*i*Port

Instruction Manual

Communications Software for
*i*Series and C Series Instruments

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Chapter 1 Introduction

*i*Port is a program designed to communicate exclusively with the *i*Series and C Series product line. The instruments in these product lines feature electronic sensors, internal data storage, and an extensive command set. The *i*Series has TCP/IP ethernet connectivity as well as RS-232. These features enable full control of instruments by a remote device, such as a computer. *i*Port takes advantage of the instruments' rich command set and of Microsoft Windows to provide a robust remote interface. Major features include:

- Easy Remote Control
- Extensive Diagnostic Information
- Graphing and Downloading Capability
- Dynamic Data Exchange (DDE) Capability
- Control Multiple Instruments
- Print Capability
- Firmware Upgrade

Easy Remote Control. With *i*Port, you can control instruments remotely as easily as you can in person. The pushbuttons and display used to control the instrument are simulated in the program. Simply press the program pushbuttons to control the instrument as you would normally. Many frequently used parameters such as ranges, can be set by using designated buttons. These buttons provide direct control of parameters without having to navigate the menu-driven instrument software.

Extensive Diagnostic Information. *i*Port provides easy access to the extensive diagnostic information available in each instrument. Diagnostic information and concentration readings are stored in the instruments as records. These records can be graphically displayed, printed, or downloaded as an ASCII text file, for importing to other programs.

Graphing and Downloading Capability. *i*Port can graph any item stored in an instrument record including concentration readings, temperatures, flows, and voltages. This enables you, for example, to observe how a changing flow rate affects the concentration reading.

Dynamic Data Exchange (DDE) Capability. With DDE you can link *i*Port to other applications that support DDE, such as Microsoft Excel.

Control Multiple Instruments. *i*Port can control one or more instruments at the same time. Using a daisy-chain configuration, a suite of instruments can be connected to one computer (via modem or direct cable connection). Multiple instruments can also be connected via Ethernet TCP/IP connection for *i*Series. Each instrument is displayed within *i*Port in its own window. An instrument ID, or address, is used to identify each instrument on the serial line, and TCP/IP address for Ethernet.

Print Capability. With print capability, you can print the contents of internal data downloaded from any instrument. The records are printed in a graphical or tabular format.

Firmware Upgrade. *i*Series firmware can be upgraded using *i*Port.

Chapter 2 Installation

Software Installation

This chapter discusses the installation of *i*Port. After installing the program, follow the instructions in this chapter to connect the instrument(s) to the computer.

System Requirements

Table 2-1 describes the *i*Port hardware and software requirements.

Table 2-1. System Requirements

Component	Description
Computer	A 486 or higher computer. The *i*Port program is qualified to run on Windows 98, Windows 2000 and Windows XP.
Disk Drives	A CD-ROM and a hard drive with at least 3 megabytes free space available
RAM	A minimum of 64 megabytes
Video	SVGA or better resolution
Mouse	A mouse is not required to run the program, however, any pointing device supported by Windows will make *i*Port much easier to use.
Modem	Internal or external Hayes-compatible modem. A direct connection between computer and instrument does not require a modem; however, a serial connection does require a null-modem cable.
Ethernet	RJ-45, 10 Mbps (optional)

Installation

The Install program automatically installs *i*Port onto your computer and creates the Thermo program group. Use the following procedure to install the program.

1. Insert the *i*Port Installation Disk into the CD-ROM drive.

2. If the CD does not autostart, run setup.exe from the CD.

   The Welcome dialog box appears.

3. Choose **Install**.

The Target Directory dialog box appears.

4. Enter the drive and directory where the *i*Port program will be installed.

5. Choose **OK** or press the **Enter** key.

   After the *i*Port files have been installed on the target drive and directory, the Program Group screen appears.

6. Select a program group where the *i*Port program will be installed.

7. Choose **OK**.

   The Installation Completed dialog box appears.

8. Choose **OK**.

   The *i*Port installation is now complete. The desktop displays the *i*Port icons, and the *i*Port program will also be installed in the Start Menu > Programs. Double click on the ***i*Port** icon to begin the program.

Hardware Installation

*i*Port can control remote instruments serially with a null-modem cable (direct connection) or through a modem (over telephone lines). *i*Port can also connect to *i*Series instruments over Ethernet using the RJ-45 connector. This chapter describes all types of connections.

Serial Direct Connection

With a direct connection to a single instrument, a null-modem cable is connected between the instrument's COM port and the computer's COM port, as shown in Figure 2-1 and Figure 2-2. In the null modem cable, pins 2 and 3 are switched, so that pin 2 in the connector at one end of the cable is connected to pin 3 in the connector at the other end of the cable.

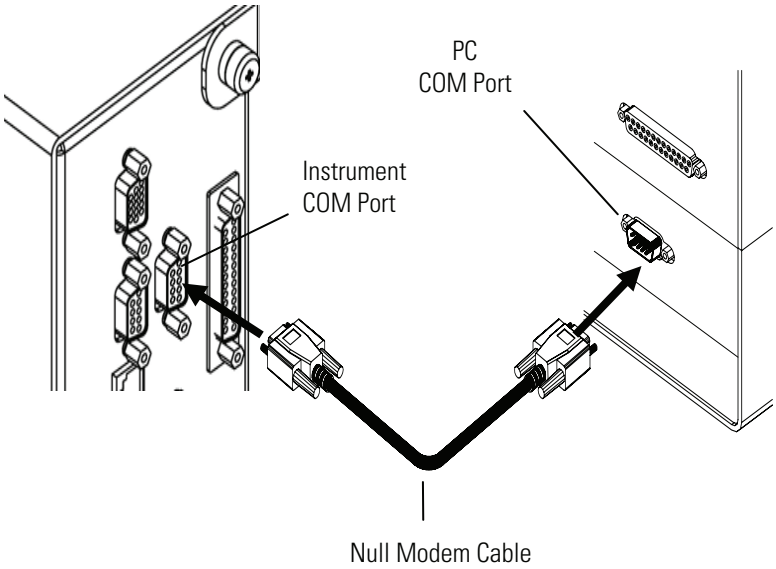


Figure 2-1. Direct Connection to *i*Series

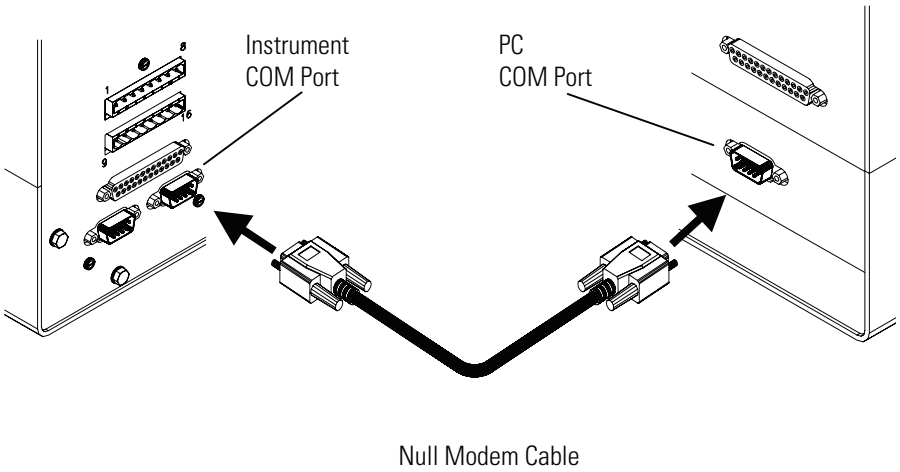


Figure 2-2. Direct Connection to C Series

The instrument's COM port has two connectors, as shown in Figure 2-1 and Figure 2-2. Both connectors are identical; therefore, either one can be connected to the computer. The remaining connector can be used to daisy chain multiple instruments, as shown in Figure 2-3. When several

instruments are connected, a null-modem cable is required only between the computer and the first instrument. Subsequent instruments are connected with straight-through cables.

Note Cables are not supplied as standard equipment with the instruments.

The straight-through cables do not switch pins 2 and 3. The total length of the cables should not exceed 15 meters (50 feet) using RS-232 or 1,800 meters (6000 feet) using RS-485.

If your computer's COM port has a DB25 connector instead of a DB9 connector (as shown above), you will need a DB25 female to DB9 male serial adapter (not supplied with instrument).

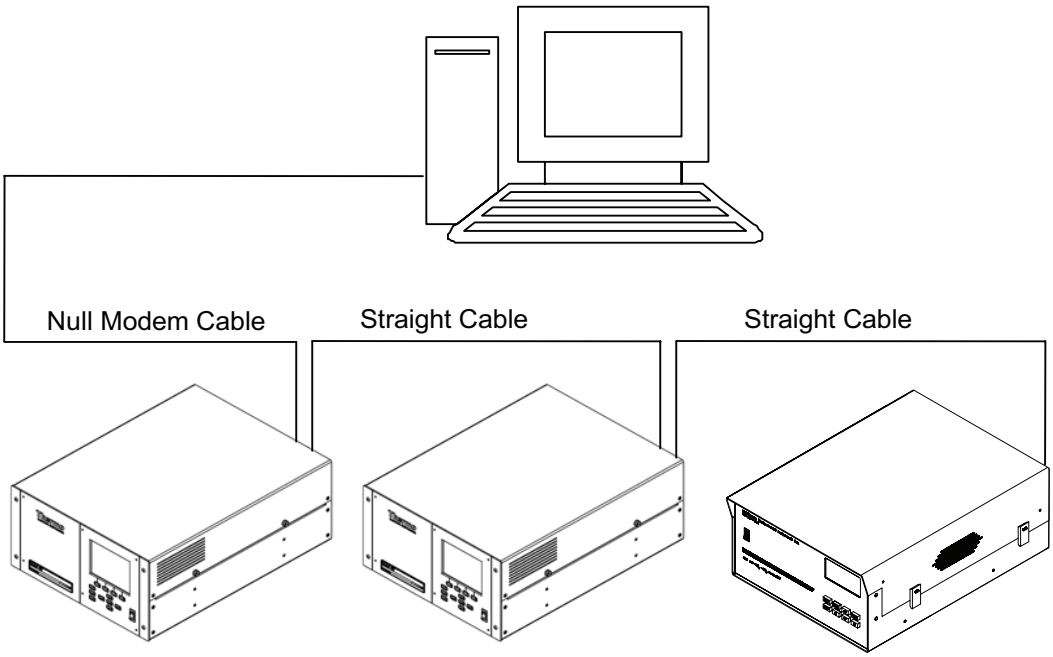


Figure 2-3. Direct Connection of Multiple Instruments Over Serial

Modem Connection

Before you connect a modem to the instrument, the modem must first be programmed to automatically answer incoming calls. The modem is programmed by sending it commands from a communications program such as Windows HyperTerminal.

