

# Amersham™ Imager 680

## Operating Instructions

Original instructions

Translation disc enclosed



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# 1 Introduction

## About this chapter

This chapter contains important user information, description of safety notices, regulatory information, and a general description of the intended use of Amersham Imager 680.

---

## In this chapter

| Section                        | See page |
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---

- 1 Introduction
- 1.1 About this manual

## 1.1 About this manual

### Purpose of this manual

The *Operating Instructions* provide you with the instructions needed to operate, and maintain Amersham Imager 680 in a safe way.

---

### Typographical conventions

Software items are identified in the text by ***bold italic*** text. A colon separates menu levels, thus ***File:Open*** refers to the ***Open*** command in the ***File*** menu.

Hardware items are identified in the text by **bold** text (for example, **Power**).

---



## 1.2 Important user information

### Read this before operating Amersham Imager 680



**All users must read the entire *Operating Instructions* before installing, operating or maintaining Amersham Imager 680.**

Always keep the *Operating Instructions* at hand when operating Amersham Imager 680.

Do not operate Amersham Imager 680 in any other way than described in the user documentation. If you do, you may be exposed to hazards that can lead to personal injury and you may cause damage to the equipment.

---

### Intended use

Amersham Imager 680 is a CCD camera system that produces digital images of samples in gels or membranes in three different modes: chemiluminescence, colorimetric, and fluorescence.

Amersham Imager 680 is intended for research use only, and shall not be used in clinical procedures, or for diagnostic purposes.

---

### Prerequisites

In order to operate Amersham Imager 680 in the intended way, the following prerequisites must be fulfilled:

- You have read and understood the safety instructions in this *Operating Instruction*
  - You should be acquainted with the use of general laboratory equipment and with handling of biological materials
  - The instrument is installed by GE representatives
-

## Safety notices

This user documentation contains safety notices (WARNING, CAUTION, and NOTICE) concerning the safe use of the product. See definitions below.



### WARNING

**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury. It is important not to proceed until all stated conditions are met and clearly understood.



### CAUTION

**CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. It is important not to proceed until all stated conditions are met and clearly understood.



### NOTICE

**NOTICE** indicates instructions that must be followed to avoid damage to the product or other equipment.

## Notes and tips

**Note:** *A note is used to indicate information that is important for trouble-free and optimal use of the product.*

**Tip:** *A tip contains useful information that can improve or optimize your procedures.*

---

## 1.3 Regulatory information

### Introduction

This section describes the directives and standards fulfilled by Amersham Imager 680.

---

### Manufacturing information

The table below summarizes the required manufacturing information.

| Requirement                      | Information  |
|----------------------------------|--|
| Name and address of manufacturer | GE Healthcare Bio-Sciences AB,<br>Björkgatan 30, SE 751 84 Uppsala, Sweden |

### In this section

| Section   | See page |
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---

## 1.3.1 EU Directives

### Conformity with EU Directives

This product fulfills the European Directives listed below. See the EU Declaration of Conformity for the directives and regulations that apply for the CE marking.

If not included with the product, a copy of the EU Declaration of Conformity is available on request.

| Directive  | Title  |
|------------|--|
| 2006/42/EC | Machinery Directive (MD)                             |
| 2014/30/EU | Electromagnetic Compatibility (EMC) Directive        |
| 2014/35/EU | Low Voltage Directive (LVD)                          |
| 2011/65/EU | Restriction of Hazardous Substances (RoHS) Directive |

### CE marking



The CE marking and the corresponding EU Declaration of Conformity is valid for the instrument when it is:

- used according to the Operating Instructions or user manuals, and
  - used in the same state as it was delivered from GE, except for alterations described in the Operating Instructions or user manuals.
-

## 1.3.2 Eurasian Customs Union

### Introduction

This section contains additional regulatory information to comply with the Eurasian Customs Union technical regulations.

---

### Manufacturer and importer information

The table below summarizes the manufacturer and importer information required by the Eurasian Customs Union.

| Requirement  | Information   |
|--|---|
| Name and address of manufacturer                                 | See <i>Manufacturing information</i>  |
| Telephone number of manufacturer                                 | Telephone: + 46 771 400 600   |
| Importer and/or company for obtaining information about importer | GE Healthcare LLC<br>GE Healthcare Life Sciences<br>Presnenskaya nab., 10C, 12th floor<br>RU-123 317 Moscow, Russian Federation<br>Telephone 1: + 7 495 411 9714<br>Fax nr: + 7 495 739 6932<br>Email: LSrus@ge.com |

## 1.3.3 Regulations for USA and Canada

### NRTL certification



This symbol indicates that Amersham Imager 680 has been certified by a Nationally Recognized Testing Laboratory (NRTL).

NRTL means an organization, which is recognized by the US Occupational Safety and Health Administration (OSHA) as meeting the legal requirements of Title 29 of the Code of Federal Regulations (29 CFR), Part 1910.7.

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### FCC compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Note:** *The user is cautioned that any changes or modifications not expressly approved by GE could void the user's authority to operate the equipment.*

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 instruction 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.

---

### CAN ICES/NMB compliance

This product complies with the Canadian standard ICES-003/NMB-003 concerning electromagnetic compatibility.

---

## 1.3.4 Notification - products containing mercury (Canada)

### Introduction

This notice is provided in accordance with the Products Containing Mercury Regulation SOR/2014-254 November 7, 2014 as annexed in the Canadian Environmental Protection Act, 1999.

Cette mise en garde est fournie conformément au règlement DORS/2014-254 du 7 novembre 2014 sur les produits contenant du mercure, tel qu'annexé à la loi canadienne sur la protection de l'environnement (1999).

---

### Notification (English)

**Notification about this product.**



- Contains mercury.
- For safe handling procedures and the measures to be taken in case of accidental breakage, and for options available for disposal and recycling, please refer to <https://www.ec.gc.ca/mercuremercury/Default.asp?lang=En&n=DB6D2996-1>. If additional support is needed, please contact your GE representative.
- This product should be disposed of or recycled in accordance with the applicable laws.

## 1 Introduction

### 1.3 Regulatory information

#### 1.3.4 Notification - products containing mercury (Canada)

## Notification (français)

### Notification sur ce produit.



- Contient du mercure.
- Pour les procédures de manipulation sécuritaires et les mesures à prendre en cas de rupture accidentelle, et pour les options disponibles pour l'élimination et le recyclage, veuillez consulter le site <https://www.ec.gc.ca/mercure-mercury/Default.asp?lang=Fr&n=DB6D2996-1>. Pour obtenir une aide supplémentaire, veuillez communiquer avec votre représentant GE.
- Ce produit doit être éliminé ou recyclé en conformité avec les lois applicables.



## 1.3.5 Other regulations and standards

### Environmental Conformity

| Requirement | Title  |
|-------------|--|
| 2012/19/EU  | Waste Electrical and Electronic Equipment (WEEE) Directive   |
| China RoHS  | Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products. |

### Standards, machinery and electrical equipment

Standard requirements fulfilled by this product are summarized in the table below.

| Standard   | Description   |
|--|---|
| EN ISO 12100   | Safety of machinery. General principles for design. Risk assessment and risk reduction.   |
| EN 61010-1, IEC 61010-1, UL 61010-1, CAN/CSA-C22.2 No. 61010-1 | Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements.   |
| IEC/EN 61010-2-010   | Particular requirements for laboratory equipment for the heating of materials   |
| IEC/EN 61010-2-081   | Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes   |
| EN 60529   | Degrees of protection provided by enclosures  |
| IEC/EN 61326-1   | Electrical Equipment for Measurement, Control, and Laboratory Use-EMC requirements-Part 1: General requirements<br><br>(Emission according to CISPR 11, Group 1, class A) |

- 1 Introduction
- 1.3 Regulatory information
- 1.3.5 Other regulations and standards

## Light sources

The safety of the LED light sources in this instrument has been assessed by risk analysis in accordance with EN 61010-1.

Amersham Imager 680, depending on configuration, is equipped with some or all light sources in the table below:

| Light sources        | Wavelength       |
|----------------------|------------------|
| Blue LED             | 460 nm           |
| Green LED            | 520 nm           |
| Red LED              | 630 nm           |
| White LED            | 470 nm to 635 nm |
| Trans-UV-illuminator | 312 nm           |

---

# 2 Safety instructions

## About this chapter

This chapter describes safety precautions, safety labels, and emergency procedures for the Amersham Imager 680 instrument, in addition to information on the safe disposal of the instrument.

---

## Important



### WARNING

**Before installing, operating or maintaining the product, all users must read and understand the entire contents of this chapter to become aware of the hazards involved.**

## In this chapter

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---

## 2 Safety instructions

### 2.1 Safety precautions

## 2.1 Safety precautions

### Introduction

Amersham Imager 680 is powered by mains voltage, may be equipped with a UV light source, and is used to capture images of samples that may be hazardous. Before installing, operating or maintaining the system, you must be aware of the hazards described in this manual.

**Follow the instructions provided to avoid personal injuries, damage to the product, or to other personnel and equipment in the area.**

The safety precautions in this section are grouped into the following categories:

- General precautions
  - Personal protection
  - Installation
  - Operation
  - Maintenance
- 

### General precautions



#### **WARNING**

Do not operate the product in any other way than described in the user documentation.



#### **WARNING**

Use of this equipment in other ways than those specified in the user documentation may result in physical damage because of exposure to irradiated light or electric shock or injury from touching an operating part.



**WARNING**

Do not use the instrument if smoke, atypical noises or odors can be perceived, or if the instrument becomes unusually hot as this may result in fire or electric shock.

Stop using the instrument immediately, turn off the power switch, and unplug the instrument from the power outlet. Contact your local GE representative to request repair.



**WARNING**

Do not damage the power supply cord by bending, twisting, heating or allowing them to become pinned under the equipment. Using damaged power cords could result in fire or electric shock.

If the power supply cords are damaged, contact your local GE representative for replacements.



**WARNING**

**Access to power switch and power cord with plug.** Do not block access to the power switch and power cord. The power switch must always be easy to access. The power cord with plug must always be easy to disconnect.



**WARNING**

Do not block vents and make sure that they are kept free of dust and dirt. Blockage can cause overheating and malfunctioning. To allow adequate cooling make sure there is at least 40 cm of free space in front of the instrument and at least 10 cm on all other sides between walls or other equipment.

## 2 Safety instructions

### 2.1 Safety precautions

#### Personal protection



#### WARNING

**Hazardous substances.** When using hazardous chemicals, take all suitable protective measures, such as wearing protective glasses and gloves resistant to the substances used. Follow local and/or national regulations for safe operation and maintenance of the system.



#### CAUTION

The instrument is equipped with a safety interlock. If the interlock is out of order or has been tampered with, UV and visible light may be emitted, which may cause skin burn and impair vision.

Do not open the instrument door during operation, when the RUN indicator is lit. If the door is opened and the instrument keeps running, turn off the instrument immediately and contact GE service.



#### CAUTION

Do not touch the UV unit after UV exposure. There is a risk of skin burn.

#### Installation



#### WARNING

As the equipment is heavy, contact a GE service person when moving or relocating the main body of the equipment. If the equipment drops, it may be broken, or you may get seriously injured if it drops on your foot.



#### WARNING

**Power cord.** Only use power cords with approved plugs delivered or approved by GE.



**WARNING**

**Protective ground.** The product must always be connected to a grounded power outlet.



**WARNING**

In USA and Europe (Belgium, Netherlands, Luxemburg, Germany, France, Italy, Denmark, Greece, Spain, Portugal, Austria, Finland, Sweden, Poland, Hungary, Czech, Slovenia, Slovakia, Estonia, Latvia, Lithuania, and Romania), use the proper power cord included in the product package. In other countries, use the proper power cord delivered separately from the product package by GE. Do not change AC power cord to inappropriate one.



**WARNING**

Connect the power supply directly to a grounded wall power outlet. The use of extension cords or multiple loads on one electrical outlet could result in fire and electric shock.



**CAUTION**

Amersham Imager 680 must be secured before transport or relocation. Contact GE for instructions before transporting the instrument.



**NOTICE**

Do not connect telephone lines to the Ethernet port. Only the IEC 60950-1/VL 60950-1 standard non-shielded cables are appropriate for connection to this connector.



**NOTICE**

Only use IEC 60950-1-certified equipment and cables to connect to the instrument.

## 2 Safety instructions

### 2.1 Safety precautions

## Operation



### **WARNING**

Do not use the instrument within or near a sink, or in humid (above 70% RH) or dusty environments. This can result in fire or electric shock.



### **WARNING**

In case of thunder, do not touch the power supply plug, as this can result in electric shock.



### **CAUTION**

Do not put your hand into the upper tray position. The gap is small and you may injure your hand.



### **CAUTION**

Always use appropriate Personal Protective Equipment (PPE) during operation and maintenance of Amersham Imager 680.

- Protective eyewear
- Protective gloves
- Protective footwear, preferably with steel lining



### **CAUTION**

Reagents used to prepare the sample should be used in accordance with the manufacturer instructions.



### **CAUTION**

Do not lean on the sample door.





**CAUTION**

Use the handle to open or close the instrument door.



**CAUTION**

Do not place heavy objects on top of the instrument.



**CAUTION**

Handle sample trays and tablet computers with care to avoid dropping them.



**CAUTION**

Do not touch the light source in the instrument. The light source may be hot.



**CAUTION**

Do not leave samples in the instrument after exposure. If left, these may degrade and cause damage to the instrument.



**CAUTION**

Do not disable the interlock of the equipment as UV light can be emitted if the door is opened.



**NOTICE**

Both the Amersham Imager 680 Control Software and Amersham Imager 680 Analysis Software do not analyze image files other than those captured and generated by Amersham Imager 680. Analysis of files other than those captured on the Amersham Imager 680 may introduce errors.

## 2 Safety instructions

### 2.1 Safety precautions



#### **NOTICE**

Do not add and/or remove any files in the folder generated by Amersham Imager 680 with Amersham Imager 680 Control Software and Amersham Imager 680 Analysis Software. Do not modify any folders in which files have been added or removed. This may prevent a correct analysis afterwards.



#### **NOTICE**

Do not use USB ports for recharging external devices. This can cause instrument malfunction.



#### **NOTICE**

Connection of multiple computers to one instrument may impair performance. Simultaneous use can cause loss of data.



#### **NOTICE**

Avoid connecting additional accessories such as computers, monitors or keyboards to the instrument during operation as this can stop the exposure or cause loss of data.



#### **NOTICE**

Do not turn off power during operation as this can cause loss of data and damage the Compact flash drive. Only turn off power in an emergency situation.



#### **NOTICE**

Do not open the instrument door during exposure, when the RUN light indicates operation. This will stop the exposure and data will not be saved.



**NOTICE**

Transferring large amounts of files to a connected computer during operation can impair the system's performance.



**NOTICE**

Do not touch the light source windows as scratches or dirt may impair performance.



**NOTICE**

The tablet computer cannot be recharged with this instrument.



**NOTICE**

When connecting an external monitor to the system, use a monitor with SVGA resolution. With a low-resolution monitor, operation buttons cannot be seen.



**NOTICE**

Remove all traces of acidic solutions to prevent corrosion in the equipment.

## Maintenance



**WARNING**

**Electrical shock hazard.** All instrument repairs or modifications should be performed by service personnel authorized by GE. Do not open any covers or replace parts unless specifically stated in the user documentation.

## 2 Safety instructions

### 2.1 Safety precautions



#### **WARNING**

Do not use excessive amounts of liquids for cleaning the Amersham Imager 680 instrument. This may result in instrument malfunction or electric shock.



#### **CAUTION**

Always use appropriate Personal Protective Equipment (PPE) during operation and maintenance of Amersham Imager 680.

- Protective eyewear
- Protective gloves
- Protective footwear, preferably with steel lining



#### **CAUTION**

Turn off the power switch before cleaning the inside of the instrument.



#### **CAUTION**

UV lamps in Amersham Imager configurations 680 UV, 680 QC, and 680 RGB contain mercury, which must be recycled or disposed of in accordance with local regulations.



#### **NOTICE**

Do not use abrasive cleaning materials, such as a scouring pad, for cleaning. This may cause damage to the instrument.



#### **NOTICE**

Dispose of the tablet computer as instructed in its user manual.



**NOTICE**

When performing maintenance of the equipment, remove the tablet computer. There is risk of injury if it falls on your foot.

## 2 Safety instructions

### 2.2 Labels

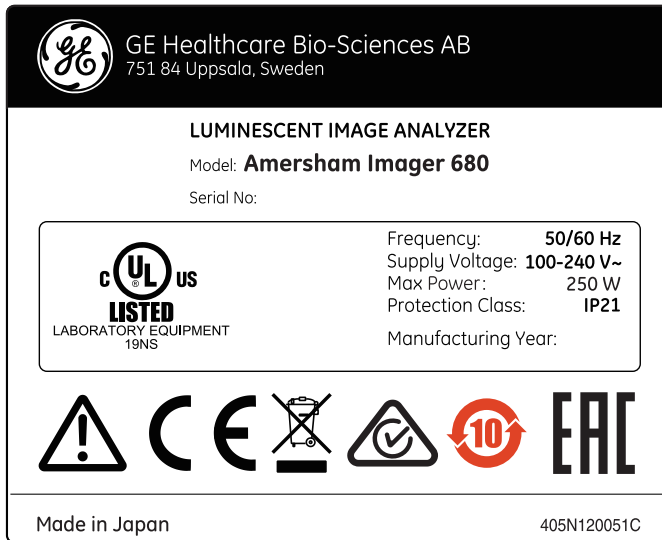
## 2.2 Labels

### Introduction

This section describes the system label and other safety or regulatory labels that are attached to the product.

### System label

The following illustration shows an example of the system label that is attached to the Amersham Imager 680 instrument. The system label identifies the product and shows electrical data and regulatory compliance.



### Manufacturing date

Manufacturing year and month are determined by the serial number on the system label. The serial number has the format YMMSSSSS and depicts the manufacturing year and month as follows.








| Character | Meaning                                  |
|-----------|--|
| Y         | The last digit of the manufacturing year |

| Character | Meaning                      |
|-----------|------------------------------|
| MM        | The manufacturing month + 60 |
| SSSSS     | Serial production number     |

Example: A product with serial number YMM = 364 is manufactured in April 2013. For information regarding shelf life please contact your local GE representative.


## Symbols used on the labels

The following symbols can be found on the label on the instrument:

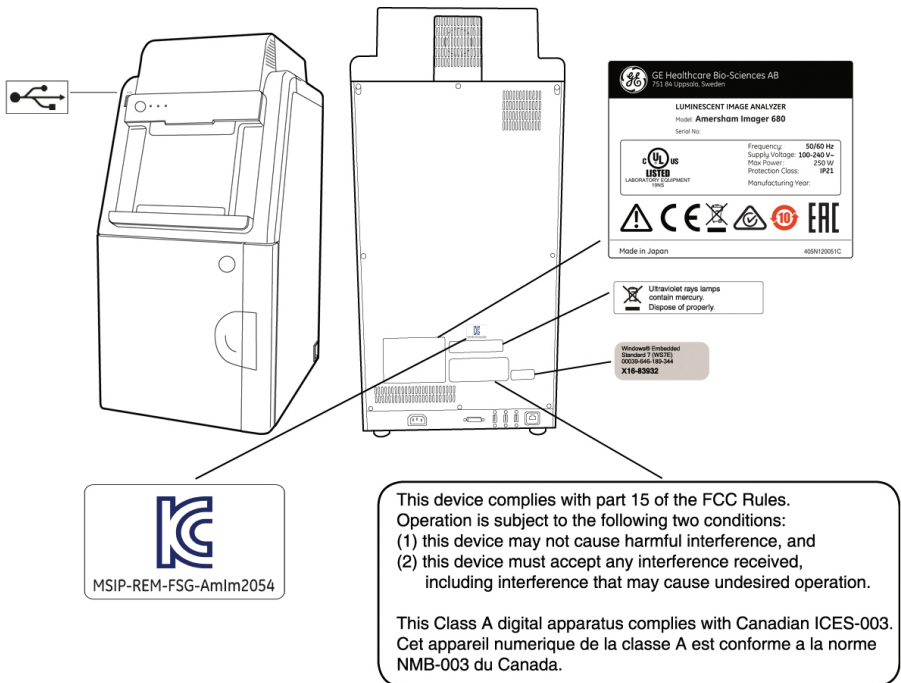
| Label   | Meaning   |
|---|---|
|    | <b>Warning!</b> Read the Operating Instruction before using the system. Do not open any covers or replace parts unless specifically stated in the Operating Instruction.  |
|    | The instrument complies with the requirements for electromagnetic compliance (EMC) in Australia and New Zealand   |
|    | The instrument complies with applicable European directives   |
|  | This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the de-commissioning of equipment.  |
|  | This symbol indicates that the product contains hazardous materials in excess of the limits established by the Chinese standard <i>GB/T 26572 Requirements of concentration limits for certain hazardous substances in electrical and electronic products.</i>  |
|  | Eurasian Conformity mark: the single conformity mark indicates that the product is approved for circulation on the markets of the member states of the Eurasian Customs Union.  |
|  | This symbol indicates that the instrument has been certified by a Nationally Recognized Testing Laboratory (NRTL). An NRTL is an organization that the Occupational Safety and Health Administration (OSHA) has recognized as meeting the legal requirements in USA title 29 of the Code of Federal Regulations (29 CFR) Part 1910.7. |

## 2 Safety instructions

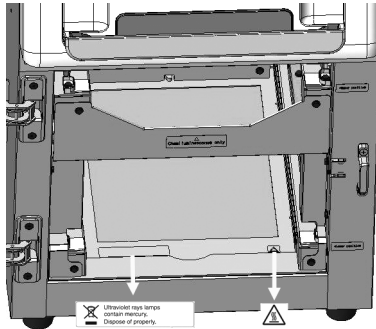
### 2.2 Labels

| Label   | Meaning  |
|---|--|
|  | The KC symbol indicates RRA registration of compatibility in Korea. The registration number of the product will appear beside the symbol. This equipment has been tested and found to comply with the limits for a Class A digital device. |





### Position of label and additional symbols







**Note:** For details on symbols see Section 3.4 Instrument hardware description, on page 43.

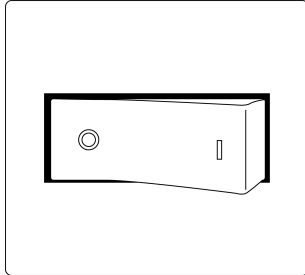
| Symbol  | Description                                 |
|---|---|
|    | On/Off switch                               |
| I/O   | Power switch<br>I: Power ON<br>O: Power OFF |
| DVI-D   | Connector for DVI-D monitor                 |
|  | USB port                                    |
|  | Ethernet port                               |
|  | Caution, hot surface                        |

## 2.3 Emergency procedure

### Emergency shutdown

In case of emergency:

- Turn off the power by pushing the Power switch to the **O** position on the bottom right-hand side of the instrument.



- Disconnect the power cord from the wall socket.
- 

### Precautions



#### **WARNING**

**Access to power switch and power cord with plug.** Do not block access to the power switch and power cord. The power switch must always be easy to access. The power cord with plug must always be easy to disconnect.

## 2.4 Recycling information

### Introduction

This section contains information about the decommissioning of Amersham Imager 680.

---

### Decontamination

The equipment and the accessories must be clean from contaminants before decommissioning and all local regulations must be followed with regard to waste disposal.

Samples are to be disposed of according to local regulations.

---

### Disposal of the product

When taking the product out of service, the different materials must be separated and recycled according to national and local environmental regulations.

---

### Recycling of hazardous substance

The lamps in Amersham Imager 680 configurations: 680 QC, 680 UV, and 680 RGB contain mercury vapour. These must be recycled or disposed of in a manner compliant with national and local environmental regulations.

---

### Disposal of electrical components



Waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of the equipment.

---

## Instructions for disposal

Follow the instructions below for disposal of the Amersham Imager 680:

| <b>Step</b> | <b>Action</b>  |
|-------------|--|
| 1           | Separate all electronic components (terminal strips, power supplies, transmitters, pumps, probes / sensors, etc.) from the system cabinet.   |
| 2           | Decontaminate the Amersham Imager 680 Cabinet and system cabinet following appropriate procedures depending on what type of environment the unit was located in. Follow local and/or national/federal requirements for disposal of the Amersham Imager 680 Cabinet and the system cabinet. |
| 3           | Dispose of electronic components as specified by local regulations depending on material used in the construction of the components. Follow local and/or national/federal requirements for disposal of the electronic components.  |

## 2.5 Declaration of Hazardous Substances (DoHS)

根据SJ/T11364-2014《电子电气产品有害物质限制使用标识要求》特提供如下有关污染控制方面的信息。

The following product pollution control information is provided according to SJ/T11364-2014 Marking for Restriction of Hazardous Substances caused by electrical and electronic products.

### 电子信息产品污染控制标志说明

#### Explanation of Pollution Control Label



该标志表明本产品含有超过中国标准GB/T 26572《电子电气产品中限用物质的限量要求》中限量的有害物质。标志中的数字为本产品的环保使用期，表明本产品在正常使用的条件下，有毒有害物质不会发生外泄或突变，用户使用本产品不会对环境造成严重污染或对其人身、财产造成严重损害的期限。单位为年。

为保证所声明的环保使用期限，应按产品手册中所规定的环境条件和方法进行正常使用，并严格遵守产品维修手册中规定的定期维修和保养要求。

产品中的消耗件和某些零部件可能有其单独的环保使用期限标志，并且其环保使用期限有可能比整个产品本身的环保使用期限短。应到期按产品维修程序更换那些消耗件和零部件，以保证所声明的整个产品的环保使用期限。

本产品在使用寿命结束时不可作为普通生活垃圾处理，应被单独收集妥善处理。

This symbol indicates the product contains hazardous materials in excess of the limits established by the Chinese standard GB/T 26572 Requirements of concentration limits for certain restricted substances in electrical and electronic products. The number in the symbol is the Environment-friendly Use Period (EFUP), which indicates the period during which the hazardous substances contained in electrical and electronic products will not leak or mutate under normal operating conditions so that the use of such electrical and electronic products will not result in any severe environmental pollution, any bodily injury or damage to any assets. The unit of the period is "Year".

In order to maintain the declared EFUP, the product shall be operated normally according to the instructions and environmental conditions as defined in the product manual, and periodic maintenance schedules specified in Product Maintenance Procedures shall be followed strictly.

Consumables or certain parts may have their own label with an EFUP value less than the product. Periodic replacement of those consumables or parts to maintain the declared EFUP shall be done in accordance with the Product Maintenance Procedures.

This product must not be disposed of as unsorted municipal waste, and must be collected separately and handled properly after decommissioning.

## 2 Safety instructions

### 2.5 Declaration of Hazardous Substances (DoHS)

#### 有害物质的名称及含量

#### Name and Concentration of Hazardous Substances

#### 产品中有害物质的名称及含量

Table of Hazardous Substances' Name and Concentration

| 部件名称<br>Component name | 有害物质<br>Hazardous substance |           |           |                 |               |                 |
|------------------------|-----------------------------|-----------|-----------|-----------------|---------------|-----------------|
|                        | 铅<br>(Pb)                   | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr(VI)) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 29270769               | X                           | O         | O         | O               | O             | O               |
| 29270770               | X                           | X         | X         | O               | O             | O               |
| 29270771               | X                           | X         | X         | O               | O             | O               |
| 29270772               | X                           | X         | X         | O               | O             | O               |

本表格依据SJ/T 11364的规定编制。

This table is prepared according to SJ/T 11364.

O: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

- 此表所列数据为发布时所能获得的最佳信息。

O: Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

X: Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

- Data listed in the table represents best information available at the time of publication.

# 3 Instrument description

## About this chapter

This chapter presents an overview of Amersham Imager 680 features and different instrument configurations. It also contains descriptions of hardware components, software displays, and functions.

**Note:** *Due to cosmetic changes to the software, the screen captures in this manual may differ slightly compared to the actual software. However, the general functions are the same.*

---

## In this chapter

| Section                             | See page |
|-------------------------------------|----------|
| 3.1 Introduction                    | 40       |
| 3.2 Feature overview                | 41       |
| 3.3 Illustration of the instrument  | 42       |
| 3.4 Instrument hardware description | 43       |
| 3.5 Instrument software description | 50       |
| 3.6 Accessories                     | 70       |

---

## 3 Instrument description

### 3.1 Introduction

## 3.1 Introduction

Amersham Imager 680 is an imaging instrument designed to identify and quantify proteins or DNA in gels or membranes. A cooled 3.2 megapixel CCD camera is used to capture high resolution digital images of protein and DNA bands in gels and on membranes obtained by electrophoresis or western blotting separation methods. The instrument can capture images of chemiluminescent, fluorescent, and colorimetric samples, depending on the system configuration. Analysis software is included with the instrument.

The instrument can be used for research purposes in the academia and life sciences industry.





## 3.2 Feature overview

The following features are offered by Amersham Imager 680:

- A highly sensitive CCD camera with 3.2 megapixels
  - Fast detector cooling capacity
  - Ready-to-use within 5 minutes after start-up
  - Tablet computer interface
  - Chemiluminescence imaging with high sensitivity
  - Generation of a combined color image of a chemiluminescence sample image and a white light image of a color marker
  - Fluorescence imaging using blue, green, and red Epi light sources and UV trans-illuminator
  - Color images of colorimetrically stained gels or membranes obtained by white light illumination
  - Accurate quantification of stained gels using white trans-illumination
  - Intuitive design with easy to use image analysis workflow
-

### 3.3 Illustration of the instrument

The Amersham Imager 680 instrument is operated from a wireless connected tablet computer. It may also be operated from a wired touchscreen or a monitor with mouse. The illustration below displays Amersham Imager 680 setup with tablet computer.



## 3.4 Instrument hardware description

### Main components in each configuration

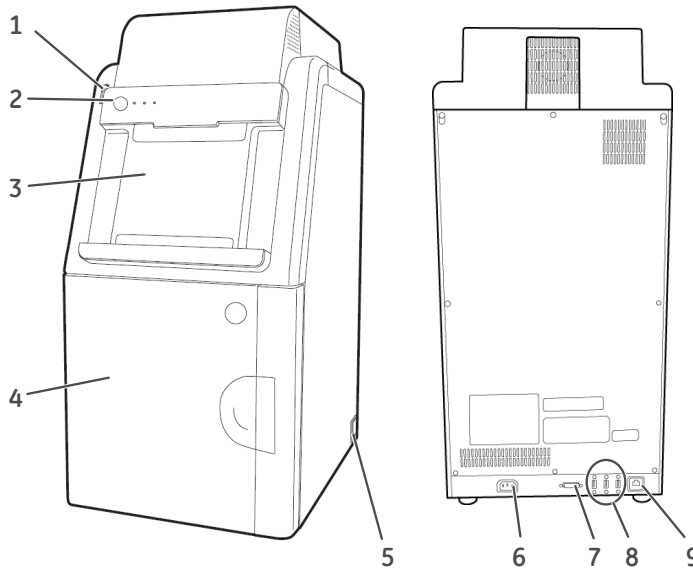
Amersham Imager 680 is available in four different configurations. Different parts and functions of Amersham Imager 680 are available depending on configuration.



The table below describes the functions and components of the different instrument configurations.



| Functions  | Amersham Imager 680<br>29270769 | Amersham Imager 680<br>UV<br>29270770 | Amersham Imager 680<br>QC<br>29270771 | Amersham Imager 680<br>RGB<br>29270772 |
|--|---------------------------------|---------------------------------------|---------------------------------------|--|
| Control Software for image capture and analysis  | X                               | X                                     | X                                     | X                                      |
| Chemiluminescence CCD camera head including lens | X                               | X                                     | X                                     | X                                      |
| Epi White light source                           | X                               | X                                     | X                                     | X                                      |
| Filter changer                                   |                                 | X                                     | X                                     | X                                      |
| Trans-UV light source                            |                                 | X                                     | X                                     | X                                      |
| Trans-White light source                         |                                 |                                       | X                                     | X                                      |
| Blue, Green, and Red Epi light source            |                                 |                                       |                                       | X                                      |

## Amersham Imager 680 exterior

The illustration below shows the main exterior hardware components of the instrument.

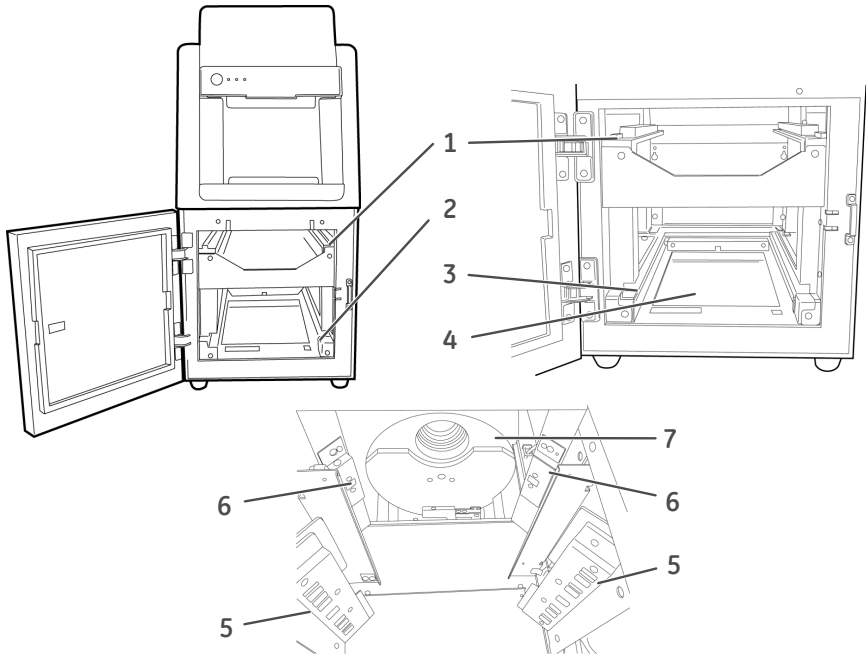


| Part | Name  | Description  |
|------|---|--|
| 1    | USB port<br>                         | A USB 2.0 port for connection of USB flash drive.<br><br><b>Note:</b><br><i>Password protected USB flash drives are not supported.</i>   |
| 2    | On/Off button and LED indicators<br> | On/Off button: Press the button to turn on power. Press again to turn off the power.<br><br><b>Power:</b> The LED is lit (white) when the instrument is powered on.<br><br><b>Run:</b> The LED is lit (blue) when the instrument is operating, or if the <b>Instrument indicator</b> is selected.<br><br><b>Error:</b> The LED is lit (red) when the instrument is malfunctioning. |

| Part | Name   | Description   |
|------|--|---|
| 3    | Tablet computer dock   | <p>The dock can hold tablet computers of the following dimensions and weight:</p> <p>Width: 222 to 242 mm</p> <p>Height: 183.5 to 186 mm</p> <p>Depth: 9.5 mm or less</p> <p>Weight: 750 g or less</p> <p><b>Note:</b><br/><i>Some tablet computers cannot fit due to the shape of corners.</i></p> <p><b>Note:</b><br/><i>The tablet computer cannot be recharged on the instrument.</i></p> <p><b>Note:</b><br/><i>With an iPad Air<sup>®</sup> attachment, iPad Air can be placed on the dock.</i></p> |
| 4    | Door   | Instrument door   |
| 5    | Power switch   | <p>Toggle switch:</p> <p>I: Power ON</p> <p>O : Power OFF</p>   |
| 6    | Power connector  | Connector for attaching the AC power cord.  |
| 7    | DVI-D port   | Port for connecting a digital only DVI monitor.   |
| 8    | USB port<br>      | <p>Port for additional external devices, for example a printer.</p> <p><b>Note:</b><br/><i>The tablet computer cannot be recharged with the instrument.</i></p>   |
| 9    | Ethernet port<br> | Connector for a network cable.  |

## Amersham Imager 680 interior

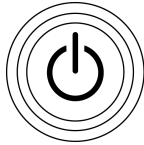
The illustration below shows the main hardware components inside the instrument.



| Part | Name                     | Description   |
|------|--------------------------|---|
| 1    | Upper Tray guide         | Guides which support and position the tray.   |
| 2    | Lower Tray guide         | Guides which support and position the tray.   |
| 3    | Trans-White light source | White light   |
| 4    | Trans-UV light source    | UV light  |
| 5    | Epi light source         | For configurations 680, 680 UV, and 680 QC:<br>White light source<br><br>For configuration 680 RGB: White light plus Blue, Green, and Red light sources |
| 6    | Epi light source         | White light   |
| 7    | Filter changer           | Filter changer unit   |

## Amersham Imager 680 LED indicators

The table below describes the different states of the LED indicators located at the front of the instrument, to the right of the On/Off button.



**Power**     **Run**     **Error**

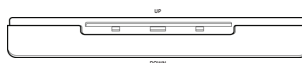
| State            | POWER<br>White light | RUN<br>Blue light | ERROR<br>Red light | Indication type and frequency                        |
|------------------|----------------------|-------------------|--------------------|--|
| Off              |                      |                   |                    |  |
| Power up         | X                    |                   |                    | Flashing ~ 1 Hz<br>ON = 0.5 s / OFF = 0.5 s          |
| Ready / Power on | X                    |                   |                    | Steady light   |
| Busy / Run       | X                    | X                 |                    | Steady light   |
| Error            | X                    |                   | X                  | Flashing ~ 1 Hz<br>ON = 0.5 s / OFF = 0.5 s          |
| Shutdown         | X                    |                   |                    | Flashing ~ 1 Hz<br>ON = 0.5 s / OFF = 0.5 s          |
| Power save       | X                    |                   |                    | Flashing slowly ~ 0.5 Hz<br>ON = 0.5 s / OFF = 1.5 s |

## Mount iPad Air attachment

The description below gives the necessary information for the fitting and removing of the iPad Air attachment to Amersham Imager 680.

