Agilent 8453 UV-visible Spectroscopy System

Installation Guide

Agilent Technologies

Notices

Manual Part Number

G1115-90040

Edition

07/11

Printed in Australia

Agilent Technologies
679 Springvale Road
Mulgrave, Victoria

Research Use Only

This product may be used as a component of an in vitro diagnostic system if the system is registered with the appropriate authorities and complies with the relevant regulations. Otherwise, it is intended only for general laboratory use.

Software Revision

This handbook is for B.04.xx revisions of the Agilent ChemStation software, where xx is a number from 00 through 99 and refers to minor revisions of the software that do not affect the technical accuracy of this handbook.

Warranty

The material contained in this document is provided "as is," and is subject to being changed, without notice, in future editions. Further, to the maximum extent permitted by applicable law, Agilent disclaims all warranties, either express or implied, with regard to this manual and any information contained herein, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Agilent shall not be liable for errors or for incidental or consequential damages in connection with the furnishing, use, or performance of this document or of any information contained herein. Should Agilent and the user have a separate written agreement with warranty terms covering the material in this document that conflict with these terms, the warranty terms in the separate agreement shall control.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Restricted Rights Legend

If software is for use in the performance of a U.S. Government prime contract or subcontract, Software is delivered and licensed as "Commercial computer software" as defined in DFAR 252.227-7014 (June 1995), or as a "commercial item" as defined in FAR 2.101(a) or as "Restricted computer software" as defined in FAR 52.227-19 (June 1987) or any equivalent agency regulation or contract clause. Use, duplication or disclosure of Software is subject to Agilent Technologies' standard commercial license terms, and non-DOD Departments and Agencies of the U.S. Government will receive no greater than Restricted Rights as defined in FAR 52.227-19(c)(1-2) (June 1987). U.S. Government users will receive no greater than Limited Rights as defined in FAR 52.227-14 (June 1987) or DFAR 252.227-7015 (b)(2) (November 1995), as applicable in any technical data.

Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

In This Guide...

This handbook describes what you have to do to install your new Agilent 8453 UV-visible spectroscopy system. Most of the handbook deals with installing a complete system, that is, the spectrophotometer, computer and printer. However, in the second half of this handbook you will find additional information about installing accessories, accessory boards, GPIB connections and configuration, and software installation.

1 Fast Installation

Use this chapter as an overview of the different actions you want to perform to install an Agilent 8453 UV-visible spectroscopy system. If you are an experienced user of analytical equipment from Agilent Technologies, this may be all you need. If you need more information, this chapter guides you to other relevant areas in this or another handbooks.

2 Installation and Start Up

Use this chapter if you need more detailed information to begin with.

3 Good Measurement Practices

Use this chapter if you require information about general operating conditions to perform accurate and reliable measurements, for example, handling samples, solvents and cells.

4 Installing Accessories

This chapter describes how to install the simple mechanical and optical accessories that are available to expand the capabilities of your Agilent 8453 spectrophotometer.

5 Installing the UV-visible Software

This chapter describes what your computer needs to have and what you need to do to install the software.

6 GPIB Communication, Connections and Configuration

This chapter describes how to set the select code, how to install an GPIB card in your computer and how to change the GPIB address of your spectrophotometer.

7 LAN Communication, Installation, Connection and Configuration

This chapter describes how to set up LAN communication between your Agilent ChemStation and Agilent 8453 spectrophotometer.

A Safety Information

This chapter contains relevant safety information.

Contents

1 Fast Installation 11

Installing Preconfigured Agilent 8453 Systems 12

Installing Agilent 8453 Systems 13

Installing Software Only 15

2 Installation and Start Up 17

Site Requirements for Your Agilent 8453 Spectrophotometer 19

- Power considerations 19
- Power cords 20
- Space 20
- Environment 21

Unpacking Your Agilent 8453 Spectrophotometer 22

Installing your Agilent 8453 Spectrophotometer 23

- Instrument overview 23
- Setting up the Spectrophotometer 27

Installing Your Computer 29

- Setting up the computer 29

Starting the Agilent 8453 Spectrophotometer 31

- Turning On 31
- Instrument Warm-up 33

Starting the Agilent ChemStation Software 34

Operational Checkout 34

3 Good Measurement Practices 37

General Considerations 38
- Spectrophotometer Design 38
- Making Measurements 38
- Sample Cell or Cuvette Material 39
- Optical Specifications of Cells 40
- Apertured Cells or Cuvettes 41
- Flow Cells 42
- Handling and Maintaining Cells or Cuvettes 43
- Solvents 45
- Sample Preparation 46
- Photosensitive Samples 47
- Stirring and Temperature Control 47
- Checklist for Best Results 48

Inserting a Cell 50

4 Installing Accessories 51

Thermostattable Cell Holder 52
- Installing a Thermostattable Cell Holder 53

Cell Stirring Module 54
- Installing the Cell Stirring Module 55
- Tubing Connections and Operation 56

Long Path Cell Holder 58
- Installing the Long Path Cell Holder 59
- Installing a Sample Cell 59

Optical Filter Wheel 61
- Installing the Filter Wheel Assembly 63
- Removing the Filter Wheel Assembly 64

5 Installing the UV-visible Software 65

Agilent ChemStation Computer Details 66

Minimum PC Requirements for the Agilent ChemStation 66

Installing the Agilent ChemStation Using CD-ROM 69

Overview 69

Uninstalling Preexisting Agilent UV-Vis ChemStation Software 69

Installation Procedure 70

Monitor Configuration 74

Configuring Your System 75

6 GPIB Communication, Connections and Configuration 79

GPIB Communication 80

Operating System-Instrument Compatibility 81

Installing an GPIB Interface 81

GPIB Cabling 82

Installation of the Agilent GPIB Communication Library 84

Installing New IO Libraries 84

Configuring the Agilent 82350 GPIB Interface 88

Configuring the Agilent 82357 USB - GPIB Interface 94

Upgrading Existing IO Libraries 105

Upgrading IO Libraries under Windows XP 105

Working with your Agilent IO Libraries 106

Troubleshooting 107

Missing files during installation 107

Problems with Plug and Play option GPIB cards 109

Changing the GPIB Address of the Spectrophotometer 111

GPIB Address Settings 113

7 LAN Communication, Installation, Connection and Configuration 115

Installing and Configuring TCP/IP on the PC 116

Installation of the TCP/IP protocol using Windows XP. 117

Installation of the TCP/IP protocol using Windows Vista or Windows 7. 120

Installing the LAN Interface in your Agilent 8453 Spectrophotometer 123

Connecting Agilent 8453 Spectrophotometer(s) to the PC 124

Single Instrument Installation 124

Multiple Instrument Installation 125

Setting the IP Address of the Agilent 8453 Spectrophotometer 125

Using the Agilent BootP Service 126

What is the Agilent BootP Service? 126

Addresses 127

Using the Agilent BootP Service Program 128

Configure the Agilent BootP Service Program 129

Configure the Agilent BootP Service 131

Configuring the G1369A LAN Card Using BootP 133

Using the Agilent ChemStation Configuration Editor to Configure the Agilent 8453 Spectrophotometer 135

What is the Agilent ChemStation Configuration Editor? 135

Configuring an Agilent 8453 Spectrophotometer 136

Troubleshooting LAN Communication 139

Power fail reported on the Agilent ChemStation 139

Frequent buffer overrun in Agilent 8453 logbook 140

A Safety Information 141

Safety Information 142

General 142

Operation 142

Safety Symbols 143

Solvent Information 145

Flow Cells 145

Solvents 145

Lithium Batteries Information 147

Agilent Technologies on Internet 148

Index 149

1
Fast Installation

Installing Preconfigured Agilent 8453 Systems 12
Installing Agilent 8453 Systems 13
Installing Software Only 15

Installation is straightforward, but if you have difficulties or need more information references to detailed installation information are given.

Use this chapter if you are:

- installing a preconfigured Agilent 8453 UV-visible spectroscopy system from Agilent (including spectrophotometer, computer and software),
- installing an Agilent 8453 UV-visible spectroscopy system not purchased as a preconfigured system, or
- installing software only.

Installing Preconfigured Agilent 8453 Systems

If you have purchased one of these systems the software is pre-installed and preconfigured. You need only to install and switch on the hardware.

✔ Ensure you have space and appropriate power supplies.

For more information, see "Site Requirements for Your Agilent 8453 Spectrophotometer" on page 19.

✔ Unpack the system—check for damage and contents against packing list.

For more information, see "Unpacking Your Agilent 8453 Spectrophotometer" on page 22.

✔ Install your Agilent 8453 spectrophotometer.

- Connect line power to the rear.
- Connect the waste tubing underneath the sample pan.

For more information, see "Installing your Agilent 8453 Spectrophotometer" on page 23.

✔ Install your computer and printer.

- Connect keyboard and mouse.
- Connect monitor to line power and the computer.
- Connect printer to line power and the computer.
- Connect to the spectrophotometer with the GPIB or LAN cable.

For more information, see "Installing Your Computer" on page 29 and Chapter 7, "LAN Communication, Installation, Connection and Configuration".

✔ Switch on the Agilent 8453 (make sure sample area is clear), wait 2 minutes for the lamps to ignite. When you are ready to operate your spectrophotometer switch on the computer and printer.

For more information, see "Starting the Agilent 8453 Spectrophotometer" on page 31.

Installing Agilent 8453 Systems

The software has to be installed and configured. In addition the required interface for the instrument communication may have to be installed (e.g. GPIB PCI interface card) and configured.

✔ Ensure you have space and appropriate power supplies.

For more information, see “Site Requirements for Your Agilent 8453 Spectrophotometer” on page 19.

✔ Unpack the system - check for damage and contents against packing list.

For more information, see “Unpacking Your Agilent 8453 Spectrophotometer” on page 22.

✔ Install your Agilent 8453 spectrophotometer.

- Connect line power to the rear.
- Connect the waste tubing underneath the sample pan.

For more information, see “Installing your Agilent 8453 Spectrophotometer” on page 23.

✔ In case your computer and printer are not supplied by Agilent ensure that the requirements for proper operation of the software are met.

For more information, see “Minimum PC Requirements for the Agilent ChemStation” on page 66.

✔ Install the GPIB interface board in your computer.

For more information, see “Installing an GPIB Interface” on page 81.

✔ Install your computer and printer.

- Connect keyboard and mouse.
- Connect monitor to line power and the computer.
- Connect printer to line power and the computer.
- Connect to the spectrophotometer with the GPIB cable.

For more information, see “Installing Your Computer” on page 29.

✔ Switch on the Agilent 8453 (make sure sample area is clear), wait 2 minutes for the lamps to ignite. When you are ready to operate your spectrophotometer switch on the computer and printer.

For more information, see “Starting the Agilent 8453 Spectrophotometer” on page 31.

✔ From the Windows menu install the Agilent ChemStation software.

For more information, see “Installing the Agilent ChemStation Using CD-ROM” on page 69.

✔ From the Windows menu start the Agilent ChemStation software.

For more information, see “Starting the Agilent ChemStation Software” on page 34.

✔ Check if your software and spectrophotometer operate properly, taking a blank measurement or performing the automatic self-test in the diagnostic section of your software.

For more information, see “Operational Checkout” on page 34.

✔ If you need information about solvents, sample preparation, blank measurements, cuvette handling or how to insert a cuvette, see Chapter 3, “Good Measurement Practices”.

✔ Install any accessories.

For simple accessories see Chapter 4, “Installing Accessories”, for complex accessories see instructions supplied with the accessory or the Installation and Maintenance section of the Agilent ChemStation online help.

Installing Software Only

- ✔ Unpack the software—check for damage and contents against packing list.
- ✔ Ensure that your computer and printer meet the requirements for proper operation of the software.

  For more information, see “Minimum PC Requirements for the Agilent ChemStation” on page 66.
- ✔ Switch on the Agilent 8453 (make sure sample area is clear), wait 2 minutes for the lamps to ignite. When you are ready to operate your spectrophotometer switch on the computer and printer.
- ✔ From the Windows menu install the Agilent ChemStation software.

  For more information, see “Installing the Agilent ChemStation Using CD-ROM” on page 69.
- ✔ From the Windows menu start the Agilent ChemStation software.

  For more information, see “Starting the Agilent ChemStation Software” on page 34.
- ✔ Check if your software and spectrophotometer operate properly, taking a blank measurement or performing the automatic self-test in the diagnostic section of your software.

  For more information, see “Operational Checkout” on page 34.

2
Installation and Start Up

Site Requirements for Your Agilent 8453 Spectrophotometer 19
Unpacking Your Agilent 8453 Spectrophotometer 22
Installing your Agilent 8453 Spectrophotometer 23
Installing Your Computer 29
Starting the Agilent 8453 Spectrophotometer 31
Starting the Agilent ChemStation Software 34
Operational Checkout 34

The following topics are covered in this section:

- "Site Requirements for Your Agilent 8453 Spectrophotometer" on page 19 contains information about electrical requirements, i.e. power lines, power cords, etc. It also gives recommendation for minimum available bench space and environmental conditions in the laboratory.
- "Unpacking Your Agilent 8453 Spectrophotometer" on page 22 contains information about what you do when the packing material is damaged or the shipment is incomplete. It also gives a list of items which comes with the instrument and computer.
- "Installing your Agilent 8453 Spectrophotometer" on page 23 gives an overview of the instrument and explains pushbuttons, indicators and line power switch. It gives instructions where and how to do line power connection, communication connections and where to install the waste drain tubing.
- "Installing Your Computer" on page 29 describes how you install the computer and peripherals, e.g. monitor, mouse, keyboard and printer. Because the UV-Visible operating software comes already installed when the system has been ordered as a bundle, this topic is covered in Chapter 6, "GPIB Communication, Connections and Configuration".

- "Starting the Agilent 8453 Spectrophotometer" on page 31 describes the turn-on procedure of the spectrophotometer and the warm up time required to fulfill all specifications.
- "Starting the Agilent ChemStation Software" on page 34 describes how you start Windows from the MS-DOS operating system and how you start your Agilent ChemStation software.
- "Operational Checkout" on page 34—use this section to check if your spectrophotometer in combination with the computer and the UV-visible operating software is in proper operating condition. Optionally there is an automated self-test which can be used for a quick check out of the spectrophotometer. This self-test can only be executed after 1 hour warm-up time of the instrument.

Site Requirements for Your Agilent 8453 Spectrophotometer

Power considerations

Your spectrophotometer can operate on a line voltage of 100–120 or 220–240 V AC ±10% with a line frequency of 50 or 60 Hz ±5%. Maximum power consumption is 220 VA.

The instrument power supply has wide ranging capability. It accepts any line voltage supplied in the above mentioned range. Consequently there is no voltage selector in the rear of the spectrophotometer. There are no externally accessible fuses, because automatic electronic fuses are implemented in the power supply.

WARNING **To disconnect the instrument from line, pull out the power cord. The power supply still uses some power, even if the power switch on the front panel is turned off.**

The computer and InkJet or LaserJet printers accept a nominal line voltage of 110 or 220 V AC with a line frequency of 50 or 60 Hz. For more information, see the documentation that comes with your computer and/or printer.

WARNING **If you connect your instrument to a line voltage that is higher than specified, shock hazard or damage to your instrument can occur.**

Power cords

Different power cords are offered as options with the spectrophotometer. The female end of each of the power cords is identical. It plugs into the power-input socket at the rear of the spectrophotometer. The male end of each of the power cords is different and designed to match the wall socket of a particular country or region.

WARNING **Always operate your instrument from a power outlet which has a ground connection. Always use the power cord designed for your region.**

Space

The spectrophotometer is 34.4 cm (13.5 inches) wide, 56.0 cm (22.0 inches) deep and 18.5 cm (7.3 inches) high (see Figure 1 on page 24). It weighs only 14 kg (30.86 lbs) so it will fit on almost any desk or laboratory bench. It needs an additional 2.5 cm (1.0 inches) of space on either side to allow for the circulation of air for cooling and approximately 8 cm (3.1 inches) in the rear for electrical connections.

The computer including the keyboard is approximately 50 cm (19.7 inches) wide and 60 cm (23.6 inches) deep.

Additional space is required for accessories like pumps and autosamplers.

Environment

Your spectrophotometer will operate within specifications at ambient temperatures of 0 to 55° C (32 to 131° F).

WARNING **If you use the instrument at environmental temperatures higher than 50°C (122°F), the rear of the instrument may get hot.**

The spectrophotometer can be shipped or stored where the ambient temperature is between -40 and 70° C (-4 and 158° F).

WARNING **Do not store, ship or use your instrument under conditions where temperature fluctuations could cause condensation within the instrument. Condensation will damage the electronics. If your instrument was shipped in cold weather, leave it in its box and allow it to warm up slowly to room temperature to avoid condensation.**

You can operate your spectrophotometer in environments with relative humidity up to 95 % (non-condensing) provided the temperature is between 25 and 40° C (77 to 104° F).

Avoid air circulation of varying temperatures (like from refrigerators or air conditioners) and exposure to direct sun light to ensure the instrument operates within performance specifications.

Your spectrophotometer can be stored at altitudes up to 4,600 m (14,950 ft.) and operated at altitudes up to 2,000 m (6,500 ft.).

Unpacking Your Agilent 8453 Spectrophotometer

Upon receipt of your spectrophotometer, computer and printer, inspect the shipping containers for any signs of damage. If the containers or cushioning material are damaged, save them until the contents have been checked for completeness and the spectrophotometer, computer or printer have been mechanically and electrically checked. If the shipping container or cushioning material is damaged, notify the carrier as well as Agilent Technologies. Save the shipping material for the carrier's inspection.

Check the contents of the shipping container against the list below. If any items are missing or obviously damaged, call Agilent Technologies.

✔ Unpack the spectrophotometer. You should have the following components:

- Power cord to connect the spectrophotometer to line power.
- LAN Interface, if you connect the spectrophotometer through LAN
- Waste tubing to connect the sample pan of your spectrophotometer to a waste container.
- Checkout sample (caffeine solution).

✔ Unpack the computer and its accessories. You should have the following components:

- Computer and power cable
- Keyboard
- Mouse
- Display unit, connecting cable and power cable
- USB to GPIB Interface, if you connect the spectrophotometer through GPIB
- Printer, connecting cable and power cable
- Printer accessories, for example, ink cartridge in case of a DeskJet printer

Installing your Agilent 8453 Spectrophotometer

Your spectrophotometer is very easy to install. This section provides an overview of the instrument and a checklist of the main installation procedure. If you have accessories for the spectrophotometer which are not covered in this section, see Chapter 4, “Installing Accessories” or refer to the documentation that was delivered with your accessories for detailed information.

Instrument overview

The front view of the spectrophotometer is shown in Figure 1. Notice that the sample compartment is open. Unlike conventional instruments the Agilent 8453 does not suffer from ambient stray light. The open sample area makes it easier to access it generally and to connect tubing to a flow cell or thermostattable cell holder. The spectrophotometer is shipped with the standard single-cell cell holder already in place. Standard and accessory cell holders can be removed and replaced in seconds with few or no tools.

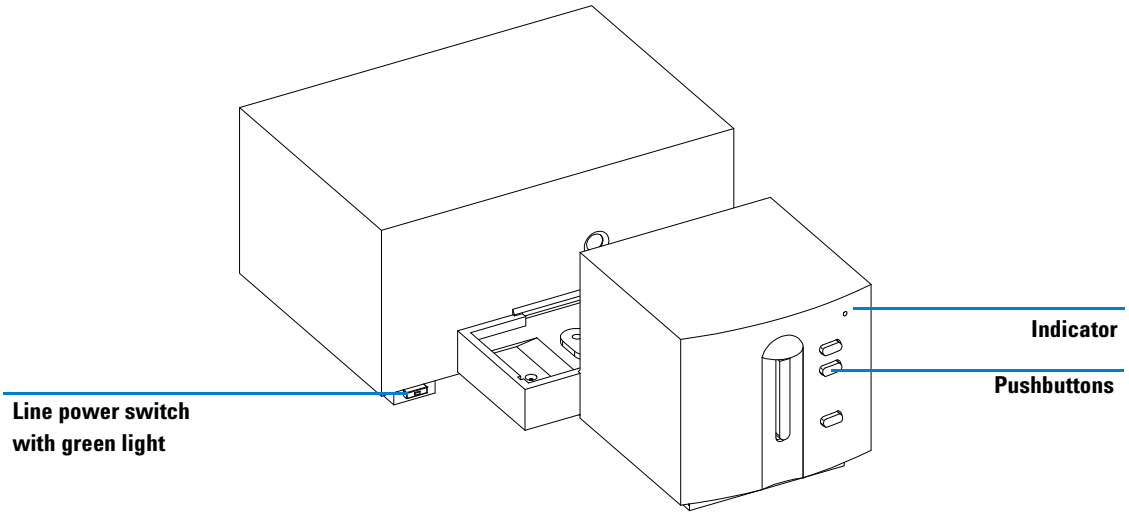


Figure 1 Front View of the Spectrophotometer

The line power switch is located at the lower left part of the instrument. Pressing it in turns on the instrument. It stays pressed in and shows a green light when the instrument is turned on. When the line power switch stands out and the green light is off, the instrument is turned off.

On the front panel of the spectrophotometer is an indicator which will display different colors depending of the actual condition of the instrument.

- Green: the instrument is ready to measure.
- Green, blinking: the instrument is measuring.
- Yellow: the instrument is in busy state, for example, turning one of the lamps on or if both lamps are switched off.
- Red: Error condition, that is, the spectrophotometer does not pass one of the self tests which are run when the spectrophotometer is turned on or an error occurred during operation. In this case the UV-visible operating software gives a detailed error message and possible explanations are in the online help system. Additionally the *Reference Manual* gives information about troubleshooting.

