



Step By Step Guide – CT Supine Abdomen

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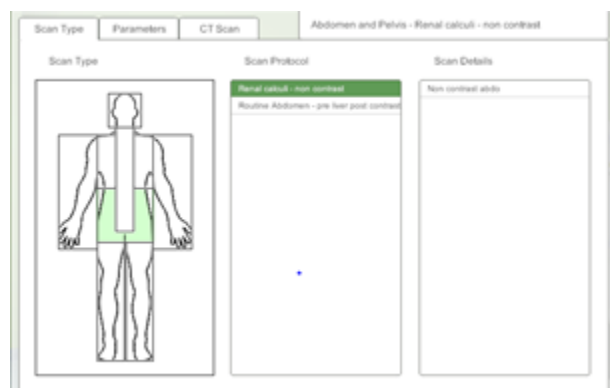
Step By Step Guide

This tutorial will take you through the following steps.

- Selecting a Protocol
- Patient entry and positioning
- Table movement
- Positioning using the Gantry panel
- Alignment - patient in scanner
- Skeleton View
- Setting up the Scan Parameters in the Main Workstation Console
- Setting Scan Type, Protocol and Scan Details
- Inputting Topogram Parameters
- Selecting Topogram Parameters on the Topogram image
- Setting Scan Parameters
- Selecting more than one scan region
- Performing the Scan
- Comparing with the Technical Standard
- Scanning with Contrast injection
- Loading Contrast and setting injection parameters
- Setting Contrast Parameters

Selecting a Protocol

Once you are in the CT environment select the main console by clicking on with the LMB or alternatively using the shortcut key '5' or the 'Equipment' dropdown menu.

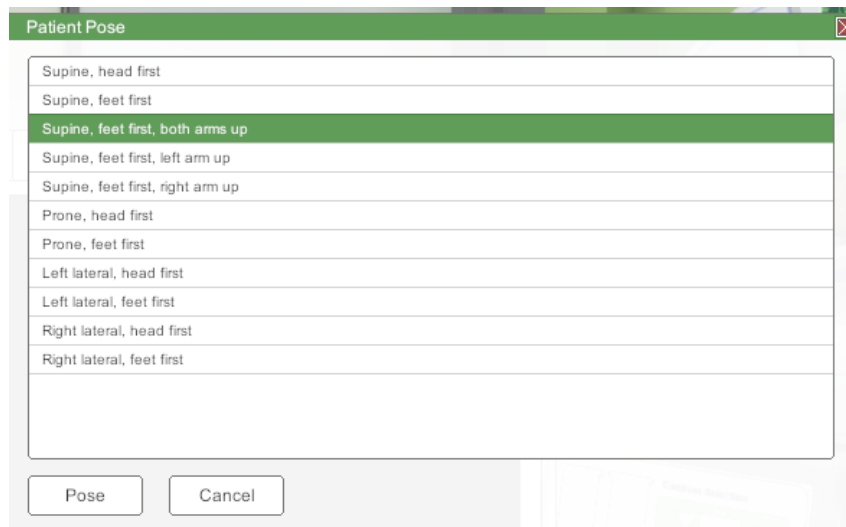


The Tutorial Selection Panel

Click on the body region with your LMB that you want to scan and select the protocol from the 'Scan Protocol' column. In this example we have selected Abdomen and Pelvis: Renal calculi – non contrast.

Patient entry and positioning

The next step is to place the patient on the table in the correct orientation for the selected protocol. From the 'Patient' dropdown menu, select 'Entry Position' with the LMB. The 'Patient Pose' panel will be displayed.



The Patient Pose Panel

Choose a pose that is appropriate to the selected protocol. In this example we will choose to place the patient in the supine position with the feet first, both arms up. Click 'Pose' to complete the selection.



Patient posed in the supine with feet first, both arms up.

With the patient posed it is possible to carry out fine adjustments for head tilt and rotation only. To adjust the head tilt and rotation click on the patient with the LMB. The 'Head' positioning control panel will be displayed.

Click on the relevant movement button with your LMB to adjust the head pose.



The Patient Head Movement options

Table movement

There are number of ways of accessing the table controls for positioning. You can:

- Click 'Table' on the dropdown 'Equipment' menu
- Select shortcut key "2"
- Click on the table with the LMB
- Select the gantry controls

