DE BEERS GROUP

DiamondView™ ZOOM

User Manual



PLEASE READ THIS IMPORTANT INFORMATION PRIOR TO USE

DISCLAIMER

The intended use of this DiamondView Zoom instrument (the "Instrument") is expressly limited to that set out in the "Limitations of Use" section of this manual and is subject to compliance with the procedures otherwise provided in this manual. The instructions and descriptions in this manual are accurate for this Instrument at the time that this manual is produced. Successive manuals are subject to change without notice and no liability is accepted for any losses which may result from such changes.
Customers and users of the Instrument must carefully read the manual and the Limitations of Use in full and, prior to conducting any analysis or testing activities, properly familiarize themselves with the operation of the Instrument. While care has been taken to ensure compatibility and compliance of the Instrument with local laws and regulations as at the date of the manual, it shall be the ultimate responsibility of the customer/user to ensure that the Instrument is compatible and compliant with such laws and regulations in force as at the date of the Instrument's importation, sale and use.

To the extent permitted by law:

1. neither the authors of this manual, nor the designers or manufacturers of this Instrument, nor the instructors in the operation of the Instrument shall be liable for the misidentification by third parties of a diamond as natural or synthetic or vice versa if it arises (whether wholly or partly) as a result of:
    a. any misuse of the Instrument (which shall include, without limitation, any failure on the part of the user to operate or maintain the Instrument at all times in strict accordance with this manual and the Limitations of Use); or
    b. screening for those types of diamond, treatments or other substances for which the Instrument is not intended to detect as identified in the manual or in the Limitations of Use;
    c. any development or alteration in the composition or in the design, production or treatment processes for those types of diamonds or other substances for which the Instrument is intended to detect occurring after the date of the manual which renders the Instrument inaccurate or otherwise unable to detect the modified diamond or substance; or
    d. any other customer/user error (whether as a result of poor-quality images generated through incorrect use of the Instrument and/or the misinterpretation of any images or resulting data or otherwise) or third party act or omission;
2. the parties referred to in section 1 above may not be held liable for any damage to samples of any nature which are tested by the Instrument. The use of the Instrument constitutes acceptance of the above conditions.

PLEASE READ THIS IMPORTANT INFORMATION PRIOR TO USE

FCC COMPLIANCE STATEMENT

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the installation and user manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IMPORTANT NOTICE

THERE ARE NO USER SERVICEABLE PARTS WITHIN THE ENCLOSURE OF THE INSTRUMENT.

1 LIMITATIONS OF USE 1
1.1 .....Warnings 1
1.2 .....Technical Specifications 2
1.3 .....Definitions 2

2 INTRODUCTION 3
2.1 .....General 3
2.2 .....Operating principle 3
2.3 .....Key Features 3
2.3.1 DiamondView Zoom PC Hardware & Software 3
2.3.2 DV Collection Images 3
2.3.3 Basic Brightness Dial 4
2.3.4 Auto Phosphorescence Capture 4
2.3.5 Continuous Phosphorescence Imaging 4
2.3.6 Field Stop 4
2.3.7 Minimum Excitation Mode 4
2.3.8 Filtering fluorescence 5
2.4 .....DiamondView Zoom front side view 5
2.5 .....DiamondView Zoom rear view 6
2.6 .....DiamondView Zoom bottom view 7

3 SETTING-UP THE DIAMONDVIEW ZOOM 8
3.1 .....Unpacking 8
3.2 .....PC Requirements 8
3.3 .....Connecting the DiamondView Zoom 9

4 INSTALLING THE DIAMONDVIEW ZOOM SOFTWARE 10
4.1 .....Diamond View Zoom Application 10
4.1.1 Installation of the Diamond View Zoom application including the drivers 10
4.1.2 Manually installing the USB Video graphics driver using VimbaDriverInstaller 11

5 DIAMONDVIEW ZOOM USER CONTROLS 13
5.1 .....Opening DiamondView Zoom chamber 14
5.2 .....Changing vacuum cup 14
5.3 .....Sample mounting 15
5.4 .....Closing the instrument chamber 16
5.5 .....Changing sample position as viewed on screen 16
5.5.1 Sample Rotation 16
5.5.2 Sample Tilt position 16
5.5.3 Sample Horizontal position 16
5.5.4 Sample Vertical position 16
5.5.5 Focus Control 16
5.6 .....Fitting the Jewellery Holder 16
5.7 .....Fitting the filters 17
5.8 .....Fitting the small sample holder 18
5.9 .....Fitting the large stone holder (supplied on request) 18

6 SOFTWARE USER INTERFACE 19
6.1 .....Running the DiamondView Zoom application 19
6.2 .....Selecting a location for the Application database 20
6.3 .....Application window 21
6.4 .....Customising the application window 22
6.5 .....Components of the application window 23
6.5.1 Toolbar 23
6.5.2 Collection view 24
6.5.3 Video (“Main view”) 25

6.5.4 Snapshots (“Main view”) 26
6.5.5 Instrument Controls (Auxiliary view) 27
6.5.6 Snapshot details (Auxiliary view) 32
6.5.7 Snapshot Thumbnails (Auxiliary view) 36
6.5.8 About DiamondView Zoom (Auxiliary view) 37
6.5.9 Status bar 37
6.5.10 Menu 37
6.6 Capturing sample snapshots 41
6.6.1 Mounting and observing the sample 41
6.6.2 Selecting the Instrument Mode 41
6.6.3 Setting the Instrument Controls 41
6.6.4 UV lamp timeout 42
6.6.5 Hiding the side views 42
6.6.6 Zooming 43
6.6.7 Comparing video with an existing snapshot 44
6.6.8 Capturing a snapshot 46
6.6.9 Adding notes to a snapshot 47
6.6.10 Comparing snapshots 47
6.6.11 DV Collections 48
6.7 Managing elements in the Collections view 50
6.7.1 Adding Folders 51
6.7.2 Renaming elements 51
6.7.3 Moving elements 51
6.7.4 Copying elements 52
6.7.5 Deleting elements 52
6.7.6 Viewing snapshot details 53
6.7.7 Quick viewing a snapshot 53
6.7.8 Quick viewing snapshots contained in a folder 53
6.7.9 Exporting a selected snapshot(s) 54
6.7.10 Printing a selected snapshot 55
6.7.11 Exporting elements 55
6.7.12 Importing elements 56
6.8 Closing the application 56

7 STEP BY STEP USER GUIDE 57
7.1 Using Visible Mode 57
7.2 Using Fluorescence Mode 59
7.3 Using Fluorescence Mode with Filtering 60
7.3.1 Filter Selection 60
7.3.2 Filter Use 60
7.4 Using Phosphorescence Mode 61
7.5 Using Dark mode 62

8 MAINTENANCE 63
8.1 DiamondView Zoom Database backup 63
8.2 DiamondView Zoom Database copying 63
8.3 Interlock servicing interval 63
8.4 Calibration 64
8.4.1 Filter bleedthrough test 64
8.4.2 UV throughput test 64
8.5 Filter replacement 66
8.6 Taking new Calibration images following filter replacement 70

9 TROUBLESHOOTING 73
9.1 DiamondView Zoom Instrument Communication Error 73
9.2 DiamondView Zoom Instrument Video Error 73
9.3 Repairing a DiamondView Zoom Installation 74

9.4.....DiamondView Zoom Disk/Database Save and Write Errors 75
9.5.....DiamondView Zoom Application Database Error 76
9.5.....Video flickering 76

1 LIMITATIONS OF USE

The DiamondView Zoom is designed solely for fluorescence imaging of polished diamonds. The unit may be used in conjunction with other De Beers Group Verification Instruments, such as DaimondSure™, as a means of examining referral diamonds, or it may be used independently of them.

THE DIAMONDVIEW ZOOM SHOULD NOT BE USED WITHOUT FIRST READING THIS USER MANUAL.

1.1 Warnings

Before connecting the instrument, the following warnings should be strictly observed:

THE POWER OUTLET MUST INCLUDE AN EARTH CONNECTION FOR CLASS 1 SAFETY PROTECTION.

THE DIAMONDVIEW ZOOM IS TO BE OPERATED ONLY WITH THE SUPPLIED MAINS ADAPTOR.

IF THE MAINS ADAPTOR OR DiamondView Zoom SHOWS SIGNS OF DAMAGE OR MALFUNCTION IMMEDIATELY STOP USING THE UNIT, DISCONNECT FROM MAINS AND CONTACT SUPPLIER FOR REPAIR OR REPLACEMENT.

THERE ARE NO USER SERVICEABLE PARTS INSIDE THE DiamondView Zoom, EXCEPT FILTER REPLACEMENT, WHICH MUST BE CARRIED OUT BY A RESPONSIBLE BODY.

DO NOT REMOVE THE COVER: LETHAL VOLTAGES, HIGH TEMPERATURES, ULTRAVIOLET RADIATION, OZONE HAZARDS AND RISK OF LAMP EXPLOSION INSIDE.

IF A FAULT HAS OCCURRED AND THE LEDs ARE ON WHILE THE UNIT'S CHAMBER DOOR IS OPEN DO NOT STARE AT THE LEDs OR VIEW THEM DIRECTLY USING OPTICAL INSTRUMENTS SUCH AS AN EYE LOUPE.

SERVICING TO BE CARRIED OUT BY QUALIFIED PERSONNEL ONLY.

THE UNIT MUST NOT BE USED OR LEFT WITHOUT A UV FILTER.

DO NOT OPERATE THE UNIT WITH A DEFECTIVE, LOOSE OR ILL-FITTING DOOR.

IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.

KEEP THIS USER MANUAL IN A SAFE PLACE FOR FUTURE REFERENCE.
During operation of the ultraviolet lamp acoustic noise will be heard. This is normal.

Warning symbols explanation:



Risk of exposure to UV radiation
Warning Symbol



Risk of Electric shock
Warning Symbol

1.2 Technical Specifications

Model Number:	3618
Instrument:	
Power requirements:	+24V DC @3A Max
Maximum voltage fluctuation:	+/-2%
Supplied mains adaptor:	
Power requirements:	100-240V AC @1.0A
Maximum voltage fluctuation:	+/-10%
Filter requirements:	None
Environment:	Indoor laboratory use
Maximum altitude:	2000m
Temperature range:	5°C-40°C (30°C maximum is recommended to maximise filter life)
Humidity:	80% up to 31° decreasing linearly to 50% at 40°
Rated pollution degree:	II
Ventilation requirements:	Do not obstruct ventilation holes in base.
Minimum PC requirements:	CPU 1.4GHz 2Gb(Win10) 1024 x 768 24bit display HD 2Gb (~400 image captures) At least one spare USB3 interface and one spare USB2 interface
Operating System requirement:	Windows 10 64bit 21H2 or later Windows 11 64bit 21H2 or later
Video:	
Resolution:	1456 x 1088
Maximum field of view:	7.0mm x 5.2mm
Weight:	13kg
Dimensions:	26cm x 24cm x 44cm
Regulatory standards:	BSEN61010-1 (safety) BSEN61326 (EMC)
Manufacturer:	De Beers UK Limited De Beers Group Belmont Road Maidenhead SL6 6JW UK

1.3 Definitions

Responsible Body: Individual or group responsible for the use and maintenance of equipment, and for ensuring that OPERATORS are adequately trained. It is assumed that the **responsible body** is capable of performing simple tasks using written instructions and understands the importance of adhering to the written instructions and conforming to hazard warnings.

2 INTRODUCTION

2.1 General

This manual describes the installation and operation of the DiamondView Zoom.

This instrument is designed to generate a surface fluorescence and phosphorescence image of polished diamonds.

High pressure high temperature (HPHT) grown synthetics exhibit characteristic growth-sector fluorescence patterns under such illumination conditions and this enables them to be discriminated from natural diamond. In addition certain types of HPHT grown synthetics exhibit a diagnostic strong long-lived fluorescence afterglow once the excitation has been extinguished (termed phosphorescence). This phosphorescence is captured automatically.

Chemical Vapour Deposition (CVD) synthetics also exhibit characteristic fluorescence growth patterns and colours under such illumination conditions and this enables them to be discriminated from natural diamond.

The DiamondView Zoom may be used with a wide variety of loose polished and mounted polished samples in the size range of 0.01 carats to 10 carats.

The apparatus consists of a xenon flashlamp and special ultraviolet filter with optics to produce an area of ultraviolet illumination at the sample. The sample is imaged by a colour CCD camera. The image is displayed on a computer monitor. The sample may be viewed under white light conditions to aid focussing, prior to excitation with ultraviolet light. Depending upon the instrument configuration, the image may be filtered using supplied filters to aid detection of synthetic features.

2.2 Operating principle

Ultraviolet light of wavelength less than about 225 nm is substantially absorbed within a few microns of the diamond surface to produce what is effectively a surface fluorescence image.

2.3 Key Features

2.3.1 DiamondView Zoom PC Hardware & Software

The DiamondView Zoom instrument uses USB3 digital video to provide high resolution colour imaging and zooming on a PC installed with a Windows operating system without any bespoke video capture hardware or cables. Instrument control is via a USB2 interface.

The DiamondView Zoom software provides control of the instrument in the different sample excitation and imaging modes and allows users to view, manage and export sample snapshots captured with the Instrument.

The DiamondView Zoom instrument control software and instrument drivers are supplied on a USB memory stick and may be deployed by the user on any PC with a specification meeting the minimum requirements (see section 1.2)

2.3.2 DV Collection Images

The DiamondView Zoom is supplied with example images of polished natural diamonds, HPHT (high-pressure, high-temperature) synthetics grown in a belt-type press, HPHT synthetics grown in a BARS-type press and CVD (Chemical Vapour Deposition) grown synthetics. These images also show examples of the use of DiamondView Zoom features such as Field Stop, Minimum Excitation Mode and Gamma Correction to improve the contrast of images.

It is recommended that new users of DiamondView Zoom take time to review these images with the supporting notes accompanying each image. These images can be useful in comparing with captured images.

2.3.3 Basic Brightness Dial

DiamondView Zoom incorporates a basic brightness dial for each of the viewing modes. Images may be made brighter by turning the dial clockwise. This results in automatic adjustments to the advanced controls such as integration time, gain and aperture that will be appropriate to most situations. The advanced controls normally remain hidden, but are available if required.

The use of the “advanced controls” is recommended when viewing fine detail, such as dislocation networks.

2.3.4 Auto Phosphorescence Capture

The DiamondView Zoom will capture an automatic Phosphorescence image after a Fluorescence image has been captured. The automatic Phosphorescence capture will be made using the current Aperture & Field Stop settings. The delay is set to 50ms.

Every sample tested with the DiamondView Zoom should be studied carefully but an automatic phosphorescence capture is a useful means of alerting the operator to potential synthetics. Extensive research by De Beers Group has shown that all type IIa (near-colourless) HPHT (high-pressure high-temperature) grown synthetics show phosphorescence after exposure to shortwave UV light. Some diamonds exhibit weak phosphorescence but the strong, long-lived phosphorescence exhibited by near-colourless HPHT synthetics is very vivid in the DiamondView Zoom.

If a colourless diamond shows phosphorescence in the DiamondView Zoom, then particular attention should be paid to its fluorescence image. Look for growth sector structures typical of HPHT grown synthetics.

2.3.5 Continuous Phosphorescence Imaging

The DiamondView Zoom includes a “continuous” phosphorescence mode. The sample is first excited with ultraviolet light, then the excitation is switched off and a phosphorescence image is captured. This cycle is repeated, resulting in a steady image of the phosphorescence. It is possible to compare fluorescence and phosphorescence images by switching between the two modes.

2.3.6 Field Stop

DiamondView Zoom incorporates a field stop to increase the level of contrast in areas where luminescence is weak. This is achieved by reducing the amount of stray light originating from areas of the sample other than the region of interest. Light from brightly fluorescing regions often back-illuminates the region of interest, reducing the ability to see dislocation networks and other weakly fluorescing features. The field stop provides the facility to confine the UV illumination area to the region of interest – thus minimising the level of back-illumination and increasing image contrast.

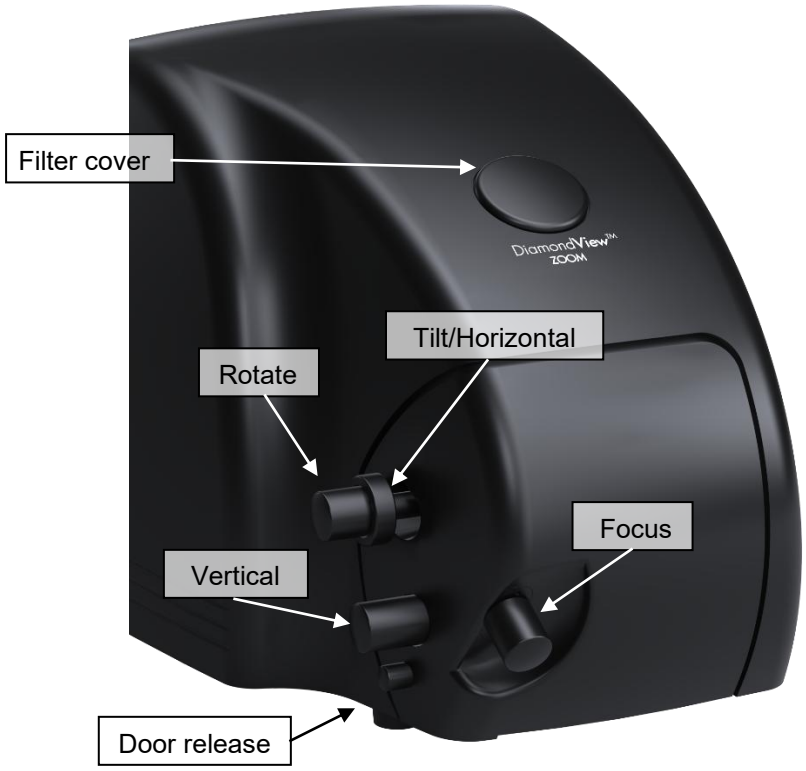
2.3.7 Minimum Excitation Mode

In some circumstances the clarity of fluorescence images may be improved by limiting the amount of UV exposure (thus preventing the build-up of strong phosphorescence) before the fluorescence image is captured. This minimum excitation mode is useful in the study of the fluorescence characteristics of individual growth sectors in synthetics.

2.3.8 Filtering fluorescence

In some circumstances images may be dominated and saturated by one fluorescence colour. In such circumstances the dominant fluorescence can mask fluorescence patterns and colours that may indicate the sample is synthetic. Research by De Beers Group has demonstrated that the filters provided with the DiamondView Zoom unit are the most efficient filters to display those fluorescence patterns associated with synthetic samples.

2.4 DiamondView Zoom front side view



	Description
Rotate Control	Allows the sample in the chamber to be rotated on its axis.
Tilt/Horizontal Position Control	Allows the sample in the chamber to be positioned onto its side to allow, for instance, imaging of crown / pavilion facets. Pulling and pushing the control also has the effect of controlling the horizontal position (left/right as viewed on screen) of the sample.
Vertical Position Control	Controls the vertical position (up/down as viewed on screen) of the sample.
Focus Control	Focuses the sample to produce a sharp image.
Door Release Button	Opens the door to give access to the sample chamber.
Filter Cover	Covers the 'letter-box' opening where filters can be inserted

2.5 DiamondView Zoom rear view



	Description
USB3 Interface	The USB3 cable transports video from the DiamondView Zoom instrument to the PC. It is connected to the PC via the supplied cable or with a standard USB3 cable if a different length is required.
USB Interface	The USB cable transports control information from the PC to the DiamondView Zoom instrument. It is connected to the PC via the supplied cable or with a standard A-B USB cable if a different length is required.
Green LED Indicator	When this LED is illuminated it indicates that the DiamondView Zoom instrument is powered on.
Power Switch	The power switch is a toggle switch that switches power to the DiamondView Zoom instrument
DC Power Input	The power input takes 24V from the mains power adaptor supplied with the instrument.

2.6 DiamondView Zoom bottom view



	Description
UV filter access cover	Provides access to the UV filter for filter replacement by the **responsible body**.

3 SETTING-UP THE DiamondView Zoom

Setting-up the DiamondView Zoom consists of connecting the instrument to a power supply and a PC.

3.1 Unpacking

Carefully remove all the items from the package. In addition to this manual, be certain that you have the following items:

- DiamondView Zoom instrument
- Mains Power adaptor
- Mains Power adaptor cable with plug suitable for your country's power supply
- USB A-B cable
- USB3 cable
- USB memory stick
- Calibration samples (calcite & ball bearing)
- Suction cups (2 x 2.5mm & 2 x 3.5mm)
- Sample height-setting gauge
- Jewellery holder
- Quick User Guide

In a separate case:

- Five filters and filter holders
- One blank filter holder

If any item is missing or damaged please contact your supplier for assistance.

3.2 PC Requirements

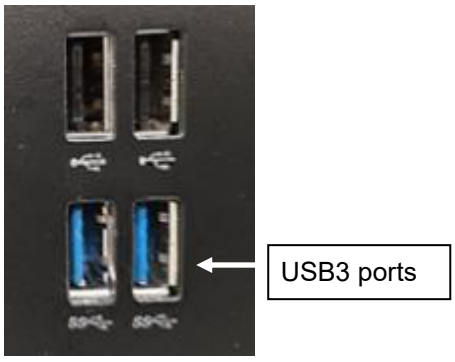
PC requirements are detailed in section 1.2.

DiamondView Zoom image display and capture functions require a USB3 connection. It will not function with USB connections lower than USB3.

3.3 Connecting the DiamondView Zoom

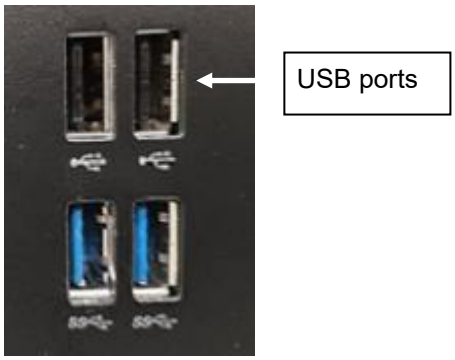
Connect the USB3 type B plug to the DiamondView Zoom instrument. The other end should be connected to a USB3 port on the PC. USB3 ports feature a blue coloured tongue in the connector.





1. Connect one end of the USB cable to the DiamondView Zoom instrument. Connect the other end to a USB or USB3 port on the PC.





2. Connect the mains power adaptor to the power supply and the 24V output cable to the DiamondView Zoom instrument. Check that there is power by toggling the power switch and observing that the LED power indicator illuminates.





4 INSTALLING THE DiamondView Zoom SOFTWARE

Installing the DiamondView Zoom software involves installing DiamondView application and a USB3 Video driver.

The DiamondView Zoom Installer program installs DiamondView Zoom Application and copies the USB3 driver to the installation folder. Installation of this software will typically require Windows Administrator privileges.

Please follow these steps for a trouble-free software installation:

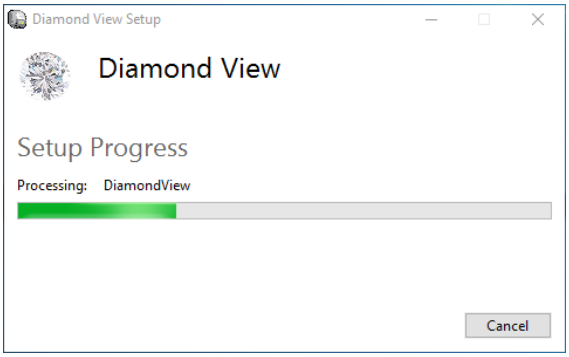
4.1 DiamondView Zoom Application

4.1.1 Installation of the DiamondView Zoom application including the drivers

1. Insert the media containing the DiamondView Zoom Installer program. The DiamondView Zoom software installer should start automatically if auto-start is enabled. If this does not occur open the drive with Windows Explorer and double-click on the “DiamondViewInstaller.exe” installer.
2. When the license agreement appears, please read it and check the ‘I Agree’ check box.



