Andrea T-VK12, BT-VK12, Ch. VK12

These models appear on *pages 2-9,10 through 2-37 of Rider's TV Manual Volume 2*. The following corrections should be made on the schematic diagram.

Part No.	Error	Correction
R14	Connected to +150 v. bus	Connect to +300 v. bus
C35A	HCE-1313	HCE-1318
C68	50 $\mu\mu$f ± 10%	60 $\mu\mu$f ± 10%
C74	5 $\mu\mu$f ± 10%	50 $\mu\mu$f ± 10%
C102	Connected across R109	Connect across R110
C112A, C112B, C113, C118	Connected to B- bus	Connect to ground

Belmont 7DX21, Series B

This model is the same as Model 7DX21, *appearing on pages 2-11 through 2-25 of Rider's TV Manual Volume 2*, except for the following. The vertical multivibrator and vertical sweep circuits were modified, as shown in the accompanying diagram, to improve the vertical linearity and to provide greater vertical capabilities.

The following components have been changed:

Resistor R80 from 10 megohms to 4.7 megohms.

Resistor R81 from 4.7 megohms to 10 megohms.

Resistor R82 from 3.9 megohms to 5.6 megohms.

Resistor R85 from 4.7 megohms to 10 megohms.

Resistor R97 from 10 megohms to 6.8 megohms.

Resistor R113 (10 megohms) added.

Capacitor C101 from 0.03 μf, 600 volts, to 0.02 μf, 1600 volts.

Capacitor C104 from 0.05 μf, 6000 volts, to 0.005 μf, 6000 volts.

Capacitor C105 from 0.05 μf, 6000 volts, to 0.005 μf, 6000 volts.

Capacitor C106 from 1000 to 1600 volts.

Capacitor C107 from 0.1 μf, 600 volts, to 0.02 μf, 1600 volts.

Capacitor C108 from 220 $\mu\mu$f to 0.0014 μf.

Capacitor C120 (800 $\mu\mu$f, 1600 volts) added.

The parts list should be changed to agree with the following:

Ref. No.	Cat. No.	Description
R80	C-9B1-35	Resistor, 4.7 megohms, ±20%, ½ w.
R81-85-113	C-9B1-37	Resistor, 10 megohms, ±20%, ½ w.
R82	C-9B1-249	Resistor, 5.6 megohms, ±5%, ½ w.
C101-107	B-8D-16578	Capacitor, 0.02 μf, 1600 volts
C104-105	B-8D-16574	Capacitor, 0.005 μf, 6000 volts
C106	B-8D-16577	Capacitor, 0.01 μf, 1600 volts
C108	B-8D-16576	Capacitor, 0.0014 μf, 1600 volts
C120	B-8D-16575	Capacitor, 800 $\mu\mu$f, 1600 volts

The following changes have also been incorporated in the "Series B" chassis. R43 was changed from 150,000 ohms to 47,000 ohms (part C-9B1-82) to improve the video response. R114 (1 megohm, part C-9B1-31) has been added between the picture-tube shield and B— to bleed off static charges.

Belmont 18DX21

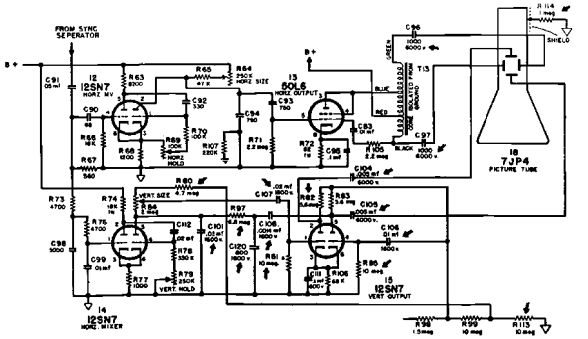
This model is the same as Model 18DX21A, appearing on *pages 2-11 through 2-25 of Rider's TV Manual Volume 2*, except for the following changes.

In the tuner chassis, capacitors C117 and C118 (5 $\mu\mu$f) and resistor R109 (5600 ohms) have been omitted. Capacitor C6 has been changed in value from 1.0 $\mu\mu$f to 0.5 $\mu\mu$f. The lower side of capacitor C10 is connected directly to ground instead of to the lower part of coil L6.

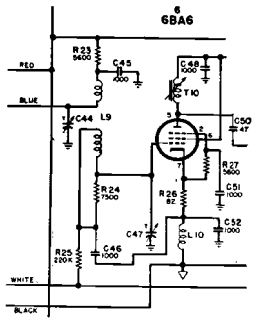
The coupling circuit to the grid of the first 6BA6 tube in the main chassis (tube 6) has been changed. See the accompanying diagram. Resistor R28, the grid resistor of the second 6BA6 tube (tube 7) has been changed in value from 47,000 ohms to 18,000 ohms. Resistor R31 (the plate resistor of the same tube) has also been changed in value from 47,000 ohms to 18,000 ohms. Capacitor C119 (1000 $\mu\mu$f) has been omitted. Resistors R87, R88, R89, and R90 have all been changed in value from 2.2 megohms to 1.0 megohm.

Capacitor C92 has been connected from the grid (pin 1) of the 12SN7 tube (tube 12) to the plate (pin 2) of the same tube. Capacitors C93 and C94, which were formerly connected to this plate, have been connected to the plate of the other half of the tube (pin 5). Resistor R112 is used only when ballast resistor R55 is 104 ohms. When 5R5 is 40 ohms, the container is marked with a yellow dot.

Capacitor C116 (1000 $\mu\mu$f), choke coil L9, resistor R108 (33,000 ohms), and capacitor C115 (10 μf) have all been omitted. The diode plate (pin 6) of the 19T8 tube is now connected to its cathode (pin 7) instead of to the bottom of the parallel combination of C115 and R108.



The vertical multivibrator and vertical sweep circuits of the Belmont Model 7DX21, Series B.



The coupling circuits associated with the first 6BA6 tube in the main chassis of the Belmont 18DX21.

Delete the following from the parts list.

Ref. Symbol	Part No.	Description
C6	A-8G-12495-2	1.0 $\mu\mu$f
C117-118	A-8G-12495-7	0.5 $\mu\mu$f
R109	C-9B1-71	5600 ohms, 10%, ½ watt
L-4-5-6-7-8	A-16A-16637	R-f choke
C115	A-8C-11495	Electrolytic, 10 μf, 150 v.
C116-119	C-8G-13201	100 $\mu\mu$f, ceramic
C44	C-8F3-109	47 $\mu\mu$f, 10%, 500 v.
R23	C-9B1-13	1000 ohms, 20%, ½ watt
R24	C-9B1-19	10,000 ohms, 20%, ½ watt
R28-34	C-9B1-82	47,000 ohms, 10%, ½ watt
R87-88-89-90	C-9B1-102	2.2 megohms, 10%, ½ watt
L9	A-201-16379	Choke coil
L10-11-14-18-22-23	A-16A-16637	Filament choke coil
T15	B-201-15612	Stagger tuned coil assembly
	A-200-15732	Strap assembly for front of picture tube
	B-200-16300	Strap assembly for rear of picture tube
	A-51A-16693	Iron core for stagger tuned coil assembly (part number B-201-15612)
R61	C-9B2-66	2200 ohms, 10%, 1 watt

Add the following to the parts list:

Ref. Symbol	Part No.	
C6	A-8G-12495-7	0.5 $\mu\mu$f
L4-5-6-7-8	A-201-15677	R-f choke
C44-47	B-201-15142	Trimmer capacitor
R23	C-9B1-71	5600 ohms, 10%, ½ watt
R24	C-9B1-180	7500 ohms, 5%, ½ watt
R28-31	C-9B1-77	18,000 ohms, 10%, ½ watt
R87-88-89-90	C-9B1-31	1 megohm, 20%, ½ watt
L9	B-201-15611	Converter coil
L10-11-14-18-22-23	A-201-15609	Filament choke coil
	A-2C-156-15654	Retainer strap for rear of picture tube
	A-49A-15616	Spring for rear tube strap
	A-51A-11761	Iron core for stagger tuned coil assemby (part number B-201-15612)
R61	C-9B2-64	1500 ohms, 10%, 1 watt

DuMont RA-103

The model appears on *pages 1-58 through 1-80 of Rider's TV Manual Volume 1*. The current production of the RA-103 incorporates the new 12QP4 cathode-ray tube. This new tube features the use of the bent electron gun. This bent gun necessitates the use of a magnet to deflect the electrons toward the face of the cathode-ray tube. Although these magnets are adjusted before the teleset leaves the manufacturer, they may conceivably come loose in shipment. If this occurs the illumination on the screen may be quite low. The magnet should then be adjusted for maximum brightness.

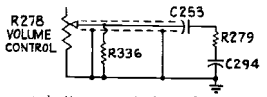
DuMont RA-105

This model appears on *pages 2-5 through 2-55,56 of Rider's TV Manual Volume 2*. The following corrections should be made in the service data.

On the detailed block diagram on *page 2-7*, in the block for V401-A, the abbreviation Amp. should be changed to "Maker."

In the voltage measurement chart on *page 2-52*, the measurement for pin #2 of V220 should be 135 volts instead of 13.5 volts.

