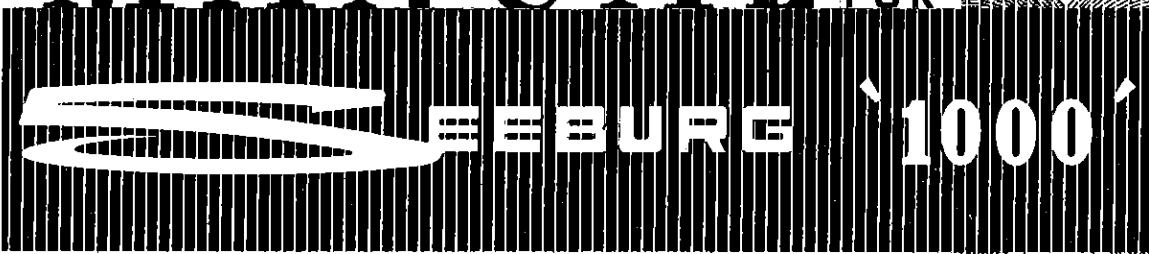


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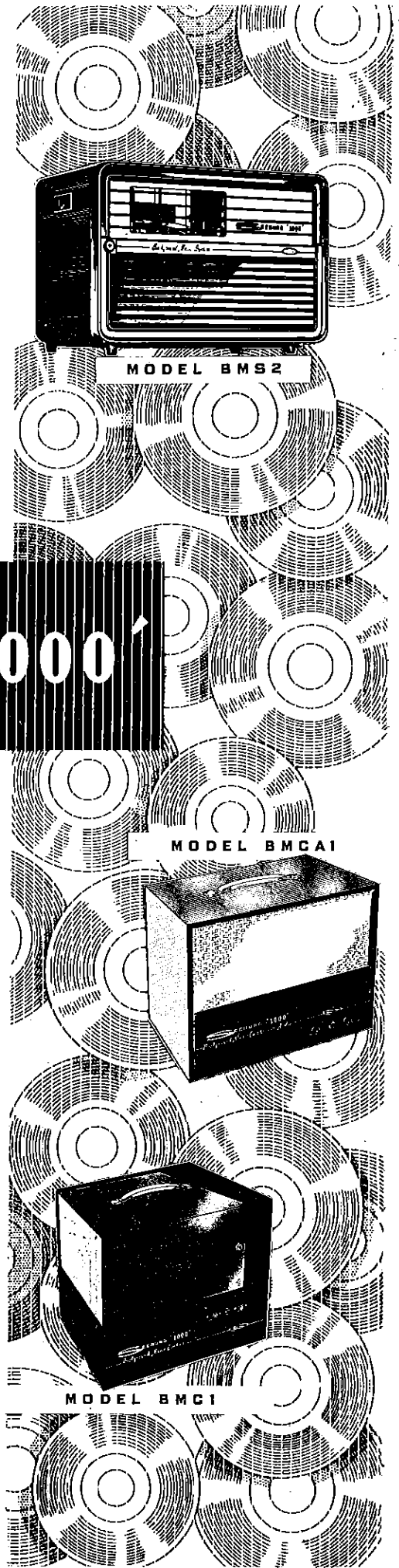
Background Music Systems
AND
ACCESSORY EQUIPMENT

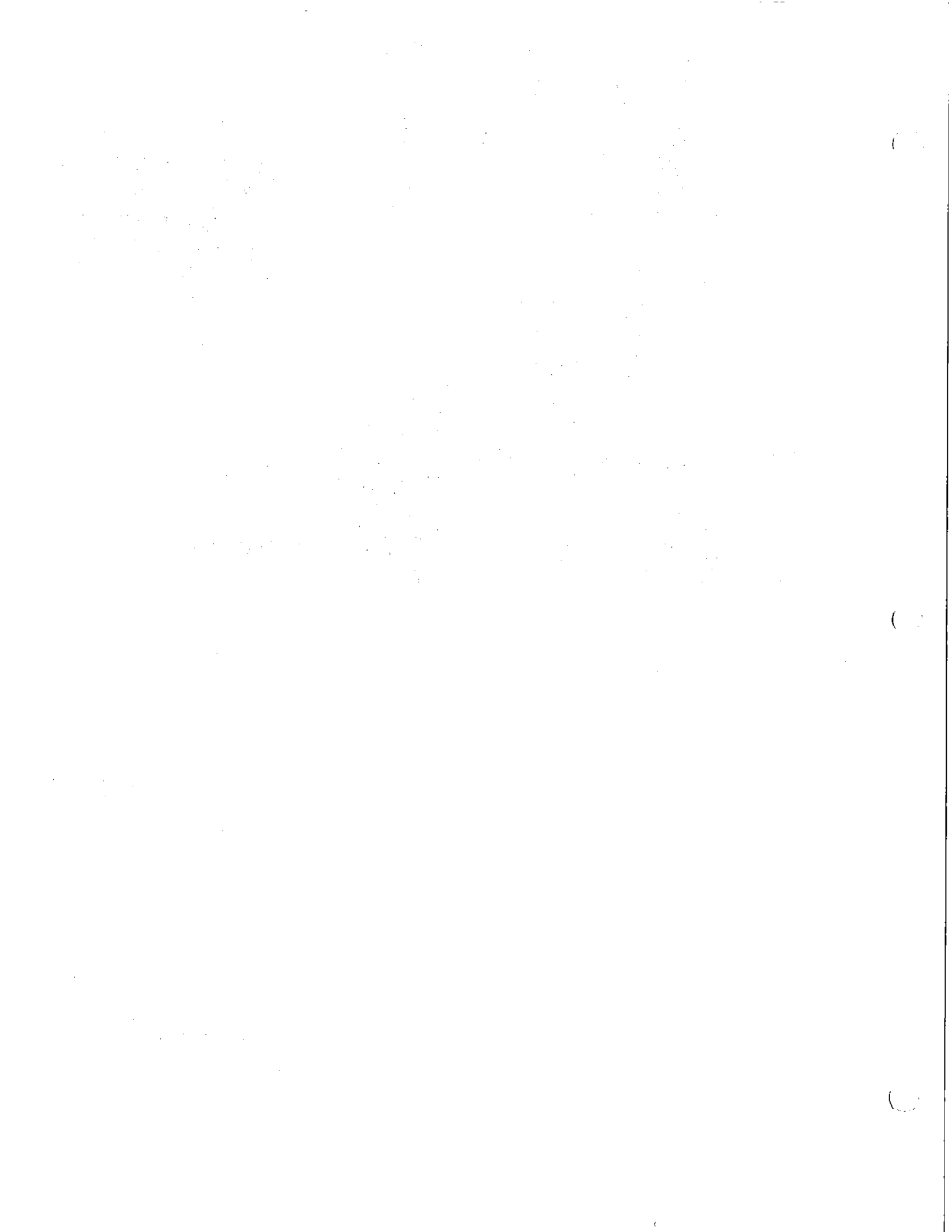


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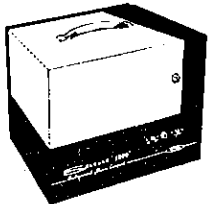
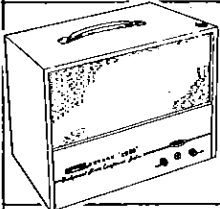
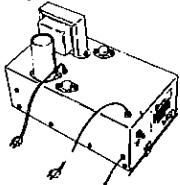
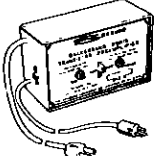
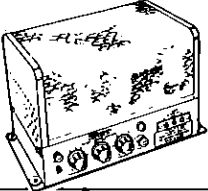

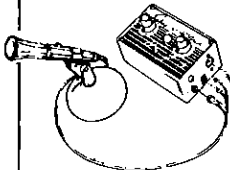
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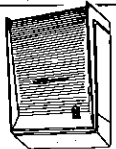
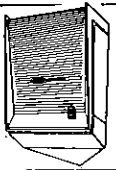
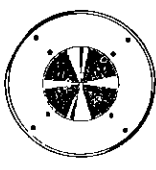
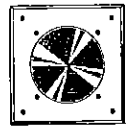

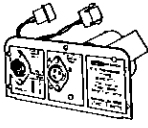
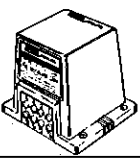
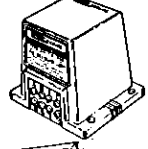
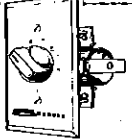
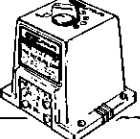




INDEX

	MODEL NO. OR TYPE NO.	NAME	FUNCTION	SECTION
	Model BMS2	Background Music System	To automatically supply background music to small locations or by the addition of speakers and other equipment, locations of any size. Includes monitor speaker, 20-watt amplifier and provision for microphone and program timer.	300-11 See page 5 for reference.
	Model BMC1	Background Music Compact	Consists of record playing mechanism for Seeburg Library records in a small cabinet. Use with BMCA1 or existing sound system having input for magnetic pickup.	300-9 See page 5 for reference.
	Model BMCA1	Background Music Companion Audio	For use with BMC1. Includes speaker and 4-watt amplifier. Amplifier may be used for external CV speakers.	300-10 See page 5 for reference.
	Type ABMA3-56	Power Amplifier	To provide additional power (20 watts) where required. May be installed in Model BMS2 Cabinet.	500-14
NO LONGER AVAILABLE				
	Type BMPA11-56	Background Music Preamp	The Seeburg Background Music Preamp is a fully transistorized, low distortion, wide frequency range preamp designed for use with the BMC1.	500-11
	Type HFA4-56	High Fidelity Amplifier	60-watt amplifier for use where additional power is required for remote speakers. Includes microphone channel with independent tone and volume control.	500-12
	Part No. 503940	Microphone and Desk Stand	When connected to Model BMS2 or Type HFA4 Amplifier provides paging over entire system (or selected areas).	800-16
	Type TMP52-56	Microphone Pre-amplifier Kit	Used when multiple microphones are required.	800-17


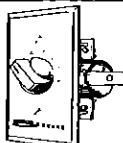
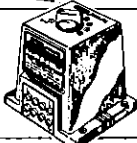
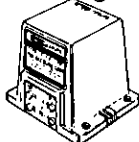
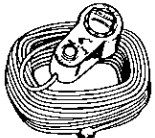
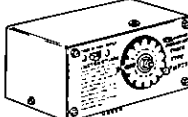
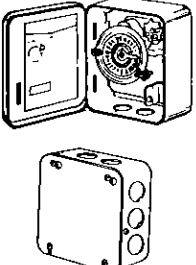
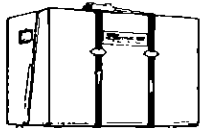
INDEX

	MODEL NO. OR TYPE NO.	NAME	FUNCTION	SECTION
	Type BWS3-8CV	Wall Speaker	A surface mounted, CV, wall-type speaker. Taps at 4, 2, 1, ½ and ¼ watts.	700-23
	Type BCS7-8CV.	Corner Speaker	A surface mounted, CV, corner speaker. Taps at 4, 2, 1, ½ and ¼ watts.	700-23
	Type BRR51-8CV	Recessed Speaker (round)	A flush mounted, CV, wall or ceiling speaker. Taps at 4, 2, 1, ½ and ¼ watts.	700-25
	Type BRS1-8CV	Recessed Speaker (square)	A flush mounted, CV, wall or ceiling speaker. Taps at 4, 2, 1, ½ and ¼ watts.	700-26
	Type BTWS1-8CV	Two-Way Speaker	A surface mounted, CV, wall or ceiling mounted speaker. Taps at 4, 2, 1, ½ and ¼ watts.	700-24
	Type BMCVT-2 Part No. 508970	Constant Voltage Transformer Assembly	Used with Type BMA3 amplifier. Has connections for 70.7 volt CV line and for 16 ohm speakers at 4, 2, 1, ½ or ¼ watts for each speaker. Supplied as standard equipment in Model BMS2. Rated 20 watts.	Ref: 300-11
	Type 4LT-1 Part No. 508330	Line Transformer	When connected to far end of 70 volt CV line, feeds up to 4 watts of power to 16 ohm speakers with choice of 4, 2, 1, ½ or ¼ watts for each speaker.	800-21
	Type 25LT-3 Part No. 508350	Line Transformer	When connected to far end of 70 volt CV line, feeds up to 25 watts of power to 16 ohm speakers with choice of 8, 4, 2, 1 or ½ watt for each speaker.	800-21
	Type 12LC-1 Part No. 508210	Line Control	Recessed mounted unit controls volume of one or more speakers on 70 volt CV line, rated 12 watts.	800-22
	Type 12LC-2 Part No. 508290	Line Control	A surface mounted unit controls volume of one or more speakers on 70 volt CV line, rated 12 watts.	800-23

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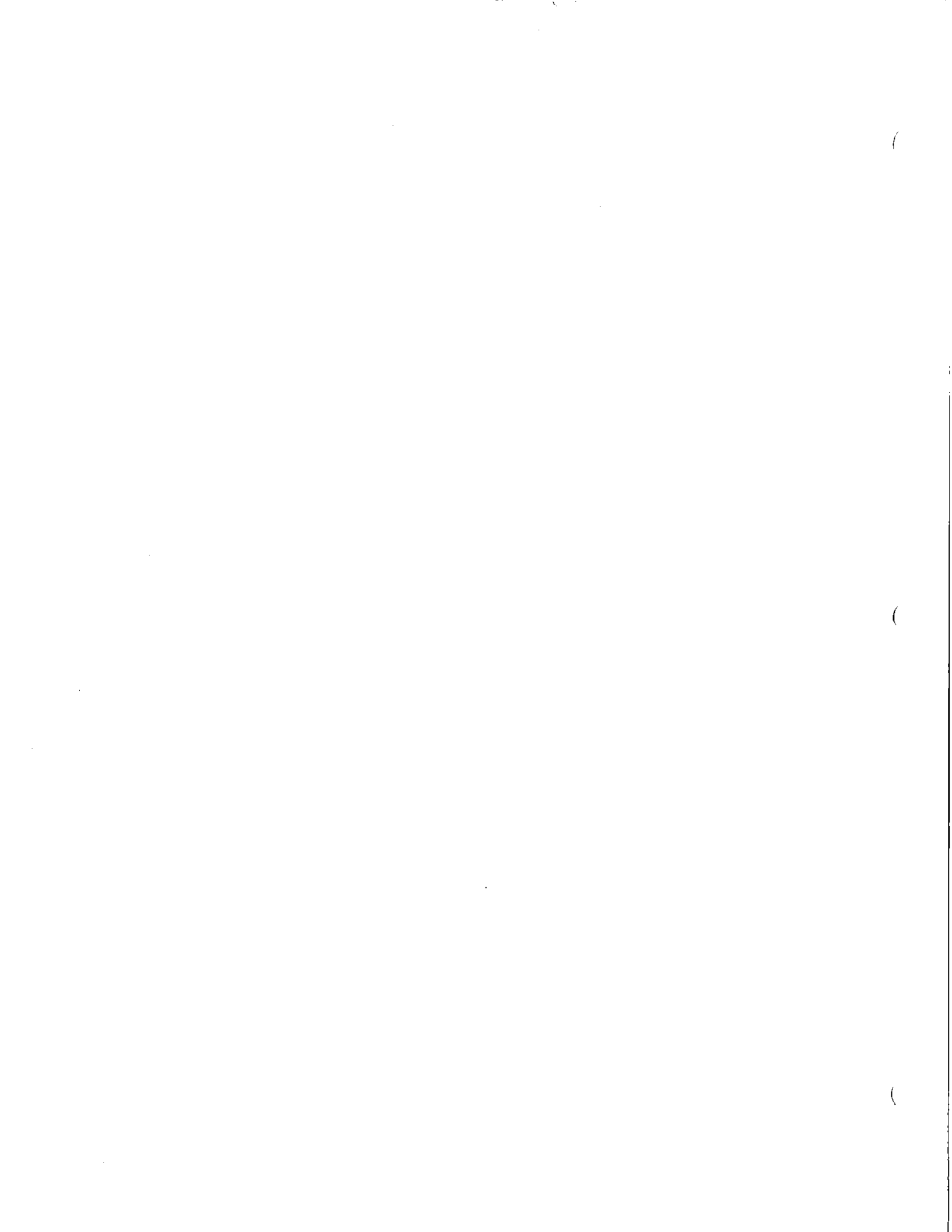
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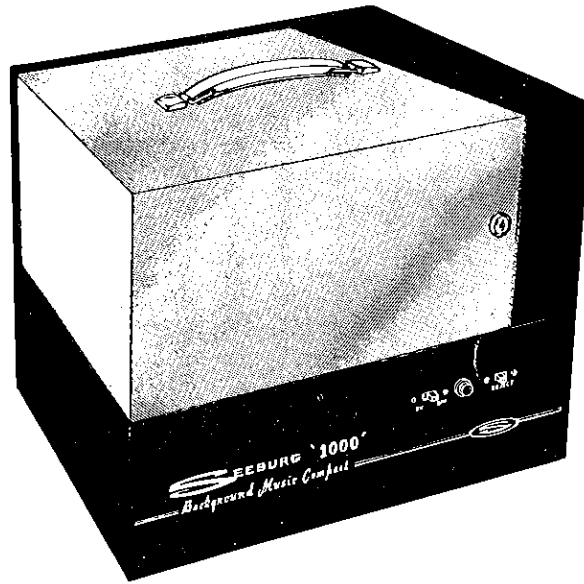
	MODEL NO. OR TYPE NO.	NAME	FUNCTION	SECTION
	Type 25LC-1 Part No. 508260	Line Control	Surface mounted unit controls volume of one or more speakers on 70 volt CV line, rated 25 watts.	800-23
	Type 12LIC-1 Part No. 508230	Low Impedance Control	A recessed mounted unit to control volume of one or more 16 ohm speakers when connected between speaker and a line transformer, rated 12 watts.	800-24
	Type 12LIC-2 Part No. 508310	Low Impedance Control	A surface mounted unit to control volume of 1 or more 16 ohm speakers when connected between speaker and a line transformer, rated 12 watts.	800-25
	Type 12UMT Part No. 508430	Universal Impedance Line Transformer	Replaces existing Type BMA1 amplifier (Model BMS1) to any speaker load of 0.35 ohms to 500 ohms, rated at 12 watts.	800-28
	Type BMRVC-1	Remote Volume Control	May be used up to 60 feet from Model BMS1 or Model BMS2 for control of system volume and allow rejection of records.	800-19
	Type BMPT1 Part No. 508540 (60 cycle)	Program Timer Kit	For use with Models BMS1, BMS2 and BMU10 for intermittent music. Adjustable to give any number of selections (from two to continuous playing) in each half hour period.	800-29
	Type BMPTAK1 Part No. 508430	Power Timer Accessory Kit	A kit used to modify operation of Model BMS2 for daily automatic on-off control and cut-out on one or more days of the week. Use of this timer does not affect operation of the Type BMPT1 Program Timer. The kit consists of the timer and the junction box, hardware and cables for plug-in connections but does not include wiring for connections between the junction box and the timer.	800-27
	Part No. 495147 Part No. 495324 Part No. 495326	Carrying Case	Waterproof canvas, leather reinforced, zippered carrying case specifically designed for safe, convenient transporting of the "1000" units. No. 495147 for BMS1, BMS2 and BMU10 No. 495324 for BMC1 No. 495326 for BMCA1	--

INSTRUMENT INDEX

	UNIT	MECHANISM OPER.	MECHANISM SERVICE	MECHANISM PARTS	POWER AMPLIFIER
Backgr. Music System BMS2	300-11	400-5	400-6	400-7	500-12
Backgr. Music Compact BMC1	300-9	400-5	400-6	400-8	-
Backgr. Music Companion Audio BMCA1	300-10	-	-	-	Ref: 300-10



SEEBURG "1000", BACKGROUND MUSIC COMPACT, TYPE BMCI



The Seeburg "1000" Background Music Compact, Type BMCI record player is designed for playing Seeburg Background Music Library recordings through the Seeburg Background Music Companion Audio, Type BMCA1 or an existing sound system. It incorporates the Seeburg Background Music Mechanism, Type BMM2 which plays both sides of 25 records sequentially to provide 1000 individual selections for 37½ hours of music and then restacks the records.

The associated records are 9 inches in diameter with twenty tunes per side and are played at 16-2/3 rpm.

The Type BMCI is operated at 117 V.A.C. and includes circuits and switches for power control of the sound system with which it would be used.

SPECIFICATIONS

Dimensions and Weight:

Height 14-1/8" above supporting surface.
 Width 16-1/2"
 Depth 11"
 Net Weight 37 Pounds
 Shipping Weight 42.5 Pounds

Finish:

Cabinet Scotch Textured - Charcoal
 Lid Assembly Green

Pilot Light:

Neon Pilot Lamp Socket Assembly.

Cabinet Key Number: L290

Carrying Case:

Waterproof, zippered, canvas, leather reinforced,
 Part No. 495324, available from your Seeburg
 Distributor.

Record Capacity: 25
 1000 Selections, 37-1/2 hours of music without
 repetition.

Record Weight: 25 records, approximately 5 pounds.

Record Type: 16-2/3 rpm.
 9 inch diameter, 2 inch center hole.
 Property of Seeburg Music Library, Inc.

Power Requirements:

117 volts A.C., 60 cycles, 0.3 amp., 20 watts.
 Accessory Receptacle 3 amp.
 Maximum Accessory Power 290 watts.

Background Music Mechanism: Type BMM2.

Pickup: Seeburg High Fidelity Magnetic.
 Armature Assemblies with Diamond Styluses
 (green), Part No. 233175. Two used.

Audio Output:

1 m.v./cm./sec. of recorded level at 1000 cycles.
 Load impedance approximately 25000 ohms.

The output is approximately 3 to 5 m.v. Satisfactory performance will be had with an amplifier or preamplifier designed for low impedance magnetic pickups.

Output Connection:

A 3-prong socket at the rear of the cabinet.
 (Plug to be used is 3-prong, Seeburg Part No.
 250938, furnished).

INSTALLATION INSTRUCTIONS

INSPECTION

Examine the instrument for external as well as internal damage immediately after unpacking. If any damage is found, notify the transportation representative.

PLACING THE BACKGROUND MUSIC SYSTEM

Choose a location for the instrument in which it will be conveniently accessible for operation and servicing. It should be placed on a firm, level surface free from vibration or any sources of excessive heat (do not place on radiator). Adequate ventilation is essential to prevent warpage of records. Allow minimum cabinet clearances as follows: 2 inches in the rear, 2 inches on top, 1½ inches on the left side and 1½ inches on the right side.

The instrument may be secured in position to prevent unauthorized movement. A No. 10 by two inch long self-tapping screw and split rubber washer are provided and may be installed after removing the plug button from the base of the cabinet as shown in *Figure 2*.

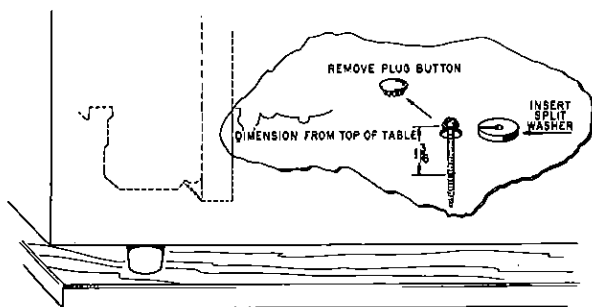


Figure 2. Securing Cabinet

PREPARATION FOR OPERATION

1. Before placing the system in operation, it is necessary to remove or loosen all shipping hardware, pads and packing. Carefully follow instructions on the tags. Store removed material in original carton for possible future shipment.
2. Make certain that the supply voltage and frequency agree with the markings on the instrument name plate.
3. Unwind the line cord located on the rear of the case and plug into the service outlet.

LOADING RECORDS

Remove upper spindle weight and place it on a clean surface, padded side up. Before loading records, make certain that the pick-up-arm is in rest position, that the record clamping fingers on the lower spindle are retracted and that the upper spindle support fingers are extended as shown in *Figure 3*.

