

CORSO DI LAUREA
TECNICHE DI RADIOLOGIA MEDICA, PER IMMAGINI E RADIOTERAPIA

CORSO INTEGRATO
«**RADIODIAGNOSTICA II – RMX013**»

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Gemelli



Insegnamento:
TECNICHE DI IMAGING TC E ANGIOGRAFICO
RMX055 - 25 ore MED/50 CFU 2

gen. '24

2° anno I semestre

Fondazione Policlinico Universitario Agostino Gemelli IRCCS
Università Cattolica del Sacro Cuore



Insegnamento:

TECNICHE DI IMAGING TC E ANGIOGRAFICO

RMX055 - 25 ore MED/50 CFU 2

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**TC GE: CORSO
INTRODUTTIVO**
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Emergency stop

There are up to 6 emergency stops:



4 Gantry emergency stops: One on each control panel on the front and two on the rear of the gantry (Optional depending on configuration).

1 emergency stop on the scan control interface module. **(Operator Console)**

1 emergency stop on the PDU

In case of **emergency** related to the **patient** or the **table**. Stops **table movement**, **X-rays** and **releases table** for manual movement.

Reset button

Restarting the system after an emergency stop



Once normality is restored after the emergency stop button is operated, you must press the **Reset button on the gantry**. If the equipment is turned off without following the correct steps (electrical failure, power cuts, etc). When it is turned on, it will be in emergency stop mode, requiring a restart.



Equipment shutdown with main disconnect

In case of **emergencies** or **catastrophes** such as fire or flood.

Immediately interrupts the power supply of the system (being able to damage the system files or cause the loss of patient data).



To activate the emergency shutdown system, you must press the **red circular button on the wall.**

System restart after mains disconnection

1. Reset the circular red button located on the wall to restore power. (Restore power to PDU, operator console and electronics) plus any other electrical switch that might have been disconnected

2. Switch on the system from the OC



3. Press the reset button in the gantry panel. (Restores power for gantry, X-Ray system and table brakes)

Stop the scan from the operator console

Other buttons located on the scan control module also allow us to stop or pause the scan:

Stop Scan : For stopping X-Ray Exposure, and gantry and table movements.

Pause Scan : Pause the scan after the current X-Ray exposure ends. Please be aware that it will only pause in between scans.



The table loading and unloading pedals are used to **raise and lower the table in order to adjust its height**, as well as **insert it and remove it from the gantry**.

This allows you to have your hands free to help the patient or pick up accessories and introduce or remove them from the table safely.

The loading and unloading pedals are always active.



The Gantry's display is touch screen and provides information on the status of the gantry and the table.



Basic accessories available with your CT

A set of accessories similar to the ones below should **be in your possession once the installation of the CT system is completed.**



Maximum supported weight as well as other important safety information concerning the holders can be found in a Yellow sticker attached to the device.

Head anatomical region accessories

Head Holder



Head Holder Pads



*Chin Strap/
Immobiliser*



Head Positioning Pads



Body anatomical region accessories

Table Extender



Extender pad



Leg Rest



Immobilisation Staps



The CT system operator console is made up of two monitors:



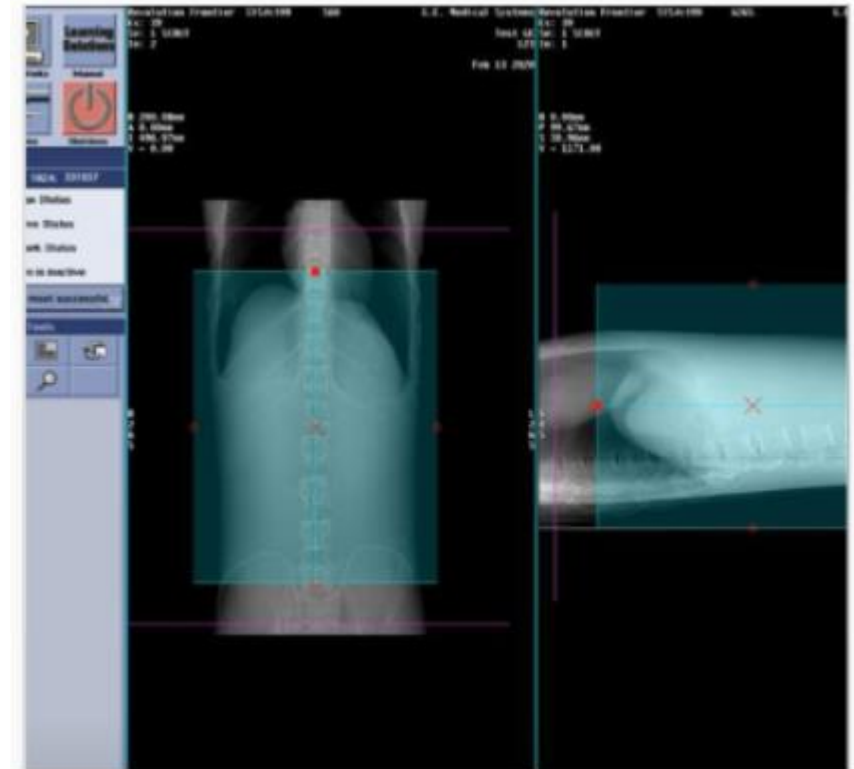
Left Screen: Acquisition

- Data entry
- Select protocols
- Configure protocols
- Retro-reconstruction
- Heating / Calibration



Right Screen: Visualization and Post-process

- Viewing MPR images
- Post-process with Volume Viewer
 - Manual transfer
 - Manuals
- Shutdown / Restart



Left Monitor: Acquisition



Data entry and
acquisition protocol
selection

Step 1

Access New Patient or Patient List



Click on **new patient** or **select the name from the list of patients** connected to PACS or other data management systems.



Step 2

Complete patient data



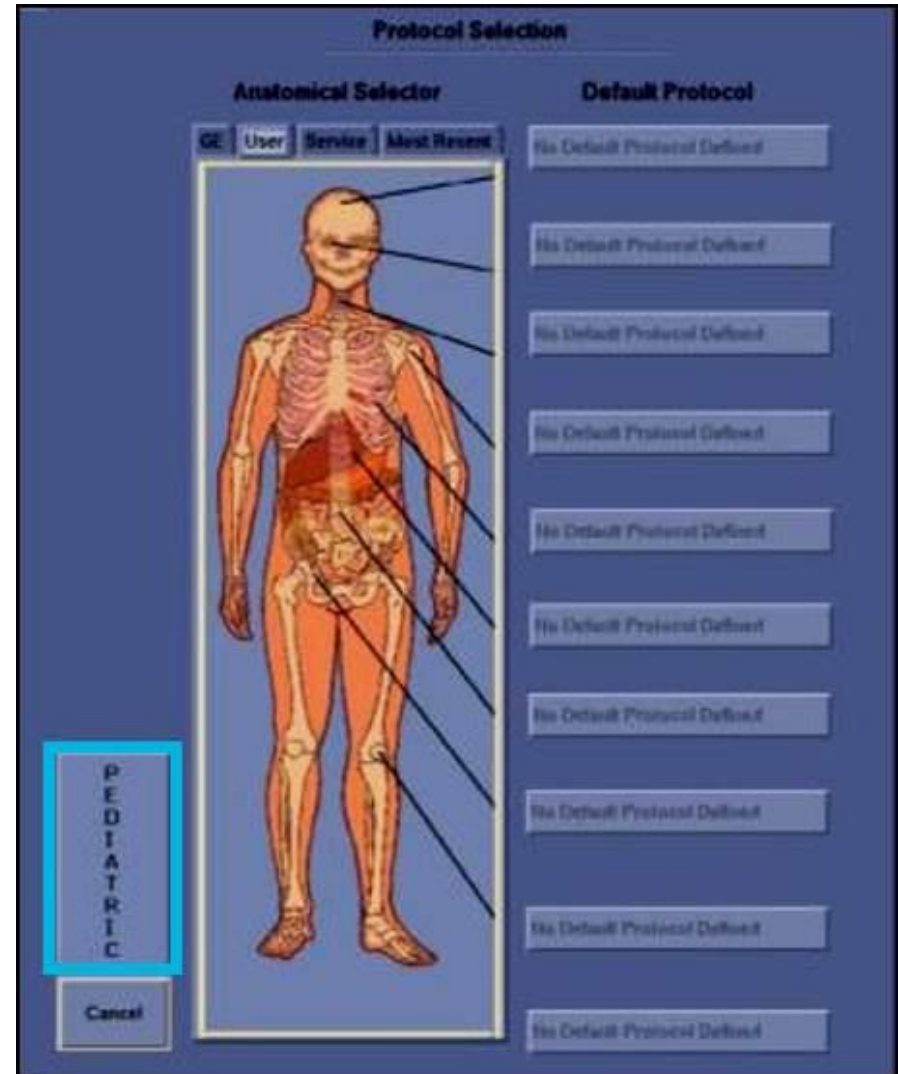
The screenshot displays a medical console interface with two main sections: 'Patient Information' and 'Protocol Selection'. The 'Patient Information' section includes fields for Exam Number, Account Number, Patient ID, Patient Name, Sex, Birthdate, Age, Weight, Height, Referring Physician, Radiologist, Operator, History, Exam Description, Protocol Number, and Ref. Proc. ID. The 'Protocol Selection' section features a central anatomical diagram of a human body with various regions highlighted, and a list of protocols on the right side, each with a selection button.

Once the data has been entered manually or automatically through the work list, **the data to be added can be completed**, such as the weight and height of the patient or radiologist in charge of the exam.

Selection of the Adult or Pediatric protocol

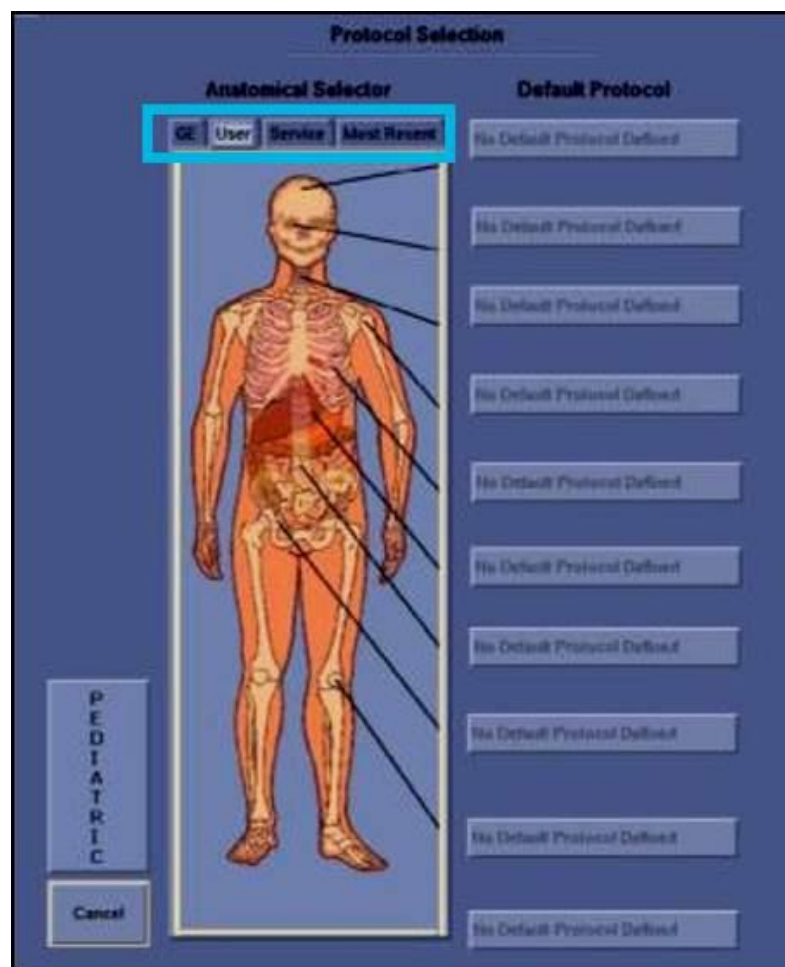
Step 3

Once the patient's data is completed, the desired protocol will be selected



Step 4

Protocol selection tabs



Step 4

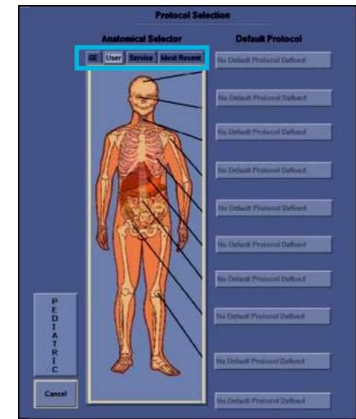
There are four types of protocol selections:

User: Protocols customized by the clinical application specialist and / or by the user himself.

