Agilent Cary 620 FTIR Microscope

User's Guide

Agilent Technologies

Notices

Manual Part Number

8510247400

Edition

Ninth edition, April 2016

Printed in Malaysia

Agilent Technologies Australia (M) Pty Ltd

679 Springvale Road

Mulgrave, Victoria, Australia 3170

www.agilent.com

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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.

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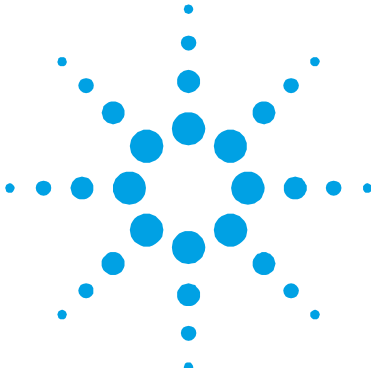

1. Safety Practices and Hazards

Your Agilent Cary 620 FTIR Microscope and accessories have been carefully designed so that when used properly you have an accurate, fast, flexible and safe analytical system.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Information about safety practices appears throughout the documentation (both hard copy and online) provided with your instrument and accessories. Before using the instrument or accessories, you must thoroughly read these safety practices.

Observe all relevant safety practices at all times.

General

Operation of an Agilent Cary 620 FTIR Microscope involves the use of compressed gases, high-voltage energy, and hazardous materials including liquid nitrogen, tungsten-halogen source lamps that emit ultraviolet radiation and a helium-neon Class 2 laser operating in the visible region at 632.8 nanometers. Careless, improper or unskilled use of this microscope can cause death or serious injury to personnel, and/or severe damage to equipment and property.

Develop safe working habits that do not depend upon the correct operation of the interlocks for safe operation. Do not bypass any interlock or cover.

These safety practices are provided to help you operate the instrument safely. Read each safety topic thoroughly before attempting to operate the instrument and **always** operate the spectrometer and microscope in accordance with these safety practices.

Verifying Safe State

The following general safety precautions must be observed during all phases of operation, maintenance and service of this instrument.

To ensure continued safety of the instrument after maintenance or service procedures verify the instrument is returned to a safe state for the user. This includes running performance checks to verify the instruments safety systems are functioning correctly. Check the general condition of the instrument during operation for wear or signs of corrosion that are likely to inhibit function or safety.

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.

Ultraviolet radiation

Tungsten-halogen source lamps (for near-infrared analysis) emit hazardous ultraviolet (UV) radiation. This radiation can cause serious damage to eyes. NEVER look directly at the lamp and always wear appropriate protective equipment and clothing when required.

Cryogenic cooling

Some detectors used with your Agilent Cary 620 FTIR Microscope (FPA, MCT, or InSb detectors) are cryogenically cooled. The liquid nitrogen used in this process is extremely cold (-196 °C, -320.8 °F) and can cause damage to the human body. Use appropriate protective equipment when working with liquid nitrogen.

Compressed gas cylinders

Consult the Agilent Cary 600 Series FTIR Site Preparation Guide for requirements on gas pressures. Compressed gas cylinders contain highly pressurized gas. If storage conditions are outside of the recommended supplier's safety codes, the cylinders can explode or rapidly release gas into the environment. This may result in injury or death.

- Store and handle compressed gases carefully and strictly adhere to local safety codes and regulations.
- Secure cylinders to an immovable structure or wall.
- Store and move cylinders in an upright, vertical position. Before transport, remove regulators and install the cylinder cap.
- Store cylinders in a well-ventilated area away from heat, direct sunshine, freezing temperatures, and ignition sources.
- Clearly mark cylinders so there is no doubt as to their contents.
- Use only approved regulators and connections.
- The installation of compressed or liquid gas supplies must comply with the rules and/or regulations imposed by the local authorities for such use in the workplace.

- Use only clean, dust-free connector tubing that has a pressure rating significantly greater than the highest outlet pressure from the regulator.

Storage

Cylinders containing gas under pressure should be firmly secured to a rigid structure, and the storage area must be adequately ventilated.

Never locate gas cylinders near a source of ignition, or in a position that is subject to direct heat. Gas storage cylinders can include a pressure release device, which will discharge the gas at a predetermined temperature, usually around 52 °C (125 °F).

If gases are to be plumbed from a remote storage area to the instrument site, ensure that the local outlets are fitted with stop valves, pressure gauges and suitable regulators which are easily accessible to the instrument operator. The gas outlets must be provided within 1.5 meters (5 feet) of the instrument.

Electrical hazards

The Agilent Cary 620 FTIR Microscopes and some accessories contain electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices and components can cause death, serious injury, or painful electrical shock.

Good grounding/earthing is essential to avoid a potentially serious electric shock hazard. Ensure that there is an integral ground connection between the metal base of the instrument and accessories and the 3-pin earth-grounded mains socket outlet. Consult the manuals or product labels supplied with your computer, monitor and printer for the relevant grounding requirements.

NOTE The above model is Equipment Class I.

Application of the wrong supply voltage can create a fire hazard and a potentially serious shock hazard, and could seriously damage the Agilent Cary 620 FTIR Microscope, accessories and any attached ancillary equipment. The Agilent Cary 620 FTIR Microscope has a universal power supply that adapts to the supply voltage. However, care must be taken to ensure that the correct voltage is used.

Consult the manuals supplied with your computer, monitor and printer for their specific voltage requirements.

Replace blown fuses with fuses of the size and rating as stipulated in the text adjacent to the fuse holder or in the manuals where listed.

Do NOT use power cords with faulty or frayed insulation. Replace the mains power cord only with a rating equivalent to the one supplied with the instrument.

Laser safety

The Agilent Cary 600 Series FTIR spectrometers use a helium-neon laser operating in the visible region at 632.8 nanometers. The spectrometer is a Class 2 laser product, powerful enough to warrant caution in its use. Agilent Cary 600 Series FTIR spectrometers and microscopes comply with FDA and CE standards for light-emitting products.