### Fitting the attachment

**Note:** Place the attachment as illustrated below.

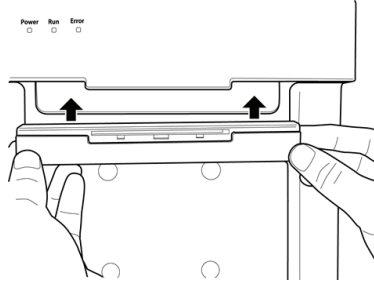


### 3 Instrument description

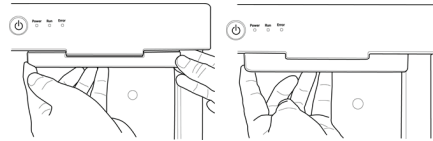
#### 3.4 Instrument hardware description

| Step | Action |
|------|--------|
|------|--------|

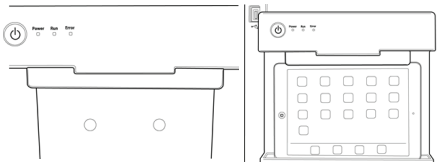
- |   |  |
|---|--|
| 1 | Hold the attachment and slide it upward. |
|---|--|



- |   |   |
|---|---|
| 2 | Push the attachment upward firmly into the guide until you hear a clicking sound. |
|---|---|



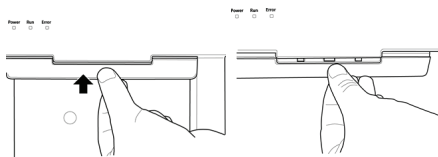
- |   |  |
|---|--|
| 3 | Connect an iPad Air to the attachment. |
|---|--|



### Removing the attachment

| Step | Action |
|------|--------|
|------|--------|

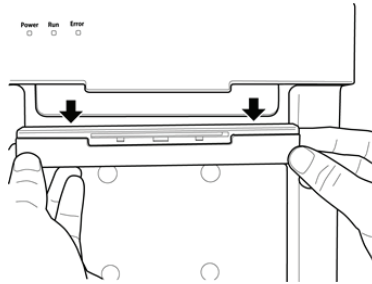
- |   |   |
|---|---|
| 1 | Push the center of the attachment to release the lock points. |
|---|---|





| Step | Action |
|------|--------|
|------|--------|

|   |                               |
|---|-------------------------------|
| 2 | Pull the attachment downward. |
|---|-------------------------------|



## 3.5 Instrument software description

### Introduction

The Amersham Imager 680 software is designed to guide you through the workflow of capturing images and analyzing the image data. The software is normally operated on a wireless connected tablet computer placed in the docking support on the instrument front. This section describes the main components and functions of the software.

**Note:** *The software can be controlled from a handheld tablet computer, a digital visual interface-connected touchscreen or a monitor plus mouse.*

**Note:** *The available functions may vary depending on the system configuration. For details on system configurations see Section 3.4 Instrument hardware description, on page 43.*

---

### In this section

This section contains the following:

| Section                                    | See page |
|--|----------|
| 3.5.1 Description of the Capture tab       | 51       |
| 3.5.2 Description of the Library tab       | 56       |
| 3.5.3 Description of the image view        | 58       |
| 3.5.4 Description of the analysis workflow | 62       |
| 3.5.5 Description of settings views        | 66       |

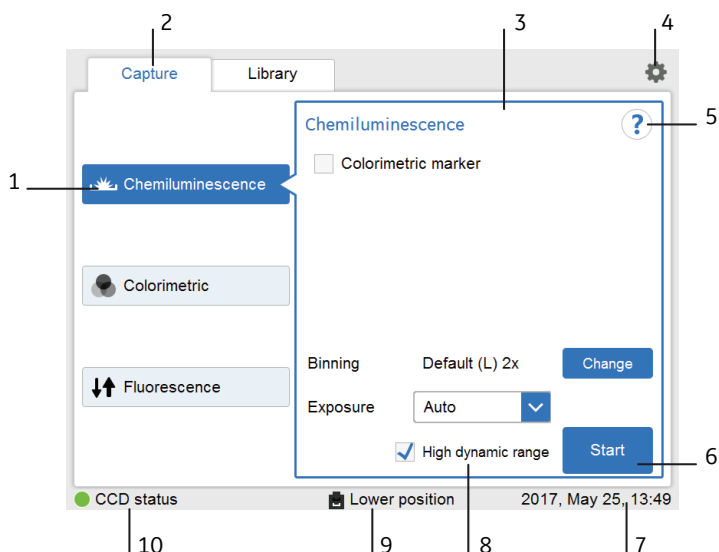
---

## 3.5.1 Description of the Capture tab

### Capture view

The **Capture** tab is displayed as the default start screen when Amersham Imager 680 and the tablet computer are turned on and the start up procedure has completed. It allows you to select image capturing method and set details for the exposure. The display changes depending on the choice of method.

The following illustration describes the basic elements of the **Capture** tab.



| Part | Function   |
|------|--|
| 1    | The selected image capturing method.   |
| 2    | <b>Capture</b> - The tab for selecting image capturing method and starting exposure. |
| 3    | Area displaying options for the selected method.                                     |
| 4    | The settings icon for accessing the <b>Settings</b> view.                            |
| 5    | The help icon for accessing context sensitive online help.                           |
| 6    | <b>Start</b> - The start exposure button.  |
| 7    | The date and time.   |

### 3 Instrument description

#### 3.5 Instrument software description

##### 3.5.1 Description of the Capture tab

| Part | Function   |
|------|--|
| 8    | <b>High dynamic range</b> checkbox for image capture with high dynamic range is available in <b>Auto</b> and <b>Semi-auto</b> capturing methods.   |
| 9    | The position of the inserted tray.   |
| 10   | The instrument <b>CCD status</b> displaying one of: <ul style="list-style-type: none"><li>• Green = The CCD temperature is within specifications and the instrument is ready for use.</li><li>• Orange = The CCD temperature is not within specifications. Wait for a green light before proceeding.</li></ul> |

### Method sensitive displays

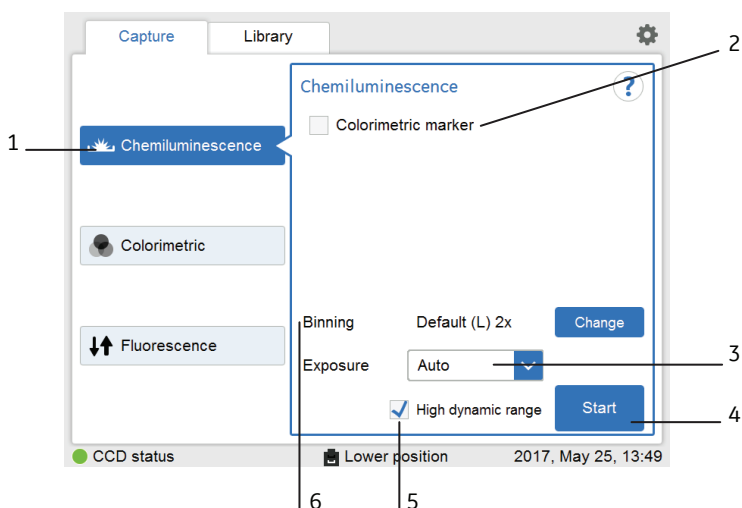
The display on the screen shows the selected image capturing method and presents the options relevant for that method. Depending on system configuration you may or may not have access to all methods. The following section describes all available method displays in the Amersham Imager 680 product family.

For details on system configurations see *Section 3.4 Instrument hardware description, on page 43*.

---

## Chemiluminescence

The illustration below shows the main components of the **Capture** tab with the default setting **Chemiluminescence** image capturing method and automatic exposure time, **Auto**.

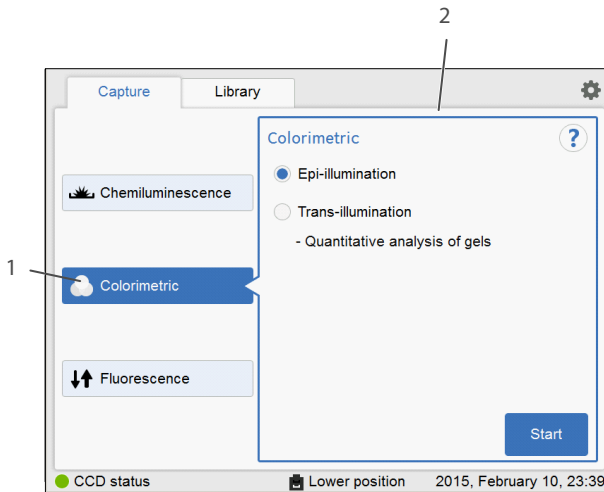


| Part | Function  |
|------|---|
| 1    | <b>Chemiluminescence</b> button: the selected chemiluminescence image capturing method.   |
| 2    | <b>Colorimetric marker</b> check box: use the check box for samples with colorimetric marker.   |
| 3    | <b>Exposure</b> drop down menu: use to select the exposure option for chemiluminescence image capturing: <b>Auto</b> , <b>Semi-Auto</b> , <b>Manual</b> , <b>Incremental</b> and <b>Advanced</b> .<br><br><b>Note:</b><br><i>For more information on manual and incremental settings see Set exposure time, on page 68.</i> |
| 4    | <b>Start</b> button: use the button to start capturing.   |
| 5    | <b>High dynamic range</b> checkbox: use the check box for image capture with high dynamic range.  |
| 6    | <b>Binning</b> : Click <b>Change</b> button to change binning.  |

## Colorimetric

The illustration below shows the specific components of the **Capture** tab with the **Colorimetric** image capturing method selected.

For more details of the general components, see *Capture view, on page 51*.

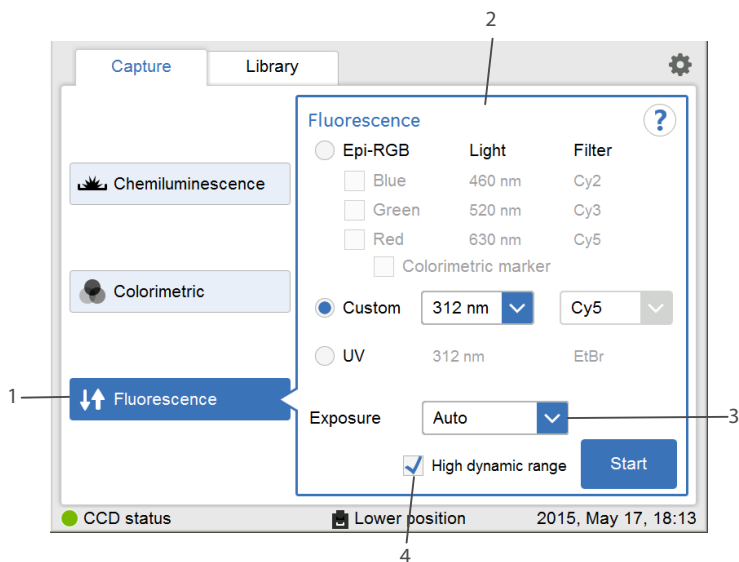


| Part | Function   |
|------|--|
| 1    | <b>Colorimetric</b> image capturing method selected  |
| 2    | Options area for the colorimetric image capturing method: <ul style="list-style-type: none"> <li>• <b>Epi-illumination</b> (selected here)</li> <li>• <b>Trans-illumination</b></li> </ul> |

## Fluorescence

The illustration below shows the specific components of the **Capture** tab with the **Fluorescence** image capturing method. Depending on selected options, the display changes and unavailable options are hidden (greyed out).

For more details of the general components, see *Capture view, on page 51*.

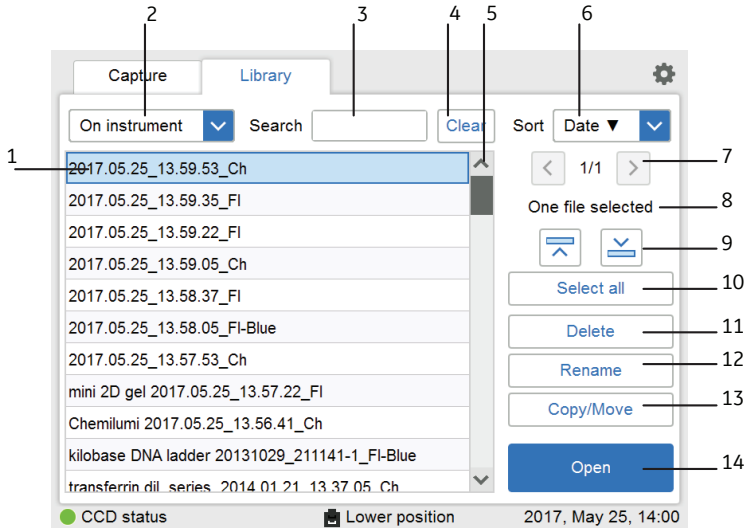


| Part | Function  |
|------|---|
| 1    | <b>Fluorescence</b> image capturing method selected   |
| 2    | Options for the selected image capturing method: <ul style="list-style-type: none"> <li>• <b>Epi-RGB</b></li> <li>• <b>Custom</b> (selected here)</li> <li>• <b>UV</b></li> </ul>   |
| 3    | <b>Exposure</b> options: <ul style="list-style-type: none"> <li>• <b>Auto</b> (selected here)</li> <li>• <b>Semi-Auto</b></li> <li>• <b>Manual</b></li> <li>• <b>Advanced</b></li> </ul> <p><b>Note:</b><br/>           For more information on manual settings see <i>Set exposure time</i>, on page 68.</p> |
| 4    | <b>High dynamic range</b> checkbox: Use the check box for image capture with high dynamic range.  |

### 3.5.2 Description of the Library tab

The **Library** tab allows you to find and manage image files.

The illustration below shows the main components of the **Library** tab.



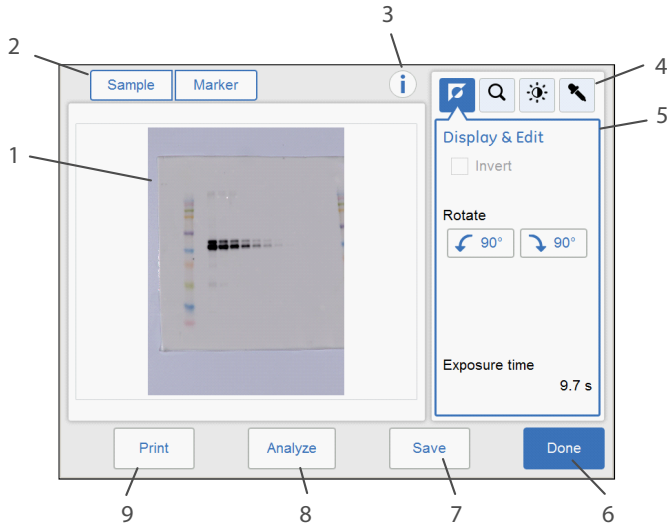
| Part | Function   |
|------|--|
| 1    | The list of files in the selected location. The selected file is highlighted in blue.<br><br><b>Note:</b><br><i>You may need to scroll or navigate between views to see all files.</i>         |
| 2    | The selected file location (here On instrument): use to view file storage options, for example USB flash drive or network locations. Select the drop down menu for more file location options. |
| 3    | <b>Search</b> field: use the field to search for specific files  |
| 4    | <b>Clear</b> button: use the button to clear the search field  |
| 5    | Scroll buttons and bar: use the bar or buttons to navigate among files in the displayed list of stored files   |



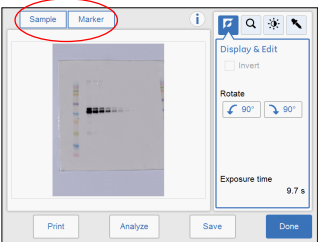
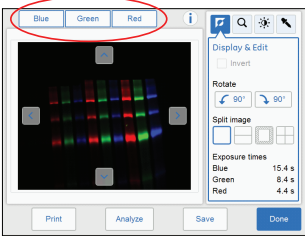
| Part | Function   |
|------|--|
| 6    | The selected <b>Sort</b> option: select the drop down menu to view the file sorting options: <ul style="list-style-type: none"> <li>• <b>Name</b></li> <li>• <b>Date</b></li> <li>• <b>Method</b></li> </ul> |
| 7    | The list displayed of the number of lists available: use the arrows to navigate between lists.   |
| 8    | The number of selected files.  |
| 9    | Toggle between the previous or next selected file in the library.  |
| 10   | <b>Select all/Deselect all</b> button: use the buttons to select all files displayed or to deselect a selection of files.  |
| 11   | <b>Delete</b> button: use the button to delete the selected (marked) file or files.  |
| 12   | <b>Rename</b> button: use the button to rename a saved file.   |
| 13   | <b>Copy/Move</b> button: use the button to copy or move selected files.  |
| 14   | <b>Open</b> button: use the button to open the selected file.  |

### 3.5.3 Description of the image view

After capturing, the resulting image or images are displayed. The illustration below describes the main components of the image view.








| Part | Function   |
|------|--|
| 1    | <p>Display of the captured image.</p> <p><b>Note:</b><br/> <i><b>Incremental</b> and <b>Advanced</b> exposures may result in several images being displayed two at a time as they are exposed. Navigate among the images using forward and backward arrows.</i></p> <p>The screenshot shows two image thumbnails with exposure times of 3:30 s and 4:40 s. Below them are 'Select' buttons. At the bottom, there are 'Cancel', navigation arrows, 'Select all', 'With Marker' checkbox, and 'Save' buttons. A status bar at the very bottom shows 'CCD status', 'Lower position', and the date/time '2017, May 25, 14:05'.</p> |

| Part | Function   |
|------|--|
| 2    | <p>Buttons for captured images. A blue text and frame highlights the displayed image(s).</p> <p><b>Note:</b><br/> <i>By selecting two or more images a composite image is displayed.</i></p> <p>For more information on displayed images for the different capturing methods see <i>Section 5.5 Capture an image, on page 109.</i></p> <p>If the colorimetric marker option was checked the tabs will display <b>Sample</b> and <b>Marker</b>.</p>  <p>If a multichannel fluorescence capture was performed, the tabs will display the selected channels of <b>Blue</b>, <b>Green</b>, and <b>Red</b>.</p>  |
| 3    | <p>Information icon: use to access additional image and exposure information such as image file name and exposure time.</p>  |

### 3 Instrument description

#### 3.5 Instrument software description

##### 3.5.3 Description of the image view

| Part | Function  |
|------|---|
| 4    | <p>The image tools menu: use the tools to modify the settings of the captured image and to view details.</p> <p> <i>Display</i></p> <p> <i>Zoom</i></p> <p> <i>Contrast</i></p> <p> <i>Intensity tool</i></p> <p>For more information on the image tools see <i>Image tools, on page 164</i>.</p> |
| 5    | <p>The selected image tool and options view: <b>Display</b> is the default view.</p>  |
| 6    | <p><b>Done</b> button: Use the button to leave the view without saving.</p> <p><b>Note:</b><br/><i>A dialog appears asking to confirm the cancellation. This prevents deleting images by accident.</i></p>   |
| 7    | <p><b>Save</b> button: use the button to save the image. See <i>Section 5.7 Save and manage image files, on page 167</i> for further details.</p>   |

| Part | Function   |
|------|--|
| 8    | <b>Analyze</b> button: use the button to open Analyze view. See <i>Section 5.8 Analyze the image, on page 181</i> for further details.   |
| 9    | <b>Print</b> button: use the button to print the image.<br><br><b>Note:</b><br><i>The print function requires that the instrument is connected to a USB connected printer. For installation of a printer contact a representative from GE.</i> |

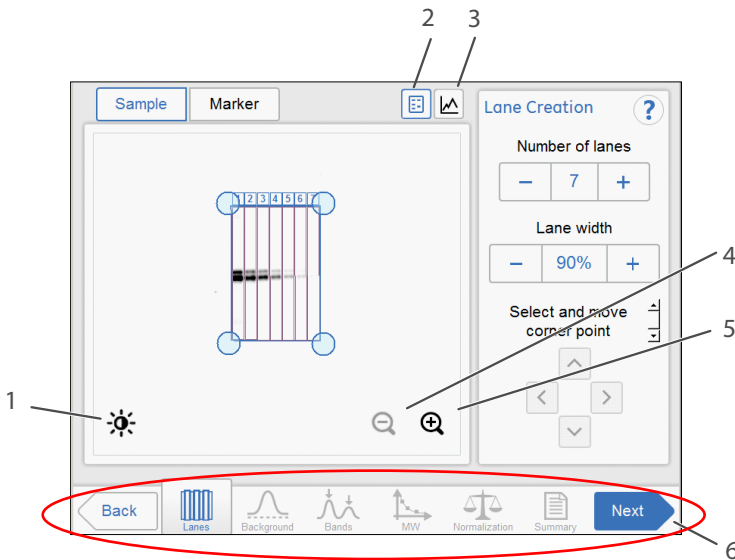
### 3.5.4 Description of the analysis workflow

This section describes the analysis workflow options. The workflow allows you to perform an analysis of the image data. Open the analysis workflow by selecting the **Analyze** button. The button is available after capturing or when opening an already captured image.

The workflow is performed in five steps and results in a summary. After completing a step, navigate to the next step by selecting the **Next** button. For more details see Section 5.8 *Analyze the image*, on page 181.

#### Description

The following illustration shows the start screen and first step of the analysis.

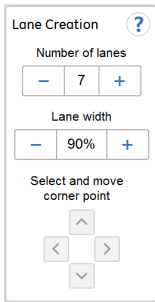

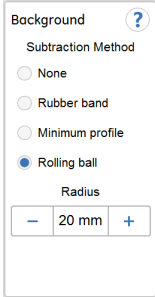



| Part | Function   |
|------|--|
| 1    | Contrast button: Use the button to change the contrast of the image.             |
| 2    | Image view button: Use the button to activate the image view.                    |
| 3    | Lane profile button: Use the button to display separate graphical lane profiles. |
| 4    | Zoom out button: Use the button to zoom out.                                     |
| 5    | Zoom in button: Use the button to zoom in.                                       |

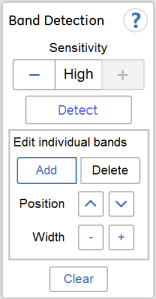

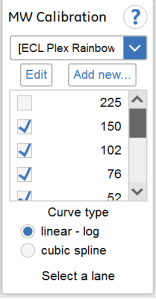

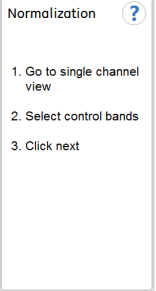

| Part | Function  |
|------|---|
| 6    | Analyze workflow buttons: Use the buttons to navigate in the analysis workflow. |

## Analysis options

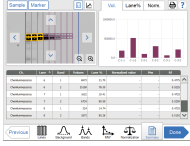

The illustration below describes the workflow steps and options.

| Step | Illustration of step   | Description  |
|------|--|--|
| 1    |   | <p>Open the lane creation step with the button</p>  <p><b>Lane Creation</b> is used to define and position lanes to be used in the subsequent analysis.</p> |
| 2    |  | <p>Open the background subtraction step with the button</p>  <p><b>Background</b> is used to select method for background subtraction.</p>                |

3 Instrument description  
 3.5 Instrument software description  
 3.5.4 Description of the analysis workflow

| Step | Illustration of step  | Description  |
|------|---|--|
| 3    |    | <p>Open the band detection step with the button</p>  <p><b>Band Detection</b> is used to detect the bands in each defined lane.</p>   |
| 4    |    | <p>Open the MW calibration step with the button</p>  <p><b>MW Calibration</b> is used to create a molecular weight calibration curve based on a selected standard marker.</p> |
| 5    |  | <p>Open the normalization step with the button</p>  <p><b>Normalization</b> is used to select bands to be used for normalization.</p>                                       |



| Step | Illustration of step  | Description  |
|------|---|--|
| 6    |  | <p>Open the summary with the button</p>  <p><b>Summary</b></p> <p><b>Summary</b> is used to present an overview of the result data from the analysis.</p> <p>Use the <b>Save</b> button to save the analysis data together with the image file.</p> |

### 3.5.5 Description of settings views

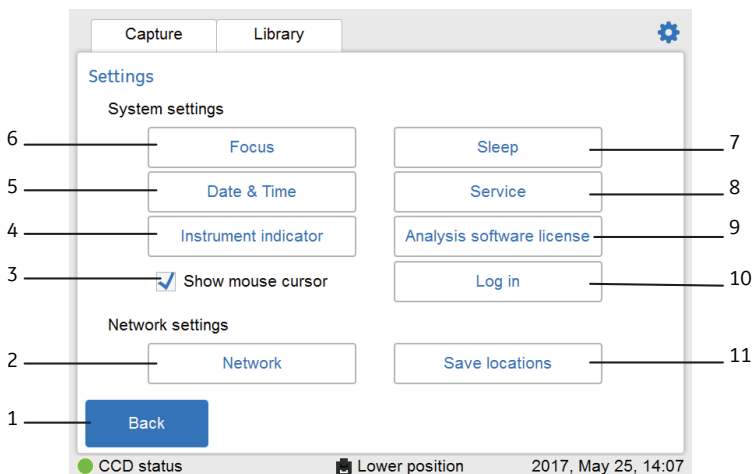
This section describes various settings views and options.

#### General settings view

The settings options found in the **Settings** view allow you to set specifications for the instrument. The settings view is displayed by selecting the settings icon:



The illustration below shows the main components of the **Settings** view. For details see *Section 4.3 System settings, on page 78*.



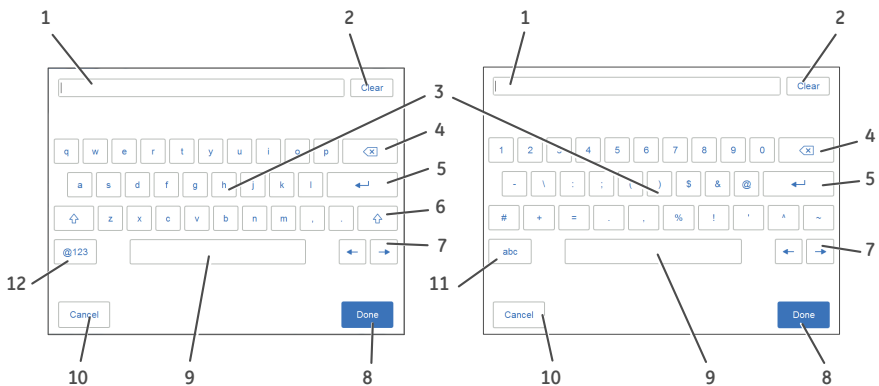
| Part | Function   |
|------|--|
| 1    | <b>Back</b> button: Use to close the settings view and return to the previous view.  |
| 2    | <b>Network</b> button: Use to set up DHCP or Static IP network   |
| 3    | <b>Show mouse cursor</b> check box: Use to display a mouse cursor on a connected external monitor by checking the check box.                       |
| 4    | <b>Instrument indicator</b> button: Use to activate the instrument connected to the tablet computer and light the instrument <b>Run</b> LED light. |
| 5    | <b>Date &amp; Time</b> button: Use to set date and time on the instrument  |
| 6    | <b>Focus</b> button: Use to adjust focus   |
| 7    | <b>Sleep</b> button: Use to set the time when the automatic CCD cooling shall stop after periods of non-use.                                       |

| Part | Function   |
|------|--|
| 8    | <b>Service</b> button: Use to view instrument serial number, version number and for accessing <b>Software update</b> and <b>Export log</b> . |
| 9    | <b>Analysis software license</b> button: Use to generate license keys for Amersham Imager 680 Analysis Software.                             |
| 10   | <b>Log in</b> button: Use to turn password protected login on or off.  |
| 11   | <b>Save locations</b> button: Use to add new, edit or remove network locations for image file storage  |

## Keypad view

The keypad appears when you select text fields where typing is required. Examples of text fields are: **Search**, **Optional image name prefix**, **Comment** or **Rename**.

The following illustration and table show the main components of the keypad. The image to the left shows the alphabetic view of the keypad (with lower case letters). The image to the right shows the numeric and symbol view of the keypad.



| Part | Function  |
|------|---|
| 1    | The text field where the typed text is displayed.                               |
| 2    | <b>Clear</b> button: Use the button to remove all typed text in the text field. |
| 3    | Keyboard area: Use the keyboard to type text.                                   |
| 4    | <b>Delete</b> button: Use the button to delete one letter at a time.            |
| 5    | Enter button: Use the button to create a new row.                               |

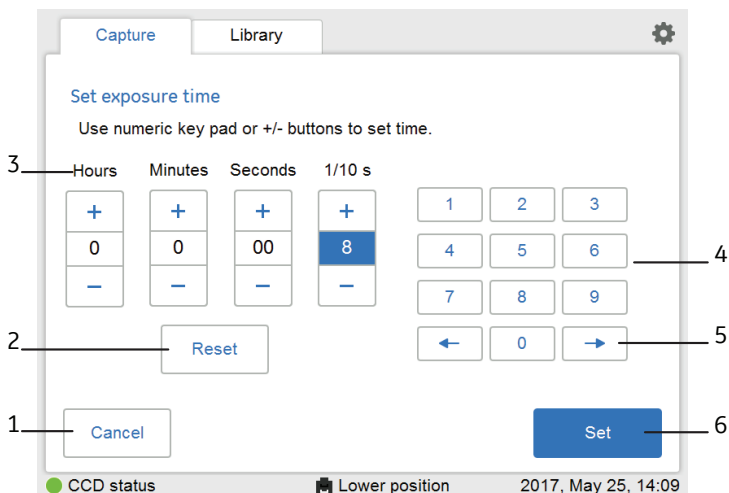
3 Instrument description  
 3.5 Instrument software description  
 3.5.5 Description of settings views

| Part | Function  |
|------|---|
| 6    | Shift button: Use the button to change to upper case letters keypad.  |
| 7    | Navigation buttons: Use the buttons to navigate back and forward in the typed text.   |
| 8    | <b>Done</b> button: Use the button to save the changes.   |
| 9    | Space button: Use the button to create a space.   |
| 10   | <b>Cancel</b> button: Use the button to return to the previous window without saving the changes.   |
| 11   | <b>abc</b> button: Use the button to change to the lower case letters keypad.   |
| 12   | <b>@123</b> button: Use the button to change to the numeric and symbol keypad.<br><br><b>Note:</b><br>Use <b>abc</b> or the <b>ABC</b> button to return to the alphabetic keypad. |

## Set exposure time

The **Set exposure time** view appears when you select **Manual** or **Incremental** exposure in the drop down menu and then select the **Exposure** time button or **Interval** time button. It allows you to set the exposure time manually.

The illustration below shows the main components of the **Set exposure time** view.



**Note:** The time displayed in the **Set exposure time** window, is by default the exposure time used during the last capture. The time can be set from 0.1 seconds up to 10 hours.




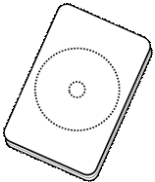

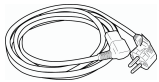
| Part | Function   |
|------|--|
| 1    | <b>Cancel</b> button: Use to return to the <b>Capture</b> tab without saving changes.  |
| 2    | <b>Reset</b> button: Use to reset the the exposure time to zero.   |
| 3    | Time units area: Use the plus or minus buttons to increase or decrease the exposure time by <b>Hours</b> , <b>Minutes</b> , <b>Seconds</b> , or <b>1/10 sec</b> .  |
| 4    | Keypad: Use the right and left arrow buttons to navigate between the <b>Hours</b> , <b>Minutes</b> , <b>Seconds</b> , and <b>1/10 sec</b> fields. The active field appears blue in the time units area.<br>Use the numeric keys to set the time in the selected field. |
| 5    | Arrow buttons: Use the buttons to navigate between hours, minutes, seconds, and 1/10 s in the time units area.   |
| 6    | <b>Set</b> button: Use the button to save the changes made.  |

## 3.6 Accessories

### Accessories delivered with the instrument

The following table shows the accessories of Amersham Imager 680. Depending on configuration the included accessories may vary.



| Part  | Description  | Code no. | Relevant for configuration: |
|---|--|----------|-----------------------------|
|    | Black tray, marked <b>Black Tray</b>   | 29083417 | All configurations          |
|    | UV Trans tray, marked <b>UV Trans Tray</b> (transparent)                                   | 29083419 | 680 UV<br>680 QC<br>680 RGB |
|  | White Trans tray, marked <b>White Trans Tray</b>   | 29083418 | 680 QC<br>680 RGB           |
|  | White Insert, marked <b>White Insert</b> (for use with <b>Black Tray</b> where applicable) | 29088060 | All configurations          |

| Part  | Description   | Code no. | Relevant for configuration: |
|---|---|----------|-----------------------------|
|    | Diffuser Board, marked <b>Diffuser Board</b> (for white light Trans-illumination) | 29083420 | 680 QC<br>680 RGB           |
|    | Amersham Imager 680 Operating Instructions  | 29271308 | All configurations          |
|    | DVD containing translations of Amersham Imager 680 Operating Instructions         | 29272133 | All configurations          |
|   | Amersham Imager 680 Analysis Software   | 29272479 | All configurations          |
|  | AC power cord (for North America)   | 19244801 | All configurations          |
|  | AC power cord (for Europe)  | 80648033 | All configurations          |

### 3 Instrument description

#### 3.6 Accessories

#### Additional accessories to order

| Part  | Description                             | Code no. | Relevant for configuration: |
|---|---|----------|-----------------------------|
|  | Gel Sheets 17x25<br>(for UV-Trans tray) | 29083457 | 680 UV<br>680 QC<br>680 RGB |
|  | iPad Air attachment                     | 29133829 | All configurations          |

#### Upgrade options

| Part/Description             | Code no. | Relevant for configuration: |
|------------------------------|----------|-----------------------------|
| AI 600/680 upgrade to UV     | 29083422 | 600/680                     |
| AI 600/680 upgrade UV to QC  | 29083424 | 600/680 UV                  |
| AI 600/680 upgrade QC to RGB | 29083425 | 600/680 QC                  |
| AI 600/680 upgrade UV to RGB | 29083426 | 600/680 UV                  |



# 4 Installation

## About this chapter

This chapter contains information on how to prepare the site for Amersham Imager 680, how to set up network connections, and set system settings.

**Note:** *Installation or transport of the Amersham Imager 680 instrument must be performed by GE authorized personnel. The instrument contains parts that may be damaged unless they are secured for transportation and handled correctly.*

---

## In this chapter

| Section               | See page |
|-----------------------|----------|
| 4.1 Site requirements | 74       |
| 4.2 Instrument setup  | 77       |
| 4.3 System settings   | 78       |
| 4.4 Network           | 89       |

---

## 4.1 Site requirements

### Space requirements

Prepare a clean working area on a stable laboratory bench. The bench must comply with the specifications in the following table.

| Parameter  | Specification   |
|--|---|
| Minimum bench area for operating Amersham Imager 680 | 70 x 60 cm  |
| Free space required around the imager                | At least 40 cm free space in front of the instrument<br>10 cm free space on all other sides |
| Load capacity  | 980 N (100 kg) or higher  |
| Inclination of bench surface                         | Horizontal $\pm 2^\circ$  |



#### WARNING

**Access to power cord.** Do not block access to the power cord. The power cord must always be easy to disconnect.



#### NOTICE

This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

## Dimensions

The following illustration shows the dimensions of the instrument.



Amersham Imager 680 weighs 43 kg.

---

## Environmental conditions

The following general requirements must be fulfilled:

- The instrument should not be exposed to sources of heat, such as radiators or direct sunlight
- Dust in the atmosphere should be kept to a minimum
- The equipment must not be excessively exposed to vibration or impacts
- Exposure to corrosive gas must be avoided

The installation site must comply with the following specifications.

---

## 4 Installation

### 4.1 Site requirements

#### Ambient temperature requirements



##### **CAUTION**

Do not use the instrument in a room with a temperature above +28°C. Higher temperatures does not allow the CCD to cool down properly (to -25°C).

For environmental requirements, see *Environmental requirements*, on page 245.

---

## 4.2 Instrument setup

### Introduction

Amersham Imager 680 is initially installed by GE service representatives.

Amersham Imager 680 must be secured before long distance transports. Contact GE for instructions before transport or relocation of the instrument.

For connecting additional monitors or peripheral equipment contact GE for instructions.

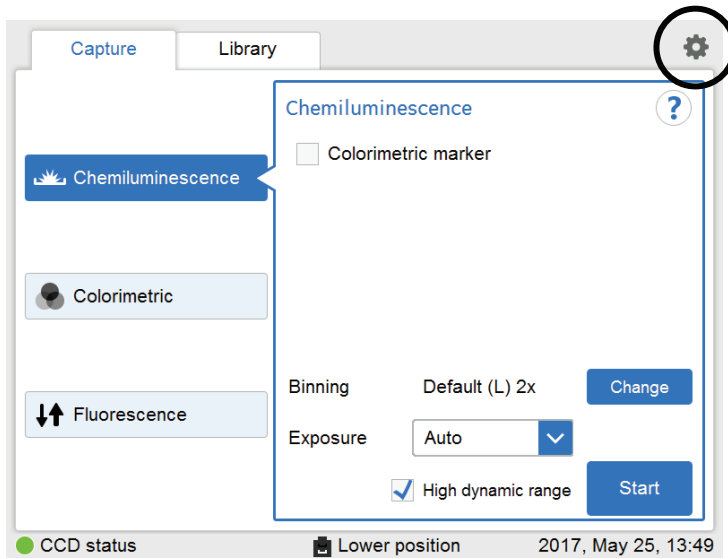
---

## 4.3 System settings

### Introduction

This section describes how to set system-specific settings.

