Admiral

SERVICE MANUAL SUPPLEMENT
for models using
20A1, 20B1, 21A1, 4J1, and 4K1 CHASSIS

IMPORTANT

When servicing any model using the 20A1, 20B1, 21A1, 4J1, and 4K1 chassis, use this supplement with the Television Service Manual for 20A1, 20B1, 21A1, 4J1, and 4K1 Chassis (Form No. S267).

This supplement contains necessary service data for late production 20A1, 20B1, 21A1, 4J1, and 4K1 chassis. It also includes corrections and additions for the Television Service Manual (Form S267).

The most important production change is the use of a new TV Tuner (part number 94C18-2). Page 64 explains how to identify the type of tuner used. When servicing, or ordering parts for a 94C18-2 Tuner (late production), BE SURE to use this Service Manual Supplement. When servicing, or ordering for a 94C18-1 Tuner (early production), BE SURE to use the Television Service Manual for 20A1, 20B1, 21A1, 4J1, and 4K1 Chassis (Form S267).

WRITING TO DISTRIBUTOR OR FACTORY

When reporting about any Admiral product, be sure to include the following information:

1. Model number and anything stamped on model label.
2. Fill out and send the Inspection Tag, if a tag is attached to chassis.
3. If Inspection Tag is *not* sent in, give all letters and numbers stamped on back of chassis.
4. Detailed explanation to speed investigation.
5. If reporting parts failure, give symbol number, part number and any brand name on part.
6. For record changers, give model and anything stamped on model label on bottom of changer pan.

ADDITIONS AND CHANGES IN TELEVISION SERVICE MANUAL

Important: To prevent possibility of error when using the Television Service Manual (Form No. S267), portions of it should be revised or crossed out in accordance with the information given below.

Models 4H18C, 4H19C, 4H145C, 4H146C, 4H156C, 4H166C and 4H167C should be added to the list of models given on the first page of the service manual. (Note that any of these model numbers may have a suffix letter "N".) All these models use a 4K1 radio tuner and a 6PA3 power supply. (See "Model Identification Chart" on page 58.)

The "Deflection Yoke Adjustment" procedure given on page 8 should be changed to read as follows: "If picture appears tilted (Figure 17), loosen the wing nut on top of deflection yoke and rotate the deflection yoke coil for correct picture orientation while pushing the yoke coil forward as far as it will go".

Page 13, under the heading "Test Equipment", states that the Signal Generator should have an output "AM modulated at 4.5 MC". This is not a requirement of the signal generator and the sentence can be crossed out.

Page 14, in step 9 of the "IF Amplifier and Trap Alignment" chart, states that the Signal Generator Frequency (MC) should be "*4.5 AM modulated". This should be changed to read "*4.5 unmodulated or 400 cycle AM modulated".

In Figure 30 "Overall Video IF Response Curve" on page 15, the first line inside the curve should read "21.25 MC AUDIO MARKER **NOT** VISIBLE DUE TO TRAP".

Under heading "Sharp Tuning Control" on page 36, in the fifth line of the second paragraph, the word "circulator" should be "circular".

On page 39, the correct part number for C102 should be 98A45-87.

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On page 41, L606 was erroneously listed as an "FM" peaking coil instead of an "AM" peaking coil.

On page 41, the part number of coil L104 should be corrected to read 98A45-14.

On page 44, the correct dimensions for "Door Bumper, Sponge Rubber", part number 12A5-6 are $\frac{3}{16}$"x$\frac{3}{8}$"x2". This item appears in the left-hand column, 5 lines from the bottom of the page.

Note that in the cabinet parts list, the descriptions given for channel escutcheons are not always correct. Channel escutcheons are supplied less mounting spring and any other parts if used. The following information should be noted: Channel escutcheons part #23B43, 23B43-1 and 23B43-2 require a hairpin wire mounting spring (part #19A48). Channel escutcheon part #23B44-1 requires a at bronze mounting spring (part #18A27), two speed nuts (part #2B10-5-68) and a fibre cushion plate (part #32A78).

On page 49, the part number for cabinet doors on models 30F15, 30F16, 30F17 are incorrect. See parts list on page 67.

In the "Voltage Chart" on page 50, at the top of the right column, we indicate "● Channel selector set on channel 2". This should be changed to read "● Channel selector set on an unused low channel (preferably channel 2).

Production Change "Y" (in this Supplement) states that condenser C214 has been added to the circuit. C214 should be added to the schematics given in Figures 81 and 82. C214 is connected in series between the junction of R207, C204 and the volume control R212A.

In all four schematics, the coil terminal numbers on the physical illustration of the width control T405 (at the extreme right end of the schematics), should be changed as follows:

Terminal number 1 should be 2.
Terminal number 2 should be 1.
Terminal number 3 should be 4.
Terminal number 4 should be 3.

All wire colors remain as originally shown; only the numbers change.

In the schematics for combination models, on pages 54 and 56, the band switch section (SW601) connected between the oscillator (V601B) and the 1st IF Transformer (T601) is shown in the FM position. This should have been shown in the AM position since all other sections of this switch are shown in the AM position.

ION TRAP ADJUSTMENT FOR 16" (21A1) SETS

Care must be exercised in adjustment of the ion trap for 16" sets since there are two locations on the neck of the tube where a raster can be produced.

Locate the ion trap magnet approximately over the metal flags of the electron gun structure located near the tube base. Starting from this point, very carefully move the ion trap forward or backward and at the same time rotate it slightly in either direction; adjust for the brightest raster possible with the lowest setting of the brightness control on which good line focus can be maintained. The second ion trap location, which is further forward on the tube neck, should not be used.

MODEL IDENTIFICATION CHART

Model Numbers	Television Chassis	FM-AM Radio Tuner	Power Supply Used
24A12, 24A125	20A1	—	4PA1
4H15A or B, 4H16A or B, 4H17A or B	20A1	4J1	*6PA1
24C15, 24C16	20B1	—	4PA1
4H145A or B, 4H146A or B, 4H147A or B, 4H155A or B, 4H156A or B, 4H157A or B, 4H165A or B, 4H166A or B, 4H167A or B, 30F15 30F16, 30F17	20B1	4J1	*6PA1
4H18C or CN, 4H19C or CN, 4H145C or CN, 4H146C, 4H156C or CN, 4H166C or CN, 4H167C or CN, 30F15A, 30F16A, 30F17A	20B1	4K1	6PA3
25A15, 25A16, 25A17	21A1	—	4PA2
4H137A or B, 4H126A or B	21A1	4J1	**6PA2
4H126C or CN	21A1	4K1	6PA4

* 6PA3 can also be used. ** 6PA4 can also be used.

IMPORTANT

To identify a 4J1 or 4K1 Radio tuner, note that there are two leads for each pilot light in the 4K1 since the pilot lights and heaters are not returned to ground in the 4K1 chassis. In the 4J1 tuner, the pilot lights have one lead and are grounded by the pilot light mounting brackets; one side of the heater circuit is grounded to the 4J1 chassis. The Tuner type is also indicated on the serial number decal.

Note that the power supplies are stamped with their number; usually on the top of the chassis near the power transformer. The power supplies can also be identified by the following differences:

R505 is 270 ohms in the 4PA1 Power Supply.
R505 is 150 ohms in the 4PA2 Power Supply.
R516 is used in the 6PA1 and 6PA3 Supplies.
R516 is NOT used in the 6PA2 and 6PA4 Supplies.

FM RF ALIGNMENT PROCEDURE

The FM RF alignment procedure for 4J1 and 4K1 Radio Tuners has been changed as indicated below to prevent possible spurious oscillation at the high frequency end of the FM band.

It is important to use the FM RF Alignment Procedure Chart given below and disregard the chart on page 21 of the "Television Service Manual for 20A1, 20B1, 21A1, 4J1, and 4K1 Chassis" (Form No. S267).

FM RF ALIGNMENT PROCEDURE

Step	Connect Generator	Generator Frequency	Receiver Gang or Dial Setting	Output Connections	Adjust as follows (very carefully)
1	To ends of FM antenna twin lead thru 120 ohm carbon resistors in series with each generator lead.	†109 MC	Gang fully open	Connect VTVM (DC probe) from point "P" to chassis	*M (oscillator) for maximum
2		109 MC	"	"	*Adjust N (antenna) for maximum VTVM reading, while rocking signal generator. If trimmer does not peak, it will be necessary to squeeze or spread turns of FM antenna coil.
3		87 MC	Tune in Signal. (Gang should be closed or almost closed).	"	If signals in steps 1 and 3 will not tune in at gang tuning extreme (within 0.5 MC), it will be necessary to spread or squeeze oscillator coil turns and then repeat steps 1 and 3 until correct results are obtained.
4		106 MC	At 106 MC See Figs. 85 and 86	"	Readjust M (oscillator) for maximum.
5		109 MC	Gang fully open	"	Readjust N (antenna) for maximum VTVM reading, while rocking signal generator. Check tracking and calibration at 106 and 92 MC. See Figures 85 and 86. Calibration error should not exceed ±0.5 MC. If necessary, repeat alignment until correct results are obtained.

* It is advisable to adjust generator output so VTVM readings do not exceed approx. —1.5 V. DC while peaking.
† Signal may be unmodulated or 400 cycle AM modulated. If your signal generator does not reach this frequency, use harmonics as described in "FM Alignment Equipment" on page 19 of the Service Manual.

IMPORTANT

After completing alignment, assemble chassis cover and dial scale to chassis. Set dial pointer as shown in Figure 85. Recheck dial calibration for AM and FM tuning. The AM and FM oscillator or antenna trimmer adjustments may be touched up for more accurate calibration and tracking.

AM antenna trimmer adjustment "F" in step 3 of "AM Alignment Procedure" should be repeated after receiver and antenna have been installed in cabinet. Note: AM antenna trimmer may not peak properly if antenna leads are not routed properly or separated as originally made.

