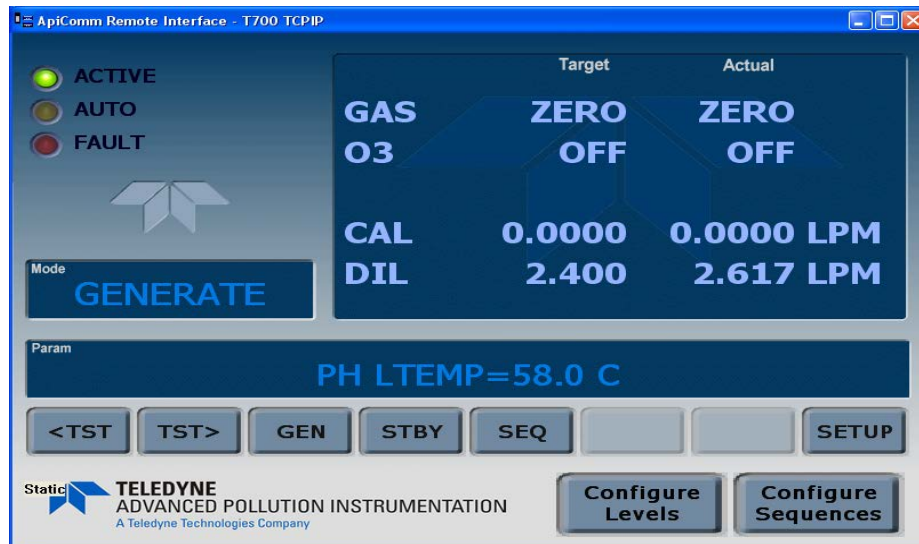




Software Instruction Manual

APIcom and Data Acquisition Instrument Control Software

Version 5.07



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1. INTRODUCTION

This manual describes APIcom (versions 5.05-5.07), a graphical interface for remote operation of the standard suite of ambient and stack-gas Teledyne API (TAPI) instruments. It also includes instructions for configuring and using the internal Data Acquisition System (DAS).

The APIcom user interface is simple and intuitive. The figure below shows the primary APIcom interface to a remote instrument. It features a graphical display that emulates the T-Series instrument's front panel with a touch button, menu-driven interface. The same interface operates E-Series instruments as well. (In E-Series local front panels, the hard buttons are situated below their corresponding menu items displayed on the screen. In contrast, the T-Series soft buttons are labeled with the menu items directly).

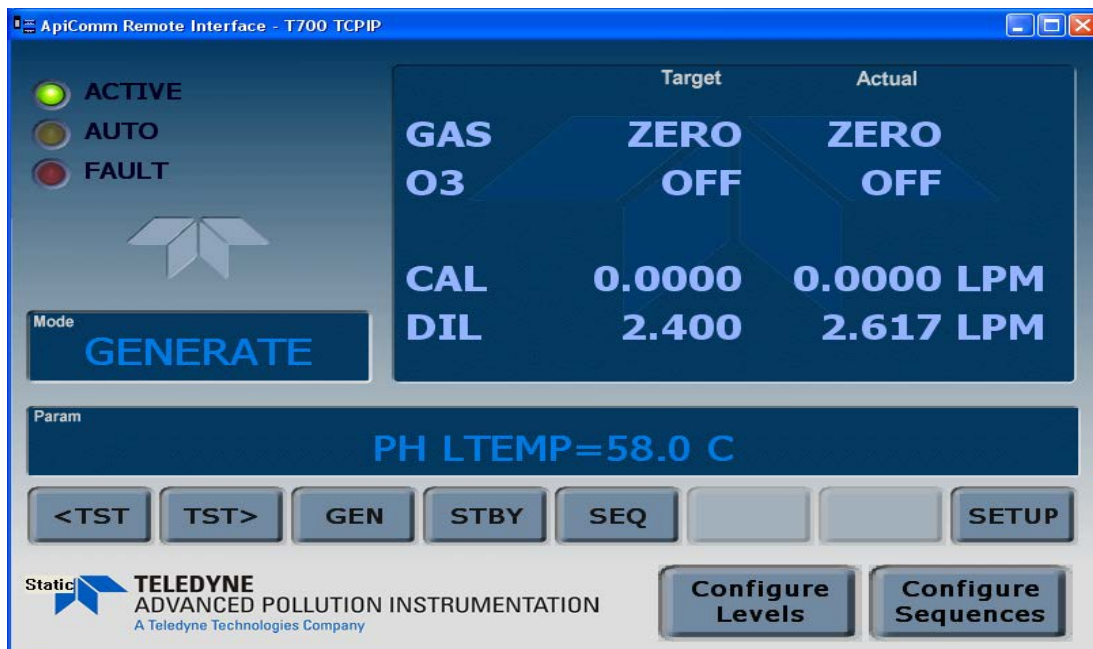


Figure 1-1: Remote Operation Interface Example

In addition to the basic front-panel functionality, APIcom includes advanced data acquisition system (DAS) and sequence configuration functions.

1.1. Features

- ❑ APIcom provides a simple means to connect to multiple local or remote TAPI instruments, view their status, and change their settings.
- ❑ Use APIcom to connect to multiple instruments at the same or different sites simultaneously, optionally using TAPI's multidrop protocol or a code-operated RS-232 switch.
- ❑ User interface is identical to that built into TAPI's instruments. Anyone who is familiar with the user interface built into TAPI's instruments can use APIcom immediately.
- ❑ Full access to all the capabilities built into the instrument.
- ❑ Works with most of TAPI's standard, microprocessor-based instruments.

- ❑ Download the DAS data that are stored in the instrument, view it on screen, graphically plot it, and save it to a file.
- ❑ Access the DAS configuration from an instrument, modify it, save it on the local computer, and then send the modified configuration to the instrument.
- ❑ Download the sequence configuration from an Model 700 or T700 calibrator, modify it, save it on the local computer, and then send the modified configuration to the instrument (*Model 700 calibrators with firmware revision D.3 or higher and T700 calibrators*).
- ❑ APIcom can edit the DAS or sequence configuration *off-line*, saving money in long distance phone charges.
- ❑ APIcom uses Windows modem support for maximum compatibility with a customer's equipment, and also supports older modems directly even if Windows does not support them.
- ❑ Allows online editing of Dasibi-like level tables with Models T700, T703, T703U, 700, 700E, 403, T703, T703U, and 703E configured for LEADS operation.

1.2. Features New with this Version

- ❑ An enhanced user interface that presents sites and instruments in a tree-like format in the main program window. A richer and more intuitive set of controls for editing site and instrument properties.
- ❑ The **Instrument Information** dialog (see section 7.1) has been enhanced to show the instrument's software part number, whether the instrument's DAS has the new SDEV mode, and whether the target instrument supports the "Download Cancel" feature.
- ❑ Operation with serial data ports from COM1 – COM19.
- ❑ Support for sequences in the Models 403 and 703E, and advanced features in the Model 700E, T700, T703, and T703U.
- ❑ Support for Dasibi-like levels and level tables for use with the IPS MeteoStar data system.
- ❑ Online help is now a Portable Document File (.pdf) that can also be used for printing the manual.

1.3. System Requirements

Operating System:

APIcom runs only on 32-bit Windows operating systems (Windows 95/98/ME/NT/2000/XP). Do not attempt to run the program on Windows 3.1.

RAM and Disk Space:

APIcom requires 4–20 MB of RAM during normal operation, 5 MB of disk space for installation, and more disk space for storing DAS data and scripts.

NOTE: Some versions of Windows 95 and NT4 may not have the correct common user interface dynamic link libraries that APIcom requires in order to display checkboxes in the DAS configuration tree. These checkboxes make it convenient to select DAS channels and parameters to download DAS data from. See Section 4.6 for a work-around solution.

The problem can be corrected by installing Microsoft Internet Explorer 5.0 or higher. Please point your internet browser to this location to see the latest updates:

<http://www.windowsupdate.microsoft.com/>

1.4. Typographic Conventions Used in this Manual

All of the examples used in this manual refer to specific instruments and sites. Keep in mind that names of instruments and sites will be different from those of the user.

In this manual, names of push buttons on the actual instrument front panel are indicated using bold capital characters, for example, **SETUP**. Push button sequences are denoted by a series of button names, separated by dashes, such as **SETUP-MORE-COMM-BAUD**.

APIcom menus are depicted in bold, as in **File-New**. Buttons in dialog boxes and on the toolbar are shown as bitmap images, like this: .

Names of items such as files and setup variables are indicated using italicized capital characters, as in *RS232_MODE*.

1.5. Installing APIcom

If the installation file was downloaded, simply locate the file named Setup.exe or Setup.msi on the hard drive and double-click on it, then follow the instructions. If APIcom was received on CD, locate your CD drive in Explorer, locate and double-click the file named Setup.exe or Setup.msi, and follow the prompts.

The APIcom installer is a stand-alone, executable installation routine, which copies the following files to the hard drive into a user-selected directory/folder:

- **APIcom.exe** - the program
- **README.txt** - a readme file with late-breaking news and latest changes to the program. You will have a chance to read this file during installation.
- **APIcom.license.agreement.txt** - the software license agreement to which you have to agree upon installation of APIcom. You will have a chance to read this file during installation.
- **APIcom_User_Manual.pdf** - User manual in Acrobat PDF format for printing purposes and for online help. This file **MUST** be located in the same directory as APIcom.

For advanced users:

Upon installation, APIcom creates the following registry entries. These entries - including all previously stored program and window settings - are completely removed when uninstalling APIcom. Note that network configuration files (site, instrument and DAS settings) are not affected by uninstalling APIcom.

- HKEY_CURRENT_USER\Software\TeledyneAPI\APICOM
- Recent File List
- Settings

NOTE

If there already is a previous version of APIcom installed, the installation utility will prompt to remove the previous version.



CAUTION

Site and instrument definitions created with older versions of APIcom are stored in the network configuration files (.cfg). These files may not be compatible with the latest version of APIcom.



CAUTION

It is strongly recommended that you make a backup of all configuration and script files *before* installing or upgrading APIcom. We cannot take any responsibility for lost files, time or revenue due to lost or altered configuration settings and files.



The APIcom installer is virus-checked and safe to run. Never accept installation files from third parties (including your TAPI distributor or representative), always download your own copy and do not trust that executables sent to you from anybody outside of TAPI are safe to run. If in doubt, run a virus checker before and after running the installer file.

Uninstalling APIcom versions 3 and higher (using Control Panel/Add or Remove Programs) will delete all of the registry entries (program and DAS settings) and the entire folder with APIcom files. The installer will not delete the folder if files were added by the user (e.g., network configuration files, DAS scripts etc.). In this case, only the originally installed files will be removed. Likewise, if the program group folder is open in Explorer during the uninstallation, it will not be removed, only its shortcuts. Registry entries created by APIcom versions lower than 3 may not be removed properly upon installing version 3 and higher but this should not cause any problems.

2. CONFIGURATION

This section explains how to configure APIcom to connect to an instrument.

2.1. Main Application Window

The following figure shows the top-level window of APIcom. This window will always be open in addition to one window for each instrument front panel.

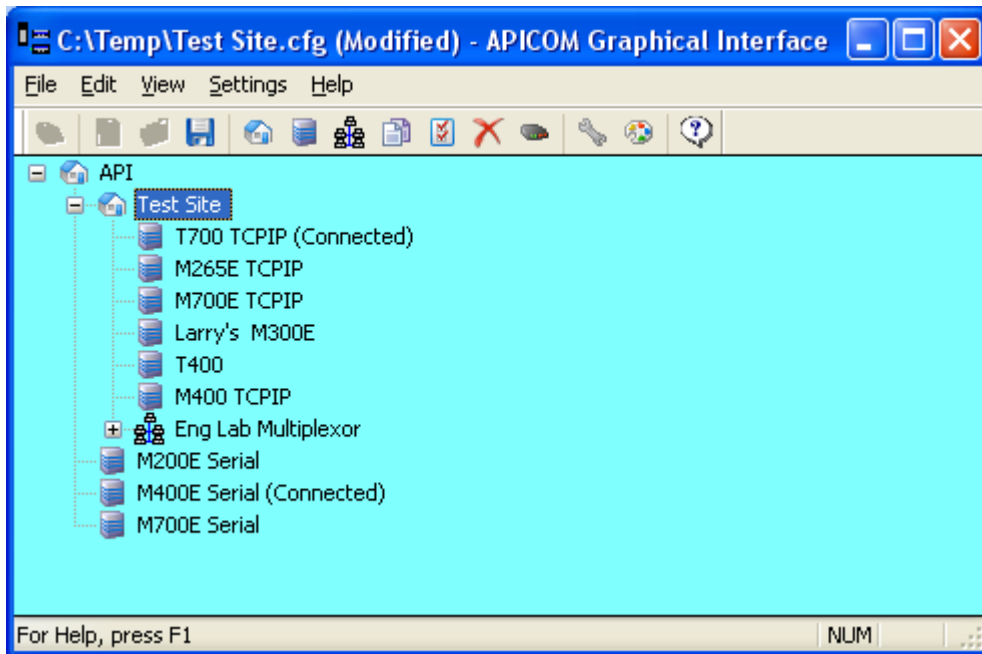















Figure 2-1: Main Application Window

All configuration tasks can be carried out in any of three ways: using the main window menu, using the context menus (right-click on sites or instruments in the main window), or with the toolbar buttons, which are summarized in the table below.

Table 2-1: Main Application Window Toolbar Buttons

| Button | Main Menu Equivalent | Description |
|---|----------------------|---|
|  | File-Connect | Connects to selected instrument |
|  | File-New | Creates a new, empty network configuration |
|  | File-Open | Opens an existing network configuration |
|  | File-Save | Saves current network configuration |
|  | Edit-New site | Creates a new site |
|  | Edit-New instrument | Creates a new instrument at the selected site |
|  | Edit-Duplicate | Creates a copy of the selected site or instrument |




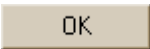
| Button | Main Menu Equivalent | Description |
|---|---------------------------|---|
|  | Edit-Properties | Edits properties of selected site or instrument |
|  | Edit-Delete | Deletes selected site or instrument |
|  | Edit-Modems | Edits list of non-Windows modems |
|  | Settings-Options | Changes program options |
|  | Settings-Background color | Selects main window background color |
|  | Help-About | Displays program information, revision number and copyright |

2.2. Quick Start (Direct Cable Connection)

This section explains how to get the software running as quickly as possible with a local instrument that is connected to a host computer via a direct serial cable such as RS-232 (either E-series or T-series) or USB (T-series only, if instrument purchased with USB option). This is useful for getting acquainted with the program and to test and setup instruments before deployment. For USB communication you will need to download the USB driver from the TAPI website (instructions included at Steps 7 and 8 of the following APIcom configuration guide.

Configure APIcom

When APIcom is run for the first time at least one site and one instrument need to be created.

| Step | Action | Comment |
|------|--|---|
| 1. | Select Edit-New site from the main menu, or right-click within the main window and select New site , or click on the  toolbar button to create a new site. | Create a site. |
| 2. | Specify the site's properties. | Either input a custom name, e.g., "Shelter1", or leave default name, "Local Site", as is. This is also where you will specify the computer 's COM port. |
| 3. | Click  to finish editing the site's properties and accept the changes. | |
| 4. | Select Edit-New instrument from the main menu, or right-click on the new site and select New instrument , or click on the  toolbar button to create a new instrument on the new site. | Create an instrument. |
| 5. | Specify the instrument's properties. | Either customize or leave default. |
| 6. | Click  to finish the instrument's properties and accept the changes. | |

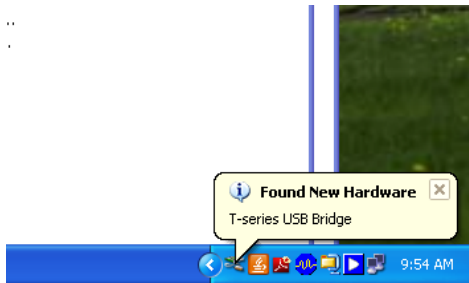
| Step | Action | Comment |
|------|-----------------|--|
| 7. | Attach a cable. | Refer to one of the following communication modes (RS-232, USB, or EthernetLAN). |

RS-232:

Attach a serial cable from the computer's COM (Serial) port that was specified in the site configuration to the RS-232 port of the instrument. The cable must be a "straight-through" cable with a DB-9, female plug on the instrument's site and either a DB-9 or DB-25, female plug at the computer's side. Please refer to the computer's user manual on how to use the Serial port. Make sure that the connectors are securely fastened to ensure proper connection.

USB:

Attach a USB cable from the computer to the USB port of the T-series instrument: Type A Male – Type B Male (USB printer cable).



- From Internet Explorer go to <http://www.teledyne-api.com/software> to download the USB COM port driver file.

Ethernet:

Connect an Ethernet cable from the instrument's rear panel Ethernet interface connector to an Ethernet port.

| | | |
|----|------------------------|--|
| 8. | Configure the COM port | For RS-232 do this in the APIcom application screens, per the following paragraph. |
|----|------------------------|--|

RS-232:

Make sure that the computer's COM/Serial port is configured to the same baud rate as specified in the Instrument settings above. The COM settings must be as follows:

BAUD rate: up to 19200 kbaud, we recommend 9600. Longer cables may require lower baud rates. Instruments support up to 115 kbaud.

Data bits: 8

Parity: None

Stop bits: 1

Flow control: None

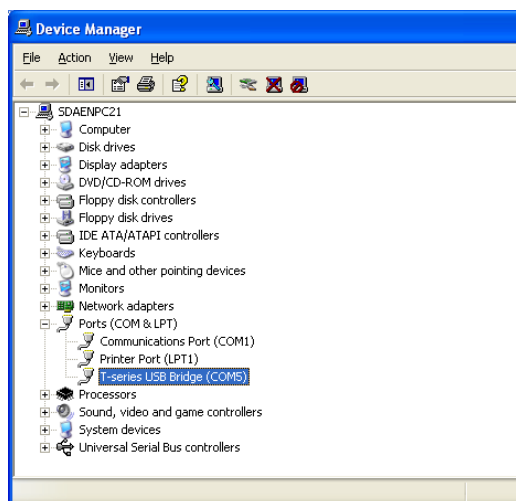
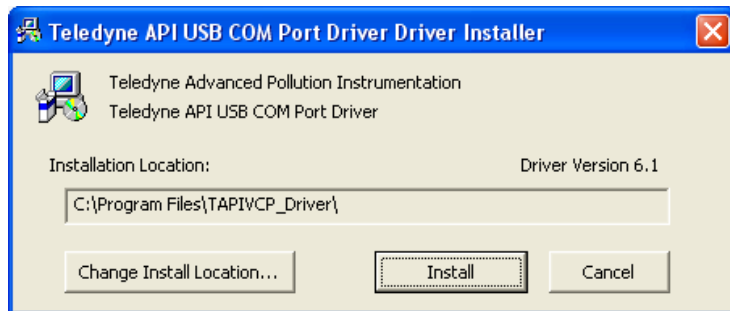
Optionally, newer instruments support Xon/Xoff flow control, which must be enabled in both the instrument and APIcom and must also be available for all instruments within one multi-drop chain.

Once all settings are configured, perform the remaining steps to connect to the instrument.

USB:

Driver Installation on PC:

Run file: "TAPIVCPInstaller.exe"

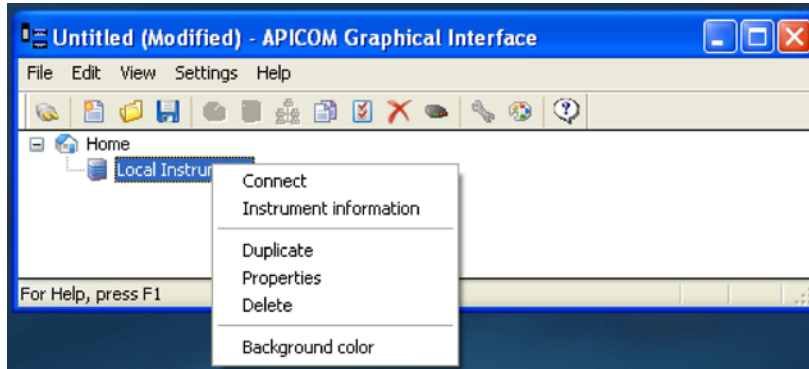


Recommended COM2 Settings for T-series USB connection:

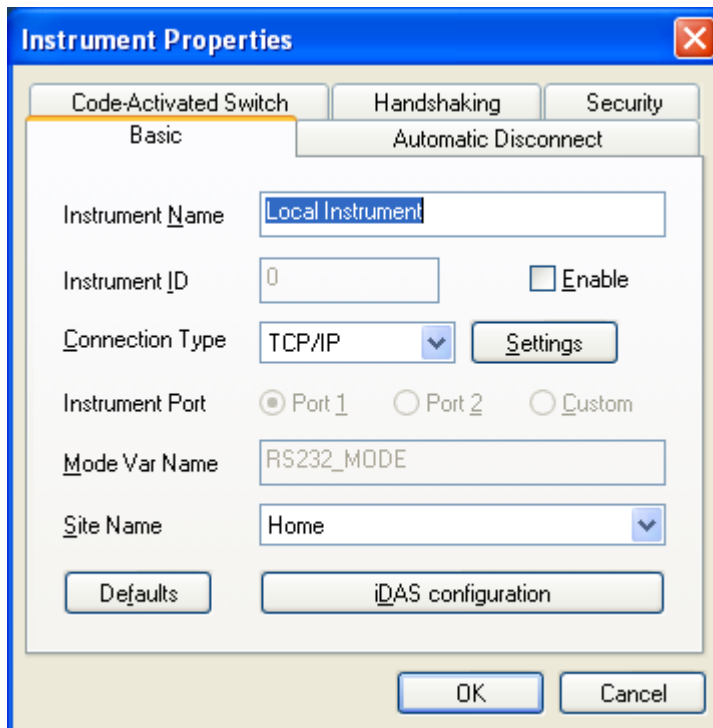
- Baud Rate: 115200
- COM2 Mode Settings:
 - Quiet Mode ON
 - Computer Mode ON
 - MODBUS RTU OFF
 - MODBUS ASCII OFF
 - E,8,1 MODE OFF
 - E,7,1 MODE OFF
 - RS-485 MODE OFF
 - SECURITY MODE OFF
 - MULTIDROP MODE ... OFF
 - ENABLE MODEM OFF
 - ERROR CHECKING ... ON
 - XON/XOFF HANDSHAKE OFF
 - HARDWARE HANDSHAKE OFF
 - HARDWARE FIFO ON
 - COMMAND PROMPT OFF

Ethernet/LAN:

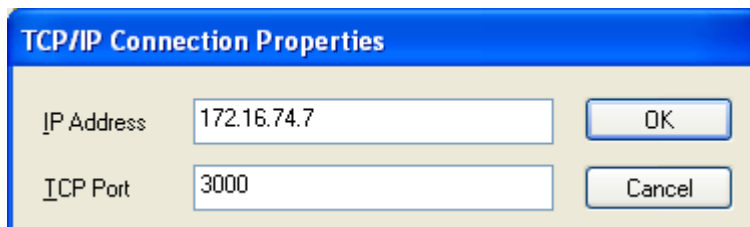
Right-click the instrument and select “Properties” from the drop-down




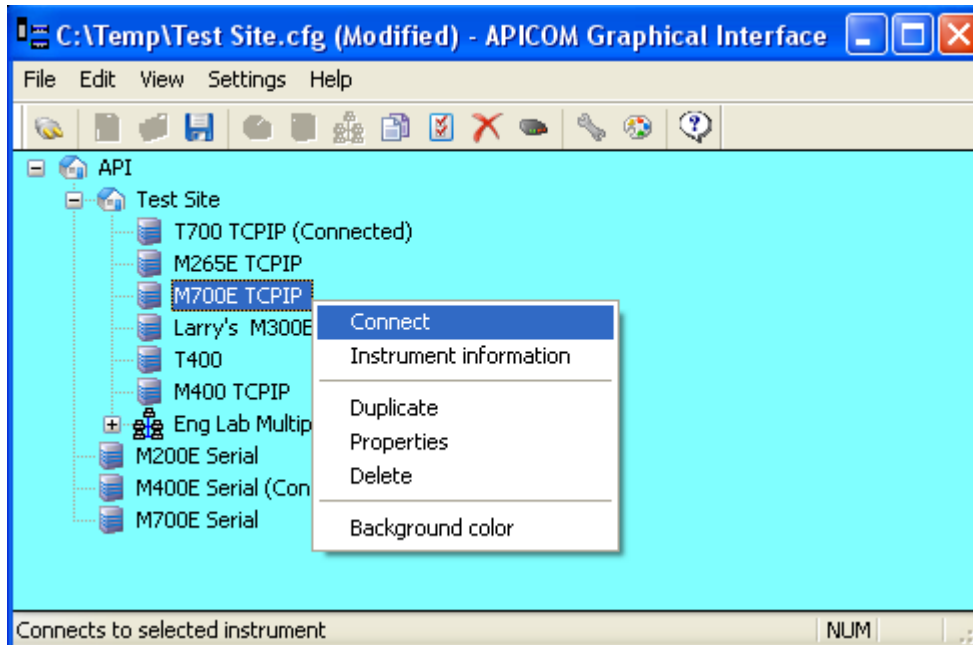
In the Properties window select “TCP/IP” for the Connection Type.