System settings are found under the **Settings** view. Open the settings view by selecting the settings icon found in the top right hand corner of the **Capture** and **Library** tabs.

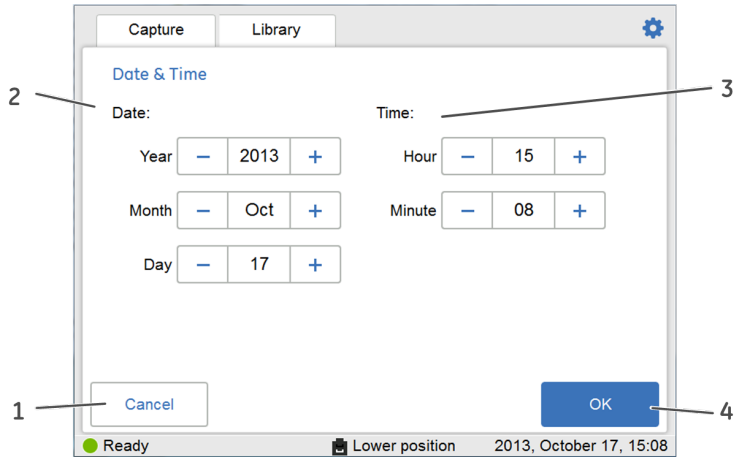


For the general components of the **Settings** view see *Section 3.5.5 Description of settings views, on page 66*

## 4.3.1 Date and time

### Date and time view

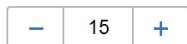
The following illustration describes the **Date & Time** view.



| Part | Function  |
|------|---|
| 1    | <b>Cancel</b> button: Use the button to return to the <b>Settings</b> window without saving the changes.                                      |
| 2    | <b>Date</b> field: Use the plus and minus buttons next to <b>Year</b> , <b>Month</b> , and <b>Day</b> to set values for year, month, and day. |
| 3    | <b>Time</b> field: Use the plus and minus buttons next to <b>Hour</b> and <b>Minute</b> to set values for hour and minute.                    |
| 4    | <b>Ok</b> button: Use the button to save the changes to date and time and return to the <b>Settings</b> window.                               |

### Change date

To change the date setting on the instrument, select the plus or minus buttons next to the **Year**, **Month**, and/or **Day** field, to change the value of year, month or day.



## 4 Installation

### 4.3 System settings

#### 4.3.1 Date and time

### Change time

To change the time setting on the instrument, select the plus or minus buttons next to the **Hour** or **Minute** field, to change the value of hour or minute.

|   |    |   |
|---|----|---|
| - | 15 | + |
|---|----|---|

---

### Save the changes to date and time

Select the **Ok** button to save the changes to the **Date & time** view.

Select the **Cancel** button to leave the view without saving changes.

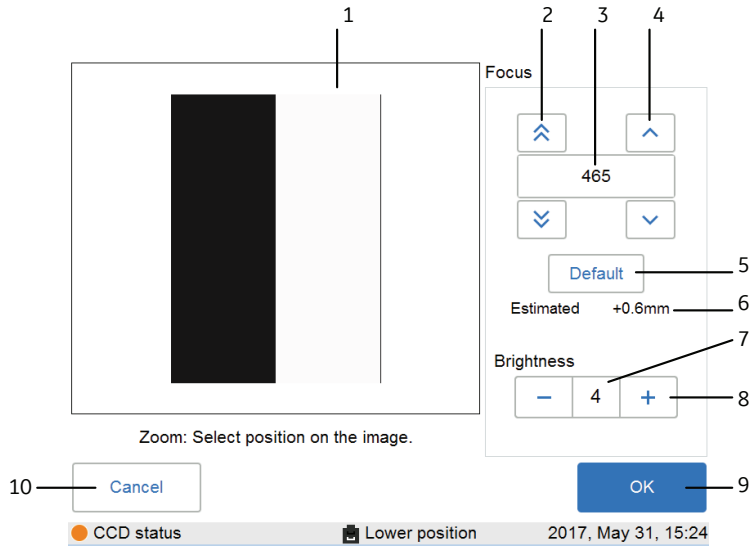
---



## 4.3.2 Focus

### Focus view

The focus is normally fixed. For thick samples this fixed focus may not be adequate and you may need to temporarily adjust it.



| Part | Function  |
|------|---|
| 1    | The image area which displays the image of sample.  |
| 2    | Double arrow buttons: Use the buttons to adjust focus in larger steps.  |
| 3    | The focus value.  |
| 4    | Single arrow buttons: Use the buttons to adjust focus in smaller steps.   |
| 5    | <b>Default</b> button: Use the button to reset focus to the default value.<br><b>Note:</b><br><i>The default value differs between instruments.</i> |
| 6    | Estimated focus in mm above (+) or below (-) the default focus.   |
| 7    | The brightness value.   |
| 8    | Plus and minus buttons: Use the buttons to adjust the brightness value.   |
| 9    | <b>OK</b> button: Use the button to save the new settings.  |

| Part | Function   |
|------|--|
| 10   | <b>Cancel</b> button: Use the button to leave the view without saving changes. |

## Adjust focus

| Step | Action  |
|------|---|
| 1    | Prepare and place a sample on a tray and place the tray in the instrument's upper or lower tray position.   |
| 2    | If relevant, point to an area of interest to zoom in on.  |
| 3    | Adjust the brightness of the image to a satisfactory level by using the plus and minus buttons next to the <b>Brightness</b> value.   |
| 4    | Adjust the focus to a satisfactory level by using the arrows above and below the <b>Focus</b> value.  |
| 5    | Select <b>OK</b> to save the settings.<br><br><b>Note:</b><br><i>Cancel will close the view without saving changes.</i>   |
| 6    | The new focus will be available for captures until a new capturing method is selected, or until the instrument enters standby mode.<br><br>Prior to the capture confirm the use of the new focus with <b>Yes</b> . Selecting the <b>No</b> button cancels the adjustments to focus and the normal fixed focus setting (default) is once again in use. |



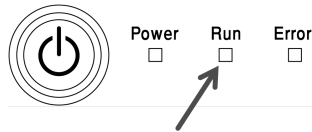
### CAUTION

Do not put your hand into the upper tray position. The gap is small and you may injure your hand.

### 4.3.3 Instrument indicator

The *Instrument indicator* is a useful tool when several Amersham Imager 680 instruments are used in the same location. It identifies which instrument is connected to a certain tablet computer.

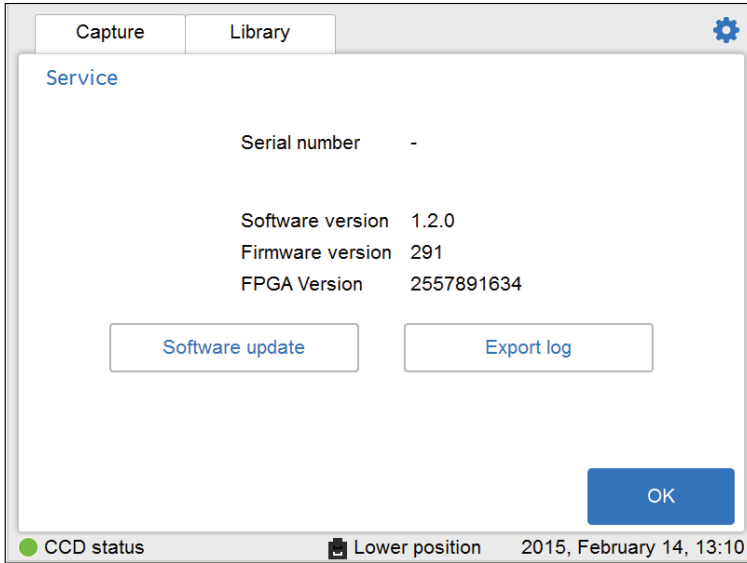
Select the *Instrument indicator* button. This activates the **Run** LED light on the instrument it is connected to.



## 4.3.4 Service

### Introduction

In the **Service** view the following information can be found:



- **Instrument serial number**
- **Software version**
- **Firmware version**
- **FPGA version**

The view also displays buttons for software update and export log functions.

---

### Update software

Follow the instructions below to update the software for Amersham Imager 680.

| Step | Action   |
|------|--|
| 1    | Connect a USB flash drive containing the update file provided by GE stored at the root level of the USB flash drive. |
| 2    | Select the <b>Software update</b> button.  |
| 3    | Confirm USB insertion by selecting the <b>OK</b> button.   |
| 4    | Select the <b>Yes</b> button to update the software.   |

| Step | Action  |
|------|---|
| 5    | To return to the <b>Settings</b> window select the <b>OK</b> button.                |
| 6    | Confirm that the software, Firmware and FPGA version numbers are correctly updated. |

## Export log

Follow the instructions below to export a log from Amersham Imager 680.

| Step | Action  |
|------|---|
| 1    | Select the <b>Export log</b> button.<br><i>Result:</i> A text file will be created on the instrument containing the export log file.                                |
| 2    | Insert a USB flash drive and confirm insertion by selecting the <b>OK</b> button.<br><i>Result:</i> The export log file will be transferred to the USB flash drive. |
| 3    | To return to the <b>Settings</b> view, select the <b>OK</b> button.   |

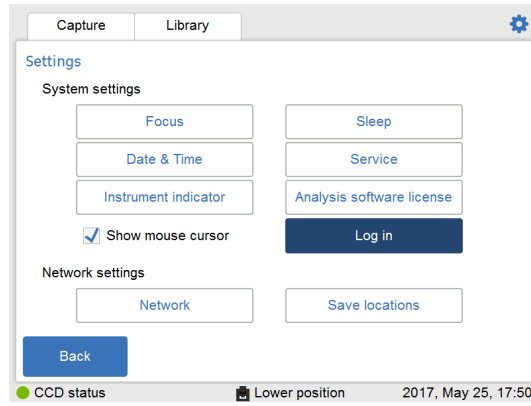
## 4.3.5 Log in

### Setting a password

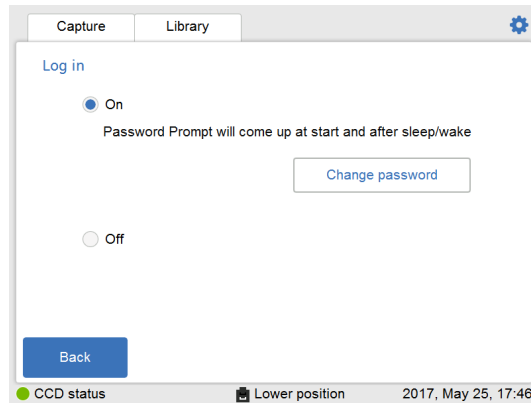
To set a password follow the following steps.

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 1 | In the <b>Settings</b> menu, click <b>Log in</b> . |
|---|--|



|   |  |
|---|--|
| 2 | In the <b>Log in</b> window, click <b>On</b> . |
|---|--|



|   |  |
|---|--|
| 3 | Enter a password and click <b>Done</b> . |
|---|--|

**Note:**

*The default password is AI600user.*

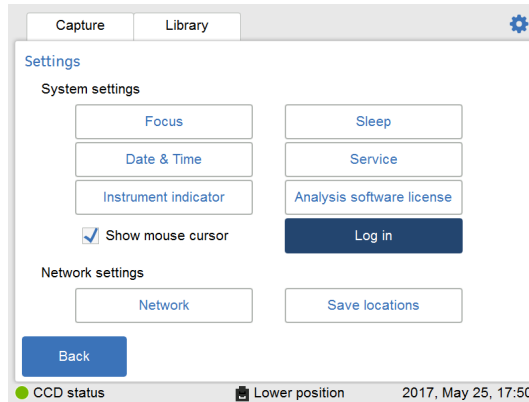
---

## Changing a password

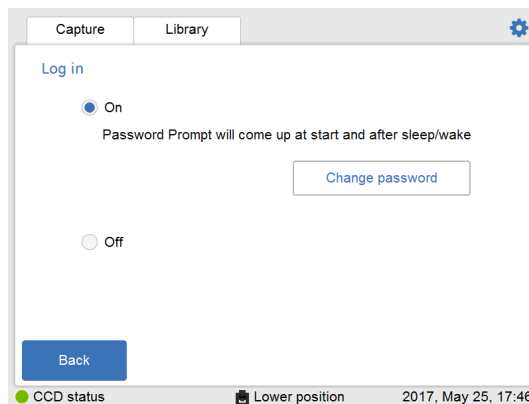
To change a password follow the following steps.

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | In the <b>Settings</b> menu, click <b>Log in</b> . |
|---|--|



- |   |   |
|---|---|
| 2 | To change password click the <b>Change Password</b> button. |
|---|---|



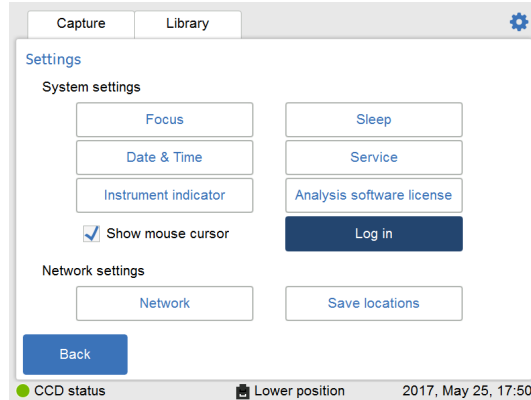
- |   |  |
|---|--|
| 3 | Enter current password, new password, confirm new password, then click <b>OK</b> . |
|---|--|

## Turning off password protection

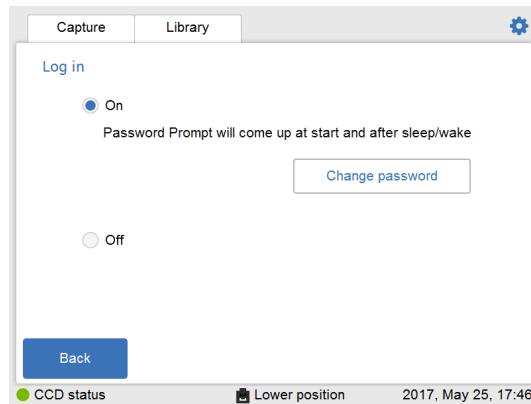
To turn off password protected login follow the following steps.

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | In the <b>Settings</b> menu, click <b>Log in</b> . |
|---|--|



- |   |  |
|---|--|
| 2 | To turn off log in functionality, select <b>Off</b> . Enter the current password and click <b>Done</b> to turn it off. |
|---|--|





## 4.4 Network

### Introduction

Via a network connection you can save image files to a network location, access files stored on a network location from the instrument and copy and delete image files from a computer.

This section contains information on network setup options, virus protection, network settings, and file access.

---

### In this section

| <b>Section</b>                       | <b>See page</b> |
|--------------------------------------|-----------------|
| 4.4.1 Network setup                  | 90              |
| 4.4.2 Network access from instrument | 94              |
| 4.4.3 Instrument access from network | 96              |

---

## 4 Installation

### 4.4 Network

#### 4.4.1 Network setup

## 4.4.1 Network setup

### Virus protection

The technical solution for Amersham Imager 680 protects it from virus transfer from infected USB flash drives. Each restart of the instrument resets the software to its original installation.

**Note:** *If you, for any reason, suspect that the instrument has been infected by a computer virus, restart the instrument as soon as possible.*

---

### Network connection options



#### NOTICE

Do not connect telephone lines to the Ethernet port.

Only the IEC 60950-1/VL 60950-1 standard non-shielded cables are appropriate for connection to this connector.

Connection to a network enables the instrument to access files from, and to save files to, a network location.

There are two options for network setup:

- 1 DHCP
- 2 Static IP

**Note:** *If a DHCP network is used the IP address will be assigned automatically by the DHCP server. If a Static IP network is used the network details have to be entered manually.*

---

## Connect to network

Follow the instructions below to connect to a **Network**:

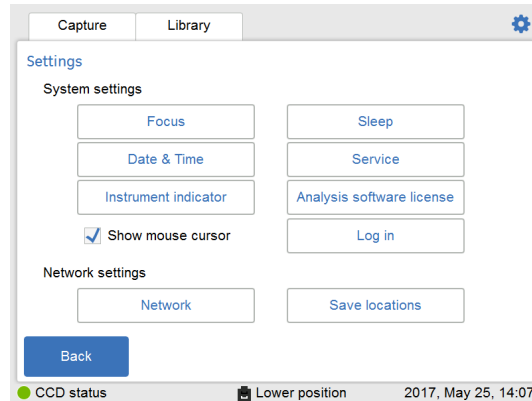
| Step | Action |
|------|--------|
|------|--------|

1

Select the settings icon.



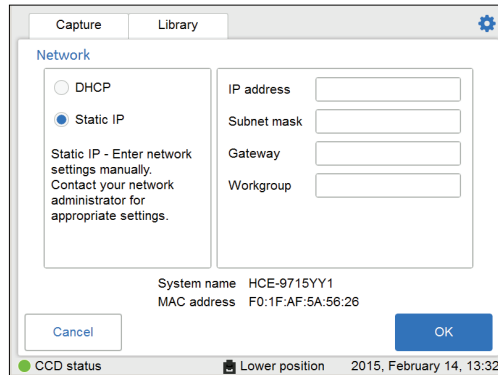
*Result:* The **Settings** view will appear.



2

Select the **Network** button.

*Result:* The **Network** view will appear.



3

Select the type of network connection and follow the separate instructions below.

### Connect to a DHCP network

Follow the instructions below, to connect to a DHCP network:

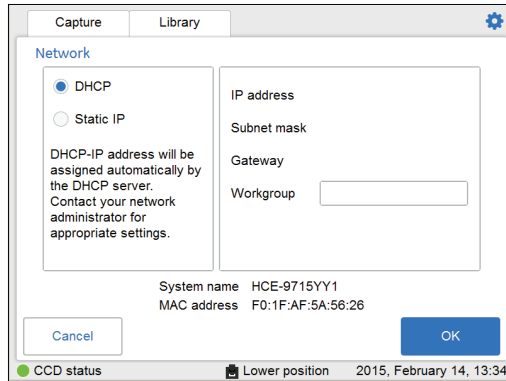
## 4 Installation

### 4.4 Network

#### 4.4.1 Network setup

| Step | Action |
|------|--------|
|------|--------|

- 1 Connect the network cable to the Ethernet port on Amersham Imager 680.
- 2 Check the **DHCP** radio button in the **Network** window.



- 3 If desired, check the **Workgroup** field and use the keypad to enter the workgroup.

**Note:**

*For detailed information on how to use the keypad, see Keypad view, on page 67.*

- 4 Select **OK**.

*Result:* An automatic connection to the DHCP network is established within a couple of seconds.

**Tip:**

*Reserve the IP address to Amersham Imager 680 for easier access of its network resources.*

---

### Connect to a Static IP network

Follow the instructions below, to connect to a Static IP network:

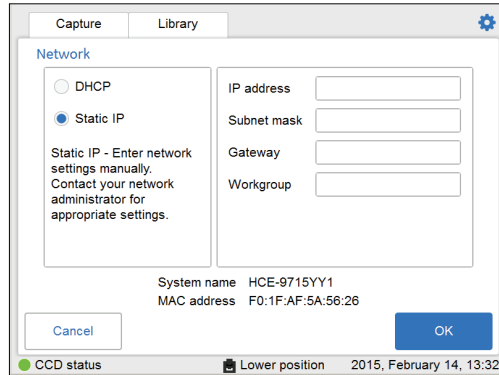
| Step | Action |
|------|--------|
|------|--------|

- 1 Connect the network cable to the Ethernet port on Amersham Imager 680.

**Step**      **Action**

---

- 2            Check the **Static IP** radio button in the **Network** window.



- 3            Select the:
- 1    **IP address** field and use the keypad to enter the IP address.
  - 2    **Subnet mask** field and use the keypad to enter the subnet mask.
- If desired, select the :

- **Gateway** field and use the keypad to enter the router.
- **Workgroup** field and use the keypad to enter the workgroup.

- 4            Select **OK** to save the changes.
- Result:* The connection to the network will be established within a couple of seconds.
-

## 4 Installation

### 4.4 Network

#### 4.4.2 Network access from instrument


## 4.4.2 Network access from instrument

To be able to store and access files on a network location, Amersham Imager 680 must have access permission to the specific computer or server where the files are to be stored.

The exact procedure for setting permissions for network file sharing depends on the computer's Operative System (OS) and your organization's network security settings.

**Note:** *Contact your GE representative for optional OS instructions or refer to your local IT support or your own computer's help files.*

## OS Windows® 7 instructions

| Step | Action   |
|------|--|
| 1    | On the computer: Open <b>Control panel: System and Security: System</b> and write down the name of the computer (the network identification name).   |
| 2    | Create a new folder and name the folder:<br><i>Example:</i> "AmershamImager680".   |
| 3    | Right-click on the folder and select <b>Properties: Share with</b> .   |
| 4    | Select which user or group you wish to grant permission (for example users) and check the check box <b>Full control</b> .<br><br><b>Note:</b><br><i>Limited permissions, such as Read, will not allow the instrument to export or analyze saved files on the computer.</i> |
| 5    | Select <b>Share</b> .  |
| 6    | Note the full computer name and go to the instrument.  |
| 7    | <b>On the instrument:</b> Select the settings icon.<br>   |
| 8    | Select the <b>Save locations</b> button.   |
| 9    | Select the <b>Add new</b> button.  |
| 10   | Browse to the location, or type the name of the computer in the field <b>Location</b> .<br><i>Example:</i> "//HXX-DTKJ8Q9.clients.region.division.company.com/AmershamImager680"   |

| Step         | Action   |
|--------------|--|
| 11           | <p>Select <b>OK</b>.</p> <p><i>Result:</i> This will allow for sharing files from the computer to the instrument and from the instrument to the computer for users.</p>  |
| <b>Note:</b> | <p><i>If password-protected sharing is turned on, you must have a user account and password on your computer for full access to shared items. Password-protected sharing is located in the <b>Control panel</b> under <b>Advanced sharing settings</b>. Password protection is turned on by default.</i></p> |

## 4 Installation

### 4.4 Network

#### 4.4.3 Instrument access from network

### 4.4.3 Instrument access from network

Amersham Imager 680 is equipped with a web tool which allows instrument access from a network. The web tool can be used to copy or delete files on the instrument from a remote location.

To be able to access **Amersham Imager 680 web tool** the following conditions must be fulfilled:

- The instrument and the computer must be connected through a local network.
- The instrument's IP address must be known.

Your instrument's IP address is found in the **Network** view. Open the view by selecting the settings icon in the top right-hand corner and then select the **Network** button in the **Settings** view.

**Note:** *DHCP networks has a dynamic IP address assignment, therefore the IP address may vary between connections. When using a DHCP network connection, check regularly that the IP address is still accurate. If the IP address has changed, use the new IP address in the **Network** view.*

#### Access the web tool

Follow the steps below to set up and access files via the web tool.

| Step | Action |
|------|--------|
|------|--------|

---

|   |                                  |
|---|----------------------------------|
| 1 | Open the computer's web browser. |
|---|----------------------------------|



- | Step | Action  |
|------|---|
| 2    | Type the instrument's IP address in the browser address field and select enter.<br><i>Example:</i> <code>http://192.168.0.25:8080</code><br><i>Result:</i> A page asking for password is displayed. |

**Note:**

The password can be changed. Click **Option** in the **Login** window and follow the instruction in the **Options** window.

- |   |  |
|---|--|
| 3 | Type the default password: <code>AI600user</code> and select <b>Login</b> .<br><i>Result:</i> This opens the <b>Amersham Imager 680 web tool</b> page. |
|---|--|

## 4 Installation

### 4.4 Network

#### 4.4.3 Instrument access from network

| Step | Action  |
|------|---|
| 4    | <p>Use the search function to limit the list.</p> <ul style="list-style-type: none"><li>• Search by date: Use the date format YYYY-MM-DD<br/><i>Example: "2013-11-30"</i></li><li>• Search by keyword</li></ul> <p>Select <b>Search</b> to perform the search.</p> <p>Delete the information in the search fields and select <b>Search</b> to reset the list.</p>   |
| 5    | <p>Select the files to be copied or deleted by checking the file's check box.</p> <p><b>Note:</b><br/><i>A maximum number of 5 files can be copied at one time. You may repeat this step to copy additional files.</i></p>  |
| 6    | <ul style="list-style-type: none"><li>• Select the <b>Copy</b> button to copy the selected files.</li><li>• Select the <b>Delete</b> button to delete the selected files.</li></ul> <p><b>Note:</b><br/><i>The copied files will be downloaded as a zip-file with an automatically generated name. The download location and procedure will vary with the chosen web browser's download settings.</i></p> |

# 5 Operation

## About this chapter

This chapter describes how to operate Amersham Imager 680.

Prior to operating the Amersham Imager 680 system it is important that you have read and understood the safety information. Make sure to read the relevant safety instructions prior to operation. See *Section 2.1 Safety precautions, on page 20* for details.



### WARNING

Do not operate Amersham Imager 680 in any other way than described in the User Manual.

## In this chapter

| Section                              | See page |
|--------------------------------------|----------|
| 5.1 Operation flow chart             | 100      |
| 5.2 Turn on the instrument           | 101      |
| 5.3 Select tray                      | 105      |
| 5.4 Place the tray in the instrument | 106      |
| 5.5 Capture an image                 | 109      |
| 5.6 View the image                   | 163      |
| 5.7 Save and manage image files      | 167      |
| 5.8 Analyze the image                | 181      |
| 5.9 Turn off the instrument          | 199      |

## 5 Operation

### 5.1 Operation flow chart

## 5.1 Operation flow chart

The general flow of operation is as follows:

| <b>Stage</b> | <b>Description</b>               |
|--------------|----------------------------------|
| 1            | Turn on the instrument           |
| 2            | Select a tray and place sample   |
| 3            | Place the tray in the instrument |
| 4            | Capture the image                |
| 5            | Save the image file              |
| 6            | Analyze the image                |

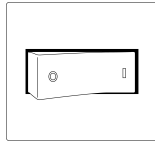
## 5.2 Turn on the instrument

The following section describes the startup process.

**Note:** *If using a wired external monitor or touchscreen it must be connected to the instrument before start up.*

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | Turn on power to the instrument by pressing the Power switch on the bottom right side of the instrument to the I position. |
|---|--|



- |   |  |
|---|--|
| 2 | Press the On/Off button on the front of the instrument to activate it. |
|---|--|



*Result:* The instrument's self-diagnostic process will initialize.

**Note:**

*The self-diagnostic process will normally take approximately 5 minutes. Connection to a network may take longer.*

- |   |   |
|---|---|
| 3 | If relevant, connect a USB flash drive to the instrument for file storage.<br>The USB flash driver is automatically installed when the USB flash drive is connected to Amersham Imager 680. |
|---|---|

**Note:**

*Password protected USB flash drives are not supported.*

## 5 Operation

### 5.2 Turn on the instrument

| Step | Action |
|------|--------|
|------|--------|

- |   |   |
|---|---|
| 4 | Select the icon for Amersham Imager 680 on the desktop screen of the connected tablet computer. |
|---|---|

*Result:*

1. A welcome screen appears.



Initializing...

2. The following screen will be displayed.

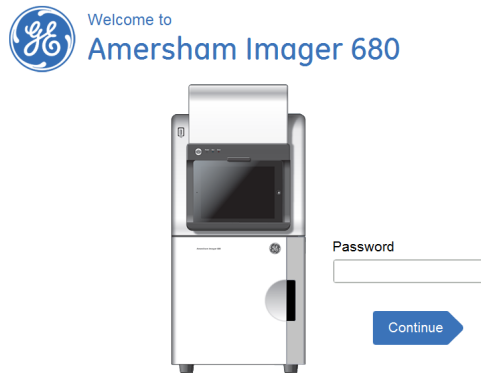


Continue

3. If **Log in** is turned **On** then password prompt is displayed on welcome screen.

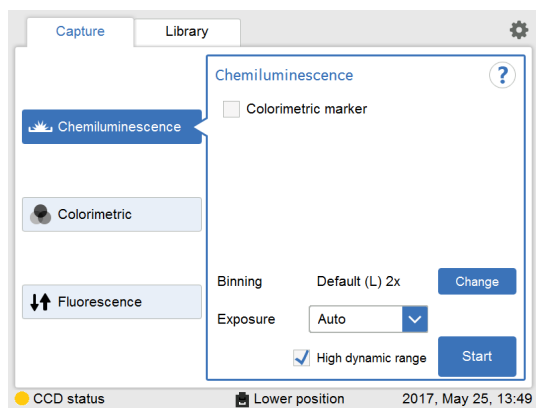
Step      Action

---



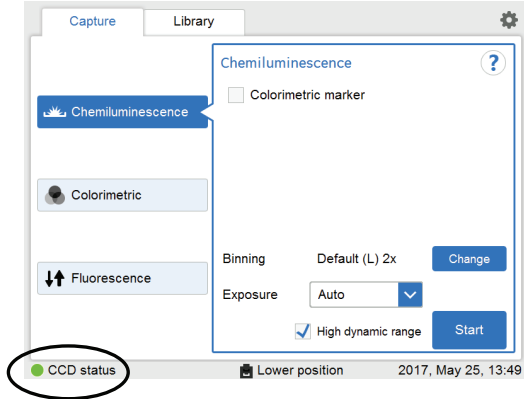
5      Select the **Continue** button.

*Result:* The following screen will be displayed.



5 Operation  
5.2 Turn on the instrument

| Step | Action  |
|------|---|
| 6    | Wait for the <b>CCD status</b> to turn green. |



*Result:* Image capturing can begin.



## 5.3 Select tray

The following table describes the suitable tray and accessory for each capturing method.

**Note:** Use the correct tray to the selected exposure for optimal image quality.

| Image capturing method                               | Sample type   | Tray and accessory  | Available in configuration         |
|--|---|---|------------------------------------|
| <b>Chemiluminescence</b>                             | <ul style="list-style-type: none"> <li>Membrane</li> </ul>              | <b>Black Tray</b>   | 680<br>680 UV<br>680 QC<br>680 RGB |
| <b>Chemiluminescence</b><br>with colorimetric marker | <ul style="list-style-type: none"> <li>Membrane</li> </ul>              | <b>Black Tray +<br/>White Insert</b>                          | 680<br>680 UV<br>680 QC<br>680 RGB |
| <b>Colorimetric</b><br>Epi illumination              | <ul style="list-style-type: none"> <li>Membrane</li> <li>Gel</li> </ul> | <b>Black Tray +<br/>White Insert or,<br/>White Trans Tray</b> | 680<br>680 UV<br>680 QC<br>680 RGB |
| <b>Colorimetric</b><br>Trans-illumination            | <ul style="list-style-type: none"> <li>Gel</li> </ul>                   | <b>White Trans Tray +<br/>Diffuser Board</b>                  | 680 QC<br>680 RGB                  |
| <b>Fluorescence</b> RGB<br>Epi-illumination          | <ul style="list-style-type: none"> <li>Gel</li> <li>Membrane</li> </ul> | <b>Black Tray</b>   | 680 RGB                            |
| <b>Fluorescence</b><br>Trans-UV                      | <ul style="list-style-type: none"> <li>Gel</li> </ul>                   | <b>UV Trans Tray</b><br>(transparent) +<br>Gel sheet          | 680 UV<br>680 QC<br>680 RGB        |



### NOTICE

With regards to third party patents related to sample preparation etcetera, it is recommended that you consult a lawyer or patent attorney for information on obtaining appropriate licenses.

## 5 Operation

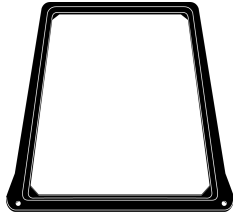
### 5.4 Place the tray in the instrument

## 5.4 Place the tray in the instrument

### Place the tray

This section describes how to place the sample on the tray and how to place the tray in the correct tray position in Amersham Imager 680.

| Step | Action  |
|------|---|
| 1    | Select a tray and accessories suitable for the capturing method.  |
| 2    | For <b>Chemiluminescence</b> with colorimetric marker and <b>Colorimetric Epi</b> capturing, place the <b>White Insert</b> inside the <b>Black Tray</b> . |



| Step | Action |
|------|--------|
|------|--------|

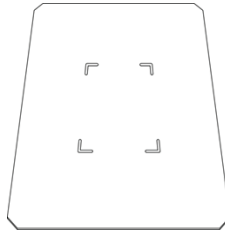
|   |   |
|---|---|
| 3 | Place the sample(s) on the tray or on the <b>White Insert</b> . |
|---|---|

Take care not to cover the areas outside any visible markings on the tray, or the **White Insert**, as they mark the field of view.

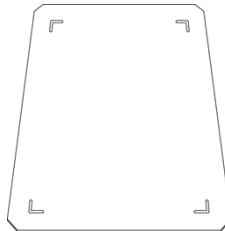
It is possible to place more than one membrane or gel provided they fit into the field of view.

There are two alternative tray positions with different fields of view:

- 1 One side of the **White Insert** indicates the maximum field of view of 8 x 11 cm for the upper tray position. Use the upper tray position for Chemiluminescence capturing for a smaller field of view of a single membrane and shorter exposure time.



- 2 The other side of the **White Insert** indicates the maximum field of view of 16 x 22 cm for the lower tray position. Use the lower tray position for a larger field of view for one to four samples.



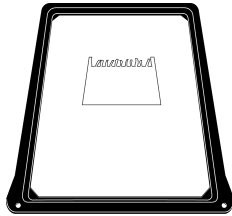
## 5 Operation

### 5.4 Place the tray in the instrument

| Step | Action |
|------|--------|
|------|--------|

**Note:**

For **Colorimetric Epi-illumination** position the gel so that the lanes are parallel to the long side of the tray as illustrated below. This is important to avoid capturing artefacts in the image.

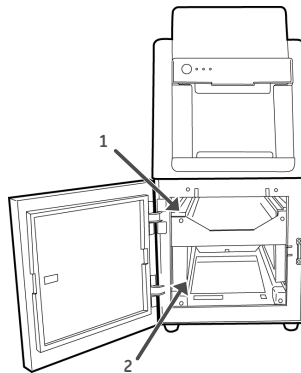


4 Open the instrument door.

5 Insert the tray in the correct tray position.

**Note:**

For **Chemiluminescence** capturing you may also select the upper tray position (1 in the illustration below).



6 Close the door.

## 5.5 Capture an image

This section describes how to capture an image with any of the available methods.

### In this section

| <b>Section</b>                  | <b>See page</b> |
|---------------------------------|-----------------|
| 5.5.1 Available methods         | 110             |
| 5.5.2 Chemiluminescence capture | 111             |
| 5.5.3 Colorimetric capture      | 137             |
| 5.5.4 Fluorescence capture      | 141             |

## 5 Operation

### 5.5 Capture an image

#### 5.5.1 Available methods

## 5.5.1 Available methods

This section describes how to capture an image.

The table below describes the available methods for each Amersham Imager 680 configuration:

| Method  | 680 | 680<br>UV | 680<br>QC | 680<br>RGB |
|---|-----|-----------|-----------|------------|
| Chemiluminescence   | x   | x         | x         | x          |
| Chemiluminescence - with colorimetric marker  | x   | x         | x         | x          |
| Colorimetric - Epi-illumination   | x   | x         | x         | x          |
| Colorimetric - Trans-illumination   |     |           | x         | x          |
| Fluorescence - UV trans-illumination  |     | x         | x         | x          |
| Fluorescence - Blue, Green, Red, Epi-illumination (single channel or multichannel)          |     |           |           | x          |
| Fluorescence - Blue, Green, Red, Epi-illumination with colorimetric marker (single channel) |     |           |           | x          |



### NOTICE

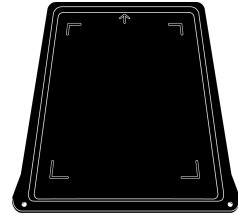
Do not open the instrument door during exposure, when the **RUN** light indicates operation. This will stop the exposure and data will not be saved.

## 5.5.2 Chemiluminescence capture

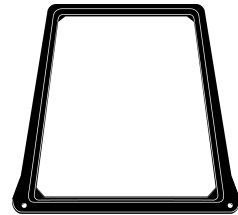
### Introduction

The chemiluminescence image capture method is available in all configurations of Amersham Imager 680. The instrument captures the light which is emitted during the chemical reaction on the membrane. When a colorimetric marker is present in the sample, an additional color image can be captured using a white light source.

Chemiluminescence image capture is performed on one to four membranes placed on a **Black Tray**.



Chemiluminescence image capture with colorimetric markers is performed on one to four membranes placed on a **Black Tray** with a **White Insert**.

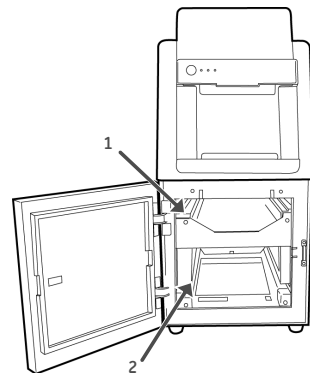


**Note:**

The **White Insert** has 2 sides, one for upper tray position and the other for the lower tray position.