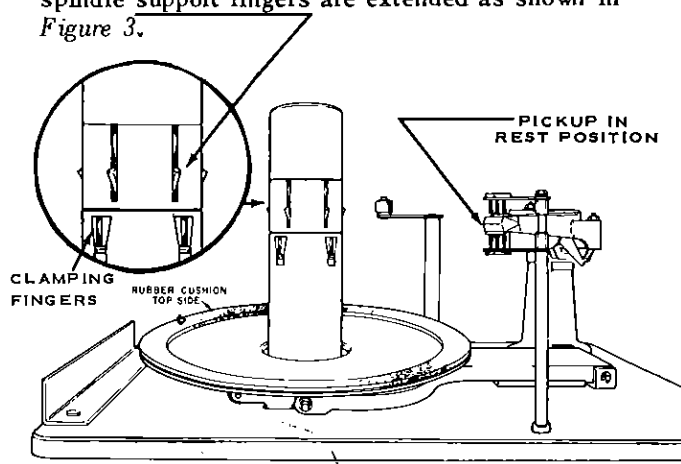


Figure 3. Ready For Loading - Pickup In Rest Position.

CAUTION: Wash hands thoroughly before handling records. Hold records by outer edge or center hole and outer edge. DO NOT TOUCH GROOVES. To assure subsequent exclusion of dust and dirt, make certain that cabinet door is kept closed after completion of installation.

Load records, five or six at a time, in numerical order (1-25) with all "A" sides facing downward, the bottom record should be 1A. After the records are loaded, place the Record Weight on top of the stack, padded side down.

A full load of 25 records must be used when testing or operating this equipment. Do not use partial loads. The instrument is designed to give optimum performance only with a full stack of records.

NOTE: After loading, let the mechanism "run-in" for half an hour to an hour. This will allow the rubber mounts and rubber motor coupling, which have been compressed by packing material, to be normal and function properly.

TO CHANGE RECORDS, conform to the following procedure:

1. If the mechanism is playing the underside of a record, *Figure 4*, reject this record side by pushing the Reject Button to the left. After

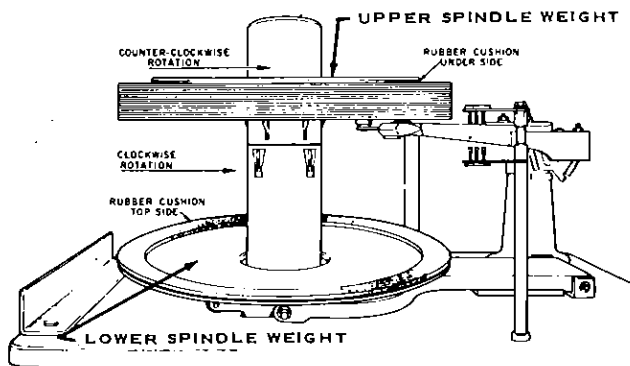


Figure 4. Playing Underside of Record.

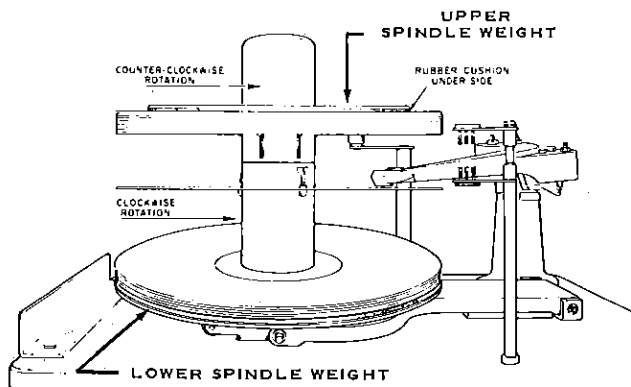


Figure 5. Playing Topside of Record.

the mechanism has started playing the top side of this record, *Figure 5*, push the power switch to the "OFF" position (to the right).

2. Wait until all records have stopped rotating.
3. Remove upper spindle weight and place it on clean level surface padded side up. Remove records 5 or 6 at a time and stack them on record weight upside down thereby maintaining original sequence. To restack records on spindle reverse this procedure. See instructions on record replacement packages.

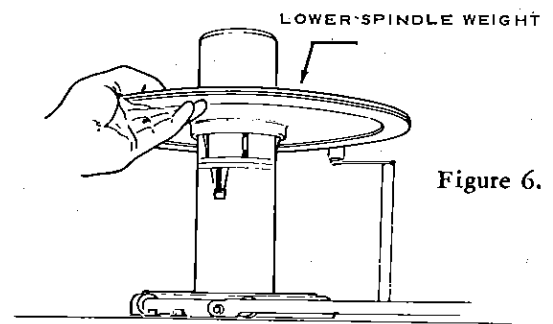
CAUTION: Do not remove Lower Spindle Weight. DO NOT TOUCH RECORD GROVES.

REPLACEMENT OF LOWER SPINDLE WEIGHT

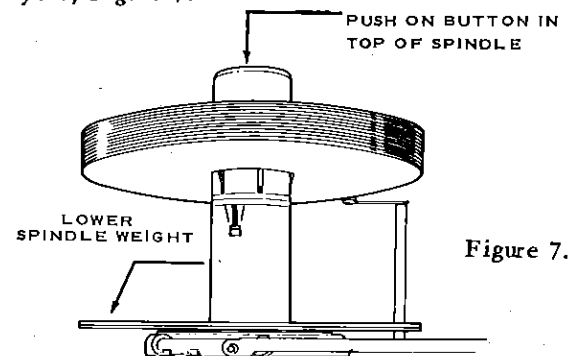
If at anytime the Lower Spindle Weight has been removed and is to be replaced, place it on the upper spindle support fingers. Firmly grasp the weight, push recessed button in top of the spindle and gently lower the weight to the turntable, *Figure 6*.

ACCELERATED RECORD DROPPING

Before rapid record drop operation, make certain that there is no record in the intermediate position.



Individual records may be rapidly dropped to the turntable by manually pulsing downwardly the recessed push button located in the top of the spindle, thus simulating a rapid transfer cycle, *Figure 7*.



CAUTION: Do not drop the last record manually; operate the mechanism electrically and actuate the Reject Button on the front of the cabinet.

AUDIO OUTPUT

Connect the output of the record player at the three-prong socket (J652) located on the rear of the cabinet by means of a three-prong plug, Part No. 250938, provided. Use a low capacitance (100 mmfd./ft. max.) shielded cable for connection to the sound system. Recommended cable available from Seeburg distributor is Part No. 304721. Refer to schematic, *Figure 10*, for circuitry.

NOTE: The maximum capacitance of the interconnecting cable between the BMC1 and the associated audio system should not exceed 1200 mmfd.

Insure minimum audio hum pickup by (1) dressing shielded cable away from A.C. power line cords, (2) checking all ground connections in the audio system, (3) grounding the BMC1 case to the sound system chassis ground, and (4) reversing the A.C. wall plug polarity experimentally.

POWER CONTROL

Plug existing audio system power control into socket (J651) at the rear of the cabinet if it is desired to provide simultaneous control of both the record player and audio system.

STYLUS REPLACEMENT

In the presence, of friction, wear of the stylus starts with the first play and continues until the stylus is replaced. The tone quality will be optimum and distortion remains at a low level for thousands of plays but gradually distortion increases until a disagreeable amount is noticed. The styluses should be replaced in pairs before objectionable wear has developed; approximately every 6 months of system operation and in pairs. Neglect may permanently damage records and subsequent replacement of styluses will not restore the original tone quality.

TO REPLACE ARMATURE ASSEMBLIES:

1. Push power switch to "OFF" position (to the right)
2. WAIT until pick-up is at REST position and the records stop rotating.
3. Hold the tone arm against the stylus brush post, *Figures 8 and 9*. Slide worn armature assemblies out of pickup by gripping the top portion of the "T", using the thumb and forefinger. Light pressure in the direction away from the stylus point will slide the armature out of the cartridge slot.
4. Install the new armature assembly by laying it flat in open end of cartridge slot and sliding forward in slot until it bottoms.
5. **CAUTION:** *The pickup and styluses must be handled carefully or the delicate armature suspension may be damaged.*

LUBRICATION

Every 6 months put 3 to 6 drops of Seeburg Special Purpose Oil No. 53014 in each of the two oil cups on motor and in each of the two oil holes in main drive bearing casting. To lubricate main drive bearing:

1. Restack records to upper spindle.
2. Manually lift turntable weight and hold to expose main drive bearing oil cups, *see label below mechanism.*

CAUTION: *Do not raise turntable weight to upper spindle. DO NOT USE AN EXCESS OF OIL.*

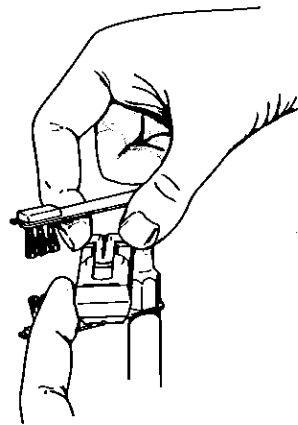


Figure 8. Replacing Upper Stylus.

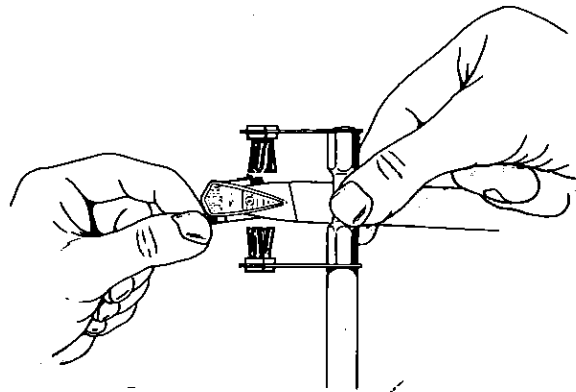


Figure 9. Replacing Lower Stylus.

CLEANING OF RUBBER IDLER WHEELS

It is recommended that, at the time of mechanism lubrication, all rubber drive wheels be carefully wiped off with a clean cloth dampened with denatured alcohol. Refer to the Background Music System Service Manual for details.

PREPARATION FOR SHIPMENT

If instrument is carried or transported short distances with records in place follow steps 1 and 2 under "TO CHANGE RECORDS".

TO SHIP

If instrument is to be shipped by way of a transportation company, it should be blocked and crated in the same manner in which it was received from the factory. Refer to step 1 under "PREPARATION FOR OPERATION."

SEEBURG "1000", BACKGROUND MUSIC COMPANION AUDIO, TYPE BMCA1

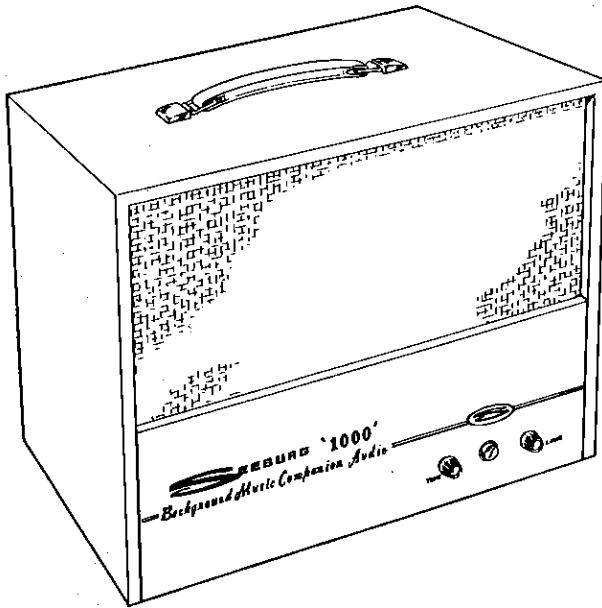


Figure 1.

The Seeburg "1000" Background Music Companion Audio, Type BMCA1, is specifically designed for use with the Background Music Compact, Type BMCI, in playing Seeburg Background Music Library recordings.

The Companion Audio is a complete 4-watt audio system consisting of an amplifier, Type BMA2, equipped with a volume control and a tone control. The cabinet contains a 6 x 9 inch heavy duty wide frequency range speaker.

The Companion Audio A.C. power line cord plugs into the BMCI and is turned on and off with the switch that controls the record player motor.

SPECIFICATIONS**Dimensions and Weight:**

Height14-1/8 inches above supporting surface
 Width 16-1/2 inches
 Depth 8 inches
 Net Weight 16 pounds
 Shipping Weight 20 pounds

Finish:

Cabinet Scotch Textured - Charcoal

Pilot Light:

Neon Pilot Lamp and Socket

Handle Assembly:

Handle Assembly, Part No. 495288, and Handle Caps, Part No. 495289, not supplied. Available from your Seeburg Distributor.

Carrying Case:

Waterproof, zippered, canvas, leather reinforced, Part No. 495326, available from your Seeburg Distributor.

Power Requirements:

117 volts A.C., 60 cycles, 0.4 amp., 45 watts.

Background Music Amplifier Type BMA2

Audio Input:

Plug-in coaxial connector to input circuit (approximately 25000 ohms) designed for low impedance magnetic pickups.

Capable of equalizing and amplifying an approximate 3 to 5 M.V. signal.

Audio Output:

4 watts at less than 5% distortion.

Audio Output Connection:

Internal speaker connection for 1/4 watt, 1 watt or 4 watt power (push-in pin type jacks).

C.V. terminals for 70-volt remote speakers.

Tubes:

1 - 6FE5 1 - 6EU7

Transistor:

1 - 2N591

INSTALLATION INSTRUCTIONS

INSPECTION

Examine the instrument for external as well as internal damage immediately after unpacking. If any damage is found, notify the transportation representative.

PLACING THE BACKGROUND MUSIC COMPANION AUDIO

Choose a location for the instrument in which it will be conveniently accessible for operation and servicing. It should be placed on a firm, level surface, free from any source of excessive heat (*do not place on a radiator*). Adequate ventilation is essential to prevent overheating of components. Do not block rear or bottom cabinet ventilation openings.

If desired, the Companion Audio may be mounted on the wall with brackets that are part of the cabinet back panel. Unscrew the back panel and locate the mounting hole centers using the panel as a template. Use a level to insure horizontal installation. Screw in two No. 10 (two inch long) self-tapping screws and allow about 1/2 inch clearance between the heads and the wall. Replace the panel on the cabinet.

After wiring to the BMCA1 has been completed, place the cabinet in position and, allowing the screw heads to enter the slots in the back panel, move the cabinet downward until the screw shanks are wedged firmly in the slots.

NOTE: The BMCA1 should be close enough to its associated Background Music Compact, Type BMC1, so that not more than 12 feet of connecting cable is required.

WIRING

A 12 foot long audio interconnecting cable assembly, Part No. 495376, Figure 2, is supplied with the Seeburg Companion Audio.

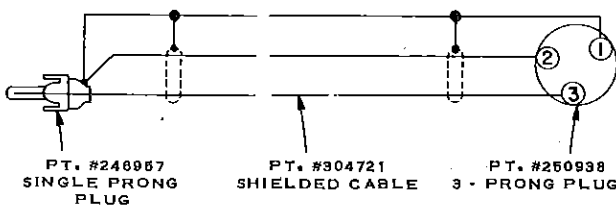


Figure 2. Audio Interconnecting Cable.

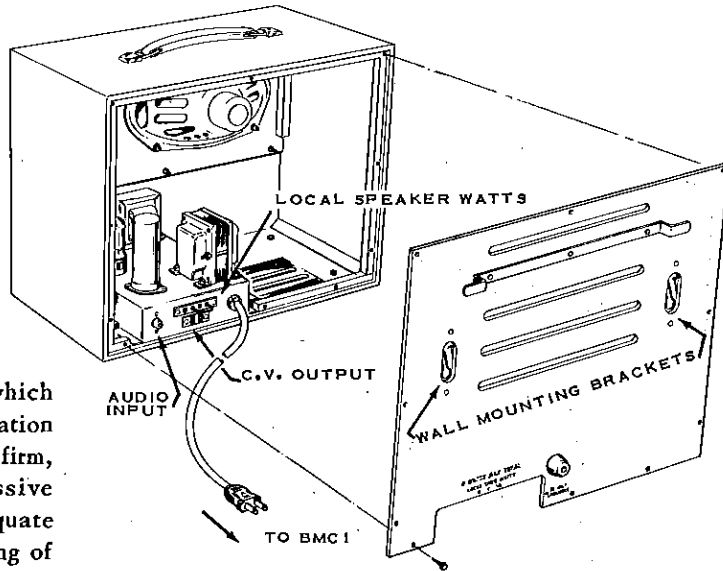


Figure 3. Companion Audio with cover removed.

Longer cable may be used providing that the maximum shunt capacitance does not exceed 1200 Mmfd.

The 3-prong plug end of the cable plugs into the Seeburg Background Music Compact audio output socket. The single prong plug end of the cable plugs into the Seeburg Companion Audio input socket.

Using the prepared cable assembly, connect the BMCA1 to the BMC1. Insure minimum audio hum by (1) routing shielded cable away from A.C. power line cords, (2) checking all ground connections, (3) experimentally reversing the A.C. wall plug polarity.

Select the desired local speaker power output (4, 1 or 1/4 watt) by inserting the selector pin into the appropriate jack on the rear of the BMA2 amplifier (see Figure 3).

POWER CONTROL

Plug the A.C. power line into the socket on the back of the Background Music Compact, Type BMC1, to provide simultaneous control of both the BMCA1 and the BMC1 record player.

ADDITIONAL SPEAKERS

If wider distribution of sound is required or if speakers remote from the Companion Audio

are to be installed, they may be connected to the C.V. terminals on the rear of the amplifier chassis. The total load of external speakers and the speaker in the Compact Audio should not exceed 4 watts. The following constant voltage type speakers are available:

- A. Type BWS2-8CV Wall Speaker, 70-volt constant voltage (4 watts), Part No. 512160.

NOTE: Type BWS2-8CV speakers may be converted for corner installation by addition of Corner Adapter, Type BCA1, Part No. 502871.

- B. Type BCS6-8CV Corner Speaker, 70-volt, constant voltage (4 watts), Part No. 512190.

- C. Type BRS3-8CV Recessed Speaker (Round), 70-volt constant voltage (4 watts), Part No. 512230.

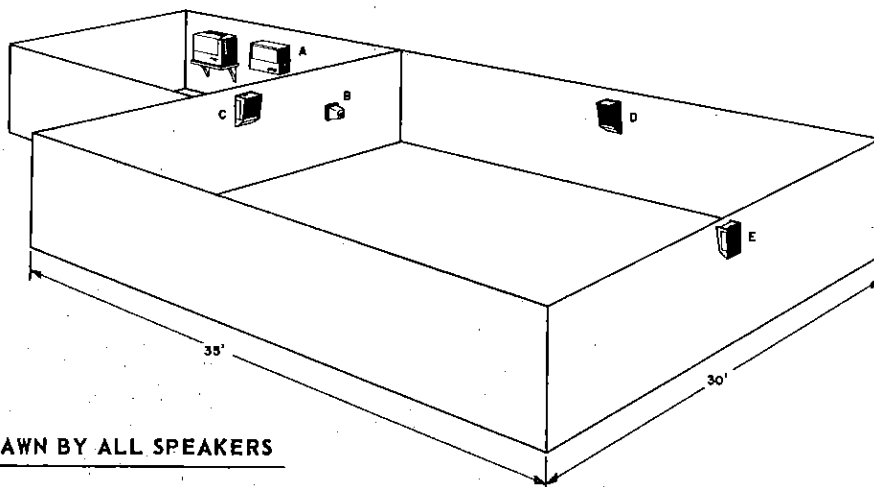
- D. Type BRS4-8CV Recessed Speaker (Square), 70-volt constant voltage (4 watts), Part No. 512210.

LINE CONTROLS, TYPE 12LC1 & 12LC2 (Accessory)

These line controls are rated at 12 watts and are installed in C.V. speaker lines to control the volume of one or more speakers on the line. The Type 12LC1 and Type 12LC2 differ only in that the former is for recessed mounting and the latter is for surface mounting.

TYPICAL AUDIO SYSTEM INSTALLATION

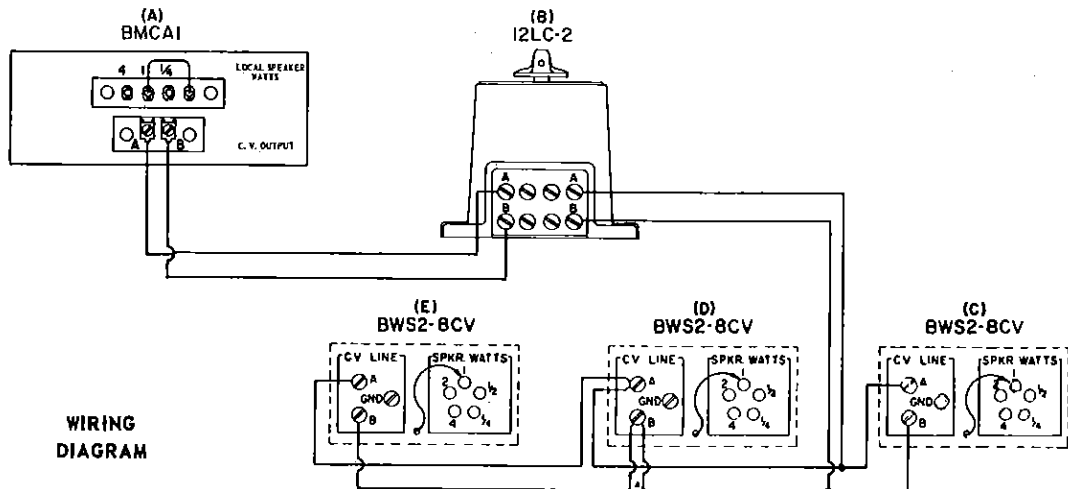
Two separate rooms are served by the audio system. The smaller room contains the Background Music Compact and its associated Background Music Companion Audio whose speaker (A) supplies the sound. The larger room has three wall mounted speakers (C, D & E) which are controlled by a Line Control (B), Type 12LC2.



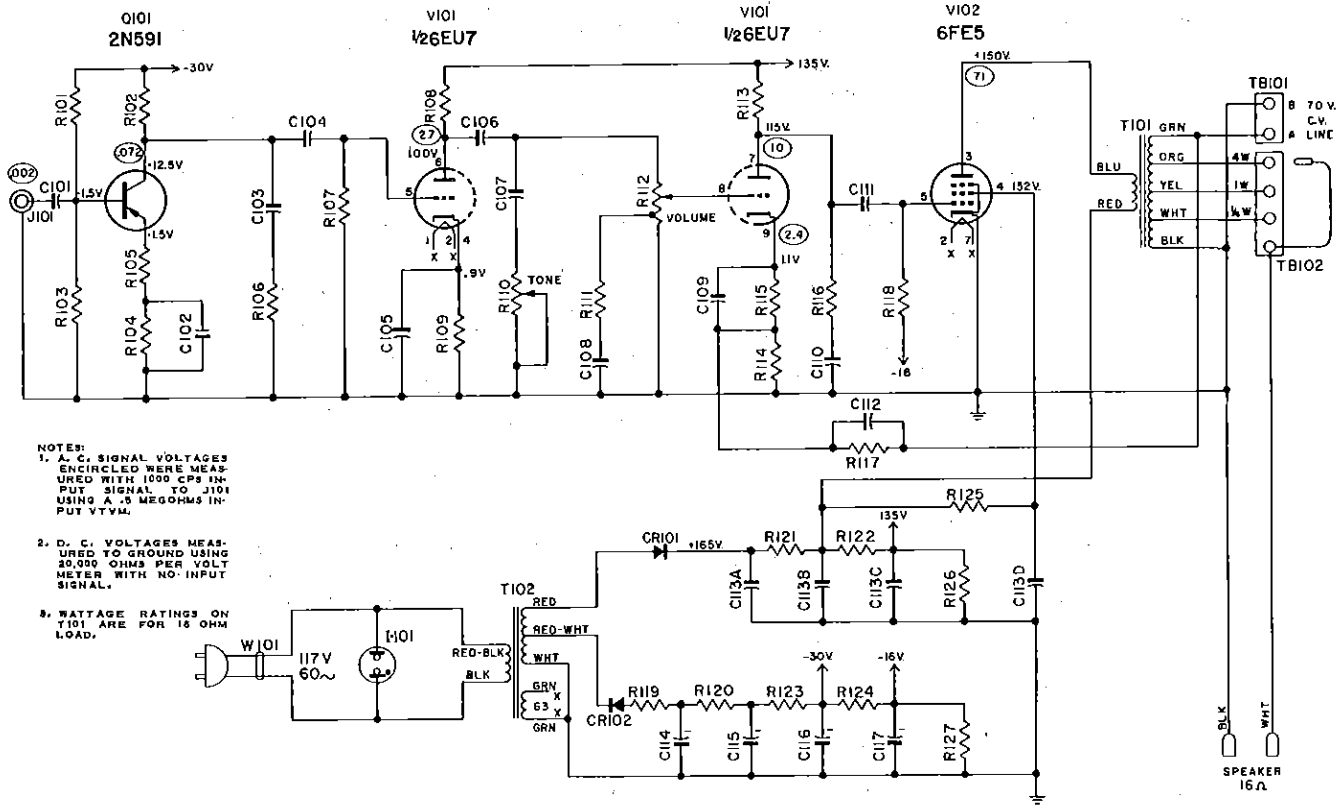
POWER DRAWN BY ALL SPEAKERS

Speaker in Companion Audio (A)	1 Watt
BWS2-8CV (C), (D) & (E)	<u>3 Watt</u>
Total	4 Watts

This is satisfactory Amplifier Loading.



