DUMONT

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SERVICE NOTES

FOR

DU MONT TELESETS

ALLEN B. DU MONT LABORATORIES, INC.

Teleset Service Control Department

MARKET STREET **EAST PATERSON, N. J.**

RA-105A-106A

RA-105 -- RA-106 SECTION

This section is devoted to information pertaining to the RA-105 and RA-106 Telesets. The information on the two Telesets is combined in one section because there is a great deal of similarity between these two sets.

The models produced under the two different types follow:

RA-105A	RA-106A
Stratford	Club 20
Westbury	Manchu
Whitehall	
Colony	

The main chassis is the same in both the RA-105 and RA-106 sets. The RA-105 series uses a 15 inch cathode ray tube whereas the RA-106 uses a 20 inch cathode ray tube. Because of the deflection requirements of these two tubes, a slightly different power supply is used on both these Telesets.

Complete schematic diagrams for both the RA-105 and RA-106 Telesets are supplied with the RA-105 Service Manual. These manuals are available at a cost of $0.75 each.

Index RA-105 -- RA-106 Section

RA-106 TELESET

As mentioned in the previous page two models of the RA-106A were produced. The Club 20 uses a main chassis and a power supply chassis. The main chassis is the same as used on the RA-105 Teleset, whereas the power supply is slightly different than that used with the RA-105 models. The circuit diagram for this RA-106 power supply is included in the RA-105 service manual. The other model known as the Manchu is a complete home entertainment unit:

Receiver Main Chassis (Same as used in Club 20)
Flyback Power Supply (Same as used in Club 20)
AM Tuner (Same as used in Colony)
Push Pull Audio Amplifier (Same as used in new Colony)
Webster Model 256 Dual Speed Record Player.

Two speakers are used in this Teleset:

One three inch speaker assembly (part #18002811) located at the front of the cabinet and one 12 inch high quality speaker (part #18002821) located beneath the cabinet. (This 12 inch speaker is electrically the same as part #18002801 as used in the new Colony; the difference in part number is due to the different lead length.)

This Teleset has an unusual feature that permits the entire cabinet containing all the electrical equipment to be swivelled through 180°. This permits the tube to be viewed from various angles as desired by the customer. Upon receipt of this Teleset from our factory very close adherence to the unpacking instructions should be followed. These unpacking instructions are included with each Teleset. In addition to this the following information is presented for your benefit:

1. DO NOT install with the set touching the side of a wall. The side of the table should not come any closer than three inches to the wall. When the cabinet is swivelled the top edge of the cabinet can conceivably hit the wall and thus cause severe damage to the wall and the Teleset.

2. DO NOT remove any bolt from underneath the Teleset other than the hex head bolt located on the center metal rail below the cabinet base. A yellow tag is fastened to this bolt to identify it. An Allen head set screw is also located adjacent to this bolt. Removal of this screw will cause the cam follower to fall out and thus permit the cabinet to swivel completely around.

When rotating, the cabinet should be held at the front. It would be very difficult to rotate by grasping from the rear.

The Audio Amplifier used with this Teleset is the same amplifier that is incorporated in the new RA-105 Colony Telesets. However, a 6W4 rectifier tube is used in place of the 5Y3. This is necessary inasmuch as the tube manufacturers do not recommend horizontal mounting of the 5Y3 as it is possible for the filament to sag and short against the plate.

On the Manchu Telesets at high line voltages (about 129 volts) the focusing may not be satisfactory. To improve focus, move the "chimney" (this is the metal support that holds the yoke and focus coil assembly and is affixed to the inside of the cabinet) back to permit better focusing. This is accomplished by removing the 2 screws that are mounted in T nuts and replacing with wood screws in the new location. The deflection yoke will of necessity have to be pushed up as far as possible to the front of the tube and then the focus coil can be adjusted for best focusing.