Use the following procedure to program the modem using HyperTerminal.

1. Open HyperTerminal.

2. Enter name in the Connector Description menu.

3. Cancel out of “Connect To.”

4. From the File menu, choose **Properties**.

5. From the Phone Number tab or the Connect To tab:

   a. Either uncheck Area Code or check Area Code and place digits in the Area Code box (do not place digits in the Phone Number box).

   b. Choose selection from the “Connect Using” drop down list.

   c. Press the **Configure** button and set Maximum Speed (1200 to 115200) to the maximum speed of the modem. The instrument should be set to the same baud rate.

      Data bits = 8

      Parity = None

      Stop bits = 1

      Flow control = None

6. From Properties choose the **Settings** tab, check the **Terminal Keys** radio button, and set Emulation to **VT100**.

7. Press the **ASCII Setup** button:

   a. Check **Send Line Ends With Line Feeds**.

   b. Check **Echo Typed Character Locally**.

   c. Set **Line Delay** to **0**.

   d. Set **Character Delay** to **0**.

   e. Check **Wrap Lines That Exceed Terminal Width**.

8. Save the file.

Programming a US Robotics Sportster (14,400 to 56K) Modem to Auto-Answer

Use the following procedure to program a US Robotics Sportster (14,400 to 56K) modem to auto answer.

1. Set the modem's DIP switches as shown in Table 2-2.

Table 2-2. DIP Switch Settings

DIP Switch	Position	Meaning
1	Down	Override DTR
2	Up	Verbal result codes
3	Down	Display result codes
4	Up	Echo offline commands
5	Up	Auto answer on first ring or higher, if specified
6	Up	Carrier detect normal
7	Up	Load NVRAM defaults
8	Down	Smart mode

2. Connect the modem to the computer's COM port (no telephone line is needed). See Figure 2-4.

3. Start Windows HyperTerminal.

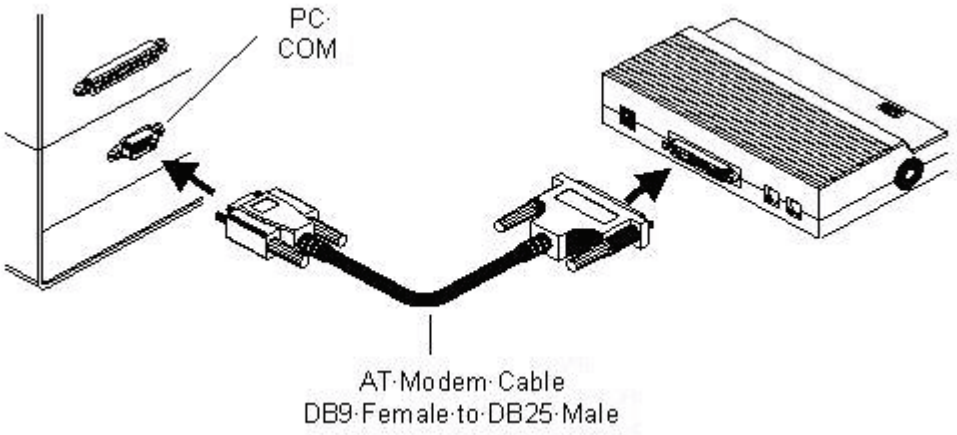


Figure 2-4. Connecting a Modem to a Computer for Programming

4. Issue the following commands (Table 2-3) one at a time. The modem responds OK (Figure 2-5).

Note These commands must be sent to the modem at the same baud rate that the instrument is programmed for. ▲

After typing the ATE0 command to set local echo OFF, the screen will not display the other keyboard entries, although these subsequent entries will be in effect. ▲

Table 2-3. US Robotics Modem Programming Commands

Command	Meaning
AT&F	Sets modem parameters to factory default
ATQ0	Displays result codes
AT&C0	Assumes presence of carrier detect signal
AT&D0	Ignores status of DTR signal
AT&K3	Enables RTS/CTS local flow control
AT&R1	Ignores RTS; assumes presence of CTS
ATS0=1	Sets the number of rings on which to answer to 1
ATE0	Sets local Echo OFF
ATQ1	Suppress results code
AT&A0	Suppress ARQ results codes
AT&B1	Fixed serial port rate
AT&W0	Writes storable parameters of current configuration in memory as profile 0
AT&W1	Writes storable parameters of current configuration in memory as profile 1

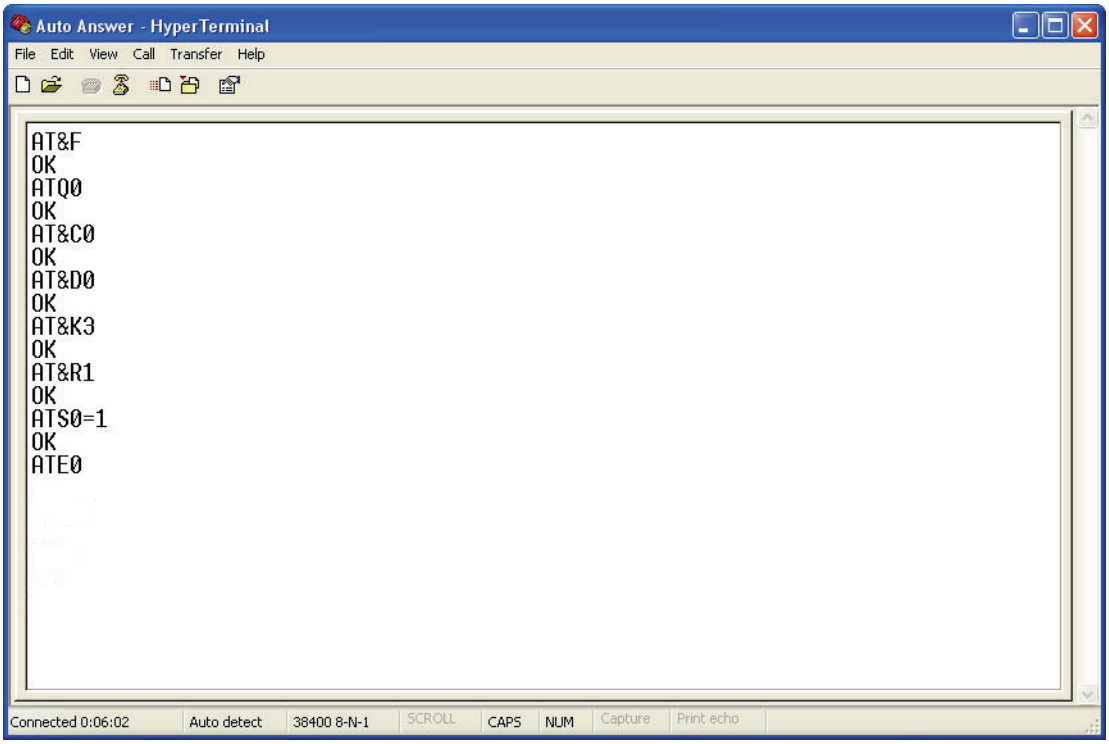


Figure 2-5. Programming a US Robotics Modem To Auto Answer for *i*Port

5. Disconnect the modem from the computer and connect it to the instrument and phone line as shown in Figure 2-6.

Programming a Hayes Accura 14,400 Modem to Auto-Answer

Use the following procedure to program a Hayes Accura 14,400 modem to auto answer.

1. Connect the modem to the computer's COM port.

2. Start Windows HyperTerminal.

3. Issue the following commands shown in Table 2-4 one at a time. The modem responds OK. See Figure 2-5 for similar type of display.

Table 2-4. Hayes Accura 14,400 Modem Programming Commands

Command	Meaning
AT	Tells the modem that modem commands follow
AT&F	Sets the modem parameters to factory default
AT&C0	Assumes presence of carrier detect signal
AT&D0	Ignores status of DTR signal
AT&Q0	Communicates in asynchronous mode
AT&R1	Ignores RTS, assumes presence of CTS
ATS0=1	Sets the number of rings on which to answer to 1
AT&W0	Writes storable parameters of current configuration in memory as profile 0
AT&W1	Writes storable parameters of current configuration in memory as profile 1

4. Disconnect the modem from the computer and connect it to the instrument and phone line as shown in Figure 2-6.

Programming a Hayes Accura 56K Modem to Auto-Answer

Use the following procedure to program a Hayes Accura 56K modem to auto answer.

1. Connect the modem to the computer's COM port.

2. Start Windows HyperTerminal.

3. Issue the following commands (Table 2-5) one at a time. The modem responds OK. See Figure 2-5 for similar type of display.

Table 2-5. Hayes Accura 56K Modem Programming Commands

Command	Meaning
AT	Tells the modem that modem commands follow
AT&F	Sets the modem parameters to factory default
AT&C	Assumes presence of carrier detect signal
AT&D	Ignores status of DTR signal
AT&K	Disable local flow control

Table 2-5. Hayes Accura 56K Modem Programming Commands, continued

Command	Meaning
ATS37=*x*	Maximum DCE speed, where *x* = 5 -> 1200 baud, 6 -> 2400 baud, 7 -> 4800 baud, 9 -> 9600 baud
ATS0=1	Sets the number of rings on which to answer to 1
ATN0	When originating or answering modem, will only handshake at the value set in S37
AT&W	Writes storable parameters of current configuration in memory as profile 0
AT&Y	Selects stored profile 0 as the current configuration

4. Disconnect the modem from the computer and connect it to the instrument and phone line as shown in Figure 2-6.

Connecting the Programmed Modem to an Instrument

Once the modem is programmed to auto-answer, connect it to the computer's COM port as shown in Figure 2-6. Several instruments can be connected to one computer, as shown in Figure 2-7.

