

## General Electric Co.

	<b>Model:</b> 60	<b>Chassis:</b>	<b>Year:</b> Pre 1952
	<b>Power:</b>	<b>Circuit:</b>	<b>IF:</b>
	<b>Tubes:</b>		
	<b>Bands:</b>		

### Resources

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**Farnsworth 1000-M, Capehart, Ch. P8**

Model 1000-M is similar to Models 1002-F, 1003-M, and 1004-B, and uses a-m-f-m radio chassis P-8.

**Gamble-Skogmo 43-7661, 43-7852**

Model 43-7661 is the same as Model 43-7660 except that the 7661 uses a blond cabinet. Model 43-7852 is the same as Model 43-7851 except that it uses a blond cabinet.

**Gamble-Skogmo 43-8101, 165, 197, 197U**

Model 165 is the same as Model 94RA31-43-8115A. Model 197 is the same as Model 94RA31-43-8115B. Model 197U is the same as Model 94RA31-43-8116A. Model 43-8101 is electrically the same as Models 94RA31-43-8115A, -8115B, and -8116A.

**Gamble-Skogmo 43-9841A**

Model 43-9841A is the same as Model 94RA31-43-9841A.

**Gamble-Skogmo 94RA4-43-8129A,****94RA4-43-8130A, 94RA4-43-8130B,****94RA4-43-8131A, 94RA4-43-8131B,****94RA4-43-8132A**

Model 94RA4-43-8129A is the same as Model 43-8129A. Models 94RA4-43-8130A and 94RA4-43-8130B are the same as Models 43-8130A and 43-8130B, respectively. Model 94RA4-43-8131A is the same as Model 43-8131A. Model 94RA4-43-8131B is the same as Model 43-8131B. Model 94RA4-43-8132A is the same as Model 94RA4-43-8131A except that it employs a maroon cabinet.

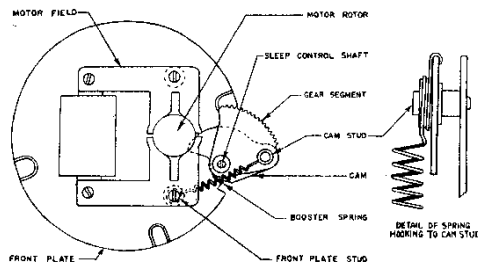
**Gamble-Skogmo 94RA33-43-8135**

The 94RA33-43-8135 is the same as Models 94RA33-43-8130C and 94RA33-43-8131C except for the differences mentioned below. The physical difference is the cabinet, larger drum on the tuning gang, speaker bracket, dial glass, dial bracket and power-cord strain relief. The parts list for Model 94RA33-43-8135 is the same as that for the 8130C and 8131C except for the following parts.

Part No.	Description
E81650-2	Tuning gang
E81645-82	Speaker
M1607-2	Dial bracket
P1602-2	Dial glass
SR-2P	Strain relief
P1601A-2	Cabinet, walnut
M1605-2	Chassis.

**General Electric P15**

To further clarify the identity of the three spindles for the record speeds for which they are to be used, the following descriptions have been added to the Parts List for record changer P15: RMU-060 Spindle, offset spindle for 7 inch, 33-1/3 rpm records; RMX-162 Spindle, for 10 or 12 inch, 33-1/3 or 78 rpm records; RMX-163 Spindle, for 7 inch, 45 rpm records.

**General Electric 145**

In late productions, resistors R13 and R14 have been combined into one tapped resistor, R25A and R25B. This new resistor is mounted in place of R14. The catalogue number for R25 is RRW-047. R25A is 1,000 ohms and should be wired in place of R14. R25B is 1,300 ohms and should be wired in place of R13.

Late production Models 145 have an automatic shutoff when the cabinet front is closed. New parts for these models are interchangeable and will be carried in replacement stock in place of the original early production items as shown below:

Part No.	Description
RDE-049	Escutcheon replaces RDE-034
RDK-166	Knob and knob clip replaces RDK-149
RAC-067	Cabinet front cover replaces RAC-055
RMC-036	Nameplate and catch, with 2 stud mount for maroon or white cabinets
RMC-038	Nameplate and catch, with 3 stud mount for maroon or white cabinets
RMC-039	Nameplate and catch, with 3 stud mount for brown cabinet.



Lead identification for ceramic capacitor RCW-3015.

The accompanying illustration of the four-section ceramic capacitor, catalogue number RCW-3015, is added to aid in capacitor-terminal identification of C9, C10, C11 and C12.

**General Electric 64, 65**

Late production receivers incorporate a helical spring in the clock mechanism which provides a more positive trip action to the switch contact assembly when operating the sleep control. Failure of switch contacts to open may be due to the incomplete travel of the sleep control gear segment and cam assembly after its release by the segment gear's drive pinion. Normally, the spring action of the switch contacts through the sleep control switch lever should be sufficient to allow sleep control cam and gear segment to spring outward completely after it becomes disengaged from its pinion drive gear. However, if binding or position of control parts results in failure of segment gear and cam to swing completely outward properly releasing switch control lever and contacts, the addition of the booster spring (catalogue no. RMS-203) will provide the additional tension to correct segment gear and cam operation.

To install the booster spring, remove the case and draw the clock mechanism forward from the front of the radio cabinet, just far enough to permit installation of the booster spring. The accompanying illustration shows the position of the booster spring as viewed from the rear of the clock mechanism. One end of the spring is fastened to the cam stud, the other end to the brass front plate stud.

**General Electric 60, 62, 64, 65, 66, 67**

The stock item RAB-054, Cabinet back and loop, is no longer available and Stock No. RAB-097, Cabinet back and loop, is substituted in its place. For those receivers produced, employing RAB-054 with connections made to the primary antenna winding, the black wire to chassis ground is removed when RAB-097 is substituted for replacement.

**General Electric 123, 124, 125**

A self-tapping screw, #4 x 1/4 inch, Cat. No. RHS-044, Shakerproof type 25, has been added to the Parts List for the above models. Cabinets of later production receivers were tapped for these screws to mount the loudspeaker in lieu of the Tinnerman clip, RHM-061, used in earlier speaker mountings.

**General Electric 140**

The rectifier assembly, REX-004, is no longer stocked riveted to a mounting bracket. The new rectifier may be screw mounted to the original rectifier bracket as follows: remove wires at the connecting lugs of the old rectifier; using screwdriver blade between plates of rectifier to be removed, pry plates off from rectifier mounting bracket; assemble new rectifier to bracket, using a #6-32 x 1 inch long screw through rectifier and bracket hole and fasten using lock washer and nut; replace wire connections to new rectifier.

**General Electric 143**

In late production receivers, C5 was changed to 0.25  $\mu$ f, 200 volts, Cat. No. UCC-050. This change was made to reduce regeneration which resulted in unstable operation.

**General Electric 165**

A tube shield has been added in late production receivers to the 1S5 tube, improving its stability. This item is carried in parts replacement stock at RHS-010.

**General Electric 218, 218H**

A 15,000-ohm, 1/2-watt resistor R33 has been added between the high side of the volume control and the arm of the band switch S1D. This improves receiver stability. The following changes should be made in the Parts Lists for these models:

Delete Stock No. RLI-084; Add RLI-088, Choke, f-m antenna (L2), used in 218 only; Add URD-077, Resistor, 15,000 ohms, 1/2 w. carbon.

Stock No. RLI-088 has been deleted from the Parts List and Stock No. RLI-084, Coil, f-m antenna choke, L2, added in its place.

**General Electric 402**

R2, shown connected to B+, should cross over the vertical B+ lead to pin 6 of V2, and a dot connection should be drawn at the vertical B— lead to pin 2.

**General Electric 595, 506, 507, 508**

Catalogue items RWL-009 and RWL-016 should be deleted from the Parts List and replaced by the following items: RWL-025, Cord, power cord and plug (brown, heavy duty type) for Models 505, 507, 508; RWL-026, Cord, power cord and plug (ivory, heavy duty type) for Model 506.

