DENTAL IMAGING SYSTEMS & SOFTWARE

I-Max Touch

CE 0459

User's Manual

Version 4 December 2008 (Rev. 1)

6. GENERAL INSTRUCTIONS FOR USE

6.1 Control panel - description and functions

The I-Max Touch keyboard is divided into function areas, plus a display to view the operative messages and error signals.
The next figure shows a general view of the control interface, while details on each functional area are provided in the following pages.

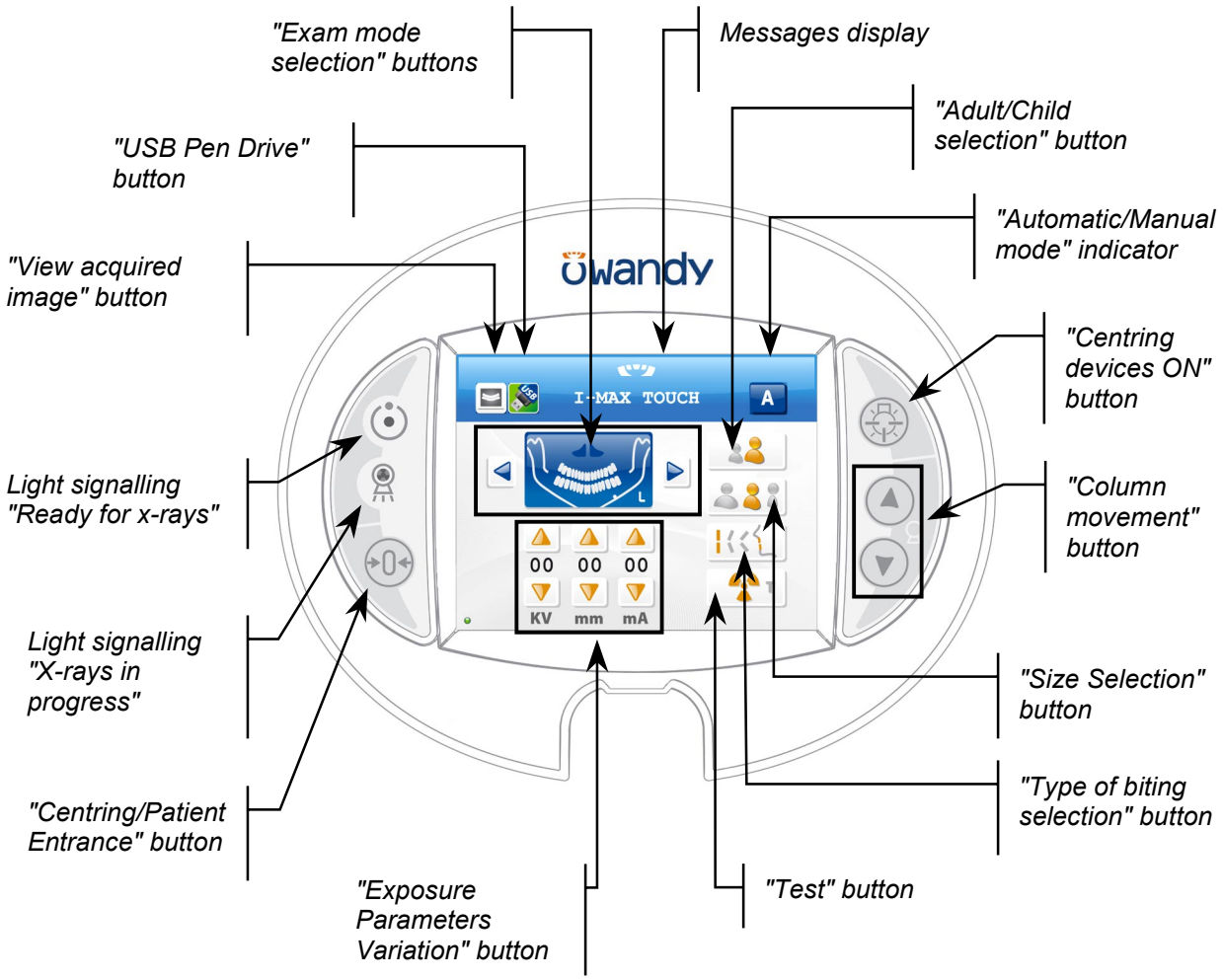


Figure 5

WARNING:
The USB port on the keyboard MUST NOT be used with an external Hard Disk with own mains connection. It has to be used only with USB Pen Drives.

The next figure shows a general view of the display of the acquired image, details on each functional area are provided in the following pages.

