that can apply a small pressure on the display surface; this pressure can be applied by naked fingers, gloves, stilettos, etc. You can select the "Power" icon to change the operation of the display, such as brightness and backlight. The "Power" icon gives you the following display variations:


From this screen, you can optimize the battery use parameters (when connected and not connected to USB). Note: "-" means "never".

- DIMMED SCREEN: Number of minutes after which the screen will be dimmed.
- STANDBY: Number of minutes after which the screen is turned off.
- SHUT DOWN: Number of minutes after which the Nomad-*Touch* is turned off.

Each sub-menu has a "help" button that gives more information about the various parameters.

5.3 The setup menu

This menu allows for setting the date and time. It can also be invoked to reset all parameters to the factory defaults, as well as clearing the temperature logging memory.
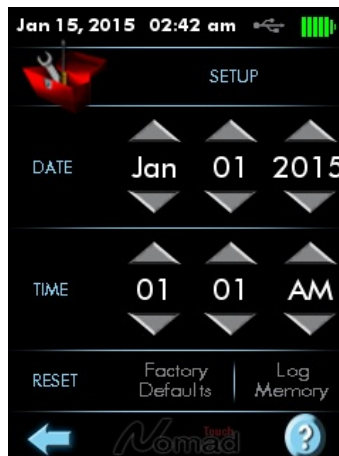
The details of these parameters are here:

- DATE: Enter today's date.
- TIME: Enter current time. Time can be entered and displayed in 12h or 24h format.
- RESET: Factory defaults and Log memory. These actions require a confirmation.

5.4 The acquisition menu

This menu can be selected by pressing the "Acquisition" icon from the main window. The following screen then appears:

Here you have access to the following parameters:
- UNIT: Celsius or Fahrenheit
- WTUNE: It is suggested to turn on this parameter, unless very fast measurements are to be done. This makes the system more sensitive, at the cost of speed.
- GSKIP: A value of 5 is suggested. This represents the number of readings the thermometer will do before abdicating.
- PROBE TYPE: Select Nortech Fibronic Inc. to read old probes.
- OFFSET: This allows modifying the calibration by adding this offset to the read value. The offset must be within ±20 degrees.

Information: If you select Nortech Fibronic probes or an offset, there will be a note informing you in the main window.

5.5 The logging menu

Your Nomad-*Touch* includes a very useful temperature-logging feature. The logged data is internally stored as binary files. The files consist of up to 65,000 lines of data, each line representing the temperature for the single channel along with a date-time stamp, the probe name (prefix and sequential number 00 to 99), and probe optical performance data. This means that the 32 MB total space can accommodate a total of 6 such files. This represents a grand total of 390,000 lines, or about 7.5 years of data if the sampling rate is 1 sample per 10 minutes. Once all 6 files have been filled up, the oldest file is deleted without any warning and replaced by a new one. These 6 files can be downloaded using the OptiLink-II software.

The logging parameters can be controlled from the 2 windows shown below; the one on the left illustrates the case where the "snap" mode is active, while the one on the right illustrates the logging done automatically at regular time intervals.
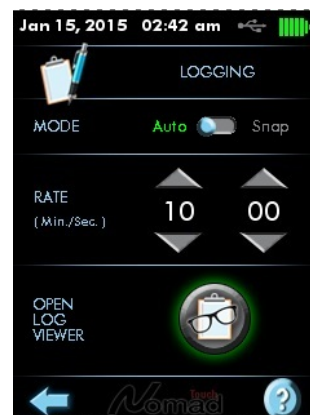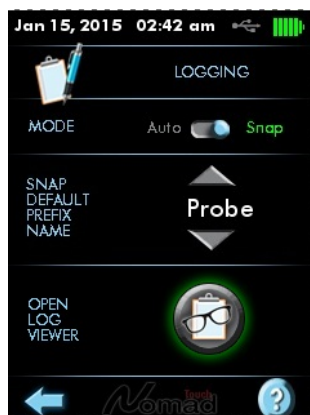
The parameters available from these screens are:

- MODE: Auto means that logging will be done at fixed time intervals. Snap means "manual" logging; a sample is saved when the SNAP (on the main screen) button is pressed.
- RATE: Logging rate from adjustable from 1 second to 61 minutes.
- SNAP DEFAULT PREFIX NAME: Prefix that will be used to identify probes when testing in snap mode. This prefix will be followed by 2 numbers that would normally identify the probe then currently tested. OptiLink-II allows you to manage the prefixes; 15 prefixes are supported.)
    o The prefix name is saved with the logged temperature data when the snap button is pressed.
- OPEN LOG VIEWER: Allows you to review the temperature data logged in internal memory. Data can be selected by 1) the cursor, for coarse selection; and 2) the left and right arrows, for fine selection. The log viewer screen looks like this:
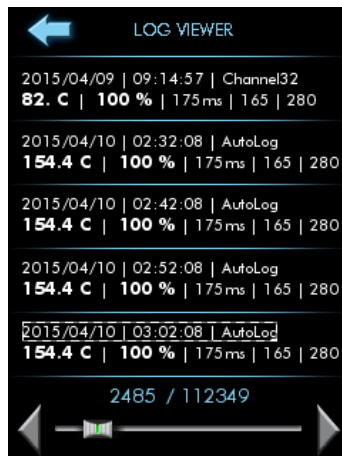
Note that the cursor ( ) is not displayed when the log memory contains less than 11 entries.

File name conventions:
1- The current log file is always named temperatures.tem
2- When the current file is full, it is archived with the same name but by adding to it a prefix that corresponds to the date and time at the time of closing this file.

5.6 Probe connector

This ST connector mates to a Neoptix temperature probe. It will also work fine with older Nortech Fibronic Inc. probes, as long as the appropriate calibration selection is made.

6 USB COMMUNICATION DESCRIPTION (SERIAL PORT)

You can communicate with your Nomad-*Touch* thermometer via the standard USB link. This first protocol implementation on this Nomad is an emulation of a serial port.

VERY IMPORTANT: Before you connect it for the first time to a PC, you must install a driver in this PC. The procedure to do this is outlined in Section 4.1.1.

Recommendation: The use of OptiLink-II software is highly recommended as an alternative to the serial command protocol described in this chapter; for more information on OptiLink-II, see chapter 8.

Your Nomad-Touch should now be ready for use with software packages such as:
- HyperTerminal[1], or Tera-Term; this is described below.
- OptiLink
- OptiLink-II.

Take note of the serial port information given when the driver is installed (COM8 in the above example); you may need this information to connect to the above mentioned software packages.

6.1 Restrictions on Serial Port Use

The use of serial port may occasionally cause some problems. Some of them are:
- When you connect multiple Nomad-*Touch's* to your PC, or different Nomad-*Touch's*, the serial port Windows logic will always generate a different COM port number, a new one every time you connect a new instrument. After a while, this may result in a COM port that has an assigned number which is very high (for example, OptiLink requires that the port number be 32 or less). If this is the case, you will need to overwrite older COM ports that you do not use anymore; a COM port number can be reassigned in Device Manager.
- If your PC does not find a driver automatically, you should use the one that is on the DVD included with the instrument.

6.2 Using OptiLink Console

The OptiLink software package includes a convenient console option that can be used to "exercise" your Nomad serial communication protocol. With this console, there are almost no more reasons to use HyperTerminal or equivalent to use the serial commands that are described in this Section. No file transfer can be done with this console; if you want to download files, you must use the OptiLink-II software.

Refer to the next Chapter for instructions on how to use OptiLink.

6.3 Using HyperTerminal in Windows

Hyper Terminal is a standard Windows program that can be easily used to exercise your Nomad thermometer. To use Hyper Terminal, you first set its properties as follows:

1- In the "Connection Description" window, enter a name that suits you, such as "Neoptix-Reflex" or "Neoptix-Nomad". Click OK.
2- In the next window, "Connect To", select COM1 (or another COM port, if you are planning to use another port than COM1) in the box called "Connect using". Click OK.

---

[1] Vista, Win-7 and Win-8 users: HyperTerminal is not included with Vista and subsequent Windows versions. However, an equivalent program (HTPE) can be downloaded (for a fee) at the following website: http://www.hilgraeve.com/htpe/download.html. Tera Term (freeware) has also given good results; see http://ttssh2.sourceforge.jp/ .

