





## ***Acknowledgements***

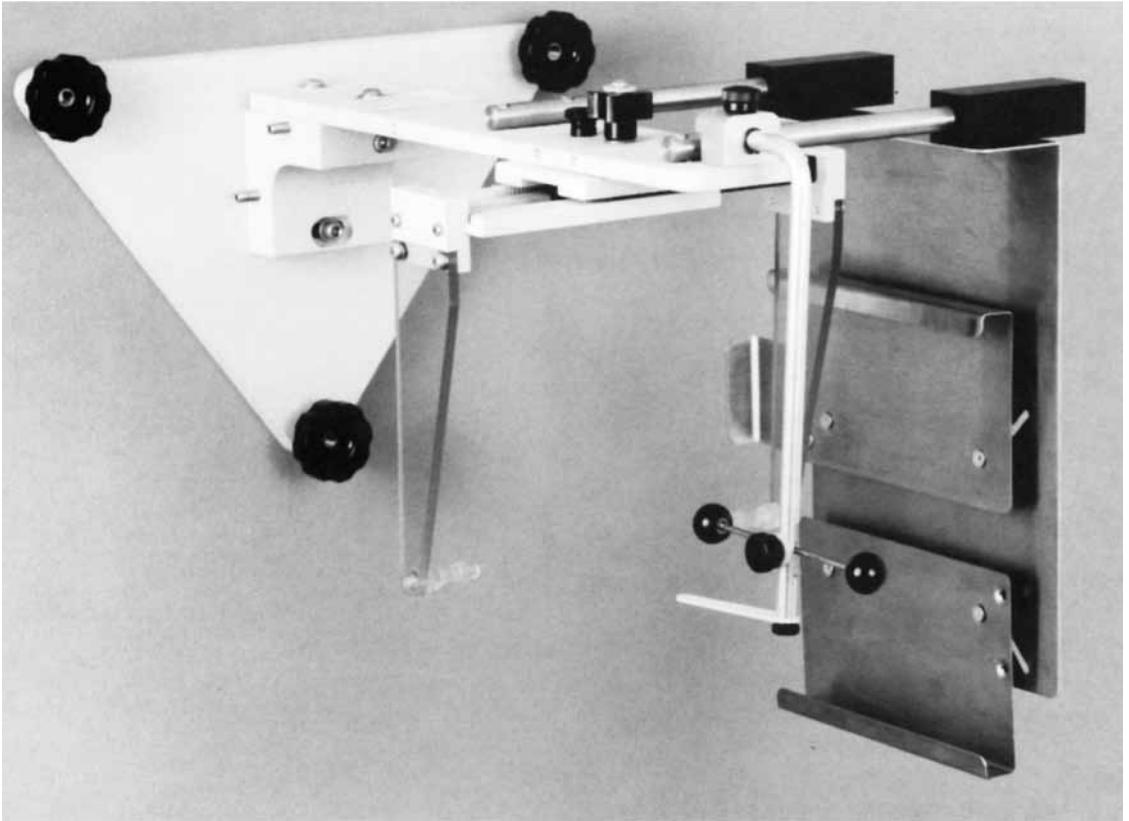
It was a gratifying experience for the Denar Corporation to introduce the Accuceph Cephalometer System.

We at Whip Mix Corporation wish to acknowledge the outstanding contributions made by Dr. Skip Truitt in helping with the design of the Accuceph System. His experience and foresight were invaluable in helping to offer the finest cephalometer system available.

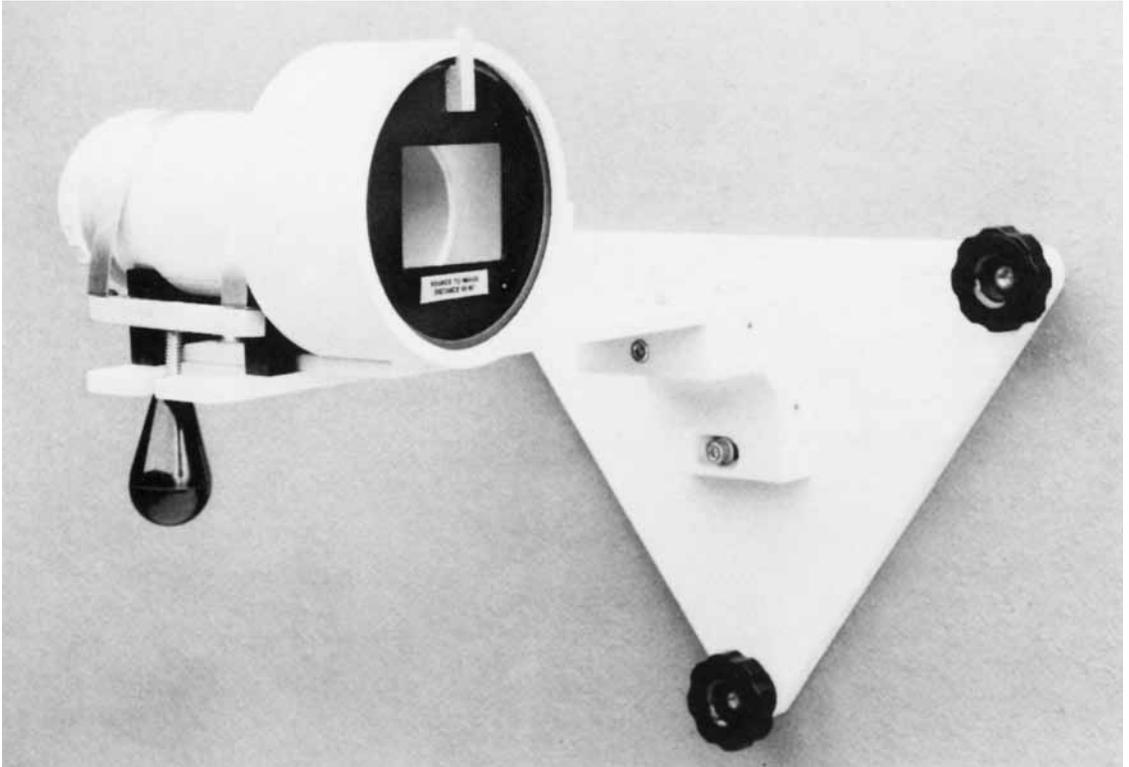


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The Cephalostat



The Fixator/Collimator

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# ***I. Features and Benefits***

The Denar® wall-mounted Accuceph Cephalometer System allows you to take precise, high quality, repeatable cephalograms. It is compatible with most cones\* and is durably designed to provide years of trouble-free use.

## ***Features***

- Rigid, sturdy construction.
- Ear post adjustment allows ear posts to move in and out simultaneously.
- Cephalostat ear post assembly rotates a full 360 degrees with 45 degree interval stops.
- Radiopaque metal rings inside plastic ear pieces.
- Cassette travel lock allows the cassette to travel with the ear posts.
- Quick-release wall plates (optional).
- Plastic orbitale pointer and nasion rest.
- Cassette and fixator/collimator adjust horizontally and vertically to allow for 8" x 10" and 10" x 8" exposures.
- Plastic cone spacer tabs.

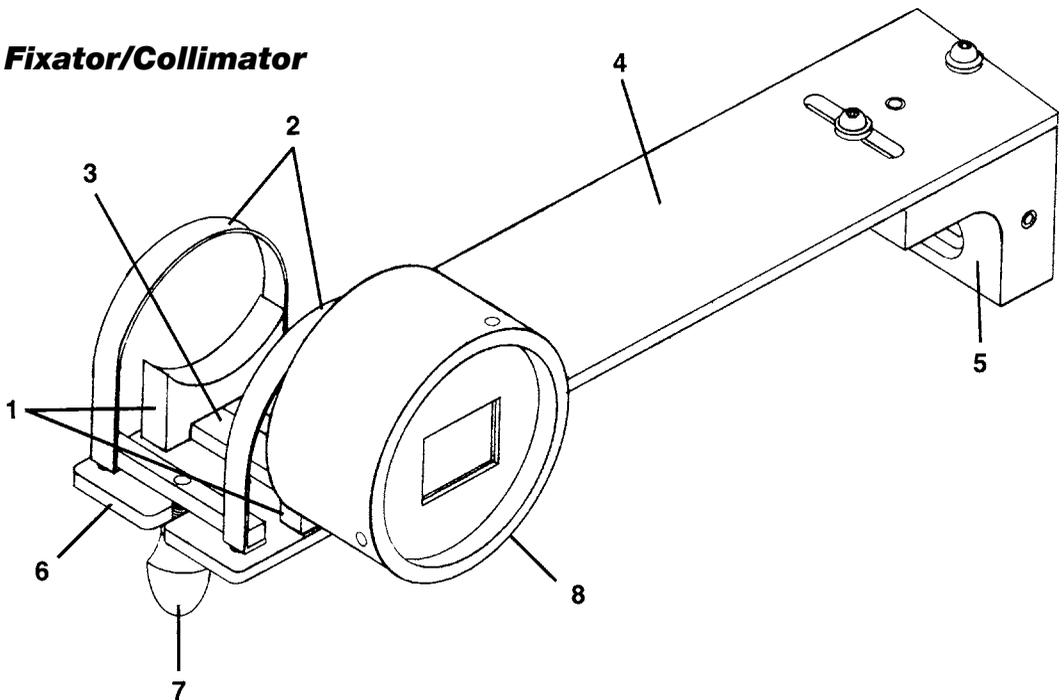
## ***Benefits***

- Maintains correct alignment of the X-ray beam to the patient for accurate cephalograms.
- Maintains a constant mid-sagittal reference plane to ensure a fixed distance from the focal point of the X-ray beam to the patient, ensuring proper image geometry.
- Maximizes versatility of the Accuceph System by allowing for lateral, anterior-posterior and posterior-anterior views.
- Identifies external auditory meatus to be used as a reference point for tracings. Confirms correct alignment of the Accuceph to the X-ray beam and patient, ensuring accuracy and repeatability of cephalograms for monitoring progressive treatment.
- Maintains the cassette as close to the patient as possible, minimizing magnification and maximizing resolution of each cephalogram for ease in tracing.
- Allows easy removal and storage of one or both parts of the system.
- Establishes and maintains proper plane for leveling the patient's head for each lateral procedure, ensuring repeatability of patient positioning throughout progressive treatment.
- Maximizes versatility of the Accuceph System by providing lateral, A-P, P-A and cervical area views for increased range of diagnosis.
- Allows use of X-ray cones less than 3 inches in diameter.

\* The Accuceph is not adaptable to short cones of the Belmont Accuracy, Yoshida Rex 70 or Yoshida X-70. For these units, longer cones are necessary.

