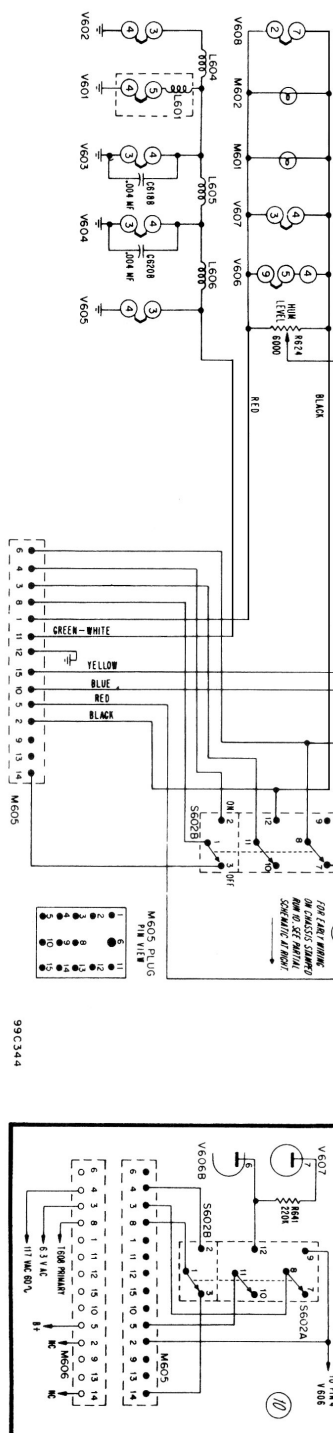
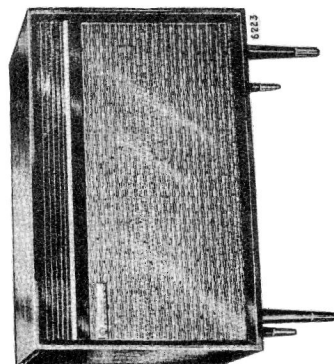




RUN CHANGES

- 10 Start of production 8H1
- 11 S602A wiring changed to eliminate B+ switching to stop switching noise
- 12 R629 was 47 K, R630 was 4.7 K, C630 was .001 mF, C631 was .03 mF, Changes made to increase bass response

8H1 FM-AM TUNER and 4S2 HI-FI AMPLIFIER



SPECIFICATIONS

FREQUENCY RESPONSE:

AMPLIFIER—Amplifier section flat from 50 to 20,000 cycles within 1 db at 10 watts output.

PRE-AMPLIFIER—At 1 watt level, Bass control gives 31 db change at 100 cycles and Treble control gives 26 db change at 10,000 cycles.

DISTORTION—3% at 12 watts.

POWER OUTPUT—17 watts maximum.

POWER CONSUMPTION—100 watts.

POWER SUPPLY—117 volts AC, 60 cycle only.

SPEAKER SYSTEM—Woofers, 12" PM; Mid-range, 5 1/4" PM; Mid-range, 4" PM; Tweeter, 3 1/2" PM.

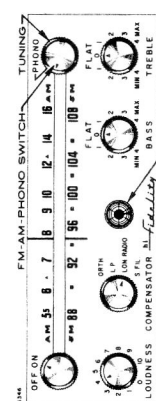


Figure 1. Operating Controls.

392	Mahogany	7N1	RC
393	Blond	4S2	637-8

TROUBLE SHOOTING HINTS

Tube locations for the tuner and amplifier are shown on figures 6 and 7. Alignment points for the tuner are shown on figure 6.

Tubes may be reached from rear of cabinet for servicing purposes.

B+ voltages and filament voltages for tuner are furnished by power supply on amplifier chassis.

By placing a jumper wire between lugs 4 and 8 of M606, the amplifier may be serviced separately. NOTE: When amplifier is serviced separately, voltage readings will be higher due to the reduced load on the power supply.

Tuning Eye tube is mounted vertically on front of chassis. To remove tube, grasp at base and work downward, out of its clip, until it is free.

HUM LEVEL: Excessive hum can often be minimized by reversing line cord plug in wall outlet. Move **Rej-On-Off** pointer to "ON". Touch record changer centerpost and note hum level. Reverse line cord in wall outlet; touch centerpost again and again note hum level. Leave line cord in position giving least hum.

A **Hum Level** control is located on the tuner chassis, see figure 6. Hum may be further reduced, if necessary, by adjusting this control.

RECORD CHANGER SERVICING

If it becomes necessary to remove record changer from its mounting board, remove the three large washer-head screws extending through bottom of the mounting board. With these screws removed, the three springs which "float" the record changer may be loose. Lift record changer from the mounting board, being careful to retain mounting screws for installation.