WIRING DIAGRAM

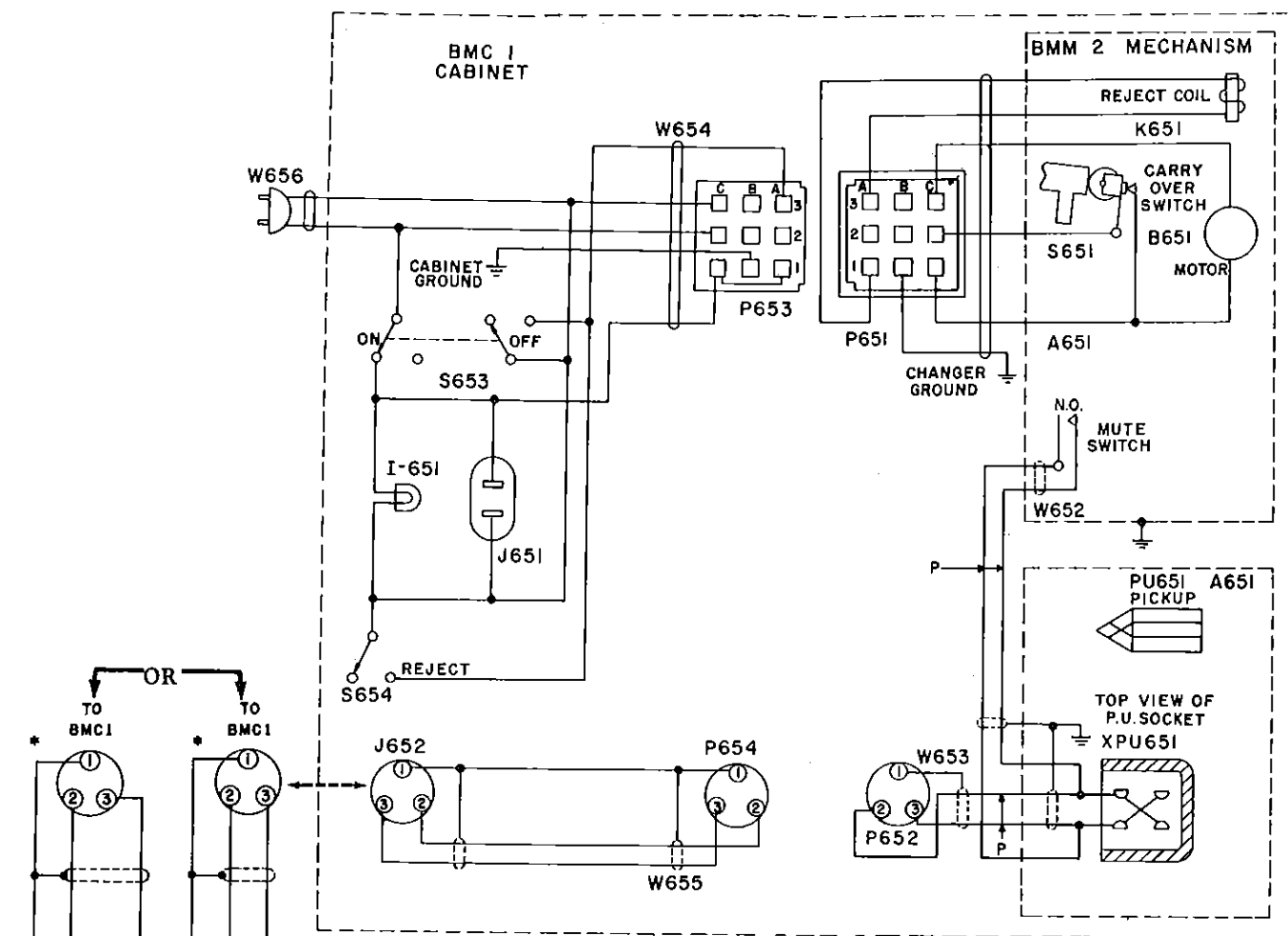


NOTES:
 1. A, C, SIGNAL VOLTAGES ENCIRCLED WERE MEASURED WITH 1000 CPS INPUT SIGNAL TO J101 USING A .5 MEGOHMS INPUT VTVM.
 2. D. C. VOLTAGES MEASURED TO GROUND USING 20,000 OHMS PER VOLT METER WITH NO INPUT SIGNAL.
 3. WATTAGE RATINGS ON V101 ARE FOR 15 OHM LOAD.

Figure 4. Schematic Diagram for Background Music Amplifier, Type BMA2.

PARTS LIST

Item	Part No.	Description	Item	Part No.	Description	Item	Part No.	Description
C101	87697	9 Mfd. 6 V. Lytic	I 101	375289	Neon Pilot Light	R118	82448	100,000 Ohm ½ W. 10%
C102	87696	50 Mfd. 6 V. Lytic	J 101	300152	Audio Input Socket	R119	82416	220 Ohm ½ W. 10%
C103	86341	0.056 Mfd. 10% 100 V. Mylar	Q101	309404	2N591 Transistor	R120	82629	5,600 Ohm ½ W. 5%
C104	86213	0.005 Mfd. 10% 400 V. Paper	R101	308963	220,000 Ohm. ½ W. 10%	R121	81215	100 Ohm 3 W. 10% W.W.
C105	87696	50 Mfd. 6 V. Lytic	R102	308979	47,000 Ohm ½ W. 10%	R122	82436	10,000 Ohm ½ W. 10%
C106	86343	0.02 Mfd. 20% 200 V. Mylar	R103	308976	12,000 Ohm. ½ W. 10%	R123	82629	5,600 Ohm ½ W. 5%
C107	86213	0.005 Mfd. 10% 400 V. Paper	R104	82431	3,900 Ohm ½ W. 10%	R124	82629	5,600 Ohm ½ W. 5%
C108	86213	0.005 Mfd. 10% 400 V. Paper	R105	82408	47 Ohm. ½ W. 10%	R125	82426	1,500 Ohm ½ W. 10%
C109	87696	50 Mfd. 6 V. Lytic	R106	82431	3,900 Ohm ½ W. 10%	R126	82448	100,000 Ohm ½ W. 10%
C110	86244	680 Mmfd 10% 500 V. Ceramic	R107	82460	1 Meg. ½ W. 10%	R127	82630	6,800 Ohm ½ W. 5%
C111	86142	0.1 Mfd. +20 -10% 200 V. Paper	R108	82446	68,000 Ohm ½ W. 10%	T101	375285	Output Transformer
C112	86310	390 Mmfd 10% 500 V. Ceramic	R109	82427	1,800 Ohm ½ W. 10%	T102	375287	Power Transformer
C113A	87693	125 Mfd. 200 V. Lytic	R110	375294	Tone Control	TB101	305671	Terminal Board (2 Lug)
C113B		100 Mfd. 200 V. Lytic	R111	82441	27,000 Ohm ½ W. 10%	TB102	375284	Terminal Board (4 Socket)
C113C		15 Mfd. 200 V. Lytic	R112	375293	Volume Control	V101	308646	6EU7 Tube
C113D		10 Mfd. 200 V. Lytic	R113	82444	47,000 Ohm ½ W. 10%	V102	308648	6FE5 Tube
C114	87690	20 Mfd. 75 V. Lytic	R114	82422	680 Ohm ½ W. 10%	W101	402781	Line Cord
C115	87691	50 Mfd. 60 V. Lytic	R115	82427	1,800 Ohm ½ W. 10%	-	495363	Knob
C116	87691	50 Mfd. 60 V. Lytic	R116	82433	5,600 Ohm ½ W. 10%			
C117	87698	100 Mfd. 25 V. Lytic	R117	82440	22,000 Ohm ½ W. 10%			
CR101	375298	Diode (0.5 Amp. 500 Piv) RCA IN2863						
CR102	305636	Diode (0.05 Amp. 380 Piv)						



Schematic Diagram for Background Music Compact, Type BMC1.

PARTS LIST

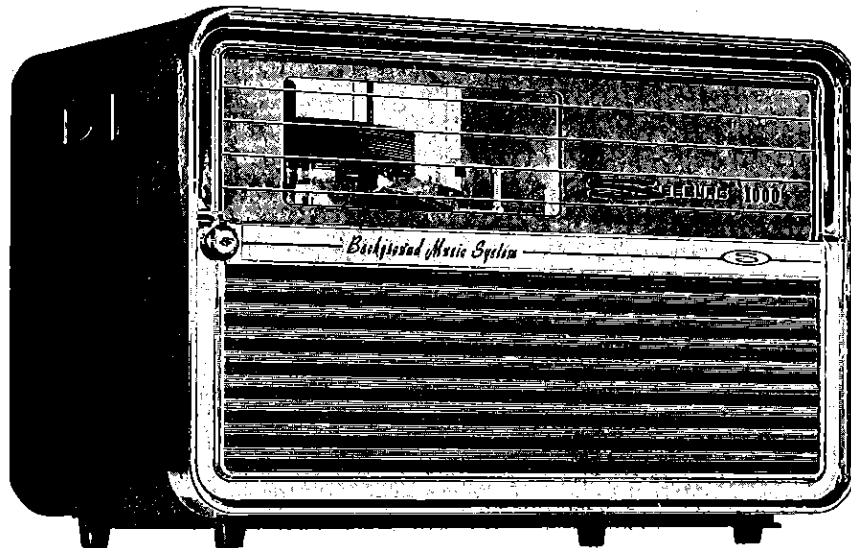
Item	Part No.	Description	Item	Part No.	Description
A651	233002	BMM2	PU651	249730	Magnet Pickup
A652	233131	Pickup & Shaft Assembly	S651	233410	Carry-Over Switch
B651		Motor	S652	233414	Mute Switch
I651	495300	Indicator Light	S653	495313	Power Switch
J651	602386	AC Receptacle	S654	305635	Reject Switch
J652	12034	3 Prong Socket	W651	233408	Cable
K651	233461	Reject Coil	W652	233413	Mute Shielded Cable
P651	233409	Plug	W653	233412	P.U. Shielded Cable
P652	250938	Plug	W654	495298	Cable Assembly
P653	84315	Connector	W655	495395	Audio Cable Assembly
P654	495299	Socket Assembly	W656	495301	Line Cord
			XPU651	233153	Pickup Cartridge Socket
			*	250938	3-Prong Plug

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Seeburg "1000" Background Music System Model BMS2



The Seeburg Background Music System subsequently referred to as the Seeburg "1000" is a completely self-contained phonograph designed for the playing of Seeburg Music Library recordings. It incorporates the Seeburg Background Music Mechanism, Type BMM1 which plays both sides of 25 records sequentially to provide 1000 individual selections for 37½ hours

of music and then restacks the records.

The associated records are 9 inches in diameter with twenty tunes per side and are played at 16-2/3 rpm. The Seeburg "1000" also contains a fully transistorized (no vacuum tubes) Background Music Amplifier, Type BMA3-56 and a heavy duty 6 x 9 inch oval speaker.

SPECIFICATIONS

Dimensions and Weight:

Height.....14 5/8" above supporting surface
Width 22 1/4"
Depth 12 1/2"
Net Weight 51 Pounds
Shipping Weight 59 Pounds

Finish:

Cabinet:..... Scotch Textured - Charcoal
Front door: Wedgewood Blue with Chrome Trim.

Cabinet Lighting:

Frosted Miniature Double Contact Bulb No. 64.

Cabinet Key Numbers:

Chicago Lock C-2313
Illinois Lock L290

Carrying Case:

Waterproof, zippered, canvas, leather reinforced, Part No. 495147, available from your Seeburg Distributor.

Record Capacity: 25
1000 Selection, 37 1/2 hours of music without repetition.

Record Weight 25 records, approximately
5 pounds

Record Type:..... 16 2/3 RPM.
9 inch diameter, 2 inch center hole.
Property of Seeburg Music Library, Inc.

Power Requirements:

117 Volts A.C., 60 cycles, 0.7 amp., 65 watts
Accessory Receptables 1
Maximum Accessory Power 270 watts

Background Music Mechanism: Type BMM 1

Pickup:..... Seeburg High Fidelity Magnetic.
Armature Assemblies with Diamond Styluses
(red), Part No. 233176. Two used.

Program Timer Connector:

12-prong dummy plug is removed to plug in Type BMPT1 Program Timer (Accessory Unit)

Audio Amplifier: (Fully Transistorized) Type BMA3-56
11 Transistors, 2 Silicon Diodes

Audio Power Ratings: Program Material (Music)
20 watts at less than 5% distortion (IHFM)

Microphone: Miniature threaded collar Coaxial connector. 250 ohms, 1 M.V. for full output, Seeburg Part No. 503940.

Output Connections:

HI-Z Output: (for driving external power amplifiers) Plug-in Coaxial Connector, 0.7 volts into 100,000 ohms (min)

Microphone Preamp Output: Plug-in Coaxial Connector, 1 volt into 20,000 ohms (min)

External Program Control:

Out: Plug-in Coaxial Connector which is output of Selector Switch; 0.5 volts into 50,000 ohm (min)

In: Plug-in Coaxial Connector, 0.5 volts (max) into 50,000 ohms.

Remote Volume & Record Reject Control, Type BMRVC-1:

Plugs into 9-pin noval socket at rear of Amplifier Chassis.

Line Cord:

3-contact polarized receptacle on amplifier rear panel. (2 wire line cord supplied)

3 wire line cord (accessory) Part No. 495158.

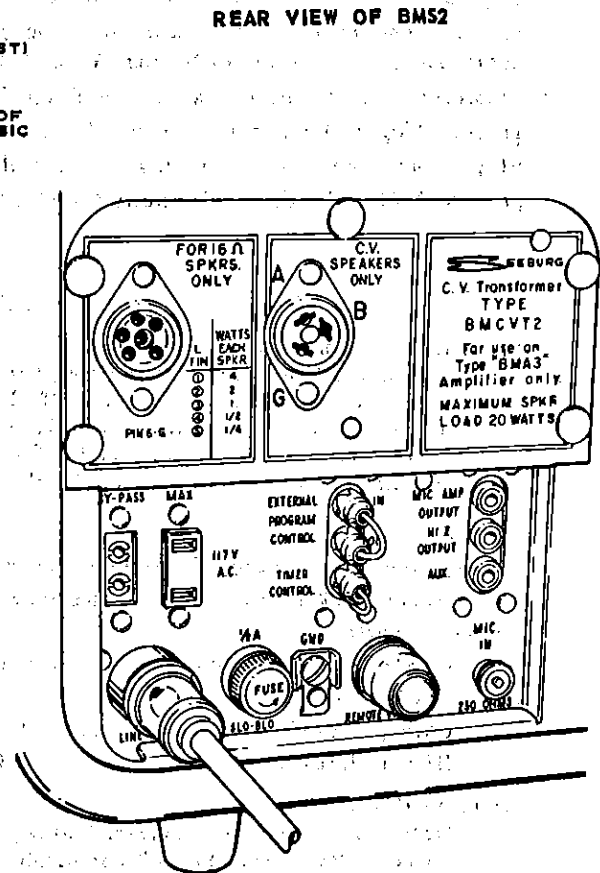
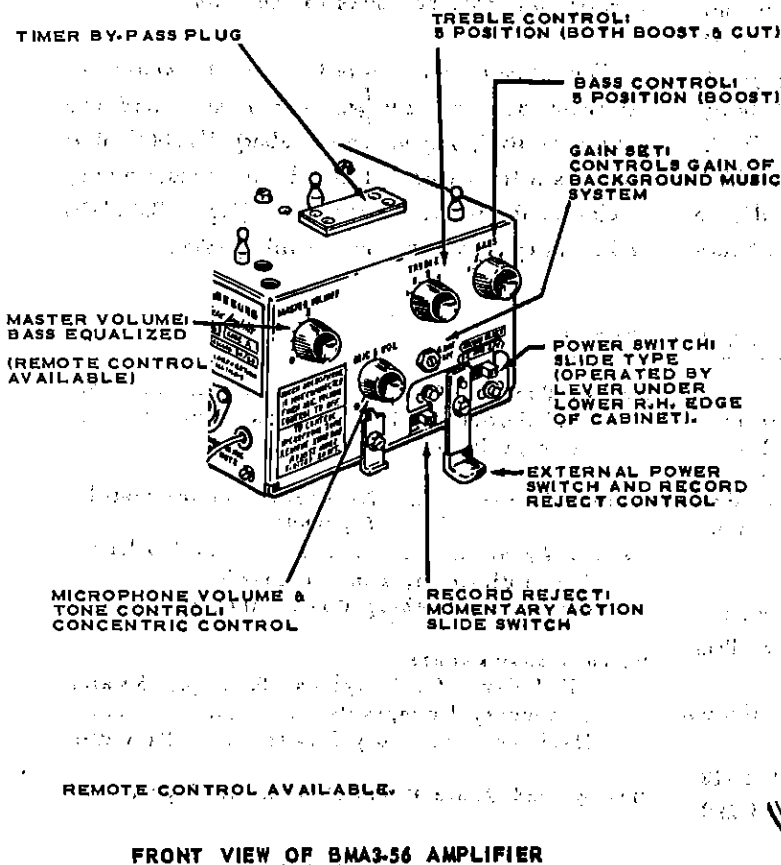


Figure 1. Identification Drawings.

INSTALLATION INSTRUCTIONS

INSPECTION

Examine the instrument for external as well as internal damage immediately after unpacking. If any damage is found, notify the transportation representative.

PLACING THE BACKGROUND MUSIC SYSTEM

Choose a location for the instrument in which it will be conveniently accessible for operation and servicing. It should be placed on a firm, level surface free from vibration or any sources of excessive heat (do not place on radiator). Adequate ventilation is essential to prevent warpage of records and overheating of components. Allow minimum cabinet clearances as follows: 2 inches in the rear, 2 inches on top, 1½ inches on the left side and 1½ inches on the right side.

The instrument may be secured in position to prevent unauthorized movement. A No. 10 by two inch long self-tapping screw and split rubber washer are provided and may be installed after removing the plug button from the base of the cabinet as shown in *Figure 2*.

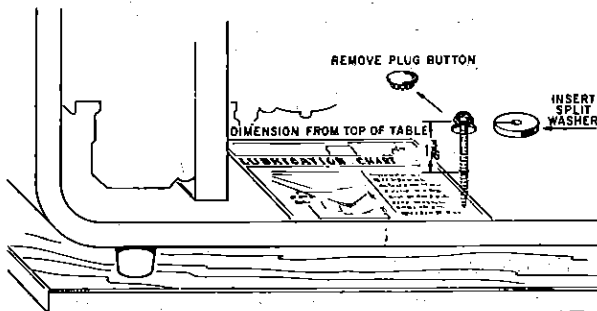


Figure 2. Securing Cabinet

PREPARATION FOR OPERATION

1. Before placing the system in operation, it is necessary to remove or loosen all shipping hardware, pads and packing. Carefully follow instructions on the tags. Store removed material in original carton for possible future shipment.
2. Make certain that the supply voltage and frequency agree with the markings on the instrument name plate.
3. Remove the line cord found in the case and plug one end into the rear of the amplifier and the other end into the service outlet.

LOADING RECORDS

Remove upper spindle weight and place it on a clean surface, padded side up. Before loading records, make certain that the pick-up-arm is in rest position, that the record clamping fingers on the lower spindle are retracted and that the upper spindle support fingers are extended as shown in *Figure 3*.

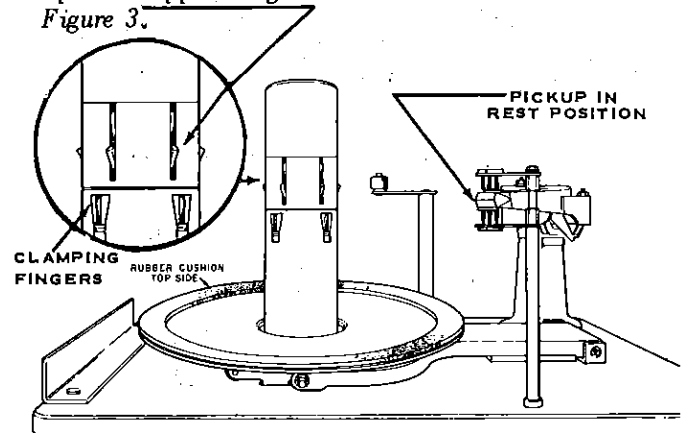


Figure 3. Ready For Loading-Pickup In Rest Position

CAUTION: Wash hands thoroughly before handling records. Hold records by outer edge or center hole and outer edge. DO NOT TOUCH GROOVES. To assure subsequent exclusion of dust and dirt, make certain that cabinet door is kept closed after completion of installation.

Load records, five or six at a time, in numerical order (1-25) with all "A" sides facing downward; the bottom record should be 1A. After the records are loaded, place the Record Weight on top of the stack.

A full load of 25 records must be used when testing or operating this equipment. Do not use partial loads. The instrument is designed to give optimum performance only with a full stack of records.

NOTE: After loading, let the mechanism "run-in" for half an hour to an hour. This will allow the rubber mounts and rubber motor coupling, which have been compressed by packing material, to be normal and function properly.

TO CHANGE RECORDS, conform to the following procedure:

1. If the mechanism is playing the underside of a record, *Figure 4*, reject this record side by pushing the Reject Button to the left. After the mechanism has started playing the top side of this record, *Figure 5*, push the power switch to the "OFF" position (to the right).

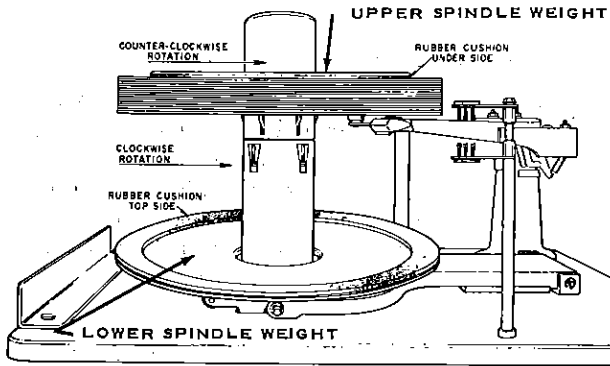


Figure 4. Playing Underside of Record.

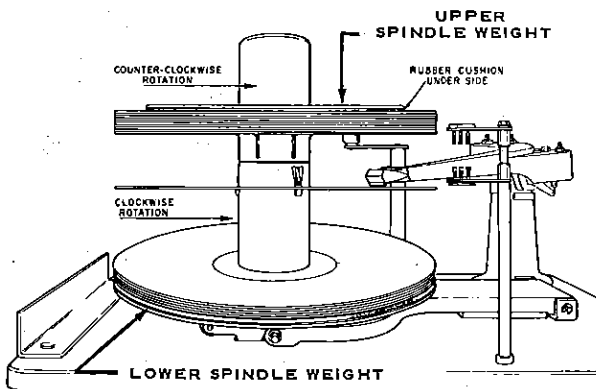


Figure 5. Playing Topside of Record.

2. Wait until all records have stopped rotating.
3. Remove upper spindle weight and place it on clean level surface padded side up. Remove records 5 or 6 at a time and stack them on record weight upside down thereby maintaining original sequence. To restack records on spindle reverse this procedure. See instructions on record replacement packages.

CAUTION: Do not remove Lower Spindle Weight. DO NOT TOUCH RECORD GROOVES.