3- Then the COM1 Properties window will come up. As indicated above and as shown in the figure at right, set the port parameters to 9600 Baud, 1 Stop-Bit and No-Parity. Click OK.
4- You are ready to go. Type "h Q   " to test your setup (see below). Warning: the characters that you enter are not echoed to you!
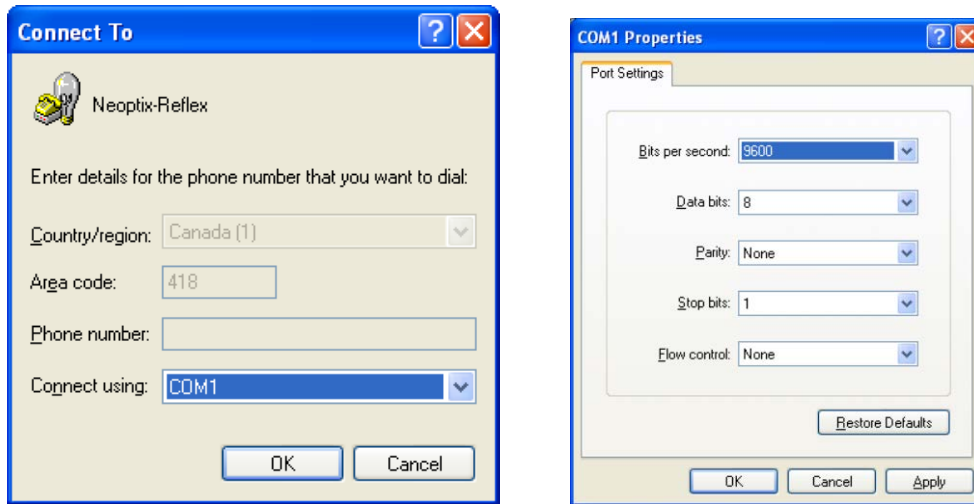
6.4   Serial help menu

The following is the menu as displayed by the instrument when sending the "h" command. Note that the USB interface can also be used to upgrade the thermometer controlling firmware, without opening the thermometer case. Instructions to perform an upgrade are normally sent with the upgrade program; a PC compatible computer will be required to perform such firmware upgrade.

Nomad-1	Description
baud:nnnn	Set baud rate to 'nnnn' bit per second, valid rates are: 9600, 115200 or 921000 (remember to reconnect)
batt?	Battery information
c:xxxxx	Clean up (delete) log file xxxxx (use command "l" to list files)
f[j]	Set point adjustment on channel to [j]
format	Erase all log files
gskip[i]	Skip up to i (0 to 9) marginal read cycles
h	Help menu (this screen)
i	Get factory and status information
l	List log files
logging[i]	Logging+ to enable logging, logging- to disable. Note: to use snap, logging- must be selected
n+[i]	Select calibration type (n+e for Neoptix, n+o for Nortech-F)
rd	Read date and time
rr	Read logging rate
resetoff	Reset temperature offset to zero

`t`	Get Temperature reading
`ta[i]`	Auto temperature output to serial port (+ to enable, - to disable)
`u[i]`	Unit (c = ^{o}Celcius, f = ^{o}Fahrenheit)
`wd:yyyy/mm/dd`	Write current date
`wt:hh:mm`	Write current time (23:59)
`wr[n]`	Write logging rate
`n`	Logging rate
`1,2,3,4,5`	1, 2, 5, 10, 30 sec
`6,7,8,9`	1, 5, 10, 30 min
`10`	1 hour
`wtune[i]`	Optimize CCD read time (wtune+ to enable, wtune- to disable)
`y`	Probe optical signal strength

6.5 Detailed description of USB serial commands

All commands must be terminated by a carriage return character (Q). When more than one argument is required, each argument must be separated from the next one by a blank or space character. Characters are not echoed back to your controlling device.

Every time a command is executed successfully by the thermometer, the "*" prompt character is automatically sent, except in case of failures when the "Errx" error code is sent instead. Do not send your next command before receiving either the "*" or the "Errx" prompt. The "[' and "]" characters must not be typed in; they are used here for ease of reading only.

"baud:nnnn" Making a change in the baud rate used to communicate with the serial port will automatically disable your serial port client program: you will then need to disconnect *HyperTerminal* or *Tera Term*, modify the setting on your serial client to match the setting you just saved, then reconnect. This command is useful if you need to transfer files faster: by raising the baud rate you will also make the file transfer faster. Remember that a baud rate change for the Neoptix protocol is not persistent after a reboot; it will revert to 9600 baud.

"batt?" This command gives information about the internal Lithium-Ion battery. The following information is given: battery voltage (mV), charging current (mA), capacity (mAh) and % charge availability.

"c:xxxx" The content of log files is designed to be easy to copy and paste into a Microsoft Excel spreadsheet. Certain older versions of Excel had a limitation of about 65,000 lines which could be copied and pasted into it. For this reason, when a log file reaches that size, it is archived and a new log file is started. This has the benefits of saving disk space as well as providing a relatively small log file containing the latest readings ready for download. Archived log files can also be downloaded, or they can be disposed of file-by-file using this command.

"f[j]" This command forces an actual temperature reading (j); any resulting offset will be applied to all future measurements for that channel. This is useful to compensate for small temperature deviations that may occur between sensors. A maximum offset of ±5 ^{o}C is recommended; if it is required for you to force a larger offset, your thermometer probably requires a new factory calibration; consult your distributor or factory for more information. This command alters the internal calibration of the instrument. Always follow the recommended procedure, as given below.

Force temperature procedure:
   I.   Apply a stable and known temperature to the sensor tip
   II.   Check the display reading for abnormal deviation from the known temperature

III.　　Send the "f" command followed by channel number, a blank character and the reference temperature value (example "f2 27.0 Q   "). <u>Temperatures must be entered in units as specified by the "u" command</u>

IV.　　Wait a few seconds

V.　　Confirm that the readings correspond to the known temperature.

Note: You can revert at any time to the factory calibration using the "f" command (ex: "f Q   ").

Note: Always make sure you are reading a valid temperature value before using the "f " command; otherwise, your thermometer may display a random value for a channel where the "f" command has been used.

"format" This command deletes the current as well as all archived log files. This preserves disk space but is not necessary in normal use, even after several years, unless the logging rate has been reduced substantially on the device for long periods of time.

"gskip[i]" This command is useful to eliminate annoying dropouts that can happen when using "weak" probes. The parameter "i" indicates the number of scans that the Nomad system will perform before actually indicating that it cannot read the probe on a specific channel. The range of i is from 0 to 9; a value of 0 indicates that the Nomad makes no attempt at removing dropouts. A value of 3 to 5 is recommended, especially for transformer applications. This command is active even when the sleep command is valid, but is limited to a timeout of 2 minutes.

"h" Displays a help menu screen (see above).

"i" Returns general information regarding the instrument, as well as some parameters that have been programmed previously in the thermometer (either by serial commands or via the touch screen):

Ex:　Model:　　　　　　　　Nomad-Touch
　　　Serial:　　　　　　　　NMT003B
　　　Number of channels　　1
　　　Calibration type:　　　Neoptix probe
　　　Internal Software:　　　V1.0
　　　Factory Calibration:　　15/03/04 (YY/MM/DD)
　　　Unit　　　　　　　　　degrees C
　　　Temperature offset:　　 0.0

"l" This lists the files that you can download using the "d" command. This would include the temperature log files, as well as some information file related to the smart protocols, and other system files, such as "status". File size is also given, for download time estimation. See section 5.5 for information regarding log file name convention.

"logging[i]" Convenience to start (logging+) and to stop (logging-) temperature logging in internal memory. Logging must be disabled to activate the logging "snap" mode.

"n+[i]" "n+o" or "n+e" This command can be used to change the calibration type that is active at any given time. "n+o" should be used to enable the Nortech-Fibronic, Inc. calibration, while "n+e" should be used for Neoptix probes.

"rd" This will display the current system date and time in the format "yyyy/mm/dd hh:mm:ss" (these settings are configurable with two separate commands, *wd* for the date and *wt* for the time, with the exception of seconds which cannot be set).

"rr" This displays the interval in seconds currently set on the system for logging. This interval can be reduced all the way down to one second; however, if the logging rate is set to a number of seconds less than 60, the system will reset this value on reboot to 60 seconds.

"resetoff" Please refer to command "f", described above. This will reset the offset on the optical channel.

"t" Returns the current temperature reading. "---.-" is displayed when no valid temperature is available. All temperatures are returned in °C or °F unit, as specified by the "u" command.
ex: "t Q   ", with the Nomad-*Touch* thermometer, will return:
                   +24.3<CR>
                   *

The "t" command is also available in a special "**ta**" version, that can be useful for continuously and automatically monitoring all enabled channels. This special mode is recommended when automatically acquiring temperature readings with a suitable data-logging software, and can be activated by issuing the "ta+" command, or deactivated with the "ta-" command. Once activated, the following information is automatically sent when the temperature on a channel has been acquired:
          "C:I;T: ±xxx.x Q   "
where i is the channel number, and xxx.x is the temperature reading (signed number).

"u[i]" Set units of measurements to either Celsius (i=c) or Fahrenheit (i=f). Note that this unit selection is the same as the temperature unit selection made from the keypad (if the display option is installed).
Ex: "uc Q   ", to select °C (Celsius).