There are two alternative tray positions:

- 1 Upper tray position:  
Use the upper tray position for a smaller field of view of a single membrane and shorter exposure time.  
The field of view is 8 x 11 cm.
- 2 Lower tray position:  
Use the lower tray position for a larger field of view for one to four membranes.  
The field of view is 16 x 22 cm



## 5 Operation

### 5.5 Capture an image

#### 5.5.2 Chemiluminescence capture

## Chemiluminescence exposure options

There are five exposure options for Chemiluminescence capturing. The table below suggests the options to use in different situations.

| When...                                     | Then...  |
|---|--|
| An optimal dynamic range is required:       | <p>Select <b>Auto</b> for automatic exposure.</p> <p>A short pre-exposure is performed to determine the signal intensity. The system will use this information to calculate which exposure time will give the highest possible signal below saturation to enable accurate quantification of the sample.</p> <p>To use the full dynamic range of the image file, check <b>High dynamic range</b>.</p> <p><input checked="" type="checkbox"/> High dynamic range</p> <p>To minimize exposure time, leave <b>High dynamic range</b> unchecked.</p> <p><input type="checkbox"/> High dynamic range</p> |
| A specific area of a sample is of interest: | <p>Select <b>Semi-automatic</b>.</p> <p>A short pre-exposure is performed which results in an image. This allows you to select the area of the sample image to focus on. The software automatically calculates the optimal exposure time for the specified area.</p> <p>To use the full dynamic range of the image file, check <b>High dynamic range</b>.</p> <p><input checked="" type="checkbox"/> High dynamic range</p> <p>To minimize exposure time, leave <b>High dynamic range</b> unchecked.</p> <p><input type="checkbox"/> High dynamic range</p>  |



| When...   | Then...   |
|---|---|
| The intensity of the image is inadequate after automatic exposure or a known exposure time is required: | Select <b>Manual</b> exposure and set the exposure time manually.   |
| A sequence of images is required:   | Select <b>Incremental</b> exposure and set the number of repetitions and interval time of the exposures to capture sequential images. |
| Full control of exposure parameters is required for special applications:                               | Select <b>Advanced exposure</b>   |
| Binning needs to be changed:  | Select <b>Change</b> and choose desired binning option  |

**Note:** *Do not open the door during exposure as this will stop the exposure and the data will not be saved.*

## 5 Operation

### 5.5 Capture an image

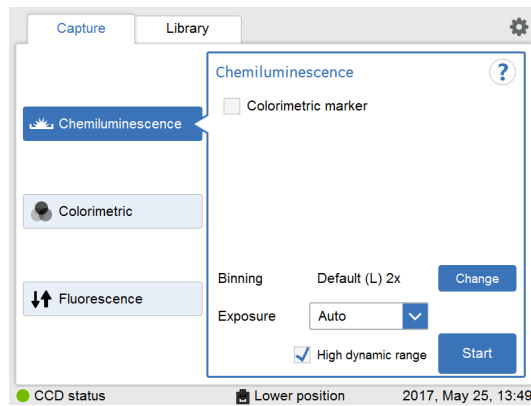
#### 5.5.2 Chemiluminescence capture

## Chemiluminescence with automatic exposure time

Follow the instructions below to perform chemiluminescence capture using automatic exposure time.

| Step | Action |
|------|--------|
|------|--------|

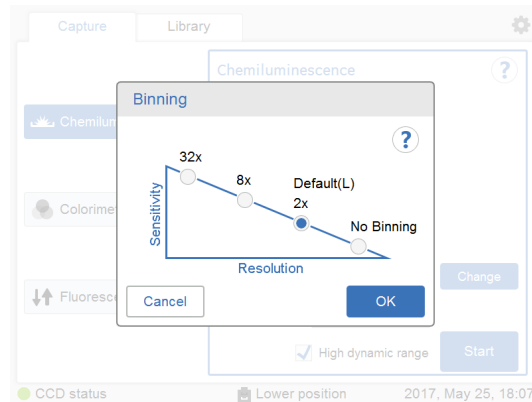
- |   |  |
|---|--|
| 1 | <p>In the <b>Capture</b> tab, select <b>Chemiluminescence</b>.</p> <p><i>Result:</i> The options available for Chemiluminescence capturing are displayed to the right on the screen. Automatic exposure is selected by default and the <b>Exposure</b> options field displays <b>Auto</b>.</p> |
|---|--|



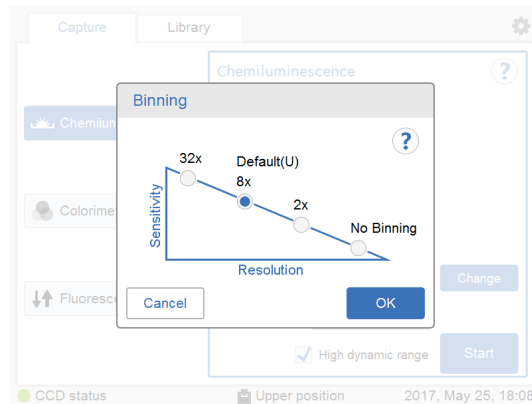
**Step**      **Action**

- 2      To change **Binning** from **Default**, click the **Change** button. The following pop-up screens will be displayed depending on if the sample tray is inserted in lower or upper position.

Lower position:



Upper position:



Choose the desired binning option and click **OK**.

- 3      If your sample contains a colorimetric marker, then select the check box **Colorimetric marker**.

Colorimetric marker

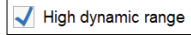
## 5 Operation

### 5.5 Capture an image

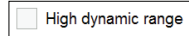
#### 5.5.2 Chemiluminescence capture

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 4 | To use the full dynamic range of the image file, check <b>High dynamic range</b> . |
|---|--|

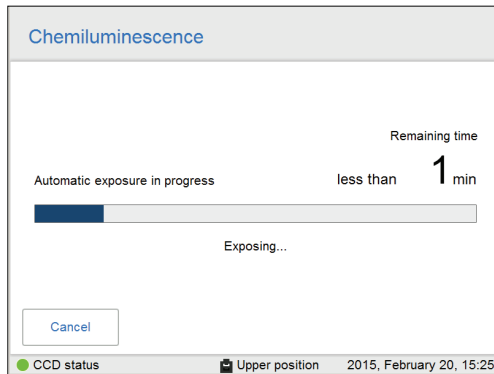


To minimize exposure time, leave **High dynamic range** unchecked.



|   |                       |
|---|-----------------------|
| 5 | Select <b>Start</b> . |
|---|-----------------------|

*Result:* The exposure will begin following a pre-exposure. A progress bar appears on the screen indicating the time remaining of the imaging process, the exposure selected and the calculated remaining time.

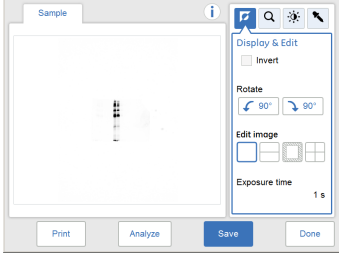
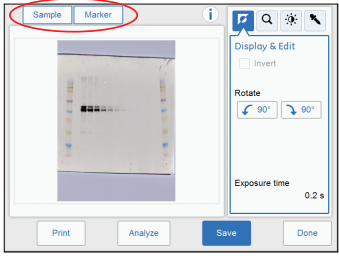


**Note:**

Selecting **Cancel** will cancel the exposure and the **Capture** view will appear.

**Step Action**

6 When the exposure is finished the image view appears displaying the image(s). Amersham Imager 680 creates a folder containing the created image files which can be saved. For details see *File formats, on page 174*.

| If...                                  | Then...   |
|--|---|
| <p>No colorimetric marker was used</p> | <p>The resulting image is displayed in gray scale.</p>   |
| <p>Colorimetric marker was used</p>    | <p>The resulting images are displayed under <b>Sample</b> and <b>Marker</b> tabs.</p> <ul style="list-style-type: none"> <li>• Select the relevant tab for the image you wish to display. A selected tab is highlighted with blue text and frame.</li> <li>• Select both tabs simultaneously to see a composite color image of the <b>Sample</b> and <b>Marker</b> images.</li> </ul>  |

7 Select the **Save** button to save the images.  
 For other options after capturing see *Options after capturing, on page 135*.

## Chemiluminescence with semi-automatic exposure

Follow the instructions below to perform chemiluminescence capture using semi-automatic exposure time.

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 1 | In the <b>Capture</b> tab, select <b>Chemiluminescence</b> .<br><i>Result:</i> The options available for chemiluminescence capturing are displayed to the right on the screen. |
|---|--|

|   |   |
|---|---|
| 2 | If your sample contains a colorimetric marker, then select the check box <b>Colorimetric marker</b> . |
|---|---|

Colorimetric marker

|   |  |
|---|--|
| 3 | To change <b>Binning</b> use the <b>Change</b> button. |
|---|--|

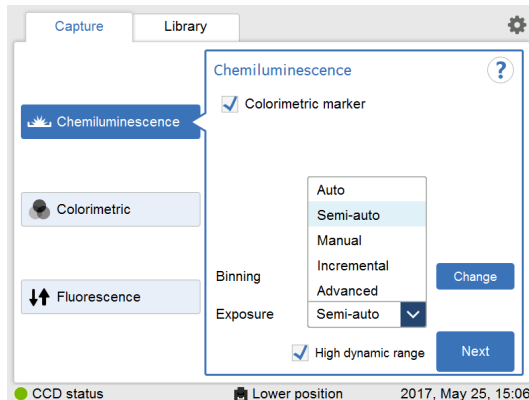
|   |  |
|---|--|
| 4 | To use the full dynamic range of the image file, check <b>High dynamic range</b> . |
|---|--|

High dynamic range

To minimize exposure time, leave **High dynamic range** unchecked.

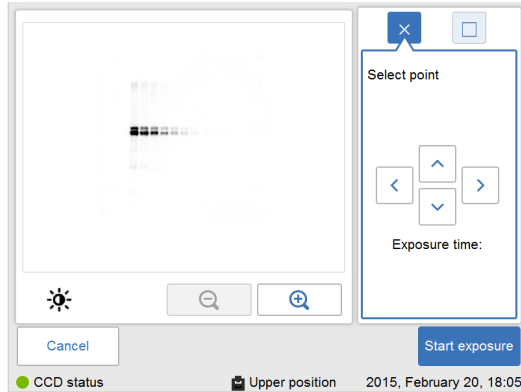
High dynamic range

|   |  |
|---|--|
| 5 | Select <b>Semi-Auto</b> exposure in the exposure drop down menu. |
|---|--|



|   |   |
|---|---|
| 6 | Select <b>Next</b> and wait for the pre-exposure to finish. |
|---|---|


| Step | Action   |
|------|--|
| 7    | When the pre-exposure is finished a low resolution preview image is displayed. |

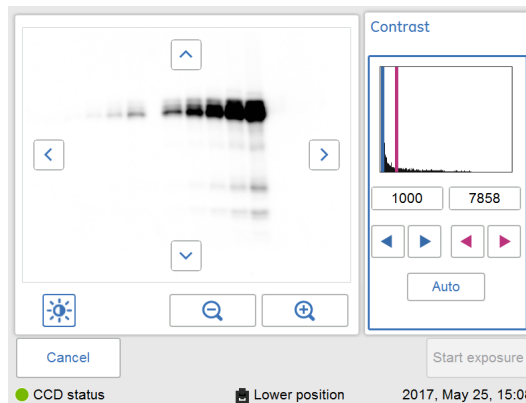



Use the zoom tools and arrows to get an optimal view of the area of interest.

Choose  to zoom in.

Choose  to zoom out.

Use the contrast tool  and arrows to get an optimal view of the area of interest.







Choose  (blue arrows) to adjust the lower range of the grayscale in the displayed image indicated by the blue line in the image histogram.

## 5 Operation

### 5.5 Capture an image

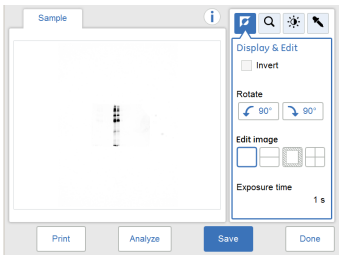
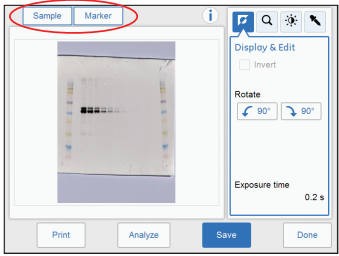
#### 5.5.2 Chemiluminescence capture

| Step | Action   |
|------|--|
|      |  <p>Choose  (red arrows) to adjust the upper range of the grayscale in the displayed image indicated by the red line in the image histogram.<br/>Enter contrast values manually if required.</p>   |
| 8    | <p>Choose one of the two options displayed to the right of the image to point out the area of interest:</p> <ul style="list-style-type: none"><li>• Choose , then select one point of interest in the image.<br/><i>Result:</i> The selected point is highlighted with an X.</li><li>• Choose , and then select two diagonal corners of an area of interest in the image.<br/><i>Result:</i> The selected area is highlighted with a square.</li></ul> <p>Use the right hand side arrow buttons to move the highlighted point or area.</p> |
| 9    | Select <b>Start exposure</b> and wait for the exposure to finish.  |



**Step Action**

10 When the exposure is finished the image view appears displaying the image(s). Amersham Imager 680 creates a folder containing the created image files which can be saved. For details see *File formats, on page 174*.

| If...                                  | Then...   |
|--|---|
| <p>No colorimetric marker was used</p> | <p>The resulting image is displayed in gray scale.</p>   |
| <p>Colorimetric marker was used</p>    | <p>The resulting images are displayed under <b>Sample</b> and <b>Marker</b> tabs.</p> <ul style="list-style-type: none"> <li>• Select the relevant button for the image you wish to display. A selected tab is highlighted with blue text and frame.</li> <li>• Select both buttons simultaneously to see a composite color image of the <b>Sample</b> and <b>Marker</b> images.</li> </ul>  |

11 Select the **Save** button to save the images.  
 For other options after capturing see *Options after capturing, on page 135*.

## 5 Operation

### 5.5 Capture an image

#### 5.5.2 Chemiluminescence capture

## Chemiluminescence with manual exposure

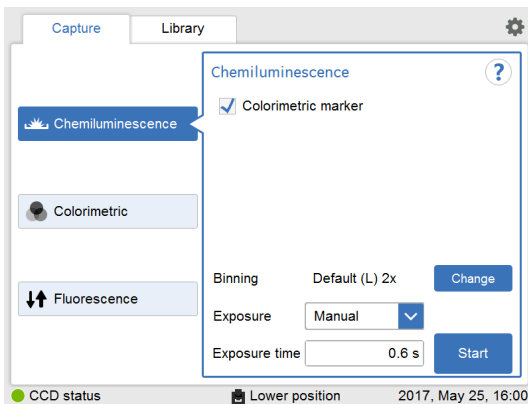
Follow the instructions below to perform chemiluminescence capture using manually set exposure time.

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | In the <b>Capture</b> tab, select <b>Chemiluminescence</b> .<br><i>Result:</i> The options available for chemiluminescence capturing are displayed to the right on the screen. |
| 2 | If your sample contains a colorimetric marker, then check the check box <b>Colorimetric marker</b> .   |

Colorimetric marker

- |   |   |
|---|---|
| 3 | Select <b>Manual</b> exposure in the exposure drop down list. |
|---|---|

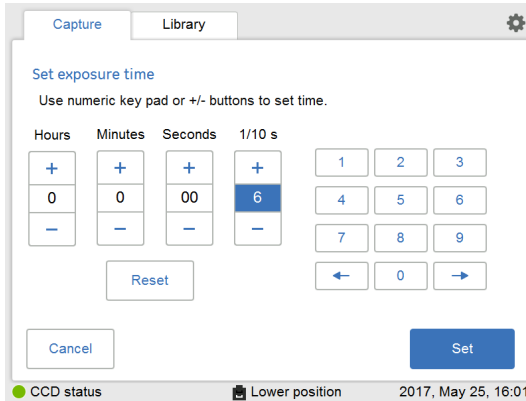


- |   |  |
|---|--|
| 4 | To change <b>Binning</b> use the <b>Change</b> button. |
|---|--|

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 5 | To change the exposure time, select the exposure time field. |
|---|--|

*Result:* The **Set exposure time** view opens.



|   |   |
|---|---|
| 6 | Enter the new time and select <b>Set</b> to return to the previous view. For detailed instructions see <i>Section 3.5.5 Description of settings views, on page 66</i> . |
|---|---|

|   |  |
|---|--|
| 7 | Select <b>Start</b> and wait for the exposure to finish. |
|---|--|

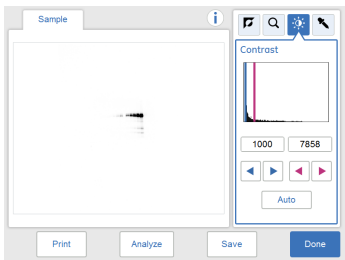
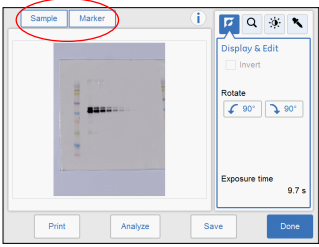
## 5 Operation

### 5.5 Capture an image

#### 5.5.2 Chemiluminescence capture

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 8 | When the exposure is finished the image view appears displaying the image(s). Amersham Imager 680 creates a folder containing the created image files which can be saved. For details see <i>File formats</i> , on page 174. |
|---|--|

| If...                           | Then...   |
|---------------------------------|---|
| No colorimetric marker was used | <p>The resulting image is displayed in gray scale.</p>   |
| Colorimetric marker was used    | <p>The resulting images are displayed under <b>Sample</b> and <b>Marker</b> tabs.</p> <ul style="list-style-type: none"><li>• Select the relevant tab for the image you wish to display. A selected tab is highlighted with blue text and frame.</li><li>• Select both tabs simultaneously to see a composite color image of the <b>Sample</b> and <b>Marker</b> images.</li></ul>  |

9 Select the **Save** button to save the images.  
For other options after capturing see *Options after capturing*, on page 135.

## Chemiluminescence with incremental exposure

Follow the instructions below to perform chemiluminescence capture with incremental exposure time.

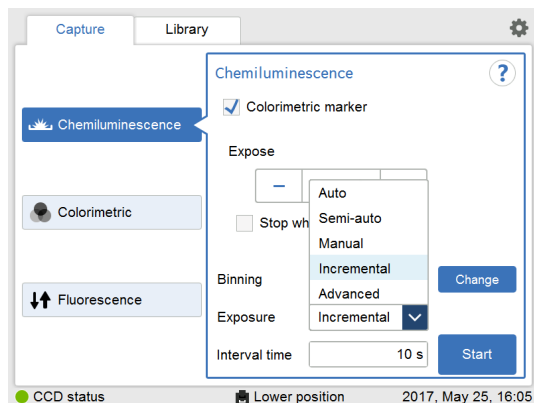


### NOTICE

When using incremental exposure, images that are not selected will be deleted at saving.

| Step | Action |
|------|--------|
|------|--------|

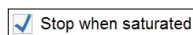
- 1 In the **Capture** tab, select **Chemiluminescence**.  
*Result:* The options available for chemiluminescence capturing are displayed to the right on the screen.
- 2 Select **Incremental** exposure in the exposure drop down menu.



- 3 Set the number of repetitive exposures in the **Expose** field using the plus and minus buttons.



- 4 Check the check box **Stop when saturated** if you wish the exposure to stop when the pixel intensity of the accumulated exposed images reaches saturation.



### Note:

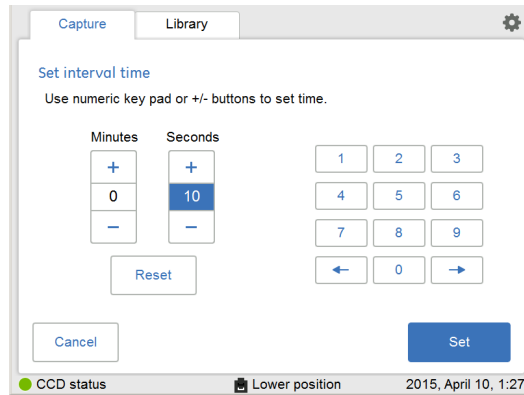
The **Stop when saturated** function overrides the set repetitive exposures.

## 5 Operation

### 5.5 Capture an image

#### 5.5.2 Chemiluminescence capture

- | Step | Action  |
|------|---|
| 5    | To change <b>Binning</b> use the <b>Change</b> button.  |
| 6    | If your sample contains a colorimetric marker, check the check box <b>Colorimetric marker</b> .                 |
| 7    | Set <b>Interval time</b> by pressing the value.<br><i>Result:</i> This opens the <b>Set interval time</b> view. |

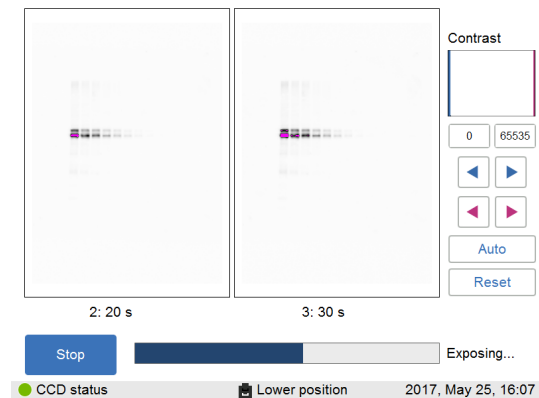


- 8 Enter the value and select **Set** to to save the value and to return to the previous view.  
The **Reset** button resets the value to zero.

**Step Action**

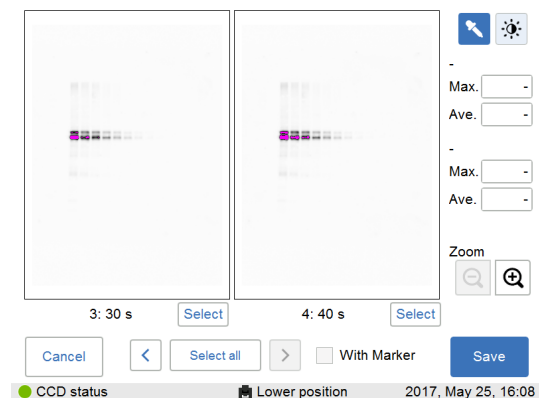
- 9 Select the **Start** button and images are captured repeatedly for the set time period (or until saturation). During repeated image capture, the contrast of the images can be adjusted by pressing **Auto**. This adjustment can be reset with the **Reset** button.

*Result:* The number of images matching the selected repetitions are displayed as they are exposed. A progress bar indicates the time remaining of the imaging process.



- 10 When the exposure is finished the image view appears displaying the images. You can navigate among the images by selecting the left or right arrows. Use the intensity tool to check pixel intensity and the contrast tool to adjust contrast and brightness.

Amersham Imager 680 creates a folder containing the created image files which can be saved. For details see *File formats*, on page 174.



## 5 Operation

### 5.5 Capture an image

#### 5.5.2 Chemiluminescence capture

| Step | Action  |
|------|---|
| 11   | Use the <b>Select</b> button to select which image or images you wish to save. Then select the <b>Save</b> button.<br><br><b>Note:</b><br><i>If you select more than one image, then the <b>Library</b> view will open after selecting <b>Save</b>.</i> |
| 12   | If <b>Colorimetric marker</b> was selected it is possible to check the check box <b>With marker</b> to display the marker image.  |

## Chemiluminescence with advanced exposure

Follow the instructions below to perform chemiluminescence capture with Advanced exposure mode.

**Note:** *This exposure mode is for greater control of image capture in case it is needed for a particular application.*



### NOTICE

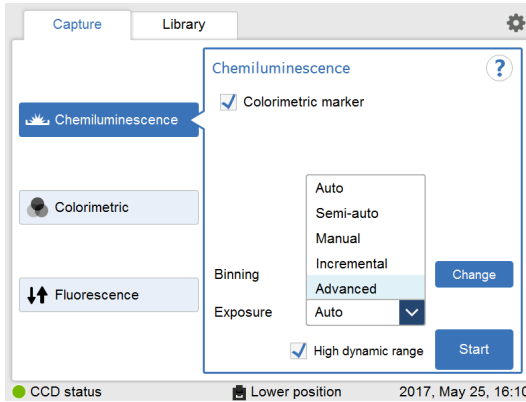
When using advanced exposure, images that are not selected will be deleted at saving.

| Step | Action   |
|------|--|
| 1    | In the <b>Capture</b> tab, select <b>Chemiluminescence</b> .<br><br><i>Result:</i> The options available for chemiluminescence capturing are displayed to the right on the screen. |
| 2    | If your sample contains a colorimetric marker, then check the <b>Colorimetric marker</b> check box.<br><br><input checked="" type="checkbox"/> <b>Colorimetric marker</b>          |

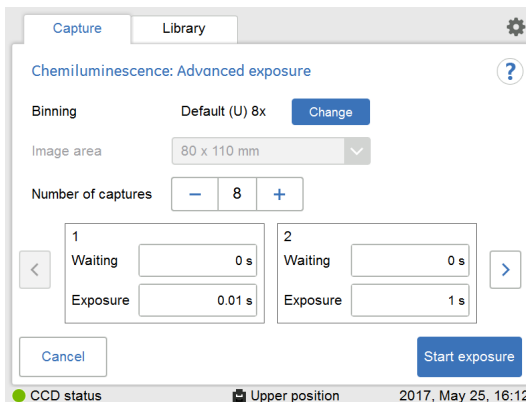


**Step Action**

3 Select **Advanced** in the exposure drop down menu.



**Result:** *Advanced exposure* setting is displayed.



**Binning**, **Image area** and **Number of captures** can be specified depending on the conditions. The table below shows the available combinations for the lower tray position.

|                        | Colorimetric marker | No colorimetric marker |
|------------------------|---------------------|------------------------|
| <b>Tray position</b>   | Lower               | Lower                  |
| <b>Binning</b>         | 4 levels            | 4 levels               |
| <b>Image area</b>      | 1 area              | 4 areas                |
| <b>No. of captures</b> | 1                   | 1 - 12                 |

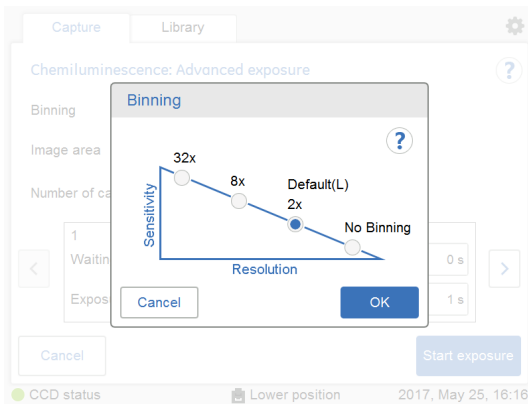
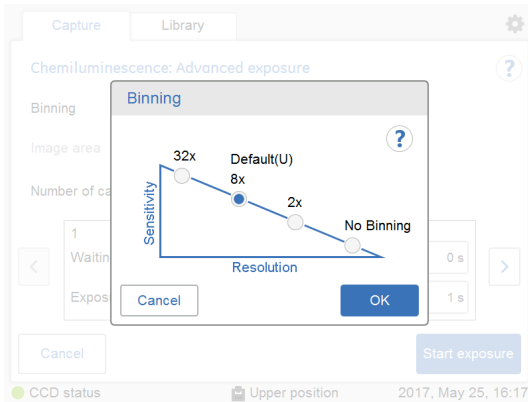
## 5 Operation

### 5.5 Capture an image

#### 5.5.2 Chemiluminescence capture

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 4 | <p><b>Binning</b> is pre-selected to <b>Default</b>. Click the <b>Change</b> button to choose another binning setting. A pop-up window displays the binning options.</p> |
|---|--|

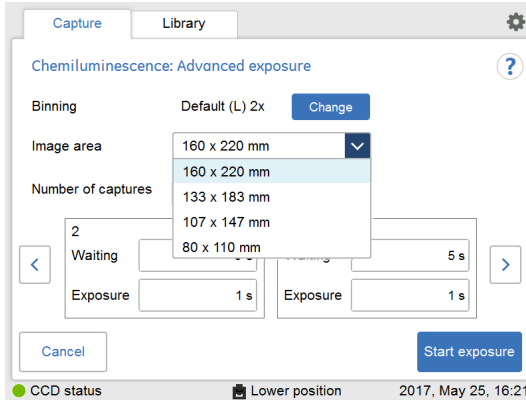


**Note:**

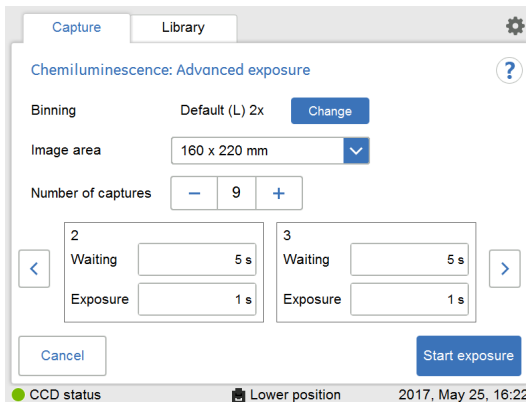
The **Binning** function increases sensitivity by binning pixels and results in lower image resolution.

**Step**      **Action**

- 5      Select an area in **Image area**. This is only available for image capture in the lower tray position with standard sensitivity without colorimetric maker.



- 6      Set the number of repetitive exposures in **Number of captures** by using the plus and minus buttons.



## 5 Operation

### 5.5 Capture an image

#### 5.5.2 Chemiluminescence capture

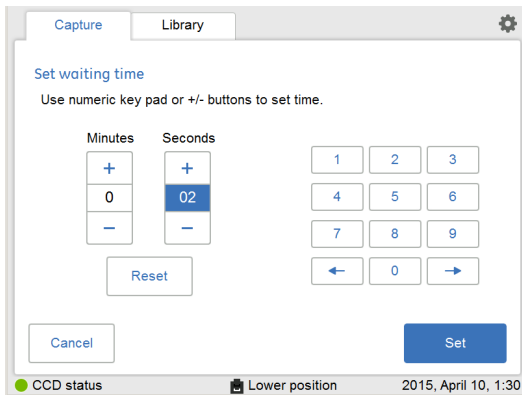
| Step | Action |
|------|--------|
|------|--------|

|   |   |
|---|---|
| 7 | Set the waiting time by pressing value. |
|---|---|

*Result:* this opens the **Set waiting time** view.

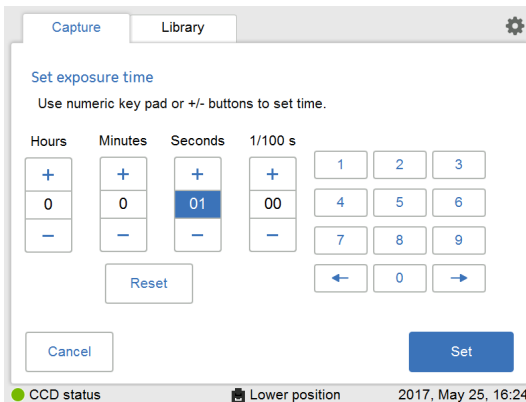
Enter the value and select **Set** to save the value and to return to the previous view.

The **Reset** button resets the value to zero.



|   |  |
|---|--|
| 8 | Set the exposure time by pressing value. |
|---|--|

*Result:* the **Set exposure time** view opens

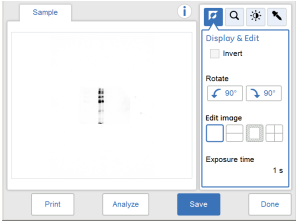
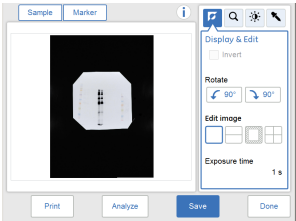


Enter the value and select **Set** to save the value and to return to the previous view.

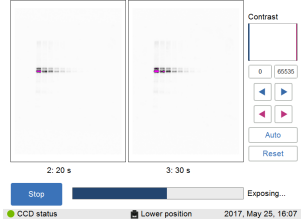
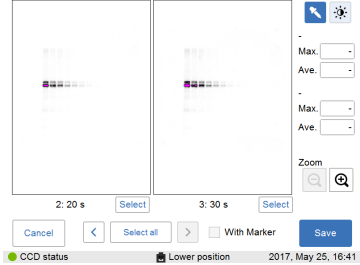
The **Reset** button resets the value to zero.

| Step | Action                               |
|------|--------------------------------------|
| 9    | Select <b><i>Start exposure.</i></b> |

**Step**      **Action**

| If...   | Then...   |
|---|---|
| <p>No colorimetric marker was used and one capture was chosen</p> | <p>The resulting image is displayed in gray scale.</p>  <p>When the exposure is finished the image view appears displaying the image. Amersham Imager 680 creates a folder for the image files. For details see <i>File formats</i>, on page 174.</p> <p>Select the <b>Save</b> to save the images.</p>  |
| <p>Colorimetric marker was used and one capture was chosen</p>    | <p>The resulting images are displayed under <b>Sample</b> and <b>Marker</b> buttons.</p> <ul style="list-style-type: none"> <li>• Select the relevant button for the image you wish to display. A selected button is highlighted with blue text and frame.</li> <li>• Select both buttons simultaneously to see a composite color image of the <b>Sample</b> and <b>Marker</b> images.</li> </ul>  <p>When the exposure is finished the image view appears displaying the image. Amersham Imager 680 creates a folder for the image files. For details see <i>File formats</i>, on page 174.</p> <p>Select the <b>Save</b> to save the images.</p> |
| <p>More than one capture was selected</p>                         | <p>Images are captured several times with the set waiting and exposure times.</p> <p>The number of images matching with the set waiting and exposure times are displayed as they are exposed. A progress bar indicates the time remaining of the imaging process.</p>   |

Step Action

| If... | Then...  |
|-------|--|
|       |  <p>When the exposure is finished the image view appears displaying the image. Navigate among the images by selecting the left or right arrows. Use the intensity tool to check pixel intensity and the contrast tool to adjust contrast and brightness.</p> <p>Amersham Imager 680 creates a folder for the image files. For details see <i>File formats, on page 174</i>.</p>  <p>Use the <b>Select</b> to select the images to be saved then <b>Save</b> to save the images.</p> <p>If <b>Colorimetric marker</b> was selected it is possible to check the check box <b>With marker</b> to display the marker image.</p> <p><b>Note:</b><br/> <i>If more than one image is selected, then the <b>Library</b> view will open after selecting <b>Save</b>.</i></p> |

## Options after capturing

Select one or more of the following actions after capturing:

- To save the image select **Save**. This will allow you to reopen the image later to use the image tools, to perform an analysis or to print the image.

## 5 Operation

### 5.5 Capture an image

#### 5.5.2 Chemiluminescence capture

See *Section 5.7 Save and manage image files, on page 167* for further instructions.

- To modify the display settings or view details of the image, select the image tools to the right of the image.

See *Image tools, on page 164* for further instructions.

- To analyze the image, select **Analyze**.

See *Section 5.8 Analyze the image, on page 181* for further instructions.

- To print the image, select **Print**.
  - To discard the image without saving select **Done** and confirm the following dialog.
-



## 5.5.3 Colorimetric capture

### Introduction

Colorimetric capture is available in Amersham Imager 680 configurations as described in the following table.

| Option                    | Sample  | Illumination | 680 | 680 UV | 680 QC | 680 RGB |
|---------------------------|---|--------------|-----|--------|--------|---------|
| <b>Epi-illumination</b>   | <ul style="list-style-type: none"> <li>Membrane</li> <li>Gel</li> </ul> | Epi-White    | x   | x      | x      | x       |
| <b>Trans-illumination</b> | <ul style="list-style-type: none"> <li>Gel</li> </ul>                   | Trans-White  |     |        | x      | x       |

Both options use white light imaging sources. For Epi-illumination the light source is located at the top of the Amersham Imager 680 interior. For Trans-illumination the sample is illuminated from the light source at the bottom of the instrument interior. When using Trans-illumination, the intensity data is converted to optical density (OD values), which provides a more quantitative result compared to Epi-illumination.

**Note:** Colorimetric capture is only available with **Lower tray** position.

The images are by default created with automatic exposure time.


The table below describes details on accessories and tray positions for colorimetric image capturing.

| Option                  | Tray and accessory               |   | Tray position       |
|-------------------------|----------------------------------|---|---------------------|
| <b>Epi-illumination</b> | <b>Black Tray + White Insert</b> |  | Lower tray position |
|                         | <b>White Trans Tray</b>          |  | Lower tray position |

## 5 Operation

### 5.5 Capture an image

#### 5.5.3 Colorimetric capture

| Option                    | Tray and accessory  | Tray position       |
|---------------------------|---|---------------------|
| <b>Trans-illumination</b> | <b>White Trans Tray + Diffuser Board</b><br> | Lower tray position |

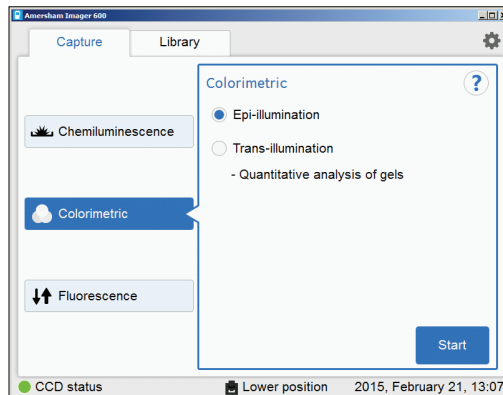
## Colorimetric capture

Follow the instructions in the table to perform colorimetric capture.

| Step | Action |
|------|--------|
|------|--------|

- 1 In the **Capture** tab, select **Colorimetric**.

*Result:* The options available for colorimetric capturing are displayed to the right on the screen.

