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# Use, Operation, Installation, and Assembly Manual

780.300.00 Rev 2

**TXR Ceiling/Wall Mounted Tube Stands  
Including Stands with Column Rotation**



**Do *not* install or operate this X-ray tube stand without first reading and understanding this manual.**



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## Introduction

Tingle X-Ray, LLC tube stands are designed for use in medical X-ray environments. Various models permit cross-travel, vertical travel, and horizontal travel of the tube arm. Some models may also provide rotational movement of the tube stand. Magnetic locks are provided for each axis of rotation.

Each tube stand has a certification label that provides the serial number, date of manufacture, and model identification number. The certification label is located on the bottom right side of the tube stand as shown in Figure 1. Please reference these numbers when ordering parts or requesting further information.



**Figure 1**

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## Safety

### X-Ray Protection

#### **IMPORTANT!**

X-ray equipment may cause injury if improperly used. Accordingly, the instructions herein should be thoroughly read and understood before attempting to operate this equipment. We will be glad to assist and cooperate in putting this equipment to use.

Although this apparatus is built to the highest safety standards and incorporates a high degree of protection against “scatter” radiation (that is, other than the useful beam), no practical equipment design can provide complete protection, nor can any practical design compel the operator to take adequate precautions in preventing the possibility of any persons carelessly, unwisely, or unknowingly exposing themselves or others to X-rays.

It is important that everyone working with X-rays be properly trained and take adequate steps to ensure protection against injury.

The manufacturer assumes that all operators and service personnel authorized to use, install, calibrate, and maintain this equipment are cognizant of the danger of excessive exposure to radiation, are sufficiently trained, and have the required knowledge for it. The equipment described herein is sold with the understanding that the manufacturer and its agents and representatives are not liable for injury or damage that may result from exposure to radiation. Various protective material and devices are available. The use of such materials and devices is recommended.



**Notice:** If unique situations or applications arise that are not covered in this manual, please call us for assistance.

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## Tube Stand Safety

TXR tube stands are of sturdy construction and heavy. Great care must be exercised during the installation, operation, and maintenance of these devices. At least two people are required to install all TXR tube stands.

In order to operate these devices safely, Tingle X-Ray, LLC has identified certain hazards that may occur during the installation, maintenance, and use of these tube stands. Follow the procedures below to avoid these hazards.

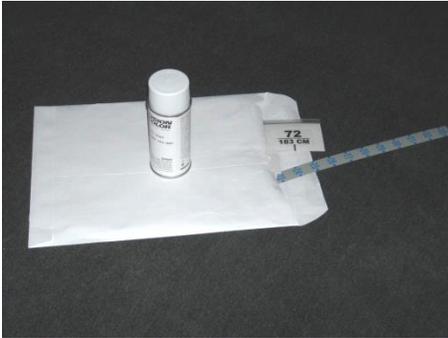
- Install correctly all components on the tube stand prior to placing it into service.
- Counterbalance the tube stand correctly prior to use.
- Anchor both rails securely: the upper rail to either the ceiling or wall, the lower rail to the floor.
- Do not allow any part of a patient under the X-ray tube arm if the locks are not working properly.
- Do not perform any repair work while a patient is present in the room with the tube stand.
- Ensure that all personnel and patients stand clear while the stand is being moved beyond the end of the table or being rotated.
- Do not work under the tube arm.
- Do not stand, sit, or climb onto the tube arm.
- Do not exceed load capacity.
- Never leave patients unattended at *any* time.



Notice: X-ray equipment is dangerous to both patient and operator unless protective measures are strictly observed.

## Pre-Installation

Open the shipping crate and verify the contents according to the provided packing checklist. Inside the crate is a large, white envelope containing assembly instructions and decal labels and a box containing a spray can of white touch-up paint as well as the column cap for the tube stand (Figure 2). The Top Rail and Floor Rail are located in the shipping crate, except for the CSM tube stand or when extended length rails are ordered. In these cases the rails may be shipped in cardboard shipping tubes. (See **Figure 3**)



**Figure 2**



**Figure 3**

Prior to installation, make sure there is reinforcement in the wall or ceiling that will sufficiently support the top rail. Perform any necessary floor preparations to ensure the floor is structurally sound and level, and review the room layout to determine the correct placement of the tube stand.

## Installation

### Uncrating and Inspection

All TXR tube stand assemblies are factory inspected to ensure their suitability for use. TXR tube stands are specially packaged to prevent damage during shipment and while opening and removing their contents. See **Figure 4** for a unit illustration. Take the following steps to ensure the tube stand is undamaged and ready for assembly.



**Figure 4**

- Take care to prevent the shifting of contents while removing straps or other protective materials.
- Check for signs of damage to the tube stand.
- Check for loose screws, bolts or nuts.
- Inspect for bent or damaged metal parts.

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## Erecting the Tube Stand

1. Remove the protective wrapping from all components. Remove the cover on the tube stand “skateboard” to expose the horizontal lock wires.
  - **For CSM stands:** Please note that the Pivot shaft on the tube stand skateboard unit has lubricant on it. Please do not attempt to clean this from the tube. It is necessary to ensure smooth insertion and operation of the unit.
2. *Optional:* Remove the horizontal lock from the tube stand skateboard to prevent damage while erecting the tube stand. (See **Figure 5**) It can be reinstalled later.

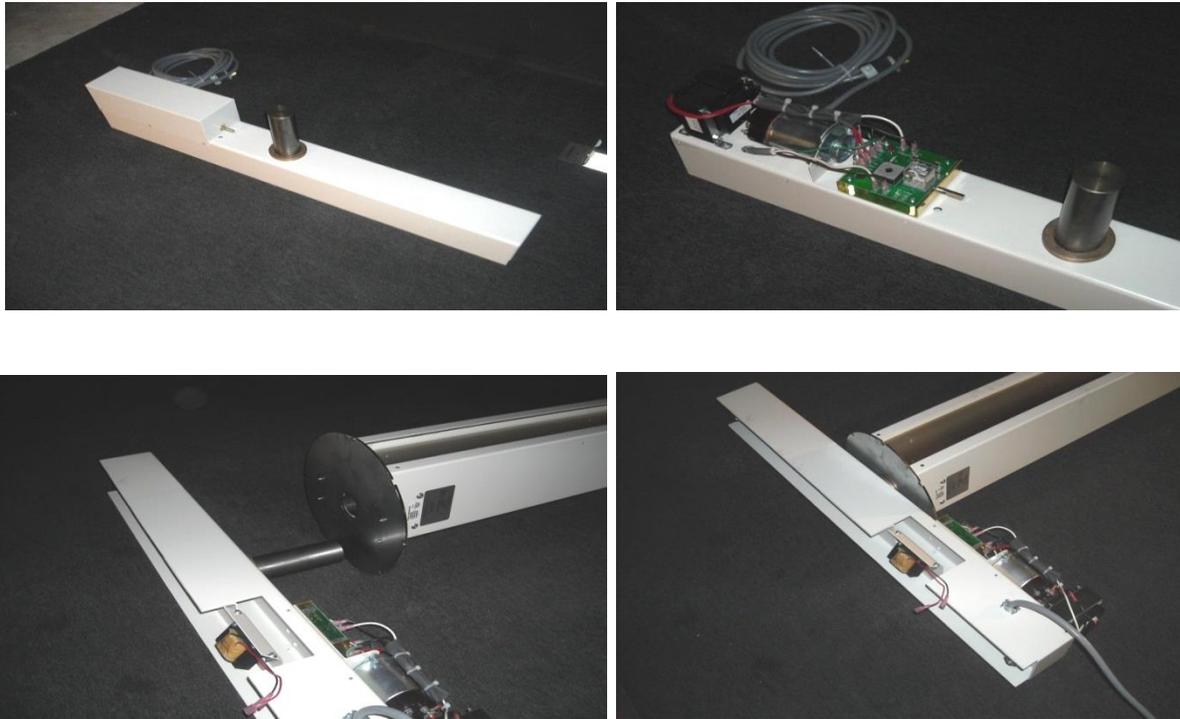


Observe horizontal lock. Removing this prior to erecting tube stand may prevent damage. It can be reattached once tube stand is in place.

**Figure 5**

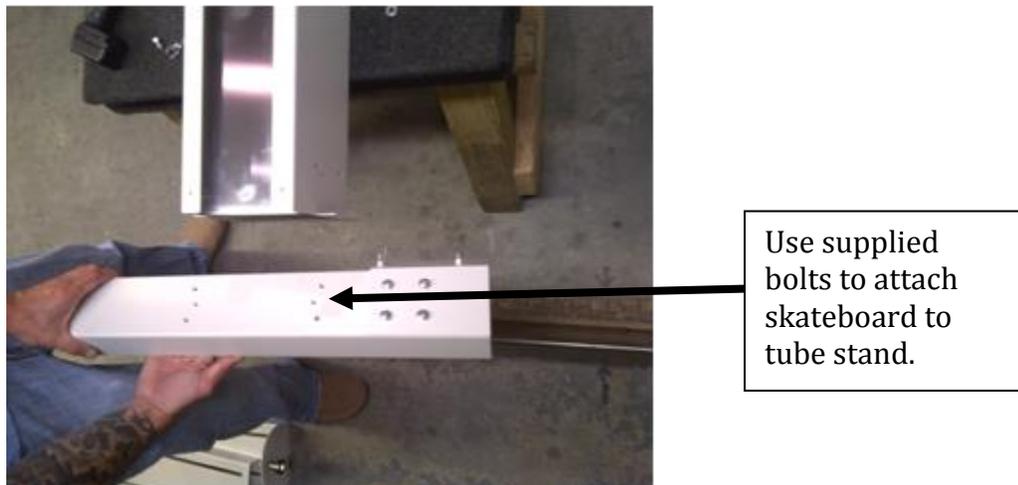
3. Using the supplied bolts, attach the skateboard to the tube stand. Tighten nuts and bolts so as to ensure they will not come loose during use. **For CSM stands:** Retract the detent pin and the insert the Pivot shaft into the tube stand, being sure the tube stand fully seats onto the skateboard. Please note orientation of lock access opening. (See **Fig. 6** for assembling CSM models or **Fig. 7** for all other models.)

