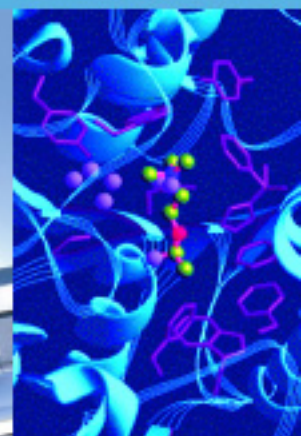
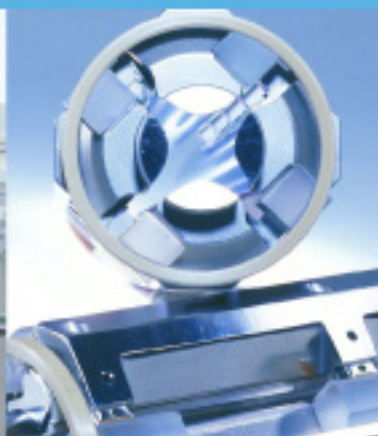


ChromQuest™ 4.2 Chromatography Data System

Installation Guide

CHROM-97200 Revision A

April 2005



Analyze • Detect • Measure • Control™

Thermo
ELECTRON CORPORATION

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Software Version: ChromQuest 4.2

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Preface

About This Guide

Welcome to ChromQuest™4.2. The ChromQuest chromatography data system is a member of the Thermo Electron family of LC data systems.

For information on connecting the Surveyor Plus LC system, refer to the *Surveyor Plus Getting Connected* manual.

Related Documentation

In addition to this guide, Thermo Electron provides the following documents for the ChromQuest chromatography data system:

- Administrator's Guide
- User's Guide
- Reference Guide
- QuickStart

Safety and Special Notices

Make sure you follow the precautionary statements presented in this guide. The safety and other special notices appear in boxes.

Safety and special notices include the following:

IMPORTANT Highlights information necessary to avoid damage to software, loss of data, invalid test results, or information critical for optimal performance of the system.

Note Highlights information of general interest.

Tip Helpful information that can make a task easier.

Contacting Us

There are several ways to contact Thermo Electron Corporation.

Assistance

For new product updates, technical support, and ordering information, contact us in one of the following ways:

Visit Us on the Web

www.thermo.com/finnigan

Contact Technical Support

Phone: 1-800-685-9535
Fax: 1-561-688-8736
E-mail: techsupport.finnigan@thermo.com

Find software updates and utilities to download at <http://mssupport.thermo.com>

Contact Customer Service

In the US and Canada for ordering information:

Phone: 1-800-532-4752
Fax: 1-561-688-8731
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Changes to the Manual and Online Help

To suggest changes to this guide or to the online Help, use either of the following methods:

- Fill out a reader survey online at www.thermo.com/lcms-techpubs
- Send an e-mail message to the Technical Publications Editor at techpubs.finnigan-lcms@thermo.com

Chapter 1 Software Installation

This chapter shows you how to install the ChromQuest data system and contains the following sections:

- [Definitions](#)
- [Installation Configurations](#)
- [Stand-Alone Installations](#)
- [Client/Server Installations](#)
- [Hardware Requirements](#)
- [Installing ChromQuest](#)
- [Installation Qualification](#)
- [Software License Installation](#)
- [Network Printers](#)

Definitions

The following terms are used to describe the standalone and client/server ChromQuest installation configurations:

- **Enterprise Path**

The Enterprise Path is a shared folder that is used to store all of the files (methods, data, sequences, configurations, settings, and so on) used by the software. The Enterprise path must always be accessible to all PCs running the data system.

In the client/server environment, the Enterprise Path must be a shared folder on a Microsoft Windows Network. Typically, it is located on a Windows File Server.

For standalone installations, the Enterprise Path can be a shared network folder or a folder on the local PC.

- **Enterprise File Server**

The Enterprise File Server is a PC on the network that is used to store all of the files (methods, data, sequences, configurations, settings, and so on) used by the software. These files are stored in a shared folder (see Enterprise Path) on this PC.

- **Enterprise Machine**

The Enterprise Machine is a PC on the network that is used to perform overall data system management tasks such as log ins to the data system and file access. The Enterprise Machine must always be accessible to all PCs running the ChromQuest data system.

In a client/server environment, the Enterprise Machine is the Enterprise File Server. For standalone installations, the Enterprise Machine is the PC on which the software is installed.

- **ChromQuest Workstation**

A ChromQuest Workstation can be a standalone or networked PC that has control and access only to the instrument attached to it.

- **ChromQuest Chromatography Interface**

A ChromQuest Chromatography Interface is a PC that is attached to directly to an instrument. It can be controlled locally or by a networked Client PC.

- **Domain Controller**

A Domain Controller is a PC that is used to provide control and data acquisition to one or more LC or GC systems. In general, users do not interact directly with the software on Domain Controllers. Rather, Client PCs are used to connect to Domain Controllers and provide user control.

- **Client PCs**

Client PCs provide the user interface and interactive environment for users of the data system. Client PCs are used to set up runs, monitor instrument activity, review data and perform other interactive tasks.

- **Enterprise Service Account**

This special domain user account is used internally by the data system to access the Enterprise. This account should not be the account of a normal domain user. Because of the nature of its usage, if possible, this account should be given a secure password with no expiration date.

- **Enterprise Service Group**

When Advanced File Security is activated, members of this group have complete access to the Enterprise Path. This group should contain the Enterprise Service Account, as well as any other accounts that will be permitted full access to the files in the Enterprise Path. This may include accounts such as domain administrators, accounts used by network back systems, and so on. It should not contain the accounts of normal data system users.

- **Advanced File Security**

Advanced File Security (AFS) is a feature wherein the data system software modifies the Windows 2000/XP permissions on the Enterprise so that only members of a special domain users group can access the files. While Advanced File Security greatly increases the level of security for your data, it also imposes restrictions on access to the files within as well as outside of the data system. Once AFS has been implemented for an Enterprise, it cannot be turned off.

Note Although it is easier to install Advanced File Security when you install the ChromQuest software, you can secure the Enterprise at any time by running the Enterprise Setup Utility.

Installation Configurations

There are several ways to install ChromQuest 4.2 ranging from stand-alone data systems to fully networked client/sever systems with maximum security afforded through an NT domain controller. These installation configurations are summarized in the following topics:

- [Workstation Control with Local Data System Users](#)
- [Workstation Control with Domain Controller Users](#)
- [Client/Server Control with Local Data System Users](#)
- [Client Server Control with Domain Controller Users](#)

Workstation Control with Local Data System Users

This configuration contains one or more stand-alone ChromQuest workstations. The workstations may or may not be connected to a network. Each workstation has control and access to only the instruments attached to it, and users are administered by each workstation independently of the others.

Workstation Control with Domain Controller Users

This configuration contains one or more ChromQuest workstations on a Windows 2000/XP Network. In this environment, each ChromQuest workstation has instruments attached that can only be controlled or accessed by the local workstation. User privileges are administered by the Windows 2000/XP Domain Controller. Use of the Windows 2000/XP Domain Controller affords enhanced security.

Client/Server Control with Local Data System Users

This configuration consists of one or more ChromQuest Chromatography Interfaces with instruments attached, along with one or more ChromQuest clients on an NT Network where users are administered by the data system. Because users are administered locally, file security is not as high as when using a domain controller to administer users.

Client Server Control with Domain Controller Users

This configuration consists of one or more ChromQuest Chromatography Interfaces with instruments attached, along with one or more ChromQuest clients on an NT Network, where users are administered by the domain controller (NTFS). This configuration affords the highest possible security.

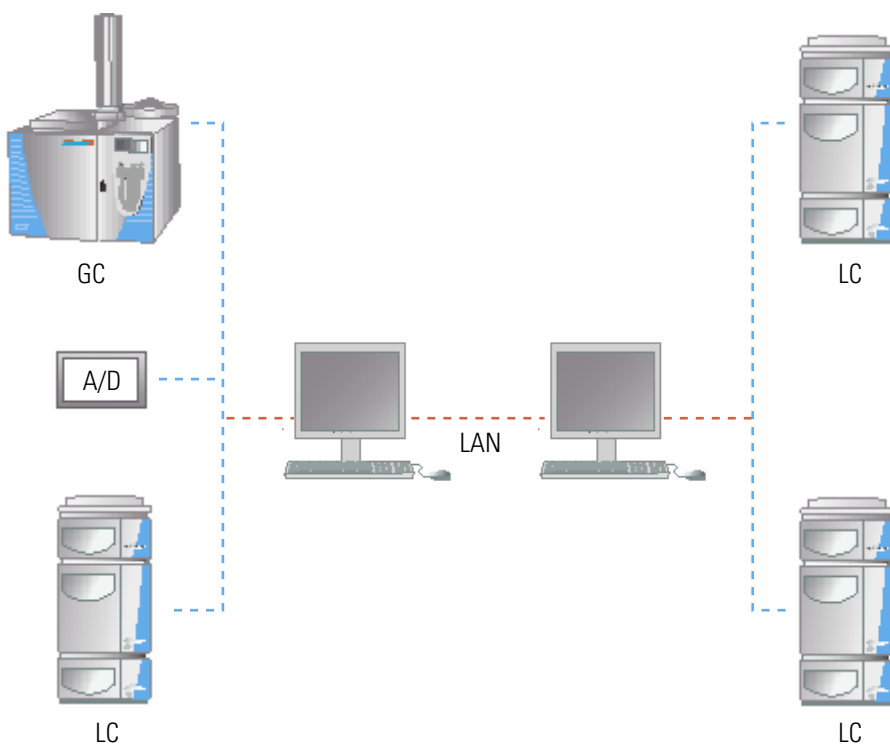


Figure 1. Client Server Control with Domain Controller Users

Stand-Alone Installations

To install a Standalone system, perform the following steps:

Step 1: Set up the Enterprise Path

Step 2: Set up the Workstations

Step 3: Install the Software Licenses

Step 4: Activate Advanced File Security

Step 5: Configure the Enterprise

Step 1: Set up the Enterprise Path

To set up the Enterprise Path

1. Create a folder on the File Server PC that will be designated as the Enterprise Path.
2. Set the file permissions on this folder to “Full control” for the Data System Users Group.
3. Share this folder, giving “Full Control” to Everyone for the Share Permissions.

Note Document the share name for the Enterprise Path. The Enterprise Path must be in UNC format (i.e. \\ComputerName\ShareName)

4. Confirm that the Enterprise Service Group and the Data System Users Group have been granted the Windows 2000/XP permission called “Access this Computer from the Network”.

Note When Advanced File Security is activated, the permissions on the Enterprise folder will be modified to restrict access to its contents.

Step 2: Set up the Workstations

To setup each workstation

1. Confirm that the workstation is a member of your Windows 2000 / XP domain and has TCP/IP installed.
2. Confirm that the Enterprise Service Group and the Data System Users Group have been granted the following Windows 2000 / XP permissions:
 - Log on Locally
 - Act as part of the operating system

The Enterprise Serve Account/Group needs the “Access this computer from the network” privilege on the domain controller machine.

3. Log into the workstation.
4. Install the ChromQuest 4.2 software and accept the default settings for each installation option section. During installation, leave the field labeled Enterprise Machine blank, and specify the share name as the Enterprise Path.
5. Reboot the computer after you install ChromQuest and login using the name and password of the Enterprise Service Account.
6. Launch ChromQuest by choosing **Start > Programs > Chromatography > ChromQuest**. This will create the necessary folder structure in the Enterprise path, as required by ChromQuest.
7. When the Main Menu window appears, choose **File > Exit**.
8. Reboot the computer.

Step 3: Install the Software Licenses

For a set of networked ChromQuest Workstations, the license key is typically a pool of software licenses that must be installed in the Enterprise Path. As chromatography interface PCs connect to the Enterprise, the software maintains the count of the remaining available licenses. Refer to “[Software License Installation](#)” on [page 27](#).

Step 4: Activate Advanced File Security

Advanced File Security (AFS) protects files from unauthorized access. When AFS is activated, the Windows 2000/XP permissions on the entire Enterprise Path are modified so that only members of a special domain users group have access to the files.

Note Once you have enabled the advanced file security feature by setting an Enterprise Service Account, the change will be permanent. All dialog boxes for file opening, saving, and so on will reflect this change and will limit access to Enterprise locations only. In addition, file permissions for the Enterprise will be modified so that no users other than members for the Enterprise Service Group will have access to the contents of the Enterprise outside of the data system software.

Activation of Advanced File Security may be performed from any PC with the data system software installed.

To activate the Advanced File Security feature

1. Reboot the PC and log in using the name and password of the local administrator.
2. Copy the program EnterpriseSetup.exe from the Software Installation CD into the main data system installation folder.

3. Double-click on the EnterpriseSetup.exe application icon to run it.
4. When the program starts, log in using the name and password of a person who has the authority to make changes on the Enterprise File Server.
5. In the Enterprise Service Account dialog box, make the following entries:
 - Enter the name and password of the Enterprise Service Account.
 - Enter the domain to which the Enterprise Service Account belongs.
 - Enter the name of the Enterprise Service Group.
6. After the entries have been made, click on **OK**.
7. Delete the EnterpriseSetup.exe file from the data system installation directory.

After running EnterpriseSetup.exe, the directory structure for the enterprise will be established. The NTFS rights will be set so that users other than the Enterprise Administrator cannot view the project directories from Windows 2000/ XP Explorer. These users will be able to access the projects and files from the data system software if they are given those rights inside the data system software.

Step 5: Configure the Enterprise

Configuration of the Enterprise can be performed from any PC with the ChromQuest 4.2 data system installed.

To configure the Enterprise

1. Launch ChromQuest by choosing **Start > All Programs > Chromatography > ChromQuest**.
2. From the Main Menu screen, choose the **Tools > Options**.
3. Click on the Enterprise tab.
4. Select the Stand-alone option button in the Instrument Control Mode group box.
5. If you want the users to log into ChromQuest, select the Enable Instrument Login And Project Management check box.
6. If you are enabling log ins, select the source of the user lists. To use Windows 2000/XP domain bases user lists, select the Domain Controller option button and specify the name(s) of your domain(s).
7. Click on **OK**. Then, exit ChromQuest.

