



KONICA MINOLTA



# KDR™ AU DDR

## Advanced U-Arm System with Dynamic Digital Radiography

### Operator's Manual



KMHA 500-000099  
Revision D



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# I. INTRODUCTION

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# I. INTRODUCTION

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## 1.0 REVISION HISTORY

<b>Revision</b>	<b>Date</b>	<b>Document Name (Reason for Change)</b>
A	11/01/2019	Original document
B	12/13/2019	Updates to clarifications of use
C	02/25/2020	Updates to dynamic mode, DAP meter, and exposure index sections
D	07/06/2020	Updates to chapter and section organization, template numbering, additional software information, general formatting, and updates surrounding the addition of the Sedecal generator option.

# I. INTRODUCTION

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## 2.0 OVERVIEW

### 2.1 General Overview

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The KDR™ AU DDR Advanced U-Arm System with Dynamic Digital Radiography is a versatile digital radiography system that improves workflow and provides exceptional dose efficiency. The KDR AU DDR features the latest developments in high-technology construction and design, including the potential for Dynamic Digital Radiography (DDR), making it possible to rapidly capture sequential radiographs in a single exam. It consists of the following subassemblies: X-ray tube, positioner, automatic exposure control, collimator, X-ray generator, patient mobile table, and acquisition station with ULTRA software.

Two KDR AU sub-models are available. The KDR AU DDR Advanced U-Arm System with Dynamic Digital Radiography is capable of both dynamic digital radiography (or “dynamic mode,”) and single-frame radiology (or “static mode.”) The KDR AU Advanced U-Arm System (KDR™ AU) is capable of single-frame radiology only.\* The name “KDR AU DDR” will be used to refer to both models throughout this manual.

This operator’s manual describes the operation, safety, and care of the KDR AU DDR and can be used as a general reference. The operator must be familiar with all sections of this manual before attempting to operate the KDR AU DDR. For more information on individual components, see the component manuals.

Installation of the KDR AU DDR should be performed by a qualified field service engineer. Follow all safety guidelines for the safe handling of the KDR AU DDR. Follow all instructions exactly as given.

*\* The optional HD / FNB flat panel detector (FPD) is required for dynamic digital radiography in the KDR AU DDR. The optional HQ / KDR flat panel detector (FPD) is for use with single frame radiology only in the KDR AU. DDR functionality is only available with KDR AU DDR.*

### 2.2 Intended Use

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The KDR AU DDR Advanced U-Arm System with Dynamic Digital Radiography is indicated for use by a qualified/trained doctor or technician on both adult and pediatric subjects for taking diagnostic static and serial radiographic exposures of the skull, spinal column, chest, abdomen, extremities, and other body parts. Applications can be performed with the patient sitting, standing, or lying in the prone or supine position (this system is not for mammography or fluoroscopy.)

The KDR AU DDR is designed for general radiography in hospitals, clinics, radiology imaging centers, and medical practices.

### 2.3 Essential Performance Statement

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The KDR AU DDR System does not have essential performances.

# I. INTRODUCTION

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## 3.0 DOCUMENT INFORMATION

### 3.1 Document Information

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It is important to keep this document for the life of the equipment and pass it on to any subsequent user of the equipment. The original version of this manual was written in the English language.

### 3.2 Stylistic Conventions

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All warning label texts are shown in italic style in this manual. All references are shown in italic style in this manual.

### 3.3 Text Emphasis

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***WARNING!*** All texts labelled with "WARNING" call attention to potential risk to health or life.

***CAUTION:*** All texts labelled with "CAUTION" contain information about dangerous situations and measures to avoid risk.

***NOTE:*** All texts labelled with "NOTE" contain additional information regarding the work step and are provided for better understanding and/or to avoid unnecessary difficulties.

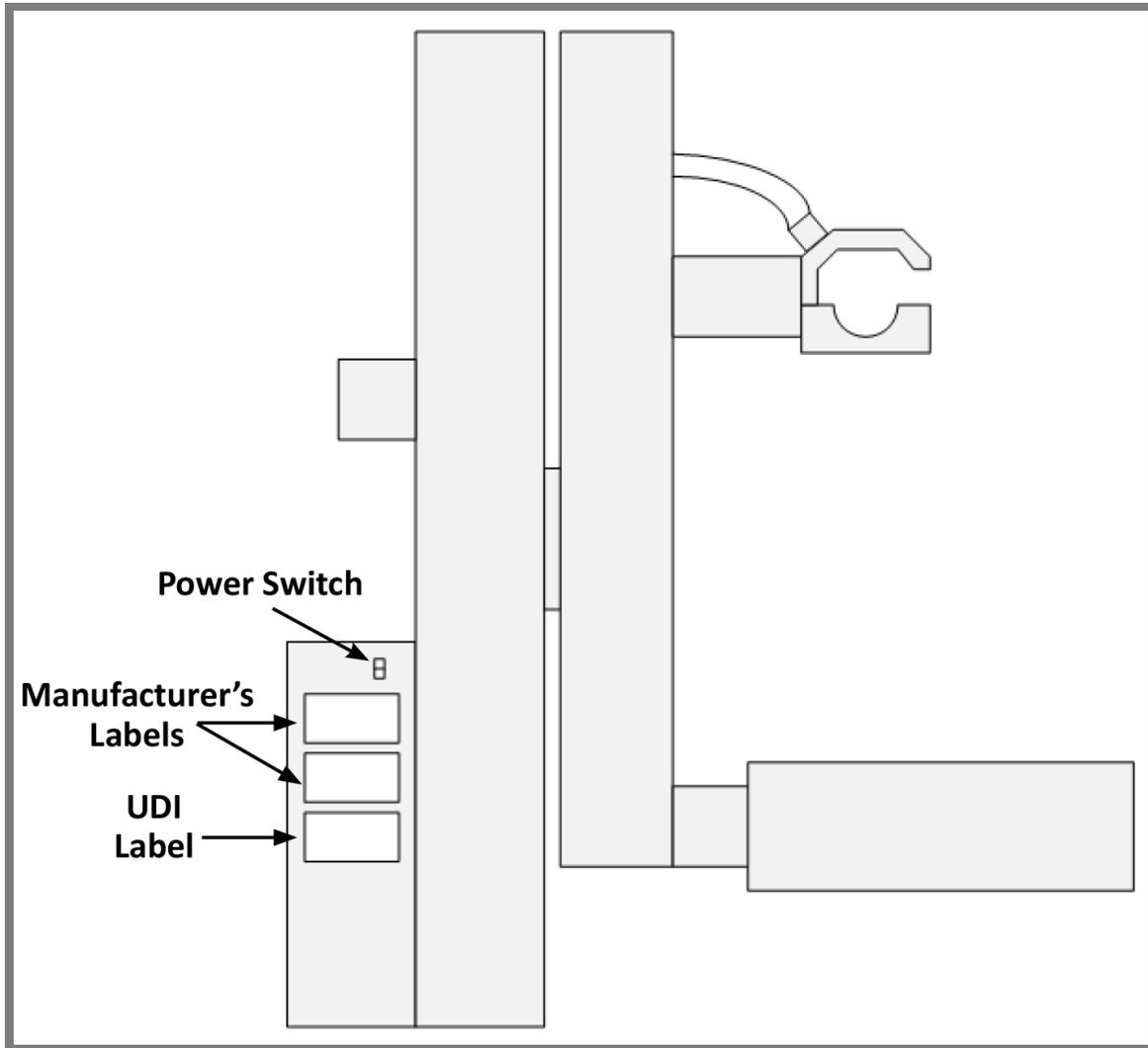
# I. INTRODUCTION

## 4.0 SYSTEM DESCRIPTION

### 4.1 Identification Labels

Figure 4.1.1 shows the location of the identification labels on the KDR AU DDR.

Figure 4.1.1  
KDR AU DDR Identification Labels



### 4.2 Hardware

The KDR AU DDR is a compact radiographic system with proprietary software. The system consists of a rotating and linear moving floor-mounted stand with integrated software, flat panel digital radiography detector system, generator, GUI interface station, computer workstation, and table (optional: stitch stand or weight bearing stand).

There are two modes within the software package, “static mode,” which may be used to generate static images, and “dynamic mode” (or “Dynamic Digital Radiography,” abbreviated “DDR,”) which may be used to generate a cine loop presenting the physician with a diagnostic view of dynamic density and anatomic motion without using fluoroscopy.

The KDR AU DDR is also capable of quickly assuming a preprogrammed position when a new exam is selected, saving time when positioning the patient. This is referred to as “auto positioning,” and made possible by the detector and image processing software working together.

# I. INTRODUCTION

## 4.3 System Overview

Figure 4.3.1 and Table 4.3.1 illustrate and describe all components of the KDR™ AU DDR system.

Figure 4.3.1  
KDR AU DDR

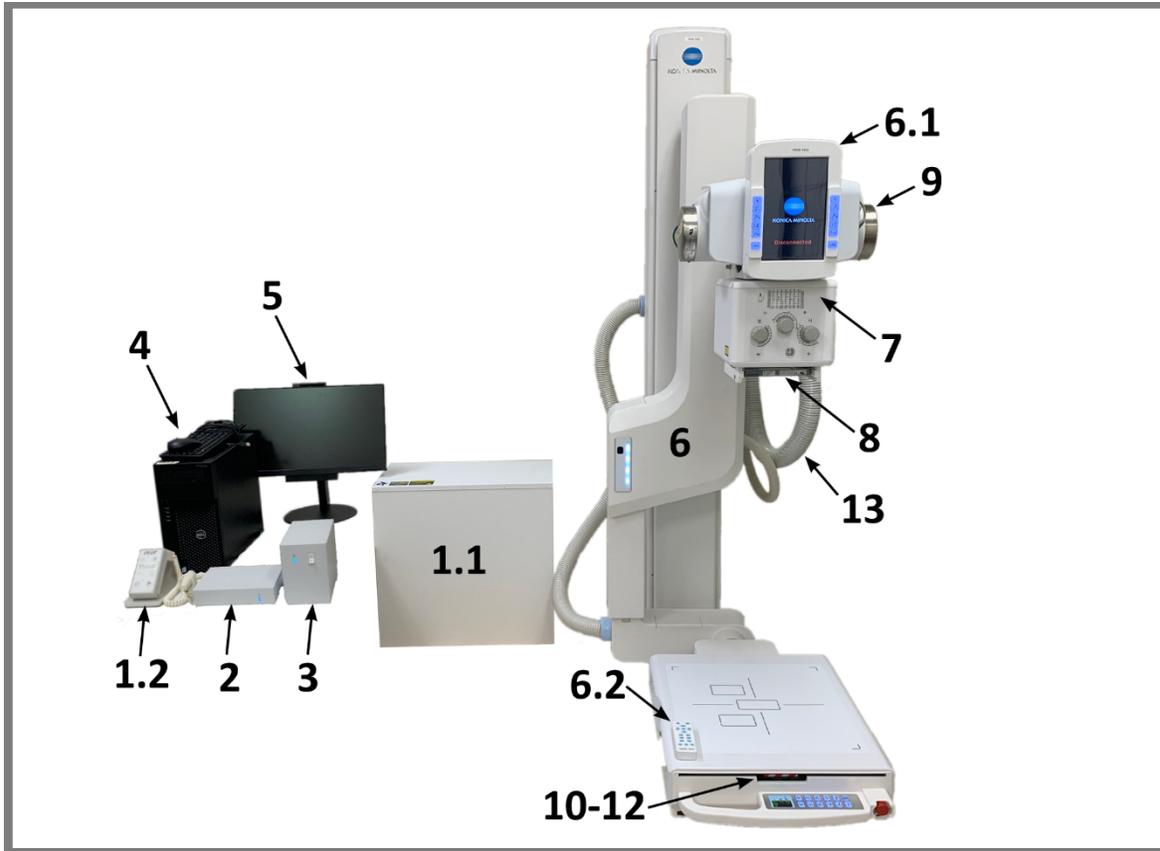


Table 4.3.1  
KDR AU DDR Component Descriptions

Figure Number	Component	Description
1-13	<b>KDR AU DDR</b>	The entire KDR AU DDR system
1	<b>Generator</b>	
1.1	<b>Generator – main cabinet</b>	Generates the high voltage (40-150 KV) required by the X-ray tube; interfaces with the X-ray tube, automatic exposure control (AEC,) flat panel detector, and acquisition station.
1.2	<b>Generator Exposure Control</b>	On/off and exposure button.
2	<b>Generator Interface Unit</b>	Interface unit for imaging system synchronization with the generator. Enables start synchronization between the generator and the FPD.
3	<b>Interface Power Supply</b>	Power supply unit for the FPD and the generator interface unit.
4	<b>PC, Keyboard, Mouse</b>	PC used for the acquisition station. DDR Minimum requirements: i7, 16GB, 512 SSD.
5	<b>Monitor</b>	Touch screen monitor

# I. INTRODUCTION

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Table 4.3.1  
KDR AU DDR Component Descriptions

<b>Figure Number</b>	<b>Component</b>	<b>Description</b>
6	<b>Positioner</b>	Positions the X-ray tube and imaging receptor.
6.1	<b>Positioner – control panel</b>	User interface for the KDR AU DDR system and positioner.
6.2	<b>Positioner – remote</b>	Movements remote control.
7	<b>Collimator</b>	Collimates (focuses) the X-ray beam from the X-ray tube. It uses an LED to mark the radiated area.
8	<b>DAP Meter (optional)</b>	Measures the dose of radiation exiting the collimator.
9	<b>X-Ray Tube</b>	The tube produces an X-ray when a high voltage from the generator is applied. The tube assembly shields the X-ray except for the exposure window (where it mounts to the collimator).
10	<b>Flat Panel Detector (FPD)</b>	Converts X-ray information to a digital image.
11	<b>Automatic Exposure Control (AEC)</b>	Provides image density control by feeding back dose information to the generator.
12	<b>Grid</b>	Reduces the amount of scatter radiation reaching the flat panel detector (FPD).
13	<b>High Voltage Cables</b>	Connect the X-ray tube to the generator.

# I. INTRODUCTION

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## 5.0 SYSTEM DOCUMENTATION

The following documentation is available for the system:

- KDR™ AU DDR Operator's Manual (this manual)
- KDR™ AU DDR Pre-Installation, Installation, and Service Manual
- Ultra Operator's Manual
- Positioner documentation
- Generator documentation (technical manual)
- X-ray Tube documentation
- Collimator documentation
- DAP meter documentation
- AEC chamber documentation
- Stitching stand documentation
- Weight bearing stand
- Automatic motorized vertical movement table documentation
- Fixed height table documentation

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## II. SAFETY

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## II. SAFETY

### 6.0 PRECAUTIONS

#### 6.1 General Precautions

**WARNING!** Do not use this device if you see smoke or notice unusual odors or noises. If smoke, unusual odors or noise are being generated, continued use of this product may result in a fire. Turn OFF the power source breaker immediately, unplug the device, and contact your nearest service representative. Do not attempt to repair it.

**WARNING!** Although the precautions indicated on this device, in this document, or in component manuals are provided based on various considerations, unpredictable events may still occur. While operating this device, pay constant attention to possible hazards in addition to observing the instructions.

**CAUTION:** Federal law restricts this device to sale by or on the order of a physician.

**CAUTION:** Before using this device, read the manuals accompanying this device in order to understand functions, operation, and performance.

**CAUTION:** Make sure this device operates correctly and safely after a prolonged discontinuance of use.

**CAUTION:** Follow the Operator's Manual for correct operation procedures.

**CAUTION:** While using the device, always monitor all devices and patients to prevent unfavorable conditions.

**CAUTION:** After using the device, return the switches and dials to the original positions using the specified procedures, and turn the power OFF.

**CAUTION:** The system is provided with air intakes and outlets to prevent the machine from overheating. Do not block them.

**CAUTION:** When operating this device, be sure to follow the instructions and procedures described in this document and component manuals.

**CAUTION:** Be sure to observe the precautions indicated on this device, in this document, or in component manuals. Failure to observe them can cause personal injury or damage to this device.

**CAUTION:** When using this device, be sure to observe the installation environment requirements (temperature, humidity, and power rating conditions, or restriction of use near a device generating strong magnetic or electromagnetic waves).

**CAUTION:** Do not use any flammable or explosive gases near the machine.

**CAUTION:** The installation environment and location, device configuration, network, power supply, and other conditions are optimized for this device. If you want to change any condition, contact your service representative. Otherwise, the functions and performance of this machine may be impaired.

**CAUTION:** Do not put liquids or foreign objects into the device. Fires, electric shocks, or malfunctions may result. If any foreign objects have fallen into the machine, turn OFF the power source breaker immediately and unplug the machine. Contact your nearest service representative. Never disassemble the device.

**CAUTION:** If the positioner control panel is broken, and the liquid inside it leaks out, do not put it in your mouth. If the liquid gets on part of your body or clothes, immediately wash it off with soapy water.

## II. SAFETY

**CAUTION:** If the positioner control panel breaks or cracks, immediately stop using it. Never use the positioner control panel if it is damaged.

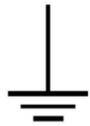
**NOTE:** The following radio interference standards apply to this machine: Voluntary Control Council for Information Technology Equipment (VCCI) Class B.

**NOTE:** The following radio interference standards apply to this machine: Federal Communications Commission (FCC) Part 15 Class B.

**CAUTION:** DDR is not intended for diagnosis during the exam sequence. Diagnosis should only be performed after the exam is complete and the images are sent to a diagnostic workstation. The preview of images during the exposure sequence is not for diagnostic purposes, is not real time, and is at a lower framerate than the acquisition.

### 6.2 Safety and Warning Symbols

Table 6.2.1  
Safety and Warning Symbols

Symbol	Note
	Attention: consult accompanying documents
	Type B applied part
	Protective earth terminal
	Earth terminal
N	Connection point for the neutral conductor on permanently installed equipment
	Squeezing hazard

## II. SAFETY

Table 6.2.1  
Safety and Warning Symbols

<b>Symbol</b>	<b>Note</b>
	Indicates compliance of the equipment with Directive 93/42/EEC
	Separate collection for electrical and electronic equipment
	Manufacturer
	Indicates the emission or the imminent emission of X-radiation

## II. SAFETY

### 6.3 Emergency Stop

The emergency stop is located on the outer right corner of the bucky assembly. If the stand is not working properly or making unintended movements, the emergency stop switch can be pressed to immediately stop the stand from moving. The emergency stop only disables motorized mechanical movements of the stand and does not affect the generator and other components of the system. To recover movement capability, make sure the area around the stand is clear and free of obstructions, then pull the switch directly out and rotate it clockwise. Contact your service engineer if there are persistent erratic movements in the stand.

Figure 6.3.1  
Emergency Stop



### 6.4 Radiation and X-Ray Tube

**WARNING!** Make sure that patients, operators, and third parties are protected against unnecessary X-ray radiation according to local regulations.

**WARNING!** The collimator filter must be verified so that the correct filter is used during exposure.

**NOTE:** Verbal and visual communication must be possible between the operator and the patient when exposures are performed.

**NOTE:** The X-ray beam must never be outside the boundaries of the image receptor holder.

## II. SAFETY

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### 7.0 QUALIFICATIONS OF PERSONNEL

**CAUTION:** *This equipment is intended for use in radiographic examinations under the guidance of trained health care professionals.*

#### 7.1 Operating Personnel

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Before using this system, operating personnel must be thoroughly familiar with the system and its operating instructions.

#### 7.2 Service Personnel

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The equipment should be serviced only by qualified personnel who:

- are completely familiar with the system,
- have read and understood the operator's manual and the pre-installation, installation, and service manual,
- know how to remove power to the unit in case of an emergency, and
- are trained in the use of equipment and procedures of this type.

Failure to follow the instructions given in this manual could result in serious injury to the service person, patient, and operator.

**NOTE:** *It is the responsibility of the owner to ensure that the product is operated only by certified radiology technologists.*

**NOTE:** *It is the responsibility of the supplier to ensure that the technicians have the right training and knowledge to perform service and maintenance.*

## II. SAFETY

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### 8.0 SERVICE AND MAINTENANCE

**NOTE:** When service or maintenance will be performed the technician must lock the equipment from all energy sources.

The equipment must be checked according to the “Function and Safety Checks” in this manual to maintain reliability and serviceability, and to ensure the safety of the patients, the operator, and third parties. If national rules or regulations specify more frequent checks and/or maintenance, such regulations must be observed.

#### 8.1 Operation, Installation, and Repair

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Modifications of or additions to the device must be made in accordance with legal regulations and generally accepted engineering standards.

Konica Minolta cannot assume responsibility for the safety features and for the reliability and performance of the equipment, if:

- Installation of equipment expansions or modifications are not approved by the manufacturer
- Installation of equipment expansions or modifications are not carried out by persons authorized by the manufacturer
- Components are not replaced by original parts in case of a malfunction
- The electrical installation of the room does not meet the requirements or the corresponding national regulations
- The product is not used in accordance with the operating instructions

**CAUTION:** Do not remove, disassemble, change, modify, repair, or add any part. Only service engineers should open the covers on the system.

**CAUTION:** When installing this machine in a different location, contact Konica Minolta or our designated dealer.

**CAUTION:** Do not modify this device.

#### 8.2 General Safety and Regulatory Information

---

**WARNING!** For continued safe use of this equipment, follow the instructions in this manual. Both operator and service personnel must study this manual carefully. Instructions herein should be thoroughly read and understood before attempting to place the equipment in operation, especially the instructions concerning safety, regulations, dosage, and radiation protection.

**WARNING!** Please study this manual and its referenced manuals for each system component to be fully aware of all safety, installation, calibration, and operational requirements.

**WARNING!** Take adequate steps to ensure protection from exposure to radiation. It is vitally important that everyone working with X-ray radiation is properly informed and trained on its hazards.

## II. SAFETY

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**WARNING!** Operators must have sufficient knowledge to properly perform diagnostic imaging procedures with X-ray devices. This knowledge is acquired through a variety of educational methods including clinical working experience, and as a part of many college and university radiologic technology programs in accordance with local laws or regulations.

**WARNING!** Service personnel must have sufficient knowledge to competently perform the service tasks related to X-ray devices and particularly to the equipment described in this manual. This knowledge is acquired through a variety of educational methods for technicians in accordance with local laws or regulations, including specific training on this equipment.

**WARNING!** X-ray equipment is potentially dangerous to both patients and operators. Safety measures must be strictly observed. If the equipment is not used properly it may cause an injury.

**WARNING!** Use of this equipment adjacent to or stacked with other equipment should be avoided because it could result in improper operation. If such use is necessary, this equipment and the other equipment should be observed to verify that they are operating normally.

**WARNING!** Use of accessories, transducers, and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

**WARNING!** Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the KDR AU DDR including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

**WARNING!** Failure to use this equipment in the specified type of shielded location could result in degradation of the performance of this equipment, interference with other equipment or interference with radio services.

**WARNING!** This equipment is not to be used with high frequency electrosurgery equipment.

**WARNING!** This equipment is not to be used with defibrillators.

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## III. USER INTERFACES

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### III. USER INTERFACES

#### 9.0 SYSTEM OPERATIONS

**NOTE:** The KDR AU DDR is built from various components designed to operate together. If the system stops working due to an electromagnetic disturbance, the user must cycle power to restart the system.

#### 9.1 System Start Up

1. Turn on the positioner.

Flip the switch labelled “1” to the downward position (see Figure 9.1.1).

2. Turn on the positioner control panel.

Press back and hold the silver button labelled “2” on the lower left side of the positioner control panel (see Figure 9.1.2).

Figure 9.1.1  
Positioner Switch “1”

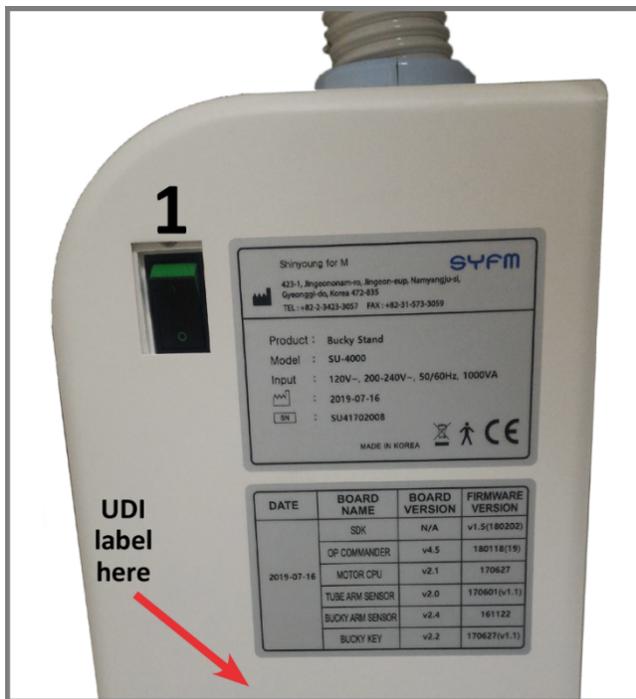


Figure 9.1.2  
Positioner Control Panel Button “2”



After the positioner control panel is powered, it will read “disconnected”. Do not turn on switch “3” until it reads “disconnected”.

3. Turn on the interface power supply unit.

Flip the switch labelled “3” to the downward position (see Figure 9.1.3).

4. Turn on the computer.

Press the button labelled “4” on the computer (see Figure 9.1.4).

### III. USER INTERFACES

Figure 9.1.3  
Interface Power Supply Unit Switch “3”



Figure 9.1.4  
Computer Switch “4”



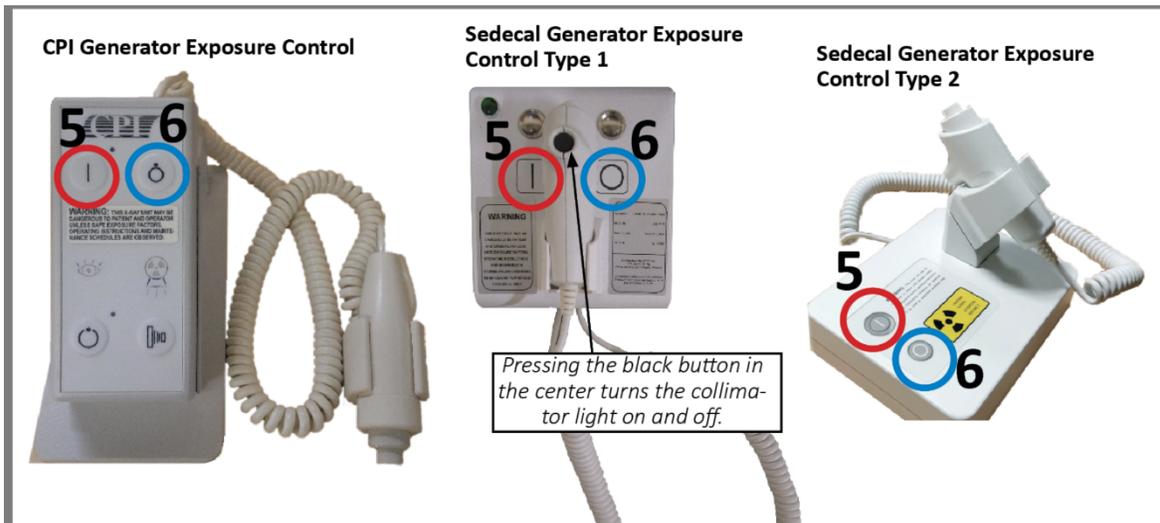
This controls the power to the computer. ULTRA software will automatically load.

Make sure steps 1, 2, 3, and 4 are complete before turning on switch “5.”

5. Turn on the generator.

Press the upper left button on the generator control unit labelled “5” (see Figure 9.1.5).

Figure 9.1.5  
Switches “5” and “6”



This controls the power to the generator.

**NOTE:** Pressing and holding the hand-held exposure control button will make an exposure.

### III. USER INTERFACES

#### 9.2 System Shut Down

1. Turn off the generator.

Press the upper right button on the generator exposure control labelled “6” (see Figure 9.1.5).

2. Turn off the computer.

DO NOT press the power button labelled “4” on the tower.

- a. On the display, click the “log off” button in the top right corner (see Figure 9.2.1).
- b. A confirmation box will appear (see Figure 9.2.2).
- c. Click “Log off”.
- d. From the desktop, click the windows icon, the power icon, then select “Shut Down” (see Figure 9.2.3).

Figure 9.2.1  
Log Off



Figure 9.2.2  
Confirmation Box

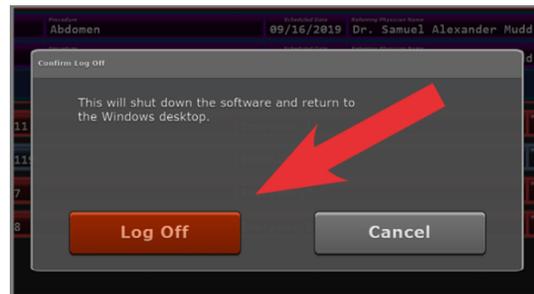
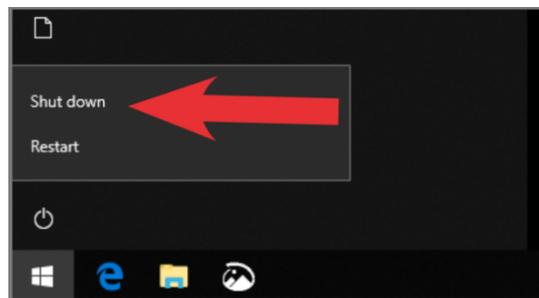


Figure 9.2.3  
Shut Down



3. Turn off the power supply unit  
(switch “3,” see Figure 9.1.3).

4. Turn off the positioner  
(switch “1,” see Figure 9.1.1).

**NOTE:** The positioner control panel will shut down automatically within three minutes.

## III. USER INTERFACES

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### 10.0 COLLIMATOR

#### 10.1 Description

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The X-ray field is defined by six pairs of brass shutters, four of which are lead lined. The six pairs of shutters move perpendicularly within the X-ray field. Two pairs of shutters are located near the focus, two are located near the entrance window, and two are located near the exit window of the X-ray beam from the collimator. The shutters near the exit window serve to accurately define the X-ray field edges (see Figure 10.2.1.)