*For CSM model Tube Stands:*



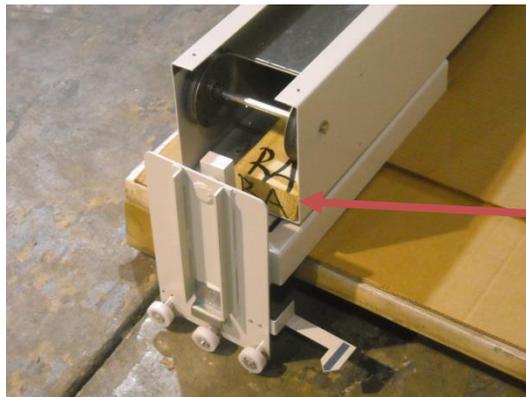
**Figure 6**

*For all other model tube stands:*



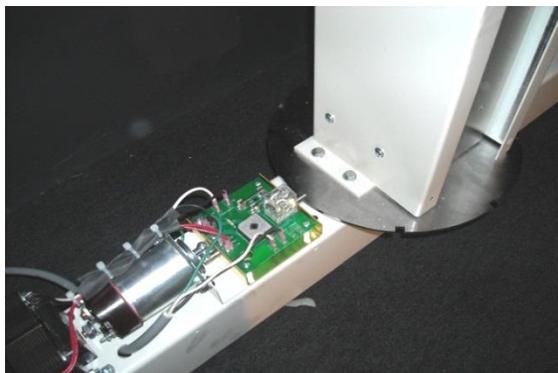
**Figure 7**

4. Locate the wooden two-by-four (2x4) inside the top of the tube stand (**Figure 8**). This stabilizes the counterweights at the bottom of the unit and prevents the pulley cables from loosening, coming off, or becoming tangled during shipping.
5. Push the two-by-four forward to assure the counterweights are completely seated at the bottom. Make sure the cables are still correctly positioned on the pulleys and have not slipped off. Reposition them if necessary, then remove the two-by-four. (You will have to remove upper bearing plate assembly to do this.)
6. **For 13-CSM-84 stands:** Rotate the detent plate on the bottom of the tube stand so that the metal pin (from the solenoid) engages and snaps into place. (See **Figure 9** below for how the unit attaches.)



Remove the 2x4 after making sure the counterweight is pushed to the bottom of the stand and cables remain in pulley tracks.

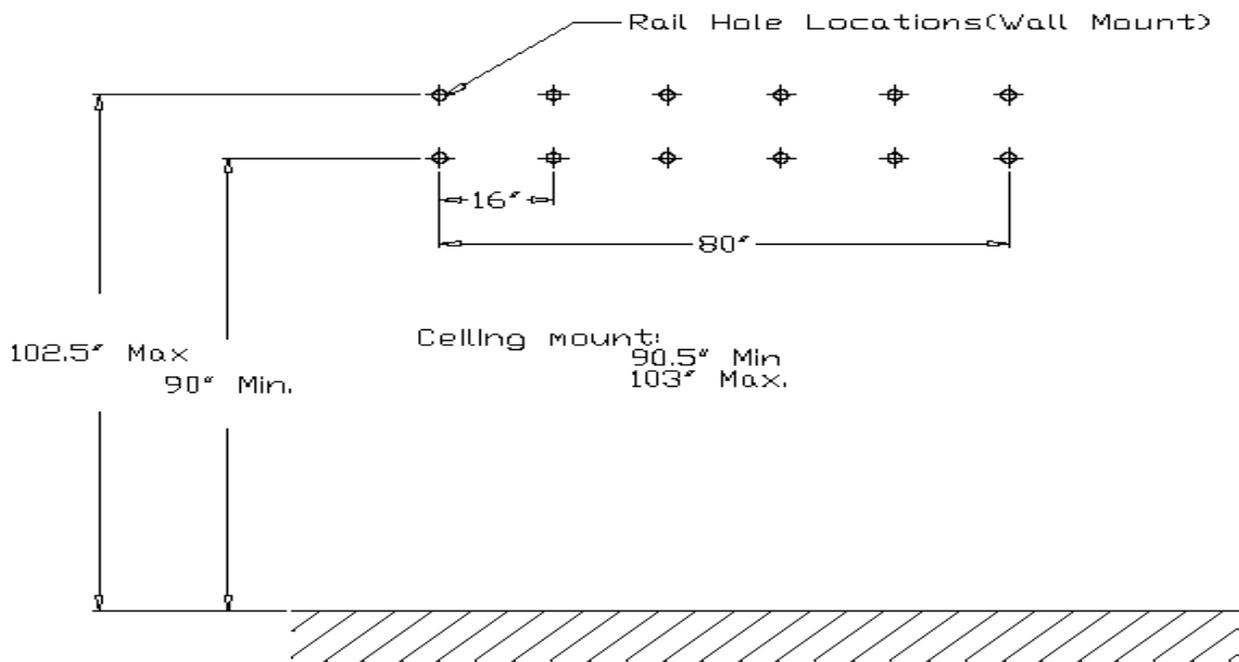
**Figure 8**



**Figure 9**

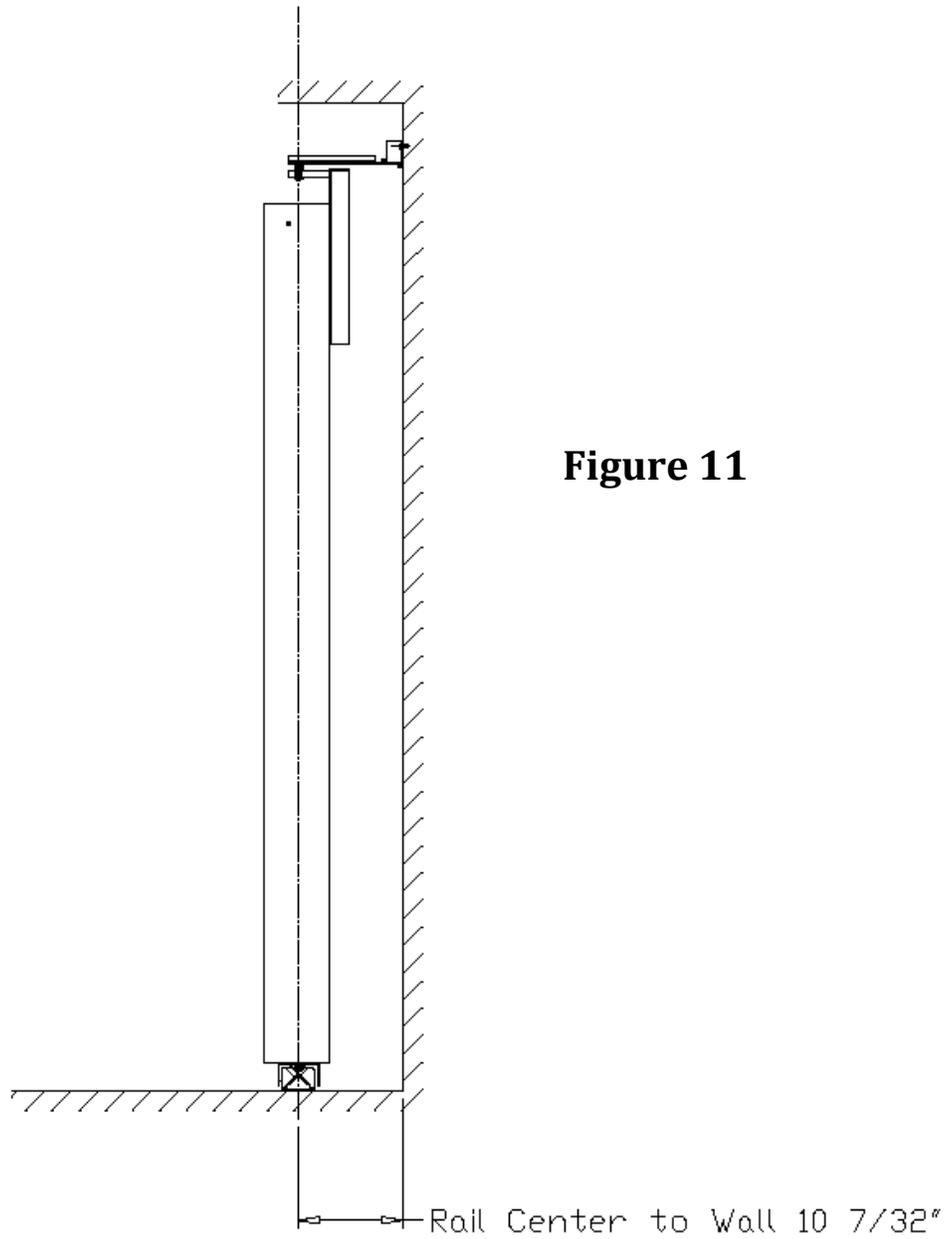
### Floor & Ceiling Rail Installation

7. Upper Rail Range & Positioning: When installing the Upper Rail, the Upper Bearing Extension will allow for rail mounting within a range of 90" to 102.5" as shown in the illustration. Remember to mount upper rail to allow 40" and 72" SID from tube stand to wall stand. **IMPORTANT**: Make sure upper rail is level before anchoring into place.



