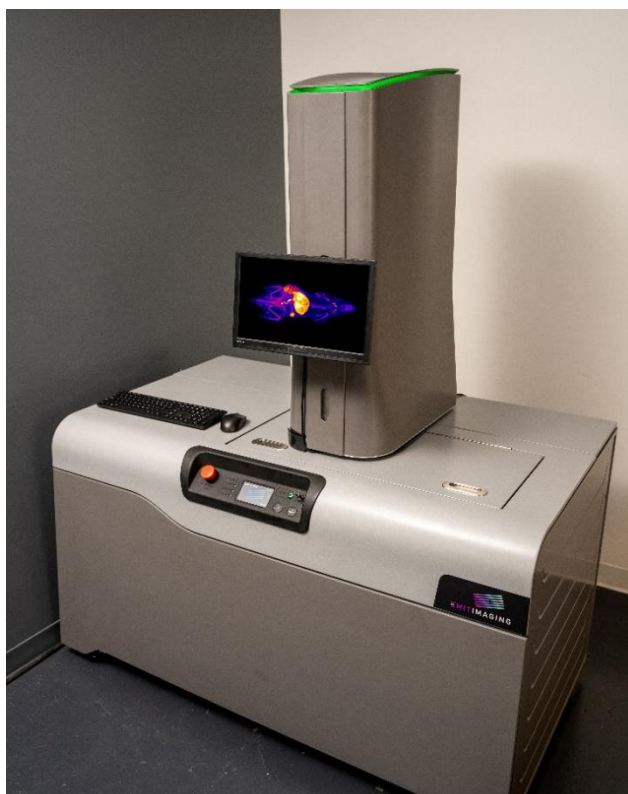


Xerra™



Xerra User Manual

March 1, 2023
[1000964]

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SAFETY INFORMATION

The following sections outline important safety information about the Xerra system and its operation.

Warnings

When users see the following symbols, they should pay close attention to the safety information presented. Following these safety precautions will help avoid actions that could damage or adversely affect the performance of the Xerra system or injure the user. If the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or mechanical damage. It is also used to:

- Alert against unsafe practices
- Remind the user that all safety instructions should be read and understood before installation, operation, maintenance, or repair of this instrument.

WARNING

Used when an action or condition may potentially cause serious personal injury or loss of life. Mechanical damage may also result.

VOLTAGE

Indicates the presence of high voltage or risk of electric shock.

Instrument Labels

Always pay close attention to the labels on Xerra and its components.

Instructions

- Before installing, operating, or performing maintenance on Xerra, please read and understand all the safety and operating instructions. A complete understanding of the following safety instructions, warnings, and disclaimers is required before proceeding with the rest of the manual.
- Retain all safety and operating instructions for future reference. Follow all operating and handling instructions. Failure to follow operating or handling instructions may void any warranty covering this product.
- Abide by all warnings on the product and in the operating instructions. Failure to adhere to warnings or safety precautions may void any warranty covering this product.
- **Xerra is NOT intended for the processing or imaging of:**
 - Human tissue.
 - Human bodily fluids.
 - Infectious agents.
 - Radiolabeled tissue.
 - Cryogenically preserved tissue.
 - Animals infected with any infectious pathogens or infectious materials.
 - Physical objects inconsistent with tissue imaging.

General

- This equipment contains mechanical parts that operate with large force and electrical components that carry high current. The user must follow the precautions in this document to avoid injury.
- Installation of the equipment must be conducted by trained and qualified personnel only.
- No repair or disassembly should be conducted by the user. Only trained and qualified personnel should work on the unit. Never remove or modify any protective cover or device.
- All covers and openings must remain closed during operation.

Pay attention to the following symbols:



Never put any human body part between the knife holder and the specimen block at any time, even when stationary.



This system contains a laser light source that will not function when the door is interlocked. Never override or disable these interlocks.



The top doors that open into the chamber could cause serious damage to the user's hands if shut too quickly. **Always** hold the door firmly by the handle with one hand and keep the other hand clear of the system.



Never handle the blades by the sharp edge. Promptly dispose of used blades into proper sharps containers at the completion of each study.



Never use the system near open flames.

The system features a prominent Stop button on the front panel. This button should be pressed any time the user feels there is imminent danger to a person or the machine.

Be cautious when opening doors to make sure the doors do not collide with any part of the tower.

Blades

This instrument uses extremely sharp blades for operation. Serious injuries can result from improper blade handling. Always follow these procedures:

- Put the specimen block in place and adjust the blade angle before inserting the blade.
- Handle the blade from the back/non-cutting edge.
- Handle the blade with extreme care.
- Never leave a blade in an open, unprotected area.
- Never try to catch a blade that is falling.

Chamber Temperatures



The internal chamber and equipment of this unit are kept at very cold temperatures (-20°C to -10°C [-4°F to 14°F]). Users must always wear insulating gloves when handling metal parts to avoid frostbite on exposed skin. Standard disposable laboratory gloves DO NOT provide adequate insulation.

Laser Safety

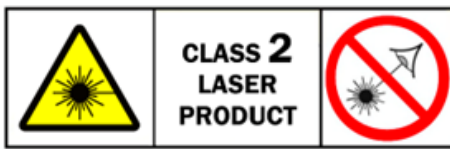
Lasers are classified according to their level of danger (Class 1–4) to the user. The higher the number, the more dangerous the laser is to the user.

The Xerra laser is a multichannel Class 4 laser under maintenance conditions. If the user were performing maintenance on the laser, they would have to follow Class 4 safety protocols. However, only Emit Imaging can perform such maintenance.



Class 4 lasers are hazardous for eye exposure, so the user should not look directly into the laser beam when the laser is turned on. They can burn skin and materials, especially dark and/or lightweight materials at close range. The Xerra laser emits ultraviolet light, which is invisible to the human eye.

The Xerra system is designed to protect the user from the laser even when it is open, so the official designation is Class 2. There is no radiation path back to the eye.



A Class 2 laser is relatively weak. It normally would not harm an eye unless a person deliberately stared into the beam. This is not possible with the Xerra system. Laser protective eyewear is normally not necessary. A Class 2 laser is not a skin or materials burn hazard.

Environmental Considerations for System Components

Location

Before Xerra is installed, select a location that meets the following criteria:

- Indoor use only.
- Room temperature is maintained between 19°C to 24°C (66°F to 75°F).
- Humidity is at 30% to 60%.
- No strong electric or magnetic fields exist.
- No corrosive gases are present.
- It is dust-free (Pollution Degree 2).
- Vibration-free.
- No open flame is present.
- A minimum space of 7.6 cm (3 in.) from the flat surface of the rear panel should be provided behind the equipment to provide unobstructed air flow and access to the main power on/off switch.
- The floor is level and structurally sound. Xerra is equipped with four locking feet located at the corners of the unit to help level it if needed.
- Altitude is less than or up to 2000 meters.
- IP30.

Heat

Keep the system away from all heat sources such as open flames, radiators, heat registers, stoves, and other heat-generating electrical equipment.

Note: The Xerra system uses a propane compressor to comply with the Environmental Protection Agency's SNAP (Significant New Alternatives Policy) regulations. The room where the system is installed should be a minimum of 4.6 m² (50 ft²) in size to prevent an explosion if there is a compressor leak.

Water and Moisture



Because of the high voltages, do not use this equipment near water (for example, near a sink or wet room) due to risk of electric shock, electrical damage, and/or failure.

Power Considerations

Power Sources

Xerra is configured for the voltage requirements of the installation locality that is specified at the time of order. If the system is moved to another area, check to make sure the same voltage requirements exist. Xerra can operate on 230-240 volts alternating current (VAC) at 50/60Hz.

A dedicated 15-amp circuit is required that is not shared with other loads except the computer. Make sure that all equipment is plugged into a properly grounded AC supply.

The computer should share the same circuit to avoid ground loops. Never use auxiliary power outlets on other equipment to supply Xerra. Since the system contains internal surge protection, it must be powered directly from the main electrical supply wall socket. Use the surge protector provided by Xerra for the computer and other accessories.

Power Cord Protection

Make sure power supply cords are routed so that they are unlikely to be walked on or damaged by items placed upon or against them. Pay close attention to receptacles and points of connection between cords and equipment.

Lightning and Power Line Surges

Xerra is supplied with an internal surge protector that can only be serviced by Emit Imaging. Contact Emit Imaging regarding equipment servicing.

A separate surge protector is provided for the computer and other accessory equipment. Facilities should be wired according to local building codes.

Power Outages

If Xerra experiences a loss of supply power, turn off the power to all components and do not restart the system until reliable power has been restored and the system is completely dry. For more details on how to restart the system, refer to the Startup Procedure.

Terminology

The following terms and acronyms are used throughout the manual.

Term	Definition
.avi	(audio video interleave). A file extension for a popular video container format, which can hold different types of video and audio streams for synchronized playback.
Bandpass filter	A filter that allows only a narrow range of light to pass through. Filters are usually defined by the center frequency and then the total width. For example, an 840/70 filter will nominally pass light of 840 nm, and the exact range is roughly 805 thru to 875 nm.
CFT	(cryo-fluorescence tomography). An imaging modality that takes ex vivo fluorescence from 2D sections and combines it into a 3D image.
CMOS	(complementary metal oxide semiconductor). Sensors are used to create images in digital cameras, digital video cameras, and digital closed-caption television (CCTV) cameras.
Dewar	An insulated container used for storing cryogens. Most Dewars are double-walled and vacuum-insulated.
Fluorophore	A fluorescent chemical compound that can re-emit light upon light excitation.
FOV	(field of view). The maximum area of a sample that a camera can image, determined by the focal length of the lens and the sensor size. Xerra has five FOV options, labeled A-E (smallest to largest), which are defined in the Specifications section.
HDR	(high dynamic range). The range of the lightest tones to the darkest tones within an image. HDR combines multiple images at different exposure settings for the best end result. HDR + captures a broader set of images and is useful for imaging low-signal regions, or when developing new fluorophores.
LDI	(laser direct imager). An advanced exposure unit. After patterns are plotted on a digital file, this file is uploaded into the LDI, which then selectively images the pattern on the substrate.
OCT	(optimal cutting temperature compound). Used to embed tissue samples prior to frozen sectioning on a microtome-cryostat. The sample slices can then be mounted onto slides for analysis.
Protocol	The imaging protocol for each study is defined by the application, laser channel, filter, and exposure time.
QA	(quality analysis). Xerra ensures data integrity with real-time slice-by-slice QA.
Recon computer	A computer system not part of Xerra, which is used for final reconstruction and visualization.
Voxel	A unit of graphic information that defines a point in three-dimensional space.

Product Description

Xerra is a high sensitivity, whole tissue, *ex vivo* imaging platform that constructs whole body or tissue data from white light and fluorescent light images. Using a technique called cryo-fluorescence tomography (CFT), Xerra can image cell clusters, isolated organs, and entire intact animals. CFT allows for detailed imaging of samples over several orders of magnitude. [Figure 1](#) shows a picture of the system.



Figure 1: Xerra System

As Xerra removes each layer of tissue, it creates a high-resolution digital record of each two-dimensional (2D) slice. During reconstruction, these images are stitched together into a high-resolution 3D model. Xerra can map the exact anatomical location of molecular imaging data because of its 7-channel multiplexing functionality.

Features

Xerra combines cryo-slicing, high-resolution imaging, and data analysis software into one molecular imaging platform. The system incorporates the following features:

- 12-megapixel (MP) high-resolution camera
- 20-55 micron (μm) slicer
- Slices tissue at 10-15 mm/second
- Proprietary disposable blade
- 6-channel laser module
- 7 interchangeable emission filters
- Refrigerated storage chamber
- Onboard Windows computer with Xerra software and touchscreen display

This multispectral fluorescence imaging technique is used in a wide range of applications, including drug discovery, cancer biology, nanotechnology, neuroscience, and molecular biology/gene expression.

Functionality

Xerra provides the following functionality:

- Automatically slices, images, reconstructs, or renders in 3D and analyzes datasets.
- Provides zooming capability down to 20 μm , with largest field of view (FOV) providing 55- μm isotropic images.
- Performs as many as 2,000 scans per specimen, extracting exponential volumes of data from a single sample.
- Offers high sensitivity for detecting signals deep in tissue.
- Processes several rodents or multiple dissected organs on the same block for high throughput.
- Requires no fixation, perfusion, tissue clearing, or radiolabeling. Maintains complete anatomical context within a single machine.
- Supports 3D fluorescence imaging from 470 nm to 850 nm, including visualization of a wide range of fluorophores (Alexa family, BODIPY family, FITC, Cy family, Rhodamine family, SYBR family, and many more).
- Ensures data integrity with real-time slice-by-slice quality analysis (QA).

OVERVIEW

The following sections describe the Xerra system and its operation in more detail.

Major Components

The Xerra system has two major sections: the tower (A) and the main body (B), as shown in Figure 2.