- Red, blinking: Error condition of the spectrophotometer processor system. Because in this case there is no communication with the computer there will be no error message. The online help system and the *Reference Manual* gives more information about troubleshooting.

The four pushbuttons on the front panel cause the following actions to be performed and the resulting data being sent to the computer.

- blank: the instrument takes a blank measurement, that is, a reference measurement of solvent without the analyte. This is used in all subsequent sample measurements until a new blank measurement is taken. A baseline spectrum is displayed on the computer.
- sample: the instrument takes a sample measurement or starts a series of measurements. This depends on the parameters set in your software.
- standard: the instrument takes a measurement of a standard. Additional information, such as concentration and so on, have to be entered in the operating software.
- stop: the instrument and/or software aborts any ongoing activity and returns to a to measure state.

All connections are made at the rear of the spectrophotometer, see Figure 2.

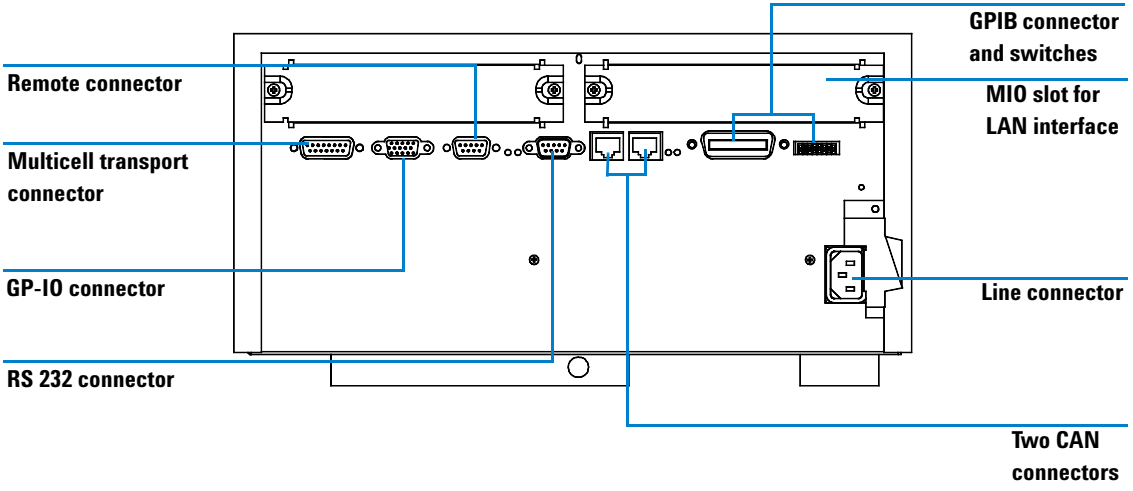


Figure 2 Rear View of the Spectrophotometer

- The multi-cell connector allows you to connect the cable which comes from the multicell transport.
- The GPIO (general purpose input/output) connector allow you to connect your sipper and autosampler or other accessories.
- The remote connector may be used in combination with other analytical instruments from Agilent Technologies if you want to use features such as common shut down, prepare etc.
- The RS 232 connector may be used to control the spectrophotometer from a computer through RS 232 connection, using appropriate software (for future use). This connector needs to be activated by the configuration switch module next to the GPIB connector. The software needs the appropriate drivers to support this communication. See your software documentation for further information.
- The CAN bus is a serial bus with high speed data transfer. The two connectors for the CAN bus are also for future use.
- The GPIB connector is used to connect the spectrophotometer with a computer. The 8-bit configuration switch module next to the GPIB connector determines the GPIB address of your spectrophotometer. The switches are preset to a default address recognized by the operating software from Agilent Technologies.
- The MIO slot for the Lan interface.
- The accessory board slot is reserved for future use.
- The power input socket accepts a line voltage of 100–120 or 220–240 V AC ±10% with a line frequency of 50 or 60 Hz ±5%. Maximum power consumption is 220 VA. There is no voltage selector on your spectrophotometer because the power supply has wide ranging capability. There are no externally accessible fuses, because automatic electronic fuses are implemented in the power supply. The security lever at the power input socket prevents that the spectrophotometer cover is taken off when line power is still connected.

On the right side of the instrument there is a door for exchanging the lamps. Behind this plastic door there is another sheet metal door. Two independent safety light switches are implemented. They automatically turn off the lamps when the sheet metal door is opened.

Setting up the Spectrophotometer

Connecting Your Spectrophotometer via GPIB to the Computer

1 Identify the spectrophotometer's configuration switch module, see Figure 3. For GPIB operation the default address is 25, that is, all switches are in the down position except for the switches 4, 5 and 8 which are in up the position, resulting in a pattern 00011001 (where 0 means down and 1 means up). No two instruments or accessories may share the same GPIB address. For alternate switch settings, see Chapter 6, "GPIB Communication, Connections and Configuration".

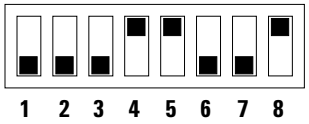


Figure 3 Configuration Switch Module

2 Connect the GPIB cable to the GPIB connector at the rear of the spectrophotometer.

Connecting your Spectrophotometer via LAN to the Computer see Chapter 7, "LAN Communication, Installation, Connection and Configuration"

Connecting Power to Your Spectrophotometer

See Figure 2 on page 25.

1 Your line voltage must be between 100–120 or 220–240 V AC ±10% with a line frequency of 50 or 60 Hz ±5%. There is no voltage selector on your spectrophotometer because the power supply has automatic wide ranging capability.

2 Make sure the power switch of the spectrophotometer is in the off position, that is, the pushbutton stands out and the LED inside the

switch is off, see Figure 1.

3 Plug the female end of the power cord into the power input socket at the rear of the spectrophotometer. Plug the male end of the power cord into your electrical outlet.

Installing the Waste Tubing

There is a waste outlet for the sample area. It is used to drain any liquids which may come from the sample area in case of a leak or a spill to a waste container. To connect your waste tubing to the spectrophotometer:

1 Lift the front part of the spectrophotometer up so that you can locate the waste outlet underneath the sample pan.

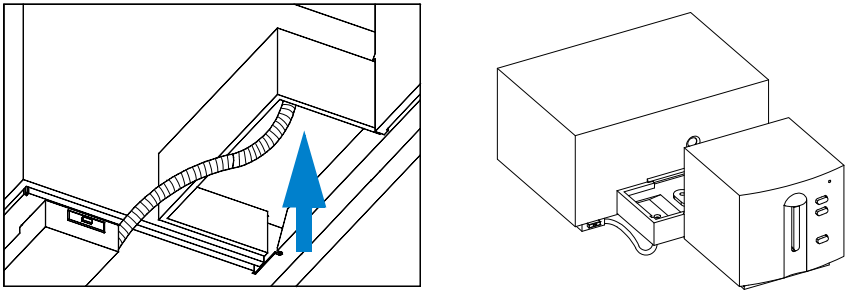


Figure 4 Connecting the Waste Tubing

2 Connect the waste tubing which comes with your spectrophotometer to the waste outlet underneath the sample pan.

3 Put the other end of the waste tubing into the waste container.

4 Make sure that the waste tubing has a constant down slope from the spectrophotometer to the waste container.

Installing Your Computer

Detailed instructions for installing your computer are specific to the type and configuration of the computer and are provided with it. This section gives a checklist of the main installation procedures; refer to the documentation that was delivered with your computer for detailed information.

Setting up the computer

✔ If you have any additional accessories, install them before you set up your computer:

- Additional memory, refer to your computer documentation.
- Additional mass storage devices (hard disk drive, tape drive, CD-ROM), refer to your computer documentation.
- Accessory boards excluding USB to GPIB interface, refer to your computer documentation.
- USB to GPIB interface, see "Installing an GPIB Interface" on page 81.

✔ Connect the keyboard and mouse to the sockets at the back of the computer.

✔ Connect the display unit to the video socket at the back of the computer.

✔ Connect the printer cable to the socket on the printer and to the correct printer interface socket on the back of the computer.

✔ Connect the GPIB connector of the USB to GPIB interface to the spectrophotometer's GPIB connector and the USB connector to the computer or connect your LAN cable from the spectrophotometer to the LAN connector on the computer.

If you have more GPIB instruments connected to your computer, see Chapter 6, "Installing an GPIB Interface" for correct GPIB cabling, because you must observe some basic rules. For correct setup, see Chapter 7, "LAN Communication, Installation, Connection and Configuration".

✔ Connect the power sockets to the computer, display and printer, and switch them on. Follow the instructions for setting up the computer in your computer documentation.

Starting the Agilent 8453 Spectrophotometer

Before you turn on your spectrophotometer, make sure the light path through the sample compartment is clear. All filters should be removed from the light path. Anything blocking or absorbing part of the light beam could cause an error indication when you turn on the spectrophotometer.

The power switch is located at the left front of the spectrophotometer. When starting UV-Visible application software wait until the completion of the self-test procedures for the spectrophotometer. Otherwise the application software may not recognize the spectrophotometer.

Turning On

1 turn on your spectrophotometer with the pushbutton at the lower left part of the instrument. The pushbutton will stay pressed in and light green if power is present.

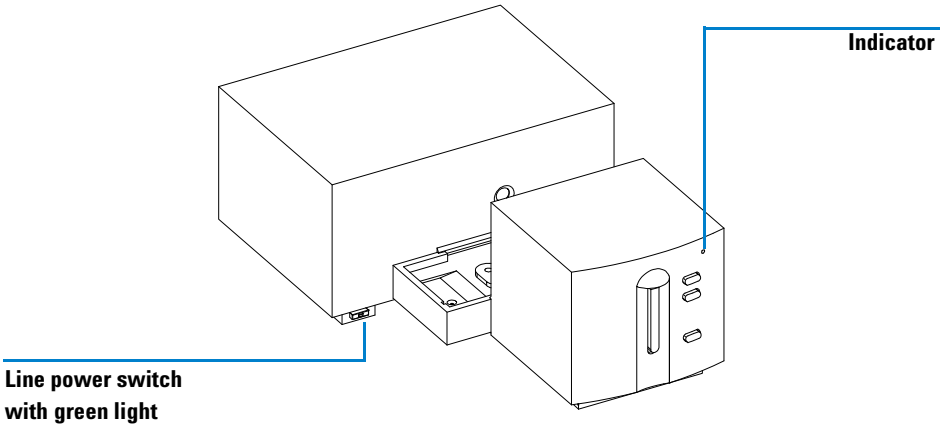


Figure 5 Turning on the Spectrophotometer

2 The fan will start turning.

3 The indicator at the upper right corner of the front panel will light in three different colors. The yellow color which means busy will stay on during the start up and self test routines, until at least one of the lamps are ignited and the spectrophotometer is ready to operate.

4 The turn on procedure including electronic self tests lasts about 20 seconds before the lamps start turning on. Under cold ambient conditions the lamp may not ignite and the instrument will repeat the ignition cycle automatically. The entire turn-on and self-test process will take about 1–2 minutes. Optical self tests are performed which last a few seconds.

5 When the green indicator at the upper right corner of the front panel comes on, the instrument is ready to measure and you can turn on your computer and printer.

In case the software is set to leave both lamps off at turn on of the spectrophotometer, the front panel indicator remains yellow.

If the indicator shows a red color, there is an error condition. Try turning on the spectrophotometer again.

- red: error condition, that is, the spectrophotometer does not pass one of the self-tests. In this case turn on your computer and start the UV-visible operating software. The software will give a detailed error message and possible explanations are in the online help system. Additionally the *Reference Manual* gives information about troubleshooting.
- red, blinking: error condition of the spectrophotometer processor system. Because in this case there is no communication with the computer there will be no error message. The online help system and the *Reference Manual* gives more information about troubleshooting.

Instrument Warm-up

Technically, once your spectrophotometer has passed the self-tests it is ready to run samples. For best results you may want to let the spectrophotometer warm up for at least 1 hour. This time allows the optical system to stabilize and should result in better measurements. If the instrument was not stored at room temperature before it was turned on, allow more time for the instrument to stabilize.

In general, the life of your spectrophotometer will be increased by leaving it on all the time but switching off the lamps when the instrument is not in use. lamp intensity of the deuterium lamp and lifetime of lamps decrease with use.

Starting the Agilent ChemStation Software

If Microsoft Windows is not already running, start it. If the Agilent UV-visible ChemStations is not visible on the Desktop, open the Start menu and select Agilent UV-visible ChemStations from the list of programs. A maximum of two sessions of an instrument can be started in parallel; the online session must be always the first launched session.

Two instrument icons are displayed for the Agilent UV-visible ChemStations:

- Instrument Online starts the software in online mode (online means Agilent ChemStation is connecting to the configured spectrophotometer).
- Instrument Offline starts the software in offline mode (offline means Agilent ChemStation is *not* connecting to the configured spectrophotometer).

To start the software, click the Instrument Online or Instrument Offline icon in the Agilent ChemStations section.

Operational Checkout

Operational checkout is used to determine if the instrument is in proper operating condition in combination with your UV-visible operating software.

1. Be sure to verify the successful completion of the turn-on self test of the spectrophotometer, that is, the indicator LED on the front panel of the Agilent 8453 spectrophotometer is lit and is green.
2. In your UV-visible operating software, take a blank measurement and observe the baseline noise. With an empty sample area, this should be in the low mAU range. Excessive noise or spikes may indicate a problem.
3. For the Agilent 8453 spectrophotometer an additional (optional) qualification can be automatically performed using your software. After warm-up of the spectrophotometer for 1 hour, the instrument is ready

for the automated selftest which is located in the diagnostic portion of the software. The successful completion of these tests complete the operational qualification of your spectrophotometer. For reference purposes you may want to print a copy of the results.

3
Good Measurement Practices

General Considerations 38
Inserting a Cell 50

This chapter describes:

- making measurements
- selecting material, optical specification and type of cell
- handling and maintaining cells
- checklist for good results
- solvents selection,
- sample preparation,
- use of filters,
- stirring and temperature control of sample,
- how to insert cuvettes into the cell holder.

General Considerations

There are many factors that can affect the results of your measurements. This section provides brief discussions of some of the more important ones.

Spectrophotometer Design

The sample compartment of the Agilent 8453 spectrophotometer is open. Unlike conventional instruments the Agilent 8453 does not suffer from ambient false light. The open sample area makes it easier to access it generally and to connect tubing to a flow cell or thermostattable cell holder.

Making Measurements

Blank (Reference) and Sample Measurement

Your spectrophotometer is a single beam instrument so you must measure a blank before you measure a sample. For the high accuracy measurements, the blank and the sample measurement should closely follow each other.

In general, a blank measurement should be repeated as often as is practical. Even in a thermally stable environment, a blank measurement should be taken every half hour to ensure accurate results.

Chemically, the only difference between the blank and the sample should be the presence of the analyte(s). For measurements with liquid samples, the blank should be a sample cell filled with the solvent you plan to use.

Sample Cell or Cuvette Material

Quartz sample cells (cuvettes) or sample cells with quartz face plates are required if you want to use the full 190 to 1100 nm wavelength range of your spectrophotometer.

If you plan on working only in the visible and/or short-wave near-infrared range of 350 to 1100 nm, you can use good quality **glass cells**.

Disposable plastic sample cells, for measurements in the range 400 - 1100 nm, are also available. The quality of these cells varies and they are generally not recommended.

Optical Specifications of Cells

The accuracy of the readings of a diode array instrument is very sensitive to spatial shifts of the analysis light beam. Cells having non parallel opposite faces, or so called wedge shaped cells, lead to a spatial shift of the light beam (see Figure 6). Therefore, the opposite cell walls illuminated by the analysis light beam have to very parallel. The parallelism is measured in terms of the **angle between the two opposite cell walls**. We recommend to use 10 mm path length cells with **an angle which is below 0.1 degrees of an arc**.

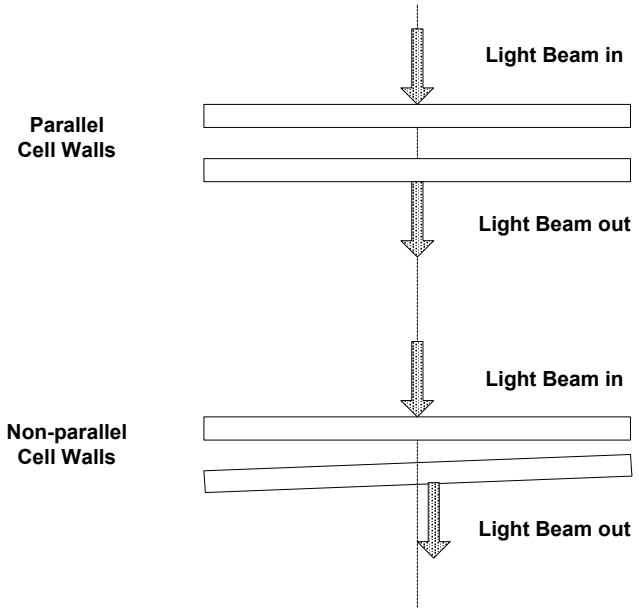


Figure 6 Shift of the Instrument Light Beam due to non Parallel Cell Walls

Apertured Cells or Cuvettes

In applications where sample volume is limited, *apertured* or microcells are used. The width of these cells is reduced to reduce the volume and the *blank* **part of the cell must be blackened** to avoid unwanted transmission and reflection through the side walls. If the side walls are not blackened the result will be poor photometric accuracy and, if different concentrations are measured, poor linearity.

The disadvantage of apertured and microcells is that part of the light beam is blocked. Not all the light passes through the sample and there can be some loss in sensitivity. See Figure 7 for recommended cells and Figure 8 for cells you should not use with the instrument.

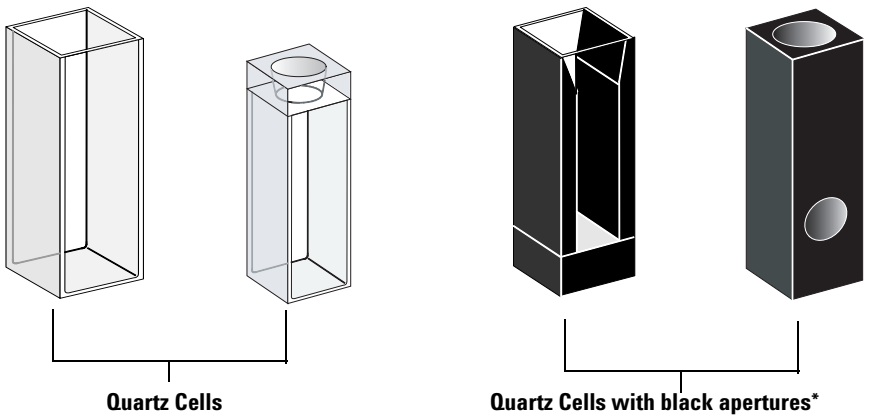
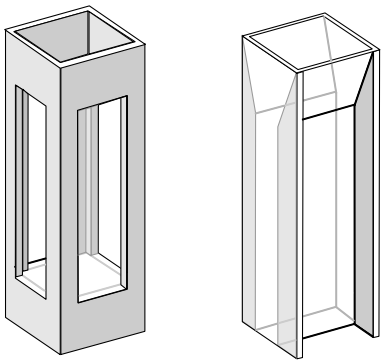


Figure 7 Recommended Cells

CAUTION * Quartz Cells with black apertures smaller than 2 mm, when used with a multicell transport, can lead to measurements of poor reproducibility.



Quartz Cells with transparent apertures,
Fluorescence Cells,
Plastic Cells

Figure 8 Cells You Should Not Use With the Instrument

Flow Cells

We recommend a sipper system with a flow cell for obtaining the high precision measurements. Using a flow cell eliminates the necessity of moving the cell between blank measurement and sample measurement. Also, the cell can be rinsed thoroughly with the solution to be measured.

The design of the flow cell should minimize entrapment of bubbles and flow *channeling* to provide the most reliable results.

Handling and Maintaining Cells or Cuvettes

Passivating New Cells

When filling a non passivated new cell with your sample, you will observe that air bubbles stick on the windows of your cell. To prevent the formation of sticky bubbles, rinse the cell with cleaning and passivating fluid (part number 5062-8529). The cleaning procedure you should apply is described on the label of the cleaning fluid container.

Cleaning Cells

The fats in fingerprints are significant absorbers in the UV region and, if left on optical surfaces, can cause erroneous results. Wipe off all fingerprints and contaminants before using a sample cell.

Use only high quality lens tissues (part number 9300-0761) and **never dry the inside of a cell with lens tissues**. Dry the inside of the cell with pressurized, oil free air, that prevents the cell from getting contaminated with tissue particles, or rinse the cell with blank or sample solution. Floating particles in the cell will deflect the light beam and so lead to a very poor quality of the measured spectrum.

