



PLANMECA
ProMax 3D Max



Profound understanding of anatomy



The unique Planmeca ProMax 3D product family offers equipment for all maxillofacial imaging. All the volume sizes from smallest special cases to whole head images are available. Planmeca ProMax 3D Max, the dedicated CBVT X-ray unit, is designed to obtain complete information on patient anatomy in the minutest detail. With a maximum field of view (FOV) of $\text{Ø}22 \times 22 \text{ cm}$, it offers entirely new possibilities in diagnostics. Advanced imaging software tools maximise the benefits.



Detailed diagnostics with 3D imaging

In modern dentistry, the demand for surgical treatments is steadily growing. The growth trend has created a need for a more advanced X-ray imaging device. Planmeca ProMax 3D Max, is expressly designed to comply with the needs of modern surgical dentistry. It supplies clear, dependable imaging in a three-dimensional format with limited patient radiation dose.

Thanks to its small footprint, Planmeca ProMax 3D Max makes effective three-dimensional imaging possible in every dental office. This innovative, versatile, and dynamic imaging device will open up new possibilities for dentists on-site in their offices.

Planmeca ProMax 3D Max uses Cone Beam Volumetric Tomography (CBVT) technology, in which the X-ray beam used is shaped in the form of a cone or a pyramid. The CBVT technology takes the whole volume needed in a single semicircle scan, as opposed to a medical CT that takes multiple axial slices in multiple full circle scans.

During the scan, each image is made using a short X-ray pulse instead of continuous radiation. The total scanning time is 18 seconds for one single volume, but the actual exposure time is less than 3 seconds at shortest. This technique reduces patient radiation dose considerably and forms stroboscopic X-ray effect which

virtually eliminates artefacts contributing to outstanding image quality.

The Planmeca ProMax platform's unique SCARA technology (Selectively Compliant Articulated Robot Arm) enables free formation of the imaging geometry. Planmeca's patented, computer-controlled SCARA robotic arm can produce any movement pattern required, ensuring perfectly accurate and reliable image volume positioning. All controls are made on a full colour graphical user interface in the language of your choice.

The direct deposit semiconductor flat panel with CsI scintillator produces accurate, distortion-free images

for 3D reconstruction. Unlike image intensifier sensors that use old vacuum tube technology and multi-step focusing, flat panels use single step image readouts with no geometric distortion, no loss of sensitivity, and therefore no need for frequent calibration.

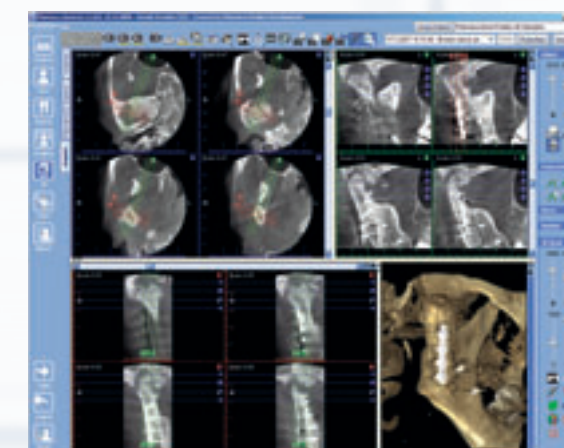
Planmeca's proprietary 3D reconstruction algorithm converts the original 2D transillumination images to 3D volume study and is the core component for high quality 3D imaging. The reconstructed cylindrical image volume consists of hundreds of millions of voxels. These voxels are isotropic, which enables accurate 1:1 measurements and ensures geometric relations throughout the image. The extremely small voxel size ($100^3 / 200^3 / 400^3 \mu\text{m}^3$)

provides a detailed high-resolution 7 lp/mm (theoretical maximum) image. Improved Artefact Removal (IAR) and High Contrast Object Compensation (HCOC) eliminate effectively the artefacts caused by implants, metal fillings or braces.