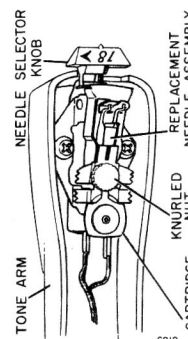


Figure 3. Needle Replacement.

NEEDLE REPLACEMENT

A worn needle causes "scratch" and a harshness of high tones in the output. Damage to records may be caused by worn needles.

To replace needle assembly, refer to figure 3 and loosen the knurled nut that is located under the cartridge. Slip the worn needle assembly out and insert the new needle assembly in the exact same position. Tighten the knurled nut.

AMPLIFIER CHECKS			
CONTROL SETTINGS FOR AMPLIFIER CHECKS		Fully Clockwise	
Loudness Control			
Bass Control			
Treble Control			
AMPLIFICATION CHECK			
AUDIO GENERATOR OUTPUT	Frequency	Volts In	
	1000 Cycles	0.34 Volts	
AMPLIFIER OUTPUT	Volts <td colspan="2">Watts</td>	Watts	
	5.6 Volts	10 Watts	
FREQUENCY RESPONSE CHECK			
AUDIO GENERATOR OUTPUT	Frequency	Volts In	
	In steps between 50 and 20,000 Cycles	0.34 Volts	
AMPLIFIER OUTPUT	Volts <td colspan="2">Db</td>	Db	
	5.6 Volts	±1 Db	

AMPLIFICATION AND RESPONSE CHECK

The amplifier may be checked for gain and frequency response by using the tests outlined below.

TEST EQUIPMENT:

Audio Oscillator, preferably with flat output from 50 cycles to 20 kilocycles.
Vacuum Tube Voltmeter, preferably with decibel scale.

PROCEDURE: Disconnect phono power plug (M611). Disconnect phono output plug (M608) from socket (M603) on tuner chassis. The oscillator signal is to be injected into socket (M603) on tuner chassis. This enables the checking of the preamplifier and amplifier for amplification and frequency response. Measurements taken with **FM-AM-Phono** switch in "PHONO" position.

Connect audio oscillator ground to chassis. Connect signal lead to phono input (M603). Allow several minutes warm-up for oscillator and amplifier. Set **Loudness, Bass, and Treble** controls as shown in "AMPLIFIER CHECKS" table.

To check amplification, adjust audio oscillator output to 0.34 volts at 1,000 cycles, measured from M603 to ground with a vacuum tube voltmeter. Connect a 32 ohm resistive load across secondary of T609 (audio output transformer). Measure output voltages across the load.

To check frequency response, set "**Compensator**" control to "LON RADIO" and adjust oscillator output to 0.34 volts. Change oscillator frequency in steps between 50 cycles and 20,000 cycles. Readjust oscillator output to 0.34 volts each time a new setting is made.

Compare amplifier output voltage with readings given in "AMPLIFIER CHECKS" table.

HI-FI FM-AM CONSOLE
PHONOGRAPH

MODEL	COLOR	CHASSIS	RECORD CHANGER
402	Mahogany	8H1	RC
403	Blond	and	637-2
404	Sierra	4S2	

CHASSIS REMOVAL

To remove amplifier chassis from cabinet:

1. Disconnect line cord from power source.
2. Disconnect record changer power plug (M611), speaker plug (M615), tuner audio output plug (M604), and power input plug (M606) from tuner chassis.
3. Remove screws that hold chassis to cabinet.

To remove FM-AM tuner from cabinet:

1. Remove control knobs from tuner front panel and phono output plug (M608) from tuner chassis.
2. Disconnect FM antenna from terminal board and remove terminal board from cabinet.
3. Support tuner from bottom and remove 4 hex nuts and lock washers that hold tuner chassis to cabinet. Carefully remove tuner chassis from cabinet.

To remove FM RF tuner sub-chassis:

1. Remove four screws that hold sub-chassis and disconnect wires from antenna terminals.
2. Disconnect cable from pin 8 on S601.
3. Lift sub-chassis up for servicing. DO NOT disconnect FM tuner dial cord.

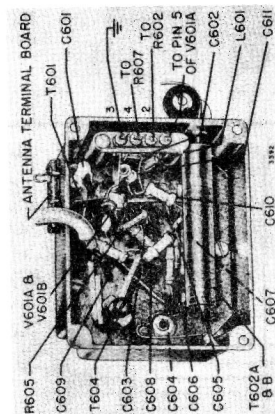


Figure 2. Bottom View of FM Tuner Sub-chassis. Location of components shown.

