

Helios DRF
*Full Digital
R&F
Tilting Table*



PRODUCT DATA Sheet V.2.1

SUMMARY

PRODUCT DATA

INSIDE: FULL DIGITAL R&F ACQUISITION SYSTEM

TOMORIX - TOMOSYNTHESIS

ASSING S.p.A.

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Cap. Soc. € 2.500.000 \ P. Iva IT01603091008 \ C.F. 06725640582

PRODUCT DATA

GENERAL	
Manufacturer	Assing SpA
Kind of equipment and class According to IEC60601-1	Class II with applied parts of B type
Protection degree according to IEC 60529	Continuous working
Covers	ABS PUR Metallic
Colors	Standard: - White RAL9001 - Green NCS S 0575G40Y
ELECTRICAL	
Standard power supply	3N - 380-400 Vac
Frequency	50-60 Hz
Net isolation	Transformer 2 kVA
Protection	8A with thermo magnetic switch
Line impedance	< 1.0 Ω 380-400 Vac \pm 10%
Loaded voltage fall	< 2%
MECHANICAL CHARACTERISTICS	
Table height in vertical position	2580 mm
Vertical mount height	1960 mm
Width	2545 mm
Maximum height with table in horizontal position and focus to film at 180 cm	2370 mm
Minimum and maximum height from ground with table in horizontal position	450 mm - 1450 mm
Tilting range (continuous movement)	$\pm 90^\circ$
X-ray tube rotation range, motorized and with stop each 90°	$\pm 180^\circ$
X-ray focus minimum distance from ground with table at $+90^\circ$	≤ 61 cm
Footrest minimum distance from ground with table at $+90^\circ$	10 cm
Depth (distance between mounting base and tabletop edge)	2040 mm
Access from forth side (back)	300 mm
Column displacement	2240 mm

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DRF holder displacement		2250 mm
Rx covering area		430 x 2090 mm
Focus to Film distance, continuously adjustable. Also, with preset position according to chosen exam. Chest exams can be performed directly on the table without an external stand		105-200 cm
Tube angulations for oblique projections		± 40°
Tabletop to flat panel detector distance		70 mm
X-ray tube maximum height with table at +90°		2000 mm
Magnification and reduction factor	<ul style="list-style-type: none"> - magnification factor at 105 cm = x1,06 - magnification factor at 180 cm = x1,03 - area reduction factor at 105 cm = x0,93 - area reduction factor at 180 cm = x0,96 	
DIMENSIONS AND WEIGHTS		
ITEM	Dimensions (mm)	Weight (Kg)
Vertical Mounting	1960x900x650	580
Tube Column	760x340x1170	115
Electric cabinet	800x800x1760	173
Translator group	2460x310x30	235
Tabletop	2500x720x50	57
Detector holder	900x640x280	30
Lateral arms	1110x120x70	40
Console	1080x600x610	70
Covers		70
Standard set of accessories		45
Total NET Wight		1415
Weight distribution plate	152x1520x15	262
PATIENT TABLETOP		
Standard Tabletop in Laminated	Overall dimension 249,5 x 80 cm. Width 27 mm X-ray useful area: 232x50,5 cm Material: carbon fiber covered with laminated Filtration: 0,7 mm al @100 kV Max patient weight: 270 kg without limitation	
Lateral Movement	30 cm (±15 cm)	
Height Movement	45-110 cm	
Longitudinal excursion	Tube column longitudinal run: 188 cm Flat panel (center) run: 168,5 cm The movement of both column and flat panel allows for patient	

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	total scanning: 210 cm at adjustable speed up to 15 cm/sec, controlled through joystick.
ACCESSORIES	
Standard	<ul style="list-style-type: none"> • Removable footrest with surface 400x600 mm • Shoulder rest • Pair of ergonomic handlers • Pedal (in control room) for RAD/Fluoro
Included	<ul style="list-style-type: none"> • Stand for foot examination
	<ul style="list-style-type: none"> • TLK Movement - it consists of tabletop lifting and freeing the exposure area from itself, allowing exams on an x-ray stretching or contact exams.