Locating 109, 106 and 92 MC Settings With Gang Drum

Fully open the gang condenser. This is the 109 MC setting. Make a pencil line on the edge of the gang drum as shown by the arrow marked "109 MC" in Figure 86. Then to locate the 106 MC or 92 MC settings, merely rotate the gang drum until the pencil line corresponds to the dotted line positions (marked 106 MC and 92 MC) shown in Figure 86.

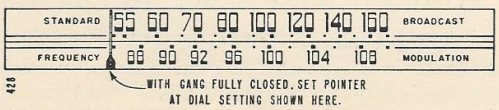


Figure 85. Pointer Setting.

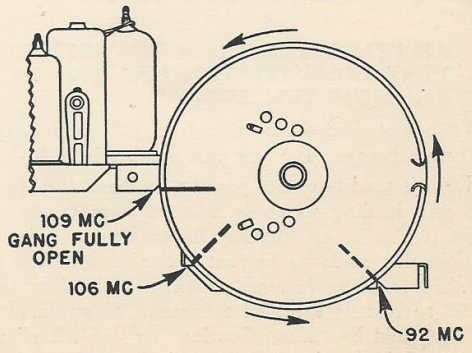


Figure 86. Locating Alignment Settings.

ADDITIONAL PRODUCTION CHANGES AND TROUBLE SHOOTING

(For earlier Production Changes and complete Trouble Shooting data, see pages 25 through 32 of Television Service Manual for 20A1, 20B1, 21A1, 4J1 and 4K1 Chassis, Form No. S267.)

S. BREAKDOWN OF C437

To prevent breakdown, the working voltage rating of coupling condenser C437 (.05 mfd.) was changed from 400 volts (DC) to 600 volts (DC). The new part number is 64B5-7. Chassis with this change are stamped run 17A or higher.

If C437 shorts in sets using a 12AU7 Sync Separator and Clipper, the Sync Separator section of the 12AU7 will draw grid current. This will bias the AGC tube (V305) to cut-off. Since no AGC voltage is developed, the 1st and 2nd video IF's are not controlled by AGC, and their gain will be maximum. With a strong signal, enough negative voltage will be developed across video detector load resistor R319 to drive the video amplifier V306 to cut-off.

This trouble can be identified by either a weak picture with loss of horizontal and vertical sync, or no picture at all. In most cases, the picture may be observed faintly by turning up the brightness and contrast controls. In any case, vertical and horizontal synchronization will be impossible.

If this condition appears, remove the 12AU7 (V403) tube. If the picture appears with brightness and contrast restored, but will still not sync either vertically or horizontally, replace C437 with a .05 mfd. 600 volt condenser, part number 64B5-7.

T. R436 DECREASED IN VALUE TO IMPROVE HORIZONTAL OSCILLATOR STABILITY

Chassis with this change stamped run "18" or higher.

Load resistor R436 was changed from a 270,000 ohm, ½ watt resistor to a 240,000 ohm, ½ watt, 5% resistor (part number 60B7-244).

R436 was changed to compensate for any increase in its resistance value that may occur during use of the receiver. If R436 does increase in value, horizontal sync will be affected, and a split-framed picture may result.

A check can easily be made with an ohmmeter. When replacing R436, use part number 60B7-244.

U. AM PEAKING COIL L606 CHANGED TO PREVENT EXCESSIVE REGENERATION IN 4K1, 4J1 RADIO TUNER

L606 was changed in value from 475 microhenrys to 120 microhenrys. The new part number is 73A5-10.

L606 is used to obtain positive feedback and eliminate the grid loading which is inherent in a triode mixer. This results in an increase in conversion gain. This change was made to prevent excessive feedback which resulted from an increase in value of loading resistor R605 beyond its specified tolerance. This difficulty can be identified by "motor boating" or "whistling" at the center of the band, when the AM-FM switch is on AM, and the loop antenna is connected. If the converter is oscillating at the center of the band, place your hand across the loop antenna. If the oscillations stop, replace L606 and damping resistor with the new part.

V. CHANGE IN LENGTH OF 300 OHM LINE FROM ANTENNA TO TUNER WHEN BUILT-IN "ROTO-SCOPE" ANTENNA IS USED

FOR 20A1, 20B1 CHASSIS: In these chassis, the length of antenna twin lead (300 ohm) connected from the antenna terminals to the TV Tuner (94C18-1), has been shortened from 18 inches (in early sets) to 13 inches (in later sets).

FOR 21A1 CHASSIS: In these chassis, the length of the antenna lead has been shortened as much as possible (between 4 and 5 inches).

This change was made to increase the signal pickup on the high channels ***in sets using the built-in Roto-Scope antenna.*** When necessary to make this change in a set having the built-in Roto-Scope antenna, unsolder the antenna lead from the antenna terminals and shorten as described above. Then resolder the lead to the antenna terminals.

W. BREAKDOWN OF C311

Condenser C311 was changed from .05 mfd., 400 volt condenser to a .05 mfd., 600 volt condenser (part number 64B5-7).

A voltage divider network consisting of R323 and R324, supplies the proper bias voltage for the picture tube (V307). If C311 shorts, the total voltage is applied to the picture tube cathode, and the picture tube will be cut off. The symptom of this trouble would be: no raster, sound OK.

X. UNGROUNDED STATOR PLATE FOR SHARP TUNING CONDENSER C111 CHANGED TO MINIMIZE FREQUENCY DRIFT

A ceramic ungrounded stator plate was added to late production 94C18-1 Tuners. This new type stator plate is also used in the 94C18-2 Tuner and is shown in figure 86 as M118. Use of this stator minimizes frequency drift.

To install this new type stator plate on a tuner, see instructions on page 64.

Y. COUPLING CONDENSER (C214) ADDED TO ELIMINATE NOISE IN VOLUME CONTROL

A coupling condenser (C214, .05 mfd., 400 volts, part #64B5-22) was connected in series between junction of de-emphasis network (R207 and C204) and terminal of volume control R212A. Addition of this condenser

blocks direct current into the volume control, thereby avoiding noise with rotation of volume control.

Z. VERTICAL OUTPUT TRANSFORMER T402 LEAD LENGTH CHANGED

Lead length of vertical output transformer T402 has been increased to make this new part (part number 79B24-1) a universal replacement for the 20A1, 20B1 and 20X1 television chassis.

CHANGE IN AMPERAGE OF LINE FUSE M313

A 3-ampere fuse F313 was added in late production sets (see production change "M" on page 26 of the manual). The amperage of line fuse M313 has since been increased from 3 amperes, 250 volts (part number 84A1-14) to 4 amperes, 250 volts (part #84A1-18) to avoid burning out of fuse due to possible momentary increase in current drain.

SERVICE HINTS

These service hints have been compiled as an addition to the "Trouble Shooting" information and chart on pages 27 to 32 in the "Television Service Manual for the 20A1, 20B1, 21A1, 4J1, 4K1 Chassis" (Form No. S267). In general, the regular trouble shooting procedures apply, but these hints should assist you in making a quick diagnosis of some service troubles. Note, however, that these service hints are not intended to cover all possibilities that may cause a particular trouble, but should be used together with the material in the service manual.

HINTS ON AUTOMATIC GAIN CONTROL (AGC) CIRCUIT

Note: Although reference numbers used in the following discussion apply to the schematic (Figure 81) showing the 12AU7 sync separator and clipper, these service hints apply to all 20A1, 20B1, 21A1 chassis.

The AGC system employed in the 20A1, 20B1, 21A1 chassis can be serviced more readily if its function is properly understood.

A sharp cut-off pentode amplifier (V305, 6AU6) is used as a "triggered" AGC tube to supply a negative control bias to the RF amplifier and the first two video IF amplifiers. A positive sync pulse is applied to the control grid of the AGC tube through an isolating resistor R315. A pulsed plate voltage, supplied through the width control and developed during retrace time, is applied to the AGC tube plate through condenser C430. The AGC tube is biased to cut-off until the pulsed plate voltage is applied to condenser C430, and the positive sync pulse is applied to the control grid, simultaneously.

The current through the AGC tube V305 will charge the condenser C430 to a negative value in respect to chassis ground. AGC voltage is developed by the discharge of C430 through the filter network (R430, R447, C417 and C305) and the bias resistors (R303 and R308) to ground. Note: Under normal conditions, the AGC voltage measured at the control grid (pin 1) of the 1st video amplifier (V301) will be approximately —4.5 volts. This voltage will vary slightly with signal input and contrast control setting.

Since the AGC tube is dependent upon other circuits for its operation, it will be affected by defective components in the video amplifier V306, damper V408, and sync separator V403 circuits. The following hints are associated with these circuits:

No Sound; No Picture. AGC measured at pin 1 of V301 (6AU6) will read approximately —10 volts.

The voltage present at the junction of the video amplifier plate load resistors R340 and R341 is applied to the control grid of the AGC tube. If the video amplifier tube or circuit becomes defective and the voltage drop across R341 is decreased, an increased positive voltage is applied to the grid of the AGC tube. The AGC tube is no longer at cut-off between sync pulse intervals, and increased plate current results.

The AGC voltage developed will be of sufficient amplitude to cut-off the RF amplifier and 1st two video IF tubes. This will result in no sound or video.

Low or Varying 2nd Anode Voltage; Distortion in Sound. Plate voltage is applied to the AGC tube through the width control (T405), which is connected to the horizontal output transformer. If damper tube V408 becomes gassy, the pulsed voltage applied to condenser C430 may vary enough to cause distortion in the RF amplifier and 1st and 2nd video IF amplifier. This will affect both the sound and picture.