## II. Product Identification

### Fixator/Collimator



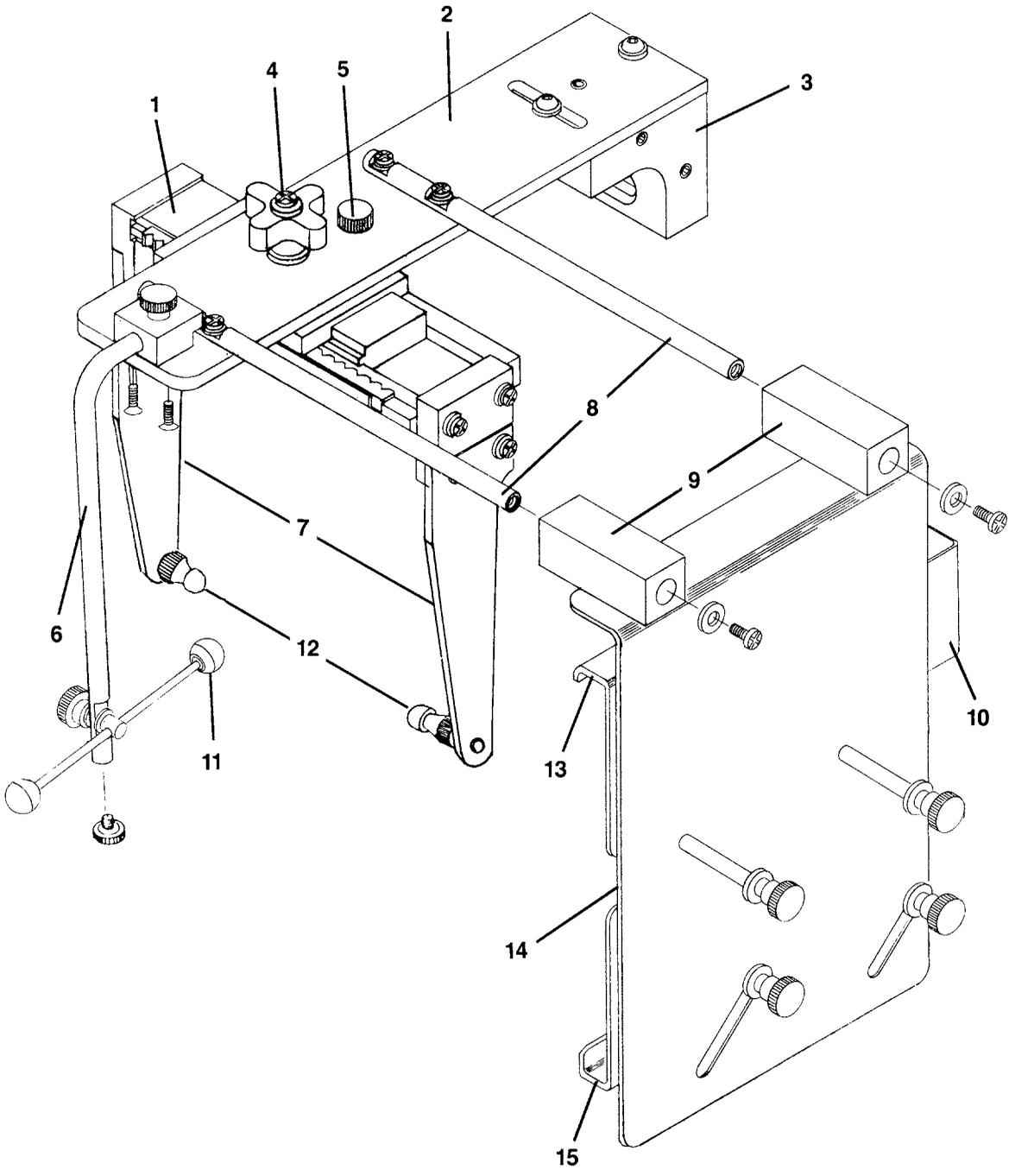
### Fixator/Collimator

1. Cone Supports
2. Cone Straps
3. Housing Platform
4. Support Bar
5. Mounting Block
6. Fixator Base
7. Lock Handle
8. Cone Housing

### Cephalostat

1. Ear Post Assembly
2. Support Bar
3. Mounting Block
4. Ear Post Control Knob
5. Ear Post Rotation Lock
6. Orbiton/Nasion Bar
7. Ear Posts
8. Travel Rods
9. Travel Blocks
10. Cassette Stop
11. Nasion Rest
12. Ear Pieces
13. Upper Cassette Carrier
14. Cassette Carrier Main Plate
15. Lower Cassette Carrier

# Cephalostat



### III. Installation of the Accuceph Cephalometer System

#### A. Placement Considerations

To determine the best location for the Accuceph System, the following conditions must be met:

1. Be sure the wall structure is adequate to support the system. (A  $\frac{5}{8}$ " to  $\frac{3}{4}$ " "dry wall" normally provides sufficient support.) Whenever possible, it is preferable to center the wall plates for the cephalostat and fixator/collimator directly over studs in the wall.
2. You must provide a 60 inch (152.4cm) distance from the focal point of the X-ray beam to the mid-sagittal plane of the cephalostat.
3. Be sure that any obstacles between the fixator/collimator and cephalostat will not project into the primary beam. An obstacle projecting out from the wall 8 inches or less will not interfere with the primary beam.
4. You must have easy access to place the X-ray cone into the fixator/collimator. The top edge of the fixator/collimator wall plate should be 51 $\frac{3}{8}$  inches (130.5cm) from the floor. (See drawing below.)

a. The vertical mounting height of 51 $\frac{3}{8}$  inches is based on using the Accuceph System with an adjustable patient chair which has a minimum seat height of 20 inches from the floor and a vertical adjustment capability of approximately 7 or 8 inches. If the chair to be used has a higher minimum height, adjust the installation height of the Accuceph System accordingly.

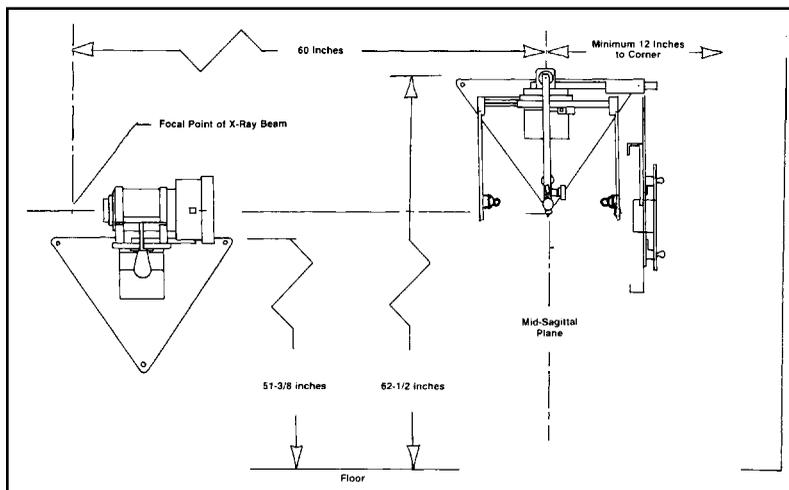
5. Do not install the Accuceph System so that work areas or film processing areas are located in the path of radiation. Protective barriers should be used if there is any possibility of irradiating office personnel. Outside walls or walls capable of attenuating radiation are most suitable for this purpose.

6. If you mount the cephalostat in a corner, allow a minimum of 12 inches from the mid-sagittal plane of the cephalostat wall plate to the adjacent wall. More distance is desirable to allow room for patients' knees when taking a posterior-anterior (P-A) film.

7. When mounting the Accuceph System, be sure that the top edges of the cephalostat wall plate and fixator/collimator wall plate are level. (Verify with a "bubble level" device.)

Dry wall installations require:

- (8)  $\frac{1}{4}$ " x 20 Molley Bolts
  - (8)  $\frac{1}{4}$ " x 20 x 2" Flat Head Screws. Replace Molley Bolt Round Head Screws.
  - (4) #12 x 1 $\frac{1}{2}$ " Flat Head Wood Screws. Use for mounting to wood stud.
- Masonry wall installations require:
- (8)  $\frac{1}{4}$ " x 20 x 2" Flat Head Screws with suitable lead anchors.



## B. Installing the Fixator/Collimator

The suggested mounting height for the fixator/collimator wall plate is 51 $\frac{3}{8}$  inches from the floor to the top edge of the plate (see drawing, page 8). After determining the proper location for the fixator/collimator, use the wall plate as a template and mark the location of the fastener holes. (The wall plates for the fixator/collimator and the cephalostat are identical.) Use appropriate fasteners and secure the wall plate to the wall, being certain it is level.

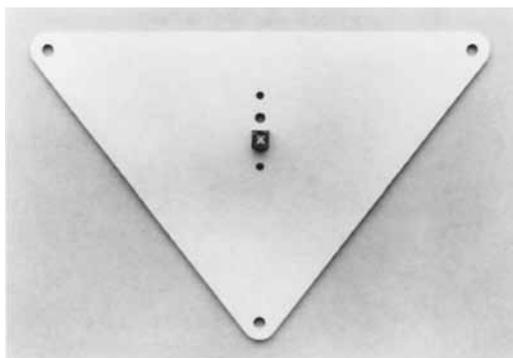


Figure 1

**Note:** These instructions are for placement of the standard wall plate (Figure 1). If you have the optional quick-release wall plate, it has a slightly modified configuration of holes (Figure 2) and you must follow these steps for installation:

1. Attach the fixator/collimator quick release wall plate to the wall as described above.

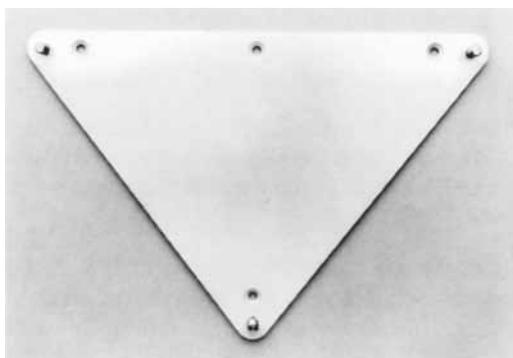


Figure 2

2. Place the holes of the standard wall plate over the screws extending from the quick-release wall plate and slide the standard plate forward until it is in full contact with the quick-release plate.

3. Secure the standard plate in position with the supplied black knobs (Figure 3).



Figure 3

4. To dismantle the standard wall plate, simply remove the black knobs, then remove the standard plate from the quick-release plate. Store the knobs by securing them in place on the quick-release plate.