"wd:yyyy/mm/dd" This will reset the system date of the Nomad to a provided valid value. This value will be used in system and temperature logs. The system date is persistent even after a prolonged power down of the device. To view the current system date, refer to the "rd" command.

"wt:hh:mm" This will reset the system clock of the Nomad to provided hour and minute values. The system time is persistent even after a prolonged power down of the device. To view the current system time, refer to the "rd" command.

"wr[n]" Write logging rate.

n	Logging rate
1,2,3,4,5	*1,2,5,10,30 sec*
6,7,8,9	*1,5,10,30 min*
10	*1 hour*

A logging rate less than once per minute is considered abnormal and is automatically reset to once per minute following a reboot. Log files can be listed with the "l" command and downloaded with the "d:xxxxx" command. Entering this command will also forced implicitly the command "logging+". Entering the command "logging-" will force the "snap" mode to become active.

"wtune[i]" This command can be used to increase the optical integration time to force the Nomad system to read temperatures when the optical signal is weak, at the expense of a slower response (slower temperature update frequency). This command (wtune+) enables this feature. It should be noted that in general the scanning rate of the system would slow down when this command is enabled. It is highly recommended for power transformer applications.

"y" The "y" command can be used to confirm the signal strength of a probe and/or its connection. It can be used as a diagnostic tool to confirm the good operation of a probe and its extension cable (if applicable) connected to a channel. The returned value can be between 1.00 to approximately 3.00; a higher value is better. A minimum of 1.25 is required for a channel to return a temperature. A complete discussion on how to interpret the "y" command, refer to Section 6.6 below.
Ex: "y Q   ", with the Nomad thermometer, will return:
                   CH1: 98%, ratio:2.01**, lamp: 200, CCD: 250 ms (auto*) +23.5 Q

*: Value: Auto (when wtune+ is active) or Fixed (when the wtune command is disabled).
**: 1.0 to 1.1 indicates that no probe is detected for this channel.

6.6 Interpretation of "y" command results

The Neoptix Nomad-*Touch* systems are fitted with a function that gives an evaluation about probe signal strength or signal quality index; in Neoptix jargon, this is called the "y" command. The easiest method to access this command is to use Windows' HyperTerminal or OptiLink Console. This information is also displayed on the main window of the Nomad-*Touch* color screen.

Typically, the "y" command will return the following information:
```
CH01:  100%, ratio:2.38, lamp:160, CCD: 100, (auto) +23.5
```
CH01 indicates the channel number (always 1 for a Nomad system)
2.05 indicates the power strength (ratio) and can span from about +0.3 to +2.8. You can interpret it approximately as follows:

- 0.3 to 1.07: no probe is detected
- 1.07 to 1.25: a probe is probably present, but exhibits a very weak signal; its reading is usually rejected, as it is considered as unreliable
- 1.25 to 2.7: a good probe is present (the higher the ratio the more healthy the probe).

Lamp attenuation: gives an indication about the white light lamp intensity for this channel. It ranges from 250 (weak lamp) to 0 (strong or intense lamp). A weak lamp is usually preferred and indicates a "healthy" probe.
CCD time, in millisec: this is the CCD (charge couple device) optical integration time in millisecond; it can range from 50 to 500 ms. A weak probe will normally have a long integration time.

(auto) means that the wtune feature is enabled. If wtune is disabled, this information is not present.

To summarize, a very good probe is characterized by a good quality index ratio (>1.8), then by a high lamp attenuation (>150) and finally by a short integration time (<200ms). Also, dirty connectors will contribute to lower probe strength; always assure that all fiber connections are clean before evaluating probe performance.

This Nomad includes a convenient "Power%" feature that makes probe strength interpretation easier. The "Power%" is only available when the "wtune" feature is enabled. For additional information regarding the interpretation of this percentage parameter, especially when dealing with power transformer applications, whereby an OFT and an extension cable is used, please refer to the Neoptix Probe Installation Guide, part number g1009rxx; this guide is available from Neoptix.

Warning: These values are approximate and will change slightly from system to system.

Note: For transformer T2 probes, as they are normally going to be used with a feedthrough and an outside extension cable, it is recommended that a probe (when measured directly, without feedthrough) is to be considered healthy when its Power % reading is at 100% (probe alone, no feedthrough, no extension cable); with a feedthrough and extension cable, the minimum acceptable and recommended percent level is 65%. If the 1-meter short extension cable is used in addition, then these 2 values should be lowered by 10%, respectively to 90% and 55%.

6.7 Typical temperature reading sequence

Once all parameters have been set, the following sequence should normally be followed to extract temperature information from your Neoptix thermometer. 2 procedures can be used for this purpose. The first method consists in using the "ta" command (preferred), while the second sequence would be:

a) The host computer should send the "t" command, followed by a Q character.

b) The thermometer responds by echoing the requested temperature values, as indicated above; the transmission is terminated by a "*" character.

c) When the "*" character is received, it is suggested to immediately terminate the dialog session by having the host computer issue the "r" command followed by a Q character.

7 ERROR CODES

The following error messages are displayed under certain error conditions:

RS-232	Display	Description
Err2	Err2	Internal memory checksum error. Memory corruption. Message "Corrupted Memory" will be displayed on LCD display. If this happens, use caution in reading temperatures, as these readings may be in error. Contact Neoptix.
"- - . -"*	"- - - - -"	Temperature out of maximum instrument limits or no signal
Err5		Argument out of range
Err6		Unrecognized command

*: In case of anomalies, the following values are returned (USB serial interface):
-999.99: Temperature too high
-999.66: Temperature error (- - . - is displayed)
-999.55: Channel is disabled
-999.44: Internal error (slave timeout)
-999.33: Internal error (slave error)
-999.11: Temperature too low.

Note that these error codes are not applicable when using the OptiLink software package. This high-level software package is programmed to automatically handle all types of errors, as outlined in the next section.

8 OPTILINK-II SOFTWARE DESCRIPTION

OptiLink-II is particularly interesting for users of the Nomad-*Touch* as this instrument does not have an Ethernet interface (web server). It offers a friendlier procedure to load various parameters, such as optical channel parameters that would otherwise require being set by hand using the touch screen. The goals and purposes of this software packages are as follows:

- Display temperature information, for up to 16 channel per instrument
  - Can display temperatures for up to 4 compatible instruments at the same time (all Neoptix models are supported, except the T/Guard2[2])
  - Can provide results in graphical form
- Initialize and manage the optical channel and associated control parameters
- Upload new Nomad-*Touch* firmware (software upgrade)
- Download data and status files from the Nomad-*Touch*, and other files.

8.1 Installation and initial operation

When you connect the Nomad-Touch for the first time to your computer, a driver will be installed; this procedure is described at the beginning of Chapter 6 above, and is not repeated here.

The current release is available in 2 versions: a) For Windows XP, or 2) For Windows Vista and above, including Win8; make sure you install the version that fits your PC OS. Recommendation: unless you use XP, install the second version, as it is much faster and should run with less problems. If you are using a newer version that the one described here, you should expect some differences in the use of OptiLink-II.

The Neoptix OptiLink-II tool is installed using a standard Microsoft Windows setup.exe package. Double-click on setup.exe to launch and accept the usual Windows Security warning to proceed.

OptiLink-II requires the Microsoft .NET Framework version 4.5. If this dependency is not present on the target computer, then it will be automatically installed first and a reboot will probably be required before resuming the installation.

Warning: To reinstall the software, or install a new version, you will need to first uninstall the older version. This must be done by using the "Programs and Features", found in Windows Control Panel.

After installing all the required software, a master application window will open as follows:

This application requires that you know which serial com port or which IP address will be used by OptiLink-II. The COM port selector will only list the currently available ports on your Windows; this is the same list of available ports you would view in your Windows Hardware Device Manager. With the Nomad-*Touch*, the IP connection option is not available, as the Nomad-*Touch* does not support an Ethernet link. Click the Connect button. The following window will open:

---

[2] The new version T/Guard-2B is supported.
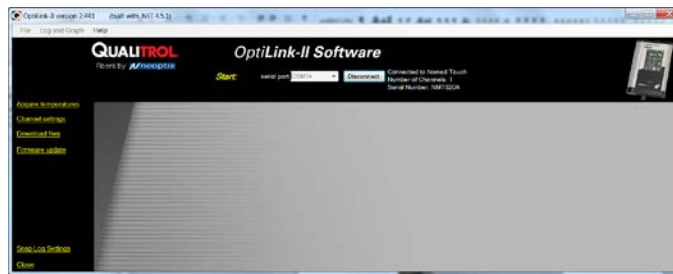
8.2 Acquire and Display Temperature Data

The "Acquire Temperatures" application will display up to 64 temperatures (16 temperatures for up to 4 instruments), as follows (only one Nomad-*Touch* is shown here):
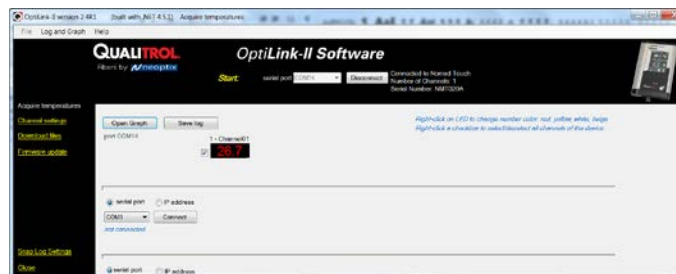
This window also includes a "Graph" button, which will open an additional window that will show a trend graphic for all previously selected channels (channel selection should be made prior to opening this second window). See section 8.2.2 for more information.