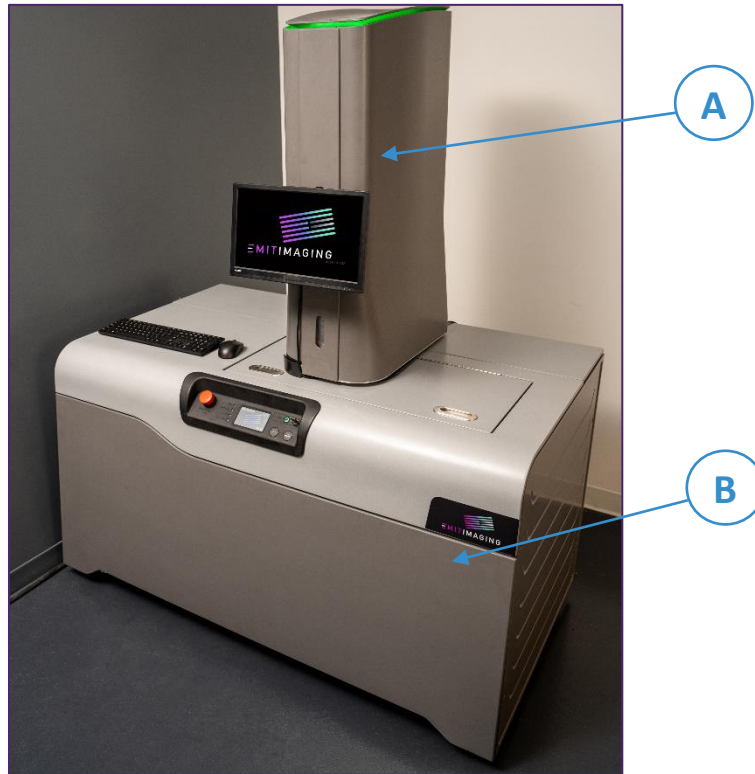


Figure 2: Major Components

Tower

The tower is the vertical section of the instrument which swings over the chamber window 90 degrees on an internal axis.

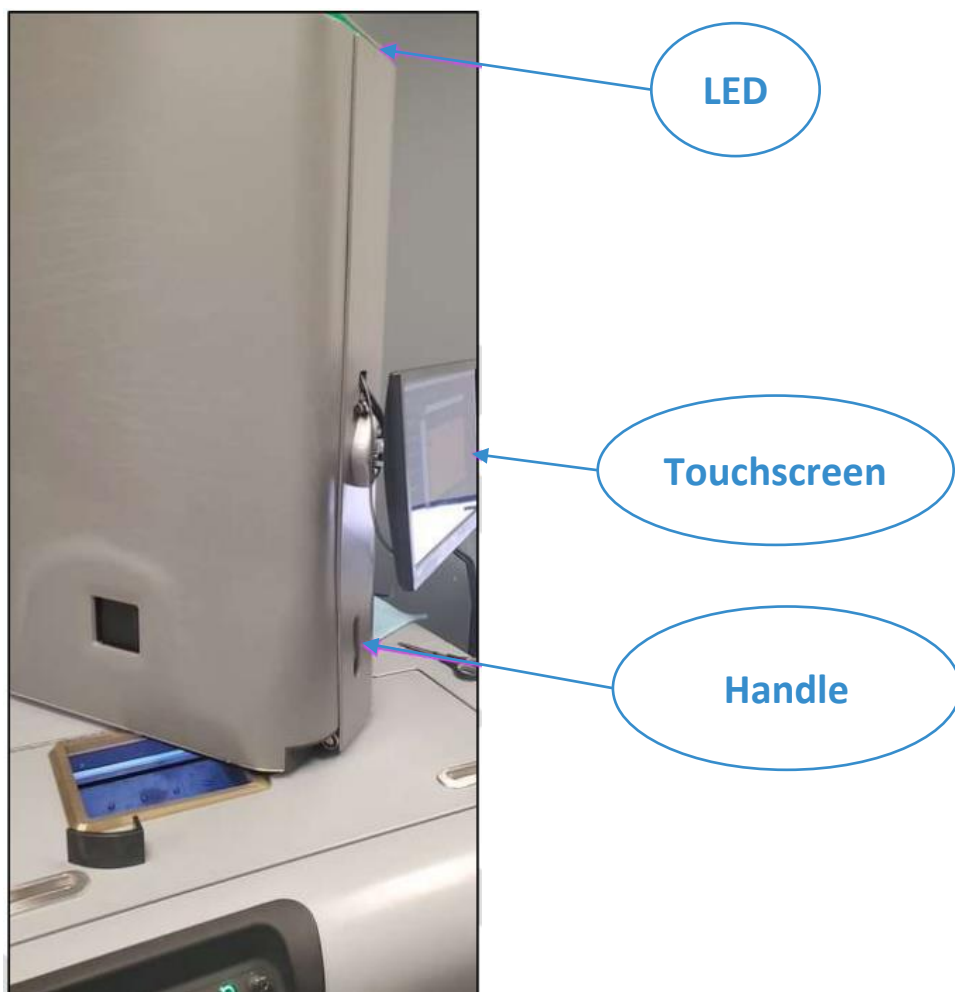


Figure 3: Major Tower Components

The tower contains an imaging camera, filters, and a laser homogenizer. The Main Screen is the large touchscreen attached to the tower. The onboard computer runs the Xerra software, stores saved images, and runs preprocessing on images prior to transfer to a recon computer.

Just below the display screen, in the front center of the tower, a handle is used for rotating the tower. When the tower is open, it is positioned parallel to the long axis of the main body. When the tower is closed, it is positioned at a right angle to the long axis of the main body (as shown in [Figure 2](#)). To prevent frost, the refrigeration system only runs if the tower is completely closed.

An actuated door on the left side of the tower allows the user to access the filter wheel to change filters during a filter change routine in the software. The top of the tower contains LEDs, which change color depending on the function occurring within the system.

Light Color	Definition
Red	System error
Green	System is acquiring data
Blue	System is running/moving

The camera stage automatically adjusts to the appropriate location within the tower for the selected resolution and sample size.

Figure 4 shows the tower interior.

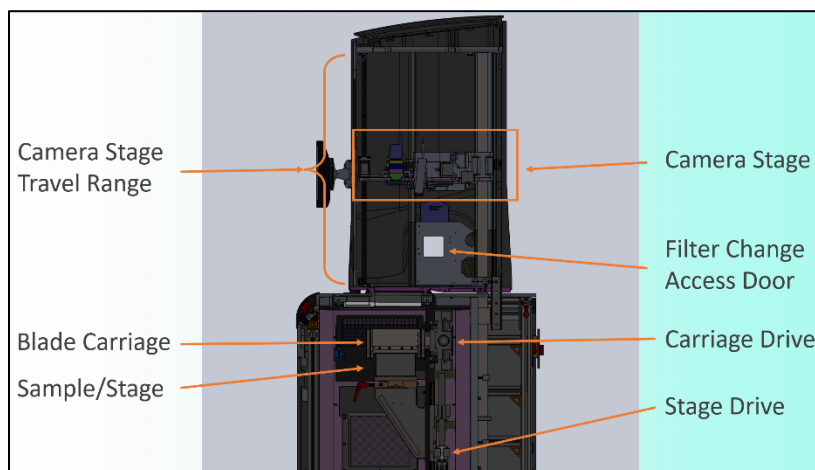


Figure 4: Interior Layout of the Tower

Imaging System

The imaging system consists of an area scan camera and fixed zoom lens. FOV adjustments are made by scaling the distance from the lens to the imaging plane. The focus is set once during the study setup. Chromatic aberrations are corrected for by automatically altering the distance to the imaging plane.

Excitation is produced by a six-channel laser (470, 555, 640, 685, 730, 780 nm). The laser light is emitted through a homogenizer located at the side of the camera.

Emission is collected through a filter wheel. There are seven filter cartridges for fluorescent imaging and one open position for white light imaging. The filter cartridge is a plastic container where the filter is mounted. Each cartridge has an RFID chip.

Figure 5 shows the components of the imaging system and imaging head.

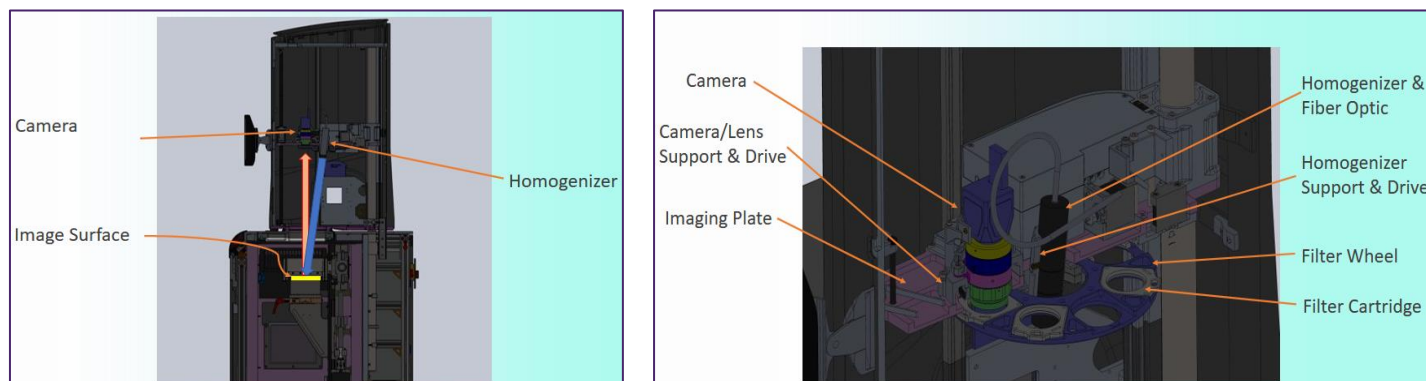


Figure 5: Imaging Components (left) and Imaging Head (right)

Main Body

The body is the lower rectangular section containing a cold chamber, which is refrigerated and insulated. There is a large door on the top to access the chamber with recessed handles for opening and closing. An air handler is the refrigeration system, which controls the temperature of the chamber.

Front Panel

On the front of the main body is a panel consisting of a secondary display screen to use when the tower is open, LED indicator lights for the system, and a red **Stop** button, which shuts down the cutting carriage and sample plate lift if a problem occurs.

Figure 6 shows the front panel and its components.



Figure 6: Xerra System Front Panel

The front panel of the system has four LED indicator lights, as shown in Figure 7:



Figure 7: LED Indicator Lights

Light	Definition
SYSTEM	- Green indicates the operating system and software are running. - No color indicates the system is off.
MOTORS	- Green indicates the motors are operating properly. - Red indicates a malfunction. Restart the system by powering off Xerra. - No color indicates the motors are not communicating with the operating software.
LASER	- Green indicates the laser is functioning properly. - Yellow indicates the laser is warming up. - Red indicates the laser has malfunctioned. Restart the system by powering off Xerra.
COOLING	- Green indicates the cooling system is functioning normally. - No color indicates the cooling system is not in communication with the operating software.

The front panel also has an illuminated power button and key switch for the laser, as shown in [Figure 8](#). Below the laser light and key switch, there are two USB ports that connect directly to Xerra's onboard computer. The laser key must be inserted into the switch for the laser to operate.



Figure 8: Laser Light, Key, and USB Ports

The following colors indicate the different laser conditions:

Light Color	Definition
Green	Operation is normal.
Red	The laser is in error, or the key interlock is off.
Yellow	The laser is warming up, which can take several minutes.
Blue	There is a communication error. Contact Technical Support.*

*Refer to the *Troubleshooting* section for more details on resolving errors.

Cold Chamber

There are two motion systems inside the cold chamber, as shown in [Figure 9](#). The X rail (X) moves the blade holder (D) in a horizontal path parallel to the front of the instrument. The Z rail (Z) holds the specimen plate on a stage (E) with a clamping mechanism and moves it along a vertical axis.

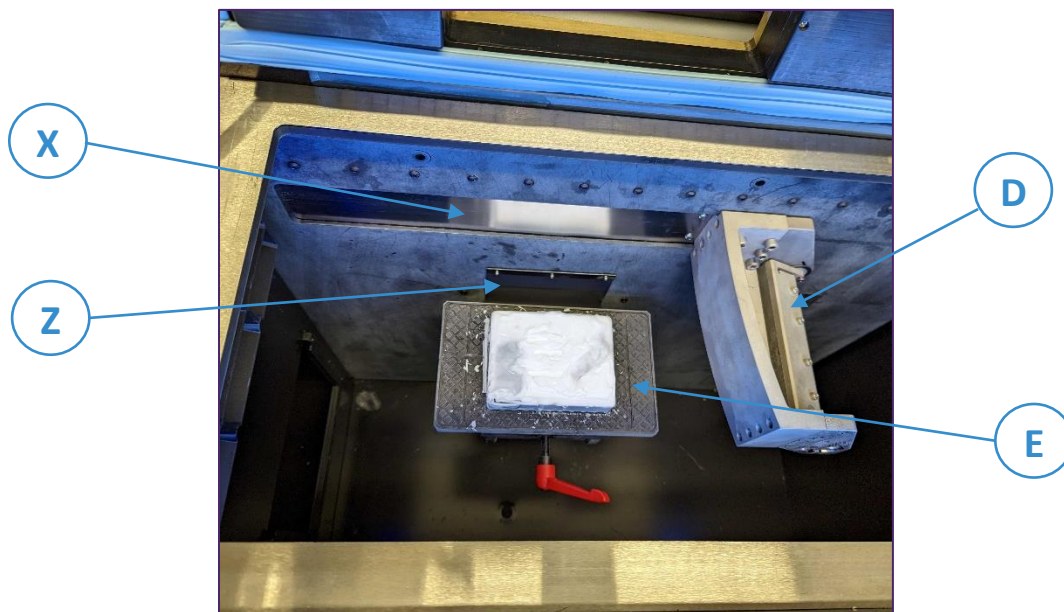


Figure 9: Motion Systems

SPECIFICATIONS

Xerra is a multimodal high-throughput tissue sectioning and imaging system with a Class 2 laser (refer to laser class descriptions in the *Safety Information* section). It produces 2D/3D fluorescence and white light images and datasets.