Shutter movements are manual, controlled by two knobs (or three, see “Three Knob Collimator” section) on the collimator front panel.

The collimator is supplied with a flange for rotation.

#### 10.2 Operating Instructions

---

##### **Light/X-ray Field Setting**

1. Make sure the positioner control panel is turned on (see Section 9.1, “System Start Up”).
2. Set the collimator at 100 cm SID (see Figure 10.2.1 and Figure 10.2.2).
3. By rotating the knobs and with the knob index on the front panel, follow the tags of the scale (see Figure 10.2.1).
4. Do not force the knobs.
5. Activate the light field by pressing the related push-button on the collimator front panel (or the collimator light button on the bucky control panel (see Figure 10.2.1).
6. The collimator is ready to operate.

##### **Operation**

The collimator has been designed to operate as follows:

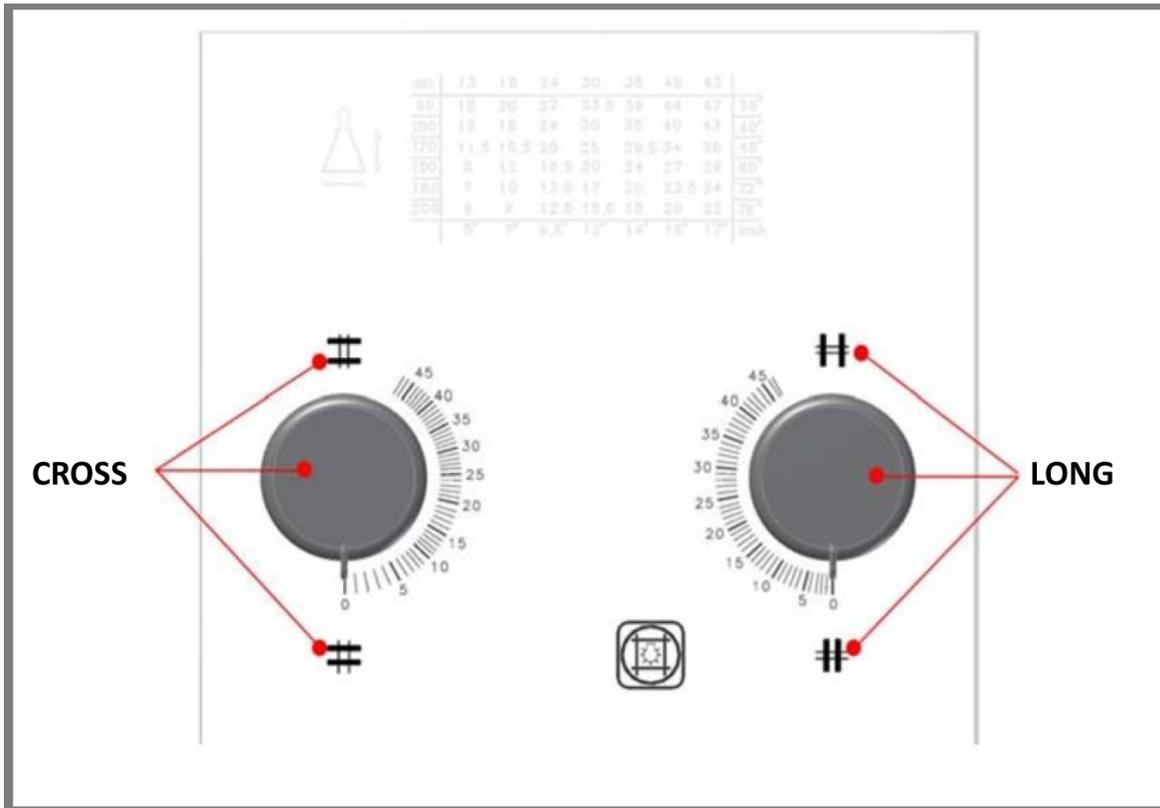
- The light source ON time for the light field is factory set at 30 seconds. It is adjustable from 30 to 45 seconds (contact a field service engineer to make this adjustment).
- The normal ON/OFF cycle is set at 1 minute followed by an idle time of 4 minutes to allow for cooling time (i.e., 1 minute ON / 4 minutes OFF).
- The field is set by the two (or three) knobs on the front panel by following the indications of the scale with the knob index or visually with the light field.

##### **Front Panel**

The X-ray field must be set by adjusting the two knobs that control the movement of the shutters, the long aperture on the right, and the cross aperture on the left (see Figure 10.2.1).

### III. USER INTERFACES

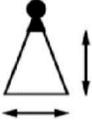
Figure 10.2.1  
Front Panel



Figures 10.2.2 and 10.2.3 show the values that must be set with the knobs. The exact value to be set is obtained by crossing the SID in use (the value indicated by the vertical axis), with the cassette size value in cm or inches (horizontal axis).

### III. USER INTERFACES

Figure 10.2.2  
Long Aperture

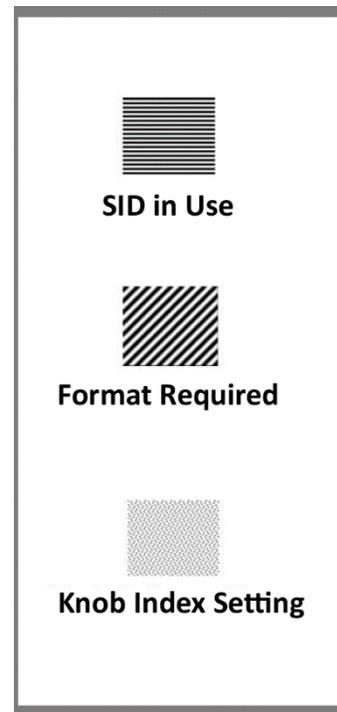


cm	13	18	24	30	35	40	43	
90	15	20	27	33.5	39	44	47	36"
100	13	18	24	30	35	40	43	40"
120	11.5	15.5	20	25	29.5	34	36	48"
150	8	12	16.5	20	24	27	29	60"
180	7	10	13.5	17	20	22.5	24	72"
200	6	9	12.5	15.5	18	20	22	78"
	5"	7"	9.5"	12"	14"	16"	17"	Inch

Figure 10.2.3  
Cross Aperture



cm	13	18	24	30	35	40	43	
90	15	20	27	33.5	39	44	47	36"
100	13	18	24	30	35	40	43	40"
120	11.5	15.5	20	25	29.5	34	36	48"
150	8	12	16.5	20	24	27	29	60"
180	7	10	13.5	17	20	22.5	24	72"
200	6	9	12.5	15.5	18	20	22	78"
	5"	7"	9.5"	12"	14"	16"	17"	Inch



**EXAMPLE:** To obtain an X-ray field of 24 cm (long) by 35 cm (cross) at SID 150 cm, with reference to the chart, set the long knob indicator to 16.5 cm and the cross knob indicator to 24 cm (see Figures 10.2.2 and 10.2.3).

#### 10.3 Three-Knob Collimator

The three-knob collimator includes a fine tuning knob in the center allowing the user to manually adjust the area of an image during an exposure to accommodate patients that may require special circumstances (injuries, limited movement, etc.). In this offsetting process, the bucky and the X-ray beam are manually aligned for each exposure (see Figures 10.3.1 and 10.3.2).

### III. USER INTERFACES

Figure 10.3.1  
Three-Knob Collimator in Standard Mode

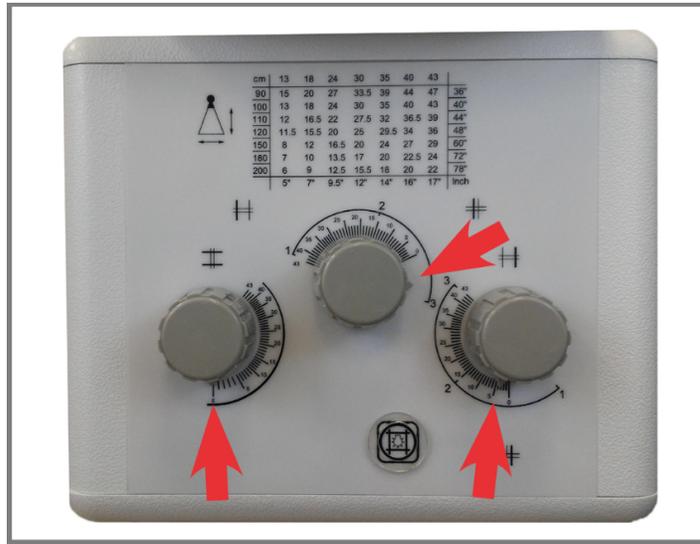
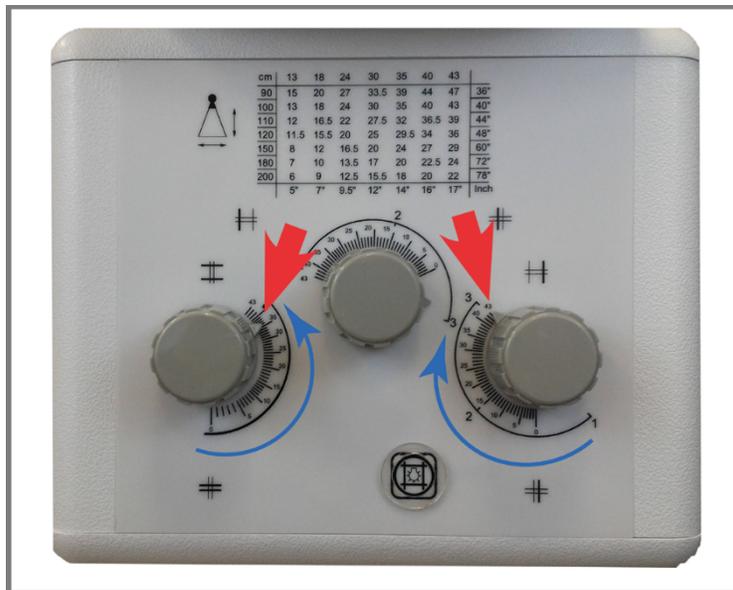


Figure 10.3.2  
Three-Knob Collimator in Offset Mode



### III. USER INTERFACES

#### Using the Three-Knob Collimator in Standard Mode

At the desired SID, the operator must select the proper field using the references in the diagram on the front panel.

**EXAMPLE:** If the operator wants to set an X-ray field of 35 cm x 43 cm where 35 cm is given by the cross shutter and 43 cm is given by the long shutters, at SID 100 cm, the operator must position the left knob at a value of 35 and both the two long knobs (the middle and right knobs) at values of 43 each (see Figure 10.3.1).

#### Using the Collimator in Offset Mode

The maximum aperture of the X-ray field is 43 cm x 43 cm at SID 100 cm. The offset mode can be used at a different SID. This mode allows the user to move the exposure area to accommodate patients that may require special circumstances.

To set the offset mode to the desired SID, the cross knob (the knob on the left) has to be positioned on the value of the scale in reference to the diagram on the front panel. The two long knobs (knobs in the middle and on the right) both must be positioned on the setting 1, 2, or 3 indicated on the scale following the desired field.

Figure 10.3.3 provides a visual example of the exposure area offset into three different sections with the three-knob collimator.



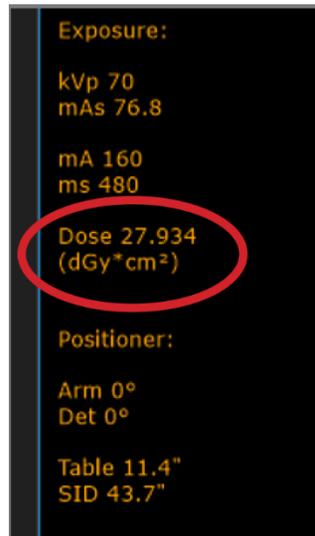
### III. USER INTERFACES

#### 11.0 DAP METER

##### 11.1 DAP Meter

The DAP meter measures the dose of radiation exiting the tube/collimator. The DAP meter reading is displayed in the middle left of the acquire screen of the acquisition software (see Figure 11.1.1).

Figure 11.1.1  
DAP Meter Display



**NOTE (Sedecal generators only):** If the generator is not calibrated to the full range, taking an exposure outside the calibrated range will result in a phantom exposure (a DAP meter, if installed, will read 0 dGy\*cm<sup>2</sup> with no image). There will be no error or warning. The Sedecal generator must be calibrated to the full range of exposure settings to prevent such errors.

### III. USER INTERFACES

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#### 12.0 GENERATOR

##### 12.1 Generator

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The high frequency X-ray generator provides a 24 VAC, 150 Watt power source for the collimator lamp.

For routine maintenance, safety, and additional information for the CPI generator, see:

*Communications & Power Industries "CMP 200/CMP 200 DR Series X-Ray Generator service manual"*

For routine maintenance, safety, and additional information for the Sedecal generator, see:

*Sedecal "Maintenance, HF Series Generators," Technical Publication MA-1004R6*

**NOTE (Sedecal generators only):** If the generator is not calibrated to the full range, taking an exposure outside the calibrated range will result in a phantom exposure (a DAP meter, if installed, will read 0 dGy\*cm<sup>2</sup> with no image.) There will be no error or warning. The Sedecal generator must be calibrated to the full range of exposure settings to prevent such errors.

**NOTE (Sedecal generators only):** If connected, the room light will briefly turn on when the generator is turned on to show light function is working. X-ray is not emitted during the initial powering up of the generator.

### III. USER INTERFACES

#### 13.0 POSITIONER

##### 13.1 Using the Positioner Safely

The positioner must be monitored at all times when operating the KDR AU DDR. It is equipped with motion sensors that will stop its movement when the light fields are broken (see Figure 13.1.1 and Table 13.1.1). It is designed to stop when met with an obstruction, but precaution is necessary to avoid collision. It may pose a risk of pinching and squeezing.

**NOTE:** The motion sensors are a safety precaution only and should not be relied on during normal operation of the positioner.

Figure 13.1.1  
Motion Sensor Locations

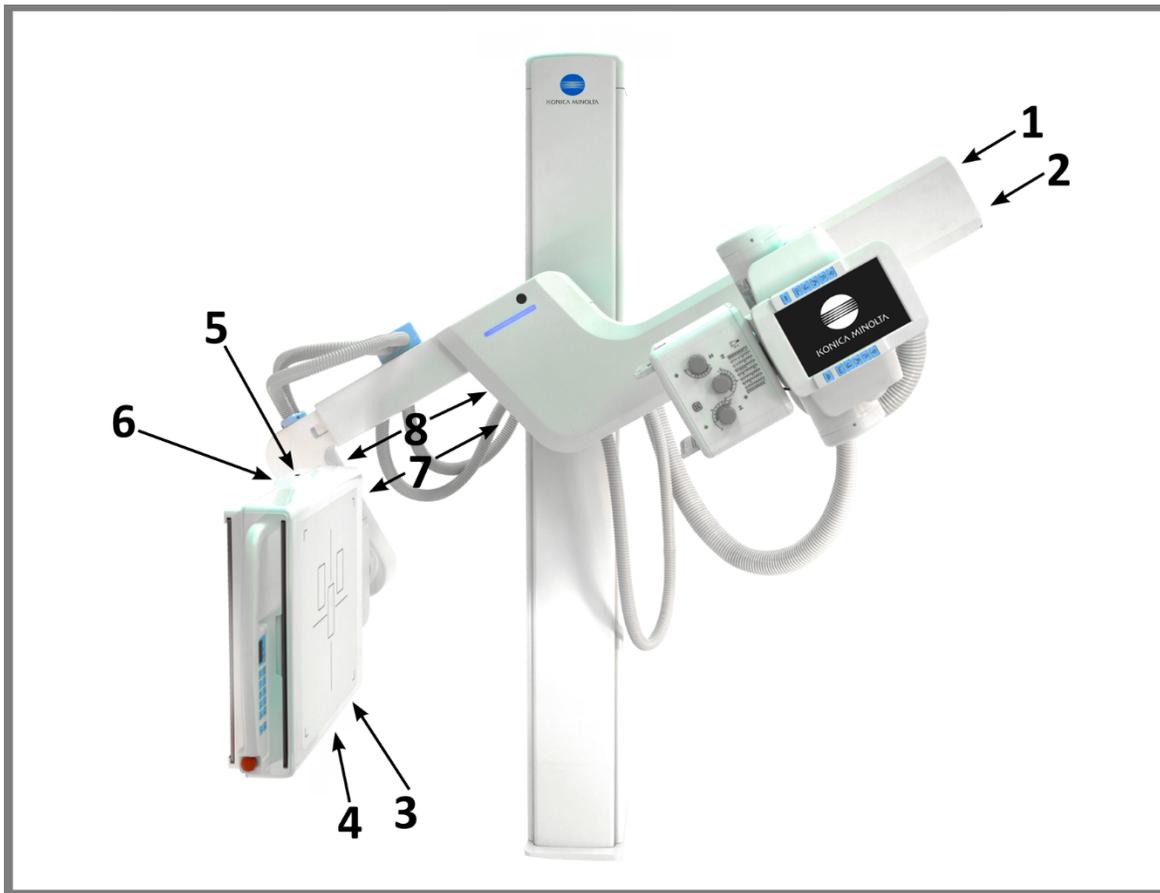


Table 13.1.1  
Motion Sensor Functions

Label	Function
1, 2	Stop rotation and elevation of the tube end of the u-arm
3, 4, 5, 6	Stop rotation of the bucky and u-arm
7	Slows downward movement of the u-arm
8	Stops downward movement of the u-arm

## III. USER INTERFACES

### 13.2 Turning On the Positioner

For instructions on turning on the entire system, see Section 9.1 “System Start Up,” step 1.

### 13.3 Turning On the Positioner Control Panel

To turn ON the control panel, press the ON/OFF switch and hold it more than five seconds until it shows a beginning screen (see Figure 13.3.1). Turning the panel OFF is unnecessary. The panel will automatically switch itself off within three minutes after the main power is turned off.

Figure 13.3.1  
Positioner Control Panel

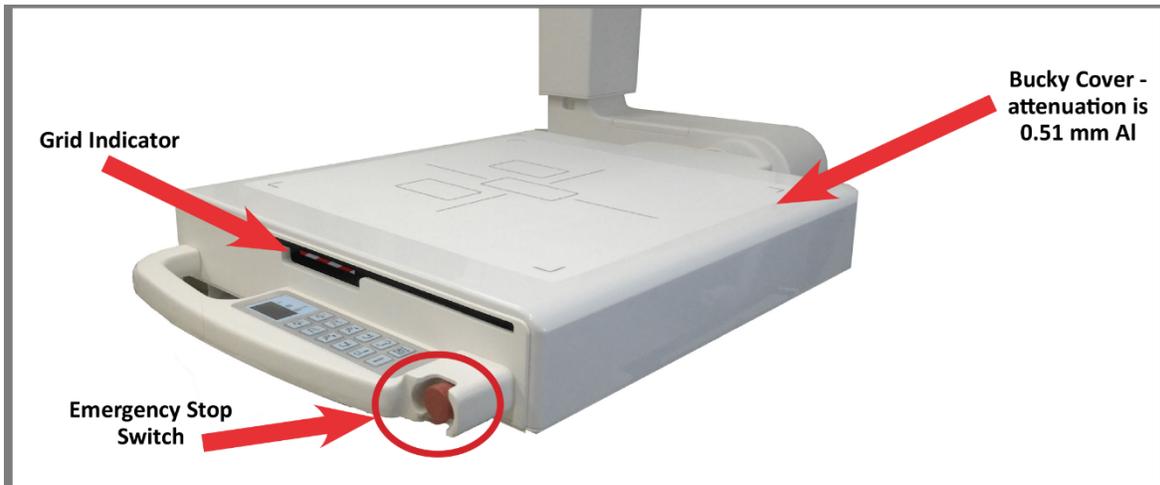


### 13.4 Emergency Stop Switch

In case of a malfunction or unintended movement in the stand, press the emergency stop switch to stop the unit immediately (see Figure 13.4.1). Remove the obstruction from the path of the positioner. To re-enable movement of the positioner, pull and twist the emergency stop switch. In case of a persistent malfunction, contact your service engineer concerning the issue.

### III. USER INTERFACES

Figure 13.4.1  
Emergency Stop Switch



**WARNING!** Users should be familiar with emergency switch operation before operating the stand.

#### 13.5 Grid (Grid Holder)

Place the grid into the Bucky with the label on the grid faceup. The red and white striped sticker (grid indicator) on the side of the grid holder is used as a visual indicator that the grid holder is installed in the Bucky (see Figure 13.5.1). Use the grid within its stipulated range and be aware of the tradeoff dose versus the scatter removal.

Figure 13.5.1  
Grid Installed With Grid Indicator



### III. USER INTERFACES

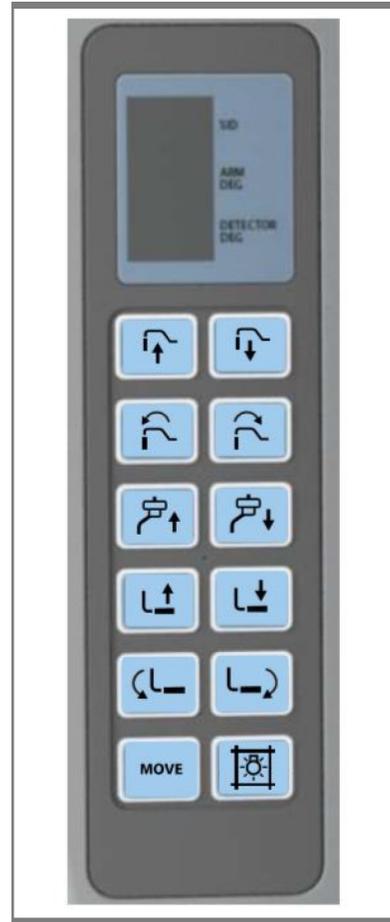
#### 13.6 Positioner Control Panel

The buttons on the positioner control panel are used to move the stand to desired positions. (See Figure 13.6.1 and Figure 13.6.2).

Figure 13.6.1  
Positioner Control Panel Close Up



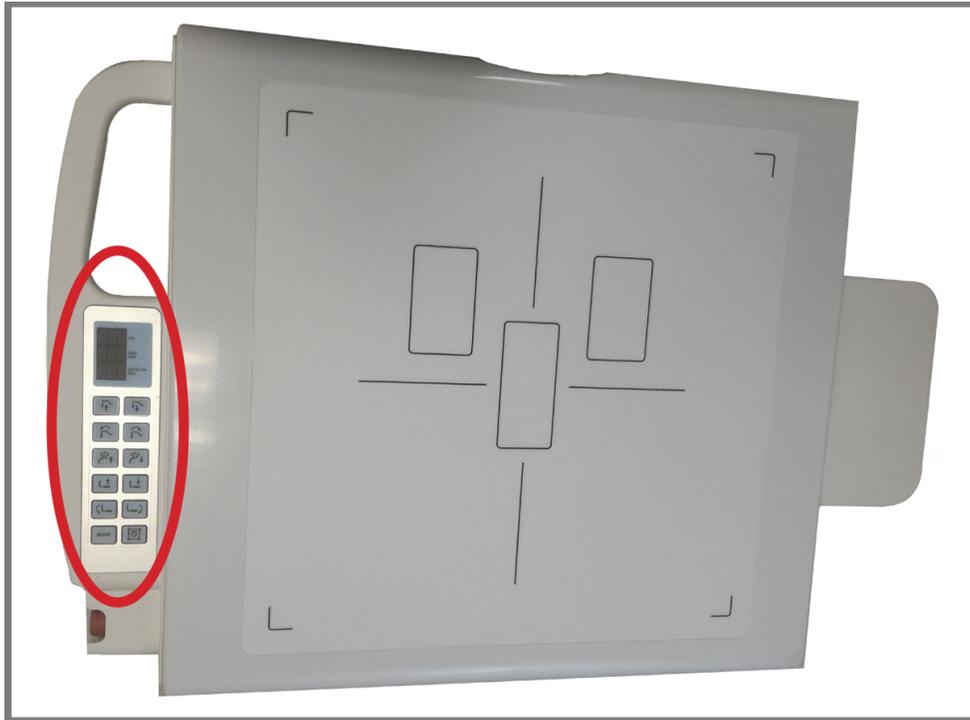
Figure 13.6.2  
Bucky Handle Control Panel



### III. USER INTERFACES

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Figure 13.6.3  
Bucky



**NOTE:** Illustrations of functions assume the user is directly facing the front of the stand.

#### 13.7 Positioning

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The positioner can be moved by three different methods: the 12 buttons on the face of the positioner control panel (see Figure 13.7.1), the 12-button control panel on the Bucky handle (see Figure 13.7.2) or the 16-button remote control (see Figure 13.7.3).

##### **Linear Movements**

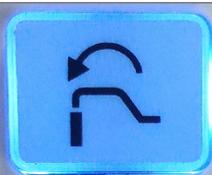
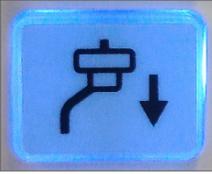
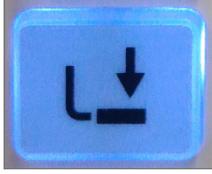
The tube head and detector arm can be moved up or down.

##### **Rotating Movements**

The u-arm and detector arm (or swivel arm) can be rotated clockwise or counterclockwise.

### III. USER INTERFACES

Table 13.7.1  
Positioner Control Buttons on the Positioner Control Panel

Button	Image	Function
1. Up Button		Raises the swivel arm
2. Down Button		Lowers the swivel arm
3. Left Rotate Button		Rotates the swivel arm in the counterclockwise direction
4. Right Rotate Button		Rotates the swivel arm in the clockwise direction
5. Tube Arm Up Button		Raises the tube arm
6. Tube Arm Down Button		Lowers the tube arm
7. Detector Arm Up Button		Moves the detector arm up
8. Detector Arm Down Button		Moves the detector arm down

### III. USER INTERFACES

Table 13.7.1  
Positioner Control Buttons on the Positioner Control Panel

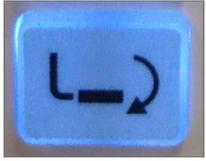
Button	Image	Function
9. Detector Left Rotate Button		Rotates the detector in the counterclockwise direction
10. Detector Right Rotate Button		Rotates the detector in the clockwise direction
11. Move Button		Selects an auto-programmed position
12. Auto Stitching Button		Enables auto-positioning movements for auto-stitching

Figure 13.7.2  
Positioner Control Buttons on the Bucky Handle Control Panel

Button	Image	Function
1. Up Button		Raises the swivel arm
2. Down Button		Lowers the swivel arm
3 Left Rotate Button		Rotates the swivel arm in the counterclockwise direction
4. Right Rotate Button		Rotates the swivel arm in the clockwise direction

### III. USER INTERFACES

Figure 13.7.2  
Positioner Control Buttons on the Bucky Handle Control Panel

Button	Image	Function
5. Tube Arm Up Button		Raises the tube arm
6. Tube Arm Down Button		Lowers the tube arm
7. Detector Arm Up Button		Moves the detector arm up
8. Detector Arm Down Button		Moves the detector arm down
9. Detector Left Rotate Button		Rotates the detector in the counterclockwise direction
10. Detector Right Rotate Button		Rotates the detector in the clockwise direction
11. Move Button		Selects an auto-programmed position
12. Collimator Light Button		Turns on the Collimator Light

*\*The large red button on the front side of the bucky handle is an emergency stop (see section 13.4, "Emergency Stop Switch.")*

### III. USER INTERFACES

#### Remote Control

See Figure 13.7.3 and Table 13.7.1 for an explanation of remote control functions.

Figure 13.7.3  
KDR AU DDR Remote Control

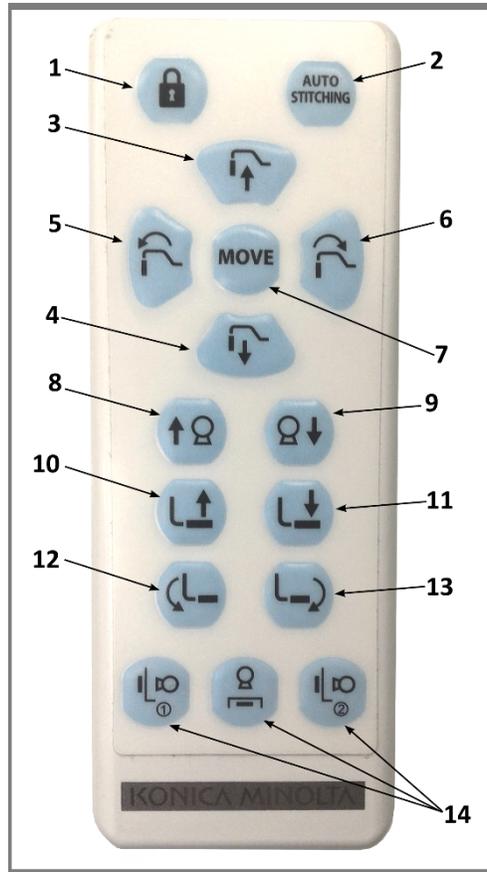


Table 13.7.1  
KDR AU DDR Remote Control Buttons

Button	Function
1. Lock Button	Stops the system and disables all buttons (remote and positioner) until it is pressed again
2. Auto Stitching Button	Used for stitching sequences
3. Up Button	Moves the swivel arm up
4. Down Button	Moves the swivel arm down
5. Left Rotate Button	Rotates the detector in the counterclockwise direction
6. Right Rotate Button	Rotates the swivel arm in the clockwise direction
7. Move Button	Sends the stand to an APR, or pre-programmed position (press and hold) Moves the stand to an auto-programmed position. The button must be pressed and held until the tablet reads "reached"
8. Tube Arm Up	Raises the tube arm
9. Tube Arm Down	Lowest the tube arm

### III. USER INTERFACES

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Table 13.7.1  
KDR AU DDR Remote Control Buttons

<b>Button</b>	<b>Function</b>
10. Detector Arm Up	Moves the detector arm up
11. Detector Arm Down	Moves the detector arm down
12. Detector Left Rotate Button	Rotates the detector in the counterclockwise direction
13. Detector Right Rotate Button	Rotates the swivel arm in the clockwise direction
14. Home Positions	Moves the stand to one of three pre-programmed home positions: <ul style="list-style-type: none"><li>• 40" horizontal SID</li><li>• 40" vertical SID</li><li>• 72" horizontal SID</li></ul>

**NOTE:** If you have pressed the "Lock" button during an APR command, you must re-select the APR at the acquisition station, then press "Lock" once more, before using the "Move" button again.