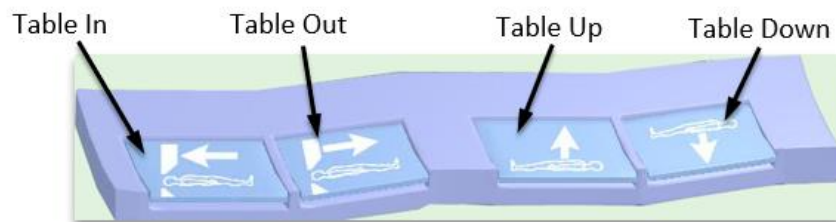


Table controls via the foot pedals

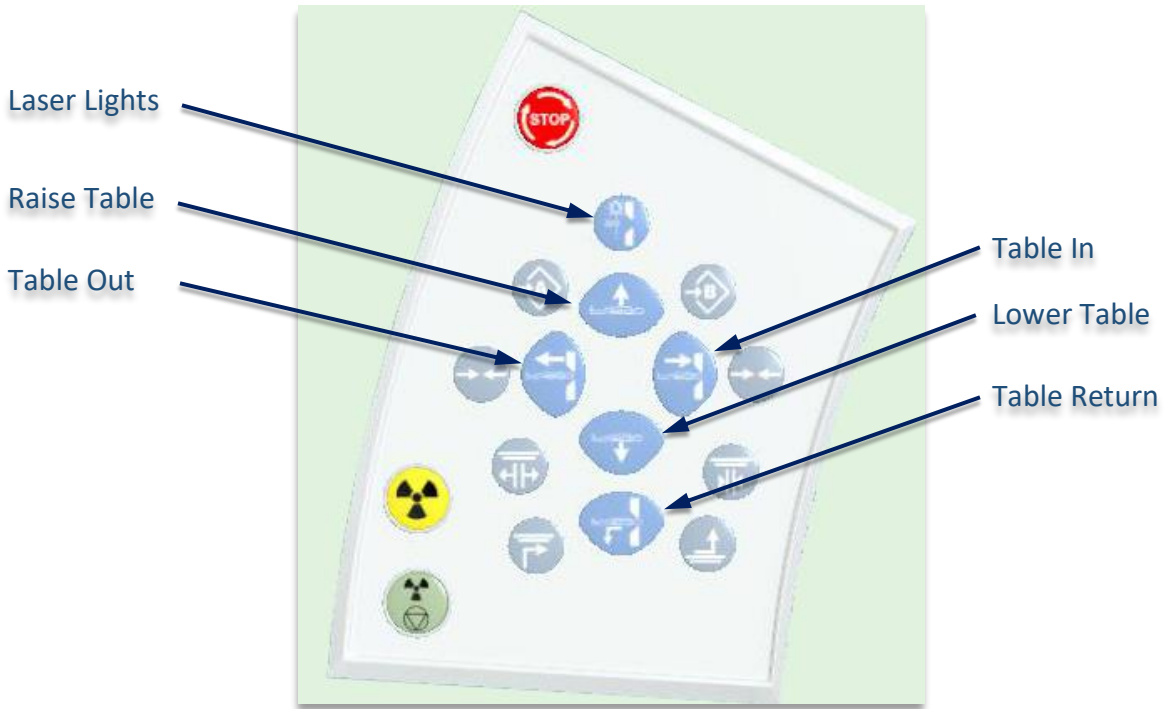
- Use the table controls to raise and move the table with the patient into the correct position for the scan.
- You can hold down the 'Shift' key while clicking on a pedal to speed up the movement.
- It is useful to turn on the laser lights via the Gantry control panel to assist in positioning the table as in the example below.
- It is also useful to switch between the various camera views to achieve precise positioning.



Positioning the patient with the aid of the Laser Lights

Positioning using the Gantry panel

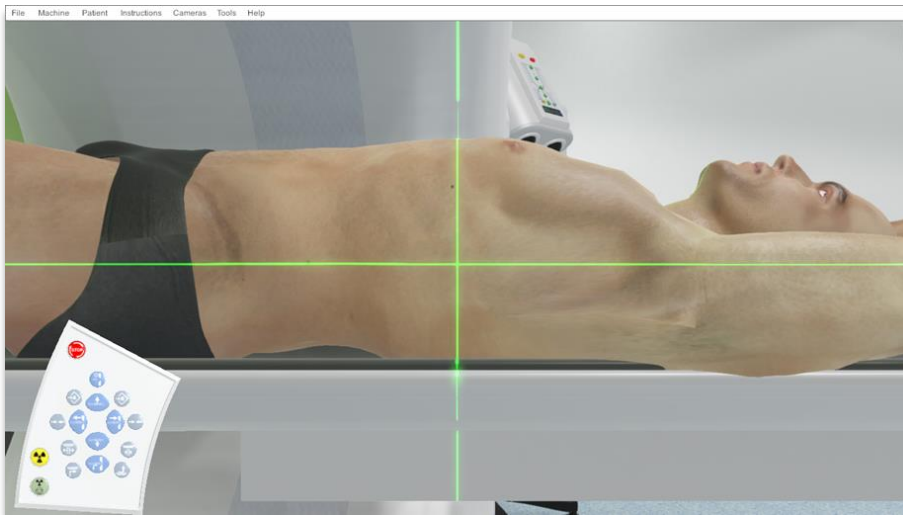
To position the table using the Gantry controls, click on the Gantry with the LMB or alternatively use the shortcut key '1' or the 'Equipment' dropdown menu. The Gantry control panel will be displayed. Use the Gantry controls in the same way that you would use the table controls.