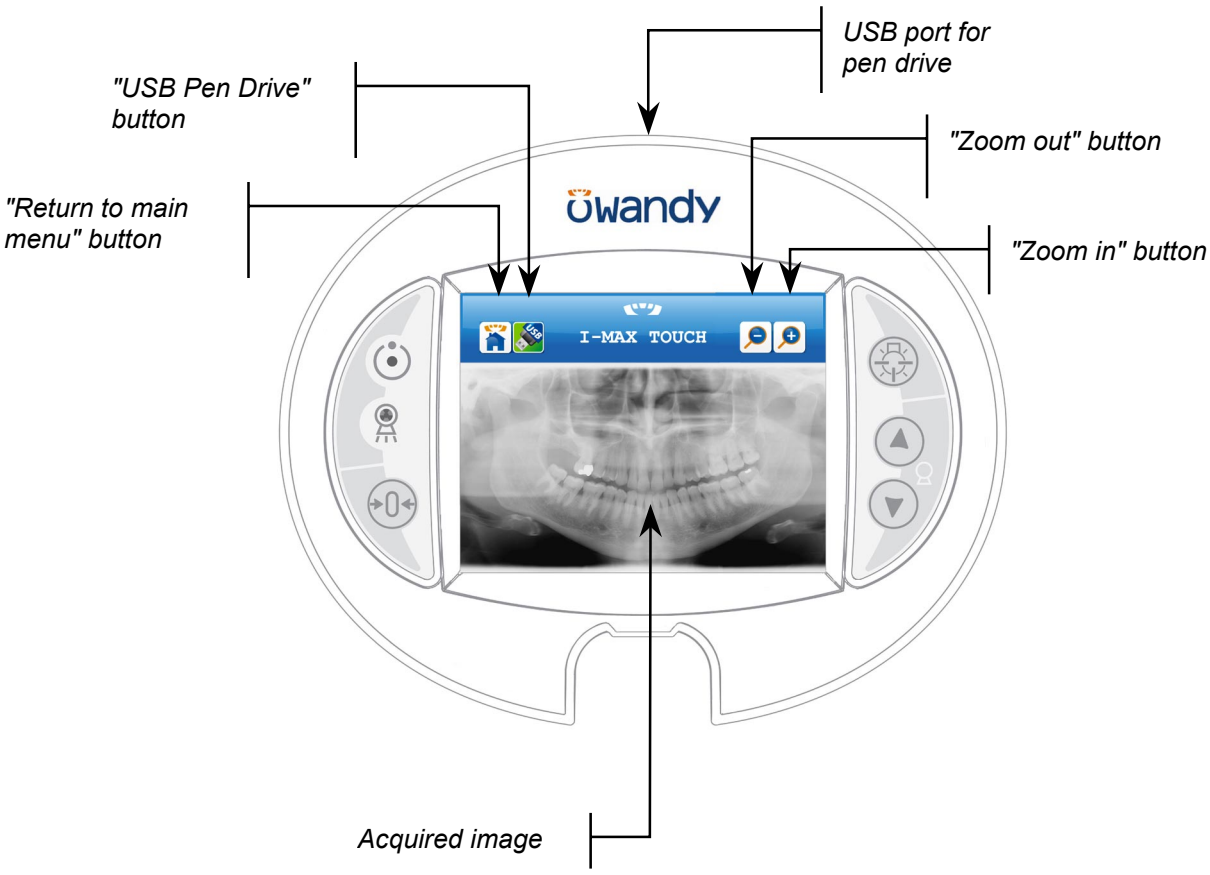


Figure 6

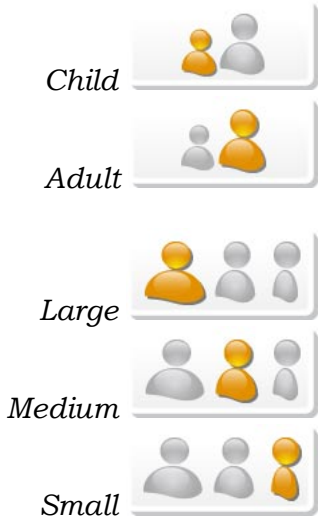
WARNING:
The USB port on the keyboard MUST NOT be used with an external Hard Disk with own mains connection. It has to be used only with USB Pen Drives.

The "Centring/Patient Entrance" button is used to:

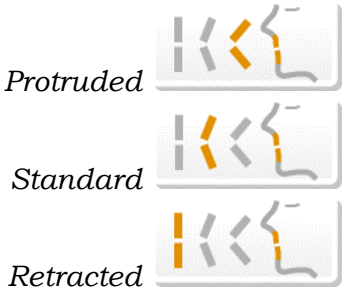
- start/stop the start examination procedures
- bring the rotation arm to the patient entrance position at the end of the exam.