The main window also includes a feature whereby the user can save the data acquired since this window was open; this data file has the default extension .tem, and is a .CSV type file that can be directly read by Excel. Direct saving to an .xls file is also possible. Please note that data is being acquired ONLY when the "Acquire temperatures" window is active; however, the data will be saved only after the "Save log" button is clicked; this will open the following window:
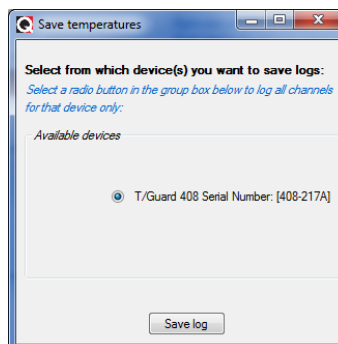
If you have more than one instruments connected, then instead, this window will look like this, where more options are available to conditionally save specific channels:
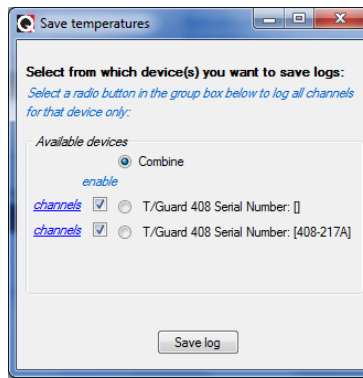
Then, you will need to enter a file name and select if you want to save your data as a text .csv file, or as a genuine Excel file already acquired in kept in memory, and can be saved as any time using the menu item "Log" and then "Save log", or by using the "Save Log" button found in the lower right corner of the main window. It is also possible to save data directly to Excel, if the file you select to save it is an .xls file, as illustrated here:
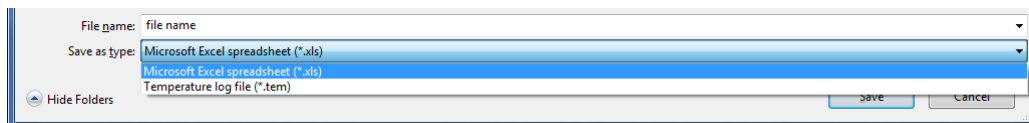
Then, all future data will be logged on your hard disk.

The latest version of OptiLink-II now supports data transfers to an Excel file; this transfer can be punctual or can proceed as temperature data is being acquired. Make sure you download the latest version from the Neoptix web site (www.neoptix.com).

Warning: this current implementation is weak in term of supporting user interaction with the Excel file during temperature acquisition; make sure you do not write or handle anything in the Excel application while an acquisition is active.

Information: This PC data logging never interferes with the instrument on-board logging. If the data logging is enabled on your Nomad-*Touch* instrument, this logging will continue uninterrupted whenever OptiLink-II is running.

8.2.1   Data Acquisition, Logging and Graphing Rates

Logging and graphing rates (or frequencies) in OptiLink-II is very flexible, but could be also a bit confusing. This section explains the acquisition rate philosophy that is implemented in the software.

When the "Display Temperature" window is active, the software will continuously acquire and temporarily store the data in a very large software buffer; this buffer is being filled at a rate that is called "Acquisition Rate" (now fixed at 1 per second; averaging is possible, and this will show down the acquisition rate to one per minute. This buffer will keep filling as long as the "Acquire temperatures" window is active.

8.2.2   Graphs

This window allows presenting in graphical form both data 1) that is now being acquired, and 2) data previously acquired and that is saved in the instrument log memory (not implemented at the time of this writing). Similar to the previous windows whereby one can display up to 64 channels from 4 instruments, this window can also display up to 64 channels.

The example below shows a graph while data is being acquired.
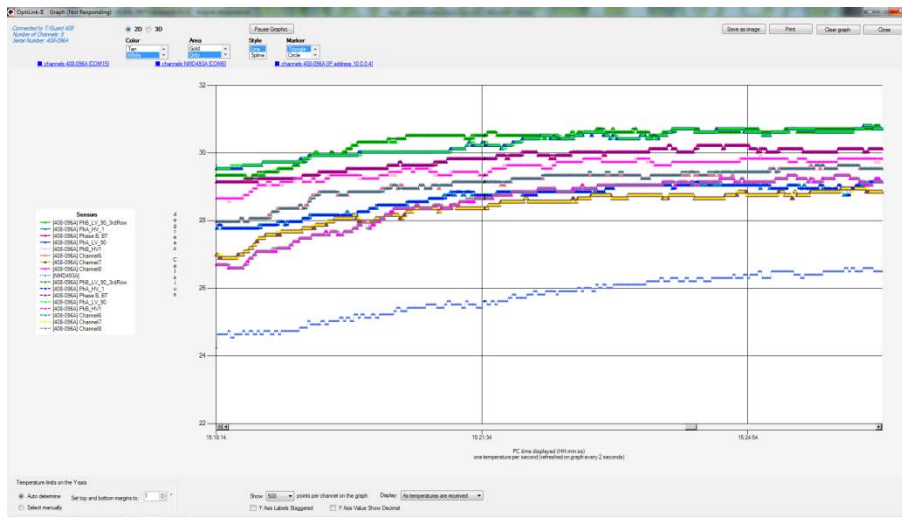
The code behind this window is quite heavy, so this window may sometime appear non-responsive; please be patient!

Description of some options that are offered to you:

- You can adjust the colors of the window background, marker style, etc. With the 3D option, more variances are available, such as graph rotation, etc.
- The graphic can be zoomed, by first right-clicking anywhere in the graphic area, and select "Zoom"; then select an area that you would like to zoom with your mouse. The zoom is cancelled either after one minute, or by clicking the "Zoom out" button.
- The graphic can be panned, by first right-clicking anywhere in the graphic area, and select "Pan"; then use your mouse to move the graphic area.
- The window can be saved as an image (jpeg, png or gif), and can be printed.
- A "Pause Graph" option is useful if one want to examine in details some parts of the graphic. The graphic can be later resumed, without loss of data.

8.3 Optical channel settings tool

- This tool is useful to set up parameters that are related to the optical channels of your T/Guard system. Click "Refresh Config" to download the current information, which will be displayed as follows (for an 8-channel system):
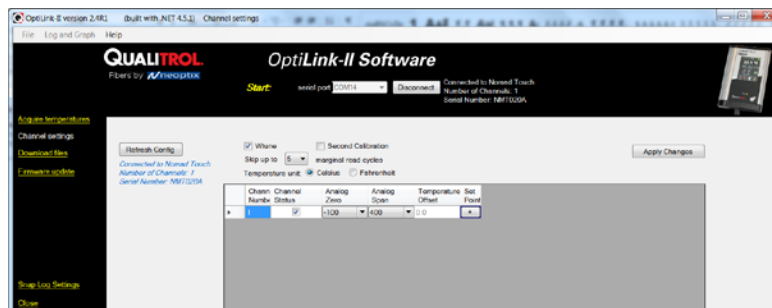
Once you have made the required changes to the displayed matrix of parameters, you must upload these changes by clicking "Apply Changes".

8.4   Download files tool

This tool can be very useful to download these types of file:

- Status.txt: This is the status file described elsewhere in this document. It essentially gives an overview of all parameters of your system, which can easily be e-mailed or printed. See example below.

- Temperatures.tem: This is the current logging file for temperature information. When this files gets to 65,000 lines long, it will be archived by using the date and time at the time of the closing of the archive as a prefix to the temperatures.tem file (example: 2015-03-27_22-24-07_temperatures.tem), and a new current temperatures.com file will be open.

This figure shows the download tool:
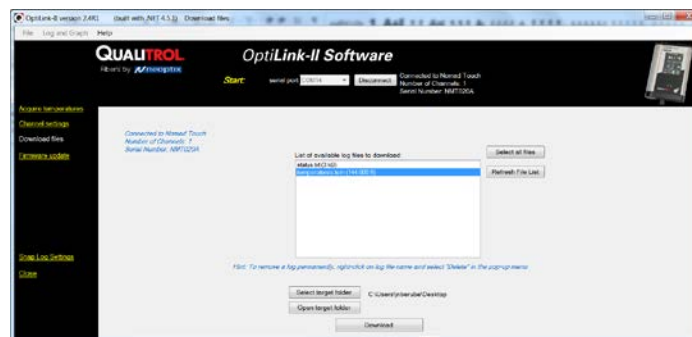
When you download a file, its name is fixed. To avoid overwriting a file, it is suggested to rename the previously downloaded file first. Downloading large file can take some time… the download rate is approximately 5 kilobyte per second.

