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**BLOCK DIAGRAM
ADJUSTMENTS
and
TROUBLE SHOOTING
for
TELESET MODEL
RA-109A**

Winslow

Hanover

Sherbrooke

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**BLOCK DIAGRAM
and
TROUBLE-SHOOTING**

INTRODUCTION

The purpose of this block diagram is to assist the serviceman in rapidly localizing troubles. It also provides a means for quickly familiarizing the serviceman with the functional details of the Teleset.

In analyzing trouble, especially in the home of a customer, it is essential that the serviceman quickly and accurately diagnose the cause of the difficulty. Since most troubles are caused by tubes, the use of this block diagram, in conjunction with the tube location chart stapled to the inside of the cabinet, will enable the serviceman to quickly remedy most faults.

The RA-109A schematic diagram was divided into as many sections as possible. The number of sections into which a television receiver may be divided depends upon the number of indications available within the Teleset. Thus, by carefully examining the operation of the Teleset, the indications observed in conjunction with the following information should point to the source of the trouble.

Obviously, a block diagram of this type is not fool-proof since certain defects can result in indications in more than one section at a time. It is, therefore, left to the intelligence of the serviceman to analyze the difficulty in any case not specifically covered here.

The following chart is a tabulation of the various sections and the type of difficulty caused by each section. Where no direct reference is made to the probable cause of defect, it is understood that all tubes within the confines of the section are possible causes. It is further understood that the only observed symptoms are those shown under the heading "Indications of trouble" and that only one trouble occurs at one time.

1. PIX AND SOUND SECTION

Indications of trouble:

- A. No picture and no sound.
- B. Weak picture (very snowy) and weak sound.
- C. The AGC clamp tube is shown in this section since it is part of the AGC circuit that controls the RF and mixer stages. If it becomes defective, except for a short, its effect may not immediately be noticed. However, operation of the tube in a non-conducting state may result in defective 6J6 or 6AK5 tubes.

2. SOUND IF SECTION

Indications of trouble:

- A. No sound output. Tuning indicator does not function as Teleset is tuned to a station.
- B. Weak sound output. Very little tuning eye deflection as Teleset is tuned.

3. AUDIO SECTION

Indications of trouble:

- A. No sound output. Tuning eye functions normally during tuning.

4. PIX AND SYNC SECTION

Indications of trouble:

- A. No picture. Raster not synchronized as indicated by vertical retrace lines moving through the raster. [Defective V210 or V211.]
- B. Very weak picture. Raster barely synchronized. This may be caused by a defective 6AU6 in the V209 stage. This condition will probably occur only if the received station is very strong.

5. PIX SECTION

Indications of trouble:

- A. No picture. Raster is synchronized as evidenced by vertical retrace lines remaining stationary when tuned to a station.

6. COMPOSITE SYNC SECTION

Indications of trouble:

- A. Loss of horizontal and vertical sync on both weak and strong signals. [Defective V218, V219A or Sync Detector half of V217.]
- B. Loss of horizontal and vertical sync plus loss of AGC. Loss of AGC will be apparent when tuned to strong stations which will overdrive the set. [Defective V216 or entire V217.]
- C. No AGC. Depending on the strength of the received signal, lack of AGC may result in the loss of horizontal and vertical sync. On the strongest stations, complete loss of horizontal and vertical sync will take place. On medium strength signals, bad vertical jitter and tendency of the horizontal to lose sync may result. On the weak signals (those not normally affected by AGC) the picture will be synchronized both horizontally and vertically. If the signal strength of all received stations is fairly high, the condition may be checked by inserting an attenuator in the transmission line. The attenuation should be sufficient to produce a "snowy" picture. If lack of AGC is the only difficulty, the picture will be synchronized. [Loss of AGC is caused by defective AGC detector section of V217.] [See page 2 of the Installation section of the Service Notes for information on attenuators.] [In the above, reference to a defective half tube is meant to indicate a possible defect in that half of the circuit. Obviously, a defective half tube requires a replacement.]

7. VERTICAL SWEEP SECTION

Indications of trouble:

- A. No vertical sweep or insufficient vertical sweep.

8. HORIZONTAL SYNC SECTION

Indications of trouble:

- A. Loss of horizontal sync.
- B. If top third of picture wavers horizontally at times, check with the television station. Station may be operating their sync generator on short AFC sync time constant. Request they operate on long time constant AFC.

9. HORIZONTAL SWEEP AND HIGH VOLTAGE SECTION

Indications of trouble:

- A. No high voltage. [Defective V226, V227A, or either 1X2. It is doubtful that both 6BG6's or both 6W4 dampers would fail at the same time.] If tubes are o.k. check 1/4 amp. fuse F202. [This may be checked without removing the chassis, merely by removing a 6W4 and measuring the resistance from pin 5 to ground. Infinite resistance indicates a blown fuse. If replacement fuse blows, check deflection yoke.]
- B. Picture size reduced horizontally approximately one inch on each side. Brightness considerably lower than usual. Regulation of high voltage poor as indicated by raster "blooming" (enlarging) with increase in brightness setting. Defective 6BG6.