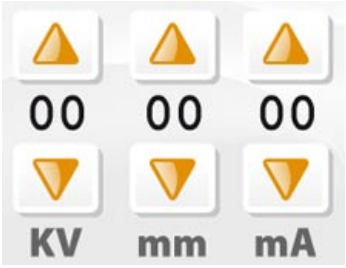
The "Examination Selection Mode" takes place by means of three keys: the first one, the main button, helps select the exam mode between Panoramic, TMJ, Sinus, and Cephalometric.
The other two, identified by the arrows, help navigate within the exams of each mode.

It is possible to select the anatomic mode examinations (anatomic selection), using prefixed exposure values.
This kind of selection enables to choose between Adult/Child, each with three different sizes (small, medium, large).



The Panoramic mode enables to select the patient's type of biting between: protruded, standard or retracted, as indicated within the button.
The arch selection does not influence the values of kV and mA but acts on the position of the focus layer.





Furthermore there is the possibility to manually select the exposure parameters; in this case, it is possible to set the parameter with the desired value.
The parameters available are: kV and mA (Soft Tissue Filter position, mm, only in cephalometry).
When the exposure parameters are changed manually, the mode indicator switches from “Anatomic” to “Manual”.
Return to “Anatomic mode” using the main programme selection button.

There are two light indicators; the first one on the top indicates the condition "Machine Ready", indicating the user that by pressing the X-ray button key once more, X-rays emission will start; the second indicates the effective emission of X-rays.

The movement of the column is controlled by the appropriate keys.
The speed has two set values.
The movements are enabled during equipment setting.

The key "Luminous centring device" helps turn ON/OFF the laser centring devices that allow the correct positioning of the medial-sagittal and Frankfurt planes, by adapting the I-Max Touch to the patient's anatomy.

Test OFF

Test ON

The key "Test" is used to avoid the X-rays emission, in order to check the absence of collisions with the patient.

6.1.1 Key function description

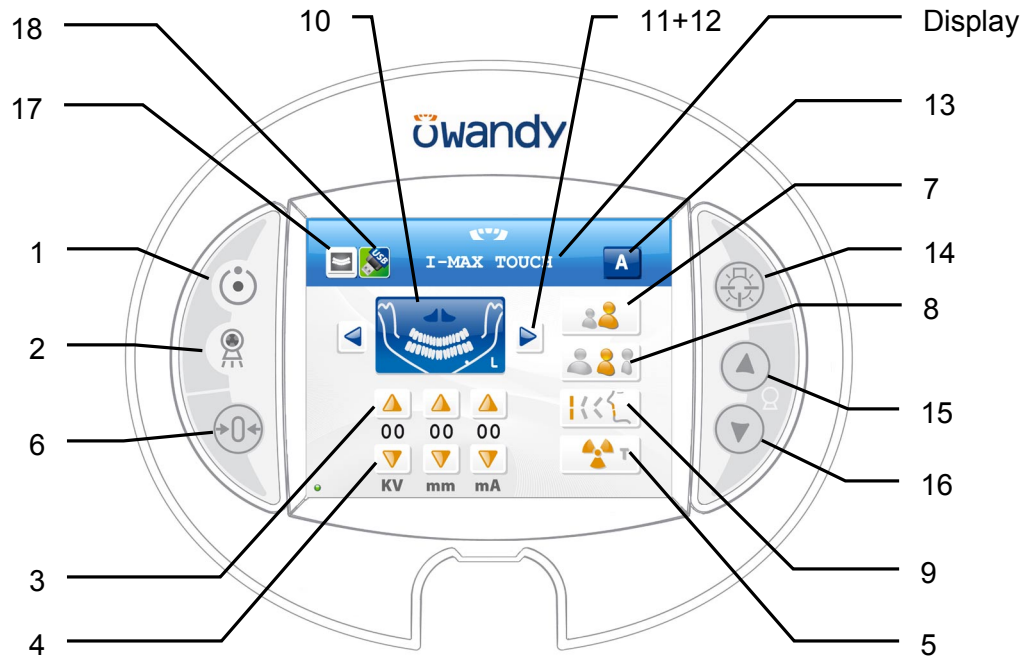


Figure 7 - Control panel

LEGEND:

Messages
Display: indicates operative messages, warnings and exposure parameters.

Signal lights
1 - Light indicating the machine is ready for X-ray emission (green LED)
2 - Yellow LED indicating X-ray emission

Manual setting of exposure parameters
3 - kV, mA and Soft Tissue Filter increase keys
4 - kV, mA and Soft Tissue Filter decrease keys

Preparation functions
5 - Key to set Test function
6 - Key for:
> Resetting and realigning the device's axes (in case of collision with patient or in case of release of rays button)
> Repositioning the rotation group (to bring the group to the initial position after the examination and to exit from the "making an exposure") mode
> Confirmation

Anatomic selection
7 - Patient selection key: Adult or Child
8 - Size selection key: Small, Normal, or Large
9 - Arch selection key: Protruded, Standard or Retracted (for panoramic execution)