Weak Picture, No Sync; Or No Picture. This trouble can be identified by either a weak picture with loss of horizontal and vertical sync, or no picture at all. In most cases, the picture may be observed faintly by turning up the brightness and contrast controls. In any case, vertical and horizontal synchronization will be impossible. The AGC voltage measured at pin 1 of V301 (6AU6) will read approximately —.3 volts.

If C437 shorts in sets using a 12AU7 Sync Separator and Clipper, the Sync Separator section of the 12AU7 will draw grid current. This will bias the AGC tube (V305) to cut-off. Since no AGC voltage is developed, the 1st and 2nd video IF's are not controlled by AGC and their gain will be maximum. With a strong signal, enough negative voltage will be developed across video detector load resistor R319 to drive the video amplifier V306 to cut-off.

If this condition occurs, remove the 12AU7 (V403) tube. If the picture appears with brightness and contrast restored, but will still not sync either vertically or horizontally, replace C437 with a .05 mfd., 600 volt condenser, part number 64B5-7.

ARCING OR CORONA IN 21A1 (16") SETS

Arcing or corona in the 2nd anode supply circuit of the picture tube will generally produce a sharp crackling noise in the sound of the receiver, a faint hissing sound, or an odor of ozone. It can also cause the raster to vary in brightness. Arcing or corona is generally aggravated by conditions of high humidity.

If the noise in sound, hissing sound, or odor of ozone stops when the 2nd anode connector is disconnected from the chassis, the difficulty is in or at the picture tube mounting assembly. If these symptoms persist after disconnecting the 2nd anode connector, the difficulty will be found in the 2nd anode supply in the chassis.

In general, the exact spot of arcing or corona can be located by close observation under subdued light. However, if location or arcing or corona is not visible, it may be located by listening through a length of fibre or bakelite tubing (approx. 1" diameter, at least 18" long). The tubing is held close to the ear with the other end directed to suspected point of arcing or corona.
Caution: 2nd anode voltage is approximately 12,000 volts; extreme precaution should be exercised when making this test. Before handling picture tube, see "Picture Tube Replacement" on page 33 of the Service Manual.

If the arcing or corona is located in or at the picture tube assembly (stops when 2nd anode lead is disconnected), the remedy may be found in the following:

Arcing or corona from the front of the picture tube (cone or screen) to the picture tube window. Clean picture window and picture tube screen; see "Cleaning Plastic Picture Tube Window" on page 32 of the Service Manual.

Except for very early sets, a polyethylene insulating sheet is mounted in back of the picture window. Install a polyethylene insulating sheet if set does not have one or if original one is deteriorated, torn, or has deep scratches or holes in it. Plastic sheet part #32D122 is used in sets having a rectangular picture window and part #32D126 is used in sets having a rounded-end picture window. Important: To avoid arcing or corona to cabinet, mount the insulating sheet with short tacks or staples applied as far to the top or sides of the cabinet as possible.

Arcing or corona from the front of the picture tube (cone or screen) to the polyethylene insulating sheet. This may be due to presence of moisture or dust on the screen of the picture tube and on the polyethylene insulating sheet. It may also be due to locating the insulating sheet mounting staple too close to the edges of the picture window.

Clean picture tube screen. Remove the polyethylene sheet and clean it with carbon tetrachloride. If insulating sheet is deteriorated, torn, or has deep scratches or holes in it, replace it.

Arcing or corona inside the connector on the 2nd anode connector lead. Push the connector together for good contact. If the connector does not fit together securely, trim excess material off with a file or sharp knife.

If the arcing or corona is located in the 2nd anode supply in the chassis (does not stop when 2nd anode lead is disconnected) the remedy may be found in the following:

Arcing or corona between or across components mounted on the 1B3(8016) rectifier tube mounting strip. Make proper clearances, tighten mounting screws, check soldered connections. Clearance between the corona ring (below the 1B3/8016 tube socket) and the chassis should be approximately ¾ of an inch. Check for leakage across 500 mmfd. condensers (C440, C441 or C427). Clean surface of condensers, tube sockets, phenolic mounting strip, etc. with carbon tetrachloride. If arc-over or corona persists, replace the part.

Arcing or corona between terminals, leads or windings of horizontal output transformer. If arcing occurs across terminals, check for protruding edges of solder or strands of wire.

If arcing occurs between wire leads, separate leads. If insulation on leads is not burned badly, the surface of wire and terminal may be cleaned with carbon tetrachloride and the part may still be usable.

GENERAL SERVICE HINTS

Focus Control Requires Full Rotation, Or Some Tubes Have No Heater Voltage, Due To Use Of Wrong Power Supply. It is important to use the correct power supply with the various television and radio tuner chassis. To determine the correct power supply, refer to the "Model Identification Chart" given on page 58.

If the power supplies for 10-inch, 12-inch television sets are used in 16-inch television sets, or vice-versa, incorrect focus will result. The picture may focus at an extreme setting of the focus control.

If a 6PA1 or 6PA2 power supply (used in combination models having 4J1 tuners) is used in sets which require a 6PA3 or 6PA4 (used in combination models having 4K1 tuner), the heaters of the 6X5 rectifier (V516), the video amplifier (V306), and the horizontal output tube (V406) will not be connected to the heater string, and therefore will not operate.

The AM-FM radio tuners can be identified either by the serial number decal on the tuner chassis or by noting that the pilot lights in the 4K1 have two leads, while the 4J1 pilot lights have only one lead.

Split-frame Picture. See Production Change "T" in this supplement.

Horizontal Jitter, or Loss of Horizontal Sync. If filter condenser C413 (.01 mfd., 400 V, part number 64B5-25) opens up, it may be difficult to detect. The Horizontal Hold adjustment will be very critical, or will not hold sync at all. In some cases, adjustment of the Horizontal Lock L401 in rear of chassis, will not bring the picture into sync. If the picture will sync, horizontal "jitter" in the picture will result.

Shadows Or Rounded Corners In Picture When Ion Trap Is Adjusted For Maximum Brightness. Always adjust the Ion trap for maximum brightness. If shadows appears on the picture raster, adjust the deflection yoke until it is as far forward as possible. Then center the picture by carefully moving the focus coil forward or backward on the neck of the picture tube. If it is impossible to remove the shadows, try reversing the leads of the focus coil.

No Raster, Sound OK. See production change "W".

Vertical Line At Left Of Picture. If a white vertical line appears at the left side of the picture, it is probably due to misadjustment of the horizontal drive C421. Adjust the horizontal drive until the line disappears.

Interference From Electric Range Switches. If the Admiral Flex-O-Heat electric range switch or other electric range switches create an electrical disturbance in the television set, connect a .25 mfd. 1000 volt DC condenser across the line input terminals to the switch. If necessary, a smaller condenser should be used from each terminal to the range body or neutral.

Interference From Cash Registers. Television interference which is caused by operation of a cash register can be eliminated by installing an inductive-capacitive line filter (such as Tobe Filterette #1394). The line filter should be installed inside the cash register as close to the motor as possible, and should be mounted on clean surface of the metal frame. The connecting leads should be as short as possible (see instructions supplied with filter).

Tunable Audio Hum. If audio hum is present which is tunable, but may be "tuned out" at a particular setting of the Sharp Tuning control, try connecting a 2,200 ohm, ½ watt resistor and a .1 mfd, 400 volt condenser in series from the AGC tube plate (pin 5 of V305) to ground.

Sound Has Excessive Bass Response. If the bass response of the set seems over-emphasized, check the condenser which shunts the primary of the output transformer. If this condenser is .01 mfd, replace it with a .002 mfd, 600 volt (part number 64B5-14). Over-emphasized bass response can often be determined by mechanical vibrations such as rattle of the cabinet grille.

Weak Sound In High Signal Strength Areas. If the sound is weak in a high signal strength area, and all other possibilities of a defective sound system have been checked, disconnect the green AGC lead going to the tuner from the junction of R447 and R303. Then, reconnect this lead to the junction of R303 and R308. The decreased AGC will increase the gain of the RF amplifier (V101); and thus increase the gain of the sound as well as the video signal.

Tweets Heard on A.M. in 4J1, 4K1 Radio Tuners. If interference is present on the broadcast band in the 4J1 or 4K1 AM-FM radio tuner, first tune in the interference. Then, remove the horizontal oscillator tube (V405) in the television set. If the interference stops, disconnect the ground connection from pin 8 of the horizontal oscillator. Then connect a lead from pin 8 of V405 to pin 2 of V406. This will stop the horizontal oscillator from oscillating when the AM-FM tuner is used.

Audio Hum. Connect 25 inches of ½ inch bonding braid under the bracket holding the webbing for the picture tube, on the side nearest the audio lead; connect the other end of the braid under the power supply chassis, at the mounting screw nearest the audio lead.

Weak Sound in Normal or Fringe Area. While watching picture, carefully turn slug A9 (see Figure 27, page 15 of the manual) approximately two turns inward for an increase in audio gain without loss of picture contrast. If further audio gain is necessary see Production Change F, on page 25 of Television Service Manual for 20A1, 20B1, 21A1, 4J1 and 4K1 chassis.

Whistle on AM Band of 4J1, 4K1 Tuner. See production change "U".

Noisy Volume Control. See Production Change "Y" in this supplement.

Horizontal Output Transformer Protection Fuse M405 Blows When Set Is Apparently OK. If the .25 ampere fuse M405 (located inside the high voltage housing) blows repeatedly, even though the television set appears to be operating properly, try replacing damper tube V408 (6W4GT).

3 Ampere Line Fuse M313 Blowing. See Production Change on page 61 in this supplement.

Cabinet Grille Rattle. See "Sound Has Excessive Bass Response" on this page.

Operating The 4J1, 4K1 Radio Tuner Without Television Chassis Connected to Power Supply. If the special adapter socket, illustrated on page 19 in the manual is used to operate the radio tuner without the television set, be sure that the band switch is in the "Radio" position. This adapter will not suffice to check the phonograph, since plate voltage is not supplied to the audio amplifier and output tubes when the band switch is in the "Phono" position.