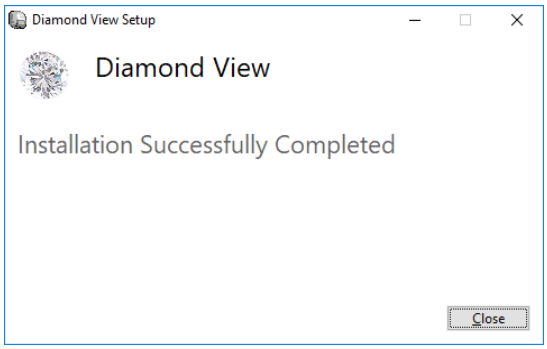
3. Click ‘Install’ to install the software. A Progress dialog will be displayed during the installation.



4. At the end of the installation a dialog will be presented to remind the user that the video driver must be installed in order for DiamondView Zoom to capture images:



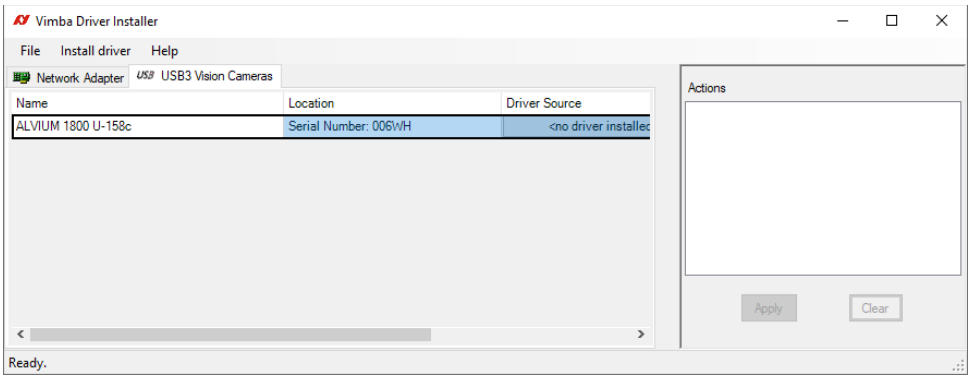
5. A dialog will indicate when installation of the DiamondView Zoom software is complete:



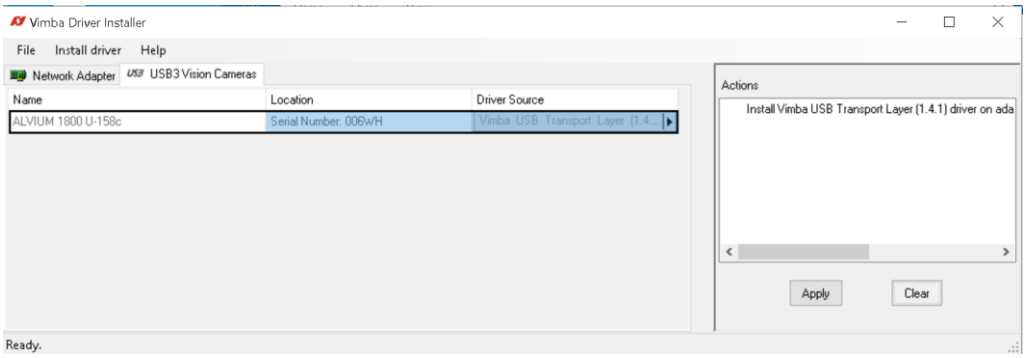
4.1.2 Manually installing the USB Video graphics driver using VimbaDriverInstaller

The following steps are required to allow DiamondView Zoom to capture images. The instrument should be connected to the PC and powered on before this action is undertaken or the camera will not be detected.

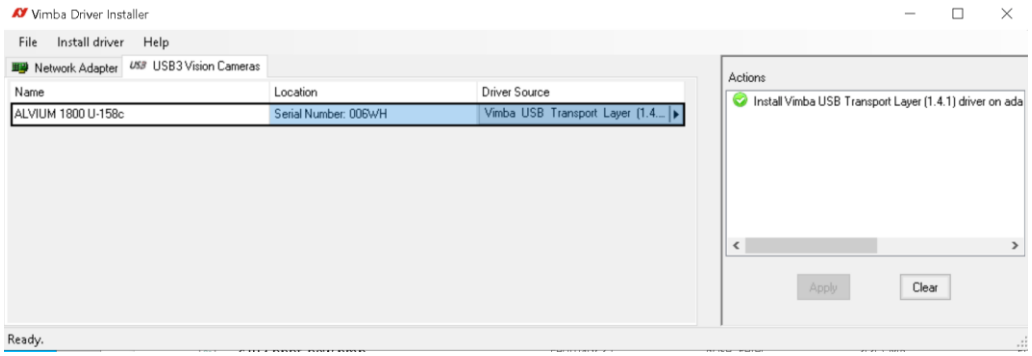
1. To install a driver manually, click on the deskop VimbaDriverInstaller icon or run VimbaDriverInstaller.exe located in the C:\Program Files\Allied Vision\Vimba_6.0\ Tools\DriverInstaller\Win64 folder to display the installation dialog:



2. Click on the USB3 Vision Cameras tab.
3. Click on the ALVIUM 1800 U-158c entry.
4. Select the menu option: Install driver –> USB VisionCamera –> Vimba USB Transport Layer 1.4.1 driver menu items. Observe the entry in the Actions box and click on the Apply button to install the driver:



5. Driver installation can be confirmed looking for the green tick annotation against the “Install Vimba USB Transport Layer 1.4.1 driver” message in the action box:



5 Diamondview Zoom USER CONTROLS

This section describes the various controls used to operate the DiamondView Zoom.

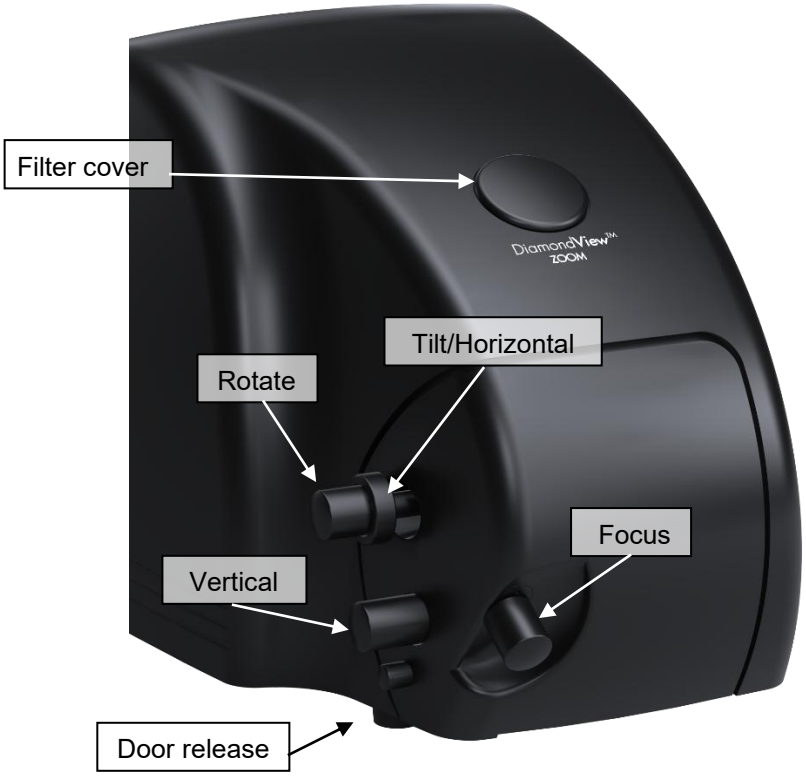


Figure 1: DiamondView Zoom User Controls

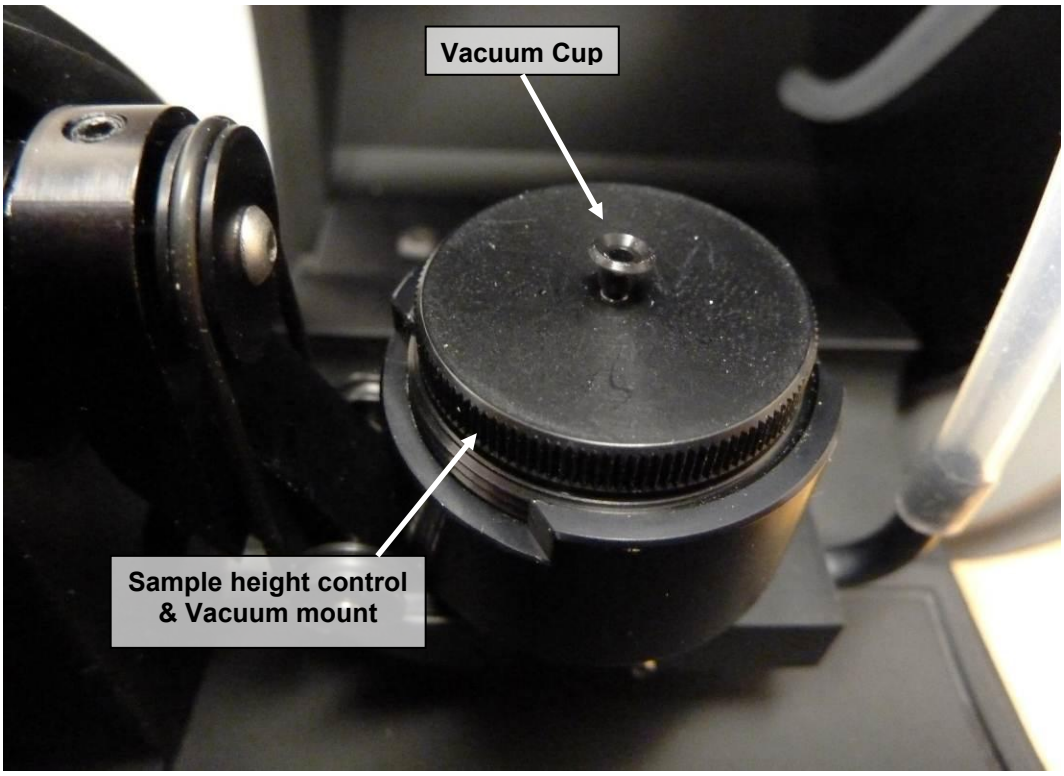


Figure 2: Vacuum Arm

5.1 Opening DiamondView Zoom chamber

To open the DiamondView Zoom chamber press the ”**Door Release**” button as shown in Figure 1. It is recommended that the door is supported by hand when opening.

5.2 Changing vacuum cup

The DiamondView Zoom is supplied with 2 sizes of vacuum cups: 2.5mm and 3.5mm. Select the appropriate size cup to match the size of sample to view. Carefully pull the existing cup away from the vacuum nozzle using a pair of tweezers as shown in Figure 3. Replace with the new cup by placing the cup over the vacuum nozzle and pressing downwards.



Figure 3: Removing the vacuum cup

5.3 Sample mounting

Open the DiamondView Zoom chamber. The Toolbar "**Pump**" button will be enabled when the chamber is opened allowing the pump to be operated. Pressing the button will toggle the pump on and off.



Figure 4: Enabling the pump

With the pump enabled place the sample on the vacuum cup holder, ensuring the correct size vacuum cup is fitted as described in Section 5.2. The sample height can be adjusted by rotating the **"Sample Height Control"** (knurled ring) on the vacuum arm as shown in Figure 5.



Figure 5: Adjusting vacuum cup holder height

Use the supplied "**Sample Height Gauge"** to check that the sample height is set correctly, as shown in Figure 6. If required adjust the sample height as described above. Using the "**Sample Height Gauge"** will ensure that there is enough travel in the "**Focus Control**" to allow the sample to be focused.



Figure 6: Setting the sample height

Using the "**Tilt Control"**, rotate the vacuum arm so that it is in the vertical position as shown in Figure 7.



Figure 7: Setting the vacuum arm to the vertical position

5.4 Closing the instrument chamber

To close the DiamondView Zoom chamber door push the door towards the main body of the instrument until the interlock is engaged.

5.5 Changing sample position as viewed on screen

5.5.1 Sample Rotation

The sample can be rotated clockwise and counter clockwise by turning the "**Rotation Control**" shown in Figure 1.

5.5.2 Sample Tilt position

To allow for pavilion, crown and other facets to be imaged the sample can be moved a total of 105° by rotating the "**Tilt Control**" shown in shown in Figure 1

5.5.3 Sample Horizontal position

The sample can be moved, by a small distance, either left or right on the screen by respectively pulling or pushing the "**Tilt Control**" shown in shown in Figure 1

5.5.4 Sample Vertical position

The sample can be moved up or down on the screen by rotating the "**Vertical Position Control"** shown in shown in Figure 1

5.5.5 Focus Control

To focus on the sample surface rotate the "**Focus Control**" shown in Figure 1. If focus cannot be reached the sample height may need adjusting as detailed in Section 5.3.

5.6 Fitting the Jewellery Holder

The DiamondView Zoom unit is supplied with a jewellery holder which consists of two fitted foam pieces. These can be used to mount and view samples in standard jewellery settings. Remove the vacuum mount by rotating it anti-clockwise until released, see Figure 8.

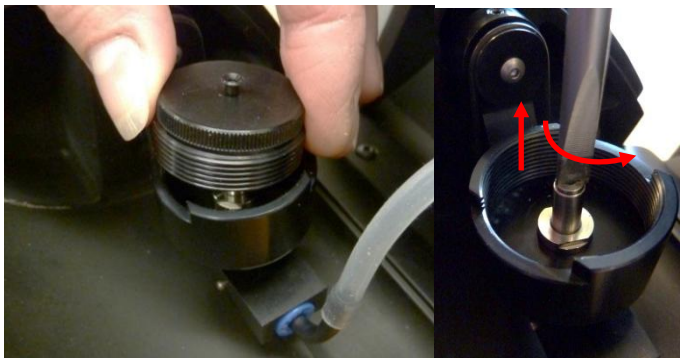


Figure 8: Removing the vacuum main body

Take the jewellery holder and place into the vacuum bowl as shown in Figure 9.

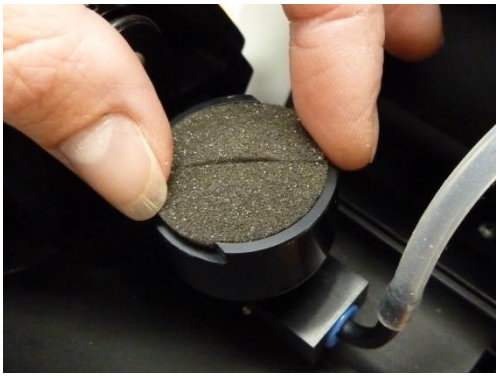


Figure 9: Fitting the jewellery holder

Mounted jewellery can then be fitted as shown in Figure 10. Use the supplied "**Sample Height Gauge"** to check that the sample height is set correctly.



Figure 10: Fitting jewellery pieces

5.7 Fitting the filters

The filters are stored in a separate case, see below. Five filters are supplied as well as one blank filter holder that will accept a one-inch diameter filter of the users choosing. Filters are engraved with the following:

B	Blue band pass filter (B390)
G	Long pass 475nm filter (GG475)
O	Long pass 550nm filter (OG550)
V	Standard DV filter (Infrared KG-5)
R	Long pass 725nm filter (RG725)



Depress the circular cover on the DiamondView Zoom case to release the mechanism and reveal the 'letter-box' opening. As required, insert one filter at a time into the 'letter-box' opening. Make sure that the filter is fully inserted. If the visible mode is selected the change in the image colour is an indication that the filter has been correctly positioned.

5.8 Fitting the small sample holder

The DiamondView Zoom is supplied with a small sample holder. This can be used to view smaller diamonds without the risk of losing them up the vacuum line.

Unscrew the vacuum mount exposing the tube fitting as shown in Figure 8.

Place a small amount of Blu-tack into the end of the small stone holder. Place the diamond table down onto a clean surface. Press the holder onto the diamond 'capturing' it in the Blu-tack. Place the holder over the tube fitting as shown in Figure 11.



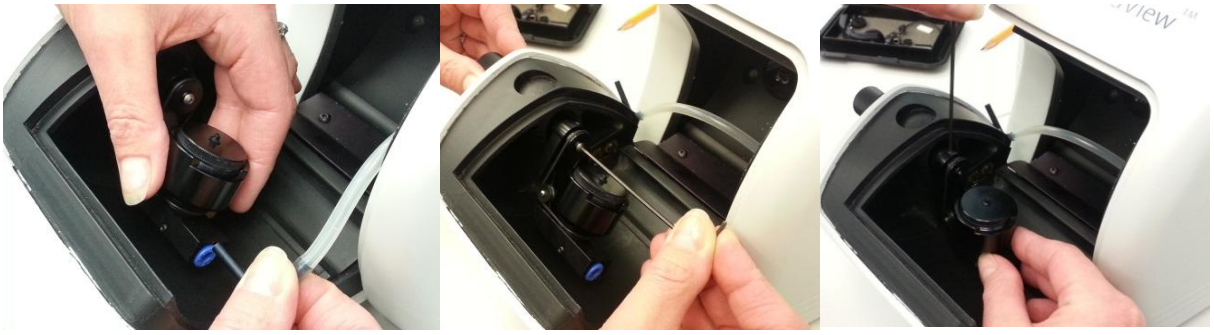
Figure 11: Placing the small stone holder in the sample chamber

Close the sample chamber and a visible image of the diamond will be seen on the monitor.

5.9 Fitting the large stone holder (supplied on request)

In some cases, for larger stones, the standard vacuum holder will not be sufficient to hold it. To view these stones a 'large stone holder' can be exchanged for the 'standard' vacuum holder. This uses a tweezers attachment to clamp around the stone thereby removing the risk of the stone falling off.

Remove the vacuum line and then remove the vacuum bowl assembly by removing the screw and loosening the upper grub screw as shown below.



Carefully remove the bowl assembly and replace with the new large stone assembly.

Tighten the screws and place the 'O' ring around the top and corner pulleys to ensure rotational movement (see below). Pick up the stone with the tweezers attachment and locate in the large stone holder assembly. Close the sample chamber door and a visible image can be viewed on the screen.



6 SOFTWARE USER INTERFACE

Once the instrument has been set-up and the software installed, it is possible to run the DiamondView Zoom application and operate the instrument.

6.1 Running the DiamondView Zoom application

The application may be run by double-clicking on the “DiamondView Zoom” icon on the Windows desktop or by clicking on the “DiamondView Zoom application” shortcut on the Windows Start menu.

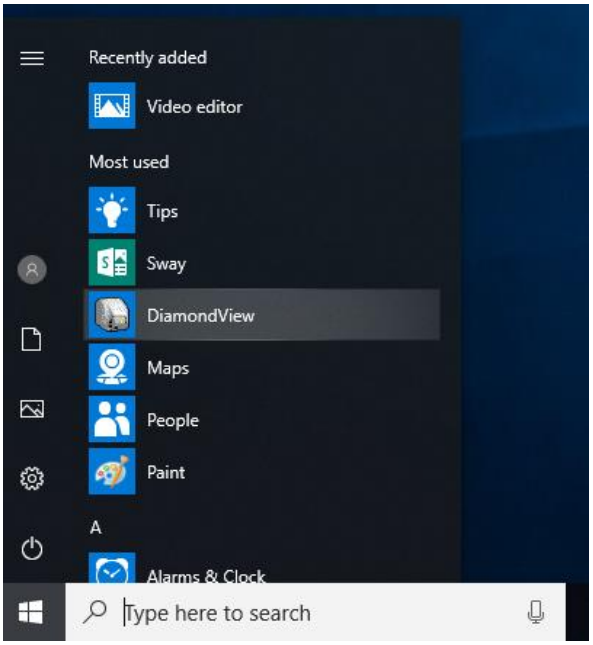


Figure 12: Running the DiamondView Zoom application

If you intend to use the DiamondView, ensure that the instrument has been switched on. If either of the two error messages shown in Figure 13 appears, ensure that the instrument is powered and all the cables are firmly connected. The application will continuously retry to connect with the DiamondView Zoom and the error messages will disappear when the instrument becomes available. Clicking on ***“Quit”*** will exit the application, whilst clicking on ***“No Instrument”*** will run the software without a connection to the instrument.

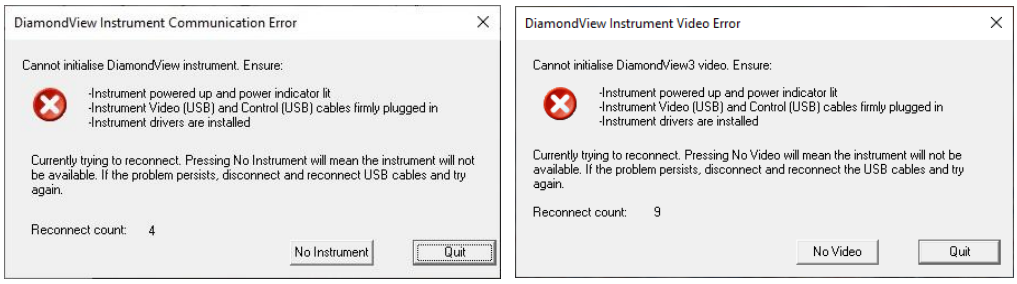


Figure 13: Instrument "Communication" and "Video" error messages

6.2 Selecting a location for the Application database

When the software runs for the first time it will prompt the user for a location where it can create the "dv3_data" directory for its database. Select a writable drive with plenty of free space. Subsequent new login users will also be prompted the first time they run the application and they may choose to select an existing database or to create a new one.

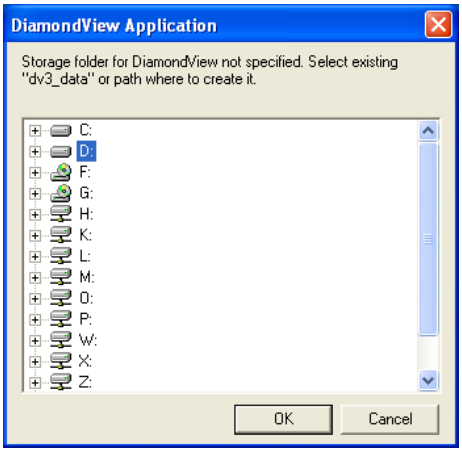


Figure 14: Locating the application database

If the location provided by the user already contains a "dv3_data" directory the application will load it. If the database does not exist it will create a new one.