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## IV. SOFTWARE

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## IV. SOFTWARE

### 14.0 ULTRA SCREEN OVERVIEW

#### 14.1 Ultra Screen Overview

Figure 14.1.1  
Ultra Screen Overview



#### 14.2 Ultra Screen Overview: Upper Icons



**Technologist Icon:** displays the selected technologist of record for the exam.



**Exit Icon:** clicking the exit icon logs you out of the Ultra software.



**DR Panel Battery Indicator:** (wireless DR panels only) – when fully green, batteries are fully charged. As the battery becomes more discharged with use, the green portion will display less in stages.



**Search Field:** this field is used to search for previous exams. The search checks for a match in all available fields for patient exams within either the worklist or completed tabs.



**Broken Link Icon:** When a wireless DR panel battery has become fully discharged or if the panel has been turned off, the battery indicator will change to a broken link icon.



**Home Return:** touching the Home button clears all search filters and returns the display back to the default unfiltered view.



**Options Icon:** launches the options menu to configure settings for Ultra and devices (password required.)

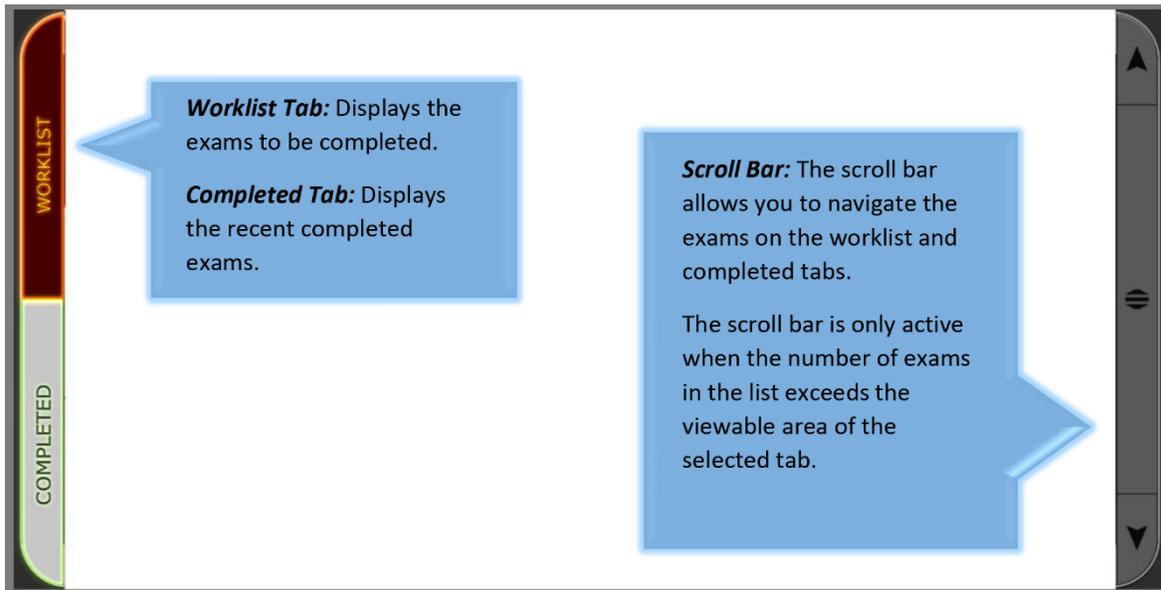


**Refresh:** refreshes the Ultra Worklist screen.

## IV. SOFTWARE

### 14.3 Ultra Screen Overview: Sidebars

Figure 14.3.1  
Ultra Screen Overview: Sidebars



### 14.4 Ultra Screen Overview: Lower Icons



**NEW:** this button starts the “Add a New Patient Exam” process by opening a new worklist entry for a new patient exam.



**MORE:** after selecting a patient exam from the Completed tab, this button launches the more options menu to allow you to either burn the study to a CD/DVD, save the study to external HDD, or print the study to a DICOM printer (completed tab only)



**EMERGENCY:** this button allows you to complete a patient exam without any patient information entered yet. Generic info will populate into the fields. These fields will need to be filled in with correct patient information before sending the completed emergency exam to a PACS server.



**ACQUIRE:** launches the UAI Acquire screen and populates the appropriate acquire fields with the selected exam information.



**QUERY:** this button performs a MWL Query for any configured modality worklist provider and populates the Ultra Worklist screen with any resulting patient exams (worklist tab only.)

## IV. SOFTWARE

### 15.0 PERFORMING AN EXAM IN ULTRA

#### 15.1 MWL Worklist

New patient exams from a configured Modality Worklist server will show up in the Ultra Worklist screen when you click the **Query** button.



**NOTE:** New patient exams will show up automatically in the Worklist if your MWL sites are configured to Auto Query.

#### 15.2 Navigating the Ultra Worklist Screen

Ultra Worklist Screen



#### Adjusting the Size of the Worklist Screen

You can increase or decrease the display size of the exam views within the Worklist screen, by holding down the **Ctrl button** and pressing **+** to increase the size or pressing **-** to decrease the size of the exam views.

#### Worklist Screen Colors

Each worklist exam entry is color coded based on its current status.

**Blue** – new worklist entry

- If the entry flashes, it indicates that an exam has been started and suspended.
- If the entry does not flash, the exam has not been started. However, procedures may have been added.

## IV. SOFTWARE

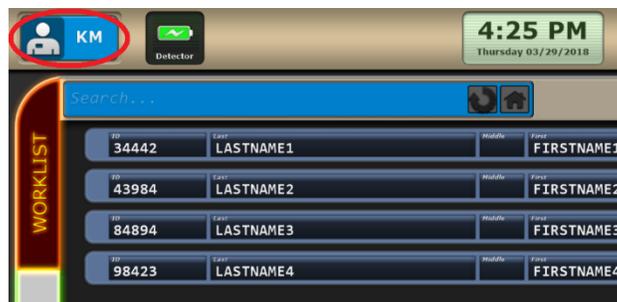
**Red** – indicates that the exam is an emergency patient exam. Once patient information has been filled in, the exam will turn blue.

**Orange** – indicates that an exam has missing views or body parts, or the exam is missing images because they are no longer in the archive. Images that are affected are replaced with the following image icon in the exam:



### 15.3 Performing an Exam Without a Worklist

1. Click the **Technologist** icon.



2. Select the technologist(s) for the exam.

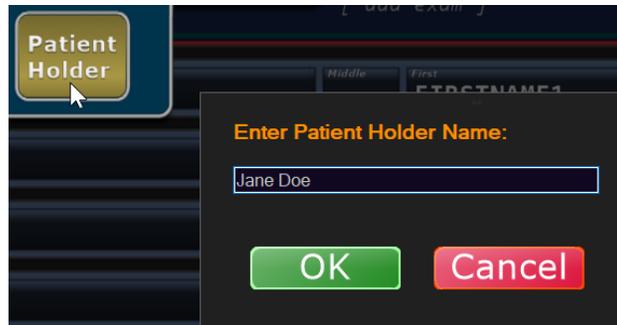


3. To select more than one technologist, click the Groups icon and select each acting technologist.



4. Type in the name of a patient holder, if applicable to the exam, and click OK.

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- The patient holder will display next to your selected technologist(s) on the selected exam and in log reports.

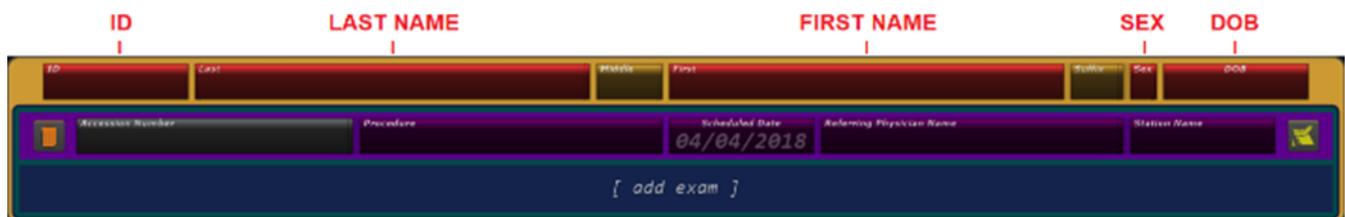


**NOTE:** A patient holder is usually a designated family member or guardian to assist with patients that cannot maintain the physical or mental demands of being stationary during an exposure. The patient holder is temporary and only applies to the current exam.

- After selecting your technologist, select the patient's exam from the worklist.
- To perform an exam without a MWL Worklist, click the **New** button.



- Enter the patient's information in the required RED boxes

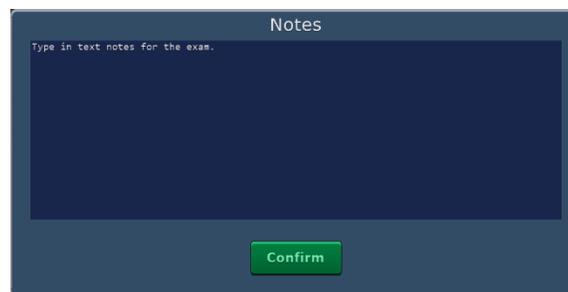


- Press **Tab** or click in the **Accession Number** field, and type in the exam's Accession Number (optional).
- Press **Tab** or click in the **Procedure** field, and select or search for your exam from the **Choose a procedure** list.

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11. After selecting your exam, click the **Choose** button or double-click your exam.
12. You will do the same for the **Referring Physician** field, or you can manually type in the referring physician's name.
13. Type in a Station Name, if needed (optional).
14. Click the yellow **Note** icon, if you need to add text notes to the exam and click **Confirm** (optional).



15. If you need to add another exam, click **[add exam]** and select another procedure.
16. When you have selected all exams for the patient study, click the **Acquire** button at the bottom right of the screen.



This will take you to the **Acquisition Screen**.

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### 15.4 Acquiring DR Images

1. Select a patient and click **Acquire** to launch into the Universal Acquisition Interface (UAI).

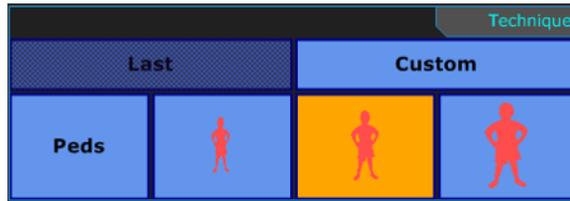
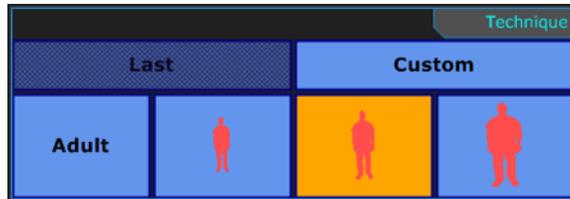


2. Click on the **exam view** that you want to complete first. The radiation symbol will appear in that box, showing that it is active.



3. Select the correct **Body Habitus** of your patient to enable the appropriate technique. Clicking on **Adult** toggles between Adult and Peds habitus.

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**NOTE:** See section 16.0, "Adult/Pediatric Patients and Body Habitus."

4. Select the **Grid In** icon to enable grid suppression filtering when using a grid, or select Grid Out.



5. Select the **AEC** icon and the appropriate Ion Chamber icon(s) in order to enable AEC phototiming.



**NOTE:** If APRs are programmed in Ultra, an AEC technique is set for the body part view. You can still adjust the Density, kVp, mA and BUT for the current exam. Numbers that appear in red are set too high for your generator and X-ray tube.



6. You can disable AEC by deselecting the AEC icon, to manually adjust time (ms).



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- Use the up and down arrows to manually adjust your techniques (kVp, mA, ms, mAs).



- Position your patient and shoot your first image.



**NOTE:** The radiation symbol will automatically jump to the next view while the image is processing.

**NOTE:** If you have a licensed U-arm positioner, once the radiation symbol has moved to the next view, you will be able to hit **MOVE** on the remote or positioner console, and the U-arm positioner will move to the next position.

- For a Sedecal generator with a door interlock connected, if the door is open or the interlock is not otherwise engaged, an image will be displayed showing an open door.

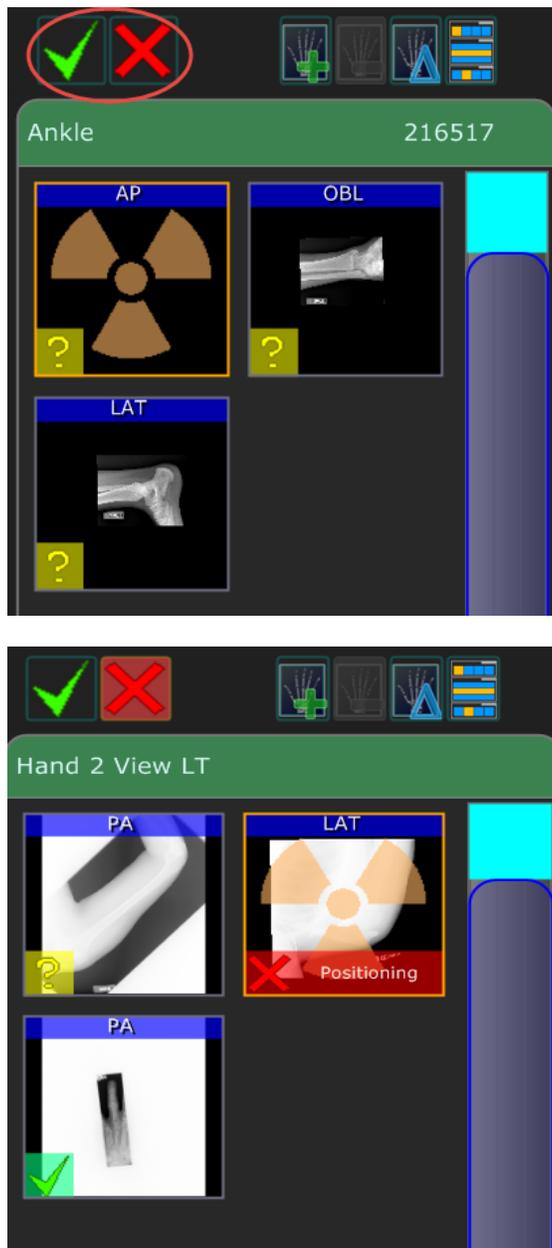


- Continue the procedure until you have acquired all the images needed.

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### 15.5 Accepting and Rejecting Images

Before you can send images to a PACS destination, all images must be marked as either accepted or rejected. You can individually reject some or all images during an exam or collectively when you exit the exam.



**NOTE:** It is good a practice to reject images as needed during the exam. Therefore, when you exit the exam, you can select the option to “Accept All Unmarked” images.

If you do not accept or reject all images during the exam, you are prompted to accept or reject any remaining images that have a questionable status when you exit Acquire.

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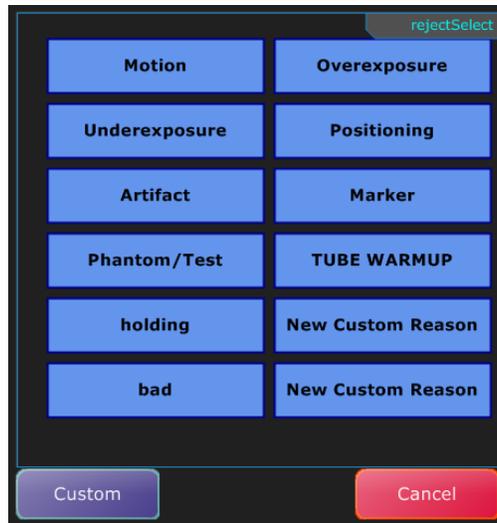
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### **Accepting Individual Images**

1. Select an image.
1. Click to accept the selected image.

### **Rejecting Individual Images**

1. Select an image.
2. Click to reject the selected image.
3. Select a reason for rejecting the image.

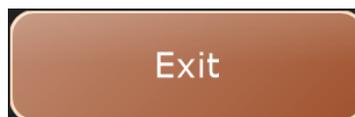


### **Rejecting and Accepting Unmarked Images**

During an exam, you can individually accept and reject images. If you did not approve all images, you are prompted with the option to accept all unmarked images or to reject all unmarked images that still have a questionable status when you exit Acquire.

You also have the option to suspend the exam to approve images at a later time. However, you must accept or reject all images to send the exam to PACS.

After completing the exam procedures, click Exit to return to the Worklist view.



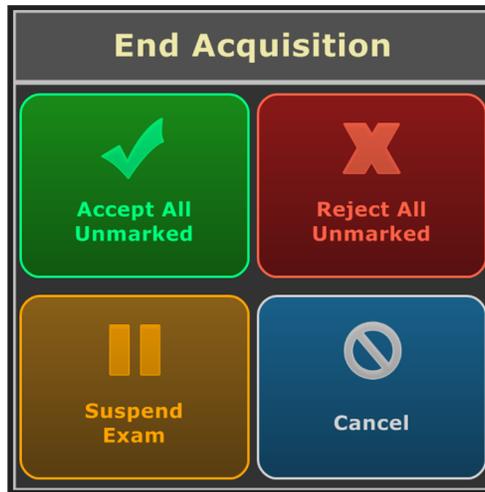
If there are any images that still have a questionable status you are prompted with the following options:

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Accepts and sends all images that have a  in the bottom left corner of the thumbnail.

Pauses the exam and takes you back to the Worklist. You can edit patient or study info before sending to PACS.



Provide a reason for the rejection of each image. Nothing will be sent to PACS.

Cancel exiting and takes you back to the Acquire screen. Nothing is accepted or rejected.

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### 16.0 ADULT/PEDIATRIC PATIENTS AND BODY HABITUS

#### 16.1 Adult Patients

1. Select the “Adult” button in the lower left corner of the “Acquire” screen (see Figure 16.1.1).
2. Select the body habitus of the adult patient (see Figure 16.1.2).

Figure 16.1.1  
Adult Parameters Selection

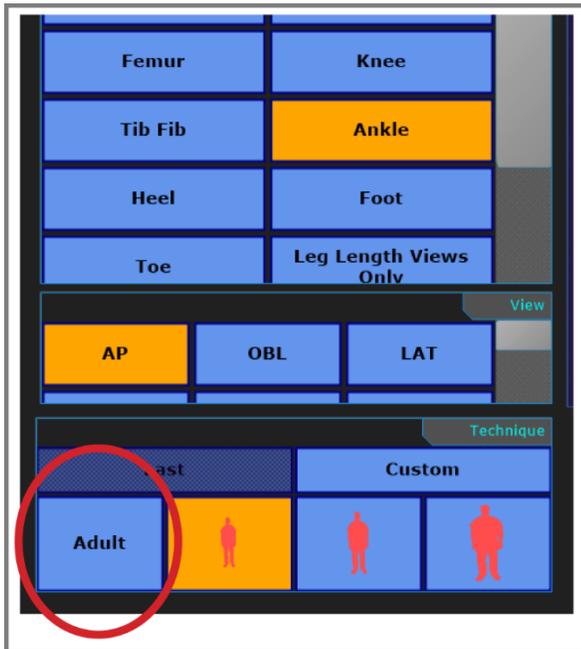
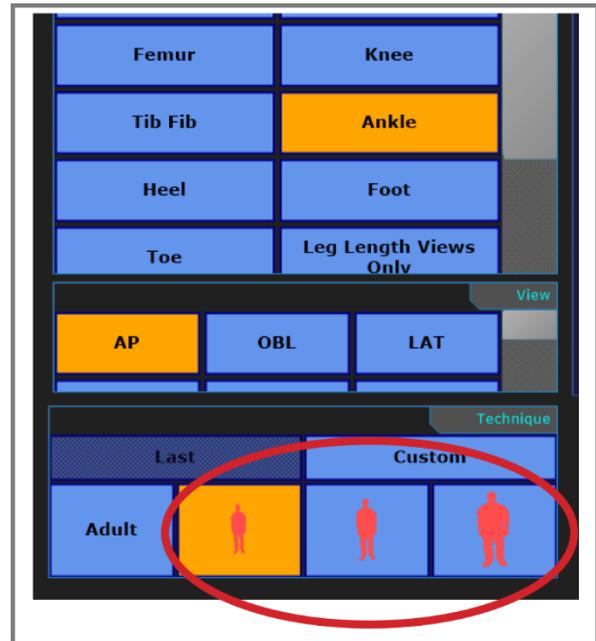


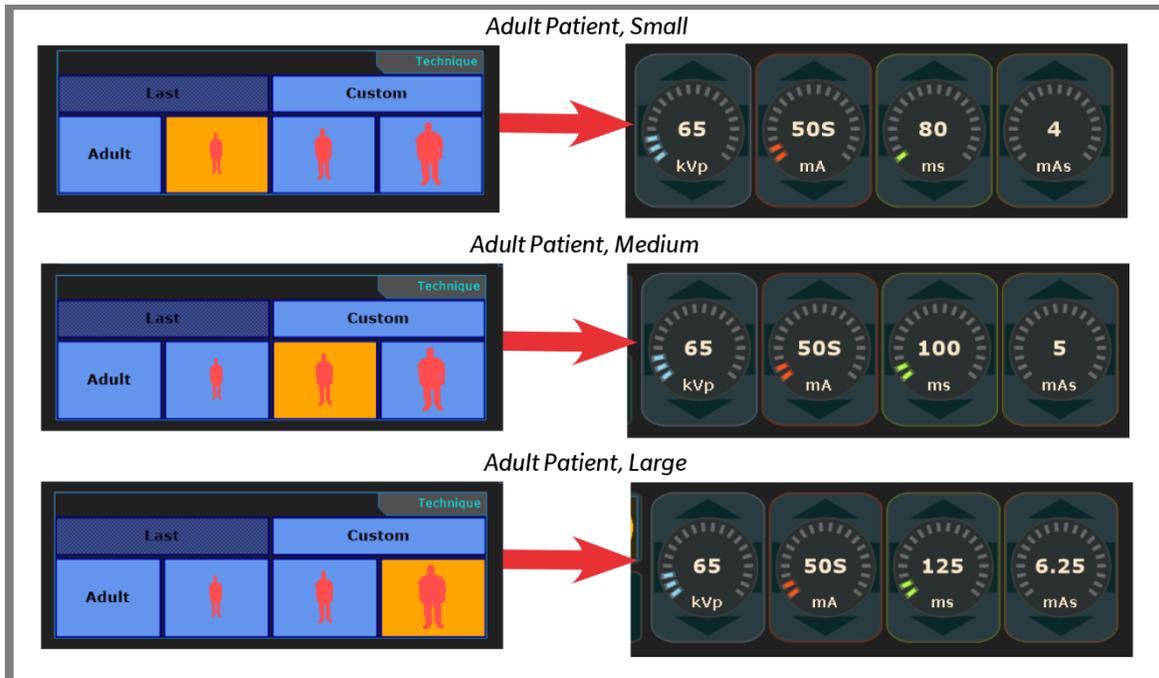
Figure 16.1.2  
Adult, Small Habitus



The system adjusts the x-ray parameters, visible in the lower center of the screen, according to the approximate size of the adult patient (see Figure 16.1.3).

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Figure 16.1.3  
Adult Body Habitus Parameters Selection



### 16.2 Pediatric Patients

1. Clicking the “Adult” button in the lower left corner of the “Acquire” screen will shift the system to “Pediatric,” (see Figure 16.2.1).
2. Select the body habitus of the pediatric patient (see Figure 16.2.2).

Figure 16.2.1  
Pediatric Parameters Selection

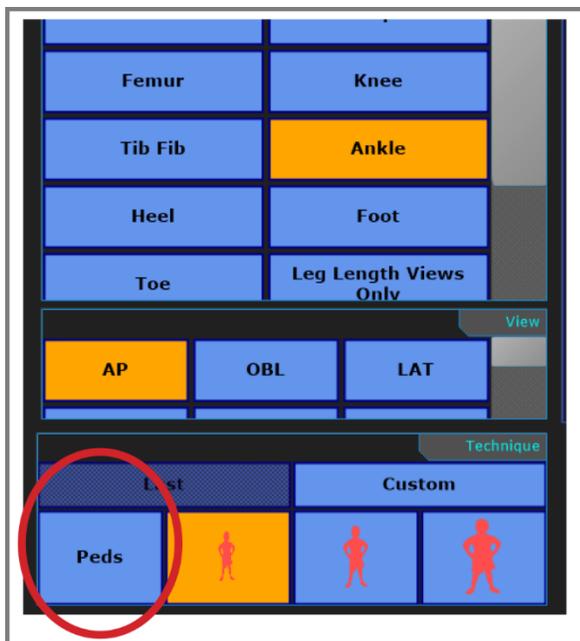
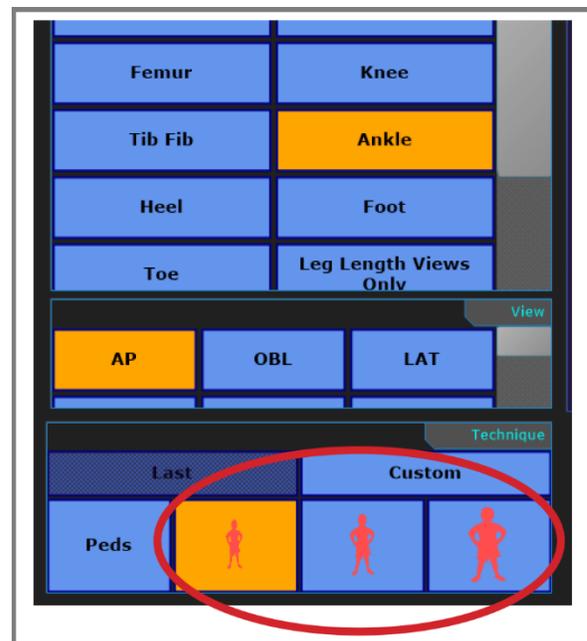


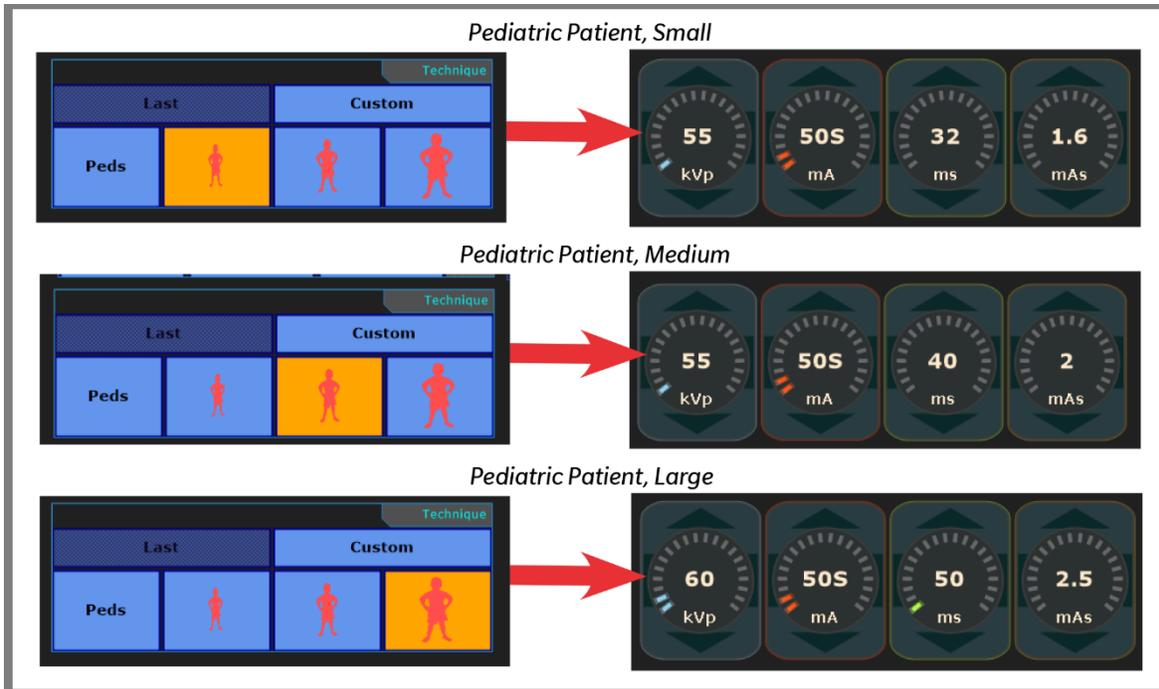
Figure 16.2.2  
Pediatric, Small Habitus



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The system sets the user programmed system parameters linked to the selected body size of the patient, visible in the lower center of the screen, according to the approximate size of the pediatric patient (see Figure 16.2.3).

Figure 16.2.3  
Pediatric Body Habitus Parameters Selection



**NOTE:** X-ray parameters are adjustable by a physician. For any x-ray, the relationship between the age/size of a patient and the dosage is at the discretion of the physician.

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### 17.0 PERFORMING POST PROCESSING FUNCTIONS

The following post processing tools can be applied to any unaccepted image.

**NOTE:** Be aware that once an image has been accepted, no further changes can be made to that image.

#### 17.1 Viewing an Image

To view an image in full screen mode, double click anywhere on the screen. To exit full screen mode, double click again.