In the schematic on *pages 2-55,56*, in the volume control circuit, R336 is shown shorted out and the "hot" wire of the shielded lead is shown grounded. The accompanying diagram shows the correct connections.



Corrected diagram of the volume control circuit of the DuMont Model RA-105.

For a short time the 47-$\mu\mu$f 5-kv capacitor, C414, in the flyback power supply was changed to 22 $\mu\mu$f, 5 kv. This change was made to obtain an additional 1-kv accelerating voltage. However, it was found that the additional accelerating voltage made it difficult to obtain full horizontal size, thus necessitating a change back to the original value of 47 $\mu\mu$f 5 kv.

In current production, R413 in the flyback power supply has been changed as follows:

The taps were formerly at 6,500 ohms and 7,500 ohms. On the new resistor the taps are at 5,500 ohms and 7,500 ohms This new resistor is described as follows

R413, 02018991, 8,500 ohms ± 5% fixed, tapped.

A defective 6AT6 tube in the AGC amplifier may result in "drift" of the AGC setting which would become apparent as a change in sensitivity of the receiver as it operates. In such cases the 6AT6 tube should be replaced and the AGC readjusted as described on *page 2-24*. An accidental change in the AGC setting during shipment might result in low sensitivity, also necessitating readjustment of the control.

It is possible to adjust the AGC using the "meter" method without removing the main chassis from the cabinet. This can be accomplished by removing either the first or second video i-f tube, V201 or V202, and inserting a sharp-pointed test prod into pin #1 of the tube socket involved. (Remember that when the tube socket is viewed from the top, the pins are counted in the counter-clockwise direction.) Once the meter connection has been made, the procedure is the same as that outlined on *page 2-24* under the heading "Procedure for Adjustment in the Shop."

DuMont RA-103, RA-105, RA-106

Model RA-103 appears on *pages 1-58 through 1-80 of Rider's TV Manual Volume 1*. Mocel RA-105 appears on *pages 2-5 through 2-56 of Rider's TV Manual Volume 2* and Model RA-106 is on *pages 2-57 and 2-58* of the same volume. The following change has been made on the inputuners, which are the same on all these models.

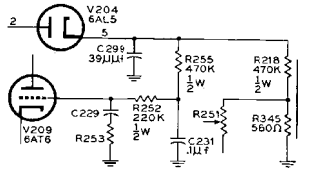
The screen bypass capacitor, C110, on the 6AK5 mixer has been changed to 5000 $\mu\mu$f, minimum. The purpose of this change is to improve the strong signal handling capabilities.

The new capacitor is described as follows:

03016760 F CE 500 $\mu\mu$f min, 600 v.

DuMont RA-105, RA-106

Model RA-105 appears on *pages 2-5 through 2-56 of Rider's TV Manual Volume 2* and Model RA-106 on *pages 2-57 and 2-58* of the same volume. The following changes have been made in the AGC circuit, as shown in the accompanying diagram.



The AGC circuit of the DuMont RA-105, and RA-106.

R218 was changed from a 1.2-megohm resistor to 470,000 ohms, ½ watt, part number 02032090 and connected in the AGC circuit as shown.

A 39-$\mu\mu$f, 500-volt ceramic capacitor, C299, part number 03017030, was added from pin number 5 of V204 to ground.

C231 was changed from a 0.005-μf capacitor to a 0.1-μf, 200-volt capacitor, part number 030-3910/3-1391.

The purpose of these changes is to reduce the impedance of the grid circuit of the 6AT6 AGC stage and thus improve the stability of this circuit.

Extension cables, designed to allow the main chassis or power supply chassis of these telesets to be serviced outside the cabinet while leaving the tube or other chassis in the cabinet, are now available.

These cables are 6 feet long, permitting the serviceman to work on the chassis in front of the set and view the action on the face of the CRT while making any checks.

The following description of these cables should be added to the parts lists:

Part No.	Where Used
34001281	Between CRT base and main Chassis (J206).
50014161	Between yoke focus assembly (P6Q4) and main chassis (J204).
50014171	Between main chassis (P201) and power supply (J702 on RA-106.
50014180	Between main chassis (P202) and power supply (J402 on RA-105. Between main chassis (P202) and power supply (J701 on RA-106.

When servicing the a-m tuner or the audio amplifier in the new Colony or in the Manchu, it is possible to use cable #50014171 as the extension. The use of this cable will introduce hum in the output since the signal lead of either unit should be shielded. The serviceman should take this into consideration when using this cable.

Cables #50014161 and #50014180 are exactly the same as far as external appearances are concerned. However, cable #50014180 contains the sync line between the main chassis and the power supply chassis and this line is a shielded lead.

To identify this cable, it has been color coded with a ring of red paint near the male plug.

A complete set consists of the 4 cables and will permit removal of both chassis simultaneously if necessary. However, for the high-voltage connections if the power supply is removed, an improvised cable can be made up in the field. This cable consists of a suitable length of high-voltage cable with an alligator clip on each end. Obviously, the serviceman should be careful how he "dresses" this lead to prevent "arcing."

Capacitor C213 (1-3.5 $\mu\mu$f, 500 v.) is changed to 2.6 $\mu\mu$f ±10%. This new capacitor is made from a piece of twinex transmission line. The capacity may be varied by separating or squeezing together the two wires. In alignment, the greater the capacity, the broader will be the response of the stage.

The part number of this new capacitor is 03016891.

Farnsworth 651-P

This model appears on *pages 2-11,12 through 2-25 of Rider's TV Manual Volume 2*. If low signal or noisy reception is encountered, it is suggested that the following be checked. Make sure that the connection at the antenna terminal lead plug has not been pulled loose. A good soldered connection is important. Make sure that the antenna terminal lead plug has not been inserted backwards into connector on side of chassis. Note: If the large prong has been forced into the small clip, the chances are that it has sprung this connector. This allows the small prong to float in the connector and may result in loss of signal energy or noise.

Farnsworth 651-P

This model appears on *pages 2-11,12 through 2-25 of Rider's TV Manual Volume 2.* A scratching or barking sound sometimes emanates from the r-f unit of Model 651-P when the 12-channel tuner is used. This may be noticeable after a period of service, when switching channels or in operating the Fine Tuning Control. The present run of 12-channel units (which use a separate variable capacitor for fine tuning, rather than the former system of varying the main tuning capacitor by a gearing system) use a glass detent ball instead of a metal ball as originally used. This glass ball is used to preclude the possibility of scratch caused by friction between the metal ball and the metal detent cam. It is suggested that the metal ball be replaced with a glass ball if scratch is encountered. This will provide quieter operation over a long period of time.

These glass detent balls are now available in lots of ten only, from the Parts Department of Farnsworth. The part number is 450191-A.

If the top of the picture is below the limits of the mask, even though the height control is at its maximum upward position, use the following procedure:

Rotate the focus coil. This may move the picture upward.

If this is insufficient, modify the wiring of the vertical centering control by removing the lead attached to the tap (not the movable arm) and re-connect to the control terminal to which is attached the 3.3-ohm resistor.

Farnsworth 651-P, 661-P

These models appear on *pages 2-11,12 through 2-25 of Rider's TV Manual Volume 2.* Certain bypass capacitors may be a possible source of trouble in case of horizontal sync failure or instability in these models. Recent reports have indicated instances of breakdown of the 6SN7 cathode bypass capacitor (0.02 μf, 200 v.). This breakdown results from the use of capacitors which did not come up to the required heat specifications. The recommended replacement for this capacitor is either Aerovox Duranite type P-88 (0.022 μf, 400 v.) or Solar type ST (0.02 μf, 400 v.).

Farnsworth GV-260 and 651-P

Model GV-260 appears in *Rider's TV Manual Volume 1 on pages 1-1 through 1-25,26.* Model 651-P can be found on *pages 2-11,12 through 2-25 of Rider's TV Manual Volume 2.*

The focus control was not listed in the service data for Model GV-260 but was on the parts list of Model 651-P. The same control, part number 78135, is used on both instruments.

To reduce wattage dissipation and the possibility of overheating in the focus control, apply the following:

Connect a 270-ohm, 2-watt resistor in parallel with the combination. Also, connect the free end of the control arm.

If leakage should develop between the heater and cathode of the 6AL5 sync discriminator, hum in the picture will result and linearity will be affected. Tube replacement is indicated, and recurrence will be less likely if a 3.3-ohm, 1-watt resistor is connected between pin 3 and ground. Recent production incorporates this resistor.

Farnsworth U-12A Capehart

This model appears on *pages 2-1 through 2-9,10 of Rider's TV Manual Volume 2.* Horizontal output transformer 750002-A is now being supplied as a replacement for transformer 94276. The parts are identical with the following exception. The secondary of transformer 94276 is tapped twice and these leads are numbered 5 and 6, while the secondary of transformer 750002-A has only one tap, numbered 5. When using transformer 750002-A as a replacement, therefore, leads 5 and 6 must be connected to the points previously connected to leads 6 and 7.

General Electric 802

This model appears on *pages 1-29 through 1-49,50 of Rider's Television Manual Volume 1.* The following changes should be made on the parts list.