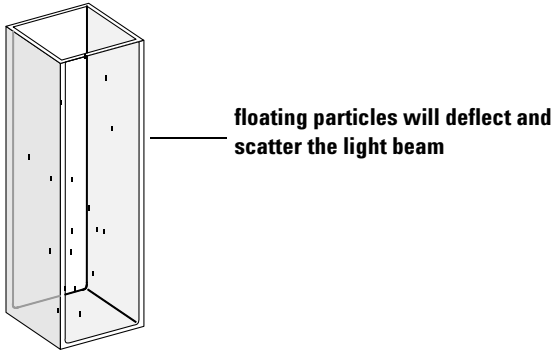


Figure 9 Floating Particles in a Cell

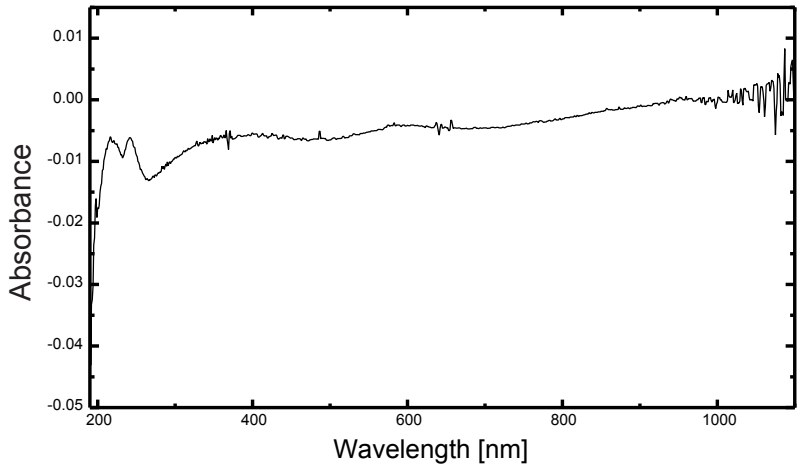


Figure 10 Spectrum Taken With Floating Particles in the Light Path

Lens tissues for glasses or other uses often contain detergents or lubricants which can affect your measurements. If possible avoid cleaning the faces of your cell between blank and sample measurements.

Handling Cells

Always install a cell so that it faces the same direction to minimize problems with cell non-uniformity. For best results with microcuvettes, leave your sample cell clamped in position throughout the measurement sequence. Solutions should be removed and replaced by pipette or use flow cells.

CAUTION If glass pasteur pipettes are used, make sure that the optical windows of the cell are not touched or scratched by the pipette.

Solvents

Your choice of solvents should be based primarily on the solvent's absorbance characteristics over the wavelengths of interest, its suitability as a solvent for the analyte, and on experimental conditions. Table 1 lists common solvents and the lower limit of their useful wavelength range.

Table 1 Lower Limit of UV Transmission for Some Common Solvents

Lower Limit	Solvent
180–195 nm	Sulfuric acid (96%) Water Acetonitrile
200–210 nm	Cyclopentane n-Hexane Glycerol 2,2,4-Trimethylpentane Methanol
210–220 nm	n-Butyl alcohol Isopropyl alcohol Cyclohexane Ethyl ether
245–260 nm	Chloroform Ethyl acetate Methyl formate
265–275 nm	Carbon tetrachloride Dimethyl sulfoxide Dimethyl formamide Acetic acid
280–290 nm	Benzene Toluene m-Xylene
Above 300 nm	Pyridine Acetone Carbon disulfide

WARNING **Many of the solvents in Table 1 are hazardous. Be sure you fully understand their properties before using them.**

When using volatile solvents such as acetone or methylene chloride, make sure that the sample cell is stoppered. Evaporation of a solvent can change the solute concentration or cause *solution noise* due to solute convection currents. Both of these will affect the accuracy of your measurements. We also recommend stirring and temperature control when you use volatile solvents.

When using water as solvent we recommend using UV grade or HPLC grade water to reduce unwanted absorbance from the water. If you are using the sipper/sampler system the water should be degassed to avoid bubble formation in the flow cell, especially if the water comes from a pressurized water supply.

Sample Preparation

The sample cell should be rinsed three to five times with your intended solvent before you fill it with the pure solvent that will be used in the measurement. Turning the cell upside down on a small stack of absorbent tissues will help remove any residual solvent. This treatment will minimize contamination from previous experiments.

Samples which contain colloidal dispersions, dust or other particulate matter should be filtered, centrifuged or allowed to settle. If not, the overall attenuation-of-transmittance spectrum due to light scattering and/or reflection will hide the spectral information from the analyte.

Photosensitive Samples

A few substances are very photosensitive. They degrade or undergo photochemical reactions if exposed to light. This can be easily seen by a decrease of sample absorbance over time.

Use of Filters

The shorter wavelength, higher-energy UV light is most likely to degrade photosensitive samples. If you have a problem, you can selectively block portions of the UV spectrum with a UV cut-off filter. An optical filter wheel assembly with three cut-off filters is available for the spectrophotometer. The cut-off wavelength of the filter you choose should be low enough that it does not eliminate important spectral information but high enough that it blocks the light that could degrade your sample. If you use a filter with your samples, you must use the same filter when you make your blank measurement.

Turning the D_2-Lamp off

The short wavelength radiation leading to photodegradation comes from the light of the D_2-Lamp. For application where readings are taken at wavelengths above 400 nm, the D_2-Lamp can be turned off. The light intensity supplied by the Tungsten lamp is sufficient for a good signal to noise ratio over the wavelength range 400 nm - 1100 nm.When using cells with small apertures, you should check the signal to noise ratio by making sample measurements under conditions of your application.

Stirring and Temperature Control

Solution homogeneity can be a problem, especially for viscous solutions. There are cases where, due to convection induced gradients, rapid absorbance changes may give irreproducible data. These changes can be observed spectroscopically by taking measurements with short integration times. To minimize convection effects keep the temperature of your sample the same as the cell holder or environmental temperature. Problems like these can also be minimized by using a thermostattable cell holder and/or a stirring module.

A similar effect can occur in cases of incomplete mixing. This is especially true where the specific gravities or miscibilities of the solvent and analyte are quite different. Again, stirring is a way to prevent this kind of problem.

In an unstirred cell, it is sometimes possible to observe local photodegradation of sensitive analytes. Because the actual volume of the sample in the light path is very small, stirring the sample will reduce the time any given analyte molecule is in the light path. This minimizes the photodegradation and increases homogeneity. Using a flow cell with continuous flow can yield similar results.

Checklist for Best Results

Cell:

- ✔ Cell is made of quartz or glass
- ✔ Apertured cells has black sides
- ✔ Apertured cells has an aperture greater than or equal to 3 mm
- ✔ Cell windows are free of fingerprints and other contamination
- ✔ Flow cell used instead of an apertured standard cell

Measurements:

- ✔ Solution in cell is free of floating particles
- ✔ Solution in cell and cell walls are free of bubbles
- ✔ Solution in cell is mixed homogeneously
- ✔ Blank measured on same solvent as sample
- ✔ Blank measurement shows a flat baseline (Figure 11 and Figure 12 show a good and a poor baseline)
- ✔ Cell orientation of blank and sample measurements is the same
- ✔ Ideally the cell is not removed between the measurement, which means the cell is filled/rinsed using a pipette or a flow cell is used
- ✔ Time between blank and sample measurement should be short

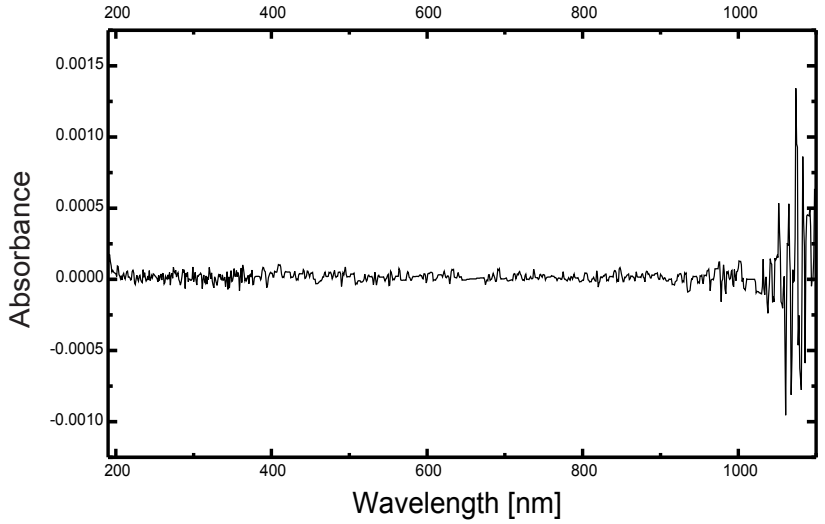


Figure 11 Example of a Blank on Water Showing a Good Baseline

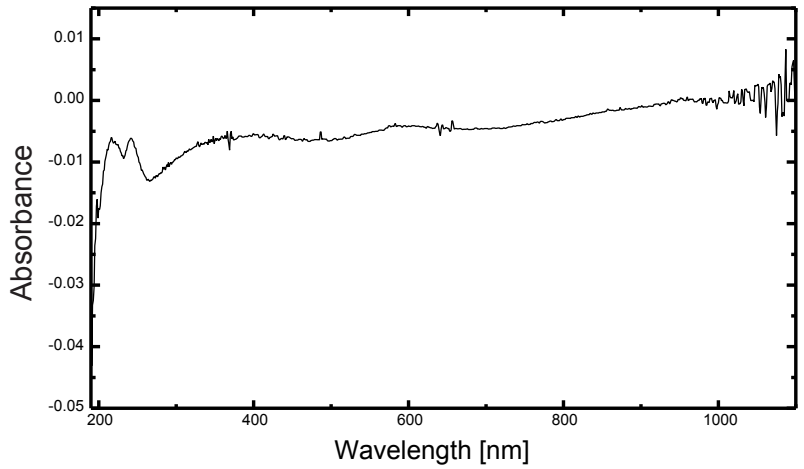


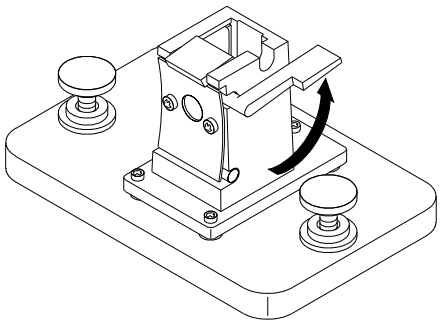
Figure 12 Example of a Blank on Water with Bubbles Causing a Poor Baseline

NOTE If your blank or spectra shows artifacts similar to the one in Figure 12, see "Solvents" on page 45 to optimize the measurement procedure.

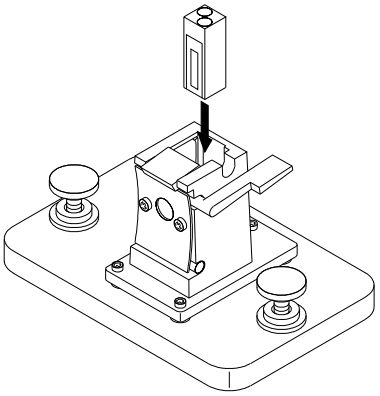
Inserting a Cell

Your spectrophotometer is shipped with the standard single-cell cell holder you first have to install in the sample compartment. This cell holder accommodates standard cells or flow cells. To insert a sample cell (cuvette) in the cell holder:

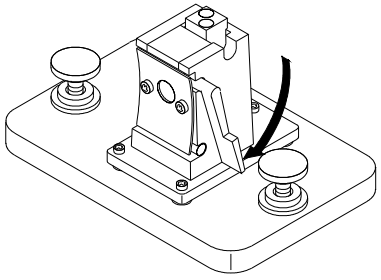
1 Move the locking lever to its up position.



2 Insert the sample cell, making sure you orient it correctly. The frosted (non-clear) sides of the sample cell *should not* be in the path of the light beam.



3 Lock the sample cell in place by pushing the locking lever back down.



Small volume flow cells and particularly any cells with less than a 2 mm aperture may require use of the optional adjustable cell holder. The adjustable cell holder helps you ensure the cells are properly centered in the light path.

4
Installing Accessories

Thermostattable Cell Holder 52
Cell Stirring Module 54
Long Path Cell Holder 58
Optical Filter Wheel 61

Many simple, mechanical/optical accessories are available to expand the capabilities of your Agilent 8453 spectrophotometer. This section briefly describes these accessories and outlines how to install them.

The following more complex accessories with electronic components are available to enhance the functionality and capabilities of your spectrophotometer. Information about these are included with the accessories in separate handbooks.

- Sipper system
- Autosampler
- Multicell transport
- Peltier temperature control accessory

Thermostattable Cell Holder

The Agilent 89054A thermostattable cell holder (see Figure 13) is a single-cell cell holder with a manifold around the cell. Water from a thermostatted water bath can be circulated through the manifold to hold the sample cell at a uniform temperature. Up to 1 cm open-topped cells and flow cells can be used in a thermostattable cell holder.

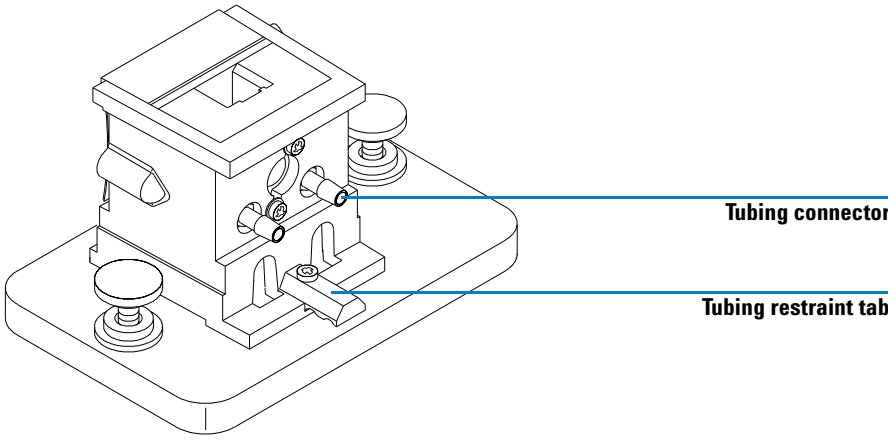


Figure 13 Thermostattable Cell Holder

Installing a Thermostattable Cell Holder

1. Loosen the hold-down screws and remove the current sample holder from the sample compartment.
2. Orient the thermostattable cell holder the same way the standard cell holder was oriented and lower it onto the sample compartment mounting guides.
3. Tighten the hold-down screws.
4. Connect tubing (silicon, 3/16 inch i.d.) to the inlet and outlet of the manifold. It does not matter which side is used as the inlet and which side is used as the outlet. If necessary, route the tubing under the tubing restraint tab to keep it from interfering with the light beam. Make sure the tubing is securely attached; it expands when heated and if it is not secure a leak will result.
5. Insert the sample cell and lower the lever down to lock the cell in place.
6. Begin pumping thermostatted water through the manifold. Wait for the sample cell and sample to reach thermal equilibrium before you make any measurements. The time required to reach thermal equilibrium will vary depending on the water temperature and the sample but generally should take about five minutes.

When the thermostattable cell holder is not in use, it is best to disconnect the tubing and drain the manifold.

Cell Stirring Module

The Agilent 89055A cell stirring module shown in Figure 14, mounts inside the base of the thermostattable cell holder. It provides the capability of magnetic induction stirring inside a standard 1 cm sample cell. The cell stirring module contains a plastic-encased magnetic impeller that can be driven by water or pressurized air. When you put a magnetic stirring bar (9301-1161) into the filled sample cell, the stirring bar rotates in tandem with the impeller magnet, thus stirring the sample.

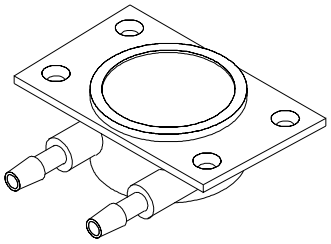


Figure 14 Cell Stirring Module

Installing the Cell Stirring Module

1 Remove the thermostattable cell holder from the sample compartment.

2 Remove the three screws that hold the thermostattable cell holder to its base. Remove the cell holder and turn it upside-down.

3 Insert the cell stirring module into the cavity in the base of the thermostattable cell holder, see Figure 15.

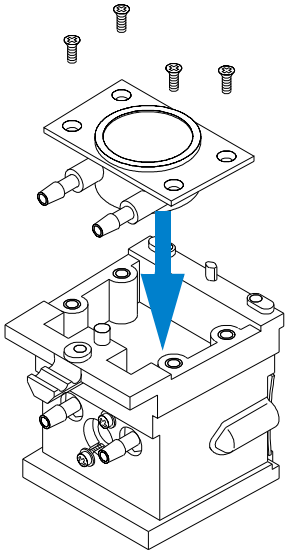


Figure 15 Installing the Cell Stirring Module

4 Tighten the four screws (flathead, M3×6 mm) that will hold the cell stirring module in place.

5 Attach the thermostattable cell holder to its base.

6 Mount the thermostattable cell holder back in the sample compartment.

Tubing Connections and Operation

The cell stirring module can be driven by either water or air. Water is probably the fluid of choice because it is more easily controlled. Water temperature can be up to 100 °C (212 °F) with a maximum allowable back pressure of 4 bar (approximately 60 psi). If air is used to drive the cell stirring module, the pressure should be less than 0.3 bar (approximately 5 psi) when the stirrer is started. Again, the maximum pressure is 4 bar (approximately 60 psi).

There are several ways you can connect a water or air supply to the cell stirring module, see Figure 16. In all cases we recommend using 3/16 inch i.d. silicon tubing between the water supply and the stirring module.

- The stirring module can be used alone, without the thermostattable functions of the cell holder.
- The same water supply can be used to regulate sample cell temperature and to power the cell stirring module.

If you need a faster stirring speed than can be obtained by connecting the manifold and cell stirring module in series, you can connect separate supplies to the manifold and stirring module.

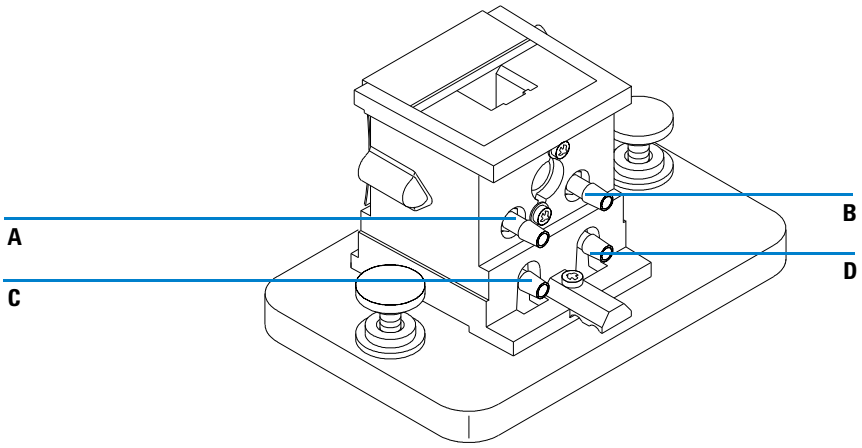


Figure 16 Tubing Connections for a Cell Stirring Module

Table 2 Tubing Connections for a Cell Stirring Module

Connection	Comment
A (in), B (out)	Without stirring
C (in), D (out)	Without cell thermostatting
A (in), B to D, C (out)	In series with cell thermostatting
A and C (in), B and D (out)	In parallel with cell thermostatting

Long Path Cell Holder

The Agilent 89076A long path cell holder is a sample cell holder which can be adjusted to hold most cylindrical and rectangular sample cells with path lengths of up to ten centimeters. It uses the same mounting system as the other sample cell holders.

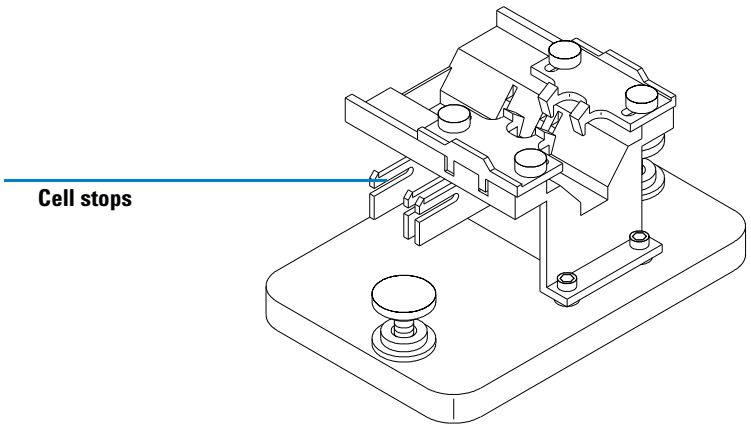


Figure 17 Long Path Cell Holder

The long path cell holder includes built-in cell stops for accurate positioning of 1, 2, 5, and 10-cm sample cells.

The optical filter wheel (08451-60302) can be mounted on the long path cell holder in the same way it is mounted on other cell holders, see "Optical Filter Wheel" on page 61 for details. However, instead of a screwdriver, a 2.5-mm hex wrench is required to install the optical filter wheel on the long path cell holder.

Installing the Long Path Cell Holder

1 Loosen the hold-down screws and remove the current sample holder from the sample compartment.

2 Orient the long path cell holder so that the clamps that hold the sample cell in place are on the right. Lower the cell holder onto the sample compartment mounting guides.

3 Tighten the hold-down screws.

Installing a Sample Cell

1 Position the cell stops according to the path length of the sample cell you will be using. For example if your sample cell is a 1-cm cell.

