

To Remove the Chassis: Follow the procedure outlined above under "To Replace Tubes", and then proceed as follows:

Disconnect the audio input plug (M1), the record changer motor plug (M5) and the audio output plug (M8) from the chassis. Remove the four knobs from the controls on the chassis. Remove the four screws that mount the chassis and carefully lift the chassis from the cabinet.

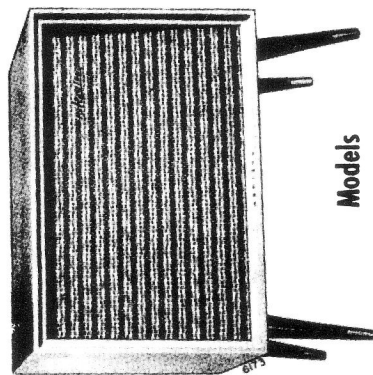
To Remove the Record Changer: Follow the procedure outlined under "To Replace Tubes", and then proceed as follows:

Disconnect the audio input plug (M1) and the record changer motor plug (M5) from the chassis. Remove the three washer-head screws that mount the record changer while holding the record changer in place. Remove the record changer by lifting it free from the cabinet.

Service Note: The **Rej-On-Off** switch (S1) on the record changer operates both amplifier and record changer motor. To operate the amplifier and measure voltages with the record changer disconnected, a short, temporary jumper wire must be connected between the brown and orange leads on socket (M6). See schematic.

Amplifier voltage readings may also be taken by connecting the record changer motor plug (M5) to the socket (M6) on the chassis. Unclamp the **Tone Arm** from the tone arm rest and move the **Rej-On-Off** switch to the "On" position.

Set **Volume** control for minimum, **Comp** control to "Lon" and the **Tone** controls to their "0" position. Do not play record while taking readings.



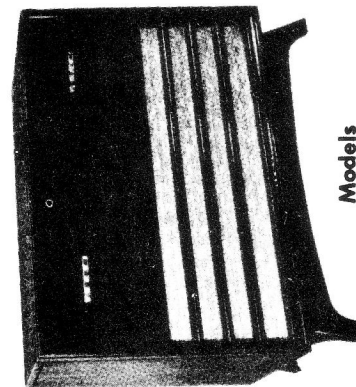
Models

HC4405X — HC4406X — HC4407X

CHASSIS 6R2AX

HIGH FIDELITY PHONOGRAPH

MODEL	COLOR	CHASSIS
HC4405X	Walnut	6R2AX
HC4406X	Mahogany	
HC4407X	Blond	
HC4415X	Walnut	6R2AXT
HC4416X	Mahogany	
HC4417X	Blond	



Models

HC4415X, HC4416X, HC4417X

TROUBLE SHOOTING HINTS

If the phonograph sounds weak or distorted, examine the needles for wear. A worn needle may cause excessive needle scratch and a harshness of treble tones. Test the tubes and, if possible, the cartridge by substitution. Check voltage (see "Service Note") at tube pins.

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

Test Equipment Specifications:

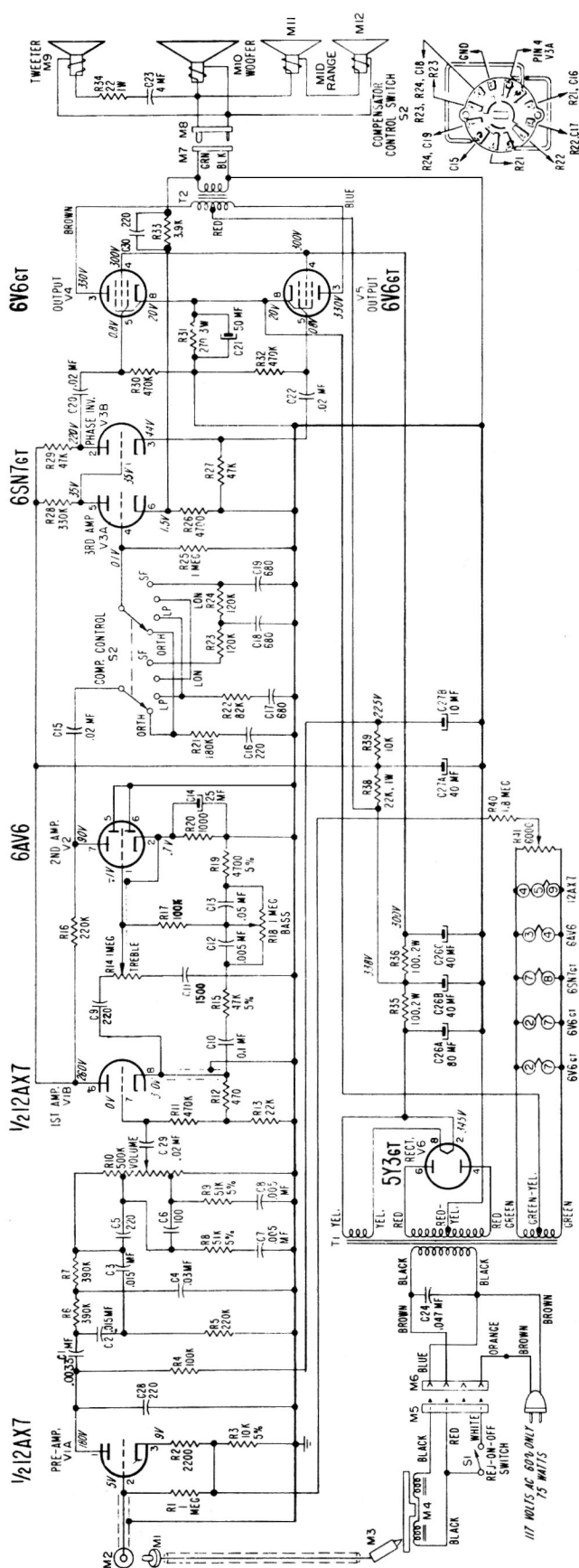
Audio Oscillator, preferably with flat output from 30 cycles to 30 kilocycles.