Physical Characteristics

The following table summarizes the weight and dimensions of Xerra:

Parameter	Measurement
Weight	635 kg (1,400 lb.)
Height	191 cm (75 in.)
Depth	91 cm (35.8 in.)
Width	161 cm (63.5 in.)

Figure 10 shows the basic dimensions.

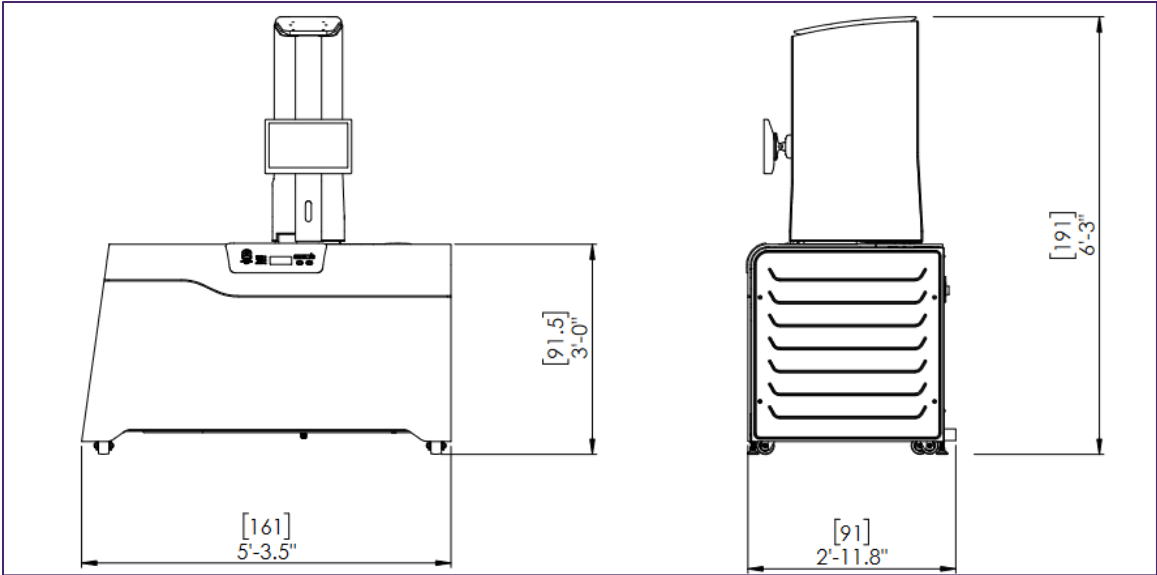


Figure 10: Basic Dimensions of the Xerra System

Laboratory Space and Ventilation Requirements

Xerra requires a minimum of 4.6 m² (50 ft²) laboratory space for adequate ventilation. At least 7.6 cm (3 in.) of space is required behind the rear flat panel to provide unobstructed air flow. Allocate an area at least 191 cm (75 in.) wide and 97 cm (38 in.) deep (excluding work area) for the imaging system console to allow the door to be fully opened and provide the recommended air space behind the instrument.

An additional area that is 122 cm (48 in.) wide should be provided (preferably on the right side) for a table or cart to hold the user's computer and provide a work surface.

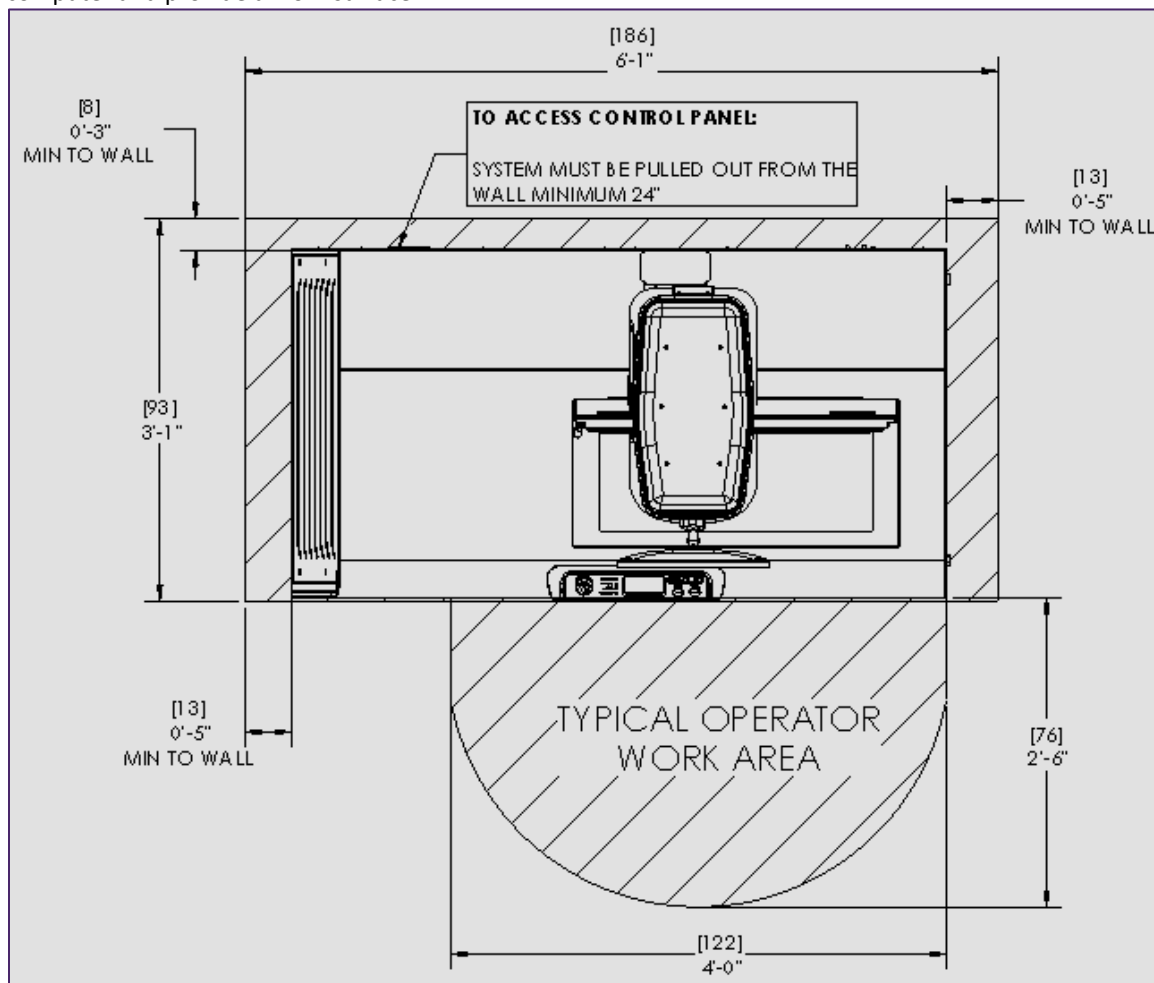


Figure 11 summarizes the recommended room setup dimensions.

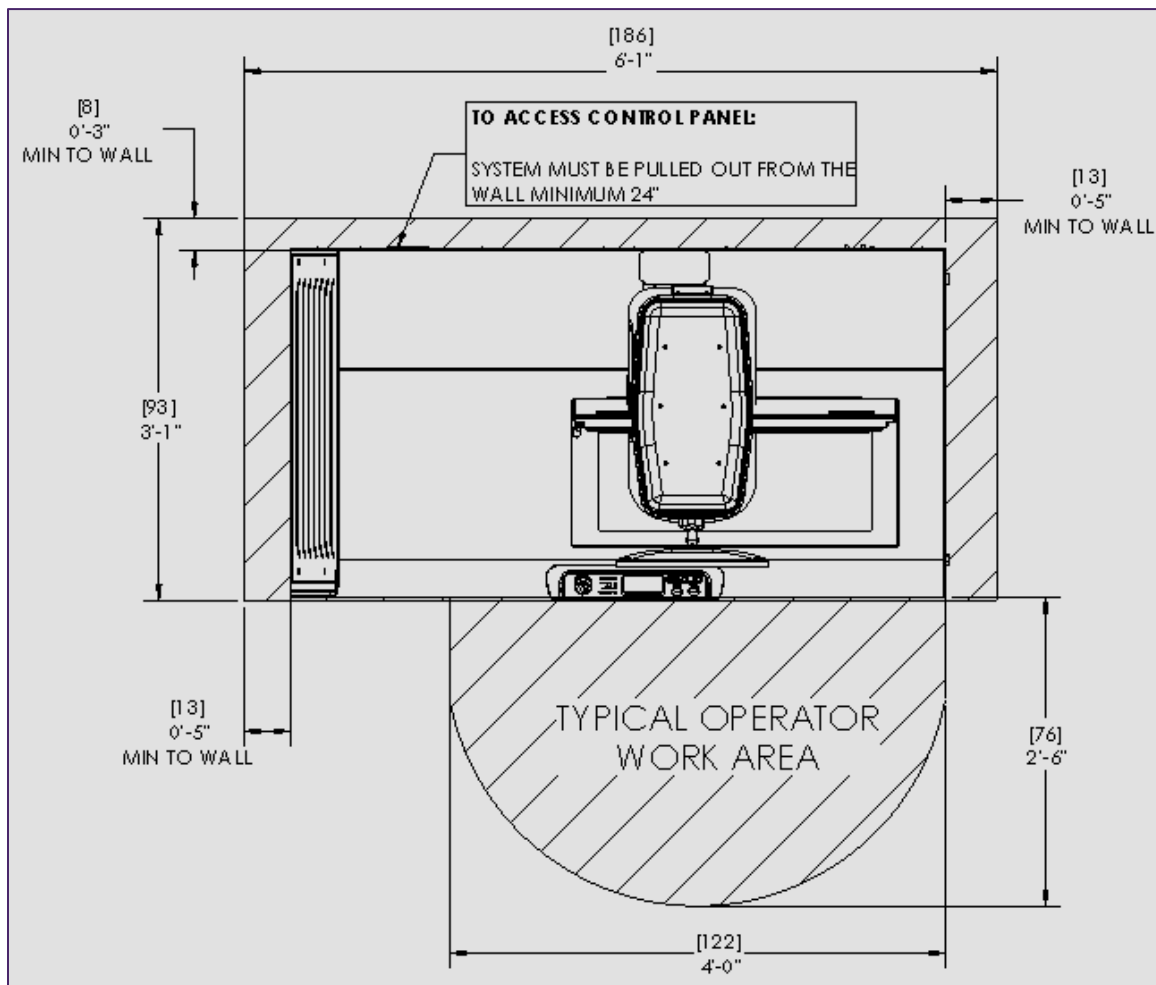


Figure 11: Room Setup Dimensions

Power Requirements

Xerra requires a dedicated 230/240 VAC at 50/60Hz 15 Amp circuit.

Note: The following plugs are supported:

- L6-15 (preferred)
- L25-20
- L14-20
- 6-20
- L6-20

Integrated Computer

Xerra is equipped with an onboard computer and touchscreen display, with the following specifications:

- Intel i7-10700T
- 2 x 2 TB SSDs
- 32 GB RAM

Note: Specifications are subject to change.

Camera

Xerra is equipped with a CMOS camera (12 megapixel, monochrome, 12 bit). Images are collected through HDR, which increases the final bit depth to 32.

Fluorescent images are captured thru a 7-position filter wheel.

The following lists the emission filter specifications:

- 7 bandpass filters (wavelength/width)
 - 511/20
 - 586/15
 - 620/14
 - 680/13
 - 711/25
 - 794/32
 - 835/70

Excitation Laser Parameters

The following lists the laser specifications.

- Fluorescence excitation via six narrow band, high-powered lasers with wavelengths from 470–780 nm:
 - 470 (465 ±5)
 - 555 (555 ±1.5)
 - 640 (638 ±5)
 - 685 (685 ±3)
 - 730 (730 ±7)
 - 780 (780 ±7)
- 900-1500 mW per channel

Every laser diode is tested spectrally with an integrating sphere and spectrometer before it is installed in a unit.

Cold Chamber

A central control point controls all heaters, door interlocks, temperature, and humidity. The refrigerated chamber operates at -20°C to -10°C (-4°F to 14°F).