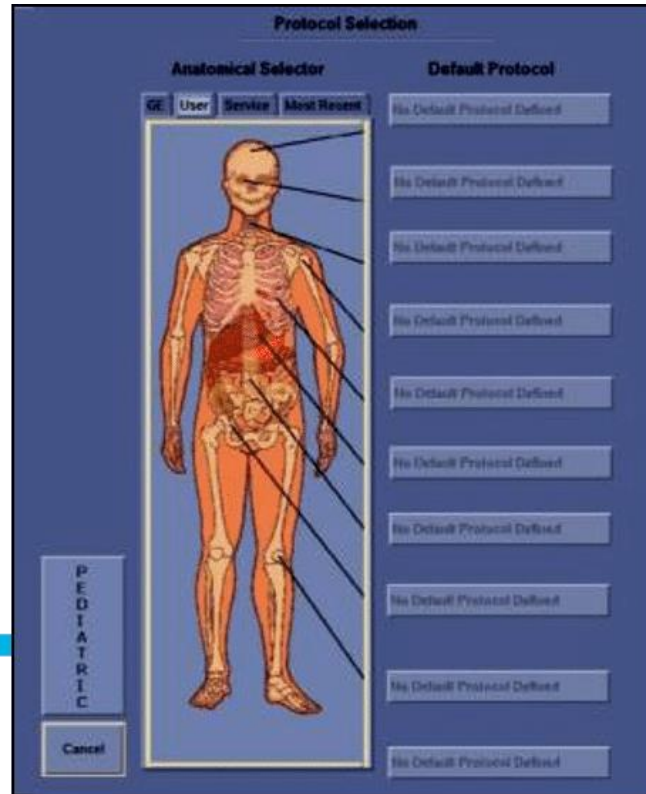
GE: Predefined protocols that can be copied and used, they can't be modified within this tab as these protocols are factory installed and have been developed in collaboration with clinical partners to provide the user with a timely and relevant clinical starting point for adapting department protocols

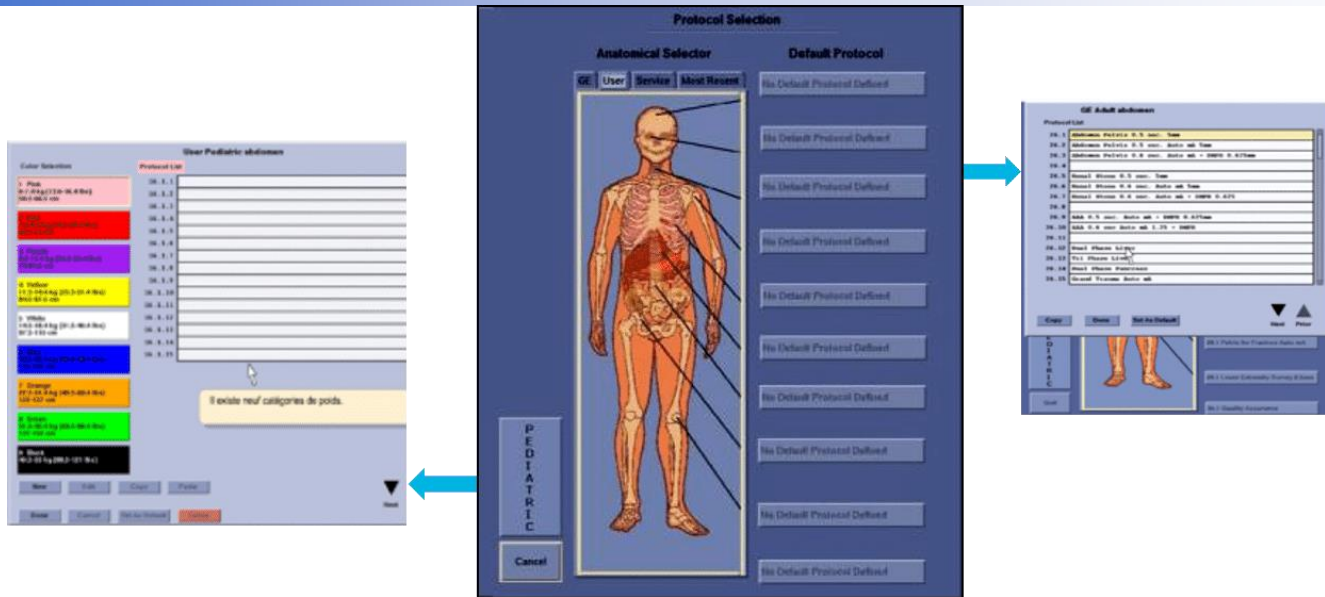
Service: Protocols used by the technical service representative.

Most Recent : You will find the copy of the last 90 protocols as they were used. These protocols can be copied and used, but cannot be modified or removed.



Step 5





Once the correct section of the protocol selector is activated, you need to proceed to the **selection of the anatomical region of interest**. In this way, a window will open with all the available protocols referring to the same region, and then select the protocol you want.

You also have the **ability to add a default protocol for each region for quick access**.

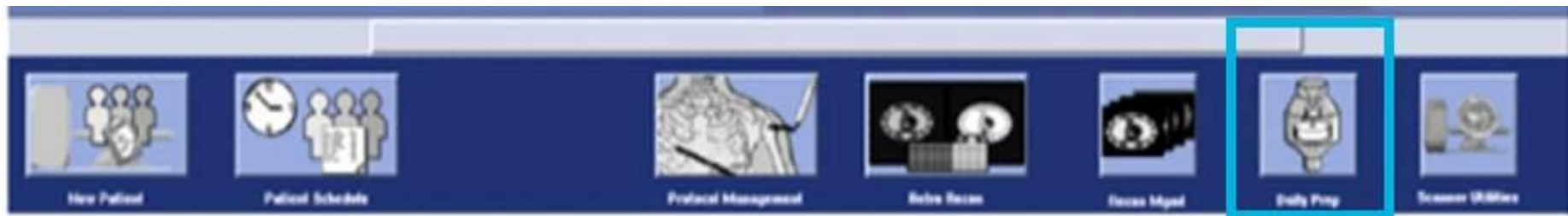
Calibration and heating of the X-ray tube

To achieve optimal equipment performance, avoid artifacts, maintain correct image quality, and extend tube life, you should **warm up the tube after two hours of disuse** of equipment and **Fast calibrate every 24 hours** that already includes heating of the tube.



Step 1

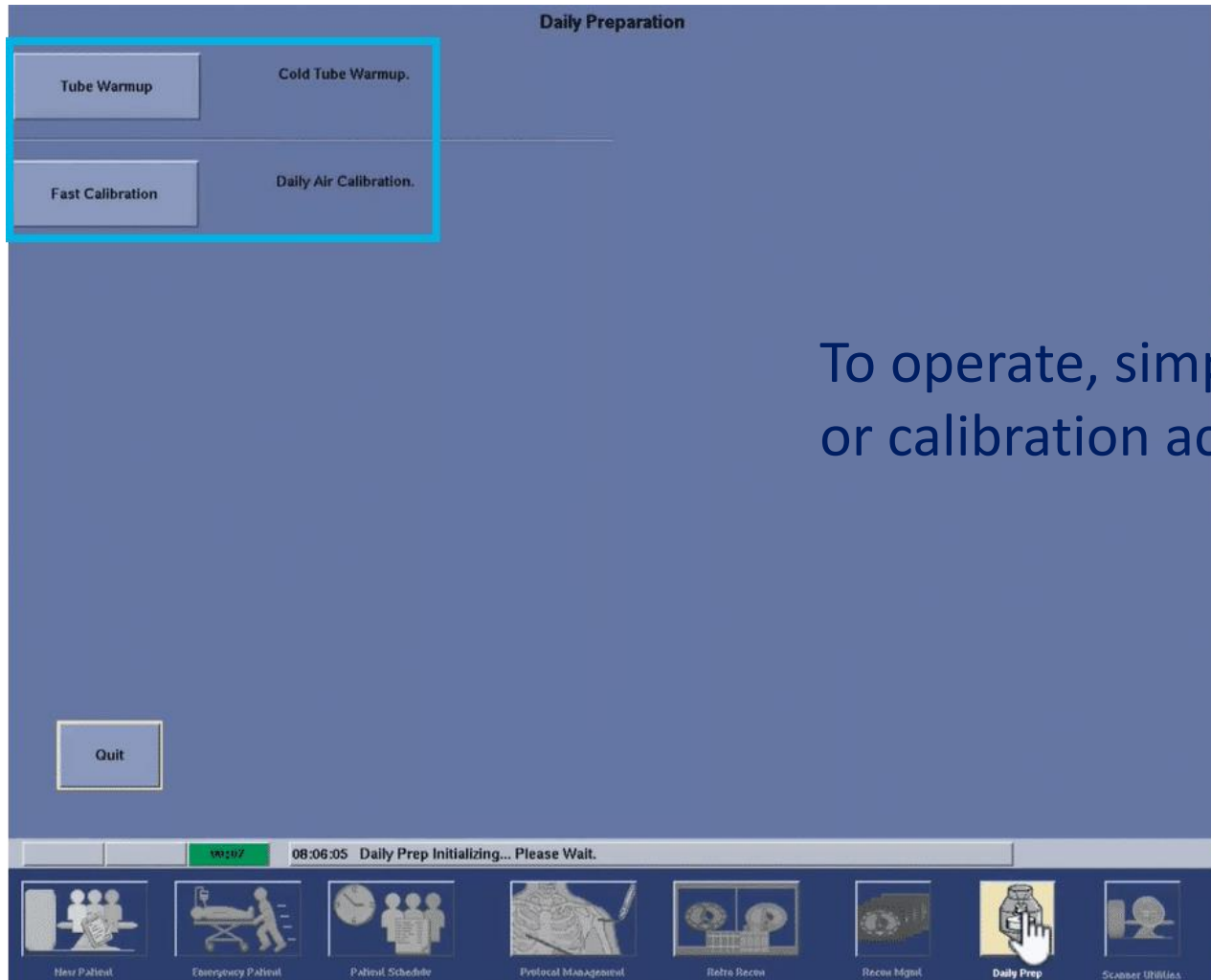
Press Daily Prep



You should go to the button **Daily preparation**. Selecting this button will give access to the quick calibration and tube heating buttons.