Attach the fixator/collimator to the wall plate with the two mounting block screws (Figure 4)

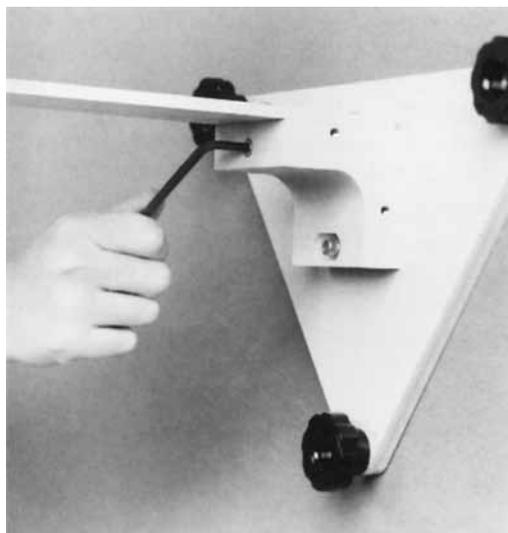


Figure 4

To establish the correct horizontal distance from the fixator/collimator to the cephalostat, you must locate the focal point of the X-ray beam. In some cases, this point will be marked on the outside of the tube head housing. If it is not marked, call the manufacturer for this information or refer to the procedure outlined in Appendix A to establish its exact location.

Transfer the location of the focal point from the tubehead housing to the wall by following these steps:

1. Insert the X-ray cone into the fixator/collimator with the front end of the cone at least 1 inch inside the cradled cone housing. If the outer diameter of the cone is 3 inches, no adjustment is necessary to properly center the cone.



Figure 5

a. If the outer diameter of the cone is less than 3 inches, spacer tabs (16 included with each unit) must be added to achieve proper centering. To determine how many spacer tabs are necessary, measure the outer diameter of the cone and subtract this measurement from 3 inches. For each 1/8" of difference, add 2 spacer tabs to each cone support (Figure 5).

2. Secure the cone into position by sliding the threaded shank of the lock handle into the slot on the fixator/collimator base and tightening the knob (Figure 6).

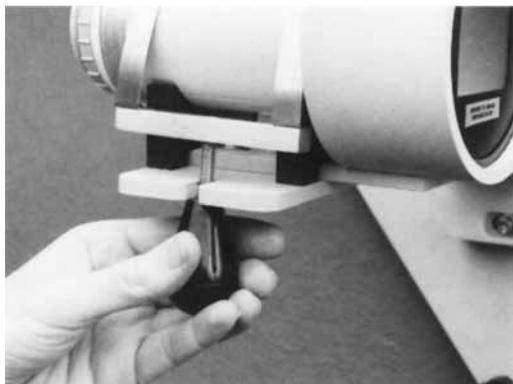


Figure 6

3. Locate the focal point of the X-ray beam and transfer that point straight back to the wall, marking the wall with a pencil or a piece of tape.

### C. Installing the Cephalostat

Measure 60 inches horizontally from the focal point of the X-ray beam toward the intended placement of the cephalostat and mark that point on the wall. (The mid-sagittal plane of the cephalostat wall plate must be 60 inches from the focal point of the X-ray beam.) Position the cephalostat wall plate so the 60-inch mark aligns with the mid-sagittal plane of the cephalostat wall plate and the top edge of the wall plate is 62½ inches from the floor (see drawing, page 8).

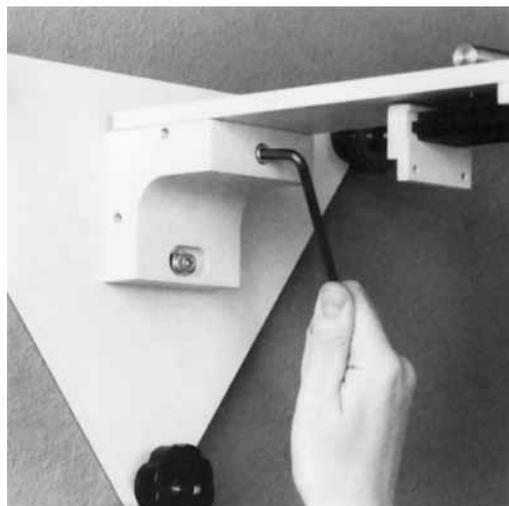


Figure 7

Using the wall plate as a template, mark the location of the fastener holes. Using appropriate fasteners, secure the cephalostat wall plate to the wall being certain it is level. Attach the cephalostat to the wall plate with the two mounting block screws (Figure 7). (Note: If you are using the quick-release wall plate, refer to Section III-B, Steps 1-4.)

Next, attach the wooden ear posts to the slide block with the supplied screws (Figure 8). Install the ear posts so the ear pieces will face the patient.

To complete assembly of the unit, attach the orbitale indicator to the base of the orbiton/nasion bar. Remove the knob at the base of the bar, insert the indicator onto the knob and reinsert into the bar (Figure 9).

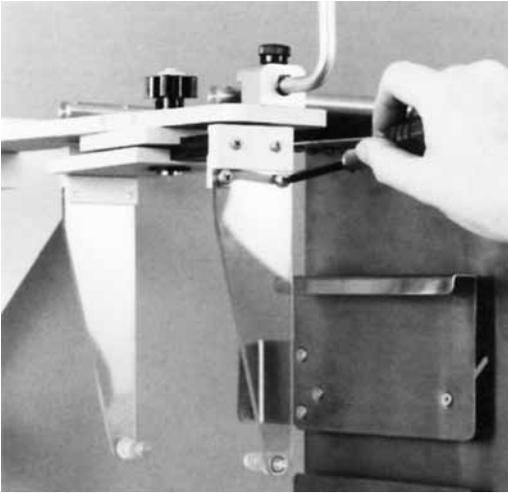


Figure 8

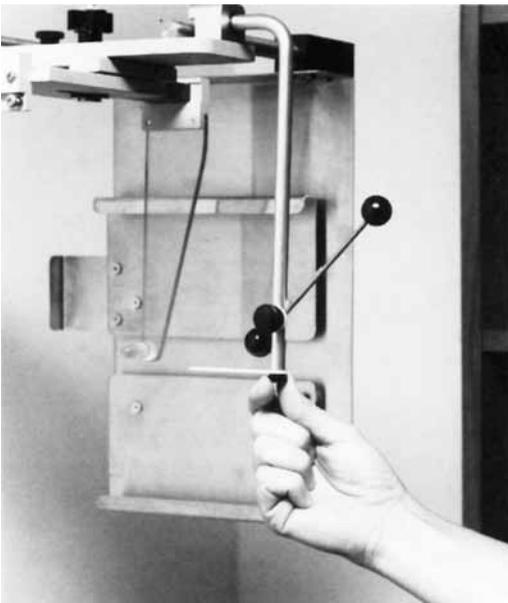


Figure 9

#### D. Reverse Set-Up

Normally, the Accuceph System is installed so the cassette is on the patient's left side. Occasionally it is impossible to mount the Accuceph System in this manner and a reverse set-up is required. Follow this procedure for a reverse set-up:

##### **On the Cephalostat:**

1. Remove the ear post rotation lock (Figure 10) and rotate the ear post assembly until it is parallel to the support bar. Reinsert the ear post rotation lock.

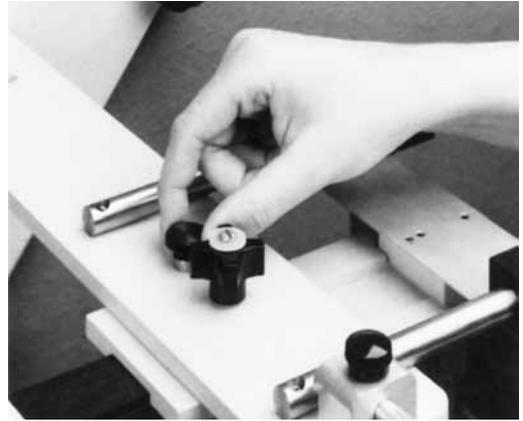


Figure 10

2. Remove the screws and plastic rings from the end of both cassette travel rods (Figure 11).

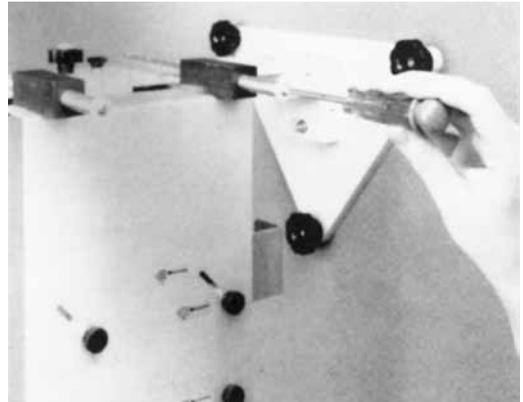


Figure 11

3. Slide the cassette carrier assembly off of the travel rods (Figure 12).

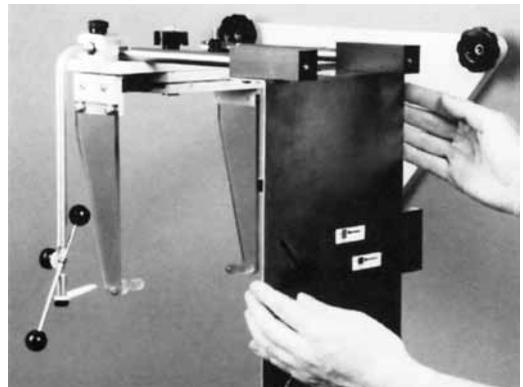


Figure 12

4. Remove both travel rods from the support bar by removing all four pan head screws (Figure 13)

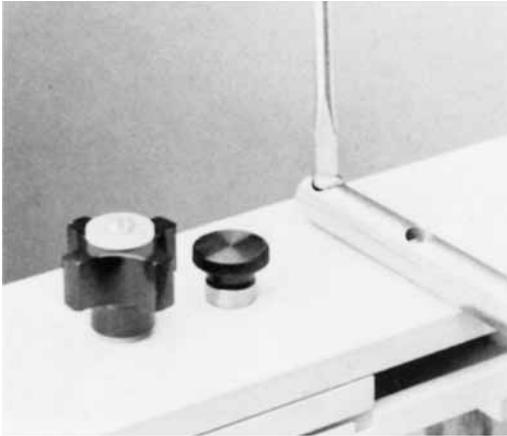


Figure 13

5. Turn the rods around and, using the four screws, re-attach them facing the opposite direction. Note: **Do not tighten the screws all the way at this point.**

6. Slide the cassette carrier assembly onto the rods, **being sure the cassette stop faces the wall plate.** Slide it forward until the black travel blocks touch the support bar (Figure 14). Tighten all four screws securely.