Next, click the Settings button and input the IP address of the instrument and specify “3000” for the TCP Port, and click OK:



9. In the APICOM interface window, single-click on the instrument you want to connect to and then select **File-Connect** from the main menu, or right-click on the instrument and select **Connect** (see figure that follows), or click on the , or double-click on the instrument.



2.3. Physical Instrument Settings

This section briefly explains how to configure an TAPI analyzer to work with APIcom. Refer to the instrument's manual for detailed information.

Baud Rate

In most instruments pressing **SETUP-MORE-COMM-BAUD** sets the baud rate. The higher the baud rate, the faster the communication with the instrument. However, long serial cables or those with low quality, poor cable connection or noisy phone lines (when using a modem) may require lower baud rates. You may have to experiment to find the optimal baud rate for connection. Keep in mind that the baud rate specified in APIcom needs to match the baud rate of the instrument! Baud rates vary between 2400 and 19200 baud (115200) in E and T-series models).

ID Number

The instrument ID allows you to use more than one instrument on a multi-drop setup as well as multiple instruments of the same model. In most instruments, pressing **SETUP-MORE-COMM-ID** sets the instrument's ID.

Xon/Xoff Handshaking

Flow control improves communication between host computer and instrument and may prevent many transfer failures (particularly when uploading the DAS configuration). To enable *Xon/Xoff* flow control in APIcom, it must also be enabled in the instrument by setting the instrument's *RS232_MODE* variable properly.

Older TAPI instruments do not have *Xon/Xoff*, hence, the default value for flow control in APIcom is set to *NONE*.

Modem


Modem support can be enabled in instruments by setting the *RS232_MODE* and the *MODEM_INIT* setup variables properly. Please consult the instrument documentation and/or the factory for details on doing this.

If modem support is enabled it is critical that "computer" mode is also enabled. Otherwise, the instrument will try to send the modem initialization string to the modem when the instrument powers up. Most likely, the modem is also in echo mode at that time and the modem will echo

an AT command to the instrument returning an AT echo from the instrument in an indefinite loop.

In addition, most of TAPI's instruments have a password protection capability in which the instrument will only accept commands after a password has been submitted. This security feature must be used carefully with modems. The problem is that while the modem is answering an incoming call, it sends status messages such as "RING" and "CONNECT" to the instrument, to which the instrument responds "MUST LOG ON" if the security mode is enabled. These messages sent by the instrument may cause some modems to hang up during the call. So the modem must be configured, using the *MODEM_INIT* setup variable, to not issue responses to the instrument if the security feature is used. This is accomplished in some modems with the AT command "Q1".

2.4. Global Options

Global application settings can be accessed by selecting **Settings-Options** or the  toolbar button. This dialog is *tabbed* because it contains several categories of settings (refer to the following figure).

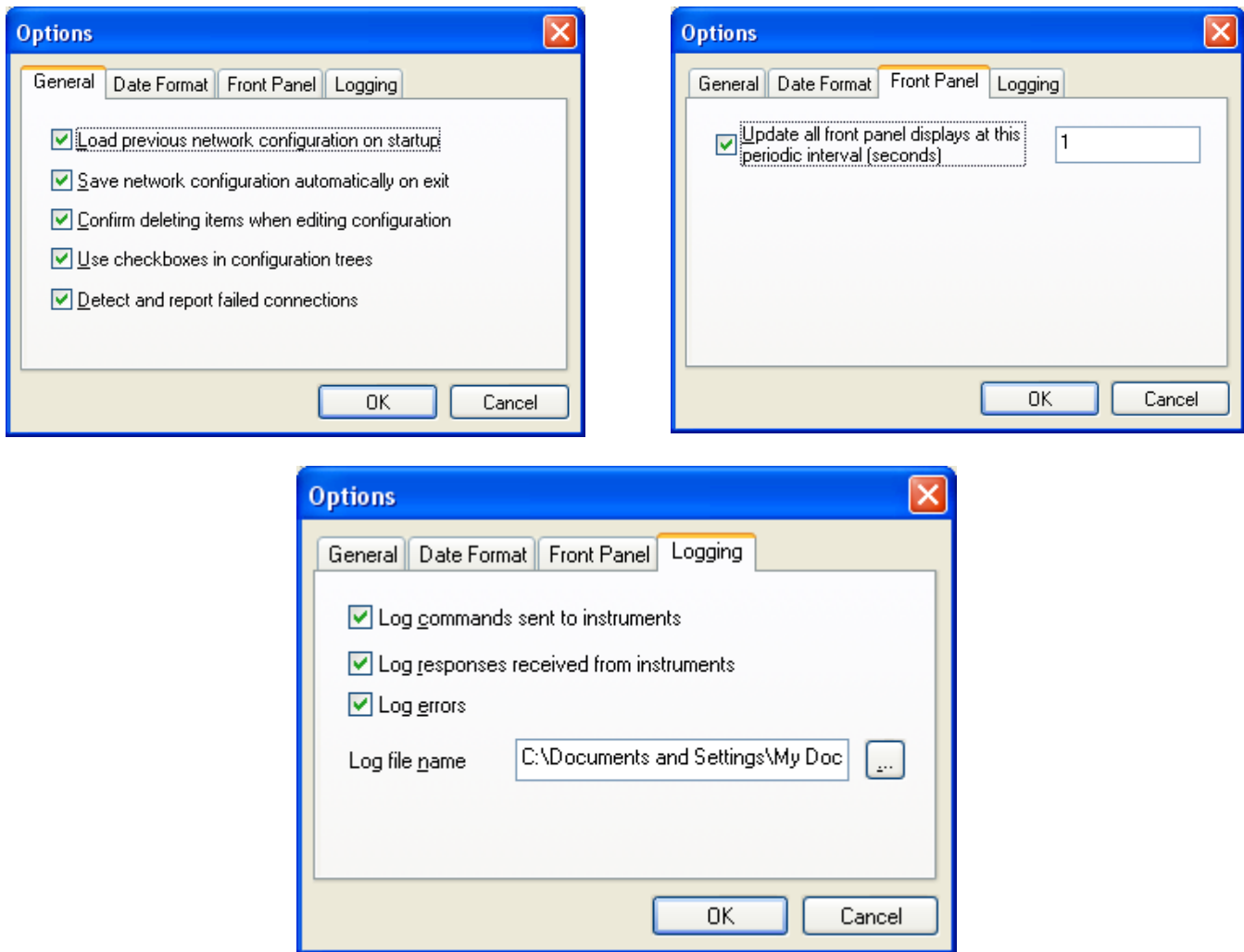



Figure 2-2: Global Program Options Dialogs

Global APicom program options are stored in the computer's registry. See Section 1.5 for installed registry keys. The global options are summarized in the table below.

Table 2-2: Global Options

| Tab | Property | Description |
|--|---|---|
| General | Load previous network configuration on startup | If checked, APIcom will attempt to open the network configuration file it was using previously. If APIcom cannot open the file — because the file has been moved or renamed — it will issue an error message and the file will have to be opened manually using the File-Open menu or the  toolbar button. |
| General (continued) | Save network configuration automatically on exit | If checked, APIcom will automatically save the network configuration when it exits. If it's not checked and the configuration is modified, APIcom will prompt to save the configuration when it exits. This is useful to temporarily modify some settings but not save them. |
| | Confirm deleting items when editing configuration | If checked, APIcom will prompt for all delete actions. |
| | Use checkboxes in configuration trees | If checked, APIcom will attempt to use checkboxes in configuration trees. Some versions of Windows do not support the checkboxes. |
| Front Panel | Update all front panel displays at this periodic interval (seconds) | If checked, APIcom will update all the front panel windows at the specified periodic rate. The default is checked and set to 10 seconds. When using slow connections, this setting should not be set too low. For example, if 5 instruments are simultaneously connected over a 2400 baud connection, and the update period is set to 5 seconds, APIcom will not be able to fetch the display contents from all 5 instruments within 5 seconds. This will result in display requests getting queued up, which will make APIcom appear unresponsive to key presses. In this example, an update interval of 15 seconds is more appropriate. Keep in mind that the front panel display is always refreshed immediately whenever a button is pressed. If this option is unchecked, APIcom will only refresh the front panel when a button is pressed. |
| Logging (<i>Advanced Feature</i>) | Log commands sent to instruments | If checked, APIcom will write each command that it sends to an instrument to the log file. |
| | Log responses received from instruments | If checked, APIcom will write each response that it receives from an instrument to the log file. |
| | Log errors | If checked, APIcom will write error messages to the log file. |

2.5. The APIcom Network: Instruments, Sites, and Connectors (Cable, Modem and Ethernet)

APIcom works with three distinct types of objects: *instruments*, *sites*, and *connectors*. The diagram below shows how these three objects (using modems as connectors) are related to each other and to the physical equipment. Other *connectors* can be: direct cable (RS-232 in E-series and T-series or USB option in the T-series), RS-232 to Ethernet converter or direct Ethernet connection.

In the figure below, everything inside the box labeled “APIcom” represents APIcom program objects, not physical equipment. From left to right, the diagram shows instruments, sites, and modems. Everything else in the diagram represents physical equipment. Notice how APIcom program objects mirror the arrangement of the physical equipment.

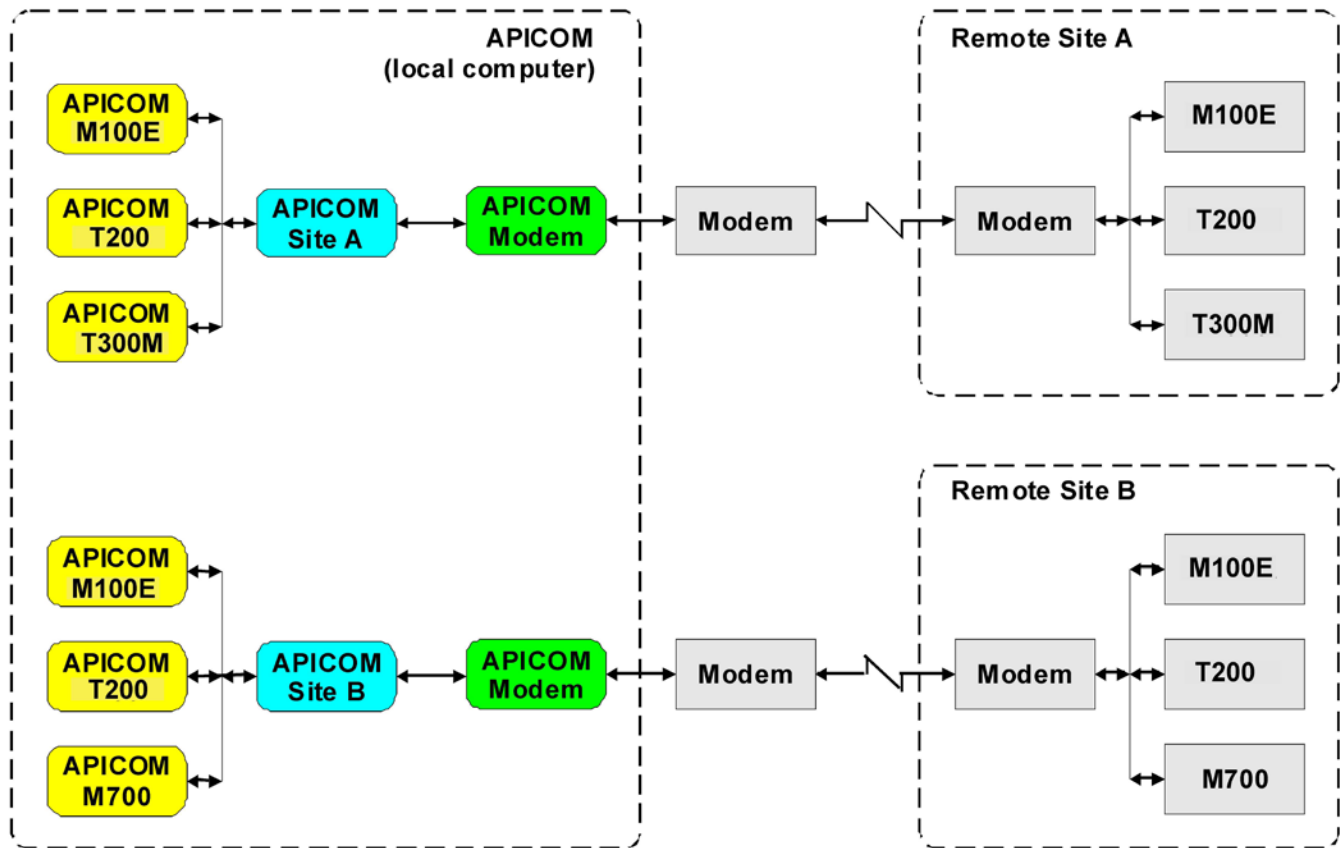




Figure 2-3: Instruments, Sites, and Connectors

2.5.1. Configuring APIcom Instruments

APIcom maintains a list of all the instruments, which are accessible in the main window. Since each instrument must reside at a site, the list of instruments and sites is presented in a tree-like format, as shown below. Each instrument in the list represents one monitor or calibrator, and APIcom maintains separate properties for each instrument.

Site labels in the tree structure shown below may be collapsed to hide the instruments it contains, which makes the display less cluttered. (Click the  icon to collapse a site and  to expand a site. You can also double-click on a site or use the right and left arrows on the keyboard to expand or collapse it.) APIcom remembers the expanded/collapsed state of each site label and restores it when the network configuration file is reopened.

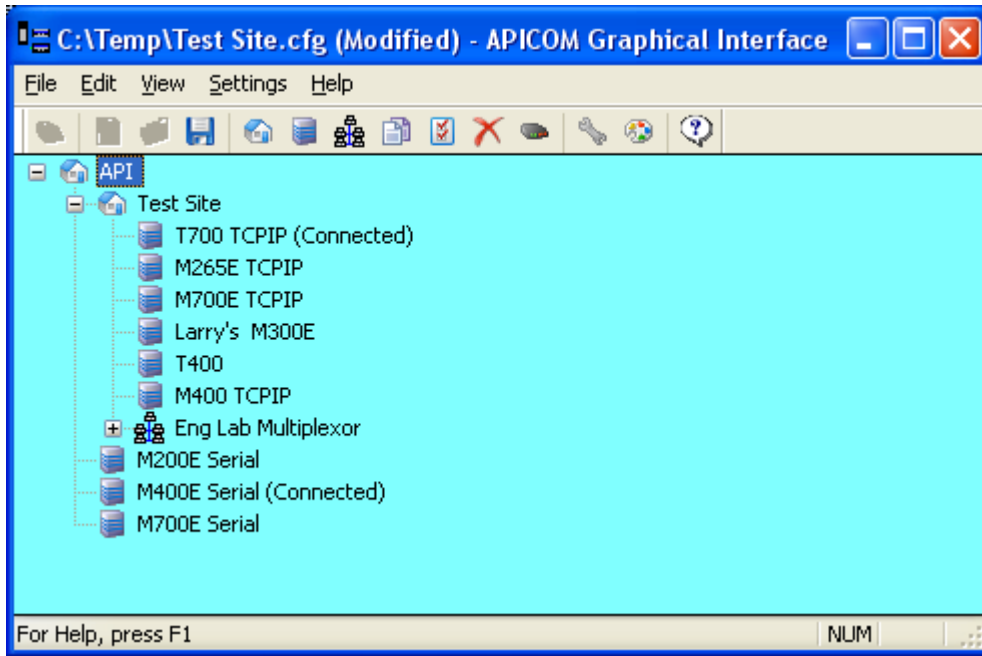



Figure 2-4: Site and Instrument Tree

2.5.1.1. Opening the Instrument Properties Dialog Box

| Step | Action | Comment |
|------|---|---|
| 1. | Using the mouse, click on the desired instrument | |
| 2. | Select Edit-Properties from the main menu, or right-click on the instrument and select Properties , or click on the  toolbar button. | The Instrument Properties dialog box appears (refer to Figure 2-5). |

Most of the instrument properties are optional and are included for maximum compatibility with all of TAPI's instruments. The **Defaults** button in the *Basic* tab (Figure 2-5) will reset all options to their default values. Notice that only the instrument-specific communication settings appear in this dialog box. The remaining communication settings are specified on a site-by-site basis. The following section describes all instrument properties.

2.5.1.2. Instrument Properties Tabs

Basic Tab

The following figure shows the instrument properties screen Basic tab. Table 2-3 identifies the instrument properties and provides a brief description of each property.

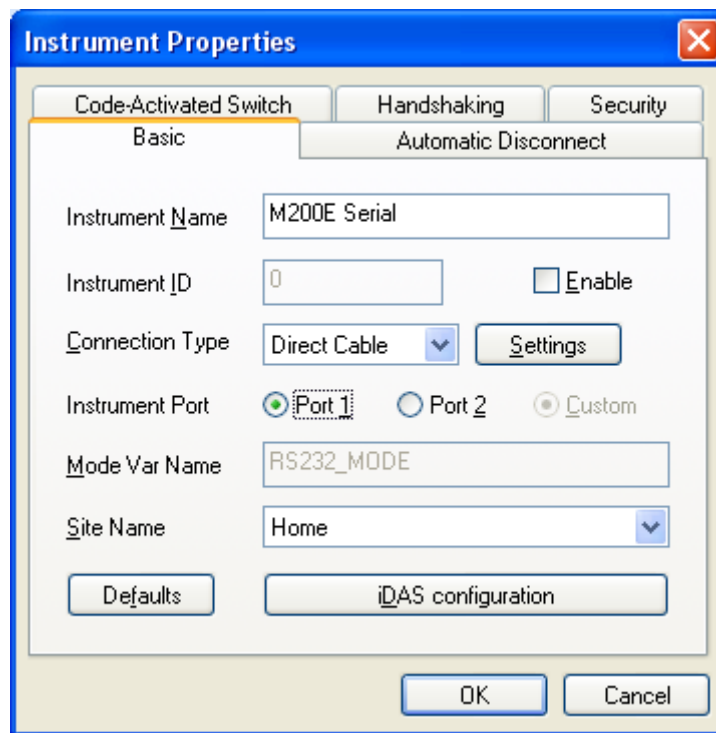
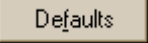
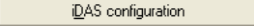
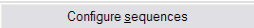


Figure 2-5: Instrument Properties Dialog Box, Basic Tab

Table 2-3: Instrument Properties, Basic Tab

| Property | Description |
|--|--|
| Instrument Name | A user-defined name for the instrument. We recommend to use the model number and an identifier (if more than one of the same model are used) This name also appears in graphs and window captions as well as data file names. |
| Instrument ID | An ID number for the instrument. Not needed for single-instrument operation. Must be unique if the TAPI multidrop protocol is being used. Also, it must match the ID number specified by the <i>MACHINE_ID</i> setup variable in the instrument, or in the SETUP-MORE-COMM-ID menu in most instruments. Used only if <i>Enable</i> is checked. |
| Instrument Port | One of several RS-232 ports of the instrument that APIcom is connected to. Some newer instruments use different names for the setup variables that control the RS-232 port settings, the <i>Custom</i> option allows to specify the variable name. |
| Mode Var. Name | Setup variable name in the instrument for the RS-232 port settings. Used only if the <i>Instrument Port</i> property is set to <i>Custom</i> . |
| Site Name | The site where the instrument resides. The site must have been created before creating the instrument. The site is automatically set to the site that was selected when you created the new instrument. To change the site, select a different site from the list and the instrument will automatically be moved to the correct site in the tree in the main window. |
|  Defaults | Sets all the properties for the instrument to their default values. |
| DAS configuration  | Permits <i>off-line</i> editing of the instrument's DAS configuration. Enabled only if instrument has DAS and APIcom was connected to the instrument and downloaded its DAS configuration at least once. After connecting to an instrument, it takes a few seconds to make this option available. During this time, APIcom does not respond to any user input. |
| Configure sequences  | Permits <i>off-line</i> editing of the instrument's sequence configuration. Enabled only if instrument is an M700 and APIcom was connected to it and downloaded its sequence configuration at least once. Also takes several seconds to become available. |

Automatic Disconnect Tab

The following figure shows the instrument properties screen Automatic Disconnect tab. Table 2-4 identifies the instrument properties and provides a brief description of each property.

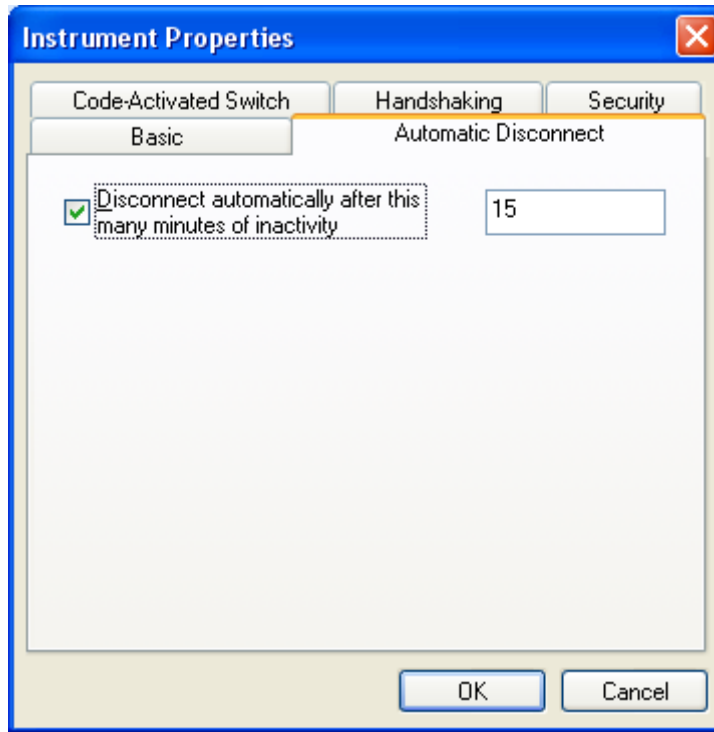


Figure 2-6: Instrument Properties Dialog Box, Automatic Disconnect Tab

Table 2-4: Instrument Properties, Automatic Disconnect Tab

| Property | Description |
|--|--|
| Automatically disconnects APIcom from the instrument (minutes) | If checked, APIcom will automatically disconnect from the instrument, including hanging up the modem, after the specified number of minutes of inactivity. The inactivity timer is reset to zero every time a button on the front panel window is pressed. Automatic disconnect is disabled while the DAS or sequence configuration dialog boxes are open! |

Code Activated Switch Tab

The following figure shows the instrument properties screen Code Activated Switch tab. Table 2-5 identifies the instrument properties and provides a brief description of each property.

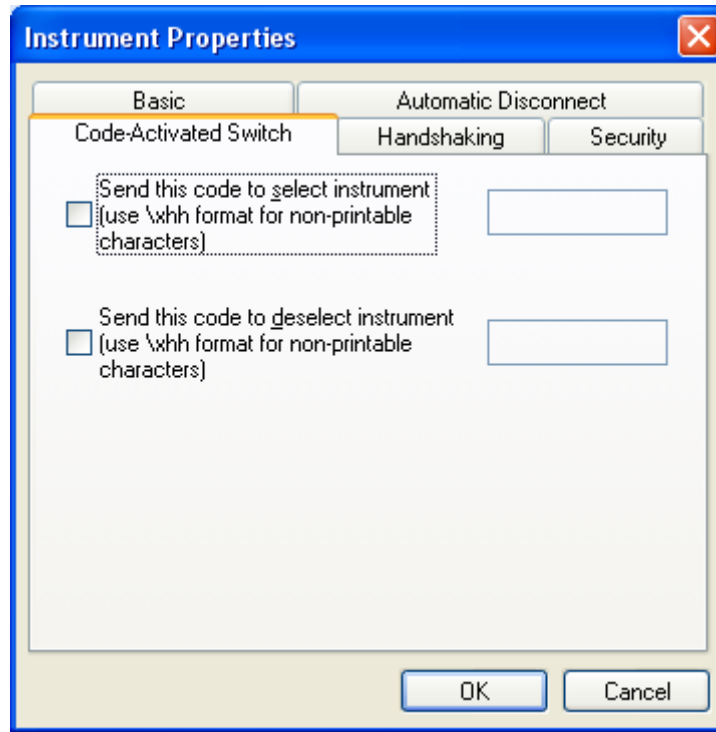


Figure 2-7: Instrument Properties Dialog Box, Code Activated Switch Tab

Table 2-5: Instrument Properties, Code Activated Switch Tab

| Property | Description |
|---------------------------------------|--|
| Send this code to select instrument | This property allows connection to multiple instruments by means of a code-operated RS-232 switch (COS) instead of the TAPI multidrop protocol. APIcom will transmit the characters specified in this property before communicating with the instrument. Non-printable characters can be encoded by entering them as a backslash character (\), followed by a lower case 'x', followed by two hex digits. For example, enter the Ctrl-D (ASCII code 4) character in the switch prefix property as "\x04". If a hexadecimal sequence is followed by a character in the hexadecimal range (i.e. 0-9 or A-D), that character must also be entered using hexadecimal notation. For instance, to enter the sequence <Ctrl-D><2> to select port 2 on the COS, "\x04\x32" must be entered (04 for D, 32 for 2). |
| Send this code to deselect instrument | Like "Send this code to select instrument" except that it's sent to the code-operated RS-232 switch after APIcom is finished communicating with the instrument. This property can be used to restore the switch position to a specific port. Most communication with the instrument — pressing a button, for instance — takes only a few seconds. |

Handshaking Tab

The following figure shows the instrument properties screen Handshaking tab. Table 2-6 identifies the instrument properties and provides a brief description of each property.

