

## Broadcast-Tube Handling and Installation Instructions

### General

This application note is intended to provide the user of RCA tube types 8806, 8807 and 8916 with the necessary information to assure the proper handling of the tubes. Included in this application note is information and photographs to assist the operator in the recommended insertion and removal of the tubes from the Y1116 and other VHF-TV broadcast cavities.

### Handling

The 8806, 8807 and 8916 tubes use the thoriated-tungsten, basket-weave filament structure. Thoriated tungsten can readily be damaged by a sudden shock during tube handling. Precautions should be taken by operating personnel to avoid bumping or laying the tube down on any hard surface such as a table, bench, or the floor. The recommended procedure is to store the tube, when not in use, in the original shipping container. If this container is not readily available, the tubes should be stored on a foam rubber pad of the type material used in the shipping container.

### Removal and Insertion of the RCA Tube Type 8807 in the Y1116 Cavity

#### Tube Removal

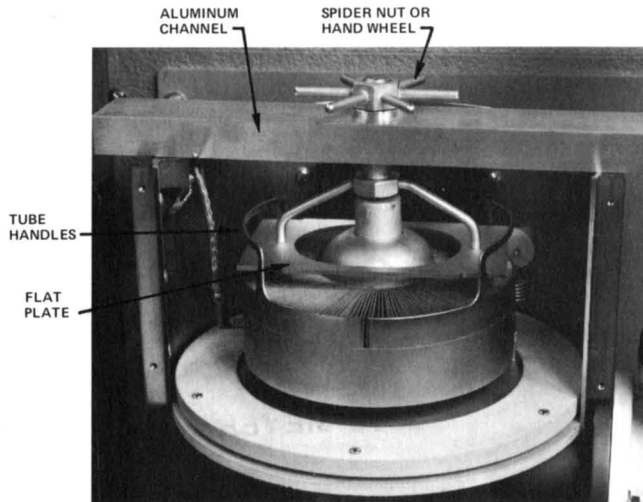
Before removing the four screws that hold the front cover and lid assembly on the tube compartment of the Y1116 cavity, **EXTREME CAUTION** must be observed by the operator to insure that all operating voltages have been removed from the tube and the cooling blowers turned off. To avoid handling a "hot tube" the air should be left on for three to five minutes after all voltages are removed.

After the captive screws have been loosened, raise the lid assembly straight up approximately two inches to allow the air chimney to clear the tube. The mechanical B+ grounding rod, which is provided on all cavities, can now be seen by the operator, as shown in **Figure 1**. The grounding rod is actuated by removal of the lid assembly, and if operating properly, it will remove any static voltage from the tube plate. It is recommended for the safety of the operator, an external grounding rod also be used.



**Figure 1 — RCA Tube Type 8807 Installed in Y1116B Cavity**

The 8807 tube puller (RCA Part No.J15448) as shown in Figure 2, will greatly assist the operator in tube removal.



**Figure 2 — RCA Tube Type 8807 Being Removed with J15448 Tube Puller**

The tube puller should be operated as follows: 1) Prior to positioning of the tube puller on the tube, unscrew the spider nut or hand wheel as far as possible without disengaging the nut from the bolt. 2) Insert the flat plate under one handle of the tube and then under the other handle. 3) Position the aluminum channel on the top edge of the cavity air chamber. 4) Position the spider nut over the center of the tube. Tighten the spider nut until the flat plate comes up against the bottom edge of the tube handles. (See Figure 2.) 5) Continue turning the hand wheel until the tube has been raised approximately 3/8 of an inch. The tube will now be free of all finger contacts and can be rotated freely. 6) Loosen the hand wheel, so the tube rests lightly on the finger contacts and remove the tube puller from the tube.

**CAUTION:** Do not remove the tube from the cavity while it is attached to the tube puller. This will eliminate the possibility of the tube dropping off the tube puller if both are removed together.

To remove the tube from the socket it should be lifted straight up and out of the cavity by hand.

**EXTREME CAUTION** should be used so that the tube is not permitted to bump the contact fingers or any portion of the cavity enclosure.

Remove the filament cooling radiator by unscrewing the captive jack-screw as shown in Figure 3. As the screw is removed it will withdraw the radiator from the filament terminal. When the contacts are free from the filament terminal, hand-hold the radiator while removing the screw from the tube post.

