



**Panoura ULTRA Pan Panoramic X-ray Unit**

**Panoura ULTRA Pan/Ceph Panoramic and Cephalometric X-ray Unit**

**Operating Instruction Manual**

Caution: Federal law restricts this device to sale by or on the order of a licensed physician or dentist.

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Panoura ULTRA Pan  
Panoura ULTRA Pan/Ceph  
Instruction Manual

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# GENERAL INFORMATION

## Introduction

This manual provides information relative to Yoshida dental X-Ray unit models Panoura ULTRA Pan and Panoura ULTRA Pan/Ceph.

**CARELESS OR IMPROPER USE OF X-RAY EQUIPMENT CAN BE EXTREMELY HAZARDOUS.** It is imperative that this equipment be operated and serviced only trained personnel familiar with the safety precautions required to prevent excessive exposure to primary and secondary radiation, the dangers of exposure to X-ray radiation, and the proper use of the equipment discussed in this manual.

All personnel authorized to operate or service this equipment should be fully acquainted with the established maximum permissible doses, safety recommendations and procedures derived from the following sources:

- 1) National Council on Radiation Protection Report No. 33 (Medical X-ray and Gamma Ray Protection for Energies up to 10 MEV-Equipment Design and Use); from NCRP Publications, P.O. Box 30175, Washington, D.C. 20014.
- 2) National Bureau of Standards Handbook No. 76 (Medical X-ray Protection up to Three Million Volts); from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20401.
- 3) All documents relating to the Performance Standard for Diagnostic X-ray Systems, 21 CFR Subchapter J, Part 1020, obtainable from the Center for Devices and Radiological Health, Food and Drug Administration, 1390 Piccard Drive, Rockville, MD 20850.
- 4) State and local regulations governing radiation protection and use of diagnostic X-Ray equipment.
- 5) Requirements of the user's in-house radiation protection program.
- 6) Instructions and precautionary notices of this manual.

Although this equipment incorporates protective design features for limiting both the direct (primary) X-ray beam and the secondary radiation produced by this beam, design factors alone cannot prevent human carelessness, negligence, or lack of knowledge. This apparatus is sold with the understanding that **the user assumes sole responsibility for radiation safety** and that The Yoshida Dental Mfg. Co., Ltd., its agent and representatives, do not accept any responsibility for:

- 1) Injury or danger to patient or other personnel from X-Ray exposure.
- 2) Overexposure due to poor operating techniques or procedures.
- 3) Equipment not properly serviced, installed or maintained in accordance with this manual.
- 4) Equipment which has been modified or tampered with in any way.

## A. PANOURA ULTRA PAN AND ULTRA PAN/CEPH COMPONENTS AND THEIR FUNCTIONS

### A-1 Main Body

1) X-ray Tubehead

The X-ray tubehead houses the X-ray generator and beam limiter. X-rays are emitted from the tubehead when an exposure is made.

2) Rotating Arm

The rotating arm supports the X-ray tubehead and film cassette holder, rotating them around the patient's head when an exposure is made.

3) Drive

The drive houses the rotating arm drive mechanism and X-ray generator control circuit.

4) Temple Supports

The temple supports stabilize the head of the patient to maintain correct positioning. The tube voltage (kVp) is automatically set by Panoura ULTRA Pan according to the size of the patient's head.

5) Forehead Support

The forehead support stabilizes the forehead of the patient to maintain correct positioning.

6) Film Cassette Holder

The film cassette holder holds a panoramic film cassette in the correct position for the taking of an X-ray.

7) Mirror

The mirror is used by the operator to check the position of the patient's head before the radiograph is taken. The patient can also use the mirror to assist in positioning.

- 8) **Positioning Gauge**

The positioning gauge indicates the position of the focal trough when positioning the patient's anterior teeth for panoramic radiography. This is used if the Panoura ULTRA Pan is not equipped with positioning lights.
- 9) **Chinrest Base**

The chinrest block and bite block rod are mounted on the chinrest base during panoramic radiography. The palate support is mounted on the chinrest base during temporomandibular joint (TMJ) radiography.
- 10) **Chinrest Arm**

The chinrest arm supports the chinrest base. It is equipped with a knob for adjusting the position of the chinrest base, and buttons raising and lowering the superstructure.
- 11) **Hand Grips**

The hand grips are held by the patient during positioning for panoramic and TMJ radiography, and during the exposure, for stability and image clarity.
- 12) **Superstructure**

The superstructure supports the drive, rotating arm, and chinrest arm. The height of the superstructure is adjusted electrically by the operator during positioning using the buttons on the chinrest arm. Buttons on the cephalometric arm of the Panoura ULTRA Pan/Ceph enable the operator to adjust the superstructure height while positioning the patient for cephalometric radiography.
- 13) **Upright**

The upright supports the superstructure, houses the height adjustment motor, and the main power switch.
- 14) **Wall Bracket**

The wall bracket is attached to the wall to secure the Panoura ULTRA Pan or Panoura ULTRA Pan/Ceph at the time of installation if the optional base is not used.
- 15) **Cephalometer (Panoura ULTRA Pan/Ceph)**

The cephalometer is attached by an arm to the upright. It is used to position the patient for all cephalometric views, including lateral, PA, and oblique. There is a cassette holder provided for the cephalometric cassette.