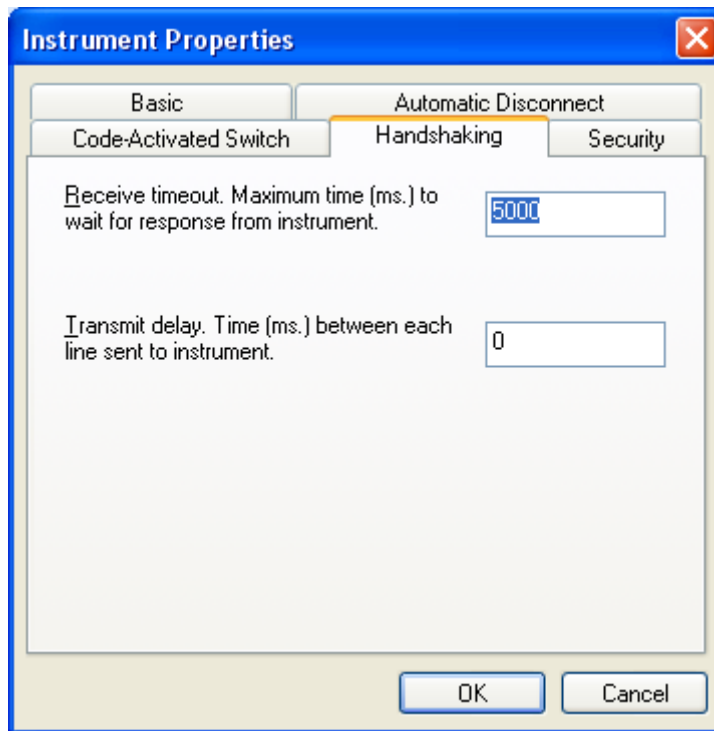


Figure 2-8: Instrument Properties Dialog Box, Handshaking Tab

Table 2-6: Instrument Properties, Handshaking Tab

| Property | Description |
|-----------------|--|
| Receive timeout | Maximum time (in milliseconds) that APIcom waits for a response from the instrument after a command is sent. The instrument’s response time varies depending on a number of factors, including its operating firmware, the connection type, the baud rate, etc. |
| Transmit delay | Most of the instruments do not use any conventional RS-232 handshaking, such as RTS/CTS or XON/XOFF. Newer instruments do support XON/XOFF handshaking, which APIcom also supports (<i>see site configuration</i>). This transmit delay property inserts a brief delay between each line of DAS or sequence configuration information that APIcom sends to the instrument, in lieu of conventional handshaking. This transmit delay prevents APIcom from overflowing the receive buffers of slower instruments, which will cause them to reject the DAS or sequence configuration. |

Security Tab

The following figure shows the instrument properties screen Security tab.

Table 2-7 identifies the instrument properties and provides a brief description of each property.

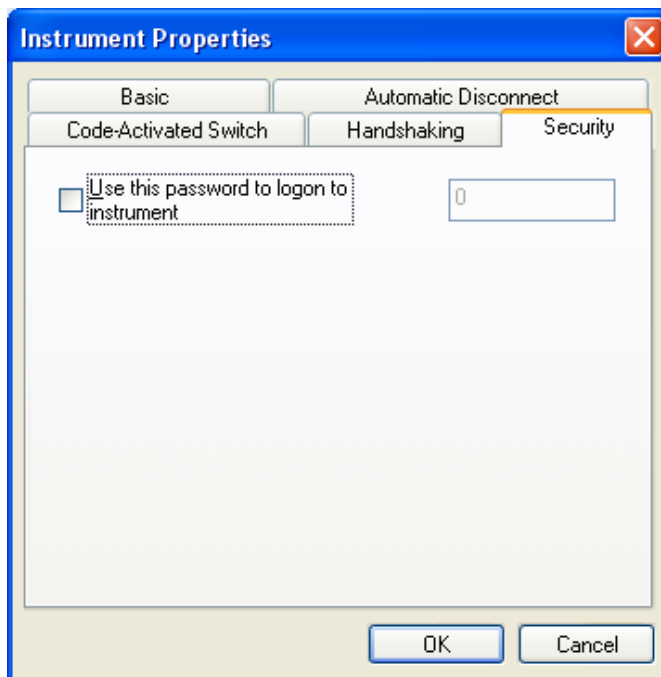


Figure 2-9: Instrument Properties Dialog Box, Security Tab

Table 2-7: Instrument Properties, Security Tab

| Property | Description |
|---|---|
| Use this password to logon to an instrument | If checked, APIcom will use the specified password to logon to the instrument when establishing a connection. Most of TAPI's instruments have some password mode in which the instrument will only accept commands after a password has been submitted. Also refer to the section titled <i>Modems</i> below. |

2.5.2. Sites

APIcom maintains a list of all the sites, which are accessible in the main window, as shown in Figure 2-4.

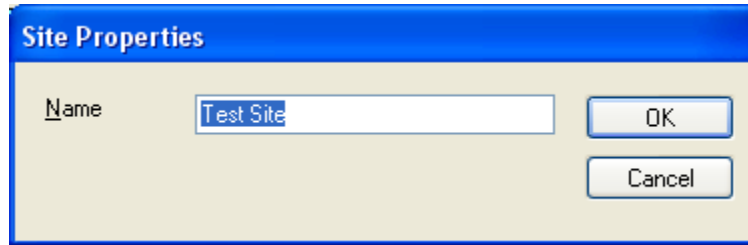



Figure 2-10: Site Properties Dialog

Table 2-8: Site Properties

| Property | Description |
|----------|--|
| Name | The site's user-defined name, which will appear in graphs and window captions. The site name is combined with the instrument name to form a title for dialog boxes and graphs. For example, a "M300E" instrument name and a "San Francisco Lab" site name are combined as "M300E at San Francisco Lab" |

2.5.3. Direct Cable Connections (RS-232, USB)

If an instrument's *Connection Type* property is set to *Direct Cable*, then clicking on  will display the first dialog box shown in the following figure.

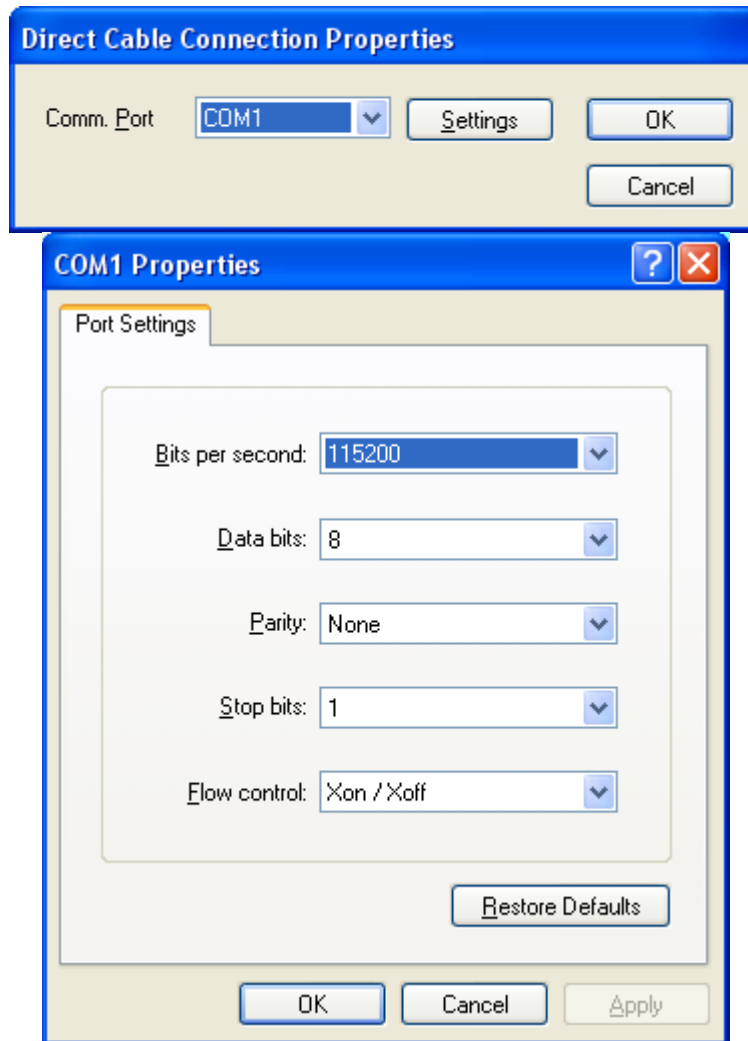



Figure 2-11: Direct Cable Connection Properties and Port Settings Dialogs

The first dialog box only displays the COM ports that are present on the host computer, up to COM19. It is possible that even though a COM port is physically present, it is reserved by some other application, and consequently it doesn't appear in the list. Furthermore, devices such as mouse, games and terminal programs may be using one COM port. Even though these ports would show in the list, they cannot be used for APIcom. APIcom needs a dedicated, free COM port to operate (However, several programs can share one COM port if operated in alternating sequence, one at a time). Select the COM port to use and click on , which will display the second dialog box in Figure 2-11.

This dialog box is a standard Windows dialog. APIcom only uses the *Bits per second*, *Data bits*, *Parity*, *Stop bits*, and *Flow control (NONE or XON/XOFF only)* properties, even if the COM port hardware has more settings. APIcom supports XON/XOFF flow control, but all instruments at one site need to do so. In that case, XON/XOFF flow control needs to be enabled in each instrument-

2.5.4. Windows (TAPI) Modem Connections

If a site's *Connection Type* property is set to *Windows Modem*, then clicking on  will display the following dialog box.

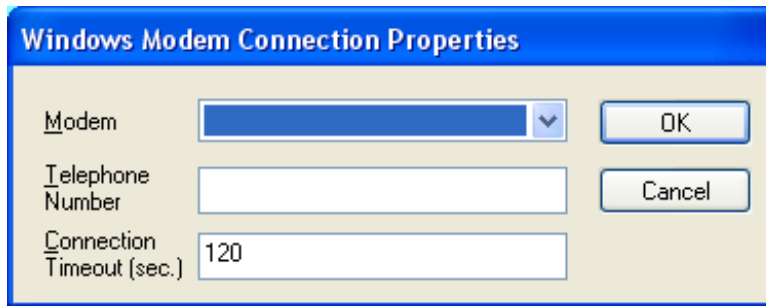



Figure 2-12: Windows Modem Connection Properties Dialog

Editing the Windows modem settings must be done through the Windows Control Panel or the software provided by the modem manufacturer. The following table describes the Windows modem connection properties.

Table 2-9: Windows Modem Connection Properties

| Property | Description |
|--------------------|--|
| Modem | The Windows modem to use. Configure the modem with the Windows Control Panel. |
| Telephone Number | The telephone number to dial if the connection is a modem connection. Insert the tilde (~) character to impose a delay in the dialing process. |
| Connection Timeout | The maximum number of seconds to wait for the modem connection to be established. |

2.5.5. Non-Windows Modem Connections

If a site's *Connection Type* property is set to *Other Modem*, then clicking on  will display the following dialog box.

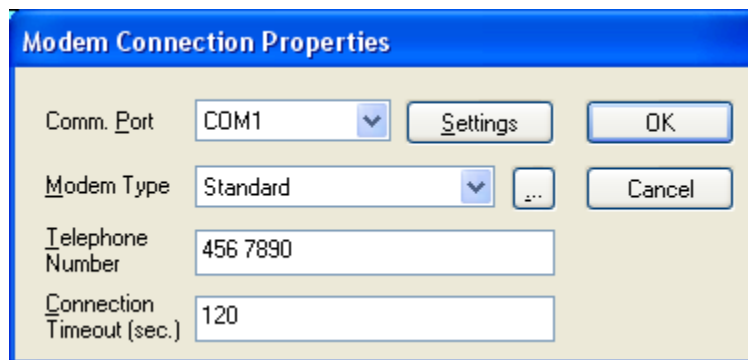



Figure 2-13: Non-Windows Modem Connection Properties Dialog

Notice that this connection type has properties in common with both the direct cable and Windows modem connection types. As for direct cable connections, this dialog box only displays the COM ports that are present on the host computer. It is possible that even though a COM port is physically present on the computer, it is reserved by some other application and does not appear in the list. Select the COM port to be used and click on , which will display the same port settings dialog box as for direct cable connections. A modem type must




be selected as well. If no modem types are defined, click on  to define a modem type (see the section below). The table below describes the non-Windows modem connection properties shown in Figure 2-13.

Table 2-10: Non-Windows Modem Connection Properties

| Property | Description |
|--------------------|---|
| Comm. Port | The COM port on the computer that the modem is attached to. Most internal modems emulate a COM port. Consult the modem documentation or the Windows Control Panel to determine which COM port the modem emulates. |
| Modem Type | The modem type to use. Click on  to define or edit a modem type. |
| Telephone Number | The telephone number to dial if the connection is a modem connection. Insert the tilde (~) character to impose a delay in the dialing process. |
| Connection Timeout | The maximum number of seconds to wait for the modem connection to be established. |

2.5.6. Modems

APIcom maintains a list of all the non-Windows modems, which can be accessed by selecting **Settings-Modems** or clicking on the  toolbar button (refer to Figure 2-14). The list of Windows modems is maintained and managed by the Windows operating system, not APIcom.

Each modem represents one type of modem that can be used to connect to a site. This is the modem attached to the computer running APIcom, not the modem at the remote site.

Usually, the standard Hayes-compatible modem will work. But if the modem requires special settings, a new modem type can be defined and select it in the site connection dialog.

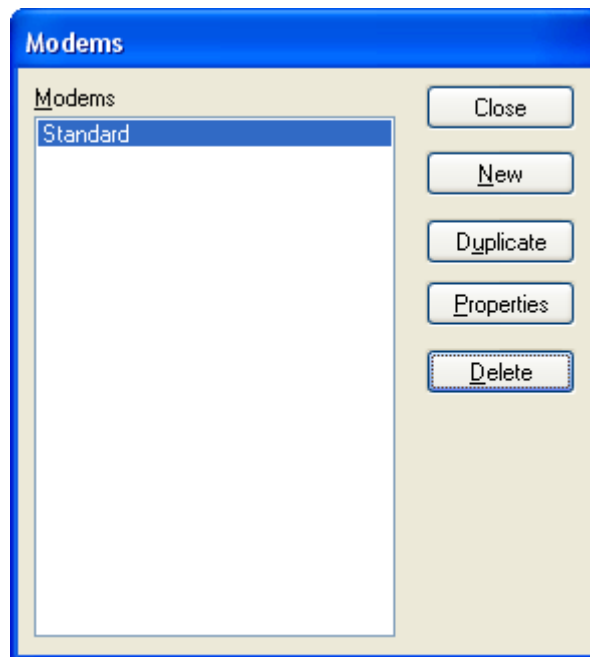


Figure 2-14: Modem List Dialog

The modem properties are shared by all sites using that modem type, so only one modem configuration has to be created for each type of modem. APIcom maintains separate properties for each modem type. To modify the properties for a modem, select the modem in the list with

the mouse and click on **Edit...**, which will display the dialog box shown in the following figure.

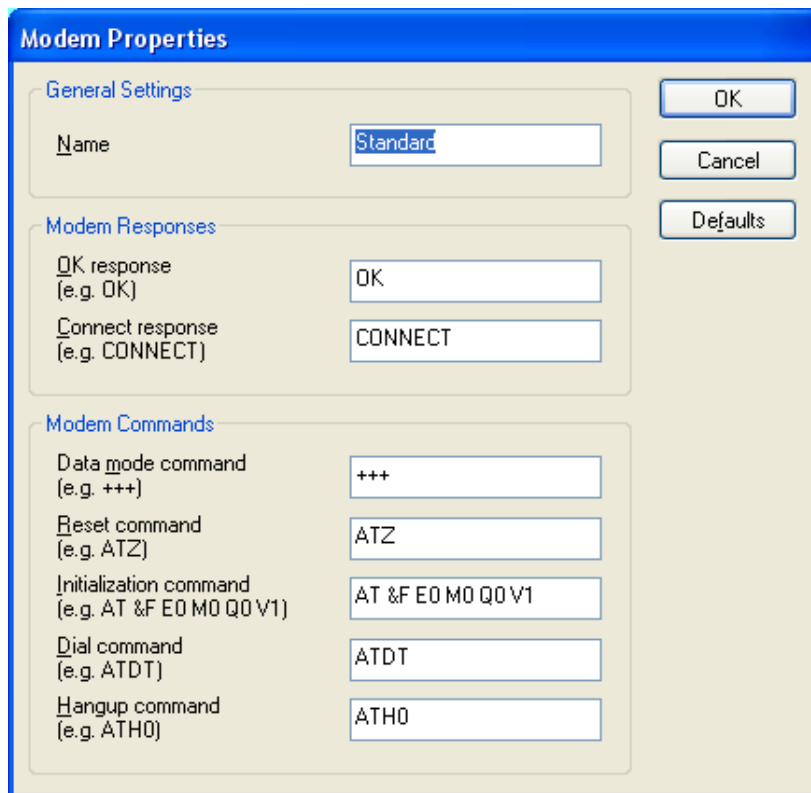


Figure 2-15: Modem Properties Dialog

The default properties should work for most standard modems. If properties were changed, clicking on **Defaults** will reset all parameters to the defaults. Notice that the commands include the “AT” command prefix. When APIcom establishes a non-Windows modem connection it sends the commands to the modem in the following order:

- ❑ Reset command (e.g. “ATZ”)
- ❑ Wait for OK response (e.g. “OK”)
- ❑ Initialization command (e.g. “AT &F E0 M0 Q0 V1”)
- ❑ Wait for OK response (e.g. “OK”)
- ❑ Dial command + telephone number (e.g. “ATDT456 7890”)
- ❑ Wait for connect response (e.g. “CONNECT”)

When APIcom terminates a non-Windows modem connection it sends the commands to the modem in the following order:

- ❑ Wait 1 second
- ❑ Data mode command (e.g. “+++”)
- ❑ Wait for OK response (e.g. “OK”)
- ❑ Hangup command (e.g. “ATH0”)
- ❑ Wait for OK response (e.g. “OK”)
- ❑ Reset command (e.g. “ATZ”)
- ❑ Wait for OK response (e.g. “OK”)

The following table describes the modem type properties.

Table 2-11: Modem Properties

| Property | Description |
|------------------------|---|
| Name | A user-defined name for the modem. Should be something descriptive, such as the manufacturer and model name. For user interface only. |
| OK response | The string that the modem sends to APIcom to indicate successful execution of a command. |
| Connect response | The string that the modem sends to APIcom to indicate that a connection has been established. |
| Data mode command | The command that switches the modem from online mode into data mode. |
| Reset command | The command that resets the modem to its power up state. |
| Initialization command | The command that initializes the modem. |
| Dial command | The command that tells the modem to dial a telephone number, using either tone or pulse dialing. |
| Hangup command | The command that tells the modem to hang up. |

2.5.7. Ethernet Connections

If the Connection Type is set to TCP/IP, clicking on  will bring up TCP/IP Connection Properties dialog box in which the IP (Internet Protocol) address and the TCP Port need to be specified (refer to the following figure).

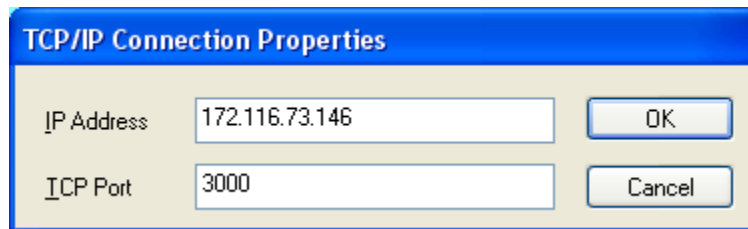


Figure 2-16: TCP/IP Connection Properties Dialog Box

2.6. Configuration Storage

APIcom stores information in different places, as described below.

2.6.1. Global Options

APIcom stores its global options in the computer's registry under

HKEY_CURRENT_USER\Software\TeledyneAPI\APICOM

Global options include all of the settings in the **Settings-Options** menu, the name of the network configuration file last used, the names of the most recently used network configuration files, the global DAS record selection criteria, and the position and size of various windows and dialog boxes. APIcom permits to change the size of many dialog boxes and windows, and it remembers the last used size and position of each window. APIcom also remembers the names of the four most recently used network configuration files, which appear in the **File** menu.

2.6.2. APIcom Network Configuration

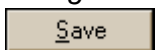
The APIcom network configuration (see Section 2.5), which consists of instruments, sites, and non-Windows modems, is stored in a file traditionally called *APIcom.cfg*, which - by default - is located in the same directory as *APIcom.EXE*. However, the network configuration can be stored in a file with any name and a *.CFG* extension in any location on disk or a local area network. This enables to create different configuration files to represent different networks and to share configuration settings with other users.

APIcom also stores the DAS or sequence configuration for each instrument in this file. This allows you to create predefined standard DAS and sequence configurations and easily upload them to an instrument upon connection. These configurations can also be edited offline after they were created or downloaded without connecting to an instrument. Maintaining different *.CFG* files allows to create any number of instruments, each with distinct names, and various configurations to suit all needs.

2.6.3. APIcom Network Configuration File Types

APIcom supports two different network configuration file formats: a binary format (*.CFG*) and a text format (*.CFX*). The binary format is used for operation and the text format is provided for future versions of APIcom to be able to read configurations created by earlier versions. Configurations can be stored in either format for APIcom to work. However, the *.CFX* format stores only the instrument, site, and modem configuration. It does not store the DAS and sequence configuration for an instrument. To store the DAS and sequence configuration for each instrument, the *.CFG* format must be used.

To save a configuration in the text format, select **File-Save As** and select *Text network configuration Files* from the *Save as type* drop-down field. Enter the file name, and click on



NOTE


.CFX configuration files should not be directly edited because syntax or typographical errors could render a configuration file unreadable by APIcom or the instrument.



APIcom displays the name of the currently used configuration file in the title bar of its main application window.

APIcom also indicates that a configuration has been modified by appending "(Modified)" to the configuration file name in the application's title bar:

2.6.4. Saving Network Configuration Files

The current network configuration can be saved at any time by clicking on the  toolbar button or by selecting **File-Save** from the main menu.

APIcom will automatically save modified configuration files upon exiting if that option was enabled in the **Settings-Options** menu. However, if that option was not enabled and the configuration has been modified before exiting the program, APIcom will prompt to save the changes.


2.6.5. Opening Network Configuration Files w/Windows Shortcuts

Different network configurations can be maintained and easily used by creating a Windows shortcut that specifies the configuration file on APIcom's command line. A user could, for example, create a different icon on the desktop to represent each network configuration. To do this, simply locate the *.CFG* file and right-click, then select "Send To Desktop (Create Shortcut)" from the menu.

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3. BASIC OPERATION

3.1. Connecting to an Instrument

To connect to an instrument and display its *Front Panel Window*, double-click on the instrument in the main window, or single-click on the instrument and then click on the  toolbar button, or type *Ctrl-C* on the computer keyboard, or select **File-Connect** from the main menu, or right-click on the instrument and select **Connect**.

APIcom immediately displays the front panel while it attempts to connect to the instrument. The front panel cannot be used until the extra button (“DAS” or “Configure sequences” or “Scroll module”) is enabled (i.e. not grayed out). Older instruments without such functionality can be used as soon as the instrument’s display contents appears.

If the connection is via a direct cable, the *Front Panel Window* should promptly display the contents of the instrument’s physical display. If the connection is via a modem, it will take some time for APIcom to dial the remote site. Ethernet connection speed may vary depending on the speed of the network that APIcom is connecting through.

APIcom may not be able to connect to the instrument for many reasons. The wrong COM port or settings may be in use. The cable may be the wrong type or low quality. The wrong modem type may be selected. The connection may be a direct cable connection when it should be a modem connection. The cables may not be attached. The instrument ID may be incorrect. A switch prefix may be in use when it should not be, or is not in use when it should be.