Figure 17.1.1  
Image in Full Screen Mode

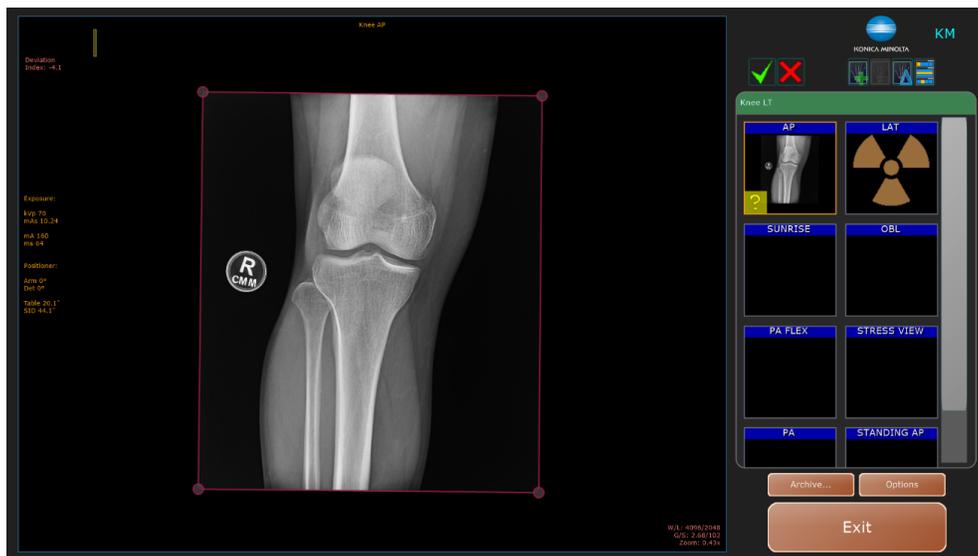
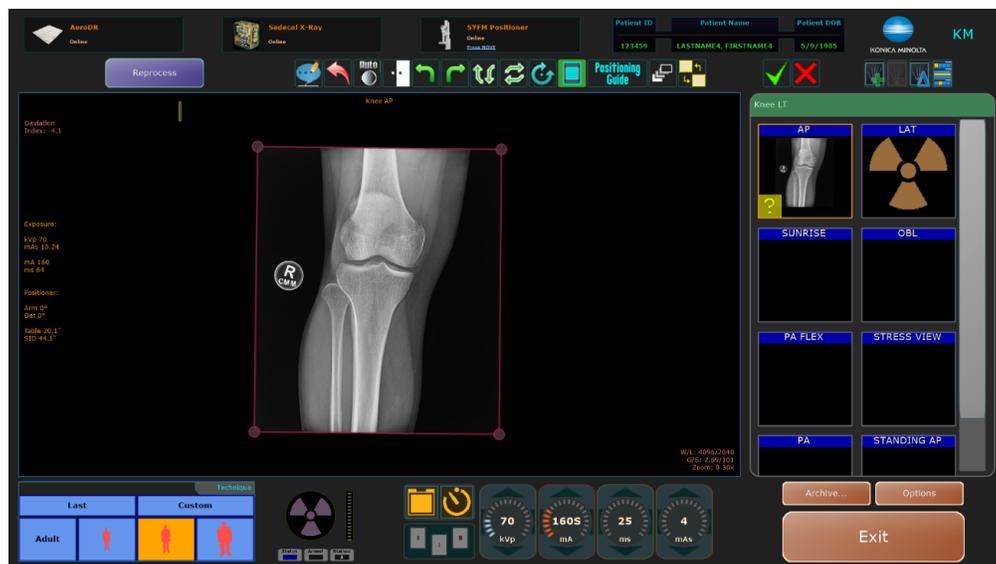


Figure 17.1.2  
Full Screen Mode Exited



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### 17.2 Apply Post Processing to Images Before Accepting Them

1. Once you have acquired all your images, select each image thumbnail to perform post processing as necessary.



2. You have the option to use the Ultra toolbar located at the top of the scanned image to perform post processing functions, such as reshuttering, window/leveling, adding annotations, and rotating, and flipping the images.



1. Annotations
2. Rotate Annotations (Not Default on DDR)
3. Pan (Not Default on DDR)
4. Zoom (Not Default on DDR)
5. Alternate Grid Suppression (Not Default on DDR)
6. Window/Level
7. Auto W/L (Resets W/L Only)
8. Reset
9. Invert
10. Rotate 90° to the Left
11. Rotate 90° to the Right
12. Flip Image Vertically
13. Flip Image Horizontally
14. Free Rotate Image (Rotate Image Slightly)
15. Intelligent Grid
16. Auto Shutter
17. Positioning Guide
18. Stitching
19. Merge Images into One Image

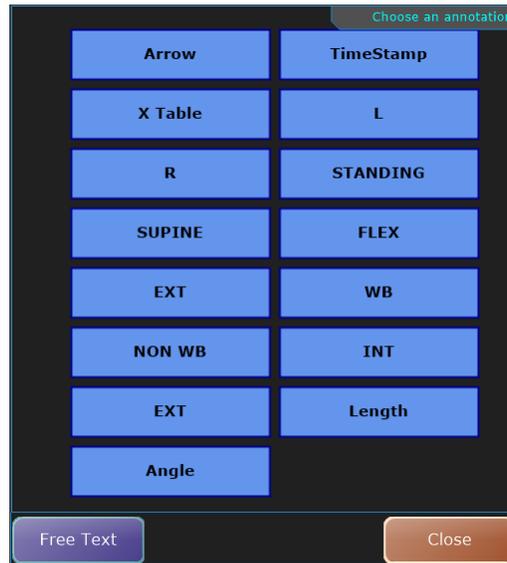
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### 17.3 Applying Annotations to Images

1. After acquiring an image you can add annotations to the image by clicking the **Annotations** icon.

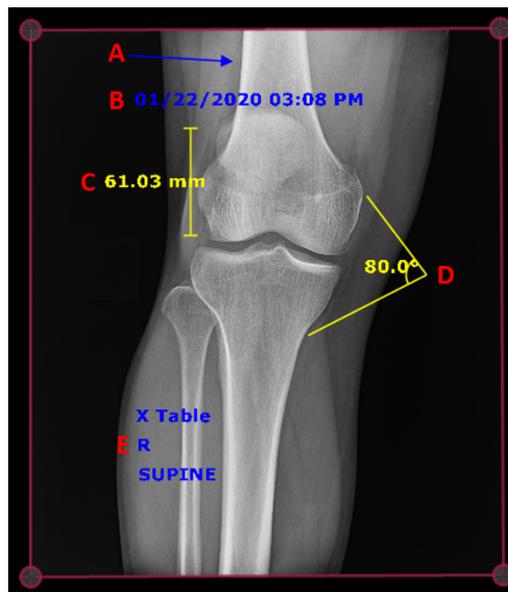


2. Select the annotation(s) that you want to apply to the image.



3. After selecting an annotation, move your cursor to where you want to place it on the image and **left-click**. For the following annotations:
  - a. Arrow:** Left click two points to draw an arrow from the first point to the second (see "Annotations," "A").
  - b. Timestamp:** Left click the desired area to add the current date and time (see "Annotations," "B").
  - c. Length:** Left click two points to add a measurement of length in millimeters (see "Annotations," "C").
  - d. Angle:** Left click three points to add a measurement of angle in degrees (see "Annotations," "D").
  - e. X Table, L, R, STANDING, SUPINE, FLEX, EXT, WB, NON WB, INT:** Left click the desired area to add any of these annotations.

Annotations



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### 17.4 Reset Entire Image to Remove All Applied Post Processing

Clicking the **Reset Entire Image** icon removes all the of post processing that you have applied to the image and resets it to the original raw image.

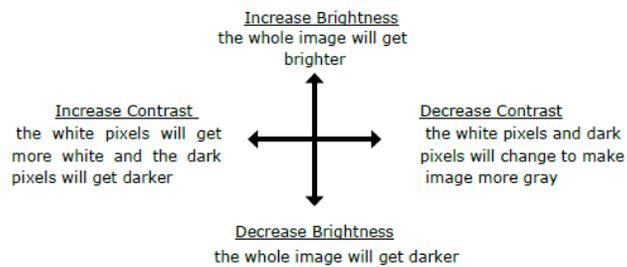


### 17.5 Mouse Functions

- **Zoom In** – scroll wheel up.
- **Zoom Out** – scroll wheel down.
- **Pan** – click and hold the wheel, then move your mouse.



WINDOW/LEVEL - Left or Right-Click



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### 17.6 Auto W/L

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If you have manually windowed and leveled an image to increase or decrease contrast and/or brightness and you want to reverse your changes, you can restore the window and leveling that Ultra originally applied to the image by clicking the **Auto W/L** icon.



**NOTE:** Ultra automatically applies window and leveling filters to images based on the body view you have selected (e.g., Chest AP). Unlike **Reset Entire Image**, **Auto W/L** only resets manually applied window and leveling to the original W/L filtered image for that view. All other applied post processing will remain.

**NOTE:** Double click an image to view it in full screen mode.

### 17.7 Invert Image

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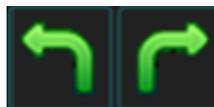
You can invert the image from positive to negative with the **Invert Image** icon.



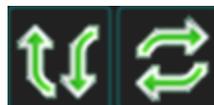
### 17.8 Rotating and Flipping Images

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You can rotate images in 90 degree increments each time you click on either the left or right **Rotate Images** icon.



You can flip images vertically or horizontally by clicking on the corresponding **Flip Images** icon.



#### **Rotating Images Slightly**

You can manually rotate images in small degrees, when you need to slightly rotate an image.

1. Left-click once on the **Rotate Images Slightly** icon to activate the function. The background of the icon will turn green when it is activated.



INACTIVE



ACTIVE

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- Left-click outside the shutter lines of the image. (Be sure not to click on a shutter corner or line).



- Drag your mouse to rotate the image to the desired angle.



**NOTE:** If you have a touch screen, use one finger to drag outside the image instead of using a mouse

- Release the mouse button.

**NOTE:** The "Rotate Images Slightly" icon will change back to inactive, after you lift your finger off the mouse button. If you need to rotate the image some more, click again on the Rotate Images Slightly icon.

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### 17.9 Shuttering Images

If **Auto Shutter** is not enabled, you can activate shuttering per exam, by clicking the **Shutter** icon to create a shutter box around the image.



There are **two different ways** to correct a missed Auto Shutter:

1. Manually adjust either the **Red** shutter lines or its corners to the appropriate shape. When you hover over either one of these, they will turn **Blue**. This means that you can drag them freely.



- Click the **Reprocess** button to reprocess the image for missing parts.

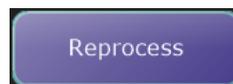


2. Draw your own shutter box by right-clicking the **Shutter** icon, then left-clicking the 3 corner dots in a clockwise or counter-clockwise direction.

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- Click the **Reprocess** button to reprocess the image for missing parts.

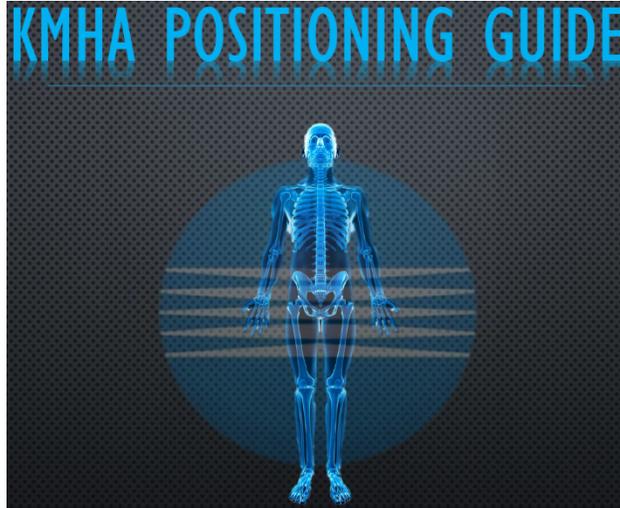


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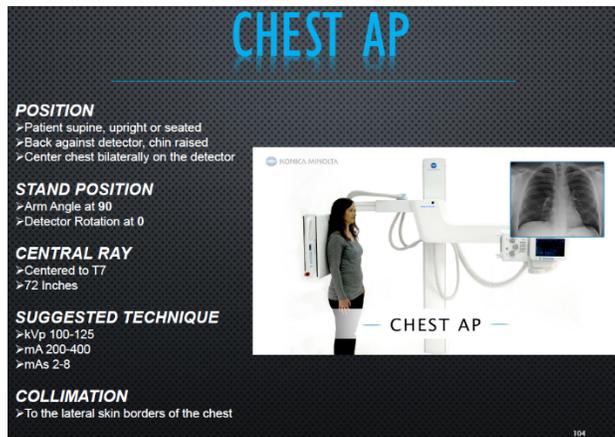
### 17.10 Opening the Positioning Guide

The positioning guide can be used as a reference for typical technique ranges, patient positioning for each body part view and stand positioning.

1. Click on the **Positioning Guide** icon to launch the Positioning Guide PDF document.



2. The **Table of Contents** page is linked to each type of exam. Click a link to be taken to the page for that particular view.



3. Click the **red X** at the top left corner to close the document.

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### 18.0 MERGING IMAGES

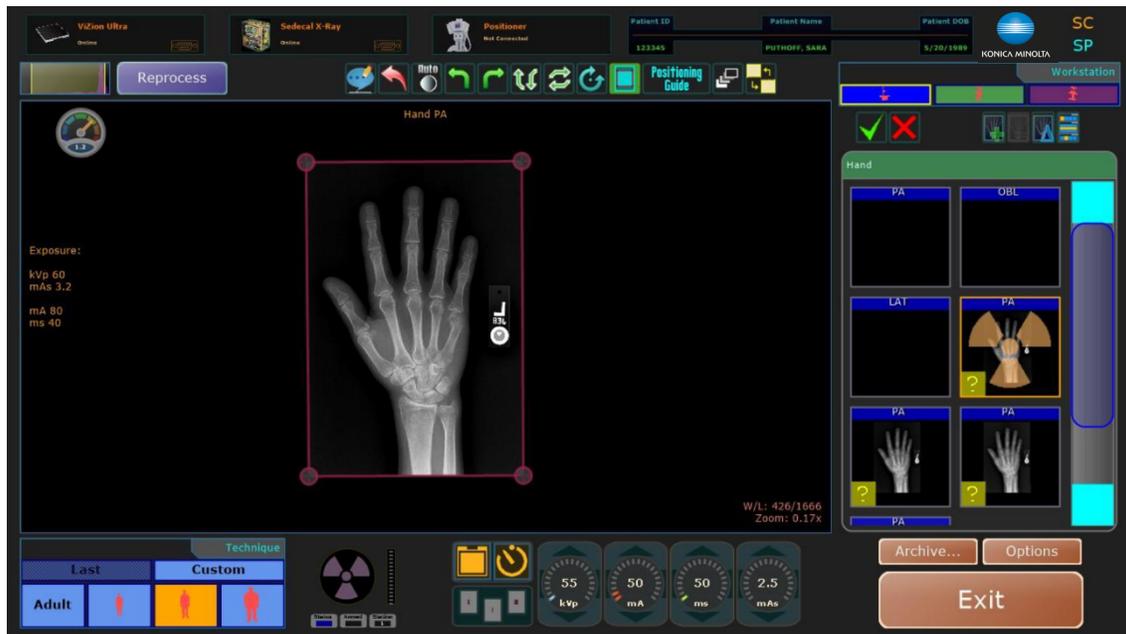
You can combine a set of images into one view to display those images side by side. You have the option to manually merge images into one view or you can create an image merge group to automatically merge preset views into one view.

#### 18.1 Merging Images Manually (Multiple on 1)

1. Acquire the images for the exam.
2. Perform image post processing as needed for each image you plan to merge, but do not accept them afterwards.
3. Left click to highlight the first image that you want to merge, then right-click the **Merge** icon. The **Merge** icon will turn green.

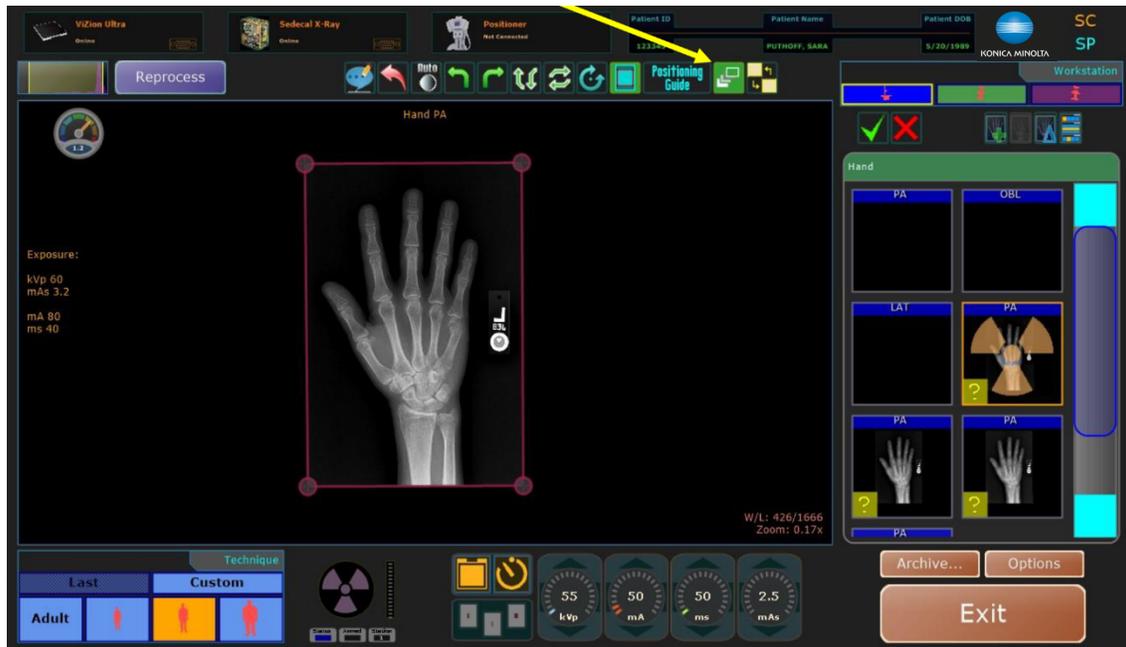


4. Left click the first image in the folder.

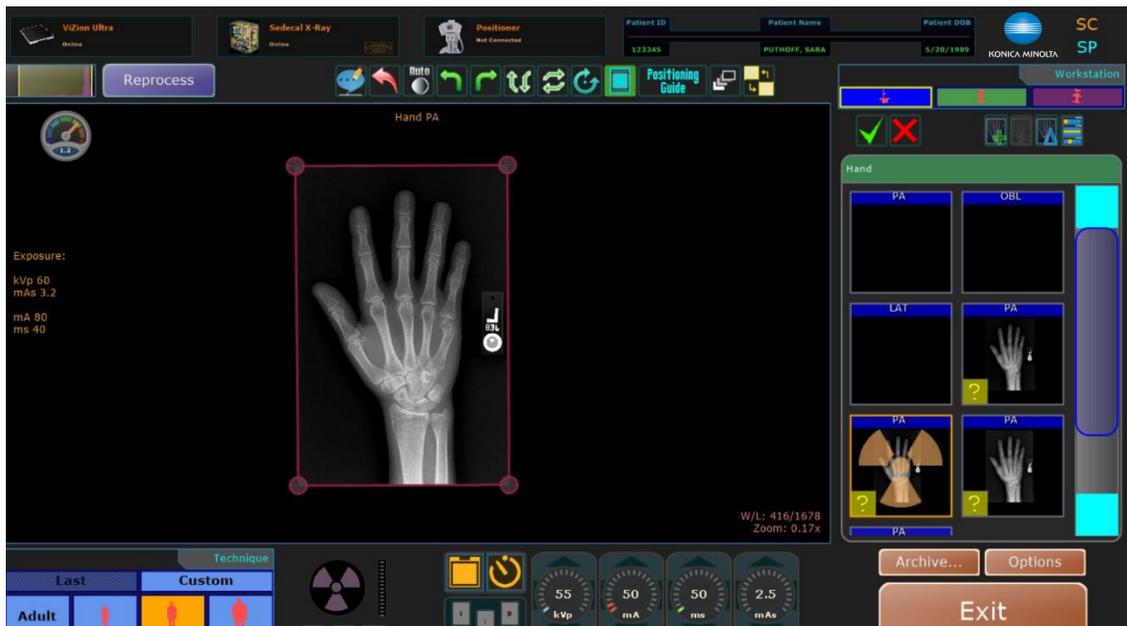


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- Right click the **Multiple On 1** button.

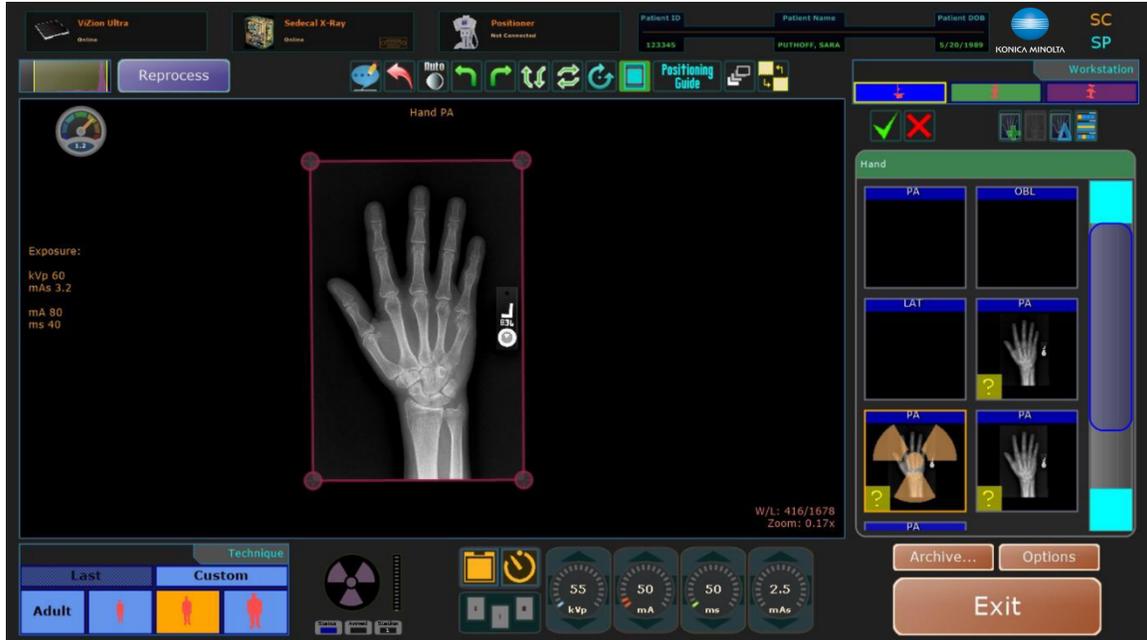


- Left click the second image in the folder.

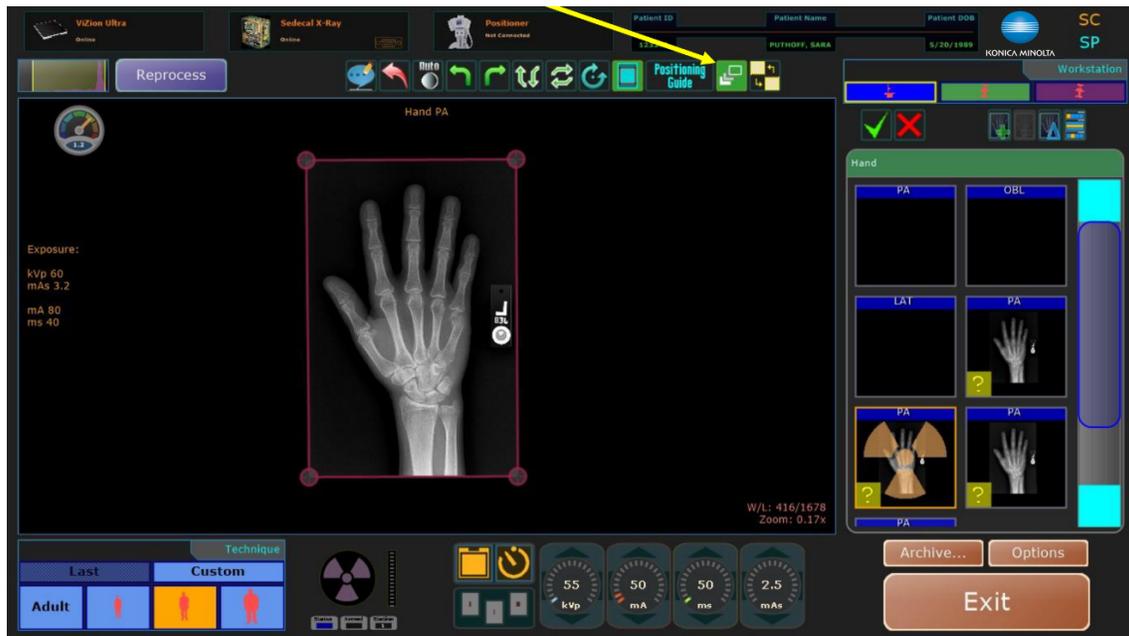


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7. Right click the **Multiple On 1** button.



8. Repeat steps 4-7 if you need to add a third image.
9. Once you are ready to merge the images together, left click the **Multiple On 1** button.



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10. This box will appear.



11. Select the view you want the final image to be named, e.g., "PA Hand".

12. Click "Choose".

This is an example of the final image with three images on one. It will send to PACS as a single image under this study.

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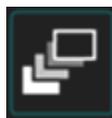


**NOTE:** After the images are merged together, the window/level function is for the whole image. Any adjustments should be made before merging.

### 18.2 Merging Images Automatically

Before you can merge images automatically, you must have already created an **Image Merge Group** (refer to the Ultra Administrator's Manual).

1. Create a new exam and select the views that are included in the defined Image Merge Group that was created.
2. Capture the images.
3. Once you have acquired the images for the exam, left click the **Merge** icon to merge the images into one view.



4. Select a view to merge them under and click **Choose**. The merged view is then displayed as the view chosen.

**NOTE:** You must capture all images defined in the Image Merge Group. If all required images are not captured, the image auto-merge process cannot complete.

**NOTE:** The final merged image will not contain dose information.

5. If **Auto Reject** was selected in the Image Merge Group configuration, a reject prompt is displayed. If Auto Reject was not selected, you must manually accept or reject each image.

**NOTE:** When "Auto Reject" is enabled, all original individual views used to create the grouped image are rejected. However, you still need to accept the new merged view if applicable.

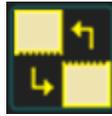
**EXAMPLE:** If you want to automatically merge the images for AP Ankles, OBL Ankles, and LAT Ankles into one view, create an Image Merge Group that includes those three views. After the image merge group is created, create an exam using the Ankle 3 view procedure and capture the AP Ankles, OBL Ankles, and LAT Ankles images. After all images are captured, click the Merge icon to automatically merge the 3 views into one view.

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### 19.0 STITCHING IMAGES

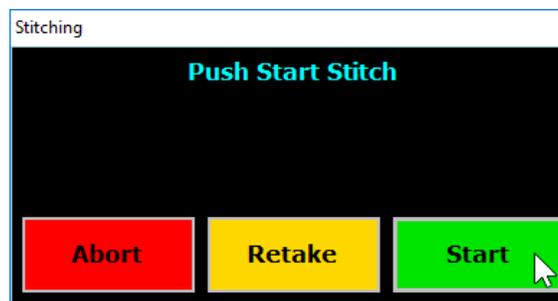
Stitching joins multiple images together to form one unified image.

The auto stitching process joins multiple Leg Length or Scoliosis images together to form one unified image. Manual stitching can also be performed by selecting the **Stitching** icon.



#### 19.1 Auto Stitching a Leg Length Study

1. When you are ready to begin the exam click the stitching **Start** button.



2. The Ultra software will now indicate that you are ready to take **Shot 1**.



3. Press and hold the **Move** button on the remote to move the U-Arm into the first position, when the LED light turns from **Red** to **Blue**.
4. Hold until the LED light on the stand turns green.
5. When the software and the green LED light on the stand indicate you have reached the first position, go into the room and make any necessary height adjustments to the U-Arm with the patient on the stand.

**NOTE:** The first position should always start at the bottom of the patient and move up towards the patient's head.

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6. Make sure your collimation light is open completely from top to bottom.
7. Position the stitching stand at least a fist's width away from the detector.
8. Once setup, direct the patient to remain still and take your first exposure.
9. Your first image will appear and will prompt for **Shot 2**.



**NOTE:** The **Blue** LED light on the stand will indicate when to again press and hold the **Move** button on the remote.

**NOTE:** The final stitched image will not contain dose information on screen or in DICOM.

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10. When the software and green LED light on the stand indicate that you have reached the **second position**, you are ready to take your next exposure.



11. Again, wait until the LED light turns blue, then press and hold the Move button to get to the **third position**.

**NOTE:** It is recommended to continually remind your patient to remain perfectly still throughout the entire stitching process.

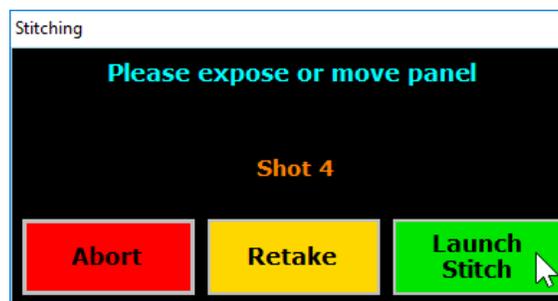
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12. When the software and green LED light indicate you have reached the next position you are ready for the next exposure.



13. Look at your images and make sure you have included all that you need. If you need to take another image, press and hold the **Move** button on the remote at this time.
14. If you are satisfied with your images, you will now click the **Launch Stitch** button.



15. Click the stitching **Retake** button at any time during the study to repeat an exposure without starting over.
16. Upon clicking the **Launch Stitch** button in the Acquire screen, the following window will appear, where any final adjustments can be made.