An attenuated portion of the laser beam passes into and through the spectrometer sample compartment. Although not powerful enough to harm your skin should your hand intercept it, the laser light could cause retinal (eye) damage during prolonged direct viewing. This is not possible given the normal optical layout of the spectrometer. However, if a highly reflective surface such as a mirror is allowed to intercept the beam, the beam could be redirected out of the sample compartment resulting in on-axis or direct viewing. Care must be taken to avoid this.

The laser in the spectrometer is operating when the green power indicator of the spectrometer is active. The Cary 600 Series FTIR spectrometers incorporate an interlock switch that automatically turns off power to the laser if the interferometer compartment cover is opened.

No maintenance of the spectrometer or microscope by users is required to maintain specifications, proper operation, and compliance with FDA and CE standards for light-emitting products.

Near apertures

The following image shows the laser safety warning located near all apertures on both the Agilent Cary 600 FTIR Series instruments and microscopes.

Figure 1. Laser safety warning located near apertures

Laser aperture locations

WARNING

Laser Hazard
Avoid exposure – laser light may be emitted from this aperture. The laser light could cause retinal (eye) damage if prolonged direct viewing occurs. This is a Class 2 laser product. It is not powerful enough to harm your skin should your hand intercept it.

The optical design of the Cary 620 FTIR microscope normally precludes this. You are never required to remove the protective housing of the Cary 620 FTIR microscope. Always wear appropriate safety equipment and clothing.

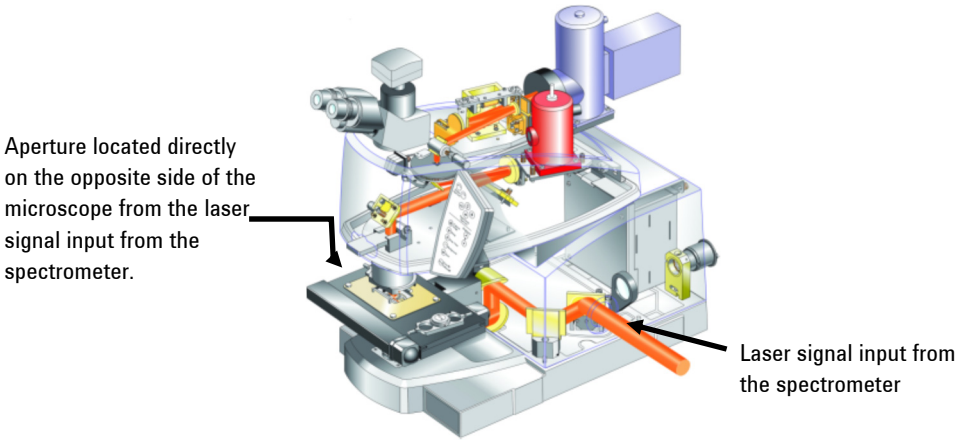

Figure 2. Laser aperture locations

Other precautions

Infrared sources operate at high temperatures, which may burn you. Before replacing a source element that has been lit, switch off the instrument and wait for the source to cool.

Do not block the ventilation grills on the instrument and accessories. Consult the manuals supplied with your computer, monitor and printer for their specific ventilation requirements.

Use of the Agilent Cary 620 FTIR Microscope and accessories may involve materials, solvents and solutions which are flammable, corrosive, toxic or otherwise hazardous.

Careless, improper, or unskilled use of such materials, solvents and solutions can create explosion hazards, fire hazards, toxicity and other hazards which can result in death, serious personal injury, and damage to equipment and property.

ALWAYS ensure that laboratory safety practices governing the use, handling and disposal of such materials are strictly observed. These safety practices should include the wearing of appropriate safety clothing and safety glasses.

Use only spare parts from Agilent with your instrument.

Warnings or symbols

The following triangular symbols appear in conjunction with warnings on the spectrometer, microscope or associated documentation. The hazard they depict is shown below each symbol:

Electrical shock

Extreme cold

UV hazard

Heavy weight (danger to hands)

Hot surface

Laser hazard

The following symbol may be used on warning labels attached to the instrument. When you see this symbol, refer to the relevant operation or service manual for the correct procedure referred to by that warning label.

The following symbols also appear on the instrument or in the documentation:

I	Mains power on
O	Mains power off
	Fuse
	Single phase alternating current
	Protective conductor terminal

Color coding

The various indicator lights appearing on Agilent instruments and associated accessories are color-coded to represent the status of the instrument or accessory.

- A green light indicates the instrument is in normal or standby mode.
- A yellow light indicates that the instrument needs attention.
- A blue light indicates that operator intervention is required.

CE compliance

The Agilent Cary 620 FTIR Microscope has been designed to comply with the requirements of the Electromagnetic Compatibility (EMC) Directive and the Machinery Directive (MD) of the European Union. Agilent has confirmed that each product complies with the relevant directives by testing a prototype against the prescribed EN (European Norm) standards.

Proof that a product complies with the directives is indicated by:

- The CE marking appearing on the rear of the product.
- The documentation package that accompanies the product, containing a copy of the Declaration of Conformity. This declaration is the legal declaration by Agilent that the product complies with the directives and also shows the EN standards to which the product was tested to demonstrate compliance.

Electromagnetic compatibility

EN55011/CISPR11

Group 1 ISM equipment: group 1 contains all ISM equipment in which there is intentionally generated and/or used conductively coupled radio- frequency energy which is necessary for the internal functioning of the equipment itself.