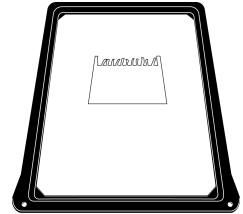


| Step | Action |
|------|--------|
|------|--------|

2 Choose **Epi-illumination** or **Trans-illumination** as preferred.

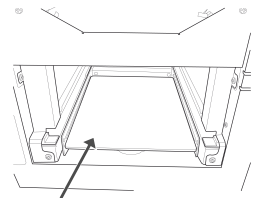
**Note:**

For **Colorimetric Epi-illumination** capture position the gel so that the lanes of the gel are parallel to the long side of the tray. This is important to avoid artefacts in the image.



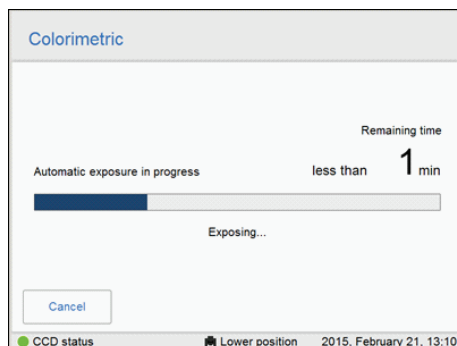
**Note:**

For **Trans-illumination** place a diffuser board at the bottom of the instrument with the matte side up, before capturing.



3 Select **Start**.

*Result:* A progress bar appears on the screen indicating the time remaining of the imaging process.



## 5 Operation

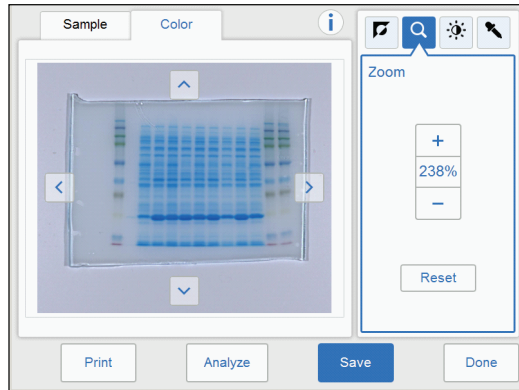
### 5.5 Capture an image

#### 5.5.3 Colorimetric capture

| Step | Action |
|------|--------|
|------|--------|

- 4 When the exposure is finished the image view appears displaying the images. Amersham Imager 680 creates a folder containing the created image files which can be saved. For details see *File formats, on page 174*.

Select the relevant tab of **Sample** and **Color** for the image you wish to display. A selected tab is highlighted with blue text and frame.



- 5 Select the **Save** button to save the images.  
For other options after capturing see *Options after capturing, on page 140*.

## Options after capturing

Select one or more of the following actions after capturing:

- To save the image select **Save**. This will allow you to reopen the image later to use the image tools, to perform an analysis or to print the image.  
See *Section 5.7 Save and manage image files, on page 167* for further instructions.
- To modify the display settings or view details of the image, select the image tools to the right of the image.  
See *Image tools, on page 164* for further instructions.
- To analyze the image, select **Analyze**.  
See *Section 5.8 Analyze the image, on page 181* for further instructions.
- To print the image, select **Print**.
- To discard the image without saving select **Done** and confirm the following dialog.

## 5.5.4 Fluorescence capture

### Introduction

Fluorescence image capturing is performed with Epi-illumination (Blue, Green and Red) or Trans-UV illumination. The Epi-illumination method allows for both single and multi-channel detection. Fluorescence capturing is performed using a light source and emission filter.

**Note:** *Fluorescence capture is only available with **Lower tray** position.*

The methods available in Amersham Imager 680 configurations are described in the following table:

|                 | 680 | 680 UV | 680 QC | 680 RGB |
|-----------------|-----|--------|--------|---------|
| <b>Epi-RGB</b>  |     |        |        | x       |
| <b>Custom</b>   |     |        |        | x       |
| <b>Trans-UV</b> |     | x      | x      | x       |

**Note:** *The **Custom** method allows for different combinations of the blue, green or red light sources and an emission filter of choice.*

### Fluorescence capture options

The table below illustrates sample types for fluorescence capturing:

| Sample type  | Tray and accessory (placement only in the lower tray position) | Light source (location inside)              |
|--|--|---|
| Gel (e.g. Cy <sup>TM</sup> 2/Cy3/Cy5)                                  | Black Tray   | Epi-Blue, Green, and Red fluorescence (top) |
| Membrane (e.g. ECL Plex <sup>TM</sup> Cy2, ECL Plex Cy3, ECL Plex Cy5) | Black Tray   | Epi-Blue, Green, and Red fluorescence (top) |
| Gel (e.g. EtBr/SYBR <sup>TM</sup> Green)                               | UV Trans Tray (transparent) + gel sheet                        | Trans-UV (bottom)                           |

## Fluorescence exposure options

There are four exposure options for fluorescence capturing. In the following table the benefits of each exposure option are described.

| When...   | Then...   |
|---|---|
| <p>Optimal dynamic range is required</p>  | <p>Select <b>Auto</b> for automatic exposure.</p> <p>A short pre-exposure is performed to determine the signal intensity. The system will use this information to calculate which exposure time will give the highest possible signal below saturation to enable accurate quantification of the sample.</p> <p>To use the full dynamic range of the image file, check <b>High dynamic range</b>.</p> <div data-bbox="551 698 748 735" style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> High dynamic range         </div> <p>To minimize exposure time, leave <b>High dynamic range</b> unchecked.</p> <div data-bbox="551 833 748 869" style="border: 1px solid black; padding: 2px;"> <input type="checkbox"/> High dynamic range         </div>  |
| <p>A specific area of a sample is of interest</p>   | <p>Select <b>Semi-automatic</b>.</p> <p>A short pre-exposure is performed which results in an image. This allows you to select the area of the sample image to focus on. The software automatically calculates the exposure time for the specified area.</p> <p>To use the full dynamic range of the image file, check <b>High dynamic range</b>.</p> <div data-bbox="551 1161 748 1197" style="border: 1px solid black; padding: 2px;"> <input checked="" type="checkbox"/> High dynamic range         </div> <p>To minimize exposure time, leave <b>High dynamic range</b> unchecked.</p> <div data-bbox="551 1295 748 1332" style="border: 1px solid black; padding: 2px;"> <input type="checkbox"/> High dynamic range         </div> <p><b>Note:</b><br/> <i>Semi-automatic exposure is not available for multichannel fluorescence capture.</i></p> |
| <p>The intensity of the image is inadequate after automatic exposure or a known exposure time is required</p> | <p>Select <b>Manual</b> exposure and set the exposure time manually.</p>  |

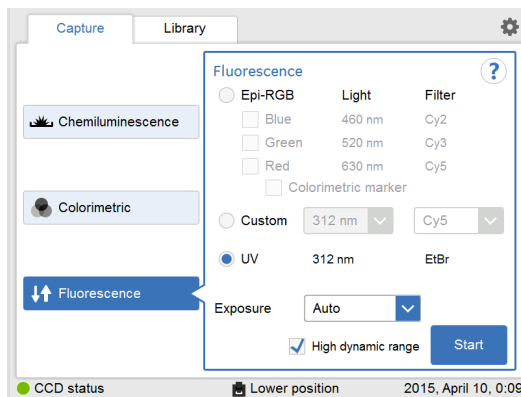
| When...  | Then...                           |
|--|-----------------------------------|
| Full control of exposure parameters is required for special applications | Select <b>Advanced exposure</b> . |

## Fluorescence Epi-RGB

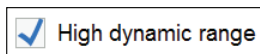
This method is used for fluorescence imaging: single or multichannel. Follow the instructions below to perform **Fluorescence** Epi-RGB capture.

| Step | Action |
|------|--------|
|------|--------|

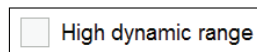
- |   |  |
|---|--|
| 1 | In the <b>Capture</b> tab, select <b>Fluorescence</b> .<br><i>Result:</i> The options available for fluorescence capturing are displayed to the right on the screen. |
|---|--|



- |   |  |
|---|--|
| 2 | To use the full dynamic range of the image file, check <b>High dynamic range</b> . |
|---|--|



To minimize exposure time, leave **High dynamic range** unchecked.



**Note:**

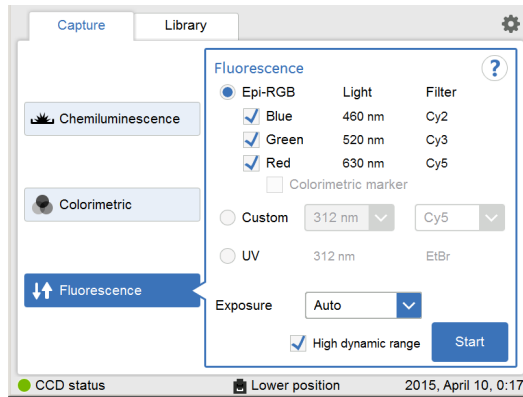
*This function is only effective with the **Auto** and **Semi-Auto** exposure settings.*

**Step**      **Action**

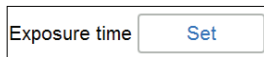
- 3 Check the **Epi-RGB** radio button, and then check the relevant detection channel check boxes of **Blue**, **Green** and **Red**.

**Note:**

*More than one check box can be checked for simultaneous multichannel capture.*



- 4 Choose an exposure option in the **Exposure:** drop down menu:
- **Auto** and proceed to step 7, or
  - **Semi-auto**,
  - **Manual** and proceed to the next step.
  - For **Advanced** exposure see *Fluorescence RGB with Advanced exposure, on page 151*.
- 5 If exposure option **Manual** was selected, then select the **Exposure time: Set** button.



**Note:**

*If more than one detection channel was selected, the **Exposure time** button displays **Set**.*

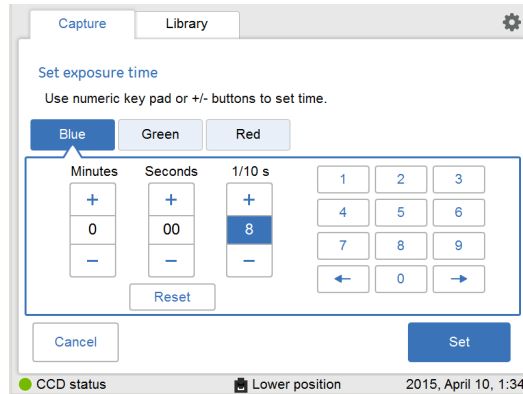
*If only one detection channel was selected, the button displays the latest set exposure time.*

*Result:* This opens the **Set exposure time** view.



**Step**      **Action**

- 6      Set the exposure time for each detection channel by selecting the color tab, enter the value.



When all values are entered press **Set**.

*Result:* This will close the view.

For details see, *Set exposure time*, on page 68.

- 7      Select **Start**. A progress bar appears on the screen indicating the time remaining of the imaging process and the selected exposure option.

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 8 | <p>When the exposure is finished the image view displays the images. Amersham Imager 680 creates a folder containing image files which can be saved. The display and number of images created depends on the number of detection channels selected in step 2.</p> <p>For details see <i>File formats, on page 174</i>.</p> |
|---|--|



| If...                                  | Then...   |
|--|---|
| Three detection channels were selected | <ul style="list-style-type: none"> <li>Select the relevant tab of <b>Blue</b>, <b>Green</b> or <b>Red</b> for the image you wish to display. A selected tab is highlighted with blue text and frame.</li> <li>Select two or more tabs simultaneously to see a composite color image.</li> </ul> |
| Two detection channels were selected   | <ul style="list-style-type: none"> <li>Select the relevant tab of <b>Blue</b>, <b>Green</b> or <b>Red</b> for the image you wish to display. A selected tab is highlighted with blue text and frame.</li> <li>Select both tabs simultaneously to see a composite color image.</li> </ul>        |
| One detection channel was selected     | <ul style="list-style-type: none"> <li><b>Sample:</b> One image is displayed</li> </ul>   |

|   |   |
|---|---|
| 9 | <p>Select the <b>Save</b> button to save the images. For other options after capturing see <i>Options after capturing, on page 135</i>.</p> |
|---|---|

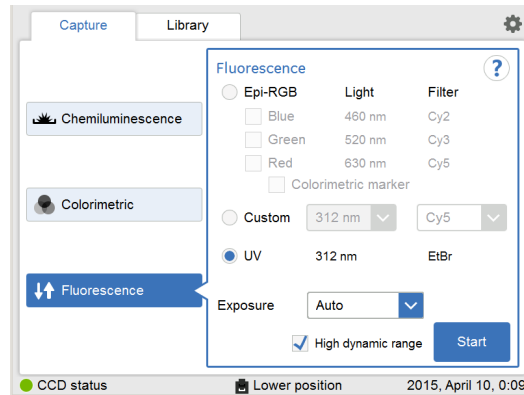
## Fluorescence Epi-RGB with colorimetric marker

This method is used for samples containing a colorimetric marker, and is only available for single channel capture.

Follow the instructions below to perform **Fluorescence** single channel capture with a colorimetric marker.

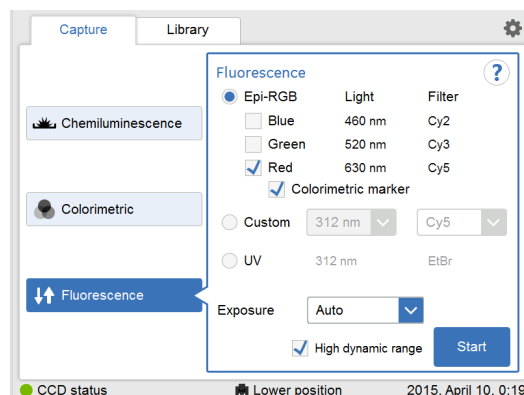
| Step | Action |
|------|--------|
|------|--------|

- 1 In the **Capture** tab, select **Fluorescence**.



*Result:* The options available for fluorescence capturing are displayed to the right on the screen.

- 2 Check the **Epi-RGB** radio button, and then check the relevant check box of **Blue**, **Green**, or **Red**.
- 3 Check the **Colorimetric marker** check box.



## 5 Operation

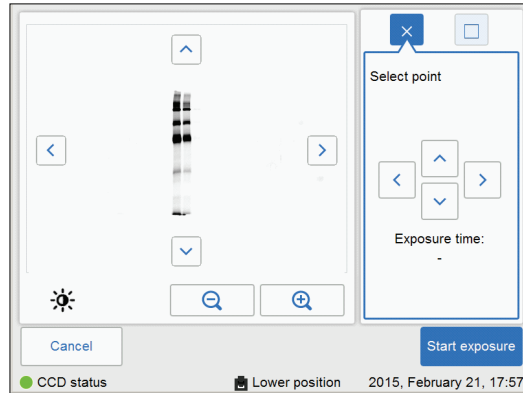
### 5.5 Capture an image

#### 5.5.4 Fluorescence capture

| Step | Action  |
|------|---|
| 4    | <p>Select an exposure option in the <b>Exposure:</b> drop down menu:</p> <ul style="list-style-type: none"><li>• <b>Auto</b></li><li>• <b>Semi-Auto</b></li><li>• <b>Manual</b> - click the <b>Exposure time</b> button and set an exposure time and then click <b>Set</b>.<br/>More details are found in <i>Set exposure time, on page 68</i>.</li><li>• For <b>Advanced</b> exposure see <i>Fluorescence RGB with Advanced exposure, on page 151</i>.</li></ul> |
| 5    | <p>If <b>Auto</b> or <b>Manual</b> exposure was chosen, select <b>Start</b>.</p> <p><i>Result:</i> A progress bar appears on the screen indicating the time remaining of the imaging process and the selected exposure option.</p> <p>Proceed to the final step of this instruction.</p>  |
| 6    | <p>If <b>Semi-Auto</b> exposure was chosen, select <b>Next</b> and wait for the pre-exposure to finish.</p> <p><i>Result:</i> A pre-exposed image appears.</p>  |

**Step Action**

7 When the pre-exposure is finished a low resolution preview is displayed.

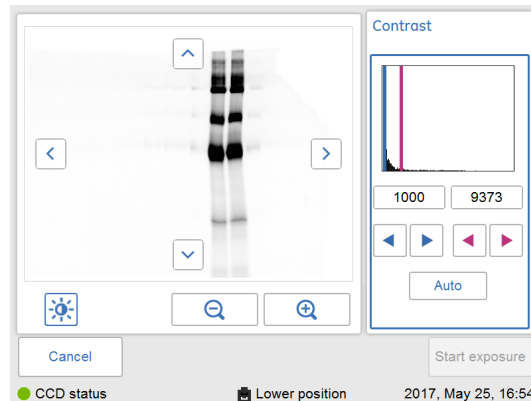


Use the zoom tools and arrows to get an optimal view of the area of interest.

Choose to zoom in.

Choose to zoom out.

Use the contrast tool and arrows to get an optimal view of the area of interest.



Choose (blue arrows) to adjust the lower range of the grayscale in the displayed image indicated by the blue line in the image histogram.



Choose (red arrows) to adjust the upper range of the grayscale in the displayed image indicated by the red line in the image histogram.

| Step | Action |
|------|--------|
|------|--------|

**Note:**

*The colorimetric marker is not displayed in the preview.*

8 Choose one of the two options displayed to the right of the image to point to the area of interest:

- Choose , then point to one point of interest in the image.  
*Result:* The selected point will be highlighted with an X.
- Choose , and then point to two diagonal corners of an area of interest in the image.  
*Result:* The selected area will be highlighted with a square.

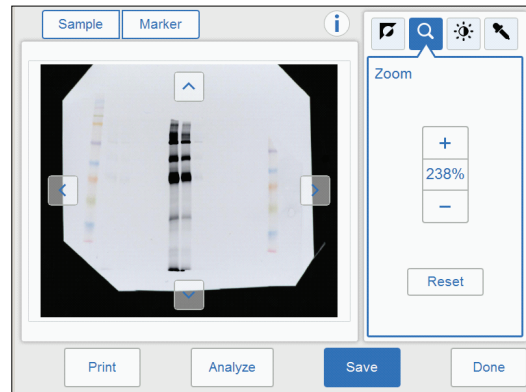
Use the right hand side arrow buttons to move the marked point or area.

9 Select **Start exposure** and wait for the exposure to finish.

10 When the exposure is finished the image view appears displaying the images. Amersham Imager 680 creates a folder containing the created image files which can be saved.

For details see *File formats, on page 174.*

- Select the relevant tab of **Sample** and **Marker** for the image you wish to display. A selected tab is highlighted with blue text and frame.
- Select both tabs simultaneously to see a composite color image of the **Sample** and **Marker** images.



11 Select the **Save** button to save the images.

For other options after capturing see *Options after capturing, on page 135.*

## Fluorescence RGB with Advanced exposure

Follow the instructions below to perform Fluorescence RGB capture with **Advanced** exposure mode.

**Note:** *This exposure mode is designed only for those who need more control of image capture for a particular application.*

**Note:** *Fluorescence capture is only available with the **Lower tray** position.*



### NOTICE

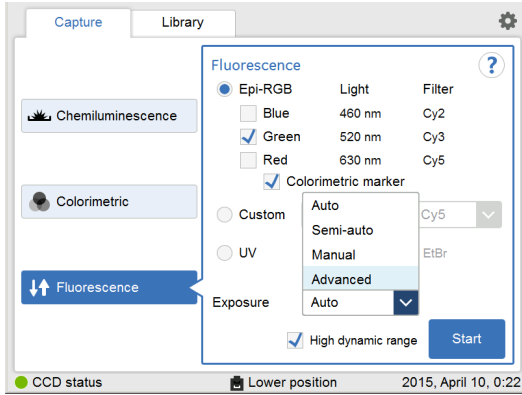
When using advanced exposure mode, images that are not selected will be deleted at saving.

| Step | Action   |
|------|--|
| 1    | <p>In the <b>Capture</b> tab, select <b>Fluorescence</b>.</p> <p><i>Result:</i> The options available for fluorescence capturing are displayed to the right on the screen.</p> <p><b>Note:</b><br/><i>Advanced exposure mode is available with only one channel of Epi RGB or a custom channel under Fluorescence RGB capture.</i></p> |
| 2    | <p>If the sample contains a colorimetric marker, then check the <b>Colorimetric marker</b> box.</p> <p><input checked="" type="checkbox"/> <b>Colorimetric marker</b></p>  |

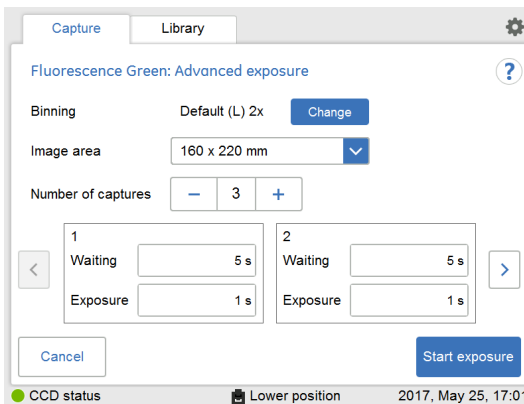
5 Operation  
 5.5 Capture an image  
 5.5.4 Fluorescence capture

**Step**      **Action**

3      Select **Advanced** exposure in the exposure drop down menu.



**Result:** **Advanced exposure** setting is displayed.



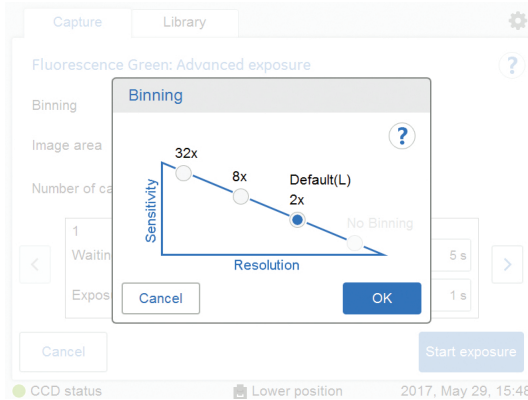
**Binning**, **Image area** and **Number of captures** can be specified depending on the conditions. The table below shows the available combinations.

|                    | Colorimetric marker | No Colorimetric marker |
|--------------------|---------------------|------------------------|
| Tray position      | Lower               | Lower                  |
| Binning            | 3 levels            | 3 levels               |
| Image area         | 1 area              | 4 areas                |
| Number of captures | 1                   | 1 - 12                 |



**Step**      **Action**

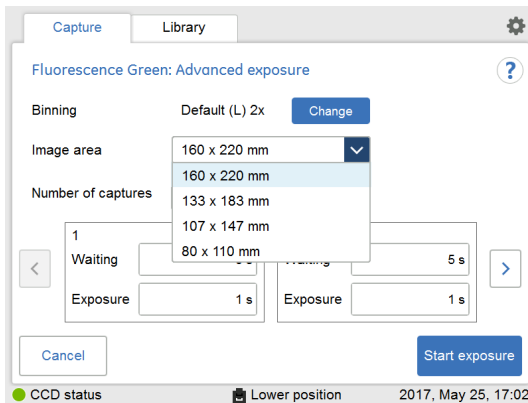
- 4      **Binning** is set to **Default**. Click the **Change** button to change sensitivity.  
Three **Binning** levels can be chosen when the tray is in the **Lower position**.



**Note:**

The **Binning** increases sensitivity by binning pixels and results in lower image resolution.

- 5      Select an area in **Image area**. This is only available for image capture in the lower tray position without colorimetric maker.



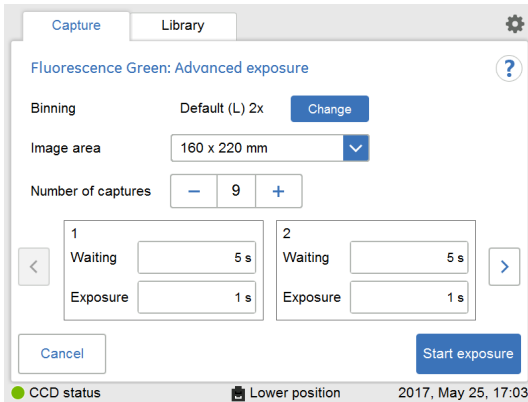
## 5 Operation

### 5.5 Capture an image

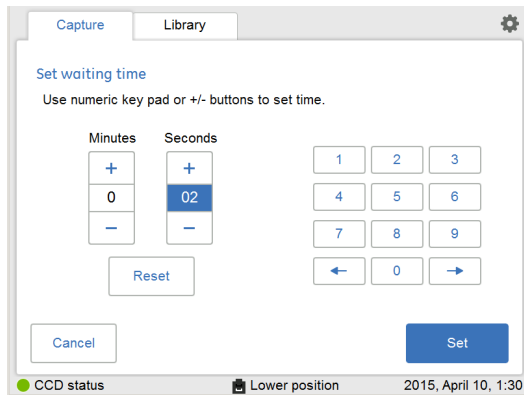
#### 5.5.4 Fluorescence capture

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 6 | Set the number of repetitive exposures in <b>Number of captures</b> by using the plus and minus buttons. |
|---|--|



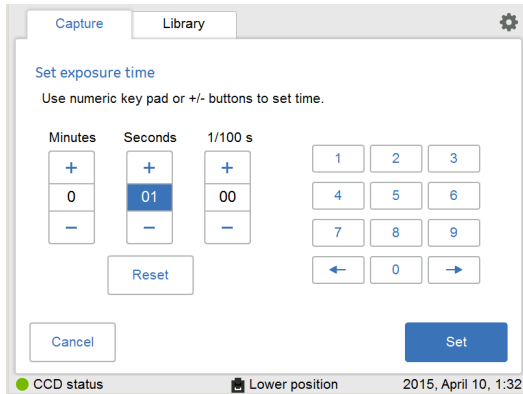
- |   |  |
|---|--|
| 7 | Set the waiting time by pressing value.<br><i>Result:</i> this opens the <b>Set waiting time</b> view.<br>Enter the value and select <b>Set</b> to save the value and to return to the previous view.<br>The <b>Reset</b> button resets the value to zero. |
|---|--|



| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 8 | Set the exposure time by pressing value. |
|---|--|

*Result:* the **Set exposure time** view opens



Enter the value and select **Set** to save the value and to return to the previous view.

The **Reset** button resets the value to zero.

## 5 Operation

### 5.5 Capture an image

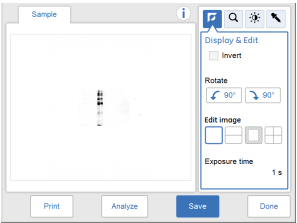
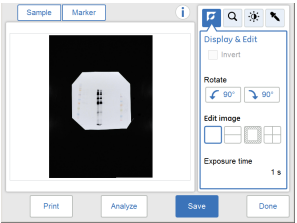
#### 5.5.4 Fluorescence capture

| Step | Action |
|------|--------|
|------|--------|

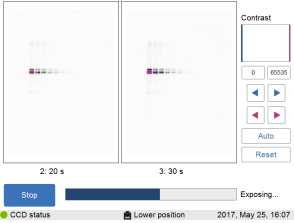
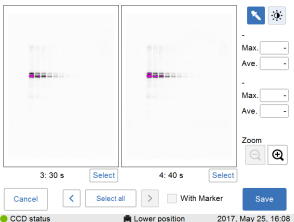
---

|   |                                       |
|---|---------------------------------------|
| 9 | Select <b><i>Start exposure</i></b> . |
|---|---------------------------------------|

Step Action

| If...   | Then...  |
|---|--|
| <p>No colorimetric marker was used and with only one capture was chosen</p> | <p>The resulting image is displayed in gray scale.</p>  <p>When the exposure is finished the image view appears displaying the image. Amersham Imager 680 creates a folder for the image files. For details see <i>File formats</i>, on page 174. Select the <b>Save</b> to save the images.</p>  |
| <p>Colorimetric marker was used and with only one capture was chosen</p>    | <p>The resulting images are displayed under <b>Sample</b> and <b>Marker</b> buttons.</p> <ul style="list-style-type: none"> <li>• Select the relevant button for the image you wish to display. A selected button is highlighted with blue text and frame.</li> <li>• Select both buttons simultaneously to see a composite color image of the <b>Sample</b> and <b>Marker</b> images.</li> </ul>  <p>When the exposure is finished the image view appears displaying the image. Amersham Imager 680 creates a folder for the image files. For details see <i>File formats</i>, on page 174. Select the <b>Save</b> to save the images.</p> |
| <p>More than one capture was selected</p>                                   | <p>Images are captured several times with the set waiting and exposure times.</p> <p>The number of images matching with the set waiting and exposure times are displayed as they are exposed. A progress bar indicates the time remaining of the imaging process.</p>  |

**Step**      **Action**

| If... | Then...   |
|-------|---|
|       |  <p>When the exposure is finished the image view appears displaying the image. Navigate among the images by selecting the left or right arrows and check pixel intensity with the intensity tool.</p> <p>Amersham Imager 680 creates a folder for the image files. For details see <i>File formats</i>, on page 174.</p>  <p>Use the <b>Select</b> to select the images to be saved then <b>Save</b> to save the images.</p> <p><b>Note:</b><br/> <i>If more than one image is selected, then the <b>Library</b> view will open after selecting <b>Save</b>.</i></p> |

## Fluorescence Custom

The **Custom** option is designed to allow for various customized combinations of wavelengths of the illuminating light and filters.

Please contact your GE representative for more details as the customized methods require service.

## Fluorescence Trans-UV

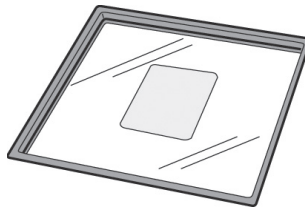
Capturing with the **Fluorescence** image capturing method option **Trans-UV** is performed using the UV Trans Tray (transparent tray) and a gel sheet.

### Fluorescence Trans-UV sample preparation

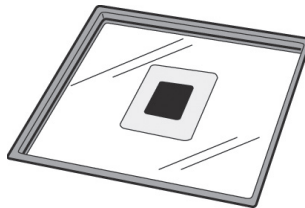
Follow the instructions below to prepare the sample.

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | Cut out a gel sheet slightly larger than the sample size.    |
| 2 | Place the gel sheet on the UV Trans Tray (transparent tray). |



- |   |                                    |
|---|------------------------------------|
| 3 | Place the sample on the gel sheet. |
|---|------------------------------------|



- |   |                             |
|---|-----------------------------|
| 4 | Proceed with the capturing. |
|---|-----------------------------|

**Note:**

*After use, wash the gel sheet with mild detergent, rinse with water then dry well. A gel sheet can be reused about 20 times.*

Follow the instructions below to perform fluorescence capture using **Fluorescence UV**.

| Step | Action |
|------|--------|
|------|--------|

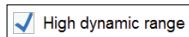
- |   |  |
|---|--|
| 1 | In the <b>Capture</b> tab, select <b>Fluorescence</b> . The options available for Fluorescence capturing are displayed to the right on the screen. |
| 2 | Choose the <b>UV</b> .   |

## 5 Operation

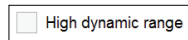
### 5.5 Capture an image

#### 5.5.4 Fluorescence capture

- | Step | Action   |
|------|--|
| 3    | Select an exposure option in the drop down menu: <ul style="list-style-type: none"><li>• <b>Auto</b> or</li><li>• <b>Semi-Auto</b> or</li><li>• <b>Manual</b>, enter the exposure time and click <b>Set</b>.</li></ul> |
| 4    | To use the full dynamic range of the image file, check <b>High dynamic range</b> .   |



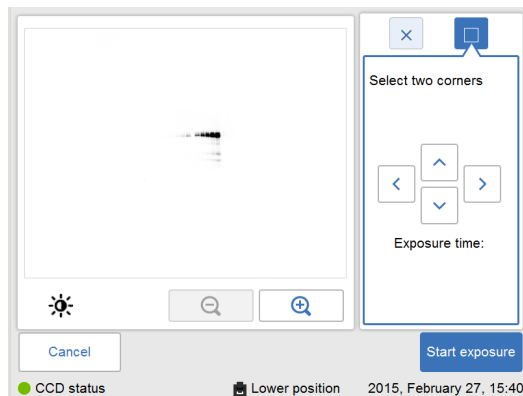
To minimize exposure time, leave **High dynamic range** unchecked.



#### Note:

*This function is only effective with **Auto** and **Semi-Auto** exposure setting.*

- |   |  |
|---|--|
| 5 | If <b>Auto</b> or <b>Manual</b> exposure was selected, select <b>Start</b> .<br><i>Result:</i> A progress bar appears on the screen indicating the time remaining of the imaging process and the exposure time. Proceed to the final step of this instruction. |
|---|--|

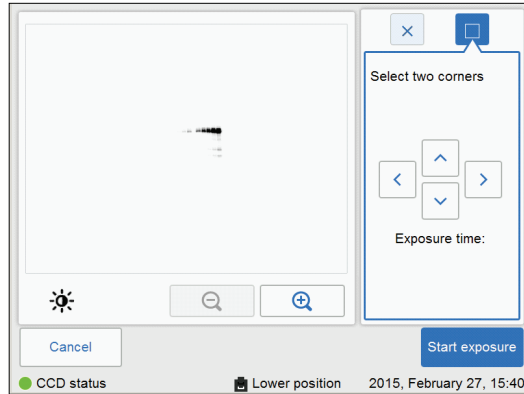


- |   |   |
|---|---|
| 6 | If <b>Semi-Auto</b> exposure was selected, select <b>Next</b> .<br><i>Result:</i> A low resolution preview appears. |
|---|---|



**Step Action**


- 7 When the pre-exposure is finished a low resolution preview image is displayed.

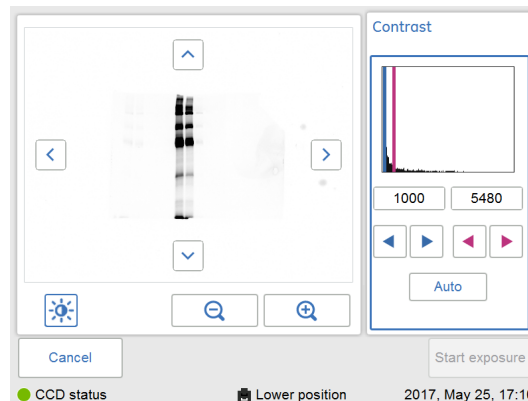



Use the zoom tools and arrows to get an optimal view of the area of interest.

Choose  to zoom in.

Choose  to zoom out.

Use the contrast tool  and arrows to get an optimal view of the area of interest.






Choose  (blue arrows) to adjust the lower range of the grayscale in the displayed image indicated by the blue line in the image histogram.

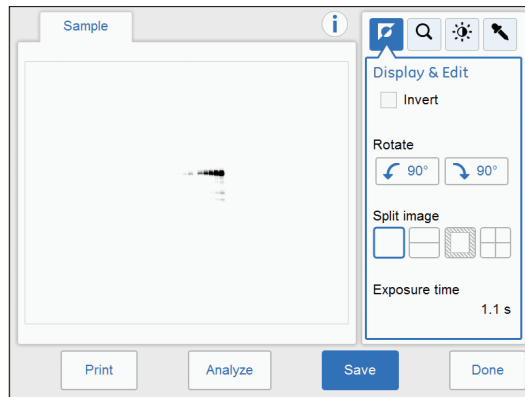
## 5 Operation

### 5.5 Capture an image

#### 5.5.4 Fluorescence capture

| Step | Action |
|------|--------|
|------|--------|

- |    |  |
|----|--|
|    | Choose  (red arrows) to adjust the upper range of the grayscale in the displayed image indicated by the red line in the image histogram.<br>Enter <b>Contrast</b> values manually if needed.  |
| 8  | Choose one of the two options displayed to the right of the image to point out the area of interest: <ul style="list-style-type: none"><li>• Choose  then select one point of interest in the image.<br/><i>Result:</i> The selected point is highlighted with an X.</li><li>• Use the  button to point out two diagonal corners of an area.<br/><i>Result:</i> The selected area is highlighted with a square.<br/>Use the right hand side arrow buttons to move the highlighted point or area.</li></ul> |
| 9  | Click <b>Start exposure</b> and wait for the exposure to finish.   |
| 10 | When the exposure is finished the image view displays the image. Amersham Imager 680 creates a folder containing the image files which can be saved.<br>For details see <i>File formats, on page 174</i> .   |



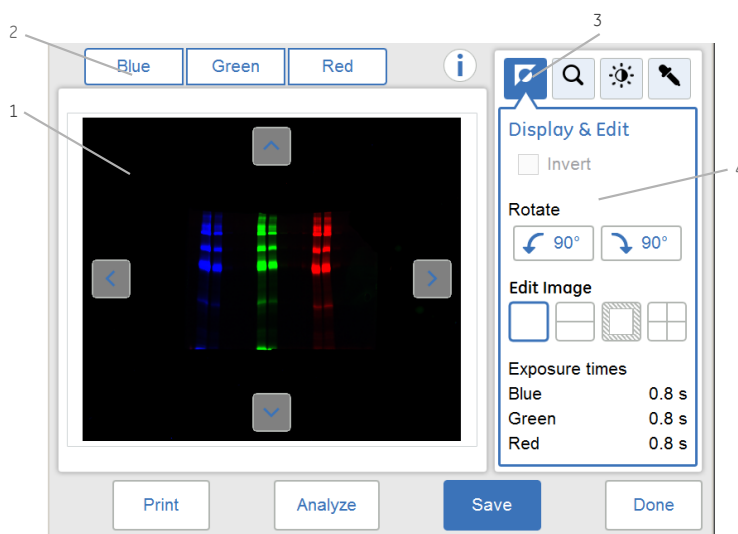
- |    |  |
|----|--|
| 11 | Select the <b>Save</b> button to save the images.<br>For other options after capturing see <i>Options after capturing, on page 135</i> . |
|----|--|

## 5.6 View the image

### Image view screen

When the capture is performed a view with the captured image(s) is displayed on the screen. The content on the screen varies with the capturing method and chosen exposure option.