Examination mode
10 - Exam mode selection key
11 +12 - Type of exam selection keys (only for panoramic mode)
13 - Mode indicator : Anatomic or Manual

Centring devices
14 - Sagittal and Frankfurt plane centring device ON key

Column height adjustment
15 - Column up key
16 - Column down key

Other
17 - Display acquired image key
18 - USB Pen Drive key

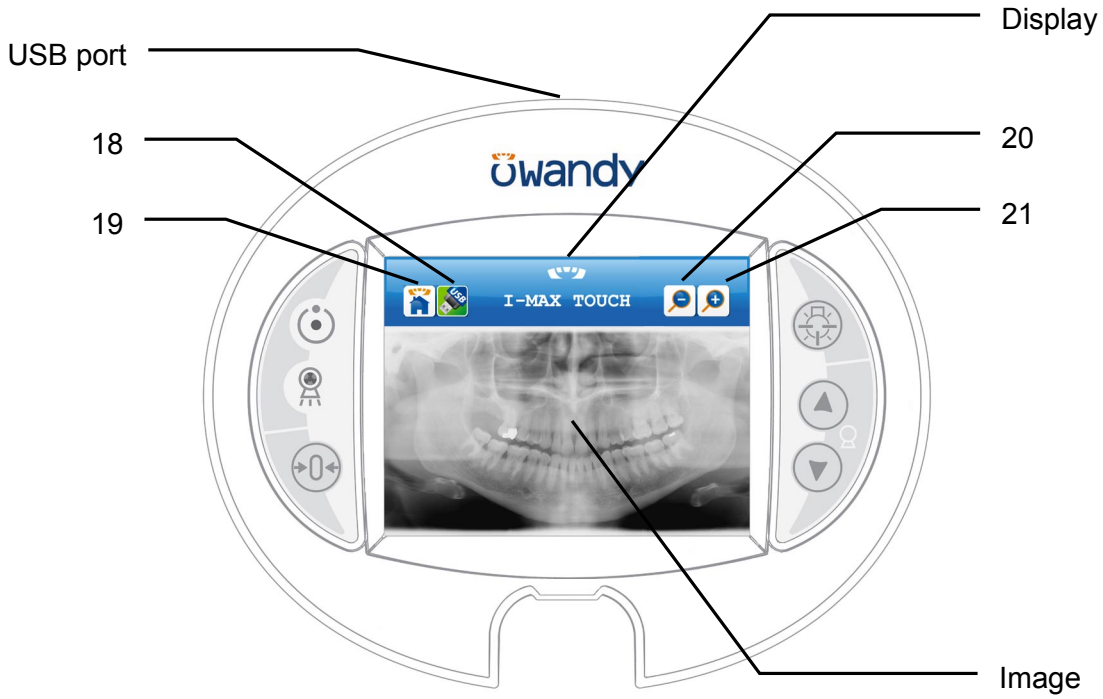


Figure 8 – Acquired image display

LEGEND:

Messages
Display: indicates operative messages, warnings and exposure parameters.

Other
18 - USB Pen Drive key
19 - Return to control panel (main menu)
USB port: to connect a pen drive

Acquired image display
Image: displays the last acquired image, stored in the memory of the unit
20 - Zoom out on the image
21 - Zoom in on the image

6.2.1 Inserting the sensor in the sensor holder

The digital sensor is equipped with a handgrip used to safely transport the sensor from one holder to the other, in order to minimise the risk of fall. The system used to hook the mobile sensor to the holder is also engineered to reduce the sensor's risk of fall due to failure to hook the sensor and/or due to early release.

Inside the transport handgrip there is a lever that controls the sensor's hooking and release operations; at the same time, this lever works on the electronic connector in order to guarantee the correctness of the connection operations. On the fixed part of the sensor holder, there are two hooks that need to be inserted into the corresponding gaps on the mobile part of the sensor. On this latter, metallic plugs have been mounted which, by joining in the corresponding fixed part, guide all parts to a position suitable for the execution of a safe and stable contact.

In order to insert the sensor in the desired station, carry out the following operations:

1. Grip the sensor by the appropriate handgrip; close your fingers to form a fist, by engaging the control lever and bring it to the position where the same disappears inside the handgrip, so that the whole mobile system retracts.
2. Keep the sensor with the relative handgrips vertical, so that the upper plane is parallel to the horizontal part of the sensor holder, bring the sensor close to the fixed station, by engaging the protruding part of the mobile sensor into the relative casing.
3. Push the sensor mobile part to the very end, in order to engage the mobile part onto the fixed hooking system.
4. Carry out a movement towards the lower part, ensuring that the movement is complete.
5. **Only at this point, release the hooking lever,** checking that the sensor is correctly engaged before releasing the handgrip.

