BLOCK DIAGRAM ADJUSTMENTS and TROUBLESHOOTING for TELESET MODEL RA-111A

Putnam Guilford

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INTRODUCTION

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

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, should enable the serviceman to quickly remedy most faults.

The RA-111A schematic diagram was divided into as many sections as possible. The number of sections into which the television receiver may be divided depends upon the number of indications available within the set. Thus, by carefully examining the operation of the set, the indications observed in conjunction with the following information should point to the source of the trouble.

The 6E8 tube is shown on the schematic diagram as Y210. Since this tube performs three different functions, it was placed on the block diagram into three separate designations, namely Y210A, Y210B, Y210C. The purpose of this broadening was merely to make the block diagram more accurate from a functional standpoint.

Obviously, a block diagram of this type is not foolproof 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 noisy) and weak sound.
   C. The ASC clamp tube is shown in this section since it is part of the ASC 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 nonconducting state may result in defective 6L6 or 6AS6 tubes.

2. SOUND IF SECTION
   Indications of trouble:
   A. No sound output. Testing indicator does not function as detector is tuned to a station.
   B. Weak sound output. Very little tuning eye deflection as detector 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.

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 V211, V212X or Sync Detector half of V212).
   B. Loss of horizontal and vertical sync plus loss of ASC. Loss of ASC will be apparent when tuned to strong stations which will override the set. (Defective V212 or entire V212).
   C. No ASC. Depending on the strength of the received signal, loss of sync 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 occur. On the weak signals whose normally affected by ASC, the picture will be synchronized both horizontally and vertically. If the signal strength of all received stations is fairly high, the ASC may be due to an ASC detector which is located between the horizontal and vertical sweep i.e., the output of the horizontal sweep transistor. If the ASC detector is defective, the picture will be synchronized. (Loss of ASC is caused by defective ASC detector half of V212).

7. HORIZONTAL SYNC, SWEEP, AND HIGH VOLTAGE SECTION
   Indications of trouble:
   B. High voltage. Any one of the four tubes.

8. LOW VOLTAGE SECTION
   Indications of trouble:
   A. No sound, picture or raster. Testing indicator does not show. (Defective fuse or S145).

9. VERTICAL SWEEP SECTION
   Indications of trouble:
   A. No vertical sweep or insufficient vertical sweep.
SERVICE ADJUSTMENTS FOR DU MONT TELESET
RA-111A

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 resetting.

There are no electrical positioning controls used in the RA-111A Teleset. Positioning of the picture is accomplished by adjusting the position of the focus coil.

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 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-111A

(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 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 screws (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 screws (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 (screws C). Do not attempt to eliminate cutoff (shadowing) or obtain screen coverage by adjustment of ion-trap magnet.

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 interface.

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

Important

The horizontal size, linearity and drive controls should always be set correctly before the final adjustments are made on the synchronization circuits. Any change in the horizontal drive capacitor will necessitate resetting of the horizontal synch adjustments. It is further recommended that all adjustments of the deflection and synch circuits be made at 117 volt line.

Horizontal Deflection Adjustment

Procedure:

If the picture size is improper or if the horizontal linearity is off, one or more of the following controls must be readjusted as prescribed:

Horizontal Size

Adjustment of this control will change the picture size without affecting the linearity.

Horizontal Drive

This control affects the picture width and the linearity of the left side. This control should be adjusted in a clockwise direction to obtain maximum width and no bright vertical line on the left side of the raster. It should not be turned further clockwise from this point as it will result in loss of picture size and a larger amount of current drawn by the 6BQ6.

Linearity Adjustments

If any horizontal non-linearity exists in the picture the following controls should be adjusted as follows:

1. Turn linearity slug (in 2) to minimum inductance (slug all the way out of coil).
2. Turn linearity pot (in 1) to maximum resistance (completely counter-clockwise).
3. Position picture so that the extreme right side of the raster may be seen. Adjust the horizontal hold control on the front panel until the leading edge of the synch pulse is at the extreme right side of the raster.
4. Turn linearity slug (in 2) in until "packing" is just observed at the right edge of the picture (not raster).
5. Adjust the linearity pot so the linearity of the left third of the picture is equal to that of the center third.
6. Turn the linearity slug in another turn or until "packing" is again just seen at the right side of the picture. With this adjustment the picture should now have the desired linearity.
7. A slight adjustment of the horizontal drive capacitor in the counter-clockwise direction to bring in the left side of the picture is permissible if necessary, and if no bright vertical line appears.

Horizontal Synchronization Adjustments

1. Turn locking range capacitor C240A (marked "Freq.", and located at rear of horizontal-HV compartment) full clockwise.
2. Rotate waveform adjustment slug (top of Z210, between yoke mounting assembly and horizontal-HV compartment) full counter-clockwise then four turns clockwise.
3. Adjust front panel horizontal hold control full clockwise.
4. Rotate frequency slug (bottom) of Z210 until picture syncs.
5. Connect an oscilloscope through a 10 mfd capacitor to terminal C of Z210 and ground.
6. Adjust internal sweep of oscilloscope to 15,750 cps and observe waveform composed of two peaks—one broad, one sharp. (See adjoining illustrations.) Carefully rotate waveform adjustment slug (top) of Z210 until two peaks are of equal amplitude. This adjustment must be made with picture in sync, and should require only a portion of a turn.
7. Remove scope and readjust frequency slug (bottom) of Z210, still keeping front panel control full clockwise. Proper adjustment of slug is with picture phased as far to right as possible without instability or "gear-tooth" effect appearing. Some blanking must appear at left side of picture.
8. Check to see that picture holds sync when front panel hold control is rotated completely counter-clockwise. If sync is not held over full range of control, it may be necessary to repeat 5, 6 and 7 (above). It is normal in this circuit to lose sync if the signal is interrupted while front panel hold control is in the counter-clockwise position of its range. This may be used as a check of the circuit adjustment, since when normal, 4 or 5 slanting black bars of horizontal blanking should be visible.
9. When above steps are completed, set front-panel hold control for stable sync (approximately mid-point of its rotation range), and make any necessary correction of picture positioning by using focus coil adjustment (See Picture Positioning instructions). Front-panel hold control is not intended as a positioning adjustment.

The AGC control is the only unmarked potentiometer type control in the RA-111A Teleset and is located on top of the chassis. When viewing the chassis from the rear, it is directly to the right of V203 (6T6) and under the CRT.

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.