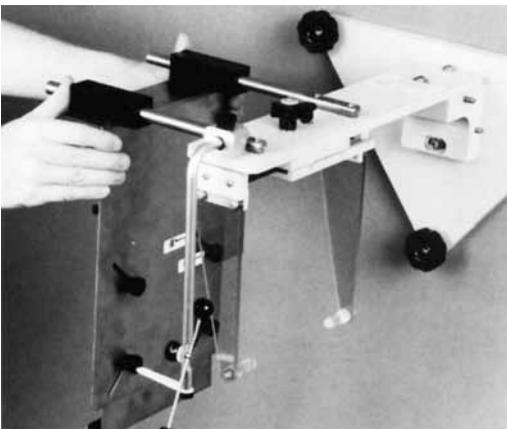


Figure 14

7. Reinsert the plastic rings and screws into the ends of the travel rods.

8. Remove the four black knobs on the cassette carrier main plate (Figure 15) and remove the upper and lower cassette carriers.

9. Position the cassette carriers on the opposite side of the main plate, **being sure the cassette stop faces the wall plate.** Secure the carriers in place with the four black knobs. (See Figure 16 for correct installation.)

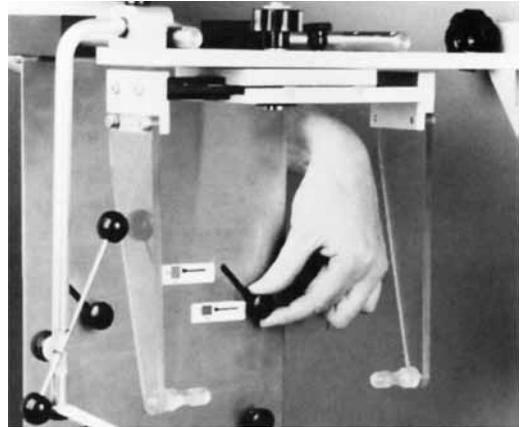


Figure 15

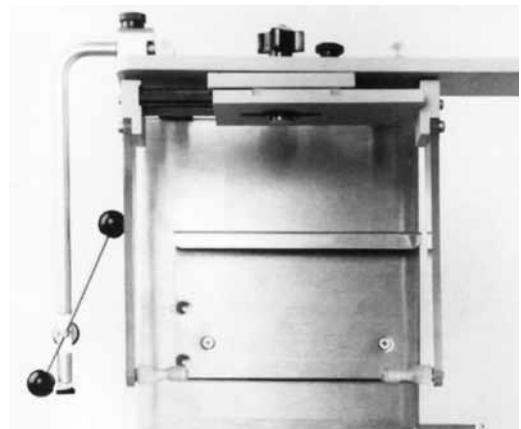


Figure 16

10. Attach the reversal adapter bar to the top of the cassette carrier main plate by inserting the dowel pin through the hole closest to the front of the plate (Figure 17). Secure the bar in position by attaching the screw from underneath.

- a. To use the cassette travel lock with the reversal adapter bar, insert the lock in the hole closest to the dowel pin (Figure 18).

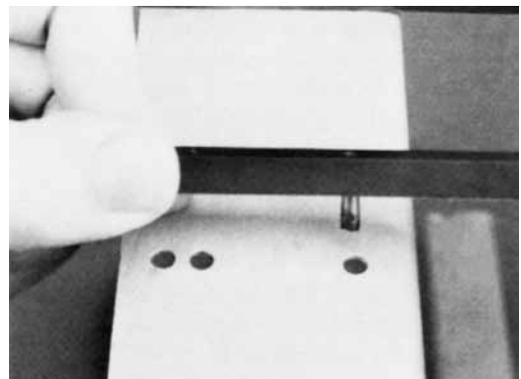


Figure 17

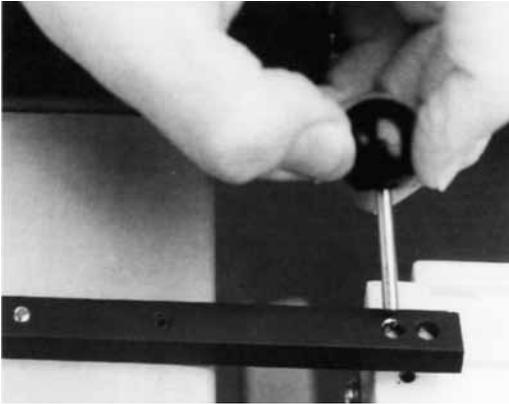


Figure 18

### **On the Fixator/Collimator**

1. Remove the two button head screws and washers from the housing platform (Figure 19). Slide the platform off of the fixator base. Turn it around and slide it back on the base facing the opposite direction. Secure in place with the washers and screws.

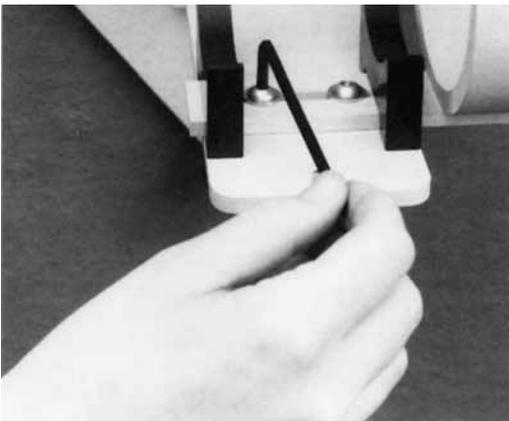


Figure 19

### **E. Alignment Adjustments/Test Films**

It is necessary to make final adjustments to the mounted Accuceph System in order to (1) center the image field, (2) confirm image size and (3) precisely align the ear pieces.

1. **To Center the Image Field.** Check the cassette format indicators to be sure the setting of the cephalostat corresponds with the setting of the fixator/collimator (Figure 20). (Both should be set in the 8" x 10" **horizontal** format for test films.)

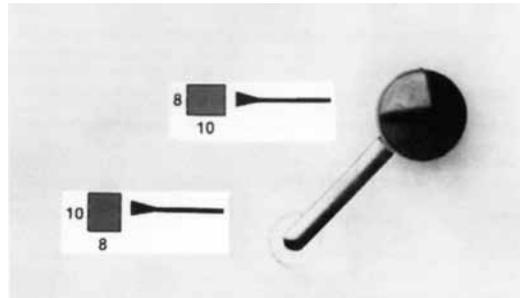
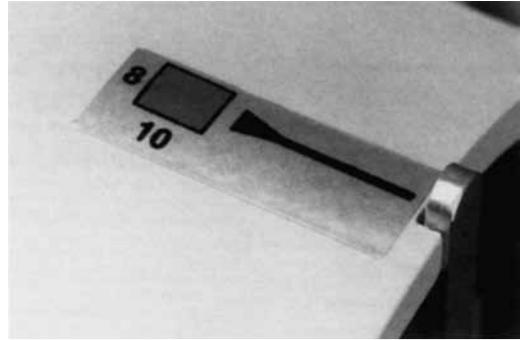


Figure 20

Open the cassette and insert it into the cassette carrier with the white intensifying screen facing the tubehead (Figure 21). Be sure the edge of the cassette touches the cassette stop.

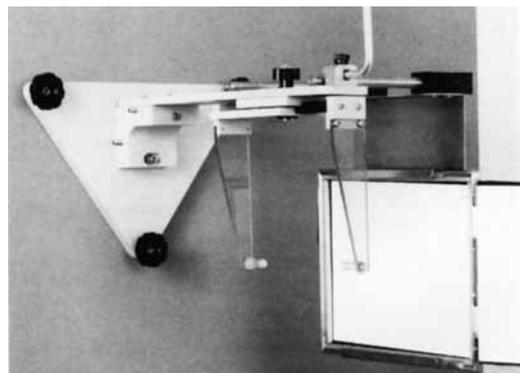


Figure 21

Darken the room and align the tubehead in the fixator/collimator. (The front end of the X-ray cone must be at least 1 inch inside the cradled cone housing.) Stand behind the tubehead and make an exposure. The Rare Earth screen will fluoresce, enabling you to visually confirm the alignment of the X-ray beam. (Note: Conventional calcium tungstate medium-speed and high-speed screened cassettes will not fluoresce.)

If **horizontal** adjustments are necessary to center the beam in the image field, slightly loosen the two support bar screws on the fixator/collimator (Figure 22) just enough to allow the support bar to pivot. Pivot the bar side to side to achieve correct centering of the X-ray beam. (Fluoresce the screen as described to confirm the accuracy of adjustments.) When final adjustments are complete, securely tighten the two support bar screws. Tighten the upper two set screws on the mounting block; there is one on each side (Figure 23).

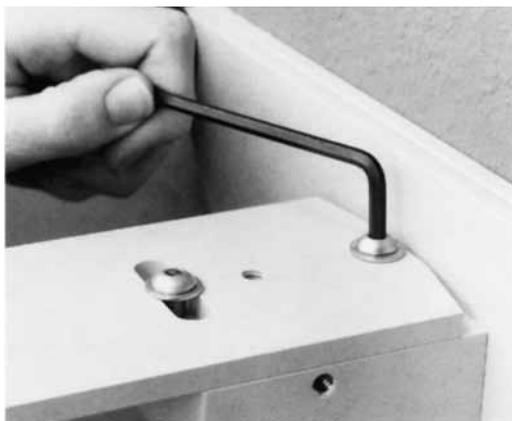


Figure 22

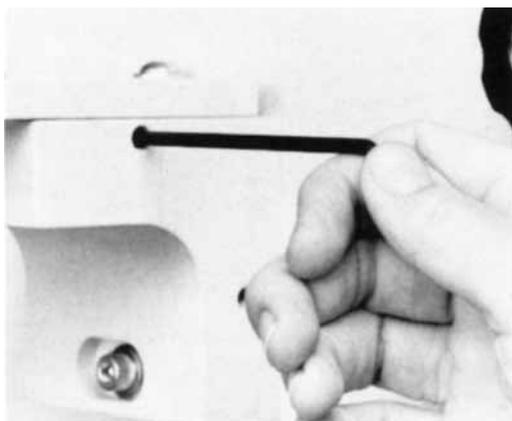


Figure 23

If **vertical** adjustments are necessary to center the beam in the image field, Slightly loosen the two mounting block screws on the **fixator/collimator** just enough to allow the mounting block to pivot. Pivot the block up and down until you have achieved correct centering of the X-ray beam. (Fluoresce the screen as described above to confirm the accuracy of adjustments.) When final adjustments are complete, securely tighten the two mounting block

screws. Tighten the lower two set screws on the mounting block; there is one on each side (Figure 24).