Selection of heating or calibration



Step 2

To operate, simply select warmup or calibration according to interest.

Confirm and start the scan

Step 3



Once selected confirm and start the scan.

The average duration of both tube heating and fast calibration is approximately two and fifteen minutes respectively.

Attention



Remember that if you do not properly prepare the CT equipment, artifacts may appear, you may get incorrect image quality and the life of the tube may be shortened.

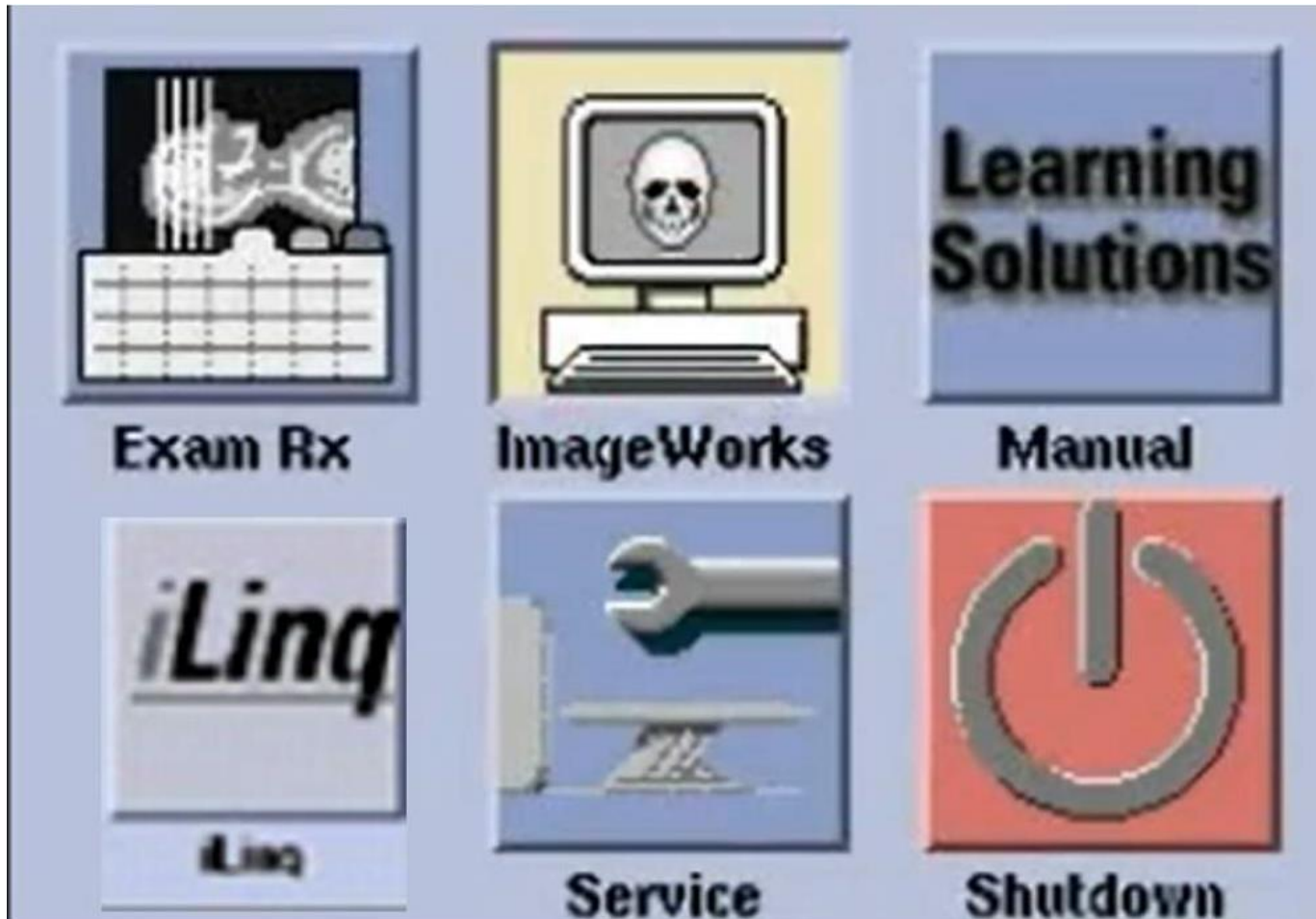
Right monitor: Visualization and post process

Once we have seen the general functionalities of the acquisition monitor, we move on to the display and post-process monitor located on the right side of the operator.



Function Selection and Function Status Area

At the top left, you will find the icon display area:



Below this you will find the function status area, where the date, time and available disk space on the system are displayed, as well as the reconstruction, archive, network and filming status.



2

1. Date / Time
2. Available image space
3. Image Reconstruction Tasks
4. Archive / Restore Tasks
5. Network Tasks
6. Filming and printing tasks
7. System message area

Considerations

The available space is divided according to the image matrix. GE Healthcare recommends **deleting images** from the 512 array **when there is less than 10,000 images remaining** so there is enough disk space to acquire and reconstruct images

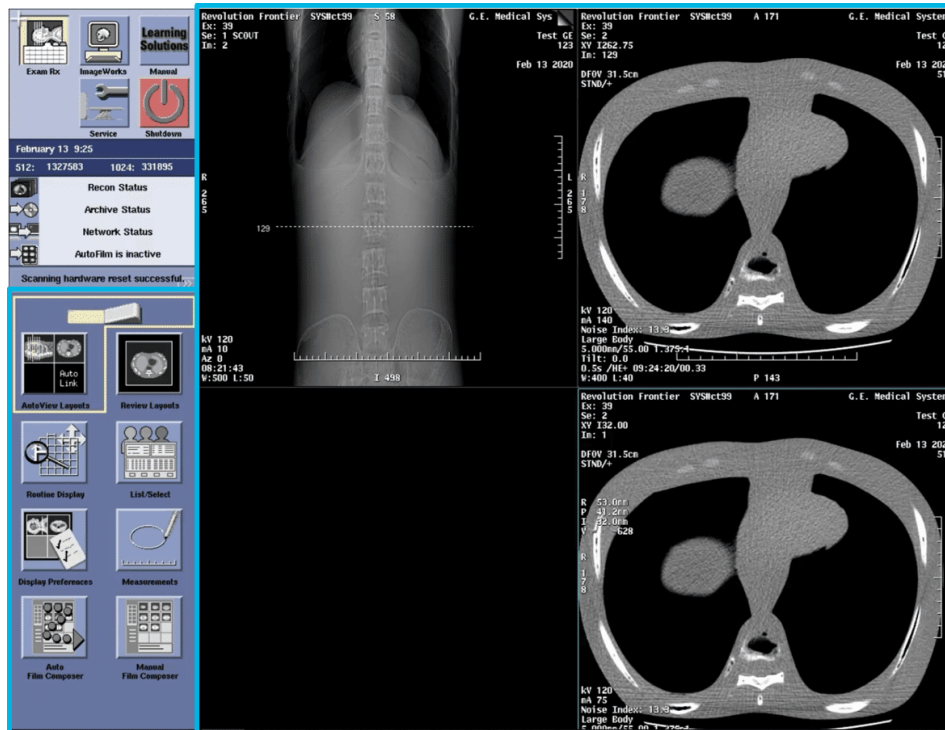
You should not delete images during image browsing, recovery, or reconstruction.



If the system does not have enough storage capacity to acquire and reconstruct the images of the study in question, a message will appear in the message area of the system indicating the lack of necessary space and **you will not be able to scan.**

Application presentation area

The rest of the right monitor refers to the presentation area of the selected application.



In the image, the **Exam Rx application is active**, and therefore, the application displays the desktop of the application in the presentation area.

The Exam Rx desktop is divided into two areas, the **View Control Panel** and the rest of the screen that corresponds to the customizable **Exam and Image View prescription windows**.

Image Works is the application that allows you to view the list of patients already performed and perform the post-processing of them or other applications of interest.

The distribution that image Works uses for organizing content is as follows:

The screenshot displays the Image Works Browser interface. On the left, there is a sidebar with navigation icons for 'Exam Rtr', 'ImageWorks', 'Masred', 'InSite', 'Service', and 'Shutdown'. Below these are system status indicators for 'December 21 19:40', '072: 107559', '1024: 06809', and 'Archivio Status'.

The main window is divided into several sections:

- Source:** Local DB
- # Exams: 87** (Find: Name)
- Exam List Table:**

Exam	Station name	Name	Date	Description	Modality	MPPS	Archived	Transferred
7	ct99	BIS	11 Nov 30		CT;SR		Yes	Yes
19	ct99	MFG QA	11 Nov 30		CT;SR		Yes	Yes
7	ct99	Bone/WEQ	11 Nov 30		CT;SR		Yes	Yes
172	ANONYMIZ...	ANON172	11 Nov 25	ANONYMIZED	CT		No	No
172	tc06bay	Volume ASIR QA	11 Nov 25	Y.Yazaki	CT		No	No
961	tc08bay	31CFR1020.33	10 Jan 14		CT		No	No
EMPTY		AL6 VCT Cardiac ...	80 Jul 14		CT		No	No
- # Series: 7**
- Series List Table:**

Series	Type	Images	Description	Modality	Manufacturer	MPPS	Archived	Transferred
504+C	RETRO	2400		CT	GE MEDICAL...			
505	SSAVE	1	Processed L...	CT	GE MEDICAL...			
505	SSAVE	5	Processed L...	CT	GE MEDICAL...			
506	SSAVE	1	3D Saved S...	CT	GE MEDICAL...			
506+C	REFMT	3	Processed L...	CT	GE MEDICAL...			
507	SSAVE	1	1.25	CT	GE MEDICAL...			
508	SSAVE	1	3D Saved S...	CT	GE MEDICAL...			
- # Images: 2400**
- Image List Table:**

Image	Img Ctr...	Thick(mm)	Tilt (°)	Img Ctr...	Img Ctr...	SFOV (c...	DFOV(c...	Alg	Matrix	Midsc...	Pb (c...	Imag...
1+C	S 120.00	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
2+C	S 119.38	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
3+C	S 118.75	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
4+C	S 118.13	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
5+C	S 117.50	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
6+C	S 116.88	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
7+C	S 116.25	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
8+C	S 115.63	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2110...	00%	
9+C	S 115.00	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2110...	00%	
10+C	S 114.38	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2110...	00%	
11+C	S 113.75	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2110...	00%	
- Message:** retrieve job submitted successfully for exam EMPTY from aw43 to Local DB.
- Destinations:** Local DB, sweng2, sweng2, aw43, tc02bay, tc03b.



1. Daily Quality Control

Fast calibration

Before performing patient scans, perform fast calibration of the CT equipment if it has not been performed for more than 24 hours.

Before performing quick calibration:

1. Remove objects or people in the Gantry. Any obstruction of the Gantry can cause artifacts to appear in the scanned images.

2. Check that the gantry tilt is set to zero.



Considerations



Fast calibration should be done every 24 hours. It takes approximately 10 to 15 minutes to complete, depending on the options installed.