6.3 Application window

The application consists of a number of different elements:

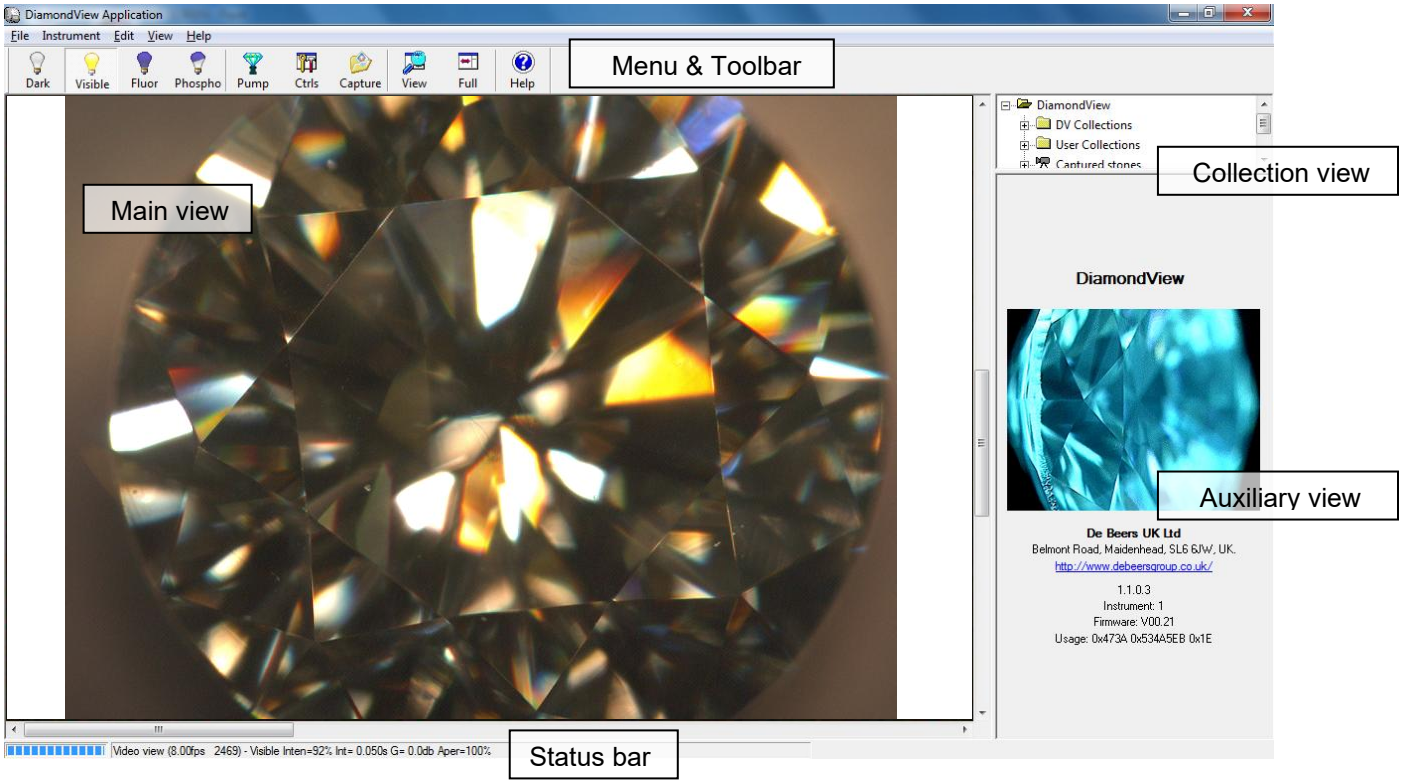


Figure 15: Elements of the DiamondView Zoom application

	Description
Menu & Toolbar	Via the Menu and Toolbar it is possible to: • Enable the Dark, Visible, Fluorescence or Phosphorescence modes • Display the Instrument controls related to the mode • Control the sample holder vacuum pump • Capture snapshots from the video • Control the application “Main view” • Open this manual
Main view	The “Main view” has two view modes: • Video view showing the live Instrument video • Snapshot view showing captured snapshots
Collection view	The “tree” contains the DV snapshot collection, calibration snapshots and the user captured snapshots. The view also allows users to manage their snapshot collections.
Auxiliary view	The “Auxiliary view” has multiple view modes showing: • Information about the software and connected instrument • The instrument controls • The snapshot thumbnails • The snapshot details
Status bar	The status bar is composed of the progress bar, text showing the active “Main view” and the instrument settings for the selected mode.

6.4 Customising the application window

The application window and its views can be sized by clicking on the window corner or view dividers and dragging them to the desired position with the mouse.

The toolbar may be detached from the application window and attached to any of its four sides.

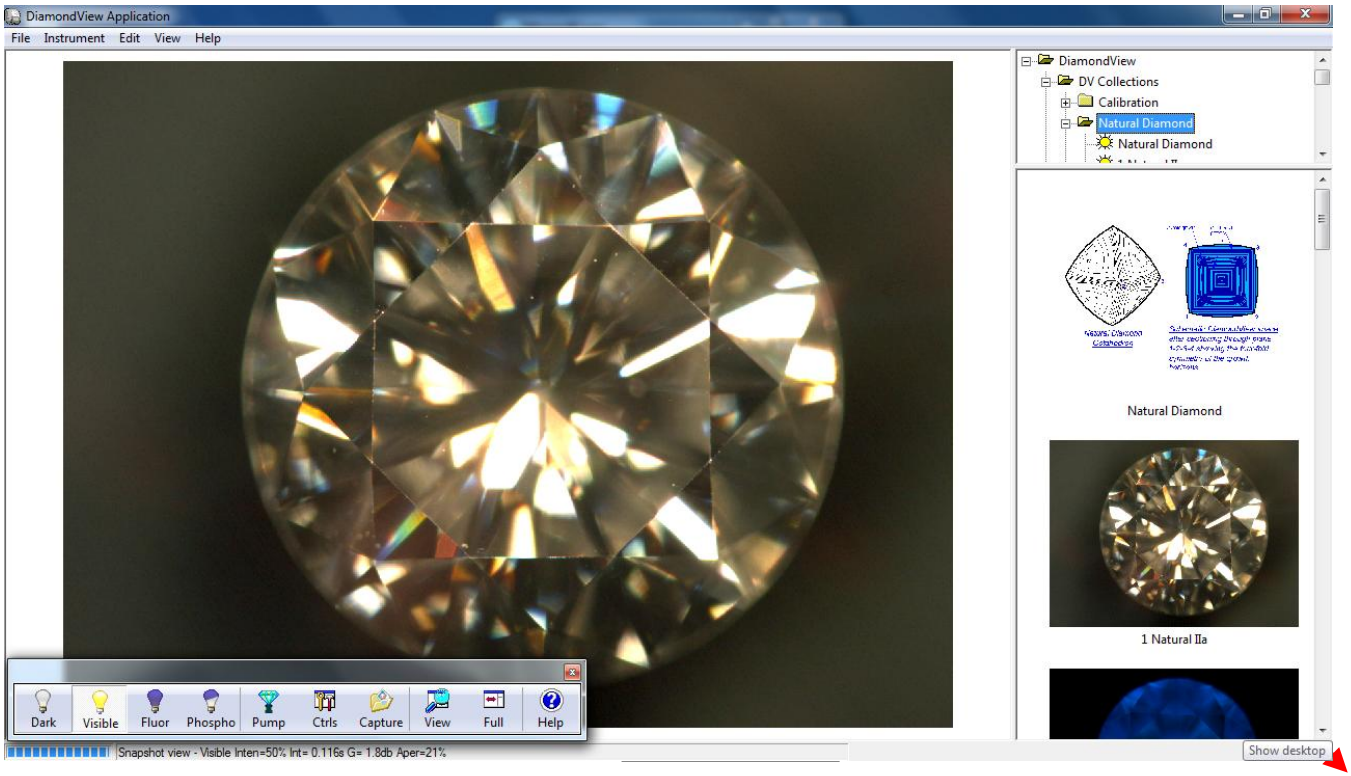


Figure 16: Customising the application window

6.5 Components of the application window

6.5.1 Toolbar

The Toolbar contains the most commonly used features from the application menu. By operating the buttons it is possible to switch between the Dark, Visible, Fluorescence or Phosphorescence modes, control the instrument, set the “Main View” to show video or captured snapshots and call up the help. The Toolbar may be detached from the application or attached to any of its sides.



Figure 17: The Toolbar

The function of the toolbar buttons are as follows:

	Description
Dark	Show sample with no visible illumination or UV excitation.
Visible	Show sample illuminated with visible light.
Fluor	Show sample Fluorescence by exciting it with continuous UV.
Phospho	Show sample Phosphorescence by charging it with UV and showing its resulting glow.
Pump	Enable/Disable the vacuum pump used to hold the sample in the holder. **Note:** This button can only be operated when the chamber door is open.
Ctrls	Shows the instrument controls in the “Auxiliary view”.
Capture	Capture snapshot from the video. **Note:** This button may be disabled for a brief period following an adjustment to the instrument controls while the changes are applied to the instrument.
View	Selects the type of video or snapshot view shown in the “Main view”.
Full	Hides/shows the “Collection view” and “Auxiliary view” to maximize the area available in the “Main View” for viewing video or snapshots.
Help	Opens this manual.

6.5.2 Collection view

The Collection view as shown in Figure 18 contains the sample reference snapshots that have been supplied by De Beers Group and any snapshots that the user may capture. This view allows the user to manage and organise their captured snapshots into folders to suit their classification needs.

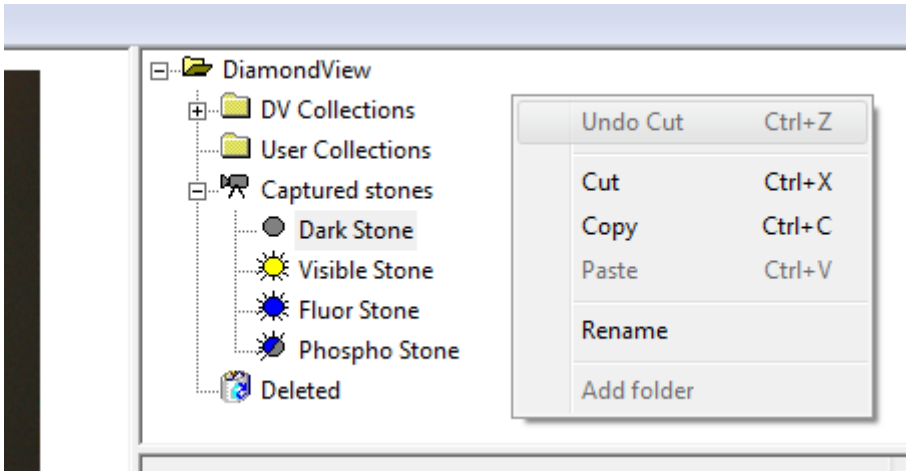


Figure 18: Collection view

Clicking on an item with the left mouse button selects one element while clicking with the shift key pressed allows multiple items to be selected. Right clicking the mouse when the pointer is over the view shows a pop-up menu that allows the user to copy & paste elements, rename them and add folders. Some of the pop-up menu options may be disabled depending on the type of element(s) selected. The user may also drag elements to different locations by left clicking on them and moving the mouse with the left button pressed down.

The different elements are summarised in the table below:

Collection View Icon	Description	Cut/Rename/ Delete in?	Copy/Paste in?	Copy from?
DiamondView	Top level folder	No	No	No
DV Collections	Contains collections of sample snapshots supplied by IIDGR and calibration images.	No	No	Yes
User Collections	Contains collections of snapshots that have been created by the user.	Yes	Yes	Yes
Captured stones	Contains snapshots that have been captured.	Yes	Yes	Yes
Deleted	Contains elements that have been marked for deletion when the application exits.	Yes	Yes	Yes
???	Folder	Depends on parent folder		
???	Dark mode snapshot	Depends on parent folder		
???	Visible mode snapshot	Depends on parent folder		
???	Fluorescence mode snapshot	Depends on parent folder		
???	Phosphorescence mode snapshot	Depends on parent folder		

6.5.3 Video (“Main view”)

The default “Main view” showing video can be seen in Figure 19. It can be selected by clicking on the “**View**” Toolbar button and selecting “**Video view - fit**”. Selecting “**Video view - actual**” shows the video in its actual video resolution size of 1280x960 as shown in Figure 20.

Right clicking on this area shows a pop-up menu that allows the user to toggle between the two video modes and apply digital zooming. A left click on the video image has the effect of zooming in one step.

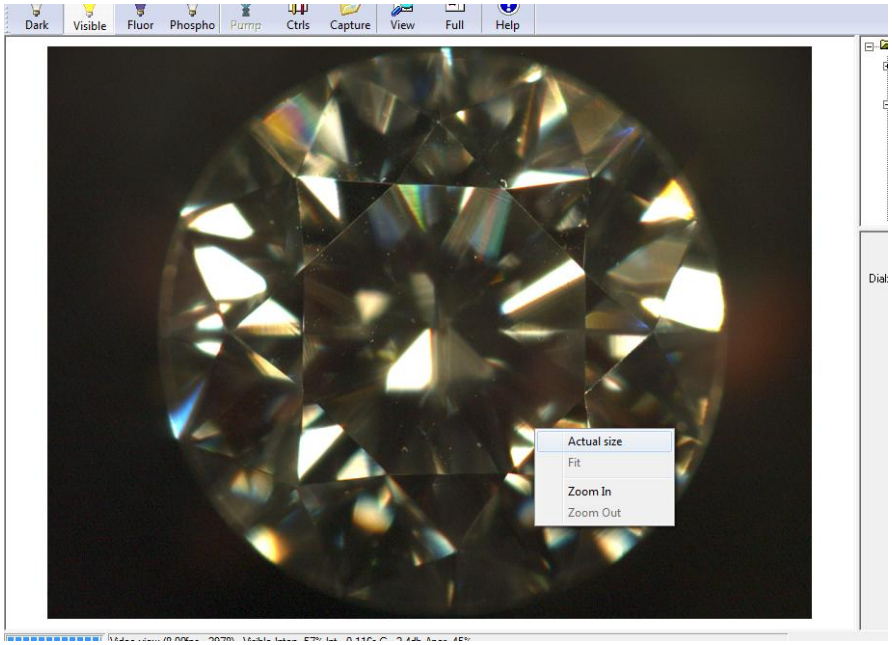


Figure 19: “Video view – fit” in “Main view”

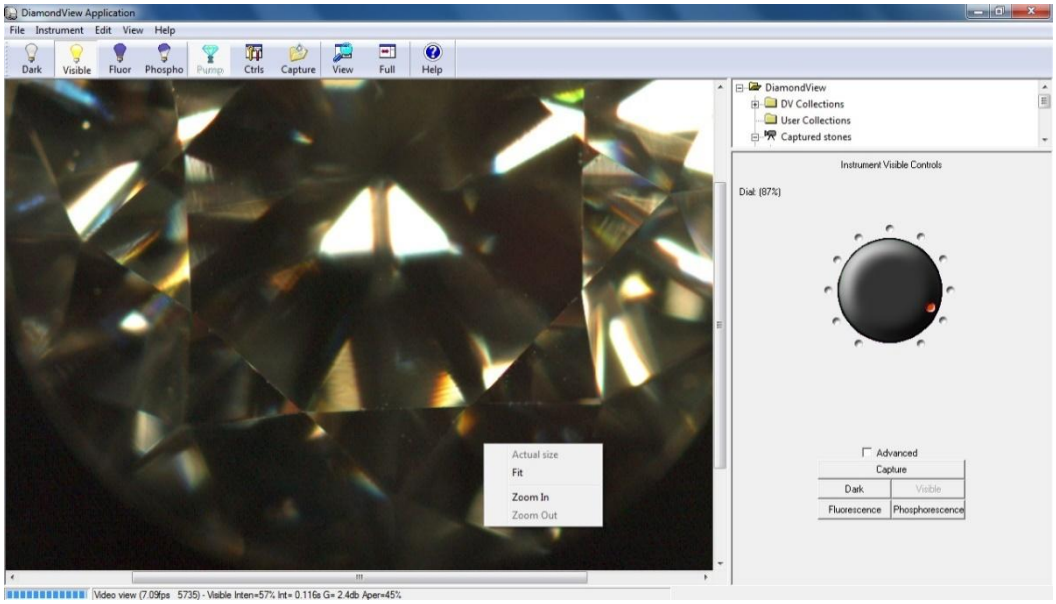


Figure 20: “Video view – actual” in “Main view”

6.5.4 Snapshots (“Main view”)

The secondary purpose of the “Main view” is to view snapshots. Snapshots can be viewed by clicking on the “**View**” Toolbar button and selecting “**Snapshot view – 1x1**” or “**Snapshot view – 2x2**” that are shown respectively in Figure 21 and Figure 22. Clicking on a sample snapshot in the “Collection view” will display the snapshot.

Right clicking on this area shows a pop-up menu that allows the user to toggle between the actual snapshot and fit to screen sizes and apply digital zooming. A left click on the video image has the effect of selecting the snapshot highlighting it in the “Collection view” and showing the snapshot details in the Auxiliary view.

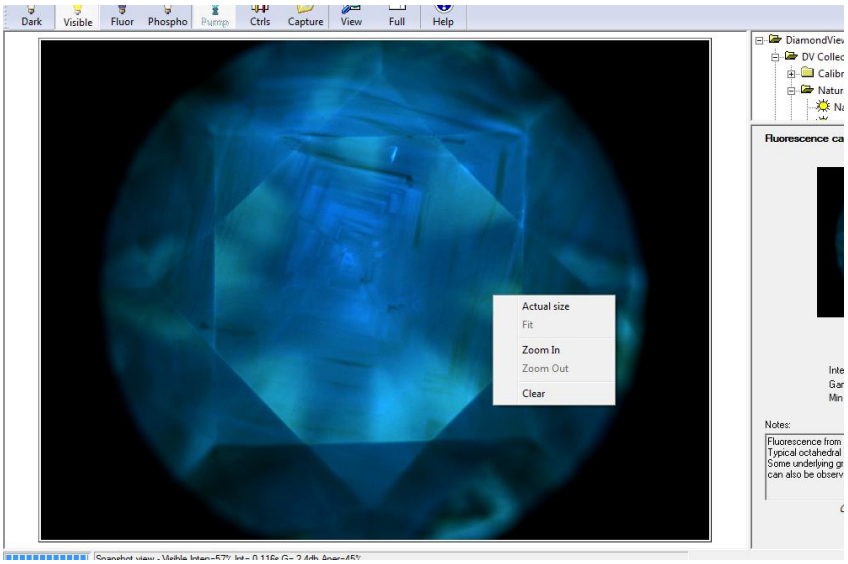


Figure 21: Snapshot view – 1x1 in “Main view”

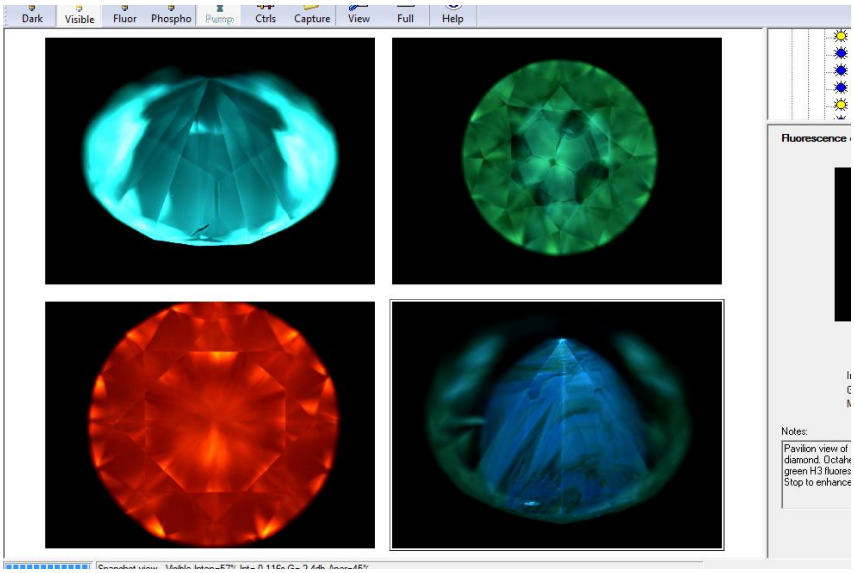


Figure 22: Snapshot view – 2x2 in “Main view”

6.5.5 Instrument Controls (Auxiliary view)

The Instrument controls are displayed in the Auxiliary view and allow the user to control the behaviour of the instrument “Dark”, “Visible”, “Fluorescence” and “Phosphorescence” modes. The controls can be shown by clicking on the “**Ctrls**” Toolbar button.

6.5.5.1 Dark

Figure 23 shows an example of the Instrument Controls when the Instrument is in “Dark” mode. Clicking on the “**Advanced**” tick-box will toggle between the basic and advanced controls. The basic controls allow the user to quickly obtain an image with the dial position controlling the brightness of the video image. The advanced controls allow the user to obtain precise control of the different settings without the presets hardwired in the basic control. Some of the sliders in the advanced mode may be greyed out and disabled as they are not applicable to all modes.

All the control sliders and the dial can be operated by clicking with the left mouse button and moving the mouse with the button pressed down and then releasing the button.

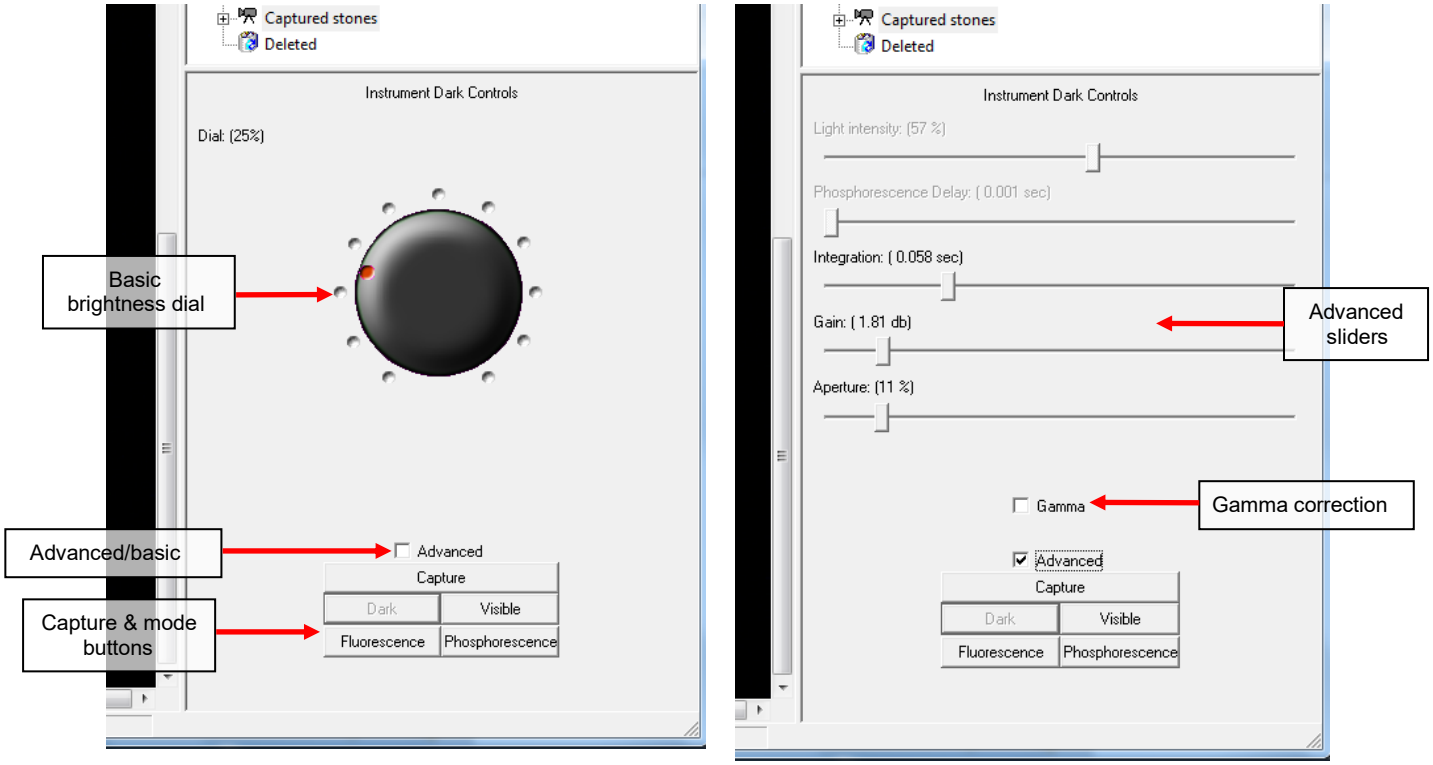


Figure 23: Instrument Dark mode Basic and Advanced controls

Common controls found in all the modes are:

	Description
Dial	Sets the brightness of the video image by automatically setting the advanced controls.
Advanced tick-box	Toggle between basic and advanced instrument controls
Capture button	Capture snapshot from video. Identical to Toolbar “Capture”. **Note:** This button may be disabled for a brief period following an adjustment of an instrument control while the changes are applied to the instrument.
Dark button	Show sample with no visible illumination or UV excitation Identical to Toolbar “Dark”.
Visible button	Show sample under visible illumination. Identical to Toolbar “Visible”.
Fluorescence button	Show sample Fluorescence under UV excitation. Identical to Toolbar “Fluor”.
Phosphorescence button	Show sample Phosphorescence. Identical to Toolbar “Phospho”.
Integration	Sets the integration period of the instrument camera **Note:** Lower integration time settings increase the video frame rate producing a more fluid image. The maximum frame rate attainable is 7.5 frames per second at the lower integration time settings.
Gain	Sets the electronic gain of the instrument camera **Note:** The higher values of electronic gain introduce noise into the video image.
Aperture	Sets the instrument camera aperture size **Note:** The smaller the aperture the greater depth of field but at the expense of resolution and signal level
Gamma tick-box	Enable/Disable video gamma correction **Note**: The Gamma correction is most useful where snapshots have a large range of contrast. It is recommended that the gamma correction is selected when in visible mode.