FM IF AND RF ALIGNMENT PROCEDURE USING VTVM AND AM SIGNAL GENERATOR			
NOTE: For FM alignment, use a signal generator that has crystal calibration. Signal generator settings are critical for FM alignment.			
- Turn receiver and amplifier on and allow 15 minutes warm-up. - Set Volume control at minimum, Bass and Treble at mid-rotation. - Rotate Selector switch to FM position. - Use DC VTVM as output indicator. Set generator output so that indication on VTVM is 1 volt above noise level for maximum adjustments.			
STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	RECEIVER GANG SETTING
Connect DC VTVM from "5" to ground. Voltage reading will be negative.			
1	To FM antenna terminals on FM RF sub-chassis.	10.7 MC	Fully open
Disconnect VTVM and connect between point "R" and ground.			
2	Same as "STEP 1".	10.7 MC	Fully open
Disconnect VTVM and connect between point "5" and ground. If "Adjustment" for step 2 was in great error, readjust "A", "B", "C", "D" and "E".			
3	Same as "STEP 1". Insert a 150 ohm resistor in series with each lead.	109 MC	*Fully open
4	Same as "STEP 3".	108.4 MC	Fully open
5	Same as "STEP 3".	96 MC	Tune in on generator signal
Remove signal generator and VTVM. Insert tuner into cabinet and check tracking between dial pointer and scale. It is possible to adjust RF trimmer "H" on a false peak. RF trimmer "H" may have to be readjusted if tuner is not tracked properly.			
*Loosen Phillips screw that is located on tuning gang shaft. See figure 5. Loosen FM tuner string until it is slack. Perform instruction listed under "Adjustment". Remove slack in FM tuner string by rotating the washer, to which it is attached, clockwise when viewed from front of chassis. Tighten screw.			
**FM tuner should be calibrated to 108.4 mc. If tension adjustment on FM tuner string is incorrect, loosen Phillips screw and change tension slightly until 108.4 MC is being received strongest. Tighten screw.			
***When receiver is tuned on 96 MC, the dial pointer will be positioned at approximately mid-band (center point of dial pointer travel). Perform instructions under "Adjustment".			

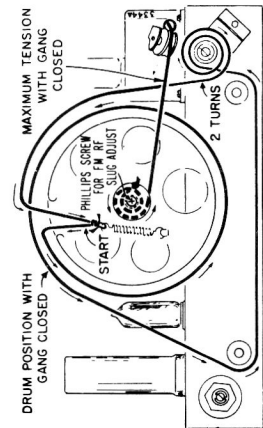


Figure 4. Dial Stringing (Early Production).

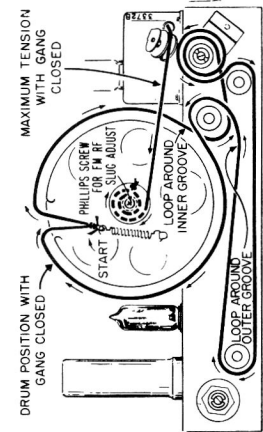


Figure 5. Dial Stringing (Present Production).

AM IF AND RF ALIGNMENT PROCEDURE			
- Turn receiver and amplifier on and allow 15 minutes warm-up. - Set Volume control at maximum, Bass and Treble controls at mid-rotation. - Rotate Selector switch to AM position. - Connect output meter across speaker voice coil.			
Use 400 or 1000 cps modulation for alignment. Use lowest setting of signal generator capable of producing adequate indication on lowest scale of output meter. Use a non-metallic alignment tool with tip 3/32" wide for IF transformer adjustments. Repeat adjustments to insure good results.			
STEP	GENERATOR CONNECTION	GENERATOR FREQUENCY	RECEIVER GANG SETTING
1	To stator plates, antenna section of gang tuning capacitor.	455 KC	Fully open
2	Same as "STEP 1".	1620 KC	Fully open
3	Radiated signal. Loop of several turns of wire or place generator lead close to receiver for signal pickup.	1400 KC	Tune in on generator signal
*Adjustments "K" and "M" are made from bottom of chassis.			

VOLTAGE DATA

Voltages shown on schematic diagram.

- All measurements, except some filament voltages, are taken with respect to chassis ground.
- Measured on 117 volts AC, 60 cycle line.

DIAL STRINGING

To accomplish dial stringing, remove the dial background bracket and string the dial in

POINTER SETTING

accordance with figure 4 or 5, whichever is proper.

Set tuning gang fully open. With dial background bracket removed, place pointer carriage on top edge of pointer glide frame. Slide dial pointer to right until it is positioned at right edge of pointer glide frame. Place dial string in pointer carriage and fasten securely.