The following illustration and table describe the image result view of a Fluorescence Epi-RGB multichannel capture. For a detailed description of the image result view see Section 3.5.3 *Description of the image view*, on page 58.



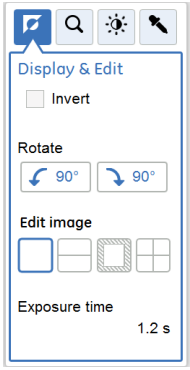
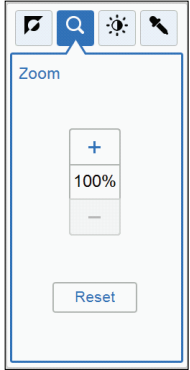
| Part | Function  |
|------|---|
| 1    | The captured image is displayed.  |
| 2    | Tabs for captured images: Use the tab to select or deselect images of the different detection channels<br><br><b>Note:</b><br><i>A displayed channel is indicated with a tab in blue text and blue frame. All three channels can be selected simultaneously.</i><br><i>A non displayed channel is indicated with a black text and gray frame.</i> |
| 3    | Image tools menu: Use the buttons to choose tools to modify the image display and to examine the image.   |
| 4    | The selected image tool options.  |

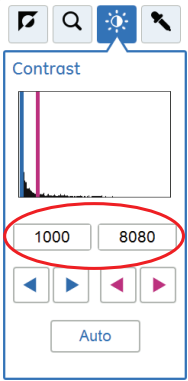
## Image tools

A captured image can be visually modified and examined with the image tools found to the right on the screen. The image tools can be used on images immediately after capture and on a previously saved image. Use one or several of the tools to modify or to examine the image.

**Note:** *The original image data remains unaltered.*

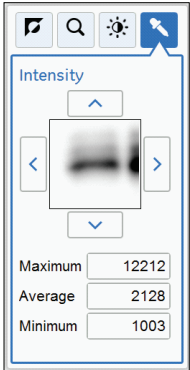
The following table describes each tool in the image tools menu in detail.

| Description  | Illustration   |
|--|--|
| <p>The <b>Display</b> tool is displayed by default after capturing or opening an image.</p> <p>Select the <b>Invert</b> check box to invert the display of the image, that is to change from white background and black bands to black background and white bands.</p> <p>Use the <b>Rotate</b> 90 degrees left or right buttons to rotate the image. Rotation changes will be saved in the image file.</p> <p>Use the <b>Edit image</b> buttons to edit the image into separate image files. The selected edit option is marked, and red lines illustrate the edit in the image. Edits will be saved in the image file.</p> |  <p>The screenshot shows the 'Display &amp; Edit' menu. At the top are four icons: a square with a diagonal line, a magnifying glass, a sun, and a pencil. Below the icons is the title 'Display &amp; Edit'. There is a checkbox labeled 'Invert'. Underneath is a 'Rotate' section with two buttons: a left arrow with '90°' and a right arrow with '90°'. Below that is an 'Edit image' section with four square buttons representing different crop or edit options. At the bottom, it says 'Exposure time 1.2 s'.</p> |
| <p>Open the <b>Zoom</b> tool by selecting the zoom button in the image tools menu.</p> <p>Use the plus or minus buttons to zoom in or out in the image.</p> <p>When zooming in, arrows appear in the image view. Use the arrows, or point to the image and drag, to position the image on the screen. If a different tool is selected when the image is zoomed in, the selected zoom will be kept until saved.</p> <p>Use the <b>Reset</b> button to return to the original zoom view.</p>   |  <p>The screenshot shows the 'Zoom' menu. At the top are the same four icons as in the previous screenshot. Below them is the title 'Zoom'. In the center, there are three vertically stacked buttons: a plus sign '+', '100%', and a minus sign '-'. At the bottom is a 'Reset' button.</p>   |

| Description  | Illustration  |
|--|---|
| <p>Open the <b>Contrast</b> tool by selecting the contrast button in the image tools menu.</p> <p>The contrast tool allows for modifications of image contrast and brightness and displays the results as modifications are made.</p> <p>The software will automatically adjust the contrast if you select the <b>Auto</b> button.</p> <p>Enter manual contrast values if required in the space provided (encircled in the illustration).</p> <p><b>Image histogram</b></p> <p>A histogram is displayed illustrating the intensity distribution, plotting the number of pixels for each intensity value in the captured image. The horizontal axis represents intensity variations. The vertical axis represents the number of pixels with a given intensity.</p> <p>The blue and red lines indicate the min/max range of the grayscale in the displayed image.</p> <p>Use the blue and red arrows to modify the contrast. It is also possible to enter contrast limits manually if needed.</p> <p><b>Note:</b></p> <p><i>For samples with colorimetric marker, use the contrast tool for setting the contrast of the chemiluminescent sample. The selected contrast is saved with the combined color image.</i></p> |  <p>The illustration shows the software interface for the Contrast tool. At the top, there is a toolbar with icons for crop, zoom, contrast, and pan. The Contrast tool is active, displaying a histogram of the image's intensity distribution. The histogram has a vertical axis for pixel count and a horizontal axis for intensity. A blue vertical line is positioned at the minimum intensity, and a red vertical line is at the maximum intensity. Below the histogram, there are two input fields for manual contrast limits, with the values '1000' and '8080' entered. These input fields are circled in red. There are also four directional arrows (left, right, left, right) and an 'Auto' button.</p> |

## 5 Operation

### 5.6 View the image

| Description   | Illustration   |
|---|--|
| <p>Open the <b>Intensity</b> tool by selecting the intensity button in the image tools menu.</p> <p>Select an area of interest in the image. The selected area will be displayed to the right of the image. The maximum, average and minimum intensities in the area of interest are displayed under the image.</p> <p>Use the arrow buttons to make fine adjustments or point to a new area of interest in the main image.</p> <p><b>Note:</b><br/><i>When multiple channels are selected for viewing only the maximum value for each channel is displayed.</i></p> <p><b>Note:</b><br/><i>For incremental images the intensity tool is the only available tool. Navigate between the images using the forward and backward arrows. Point to a specific area of interest to display the maximum pixel intensity and the average pixel intensity in the area.</i></p> <p><b>Tip:</b><br/><i>If the intensity is too low or too high, consider to capture the image using a different exposure time.</i><br/><i>Too high intensity results in saturation and prevents quantitative analysis. Saturation occurs close to 65 500 intensity levels.</i></p> |  <p>The illustration shows a software interface for the Intensity tool. At the top, there is a toolbar with icons for a selection tool, a magnifying glass, a sun (brightness), and a pencil. Below the toolbar, the word "Intensity" is displayed in blue. A central grayscale image shows a dark horizontal band with a white selection box around it. To the left and right of the image are left and right arrow buttons. Above and below the image are up and down arrow buttons. At the bottom, there are three rows of statistics: "Maximum" with a value of 12212, "Average" with a value of 2128, and "Minimum" with a value of 1003. Each value is displayed in a small white box with a black border.</p> |

## Print image

Image files may be printed directly from the result image screen. The printing option requires a printer to be connected to the instrument. Print using the **Print** button. Contact your GE representative for further details on printer installations.

## 5.7 Save and manage image files

### Introduction

After capturing the image(s) can be saved. You can also copy, move, rename, delete, search, sort, and open files. If the Amersham Imager 680 instrument is connected to a network, you can access and manage files stored on the network location.

This section describes the locations where you can save files, how to save a file, the various file formats, and the file management options.



#### **NOTICE**

Transferring large amounts of files to a connected computer during operation can impair the system's performance.

## 5 Operation

### 5.7 Save and manage image files

#### 5.7.1 Save locations

## 5.7.1 Save locations

### Introduction

You can save files on several locations:

- On the instrument

**Note:** *Amersham Imager 680 is equipped with a flash drive that allows for storage of a finite number of images on the instrument. It is necessary to regularly remove images from the instrument to ensure available storage space. If the instrument flash drive runs full, the oldest images will automatically be removed when a new image is captured.*

**Tip:** *An external hard drive can be added to the USB port at the rear of the instrument to expand available storage capacity.*

- On an external USB flash drive
- On a network drive

**Note:** *Network access is possible providing the instrument has been granted access to the network location. For more details see Section 4.4 Network, on page 89.*

---

### Connect a USB flash drive

A USB flash driver is automatically installed when the USB flash drive is connected to Amersham Imager 680.

**Note:** *Password protected USB flash drives are not supported.*

---

### Add new save location

Follow the instructions to add a location for file saving.

**Note:** *To enable access to a location for saving files over the network, the specific folder must be shared and read/write privileges must be added for the Amersham Imager 680 instrument. See Section 4.4 Network, on page 89.*

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | Select the settings icon in the top right hand corner of the screen: |
|---|--|

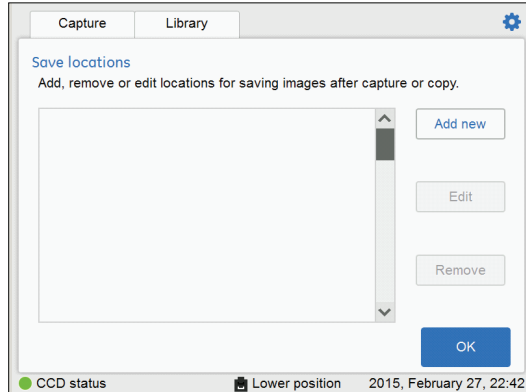




| Step | Action |
|------|--------|
|------|--------|

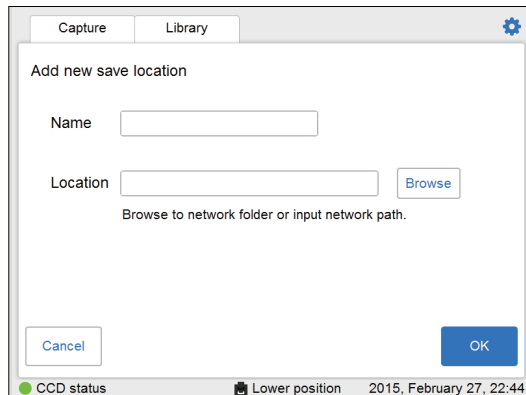
2 Select the **Save locations** button.

*Result:* The following screen appears:



3 Select the **Add new** button.

*Result:* The following screen appears:



4 Select the **Name** field and use the keypad to type a name for the new location.

5 Select the **Browse** button next to the **Location** field.

**Note:**

*The network settings need to be properly configured before a network folder can be added as a location for saving files. For information on how to configure a network, see Section 4.4 Network, on page 89.*

6 In the **Choose save location** view, mark the network folder you wish to add and select the **Use this location** button.

## 5 Operation


### 5.7 Save and manage image files

#### 5.7.1 Save locations

| Step | Action   |
|------|--|
| 7    | Ensure that the path to this location appears in the <b>Location</b> field.  |
| 8    | Select the <b>OK</b> button to save the added location. The <b>Cancel</b> button will leave the view without saving changes. |


## Remove save location

Follow the instructions below to remove a location for files saving.

| Step | Action  |
|------|---|
| 1    | Select the settings icon in the top right hand corner of the screen.<br> |
| 2    | Select the <b>Save locations</b> button.  |
| 3    | Select the location you wish to remove from the list.   |
| 4    | Select the <b>Remove</b> button.  |
| 5    | Confirm removal by selecting the <b>Yes</b> button.   |

## Edit save location

This table describes how to edit a location for files saving.

| Step | Action  |
|------|---|
| 1    | Select the settings icon in the top right hand corner of the screen.<br> |
| 2    | Select the <b>Save locations</b> button.  |
| 3    | Select the <b>Edit</b> button.  |
| 4    | If desired, edit the name for the save location in the <b>Name:</b> field.  |
| 5    | If desired, edit the folder for the save location by selecting the <b>Browse</b> button next to the <b>Location</b> field.                                  |

### **Note:**

*The network settings must be properly configured before a network folder can be added as a location for saving files. For information on how to configure a network, see Section 4.4 Network, on page 89.*

| <b>Step</b> | <b>Action</b>                                     |
|-------------|---|
| 6           | To save the changes, select the <b>OK</b> button. |

## 5 Operation

### 5.7 Save and manage image files

#### 5.7.2 Save images

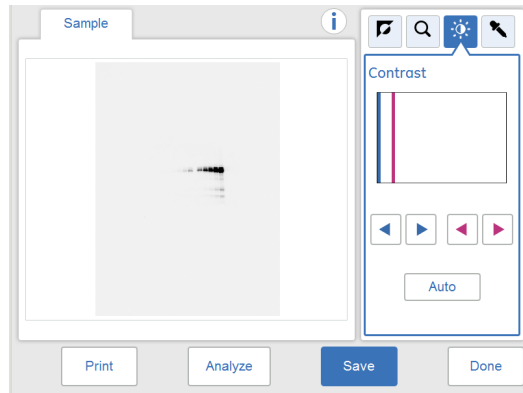
## 5.7.2 Save images

### Saving the image

Follow the instructions below to save the image(s).

| Step | Action |
|------|--------|
|------|--------|

|   |   |
|---|---|
| 1 | Select <b>Save</b> to save the image or images. |
|---|---|



*Result:* The **Save** view opens. The automatically generated image name(s) are displayed in the lower part of the view.

Save ?

Where to save file  v

Optional image name prefix

Comment

Save summed images

Highlight saturated pixels in JPEG

Image names:

- 2017.05.25\_17.16.20-01\_Ch
- 2017.05.25\_17.16.20-02\_Ch
- 2017.05.25\_17.16.20-03\_Ch
- 2017.05.25\_17.16.20-04\_Ch
- ...

**Note:**

**Step Action**

*If an edited (split) image is saved then the screen will display the edited (split) suffix.*

*Example:*

**Note:**

*If multiple images have been taken with **Advanced capture**, you have an option to save selected files as summed images.*

**Note:**

*Uncheck **Highlight saturated pixels in JPEG** to save a .jpg image without highlighting the saturated pixels.*

- 2 Select the location to save in the **Where to save the file:** drop down menu.

**Note:**

*Images can be saved on the instrument. However, when the instrument memory status is full, the oldest file will automatically be deleted when a new image is saved. It is therefore recommended to save the images on a USB flash drive or a network drive.*

*It is possible to expand storage capacity by connecting an external hard drive to the USB port at the rear of the instrument.*

- 3 To personalize the image file name, select the **Optional image name prefix:** field to add a prefix to the auto generated image file name. This opens a keypad view. Type your text and then select **Done** to return to the previous view.

## 5 Operation

### 5.7 Save and manage image files

#### 5.7.2 Save images

| Step | Action  |
|------|---|
| 4    | To add a comment, select the <b>Comment:</b> field. This opens a keypad view. Type your comment and then select <b>Done</b> to return to the previous view.   |
| 5    | Select <b>Save</b> to save the file(s). The saved files can be accessed via the <b>Library</b> tab. See <i>Section 3.5.2 Description of the Library tab, on page 56</i> for more details.   |
| 6    | If capturing is finished for the day, switch off the instrument by pressing the On/Off button on the front panel. Wait until the instrument is shut down (LED lights are turned off). Then press the Power switch on the right side of the instrument to the <b>O</b> position.<br><br><b>Note:</b><br><i>To optimize the instrument's life time and to minimize unnecessary power consumption, shut down the instrument when image captures and analyses have been completed for the day. If the Amersham Imager 680 instrument is used around the clock, make sure to restart the system at least once a day to remove temporary files that may take up unnecessary memory space.</i> |

## File formats

The saved image files are stored in the formats described in the following table.

**Note:** *The .jpg images are created from the equivalent .tif image, to facilitate for presentation purposes.*

| Imaging method    | File format of saved image  |
|-------------------|---|
| Chemiluminescence | <p>A folder containing the following files:</p> <ul style="list-style-type: none"><li>• <b>Sample:</b> A <code>.tif</code> image in gray scale, for quantification of chemiluminescence data</li><li>• A <code>.jpg</code> image in gray scale, and with set contrast, for presentation purposes</li></ul> <p><b>Note:</b><br/><i>The .jpg image is included in the folder but it is not displayed on the screen.</i></p> |

| Imaging method                                | File format of saved image  |
|---|---|
| Chemiluminescence<br>with colorimetric marker | <p>A folder containing the following files:</p> <ul style="list-style-type: none"> <li>• <b>Sample:</b> A <code>.tif</code> image in gray scale, for quantification of chemiluminescence data</li> <li>• <b>Marker:</b> A <code>.tif</code> image in gray scale, for quantification of colorimetric data</li> </ul> <p><b>Note:</b><br/> <i>Both the above files have the same pixel resolution.</i></p> <ul style="list-style-type: none"> <li>• <b>Sample + Marker:</b> A <code>.jpg</code> composite image of chemiluminescence and colorimetric data in color, and with set contrast</li> </ul> <p><b>Note:</b><br/> <i>The composite image is displayed if both tabs are selected simultaneously.</i></p> <ul style="list-style-type: none"> <li>• A <code>.jpg</code> image of the Marker image in color, and with set contrast, for presentation purposes</li> </ul> <p><b>Note:</b><br/> <i>The .jpg image is included in the folder but it is not displayed on the screen.</i></p> |
| Colorimetric                                  | <p>A folder containing the following files:</p> <ul style="list-style-type: none"> <li>• <b>Sample:</b> A <code>.tif</code> in gray scale, for quantification of colorimetric data</li> <li>• <b>Color:</b> A <code>.jpg</code> in color, and with set contrast, for presentation purposes</li> </ul>   |
| Fluorescence<br>Single channel imaging        | <p>A folder containing the following files:</p> <ul style="list-style-type: none"> <li>• <b>Blue/Green/Red:</b> A <code>.tif</code> in gray scale, for quantification of fluorescence data</li> <li>• A <code>.jpg</code> in gray scale, and with set contrast, for presentation purposes</li> </ul> <p><b>Note:</b><br/> <i>The .jpg image is included in the folder but it is not displayed on the screen.</i></p>  |

## 5 Operation

### 5.7 Save and manage image files

#### 5.7.2 Save images

| Imaging method   | File format of saved image   |
|--|--|
| Fluorescence<br>Single channel imaging<br>with colorimetric marker | <p>A folder containing the following files:</p> <ul style="list-style-type: none"><li>• <b>Sample:</b> A <code>.tif</code> in gray scale, for quantification of fluorescence data</li><li>• <b>Marker:</b> A <code>.tif</code> in gray scale, for quantification of colorimetric data</li></ul> <p><b>Note:</b><br/><i>Both the above files have the same pixel resolution.</i></p> <ul style="list-style-type: none"><li>• <b>Sample + Marker:</b> A <code>.jpg</code> composite image of fluorescence and colorimetric data, in color, and with set contrast</li></ul> <p><b>Note:</b><br/><i>The composite image is displayed if both tabs are selected simultaneously.</i></p> <ul style="list-style-type: none"><li>• A <code>.jpg</code> of the Marker image in color, and with set contrast, for presentation purposes</li></ul> <p><b>Note:</b><br/><i>The .jpg image is included in the folder but it is not displayed on the screen.</i></p> |



| Imaging method                       | File format of saved image   |
|--------------------------------------|--|
| Fluorescence<br>Multichannel imaging | <p>A folder containing the following files:</p> <ul style="list-style-type: none"> <li>• <b>Blue:</b> A <code>.tif</code> in gray scale, for quantification of fluorescence data</li> <li>• <b>Green:</b> A <code>.tif</code> in gray scale, for quantification of fluorescence data</li> <li>• <b>Red:</b> A <code>.tif</code> in gray scale, for quantification of fluorescence data</li> </ul> <p><b>Note:</b></p> <p><i>The number of tif files created correspond to the number of selected detection channels.</i></p> <ul style="list-style-type: none"> <li>• <b>Blue + Green + Red:</b> A <code>.jpg</code> composite image of fluorescence data, in color, and with set contrast</li> </ul> <p><b>Note:</b></p> <p><i>The composite image is displayed if two or three tabs are selected simultaneously.</i></p> |

## 5 Operation

### 5.7 Save and manage image files

#### 5.7.3 File manage options

## 5.7.3 File manage options

### Select and deselect all

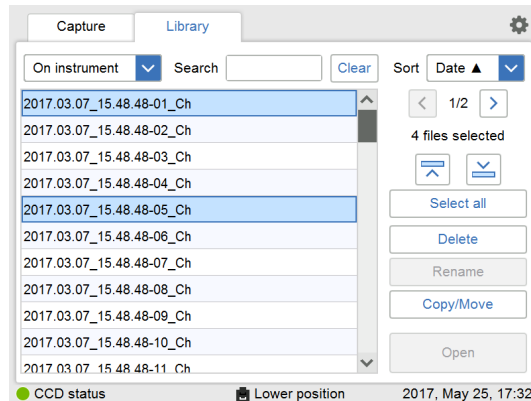
The **Select all** and **Deselect all** buttons are used to select or deselect all of the files in the library.

### Delete files

Follow the instruction to delete files from the device.

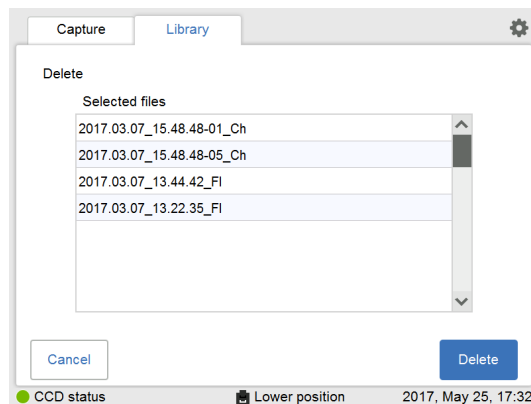
| Step | Action |
|------|--------|
|------|--------|

- |   |                               |
|---|-------------------------------|
| 1 | Select the file(s) to delete. |
|---|-------------------------------|



- |   |                                  |
|---|----------------------------------|
| 2 | Select the <b>Delete</b> button. |
|---|----------------------------------|

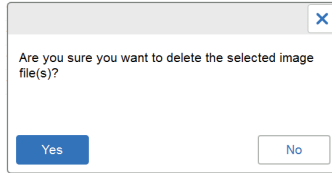
*Result:* The following window will appear:



| Step | Action |
|------|--------|
|------|--------|

|   |                                  |
|---|----------------------------------|
| 3 | Select the <b>Delete</b> button. |
|---|----------------------------------|

*Result:* The following window will appear:



|   |   |
|---|---|
| 4 | Select <b>Yes</b> button to delete the file(s). |
|---|---|

## Copy or move files

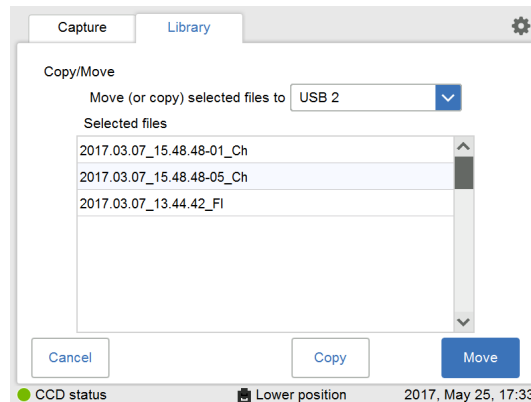
Follow the instruction to copy and move files.

| Step | Action |
|------|--------|
|------|--------|

|   |                                     |
|---|-------------------------------------|
| 1 | Select the file(s) to copy or move. |
|---|-------------------------------------|

|   |                                     |
|---|-------------------------------------|
| 2 | Select the <b>Copy/Move</b> button. |
|---|-------------------------------------|

The following window will appear:



|   |   |
|---|---|
| 3 | Select the location to copy or move the file(s) to in the drop down menu in the <b>Move (or copy) selected files to:</b> field. |
|---|---|

## 5 Operation

### 5.7 Save and manage image files

#### 5.7.3 File manage options

| Step | Action   |
|------|--|
| 4    | Select the <b>Copy</b> button, to copy the file(s) to the desired location.<br>Select the <b>Move</b> button, to move the file(s) to the desired location.<br><br><b>Note:</b><br><i>When a file is copied, the file will remain in the original location, thus be stored in two places.</i> |

## Rename files

Follow the instruction to rename files.

| Step | Action   |
|------|--|
| 1    | Select the file to rename.   |
| 2    | Select the <b>Rename</b> button.<br><i>Result:</i> The keypad will appear.   |
| 3    | Use the keypad to change the name of the file. Select <b>Done</b> to save the changes.<br><br>For detailed information on how to use the keypad see <i>Keypad view, on page 67</i> . |

## Open files

Follow the instruction to open files.

| Step | Action   |
|------|--|
| 1    | Select the file to open.   |
| 2    | Select the <b>Open</b> button to open the file.  |
| 3    | If desired, use the Image tools to adjust the view of the image.<br>For detailed information on the Image tools, see <i>Image tools, on page 164</i> . |
| 4    | When finished, select the <b>Done</b> button to go back to the <b>Library</b> tab.   |

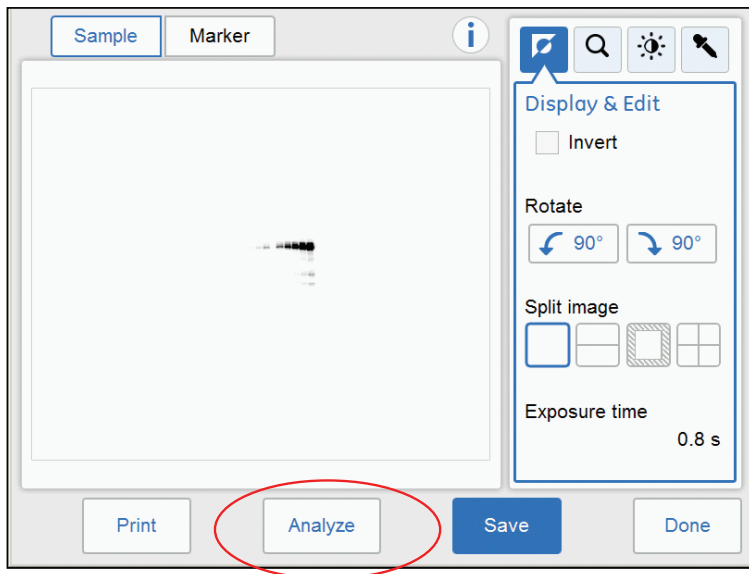
## 5.8 Analyze the image

### Introduction

This section describes how to analyze the image using the analysis tool.

The analysis workflow in Amersham Imager 680 allows you to perform a step-by-step analysis of the image data and to save the analysis results. The workflow is performed in five steps and the final result is presented in a summary. You can analyze a newly captured image or analyze a previously saved image.

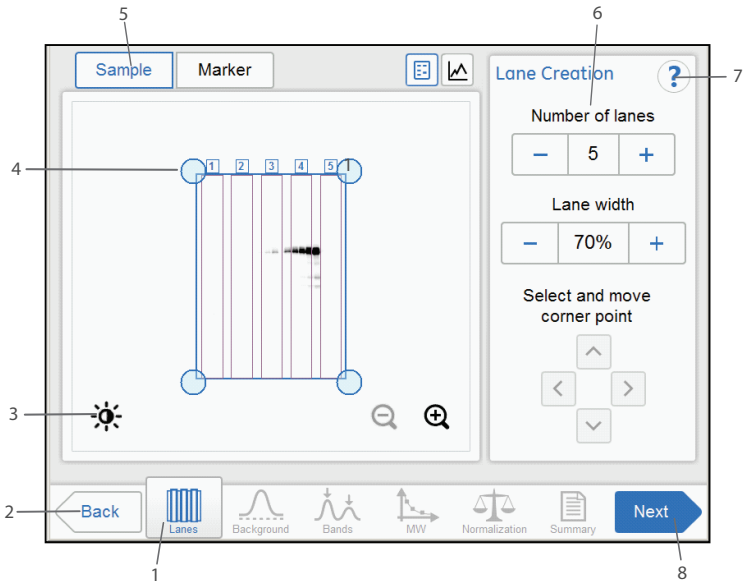
Select the **Analyze** button in the image view to open the analysis workflow view.








The following illustration and table describe the start view of the analysis workflow.

## 5 Operation

### 5.8 Analyze the image



| Part | Function   | Illustration |
|------|--|--------------|
| 1    | The current step in the analysis workflow (highlighted).           |              |
| 2    | <b>Back</b> button: Use the button to close the analysis workflow. |              |

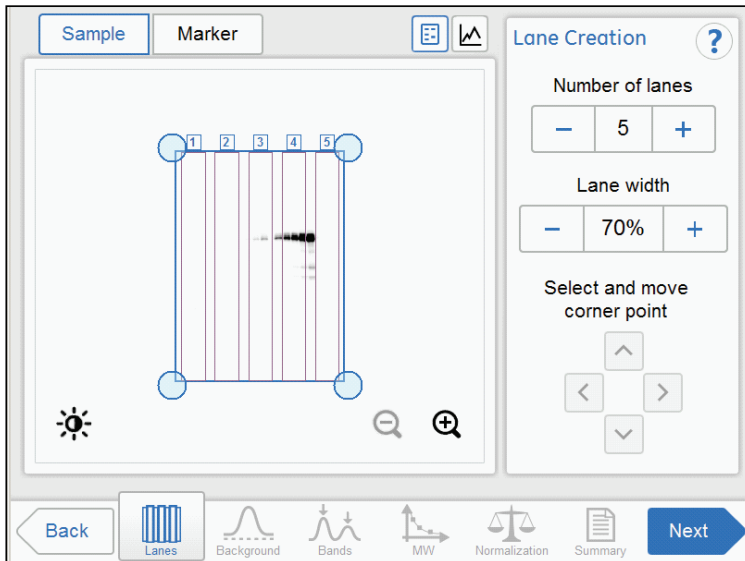
| Part | Function   | Illustration  |
|------|--|---|
| 3    | Image view buttons:  |   |
|      | Contrast button: Use to adjust the contrast of the displayed image. Saturated pixel highlights on the image can be removed with a check box. |  |
|      | Lane profile button: Use the button to view a selected lane profile. Use the drop down list to select which lane to view.                    |  |
|      | Image view button: Use the button to display the image.  |  |
|      | Zoom buttons: Use the button to zoom in on, or zoom out of, the image.   |  |
|      | Navigation arrow buttons: Use the button to move the image on the screen.  |  |
| 4    | The automatically created lane grid and lane numbers.  |   |
| 5    | The displayed image tab highlighted with a blue frame.   |   |
| 6    | Options and steps associated to the current step in the analysis.  |   |
| 7    | Help icon: Use to reveal additional information on the selected step in the analysis.  |   |
| 8    | <b>Next</b> button: Use to open the next step in the analysis workflow.  |   |

## 5.8.1 Lane creation

### Description

This is the first step of the analysis workflow. The selected image appears on screen with a grid of automatically created lanes and the button **Lanes** marked in the workflow. The options for lane creation are presented next to the image.

Use the **Lane Creation** options to the right to arrange the lane grid to correspond with the lanes in the image.



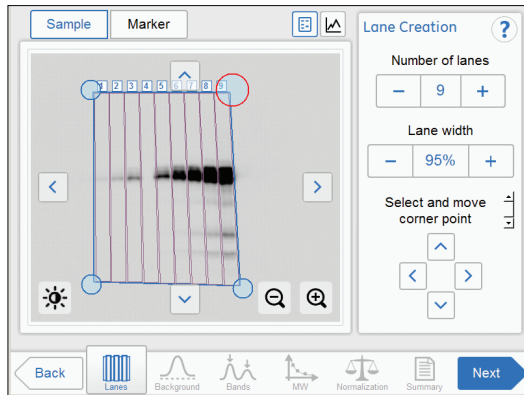
### Adjust the lane grid

Follow the instructions below to adjust the lane grid to match lanes in the image.

| Step | Action   |
|------|--|
| 1    | Select the minus and plus buttons adjacent to <b>Number of lanes</b> to increase or decrease the number of grid lanes to correspond with the number of lanes in the image. |
| 2    | Select a grid corner circle.<br><i>Result:</i> The selected corner circle is highlighted.  |



- | Step | Action  |
|------|---|
| 3    | Drag and drop the corner, or use the <b>Move corner point</b> arrow buttons, to move it to the correct lane position on the displayed image.<br>Repeat until all four corners are positioned corresponding to the lanes in the image. |



- |   |   |
|---|---|
| 4 | Select the minus and plus buttons adjacent to <b>Lane width</b> to increase or decrease the lane fill factor.<br><br><b>Note:</b><br><i>If the value is 100% then the grid contains only the lanes. Using a lesser percentage creates an empty space between lanes.</i> |
| 5 | When you are done select the <b>Next</b> button or select the <b>Background</b> button in the workflow. The <b>Back</b> button will bring you back to the captured image.   |

## 5.8.2 Background Subtraction

### Description

This is the second step of the analysis workflow. The options for background subtraction are presented next to the image.

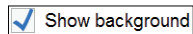
**Tip:** Use the lane profile button to display separate graphical lane profiles with the current lane number displayed in the dropdown list.

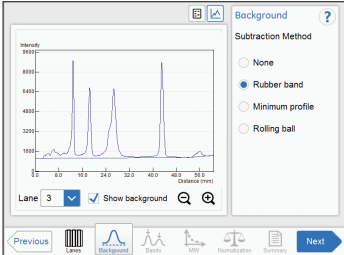


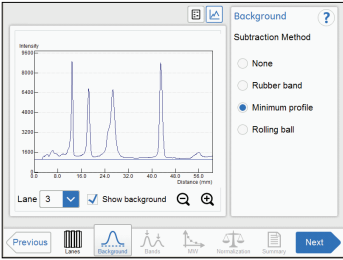
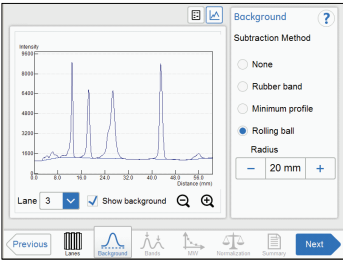
The illustration and tables below describe the background subtraction options.

**Note:** The selected method subtracts background for all lanes in the image.



**Tip:** Use the **Show background** check box to see how each background subtraction options works. This function shows the background level calculated by each option.



| Option             | Description   |
|--------------------|---|
| <b>None</b>        | Use this option when no background should be subtracted from the image.   |
| <b>Rubber band</b> | Use this option to subtract the background below a base-line between the lowest points on the lane profile, as though a rubber band was stretched under the profile.<br><br> |

| Option                        | Description  |
|-------------------------------|--|
| <p><b>Minimum profile</b></p> | <p>Use this option to subtract all the background below the minimum value in the lane profile view.</p>   |
| <p><b>Rolling ball</b></p>    | <p>Use this option to subtract the background below the graph as if erasing it using the radius of a ball. A small radius will subtract more background than a large.</p>  |

## Subtract background

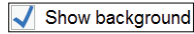
| Step | Action   |
|------|--|
| 1    | <p>If an image of the sample is displayed, select the lane profile button.</p>  <p><i>Result:</i> A screen will appear displaying the lane profile graphically, with the current lane number displayed in the drop down list and the lane profile button in blue.</p>  |

## 5 Operation

### 5.8 Analyze the image

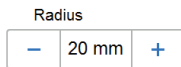
#### 5.8.2 Background Subtraction

| Step | Action   |
|------|--|
| 2    | To see how each background subtraction options works, check <b>Show background</b> . This function shows the background level calculated by each option. |



|   |  |
|---|--|
| 3 | Choose one of the relevant method radio buttons: |
|---|--|

- **None**
- **Rubber band**
- **Minimum profile**
- **Rolling ball**, and then select the **Radius** plus or minus buttons to set the radius for the virtual rolling ball eraser to set the new baseline of the graph.

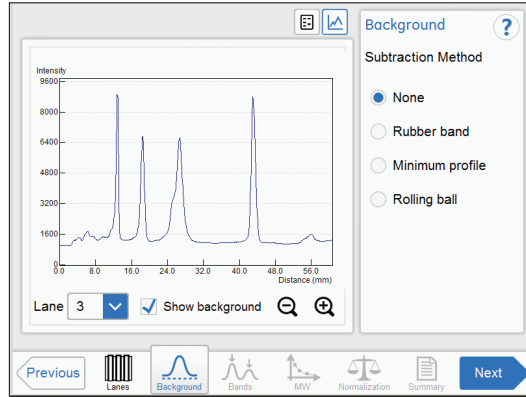


**Tip:**

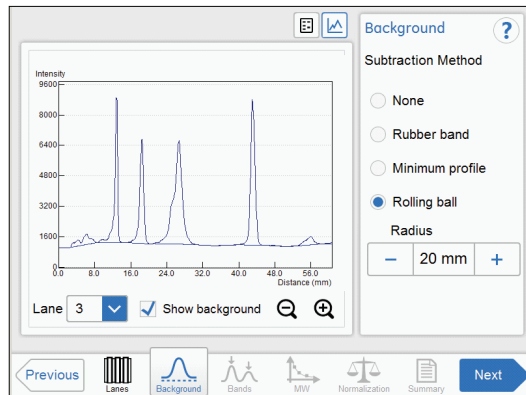
*The smaller the radius the more background will be removed.*

**Step**      **Action**

- 4      Select **Subtract** to subtract the background.



*Result:* The lane profile view is displayed with the background subtracted.



To view the result in any lane, select the lane number to view in the drop down menu.

- 5      When you are done select the **Next** button or select the **Bands** button in the workflow. The **Previous** button will bring you back to the previous step.

## 5.8.3 Band detection

### Description

This is the third step of the analysis workflow. The options for band detection are presented next to the image.

Bands can be detected automatically and/or manually. However, manual bands can only be added in single channel view. Bands modified manually are highlighted in the image.