BUILT-IN "ROTO-SCOPE" ANTENNA

Some late production models were equipped with the new Admiral Built-In "Roto-Scope" Antenna which may eliminate the need for either an indoor or outdoor antenna if the installation is in a "normal signal strength" area.

Operating the "Roto-Scope" Antenna: The Roto-Scope antenna is operated by the antenna control lever which extends from the back of the cabinet near the top (see figure 87). The antenna control lever can be set to any of three different positions which, in effect, allow the Roto-Scope to be oriented (rotated) for best possible reception on all channels operating in your area.

To determine the best position of the antenna control lever, first tune in a television station. Then, after tuning the set for best sound, move the antenna control lever to each of its three positions (extreme left, center and extreme right). As the lever is moved to the different positions, carefully watch for the position giving the clearest picture.

A good picture should have good contrast, sharp detail, and freedom from "ghosts", "snow" effect, and the various types of interference.

The antenna control lever should be left in the position which gives the most satisfactory picture on all channels.

Note: Sometimes, rotating the set slightly will improve the picture. Sometimes moving the set to another location in the room, even as little as two or three feet away, will make an appreciable difference in the picture.

However, if it is not possible to find a setting which gives satisfactory reception on ALL channels, it may be desirable for the owner to reposition the antenna control lever for each particular station being tuned in.

Weak Signal Areas: Some signal areas are so weak, or some particular locations are so unfavorable, that it is not possible to get satisfactory pictures with a built-in antenna. **Important:** Before connecting an indoor or outdoor antenna, be sure to disconnect the Built-In Roto-Scope antenna from the antenna terminals. Do not reconnect the Roto-Scope leads. When disconnected the matching stub (see figure 87) may be taped to the side of the cabinet.

If an indoor or outdoor antenna is to be used, select the proper Admiral antenna for the location and type of installation. Admiral antennas and transmission line are made of the highest quality material and workmanship. They are designed for ease of installation, good appearance, sturdiness, long use and top performance.

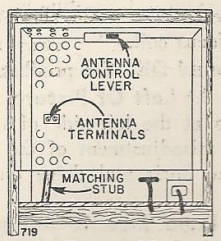


Figure 87

94C18-1 and 94C18-2 TELEVISION TUNERS

IMPORTANT: ***It is very important to correctly identify a tuner to be serviced so that the proper service instructions and parts lists are used.***

TELEVISION TUNER IDENTIFICATION

Early production sets used the 94C18-1 Tuner. Late production sets use the 94C18-2 Tuner. These tuners are similar in physical appearance and electrical operation but are only interchangeable as a complete unit. Many of the parts are neither electrically or mechanically interchangeable. Some of the parts appear to be identical physically but are not interchangeable. For example: The detent rollers in these tuners both have a $\frac{3}{8}$" diameter but the diameters of the bearings are different. The bearing diameter for the 94C18-1 Tuner is $\frac{1}{16}$"; the bearing diameter for the 94C18-2 Tuner is $\frac{3}{32}$". Consequently it is important that the tuner being serviced is identified properly and the correct parts list used.

The most noticeable identifying feature of the 94C18-2 Tuner is the individual channel coils. The coils on the 94C18-2 Tuner are stamped 2F, 3F, 4F, etc. and the coil contacts are mounted on a "raised" portion on the surface of the coil. See Figure 89.

The coils on the 94C18-1 Tuner are stamped 2, 3, 4, etc. (*without* letter "F") and the coil contacts are mounted on the flat surface of the coil. (For 94C18-1 Tuner illustration see Figure 73 on page 37 of Television Service Manual, Form No. S267.)

Another distinguishing feature is the difference in detent plates. See the adjoining illustration for detent plate detail.

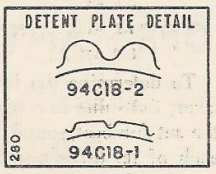


Figure 88.

94C18-2 TELEVISION TUNER SERVICE

Service procedure for the 94C18-2 Tuner is practically identical with service procedure for the 94C18-1 Tuner. Refer to pages 36 and 37 of the Television Service Manual (Form No. S267) for all service data for 94C18-1 tuners. The only difference in servicing the 94C18-2 Tuner is that the contact plate assembly M123 can not be repositioned and the detent spring M122 can not be reset. Therefore, the paragraphs under heading "Repositioning Contact Plate Assembly M103" and "Resetting Detent Spring M102" apply only to the 94C18-1 Tuner.

Replacement of the Ungrounded Stator Plate of Sharp Tuning Control. The new type (ceramic disc) ungrounded stator plate M118 will be supplied as a replacement for the metal stator plate with a phenolic wafer used in the 94C18-1 Tuner and early production 94C18-2 Tuners. The part number for the new type stator plate is 98A45-86. Note that this part is supplied with wiring lead and trimmer condenser C110 attached, because it is difficult to solder the wire lead to the silver plated surface on the ceramic stator plate disc.

To replace an early production stator plate (in 94C18-1 or very early 94C18-2 Tuner) remove turret assembly as described under "Removing Tuner Turret Assembly" on page 36 of the Television Service Manual (Form No. S267). Remove mounting rivets from stator plate by drilling out or clipping them out with diagonal wire cutters. Remove trimmer screw M115 and locking nut M114 from trimmer condenser C110. Unsolder wiring lead connecting trimmer to terminal on contact plate.

Assemble the replacement stator plate (M118) by placing the ceramic button over the $\frac{5}{8}$" hole in the chassis with the wiring lead extending into the chassis. Place the mounting bracket over the ceramic button and mount securely using #4x$\frac{3}{16}$ round head machine screws with #4-40x$\frac{3}{16}$ hex nuts and #4 shake proof lock washers. Mount trimmer condenser C110 in chassis and solder wire lead to its original terminal on the contact plate making this lead as short as possible. Dress wiring lead from ceramic stator plate to trimmer condenser C110 so it does not come in contact with the turret drum. After replacement of the stator plate, it will be necessary to make "Overall Oscillator Adjustment (A15)". See page 17 in Television Service Manual (Form No. S267).

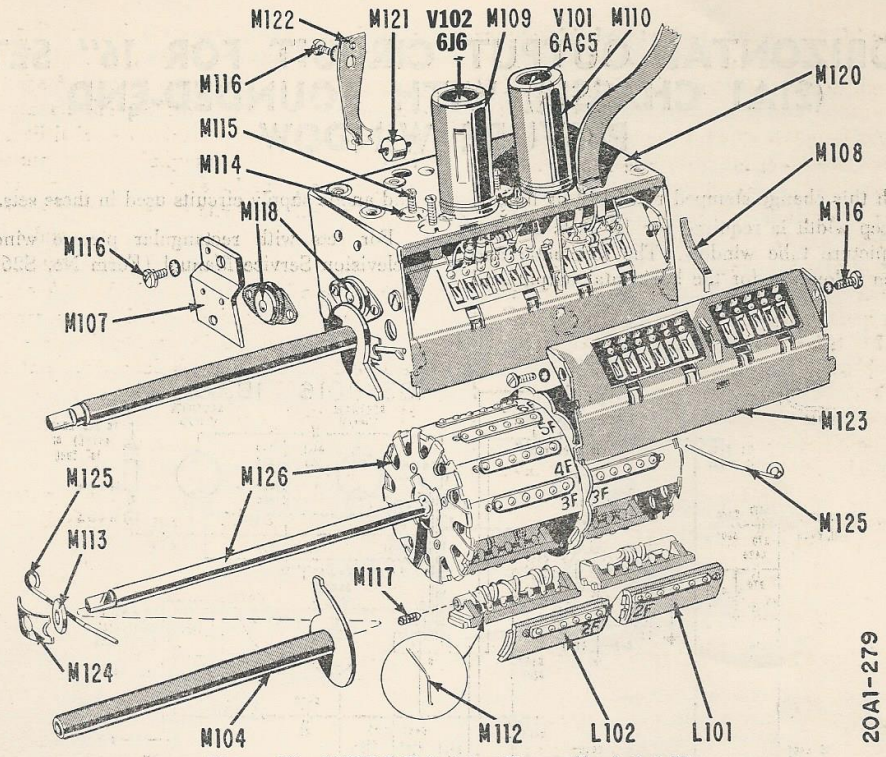


Figure 89. 94C18-2 Television Tuner, Exploded View

PARTS LIST FOR 94C18-2 TELEVISION TUNER

IMPORTANT

Use this parts list for 94C18-2 Tuner only. Some parts for early tuner (94C18-1) and late tuner (94C18-2) are not interchangeable. Be sure to use the parts list in the Television Service Manual (Form S267) for all 94C18-1 parts.

CONDENSERS

Sym.	Description	Part No.
C102	.5 to 3 mmfd, Ceramic Trimmer	98A 45-87

COILS FOR 94C18-2 TUNER

NOTE: Channel coils in this tuner are stamped 2F, 3F, 4F, etc.

L101	Antenna Coil	
	for Channel #2	98A 62-2
	for Channel #3	98A 62-3
	for Channel #4	98A 62-4
	for Channel #5	98A 62-5
	for Channel #6	98A 62-6
	for Channel #7	98A 62-7
	for Channel #8	98A 62-8
	for Channel #9	98A 62-9
	for Channel #10	98A 62-10
	for Channel #11	98A 62-11
	for Channel #12	98A 62-12
	for Channel #13	98A 62-13
L102	Mixer—Oscillator Coil	
	for Channel #2	98A 63-2
	for Channel #3	98A 63-3
	for Channel #4	98A 63-4
	for Channel #5	98A 63-5
	for Channel #6	98A 63-6
	for Channel #7	98A 63-7
	for Channel #8	98A 63-8
	for Channel #9	98A 63-9
	for Channel #10	98A 63-10
	for Channel #11	98A 63-11
	for Channel #12	98A 63-12
	for Channel #13	98A 63-13

Before inserting replacement coil L101 or L102, see that teeth at inner end of coils fit together when fitted in detent plate at center of turret. If necessary file teeth slightly.