6.5.5.2 Visible

Figure 24 shows the “Visible” instrument basic and advanced controls.

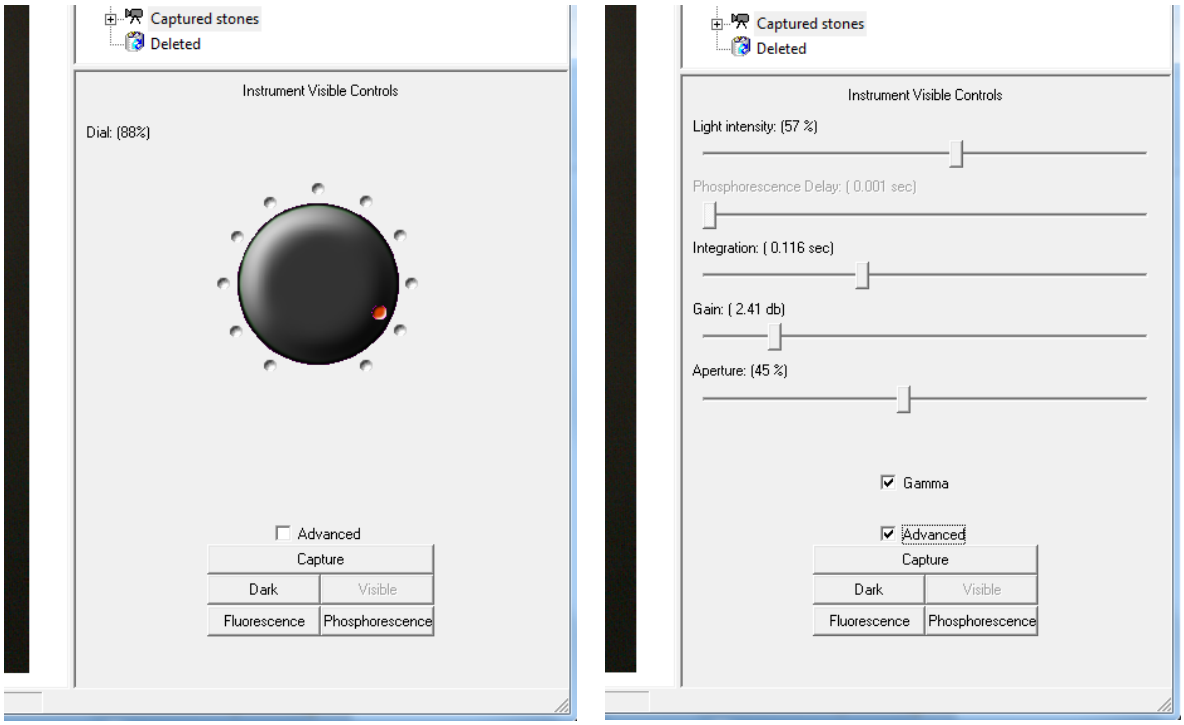


Figure 24: Instrument Visible mode Basic and Advanced controls

In addition to common controls found in “Dark” mode the following controls are also applicable:

	Description
Light intensity	Sets the visible light intensity

6.5.5.3 Fluorescence

Figure 25 shows the “Fluorescence” instrument basic and advanced controls.

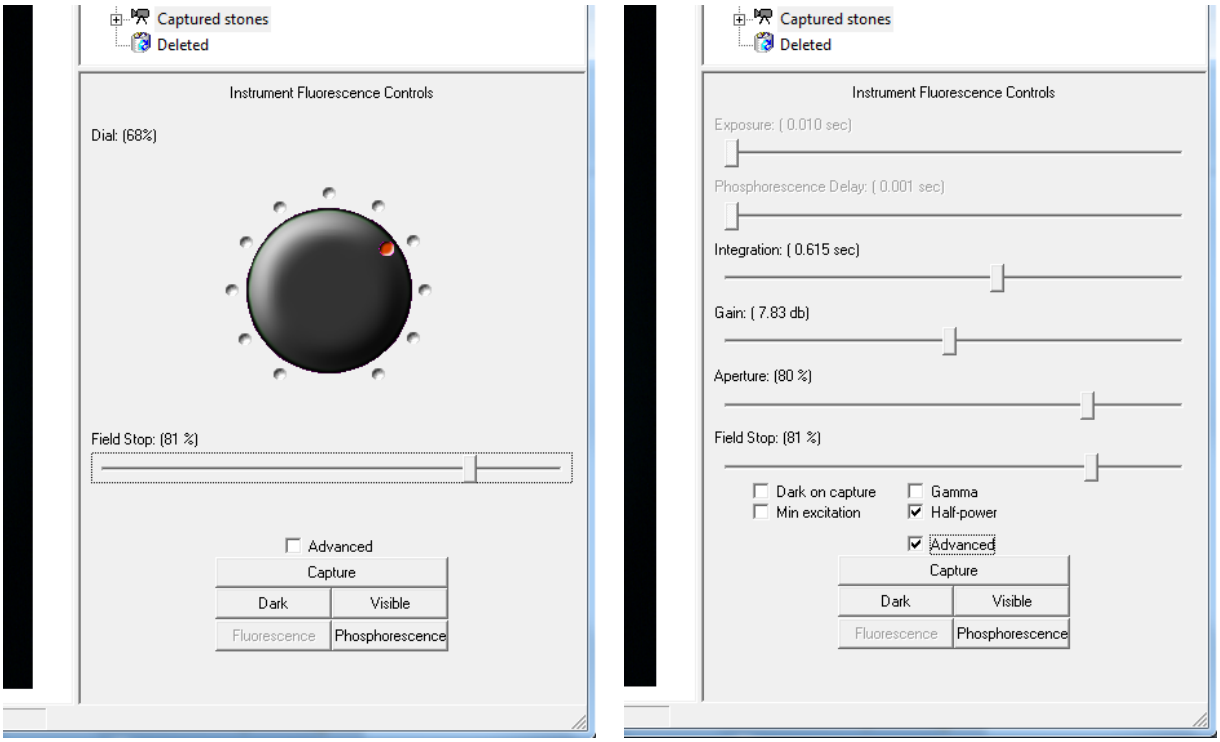


Figure 25: Instrument Fluorescence mode Basic and Advanced controls

In addition to common controls found in “Dark” mode the following controls are also applicable:

	Description
Field stop	Sets the field-stop on the UV lamp.
Minimum excitation tick-box	Enable/Disable minimum excitation so that the sample is excited only during the camera integration. To allow underlying phosphorescence to decay, a 20sec delay is instigated before each integration.
Dark on capture tick-box	Enable automatic switching to “Dark mode” after a capture to observe phosphorescence.
Half-power tick-box	Enable/Disable full power. **Note: At full power the life of the UV strobe and filter is reduced.**

6.5.5.4 Phosphorescence

Figure 26 shows the “Phosphorescence” instrument basic and advanced controls.

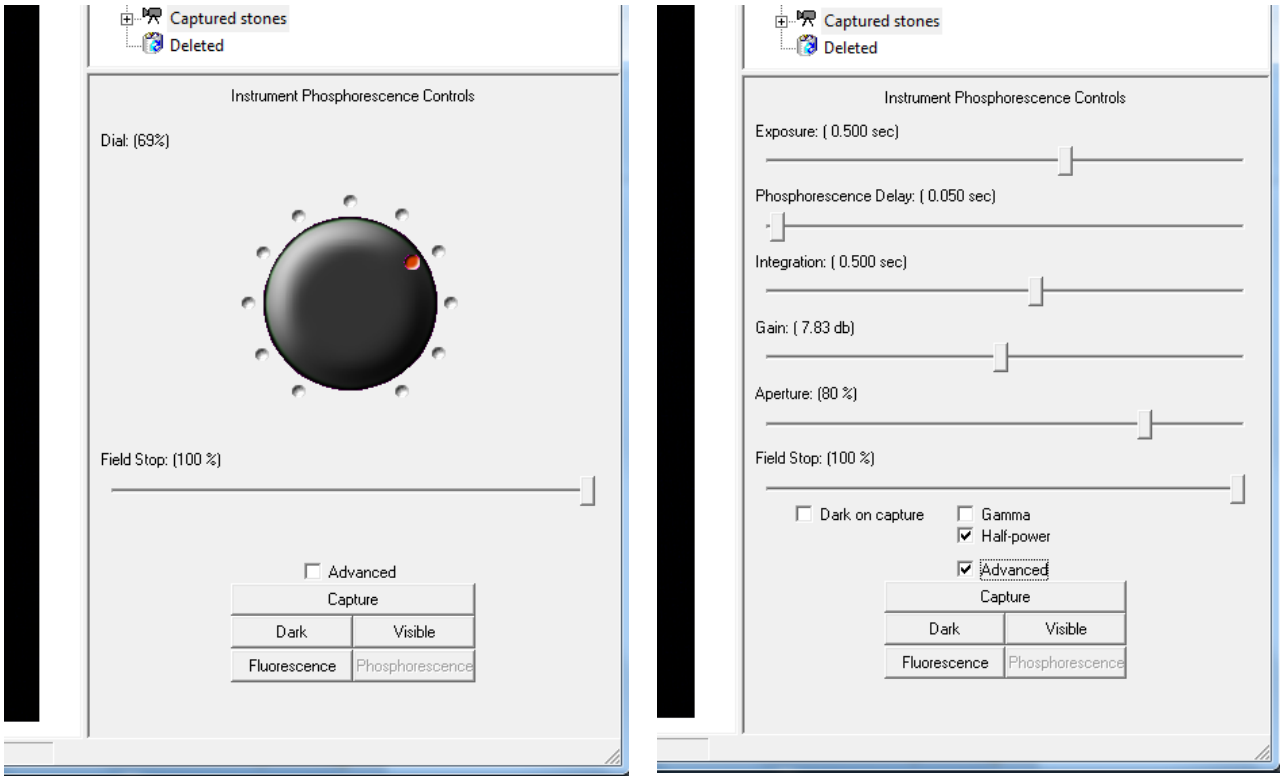


Figure 26: Instrument Phosphorescence mode Basic and Advanced controls

In addition to common controls found in “Dark” mode the following controls are also applicable:

	Description
Field stop	Sets the field-stop on the UV lamp.
Exposure	Sets the exposure time of the sample to UV light
Phosphorescence delay	Sets the delay between the exposure period and the subsequent integration period
Dark on capture tick-box	Enable automatic switching to “Dark mode” after a capture to observe long-lived phosphorescence.
Half-power tick-box	Enable/Disable full power. **Note: At full power the life of the UV strobe and filter is reduced.**

6.5.6 Snapshot details (Auxiliary view)

When a snapshot is selected in the “Collections view” or “Main View” by left clicking with the mouse on the element, the “Auxiliary view” displays the snapshot details. There are four types of snapshot details views corresponding to the “Dark”, “Visible”, “Fluorescence” and “Phosphorescence” modes.

6.5.6.1 Dark

Figure 27 shows the snapshot details view for a snapshot captured in “Dark” mode.

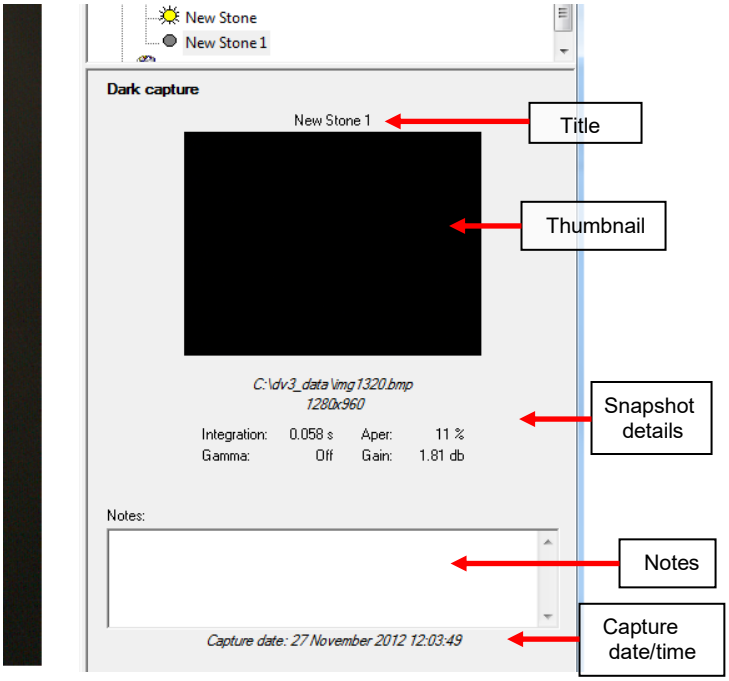


Figure 27: Dark snapshot details

Common details found in all snapshots captured in different modes are:

	Description
Title	Title of the snapshot assigned in the “Collection view”.
Snapshot thumbnail	Thumbnail showing the captured snapshot. Clicking on the thumbnail shows the snapshot in the “Main view” in 1x1.
Snapshot path	Path where snapshot is kept on disk.
Snapshot resolution	Resolution of snapshot.
Integration	Setting for instrument camera integration used in snapshot capture.
Gain	Setting for instrument camera electronic gain used in snapshot capture.
Aperture	Setting for instrument camera aperture used in snapshot capture.
Gamma	Indicates if gamma correction was enabled during snapshot capture.
Notes	Notes to accompany captured snapshot. **Note:** Only notes of snapshot captured by the user may be modified.
Capture date/time	Indicates date and time of snapshot capture

6.5.6.2 Visible

Figure 28 shows the snapshot details view for a snapshot captured in “Visible” mode.

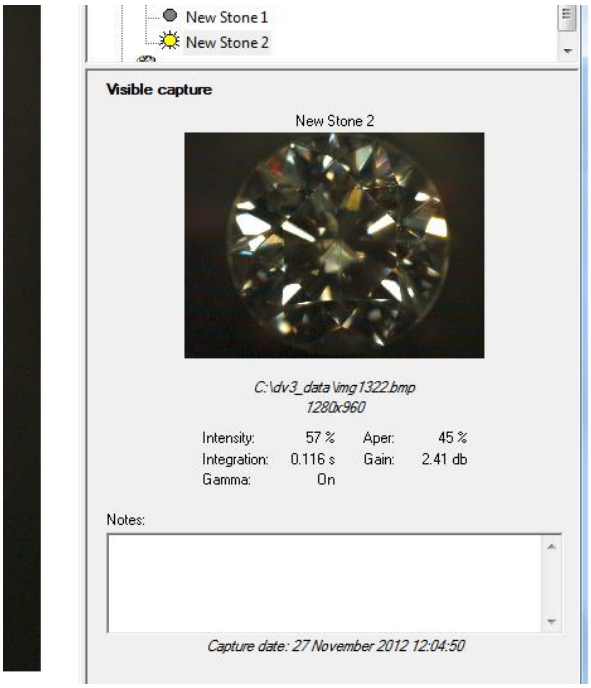


Figure 28: Visible snapshot details

In addition to the common details found in the “Dark” details the following are also shown:

	Description
Light intensity	Intensity of visible lamp used in snapshot capture.

6.5.6.3 Fluorescence

Figure 29 shows the snapshot details view for a snapshot captured in “Fluorescence” mode.

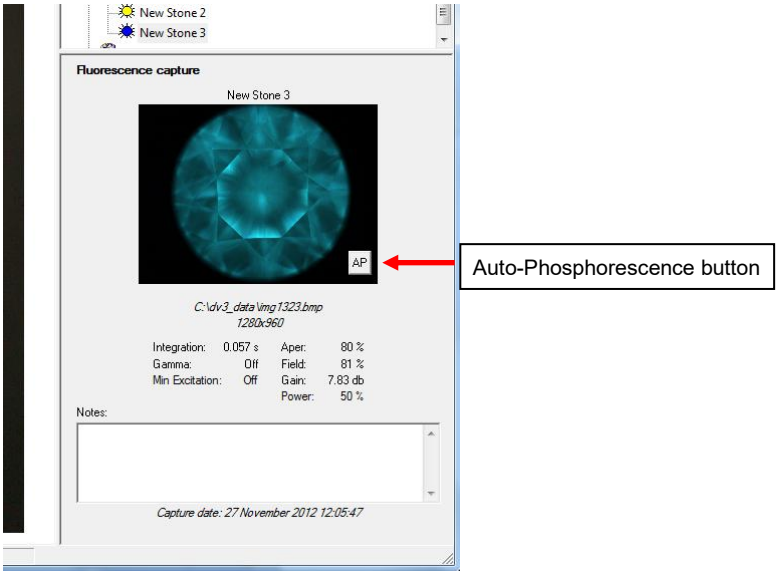


Figure 29: Fluorescence snapshot details

In addition to the common details found in the “Dark” details the following are also shown:

	Description
Field stop	Shows the field-stop on the UV lamp used in snapshot capture.
Min Excitation	Indicates if minimum excitation was enabled during snapshot capture.
Power	UV Strobe power (50% or 100%)

The Fluorescence snapshot thumbnail has a button labelled “**AP**” which when clicked will open a window as shown in Figure 30. This window displays the auto-phosphorescence image that is automatically captured with the Fluorescence snapshot.



Figure 30: Auto-Phosphorescence capture

6.5.6.4 Phosphorescence

Figure 31 shows the snapshot details view for a snapshot captured in “Phosphorescence” mode.

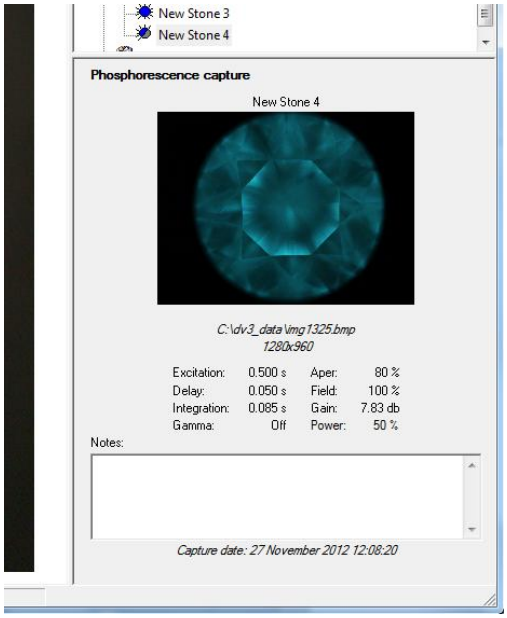


Figure 31: Phosphorescence snapshot details

In addition to the common details found in the “Dark” details the following are also shown:

	Description
Field stop	Shows the field-stop on the UV lamp used in snapshot capture.
Exposure	Shows the exposure time used in snapshot capture.
Phosphorescence delay	Shows the delay between the exposure period and the subsequent integration period used in snapshot capture.
Power	UV Strobe power (50% or 100%)

6.5.7 Snapshot Thumbnails (Auxiliary view)

When a folder is selected in the “Collections view” by left clicking with the mouse on the element, the “Auxiliary view” displays all the snapshots contained as shown in Figure 32.

Clicking on a thumbnail will automatically show the snapshot details in the “Auxiliary view”.

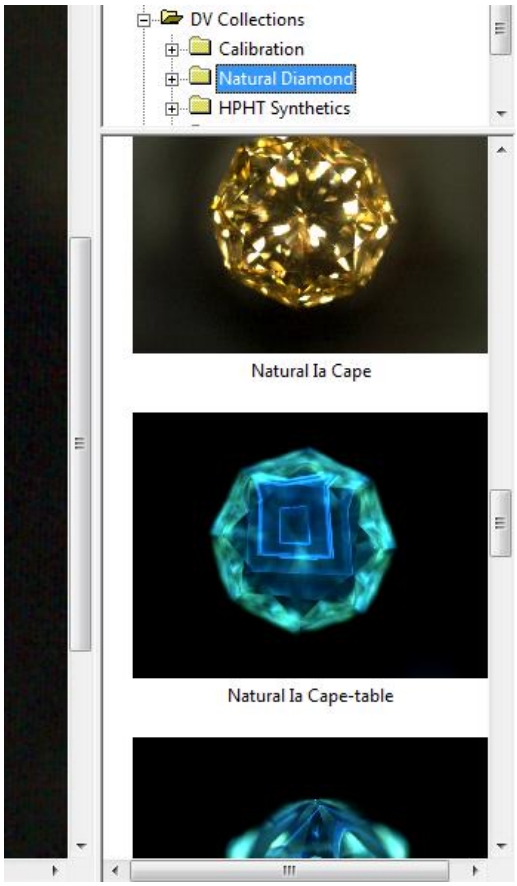


Figure 32: Snapshot thumbnails

6.5.8 About DiamondView Zoom (Auxiliary view)

The "**About DiamondView…"** option under the "**Help**" menu displays the software build version, the instrument serial number and the instrument firmware version.



6.5.9 Status bar

The status bar shows the progress of a capture operation, the view type, the current mode and a summary of the instrument control settings.

Figure 33 shows the status bar in video mode while the instrument is in "Phosphorescence" mode. The values within brackets besides the view type indicate the video frame rate and the frame count within a given session. The view type can be either "Video view" as shown or "Snapshot view". The mode can show "Dark", "Visible", "Fluorescence" or "Phosphorescence".

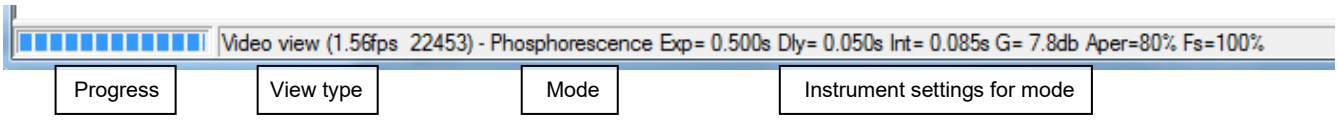


Figure 33: Status bar

The instrument settings are abbreviated as follows:

	Description
Exp	Phosphorescence Exposure time
Dly	Phosphorescence Delay time
Int	Integration time
Inten	Visible Intensity

	Description
G	Camera Electronic Gain
Aper	Camera Aperture
Fs	UV lamp Field-stop

6.5.10 Menu

The Menu is divided into five categories under "File", "Instrument", "Edit", "View" and "Help".

6.5.10.1 File

Figure 34 shows the File menu.