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17. Use the **A**, **S**, **D** and **W** keys on the keyboard in order to make pixel shift adjustments. This will allow you to move the image in small increments.



18. The **Stitching Toolbar** can be used to make further adjustments.



-  aligns image back to original stitch
-  takes image back to original W/L
-  resets the last movement you made
-  decreases the current overlap number
-  increases the current overlap number

19. After clicking the **Confirm** button, your final stitched image will appear.



20. At this point, you are able to either accept the stitched image or re-stitch the 2-4 images together again, if you decide they are not lined up correctly.

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### 19.2 Manually Stitching a Leg Length Study

Manual stitching can be performed when needed to complete a stitching study, if for example, you cancelled out of the auto stitching procedure, or your positioner stand does not offer a feature to move automatically to a position based on the view you select in Ultra.

1. From the Acquire screen, left click on the **Ankles** leg length view.



2. Right click on the **Stitching** icon located on the far right side of the Ultra toolbar.



3. Left click on the **Knees** leg length view.



4. Right click on the **Stitching** icon.

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5. Left click on the **Pelvis** leg length view.



6. Finally, left click on the stitching icon.
7. After left clicking on the stitching icon, this window will appear, allowing you to manipulate the image however necessary.



8. After clicking the **Confirm** button, your final stitched image will appear.



9. At this point, you are able to either accept the stitched image or re-stitch the two to four images together again if you decide they are not lined up correctly.



**CAUTION:** Images can be re-stitched as many times as needed. Even if the images have been sent to PACS, this process can be followed to send another edited final stitched image.

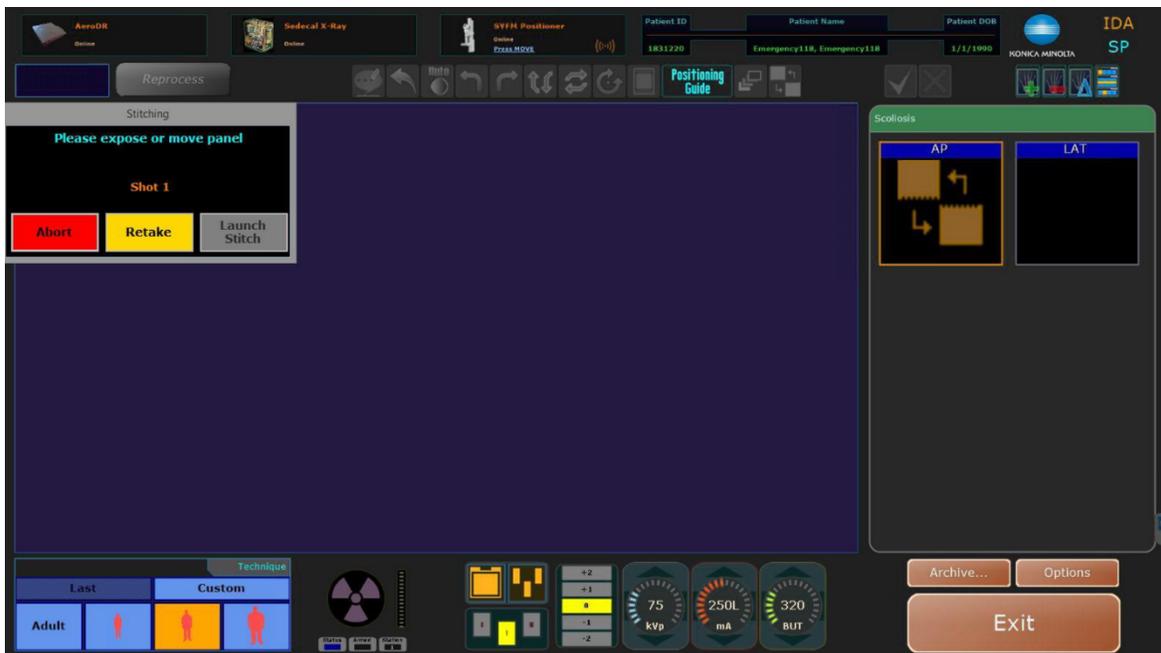
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### 19.3 Auto Stitching a Scoliosis Study

1. When you are ready to begin the exam click on the green **Start** button.



2. Press and hold the MOVE button on the remote to move the U-arm into the first position when the LED light turns from red to blue. Hold until the LED light turns green.



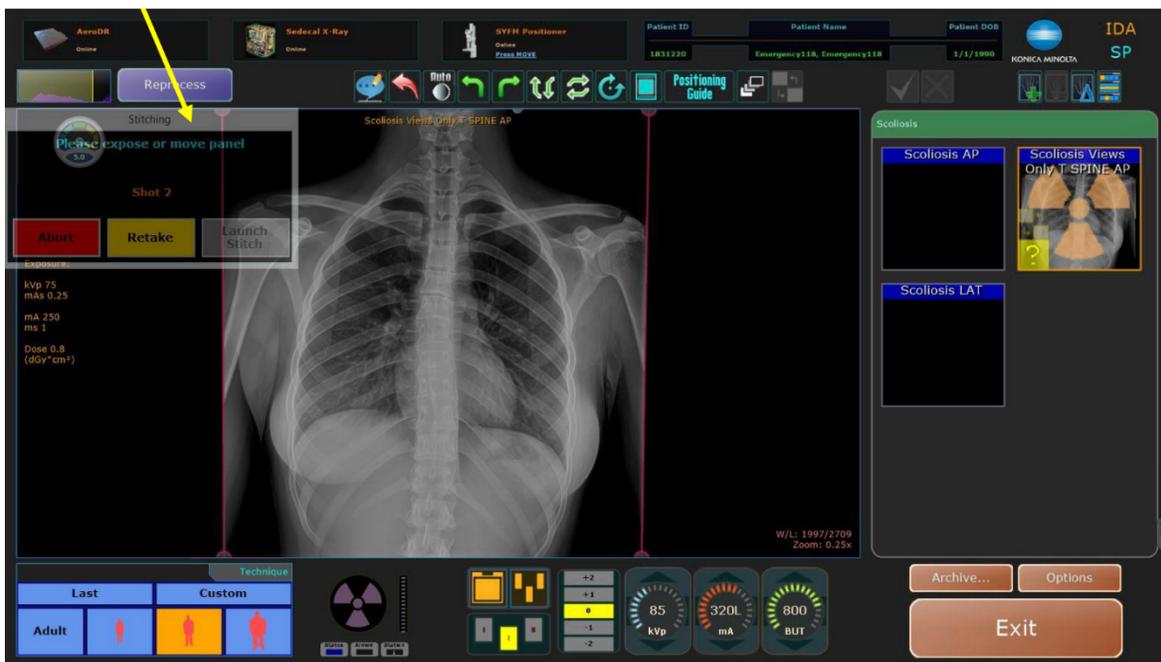
3. When the software and the Green LED light on the stand indicate you have reached the first position, go into the room and make any necessary height adjustments to the U-Arm while the patient is on the stand.

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**NOTE:** The first position should always start at the top of the patient and move down towards the patient's feet. Also, make sure your collimation light is open completely from top to bottom. Position the stand at least a fist's width away from the detector.

4. The software will now indicate that you are ready to take an exposure.
5. Your first image will appear. The blue light on the stand will indicate when to again press and hold the MOVE button on the remote.

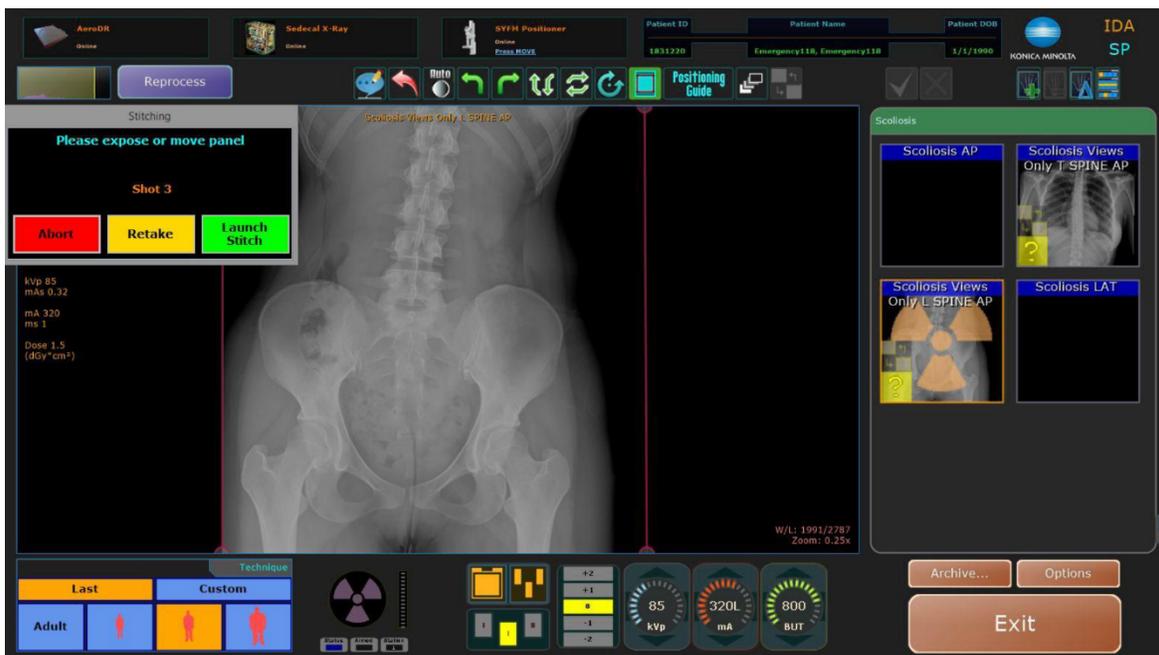


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- Once the software and green LED light indicate that you have reached the **second position**, you are ready to take your next exposure.

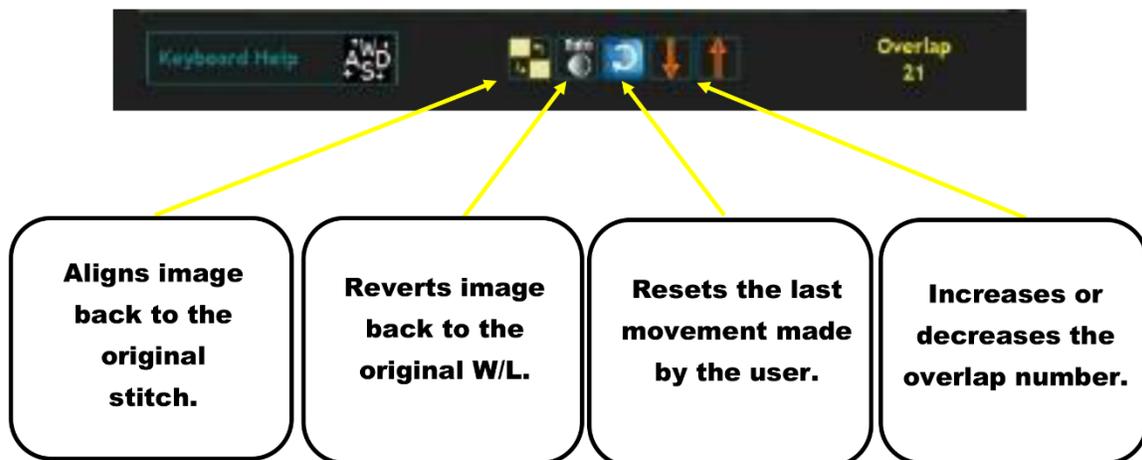
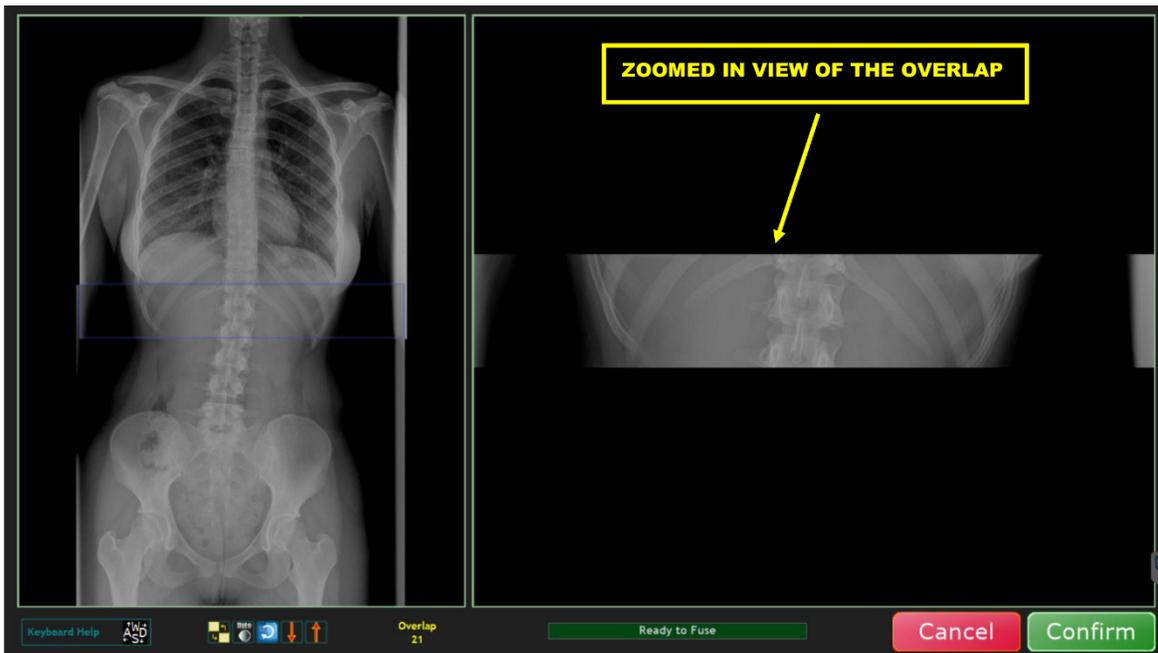


- Look at your images and make sure you have included all that you need. If you need to take another image, press and hold the MOVE button on the remote. If you are satisfied with your first two images, you will now click on the green **Launch Stitch** button. Click the yellow **Retake** button at any time during the study to repeat an exposure without starting over.



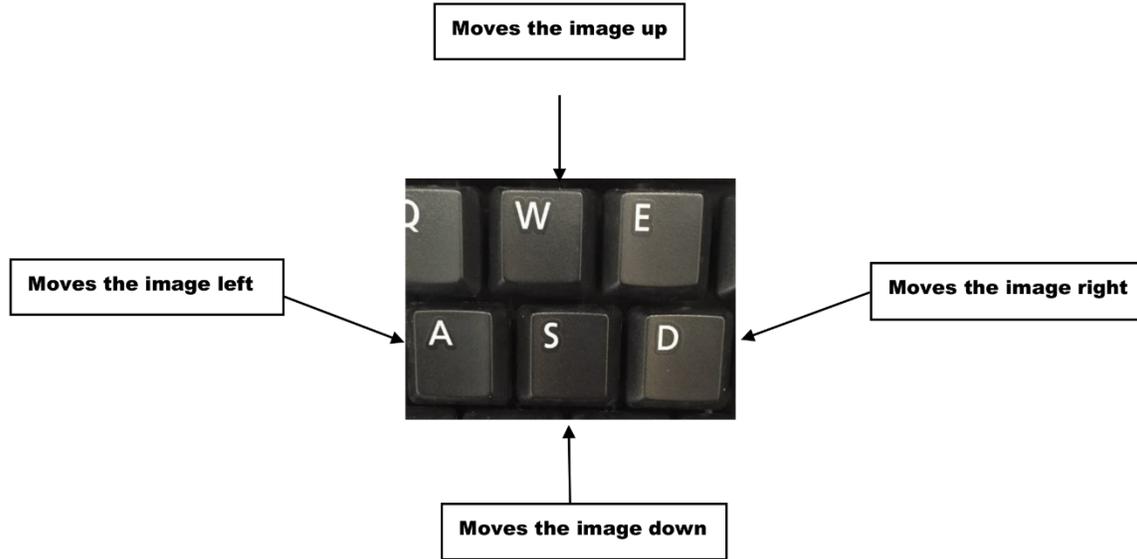
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8. Upon clicking the **Launch Stitch** button in the acquire screen, the following page will appear where any final adjustments can be made.



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To make any adjustments you will use the keys A, S, D, and W on the keyboard of the computer to pixel shift the image. This will allow you to manipulate the image in small increments.

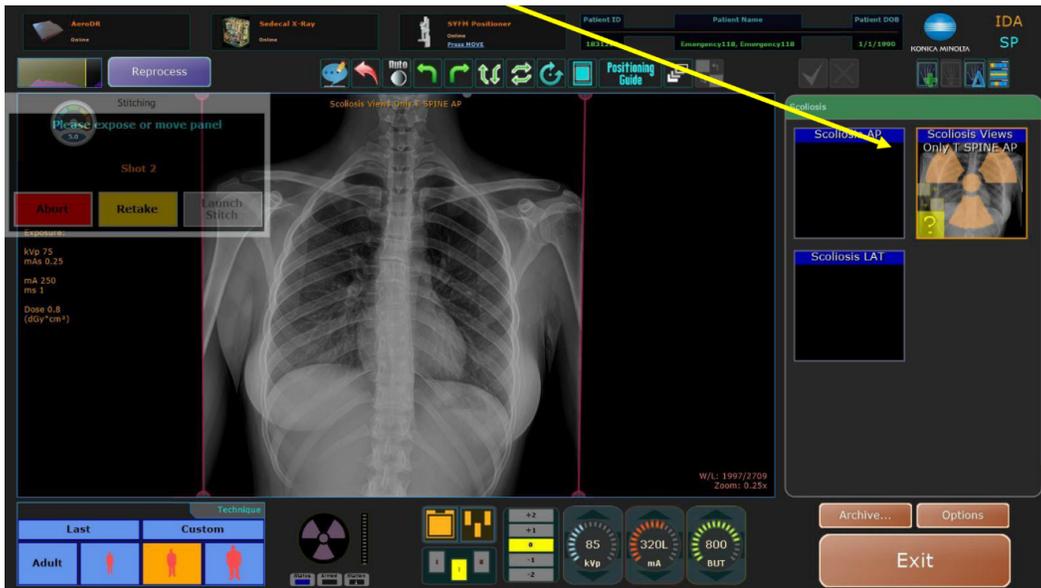


After clicking “confirm” your final stitched image will appear. At this point you are able to either accept the images or re-stitch the two or three images together again if you decide they are not lined up correctly.

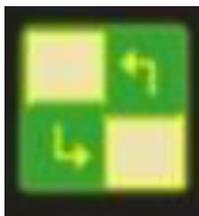
## IV. SOFTWARE

### 19.4 Manually Stitching a Scoliosis Study

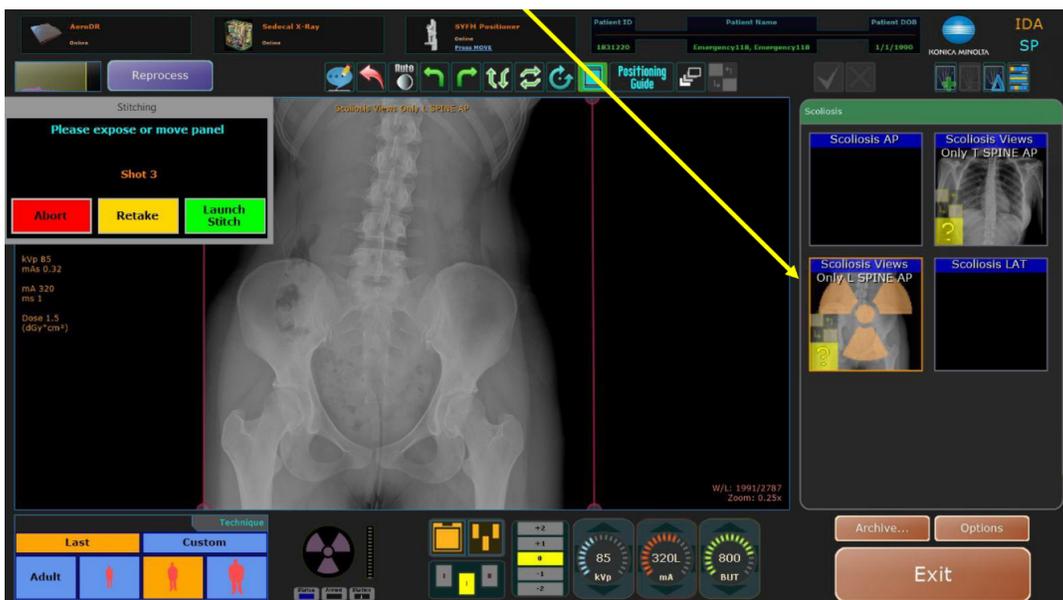
1. Left click on the **T SPINE** view.



2. Right click the **Stitch** icon at the top of the screen.

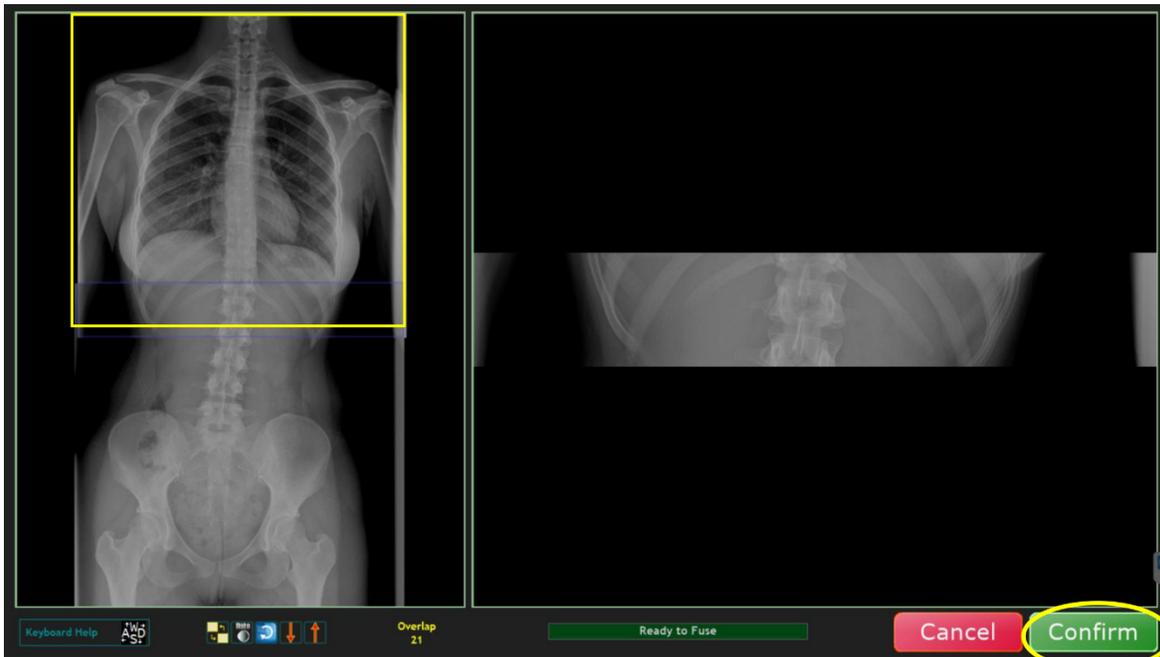


3. Left click on the **L SPINE** view.



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4. Right click the **Stitch** icon at the top of the screen.
5. Finally, left click the **Stitch** icon at the top of the screen.
6. After left clicking the **Stitch** icon this page will appear, allowing you to manipulate the image however necessary. Once you are completed, click "Confirm" for the final stitched image.



**NOTE:** Images can be re-stitched as many times as needed.

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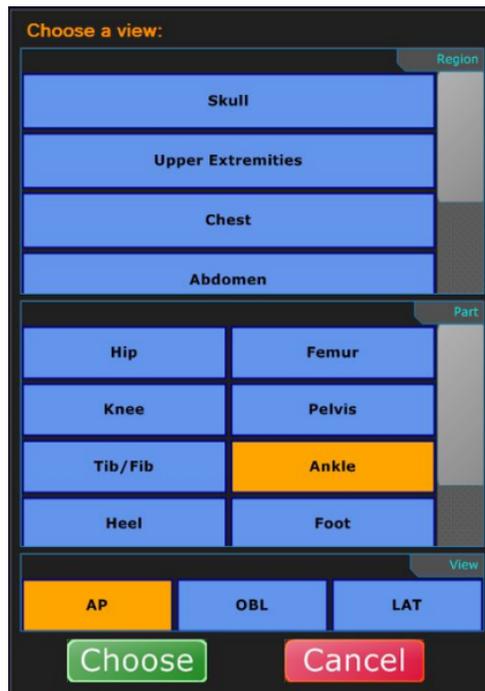
### 20.0 ADJUSTING VIEWS AND EXAMS

#### 20.1 Adding Additional Views to an Exam Procedure

1. Open a patient exam.
2. Click the **Add View** button above the procedure section.



3. In the **Choose a View** window, select the exam view you want to add.



4. Click **Choose**. The next view is displayed in the procedure view section.

#### 20.2 Adding Additional Procedures

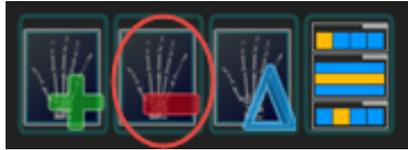
1. Click on highlighted icon shown below to add a procedure.



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### 20.3 Removing a View From an Exam

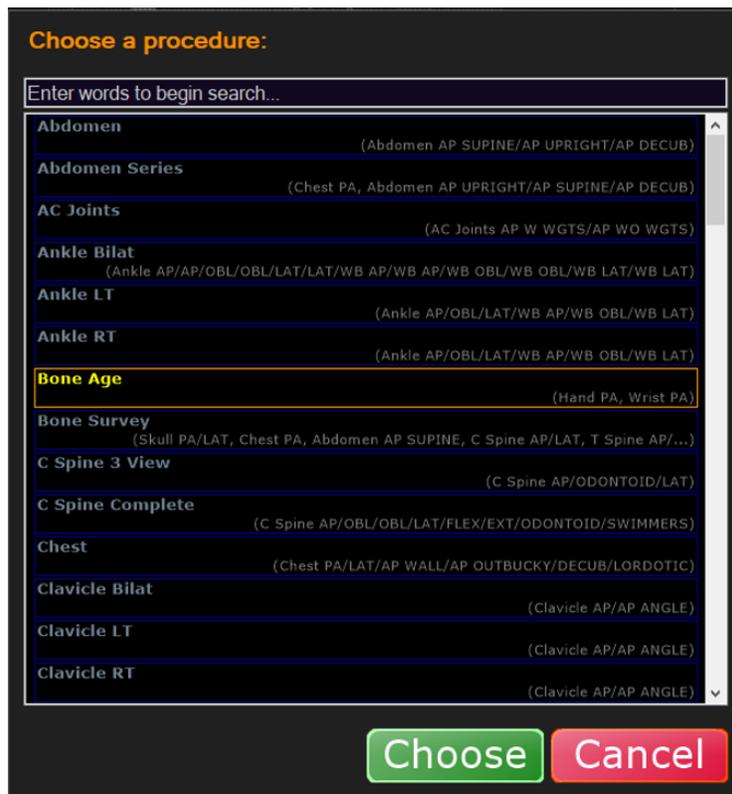
1. In an exam, select a view that does not have a captured image.
2. Click the **Delete View** button.



3. The view is removed from the exam.

### 20.4 Change the Name of a View in an Exam

1. In an exam, select an image with the incorrect view name.
2. Click the **Change View** button.



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3. Select the correct name of the view.
4. Click **Choose**. The view changes to the correct name.
5. Click the **Reprocess** button to reprocess the image as that new view.



### 20.5 Adding Exams from the Acquire Screen

Exams can be added from the **Acquire Screen** without having to return to the **Worklist**.

1. To add exams from within the Acquire screen, click on **Add Exam** button.
2. This will display the Choose Procedure Screen.
3. Select or search for your exam from the Choose a procedure list.
4. After selecting your exam, click the **Choose** button or double-click your exam. Note: If you do not wish to add exam click **Cancel** to close this window without adding exam.
5. The procedure is now added and displayed in the Exam View.
6. Exam images can now be acquired for the newly added exam views.
7. Accession number is not added for exam views added in Acquire screen and can be added after returning to Worklist.

### 20.6 Editing Patient and Exam Information

1. Select the patient you want to edit.
2. Left click the field you wish to edit.

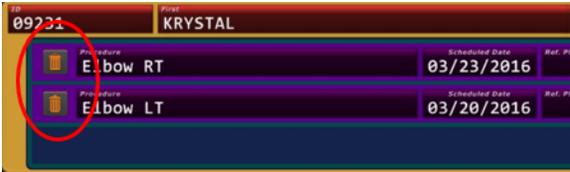


3. Edit the information.

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### 20.7 Deleting Exams

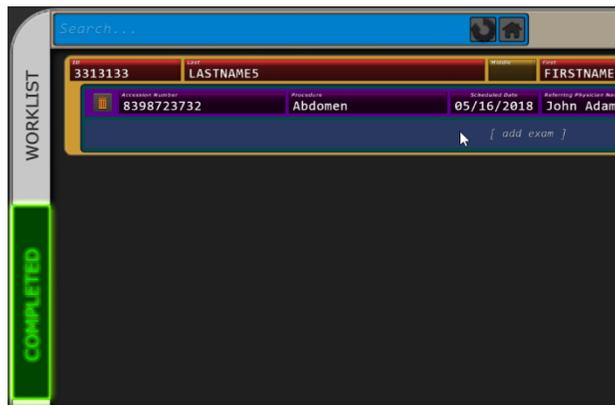
1. In an expanded exam, click on the **trash can** icon next to the study you want to delete.



2. Click **Delete** to permanently delete the exam. (Any raw images associated with the deleted exam will still remain in the image archive.)