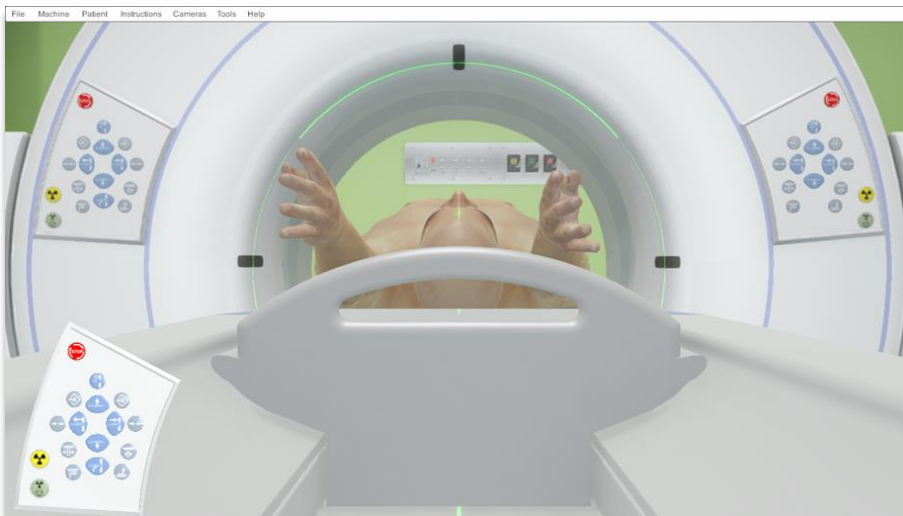
CT Gantry controls

Alignment - patient in scanner

It is useful to turn on the laser lights via the Gantry control panel to assist in positioning the table. It is also useful to switch between the various camera views to achieve precise positioning.



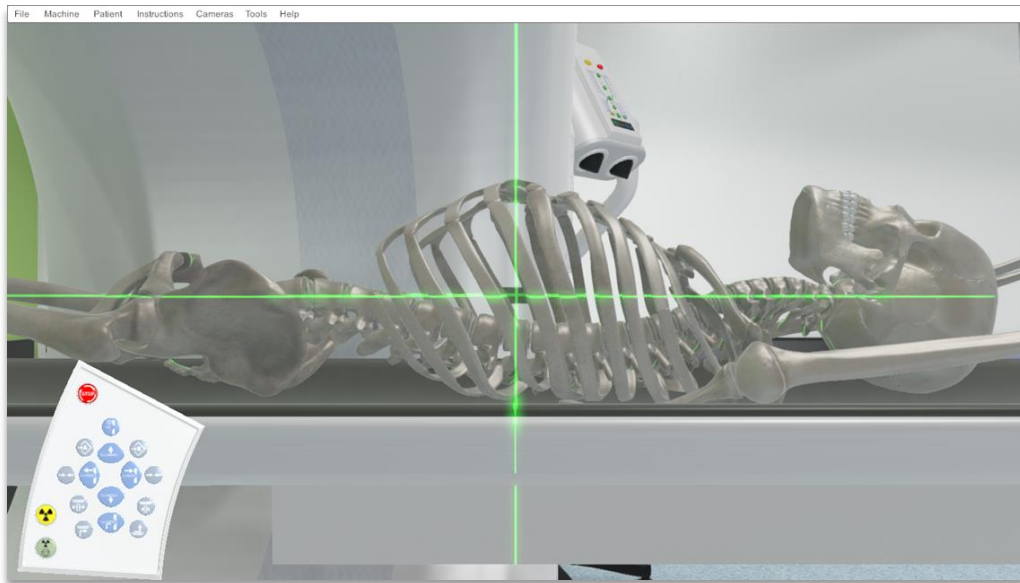
Left camera view
Ctrl + 2



Front camera view
Ctrl + 4

Skeleton View

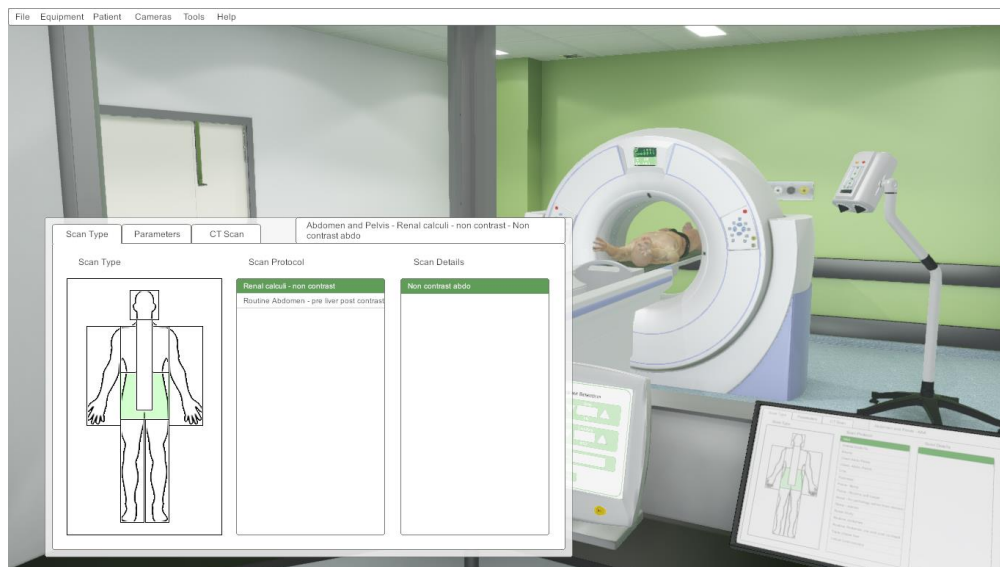
Skeleton view can be enabled through the 'Tools' menu by selecting the 'Bone' option. Alternatively use the shortcut key Ctrl + 8. This enables students to interact with the bony landmarks, normally palpated.