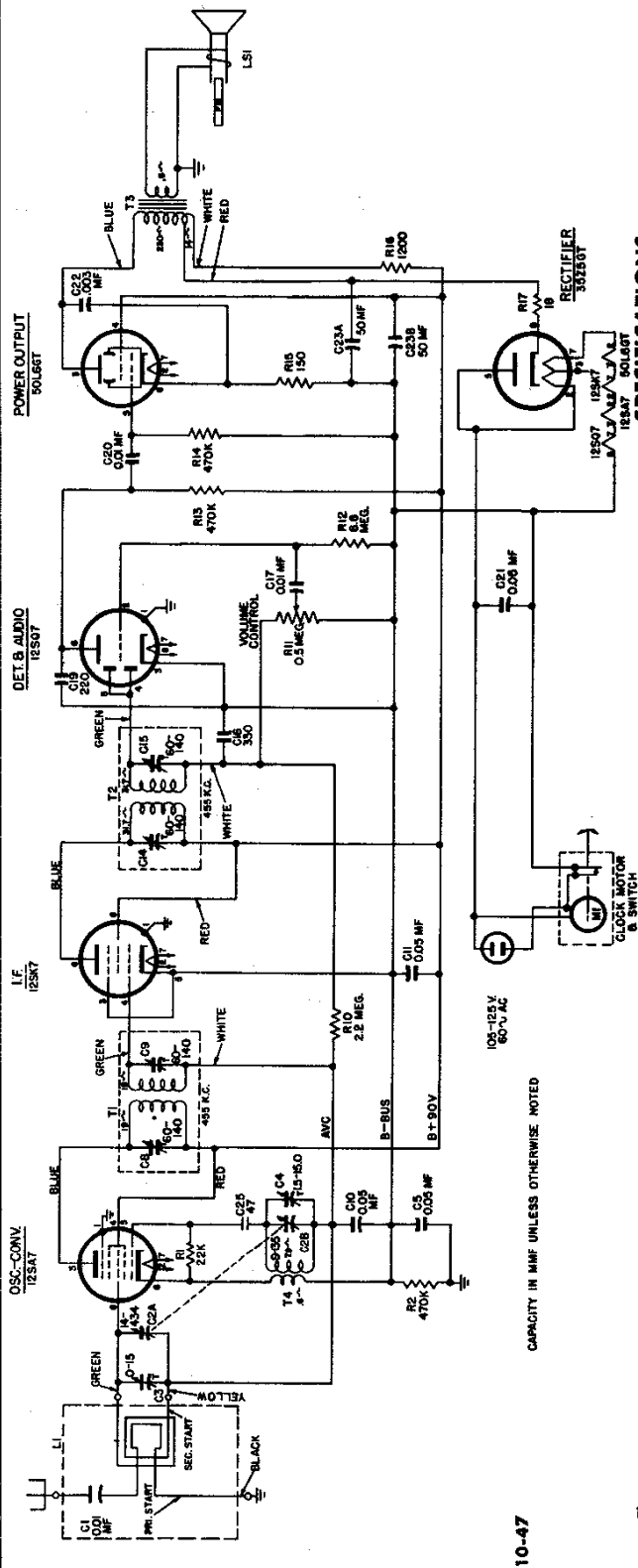
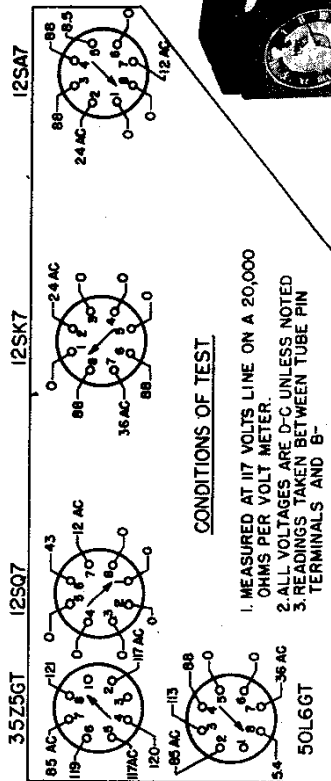


Fig. 2. Schematic diagram, Models 60 and 62

<b>CABINET:</b>	
Model	60
Color	Mahogany
Height	6 1/4 in.
Width	10 1/2 in.
Depth	5 3/8 in.
<b>ELECTRICAL RATING (INPUT):</b>	
Voltage	105-125 volts, a-c
Frequency	60 cycles
Wattage	35 watts
<b>OPERATING FREQUENCIES:</b>	
Intermediate Frequency	455 kc
Broadcast Band	540-1600 kc
<b>POWER OUTPUT:</b>	
Undistorted	1.2
Maximum	2.0
<b>LOUDSPEAKER:</b>	
Type	Alnico PM
Outside Cone Diameter	4-inch
Voice Coil Impedance (400 cycles)	3.5 ohms
<b>CAUTION:</b> One side of the power line is connected to B-. Avoid any ground connections direct to B-. Use an isolating transformer when making service adjustments with the chassis removed from the cabinet.	



VIEWED FROM BOTTOM OF CHASSIS

Fig. 3. Socket Voltages

## GENERAL ELECTRIC CO.

MODELS 60, 62

## CLOCK SERVICE

Figure 4 shows clock parts referred to in the following paragraphs and the parts list.

## CLOCK MOVEMENT DISASSEMBLY

1. Remove clock movement from case. When removing knobs, note that the Alarm-Set knob is a left-hand thread, while Alarm-Radio is a pull-off knob.
2. Remove Bezel, Hands and Dial Face.
3. Remove the motor assembly by removing two screws (A) and break two soldered joints on Field. The Field and Rotor Assembly (R) can now be removed. The Rotor is held by friction only to the Field.
4. Remove Switch Assembly (B) by removing two screws from base plate.
5. Remove Switch Shaft Assembly (C) and spacer.
6. Remove Alarm-Set Shaft Assembly (D) and spacer.
7. Remove the three front plate assembly screws that are located under the Dial Face and then remove Front Plate.
8. Remove Alarm Gear Sleeve Assembly (E), Hour Gear Sleeve Assembly (F), Minute Gear Sleeve Assembly (G), and Sweep Second Gear Shaft Assembly (H).
9. Remove Alarm Cam Gear Assembly (I) and Spring Washer (J).
10. Remove Alarm-Set Gear (K).
11. Remove Time-Set Gear and Shaft Assembly (L).
12. Remove Switch Cam Lever (M).

## CLOCK MOVEMENT REASSEMBLY

Reassemble in the reverse order of disassembly, observing the following precautions:

1. The spring washer (J) should curve away from the gear when placed on the Alarm Cam Gear Assembly (I).
2. The Switch Cam Lever (M) fork must straddle the base plate post as shown in the illustration.
3. After reassembly of front plate, check the Sweep Second Gear (H) through the hole in the base plate to make sure it is free to turn.
4. Proceed with Alarm and Switch Adjustments as described below before installing hands.

## ALARM AND SWITCH ADJUSTMENTS

1. Turn Alarm-Radio shaft to ALARM position.
2. Slowly rotate Time Set shaft clockwise until the contacts of the Switch Assembly (B) close.
3. Replace Dial Face, Alarm Dial, the Minute, Hour and Second Hands. Set all Hands and Dial so that they indicate 12 o'clock. Make sure all Hands and Alarm Dial are tight on their respective shafts.
4. With Alarm Set knob pulled out, continue to rotate Time Set shaft clockwise and note that the vibrator arm (N) drops against field core approximately 7-10 minutes later.
5. Set alarm at some other selected position and make sure mechanism actuates within limits ( $\pm 1$  minute).
6. Check alarm tone of vibrator. This can be adjusted by either bending vibrator arm nearer or farther away from field core. Bend arm near anchor point.

## CLEANING AND LUBRICATION

To clean, completely disassemble and clean all moving parts in carbon tetrachloride or some similar cleaner.

The inside of the sleeves and shaft surfaces may be cleaned of oxidized oil by rubbing with a fine grade of steel wool dampened in carbon tetrachloride.

Do not use too much oil and apply by means of a small wire (drop oiler). Too much oil collects dust and later oxidizes. Use only recommended clock oil, such as Nye's Celebrated Oil which may be purchased from Wm. F. Nye Co., Inc., New Bedford, or equivalent.

## CLOCK TROUBLES

1. Clock will not operate—Defective field coil, defective rotor, binding of parts.
2. Clock loses time—Binding parts, too little friction on minute hand sleeve assembly, defective rotor. Clock time set shaft bent and rubs against hole in clock bracket.
3. Noisy Clock—Rotor defective, alarm armature improperly adjusted, loose parts, or binding of moving parts.