WARNING:
During the lever releasing operation, hold the sensor firmly, to prevent the sensor from falling during the insertion phase due to possible errors.

6.2.2 Release of the sensor from the sensor holder

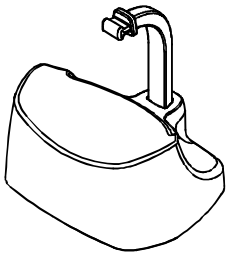
The operations for releasing the sensor from the relative sensor holder are specular to the ones described for the hooking of the same.

1. Grip the sensor by the appropriate handgrip; close the fingers to form a fist, by engaging the control lever and bring it to the position where the same disappears inside the handgrip, so that the whole mobile system retracts and the electronic connectors and the reference plugs are completely released.
2. **Grip firmly the handgrip**, and move towards the upper part of the digital sensor, in order to free the mobile part from the hooking system.
3. By keeping the sensor with the upper part parallel to the relative horizontal part, carry out a horizontal movement in order to free the protruding part of the sensor from the relative casing of the sensor holder, disengaging thus the hooking system.
4. Always gripping firmly the sensor, in order to avoid accidental falls, it is possible to freely move the sensor to the desired position.

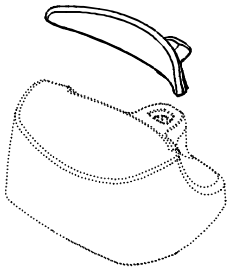
6.4 Positioning of chin support

The I-Max Touch is equipped with two types of supports: a standard support fitted with a special removable appendix for edentulous patients, and a lower one, for SINUS/TMJ examinations.
The standard chin support must be used, in Panoramic mode, with all the people who can assure a tight grip on the centring bite. The appendix for edentulous patients must be applied only for patients who cannot assure a tight grip on the bite or are not co-operating and might move during the examination.

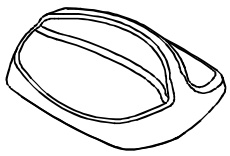
For the SINUS/TMJ examinations, there is special support that, being in a lower position, ensures a better centring of the interested area in the rays field.



Panoramic standard chin support



Edentulous patients appendix



SINUS/TMJ chin support

NOTE:
Always remove the chin support when performing Ceph examinations.

- **Right / Left Emi-panoramic**


The Emi-panoramic mode, right or left, means that only the corresponding half arch is irradiated; the emission will start from the beginning, to just after the mid sagittal plane for the right part. For the left, it will start just before the mid sagittal plane and continue until the end of the rotation.
These two kinds of examinations are usually used when it is already known that the patient has a problem on only one half of the arch, so it is possible to reduce the irradiation of the patient.

Follow the instructions for normal Panoramic for patient positioning.

- **Reduced dose Panoramic**

The reduced dose Panoramic examination makes an X-ray only of the dental arch, excluding from the image the ascending rami of the temporo-mandibular joint; the examination is performed with the same trajectory of the standard Panoramic, by reducing the rays emission time.
This examination is used, for instance, during the treatment continuation phases or where the lack of pathologies of the same joint is already known.

Follow the instructions for normal Panoramic for patient positioning.

- **Improved orthogonality dentition**

The improved orthogonality Panoramic delivers the image of the pure dental arch cutting out from the image the ascending rami branches of the temporo mandibular joint; the trajectory of the rotating arms is, however, optimised for a better orthogonality between the X-ray beam and the incident sections of near teeth.
Thus the image has reduced overlapping of the teeth, improving the diagnosis of interproximal decay.

As a consequence of the different trajectory, the focus layer, mainly in the front teeth area, is smaller and the patient positioning for this examination needs more care.

Follow the instructions for normal Panoramic for patient positioning.

- **Frontal dentition**

The Frontal dentition examination performs an x-ray of the dentition frontal area (roughly from canine to canine).

Follow the instructions for normal Panoramic for patient positioning.

NOTE:
The I-Max Touch is based on a standard dentition and ascending rami shape.
This shape, based on statistic study, establishes a form for the dentomaxillofacial complex that it is assumed as "standard".
The I-Max Touch follows a rototranslation path which maintains constant the magnification factor stated in the technical characteristics of each type of exam along this "standard" shape and in the dentition area. The patient's anatomy can differ significantly from the statistical model, so the magnification factor is not maintained and can be different from the value stated. Based on his experience and competence, the user has to judge this variation.

IN ANY CASE, THE RADIOGRAPHY IMAGES CANNOT BE USED TO PERFORM CALCULATIONS OF DISTANCES, ANGLES ETC. ON THE IMAGE.

6.5.2 Anatomic / manual exposure

NOTE:
If the previous exam was carried out manually, just press the key "Size Selection" (8)  or the key "Selection Examination Mode" (10)  .