REPLACEMENT OF LOWER SPINDLE WEIGHT

If at anytime the Lower Spindle Weight has been removed and is to be replaced, place it on the upper spindle support fingers. Firmly grasp the weight, push recessed button in top of the spindle and gently lower the weight to the turntable, Figure 6.

ACCELERATED RECORD DROPPING

Before rapid record drop operation, make certain that there is no record in the intermediate position.

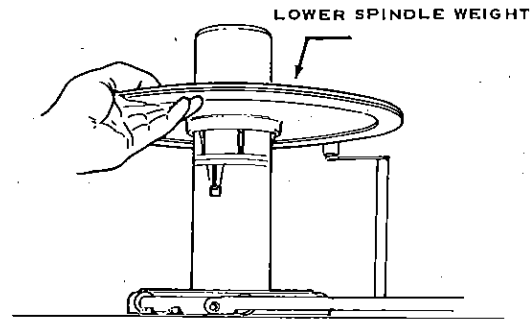


Figure 6.

Individual records may be rapidly dropped to the turntable by manually pulsing downwardly the recessed push button located on the top of the spindle, thus simulating a rapid transfer cycle, Figure 7.

CAUTION: Do not drop the last record manually: operate the mechanism electrically and actuate the Reject Button.

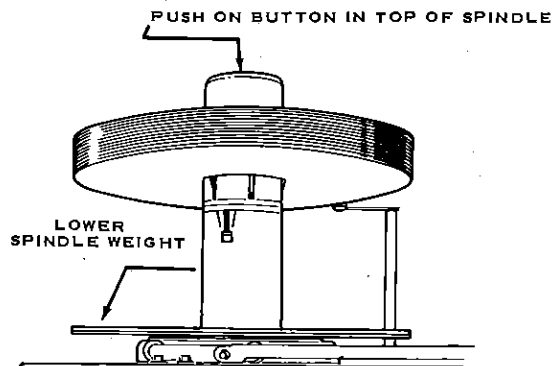


Figure 7.

OPERATION

Slide the power switch to the "ON" position (to the left) and set the Program Timer dial to "START". While a record is playing, proceed to balance the audio system.

1. The Gain Set is adjusted as follows:
 - a. Turn the Gain Set Control to its full counter-clockwise position.
 - b. Set the Master Volume Control at position 5.
 - c. Set the Treble and Bass Controls at position 3.
 - d. Turn the Gain Set Control clockwise to a position that will give the desired volume of sound for prevailing noise level conditions.
 - e. Subsequent volume adjustments are to be made with the Master Volume Control.

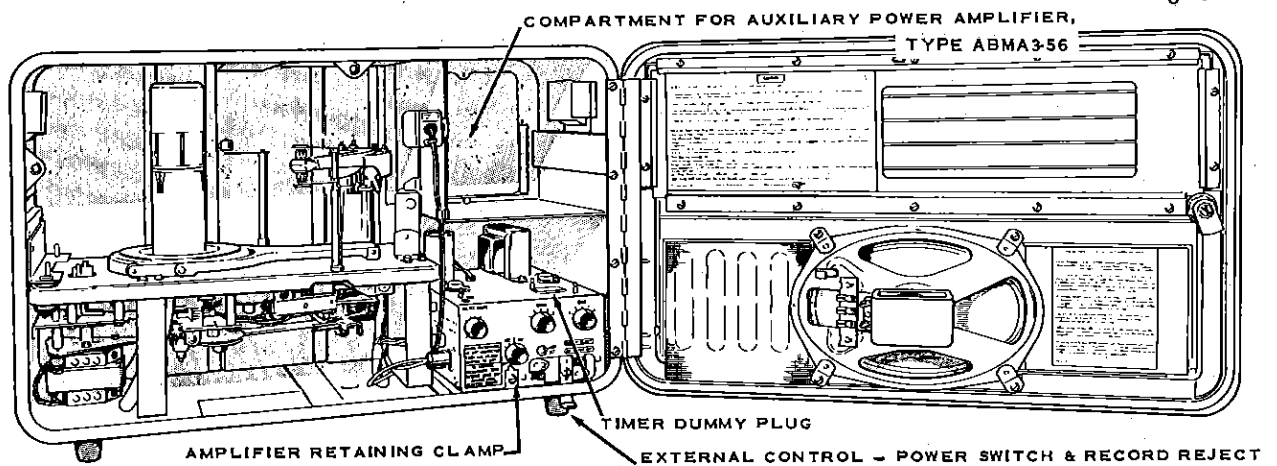


Figure 8. Internal View.

OPERATION (continued)

- Adjust the Treble and Bass Controls to the acoustic requirements of the establishment in order to achieve desired tone balance. Refer to tone balance settings table, *Figure 9*.

LOCATION CONDITIONS	TONE CONTROL SETTINGS
ACOUSTICALLY LIVE - HARD WALLS, CEILING AND FLOOR - LITTLE OR NO UPHOLSTERY AND DRAPERIES.	BASS 3 TREBLE 3-4
AVERAGE ROOM - AVERAGE AMOUNT OF SOUND DEADENING MATERIAL.	BASS 3-4 TREBLE 4
ACOUSTICALLY DEAD - ACOUSTIC TILE, HEAVY DRAPERIES AND CARPETS, UPHOLSTERED BOOTHS.	BASS 2-3 TREBLE 5

ROOM SIZE - IN SMALL ROOMS REDUCE TREBLE CONTROL ONE NUMBER. IN LARGE ROOMS INCREASE TREBLE CONTROL ONE NUMBER.

NOISE - THE NOISE ENCOUNTERED IN SOME LOCATIONS (RESTAURANTS, ETC) HAS A MASKING EFFECT ON HIGH FREQUENCIES. FINAL CONTROL SETTINGS SHOULD BE MADE UNDER ACTUAL NOISE CONDITIONS WITH A REPRESENTATIVE NUMBER OF PEOPLE PRESENT.

NOTE: GOOD QUALITY REPRODUCTION CANNOT BE ATTAINED WITH WORN STYLII. REMEMBER - WORN STYLII WILL RUIN YOUR RECORDS.

Figure 9. Tone Balance Settings.

Turn off the master power switch. If it is desirable to start the program with selection "1A", restack the records on to the upper spindle. Refer to section on Loading Records.

PROGRAM TIMER KIT, Type BMPT1 (Accessory)

The Program Timer Kit, Part No. 508540, is for use with the Seeburg "1000" to make available intermittent music - adjustable to any number of selections per each half-hour period.

The Program Timer plugs into a socket on the top of the preamplifier after removal of the existing 12-prong dummy plug.

AUXILIARY AMPLIFIER, Type ABMA3-56

If more than 20 watts of audio power is required, a fully transistorized Seeburg Auxiliary Background Music Amplifier, Type ABMA3-56, Part No. 375102 may be installed on the shelf above the master amplifier. A 3-prong socket on the rear of the amplifier, *Figure 1*, supplies 70-volt C.V. power to remote speaker lines. (See example 3 on page 11).

CAUTION: Do not install a Vacuum Tube amplifier in this compartment. Excessive heat generated will cause damage.

EXTERNAL AMPLIFIERS

External power amplifiers such as the Seeburg Type HFA4-56, Part No. 603251, may be connected to the HI-Z output plug-in coaxial connector located at the rear of the master amplifier to provide 60 watts of additional audio power. (See example 5 on page 13).

DYNAMIC MICROPHONE, (Accessory)

An input jack is provided at the rear of the amplifier for a low impedance (250 ohm) dynamic microphone. The microphone volume control is on the amplifier front panel; the tone control is a screw driver adjustment accessible by removing the volume control knob.

EXTERNAL PROGRAM CONTROL

External program control jacks on the rear of the BMA3 amplifier provide for connection of any number of additional program sources. *Figure 10.* illustrates a typical circuit using Seeburg switch, Part No. 508115.

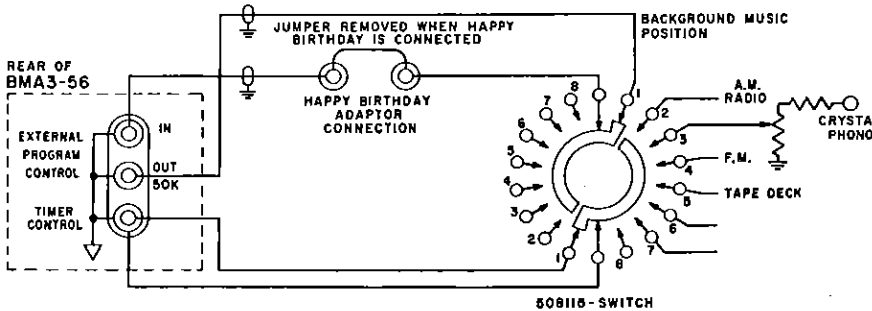


Figure 10.

Typical External Program Control Circuit.

The switch permits normal background music operation plus switching to seven (7) additional program sources. The connection to the timer control jacks serves to turn off the phonograph when switching to external program sources.

A Happy Birthday Adaptor, later described, may be connected after removal of the jumper as shown in *Figure 10.* Wiring of the external program switch to the BMA3 should be made using single conductor shielded cable such as Seeburg Part No. 95106 and single prong pin jacks such as Seeburg Part No. 246957.

HAPPY BIRTHDAY ADAPTER

"Happy Birthday", "Anniversary Song" or other specialty records may be played over the Seeburg Background Music System by the application of the "Happy Birthday" Adapter. Comprehensive construction details using standard components are described in the Adapter Instruction Sheet, Part No. 50766, available from your Seeburg Distributor.

Any conventional record player equipped with automatic shut-off controlling both the motor and an A.C. service outlet should be used. The V.M. record player Model 1229 satisfies the requirement.

The adapter is connected to the record player and to the rear panel of the BMA3-56 amplifier in the Seeburg "1000". When the external record player is in operation, the Seeburg Background Music is muted and resumes playing at the completion of the specialty selection.

MICROPHONE PREAMPLIFIER KIT,

Type TMPS2-56 (Accessory)

The Microphone Preamplifier Kit, which is fully transistorized, may be used in conjunction with the Seeburg "1000" when multiple microphones are required.

POWER TIMER ACCESSORY KIT,

Type BMPTAK1 (Accessory)

The Power Timer Accessory Kit is specifically designed for use with the Seeburg "1000" to modify its operation for daily automatic on-off control and cut out on one or more days of the

week. Use of this kit does not affect the operation of the Program Timer in the Background Music System.

REMOTE VOLUME CONTROL,

Type BMRVC-1 (Accessory)

The Background Music Remote Volume Control may be used to remotely control the volume and cancel selections of the Background Music System. It is plugged into the back panel of the master amplifier after removing a 9 prong dummy plug.

CABLE CLAMP

A cable clamp and self tapping screw are provided and should be applied as shown in *Figure 11,* after removal of the corner snap-in plug. Unhook the cable clamp and feed through all cables. Allow enough slack to avoid strain on plugs. Rehook the cable clamp.

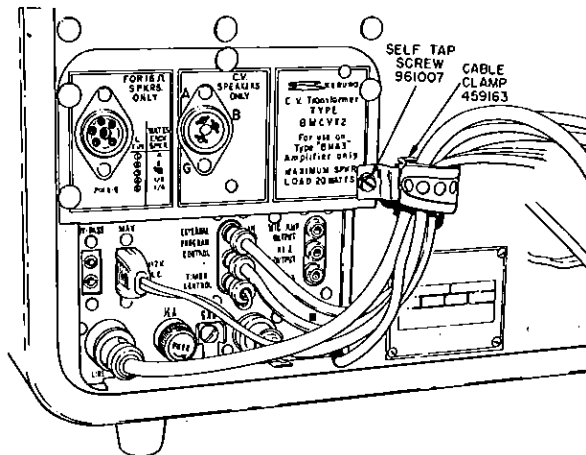


Figure 11. Cable Clamp Installed.

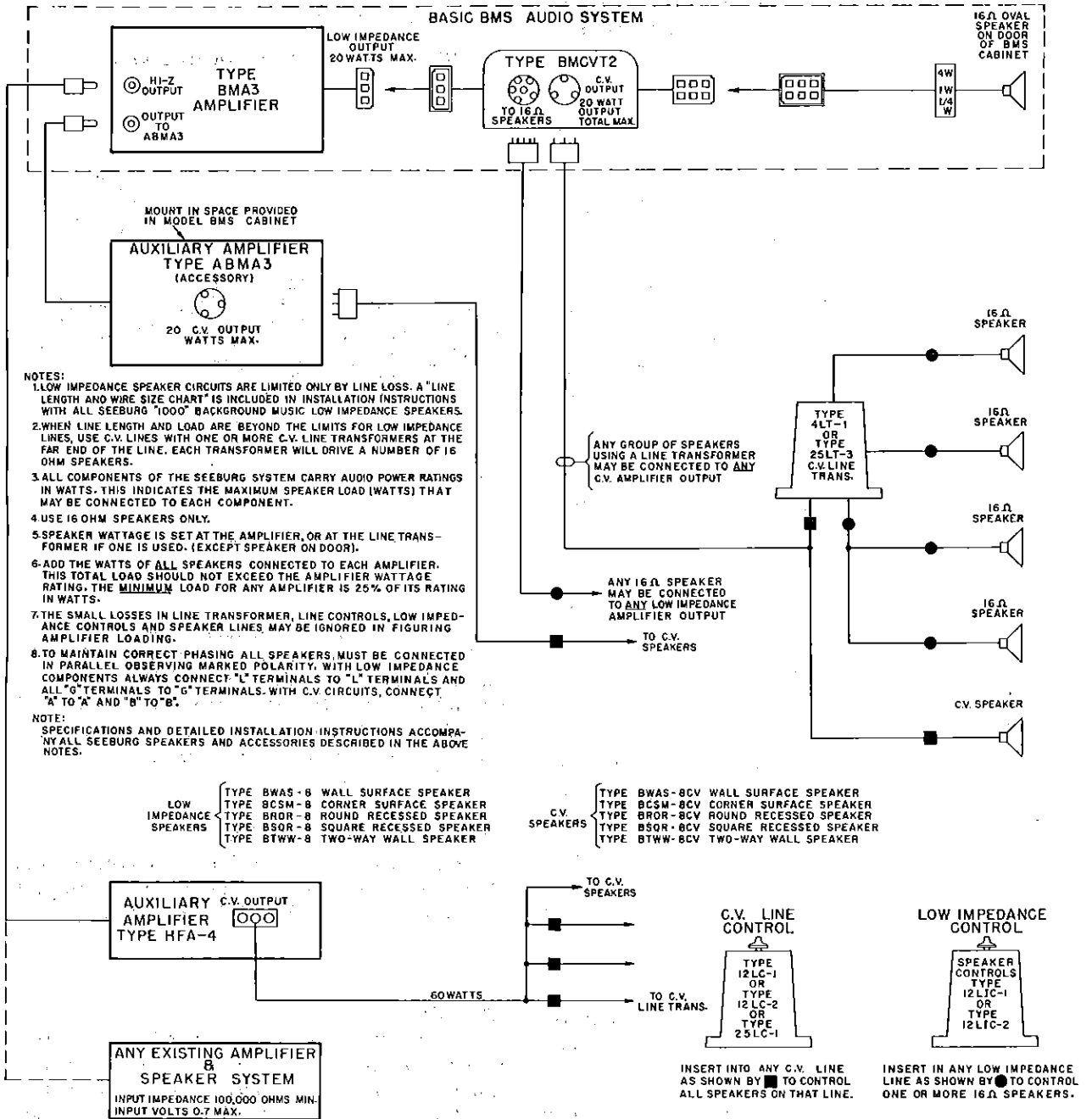
SEEBURG BACKGROUND MUSIC - SOUND DISTRIBUTION SYSTEM

FOR GOOD, UNIFORM COVERAGE OF THE SERVICE AREA, AN ADEQUATE NUMBER OF SPEAKERS MUST BE INSTALLED. THE FLOOR AREA PER SPEAKER WILL RANGE BETWEEN 300 SQUARE FEET FOR LOW CEILING ROOMS OR LONG, NARROW ROOMS TO 800 SQUARE FEET IN HIGH ROOMS WITH SPEAKERS MOUNTED WELL ABOVE HEAD HEIGHT. TOO FEW SPEAKERS WILL CAUSE:

- A. NON-UNIFORM COVERAGE (TOO LOUD IN SOME PLACES AND NOT ENOUGH VOLUME IN OTHERS).
- B. EXCESSIVE REVERBERATION (ECHO) RESULTING IN HARSH AND UNPLEASANT REPRODUCTION.

SPEAKERS IN QUIET AREAS WILL PROVIDE ADEQUATE BACKGROUND MUSIC LEVEL IF SET FOR 1/3 WATT OR 1/2 WATT PER SPEAKER. NOISY AREAS WILL REQUIRE 1 WATT PER SPEAKER OR MORE DEPENDING ON THE NATURE AND LEVEL OF THE NOISE. RESTAURANTS, LOUNGES, OFFICES AND BANKS ARE EXAMPLES OF TYPICAL "QUIET AREAS". FACTORY AREAS INVOLVING MACHINERY, ASSEMBLY AREAS AND OFFICES WITH MANY BUSINESS MACHINES ARE USUALLY "NOISY AREAS".

IN VERY NOISY FACTORY AREAS AMPLIFIER POWER MAY BE CONSERVED BY THE USE OF PRESSURE-TYPE HORN SPEAKERS WHICH ARE MORE EFFICIENT THAN CONE-TYPE SPEAKERS. THEY ARE AVAILABLE WITH IMPEDANCE OF 16 OHMS AND MAY BE CONNECTED TO THE SEEBURG SYSTEM IN THE SAME WAY AS OTHER TYPES.



GENERAL MAINTENANCE OF THE SEEBURG "1000"

STYLUS REPLACEMENT

In the presence, of friction, wear of the stylus starts with the first play and continues until the stylus is replaced. The tone quality will be optimum and distortion remains at a low level for thousands of plays but gradually distortion increases until a disagreeable amount is noticed. The styluses should be replaced in pairs before objectionable wear has developed; approximately every 6 months of system operation and in pairs. Neglect may permanently damage records and subsequent replacement of styluses will not restore the original tone quality.

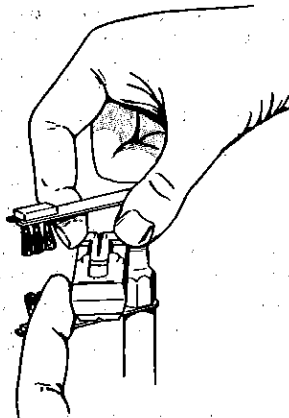


Figure 12. Replacing Upper Stylus.

TO REPLACE ARMATURE ASSEMBLIES:

1. Push power switch to "OFF" position (to the right)
2. WAIT until pick-up is at REST position and the records stop rotating.
3. Hold the tone arm against the stylus brush post, *Figures 12 and 13*. Slide worn armature assemblies out of pickup by gripping the top portion of the "T", using the thumb and forefinger. Light pressure in the direction away from the stylus point will slide the armature out of the cartridge slot.
4. Install the new armature assembly by laying it flat in open end of cartridge slot and sliding forward in slot until it bottoms.
5. **CAUTION:** *The pickup and styluses must be handled carefully or the delicate armature suspension may be damaged.*

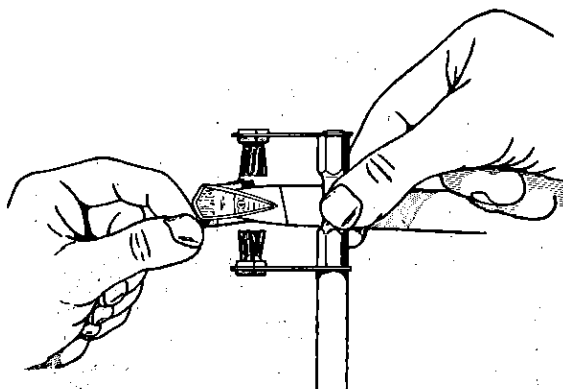


Figure 13. Replacing Lower Stylus.

LUBRICATION

Every 6 months put 3 to 6 drops of Seeburg Special Purpose Oil No. 53014 in each of the two oil cups on motor and in each of the two oil holes in main drive bearing casting. A plastic tube of oil, Part No. 50998, is provided in the Seeburg "1000". To lubricate main drive bearing:

1. Restack records to upper spindle.
2. Manually lift turntable weight and hold to expose main drive bearing oil cups, *see label below mechanism.*

CAUTION: *Do not raise turntable weight to upper spindle. DO NOT USE AN EXCESS OF OIL.*

CLEANING OF RUBBER IDLER WHEELS

It is recommended that, at the time of mechanism lubrication, all rubber drive wheels be carefully wiped off with a clean cloth dampened with denatured alcohol. Refer to the Background Music System Service Manual for details.

PREPARATION FOR SHIPMENT

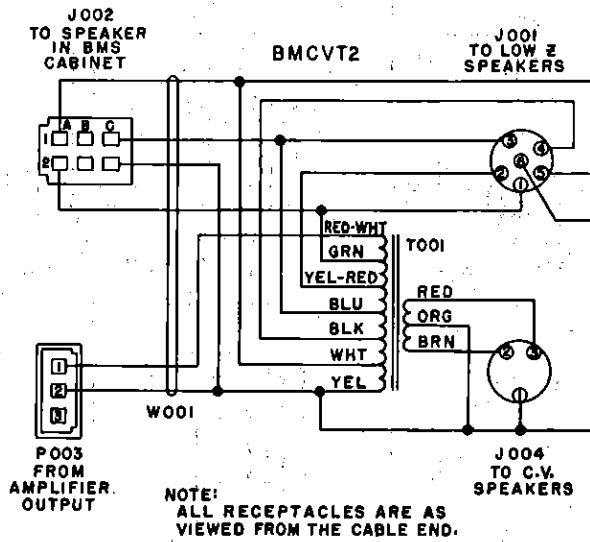
If instrument is carried or transported short distances with records in place follow steps 1 and 2 under "TO CHANGE RECORDS".

TO SHIP

If instrument is to be shipped by way of a transportation company, it should be blocked and crated in the same manner in which it was received from the factory. Refer to step 1 under "PREPARATION FOR OPERATION."

TRANSFORMER ASSEMBLY, Type BMCVT-2

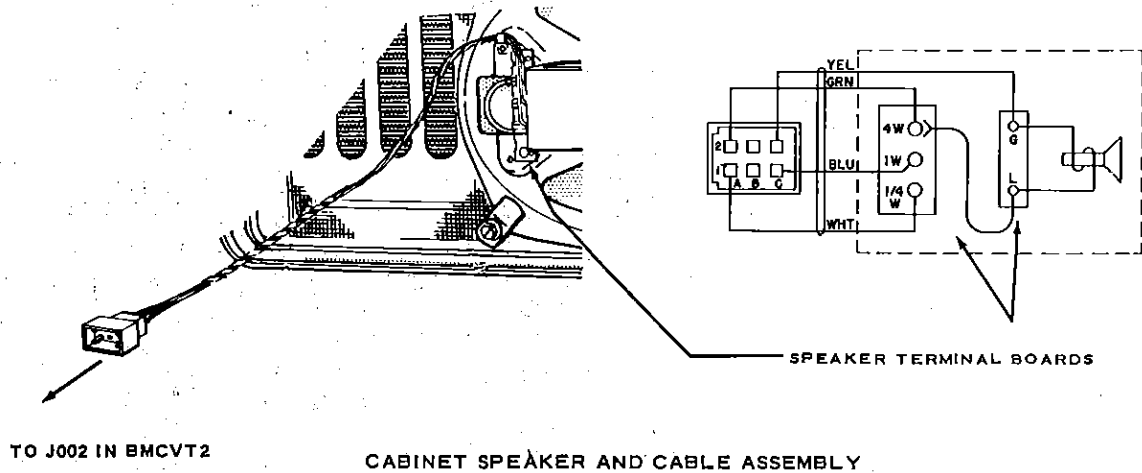
The Transformer Assembly is used with the Type BMA3-56 amplifier to provide 70 volt C.V. line as well as low impedance (16 ohm) output circuits. It may be used to drive a number of Seeburg Background Music speakers as well as the speaker on the door of the cabinet. The combined low impedance and C.V. speaker load must not exceed 20 watts.