Logged data can also be reviewed from the LCD display; see section 5.5. This alternative way of looking at your data is interesting when the memory content is small, for example to visualize temperatures that were just acquired.

8.4.1   An example of status file

Here is an example of a typical status file. The content of this file gives an instantaneous "picture" of your Nomad-*Touch* system. When contacting Neoptix for support, try to email a copy of this file with your request.

```
Nomad Touch  -  Status Report
2015/03/23 08:32:51

Serial Number: NMT003B
Firmware version: 0.07
Hardware code: 1
Calibration date: 15/3/20
Up time: 0 day, 0 hour, 20 minutes, 26 seconds

----- Serial Interface -----
Baud rate: 9600
Parity: None
Stop bits: 2

----- Temperature Data Logging -----
Logging Enabled: yes
Logging rate: 120 seconds

List of files:
```

```
>temperatures.tem (446.304 KB)
Total: 1 files, 446.304 KB

----- Acquisition -----
Wtune: ON
Gskip: 5
Calibration type: Neoptix probe
Unit: Celsius

----- Offset Setting -----
0.0

----- Signal Quality -----
CH01: 100, ratio:2.35, lamp:160, CCD:100ms    (auto)    22.21 C

Snap Log Prefix Name List :
Probe    (active)
Channel
Transformer
Winding
Measurement
User01
User02
User03
User04
User05
User06
User07
User08
User09
User10
List end#
*

(Status Report end)
```

8.5 Firmware update tool

This tool provides a simple way to upgrade the Nomad-*Touch* internal software code. Please note that an upgrade of a Nomad will take about 15 minutes using the OptiLink-II software.
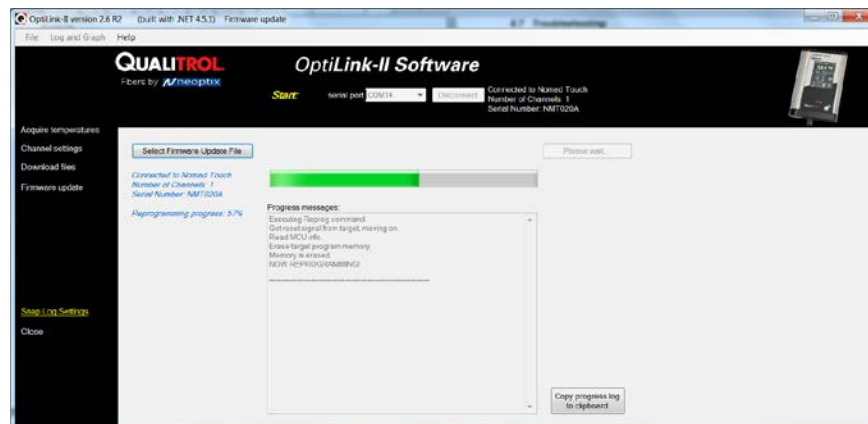
To get an upgrade file, you must contact Neoptix support, at support@neoptix.com .

Warning: Upgrading firmware is a delicate operation! Pay attention to these points:
- Make sure your upgrade file is on a local hard disk (normally C:).
- During the upgrade, avoid using your PC for any other tasks.
- You may get a few "retry" messages during the upgrade; this is perfectly normal.
- If logging, the current temperatures.tem file will be deleted; it is strongly suggested that you download any logged temperatures before attempting the firmware upgrade.
- The upgrade process supported by this tool will upgrade only the main processor program. There exists a different procedure to upgrade the display module; contact Neoptix for more information.

8.6 Snap log parameters

This window allows setting up the names of the prefixes that are going to be used when "snapping" temperatures using the Nomad-Touch touch screen. 15 prefixes are predefined, but can be changed to anything by the user (up to 32 characters are supported). This is illustrated here:
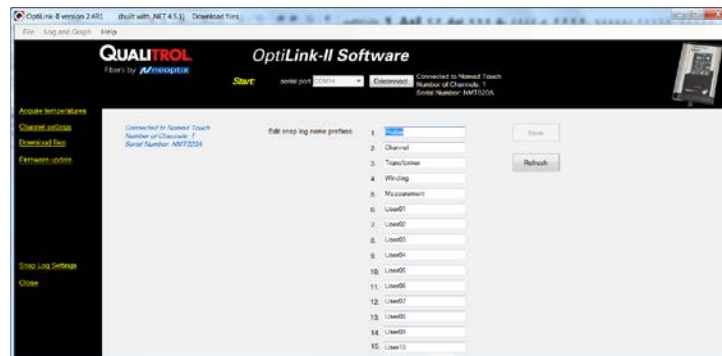
8.7 Troubleshooting

Here are some tricks you can try to fix OptiLink-II issues:

1- Make sure the FTDI serial protocol software driver is installed correctly. See this website for more help:http://www.ftdichip.com/Support/Documents/AppNotes/AN_119_FTDI_Drivers_Installation_Guide_for_Windows7.pdf

2- Make sure the COM port is listed correctly in the Windows Device Manager. Check the port properties.

3- Try connecting to the port with a HyperTerminal (or Tera Term) client to see if it is responsive.

4- To download files from your Nomad-*Touch*, the use of OptiLink-II is mandatory, as the transfer file format is Neoptix proprietary (it is not compatible with XModem format).

5- Try rebooting Windows.

6- Make sure you sue the proper version of OptiLink-II, as it is available in two versions according to your PC operating system. One version is compatible with XP to Win7, and the second one with Vista to Win8.

7- Try re-installing your USB to serial port drivers on Windows.

8- When reinstalling OptiLink-II, make sure you use the Programs and Features facility in Control Panel of Windows.

9   OPTILINK SOFTWARE

The OptiLink™ software package (formerly NeoLink) option allows using your thermometer system in a highly flexible manner. The built-in functions allow for temperature displaying and data logging, as well as exporting to a variety of standard spreadsheet packages.

As of 2014, a new software package is available from Neoptix, which is called OptiLink-II. OptiLink-II is compatible with the Nomad-*Touch* instrument. Contact Neoptix for more information on this software. For documentation on OptiLink-II, you can refer to chapter 8.

OptiLink-II allows doing the following functions:
- Acquire and display temperatures
- Graphing
- Logging directly to an Excel file
- Channel settings.

9.1   The "Lite" vs. the "Pro" version

OptiLink is now offered in two versions. The "Lite" version is now shipped as a standard item with every Neoptix thermometer. The "Pro" version includes more features and support more instruments and/or channels simultaneously. Contact your Neoptix Representative or the Neoptix factory to buy an unlocking code.

Note: The T/Guard systems (TGD, 405, 408, etc.) are normally supplied with OptiLink Pro.

9.1.1   Differences between the two OptiLink versions

The "Lite" version exhibits the following limitations:
- Only one instrument is supported (when scanning the COM ports (going from 1 to 32), the first instrument that is detected by OptiLink will be the active instrument).
- Only 1 channel is supported.
- No DDE temperature data logging is supported.

The remaining of this Chapter describes the "Pro" version.

9.2   Getting started with OptiLink

OptiLink was designed to acquire temperature readings from all models of the Neoptix Nomad and T/Guard thermometer family, except the T/Guard2. This versatile software package is designed to work with Microsoft Windows operating system; to fully exploit the capabilities of OptiLink, it is recommended to use it in conjunction to commercial spreadsheet software, such as Microsoft Excel.

9.2.1   Hardware and software requirements

The following list includes the minimum requirements for running the OptiLink software:
- A Pentium class or higher CPU
- SVGA or higher resolution display system supported by Windows
- 512 MB of RAM memory (operating system dependent)
- At least 40 MB of hard disk space
- A CD/DVD disk drive (to load software); software is also available for down load from Neoptix website (contact Neoptix if required)
- A mouse or other Windows pointing device
- A serial interface (COM1 to COM32). Up to 4 thermometer units are supported, each one requiring its own COM port
- Windows XP or later, including Vista and Windows 7, 8 and 10.

OptiLink works correctly with both half-duplex and full-duplex Neoptix thermometers. OptiLink is not compatible with older Nortech-Fibronic thermometers and with Neoptix thermometers that have been manufactured before August 2005.

9.2.2 Installing OptiLink

Before opening the CD and installing the software, please refer to the **License and Limited Warranty Agreement** at the beginning of this manual.