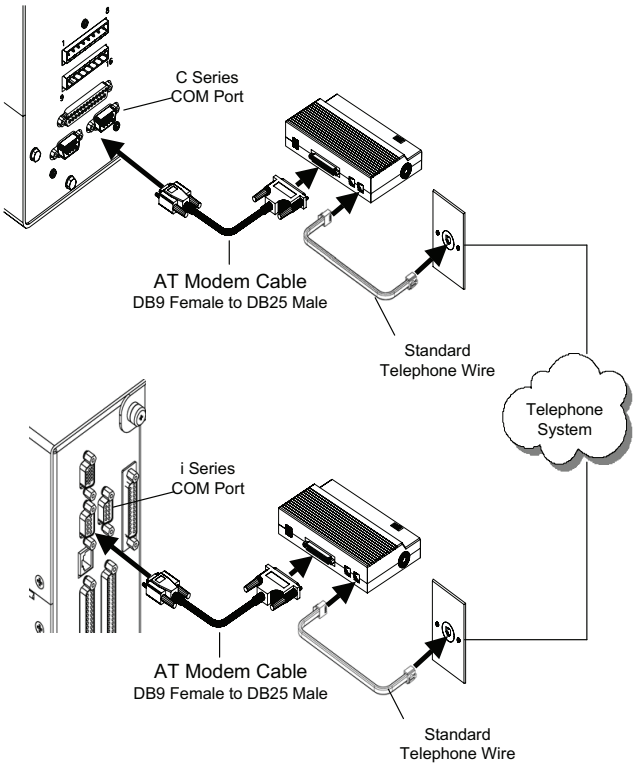


Figure 2-6. Programmed Modem Connected to Instrument

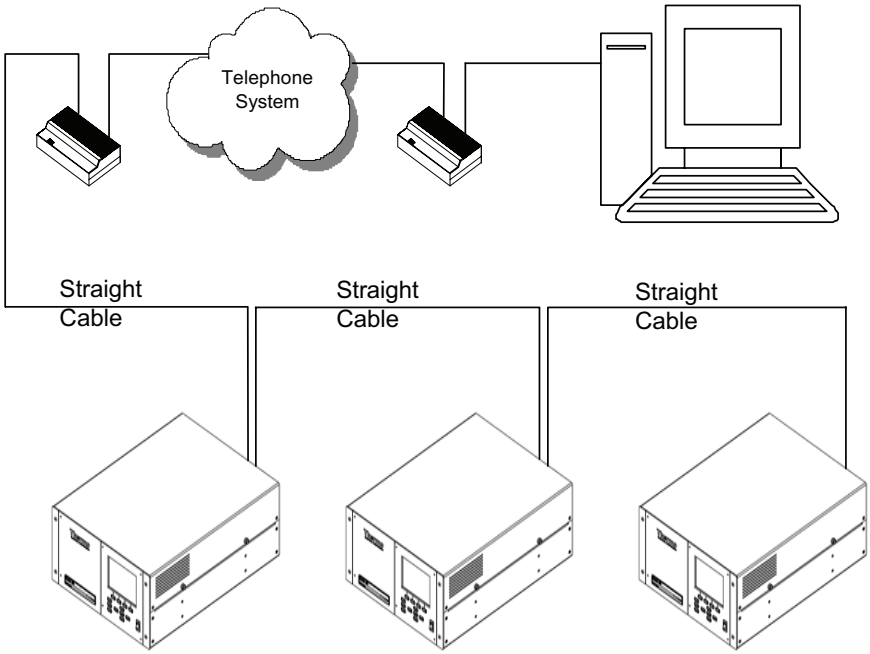


Figure 2-7. Multiple Instruments Connected via Modem

TCP/IP Ethernet Connection

The *i*Series instruments are equipped with a 10 Mbps Ethernet RJ-45 connection (Figure 2-8). To use TCP/IP, connect a 10 Mbps qualified cable with an RJ-45 to a TCP/IP network.

The instrument must be configured to a proper TCP/IP address for use on the network. This can be done using a static IP address or using DHCP services. See the instrument manual for details on configuring the address.

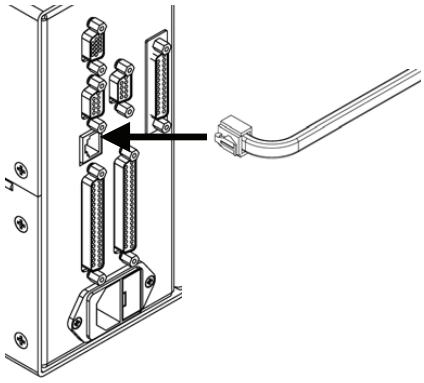


Figure 2-8. Ethernet Connection

Multiple Instruments Connected Via Hub/Router

If more than one instrument must be connected over Ethernet, a hub, switch or router must be used. This may be connected to a single PC or to a larger network so users from different locations may connect to the instruments.

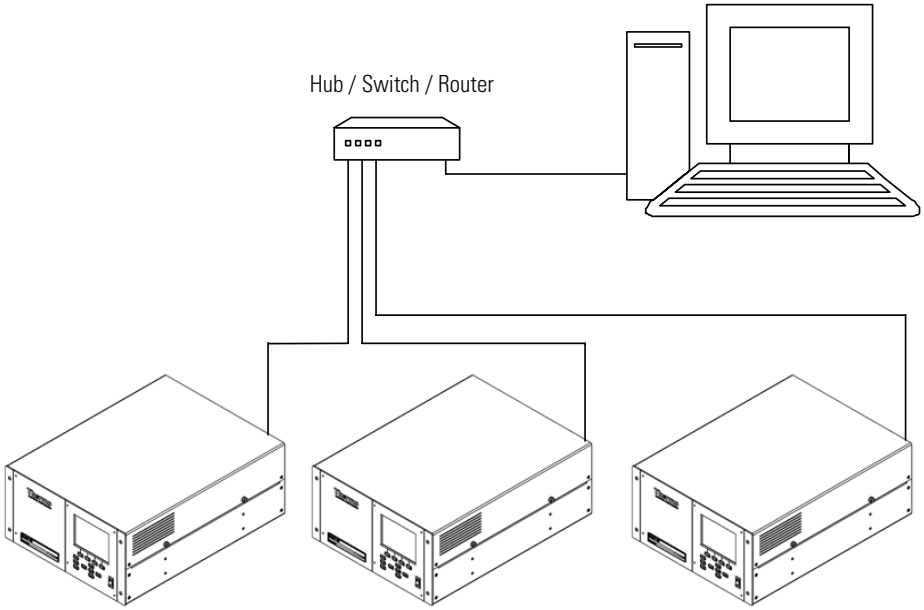


Figure 2-9. Multiple Instruments Connected Via Hub/Switch/Router

Chapter 3 Configuration

This chapter explains how to configure *i*Port for direct Serial connections, modem connections, and TCP/IP.

Configuring iPort for a Direct Serial Connection

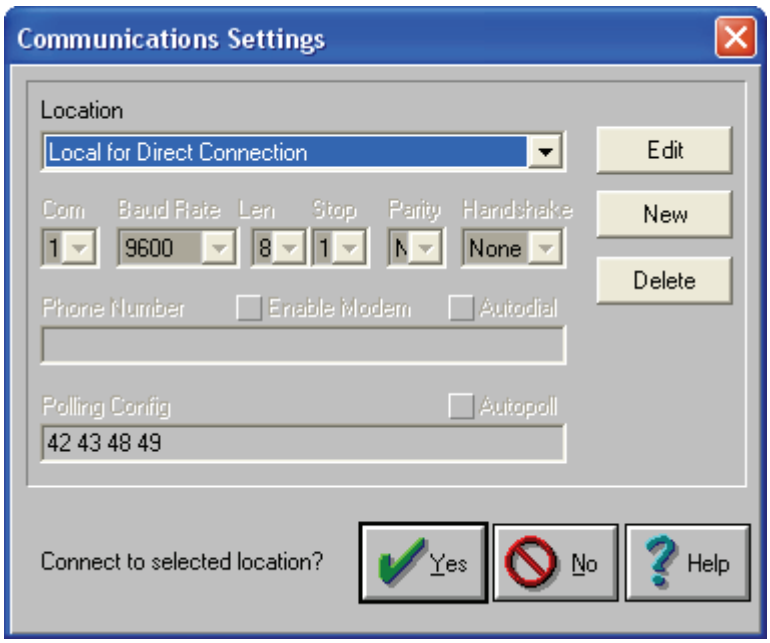
Use the following procedure to configure *i*Port for a direct connection.

1. Start *i*Port by double clicking on the ***i*Port** icon.

Note Be sure ESC 8832 Enable and Direct TCP/IP Enable are unchecked in the Preferences menu. See the "Menu System" chapter. ▲

2. Select Comm > **Connect**.

   The Communications Settings dialog box appears.



3. Click on **New** to add a new location to the location directory.

The location directory contains the information necessary to communicate with a remote instrument such as the COM port, baud rate, and instrument ID. Additional locations can be added and edited.

4. Click on **Edit** to modify the settings.

5. Enter the following information:

   - The name of the location
   - The computer's COM port being used to communicate with the remote instrument
   - The baud rate of the remote instrument
   - Clear the **Enable Modem** check box
   - Under Polling Config, **enter the instrument ID** of each instrument (separated by spaces)

   The instrument ID for each instrument is set in the instrument's Instrument Controls menu. Be sure that the instrument ID you specify under Polling Config matches the instrument ID on the instrument. To check the current instrument ID setting, press (Menu) to display the Main Menu, then choose Instrument Controls > Communication Settings > **Instrument ID**.

   If there are multiple instruments in a configuration, make sure there are no duplicate IDs.

6. If you wish to have *i*Port automatically poll for the remote instrument(s) upon connecting this location, check the **Autopoll** check box. The recommended setting is to have this box checked.

7. Click on **OK** to add the location to the location directory.

8. Click on **Yes** to connect with the remote instrument.

   If you did not enable Autopoll, you must poll for the instrument manually once the connection has been successfully made. Select Instrument > Poll Serial > **Config** to do this.

The program polls (searches) for instruments connected to the computer's COM port. The program opens each instrument window maximized as it is discovered during the poll.

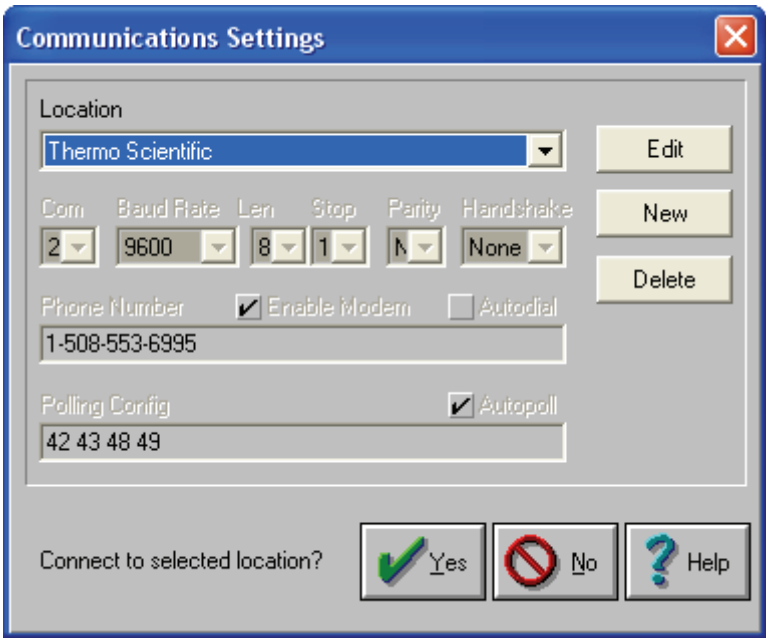
Configuring iPort for a Modem Connection

Use the following procedure to configure *i*Port for a modem connection.

