SERVICING TELEVISION SETS

By EUGENE TRIMAN

SOME of the notes compiled herewith are applicable in general to other manufacturers' models than those mentioned. In applying them, a strict coherence to the fundamentals involved, will simplify what is depicted by some as a complicated procedure. The notes which follow are submitted in the spirit of helpful cooperation which must exist between those Service Men who are actively engaged in making television service a down-to-earth, common-sense, profitable, business

BEFORE any service process is attempted on Andrea receivers, the physical wiring should be examined. If the unit is not a factory wired one, check the layout of the heater and i-f section leads against that prescribed in the wiring diagrams. The wiring instructions and charts supplied by the manufacturer are important service accessories. No adjustments should be attempted if the wiring is slipshod or different from that recommended in the charts. Troubles which are caused by bad wiring layout are: the presence of spurious hum voltages causing stationary interference patterns on the screen, and poorly received images as a result of incorrect band pass in the video i-f stages.

• • • alignment

Because of the engineered simplicity which has been built into the Andrea receivers, the unit can be aligned by a method which does not require the use of a frequency modulated oscillator and an oscilloscope. However, it is very difficult to determine the alignment condition without these instruments. The writer recommends that the technician be well able to judge the condition of the receiver by inspection of a received resolution chart before attempting an alignment. The Service Man can judge the true condition by a careful determination of whether or not the cause of a stationary zigzagging of the long vertical lines in the pattern can be directly traced to incorrect alignment of the r-f unit. A curve to the entire pattern can be generally traced to bad alignment. The video i-f portion of this receiver is fixed and therefore leads to the fact that the phase shift which is causing the displacement of the pattern lines can more easily be caused by the r-f unit rather than the remaining other possibility of the video amplifier itself offending. With this established, the method of aligning which of necessity requires a complete alignment of the entire receiver, follows:

The detailed wiring instructions and charts supplied by the television set manufacturer are very important service accessories.

(1) *Sound alignment*: Perform this step in the usual way, feeding the 8.25 megacycle signal to the grid of the 1852 modulator tube. The contrast control should be turned three-fourths of full on. The two sound trimmers shown in the trimmer location chart should be adjusted for maximum output on an indicator.

(2) *Interchannel trap adjustment*: To prevent interchannel interference there are two 14.25 megacycle traps in the video i-f section. If these are not adjusted with the greatest of accuracy, poor sharpness of detail will result due to the reduction in high frequency response of the video band pass. It will be impossible to focus to a sharp picture if this exists. To adjust these traps feed a 14.25 signal to the grid of the modulator tube and adjust the trimmers shown in the chart for minimum output of the 6V6G video output tube. The output indication can be observed by the degree of brightness of the pattern then seen on the screen or also by means of a vtvm connected from the picture tube grid (heavy light-colored rubber lead) to the grid return top connection of brightness control. In making any measurements from the grid of the picture tube, take precautions against the accidental application of a positive potential to the grid. If the grid is made positive at any time, the screen of the picture tube will be damaged.

(3) *Video i-f alignment*: The alignment of this portion of the receiver can be changed only by changing the position of the grid and plate leads of the video i-f amplifier stages. If these wires are located in position strictly in accord with the wiring instructions, practically optimum results will be obtained. A costly way of improving the wire positions can be done by using a wobbulated oscillator with a frequency calibration that can be seen accurately on an oscilloscope, moving the wires until the proper band pass is obtained.

(4) *R-f alignment*: A reasonably excellent alignment of the r-f stages can be obtained with no more than an accurate high frequency oscillator and a good output indicator. The indicator is connected to the output of the second detector 6SQ7 in the sound portion of the receiver.

Feed a 49.75 mc, amplitude-modulated signal to the antenna input of the receiver. Turn channel selector to the lower channel position. Set contrast control at ¼ of full on. Set sound sensitivity control at midway position, which is ½ of full trimmer capacity.