After setting the machine, it is possible to choose between the following two operating modes:

- **ANATOMIC:** with the values of kV and mA programmed on the basis of the type of patient and the size.
- **MANUAL:** with the possibility to vary the kV and mA values already set.

NOTE:
In manual condition, the "Anatomic/Manual mode" (13) indicator displays "M" to indicate the manual mode; it is possible to press key (7)  to change from Adult to Child and press key (9)  to modify the type of biting from Normal to Protruded to Retracted.

6.5.2.1 Anatomic exposure

Select the type of patient with the **Adult/Child** key (7).

Select the type of build with the **Size** (8) key (*small - medium - large).*

On the basis of these selections, the display will visualise the kV and mA settings as in the table.

Exposure values in PAN mode				
	Adult Patient (13.8 seconds)		**Child Patient** (13.4 seconds)	
	kV	**mA**	**kV**	**mA**
Small	68	6	64	6
Medium	72	6	66	6
Large	74	6	68	6

Table 1

Select the type of biting with the key "Type of Biting Selection"

(9)  .

NOTE:
The type of biting does not affect the kV and mA values, but it affects the position of the focus layer, by adapting the rotation movement to the patient's anatomy.

Panoramic positioning

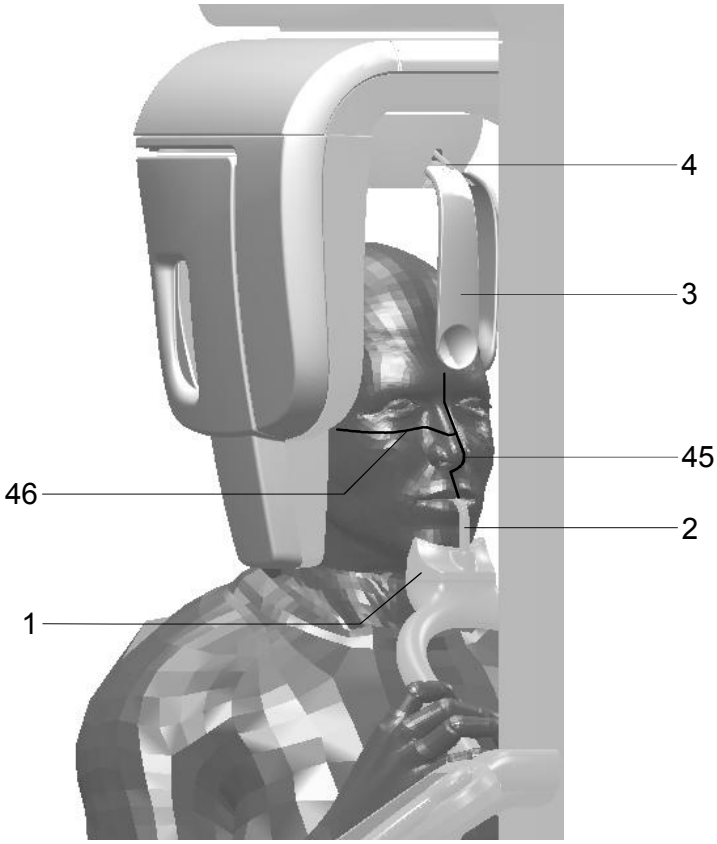


Figure 9

Legend positioning devices and patient centring

1 Panoramic chin rest
2 Centring bite
3 Temple clasps - Forehead support
4 Temple clasps - Forehead support release knobs

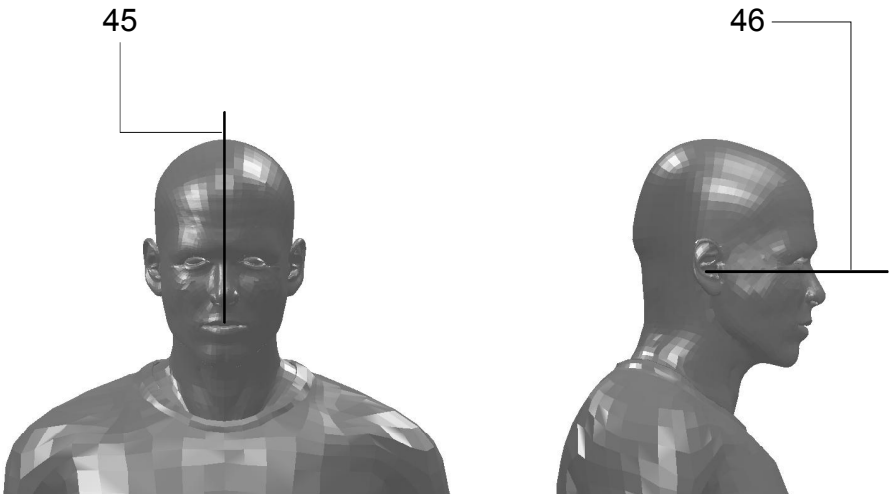


Figure 10

Legend of Reference Lines

45 Sagittal medial line
46 Frankfurt plane line

6.8 Cephalometric examination

There is no rotation of the tube-head (X-ray generator) support arm and sensor holder for the cephalometric examination.
Various projections are possible for the cephalometric examination. On the basis of the image format selected and the projection chosen, the primary diaphragm will automatically place itself in the correct position, at the same time as the secondary collimator and the digital sensor.
The Cephalometric examination is fitted with a Soft Tissues Filter (STF); this filter reduces the dose in areas with low bone content and highlights the patient's profile which, under normal conditions, would be overexposed and so not visible.