Add UDL-019, dial light, Mazada 1816. Change Cat. No. RHC-014 to RMA-162, spring for high-voltage capacitor.

Refer to the waveform diagrams on *Page 1-68 of Rider's TV Manual Volume 1.* The captions on some of these drawings should be altered as follows:

Fig. 48: the caption should read "Grid (4) V18B"

Fig. 49: the caption should read "cathode (6) of V18B"

General Electric 802, 803

Model 802 appears on *pages 1-52 through 1-72 of Rider's TV Manual 1* and Model 803 appears in *TV Volume 2 on pages 2-1 through 2-21.*

A sharp low-frequency audio buzz which sounds similar to 60 cycle sync pulse reproduction has been isolated to the filament lead that connects to the head-end switch wafer of these models. This hum was noted particularly on Channel 13 reception but possibly exists on some of the other high-frequency channels. It is apparent only when tuned to the station. Make the following corrections:

Disconnect the supply filament lead at the point where it connects to the r-f head-end switch wafer (2nd from rear). This filament lead runs between V20 and the r-f head-end switch, S1. Wind a choke out of self-supporting #18 insulated wire by close winding 8 turns around a ¼-inch rod. Slip the choke off the rod and connect it in series with the filament lead and the point of the switch where the lead was originally connected. Connect a 5,000 $\mu\mu$f ceramic capacitor between the junction of the choke and filament supply lead, to the lug on which C147 is grounded. Attach the ground end of this capacitor as close as possible to the ground end of the lug where it assembles to switch back plate. Leads on choke and capacitor must be short.

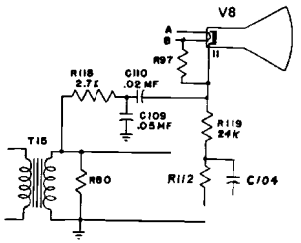
The following new parts are to be added to the Parts Lists:

1 Choke—8 turns #18 wire closewound, ¼-inch inside diameter.

1 5,000 $\mu\mu$f ceramic capacitor, Cat. No. RCW-3014.

GE 810

This model appears on *pages 2-22 through 2-43 of Rider's TV Manual Volume 2.* The circuit shown in the accompanying diagram has been added in late production to remove the vertical retrace lines which appear when the contrast control is used at a low setting or the brightness control is used at a high setting.



The circuit will remove the vertical retrace lines in the GE810 television receiver.

The following additions should be made to the parts list:

Ref. No.	*Cat. No.*	*Description*
C109	UCC-635	Capacitor, 0.05 μf, 600 volts
C110	UCC-631	Capacitor, 0.02 μf, 600 volts
R118	URD-059	Resistor, 2,700 ohms, ½ w.
R119	URD-1082	Resistor, 24,000 ohms, ½ w.

General Electric 810, 814

Model 810 appears on *pages 2-22 through 2-43 of Rider's TV Manual Volume 2* and Model 814 on *pages 2-44 through 2-57,58* of the same Volume.

The color code shown on the horizontal sweep output transformer, T17, on Model 810 was shown in error on the schematic diagram of the service notes. No replacement transformers have been shipped having the code shown. The Model 814 service notes do not show the color code on the service note schematic.

The following is the correct color code as it appears for all replacement sweep transformers as used in these models:

Primary Winding	*Color Code*
B+ Return	Red Dot
Secondary Winding	
5V4G Plate	White Dot
Junction of B+ and L18	Blue Dot

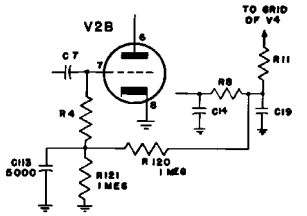
All other leads are identified physically, either by the tube caps assembled thereon, or by their lead length.

Audio clicks heard when the volume control is moved past the tap or at maximum volume setting when operating in a high channel can be cured by redress of the audio shielded leads and placement of components. To make these changes proceed as follows:

Remove the two shielded audio leads from under the cable clamp which is located on the side chassis apron above the 2nd audio if transformer. These audio leads are then dressed out of this clamp so they will be spaced approximately ⅛-inch away from the chassis side apron.

The three paper capacitors (C87-0.01 μf, C74-0.01 μf, and C76-0.02 μf) mounted on the left apron terminal board must be dressed down close to the side apron, as far away as possible from the head-end unit.

Bias has been added to the converter grid (pin 7 of V2-B) by the addition of R120, R121, and C113, as shown in the accompanying figure. This addition of bias is sometimes necessary when the receiver is used in areas of strong signal strength, especially on the high-frequency channels. The peaks of the signal, which are the vertical pulses, were causing the grid to draw grid current which, in turn, frequency-modulated the oscillator voltage at the vertical pulse rate (60 cps). This modulation appeared in the audio as a buzzing sound.



Bias is added to the converter grid of the GE 810 and 814 in the manner shown.

Add a terminal board to the underside of the main chassis near the r-f unit. The board should be mounted so that short leads can be used. Remove R4 from ground under the oscillator trimmer C80 and connect to the junction of R120 and R121 on the new terminal board. Connect C113 from the junction of R120 and R121 to the ground point on the r-f chassis under oscillator trimmer C80.

NOTE: Dress C113 as far away as possible from the oscillator trimmer C80.

The following should be added to the parts list:

Part No.	*Cat. No.*	*Description*
R120, R121	URD-121	Resistor, 1 megohm, ½ w.
C113	RCW-3014	Capacitor, ceramic, 5000 $\mu\mu$f

General Electric 901, 910

These models appear in *Rider's TV Manual Volume 2 on pages 2-59 through 2-94.* No picture in these sets may be caused by an inoperative horizontal sweep generator tube, V14, which results in no high voltage on the 5TP4 picture tube anode. In this sweep oscillator, feedback is provided through the common cathode resistor, R40, in the two triode sections of V14. This resistor has a value of 1,000 ohms. However, where low line voltage exists, this may not provide sufficient feedback to maintain oscillation and it is suggested that the value of R40 be increased to 1,200 ohms in all receivers to cure this trouble or insure against a possible service complaint.

When insufficient picture height is experienced with the vertical size control, the range may be extended about four inches by shunting R118 (2.2 megohms) with another 2.2-megohm resistor or replacing R118 by a 1.0-megohm resistor. R118 is one of the plate charging resistors in the vertical sweep generator tube, V11B, circuit located at the rear of the television chassis.

Add the following parts to the Parts List:

R40	Cat. No. URD-051	1200 ohms, ½ w., carbon
	Cat. No. URD-129	2.2 megohm., ½ w., carbon or
	Cat. No. URD-121	1.0 megohm, ½ w., carbon

Hallicrafters T-54 and 505

These models appear on *pages 1-1 through 1-29,31 of Rider's TV Manual, Volume 1.* Remove all dark brown 3.3-$\mu\mu$f capacitors C96 and C97 and replace with 6-$\mu\mu$f mica unit Part No. CM20A060M. The light tan colored 3.3-$\mu\mu$f capacitors used for C96 and C97 in some receivers are okeh and need not be changed.

Resistors R67 and R68 should be 47,000 ohms rated at 2 watts.

Change the 7JP4 filament wiring so that it is in series with the 6X5GT filament on the ground end of the filament circuit.

Add a 1000-$\mu\mu$f ceramic capacitor from the filter capacitor side of the R57 filament to ground, and from the 6X5GT filament, Pin 2 to ground.

Resistor R-29 found in some plate circuits of V-5 should be removed and discarded entirely. This results in additional gain.

The following should be tried if trouble is encountered with picture synchronization.

If the picture moves up and will not center with the vertical centering control, replace capacitor C20. If the picture moves down and will not center with the vertical centering control, replace capacitor C21.

If the picture moves to the right and will not center with the horizontal centering control, replace capacitor C28. If the picture moves to the left and will not center with the horizontal centering control, replace capacitor C29.

The universal chassis used in the 10-inch table model has undergone a simple change in production. R-34 has been changed from 2,200 ohms, ½ watt, to 15,000 ohms, 1 watt, ±10%. The part number is RC30AE153K. The chassis incorporating this change will be marked Run #2.

This change allows the 6AK5 tube to be used as an alternate for the 6AG5 tube in the r-f stage. The purpose is to provide greater production or service latitude in view of the possible and pending tube shortage.

Hallicrafters T-67

This model appears on *pages 2-1 through 2-15 of Rider's TV Manual Volume 2.* To improve the sensitivity and remove fringe area snow, try the following. Remove capacitors C9 and C11 from the push-button tuner. Remove grounding leads from socket terminal #4 of V1 and #7 of V2 and ground these socket terminals directly to the chassis.

There have been some reports that the bosses on the plastic escutcheon are breaking, allowing the safety glass to drop out of position. To prevent this, additional clips, part number 76A446, have been fastened with round head screws directly to the inside of the cabinet. These six clips are installed around the safety glass in a manner to hold it in position independent of the bosses on the escutcheon. It is no longer necessary to replace the entire escutcheon because of broken bosses. The clips may be obtained from the Service Parts Department.