Skeleton view

Setting up the Scan Parameters in the Main Console

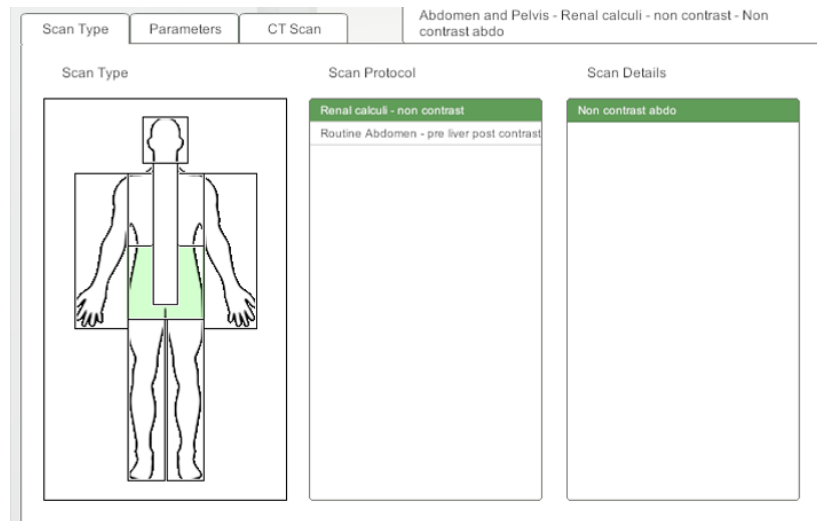
The final scan parameters are all set up using the main workstation console. It is a good idea to follow protocol at this stage and switch to the operator room for the rest of this procedure. To go to the operator room, use the shortcut Ctrl + 6 or alternatively use the 'Cameras' dropdown menu and select 'CT Panel' with the LMB. Select the Main Console by clicking on it with your LMB or alternatively use the shortcut key '5'.



View from the operator room with the Main Console interface displayed.

Setting Scan Type, Protocol and Scan Details

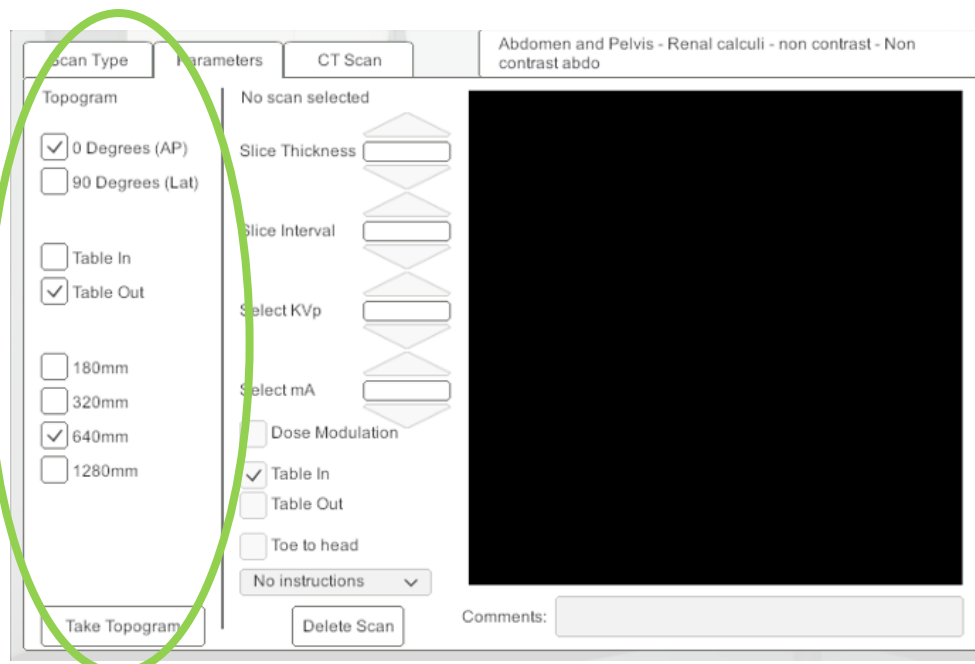
1. Click on the body part or region of the scan to select the Scan type
2. Next select the scan protocol wanted. If not available, ask your administrator to add the scan protocol you want
3. Finally select the specific scan for that protocol e.g. Non Contrast abdo



View from the operator room with the Main Console interface displayed

Inputting Topogram Parameters

After you have selected the region for scanning you must set the Topogram parameters. Switch to the 'Parameters' Tab



Topogram parameter selection

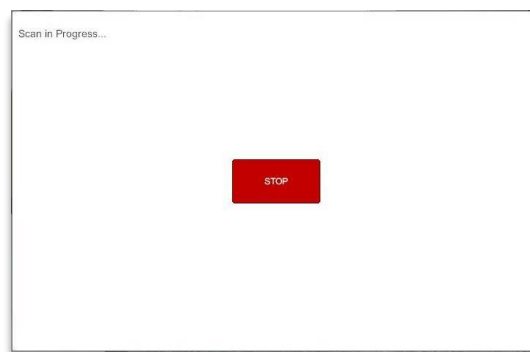
Input the Topogram parameters relevant to the selected scan protocol.