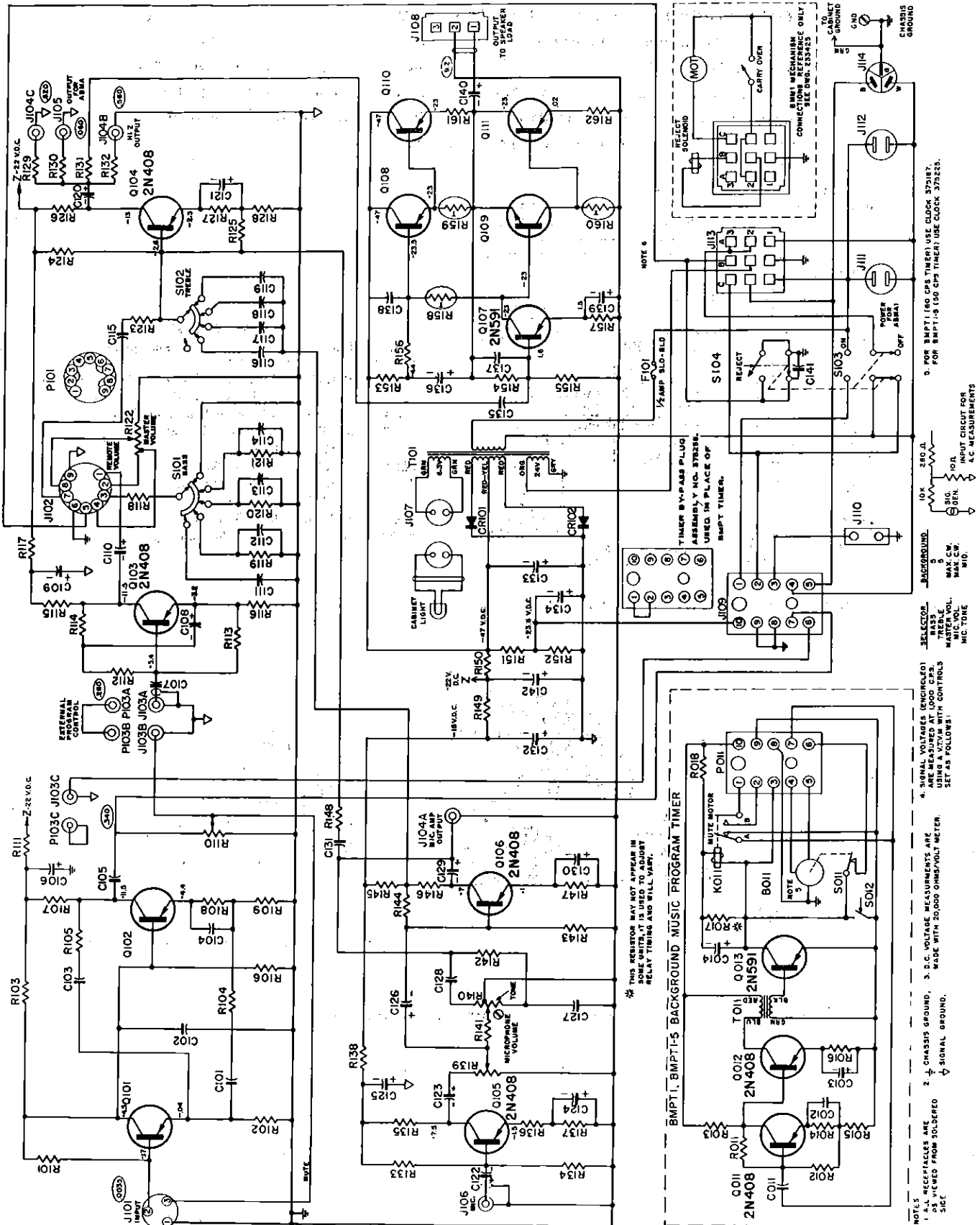
- PARTS LIST -

Item	Part No.	Description
-	508970	Type BMCVT2 Bkg. Music Constant Voltage Transformer Assembly
J001	84316	6-Contact Miniature Socket
J002	305632	6-Contact Socket
	941750	Contact
J004	12034	3-Prong Socket
P003	307049	3-Contact Plug
	941750	Contact
T001	508976	C.V. Transformer
W001	508982	C.V. Cable & Plug Assembly

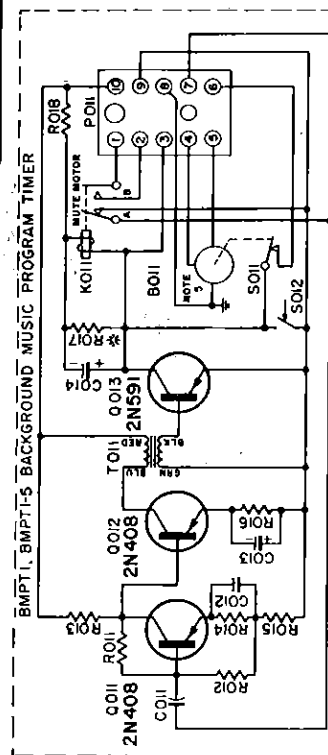
Figure 14. Type BMCVT-2 Schematic Diagram.



SEEBURG BACKGROUND MUSIC AMPLIFIER, Type BMA3-56

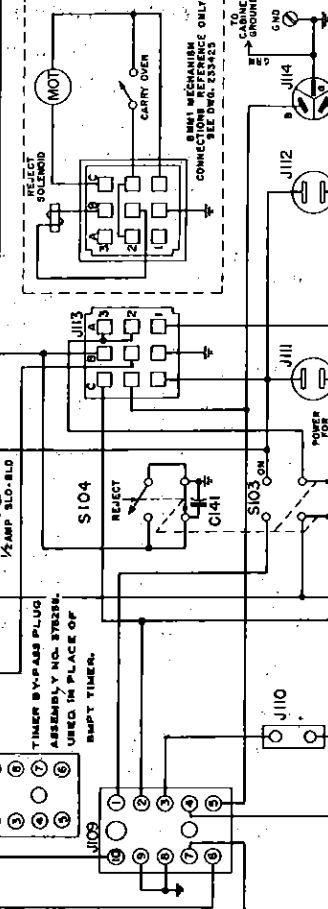


* THIS RESISTOR MAY NOT APPEAR IN SOME DATA, IT IS USED TO ADJUST RELAY TIMING AND WILL VARY.



- NOTE 5
1. RECEPTACLES ARE VIEWED FROM SOLID-ROD SIDE
2. CHASSIS GROUND
3. D.C. VOLTAGE MEASUREMENTS ARE MADE WITH 20,000 OHMS/POLY-METER.
4. SIGNAL VOLTAGES (ENCIRCLED) ARE MEASURED AT 1,000 CPS. USING A OSCILLOSCOPE WITH CONTROLS SET AS FOLLOWS:
- SELECTOR: BACKGROUND
 - BASS: 5
 - TREBLE: 5
 - MIC VOL: MAX. C.W.
 - MIC TONE: MID.
- INPUT CIRCUIT FOR A.C. MEASUREMENTS
- 200 A
100 Ω
50 Ω
10 Ω
GEN. →

- NOTE 6
9. FOR BMA3-160 CPS TIMER USE CLOCK 375187.
FOR BMA3-100 CPS TIMER USE CLOCK 375225.



REJECT SOLENOID
CARRY OVER
BMA3 MECHANISM ONLY
CONNECT TO REJECT PRESSURE
CABINET GROUND
CHASSIS GROUND

SEEBURG BACKGROUND MUSIC AMPLIFIER, Type BMA3-56

Item	Part No.	Description	Item	Part No.	Description	Item	Part No.	Description
C101	86328	0.33 Mfd. 50 V. Mylar	P101	375076	Dummy Plug	R146	82626	3,900 Ohms ½ W. 5%
C102	86330	0.0047 Mfd. 50 V. Mylar	P103A	375089	Remote Program Jumper	R147	82620	1,000 Ohms ½ W. 5%
C103	86327	0.047 Mfd. 50 V. Mylar	P103B			R148	82678	43,000 Ohms ½ W. 5%
C104	87703	50 Mfd. 12 V. Lytic	P103C			R149	82426	1,500 Ohms ½ W. 10%
C105	86328	0.33 Mfd. 50 V. Mylar			R150	82427	1,800 Ohms ½ W. 10%	
C106	87717	130 Mfd. 25 V. Lytic	Q101	309413	— Transistor	R151	81201	250 Ohms 5 W. 10%
C107	86303	0.15 Mfd. 50 V. Mylar	Q102	309414	— Transistor	R152	81201	250 Ohms 5 W. 10%
C108	87707	4 Mfd. 15 V. Lytic	Q103	309401	2N408 Transistor	R153	82620	1,000 Ohms ½ W. 5%
C109	87717	130 Mfd. 25 V. Lytic	Q104	309401	2N408 Transistor	R154	82795	36,000 Ohms ½ W. 5%
C110	87707	4 Mfd. 15 V. Lytic	Q105	309401	2N408 Transistor	R155	82670	2,700 Ohms ½ W. 5%
C111	86303	0.15 Mfd. 50 V. Mylar	Q106	309401	2N408 Transistor	R156	82610	6,200 Ohms ½ W. 5%
C112	86334	0.1 Mfd. 50 V. Mylar	Q107	309404	2N591 Transistor	R157	82619	430 Ohms ½ W. 5%
C113	86303	0.15 Mfd. 50 V. Mylar	Q108	309411	— Transistor	R158	375088	100 Ohms Thermistor
C114	86328	0.33 Mfd. 50 V. Mylar	Q109	309410	— Transistor	R159	375099	250 Ohms Thermistor
C115	86329	0.47 Mfd. 50 V. Mylar	Q110	309412	— Transistor	R160	375099	250 Ohms Thermistor
C116	86325	0.0033 Mfd. 50 V. Mylar	Q111	309412	— Transistor	R161	81220	1 Ohm 5 W. 10%
C117	86325	0.0033 Mfd. 50 V. Mylar				R162	81220	1 Ohm 5 W. 10%
C118	86330	0.0047 Mfd. 50 V. Mylar	R101	82435	8,200 Ohms ½ W. 10%	S101	375052	Bass Switch
C119	86332	0.0068 Mfd. 50 V. Mylar	R102	82409	56 Ohms ½ W. 10%	S102	375052	Treble Switch
C120	87706	10 Mfd. 15 V. Lytic	R103	82436	10,000 Ohms ½ W. 10%	S103	375079	On-Off Switch
C121	87696	50 Mfd. 6 V. Lytic	R104	82649	75 Ohms ½ W. 5%	S104	305635	Reject Switch
C122	87707	4 Mfd. 15 V. Lytic	R105	82999	4,300 Ohms ½ W. 5%			
C123	87707	4 Mfd. 15 V. Lytic	R106	82439	18,000 Ohms ½ W. 10%	T101	375323	Transformer
C124	87696	50 Mfd. 6 V. Lytic	R107	82435	8,200 Ohms ½ W. 10%			
C125	87717	130 Mfd. 25 V. Lytic	R108	82432	4,700 Ohms ½ W. 10%			
C126	87707	4 Mfd. 15 V. Lytic	R109	82408	47 Ohms ½ W. 10%			
C127	86327	0.047 Mfd. 50 V. Mylar	R110	375050	1 Meg. Ohm. Gain Set			
C128	86240	1500 MMfd. 500 V. Ceramic	R111	82620	1,000 Ohms ½ W. 5%			
C129	87707	4 Mfd. 15 V. Lytic	R112	82666	100,000 Ohms ½ W. 5%			
C130	87696	50 Mfd. 6 V. Lytic	R113	82634	10,000 Ohms ½ W. 5%			
C131	86303	0.15 Mfd. 50 V. Mylar	R114	82666	100,000 Ohms ½ W. 5%			
C132	87717	130 Mfd. 25 V. Lytic	R115	82620	1,000 Ohms ½ W. 5%			
C133	87716	1300 Mfd. 50 V. Lytic	R116	82570	510 Ohms ½ W. 5%			
C134	87700	100 Mfd. 35 V. Lytic	R117	82423	820 Ohms ½ W. 10%			
C135	87707	4 Mfd. 15 V. Lytic	R118	82425	1,200 Ohms ½ W. 10%			
C136	87700	100 Mfd. 35 V. Lytic	R119	82435	8,200 Ohms ½ W. 10%			
C137	86333	220 MMfd. 500 V. Ceramic	R120	82433	5,600 Ohms ½ W. 10%			
C138	86340	0.003 Mfd. 500 V. Ceramic	R121	82427	1,800 Ohms ½ W. 10%			
C139	87702	200 Mfd. 6 V. Lytic	R122	375045	25,000 Ohms Master Vol. Control			
C140	87718	1200 Mfd. 35 V. Lytic	R123	82637	15,000 Ohms ½ W. 5%			
C141	86313	0.01 Mfd. 500 V. Ceramic	R124	82682	62,000 Ohms ½ W. 5%			
C142	87717	130 Mfd. 25 V. Lytic	R125	82610	6,200 Ohms ½ W. 5%			
			R126	82626	3,900 Ohms ½ W. 5%			
CR101	309387	Diode 200 PVI	R127	82620	1,000 Ohms ½ W. 5%			
CR102	309387	Diode 200 PVI	R128	82798	360 Ohms ½ W. 5%			
			R129	82480	2,000 Ohms ½ W. 10%			
F101	503636	½ Amp. Slow Blowing Fuse	R130	82612	2,000 Ohms ½ W. 5%			
J101	12034	Audio Input 3 Pin Socket	R131	82612	2,000 Ohms ½ W. 5%			
J102	84305	Remote Volume Socket	R132	82445	56,000 Ohms ½ W. 10%			
J103	84313	Triple Input Socket	R133	82445	56,000 Ohms ½ W. 10%			
J104	84313	Triple Input Socket	R134	82434	6,800 Ohms ½ W. 10%			
J105	300152	Output Socket	R135	82428	2,200 Ohms ½ W. 10%			
J106	302597	Microphone Connector	R136	82404	22 Ohms ½ W. 10%			
J107	301019	Light Socket	R137	82418	330 Ohms ½ W. 10%			
J108	307154	Output Plug	R138	82423	820 Ohms ½ W. 10%			
J109	306014	Timer Socket	R139	375047	25K Mic. Volume Control			
J110	375230	Timer By Pass Socket	R140		200K Mic. Tone Control			
J111	602386	Convenience Socket	R141	82439	18,000 Ohms ½ W. 10%			
J112	602386	Convenience Socket	R142	82439	18,000 Ohms ½ W. 10%			
J113	84315	Mechanism Socket	R143	82634	10,000 Ohms ½ W. 5%			
J114	84314	Linecord Receptacle	R144	82793	68,000 Ohms ½ W. 5%			
			R145	82422	680 Ohms ½ W. 10%			

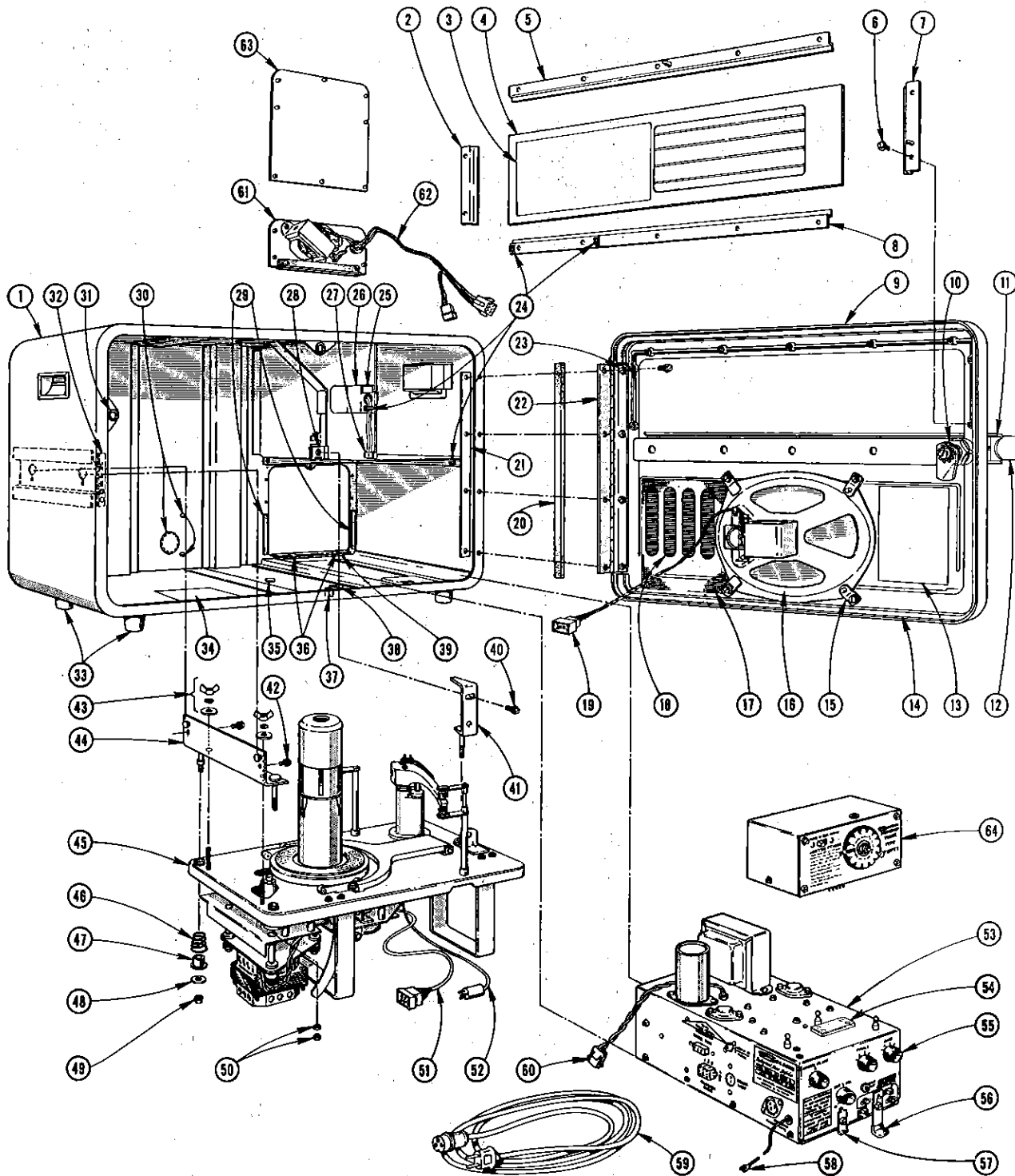
Background Music Program Timer
Type BMPT1.

* B011	--	Clock Motor (see note)
C011	86327	0.047 Mfd. 50 V. Mylar
C012	86329	0.47 Mfd. 50 V. Mylar
C013	87706	10 Mfd. 15 V. Lytic
C014	87673	2,000 Mfd. 25 V. Lytic
K011	375193	Relay
P011	375189	Plug
Q011	309401	2N408 Transistor
Q012	309401	2N408 Transistor
Q013	309400	2N591 Transistor
R011	82458	680,000 Ohms ½ W. 10%
R012	82676	47,000 Ohms ½ W. 5%
R013	82642	33,000 Ohms ½ W. 5%
R014	82634	10,000 Ohms ½ W. 5%
R015	82634	10,000 Ohms ½ W. 5%
R016	82642	33,000 Ohms ½ W. 5%
R017		(see note)
R018	82404	22 Ohms ½ W. 10%
S011	375175	Switch
S012	305365	SPDT Switch
T011	375183	Transformer

* FOR BMPT1 (60 CPS TIMER) USE CLOCK NO. 375187.
FOR BMPT1-5 (50 CPS TIMER) USE CLOCK NO. 375225.

◆ THIS RESISTOR MAY APPEAR IN SOME UNITS, IT IS USED TO ADJUST RELAY TIMING AND WILL VARY.

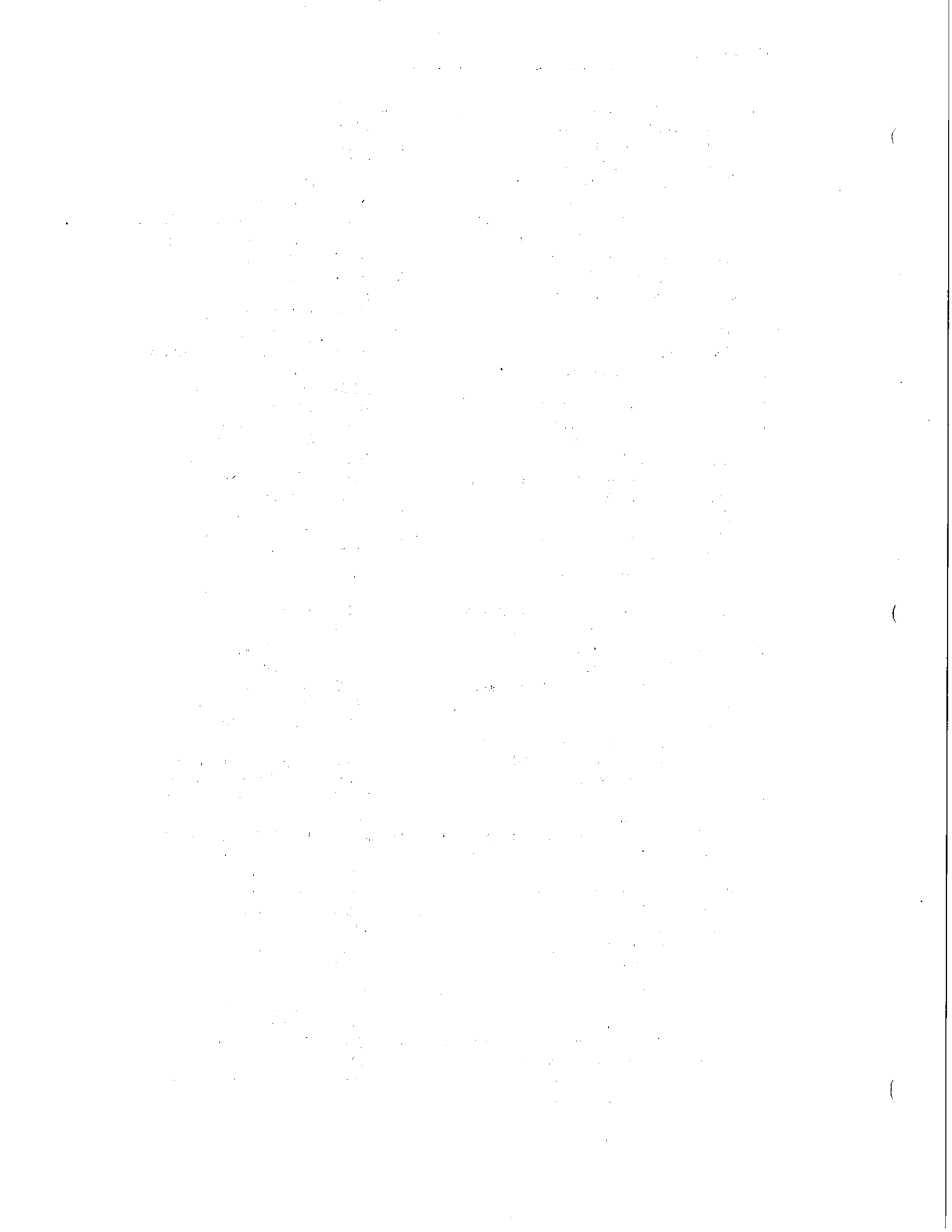
BACKGROUND MUSIC SYSTEM MODEL BMS2



PARTS LIST 

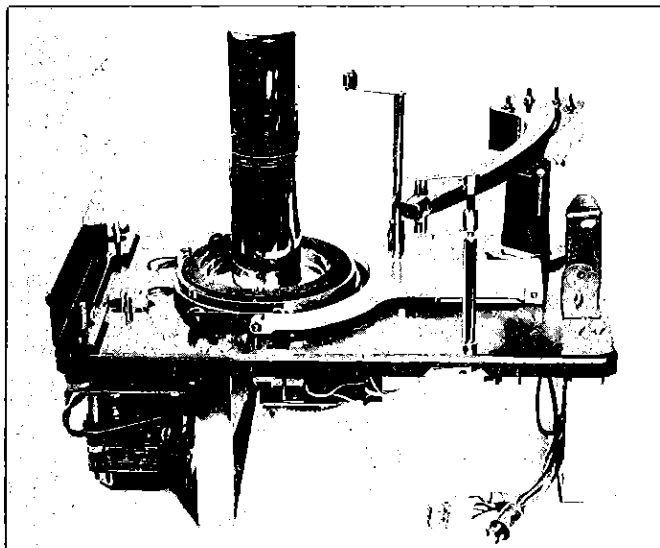
Seeburg "1000", Part No. 495400.