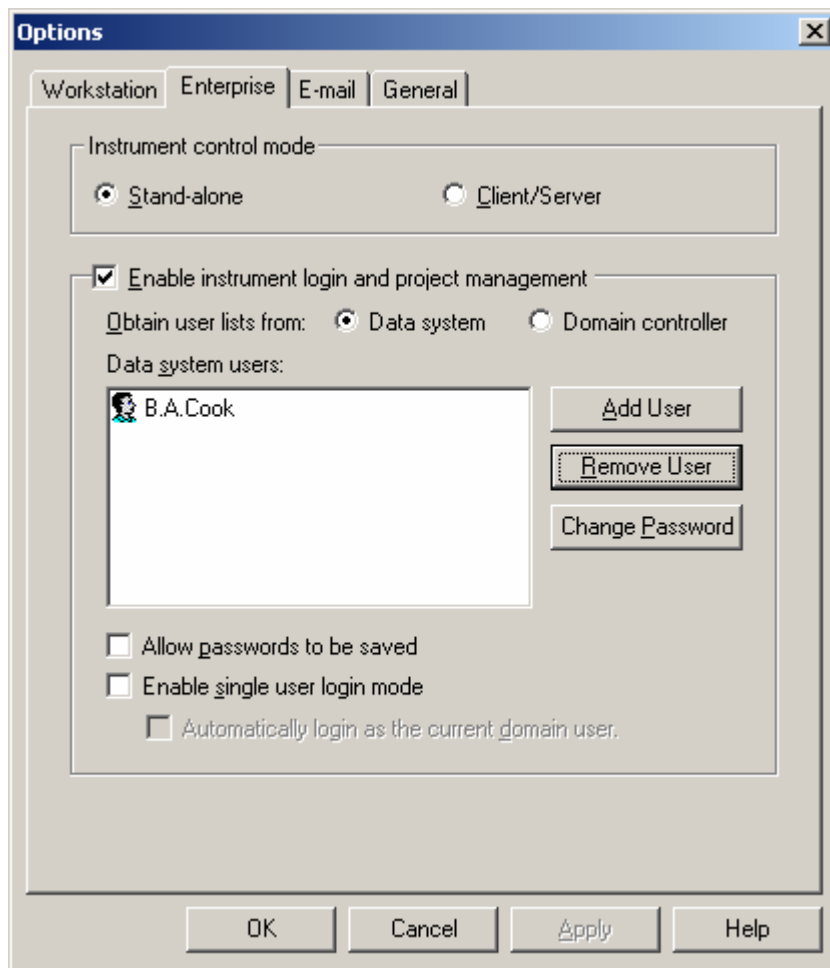


Figure 2. Options - Enterprise dialog box

Client/Server Installations

To install the ChromQuest Chromatography Data System in the Client/Server mode

Step 1: Set Up the Enterprise Path

Step 2: Set up the Enterprise Machine

Step 3: Set Up the Data Acquisition PCs

Step 4: Set Up the Client PCs

Step 5: Install the Software Licenses

Step 6: Activate Advanced File Security

Step 7: Configure the Enterprise

Step 1: Set Up the Enterprise Path

To set up the Enterprise Path

1. Create a folder on the Enterprise File Server machine that will be designated as the Enterprise Path.

Note Document the share name for the Enterprise Path. The Enterprise Path must be in UNC format (for example, \\ComputerName\ShareName)

2. Set the file permissions on this folder to “Full control” for the Data System Users Group.
3. Share this folder, giving “Full Control” to Everyone for the Share Permissions.
4. Confirm that the Enterprise Service Group and the Data System Users Group have been granted the Windows 2000/XP permission called “Access this Computer from the Network”.

Note When Advanced File Security is activated, the permissions on the Enterprise folder will be modified to restrict access to its contents.

Step 2: Set up the Enterprise Machine

To set up the Enterprise Machine

1. Confirm that the Enterprise Service Group and the Data System Users Group have been granted the following Windows 2000/XP permissions:

- Log on Locally
- Act as part of the operating system

The Enterprise Service Account/Group needs the “Access this computer from the network” privilege on the domain controller machine.

2. Log into the Enterprise Machine using the name and password of a user with local administrator permissions.
3. Install the ChromQuest 4.2 software and accept the default settings for each installation option section.

During installation, leave the field labeled Enterprise Machine blank, and specify the share name as the Enterprise Path.

4. Reboot the computer after you install ChromQuest and login using the name and password of a user with local administrator permissions.
5. Launch ChromQuest by choosing **Start > All Programs > Chromatography > ChromQuest**.

This will create the necessary folder structure in the Enterprise path, as required by ChromQuest.

6. When the Main Menu screen appears, choose **File > Exit**.
7. Reboot the computer.
8. Run the program DCOMServerSettings.exe, which is found in the main data system installation folder.
9. In the DCOM Server Settings dialog box, do the following:
 - a. From the Run As list box, select Auto Logon.
 - b. In the User Name text box and the Password text box, enter the name and password of an account that has local Administrative privileges
 - c. Click on **Set**.
 - d. Close the DCOM Server Settings dialog box.

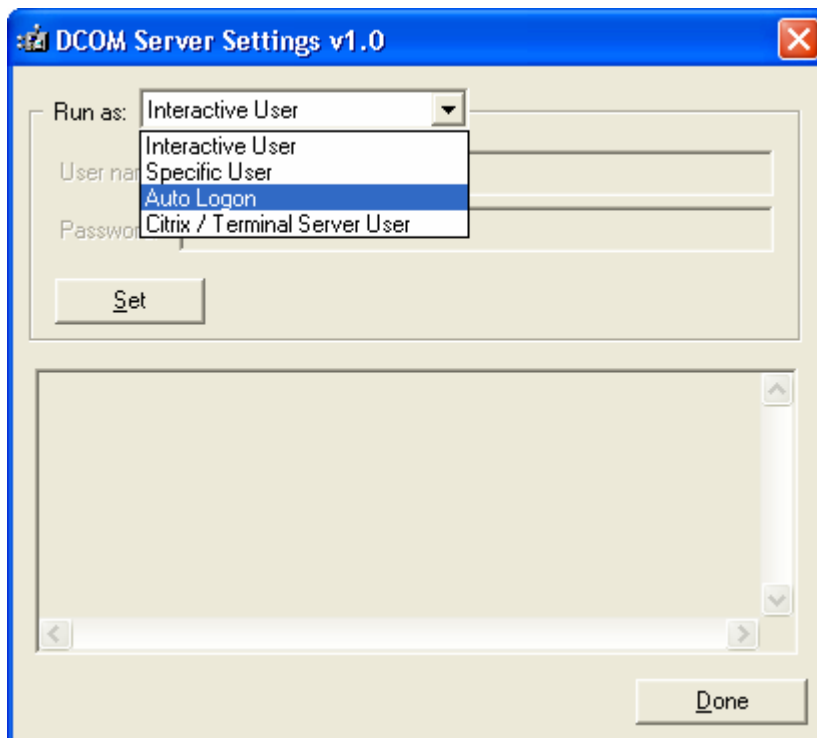


Figure 3. DCOM Server Settings v1.0 dialog box

10. Reboot the computer.

Step 3: Set Up the Data Acquisition PCs

In the ChromQuest client/server environment, the data acquisition PC is the ChromQuest Interface PC.

To set up the ChromQuest Interface PCs

1. For each ChromQuest Interface PC confirm the following:
 - Confirm that each ChromQuest Interface PC is a member of the Windows 2000/XP domain and has TCP/IP installed.
 - Confirm that the Enterprise Service Group has been granted the Windows 2000/XP permissions called Logon Locally and Act as Part of the Operating System.
2. Log onto the Interface PC using the name and password of a user with local administrator rights.
3. Install the ChromQuest software. During installation, enter the name of the Enterprise Machine and the share name of the Enterprise Path.
4. Reboot the computer and login using the name and password of a user with local administrator rights.

5. Run the program DCOMServerSettings.exe, which is found in the main data system installation folder.
6. In the DCOM Server Settings dialog box, do the following:
 - a. Make a selection from the Run As list box:
 - If the Interface PC will be dedicated to data acquisition, select *Auto Logon* from the Run As list box.
 - If the Interface PC will function as both a data acquisition station and a Client PC, select *Interactive User* from the Run As list box.
 - b. In the User Name text box and the Password text box, enter the name and password of an account that has local Administrative privileges
 - c. Click on **Set**.
 - d. Close the DCOM Server Settings dialog box.
7. Reboot the computer.

Step 4: Set Up the Client PCs

To set up the Client PCs

1. For each Client PC in the Enterprise confirm the following:
 - Confirm that the Enterprise Service Group has been granted the Windows 2000/XP permission called Logon Locally
 - Confirm that the Data System Users Group has been granted the Windows 2000/XP permission called Act as part of the Operating System.
2. Log onto the Client PC using the name and password of a user with local administrator rights.
3. Install the ChromQuest software.
4. Reboot the computer and login using the name and password of a user with local administrator rights.

Step 5: Install the Software Licenses

To install software licenses

To control instruments and perform data acquisition, you must install a software license key in the Enterprise Path.

In Client/Server installations, the license key is a pool of software licenses that must be installed in the Enterprise Path. As clients connect to the Enterprise, the count of the remaining available licenses is maintained by the ChromQuest chromatography data system.

Step 6: Activate Advanced File Security

Advanced File Security (AFS) protects files from unauthorized access. When AFS is activated, the Windows 2000/XP permissions on the entire Enterprise Path are modified so that only members of a special domain users group have access to the files.

Note Once you have enabled the advanced file security feature by setting an Enterprise Service Account, the change will be permanent. All dialog boxes for file opening, saving, and so on will reflect this change and will limit access to Enterprise locations only. In addition, file permissions for the Enterprise will be modified so that no users other than members for the Enterprise Service Group will have access to the contents of the Enterprise outside of the data system software.

Activation of Advanced File Security can be performed from the Enterprise Machine or any other PC in the client/server network with the data system software installed.

To activate the Advanced File Security feature

1. Reboot the PC and log in using the name and password of the local administrator.
2. Copy the program EnterpriseSetup.exe from the Software Installation CD into the main data system installation folder.
3. Double-click on the EnterpriseSetup.exe application icon to run it.
4. When the program starts, log in using the name and password of an account that has the authority to change the folder/file rights on the Enterprise File Server.
5. In the Enterprise Service Account dialog box, make the following entries:
 - Enter the name and password of the Enterprise Service Account.
 - Enter the domain to which the Enterprise Service Account belongs.
 - Enter the name of the Enterprise Service Group.
6. After the entries have been made, click on **OK**.
7. Delete the EnterpriseSetup.exe file from the data system installation directory.

After running EnterpriseSetup.exe, the directory structure for the enterprise will be established. The NTFS rights will be set so that users other than the Enterprise Administrator cannot view the project directories from Windows 2000/XP Explorer. These users will be able to access the projects and files from the data system software if they are given those rights inside the data system software.

Step 7: Configure the Enterprise

Configuration of the Enterprise can be performed from any PC with the ChromQuest 4.2 data system installed.

To configure the Enterprise

1. Launch ChromQuest by choosing **Start > All Programs > Chromatography > ChromQuest**.
2. From the Main Menu screen, choose the **Tools > Options**.
3. Click on the Enterprise tab.
4. Select the Client/Server option button in the Instrument Control Mode group box.
5. If you want the users to log into ChromQuest, select the Enable Instrument Login And Project Management check box.
6. If you are enabling log ins, select the source of the user lists. To use Windows 2000/XP domain bases user lists, select the Domain Controller option button and specify the name(s) of your domain(s).
7. Click on **OK**. Then, exit ChromQuest.

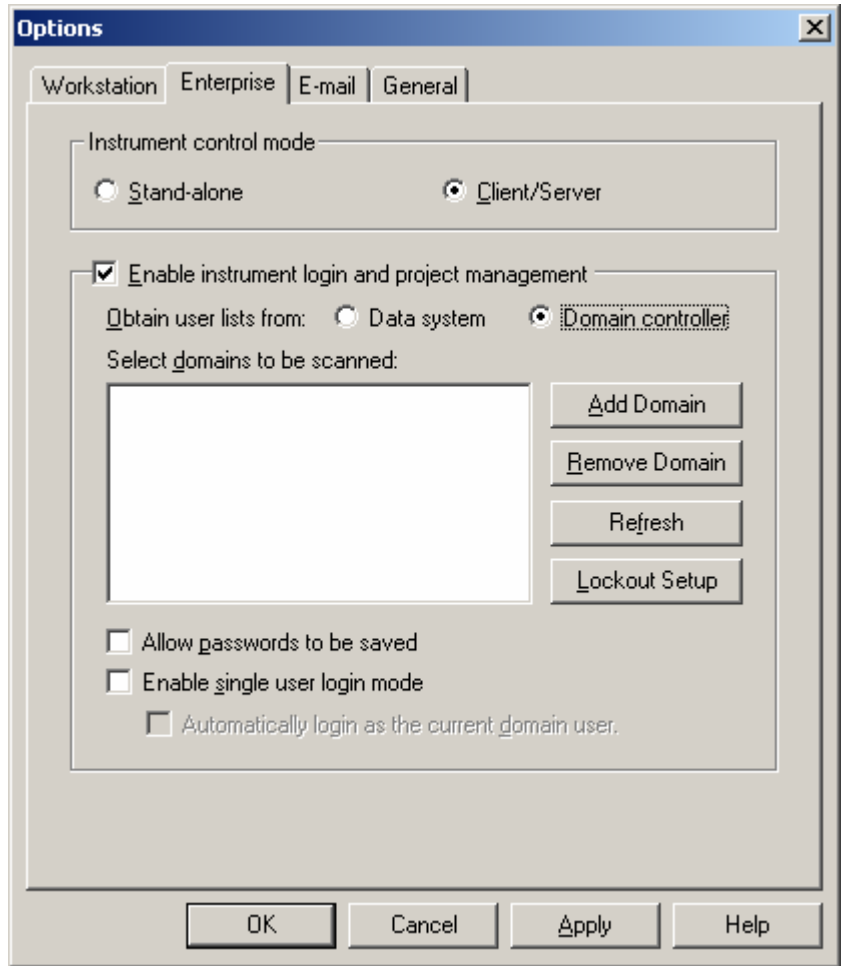


Figure 4. Options - Enterprises dialog box

Hardware Requirements

The recommended minimum hardware requirements for running ChromQuest are as follows.

Note A faster processor and additional RAM memory are required when using other programs in addition to ChromQuest.

Enterprise Path PC

The Enterprise Path PC should be a PC running one of the following:

- Windows 2000 Server with Service Pack 4
- Windows XP Professional with Service Pack 2

Network: Network with TCP/IP

Note In most cases, the server versions are preferred because of the limitations of the number of simultaneous network connections in the workstation versions.

Standalone Systems

CPU: Pentium II 500 MHz minimum
Memory: 256 MB to control 1 instrument
Add 32 MB per additional instrument
Add an additional 64MB per PDA
Disk: At least 80 MB free disk space
Network: Network with TCP/IP

The chromatography interface PCs should be running one of the following:

- Windows 2000 Professional with Service Pack 4
- Windows XP Professional with Service Pack 2

Client/Server Systems

CPU: Pentium II 500 MHz minimum
Memory: 256 MB to control 1 instrument
Add 32 MB per additional instrument
Add an additional 64MB per PDA
Disk: At least 80 MB free disk space
Network: Network with TCP/IP

The chromatography interface PCs should be running one of the following:

- Windows 2000 Professional with Service Pack 4
- Windows XP Professional with Service Pack 2

Advanced File Security

In addition to the hardware and operating system requirements specified above, the use of Advanced File Security requires that all computers and users in the Enterprise must be members of a Microsoft Windows 2000/XP Domain.