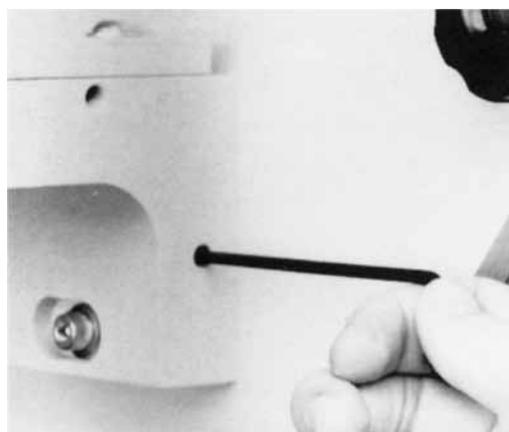
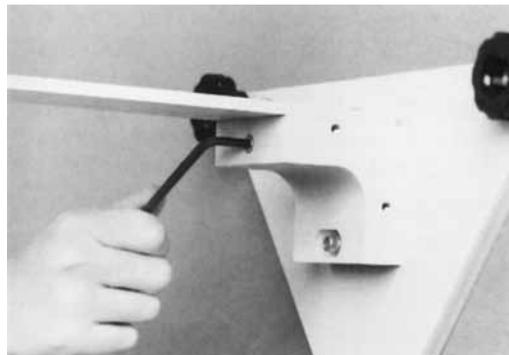


Figure 24

**2. To Confirm Image Size.** With the tube-head/cone placed in the fixator/collimator as described above, the image should be within  $\frac{1}{2}$ " of the cassette borders. (The total image field must not exceed 9.2" x 11.2".) If adjustments need to be made, you may (a) relocate the cone in the cradle (being certain the front end of the cone is at least 1 inch inside the cradled cone housing) or (b) loosen the two screws on the housing platform (Figure 25) to allow the platform to slide along the fixator base. Sliding the cone or housing platform in the direction of the cephalostat reduces the image size. Sliding the cone or housing platform away from the cephalostat increases the image size.

After making any needed adjustments, secure the cone and/or tighten the two screws on the housing platform. Confirm image size by fluorescing the screen.

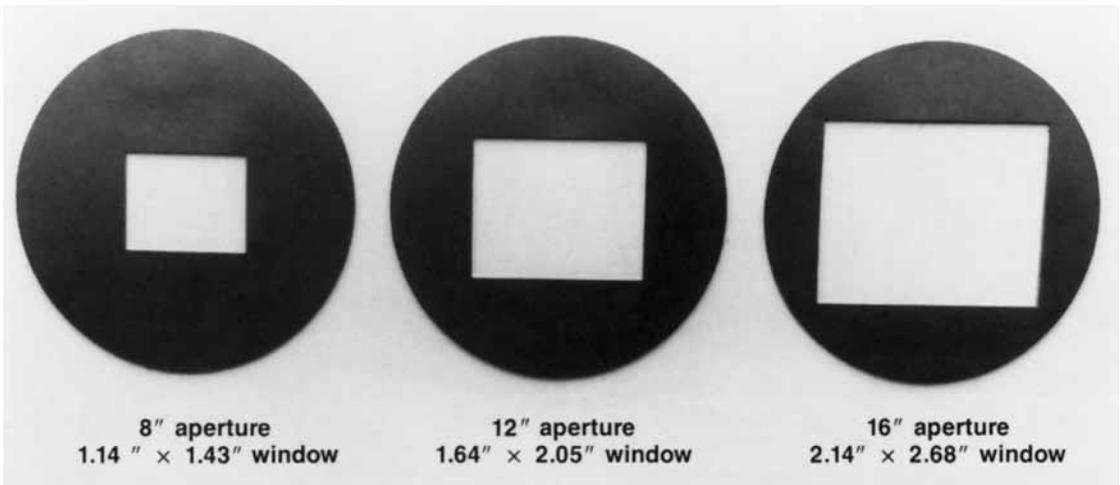


Figure 26

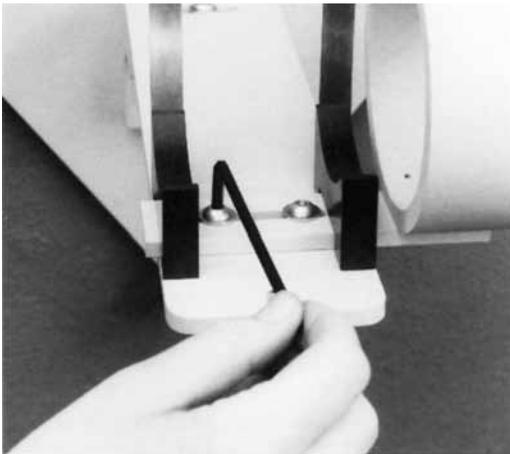


Figure 25

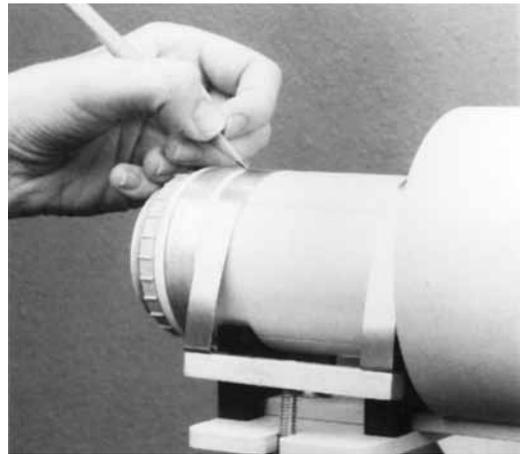


Figure 27

If the image is too small after adjustment, the aperture on the fixator/collimator is for an 8" or 12" technique and you need a larger aperture. You may order this aperture from Denar (Figure 26).

**IMPORTANT:** Before removing the cone from the fixator/collimator, mark the exact spot where the rearmost cone strap wraps around the cone (Figure 27). Remove the cone and attach the foil strip provided to mark the proper placement of the cone in the fixator/collimator (Figure 28). You will need this landmark in order to re-establish the proper location of the cone when you set up for future cephalometric exposures.

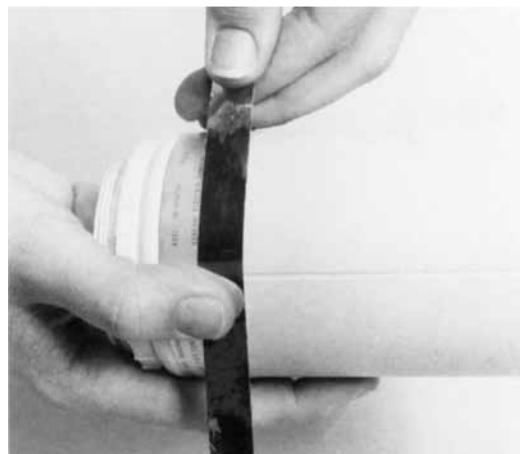


Figure 28

3. To Align Ear Pieces. Metal rings are implanted in each ear piece and will appear on the cephalogram as circles; the ring in the ear piece closest to the cassette will

appear smaller. When the unit is properly aligned, the smaller circle should be centered within the larger circle.

Be sure the two support bar screws and two mounting block screws on the cephalostat are secure. Tighten all four set screws on the cephalostat mounting block.

Adjust the ear posts for a standard lateral (horizontal) cephalogram projection. Loosen the ear post control knob (Figure 29) and close the ear posts approximately half way to simulate the width of a patient's head. Secure the ear posts by tightening the ear post control knob.

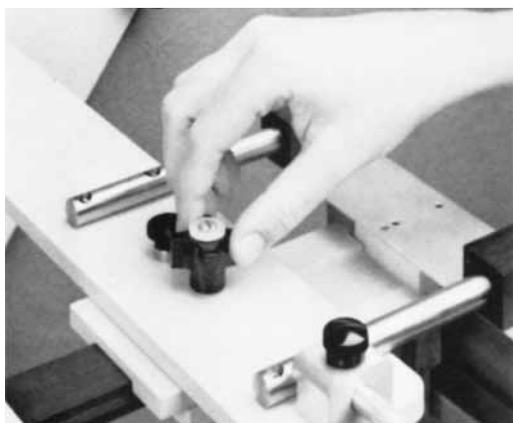


Figure 29

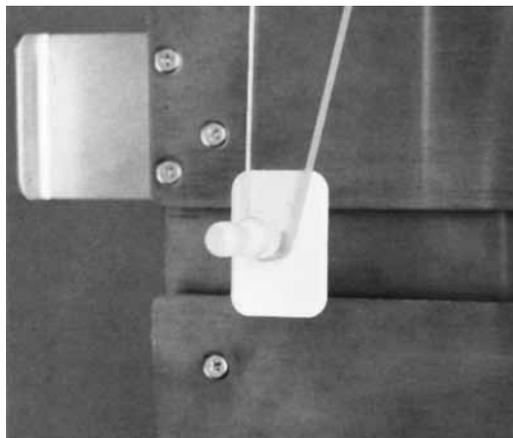


Figure 30

Tape an intra-oral film with the tab up on the cassette side of the ear post closest to the cassette (Figure 30). The dimple on the film will be located in the upper right corner projecting out in the direction of the tube-head. Make an exposure at the suggested exposure time for an adult as shown on the exposure time chart on page 22 . On the processed film, identify the dimple in the

upper right corner and the smallest ring (that closest to the cassette). If the metal rings are not centrally aligned one inside the other, adjust as follows:

To make **horizontal** adjustments, **slightly** loosen the two support bar screws on the **cephalostat**. Next, adjust the **upper** two set screws on the mounting block (Figure 31); one set screw must be loosened and the opposite one tightened to cause horizontal movement. (Example: As you **face the wall plate**, if you loosen the left set screw and tighten the right set screw, the metal ring closest to the cassette will move away from the wall.)

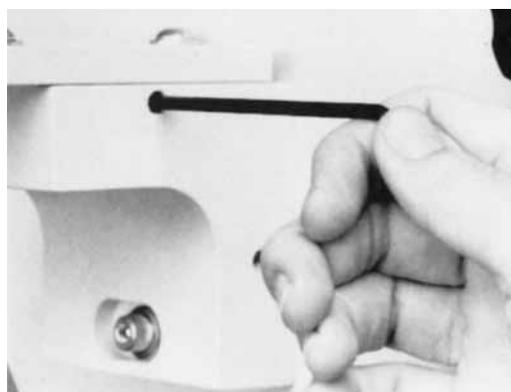


Figure 31

To make **vertical** adjustments, **slightly** loosen the two mounting block screws on the cephalostat. Next, adjust the **lower** two set screws on the mounting block (Figure 32); one set screw must be loosened and the opposite one tightened to cause vertical movement. (Example: As you **face the wall plate**, if you loosen the left set screw and tighten the right set screw, the metal ring closest to the cassette will move up.)