10. LOW VOLTAGE SECTION

Indications of trouble:

- A. No picture, no sound, no raster, tuning indicator does not glow. Fuse probably burned out.
- B. Picture size reduced both horizontally and vertically. Usually at least one-half inch on top, bottom and sides. Focus control is at extreme end of setting for proper focus. Defective 5U4G.

SERVICE ADJUSTMENTS FOR DUMONT TELESET MODEL RA-109A

GENERAL

All Du Mont Telesets are properly adjusted before they are shipped from the factory. It is possible, however, that during shipment certain of these adjustments will be disturbed and may require re-setting.

The use of a constant voltage power transformer as contained in the RA-109A will make many of the adjustments independent of line voltage. Therefore, if the adjustments are correct at your shop, it should not be necessary to reset them in the customer's home if the line voltage is within the 105-129 volt range.

There are no electrical positioning controls used in the RA-109A Teleset. Positioning of the picture is accomplished by adjusting the position of the focus coil.

INSTALLATION OF YOKE AND FOCUS COIL ASSEMBLY

1. Remove the focus-coil-and-deflection-yoke assembly from its shipping position in the cabinet.
2. Three self-tapping screws and accompanying flat washers, which are used for mounting the focus-coil-and-deflection-yoke assembly, will be found inserted in the oval-shaped slots on the rear cathode-ray tube support. Remove and retain these screws and washers.
3. Slip off the ion trap magnet and CRT socket to clear the neck of the picture tube.
4. Grasp the focus-coil-and-deflection-yoke assembly in both hands, keeping the axis of the large hole through the assembly horizontal, with the thumbscrew up. Cautiously slide the assembly over the neck of the tube, taking care not to damage the polyethylene sleeve. **THE WEIGHT OF THE YOKE ASSEMBLY MUST NOT AT ANY TIME BE ALLOWED TO PRESS, OR EVEN REST, ON THE NECK OF THE PICTURE TUBE.** Bring the mounting plate of the assembly flush against the tube support so that the 3 oval-shaped slots in each are lined up. Re-insert the self-tapping screws and washers that were retained from step 2 (above), and then, after centering the assembly with care on the neck of the picture tube, tighten the screws.
5. Insert the plug on the yoke-assembly cable into the female connector on the long cable from the main chassis. Keep this long cable as far from the metal cone as possible by bringing it around the right-hand side of the yoke-assembly, as viewed from the rear.
6. Set ion-trap magnet (see instructions).

ION-TRAP MAGNET ADJUSTMENT

(See Adjoining Illustrations)

NOTE: Accurate setting of the ion-trap magnet is

highly important to insure optimum performance and normal life of the picture tube. The procedure should be carried out as rapidly as possible, to prevent damage to picture tube, and is not to be used as a picture positioning or screen coverage adjustment.

1. Start with the magnet about $\frac{1}{2}$ " from the base of the tube.
2. Keep the Brightness Control at the lowest possible setting that will allow adjustment of the magnet.
3. Adjust the magnet by rotating it on the neck of the tube and sliding it back and forth for maximum illumination. Correct positioning of the magnet results in a decrease in brightness with movement of the magnet in any direction. (Two positions will be found; use position NEAREST BASE of tube).
4. Make final adjustment of magnet with Brightness Control set just below point where "blooming" (defocus) occurs.