## Superstructure Height Adjustment

A motor driven mechanism is housed in the upright of the Panoura ULTRA Pan. The operator can easily fit the Panoura ULTRA Pan and Panoura ULTRA Pan/Ceph to each patient at the touch of a button. The height adjustment has a stroke of 840 mm (33.0 inches).

### A-2 Panoura ULTRA Pan Remote Control Functions

#### A-2-1 Remote Control

##### 1) MODE Switch

Used to select between panoramic, TMJ, and cephalometric radiography modes.

##### 2) SELECT Switch

Used to switch between the Auto and Manual modes for kVp adjustment.

##### 3) + Switch

This switch increases the size of the focal trough during positioning for panoramic or TMJ radiography. Make this adjustment for patients with a large dental arch. The + switch is also used to increase the kVp setting in Manual mode.

##### 4) - Switch

This switch decrease the size of the focal trough during positioning for panoramic or TMJ radiography. Make this adjustment for patients with a small dental arch. The - switch is also used to decrease the kVp setting in Manual mode.

##### 5) RESET Switch

Pressing this switch will return the rotating arm to the starting position for the next panoramic or TMJ radiograph.

6) X-RAY ON Switch

This switch is pressed and held by the operator when taking an X-ray of the patient. An audible signal will be heard during the exposure. The X-ray emission will automatically stop at the end of the correct exposure time, or immediately if the switch is released before the exposure is completed.

7) Radiography Mode LED Indicator

This LED indicates the radiography mode selected by the operator; panoramic, temporomandibular (TMJ), or cephalometric.

8) Tube Voltage (kVp) LED Indicator

This LED indicates the tube voltage (kVp) selected. In Auto mode the kVp will be automatically set by the position of the temple supports (panoramic and TMJ radiography) or the ear rods (cephalometric radiography) based on the size of the patient's head. In Manual mode the kVp LED will indicate the kVp selected by the operator using the + or - switches on the remote control.

9) Tube Current (mA) LED Indicator

This LED indicates the tube current (mA) automatically selected for each radiography mode: 6 mA for both panoramic and TMJ modes, and 10 mA for cephalometric radiography.

10) Exposure Time Indicator (2 digits)

This window displays the exposure time for each selected radiography mode. This window will also indicate focal trough size when changed by the operator. Should there be any operational errors, the Panoura ULTRA Pan and Panoura ULTRA Pan/Ceph will display error codes in this window.

11) Reset LED Indicator

This LED lights up when the rotating arm and film cassette holder are in the correct starting position for the next radiograph. The LED will flash while the rotating arm is returning to the start position.

12) X-RAY ON LED

This LED lights up during X-ray exposure to indicate that X-ray is being generated. An audible signal will also be heard during each X-ray exposure.

A-2-2 Chinrest Control Panel Switches and Their Functions

1) UP Switch

Press this switch to raise the chinrest to fit the Panoura ULTRA Pan to the patient's height during positioning.

2) DOWN Switch

Press this switch to lower the chinrest to fit the Panoura ULTRA Pan to the patient's height during positioning.

NOTE: If the chinrest is raised or lowered excessively, a motor safety device will be actuated, and the height adjustment motor will stop operating to prevent overheating. This safety device will reset automatically after about ten (10) minutes to allow the motor to cool.

3) Positioning Lights Switch (Optional)

This switch turns on and off light beams to aid in patient positioning for panoramic and TMJ radiography. These lights indicate the mid-sagittal plane, Frankfort horizontal plane, and correct position for the patient's anterior teeth. The lights will automatically turn off in about 60 seconds. To manually turn off the lights before this time, simply press the switch again.

B. OPERATION OF THE PANOURA ULTRA PAN AND ULTRA PAN/CEPH

B-1 Readyng the Panoura ULTRA Pan and ULTRA Pan/Ceph for use

Connect the Panoura ULTRA Pan or ULTRA Pan/Ceph to a dedicated electric circuit with the rated voltage for your unit (115 in North America).

CAUTION: Make sure that the Panoura ULTRA Pan or ULTRA Pan/Ceph is installed where no object will interfere with the normal movement of the rotating arm or the vertical movement of the superstructure and cephalometric arm.

Clean and disinfect appropriate components. (See daily check and maintenance sections of this manual.)

Read all safety precautions for operating electronic medical equipment.