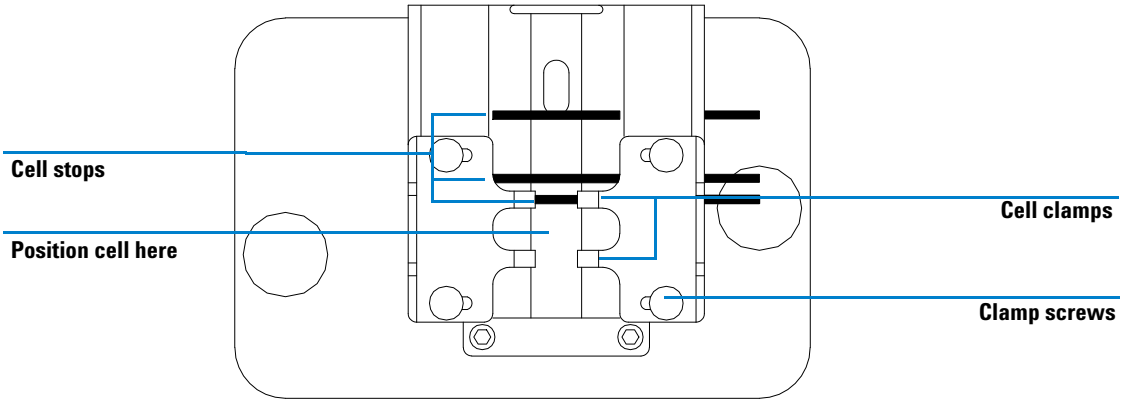


Figure 18 Positioning the Cell Stops for a 1-cm Sample Cell

2 If your sample cell is not one of the standard lengths, position the cell stops as for a long path sample cell, i.e. move all cell stops in Figure 18 to the left.

3 Because the light beam is collimated, absolute positioning of the sample cell is not important; however, consistent cell positioning gives more consistent results. The cell stops make it easier to consistently position your sample cells.

4 Install the sample cell between the clamps. Slide it against the cell stop. If your sample cell is not one of the standard lengths, position it so the clamps are gripping the mid-point of the cell.

5 Allow the clamps to close against the sample cell, see Figure 19. Tighten the four screws that hold the sample cell in place.

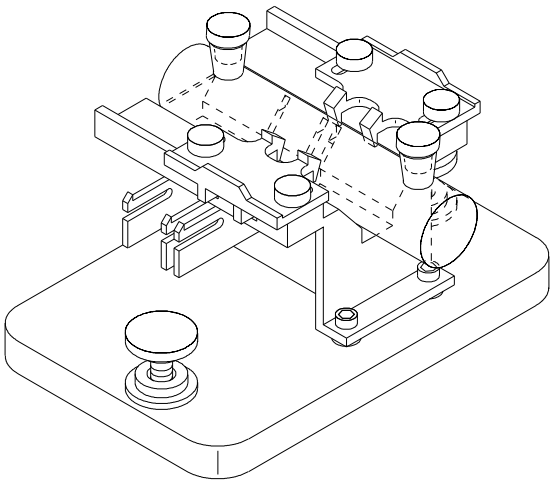


Figure 19 Installed 10-cm Cylindrical Cell in the Long Path Cell Holder

Optical Filter Wheel

To achieve optimum measurement conditions, optical filters may be necessary for spectral measurements of photosensitive samples. Agilent Technologies offers an optical filter wheel assembly (08451-60302), see Figure 20, which can be mounted on the standard cell holder, the adjustable cell holder or the thermostattable cell holder. An optical filter wheel with the same filters but with a different mounting can be used with the multicell transport, see *User's Guide* of the multicell transport.

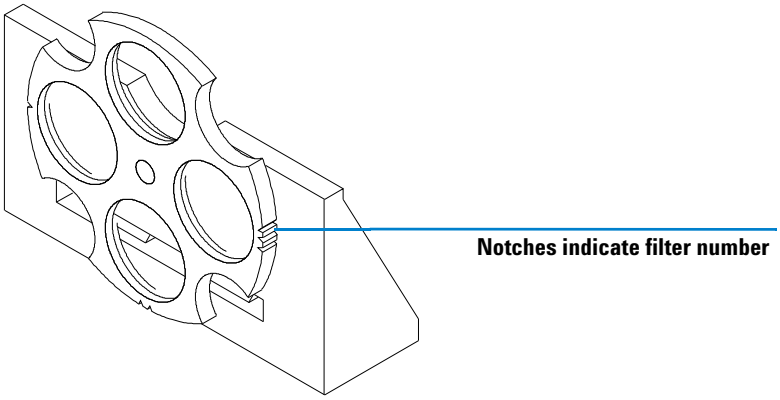


Figure 20 Optical Filter Wheel Assembly

The filter wheel rotates to four different positions. Position zero is empty and permits 100% transmittance at all light wavelengths. Positions one, two and three have filters which absorb varying amounts of the UV spectrum. Figure 21 shows the transmission characteristics of each filter.

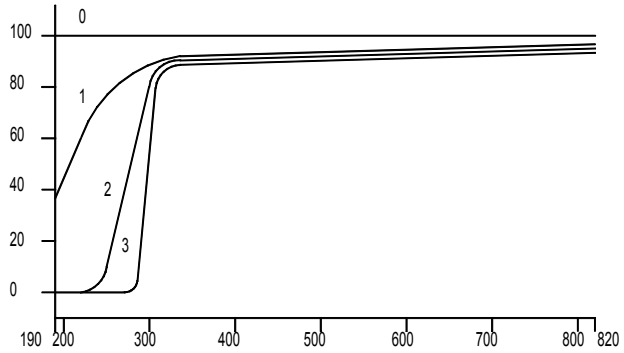


Figure 21 Transmission Characteristics of Filter Wheel Filters

Table 3 Filter Wheel Positions

Position	Filter
0	None
1	UV roll-off
2	265 nm UV cut-off (at 50%T)
3	295 nm UV cut-off (at 50%T)

The choice of when to use a filter and which filter to use should be made only after considering all the factors that affect your measurements. If you decide that a filter is needed, you should choose a filter that transmits the wavelengths needed for analytical information and that blocks the wavelengths that contribute to sample degradation. Often, your final choice will be a compromise since sometimes even the light at the wavelengths of analytical interest can affect your sample.

If you do not need a filter for a group of measurements, you can move the filter wheel to position zero. This permits full light transmission. When you will not be using the filter wheel for an extended period of time you should remove the filter wheel assembly from the cell holder and store it in a clean plastic bag.

The optical filters of the filter wheel must be kept clean. Dirty filters interfere with light transmission and lower the spectrophotometer performance. These filters may be cleaned with isopropanol and photographic lens tissues.

Installing the Filter Wheel Assembly

Installing the filter wheel assembly is fairly simple. The procedure is the same for all three cell holders. You will need a Phillips screwdriver to install the filter wheel assembly. However, if you install the filter wheel on the long path cell holder, instead of a screwdriver, a 2.5-mm hex wrench is required.

1 Remove the cell holder from the sample compartment.

2 Remove the two screws shown in Figure 22.

3 Position the filter wheel assembly clamp as shown in Figure 22. Replace the two screws but do not tighten them.

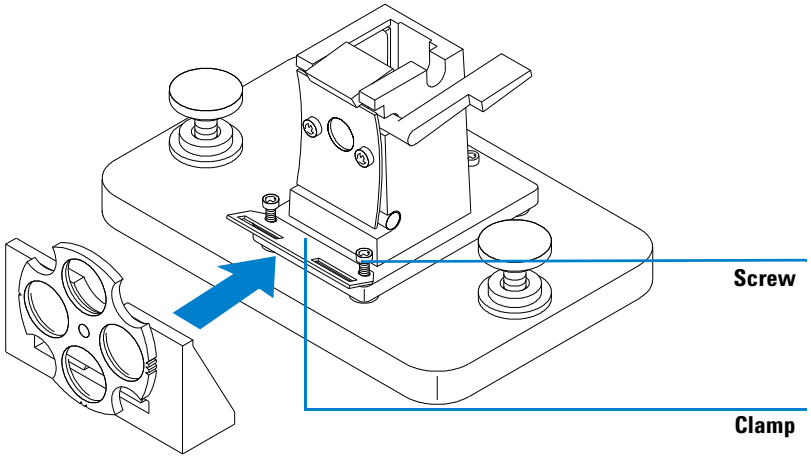


Figure 22 Installing the Optical Filter Wheel Assembly

4 Tilt the outer edge of the clamp up slightly.

5 Bring the filter wheel assembly against the cell holder so that the clamp fits in the slot of the filter wheel assembly. The mounting ridges on the

filter wheel assembly should fit into the holes in the clamp. The base of the filter wheel assembly should be against the base of the cell holder.

6 Tighten the screws that hold the clamp.

Removing the Filter Wheel Assembly

1 Loosen but do not remove the two screws that hold the clamp.

2 Separate the filter wheel assembly from the cell holder.

3 The filter wheel clamp may be left in place or removed. In either case, retighten the two screws.

4 Store the filter wheel in a clean plastic bag.

5
Installing the UV-visible Software

Agilent ChemStation Computer Details 66
Installing the Agilent ChemStation Using CD-ROM 69

This chapter describes about the minimum requirements which your computer must have, and describes what you have to do when you want to install the UV-Visible software on your own.

It is assumed that a supported Microsoft Windows operating system is already installed.

Agilent ChemStation Computer Details

This section describes the PC hardware and operating system requirements that must be met for successful installation and operation of the Agilent ChemStation.

The Agilent ChemStation B.04.xx is supported on personal computers with an 1 GHz 32-bit (x86) processor. All PC hardware and peripherals must be listed in the Microsoft Windows Marketplace Tested Products List Hardware section. The hardware testing status is available from the Microsoft home page on the world wide web: (http://winqual.microsoft.com/HCL/Default.aspx). If your PC hardware is not tested, the system may not work with the supported operating system.

NOTE The software runs on systems with sufficient random access memory (RAM) installed. Depending on the usage of the system and the desired data throughput, those systems may not exhibit acceptable performance.

Minimum PC Requirements for the Agilent ChemStation

Table 4 Minimum PC Requirements

PC configuration	Microsoft Windows XP Professional 32-bit (SP 2 or 3) Windows Vista Professional 32-bit (SP 1 or 2) Windows 7 Professional 32-bit (SP 1) Windows Server 2003 Windows Server 2008 32-bit (SP 1)
Graphics resolution	The recommended graphics resolutions for video graphics adapter are: 1024 by 768 with large fonts or 1280 by 1024 with large fonts
Processor	1 GHz 32-bit (x86) (3 GHz for Windows Vista and Windows 7)
Screen resolution	Super VGA (1280 × 1024)

Table 4 Minimum PC Requirements (continued)

Mass storage	40 GB Hard-Disk and CD-ROM
Memory	Minimum of 1 GB of RAM for UV-Visible ChemStation software and a single instrument. For Windows Vista or Windows 7 add another 1 GB for a total of 2 GB of RAM. The minimum recommended amount of memory for a single- bath dissolution system (G1118AA) and kinetic measurements (G1117AA) is 2 GB of RAM. For Windows Vista or Windows 7 add another 1 GB of RAM for a total of 3 GB. Add 256 MB of RAM for each additional bath in a multi-bath dissolution system (G1118AA). In all cases, an appropriate amount of virtual memory should be configured.

NOTE A maximum of four instruments may be interfaced to each Agilent ChemStation.

NOTE If you are upgrading from a previous version of Agilent ChemStation, you *must* uninstall the old version of ChemStation first.

Scheduled Processes

Some scheduled processes like virus checking or defragmenting may cause instrument communication problems. Due to these problems, any automated measurement will be aborted. To prevent problems of this kind please disable any scheduled event.

Number Format

To avoid wrong values displayed or printed, the International settings must include the correct number format. Set the Number Format's Decimal Separator to "." (decimal point) in the Control Panel's International settings or in “Region and Settings” when using Windows 7.

Printer

Please make sure that a default printer is configured in your Microsoft Windows operating system. This is done via the Control Panel application.

If no default printer is configured then following problems may occur:

- the 'Copy To Clipboard' menu will have an error
- in the 'Custom Report View' there are problems with new templates
- the 'print preview' doesn't work

Installing the Agilent ChemStation Using CD-ROM

Overview

This section explains how to use the Agilent Technologies UV-visible ChemStation Software Products CD-ROM to:

- install the Agilent ChemStation for the first time
- upgrade/repair an existing Agilent ChemStation software
- install an additional Agilent ChemStation module

NOTE Agilent UV-Vis ChemStation B.04.xx is only supported on Microsoft Windows XP Professional 32-bit (SP2 or SP3), Windows Vista Professional 32-bit (SP1 or SP2), Windows 7 Professional 32-Bit (SP1), Microsoft Server 2003, and Microsoft Server 2008 32-bit (SP1)

NOTE Local Administrator rights on the target PC are required to perform the installation.

Uninstalling Preexisting Agilent UV-Vis ChemStation Software

To remove all analytical ChemStation software from your hard disk:

1. Insert your Agilent Technologies UV-visible ChemStation Software Products CD-ROM into the drive.
2. Run the setup program on CD-ROM.
3. Select Remove and then click Next.

Note that the removal of ChemStation software can also be done from within the Control Panel.

NOTE Only files installed by the product CD-ROM are removed. All additional files such as method and data files are not automatically removed. By default they are located in the respective instrument directory C:\Chem32\1.

NOTE If the Security Pack had been installed, please see your manual Agilent ChemStation Security Pack for UV-visible Spectroscopy - User's Guide for details.

During the installation some of your configuration files will be changed. If you don't intend to use any ChemStation software you can remove the ChemStation.ini file located in the operating system folder, C:\Windows by default.

Installation Procedure

Use the following procedure if you are using the CD-ROM to install or upgrade the Agilent ChemStation.

Before installing the software:

- Set up the computer hardware.
- If GPIB communication shall be used, interface as described in "Installing an GPIB Interface" on page 81 (not required for LAN communication).
- Make sure an operating system, supported by your revision of the Agilent UV-visible ChemStation software, is available on the target PC.

1. Insert Agilent UV-visible ChemStation Products CD-ROM into the CD-ROM drive.
2. From the Start menu in the taskbar, select Start / Run.
3. At the command line, type *diskdrive*:\Setup.exe (for example, D:\Setup.exe), then click OK.

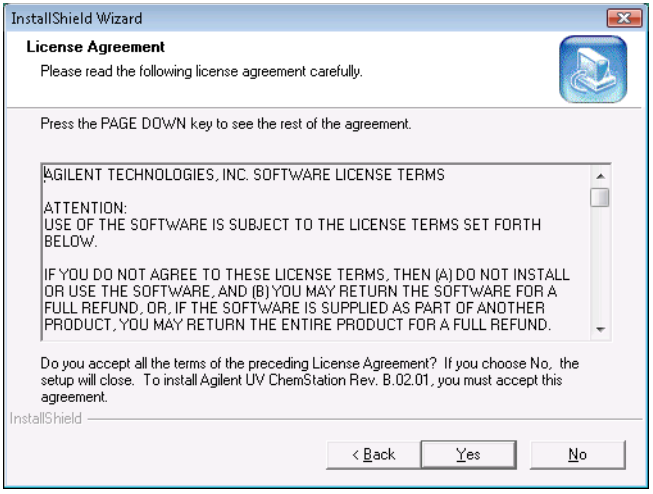
NOTE

Using Windows Vista or Windows 7 you may get the warning dialog below several times during the installation.

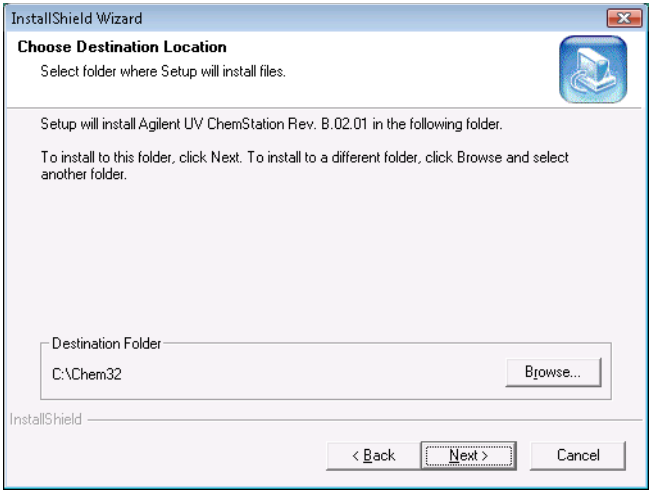
Press **RUN** to continue.

---

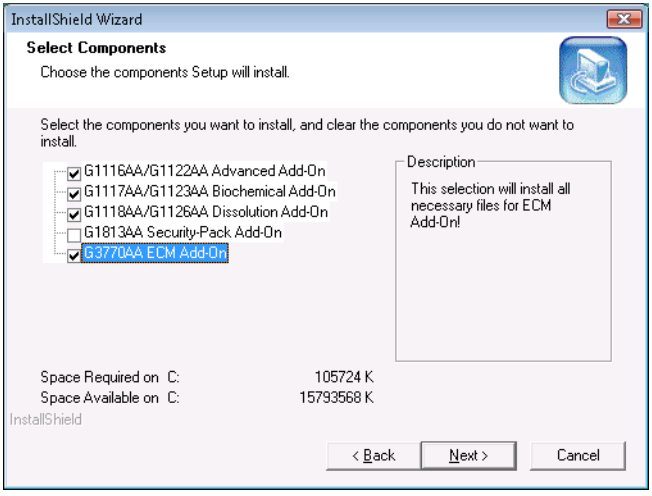
4 Please read the licence agreement and press *YES* to accept.



5 Use the default installation path C:\Chem32 then press *NEXT*. (Drive letter can be changed from C drive to another drive if desired.)



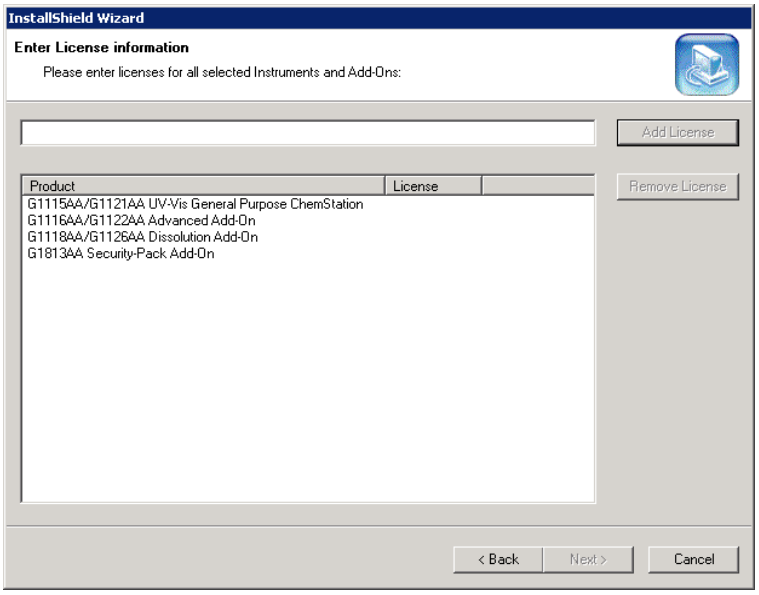
6 Select the additional modules you want to install and press *NEXT*.



Note that the Security-Pack Add-On and the ECM Add-On are mutually exclusive. One or the other can be installed, but not both.

7 Enter the License Registration Number for each selected module in the entry line and press *Add License*. When all required licenses are added,

press *NEXT*.

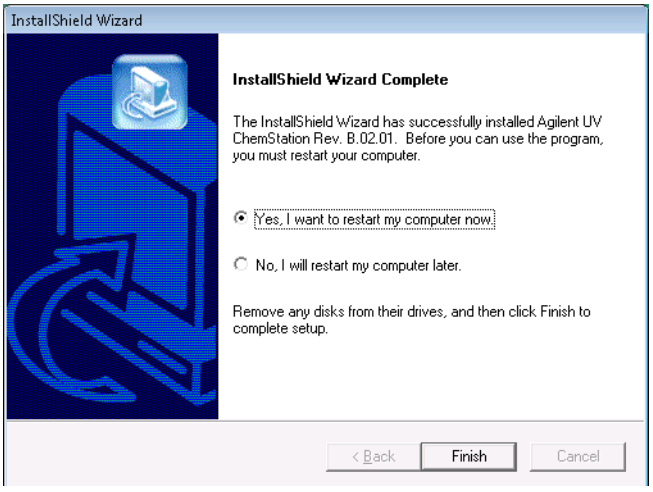


The applicable product and license numbers are printed on your Software Certificate and Registration Packet (see the example license registration label).

Figure 23 Example License Registration Label

8 The configuration editor will open automatically as part of setup. Adjust the configuration if desired - the default is for GPIB communication from the PC to the 8453. Save the configuration and exit the configuration editor. Setup will then continue.

9 Press *Finish* to complete the setup and reboot your system.



NOTE If you selected the G3770AA ECM access module, please make sure to establish you ECM access using the Internet Explorer before you first launch you UV-visible ChemStation.

Monitor Configuration

If you have a monitor with a 800×600 pixel resolution, use small fonts, whereas for a monitor with a 1024×768 or higher resolution, you may select a larger font. The font size is available with the control panels's Display settings. In the Display properties dialog box use the Appearance tab for the adjustment.

Configuring Your System

The setup program configures the system automatically for your Agilent 8453 spectrophotometer as Instrument 1, with an GPIB address of 25.

If you wish to use LAN communication, a different GPIB address, set up an additional spectrophotometer, or set up an temperature control accessory you must configure the system.