Hallicrafters T61-T67

Reduction of noise in picture . . . Certain parts of the Boston area, having lower-than-normal TV signal strength, experience an accentuation of noise on the screen. An investigation revealed that this condition is improved by shielding the leads to the contrast control. Ordinary braid shielding may be used to encase the two leads, shielding that portion which appears above the chassis. The braid should be grounded to the chassis. This information applies to the receiver shown on *Hallicrafters pages 1-1 and 1-2 in Rider's TV Manual Volume 2.*

Industrial Television IT-1R 20-inch

This model appears on *pages 1-1,2 through 1-10 of Rider's Television Manual Volume 1.* If either severe distortion or low sound output is present in the IT-1R 20-inch audio amplifier, check for possible mis-wiring at the audio output transformer. In some cases it has been found that the B-plus lead from L401 and L402 to the center tap on the primary of T402 was mis-wired to pin 3 of V403 or to pin 3 of V404.

Industrial Television IT-1R Series 2

This model appears on *pages 1-3,4 of Rider's Television Manual Volume 1.* The gear assembly on the r-f tuning assembly may be adjusted in the following manner.

With the chassis removed from the cabinet and placed on the bench facing the mechanic:

Loosen screw in left-hand bottom corner of the dial assembly. (This screw holds the idler gear bracket.)

Move the idler gear out of mesh with the rest of the assembly.

Rotate tuner clockwise to stop.

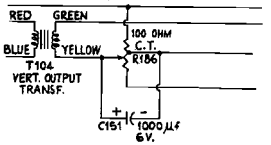
With pointer held at the right-hand edge of the 7-13 television box, gently mesh idler gear and tighten the screw holding same to the rear assembly.

Pointer should now be in the correct position, and indicate correctly over the range of the tuner.

Industrial Television IT-11R

This model appears on *pages 2-1,2,3 of Rider's TV Manual Volume 2.* The following changes have been incorporated in current production. It is not recommended that these changes be made in the field, except in the case of the noise limiter change. This change may be made if conditions of high noise are encountered.

In the vertical positioning circuit, the 100-ohm potentiometer, R186, and the 47-ohm resistors, R187 and R188, have been replaced by a 100-ohm center-tapped potentiometer. This change is shown in the accompanying diagram.



The 100-ohm potentiometer connected into the vertical positioning circuit of the Industrial Television Model IT-11R.

Resistor R180 in the vertical sawtooth generator has been changed to 180,000 ohms, one watt from 270,000 ohms, one watt. This change improved the range of the vertical size control.

Resistor R1100, (470,000 ohms, one watt) has been added between the plate and cathode of V103 to stabilize the action of the noise limiter circuit.

Industrial Television IT-11R, IT-13R

Model IT-11R appears on *pages 2-1,2,3 of Rider's TV Manual Volume 2* and Model IT-13R appears on *pages 2-4,5,6* of the same volume. Due to recurrent internal shorts in the 6BG6-G horizontal sweep output tubes, it has been found necessary to devise a means to protect the horizontal output transformer from being damaged by excessive current. A Mazda #47, brown bead, 6-8-volt, 0.150-ampere pilot bulb is inserted in the B+ feed to terminal #1 of the horizontal output transformer, T102, serving as a fuse in case of a shorted 6BG6-G tube. This change has been made in production and may readily be made in the field.

A special pilot light socket with **good** insulation to ground is available. **The** part number of this socket is **44-235. The** socket clips onto the assembly strap of transformer T102.

Magnavox CT 214 B

This model is the same as **CT 214 A**, appearing on *pages 2-1 through 2-37,38 of Rider's TV Manual Volume 2*, except for the following modifications. A green-colored peaking coil, part number 360332G10, has been inserted between the 2,000-ohm plate load resistor (138) of V14A and the +135-volt bus. This extends the h-f response of this video amplifier stage.

An iron-slug coil, part number 360346G1, has been inserted as the horizontal oscillator frequency control (speed), replacing the 120-$\mu\mu$f capacitor (25) used previously. If it is desired to install this unit for improved stability of horizontal deflection, the following should be done:

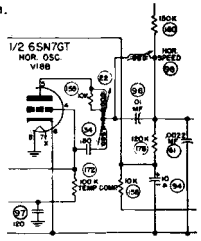
(1) Remove the 120-$\mu\mu$f capacitor (33) and replace with mica capacitor, 180-$\mu\mu$f ±10%, 500-volt, part number 250159G85. Note: The capacitor which is removed may be used in step (3).

(2) Remove the horizontal speed capacitor. This is the center capacitor of the three-gang trimmer (25).

(3) Connect a 120-$\mu\mu$f ±10%, 500 volts, part number 250159G83, from the tie lug at the junction of the 100,000-ohm resistor (172) and the 180,000-ohm resistor (181) to the grounded terminal of V18 (pin 8).

(4) Mount the horizontal speed coil, part number 360346G1, with mounting bracket part number 633750G2 directly above the gang trimmer (25). The tuning slug of th coil should be accessible through the opening marked HORIZONTAL SPEED.

(5) The horizontal speed coil should be connected as shown in the accompanying diagram.



Horizontal speed coil in the Magnavox TV set model number CT 214 B.

(6) Connect one side of the coil to the second lug from the end of the strip nearest horizontal linearity coil (13). Remove the 10,000-ohm resistor (155) and retain for use in step (8).

(7) Connect the opposite side of the coil to the center tap of Magnalok transformer (22). Dress the lead so that it will follow the contour of the wires leading to the tie lug strip mounted between the Magnalok transformer (22) and the 6V6GT audio output stage. Connection should be made from the opposite terminal of the horizontal speed coil to the second tie lug from the end of the tie lug strip nearest the front of the chassis.

(8) Connect resistor 55 removed in step (6) across terminals 1 and 2 of the tie lug (across one-half of the coil).

(9) Connect a 0.01-μf, 300-volt capacitor, part number 250161G53, across the coil. The connection should be made across the tie lug points 2 and 3.

Note: Some models do not incorporate the tie lug described in step (7). For these models, steps (8) and (9) should be done as follows:

a. Mount resistor 155 directly across the Magnalok transformer coil terminals.

b. Mount the 0.01-μf capacitor directly across the terminals of the horizontal speed coil.

Connect a 4.7-megohm resistor between lug F on the discriminator transformer (4) and the open lug of the terminal strip mounted directly under the 6AU6 tube socket (V6). Then connect a lead from this lug to pin 1 of the Sync Clipper 6SN7 tube socket (V16).

Meissner 24TV. Serial Higher Than 1500

This receiver is the same as Model 24TV, appearing on *pages 2-1 through 2-12 of Rider's TV Manual Volume 2*, except for the following changes. The 100-ohm resistor connected between the contrast control and the 100-ohm cathode resistor of the first video i-f stage has been removed. A 0.00025-μf capacitor in parallel with a 100-ohm resistor has been connected between the cathode (pin 5) of the 6AC7 first video amplifier and ground. The choke in the plate circuit of the second video amplifier has been changed in value from 250 μh to 125 μh. The new part number is 05654.

The 0.25-μf capacitor connected between the brightness control and the choke in the plate circuit of the second video amplifier has been removed. A 6AL5 diode has been added to the circuit as the horizontal phase detector. This new tube necessitated changes in the 6SN7 sync separator circuit, as may be seen in Fig. 1.

The resistor in the arm of the brightness control has been changed in value from 220,000 ohms to 680,000 ohms, and a 0.25-μf, 600-volt capacitor connected from the top side of this resistor to ground. The 22-ohm resistor connected to the horizontal deflection coil has been replaced by a 0.5-μf, 400-volt capacitor. The 0.02-μf, 600-volt capacitor connected from the junction of the horizontal linearity control and the primary of transformer 29445 to the bottom of the grid-leak combination of the 6BG6G tube has been changed to a 0.03-μf, 1000-volt capacitor.

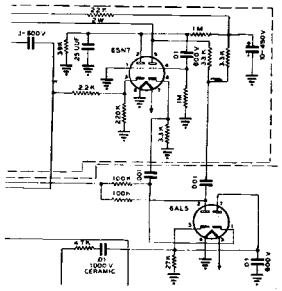


Fig. 1. The 6SN7 sync separator circuit for Meissner 24TV showing recent changes.

A corona ring has been added between the 1-megohm resistor and the filament (pin 7) of the 1B3GT high-voltage rectifier. A variable choke (05845) is used as a horizontal size control and connected from a tap to the bottom of the secondary of transformer 29445. A connection has been made from this tap to the 0.5-μf, 400-volt capacitor mentioned formerly. The 6SN7 horizontal oscillator circuit has been changed as shown in Fig. 2.

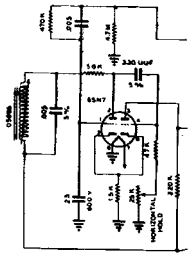


Fig. 2. Changes in 6SN7 horizontal oscillator circuit for Meissner 24 TV.