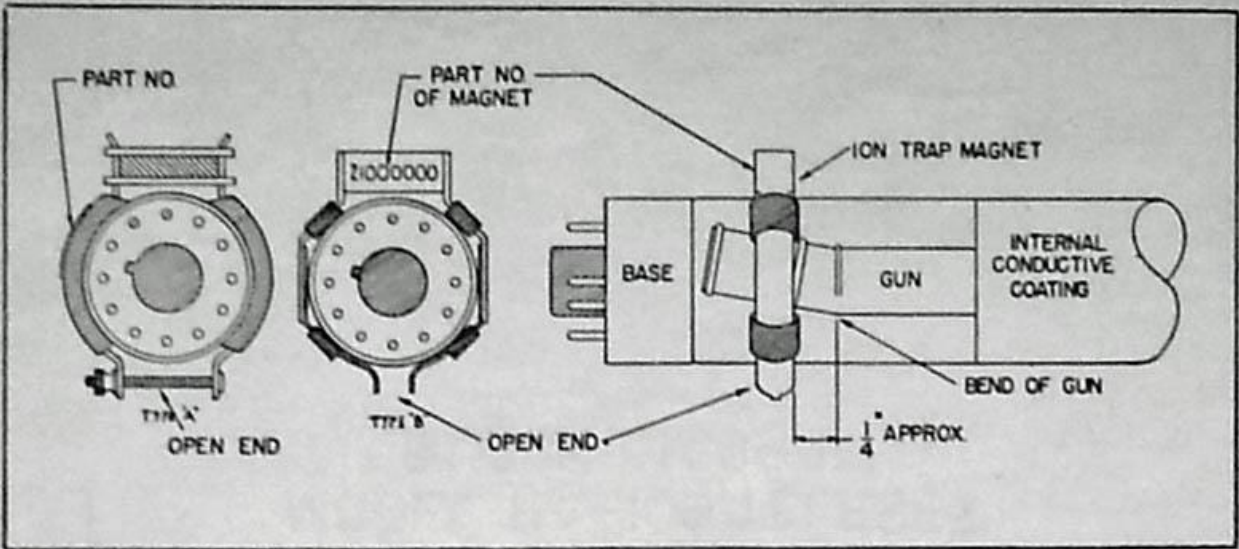
PICTURE POSITIONING ADJUSTMENTS RA-109A

(See Adjoining Illustration)

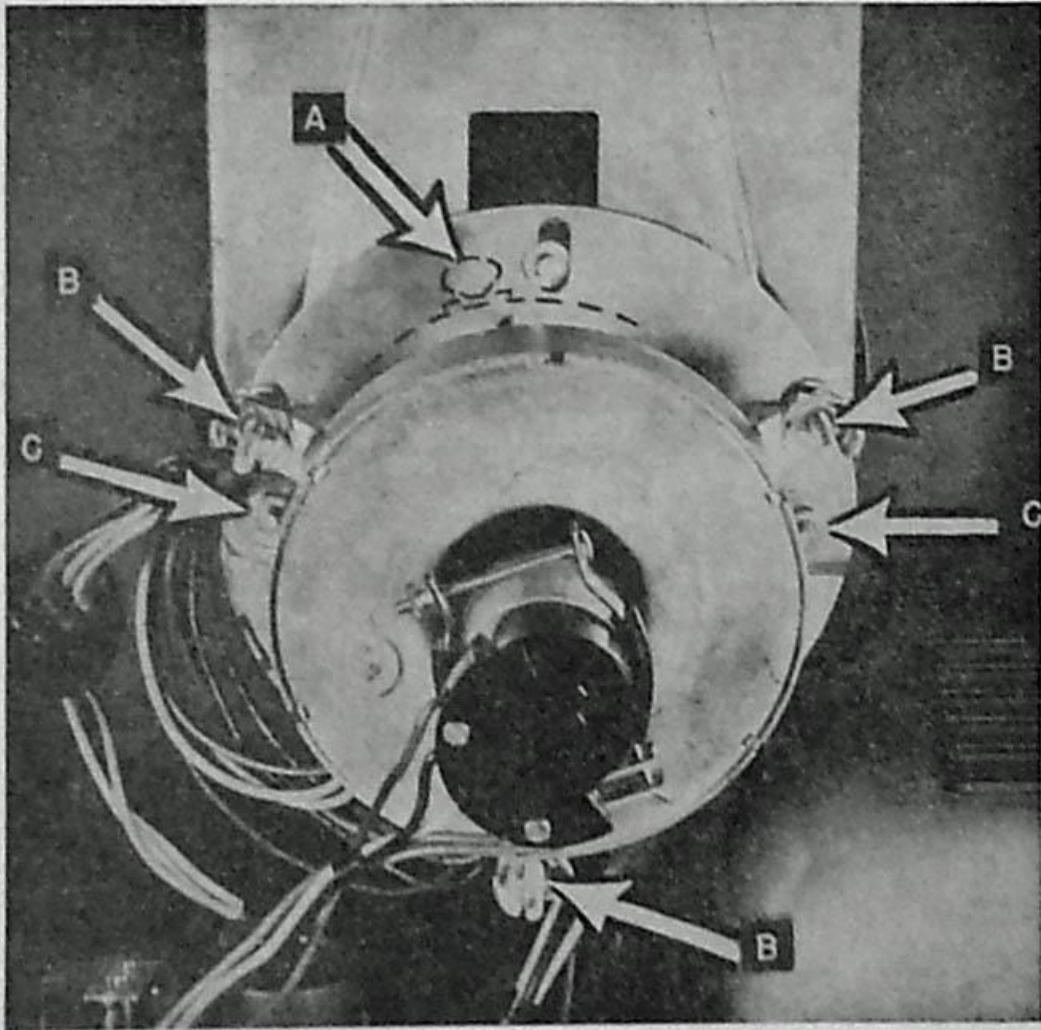
Note 1: Be sure that ion-trap magnet has been properly adjusted before attempting picture positioning.