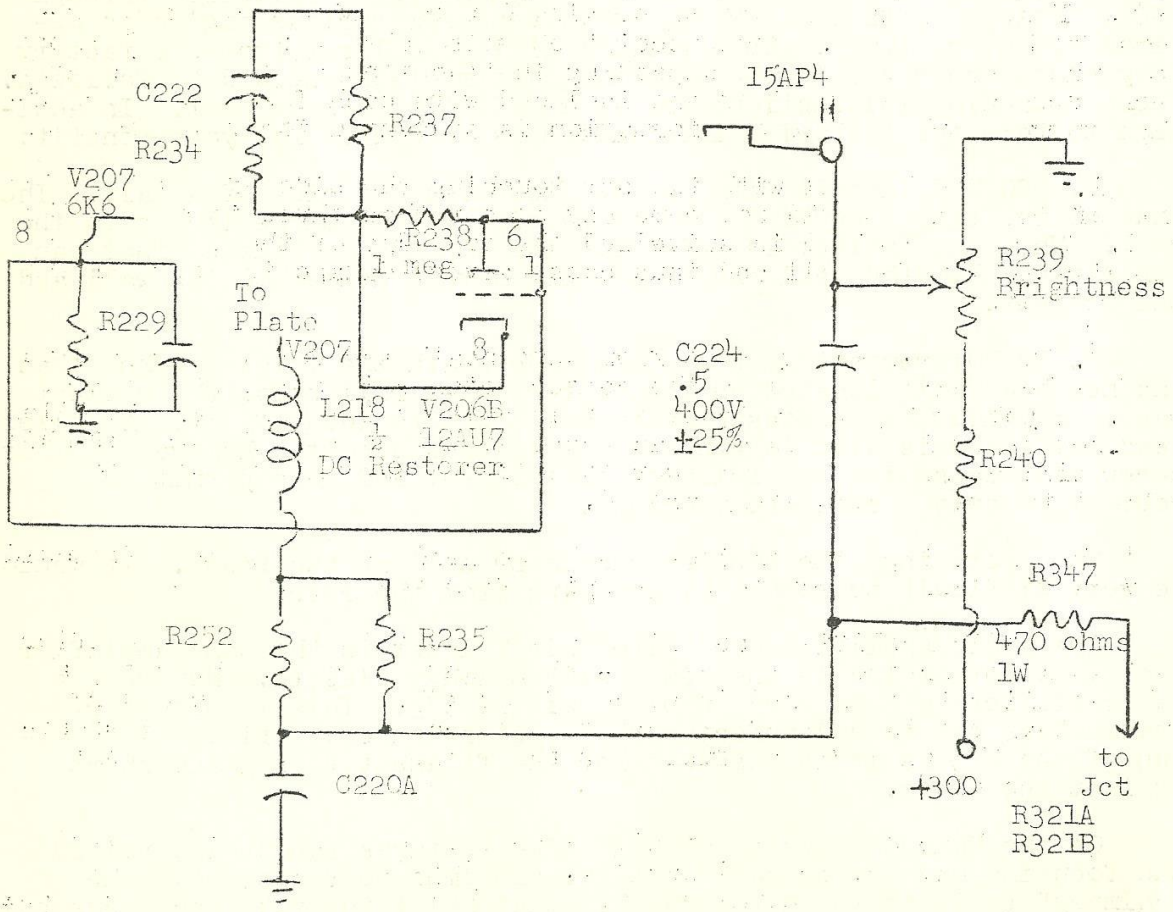
RA-105 - RA-106 Section

The following list indicates the changes made in the RA-105 and RA-106 Telesets since the issuance of the RA-105 and RA-106 schematics:

CHASSIS	CHANGE	REASON
Main Chassis (RA-105 - RA-106)	Tolerance of A.C. line capacitors C279 and C280 is changed from ± 25% to ± 20%	To satisfy underwriters requirements.

ANTI-FLICKER CIRCUIT

The schematic shown below illustrates changes made in the RA-105, RA-106 main chassis to reduce flicker. The flicker referred to results from periodic line voltage fluctuations such as are produced by reciprocating pumps and like devices. This change is sometimes referred to as an "anti-flicker circuit".



The list of changes follow:

1. Pins #6 and #7 on V206-B the DC restorer tube are removed from ground.

2. Pins #6 and #7 on V206-B are connected together and a lead is run from pin #6 of V206-B to pin #8 of V207, thus returning the DC restorer to the cathode of the third video amplifier instead of ground.