Block and Blade Details

- Optimal cutting temperature compound (OCT) is used to embed tissue samples and create the block prior to CFT.
- Maximum block size: 250 x 150 x 100 mm (9.8 x 5.9 x 3.9 in.) (X Y Z)
- Minimum block size: 85 x 60 x 20 mm (3.3 x 2.4 x 0.8 in.) (X Y Z)
- Maximum sample volume: 220 x 120 x 80 mm (8.7 x 4.7 x 3.2 in.) (X Y Z)
- Minimum/maximum volumes of OCT: 100 ml/3,750 ml (3.4 fl. oz./127 fl. oz.)
- Once frozen, the block must remain below -15°C (5°F) until slicing is completed.
- Slicing blades are disposable and sold in kits.
- Molds/OCT/blade kits are available.

XY Slicing System

Blocks are sliced on the X-Y axis. Other specifications include:

- Section thickness: 10-250 µm.
- Supports 10 µm +/- sample collection cuts.
- Individual slices can be collected with histology tape.

Data Handling and Study Monitoring

Xerra provides real-time slice-by-slice focus and QA to ensure data integrity. The system supports manual section collection.

3D Reconstruction Software

The Emit Reconstruction Suite provides:

- Exposure selection and bracket selection
- Isotropic voxels per FOV
 - A: 20 x 20 μm
 - B: 30 x 30 μm
 - C: 35 x 35 μm
 - D: 45 x 45 μm
 - E: 55 x 55 μm
- Supports one white light and four fluorescence channels

Output File Formats

For white light data:

- Subject folder: Raw + header (.mhd)
- Subject folder: jpeg 2,000 images + header (.mhd)
- Flythrough (.avi)

For fluorescence data:

- Subject folder: Raw + header (.mhd)

Data Visualization and Analysis

Xerra data files can be loaded into any application that supports .mhd files (Fiji/ImageJ, 3DSlicer, VivoQuant™).

Standard Outputs

The outputs are:

- Xerra white light: 8-bit R, G, and B TIFFs, compiled into 24-bit RGB TIFF
- Xerra fluorescence: 16-bit TIFFs in requested channel exposure times
- Recon output: MHD and UVF for each subject in white light and all fluorescent channels
- AVI output for flythrough movies

Workstation

For processing raw data and performing analysis, the recommended workstation specifications are:

- Dual core Intel Xeon Gold 5218 or greater
- 128 GB RAM or greater
- 4TB SSD or greater

Note: Recommended specifications may vary based on the data analysis requirements.

IT Infrastructure

Xerra is equipped to connect with the Emit workstation and, if desired, to a local network via WiFi. Both Xerra and the workstation have background processes that automatically transfer and archive data if networked.

- **Xerra:** if networked, streams raw and reconstructed data to the workstation during acquisition.
- **Workstation:** optionally streams to IPACS® or long-term storage (AWS, local storage).

In order to prevent unintended interruptions and loss of data during active studies, automatic Windows updates should be disabled for the onboard system computer in Xerra.

OPERATION

How Xerra Works

The steps are as follows:

- 1) The user selects the desired FOV.
- 2) The tower moves to the selected FOV position.
- 3) The block is surfaced to a flat plane.
- 4) The user places a calibration card onto the block surface.
- 5) The focus is automatically set based on the card.
- 6) Both the flat field and dark field are collected.
- 7) The user then begins study.

After the study starts, the following flow diagram shows the image capture procedure followed by the Xerra system.

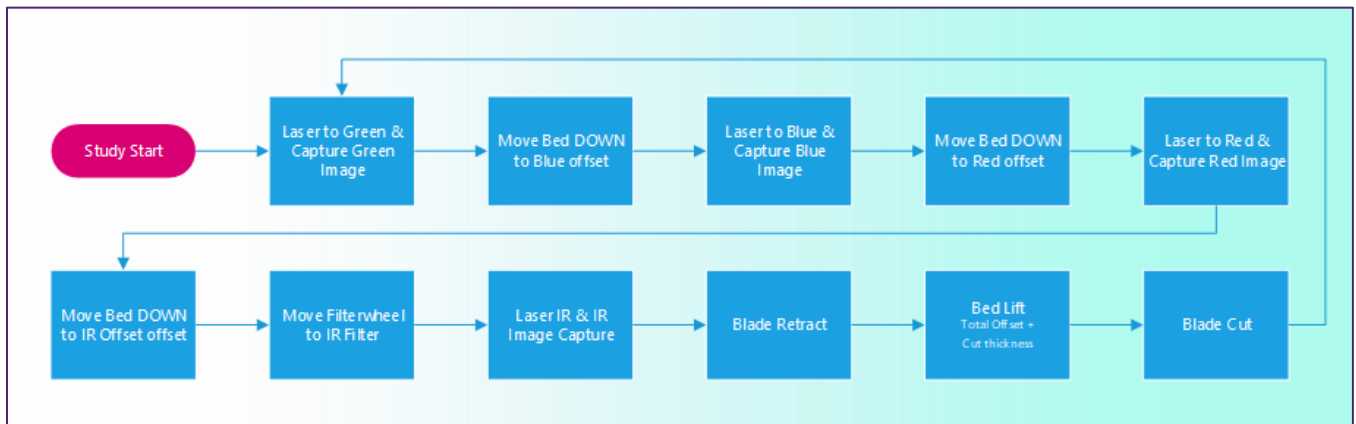


Figure 12: The Capture Process

The steps are follows:

- 1) The laser is set to green and captures the green image.
- 2) The sample bed adjusts for the blue offset.
- 3) The laser is set to blue and captures the blue image.
- 4) The sample bed adjusts for the red offset.
- 5) The laser is set to red and captures the red image.
- 6) The sample bed adjusts for the infrared offset.
- 7) The filter wheel is moved to the infrared (IR) filter position.
- 8) The laser IR and IR images are captured.
- 9) The blade retracts.
- 10) The bed lifts to set the total offset and cut thickness.
- 11) The blade cuts the sample.
- 12) Steps 1–11 repeat until the required number of slices are cut.

Power Up Procedure

To power up the system, complete the following steps:

- 1) Close the doors and tower of the system.
- 2) Plug the system into the wall.
- 3) Move the power switch from **Off** (0) to **On** (1).
- 4) Allow the system to cool down for 24 hours before starting the first study.

Power Down Procedure

If the system must be completely powered down, such as in the case of a planned power outage, complete the following steps:

- 1) Close the chamber.
- 2) Turn power off to the system.
- 3) Wait 6 to 12 hours.
- 4) Clean the chamber of all debris and tissue.
- 5) Close the chamber.
- 6) Wait 1 hour.
- 7) Power off the system.
- 8) Leave the tower in the open position to allow the air to circulate.
- 9) The power must remain off for at least 48 hours before starting up again.

Moving Xerra

Never tilt the instrument for transportation. Please contact Emit Imaging (service@emitimaging.com) prior to moving the instrument beyond the building in which it was installed. The compressor oil will displace during transportation, and the unit must be allowed to sit in its final position for 4 hours or more before operation to avoid severe internal damage.

Sample Preparation

Sample preparation involves three main processes: freezing the specimens, preparing the block, and demolding.

Note: For a streamlined workflow, it is recommended to complete all steps in the same room.

Freezing Procedure

Gather the following items:

- Dewar for flash freezing specimen or a cooler (if not flash freezing specimen)

Note: The cooler should be large enough to fit the entire sample plate with space around the sides to insert and remove the sample plate. Test the cooler size by placing the plate in the cooler and removing it before proceeding.

- 2 kg (1 lb.) dry ice
Note: Wear insulated gloves when handling.
- Certified ACS hexanes for specimen preparation
- Metal pan and aluminum foil
- Hot air gun (used for demolding)
- Clear, resealable plastic bags
- Permanent marker

Freezing (Whole Animal)

- 1) Clearly label an individual plastic bag for each sample that will be frozen.
- 2) Cover the bottom of the Dewar with dry ice.
- 3) Add enough hexanes to fully submerge the specimen without it touching the bottom of the Dewar or the dry ice.
Note: Leave enough empty space within the Dewar so that hexanes do not overflow when submerging the specimen.
- 4) Allow the temperature of the hexanes to reach the temperature of the dry ice.
Note: Hexanes equilibrated to the proper freezing temperature will no longer rapidly boil.
- 5) Submerge the specimen slowly into the cold hexanes (this should take a few minutes).
Note: The hexanes should not boil over during this process.
- 6) Leave the specimen in the hexanes for 10 minutes.
- 7) Remove the specimen from the hexanes and store it in the clearly labeled, individual bag.
- 8) Place the bag(s) in the freezer and store them at -20°C (-4°F) for less than one month or -80°C (-112°F) for long-term storage.

Freezing (Tissue)

- 1) Cover the bottom of a cooler with crushed dry ice.
- 2) Place a metal pan over the crushed dry ice.
- 3) Place the lid on the cooler for 10 minutes to allow the cold environment in the cooler to equilibrate and freeze properly.
- 4) While the cooler is equilibrating, label an appropriately sized piece of foil for each sample to be frozen.
- 5) Pre-cool a large resealable plastic bag at the appropriate temperature for the intended sample storage time: -20°C (-4°F) for less than one month or -80°C (-112°F) for long-term storage.
- 6) Remove the cooler lid and lay a piece of labeled foil onto the flat, chilled pan surface.
- 7) Place the specimen in the desired confirmation/orientation on the chilled foil on the pan.
- 8) Replace the cooler lid and wait for 5-10 minutes to allow the specimen to freeze in its natural state.
- 9) Wrap the specimen in the chilled foil.

Note: Each specimen must be frozen before wrapping to avoid destroying the anatomical morphology.

- 10) If there are multiple specimens, repeat Steps 6-9 for each, wrapping each specimen carefully in its designated pre-cooled, labeled foil.
- 11) Place them in the pre-cooled labeled plastic bag.
- 12) Place the bag in a freezer box. Store it at -20°C (-4°F) or -80°C (-112°F).

Note: Specimens prepared appropriately can be stored 1 to 3 years in -80°C (-112°F). For short-term storage (≤1 month), store at -20°C (-4°F).

Block Preparation

Once the specimen is properly frozen, perform the following steps:

Note: When pouring multiple layers of OCT, it is critical to pour each new OCT layer while the surface of the previous layer is still wet. Always avoid pouring a new OCT layer onto layers of OCT that are already hard frozen. The molds are designed so that each layer of OCT will freeze from the bottom up, so each new layer of OCT should be added to the previous layer when the surface is still wet. Not following this procedure results in poor imaging performance, lost samples, and could damage the Xerra system.

- 1) Gather the appropriate FOV mold (refer to the [Specifications](#) section) and stage, which includes:
 - Sample plate
 - 2 end walls (stamped with selected FOV size)

Note: The end walls for D and E are the same.
 - 2 side walls (stamped with selected FOV size)
- 2) Place 1 kg (2 lb.) of dry ice in the bottom of a cooler.

Note: There should be enough dry ice to fill the cooler to the bottom of the sample plate. DO NOT allow any dry ice to contact the inside of the mold or the OCT at any time.
- 3) Place the FOV mold on the sample plate.
- 4) Place the FOV mold and sample plate into the cooler.
- 5) Close the cooler and wait 60 minutes for the sample plate to cool.
- 6) Take the specimens from the freezer.
- 7) Temporarily place the samples into the mold in the approximate orientation.

Note: Be sure the specimens fit into the mold. If they do not fit, trim the specimen to fit or select a new mold size.
- 8) Shampoo the specimens with OCT by working OCT into the fur of the animal, if applicable, or coating the tissue with OCT.

Note: Complete the next steps with the sample plate in the cooler and the bottom of the sample plate surrounded by dry ice.
- 9) Pour approximately 1 cm of OCT on the bottom of the mold to cover the textured bottom of the stage.
- 10) Allow the OCT to cool and freeze to the sample plate, which should take 5 to 10 minutes.