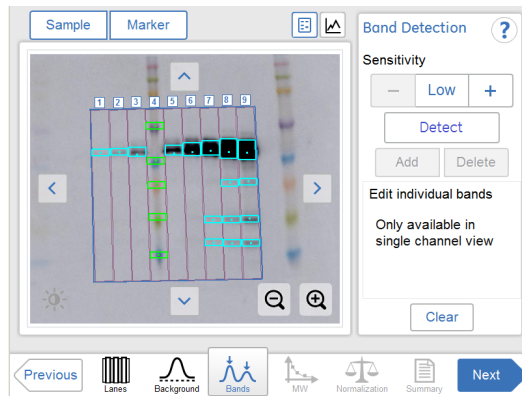
The bands resulting from multichannel imaging are color marked in the image or lane profile according to the detection channel used. For example, a band detected in the green channel is displayed with a green frame, etc.

### Detecting bands

Follow the instructions below to detect bands.

| Step | Action |
|------|--------|
|------|--------|





- |   |  |
|---|--|
| 1 | Select the <b>Detect</b> button to detect the bands automatically. |
|---|--|



**Tip:**

Shift between lane profile, image view, and image tabs to verify the result of the band detection.

If the band detection is satisfactory, then proceed to the final step in this table.

| Step | Action   |
|------|--|
| 2    | <p>If too many bands are detected, then use the <b>Sensitivity</b> minus button to decrease the sensitivity.</p> <p>If too few bands are detected, then use the <b>Sensitivity</b> plus button to increase the sensitivity.</p>  |
| 3    | <p>To make manual changes, select one detection channel from: <b>Sample</b>, <b>Markers</b>, <b>Blue</b>, <b>Green</b> or <b>Red</b> above the image and select one or more relevant options.</p> <ul style="list-style-type: none"><li>To create a new band, point to the position in the image.<br/><i>Result:</i> A new highlighted band appears.</li><li>To shift a band position, select the band and shift the band position up or down with the <b>Position</b> arrow buttons.<br/><b>Position:</b>  </li><li>To adjust a band width, select the band and adjust it with the <b>Width</b> plus and minus buttons.<br/><b>Width:</b>  </li><li>To delete a band, select the band and click <b>Delete</b>.</li><li>To delete all detected bands in the image, click <b>Clear</b>.</li></ul> |
| 4    | Repeat actions in step 3 for other detection channels, if relevant.  |
| 5    | When you are done detecting bands click the <b>Next</b> button or select the <b>MW</b> button in the workflow. The <b>Previous</b> button will bring you back to the previous step.  |

## 5.8.4 Molecular weight assignment

### Description

This is the fourth step in the analysis workflow. The selected image is displayed on the screen and the button **MW** is highlighted in the workflow. The options for molecular weight assignment are presented beside the image.

Molecular weight is calculated using standard molecular weight (MW) markers.

### Assign molecular weight

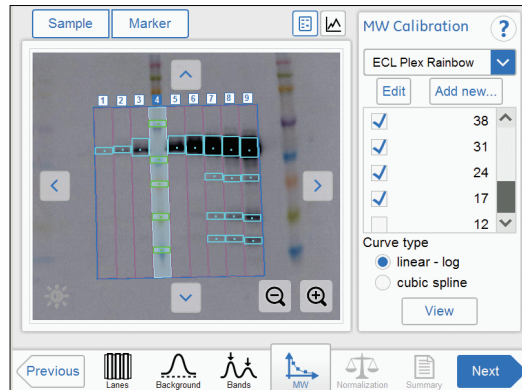
The following illustration and table below describe how to assign molecular weight.

**Note:** *Molecular weight calibration can only be performed in single channel view.*

| Step | Action |
|------|--------|
|------|--------|

|   |   |
|---|---|
| 1 | Select the lane containing the molecular weight marker. |
|---|---|

*Result:* The selected lane appears highlighted.



|   |  |
|---|--|
| 2 | Select the standard molecular weight marker from the drop down menu. |
|---|--|

If the correct marker is missing:

- Add a missing marker by selecting **Add new...** button. See instructions below.
- Edit a marker by selecting the **Edit** button. See instruction below.

|   |  |
|---|--|
| 3 | Deselect any missing bands in the sample marker lane by unchecking relevant check boxes. |
|---|--|

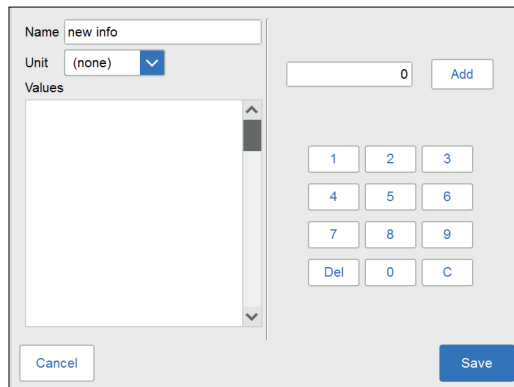


| Step | Action  |
|------|---|
| 4    | Select the fitting function by marking one of the <b>Curve type</b> radio buttons: <ul style="list-style-type: none"><li>• <b>Linear - log</b> - which presents a linear fit to logarithmic data.</li><li>• <b>Cubic spline</b> - which presents a smooth polynomial that is piecewise defined.</li></ul> |
| 5    | Select <b>View plot</b> to see the plot.  |
| 6    | Select <b>Close</b> to return to the previous view.   |
| 7    | When you are done select the <b>Next</b> button or select the <b>Normalization</b> button in the workflow. The <b>Previous</b> button will bring you back to the previous step.   |

**Note:** *The calculated molecular weight is presented in the summarized table in **Summary**.*

## Add a molecular weight standard marker

| Step | Action   |
|------|--|
| 1    | Select the <b>Add new...</b> button.<br><i>Result:</i> The following view appears. |



|   |  |
|---|--|
| 2 | Select the <b>Name</b> field and type the name of the marker.  |
| 3 | Select the unit from the <b>Unit</b> drop down menu.   |
| 4 | Type a value, and select the <b>Add</b> button.<br><i>Result:</i> The value will appear in the bottom of the list to the left on the screen. |

## 5 Operation

### 5.8 Analyze the image

#### 5.8.4 Molecular weight assignment

| Step | Action  |
|------|---|
| 5    | Select the <b>Save</b> button to save the added values and to return to the <b>MW Calibration</b> view. Select <b>Cancel</b> to leave without saving changes. |

## Edit a marker

| Step | Action   |
|------|--|
| 1    | Select the <b>Edit</b> button.<br><i>Result:</i> The following view appears. |

| Name   | ECL Plex Rainbow |   |
|--------|------------------|---|
| Unit   | kDa              |   |
| Values |                  |   |
| 1      | 225              | X |
| 2      | 150              | X |
| 3      | 102              | X |
| 4      | 76               | X |
| 5      | 52               | X |
| 6      | 38               | X |
| 7      | 31               | X |
| 8      | 24               | X |
| 9      | 17               | X |
| 10     | 12               | X |

0 Add

1 2 3

4 5 6

7 8 9

Del 0 C

Cancel Delete Save

- 2 Select the value from the list. The marked values are highlighted.
- 3 Type a new value, and select the **Add** button.  
*Result:* The new value will appear in the list.  
**Note:**  
*You may need to scroll to see the new value.*
- 4 Select the **Save** button to save the edited values and to return to the **MW Calibration** view. Select **Cancel** to leave without saving changes. **Delete** will delete the entire marker group.

**Note:** To delete a value, select the **X** next to the value.

## 5.8.5 Normalization

### Description

This is the fifth step in the analysis workflow. The selected image is displayed on screen and the button **Normalization** is highlighted in the workflow.

Normalization calculates band volumes relative to one or more reference bands. Select reference band(s) in the lane and all other bands in that lane will be normalized against the selected band(s). If multiple reference bands are selected, the reference value is set as the average of the selected band volumes.

Normalization is useful when comparing relative band volumes in different lanes.

The options for normalization are presented next to the image.

### Normalize bands

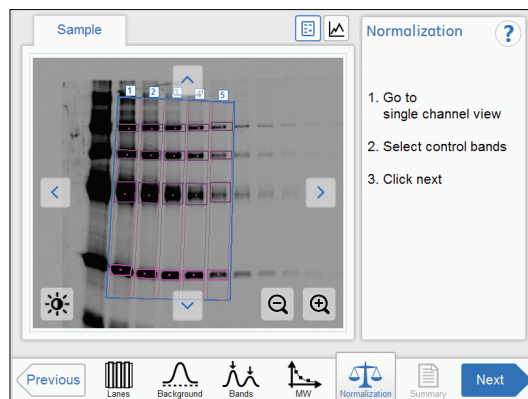
Follow the instructions below to perform normalization.

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | Select one or two control bands in a lane.<br>Result: The selected band(s) appear highlighted. |
|---|--|

**Note:**

*Control bands can only be selected in single channel view.*



- |   |   |
|---|---|
| 2 | When you are done select the <b>Next</b> button or select the <b>Summary</b> button in the workflow. The <b>Previous</b> button will bring you back to the previous step. |
|---|---|

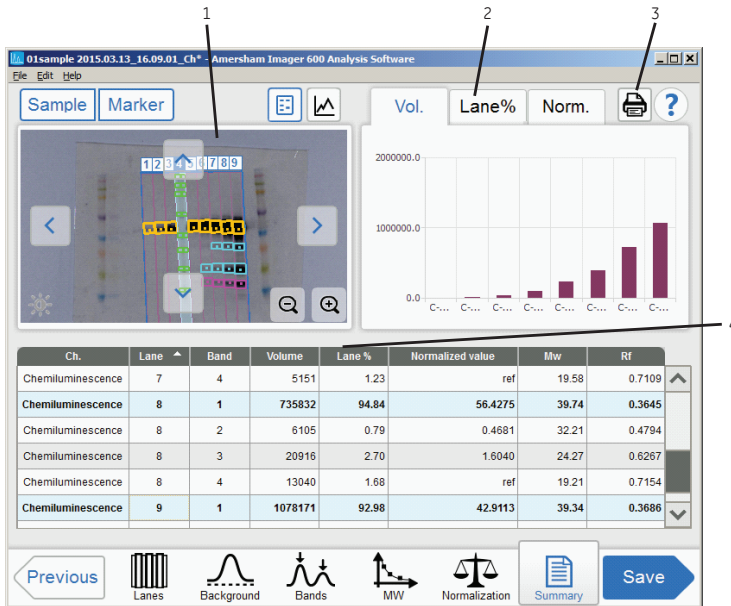
- 5 Operation
- 5.8 Analyze the image
- 5.8.6 Summary

## 5.8.6 Summary

### Description

This is the final view of the analysis workflow. The analyzed image is displayed on the screen and the **Summary** button is highlighted in the workflow.

The illustration and table below describe the summary view.



| Part | Function   |
|------|--|
| 1    | The analyzed image   |
| 2    | Tabs for displaying details.                                   |
| 3    | Print button: Use to print the summary on a connected printer. |

| Part | Function   |
|------|--|
| 4    | Columns displaying:<br><b>Ch.</b> - the detection channel<br><b>Lane</b> - the number of the lane (change the sort order by selecting up or down arrow in the column heading)<br><b>Band</b> - the number of the band (from top to bottom)<br><b>Volume</b> - the integrated signal intensity in the specific band<br><b>Lane%</b> - the relative band volume within a lane (in percentage)<br><b>Normalized value</b> - the band volume relative to the control band volume<br><b>Mw</b> - the calculated Mw<br><b>Rf</b> - the relative mobility of the band |

## Finalize and save analysis

| Step | Action  |
|------|---|
| 1    | Review the summary.   |
| 2    | If the analysis is completed, click <b>Done</b> .<br><i>Result:</i> The image view appears.   |
| 3    | To save the analysis, click <b>Save</b> .<br><i>Result:</i> The image file is updated with the analysis information.  |
| 4    | Choose a location to save the analysis by selecting the <b>Where to save file:</b> drop down menu and select a location in the list.  |
| 5    | If desired, edit the prefix of the image name by selecting the <b>Image name prefix:</b> field. Type the new prefix using the appearing keypad and select the <b>Done</b> button to save the changes. |
| 6    | If desired, add a comment by selecting the <b>Comment:</b> field. Type the comment using the appearing keypad and select the <b>Done</b> button to save the changes.                                  |

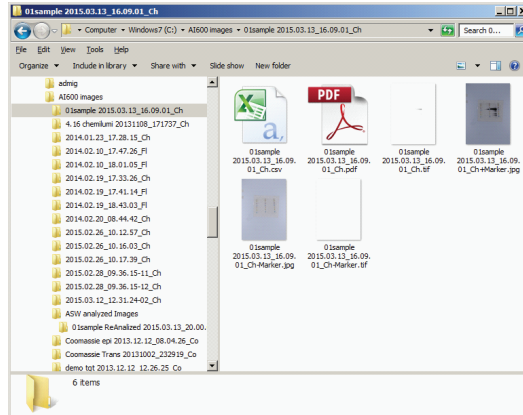
5 Operation  
5.8 Analyze the image  
5.8.6 Summary

**Step**      **Action**

---

7              Click **Save**.

In addition to the image file(s), analyzed data is saved with a CSV file and the summary view is saved as a pdf file.



See Section 5.7 *Save and manage image files*, on page 167 for details.

---

## 5.9 Turn off the instrument

This section describes the instrument shutdown procedure.

Follow the instruction below to turn off the instrument when capturing and analysis is finished for the day.

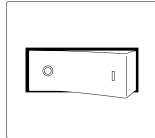
| Step | Action |
|------|--------|
|------|--------|

- |   |   |
|---|---|
| 1 | Press the On/Off button on the front panel. |
|---|---|



*Result:* The LED **Power** light shuts down.

- |   |   |
|---|---|
| 2 | Press the Power switch button on the right side of the instrument to the <b>O</b> position. |
|---|---|



*Result:* The instrument is turned off.

---

**Note:** *To optimize the instrument's life time and to minimize unnecessary power consumption, shut down the instrument when image captures and analyses have been completed for the day. If the Amersham Imager 680 instrument is used around the clock, make sure to restart the system at least once a day to remove temporary files that may take up unnecessary memory space.*

# 6 Analysis software

## About this chapter

This chapter describes the installation and the operation of Amersham Imager 680 Analysis Software, which is available as an independent software package. Amersham Imager 680 Analysis Software can be installed on computers using Windows 7, Windows 8.1, or Windows 10 operating system.

The Amersham Imager 680 Analysis Software can be used with images generated by both the Amersham Imager 600 and Amersham Imager 680 instruments.

---

## In this chapter

| Section                                  | See page |
|--|----------|
| 6.1 Software installation and activation | 201      |
| 6.2 Software operation                   | 210      |

---



## 6.1 Software installation and activation

### System requirements

| Parameter          | Minimum requirement  |
|--------------------|--|
| Operating system   | Microsoft® Windows 7 Professional SP1 (32/64-bit)<br>or<br>Microsoft Windows 8.1 Pro (32/64-bit)<br>or<br>Microsoft Windows 10 Pro (32/64-bit) |
| Internal memory    | 2 GB   |
| Processor          | Intel™ Core i7 processor   |
| Hard drive         | 80 GB  |
| Monitor resolution | 1280 × 1024 pixels   |
| Other requirements | DVD-ROM drive  |

### Installation sequence

Software installation is performed in the following sequence:

- 1 Install the Amersham Imager 680 Analysis Software.
- 2 A registration number is presented by the Amersham Imager 680 Analysis Software.
- 3 Go the main instrument to create a license key with the Amersham Imager 680 Control Software.
- 4 Activate the Amersham Imager 680 Analysis Software by registering with the license key.

**Note:** *You need to have access to the main instrument to activate the Amersham Imager 680 Control Software.*

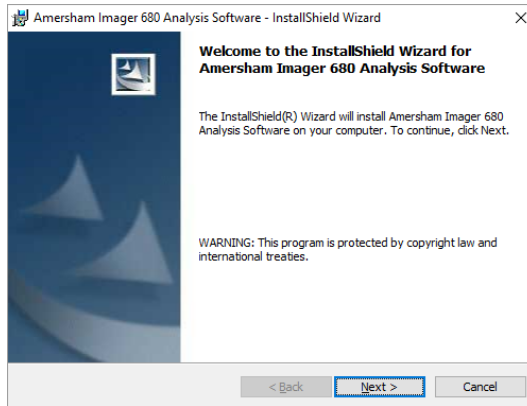
---

- 6 Analysis software
- 6.1 Software installation and activation
- 6.1.1 Amersham Imager 680 Analysis Software installation

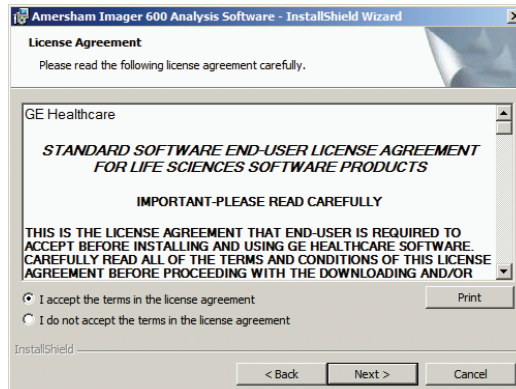
## 6.1.1 Amersham Imager 680 Analysis Software installation

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | Insert the installation DVD  |
| 2 | In the <i>Installer</i> , locate and double-click the file, <b>Amersham Imager 680 Analysis Software.msi</b><br><br><i>Result: Amersham Imager 680 Analysis Software InstallShieldWizard</i> dialog box appears. |



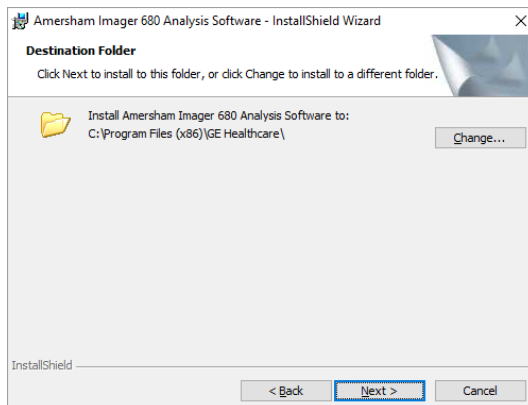
- |   |  |
|---|--|
| 3 | Click <b>Next</b> .  |
| 4 | Read the license agreement. If the license agreement is not acceptable, please contact your GE representative. |



- |   |  |
|---|--|
| 5 | If the license agreement is acceptable, select I accept the terms in the license agreement and click <b>Next</b> . |
|---|--|

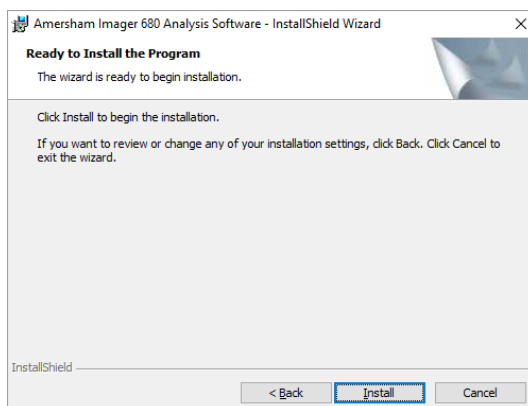
| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 6 | Define the software destination folder in the <b>Destination Folder</b> dialog as described below. |
|---|--|



- If the default folder C:\Program Files (x86)\ is acceptable, click **Next**.
- If you want to use a different folder, click **Change** and define a suitable destination folder. Click **Next**.

|   |               |
|---|---------------|
| 7 | Click Install |
|---|---------------|



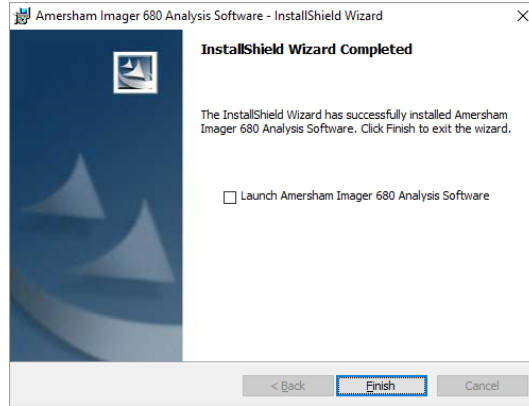
## 6 Analysis software

### 6.1 Software installation and activation

#### 6.1.1 Amersham Imager 680 Analysis Software installation

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 8 | Click <b>Finish</b> in <i>InstallShield Wizard</i> . |
|---|--|

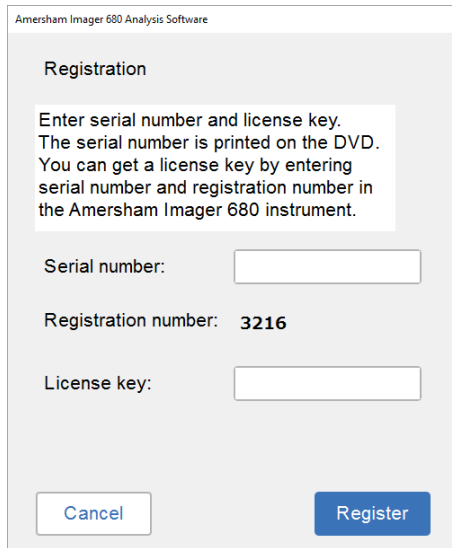


## 6.1.2 Amersham Imager 680 Analysis Software registration

Follow the instructions below to register the Amersham Imager 680 Analysis Software.

| Step | Action |
|------|--------|
|------|--------|

- |   |   |
|---|---|
| 1 | After the installation, the software starts automatically and shows the <b>Registration</b> dialogue box. |
|---|---|



The screenshot shows a dialog box titled "Amersham Imager 680 Analysis Software" with a "Registration" header. Inside, a text box contains the following instructions: "Enter serial number and license key. The serial number is printed on the DVD. You can get a license key by entering serial number and registration number in the Amersham Imager 680 instrument." Below this are three input fields: "Serial number:" with an empty text box, "Registration number:" with the value "3216", and "License key:" with an empty text box. At the bottom, there are two buttons: "Cancel" and "Register".

- |   |   |
|---|---|
| 2 | Make a note of the 4-digit registration number for later use. |
|---|---|

**Note:**

*"3216" is an example. This 4-digit number will differ each time you install the software.*

**Note:**

*Access to the main instrument is needed for steps 3-7*


## 6 Analysis software

### 6.1 Software installation and activation

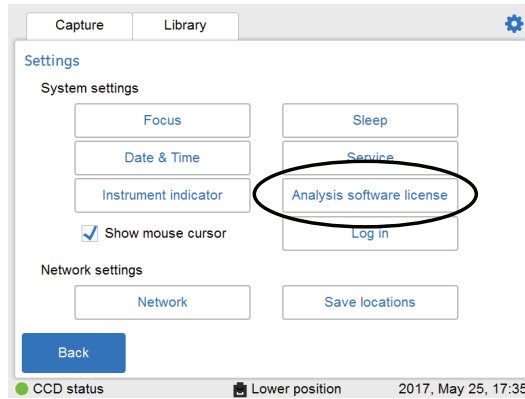
#### 6.1.2 Amersham Imager 680 Analysis Software registration

| Step | Action |
|------|--------|
|------|--------|

3

Select  to open the **Setting** Screen on the Amersham Imager 680 Control Software.

Select **Analysis software license**



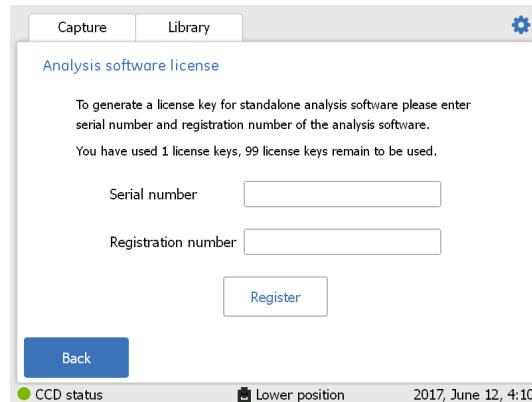
*Result:* Analysis software license appears.

4

Enter the **Serial number** and the **Registration number**.

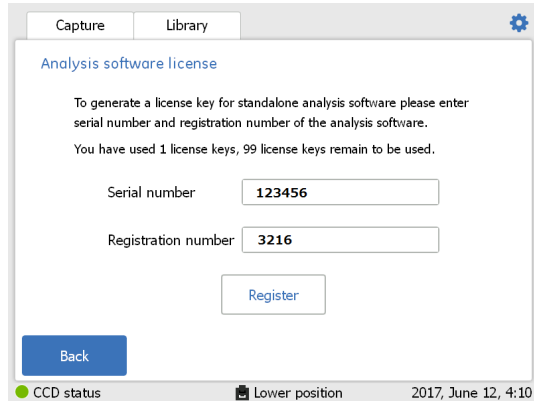
**Note:**

*The 6-digit serial number is printed on the analysis software DVD.*

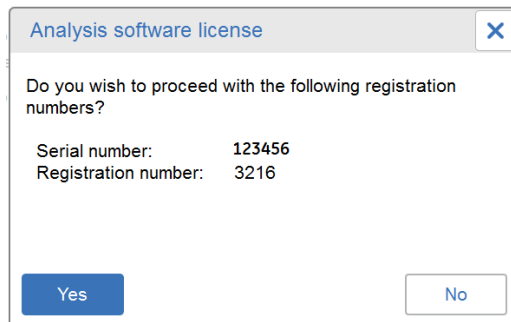


**Step**      **Action**

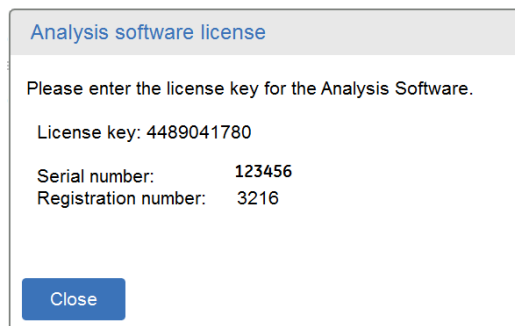
5      Click **Register**.



6      Click **Yes** when confirmation of the registration appears.



*Result:* The 10-digit **License key** number is generated.



Make a note of the 10-digit **License key** number.

## 6 Analysis software

### 6.1 Software installation and activation

#### 6.1.2 Amersham Imager 680 Analysis Software registration

| Step | Action |
|------|--------|
|------|--------|

|   |   |
|---|---|
| 7 | Enter the <b>Serial number</b> and the <b>License key</b> to the registration screen. |
|---|---|

Amersham Imager 680 Analysis Software

### Registration

Enter serial number and license key.  
The serial number is printed on the DVD.  
You can get a license key by entering  
serial number and registration number in  
the Amersham Imager 680 instrument.

Serial number:

Registration number:

License key:



| Step | Action |
|------|--------|
|------|--------|

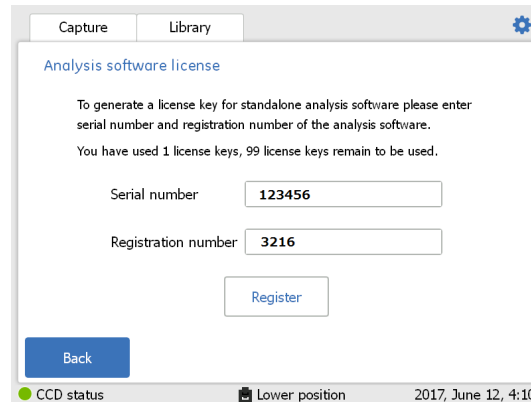
|   |                         |
|---|-------------------------|
| 8 | Click <b>Register</b> . |
|---|-------------------------|



The registration of the analysis software is now complete.

**Note:**

*The software license screen shows the number of licenses generated.*



## 6.2 Software operation

### Introduction

This section describes how to analyze the captured image by Amersham Imager 680 using Amersham Imager 680 Analysis Software. The analysis software runs independently on a Windows PC.

The workflow in the Amersham Imager 680 Analysis Software allows you to perform a step-by-step analysis of the image data and to save the results in the same way as with the **Image analysis** function in the Amersham Imager 680 Control Software.

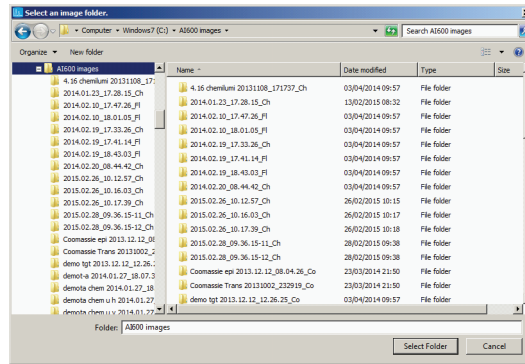
| Step | Action |
|------|--------|
|------|--------|

- |   |   |
|---|---|
| 1 | The workflow starts with opening the image file and is followed by five steps of analysis. The final result is presented in a summary. Select <b>Open</b> in the start-up screen to open images for analysis. |
|---|---|



**Step Action**

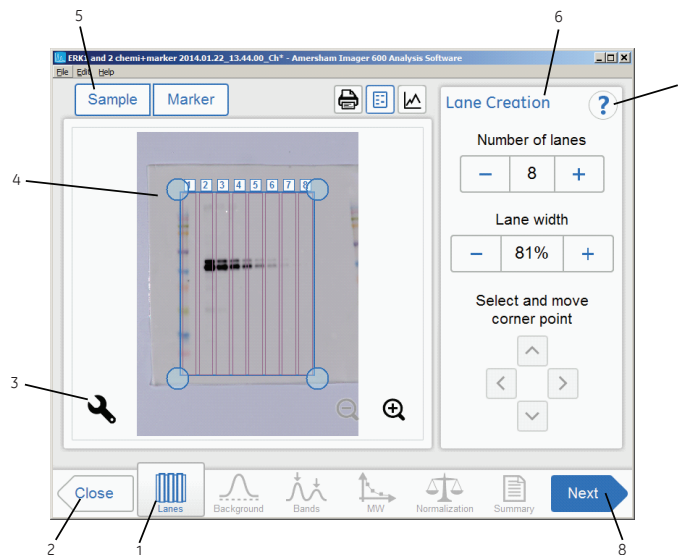
2 Choose a folder containing the images to be analyzed.






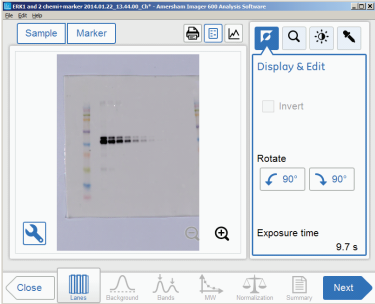




**Note:**

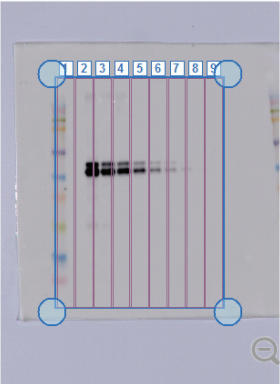


*Up to 5 images can be opened simultaneously.*

The image file opens in the analysis workflow. The following illustration and table describe the start view of the analysis workflow.



| Part | Function   |
|------|--|
| 1    |  The current step in the analysis workflow is highlighted in blue |

| Part | Function  |
|------|---|
| 2    |  <p>Use the <b>Close</b> button to close the analysis workflow</p>   |
| 3    |  <p>Image tools button: Use to access the image tools which modify display settings and to view image details.</p>  <p>  Display<br/>  Zoom<br/>  Contrast<br/>  Intensity     </p> <p>For more information see <i>Image tools</i>, on page 164.</p> |

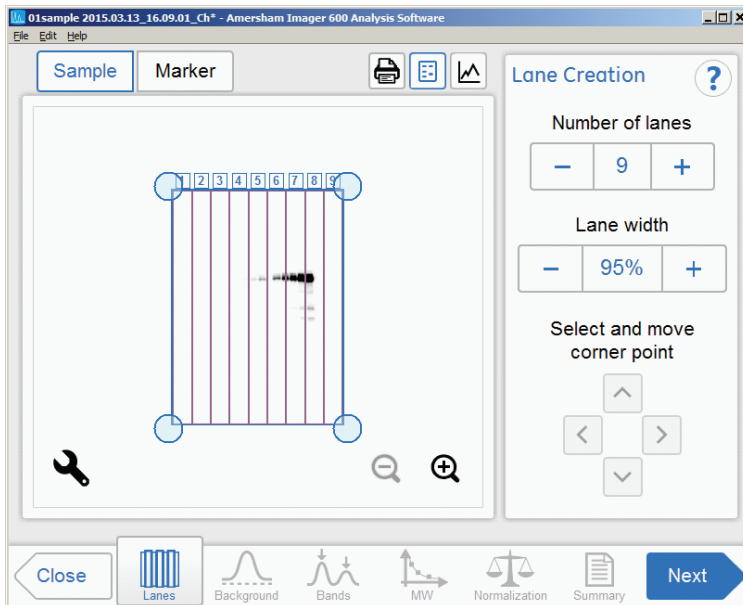
| Part | Function  |
|------|---|
| 4    | <p>Display of the opened image with automatically created lane grid and lane numbers.</p>      |
| 5    | <p>The displayed image buttons are highlighted with a blue frame.</p>   |
| 6    | <p>Options and steps associated with the current step in the analysis.</p>  |
| 7    |  <p>Help icon: Use to show additional information about the selected step in the analysis.</p> |
| 8    |  <p><b>Next</b> button: Use to proceed to the next step in the analysis workflow.</p>        |

## 6.2.1 Lane creation

### Description

This is the first step of the analysis workflow. The selected image appears on screen with a grid of automatically created lanes and the button **Lanes** marked in the workflow. The options for lane creation are presented next to the image.

Use the **Lane Creation** options to the right to arrange the lane grid to correspond with the lanes in the image.

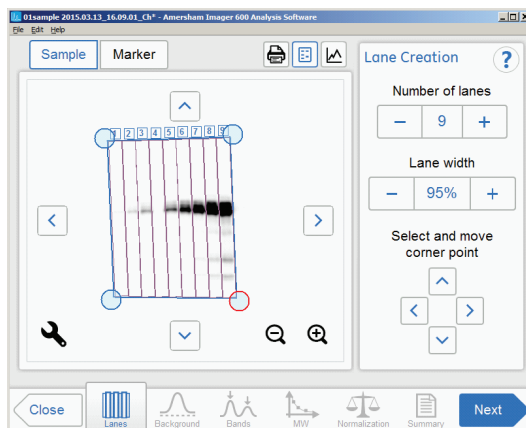


### Adjust the lane grid

Follow the instructions below to adjust the lane grid to match lanes in the image.

| Step | Action   |
|------|--|
| 1    | Select the minus and plus buttons adjacent to <b>Number of lanes</b> to increase or decrease the number of grid lanes to correspond with the number of lanes in the image. |
| 2    | Select a grid corner circle.<br><i>Result:</i> The selected corner circle is highlighted.  |

- | Step | Action  |
|------|---|
| 3    | Drag and drop the corner, or use the <b>Move corner point</b> arrow buttons, to move it to the correct lane position on the displayed image.<br>Repeat until all four corners are positioned corresponding to the lanes in the image. |



- |   |   |
|---|---|
| 4 | Select the minus and plus buttons adjacent to <b>Lane width</b> to increase or decrease the lane fill factor.<br><b>Note:</b><br><i>If the value is 100% then the grid contains only the lanes. Using a lesser percentage creates an empty space between lanes.</i> |
| 5 | When you are done select the <b>Next</b> button or select the <b>Background</b> button in the workflow. The <b>Previous</b> button returns you to the captured image.   |

## 6.2.2 Background subtraction

### Description

This is the second step of the analysis workflow. The options for background subtraction are presented next to the image.

**Tip:**



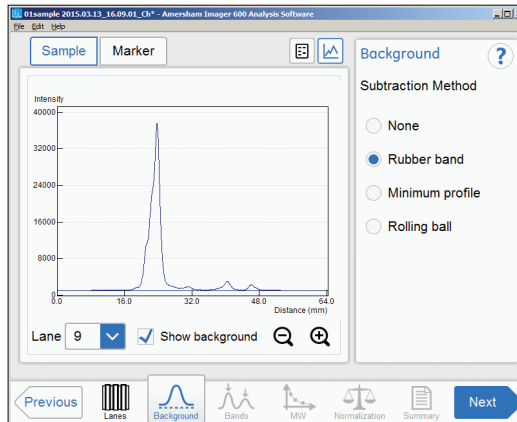
Use the lane profile button to display separate graphical lane profiles with the selected lane number displayed in the dropdown list.

**Tip:**

Use **Show background** check box to see how each background subtraction option works. This function shows the background level calculated by each option.

The illustration and tables below describe the background subtraction options.

| Option             | Description   |
|--------------------|---|
| <b>None</b>        | Use this option when no background should be subtracted from the image.   |
| <b>Rubber band</b> | Use this option to subtract the background below a baseline between the lowest points on the lane profile, as though a rubber band was stretched under the profile. |

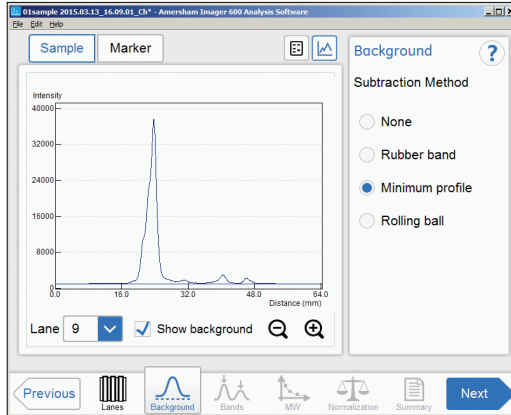




**Option**    **Description**

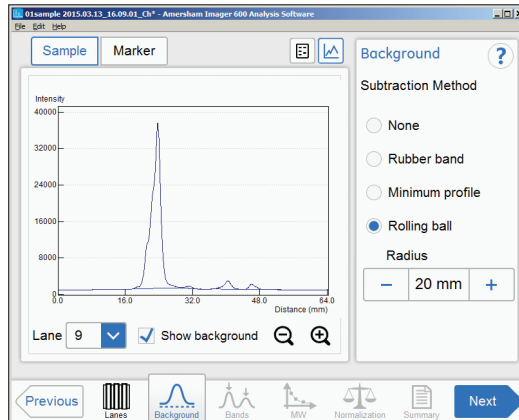
**Mini-profile**

Use this option to subtract all the background below the minimum value in the lane profile view.