### 20.8 Adding an Exam Procedure to a Completed Patient Exam

1. Select a patient from the **Completed** tab of the Ultra software window.



2. Click [ **add exam** ] below the patient's last exam.
3. Select the exam procedure and click **Choose**.

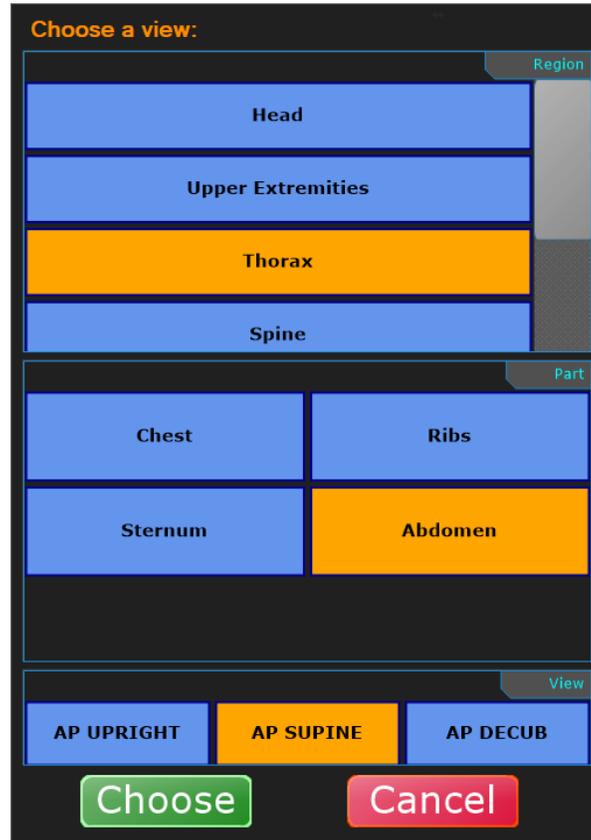
**NOTE:** You will **NOT** see the new exam on the **Completed tab**. The new exam will be added to the **Worklist tab**. Any completed exams remain on the **Completed tab**.

4. Continue the process of editing the exam as outlined in "Creating New Patient Exams".

### 20.9 Adding an Image to a Completed Exam

1. Select a patient from the completed tab of the Ultra software window.

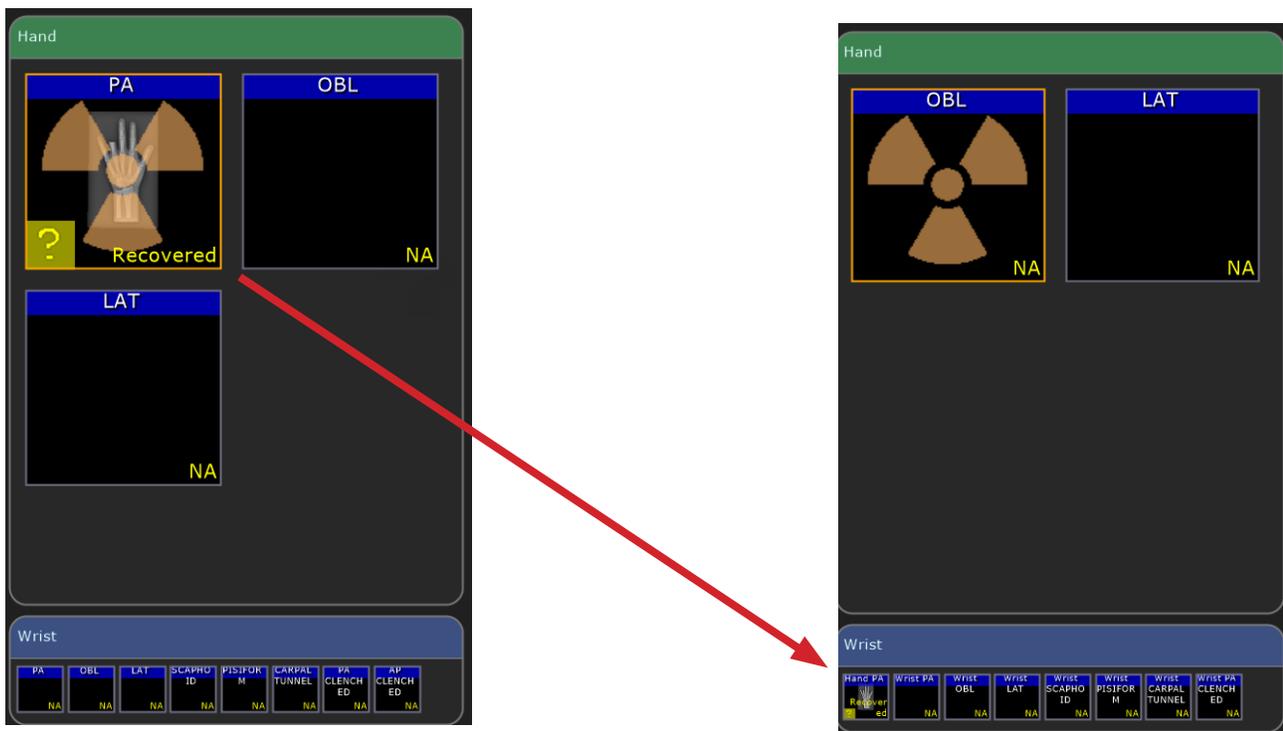
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2. Double click the patient name.

### 20.10 Moving an Image to Another Exam within the Same Patient Acquisition Screen

1. Click and hold the left mouse button on the desired view.
2. Drag the view into the desired exam and release the left mouse button.



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### 20.11 Moving an Image to Another Exam

You can move images from an existing exam to another.

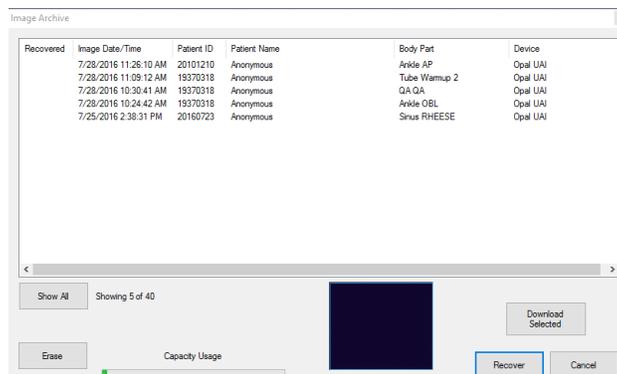
**EXAMPLE:** You may need to do this if you acquired an image under the wrong patient study.

**NOTE:** When moving an image, you should reject the image from its current exam (if it hasn't already been accepted), then select the correct exam and recover the raw image from the archive.

1. If necessary, add a new exam to an existing patient study that is going to receive the moved image.
2. Open the original patient exam.
3. Reject the image that you want to move (unless you have already accepted the image).
4. Select the correct receiving exam and go into the Acquire screen.
5. Click the **Archive** button.



6. The Image Archive window displays.



7. Select the image to recover and click **Recover**.

**NOTE:** To select multiple images, select an image and hold down the Ctrl button, select the additional images, then click Recover.

8. Proceed normally by applying post processing to the image and accepting it.

**NOTE:** If you have mistakenly accepted an image and sent the image to PACS under the wrong patient, you must contact your PACS administrator to remove the image from the PACS server.

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### 20.12 Move/Copy/Resend

1. From the worklist, the “completed” tab, or by adding a new patient, select the patient you want to recover the image for (see Figure 20.9.1).
2. Click “Acquire,” (see Figure 20.9.1).

Figure 20.9.1  
Recovering an Image from Archive



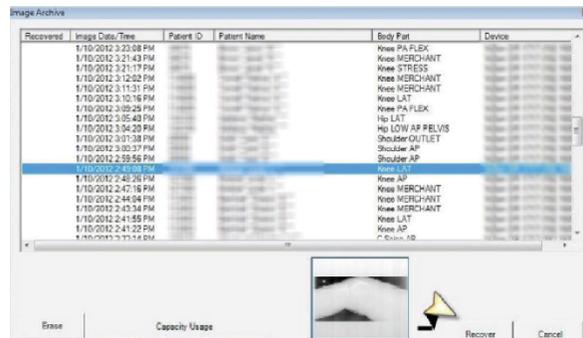
3. In the “Acquire” screen, select the “Archive” button in the lower right corner (see Figure 20.9.2).
4. The “Image Archive” will appear (see Figure 20.9.3).
5. Locate the patient you want to recover the images for.
6. Double click or select the image and click the “Recover” button at the bottom of the list.

Images are restored to the bottom of the selected procedure box in the acquire screen. Use the post processing tools as needed and accept the image(s).

Figure 20.9.2  
Acquire Screen



Figure 20.9.3  
Image Archive



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### 21.0 STORING AND SHARING IMAGES

#### 21.1 Manually Send Images to a PACS Destination

You can configure the system to automatically send images to a PACS destination, after accepting the image(s) and exiting the exam, or you can manually send them after you complete an exam. The following steps provide details on how to manually send images.

1. Select a patient exam from the **Completed** tab in the Ultra UAI Window.
2. In the expanded exam view, the **Send Destination** icon(s) display to the right of the list of exams.



For systems with multiple send destinations configured, multiple icons are displayed.



3. Click on the destination PACS icon(s) you want to send a study to. The icon will change to **blue** and a **green progress bar** will display on the icon while the transfer is in progress.



4. The destination icon(s) will turn green once the image(s) have successfully been sent to their destination PACS server(s).



**NOTE:** Destination Icons have the following status colors:

**Gray** – not sent to PACS

**Blue** – sending in progress

**Green** – successfully sent

**Red** – failed to send

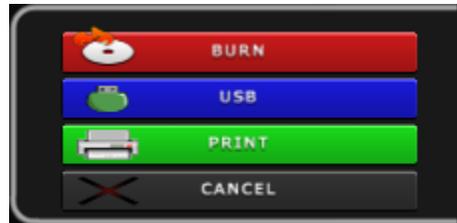
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### 21.2 Printing and Saving Exam Studies to a Storage Device

The **More** button at the bottom of the Ultra screen is used to export studies and images to a selected media format.



You can burn a completed study and images to a CD/DVD, copy them to an external drive, or print them to a DICOM printer by selecting an option from the More menu.



1. From the **Completed** tab, select a completed study and click the **More** button.
2. Each exam within the patient study will be included by default. All included exams will be highlighted in blue.



3. Left click on any blue highlighted exam you want to exclude from burning, saving, or printing. You can right click an excluded exam again to re-include them.



### 21.3 Burning a Study to a CD/DVD

1. Click the **Burn** button from the **More** menu.
2. Insert a blank CD or DVD in the drive.

**NOTE:** Until a CD or DVD has been recognized in the drive, a status message will display "Please wait...." Once the disc is ready, the status message will change to "Burner Ready".

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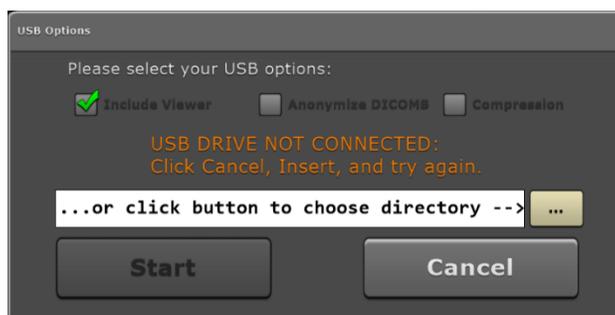
3. Select burn options as needed. When saving images, you can include the Opal viewer, remove patient demographics, or compress the images.
  - **Include Viewer** – burns the CD/DVD with the Ultra viewer executable included. Including the viewer makes viewing images easy from any computer (selected by default).
  - **Anonymize DICOMS** – when selected, all patient demographic and personalized information is removed from the study and replaced with generic first and last names.
  - **Compression** – saves the file in a compressed format, reducing the file size, which allows for more storage.
4. Click **Start** to begin burning the CD/DVD. The progress indicator is displayed in the top left corner.
5. You can remove the CD/DVD once the progress indicator displays “**Done**”.

### 21.4 Copying a Study to a USB Drive

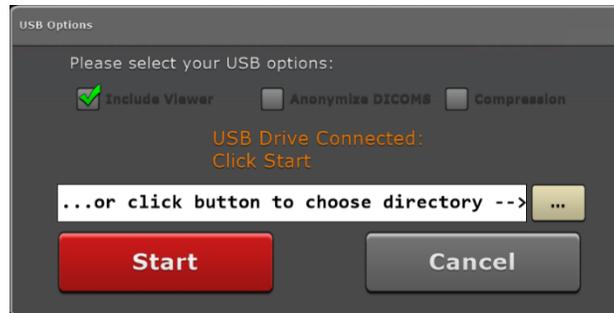
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1. Click the **USB** button from the **More** menu.
2. Insert an **USB external drive**.

**NOTE:** Until an external drive is inserted, a status message will display “USB Drive Not Connected.” Once the drive is ready, the status message will change to “USB Drive Connected: Press Start.”



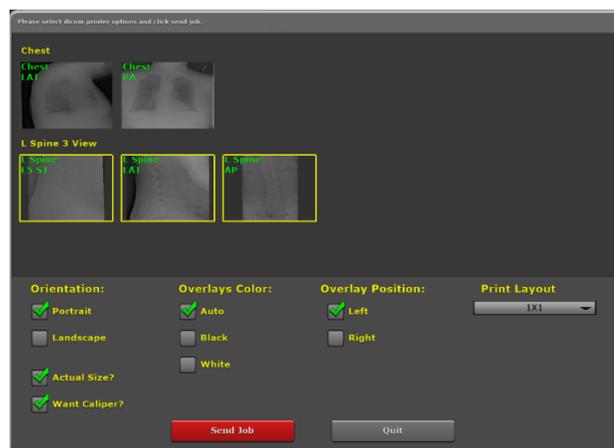
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3. Select USB options as needed. When saving images, you can include the Opal viewer, remove patient demographics, or compress the images.
4. If more than one USB drive is inserted, click the ... button to navigate to the appropriate USB drive.
5. Click **Start** to begin copying the patient study and exam images to the USB drive. The progress indicator is displayed in the top left corner.
6. You can remove the USB drive once the progress indicator displays “Done.”

### 21.5 Printing a Study to a DICOM Printer

1. Click **Print** button from the **More** menu.
2. Click on the image(s) you want to send to a **DICOM printer**. A yellow border will surround each selected image.



3. Select **Print Options** as needed.
  - **Orientation** – portrait or landscape. Portrait is selected by default.
  - **Overlays Color** – auto, black or white. Auto is selected by default.
  - **Overlay Position** – left or right. Left is selected by default.
  - **Print Layout** – number of rows and columns. 1x1 is selected by default.
  - **Actual Size?** – prints the actual size of the image. Deselecting this option utilizes the Print to Fit feature which is selected by default.
  - **Want Caliper?** – includes the measurement tool in the images which is selected by default.
4. Click **Send Job** to print the image(s). The progress indicator is displayed in the top left corner.

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### 22.0 SETTINGS AND ADJUSTMENTS

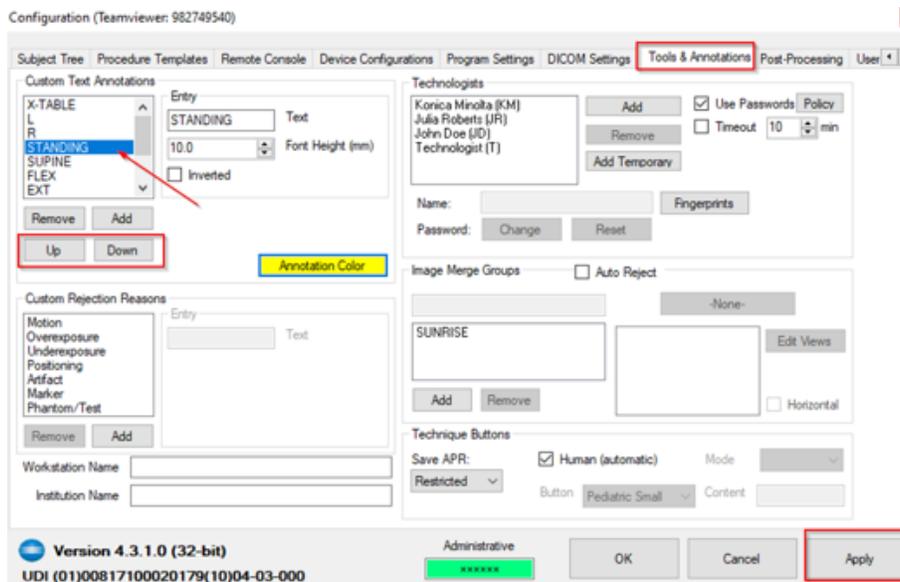
#### 22.1 Adjust the Annotation Order in Settings

The order of annotations displayed in the annotations dialog of the acquisition screen can be configured in the settings page.

1. Click the **Options** button



2. Select the **Tools & Annotations** tab from the Options menu.
3. Select an annotation from the list under **Custom Text Annotations**.
4. Click the **Up** or **Down** button to highlight the annotation higher or lower in the list.



5. Click on **Apply** to apply the changes made.
6. Click **OK** to close the Configuration screen.

#### 22.2 Adjust the Annotation Text Color in Settings

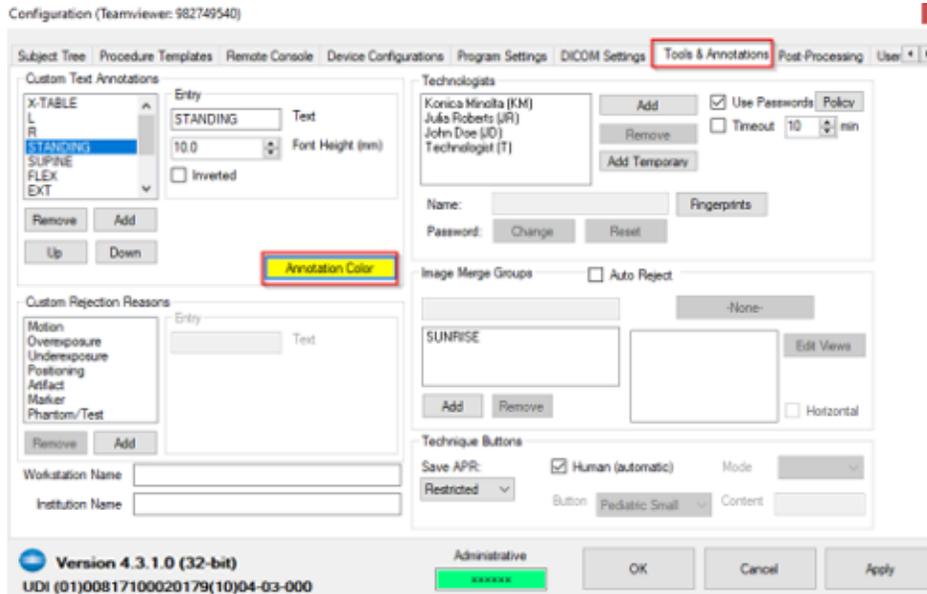
The text color of annotations displayed after adding them to the image in the acquisition screen can be configured in the settings page.

1. Click the **Options** button.

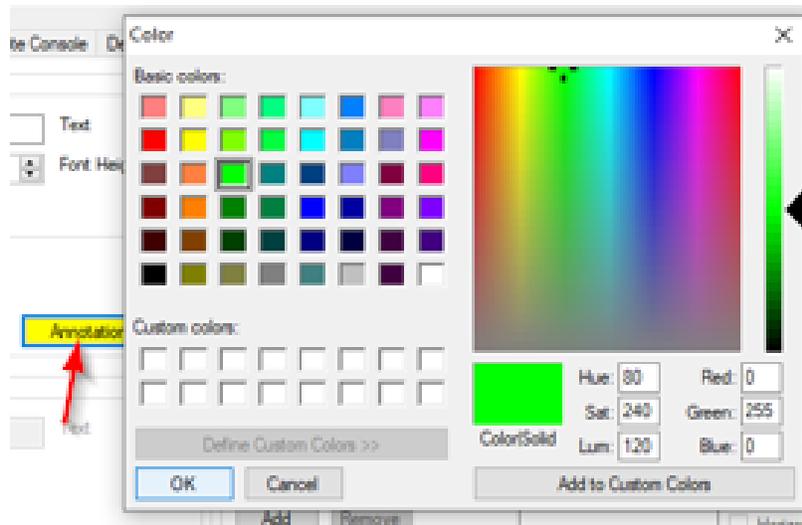


2. Select the **Tools & Annotations** tab from the Options menu.
3. Click on **Annotation Color**.

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4. Select a color from the color grid and click OK.



5. Click on **Apply** to apply the changes made.
6. Click **OK** to close the Configuration screen.

### 22.3 Procedure Template Editor in Settings – Unassign, Remove Selected, and Copy

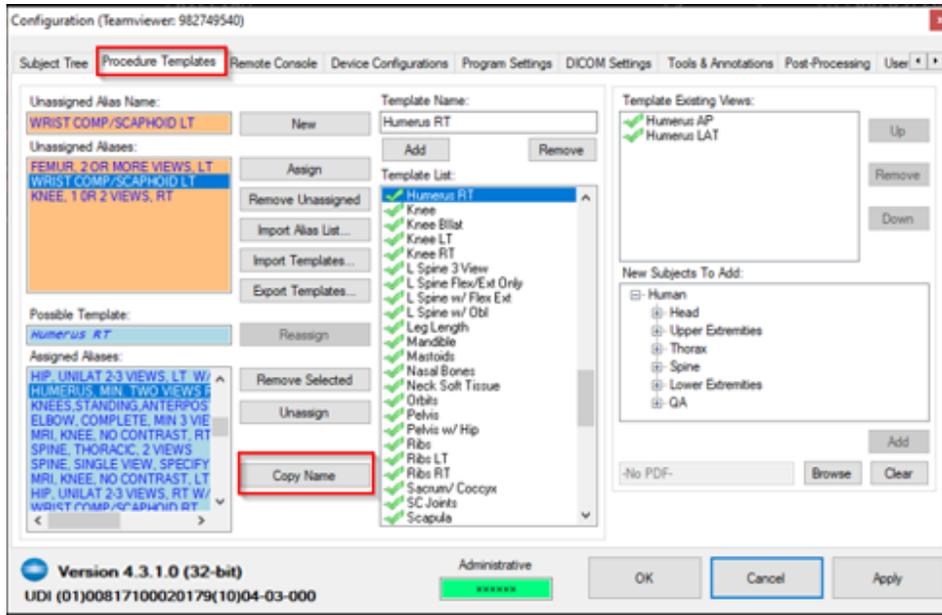
A new “Unassign” button returns the selected procedures alias name to the Unassigned aliases list.

1. Click the **Options** button.

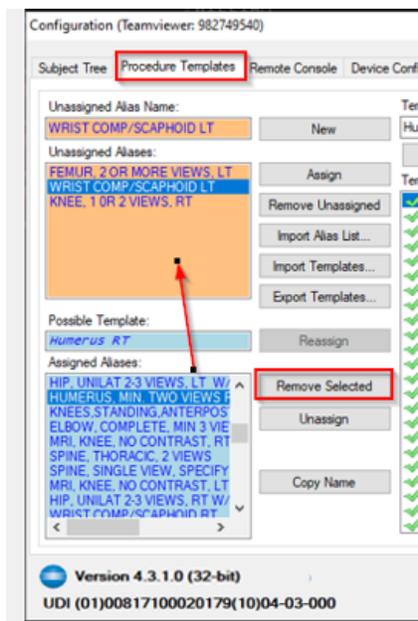


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2. Select the **Procedure Templates** tab from the Options menu.
3. Select an alias name in the Assigned Aliases list.
4. Click on Copy Name to copy alias name to clipboard (optional).



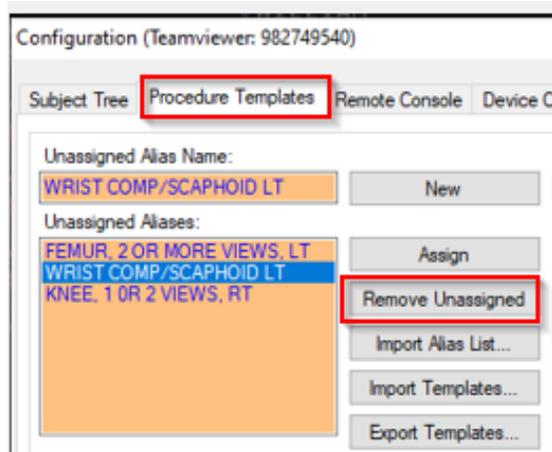
5. Click on the **Remove Selected** button.
6. The procedure is removed and the assigned alias name is returned to the Unassigned aliases list.



7. Click **Apply** to save changes.

Proceed with the following steps if you wish to delete the alias name from unassigned alias list.

8. Select an alias name in the **Unassigned Aliases list**.
9. Click on **Remove Unassigned** button.

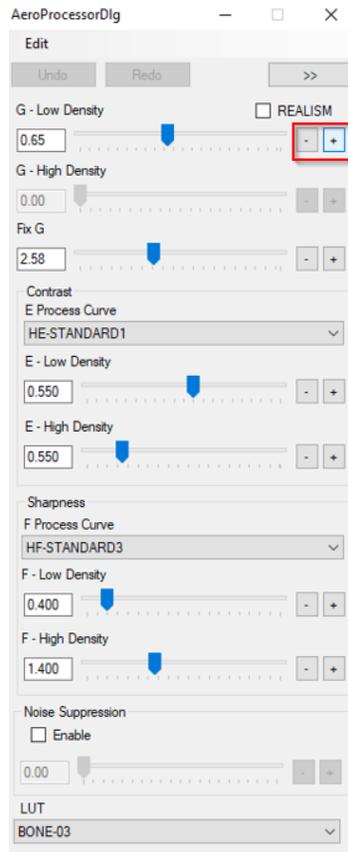


10. The selected alias name in the **Unassigned Alias** name list is removed.
11. Click **Apply** to save changes.

### 22.4 Regius Tuner Popup – Fine Tune

The Regius tuner popup can be used to adjust the density values in small increments.

1. In the acquisition screen, press **Ctrl+O** to launch Regius tuner popup.
2. To increase or decrease the density values in smaller increments (Fine Tune), click the + / - buttons.



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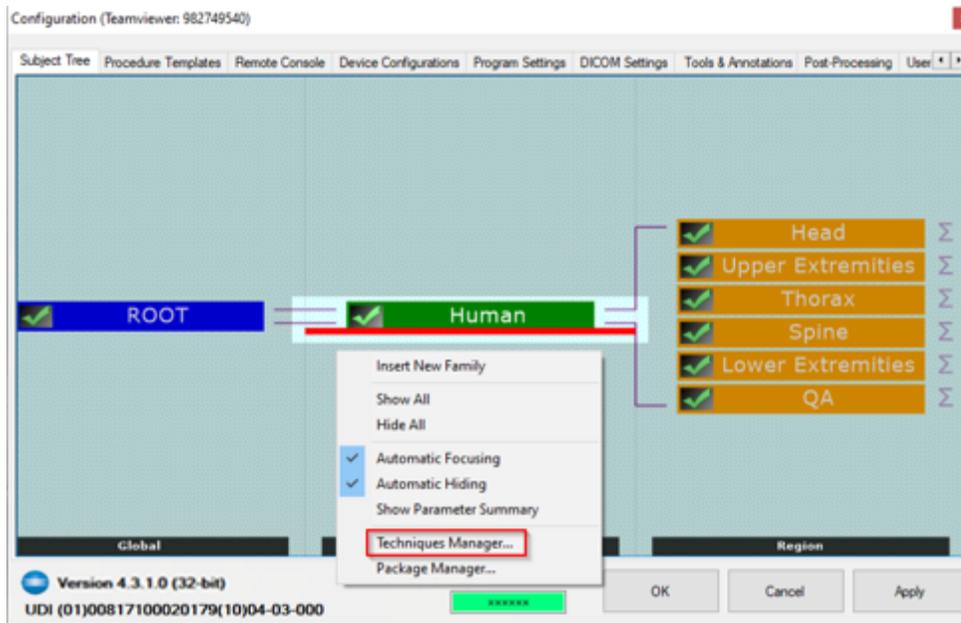
### 22.5 Techniques Manager Export to CSV Format

The techniques manager can be exported to csv format.

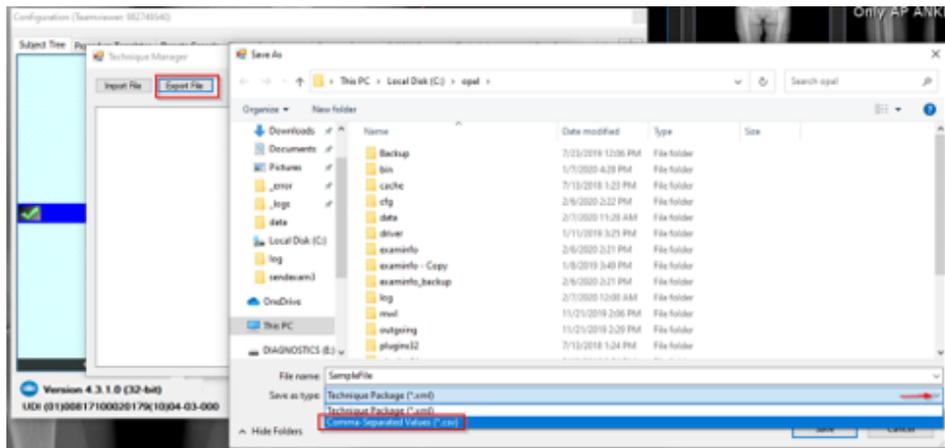
1. Click the **Options** button.