B-2 Operating the Remote Control

1) Switching from panoramic mode to TMJ mode

No.	OPERATION	INDICATION
1	Press the MODE selector switch.	Panoramic radiography LED begins flashing. Tube current (mA) LED flashes on 6 mA.
2	Press the SELECT switch.	Panoramic radiography LED turns off. TMJ radiography LED begins flashing. Tube current (mA) LED flashes on 6 mA.
3	Press the MODE selector switch.	TMJ radiography LED changes from flashing to on. Tube current (mA) LED changes from flashing to on at 6 mA.

2) Switching from TMJ mode to panoramic mode

No.	OPERATION	INDICATION
1	Press the MODE selector switch.	TMJ LED begins flashing. Tube current (mA) LED flashes on 6 mA.
2	Press the SELECT switch.	TMJ LED turns off. Panoramic LED begins flashing. Tube current (mA) LED flashes on 6 mA.
3	Press the MODE selector switch.	Panoramic LED changes from flashing to on. Tube current (mA) LED changes from flashing to on at 6 mA.

3) Switching from Automatic kVp mode to Manual kVp mode

No.	OPERATION	INDICATION
1	Press the SELECT switch.	Tube voltage (kVp) LED begins flashing.
2	Press the + switch.	Tube voltage (kVp) LED moves right, indicating a higher kVp setting.
3	Press the - switch.	Tube voltage (kVp) LED moves left, indicating a lower kVp setting.
4	Press the SELECT switch.	Tube voltage (kVp) LED changes from flashing to on.

4) Switching from Manual kVp mode to Automatic kVp mode

No.	OPERATION	INDICATION
1	Press the MODE selector switch twice.	Tube voltage (kVp) LED will now be automatically set by the temple supports (panoramic) or ear rods (cephalometric) during patient positioning based on the size of the patient's head.

NOTE: Releasing the Manual kVp override and returning the Panoura ULTRA Pan or Pan/Ceph to Automatic kVp mode also resets the dental arch size to the default setting.

5) Changing the dental arch size

No.	OPERATION	INDICATION/OPERATION
1	Press the + switch.	The dental arch size increases by one size.
2	Press the - switch.	The dental arch size decreases by one size.
3	Press the RESET switch.	The selected dental arch size is displayed in the exposure time window while the RESET switch is pressed. Indicators are S (small), n (normal), or L (large).

6) Reset to the starting position for the next panoramic or TMJ radiograph

No.	OPERATION	INDICATION/OPERATION
1	Press the RESET switch.	The rotating arm will return to the starting position for the next radiograph. While the rotating arm is in motion, the RESET LED will flash. When the reset cycle is complete, the RESET LED remains on.

7) Making an X-ray exposure

No.	TYPE	OPERATION	INDICATION/OPERATION
1	Panoramic or TMJ	Press and hold the X-RAY ON switch.	The rotating arm will move according to the program selected for panoramic or TMJ radiography. X-ray is generated for the time displayed in the exposure time window of the remote control. The X-RAY ON LED lights up and an audible signal will be heard while X-Ray is being emitted.
2	Cephalometric	Press and hold the X-RAY ON switch.	The rotating arm will not move during a cephalometric radiograph. X-ray is generated for the time set by the operator and displayed in the exposure time window of the remote control. The X-RAY ON LED lights up and an audible signal will be heard while X-Ray is being emitted.

NOTE: X-ray output will stop immediately when the X-RAY ON switch is released while the exposure is in progress. The Panoura ULTRA Pan must be reset to its starting position before beginning a new panoramic or TMJ exposure.

B-2 Operating the Remote Control

(INSERT CHART HERE)

B-3 Taking a Panoramic Radiograph

B-3-1 Readyng the Panoura ULTRA Pan

(I) Loading The Panoramic Cassette With Film

Have a film cassette, intensifying screens (front and back) and unexposed film handy.

CAUTION: Load the cassette in a darkroom, or in the daylight loader of an automatic film processor. Exposure to light will fog the film and compromise the quality of the radiographic image.

Place an unexposed sheet of X-ray film between the intensifying screens, and insert the intensifying screens and film in the film cassette in the darkroom or a processor's daylight loader. Make sure that the intensifying screens and film are inserted in the cassette so the side of the screens marked "Tube Side" faces the side of the cassette marked "PANOURA." Insert the intensifying screens and film fully into the cassette.

**CAUTION:** Radiographic detail will be lost unless the film and intensifying screens are in close, even contact with each other. Use your palms to squeeze out any air trapped in the cassette.

Close and seal the film cassette. It is now ready for loading on the cassette drum of the Panoura ULTRA Pan.

#### (II) Loading the Panoramic Film Cassette on the Panoura ULTRA Pan

Unhook the cassette holder on the cassette drum.

Face the side of the cassette marked "PANOURA" out toward the X-ray tubehead. Place the cassette on the drum with the end fully against the point where the cassette holder is attached to the drum. Place the bottom edge of the cassette evenly on the lip on the bottom of the cassette drum. Make sure the cassette and the clear plastic cassette holder are in tight, even contact. Rehook the cassette holder on the cassette drum.

