

NOTE
Switches shown for all buttons in out position. When buttons are pushed in, switches move as shown by arrows.



IMPORTANT:

1. The loop must be connected to the receiver at all times.
2. Push in button marked "Radio."
3. Connect an output meter to the receiver. Connect the ground lead of the signal generator to the receiver chassis.
4. With gang condenser in full mesh, set the dial pointer so that its position is horizontal.
5. Turn the volume control to maximum and keep it in this position throughout the alignment procedure.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Gen. Output to Receiver	Sig. Gen. Frequency	Band Switch Position	Receiver Dial Setting	Trimmer No.	Trimmer Description
.1 MFD. Condenser	Solder Lug on Rear of Section of Gang Condenser	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.
No Connection	Disconnect Signal Generator Leads from Set and Place Near Loop	16 MC	Foreign	16 MC	5	Foreign Oscillator
No Connection	Disconnect Signal Generator Leads from Set and Place Near Loop	16 MC	Foreign	16 MC. Gen. Signal	6	Foreign Antenna
200 MMFD. Mica Condenser	Antenna Terminal on Loop	1500 KC	Broadcast	1500 KC	7	Broadcast Oscillator (Shunt)
200 MMFD. Mica Condenser	Antenna Terminal on Loop	1500 KC	Broadcast	Tune to 1500 KC Gen. Signal	8	Broadcast Antenna
200 MMFD. Mica Condenser	Antenna Terminal on Loop	600 KC	Broadcast	Tune to 600 KC Gen. Signal	9	Broadcast Oscillator Series Podder

Type of Adjustment

Adjust for maximum output. Then repeat adjustment.

Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear, re-align at 16 MC with trimmer screw farther out.

Adjust for maximum output. Try to increase output by de-tuning trimmer and re-tuning receiver dial.

Adjust for maximum output.

Place loop antenna in same position relative to chassis as it occupies when in cabinet. Adjust for maximum output.

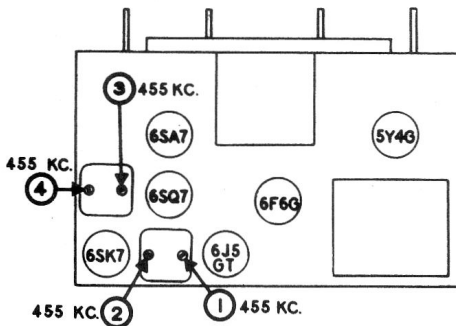
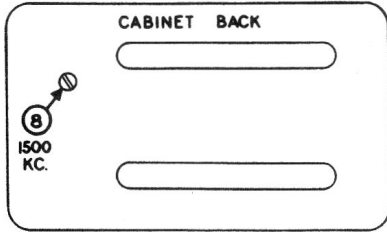
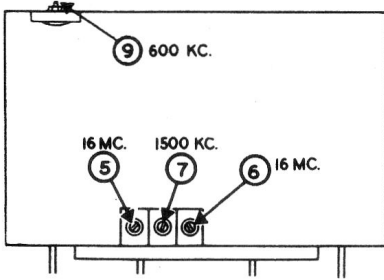
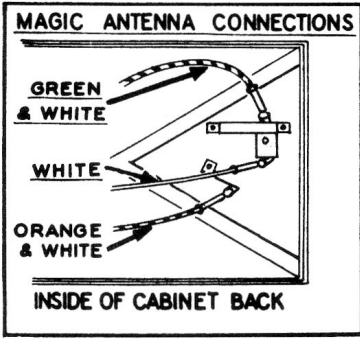
Adjust for maximum output. Try to increase output by de-tuning trimmer and re-tuning receiver dial until maximum output is obtained.

REFERENCE NOTCH

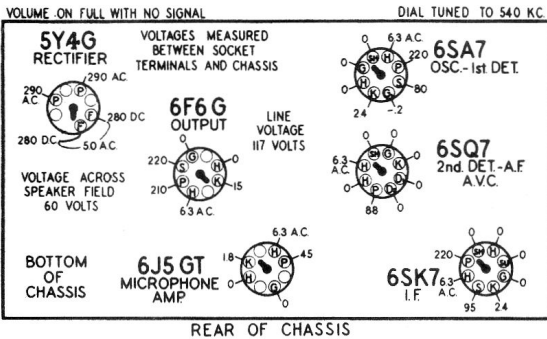
MODEL 485

LAYOUT & RECORDER SERVICE DATA ON DATA SHEET 107

RECORDER SERVICE DATA



SOCKET VOLTAGES



Use a high resistance voltmeter of 1000 oms per volt.

PUSH BUTTONS

The six push buttons shown on this circuit control the various functions of this receiver. The "RADIO," "PHONO," "MICRO-P.A." and "MICRO-RECORDER" buttons are mechanically interconnected so that when any one of them is pushed in, it releases any of the other three buttons which was pushed in.

The "RECORDER ON" and "RECORDER OFF" buttons are mechanically coupled to each other, but are independent of the other four buttons. Pushing in the "RECORDER ON" button releases the "RECORDER OFF" button, and vice versa.

ACTION OF VARIOUS PUSH BUTTONS

RADIO—Button in: Cathode circuits of 6SA7 and 6SK7 completed to ground through resistor No. 27. Volume control connected across diode load resistor No. 18.

Button out: 6SA7 and 6SK7 Cathode circuits opened. Volume control disconnected from diode load resistor No. 18.

PHONO—Button in: Output of crystal pick-up connected across Volume Control.

Button out: Crystal pick-up disconnected from Volume Control.

MICRO-P.A.—Button in: Output of microphone amplifier connected across volume control. Loudspeaker connected to reproduce sound.