DYNAMIC CHARACTERISTICS	
Tabletop rise time from lower to max height (horizontal position)	15 sec
Tabletop combined rotation from 0° to +90°	25 sec
Tabletop combined rotation from 0° to -90°	26 sec
Tabletop combined rotation from -90° to +90°	37 sec
Tabletop lateral displacement	From 1cm/sec to 2,5 cm/sec
Lined translation (tube+receptor) along the horizontal axis	12 sec
Rotation only from 0° to +90°	16 sec

TOMOGRAPHY	
Type	Planigraph with homothetic linear movement and electronic fulcrum calculation
Stratum max height	400 mm (physical limit 450 mm)
Increase / decrease	Manual, 1 mm step Automatic (auto step function) with step mm program and selectable according to starting tomo angle
Speed	10° - 21° / sec. Adjustable
Tilting angles	Preset: 8° - 15° - 20° - 30° - 40° According to customer preference within max 80° with respect to the chosen anatomical area and FFD
Tomo timings	Up to 5 speeds can be chosen that represent a percentage of the max speed: 3525 cm/sec (21° /sec) For each tilting angles the speed can be decreased in 5 steps of approx. 10% per step. A tomography at 40° and FFD 105cm at the maximum speed will take approx. 2,2 sec.
Direction	Bi-directional in each position of table and FPD/column group
Sequence tomography	Sequence program with outward and inward emission up to the limits set by the operator or to the reaching of preset limit; stratum, area, etc.
Receptor movement range	Tomography is achieved at different receptor position according to the angle, to the FFD and the selected stratum.

ABDOMINAL COMPRESSOR	
Positions	On field Compression Out of field, laterally positioned
Commands	On the touch screen, through the joystick and on table control boards
Compression power	Can be set from 5 kg to 20 kg with 1 kg step
Min. distance compressor cone from tabletop	80 mm
Max. distance compressor cone from tabletop	520 mm
Compressor displacement	440 mm
Protections	Programmable Compressor limit control Automatically deductible compressor
Movements and parking	Motorized
Other characteristics	Remote controlled with automatic parking. It can be separately installed.

	Display of the dynamic pressure and of the set pressure.
STITCHING	
EXAMS OF THE COLUMN AND LOWER ARTS	
Image sizes	43 x 70 (2 images) 43 x 100 (3 images) 43 x 130 (4 images)
Direction	Head to foot
Interface	Integrated with HF Generator, collimator and digital images acquisition system

COLLIMATOR	
Shutters	Multilayer, 4 pairs of shutters in 2 layers
Functioning	Manually or remote control (both motor-driven)
Collimator	Rectangular field Min. 00 x 00 cm Max. 48 x 48 cm at 1m SID
Attenuation equivalent EN-IEC 60601-1-3:2008	1.2 mm Aluminium at 75kV
Additional filtering	2 additional motor driven filters, manually selectable or by CAN-bus. Selectable filter combinations: <ul style="list-style-type: none"> • No added filtration • Filter 1 =1 mm Al + 0.1 mm Cu • Filter 2 =1 mm Al + 0.2 mm Cu • Combined: 2 mm Al + 0.3 mm Cu
Display	Touch screen. Display/input of field size, SID, filters, beam tilting angle etc.
Light source	Power LED, white with adjustable illuminance.
Light field illuminance (1m from focus, 35x35cm) EN-IEC 60601-2-54:2009	>230 lx with illuminance set to 100%
Leakage radiation (at 1m, 150kVp, 4mA) EN60601-1-3:2008	≤0.5 mGy/hr
REMOTE CONSOLE	
Description	21" Control console Medical Grade Panel PC Touch Screen with all commands. N. 4 joysticks duplicating the most frequent commands: tube angulation movements; FFD; tabletop tilting and elevation

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	movements; longitudinal and transversal displacement.
Touch screen characteristics	Dimensions: 21" Resolution: 1600 x 1200 pixel Brightness: 350 cd/m2 Number of colors: 32 bits View angle: 170° H - 170° V Aspect ratio: 4:3
Available connections	<ul style="list-style-type: none"> • Dedicated LAN connected to control CPU • Standard LAN for networking • N. 4 RS 232 ports
Safety features	All movements are protected by end-of-run switches.
ADDITIONAL CONTROLS	
N.2 additional membrane keyboards are located on the image receptor front and a X-ray tube front duplicating ALL table controls.	