#### (III) Turning On The Main Power to the Panoura ULTRA Pan

Press the MAIN POWER switch on the upright to the ON position. The switch will light up when power is on.

Turning the main power on to the Panoura ULTRA Pan will light up the panoramic radiography, tube voltage, tube current and other LEDs on the remote control in the Automatic mode. Normally "16" is displayed in the exposure time window.

**CAUTION:** Be sure to turn off the main power to the Panoura ULTRA Pan after use.

## B-3-2 Panoramic Radiography

### (I) Resetting to the Starting Position

Check on the remote control that the panoramic mode is selected. If set to TMJ or cephalometric modes, switch to panoramic mode. (See B-2 Remote Control Operation)

If the TMJ palate support is mounted, replace it with the black chinrest block.

Press the RESET switch on the remote control. The rotating arm and cassette drum will return to the starting position for the next radiograph.

### (II) Ready the Panoura ULTRA Pan for Patient Positioning

Insert the bite block into the bite block rod.

Check that the chinrest base position is set to "0" on the scale on the side of the chinrest arm.

Insert the black chinrest block into the chinrest base.

Insert the bite block rod with bite block into the chinrest base.

### (III) Patient Positioning

Press the UP or DOWN switches on the chinrest arm to adjust the height of the chinrest to approximately match the height of the patient's chin. Have the patient approach the Panoura ULTRA Pan.

**CAUTION:** Do not have the patient approach the Panoura ULTRA Pan if the unit is in motion.

#### (IV) Chinrest Height Adjustment

Ask the patient to sit or stand with his or her back and neck as straight as possible. Press the UP and DOWN switches to adjust the height of the chinrest block to match the height of the patient. Ask the patient to hold the hand grips and bite the bite block.

**CAUTION:** radiographing a patient with a bad posture with a slumped neck and back will produce a white shadow on the film, obscuring the image of the anterior teeth. This shadow is produced by the radiographic image of the patient's cervical spine coming into focus on the film. It is very important to have the patient sit or stand with a straight back and neck.

#### (V) Positioning With The Positioning Gauge

Use the mirror in front of the patient to align the bite block rod and center line indicated on the forehead support with the mid-sagittal plane of the patient's face.

Adjust the height of the chinrest so that the horizontal reference line on the temple supports is parallel to the imaginary line from the patient's ear to the bottom of the orbit (the Frankfort horizontal plane).

The positioning gauge on the side of the chinrest indicates the center of the focal trough for the anterior teeth. Adjust the position of the chinrest base into and out of the Panoura ULTRA Pan so that the tip of the gauge points to the center of the mandibular lateral incisor. This will place the patient's dental arch within the focal trough of the Panoura ULTRA Pan.

Positioning With the Optional Positioning Lights

Press the positioning light switch on the chinrest arm to turn on the lights.

The positioning lights will remain on for approximately 60 seconds. You can turn them off before this time by simply pressing the positioning light switch again.

Check that the patient's head is positioned to align with the beams indicating the mid-sagittal plane, Frankfort horizontal (eye-ear) plane, and the center of the anterior mandibular lateral incisor. Adjust the height and chinrest position until the patient's head is correctly positioned, as indicated by the light beams.

#### (IV) Fixing the Correct Position of the Patient's Head

The patient should now be correctly positioned. Adjust the forehead support and temple supports to keep the patient's head in the correct position. A tube voltage (kVp) setting appropriate for the patient will be automatically set by the Panoura ULTRA Pan.

**CAUTION:** Make sure that the forehead support is not positioned too low on the patient's face. Adjust the forehead support vertically so that it contacts the forehead of the patient, and not the nose. Tighten the adjustment knob on the forehead support after making any change to its position.

The Panoura ULTRA Pan allow edentulous patients to be positioned using the clear plastic chinrest. Be sure to remove the bite block rod from the chinrest base before inserting the clear plastic chinrest.

Mount the clear plastic chinrest on the chinrest block and position the patient. You may choose to have the edentulous patient bite on a folded cotton roll. Refer to Sections II to V for correct patient positioning technique.

#### (VII) Taking An X-ray

The operator should leave the room after the patient is correctly positioned. Check the remote control to see that the correct mode, tube current, and exposure time have been selected.

**WARNING:** Only qualified operators should operate X-Ray equipment, in conformance with all federal, state, and local regulations.

Press and hold the X-RAY ON switch to start the exposure. Keep pressing the X-RAY ON switch, and X-ray will be emitted for the time indicated in the exposure time window on the remote control. During X-ray exposure the X-RAY LED will light, and an audible signal will be heard. The rotating arm will circle the patient's head during the exposure.

**CAUTION:** The X-RAY ON switch is a dead-man type. Releasing the X-RAY ON switch on the remote control during the X-ray exposure will immediately terminate the exposure, as a safety feature. The Panoura ULTRA Pan must be reset to its starting position before another exposure can be made.