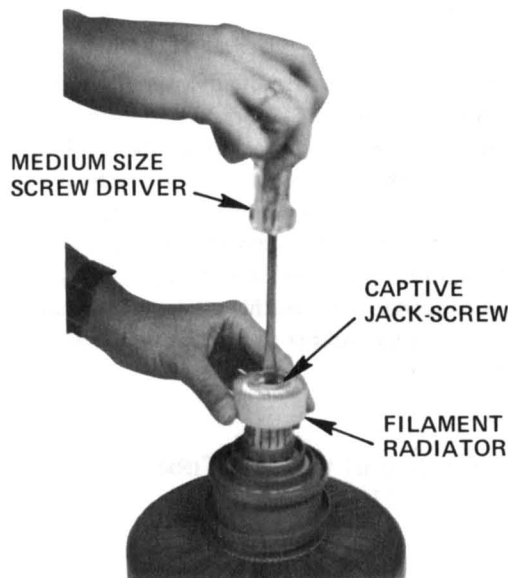
Inspect the tube contact rings for signs of burning or arcing. If there is any arcing apparent, the finger contact rings in the cavity have probably been damaged. To prevent the new tube from being damaged due to poor contact, all cavity contact rings should be inspected for broken or dirty fingers.

If more than three fingers are missing from any one contact ring, it is recommended that the entire ring be replaced. Oxidised or dirty contacts may be cleaned with crocus cloth or with "Scotchbrite" Type A, a very fine cleaning pad made by the 3M Company. Contacts indicating overheating should be bent very slightly to increase contact pressure. Replace the contact ring if the spring fingers have lost their temper.

#### Tube Insertion

Install the filament cooling radiator on the tube. Align all the contact points with the filament terminal as shown in Figure 3. Start the radiator into the filament terminal by turning the jack-screw clockwise. Using only one hand on the medium-size screw driver, continue turning the screw until it reaches a positive stop. **Do not** use excessive force. Snug contact is all that is required.

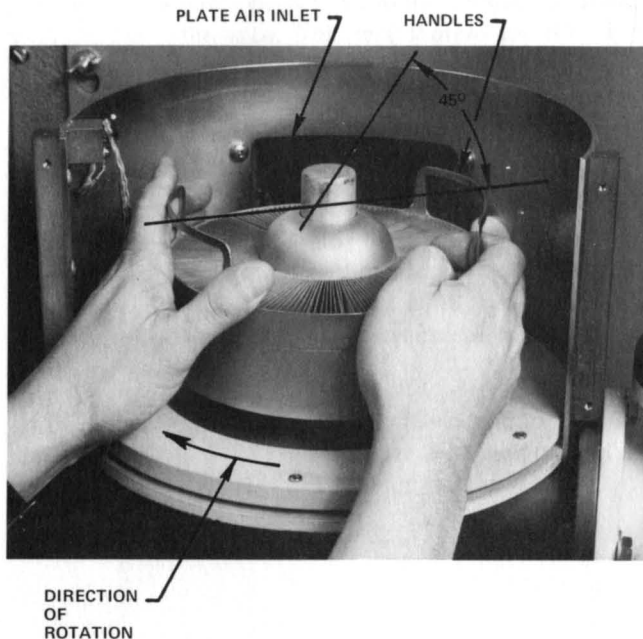
**CAUTION:** Make sure the radiator cooler does not tilt with respect to the tube terminals.



**Figure 3 — Filament Radiator Being Removed From Tube Type 8807**

Insert the tube **VERY CAREFULLY** into the cavity surfaces so the fingers will not be damaged by the filament radiator. Care should be taken to assure that the tube does not bump either the cavity enclosure or the contact fingers.

With the tube resting on the cavity contact surfaces and the tube handles rotated approximately  $45^\circ$  from the center line of the plate air inlet hole, as shown in **Figure 4**, push



**Figure 4 — RCA Tube Type 8807 Being Inserted into Cavity Y1116B**

down and rotate the tube until the handles are  $90^\circ$  from the inlet hole in the back of the cavity. While rotating the tube and applying a downward force, the operator will notice that the tube will easily settle into the contact surfaces. If the operator will try this insertion technique several times, he will soon get the "feel" of determining when the tube is properly seated as shown in **Figure 5**.