Note

1. Make sure the Enterprise Path PC is rebooted either before or immediately after EnterpriseSetup.exe is run to enable the Advanced File Security. Otherwise, the postings to the Instrument Activity log will be interrupted.
2. Service packs are available on the ChromQuest CD-ROM.

Installing ChromQuest

This section describes how to install the ChromQuest chromatography data system and contains the following topics:

- [Installation Requirements for Windows 2000/XP](#)
- [The Installation Screens](#)

Installation Requirements for Windows 2000/XP

Before installing ChromQuest software on a Windows 2000/XP workstation, the following requirements must be met:

1. Verify that Windows 2000 Service Pack 4 or greater is installed. This is displayed when Windows is starting.
2. Log in to the Windows 2000/XP system as a local administrator for the machine. The user(s) that will be running ChromQuest do not have to be administrators, but installation requires administrator rights.
3. Configure the TCP/IP protocol. Use DHCP or assign a static IP address.
4. If running in a Windows 2000 domain, make sure that the user(s) log into the domain and not just the local computer.

The Installation Screens

The following screens appear after you insert the ChromQuest CD into your CD-ROM drive:

- [Welcome](#)
- [Choose Destination Location](#)
- [Enterprise Settings](#)
- [Select Program Folder](#)
- [Information](#)
- [Reboot to Complete Setup](#)

Welcome

The first installation screen advises you to close down any current Windows applications before you start the installation, and informs you of the copyright laws governing the ChromQuest application.

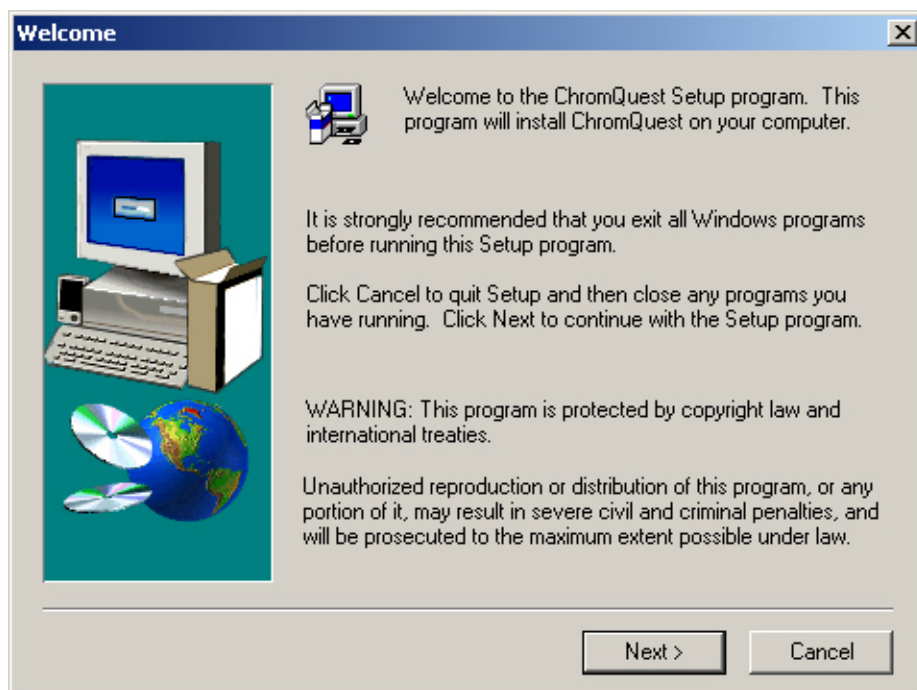


Figure 5. Welcome window

Click on **Next** to continue the installation.

Choose Destination Location

This screen allows you to select the folder where you want the ChromQuest program files to be installed. You may accept the default location, enter a new one by typing it in, or you may select a folder from those already on your disk by clicking on the **Browse** button.

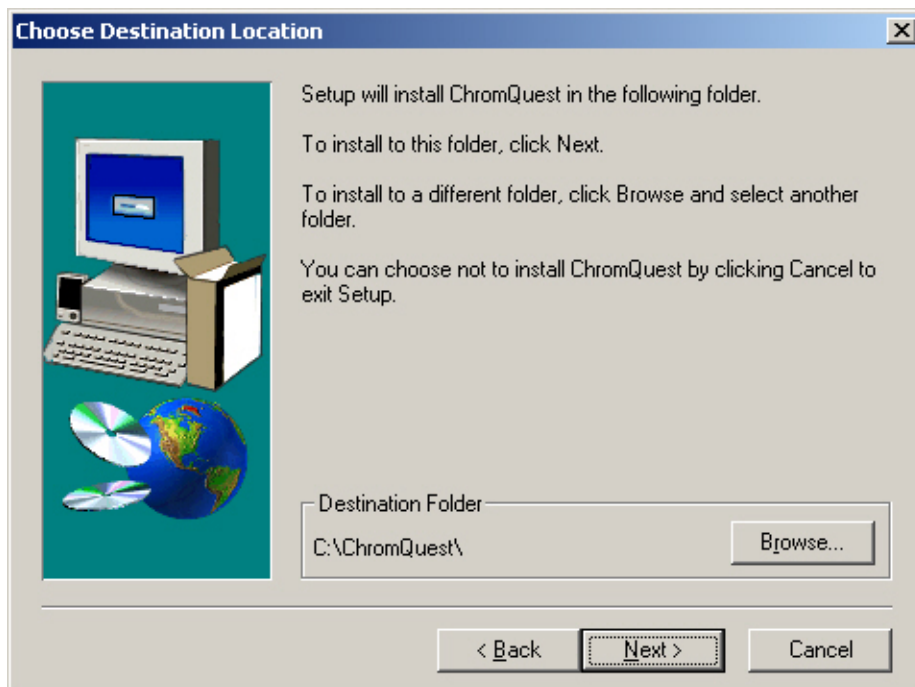


Figure 6. Choose Destination Location window

When you have the correct folder designated, click **Next** to continue.

Enterprise Settings

This screen is used to designate enterprise information.

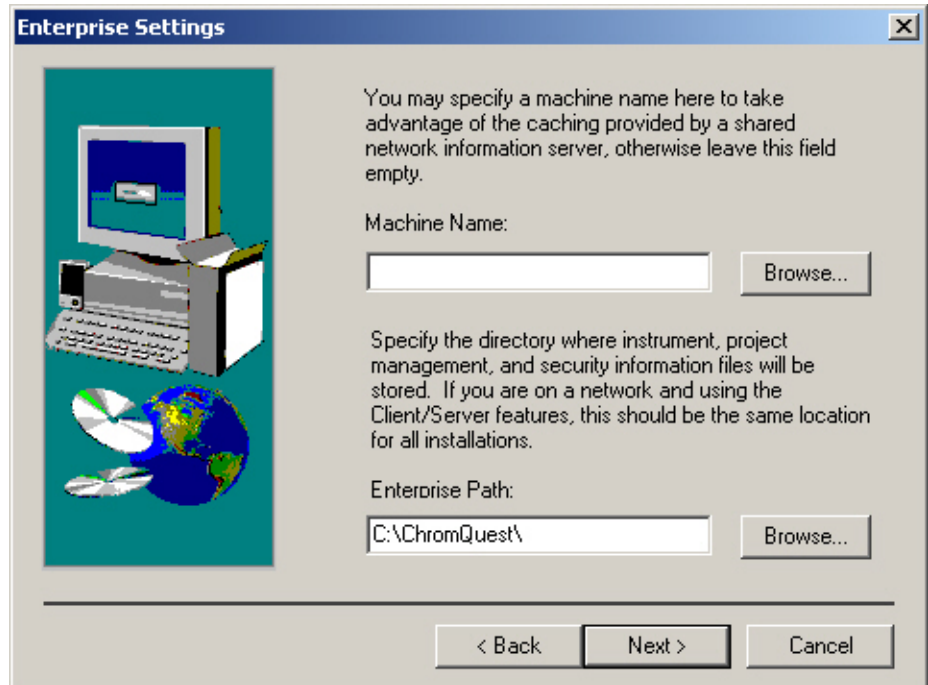


Figure 7. Enterprise Settings dialog box

- Enterprise Machine

This field is not used for workstation or networked workstation environments.

- Enterprise Path

The enterprise path is where configuration files for instruments, project management, and network security are stored. You can set the enterprise path to your own computer, or to another location on the network.

Note Enterprise paths must be designated using the Universal Naming Convention (\\ntserver).

Select Program Folder

From this screen, you designate where you want the ChromQuest program icon to be located.

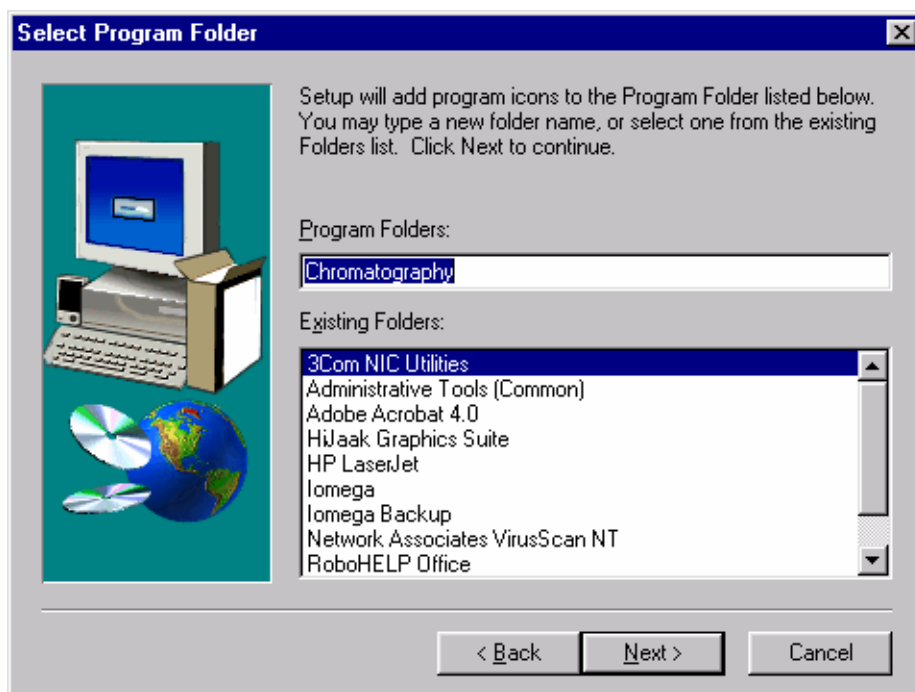


Figure 8. Select Program Folder dialog box

Information This screen summarizes the installation information you have designated.

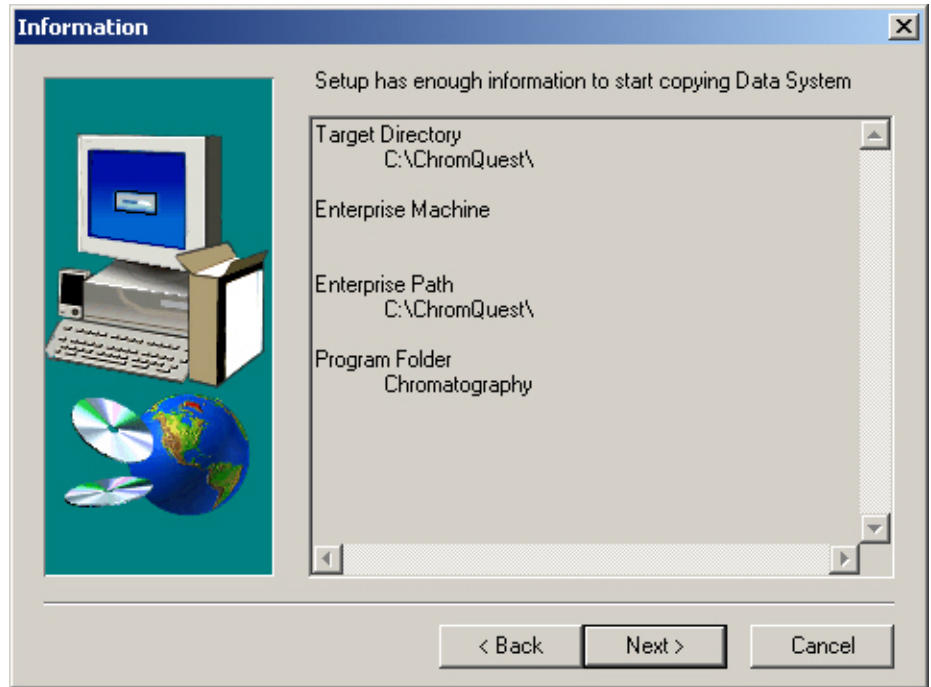


Figure 9. Information dialog box

Review the settings, and if you want to change them before installation proceeds, click on **Back**. If you are satisfied with the information, click on **Next** to finish installing the software. When the software is installed, a “default” project will be created automatically on the enterprise machine. All users on the system have access to the default project. After installation, the system administrator may want to delete this project.

Reboot to Complete Setup

When the software installation is complete, you should re-start your computer before running it.

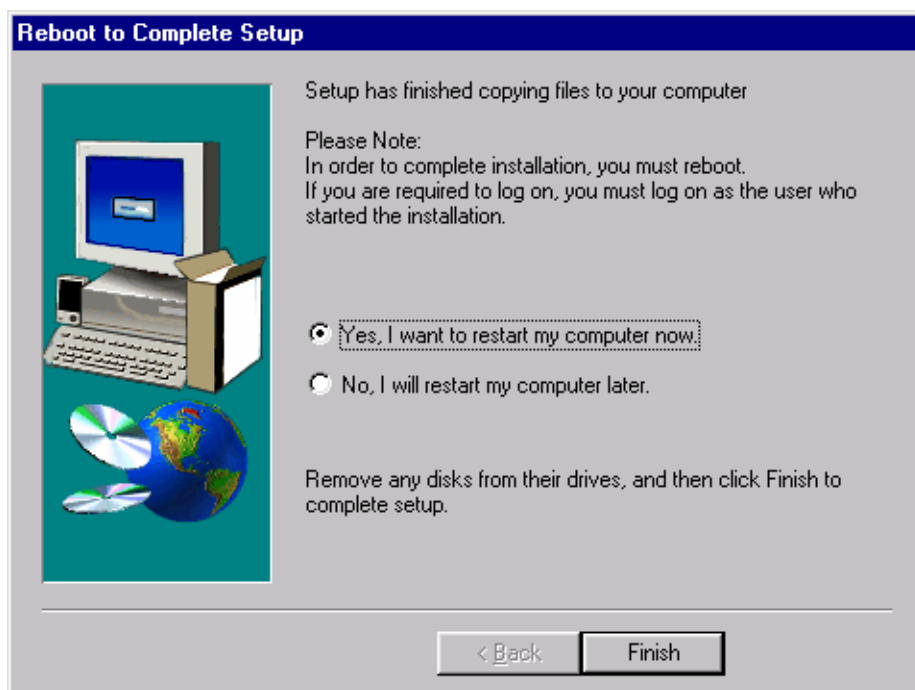


Figure 10. Reboot to Complete Setup dialog box

If you select the **Yes, I want to restart my computer now** option button, the setup program will automatically reboot your computer when you click on **Finish**. If you select the **No, I will restart my computer later** option button, the computer will not be rebooted. However, you **MUST** reboot before running the ChromQuest software.