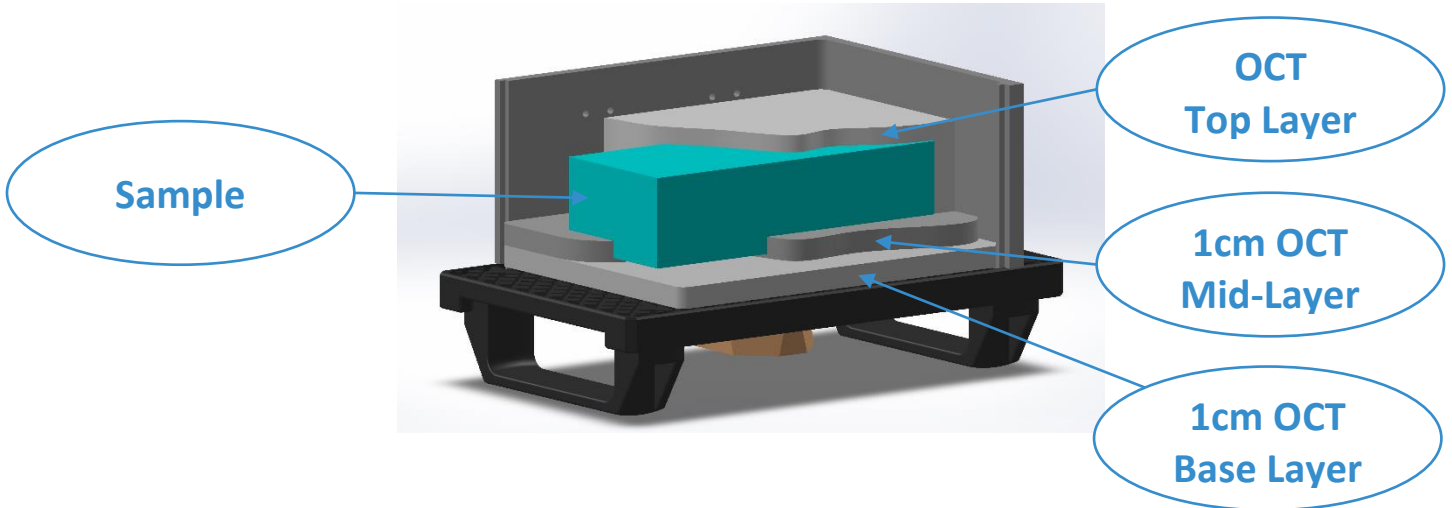
Note: The OCT turns a pale milky white as it freezes and starts solidifying at the sample plate.

- 11) Before the OCT fully solidifies, place the specimen (animals prone with feet down) into the OCT.

Notes:

- Keep specimens near the center of the block, avoiding placement near the edges.
- Do not push or press down to the bottom of the stage.
- Approximately 0.5 cm (0.2 in.) of material is left at the bottom of the stage after the study is completed. Any material below this level will not be imaged.
- When imaging multiple specimens, maintain at least 1 cm (0.39 in.) between each specimen.

- 12) Pour an additional 1 cm of OCT over the specimens. The total depth of OCT should now be approximately 2 cm (1 in.).
- 13) Close the cooler lid and wait until the OCT has begun to turn milky white (15-30 minutes).
- 14) Add a third layer of OCT, filling the mold enough to fully cover all specimens with at least 1 cm layer of OCT above the specimen.



- 15) When the OCT has solidified, remove the sample plate from the cooler. Keeping the FOV mold on the plate, cover it with foil and place the mold and plate into a -20°C (-4°F) freezer for 4 to 8 hours.

Note: The hardness of OCT is highly dependent on temperature. This waiting period is intended to allow the block to homogenize to a stable -20°C (+/-2°C).

Demolding

In preparation for imaging, remove the mold walls from the OCT by completing the following steps.

- 1) Remove the FOV mold and sample plate from the freezer.
- 2) Unlatch the four clips holding the walls in place (two are shown in the photo to the right).
- 3) Using a hot air gun, gently heat one wall for no longer than 20 seconds.
Note: Heating the base of the mold wall is often most effective. Do not heat the sample plate directly.
- 4) From the inside out, tap the top edge of the mold wall with a rubber mallet to gently free the edge. The walls will release, with the bottom of the OCT block still stuck to the mold base.
- 5) Lift the mold wall out from the sample plate.
Note: The OCT around where the mold wall was removed should still be frozen.
- 6) Repeat steps 3–5 for each of the mold walls.
- 7) If imaging is delayed, wrap the sample plate in foil, place the wrapped plate into an airtight bag, and place the bag into the -20°C (-4°F) freezer.



Study Setup

The following steps explain how to set up and run a study on the Xerra system.

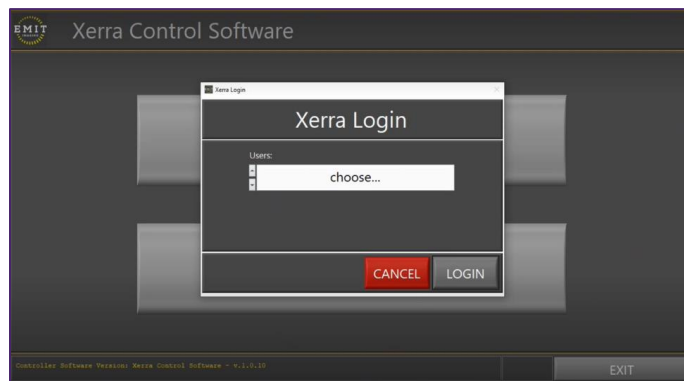
Note: Never export data from Xerra while running a study.

- 1) Prior to setting up the study on the Xerra computer, the system must be powered on.
 - It will take 24 hours for the system to reach the proper temperature.
 - When the software is not running, the system holds a set temperature of -15°C (5°F).
 - Make sure the tower is in the closed position. If the tower is open, the air handler will not run to cool the system.
 - The front display screen does not display the correct temperature if the software is not running.
- 2) Be sure the block is frozen and ready.
- 3) Open the Xerra software by double-clicking the **Startup** icon.
 
- 4) On the external computer screen, select the Xerra Computer Shortcut icon  or double-click the **Startup** icon on the Xerra screen.
- 5) Check that the laser is on, and the laser LED is green.

Note: If the laser is OFF, complete the following steps:

 - a) Turn the key so it is horizontal.
 - b) Press and hold the laser power button for 1 second.
 - c) The indicator should turn yellow to indicate it is warming up.

Note: If the light does not turn yellow, the key may not be properly inserted. Confirm the key is inserted all the way, rotated 90 degrees, and does not immediately come out. Refer to the *Troubleshooting* section if the issue is not resolved.
 - d) After approximately 180 seconds, the laser indicator will change to green, indicating that it is warm and ready to start.
- 6) After the software loads, a login displays.



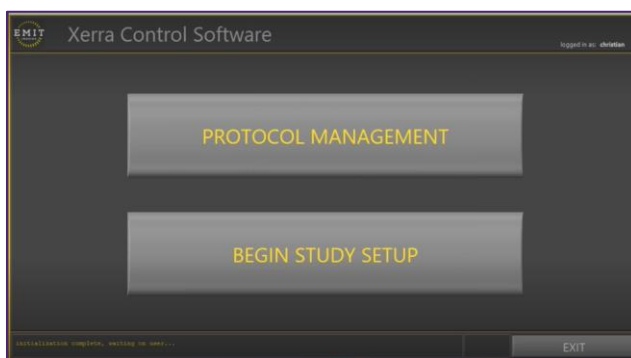
- 7) From the dropdown menu, select the appropriate user.



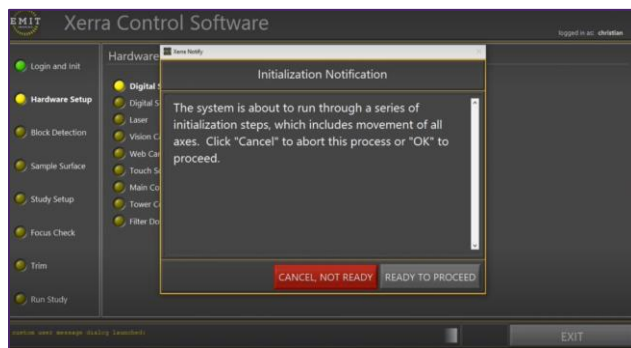
- 8) To create a new profile, select **<NEW>** and enter a new name in the **New Username** field.
Note: Spaces and special characters are not allowed.



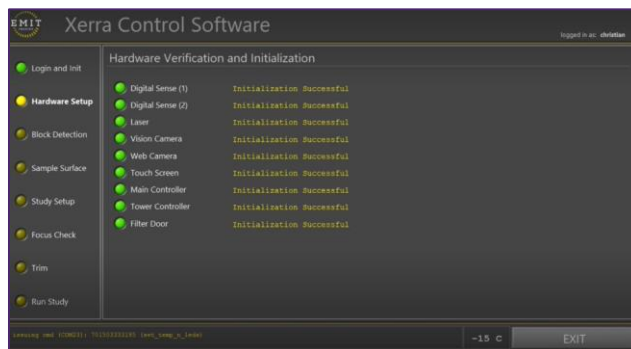
- 9) After logging in, the following screen displays:



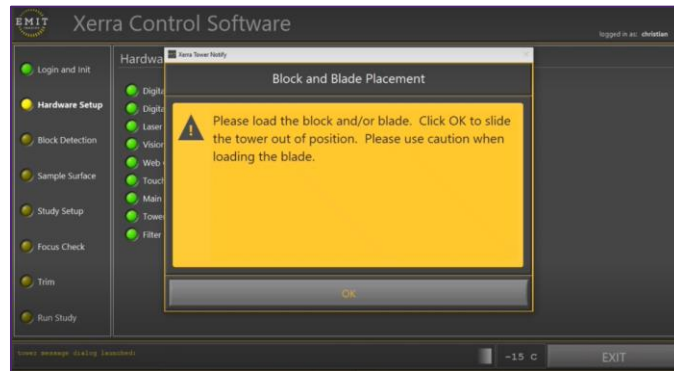
- 10) Select **BEGIN STUDY SETUP**.
 11) The following screen displays.



- 12) Select **READY TO PROCEED**. If a problem is encountered that would cause a malfunction, select **CANCEL, NOT READY**.
 13) The system automatically runs through a verification and initialization process for the hardware. As each device is connected, the circle turns from yellow to green.
Note: Some initialization steps may take longer than others.



14) When all are successfully completed, the following screen displays.



Note: If there are problems with any of the initialization steps, refer to the *Troubleshooting* section.

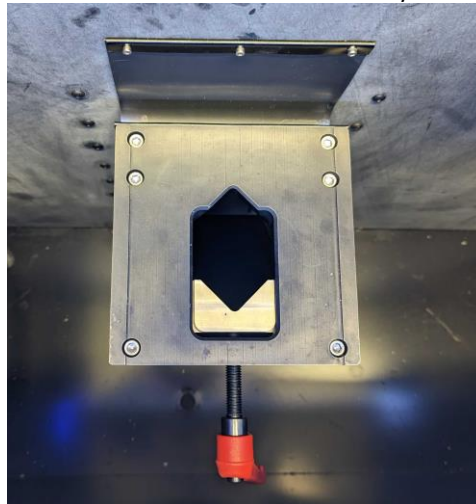
15) Select **OK** to unlock the tower and move the tower away from the sample chamber.

16) Load the sample block.

Note: Be sure the sample block has the mold removed prior to loading.

17) Place the sample block onto the sample knee, so that the locking feature on the sample block sits into the pocket of the knee.

18) Once nested in place, rotate the red handle clockwise until the block is securely locked in place.



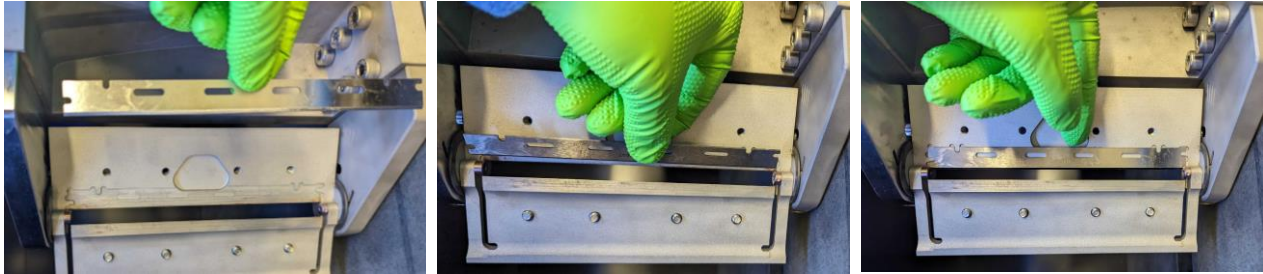
- The block will naturally align as the handle is turned.
- Once locked in place, the sample bed should feel secure and not move.

19) If the handle is in an upright position, pull the handle back toward the front wall, which disengages the screw lock and allows the handle to rotate freely. Moving clockwise, turn the handle down so that it is not in front of the block.



20) Wearing laboratory gloves, install the blade using the following steps.

- a) Using a 4-mm wrench, loosen the four screws holding the blade cover in place by fully turning the wrench approximately seven times.
Note: When loose, the screws should wiggle freely, but remain captive within the blade cover.
- b) Lift the blade cover up and to the right to expose the blade pocket.
- c) Holding the blade from the rear center, and with the serial number up, place the blade into the keyed pocket. If the blade does not fit, inspect to see if the blade is upside down.

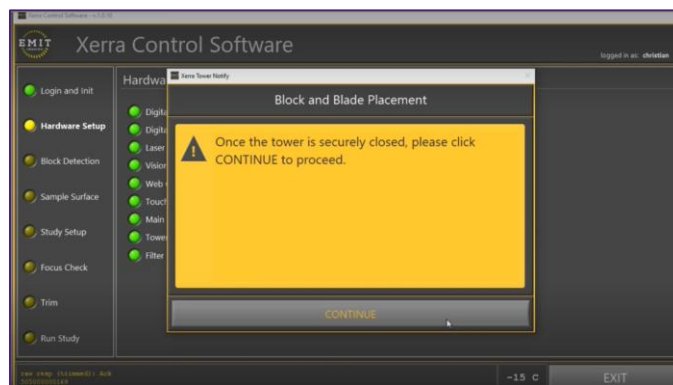


Note: Do not hold the blade from the sharp edge. Hold the blade from the center rear to place into the keyed pocket.