Input:

- Image orientation – AP or Lateral
- Table movement – in or out
- Length of scan – 180mm, 320mm, 640mm, 1280mm

Once your parameters have been selected click the 'Take Topogram' button with the LMB.

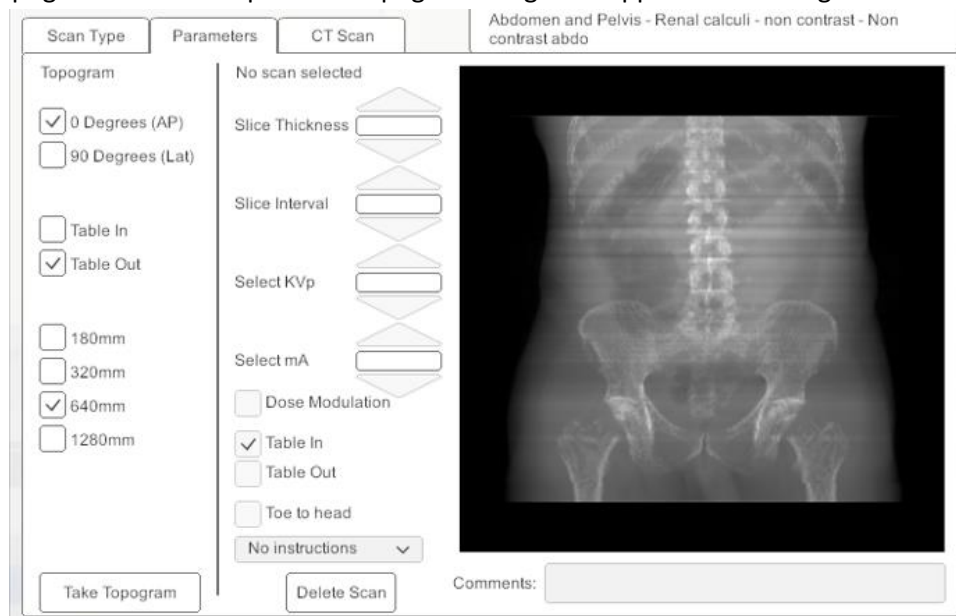
The initial Topogram scan will now take place. While the scan is taking place the following window will be displayed. If you wish to stop the Topogram at any point, press "stop".



Screen when Topogram is being scanned

Selecting Scan Parameters on the Topogram image

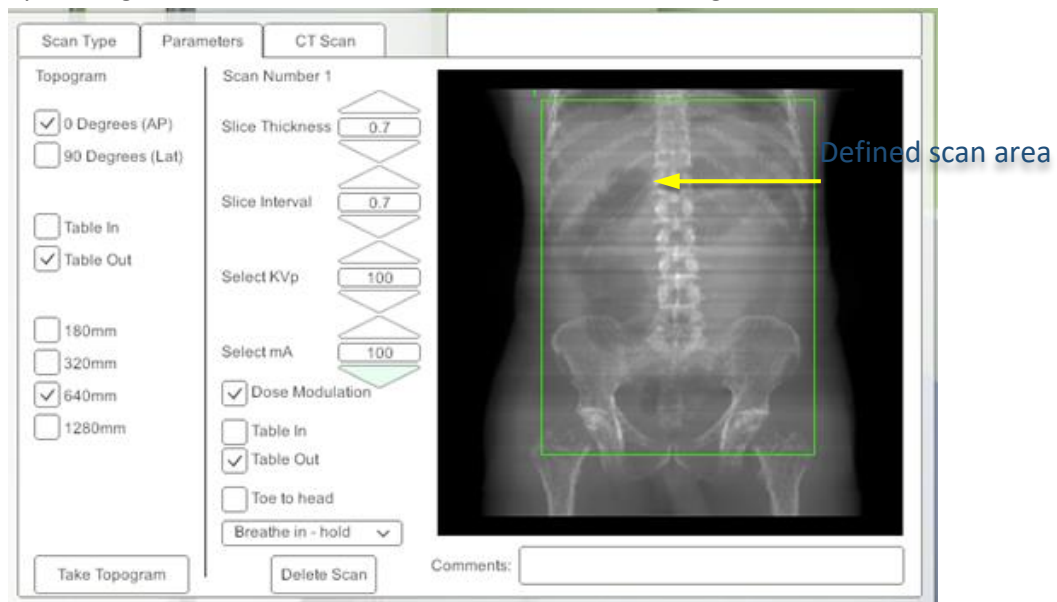
Once the Topogram scan is completed a Topogram image will appear in the Image Window.