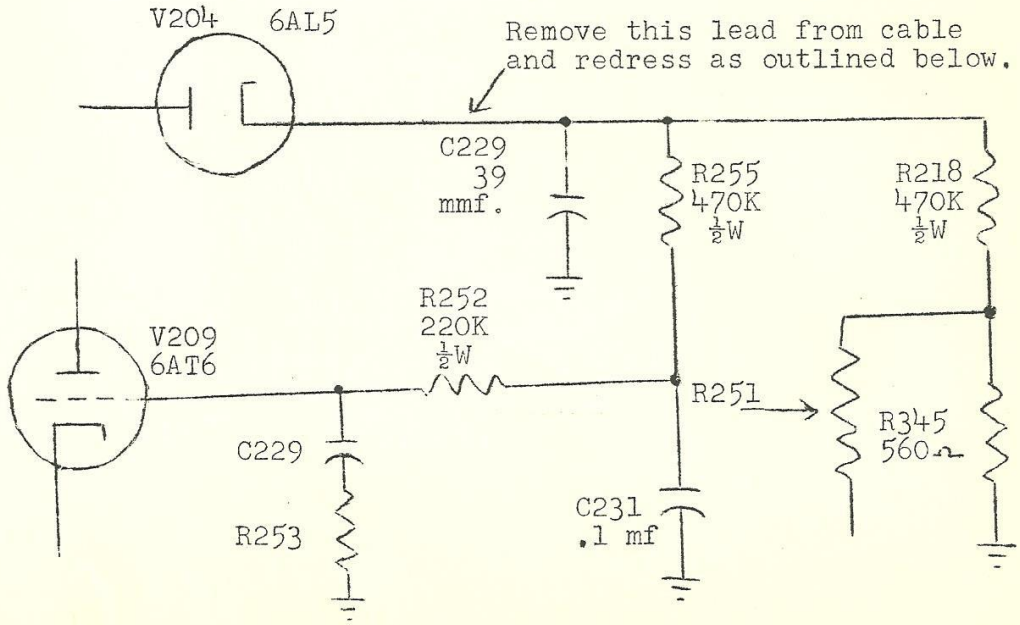
3. Capacitor C224 is changed from .1 200V ± 25% to .5 400V ± 25%. The part number of the new capacitor is 03014260.

4. Capacitor C224 is connected between pin #11 of the CRT and the junction of R235 and C220A.

5. Resistor R347 470 ohms 1 W 10% (part #02034730 alternate part #02044730) is connected in series between R232 and R321.

AGC CHANGES

Very humid weather normally encountered in the summer months has been the cause of considerable difficulty with the AGC circuit as used in the early RA-105 Telesets. The condition that is normally encountered was a fading of both picture and sound. When the serviceman checks the set he usually finds that all components are normal and is at a loss to determine the reason for the faulty operation of the receiver. Where this trouble is encountered it is recommended that the following changes in the AGC circuit be made. These changes have been included in production on all of the sets made after March, 1949. 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. The list of changes follow:



The list of changes follow:

R218 was changed from a 1.2 meg. resistor to 470K, ½W, part number 02032090. It was disconnected from the junction of R252, R255 and C296 and connected to the junction of R345 and R251.

R252 has been changed from a 1.2 meg. resistor to 220K, ½W, part number 02032050.

R255 and C231 are no longer used.

R345 is changed from a 390 ohm resistor to a 560 ohm ½ watt resistor, part number 02031740.

A 470K, ½ watt resistor, part number 02032090 between pin #5 of V204 and the junction of R252 and C231 was added.

A 39 mmfd. 500 volt ceramic capacitor, part number 03017030 from pin #5 of V204 to ground was added.

C231 was changed from a .005 mfd. capacitor to a .1 mfd. 200 volt capacitor, part number 03013910.

In addition to the above changes the blue lead that runs through the cable from pin #5 of the 6AL5 (V204) to V209 (AGC circuit) should be removed from the cable. This lead should be run as short as possible. A simple method of dressing this is to go through a hole in the RF shield (this shield is the one on which the traps are mounted) to the 6AT6 circuit.

ADDITION OF ADJACENT CHANNEL VIDEO TRAP

In certain areas where television signals are received on two adjacent channels (such as half way between two cities having television stations) adjacent channel video interference has been observed on RA-105 and RA-106 Telesets. When tuned to the lower frequency channel of two such adjacent channels, interference is usually seen as horizontal sync running back and forth through the desired signal.

This may be corrected in the field by the addition of a series-parallel resonant trap in the third video IF amplifier as illustrated in Fig. 1. (Note: the latest RA-105 and RA-106 Telesets include this trap).