MISCELLANEOUS PARTS FOR TV TUNER 94C18-2

To identify a 94C18-1 or 94C18-2 Tuner see illustrations. For illustration of 94C18-1 Tuner, see Figure 73 on page 37 of the Television Service Manual. For illustration of 94C18-2 Tuner, see Figure 89 in this Supplement.

Sym.	Description	Part No.
M104	Shaft Shell & Rotor Assy. (Sharp Tuning) (with 4½" long brass shaft Shell)	98A 45-71
M107	Bracket, Sharp Tuning Rotor Retaining	98A 45-61
M108	Spring, Detent Plate Grounding	98A 45-74
M109	Shield, Tube (Slotted; for 6J6)	98A 45-73
M110	Shield, Tube (Plain; for 6AG5)	98A 45-36
M112	Spring, Slug Retaining (Osc. coil)	98A 45-52
M113	Washer, Fibre Spacer (¼" IDx½" OD)	98A 45-63
M114	Nut, Locking Spring (for trimmers)	98A 45-31
M115	Screw, Trimmer (4-36x5/8")	98A 45-33
M116	Screw, Bracket Mounting (6-32x¼")	98A 45-62
M117	Slug, Brass Tuning	98A 45-88
M118	Stator Plate (ungrounded); Silver with Ceramic Insulator, for Sharp Tuning C111. (includes mtg. bracket)	98A 45-86
M120	Tuner, Television (complete)	94C 18-2
M121	Roller, Detent (3/8" dia., 3/32" dia. bearing)	98A 45-82
M122	Spring, Detent (2 5/16" long)	98A 45-81
M123	Contact Plate and Bracket Assembly (uses wiping contacts)	98A 45-84
M124	Spring, Sharp Tuning Rotor Contact (Flat bronze 1 7/16"x½")	98A 45-83
M125	Spring, Front and Rear Turret Shaft (Wire 2¾" long, 3/64" dia.)	98A 45-85
M126	Turret and Shaft Assembly (less coils) (5/8" shaft and 3/16" detent depression)	98A 45-80

HORIZONTAL OUTPUT CIRCUIT FOR 16" SETS (21A1 CHASSIS) WITH ROUNDED-END PICTURE WINDOW

Chassis with this change stamped run "19" or higher.

Greater sweep width is required for 16" sets using a rounded-end picture tube window. The schematic and parts list given below are for the horizontal output and 2nd anode supply circuits used in these sets.

For sets with rectangular picture window, see the Television Service Manual (Form No. S267).

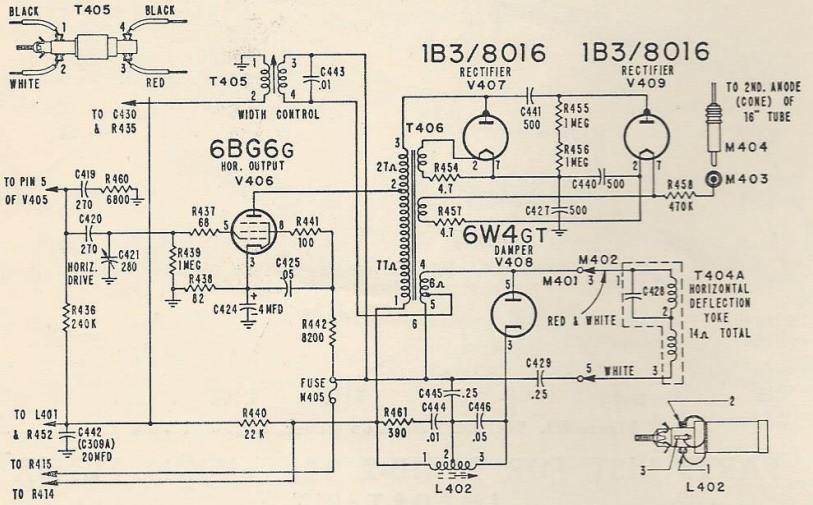


Figure 90. Horizontal Output Circuit For 16" Sets With Rounded End Picture Window.

PARTS FOR 16" SETS WITH ROUNDED-END PICTURE WINDOW

For 16" sets with rounded-end picture window, use this list **FIRST,** then use the list in the manual for any parts not given below.

RESISTORS

Sym.	Description	Part No.
R460	6800 ohms, ½ watt	60B 8-682
R461	390 ohms, ½ watt	60B 8-391

CONDENSERS

Sym.	Description	Part No.
C424	4 mfd., 25 volts Electrolytic	67A 4-3
C444	.01 mfd., 200 volts	64A 2-7
C446	.05 mfd., 200 volts	64A 2-8
C445	.25 mfd., 600 volts	64B 6-3
C443	.01 mfd., 400 volts	64B 5-25

COILS AND TRANSFORMERS

Sym.	Description	Part No.
L402	Coil, Horizontal Linearity	
	for sets with rounded-end picture window (2.5 to 9 millihenrys)	94A 26
	for sets with rectangular picture window (5.5 to 20 millihenrys)	94A 3
T405	Transformer, Width Control	
	for sets with rounded-end picture window	94A 19-1
	for sets with rectangular picture window	94A 19
T406	Transformer, Horizontal Output	
	for sets with rounded-end picture window	79C 17-3
	for sets with rectangular picture window	79C 17-2

CABINET PARTS FOR 25A15, 25A16, 25A17

(For all other parts see page 48 of "Television Service Manual for 20A1, 20B1, 21A1, 4J1, 4K1 Chassis")

Escutcheon, Television
for sets with rectangular picture window..... 23D 42
for sets with rounded-end picture window..... 23D 55-1

Sheet, Insulating (for back of picture window)
for use with 23D42 escutcheon..... 32D 122
for use with 23D55-1 escutcheon..... 32D 126

Gasket, Sponge Rubber
for 23D42 escutcheon 12A 5-13
for 32D55-1 escutcheon 12A 32-6
(rubber channel 12A35-1 was used in early sets)

SUPPLEMENTARY PARTS LIST

This parts list contains corrections and additions to the parts list in the Television Service Manual for 20A1, 20B1, 21A1, 4J1, and 4K1 Chassis (Form No. S267). Use this parts list **FIRST**, then use the list in the manual.

Sym.	Description	Part No.	Remarks
R436	240,000 ohms, ½W, ±5%	60B 7-244	See Production Change T.
C102	.5 to 3 mmfd, Ceramic Trimmer	98A 45-87	Part number corrected.
C214	.05 mfd., 400 V	64B 5-22	See Production Change Y.
C311	.05 mfd., 600 V	64B 5-7	See Production Change W.
C437	.05 mfd., 600 V	64B 5-7	See Production Change S.
L104	Choke, Fil. Osc.	98A 45-14	Part number corrected.
L606	Coil, AM Peaking	73A 5-10	See Production Change U.
M302	Plug, AC Input (Interlock)	89A 22-2	Part number corrected.
M313	Fuse, Line (4 amp. 250 volts)	84A 1-18	See "Production Changes"
Clamp, Webbing Strap Tension		19A 61	Part added.
Slug, Brass Tuning (for L102)		98A 45-88	Omitted from parts list.
Stator Plate (ungrounded); Silver with ceramic insulator, for Sharp Tuning C111. (includes mtg. bracket)		98A 45-86	See Production Change X.

CABINET PARTS FOR 30F15, 30F16, 30F17

When ordering parts for these models, use this parts list **FIRST.** Then see page 49 of the Television Service Manual (Form No. S267) for any parts not listed here.

Description	Part No.	Remarks
Door, Television and Radio-Phono		
pair for Walnut (30F15)	98A 48-67	Part number corrected.
pair for Mahogany (30F16)	98A 48-68	Part number corrected.
pair for Blond (30F17)	98A 48-69	Part number corrected.
Gasket, Sponge Rubber (includes chipboard backing for back of picture window escutcheon) for sets with 23D49 Picture Window Escutcheon	98A 61-2	Omitted from parts list.
Knob, Television Tuning		These knobs for sets with all plastic television panel. For sets with wood television panel, see Television Service Manual (Form No. S267).
for Walnut (30F15) and Mahogany (30F16)		
'Sharp Tuning' (Maroon outer knob)	33C 28-21	
'Vertical, Brightness and Focus' (Maroon outer knob)	33C 28-22	
'Channel Selector' (Gold inner knob)	33C 28-17	
'Horizontal, Contrast and Off-Volume' (Gold inner knob)	33C 28-18	

BUILT-IN ROTO-SCOPE ANTENNA

Built-In Roto-Scope Antenna used only in late production sets.