3.2. Front Panel Buttons


A button on the *Front Panel Window* can be activated two different ways: by clicking on the button with the mouse, or by typing key 1–8 on the computer keyboard. As buttons on the *Front Panel Window* are activated, the graphical display changes.

NOTE


While using APIcom, be careful not to change any setting that may affect the RS-232 connection, such as the RS-232 mode, the baud rate, or the instrument ID number.



3.3. Disconnecting From an Instrument

To disconnect from an instrument, press *Alt-F4* or the *Esc* key on the computer keyboard while the *Front Panel Window* has focus, or click on  in the upper right hand corner of the *Front Panel Window*, or select **Close** from the system menu (upper left hand corner) of the *Front Panel Window*. APIcom will prompt for confirmation and will also prompt if the DAS settings were changed without saving or uploading them.


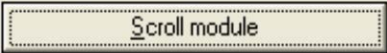
3.4. Exiting APIcom

To exit APIcom, press *Alt-F4* on the computer keyboard while the *Main Application Window* is displayed (see Figure 2-1), or click on  in the upper right hand corner of the *Main Application Window* or select **File-Exit** from the main menu.

APIcom will prompt the user if there is any front panel left open and if the network configuration file was changed and not yet saved.

3.5. Using APIcom with the TMS9000

APIcom can be used with terminus-equipped TMS9000 systems that are configured for ASCII data mode (see TMS9000 Terminus manual), either directly to the serial port or via the Ethernet port using a TCP connection. At present APIcom does not support MODBUS operation for the

TMS9000. When connected to a TMS9000 the  button is replaced by a  button which allows the user to scroll between system and sensor modules of the TMS9000.

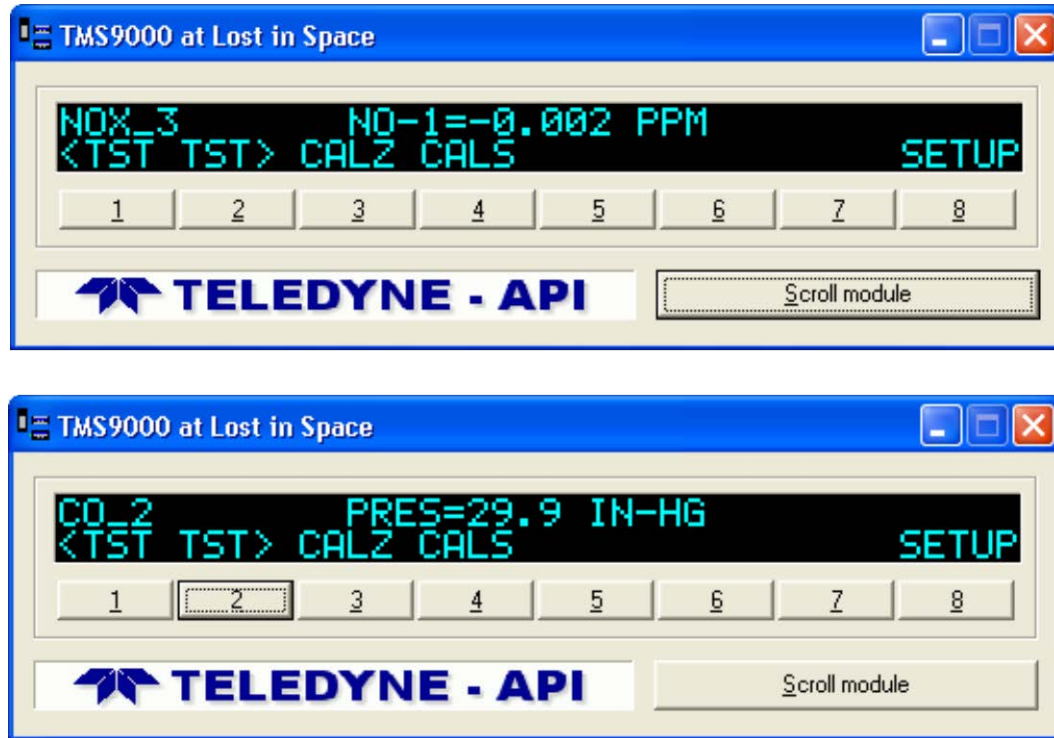


Figure 3-1: Operation with TMS9000

4. DAS CONFIGURATION AND DATA ACCESS

A major feature of APIcom is its ability to modify the built-in DAS configuration and access the DAS data in a remote instrument. The current instrument configuration can be downloaded, modified, and then sent back to the instrument. Once the DAS configuration is downloaded, it can be edited off-line, saving money on long distance phone connections to the instrument.

NOTE

Sending a DAS configuration to the instrument will completely replace its existing configuration and discard all of the instrument's stored data. We suggest that you download any data and save both data and the configuration on local disk before making any changes to the DAS.




DAS data can be safely downloaded, graphed and saved in a file without discarding the configuration or data in the instrument. The DAS configuration can also be changed by using the instrument's own menus through the *Front Panel Window* by pressing the appropriate buttons. Changing the configuration using the instrument's own menus will only discard data stored in the instrument if the number of records or parameters is changed. APIcom can also be used to automatically download data in unattended mode and to append the data to existing files (see Section 4.12).


4.1. Supported Instruments

The DAS capability of APIcom is only supported by analyzers, not calibrators or zero air generators.

Upon connection to an instrument, APIcom attempts to determine if that instrument contains the

DAS capability, and if so, it enables the  button in the *Front Panel Window* (see Figure 1-1). If this button is not enabled even though the instrument has the DAS capability, simply disconnect from the instrument and reconnect.

4.2. DAS Configuration and Downloaded Data Dialog

Click on  in the *Front Panel Window* (see Figure 1-1) or select **DAS configuration and data access** in the system menu (icon in the top-left corner of the instrument window) to display the following dialog box:

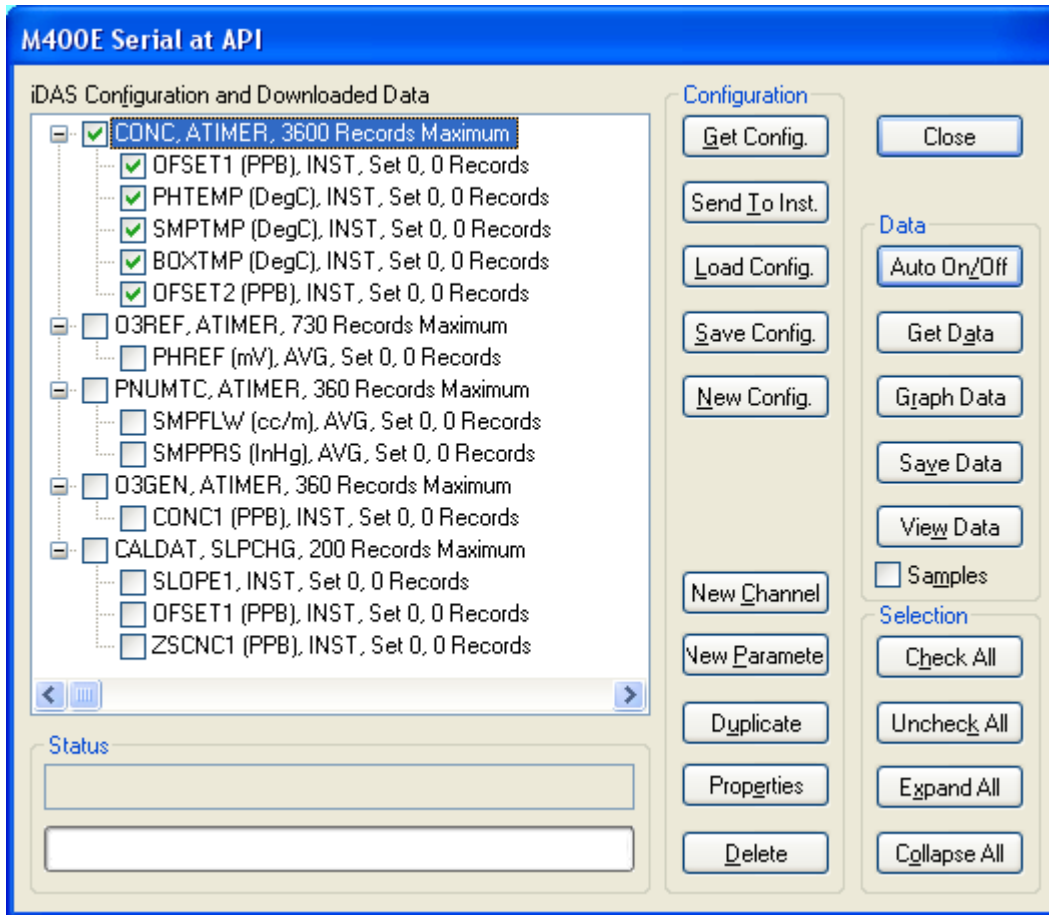



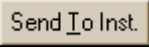







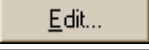











Figure 4-1: DAS Configuration and Downloaded Data Dialog

This dialog box displays both the DAS configuration and the number of records downloaded for each parameter. Initially, the configuration list is empty. Press the **Get Config** button to download the instrument's DAS configuration. This dialog box can also be entered off-line

when editing the instrument's properties by clicking on **iDAS configuration** in the instrument properties dialog. When the DAS configuration is edited off-line, the buttons related to downloading, uploading, and data access are disabled. Note that the configuration must have been downloaded at least once to edit it off-line. A new configuration can be edited off-line without prior download.

The table below summarizes the functions of the buttons in the *DAS Configuration and Downloaded Data Dialog* (Figure 4-1).

Table 4-1: DAS Configuration and Downloaded Data Dialog Buttons

| Button | Description |
|--|--|
| Configuration Buttons | |
|  | Downloads the DAS configuration from the instrument into APIcom and discards any data stored in APIcom. |
|  | Sends the DAS configuration in APIcom to the instrument. This will completely replace the instrument's current DAS configuration and discard all of the data stored in the instrument. |
|  | Loads the DAS configuration from a text file stored on the computer. This configuration may be edited and saved on the computer again, or it may be sent to an instrument. This configuration file may have been downloaded from the instrument using the "D PRINT SCRIPT" RS-232 command, or it may have been created using the  button in APIcom. |
|  | Saves the DAS configuration to a text file on the computer. This configuration file is suitable for uploading to the instrument via its RS-232 interface. |
|  | Creates a new, empty DAS configuration. |
|  | Creates a new channel. |
|  | Creates a new parameter on the selected channel. |
|  | Creates a duplicate of the selected channel or parameter. This button facilitates creating channels or parameters that are minor variations of existing ones. When selected, it will prompt for a new channel name. Channel names must be unique. |
|  | Edits the properties of the selected parameter or channel. |
|  | Deletes the selected parameter or channel. |
| Data Buttons | |
|  | Turns the automatic data download feature on and off. |
|  | Downloads the data for the selected parameter or channel from the instrument. |
|  | Graphs the data for the selected parameter or channel. |
|  | Saves the data for the selected parameter or channel in a text file. |
|  | Views the data for the selected parameter or channel as a table on the computer screen. |
| <input type="checkbox"/>  | Enables downloading, viewing, or saving the number of samples in each average. Only newer instruments support this option. |
| Selection Buttons | |
|  | Selects all the channels and parameters in the list. |
|  | Unselects all the channels and parameters in the list. |
|  | Expands all the channels in the list, showing all the parameters. |
|  | Collapses all the channels in the list, hiding all the parameters. |

4.3. Downloading the DAS Configuration

Download the remote instrument's DAS configuration by clicking on **Get Config**. Any DAS data that were previously downloaded by APIcom will be discarded (but are not affected within the instrument).

APIcom stores the last used DAS configuration of any instrument in the network configuration file (.CFG). If the configuration was already downloaded from this instrument, the DAS configuration will appear in the dialog. After downloading the DAS configuration, which should take a few seconds, the dialog box will look similar to the following example:

In Figure 4-1, the channels have been expanded to show all the parameters. The dialog box displays a summary of the channels, including the channel name, the triggering event, and the maximum number of records the channel stores. The parameter summary includes the parameter name and numeric units, the sampling mode, the record set number, and the number of records actually downloaded from the instrument. Since no data have been downloaded yet, the number of records is zero for all the parameters.

4.4. Saving the DAS Configuration

Saving the DAS configuration of any instrument to disk is useful to maintain several different measurement protocols (frequent data acquisition for trouble-shooting and engineering, long-term averages for monitoring, etc.) or simply to keep a backup when replacing the firmware of the analyzer.

There are two ways to save the DAS configuration. APIcom automatically stores the DAS configuration in its network configuration file when the configuration file is saved. This copy is not permanent. The second way is to save the DAS configuration as a text file on disk. When using the **Save Config...** button, APIcom prompts for a file name. The default file name format is:

"<Instrument Name>-< Instrument Serial Number> DAS Configuration.txt"

This name can be changed to any other file name. Once saved as a text file, it can be loaded by using the **Load Config...** button or uploaded to the instrument by using APIcom (**Send To Inst.**) or a simple terminal program.

4.5. Modifying the DAS Configuration

APIcom can modify the DAS configuration in instruments with library revision 2.4 or higher. APIcom facilitates configuring the instrument's DAS in the following ways:

- ❑ Validates the user's inputs and verifies that the configuration is successfully sent to the instrument. Displays an error message on unsuccessful upload.
- ❑ Allows loading DAS configurations stored on the computer and to send them to the instrument, making it quick and easy to load the same configuration into multiple instruments.
- ❑ Can store many DAS configurations on the computer, allowing a user to download different configurations for different purposes.

To download the current configuration, click on **Get Config**. To start a new, empty configuration, click on **New Config**. To start with a configuration that was previously saved, click on **Load Config...**

4.5.1. Adding or Modifying a Channel

A channel can be expanded to see its parameters by clicking on the “+” boxes next to the channel names. A channel can also be expanded or collapsed by double-clicking on it. To add a new channel, either click on **New Chan...** or right-click on any existing channel, which will bring up the context menu shown below, and select **New Channel**. The maximum number of channels that can be configured is 20 per instrument. The maximum number of parameters in each channel is 10 and the maximum number of data records in each channel is 64000. However, the A-series analyzers are limited by 64 KB data memory, hence the average number of records (depending on the number of channels and parameters and if the number of samples in a concentration average is recorded) is much lower, typically around 3000-12000 records. E-Series and T-Series instruments will have 1 MB of data storage capacity and the ability to store up to about 100,000 records.

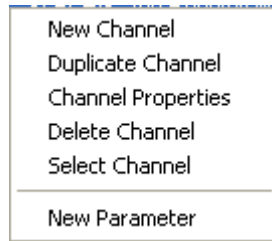


Figure 4-2: DAS Channel Context Menu – Adding or Modifying a Channel

To edit the existing channel, select **Edit Channel** or click on **Edit...**, which will bring up the following tabbed dialog box.

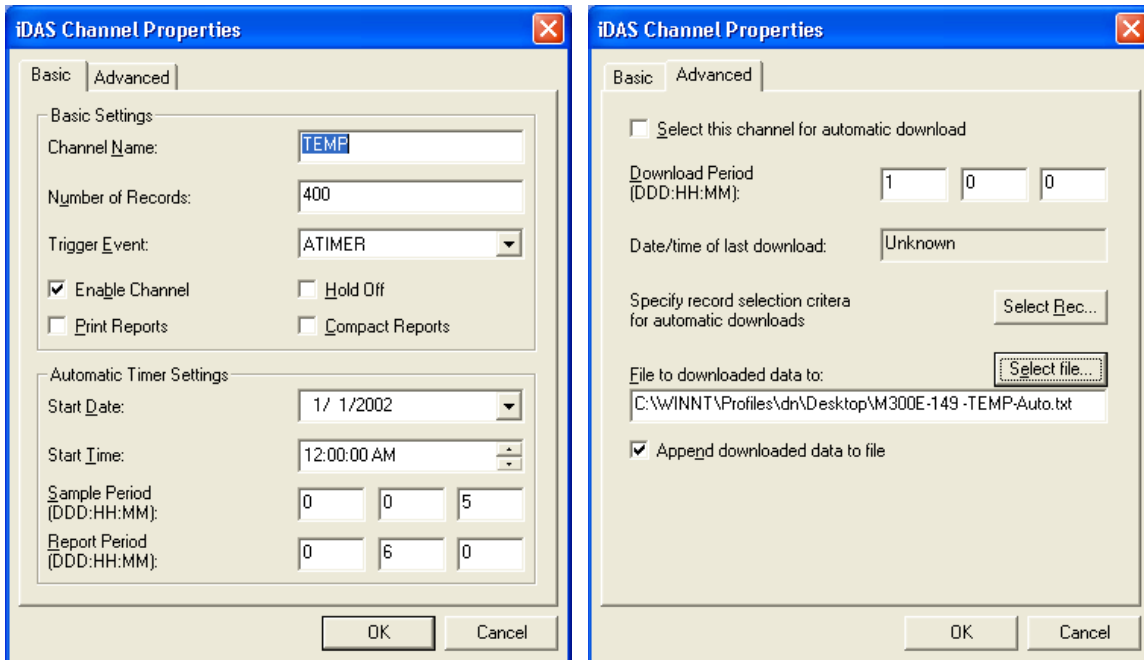
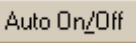



Figure 4-3: DAS Channel Properties Dialog – Basic and Advanced Tabs

The following table describes the tab parameter properties shown above.

Table 4-2: DAS Channel Properties

| Tab | Property | Description |
|------------------|-------------------|--|
| Basic | Channel Name | The name of the channel, up to 20 characters long. For RS-232 reports of this channel, the name will be truncated to 6 characters in order to maintain a neat printed format. The name should not contain any spaces. |
| | Number of Records | The number of records to store for this channel. The maximum number of records that can be stored (across all channels) typically ranges from 3000–12000 and depends on the number of parameters in each channel and the number of channels. |
| | Trigger Event | The instrument event that triggers recording of this channel: an automatic timer event, a calibration event, or a warning event. |
| | Enable Channel | If checked, the channel will store records. If unchecked, the channel will not store records. This property can disable a channel without having to delete it. |
| | Hold Off | If checked, this channel will not store any records during the hold off interval (calibration period). If unchecked, this channel will store records regardless of the hold off state. |
| | Print Reports | If checked, this channel will print each record that it stores to the RS-232 interface (and dump it to a Terminal program). If unchecked, it will store the record but not print it. When APIcom is connected to the instrument, the records will not be printed to the RS-232 interface, regardless of the setting of this property. Note that “COMx QUIET MODE” must be OFF. |
| Basic (cont.) | Compact Reports | If checked, records printed to the RS-232 will be printed with up to 5 records per line. If unchecked, each record will be printed on a separate line. This property only applies if the <i>Print Reports</i> property is checked. |
| | Start Date | The date when the DAS starts storing records. By default, this is a date in the past, but if set to the future, the instrument won't start storing records until that date. |
| | Start Time | Time on the starting date when the DAS should start storing records. |
| | Sample Period | Number of days (maximum 365-366 per Julian calendar), hours, and minutes, measured from the starting date and time, between each sampled data point. At least one of the three fields of this property must be non-zero. |
| | Report Period | Number of days (maximum 365-366 per Julian calendar), hours, and minutes, measured from the starting date and time, between each reported record. At least one of the three fields of this property must be non-zero. If sample period is larger or identical to the report period, the resulting value will be an instantaneous value every <i>report period</i> . If the sample period is smaller than the report period (and the parameter is set to AVG), the resulting value is an average over <i>Report/Sample</i> number of instantaneous values every <i>report period</i> . |

| Tab | Property | Description |
|----------|---|--|
| Advanced | Select this channel for automatic download | If checked, data for this channel will be downloaded automatically when the  button is pressed. |
| | Download Period | This is the number of days, hours, and minutes, between each automatic data download. At least one of the three fields of this property must be non-zero. |
| | Date/time of last download | The last date and time that data was downloaded from this channel. This is a read-only field, it cannot be modified |
| | Specify record selection criteria for automatic downloads | This specifies the criteria for downloading data records automatically. This selection criteria is separate from the global one used with the  button, and is specified for each channel to afford maximum flexibility. |
| | File to download data to | This is the file to download data to automatically. The name can be freely chosen, i.e. with user-defined extension .csv, .prn, .dat, .apicom etc for easier import into data analysis programs. |
| | Append downloaded data to file | If checked, APIcom will append new data to the existing file. Otherwise it will completely overwrite the file. |


4.5.2. DAS Channel Names

When a channel's properties are edited, APIcom checks to make sure that the channel name is unique and contains valid characters. APIcom does not perform this check when downloading a configuration from an instrument or when loading a configuration from a file because it assumes that the names are already valid in these cases. If the name is invalid because it isn't unique or because it contains invalid characters, APIcom will display an error message and remain in the channel property dialog.

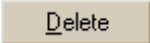
When editing the DAS channel names through the front panel push buttons, the instrument will only allow to use upper case characters with no more than 6 characters. However, APIcom permits to use longer names and lower case characters. When viewing the channel names using the instrument's menus, however, the display will be truncated to 6 characters (with the remaining name stored and recognized in memory). This limitation is due to the size of the instrument's display.

Some older instruments with DAS support may require unique, 6 character names. If long channel names create problems, we recommend to make the names unique within the first 6 characters and, failing that, make the names no longer than 6 characters. The names are not case-sensitive in any instrument.

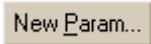
4.5.3. Duplicating a Channel

APIcom can duplicate a channel and all its properties including parameters. Simply select a channel and click on  or right-click on a channel and select Duplicate Channel from the context menu. APIcom will create a new channel and prompt the user for a new channel name to ensure a unique name.

4.5.4. Deleting a Channel

To delete a channel, simply select the channel and click on . Alternatively, the user can right-click on a channel and select **Delete Channel** from the context menu. In either case, APIcom prompts to confirm the deletion. Prompts like this can be disabled in the **Settings-Options** menu. When a channel is deleted, all the parameters in it and all the data downloaded for the channel are automatically deleted as well. It is recommended to make frequent backups of DAS scripts on disk to avoid duplicate work in case of accidental deletion.

4.5.5. Adding or Modifying a Parameter

In order to capture any data, a channel must contain at least one parameter. To add a new parameter to a channel, either click on  while a channel is selected, or right-click on any existing parameter in the channel, which will bring up the menu shown below, and select **New Parameter**. If APIcom refuses to create a new parameter, the maximum number of parameters may have been exceeded. The maximum number of channels is 20 per instrument, the maximum number of parameters in each channel is 10 and the maximum number of data records in each channel is 64000. However, the A-series analyzers are limited by 64 KB data memory, hence the average number of records (depending on the number of channels and parameters and if the number of samples in a concentration average is recorded) is much lower, typically around 3000-12000 records. E-Series and T-Series instruments have 1 MB of data storage capacity and the ability to store up to about 100,000 records.

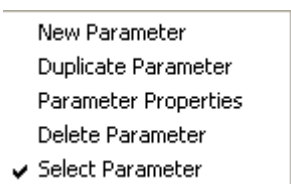


Figure 4-4: DAS Parameter Context Menu – Adding or Modifying a Parameter

To edit any existing parameter, click on **Edit Parameter** or , which will bring up the following dialog box.

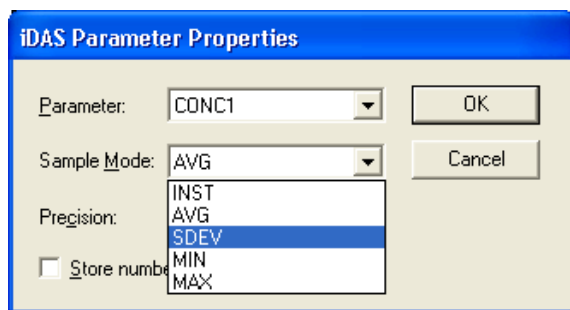



Figure 4-5: DAS Parameter Properties Dialog

The following table describes the parameter properties shown above.