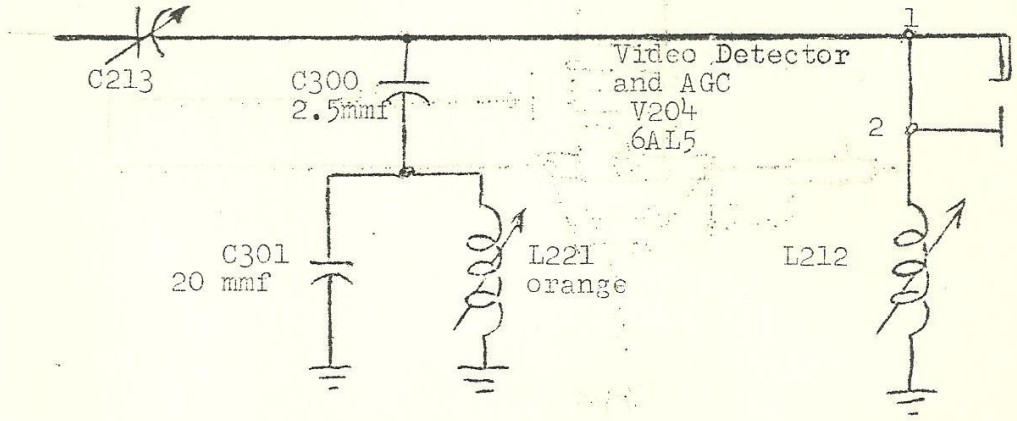


Figure 1

This trap will be tuned to 20.4 mc. This 20.4 mc is obtained when the local oscillator beats with the video carrier of the channel above the desired channel. Consider a location where both channel #5 and channel #6 can be received. With the Teleset tuned to channel #5, 76-82 mc, the local oscillator is tuned to 77.25 mc (video carrier of channel #5) plus 26.4 mc or 103.65 mc. The local oscillator signal also beats with the video carrier of channel #6 (83.25 mc) and produces a frequency equal to the difference between 103.65 mc and 83.25 mc which is 20.4 mc.

The parts used follow:

C300	03002720	Cap Ce 2.5 mmfd ± .5 mmfd 500V
C301	03013800	Cap Ce 20 mmfd ± 5% 500V
L221	21003971	Variable Inductance

Trap Assembly:

Connect the 2.5 uuf capacitor to the lug to which the end of the winding closest the lug is soldered, leaving ⅛" of wire between the body of the capacitor and the lug.

Connect a 2½" length of #18 bare-tinned copper wire to the other lug of the inductor. Connect the 20 uuf capacitor across both of the lugs of the inductor. See Fig. 2.

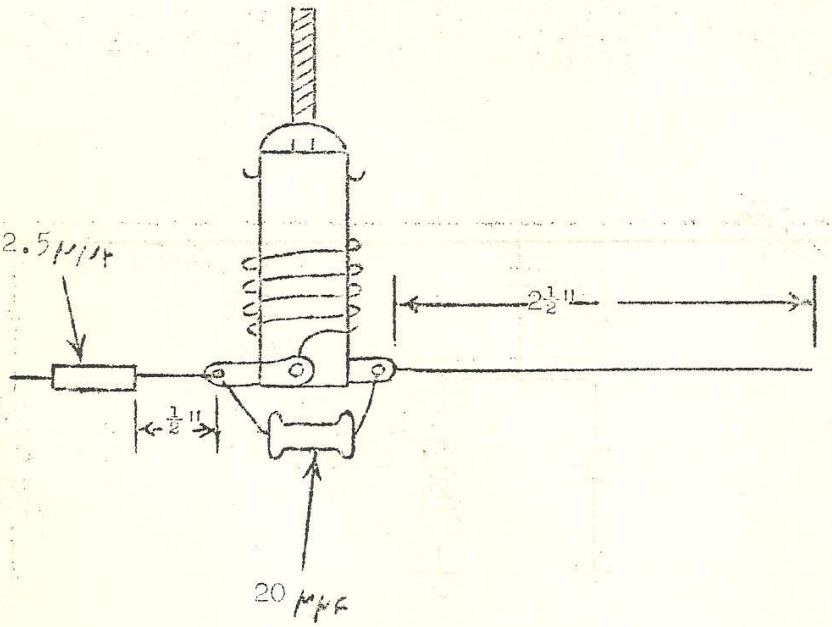


Figure 2

Installation:

Carefully enlarge the "keyhole", to 13/32 diameter, in the video IF amplifier shield plate using a Parker-Kalon Metal Punch XI. See Fig. 3.