Installation Qualification

To verify that all ChromQuest files were successfully installed, run the Installation Qualification program. From the Windows taskbar, choose **Start > All Programs > Chromatography > Installation Qualification (IQ)**.

The IQ program will generate an Installation Qualification Report that should have the result "PASSED". If it does not pass, you need to check that all the computer requirements and preparations were done properly and then re-install ChromQuest. Do not proceed with using the system if the installation qualification does not pass.

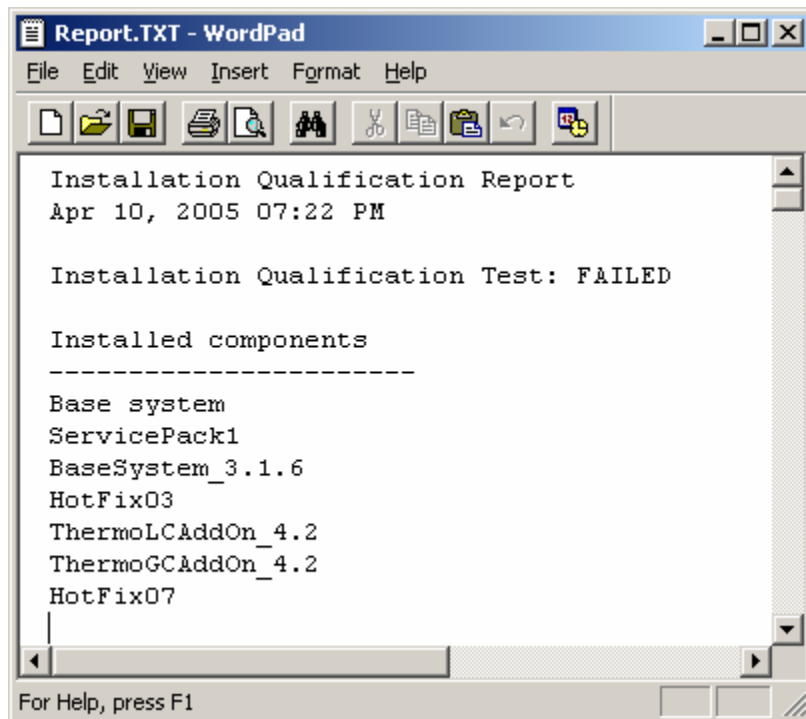


Figure 11. Report.TXT - Wordpad window

Software License Installation

To run ChromQuest, you must install a "software key" or "license key" that enables operation of the software on your computer. The key is your software license. It contains your data system serial number and determines the number of instruments and other options that may be used with your system.

A license key disk containing a file with all the purchased options (for example, number of instruments, LC, GC, spectral, and other options) was provided with your shipment. This disk should be saved for uninstalling and reinstalling the software.

To install the license, or upgrade an existing license, you must run the key installation wizard from the **Key.exe** program. This program will be located in the ChromQuest program folder following software installation. The wizard will request user information and serial number and then will provide a **Request Code**. You must contact Thermo Electron with this number to obtain a valid **Enable Code** for your system. Once this code is entered in the Key Installation Wizard, the key installation will be completed and your software will become fully functional.

If you require more instruments or other options than your license allows, contact your sales representative for upgrade information.

This section contains the following topics:

- [License Installation Wizard](#)
- [Upgrading Existing License](#)
- [Uninstall License Wizard](#)
- [Installation of Evaluation License](#)
- [Reinstalling a License Key](#)
- [Key Program](#)

License Installation Wizard

The License Installation Wizard is started when you execute the **Tools > Install License Options** from the **Key.exe** program. This command is used to install the initial license key as well as to update an existing key with additional options you have purchased.

To access the Key window from the desktop, choose **Start > Programs > Chromatography > Key**.

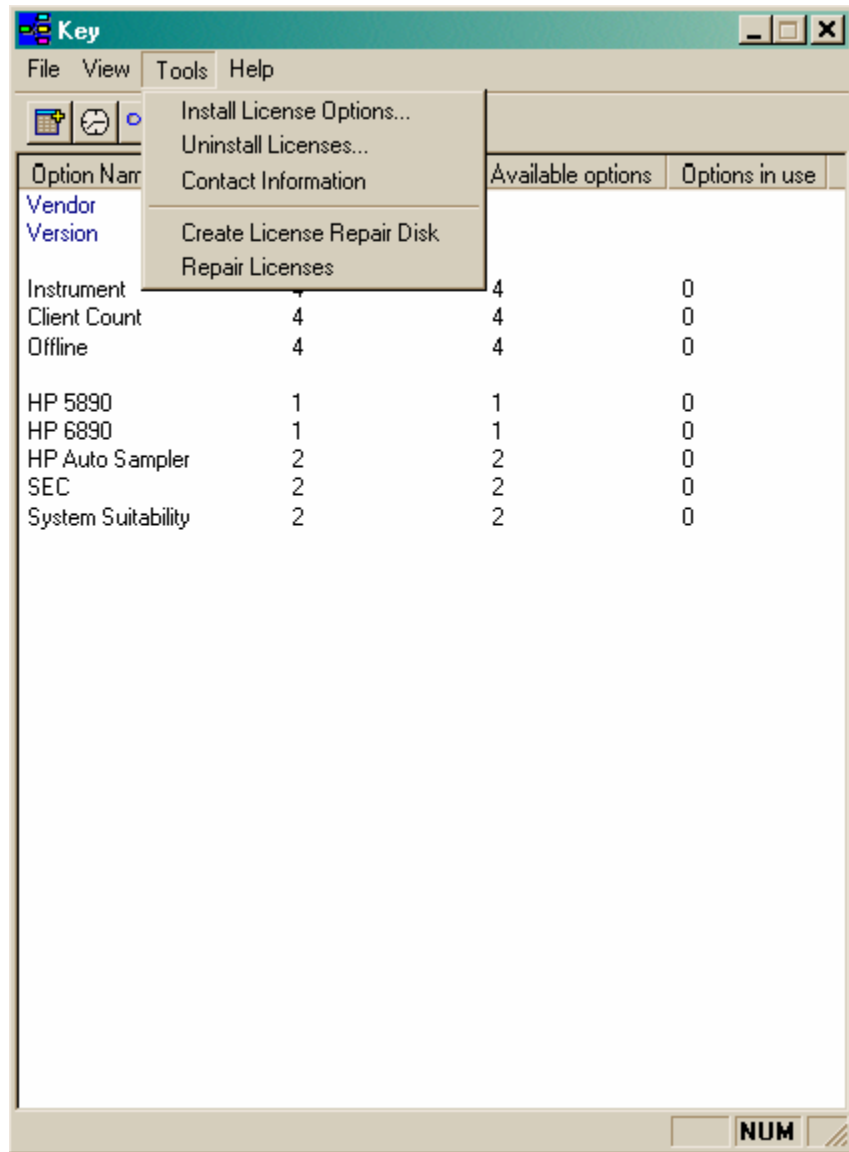


Figure 12. Key window

Initial License Activation

The first screen in a new license installation is shown below. This screen is for information, and gives you an overview of what you need to continue the installation of the software license.

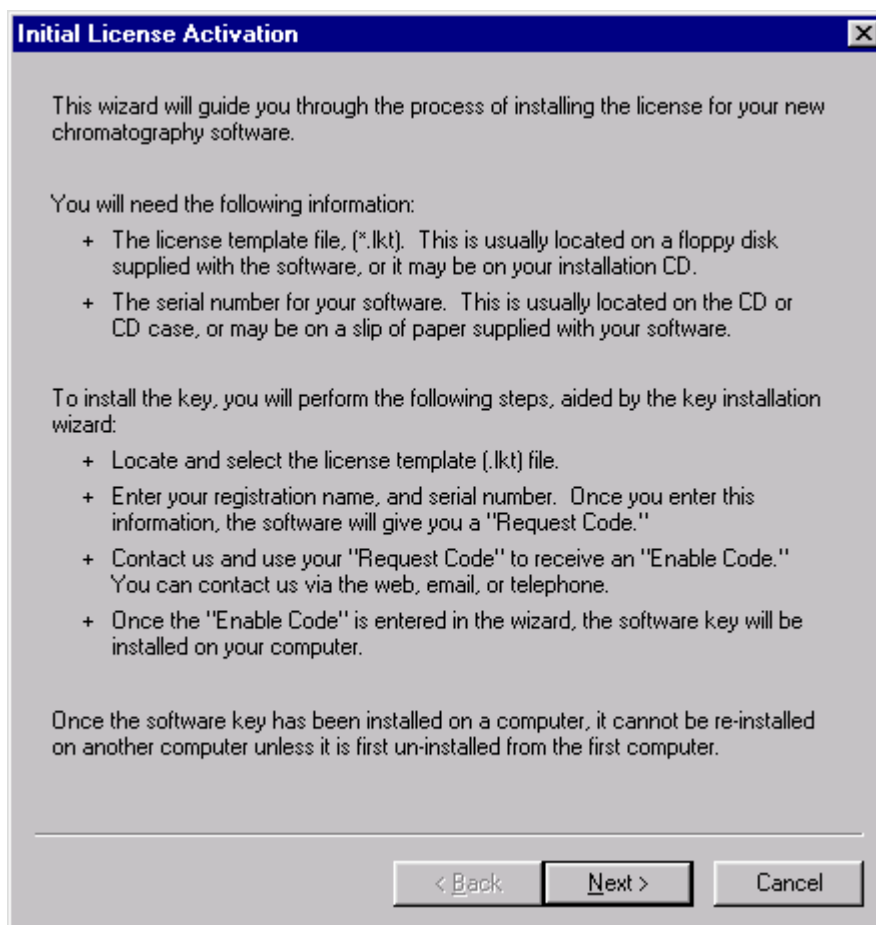


Figure 13. Initial License Activation window

Select Template File

This step in the Wizard prompts you to locate and select your .LKT file that describes the software and options you have purchased for this system. When you select the .LKT file, the license options to be installed will be displayed in the window at the bottom of the dialog. If these options do not match the options you purchased, contact Thermo Electron immediately.

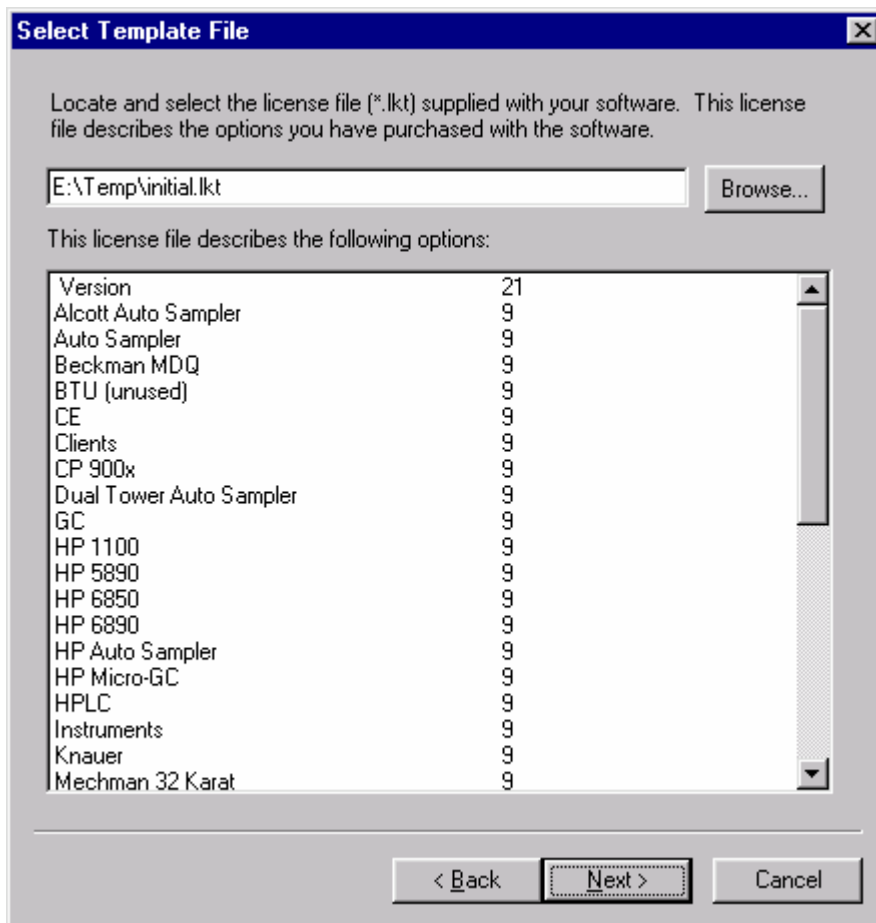
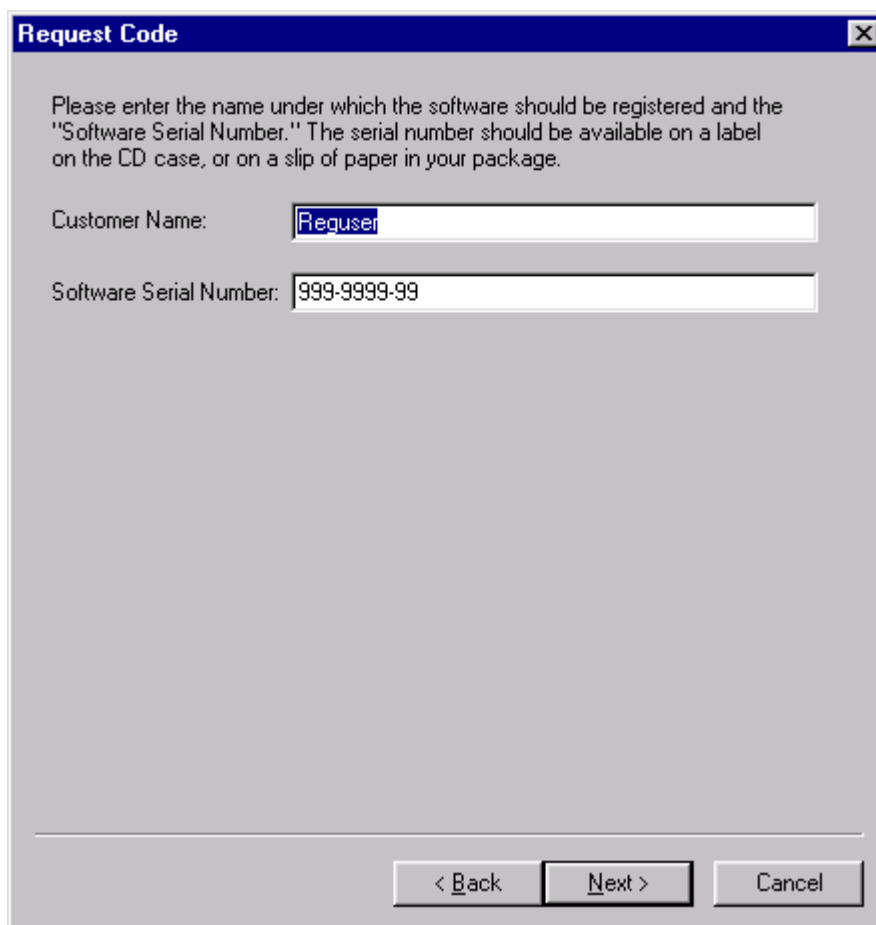


Figure 14. Select Template File window

Request Code

In order to continue installation of the software licenses, you must supply a name to be used for system registration (Customer Name), and the serial number of your software. The serial number is located on the Create Key diskette.