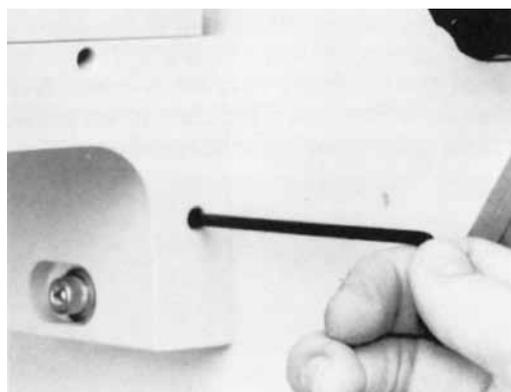


Figure 32

Confirm proper metal ring alignment with another intra-oral film as outlined above. Readjust if necessary. When you have finalized adjustments, securely tighten the two support bar screws and the two mounting block screws.

**4. Final Test Film.** When all adjustments are complete, make a final 8" x 10" horizontal test film to verify (1) centering of the image field, (2) proper image size and (3) correct alignment of the ear pieces.

To make the test film, push the cassette carrier assembly until it is in contact with the ear post (Figure 33). (Option: Insert the cassette travel lock in the center hole of the cassette carrier assembly to allow the cassette to travel with the ear post. Figure 34).

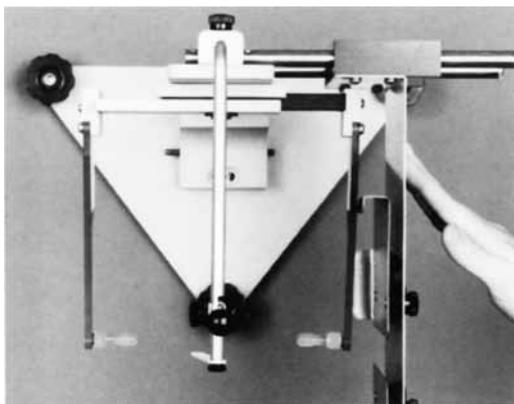


Figure 33

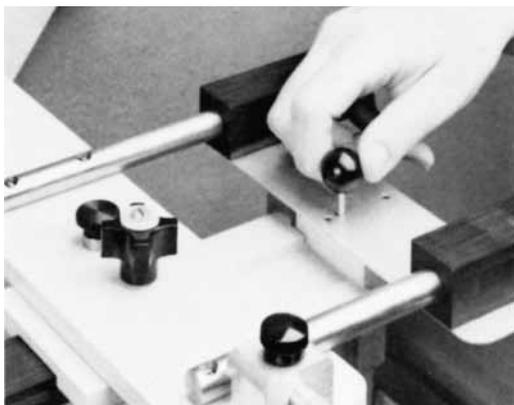


Figure 34

Load the cassette (refer to Section IV-A) and insert it into the cassette carrier assembly until the edge of the cassette touches the cassette stop. Make a test exposure and confirm image size and centering on the processed film.

If the image size is incorrect or improperly centered, further alignment adjustments should be made on the fixator/collimator.

If the image size is correct but the ear piece alignment needs further adjustment, make the necessary adjustments on the cephalostat.

#### F. To Change Horizontal/Vertical Cephalogram Format

1. **Cassette Carrier Assembly.** When the cassette carrier assembly is set in the 8" x 10" horizontal format, the main plate will appear as shown in Figure 35.

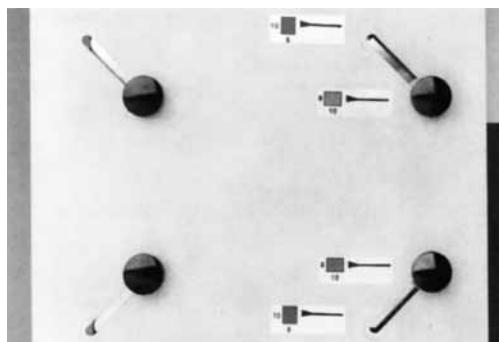


Figure 35

To change the cassette carrier assembly from the 8" x 10" format to the 10" x 8" format, follow these steps:

- a. Loosen (but do not remove) the four black knobs on the cassette carrier main plate.
- b. Simultaneously pull the top two knobs to the highest point in the slots; tighten the knobs.
- c. Simultaneously pull the bottom two knobs to the lowest point in the slots; tighten the knobs.

If the cassette carrier assembly is set in the 10" x 8" vertical format, the main plate will appear as shown in Figure 36.

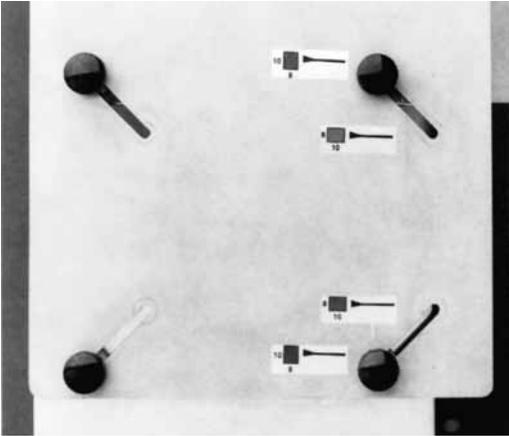


Figure 36

To change the cassette carrier assembly from the 10" x 8" format to the 8" x 10" format, follow these steps:

- a. Loosen (but do not remove) the four black knobs on the cassette carrier main plate.
- b. Simultaneously pull the top two knobs to the lowest point in the slots; tighten the knobs.
- c. Simultaneously pull the bottom two knobs to the highest point in the slots; tighten the knobs.

**2. Fixator/Collimator.** To change the format of the fixator/collimator, simply rotate the housing until the housing lever corresponds to the desired setting as marked on the unit (Figure 37).

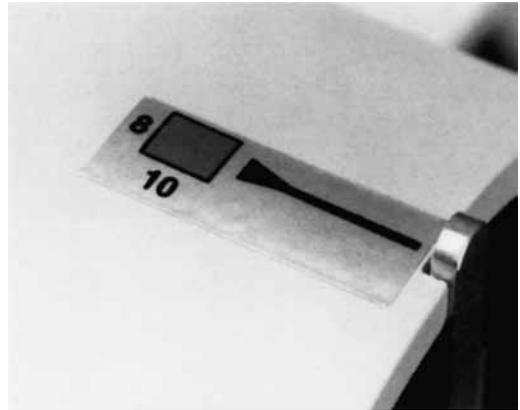


Figure 37

## IV. Procedures for Use of the Accuceph Cephalometer System

### A. Loading the Cassette

This procedure must be done in complete darkness or under the required filter. (See Appendix B - Film Considerations.)

1. Remove the protective paper from the film.
2. Open the cassette by turning and releasing the two metal spring bars (Figure 38).
3. Insert the film into the cassette, close and latch.

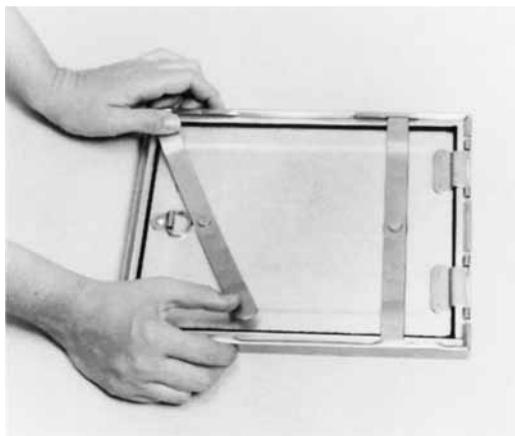


Figure 38

### B. Patient Positioning

**1. Initial Set-Up Checklist.** Before a patient is positioned in the cephalostat, routinely follow these steps:

- Be sure the cassette carrier is set for the correct format to be used (8" x 10" for lateral views or 10" x 8" for A-P or P-A views).
- Be sure the fixator/collimator is set to the same format as the cassette carrier. (To adjust the cassette or collimator settings, refer to Section III-F.)
- Engage the X-ray cone in the fixator/collimator. Position the cone so the rearmost cone strap exactly covers the foil strip that was affixed to the cone. Secure the cone into position by sliding the threaded shank of the lock handle into the slot on the fixator/collimator base and tightening the knob.

**2. Lateral View.** Loosen the nasion rest control knob and retract the nasion rest to its farthest position. Direct the orbitale indicator away from the wall plate.



Figure 39

With the orbiton/nasion bar in the "up" position and the fixator/collimator and cephalostat adjusted in the 8" x 10" **horizontal** format, seat the patient erect within the cephalostat (Figure 39). It is suggested that the patient be instructed to sit on the chair with his/her feet firmly planted on the floor. The patient should grasp the two ear posts and assist the operator in carefully moving the ear pieces into the external auditory meatus. Instruct the patient to move his/her head as the ear pieces seat into uniform positioning. The ear pieces should be brought in far enough to adequately secure the patient's mid-sagittal plane symmetry, but not so far as to cause pain. **To avoid possible pain or ear damage, be very careful not to exert excessive pressure when moving the ear pieces into the patient's ears.** Secure the ear posts by tightening the ear post control knob.

**Note:** The ear pieces are removable for cleaning. To remove, simply twist and pull the pieces from the plastic tubes. Clean with isopropyl alcohol.

Swing the orbiton/nasion bar to the “down” position (Figure 40). The orbitale indicator and nasion rest should not be touching the patient. Position the patient so his/her Frankfort plane is parallel to the floor. (The Frankfort Plane is an imaginary line drawn from the highest margin of the auditory meatus to the lowest rim of the orbitale.) Locate the patient’s infra-orbital notch (orbitale) and swing the indicator towards the notch. Secure the patient in this position with the nasion rest.



Figure 40

Insert a loaded cassette into the cassette carrier assembly until the edge of the cassette contacts the cassette stop. Move the carrier toward the ear post to minimize the space between the cassette and the patient. (If the cassette travel lock is engaged, the cassette will automatically travel with the ear post.)

You are now ready to make an exposure (Figure 41). (Refer to Section V–Exposure Charts.)

- a. **Soft Tissue Shield** (optional). Hang the soft tissue shield on the cassette so the straight edge of the shield lines up with the edge of the cassette (Figure 42). Verify that the anterior edge of the cassette and soft tissue shield will cover and record the facial profile. If necessary, adjust by sliding the soft tissue shield and/or cassette in the needed direction. (See “Appendix C–Soft Tissue Shield” for further information on the use of this accessory item.)

- b. **Post-Exposure.** Release the nasion

rest and retract it as far as possible. Swing the orbitale indicator away from the patient and move the orbiton/nasion bar to the “up” position.