1. Start *i*Port by double clicking on the ***i*Port** icon.

2. Select Comm > **Connect**.

   The Communications Settings dialog box appears.



3. Click **New** to add a new location to the location directory, or click **Edit** to modify the settings.

4. Enter the following information:

   - The name of the location
   - The COM port of the modem being used to communicate with the remote instrument
   - The baud rate of the remote instrument
   - Check the **Enable Modem** check box

- The phone number of the remote modem
- Under Polling Config, enter the **instrument ID** of each instrument (separated by spaces)

The instrument ID for each instrument is set in the instrument's Instrument Controls menu. Be sure that the instrument ID you specify under Polling Config matches the instrument ID on the instrument. To check the current instrument ID setting, press the Menu button to display the Main Menu, then choose Instrument Controls > Communication Settings > **Instrument ID**.

If there are multiple instruments in a configuration, make sure there are no duplicate IDs.

5. If you wish to have *i*Port automatically dial the phone number when connecting to this location, check the **Autodial** check box.

6. If you wish to have *i*Port automatically poll for the remote instrument(s) once a connection has been made to this location, check the **Autopoll** check box.

7. Click on **OK** to add the location to the directory.

8. Click on **Yes** to connect with the remote instrument.

   If you did not enable Autopoll, you must poll for the instrument manually. There are two types of manual polling. By selecting Instrument > Poll Serial > **Config**, the program polls for the chosen instruments, and connects to those it finds. By selecting Instrument > Poll > **All**, the program polls for all possible IDs, from 1 to 99, and connects to those it finds.

   The program polls (searches) for instruments connected to the computer's COM port. The program opens each instrument window maximized as it is discovered during the poll.

Configuring for a TCP/IP Connection

Use the following procedure to configure *i*Port for a TCP/IP connection.

1. Start *i*Port by double clicking on the ***i*Port** icon.

Note Be sure Direct TCP/IP Enable is checked first in the Preferences menu. See the “Menu System” chapter. ▲

2. Select Instrument > TCPIP Connect > **addresses**.

   A popup box will appear requesting the TCP/IP addresses of the instruments to connect to. Enter up to 25 IP addresses in the form xxx.xxx.xxx.xxx separated by spaces. The addresses entered will be saved in the ini file on disk and will be restored when the program is restarted.

   The program attempts to connect to instruments at the IP addresses in the list. The program opens each instrument window maximized as it is connected.

Note Instrument ID is not used for TCP/IP connections. ▲

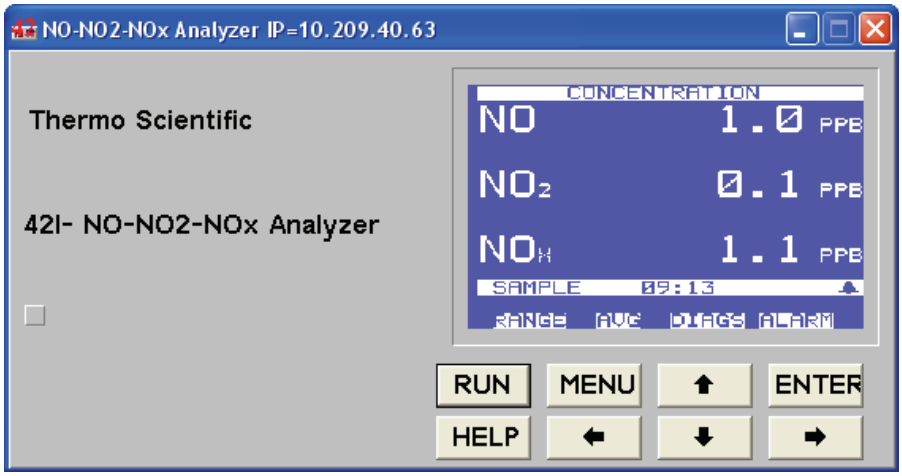
Be sure that the Enable TCP/IP is checked in the Preferences box. See the “Menu System” chapter.▲

Chapter 4 Operation

*i*Port enables complete remote control of a suite of *i*Series and C Series instruments. This chapter shows how to use the various modes of *i*Port.

Simulated Local Control

Each instrument being controlled by *i*Port has its own window as shown below. Use the pushbuttons to control an instrument just as it is controlled locally.



Multiple instruments can be displayed at one time on the screen. To change the size of the instrument's window, select Instrument > Size > Small, Medium, Large or Full.

Table 4-1 describes the various front panel pushbuttons and the expected key actions for each.

Table 4-1. Front Panel Pushbuttons

Button	Description
RUN	Used to display the Run screen. The Run screen normally displays the concentrations.
MENU	Used to display the Main Menu when in the Run screen, or back up one level in the menu system.
ENTER	Used to select a menu item, accept/set/save a change, and/or toggle on/off functions.
HELP	Used to display the context-sensitive help that provides additional information about the screen that is being displayed.

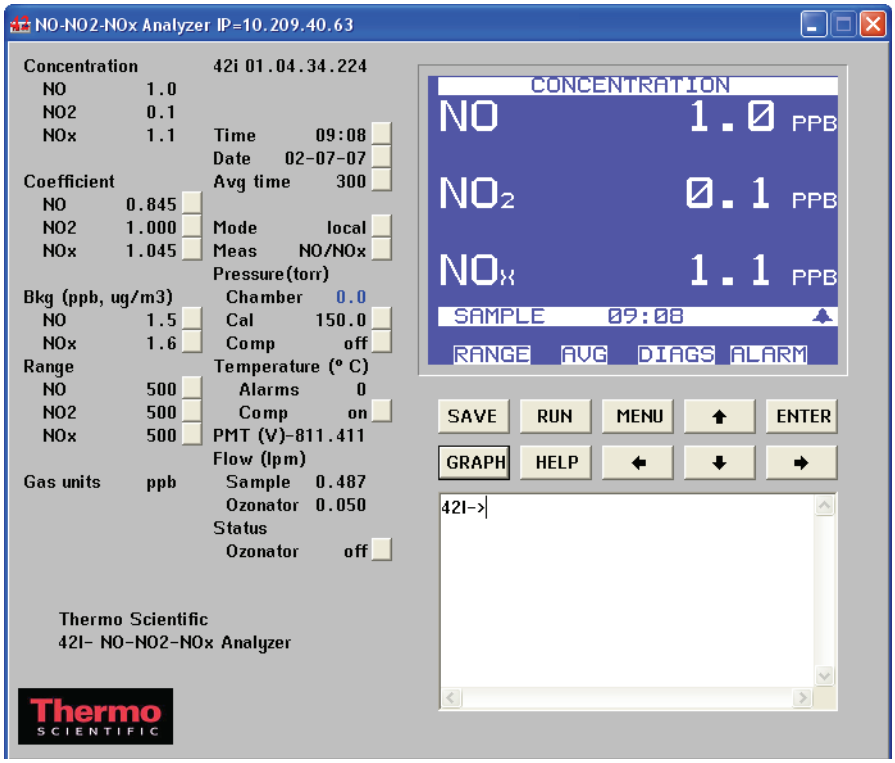
Table 4-1. Front Panel Pushbuttons, continued

Button	Description
↑ Up ↓ Down ← Left → Right	The arrow pushbuttons move the cursor up, down, left, and right or change values and states in specific screens.

Diagnostics Mode

The diagnostics mode displays extensive diagnostic information about the instrument. To display the diagnostic information, select Instrument > Size > **Full**. Each instrument has its own window as follows.

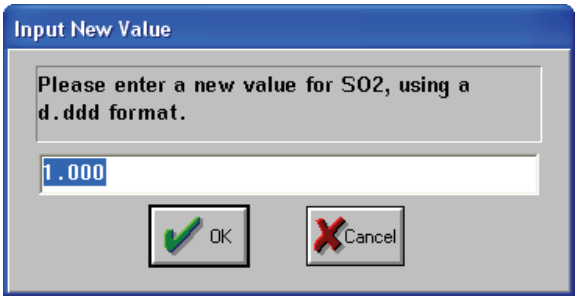
Note that it may be necessary to close and re-run iPort after changing the instrument screen size.



Although each instrument's window is slightly different, they function the same way. Each window shows concentrations, pressures, temperatures, flows, calibration coefficients, ranges, gas units, control mode, and gas mode. The pop-up boxes used to control these common parameters are the same.

Coefficients

To set the coefficient, click on the button to the right of the coefficient, enter the new value for the coefficient, and click **OK**.



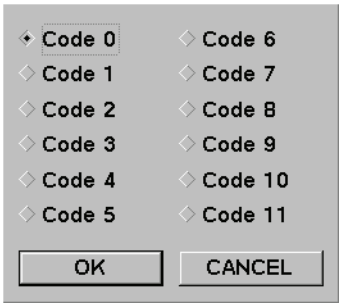
Backgrounds

To set the background, click on the button to the right of the background value. Enter the new value for the background and click **OK**.

Ranges

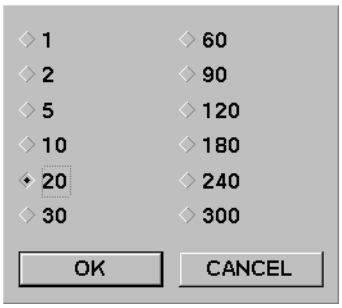
To set a range, click on the button to the right of the displayed value.

The code numbers of each available range are listed in Appendix B of the manual for each instrument. Select the desired code and click **OK**.



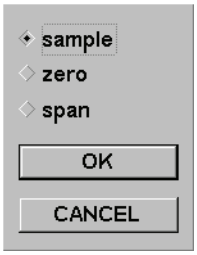
Averaging Time

To set the averaging time, click on the button to the right of the displayed value. The averaging time box is displayed. Select the averaging time and click **OK**.