Item	Part No.	Description	Item	Part No.	Description
1	495435	Cabinet Shell Assembly	42	914425	8-32 x 3/8 Sems
2	495076	End Window Retainer	43	902253	Wing Nut
3	495123	Large Instruction Label		925520	1110 Lockwasher
4	495101	Front Panel Window		921166	Flatwasher
5	495103	Top Window Retainer Assembly	44	233195	Mounting Bracket Assembly (L.H.)
6	961008	8-32 x 3/8 Hex Washer H. Self Tap Screw	45	233000	Type BMM1 Background Music Mechanism
7	495104	Window Retainer Assembly (L.H.)	46	233613	Mechanism Mounting Spring
8	495055	Lower Window Retainer	47	233612	Spring Snubber
9	495037	Cabinet Front Panel	48	921114	Washer
10	495164	Lock & Handle Assembly		921166	Flatwasher
	495166	Key	49	902385	10-32 Keps Hex Nut
	495167	Lock Cam	50	902360	10-32 Hex Nut
	916667	1/4-28 x 1/4 Sems	51	233407	Plug, Cable & Switch Assembly
11	495034	Cabinet Front Panel Bar		233408	Cable
				233409	Plug (Less Contacts)
12	495116	Fuse-On Metal Trim Strip		941757	Contact
13	495431	Small Instruction Label		307154	3-Contact Socket
14	495100	Front Panel Gasket		233410	Carry-Over Switch
15	495066	Speaker Clip	52	233411	Pickup & Mute Cable Assembly
	961008	8-32 x 3/8 Hex Washer H. Self Tap Screw		250938	3-Prong Plug Assembly
16	495130	6 x 9 Oval Speaker (Utah)		233414	Mute Switch
17	495155	Grille Cloth	53	375010	Type BMA3-56 Amplifier
18	495099	Front Panel Grille Screen	54	375255	Timer By-Pass Plug
19	495096	Speaker Cable	55	375072	Knob (3 used)
	481205	Cap (Less Contacts)		375073	Knob (1 used)
	941750	Contact	56	375081	Vinyl Dipped Switch Arm
20	53428	1/2 x 3/8 Adhesive Coated Polyurathene		914188	8-32 x 1/4 Sems
21	495075	Front Panel Hinge Tapping Strip		375033	Switching Plate
22	495074	Front Panel Hinge		924708	Spring Washer
	914425	8-32 x 3/8 Sems	R-	231163	Retaining Ring
23	961008	8-32 x 3/8 Hex Washer H. Self Tap Screw	57	495078	Amplifier Retainer
24	495119	Plastic Cable Guide		960941	No. 8 x 1/2 Hex Washer H. Self Tap Screw
25	495122	Caution Label	58	375091	Jumper Assembly
26	495095	Cabinet Light Cable & Plug Assembly	59	495084	Detachable Line Cord
	495121	Lamp Socket & Shield Assembly		495158	3-Wire Line Cord (Accessory)
	495124	No. 64 Frosted Lamp	60	375092	Audio Output Cable Assembly
27	248186	Cable Clip		307154	3-Prong Socket (Less Contacts)
28	495125	"U" Fastener		941751	Contact
29	53405	3/8 x 1/8 Adhesive Coated Sponge Rubber	61	508970	Type BMCVT2 Background Music Constant Voltage Transformer Assembly
30	495202	Plug Button		508974	C.V. Transformer Mtg. Plate Assembly
	980986	Push Rivet Stud		84316	6-Contact Miniature Socket
31	988441	Polyethylene Black Grommet		12034	3-Prong Socket
32	495168	Lock Bar		508976	Constant Voltage Transformer
33	495065	Cabinet Foot		53405	3/8 x 1/8 Adhesive Coated Sponge Rubber
34	495430	Preventive Maintenance Card		508982	C.V. Cable & Plug Assembly
35	495064	Plug Button	62	508982	3-Contact Plug
36	400972	Spring Clip		307049	6-Contact Socket
37	130493	Tab		305632	Contact
38	495154	Cable Clamp		941750	Contact
39	53401	1/8 x 1/8 Adhesive Coated Sponge Rubber	63	495094	Upper Closure Plate
40	961154	No. 10 x 3/4 Hex Washer H. Sheet Metal Screw		980986	Push Rivet Stud
41	233200	Mounting Bracket Assembly (R.H.)	64	375150	Type BMPT1 Background Music Program Timer (Accessory)



SEEBURG

BACKGROUND MUSIC MECHANISMS, Type BMM-1 & Type BMM-2



The Type BMM-1 and Type BMM-2 mechanisms, are part of the Seeburg "1000" Background Music Systems. The two types have identical operation and use the same pickup, play the same records and, except for the mute switches and cabling, parts are interchangeable. They differ only in signal muting and in the operating voltage and plug connections of a record reject magnet coil. The Type BMM-1 has a 24-volt reject coil and has mute switch connection brought out through the pickup plug for signal grounding (muting) in high-signal-level amplifier circuits. The Type BMM-2 has a 115-volt reject coil and has the mute switch in parallel with the pickup. The circuits are shown in Figures 3 and 4.

The mechanisms are designed for use only with the Seeburg Background Music Library 9-inch, 16-2/3 r.p.m. microgroove records, playing first the lower side, then the upper side of each record successively from the bottom to the top of the record stack until all of up to 25 records have been played. When the upper side of the top record has played, the entire stack is automatically reset and the playing sequence is repeated.

All operations of the mechanism are powered by a single motor operating through friction drive idlers to two flywheels one of which is

above and the other below the mechanism main frame plate. The record changing cycle and the change of the pickup arm position from the lower to the upper side of the record is initiated by mechanical trip-off when the pickup, following the record groove, has moved the pickup arm to a cut-off position. The restacking operation is controlled by a feeler roller that momentarily bears against the edge of the unplayed records. If all records have moved from the unplayed position, the feeler roller can move inside the record position area so its associated linkage starts the restacking operation.

Records to be played are placed on the record spindle that is in two counter-rotating sections. The lower section is part of the upper flywheel and, with the flywheel, constitutes a turntable turning in a clockwise direction at all times. The upper part of the spindle is coupled with a shaft to the lower flywheel and turns counter-clockwise. When records are put in place they are held on the upper spindle with the bottom record, record number 1,* resting on six equally spaced record holders that project from the side of the spindle. The bottom record - the one that is on the record holders is in the position in which its lower side will be played.

When the lower side of record number 1 has been played and trip-off occurs, the mechanism

* In this discussion, the records are numbered beginning with number 1 at the bottom; number 2 next above; number 3 above number 2, etc. to the top record.

enters a sequence of operations in which the record is shifted to the lower section of the spindle and the pickup arm counterbalance springs are shifted so the stylus force is downward. The pickup balance shift occurs when the pickup arm has moved to the rest position. The record is shifted by retracting the holders in the upper spindle so the record drops to another set of record holders that are in the lower spindle section. A record that is on these lower holders is held firmly in place on the spindle by outward force of the holders and is turning clockwise in the position in which its upper side will be played.

The records that are stacked above record number 1 are prevented from dropping with number 1 by record separators that are in the spindle above the upper record holders. The separators, when retracted, are flush with the surface of the spindle. They move outward so hook-like extensions at their lower ends will be between records number 1 and 2. Then, when the upper holders are retracted, record number 2 and the other records on the spindle are supported on the separators.

After record number 1 is in position on the lower record holders, the pickup is moved to landing position on its upper side and released to follow the record grooves. When trip-off occurs, the pickup is moved to the rest position and the balance springs are shifted so the stylus force is again upward and the lower holders are retracted so record number 1 drops to the turntable surface at the bottom of the spindle.

While the lower holders are being retracted to release record number 1, the upper holders are moving outward. When the record has dropped and the upper holders have been extended, the record separators are withdrawn from record number 2 so it, and the others stacked above it, move down and are supported on the upper holders. Number 2 is then in playing position for its lower side and the pickup, which now has upward stylus force will move to landing position on the lower side of the record.

The operation sequence continues in this manner, playing first the lower side of a record, dropping the record to the lower holders and shifting stylus force direction, playing the upper side, then dropping the record to the turntable while restoring the upward stylus force condition and lowering the next unplayed record to the upper holders for playing its lower side.

When all the records have been played and the uppermost record drops to the turntable, the entire stack is lifted to its original position on the upper record holders. The requirement of restacking for continuous operation is sensed by the feeler roller. This roller moves toward the record spindle at the level of the upper record holders when trip-off occurs after playing the upper side of a record. If one or more records are on the upper record holders, the roller movement is restricted. If there is no record remaining on the holders, the roller moves in far enough to cause engagement of a restacking gear and the lifting operation begins as soon as the pickup arm is in the rest position.

As soon as the records have been restacked and the lifting arm (restack yoke) restored to normal position, the playing and shift sequence is resumed by playing the lower side of record number 1.

The low record speed at which these mechanisms operate requires an appreciable "fly-wheel" effect to avoid objectionable tremolo or "wow" from imbalance of the motor, motor coupling or drive wheels. The needed inertia is obtained and, at the same time, the over-all weight of the equipment is minimized, by taking advantage of the weight of the records and the weight which is placed on the stacked records. The full record stack and the weight should be used at all times.

The motor that drives the mechanism, a carryover switch, a reject magnet, a mute switch, the magnetic pickup, and the connecting leads associated with these constitute the wiring and electrical circuits. The motor is a 4-pole, shaded-pole induction type operating at 117 volts, 60 cycle AC. The carry-over switch is in the 117 volt line circuit to maintain motor operation after the main switch of the music system has been turned off and is closed except when the pickup arm is in the rest position. The reject magnet of the type BMM-1 operates at 24 volts AC that is supplied from a transformer in the system audio amplifier. The reject magnet of the type BMM-2 operates at line voltage. The magnets of both types operate from a reject switch and "trip" the mechanism to start a record change or shift operation in the same way that the pickup does when it has moved across the record. The mute switch is closed, except when the pickup arm is released for playing a record.

The sequence of operation, step-by-step, is given in the chart, Page 4.

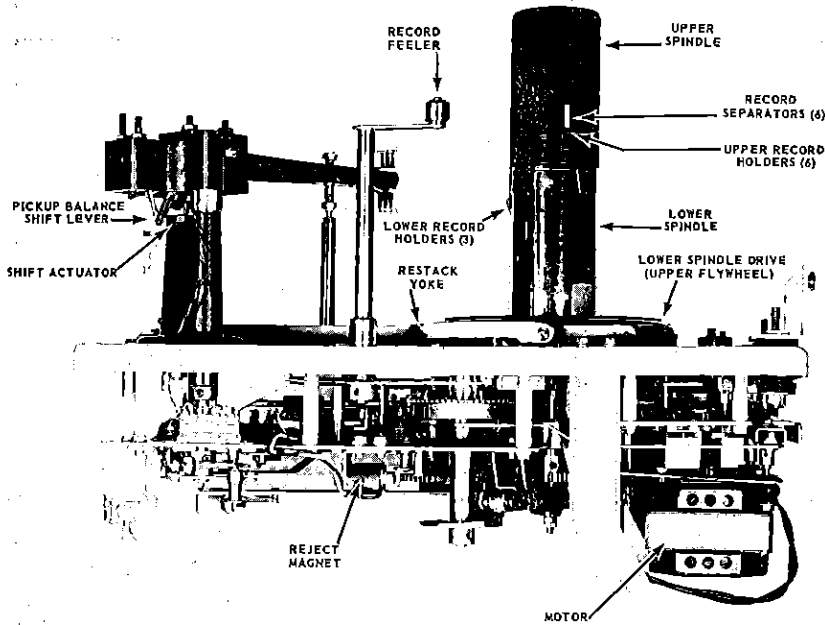


Figure 2.

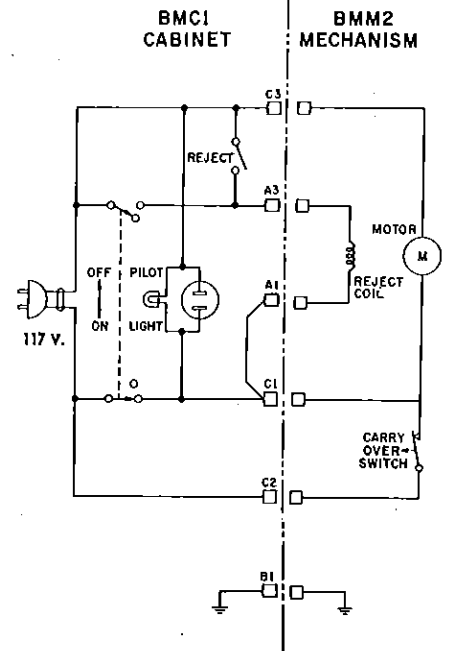


Figure 4. Power and Control Circuit, Type BMM2 Mechanism in Model BMC1.

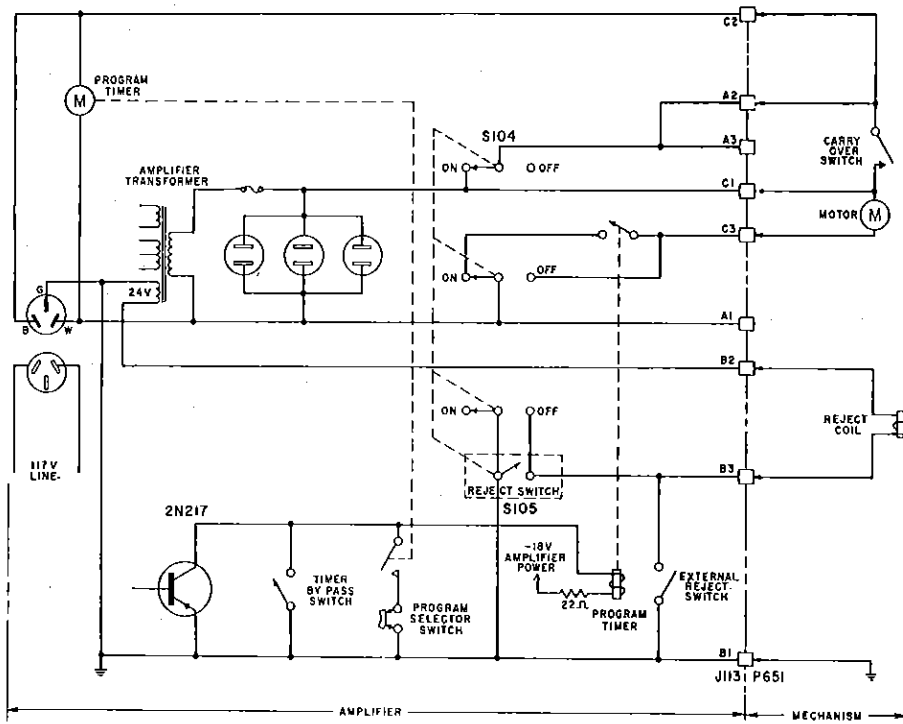


Figure 3. Power and Control Circuit, Type BMM1 Mechanism and the Model BMS-1.

SEQUENCE OF OPERATION					
1	0° (Note 1)	Starting position (a) Pickup arm in rest position. (b) Pickup stylus force upward. (c) Separators retracted (d) Upper holders fully projected. (e) Records on upper holders. (f) Lower holders retracted.	19	90°	Pickup arm begin returning to rest position; lower record holders begin to retract; upper holders begin to move out.
			20	30°	Record released from lower holders to turntable; separators begin to retract.
			21	60°	Separators retracted and stack of unplayed records moves to upper holders; feeler roller moves away from records.
			22	90°	Pickup arm in rest position; separators fully retracted; lower record holders fully retracted; upper holders fully projected; pickup balance shifts to upward stylus force.
2	180°	Pickup arm to landing position.			
3	90°	Stylus contacts lower side of record.			
4	180°	Pickup arm released to follow grooves.			
5		Play lower side of record and trip-off to start shift of pickup balance and record position.	RECORD RESTACKING SEQUENCE		
6	0°	Start shift operation.	23		Play and trip-off from upper side of last (top) record of stack to start shift of pickup balance and restacking of records to upper record holders.
7	180°	Pickup lifted from record and start return to rest position.	24	0°	Start shift and restacking operation.
8	90°	Separators start moving outward.	25	180°	Pickup begins lifting; record feeler roller move toward spindle.
9	90°	Lower holders start moving outward.	26	10°	Feeler roller moves inside record radius.
10	90°	Separators fully projected; pickup at rest position; upper holders start to retract.	27	80°	Pickup arm begin returning to rest position; lower record holders begin to retract; upper holders begin to move out.
11	15°	Record drops to partially projected lower holders; pickup balance shifts to downward stylus force.	28	30°	Record released from lower holders to turntable separators begin to retract.
12	75°	Pickup moves toward record.	29	60°	Separators retracted; feeler roller moves away from records.
13	180°	Pickup in landing position; lower holders clamping record.	30	90°	Pickup arm in rest position; separators fully retracted; lower record holders fully retracted; upper holders fully projected; restacking gear engages; pickup balance shifts to upward stylus force.
14	90°	Stylus contacts upper side of record.	31	(5 turns)	Records raised to maximum elevation.
15	90°	Pickup arm released to follow grooves.	32	(5 turns)	Restacking yoke restored to lowered position.
16		Play upper side of record and trip-off to start shift of pickup balance and record change.	33	225°	Mechanism restored to original position (as in step 1) to play lower side of bottom record.
17	0°	Begin shift and change operation. (unplayed record or records, still on spindle)			
18	180°	Pickup begin lifting; record feeler roller moves against unplayed records.			
					Record Playing Cycle Completed

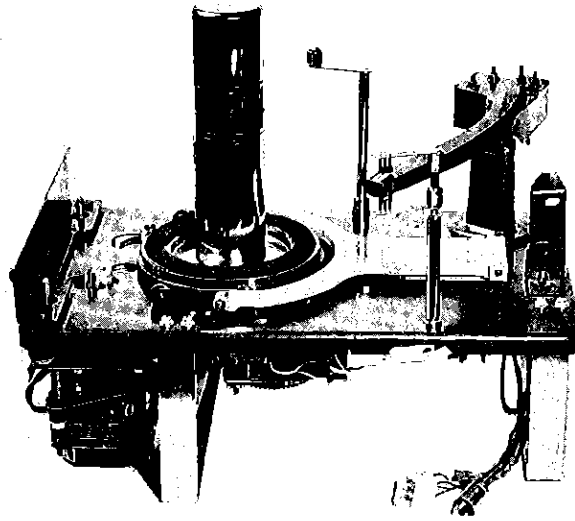
NOTE: 1. Approximate rotation of record spindle between sequence steps.

2. Mute switch closed except when pickup arm is released to play as in step 5 and 16.

3. Carry-over switch closed except when pickup arm is in rest position.

SEEBURG

BACKGROUND MUSIC MECHANISMS, Types BMM-1 & BMM-2, ADJUSTMENT & ASSEMBLY



The adjustments for the Type's BMM-1 and BMM-2 Mechanisms are arranged on the following pages in a sequence that requires a minimum of operations to fully check a mechanism or restore one to operating condition. Each adjustment is numbered and the associated adjusting screw or nut is identified by the same number in *Figures 3, 4 or 5*. Individual adjustments may be made or any sequence may be used if careful attention is given to notes indicating dependent adjustments or assembly requirements.

Most of the adjustments are to be made when the mechanism is in the playing positions defined as follows:

Bottom Side Play Position – (a) Record release cam positioned with the hole in the cam next to the record release arm roller as shown at A in *Figure 3*; (b) Pickup operating gear out of mesh with drive gear as in *Figure 3*.

Top Side Play Position – (a) Record release cam positioned with record release arm roller on highest step of cam; (b) Pickup operating gear out of mesh with drive gear.

The mechanism can be manually cycled by turning the upper spindle counter-clockwise while releasing the drive wheels from the upper and lower flywheels. This is done by pressing to-

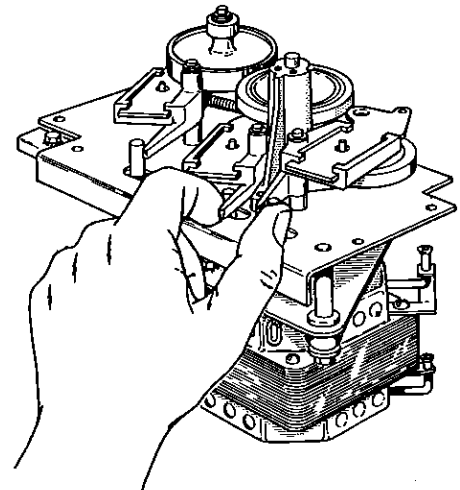


Figure 2. Mechanism Drive Disengagement.

gether the drive pivot levers as shown in *Figure 2*, or the motor and drive assembly may be temporarily removed. All manual rotation of the upper spindle should be in the counter-clockwise direction.

Manual operation and access for adjustments 1, 2 and 3 or inspection of parts below the base plate can be had while the mechanism is resting on the rear edge of the base plate. Blocks should be used to provide clearance for the pickup arm lock lever.

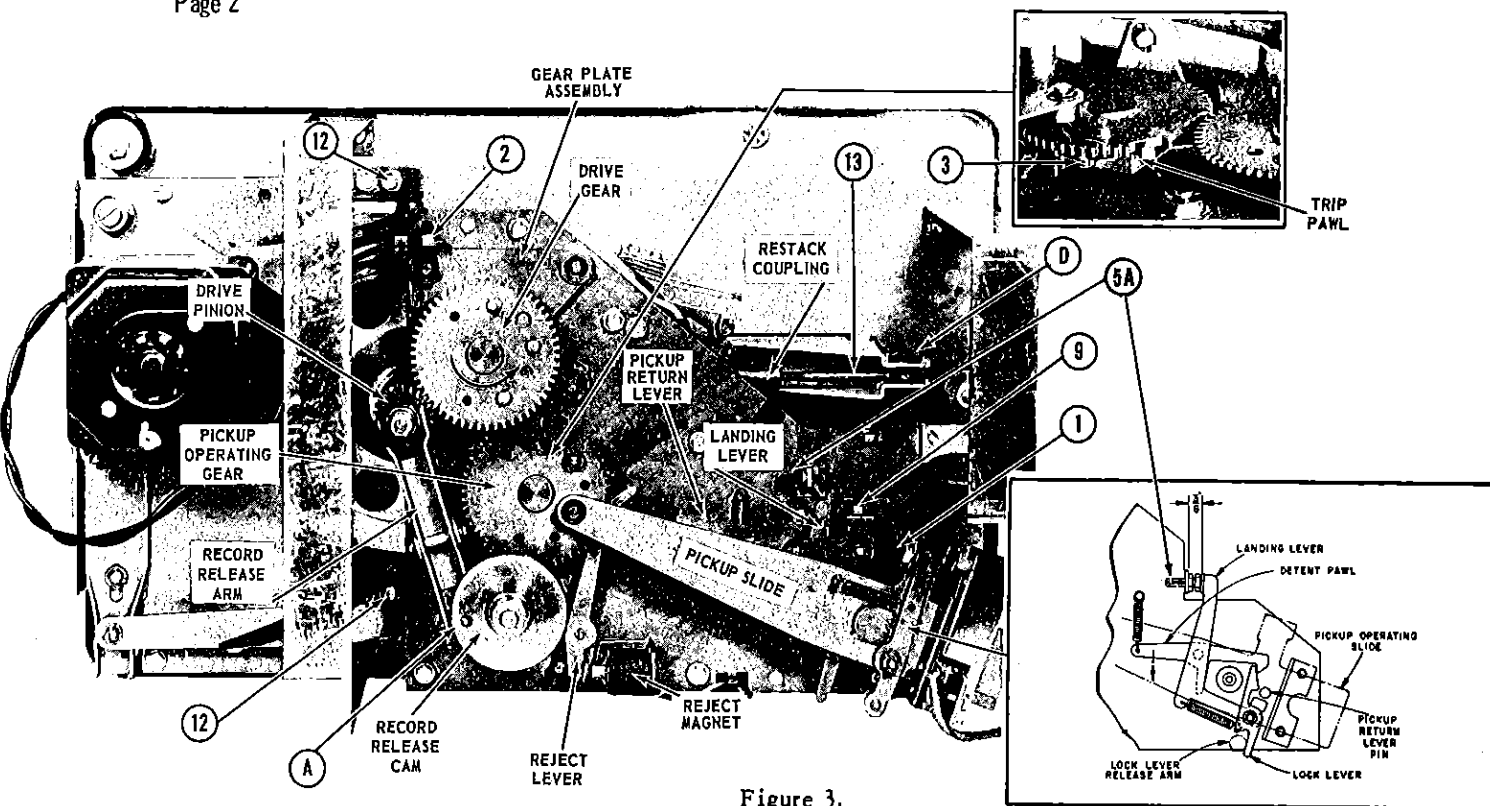


Figure 3.