If the detectors do not have the proper operating temperature, a message will appear stating that no scans will be possible until the detectors are at optimal operating temperature.

If a significant variation in ambient temperature (+/-10 degrees), carry out a fast calibration to maintain optimal image quality. When the temperature has stabilized, perform another quick calibration.

If the scan is canceled and resumed during quick calibration, inform the maintenance technician.

X-ray tube heating



The system works more effectively by using certain parameters that are set by heating the tube with the help of a predefined group of exposures.

Heating the tube when requested by the system reduces the risk of artifacts and extends the life of the tube. For the tube to be in the best condition, **heating should never be skipped.**

The status of the tube is indicated by colored indicators that specify the time remaining for the tube to go to the following state:



00:18

01:41

19:22

Recon Status

Archive Status

Network Status

AutoFilm is inactive

Scanning hardware reset successful.

AutoView Layouts

Review Layouts

Baseline Display

List/Select

Display Preferences

Measurements

Auto Film Composer

Manual Film Composer

New Patient

Emergency Patient

Patient Schedule

Protocol Management

Beta Recon

Recon Mgmt

Daily Prep

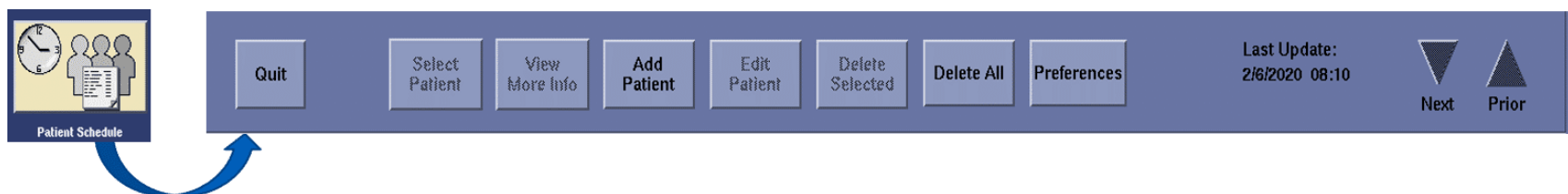
Scanner Utilities

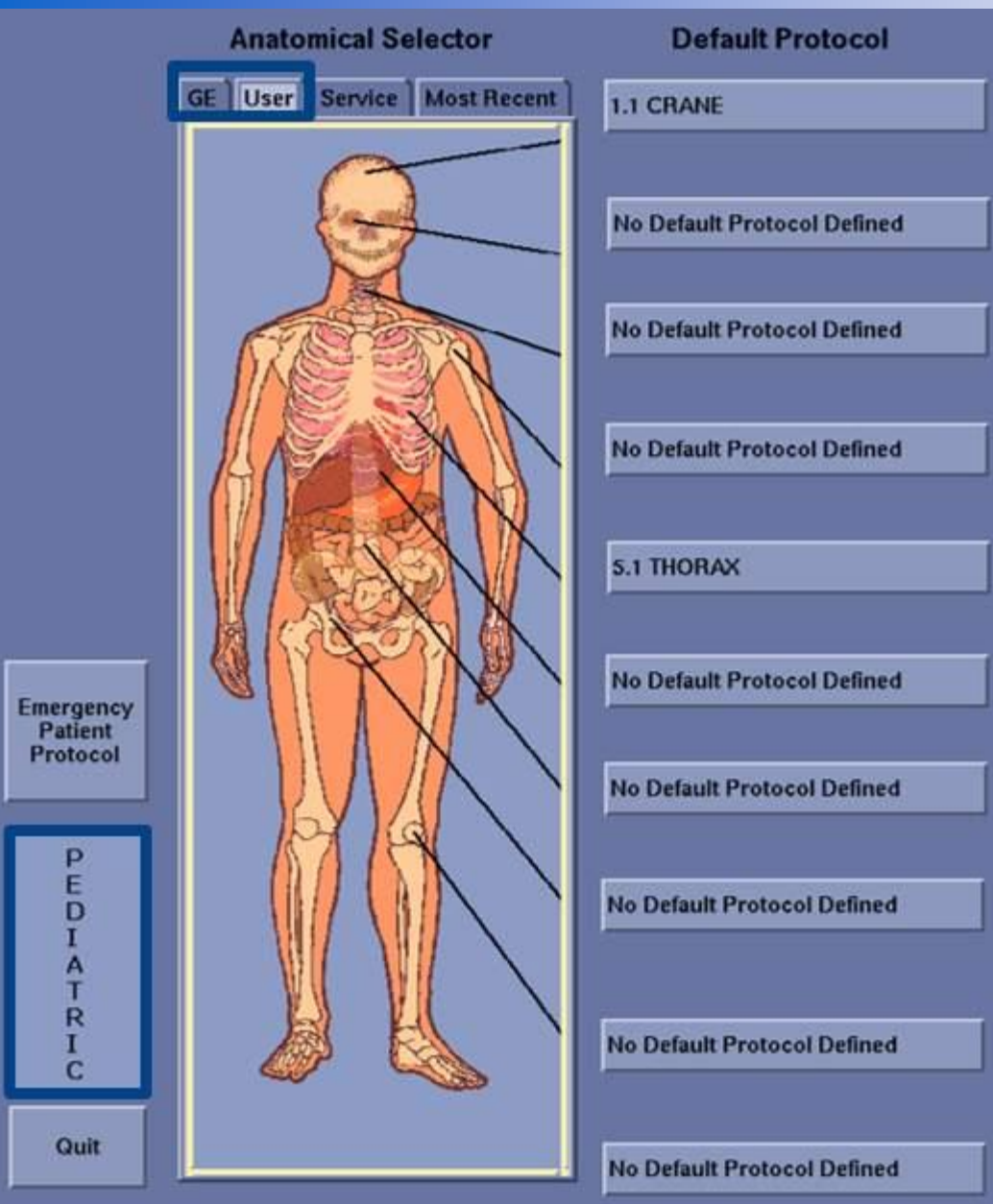


2. Patient selection and acquisition protocol

At the time of the scan, you can **select the patient from the list created either manually or automatically** using radiological information systems.

The menu options once the new patient panel is open are:

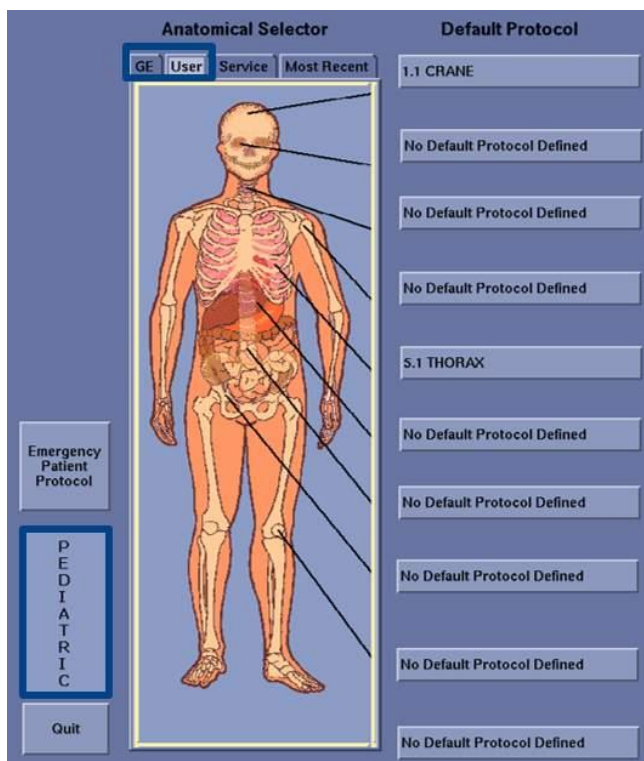




Protocol selection screen

The protocols are used as the basis for performing routine or established procedures. They save time, since they use pre-established factors.





The system includes a series of protocols under the **GE tab** that cover **common exam types**.

It is also possible to use **protocols modified and adapted** to the specific clinical needs of your department in the **User tab**.

The area of protocols includes **10 categories of adult protocols** and **10 of pediatric protocols** organized by anatomical section.



3. Scout - positioning X-Ray

Patient position area

It allows you to obtain and modify information about the patient, their position and the description of the series. It also allows you to manage the settings for sending images and dose reports.

Verify that the orientation of the patient matches the orientation that appears in the patient position area.

Name: Test GE ID: 123 Protocol: 25.1 Routine Chest 0.4 s 5mm Au Exam: 34 Series: 1

Anatomical Reference
SN

Patient Orientation
Feet First

Patient Position
Supine

Copy Pt. Orient. Pt. Position Anat. Ref.

Auto Store Auto Transfer Dose Report Auto Transfer Dose SR Report Auto Transfer

Series Description Scout

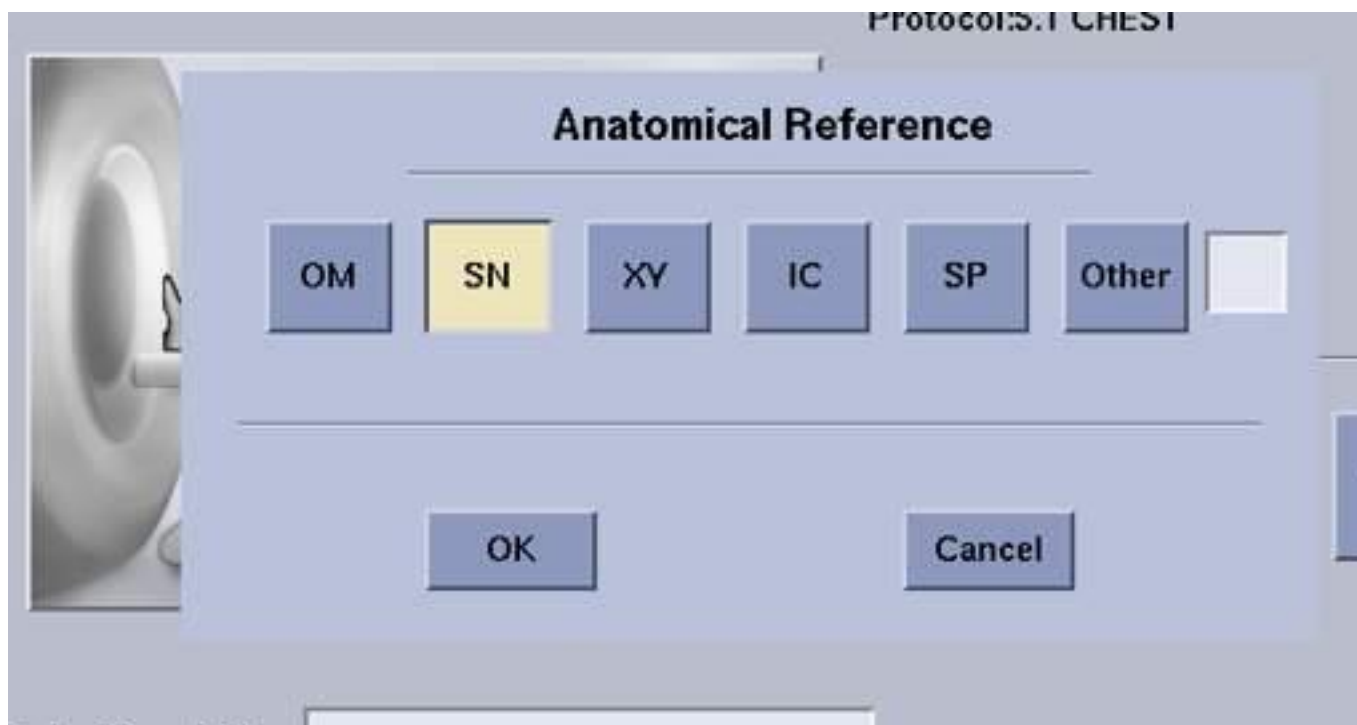
Patient position area / series level functions

In the technical parameters area of the positioning radiograph, the values of the start and end locations, the technical factors of the scan, the automatic voices (if applicable) and the WW / WL values for a correct image visualization must be confirmed.