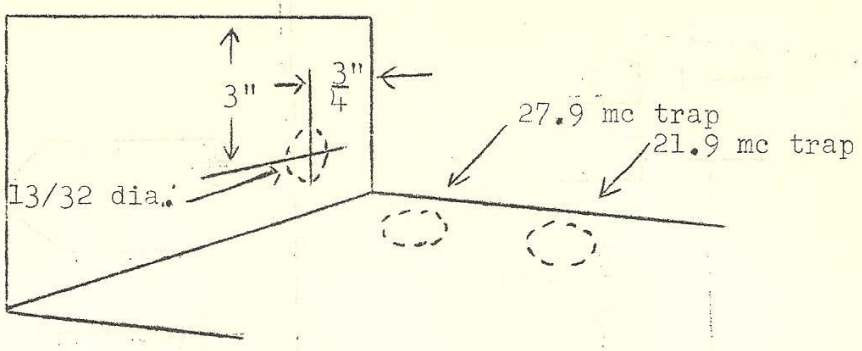


Figure 3

Use extreme caution when punching this hole so that alignment will not be disturbed.

Insert the trap assembly in the hole so that the lugs are parallel to the main chassis and with the bare wire away from the main chassis. Solder the bare-tinned wire to the ground lug directly beneath on the main chassis. Solder the free end of the 2.5 uuf capacitor to the junction of L212, C213, and Pins 1 and 2 of V204.

Tuning Procedure:

The trap may be tuned using a signal generator or by utilizing the interfering station.

A. Setting the trap by signal generator:

Turn the contrast control to the extreme right. Connect a signal generator, 30% modulated at a carrier frequency of 20.4 mc to pin 1 (grid) of V201 and chassis. Connect an oscillograph between pin 4 (grid) of V205 and ground. Adjust coil for minimum deflection of the oscillograph.

B. Setting trap using two adjacent stations:

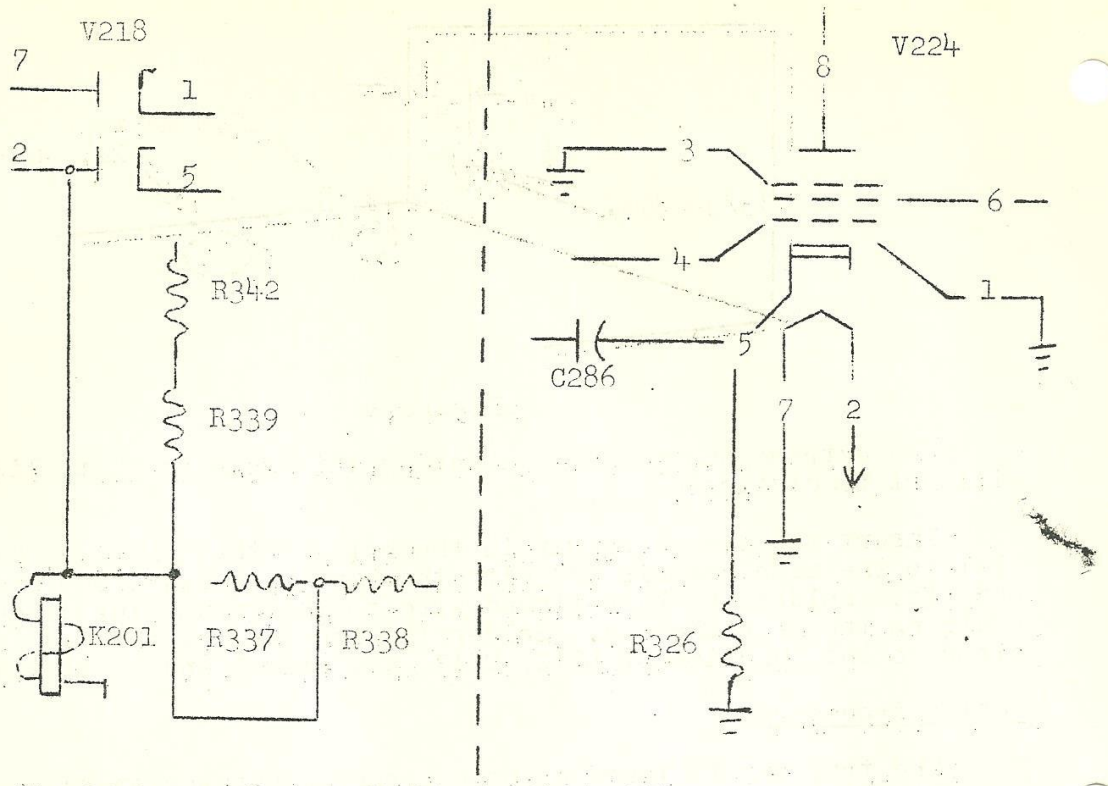
Tune receiver to sound of lower channel. Adjust contrast and watch for the interference. Tune trap from maximum inductance toward minimum inductance until the interference disappears. Rock trap tuning back and forth to be certain that trap is correctly set.