Class A equipment is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

This device complies with the requirements of CISPR11, Group 1, Class A as radiation professional equipment. Therefore, there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

1. Relocate the radio or antenna.
2. Move the device away from the radio or television.
3. Plug the device into a different electrical outlet, so that the device and the radio or television are on separate electrical circuits.
4. Make sure that all peripheral devices are also certified.
5. Make sure that appropriate cables are used to connect the device to peripheral equipment.
6. Consult your equipment dealer, Agilent Technologies, or an experienced technician for assistance.

Changes or modifications not expressly approved by Agilent Technologies could void the user's authority to operate the equipment.

ICES/NMB-001

This ISM device complies with Canadian ICES- 001.

Cet appareil ISM est conforme à la norme NMB-001 du Canada.

South Korean Class A EMC declaration

A 급 기기 (업무용 방송통신기자재)

This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.

이 기기는 업무용 (A 급) 전자파적합기기로서 판 매자 또는 사용자는 이 점을 주

의하시기 바라 며 , 가정외의 지역에서 사용하는 것을 목적으 로 합니다 .

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2. Introduction

This manual contains the information required to successfully get started using Agilent Cary 620 FTIR Microscope.

For information regarding your spectrometer and Resolutions Pro Software see the Agilent Cary 600 FTIR Spectrometers and Microscopes User's Guide that came with your instrument.

ITAR statement

This product is regulated by the U.S. Department of State under the International Traffic in Arms Regulations, 22 CFR 120-130 ('ITAR'). An export license from the U.S. government is therefore required to export this product from the United States, and other ITAR restrictions apply to the shipment, use, service and other aspects of this product and the FTIR instrument in which it is used.

Specifications

The Agilent Cary 620 FTIR Series microscope is suitable for indoor use *only* and is classified Pollution degree 2 and Installation Category II (EN 61010-1).

Environmental

For proper operation of your Agilent Cary 620 FTIR Microscope, these conditions are required:

- Temperature: 20 °C to 26 °C (68 °F to 80 °F)
- Temperature gradient: 1 °C/hr (1.8 °F/hr) maximum
- Relative humidity: 20% to 50% non-condensing
- Altitude: FTIR spectrometers and microscopes have been thoroughly tested for correct operation at sea level only. Please contact Agilent Technologies for advice if you wish to install a system at an altitude significantly above sea level.
- Free from corrosive and flammable fumes
- Free from strong electromagnetic fields
- Free from vibrations

Performance degradation may result if the microscope is exposed to strong radio frequency energy. If degradation is experienced, the user should reorient or relocate the microscope or the radio frequency source.

Power

The power requirements for the Agilent Cary 620 FTIR are:

- Microscope voltage: 100–240 VAC; 50–60 Hz, 60 W max and uses an auto-ranging power supply.
- Dedicated, clean 10 A power circuit with grounded receptacles. No other instruments should be powered from the same circuit.
- A grounded receptacle. It is useful to have at least 2 additional receptacles for additional peripheral devices or spectrometer accessories. Depending on the computer options, monitor, peripherals, and spectrometer accessories chosen, it is possible that a second dedicated clean power circuit be provided.
- See the vendor's documentation that came with the computer, monitor, and printer for power requirements.
- Fuse information on the rear of the instrument is the most up-to-date.

Table 1. Fuse specifications

Instrument	Fuse type
Agilent Cary 600 Series FTIR spectrometer	T4 AH 250 V, IEC601272-2 Sheet 5, 5x20 mm, Littelfuse 0215004 or equivalent
Agilent Cary 610/620 FTIR microscope (typical)	1FS1: T2.0 AH 250 V, IEC601272-1 Sheet 5, 5 x 20 mm, Littelfuse 0215020 or equivalent

Purge gas

Purge gas must be water-free air (dried to a dew point of -70 °C) or dry nitrogen. In this manual, the term 'purge gas' refers to dry nitrogen or dry air.

Purge can be supplied to the sample compartment, instrument enclosure and microscope in any combination.

NOTE Conversion factors: L/min = cfm x 0.0353; cfm = L/min x 28.3

Flow rate for purge: 10 L/min (20 ft^3/hr) maximum. You must have a flow meter to monitor the flow of the purge gas.

An additional regulator is required if the source pressure is greater than than the maximum pressure of 60 psi (420 kPa).

Tubing should be clean and free of any dust and debris. Do not use tubing treated with talcum powder.

Liquid nitrogen

WARNING

Extreme Cold Hazard
Liquid nitrogen is very cold and can cause damage to the human body. Use appropriate protective equipment when handling liquid nitrogen.

If you are using the FPA, MCT or InSb detector, you will need a supply of liquid nitrogen to cool it. It takes about 475 milliliters (16 ounces) of liquid nitrogen for the initial fill to bring the Dewar to an equilibrium temperature. It will take about 10-20 minutes to reach equilibrium. Then add an additional 200 milliliters (7 ounces) of liquid nitrogen to top off the Dewar. See Page 38 for more information on filling the microscope Dewar.

Weights and dimensions

Table 2. Cary 620 FTIR microscope weights and dimensions

Width (cm, in)	Depth (cm, in)	Height (cm, in)	Weight (kg, lb)
39.6, 15.6	68.9, 26.3	66.8, 26.3	50, 110

CAUTION

Allow for a minimum of 30 cm (12 in) at the rear of the microscope for cable connections and an overhead space of 75 cm (30 in). Position the equipment for easy access to the disconnecting switch on the rear of the instrument.

WARNING

Heavy weight
The Agilent Cary 610 or 620 FTIR microscopes weigh approximately 50 kg (110 lb). To avoid injury to personnel or damage to equipment, always use a fork lift or other suitable lifting device when moving the instrument.

Installation requirements

Before receiving your Agilent Cary 620 FTIR Microscope, you will have been given a Site Preparation Guide, which describes the environmental and operating requirements of the 620 FTIR microscope. You must prepare your laboratory according to these instructions before the Cary 620 FTIR microscope can be installed. You should keep the Site Preparation Guide for future reference. If you have misplaced your copy, you can obtain a replacement from your local Agilent office.