Scout Num	Scan Type	Start Loc.	End Loc.	kV	mA	Scout Plane	Voice Lights Timer	Scout WW / WL
1	Scout	S60.00	I300.00	120	10	90	2	500/50
2	Scout	S60.00	I300.00	120	10	0	2	500/50

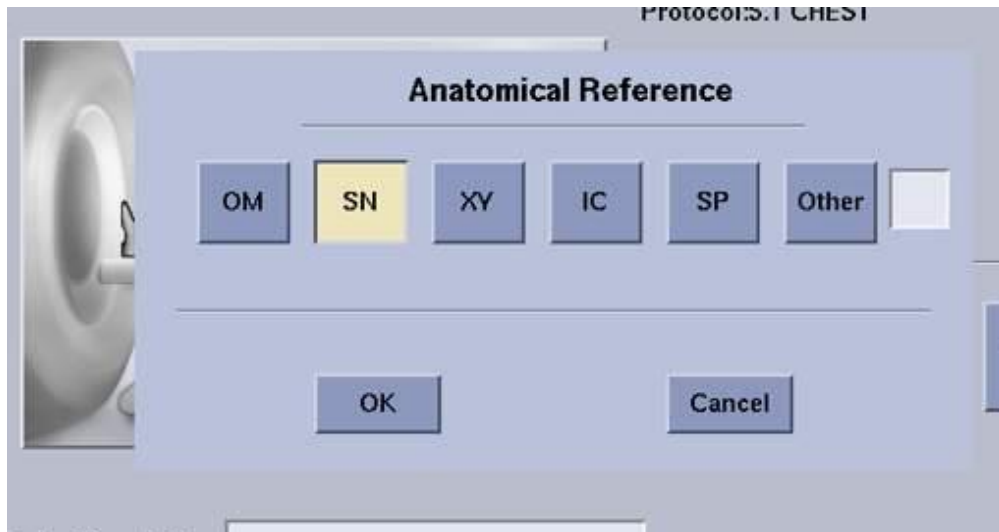
Anatomical references

In **General Electric CT equipment**, an anatomical reference is used **to position the zero** of the scan, so that the Scout ranges can be pre-defined and both variability between technicians and the need for routine adjustments are avoided.



OM: Centering of the auditory meatus for head scans

SN: centering on the sternal notch for examinations beginning in the chest



XY: centering of the xiphoid process for examinations beginning in the abdomen

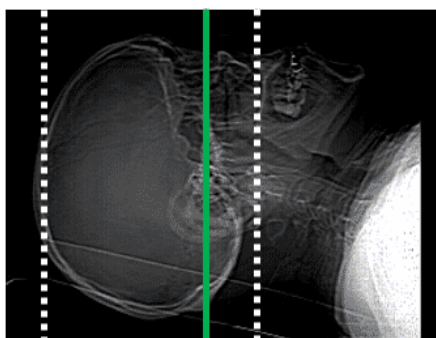
IC: centering on the iliac crest for scans centered on the pelvis, lumbar spine and/or hip

SP: centering of the pubic for pelvic, hip, etc..

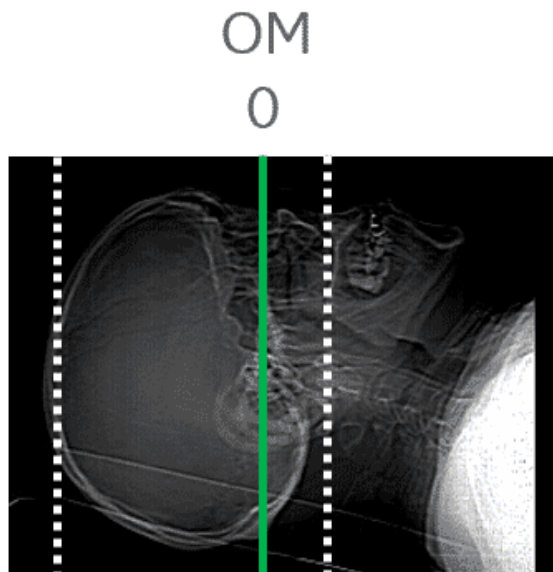


Defining the range

The Scout range always refers to the **position of the Anatomical Reference**, this being the number from the Zero centering point. The letter **S** is **superior** or Cranial (above the Zero centering point) and the letter **I** is **inferior** or caudal (below the Zero centering point). Values are always expressed in mm.



Scout Num	Scan Type	Start Loc.	End Loc.	kV	mA	Scout Plane	Voice Lights Timer	Scout WW / WL
1	Scout	S150.00	I50.00	100	10	90	H	500/50



In the example, for a **total scout of 20 cm (200 mm)**.
The scout will include from **15 cm (150 mm) above Zero** to **5 cm (50 mm) below**.

Scout Num	Scan Type	Start Loc.	End Loc.	kV	mA	Scout Plane	Voice Lights Timer	Scout WW / WL
1	Scout	S150.00	I50.00	100	10	90°	N	500/50

Adjusting the graphic prescription

After Scouting, use this procedure to adjust the graphic prescription and set up a scan series.

If the protocol is properly configured, you may not have to make changes. You can adjust the graphical prescription (blue boxes), representing the series and confirm the adjustment.

The following tools will be used and programming the graphic prescription area of the examination, they are the most usual setting but it may vary slightly depending on your scanner model:



Gemell






Procedura esami

Scanning parameters

4. Scanning

Once the graphic prescription has been programmed and reviewed, **the examination parameters and study time should be reviewed.**

Although we start from established protocols, **the examination parameters and time may require an adjustment for each clinical procedure and / or patient**, so it is important to review them after adjusting the examination range.

Add Group		Split Current Group		Delete Selected Group		Biopsy Rx More Info		Preview mA Table		Optimize not Needed		Prior		Next		  	
Images	Scan Type	Start Location	End Location	No. of Images	Thick Speed	Interval (mm)	Gantry Tilt	SFOV	kV	mA	Total Exposure Time	Prep Group (s)	ISD (s)	Breath Hold (s)	Breathe Time (s)	Voice Lights Timer	Cine Duration (s)
1-81	Helical Full 0.5 s	S0.000	I400.000	81	5.0 55.00 1.375:1	5.000	S0.0	Large Body	120	500 13.30	4.22	65.0	1.3	N	N	1 T	2.0

Scanning Parameters

Time parameters

Dose Information

Attention: Unrecognized tube - Dose not validated by GE

Images	CTDIvol mGy (NV)	DLP mGy-cm	Dose Eff. %	Phantom cm
1-81	4.50 (N)	208.91	91.90	Body 32

Est. max Z location CTDIvol: 4.50 mGy
Projected series DLP: 208.91 mGy-cm
Accumulated exam DLP: 0.00 mGy-cm

Dose Information Area

Dosimetric values are displayed during the examination prescription and provide information on the patient's dose.

The CTDIvol, DLP, and Phantom size values that are used to calculate the dose are automatically saved after the exam is complete by generating the dose report as a secondary image capture.



Before confirming the study to start scanning, the patient's dose area should be reviewed.

ALARA should always be applied during the prescription of a CT exam. (As low As Reasonably Achievable)

The dose received by the patient can never exceed the established limits by current radiation protection regulations.

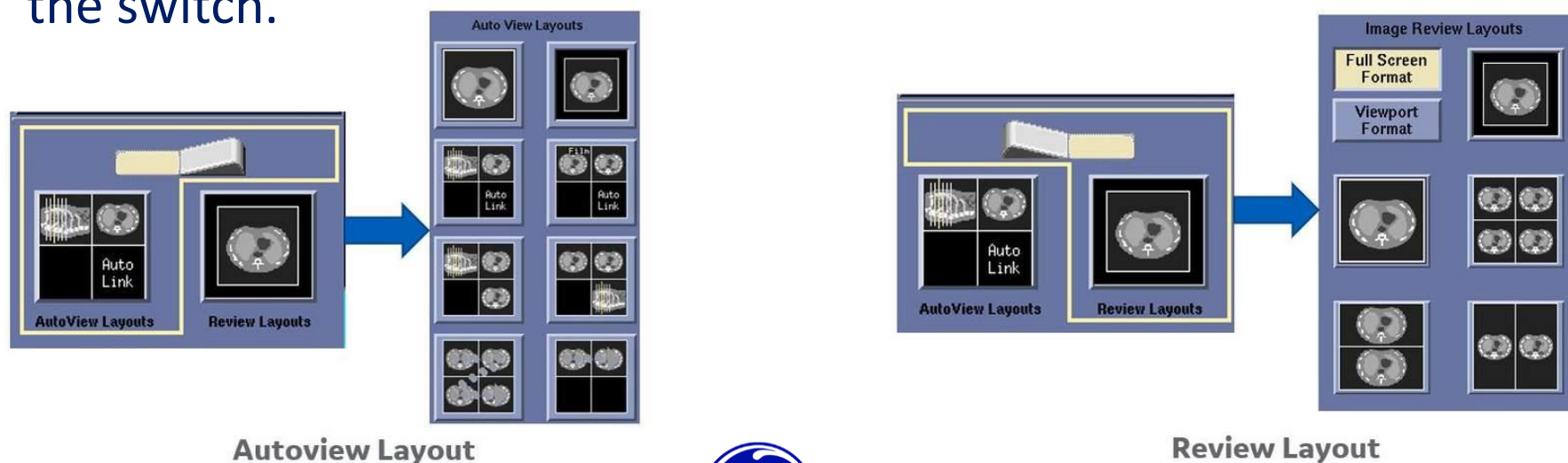


5. Viewing images

Viewing images in Exam Rx

When you perform a scan, the images from the current scan appear in the Exam Rx screen display windows after they have been reconstructed.

Two customizable display modes can be selected in Exam Rx using the switch.