A 0.002-μf capacitor has replaced the 100,000-ohm resistor in the CR network in the primary of transformer 29443. A 22,000-ohm resistor has replaced the 0.005-μf capacitor in the line leading from the sync separator. The 0.05-μf, 600-volt capacitor connected from the bottom of transformer 29443 to ground has been changed in value to 0.25μf. The connections to the elements of the 6SN7 vertical oscillator tube have been reversed; that is, the connections to pins 1 and 4 have been reversed, as have those of 2 and 5, 3 and 6, and 7 and 8. No other change has been made in the circuit. The 4700-ohm resistor connected between the cathode (pin 3) of the 6SN7 vertical amplifier and the 0.05-μf capacitor has been removed.

The voltage readings of the sync separator and the horizontal phase detector are:

Pin #	1	2	3	4	5	6	7	8
6SN7	0	7	3	0	210	8.8	6.3AC	0
6AL5	0.8	-0.5	6.3AC	0	0	0	0	0

The resistance readings for the sync separator and the horizontal phase discriminator are:

Pin #	1	2	3	4	5	6	7	8
6SN7	0	39K	220K	1Meg	32K	3.3K	0	0
6AL5	∞	∞	0	0	27K	∞	2.7K	0

Philco 48-1001, Code 121

This model appears on *pages 2-81,82 through 2-86 of Rider's TV Manual Volume 2*. All model 48-1001 receivers are Code 121 unless a different code number is stamped next to the model number on the rear of the chassis. To determine the run number of a set, examine the series of numbers stamped in ink on the rear of the chassis. The last digit of the series gives the run number. For example, if the number is 1111374, the set is run 4.

Run 4

All paper capacitors were changed to paper-molded capacitors. When replacing parts, the parts number given in TV Manual Volume 2 should be used with, the following exceptions.

Section 2

C210 should be Part No. 45-3502
C211 should be Part No. 45-3502
C217 should be Part No. 45-3502

Section 3

C304 should be Part No. 45-3502
C305 should be Part No. 45-3502
C306 should be Part No. 45-3502
C307 should be Part No. 45-3502
C308 should be Part No. 45-3502
C310 should be Part No. 45-3502
C311 should be Part No. 45-3502
C312 should be Part No. 45-3502
C314 should be Part No. 45-3502
C315 should be Part No. 45-3502
C317 should be Part No. 45-3502

Section 5

C509 should be Part No. 45-3500-3

Run 5

Z202, the discriminator transformer, Part No. 32-4214, was replaced by Part No. 32-4214-3 to reduce frequency drift.

Run 6

R547, Part No. 33-5547-2, was replaced by Part No. 33-5546-12. This involved a change only in rating.

Run 7

To reduce modulation hum of high-frequency channels, a choke, Part No. 32-4112-2, was added between the junction of R400, C402, and L402 and the junction of C409 and R405.

Remington 1950

This model is the same as Models 80 and 130, appearing on *pages 1-1 through 1-9,10 of Rider's Television Manual Volume 1*, except for the following changes.

The B-supply voltages are all supplied by one power transformer and a 5U4G rectifier. Both the centering controls are wired in series with the common supply. Only one filter choke is used in the common supply, instead of two as in Models 80 and 130.

Remington 80, 130

These models appear on *pages 1-1 through 1-9,10 of Rider's Television Manual Volume 1*. Since the noise levels are quite high in some localities, afc has been added to minimize disturbances.

A 6AL5 double-diode tube has been added to develop the oscillator control voltages. This tube receives its signal from the plate of the 6AS7 discharge tube. See Fig. 1 for connection of the 6AL5 into the circuit.

The bias arrangement has been changed on the 6AG7 video output tube. A 150-ohm resistor bypassed by a 100-$\mu\mu$f 25-volt capacitor, is connected between the cathode of the 6AG7 video output tube and ground. The grid coupling capacitor has been removed and replaced by a direct wire. See Fig. 2 for this change. When this latter change is made in a set brought in for servicing, it will help to minimize noise and is advised for locations where noise is prevalent.

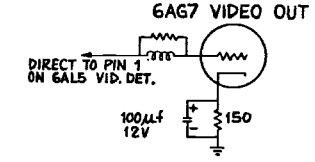


Fig. 2. This change will help minimize noise in the Remington Models 80 and 130.

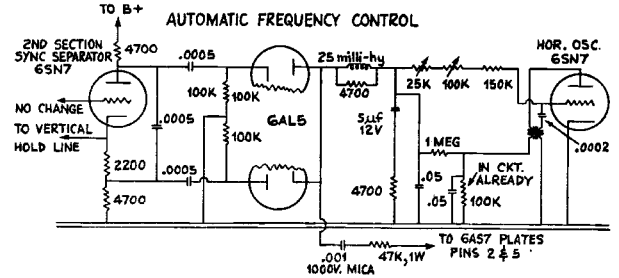


Fig. 1. The 6AL5 double-diode tube has been added to give automatic frequency control.

Philco 48-1001 Code 122

This model is similar to the Philco 48-1001 Code 121 appearing on *pages 2-81, 82 through 2-86 of Rider's TV Manual Volume 2*. It also incorporates the changes given on page 14 of the April, 1949 issue of SUCCESSFUL SERVICING and page 8 of the May, 1949 issue.

The following changes have been made in Code 122:

Section 1

The a-c power line has been connected directly to transformer T100 instead of to pins 4 and 10 of the a-c interlock.

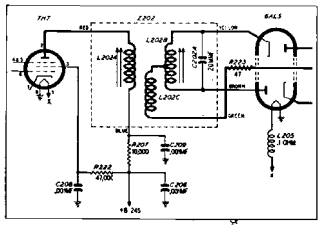


Fig. 1. New discriminator transformer and associated circuit for Philco 48-1001.

Section 2

Refer to Fig. 1. Z202 has been replaced by a new discriminator transformer, part number 32-4317. Balancing choke, L204, part number 32-4143-1, has been removed. The 5-$\mu\mu$f capacitor, connected from the plate of the second a-i-f* tube (7H7) to ground, has been removed.

Capacitor C208, 0.001 μf, part number 45-3500-5, has been added between pin 3 of the second a-i-f tube and ground. L202C, part of Z202, has been added. C202A, 100 $\mu\mu$f, part of Z202, has been removed. Balancing capacitor, C202C, part of Z202, has been removed. C202B, 10 $\mu\mu$f, part of Z202, has been changed to 20 $\mu\mu$f, and resymbolized C202A.

C206, 0.001 μf, part number 45-3500-5, was removed from the cathode (pin 7) of the second a-i-f tube, and connected as shown in Fig. 1. R222, 47,000 ohms, part number 66-3473340, was added. See Fig. 1. R223, 47 ohms, part number 66-0473340, was added. See Fig. 1.

R219, 3,300 ohms, part number 66-2333340, was changed to 1,200 ohms, part number 66-2123340. R209, 27,000 ohms, part number 66-3273340, was changed to 10,000 ohms, part number 66-3103340. R210, 27,000 ohms, part number 66-3273340, was changed to 10,000 ohms, part number 66-3103340.

Section 5

See Fig. 2. C509, coupling capacitor, 0.25 μf, part number 61-0125, was changed to 0.1 μf, part number 61-0113. The connection of the vertical deflection yoke, P9 and P3, were changed to 4 and 5, respectively. R549, linearity-control limiting resistor, 6,200 ohms, was changed to 33,000 ohms, part number 66-3333340. R545 and R546, horizontal linearity controls No. 2 and No. 3 were removed. The circuit was rewired as shown in Fig. 2.

R548, beam-bender control, was removed.

Z502, beam-bending coil assembly (including L502A and L502B) was removed. A permanent-magnet type of beam bender (BB500), part number 76-3913, was added.

J500, chassis receptacle (deflection-yoke-cable connector) 11 pins, part number 27-6229, was changed to 8 pins, part number 27-6174-4. P500, deflection-yoke-plug connector and cable, 11 pins, part number 41-3764-1, was changed to 8 pins, part number 41-3860.

*a-i-f means audio i-f.

Pilot TV-42, TV-952

These models are the same as Model TV-40, TV-950 on *pages 2-14 through 2-53, 54 of Rider's TV Volume 2*.

Regal 1031

This model is the same as Model 1030 which appears in *Rider's TV Manual Volume 2 on pages 2-1,2.*

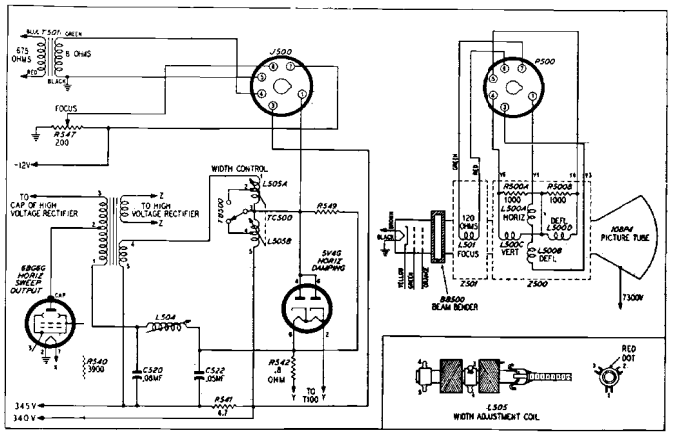


Fig. 2. Changes in wiring output circuit in Philco 48-1001.