Table 4-3: DAS Parameter Properties

| Property | Description |
|------------------------------------|---|
| Parameter | This is the instrument-specific parameter to sample. The list of parameters differs from instrument to instrument, and even from one instrument firmware version to another. |
| Sample Mode | This is the mode to sample the parameter with. Choices are: INST – records instantaneous reading. AVG – records the average reading during reporting interval. MIN – records the minimum reading during reporting interval. MAX – records the maximum reading during reporting interval. SDEV – records the standard deviation during reporting interval. |
| Precision | This is the numeric precision to use when displaying a parameter value (range 0-4). It is used to display the parameter values in the menus and in the RS-232 reports. It is used by APIcom when viewing and saving downloaded data. |
| Store number of samples in average | This option will store the number of samples in each concentration average that make up each report (no other parameters). For example, if the sample period is one minute, and the report period is one hour, then 60 samples will be taken for each report. If the sample mode is AVG, then these 60 samples will be averaged and a single average value will be stored in the data file. Setting the STORE NUM. SAMPLES property to ON will store not only the average value, but the number 60. When you request reports for this channel later, the number of samples in each report will be printed, as shown below. <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> D 288:09:00 0400 CONC : AVG O3CNC1= 11.2 PPB SAMPLES= 18 D 288:10:00 0400 CONC : AVG O3CNC1= 11.2 PPB SAMPLES= 60 D 288:11:00 0400 CONC : AVG O3CNC1= 11.2 PPB SAMPLES= 60 </div> Notice that the first report shown above contains only 18 samples, whereas the rest contain 60 samples. The number of samples can give you some idea of the validity of the data. You cannot obtain the individual samples that make up the average. |

4.5.6. Duplicating a Parameter

To duplicate a parameter and all its properties, simply select a parameter and click on  or right-click on a parameter and select **Duplicate Parameter** from the context menu. APIcom will create a new parameter of the same type and add it to the end of the channel's parameter list. The parameter name can be identical to the original without conflict. This can be used to, e.g., sample one parameter using the MIN, AVG, and MAX sampling modes.

4.5.7. Deleting a Parameter

To delete a parameter, simply select the parameter and click on . Alternatively, the user can right-click on a parameter and select **Delete Parameter** from the context menu. In either case, APIcom prompts to confirm the deletion. This prompt can be disabled in the **Settings-Options** menu.

4.6. Sending the DAS Configuration to the Instrument

To send the DAS configuration to the instrument, click on **Send To Inst.** Sending the DAS configuration to the instrument will completely replace the instrument's current DAS configuration and discard all of the data stored in the instrument. Therefore, APIcom will prompt to confirm the operation before proceeding.

Older analyzer firmware revisions may not support this functionality, see Appendix A or the website for more information. In this case, the **Send To Inst.** and other buttons will be grayed-out.

If the send operation is successful, APIcom will display the following dialog box.

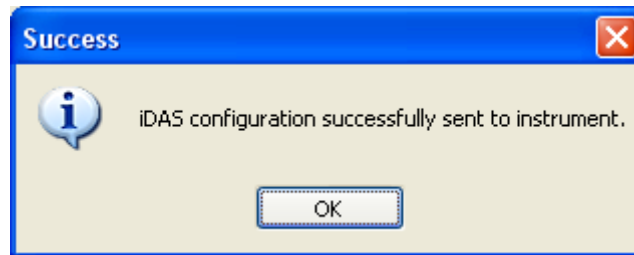


Figure 4-6: Successful DAS Send Dialog

If the send operation is unsuccessful, APIcom will display the following dialog box. Some possible causes of this error are that a channel name contains spaces or that the instrument's receive buffer overflowed while receiving the DAS configuration. Try enabling one or more handshaking options, particularly the *Transmit Delay* option in the instrument properties dialog. Also, lowering the baud rate often solves this problem.

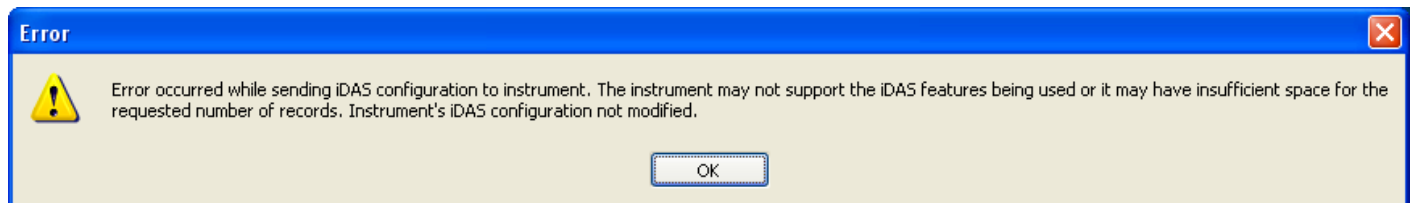


Figure 4-7: Unsuccessful DAS Send Dialog

4.7. Downloading DAS Data

To download DAS data, check the desired channels or parameters in the dialog box by clicking in the checkboxes next to each name. (The checkboxes may not appear in some versions of Windows. If this is the case, the problem can be fixed by upgrading to Internet Explorer 5.0 or higher and NT 4.0, service pack 4 or higher.) A work-around is to right-click on a channel or parameter and use **Select Channel** or **Select Parameter** to select it or deselect it. The checkmark next to the menu item shows the channel's or parameter's current selection state.

When a channel is selected or deselected, all of its parameters are automatically selected or deselected, too. Alternatively, the user can choose to SELECT ALL or DESELECT ALL by using the appropriate buttons on the bottom right of the window. Upon clicking on **Get Data**, APIcom will present the following record selection dialog to choose which records should be downloaded. See table for explanation of each option.

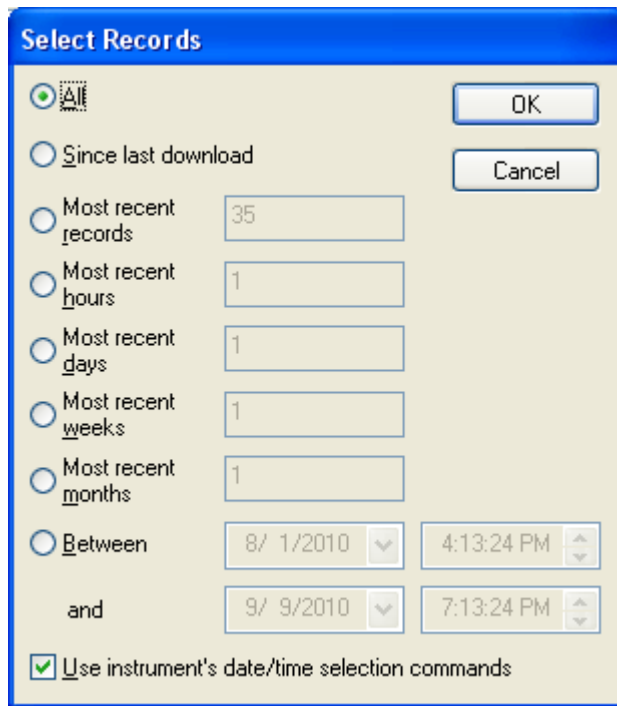
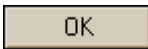



Figure 4-8: Select Records Dialog

The following table describes the properties shown above.

Table 4-4: Select Records Dialog

| Property | Description |
|---|---|
| All | Downloads all the records stored in the instrument for the selected channels or parameters. |
| Since last download | Downloads all the records stored since the last download. |
| Most recent records | Downloads the most recent <i>N</i> records. |
| Most recent hours | Downloads the records from the most recent <i>N</i> hourly intervals. For instance, a value of 1 will download all records from the beginning of the current hour; a value of 2, from the beginning of the previous hour, etc. |
| Most recent days | Downloads the records from the most recent <i>N</i> daily intervals. |
| Most recent weeks | Downloads the records from the most recent <i>N</i> weekly intervals. |
| Most recent months | Downloads the records from the most recent <i>N</i> monthly intervals. |
| Between, and | Downloads only the records between specified range of dates and times. |
| Use instrument's date/time selection commands | If checked, APIcom lets the instrument search for records within the requested date/time range using the instrument's date/time records. This may speed download times, as only the requested data are downloaded. However, some instruments are slow, particularly if their DAS data files are large, and APIcom may timeout while waiting for the instrument to respond (set time-out period in the Instrument Properties - Handshaking dialog). If APIcom cannot successfully use this option with an instrument, simply uncheck it and APIcom will download all the records and then filter out the ones that are not in the requested date/time range, using the date/time listing of the downloaded file. This is potentially slower, but may be more reliable. Only newer firmware revisions will support this functionality; see website for table of supported firmware revisions. |
| All | Downloads all records stored in the unit for the selected channels or parameters. |

Specify the record selection criteria to use and click on  to begin downloading. Note that DAS data downloads can take several minutes, depending on the baud rate and how many data were selected. For instruments with the proper software, downloads can be canceled by pressing the cancel button . The instrument information dialog, section 7.1, indicates whether the instrument supports this feature.

Instruments actually store DAS records approximately one second after the programmed time. For instance, if an instrument is programmed to store a record at 10:00:00, it will actually store it at 10:00:01. This slight delay ensures that the record is stored after the sampling interval is completed. It is important to be aware of this behavior when using the *Between* option above, and set the ending time a few seconds beyond the last time of desired download. For example, if records up to 10:00:00 are desired, the ending time limit should be 10:00:05.

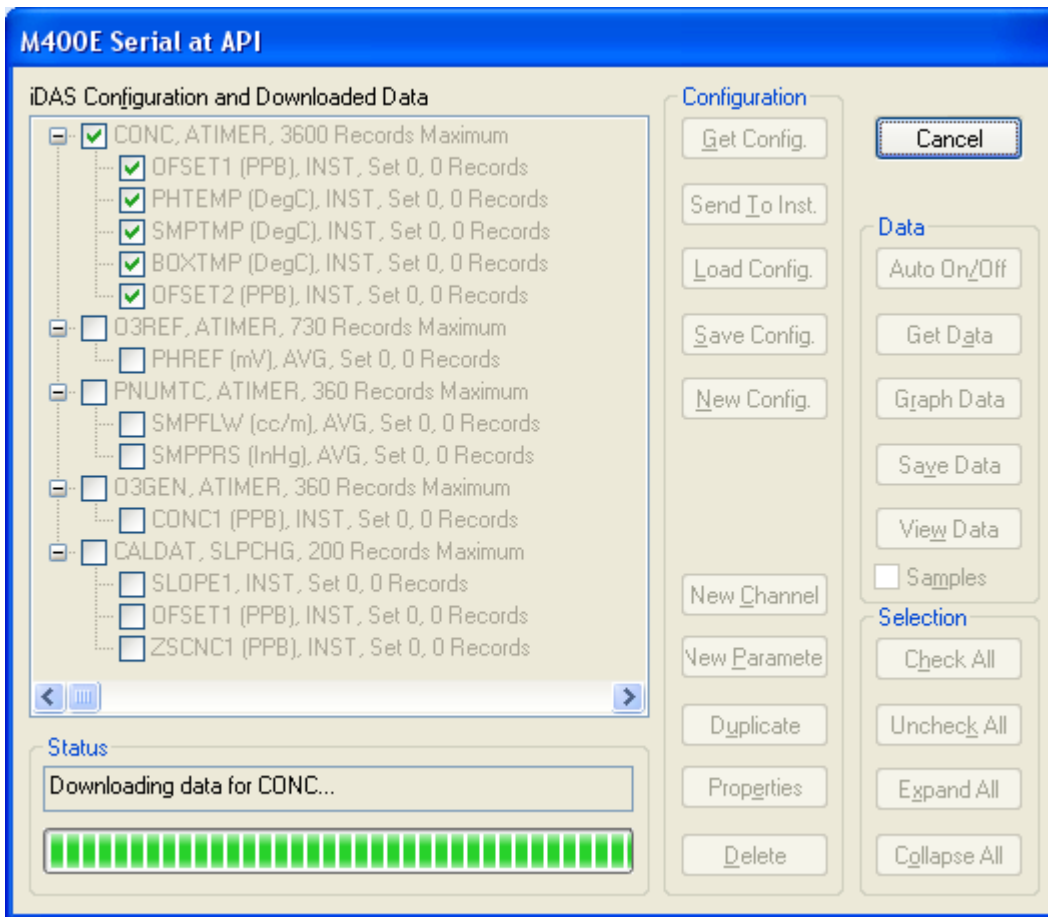


Figure 4-9: Downloading DAS Data

For instruments that do not support the date range download, APIcom must download all the records and then discard the ones outside the requested date range. Thus, in many instruments it takes just as long to download records by date range as it does to download all the records. After the records have been downloaded, the *DAS Configuration and Downloaded Data Dialog* might look like the following figure:

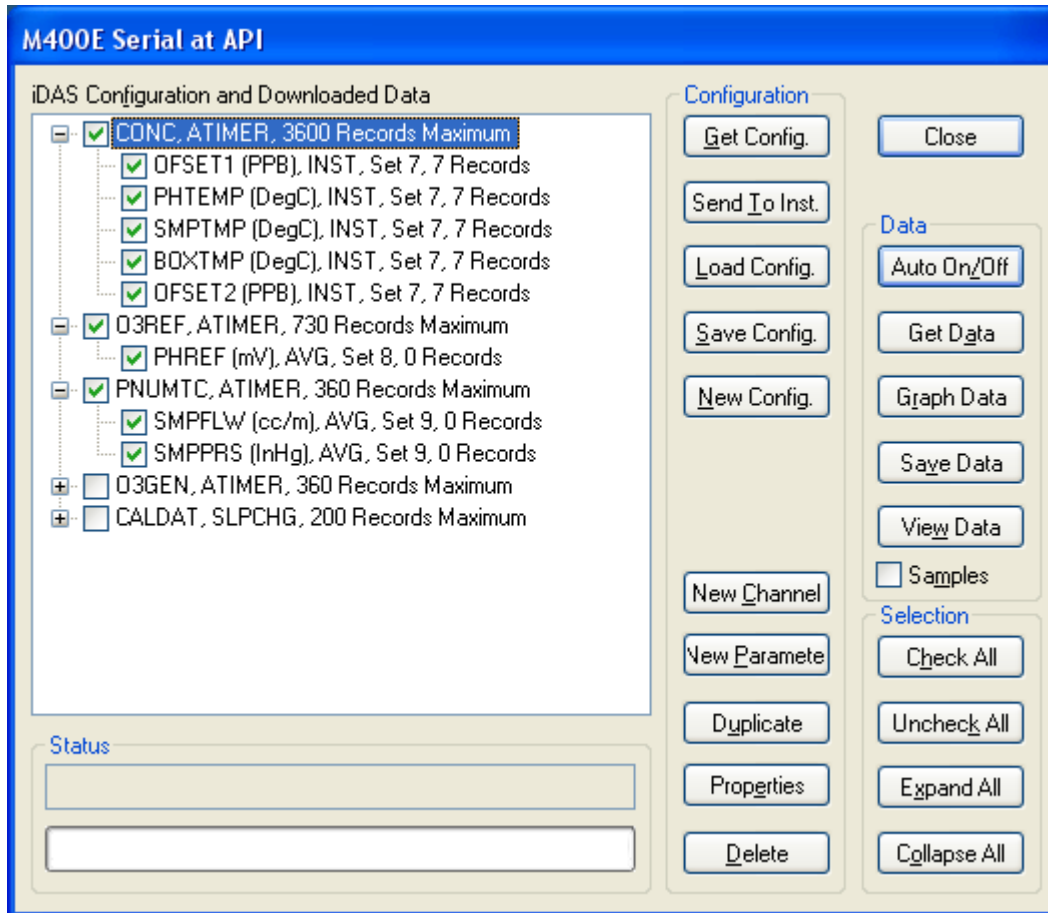


Figure 4-10: Downloaded DAS Data

Note the number of records that were downloaded from the *Concentration* and *Pneumatic* channels (32), and from the *SlopeOffset* channel (1).

APIcom remembers the downloaded DAS data as long as it is connected to the instrument or until the configuration is downloaded again. When the instrument is disconnected, the data are discarded to conserve memory.

4.7.1. DAS Record Sets

APIcom implements the notion of a *record set*. Each time DAS data are downloaded from an instrument, APIcom increments the record set number. Only parameters downloaded as part of the same record set may be combined in group operations, such as graphing, saving to a file, or viewing. Records downloaded from different channels are implicitly in different record sets. In the example above three record sets are created: 7, 8, and 9. Records from different record sets cannot be mixed because they may contain a different number of records or have different time stamps or intervals.

4.8. Graphing DAS Data

After downloading data, they can be graphed in a window by selecting one or more parameters in the *Parameters* list that are in the same record set and clicking **Graph Data**. All parameters will be plotted on the same graph.

The *Graph Window* can be resized by dragging the window border with the mouse. APIcom remembers the position and size of the last closed graph window. Up to three graph windows can be opened at any time. When graphing data that are significantly different in magnitude, each parameter should be graphed in a separate window as shown in the following figure.

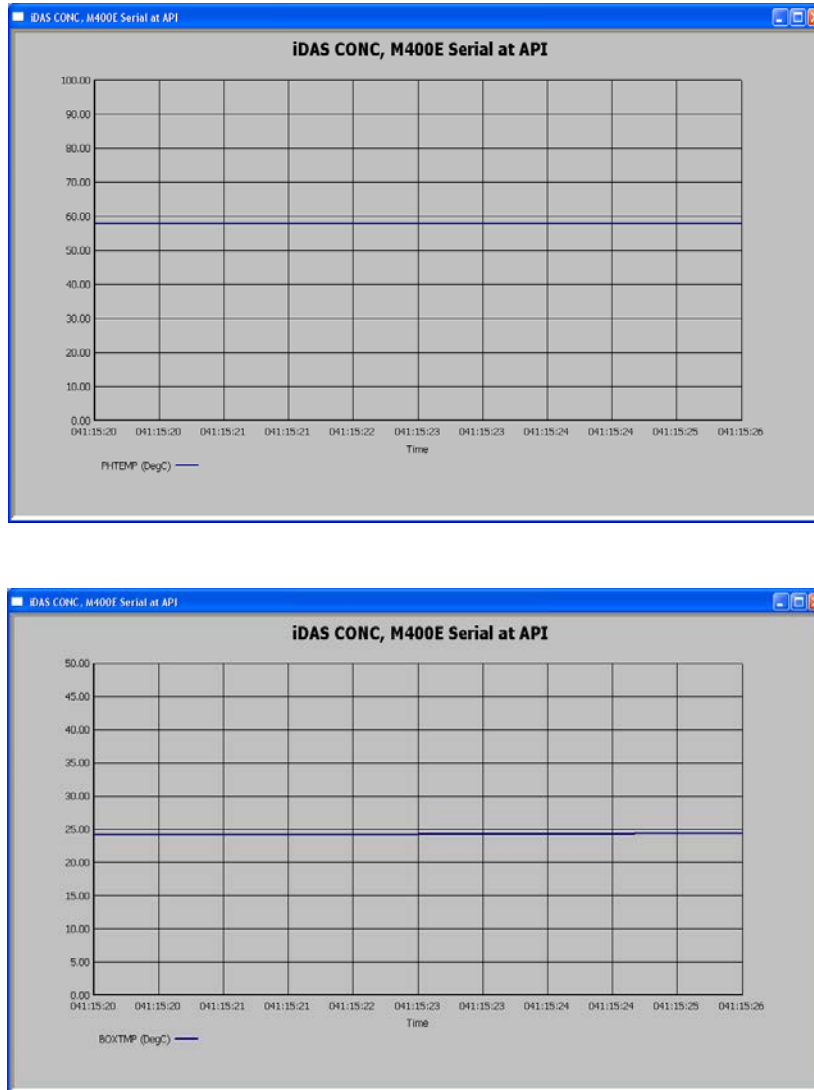


Figure 4-11: Graphing Multiple DAS Parameters With Different Scales

In the example above, each graph window has a different Y-axis scale that is appropriate for the range of data values being graphed; as all data stem from the same record set, X-axes are time-aligned.

The primary purpose of the *Graph Window* is to preview the data. For more sophisticated graphs we recommend to download and save the data, then import them into e.g., a spreadsheet program.

4.9. Viewing DAS Data

Data can also be viewed on-screen in table format. To view DAS data, select one or more parameters from the same record set or an entire channel and click View Data. This will display the data in a table format like that shown in Figure 4-12.

This window can be resized by dragging its edges with the mouse and adjusting the column widths as needed. APIcom remembers the position and size of the dialog, except for the column layout, which changes with different parameters.

| Time Stamp | OFSET1-INST (P... | PHTEMP-INST (DegC) | SMPTMP-INST (DegC) | BOXTMP-INST (De... | OFSET2-INST (PPB) |
|---------------------|-------------------|--------------------|--------------------|--------------------|-------------------|
| 02/10/2011 15:20:01 | 0.20 | 58.0 | 38.1 | 24.3 | 0.0 |
| 02/10/2011 15:21:01 | 0.20 | 58.0 | 38.1 | 24.2 | 0.0 |
| 02/10/2011 15:22:01 | 0.20 | 58.0 | 38.1 | 24.2 | 0.0 |
| 02/10/2011 15:23:01 | 0.20 | 58.0 | 38.1 | 24.3 | 0.0 |
| 02/10/2011 15:24:01 | 0.20 | 58.0 | 38.1 | 24.3 | 0.0 |
| 02/10/2011 15:25:01 | 0.20 | 58.0 | 38.1 | 24.4 | 0.0 |
| 02/10/2011 15:26:01 | 0.20 | 58.0 | 38.1 | 24.5 | 0.0 |

Figure 4-12: Viewing DAS Data

Newer versions of the DAS can store the number of samples in an average. If this option is enabled for a parameter, there will be an additional column after each parameter showing the number of samples in each average, as shown in the example below. This extra column will only show after a parameter is storing the number of samples.

NOTE: Storing the number of samples will decrease the maximum possible number of data that can be stored in the DAS.

4.9.1. Changing the Precision of DAS Data When Viewing or Saving

Downloaded data are formatted using the precision setting specified in the instrument’s DAS configuration. However, DAS data are always downloaded in their full resolution, hence, the precision of downloaded data can be changed for viewing or saving by editing the parameter’s properties and changing the precision as desired.

4.10. Saving DAS Data

After download, data can be saved to a file by selecting one or more parameters in the *Parameters* list and clicking **Save Data**. Only data from the same record set can be saved in the same file. APIcom will store each selected parameter in a separate column in the file, separated by commas so that the file can be imported into other programs, such as a spreadsheet program for further analysis. The following figure shows a sample of a saved data file, which is similar to the view format shown above, except. that the saved file separates date and time columns.

```

M306A-M306-000000-CONC-CONC1-20010927-1.txt - Notepad
File Edit Format Help
Date,Time,CONC1 (PPM),CO2CNC (%),STABIL (PPM)
2001/09/24,17:00,0.277,0.00,-0.000
2001/09/24,18:00,0.278,0.00,-0.000
2001/09/24,19:00,0.155,0.00,-0.000
2001/09/24,20:00,0.125,0.00,-0.000
2001/09/24,21:00,0.358,0.00,-0.000
2001/09/24,22:00,0.242,0.00,-0.000
2001/09/24,23:00,0.066,0.00,-0.000
2001/09/25,00:00,0.075,0.00,-0.000
    
```

Figure 4-13: Saved DAS Data

The first line in the example above is the header line, which labels the columns. The data records begin on the second line, and each consists of a complete time stamp and one or more readings. All fields are separated by commas. Storing the number of samples will create another column labeled “Samples,” which shows how many samples are in each average reading. Renaming this output file to an extension “.csv” enables to launch it directly into Microsoft Excel when double-clicking on the file.

4.10.1. DAS Data File Names

APIcom utilizes the long filename capability of Windows to help distinguish data files:

“<Instrument Name>-< Instrument Serial Number>-<Channel Name>-<1st Parameter Name>-<YYYYMMDD>-<Record Set #>.csv”

4.10.2. Saving DAS Data To An Existing File

DAS data can be appended to an existing file by following the same steps as for saving the data. Instead of accepting the automatically generated file name, simply click on an existing file in the file save dialog. APIcom will prompt to replace the file with the new data or to append the new data to the end of the file. When appending data, APIcom will not write a new header line.

Caution: APIcom allows to append data from different parameters or channels. This is because the program does not log all saved data file names. Make sure to append data only to a file with compatible column format, otherwise data may not line up with their correct date/time stamps.

4.11. Discarding DAS Data

APIcom stores the downloaded DAS data as long as it is connected to the instrument. When the instrument is disconnected, the data are discarded to conserve memory. Make sure to download and save data before they get overwritten in the DAS.

DAS data can consume up to several megabytes of the computer's RAM memory. If the host computer is experiencing memory shortages, try reducing the data amount that APIcom stores by only downloading required data. Furthermore, data are duplicated for every graph window that is displayed.

4.12. Downloading DAS Data Automatically

APIcom can be configured to download DAS data automatically at periodic intervals. Different intervals and record selection criteria can be chosen for each channel. Each channel must be configured separately for automatic download using the *Advanced* tab of the channel property dialog (see Figure 4-3).

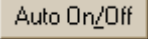
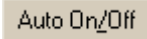
4.12.1. Configuring Channels for Automatic Download

APIcom allows to specify the download period, the record selection criteria, the data file name, and whether to append to or replace the data file, on a channel-by-channel basis. When combining "*Since last download.*" with the "*Append downloaded data to file*" option, the instrument's DAS storage capacity is essentially only limited by the host computer's disk space. Auto-download configuration has to be done only once, APIcom stores the automatic settings in its network configuration file.