The image shows a Windows-style dialog box titled "Request Code". The dialog has a blue title bar with a close button (X) in the top right corner. The main area contains the following text: "Please enter the name under which the software should be registered and the 'Software Serial Number.' The serial number should be available on a label on the CD case, or on a slip of paper in your package." Below this text are two input fields. The first is labeled "Customer Name:" and contains the text "Reguser". The second is labeled "Software Serial Number:" and contains the text "999-9999-99". At the bottom of the dialog, there are three buttons: "< Back", "Next >", and "Cancel".

Figure 15. Request Code window

Enable Code

Once you have supplied your Customer Name and serial number, you will be given a Request Code. You will need this code to request an Enable Code for the installation of the software license of your system.

In order to obtain an "Enable Code" you must contact us and provide your "Software Serial Number" and "Request Code" matching this computer.

When you receive your "Enable Code," write it down exactly, as you must enter it into the Enable Code field below to complete the key installation.

To obtain your Enable Code and activate it online, make sure you have an internet connection open on your computer, then click the Online Activation button below.

Customer Name: K McKiney

Software Serial Number: 00101200106

Request Code: XMFR - YHY7 - MU63

Contact Information ...

Enter your enable code below to continue.

Enable Code: BA27 - 92XT - TV83 - J72F - M55S - GEQ2

Online Activation

< Back Finish Cancel

Figure 16. Enable Code dialog box

You must contact Thermo Electron via web, phone, or email and provide your Request Code to receive a valid Enable Code for your system. Click on **Contact Information** to view current web sites and phone numbers.

If you have an Internet connection open on your computer, click on **Online Activation**. This will automatically send your serial number and request code to the web site and return the enable code.

Note Online Activation does not work for reinstallation.

When you have received your Enable Code, enter it exactly as provided in the Enable Code field. Click on **Finish** to complete the license installation.

You will be asked if you want to create a License Repair Disk. A license repair disk is necessary to restore your license in case it is corrupted. A blank license repair disk has been provided for you with your software media. Be sure to enter the correct computer name and enterprise path so that you can identify the correct license repair disk for this computer in the future.

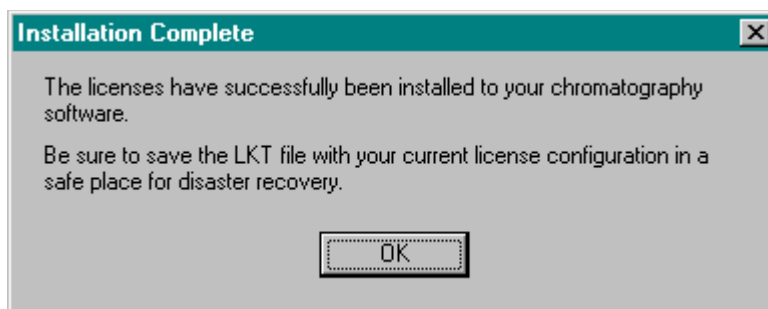


Figure 17. Installation Complete window

Upgrading Existing License

If you want to install new software options after you have installed your software license key, you must run the License wizard again. This will upgrade your license for the options you have purchased.

To upgrade an existing license, do the following:

1. Choose **Start > Programs > Chromatography > Key** to open the Key dialog box.
2. In the Key dialog box, choose **Tools > Install License Options**.

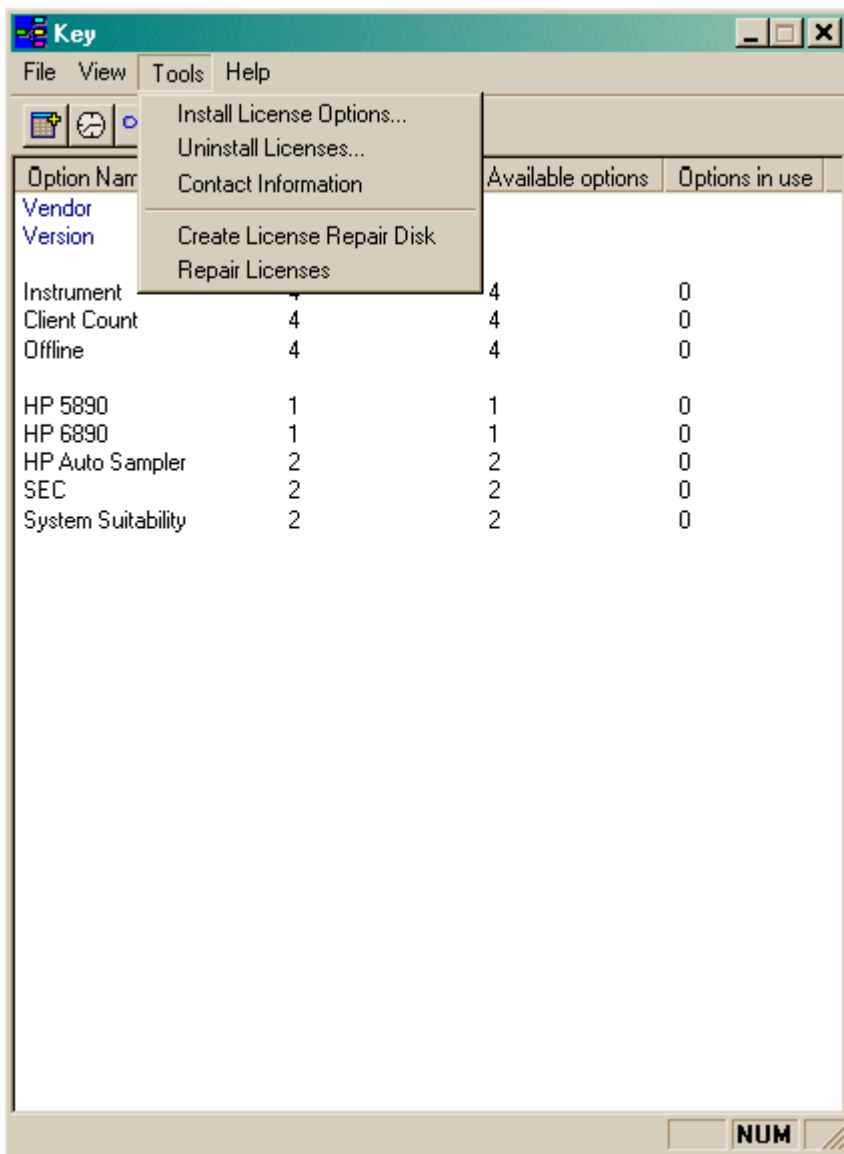


Figure 18. Key window

The license wizard will recognize your existing software key and start the upgrade wizard.

3. Follow the instructions to upgrade your license.

This is similar to the initial installation of your license. You will need to obtain an Enable Code from Scientific Software to complete the upgrade of your license.

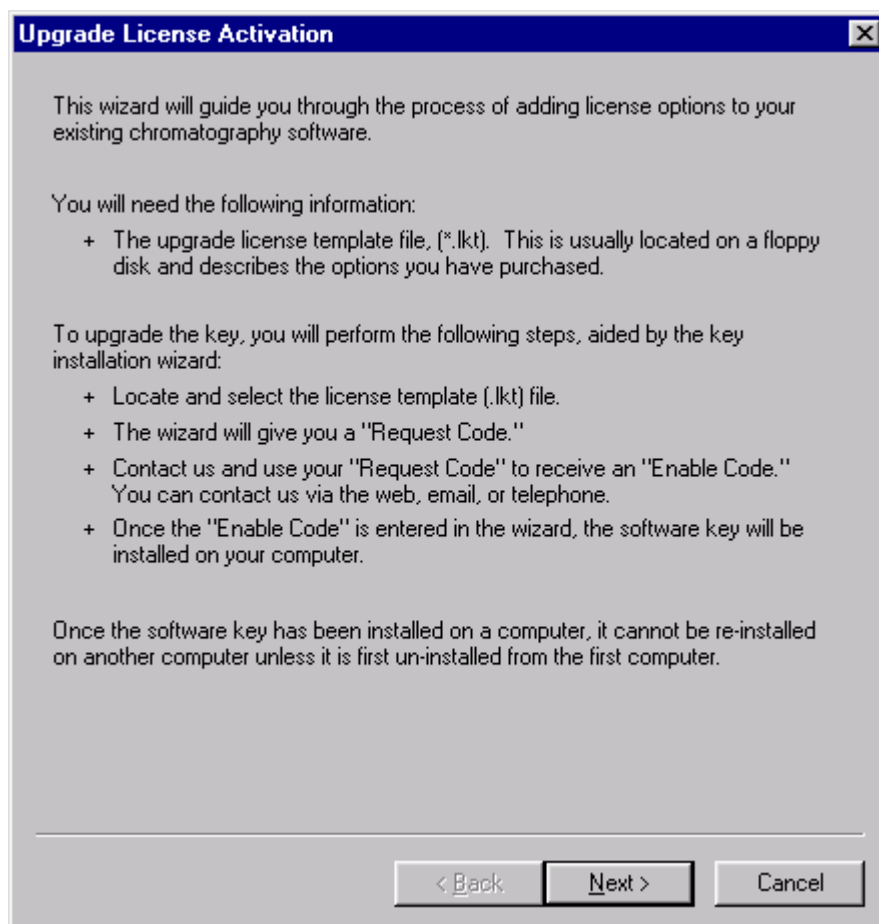


Figure 19. Upgrade License Activation window

Uninstall License Wizard

To uninstall a software license, run the **Key.exe** program by choosing **Start > Programs > Chromatography > Key** from the desktop. Then, choose **Tools > Uninstall Licenses**. This will start the Uninstall License Wizard.

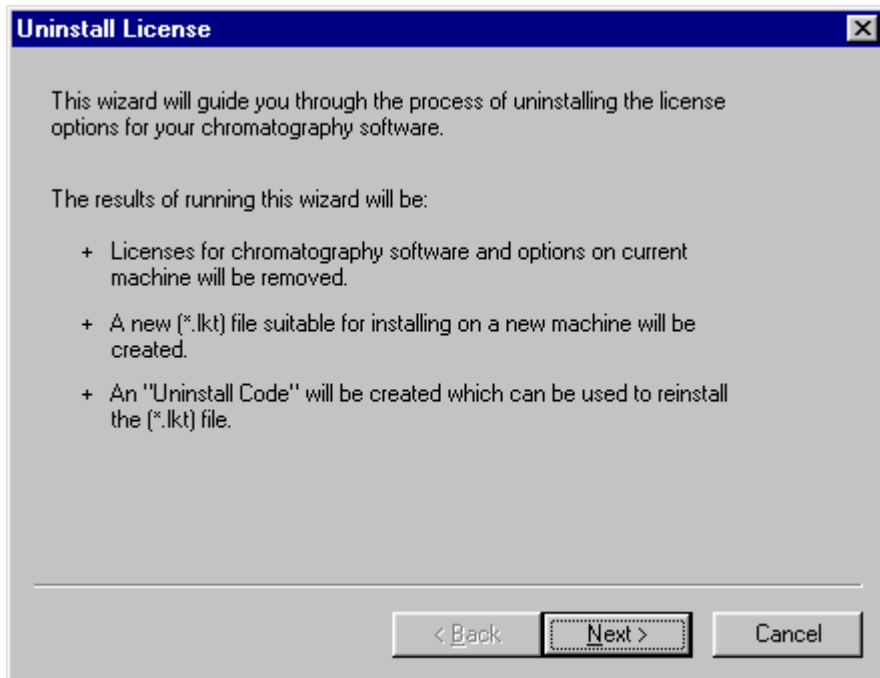


Figure 20. Uninstall License window

When you complete this wizard, all licenses will be removed from your system, a new .LKT file will be created for use in reinstalling the licenses, and you will be provided with an “Uninstall Code” which must be used to obtain a new Enable Code for reinstalling the licenses.

Output File

In this screen, you should select the location where you want to have the new .LKT file created. In most cases, this would be a floppy, but can choose another location.

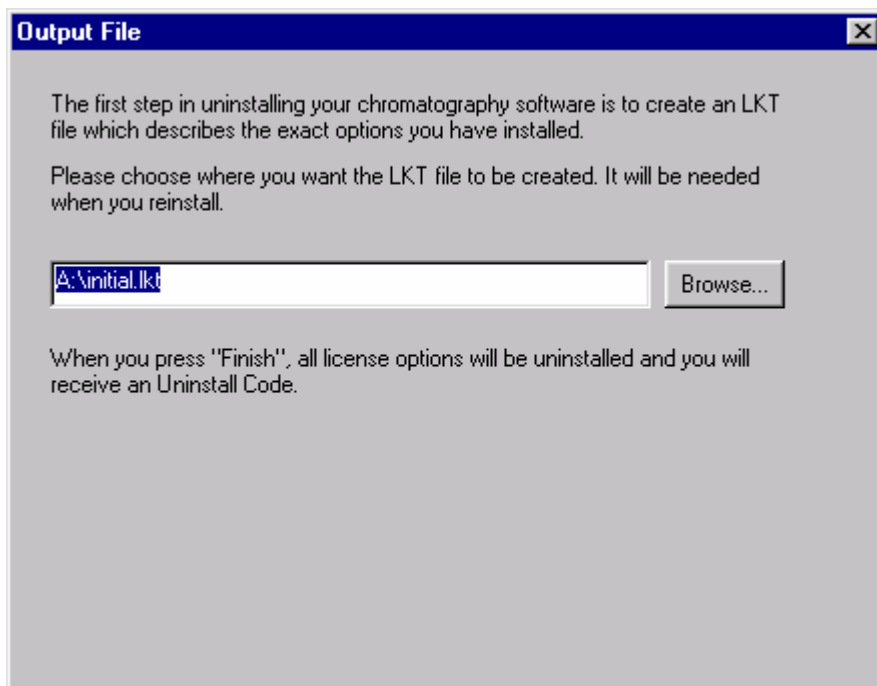


Figure 21. Output File dialog box

Make sure the location for creation of the new .LKT file is accessible from the computer where you intend to reinstall the licenses.

When you click the Finish button, the licenses will be removed from your computer, a new .LKT file will be created in the designated location, and you will receive an Uninstall Code.