Laboratory

Before installation of your Agilent Cary 620 FTIR Microscope can proceed, verify that:

- An independent 10-amp power line with grounded outlet for the microscope is available, and that the outlet is located within reach of the power leads of this device.
- You have consulted your Agilent representative for power requirements for accessories, and complied explicitly with the instruction provided.
- You have provided a level flat surface, which is free of vibration and rigid enough to support the instrument and accessories without warping or sagging. [Loaded flatness tolerance: 0.4 millimeters per 300 millimeters of length (1/64 inches per foot of length)].
- There will be at least 30 centimeters behind the microscope.
- If you have a purged system, you have provided a supply of dry air or dry nitrogen at 10 liters per minute, dried to a dew point of -70 °C.

Computer

For computer requirements, consult the Agilent Cary 600 Series FTIR Spectrometers and Microscopes User's Guide if the microscope was purchased as a part of an entire system, or your existing FTIR system operation manual if the microscope was purchased as an upgrade.

Training

The software provided with your Agilent Cary 620 FTIR Microscope includes extensive Help.

If Agilent installs the instrument(s), the Agilent representative will demonstrate the basic operating procedures while conducting the installation performance tests during the installation procedure. The Agilent representative, however, is not necessarily experienced in complex analytical routines and is not authorized to conduct extensive training.

To ensure that operators benefit the most from witnessing the installation performance tests, operator training should be completed before your equipment is installed. It is strongly recommended that you take advantage of the special training courses that are conducted at various locations by the Agilent customer support and sales organization. In some areas, it may be possible to arrange for operator training to be carried out after the installation, using your own instrument. To investigate this possibility, contact your local Agilent sales and service office.

Documentation

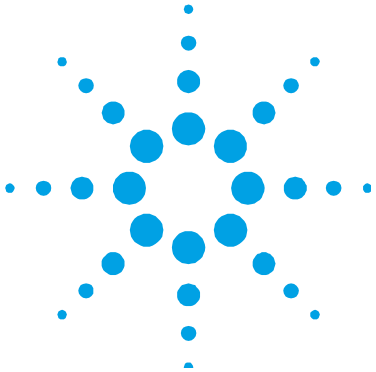
This User's Guide provides basic instructions for installing, operating and maintaining your Agilent Cary 620 FTIR Microscope.

Further information and instructions for the Resolutions Pro Software, analysis methodology, operating procedures and various accessories is provided in the Help and electronic manuals loaded onto your computer hard drive during Resolutions Pro Software installation.

Conventions

The following conventions have been used in procedures throughout the documentation:

- Bolded items indicate an action. For example, 'click **OK'** and 'From the **Edit** menu, choose **Copy'**.
- ALL CAPITALS indicate keyboard commands. For example, 'press ENTER' and 'press SHIFT+F8'.



3. Unpacking and Installation

Unpacking

As soon as the shipment arrives:

1 Locate the shipping list documentation and check that you have received all of the listed items.

NOTE If any of the listed items are missing, stop immediately and call Agilent customer service.

2 Carefully check the exterior of the shipping containers for any external damage. (Stains on the containers may indicate exposure to water.)

CAUTION Do NOT open the shipping containers at this time unless otherwise instructed by your Agilent representative.

3 If the shipping container(s) appear to be damaged (water damage, crushed package, and so on), contact Agilent and the carrier within five days. Do not accept packages with obvious puncture damage. All other damage should be noted on the shipping document and signed by the delivery agent.

4 If you are sure that all boxes have been delivered and appear to be undamaged, place them where their contents can come to room temperature.

CAUTION *Do not* unpack any additional boxes or packages or the microscope unless otherwise instructed by your Agilent representative. Your Agilent representative will complete the unpacking and installation of your Agilent Cary 620 FTIR Microscope. If incorrectly unpacked, equipment may become damaged.

Software installation

While your Agilent representative will install the Resolutions Pro Software for you during the installation process, it may become necessary to reinstall the software if the computer is replaced. You may also need to reinstall your Resolutions Pro Software if you have purchased your microscope separately as an upgrade to an existing system.

Re-installing

For Resolutions Pro uninstall (if required) and reinstall instructions, consult the Resolutions Pro Software Installation Manual.

The Agilent Resolutions Pro Software will install all files required to run the software and microscope.

Installation includes:

- Installing the Imaging Drivers (Type B detectors only. See Figure 9 for description of Type A and Type B FPAs.)
- Installing the Resolutions Pro Software
- Installing the Resolutions Pro Help
- Installing the Agilent FTIR Sample Data and Sample Spectral Libraries
- Configuring the hardware
- Registering the Resolutions Pro Software

Upgrading

If your Agilent Cary 620 FTIR Microscope was purchased as an upgrade for an existing system, you will need to check if the microscope driver is installed on the computer connected to your FTIR system.

To check for the driver:

1 Open Resolutions Pro.

2 Click **Help** > **About Installation**.

3 Look for the Agilent Cary 620 FTIR Microscope in the list.

If it is present, you will not need to update the Resolutions Pro Software. If it is not present, uninstall and then reinstall your Resolutions Pro Software.

Hardware installation

While your Agilent representative will install the microscope and accessories for you during the installation process, it may become necessary to reinstall the cabling if the instrument is moved.

Newer microscope models have an external visible camera (1 in the image below).

Figure 3. Cary 620 microscope with externally mounted visible camera

Microscope connections

Power is connected to the instrument and purge line (if used) at the rear of the instrument.

CAUTION Use only dry air or dry nitrogen to purge the microscope.

To connect the microscope:

1 Make sure the power switch on the rear of the microscope is in the off (0) position.

Figure 4. Power switch and socket on the rear of the microscope. USB to PC cable shown also.

2 Connect the power cord to the rear of the microscope and then the other end of the power cable to the electrical power outlet.