The I-Max Touch makes different kinds of exposures, according to the type of selection made:

18x22 Asymmetric for Latero-Lateral (L.L.)	24x22 Symmetric for Posterior-Anterior (P.A.) and Antero-Posterior (A.P.)	24x22 Asymmetric for Latero-Lateral (L.L.)	30x22 Symmetric for Latero-Lateral (L.L.)	18x22 Symmetric for assessment of bone growth (A.P.)
				

For all these formats, it is possible to carry out the examination in High Resolution (h) or Normal Resolution (n).
It also possible to carry out the examination to assess bone growth, following the instructions in paragraph 6.9 below.

6.8.3 Preparation of the patient

1. Ask the patient to remove all metallic objects located in the area to be X-rayed (necklaces, earrings, glasses, hairpins, removable dental prosthesis, etc.). Ensure that there are no thick garments in the area to be X-rayed (coats, jackets, ties, etc.).
2. Ask the patient to put on the protective apron, or something similar, making sure that it does not interfere with the trajectory of the X-ray beams.
3. Open the ear centring device (Figure 15) to its maximum span by using the upper part of the rods of the centring device itself. Move the nose rest (Figure 15) away outwardly to its maximum extension. Manually rotate the craniostat group according to the cephalometric projection to be made, moving the upper part of the ear centring device (Figure 15).
4. Position the patient upright near the auricular centring device.

   With the keys "Column movement" (15/16)  lift/lower, the column till the centring pins (Figure 15) are close to the ear to clasp the patient's head so that the pivots penetrate the ear (Figure 15) moving the upper part of the rods.
   If a Latero-Lateral examination is performed, position the nose rest.
5. By selecting an "asymmetric" projection, the Soft Tissues Filter (STF) will be automatically inserted.

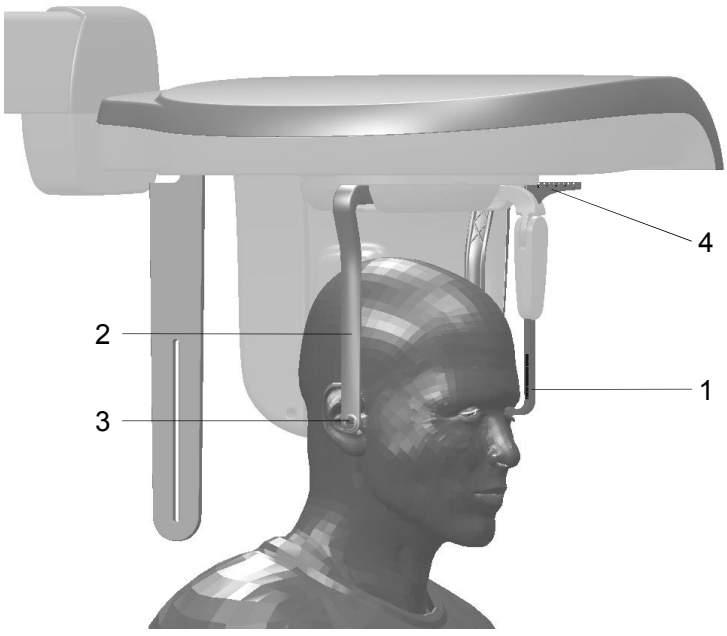


Figure 15

Legend

1 Nose rest
2 Ear centring device
3 Pins for ear centring device
4 Nose rest graduate scale

6.9.2 Preparation of the patient

1. Turn the ear centring device to the Antero-Posterior position; bring the nose-rest to a parking position.
2. Hook up the plastic positioning support for hand projection.
3. Place the patient slightly to the side of the cephalometry device.
4. Position the patient's hand on the positioning support (Figure 16). The support leads the operator to place the body part in the centre of the irradiated area. The horizontal line should help the vertical adjustment of the hand.
   The common radiological procedure to assess bone growth in children, suggests placing the end of the middle finger tangent to the reference line.
   The patient's hand and arm must form a vertical line.