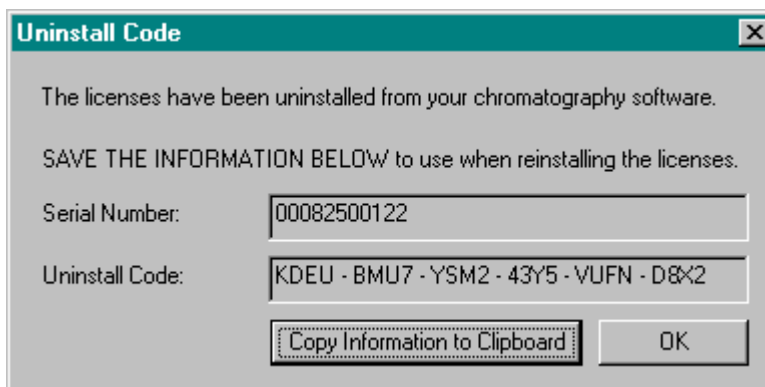


Figure 22. Uninstall Code window

Save the information provided. It will be required to obtain an Enable Code for reinstallation of the software licenses on another computer. If you click the **Copy Information to Clipboard** button, the serial number and uninstall code will be copied to the clipboard. You can then paste this information into a document that can be saved for later reference, or printed.

Installation of Evaluation License

Evaluation licenses are available that enable full use of the software and options for a limited time. These licenses are designed to aid customers in evaluation of the software or for demonstration of the software.

The process of installing an evaluation license is the same as that for installing a regular license. The evaluation license .LKT file is provided on a floppy disk. If the Evaluation Enable Code is entered during license installation, the software and options will be operational for a designated period.

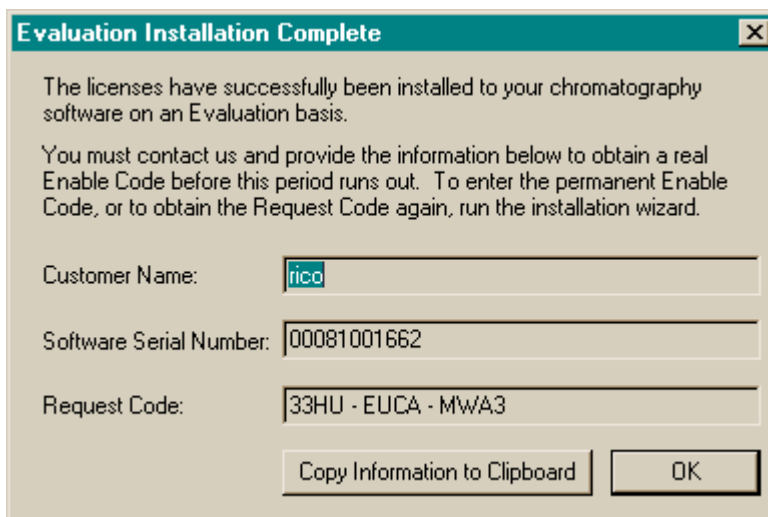


Figure 23. Evaluation Installation Complete window

Reinstalling a License Key

After you have uninstalled a license key, you should have a disk with the .LKT file created during the uninstall, and the uninstall code provided during the uninstall process. This uninstall code is required for you to obtain a new enable code when you re-install the license.

To reinstall the license key after an uninstall, use the **Tools > Install License Options** command from the **Key.exe** program and follow the installation wizard as if you were installing the license for the first time. However, the enable code for a reinstallation must come from the reinstallation web page.

Select **Reinstall** when you go to the web page at **ChromatographyKey.com/ThermoElectron**.

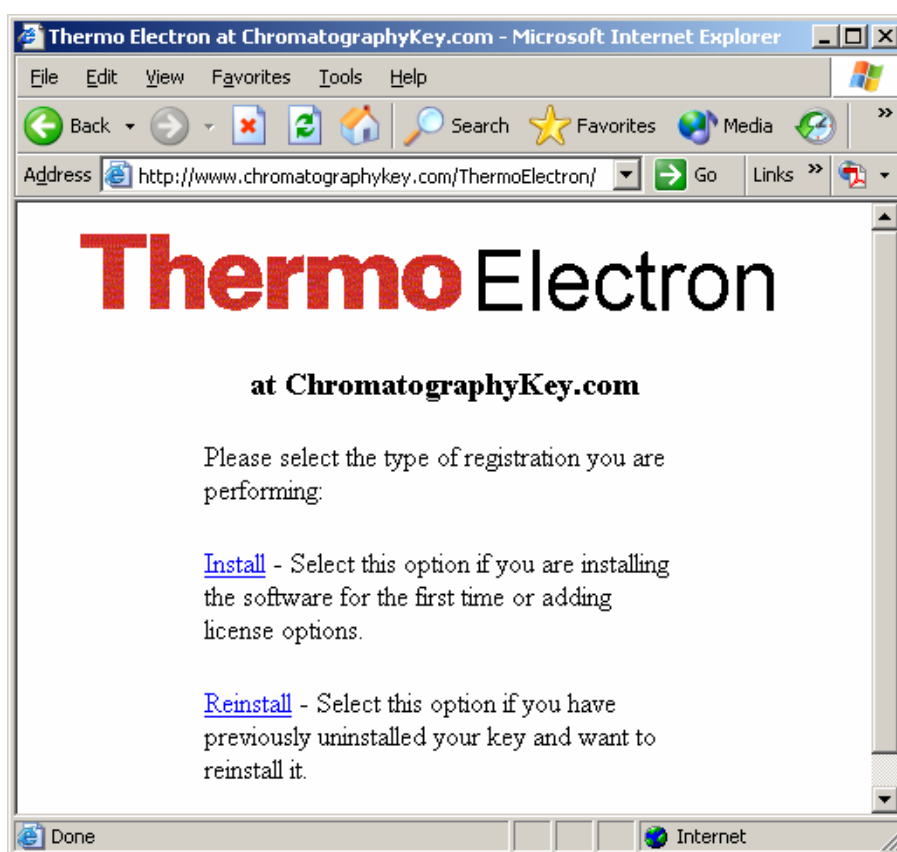


Figure 24. ChromatographyKey.com/ThermoElectron web page

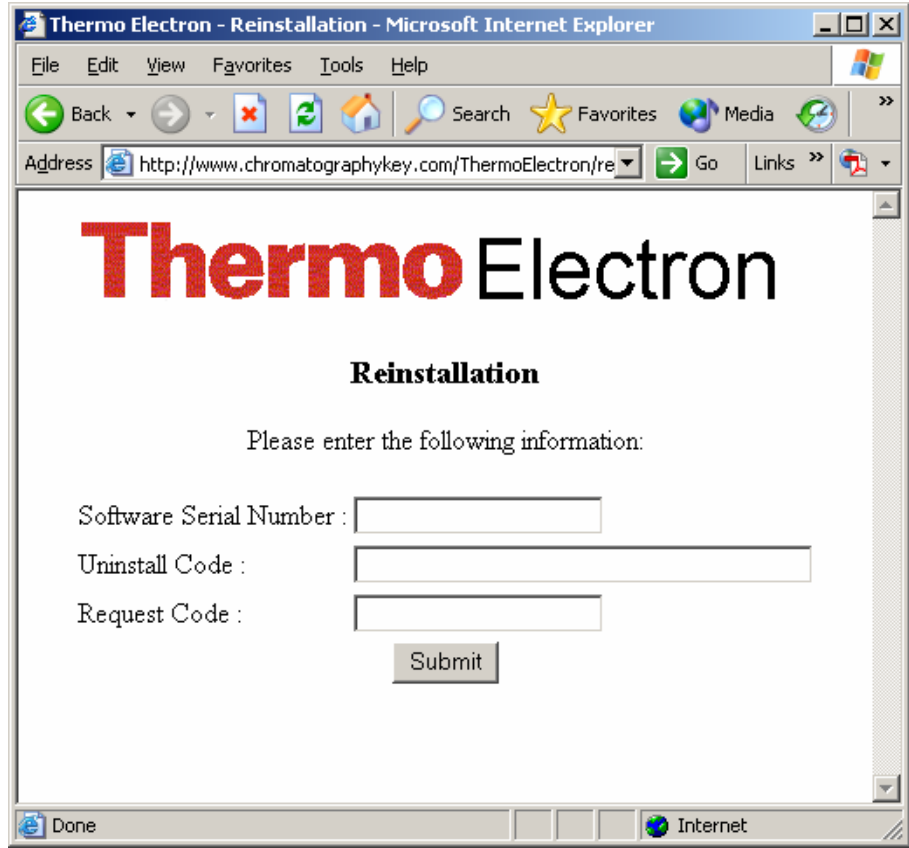


Figure 25. ChromatographyKey.com/ThermoElectron/reinstallation web page

Enter the Serial Number, the Uninstall Code provided when you uninstalled your license, and the Request Code provided by your installation wizard, then click on **Submit**.

Copy the Enable Code into the license installation wizard and step through the final wizard screens to complete the key re-installation.

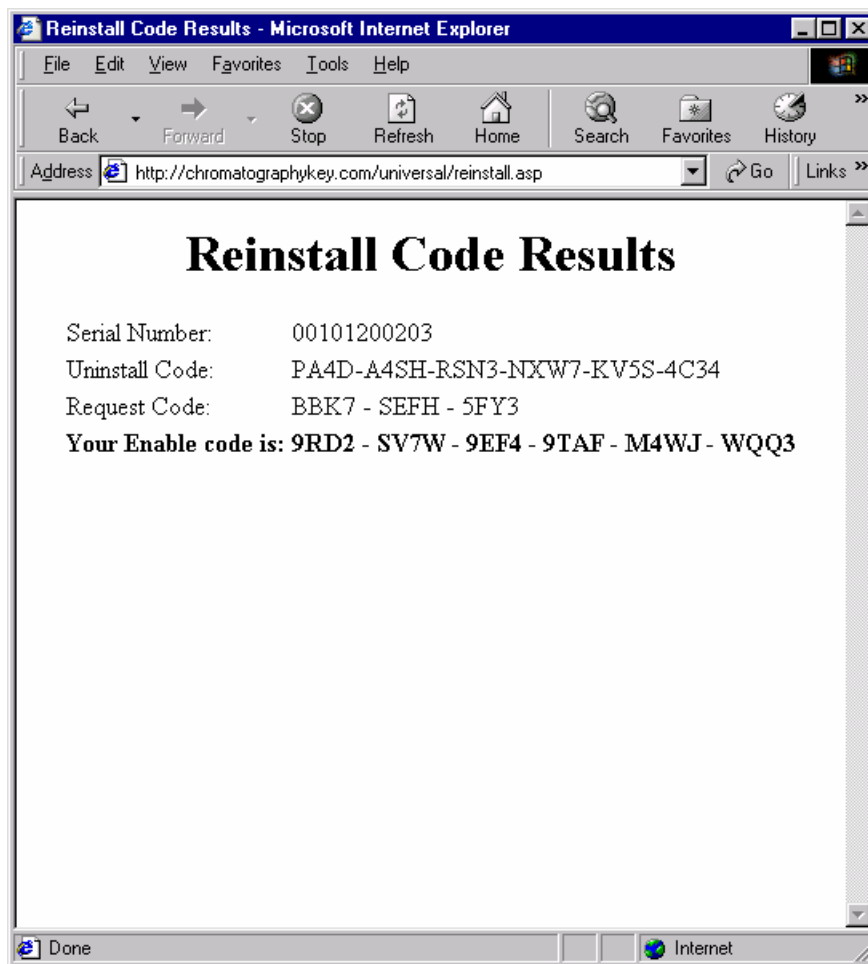


Figure 26. Reinstall Code Results web page

Creating a License Repair Disk

Once you have installed your software license key, you should create a License Repair Disk. This is **highly recommended**. This will create a License Repair disk on a formatted floppy disk and contains your software license information. If you need to restore your software license because of an unexpected error in your system, this disk will recover it for you.

Note You can only use the License Repair Disk to re-install your software license to its original location. It cannot be used to install your license to another machine or location.

The License Repair Disk is created by running the **Key.exe** program, located in your data system program directory (**Start > Programs > Chromatography > Key**). Insert the license repair disk floppy provided with your software media, and then choose the **Tools > Create License Repair Disk** command. Enter the drive letter for the floppy drive, and click on **OK** to continue.

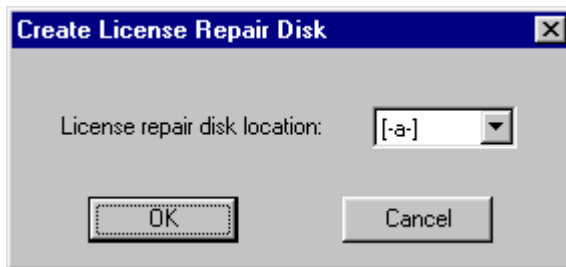


Figure 27. Create License Repair Disk dialog box

Your software license information will be transferred to the License Repair Disk.

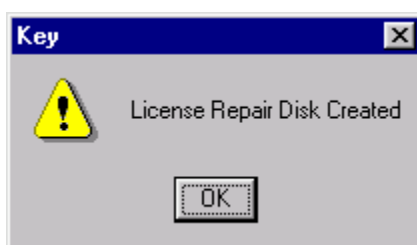


Figure 28. Key window

Save this disk in a secure location should you need it to repair your software license. Be sure to fill in the correct computer name and enterprise path so you can identify the correct license repair disk if needed.

Repairing a Software License Key

Should you for some reason lose access to your software license key, you can restore it to its original location using your License Repair Disk. (See Creating a License Repair Disk.) To repair your software license, insert the License Repair Disk in your floppy drive, and then run the **Key.exe** program in your ChromQuest program directory.