To configure your system:

1 In the Agilent ChemStation group start the Agilent UV-Visible Configuration Editor.

2 Choose Instruments from the Configure menu.

- The Instrument Type box lists the instrument types available on your Agilent ChemStation. Select one to begin your configuration.
- Enter the name you want to call the instrument in the **Instrument Name** box. The Agilent ChemStation will use this name to identify the instrument.
- Select **Normal** under **Initial Screen Window Size** to have your instrument session window appear as a full screen but with an open area across the bottom for icons. If you select **Icon** or **Full Screen**, the instrument session window will start as an icon or as a full screen.
- Choose **OK** to enter your selections and to display the Instrument Name - Device Configuration.
- To modify settings in an existing instrument configuration, you must select the modul first in the **Selected Modules** frame and press the **Delete** button.
- Select the modul in the **Modules** frame and chose the type of interfacing.
- In case of GPIB connection, select the **GPIB** option. The GPIB address is adjusted using the scrollbar. The available GPIB addresses are displayed in the box. The spectrophotometer and accessories are shipped with the following default GPIB addresses:

GPIB Address	Instrument/Accessory Name
25	Agilent 8453 spectrophotometer, or
20	Temperature control accessory

Press **Add** to add the module to the list of **Selected Modules**.

- In case of a LAN connection, select **LAN** option and press **Add**. In the upcoming dialog select **Identify by Host Name** or **Identify by IP Address** and enter the selected information - **Host Name:** or **IP Address:** - in the entry field. Press **OK** to add the module to the list of **Selected Modules**.
- Press **OK** to complete the instrument configuration.

If you configure more than one instrument, you must take care that each instrument has a unique GPIB or LAN address. You can configure up to four spectrophotometers.

3 Choose OK to enter your selections and to return to the main menu.

4 If you want to change the color of a screen element:

Choose **Colors** from the Configuration menu, select that element under **Screen Elements**, then select a color from those shown below in the **Standard Colors** or **Custom Colors** list box. Your changes will appear in the Screen Elements list box. You can create custom colors and add these, use the **Add Custom Colors...** button and follow the instructions available with the **Help**.

5 Select and configure the GPIB interface.

For GPIB communication in the configuration dialog in the GPIB Card: field hp82341 must be selected.

Choose **OK** to save changes and return to the Configuration Editor display.

6 If you want to add new instruments:

Choose Add New Instrument from the Add/Delete menu to add a new instrument window to the Configuration Editor screen. Follow the above procedure to configure the instrument. Choose Delete Instrument from the Add/Delete menu to remove an instrument from the configuration.

7 Choose Save from the File menu to save your configuration.

8 Choose Exit from the File menu to close the Configuration Editor.

9 To set parameters for the accessories you have installed and configured, refer to the online help in the UV-Visible ChemStation software.

Autosamplers

If you have an Agilent XY autosampler or an autosampler from Gilson International, your Agilent ChemStation software requires a special driver and a cable. See the readme.txt for further information.

GPIB Communication

IEEE-488 is a short-range, digital communications bus specification that has been in use for over 30 years. Originally created for use with automated test equipment, the standard is still in wide use for that purpose. IEEE-488 is also commonly known as HP-IB (Hewlett-Packard Instrument Bus) and GPIB (General Purpose Interface Bus).

GPIB communication can be used to control Analytical instruments by means of a controller. The Agilent 8453 spectrophotometer and the optional Peltier Temperature Station 89090A have build-in GPIB interfaces.

PCs are the common controllers today. Most PCs do not offer a GPIB interface by default. However, such interfaces can be added. Two different types of interfaces are supported by the UV-visible ChemStation software: the PCI interface board Agilent 82350A/B and the USB to GPIB converter interface 82357A/B.

To configure the GPIB interface on the PC and provide the interface driver for the PC's operating system, the Agilent IO Libraries Suite 16.1 is required.

The following steps are required to setup GPIB communication:

1 Installing an GPIB Interface 81

2 Connecting the intrument(s) with the controller: GPIB Cabling 82

3 Installation of the Agilent GPIB Communication Library 84

4 Configuration of the GPIB interface:
Configuring the Agilent 82350 GPIB Interface 88
Configuring the Agilent 82357 USB - GPIB Interface 94

5 Configuring an Agilent 8453 Spectrophotometer 136

Operating System-Instrument Compatibility

The Agilent 82350A/B GPIB interface PCI card and the Agilent 82357A/B USB to GPIB interface are supported on Windows XP, Windows Vista or Windows 7.

The Agilent 82350 is a PCI GPIB interface card; no additional settings on the interface card such as changing the I/O base address are required.

The Agilent 82357A/B USB to GPIB interface is connected to and powered by one of your PC's USB connectors.

NOTE The Agilent 82341C ISA GPIB interface is not supported by Agilent ChemStations, revision B.04.xx or higher.

Installing an GPIB Interface

NOTE The Agilent 82357A/B USB to GPIB interface is connected to one of your PC's USB connectors. This does not require opening your PC.

Since Peripheral Component Interconnect (PCI) interface boards can be installed in several different computers, the following instructions are general. If you have difficulties during the installation, consult your computer manual or dealer.

WARNING **Turn off and unplug your computer and all attached electrical devices before removing any covers.**

1 Turn off and unplug your computer, then remove the computer's cover(s).

2 Select the appropriate empty slot for your GPIB card. The 82350A/B plugs into any PCI slot.
It is best not to place the GPIB board next to a graphics interface. As

the GPIB connector is wider than a typical PC slot, you may have to leave the slot(s) adjacent to the GPIB interface empty.

3 Loosen the mounting screw and remove the selected empty slot's rear plate.

4 Holding the board by its edges, insert the board into its slot. Make certain that the board's edge connector is fully seated. Lock the board into place with the mounting screw.

5 Replace the computer's cover(s). Plug in, and restart the computer.

GPIB Cabling

When connecting GPIB devices together, there are several basic rules that should be observed.

1 Whenever possible, turn off and unplug the computer and all attached devices before the GPIB cables are installed.

2 Before connecting any analytical instrument to an GPIB cable, consult the documentation supplied with each device and determine its GPIB address. No two devices including the PC connected to a GPIB interface may have the same address. Alter their addresses as necessary to avoid any duplication. Write down each GPIB address. This information will be needed later.

3 Try to use short GPIB cables that are two meters long or less.

4 GPIB cable (0.5 m) (10833D)
GPIB cable (1.0 m) (10833A)
GPIB cable (2.0 m) (10833B)
GPIB cable (4.0 m) (10833C)

5 Connect one end of an GPIB cable to the computer's GPIB connector or use the USB GPIB converter interface to connect to the first instrument.

6 Be certain that you properly tighten all GPIB connectors. A poor connection causes errors which are difficult to diagnose.

7 Connect GPIB devices in a *chain*. A chain occurs when an GPIB device is connected to the next GPIB device, and it is, in turn, connected to the next, and so on. Avoid *star* configurations (connecting all of the devices to a central point).

NOTE The Agilent 82357A/B USB to GPIB interface has an integrated 2.5 m cable and an GPIB connector. In a single instrument configuration no additional GPIB cable is required (see Figure 39 on page 95).

WARNING **According to the IEEE 488 specification for the General Purpose Instrument Bus (GPIB), the bus is not designed for dynamic configuration. Cycling power on an GPIB instrument that is connected to the bus while other GPIB instruments are actively communicating to the GPIB controller can induce electrical spikes that may potentially corrupt the GPIB protocol. In extreme cases. this may require cycling power on all instruments, including the GPIB controller (that is, typically the Agilent ChemStation).**

Installation of the Agilent GPIB Communication Library

Installing New IO Libraries

1 Turn the Computer on and logon.

NOTE Local administrator rights are required to perform the setup and configuration of the Agilent GPIB I/O Library.

2 Use the Windows Explorer, locate and run **Setup.exe** in the **\GPIB** directory of your UV-visible ChemStation CD-ROM.
Follow the instructions in the installation Wizard. This will install the Agilent IO Libraries Suite on your computer, update the registry and add a new Program Group called “Agilent IO Libraries Suite”
.

NOTE Windows Vista or Windows 7 may request your permission to continue.
Press the **Run** button to continue.

Figure 24 Windows Vista and Windows 7 Security Warning

The InstallShield Wizard prepares for the installation and displays its Welcome dialog.

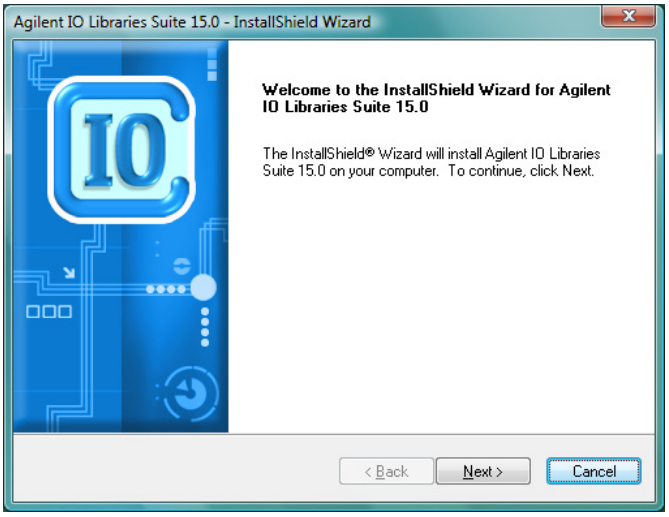


Figure 25 Agilent IO Libraries Suite Installation Welcome Screen

3 Press the **Next** button to continue and select **I accept the terms of the license agreement**.

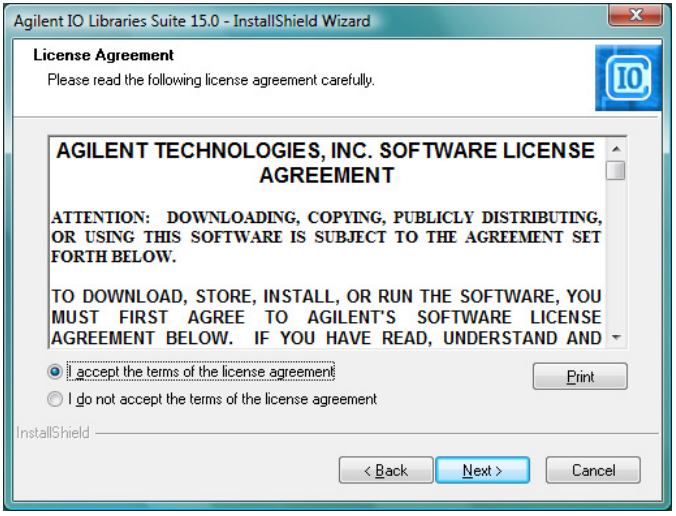


Figure 26 Agilent IO Libraries Suite License Agreement

4 Press the **Next** button to continue and select **Typical** for the **Setup Type**.

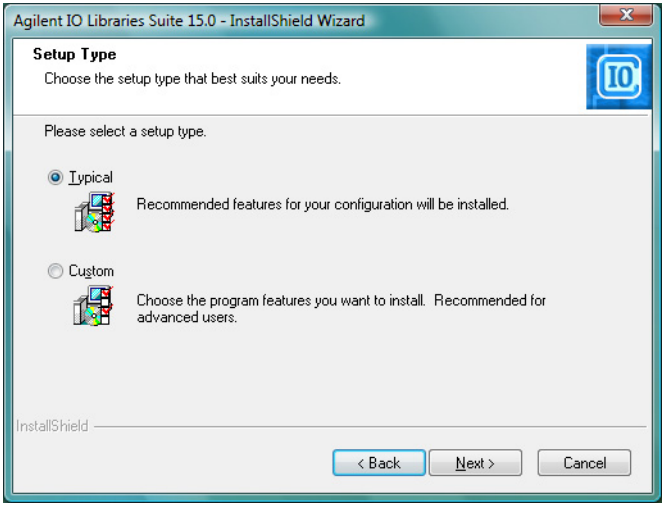


Figure 27 Agilent IO Libraries Suite Setup Type Selection

5 Press the **Next** button to continue and press the Install button on the summary screen.

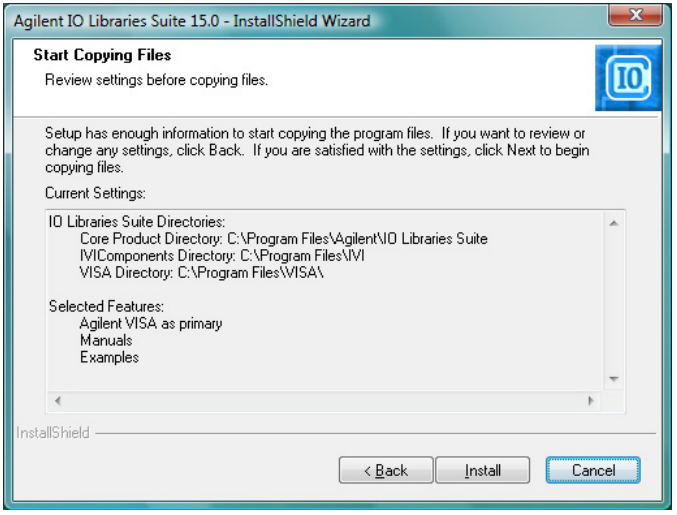


Figure 28 Agilent IO Libraries Suite Installation Summary

6 A window with feature explanations and the progress window below will be displayed.

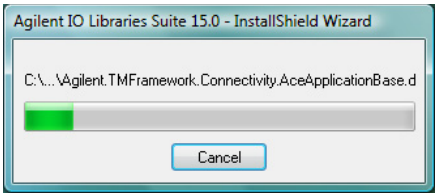


Figure 29 Agilent IO Libraries Suite Installation Progress

7 Press the Finish button to complete the setup.

Figure 30 Agilent IO Libraries Suite Completion Dialog

As a result of your installation you should see the IO library icon on the Windows task bar.

Figure 31 Agilent IO Libraries Suite Quick Launch Icon

Configuring the Agilent 82350 GPIB Interface

- To configure your 82350 GPIB Interface, the Agilent IO Libraries Suite must be installed. See "Installation of the Agilent GPIB Communication Library" on page 84 for details.
- The 82350 PCI GPIB interface must be installed in your PC. See "Installing an GPIB Interface" on page 81 for hints.

NOTE If the **Found New Hardware Wizard** appears and the Agilent IO Libraries Suite is not installed, press the **Cancel** button.

NOTE Local administrator rights are required to configure your interface.

1 Boot your PC, a tool tip will notify about new hardware and the **Found New Hardware Wizard** will start. Select **Option 2** and click **Next** (see Figure 32)

Figure 32 Found New Hardware Wizard (Windows XP)

2 Select **Option 2** and click **Next** (see Figure 33).

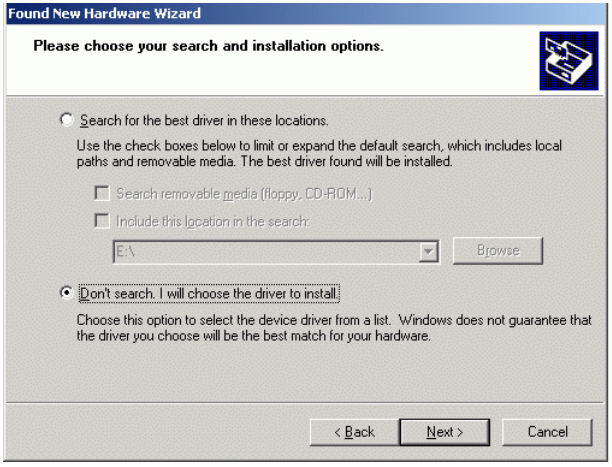


Figure 33 Install Hardware Device Drivers

3 Select 82350 PCI and click **Next** (see Figure 34). The installation of the device driver will start.

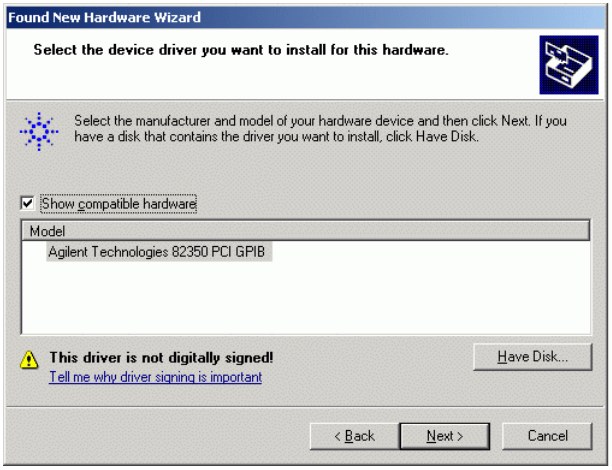


Figure 34 Select a Device Driver

4 Select **Finish** (see Figure 35).

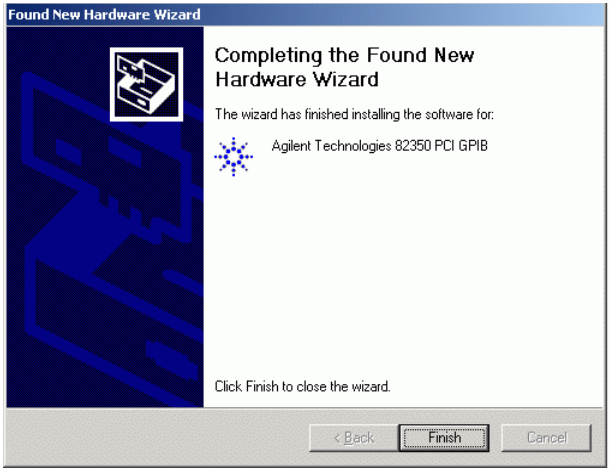


Figure 35 Finish Installation GPIB card

The user will get a notification by the task bar that the hardware is installed and ready to use.

5 Start the IO Config Utility by clicking in the IO Icon 

and choose **Agilent Connection Expert**.

6 Uncheck **Show this window at startup** and press **Close Welcome Screen**. The Agilent Connection Expert Main Window is displayed (see Figure 36).

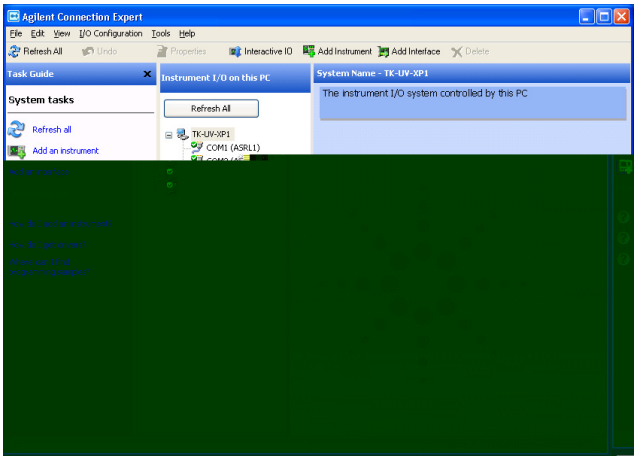


Figure 36 IO Libraries Configuration

7 In the Agilent Connection Expert main window select **GPIB0** (see Figure 37).

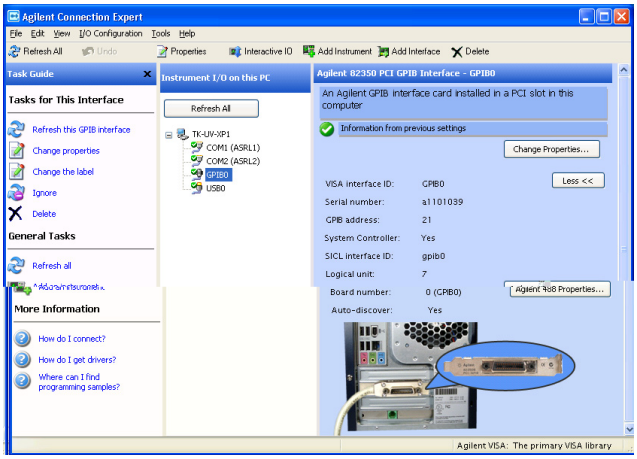


Figure 37 Agilent 82350 default settings.

8 Press the **Change Properties...** button. In the Agilent 82350 PCI GPIB Interface - GPIB0 dialog window select or enter the following properties:
VISA interface ID: to **GPIB0**,
GPIB address: to **30**,
check **System controller (recommended)**,
SICL Interface ID: to **hp82341**,
Logical unit: *to* **7** or **9** and
uncheck **Auto-discover instruments connected to this interface** (see Figure 38).

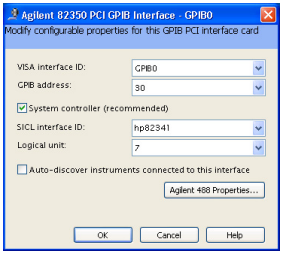


Figure 38 Agilent 82350 Interface configuration.

NOTE The appearance of the dialog slightly differs depending on the type of GPIB board installed.

NOTE You need to type in the SICL interface ID *hp82341* with lower case letters.

9 Select **OK.** The configured GPIB board should now appear as **GPIB0** in the list of **Instrument I/O on this PC** with a yellow warning symbol with an exclamation mark. Use the **File** menu's **Exit** command and in the upcoming dialog press the **Reboot Now** button.
After the reboot your GPIB library installation is complete.

Configuring the Agilent 82357 USB - GPIB Interface

- To configure your 82357 USB-GPIB Interface, the Agilent IO Libraries Suite must be installed. See "Installation of the Agilent GPIB Communication Library" on page 84 for details.
- A USB 1.0 or 2.0 connection on your PC must be available.

NOTE Local administrator rights are required to configure your interface.

1 Plug the 82357A/B USB-GPIB Interface into the GPIB connector of the instrument's GPIB connector.

NOTE

If a GPIB cable is used to interconnect multiple modules (e.g. 89090A Peltier Temperature controller) the USB Interface device needs to also be plugged into the GPIB connector (see Figure 39).