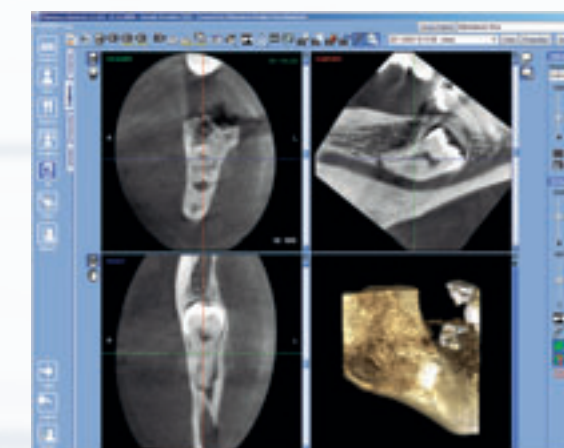
Planmeca ProMax 3D Max is equipped with an automatic vertically driven patient positioning system, which takes stitching of several basic volumes into a new level. The patient positioning system keeps the patient stationary while the unit drives from imaging position to another. Thanks to this, the imaging is more straightforward and accurate than previously.



Sinus case
Cysts and inflammation can be found in both sinuses.



TMJ case
The condyle is crashed and the ramus is fixed with a brace.



Wisdom tooth case
It is easy to see that the extraction would be difficult. The tooth is lying just on the mandibular canal.

Planmeca ProMax 3D Max complies with a multitude of diagnostic requirements: those of endodontics, periodontics, orthodontics, implantology, dental and maxillofacial surgery, and TMJ analysis.

Planmeca ProMax 3D Max offers the widest selection of volume sizes, including everything from full maxillofacial image size (Ø22 x 22 cm) to the smallest size (Ø5 x 5.5 cm) intended for single tooth imaging.

Planmeca ProMax 3D Max produces high-resolution volumetric studies of the mandible and maxilla for analysing the bone structure available, the location of the mandibular nerve canal, and the correct position

for the implant. Pre-surgical planning will reach a new level of precision, as the prospective site is visible in all three imaging planes: sagittal, axial, and coronal.

Third molars, maxillary cuspids, supernumerary teeth, and all kinds of impactions challenge the clinician to identify the tooth's orientation. With Planmeca ProMax 3D Max all angles and orientations of the teeth become clearly visible.

Planmeca ProMax 3D Max studies provide full visualisation of all classes of orthodontic malocclusion. This is highly advantageous in orthodontic planning, as time is saved and patient radiation dose reduced.

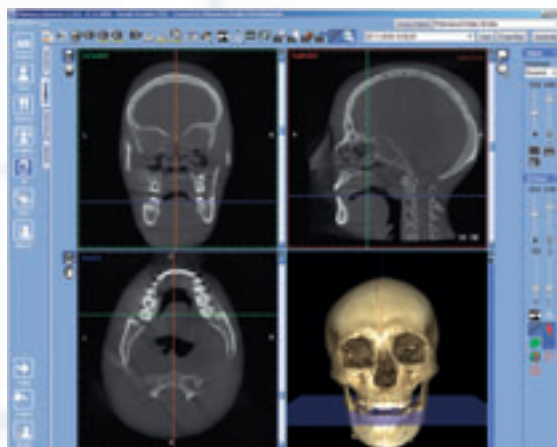
The image data from Planmeca ProMax 3D Max is delivered in the correct anatomic 1:1 ratio, without need for correcting geometric magnification.

Planmeca ProMax 3D Max also provides high-resolution TMJ studies for true and accurate evaluations of the joint arthritides, condylar morphology, and the condyle-fossa relationship.

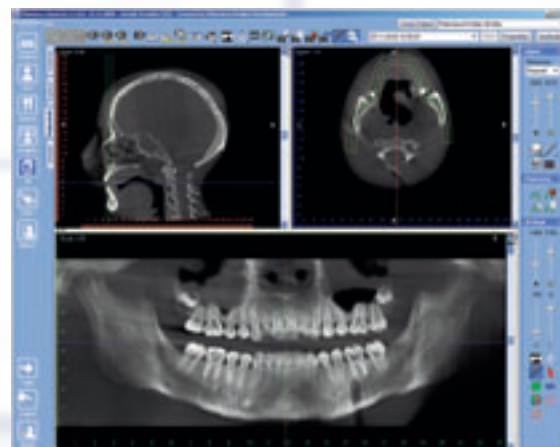
With its high resolution (5 lp/mm) and advanced reconstruction technology, Planmeca ProMax 3D Max establishes the new standard for 3D dental radiology.