## RADIO REPLACEMENT PARTS LIST

Cat. No.	Symbol	Description
<b>UNIVERSAL G-E REPLACEMENT PARTS</b>		
UCC-623	C22	CAPACITOR—.003 mf., 600 v., paper
UCC-630	C1, 17, 20	CAPACITOR—.01 mf., 600 v., paper
UCC-635	C5, 10, 11, 21	CAPACITOR—.05 mf., 600 v.
UCU-036	C19	CAPACITOR—220 mmf., mica
UCU-040	C16	CAPACITOR—330 mmf., mica
UCW-020	C25	CAPACITOR—47 mmf., ceramic
UOP-418	LS1	SPEAKER—4-inch PM speaker
URD-029	R15	RESISTOR—150 ohms, $\frac{1}{4}$ w., carbon
URD-081	R1	RESISTOR—22,000 ohms, $\frac{1}{2}$ w., carbon
URD-113	R2, 13, 14	RESISTOR—470,000 ohms, $\frac{1}{2}$ w., carbon
URD-129	R10	RESISTOR—2.2 meg., $\frac{1}{2}$ w., carbon
URD-141	R12	RESISTOR—6.8 meg., $\frac{1}{2}$ w., carbon
URP-051	R16	RESISTOR—1200 ohms, 2 w., carbon
<b>SPECIALIZED G-E REPLACEMENT PARTS</b>		
RAB-054	L1	BACK—Cabinet back cover (includes loop antenna)
RAU-020		CABINET—Mahogany plastic cabinet (Model 60)

Cat. No.	Symbol	Description
<b>SPECIALIZED G-E REPLACEMENT PARTS (Cont'd)</b>		
RAU-021		CABINET—Ivory plastic cabinet (Model 62)
RCE-050	C23A, B	CAPACITOR—50 mfd., 150 v.; 50 mfd., 150 v., dry electrolytic
RCT-021	C2A, B	CONDENSER—Tuning condenser, oscillator, and r-f section
RDK-028		KNOB—Volume control knob (Models 60 or 62)
RDK-004		KNOB—Tuning dial wheel (Models 60 or 62)
RDS-047		SCALE—Dial scale (Model 60)
RDS-050		SCALE—Dial scale (Model 62)
RJS-003		SOCKET—Octal tube socket (Type 12SA7)
RJS-006		SOCKET—Octal tube socket
RLC-051	T4	COIL—Oscillator coil
RRC-054	R11	POTENTIOMETER—0.5 megohm, volume control
RRW-008	R17	RESISTOR—18 ohms, 1 watt, wirewound
RTL-050	T1	TRANSFORMER—1st I-F transformer
RTL-051	T2	TRANSFORMER—2nd I-F transformer
RTD-036	T3	TRANSFORMER—Output transformer
RWL-009		CORD—Power cord, brown (Model 60)
RWL-014		CORD—Power cord, white (Model 62)
RZC-005	M1	CLOCK—60 cycle, 105-125 v., clock assembly
RZC-006	M1	CLOCK—50 cycle, 105-125 v., clock assembly

## CLOCK REPLACEMENT PARTS LIST

Cat. No.	Symbol	Description
<b>MISCELLANEOUS</b>		
XC3X49	Q	TIME SET SHAFT KNOB—Bronze
XC4X5	A	ALARM SET KNOB—Ivory
XC10X131	L	TIME SET GEAR AND SHAFT ASSEMBLY
XC11X11	D	ALARM SET SHAFT ASSEMBLY
XC31X26		SWEEP SECOND HAND
XC32X167		HOUR AND MINUTE HANDS
XC34X139	O	FRONTPLATE ASSEMBLY
XC53X100		INNER BEZEL—2 $\frac{3}{16}$ in., round, maroon
XC54X29		OUTER BEZEL—Brass
XC55X11		ALARM DIAL
XC58X16		CRYSTAL—2 $\frac{1}{8}$ in., round
XC59X234		NUMERAL COLOR RING—Bronze
XC59X699	C	SWITCH SHAFT ASSEMBLY
XC59X716		SWITCH KNOB—Ivory
XC60X712		DIAL FACE—(On frontplate)
<b>CLOCK MOVEMENT</b>		
XC1X1	A	SCREW—Holds Field, No. 4-40X1 $\frac{1}{2}$ in. R.H.
XC1X2		No. 1204 LOCK WASHER
XC1X6		SCREW No. 4-40 $\times \frac{3}{4}$ in. R.H.
XC1X43		HEX NUT
XC13X11	F	HOURLY GEAR SLEEVE ASSEMBLY

Cat. No.	Symbol	Description
<b>CLOCK MOVEMENT (Cont'd)</b>		
XC14X15	G	MINUTE GEAR SLEEVE ASSEMBLY
XC15X3	E	ALARM GEAR SLEEVE ASSEMBLY
XC16X14	H	SWEEP SECOND GEAR SHAFT ASSEMBLY
XC17X8	I	ALARM GEAR SHAFT ASSEMBLY
XC35X39		BASEPLATE ASSEMBLY
XC40X263		RIVET—Vibrator
XC40X76		SWITCH ASSEMBLY—Consists of: Contact Block Contact Spring Contact Spring Insulator
XC40X77	K	ALARM SET GEAR ASSEMBLY
XC40X78	M	SWITCH CAM LEVER ASSEMBLY
XC40X79		UPPER CONTACT SPRING ASSEMBLY
XC40X80		LOWER CONTACT SPRING AND TIP ASSEMBLY
XC40X202	J	SPREADER POST
XC40X252		CAM GEAR SPRING WASHER
XC40X260		SPACER—Switch shaft
XC40X261		TIME SET SHAFT SPACER
XC40X262		TIME SET SHAFT SPACER
XC40X263		ALARM SHUT-OFF SPACER
XC44X38		ROTOR UNIT—60 cycles
XC45X69	R	FIELD COIL ASSEMBLY—60 cycle
XC64X1-2-3		FRONTPLATE SCREW



MODELS 60, 62

GENERAL ELECTRIC CO.

RADIO CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES

R-F ..... 1500 kc  
I-F ..... 455 kc

EQUIPMENT REQUIRED:

- 1. Test oscillator with tone modulation.
- 2. A-c output meter, 1 1/2 volts full scale.
- 3. 0.05 mf. paper capacitor.
- 4. 200 mmf. mica capacitor.
- 5. Insulated screwdriver.

PROCEDURE—GENERAL:

- 1. With the tuning scale control wheel turned so that the gang condenser plates are fully meshed, the index should read approximately 3/4-inch to the right of the 550 kc scale calibration mark. If it does not, remove the control wheel from the gang condenser shaft and replace it for correct position. CAUTION: Do not attempt to correct the position by rotating the wheel on the shaft as this will cause the knob to slip.
- 2. For i-f alignment, it is necessary to remove the chassis from the cabinet.
- 3. Connect the output meter across the loudspeaker voice coil terminals.
- 4. Keep radio volume control at maximum and attenuate the test oscillator signal output so that the output meter reading never exceeds 1.0 volt.
- 5. Connect the capacitor as listed in column 2 between the output "High Side" of the test oscillator and the point of input specified.

- (1) R-F and I-F Stage Gains.  
Antenna Post to 12SA7 Grid ..... 2 @ 1000 kc  
12SA7 Grid to 12SK7 Grid ..... 50 @ 455 kc  
12SK7 Grid to 12SQ7 Diode Plate ..... 70 @ 455 kc
- (2) Audio Gain.  
0.15 volts at 400 cycles across the volume control (R11) with control set at maximum will give approximately 1/2-watt output across the loudspeaker, L51, voice coil.

- (3) Oscillator Grid Bias  
D-c voltage developed across the oscillator grid leak (R1) averages 8.5 volts at 1000 kc.
- (4) Socket Pin Voltages.  
Figure 3 shows voltages from all tube pins to B—unless otherwise specified. Voltage readings much higher or lower than those specified may help localize defective components or tubes.

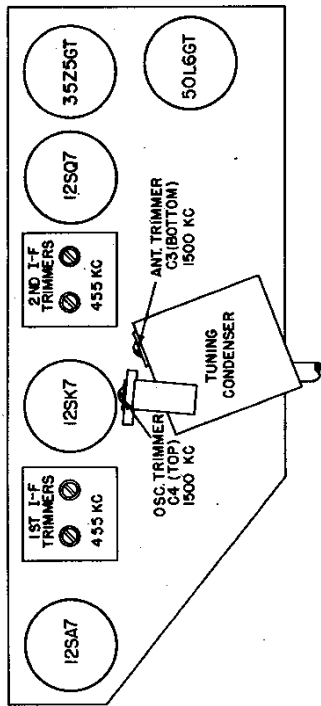


Fig. 1. Tube and Trimmer Location

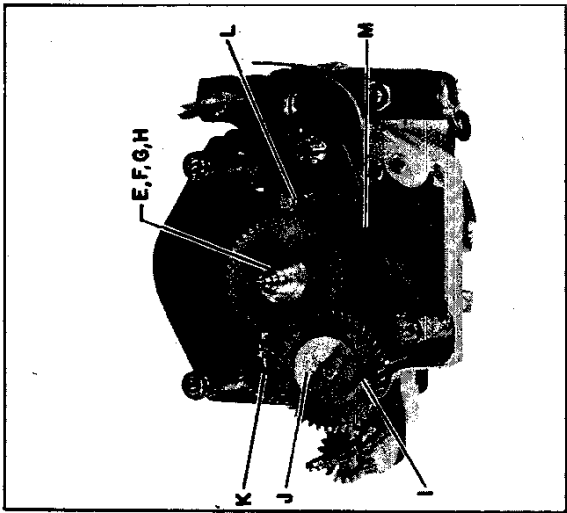
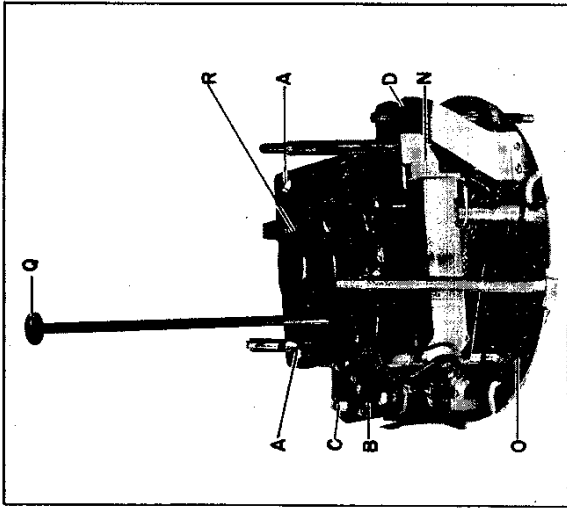