RA-105, RA-106 Main Chassis

Circuit Change to Eliminate "Hook"

The following changes were made to eliminate the horizontal displacement or "hook" in the top of the picture.

The changes are indicated in the following schematic:



The list of changes follow:

1. R327, 150 ohms connected from R326 to ground is deleted and R326 is connected to ground.

2. C289, the 25 mfd 25V capacitor connected from the junction of V224 and R326 to ground is deleted.

3. The connection from pin 2 of V218 to ground is removed.

4. Pin 2 of V218 is connected to the junction of K201, R339, R338, and R337.

5. Pin 3 of V224 is connected to pin 1 of V224.

6. R299 is disconnected from pin 2 of V218 and reconnected to pin 1 of V219, which is at ground potential.

CAPACITOR CHANGE

Capacitor C213 (1 - 3.5 mmfd. 500V) was changed to 2.6 mmfd. ± 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 item is 03016891.

RA-105 POWER SUPPLY

Change	Reason
In the Colony Telesets using the new audio amplifier, the main fuse F401 is rated at 5 amp. 250V instead of 4 amp. 250V. The part number of this fuse is 11000810.	This increase in fuse rating was necessary because of the power requirements of the new amplifier.
C414 is changed from a 47 mmf 5Kv capacitor to a 22 mmf 5Kv capacitor. The new part is identified as follows: 03016670 Cap. Co. 22mmf ± 20% 5Kv.	This change will cause an increase of about 1Kv in the accelerating voltage for the CRT.

The value of 22 mmf was used on a small quantity of Telesets. It was necessary to change back to the 47 mmf in order to obtain adequate horizontal size.

R413 changed on later models.

The taps were formerly at 6.5K and 7.5K. On the new resistor the taps are now at 5.5K and 7.5K. This new resistor is described as follows:

R413 02018981 8.5K ohms 25 W ± 5% fixed, tapped.

The wattage rating of the horizontal drive control R405 was changed from ½W to 2W. The new part is completely described as follows:

R405 01018500 Res. V. C. 25K 2W ± 20%

RA-106 POWER SUPPLY CHANGE

A ½ amp fuse, (Part #11001100) is being added in series with L702 at the junction of R724, C714 and the primary of T701.

The 4 amp fuse F701 was changed to a 5 amp. fuse. The new fuse is described as follows:

F701 11000810 Cartridge fuse 5 amp 250V

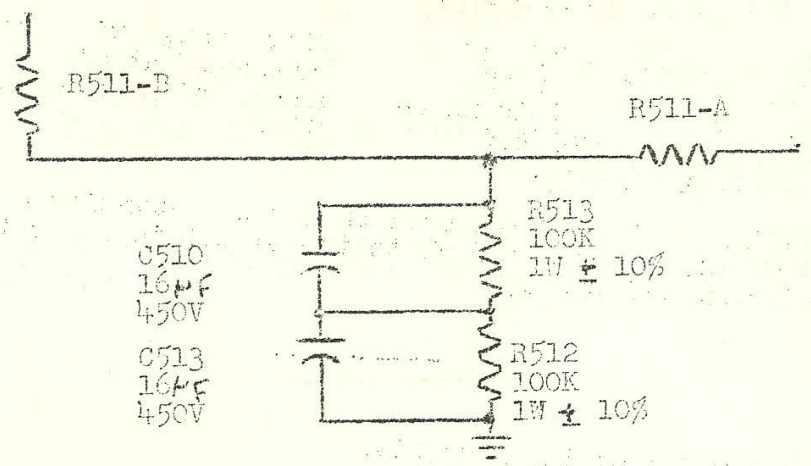
The increase in fuse rating was made to prevent accidental fuse burnout.