Planmeca Romexis Cross Sections and Implant modules



Planmeca Romexis Explorer view from a maximum size of image.



Planmeca Romexis panoramic view

Planmeca Romexis 3D Explorer, the 3D image acquisition software for Planmeca ProMax 3D Max, enables flexible viewing in all three relevant projections: axial, coronal, and sagittal. The software incorporates a re-slicing feature, which enhances the projections and enables real-time three-dimensional viewing in the desired angle. A rendered 3D view provides a realistic overview of the anatomy.

With the Planmeca Romexis 3D Explorer software, each patient study can be stored on a CD with Planmeca Romexis 3D Viewer for others to view.

The Planmeca Romexis 3D Cross Sections module, which is available as an option, produces cross-sectional images of anatomy along with the defined panoramic curve.

The number of the cross-sections and their exact positions can be freely chosen. The 3D Cross Sections module also includes the reconstructed panoramic view. The panoramic image is created from the acquired volume of data without the undesired artefacts, common in normal panoramic images. As the image is reconstructed using software, the user can determine the location and thickness of the focal trough.

The optional Planmeca Romexis 3D Implant Planning module offers tools for implant placing and nerve drawing. The implant placements are determined with the help of realistic implant models available from selected implant product lines. A drawing tool allows clear marking of the mandibular nerve.

Planmeca Romexis software has optional DICOM functionality, which allows 3D studies to be transferred to other implant planning software or any other software that receives images in DICOM format. Studies can also be transferred to PACS or to a high quality DICOM printer in the network. The image data can also be used for ordering Planmeca ProModel, a patient specific physical model that serves as a beneficial tool for preoperative planning of advanced implant, oral and maxillofacial surgeries.

Planmeca Romexis is a pure Java based software that runs in various operating systems and modern web environments.



Planmeca Romexis software

Planmeca Romexis is a complete dental imaging software, including all dental imaging modalities: intraoral, panoramic, cephalometric, 3D imaging, dental tomography as well as intraoral video and still camera imaging. With a complete set of tools for image viewing, enhancement, measurements, and annotations, Planmeca Romexis also improves the diagnostic value of radiographs. Printing, image import and export, and DICOM functionalities are also included.

Planmeca Romexis platform fully integrates digital imaging with the patient's other clinical data. The system provides direct image capture from Planmeca's X-ray equipment, and interfaces with 3rd party devices via TWAIN. Together with Planmeca's X-ray equipment, Planmeca Romexis provides a unique safety feature especially useful for teaching environment: the X-ray image capture is inhibited until the supervisor has approved the student's image capture request.

Planmeca Romexis computer recommendations

	Planmeca Romexis client work station	Planmeca Romexis server
Processor	2 GHz Core Duo or equivalent	3 GHz Core Duo or equivalent
RAM	3 GB	3 GB
Hard disk space	40 GB	2 x 500 GB (RAID1 mirroring)
Graphics card	ATI or NVIDIA, 128 MB minimum memory	Not required
Monitor	1280 x 1024	1024 x 768
Peripherals	CD R/W or DVD R/W drive	CD R/W or DVD R/W drive
Backup medium	None necessary	DAT or equivalent
Operating system	Windows XP, Windows 2003, Windows Vista, Mac OS X, Linux Mac OS X / Linux support subject to contract	Windows XP Pro, Windows 2003 Server, Windows Vista
Other	Java platform (Java Virtual Machine 1.6 or later)	Java platform (Java Virtual Machine 1.6 or later)

The disk space requirements are dominated by digital images. Thus the space requirements vary, but a rough estimate is in the order of 1 MB per 2D X-ray image, 7–9 MB per extraoral image, depending on a variety of image specific factors, and 250 MB per 3D image.