Fig. 4. Clock Part Identification

ALIGNMENT CHART

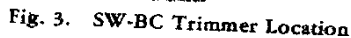
Step	Connect Test Oscillator to—	Test Osc. Setting	Dial Drum Setting	Adjust Trimmers for Maximum Output
1	12SK7 grid (4) in series with 0.05 mf. cap.	455 kc	1600 kc	2nd i-f trans. trimmers, C14 and C15
2	12SA7 grid (8) in series with 0.05 mf. cap.	455 kc	1600 kc	1st i-f trans. trimmers, C8 and C9
3	Antenna Post in series with 200 mmf. cap.	1500 kc	1500 kc	C4 (oscillator)
4	Antenna Post in series with 200 mmf. cap.	1500 kc	1500 kc	C3 (antenna)

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

### ALIGNMENT CHART

\* Use minimum capacity peak.  
\*\* Rock gang tuning condenser for optimum peak.



Before making the RF alignment make sure the pointer is set to the line at the low frequency end of the dial scale when the gang condenser plates are closed. Output meter alignment is preferable and the meter may be connected across the voice coil leads, then turn volume control partially up. Keep the signal input as low as possible to avoid AVC action.

(1) A good signal generator capable of giving a 46 MC

- Connect a 0-100 microammeter in series with a 470,000 ohm resistor between chassis and point "A" on the load circuit of the 1st limiter tube, 6SJ7. The resistor should be between the meter and point "A." Apply a 46 MC generator signal to the antenna input terminals of the Translator. Set dial pointer to 46 MC and align oscillator trimmer (C2). The image signal should be below 46 MC when the oscillator is properly set. Peak the converter trimmers (C3 and C4) for maximum output.

**NOTE.** If oscillations develop in the I.F. circuits during alignment it is probably due to the generator and oscilloscope ground connections. Be sure these ground connections are made to the same point on the chassis. Changing ground points will generally assist in eliminating instability.



## MODELS 60, 80

## GENERAL ELECTRIC CC.

**Special Service Information**

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

## (1) Stage Gains†

(a) Antenna Post to R.F. Grid at	
1000 KC.	5.0
4000 KC.	2.5
18,000 KC.	2.5

(b) R.F. Grid to Converter Grid at	
1000 KC.	5.0
4000 KC.	3.0
18,000 KC.	2.0

(c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at	
1000 KC.	.47
4000 KC.	.47
18,000 KC.	.45

(d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at	
455 KC.	.55

(e) I.F. Amplifier Grid to Detector Plate at	
455 KC.	.70

(2) Voltage across Volume Control to Give ½-watt Speaker Output‡ at 400 cycles.	.05 volts
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## (3) DC Voltage Developed across Oscillator Grid Resistor R-83 at

1000 KC.	7.5
4000 KC.	7.5
18,000 KC.	5.0

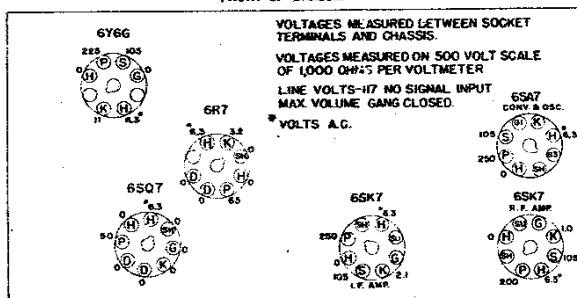
†Variations of ±20% permissible. All readings obtained with enough input signal to give ½-watt speaker output.

‡½-watt speaker output at 400 cycles is equivalent to a reading of 1.41 volts as measured by a high resistance AC voltmeter across the voice coil leads of the two speakers connected in parallel.

cap, and insert four centering shims in the air gap. Tighten the clamping set screws; remove the shims and replace dust cover.

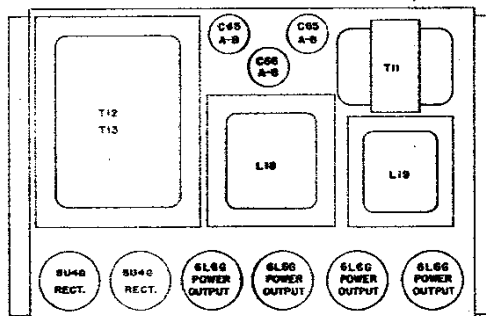
NOTE—In no case should the magnet be loosened or removed from the assembled position.

FRONT OF CHASSIS

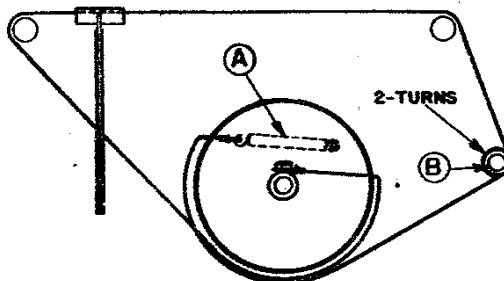


BOTTOM VIEW OF CHASSIS

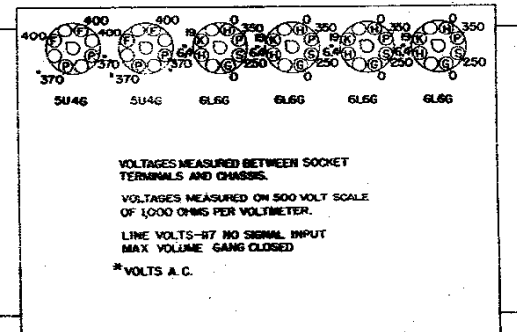
Socket Voltages—AM Chassis



Power Unit Component Layout



Dial Cord Stringing Diagram



BOTTOM VIEW OF CHASSIS

Socket Voltages—Power Unit

**Phono-FM-Television Connection**

If a television picture receiver with sound converter, a separate record player, or a frequency modulation translator (Model 60) is desired to be used with either of these models proceed as follows. On Model 80, remove the black shielded plug connection to the rear of the broadcast short-wave receiver rear chassis deck; on Model 60, remove the shielded lead to left of broadcast short-wave receiver rear chassis deck; then make the plug connection to the auxiliary unit. General Electric plug, Stock No. RP-145, fits the pin jack. To switch the receiver from radio to auxiliary unit operation, merely depress the Phono-FM push button selector key.

**Service Hints**

1. Audio howl is traceable usually to the 6Y6G audio driver tube. In making new tube replacements, it may be necessary to try several before a quiet tube is found.

2. A method of setting up broadcast automatic station selector buttons which will assure drift-proof adjustment is to screw the iron core all the way out and then turn slowly inward until the desired station is tuned in.

3. The black speaker lead should be connected to the 10-inch speaker terminal which is grounded to the speaker frames. When replacing a speaker, make sure of the proper phasing. With the speaker terminal boards facing each other, the interconnecting leads should be crossed.

**Reproducers**

The voice coil is accurately centered at the factory and should seldom give trouble. In case the voice coil needs recentering, loosen the three hex head clamping screws which hold the voice coil spider assembly; remove the voice coil dust



MODELS 60, 80  
MODEL JM-1C

GENERAL ELECTRIC CO.

# DELUXE AUTOMATIC RECORD CHANGER and RECORDING UNIT

USED IN *Musaphonic* MODELS 60 AND 80

## RECORD CHANGER MODEL JM-1C

This deluxe automatic record changer and home recording unit is standard equipment in the above model receivers and is designed for operation on a 110-volt alternating-current source. The record changer will play up to fifteen 10-inch and 12-inch records intermixed, while the recording mechanism is designed to record on record blanks which have not been pre-grooved.

### OPERATING CONTROLS

#### Power Controls

To turn power "on," press the red push button (AK) in Fig. 1 until the power switch clicks. To turn power "off" press down on tone arm rest (AH).