Topogram image display and scan parameter selection

Unless the administrators have uploaded a data set from your institution file set, the default images will be reconstructed from the Visible Human™ dataset.

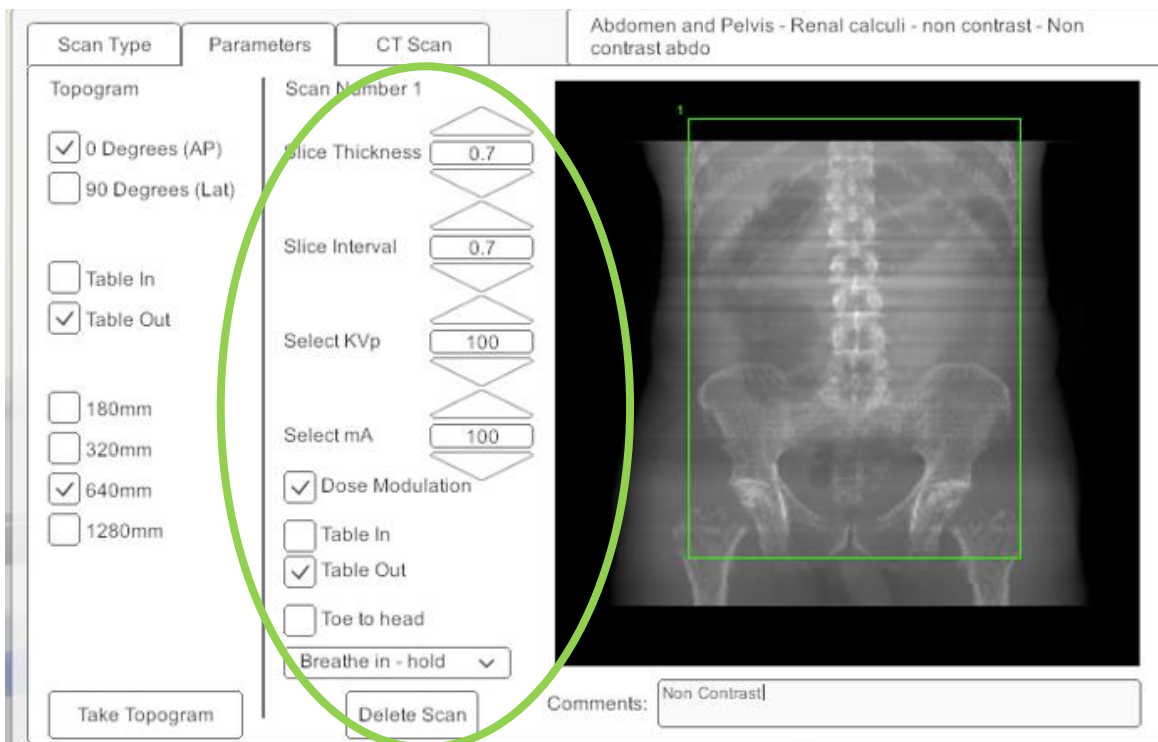
LMB click and drag over the Topogram to draw a box depicting the scan region. This box can be manipulated by altering each corner if needed or delete scan and start again.



Topogram image with scan region shown

Setting Scan Parameters

With the scan area now defined we can move on to setting the actual scan parameters.



Topogram image with scan region and parameters selected

- Set the desired *Slice Thickness* and *Interval* by clicking on the arrows with the LMB.
- Set the desired *kVp* and *mA* by clicking on the arrows with the LMB.
Note: only preselected values can be chosen
- Select *Dose Modulation*, if required, by clicking on the checkbox with the LMB.
- Set the desired *Table Direction* by clicking on the relevant checkbox with the LMB.
- Set the desired Image viewing direction ('*Head to Toe*' or '*Toe to Head*') by clicking on the checkbox with the LMB.
- Select instructions from the drop-down box (Breathe In, Hold it etc)
- Input "comments" which will be displayed on final image. For example, "Non contrast".