When you connect the Nomad-Touch for the first time to your computer, a driver will be installed; this procedure is described at the beginning of Chapter 6 above, and is not repeated here.

You must have at least one, or more, properly installed T/Guard thermometer unit(s). OptiLink should as well detect other Neoptix thermometers, such as the Reflex and any T/Guard systems (except the T/Guard2).
1- Start Windows, and make sure you are not running any other Windows program.
2- By inserting the CD in your computer, the SETUP application should automatically start; if not, manually start it.
3- Follow the instructions that are displayed.
4- Restart your computer.

9.3 A quick tour of OptiLink

1- Connect your Nomad unit to a free COM port.
2- Start OptiLink, if not already running.
3- The thermometers that are turned on and connected to your PC through a proper RS-232 connection should normally be automatically detected by OptiLink[3] (this process takes a few seconds, for a typical installation).
4- If a thermometer is connected after OptiLink is started, you should click the "Refresh" button so OptiLink rescans the COM ports (1 to 32). If a thermometer is not automatically detected, make sure your RS-232 port and cable is correctly configured and that the unit is turned on.

You should normally see a window similar to this (acquisition window):
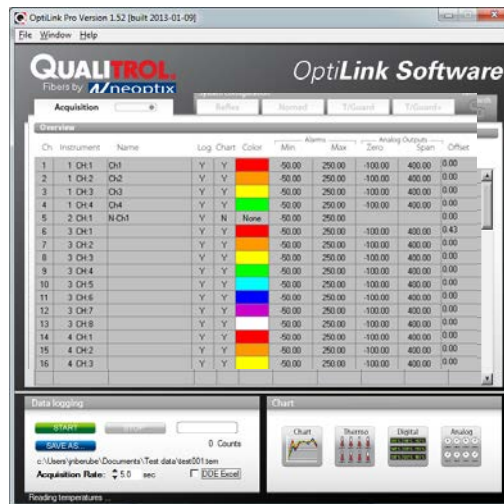
In this example, we see that OptiLink has detected 4 thermometers: a Reflex, a Nomad, a T/Guard and a T/Guard+ (in test mode only; OPC mode is not supported by OptiLink).

OptiLink is now properly installed and ready to use!

---

[3] If the automatic COM port scanning is causing problems with some of your other programs, specific COM port can be excluded from being scanned. Refer to Section 9.6.1.3 for more information.

9.3.1 Working with the Configuration Window

OptiLink starts with the "Acquisition" window active, as shown in the figure above. To switch to the "System Configuration" window, you need to click on one of the instrument names that have been detected; for example, by clicking on "Reflex", you will get the following window:
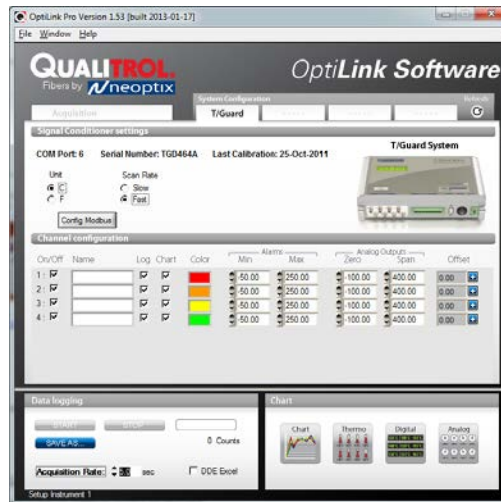
For each instrument, this configuration window gives some information about this particular information and allows you to set some parameters.

The top portion of the window gives information about the specifics of the thermometer, such as:
- COM Port number
- Serial Number
- Calibration date.

Description of the parameters that can be set:

- Unit: You can select ^{o}C or ^{o}F.

Furthermore, for each channel, you can set the following parameters:

- On / Off: You can turn on or off the temperature for each channel.

- Name: Up to 16 characters. You can enter a probe name here that suits your application. These names are not transferred to the instrument; they are for OptiLink use only.

- Log: If checked, the temperature data for this channel will be logged, when data logging is active.

- Chart: If checked, the temperature data for this channel will be displayed when one of the 4 chart windows is open.

- Color: This is the color of the curve that will be used when the Chart window is open.

- Alarms, Min and Max: Allows setting alarm limits. When one of more alarms are detected, a message is given at the bottom of the main window (must be in Acquisition mode). For a given channel, alarms are monitored only when its corresponding "Chart" *or* "Log" checkbox is checked, in the Configuration window pane. Alarms are monitored only when Acquisition is active.

- Offset: Allows adding an offset to this channel. See below.

9.3.1.1 Adjusting a temperature offset

OptiLink allows you to add an offset to the temperature readings that are returned by a thermometer. This feature is equivalent to the "f" serial command, as described in Section 6.5, although its implementation in OptiLink is somewhat different than it is for the serial command.

An offset can be useful for the following two cases:

1- To temporarily change the reading of a probe that is believed to be in error (one-point calibration procedure). This usually requires that a good temperature reference be available.

2- To force an offset to a reading, for example may want to monitor a temperature variation from a given set temperature. In this case, you can simply enter the "0" value as a forced temperature setting, and the resulting reading will give you a + or – deviation from the set temperature point.

Warning: Doing a temperature offset adjustment on a channel will alter its reading. In effect, it alters the thermometer own calibration. It must be used with care!

To perform an offset adjustment, follow these instructions:

1- Click the "Offset Adjust" button ( ) that is just next to the channel number you want to calibrate. The following menu window is available:
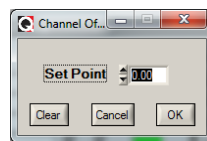
2- Type in the "Set Point" box the actual temperature that you would like to force for this channel (this temperature is normally obtained using an accurate NIST-certified primary temperature reference).

3- Press the "OK" button to activate the reference temperature. The "Offset" value will reset to its new value, as a result of your new forced temperature; this new offset is now displayed in the main window.

4- To reset this forced temperature setting, go back to the "Channel Offset" window, and click the Clear button.

5- Repeat the same procedure for the other channels that you want to modify.

9.4 Acquiring and viewing temperature data

Once all your thermometers are properly connected and configured, you may want to log data to a file, or to display their values on screen. A number of tools are available for that.

To view or acquire data, the "Acquisition" pane must be active.

9.4.1 Logging temperature data to a file

OptiLink offers the possibility to log temperature values to an Excel compatible file. The default file extension is .tem; this file can be subsequently open using Excel, which should open it and automatically recognize as an Excel compatible file (tab delimited).

Furthermore, OptiLink Pro offers the possibility to log directly to an .xls Excel file, using the Microsoft DDE data transfer protocol. This is described in Section 9.4.1.2 below.

The parameters that are useful to control the logging are shown in the lower left portion of the window, as shown here:
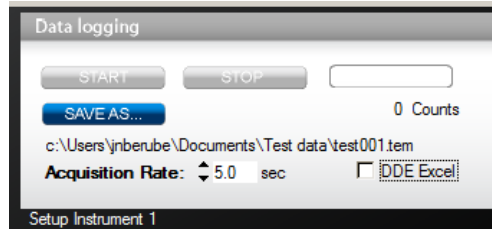
- To set the logging filename, click on "SAVE AS…"; this allows you to enter a file name. For information, the current filename is displayed just below this button. Default file location is "My Documents", for Windows 7 and above.

- To set the acquisition rate, enter a number, in seconds, in the appropriate text box. Rate can be set from 0.2 to 3600 seconds (1.0 to 3600 seconds if logging to an Excel file).

- To start acquiring data, click the "START" button. Conversely, to stop the acquisition, click the "STOP" button.

A convenient record counter is provided, confirming that logging is actually active.

9.4.1.1   Logging to a .tem file

When subsequently trying to opening the *.tem file, it is possible that you may get the following message:
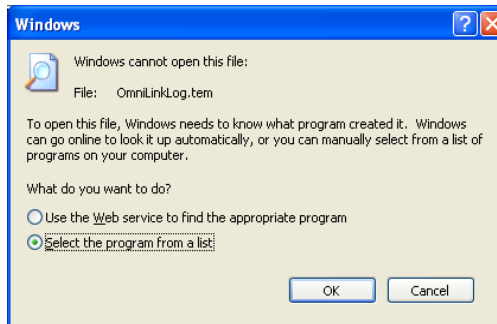
Select "Select the program from a list", and click OK. In the next window, you should instruct Windows to always open this type of file with Microsoft Excel.

If you get the following message, you should select "Read Only".
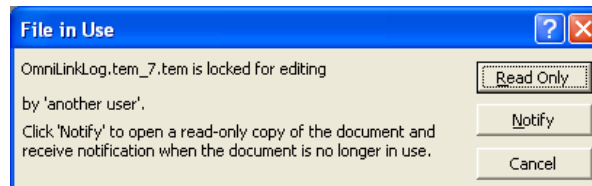
In Excel, the data file should look like this:

Notes: 1) If a column shows "#######", this means that this column is too narrow to display the data; use your mouse to widen this column.
2) If you open a logging file during acquisition, the Excel window is not refreshed as the acquisition is taking place. To get a more recent version of the file, close the Excel program, and start Excel again.
3) A value of -999.xx indicates that no reading is available for this channel. Check the probe connection.