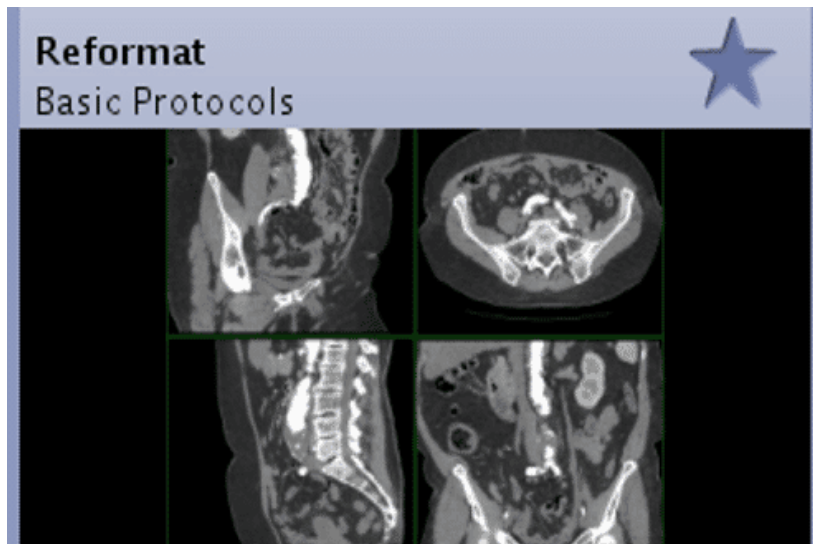


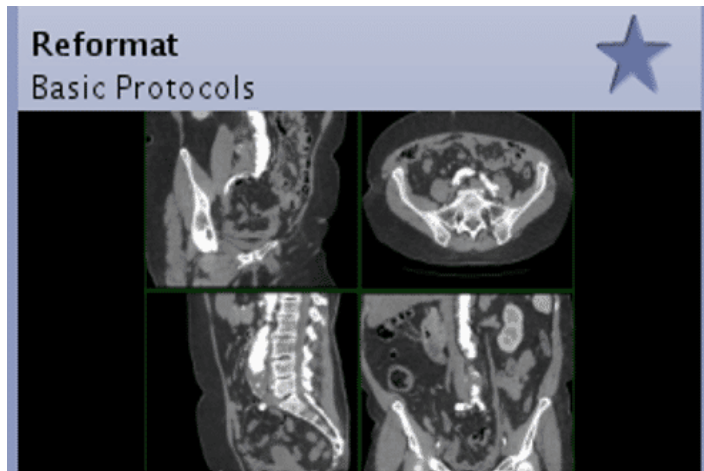
Autoview Layout

Review Layout

Viewing images in Reformat

Use the **Reformat** program on the **ImageWorks** desktop to display and manipulate Multiplanar Reformatting (MPR) datasets





Reformatting enables you to define and display cross sections of a 2D batch or 3D volume of image data that are oriented in a different position than the original acquisition images.

In this way, you can view and generate multiplanar images of the selected study and post-process the images using basic applications.





1. Viewer

The Viewer and Mini Viewer applications are located on the Image Works desktop in the upper right area. They have as their main function the basic 2D visualization of images.

The screenshot shows the GE ImageWorks software interface. The central part of the screen displays a table of exam data. A blue box highlights the 'Mini Viewer' and 'Viewer' buttons in the right-hand sidebar. The table below shows the following data:

Exam	Station name	Name	Date	Transferred
7	ct99	BIS	11 Nov 30	Yes
19	ct99	MFG QA	11 Nov 30	Yes
7	ct99	Bone/WEQ	11 Nov 30	No
172	ANONYMIZ...	ANON172	11 Nov 25	No
172	tc06bay	Volume ASIR QA	11 Nov 25	No
961	tc08bay	21CFR1020.33	10 Jan 14	No
EMPTY		AL6 VCT Cardiac ...	80 Jul 14	No

Below this table, there is another table showing series data:

Series	Type	Images	Description	Modality	Manufacturer	MPPS	Archived	Transferred
504+C	RETRO	2400		CT	GE MEDICA...			
505	SSAVE	1	Processed L...	CT	GE MEDICA...			
505	SSAVE	5	Processed L...	CT	GE MEDICA...			
506	SSAVE	1	3D Saved S...	CT	GE MEDICA...			
506+C	REFMT	3	Processed L...	CT	GE MEDICA...			
507	SSAVE	1	1.25	CT	GE MEDICA...			
508	SSAVE	1	3D Saved S...	CT	GE MEDICA...			

At the bottom of the interface, there is a table of image parameters:

Image	Img Ctr...	Thick(mm)	Tilt (°)	Img Ctr...	Img Ctr...	SFOV (c...	DFOV(c...	Alg	Matrix	MidsC...	Ph (%	Imag...
1+C	S 120.00	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
2+C	S 119.38	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
3+C	S 118.75	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
4+C	S 118.13	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
5+C	S 117.50	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
6+C	S 116.88	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
7+C	S 116.25	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2109...	00%	
8+C	S 115.63	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2110...	00%	
9+C	S 115.00	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2110...	00%	
10+C	S 114.38	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2110...	00%	
11+C	S 113.75	0.625	0.0	L 30.0	A 20.0	50.0	20.0	STND	512	2110...	00%	

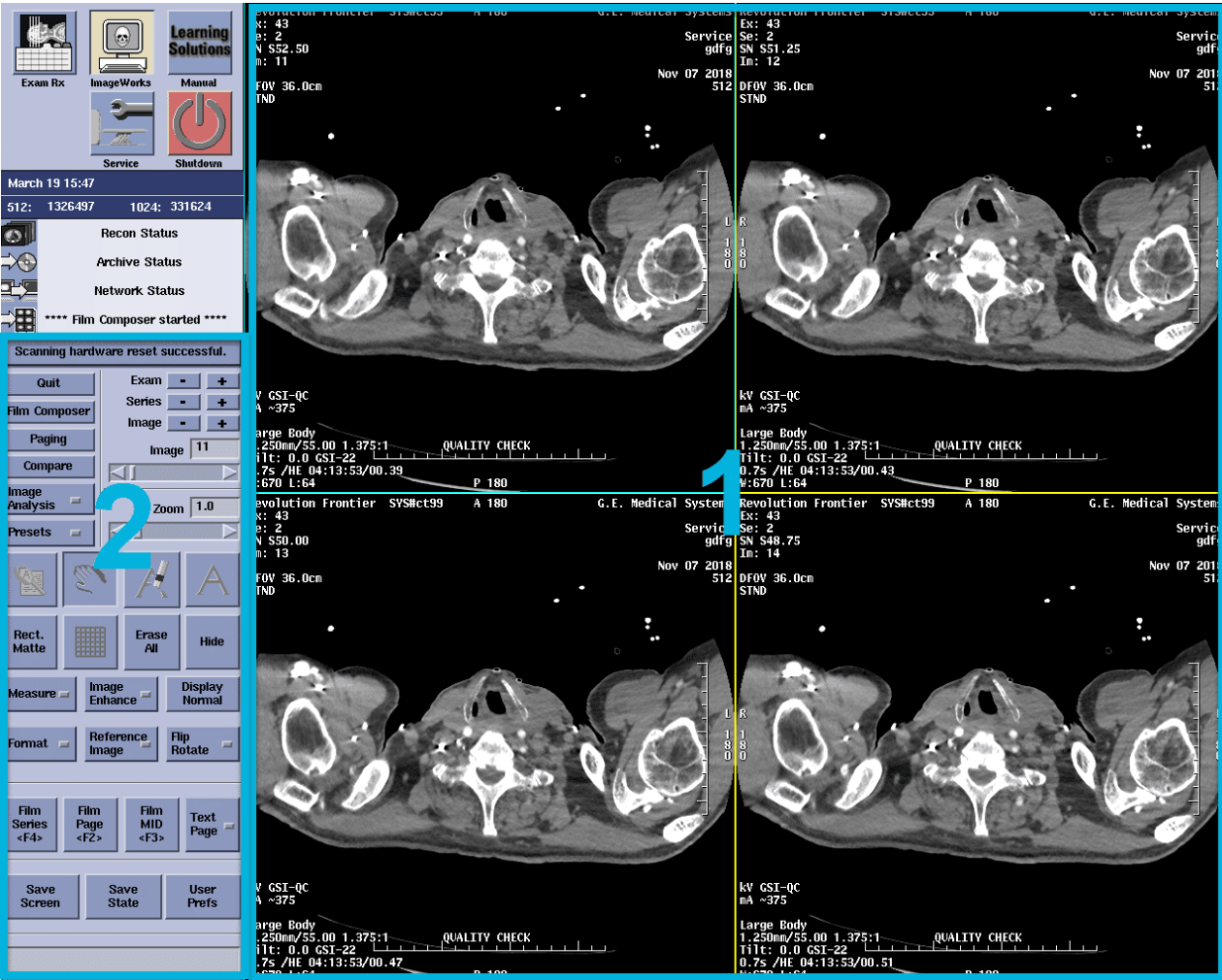
The interface also features a sidebar on the right with buttons for 'Anonymize Patient', 'Edit Patient', 'Image Header', 'Mini Viewer', 'Viewer', 'Add / Sub', 'Reformat', 'CD/DVD/USB', 'Data Export', 'Exam Split', 'Vol Viewer', 'Tools', and 'Messages'. The 'Messages' section shows a notification: 'retrieve job submitted successfully for exam EMPTY from aw43 to Local DB.'

Procedura esami

The Viewer

Upon loading the Viewer will open, displaying the selected series, there are 2 main areas:

1. The visualization Area
2. The Toolbar



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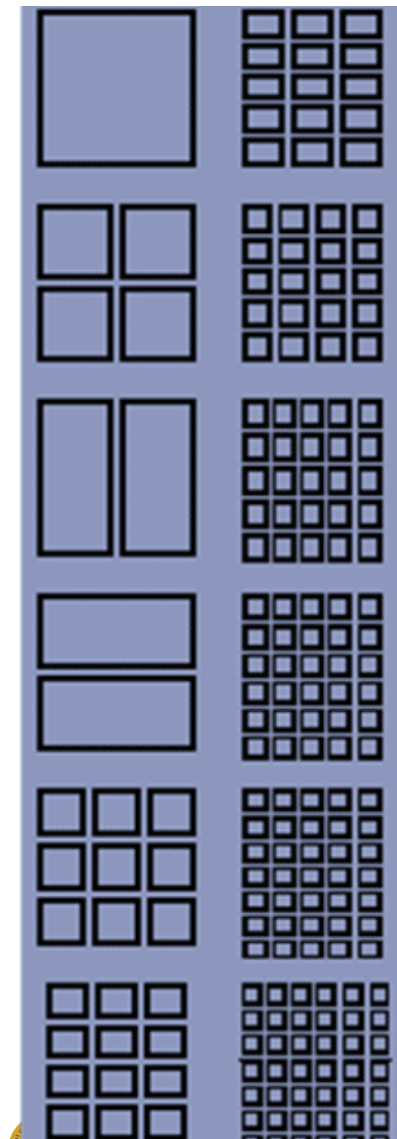
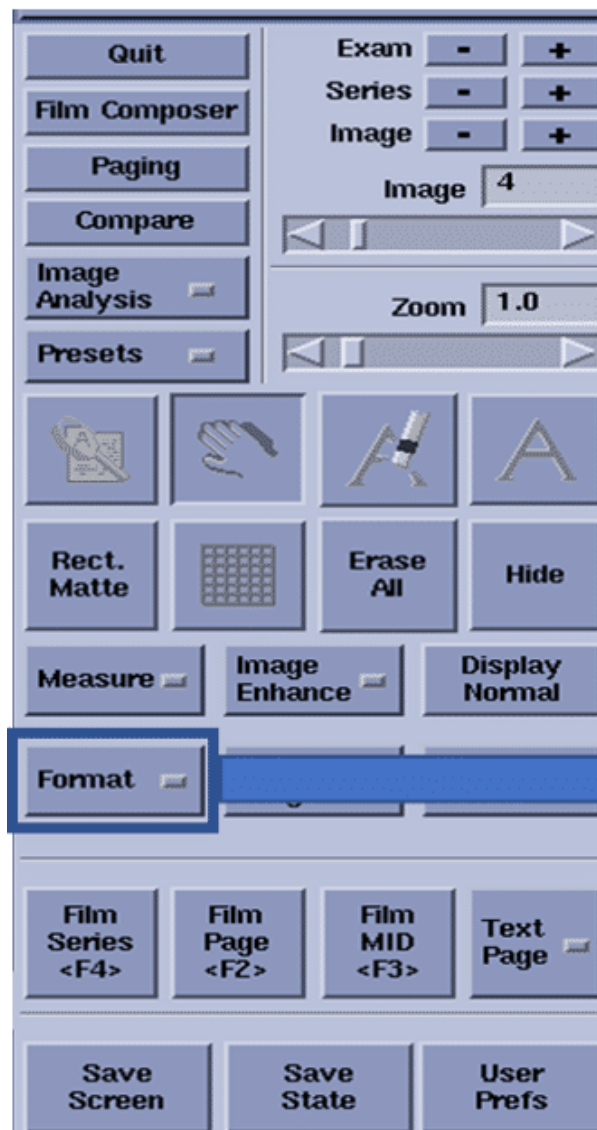