HIGH FREQUENCY GENERATOR			
Generator Type	50 Kw	65 Kw	80 Kw
Frequency	HF 400 KHz		
Input Phase / Voltage	3 Φ 400-480 VAC		
Anode speed	High Speed Starter		
Line voltage Range	±10%		
Compatible X-Ray tubes	>300 tube models		
Tube operation	1 tube standard (2 tubes optional)		
Anatomical programs (standard membrane console)	1024		
Image receptors	Up to 6		
Techniques Selection	kV / AEC, kV / mAs or kV / mA / ms		
Communication ports	USB, CAN, Ethernet, RS485, RS232, RS422		
Auxiliary Room Power and collimator power	Standard		
GenWare® Service Software	PC based and technical support software		
RADIOGRAPHY			
kVp range/Steps	40-150 kV in 1 kV increments		
kVp accuracy	± (2% + 1 kV) for 90-110 kV, ± (5% + 1 kV) for 40 - 150 kV		

High Voltage Ripple	<1 kV @ 110 kV		
Rise time	< 0.75 ms (0.5 typical)		
mA range	10-630 mA	10-800 mA	10-1000 mA
Exposure Time Range	1 ms - 6300 ms in 1 ms increments		
mAs Range (non-AEC)	0.1 - 1000 mAs		
CONTINUOUS FLUOROSCOPY			
kVp range/Steps	40-125 kV in 1 kV steps		
High Voltage Ripple	<1 kV @ 110 kV		
mA Range / Steps	0.5 - 20 mA in 0.1 mA steps		
PULSED FLUOROSCOPY			
kVp range/Steps	40-125 kV in 1 kV steps		
mA Range / Steps	5-20 mA in 0.1 mA steps; 21-99 in Ma STEPS		
Pulse rates	30, 15, 7.5, 3, 1 @ 50Hz		
Pulse width	1-40 ms in 1 ms steps, up to 50% duty cycle		
OPTIONS			
AEC board	Standard	Standard	Standard
DAP interface	Available	Available	Included
Dual speed starter	Available	Available	Included

X-Ray Tube

- Proven x-ray tube that ensures trouble free operation year over year
- Designed to handle volume of patients

Brand	I.A.E (Italy)			
	RTM101HS	RTC600HS	RTC700HS	RTC100HS
Tube Model	RTM101HS	RTC600HS	RTC700HS	RTC100HS
Anode heat capacity	400 KHU (300kJ)	600 KHU (450kJ)	800 KHU (600 KJ)	1120 KHU (840 kJ)
Standard focus	0.6x1.2mm	0.6x1.2mm	0.6x1.2mm	0.6x1.2mm
Power	26-63 low speed 40-100 high speed	24-63 low speed 43-100 high speed	40-100 high sped	40-100 kW high speed
Voltage	150 kV	150 kV	150 kV	150 kV
Anode Angle	12,5°	13°	12,5°	13°
Anode Diameter	102 mm	102mm	102 mm	110 mm
Maximum anode dissipation	1000 W (80.000 HU/min)	1000 W (80.000 HU/min)	1000 W (80.000 HU/min)	2000 W (160.000 HU/min)
Max continuous heat dissipation		1500 W	1500 W	1200 W

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		(125.000 HU/min)	(125.000 HU/min)	(96.000 HU/min)
Anode speed	3000 rpm 10000 rpm (depending on generator board)	3000 rpm 10000 rpm (depending on generator board)	3000 rpm 10000 rpm (depending on generator board)	10000 rpm
Inherent filtration	0.7 mm Al eq.	0.7 mm Al eq.	0.7 mm Al eq.	0.7 mm Al eq.
Housing	C52Super	C52Super	C52Super	C52Super
High voltage	150 kV	150 kV	150 kV	150 kV
Heat storage capacity	1280 kJ 1700 KHU	1280 kJ 1700 KHU	1280 kJ 1700 KHU	1280 kJ 1700 KHU
Cooling rate	230 W (18400 HU/min)	230 W (18400 HU/min)	230 W (18400 HU/min)	230 W (18400 HU/min)

INSIDE: FULLY DIGITAL R&F ACQUISITION SYSTEM

INSIDE is a full field direct to digital imaging system with flat panel detector combined with Varex PaxScan 4343 DXV

INSIDE makes for fast examination and therefore high patient workflow, as well as offering cost savings and excellent image quality at lower doses.