Gas Mode

To set the gas mode, click on the button to the right of the gas mode. For example, select sample and click **OK**.



Mode

To set the control mode, click on the button to the right of the displayed mode. Select the new mode and click **OK**.

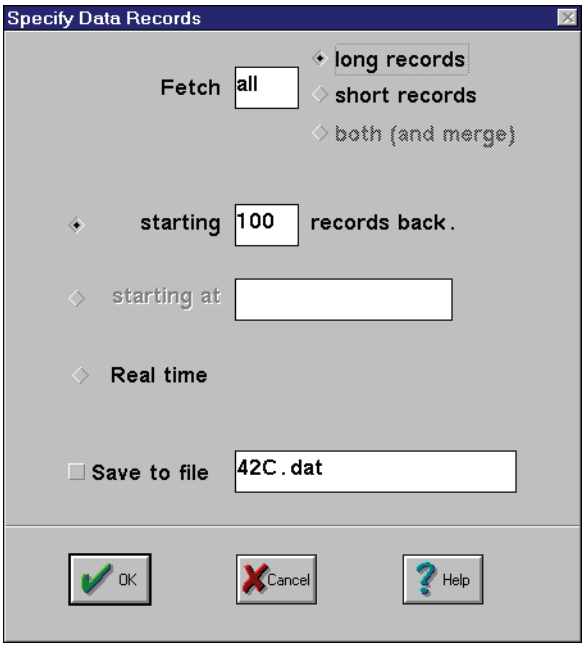
If the instrument is in local mode, no parameters can be changed remotely, except for the control mode. To set any other parameters when in local control mode, first change to remote mode.

Graphing Mode

To graph the contents of an instrument's internal data storage, first be sure the instrument window is set to Full (select Instrument > Size > **Full**).

Next, click on the **Term mode** of the Term/Graph toggle button. An empty graph is displayed.

To download records for graphing, select Instrument > **Load Records**.

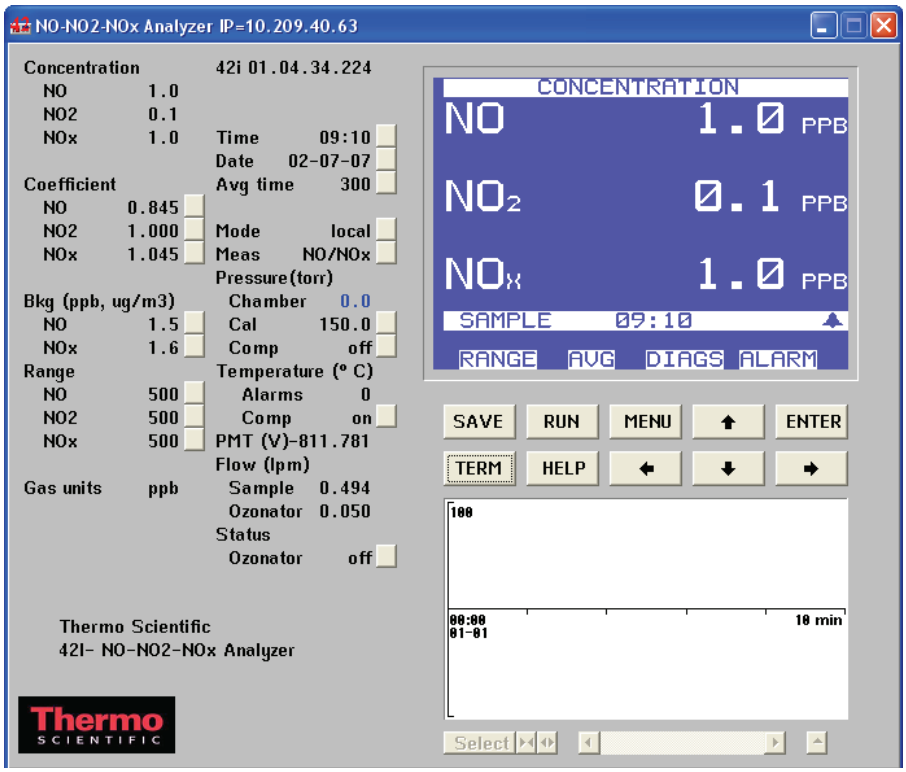


Select the type of records you wish to download, long records or short records. Either short or long records may be selected.

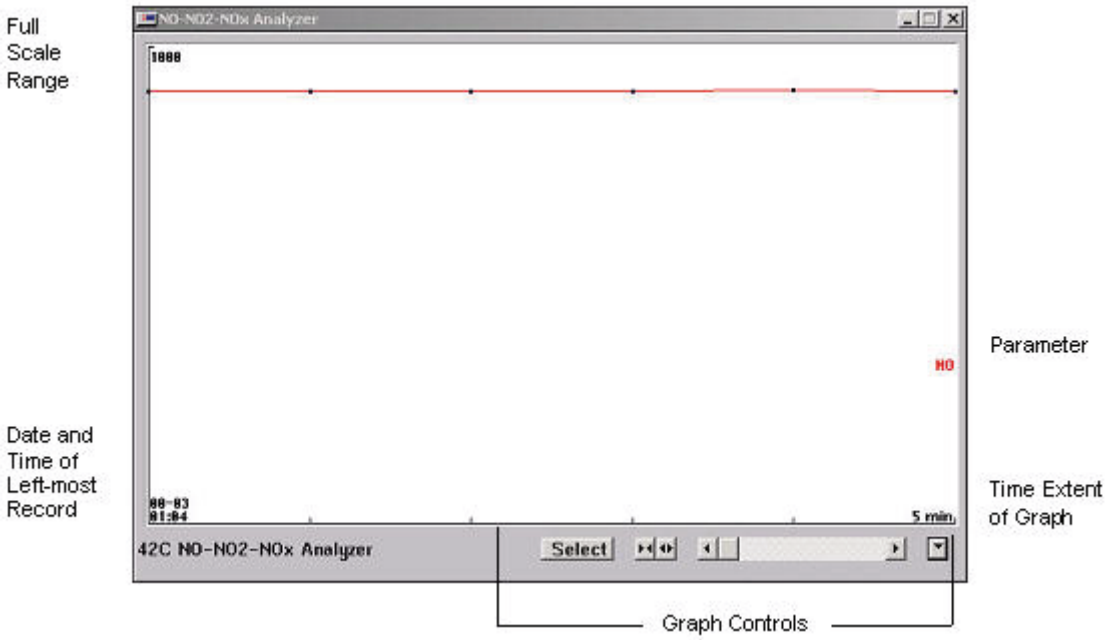
In the Fetch text box, enter the number of records you wish to retrieve. In older C Series instrument versions the maximum number of long records is 1,792 and the maximum number of short records is 4,096. In newer firmware versions, the number of records that can be downloaded is dependent upon the model of the instrument.

In the Starting Records Back text box, enter how many records back you wish to go. The newer instruments also allow selection of records according to a starting time and date. Select Real Time to graph data points as they are output from the instrument. To store records in a file as they are being read from the instrument, click on Save to File. You may enter any valid filename for the ASCII file.

Downloading may take several minutes depending on the number of records being downloaded, the baud rate, and the number of instruments connected to the computer. Progress is shown in a gauge shown in the lower right. To abort a download, press **Escape**. As records are read, they are displayed on the graph.



To maximize the graph click on ▲ in the lower right corner. The maximized graph is displayed. The button changes to a ▼. To switch back, click it again.



Graph Controls

The following buttons are used to control the graph:

Use this button to select which items to graph. Up to sixteen graphs can be shown at once.

Use these buttons to shrink or stretch the horizontal scale, increasing or decreasing, respectively, the number of records displayed per screen. The number of records displayed depends upon the time setting of the horizontal scale. Horizontal scales of 5 to 1,000,000 minutes are available. For example, if records are stored every 5 minutes and the horizontal scale is at 100 minutes, then 20 records are displayed per screen.

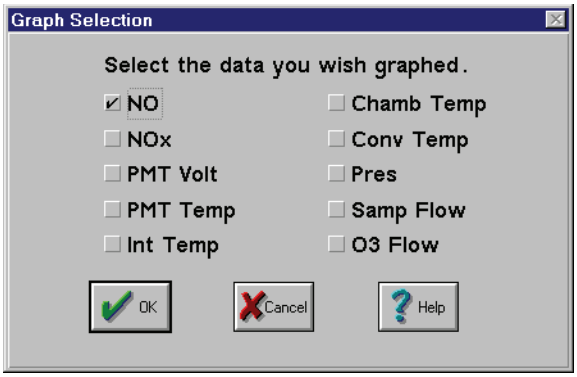
Moves the graph(s) left and right.

Maximizes the graph (shown only when the graph is minimized).

Minimizes the graph (shown only when the graph is maximized).

Graphing Multiple Parameters

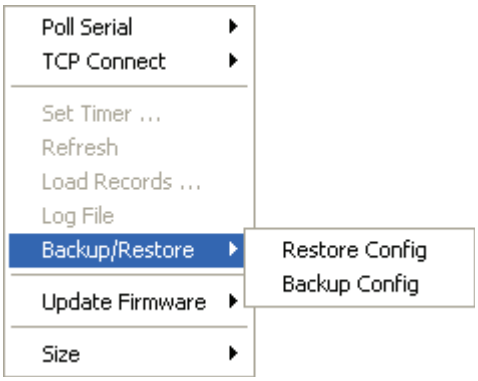
*i*Port can graph up to sixteen parameters at one time. The exact number available depends on the instrument. Click Select to choose the diagnostic items to be graphed.



Backup/Restore

The Backup/Restore menu allows configuration and calibration information to be saved to a file on the PC for archival purposes and for restoration to the instrument when necessary.

Note This information is specific to a particular instrument and should not be used to restore to any other instrument. ▲



Backup

Use the following procedure to backup configuration and calibration information to a PC via *i*Port.

1. Open a window to the instrument and select it.

2. From the Instrument menu, choose Backup/Restore > **Backup Config**.

   *i*Port will show an open file dialog.

3. Chose an existing destination file or create a new one, and click **Open**.

   *i*Port will read the data from the instrument and save the data to the file on the PC.

Restore

Use the following procedure to restore the previously created backup file.

1. Open a window to the instrument and select it.

2. From the Instrument menu, choose Backup/Restore > **Restore Config**.

   An open file dialog appears and displays files with the TBF extension (this is the default extension for backup files).