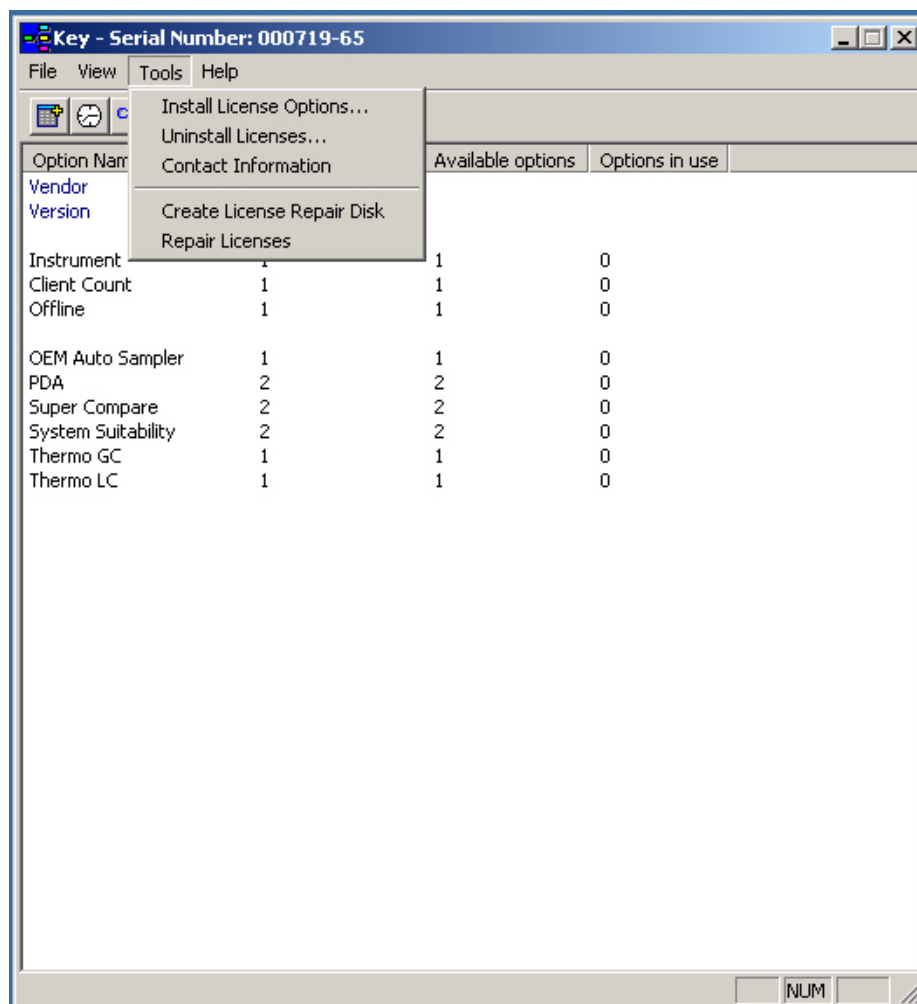


Figure 29. Key - Serial Number window

Choose the **Tools > Repair Licenses** command. The program will restore your license to its original location. Note that the repair licenses command will not overwrite an existing license key.

Key Program

The **Key.exe** program is used to display the status of the licenses available on a software license key. Once you have your software license key installed, you can view its options by running the Key.exe program located in the ChromQuest program directory (**Start > Programs > Chromatography > Key**).

This program allows you to view your key status, and also provides a means for creating a License Repair Disk, Uninstalling an existing license, or updating a current license.

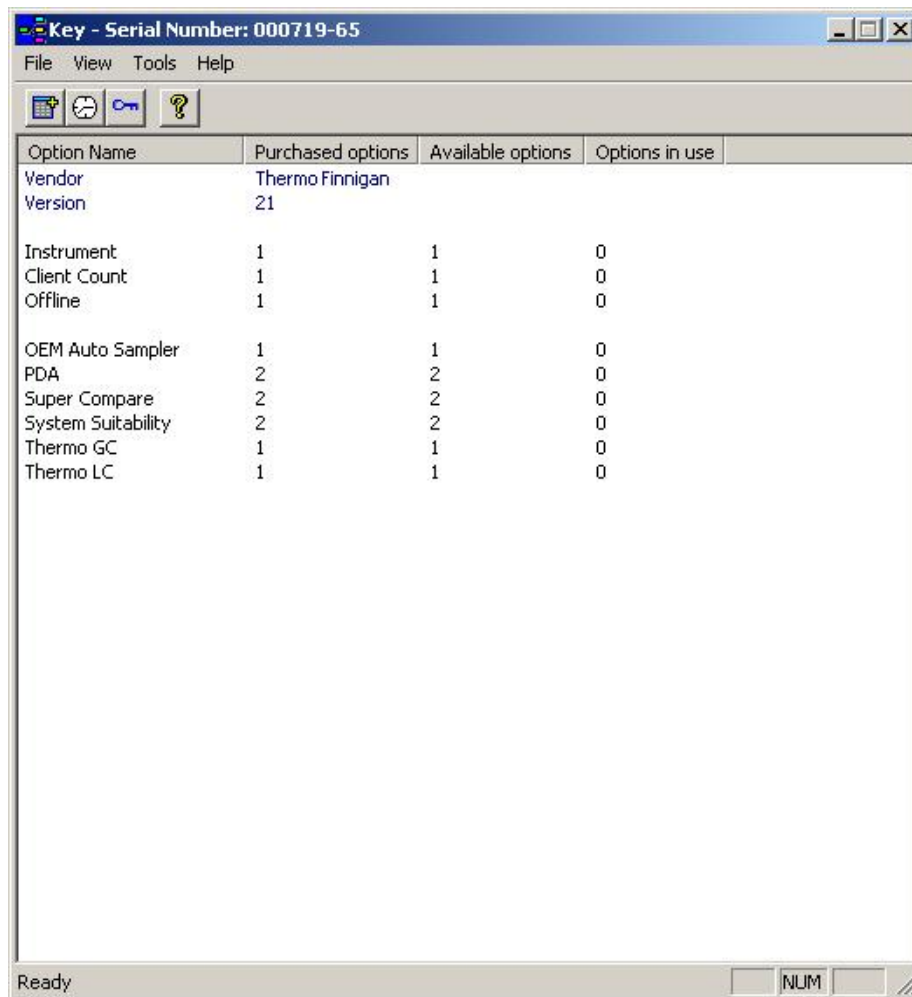


Figure 30. Key - Serial Number window

- File
 - ExitExit the key program.

- View
 - Auto Refresh

This automatically updates the status of the network key, and sets the number of seconds between refresh.
 - Refresh

Use this to update the status of the network key.
 - Toolbar

This toggles the display of toolbar icons.
 - Status Bar

This will toggle the display of the Status line.
 - Key Status

This displays information about the key, including current enterprise path and program directory.

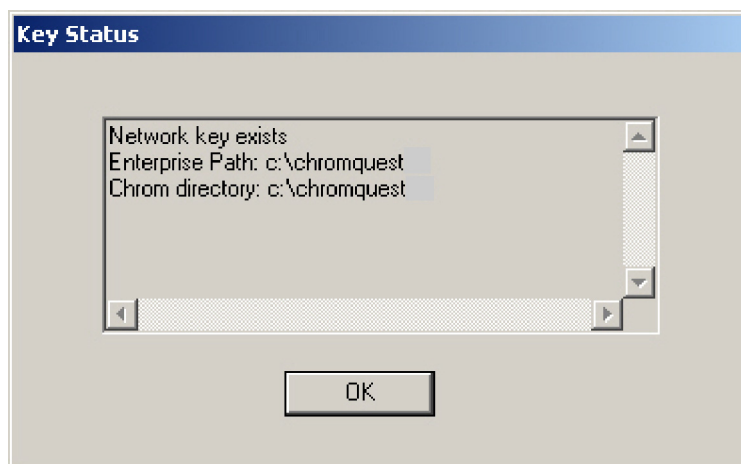


Figure 31. Key Status window

- Tools
 - Install License Options

Use this to install license or update current license with new options.
 - Uninstall Licenses

Use this to uninstall current licenses from the current machine.

1 Software Installation

Software License Installation

- Contact Information
Displays contact information for your software.
- Create License Repair Disk
This command creates a license repair floppy to be used to recover an existing license that has been damaged.
- Repair Licenses
This command uses the License Repair Disk for the current computer to restore the existing license to its original state.

Network Printers

In Windows 2000/XP, when the user logged into the computer is not a local administrator and the printer is shared with only Print permission, ChromQuest will require the user to select the printer every time they open an instrument. This is due to the logged user having insufficient rights to query for information about the printer.

To solve the problem, simply set the permissions for Everyone to Full Control rather than Print. This is done on the sharing computer as follows: log onto each computer as a local administrator, select the properties for the printer, on the Security tab click Permissions, and in the Permissions dialog change Everyone from Print rights to Full Control rights.

TCPIP Printer Installation

Certain network printers that use TCPIP communications, and are connected directly to the network must be installed properly for ChromQuest to communicate with them. The **HP5Si model printers** are examples of such printers. The following information will aid you in installing the HP5Si printers for use with ChromQuest software. Other printers may require similar procedures.

Driver Installation

HP5Si model printers come with driver installation software. Use this software to install the printer. DO NOT use the “ADD PRINTER” function from the Windows 2000/XP operating system.

To install the printer driver, run the *Setup.exe* program (Windows 2000/XP version) from the CD provided with the printer. Follow the installation wizard provided to install the driver for your chosen model. When you install the driver, the software will ask you to select a local port for the printer.

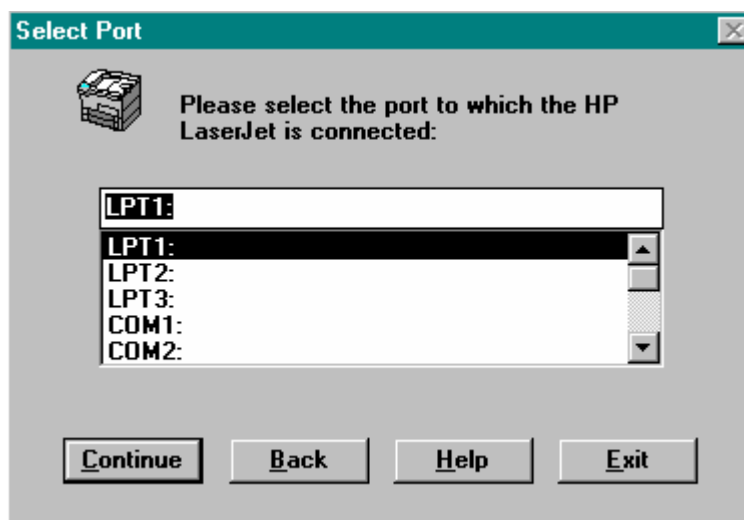


Figure 32. Select Port dialog box

This port acts as a “temporary” designation, as the printer is directly connected to the network and will later be designated.

Continue to follow the wizard to install your printer as directed. When the installation program is completed, it will prompt you to reboot, or restart Windows for the changes to take effect.

The printer driver must be installed on every ChromQuest Workstation where you want to use the printer.

It is important to set up the printer for each instrument so that the reports for that instrument are printed on the correct printer. Make sure to follow the guidelines for printer setup in stand-alone or networked mode, as appropriate for your laboratory. See the Configuration section for details on configuring printers for use with ChromQuest.

Chapter 2 Hardware Installation

This chapter describes how to install the various A/D options supported by the ChromQuest data system. For the following analog to digital modules, refer to the instruction manual included with the respective hardware: SS420X A/D interface, GPIB board, Digiboard, CIO/DIO.

For the Surveyor Plus LC system, refer to the *Surveyor Plus Getting Connected* manual.

This chapter contains the following sections:

- [SS420 A/D Installation](#)
- [HP LAS Installation](#)

SS420 A/D Installation

This section describes how to install the SS420 Analog to Digital Converter (ADC) Board and make analog detector connections on the terminal panel. It also describes how to connect trigger and external event lines.

This section contains the following topics:

- [SS420 Board Installation](#)
- [Detector Connections](#)
- [Trigger Signal Connections](#)
- [Ready Signal Connections](#)
- [External Device Connections](#)

Note Because configuration sometimes requires board number and connection information, it is a good idea to document all connections, board addresses, and external event connections and keep in a handy place for future reference.

SS420 Board Installation

The ADC board must be installed in one of the I/O slots of your computer. This board requires one I/O slot in your computer.

Preparation

Before you install the SS420 board

1. Turn the computer OFF. Care must be taken whenever your computer cover is removed to avoid electric shock or damage to your computer components.
2. Remove the cover from the computer. Remove the small cover from the narrow computer slot where you intend to install the ADC board.
3. Carefully remove the ADC board from its protective shipping bag. To avoid damaging the board, use a grounding strap, or discharge any static electricity you may have accumulated by touching the chassis of your computer before handling the ADC board.

Hints for Finding the IRQ and Base Address

You can examine the current IRQ and Address settings for your computer system by doing the following:

For Windows 2000/XP:

1. Click on **Start**.
2. Choose **Run** to display the Run dialog box.
3. In the Open text box, type **Winmsd**. Then, click on **OK** to open the System Information folder.

- Click on the Hardware Resources folder. Then, click on the IRQs folder.

SS420 Board Address and IRQ

The SS420 board is factory-set to an interrupt IRQ11, and base address of 360 (hex). If these settings conflict with a board already installed in your computer, you must change the interrupt and/or address on the board before installing it.

Note If you later install a “Plug and Play” device in your computer, you may need to change the IRQ and base address to avoid conflicts with the new device. You can also go to your computer’s BIOS setup and reserve the IRQ as a “legacy” to avoid this problem.

Changing Interrupt Level (IRQ) Jumper

If you install more than one SS420 board, then each board must have a different interrupt level setting.

Note Conflicts in interrupt level typically result in a lack of data (no chromatogram, no time clock.) If you use a network card or tape backup drive, it is especially important to check for conflicts in interrupts.

Suggested interrupt levels are:

| Board # | Interrupt (IRQ) |
|---------|-----------------|
| 1 | 10 |
| 2 | 11 |
| 3 | 5 |
| 4 | 12 |

You can also use IRQ3 by deleting COM2 if you are not using it.

To change the interrupt level, locate the IRQ jumpers on the SS420 board labeled P1. The SS420 board is shipped from the factory with the jumper set at IRQ11. Gently pull the jumper off IRQ11 and push it onto the IRQ setting you wish to use. Note the IRQ level used, as you will need to enter this number during the configuration portion of your software installation.

Note If you later install a “Plug and Play” device in your computer, you may need to change the base address to avoid conflicts with the new device.

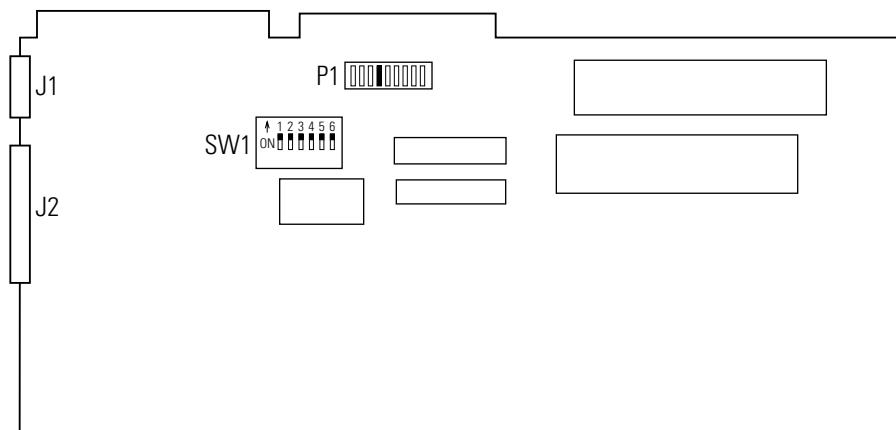


Figure 33. SS420 Analog to Digital Board

Changing Board Address

The SS420 board is shipped from the factory with a base address of 300 or 360 (hex). The address of 360 should be used if other hardware, such as a network card, tape backup, CD ROM, sound card, etc., is installed. (If more than one SS420 board is ordered, each board will be set with a unique address.) Each board uses four address spaces. Therefore, if you have four SS420 boards installed, set their base addresses to:

- 1st Board = 360
- 2nd Board = 364
- 3rd Board = 368
- 4th Board = 36C

Note Conflicts in base address often cause random failures. If you use a network card or tape backup drive, it is especially important to check for possible conflicts.