4.12.2. Selecting Channels for Automatic Download

After configuring the channels on how to automatically download, they also need to be checked for download. This is done by checking the checkbox next to the channel's name in the DAS configuration list or right-clicking on a channel and clicking *Select Channel* in the context menu. Or the option "*Select this channel for automatic download*" in the *Advanced* tab can be used.

4.12.3. Activating Automatic Download Mode

Finally, press  to activate automatic mode. While this button is pressed, all of the other buttons in the DAS configuration dialog are disabled and the user cannot access any front panel, the main window or any other APIcom settings. This is to prevent conflicts between automatic and manual downloads. To regain access to the windows, simply de-press , finish the desired operation, then press the button again to resume automatic mode.

4.12.4. File Names For Automatic Download

The file name that APIcom generates when clicking  in the *Advanced* tab has a different default format from the file name that APIcom generates when saving data manually:

“<Instrument Name>-< Instrument Serial Number>-<Channel Name>-Auto.csv”



Unlike the file name format for manual saves, the date and record set number are not included. This is because APIcom will repeatedly add data to this file or replace it entirely, hence those additional fields are meaningless in automatic mode.

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5. CALIBRATOR SEQUENCES

APIcom includes support for modifying the sequence configuration in M403, M700/M700E/T700 and M703E calibrators. APIcom can only modify the sequence configuration in M700 calibrators with firmware revision D.3 or higher. However, calibrators with firmware prior to D.3 can still be edited through the front panel. Since the M403 and M703E models are ozone only calibrators there are some features common to the M700, M700E or T700 are not present either through APIcom or directly from the front panel of the calibrator, such as gas selection and GPT.

The user interface for sequence configuration is very similar to that for configuring the DAS. If APIcom detects that the instrument is an M700 calibrator, the front-panel DAS button,

, is changed to . The M700 does not contain a DAS and stores sequences in a different memory space than the DAS is usually saved. The current sequence configuration can be downloaded, saved, modified, and sent it back to the instrument. Sending a sequence configuration to the instrument will completely replace its existing configuration. A sequence configuration can also be changed by using the instrument's own menus through the *Front Panel Window* (see Figure 1-1).

5.1. Sequence Configuration Dialog

Clicking  in the *Front Panel Window* or clicking **Configure Sequences...** in the *System Menu* (top left corner of each window) of the *Front Panel Window* will produce the following dialog box.

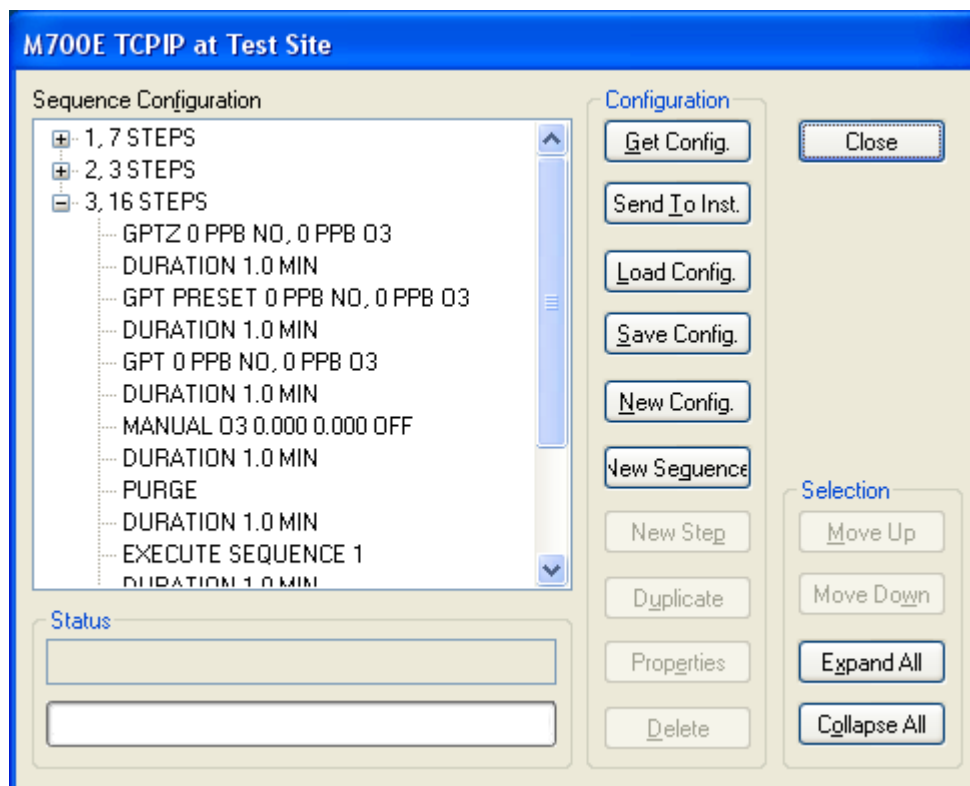



Figure 5-1: Sequence Configuration Dialog

Initially, this window is empty. Download the instrument's sequence configuration using the **Get Config** button. It is also possible to open this dialog off-line when editing the instrument's properties (see Figure 5-1) by clicking on **Sequence Configuration...**. When editing the sequence configuration off-line, the buttons related to downloading and uploading are disabled. The following table summarizes the functions of the buttons in the *Sequence Configuration Dialog*.

Table 5-1: Sequence Configuration Dialog Buttons


| Property | Description |
|------------------------------|--|
| Configuration Buttons | |
| Get Config | Downloads the sequence configuration from the instrument into APIcom. |
| Send To Inst. | Sends the sequence configuration in APIcom to the instrument. This will completely replace the instrument's current sequence configuration. |
| Load Config... | Loads a sequence configuration from a text file stored on the computer. This configuration may be edited and saved on the computer again, or it may be sent to an instrument. This configuration file may have been downloaded from the instrument using the "C PRINT SCRIPT" RS-232 command, or it may have been created using Save Config... in APIcom. |
| Save Config... | Saves the sequence configuration to a text file on the computer. The format of this configuration file is suitable for uploading to the instrument via its RS-232 interface. |
| New Config. | Creates a new, empty sequence configuration. |
| New Seg... | Creates a new sequence. |
| New Step... | Creates a new step in the selected sequence. |
| Duplicate | Creates a duplicate of the selected sequence or step. When creating a duplicate, APIcom will prompt for a new, unique sequence name. |
| Edit... | Edits the properties of the selected sequence or step. |
| Delete | Deletes the selected sequence or step. |
| Selection Buttons | |
| Move Up | Moves the selected sequence or step up one position relative to the other sequences or steps. |
| Move Down | Moves the selected sequence or step down one position relative to the other sequences or steps. |
| Expand All | Expands all the sequences in the list, showing all the steps. |
| Collapse All | Collapses all the sequences in the list, hiding all the steps. |

5.2. Downloading a Sequence Configuration


Download the remote instrument's sequence configuration by clicking . APIcom stores the sequence configuration in the network configuration file (.CFG). If the configuration from this instrument was already downloaded, the sequence configuration will appear in the dialog.

In Figure 5-1 some sequences have been expanded to show the steps. The dialog box displays a summary of each sequence, including the sequence name, the number of steps in the sequence, and the number of times the sequence will run when executed. Below each sequence is a list of steps in the sequence. Each step summary shows the step type and the properties that are specific to that step type. For instance, a *generate* step shows the concentration and gas that will be generated; a *delay* step shows the duration of the delay; and a *standby* step shows no additional properties.

5.3. Saving a Sequence Configuration

There are two ways to save a sequence configuration. APIcom automatically stores the sequence configuration in its network configuration file when saving it. The second way is to save the sequence configuration as a text file using . APIcom will prompt for a file name, the default format is:

"<Instrument Name>-<Instrument Serial Number> Sequence Configuration.txt"

Once saved as a text file, it can be loaded again using  button.

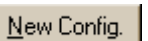

5.4. Modifying a Sequence Configuration

APIcom can only modify the sequence configuration in M700 calibrators with firmware revision D.3 or higher. This section assumes familiarity with configuring the sequences in an instrument. APIcom facilitates configuring the instrument's sequences in the following ways:

- ❑ APIcom takes advantage of the larger area of the computer screen to display more of the sequence configuration than the instrument can with its vacuum fluorescent display.
- ❑ APIcom validates the user's inputs and verifies that the configuration is successfully sent to the instrument. Scripts with unsupported entries are rejected by the instrument!
- ❑ APIcom allows to load sequence configurations stored on the computer and to send them to the instrument, making it quick and easy to load the same configuration into multiple instruments.
- ❑ APIcom can store many sequence configurations on the computer, allowing the download of different configurations for different purposes.

The basic procedure for modifying the instrument's sequence configuration is to download the current configuration from the instrument, modify it, and then send it back to the instrument and saving it to disk for backup purposes. These steps are discussed in more detail below.

To download the current configuration, click .

To start a new, empty configuration by clicking  or load a previously saved sequence by clicking .

5.4.1. Adding or Modifying a Sequence

Expand a sequence to see its steps by clicking on the “+” box next to the sequence name. To add a new sequence, either click on **New Seq...** or right-click on any existing sequence, which will bring up the context menu shown below, and select New Sequence. If APIcom will not create a new sequence, it’s because the maximum number of sequences have already been created. The number of sequences or steps is limited only by available memory. However, APIcom limits the number of sequences and steps to 100 sequences and 100 steps per sequence. These limits are larger than the M700 can actually accommodate.

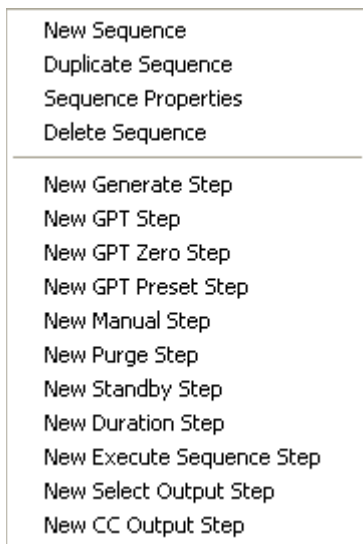


Figure 5-2: Sequence Context Menu – Adding or Modifying a Sequence

To edit an existing sequence, click on **Edit Sequence** in the context menu **Edit...**, which will bring up the dialog box in Figure 5-3. Table 5-2 describes the sequence properties shown in the following figure.

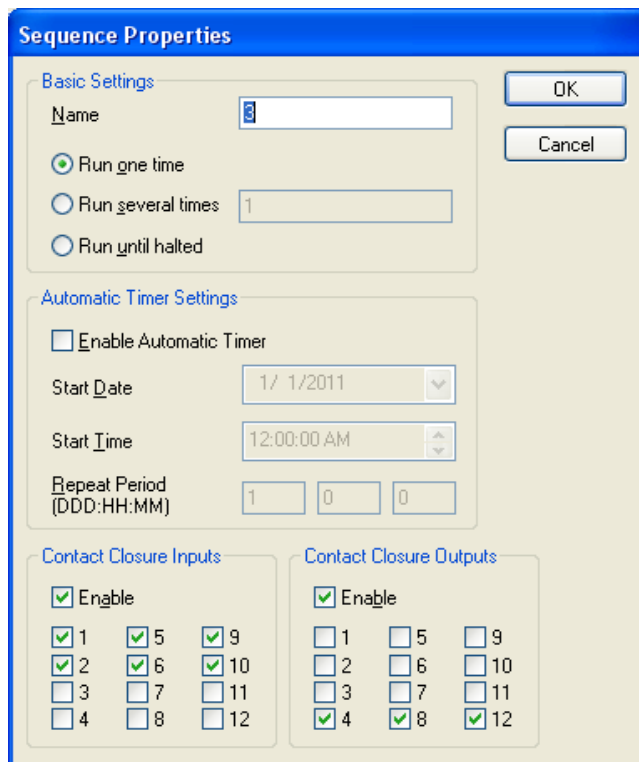



Figure 5-3: Sequence Properties Dialog

The following table describes the properties shown above.

Table 5-2: Sequence Properties

| Property | Description |
|-------------------------|---|
| Name | Name of this sequence. The name cannot contain any spaces. |
| Run mode | <p>Run one time: runs the sequence one time when it's executed. This is the usual case.</p> <p>Run several times: runs the sequence the number of times specified (0-100). Note that a value of 0 is the same as <i>Run until halted</i>, and a value of 1 is the same as <i>Run one time</i>.</p> <p>Run until halted: runs the sequence indefinitely until interrupted by pressing STBY on the front panel.</p> |
| Enable Automatic Timer | If checked, the sequence will be executed automatically at timed intervals and the Start Date , Start Time , and Repeat Period properties will be enabled. |
| Start Date | Date when the sequence should first execute. It is typically a date in the past, but if it is a date in the future, the instrument won't execute the sequence until that date. |
| Start Time | Time on the starting date when the sequence should first execute. |
| Repeat Period | Number of days, hours, and minutes, measured from the starting date and time, between each execution of the sequence. At least one of the three fields of this property must be non-zero. |
| Contact Closure Inputs | If Enable checked, the sequence will execute when the contact closure input pattern specified by checkboxes 1–12 is detected. If Enable is unchecked, the sequence will ignore the contact closure inputs. |
| Contact Closure Outputs | If Enable checked, the contact closure outputs will be set to the pattern indicated by checkboxes 1–12 when the sequence is executed. If Enable is unchecked, the contact closure outputs will not be altered when the sequence executes. Note that there is a contact closure output step that can alter the contact closure outputs at any point in the sequence. |

5.4.2. Sequence Names

When editing a sequence's properties and clicking , APIcom checks that the sequence name is unique and contains valid characters. APIcom does not perform this check when downloading a configuration from an instrument or when loading a configuration from a file because it assumes that the names are already valid in these cases. If the name is invalid because it isn't unique or because it contains invalid characters, APIcom will display the error shown in the following figure and remain in the sequence property dialog.

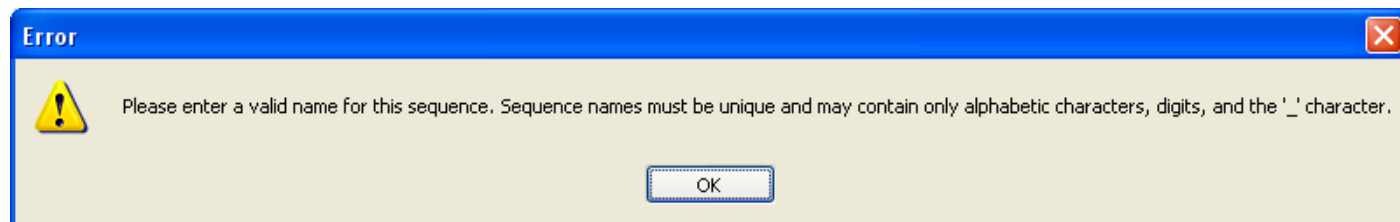



Figure 5-4: Invalid Sequence Name Dialog


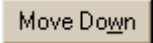
When editing the sequence names using the instrument's own menus, the instrument will only allow upper case characters, numbers, and the '_' character. However, APIcom will permit longer names and lower case characters. When viewing the sequence names using the

instrument's menus, however, the names may be truncated to fit on the display. This limitation is due to the size of the instrument's display. The names are not case-sensitive.


5.4.3. Duplicating a Sequence

Duplicate a sequence by clicking  or right-click on the sequence and select **Duplicate Sequence** from the context menu.

5.4.4. Moving a Sequence

To move a sequence relative to the other sequences, select the sequence and reposition it using the  and  buttons.

5.4.5. Deleting a Sequence

To delete a sequence, simply select the sequence and click on . Alternatively, right-clicking on a sequence and selecting **Delete Sequence** from the context menu will do the same. In either case, APIcom will confirm the deletion with a dialog box like that is shown in the following figure. When a sequence is deleted, all the steps in it are automatically deleted as well. Such prompts can be disabled in the **Settings-Options** menu.

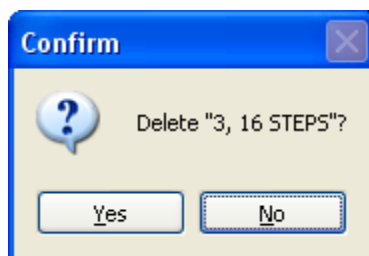


Figure 5-5: Delete Sequence Confirmation Dialog


5.4.6. Adding Steps to a Sequence

Sequences consist of a list of steps that are executed. There are several different types of steps, summarized in the table below. Refer to the M700 manual for a detailed description of these step types.

Table 5-3: Sequence Step Types

| Step Type | Description |
|------------------|---|
| GENERATE | Generates a concentration of specified gas and units. |
| GPT | Generates a GPT consisting of NO and O ₃ . |
| GPT PRESET | Generates a GPT-preset consisting of O ₃ (although input values are for both NO and O ₃). |
| GPT ZERO | Generates a GPT consisting of NO (although input values are for both NO and O ₃). |
| MANUAL | Generates gas under manual control using the specified gas, flows, and O ₃ generator setting. |
| PURGE | Purges the system with high flowrate and zero air. |
| STANDBY | Stops all actions and puts calibrator in standby mode. |
| DURATION | Generates a delay of the specified action (in minutes) |
| EXECUTE SEQUENCE | Executes a sequence by name (subroutine call). |
| SELECT OUTPUT | Specifies which output valve to open when generating gas. This functionality is available only for firmware E.4 and higher. |

| Step Type | Description |
|---------------|--|
| SET CC OUTPUT | Sets the contact closure outputs to the specified pattern. This functionality is available only for firmware E.4 and higher. |

To add a step to a sequence, select a sequence and click . The following dialog box opens.

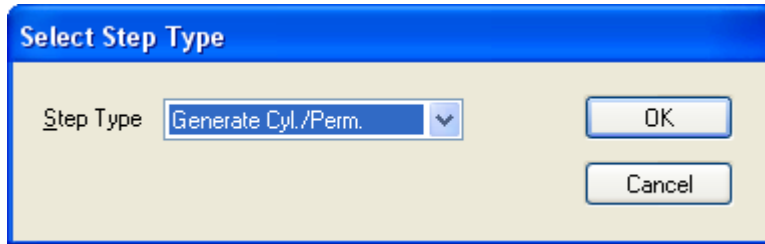



Figure 5-6: Select Step Type Dialog

Select one of the available step types from the list and click on . The context menu will appear (see Figure 5-7). Steps that are not supported by a particular firmware revision will not be available from this drop-down menu.

A step can also be added by right-clicking on a sequence and selecting one of the step types from the sequence context menu. Alternatively, right-clicking on a step within the sequence will bring up the slightly different sequence step context menu shown below. Click on one of the step types to add a step. If APIcom will not create a new step, it is because the maximum number of steps (100) has already been created for the sequence.



Figure 5-7: Sequence Step Context Menu

5.4.7. Generate Step

Editing a *Generate* step will bring up the following dialog box. The properties are described in Table 5-4.

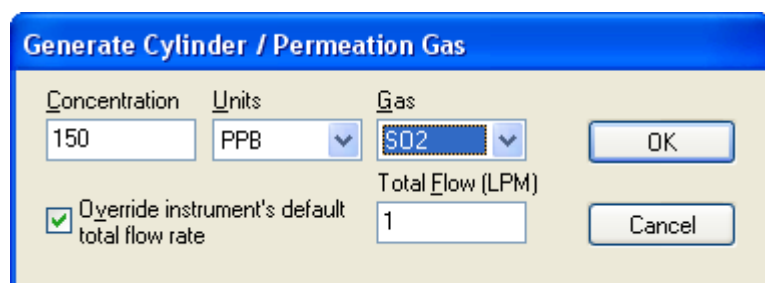


Figure 5-8: Generate Step Properties Dialog

The following table describes the properties shown above.

Table 5-4: Generate Step Properties

| Property | Description |
|---------------|---|
| Concentration | The numeric concentration to generate. |
| Units | The concentration unit to use. The M700 will perform any necessary unit conversions. |
| Gas | The gas type to generate. APIcom permits specifying several different gases, although the M700/700E may not be able to generate them all. In this case, it will simply generate zero air. |
| Total Flow | If the “Override instrument’s default total flow rate” checkbox is checked, this field permits entering the desired total flow rate. Otherwise, the default flow rate configured in the instrument is used. |

5.4.8. GPT, GPTZ and GPT Preset Steps

A GPT step will display the following property dialog.

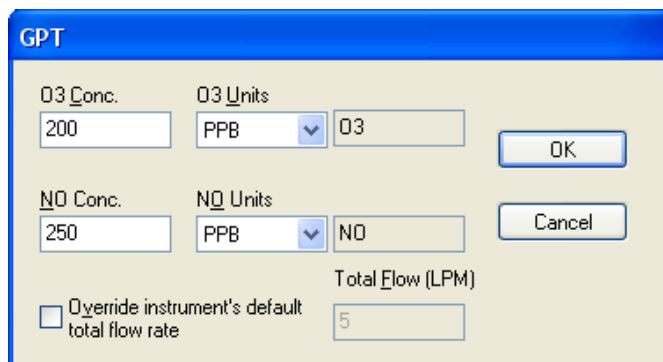


Figure 5-9: GPT Step Properties Dialog

A *GPT Preset* step will display the following property dialog.

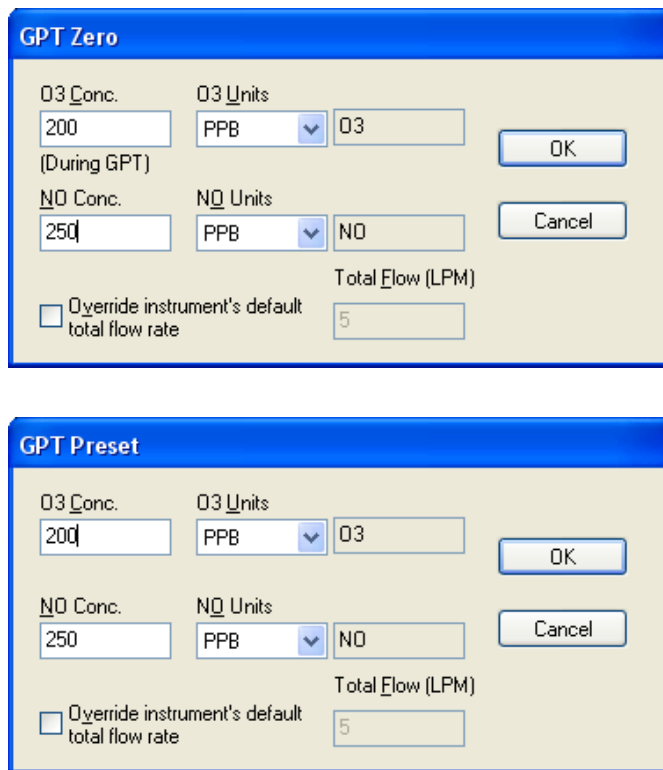


Figure 5-10: GPTZ (top) and GPT (bottom) Preset Step Properties Dialog

These two steps are almost identical. The properties are described in the following table.

Table 5-5: GPT and GPT Preset Step Properties

| Property | Description |
|------------|---|
| O3 Conc. | The numeric concentration of O ₃ gas to generate. |
| O3 Units | The O ₃ concentration unit to use. The M700 will perform any necessary unit conversions. |
| NO Conc. | The numeric concentration of NO gas to generate. |
| NO Units | The NO concentration units to use. |
| Total Flow | If the “Override instrument’s default total flow rate” checkbox is checked, this field permits entering the desired total flow rate. Otherwise, the default flow rate configured in the instrument is used. |

5.4.9. Manual Steps

A *Manual* step will display the following property dialog. The properties are described in Table 5-6.

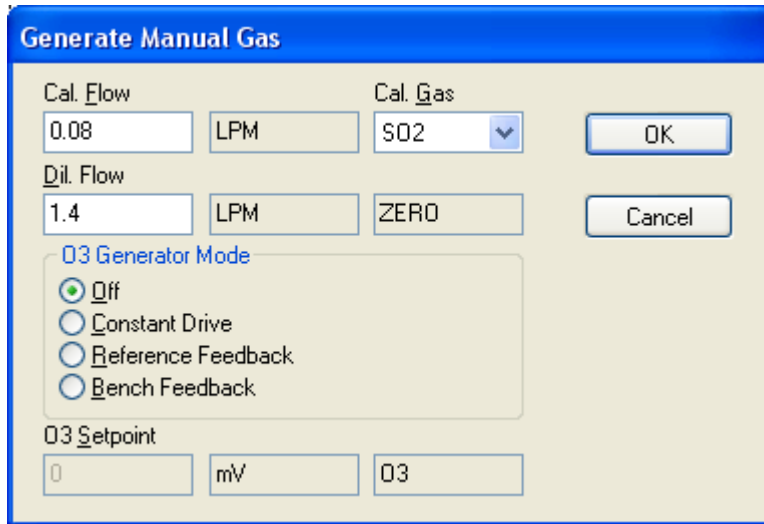


Figure 5-11: Manual Step Properties Dialog

Table 5-6: Manual Step Properties

| Property | Description |
|-------------------|---|
| Cal. Flow | Flow rate of calibration gas (LPM - liters per minute). |
| Cal. Gas | The gas type to generate. Although APIcom permits to specify several different gases, the M700 may not be able to generate them all. If the M700 cannot generate a specified gas, it will simply generate zero air. |
| Dil. Flow | Flow rate of the diluent gas (LPM - liters per minute). |
| O3 Generator Mode | For manual GPT. If Constant Drive or Reference Feedback are selected, the units for O ₃ are mV. If Bench Feedback is selected, the units for O ₃ are PPB. |
| O3 Setpoint | The mV or PPB setting for O ₃ . |

5.4.10. Duration Steps

Property dialog box & properties table.