No. 1 PICKUP RELEASE (Controls release of pickup rest position lock.) (Figure 3.)

- A. Place the mechanism in the bottom side play position with record release cam as at A in Figure 3.
- B. Preset the Stylus Landing Adjustment Screw (No. 5A) for $\frac{3}{8}$ inch clearance between the landing lever and the adjustment screw bracket, see detail, Figure 3.
- C. Move pickup to trip off position and adjust No. 1 adjustment screw so the lock lever is engaged by the detent pawl. See detail, Figure 3.
- D. Check adjustment (a) by manually releasing the detent pawl and note that pawl fully engages lock lever when released and (b) by moving the pickup arm so the pin in the pickup return lever moves past the nose of the lock lever. There should be a minimum of .015 inch clearance between the pin and the lock lever.

No. 2 DRIVE GEAR MESH (Establishes gear teeth clearance.) (Figure 3.)

- A. Place the mechanism in the bottom side play position.
- B. With the drive disengaged as shown in Figure 2, turn the pickup operating gear clockwise until approximately 4 teeth are engaged with the drive gear.
- C. Adjust the drive gear position with adjustment screw No. 2 for slight backlash between the drive gear and the pickup operating gear.
- D. Check for backlash between the drive pinion and the drive gear. If necessary, adjust the position of the entire gear assembly mounting plate to obtain slight clearance between teeth.

No. 3 TRIP PAWL LIMIT (Adjusts pickup operating gear engagement.) (*Figure 3.*)

- A. Before making this adjustment, be sure No. 2 is correct.
- B. Place the mechanism in the bottom side play position.
- C. Back out No. 3 adjusting screw so the point of the screw is flush with the surface of the Trip Pawl Counterweight.
- D. Manually operate the reject lever and slowly turn the spindle until the trip pawl is engaged by one of the ears on the drive gear and moves the pickup operating gear to start meshing with the drive gear. *See assembly data C. Page 8.*
- E. Turn in the adjusting screw, No. 3, until the first tooth of the pickup operating gear meshes with the drive gear without riding on top of a tooth: (If adjusting screw is turned in more, another position will be reached that will give proper gear mesh but this position must not be used because the trip-off adjustment, No. 9, will be critical.) If mechanism has 2 engaging ears on the drive gear, after making the adjustment, check engagement using the other ear.

No. 4 PICKUP LIFT OFF (Controls pickup clearance from record during return to rest position.) (*Figure 4*)

- A. This adjustment requires that the pickup balance springs are correctly installed and that the pickup shift actuator operates as discussed in the assembly data, *Paragraph E, Page 8.*
- B. With the mechanism in bottom side play position, manually operate the reject lever and slowly turn the spindle until the pickup arm has returned to approximately 2 inches from the brush post.
- C. Back out both No. 4 adjusting screws. Adjust screw 4a until the center of the pickup is 3-7/8 inch above the base.
- D. Adjust screw 4b until the pickup is raised to 4 inches above the base.
- E. When above adjustment is completed there should be 1/64 to 3/64 inch vertical play at the pickup.

No. 5 STYLUS LANDING (Controls the stylus landing position.) (*Figure 3.*)

- A. Adjustment No. 1 must be correct.
- B. Check pickup arm operation. *See assembly data, A and B. Page 8.*
- C. With a record on the upper spindle record holders, advance the change cycle from bottom side playing into the top side playing position until the pickup stylus moves down to within 1/32 inch of the face of the record.
- D. Set the Stylus Landing Adjustment Screw, No. 5A, so there is 3/8 inch clearance between the landing lever and the adjustment screw bracket. *See detail, Figure 3.*
- E. Adjust the position of the pickup arm by loosening the set screw, No. 5B, *Figure 4*, and moving the arm to a position where the stylus is approximately half way

No. 5 STYLUS LANDING - E continued.

between the first playing groove and the edge of the record. The lock lever must be held by the detent lever during this adjustment. See adjustment No. 1 and detail, *Figure 3*. Also see *assembly data D and J*. Page 8.

- F. Make a final adjustment of the landing position using Adjustment Screw No. 5A. The stylus should land half way between the first groove and the edge of the record.

No. 6 BRUSH POSITION (Positions the brushes for effective stylus cleaning.) (*Figure 4*.)

- A. Before making this adjustment, be sure No. 4 and No. 5 are correct.
- B. Adjust the brush position so both styluses engage $1/32$ inch of the brush tips as the pickup returns to the rest position.
- C. Position the assembly so the styluses travel through the brush centers.

No. 7 RECORD RELEASE (Positions the record separators and actuating rod for record-drop timing.) (*Figure 4*.)

- A. Position the mechanism so the record release roller is approximately centered on the first step of the record release cam as shown at C, *Figure 4*.
- B. Back off the record release adjustment nuts No. 7, that are on the actuating rod, until the upper spindle record separators are fully retracted.
- C. Place a record on the spindle and while holding spindle, slowly turn in the adjustment nuts until the record drops then turn in an additional $1/2$ to $3/4$ turn and lock.
- D. Check the position of the lower record holders. They should be extending from the spindle far enough so a record cannot fall past them but the locking lips of the separators should be flush to slightly under flush with the surface of the spindle so a record cannot catch on them. If this condition cannot be met with the adjustment as in C, check spindle assembly and operation, paragraph C, Page 9.

There must also be a minimum of .010 inch vertical play in the actuating rod when the mechanism is in the top side play position. This vertical play will be lost and cause strains if the adjusting nuts are turned in too far.

No. 8 PICKUP OPERATING GEAR DETENT (Detent Spring Position.) (*Figure 6*.)

- A. Position the detent spring in a retaining hole in the restacking gear actuating lever so the pickup operating gear is detented without carrying through into the next change cycle. (Normal position is center hole.) Check for both top and bottom side positions.

No. 9 TRIP OFF (Establishes pickup position at which record change is started.) (*Figure 3*.)

- A. With the mechanism in topside play position, adjust the trip off adjustment screw No. 9, so the trip pawl is fully operated when the stylus is $7/8$ inch from edge of the record hole. The pickup stylus is fully into the record cut-off groove at this position.
- B. Check trip operation in bottom side play position.

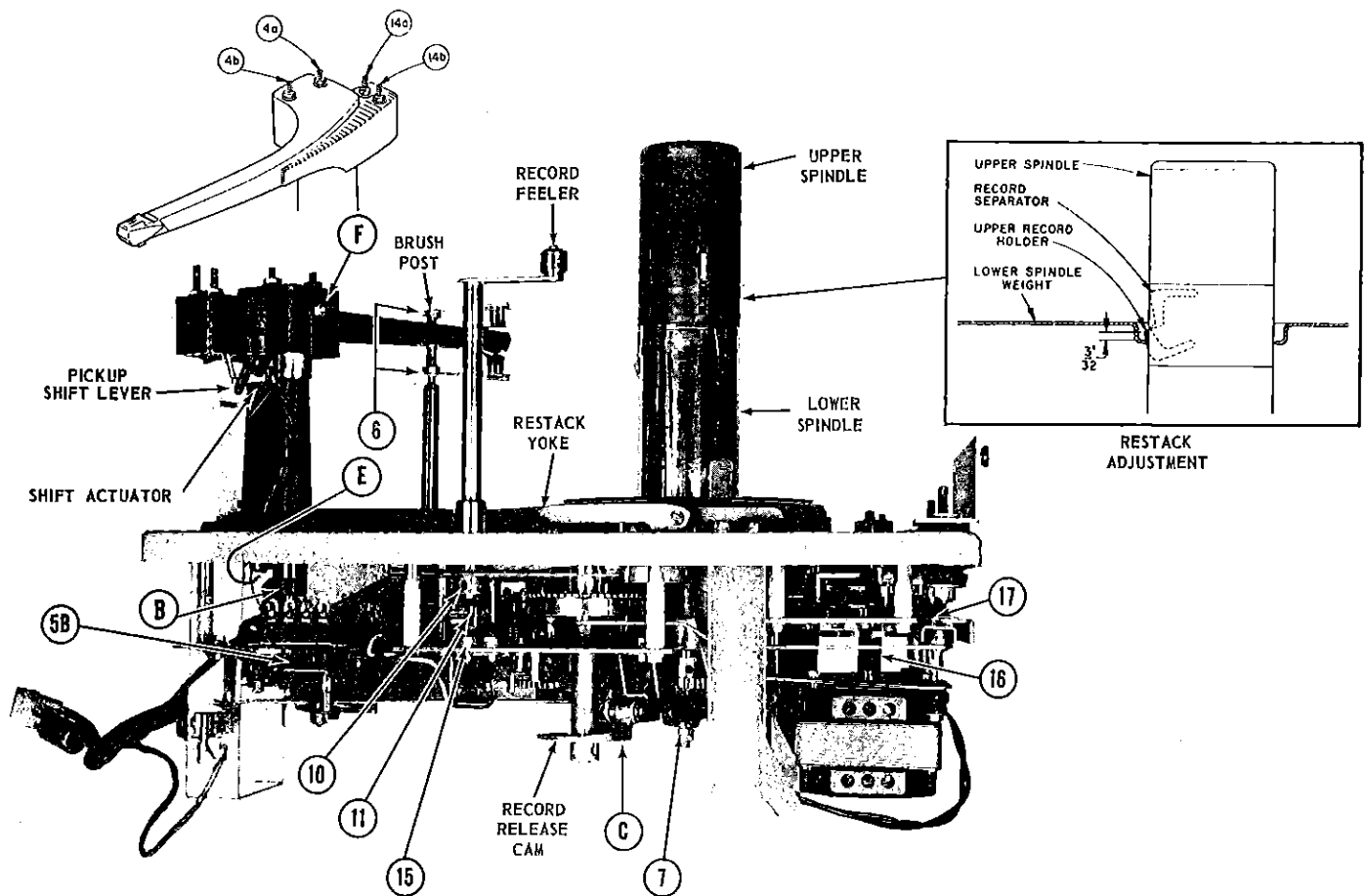


Figure 4.

No. 10 RECORD FEELER (Adjusts position of record feeler roller for starting record restacking.) (Figure 4.)

- A. With a record on the upper spindle, adjust the position of the roller for a clearance of $\frac{3}{32}$ inch to the edge of the record when the feeler lever roller is against its cam. Adjustment is made by loosening set screw No. 10 in the feeler lever hub. See assembly data G.

No. 11 RESTACK RELEASE (Adjusts release of restacking gear for engagement with drive gear.) (Figure 4.)

- A. Make sure adjustment No. 10 is correct.
- B. With the mechanism in top side play position and a record on the upper spindle, trip mechanism and slowly rotate spindle until record feeler roller contacts edge of record.
- C. While holding the stop lever to the right, adjust the stop lever adjustment screw No. 11, so the end of the screw clears the feeler lever by $\frac{3}{32}$ inch.

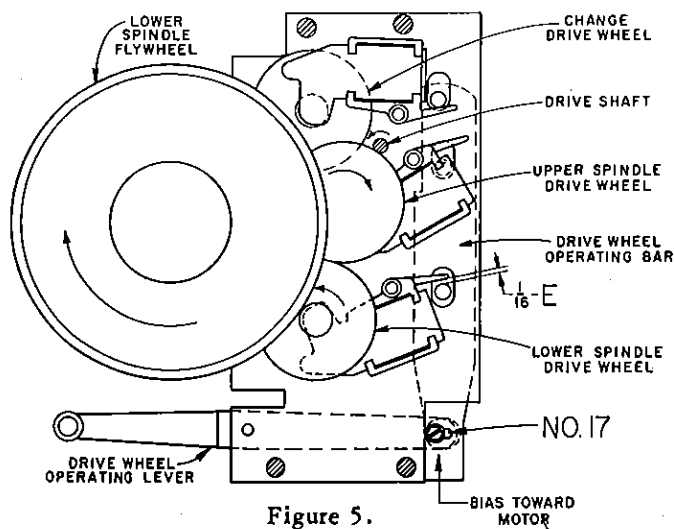


Figure 5.

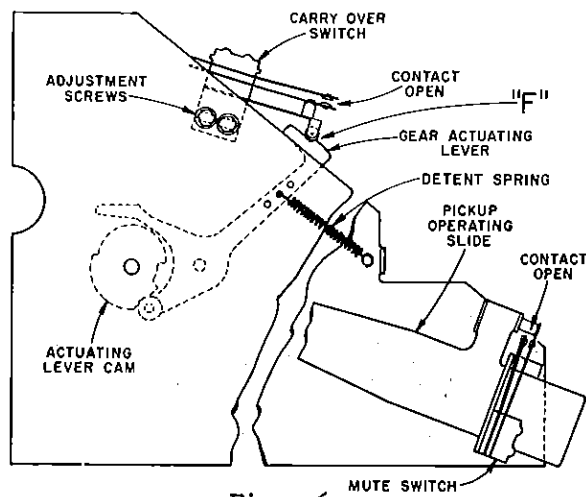


Figure 6.

No. 12 RESTACK GUIDES (Adjusts level of records during restacking.) (Figure 3.)

- A. Cycle mechanism to restack by removing records from the upper spindle.
- B. While the restack yoke is raised approximately 3 inches, adjust the restack guide roller brackets No. 12 so the edge of the turntable weight on the side adjacent to the restack yoke pivot is elevated $1/16$ to $3/32$ inch higher than the opposite side.

No. 13 RESTACK LIMIT (Adjusts the upper height of the restack yoke.) (Figures 3 and 4)

- A. With only the lower spindle weight in position (no records) adjust the upper limit of the restack yoke so the top of the record weight indentation is $3/32$ inch below the top of the upper record holders as shown in the detail, Figure 4.
- B. Adjustment is made by removing the pin that couples the operating link to the yoke (D, Figure 3) and changing the effective length of the link by turning the link in the restack coupling.

No. 14 STYLUS FORCE (Adjusts stylus force.) (Figure 4.)

- A. Screws 14a and 14b, Figure 4, control stylus force. 14a changes both the upward and downward force. For this reason, adjustment must be made in the following sequence: (See assembly data F.)
- B. With mechanism in top side playing position, adjust with screw 14a for stylus force of $3\frac{1}{2}$ to $4\frac{1}{2}$ grams.
- C. Cycle mechanism to bottom side play position and, with screw 14b, adjust for stylus force of $3\frac{1}{2}$ to $4\frac{1}{2}$ grams.

No. 15 REJECT MAGNET POSITION (Figure 3.)

- A. Adjust the reject magnet position so the reject lever fully operates the trip pawl when the magnet is energized. Adjust the position by loosening the coil mounting screws, No. 15, Figure 3. The reject lever should seat against the coil core when the magnet is energized. See assembly data C.

No. 16 MOTOR COUPLING POSITION

- A. Adjust the position of the motor coupling, No. 16, *Figure 4*, so the end of the coupling clears the motor housing by approximately $1/16$ inch.

No. 17 DRIVE BAR POSITION(Controls drive wheel engagement.) (*Figures 4 and 5*).

- A. With the mechanism in the top side play position, adjust the eccentric screw No. 17 for $1/16$ inch clearance between the drive bar pin and the lower spindle drive wheel lever as shown at E, *Figure 5*. While making this adjustment, bias the end of the operating lever toward the motor so the operating lever roller is bearing against its cam.

**CARRY-OVER SWITCH**

1. With mechanism in bottom side play position, trip and turn spindle until pickup arm is fully returned to rest position. Roller on actuating lever and the actuating lever cam should be as shown in *Figure 6*.
3. Adjust roller force, against cam for 1 ounce pressure and contact gap for $1/32$ inch.

2. Loosen the switch bracket mounting screws and position switch until the roller of blade is $1/64$ inch from the slope of lever at F, *Figure 6*.

MUTE SWITCH (*Figure 6*)

1. With mechanism in top or bottom side play position, adjust lifter pressure against slide for 1 ounce pressure and contact gap for $1/32$ inch.

**SPEED TEST**

Put a piece of masking tape or an easily seen mark on the edge of the records. Use a reasonably accurate watch and check the elapsed time for 50 revolutions of the records. The time for 50 revolutions should be between 182.0 seconds (16.5 rpm) and 176.5 seconds (17.0 rpm).

ASSEMBLY DATA

A. The pickup shaft collar, B, *Figure 4*, should be positioned vertically on the pickup shaft so there is .003 inch to .007 inch vertical free movement of the shaft.

B. The vertical position on the shaft of the pickup return lever, *Figure 3*, should allow interference free movement of the pickup arm in play position. The lever should engage the trip pawl in the center of the engagement area A, *Figure 7*.

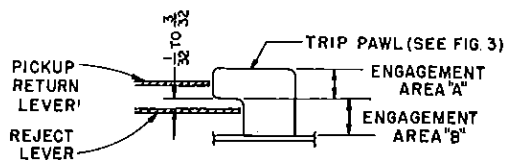


Figure 7.

C. The reject lever, *Figure 3*, should engage the trip pawl in engagement area B, *Figure 7* and clear area B projection 1/32 inch to 3/32 inch.

D. The pickup bias spring lever, *Figure 8* and 5B, *Figure 4*, should be positioned on the pickup arm shaft so the spring lever is parallel with the long edge of the mechanism base plate when the stylus is at the landing position on a record as shown in *Figure 8*.

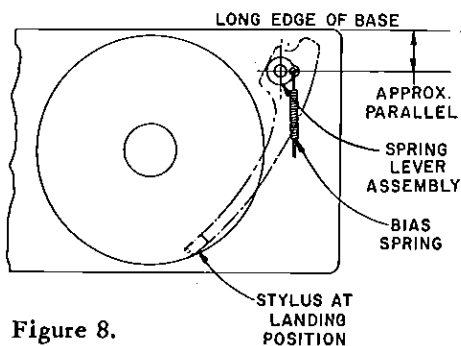


Figure 8.

E. The pickup shift pinion and rack, E, *Figure 4*, should mesh 1/2 to 1 tooth beyond the point where the shift actuator causes the pickup shift lever to latch with the pickup shift release lever when the mechanism is changing from top to bottom side play and the pickup arm is at its farthest position from the spindle. Check that shift lever is released when going from top to bottom side play and that the actuator moves clear of the shift release lever before pickup arm is released (for playing) when mechanism is going into

top side playing position. *Figure 9A* shows the relationship of the levers and the actuator in top and bottom side play position and the pickup arm at the stylus landing position.

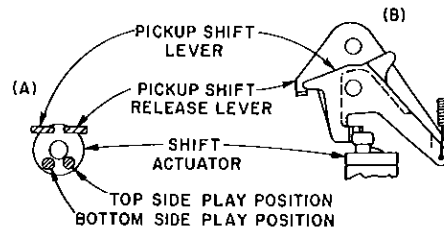


Figure 9.

F. The pickup arm pivot screw, F, *Figure 4*, should be set so there is a minimum end play of .002 inch and the pickup arm does not bind at any point.

G. The feeler arm shaft should have .005 inch to .010 inch vertical end play. Adjust with feeler lever, 10, *Figure 4*.

H. Adjust clearance between lower spindle flange and base to 1/32 inch minimum with shim washers Part No. 923476, (.010 inch) and Part No. 923477, (.015 inch) on base sleeve between spindle shaft casting in base plate and bottom thrust washer of lower spindle thrust bearing, *Figure 7*. See Paragraph B and 3 of *Spindle Assembly Instruction*.

J. Adjustment 5, Paragraph E, positions the pickup arm with reference to the operating slide and its position when it returns to the brush post during the changing operation. The arm can be bearing against the post but, must not be more than 1/8 inch from it.

K. The force required to move the pickup arm laterally in either direction over the playing area and in top and bottom side playing position should not exceed 0.5 grams. Measure force at tip of Pickup, with no record in place and with bias spring removed. See *assembly data D*.

The force required to move the pickup over the trip-off area must not exceed 1.3 grams for bottom side play position.

SPINDLE ASSEMBLY INSTRUCTIONS

The upper spindle, lower spindle and record holders must have the following relationship.

A. The upper spindle must have between .003 and .007 vertical play.

B. The clearance between the spindles must be between .003 and .015.

C. The lower record holders must extend with the locking lip of the holders flush with the side of the spindle when the actuating rod is pulled down to where the top of the upper record holders are retracted to flush with the upper spindle.

If required, set the vertical play of the upper spindle by positioning the flywheel located under the base. If the clearance or record holder position is not correct, remove the upper and lower spindles and assemble as follows:

1. Place the upper spindle races and thrust bearings on the top of the base sleeve. Do not use shim washers.
 - a. If more than .015, add shim washers (3a) under the lower race of the lower spindle thrust bearing.
 - b. If less than .003 add shim washers (3b) under the lower race of the upper spindle thrust bearing.
2. Place the lower spindle thrust bearing and races on the base sleeve and install the lower spindle.
3. Install the upper spindle assembly and check for clearance with lower spindle. See assembly data H.
 - a. If more than .015, add shim washers (3a) under the lower race of the lower spindle thrust bearing.
 - b. If less than .003 add shim washers (3b) under the lower race of the upper spindle thrust bearing.
4. After setting proper spindle clearance, pull down on the actuator rod until the upper spindle record holders are retracted and flush. Check that the lower record holders are extended so the locking lip is flush with the side of the spindle.
 - a. If lower holders are extended less than above, add shim washers (4) below the thrust collar.
 - b. If lower holders are extended more than above, remove shim washers (4) below the thrust collar.