3 Connect the USB cable from the microscope to the PC.

4 For purging of the microscope, connect the gas purge line to the fitting on the rear of the microscope upper cover. See Figure 5.

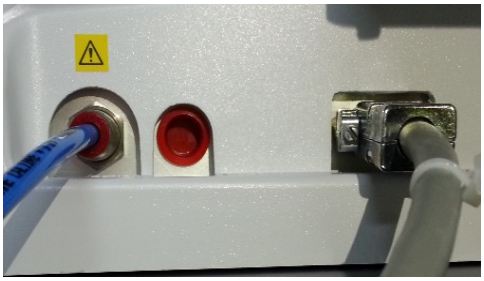


Figure 5. Upper rear connectors on the microscope. Left to right: Purge fitting to gas supply; Video out to video capture card installed in the computer (not required on microscopes with a top mounted visible camera); detector to spectrometer EXT DET 1 or EXT DET 2 connection (See Figure 8).

5 Connect the 'Video out' connector to the back of the microscope and then to the video capture card installed in the computer (not required on microscopes with a top mounted visible camera).

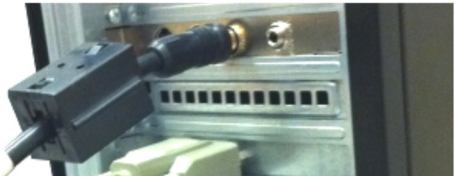


Figure 6. Video capture card (installed in PC) with 'Video out' cable connected

6 The camera will be installed by your Agilent representative. Connect the USB cable into the camera and then into a USB 3 port on the back of the computer that Resolutions Pro is installed on (top mounted visible camera models only).

Figure 7. Cary 620 microscope with externally top mounted visible camera with USB plugged in

7 Connect the 'Detector out' cable to the back of the microscope and then to the EXT DET 1 or EXT DET 2 spectrometer penthouse connector.

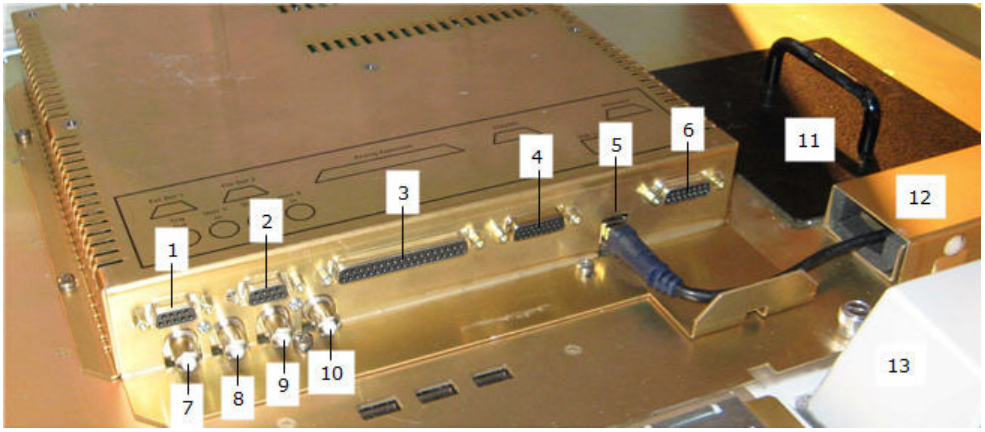


Figure 8. Cary 600 series FTIR spectrometer 'penthouse' connections. Shown with the Cary 600 series FTIR top cover off.

1 EXT DET 1 - Used to connect an external detector

2 EXT DET 2 - Used to connect an external detector

3 Analog Expansion - Provides alternate signal paths and controls

4 FPA/TRS - Used to connect either an FPA detector or TRS accessory

5 USB 2.0 - Data system connector to PC

6 Accessory - Used to connect an additional accessory

7 TRIG OUT - Located under the EXT DET 1 connector, but obscured in this image. Used to trigger to an external device

8 USER 1 IN - Used to receive a signal from an external device

9 SIGNAL OUT - Used to send a signal to an external device

10 USER 5 IN - Used to receive a signal from an external device for second ADC (if fitted)

11 Beam splitter access cover

12 Metal cover for cable routing

13 Sample compartment connectors (not shown)

FPA detector cable installation

There are two types of FPA detectors. Type A, which has two cables on the back of the FPA detector, and Type B, which has three cables on the back of the FPA detector.

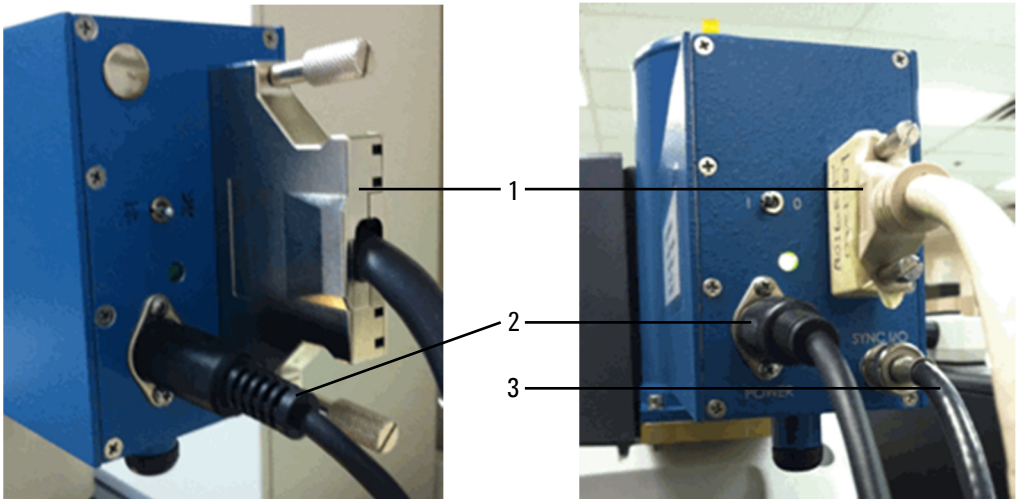


Figure 9. Type A (left) and Type B (right) FPA detectors. Where 1 is the FPA detector data cable, 2 is the Power input cable and 3 is the Trigger cable (on Type B FPA detectors only).