It covers a huge range of examinations in General Radiology studies like:

Musculoskeletal
Swallowing
Chest
Genitourinary
Gastrointestinal
Interventional

Tomography
Lymphography
Myelography
ERCP procedures
Long leg % spine stitching;
(Angiography)





MONITOR SPECIFICATIONS

Screen Technology/Type	Color TFT LCD Panel (IPS)
Backlight	LED
Screen Size (diagonal)	61 cm / 24.1 Inches (611 mm diagonal)
Native Resolution	1920x1200 (16:10 aspect ratio)
Viewable Image Size (H x V)	518.4 x 324.0 mm
Pixel Pitch	0.270 x 0.270 mm
Viewing Angle (H, V)	178° / 178°
Brightness	350 cd/m ²
Contrast Ratio	1000:1
Response Time	12 ms (On/Off)
Video Input Connectors	DVI-D x 1, D-Sub mini 15 pin x 1
Certifications	CE (Medical Device Directive), EN60601-1, UL60601-1, CSA C22.2 No. 601-1, IEC60601-1, VCCI-B, FCC-B, Canadian ICES-003-B, C-tick, RoHS, China RoHS, WEEE, CCC, GOST-R

DETECTOR SPECIFICATIONS

MODEL	PAXSCAN 4343DXV
Technology	CsI - amorphous silicon
Detector Area	43 cm x 43 cm
Pixel size	3072x3072 effective 3032x3032
Matrix size	139 µm
Limiting resolution	3.6 lp/mm @4 fps (1x1)
Image quality (RQA5)	Typical
MTF@ 0 lp/mm	100%
MTF @ 1 lp/mm	54%
MTF @ 2 lp/mm	26%
MTF @ 3 lp/mm	12%
DQE @ 0 pl/mm	78%
Quantum limited dose (2x2)	6 nGy (3x3)
Energy range	40-150 kV
Fill factor	60%

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Lag	3% (first frame)
Scan method	Progressive
A/D Conversion	16-bit
Cooling	Passive

✚ RADIOGRAPHY

Area	Resolution	Frequency	Intended use
43x43 cm	3072x3072x16bits	1-3 fps	For large format diagnostic images, at very high resolution, static images or with low dynamics needed like Gastrointestinal
43x43 cm	1536x1536x16 bit	1 ~ 15 fps	For diagnostics and angiographic interventional procedures

✚ CONTINUOUS FLUOROSCOPY

Area	Resolution	Frequency	Purpose
43x43 cm	1024x1024x16bits	Up to 18 fps	For patient positioning in large format studies
43x43 cm	3032x3032x16bits	1-3 fps	For large format diagnostic images, at very high resolution, static images or with low dynamics needed like Gastrointestinal
30x30 cm	1024x1024x16bits	Up to 18 fps	For patient positioning in limited area studies
20x20 cm	684x684x16 bits	Up to 30 fps	For studies of quick events where low dose is needed
15x15 cm	1024x1024x16bit	Up to 18 fps	For patient positioning in very limited area studies

✚ PULSED FLUOROSCOPY

Area	Resolution	Frequency	Purpose
43x43 cm	1024x1024x16bits	Up to 15 fps	For patient positioning in large format studies, low dose and lack of of dragging, like in many pediatric procedures
30x30 cm	1024x1024x16bits	Up to 15 fps	For dynamic procedures on limited area and lowest radiation applied

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20x20 cm	684x684x16 bits	Up to 15 fps	For studies of elevated dynamics and cinematic clearness.
15x15 cm	1024x1024x16bit	Up to 15 fps	For patient positioning in very limited area studies

CONTROL CONSOLE

- ✚ Multi-tasking environment capable to manage simultaneously
 - System control
 - Acquisition, images reconstruction and processing
 - Images Display
 - Images Storage and Print
- ✚ Reduced image display time in radiography (After each single shot in less than 1 second the image is available with all exposure data (kV, mAs) on the monitor)

PC Cabinet

- ✚ Integrated control system: examination table, collimator, generator, ion chamber, grid, DAM, PID, PU4343. PID PC Architecture (minimum configuration, expandable upon request): Windows 7 Pro OS, Intel i7 / RAM 8GB/ HD SSD 512 Gb (>60.000 images) expandable up to 4TB (>240.000 images), Medical Monitor 24 inches
- ✚ PU4343 flat panel control PC Architecture: Windows 7 64 bit,
- ✚ Mouse and keyboard
- ✚ UPS 1000 VA - 600 W

Instant ready Image

- ✚ > 10.000 APR programs. More than 30 preset parameters for each anatomical study.
- ✚ Anatomical presentation of the images for the best intuitive use;
- ✚ Choice of the lowest X dose for each selected study;
- ✚ Reduce examination time;
- ✚ Better comfort for the patient and the operator.

Virtual Scan, ultimate dose saving solution

- ✚ The Virtual Scan allows radiography image centering starting from the last fluoroscopy image (LIH).
- ✚ When the operator enables the “Virtual Scan” control on the console, using the joysticks he will surf on the image searching the right point to centre for radiography; the machine movessimultaneously and gets positioned on that area.
- ✚ The Virtual Scan grants a certain dose saving as the operator will not make additional fluoroscopy investigations and finds the right place to explore using the last fluoroscopy image (LIH).