Figure 39 82357 USB-GPIB Interface on e.g. 8453 spectrophotometer

2 Connect the USB connector of the 82357 USB-GPIB interface into a USB port of your Computer. The hardware wizard detects a USB device

and the **Found New Hardware Wizard** will start (see Figure 40).

3 Select **Option 1** and click **Next** and the installation will start (see Figure 40).

Figure 40 Found New Hardware Wizard Windows XP, first detection

4 To initialize the interface select **Option 1** and click **Next** and the initialization will start (see Figure 41).

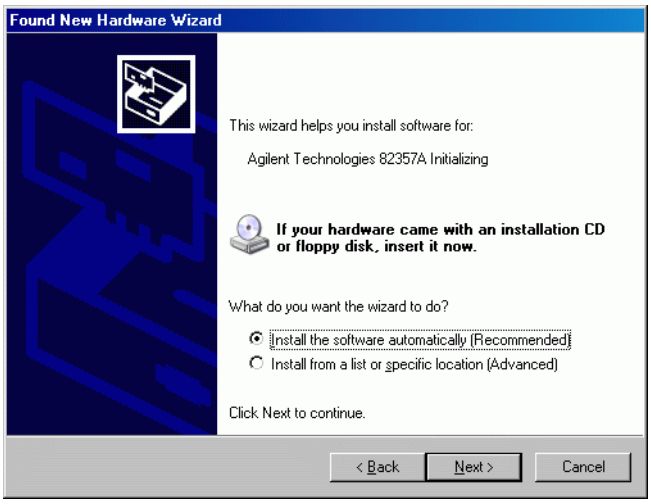


Figure 41 Found New Hardware Wizard Windows XP, first detection

5 The system will initialize the USB device. This might take some seconds (see Figure 42).

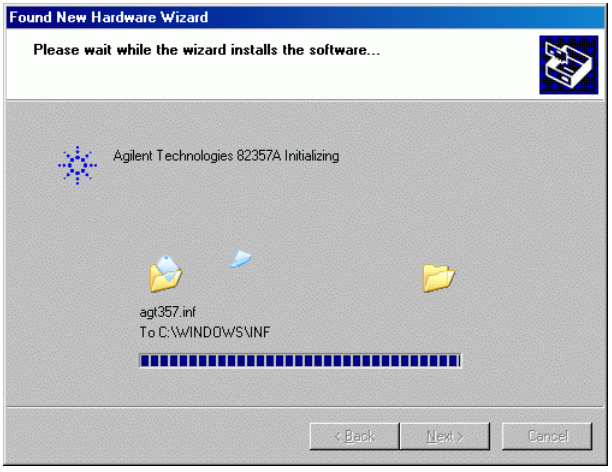


Figure 42 Initializing the 82357A USB-GPIB Interface in Windows XP, first detection

6 Select **Finish** to close the wizard after the initialization Hardware driver (see Figure 43). The initialization of the USB device is finished, the installation still needs to be done.

Figure 43 Finish Device Driver Installation in Windows XP

7 The hardware wizard detects now the USB-GPIB device for a second time and the **Found New Hardware Wizard** starts again (see Figure 44).

8 Select **Option 1** and click **Next** (see Figure 44).

Figure 44 Found New Hardware Wizard Windows XP, second detection

9 Select **Option 1** and click **Next** to start the installation (see Figure 45)).

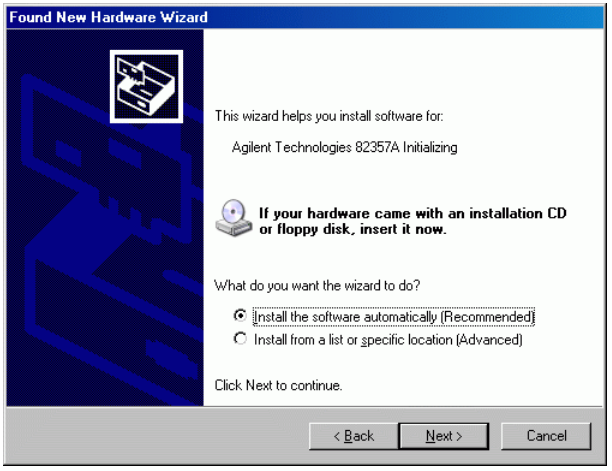


Figure 45 Found New Hardware Wizard Windows XP, second detection

10 The system initializes the 82357A USB-GPIB Interface device. This might take some seconds (see Figure 46)). Please wait until the configuration screen appears, see step 14.

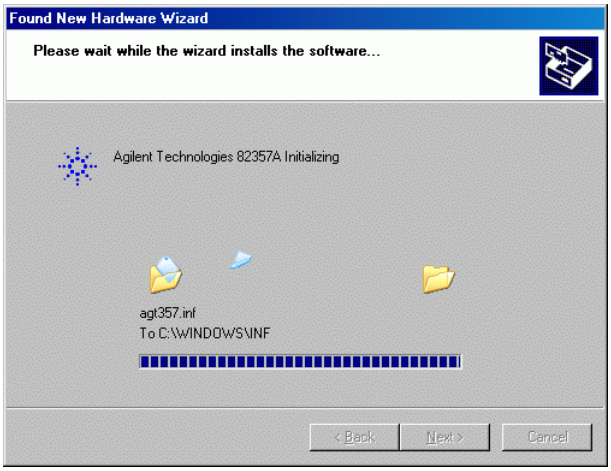


Figure 46 Installing the 82357A USB-GPIB Interface in Windows XP, second detection

NOTE

The hardware installation warning may appear. In such a case press the **Continue Anyway** button.

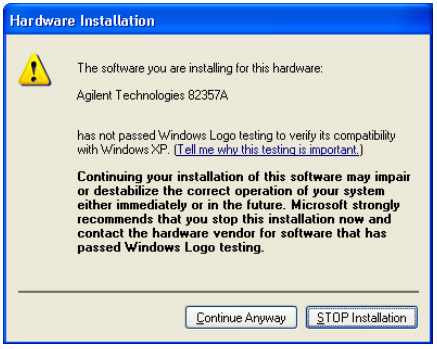


Figure 47 Hardware Installation warning.

11 Press the Finish button to complete the hardware setup.

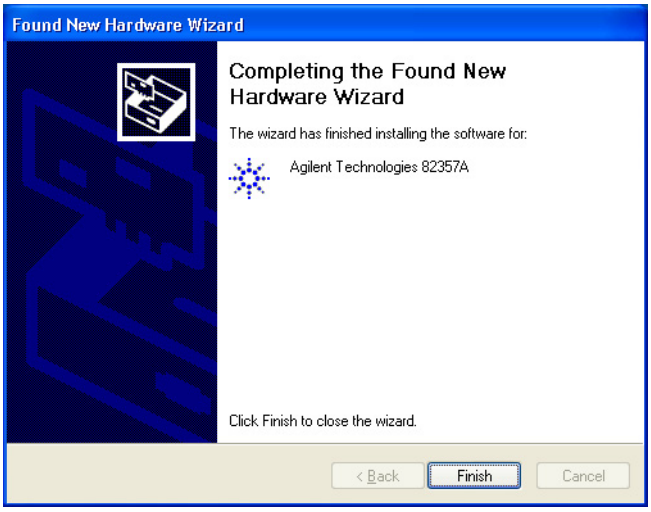


Figure 48 Hardware Wizard completion.

12 Start the IO Config Utility by clicking in the IO Icon 

and choose **Agilent Connection Expert**.

13 Uncheck **Show this window at startup** and press **Close Welcome Screen**. The Agilent Connection Expert Main Window is displayed (see Figure 49).

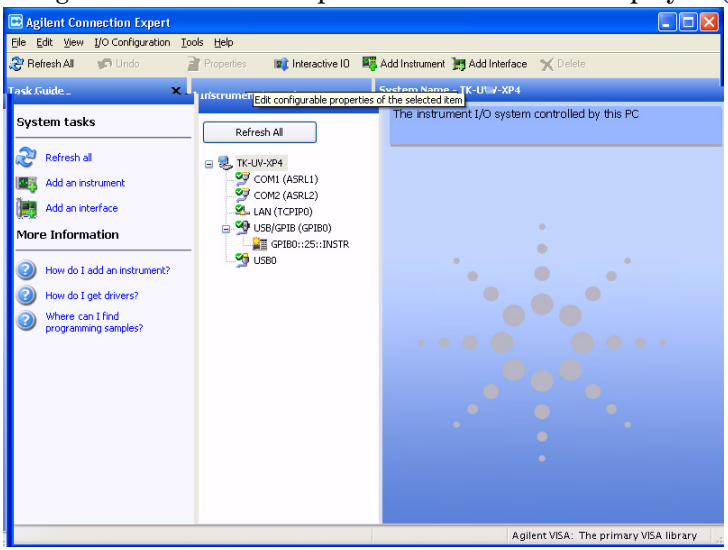


Figure 49 Agilent Connection Expert Main Window 82357 USB-GPIB interface

14 In the Agilent Connection Expert main window select **USB/GPIB (GPIB0)**

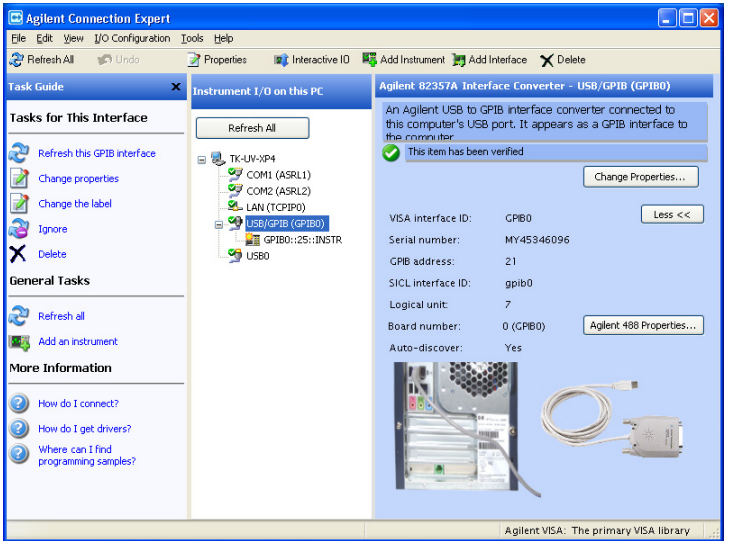


Figure 50 Agilent 82357 default settings

15 Press the **Change Properties...** button. In the Agilent 82357 Interface Converter - USB/GPIB dialog window select or enter the following properties:
VISA interface ID: to **GPIB0**,
GPIB address: to **30**,
SICL Interface ID: to **hp82341**,
uncheck **Auto-discover instruments connected to this interface** (see Figure 51)

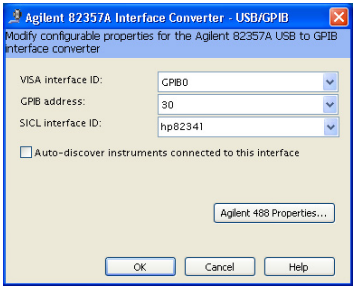


Figure 51 Agilent 82357 Interface configuration

NOTE The appearance of the dialog slightly differs depending on the type of USB-GPIB converter interface.

NOTE You need to type in the SICL interface ID *hp82341* with lower case letters.

16 Select **OK** to close the interface configuration dialog and use the **File** menu's **Exit** command to quit the Agilent Connection Expert.
Your GPIB library installation and 82357 interface configuration is complete.

Upgrading Existing IO Libraries

Upgrading IO Libraries under Windows XP

Follow the installation procedure described “Installing New IO Libraries” on page 84. The existing library will be automatically removed.

Working with your Agilent IO Libraries

For details about the Agilent IO Libraries Suite please refer to the additional documentation provided.

To access the documentation, click on the IO Icon 

of the notification area of the Taskbar, choose **Documentation** and select the type of information you need (see Figure 52).

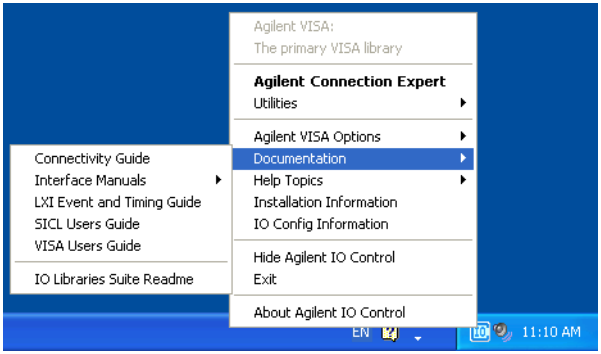


Figure 52 Agilent IO Libraries Suite Documentation access.

Troubleshooting

Missing files during installation

During installation is might be possible that the system is looking for some IO installation files which are not copied during the installation process. In this case the repair option of the Agilent IO Libraries Suite should be used.

1 Start the **Control Panel**'s **Add or Remove Programs** dialog.

2 In the **Add or Remove Programs** dialog select Agilent IO Libraries Suite and press the **Change/Remove** button. After a few seconds of preparation the **Agilent IO Libraries Suite - InstallShield Wizard** is displayed (see Figure 53).

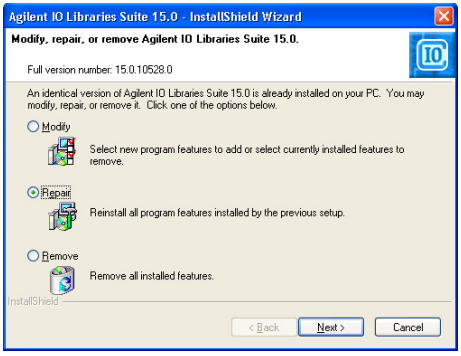


Figure 53 Agilent IO Libraries Suite InstallShield Wizard

3 Select the **Repair** option and press **Next**. Wait until the repair process is finished.

4 Press **Finish** to complete the repair (see Figure 54).

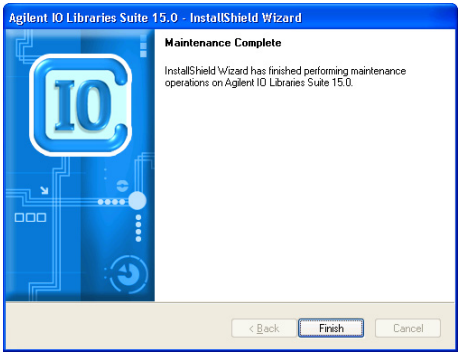


Figure 54 Agilent IO Libraries Suite Maintenance complete.

Problems with Plug and Play option GPIB cards

Operation systems using Plug and Play may show problems during the installation of the appropriate drivers for the GPIB (PCI) cards.

In order to overcome plug and play related problems please follow the steps to install the card successfully.

1 If already installed, un-install the Agilent IO Libraries from **Control Panel, Add/Remove Programs**.

2 Remove the GBIB Interfaces (if installed) listed under the Device Manager and shut down the computer.
Control Panel, double-click **System, Hardware Tab**,
Device Manager, GPIB Interfaces

3 Physically remove the GPIB card from the computers PCI Interface.

4 Restart the computer and log on to the system. Install the Agilent IO Libraries Suite.
Do not configure the card this time and shut down the computer.

5 Install the GPBI card again and turn on the computer - the new hardware found wizard will indicate that a PCI card is found. Select the second choice to search from a list of known devices and there select the option for Agilent Technologies, since the IO Libraries are already installed.

6 If the new hardware wizard does not run, check the device manager to verify that the GPIB interface is listed and installed correctly.

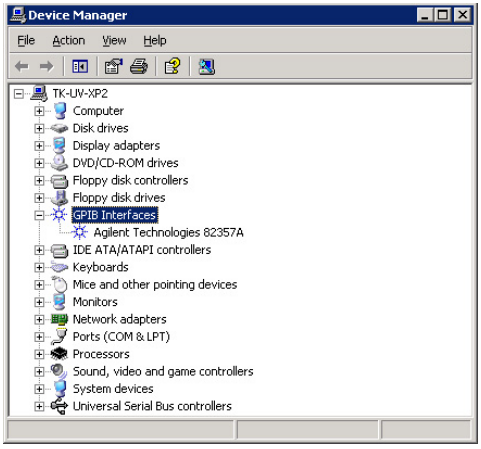


Figure 55 Device Manager GPIB Interfaces

7 To configure the GPIB card please follow the instructions stated in "Configuring the Agilent 82350 GPIB Interface" on page 88 or "Configuring the Agilent 82357 USB - GPIB Interface" on page 94.

Changing the GPIB Address of the Spectrophotometer

This section describes how to set/change the GPIB address of the Agilent 8453 spectrophotometer.

NOTE GPIB addresses are only applied in configurations using GPIB connection to the 8453 spectrophotometer.
In a LAN connection the GPIB address is not used.

The connector for the interface is located on the rear panel of the spectrophotometer. Next to the connector is an address and control switch module. This module is shown in (see Figure 56).

The address switches are set at the factory to a default GPIB address of 25 (in fact, the binary equivalent of 25).

NOTE The GPIB address 25 is also used as the default in the installation of the UV-visible ChemStation software.

To change the GPIB address of your Agilent 8453 spectrophotometer:

1 Turn-off your spectrophotometer.

2 On the spectrophotometer's configuration switch module, make sure switches 1 and 2 are in the down position for GPIB address definition and set the switches 3 through 8 for the appropriate address, see Table 5.

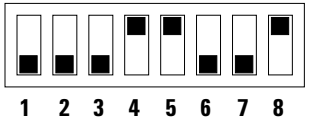


Figure 56 Configuration Switch Module

3 Remove any objects (for example, cuvettes, flow cells) from the light path and turn on the line power to the spectrophotometer. This action stores the GPIB address in the non-volatile memory.

The address will remain unchanged in the non-volatile memory until a new address is set on the DIP switches and the instrument is power-cycled again.

CAUTION Make sure that the GPIB address does not conflict with other instruments connected to the same GPIB controller and the GPIB address of the controller itself.
In our configuration the GPIB address 30 is used for the controller.

GPIB Address Settings

Use Table 5 and Table 6 to find the switch settings for the GPIB address of your Agilent 8453 spectrophotometer.

Table 5 GPIB Address Switch Settings (Addresses 0 Through 15)

Address	1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	1	0
3	0	0	0	0	0	0	1	1
4	0	0	0	0	0	1	0	0
5	0	0	0	0	0	1	0	1
6	0	0	0	0	0	1	1	0
7	0	0	0	0	0	1	1	1
8	0	0	0	0	1	0	0	0
9	0	0	0	0	1	0	0	1
10	0	0	0	0	1	0	1	0
11	0	0	0	0	1	0	1	1
12	0	0	0	0	1	1	0	0
13	0	0	0	0	1	1	0	1
14	0	0	0	0	1	1	1	0
15	0	0	0	0	1	1	1	1

WARNING **Switches 1 and 2 are used for factory firmware settings. Do not change these switches. Any changes could result in instrument failure. To recover, set switches 1 and 2 to position 0 and power-cycle the instrument. For more detailed information, see the *Service Manual*.**

Table 6 GPIB Address Switch Settings (Addresses 16 Through 31)

Address	1	2	3	4	5	6	7	8
16	0	0	0	1	0	0	0	0
17	0	0	0	1	0	0	0	1
18	0	0	0	1	0	0	1	0
19	0	0	0	1	0	0	1	1
20	0	0	0	1	0	1	0	0
21	0	0	0	1	0	1	0	1
22	0	0	0	1	0	1	1	0
23	0	0	0	1	0	1	1	1
24	0	0	0	1	1	0	0	0
25	0	0	0	1	1	0	0	1
26	0	0	0	1	1	0	1	0
27	0	0	0	1	1	0	1	1
28	0	0	0	1	1	1	0	0
29	0	0	0	1	1	1	0	1
30	0	0	0	1	1	1	1	0
31	0	0	0	1	1	1	1	1

7
LAN Communication, Installation, Connection and Configuration

Installing and Configuring TCP/IP on the PC 116
Installing the LAN Interface in your Agilent 8453 Spectrophotometer 123
Connecting Agilent 8453 Spectrophotometer(s) to the PC 124
Using the Agilent BootP Service 126
Using the Agilent ChemStation Configuration Editor to Configure the Agilent 8453 Spectrophotometer 135
Troubleshooting LAN Communication 139

The first five sections of this chapter describe all necessary installations, connections and configurations of the LAN communication.

The last section of this chapter helps you if the LAN communication does not work properly.

Installing and Configuring TCP/IP on the PC

If you connect your Agilent 8453 using a standard LAN connection, you must ensure proper communication between the PC and the instrument. The communication uses the TCP/IP protocol, that needs to be installed as a network protocol on your PC.

NOTE If you are using a LAN, please make sure that no conflict arises by assigning an IP address to both the PC and the instrument. Ask your responsible IT consultant for help.

According to your operating system applied continue with:

- Installation of the TCP/IP protocol using Windows XP. 117
- Installation of the TCP/IP protocol using Windows Vista or Windows 7. 120

Installation of the TCP/IP protocol using Windows XP.

1 Select **Start** > **Settings** > **Network Connections**, right click **Local Area Connection** and select **Properties**.