#### Index and Record-reject Control

This control consists of the switch knob (AI) pointer (AJ) and push button (AK). The selector knob provides for either manual or automatic operation of the mechanism. Turn pointer and knob assembly to "A" for automatic operation. Turn pointer and knob assembly to "M" for manual operation.

To reject a record being played, or to start the record changing cycle, push down on the red push button (AK) as far as it will go.

#### Record Holder Shelf Plates

These three assemblies consist of the selector plate (BA), center plate (BB) and shelf plate (BC). These plates are hinged so that they may be raised to a vertical position for clear access to the turntable.

### GENERAL DESCRIPTION OF PHONO CHANGE CYCLE

An automatic record player for records of two sizes has three principal duties to perform. These duties are here performed by three mechanisms inter-connected and built together, but largely separate in their operation. The motion for each is originated in one central cam gear which has three different and individual cam surfaces. The cam gear (FK) is normally at rest while a record is being played, but is put into operation by contact of a latch lever (AD) (located in the cam gear) with the teeth of an intermediate drive gear (CI). This motion takes place only when the unit is put into a change cycle. The cam gear then turns one full revolution to complete the change cycle and stops in a neutral position.

1. THE RECORD CHANGING MECHANISM is brought into operation by a segment (CH) (or lever) with a roller (EJ) at one end which runs in a cam groove in the cam gear (FK) as it turns, which drives with an oscillating motion the three pulleys (FG) by means of a metal tape (DD). The pulleys are fastened to the lower ends of the changer shafts (DL), which in turn transmit their motion to the changer plates (BC) which are fastened with setscrews to the upper ends of the shafts. When the changer plate assembly is revolved, the record resting on the shelf plates (BC) is released to the turntable.

2. THE PICK-UP OPERATING MECHANISM is likewise brought into operation originally by a cam surface on the cam gear (FK) which operates a raising lever (CA) that receives a rocking motion from the cam gear (FK) through a roller (CD) which is part of the raising lever assembly. The flat spring on the opposite end of this lever (CA) is carried upward against a lifter pin (FW) which raises the pick-up (AG), thus lifting the needle from the record. This motion also moves the hollow pick-up shaft (FX) upward, pressing together the locating plate (ES), the cork friction disc, (EV) and swing bracket (FY). While the needle is raised from the record, the swing bracket (FY) receives an angular or swinging motion from the cam gear

(FK) to a lever and link assembly (EK) and carries with it the locating plate (ES) which is directly connected to the pick-up. The pick-up (AG) is thus carried out beyond the turntable while the changer plates (BC) drop a record, and is then brought back to the proper position to start playing. If there is no record resting on changer plates (BC) when the cycle starts, the pick-up arm (AG) will then remain out beyond the turntable and descend on the pick-up rest (AH) automatically shutting off the motor after the last record has been played.

3. MECHANISM FOR BRINGING NEEDLE INTO CORRECT STARTING POSITION ON THE RECORD. This mechanism must operate fairly accurately for both 10-inch and 12-inch records. Partly due to this requirement, the starting position is not determined by the cam action, as this cam surface on the cam gear (FK) is so designed that the movement of the lever and link assembly (EK) would normally carry the pick-up arm (AG) farther toward the turntable shaft (BF) than would ever be desirable as a starting adjustment. Therefore, the travel of the pick-up arm (AG) toward the turntable shaft (BF) is stopped at the proper point for lowering onto the record by two eccentric adjusting studs on the locating plate (ES) which comes into contact with the stop arm (EQ) which is automatically pre-set by the record which is about to be released from the changer plates (BC) to the turntable. If a 12-inch record is about to be played, it rests on the center changer plate (BB) of the master changer post (which is located directly behind the pick-up arm (AG), causing same to push downward on center pin (EA) which in turn pushes downward on the center plate lifter lever (DF) which is pivoted on a hinge pin (DH) in the pulley (FG). This brings the upper end of center plate lifter lever (EB) toward the pulley hub. When the pulley is oscillated or driven by the tape (DD), the upper end of this lever (EB) will travel on the inside of the crescent shaped cam (EC). This will move the setting lever (EQ) (which is fastened to the same hub as the stop lever) in such a position that stop lever will contact the 12-inch eccentric adjusting stud on the locating plate which accurately measures the starting point of the needle on a 12-inch record. A 10-inch record which is about to be played will not rest on the center plate (BB), therefore the center plate and center pin (EA) and lever (DF) will be held upward by a spring (DI) on the pulley. The upper end of the center plate lifter lever (EB) will therefore be further away from the pulley hub and will travel on the outside of the crescent shaped cam (EC) moving the setting lever and stop lever (EQ) in such a position that stop lever will touch the 10-inch eccentric adjusting stud (ES) also on the locating plate which accordingly measures the starting point of the needle on a 10-inch record. After the last record has been dropped from the changer plates and played, the lower changer plate (BC) is pushed upward by the no-record control pin. The no-record selecting lever (EP) is also carried up so that when pulley is oscillated the no-record lever sweeps the setting lever and stop lever (EQ) to the position where the stop lever engages with a heel on the locating lever (ES) and holds pick-up (AG) out beyond the turntable. Then when the pick-up (AG) descends, it depresses the pick-up rest (AH), thereby tripping switch (CG) and shutting off the motor.

### RECORDING MECHANISM DESCRIPTION

The recording unit which mounts on the main phono motor board by the hex nut (11) and the mounting screw (12), is shown in Fig. 4. This unit is not shown mounted in Figs. 1, 2 and 3 for purposes of clarity.

The gear (10) of the recording unit meshes with the main drive pinion gear (CJ). This pinion gear drives the recording arm through a friction clutch drive principle. Since this gearing mechanism is in operation continuously while the turntable is operating, it is important to place the recording arm on its rest when not in use.

MODELS 60, 80  
MODEL JM-1C

## GENERAL ELECTRIC CO.

### SERVICE NOTES AND ADJUSTMENTS

#### Oiling

The recorder and record changer mechanism should be lubricated once a year with a few drops of good light machine oil at each of the following points:

1. Three oil holes in motor gear housing.
2. Turntable spindle bearings.
3. Recorder pivot arm spindle.
4. All other bearing points.

Caution: Never oil the friction clutch at any time as it will cause slippage.

If squeaks are heard, compare the squeak with and with-

out a load of records, as any stack of records in motion is apt to squeak with a pin through their centers.

This can be corrected by rubbing a little wax on the turntable shaft. See that all three  $\frac{1}{4}$ -inch round wicks in the motor frame are in position and are thoroughly saturated with oil (as it may not be if insufficient oil or too heavy oil has been used). Lift out all three motor wicks with tweezers. See if old oil has become "gummy" (commonly due to use of low-grade oil or low viscosity oil). If necessary, clean gummed-up wicks with kerosene. See that each is saturated with a fine oil, then before replacing them, drop a little fine oil into the holes. The gear box of the motor is packed with a semi-fluid grease at the factory, and it should never be necessary to take it apart for lubrication purposes.

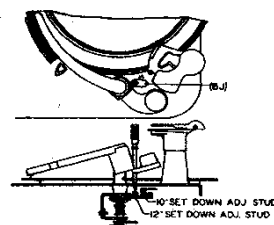
### RECORD CHANGER AND RECORDING UNIT ADJUSTMENTS

Adjustments Nos. 1, 2, 3, 15 and 16 can be made from the top of the record player. All adjustments are correctly made at the factory and ordinarily need never be altered. However, should it become necessary to re-adjust due to tampering or accident, proceed as indicated in the following chart.

1

#### ADJUSTING LANDING POSITION OF NEEDLE ON RECORD

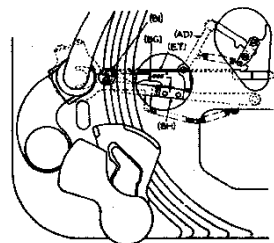
The position at which the needle lowers to the record can be adjusted by inserting a screw driver through hole (BJ) just in back of tone arm. For adjusting the 10-inch set-down, insert screw driver into the inside eccentric adjusting stud. For adjusting the 12-inch set-down, insert screw driver into the outside slotted stud. Turn very slightly clockwise or counterclockwise to move needle landing in or out. The proper adjustment for the needle landing is  $\frac{1}{8}$  inch in from the outer edge of the record.



2

#### ADJUSTING TRIP CAM FOR CORRECT CLEARANCE BETWEEN TRIP LEVER AND TRIP ARM

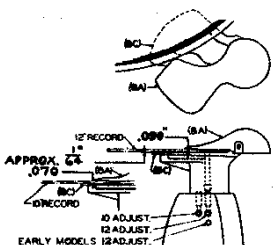
Insert screw driver through hole (BI) in main plate and locate it into slotted stud. Adjust eccentric cam so that the distance between the trip lever (BG) and trip arm (BH) is approximately .005 in. This can best be done by first adjusting the trip eccentric cam at (BI) so that there is no clearance or gap, then back off very slightly until trip lever (BG) is free to pulsate with the clutch motion or action of the release lever (ET). If the clearance is not sufficient between the trip lever (BG) and trip arm (BH) the pulsating motion of the clutch release lever (ET) will gradually cause the trip lever to move the trip arm enough to trip the trigger (AD) and start a change cycle. If gap is too great the trip lever will not move far enough to start a change cycle at the end of a record.