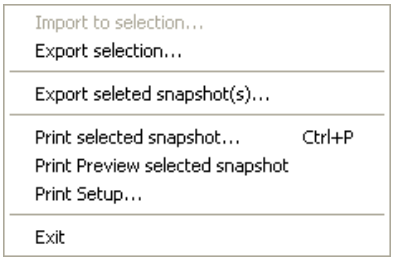


Figure 34: File menu

	Description
Import to selection…	Imports an element and its contents previously exported with “**Export selection…**” into the selected folder in the “Collection view”
Export selection…	Exports the selected element (folder or snapshot) in the “Collection view” and its contents to a XML file and a series of BMP images for importing with “**Import to selection…”**
Export selected snapshot(s) …	Exports the selected snapshot(s) in the “Collection view” as bitmap images with description files containing the capture details.
Print selected snapshot…	Print the selected snapshot in the “Collection view”.
Print Preview selected snapshot	Shows the print preview of the selected snapshot in the “Collection view” on the printer selected in “**Print Setup…**”.
Print Setup…	Shows the Printer setup that will be used when printing from the application.
Exit	Exits the application

6.5.10.2 Instrument

Figure 35 shows the Instrument menu.

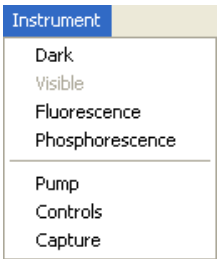


Figure 35: Instrument menu

	Description
Dark	Show sample with no visible illumination or UV excitation. Identical to Toolbar "**Dark**".
Visible	Show sample under visible illumination. Identical to Toolbar "**Visible**".
Fluorescence	Show sample Fluorescence under UV light. Identical to Toolbar "**Fluor**".
Phosphorescence	Show sample Phosphorescence. Identical to Toolbar "**Phospho**".
Pump	Enable/Disable the vacuum pump used to hold the sample in the holder. Identical to Toolbar "**Pump**". **Note:** This button can only be operated when the chamber door is open.
Controls	Brings up the instrument controls. Identical to Toolbar "**Ctrls**".
Capture	Capture snapshot from the video. Identical to Toolbar "**Capture**". **Note:** This button may be disabled for a brief period following an adjustment to the instrument controls while the changes are applied to the instrument.

6.5.10.3 Edit

Figure 36 shows the Edit menu.

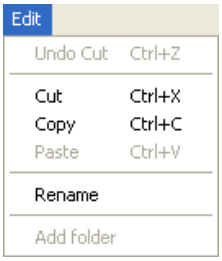


Figure 36: Edit menu

	Description
Undo Cut	Undoes the elements that have been "**Cut**" from the "Collection view".
Cut	Cut selected element(s) and its contents in the "Collection view".
Copy	Copy selected element(s) and its contents in the "Collection view".
Paste	Paste previously cut or copied elements to the selected element in the "Collection view".
Rename	Rename the selected element in the "Collection view".
Add folder	Add folder to the selected element in the "Collection view".

6.5.10.4 View

Figure 37 shows the View menu.

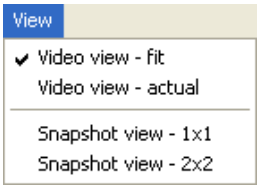


Figure 37: View menu

	Description
Video view - fit	Shows video in “Main view” and scales it to fit the available area.
Video view – actual	Shows the video in its actual video resolution size of 1280x960
Snapshot view – 1x1	Shows up to 1 snapshot in “Main view”.
Snapshot view – 2x2	Shows up to 4 snapshots in the “Main view” in a 2 by 2 array.

6.5.10.5 Help

Figure 38 shows the Help menu.

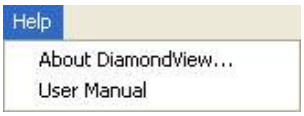


Figure 38: Help menu

	Description
About DiamondView Zoom …	Shows software details on the “Auxiliary view”
User Manual	Opens this manual

6.6 Capturing sample snapshots

This section details how to use the DiamondView Zoom to examine a sample and to capture a snapshot.

6.6.1 Mounting and observing the sample

Mount the sample as described in Section 5.3

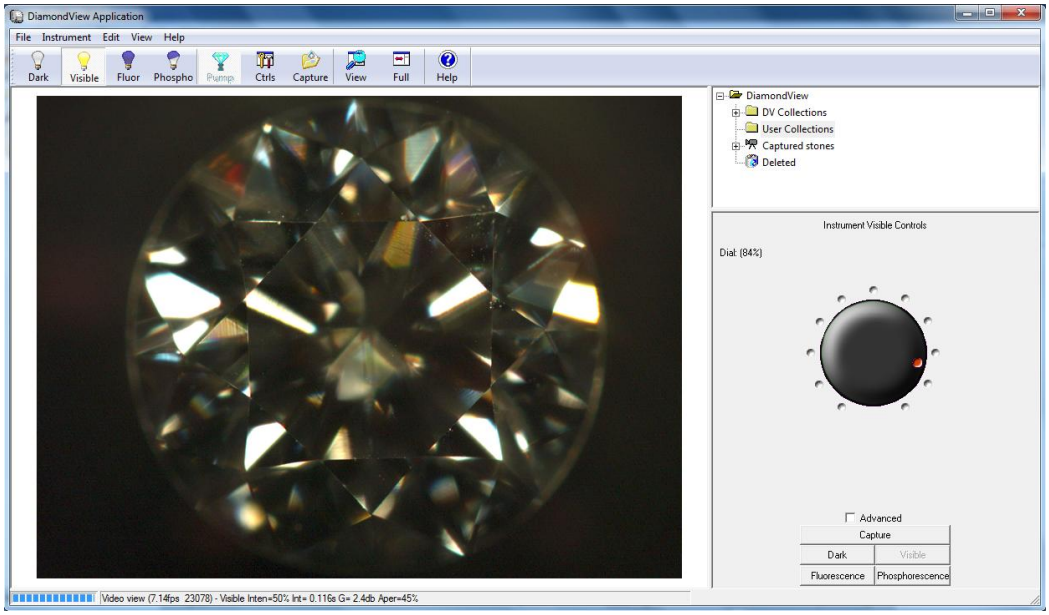


Figure 39: Video showing sample on holder

6.6.2 Selecting the Instrument Mode

Once the sample has been mounted and the chamber door closed the “Visible” mode will be selected. It is then possible to enable the “Dark”, “Fluorescence” or “Phosphorescence” mode. This can be done from the toolbar buttons shown in Figure 40.



Figure 40: Selecting Instrument mode

6.6.3 Setting the Instrument Controls

To show the Instrument Controls:

1. Click on the Toolbar “**Ctrls**” button



Figure 41: Showing the Instrument Controls

2. Use the dial or Advanced controls to adjust the settings. The dial and all the control sliders can be operated by clicking with the left mouse button and moving the mouse with the button pressed down and then releasing the button.

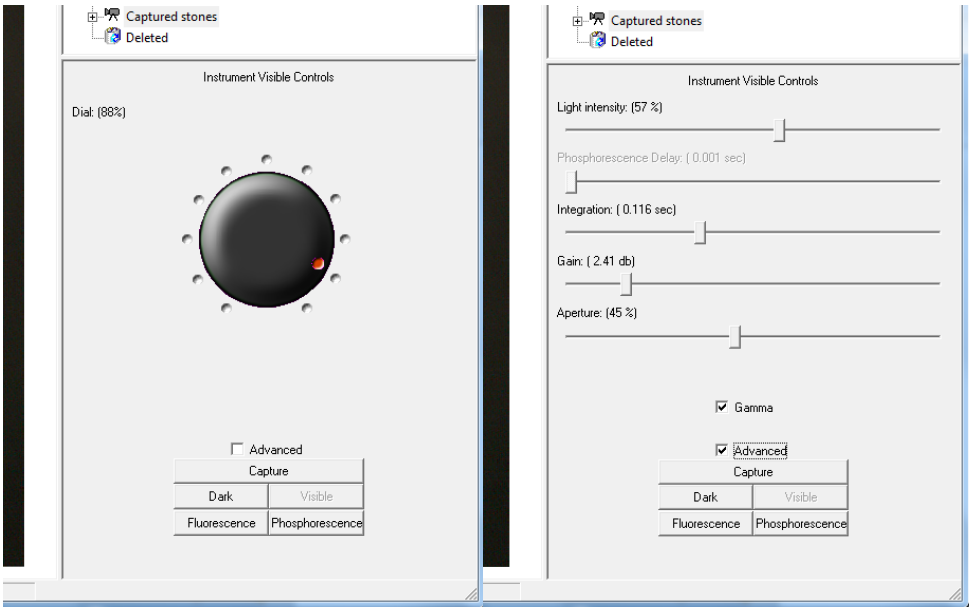


Figure 42: Visible Instrument Controls

Note: The DiamondView Zoom software maintains and saves independent Instrument Control settings for each of the different Instrument Modes. These settings are restored when swapping modes and loaded when re-starting the application. The saved settings are also user login independent.

6.6.4 UV lamp timeout

In Fluorescence or Phosphorescence mode when the UV lamp is operating the software enforces a usage timeout after which the popup shown in Figure 43 will appear and the mode will be switched to Visible. In Fluorescence mode the timeout is fixed to 2 minutes. When in Phosphorescence mode the timeout ranges from 2 to 10 minutes depending on the UV lamp duty cycle.

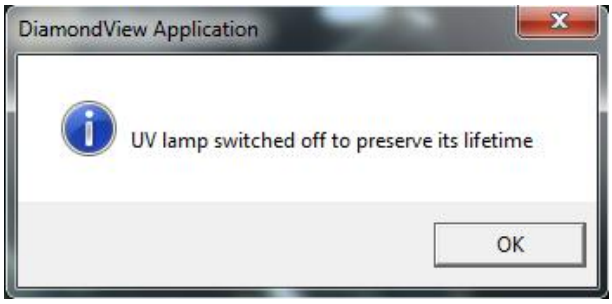


Figure 43: UV timeout

6.6.5 Hiding the side views

The DiamondView Zoom application allows detail to be observed better by allowing the user to maximise the video area. The side views are composed of the “Collections view” and the “Auxiliary view” and these can be hidden by clicking on the Toolbar “**Full**” button. Clicking on the button again will restore the side views.



Figure 44: Toggling the side views

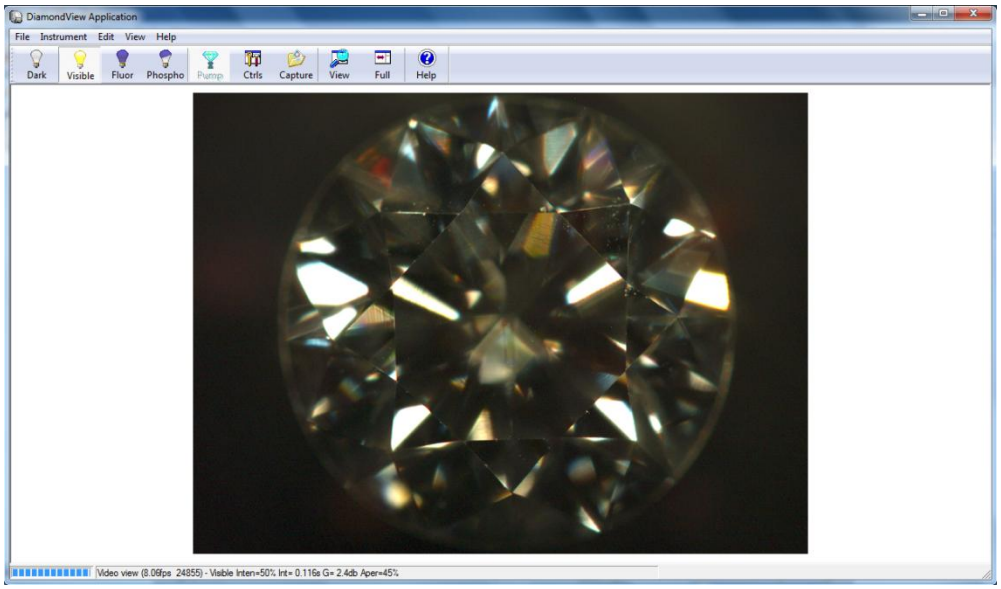


Figure 45: Hiding the side views

6.6.6 Zooming

The DiamondView Zoom application allows detail to be observed better by allowing the user to zoom into the image. Zooming can be performed by clicking with the left mouse button on the video image. The zoomed image will be centred at the point where the mouse was clicked. The side and bottom scroll bars allow vertical and horizontal movement of the image (respectively).

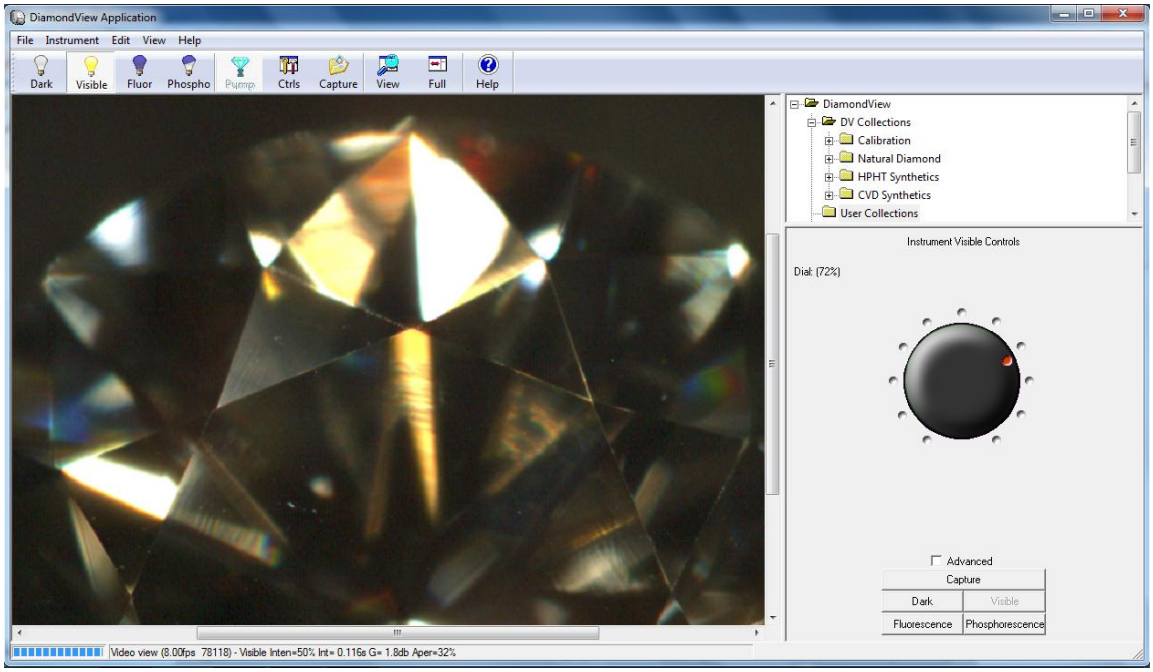


Figure 46: Zooming in

Zooming out of the image can only be done via the popup menu shown in Figure 47 that can be invoked by clicking on the right mouse button. This also has a “Zoom in” option that will zoom into the centre of the image. To completely zoom out in one action, click on the “Fit” option.

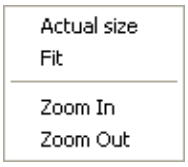


Figure 47: Zooming popup menu

6.6.7 Comparing video with an existing snapshot

To compare the video with an existing snapshot:

1. Click on the Toolbar "**View**" button and select "**Snapshot View – 1x1**".

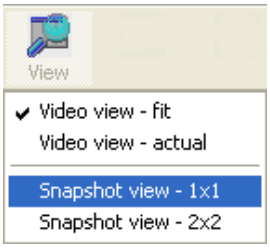


Figure 48: Selecting snapshot view

2. The snapshot view displays the video on a floating window.

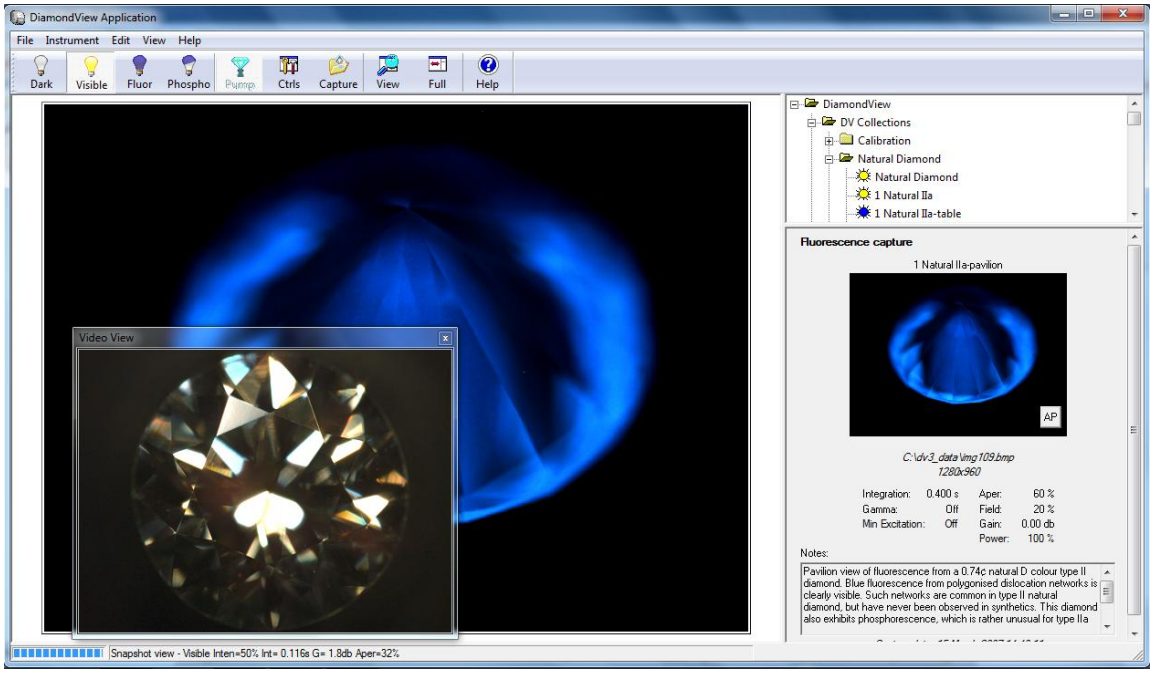


Figure 49: Snapshot view with video in a floating window

3. From the “Collection view” select a snapshot to compare with. This will have the effect of displaying the snapshot in the “Main view”.

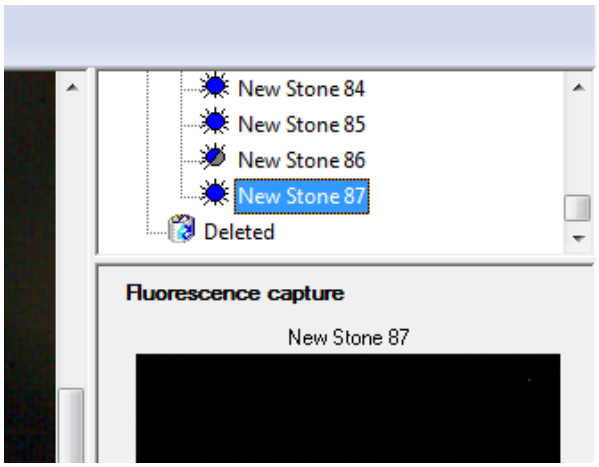


Figure 50: Selecting a snapshot to display in the “Main view”

4. Compare the video and snapshot.

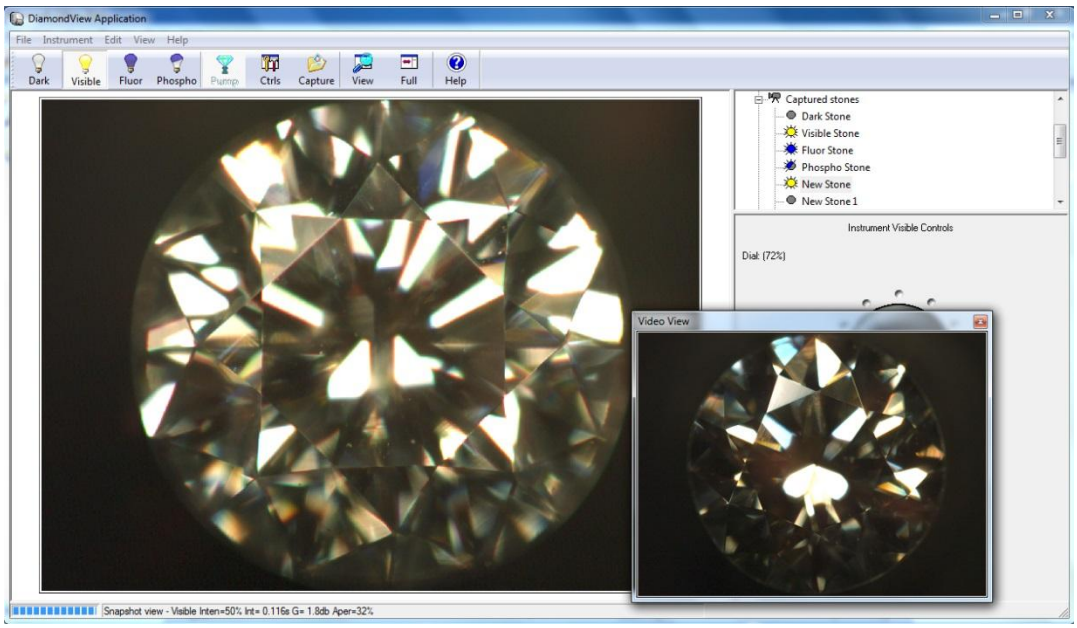


Figure 51: Comparing the video with the snapshot

6.6.8 Capturing a snapshot

To capture a snapshot from the video:

1. Click on the Toolbar "Capture" button



Figure 52: Capturing a snapshot

2. The Instrument will capture a snapshot from the video and show the snapshot details in the "Auxiliary view" and add the new snapshot to the "**Captured samples**" in the "Collection view". The name of the new snapshot will be "New Stone". Subsequent snapshots will have an incrementing trailing number ("New Stone 1"). In the "Fluorescence" mode an Auto-Phosphorescence capture is also performed and displayed in a floating window. Once an image has been captured visible mode will automatically be selected.

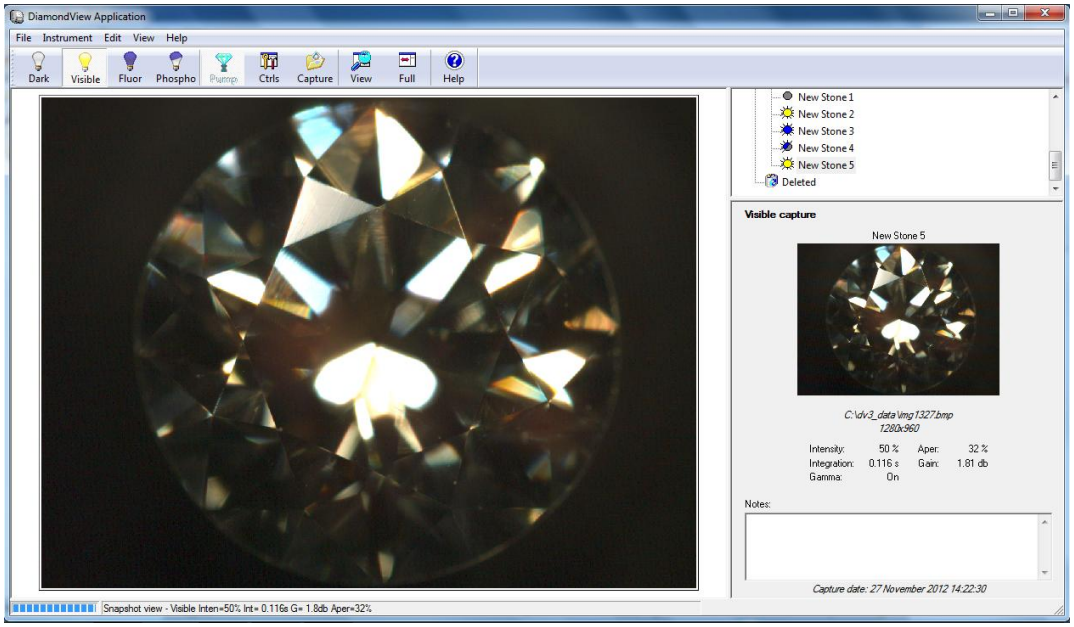


Figure 53: Captured snapshot

6.6.9 Adding notes to a snapshot

To add notes to a captured snapshot click on the snapshot in the “Collection view” and click on the “Notes” text box when the snapshot details appear in the “Auxiliary view”. Text entered from the keyboard will be captured and displayed in the “**Notes**” text box as shown in Figure 54.