INPUTUNER CHANGES

The screen by-pass condenser on the 6AK5 mixer C110 was changed to 5000 mmfd min. The purpose of this change is to improve the strong signal handling capabilities. This applies to the RA-103, RA-105 and RA-106 as the inputuner's are the same on all these units. The new capacitor is described as follows: 03016760 F Co 5000 mmfd min 600 V.

RA-105 AM Tuner Change

In the latest models of the AM Tuner C510 has been changed from 8 mfd 450V to 16 mfd 450V. In addition the filter has been changed, and as shown in the following sketch, by adding C513, R513 and R512.



The description of these new parts follow:

C510, C513	03002050	Cap E 16 mfd 450V
R512, R513	02045010	Res F. C 100K 10% 1W

EXTENSION CABLES FOR RA-105 and RA-106

Extension cables designed to allow the Main Chassis or Power Supply Chassis of the RA-105 or RA-106 Teleset 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. This length will permit the serviceman to work on the chassis in front of the Teleset and view the action on the face of the CRT while making any checks.

The description of these cables follows:

Part Number	Where Used	List Price
34001281	Between CRT base and Main Chassis (J206)	$2.70
50014161	Between Yoke Focus Assembly (P604) and Main Chassis (J204)	3.42
50014171	Between Main Chassis (P201) and Power Supply (J401) on RA-105 Between Main Chassis (P201) and Power Supply (J702) on RA-106	2.70
50014180	Between Main Chassis (P202) and Power Supply (J402) on RA-105 Between Main Chassis (P202) and Power Supply (J701) on RA-106	3.42

When servicing the AM 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 appearance 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. In the first supply of cables sold, this cable was identified by a ring of red paint on the male plug. This cable is now identified by a red tracer running through the entire length of the cord.

A complete set consists of the 4 cables and will permit the 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".

ERRATA SHEET FOR THE RA-105 SERVICE MANUAL

Several errors in the RA-105 Service Manual have been brought to our attention. The corrections for these errors follow:

On page 48 under "Miscellaneous Parts List RA-105" the following part numbers with the descriptions should be deleted:

45000211 Assembly Vernier Dial
45000221 Assembly Main Dial
45000221 Pointer Dial

In their place show:

45000242 Dial Inputuner

On Receiver Main Chassis schematic (for serial numbers 8,500,001 -- 8,501,000).

1. Connect pin #6 of V201 to junction of C204 and R205.

2. The resistor in the cathode circuit of V224 identified as R376 should be identified as R326.

On page 43 step #9 of the Video IF Alignment table, in the column headed "Connect Generator Leads Across" add an asterisk as shown below:

Pin 1 (grid)*
V102 and chassis

In step #3 of the Sound IF alignment table in the column headed "Connect Generator Leads Across" delete the asterisk.

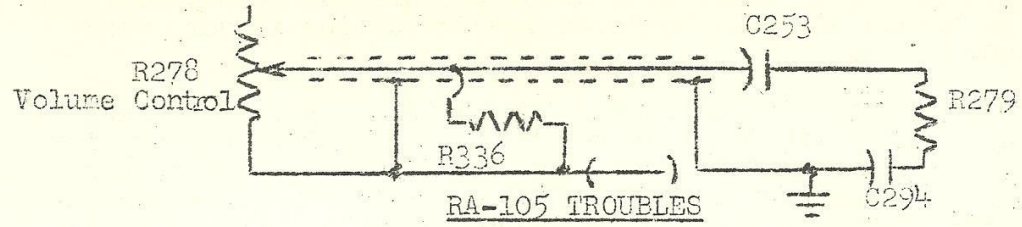
On page 38, trouble #3 under "Picture Section", the wording "Defective CRT. (Grid-cathode shorted)" should be changed to read "Defective CRT. Cathode-filament short)".

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

On the Main Chassis diagram dated Nov. 15, 1948, the voltage measurement for pin #2 V220 should be 135 volts instead of 13.5 volts.

The schematic of the Main Chassis (dated Nov. 15, 1948) should be corrected as shown in the following sketch:

(The error is in the volume control circuit, where R336 is shown shorted out and the "hot" wire of the shielded lead is shown grounded. The sketch shows the correct connections).



RA-105 TROUBLES

Investigation into complaints that the face of the CRT on the RA-105 Telesets were getting dirty disclosed the following:

The CRT assembly was not positioned far enough forward in the cabinet. This allowed a space to exist between the safety glass and the CRT assembly thus permitting dust and dirt to seep in and accumulate on the face of the CRT.