When the exposure is completed, the X-RAY ON LED and audible signal will turn off.

(VIII) Patient Exit from the Panoura ULTRA Pan

Open the temple supports and ask the patient to release the bite block from his or her mouth.

**CAUTION:** Be sure to escort the patient when he or she backs out of the Panoura ULTRA Pan to minimize the chances of falling or bumping into the X-Ray unit.

B-4 Taking a TMJ Radiograph

(I) Resetting the Panoura ULTRA Pan to the Starting Position

Check the remote control to see that the Panoura ULTRA Pan is set to TMJ mode. Change the setting from panoramic or cephalometric modes to TMJ mode is necessary. (See Section B-2 Remote Control Operation.)

Mount the TMJ palate support on the chinrest base. Be sure to remove the bite block rod and black chinrest block from the base.

Press the RESET switch on the remote control to reset the rotating arm and cassette drum to the starting position for the next radiograph.

**CAUTION:** make sure that the patient is away from the Panoura ULTRA Pan when the RESET switch is pressed.

## (II) Ready the Panoura ULTRA Pan for TMJ Patient Positioning

Insert the TMJ palate support in the Chinrest base. Remove the black chinrest block from the chinrest base.

Adjust the position of the chinrest forward to the 20 mm mark on the scale on the side of the chinrest assembly.

## (III) Patient Positioning

Press the UP or DOWN switches to adjust the height of the chinrest to the approximate height of the patient's chin. Ask the patient to step into the Panoura ULTRA Pan and hold the hand grips with each hand.

## (IV) Adjusting the Chinrest Height

Ask the patient to straighten his or her back and neck. Press the UP and DOWN switches so that the TMJ palate support will be placed on the underside of the patient's nose.

## (V) Patient Positioning

Use the mirror to align the TMJ palate support and forehead support with the mid-sagittal plane of the patient's face.

Move the superstructure of the Panoura ULTRA Pan up and down so that the horizontal reference line of the temple supports and the nasauricular line (Campel plane) on the patient's face are parallel. Tighten the temple supports lightly and adjust the position of the chinrest base horizontally so that the patient's earholes will be located directly below the temple supports.

#### Using the Optional Positioning Lights

Turn on the three positioning light beams. Only two of the three light beams are used in TMJ positioning.

Align the mid-sagittal plane of the patient's face with the vertical light beam projected on the center of the patient's face. The height of the horizontal beam can be adjusted using the slide next to the mirror.

#### (VI) Fixing the Correct Position of the Patient's Head

After positioning is complete, stabilize the patient's head in the correct position with the forehead support and temple supports. The Panoura ULTRA Pan will automatically set the tube voltage (kVp) based on the size of the patient's head.

**CAUTION:** Make sure that the forehead support is not positioned so low that it contacts the patient's nose. When correctly positioned, the forehead support should contact the patient's forehead only.

Adjust the height of the forehead support if necessary, and tighten the adjustment knob.

#### (VII) Taking a TMJ Radiograph

The Panoura ULTRA Pan will complete a TMJ radiograph automatically with two passes of the rotating arm. This will provide an opened and closed X-Ray image of each TMJ on one panoramic X-ray film.

#### Closed TMJ Images

Ask the patient to close his or her mouth lightly. After checking that the patient's mouth is closed, press and hold the X-RAY ON switch on the remote control.

X-ray will be generated for four seconds for each side, so that the left and right temporomandibular joints will be imaged in the first (section 1) and last (section 2) quarters of the film. During exposure, the X-RAY ON LED lights up, and an audible signal will be heard. When the rotating arm completes the first pass, both closed view exposures will be completed. Release the X-RAY ON switch on the remote control after the rotating arm stops moving.

NOTE: X-ray will not be emitted except to expose each TMJ during rotation in this mode. After each partial exposure, the exposure time display will decrease by four (4) seconds. "8 seconds" will be displayed when the first TMJ rotation is finished. Two separate exposures are made during each pass.

#### Open TMJ Images

Ask the patient to open his or her mouth while having the bottom of the nose touch the palate support. Check that the patient's mouth is opened. Press and hold the X-RAY ON switch on the remote control.

The cassette drum will automatically rotate 1/4 turn. The rotating arm will rotate in the opposite direction from the closed TMJ exposure taken during the first pass. The left and right TMJs are imaged in the open position in two sections (marked 3 and 4 in the diagram) in the center quarters of the panoramic film.

After each partial X-ray exposure, the exposure time display on the remote control will decrease by four (4) seconds. The exposure time display will return to 16 seconds after completing the second and final pass of the TMJ series.

**CAUTION:** X-ray emission will stop, the X-RAY ON LED will turn off, and the audible signal will stop during TMJ radiography between images of each TMJ during each pass. Rotation will continue. Keep pressing and holding the X-RAY ON switch on the remote control until each pass has completed. Releasing the X-RAY ON switch on the remote control during the TMJ cycle may result in an error, requiring a retake of the series.