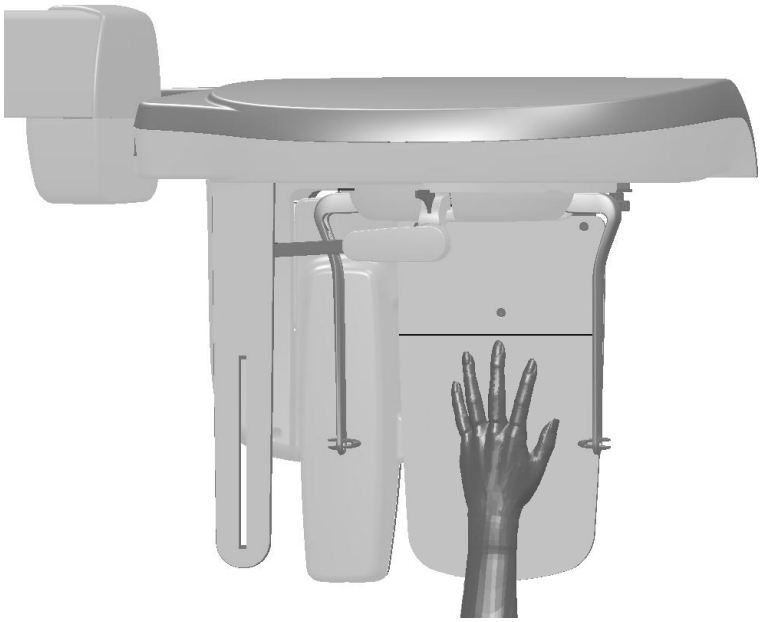


Figure 16

6.12.1 Proper positioning of the patient

The proper positioning of the patient during the panoramic examination is very important in order to get good quality radiography. This is due to the fact that the shape of the focussed area, e.g. of the layer clearly shown on the image, tends to follow the dental arch and has a non-constant deepness.
The objects outside this focused area will therefore appear blurred on the radiography.

1. The patient should not wear clothes that may interfere with the X-ray beams, also to leave more space between the patient's shoulders and the rotating arm of the machine. **Care must be taken in order to avoid interference between the X-ray beam and the protective apron worn by the patient**.
2. Metal objects (necklaces, earrings etc.) must be avoided; these objects not only create radio-opaque images in their own position, but also false images projected in other parts of the radiography, so disturbing the correct view of the anatomy.
3. The patient's head must be slightly tilted downward in order to make the Frankfurt plane horizontal. In this way, the hard palatal ceiling will be projected slightly over the superior apex of the anterior teeth. If the patient has a low palatal ceiling, slightly increase the downward tilting.
4. Align the sagittal medial plane with the centre of the chin support, normally indicated by the relevant light beam.

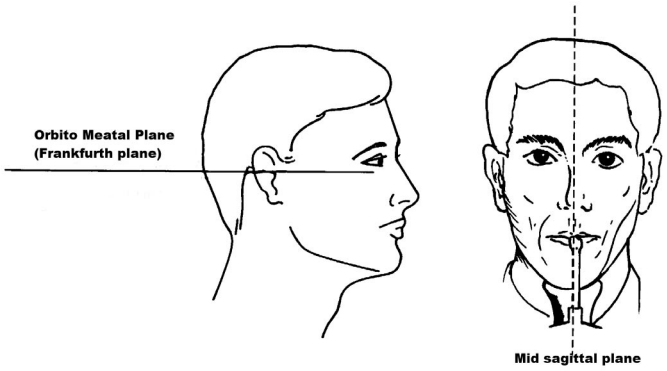


Figure 18

5. The patient must extend his spine; this is normally obtained by asking the patient to step forward, making sure that all other conditions are unchanged. If not properly extended, the spine will cause the appearing of a lower exposed area (clearer) in the front part of the image.

6.12.2 Table of pre-set anatomic parameters

PANORAMIC

	Adult	Child
Small	68 kV 6 mA	64 kV 6 mA
Medium	72 kV 6 mA	66 kV 6 mA
Large	74 kV 6 mA	68 kV 6 mA

TMJ open/close mouth

	Adult	Child
Small	68 kV 6 mA	62 kV 6 mA
Medium	72 kV 6 mA	64 kV 6 mA
Large	76 kV 6 mA	66 kV 6 mA

SINUS

	Adult	Child
Small	66 kV 6 mA	62 kV 6 mA
Medium	70 kV 6 mA	64 kV 6 mA
Large	72 kV 6 mA	66 kV 6 mA

CEPHALOMETRY (L.L.)

	Adult	Child
Small	66 kV 6 mA	62 kV 6 mA
Medium	70 kV 6 mA	64 kV 6 mA
Large	72 kV 6 mA	66 kV 6 mA

CEPHALOMETRY (A/P - P/A)

	Adult	Child
Small	74 kV 12 mA	70 kV 10 mA
Medium	76 kV 12 mA	72 kV 10 mA
Large	80 kV 10 mA	74 kV 10 mA