A.T.H. - Anatomical Tissue Harmonization

An advanced image processing in DR modality, an image quality enhancement as never before.



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- A greater flexibility by adapting the processing to the anatomical region
- ✚ A good detail visibility in under and over penetrated areas
- ✚ Increasing of latitude without loss of detail contrast
- ✚ A.T.H. reduces the need to window and level the images presented on a workstation display in PACS system
- ✚ Images with inherent large latitudes as chest, skull and lateral spine strong enhanced without noise amplification and edge artifacts
- ✚ A great benefit thanks to a better diagnostics accuracy and radiologist productivity

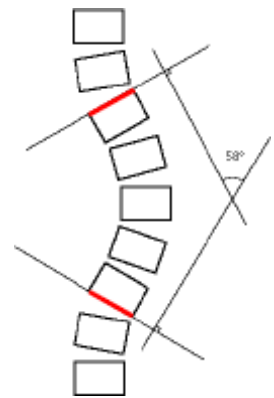
Images processing

- ✚ Sharp spatial filtering, kernel 3X3 to 11x11;
- ✚ Automatic or manual Windowing: contrast, brightness; grey level inversion;
- ✚ Automatic or manual magnification of the image: zoom on detector and on the image;
- ✚ Multi image display, with “imasette” for a quick exam check;
- ✚ Automatic or manual electronic collimators;
- ✚ Measurement SW: distances, angles, stenosis.
- ✚ Image display: H/V inversion, 90° rotation, true size image editing;
- ✚ Text editing with large fixed strings selection.

<p>Images processing</p>	<p>Image display: Magnification from 1:1 up to 3:1, inversion H/V, 90° rotation, windowing (CW and CCW adjustment), gamma correction greyscale inversion, spatial filters (sharp/smooth), kernel, harmonization.</p> <p>Image review: FW/RW, search images, cine-loop, mosaic mode (4,9,16, 1+5, 1+7).</p> <p>Image delete: images from mosaic view or entire study.</p> <p>Image collimation: free collimation with automatic centering.</p> <p>Patient data input, exam and texting</p> <p>Contrast and brightness, noise reduction, edge enhancement, LUT inversion, grey scale optimization, zoom and roam, electronic collimation.</p>
<p>Graphic tools</p>	<p>Text - Adding text to the image.</p> <p>Angle - Measuring the angles in the image.</p> <p>Calibration - Getting an estimate of the actual size of the “objects” shown in the image</p> <p>Catheter - Using a catheter in the image of known diameter for calibration purposes</p> <p>Grid - Adding a grid to the image</p> <p>Ruler - Measuring the image</p> <p>Solid rectangle - Covering parts of the image to hide them</p>

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	<p>Statistics - This function is normally used by the Technical Service when checking the system</p> <p>Frame - Drawing a frame around the body part of interest</p> <p>Arrow - Drawing an arrow on the image</p>
<p>Software Measure (optional)</p>	<p>These optional graphic functions are available for all images, but especially useful for images of the spine and legs obtained using the stitching functions</p> <p>Level difference - Measuring the difference in level between two parts of the image.</p> <p>Cobb angle - Measuring the curve of the vertebrae using the Cobb method.</p> <p>Double Cobb angle - If the patient has scoliosis with an “S” shaped spine, this function lets you calculate the two angles of curvature of the vertebrae.</p> <p>To do this, you need to define 3 segments, as shown in the figure here:</p> <ul style="list-style-type: none"> - 2 segments on the top and bottom “end vertebrae” (at the top and bottom of the curve), - 1 segment in the centre, corresponding to the vertebra where the direction of the curve changes. <p>Right-angle lines - Measuring the distance between points of interest and a vertical drawn line.</p> <p>Leg measurements - Measuring the length and angles of legs with respect to certain important points in the same.</p>
<p>DSA Software pack</p>	<p>PROCESSING</p> <ul style="list-style-type: none"> - Peak opacification - Road mapping - Image subtraction - Auto Masking <p>POST PROCESSING</p> <ul style="list-style-type: none"> - Mask Shifting - Image subtraction - Pixel shift - Vascular tracing - Landmarking - QA Analysis