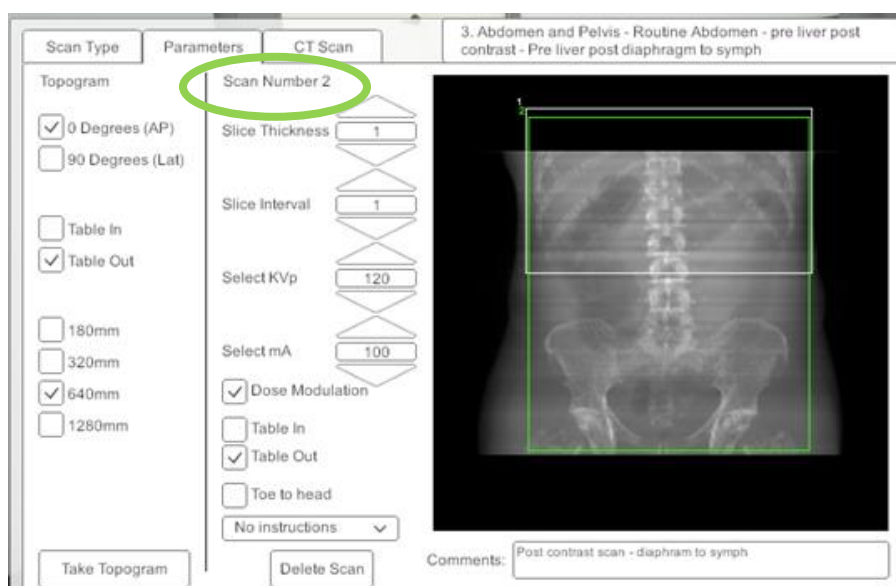
Note

If the start of the scan box is outside of the Topogram image area, as in the above example, the box must start within the image field and then be dragged outside the image area.

Selecting more than one scan region

More than one scan region can be defined after the initial Topogram has been taken and prior to starting the scan.

To add another scan, simply click and drag another box with the LMB. The green highlighted box corresponds to the Scan number and therefore the selected parameters for that scan. Each scan can have its own independent scan parameters.



Topogram window showing the multiple scan regions (for a pre-liver/Post contrast Abdomen scan)

Note

The resultant scans will not demonstrate a change in images due to contrast, however, different ROIs and start/finish scans will be shown.

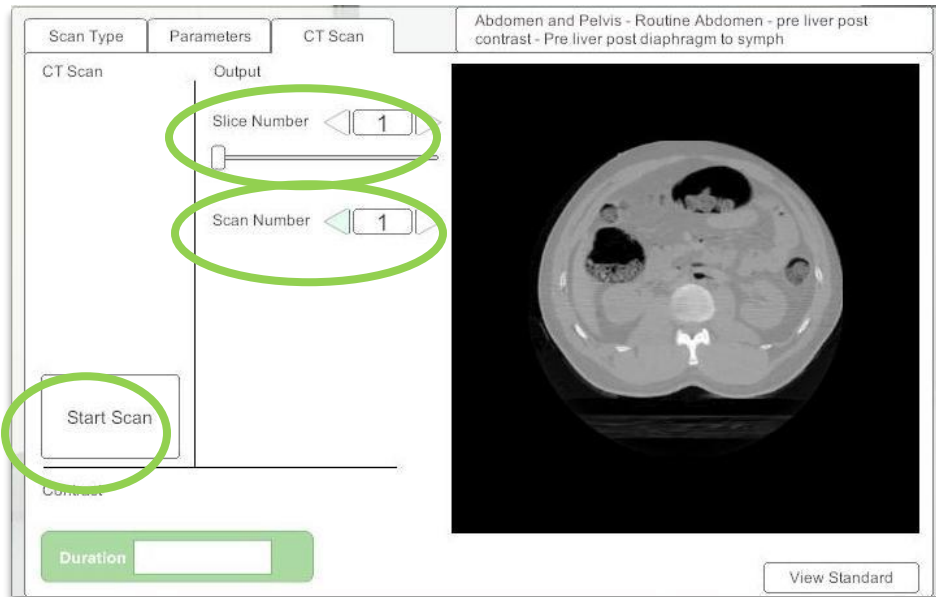
Note

The user can type into the comment box to identify the contrast scan (or other).

Performing the Scan

Once all the scan parameters have been set and the correct protocols selected the scan can be conducted.

- Select the 'CT Scan' tab by clicking on it with the LMB.
- Click the 'Start Scan' button with the LMB and the scan will start, and the machine will conduct each scan sequentially if multiple scans have been selected.



Default dataset image of 2 series scan

- At the end of the scan when the table has returned to its starting position the scanned images will be displayed.
- If these are from the default dataset provided by medspace.VR™, the Visible Human™ bone window data set will be displayed reflecting the scanning parameters selected in the previous step.
- Alternatively, institutional DICOM images uploaded by Administrator can be used.
- Images can be displayed by selecting 'Slice Number' arrows or toggle the scrollbar.
- If numerous scans were performed, progress to next scan number using the arrow keys

Comparing with the Technical Standard

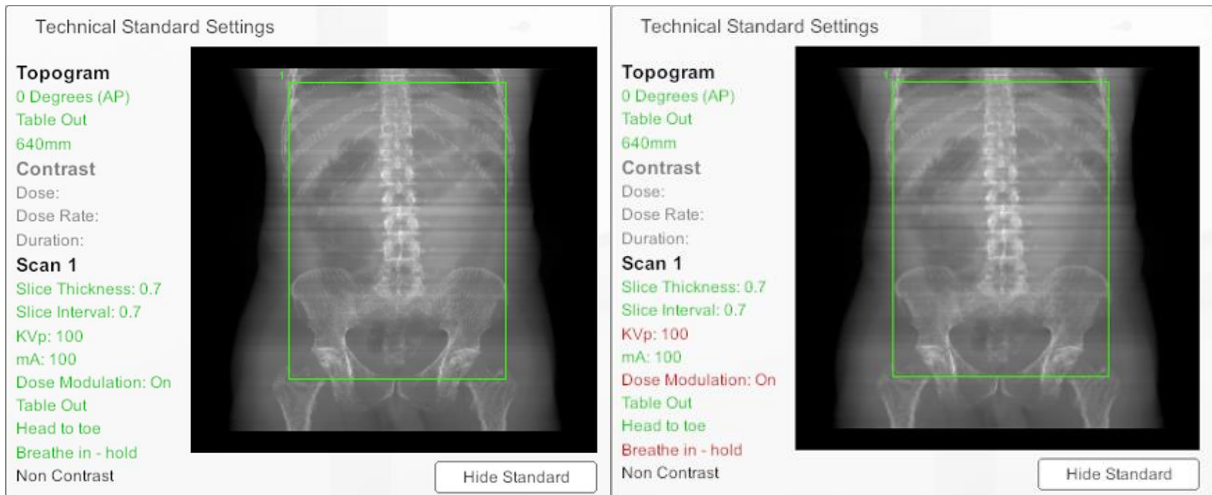
The final scans performed by the user can be compared against the Technical Standard set by your administrator.