NOTE Installation instructions are different for Type A versus Type B detectors. See below for Type A installation instructions and Page 33 for Type B installation instructions.

Type A FPA detector cable installation instructions

1. Connect the FPA detector data cable to the back of the FPA detector. See Figure 9.
2. Connect the other end of the FPA detector data cable to the Frame Grabber card installed in the PC. See Figure 10.

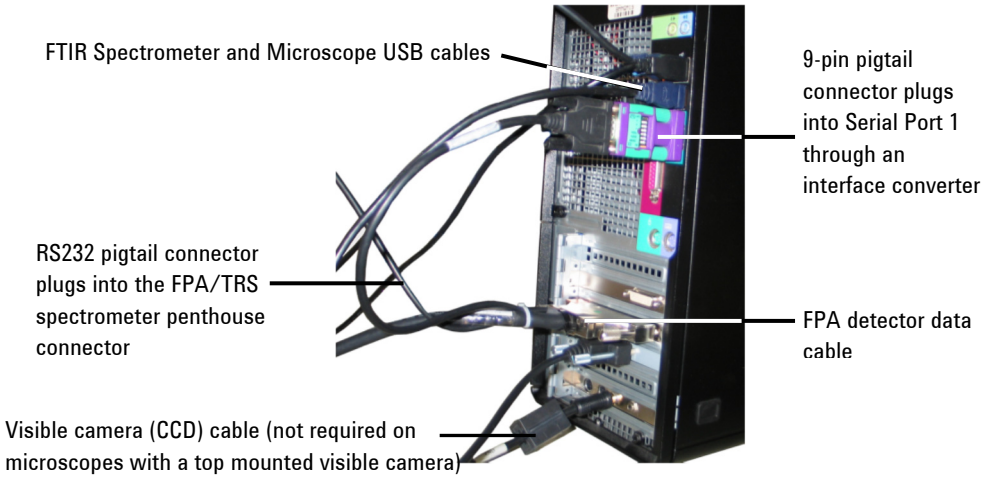


Figure 10. Computer connections for the Type A FPA detector (externally top mounted visible camera USB cable not shown)

NOTE The location of the USB ports, serial ports, camera video card and Frame Grabber card may differ from those shown.

3 Connect the 9-pin pigtail connector on the FPA detector data cable to the interface converter and then to serial port 1 on the PC.

4 Connect the RS232 pigtail connector to the FPA/TRS spectrometer penthouse connector. See Figure 9.

5 Connect the power cable to the back of the FPA detector and then to the power supply.

Type B FPA detector cable installation instructions

1 Connect the FPA detector data cable to the back of the FPA detector. See Figure 9.

2 Connect the other end of the FPA detector data cable to the left hand side connection on the Frame Grabber card installed in the PC. See the image below for details.

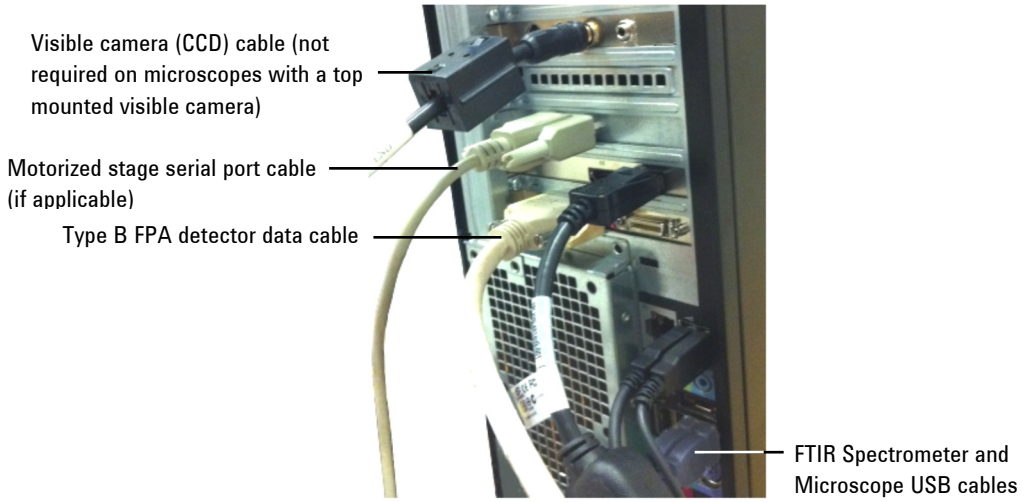


Figure 11. Computer connections for the Type B FPA detector (external top mounted visible camera USB cable not shown)

NOTE The location of the USB ports, serial ports, camera video card and Frame Grabber card may differ from those shown.

3 Connect the two-pin shielded 'snap-in' end of the trigger cable to the FPA detector assembly, see Figure 9. Connect the other end of this trigger cable (a 26-pin D-connector) to the FPA/TRS port on the spectrometer, see Figure 8.

4 Connect the power cable to the back of the FPA detector and then to the power supply.

Connecting the motorized stage cables

There are six connectors on the rear of the stage controller. If you have a Type A FPA detector, you will need two serial ports on your computer, one for the FPA detector data cable and one for the motorized stage. If you have a Type B FPA detector, you will only need one serial port for the motorized stage.