3. Click **Open**.

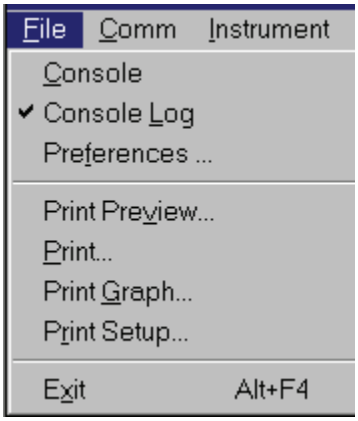
   The instrument changes to the Restore screen similarly to when the firmware is upgraded. Do not use the system until the update completes and the instrument re-boots.

Chapter 5 Menu System

There are two ways to access pull-down menus: by clicking on the menu with the mouse, or by pressing the correct Alt + key sequence. A menu item remains down until a command is selected. To escape the menu without making a selection, click an area outside the menu or press Esc. Menu items are grayed out (disabled) when they cannot be used due to system settings or program state. For example, if a printer is not installed on the system, the File > Print and Print Preview selections are disabled.

File Menu

The File menu contains the following items:



Console

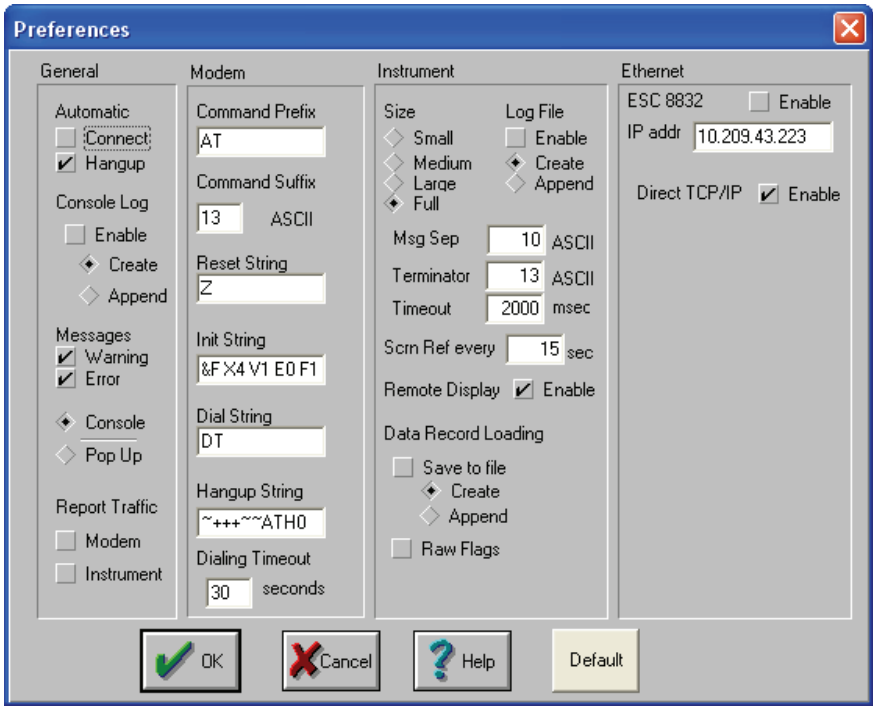
This command opens the console. The console is a window that displays status and error messages. If the console is already open, invoking this command prompts you to close the current console and reopen a new console. If the console window has been closed, error messages are displayed in pop-up message boxes.

Console Log

Console log opens a log file for the console. All messages displayed in the console are stored in a log file named “tei.log” in the tei.exe home directory. Invoke this command again to close the log file. A checkmark by the menu item indicates that the log file is currently open.

Preferences

Selecting Preferences invokes the Preferences dialog box.



The Preferences dialog box lets you customize *i*Port. The preferences are divided into three blocks: General, Modem, and Instrument. The Default button restores the preferences to factory default values.

The General block contains the following:

Automatic. You can have *i*Port automatically Connect (dial the modem and poll for instruments) on program startup and automatically Hangup the modem upon program exit by checking the appropriate boxes.

Console Log. You can Enable the console log function. If you do, you can choose to have a new console log created each time the program is started, or an existing log append each time the program is started.

Messages. You can have *i*Port display warnings and/or errors. In addition, you can select whether the messages are displayed in the console or in pop-up boxes.

Report Traffic. You can choose to display the commands sent to the modem and the commands sent to the instrument (traffic). If console message reporting is checked, then this information is sent to the console.

The Modem block contains standard Hayes compatible modem commands. In most cases, there is no need to change these commands. For more information about modem commands, see your modem user guide.

Command Prefix. The Command Prefix begins each command sent to the modem. AT tells the modem that modem commands follow. This prefix is attached to all of the commands sent to the modem, including the ones below.

Command Suffix. The Command Suffix determines how modem commands are terminated. ASCII 13 is a carriage return.

Reset String. A code that tells the modem to reset. Z tells the modem to reset.

Init String. The Initialization String configures the modem. The following modem commands are set as defaults:

&F	Sets the modem to its factory default settings.
X4	Tells the modem to use an extended set of result messages. The number after the x specifies which set of result messages the modem sends to *i*Port.
V1	Tells the modem to use words, rather than numbers for the result messages.
E0	Tells the modem to echo what is sent.
F1	Sets online local echo of transmitted data off.
L2	Controls the speaker volume of internal modems. L2 sets the volume to medium.
S0=0	Tells the modem to not answer incoming calls.
&C1	Controls the Carrier Detect (CD, a serial port status line) signal. &C1 sets normal CD operations.
&D2	Tells the modem to use normal Data Terminal Ready (DTR, another serial port status line) operations.

Dial String. The Dial String tells the modem how to dial. DT tells the modem to dial using touch tones.

Hangup String. The Hangup String tells the modem how to hangup. The following modem commands are set as defaults:

+++	Tells the modem to switch into the command mode. In the command mode, data sent to the modem is not transmitted, but rather is used to control the modem.
~~	Delays the modem for 1 second.
AT	Tells the modem that modem commands follow.
H0	Tells the modem to hangup the line.

Dialing Timeout. The length of time that *i*Port waits after dialing for a response before it hangs up. For long-distance calls, you may have to increase the wait time.

The Instrument block lets you set the instrument Size, Log File, Message Termination, Screen Refresh, and Data Record Loading options for instrument windows.

Size. Sets the starting size of the instrument windows. Use Small, Medium, and Large to display the instrument window at different sizes. Full includes complete diagnostic information, such as temperatures, pressures, and calibration coefficients. In addition, records from the internal datalogger can be downloaded and graphed. Instrument windows can be recognized after correction by using the Select > Range option.

Log File. All messages sent to and received from the instrument can be stored in a log file. The instrument log file is named according to the Instrument model; for example, a 43C SO_2 instrument would have a log file named "43.log." You can choose to have the instrument log disabled, have a new instrument log created each time the program is started, or have the existing log file appended, that is, continue to add new messages to the end of a log file that had been created previously.

Msg Sep, Terminator, Timeout. These items control how the commands are sent to the instrument and replies are read. Msg Sep (ASCII 10) inserts a line feed between commands. Terminator (ASCII 13) terminates each command with a carriage return. Timeout (500 msec) is the amount of time *i*Port waits for the instrument to respond to a command.

Scrn Ref every. Data displayed on the instrument window such as concentrations, temperature readings, pressure readings, and so on, must be regularly updated or refreshed. You can choose how often the instrument window is refreshed. If only one instrument is connected, then a short refresh interval is useful. If several instruments are connected, then choosing a slower refresh interval may speed up other functions, such as graphing. System response decreases when many instruments are connected with short refresh intervals. *i*Series instruments take much longer to transfer screen data than C Series instruments so the polling interval must be increased.

Remote Display. *i*Series instruments communicating over the serial port can cause *i*Port to perform slowly at slow baud rates. If this is a problem, the remote display can be disabled by unchecking the Remote Display Enable box.

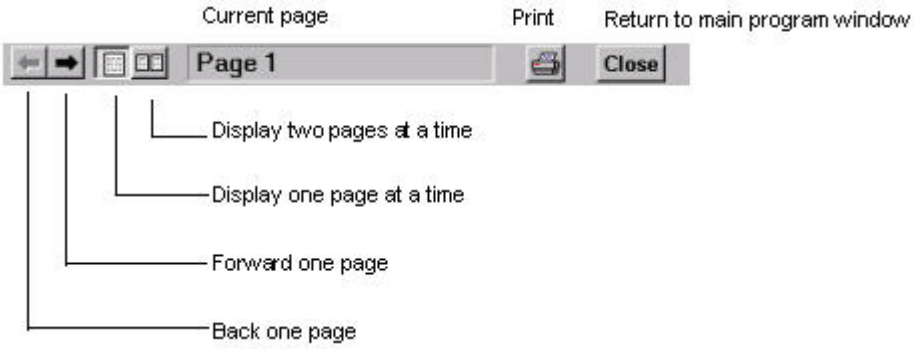
Data Record Loading. You can choose to have instrument internal records downloaded to *i*Port saved by appending to an existing file or by creating a new file. The Raw Flags setting will store the hex representation of all the instrument flags if checked or the decoded high/low alarms if unchecked.

ESC 8832. Check this box to connect to an instrument via the ESC 8832 datalogger over Ethernet. Enter the IP address of the datalogger in the IP Address field. This selection disables communication over the serial port.

TCP/IP Enable. Check this box to enable use TCP/IP to connect to the instruments. If this is set, the serial port will not be used. This selection disables communication over the serial port.

Print Preview

Displays a preview of the downloaded data before printing. The menu bar controls are:



Print

If you have a printer installed, you can print the data that has been downloaded. Set the standard Windows print options and choose OK.

Print Graph

Prints a graph of the contents of downloaded records.

Print Setup

Lets you choose a printer other than the default printer, specify the paper orientation, and select the paper size.

Exit

Terminates the program and returns you to Windows. If the modem is still connected to a remote location, *i*Port asks you whether or not you wish to disconnect before exiting.

Comm Menu

The Comm menu contains the following items:

Connect

This dialog box is used to connect to a remote location over serial and create and edit the entries in the location directory.

Location. The location directory stores the communications settings of the remote instruments that you communicate with. Each entry in the location directory consists of the name of the location, com port, baud rate, telephone number (if required), and a list of instrument IDs. Use the New button to create a new entry, the Edit button to edit an existing entry, and the Delete button to delete an entry from the location directory.

Communications Settings. If you are using a modem, select the com port that the modem is using. If you are communicating directly, select the com port that the instrument is connected to. Set the baud rate of the serial port. Be sure the baud rate setting matches the baud rate of the instrument. The Handshaking, Data Word Length, Stop Bits, and Parity are set to match that of the instruments as designed and cannot be changed.