To compare your results with the Technical Standard, click on the 'View Standard' button with your LMB.



The technical standard created by your administrator or tutor will be displayed.

Anything in **RED** highlights the pre-set parameters by the admin that did not match the student's selection. As shown below, student 1 selected the same parameters as the administrator pre-set and student 2 chose a different kVp, dose modulation and breathing instructions.



Student 1

Student 2

Scanning with Contrast injection

As mentioned previously in this manual it is possible to conduct scans that require a contrast injection.

IT SHOULD BE NOTED THAT THE PURPOSE OF THIS SOFTWARE IS NOT TO GENERATE HIGH QUALITY SCANNED IMAGES BUT TO TRAIN USERS IN THE PROCEDURAL ASPECTS OF CT PROTOCOLS.

Loading Contrast and selecting Injection Parameters

In order to do a contrast scan, you need to load the contrast injectors from within the scan room. To do this, click on the contrast unit with your LMB. Alternatively use the Shortcut key '3' or the 'Equipment' dropdown menu.



Click the 'Load Contrast' button in the 'Contrast Injection Panel'

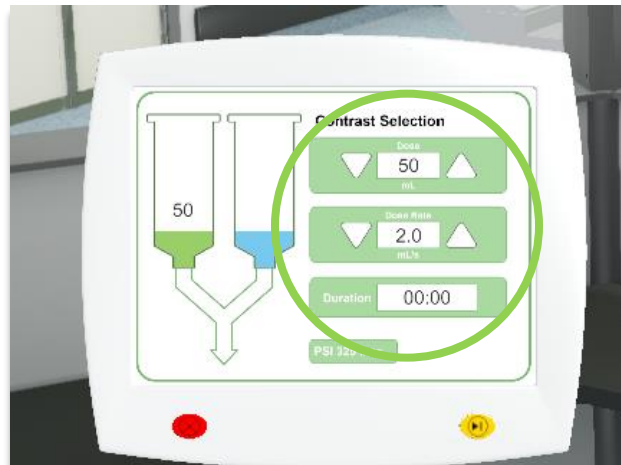
The contrast is now loaded, and you can move on to setting the scan and contrast parameters

Selecting Contrast Parameters

Clicking anywhere on the Contrast Console with the LMB will display Load Contrast Panel. Alternatively use the Shortcut key '4' or the 'Equipment' dropdown menu. Individual controls on the console can be activated using the LMB. Set Dose and Injection Rate by clicking on the relevant arrows with the LMB. Set Dose and Injection Rate by clicking on the relevant arrows with the LMB.



The Contrast Injector and Control Panel



Use the volume and dose selectors to input the desired values and the start delay time.



The Contrast Injector control panel and loaded Contrast Injector

To conduct a scan that requires a contrast injection the following steps must be followed.

- Ensure contrast is loaded (shortcut key '3') and dose measure and rate are selected (shortcut key '4')
- When you are ready to scan – i.e., all scan parameters have been selected and you are ready for contrast, press the yellow button on the bottom right of the contrast panel to start injection



Start contrast injection

- Immediately open the *Scan Console* to see the contrast timer so you know when to start the scan
- Once the timer has reached the desired period click the '*Start Scan*' button with the LMB.



Start scan when the desired contrast time delay has occurred

Note

- This current software does not enable multiple phased post contrast scans
- The default CT dataset supplied with the medspace.CT™ module is the Visible Human Data Set provide under license to medspace.VR™ by the United States National Library of Medicine, Department of Health and Human Services on the 9th of August 2014.
- These images have a default window setting of bone, they do not have any contrast enhancement, regardless of the scan chosen during medspace.CT™ procedures
- As per post-partum imaging, the lung fields and other structures are noticeably different in comparison with live patients.
- Administrators can upload institutional DICOM images (with appropriate permissions) as they see fit. Refer to the administrator's manual for details.

Help and Support

Support Options:

Website: <http://medspacevr.com>

Email: support@medspacevr.com

User Forums: <http://www.medspacevr.com/forum/>

Please allow 24 hours for support requests to be answered.

Contact Details:

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