If the X-RAY ON switch is released by mistake, load a cassette with a fresh unexposed film on the cassette drum, reset the Panoura ULTRA Pan, and start the radiograph again.

#### (VIII) Patient Exit from the Panoura ULTRA Pan

Open the temple supports and release the patient.  
Ask the patient to step backward.

**CAUTION:** Ask the patient not to move before the temple supports are opened. Otherwise, the patient may hit his or her head on the superstructure, resulting in injury to the patient or equipment failure.

#### B-5 Taking a Cephalometric Radiograph (Panoura ULTRA Pan/Ceph)

Set the cephalometer position. Rotate the position of the ear rods to match the intended cephalometric view (PA, lateral, lateral oblique, etc.) Slide the knob on the front of the cephalometer to release the lock, and rotate the assembly. When you have positioned the assembly in the correct position for the view you will take, one of the green LEDs on the side of the cephalometer will light up. Slide the knob on the front of the cephalometer to lock the assembly in this position. The other green LED on the side of this assembly will light up. Both green LEDs on the side of the assembly must be lighted before positioning the patient.

Remove the panoramic cassette drum from the Panoura ULTRA Pan/Ceph. Press the release button on the center post of the cassette drum, and pull down.

Rotate the slit plate to its position out of the path of the X-ray beam between the tubehead and the cephalometric cassette holder.

Move the chinrest base to its most forward position towards the mirror.

Adjust the beam limiter knob on the front of the tubehead from its center panoramic position sideways to the correct cephalometric position for the view you will take. The beam limiter should be set for the horizontal position for the lateral view, and the vertical position for the PA view.

NOTE: Move the beam limiter adjustment completely to the end of its travel for proper beam limitation. If you fail to move the beam limiter completely, you will cut off the X-Ray beam from full exposure of the film. If the beam limiter is not set to the correct position for the view you will take, an error code will be displayed in the “seconds” window on the remote control.

Load an 8” x 10” cephalometric film cassette with a fresh piece of unexposed X-ray film in the darkroom or in the daylight loader of your automatic processor. Place the cassette in the cassette holder of the cephalometer. Remember to place the cassette in a horizontal position for the lateral view, and in the vertical position for the PA view.

Select the correct lateral or PA CEPHALO mode on the remote control (see Section B-2). The tube current will automatically change to 10 mA.

Position the patient. Adjust the height of the Panoura ULTRA Pan/Ceph to fit the patient using the UP and DOWN switches on the back of the cephalometer cassette holder. The ear rods should be set to the same height as the patient’s ears.

Have the patient step into position in the cephalometer. Gently slide the ear rod supports inward, inserting the ear rods in the canals of the patient's ears. The Panoura ULTRA Pan/Ceph will automatically set the exposure time based on the size of the patient's head, as measured by the position of the ear rods. Set the kVp to the appropriate level using the + and - switches.

Check that the patient's head is level. Stabilize the position of the patient's head by positioning the nose support on the bridge of the patient's nose. Make sure the patient's mouth and lips are closed in their normal resting position.

Press and hold the X-RAY ON switch to start the exposure. Keep pressing the X-RAY ON switch, and X-ray will be emitted for the time indicated in the exposure time window on the remote control. During X-ray exposure the X-RAY LED will light, and an audible signal will be heard. Release the X-RAY ON switch after the exposure is complete.

NOTE: The remote control will display an error indication if the Panoura ULTRA Pan/Ceph is not correctly set for cephalometric radiography. If an error indicator appears, check that the position of the ear rods and the beam limiter matches the cephalometric mode you have selected on the remote control. Check also that the panoramic slit plate has been positioned out of the path of the X-ray beam for cephalometric radiography. The Panoura ULTRA Pan/Ceph will not allow an X-Ray exposure to be made until all components are in their correct position for the cephalometric mode you have selected.

WARNING: Only qualified operators should operate X-Ray equipment, in conformance with all federal, state, and local regulations.

CAUTION: The X-RAY ON switch is a dead-man type. Releasing the X-RAY ON switch on the remote control during the X-ray exposure will immediately terminate the exposure, as a safety feature.

When the exposure is completed, spread open the ear rods and release the nose support so the patient can exit the Panoura ULTRA Pan/Ceph.

Remove the cassette from the cassette holder and process the film.

## B-6 Developing Films

Remove the film cassette from the Panoura ULTRA Pan/Ceph after completing the exposure. Put the cassette in a darkroom or in the daylight loader of an automatic film processor.

Open the cassette and remove the film slowly and carefully.

CAUTION: Panoramic and cephalometric X-ray films are extremely sensitive to light. Avoid all exposure to light until the film is completely developed.