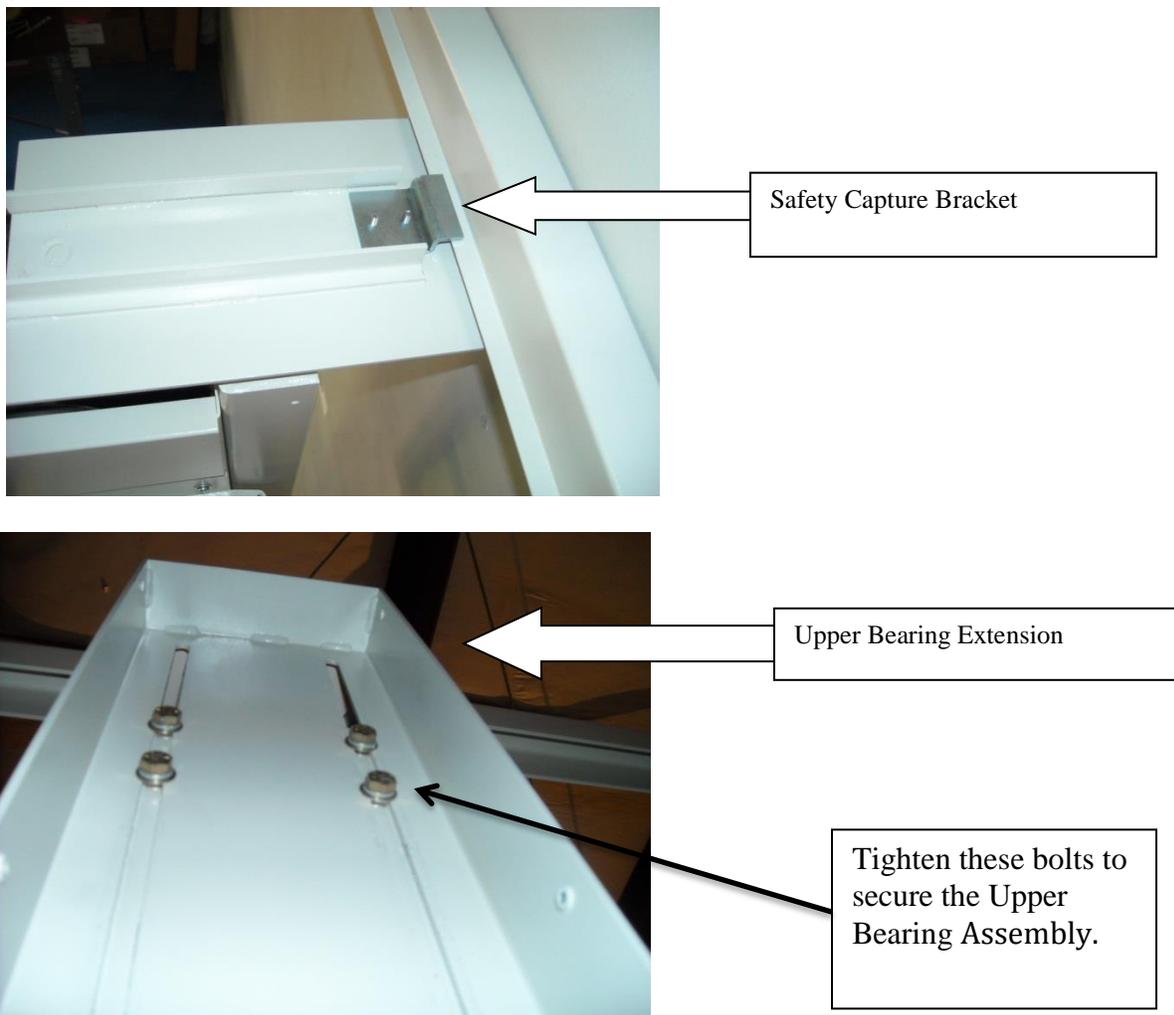
**Figure 10**

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8. Floor Rail Positioning: The center of the Floor Rail should be positioned  $10 \frac{7}{32}$ " from the wall. (See **Figure 11**) NOTE: Check level of floor rail. If floor is unlevel, it may be necessary to use shims to properly level.



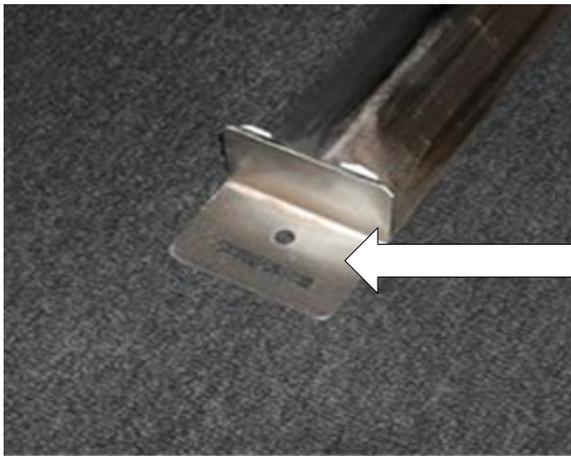
**NOTE:** Prior to standing tube stand, remove Safety Capture Bracket which is found on the Upper Bearing Plate and loosen the 4 bolts which fasten the Upper Bearing Assembly.

9. With the tube stand upright and on the floor rail, slide the top-rail bearing inside the top-rail channel as far as possible and tighten extension. Reattach Safety Capture Bracket. If necessary, loosen extension bolts and center rail flange between capture bracket and bearing plate so capture bracket or bearing plate does not make contact with top rail. Tighten the 4 bolts (See **Figure 12**)



**Figure 12**

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10. Level the tube stand vertically, (*do this by moving the floor rail towards the wall or away from it. Repeat this procedure while moving the tube stand from one end of the floor rail to the other*), then anchor the floor rail to the floor using appropriate fasteners. (See **Figure 13**)



After making sure Tube Stand is level, use anchors and fasten floor rail to the floor using these anchor holes.

**Figure 13**

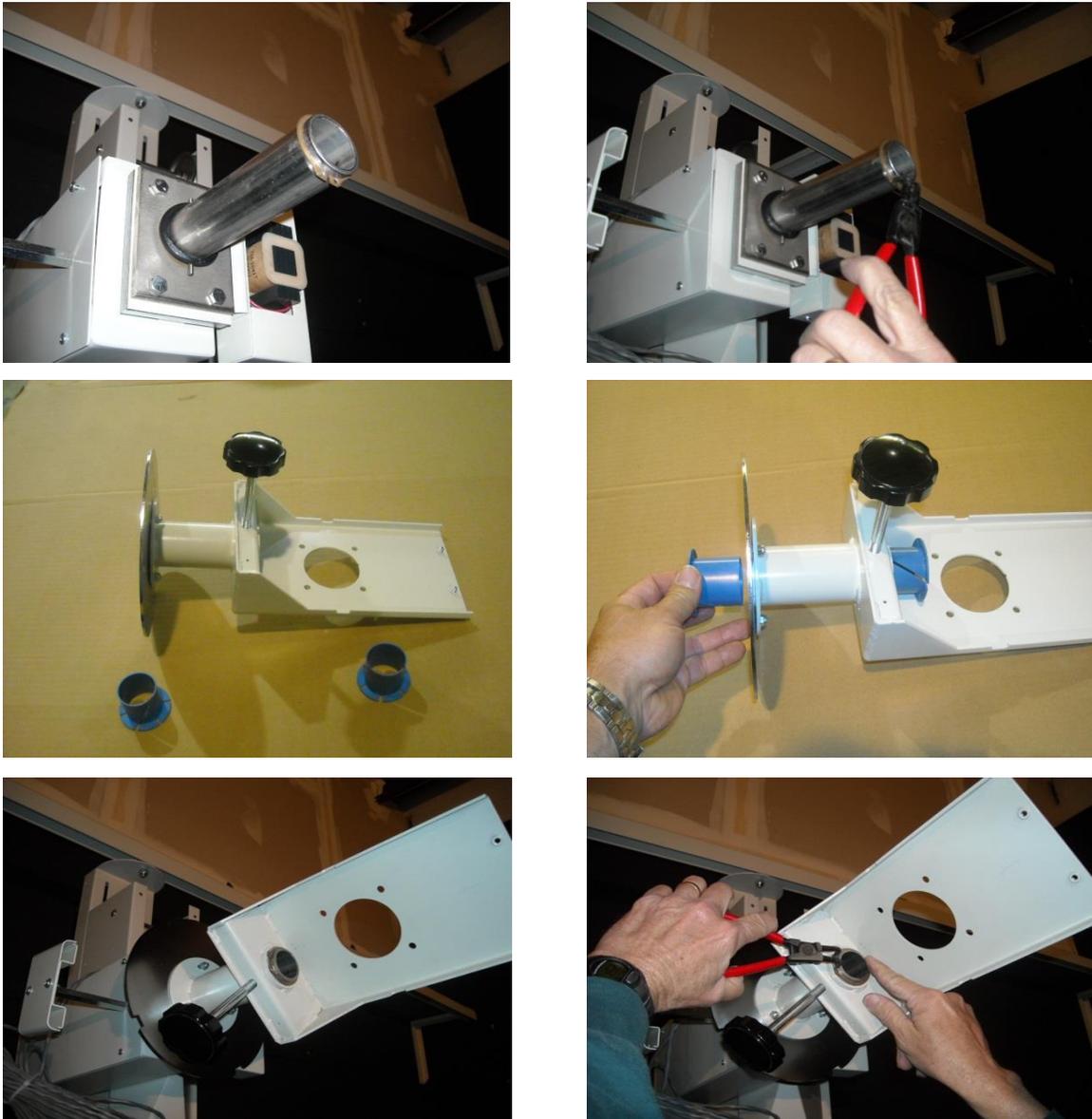


\*Please be aware of and follow all federal, state and local building codes when erecting and anchoring x-ray equipment such as Tube Stands. It is the responsibility of the installer to follow all applicable codes and safety measures when installing. TXR is not responsible for installation of equipment.