NETWORKING - IT INTEGRATION, RIS/PACS INTERFACE

- ✚ DICOM SEND SCU: possibility to send single frames, selected frames, non-selected frames or complete study. Spooler system to manage queues. It is possible to automatically store the images sent to print;
- ✚ DICOM STORAGE SCU: sending images to a DICOM server for storage;
- ✚ DICOM VERIFY SCU: checking on the links, from both directions, with the existing DICOM modules;
- ✚ DICOM WORKLIST SCU: Checking and receiving from a DICOM server the patient list to exam on the acquisition system;
- ✚ DICOM PRINT SCU: sending to Dicom printer the images (panoramic view or through film composer);
- ✚ DICOM CDR/DVD SCU (Media Interchange) Burning images on DVD or CD with a Dicom viewer;
- ✚ DICOM MPPS SCU: Modality Performed Procedure Step: informing the server about exam being in process or completed.
- ✚ DICOM STORAGE COMMITMENT SCU: checking on the server that images be properly saved, in order to cancel images from local archive
- ✚ DICOM QUERY/RETRIEVE SCU: checking and receiving from a server the images of a given patient.
- ✚ (optional) DICOM DOSE STRUCTURED REPORT: sending to a server the dose report of a study.

IMAGES STITCHING

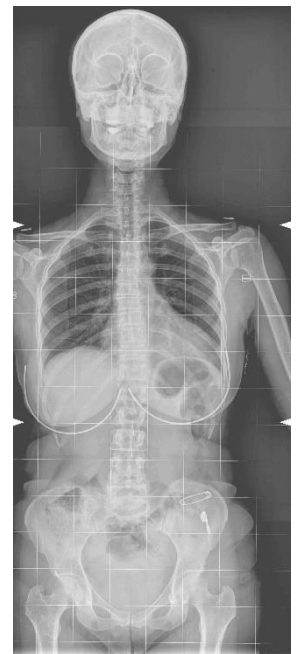
Integrated procedures for leg & spine images stitching.

The stitching function, (usually used for spine and legs scan) is needed for the automatic reconstruction of an X-ray image starting from a series of images acquired at fixed frequency during the scanning of the patient.

The image is reconstructed, keeping all original pixels, and can be viewed on the monitor, processed, printed or sent to the network.

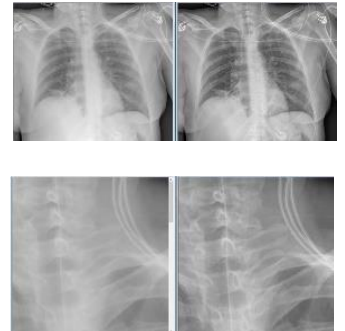
As for standard acquisition, stitching is done giving the x-ray command from the generator control panel - the system automatically generates the required exposures (2,3,4) each time irradiating a different part of the patient.

After the exposure, the system automatically processes the acquired images and then recomposes them creating a single image shown on the monitor after approx. 30seconds.



SOFTWARE GRID

This Software removes the signal coming from diffuse radiation on images taken without anti-diffusion grid. Starting from the exposure parameters, the software calculates and deletes the amount of diffuse signal, recovering the contrast and clearness of the image at the same level of an image take with grid. The use of the Software Grid gives two great advantages:



- 1) Without the grid, there is zero risk to create artifacts and remake the exam for this reason
- 2) Without the grid, that absorbs huge amount of incident radiation, there is a massive patient dose reduction

IHE - INTEGRATION PROFILES

INSIDE supports all IHE Integration profile for radiology as below specified:

IHE Profiles	IHE Actors	IHE Transactions
SWF	Acquisition Modality	Broad Worklist Query Patient Based Worklist Query Modality Group Case
	Image Display	None
Patient Information	Patient Information	Patient Information
Reconciliation (PIR)	Reconciliation (PIR)	Reconciliation (PIR)
REM	Acquisition Modality	None

TOMORIX - TOMOSYNTHESIS

The tomosynthesis is a digital technique that allows the reconstruction of volumetric images starting from a finite number of bidimensional projections taken at different tube angulations. This is given by the separation of the acquisition process from the visualization one. Among the advantages with respect to CT scan technique, it is well accepted by those patients affected by severe claustrophobia. Tomosynthesis features several applications like:

- Weight bearing views
- Knee pain
- Spontaneous osteonecrosis
- Bone on bone

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TOMOSNTHEIS SPECIFICATIONS

Frame rate	4/6/8 fps
Single exposure duration	4msec
Number of exposures per exam	Up to 60
Projection angle	40°
Scanning speeds	7.5 sec
Stratum selection	Can be set by the operator from 0 to 400 mm

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