Sears 8133, Ch. 101.846, 101.829-1

This model appears on *pages 2-1 through 2-22,23,24 of Rider's TV Manual Volume 2*. Late production of television chassis 101.846 have incorporated a 4.5-mc trap off the plate of the first video amplifier tube 6AU6, as shown in the accompanying diagram. This trap is necessary to remove the heterodyne beat caused by the 26.4-mc picture i-f signal at the video detector beating against the very low, but still present, 21.9-mc sound i-f signal. This sound i-f signal tends to pass through the sound traps when the receiver is slightly detuned. This beat will show up on the picture tube as sound bars or a small herringbone pattern across the entire screen.

To install this 4.5-mc trap, proceed as follows:

1. Place the chassis on the bench in an upside down position.
2. Remove the #6 machine screw located midway between the first video amplifier 6AU6 tube socket and capacitors C109 and C110.
3. Install the trap coil (L30) on the chassis by placing the screw through the hole in the coil bracket and replacing the screw in the chassis. Before tightening the screw, rotate the trap coil so that the side with the soldering lugs faces the front of the chassis.
4. Tighten the machine screw.
5. Solder a wire from the coil lug nearest the chassis to ground.
6. Connect a 4.7-$\mu\mu$f ceramic capacitor to the top lug on the trap coil and the plate (pin 2) of the 6AU6 first video amplifier.

Due to the addition of this trap, the following information should be added after Television Alignment Procedure High Band Alignment on *page 2-11.*

1. With the chassis completely adjusted and connected for operation, tune in a test pattern.
2. Turn the contrast control to its full-on position and the brightness control to a low level (so that contrast is still noticeable).
3. Detune the fine tuning control so that sound bars are just visible. A 4.5-mc beat is now readily visible on the screen.
4. Rotate the 4.5-mc trap coil adjustment screw counterclockwise to its full-out position (about 1" of screw showing).
5. Turn the adjustment screw in (clockwise) until the 4.5-mc beat on the screen just disappears. *Do not go beyond this point.*

Radio chassis 101.829-1 used in these sets, beginning with serial number 2001, have had a phono switch bracket assembly installed for phono operation. The switch is connected between the high side of resistor R202 (2.2 megohms) and the high side of volume control R205 (500,000 ohms). The high side of R205 no longer is connected to the junction of R203 and C213.

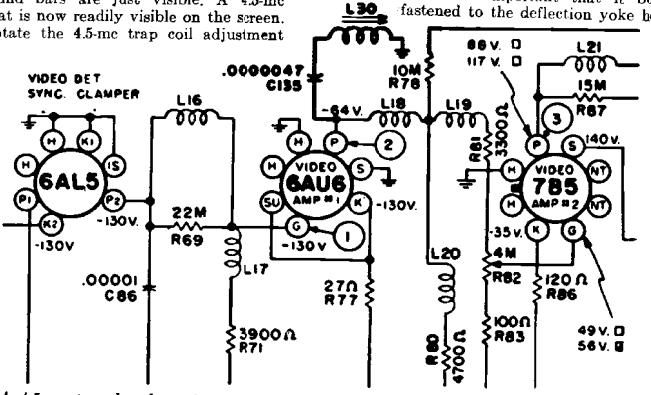
The following deletions have been made in the parts list:

Schematic Location	Part Number	Description
C24		Capacitor—1.0 $\mu\mu$f—ceramic
C4		Capacitor—1.5 $\mu\mu$f—ceramic
C131		Capacitor—100 $\mu\mu$f—ceramic
	R70015	Damper—trimmer
	R70017	Damper—tube
	R63476	Insulator—capacitor
	R63477	Insulator—capacitor
	R65491	Line ass'y.—transmission—high
	R65492	Line ass'y.—transmission—low
R9		Resistor—5,600 ohms—½ w
R207		Resistor—4.7 megohms—½ w.

The following should be added to the parts list:

Schematic Location	Part Number	Description
C24		Capacitor—1.5 $\mu\mu$f—ceramic
C4		Capacitor—2.2 $\mu\mu$f—ceramic
C135		Capacitor—4.7 $\mu\mu$f—ceramic
C131		Capacitor—50 $\mu\mu$f—ceramic
L30	R70077	Coil—4.5-mc trap
	R70090	Damper—tube
	R70057	Insulator—capacitor
R9	Resistor	Resistor—2,700 ohms—½ w.
R207		Resistor—15 megohms—½ w.
	R70140	Phono switch bracket assembly (chassis serial number 2001 and up)

A limited number of these models were shipped from the factory with loose deflection yoke caps. This cap protects the high-voltage terminals of the deflection coil and it is important that it be securely fastened to the deflection yoke housing. A good grade of paper cement can be used to fasten the cap securely. It is recommended that all deflection yoke caps be checked for proper bonding to the housing before servicing.



A 4.5-mc trap has been incorporated into the Sears television chassis 101.846.

Mark Simpson IMB-13; MTB-13X Second Production

These models are the same as model MTB-13X appearing on *pages 2-1 through 2-3 of Rider's TV Manual 2* except for the following changes:

The variable tuning capacitor used with transformer T1 has been changed in value from 28 $\mu\mu$f to 15 $\mu\mu$f. A 4,700-ohm resistor has been connected from the screen grid of the 6AK5 associated with transformer T2 to the plate of the same tube, instead of the 2 4,700-ohm resistors shown on *pages 2-3*.

The variable tuning capacitor used with transformer T3 has been changed in value from 28 $\mu\mu$f to 35 $\mu\mu$f. A 4,700-ohm resistor has been connected from the screen grid of the 6AK5 tube associated with transformer T3 to the plate of that tube, instead of the previous combination of resistors.

The 150-ohm resistor in series with the selenium rectifier may, in some cases, be 120 ohms.

Stromberg-Carlson TS-10

Because of the limited supply of twelve-inch picture tubes, it has been necessary to substitute the ten-inch 10BP4 for the 12JP4 in some of the TV-12 table model receivers. The receiver with the ten-inch tube is known as the TS-10. Service data *on pages 1-17 to 1-29,30 of TV Volume 1* applies to the TS-10 when the following changes are made.

R-286 (250 ohms) has been shorted out to provide adequate focus range. C-287 (220 $\mu\mu$f) has been omitted to give the correct horizontal sweep for the ten-inch tube.

The following parts have been added:

111055	40 μf, 475 v, capacitor C-264(A) to replace 111040
111056	40 μf, 400 v, capacitor C-264(B)
113047	10-inch tube clamp
114635	Ion trap
154053	Mask
162024	10BP4 picture tube
165009	Anode connector

In most cases when installing a Model TS-10 receiver, the ion trap will have to be adjusted. Move the ion trap back and forth on the neck of the tube, at the same time rotating it until the brightest raster is obtained on the screen of the picture tube.

Stromberg-Carlson TV-12LM, 12M5M, 12PGM, 1220T, TV12H1M, 12H2M, 12H2A

This receiver is shown in *Rider's TV Manual Volume 1 pages 1-29 and 1-30.* Terminal 5 of the horizontal-output transformer returns to plus 400 volts.

Resistor R258 is 33K instead of 3.3K.

Resistor R309 is 100K instead of 10K.

On recent models the relay contacts of K201 break the B-plus lead instead of the B-minus lead. This is between the junction of R316 and L217, and the cathodes (pin 8) of V218 and V219.

TEST PATTERNS

Abnormalities in the patterns appearing on the scope can be classified as being caused by either:-

1. Internal effects - i.e. misadjustment of one or more controls, incorrect voltages, deterioration of components, etc., or -
2. External effects - i.e. interfering signals, multiple signals, too strong or too weak a signal, etc.

Many of the internal defects, causing abnormalities in the test pattern can be corrected by the simple adjustment of the pre-set or front panel controls.

The following test patterns have been arranged firstly as to internal and then the external causes for abnormalities. It should be born in mind that whereas only one cause is given for each defect, it is possible to have more than one simultaneously, necessating several adjustments.