## Attaching the Tube Mount

1. Remove the retaining ring, insert nylon bushings fully into both front and rear openings of tube mount, slide the tube mount onto the shaft yoke, and then re-attach the retaining ring, making sure it is secure and flush to the back as in

**Figure 14**



**Figure 14**

2. Remove the back cover of the handle bar assembly and release the wires tied to the tube stand. Take the red electrical connector on the wiring harness and plug it into the printed circuit board inside the angulation dial as shown in **Figure 15**. Replace the cover, making sure no wires are caught underneath it.



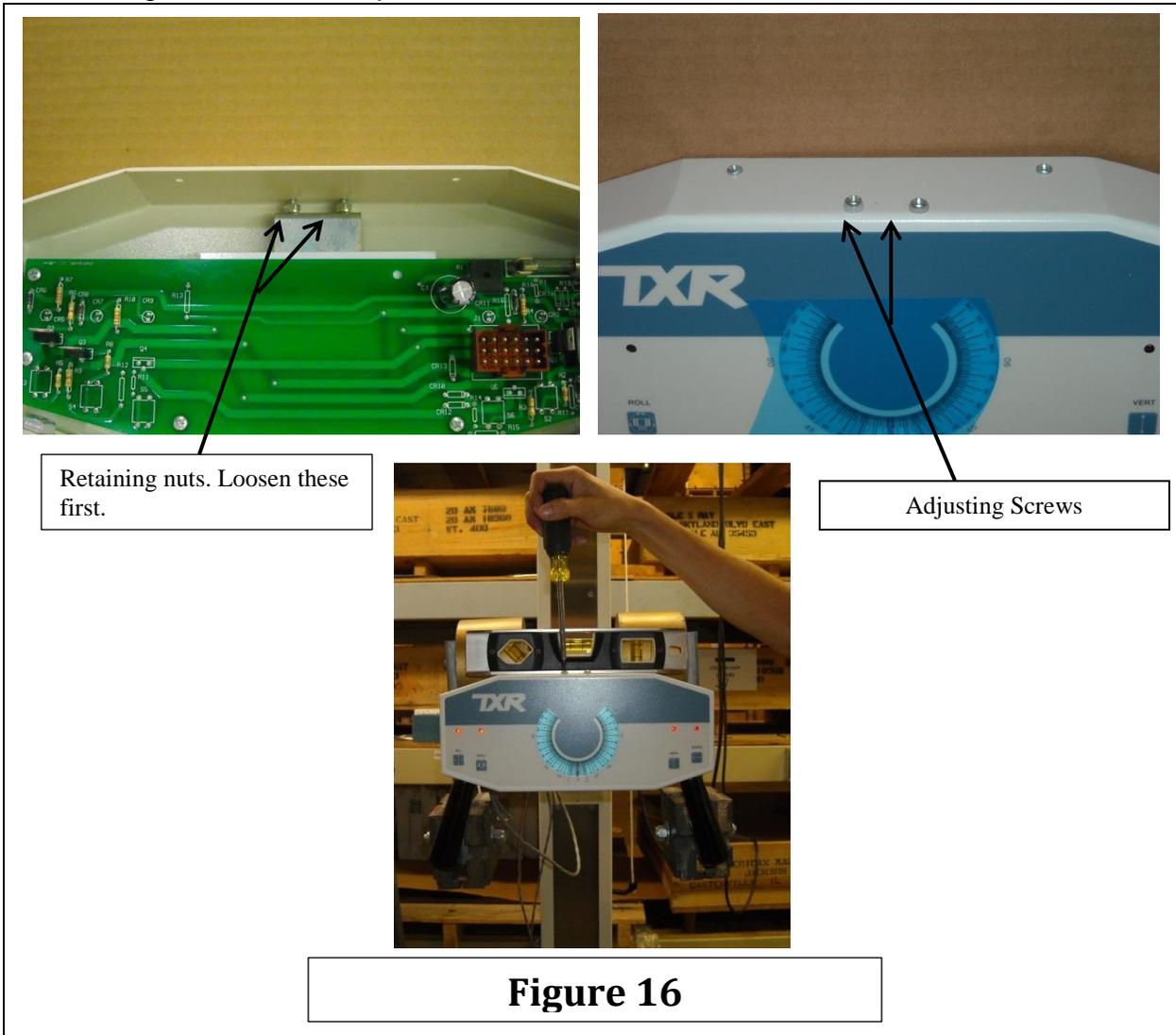
**Figure 15**

3. **For 13-CSM-84 stands:** Make sure the tube stand placement is level, then insert the electrical connector to the tube stand skateboard on the floor rail.
  - Remove the cover on the skateboard to expose the tube stand rotation circuit board.
  - Connect the electrical supply to the rotation board. Wires are labeled as such. Then replace the cover on the skateboard over the wires and connections. Make sure the wires are not pinched under the cover so they will not be damaged.
  - Remove the vertical carriage cover. Make any necessary adjustments to the magnet located beneath it, check eccentric bearings for proper contact, and then replace the cover.

### Tube Angle Indicator Adjustment *(Only If Needed)*

4. To adjust the angle indicator on TXR tube stands, **FIRST**, make sure the tube stand column is level in both front to rear and side to side directions.
5. **SECOND**, Remove the back cover of the handlebar assembly and lay it aside. Place a level on top of the tube stand handlebar assembly. Make sure the handle bar assembly is perfectly level. Look at your indicator, if it is **NOT** indicating 0 degrees, proceed to step 6.

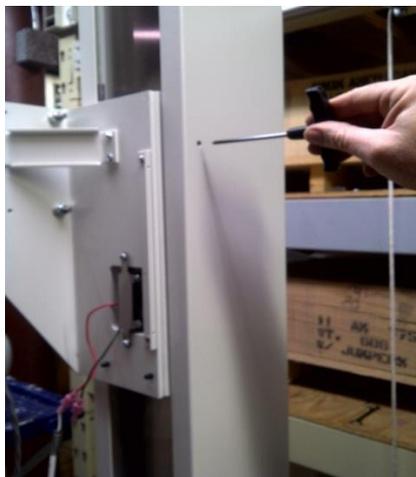
- The indicator is adjusted using two screw/nut assemblies. Use a small 5/16" wrench to loosen the nuts. Locate the two small screw heads near the front of the handle bar. Using a Phillips head screwdriver, adjust (1) screw at a time, until pointer is indicating properly. Screws may have to be tightened or loosened, depending on amount of correction needed (See **Figure 16**).
- Re-tighten nuts and replace back cover.



## Collimator and X-Ray Tube

- Mount the X-ray tube and the collimator according to the manufacturer's instructions. (Please see the instruction manuals that are included with those units.)

9. Attach the high voltage cables. Draw the cables and wires together using plastic ties. Drape the wires over the top of the X-ray tube and ensure that all of them are tied to the high voltage cables at intervals to allow for freedom of movement and placement of the unit. This will prevent them pulling apart or accidentally disconnecting and unit operators tripping on them, possibly damaging the connections.
10. Check the device rotation to ensure free movement without wire or cable involvement. Make sure the cables and wires are not pinched when the unit moves, and that there is full rotation without restriction, curling, twisting, or cutting the wires and cables. Note any possible “pinch-points” and make safety adjustments with the plastic ties as necessary.
11. Check vertical travel for smoothness and ease of movement. TXR tube stands and wall stands have adjustable bearings for setting proper side-to-side bearing tension of the vertical carriage. If vertical travel seems tight or binding, adjustment may be necessary. The tube stand column has two small access holes, located on the right hand side of the column, at a high and low point. Move the vertical carriage to the upper hole, until the allen adjustment screw on the carriage lines up with the hole. Using an Allen wrench, adjust the allen screw clockwise or counter-clockwise until proper tension is achieved. This needs to be repeated for the lower hole, making sure the carriage has even gapping between carriage and column. Move carriage up and down and adjust as needed. **(See Figure 17)**



**Figure 17**

This illustration shows the upper access hole. Adjust this bearing here, and the lower bearing using lower access hole.

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12. Place the decals and labels. Measure 40 inches from the focal spot to the image receptor beneath the table top, and mount the decals accordingly. The decals for the wall stand should be placed on the top rail at the appropriately measured distance from the focal point, using the pointer on the upper bearing extension as a reference point.
  13. Be sure to clean off any spots where lubricant may have smeared onto the outside of the tube stand skateboard, and use the can of white spray paint to touch-up any blemishes to the paint *on the outside only* of both units.