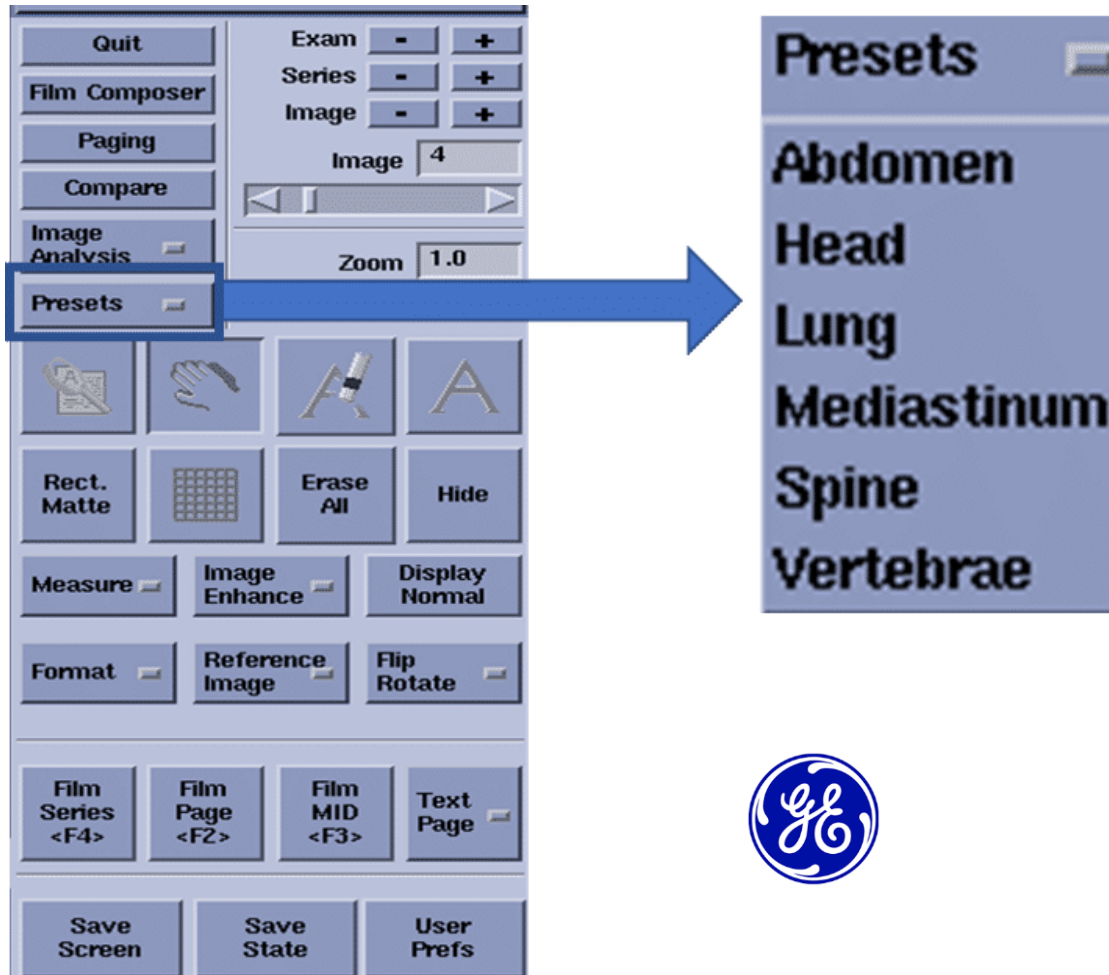
The Mini viewer

The mini viewer has the same structure as the viewer, but allows you to work while keeping the image browser available, as well. Some functions like preferences or WW/WL configurations are not present.

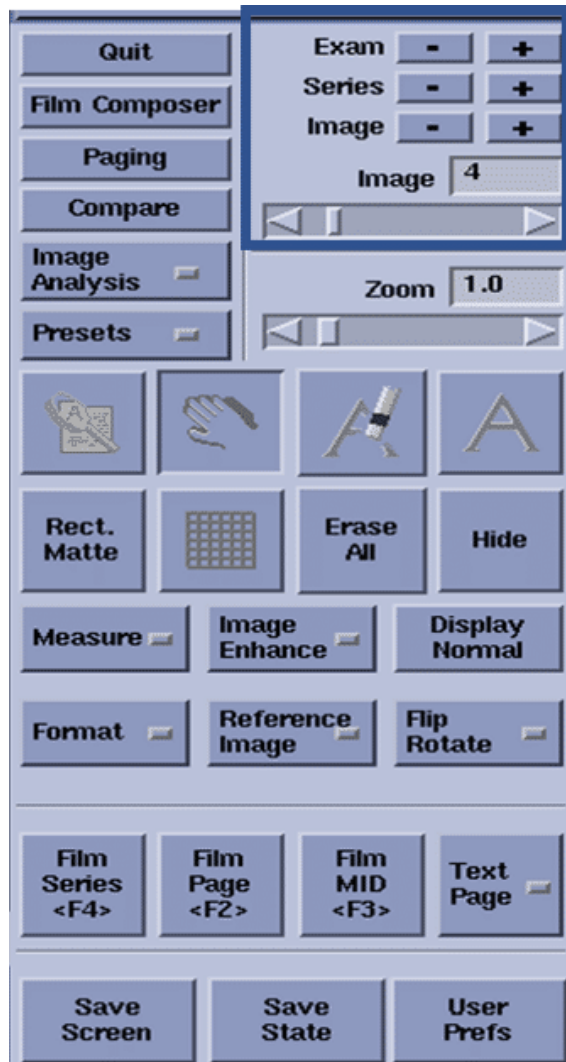


The display area can be divided into different display windows via the Format button





The values for the width and level of the window (Window Width / Window Level) can be adjusted automatically by using preloaded settings. These can be found in the **Presets** button highlighted in the image. They can also be modified through the keyboard using the F5 - F11 keys.



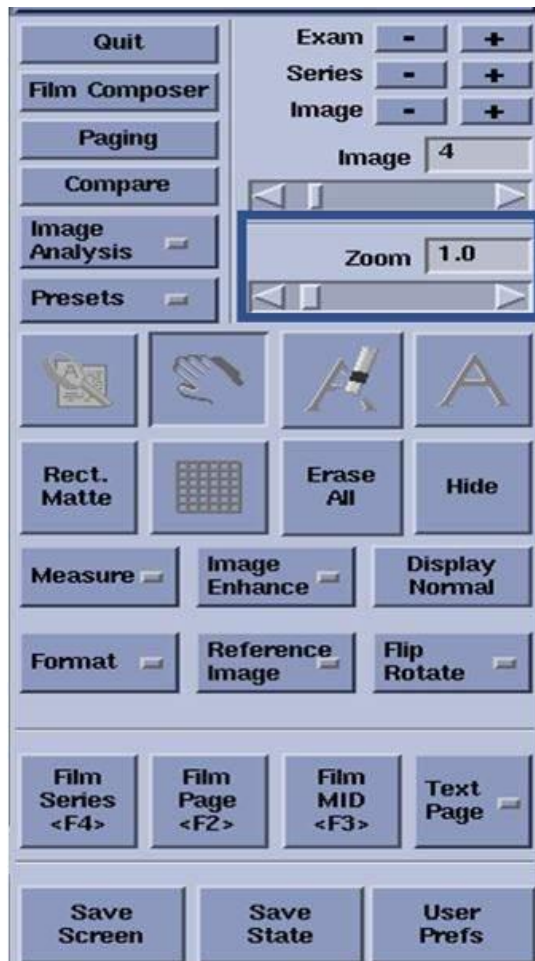
To go back and forth in the image, series or exam use the icons: **+** (Next) and **-** (Previous).

Press and hold any **arrow to scroll** through the images and / or **drag the slider**.

You can also go back and forth through images, series, or exams using the **page up and page down keys** on the keyboard.



Zoom in and out images

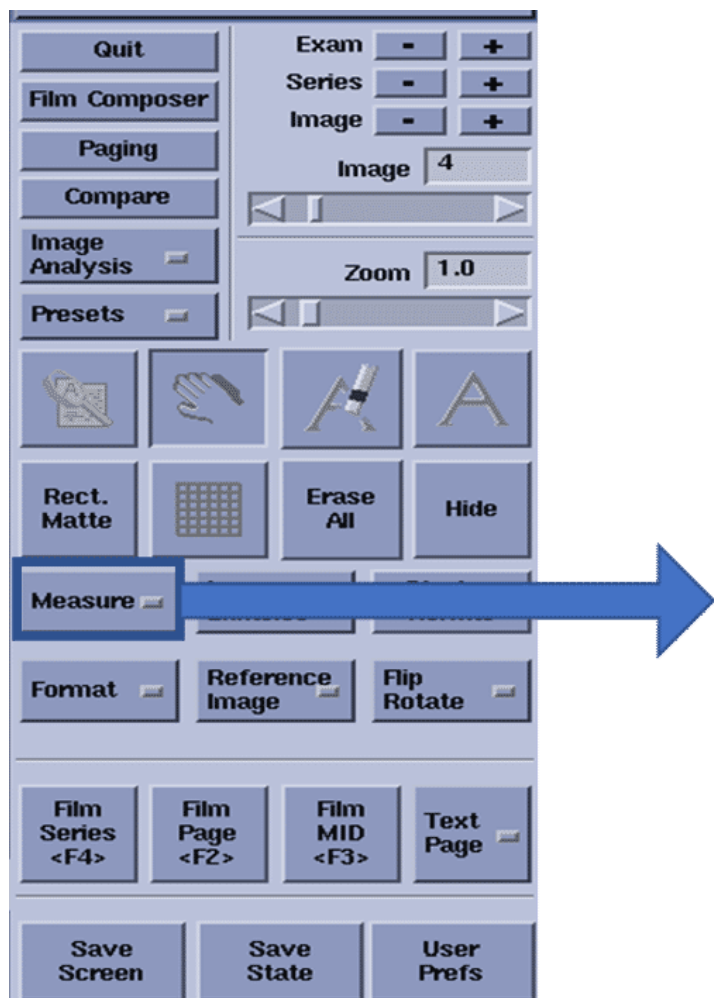


To zoom in or out on images use the zoom controls, by **typing in the desired value** or **dragging the slider bar**.