These patterns are reproduced thrcugh the courtesy of the following companies: Radio Corporation of America, General Electric Company, Allen B. DuMont Laboratories, Inc., Capehart - Farnsworth Corporation, Motorola, Inc., and others

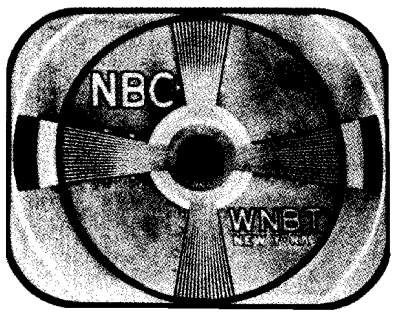


FIG. 1: NORMAL PICTURE

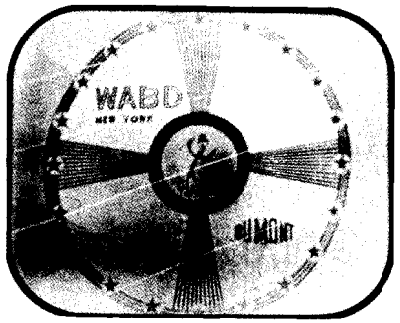


FIG. 2: CONTRAST TOO LOW

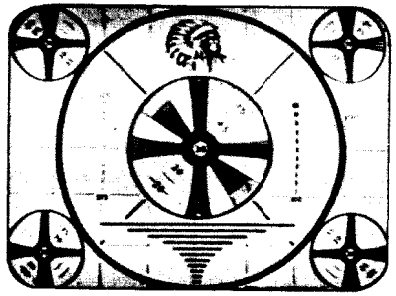


FIG. 3: CONTRAST TOO HIGH

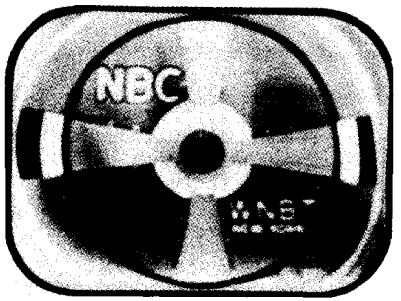


FIG. 4: FOCUS MISADJUSTED

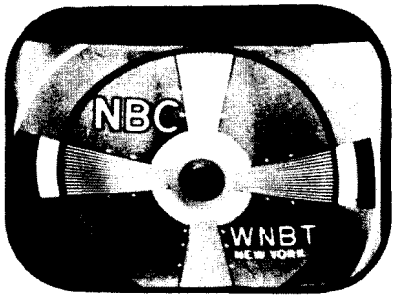


FIG. 5: FOCUS COIL AND ION TRAP MISADJUSTED

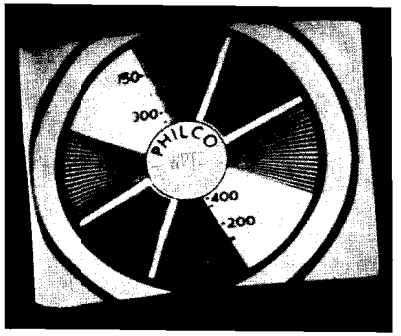


FIG. 6: DEFLECTION YOKE ROTATED

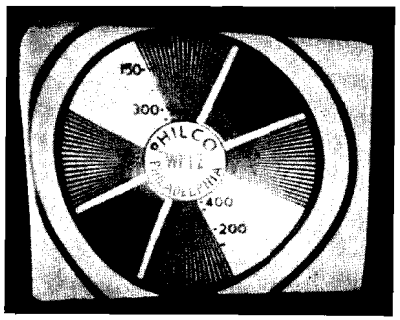


FIG. 7: PICTURE TUBE ADJUSTMENT REQUIRED

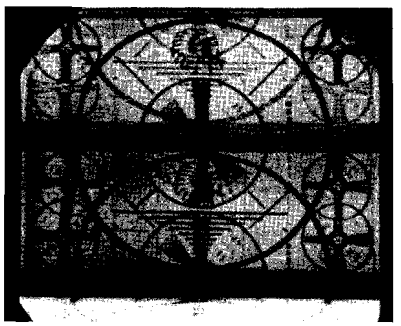


FIG. 8: VERTICAL HOLD MISADJUSTED

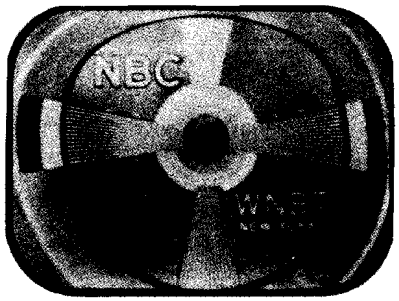


FIG. 9: VERTICAL LINEARITY MISADJUSTED

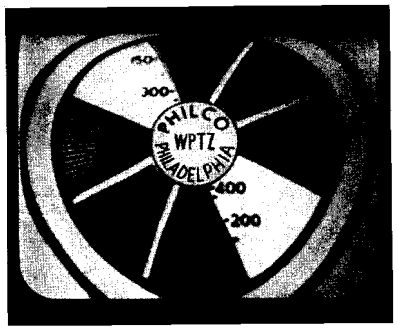


FIG. 10: VERTICAL LINEARITY MISADJUSTED

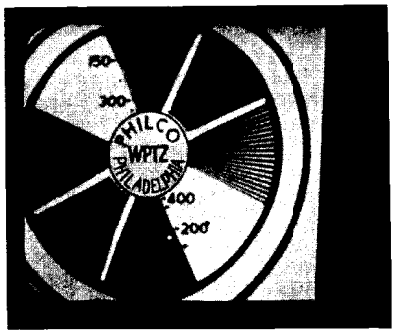


FIG. 15: HORIZONTAL CENTERING MISADJUSTED

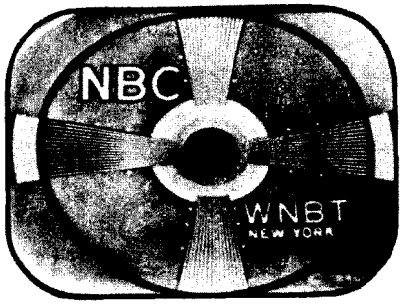


FIG. 16: HORIZONTAL WIDTH TOO WIDE

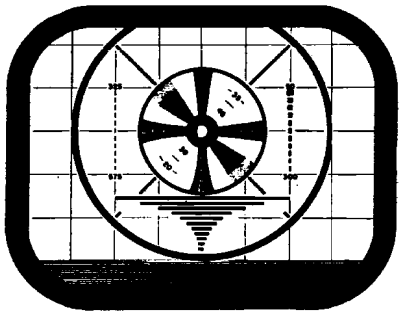


FIG. 11: VERTICAL CENTERING MISADJUSTED

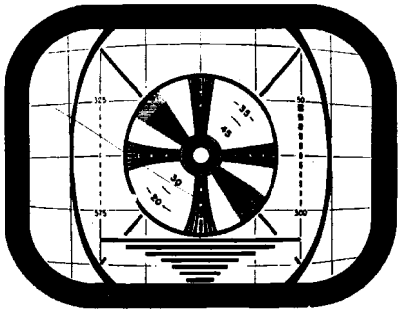


FIG. 12: VERTICAL HEIGHT TOO HIGH

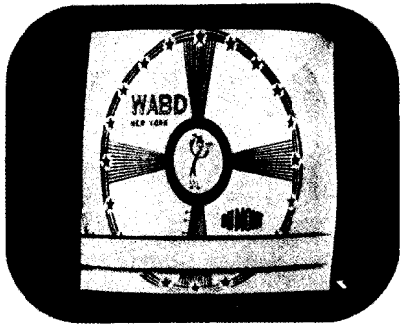


FIG. 17: HORIZONTAL WIDTH TOO NARROW

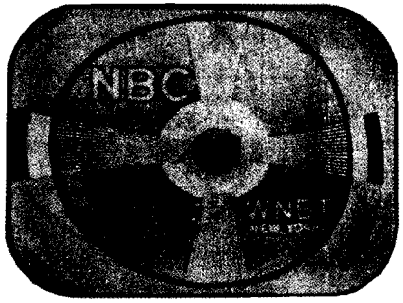


FIG. 18: HOR. LINEARITY MISADJUSTED - BUNCHES RIGHT OR LEFT

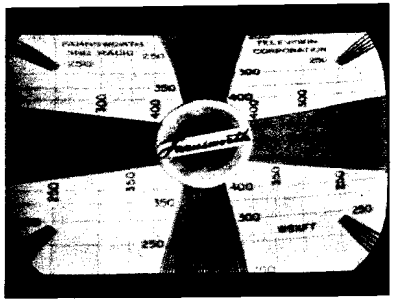


FIG. 13: VERTICAL HEIGHT TOO LOW

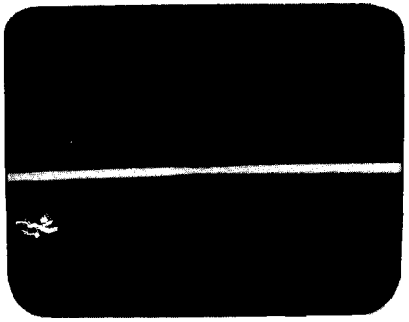


FIG. 14: NO VERTICAL SWEEP

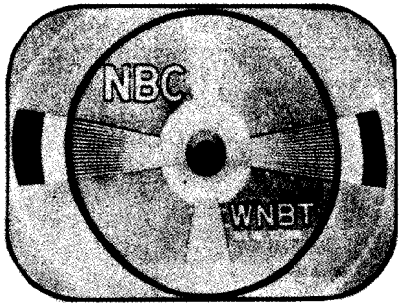


FIG. 19: HOR. LINEARITY MISADJUSTED - BUNCHES TO CENTER

FIG. 20: HOR. SYNC. DISC. XFORMER FREQ. ADJUSTMENT MISADJUSTED