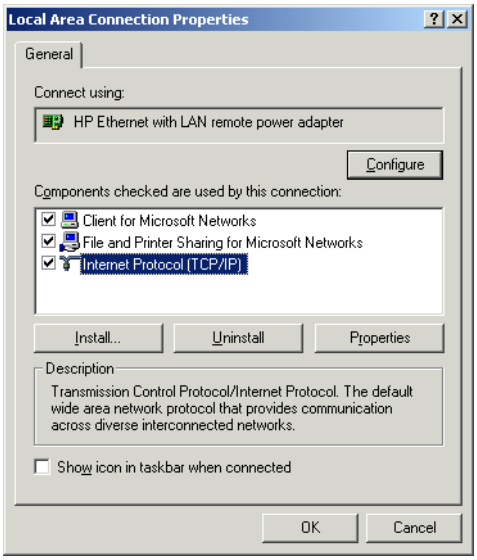


Figure 57 Local Area Connection Properties

2 In the '**Local Area Connection Properties**' dialog (see Figure 57) click the **Configuration** button to make sure the device is working properly.

NOTE If the device is not working properly or no network interface card is configured, please refer to the hardware manual of your network card and the PC for how to install and configure a network interface card.

3 In the '**Components checked are used for this connection:**' section of this dialog make sure the '**Internet Protocol (TCP/IP)**' is available and checked.

NOTE

If the TCP/IP protocol is not installed, use the **Install** button, select **Protocol** from the list of network components to install and press **Add**. From the '**Manufacturers:**' select '**Microsoft**' and from the '**Network Protocol:**' select the '**Internet Protocol (TCP/IP)**' and press '**OK**'. If required, reboot your computer.

4 Select the '**Internet Protocol (TCP/IP)**' and press the '**Properties**' button.

NOTE

If the PC is connected to your companies LAN, do not change any setting. Note down the '**Subnet Mask**' if available. Ask your responsible IT consultant for this mask if not available and request a fixed IP address for your instrument, if you want to use the existing LAN for the instrument connection.
For further details please see"Connecting Agilent 8453 Spectrophotometer(s) to the PC".

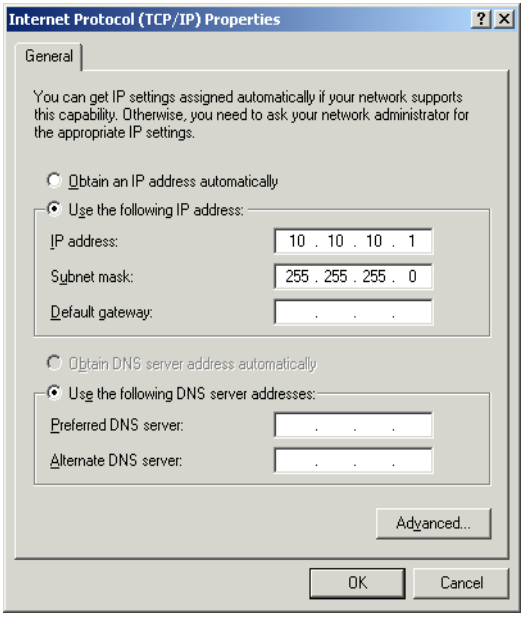


Figure 58 Internet Protocol (TCP/IP) Properties

5 In the 'Internet Protocol (TCP/IP) Properties' dialog (see Figure 58) select the option '**Use the following IP address**' and enter your computer's '**IP Address**' and '**Subnet Mask**'.

   a If the system is on an isolated LAN, the following defaults can be used: 192.168.254.10 for the PC IP address, and 255.255.255.0 for the subnet mask. (note: to use these defaults, DIP switches 5 and 6 on the LAN card must be "ON").

NOTE Gateway, DNS and WINS IP addresses do not need to be configured if you do not connect to any other part of a network.

6 Turn off the Microsoft Windows Firewall and reboot the computer.

Installation of the TCP/IP protocol using Windows Vista or Windows 7.

1 Select **Start** > **Control Panel> Network and Sharing Center.** In the **Tasks** list click on **Manage network connections**. In the **LAN or High-Speed Internet** list right click on your LAN adapter icon and select **Properties**.

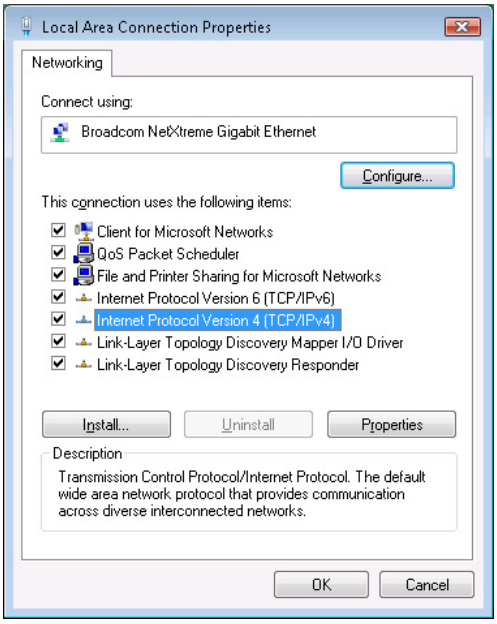


Figure 59 Local Area Connection Properties

2 In the '**Local Area Connection Properties**' dialog (see Figure 59) click the **Configure...** button to make sure the device is working properly.

NOTE If the device is not working properly or no network interface card is configured, please refer to the hardware manual of your network card and the PC for how to install and configure a network interface card.

3 In the '**This connection uses the following items:**' section of this dialog make sure the '**Internet Protocol Version 4(TCP/IPv4)**' is available and checked.

NOTE

If the TCP/IP protocol is not installed, use the **Install** button, select **Protocol** from the list of network components to install and press **Add**.
From the '**Manufacturers:**' select '**Microsoft**' and from the '**Network Protocol:**' select the '**Internet Protocol Version 4(TCP/IPv4)**' and press '**OK**'. If required, reboot your computer.

4 Select the '**Internet Protocol Version 4(TCP/IPv4)**' and press the '**Properties**' button.

NOTE

If the PC is connected to your companies LAN, do not change any setting. Note down the '**Subnet Mask**' if available. Ask your responsible IT consultant for this mask if not available and request a fixed IP address for your instrument, if you want to use the existing LAN for the instrument connection.
For further details please see"Connecting Agilent 8453 Spectrophotometer(s) to the PC".

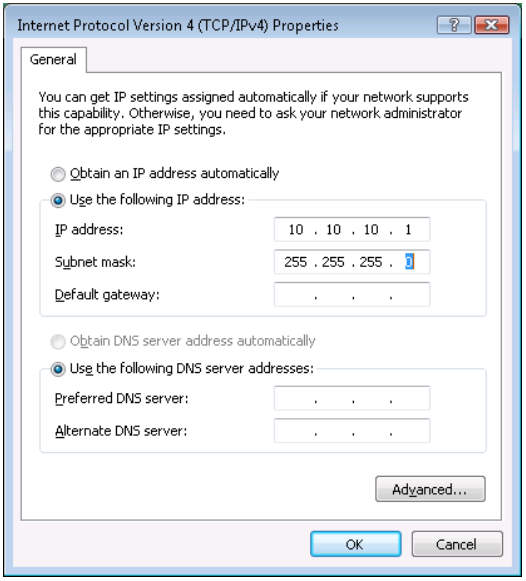


Figure 60 Internet Protocol Version 4(TCP/IPv4) Properties

5 In the '**Internet Protocol Version 4 (TCP/IPv4) Properties**' dialog (see Figure 60) select the option '**Use the following IP address**' and enter your computer's '**IP Address**' and '**Subnet Mask**'.

   a If the system is on an isolated LAN, the following defaults can be used: 192.168.254.10 for the PC IP address, and 255.255.255.0 for the subnet mask. (note: to use these defaults, DIP switches 5 and 6 on the LAN card must be "ON").

NOTE Gateway, DNS and WINS IP addresses do not need to be configured if you do not connect to any other part of a network.

6 Turn off the Microsoft Windows Firewall and reboot the computer.

Installing the LAN Interface in your Agilent 8453 Spectrophotometer

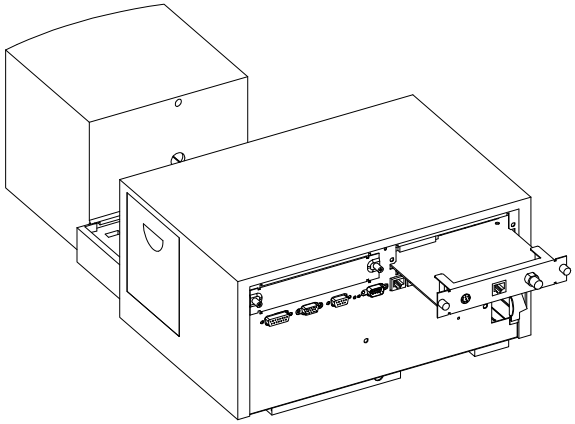
The JetDirect card (G1846A) and the TalkToLab card (G1369A) are the LAN interfaces used to physically connect the Agilent 8453 spectrophotometer to the PC via a LAN cable. To install the LAN interface card:

1 Switch off the Agilent 8453 spectrophotometer.

2 Remove the metal cover at the upper right of the rear panel.

3 If the system is on an isolated LAN, the following defaults can be used: 192.168.254.10 for the PC IP address, 255.255.255.0 for the subnet mask, and 192.168.254.11 for the 8453. (note: to use these defaults, DIP switches 5 and 6 on the LAN card must be "ON").

4 Plug the LAN interface card into the slot and screw down the two mounting screws.



WARNING **Do not connect the LAN interface of your PC to the CAN interface of the Agilent 8453 spectrophotometer, otherwise the LAN interface of the PC will be seriously damaged, because the operating voltage of the CAN interface (12 V) is higher than the operating voltage of the LAN interface (5 V).**

Connecting Agilent 8453 Spectrophotometer(s) to the PC

This section describes how to setup the connection between your instrument(s), and the PC. If you are going to connect to an existing LAN, please contact your system administrator for further assistance.

WARNING **Do not connect the LAN interface of your PC to the CAN interface of the Agilent 8453 spectrophotometer, otherwise the LAN interface of the PC will be seriously damaged, because the operating voltage of the CAN interface (12 V) is higher than the operating voltage of the LAN interface (5 V).**

NOTE A LAN connection requires the Agilent 8453 spectrophotometer to have firmware revision A.03.30 or higher.

Single Instrument Installation

In a single instrument installation, only one Agilent 8453 spectrophotometer is connected to the PC's LAN interface. In this configuration, only the black 10 ft. long *crossover* twisted pair cable (part number 5183-4649) can be used, which is supplied with the Agilent UV-visible ChemStation software.

NOTE Do not use the standard (non-crossover) Ethertwist 10BaseT cable supplied with the LAN interface card G1846A for direct single instrument connection.

Multiple Instrument Installation

If you want to connect more than one Agilent 8453 spectrophotometer to the Agilent ChemStation PC or if the PC needs to connect to a network using the same network connection, a hub (for example the G2402A 8 port hub) is required. The hub G2402A comes with one standard EtherTwist 10BaseT cable that is used for the connection to the PC. Use the standard EtherTwist 10BaseT cable (part number G1530-61485) provided with the LAN interface cards to connect the hub to the spectrophotometer.

NOTE Do not use the black 10 ft. long crossover twisted pair cable (part number 5183-4649) in an installation with multiple instruments.

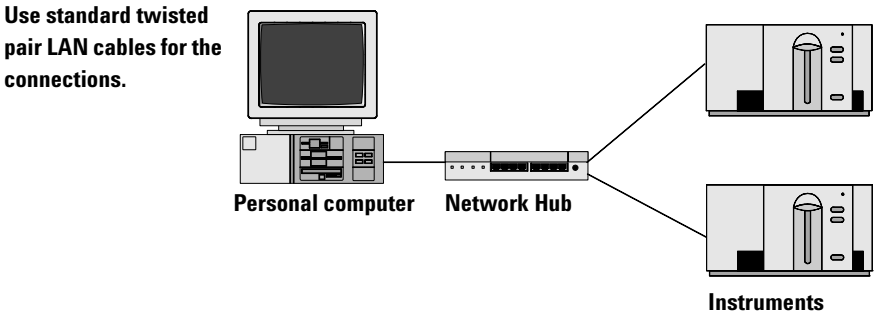


Figure 61 LAN Connection Using a Hub

Setting the IP Address of the Agilent 8453 Spectrophotometer

The IP address of the LAN interface card inserted to the Agilent 8453 spectrophotometer can be assigned by using the Agilent bootp service. This service assigns the LAN interface card with a configured IP address, each time an IP address is requested. Refer to the next section "Using the Agilent BootP Service" on page 126.

NOTE If the system is on an isolated LAN and the default IP address 192.168.254.11 for the 8453 is used, BootP is not necessary.

Using the Agilent BootP Service

What is the Agilent BootP Service?

NOTE If the system is on an isolated LAN and the default IP address 192.168.254.11 for the 8453 is used, BootP is not necessary.

The Agilent **Boot**strap **P**rotocol Service, acronym BootP Service, provides central administration of IP addresses for Agilent instruments on a LAN. The service runs on the instrument LAN PC, which must be running TCP/IP network protocol and cannot run a DHCP server/service or another BootP Service.

When an instrument is powered on, an Agilent LAN interface card in the instrument broadcasts a request for an IP address or Host Name and provides its hardware address as an identifier. The request may continue for up to 5 minutes. The Agilent BootP Service answers this request and passes a previously defined IP address and Host Name associated with the hardware address to the requesting instrument.

In case of the instrument on the LAN, the G1369A LAN card used to connect the Agilent 8453 to the LAN does not store any settings, so each time the instrument is powered on the card sends a request to the network for an IP address and setting information. The implementation of the BootP protocol on the G1369A LAN card conforms to RFC 951 and RFC 1048.

In order to provide this information to the card, the BootP Service must be operational before the card sends the request and the BootP Service must be configured to know the hardware address (also called **M**edia **A**ccess **C**ontrol, acronym MAC address) of the LAN interface card. Multiple LAN interface cards can be configured by means of a single BootP Service.

If your network is already using a BootP Service, please refer to section "Configuring the G1369A LAN Card Using BootP" on page 133. If you do not have a BootP Service, we suggest to use the Agilent BootP Service program supplied on the Agilent UV-visible ChemStation CD-ROM.

Addresses

Before installing and configuring BootP Service, you must know the IP addresses of the computer and instruments, the subnet mask, and the gateway.

Table 7 Example

Device	Address
PC	10.10.10.1
8453	10.10.10.101
Subnet mask	255.255.255.0
Gateway	10.10.10.1

Using the Agilent BootP Service Program

The Agilent BootP Service program allows configuring the LAN interface card. Within the Launch Manager of the program you can easily add a MAC address and IP address pair to the configuration. The Launch Manager is displaying a list of the currently configured MAC address and allows modification of the current configured settings.

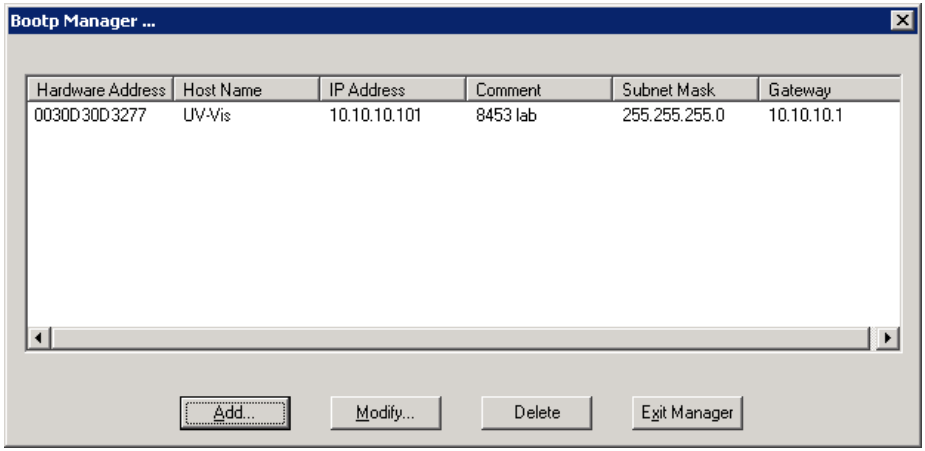


Figure 62 Configured interfaces view of the Agilent BootP Service

Configure the Agilent BootP Service Program

NOTE If the system is on an isolated LAN and the default IP address 192.168.254.11 for the 8453 is used, BootP is not necessary.

Before configuring BootP Service, you must know the IP addresses of the computer and instruments, the subnet mask, and the gateway. The MAC or hardware address of aLAN interface is a world wide unique identifier. No other network device will have the same MAC address. The MAC address is printed on the card or can be read out during the configuration procedure:

NOTE If the PC has been rebooted after installing the Agilent BootP Service, the Agilent BootP Service is started automatically during the next startup of the system. To change BootP settings, the service must be stopped, the changes made, then restarted. The details are documented within this section.

Determine your MAC Address

Determine the MAC address of the LAN card installed. The number is engraved in the board.

Write down the MAC address before installing the card into the module. To remove the card from the system, turn the module off before removing the LAN card. Read the MAC address from the label. Reinstall the card and turn on the module again.

Using the Launch Manager

1 To add the instrument to the network go to **Start** > **Programs** > Agilent BootP Service>Edit BootP Settings. The BootP Settings screen appears.

2 Uncheck **Do you want to log BootP requests?**

3 Click **Launch Manager**. The **BootP Manager** screen appears.

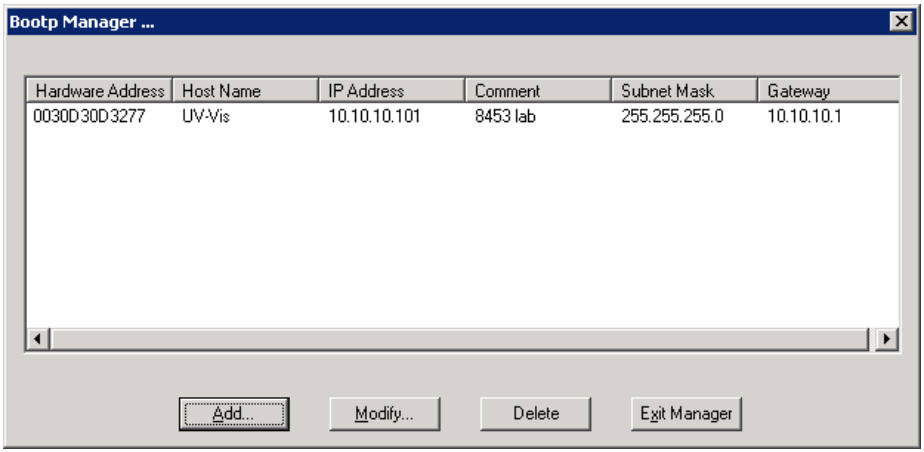


Figure 63 Configured interfaces view of the Agilent BootP Service

4 Click **Add....** The Add BootP Entry screen appears.

5 Make the following entries for your instrument:

- MAC Address
- Host Name
- IP Address
- Comment, if desired
- Subnet Mask
- Gateway Address

6 Click **OK**.

7 Exit **Launch Manager** and power cycle both the PC and the 8453.

8 Ping the IP address from a command prompt on the PC to verify.

Configure the Agilent BootP Service

BootP Service starts automatically when your PC reboots. In order to add an additional instrument or to change the configuration the service must be stopped. After the changes have been applied, the service must be restarted.

1 To stop the BootP service go to **Start > Settings >Control Panel** and select **Administrative Tools** > **Services**. The Services window appears.

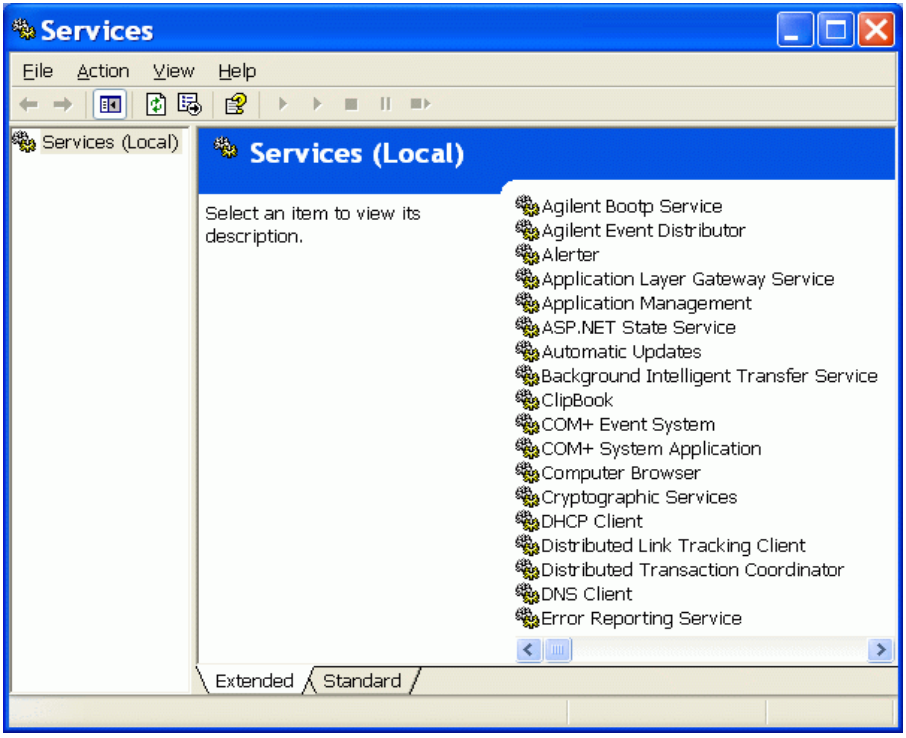


Figure 64 Services window

2 Right click **Agilent BootP Service**.

3 Select **Stop**.

4 Close the **Services** and **Administrative Tools** windows.

5 To edit the BootP Settings go to **Start >All Programs** > **Agilent BootP Service** > **Edit BootP Settings**. The **BootP Settings** screen appears.
When this screen opens the first time, the default settings from installation are displayed.