Antenna, Built-In Roto-Scope	
for 4H126A, B, C, or CN	A3023
for 4H145C or CN, 4H146C or CN	A3060
for 4H156A, B, C, or CN	A3046
for 4H18C or CN, 4H19C or CN, 4H166A, B, C, or CN	A3029
for 24A12, 24A125	A3029
for 24C15, 24C16	A3029
for 25A15, 25A16, 25A17	A3023
for 30F15, 30F16, 30F17	A3060

Universal Replacement Parts for All Roto-Scope Antennas

Antenna Lead (includes matching stub and spade lugs)	A3030
Control Lever Arm (includes switch blades)	A3024
Contact, Bronze Spring	18A 40

Admiral Corporation

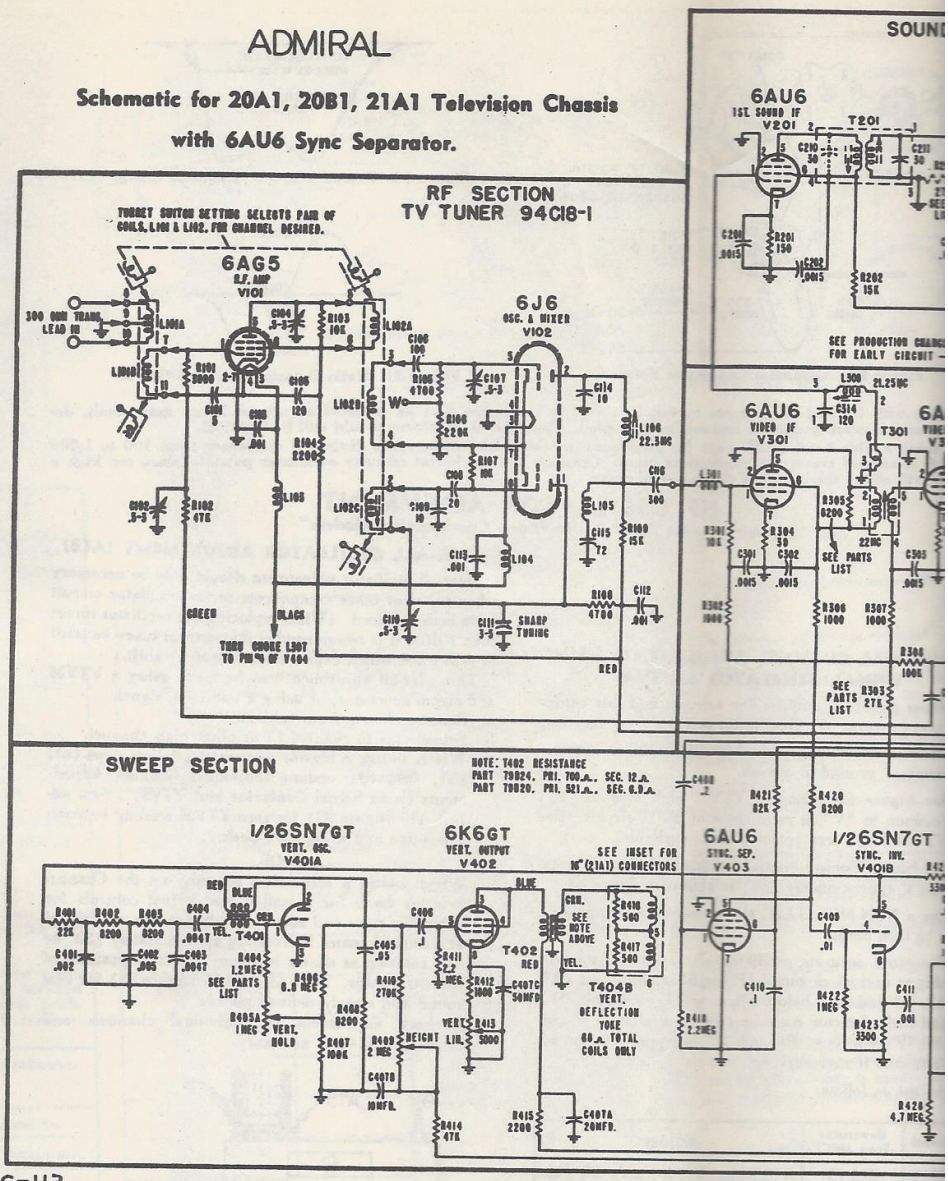
CHICAGO, ILLINOIS

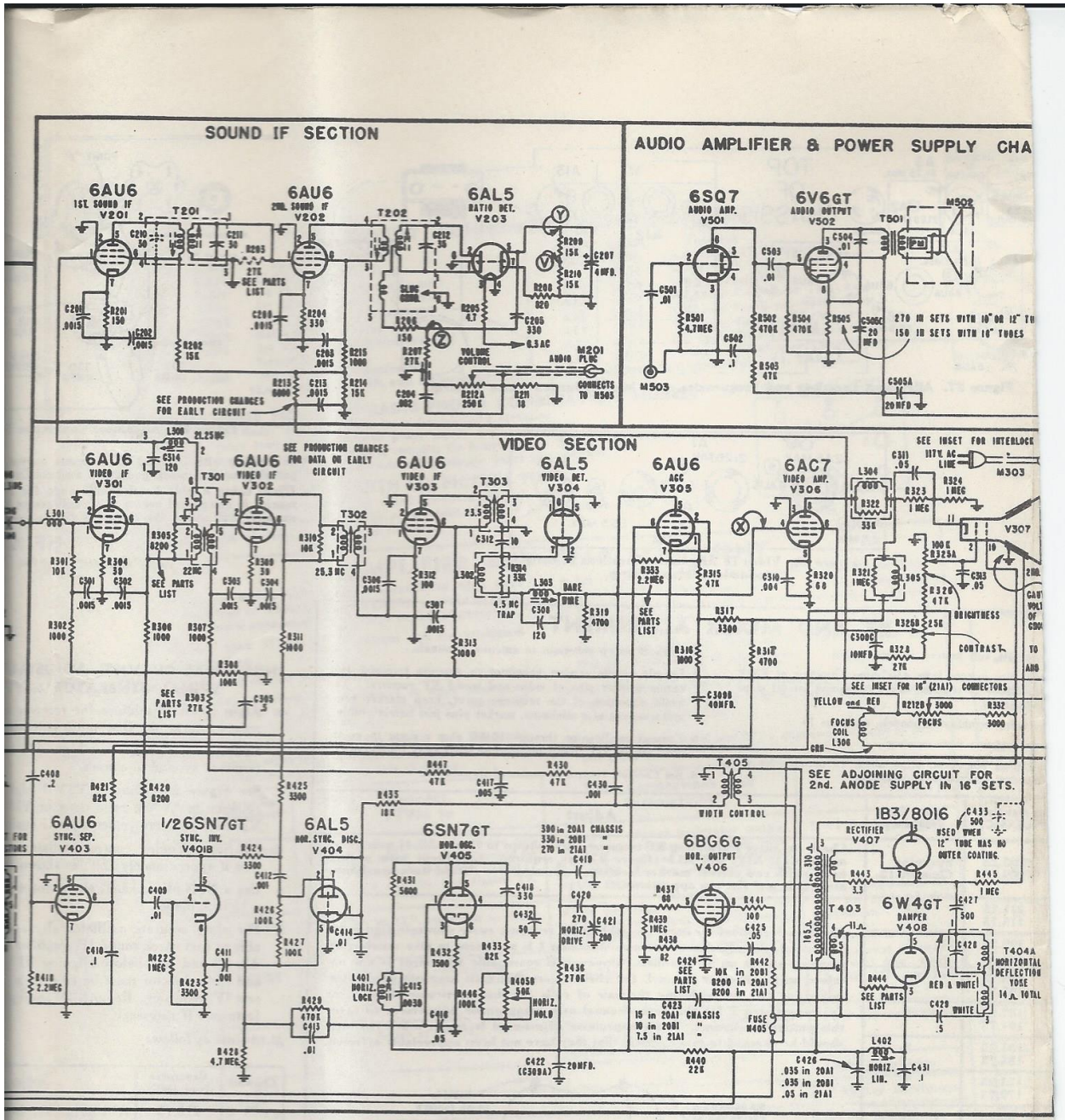
Printed in U.S.A. 12-49 15M

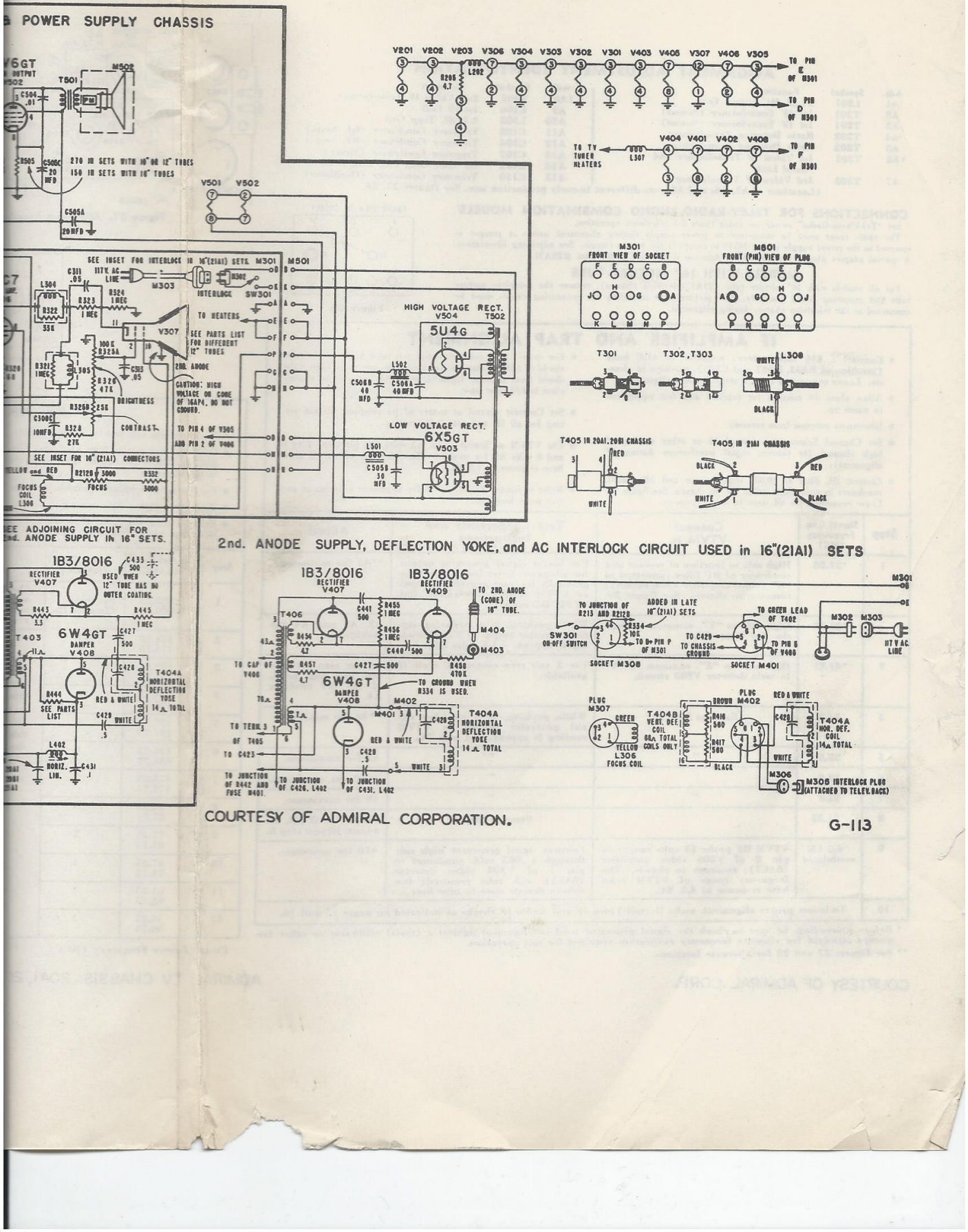
Form No. S267A

ADMIRAL

Schematic for 20A1, 20B1, 21A1 Television Chassis with 6AU6 Sync Separator.




SOUND IF SECTION
AUDIO AMPLIFIER & POWER SUPPLY CHA
VIDEO SECTION
6AU6
1ST. SOUND IF
V201
6AU6
2ND. SOUND IF
V202
6AL5
RATIO DET.
V203
6SQ7
AUDIO AMP.
V501
6V6GT
AUDIO OUTPUT
V502
T201
T202
T501
M502
M503
M201
AUDIO PLUG
VOLUME CONTROL
SLUG ADJ.
SEE PRODUCTION CHANGES FOR EARLY CIRCUIT
CONNECTS TO M505
270 IN SETS WITH 10" OR 12" TU
150 IN SETS WITH 10" TUBES
6AU6
VIDEO IF
V301
6AU6
VIDEO IF
V302
6AU6
VIDEO IF
V303
6AL5
VIDEO DET.
V304
6AU6
AGC
V305
6AC7
VIDEO AMP.
V306
T301
T302
T303
SEE PRODUCTION CHANGES FOR DATA ON EARLY CIRCUIT
SEE PARTS LIST
4.5 MC TRAP
BARE WIRE
SEE INSET FOR INTERLOCK
117V. AC LINE
M303
V307
BRIGHTNESS
CONTRAST
SEE INSET FOR 16" (21A1) CONNECTORS
YELLOW and RED
FOCUS COIL L308
FOCUS
GRN
6AU6
SYNC. SEP.
V403
1/2 6SN7GT
SYNC. INV.
V401B
6AL5
HOR. SYNC. DISC.
V404
6SN7GT
HOR. OSC.
V405
6BG6G
HOR. OUTPUT
V406
T405
WIDTH CONTROL
1B3/8016
RECTIFIER
V407
USED WHEN 12" TUBE HAS NO OUTER COATING.
6W4GT
DAMPER
V408
T403
T404A
HORIZONTAL DEFLECTION YOKE
14 Ω TOTAL
390 in 20A1 CHASSIS
330 in 20B1 "
270 in 21A1 "
HORIZ. DRIVE
HORIZ. HOLD
HORIZ. LOCK
HORIZ. LIN.
15 in 20A1 CHASSIS
10 in 20B1 "
7.5 in 21A1 "
FUSE M405
SEE ADJOINING CIRCUIT FOR 2nd. ANODE SUPPLY IN 16" SETS.
RED & WHITE
WHITE



SEE ADJOINING CIRCUIT FOR 2nd. ANODE SUPPLY IN 16" SETS.

2nd. ANODE SUPPLY, DEFLECTION YOKE, and AC INTERLOCK CIRCUIT USED in 16"(21AI) SETS

COURTESY OF ADMIRAL CORPORATION.

G-113

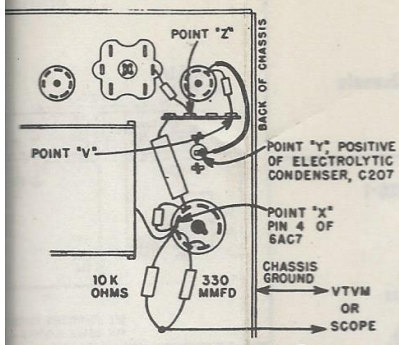


Figure 29. Alignment Connection Points.

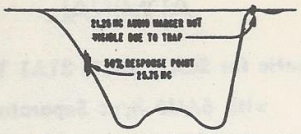


Figure 30. Overall Video IF Response Curve.

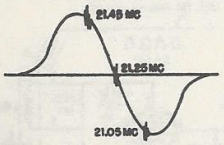


Figure 31. Ratio Detector Response Curve.

...ling with RF and IF response curves, it is well to remember that an inverted or mirror image may result, de-...g on the sweep generator and oscilloscope used. The general waveform should still be identical.

... using a wide band oscilloscope for alignment, marker pips will be more distinct if condenser from 100 to 1,000 ... is connected across the oscilloscope input. Caution: Use the lowest capacity condenser possible, since too high a ...ity will affect the shape of the response curve.

HF OSCILLATOR ALIGNMENT