3

#### ADJUSTMENT FOR CHANGER PLATES

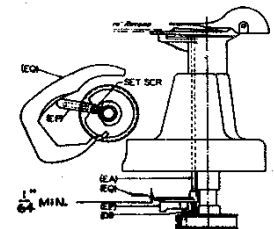
To adjust the distance between the selector plate (BA) and the shelf plate (BC) for 10-inch records, first select a 10-inch record that is approximately .070 in. thick. Then position it on changer and start a change cycle to revolve changer plates. Stop the turntable by hand just as the selector plate (BA) is about to touch the record, and shut off the motor. Then slowly turn the turntable by hand, allowing selector plates to contact edge of record so that it just slides over record, touching the surface lightly. Check all three selector plates and if any adjustment is necessary, it can be done by inserting a No. 10 Allen wrench in the setscrew holes located in the sides of the changer posts. Turn setscrew slightly clockwise to raise the selector plate and counterclockwise to lower it. The setscrew for adjusting the 10-inch record setting, and the one for 12-inch record setting is shown in the adjacent drawing. To adjust for 12-inch records, select a 12-inch record that is approximately .090 in. thick, then follow same procedure as for adjusting 10-inch records.



4

#### NO-RECORD SELECTING LEVER AD- JUSTMENT

First be sure that spring tension on spring (DI) is strong enough to lift the center blade raising pin (EA) properly and fully, but not so strong that one 10-inch record will not fully depress pin and lever. Then with setscrew loose in no-record selecting lever (EP) and pin held down by weight of one 10-inch record, slide no-record selecting lever (EP) into position so that it will just clear under lower edge of the lower cam setting lever (EQ) by approximately  $\frac{1}{64}$  in. clearance. Then tighten setscrew and check adjustment with and without a record, also be sure that without a record, the fin on no-record selecting lever (EP) swings above cam setting lever (EQ) and portion of lever (EP), indicated by arrow, sweeps stop lever (EQ) on cam setting lever into position shown in upper illustration of adjustments 12 and 13.



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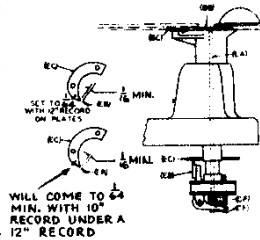
MODELS 60, 80  
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5

## ADJUSTMENTS

LIFTER  
LEVER  
DIFFERENTIAL  
ADJUSTMENT

Place a 12-inch record over the turntable spindle so that the record rests on the shelf plates. Then check the center plate lifter lever (EB) and see that point of this lever will just slide inside of center arm lifter cam (EC). Then place a 10-inch record under the 12-inch record so that the 10-inch record will rest on shelf plate (BC) and the 12-inch record will then touch center plate (BB) which presses down center pin (EA) and accordingly moves lifter plate (EB) closer to outside face of lifter cam (EC) than it would without the 12-inch record on top of the 10-inch record. The lever (EB) should then follow the outside of the center arm lifter cam (EC). If it is necessary to re-adjust, this can be done by means of adjusting screw (CE) and lock nut (CF) to balance out the contact of lever (EB) on both sides of cam (EC) in relation to starting point of cam.



6

LIFTER  
LEVER  
CLEARANCE  
ADJUSTMENT

Check the distance between the leading edges of the center plate lifter lever (EB) and center arm lifter cam (EC) with a 12-inch record resting on the shelf plates. It should be a minimum of  $\frac{1}{8}$  in. It should not be necessary to check this adjustment unless the tape clamp screws on the pulley (FG) have been loosened. To re-adjust after screws have been loosened, first set pulley so that when the slack in the tape line is taken up in the direction of forward motion of the tape segment (CH), there will be the necessary  $\frac{1}{8}$  in. clearance as mentioned above.

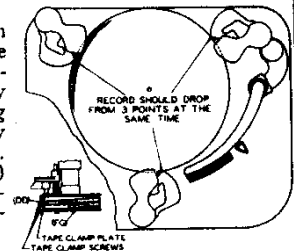
Note: If this adjustment is "OFF" most likely changer plate synchronization will also be off. Check adjustment No. 7.

7

CHANGER  
PLATE  
SYNCHRO-  
NIZATION

The synchronization of changer plates can be checked by placing one 10-inch record on the shelf plates. Then start a change cycle allowing it to continue until plates are just about ready to release the record. It can then be determined which plate is either slow or fast. This plate can then be adjusted by loosening the screws on the tape clamp which hold the tape (DD) from slipping in the pulley (FG). Then slightly move changer plate whatever is necessary to synchronize it with the other two plates so that record will drop evenly. Then tighten tape clamp screws securely. (Also check adjustment No. 6.)

Note: Tape line should have a very slight amount of slack. Check by grasping tape line with thumb and index finger and moving it in and out approximately  $\frac{1}{8}$  in. with a moderate pressure.



8

CLUTCH  
RELEASE  
LEVER  
ADJUSTMENT

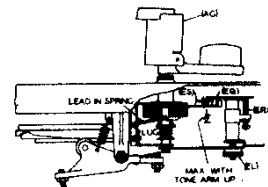
The fork on clutch release lever (ET) should be adjusted so that it only slightly moves the friction clutch with a sharp kick rather than a wavy movement. To get more or less movement of the clutch, bend the release lever (as shown in upper illustration). Also be sure that both prongs of fork on release lever (ET) contact the pressure release sleeve (EU) simultaneously. At no time should fork ride the pressure release sleeve between impulses, as the clutch would then be held open and changer would not trip.



9

SETTING CAM  
ADJUSTMENT

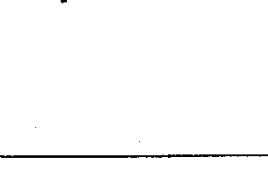
By means of the adjusting screw (ER) set stop lever (EQ) so that there will be  $\frac{1}{32}$  in. maximum overlap on eccentric studs (ES). If there is not enough overlap, the stop lever (EQ) will slide off instead of holding on eccentric studs (ES) on stop lug, while measuring set-down of tone arm (AG).



10

SLIDE-IN  
ADJUSTMENT

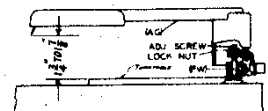
To adjust the power of the tone arm lead-in, bend the lug on lead-in spring to give it more or less tension; too much tension may cause needle to slide in on record. The knurled nut (EL) adjusts the distance tone arm will swing in, before clutch is disengaged. If clutch is still engaged after needle lands on record it may cause slide-in. Turning nut (EL) clockwise should correct slide-in if lead-in spring tension is correct.



11

TONE ARM  
HEIGHT  
ADJUSTMENT

This can be adjusted by means of an adjusting screw in the tone arm assembly (AG). The tone arm elevating pin (FW) presses against this screw which should be adjusted so that the distance between the point of needle (in tone arm) and the turntable is  $1\frac{3}{4}$  in. to  $1\frac{1}{2}$  in. which is the equivalent of approximately seventeen 10-inch records. When correct height adjustment is made, tighten lock nut on adjusting screw securely.



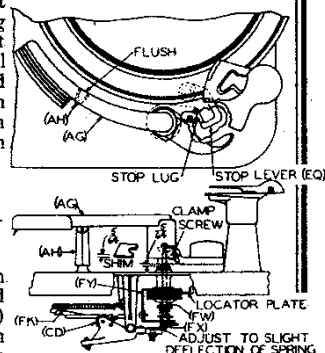
MODELS 60, 80  
MODEL JM-1C

## GENERAL ELECTRIC CO.

## RECORD CHANGER AND RECORDING UNIT ADJUSTMENTS (Cont'd)

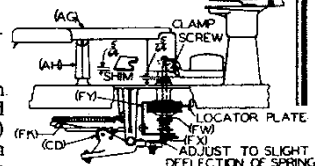
12  
TONE ARM  
SWING  
ADJUSTMENT

First raise tone arm (AG) by hand and slightly loosen clamp screw on tone arm shaft head. Then start a change cycle and shut off power supply to motor when tone arm (AG) is being held in stop position above the tone arm rest (AH) and stop lever (EQ) (on setting cam assembly) is contacting stop lug on locator plate (which is part of the tone arm shaft assembly). Then insert a  $\frac{1}{16}$ -in. shim between tone arm shaft head and bearing race to set vertical clearance (which must be approximately  $\frac{1}{16}$  in.) so that clutch will be engaged for moving trip lever when tone arm is down on record and align tone arm (AG) flush with tone arm rest (AH) as shown in upper illustration. Tighten clamp screw securely and remove  $\frac{1}{16}$  in. shim, then check action of tone arm and adjust needle landing as in adjustment No. 1, if necessary.