Note: The right and left keys of the blade must match the blade holder.

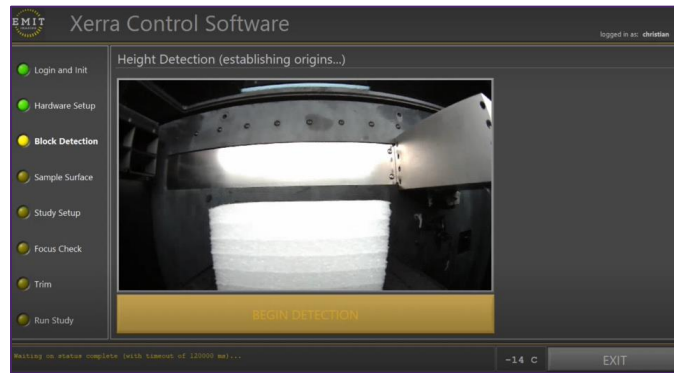
- d) Close the blade cover.
- e) Using the 4-mm wrench, turn the four locking screws approximately seven times. The screws should be snug (hand tight).
Note: Extreme force is not required.
- f) Close the tower and chamber door.
- g) Select **CONTINUE** on the following screen.



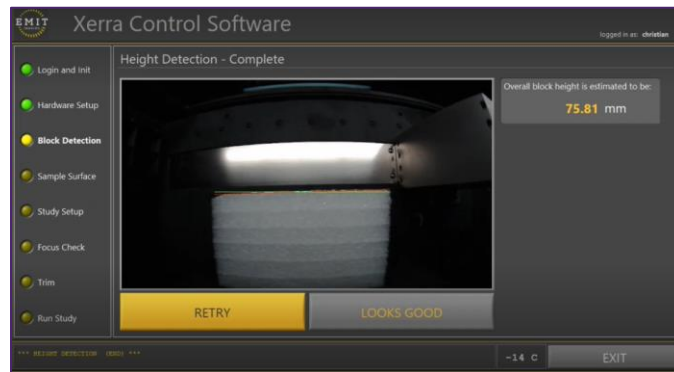
Note: The system checks the height of the sample by detecting the top surface of the block to minimize the number of slices required.

- 21) The block will retract to the low position.

22) Select **BEGIN DETECTION** on the following screen.



23) The block slowly moves up as the system finds the height of the block. The maximum height is 10 cm (3.93 in.). Once the height is estimated, it is displayed.



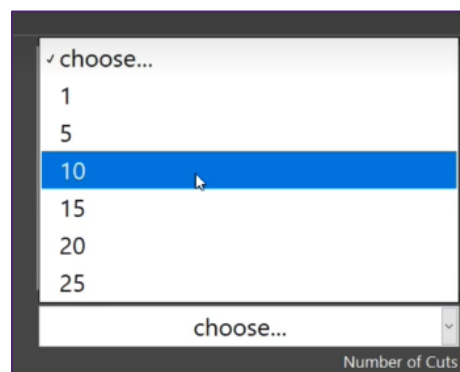
24) If the middle of the block matches the middle of the target window, select **LOOKS GOOD**. If not, select **RETRY**.

25) A flat surface is needed for calibration, so the system must run a surfacing step to smooth out the rough surface of the block. To initiate this, select **choose....**

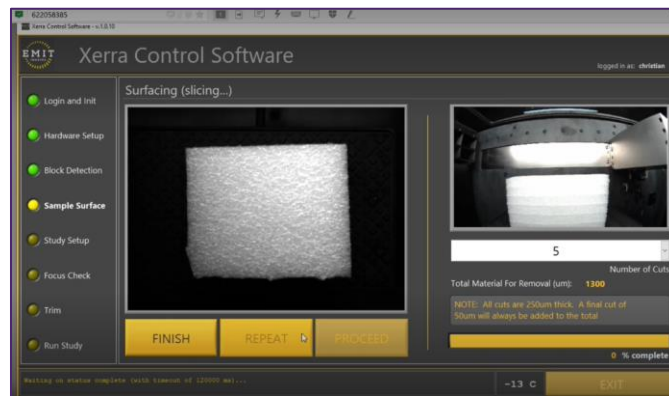


26) Select the number of slices for surfacing.

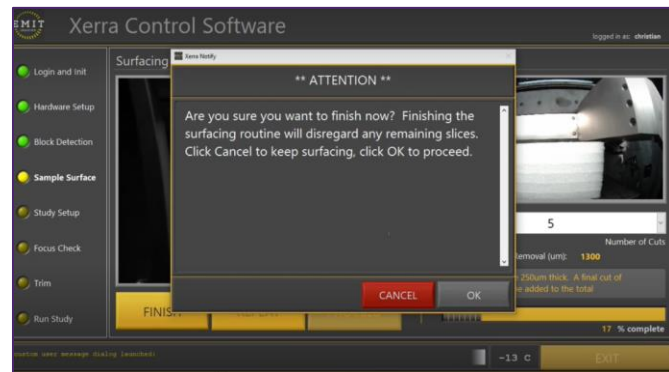
Note: 15 slices is the typical selection. If the block is not level, begin with 25 slices. Each slice removes 250 µm of material.



- 27) Select **BEGIN SURFACING**.
- 28) The system automatically cuts the selected number of layers. If the block is not flat, select **REPEAT**, which reruns the number of slices selected.

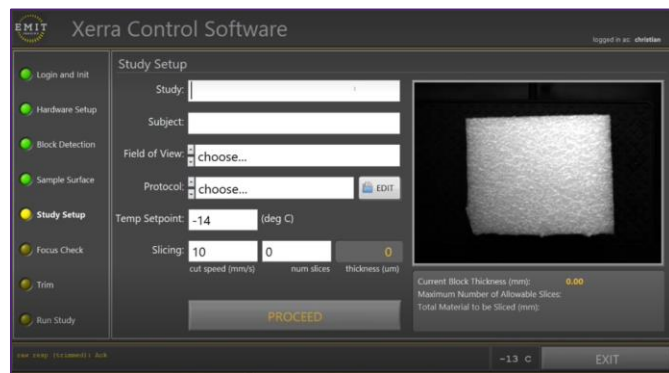


Note: Only select **FINISH** if the full segment of the block is cut. If **FINISH** is selected before the surfacing process is completed, the following message displays.

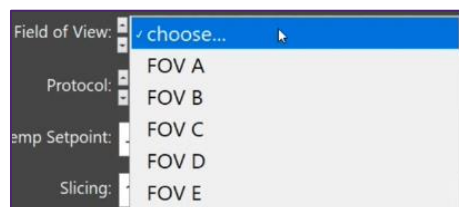


Note: If the surfacing is not completed, out-of-focus images and non-uniform corrections can occur.

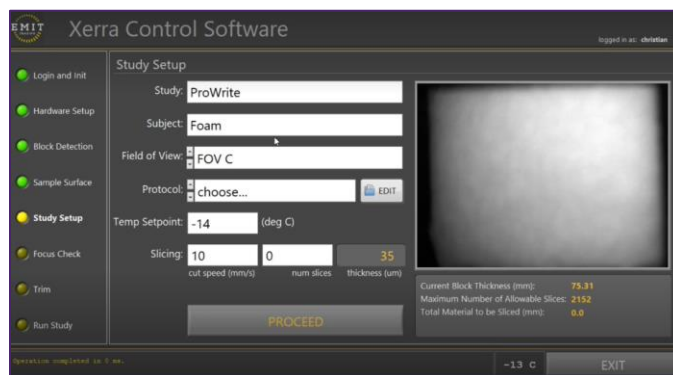
- 29) Once the surfacing is complete (all slices are finished and block is flat), the system is ready to set up the study. Select **PROCEED**.
- 30) The following screen displays.



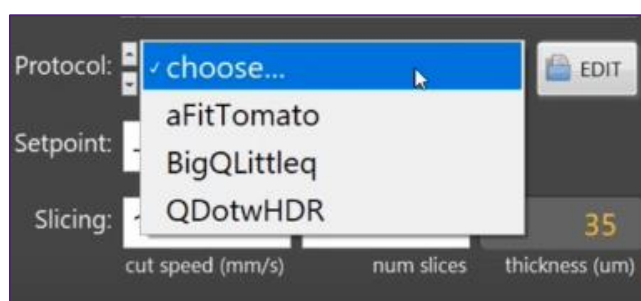
- 31) Enter the desired study name in the **Study** field and the desired meta tag in the **Subject** field.
Note: Do not use spaces or special characters.
- 32) In the **Field of View** field, choose the appropriate value from the dropdown menu based on the mold size used.
Note: This value is determined by the mold size selected during setup (A is the smallest, and E is the largest).



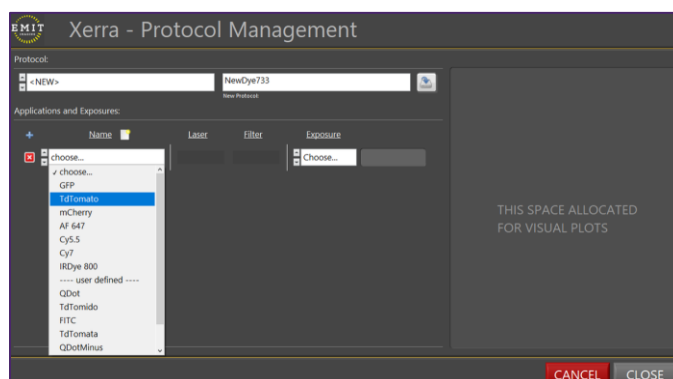
- 33) The tower automatically moves to show what portion of the sample plate is imaged.
- 34) While the tower is moving, the circle remains yellow, and no additional selections are possible. The block will lose focus during this move.



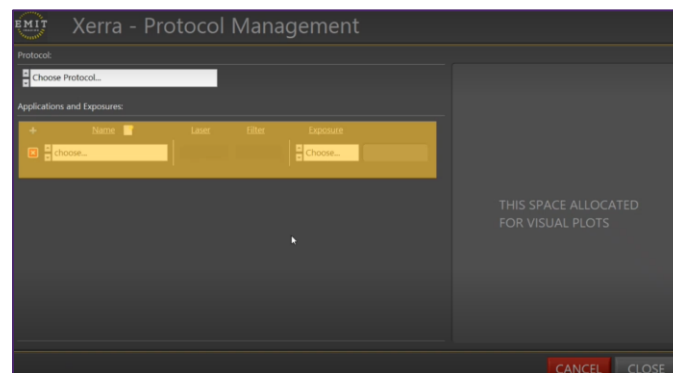
- 35) Select the desired imaging protocol from the **PROTOCOL** dropdown menu.



- 36) To set up a new protocol, choose **NEW** in the dropdown menu.



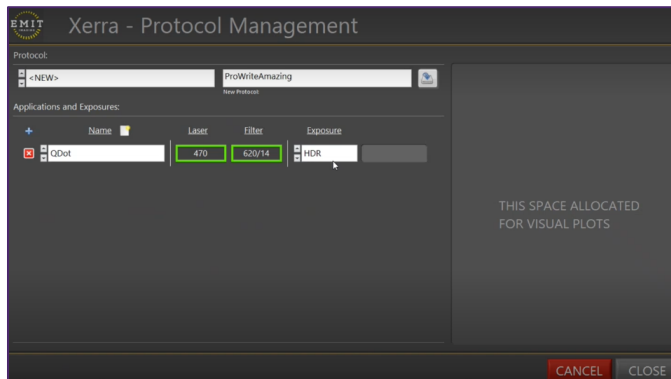
- 37) Complete the **NEW PROTOCOL** field (do not use spaces or special characters).



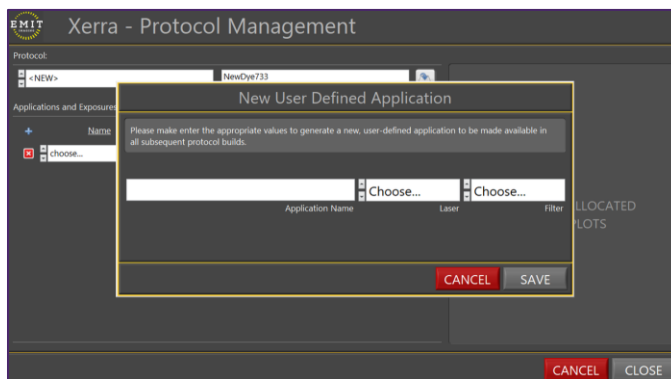
Note: The protocol selection can be completed before conducting a study but not during the study.

- 38) From the dropdown menus, select the appropriate **Application** and **Exposure**.