See "Connections for Telev-Radio-Phono Combination Models"

OVER-ALL OSCILLATOR ADJUSTMENT (A15)

Over-all oscillator adjustment should only be necessary when tubes or other components in the oscillator circuit have been replaced. (When replacing the oscillator-mixer tube (6J6), it is recommended that several tubes be tried to select one which causes least frequency shift.)

This over-all adjustment can be made using a VTVM and signal generator, or using a television signal.

a. Remove chassis from cabinet.

b. Set selector to channel 13 or other high channel.

c. **When using a signal generator,** follow steps (a), (b), (c), (d) under "Individual Channel Adjustments Using Signal Generator and VTVM", then adjust A15 (figure 33) for zero VTVM reading between a positive and a negative peak.

OR

c. **When using a television signal,** set the Channel Selector knob for a station and adjust controls for normal picture and sound. Set Sharp Tuning control at electrical center by rotating approximately 150° or half rotation as shown in figure 33. Note position of dielectric rotor. Then adjust A15 (figure 33) for best sound and clearly defined picture.

d. Recheck adjustment of individual channels and touch-up (A14) if necessary.

...DIVIDUAL CHANNEL ADJUSTMENTS USING SIGNAL GENERATOR & VTVM

...Allow about 15 minutes for receiver and test equip-...ment to warm up. Disconnect antenna from receiver.

...Connect signal generator high side to one antenna ...terminal, ground to chassis.

...See Figure 29. Connect VTVM high side to "Z"; ...common to "V" in ratio detector V203 circuit. Use ...VTVM 3 volt zero center scale if available.

...Set Sharp Tuning control at half rotation by rota-...ting it approximately 150° as shown in figure 33.

...Use a NON-METALLIC alignment screw driver with ...a 1/8 inch blade.

...For more accurate oscillator alignment, it is advis-...able to first check sound IF amplifier alignment (A2, A3, A4 and A5) before aligning HF oscillator. IF's ...and ratio detector must be accurately aligned to cor-...rect IF frequency. Retouch IF and ratio detector ad-...justments if necessary.

...Adjust as follow:

...annel	Generator Freq. (MC)	Adjust
13	215.75	A14 (Fig. 33) for zero VTVM reading between a positive and a negative peak with Sharp Tuning control at electrical center. Do this carefully as only a slight rotation of slug may be required. Note that if mis-alignment is evident on a major number of channels, an over-all HF oscillator adjustment (A15) can be made.
12	209.75	
11	203.75	
10	197.75	
9	191.75	
8	185.75	
7	179.75	
6	87.75	
5	81.75	
4	71.75	
3	65.75	
2	59.75	

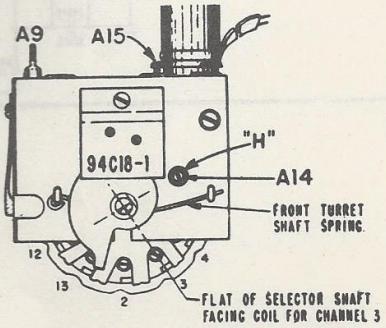


Figure 33. Front View of 94C18-1 Tuner.

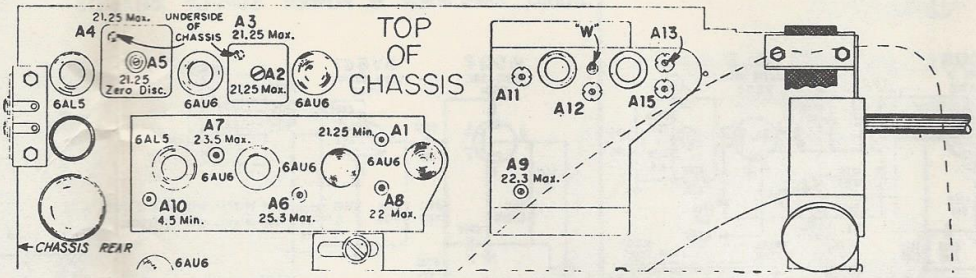


Figure 27. Alignment Locations and Frequencies, with late production Video IF strip.

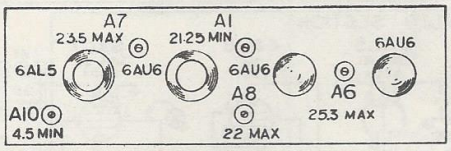


Figure 28. Video IF Alignment Locations in early production Video IF strip.