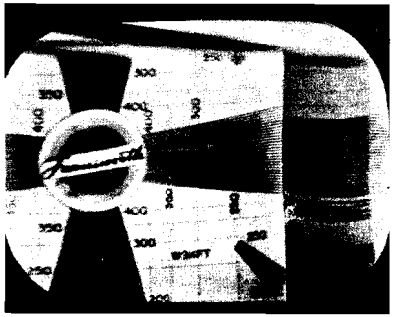


FIG. 21: HOR. SYNC DISC. XFORMER PHASE ADJUSTMENT MISADJUSTED

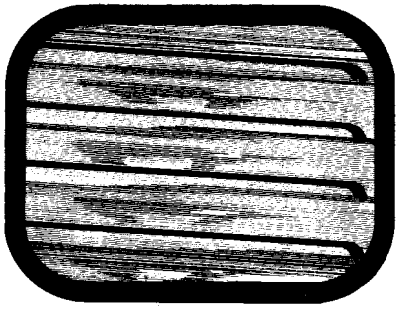


FIG. 22: HORIZONTAL HOLD MISADJUSTED FAST MOVEMENT

FIG. 27: EXCESSIVE RIPPLE IN VIDEO AMPLIFIER

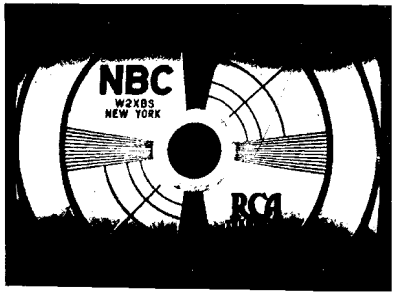


FIG. 28: EXCESSIVE RIPPLE IN VIDEO AMPLIFIER

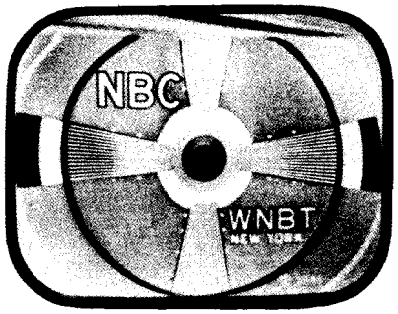


FIG. 23: HOR. HOLD MISADJUSTED "TEAR OUT" AT TOP OR BOTTOM

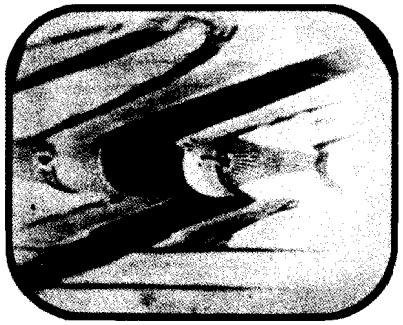


FIG. 24: HORIZONTAL HOLD MISADJUSTED SYNC AFFECTED

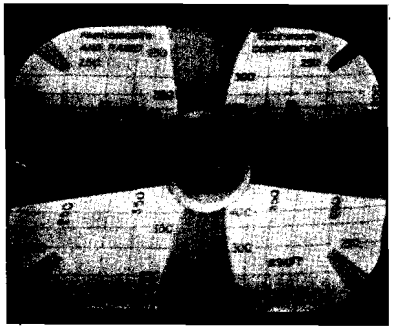


FIG. 29: 120 CYCLE HUM IN VIDEO AND HORIZONTAL SCANNING

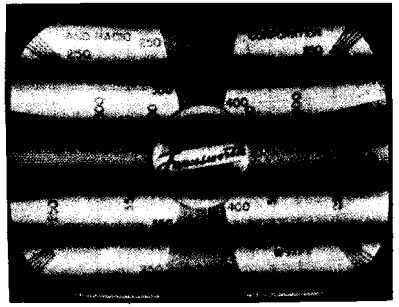


FIG. 30: SOUND BARS OR MICROPHONICS

FIG. 25: HORIZONTAL HOLD MISADJUSTED

FIG. 26: HUM IN VIDEO AND SYNC

FIG. 31: SOUND INTERFERENCE - INCORRECT TUNING

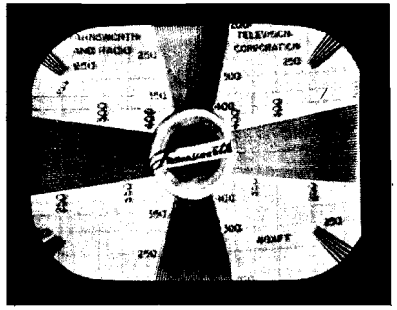


FIG. 32: MISALIGNMENT OR IMPROPER ANTENNA ORIENTATION

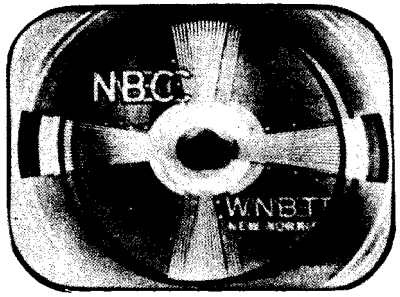


FIG. 33: MULTIPLE IMAGES GHOSTS

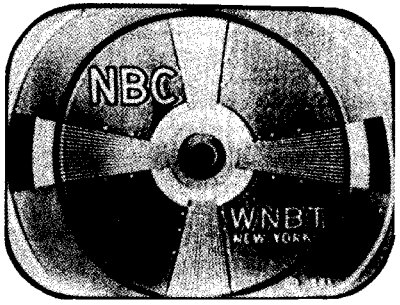


FIG. 34: TRANSIENTS

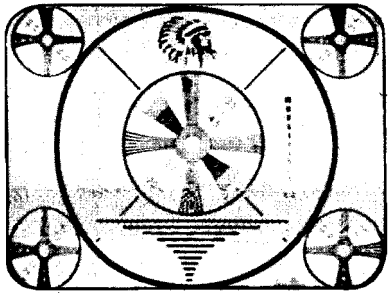


FIG. 39: DIATHERMY INTERFERENCE - WEAK

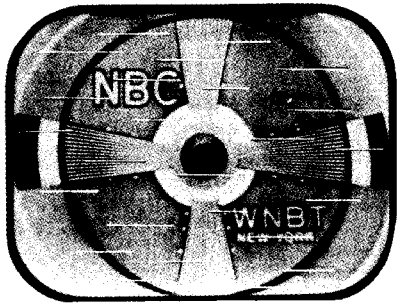


FIG. 40: IGNITION INTERFERENCE - WEAK

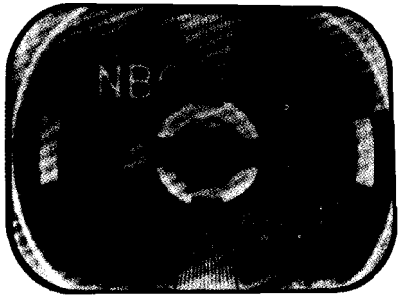


FIG. 35: INTERFERENCE FROM ANOTHER SIGNAL

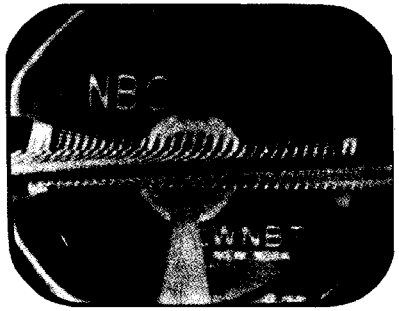


FIG. 36: DIATHERMY INTERFERENCE - HEAVY

FIG. 41: IGNITION INTERFERENCE - HEAVY

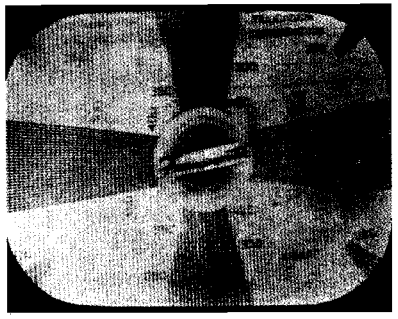


FIG. 42: BEAT FREQUENCY

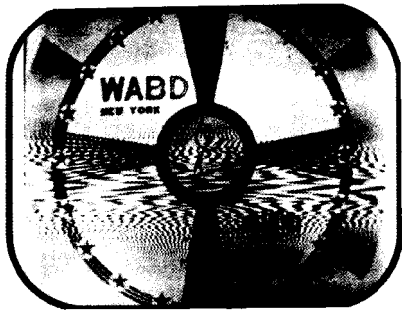


FIG. 37: DIATHERMY INTERFERENCE - MEDIUM

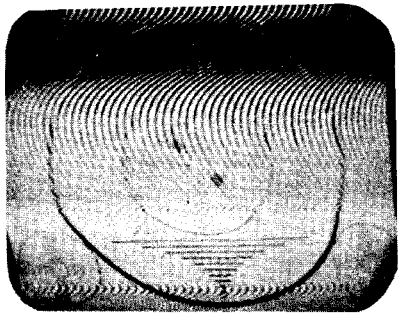


FIG. 38: DIATHERMY INTERFERENCE - LIGHT

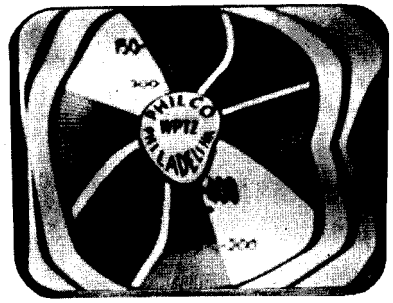


FIG. 43: HUM IN DEFLECTION COIL

FIG. 44: NO VIDEO SIGNAL