2. Select Subject Tree.
3. Right click on the blank area and click in the popup dialog select Techniques Manager.



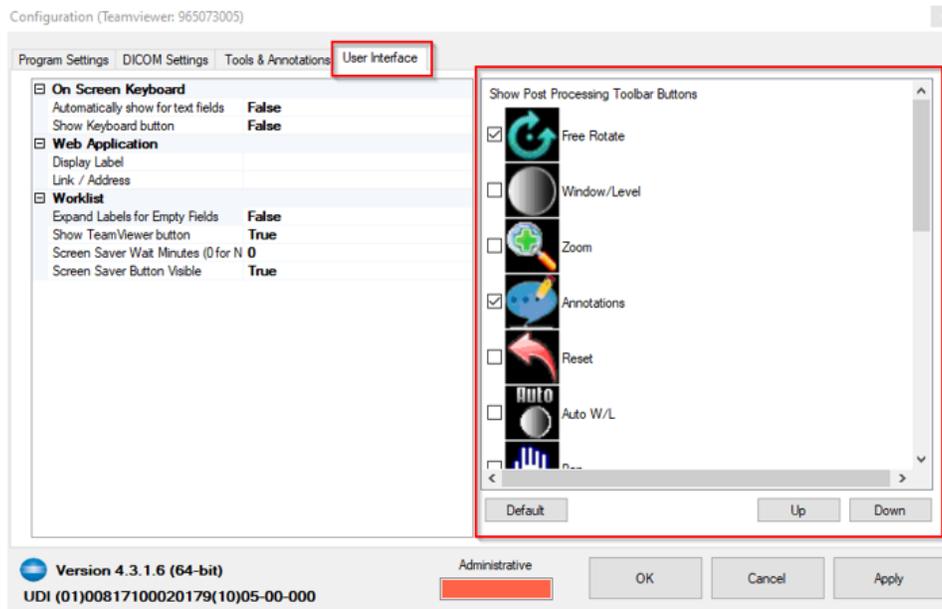
4. Select **Export File**, enter the filename and location, and save as "csv".
5. Click on the **Save** button.



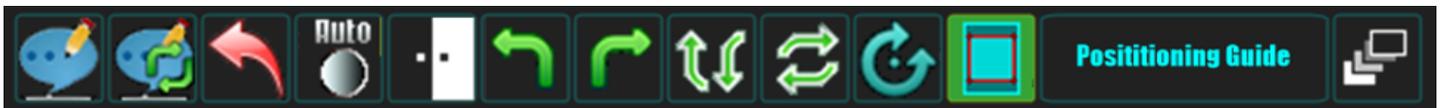
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### 22.6 Changing Options Shown in Toolbar

Options shown in the toolbar can be changed. Go to Options then User Interface.



Select the buttons to display in the Ultra toolbar. To reorder the buttons, select a button, click Up or Down to put it in the desired position, then click Apply.



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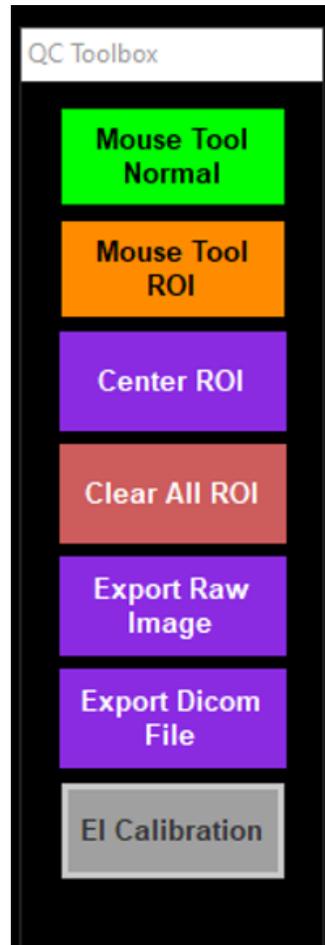
### 22.7 Physicist Mode - ROI

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Physics tools are used for image diagnostics. These tools are designed for use by engineers or technicians only.

The ROI tool is a click and drag utility that allows you to draw a box around a portion of the image to determine the values of that selected area. As the box is resized, the dimension of the custom ROI being drawn is displayed.

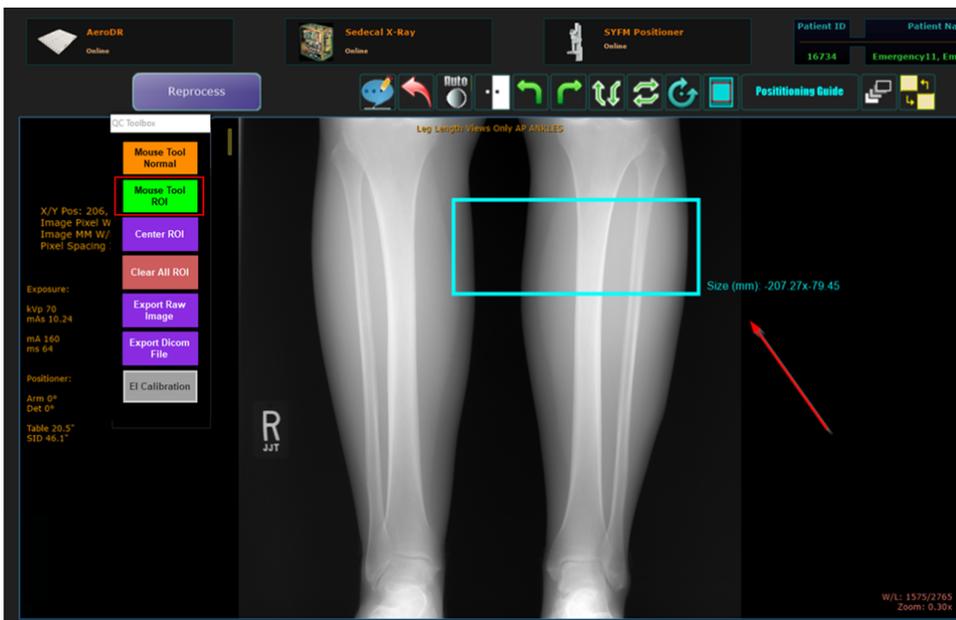
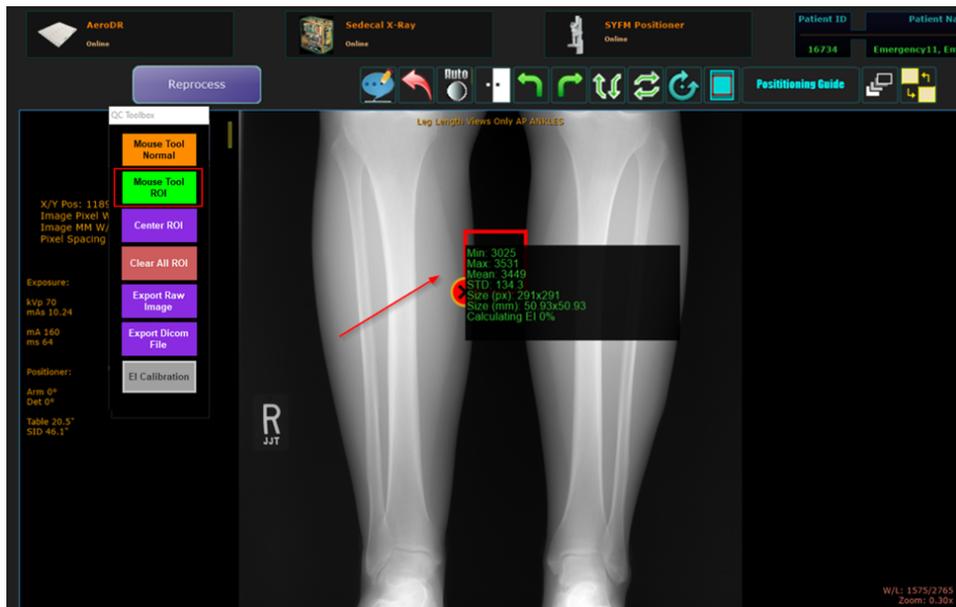
1. Acquire an Image
2. In acquisition screen, right click on the Annotation button. The QC toolbox displays:



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3. **The Mouse Tool ROI:** This tool is used to identify a region of interest in an image and review the values of that selected region.

Click on the **Mouse Tool ROI** button and click on a desired area of the image to draw a 51mm x 51 mm ROI.



4. **Center ROI:** Click on **Center ROI** to automatically draw a 51mm x 51 mm ROI at center of the image.

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### 22.8 EI Calibration Tool

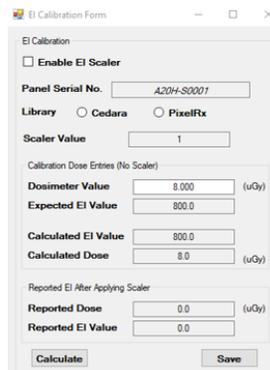
EI Calibration Tool allows user to configure, maintain per-panel EI scaling capability and able to enter/modify fine-tune parameters per-panel.

**NOTE:** This option must be enabled in advanced settings.

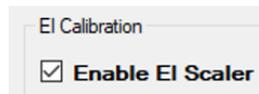
1. Acquire an image.
2. In acquisition screen, right click on the Annotation button. The QC toolbox displays.



3. Click on EI Calibration. The EI Calibration form is displayed.

A screenshot of the "EI Calibration Form" dialog box. It contains several input fields and checkboxes. The "Enable EI Scaler" checkbox is unchecked. The "Panel Serial No." field contains "A20H-S0201". The "Library" section has radio buttons for "Cedara" and "PixelRx", with "PixelRx" selected. The "Scaler Value" field contains "1". Under "Calibration Dose Entries (No Scaler)", there are fields for "Dosimeter Value" (8.000), "Expected EI Value" (800.0), "Calculated EI Value" (800.0), and "Calculated Dose" (8.0). Under "Reported EI After Applying Scaler", there are fields for "Reported Dose" (0.0) and "Reported EI Value" (0.0). "Calculate" and "Save" buttons are at the bottom.

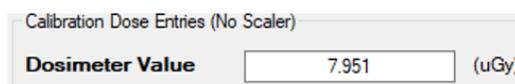
4. The dose/EI values of the selected ROI is reported from the Regius EI Calculation Framework for Aero panels. The dose/EI reported for the central ROI to perform the EI Fine-Tune Calibration Per-Panel procedure for Regius EI Calculation Framework.
  - a. To enable EI Scaler, check the option Enable EI Scaler.

A close-up of the "EI Calibration" dialog box showing the "Enable EI Scaler" checkbox, which is now checked.

- b. Select the desired EI calculation framework library Cedara or PixelRx.

A close-up of the "Library" section of the dialog box, showing radio buttons for "Cedara" and "PixelRx". The "PixelRx" radio button is selected.

- c. Adjust the calibrated dosimeter value ( $\mu\text{Gy}$ ).

A close-up of the "Calibration Dose Entries (No Scaler)" section, showing the "Dosimeter Value" input field with the value "7.951" and the unit "(uGy)".

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5. Click calculate.
6. The EI Calibration form will update.
  - a. “Expected EI Value” of the calibrated dosimeter in is units of EI (=100x  $\mu$ Gy).
  - b. “Calculated EI Value” of the fixed center ROI for the current connected panel is in units of EI when Scaler is OFF.
  - c. “Scaler Value” is the “Expected EI Value” of the calibrated dosimeter divided by the “Calculated EI Value” of the fixed center ROI.
  - d. “Reported EI Value” is the “Scaler Value” multiplied by the “Calculated EI Value”.

The screenshot shows a software window titled "EI Calibration Form". Inside the window, there is a section titled "EI Calibration". At the top of this section is a checkbox labeled "Enable EI Scaler" which is currently unchecked. Below this is a text field for "Panel Serial No." containing the value "A20H-S0001". There are two radio buttons for "Library": "Cedara" (unchecked) and "PixelRx" (checked). Below that is a text field for "Scaler Value" containing "0.936".

There are two sub-sections for calibration data. The first is "Calibration Dose Entries (No Scaler)" which contains four rows of data:

Field	Value	Unit
Dosimeter Value	7.9541	( $\mu$ Gy)
Expected EI Value	795.41	
Calculated EI Value	849.7674	
Calculated Dose	8.497674	( $\mu$ Gy)

The second sub-section is "Reported EI After Applying Scaler" which contains two rows of data:

Field	Value	Unit
Reported Dose	0.0	( $\mu$ Gy)
Reported EI Value	0.0	

At the bottom of the form are two buttons: "Calculate" and "Save".

7. Click 'Save' button to record all the parameters of EI calibration for the calibrated panel.

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### 23.0 SOFTWARE SETTINGS (FOR SYSTEM ADMINISTRATORS)

#### 23.1 Software Settings (for System Administrators)

1. Click on the “Options” button in the top right corner of the home screen or the bottom right corner of the acquisition screen (see Figures 23.1.1 and 23.1.2).
2. A password box will appear (see Figure 23.1.3).

Figure 23.1.1  
Home Screen

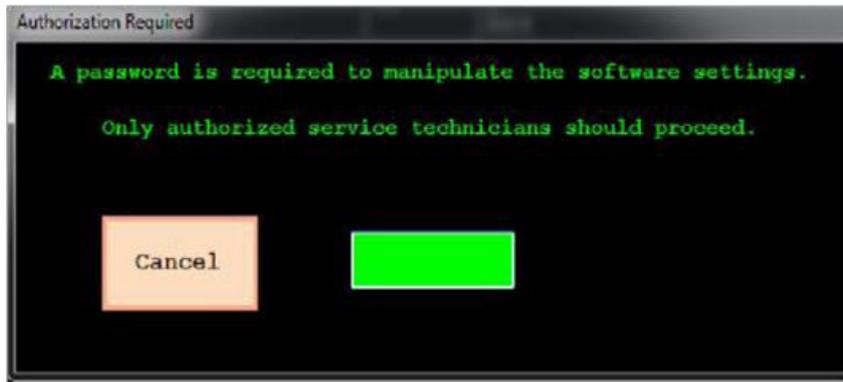


Figure 23.1.2  
Acquisition Screen



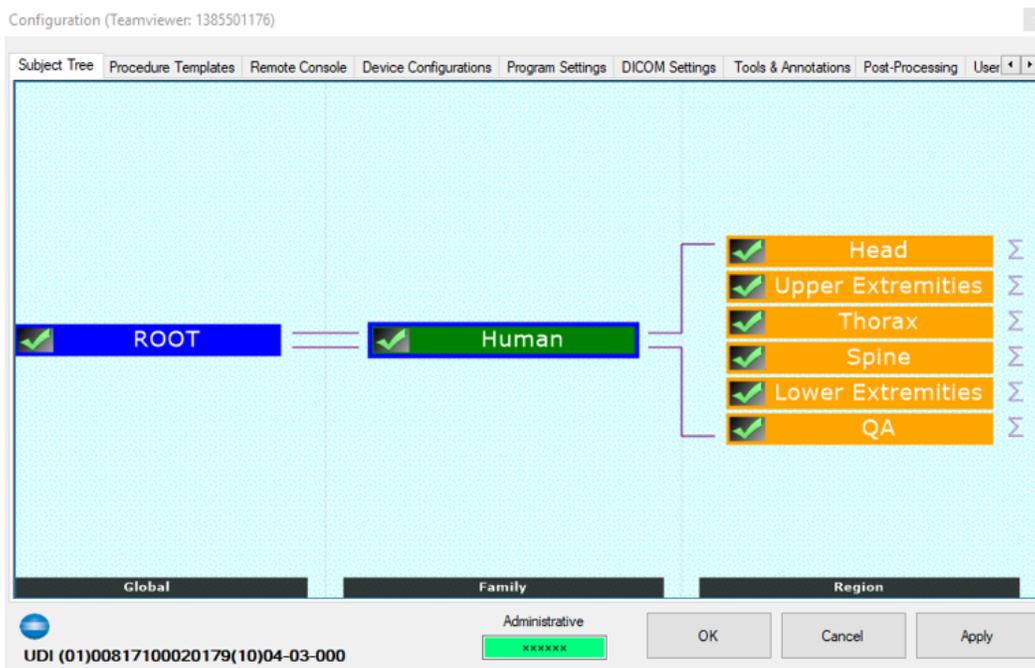
## IV. SOFTWARE

Figure 23.1.3  
Password Box



After the password has been entered, the subject tree appears (see Figure 23.1.4).

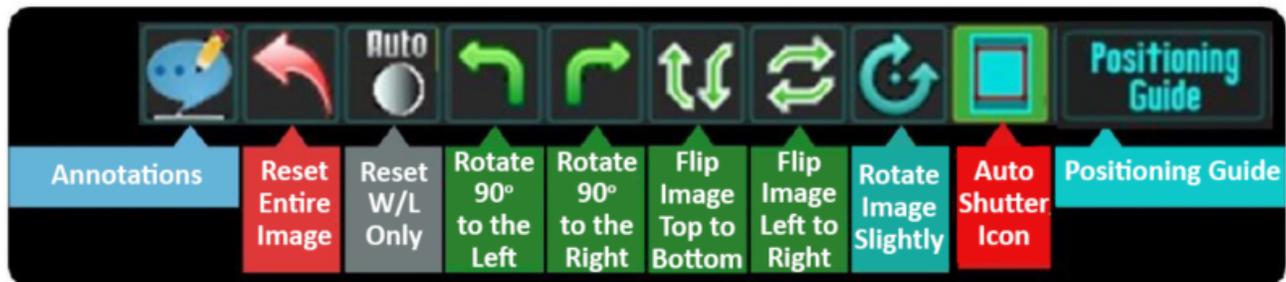
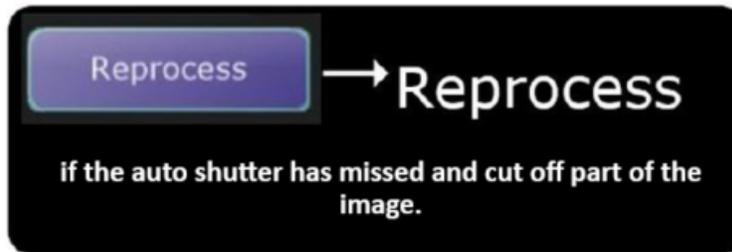
Figure 23.1.4  
Password Box



## IV. SOFTWARE

### 24.0 BUTTON GUIDE

#### 24.1 Button Guide



## IV. SOFTWARE

### 25.0 POSITIONER CONTROL PANEL SOFTWARE FUNCTIONS

#### 25.1 Performing an Exam with a Worklist on the Positioner Control Panel

1. Select the appropriate technologist.
2. Double click on the patient's name (see Figure 25.1.1).
3. This will bring you to the acquisition screen (see Figure 25.1.2).

Figure 25.1.1  
Patient's Name



Figure 25.1.2  
Acquisition Screen



4. Select the body habitus of your patient (see Figure 25.1.2).
5. Position your patient and expose the first image.

## IV. SOFTWARE

Your image will appear on the positioner control panel screen. The radiation symbol will automatically jump to the next view while the image is processing. You can press MOVE on the tube, detector, or remote and the stand will move to the next position.

6. Continue the the procedure until you have acquired all images needed.

### 25.2 Adding a View During an Exam

1. Press the “Add View” button (see Figure 25.2.1).
2. The “Add View” box will appear (see Figure 25.2.2).
3. Select the area of the patient’s body for which you want to add a view (see Figure 25.2.3).
4. From this screen you will select the body part and view that you would like to add (see Figure 25.2.3).

Figure 25.2.1  
“Add View” Button



## IV. SOFTWARE

Figure 25.2.2  
"Add View" Box

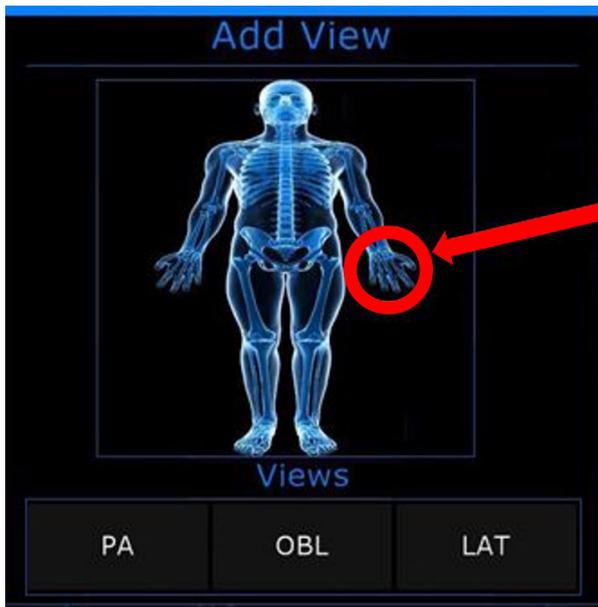


Figure 25.2.3  
"Add View" Area



### 25.3 The Exit Button on the Positioner Control Panel

1. When you are finished with your exam(s), click the "EXIT" button in the top right-hand corner of the acquire screen (see Figure 25.3.1).
2. The "Exit Exam" box will appear (see Figure 25.3.2).

Figure 25.3.1  
Exit Button

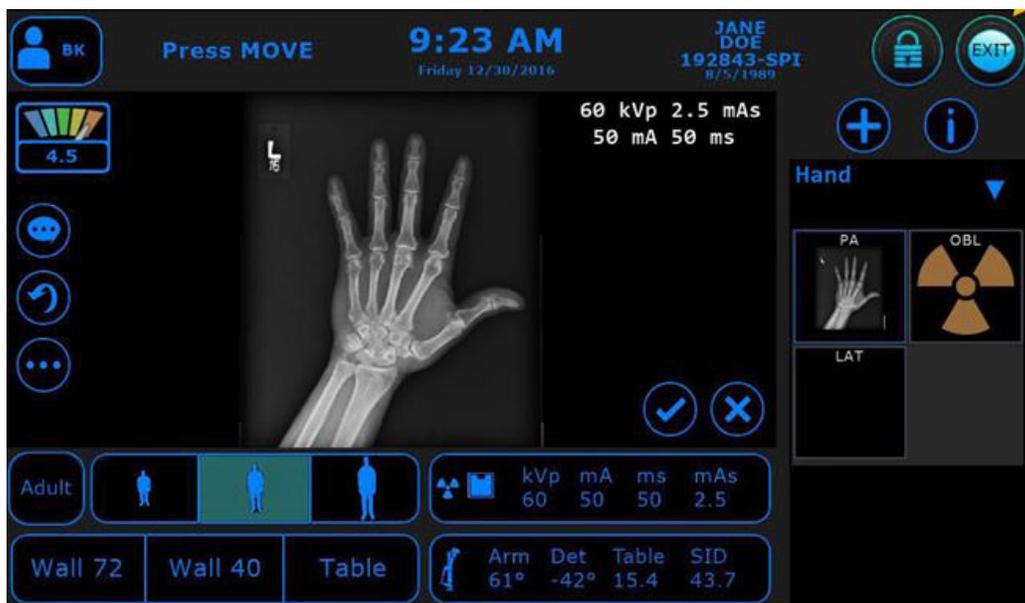
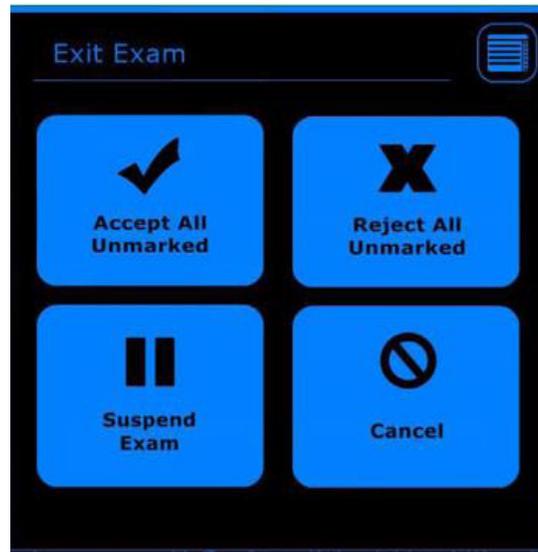


Figure 25.3.2  
Exit Button



<b>Accept All Unmarked:</b>	Accepts and sends all images that still have a question mark in the bottom corner of the thumbnail.
<b>Reject All Unmarked:</b>	Requires the user to provide a reason for the rejection of each image. Nothing will be sent to PACS.
<b>Suspend Exam:</b>	Pauses the exam and returns to the worklist. You can edit patient or study information before sending to PACS.
<b>Cancel:</b>	Returns to the acquire screen. Nothing is accepted or rejected.

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## V. DYNAMIC MODE

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## V. DYNAMIC MODE

### 26.0 DYNAMIC MODE

This section is specific for the KDR AU DDR. The KDR AU is not capable of dynamic mode. Single frame radiography is referred to as “static mode.” “Dynamic mode,” or Dynamic Digital Radiography (DDR), allows the user to take a serial exposure, resulting in a series of images.

**NOTE:** Static mode is the default mode of the KDR AU DDR. All other sections of this manual provide general instructions for operation which are applicable to both static and dynamic modes.

**NOTE:** During exposure in dynamic mode, a low frame rate preview is shown, the preview is not realtime and will show slight delays. The preview is not intended as a diagnostic tool.

**NOTE:** The system requires a preparation time of 5-20 seconds before a dynamic exam may begin. The maximal standby time in dynamic mode is 5 minutes. After 5 minutes, a new preparation time of 5-20 seconds is required.

**NOTE:** When using dynamic mode, a lower target ms range of 4-8 ms for the Sedecal Generator, and 4-10 ms for the CPI generator, is required. 4-6 ms is the ideal range.

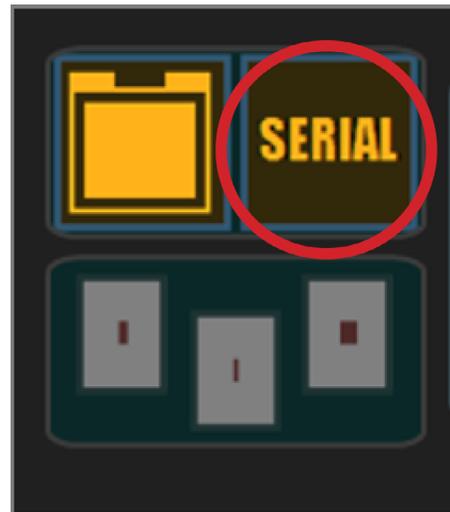
### 26.1 Operational Controls

1. Click the “photo-time” icon (see Figure 26.1.1) twice to enter dynamic mode (see Figure 26.1.2).

Figure 26.1.1  
Static Imaging Mode



Figure 26.1.2  
Dynamic Imaging Mode



2. The generator controls, in the lower part of the screen, will change (see Figures 26.1.3 and 26.1.4).

Figure 26.1.3  
Static Mode Generator Controls



## V. DYNAMIC MODE

Figure 26.1.4  
Dynamic Mode Generator Controls



### 26.2 Adjusting a Video Recorded in Dynamic Mode

#### Play – Pause Video

Click the “play” icon to toggle between play and pause (see Figures 26.2.1 and 26.2.2).

Figure 26.2.1  
Play Button (in Paused State)

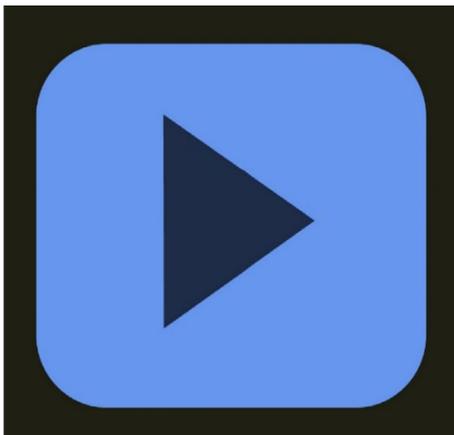


Figure 26.2.2  
Pause Button (in Playing State)



## V. DYNAMIC MODE

### Adjusting the Frames Displayed in Video Playback

Click the “play” icon to toggle between play and pause (see Figures 26.2.1 and 26.2.2).

1. Drag the “StartFrame” and “EndFrame” markers to the desired beginning and end of the subsequence. See Figures 26.2.3 and 26.2.4.

Figure 26.2.3  
StartFrame and EndFrame

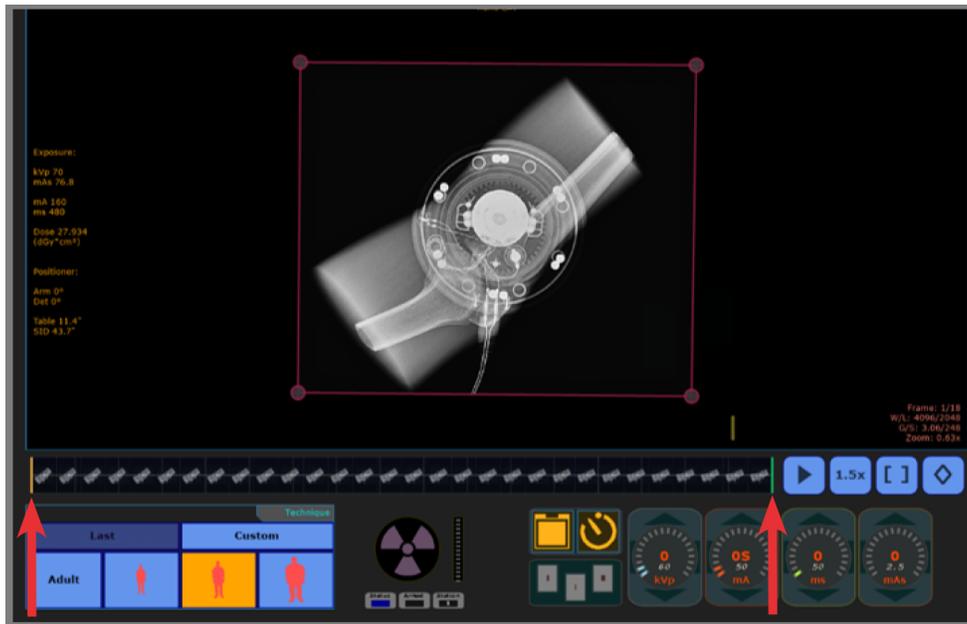
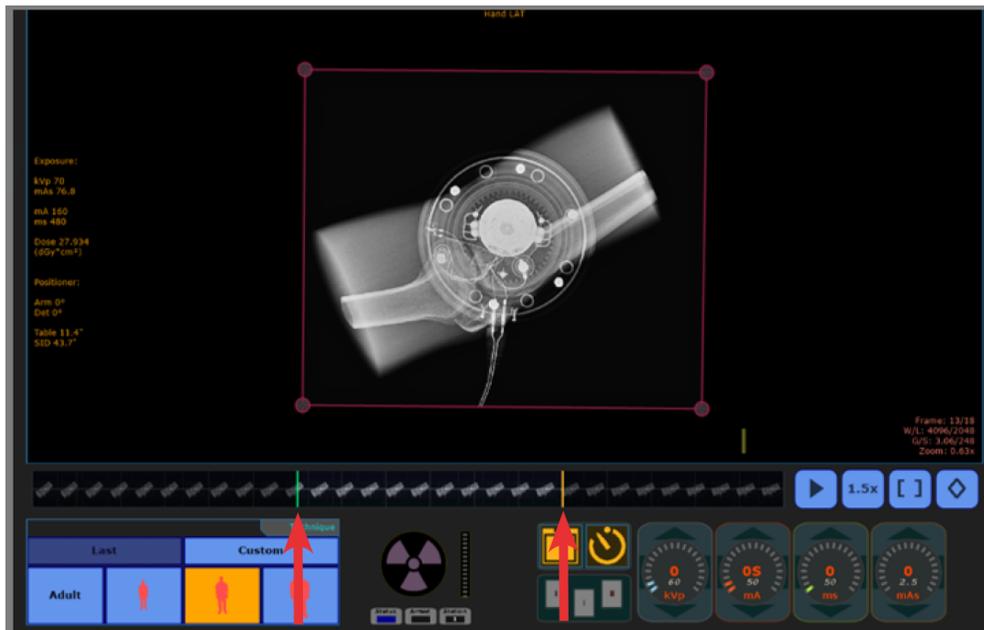


Figure 26.2.4  
StartFrame and EndFrame Subsequence Selected



2. Click on the “play” icon to play the video of the selected frames.

**NOTE:** If start and end frames are adjusted, only the selected frames will be sent to PACS applications. To send all the frames in the series, re-adjust the start and end frame to the first and the last frame in the image series before sending to PACS.