1. Set 3 wingnuts (B) so that focus coil is spaced a minimum of $\frac{1}{4}$ " from rear of deflection yoke at all points. When set properly, the focus coil should exhibit practically no tilt.
2. Tune to a TV station and make the necessary front panel adjustments for a good picture.
3. If picture requires positioning in a rotary direction, loosen thumbscrew (A) and rotate deflection yoke. When retightening, make sure yoke is full forward against cone of picture tube. This may be checked by applying forward pressure on rear of yoke cover while tightening (A).
4. Loosen 2 nuts (C) holding focus coil mounting ring to yoke bracket and move focus coil assembly to position picture as correctly as possible. Up-and-down movement of focus coil assembly results in horizontal positioning of picture, horizontal movement of focus coil assembly results in vertical positioning. Retighten nuts (C). (Immediately reset ion-trap magnet if change in brightness occurs.)
5. Using 3 wingnuts (B), accurately position picture by UNSCREWING necessary wingnut(s). Vertical tilt of coil moves picture horizontally. Horizontal tilt of coil moves picture vertically. (Immediately reset ion-trap magnet if change in brightness occurs.)

Note 2: If picture cutoff (shadowing) occurs, the tilt of the focus coil (wingnuts B) may have to be readjusted, followed by readjustment of the positioning (nuts C). Do not attempt to eliminate cutoff (shadowing) or obtain screen coverage by adjustment of ion-trap magnet.



Types of ion-trap magnets used. (Thumbscrew of Type A should be tightened by hand only—do not use tools.)



ELECTRICAL ADJUSTMENTS

The following controls are located on the rear fold of the chassis. The identification of each is stamped adjacent to the control.

VERTICAL HOLD

Rotate hold control until picture falls out of sync. Adjust control to bring picture back into sync and note point where this occurs. Rotate hold control until picture goes out of sync in direction opposite to that just described. Adjust control and note point where picture falls into sync. Correct setting is approximately half-way between the two points where picture falls into sync. A final adjustment should be made for best interlace.

VERTICAL LINEARITY

If vertical non-linearity is observed in the upper half of the picture, adjustment of this control should correct the condition.

VERTICAL SIZE

This control affects the linearity of the bottom half of the picture as well as affecting the size. For best linearity and proper size, the linearity and size controls should be adjusted in conjunction with one another.

HORIZONTAL DRIVE

Adjust to the point where "packing" or foldover just disappears from the right edge of the raster.

HORIZONTAL LINEARITY

Adjust for optimum picture linearity. This control affects the center and the left half of the picture.

HORIZONTAL SIZE

Adjust for proper picture size. This adjustment does not affect linearity. Picture should be large enough so that on stations using maximum blanking, the picture completely covers screen. On stations using less blanking, the edges of the picture will not be visible.

HORIZONTAL FREQUENCY ADJUSTMENT

Rotate the horizontal frequency control until the picture falls out of sync. Adjust the control to bring the picture back into sync and note the point at which this occurs. Repeat the above but in direction opposite to that just described. The correct setting is half-way between the two points where the picture falls into sync.

HORIZONTAL PHASE CONTROL

(It is necessary to remove the back panel to adjust this control as it protrudes from the bottom of the horizontal oscillator transformer.) Reduce the horizontal size until both edges of the picture are in view. Turn up the brightness control and reduce the contrast so that the normally blanked borders of the raster are visible. Adjust the phasing control so that the normally blanked border on one side is equal in width to that on the other side.

The following two unmarked controls are located on top of the chassis. When viewing the chassis from the rear as in the cabinet, these controls may be located as follows:

AGC control (R278) is located directly to the left of the point on the chassis where the yoke and focus coil cable comes out of the chassis. V218, the sync clipper is to the left of the AGC control.

This control should be adjusted as per instructions on the Alignment Procedure sheet. An incorrect setting of this control may result in the following conditions.

If the set is located in the vicinity of a station, the set may overload on normal contrast setting. It is also possible for the top of the picture to tear out regardless of the contrast setting. If this occurs insufficient AGC voltage is developed and the control should be turned slightly clockwise to develop more AGC.

If control is turned too far CW the weak stations will be affected which is undesirable. Therefore, a balance between the point where the strong signal will overdrive the set and the weak signal is attenuated by AGC action must be made.

The CRT SENSITIVITY CONTROL is located adjacent to the right corner of the power transformer.

This control is adjusted correctly as follows:

1. Remove antenna connection.
2. Adjust the brightness control until the voltage as measured between the control grid and cathode is -50 volts.
3. Adjust the CRT sensitivity control just to the point where the raster is no longer visible.

If it is not possible to obtain -50 volts under the above conditions then set it as close to -50 volts as possible.