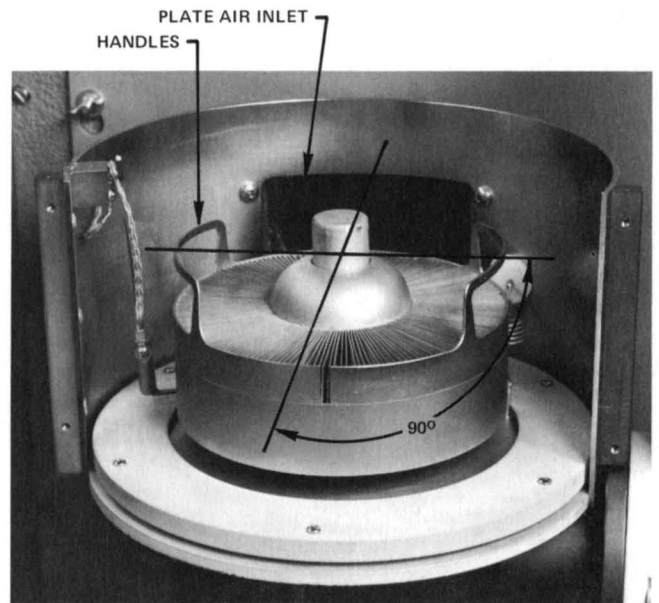
**CAUTION:** Do not insert or remove the tube from the cavity by rocking the tube back and forth. This rocking motion crushes the contact fingers and applies undue force to the internal structure of the tube. This will shorten the life of the tube.

### Removal and Insertion of the RCA Tube Type 8806 in the Y1116 Cavity

#### Tube Removal

Before removing the four screws that hold the front cover and lid assembly on the tube compartment of the Y1116 cavity, **EXTREME CAUTION** must be observed by the operator to insure that all operating voltages have been removed from the tube and the cooling blowers turned off. To avoid handling a "hot tube", the air should be left on for three to five minutes after all voltages are removed.

After the captive screws have been loosened, raise the lid assembly straight up approximately two inches to allow the air chimney to clear the tube. The mechanical B+ grounding rod, which is provided on all cavities, can now be seen by the operator. The grounding rod is actuated by removal of

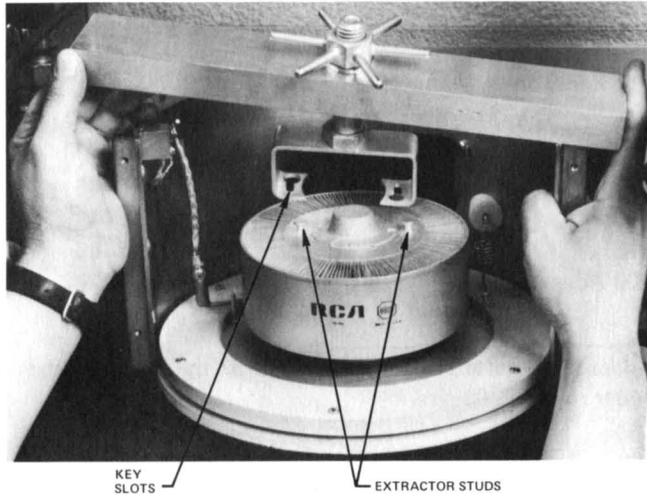


**Figure 5 — RCA Tube Type 8807 Fully Inserted into Cavity Y1116B**

the lid assembly, and if operating properly, it will remove any static voltage from the tube plate. It is recommended for the safety of the operator, an external grounding rod also be used.

The 8806 tube puller (RCA Part No. J15449), as shown in **Figure 6**, will greatly assist the operator in tube removal. The tube puller should be operated as follows: 1) Prior to positioning the tube puller on the tube, unscrew the spider nut or hand wheel as far as possible without disengaging the nut from the bolt. 2) Rest the aluminum channel on the upper edge of the air chamber and centered over the tube as shown in **Figure 6**. 3) The tube puller has a "C" shaped bracket with two key slots machined in the lower surface. Drop the key slots over the tube-extractor studs on the anode of the 8806. 4) Rotate the "C" bracket to lock the studs in the key slots as shown in **Figure 7**. 5) Tighten the hand wheel until it becomes snug. While doing this make sure the "C" bracket remains in the locked position. 6) Continue turning the hand wheel until the tube has been raised approximately  $3/8$  of an inch. The tube will now be free of all finger contact surfaces. 7) Unscrew the hand wheel until the tube is sitting loosely in the cavity contact surfaces and remove the tube puller.

**CAUTION:** Do not remove the tube from the cavity while it is attached to the tube puller. This will eliminate the possibility of the tube dropping off the tube puller if both are removed together.



**Figure 6 – Tube Puller J15449 for Use with RCA Tube Type 8806**

To remove the tube from the socket it should be lifted straight up and out of the cavity by hand.