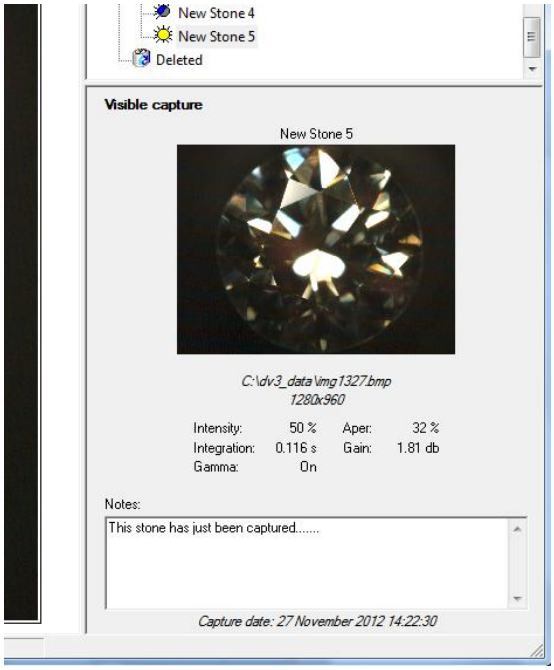


Figure 54: Adding notes to a snapshot

6.6.10 Comparing snapshots

To compare up to 4 snapshots:

1. Click on the Toolbar “**View**” button and select “**Snapshot View – 2x2**”.

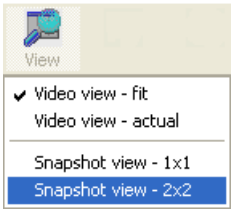


Figure 55: Setting snapshot view for comparing snapshots

2. Select snapshots from the “Collection view”.

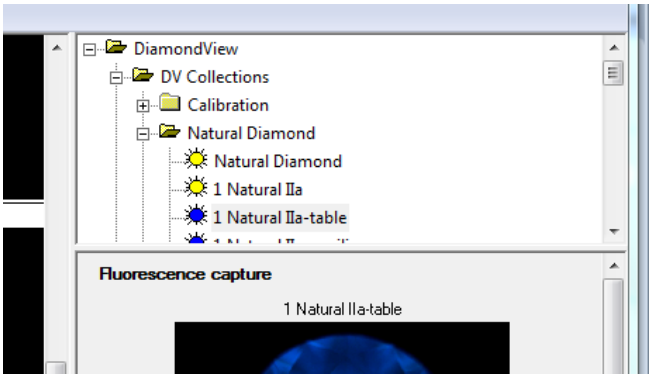


Figure 56: Select snapshots

3. As snapshots are selected in the “Collection view” they will appear on the snapshot view for comparison. If a snapshot is selected when the snapshot view is full with 4 images the least recently selected will be replaced with the new one.

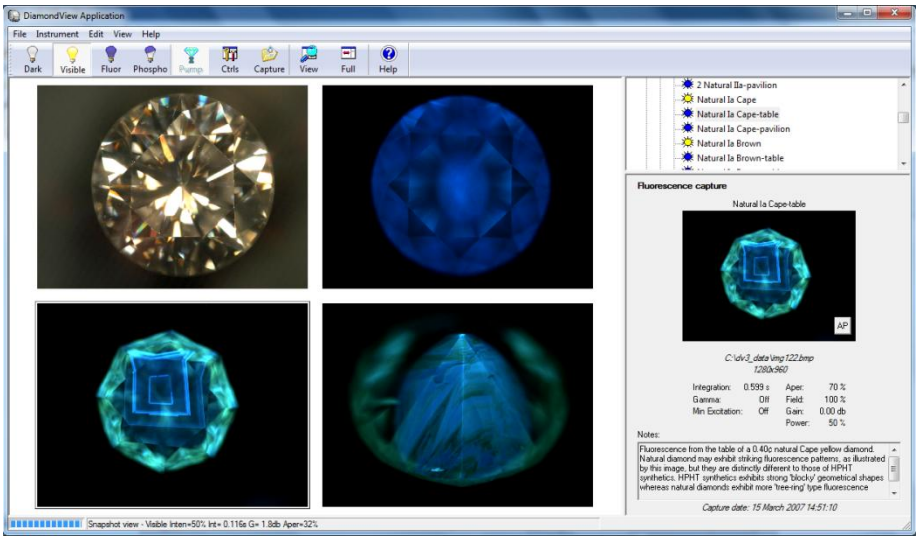


Figure 57: Comparing snapshots in snapshot 2x2 view

4. It is possible to zoom in the snapshot view by right clicking the mouse in this area. A popup menu is displayed as shown in Figure 58 that allows zooming.

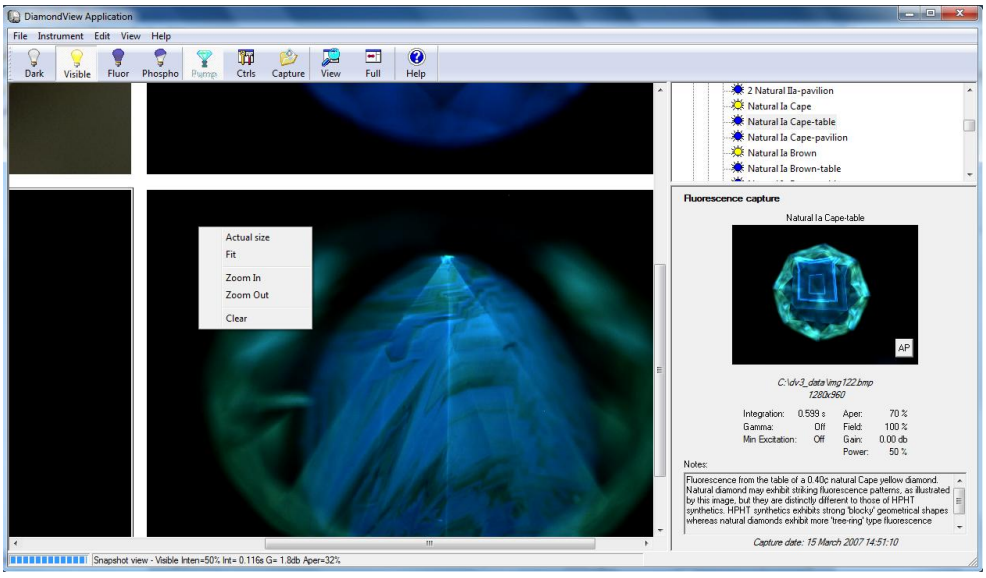


Figure 58: Zooming in snapshot view

6.6.11 DV Collections

The DV Collections folder shown in Figure 59 contains example snapshots of polished natural diamonds, HPHT (high-pressure, high-temperature) synthetics grown in a belt-type press, HPHT synthetics grown in a BARS-type press and CVD (Chemical Vapour Deposition) grown synthetics. These library snapshots are accessed like any other snapshot in the “Collection View”. These snapshots also show examples of the use of DiamondView Zoom features such as Field Stop, Minimum Excitation Mode and Gamma Correction to improve the contrast of snapshots.

It is recommended that new users of the DiamondView Zoom take time to review these snapshots with the supporting notes accompanying each snapshot. These snapshots can be useful in comparing with captured snapshots.

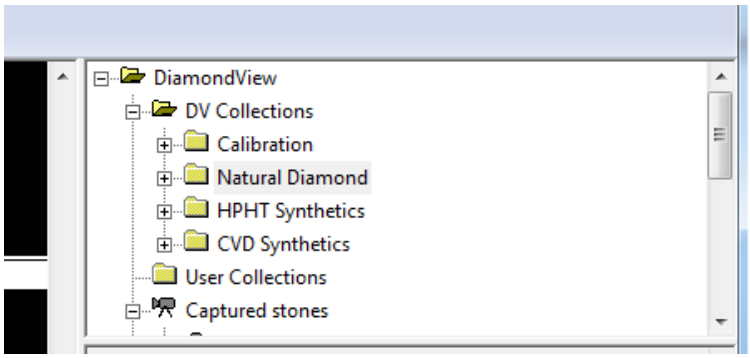
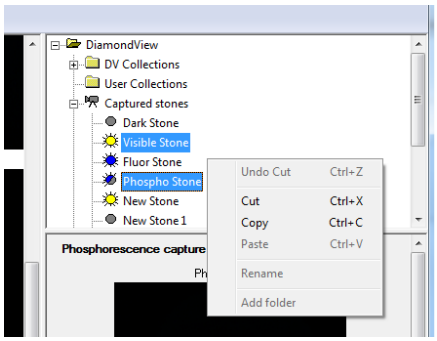


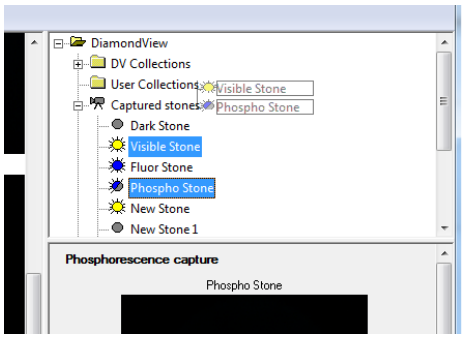
Figure 59: DV Collection folder

6.7 Managing elements in the Collections view

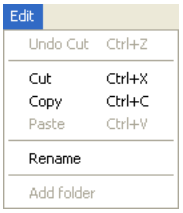
The “Collections view” has elements that consist of folders or snapshots that the user can manage in a number of ways:



- Using the Collection View popup menu by clicking the left mouse button.

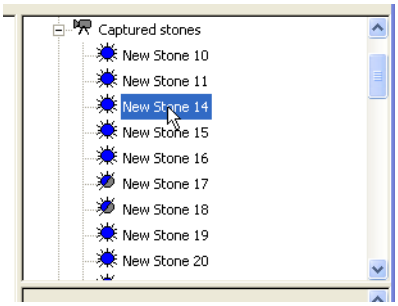


- By dragging and dropping elements with the mouse.

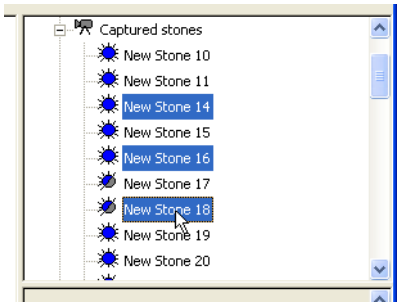


- Using “**Edit**” on the main menu.

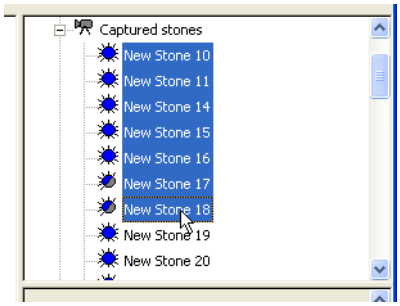
An element can be selected in the Collection View by clicking on it with the left mouse button. To select multiple items press the “Ctrl” key down while clicking on further items. A multiple selection can be deselected by clicking on an item without the “Ctrl” key pressed down. To select a range of items between two elements press the “shift” key down while clicking on the second element.



- Single selection by clicking on element.



- Multiple selections by clicking on elements with Ctrl key pressed.



- Range selection by clicking on second element with Shift key pressed.

6.7.1 Adding Folders

To add a folder, select an existing folder in the “Collection view” and open the “**Edit**” main menu or the “Collection view” popup. The “Add folder” option should be enabled if folders can be created under the selected folder. When the “Add folder” is clicked a new folder “New folder” will be created with a trailing number in the case where there are multiple folders with the same name.

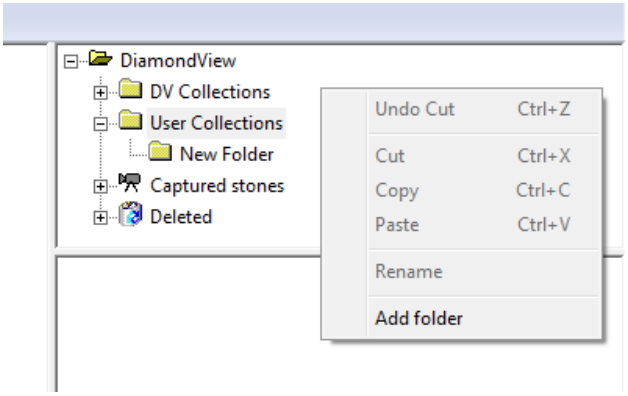


Figure 60: Adding a new folder

6.7.2 Renaming elements

Clicking on a selected element in the “Collection view” and holding the mouse over the selection for a second will allow the element to be renamed as shown in Figure 61. It is also possible to click on the “**Rename**” option on the “Edit” main menu.

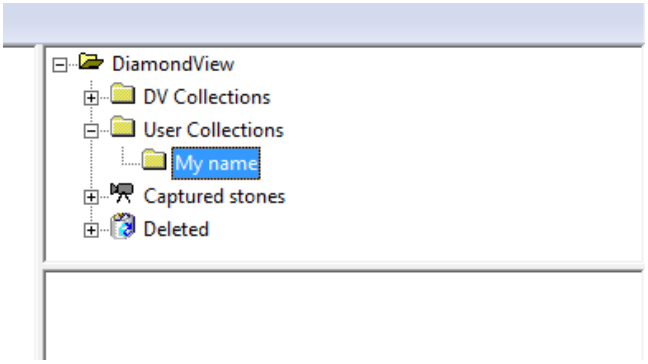


Figure 61: Renaming elements

6.7.3 Moving elements

Elements may be moved either by mouse drag and dropping or by the “**Edit**” main menu or “Collection view” popup menu.

To move using the mouse as shown in Figure 62, select the element(s) and drag the floating image to the destination element releasing the mouse button to drop.

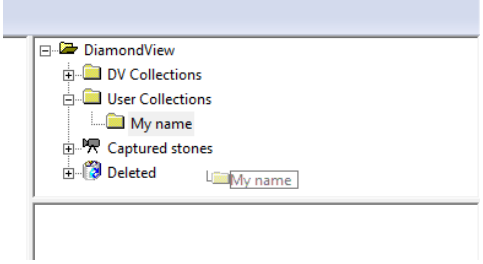


Figure 62: Moving element(s) with the mouse

To move using any of the menus, select the element to move and click on the option “**Cut**”. Select the destination element and click on the option “**Paste**”. This will move the element. To undo a cut click on the option “**Undo Cut**”.

6.7.4 Copying elements

Elements may be copied either by mouse drag and dropping or by the “**Edit**” main menu or “Collection view” popup menu.
To copy using the mouse as shown in Figure 63, select the element(s), start dragging the element ghost image, press on the “Ctrl” key until a + sign appears next to the ghost image and drop the image into the destination element releasing the mouse button to drop.

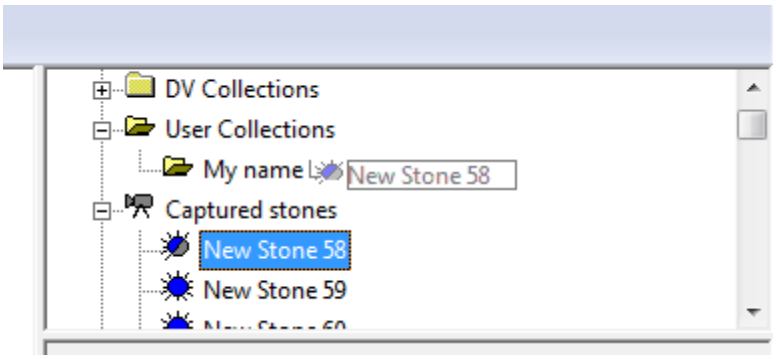


Figure 63: Copying an element with the mouse

To copy using any of the menus, select the element to move and click on the option “**Copy**”. Select the destination element and click on the option “**Paste**”. This will copy the element.

6.7.5 Deleting elements

To delete elements move them to the “**Deleted**” folder. If there are elements in this folder when the application exits the user will be prompted for their deletion as shown in Figure 64. Clicking on the “**OK**” will permanently delete the elements in the “**Deleted**” folder.

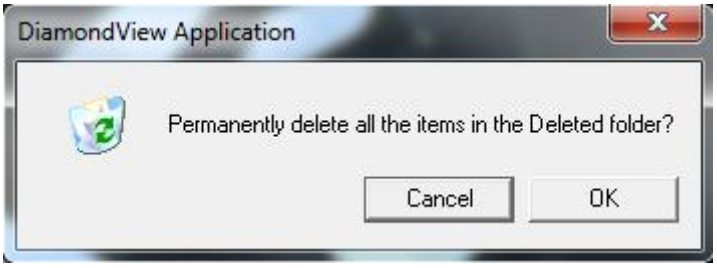


Figure 64: Emptying the “Deleted” folder

Elements located in the “**Deleted**” folder which have not been permanently deleted may be copied or moved out to other folders.

6.7.6 Viewing snapshot details

Clicking on a snapshot in the “Collection view” will automatically display the snapshot details in the “Auxiliary view” as shown in Figure 65.

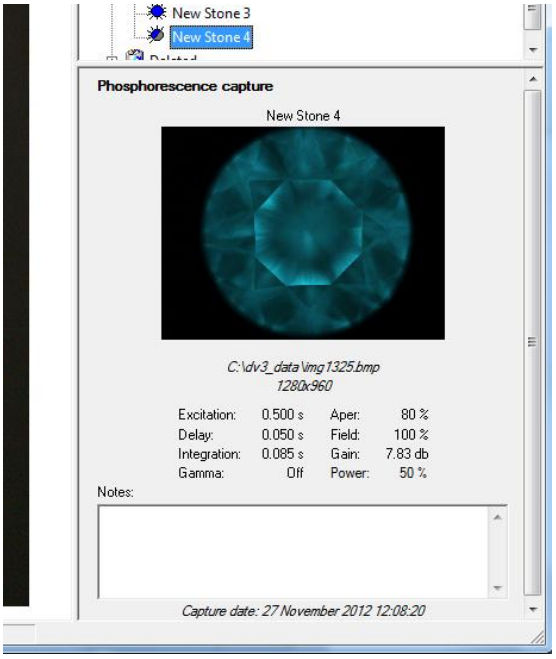


Figure 65: Viewing snapshot details

6.7.7 Quick viewing a snapshot

To quickly view a snapshot select the snapshot in the “Collection view”. This will automatically display the snapshot details in the “Auxiliary view” as shown in Figure 65. Clicking on the thumbnail image will change the “Main view” to “**Snapshot view – 1x1**” and fit the image in the available area for viewing.

6.7.8 Quick viewing snapshots contained in a folder

To quickly view a snapshot thumbnail under a folder, select the folder. This will automatically display all the thumbnails contained in the selected folder in the “Auxiliary view” as shown in Figure 66. Clicking on a thumbnail will display the snapshot details in the “Auxiliary view”.

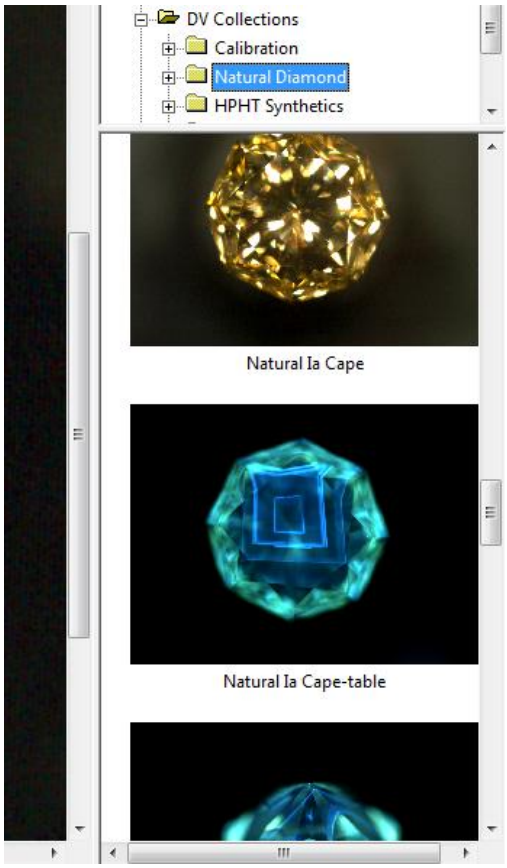
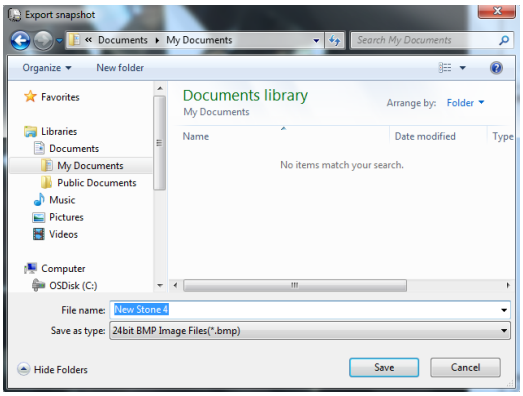


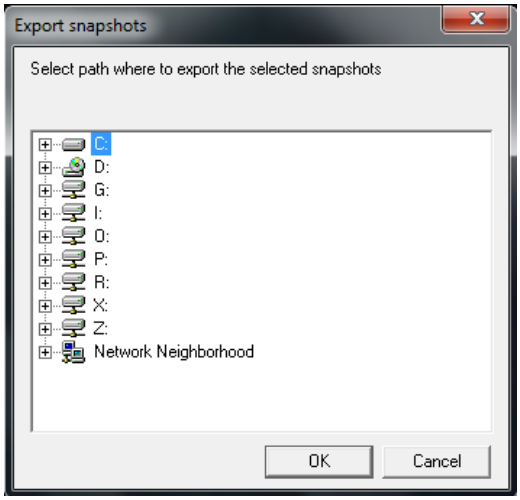
Figure 66: Snapshot thumbnails

6.7.9 Exporting a selected snapshot(s)

To export selected snapshot(s) as images, click "**Export selected snapshot(s)…**" in the "**File**" main menu. If only one snapshot is selected the application will prompt the user for a filename for the Bitmap (.BMP) image and where to save the snapshot. Otherwise the application will prompt for a path where to save the snapshots. For each image file a text file will be written containing the details associated with the snapshot.



- When one snapshot is selected the application prompts for the path and filename.



- When multiple snapshots are selected the application prompts for the path only and uses the snapshot title as the file name.

6.7.10 Printing a selected snapshot

It is possible to print snapshots if a printer is connected and the appropriate printer driver software is installed. To select printer, paper format and orientation, click on "**Print Setup…**" under the "**File**" menu. This will show the dialog shown in Figure 67.