It can also be operated by **clicking on the arrows on either side of the slider**.



Obtaining basic measurements



Use this procedure to obtain information about the anatomical areas of interest.

Select the measure button, click on the desired tool and deposit the points on the image.



Batch Oblique

2. Basic reconstruction techniques

Step 1: On the right screen

- Click Image Works
- Select the series you would like to create a batch for
- Load the series into reformat



The screenshot shows the GE PACS software interface. On the left, there are navigation buttons for 'Exam Rx', 'ImageWorks', and 'Moveit'. Below these are status indicators for 'Service' and 'Shutdown'. A central panel shows system information for 'June 10 21:02', including IP addresses and status messages like 'Recon Status', 'Archive Status', 'Network Status', and '**** Film Composer started ****'. The main area displays two tables:

Exam	Station name	Name	Date	Description	Modality	MPPS	Archived	Transferred
38	ct99	Service	Nov 07 18	Chest	CT/SR			
37	ct99	Service	Nov 07 18	Chest	CT/SR			
30	ct99	Service	Nov 07 18	Chest	CT/SR			
28204963	awpc.3124...	ANON11563	Jun 29 18	SCAN - THORAX	CT			
537	bay51	21CFR1020.33	Aug 26 10		CT			

Series	Type	Images	Description	Modality	Manufacturer	MPPS	Archived	Transferred
1	SCOUT	2	SCOUTS	CT	GE MEDICA...			
2	PROSP	319	SANS IV CD	CT	GE MEDICA...			

Below the series table is a table for individual images:

Image	Img Ctr...	Thick (mm)	Tilt (°)	Img Ctr...	Img Ctr...	SFOV (c...	DFOV (c...	Alg	Matrix	Mids...	Ph (c...	Imag...
1	5 3.00	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.35		100kV
2	5 1.75	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.36		100kV
3	5 0.50	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.38		100kV
4	1 0.75	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.39		100kV
5	1 2.00	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.40		100kV
6	1 3.25	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.42		100kV
7	1 4.50	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.43		100kV
8	1 5.75	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.44		100kV
9	1 7.00	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.46		100kV
10	1 8.25	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.47		100kV
11	1 9.50	1.250	0.0	1.92	P 28.8	50.0	33.8	STND	512	0.48		100kV

At the bottom, there are 'Destinations' for 'Local DB' and 'PACS', and a row of image thumbnails.

Procedura esami

Step 1: On the right screen

- Click Image Works
- Select the series you would like to create a batch for
- Load the series into reformat
- The Batch tool is in Favorites
- Click on the view to be used as reference and select **oblique** in the batch panel.



The screenshot displays the GE ImageWorks software interface. On the left, a toolbar contains icons for 'Image Works' and 'Batch'. The 'Batch' panel is open, showing settings for 'CT Thick Axials 5mm', including 'Number of Images' (112), 'Spacing Between Images' (5.0 mm), 'Slice Thickness' (5.0 mm), and 'Mode' (Average). The main viewing area shows four reformatted CT scan views: Oblique, Axial, Sagittal, and Coronal. A white arrow points from the 'Batch' panel to the 'Oblique' view. The bottom status bar shows '0:52' and '1x'.

Procedura esami

Step 2: Set up a Batch Oblique

- Define the range of the batch by using the Red Arrows from both sides of the batch.
- Define oblique plans by using the displayed grid. Adapt the angle by using the red square (2) on the side of the batch or use the keyboard arrow



- Use the red square (3) in the middle of the grid to move the grid.

The screenshot shows the 'Batch Oblique' configuration panel on the left side of the software interface. The panel includes the following settings:

- Protocols: CT Thick Axial 5mm
- Loop: Oblique
- Number of Images: 112
- Spacing Between Images: 5.0 mm
- Slice Thickness: 5.0 mm
- Mode: Average
- FOV: 36.0 cm
- Output: Save
- Description: Processed Images
- Apply to: Current Volume
- Buttons: Preview, OK

The main window displays three CT scan views: an anterior view (top left), a sagittal view (bottom left), and a posterior view (right). A grid is overlaid on the anterior view, with a red square in the center and red arrows on the sides, indicating the controls for moving the batch range and defining oblique plans.

Procedura esami

Step 3: In the batch panel on the left of the screen, determine:

- Number of images or the Spacing between Images
- Slice Thickness
- Rendering mode (Average, MIP, MinIP)
- FOV (this field will determine the zoom level)



The screenshot displays a medical software interface. On the left is a 'Batch' panel with the following settings:

- Protocols: CT TRAC Axials 5mm
- Loop: Oblique, Rotate
- Number of Images: 52
- Spacing Between Images: 5.0 mm
- Slice Thickness: 5.0 mm
- Mode: Average
- FOV: 36.0 cm
- Output: Save
- Description: Processed Images
- Apply to: Current Volume

On the right, four CT scan views are shown:

- Top-left: Coronal view of the abdomen and pelvis.
- Top-right: Axial view of the abdomen and pelvis.
- Bottom-left: Sagittal view of the spine and pelvis.
- Bottom-right: Another coronal view of the abdomen and pelvis.

Procedura esami

Step 4: Preview & Save Batch

- Define the output action. If you would like the images saved to your database just select Save.
- Type or select a Description
- Click Preview to view the results of your plan.
- Click OK to send the Batch prescription to selected output.



The screenshot displays the GE CT console software interface. On the left, the 'Batch' configuration panel is visible, showing the following settings:

- Protocols: CT Thick Axials 5mm
- Loop: Oblique, Rotate
- Number of Images: 44
- Spacing Between Images: 5.0 mm
- Slice Thickness: 5.0 mm
- Mode: Average
- FOV: 41.0 cm
- Output: Save
- Description: coronal
- Apply to: Current Volume
- Buttons: Preview, OK

On the right, four CT scan preview windows are shown, displaying axial, sagittal, and coronal views of a patient's abdomen and pelvis. The interface includes various toolbars and navigation controls.

Step 1: Create a 3D image

- Click Image Works
- Select the series you would like to create a 3D view for
- Load the series into Reformat
- Click on the view type active annotation
- Select VR



The screenshot displays the GE ImageWorks software interface. On the left, a sidebar contains navigation buttons for 'Exam files', 'ImageWorks', and 'Manual'. Below these are 'Service' and 'Shutdown' buttons. The main panel shows patient information (SI2: 1326413, 1024: 331603) and a 'Volume Viewer' section with various tool icons. A 'Review Steps' section lists 'Reformat' options: 3D MIP, Volume Rendering, Curved reformat, Multi Oblique, MPVR 3 mm Average, and Segment Structures. The 'Tools' section includes 'MPR / 3D' with a 'Select the viewport and then modify the rendering mode' instruction, radio buttons for 'MPR' and '3D', a 'Thickness (mm)' slider set to 0.66, and an 'Apply to all' checkbox. At the bottom, there are 'Modes' buttons for 'MIP', 'Curved', 'Volume Rendering', and 'MPR', along with 'Window Width & Level' and 'Presets: Custom' options. The main display area is divided into four quadrants showing different CT scan views: a 3D VR view (top-left), an Axial view (top-right), a Sagittal view (bottom-left), and a Coronal view (bottom-right). A context menu is open over the 3D view, listing options: 3D, VR, Axial, Sagittal, Coronal, Oblique, Oblique / 3D, Curved, Profile, Histogram, X-Section, Navigation, and Lumen. The GE logo is visible in the bottom-left corner of the software interface.

Procedura esami

Step 2: batch tool

- Open the Batch tool.
- The Batch tool is in Favorites, if it has been declared to, or you can find it in the **Film/Save** tab.
- Click on the 3D VR view to be used as reference and select **Rotate** in the batch panel.



The screenshot displays the GE ImageWorks software interface. On the left, the 'Batch' tool configuration panel is visible, showing the following settings:

- Protocols: Oblique
- Loop: Oblique
- Rotate: (selected)
- Number of Images: 12
- Spacing Between Images: 5.0 mm
- Slice Thickness: 0.66 mm
- FOV: 33.8 cm
- Output: Save
- Description: Processed Images
- Apply to: Current Volume

The main window shows four CT scan views:

- 3D View (Top Left):** A 3D reconstruction of the pelvis and spine. Technical details include: DFOV 41.3 cm, STHD/AR50, No Image Filter, 5.0 mm Spacing, and 1.2mm 1.37511/2.50var.sp.
- Axial View (Top Right):** An axial CT scan of the pelvis. Technical details include: R 140, HRCN11543, 1: 198.7, In: 162, Ex: Jun 29 2018, 1.26 KV 100, 1.2mm 1.37511/2.50var.sp, U = 753 L = 212, P 198.
- Sagittal View (Bottom Left):** A sagittal CT scan of the spine. Technical details include: Lz 9.5, HRCN11543, Ex: Jun 29 2018, DFOV 41.3 cm, STHD/AR50, No Image Filter, 0.66 KV 100, 1.2mm 1.37511/2.50var.sp, U = 753 L = 212, T 200.
- Coronal View (Bottom Right):** A coronal CT scan of the pelvis. Technical details include: Coronal, HRCN11543, Ex: Jun 29 2018, Pz 29.1, DFOV 41.3 cm, STHD/AR50, No Image Filter, 0.66 KV 100, 1.2mm 1.37511/2.50var.sp, U = 753 L = 212, T 200.

Procedura esami

Step 3: Define the Batch Rotate

- Click the appropriate arrow to indicate the direction of the rotation



The screenshot displays the GE ImageWorks software interface. On the left, the 'Batch' panel is configured for a 'Rotate' operation with the following settings:

- Protocols: Oblique
- Loop: Oblique, Rotate
- Number of Images: 12
- Angle Between Images: 30.0 °
- Slice Thickness: 3.0 mm
- FOV: 41.34 cm
- Output: Save
- Description: Processed Images
- Apply to: Current Volume

The main view shows a 3D reconstruction of a lumbar vertebra (L3) with a red 'X' indicating the rotation point. Four arrows (up, down, left, right) are visible around the 3D model to indicate the direction of rotation. To the right, three CT slices are shown: an axial slice at the top, a sagittal slice at the bottom left, and a coronal slice at the bottom right. Each slice includes technical parameters such as DFOV, STND/ARSO, and KV.

Procedura esami

Step 4: In the batch panel on the left of the screen, determine:

- Number of images or the Angle between Images
- Define FOV value (this field will determine the zoom level)



The screenshot displays a medical software interface with a central 3D model of a human spine and pelvis. To the left is a 'Batch' panel with the following settings:

- Protocols: Oblique
- Loop: Oblique
- Number of Images: 12
- Angle Between Images: 30.0
- Slice Thickness: 5.0 mm
- FOV: 41.3 cm
- Output: Save
- Description: Processed Images
- Apply to: Current Volume

On the right, three CT scan views are shown: Axial (top right), Coronal (bottom right), and Sagittal (bottom left). Each view includes technical parameters like DFOV, STND/RRSO, and image filters.

Procedura esami

Step 5: Preview & Save Batch

- Define the output action. If you would like the images saved to your database just select Save.
- Type or select a Description
- Click **Preview** to view the results of your plan.
- Click **OK** to send the Batch prescription to the selected output.

