



Adjustment Procedure for Kinescope Ion-Trap Magnets

This Note describes a recommended procedure for adjusting ion-trap magnets to obtain maximum picture brightness and to minimize the possibility of damage to kinescopes. Misadjustment of the ion-trap magnet may cause imperfect centering of the kinescope electron beam and result in excessive bombardment of the masking aperture within the electron gun. As a result of such bombardment, ions may be formed beyond the control of the ion trap and produce an ion spot on the fluorescent screen. Kinescopes utilizing low-voltage electrostatic focus are more susceptible to this type of damage than tubes using magnetic focus, possibly because the converging effect of an electrostatic focusing field on the ions is greater than that of a magnetic focusing field.

Recommended Procedure

1. Center the deflecting yoke on the tube neck and press the mounting-bracket cushion firmly against the glass funnel. If the tube uses magnetic focus, space the focusing device on the tube neck at least 1/2 inch from the end of the deflecting-coil windings. This spacing is necessary to reduce interaction between the focusing and deflecting fields. If the tube uses electrostatic focus, a small, adjustable centering magnet is usually required. It should be placed on the tube neck not more than 3-1/4 inches from the reference line shown on the Dimensional Outline given in the technical bulletin for the particular tube type.
2. Place the ion-trap magnet on the tube neck. The initial position of the magnet should be in accordance with the instructions given in the tube bulletin for the specific tube type. For such tubes as the RCA-17CP4, RCA-17TP4, RCA-21AP4, and RCA-21MP4, the proper initial position of the ion-trap magnet is in line with or slightly below grid-No.2, or about 3/4 inches from the tube base. The south pole of the magnet should be adjacent to pin No.2 and the north pole to vacant pin position No.8.



3. Adjust the brightness or background control of the television receiver midway between its minimum and maximum positions and set the picture or contrast control to its minimum position. The brightness-control adjustment will provide the kinescope with grid-No.1 voltage approximately midway between zero and cutoff; the picture-control adjustment will provide a blank raster on the kinescope screen for observation during subsequent adjustments. With some receivers incorporating automatic gain control, it may also be necessary to disable the agc circuit temporarily so that a blank raster will be obtained on the screen.

4. With the controls set as indicated in (3), apply operating voltages to the tube. As soon as the tube cathode reaches operating temperature, adjust the position of the ion-trap magnet by moving it a short distance forward or backward and rotating it slightly until maximum brightness is obtained at the center of the raster. It is important that this adjustment be made with the brightness control set, as specified in (3), midway between the minimum and maximum positions so as to keep the beam current low. It is equally important that the adjustment of the ion-trap magnet be completed quickly because operation of the kinescope with the ion-trap magnet improperly positioned may damage the tube. With certain kinescopes, particularly those utilizing electrostatic focus, two positions of the ion-trap magnet may be found in which maximum brightness is produced. The correct position is that which is nearer the base of the tube.

5. Focus the pattern and center it. These operations depend on the type of focusing and centering devices employed. If a shadow appears at the edge of the raster, check the position of the deflecting yoke to make sure that it bears firmly against the glass funnel and is centered on the kinescope neck. If any shadow remains, eliminate it by adjusting the position of the magnetic-focusing device or the centering magnet. If this adjustment reduces maximum brightness at the center of the screen or disturbs centering and focus, repeat steps (4) and (5). Never adjust the ion-trap magnet to center the pattern; never adjust it to eliminate neck shadow if such adjustment reduces the brightness at the center of the screen.

6. With the picture control in its minimum position, turn the brightness control to its maximum setting and readjust the ion-trap magnet as indicated in (4) until maximum light output at the center of the raster is again obtained. Bowing of opposite sides of the raster in the same direction may occur if the ion-trap magnet has improper rotational position. When magnetic focusing is used, bowing also may indicate that the focusing field is too close to the field of the ion-trap magnet. In this case, readjust the relative positions of the focusing device and the ion-trap magnet, and repeat operations (4) through (6).

7. Adjust the brightness and picture controls to obtain a picture of normal brightness. Readjust centering and focus if necessary. If this step requires any appreciable change in centering or focus, repeat operation (6) to recheck position of the ion-trap magnet.