To change the board address, change the switches labeled **SW1** on your board to reflect the correct address. Each switch is labeled with a number, and **SW1** contains a label showing which position is ON. To set a switch ON, slide the switch in the ON direction.

The board address is set to **3XY (hex)**, where X and Y are variables set by using the switches labeled 1 through 5. Switch 6 is not used.

The following diagram illustrates the switch positions used for setting the board address. Switches 1-3 are used for setting X, and switches 4-5 are used for setting Y.

| | | Switch Number | | | | |
|------------|----------|---------------|-----|-----|-----|-----|
| | | 1 | 2 | 3 | 4 | 5 |
| X = | 0 | ON | ON | ON | | |
| | 1 | ON | ON | Off | | |
| | 2 | ON | Off | ON | | |
| | 3 | ON | Off | Off | | |
| | 4 | Off | ON | ON | | |
| | 5 | Off | ON | Off | | |
| | 6 | Off | Off | ON | | |
| | 7 | Off | Off | Off | | |
| Y = | 0 | | | | ON | ON |
| | 4 | | | | ON | Off |
| | 8 | | | | Off | ON |
| | C | | | | Off | Off |

For example, the correct switch settings for a board address of 364 are:

| Switch Number | | | | |
|---------------|-----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 |
| Off | Off | ON | ON | Off |

Installing the ADC Board

To install the ADC board

1. Hold the ADC board by its edges and position it so that the 25-pin and 15-pin connectors face the rear of the computer.
2. Plug the ADC board into the slot of your computer by firmly pushing the edge of the card with the gold "fingers" into the long connector of the slot until the card is seated.
3. Use the screw from the slot cover plate to secure the board in place. Screw it into the chassis through the hole at the end of the board.
4. Replace the computer cover and follow the directions below to install the software and instrument connections. Do not turn on your computer until after you have completed the instrument connections.
5. Plug the 25-pin connector on the terminal panel cable into the 25-pin connector (**J2**) on the rear of the SS420 board. Connect the other end of the cable to the 25-pin connection of the terminal panel.

- Plug the 15-pin connector on the terminal panel cable into the 15-pin connector (**J1**) on the rear of the SS420 board. Connect the other end of the cable to the 15-pin connector of the terminal panel.

Installing the Terminal Panel

The TP420 terminal panel supplied with your system is used to make instrument connections (analog input, triggers, and external events) to the ADC board. The terminal panel is located inside the black cover of the box. To access the terminal panel, remove the four screws holding the cover.

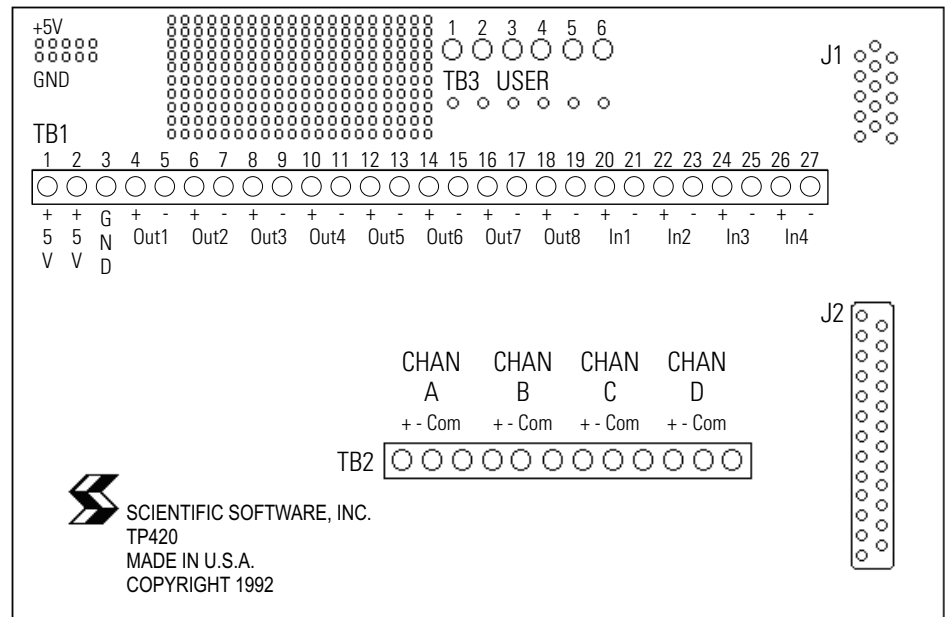


Figure 34. TP420 Terminal Panel

The TP420 terminal panel contains the following connections:

- 4 Analog Connections labeled CHAN A - D +/-com
- 4 Digital Input Connections labeled IN1 - 4 +/-
- 8 Digital Output Connections labeled OUT1 - 8 +/-
- 1 Digital ground connection labeled GND
- 1 Power connection labeled +5 v (two connectors)

Locate these connections on the card before you proceed.

Note The box surrounding the terminal panel provides electrical shielding from noise sources and provides protection for the connectors. After making all of your connections to the terminal panel, replace the terminal panel cover.

Detector Connections

You need to connect the analog output lines from each detector from which you intend to acquire data. Each detector is connected to one of the four analog connections labeled **ChanA** through **ChanD**.

Always use a shielded twisted pair cable to connect each detector to the terminal panel. This minimizes electrical noise. Up to four detectors can be connected to the terminal panel. The detector cables are connected to one of the four analog connections labeled **ChanA** through **ChanD**.

The two wires in each cable are used for the signal **HIGH (+)** and signal **LOW (-)** connections (e.g., **CHAN A +** and **CHAN A -**). Connect the cable shield at only one end, preferably to a **COM** connector on the SS420.

After making all of your detector connections, replace the terminal panel cover.

Note After power up, allow 15 minutes for the electronics to stabilize before running samples that may require sensitive measurements.

Trigger Signal Connections

If you want your instrument to trigger the start of data acquisition on your ChromQuest system, you must connect a trigger signal cable to the terminal panel. The trigger signal is connected to one of the four digital input connectors on the terminal panel of the SS420.

Connect the high side of the trigger to one of the connectors labeled **IN1-4 +**, and the low side of the trigger lead to the associated connector labeled **IN1-4 -**.

Ready Signal Connections

To connect a **READY** cable or relay so that ChromQuest can delay an injection until it is ready to acquire data, you must connect a ready signal cable from the **READY** input of your instrument to one of the digital output channels of the terminal panel of the SS420.

Connect one of the wires of the **READY** cable to the **OUT1-8 +** of the terminal panel. Connect the other wire to the associated connector labeled **OUT1-8 -**. Connect the other ends of the wires to the **READY** input of your instrument.

External Device Connections

SS420 outputs are Open Collector TTL devices. If you are using an external device that requires a contact closure or TTL signal (e.g., gas sampling or column switching valves), you must connect these properly so that ChromQuest can control them during the run. External devices are connected using the digital out connectors on the terminal panel.

The SS420 inputs can detect switch closures or can be driven by TTL compatible logic. The output switches are open collector switches. For relay connections, it is not necessary to install a pull-up resistor between the output connector and +5 v. The relay coil takes the place of a resistor.

To connect an output switch to an external device, connect one lead from the cable between the device and the SS420 to one of the output low connectors **OUT1-8 -**. Connect the corresponding lead on the other end of the cable to a ground terminal on the device. Connect the other leads on the cable to the corresponding SS420 output connector **OUT1-8 +** and the input terminal on the device.

Note The output switches do not supply power to the circuit.

HP LAS Installation

ChromQuest supports acquisition from the HP LAS A/D Models 35900A, 35900B, and 35900E Multichannel Interfaces. The 35900E must include the MIO Loop board. The HP LAS interfaces are connected via a loop cable to a loop controller board installed in the Workstation (cable and board supplied by Scientific Software).

Currently, external events, RS232 control, and BCD are not supported.

This section contains the following topics:

- [HP LAS A/D Supported Configurations](#)
- [Loop Controller Board Installation and Address Setting](#)
- [HP LAS Loop Cabling](#)
- [Error Codes for HP LAS](#)

HP LAS A/D Supported Configurations

The following configuration for acquisition from HP LAS A/D is supported: Workstation Mode

The HP LAS A/D is supported in standalone mode. One loop is permitted per system. Each instrument, when opened, consumes 10 MB of RAM.

It is possible to have a loop controller board installed with an IEEE board in one PC. For example, the IEEE board could act as a control/acquisition device for HP 5890 gas chromatographs.

Loop Controller Board Installation and Address Setting

The Loop Controller board is an 8-bit ISA board with several local processors. It interfaces to several LAS A/D converters on an HP LAS loop through a 9-pin connector. When a workstation is equipped with a loop controller board it can take the place of a HP1000 loop controller in an HP LAS system. The board supports up to 15 HP A/D converters (channels) on a loop.

Loop Controller Board Address Settings

The default setting for the Loop Controller Board is 318h. The following diagram should be used to aid in setting other addresses. The selection of the I/O address depends on the hardware configuration of your computer.

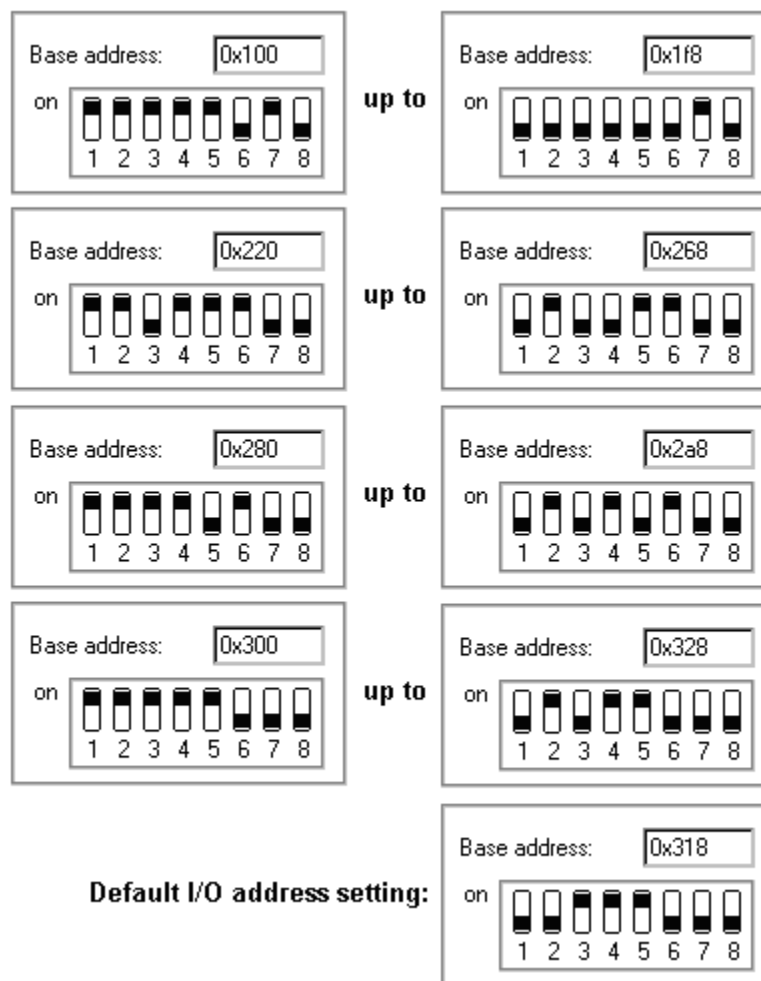


Figure 35. Loop controller board address settings

One board may be installed in a workstation.

HP 35900 Model E Interface Switch Settings

When a 35900 Model E is configured for dual channel operation and each channel will be acquiring using different sampling rates, the channel configuration (Function) DIP switches on the 35900 rear panel must be reversed. For example:

Normally board switches for Channel A @ 16 Hz and Channel B @ 8 Hz would be set as shown in the following diagram:

| | | Function | | | | | | | |
|---------|--|----------|---|---|---|---|---|---|---|
| | | A | | | | B | | | |
| Switch | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Setting | | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |

Instead, reverse the Channel settings so that the settings for channel A are set on the Function “B” side and the settings for Channel B are set on the Function “A” side:

| | | Function | | | | | | | |
|---------|--|----------|---|---|---|---|---|---|---|
| | | A | | | | B | | | |
| Switch | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Setting | | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |

HP LAS Loop Cabling

Connection of the HP LAS A/D interfaces is done using cables supplied with the option.

The table below describes the minimum requirements of cables to connect the loop controller to the loop, and for information purposes, the cables required to make a loop system functional.

Table 1. Cable Connections

| Part Number | Description |
|-------------------------------|--|
| SSI Part Number 001814-010 | Cable to connect loop control board to the loop. Consists of two three wire shielded twisted pair cables. Includes a 9-pin male connector at the PC side and two “French phone jack” male connectors on the loop side. |
| Preferred Cable Configuration | |

For information on configuring the HP LAS A/D hardware, see “[HP LAS Installation](#)” on [page 57](#).

Error Codes for HP LAS

| | |
|----------|---|
| Error 1 | Communication with PCLoop failed. Please check if the driver is running. |
| Error 2 | The device is off line. |
| Error 3 | The operation was aborted. |
| Error 4 | The operation was stopped by the user. |
| Error 5 | The operation failed because the device is busy. |
| Error 6 | The base address does not match. |
| Error 7 | The device is not responding. |
| Error 8 | The sample frequency of the PCLoop does not match the frequency set in the configuration. |
| Error 9 | An unknown error occurred on the PCLoop box. |
| Error 10 | The PCLoop is not available. Please check device power-on status and cables. |
| Error 11 | The driver timed out. |
| Error 12 | The driver's response timed out. |
| Error 13 | A buffer overrun occurred. |
| Error 14 | A response of zero was returned. |
| Error 15 | The response returned was too short. |
| Error 16 | The length of the response was wrong. |
| Error 17 | The header of the response was wrong. |
| Error 18 | An unknown error occurred. |
| Error 19 | An unknown error occurred. |
| Error 20 | The PCLoop is not available. Please check device power-on status and cables. |
| Error 21 | The PCLoop is not ready. |
| Error 22 | The PCLoop is ready. |

- Error 23 The PCLoop is currently running. Please check if the box is used by another instrument. Please reset the PCLoop box and start again.
- Error 24 The PCLoop is down.
- Error 25 The PCLoop is locked.
- Error 26 The PCLoop was stopped manually. Data acquisition will stop now.
- Error 27 The PCLoop has stopped.
- Error 28 The PCLoop has ended.
- Error 29 An unknown status was found at the PCLoop box.
- Error 30 The trigger timer timed out. The PCLoop was not responding.
- Error 31 The data acquisition timer timed out. The PCLoop was not responding.
- Error 32 An unknown error occurred.

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