6 To edit the TabFile you have to select **Maintain bootp tabfile?**
The default tab file was created at installation and is located at **Program Files\Common Files\Agilent Shared\BootP\bin\TabFile.** It contains configuration information entered on this screen.

If necessary you can

- change the **BootPtab File Location** by using the browse button on the right (a valid BootP tabfile must exist).
- create your own template for the tabfile by selecting **Create template BootP tabfile?** and click **Create Template.**

7 Check **Do you want to log bootp requests?**
The default log file was created at installation and is located at **Program Files\Common Files\Agilent Shared\BootP\bin\LogFile.** It contains an entry for every time a device requests configuration information from BootP.

If necessary you can change the **BootPlog File Location** by using the browse button on the right (a valid BootP tabfile must exist).

8 Perform your necessary changes by e.g. creating a log file entry of a new instrument and edit the new instrument using the **Launch Manager**.

9 Uncheck **Do you want to log bootp requests?**

10 Click **OK** to save the values or **Cancel** to discard them. The program ends.

11 To restart the BootP Service o to Start>Settings>Control Panel and select Administrative Tools>Services. The Service screen appears.

12 Right click **Agilent BootP Service**.

13 Select **Start**.

14 Close the Services and Administrative Tools screen.

15 This completes the configuration.

Configuring the G1369A LAN Card Using BootP

In order for an internal G1369A LAN card to use BootP, the default setting: bootp=YES must be set. For more details please see the user manual of your G1369A LAN interface card.

To change the setting, the card must be reset; this is done each time the instrument with the G1369A LAN card inserted is power cycled.

The Agilent BootP Service uses a file called bootptab were all the configuration information is stored. The BootP Service program on the Agilent ChemStation CD-ROM allows easy editing of the bootptab file. If a BootP Service is already installed, the following information must be supplied to the system administrator to be able to correctly set up the bootptab file.

```
# CAG Bootptab file
# global defaults
global.defaults:\
sm=255.255.255.0:\
gw=<gateway address - ask your system administrator>

#8453 lab
UV-Vis:\
ht=1:\
ha=0030D30D3277:\
ip=<ip address - ask your system administrator>
sm=255.255.255.0:\
gw=<gateway address - ask your system administrator>
vm=auto:\
hn:\
bs=auto:\
T145=64:T146=01:T147=01
```

The entries are described below

- `#8453 lab`
  Comment line starting the configuration set for an Agilent 8453 spectrophotometer. A comment is preceded with #; all characters after the # on the same line are ignored by the BootP Service.
- `UV-Vis:\`
  Host name of the instrument. The host name communication can only be used if a DNS server (Domain name server) is correctly set up for the name or a corresponding entry in the *HOSTS* file exists (windows\system32\drivers\etc\hosts).
- `ha=0030D30D3277:\`
  This is the hardware or MAC address of the G1369A LAN card. It is usually printed on a label attached to the card. If not, see section "Determine your MAC Address" on page 129.
- `ip=<IP address - ask your system administrator>`
  This is the IP address that will be assigned to the card after the BootP request. This IP address must be configured using the Agilent ChemStation Configuration Editor.
- `sm=255.255.255.0:\`
  This is the subnetmask assigned by the BootP request.
- `gw=<gateway address - ask your system administrator>`
  This is the gateway address assigned by the BootP request.
- `T145=64:T146=01:T147=01`
  These parameters configure the buffer handling of the G1369A LAN card. These are required for the instrument on the LAN to work properly and must not be changed.

Different entries for the subnet mask and default gateway might be required, depending on your network setup. These values need to be set by your network administrator.

Using the Agilent ChemStation Configuration Editor to Configure the Agilent 8453 Spectrophotometer

What is the Agilent ChemStation Configuration Editor?

The Agilent ChemStation Configuration Editor is a program that allows the easy configuration of your Agilent UV-visible ChemStation software. This includes

- Detecting the GPIB interface in your PC
- Selecting communication using LAN or GPIB
- Configuring the analytical hardware connected to the PC.
- Configuring the paths used for data storage.
- Configuring color display of the Agilent ChemStation.

Since the Configuration Editor modifies the internal communication module database, the Agilent UV-visible ChemStation must be closed beforehand.

NOTE

If LAN connection is used, Microsoft TCP/IP protocol must be installed and configured, the LAN interface Card must be installed, the Agilent 8453 spectrophotometer has to be connected to the PC, and a bootp server must be installed and configured before the spectrophotometer(s) can be used. See "Installing and Configuring TCP/IP on the PC" on page 116 for details.

Configuring an Agilent 8453 Spectrophotometer

This section describes how to configure an Agilent 8453 spectrophotometer for LAN communication.

1. Start the Agilent ChemStation Configuration Editor by double-clicking on the Configuration Editor icon in the UV-visible ChemStation start-up group, by choosing **Start** > **All Programs** > **UV-Visible ChemStations** > **UV-Vis Configuration Editor**.
2. Select the **Configure->Instruments** menu.
3. Select the **Instrument Type UVVis**, enter an **Instrument Name** for your configuration (e.g. Agilent 8453 UV-Visible System [1]), choose an **Initial Screen Window Size**, and select **OK**.

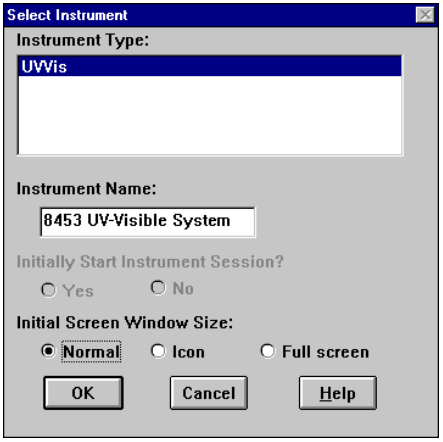


Figure 65 Instrument configuration dialog.

4 If GPIB communication has been setup for the spectrophotometer, the following screen will come up (25 is the default GPIB address).

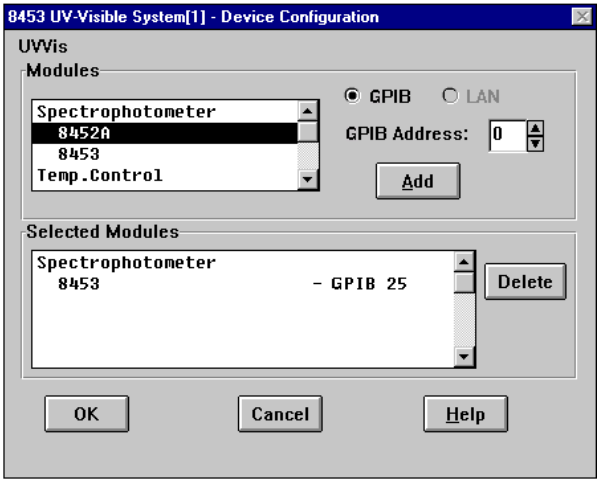


Figure 66 Device configuration dialog (GPIB interfacing)

In this case select the Spectrophotometer 8453 - GPIB 25 entry in the Selected Modules tab and click on **Delete** to delete the selected module.

5 Select **Spectrophotometer 8453** in the **Modules** tab, mark the **LAN** radio button, and click on **Add** to add to the **Selected Modules** box.

6 Select Identify by IP Address and type in the IP address of the LAN interface card. (If a DNS server is installed you can also define the host name.)

7 Select **OK** to exit and to return to the Device Configuration dialog box, which now should look like this:

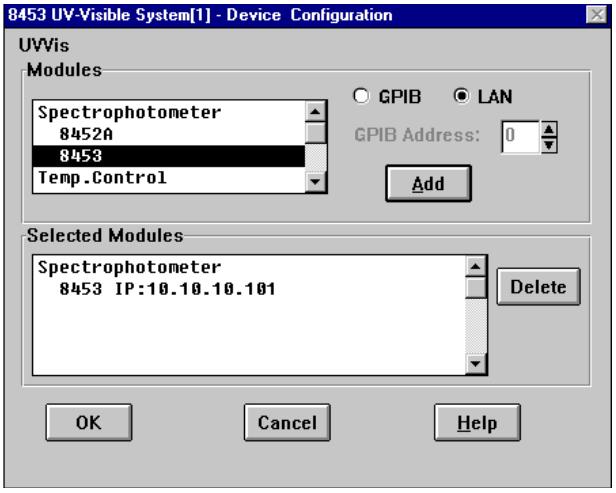


Figure 67 Device configuration dialog (LAN interfacing)

8 Select **OK** to exit the Device Configuration dialog box and save your configuration changes by selecting **File** > **Save**.

9 Exit the Configuration Editor by selecting **File** > **Exit**.

10 Reboot the PC and power cycle the 8453.

11 Wait until the front panel LED on the 8453 turns green. Then start the Agilent ChemStation to check if the software communicates with the spectrophotometer. In case the red error message line Power Fail shows up, refer either to the following troubleshooting section or repeat the installation procedure.

Troubleshooting LAN Communication

Power fail reported on the Agilent ChemStation

If your Agilent ChemStation can not connect to the spectrophotometer using LAN communication, please perform the following troubleshooting steps.

Verify that basic communication is possible

Use the ping command, to verify that the IP address is operational.

1. From the Start menu in the taskbar, select **Start** > **Run...**. In the **Open:** field type *cmd.exe* and press **Enter**.
2. Type **ping <IP-number>** and press **Enter** to verify communication of the LAN Interface Card and the LAN interface in your PC. <IP- number> needs to be replaced by the appropriate IP address (e.g. 10.10.10.101) or host name.
3. The command ping will send a request for reply to the IP address, bypassing part of the Windows TCP/IP settings. A successful ping would look like this:

   ```
   Reply from 10.10.10.101: bytes=32 time<10ms TTL=128
   ```

   If the message request timed out is displayed, the IP address can not be reached by the ping command.
4. If the ping request was answered successfully by the instrument, you need to verify that your Windows TCP/IP settings are correct for the selected network, especially the subnet mask and gateway settings should be checked.

Identify by host name

If you identify the Agilent 8453 system by host name, ensure that the used host name and IP address are correctly setup in the DNS server. Try using the IP address in the Configuration Editor.

Verify that the LAN Interface card is correctly configured

To ensure that all parameters of the LAN interface card are set correctly, use the Agilent BootP Service program from the Agilent UV-visible ChemStation CD-ROM and disable any other means that configure the LAN interface card of the instrument. Install the bootp service as described in section "Using the Agilent BootP Service" on page 126 and configure it for the MAC address of the LAN interface card.

DHCP server

Make sure that no DHCP server runs in the same subnet as the instrument(s), as these servers also may respond to a bootp request and do not set the buffer handling of the LAN interface card correctly, i.e. T145=64:T146=01:T147=01. They also may assign a different IP address to the instrument each time it is started.

NOTE If a DHCP server is running in the same subnet, make sure that fixed IP addresses are reserved for your instruments. Ask you IT consultant to make sure that no IP address conflict may occur.

Frequent buffer overrun in Agilent 8453 logbook

Please contact your system administrator, to check if the network is not capable of the network traffic induced due to the data acquisition of the instrument(s). This can also be caused by an incorrectly configured buffer handling of the LAN interface card (correct settings: T145=64:T146=01:T147=01).

A
Safety Information

Safety Information 142
Solvent Information 145
Lithium Batteries Information 147
Agilent Technologies on Internet 148

Safety Information

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

General

This is a Safety Class I instrument (provided with terminal for protective earthing) and has been manufactured and tested according to international safety standards.

Operation

Before applying power, comply with the installation section. Additionally the following must be observed.

Do not remove instrument covers when operating. Before the instrument is switched on, all protective earth terminals, extension cords, auto-transformers, and devices connected to it must be connected to a protective earth via a ground socket. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in serious personal injury. Whenever it is likely that the protection has been impaired, the instrument must be made inoperative and be secured against any intended operation.

Make sure that only fuses with the required rated current and of the specified type (normal blow, time delay, and so on) are used for replacement. The use of repaired fuses and the short-circuiting of fuseholders must be avoided.

Some adjustments described in the manual, are made with power supplied to the instrument, and protective covers removed. Energy available at many points may, if contacted, result in personal injury.

Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided as much as possible. When inevitable, this should be carried out by a skilled person who is aware of the hazard involved. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present. Do not replace components with power cable connected.

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

Do not install substitute parts or make any unauthorized modification to the instrument.

Capacitors inside the instrument may still be charged, even though the instrument has been disconnected from its source of supply. Dangerous voltages, capable of causing serious personal injury, are present in this instrument. Use extreme caution when handling, testing and adjusting.

Safety Symbols

Table 8 Safety Symbols used on Instruments and in Manuals

Symbol	Description
	The apparatus is marked with this symbol when the user should refer to the instruction manual in order to protect the apparatus against damage.
	Indicates dangerous voltages.
	Indicates a protected ground terminal.
	Eye damage may result from directly viewing light produced by deuterium lamps used in detectors and spectrophotometers. Always turn off the deuterium lamp before opening the lamp door on the instrument.

WARNING **A warning alerts you to situations that could cause physical injury or damage to the equipment. Do not proceed beyond a warning until you have fully understood and met the indicated conditions.**

CAUTION A caution alerts you to situations that could cause a possible loss of data. Do not proceed beyond a caution until you have fully understood and met the indicated conditions.

Solvent Information

Observe the following recommendations on the use of solvents.

Flow Cells

Avoid the use of alkaline solutions (pH > 9.5) which can attack quartz and thus impair the optical properties of flow cells.

Solvents

Always filter solvents, small particles can permanently block capillaries. Avoid the use of the following steel-corrosive solvents:

- Solutions of alkali halides and their respective acids (for example, lithium iodide, potassium chloride, and so on).
- High concentrations of inorganic acids like nitric acid, sulfuric acid especially at higher temperatures (replace, if your analysis method allows, by phosphoric acid or phosphate buffer which are less corrosive against stainless steel).
- Halogenated solvents or mixtures which form radicals and/or acids, for example:

  $2CHCl_3 + O_2 \rightarrow 2COCl_2 + 2HCl$

  This reaction, in which stainless steel probably acts as a catalyst, occurs quickly with dried chloroform if the drying process removes the stabilizing alcohol.
- Analysis-grade ethers, which can contain peroxides (for example, THF, dioxane, di-isopropylether) such ethers should be filtered through dry aluminium oxide which adsorbs the peroxides.

- Solutions of organic acids (acetic acid, formic acid, and so on) in organic solvents. For example, a 1-% solution of acetic acid in methanol will attack steel.
- Solutions containing strong complexing agents (for example, EDTA, ethylene diamine tetra-acetic acid).
- Mixtures of carbon tetrachloride with 2-propanol or THF.

Lithium Batteries Information

WARNING **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer.**

Do not dispose of lithium batteries in domestic waste.

Transportation of discharged lithium batteries through carriers regulated by IATA/ICAO, ADR, RID, IMDG is not allowed. Discharged lithium batteries must be disposed of locally according to national waste disposal regulations for batteries.

Agilent Technologies on Internet

For the latest information on products and services visit our worldwide web site on the Internet at:

http://www.agilent.com/chem

Index

A

accessory boards slot, 26
accurate results, 38
acetic acid, 45
acetone, 45
acetonitrile, 45
adding new instruments, 76
additional qualification, 34
address switch module, 111
Agilent 8453
  controller area network (CAN), 136
Agilent 8453 IP addresses, 125
Agilent UV-visible ChemStation
  configuration, 137
air circulation, 21
air for cooling, 20
ambient stray light, 23
ambient temperatures, 21
analytes, 38
apertured cells or cuvettes, 41
apertures, 47
automated self-test, 35

B

baseline noise, 34
benzene, 45
blank, 38, 48
blank pushbutton, 25
bootp server, 126
bubble formation, 46
buffer handling, 134

C

cable
  GPIB, 82
CAN
  Agilent 8453, 136
CAN bus, 26
carbon disulfide, 45
carbon tetrachloride, 45
chloroform, 45
cleaning cells, 43
colloidal dispersions, 46
common solvents, 45
computer video socket, 29
configuration editor, 75, 136
configuration switch
  8-bit configuration switch, 26
configuration switch module, 27
connecting power to your
  spectrophotometer, 27
connecting tubing, 53
consumption (line power), 19
contents of shipping container, 22
control switch module, 111
controller area network
  Agilent 8453 Series, 136
cooling air, 20
cut-off filter, 47
cut-off wavelength, 47
cyclohexane, 45
cyclopentane, 45

D

default address, 27
degassed, 46
device configuration, 75
device configuration dialog, 137
dimethyl formamide, 45
dimethyl sulfoxide, 45
DIP switches, 112
dirty filters, 63
display, 29
dust, 46

E

electronic self tests, 32
entrapment of bubbles, 42
error condition, 24, 25
ethyl acetate, 45
ethyl ether, 45
excessive noise, 34

F

factory firmware settings, 113
fan, 32
flow cell, 42
flow cells, 50
frequency (line power), 19
front panel indicator, 24
front panel pushbuttons, 25
front view, 23
fuses, 19

G

general purpose input/output
  connector, 26
glass cells, 39
glycerol, 45
GPIB
  cable, 82
GPIB address, 27
GPIB address definition, 111
GPIB cable, 27
GPIB connector, 26, 27
GPIB switch module, 26

GPIO connector, 26
ground connection, 20

H

handling cells, 44
hardware
  installing, 66
hardware address, 126, 129
highest precision measurements, 42
homogeneity, 48
host name, 134, 139
HPLC grade water, 46
humidity, 21

I

indicator, 32
indicator on front panel, 24
Installation of the TCP/IP protocol using Windows VISTA, 120
Installation of the TCP/IP protocol using Windows XP, 117
installing
  hardware, 66
installing the waste tubing, 28
instrument icons, 34
instrument types in configuration editor, 127
isopropyl alcohol, 45

J

JetDirect card
  Agilent 8453 IP addresses, 125

K

keyboard, 29

L

lamp intensity, 33
lamps start turning on, 32
LAN, 123
LAN adapter
  JetDirect card, 123
  TakkToLab card, 123
Lan Adapter, 123
lens tissues, 43
license registration number, 72
light beam, 40, 43
line frequency, 19
line power consumption, 19
line power input socket, 26
line power supply, 19
line power switch, 24
line voltage, 19
liquid samples, 38

M

MAC address, 126, 129, 134
magnetic impeller, 54
magnetic induction stirring, 54
making measurements, 38
methanol, 45
methyl formate, 45
MIO board slot, 26
mouse, 29
multicell connector, 26
m-xylene, 45

N

n-butyl alcohol, 45
n-hexane, 45
non-volatile memory, 112

O

offline mode, 34
online mode, 34
operating
  conditions, 21
optical filter, 47
optical self tests, 32
optical specifications of cells, 40
optical surfaces, 43

P

parallelism, 40
particulate matter, 46
passivating new cells, 43
photochemical reactions, 47
photodegradation, 47
photographic lens tissues, 63
photosensitive substances, 47
pipette, 44
plastic sample cells, 39
poor linearity, 41
poor photometric accuracy, 41
power consumption, 19
power supply, 19
power switch, 24
printer cable, 29
proper operating condition, 34
pushbuttons, 25
pyridine, 45

Q

quartz sample cells, 39

R

rapid absorbance changes, 47
ready to measure, 32
recommended cells, 41
red blinking error condition, 25, 32
red error condition, 24, 32
relative humidity, 21
remote connector, 26
repeat ignition cycle, 32
RS 232 connector, 26

S

safety light switches, 26
sample, 38, 48
sample cell, 38, 46
sample degradation, 62
sample pushbutton, 25
screen element color, 76

selftests, 24
sensitivity, 41
setting up an additional
spectrophotometer, 75
shipping container contents, 22
signal to noise ratio, 47
single beam instrument, 38
sipper system, 42
sipper/sampler system, 46
software certificate and registration
packet, 73
solute convection, 46
solution, 48
solution noise, 46
solvent, 38
solvent suitability, 45
solvents, 45
spikes, 34
stabilize, 33
standard cells, 50
standard pushbutton, 25
standard single-cell cell holder, 50
stirring, 46
stirring module, 47
stop pushbutton, 25
stoppered sample cell, 46
stray light, 23
sulfuric acid, 45
supply (line power), 19
switches
power, 27

T

TalkToLab, 123
temperature control, 46
temperature fluctuations, 21
temperatures, 21
thermal equilibrium, 53
thermostattable cell holder, 47
thermostatted water, 53
thermostatted water bath, 52
toluene, 45
trimethylpentane
2,2,4-trimethylpentane, 45
turn on your spectrophotometer, 31
turn-on self-test, 34

U

useful wavelength range of solvents, 45
UV grade water, 46

V

video socket on computer, 29
viscous solutions, 47
volatile solvents, 46
voltage (line power), 19

W

waste container, 28
water, 45
wedge shaped cells, 40

Index

www.agilent.com

In This Book

This handbook describes the steps needed to install your new Agilent 8453 UV-visible spectroscopy system.

Most of the handbook deals with installing a complete system, that is, spectrophotometer, computer and printer. However, in the second half of this handbook you will find additional information about installing mechanical and optical accessories, accessory boards, GPIB connections and configuration, and software installation.

Printed in Australia
07/11

G1115-90040

Agilent Technologies