It is recommended to use the same computer for application server and for database server. If Planmeca Romexis server computer is also used for client activities, the hardware should meet both client and server specifications.

Values presented above are recommended minimum specifications, not meeting them may in some cases cause degraded performance.

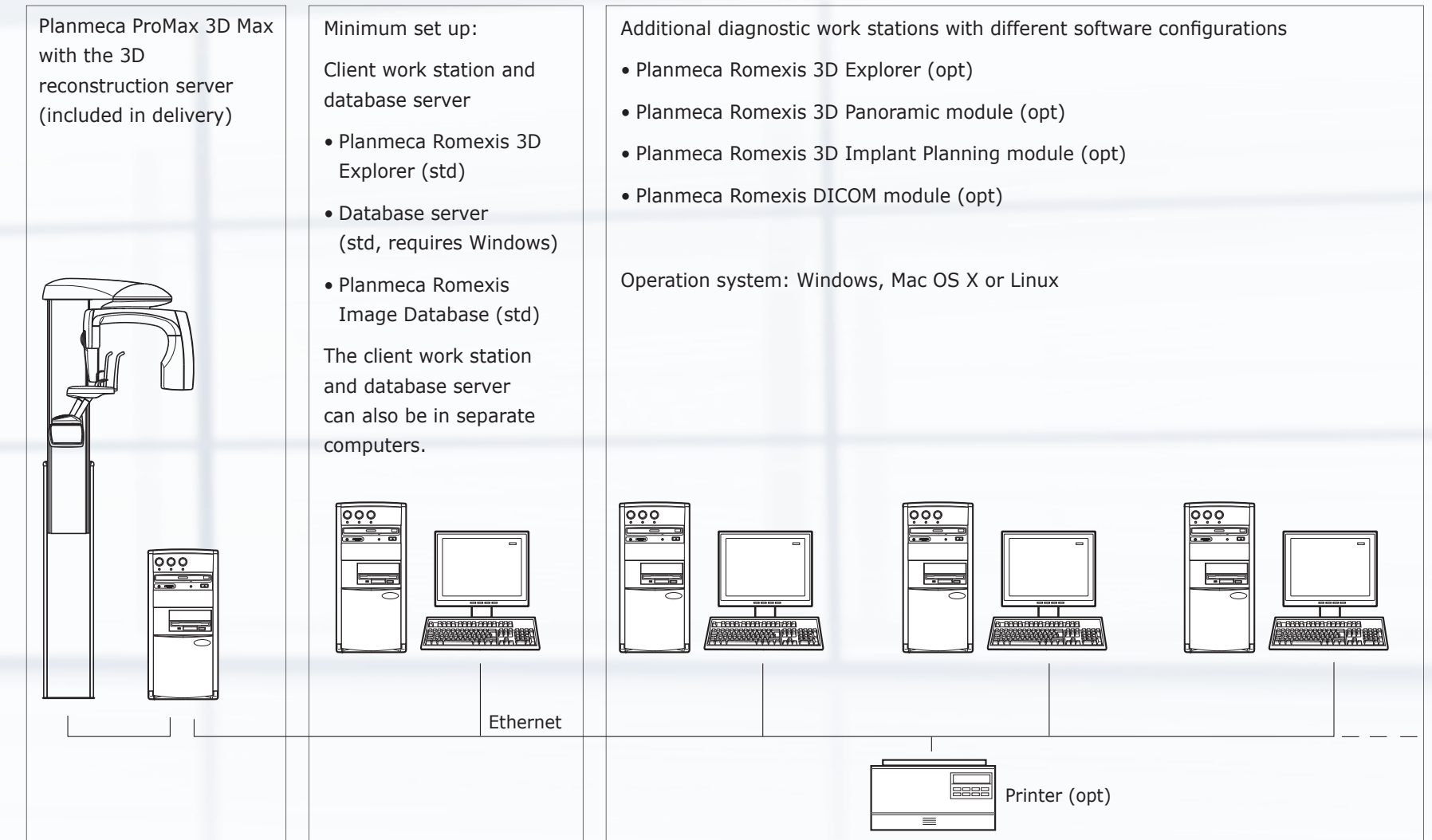
DICOM compatibility

- Media Storage – saving images into removable DICOM media
- Print – printing images on film or paper with a DICOM medical printer
- Storage – saving images into DICOM image archive
- Query/ Retrieve – importing digital images from DICOM image archive
- Worklist – importing a patient list from DICOM patient management
- Storage Commitment – confirmation of a successful image storage