Figure 41

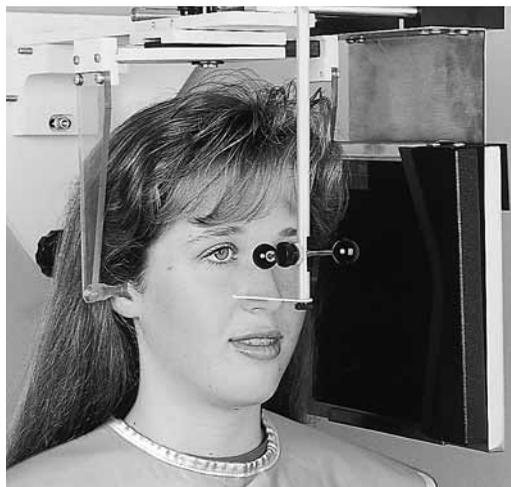


Figure 42

Loosen the ear post control knob and open the ear posts.

Guide the patient to avoid contact with any part of the cephalostat while moving away from the unit.

**3. Posterior-Anterior View.** Go through the initial set-up checklist (refer to Section IV-B-1).

Remove the cassette travel lock and store it in the hole closest to the front of the main plate (Figure 43). Both the fixator/collimator and cassette holder should be adjusted in the 10" x 8" **vertical** format.

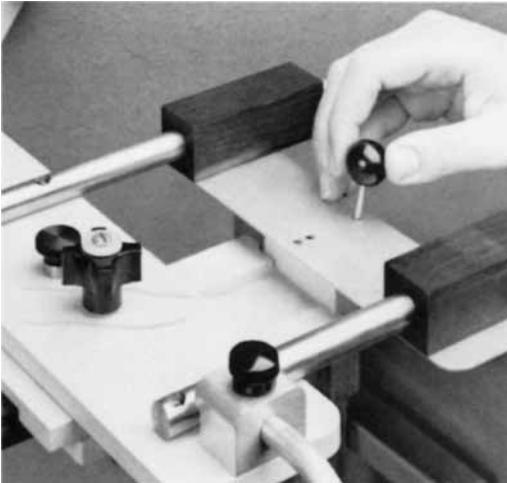


Figure 43

Remove the ear post rotation lock (Figure 44) and rotate the ear post assembly clockwise 90 degrees. Replace the ear post rotation lock.

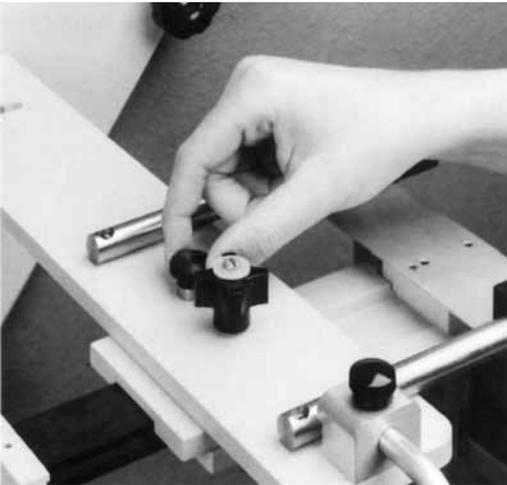


Figure 44

With the orbiton/nasion bar in the “up” position, seat the patient within the head holder facing the cassette carrier assembly. Load the cassette and insert it into the cassette carrier assembly until the edge of the cassette contacts the edge guide. Move the cassette as close to the patient as possible.

Secure the ear pieces in the patient’s ears as described above. Be sure the patient is positioned so that his/her Frankfort plane is parallel to the floor. You are now ready to make an exposure (Figure 45). **Note:** For AP and PA views, increase exposure time 50%.

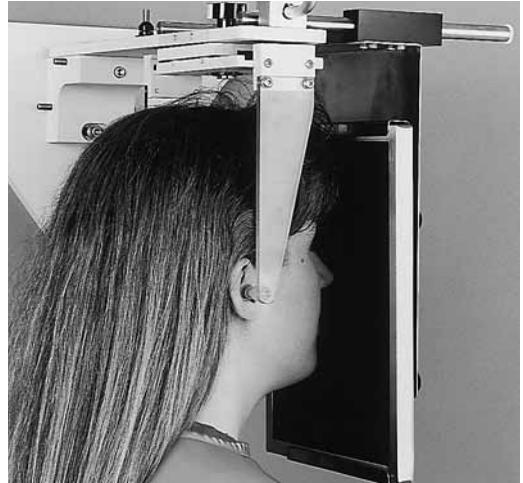


Figure 45

**4. Anterior-Posterior View.** To set up a patient for an A-P view, follow the procedures outlined for a P-A view, except seat the patient within the cephalostat facing away from the cassette carrier assembly. When the cassette has been loaded with film and inserted into the cassette carrier assembly, move the cassette as close to the back of the patient’s head as possible. Be sure the patient is positioned so that his/her Frankfort plane is parallel to the floor. You are now ready to make an exposure (Figure 46). **Note:** For AP and PA views, increase exposure time 50%.

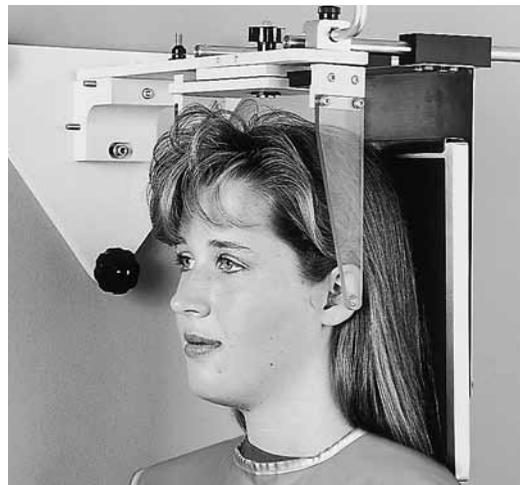


Figure 46



Figure 47

**5. TMJ View.** To set up a patient for a view of the TMJ, follow the procedures outlined for a lateral view except rotate the ear post assembly 20 degrees (Figure 47) as indicated on the support bar (Figure 48) for the right or left TMJ.

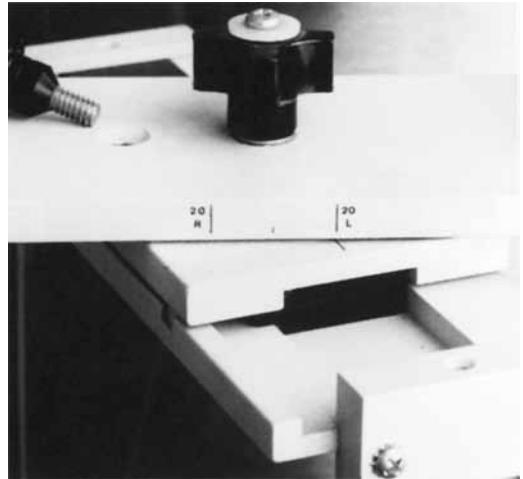


Figure 48

**6. Other Views.** The ear post assembly rotates a full 360 degrees with 45 degree interval stops. If you wish to set the cephalostat for an oblique view, simply remove the ear post rotation lock, rotate the ear post assembly to the desired location and replace the lock.

## V. Exposure Charts

### A. Suggested Exposure Guidelines for Lanex Rare Earth Intensifying Screens/OG or OL Film

(for Lateral Cephalograms)\*  
 Focal Length: 60 Inches  
 (Exposure Time in Impulses)\*\*

	8" or 16" Technique												
<b>KVP</b>	90	90	80	80	70	70	70	65	65	60	60	55	50
<b>Ma</b>	15	13	15	10	15	10	7	15	10	10	7	7	7
Child	9	13	12	17	19	30	40	24	38	49	66	91	
Adult	12	17	16	22	26	40	53	32	50	68	88	113	
Large Adult	13	20	17	26	30	42	60	38	57	74	99	135	

Not recommended.

See page 24 for decimal and fraction conversions.

\*For A-P and P-A views, increase exposure times 50%.

\*\*These are optimum times which maximize bone/tooth contrast. Reduce times by 20% if tissue is to be emphasized.

Selected Techniques for this Office	
_____ KVP	_____ Ma
	Exposure Time Selected
Child	
Adult	
Large Adult	

*This chart is intended to be used as a general guide to radiographic exposure times. Bone structure, size and weight of the patient should be taken into consideration and exposure times varied accordingly. All film results are based on good darkroom procedures and fresh solutions. **Note:** For lighter radiographs, reduce exposure time. For darker radiographs, increase exposure time.*

### B. Philips Oralix-65 Exposure Chart (Outer diameter of cone 64mm, 2.5")

Due to the "Oralix-65" exposure time system, a suggested technique has been computed. Select the proper exposure time using the chart below.

**Note:** For AP and PA views, increase exposure times 50%.

	X-Omatic Regular Intensifying Screens / XRP Film			Lanex Rare Earth Intensifying Screens/ Og Film / Accu-Image G&L		
	Patient Type	Film Type	Mas	Patient Type	Film Type	Mas
Adult (Large Head)	1.34	3.2	2.6	1.34	1	4.5
Adult (Average Head)	1.34	2.2	3.4	1	3.2	1.5
Child	1.34	2.2	2.6	1.34	1	3

$$\text{Exposure Time (seconds)} = (\text{Film Type} \times \text{Patient Type} \times \text{Mas}) \div 7.5$$

*This chart is intended to be used only as a general guide to radiographic exposure times. Bone structure, size, and weight of the patient should be taken into consideration and exposure times varied accordingly. All film results are based on good darkroom procedures and fresh solutions. **Note:** For lighter radiographs, reduce exposure time. For darker radiographs, increase exposure time.*

**C. Conversion Chart for Time Intervals in Seconds for Dental X-Ray Machines**

The following chart simplifies the change from fractions to decimals to impulse intervals. These computations are listed for a single-phase, half-wave rectified, 60-hertz generator.

FRACTIONS	DECIMALS	IMPULSES
1/60		.1
1/30		.2
1/20	0.05	.3
1/15		.4
1/12		.5
1/10	0.10	.6
1/8		
2/15		.8
3/20	0.15	.9
1/6		1.0
1/5	0.20	1.2
1/4	0.25	1.5
4/15		
3/10	0.30	1.8
1/3		2.0
7/20	0.25	2.1
3/8		
2/5	0.40	2.4
5/12		
9/20	0.45	2.7
7/15		
1/2	0.50	3.0
8/15		
11/20	0.55	3.3
7/12		
3/5	0.60	3.6
5/8		
13/20	0.65	3.9
2/3		4.0
7/10	0.70	4.2
11/15		
3/4	0.75	4.5
4/5	0.80	4.8
17/20	0.85	5.1
13/15		
7/8		
9/10	0.90	5.4
11/12		
14/15		
19/20	0.95	5.7
1	1.00	6.0
1-1/4	1.25	7.5
1-1/2	1.50	9.0

**VI. Registration**

Federal regulations require that the assembler or installer of a cephalometric system file a report certifying that certified components were installed. The report also certifies that the installation was done in accordance with the installation instructions provided. If any non-certified components were installed, that is also reported. For your convenience, a copy of that report, "Assemblies Report, Form 2539", is included.