Make sure that your developer and fixer are fresh and at the correct temperature for optimum results. Develop the film according to the directions of the chemistry manufacturer, or the manufacturer of your automatic film processor.

B-7 Troubleshooting

(I) Troubleshooting Films

TROUBLE	CAUSE	TROUBLESHOOTING
Anterior teeth appear enlarged and their images are not sharp.	The patient is positioned too far back from --2--.	Because the distance between the film and the patient's teeth is too great, the image size is enlarged and blurred.
Anterior teeth appear reduced or minified, and their images are blurred.	The patient is positioned too far forward from --2--.	Because the distance between the film and the patient's teeth is too short, image size is reduced and blurred.
Left or right side of the image is blurred.	1) Center of the chinrest block and the patient's mid-sagittal plane are not aligned.  2) The patient's head is positioned sideways instead of facing into the Panoura ULTRA Pan.	1) Correctly align the center of the chinrest block and the mid-sagittal plane of the patient's face during positioning.  2) Have the patient face straight forward toward the mirror during positioning.
Anterior teeth appear whitish and not well defined.	The patient's cervical vertebrae are compressed, absorbing X-ray, and appearing on the film as an artifact blocking the image of the anterior teeth.	Have the patient straighten his or her back and extend the neck during positioning. Make sure that the patient grasps the handles with both hands during positioning and during the exposure time.
A white image flows horizontally around the maxillary tooth roots. Tooth root images cannot be easily examined.	The image of the palate bones overlap with the image of the maxillary tooth roots.	Tilt the patient's head down slightly, lowering the chin, to make the eye-ear (Frankfort horizontal) plane horizontal during positioning.
A dark radial pattern is clearly seen on the film.	Discharge of static electricity caused by friction creates an artifact on the film.	Carefully and slowly remove and insert the film and intensifying screens when unloading and loading the film cassette.

<p>Film is generally dark overall with poor contrast.</p>	<ol style="list-style-type: none"> <li>1) The film was fogged by exposure to X-ray before being loaded into the cassette.</li> <li>2) Fogging by light in the darkroom.</li> <li>3) Deterioration of developer and fixer.</li> </ol>	<ol style="list-style-type: none"> <li>1) Store unexposed film in a shielded container, or in a location away from where the X-ray machines are used.</li> <li>2) Keep a distance of more than 3 feet (1 meter) between the darkroom safelight and undeveloped film. Make sure the safelight has the correct filter and bulb size. Make sure that you close the box of film before turning on any lights.</li> <li>3) Replenish or replace the developing solution and fixer.</li> </ol>
<p>Images on the film are very light.</p>	<ol style="list-style-type: none"> <li>1) Intensifying screens may be inside out, resulting in no contact between the active side of the intensifying screens and the film emulsion.</li> <li>2) Equipment failure.</li> </ol>	<ol style="list-style-type: none"> <li>1) Put the intensifying screens in the cassette in the correct orientation.</li> <li>2) Contact the service department of your dental dealer.</li> </ol>
<p>Many thin vertical lines are visible in films.</p>	<p>X-ray beam shear.</p>	<p>Contact your dental dealer's service department.</p>
<p>Images are generally thin and light.</p>	<ol style="list-style-type: none"> <li>1) Developer time is too short.</li> <li>2) Development temperature is too low.</li> <li>3) Chemistry is weak.</li> <li>4) Film and intensifying screens are not compatible.</li> <li>5) Equipment failure.</li> </ol>	<ol style="list-style-type: none"> <li>1, 2) Correct development time and temperature.</li> <li>3) Replenish or replace the developer and fixer solutions.</li> <li>4) Consult Kaycor or your dental dealer regarding the correct film for use with the intensifying screens supplied with your Panoura ULTRA Pan.</li> <li>5) Contact your dental dealer's service department.</li> </ol>
<p>Images are generally dark.</p>	<ol style="list-style-type: none"> <li>1) Developing time is too long</li> <li>2) Temperature is too high.</li> <li>3) Film and intensifying screens are not compatible.</li> </ol>	<ol style="list-style-type: none"> <li>1, 2) Correct the developing time and temperature.</li> <li>3) Consult Kaycor or your dental dealer regarding the correct film for use with the intensifying screens supplied with your Panoura ULTRA Pan.</li> </ol>

(II) Remote Control Error Messages

The following messages will be displayed in the exposure time display window if errors occur. (Radiation time will be displayed again when the errors are corrected.)