Button out: Output of microphone amplifier disconnected from Volume Control.

MICRO-RECORDER—Button in: Microphone amplifier connected as under "MICRO-P.A." In addition speaker is silenced by disconnecting the voice coil and connecting the output transformer secondary to resistor No. 34. This prevents acoustical feedback from speaker to microphone when recording.

Button out: Microphone amplifier disconnected from volume control. Voice coil of speaker connected to output transformer secondary.

RECORDER-ON—Button in: This button connects the crystal recorder to the output of the receiver.

Button out: Crystal recorder disconnected from receiver output.

RECORDER-OFF—Button in: This releases "RECORDER-ON" button, as it is mechanically coupled to it.

Button out: This indicates "RECORDER-ON" button has been pushed in, thus connecting the recorder to the set's output stage. The "RECORDER-ON" and "RECORDER-OFF" buttons operate independently of the four buttons described previously.

GENERAL RECORDER TROUBLE DATA

For complete recording mechanism service data, refer to the separate Recorder Service Manual, Form No. 9948, which will be published later. The receiver instructions, Form 9741, give complete data for the use of this recorder.

IMPORTANT: It is essential that the recorder be placed on a level surface when making recordings. If the recorder does not stand in a level position, it will change the effective pressure of the cutting head and proper results cannot be obtained.

ADJUSTMENT OF CUTTING HEAD

Before attempting any adjustments of the cutting head, first make certain that such adjustments are required. It is advisable to try a new cutting needle, or one known to be in perfect condition. Also the serviceman should have available a record blank of known quality. If a cutting head is suspected of being out of adjustment, make a test recording, using the new needle.

DEFECTIVE CUTTING NEEDLE

A cutting needle is considered worn when the background hiss becomes objectionable, or when the thread cut from the record becomes ragged. A dull needle may also cause the depth of cut to be incorrect.

The condition of the cutting needle can be determined by examining the point by means of a powerful magnifying glass or low power microscope, and comparing it with a good needle viewed in a similar manner. Another good check on the condition of the cutting needle is the appearance of a freshly cut record. If the record has a dull or grayish appearance instead of its usual shiny appearance, the needle should be replaced.

ADJUSTING THICKNESS OF SHAVING

The proper thickness of the shaving produced when a record is cut is about the thickness of a human hair. If the cutting needle is sharp and in good condition, and the cutting head adjusted to give the correct depth of cut, the shaving should come off as a long continuous ribbon. With some types of recording blanks, the ribbon cut by the cutting needle will come off as a straight band, while with others it may produce a curly thread. This ribbon should not, however, be too fine or extremely crinkly as this indicates a dull cutting needle or insufficient pressure of the recording head.

When the cutting head is placed on a record blank, the needle locking screw should be halfway between the top and bottom of the hole in the head. The position of the cutting needle screw may be changed by raising the cutter arm and adjusting the screw and locknut under this arm. Turning this screw clockwise will raise the stylus screw—counter clockwise rotation will lower it.

The depth of cut can be varied by means of the adjusting screw on the recorder arm. This screw is located on top of the arm and is readily accessible for adjustment. Turning this screw clockwise increases the thickness of the shaving, while turning it counter-clockwise decreases the thickness. However, if the cutting needle is dull or damaged, turning this adjusting screw will have very little effect on the depth of cut.

The proper depth of cut may be determined by cutting several grooves with no voltage impressed on the cutter head (RECORDER-OFF button pushed in). Then examine these blank grooves by reflecting light from the record and viewing the grooves through a low-power microscope. The width of the space between the grooves should be slightly less than the width of the grooves.

PROPER RECORDING LEVEL

When recording, the volume control should be adjusted to a setting somewhat higher than that required for good room volume, but below the point of overloading and distortion. If too high a volume level is used, an echo may be heard when playing back or "overcutting" of the grooves may result—that is, on loud passages one groove may actually cut into the adjacent groove, causing distortion when the record is being played. If this occurs the volume control setting should be decreased while recording, until the recorded level is normal.

On the other hand, if the level of the program being recorded is too low, it will necessitate increasing the volume control setting when playing back the recording, and the hiss and background noise will be excessive.

RECORDER HEAD INOPERATIVE

A quick check of the recorder head can be made by pushing in the "RECORDER-ON" button and the "RADIO" button and then tuning in a station. If the recorder is operating, this fact is easily determined by holding the cutting stylus of the cutter between the thumb and forefinger. Vibration of this stylus indicates that the cutter head is in operating condition.

If the recorder does not operate, check first to determine if an A.C. voltage exists across the terminals of the recorder socket. This can best be measured using the 0-150 volt scale of a rectifier type A.C. Voltmeter. With proper recording volume the peaks of the voltage appearing across these terminals should be 80 to 120 volts. If no voltage exists under these conditions, check the contacts of the "RECORDER-ON" switch, and the condenser No. 30 coupling the recorder to the 6F6G plate. If these circuits are found to be all right check the recorder crystal cartridge and replace if necessary.

CORRECT NEEDLE ANGLE

When making a recording, the cutting needle should be set at such an angle that the thread cut from the record will be thrown toward the center of the record. Otherwise the thread may be caught under the cutting needle, causing it to cut the grooves improperly.

If the thread is not thrown toward the center of the record, loosen the thumb screw holding the recording needle in the cutter head, then retightening it again. This will generally change the angle of the needle slightly, causing the thread to wind about the center pin of the turntable.

CAUTION: Never use thorn, cactus or wooden playback needles on home recordings. Their friction coefficient is high, and they score the grooves.

LAYOUT AND
RECORDER
SERVICE DATA
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