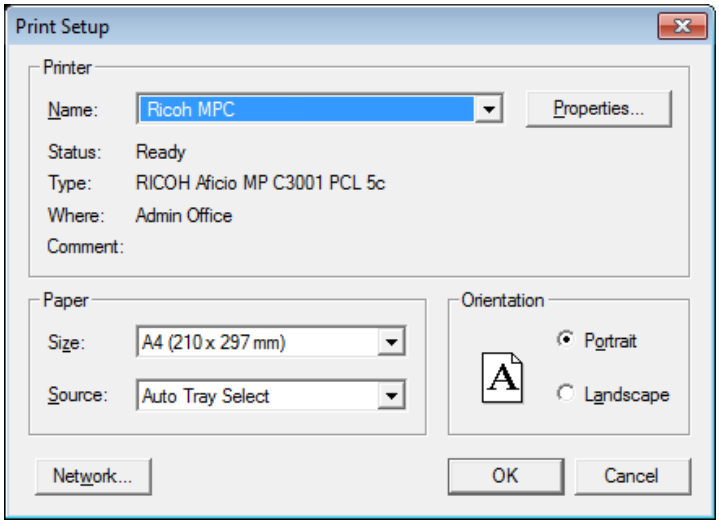


Figure 67: Print Setup

To preview the snapshot, click on "**Print Preview selected snapshot**" under the "**File**" menu. This will use the whole application area to display the preview page as shown in Figure 68. To print the preview image click on the "**Print…**" button and on the "**OK**" button of the "**Print**" dialog box.

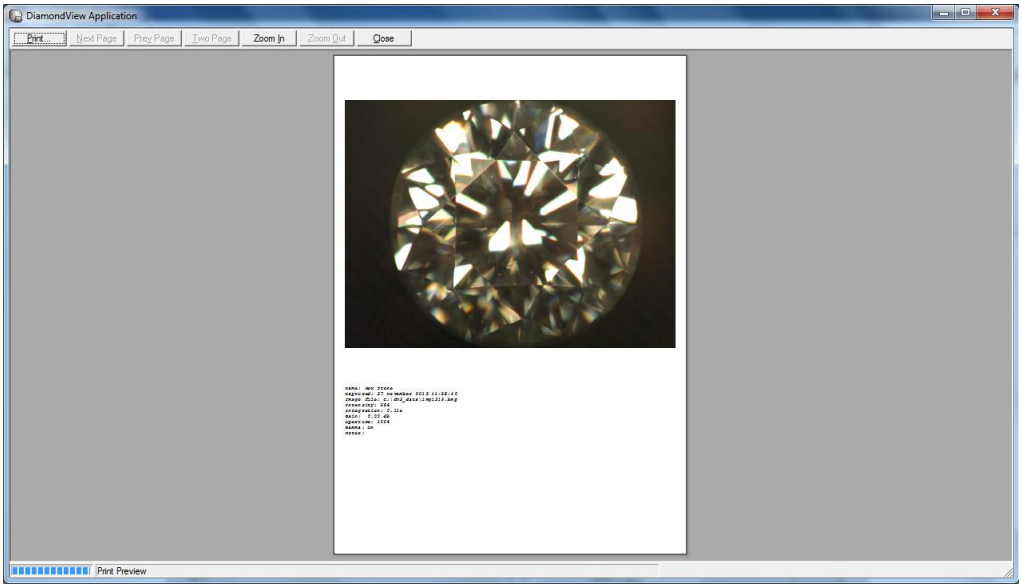


Figure 68: Print Preview

To print without previewing, click on "**Print selected snapshot…**" under the "**File**" menu and click on the "**OK**" button of the "**Print**" dialog box.

6.7.11 Exporting elements

To export an element and all its contents select the element in the "Collection view" and click on the "**Export selection…**" under the "**File**" main menu. A file selector will prompt the user for the destination of the XML index file and the images that will be copied to that directory.

6.7.12 Importing elements

To import a XML index file and its images, select an element in the “Collection view” where the elements are to be imported to and click on the “**Import to selection…**” under the “**File**” main menu. A file selector will prompt the user for the location of the XML index file and the images to be imported into the application.

By using the “Export and Import elements” feature it is possible to copy elements from one DiamondView Zoom application to another.

6.8 Closing the application

The application may be closed by clicking on the top right hand application window close button or on the “**Exit**” under the “**File**” main menu.

If the vacuum pump is on when the application exits the user will be prompted to confirm the exit as shown in Figure 69. Clicking on the “**Cancel”** will cancel the exit while clicking on **“OK”** will proceed.

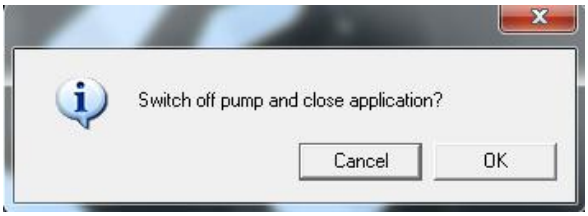


Figure 69: Confirming exit when the vacuum pump is running

If there are elements in the **“Deleted”** folder when the application exits the user will be prompted for their deletion as shown in Figure 70. Clicking on the “**OK**” will permanently delete all the elements in the “**Deleted**” folder. Clicking on the “**Cancel”** will not delete the elements.

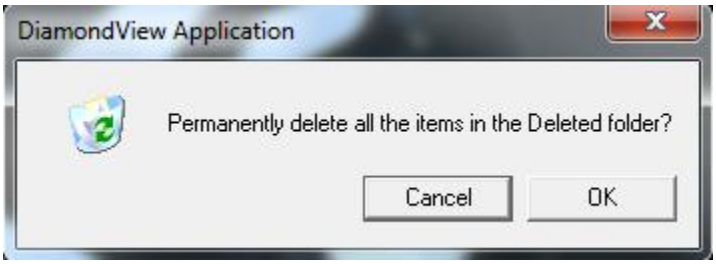


Figure 70: Emptying the “Deleted” folder

7 STEP BY STEP USER GUIDE

7.1 Using Visible Mode

What is Visible Mode?
Visible mode shows the sample illuminated with visible light from the four LEDs inside the DiamondView Zoom chamber. This mode is used to position and focus samples prior to excitation with UV.

1. Switch on the DiamondView Zoom unit and run the DiamondView Zoom software. (see: Sections 3.3 & 6.1)

2. Insert the 'V' filter into the 'letter-box' slot. Ensure that it is fully inserted. This filter corrects the light captured by the camera so the colour is more representative of what is seen 'by eye'. (see: Section 5.7)

3. Open the DiamondView Zoom chamber door. (Section 5.1)

4. Ensure the correct size vacuum cup is fitted, if required change the cup. (see: Section 5.2)

5. Switch on the vacuum pump by selecting 

6. Using tweezers place the sample on the vacuum cup. Mount the sample either culet or table down, depending on which part of the sample is to be investigated.

7. Check the sample is mounted flat (when mounted culet down) and to the correct height. (see: Section 5.3)



Tip: To check the sample is mounted flat tilt the sample using the" tilt control" on the chamber door until the sample girdle is horizontal as viewed. Rotate the sample using the "rotation control" on the chamber door; whilst rotating, apply a small amount of pressure onto the crown facets with a pair of tweezers thereby allowing the sample to self level.



Figure 71: Using the "rotation control" and tweezers to mount the table flat

8. Close the chamber door. The sample should be close to being in focus.

9. If required open the "Instrument Visible Controls" by selecting 

10. Adjust the "Instrument Visible Controls" dial setting until a satisfactory image is viewed. (see Section: 6.6.3)



Tip: A value of between 50% and 70% should provide good viewing conditions. If full control of the lighting and camera are required select the "Advanced" tick box.

11. Position the sample into the centre of the screen by adjusting the “Vertical & Horizontal Controls” on the chamber door. (see Sections: 5.5.3 & 5.5.4)

12. Check the sample is in focus by turning the “Focus Control” on the chamber door. (see Section: 5.5.5)



Tip: By zooming in on the image finer focus control can be obtained.

Tip: By moving the sample using the “Vertical & Horizontal Controls” on the chamber door the focus can be checked at different positions.

Tip: Use facet junctions or dust particles to set the focus.

13. If required capture the image by selecting 

7.2 Using Fluorescence Mode

What is Fluorescence Mode?
In Fluorescence Mode the sample is excited with Ultraviolet (UV) light generating surface fluorescence from the sample. The fluorescence pattern produced can be used to identify whether the sample is a natural diamond or a synthetic.

1. Follow steps 1 to 12 in the “Using Visible Mode” guide to ensure the sample is mounted correctly.

2. Select Fluorescence mode by selecting 

3. If required open the “Instrument Fluorescence Controls” by selecting 

4. Adjust the “Instrument Fluorescence Controls” dial setting until a satisfactory image is viewed.



Tip: If the sample is weakly fluorescing use the advanced settings to increase the camera gain, aperture & field stop to the maximum values. This will allow a reduction of integration time and a corresponding increase in refresh rate of the live image – aiding sample focussing and alignment. If required full power mode can be selected, thereby allowing further reduction of integration time.

Tip: Adjusting the “Aperture Control” in advanced mode will improve the image of the sample table when maximised and sample crown/pavilion facets when minimised.

Tip: Reducing the “Field Stop Control” will reduce unwanted reflections and improve the contrast of weakly fluorescing features.

5. Check the sample is in focus by turning the “Focus Control” on the chamber door.



Tip: By zooming in on the image, finer focus control can be obtained.

Tip: By moving the sample using the “Vertical & Horizontal Controls” on the chamber door the focus can be checked at different positions.

Tip: Use facet junctions or dust particles to set the focus.

6. If required capture the image by selecting 



Tip: If the sample is weakly fluorescing and consequently the advanced settings have been used to set the gain to a high value, reduce the gain to the minimum and increase the integration time control. This will reduce the amount of noise in the image.

Note: DiamondView Zoom will capture an automatic Phosphorescence image after a Fluorescence image has been captured. The automatic Phosphorescence capture will be made using the current Aperture & Field Stop settings. The delay is set to 50ms. To investigate the phosphorescence in detail use “Phosphorescence Mode” (see Section 7.3)

Note: In order to preserve the lamp life and prevent overheating, the UV lamp will switch off automatically after two minutes of continuous operation.

7.3 Using Fluorescence Mode with Filtering

What is "Fluorescence Mode with filtering"?
In Fluorescence Mode the sample is excited with Ultraviolet (UV) light generating surface fluorescence from the sample. The fluorescence pattern produced can be used to identify whether the sample is a natural diamond or a synthetic. The introduction of a filter between the sample and detection camera allows synthetic features to be detected more easily.

7.3.1 Filter Selection

Below is a brief description of each filter and example cases of where they may be of use.

Filter Label	Description	When to use/benefits
V	IR filter	To be used for 'standard' viewing conditions.
B	390nm band pass	Significantly reduces any fluorescence that is not blue. In some cases this can enhance imaging of dislocation networks.
G	475nm long pass	Removes background blue fluorescence, leaving any green , orange or red fluorescence. One advantage of this is that the clarity and sharpness of the dislocation network is enhanced. Striations may be more visible.
O	550nm long pass	Removes all green and blue fluorescence. In natural type IIa diamonds the dislocation networks remain clear using this filter, but is much less clear in the blue fluorescing CVD synthetic samples
R	725nm long pass	Removes all but the deep red fluorescence. Can be used to help differentiate natural dislocation networks from CVD synthetic dislocations.

7.3.2 Filter Use

1. Follow steps 1 to 11 in the "Using Visible Mode" guide to ensure the sample is mounted correctly.
2. Remove the filter labelled 'V' from the DiamondView Zoom body and insert one of the other filters labelled 'B', 'G', 'O' or the blank with a user selected filter. The filter choice will depend on the requirements and fluorescence observed in section 7.2. Push the filter into the 'letter-box' until it locates.
3. Select Fluorescence mode by selecting 

4. If required open the "Instrument Fluorescence Controls" by selecting 

5. Adjust the "Instrument Fluorescence Controls" dial setting until a satisfactory image is viewed.



Tip: With a filter in place the fluorescence image will be less intense. To increase the image brightness use the advanced settings to increase the camera gain, aperture & field stop to the maximum values. Even with these steps the integration time may be long, and full power mode can be selected, as required.

Tip: No refocusing should be required between a standard fluorescence image and a filtered fluorescence image. However, by turning the "Focus Control" on the chamber door, this can be checked.

Tip: Reducing the "Field Stop Control" will reduce unwanted reflections and improve the contrast of weakly fluorescing features.

Tip: By zooming in on the image, finer focus control can be obtained.

Tip: By moving the sample using the "Vertical & Horizontal Controls" on the chamber door the focus can be checked at different positions.

Tip: Use facet junctions or dust particles to set the focus.

6. If required capture the image by selecting 

Tip: If the sample is weakly fluorescing and consequently the advanced settings have been used to set the gain to a high value, reduce the gain to the minimum and increase the integration time control. This will reduce the amount of noise in the image.

Note: DiamondView Zoom will capture an automatic Phosphorescence image after a Fluorescence image has been captured. The automatic Phosphorescence capture will be made using the current Aperture & Field Stop settings. The delay is set to 50ms. To investigate the phosphorescence in detail use "Phosphorescence Mode" (see Section 7.4)

7.4 Using Phosphorescence Mode

What is Phosphorescence Mode?
In Phosphorescence Mode the sample is excited with Ultraviolet (UV) light, generating surface fluorescence from the sample. The UV excitation is then stopped and after a delay the resulting Phosphorescence is captured.

1. Follow steps 1 to 5 in the "Fluorescence Mode" guide.
2. Select Phosphorescence mode by selecting 

3. If required open the "Instrument Phosphorescence Controls" by selecting 

4. Adjust the "Instrument Phosphorescence Controls" dial setting until a satisfactory image is viewed.

Note: The advanced settings can be used to change the delay time to a minimum of 1ms. It is recommended that the minimum delay time used should be 50ms as delays shorter than this may lead to the capture of "long lived fluorescence" rather than true Phosphorescence.

5. If required capture the image by selecting 

Tip: To observe the Phosphorescence decay in real time use "Dark Mode" (see Section 7.5)

Note: In order to preserve the lamp life and prevent overheating, the UV lamps will switch off automatically after two minutes of cumulative operation. (see section 6.6.4)

7.5 Using Dark mode

What is Dark mode?
Dark mode shows the sample with no illumination/excitation either with visible light or UV. This mode can be used to observe phosphorescence decay characteristics of samples in “real time”.

1. Follow steps 1 to 5 in the “Fluorescence Mode” guide.
2. Select Dark Mode by selecting 

3. If required open the “Instrument Dark Controls” by selecting 

4. Adjust the “Instrument Dark Controls” dial setting until a satisfactory image is viewed.



Tip: To observe the sample in real time use the advanced settings to increase the camera gain, aperture & field stop to the maximum values, thus reducing integration time and increasing refresh rate of the live image.

5. If required capture the image by selecting 

8 MAINTENANCE

8.1 DiamondView Zoom Database backup

The DiamondView Zoom “dv3_data” database contains all the captured snapshots and Collection View data. The data is saved to this database when the DiamondView Zoom session ends and the application exits. Although the DiamondView Zoom application keeps a history of the four most recent sessions to reduce the possibility of data loss due to file corruption, it is recommended that backups of the “dv3_data” directory are periodically made to safeguard against disk failure or accidental deletion.

In the rare event that a database session has been corrupted due to disk/power or system failure the user will be prompted as shown in Figure 72 to select and load a recent backup database.

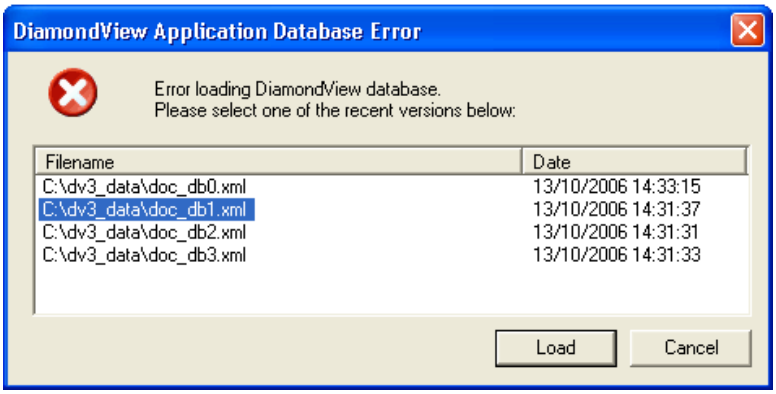


Figure 72: DiamondView Zoom Database Error

8.2 DiamondView Zoom Database copying

The “dv3_data” can be copied to another machine, drive or location. When doing this ensure that the DiamondView Zoom application is not running on the source or destination systems and there are no copy errors.

It is possible to force a DiamondView Zoom application on a system to prompt the user for the location of a new “dv3_data” database by asking your system administrator to delete the following registry key with “regedit”.

HKEY_CURRENT_USER\Software\De Beers\dv3app\lib

The DiamondView Zoom Application will now prompt for the path of the “dv3_data” database next time it is run.

8.3 Interlock servicing interval

The DiamondView Zoom door contains a safety interlock that protects the user from any exposure to UV radiation generated by the instrument. The door interlock is rated for 20000 operations and De Beers Group recommend that the unit be returned to the supplier for interlock safety checks and servicing when this number has been exceeded.
The instrument keeps track of the number of door operations and the DiamondView Zoom software will alert the user when the unit needs servicing. When the dialog shown in Figure 73 is shown, please inform your **responsible body** so that arrangements can be made for the unit to be serviced. The instrument safety interlock is a **critical safety device** and servicing should be arranged as soon as possible.

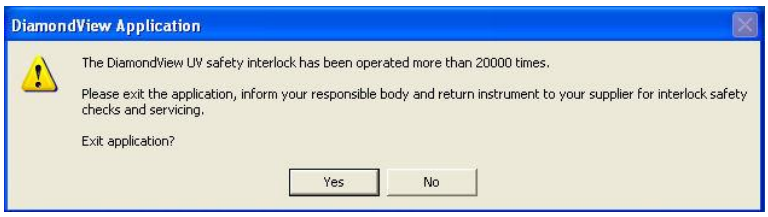


Figure 73: Interlock servicing interval

8.4 Calibration

The performance of your DiamondView Zoom instrument may be verified using the sample of calcite and a ball bearing supplied with the instrument. Fluorescence images of the calcite and ball bearing were made during factory calibration.

It is recommended that the performance of the DiamondView Zoom is checked periodically by carrying out the tests described in sections 8.4.1 & 8.4.2. The frequency of these tests will depend on how often the DiamondView Zoom is used.

8.4.1 Filter bleedthrough test

Select the calibration image of the ball bearing (labelled “Ball”) from the “DV Collections/Calibration” folder. Place the ball bearing onto the vacuum cup holder, ensuring there is sufficient suction to stop the ball bearing from falling off, if required fit the largest size vacuum cup. Carefully close the chamber door. Focus the visible image of the ball bearing. Select “**Fluorescence”**. Ensure the capture settings are the same as those indicated in the notes of the stored calibration image. Unless already active select “**Snapshot view – 1x1”** from the “**View**” menu.

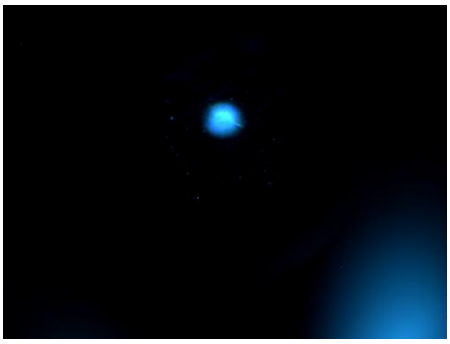


Figure 74: Filter bleedthrough test

Compare the live image with the calibration image. If the image is significantly brighter or darker than the image recorded during factory calibration a new UV filter is required (see Section 8.5). Contact the supplier of your DiamondView Zoom for a new filter.

8.4.2 UV throughput test

Select the calibration image of the calcite sample (labelled “Calcite”) from the “DV Collections/Calibration” folder. Place the calcite sample onto the vacuum cup holder ensuring there is sufficient suction to stop the calcite from falling off, if required fit the largest size vacuum cup. An instrument serial number is written on one of the side faces of the calcite. Orientate the calcite so that the serial number is facing towards the user and the correct way up as it is inserted into the sample chamber. Carefully close the chamber door. Focus the visible image of the calcite. Select “**Fluorescence”**. Ensure the capture settings are the same as those indicated in the notes of the stored calibration image. Unless already active select “**Snapshot view – 1x1”** from the “**View**” menu.

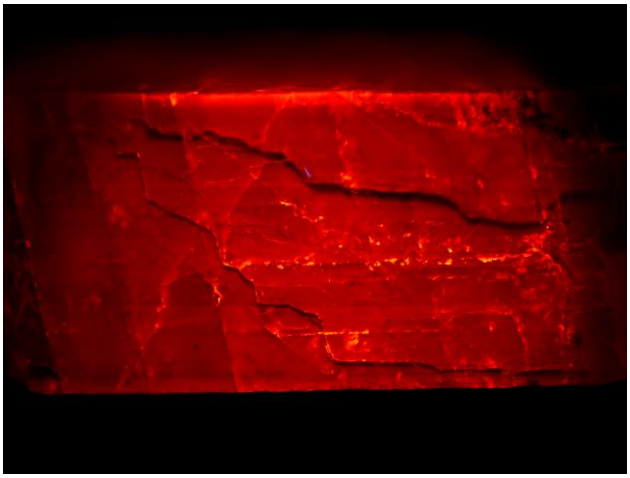


Figure 75: UV throughput test

Compare the live image with the calibration image. If the intensity of the fluorescence from the calcite is significantly less than that shown in the calibration image then a new UV filter is required (see Section 8.5). To establish the relative difference in intensity between live and calibration image increase the camera integration time until the fluorescence intensity is similar to the calibration image. Contact the supplier of your DiamondView Zoom for a new filter.

8.5 Filter replacement

The DiamondView Zoom UV filter is a field upgradeable part that may only be replaced by a competent person that has been nominated as the **responsible body** for the instrument. Since there is a small risk of UV exposure or electric shock under extreme failure conditions, the filter replacement instructions outlined in this section must be followed carefully.

THE UNIT MUST NOT BE USED OR LEFT WITHOUT A UV FILTER
THE UV FILTER MUST ONLY BE REPLACED WITH FILTER TYPE 3618-0021 AS SPECIFIED BY DE BEERS GROUP
DISCONNECT THE POWER SUPPLY BEFORE REMOVING THE FILTER COVER



Risk of exposure to UV radiation



Risk of Electric shock

DO NOT TOUCH THE FILTER SURFACE
DO NOT ATTEMPT TO CLEAN THE FILTER SURFACE

To replace the UV filter:

1. Ensure that you have a new replacement UV filter mounted in a carrier as shown in Figure 76.

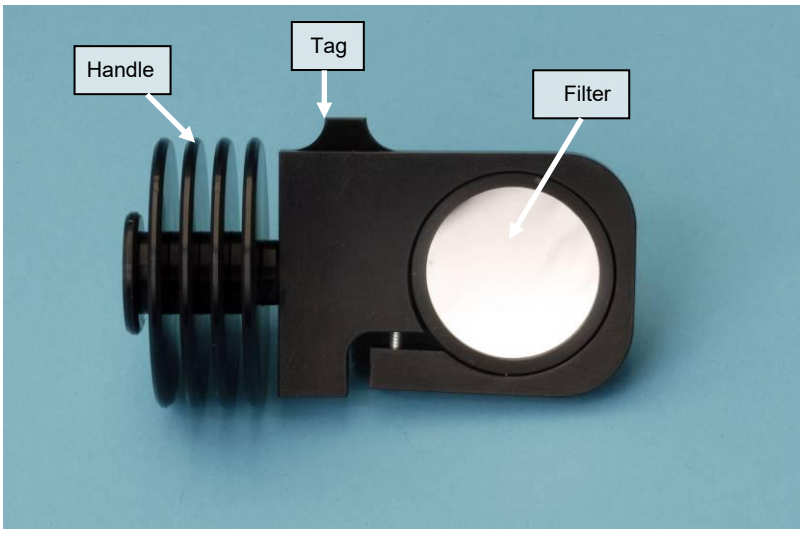


Figure 76: Replacement UV filter with carrier

2. Disconnect all the cables from the DiamondView Zoom instrument as shown in Figure 77.



Figure 77: Disconnect all cables before UV filter replacement

3. Turn the instrument on its rear and use a suitable screwdriver to remove the two screws from the UV filter cover as shown in Figure 78.