If you stop the acquisition, and start it again with the same file name, the new values will simply be appended to the existing file content. However, a new 5-line header is inserted first, as shown here:

When logging temperatures for a very long time, one needs to note that a standard Excel sheet is limited to 65535 lines. If this limit is reached, the logging process will close the current data-logging file, and will open a new one, with the same name but with "_1" appended to the file name, and so on ("_2" …), until the application is stopped or your disk becomes full.

9.4.1.2 Logging to a .xls (or .xlsx) file

This logging method requires the Microsoft Excel application, which must be already installed. This logging method has some advantages over the previously described logging method, namely:

- Temperatures are directly stored in a genuine .xls file; no intermediary file is used.
- It allows the user the look at the data as it is written in real time in the .xls file.
- It allows the user to write comments directly in the .xls file, as the data is being acquired.

Warning: An English language Excel is required; logging using Excel in other languages may work, but is not guaranteed by Neoptix. Furthermore, it is highly recommended that you do not use Excel for other purposes when DDE data logging is taking place; failure to respect this may result in lost data (your data or temperature data).

Before you can use this logging method, you must set it up on your PC. This needs to be done only once.

DDE logging setup

Click the DDE Excel checkbox, as illustrated here:
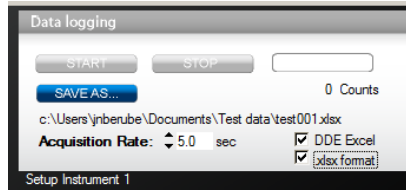
Then, you will get an invitation to specify the location of your Excel application (excel.exe). Once the Excel location and language selection[4] are confirmed (look into "C:\Program files\Microsoft Office\OfficeXX"), logging will start as described below.

If you are using Office 2007 or later, make sure to check the box ".xlsx format". With Office 2007 or later, files can be saved only in the new format .xlsx.

DDE logging

Click the START button to start the logging process. The Excel application will open, and you will be able to see the data being written to the file. **Do not close this Excel sheet**; however you may minimize it without any problem.

To stop logging, click the STOP button in OptiLink; this will automatically close the Excel sheet and application. Do not close the Excel application yourself!

Otherwise, the DDE logging is very similar to logging to a .tem file, as described above. Acquisition rate is limited to 1 second.

9.4.2 Viewing temperature data

Temperature values can be displayed on your computer screen in a number of ways. Click one of the four "Chart" button to active one or more of these windows.
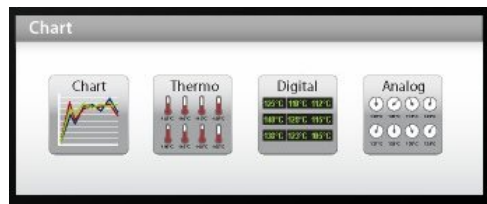
Note that more than one window type can be displayed simultaneously; in addition, you can log temperatures to a file independently from these display windows. Note that each of these 2 modes have each then own acquisition time base.

9.4.2.1 *Displaying temperature trends*

Click the "Chart" button to get the following window.

---

[4] You have two choices: English or French. If you are using Excel in another language, you must select English.
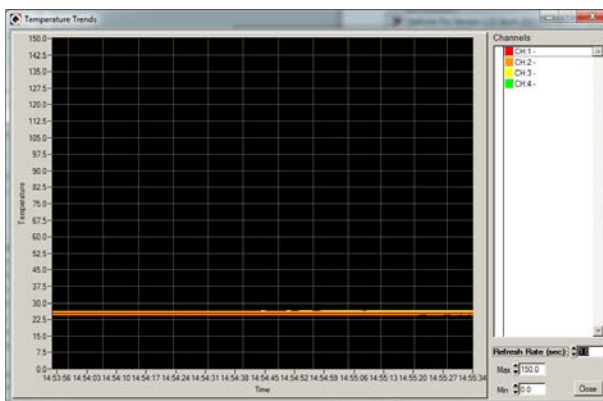
Adjust the "Refresh Rate" (minimum is 0.2 sec) and Min / Max to suit your viewing needs.

Note that the setting of curve colors and other parameters must be done in the "System Configuration" window pane. Up to 64 trends can be displayed.

9.4.2.2 *Displaying analog thermometers*

Click the "Thermo" button; the following window will appear.
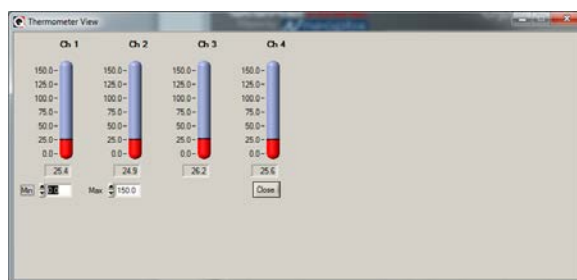
All thermometers share the same Min / Max reading setting. Refresh rate is fixed at 1.0 sec. The size of this window will change depending on the number of channels to display. Up to 16 thermometers can be shown; if you want to display more than 16 channels, only the first 16 detected channels will be shown (note that any channel that has its "Chart" checkbox unchecked, in the main window, will not be shown).

If an alarm is active for a channel, the corresponding thermometer numbers will change color: blue for a low temperature alarm, or red for a high temperature alarm.

9.4.2.3 *Displaying digital values*

To display digital temperatures, click on the "Digital" button. The following window will appear.

The size of this window will adapt to the number of channels to display. Up to 32 values can be shown. Refresh rate is always 1.0 sec.

If an alarm is active for a channel, the corresponding display will change color: blue for a low temperature alarm, or red for a high temperature alarm.

9.4.2.4 Displaying analog values (dials)

To display analog temperatures (using dials), click on the "Analog" button. The active window becomes this:
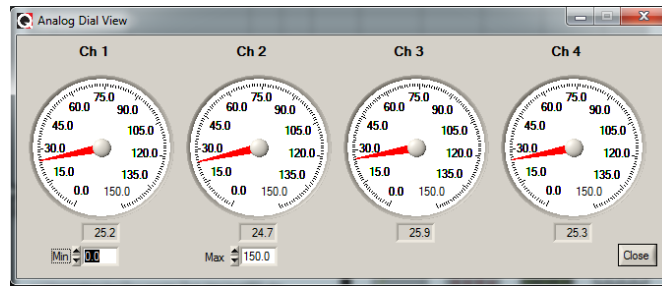
All dials share the same Min / Max reading setting. Refresh rate is always 1.0 sec. The size of this window will adapt to the number of displayed channels. Up to 16 dials can be shown; if you want to display more than 16 channels, only the first 16 detected channels will be shown (note that any channel that has its "Chart" checkbox unchecked, in the main window, will not be shown).

If an alarm is active for a channel, the corresponding dial numbers will change color: blue for a low temperature alarm, or red for a high temperature alarm.

9.5 The OptiLink Console

You must be in "System Configuration" mode to use the console.

The console, which can be invoked through the Window and then Open Console from OptiLink main window menu bar, is useful to manage each Neoptix thermometer in details. Take note that the console can only be open when no temperature acquisition is taking place. It can be useful also to understand problems and malfunctions that a module may exhibit. It operates in a similar fashion as Windows HyperTerminal, which Neoptix suggests to use with all thermometer models (such as the Reflex or T/Guard).

The console can be used to get information such as:

- Information on calibration date, serial number, etc.

- Control operational features, such as fast/slow scanning more, wtune, etc.

- Calibration type, Neoptix or Nortech Fibronic, Inc.

- And so forth.

The following illustrates the OptiLink Console:
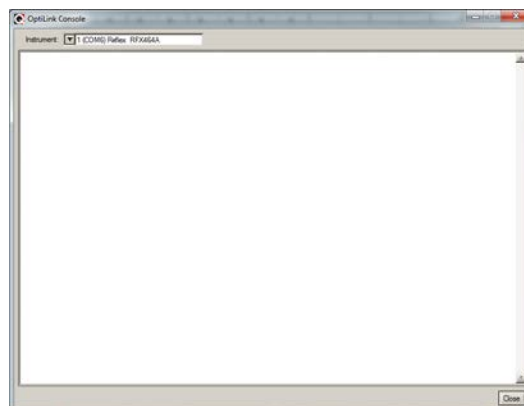
Before sending commands and receiving information from a specific module, it is necessary to select the instrument you want to interrogate. Please note that only ONE instrument can be selected at a time; if the same command is to be sent to all thermometers, then, it is necessary to repeat the command for each individual module.