Complete information regarding this report can be found in CFR 1020.3(d) 1 & 2.

The report should be mailed to the parties indicated within 15 days of the installation.

**VII. Care and Maintenance**

**A. Cephalostat and Fixator/Collimator**

The Accuceph is a sturdy instrument system that should provide long and dependable use. Rubbing alcohol may be used to clean all parts of the instrument.

**B. Film Cassette**

The film cassette is also a precision device and should be treated properly. To make sure you get the longest possible use from your cassette, always follow these simple precautions:

- 1 Do not place it where it can be knocked to the floor or where heavy objects can fall on it.
2. Promptly remove processing solutions with a soft, dry cloth. The cassette should always be kept dry.
3. The cassette surfaces, other than intensifying screens, may be cleaned with isopropyl alcohol or a mild soap and water solution. (Do not use soaps or detergents containing brightening agents as they may damage the intensifying screen.) The use of other solutions is not recommended.

### C. Intensifying Screens

Under normal conditions, intensifying screens will eventually show wear. This may occur from abrasion of the protective overcoat or inadvertent physical damage to the surface. Certain chemical agents, such as non-approved screen cleaners, hand lotions, topical medications, foodstuff, etc., may also damage the screens. Screen wear can result in artifacts on radiographs. Intensifying screens and cassettes used for dental diagnosis should be tested periodically and replaced when wear is evident.

When screens are replaced for normal wear the cassette should also be considered for replacement. Installing new screens in well-worn cassettes may be poor economy.

All cassettes and screens should be inspected systematically for light-tight integrity and general condition. Specific quality assurance test methods for cassettes are discussed in the following publications”

“Recommendations for Quality Assurance in Diagnostic Radiology,” **American College of Radiology Committee on Physics**, August 1979.

“Basic Quality Control in Diagnostic Radiology,” **American Association of Physicists in Medicine Report No. 4. Federal Register**, Vol. 44, p. 71737 ff.

Screens to be inspected should be cleaned first. A uniform exposure should then be made on a sheet of X-ray film in the cassette sufficient to produce a medium density of 1.0 to 1.5. The processed film can then be examined for screen-related artifacts.

Kodak screens should be cleaned with KODAK Intensifying Screen Cleaner and Antistatic Solution, used as follows:

1. Dampen a small, clean gauze pad with the solution.
2. Wipe the screen with the damp pad. After cleaning, wipe the screen with a dry, clean gauze pad. All cleaning methods must avoid pressure and excessive rubbing which may damage the screen surface.
3. Set the screen aside until it is thoroughly dry.

**Note:** If KODAK Intensifying Screen Cleaner and Antistatic Solution is not available, a mild soap-and-water solution may be used, following steps 1 through 3 above. **Do not use soaps or detergents containing brightening agents.** The Kodak materials described in this instruction manual for use with KODAK LANEX Intensifying Screens are available from those dealers normally supplying Kodak products for health sciences. Other materials may be used, but similar results may not be obtained.

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## VIII. Warranty

Whip Mix Corporation warrants the Accuceph System to be free from defects in material and/or workmanship for a period of one year. In the event of a defect, please notify the factory in writing of the defect prior to returning the instrument. Whip Mix Corporation will, at its option, either repair, replace, or issue credit for such defects.

Because Whip Mix Corporation is continually advancing the design of its products and manufacturing methods, it reserves the right to improve, modify, or discontinue products at any time, or to change specifications or prices without notice and without incurring obligations.

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## IX. Appendixes

### Appendix A – Locating the Focal Point of the X-Ray Beam

If you are certain of the technique for which your tube head/cone is set up, merely measure back from the edge of the cone 8, 12, or 16 inches and mark the location of the focal spot with a pencil. If you are uncertain, proceed as follows:

1. Install an 8" x 10" loaded cassette approximately four feet from the tubehead and visually aim the X-ray toward the cassette.
2. Using a piece of tape, suspend a metal marker (preferably ½" wide) over the opening of the cone and centered in the field of radiation .
3. Measure (A) the exact width of the

marker and (B) the distance from the marker to the face of the cassette.

4. Make an exposure using approximately 70 KVP, 15 impulses.
5. Process the film and measure the width of the marker as shown on the radiograph (C).
6. Calculate the distance (X) of the focal point from the marker on the cone by the following formula:

$$X = AB/C-A$$

For example:    A = .5"  
                          B = 48"  
                          C = 2"

$$X = (.5)(48)/(2)-(.5) = 24/1.5 = 16$$
$$X = 16"$$

7. After determining the focal point, mark that location on the tubehead housing with a pencil or piece of tape.

---

### Appendix B – Film Considerations

#### A. Extra-Oral Film Processing

The quality of the radiograph will be affected by various light factors. The suggestions below are provided to help identify and correct these potential problems.

#### B. The Film

The film used with your Accuceph System is green-sensitive and is far more light sensitive than conventional intra-oral film. Screen film exposed to radiation is approximately eight times more sensitive to safelight illumination than unexposed film.

#### C. The Darkroom

**The darkroom must be light-tight.** Apply self-adhesive weatherstripping around all door, window or light fixtures which emit white light.

Safelight: Filter must be a fluorescent dental safelight with a GBX filter or a Type GBX filter in a conventional safelight with a 15-watt frosted light bulb. An ML-1, ML-2 or 6B filter and 7½ or 15 watt light bulb are **unacceptable** and will fog/darken green-sensitive extra-oral film. The Denar fluorescent safelight with GBX filter is recommended and offers 68% more illumination than the above combination and is film safe. All safelights must be mounted a minimum of four feet from the working surface.

#### D. Manual Processing

Use Kodak GBX Developer and Fixer with an accurate darkroom thermometer immersed in the **developer** section. Do not agitate film during development. Process as indicated on page 27.

When scheduling solution changes, bear in mind that 8" x 10" film contains more emulsion than 32 intra-orals and consequently will shorten the life of the solution. Maximum life is 4 weeks. Replenish 1½ ounces of developer and fixer per film.

Temp of. Solution	Dev. Time	Rinse	Fix	Final Wash in Running Water
60°F (15.5°C)	8½ min.	30 sec.	4 min.	20 min.
65°F (18.5°C)	6 min.	30 sec.	4 min.	20 min.
68°F (20.0°C)	5 min.	30 sec.	4 min.	20 min.
70°F (21.0°C)	4½ min.	30 sec.	4 min.	20 min.
75°F (24.0°C)	3½ min.	30 sec.	4 min.	20 min.

### E. Automatic Processing

A 5-minute dry to dry cycle is recommended. Confirm manufacturer's recommended developer temperature with accurate thermometer. For optimum results, use Kodak Readyomatic premixed solution #102-8869 or Kodak RP X-Om at developer, fixer and starter.

### F. Film

Use only Kodak 8" X 10" Ortho G or Ortho L green-sensitive films with your Accuceph System.

## Appendix C – Soft Tissue Shield

In cephalometric radiography, there must be adequate penetration of the X-ray beam to assure subject contrast and good bone detail. For that reason, the highest available KVP is preferred. However, regardless of the KVP selected, the exposure time must still be adequate to achieve the desired bone density to read the respec-

tive anatomical landmarks. An opaque radiograph will generally allow for an acceptable soft tissue profile, but will not provide adequate density for proper bony landmark diagnosis. An increase in exposure time will provide the desired density, particularly in the posterior regions, but will obscure the soft tissue outline. To achieve both the soft tissue outline of the facial profile and good bone density, one must follow the above criteria and employ a soft tissue shield.

## Appendix D – Accuceph Troubleshooting Schedule

The following schedule has been prepared to help you achieve the highest-quality radiographic results possible. When evaluating your processed films, check the appropriate boxes to highlight the apparent problems seen on your films and identify their probable causes.

**I. Excessive matte finish, wavy pattern along film edge** (visible by reflecting overhead light off the surface of the film)

- A. Caused by excessive hypo due to insufficient development (a result of improper solutions, time/temperature imbalance, etc. See Appendix B)

**II. Graininess**

- A. Same as I-A.

**III. Fog**

- A. Light Fog (due to white light leaks, improper safelight)
- B. Chemical Fog (due to wrong/aged/contaminated solutions)

**IV. Metal Rings (located in plastic ear pieces) over EAM not centrally aligned one inside the other**

- A. Cephalostat out of alignment. Re-adjust per instructions on page 16.
- B. Excessive torquing of ear posts due to patient misalignment.

---

**V. Double Image of Inferior Border of Mandible**

- A. Cephalostat out of alignment
- B. Ear pieces not positioned adequately to secure proper patient alignment and mid-sagittal plane symmetry
- C. Patient anomaly

**VI. Image Blurred**

- A. Fog (See III-A, B)
- B. Insufficient Development (See I-A)
  - 1. Excessive Hypo (see I-A)
- C. Insufficient Rinse
- D. Insufficient Exposure Time
- E. Excessive Exposure Time

- F. Cassette holder not brought into position.

- G. Patient's mid-sagittal plane not parallel to cassette.

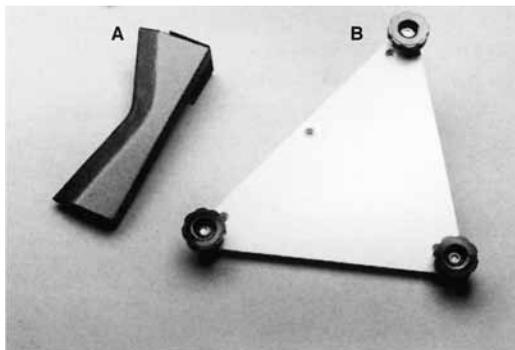
**VII. Artifacts**

- A. Scratches attributed to transport rollers or handling
- B. Fingerprints
- C. Fingernail Indentations
- D. Earring Image
- E. Fixer Stains
- F. Smears (debris on transport rollers)
- G. Other \_\_\_\_\_

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## Appendix E – Accessories

The Accuceph Cephalometer System is available with a number of accessories to maximize its versatility and provide the highest quality cephalograms attainable.



**A. Soft Tissue Shield.** Enhances tissue definition on cephalograms.

**B. Quick-Release Wall Plate.** Allows easy removal and storage of one or both parts of the system.





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