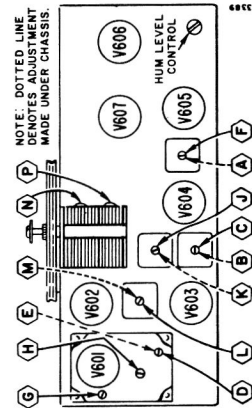


Figure 6. Top View of Tuner Chassis. Tube locations and alignment points shown.

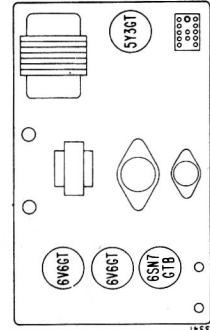
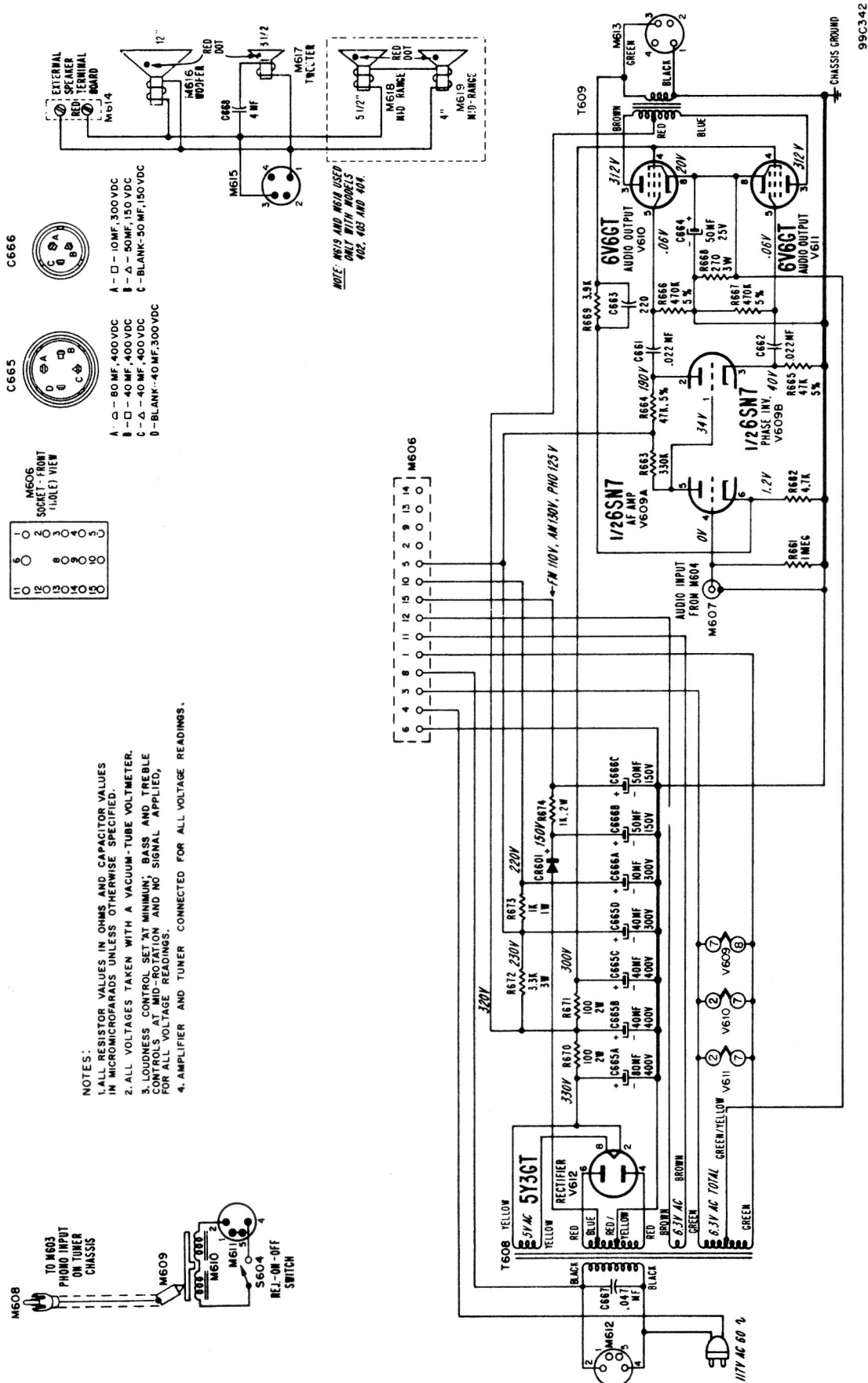


Figure 7. Top View of Amplifier Chassis. Tube locations shown.



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