DISPLAY	ERROR MESSAGE	TROUBLESHOOTING
	Power supply voltage is too high (higher than 128V). Power supply voltage is too low (lower than 112V).	Contact your dental dealer's service department.
	The X-RAY ON switch was released before the exposure was completed.	Change the film in the cassette and make another exposure after pressing the RESET switch.
	The rotating arm hit an obstacle during rotation, and was slowed down compared with its normal rotation speed. The rotating arm rotated faster than the set speed during its rotation. The film cassette drum hit an obstacle during exposure, and was slowed down compared with its normal rotation speed. The film cassette drum rotated faster than the set speed during its rotation.	Have the patient exit the Panoura ULTRA Pan and remove the obstacle. Press the RESET switch to return the rotating arm and cassette drum to their starting positions. Make an exposure without a patient in the Panoura ULTRA Pan and observe the rotation. If the Panoura ULTRA Pan functions without errors, carefully reposition the patient and make a complete exposure. If an error message is displayed again, contact your dental dealer's service department.
	The beam limiter on the tubehead is not set for the radiography mode selected.	Slide the beam limiter adjustment knob to the center position for panoramic radiography, or to the correct side for the cephalometric mode selected.
	The slit plate is not positioned correctly for the radiography mode selected.	Rotate the slit plate into the correct position for panoramic or cephalometric radiography.
	The cephalometer and beam limiter are not positioned correctly for the view selected.	Check that the beam limited is set for the horizontal beam configuration for lateral views, and for the vertical beam configuration for the PA view.

C. MAINTENANCE

## C-1 Daily Checks

Check the following items each day when beginning and completing operation of the Panoura ULTRA Pan and ULTRA Pan/Ceph:

Before operating, check that the X-ray machine is clean and ready for patients. Make sure that bite blocks and bite block rods have been disinfected and are ready for use.

After using the X-ray machine, make certain that the main power has been turned off. For safety reasons, disconnect the power plug from the service outlet.

## C-2 Cleaning and Maintenance

### 1) Cleaning painted surfaces

Clean the Panoura ULTRA Pan's painted surfaces using a soft cloth dampened with water.

### 2) Cleaning the mirror

Use a soft cloth dampened with water or glass cleaner.

### 3) Cleaning plated surfaces

Use a soft cloth dampened with water to clean all plated surfaces.

4) Bite block cleaning and sterilization

Wash bite blocks between patients with detergent, rinsing well with water. Soak in liquid germicidal solution according to the solution directions. Do not autoclave bite blocks--they will melt. Additional bite blocks can be ordered from your dental dealer.

5) Bite block rod cleaning and sterilization

Wash and sterilize bite block rods the same way as the bite blocks. Do not autoclave. Additional bite block rods can be ordered from your dental dealer.

6) Chinrest block cleaning

Use a soft cloth dampened with water and a neutral detergent to clean the chinrest block. Dry thoroughly with a soft dry cloth.

7) Cleaning the TMJ palate support, temple supports, ear rods, and forehead support

Hair oil and makeup build up on these parts. Clean these carefully using a soft cloth dampened with water and a neutral detergent. Dry thoroughly with a soft dry cloth.

**CAUTION:** Do not use thinners, benzene, or alcohol to clean any painted or plastic parts on the Panoura ULTRA Pan or ULTRA Pan/Ceph. Use only a neutral detergent to avoid discoloration, color fading, or warping of components.

C-3 Periodic Checks

- 1) Is the power plug connected to the dedicated power supply outlet securely?
- 2) Is the power plug abnormally heated?
- 3) Is the power cord free of cracking, scratches and other defects?
- 4) Are there any loose components on the X-ray machine?

CAUTION: Failure to make periodic checks may cause equipment failures or injury. Contact your dental dealer's service department immediately if you experience any problems with the proper, safe functioning of the Panoura ULTRA Pan or ULTRA Pan/Ceph.

D. EQUIPMENT SPECIFICATIONS

Model:	Dental panoramic or combination panoramic/cephalometric X-ray unit
Name:	Panoura ULTRA Pan (panoramic) Panoura ULTRA Pan/Ceph (panoramic/cephalometric)
Type:	XP-30
High voltage generator:	Self-rectified
X-ray tube:	Superior SXR-15, or equivalent

Tube focal spot size:	1.0 mm x 1.0 mm
Tube voltage:	70, 74, 78, 82, 86, and 90, $\pm 18.5\%$
Tube current:	6 mA panoramic, $\pm 15\%$ 10 mA cephalometric, $\pm 15\%$
Exposure time:	12, 14, and 16 seconds (panoramic), $\pm 10\%$ 4 seconds x 4 (TMJ), $\pm 10\%$ 0.2 - 4.0 seconds (cephalometric), $\pm 10\%$
Image magnification:	1.2 to 1.29 (panoramic)
Inherent filtration:	2.8 mm aluminum equivalent, or greater
Intensifying screens:	Kodak Lanex Regular
Film sizes:	150 mm x 300 mm/6" x 12" (panoramic) 200 mm x 250 mm/8" x 10" (cephalometric)
Power supply:	112 - 128V AC, 50/60 Hz
Power consumption:	1.3 kVA
Maximum line current:	10A at 128V AC
Line voltage regulation:	2 - 5%

Gross weight: 150 kg/330 lbs (ULTRA Pan)  
170 kg/374 lbs (ULTRA Pan/Ceph)

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