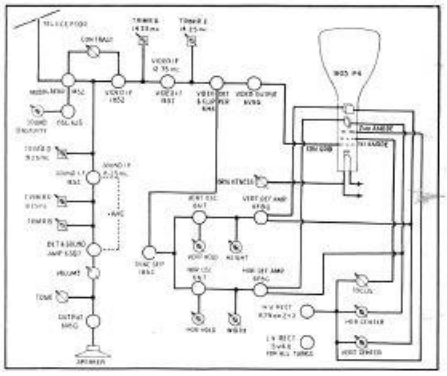
Adjust the 3 plunger-type trimmers for maximum sound output. These are shown in the trimmer chart and they should be adjusted, trimming first the oscillator, and then the detector, and then the r-f stage.

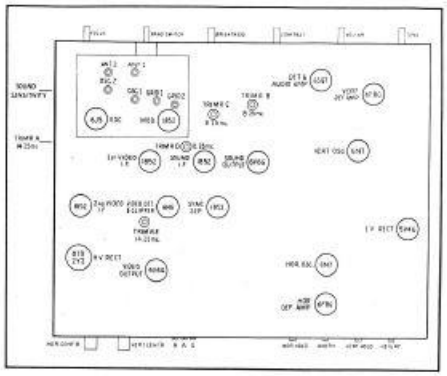
With the detector-modulator and r-f stage adjusted for maximum output, carefully pull the modulator stage trimmer out through resonance until the output starts to drop suddenly. Note the output meter reading. Push the plunger back through resonance until the output reading is the same as noted above. Then, once again pass through the maximum response section until the drop in output reaches the value noted above. Carefully mark the plunger shaft so that it may be reset to this value. (This position is the lowest capacity setting of the three positions discussed.) Adjust the marked plunger once again for center maximum response.

Repeat this entire procedure with the r-f stage plunger to the point where the upper side of the r-f channel response is found. When the lowest capacity setting is found, lock the trimmer in place. Reset

(*Continued on page 572*)

Because of the engineering simplicity built into the Andrea TF5 receiver it can be aligned without the use of the oscilloscope.





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the modulator trimmer to the mark made for the lowest capacity setting and lock it in place.

Turn the channel selector to the higher channel position and repeat operation on the other three trimmers in the same order, using a 55.75 megacycle signal on the input.

• • • picture size

The voltage swing of the deflection generators govern the size of the picture, and also, to a slight degree does the strength of the signal received. The deflection tubes in these receivers were found to be operating at maximum efficiency and the only possible way of getting more deflection was to hunt for a hot tube for the generator circuit. The problem was solved by increasing the deflection sensitivity of the picture tube rather than by increasing the deflection amplitude. Recalling the simpler theory of the ordinary cathode-ray tube used in oscilloscopes we find in review that the deflection sensitivity of the tube is affected by the level of second anode voltage. This voltage governs the velocity of the electron beam and thereby determines the degree of inertia of the beam. By lowering the voltage on the second anode, the inertia is reduced together with the velocity, and the deflection sensitivity is increased. Of course if this is done to a sufficient degree the beam will become harder to focus and the fine spot of the beam will be lost. Therefore, limitations are in order.

The principle of reducing the second anode voltage can be applied to the Andrea receiver with success. In the high-voltage power supply, there should be found in series with the plate of the 879 rectifier tube, a resistor whose value is 100,000 ohms. If the measured value is found to be less than 100,000 ohms the resistor should be discarded for one whose value is at least that. The size of the resistor can be increased to 150,000 and if necessary, up to 200,000 ohms in order to get satisfactory picture size.

We mentioned that the signal strength had an effect on picture size. This is true where the receiver is operated on the limit of its sensitivity. An accompanying effect of low signal strength is the lateral shifting of the picture across the screen. This is caused by sixty cycle hum in the deflection circuits. The curve to the picture can be eliminated by increasing the signal strength.

Demonstration will show the folly of using steel or iron dipoles and twisted No. 12 110-volt house wire in the television antenna. The criterion for judging good high-frequency transmission line has come to be the large size of the conductor and the heavy waterproof covering, *but the quality of the insulating material on the conductors should also be considered.* This eliminates the false merits of appearance. The use of copper tubing of large diameter will increase the signal strength available from a dipole. The increase will be definitely noticeable. Inspect so-called high-frequency transmission line for good live rubber insulation and other real qualifications such as additional insulating materials around the conductors. Servicing the set should include a close inspection of the television antenna.

• • • audible hum

The presence of disturbing hum was encountered in some of these receivers. This