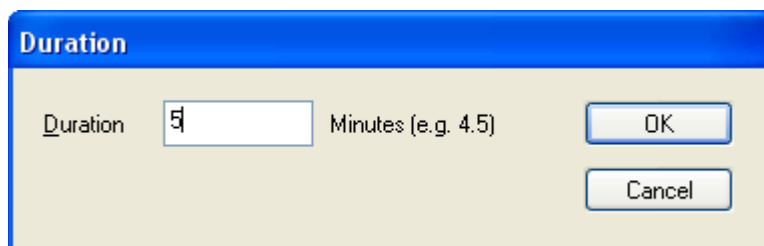


Figure 5-12: Duration Step Properties Dialog

The following table describes the property shown above.

Table 5-7: Duration Step Properties

| Property | Description |
|----------|--------------------------------------|
| Duration | The duration of the step in minutes. |

5.4.11. Execute Sequence Steps

Property dialog box and properties table.

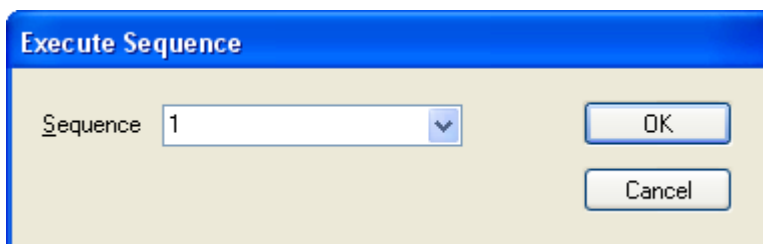


Figure 5-13: Execute Sequence Step Properties Dialog

The following table describes the property shown above.

Table 5-8: Execute Sequence Step Properties

| Property | Description |
|----------|--|
| Sequence | The name of the sequence to execute. For convenience, all the names of existing sequences will appear in the dropdown list. However any name can be entered into the <i>Sequence</i> field. If the specified sequence does not exist when the M700 tries to execute this step, the M700 will return to standby mode. |

5.4.12. Select Output Steps

Property dialog & properties table.

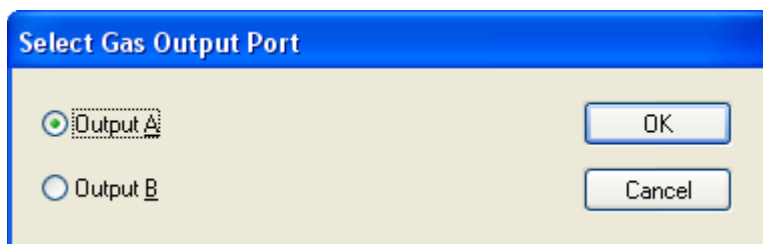


Figure 5-14: Select Output Step Properties Dialog

The following table describes the property shown above.

Table 5-9: Select Output Step Properties

| Property | Description |
|-------------|---|
| Output Port | Opens output valve A or B when generating gas. Note that this is an optional feature in the M700. This step will be ignored if the M700 doesn't have this option. |

5.4.13. Set Contact Closure Output Steps

There are two ways to control the contact closure outputs while executing a sequence. The contact closure outputs can be specified as one of the sequence properties, in which case the outputs will remain the same during the execution of the sequence. Or one or more *set CC output* steps can be inserted in a sequence, which allows to change the contact closure outputs while the sequence is executing, for example, to control other equipment. This option is only available for firmware revision E.4 or higher.

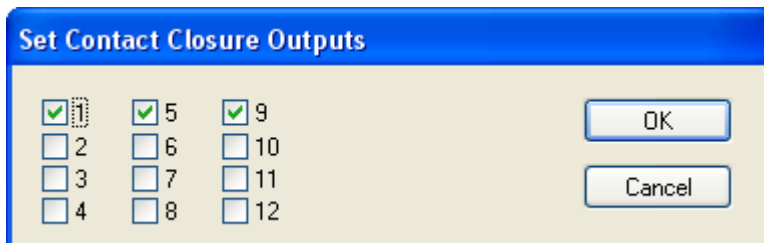


Figure 5-15: Set CC Output Step Properties Dialog

The following table describes the property shown above.

Table 5-10: Set CC Output Step Properties

| Property | Description |
|----------------|--|
| Output Pattern | The contact closure outputs will be set to the pattern indicated by checkboxes 1–12 when the step is executed. |

5.4.14. Duplicating a Step

To duplicate an existing step, select the step to duplicate and click **Duplicate** or right-click on the step and select **Duplicate Step** from the context menu. APIcom will duplicate the step and add it to the end of the sequence, but it can be repositioned using **Move Up** and **Move Down** buttons.

5.4.15. Moving a Step

To move a step relative to the other steps in the sequence, select the step and reposition it using the **Move Up** and **Move Down** buttons.

5.4.16. Deleting a Step

To delete a step from a sequence, select the step and click **Delete**. Right-clicking on a step and selecting **Delete Step** from the context menu will do the same. In either case, APIcom will confirm the deletion with a dialog box like the following figure. Such confirmation prompts can be disabled in the **Settings-Options** menu.

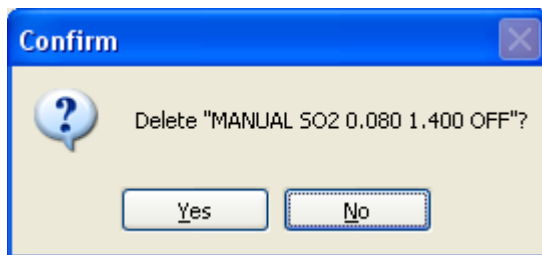


Figure 5-16: Delete Step Confirmation Dialog

5.5. Sending the Sequence Configuration to the Instrument

To send the sequence configuration to the instrument, click **Send To Inst.** **Sending the sequence configuration to the instrument will completely replace the instrument's current sequence configuration.** Therefore, APIcom will confirm the operation with the following dialog box before proceeding.

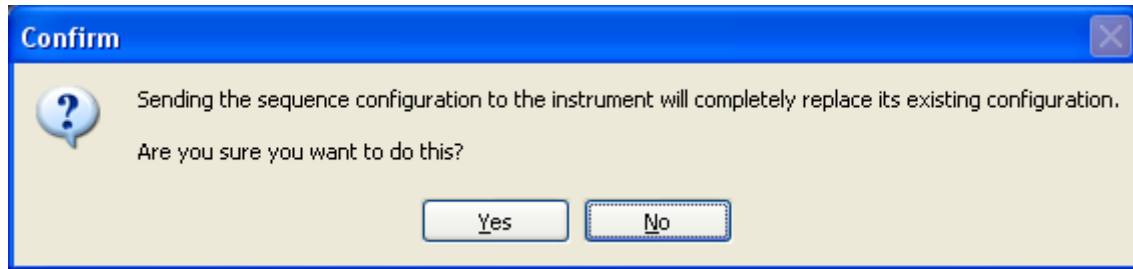


Figure 5-17: Sequence Send Configuration Confirmation Dialog

If the send operation is successful, APIcom will display the following dialog box:

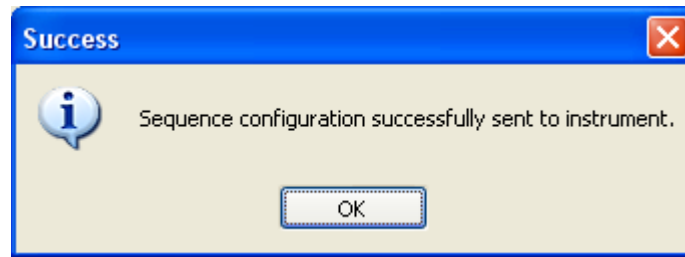


Figure 5-18: Successful Sequence Send Dialog

If the send operation is unsuccessful, APIcom will display the following dialog box. Some possible causes of this error are that a sequence name contains spaces or that the instrument's receive buffer overflowed while receiving the sequence configuration or that an incompatible sequence was loaded from disk and sent to the instrument. Try enabling one or more handshaking options, particularly the *Transmit Delay* option in the instrument properties dialog or trouble-shoot the configuration for compatibility.

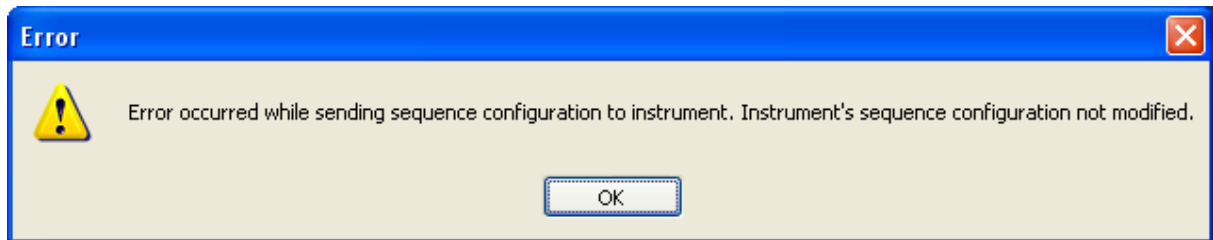


Figure 5-19: Unsuccessful Sequence Send Dialog

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6. USING APICOM AND LEADS SOFTWARE WITH MODELS 403, 700, 700E, 703E, T700, T703, OR T703U

APIcom includes features to facilitate operating the Model 403, 700, 700E, 703E, T700, T703 or T703U calibrators that are equipped with LEADS software. The primary component of this is to allow a user to create, edit, load and export level tables.

6.1. Accessing Level Table Editing Features

After successfully connecting to a LEADS software-equipped calibrator there will be an extra menu option under the APIcom system menu at the upper left hand corner of the instrument window. Selecting the configure level table option will open up a window that allows the user to create a new table, download the existing table from the calibrator, upload a new table to the calibrator, read and save tables to and from disk.

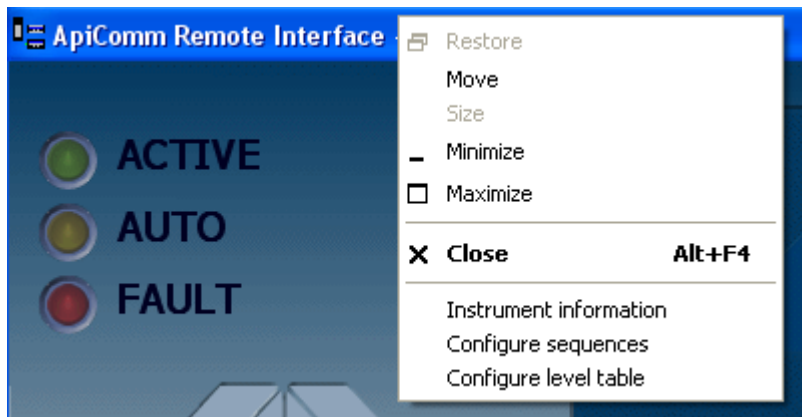


Figure 6-1 Accessing Level Table Features

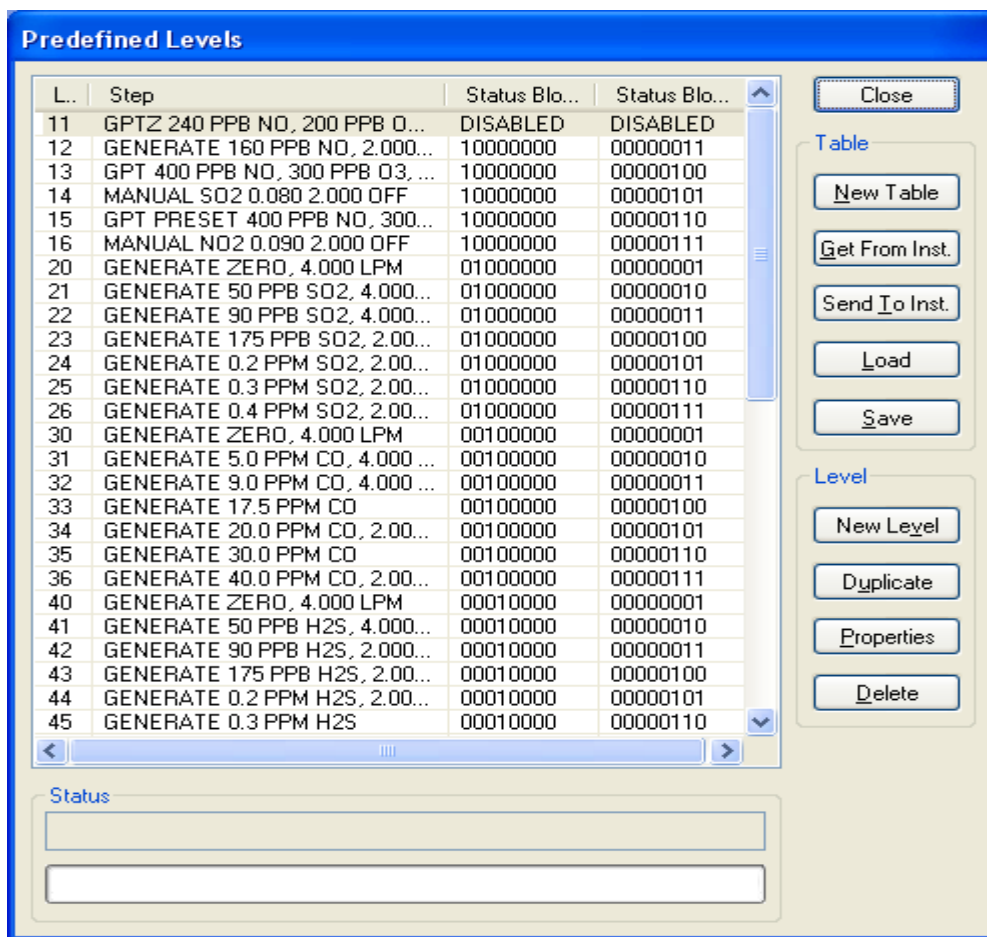


Figure 6-2 Configuring Table Menu

6.2. Editing and Adding a Level

The first step in editing an existing table is to download the table from the calibrator by pressing the Get From Inst. button. Conversely the modified table must be uploaded to the calibrator by pressing the Send to Inst. button. To add a level, press the New Level button, this will initiate the Level Properties menu where the desired level number, step type, with related information, and status block bits are configured.

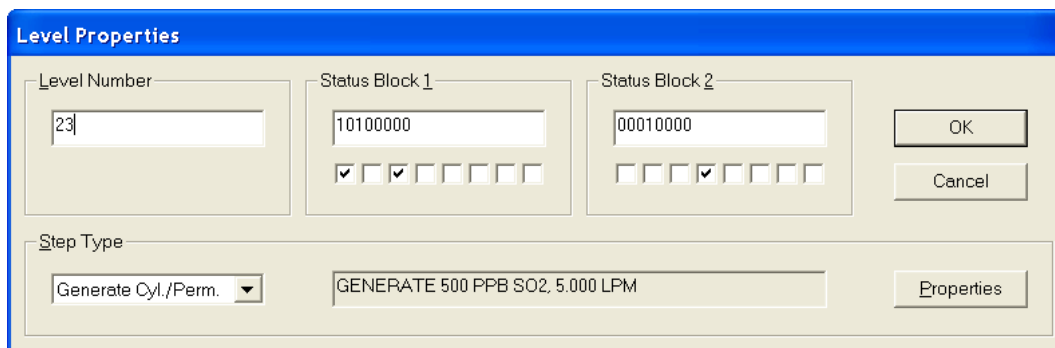


Figure 6-3 Level Properties Menu

6.2.1. Setting the Level Property

Pressing the Properties button will initiate further menus. Depending upon the step type these menus allows the user to specify the gas type, total flow, ozone and NO concentrations, for GPT and GPT presets, and set the relevant factors for manually generating a gas or gas mixture.

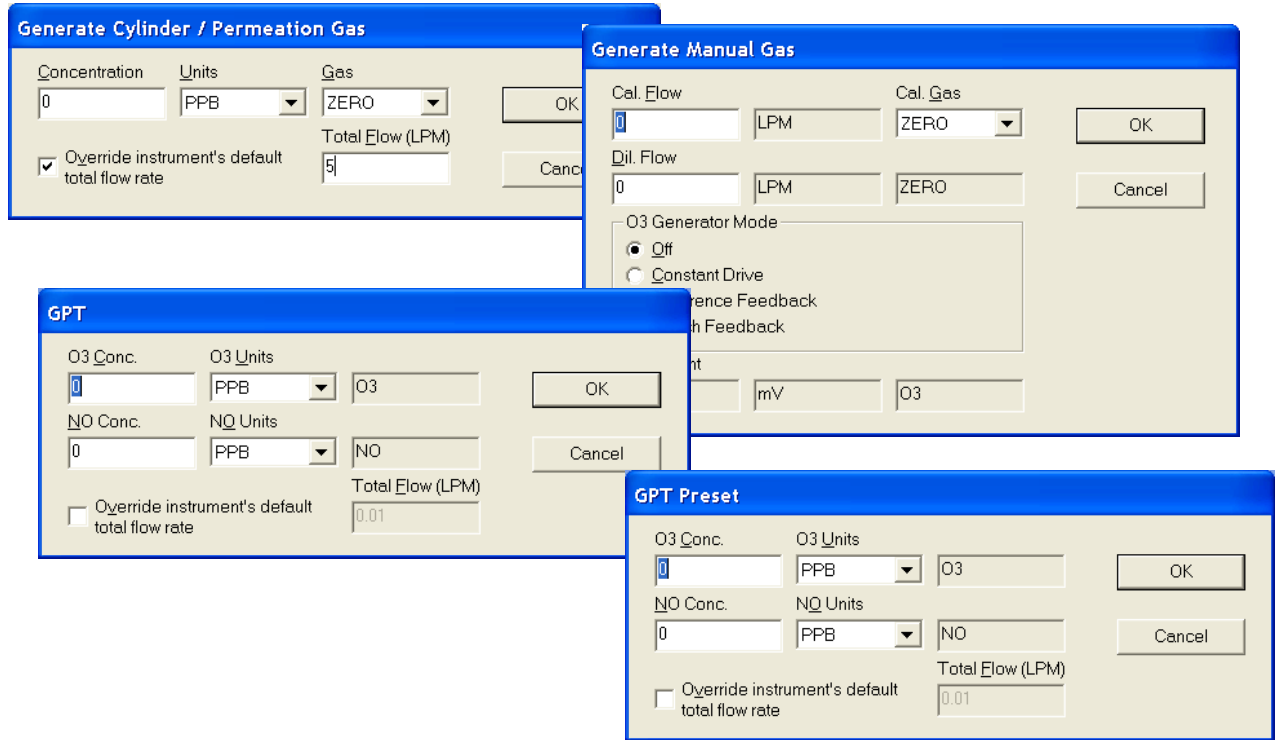


Figure 6-4: Setting Level Property

6.2.2. Status Block Configuration

There are two eight-bit status blocks that can be configured in association with a particular level. In general the first status block is associated with both hardware contact closures and a serial data status byte, while the second block only exists in serial data as a second byte. For the M700E and M703E the first status byte is associated with the Control Outputs. To set a bit click on the appropriate box – Most Significant Bit (MSB) on the left, LSB on the right.

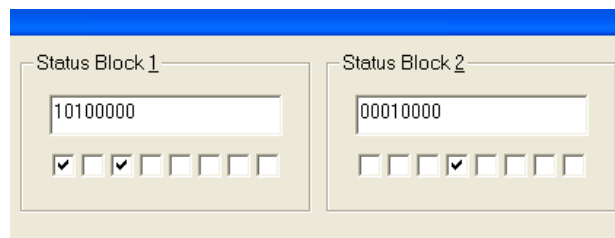
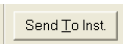
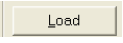


Figure 6-5: Setting Status Bits

6.3. Level Table Handling

Level tables can be uploaded to the calibrator, downloaded from the calibrator as well as loaded from a disk file and saved to a disk file. These functions allow a user to create and edit standard level tables and use them for multiple calibrators. Please note that a new table does not reside in the calibrator until it has been uploaded to the  calibrator by pressing the Send To Inst. Button.

6.3.1. Loading an Existing Table

To load an existing table from a disk file  press Load button. Using the standard Windows navigation steps, select a level table file and press Open. The level table can now be edited and uploaded to the calibrator, see above.

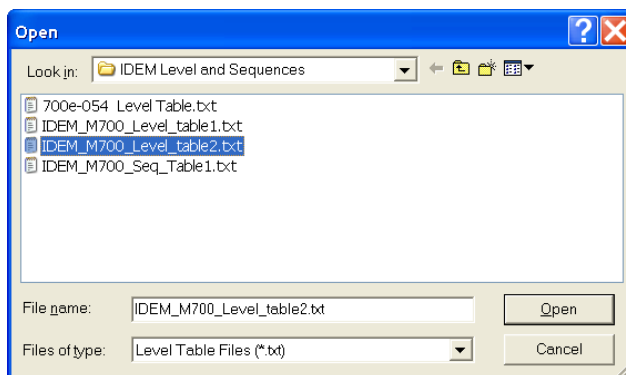
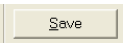


Figure 6-6. Loading a Level Table File

6.3.2. Saving an Existing Table

Existing tables can be saved to a disk file by pressing  the Save button. The tables MUST be first downloaded from the calibrator by pressing the Get from Inst. Button. Using standard Windows navigation steps select the location and file name for the level table files. Level table files are standard text files and can be edited off-line using WordPad or any other text editor.

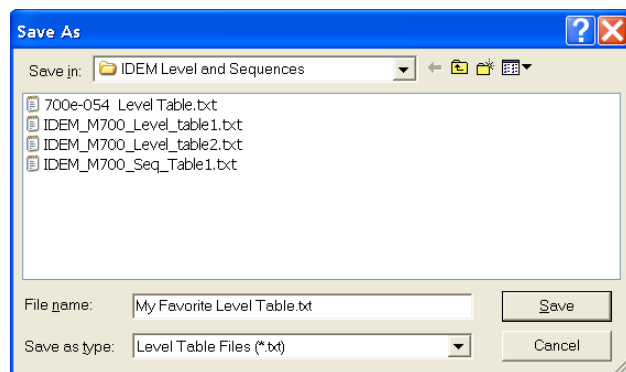


Figure 6-7. Saving a Level Table File

7. ADVANCED FEATURES

7.1. Instrument Information Dialog

Whenever APIcom connects to an instrument it interrogates the instrument to determine the type of instrument and its capabilities. Since APIcom supports all standard TAPI instruments (except industrial ozone), there are many options to be supported on an instrument-by-instrument basis.

If APIcom doesn't seem to support a particular capability that the instrument has, APIcom's instrument information dialog should show the capabilities APIcom thinks the instrument has. This is mainly a diagnostic tool, but offers information similar to that found under the instrument's own **SETUP-CFG** menu.

To view the instrument information dialog, connect to an instrument and click on the system menu in the upper left-hand corner of the *Front Panel Window*. Then click on the **Instrument information...** menu item. This should bring up a dialog like the following. The fields shown in the dialog are described in Table 7-1. If any field is not present in the list that means that feature does not exist in the instrument.