Vacuum Tube Voltmeter, preferably with decibel scale. Procedure: Connect record changer motor plug and speaker plug to their sockets on chassis. Disconnect audio input plug from socket on chassis. Unclamp **Tone Arm** from tone arm rest and move **Rej-On-Off** switch to "ON" position. (If record changer goes into change cycle and shuts off, move the switch to the "On" position again.)

Connect audio oscillator ground lead to the amplifier chassis. Connect audio oscillator signal lead to R1 on (M2), audio input socket on chassis. Allow several minutes for oscillator and amplifier to warm up. Set **Comp** control to the "Lon" position. Set the tone controls to their "0" position.

Adjust audio oscillator output to .2 volt at 1,000 cycles, measured with the vacuum tube voltmeter from socket (M2) to chassis ground. (This voltage calibration must be made every time a response check at a new frequency setting is to be made.) Measure output across voice coil leads from output transformer with speakers connected or with proper (3.2 ohm) load.

AMPLIFICATION CHECK	"COMP" CONTROL SETTING	VOLUME CONTROL SETTING	TONE CONTROL SETTINGS	INPUT		OUTPUT	
				Frequency	Volts	Volts	Watts
FREQUENCY RESPONSE CHECK	"LON" Position	Fully Clockwise	Mid Rotation	1000 Cycles	0.25 Volts	4.5 Volts	6.5 Watts
	"LON" Position	Fully Clockwise	Mid Rotation	In steps between 20 and 30,000 Cycles	0.1 Volts	Volts	Db 2 Volts ± 2 Db



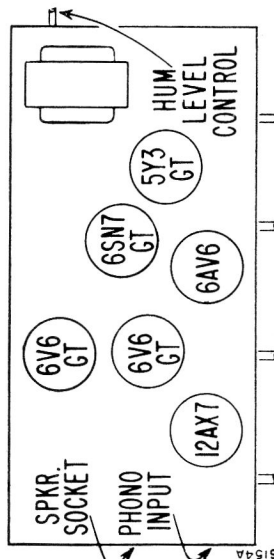
TUBE AND COMPONENT REPLACEMENT

To Replace Tubes: The vented back of the bass reflex sound chamber is removable to provide access to the speakers, tubes and amplifier chassis. To check the tubes, the cabinet back must be removed. Proceed as follows:

Remove the line cord plug from the wall outlet. Clamp the **Tone Arm** to the tone arm rest. Remove the cabinet back mounting screws and cabinet back. All tubes are now accessible. Note: The cabinet back must be reinstalled to realize full benefit of the bass reflex sound chamber.

VOLTAGE DATA

- All readings made between tube socket terminals and chassis ground.
- Volume control set at minimum.
- Measured on 117 Volts AC, 60 cycle line.
- All voltages measured with vacuum tube voltmeter.
- Tone controls set at mid rotation.



TUBE LOCATIONS

The amplifier uses one 12AX7, one 6AV6, one 6SN7GT, one 5Y3GT and two 6V6GT tubes. To insure balanced output from the push-pull output stage, it is suggested that the 6V6GT tubes be replaced in pairs.

HUM LEVEL ADJUSTMENT

Turn the set on by sliding the **Rej-On-Off** switch on the record changer to the "On" position. Set the **COMP** control to the "Lon" position. Set **Bass** and **Treble** controls to their "Max" (fully clockwise) position. Set **Volume** control to a position where hum is noticeable.

SPECIFICATIONS

FREQUENCY RESPONSE — Amplifier section flat from 30 cycles to 30,000 cycles within 2 decibels at 10 watts output. Preamp section has a ± 5 db bass control at 40 cycles. ± 13 db treble control at 10,000 cycles.

HARMONIC DISTORTION — Less than 2% at maximum output.

POWER CONSUMPTION — 110 Watts.

POWER SUPPLY — 117 Volts AC, 60 Cycle Only (Phonograph can be converted for 50 cycle operation. See "Record Changer Parts", "Kit, 50 Cycle Conversion".)

RECORD CHANGER — RC-646, RC646-1, RC646X4

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