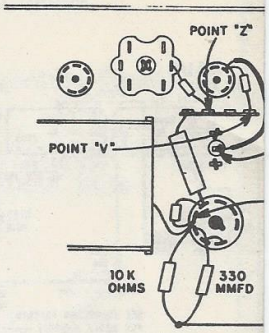


Figure 29. Alignment Conn

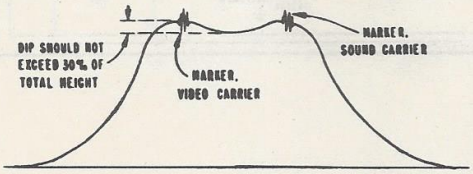
$ In dealing with RF and IF response pending on the sweep generator and When using a wide band oscilloscop mmfd. is connected across the oscill capacity will affect the shape of the

See "Connection

RF AND MIXER ALIGNMENT

- Disconnect 4½ volt battery, if used earlier.
- Connect a wire jumper from AGC buss (junction of R303, R447 and C305) to chassis. Leave connected for all steps in this alignment.
- For connecting combination models, see page 14.
- Disconnect antenna from receiver.
- Before starting alignment, allow about 15 minutes for receiver and test equipment to warm up.
- Connect sweep generator to antenna terminals.
- Loosely couple marker generator to antenna terminal (to obtain marker pips of video and sound RF carriers). To avoid distortion of the response curve, keep marker generator output at a minimum, marker pips just barely visible.
- Connect oscilloscope through 10,000 ohm resistor to point "W" (figure 27). Keep oscilloscope leads away from chassis.
- Set Contrast control at center of its rotation.

Step	Marker Gen. Freq. (MC)	Sweep Gen. Frequency	Adjust
1	*205.25 **209.75	Sweeping Channel 12	Check for curve resembling RF response curve shown in figure 32. If necessary, adjust A11, A12, and A13 (figure 27) as required. Consistent with proper band width and correct marker location, response curve should have maximum amplitude and flat top appearance.
2	211.25 215.75	13	Check each channel for curve resembling RF response curve shown in figure 32. In general, the adjustment performed in step 1 is sufficient to give satisfactory response curves on all channels. However, if reasonable alignment is not obtained on a particular channel, (a) check to see that coils have not been intermixed, or (b) try replacing the pair of coils for that particular channel, or (c) repeat step 1 for the weak channel as a compromise adjustment to favor this particular channel. If a compromise adjustment is made, other channels should be checked to make certain that they have not been appreciably affected.
3	199.25 203.75	11	
4	193.25 197.75	10	
5	187.25 191.75	9	
6	181.25 185.75	8	
7	175.25 179.75	7	
8	83.25 87.75	6	
9	77.25 81.75	5	
10	67.25 71.75	4	
11	61.25 65.75	3	
12	55.25 59.75	2	



Full skirt of curve will not be visible unless generator sweep width extends beyond 10 MC.

Figure 32. Response Curve.

* Picture Carrier Frequency (MC) ** Sound Carrier Frequency (MC)

INDIVIDUAL CHANNEL ADJ SIGNAL GENERATOR

a. Allow about 15 minutes for re ment to warm up. Disconnect
b. Connect signal generator high terminal, ground to chassis.
c. See Figure 29. Connect VTV common to "V" in ratio detec VTVM 3 volt zero center scale
d. Set Sharp Tuning control at ting it approximately 150° as
e. Use a NON-METALLIC alignm a ⅛ inch blade.
f. For more accurate oscillator able to first check sound IF am A3, A4 and A5) before alignir and ratio detector must be acc rect IF frequency. Retouch IF justments if necessary.
g. Adjust as follow:

Channel	Generator Freq. (MC)	
13	215.75	A14 (Fig.
12	209.75	reading be
11	203.75	a negative
10	197.75	ing control
9	191.75	Do this car
8	185.75	rotation o
7	179.75	quired.
6	87.75	Note that
5	81.75	evident on
4	71.75	channels, a
3	65.75	lator adjus
2	59.75	made.

ALIGNMENT ADJUSTMENT IDENTIFICATION

Adj.	Symbol	Function
†A1	L201	21.25 MC Sound Trap
A2	T201	1st IF Transformer (Sound)
A3	T201	1st IF Transformer (Sound)
A4	T202	Ratio Detector Transformer
A5	T202	Ratio Detector Transformer
†A6	T301	1st Video IF Transformer and Sound Link
A7	T303	3rd Video IF Transformer
†A8	T302	2nd Video IF Transformer
A9	L106	1st IF Coil
A10	L303	4.5 MC Trap Coil
A11	C102	Trimmer Condenser (RF Amp.)
A12	C104	Trimmer Condenser (RF Amp.)
A13	C107	Trimmer Condenser (Mixer)
A14	L102	HF Osc. Coils (All Channels)
A15	C110	Trimmer Condenser (Oscillator)

†Locations of A1, A6, and A8 were different in early production sets. See figures 27, 28.

CONNECTIONS FOR TELEV-RADIO-PHONO COMBINATION MODELS

Set "Tel-Phono-Radio" switch on radio tuner for television operation.

The radio tuner must be connected to power supply during alignment unless a jumper is inserted in the power supply socket M514 to complete the heater circuit. See adjoining illustration. A special adapter plug is available from Admiral distributor under part #89A31.

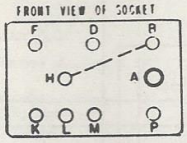


Figure 26.

MODELS WITH 16" PICTURE TUBE

For all models with 16" picture tube (21A1 television chassis), remove the complete picture tube and mounting board assembly. The picture tube including all connecting cables must be connected to the television chassis during alignment.

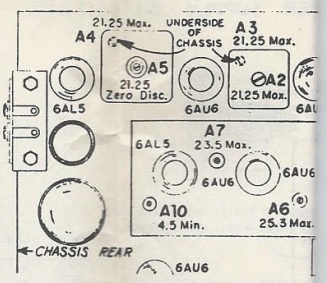


Figure 27. Alignment

IF AMPLIFIER AND TRAP ALIGNMENT

- Connect a 4½ volt battery; negative to AGC buss (junction of R303, R447 and C305), positive to chassis. Leave connected for all steps in this alignment.
- Allow about 15 minutes for receiver and test equipment to warm up.
- Disconnect antenna from receiver.
- Set Channel Selector to channel 13 or other unassigned high channel (to prevent signal interference during IF alignment).
- Connect RC filter of 10,000 ohm resistor and 330 mmfd. condenser in series from point "X" to chassis. See figure 29. Leave connected for all steps in this alignment.
- For steps 1 to 8, connect signal generator high side to tube shield of 6J6 oscillator-mixer tube. Be sure to insulate tube shield from chassis. Connect generator low side to chassis close to 6J6 tube base.
- Set Contrast control at center of its rotation. Retain setting for all IF and trap adjustments.
- Use VTVM on lowest scale. (3 volts DC for steps 1 to 8 and 3 volts AC for step 9.) The AC range of VTVM must have response to 4.5 MC.
- Refer to figures 27, 28 and 29 for alignment adjustment and test point locations.

Step	Signal Gen. Frequency (MC)	Connect VTVM to	Test Connections and Instructions	Adjust
1	*21.25	High side to junction of resistor and condenser of RC filter connected to "X" (video amplifier V306 circuit); common to chassis. See figure 29.	Use lowest signal generator output for adequate meter indication, then gradually increase generator output as VTVM reading decreases. Use VTVM DC range.	**A1 for minimum.
2	*21.25	High side to "Y", common to chassis. See figure 29.	While peaking, keep reducing signal generator output so VTVM reading is approx. +1.5 volts DC.	A2, A3 and A4 for maximum.
3	*21.25	High side to "Z", common to "V" in ratio detector V203 circuit.	Use 3 volt zero center DC scale if available.	A5 for zero between pos. and neg. peak. If far off readjust A4.
4	25.3	Same as Step 1.	While peaking, keep reducing signal generator output so VTVM reading is approx. —1 volt DC.	**A6 for maximum.
5	23.5	"	"	A7 for maximum.
6	22.0	"	"	**A8 for maximum.
7	22.3	"	"	A9 for maximum.
8	*21.25	"	Same as Step 1.	Check A1; if off, readjust. Repeat step 6.
9	*4.5 AM modulated	VTVM RF probe (3 volts range) to pin 8 of V306 video amplifier (6AC7); common to chassis. The frequency range of VTVM must have response to 4.5 MC.	Connect signal generator high side through a .005 mfd. condenser to pin 7 of V304 video detector (6AL5) with tube removed; low side to chassis close to tube base.	A10 for minimum.
10	To insure proper alignment, make Overall Video IF and Audio IF checks as indicated on pages 15 and 16.			

* Before proceeding, be sure to check the signal generator used in alignment against a crystal calibrator or other frequency standard for absolute frequency calibration required for this operation.

** See figures 27 and 28 for alternate locations.

RF

- Disconnect 4½ volt battery, if used
- Connect a wire jumper from AGC b R447 and C305) to chassis. Leave in this alignment.
- For connecting combination models,
- Disconnect antenna from receiver.
- Before starting alignment, allow ab ceiver and test equipment to warm

Step	Marker Gen. Freq. (MC)	Sweep Gen. Frequency
1	*205.25 **209.75	Sweeping Channel 12
2	211.25 215.75	13
3	199.25 203.75	11
4	193.25 197.75	10
5	187.25 191.75	9
6	181.25 185.75	8
7	175.25 179.75	7
8	83.25 87.75	6
9	77.25 81.75	5
10	67.25 71.75	4
11	61.25 65.75	3
12	55.25 59.75	2

Picture Carrier Frequency (MC)