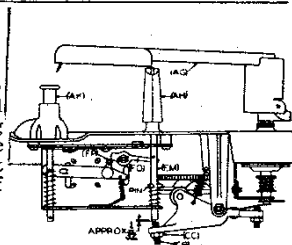
13  
RAISING  
LEVER  
PRESSURE  
ADJUSTMENT

To make this adjustment first put unit into change cycle, then stop it when roller (CD) is at the highest point on the cam (FK), then loosen lock nut and turn screw under flat lifter spring clockwise until tone arm elevating pin (FW) and shaft (FX) are completely raised and flat spring contacts the tone arm shaft (FX) holding clutch assembly firmly in the high position against tone arm swing bracket (FY) and only slightly deflecting the flat spring. Then tighten lock nut securely.



14  
SWITCH  
SHUT-OFF  
ADJUSTMENT

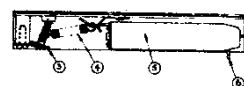
Start a change cycle by pressing push button (AK) so that roller (FP) holds switch latch (FQ) in a loaded position. Then stop turntable by hand when cam gear is in position (shown in illustration) and pin on rest shaft is sliding down decline from shoulder on cam gear, allow the rest shaft (FM) to come down gradually and when switch latch (FQ) trips, hold rest shaft in that position and adjust screw (CB) to within approximately  $\frac{1}{32}$  in. from end of shaft (FM), tighten lock nut (CC) securely and check operation.



15  
ADJUSTING  
DEPTH OF  
RECORDING  
NEEDLE CUT

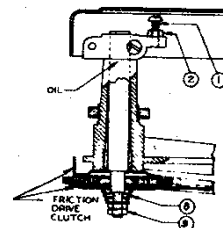
The adjustment for cut of needle pressure is thumbscrew (3) shown in illustration. This adjustment regulates the spring tension of pressure spring (4) on the pivoted cutting head (5), and by turning the thumbscrew to the left or right will increase or decrease the pressure on the needle.

The correct setting is determined by inspecting a cut record under a magnifying glass. The width of the groove should be approximately the same as the width of the uncut record surface between the grooves.



16  
ADJUSTING  
HEIGHT OF  
RECORDING  
ARM

The adjusting height screw (1) and lock nut (2) are for adjusting the height of the recording arm above the turntable. The height of the tip of the needle is approximately  $\frac{1}{8}$  in. from the record surface when the cartridge (5) is held by the screw (7) in the "UP" position. If it is necessary to adjust the height of arm to provide a final adjustment of the cutting needle pressure, loosen lock nut (2) and with screw driver, turn adjusting screw (1) counterclockwise to raise the arm or clockwise to lower the arm. Then tighten the lock nut.

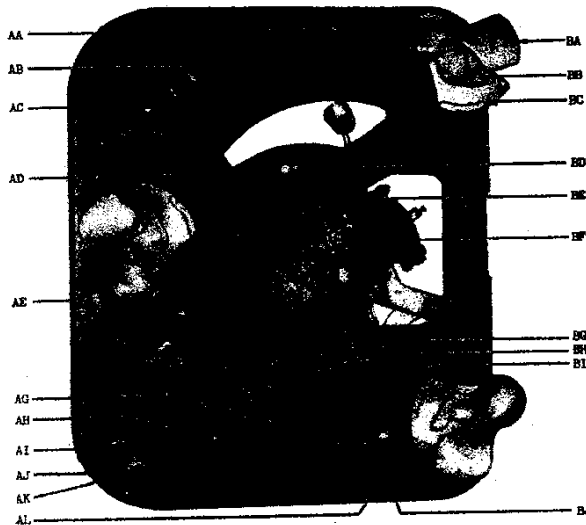
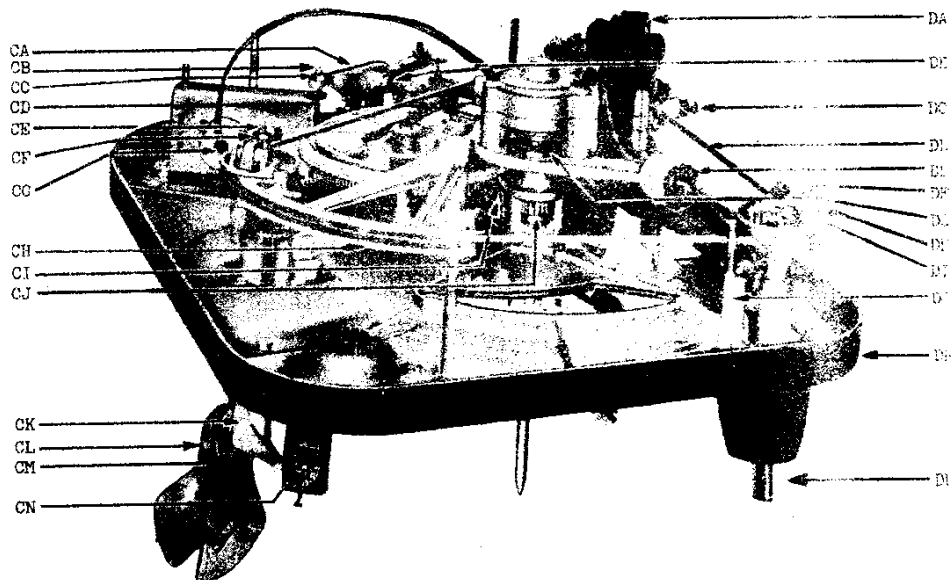


## TROUBLE SHOOTING

Cases of failure to operate satisfactorily will generally be found due to either neglect of proper lubrication, to tampering with the mechanism after it leaves the factory, or to injuries accidentally sustained as by external vibration or by impact of some heavy object. In addition, there is always the possibility that any kind of spring may "go dead" (cease to operate without any visible breakage), even though the utmost factory

precautions are taken against it—or that setscrews may work loose due to external vibration. For tightening setscrews, an Allen (hexagon) wrench is required. Be sure that setscrews are properly seated on the holes or flats provided. Damage from tampering is likely to take the form of bent parts. Never bend any part during examination.

## GENERAL ELECTRIC CO.

MODELS 60, 80  
MODEL JM-1CTop View A-B  
Fig. 1Bottom View C-D  
Fig. 2

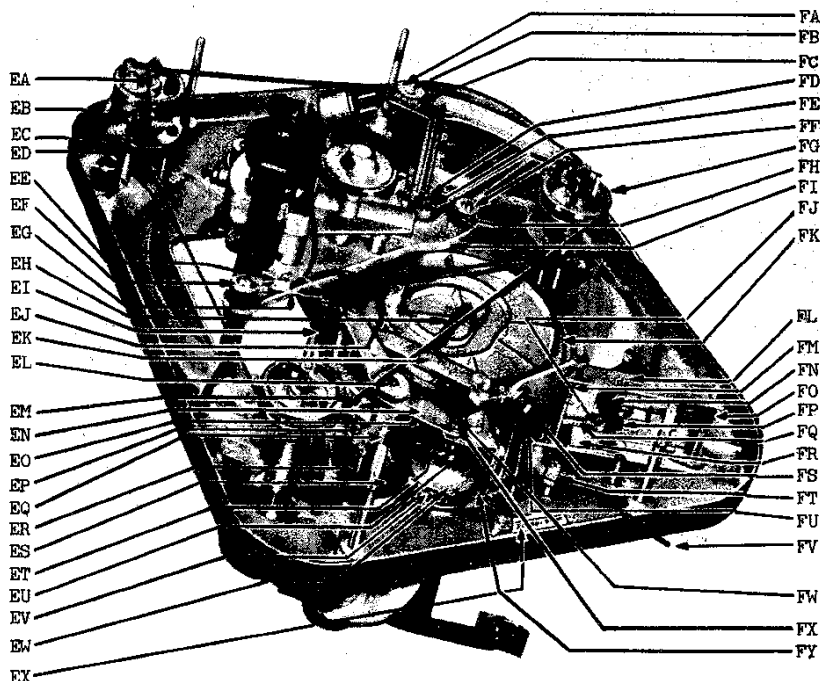
## REPLACEMENT PARTS LIST—MODEL JM-1C RECORD PLAYER AND RECORDER

Symbol	Stock No.	Description
<b>RECORD PLAYER ASSEMBLY</b>		
AD	RL-967	LATCH—Cam latch and trigger assembly
AH	RR-854	REST—Phono tone arm rest support
AI	RK-1025	KNOB—Manual-automatic selector knob
AK	RB-643	BUTTON—Reject control button
BA, BB, BC	RP-2012	PLATE—Selector plate
BC	RX-092	ASSEMBLY—Changer plate assembly
BB	RP-2010	PLATE—Shelf plate
BF	RP-2011	PLATE—Center plate
	RS-960	SPINDLE—Turntable spindle and housing
BG	RL-968	LEVER—Trip lever assembly
BH	RA-426	ARM—Trip arm assembly
CA	RX-093	ASSEMBLY—Raising lever assembly
CB, CE	RS-9020	SCREW—Adjusting screw
CD	RR-946	ROLLER—Raising lever arm roller
CG	RS-3106	SWITCH—Phono power switch
CH	RX-094	ASSEMBLY—Tape control segment assembly
CI	RG-718	GEAR—Intermediate gear assembly