Enable Modem. Check this box when communicating via modem. Uncheck it when communicating directly.

Phone Number. Enter the phone number of the remote modem. When connecting directly, this field is ignored and can be left blank.

Autodial. Check this box if you want *i*Port to automatically dial the phone number when connecting to this location.

Polling Config. Enter the instrument IDs of the remote instruments. Each number must be separated by a space. The instrument ID for each instrument is set in the instrument's Instrument Controls menu. Be sure that every instrument ID specified in the Polling Configuration box matches the instrument ID in the Instrument Controls menu.

Autopoll. Check this box if you want *i*Port to automatically poll for instruments after a connection has been made.

Dial

*i*Port prompts you to enter the phone number to call.

Redial

This command redials the last phone number entered in the Dial dialog box.

Hangup

This command hangs up the modem.

Utilities

The Utilities menu contains the following items which can be useful when internally setting up your system, or when changing configurations:

Status. This command displays a status string in the console that identifies the state (on or off) of the CD (Carrier Detect) line, RTS (Request to Send) line, CTS (Clear to Send) line, DTR (Data Terminal Ready) line, and DSR (Data Set Ready) line. In addition, it reports whether any errors were detected.

Clear TX Buffer. This command clears the transmit buffer. Commands waiting to be sent to the instrument are discarded.

Clear RX Buffer. This command clears the receive buffer. Messages waiting to be processed by *i*Port are discarded.

Toggle RTS. This command toggles the RTS line and displays the new value in the console.

Toggle DTR. This command toggles the DTR line and displays the new value in the console.

Break. This sends a break, forcing a low level interruption of communications.

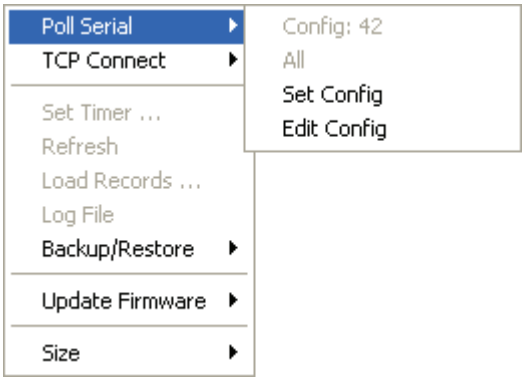
Reset. This command sends the reset string to the modem.

Instrument Menu

The Instrument menu contains the following items:

Poll Serial

The Poll menu contains the following items:

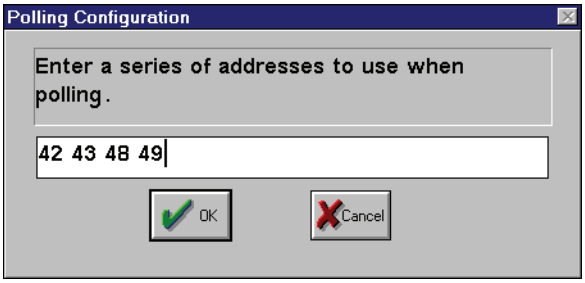


Config. Polls (searches) the com port for the Instrument ID numbers defined using Edit Config. An icon for each instrument detected is displayed in the lower-left corner of the screen. If you do not have the automatic poll function enabled (preferences), invoke this command each time you start *i*Port.

All. Polls the comm port for all possible instrument IDs (0 to 99). This command is useful if the instrument ID of a remote instrument is unknown.

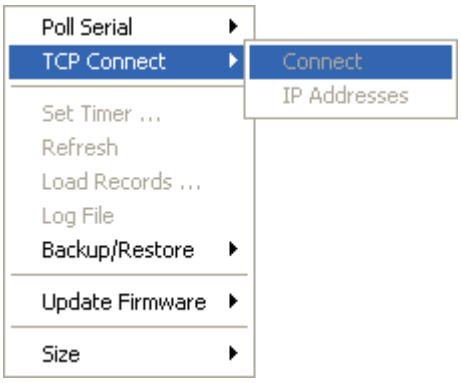
Set Config. Used after the All command to set the Config with the instrument IDs detected by the All command.

Edit Config. Sets the local list of instrument IDs of the remote instruments. Each number must be separated by a space. The instrument IDs for each instrument is set in the instrument's Instrument Controls menu. Be sure that the instrument ID you specify in the Polling Configuration dialog box matches the instrument ID set in the Instrument Controls menu.



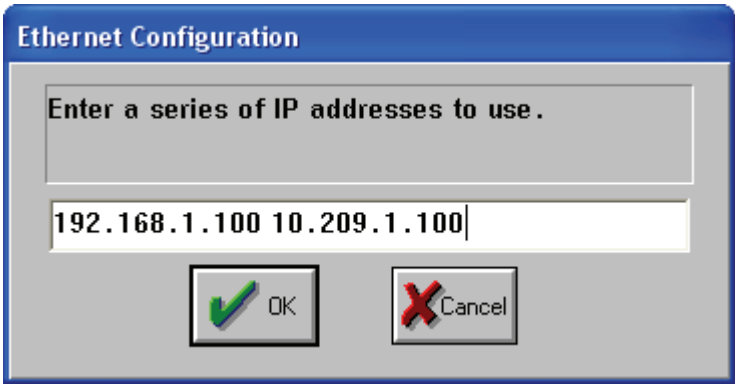
TCP/IP Connect

The TCP Connect menu contains the following items:



Connect. *i*Port will attempt to connect to instruments at the IP addresses in the address list. A dialog box for each instrument successfully connected to is displayed.

Address. Enter the addresses to attempt to connect to in the popup box. The addresses are in the form xxx.xxx.xxx.xxx separated by spaces. Up to 25 addresses can be entered.

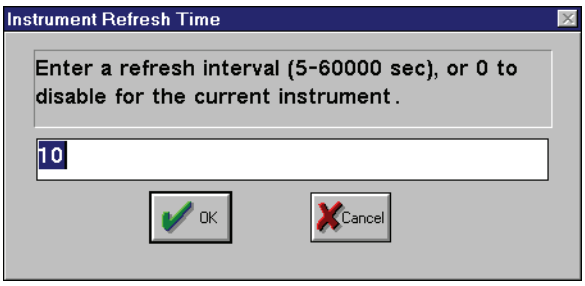


Refresh Interval. Each time an instrument window is created, the refresh interval setting found under the Preferences dialog is used to set the initial value for each window. In circumstances where specific instrument windows should be updated more or less frequently than the default, the Instrument > Set Timer command can be used.

If using a serial port baud rate less than 19200, the remote display can take more than 10 seconds per instrument to update. Refer to Table 5-1.

Table 5-1. Typical Update Speeds

Baud Rate	Update Time per Instrument
19200	10 seconds
9600	15 seconds
4800-1200	Not Recommended. Disable remote screen in Preferences screen.



Refresh

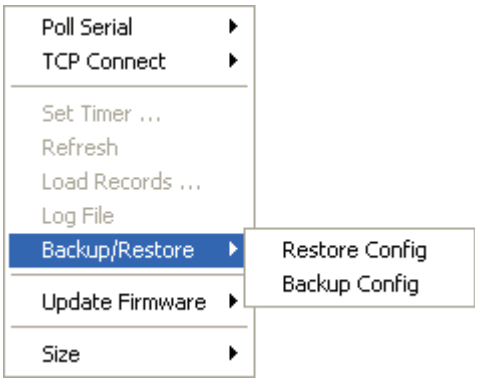
This command immediately updates the readings displayed in an instrument window. This is useful if the update interval is set to a high number or has been turned off.

Load Records

This dialog box enables you to download long records or short records from an instrument's internal datalogger. In addition, you can save the records to file by selecting Save to File. You can enter a new filename or use the default filename.

Backup/Restore

The Backup/Restore menu contains the following items:



The Backup menu allows configuration and calibration information to be saved to a file on the PC for archival purposes and for restoration to the instrument when necessary.

The instrument stores configuration and calibration information in the flash memory on the CPU card. Prior to changing the CPU board or upgrading firmware, this information should be backed up to a PC using *i*Port. This information is restored to the instrument after replacing the CPU board or upgrading firmware.

Note This information is specific to a particular instrument and should not be restored to any other instrument. ▲

Log File

All messages sent to and received from an instrument can be stored in log file. The instrument log file is named according to the instrument model and ID. For example, the filename for a Model 42C with an ID of 10 would be "42C/10.dat". You can choose to have the instrument log disabled, have a new instrument log created each time the program is started, or have the existing log file appended, that is, continue to add new messages to a log file that was created previously. Use this menu command to temporarily change the setting selected in the Preferences menu for an individual instrument.

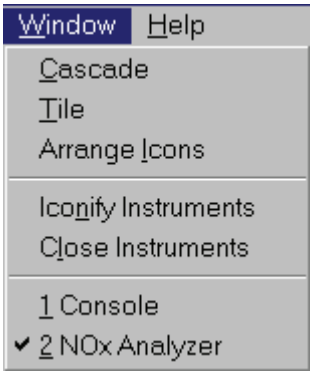
Size

You can set the size of the currently selected instrument window to Small, Medium, Large, and Full. Small displays the instrument window in the smallest possible size. Medium displays the instrument window in an

intermediate size. Large displays the instrument window in the largest size using a large font. Full displays the instrument window with complete diagnostic information.

Window Menu

The Window menu contains the following items:



Cascade

The Cascade command causes instrument windows to overlap so that each title bar is visible. This way, all open instrument windows can be displayed at the same time on the screen.

Tile

The Tile command arranges open instrument windows next to each other. If there are several instruments connected, this works best with small instrument windows.

Arrange Icons

The Arrange Icons command arranges instrument icons along the lower edge of the screen.

Iconify Instruments

The Iconify Instruments command reduces each open instrument window to an icon along the bottom edge of the screen.

Close Instruments

The Close Instruments command closes all open instrument windows severing communications with all instruments. If using serial holding open the line. To reopen instrument windows, select Instrument > Poll > Config For TCP/IP use tcp/ip / connect.

Firmware Update

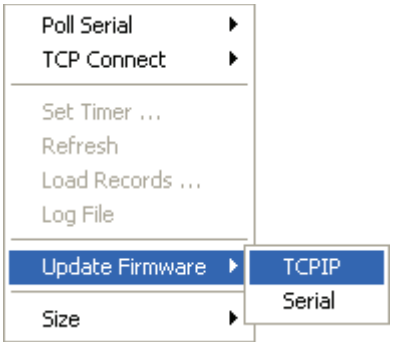
The firmware can be updated by the user in the field using *i*Port over the Ethernet or via the serial port. This includes both the main processor firmware and the firmware in all low-level processors.