### Lock Location & Adjustment

After applying power to the tube stand, verify lock operation. Locks are adjusted at the factory for optimum performance, but one or more of the locks may require adjustment. The tube stand can have up to four lock assemblies—horizontal, vertical, tube rotation, and cross travel or transverse—at the following locations:

14. The horizontal lock is located on the tube stand skateboard. (See **Figure 5**)
15. The vertical lock is located behind the cover on the vertical carriage assembly.  
(This cover must be removed to access the lock.)
16. The tube rotation (angulation) lock is located behind the tube-rotation plated disk.
17. The cross travel lock is located under the cover on top of the cross travel arm.  
The cover is removed by loosening the two screws on top and lifting up

**NOTE:** In addition to the above, the 13-CSM-84 tube stand with column rotation has a column-locking pin, which engages the circular disk at the base of the tube stand. This locking pin and electronics are located under the cover on top of the tube stand skateboard.

(See **Figure 9**)

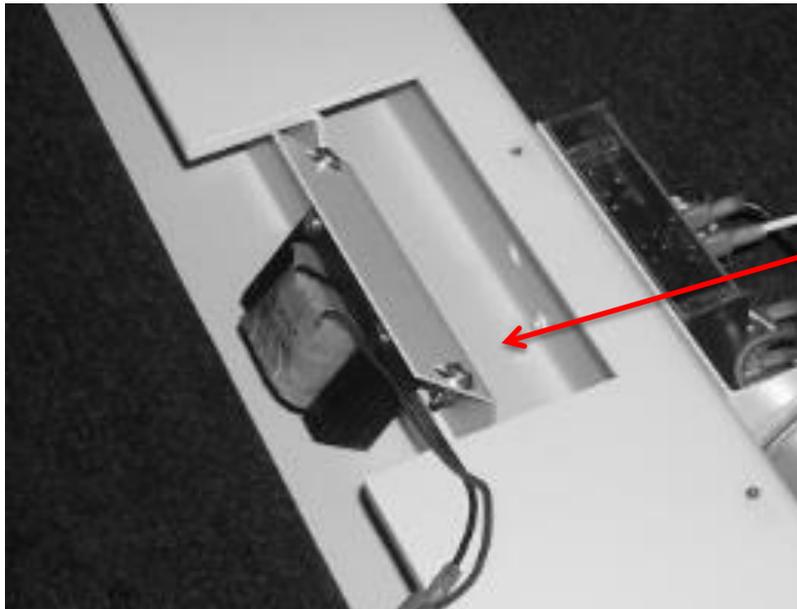
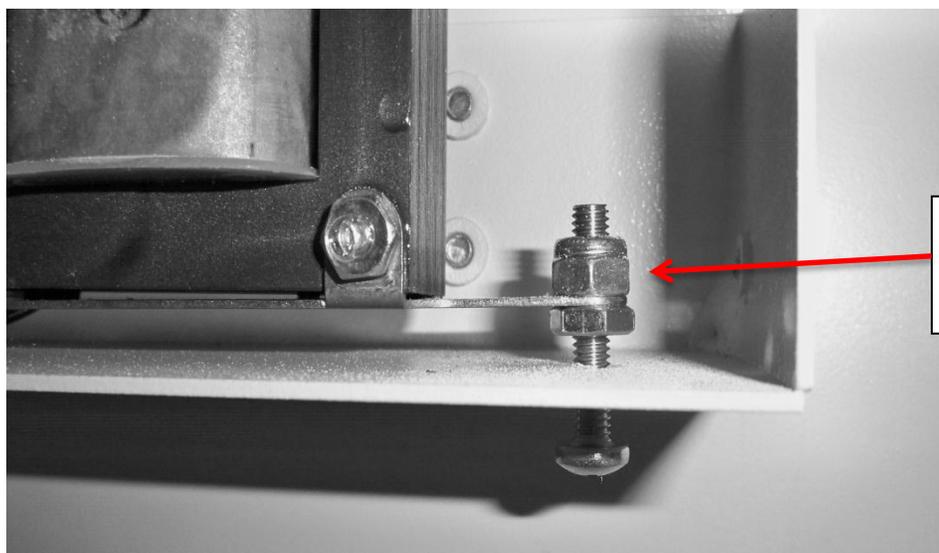


Illustration of skateboard lock access and adjusting screw assembly.

**To adjust the locks**, loosen the retaining nuts and move them in the direction needed. Example: Closer to or away from the lock track. Retighten nuts and check for proper clearance when lock is disengaged, and proper grabbing when lock is engaged. Make sure to adjust lock on both sides, so lock will sit evenly against lock plate/track.



Adjust locks using these screws and nuts



## Technical Information

### TXR Tube Stand Specifications\*

<b>Model</b>	<b>13-SM-84</b>	<b>13-RA</b>	<b>13-CT</b>	<b>13-CSM-84</b>
<b>Application</b>	<b>Spine Variable SID Select 40" to 72" Chest Internal Medicine Chiropractic</b>	<b>Medical High Line Radiographic Tube Stand</b>	<b>Medical Cross Travel Tube Stand</b>	<b>Medical Transverse Rotational 45° &amp; 95° Detents</b>
Rail Length (standard)	6 feet	8 feet	8 feet	10 feet
Rail Center to Wall (minimum)	10.22 inches	10.22 inches	10.22 inches	10.22 inches
Focal Center from Front of Column	14.375 inches	22 inches	24 inches (center detent)	24 inches (center detent)
Focal Center from Wall	25.6 inches	36.5 inches	38 inches	38 inches
Focal Center from Wall with Cross Travel Extended	N/A	N/A	44.22 inches	44.22 inches
Cross Travel	None	None	10 inches	10 inches
Longitudinal Travel	48 inches	64 inches	64 inches	80 inches
Focal Distance from Floor (maximum)	78 inches	78 inches	78 inches	76 inches
Focal Distance from Floor (minimum)	Touches floor	9.5 inches	9.5 inches	14.5 inches
Total Depth of Floor Space Needed	33 inches	39.5 inches	52 inches with cross travel extended	52 inches with cross travel extended
Minimum Ceiling Height	91 inches	91 inches	91 Inches	97 inches
Stand Weight	175 lb.	200 lb.	250 lb.	275 lb.
Power Required	24 VAC 75VA	24VAC 75 VA	24 VAC 75 VA	24 VAC 75 VA plus 120 VAC for column rotation

\* Specifications and features are subject to change without notice.

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## Electrical Circuits

The power supply board can be located inside the tube stand handlebar assembly as shown in **Figure 18**.

The power supply board powers all lock assemblies and require 24 VAC input. The circuit is protected by a three-amp fuse. If replacement is necessary, replace only with an equivalent fuse.

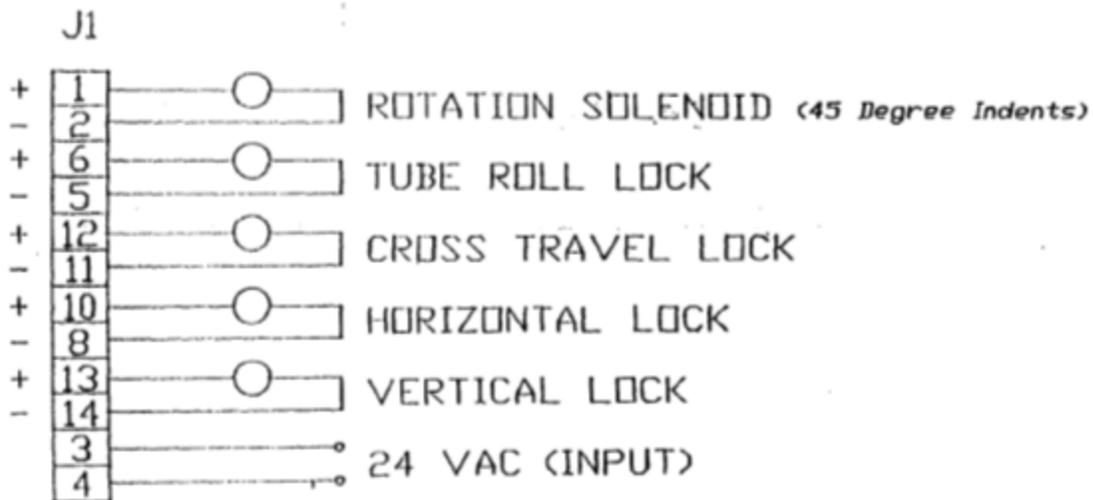


**Figure 18**



**Warning:** Do not attempt to modify or change the electrical circuit. Any alterations will cause damage to the power supply and possible physical injury. Only qualified authorized personnel should service the electrical circuits.

Wiring Diagram for Plug J1 on 4 and 6 Button Handlebars,  
Boards T-7792-4 and T-7792-6



\*\* Column rotation solenoid (J1-1, J1-2) and cross travel lock (J1-11, J1-12) do not apply to T7792-4 board/4 button handle bar.