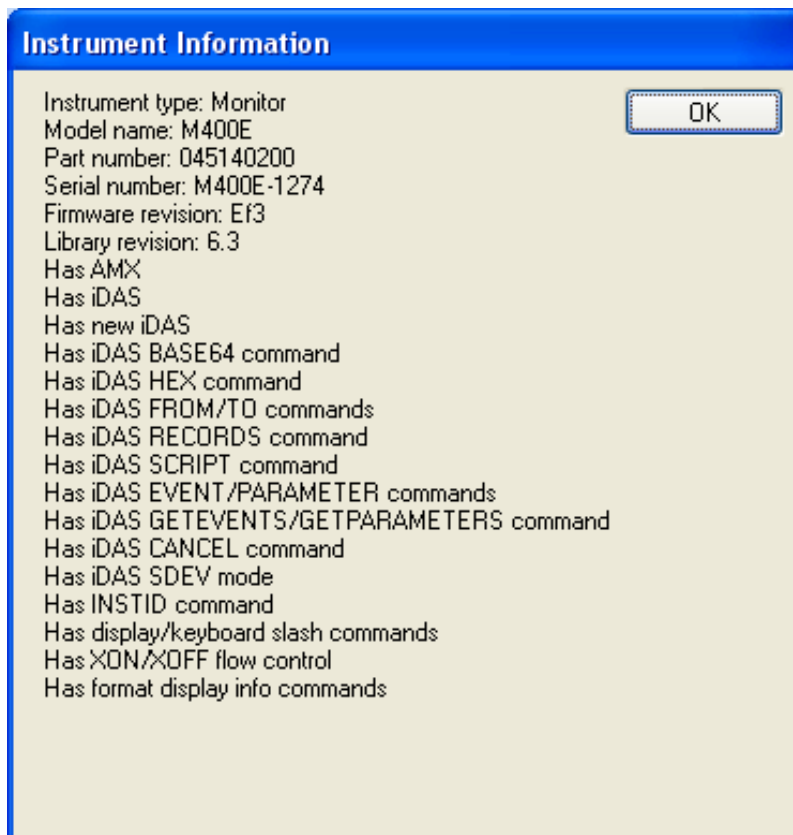


Figure 7-1: Instrument Information Dialog

Table 7-1: Instrument Information Dialog

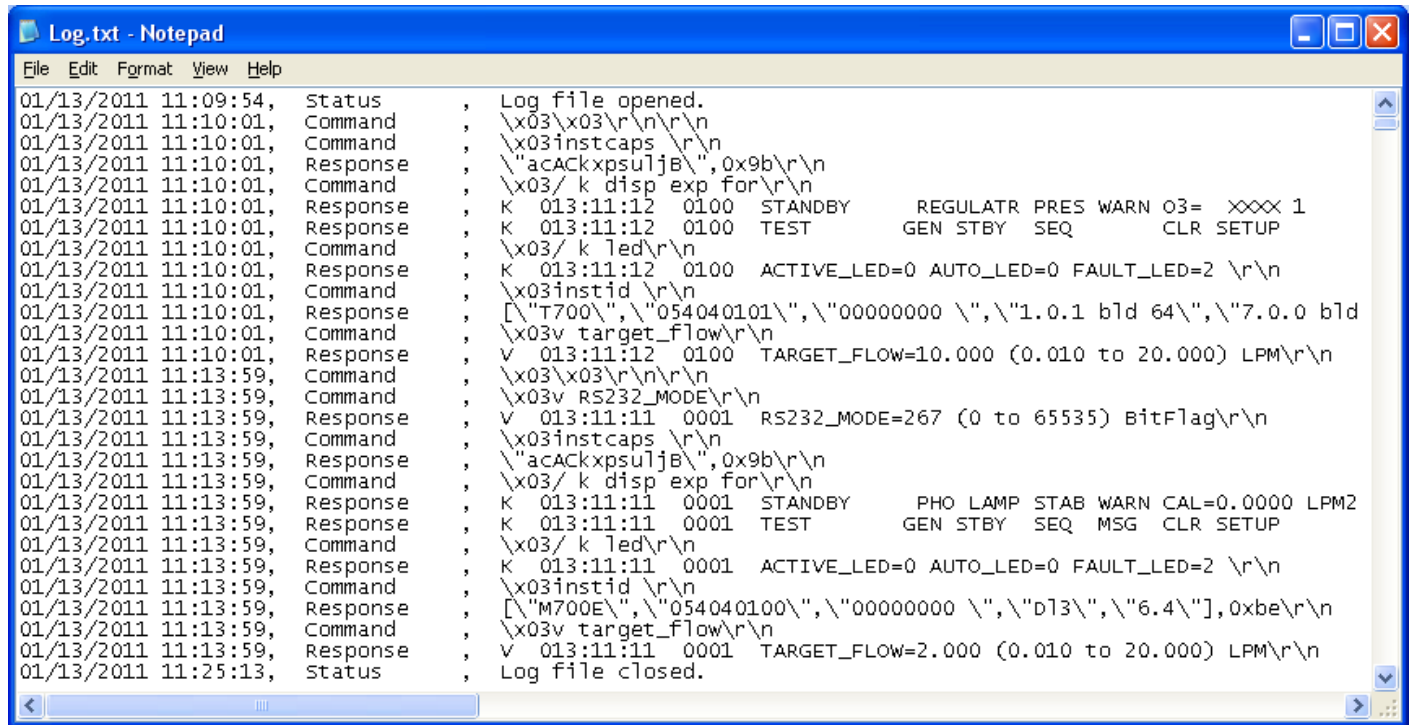
| Field | Description |
|----------------------------------|--|
| Instrument Type | Monitor or Calibrator. |
| Part Number | Part number of the instrument firmware. If APIcom cannot determine the part number, this field shows "Unknown." |
| Serial Number | Serial number of the instrument. If APIcom cannot determine the serial number, this field shows "Unknown." |
| Firmware Revision | Revision number of the instrument firmware. If APIcom cannot determine the firmware revision number, this field shows "Unknown." |
| Library Revision | Revision number of the standard library used by the instrument firmware. If APIcom cannot determine the library revision number, this field shows "Unknown." |
| Has DAS | Has DAS. |
| Has new DAS | Has DAS from standard library revision 3.0 that is flash-friendly and much faster. If this field is not present, the old DAS is installed. |
| Has DAS HEX command | The DAS supports <i>HEX</i> option to download records in compressed hex format. This is faster and more reliable than text format. If this field is not present, the DAS supports downloading records only in text format. |
| Has DAS FROM/TO commands | The DAS supports <i>FROM/TO</i> options to download records by date/time. If this field is not present, the DAS doesn't have these options. Download by date/time range is still supported, but has to be done by APIcom on the host computer rather than in the instrument. |
| Has DAS RECORDS command | The DAS supports <i>RECORDS</i> option for requesting most recent records. |
| Has DAS SCRIPT command | The DAS supports <i>SCRIPT</i> option for downloading and uploading the DAS configuration. Necessary for APIcom to support DAS configuration. If this field is not present, the DAS lacks this option. APIcom can still download the configuration and data even if the instrument lacks this option. |
| Has DAS EVENT/PARAMETER commands | The DAS has <i>EVENT</i> and <i>PARAMETER</i> commands for requesting lists of events and parameters in instrument. Necessary for APIcom to support DAS configuration. If this field is not present, the DAS lacks these commands. APIcom can still download the configuration and data even if the instrument lacks these commands. |
| Has DAS CANCEL command | The DAS has the <i>CANCEL</i> command for canceling lengthy data downloads. |
| Has DAS SDEV mode | The DAS supports the <i>SDEV</i> sampling mode. This sampling mode emulates the stability test measurement present in most instruments, but extends it to all data points and is simply the standard deviation of the samples taken during the report interval. |
| Has calibrator SCRIPT command | Calibrator supports <i>SCRIPT</i> option for downloading and uploading sequence configuration. Necessary for APIcom to support sequence configuration. If this field is not present, the calibrator lacks these commands. APIcom cannot download or modify the sequence configuration if the calibrator lacks this option. |
| Has calibrator DURATION command | Calibrator uses the new <i>DURATION</i> step name. If this field is not present, the calibrator uses the old <i>DELAY</i> step name. |

| Field | Description |
|--|---|
| Has calibrator SELDILUENT command | Calibrator supports <i>SELDILUENT</i> step type. |
| Has calibrator LEVEL command | Calibrator supports extensions that include the <i>LEVEL</i> command. This is for a LEADS equipped M403, M700/M700E or M703E |
| Has calibrator LEVELTABLE command | Calibrator supports the <i>LEVELTABLE</i> command. This is for a LEADS equipped M403, M700/M700E or M703E |
| Has calibrator LEVELTABLE command with flow | Calibrator supports the <i>LEVELTABLE</i> command, including support for specifying the total flow rate. This is for a LEADS equipped M700 or M700E |
| Has calibrator LEVELTABLE command with actions | Calibrator supports the <i>LEVELTABLE</i> command, including support for specifying the total flow rate and GPTs. This is for a LEADS equipped M700 or M700E |
| Has GETGASNAMES/GETUNITNAMES commands | Calibrator supports <i>GETGASNAMES</i> and <i>GETUNITNAMES</i> commands for downloading instrument-specific lists of gases and units. If this field is not present, the calibrator lacks these commands and APIcom will use a default set of gases and units. However, if the instrument has defined custom gas and unit names, APIcom may not be able to properly download the instrument's sequence configuration. |
| Has display/keyboard slash commands | Instrument uses newer style commands for "pressing" keys and getting the display contents. |
| Has enhanced display/keyboard commands | Instrument uses new, faster, and more robust commands for "pressing" keys and getting the display contents. |
| Has XON/XOFF flow control | Instrument has bi-directional XON/XOFF flow control. This is useful when using APIcom to upload large DAS or sequence configurations to the instrument. This does not mean that XON/XOFF flow control is enabled in this instrument, only that it is available. If this field is not present, the instrument either lacks XON/XOFF flow control entirely or supports it only when sending data, and not when receiving. |

7.2. Communication Logging

APIcom has a communication logging feature that is capable of recording all commands sent to the instruments, all responses from the instruments, errors that occur, and status changes. The logging feature can be configured in the *Logging* tab in the **Settings-Options** menu.

This logging feature is intended to be used as a diagnostic tool by advanced users. For instance, when having problems connecting to an instrument, message logging shows what was transmitted to and received from the instrument. This logging feature is a simple alternative to using an external RS-232 monitor. The following figure shows a sample log file.



```

01/13/2011 11:09:54, Status      , Log file opened.
01/13/2011 11:10:01, Command   , \x03\x03\r\n\r\n
01/13/2011 11:10:01, Command   , \x03instcaps \r\n
01/13/2011 11:10:01, Response  , \"acACkxpsuljB\",0x9b\r\n
01/13/2011 11:10:01, Command   , \x03/ k disp exp for\r\n
01/13/2011 11:10:01, Response  , K 013:11:12 0100 STANDBY      REGULATR PRES WARN O3= XXXX 1
01/13/2011 11:10:01, Response  , K 013:11:12 0100 TEST        GEN STBY SEQ      CLR SETUP
01/13/2011 11:10:01, Command   , \x03/ k led\r\n
01/13/2011 11:10:01, Response  , K 013:11:12 0100 ACTIVE_LED=0 AUTO_LED=0 FAULT_LED=2 \r\n
01/13/2011 11:10:01, Command   , \x03instid \r\n
01/13/2011 11:10:01, Response  , [\"T700\", \"054040101\", \"00000000 \", \"1.0.1 b1d 64\", \"7.0.0 b1d
01/13/2011 11:10:01, Command   , \x03v target_flow\r\n
01/13/2011 11:10:01, Response  , V 013:11:12 0100 TARGET_FLOW=10.000 (0.010 to 20.000) LPM\r\n
01/13/2011 11:13:59, Command   , \x03\x03\r\n\r\n
01/13/2011 11:13:59, Command   , \x03v RS232_MODE\r\n
01/13/2011 11:13:59, Response  , V 013:11:11 0001 RS232_MODE=267 (0 to 65535) BitFlag\r\n
01/13/2011 11:13:59, Command   , \x03instcaps \r\n
01/13/2011 11:13:59, Response  , \"acACkxpsuljB\",0x9b\r\n
01/13/2011 11:13:59, Command   , \x03/ k disp exp for\r\n
01/13/2011 11:13:59, Response  , K 013:11:11 0001 STANDBY      PHO LAMP STAB WARN CAL=0.0000 LPM2
01/13/2011 11:13:59, Response  , K 013:11:11 0001 TEST        GEN STBY SEQ MSG  CLR SETUP
01/13/2011 11:13:59, Command   , \x03/ k led\r\n
01/13/2011 11:13:59, Response  , K 013:11:11 0001 ACTIVE_LED=0 AUTO_LED=0 FAULT_LED=2 \r\n
01/13/2011 11:13:59, Command   , \x03instid \r\n
01/13/2011 11:13:59, Response  , [\"M700E\", \"054040100\", \"00000000 \", \"D13\", \"6.4\"],0xbe\r\n
01/13/2011 11:13:59, Command   , \x03v target_flow\r\n
01/13/2011 11:13:59, Response  , V 013:11:11 0001 TARGET_FLOW=2.000 (0.010 to 20.000) LPM\r\n
01/13/2011 11:25:13, Status      , Log file closed.

```

Figure 7-2: Sample Log File

Each log entry resides on a single line in the log file, and consists of three fields: a time stamp, a classification code (see the following table), and a message. The fields are separated by commas, making it easy to import the log file into another program. The *time stamp* field shows the date and time, to the nearest second. The time stamp has the same format as that in DAS data files saved by APIcom. The *classification code* field indicates the type of log entry. It can be one of the values in the following table.

Table 7-2: Log Entry Classification Codes

| Code | Description |
|----------|--|
| Misc | Miscellaneous log entry (currently there are no entries of this type). |
| Status | Status change, such as opening or closing the log file. |
| Command | A command sent to an instrument. |
| Response | A response from an instrument. |
| Error | Any error, including communication errors or internal errors. |

The *message* field contains the text of the log entry. It may be an error or status message generated internally by APIcom, or a command sent to an instrument, or a response from an instrument. Non-printable characters are represented as hexadecimal characters of the form “xhh”, where the “hh” part is the hexadecimal character code.

Beware that the log files can get very large. For example, if automatic display updating at 5-second intervals is enabled, APIcom stores about 280 bytes per display update, per instrument in the log file. That works out to about 67.2 kbytes per hour, or about 1.6 MB per day, per instrument. Also, the log file is locked for access while APIcom is running.

Timeout errors will always appear in the log file. These are not necessarily errors, though they might be. In some cases, the APIcom can detect the end of a transmission of data from an instrument only by waiting for a timeout to occur. Rather than have APIcom determine whether a timeout is normal or an error, it is easier to record all timeouts as errors in the log file.

7.3. Local Front Panel Keyboard Access to DAS

This section presents additional information for using APICOM from the front panel.

7.3.1. Viewing the Stored Data

Once you've stored some data you'll probably want to view it. This section describes how to view the stored data. Whereas data sampling is suspended while configuring the DAS, data sampling continues normally while viewing the data.

7.3.1.1. Menu for Viewing the Data Channel Status

The diagram below shows the menu tree for viewing the status of data channels, starting from the instrument's main menu.

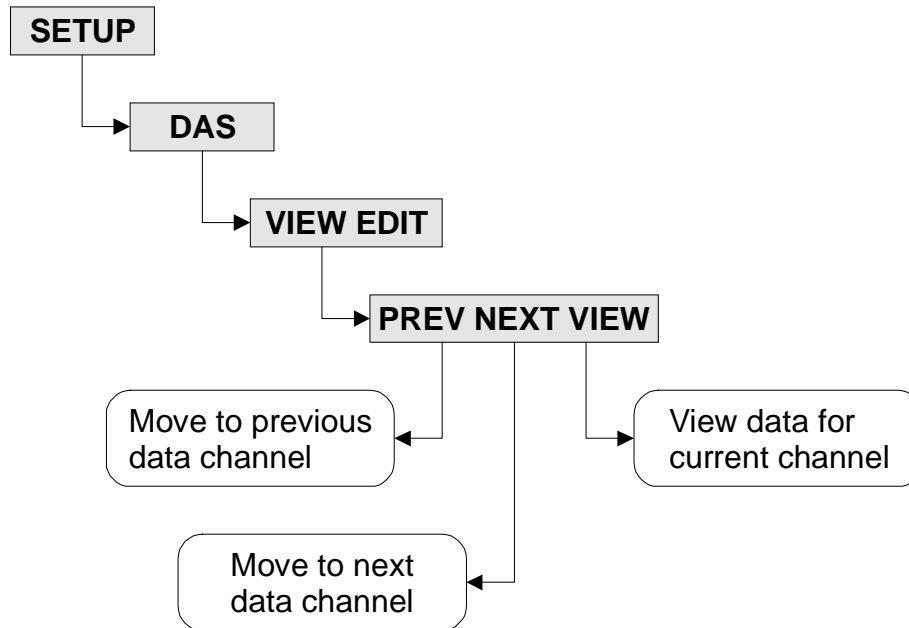
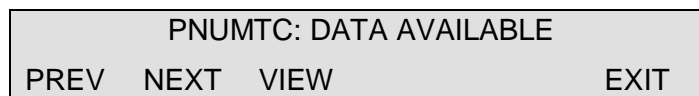
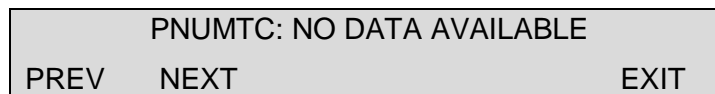


Figure 7-3: Viewing the Data Channel Status

When you enter this menu the instrument shows the status of the first data channel, similar to the following display.



The example above indicates that data has been stored for the data channel named "PNUMTC." If no data had been stored for the channel the display would look like this.



You can press the **PREV** and **NEXT** buttons to view the status of other channels. If you press **VIEW** you will go to the stored data view menu described in the next section.

7.3.1.2. Menu for Viewing the Stored Data for a Channel

The diagram below shows the menu tree for viewing the stored data for a single channel, starting from the previous menu.

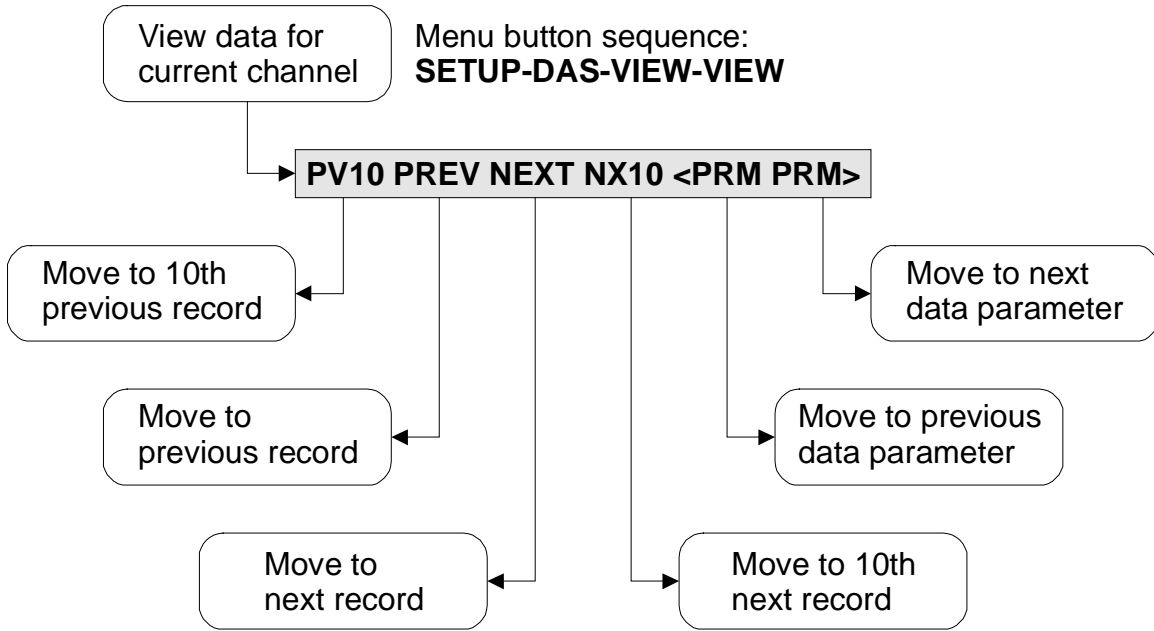


Figure 7-4: Viewing the Stored Data for a Channel

When you enter this menu the instrument shows the first stored data record for the data channel, similar to the following display. This example is for the data channel named "PNUMTC."

```

79:12:00 SMPFLW=719.6 cc/m
PV10  PREV  NEXT  NX10  <PRM  PRM>  EXIT
    
```

The format of the display above is described in the table below.

Table 7-3: DAS Record View Format

| DAS Record View Format | |
|------------------------|---|
| Display Field | Description |
| 79:12:00 | This is the record's time stamp in the format of <i>day-of-year:hours:minutes</i> . This record was recorded on the 79th day of the year at 12:00 noon. |
| SMPFLW | This is the data parameter being sampled. |
| 719.6 | This is the value that was sampled for the data parameter. |
| cc/m | This is the unit of measurement that the sampled value is in. |

If the data channel has more than one data parameter the **<PRM** and **PRM>** buttons will appear. Since the data channel in this example has two parameters the **<PRM** and **PRM>** buttons are shown. If you press the **PRM>** button the instrument will show the stored data for the next parameter in the record, *SMPPRS* in this example, as shown below.

```

79:12:00 SMPPRS=29.8 InHg
PV10  PREV  NEXT  NX10  <PRM  PRM>  EXIT
    
```

Notice that the time stamps in the above two displays are the same. This is because both parameters are part of the same record. Use the **PREV** and **NEXT** buttons to move between records, and the **<PRM** and **PRM>** buttons to move between data parameters in the same record.

7.3.1.3. Data is Stored as Two Dimensional Table

The data for each data channel is stored in the data file as a two dimensional table, with each row storing one record, and each column storing one data parameter. The diagram below shows how the data is stored in the data file.

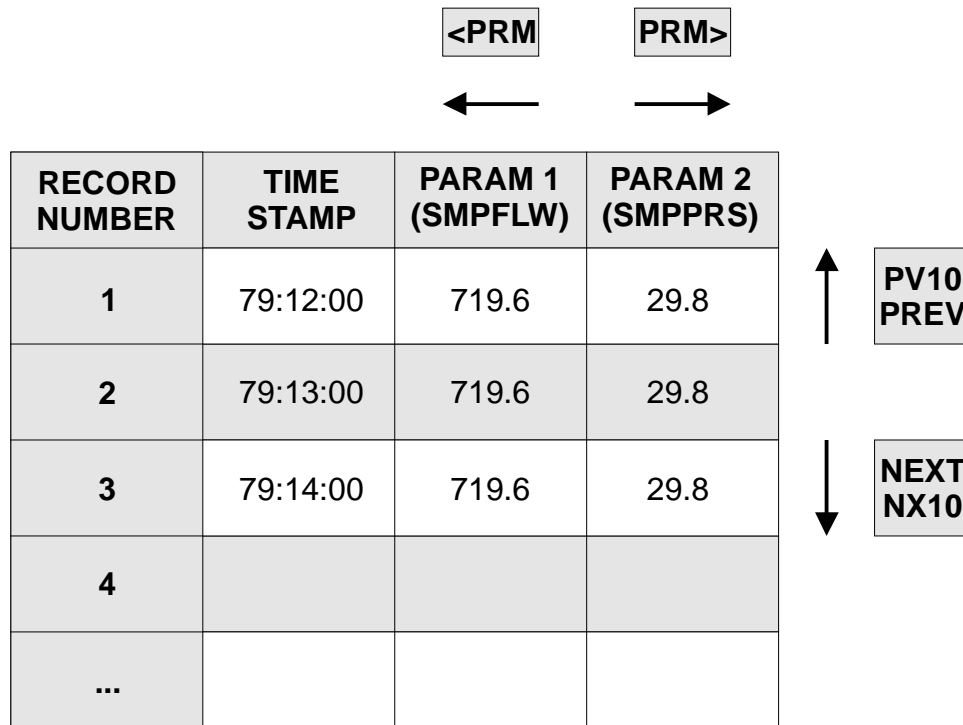


Figure 7-5: Stored Data File Format

7.3.1.4. Deleting the Stored Data for a Data Channel

Since the DAS is designed to ensure the integrity of the data it stores, there is no easy way to delete the stored data. If you must delete the data, however, you can edit the data channel configuration and edit the *NUMBER OF RECORDS* property. You don't have to actually change the number of records; simply press **ENTR** without changing the number. That will delete the existing data file and create a new one.

7.4. RS-232 Interface to the DAS

For RS-232 configuration and operation of the DAS, please contact Technical Support for Service Note 06-005.

Technical Support: email sda_techsupport@teledyne.com or phone 800-324-5190.

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APPENDIX A. FIRMWARE COMPATIBILITY

Remote (RS-232) Configuration of DAS

Whereas the basic functionality (remote control of the front panel functions) of APIcom works with all of our standard analyzers, new features that are introduced from time to time may require updates of the analyzer's firmware. The DAS feature can be configured through the RS-232 interface (in the DAS Configuration Dialog) in instruments with libraries at Revision 2.1 or higher. This capability corresponds to the "Has DAS Script Command" field in the Instrument Information Dialog.

To view the firmware version and library revision in your instrument, please select **SETUP-CFG** from the front panel and scroll through the list of information. Note the firmware revision and the library revision and submit an error report form to inquire about our available upgrades.

Number of Samples in Concentration Average

Another new feature of APIcom is to store the number of samples in averaged DAS concentration data.

Newer firmware also allows APIcom to use the internal DAS clock when extracting a range of data (instead of "all" data). This feature speeds up download because it transfers only those data that were requested. Previous versions of APIcom and older firmware revisions downloaded all data and then extracted the range of interest locally (i.e. in computer memory).