Figure 12. Motorized stage controller connections

The connectors are, from left to right:

RS-232	Connect to a RS-232A serial port on the computer using the RS-232 serial cable
Power	Connects to the power transformer
USB	Currently not used
Joystick	Connects to the joystick
Z	Connects to the Z-axis motor used to control the stage height (see 2 on Figure 13) using the cable shown below 
Stage	Connects to the X/Y stepping motors on the right side of the stage (see 1 on Figure 13)

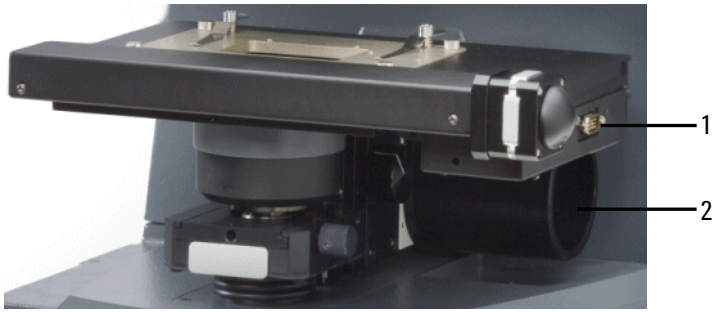


Figure 13. Motorized stage connections

Where:

1 X/Y stage control

2 Z stage control

CAUTION To avoid damaging the microscope stage, do not expose the stage to water or moisture. Do not allow liquid to spill on the product.

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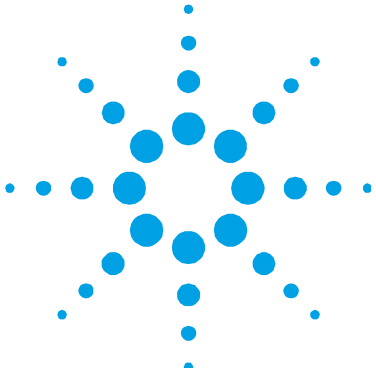


4. Operation

For additional hardware information, see the Resolutions Pro Help.

To access the Resolutions Pro Help:

1. Start the Resolutions Pro Software.
2. Press F1 on the keyboard to display the Help.
3. Click the **Contents** tab if necessary.
4. Click the plus (+) icon next to ‘About Your FTIR Systems’ to expand it.
5. Click the plus (+) icon next to ‘620-IR’ to expand it for information on your microscope hardware and imaging software.

Turning on the system and filling the Dewars

CAUTION This procedure applies to detectors requiring liquid nitrogen. Always check the detector type and cooling requirements before performing this procedure.

To fill the MCT detector Dewar with liquid nitrogen:

1. Turn on the microscope power switch located on the rear of the microscope.
2. Remove the appropriate liquid nitrogen Dewar plug. This plug is easily removed by hand.

Figure 14. Top of the microscope showing the liquid nitrogen plug

WARNING

Extreme Cold Hazard
Liquid nitrogen is very cold and can cause damage to the human body. Use appropriate protective equipment when handling liquid nitrogen.

3 Carefully fill the detector Dewar with liquid nitrogen using the provided funnel. This takes about 475 milliliters (16 ounces) of liquid nitrogen. Minimize spills by adding half a funnel of liquid nitrogen at a time and allowing it to cool down until the vapor plume dies down. Repeat as required.

4 Allow about 10-20 minutes for the Dewar to come to thermal equilibrium.

5 Top up the Dewar with about 200 milliliters (7 ounces) of liquid nitrogen.

6 Replace the plug.

CAUTION Large liquid nitrogen spills can damage the detector and other microscope components. Do not fill the Dewar to the top. This can freeze the elastomer o-ring Dewar seal causing a loss of vacuum. This will require the detector assembly to be returned for a pump-down.

To fill the FPA detector Dewar with liquid nitrogen:

1 Remove the FPA detector cover if present.

2 Turn on the microscope power switch located on the rear of the microscope.

3 Remove the liquid nitrogen Dewar plug (1 in the image below). This plug is easily removed by hand.

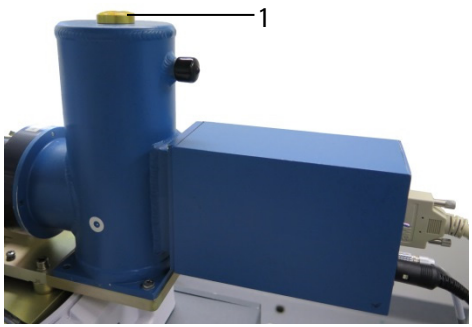


Figure 15. FPA detector liquid nitrogen plug

WARNING

Extreme Cold Hazard

Liquid nitrogen is very cold and can cause damage to the human body. Use appropriate protective equipment when handling liquid nitrogen.

4 Carefully fill the detector Dewar with liquid nitrogen using the provided funnel. The Dewar holds a maximum of 475 milliliters, (16 ounces) of liquid nitrogen. Minimize spills by adding half a funnel of liquid nitrogen at a time and allowing it to cool down until the vapor plume dies down. Repeat as required.

5 Allow about 10-20 minutes for the Dewar to come to thermal equilibrium.

6 Top up the Dewar with about 200 milliliters (7 ounces) of liquid nitrogen.

7 Replace the plug.

CAUTION

Large liquid nitrogen spills can damage the detector and other microscope components. Do not fill the Dewar to the top. This can freeze the elastomer o-ring Dewar seal causing a loss of vacuum. This will require the detector assembly to be returned for a pump-down.

Performing a collect

The basic steps to perform a collect using the microscope are:

1 Prepare the microscope.

2 Place the sample on the stage.

3 Focus on and then select the analytical area.

4 Collect data.

For instructions on how to access the Help, which contains information for each of these steps, see Page 42.

NOTE The shutter should always be in the open position when using the microscope.