**EXTREME CAUTION** should be used so that the tube is not permitted to bump the contact fingers or any portion of the cavity enclosure.

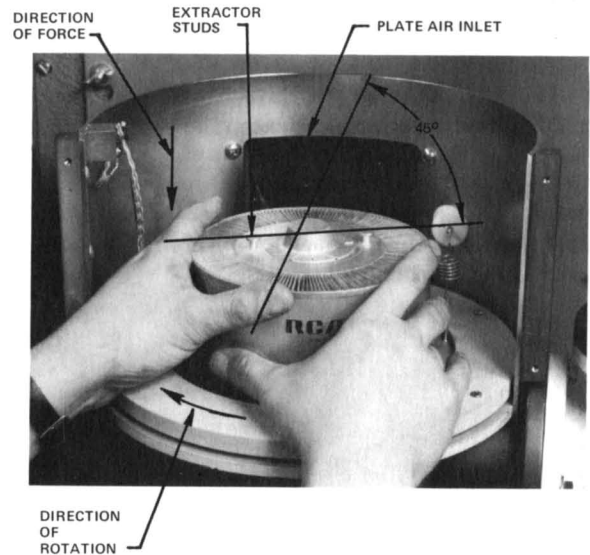
The same inspection procedures outlined in the 8807 section for the tube contact surfaces and cavity finger contact rings should be used when changing 8806 tubes.



**Figure 7 – RCA Tube Type 8806 Ready to be Removed From Cavity Y1116A**

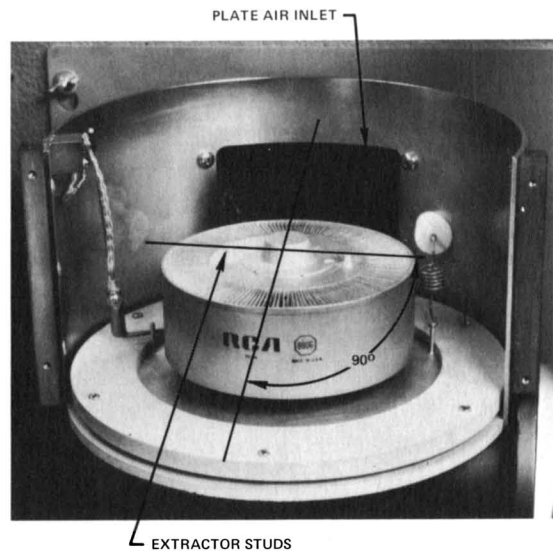
### Tube Insertion

When inserting the 8806 tube into the cavity, it should be placed into the contact rings carefully to avoid damage to the finger contacts. Orient the tube with the tube extractor studs on the anode rotated approximately  $45^\circ$  from the center line of the plate air inlet hole. This setting is shown in **Figure 8**. Rotate the tube  $45^\circ$  in a clockwise motion while applying a downward force. With this type of motion, the tube will settle into the contact rings and seat properly.



**Figure 8 – RCA Tube Type 8806 Being Installed into Cavity Y1116A**

The final position of the tube extractor studs should be  $90^\circ$  from the center line of the plate air inlet hole as shown in **Figure 9**.



**Figure 9 – RCA Tube Type 8806 Installed into Cavity Y1116A**

**CAUTION:** Do not remove or install the tube by rocking the tube back and forth. This rocking motion crushes the contact fingers and applies undue force to the internal structure of the tube. This will shorten the life of the tube.

### Removal and Insertion of the RCA Tube Type 8916 in the Y1165 Cavity

#### Tube Removal

The removal of the 8916 tube from the Y1165 cavity follows the same procedure outlined in the 8807 section of this paper. The tube puller for the 8916 is of the same design as the 8807 tube puller with the exception that the bolt is 2.5 inches longer.

If the operator will follow carefully the instructions outlined for the 8807 he will find this puller a very useful and safe device. Refer to **Figures 1 and 2.**

#### Tube Insertion

Instructions for insertion of the 8916 are similar to those for the 8807 as outlined in this paper. Rotate the tube carefully into the socket so that the final position of the tube handles is located 90° from the plate air inlet hole. Refer to **Figures 3, 4 and 5.**

#### Tube Puller Type Numbers

Tube Type	Cavity Type	Tube Puller Type
8807	Y1116B	J15448
8806	Y1116A	J15449
8916	Y1165	J15450
8806 Adaptor*	Y1116A	J15427

\*Adaptor converts either the J15448 or the J15450 tube puller to the 8806 size.