It is possible that in shipment, the CRT assembly may shift; the serviceman should therefore, be sure that the CRT assembly is completely forward so that the front of the assembly is up against the safety glass.

If, with the CRT assembly pushed all the way forward, the face of the assembly does not fit up against the safety glass, please get in touch with us so that the necessary steps can be taken to correct the condition.

Also, if any RA-105's are found wherein the tube assembly is completely forward, yet the face of the tube still gets dirty within a short time, please advise us stating all the details.

RA-105 AGC Control

A defective 6AT6 in the AGC amplifier position 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 should be replaced and the AGC readjusted as described on page 22 of the Service Manual.

It is also possible that an accidental change in the AGC setting during shipment might result in low sensitivity, necessitating re-adjustment of the control.

AGC Adjustments

It is possible to adjust the AGC control using the "meter" method without removing the main chassis from the cabinet.

This can be accomplished by removing either the first or second Video IF tube V201 or V202, and inserting a sharp pointed test prod into pin #1 of the tube socket involved. (Remember that when viewing the tube socket from the top, the pins are counted in a counter-clockwise direction). Once the meter connection is made, the procedure is the same as outlined on page 22 of the Service Manual under the heading "Procedure for Adjustment in the Shop".

Breakdown of C113 in Inputuner

One of the most common troubles in the RA-103 and RA-105 Telesets has been the breakdown of the subject capacitor. The indication of this defect would be loss of picture and sound. In some cases, the breakdown would be incomplete resulting in very weak picture and sound.

The reason for this defect was traced to a particular manufacturers capacitor which is no longer being used. For the past few months all Telesets manufactured contain only the manufacturers capacitor found to be satisfactory. A ll field replacement capacitors issued from our Spare Parts Stores are the approved capacitors.

Any breakdowns of this capacitor in new Telesets or breakdowns of our replacement capacitors should be brought to our attention.

RA-105, RA-106 PUSH PULL AUDIO AMPLIFIER

All RA-105 Colony Telesets beginning with serial #8,535,000 include a push pull audio amplifier chassis. This is used instead of the 6V6 audio amplifier stage used in previous models. This new amplifier has a rated output of 8 watts. Because of the increased power and high fidelity the speaker used with these Colony Telesets are different from the speaker previously used. The part number of this new assembly is #18002801. A schematic diagram for this amplifier with its associated parts list is available upon request.

The audio amplifier is connected to the main chassis through an interconnecting cable. The plug in this cable is inserted into the 6V6 audio output tube socket on the main chassis, as this stage is not used with the new amplifier. The B+ power for the 6SN7 is obtained from the main chassis. A self contained power supply is used to operate the 6V6 push pull tubes.

This new amplifier is also used in the RA-106 Manchu Teleset. However, in the Manchu the chassis is mounted in such a position that the tubes are horizontal. This necessitates the use of a 5W4 rectifier tube instead of 5Y3G to prevent the possibility of a plate to filament short.

Addition of Push Pull Audio Amplifier to Colony Telesets

The Colony Telesets that were manufactured before the new Push Pull Audio Amplifier was added may be modified very easily to include this new amplifier.

The parts necessary to make this change follow:

Item	Part Number	Cost to Dealers and Service Org.
Audio Amplifier	89001401	$25.00
Speaker Assembly	18002801	8.10

Procedure For Making Modifications

1. Replace the old speaker with the new speaker assembly #18002801. This speaker is rated at 8 watts compared to the 3 watt rating of the old speaker. In addition, the new speaker is a higher fidelity unit.

2. Remove the main chassis and connect pin #1 of V216 (6V6 Audio output) to ground.

3. Replace the main chassis and remove V216. (This tube is not used with the added amplifier).

4. Plug the cable from the audio amplifier into the socket formerly occupied by V216.

5. The amplifier may be placed on the bottom of the cabinet at the rear of the speaker.

DEFECTIVE VERTICAL BLOCKING OSCILLATOR TRANSFORMERS

Important

As a result of numerous reports from the field, we have found it desirable to impregnate the vertical blocking oscillator transformer to prevent failure of this component usually caused by very humid weather. The opening of the primary results in loss of vertical synch.

The impregnated transformers, readily identified by a black wax coating on the outside, should be used whenever it becomes necessary to make a replacement.

We will accept for credit any unused unimpregnated vertical blocking oscillator transformers. Impregnated transformers may be purchased from our Spare Parts Department.