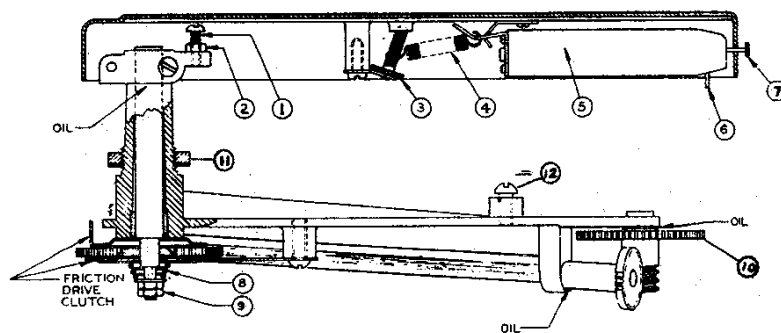
Symbol	Stock No.	Description
CJ	RG-717	GEAR—Drive pulley gear
CK	RB-1127	BRACKET—Changer plate bracket
CL	RP-413	PIN—Plate hinge pin
CM	RP-414	PIN—Plate lifting pin
CN	RC-5010	CRYSTAL—Phono crystal pick-up
DA	RM-150	MOTOR—60 cycle phono motor
DA	RM-151	MOTOR—50 cycle phono motor
DB	RS-8021	SCREW—Raising lever trunion screw
DD	RT-933	TAPE—Cycling control tape
DF	RX-095	ASSEMBLY—Centerplate lifter assembly
DG	RC-2041	COUPLING—Motor coupling assembly
DH	RP-415	PIN—Plate lifter pin
DI	RS-4036	SPRING—Plate lifter spring
DI	RP-416	PIN—Plate post pin
DL	RP-417	PIN—Centerplate raising pin
EA	RC-2042	CAM—Center arm lifter cam
ED	RS-8022	SCREW—Arm lifter cam mounting screw
EG	RC-8211	CONNECTOR—Motor grounding
EH	RS-4035	SPRING—Swing lever spring
EI	RS-4034	SPRING—Trip arm spring

MODELS 60, 80  
Model JM-1C

## GENERAL ELECTRIC CO.



Bottom View E-F  
Fig. 3



Recorder Unit  
Fig. 4

## REPLACEMENT PARTS LIST—MODEL JM-1C RECORD PLAYER AND RECORDER (Cont'd)

Symbol	Stock No.	Description	List Price	Symbol	Stock No.	Description
EJ	RR-947	ROLLER—Roller for tape control segment.	\$0.10	FK	RC-2045	CAM—Main cam and gear assembly.
EK	RL-969	LEVER—Swing lever and bracket assembly.	1.20	FL	RX-096	ASSEMBLY—Phono motor switch plate assembly.
EL	RN-015	NUT—Setting lever thumbnut.	.20	FM	RS-9025	SHAFT—Phono tone arm rest shaft.
EM	RS-4033	SPRING—Trip lever spring.	.05	FN	RS-4031	SPRING—Switch latch spring.
EN	RS-638	SUPPORT—Swing bracket support.	.45	FO	RS-9024	SHAFT—Push button control shaft.
EO	RS-4032	SPRING—Clutch brake spring.	.05	FQ	RL-972	LATCH—Switch latch gear.
EP	RL-970	LEVER—No-record selecting lever.	.30	FU	RS-4030	SPRING—Phono tone arm raising lever spring.
EQ	RC-2043	CAM—Setting cam assembly.	1.20	FW	RP-418	PIN—Phono tone arm elevating pin.
ES	RS-9026	SHAFT—Phono tone arm shaft assembly.	2.10	FX	RS-9023	SHAFT—Phono tone arm shaft.
ET	RL-971	LEVER—Clutch release lever assembly.	.50		RS-3105	SWITCH—Crystal shorting switch.
EU	RS-958	SLEEVE—Pressure release sleeve.	.20		RS-8019	SCREW—Spindle housing mtg. screws.
EV	RW-130	WASHER—Cork friction washer.	.05-3		RT-939	TURNTABLE—Turntable assembly.
EW	RC-2044	CUP—Tone arm bottom friction cup.	.10			RECORDER UNIT ASSEMBLY
FA	RW-131	WASHER—Retainer washer.	.05-3		RA-425	ARM—Cutter arm complete.
FC	RS-8023	SCREW—Binder head screw.	.05-4	(5)	RC-5009	CRYSTAL—Crystal cutter head.
FG	RP-332	PULLEY—Post pulley.	1.05	(7)	RG-716	GEAR—Recorder assembly less cutting arm and cartridge.
FH	RG-308	GROMMET—Motor plate mounting grommet.	.05	(4)	RS-876	SCREW—Crystal needle screw.
FI	RP-2013	PLATE—Motor mounting plate.	.60		RS-4029	SPRING—Crystal tension spring.

# GENERAL ELECTRIC CO.

## TROUBLE SHOOTING REFERENCE CHART

MODELS 60, 80  
MODEL JM-1C

SYMPTOM	CHECK
1. Mechanism is slow in starting, or motor overheats	a. Lubrication b. For too high or low line voltage c. For motor winding damage
2. Motor is slow starting	a. Lubrication. Old or gummy oil b. Changer may be in too cold place. Give chance to warm before trying other checks
3. Changer is noisy when in cycle	a. Lubrication. Check if any part is loose or bent and is rubbing against moving part
4. Changer fails to trip after playing record while set on "A" automatic	a. Adjustments Nos. 2, 8
5. Changer fails to trip when push button is pressed (pointer set on "A")	a. Adjustment No. 2 b. Switch assembly (FL) for obstruction or a bent or loose part
6. Trips too soon or before record has finished playing	a. Adjustment No. 2 b. For not enough clutch action. Bend forked release lever (ET) slightly to increase
7. Tone arm lifts immediately without playing record or continues cycling	a. Adjustment No. 2 b. For proper operation cam latch and trigger assembly (AD)
8. Tone arm lifts but does not swing out properly	a. Adjustment No. 13
9. Tone arm falls off record or misses record completely	a. Adjustments Nos. 1, 12 b. For too much clearance between cork clutch disc and tone arm switch bracket (FY). Adjust by means of the thumb nut (EL), turn counterclockwise
10. Tone arm slides in several grooves on record	a. Adjustments Nos. 9, 10
11. Tone arm fails to pull in first groove on record properly	a. Adjustment No. 9
12. Tone arm lands too far in or out on record	a. Adjustment No. 1 b. For loose or bent parts
13. Tone arm lands in middle of record	a. Adjustment No. 9
14. Tone arm fails to clear stack of sixteen 10-inch records	a. Adjustment No. 11
15. Tone arm lands for 10-inch record when playing a 12-inch record	a. Adjustments Nos. 5, 6
16. Changer cycles with pointer set on "M" for manual operation	a. Adjustment No. 2 b. For loose setscrew in knob (AI) c. That manual latch (FR) holds trip link rod (FS) from moving
17. Changer jams and stops	a. Adjustments Nos. 7, 14
18. Record jams	a. For off-size record or defective edge b. Adjustment No. 3
19. 12-inch record is not dropped by one of shelves	a. Adjustment No. 5
20. One or more shelves drop 2 records at a time	a. Adjustment No. 3
21. Changer fails to turn off automatically after last record is played	a. Adjustments Nos. 4, 9, 14
22. Records drop unevenly from shelf plates to turntable	a. Adjustment No. 7
23. Tone arm varies when set down on record	a. For loose tone arm shaft head on shaft (FX) b. Adjustment No. 9
24. "WOW" in record reproduction	a. For warped or defective records b. For bent motor mounting plate (FI) c. For motor shaft out of alignment with turntable shaft
25. Record is driven but not heard or not heard with proper volume	a. That pickup cord is plugged in b. Amplifier and speaker connections c. For open pickup crystal
26. Noisy or intermittent noise from speaker during change cycle	For dust particles or grease on silencing switch contacts. This switch is mounted on the power switch assembly (FL)