**Rolling ball**

Use this option to subtract the background below the graph as if erasing it using the radius of a ball. A small radius will subtract more background than a large.



## Subtract background

| Step | Action  |
|------|---|
| 1    | <p>Select the lane profile button , if an image of the sample is displayed.</p> <p><i>Result:</i> A screen will appear displaying the lane profile graphically, with the current lane number displayed in the drop down list and the lane profile button in blue.</p> <p></p> |
| 2    | <p>To confirm that each background subtraction options works, check <b>Show background</b> check box  <b>Show background</b>.</p> <p>This function shows the background level calculated by each option.</p>   |

| Step | Action |
|------|--------|
|------|--------|

|   |  |
|---|--|
| 3 | Choose one of the relevant method radio buttons: |
|---|--|

- **None**
- **Rubber band**
- **Minimum profile**
- **Rolling ball**

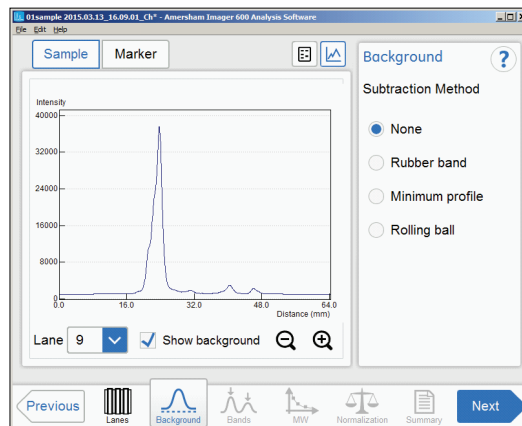
If **Rolling ball** is selected, use the **Radius** plus or minus buttons to set the radius of the virtual rolling ball eraser.

Radius

|   |       |   |
|---|-------|---|
| − | 20 mm | + |
|---|-------|---|

**Tip:**

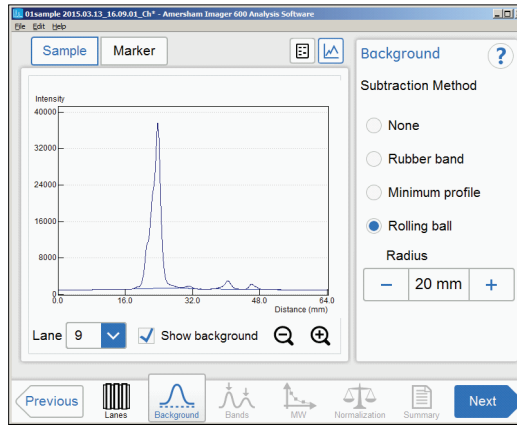
*The smaller the radius the more background will be removed.*



**Result:** The lane profile view is displayed with the background subtracted.

6 Analysis software  
6.2 Software operation  
6.2.2 Background subtraction

**Step**      **Action**



- 4 To view the result in any lane, select the lane number in the drop down menu.
- 5 When ready, click **Next** or select the **Bands** in the workflow. Clicking **Previous** takes you back one step.

## 6.2.3 Band detection

### Description

This is the third step of the analysis workflow. The options for band detection are presented next to the image.

Bands can be detected automatically and/or manually. However, manual bands can only be added in single channel view. Bands modified manually are highlighted in the image.

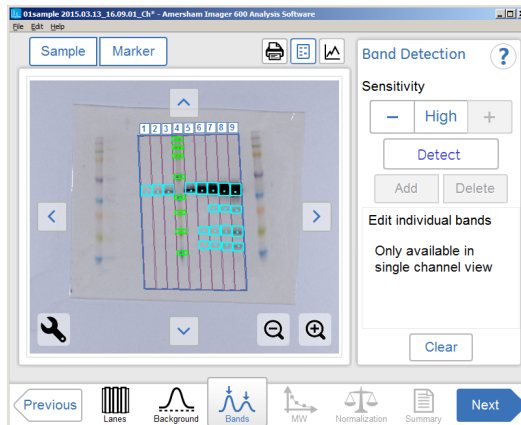
The bands resulting from multichannel imaging are color marked in the image or lane profile according to the detection channel used. For example, a band detected in the green channel is displayed with a green frame, etc.

### Detecting bands

Follow the instructions below to detect bands.

| Step | Action |
|------|--------|
|------|--------|





- |   |  |
|---|--|
| 1 | Select the <b>Detect</b> button to detect the bands automatically. |
|---|--|



**Tip:**

Shift between lane profile, image view, and image tabs to verify the result of the band detection.

If the band detection is satisfactory, then proceed to the final step in this table.

| Step | Action  |
|------|---|
| 2    | <p>If too many bands are detected, then use the <b>Sensitivity</b> minus button to decrease the sensitivity.</p> <p>If too few bands are detected, then use the <b>Sensitivity</b> plus button to increase the sensitivity.</p>   |
| 3    | <p>To make manual changes, select one detection channel from: <b>Sample</b>, <b>Markers</b>, <b>Blue</b>, <b>Green</b> or <b>Red</b> above the image and select one or more relevant options.</p> <ul style="list-style-type: none"><li>To create a new band, point to the position in the image.<br/><i>Result:</i> A new highlighted band appears.</li><li>To shift a band position, select the band and shift the band position up or down with the <b>Position</b> arrow buttons.<br/><br/>Position:  </li><li>To adjust a band width, select the band and adjust it with the <b>Width</b> plus and minus buttons.<br/><br/>Width:  </li><li>To delete a band, select the band and click <b>Delete</b>.</li><li>To delete all detected bands in the image, select <b>Clear</b>.</li></ul> |
| 4    | Repeat actions in step 3 for other detection channels, if relevant.   |
| 5    | When you are done detecting bands click the <b>Next</b> button or select the <b>MW</b> button in the workflow. The <b>Previous</b> button will bring you back to the previous step.   |

## 6.2.4 Molecular weight assignment

### Description

This is the fourth step in the analysis workflow. The selected image is displayed on the screen and the button **MW** is highlighted in the workflow. The options for molecular weight assignment are presented beside the image.

Molecular weight is calculated using standard molecular weight (MW) markers.

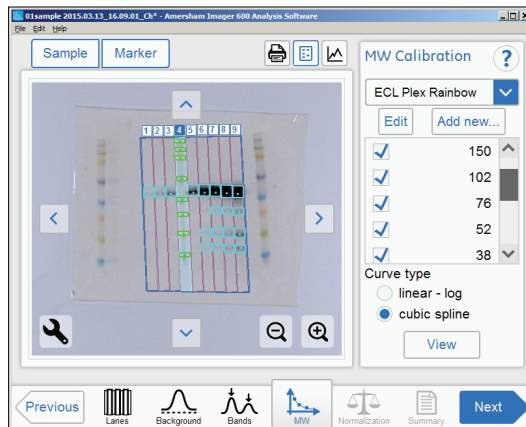
### Assign molecular weight

The following illustration and table below describe how to assign molecular weight.

**Note:** *Molecular weight calibration can only be performed in single channel view.*

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | Select the lane containing the molecular weight marker.<br><i>Result:</i> The selected lane appears highlighted. |
|---|--|



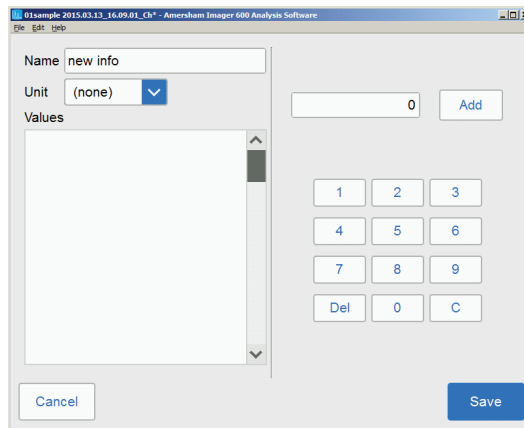
- |   |  |
|---|--|
| 2 | Select the standard molecular weight marker from the drop down menu.<br>If the correct marker is missing: <ul style="list-style-type: none"><li>• Add a missing marker by selecting <b>Add new...</b> button. See instructions below.</li><li>• Edit a marker by selecting the <b>Edit</b> button. See the instructions below.</li></ul> |
| 3 | Deselect any missing bands in the sample marker lane by unchecking relevant check boxes.   |

| Step | Action  |
|------|---|
| 4    | Select the fitting function by marking one of the <b>Curve type</b> radio buttons: <ul style="list-style-type: none"><li>• <b>Linear - log</b> - which presents a linear fit to logarithmic data.</li><li>• <b>Cubic spline</b> - which presents a smooth polynomial that is piecewise defined.</li></ul> |
| 5    | Select <b>View plot</b> to see the plot.  |
| 6    | Select <b>Close</b> to return to the previous view.   |
| 7    | When you are done select the <b>Next</b> button or select the <b>Normalization</b> button in the workflow. The <b>Previous</b> button will bring you back to the previous step.   |

**Note:** The calculated molecular weight is presented in the **Summary** table.

## Add a molecular weight standard marker

| Step | Action   |
|------|--|
| 1    | Select the <b>Add new...</b> button.<br><i>Result:</i> The following view appears. |



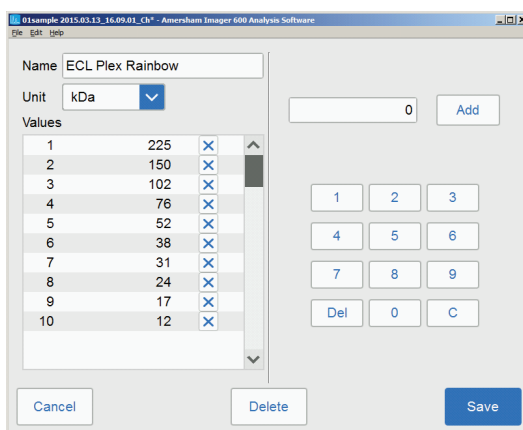
|   |  |
|---|--|
| 2 | Select the <b>Name</b> field and type the name of the marker.  |
| 3 | Select the unit from the <b>Unit</b> drop down menu.   |
| 4 | Type a value, and select the <b>Add</b> button.<br><i>Result:</i> The value will appear in the bottom of the list to the left on the screen. |



| Step | Action  |
|------|---|
| 5    | Select the <b>Save</b> button to save the added values and to return to the <b>MW Calibration</b> view. Select <b>Cancel</b> to leave without saving changes. |

## Edit a marker

| Step | Action   |
|------|--|
| 1    | Select the <b>Edit</b> button.<br><i>Result:</i> The following view appears. |



- Select the value from the list. The marked values are highlighted.
- Type a new value, and select the **Add** button.  
*Result:* The new value will appear in the list.  
**Note:**  
*You may need to scroll to see the new value.*
- Select the **Save** button to save the edited values and to return to the **MW Calibration** view. Select **Cancel** to leave without saving changes. **Delete** will delete the entire marker group.

**Note:** To delete a value, select the **X** next to the value.

## 6.2.5 Normalization

### Description

This is the fifth step in the analysis workflow. The selected image is displayed on screen and the button **Normalization** is highlighted in the workflow.

Normalization calculates band volumes relative to one or more reference bands. Select reference band(s) in the lane and all other bands in that lane will be normalized against the selected band(s). If multiple reference bands are selected, the reference value is set as the average of the selected band volumes.

Normalization is useful when comparing relative band volumes in different lanes.

The options for normalization are presented next to the image.

### Normalize bands

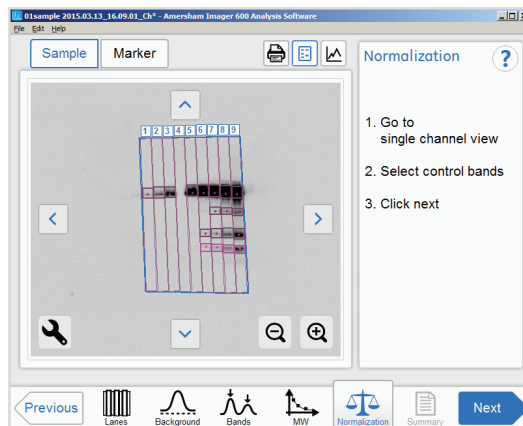
Follow the instructions below to perform normalization.

| Step | Action |
|------|--------|
|------|--------|

- |   |  |
|---|--|
| 1 | Select one or two control bands in a lane.<br>Result: The selected band(s) appear highlighted. |
|---|--|

**Note:**

*Control bands can only be selected in single channel view.*



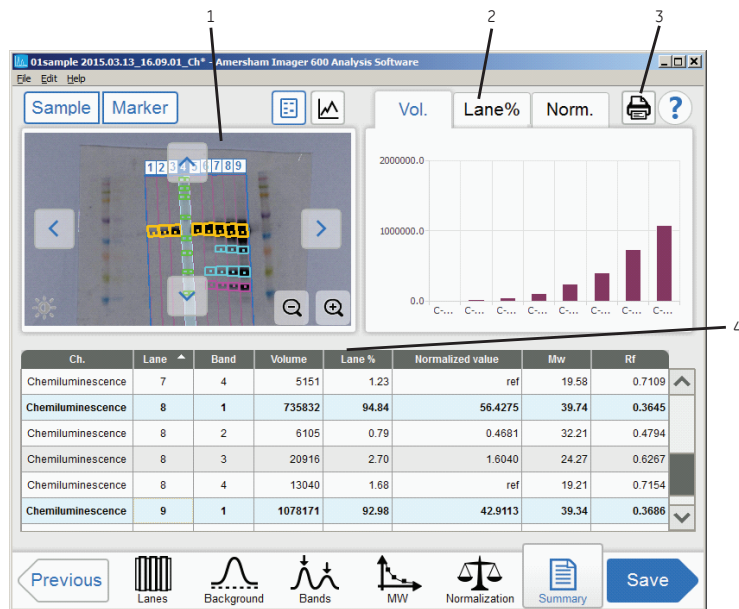
- |   |   |
|---|---|
| 2 | When you are done select the <b>Next</b> button or select the <b>Summary</b> button in the workflow. The <b>Previous</b> button will bring you back to the previous step. |
|---|---|

## 6.2.6 Summary

### Description

This is the final view of the analysis workflow. The analyzed image is displayed on the screen and the **Summary** button is highlighted in the workflow.

The illustration and table below describe the summary view.

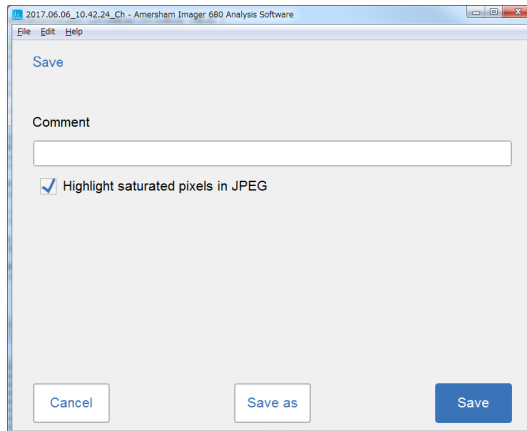


| Part | Function   |
|------|--|
| 1    | The analyzed image   |
| 2    | Tabs for displaying details.                                   |
| 3    | Print button: Use to print the summary on a connected printer. |

| Part | Function   |
|------|--|
| 4    | Columns displaying:<br><b>Ch.</b> - the detection channel<br><b>Lane</b> - the number of the lane (change the sort order by selecting up or down arrow in the column heading)<br><b>Band</b> - the number of the band (from top to bottom)<br><b>Volume</b> - the integrated signal intensity in the specific band<br><b>Lane%</b> - the relative band volume within a lane (in percentage)<br><b>Normalized value</b> - the band volume relative to the control band volume<br><b>Mw</b> - the calculated Mw<br><b>Rf</b> - the relative mobility of the band |

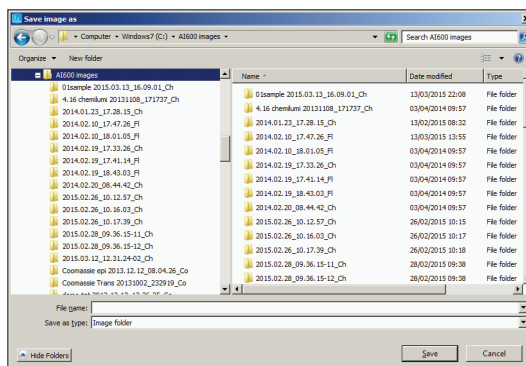
## Finalize and save analysis

| Step | Action   |
|------|--|
| 1    | Review the summary.  |
| 2    | If the analysis is completed, click <b>Save</b><br><i>Result:</i> The save view appears where comments can be added to the file. |

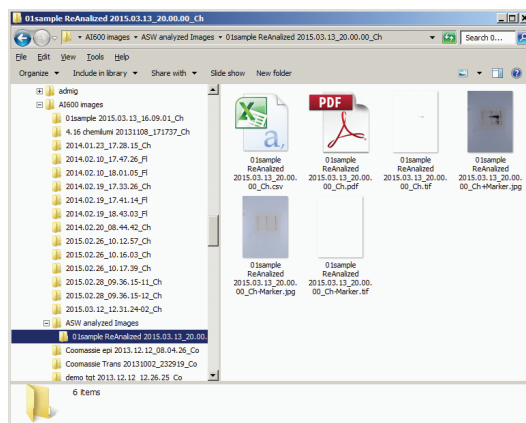


**Step Action**

- 3 To overwrite the analysis of the file opened, click **Save**.  
*Result:* The image file is updated with the analysis information.  
 To create a new file set, click **Save as**.  
*Result:* The **Save image as** view appears.



- 4 Select/Create a folder and type a file name, then click **Save**.  
*Result:* In addition to the image file(s), analyzed data is saved with a CSV file and the summary view is saved as a pdf file.



See Section 5.7 *Save and manage image files*, on page 167 for details.

# 7 Maintenance

## About this chapter

To ensure optimal performance, Amersham Imager 680 and accessories should be maintained regularly. This chapter describes the maintenance that should be performed on a regular basis.

For all safety cautions and notices relevant to maintenance please see *Maintenance, on page 27*.



### WARNING

**Electrical shock hazard.** All instrument repairs or modifications should be performed by service personnel authorized by GE. Do not open any covers or replace parts unless specifically stated in the user documentation.



### WARNING

Do not use excessive amounts of liquids for cleaning the Amersham Imager 680 instrument. This may result in instrument malfunction or electric shock.



### NOTICE

When performing maintenance of the equipment, remove the tablet computer. There is risk of injury if it falls on your foot.

## In this chapter

| Section                 | See page |
|-------------------------|----------|
| 7.1 Instrument          | 231      |
| 7.2 Accessories         | 232      |
| 7.3 Regular inspections | 234      |

## 7.1 Instrument

Use a soft dry cloth to clean the exterior of Amersham Imager 680. For marks that are hard to remove, wipe with a soft cloth slightly dampened with water and a neutral detergent, or 70% ethanol, then wipe with a new clean, dry cloth.

To clean the interior of the instrument, use a soft cloth slightly dampened with distilled water or 70% ethanol. Make sure to wipe the interior dry. Do not use any neutral domestic detergent, as the detergent residue may fluoresce when an image is captured.

## 7.2 Accessories

### Introduction

Amersham Imager 680 accessories must be cleaned after use. This section describes recommended cleaning agents and how to clean the accessories.

---

### Recommended cleaning agents



#### NOTICE

Cleaning agents should be for biochemical use to avoid that residues fluoresce when images are captured.

The accessories may be washed with water and one of the following:

- 70% ethanol
  - Mild, neutral detergent
  - Isopropanol
  - 6% H<sub>2</sub>O<sub>2</sub>
- 

### Cleaning sample trays, white insert and diffuser board



#### CAUTION

Wear gloves while cleaning. There may be residues of hazardous chemicals.



#### NOTICE

Do not use organic solvents. These may damage the surface.



**NOTICE**

Do not use abrasive cleaning materials, such as a scouring pad, for cleaning. This may scratch the surface.

After cleaning trays, inserts and/or diffuser boards, wash the accessory in water using a soft sponge soaked in a cleaning agent.

After cleaning, rinse the accessory immediately in water, until no detergent remains, and allow to air dry.

---

## Cleaning gel sheets

After use, wash the gel sheet with mild detergent, rinse with water then dry well.

**Note:** *A gel sheet can be reused about 20 times.*

---

## 7.3 Regular inspections

Regularly inspect Amersham Imager 680 to ensure the following:

- The power supply plug is firmly secured in the power outlet.
- The power cord and supply plug do not become overheated.
- The power cord is not damaged in any way.
- The ventilation holes in the equipment are free from dust and dirt.

# 8 Troubleshooting

## About this chapter

This chapter provides information to assist users and service personnel to identify and correct problems that may occur when operating the product.

If the suggested actions in this guide do not solve the problem, or if the problem is not covered by this guide, contact your GE representative for advice.

---

## In this chapter

| Section                         | See page |
|---------------------------------|----------|
| 8.1 General problems            | 236      |
| 8.2 Problems with image quality | 238      |
| 8.3 Problems with the software  | 240      |

---

## General troubleshooting procedure

Follow this procedure if an error occurs:

- 1 Take note of the error code and error message on the monitor.
  - 2 Turn off the instrument by pressing the On/Off button on the front panel and then the Power switch on the right hand side, and turn it back on again after about ten seconds.
  - 3 If the error persists refer to this troubleshooting guide for possible solutions.
  - 4 If the error cannot be resolved with this troubleshooting guide, contact your GE representative.
-

## 8.1 General problems

This section describes possible causes and corrective actions for various problems with the instrument. If the error persists after taking the suggested corrective actions, contact your GE representative.

### Atypical noise is heard

| If...  | Then...  |
|--|--|
| Noise comes from the camera head then a camera head failure has occurred | Turn off the power switch immediately and contact your GE representative |

### Atypical odor is emitted

| If...   | Then...  |
|---|--|
| Atypical odors are emitted from the camera head then a camera head failure has occurred | Turn off the power switch immediately and contact your GE representative |
| Atypical odors are emitted then an instrument failure has occurred                      | Turn off the power switch immediately and contact your GE representative |

### Smoke is emitted

| If...   | Then...  |
|---|--|
| Smoke is emitted from the camera head then a camera head failure has occurred | Turn off the power switch immediately and contact your GE representative |
| Smoke is emitted from the instrument then an instrument failure has occurred  | Turn off the power switch immediately and contact your GE representative |

### The LED blinks

| If...   | Then...  |
|---|--|
| The <b>ERROR</b> LED blinks a hardware error occurred | If an error code is displayed, make a note of it and contact your GE representative. |

| If...   | Then...                           |
|---|-----------------------------------|
| The instrument indicator LED lights do not light during startup diagnosis a power cable installation failure has occurred | Connect the power cable correctly |

### Operation is not stopped when the door is opened

| If...  | Then...   |
|--|---|
| The light source is lit or the motor is running when the door to the instrument is open, an interlock failure has occurred | Turn off the instrument's Power switch immediately and contact your GE representative |

### Other hardware problems

| If...  | Then...   |
|--|---|
| The door to the instrument cannot be opened or closed or the door cannot be locked because a foreign object is present in the locking section or the door sensor | Remove the foreign object   |
| The door to the instrument cannot be opened or closed, or the door cannot be locked and no foreign object is present   | The locking section is damaged. Contact your GE representative  |
| The instrument cannot be cooled down properly  | The ambient air temperature is too high. Lower the room temperature to 28°C or lower  |
| The instrument does not appear to respond to software control  | The instrument is not connected to the tablet computer<br><br>Use the flash indicator tool to identify which instrument is connected to a certain tablet computer |

## 8.2 Problems with image quality

### An appropriate image does not appear

| If...  | Then...   |
|--|---|
| An image is overexposed  | Shorten the exposure time   |
| An image is underexposed   | Prolong the exposure time   |
| The focus is not correctly adjusted                                    | Adjust the focus temporarily. See <i>Section 4.3.2 Focus, on page 81</i> .<br>If the problem persists contact your GE representative. |
| The tray, white insert or window covering the light source are dirty   | Clean the tray, white insert or the window covering the light source.   |
| The wrong sample tray is used  | Change to the correct sample tray   |
| The wrong light source is selected                                     | Select the correct light source   |
| The size of the object exposed does not coincide with the exposed area | Place the sample correctly on the sample tray and place the tray in the correct tray position   |

### Light leaks on the image

| If...   | Then...   |
|---|---|
| The door to the instrument is not completely closed | Close the door to the instrument and expose the image again |
| The instrument is exposed to direct sunlight        | Avoid direct sunlight                                       |

### The image appears misty

| If...                                   | Then...  |
|---|--|
| Dew is condensing in the optical system | Turn off the instrument with the On/Off button on the front panel and wait until the ambient environments meets the specifications |

### Unevenness appears on the image

| If...                                       | Then...  |
|---|--|
| The LED is deteriorated from age            | Turn off the instrument and contact your GE representative |
| A lamp in the UV transilluminator is broken | Turn off the instrument and contact your GE representative |

### Noise appears in an image exposed using the UV Trans tray

| If...                                      | Then...  |
|--|--|
| The UV Trans Tray is deteriorated from age | The UV Trans Tray is contaminated. Clean the tray. |

### Artefacts appear in a Colorimetric Epi image

| If...                    | Then...   |
|--------------------------|---|
| The correct tray is used | Rotate the gel sample 90° positioning the gel so that the lanes of the gel are parallel to the long side of the tray. |

## 8.3 Problems with the software

This section describes possible causes and corrective actions for problems with the software. If the problem persists after taking the suggested corrective action, contact your GE representative.

### After exposure, no image is displayed on the screen

| If...                                       | Then...                        |
|---|--------------------------------|
| The light source does not function properly | Contact your GE representative |
| The sample is not in position               | Check the sample position      |

### The screen of Amersham Imager 680 is not displayed on the connected tablet computer

| If...                                       | Then...  |
|---|--|
| Wireless access points are not properly set | Contact the network administrator or connect a monitor, mouse and keyboard directly with a cable |

### The buttons do not appear on an external monitor

| If...                             | Then...                                     |
|-----------------------------------|---|
| The monitor resolution is too low | Use monitors with SVGA resolution or higher |



## The software is non responding

| If...   | Then...                              |
|---|--------------------------------------|
| Transferring large amounts of files to a connected computer during operation can impair the system's performance. | Avoid transferring during operation. |

## Problems with tablet computer connection

| If...  | Then...  |
|--|--|
| The tablet computer screen turns white when starting the software.                             | Make sure you are connected to the correct network on the tablet computer, that is same network as Amersham Imager 680.  |
|  | If the instrument has recently been switched on it may take a few minutes for the instrument to come online. The wireless network can be detected before the instrumented is fully connected. Normally the instrument becomes online within 5 minutes. |
|  | Restart the software on the tablet computer.   |
| The software display on the tablet computer screen has frozen after a long time of inactivity. | Click the home button on the tablet computer and restart the software.   |
| No or few button presses are registered.   | Use gentle and distinct touches on the tablet computer to control buttons in the software. A light and short tap is best registered by the software.   |

## 8 Troubleshooting

### 8.3 Problems with the software

| If...   | Then...  |
|---|--|
| <p>The Amersham Imager 680 icon has been accidentally removed from the tablet computer.</p> | <p>Connect to the same network as Amersham Imager 680. Open the Safari™ web browser and type in the IP address of the instrument in the address field. Once the instrument connect screen is shown, add this page to the home screen of the tablet computer by clicking on the square with an upward arrow next to the address field in the browser.</p> <p><b>Tip:</b><br/><i>If a USB dongle is used on the camera the default IP address is 192.168.173.1</i></p> |

# 9 Reference information

## About this chapter

This chapter lists the technical specifications of Amersham Imager 680. The chapter also includes ordering information, and Health and Safety Declaration form for service.

---

## In this chapter

This chapter contains the following sections:

| Section                                | See page |
|--|----------|
| 9.1 Specifications                     | 244      |
| 9.2 Health and Safety Declaration Form | 247      |

---

## 9.1 Specifications

### Imaging specifications

| Parameter                | Data   |
|--------------------------|--|
| Image sensor             | Peltier cooled, 3.2 megapixel CCD  |
| Image sensor temperature | -25°C  |
| Cooling down time        | <5 minutes   |
| Lens                     | F0.85/43 mm  |
| Light source             | Blue Epi light: 460 nm<br>Green Epi light: 520 nm<br>Red Epi light: 630 nm<br>UV transillumination light: 312 nm<br>White Epi light: 470 to 635 nm<br>White transillumination light: 470 to 635 nm |
| Operation                | Fully automated (auto exposure, no focus or other adjustment or calibrations needed)   |
| Maximum sample size      | 160 X 220 mm   |
| Greyscale                | 65 536 levels (16 bit)   |
| Exposure time            | 1/100 second to 10 hours   |
| Dynamic range            | 4.8 orders of magnitude  |
| Capture control          | Binning, crop, and programmed capture  |
| Image output             | Gray scale 16 bit tif  |
|                          | Color image jpg  |
|                          | Gray scale jpg   |
| Emission filters         | Cy2: 525BP20<br>Cy3/EtBr: 605BP40<br>Cy5:705BP40   |

## Dimensions and weight

| Unit                | Dimensions                  | Weight |
|---------------------|-----------------------------|--------|
| Amersham Imager 680 | 360(W) x 785(H) x 485(D) mm | 43 kg  |

## Power supply

| Parameter         | Data            |
|-------------------|-----------------|
| Input voltage     | 100 to 240 V AC |
| Voltage variation | ±10%            |
| Frequency         | 50/60 Hz        |
| Max power         | 250 W           |

## Environmental requirements

The following table describes the environmental requirements for Amersham Imager 680.



### CAUTION

Do not use the instrument in a room with a temperature above +28°C. Higher temperatures does not allow the CCD to cool down properly (to -25°C).

| Parameter                                 | Requirement   |
|---|---|
| Operating temperature/humidity conditions | Temperature: 18°C to 28°C (with temperature fluctuation below 10°C per hour or lower)<br>Humidity: 20% to 70% RH (no dew condensation)<br><br><b>Note:</b><br><i>When the above conditions cannot be satisfied, take appropriate actions.</i> |

## 9 Reference information

### 9.1 Specifications

| Parameter                         | Requirement  |
|-----------------------------------|--|
| Transportation/storage conditions | Temperature: -25°C to 70°C<br>Humidity: 5% to 95% RH (no dew condensation)<br><br><b>Note:</b><br><i>When the above conditions cannot be satisfied, take appropriate actions.</i>  |
| Operation site                    | Indoor use   |
| Maximum operating altitude        | 2000 m or lower  |
| Noise                             | 70 dB(A) or lower<br>Fast Lmax ≤60dB(A), and average Leq ≤ 54dB(A) (1 m from the instrument)   |
| Protection provided by enclosure  | IP21   |
| Overvoltage category              | Transient overvoltage category II  |
| Rated pollution applied           | Pollution degree 2   |
| Other conditions                  | <ol style="list-style-type: none"><li>1 Take into consideration the workflow and ancillary facilities when planning the installation.</li><li>2 Any required construction and electricity/air conditioning work must be completed prior to installation.</li><li>3 It is not desirable to have a heat source near the Amersham Imager 680 air intakes, even if the other environmental requirements have been met.</li><li>4 Do not install the equipment near a window. Avoid direct sunlight. Ensure blinds are attached to nearby windows.</li><li>5 Do not place objects near the power outlet to ensure easy access to the power cord for disconnection in case of emergency.</li></ol> |

## 9.2 Health and Safety Declaration Form

### On site service



### On Site Service Health & Safety Declaration Form

|                          |  |
|--------------------------|--|
| <b>Service Ticket #:</b> |  |
|--------------------------|--|

To make the mutual protection and safety of GE service personnel and our customers, all equipment and work areas must be clean and free of any hazardous contaminants before a Service Engineer starts a repair. To avoid delays in the servicing of your equipment, please complete this checklist and present it to the Service Engineer upon arrival. Equipment and/or work areas not sufficiently cleaned, accessible and safe for an engineer may lead to delays in servicing the equipment and could be subject to additional charges.

| Yes  | No  | Please review the actions below and answer "Yes" or "No".<br>Provide explanation for any "No" answers in box below.  |
|--|---|--|
| <input type="radio"/>  | <input type="radio"/>                     | <b>Instrument has been cleaned of hazardous substances.</b><br>Please rinse tubing or piping, wipe down scanner surfaces, or otherwise ensure removal of any dangerous residue. Ensure the area around the instrument is clean. If radioactivity has been used, please perform a wipe test or other suitable survey. |
| <input type="radio"/>  | <input type="radio"/>                     | Adequate space and clearance is provided to allow safe access for instrument service, repair or installation. In some cases this may require customer to move equipment from normal operating location prior to GE arrival.  |
| <input type="radio"/>  | <input type="radio"/>                     | <b>Consumables, such as columns or gels, have been removed or isolated from the instrument and from any area that may impede access to the instrument.</b>   |
| <input type="radio"/>  | <input type="radio"/>                     | <b>All buffer / waste vessels are labeled.</b><br><b>Excess containers have been removed from the area to provide access.</b>  |
|  |   | Provide explanation for any "No" answers here:   |
| <b>Equipment type / Product No:</b>  |   | <input style="width: 100%;" type="text"/>  |
| <b>Serial No:</b>  |   | <input style="width: 100%;" type="text"/>  |
| I hereby confirm that the equipment specified above has been cleaned to remove any hazardous substances and that the area has been made safe and accessible. |   |  |
| <b>Name:</b>   | <input style="width: 100%;" type="text"/> | <b>Company or institution:</b> <input style="width: 100%;" type="text"/>   |
| <b>Position or job title:</b>  | <input style="width: 100%;" type="text"/> | <b>Date (YYY/MM/DD):</b> <input style="width: 100%;" type="text"/>   |
| <b>Signed:</b>   | <input style="width: 100%;" type="text"/> |  |

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DOC1149542/28-9800-26 AC 05/2014

## Product return or servicing



### Health & Safety Declaration Form for Product Return or Servicing

|                                     |  |   |  |
|-------------------------------------|--|---|--|
| <b>Return authorization number:</b> |  | <i>and/or</i><br><b>Service Ticket/Request:</b> |  |
|-------------------------------------|--|---|--|

To make sure the mutual protection and safety of GE personnel, our customers, transportation personnel and our environment, all equipment must be clean and free of any hazardous contaminants before shipping to GE. To avoid delays in the processing of your equipment, please complete this checklist and include it with your return.

1. Please note that items will NOT be accepted for servicing or return without this form
2. Equipment which is not sufficiently cleaned prior to return to GE may lead to delays in servicing the equipment and could be subject to additional charges
3. Visible contamination will be assumed hazardous and additional cleaning and decontamination charges will be applied

| Yes   | No | Please specify if the equipment has been in contact with any of the following: |  |
|---|----|--|--|
|   |    | Radioactivity (please specify)   |  |
|   |    | Infectious or hazardous biological substances (please specify)                 |  |
|   |    | Other Hazardous Chemicals (please specify)                                     |  |
| <b>Equipment must be decontaminated prior to service / return. Please provide a telephone number where GE can contact you for additional information concerning the system / equipment.</b> |    |  |  |
| <b>Telephone No:</b>  |    |  |  |
| <b>Liquid and/or gas in equipment is:</b>   |    | <b>Water</b>   |  |
|   |    | <b>Ethanol</b>   |  |
|   |    | <b>None, empty</b>   |  |
|   |    | <b>Argon, Helium, Nitrogen</b>   |  |
|   |    | <b>Liquid Nitrogen</b>   |  |
|   |    | <b>Other, please specify</b>   |  |
| <b>Equipment type / Product No:</b>   |    | <b>Serial No:</b>  |  |
| <b>I hereby confirm that the equipment specified above has been cleaned to remove any hazardous substances and that the area has been made safe and accessible.</b>                         |    |  |  |
| <b>Name:</b>  |    | <b>Company or institution:</b>   |  |
| <b>Position or job title:</b>   |    | <b>Date (YYYY/MM/DD)</b>   |  |
| <b>Signed:</b>  |    |  |  |

To receive a return authorization number or service number, please call local technical support or customer service.

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For local office contact information, visit  
[www.gelifesciences.com/contact](http://www.gelifesciences.com/contact)

GE Healthcare Bio-Sciences AB  
Björkgatan 30  
751 84 Uppsala  
Sweden

[www.gelifesciences.com/quantitative\\_imaging](http://www.gelifesciences.com/quantitative_imaging)

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GE Healthcare Europe GmbH  
Munzinger Strasse 5, D-79111 Freiburg, Germany

GE Healthcare UK Limited  
Amersham Place, Little Chalfont, Buckinghamshire, HP7 9NA, UK

GE Healthcare Bio-Sciences Corp.  
100 Results Way, Marlborough, MA 01752, USA

HyClone Laboratories, Inc.  
925 W 1800 S, Logan, UT 84321, USA

GE Healthcare Japan Corporation  
Sanken Bldg. 3-25-1, Hyakunincho Shinjuku-ku, Tokyo 169-0073, Japan