## V. DYNAMIC MODE

### **Display Frame by Frame**

To display the video frame by frame:

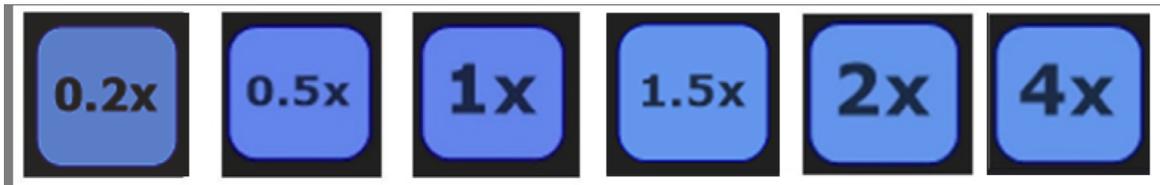
1. Pause the video.
2. Click on each frame with the mouse.

**NOTE:** You can also scroll through each frame using the left and right cursor keys of the keyboard.

### **Accelerate or Slow Down Playback**

1. Click the playback speed button to cycle through speed presets (see Figure 26.2.5).
2. The last used setting is saved to the configuration file, allowing users to keep their preferences.

Figure 26.2.5  
Speed Presets



### **Image Stack Indicator**

1. Display an indicator on “thumbnails” view to discern which images are dynamic sequences.
2. The icon chosen represents a stack of images. The number of frames is displayed on top of the icon (see Figures 26.2.6 and 26.2.7).

Figure 26.2.6  
Icon Depicting Image Stack



Figure 26.2.7  
Example Thumbnail of a Sequence Containing 150 Frames



## V. DYNAMIC MODE

### Clone Subsequence

Selecting the “Clone Subsequence” function will generate a new image sequence using only the current active portion, as defined by “StartFrame” and “EndFrame” markers.

*To Clone a Subsequence:*

1. Drag the “StartFrame” and “EndFrame” markers to the desired beginning and end of the subsequence (see Figure 26.2.8 and Figure 26.2.9).

Figure 26.2.8  
StartFrame and EndFrame

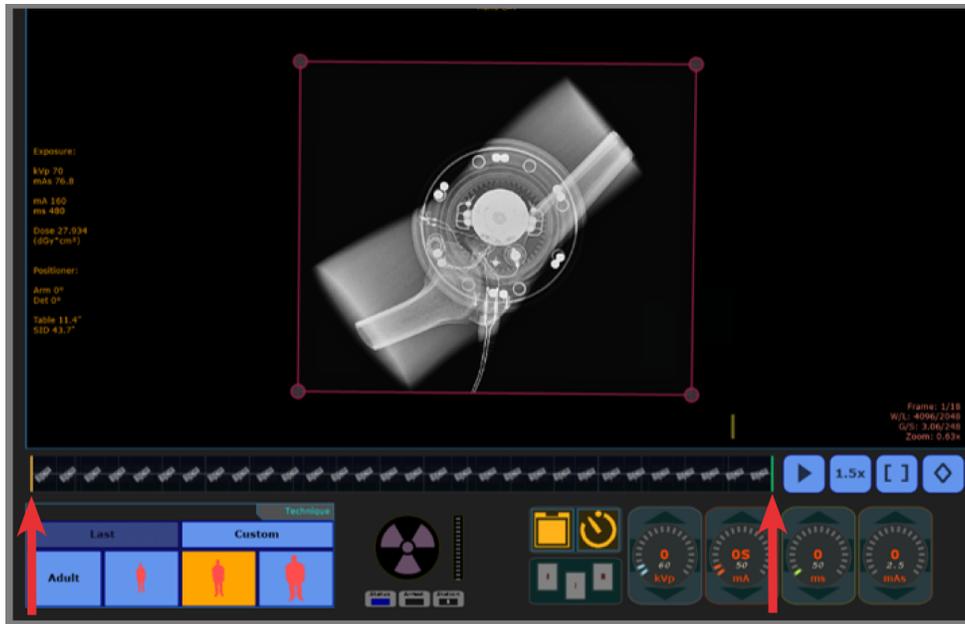
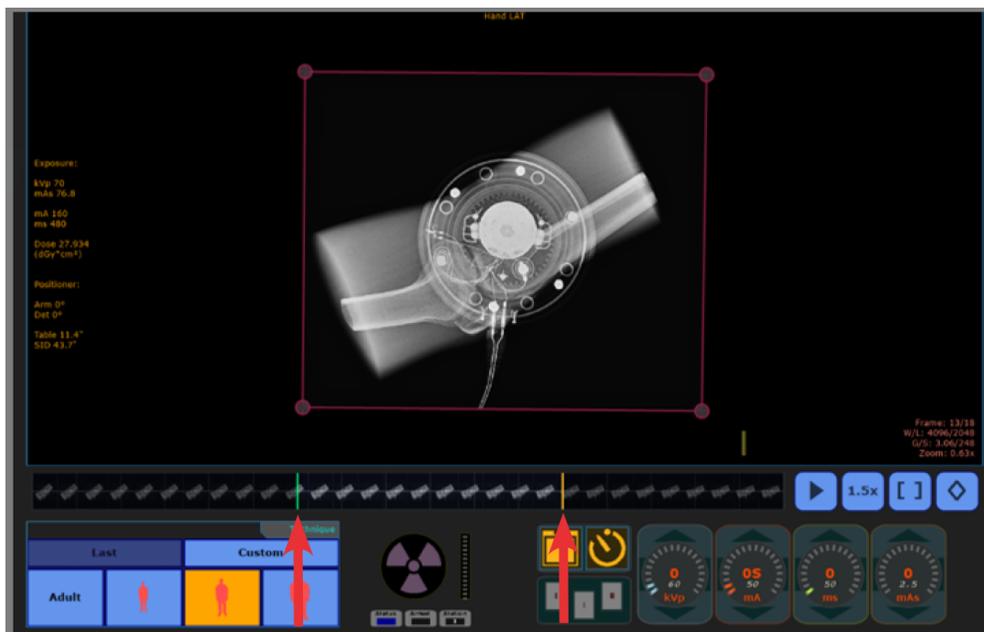


Figure 26.2.9  
StartFrame and EndFrame Subsequence Selected



## V. DYNAMIC MODE

2. Click the clone subsequence button once (see Figure 26.2.10).

Figure 26.2.10  
Icon Depicting Subsequence



**NOTE:** If start and end frames are adjusted, only the selected frames will be sent to PACS applications. To send all the frames in the series, re-adjust the start and end frame to the first and the last frame in the image series before sending to PACS.

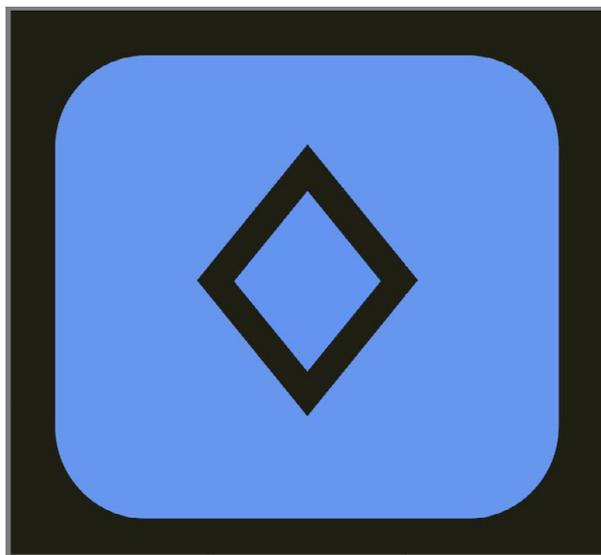
### Clone Subimage

Selecting the “Clone Subimage” function will generate a new image instance of the currently displayed frame.

To Clone a Subimage:

1. Select the desired frame.
2. Click the clone subimage button (see Figure 26.2.11).

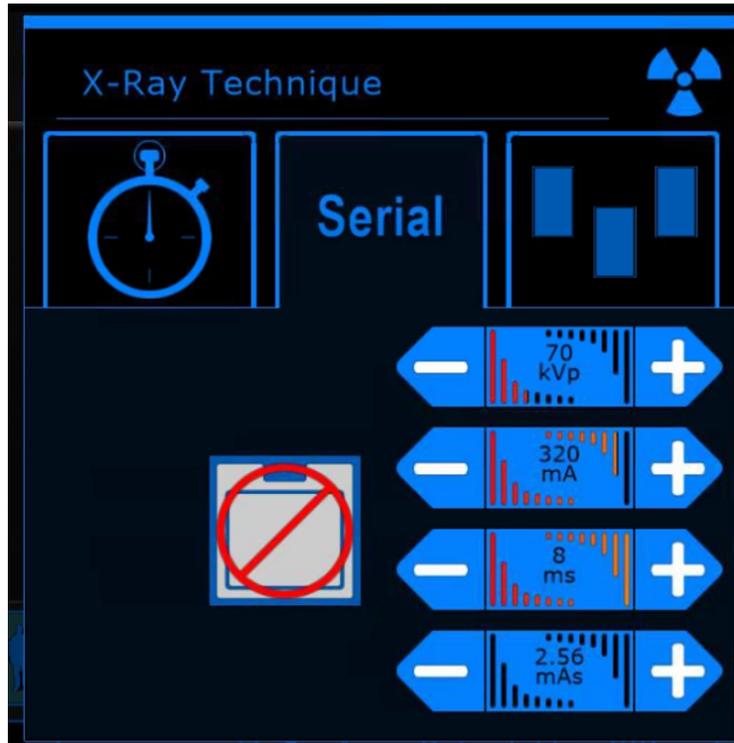
Figure 26.2.11  
Icon Depicting Subimage



**NOTE:** All derived images will display the dose of the original sequence.

## V. DYNAMIC MODE

A Serial Mode tab on the PRC Generator control is available when Dynamic is enabled in Ultra. The Acquire mode and values can be adjusted on the PRC and synced with the mode and values on the Generator Controls on the Ultra Acquire Screen.



Switching between Acquire modes on the PRC will load the values from the view.

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## VI. CLEANING

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## VI. CLEANING

### 27.0 CLEANING MAINTENANCE

The KDR AU DDR has no user replaceable parts. Replacement of parts and/or preventative maintenance must be performed according to the KDR AU DDR Pre-Installation, Installation, and Service Manual by a qualified field service technician.

*Table 27.1  
Cleaning and Disinfection Guidelines*

Description	Maintenance	Interval	Reference	
			Document	Page
Preamplifier for Measuring Chamber	Wipe with a damp cloth.	As needed	Claymount Preamplifier for Measuring Chamber	6
KDR	Clean the exterior with a soft lint-free cloth dampened with a small amount of anhydrous ethanol and wrung well.	As needed	Konica Minolta KDR System Operation Manual	50
X-Ray Collimator	Clean varnished and aluminum surfaces with a damp cloth, dry with a soft cloth. Clean chrome surfaces with a soft dry cloth only.	As needed	Series R 225 DHHS Manual X-Ray Collimator	64
			MTR 225 DHHS Manual Radiological Collimator	65
Generator (CPI)	Clean and re-grease the HV connections on the HV module.	Every six months AND whenever a related certifiable X-ray component is replaced.	CPI CMP 200 DR Series X-Ray Generator	6-1
Generator (CPI)	Clean console surfaces with soap and water. Disinfect console surfaces with Antichlor or an equivalent hypochlorite concentration of 3-5%.	Every six months AND whenever a related certifiable X-ray component is replaced.	CPI CMP 200 DR Series X-Ray Generator	6-5
Generator (Sedecal)	Clean external surfaces with a soft cloth moistened in clean water	As needed	Sedecal Maintenance, HF Series Generators, Technical Publication MA-1004R6	6-7

## VI. CLEANING

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Table 27.1  
Cleaning and Disinfection Guidelines

Description	Maintenance	Interval	Reference	
			Document	Page
Positioner	<p>LCD Screen: Clean with a soft cloth. If using a spray cleaner, do not spray directly on the screen.</p> <p>Exterior Surface: Clean with a soft cloth dampened with tepid water and soap. equivalent hypochlorite concentration of 3-5%.</p>	As needed	SU-4000 Universal Stand Installation and Service Manual	10

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## VII. FUNCTION AND SAFETY CHECKS

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## VII. FUNCTION AND SAFETY CHECKS

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### 28.0 MONTHLY CHECKS

#### 28.1 General

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If the system malfunctions, the entire system must be taken out of service until the malfunction is corrected by a service engineer from the supplier or technical staff trained by the supplier.

**NOTE:** Before performing any maintenance please read all chapters of this manual on safety.

**NOTE:** Daily and monthly checks are normally performed by the operator. Annual checks shall be performed either by local technical staff trained by the supplier or authorized service representatives.

#### 28.2 Checklist

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- 1. Check the emergency stop. By activating the emergency stop all motorized movements of the positioner are prevented.
- 2. Measure between the X-ray tube focal spot and the active image receptor surface of the image receptor holder. The measured SID must correspond with the displayed SID. Check that the SID, shown on the display of both the Image system and the collimator, correspond with the measured SID/FFD. The SID may differ by  $\pm 1\%$ .
- 3. Check all hoses for damage.
- 4. Check all outer cabling for damage.
- 5. Clean all outer surfaces, except for the lubricated bearings. See the "Cleaning" chapter for cleaning instructions.
- 6. Power up the stand and check all functions.
- 7. Make movements with the stand and observe any irregularities.

### 29.0 ANNUAL CHECKS

Refer to the KDR AU DDR Pre-Installation, Installation, and Service Manual.

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## VIII. TECHNICAL SPECIFICATIONS

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## VIII. TECHNICAL SPECIFICATIONS

### 30.0 TECHNICAL DATA

The system complies with the requirements of IEC 60601-1-2, 4<sup>th</sup> edition, regarding electromagnetic compatibility. Surrounding equipment must follow IEC 60601-1-2.

**CAUTION:** Mobile telephones and other radiating equipment can interfere with the function of the system and can therefore cause safety hazards.

### 30.1 Irradiation

Table 30.1.1  
Irradiation

Test Item	Standard	Test Performed	Power (Voltage/Frequency)	Remarks
<b>Emissions</b>				
Radiated RF emissions Test	CISPR11 Class A	Yes	480VAC/60Hz 120VAC/60Hz	
Conducted emissions Test	CISPR11 Class A	Yes		

### 30.2 Positioner Movement

Table 30.2.1  
Positioner Movement

Test Item	Standard	Test Performed	Power (Voltage/Frequency)	Remarks
<b>Immunity</b>				
Radiated RF electromagnetic field immunity test	IEC61000-4-3	Yes	480VAC/60Hz 120VAC/60Hz	
Electrical fast transient/Burst Immunity Test	IEC61000-4-4	Yes		
Power Frequency Magnetic field immunity test	IEC61000-4-8	Yes		
Immunity Test to Conducted disturbances Induced by RF field	IEC 61000-4-6	Yes		
Surge Immunity Test	IEC 61000-4-5	Yes		
Voltage dips, short interruptions, and voltage variations immunity Test	IEC 61000-4-11	Yes	120VAC/60Hz	

## VIII. TECHNICAL SPECIFICATIONS

### 30.3 Standby Mode

Table 30.3.1  
Positioner Movement

Test Item	Standard	Test Performed	Power (Voltage/Frequency)	Remarks
<b>Immunity</b>				
Electrostatic Discharge Immunity Test	IEC 61000-4-2	Yes	480 VAC/60Hz	Electrostatic Discharge Immunity Test

### 30.4 Power Input Information

Table 30.4.1  
Power Input Information

Component (Item)	Power	Frequency
Generator	480VAC±10%	60Hz
Positioner	120VAC±10%	60Hz
PSU(Power Supply Unit)	120VAC±10%	60Hz
Ultra Console (PC)	120VAC±10%	60Hz

### 30.5 Radiated Immunity Test Frequencies

Table 30.5.1  
Radiated Immunity Test Frequencies

Equipment used	Test Frequency	Test Level
Cobra WXST CB Radio	27.12 Mhz	10 v/m
Yaesu Transceiver	52.66 MHz	10 v/m
Yaesu Transceiver	145.83 MHz	10 v/m
Yaesu Transceiver	121.72 MHz	10 v/m
Yaesu Transceiver	430.0 MHz	10 v/m
Midland GXT FRS	462.50 MHz	10 v/m
Teseq CBA Amplifier	40.68 MHz	10 v/m
Teseq CBA Amplifier	433.92 MHz	10 v/m
Teseq CBA Amplifier	915 MHz	10 v/m
Amplifier research 15S1G3 Amplifier	2.45 GHz	28 v/m
<b>Table 9 Test Frequencies</b>		
Teseq CBA Amplifier	385 MHz	27 V/m
Teseq CBA Amplifier	450 MHz	28 V/m
Teseq CBA Amplifier	710 MHz	9 V/m
Teseq CBA Amplifier	745 MHz	9 V/m
Teseq CBA Amplifier	780 MHz	9 V/m
Teseq CBA Amplifier	810 MHz	28 V/m

## VIII. TECHNICAL SPECIFICATIONS

Table 30.5.1  
Radiated Immunity Test Frequencies

Equipment used	Test Frequency	Test Level
Teseq CBA Amplifier	870 MHz	28 V/m
Teseq CBA Amplifier	930 MHz	28 V/m
Amplifier research 15S1G3 Amplifier	1720 MHz	28 V/m

**NOTE:** The emissions characteristics of this device make it suitable for use in industrial areas and hospitals (CISPR 11 class A). If it is used in a residential environment (for which CISPR 11 class B is normally required) this device may not offer adequate protection to radio-frequency communication services. The user may need to take mitigation measures, such as relocating or re-orienting the equipment.

**NOTE:** Based on studies of the CPI generator, EMC is assumed to be the same or similar for the Sedecal generator.

**WARNING!** This device has not been tested for radiated RF immunity over the entire frequency range of 80 MHz to 6000 MHz. This device has been tested for radiated RF immunity only at selected frequencies (see Table 30.5.1.) Use of nearby emitters at other frequencies may result in improper operation.

### 30.6 Environmental Requirements

Table 30.6.1  
Environmental Requirements

Storage Temperature	Storage Humidity	Storage Pressure	Operating Temperature	Operating Humidity
10-40°C	35%-75%	500-1060 hPa	10-30°C	35%-70%

## VIII. TECHNICAL SPECIFICATIONS

### 31.0 EXPOSURE INDEX

The Exposure Index ( hereafter, EI) complies with IEC62494-1 (issued in 2008) to show the exposure dose received by the detector. Using EI means the exposure dose received by detector can be compared to a common scale for different manufacturers. The KDR AU DDR calculates and displays the Exposure Index (hereafter, EI) and Deviation Index (hereafter, DI) for each exposure, displays the TI (hereafter, TI or EIT) for each exposure, and can send in a DICOM tag. EI is used as a measure for image quality versus the dose, but it is not used to manage patient exposure doses.

#### 31.1 Exposure Index Calculation Flow

The calculation flow stipulated by IEC62494-1 is as follows:

1. Select the Relevant Image Region for the exposure image Raw Data.
2. Calculate the Value of Interest from the data within the Relevant Image Region.
3. Convert the Value of Interest to a detector exposure.
4. Calculate the EI (ensure that EI=100 in advance when image receptor AIR KERMA at radiation quality RQA5 is 1μGy).

IEC62494-1 does not specify (1) the selection method for Relevant Image Region, or (2) calculation method for Value of Interest above, and these have been specified by each individual manufacturer. As Konica Minolta considers that the "region of image quality to be managed with EI (Relevant Image Region), and region to display as the ideal diagnostic image using image processing (Region of Interest)" should be the same, the Region of Interest (hereafter, ROI) that uses automatic grayscale processing is used as the Relevant Image Region. The Value of Interest is also based on the standard signal value calculated using histogram analysis after setting ROI using the same automatic grayscale processing.

#### 31.2 Calculation of Deviation Index

According to IEC62494-1, image quality should be managed by viewing the amount of deviation (DI) from the target value (TI), rather than the EI value itself. DI is calculated using the following formula if the TI of each part set in advance, and the EI acquired from the actual exposed image are granted.

$$DI = 10 * \log \left( \frac{EI}{TI} \right)$$

When there is a difference between EI and TI (as shown in the table below), DI=0 when EI is equal to TI, a negative value when it is smaller than TI, and a positive value if it is larger than TI.

DI	Difference between EI and TI	
-3	-50 %	(1/2 dose)
-2	-37 %	
-1	-21 %	
0	0 %	(target dose)
1	26%	
2	58%	
3	100%	(double dose)

## VIII. TECHNICAL SPECIFICATIONS

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### 31.3 EI, TI, and DI Precautions

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1. Please use EI, TI, and DI only as a guide for image quality management.
2. If ROI recognition is not implemented properly, the correct value may not be calculated. Also, if ROI area has been changed, the value of EI and DI will be recalculated.
3. The value of EI, TI, and DI will not change even after changing the S value or G value. However, if parts have been changed, the standard signal value of the relevant parts is used to re-calculate the values.
4. Values specified by manufacturers are included with each part for TI, but please use these numbers only as reference values. In addition, these values may change depending on academic and other trends.
5. EI, TI, and DI are not displayed for mammography and linac images.

**NOTE:** For information regarding calibration and setting of EI/TI, contact your service representative, and/or see the KDR AU DDR Pre-Installation, Installation, and Service Manual.

## VIII. TECHNICAL SPECIFICATIONS

### 31.4 List of Exposure Parameters (Reference)

The list of exposure values in Table 31.4.1 is for reference only. The presentation of an image depends on the requirements of the physician. Exposure parameters must be adjusted for optimal results based on body habitus, exposure geometrics, etc.

Table 31.4.1  
List of Exposure Parameters

Area	17x17 HD/FNB				17x17 HQ/KDR			
	Tube Voltage	mAs Value	SID	Grid	Tube Voltage	mAs Value	SID	Grid
	(kVp)	(mAs)	(cm)	Ratio	(kVp)	(mAs)	(cm)	Ratio
Skull AP	80	11	120	8:1	80	14	120	8:1
Chest PA	120	1.6	180	12:1	120	2	200	12:1
Chest LAT	125	7	200	12:1	125	9	200	12:1
Abdominal AP (upright)	85	8	120	8:1	85	10	120	8:1
Cervical Spine AP	70	6	120	8:1	70	7	120	8:1
Cervical Spine LAT	70	6	120	8:1	70	7	120	8:1
Lumbar Spine AP	75	12	120	8:1	75	16	120	8:1
Shoulder Joint AP/Axial	75	5	120	8:1	75	6	120	8:1
Ribs	70	5	120	8:1	70	6	120	8:1
Humerus AP	60	3	120	-	60	4	120	-
Pelvis AP	85	8	120	8:1	85	10	120	8:1
Hip Joint Axial	75	15	120	8:1	75	20	120	8:1
Femur AP	70	6	120	8:1	70	8	120	8:1
Knee AP	55	6	120	-	55	8	120	-

**NOTE:** SID (Source Image Distance) affects the source to skin distance. Changing the source to skin distance will change the radiation dose to the patient. A shorter distance with the same loading factors will increase the dose to the patient.

**NOTE:** When using dynamic mode, a lower target ms range of 4-8 ms for the Sedecal Generator, and 4-10 ms for the CPI generator, is required. 4-6 ms is the ideal range.

**NOTE (Sedecal generators only):** If an AEC technique is used and the exposure values or the positioning of the patient are incorrect, then an extremely short exposure, less than 1 ms, will result. The reported post parameters will be not accurate. This can be recognized by the post parameters reporting the back up timer is milliseconds (ms), while no back up timer error is displayed.

This only has influence on the generator post parameters and the not EI or DAP values which will display correctly to the exposure.

Example: Direct exposure of one of the selected AEC chambers with a beam energy setting above 100kV or an AEC kV/ma exposure setting significantly higher than advised or recognized by international standards can result in exposures less than one millisecond.

## VIII. TECHNICAL SPECIFICATIONS

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### 32.0 AEC VERIFICATION

To verify the functioning of the AEC:

Use the X-RAY EQUIPMENT in conditions representative of the specified intended use, in terms of geometric settings and selection of mode of operation, the PATIENT being replaced by a phantom of acrylic or appropriate material, the section and thickness of which match the INTENDED USE. Acquire 3 images under AEC mode (photo-timed) at constant kVp and mA settings (according to the PHANTOM) to verify that the exposure time (ms) is reproducible.

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## IX. WASTE DISPOSAL

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## IX. WASTE DISPOSAL

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### 33.0 WASTE DISPOSAL

The product's useful life is estimated to be 10 years from the point of sale. This will vary depending on use and environmental conditions.

The manufacturing company is responsible for disposal of the product. To avoid environmental pollution and human injury, contact the manufacturer or your dealer if you wish to cease operation of your system with the intention of disposal. For disposal of other components, refer to the corresponding documentation. Follow the rules and regulations of your relevant authorities in the disposal of this product, accessories, options, consumables, media, and their packing materials.

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## X. APPENDIX A: CONFIGURATIONS

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### 34.0 CONFIGURATIONS

1. **Tube**

Options:

- RAD-14 with Leo Housing
- RAD-14 with Diamond Housing
- RAD-60 with Sapphire Housing

2. **Collimator**

Options:

- Two-knob
- Three-knob
- DAP Meter

3. **Generator**

Options:

- 40 kW, 480 VAC, 3-Phase, CPI
- 50 kW, 480 VAC, 3-Phase, CPI
- 65 kW, 480 VAC, 3-Phase, CPI
- 80 kW, 480 VAC, 3-Phase, CPI
- 50 kW, 208 VAC, 1-Phase, Sedecal (DR only)
- 50 kW, 208 VAC, 3-Phase, Sedecal
- 50 kW, 480 VAC, 3-Phase, Sedecal
- 64 kW, 480 VAC, 3-Phase, Sedecal
- 80 kW, 480 VAC, 3-Phase, Sedecal

4. **Flat Panel Detector (FPD)**

Options:

- 17x17 HD/ FNB
- 17x17 HQ/KDR

5. **Stand**

Options:

- Weight bearing stand
- Advanced weight bearing stand
- Stitching stand

6. **Table**

Options:

- Fixed height table/trolley
- Motorized height floating top table/trolley

7. **PC**

Options:

- Dell PC, DDR model
- Dell PC, DR only model
- 600VA uninterruptable power supply (for PC only)

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## XI. APPENDIX B: MONTHLY CHECKLIST

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# XI. APPENDIX B: MONTHLY CHECKLIST

## 35.0 MONTHLY CHECKLIST

Print these pages for use as a monthly checklist.

If there is any discrepancy use the table to make a note.

Hospital: .....	
ID #: .....	Room: .....
Sign: .....	Date: .....

- 1. Check the emergency stop. By activating the emergency stop all motorized movements of the positioner are prevented.
- 2. Measure between the X-ray tube focal spot and the active image receptor surface of the image receptor holder. The measured SID must correspond with the displayed SID. Check that the SID, shown on the display of both the Image system and the collimator, correspond with the measured SID/FFD. The SID may differ by  $\pm 1\%$ .
- 3. Check all hoses for damage.
- 4. Check all outer cabling for damage.
- 5. Clean all outer surfaces, except for the lubricated column segments. See the "Cleaning" chapter (Section 34.0) for cleaning instructions.
- 6. Power up the stand and check all functions.
- 7. Make movements with the stand and observe any irregularities.

## XI. APPENDIX B: MONTHLY CHECKLIST

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Remarks			
	<i>Remark</i>	<i>Action</i>	<i>Int Note</i>
No.			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			



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## Monthly QA Procedure 5.0.X Ultra & Aero Panel

1. Create a QA patient.
2. Select a QA procedure: 70kV, 200mA, 25ms, 72" SID.
3. Insert grid & open collimator blades.
4. Make an exposure.
5. Right-click on the Annotations icon.



6. Select the center ROI.
7. Read the Exposure Index (EI) number from the list. Verify the EI number is within 10% of the number established during the first QA baseline.
8. Record this number on the monthly QA list.





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