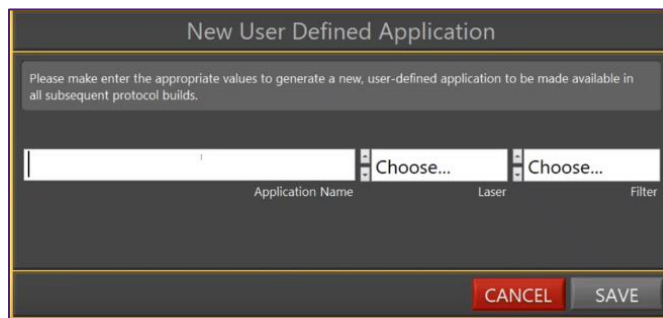
Note: Predefined applications are listed first, followed by any custom applications that have been user-created.



- 39) To create a new application, select the white square with a yellow star icon next to **NAME** . This opens a window where the new application is defined.



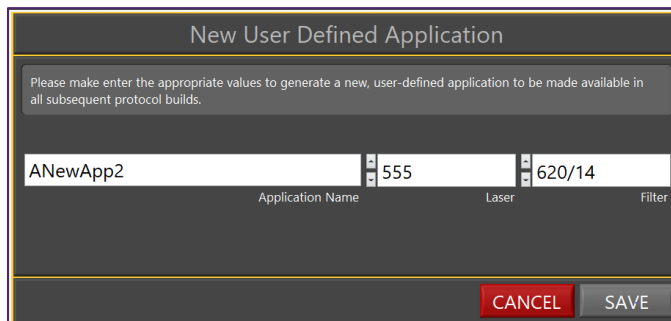
- 40) Complete the **Application Name** field. Do not use spaces or special characters.



- 41) Select a laser channel and filter to use for this application.

Note: Exposure times are defined in Step (45).

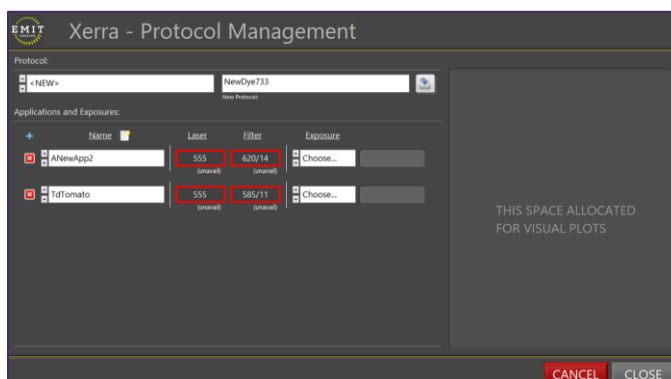
- 42) Select **SAVE** to exit.



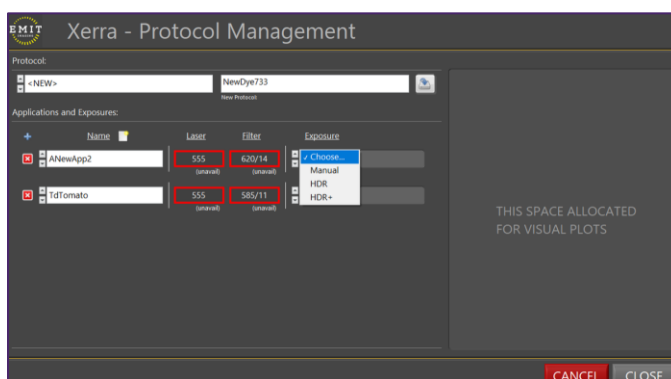
- 43) The new application can now be selected.

44) To add additional applications, select the **blue plus sign icon** .

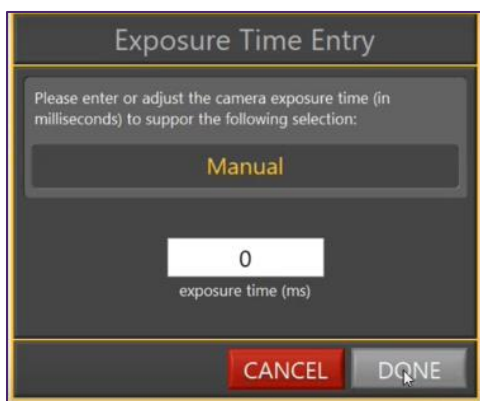
Note: If entered from SETUP, lasers and filters will show as unavailable until initialization is completed.



45) Select the appropriate exposure times for the images.



- Manual exposures are a single camera image taken at a specific number of milliseconds (ms). Only use this feature if targeting a well-defined region of interest (ROI).
Note: Fixed exposure times typically range from 30 to 2,500 ms. This option should only be used if an exact value has been experimentally determined.
- If choosing a manual exposure, complete the **exposure time (ms)** field, and select **DONE**.



- HDR captures a series of images at various exposure times. These can then be compiled into a single HDR image.
- HDR + captures a broader set of images. HDR+ is useful for imaging low signal regions, or when developing new fluorophores.

46) Select the Blue arrow icon  next to the **New Protocol** field. This saves the protocol and opens a pop-up that says **SAVING**.

- To create a new protocol, select **Stay**.
- To continue with **Study Setup** or exit to the main menu, select **LEAVE PROTOCOL EDITOR**.

47) Enter the desired temperature in the **Temp Setpoint** field. The range is -15°C (5°F) [recommended] to -18°C (-0.4°F).

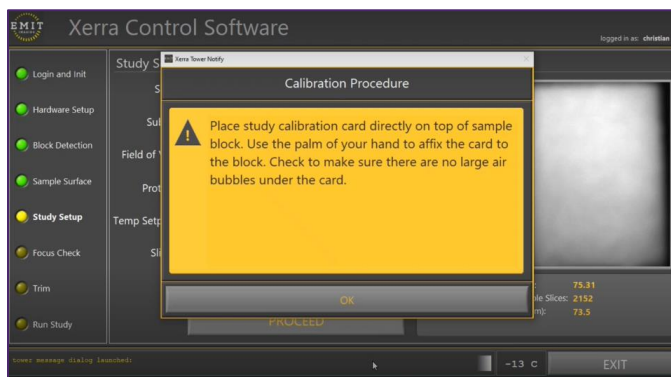
48) Complete the desired cut speed and number of slices in the **Slicing** fields.

Notes:

- For soft tissue, 10 mm/sec is recommended.
- For whole body imaging, 15 mm/sec is appropriate.
- For number of slices, any number greater than 1 and less than the total number of possible slices is acceptable.
- The study ends after the last slice is complete, so select the total allowable slices. The study can be ended early from the Run UI.

49) Once all the fields are completed, select **PROCEED**.

50) The following screen displays.



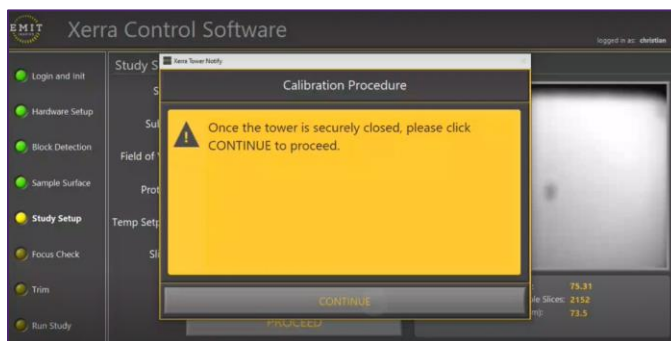
51) Select **OK** then open the tower and install the calibration card onto the block surface through the chamber opening.

Notes:

- The block size (A-E) determines which calibration card to use.
- Keep the calibration card clean and flat prior to use.
- Use the calibration card once only.

52) Center the card and push it down so it adheres to the block.

53) Close the door and tower.

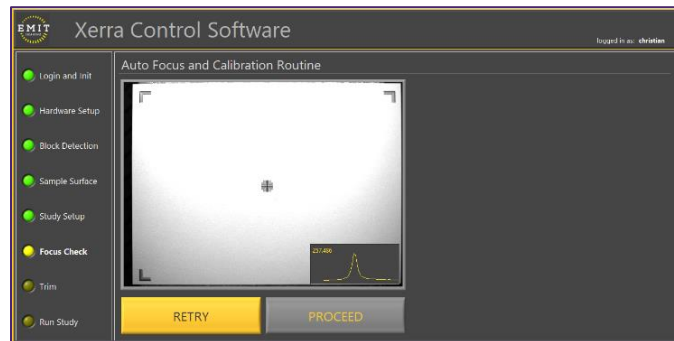


54) Select **CONTINUE**.

55) Select **START** to run the **Focus Check** process.

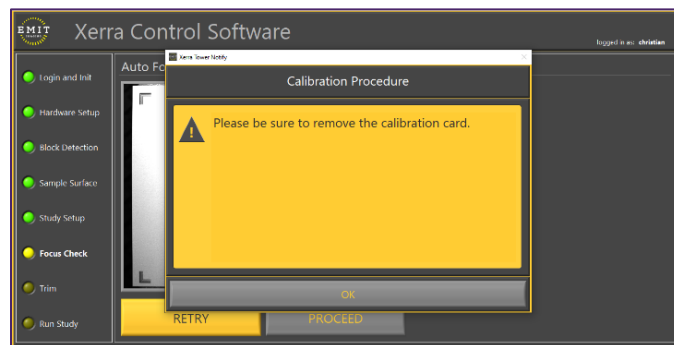


56) The focus is automatically set with the calibration card. This may take 120 seconds.



57) Select **PROCEED** to continue. As the **Focus Check** process continues, the graph in the lower right-hand corner will change its profile until a sharp peak is reached.

Note: Select **RETRY** if the card is not flat or there is another problem. There is no limit to the number of retries, but this function is rarely needed.

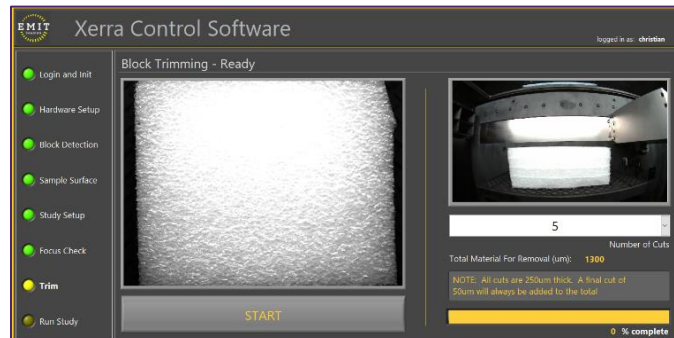


58) Select **OK** to move and unlock the tower.

59) Open the tower and door to remove the calibration card. The card can also be pushed into the waste bin.

60) Close the tower and door and select **OK**.

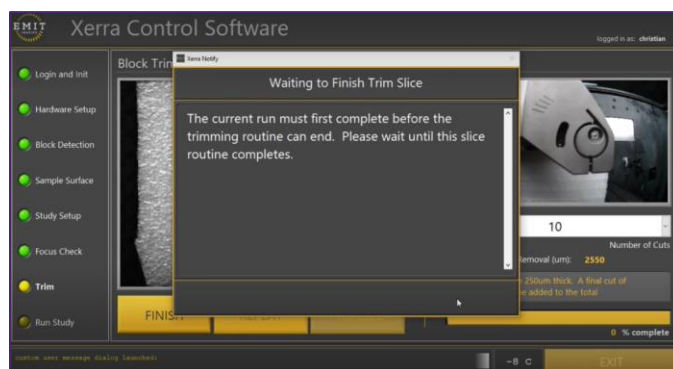
61) Select **PROCEED** to continue, and the following screen displays.



62) Select the number of trim slices. If the specimen is not partially visible from the surface, select **20**.

Notes:

- Each slice removes 250 µm of material.
- The objective is to remove as much material as possible in the shortest time.
- At least one trim cut must be run to complete the trimming routine and proceed to the next step.

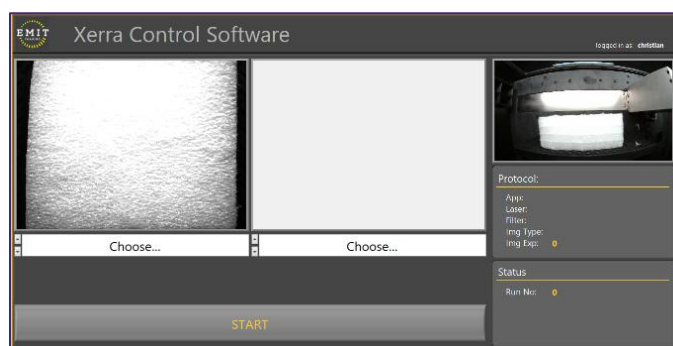


63) Select **FINISH** at any time to stop trimming. This will complete trimming on the next slice.