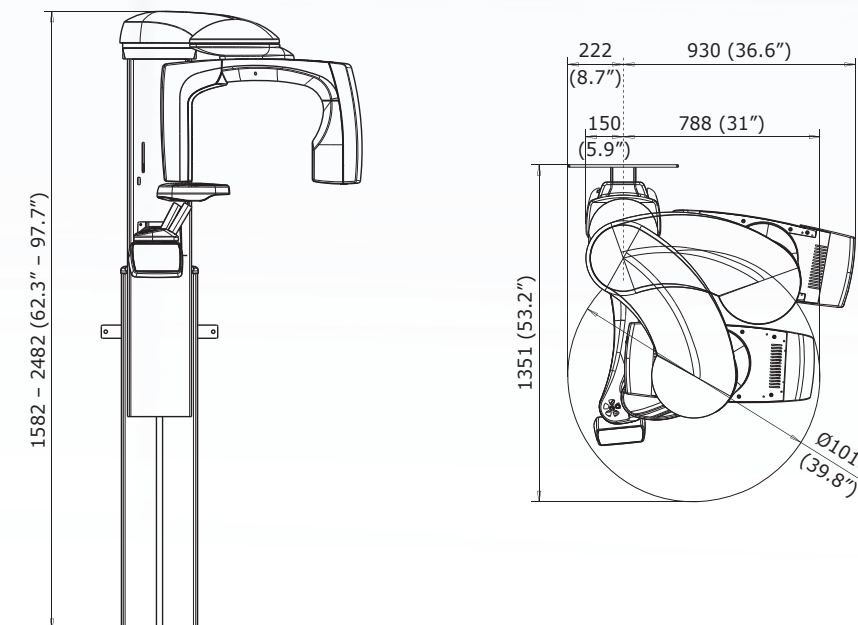
Planmeca ProMax 3D Max

X-ray beam	Cone
Focal spot	0.5 mm, fixed anode
Image detector	Amorphous silicon flat panel with CsI scintillator
Gray scale	15 bit
Detector resolution	1516 x 1900 pixels, pixel size 127 µm x 127 µm
Voxel size	100 x 100 x 100 µm, isotropic 200 x 200 x 200 µm, isotropic 400 x 400 x 400 µm, isotropic
Image acquisition	200 / 450 degree rotation
Total scan time	18–30 s, pulsed X-ray
Reconstruction time	30–150 s
Standard volumes (diam. x height)	Ø220 x 170 mm (child mode Ø187 x 145 mm) Ø100 x 130 mm (child mode Ø85 x 110mm) Ø100 x 90 mm (child mode Ø85 x 75 mm) Ø50 x 55 mm (child mode Ø40 x 50 mm)
Stitched volume (diam. x height)	Ø220 x 220 mm (child mode Ø187 x 187 mm)
3D reconstruction server	Proprietary Feldkamp type back projection reconstruction algorithm Improved Artifact Removal (IAR) High Contrast Object Compensation (HCOC)

Example installation



Dimensions and space requirements



		Planmeca ProMax 3D Max
Physical space requirements	Width	116 cm (46 in.)
	Depth	136 cm (54 in.)
	Height*	159–249 cm (63–98 in.)
Minimum operational space requirements	Width	156 cm (62 in.)
	Depth	174 cm (69 in.)
	Height*	249 cm (98 in.)
	Weight	134 kg (lbs 296)

*The maximum height of the unit can be adjusted for offices with limited ceiling space.



Planmeca Oy designs and manufactures a full line of high technology dental equipment, including dental care units, panoramic and intraoral X-ray units, and digital imaging products. Planmeca Oy, the parent company of the Finnish Planmeca Group, is strongly committed to R&D, and is the largest privately held company in the field.



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