CRT Replacement Procedure

The following procedure will help minimize the time required when changing all three picture tubes in the RA-5A, RA-6/A, and DA-4X projection television sets. The procedure will also produce the best results for optimum geometry and convergence in all modes and minimize the likelihood of Flash Focus errors occurring.
Since there are no templates available to guide the technician for proper geometry, ***it is extremely important to never replace all three tubes at the same time.*** The green CRT should be replaced first, aligned to the existing red and/or blue, and then the removal and installation of the red and blue tubes done.

CRT replacement steps:

1. Remove the VM assembly and deflection yoke from green CRT. Note the location of the VM assembly on the neck. The anode lead must be removed from the HV distribution block. The four mounting screws can now be removed and the CRT taken out. Note: If there is difficulty in removing the anode leads from the HV block, spray some component cooler into the socket and twist the lead left and right a few times. This should loosen it enough. Expect some effort in pulling the lead out.

2. Install the green CRT and neck components. Position the deflection yoke all the way forward and rotate it to approximate axis and lightly tighten the yoke clamp.

3. Turn the unit on by pressing "DISPLAY", "5", "VOLUME +", and "POWER" on the remote commander in sequence. The unit will now be in the service mode.

4. Input a crosshair pattern from an external generator. Do not use the internally generated pattern in the PJE mode. A crosshair pattern is preferred but a crosshatch may be used if unavailable.

5. Press "7" followed by "ENTER". All data inside the PJE CPU registers will zero out and the convergence will appear extremely out of alignment. This is known as the "initialize" mode and is necessary to set proper deflection yoke axis and centering magnet alignment. If this step is not performed, there is a possibility of overdriving the dynamic convergence correction circuits causing the AD board to fail. **NEVER PRESS "MUTE"/"ENTER" WHILE IN THIS CONDITION.** As long as the data is not saved, the original convergence data will reside in the NVM. The data can be read back by pressing "0" followed by "ENTER" or simply turning the unit off and back on again.

6. Rotate the yoke axis to parallel the green to the red and blue horizontal and vertical lines at the center axis of the screen. Tighten the yoke clamp.

7. Adjust the centering magnet rings at the rear of the yoke to center the green crosshairs. It is preferred to do this with green only and measuring the position of the crosshairs at the bezel edges to obtain true centering. If absolute centering cannot be achieved, center as close as possible to perfect.

8. Once yoke axis and centering are completed, press "0" followed by "ENTER" on the remote. This will read the original convergence data from the NVM back into the PJE CPU.

9. Adjust G2 cutoff level, lens focus, electrostatic focus, and 2 pole/4 pole magnet adjustments as outlined in the service manual. If the 2 pole/4 pole adjustment shifts the centering, place the unit back into the "initialize" mode as outlined in step 5 and adjust the centering magnet. Press "0" and "ENTER" when completed.

10. Enter the PJE service mode and perform all necessary rough adjustments to converge the green with the original red and blue positions using an external crosshatch pattern. Note: The unit must be in "FULL" mode when aligning convergence.

11. Display the internal crosshatch pattern and perform any fine adjustments with the cursor. Any time a positive result occurs during the alignment procedure, save the data. This will allow you to return to the last successful step should the need arise. Never wait until the end to save data.

12. Place the unit into WIDE ZOOM mode. Adjust HSIZ and HLIN to converge the green vertical lines on the left and right side with the red and blue. WIDE ZOOM horizontal linearity data is different for these two adjustments, so this is important. Save the data but *do not Flash Focus*. Return the unit to FULL mode.

13. Replace the red and blue tubes as outlined in steps 1 through 9 above.

14. Adjust convergence of the red and blue to match the green as outlined in steps 10 and 11.

15. Save the data and run Flash Focus while still in the service mode. Again, be sure you are in the FULL mode.

16. Locate COPY feature at Item 1 in the PJE mode. Change the data from 0 to 1 with the joystick. Press "MUTE" followed by "ENTER" to copy the convergence data from the FULL mode to the other modes. Note: Item 2 in

the PJE menu is listed as ALCP. This stands for "all copy". The difference between these two features is COPY will transfer the data to all other modes except WIDE ZOOM. ALCP will copy the data to all modes, including WIDE ZOOM. ALCP is not recommended since the horizontal linearity is significantly different from the other modes.

17. Place the unit into WIDE ZOOM once again and converge the red and blue to the green. Save the data when completed but *do not Flash Focus*. Never run flash focus in any other mode than FULL while in the service mode.

Hint: Whenever Flash Focus is engaged while in the service mode, best results can be obtained by turning the picture and brightness controls up to at least two thirds and selecting the tuner mode with no signal input by removing the RF cable or selecting an inactive channel.
If a Flash Focus error occurs, refer to the TVP-14 training manual on how to recover from errors.