To open or close the microscope shutter:

1 Look directly at the front of the microscope.

2 Gently pull the black handle between the right side of the microscope and spectrometer towards you.

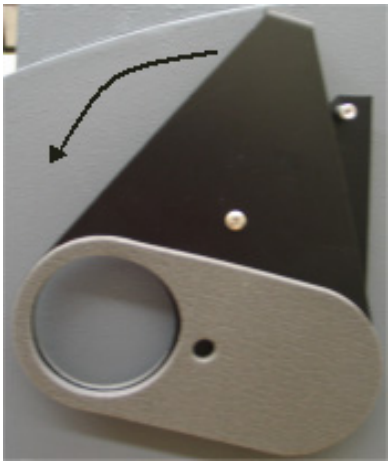


Figure 16. Side view of closed shutter and handle

3 To close the shutter, gently push the black lever away from you.

Turning off the microscope

Unless the system will be idle for some time or will be moved, we recommend that the microscope not be turned off. The computer and peripherals can be turned off if desired.

NOTE Agilent recommends that you disable the screen saver because it may interfere with long data collections. If you want to have a dark screen during long periods of disuse, it is better to turn off the monitor.

To shut down the computer module of the system:

1. Exit Resolutions Pro and close all other applications.
2. Choose **Shut down** from the **Start** menu.

CAUTION Using the computer's power switch to quit Windows may cause data to be lost. Always use the procedure advised by Microsoft.

3. If necessary, turn off the microscope power switch.

Accessing the Help

To access the Resolutions Pro Help:

1. Start the Resolutions Pro software.
2. Press F1 on the keyboard to display the Help.
3. Click the **Contents** tab if necessary.
4. Click the plus (+) icon next to 'FTIR Imaging' to expand it.
5. Click the plus (+) icon next to 'How To' to expand it.
6. Click the plus (+) icon next to 'Collect Micro Imaging Data' to access pages that describe how to perform imaging experiments..

5. Maintenance

This chapter includes information on how to access the Agilent Cary 600 FTIR spectrometers and microscopes maintenance procedures that may be carried out by an operator. Any maintenance procedures not specifically mentioned should be carried out only by Agilent-trained, Agilent-qualified or Agilent-authorized representatives.

WARNING

Eye Hazard

Near-infrared operation: The tungsten-halogen lamp is extremely bright, has high ultraviolet (UV) output, and should not be directly viewed. Avoid direct exposure to the lamp. In addition, appropriate UV filtering glasses are recommended to remove harmful UV radiation. This lamp should always be turned off when not in use, as it has a limited lifetime.

Far-infrared operation: The mercury arc lamp emits harmful ultraviolet (UV) radiation and must not be viewed by the unprotected eye. Appropriate UV filtering glasses are strongly recommended. Avoid direct exposure to the lamp. This lamp should always be turned off when the instrument is not in use or when the cover is opened. This is easily accomplished by selecting the other source position in the software.

UV-visible operation: The xenon and deuterium lamps emit harmful ultraviolet (UV) radiation and must not be viewed by the unprotected eye. Appropriate UV filtering glasses are strongly recommended. Avoid direct exposure to the lamp. The lamps should always be turned off when the instrument is not in use or when the cover is opened. This is easily accomplished by selecting the other source position in the software.

WARNING

Electrical Shock Hazard

Contact with these circuits, devices and components can result in death, serious injury, or painful electrical shock. This instrument contains electrical circuits, devices and components operating at dangerous voltages.

WARNING

Hot Surface Hazard

Burn danger. Allow hot parts to cool before proceeding with any maintenance procedure.

WARNING

Extreme Cold Hazard

Liquid nitrogen is very cold and can cause damage to the human body. Use appropriate protective equipment when handling liquid nitrogen.

WARNING

Laser Hazard

Although not powerful enough to harm your skin should your hand intercept it, the laser light could cause retinal (eye) damage if prolonged direct viewing occurs. This is a Class 2 laser product. The optical design of the Agilent Cary 620 FTIR normally precludes this. You are never required to remove the protective housing of the Cary 620 FTIR. Always wear appropriate safety equipment and clothing.

NOTE

This section refers only to maintenance procedures for the instrument. You should refer to your computer and printer manuals for their maintenance procedures and to Resolutions Pro Help for the maintenance procedures for any accessories you ordered.

Routine

Routine maintenance information is provided in the Resolutions Pro Help.

To access the Help:

1. Start the Resolutions Pro Software.
2. Press F1 on the keyboard to display the Help.
3. Click the **Contents** tab if necessary.
4. Click the plus (+) icon next to 'Maintenance' to expand it.

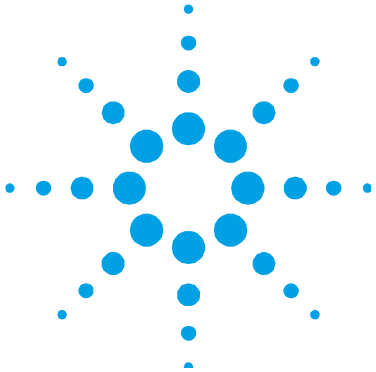
Cleaning

Any spills in the sample compartment or on the spectrometer or microscope should be immediately wiped up.

The exterior surfaces of the instrument should be kept clean. All cleaning should be done with a soft cloth. If necessary, this cloth can be dampened with water or a mild detergent. Do not use organic solvents or abrasive cleaning agents.

Spare parts

For spare parts and consumables ordering information, refer to the Agilent website, www.agilent.com



6. Troubleshooting

For troubleshooting help, refer to the Agilent Resolutions Pro Help.

To access the Troubleshooting section of the Help:

1. Start the Resolutions Pro Software.
2. Press F1 on the keyboard to display the Help.
3. Click the **Contents** tab if necessary.
4. Click the plus (+) icon next to 'Troubleshooting' to expand it.

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In This Guide

The guide describes the following:

- Safety Practices and Hazards
- Introduction
- Unpacking and Installation
- Operation
- Maintenance
- Troubleshooting

Printed in Malaysia
04/16

8510247400
Issue 9

Agilent Technologies