64) Once the selected trimming cycles have completed, or trimming has been stopped by selecting **FINISH**, choose one of the following options:

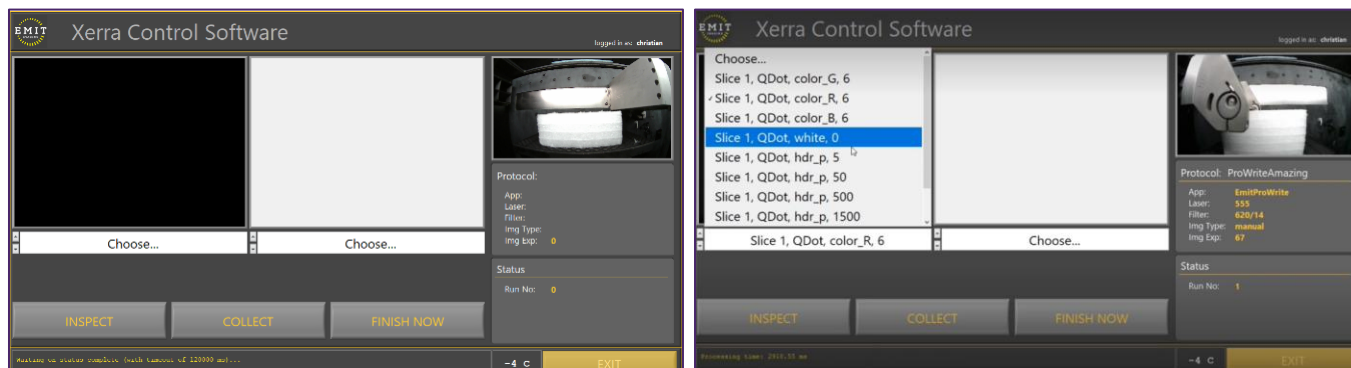
- **REPEAT:** Reruns the number of slices selected. Select to quickly remove more material.
- **PROCEED:** Ends trimming process and opens the imaging window.

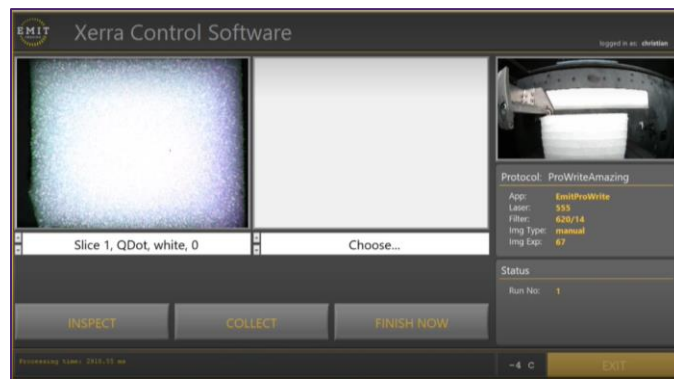
65) After selecting **PROCEED**, select **START** to begin the imaging process.



Note: The white light image (top-left of the screen) displays the previous image. Making selections from the dropdown menus will not affect the imaging study. These images may show green or red pixels since they are not color- or alignment-corrected. Post-processing produces a cleaner image.

66) The following screen displays after the imaging process is completed. A live webcam view of the interior of the chamber is displayed in the top right-hand corner of the screen. As the laser cycles through various excitation wavelengths, the chamber may illuminate with several different colors. In the IR spectrums, the chamber may appear black for several seconds.





67) Choose one of the three options at the bottom of the screen, as shown above.

- **INSPECT:** Pauses the run to allow inspection of the block. After inspection is completed, close the tower and resume the study.
- **COLLECT:** Pauses the run and enters Sample Collection mode.
- **FINISH NOW:** Ends the study and exits the Xerra software.

Notes: The study will wait until the last image is collected to enter Sample Collection mode. If multiple samples are required, enter Sample Collection mode from the run screen for each section of tissue.

Slice Collection

Complete the following steps:

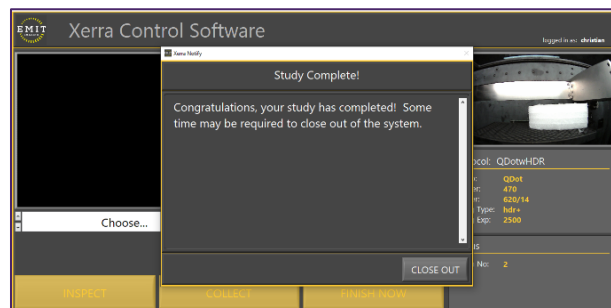
- 1) From the **Study** window, press the **Sample Collection** icon.
- 2) On entering Sample Collection mode, specify the slice thickness.
- 3) Xerra automatically makes a single cut across the top of the block to prepare the block surface.
- 4) When prompted, open the tower.
- 5) Place the collection tape over the tissue to be collected.
Note: The top of the tape should face toward the blade.
- 6) Keeping your hands clear of the blade, use the secondary touchscreen to advance the blade forward.

Notes:

- The digital buttons are temporary.
 - The blade will only move by pressing the digital button (either forward or reverse).
 - There is no ability to change the height of the block.
- 7) Pressing the **forward** button, move the blade through the block. As the blade slices under the tape, pull up on the tape to remove the tape along with the underlying tissue.
 - 8) After collection is completed, close the tower and resume the study.

Completing the Study

- 1) **FINISH NOW** ends the study and exits the Xerra software. The following screen displays:



- 2) Select **CLOSE OUT** to exit completely from the system, which takes between 12 and 30 hours.

CARE AND MAINTENANCE

Air Filter Cleaning

The air return on the lower-left side of the chamber has two filters to protect the cooling system. Inspect these filters after every experiment, i.e., every time the chamber is cleaned. If there are any shavings on the grid, remove the filter and clear the debris with a soft brush or sponge. The filter can be handwashed if the debris is particularly hard to remove.

Note: Do not put the filter back in place until it is fully dry. Do not run a study without filters in place.

System Cleaning Procedure



Do not pour or spill liquid or use aerosol cleaners and never spill liquid of any kind on any of the Xerra components. Sprays and liquids that come into contact with Xerra may result in electrocution or damage to the system. Liquid cleaners should never be used inside a cold system.

Cleaning Surfaces

Use 70%–99% isopropyl alcohol to clean the exterior surfaces of the Xerra system as needed. Apply the alcohol to a rag to wipe down any surfaces. When the system is warm, all surfaces can be wiped down with the alcohol solution and allowed to dry thoroughly.

All areas of the cold chamber may also be wiped down with 70%-99% isopropyl alcohol.

Notes:

- **Do not use soaps, acetone, xylene, or other solvents.**
- **Solvents may damage the paints and other non-reflective surfaces within the chamber.**
- **Soaps may freeze on contact with the chamber and may contaminate the chamber with dyes that may adversely affect imaging performance.**
- **Do not use lower concentrations of alcohol, as lower dilutions will freeze on contact with the cold chamber.**

Removing Shaving Debris

From the **Pause Study** menu, or at the completion of a run, the user may want to perform a basic cleaning of the system. Complete the following steps.

- 1) Swing the tower open and open the chamber door. The air handler stops operating shortly after opening the tower.
Note: The air handler will not resume normal operation until the tower is securely closed. Once closed, no further action is required to restart the air handler. When open, the system is no longer cooling. Under no circumstances should the chamber be open with an active sample for an extended period.
- 2) Remove the blade from the blade holder assembly.
Note: If cleaning mid run, it may be easier to remove the block, and place it in a refrigerator for cleaning.
- 3) Using the dustpan and hand broom, sweep up any chips that have not fallen into the waste bin.
Notes: When the system is below freezing, the dustpan should also be cold (leave it in the bottom of the chamber for 5 minutes) to avoid melting debris onto the pan. Avoid touching the chips as they are still frozen.
- 4) Discard chips and tissue per the institution's biohazard procedure.
- 5) When done cleaning, reinstall the block and blade.
- 6) Close the door and tower.
- 7) Resume imaging by following prompts on screen.

SERVICING

At no time should the customer attempt to service Xerra. Refer all servicing to Emit Imaging Technical Support. If the system is damaged and requires service, unplug the system from the outlet and contact Technical Support (service@emitimaging.com). Servicing by anyone other than those authorized by Emit Imaging voids any warranty covering this product.

TROUBLESHOOTING

System Errors

Front panel LED indicators only function while the control panel is open and after initialization of the Xerra software.

The following initialization errors can occur.

- Camera malfunctions and fails to initialize.
- Main controller error.
- Stop button is pressed.
- Tower is open.
- Something is preventing the X or Z rail from moving.

Follow on-screen prompts. If error persists, switch off the main power switch for 30 seconds, then power on and resume normal operation.

Tower Opening Error

Forcing the tower open, or proceeding without the tower being fully closed, can cause an error and an unsafe condition, as indicated by the tower's LED light.

If an error occurs, the cutting head will stop moving.

Exiting this error may require restart of the Xerra software, or a full restart of the Xerra system. Xerra will prompt the user to clear this error. If the tower is fully closed, but this error persists, please contact Technical Support.

Stuck Blade or Unusual Noises

If debris becomes lodged in the blade, or the sample block is loose, the cutting head may become jammed. Xerra will attempt to clear this error. If this error persists, complete the following steps:

- 1) Restart the Xerra software.
- 2) Enter the block setup procedure, which will retract the block away from the blade.
- 3) Remove the blade to a safe location.
- 4) During the Loading Procedure, remove the used block and inspect it for damage.
- 5) If the block is not damaged, reload and restart.
- 6) If the error persists, contact Emit Technical Support.

Power Failure

If power to Xerra is interrupted, complete the following steps:

- 1) Remove the block from the chamber.
- 2) Turn off the main power switch in the rear of the unit.
- 3) Clean and remove any debris.
- 4) Close the chamber door and the tower.
- 5) When power to the unit is available, follow Start-up procedure as normal.

Note: When the Xerra system is on, and the chamber is at temperature, leaving the chamber door open for more than 5 minutes can cause condensation on gears and motors.

Fusing

The system is equipped with several breakers and fuses to ensure safety and prevent potential damage to sub-systems:

- 1) Main Power entry module: 10 Amp
- 2) Internal GFCI Breaker: 25 Amp
- 3) System Power Supply Breaker: 6 Amp
- 4) Air Handler Supply Breaker: 3 Amp
- 5) Motor Supply Breaker: 3 Amp
- 6) Heater Fuse (#1) 4 Amp, 24VDC, Fast-Blow
- 7) Tower Fuse (#2) 6.3 Amp, 24VDC, Fast-Blow
- 8) Laser Fuse (#3) 10 Amp, 24VDC, Fast-Blow
- 9) Computer Fuse (#4) 4 Amp, 24VDC, Fast-Blow
- 10) Lower Control Fuse (#5) 10 Amp, 24VDC, Fast-Blow

Breakers and Fuses are not user serviceable. If you suspect a breaker or fuse has tripped, contact Emit Technical Support.

Laser Errors

The following table summarizes the types of errors and the steps to resolve them.

Light Indicator	Error	Solution
Laser light on front panel turns red.	System has malfunctioned.	Contact Technical Support for assistance.
	Key interlock is off.	Turn the key clockwise. The light should change to green. If the color does not change, turn the laser system off. The color should change back to green when the laser system is turned back on. If not, contact Technical Support for assistance.
	Key is missing.	Turn off laser power and set the key to the On position. Restart the laser. The light should turn yellow, indicating warmup. If the light remains red, contact Technical Support for assistance.
Laser light remains yellow for more than 180 seconds.	Warmup has not completed because system has malfunctioned.	Contact Technical Support for assistance.

Extended Warming

If the unit is allowed to warm up for more than 2 hours or the door is left open for more than 30 minutes, please follow the instrument Power Down Procedure (page 22).

APPENDIX

Technical Support

Please contact Emit Imaging at service@emitimaging.com or your local distributor.

Consumables

OCTs, blades, and calibration cards can be reordered from Emit Imaging (info@emitimaging.com) or your local distributor.

Replacement Molds and Sample Plates

Emit provides replacement FOV molds, A to E, as follows:

- Mold A (FOV1) = Samples (in-plane resolution = 20 μ m, FOV = 5 x 4 x 4 cm)
- Mold B (FOV2) = Single mouse (in-plane resolution = 30 μ m, FOV = 12 x 9 x 5 cm)
- Mold C (FOV3) = 2 mice (in-plane resolution = 35 μ m, FOV = 16 x 12 x 6 cm)
- Mold D (FOV4) = 3 mice (in-plane resolution = 45 μ m, FOV = 20 x 15 x 8 cm)
- Mold E (FOV5) = 4 mice or one rat (in-plane resolution = 55 μ m, FOV = 22 x 15 x 10 cm)

Ordering New Supplies

Emit Imaging can provide new kits of OCT compound, blades, and molds for future studies. If a unique filter is required for a new experiment, Emit can provide a filter in a cassette with a unique ID tag, which is input into the Xerra software. Please contact Emit Imaging through the website: www.emitimaging.com, or email info@emitimaging.com for more information.

Emit Imaging, Inc.

875 Hollins Street, #102b
Baltimore, MD 21201

Legal Notices

Limited Warranty

Failure to follow operating or safety precautions may void any warranty covering this product. Servicing by anyone other than those authorized by Emit Imaging voids any warranty covering this product.

Patents

US 10,209,242
US 11,385,222
US 9,799,113
JP 6,719,123
JP 7,093,086
AU 2,016,263,801
CH 108,027,981

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