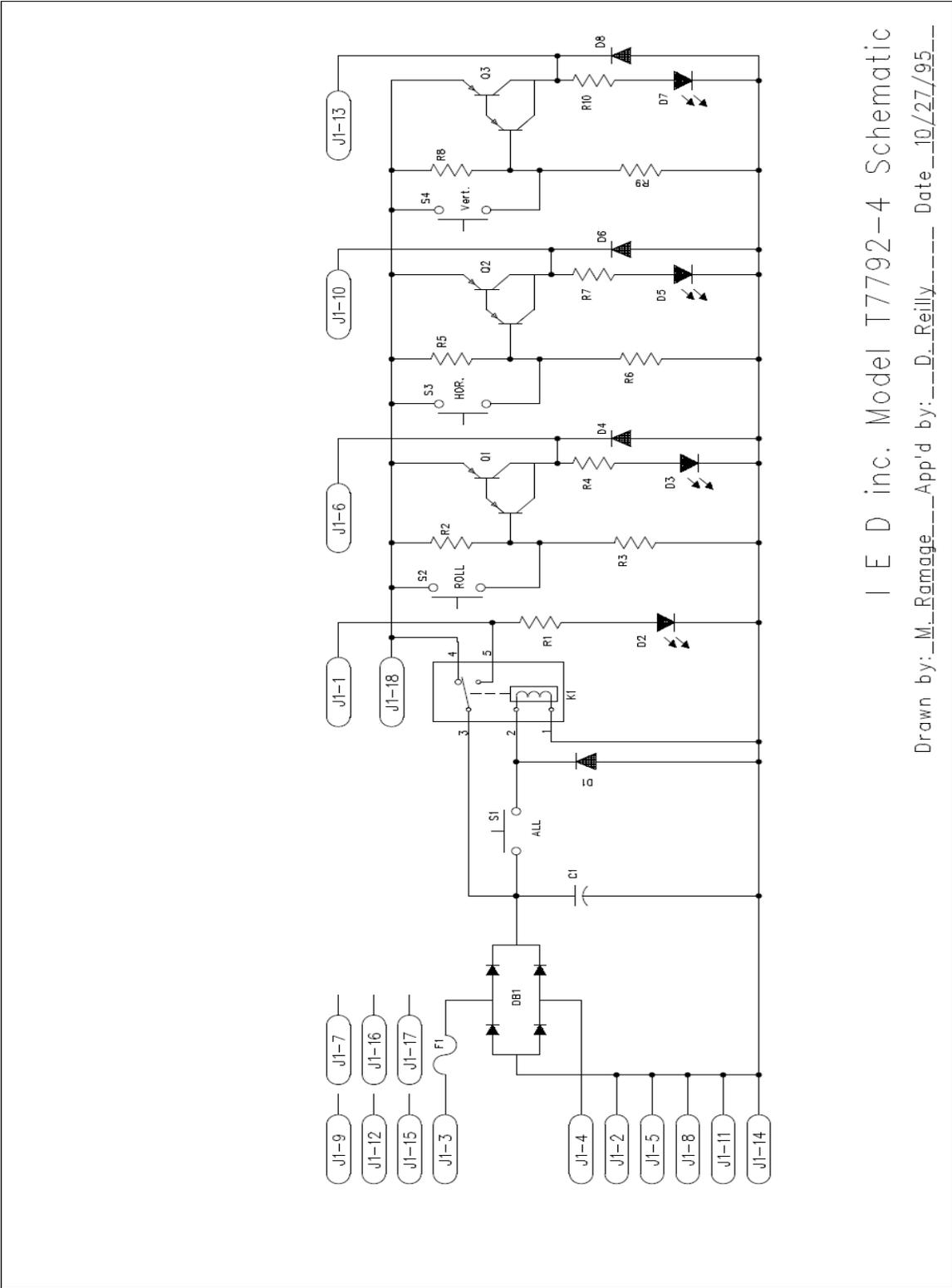
Tingle X-Ray Tube Stands:

13-RA-84, 13-SM-84 – 4 Button Handlebar

13-CT-84, 13-CSM-84 – 6 Button Handlebar

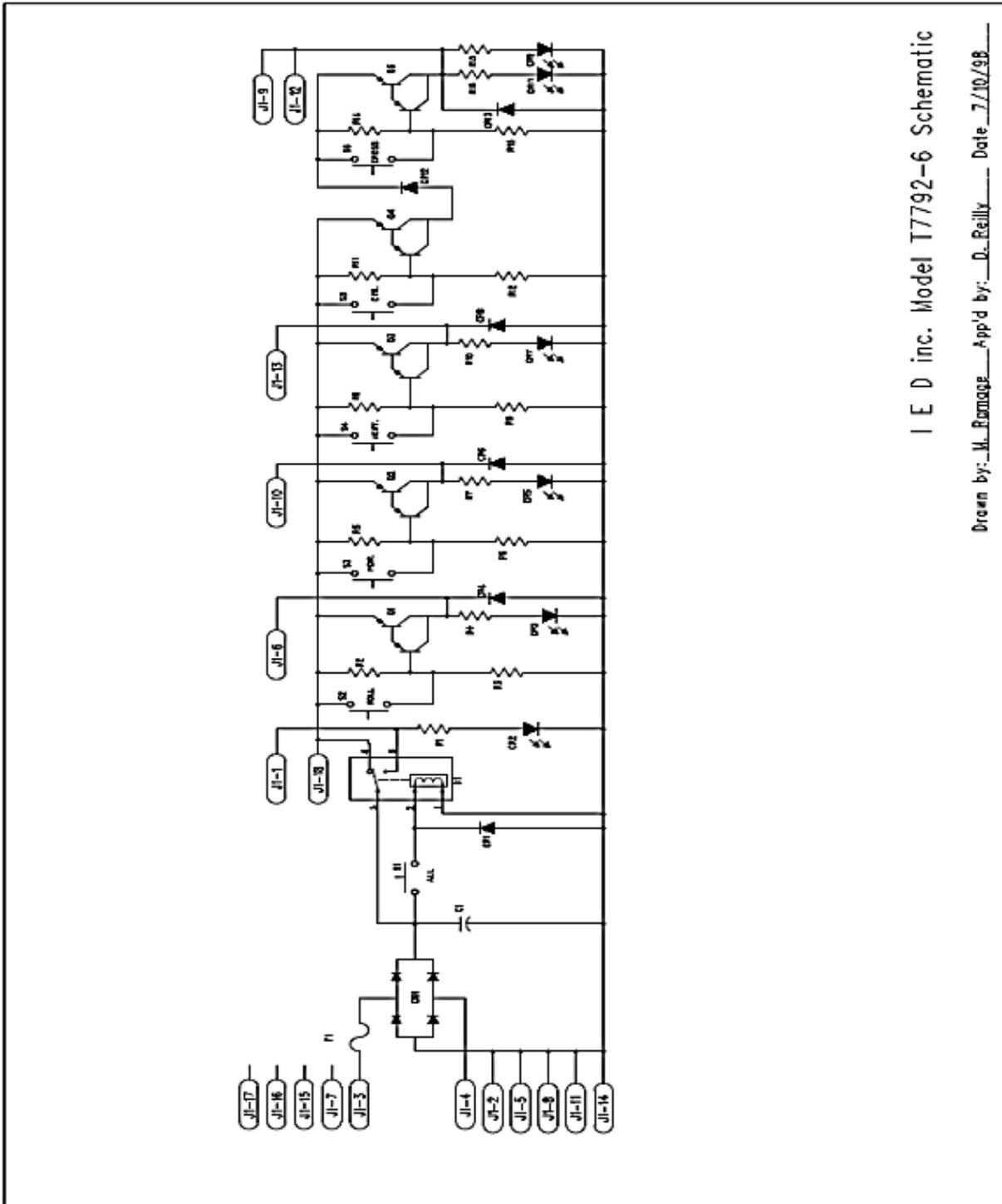
Schematics

For TXR Tube Stands with Four (4) Button Handlebars



I E D inc. Model T7792-4 Schematic  
 Drawn by: M. Ramage App'd by: D. Reilly Date: 10/27/95

For TXR Tube Stands with Six (6) Button Handlebars

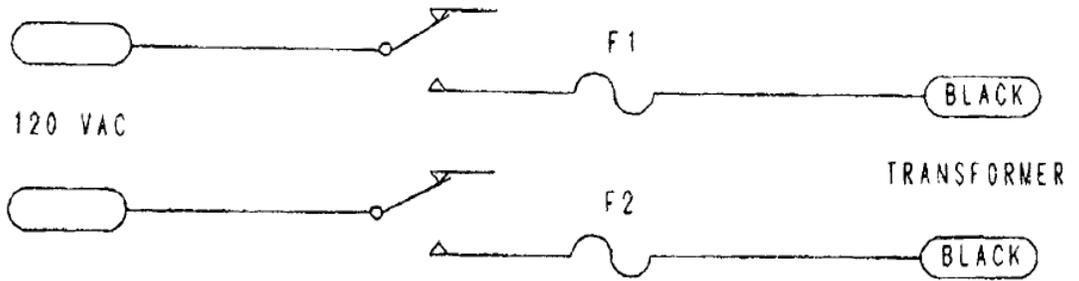


I E D inc. Model T7792-6 Schematic

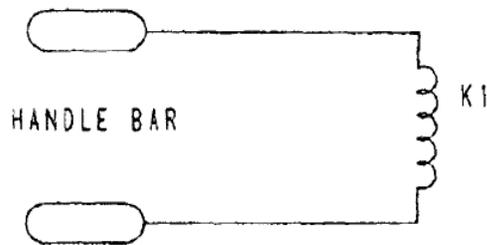
Drawn by: M. Parnage App'd by: D. Reilly Date 7/10/98