Obtain the desired firmware file from Thermo Scientific and note what directory it is in and what it is named.

TCP/IP Update

Use the following procedure to update the firmware by TCP/IP.

1. Select Instrument > Update Firmware > **TCP/IP**.



2. Enter the TCP/IP address for the instrument you want to update. See the instrument manual for details on configuring the address, if necessary.

3. Select the firmware update file using the file select window to where you noted the file was placed.

   A message box describing the version of software and instrument type will be displayed. If this is OK, select **OK** and the firmware will start to be updated.

   The instrument will show a message that the firmware is being updated and when it is done, it will automatically reset and run the new firmware.

Serial Update

Use the following procedure to update the firmware by Serial port.

1. Select Instrument > Update Firmware > **Serial**.

2. Enter the instrument ID for the instrument you want to update. See the instrument manual for details on configuring the ID, if necessary.

3. Select the firmware update file using the file select window to where you noted the file was placed.

   A message box describing the version of software and instrument type will be displayed. If this is OK, select **OK** and the firmware will start to be updated.

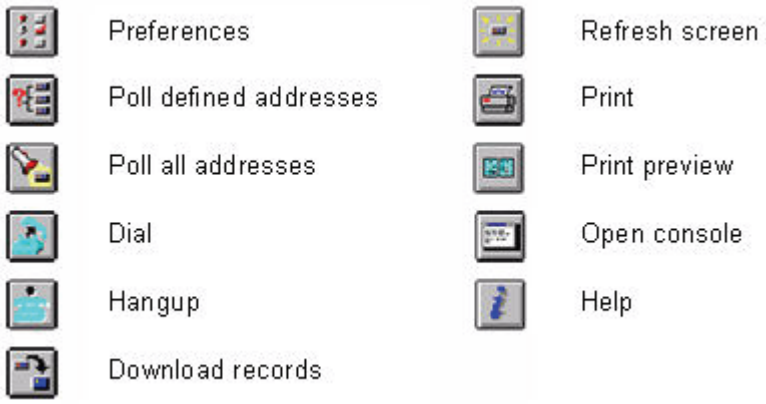
   The instrument will show a message that the firmware is being updated and when it is done, it will automatically reset and run the new firmware.

Help Menu

The online Help system provides access to information about *i*Port and contains all of the information found in this manual.

Button Bar

The button bar provides shortcuts to the most often used commands.



Chapter 6 Dynamic Data Exchange

Dynamic Data Exchange (DDE) provides an alternate method to transfer data from *i*Port to spreadsheet or database applications that support DDE conversations. These applications can be used to structure and manipulate the data.

This following description uses Microsoft Excel™, and presumes some experience with this program and a general understanding of DDE.

Note In Excel, use the **Ctrl-Shift-Enter** key combination to enter a formula into an array of cells. ▲

Before starting Excel, be sure *i*Port is running, and the appropriate data (long or short records) has been loaded from the instrument of interest.

Although in the example commands are displayed in a combination of upper and lower case letters, DDE is not case-sensitive.

Instruments Are DDE Topics

To display the available instrument(s):

- Select an entire row of cells (click on the row number)
- Enter =TEI|System!Topics into the a cell array in the first row.

In addition to the "System" topic, each instrument appears as a Topic. In the example shown in Figure 6-1, cell B-1 indicates that a 43C High Level instrument is connected. If more than one instrument were connected, these would be displayed in subsequent cells in row 1. Note that cells to the right of the last instrument have the entry "#N/A" because Excel does not leave blank cells in an array.

A20 = {=TEI|'43C-HL'!erec}

	A	B	C	D	E	F	G	H	I	J	K	L
1	System	43C-HL	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2												
3	TopicItemL	ERecFields	ERec	SRecFields	SRec	LRecFields	LRec	#N/A	#N/A	#N/A	#N/A	#N/A
4												
5	Time	Date	Alarms	SO2	PMT Volt	Flash Volt	Lamp Inter	Int Temp	Chamb Te	Perm Gas	Flow	Pres
6	10:27	05-18	--------	-3046	-555	506	7434	31.3	43.9	0	0.881	746
7												
8	10:27	05-18	--------	-3046	-555	506	7434	31.3	43.9	0	0.881	746
9	10:28	05-18	--------	-3050	-555	504	7430	31.4	44	0	0.881	746
10	10:29	05-18	--------	-3070	-555	507	7582	31.4	43.9	0	0.88	745.9
11	10:30	05-18	--------	-3043	-555	504	7390	31.4	43.9	0	0.88	746
12	10:31	05-18	--------	-3046	-555	505	7517	31.5	43.9	0	0.88	746
13	10:32	05-18	--------	-3023	-555	506	7163	31.5	44	0	0.88	746
14	10:33	05-18	--------	-3020	-555	503	7742	31.6	43.9	0	0.88	746
15	10:34	05-18	--------	-3042	-555	506	7368	31.6	44	0	0.88	746
16	10:35	05-18	--------	-3036	-555	504	7392	31.6	44	0	0.88	746
17	10:36	05-18	--------	-3055	-555	505	7449	31.6	44	0	0.88	746
18												
19	SO2 conc	SO2 coef	Backgnd	Range	Mode	Gas units	Gas mode	Avg time	Flow (lpm)	Flash int	Flash statu	Flash volt
20	-3.01	1.584	4.09	50	remote	ppm	sample	30	0.875	7063	on	505

Figure 6-1. *i*Port Data in an Excel Spreadsheet Format

Data Are Items

To display the items that an instrument supports:

- Select an entire row of cells (click on the row number)
- Enter =**TEI|'43C-HL'!TopicItemList** in a cell array.

Note that the instrument name must be enclosed in single quotes. The supported items are shown in row 3 of Figure 6-1.

To display lrec and srec fields:

- Select an entire row of cells (click on the row number)
- Enter **=TEI|'43C-HL'!LrecFields** or **=TEI|'43C-HL'!SrecFields**

Note that the instrument name must be enclosed in single quotes. The supported items are shown in row 5 of Figure 6-1.

To display lrec and srec data:

- Select an entire row of cells (click on the row number)
- Enter **=TEI|'43C-HL'!Lrec** or **=TEI|'43C-HL'!Srec**

Note that the instrument name must be enclosed in single quotes. The data is shown in row 6 of Figure 6-1.

To display multiple short or long records:

- Select a number of spreadsheet rows equal to the number of records to be displayed.
- Enter **=TEI|'43C-HL'!'Lrec(0,10)'** or **=TEI|'43C-HL'!'Srec(0,10)'**

Note that the lrec command, as well as the instrument name, is enclosed in quotes. In the example shown in Figure 6-1, ten records were requested. This was done by selecting ten rows (rows 8 through 17). These records correspond the first ten long records in the *i*Port storage, and do not necessarily coincide with the first ten records in the instrument.

ERECS Are Diagnostic Information

Erec fields and erecs are similar in most ways to the long and short record data items just described. The data corresponds to the diagnostic information displayed on the left portion of the instrument window. The difference is that there is only one erec record. Excel updates the information in the spreadsheet, at intervals of about 10 seconds, for as long as *i*Port is running and communicating with the instrument.

To display erec fields:

- Select an entire row of cells (click on the row number)
- Enter **=TEI|'43C-HL'!ErecFields**

Note that the instrument name must be enclosed in single quotes. The supported items are shown in row 19 of Figure 6-1.

To display erec data:

- Select an entire row of cells (click on the row number)
- Enter **=TEI|'43C-HL'!Erec**

Note that the instrument name must be enclosed in single quotes. The data is shown in row 20 of Figure 6-1.

Chapter 7 Troubleshooting

This chapter provides information designed to help isolate and identify *i*Port problems.

The Technical Support Department at Thermo Scientific can also be consulted in the event of problems. See “Service Locations” at the end of this chapter for contact information.

Establishing a Direct Connection

Problem: *i*Port does not communicate via direct cable connection with an instrument.

For direct communication, you must use a null-modem cable.

Verify that you have correctly specified the computer's communication port (see Comm > Connect). This port must be free, that is, it is not being used by a mouse or modem.

Check that the instrument address in the program and in the instrument match. Use Instrument > Poll > Edit to change the program address; use the instrument's front panel buttons to set the address via Instrument Controls menu.

Check that the Modem is disabled (see Comm > Connect). To disable the Modem, unchecked the box.

Check that the baud rate defined in the Comm > Connect dialog box matches the instrument's baud rate (Instrument Controls menu).

Establishing a Modem Connection

Problem: *i*Port is not dialing the modem.

Verify that you have correctly specified the communications port (see Comm > Connect) that the modem is connected to.

If the modem is external, check that it is on and that the cable connected to the modem is working.

Check that the modem is properly connected to the telephone line and that the line is ready to dial.

Check that the modem is enabled (see Comm > Connect). The Modem Enable box must have a check.

Problem: The modem dials the phone number but a connection is not made.

Check that the baud rate of the local modem matches the baud rate of the remote modem.

Verify that the remote modem is configured to answer incoming calls. For more information about programming modems, see the “Installation” chapter.

Check that the remote modem is on.

If the call is long-distance, you may need to increase the Dial Timeout (see File > Preferences). Long-distance calls take longer to connect than do local ones.

The line may be busy.

Problem: A connection is made, but the instrument does not communicate.

Check that the Instrument ID number defined in Instrument > Poll matches the Instrument ID number defined in the instrument's Instrument Controls menu. Use Poll > All if you cannot verify the instrument ID setting.

Check that the baud rate of the remote instrument(s) matches the baud rate of the remote modem. With a modem connection, *i*Port, the remote modem, and the remote instrument(s) must all have the same baud rate.

Establishing a TCP/IP Connection

Problem: *i*Port does not communicate via TCP/IP connection with an instrument.

Be sure the cable is the correct type for the TCP connection. A straight thru cable for a router and a crossover cable for a direct computer connection.

Be sure the IP address of the instrument is set correctly, as well as the gateway and mask.

If using DHCP, be sure an IP address was gotten by looking at the instrument communications TCP menu to verify the license.

Try to ping the instrument address from a computer on the same local node.

Service Locations

For additional assistance, service is available from exclusive distributors worldwide. Contact one of the phone numbers below for product support and technical information or visit us on the web at www.thermo.com/aqi.

1-866-282-0430 Toll Free
1-508-520-0430 International