You can use "Copy and Paste" Windows commands (such as the following shortcuts: ctl-c and ctl-v) to copy selected content of the console content to other Windows programs, such as Notepad, etc.

9.5.1 Console help menu

The following is the menu as displayed by the instrument when sending the "h" command. This help menu can be used as a reminder of all available commands, for this specific instruments.
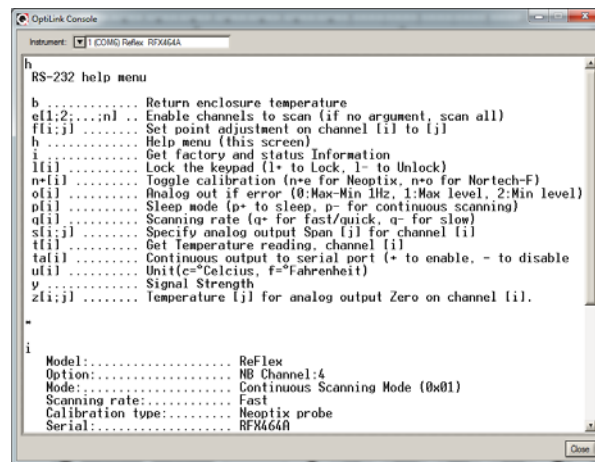
For a complete description of all commands, refer to Section 6.5 above.

9.5.2 Switching between calibration types

The OptiLink Console is a very useful tool that can easily be used to change the calibration types, for T/Guard system that have the double calibration feature enabled (Neoptix and older Nortech Fibronic, Inc. probes). One can simply enter the "n+o" to enable the Nortech-Fibronic calibration, or "n+e" for the Neoptix calibration. This is illustrated in the figure below:
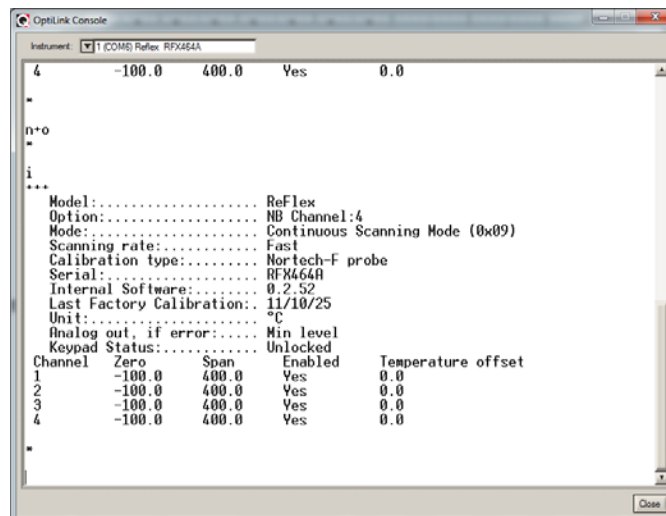
9.6 OptiLink functions

This section explains in details each one of the functions provided by the menus of the OptiLink software package. This Section only gives a brief overview of the commands that are possible; for operational details, please refer to the above Sections.

9.6.1 The File menu

The *File* menu provides the user with basic functions to handle Configuration files.

9.6.1.1 Find Instruments (Refresh)

This is equivalent to the "Refresh" button, found on the main window.

9.6.1.2 Disconnect Instruments

This will release all COM ports, select this menu item. OptiLink becomes idle, and to bring it to life again requires you to click the "Refresh" button (or to select the Find Instruments (Refresh)" menu item

9.6.1.3 Advance serial port setting

This command allows the user to force the exclusion of one or more COM ports from being scanned when clicking the "Refresh" button. This may be useful when one finds that the automatic COM port refresh feature of OptiLink is interfering with equipment that are using defined COM ports. You can check all ports that you want to exclude from the automatic scanning process. This window looks like this:
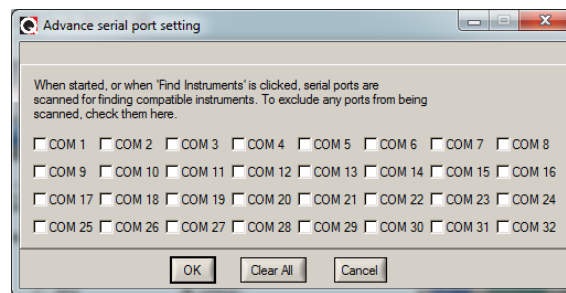
9.6.1.4 Quit

Select *Quit* from the *File* menu to exit OptiLink. Any configuration or setting that you might have done to any parameters is automatically saved, so the same configuration will be available the next time you open OptiLink.

9.6.2 The Window menu

From this menu, you can open the following 5 windows:
- Console view
- Trend view
- Thermometer view
- Digital view
- Analog (dial) view

9.6.2.1 Open Console

Open Console can be very useful for developers and other users who want to interrogate the "internal" parameters of a Neoptix thermometer. It should be used only by experienced users.

9.6.2.2 View Trends

Select this menu item to open a window that gives you a graphical representation of your temperature readings, as a function of time. Up to 64 curves can be simultaneously displayed. The sampling time base is adjustable.

9.6.2.3   View Thermometers

Select this menu item to display thermometers that will give you temperature data on up to 16 channels. Sampling rate is fixed at one reading per second.

9.6.2.4   View Digital meters

Select this menu item to display digital readouts that will give you temperature data on up to 32 channels. Sampling rate is fixed at one reading per second.

9.6.2.5   View Analog Dial meters

Select this menu item to display analog dials that will give you temperature data on up to 16 channels. Sampling rate is fixed at one reading per second.

9.6.3 The Help Menu

This is a standard Windows Help menu.

From this menu, you can also enter an unlocking code to convert OptiLink from a "Lite" version to the "Pro" version.

10 USING TEMPERATURE PROBES

10.1 Caution

Each time you connect a temperature probe to the unit, the probe **optical connector should be cleaned beforehand.** Otherwise, particles of grease or dirt may obstruct the device internal connector and affect the measurements by completely blocking the signal or by generating too much attenuation when using a long fiber length.

Never use a cloth other than the type recommended for fiber optic cleaning. Dampening the cloth with pure isopropyl alcohol ensures good cleaning.

Occasionally, clean the inside of the bulkhead connector (attached to the thermometer) with a wipe or cotton swab dipped in alcohol (2.5 mm mini foam swabs work best).

Locking nut

Ferrule key

Ferrule   0
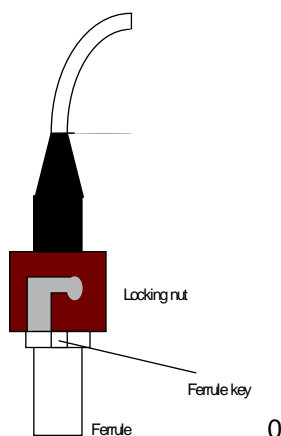
For very dirty connectors, acetone can also be used, but should be used very carefully, as it is a very strong solvent. Care should be exercised so you do not apply any on plastic materials, etc.

10.2 Description

The optical connector used is a standard ST type connector.

Device connector

Insert the Ferrule key here

Pins BNC type
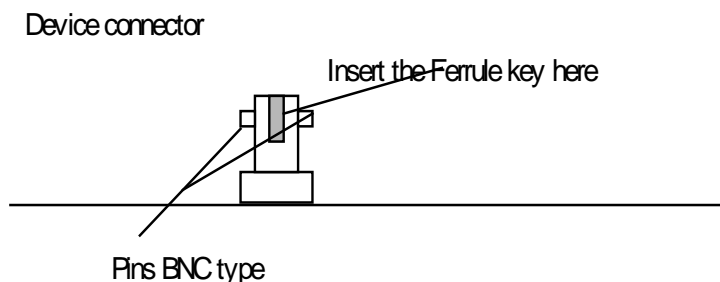
To install the connector,
Slide the ferrule key gently into the above key.
Then, turning, insert the two BNC pins into
The appropriate slots on the ST connector.

10.3 Warning

The T1 probe is quite fragile and it must be handled carefully. Please note that any probe damages are not covered by the standard warranty.

Contact your distributor for additional chemical compatibility information.

Do not expose your probes to temperatures that are higher than specified. Permanent damage can be caused to probes that have been exposed to temperatures that are higher than their limits.

10.4 Working with cryogenic probes

The use of a cryogenic probe required special attention. In particular, the probes become more brittle at very low temperatures. Avoid cycling the probes quickly between cryogenic temp and ambient temperatures, as this may cause material fatigue at the probe tips.

Warning

Always wear protective gloves and clothing when working with cryogenic material.

Never use general purpose probes at cryogenic temperatures. Neoptix sells special probes that can be used at cryogenic temperatures.

Please note that your Nomad thermometer will require a special factory calibration to be used at cryogenic temperatures (below -80°C). Consult Neoptix for more information.

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11 INDEX

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