## TXR PC Board T-7823 for Column Rotation Stand 13-CSM-84

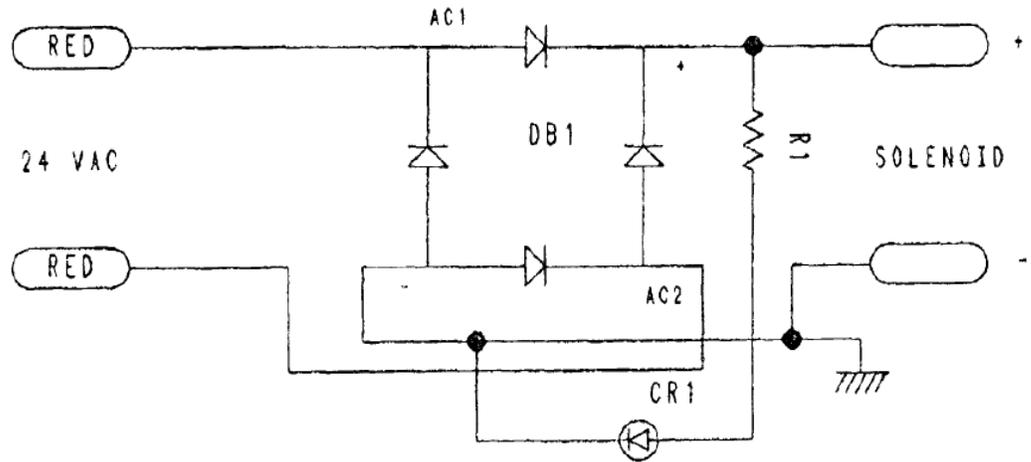
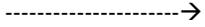
120 VAC to be supplied by wall type outlet or suitable source, using provided cable



24 V.D.C. provided by wiring harness from plug J1 on T7792-6 board in handlebar assembly



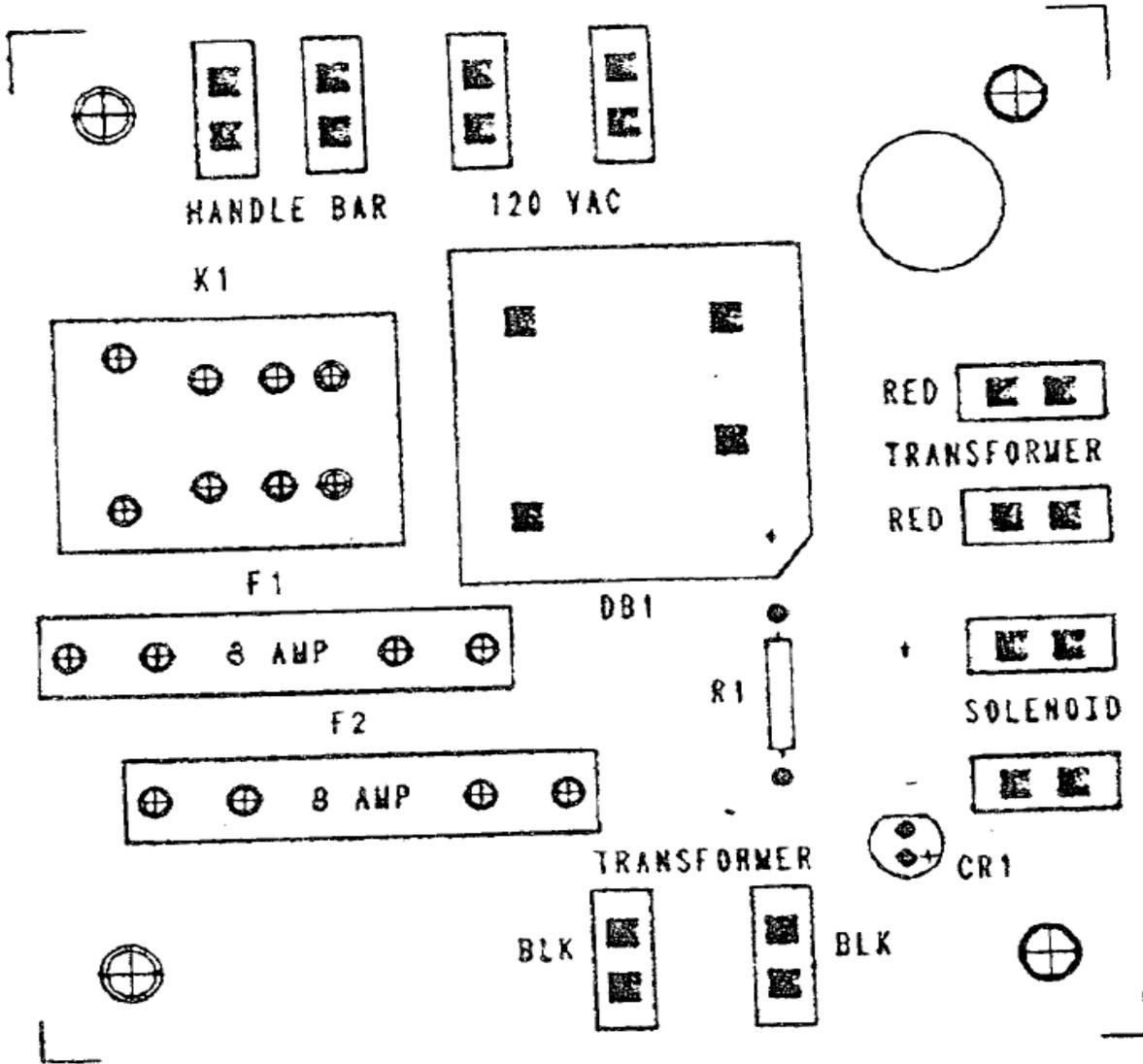
From transformer mounted on skateboard. (Black terminal connection = primary. Red = secondary)



\*Solenoid only uses one (1) wire connection (to "S" stud) and uses body/chassis for ground.

# MODEL T7823

## Column Rotation Board T-7823 for CSM Tube Stand



MODEL T7823

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## Parts

### Tube Stands

404.300.05	Tube Mount Assembly
404.300.06	Handlebar Assembly, 4 Button (with Harness)
404.301.03	Handlebar Assembly, 6 Button (with Harness)
93-4H	Harness, Handlebar, 4 Button (SM, MA & RA)
93-6H	Harness, Handlebar, 6 Button (CT)
13-CT-H	Harness, Handlebar, 6 Button (CSM)
T-7792-4	Handlebar Board (only) 4 Button
T-7792-6	Handlebar Board (only) 6 Button
185.300.00	Handlebar Overlay, 4 Button
185.301.00	Handlebar Overlay, 6 Button
404.300.00	Skateboard Assembly, 24" (SM, MA & RA)
404.301.00	Skateboard Assembly, 32" (CT)
404.302.00	Skateboard Assembly 40" (CSM)
404.302.03	Bracket, Top Bearing, HD Hardware Kit
404.302.01	Horizontal Lock Assembly
16437	Locks (universal)
404.401.01	Carriage Assembly (All Stands)
404.300.03	Column Assembly (with pulleys & side covers)
404.300.07	Column Cap Assembly
SIDP300	Horizontal Sid Pointer
185.300.09	Vertical SID Arrow Label
185.300.10	Horizontal SID Arrow Label
185.300.11	15-33" Vertical SID Label
185.300.12	34-53" Vertical SID Label

## Service

There are no user serviceable components/parts on this tube stand. If service is required, it should be performed only by qualified service personnel.

## Certification

This product meets 21CFR Subchapter J.

## Routine Maintenance

Perform routine maintenance monthly. Shut the power off before performing any maintenance. Perform the routine listed checks.

- Inspect all bearings for signs of wear and replace if damaged.
- Inspect wiring for damage or wear. Replace damaged wire immediately.
- Check all locks for proper operation.
- Inspect counterweight cables for any physical damage. If damage visible, replace immediately.

## Operating Procedures

All TXR tube stands are designed to allow the X-ray technician to make exposures in a variety of angles, distances and to various receptors. They will accommodate tables, wall stands, cassette holding devices as well as accommodating wheel chairs, mobile chairs and making exposures on the floor.