Figure 78: Remove the two screws from the UV filter cover

4. Remove the UV Filter cover



Figure 79: Remove the UV filter cover

5. Remove the old UV Filter carrier



Figure 80: Pull out the old UV Filter carrier

6. Insert the new UV Filter carrier.

Note some careful alignment is required to insert the new filter.
Note the orientation of the UV Filter carrier. The tag is on the right hand side.



Figure 81: Insert the new UV Filter carrier.

7. Screw back the UV Filter cover ensuring both screws are tightly fastened.



Figure 82: Screw back the filter cover

8. Re-connect the instrument cables.

8.6 Taking new Calibration images following filter replacement

When a UV filter is replaced it is recommended that a new set of Calibration snapshots are taken with the new filter to allow throughput and performance comparisons at a later date. To add a new Calibration snapshot folder to the user collections please follow the following procedure:

1. Create a folder in the User Collections named “Calibration dd/mm/yy”.

2. Capture a fluorescence snapshot of the ball bearing supplied with the DiamondView Zoom. Ensure the intensity of the snapshot is similar to the snapshot of the ball bearing in the “DV Collections/Calibration” folder. (Note: Capture settings will not necessarily be the same as for the original calibration snapshot due to differences in performance of filters and the amount of use the DiamondView Zoom has had.)

3. Label the snapshot “Ball” and move it into the new folder as shown in Figure 83.

4. Capture a fluorescence snapshot of the calcite sample supplied with the DiamondView Zoom. Ensure the calcite sample is orientated as described in section 8.4.2. Ensure the intensity of the snapshot is similar to the snapshot of the calcite sample in the “DV Collections/Calibration” folder. (Note: Capture settings will not necessarily be the same as for the original calibration snapshot due to differences in performance of filters and the amount of use the DiamondView Zoom has had.)

5. Label the snapshot “Calcite” and move it into the new folder as shown in Figure 83.

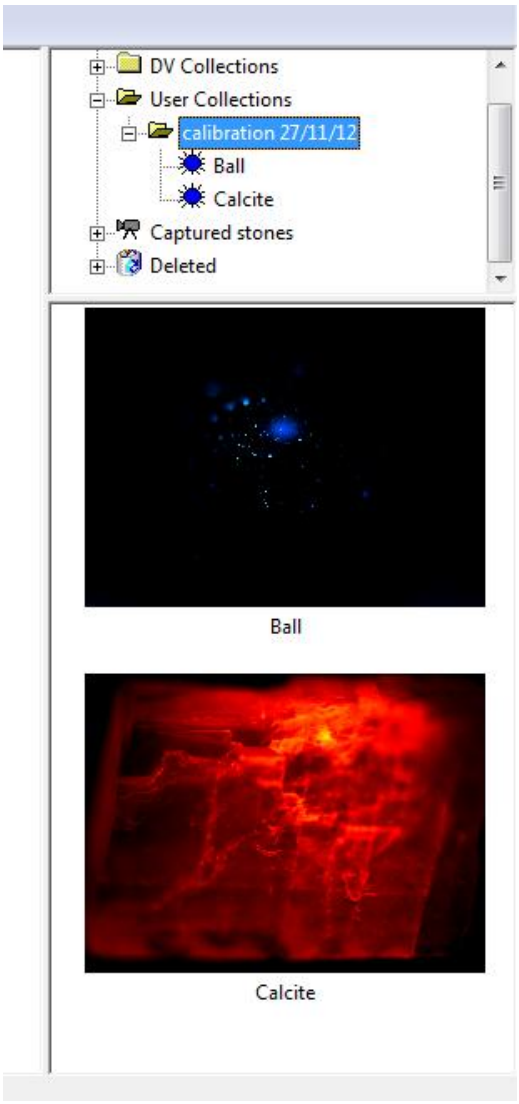


Figure 83: Retaking the Calibration images and storing them in a folder

6. Select the folder containing the new calibration snapshots and click on "**Export Selection…"** in the menu.

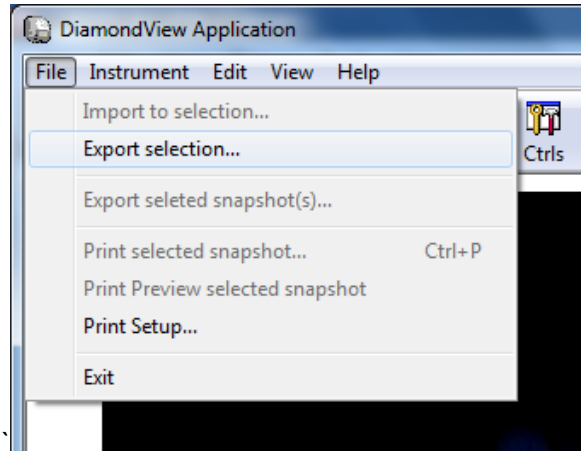


Figure 84: Exporting the new calibration folder

7. Find the “dv3_lib” path where the DiamondView Zoom application is installed as shown in Figure 85.

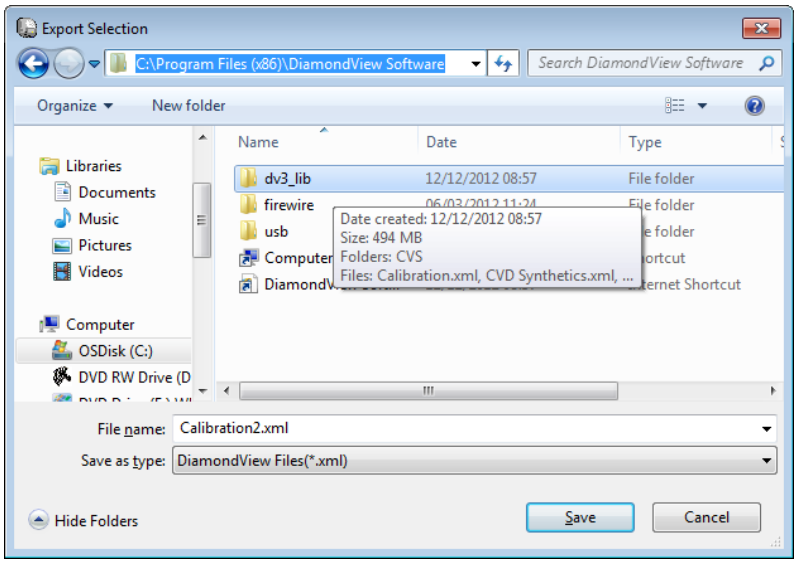


Figure 85: Selecting export “dv3_lib” directory

8. Select a new .xml file in the “dv3_lib” where to save the new calibration as shown in Figure 86

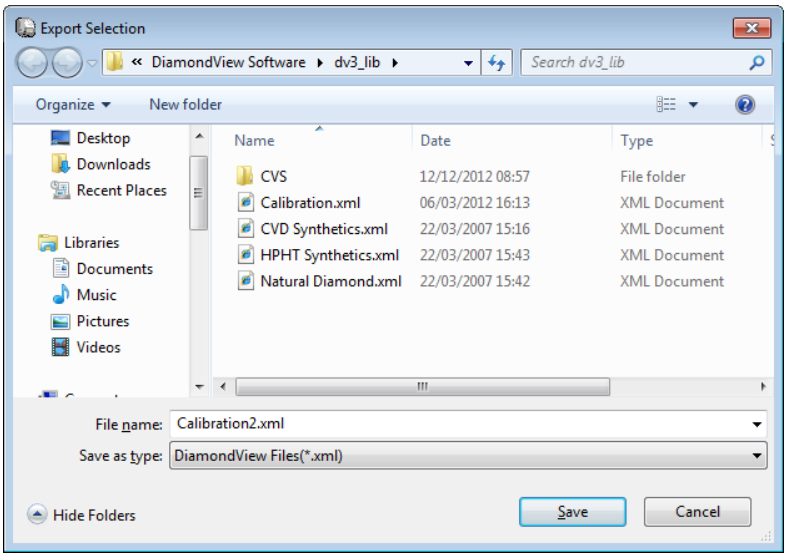


Figure 86: Selecting export filename

9. Click on Save.

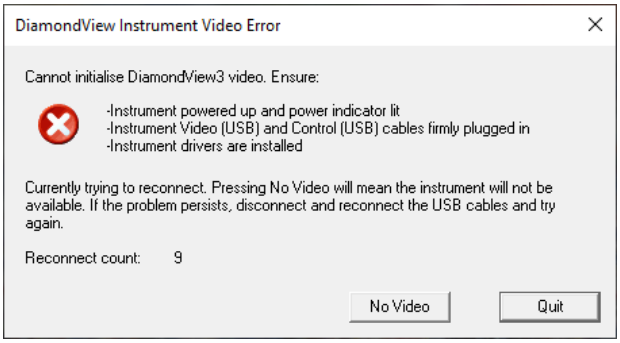
10. Exit and restart the DiamondView Zoom application.

11. The new calibration folder will appear under the “**DV Collections**” folder and may be deleted from the “**User Collections**”.

9 TROUBLESHOOTING

The most common difficulties you may encounter are:

9.1 DiamondView Zoom Instrument Communication Error



Possible causes:

- DiamondView Zoom instrument not powered.
  Solution: Ensure instrument is powered before running the software

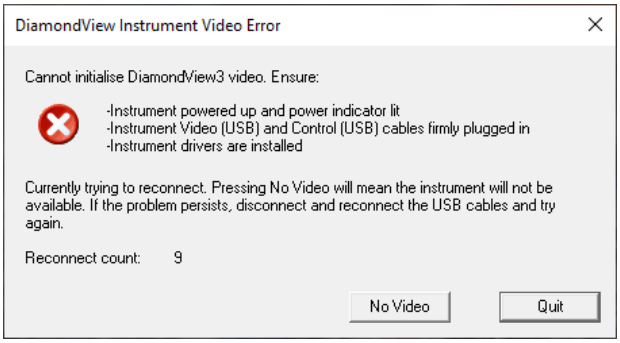
- DiamondView Zoom USB cable not connected.
  Solution: Ensure cable is firmly connected to instrument and PC

- DiamondView Zoom Instrument crash
  Solution: Power instrument off, wait 10 seconds and power it on again

- PC is going into hibernation or standby
  Solution: Disable hibernation/standby by setting the Power schemes to “Always on” in the Control Panel “Power Options” as detailed in video flickering troubleshooting section 0.

- DiamondView Zoom Instrument driver did not install properly
  Solution: Repair the Diamond View Installation (9.3).

9.2 DiamondView Zoom Instrument Video Error



Possible causes:

- DiamondView Zoom instrument not powered.
  Solution: Ensure instrument is powered before running the software

- DiamondView Zoom USB3 cable not connected.
  Solution: Ensure cable is firmly connected to instrument and PC

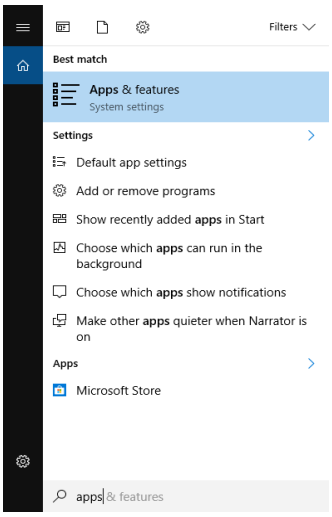
- PC is going into hibernation or standby
  Solution: Disable hibernation/standby by setting the Power scheme to “Always on” or “High Performance” in the Control Panel “Power Options”.

- Camera driver did not install properly
  Solution: Repair the DiamondView Installation (9.3).

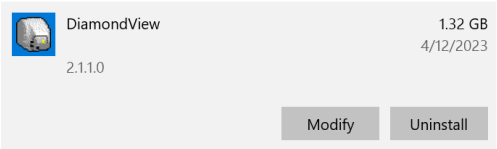
9.3 Repairing a DiamondView Zoom Installation

The diamond view installation can be repaired from the Windows Apps and features settings. This step should only be needed in the event of a faulty or corrupted installation:

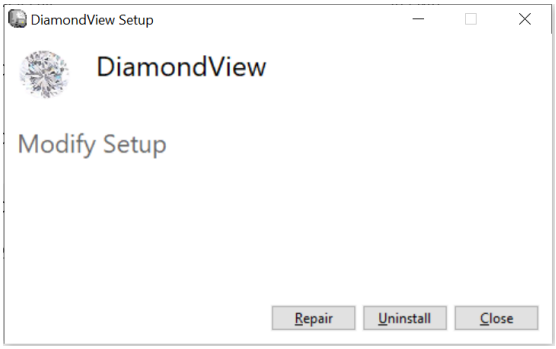
a) Power the instrument up with all the cables connected
b) In the Windows search bar, type Apps and Features and select the Apps and features System settings:



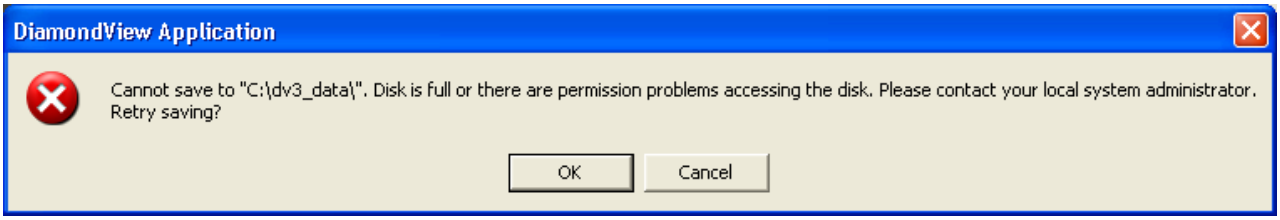
c) Select the DiamondView Zoom Installation and click Modify:

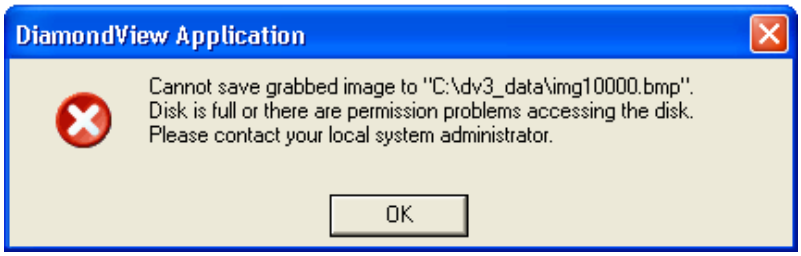


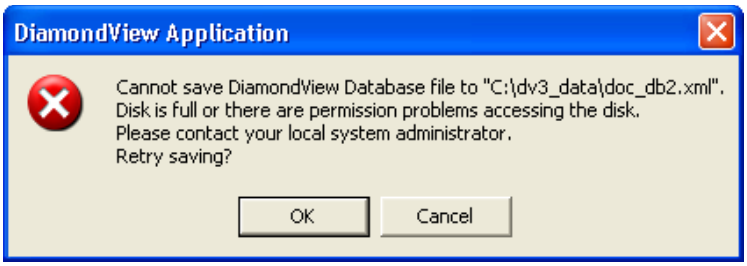
d) Click on Repair to reinstall the DiamondView components

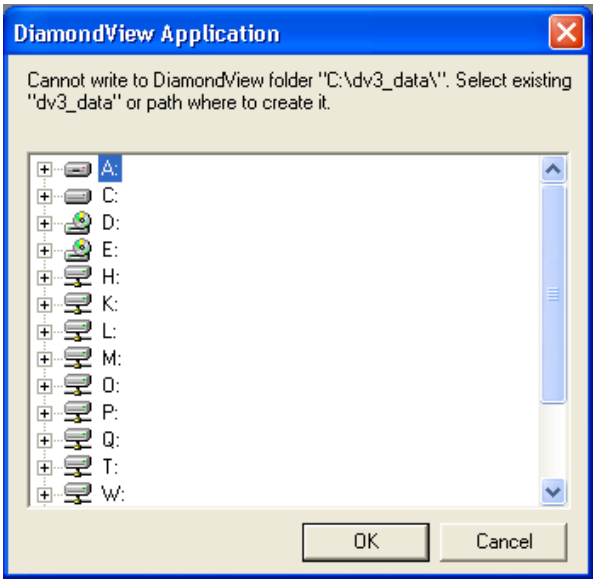


9.4 DiamondView Zoom Disk/Database Save and Write Errors







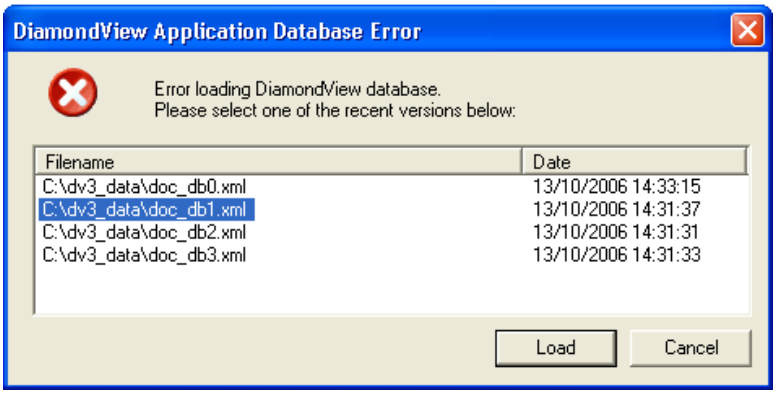


Possible causes:

- The disk where the DiamondView Zoom “dv3_data” database is stored is full.
  Solution: Free space on disk where “dv3_data” is located.

- The disk where the DiamondView Zoom “dv3_data” database is stored is write protected or your user profile does not have write permissions.
  Solution: Contact your system administrator.

9.5 DiamondView Zoom Application Database Error



Possible causes:

- The most recent DiamondView Zoom Database is corrupted and cannot be loaded. This may have happened due to a power/disk/system failure while the database was being saved.

  Solution: Try selecting and loading one of the three previous databases. Since the application saves a database every session all changes made in the last session will be lost.

9.5 Video flickering

Possible causes:

- PC below minimum specification.

  Solution: Ensure PC meets minimum specification

- PC has insufficient free RAM.

  Solution: Close unnecessary applications or upgrade RAM

DiamondView™ Zoom

Quick User Guide

DiamondView Zoom is an instrument for differentiating natural diamonds from synthetics. Ultra-violet light is used to excite fluorescence from the sample. These fluorescence patterns can then be used to examine the growth history of the sample which then allows the user to judge whether the stone is of natural origin or has been artificially created.

All samples 'referred for further tests' by the DiamondSure™ should be examined on the DiamondView Zoom.

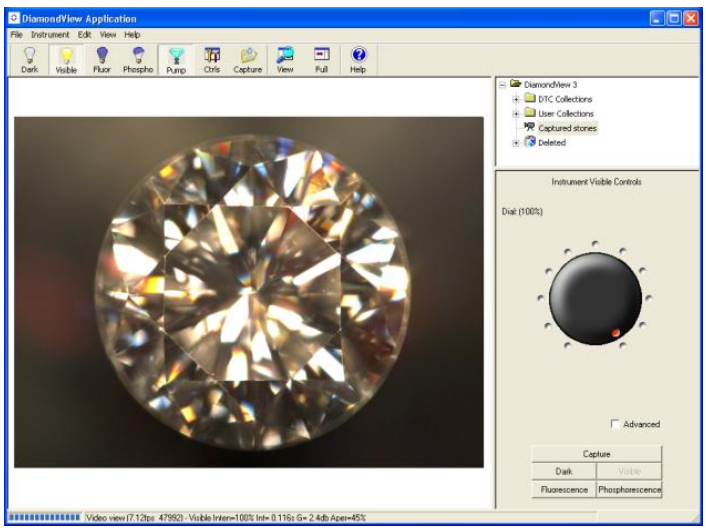
Loading the sample:

The 'Visible' mode shows the sample illuminated with visible light. This mode can be used to position and focus samples before excitation with the UV lamps

- Switch on the DiamondView Zoom (DV) unit and run the DV software
- Open the chamber door
- Ensure the correct size vacuum cup is fitted for the size of sample being loaded
- Switch on the vacuum pump 

- Using tweezers place the sample on the vacuum cup. The sample can be mounted either culet or table down, depending on which part of the sample is to be viewed
- Check the sample is mounted flat and then close the chamber door
- Position the sample in the centre of the screen by adjusting the controls on the chamber door
- Check the sample is in focus by adjusting the 'focus control' also located on the chamber door
- If required capture a visible image 

otherwise the sample is set up for observation of the fluorescence



Observing the fluorescence

In 'fluorescence' mode the sample is excited with ultra-violet (UV) light which generates fluorescence from the surface of the sample.

- Select fluorescence mode 

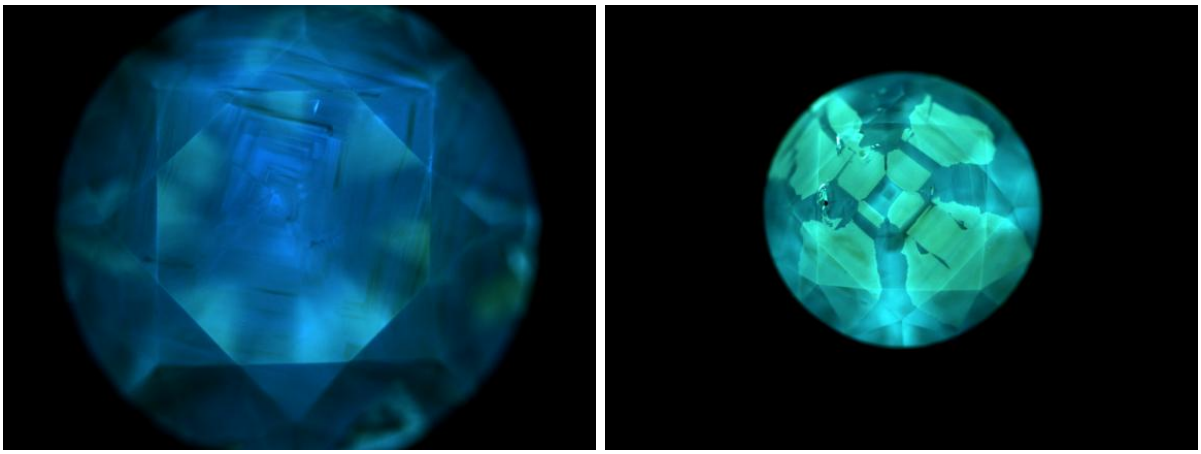
- Adjust the 'Instrument fluorescence controls' dial until a satisfactory image is observed

Tip: If the sample is weakly fluorescing use the advance settings to increase the camera gain, aperture & field stop to the maximum values. This will allow a reduction of integration time and a corresponding increase in refresh rate of the live image – aiding sample focusing and alignment. If required full power mode can be selected, therefore allowing further reduction of integration time.

Tip: Adjusting the "Aperture Control" in advanced mode will improve the image of the sample table when maximised and sample crown/pavilion facets when minimised.

Tip: Reducing the "Field Stop Control" will reduce unwanted reflections and improve the contrast of weakly fluorescing features.

- Check the sample is in focus by adjusting the 'focus control' on the chamber door. Fine focus can be obtained by zooming in on a region. Use facet junctions or dust particles to set the focus
- If required, capture an image 



- A 'phosphorescence' image is automatically taken when a fluorescence image is captured – *this can help with synthetic identification*

© De Beers UK Limited. 2007-2026.
DiamondViewTM is a Trade Mark of De Beers UK Limited to © De Beers Group. 2007-2026. DiamondSureTM and DiamondViewTM are Trade Marks of De Beers Group.