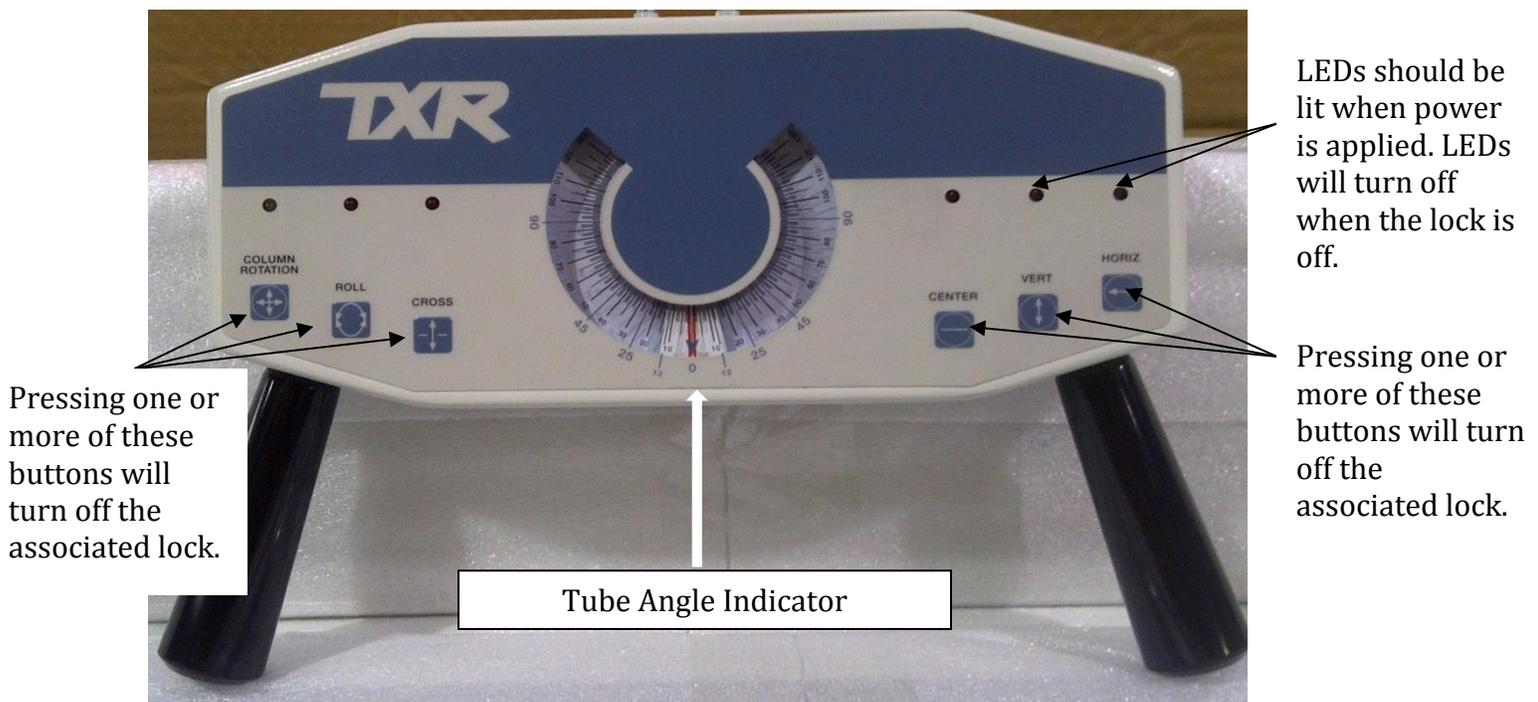
To operate a TXR tube stand, follow these procedures:

Read and understand all of the instructions before operating. If the tube stand has been modified or has accessories, read and understand their instructions.

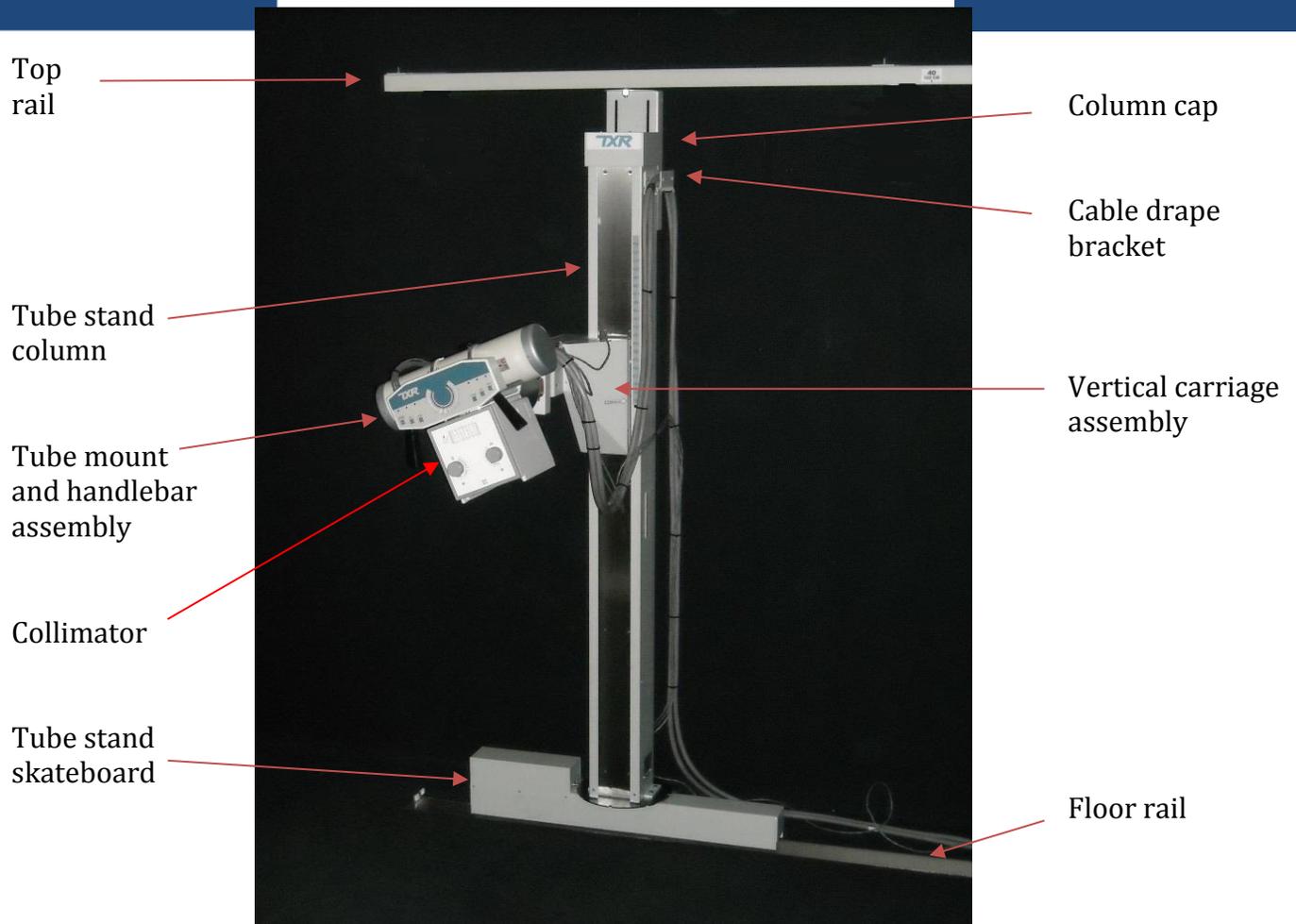
TXR tube stands move the X-ray tube in the following directions: vertical (up and down), horizontal (side-to-side across the length of the floor rails), and tube angulation (90° left and right). Transverse (tube cross travel) and column rotation (being able to rotate the entire tube arm to the left or right) are also available on specified tube stands.

When power is applied to the TXR tube stand, LEDs should light across the front of the tube stand handlebars as shown in **Figure 19**.

The x-ray technician has access to the lock on/off buttons while both hands are on the handlebars. The handlebar assembly may have four (4) or six (6) buttons, depending on which model tube stand you purchased. The model in Figure 17 has six buttons. On the following page **Figure 20** provides an illustration of the tube stand unit as a whole.



**Figure 19**



**Figure 20** (Photo for Illustration only)

## TXR Warnings:

- Do not operate tube stand if you see cut, damaged, or frayed wires.
- Do not stand, lean, or climb onto the tube stand.
- Do not load or unload a patient onto or off a table with an unsecured tube stand.
- Do not use the tube stand if locks are not working properly.
- Do not exceed the rated load.
- Do not allow the patient access to any wiring.
- Do not allow patients to extend hands, fingers, hair, or body parts near the moving parts of the tube stand during examinations.



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## Warranty

TXR, Tingle X-Ray LLC, warrants to the Buyer that any new X-ray product manufactured by TXR will be free from defects in material and manufacturing workmanship and will conform to applicable specifications in effect on the date of shipment. The criteria for all testing shall be factory-specified calibration, test procedures, and instruments. All product warranties and remedies for warranty failures are limited in time as stated below.

### Duration of Warranty

All TXR manufactured tables, tube stands, and wall stands shall carry a five (5) years parts warranty from the date of shipment by TXR with the following exceptions: elevating tables, floor mount tube stands, and URS stands carry the respective warranty listed in the Warranty Summary.

1. Any third party items, or parts not manufactured by TXR, carry their own original equipment manufacturers' warranties.
2. Collimators and high tension cables carry the warranties of their respective manufacturers when purchased loose.
3. High frequency portables are warranted for one (1) year.
4. X-ray tubes: Toshiba tubes, supplied as part of a complete system or generator package, carry a full warranty the first year and an additional 48 month pro-rated warranty. Purchase price adjustment on the repaired or replaced X-ray tube will be on a pro-rated basis from date of shipment.
5. All other tubes supplied by TXR carry their original manufacturer's warranty.

### Freight Terms for Warranty Replacements

TXR will pay ground transportation on parts shipped under warranty if failure occurs at time of initial installation. If special arrangements are required (e.g., air shipment), the buyer will be responsible for freight charges. Special arrangements will require a preferred shipping company or method of shipment and that the account number is provided.

Parts returned for warranty consideration must have the TXR (RMA) return material authorization number marked on the outside of the box and be returned with freight prepaid. We cannot accept collect shipments. Our receiving department will refuse any shipment that arrives freight collect. Any component furnished without charge to the Buyer during the warranty period to correct a warranty failure shall be warranted only to the extent of the unexpired term of the warranty of the original product.

## Appendix

### Revision History

REVISION HISTORY		
REVISION	DATE	REASON
1	March 22, 2012	New Edition
2	July 26, 2012	New Upper Brng. Assembly