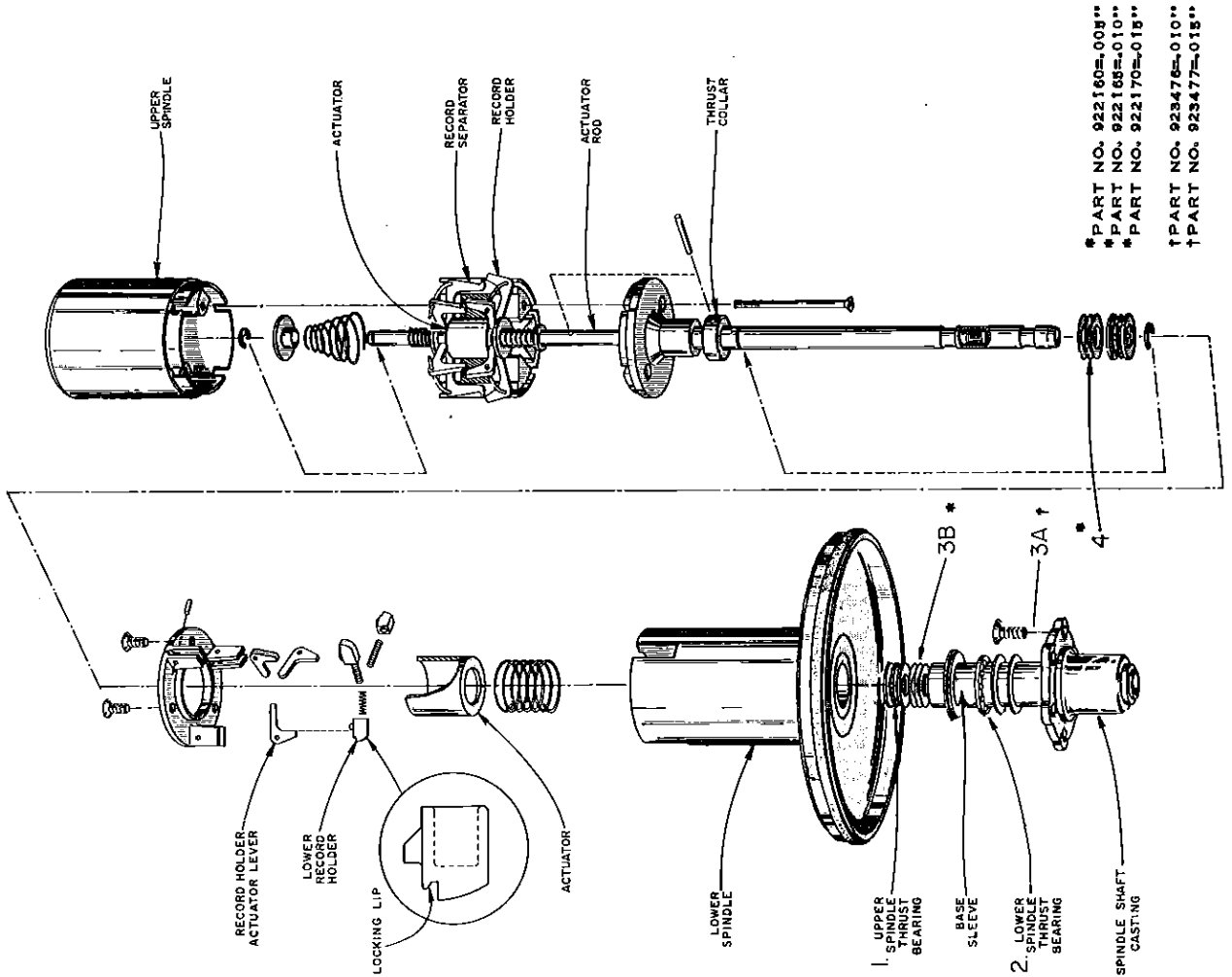
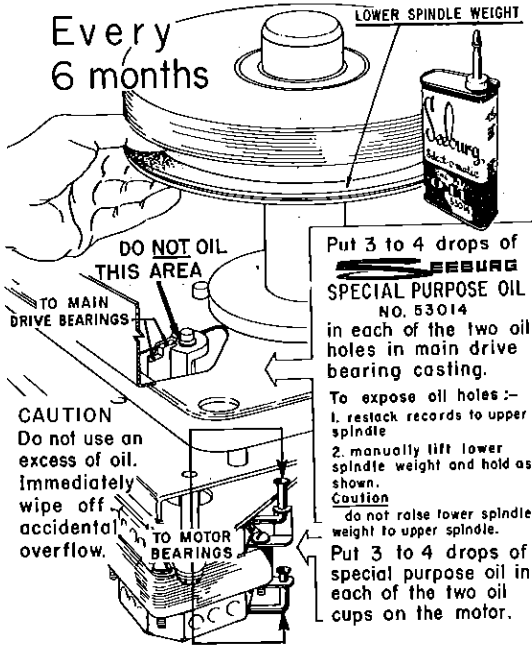


Figure 10. Spindle Assembly

LUBRICATION CHART

Every 6 months



Put 3 to 4 drops of **SEEBURG SPECIAL PURPOSE OIL NO. 53014** in each of the two oil holes in main drive bearing casting.

To expose oil holes :-
 1. restack records to upper spindle
 2. manually lift lower spindle weight and hold as shown.

Caution
 do not raise lower spindle weight to upper spindle.

Put 3 to 4 drops of special purpose oil in each of the two oil cups on the motor.

CAUTION
 Do not use an excess of oil. Immediately wipe off accidental overflow.

Figure 11. Lubrication.

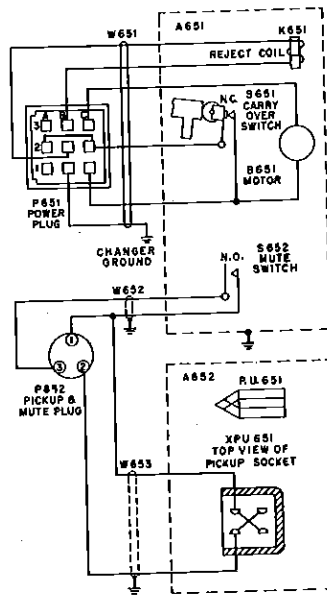


Figure 12. Type BMM1 Mechanism.

DRIVE WHEELS

The rubber drive wheels should be thoroughly cleaned with denatured alcohol to prevent slippage that reduces turntable speed, "wow" or tremolo. The motor assembly, as shown in Figure 14, should be fully removed from the mechanism to facilitate thorough cleaning.

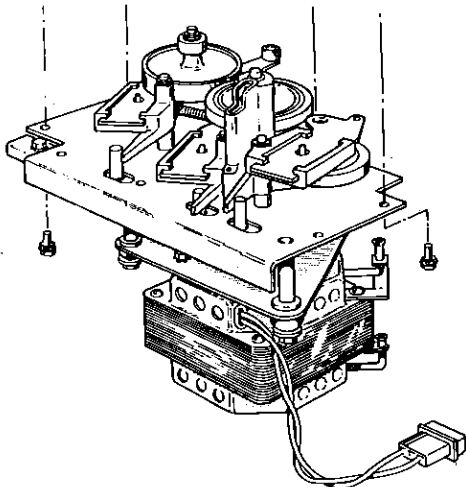


Figure 14.

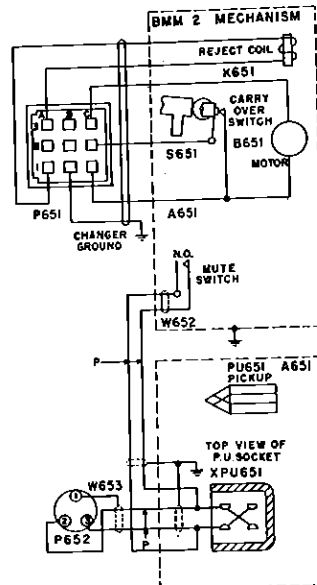
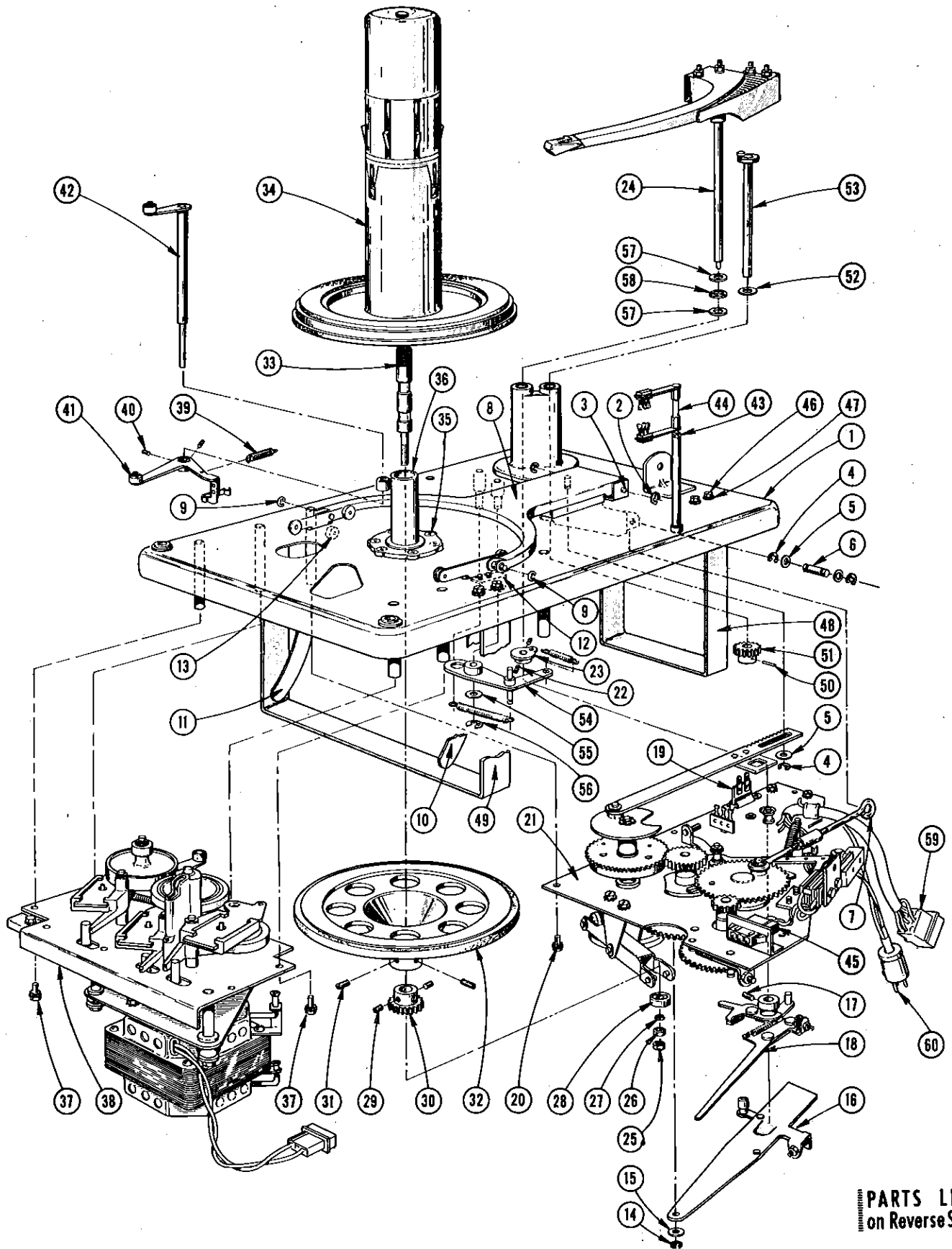


Figure 13. Type BMM2 Mechanism.

BACKGROUND MUSIC MECHANISM, Type BMM1

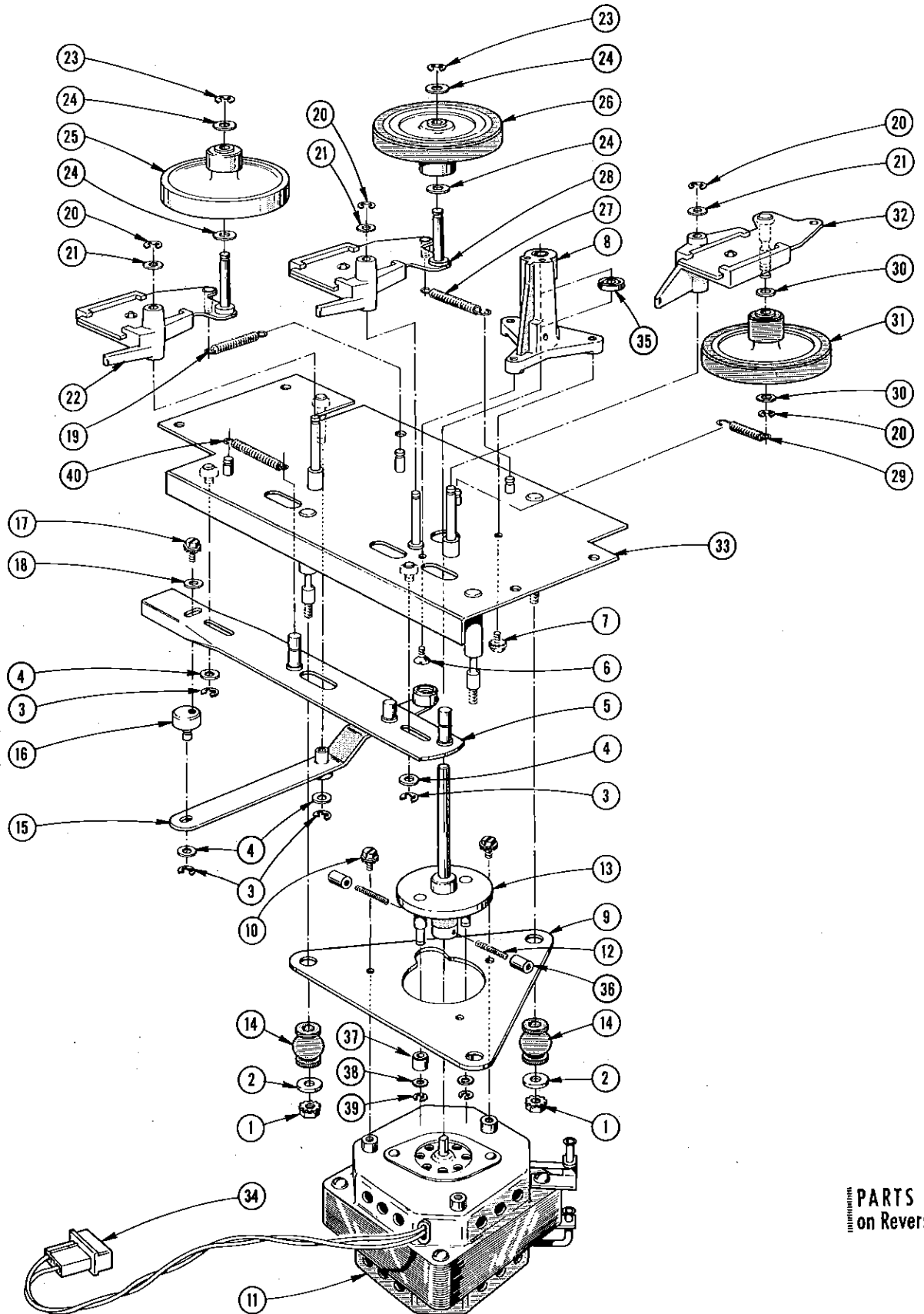


PARTS LIST
on Reverse Side

BACKGROUND MUSIC MECHANISM, Type BMM1

Item	Part No.	Description	Item	Part No.	Description
—	233000	Background Music Mech., Type BMM1	32	233428	Flywheel & Drive Ring Assembly
1	233065	Base Assembly	33	233236	Lower Spindle Assembly (Code A-D) (see Pg. 8)
2	125448	Retaining Ring		233659	Lower Spindle Assembly (Code E) (see Pg. 8)
3	233102	Restack Yoke Shaft	34	233220	Upper Spindle Assembly (see Pg. 8)
4	405203	Retaining Ring	35	914525	8-32 x 1/2 Phillips Flat H.M.S.
5	921551	Flatwasher		901682	8-32 Keps Hex Nut
6	233055	Restack Yoke Hook Pin	36	233075	Spindle Shaft & Bearing Assembly
7	233108	Restack Yoke Link	37	914425	8-32 x 3/8 Sems
8	233090	Restack Yoke Assembly	38	233500	Drive Assembly (see Page 3)
	233101	Restack Yoke Bracket	39	233126	Record Feeler Lever Spring
9	R-231163	Retaining Ring	40	918532	8-32 x 3/16 Socket H. Set Screw
10	233093	Restack Yoke Guide & Roller Assem., Front	41	233282	Feeler Lever Assembly
11	233092	Restack Yoke Guide & Roller Assem., Rear		233120	Roller
12	233082	Guide Roller Bracket Assem., Front		921061	Flatwasher
13	233081	Guide Roller Bracket Assem., Rear		301374	Retaining Ring
	920914	Flatwasher	42	233116	Feeler Arm Assembly
	914188	8-32 x 1/4 Sems	43	902360	10-32 Hex Nut
14	301374	Retaining Ring	44	233127	Brush Mtg. Blade Assembly
15	921961	Flatwasher		251684	Brush
16	233111	Pickup Operating Slide Assembly	45	307154	3-Contact Socket (Part of 59)
	233189	Pickup Release Arm & Roller Assembly	46	914188	8-32 x 1/4 Sems
	920600	Flatwasher	47	920914	Flatwasher
	125448	Retaining Ring	48	233193	Record Stand, R. H.,
	233219	Spring	49	233194	Record Stand, L.H.
	918612	8-32 x 1/2 Oval Point Set Screw	50	952110	Spirol Pin
	901631	8-32 Hex Nut	51	233046	Pinion
17	918532	8-32 x 3/16 Oval Point Set Screw	52	921551	Flatwasher
18	233159	Return & Adjustment Lever Assembly		921590	Flatwasher
	233219	Spring	53	233104	Shaft, Actuator & Pin Assembly
	233281	Return Lever Extension Spring	54	233290	Bias Spring Shaft Lever Assembly
	918612	8-32 x 1/2 Oval Point Set Screw		233298	Spring
	901631	8-32 Hex Nut	55	921551	Flatwasher
19	247287	Terminal Strip (Part of 21)	56	405203	Retaining Ring
20	914425	8-32 x 3/8 Sems	57	921666	Thrust Washer
21	233300	Gear Train Assembly (see Page 5)	58	233172	Ball Retainer Assembly
22	918532	8-32 x 3/16 Socket H. Set Screw	59	233407	Plug, Cable & Switch Assem. (Comp.)
	921061	Flatwasher		233408	Cable
23	233287	Spring Lever Assembly		233409	Plug
	233299	Pickup Arm Biasing Spring		941757	Contact
24	233131	Pickup Arm & Shaft Assembly (see Page 7)		233410	Carry-Over Switch
25	902360	10-32 Hex Nut	60	233411	Pickup & Mute Cable Assem., (Comp.)
26	902360	10-32 Hex Nut		233412	Pickup Shielded Cable
27	233209	Radial Ball Bearing Spacer		233413	Mute Shielded Cable
28	233184	Radial Ball Bearing		250938	3-Prong Plug Assembly
	233208	Radial Ball Bearing Sleeve		233414	Mute Switch
29	918511	8-32 x 1/8 Socket H. Set Screw			
30	233047	Spindle Shaft Pinion	—	233167	Record Wt. Assem. (Upper)(Not Shown)
31	918755	10-32 x 1/4 Socket H. Set Screw	—	233273	Turntable Wt. & Pad Assem.(Lower)(Not Shown)

BACKGROUND MUSIC MECHANISM, Type BMM1

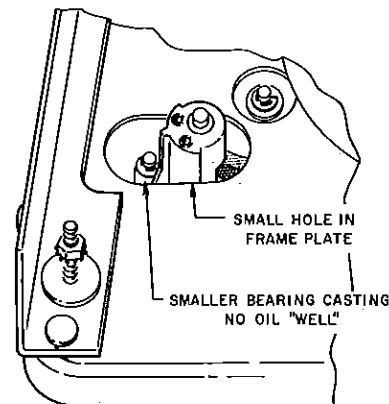


Drive Assembly, Part No. 233500.

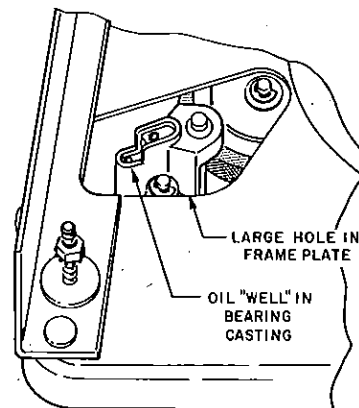
PARTS LIST
on Reverse Side

BACKGROUND MUSIC MECHANISM, Type BMM1

Item	Part No.	Description
1	902385	10-32 Keps Hex Nut
2	921260	Flatwasher
3	301374	Retaining Ring
4	921061	Flatwasher
5	233536	Drive Wheel Operating Bar Assembly
6	912992	6-32 x ¼ Phillips Flat H.M.S.
7	913026	Sems 6-32 x ¼ (2)
* 8	233596	Drive Shaft Bearing Housing & Oiler Assembly
†	233639	Drive Shaft Bearing Housing & Oiler Assembly
9	233583	Motor Mounting Plate
10	913026	Sems 6-32 x ¼
11	233579	Motor (60 cycle)
12	918389	6-32 x ½ Socket H. Cup Pt. Set Screw
* 13	233623	Coupling & Drive Shaft Assembly
†	233654	Coupling & Drive Shaft Assembly (Must be used with motor mounting plate (9) having "key-hole" center.
14	233668	Motor Shock Mount
15	233542	Drive Wheel Operating Lever Assembly
16	233541	Adjusting Stud
17	920914	Flatwasher
18	914302	Sems 8-32 x 5/16
19	233572	Lower Spindle Drive Spring
20	301374	Retaining Ring
21	921061	Flatwasher
22	233561	Lower Spindle Drive Assembly
23	R-231163	Retaining Ring
24	233611	Fibre Washer
25	233599	Lower Spindle Drive Wheel (Complete)
26	233633	Upper Spindle Drive Wheel (Complete)
27	233571	Upper Spindle Drive Spring
28	233548	Upper Spindle Drive Assembly
29	233570	Change Cycle Drive Spring
30	233590	Fibre Washer
31	233635	Change Drive Wheel (Complete)
32	233554	Change Cycle Drive Assembly
33	233520	Drive Plate Assembly
34	307049	3-Contact Plug
	941757	Contact
†35	233643	Oil Slinger
36	233652	Bumper
37	233651	Roller
38	920600	Flatwasher
39	125448	Retaining Ring
40	233625	Spring

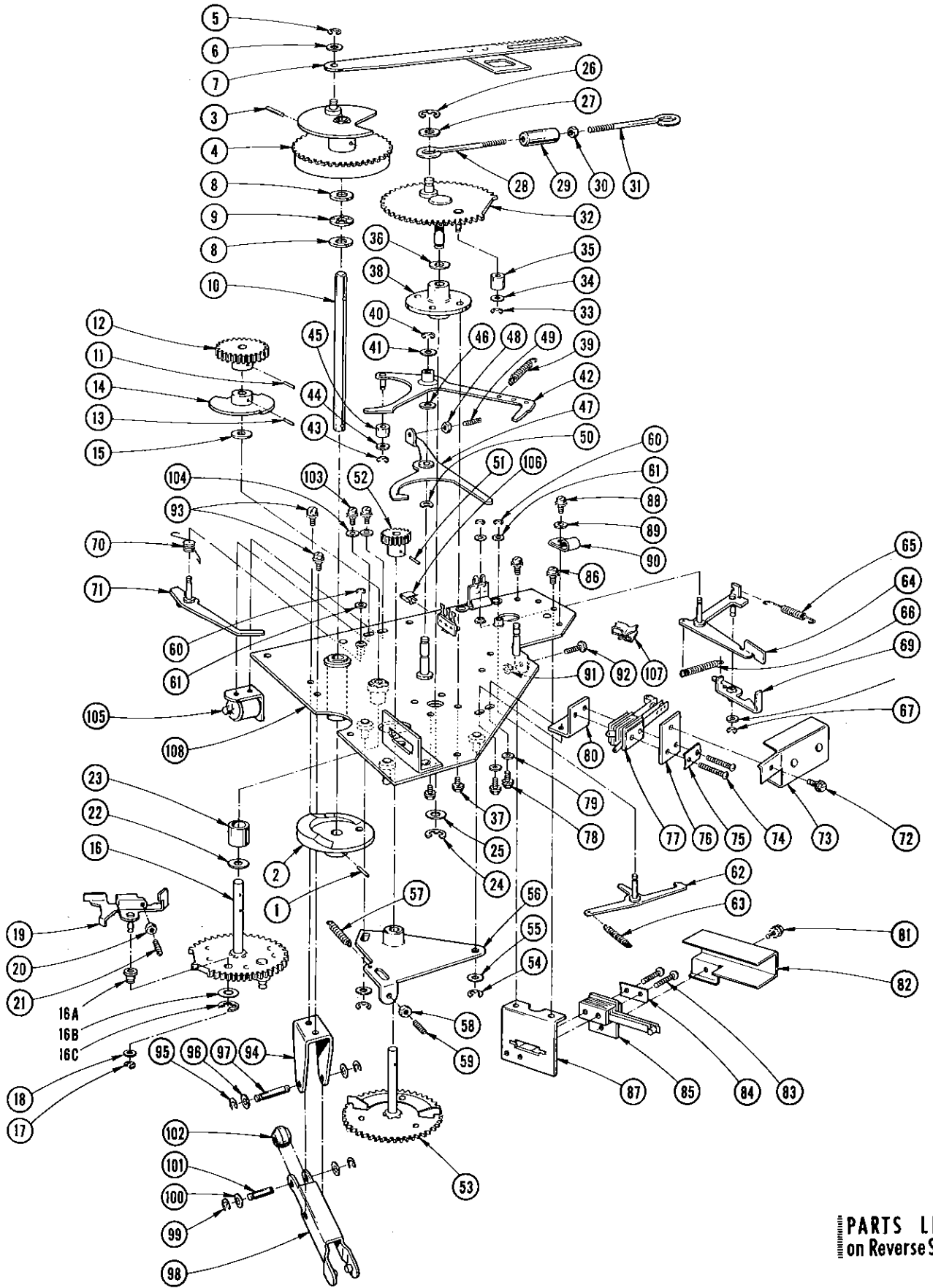


* CODE A & B



† CODE C

BACKGROUND MUSIC MECHANISM, Type BMM1



Gear Train Assembly, Part No. 233300.

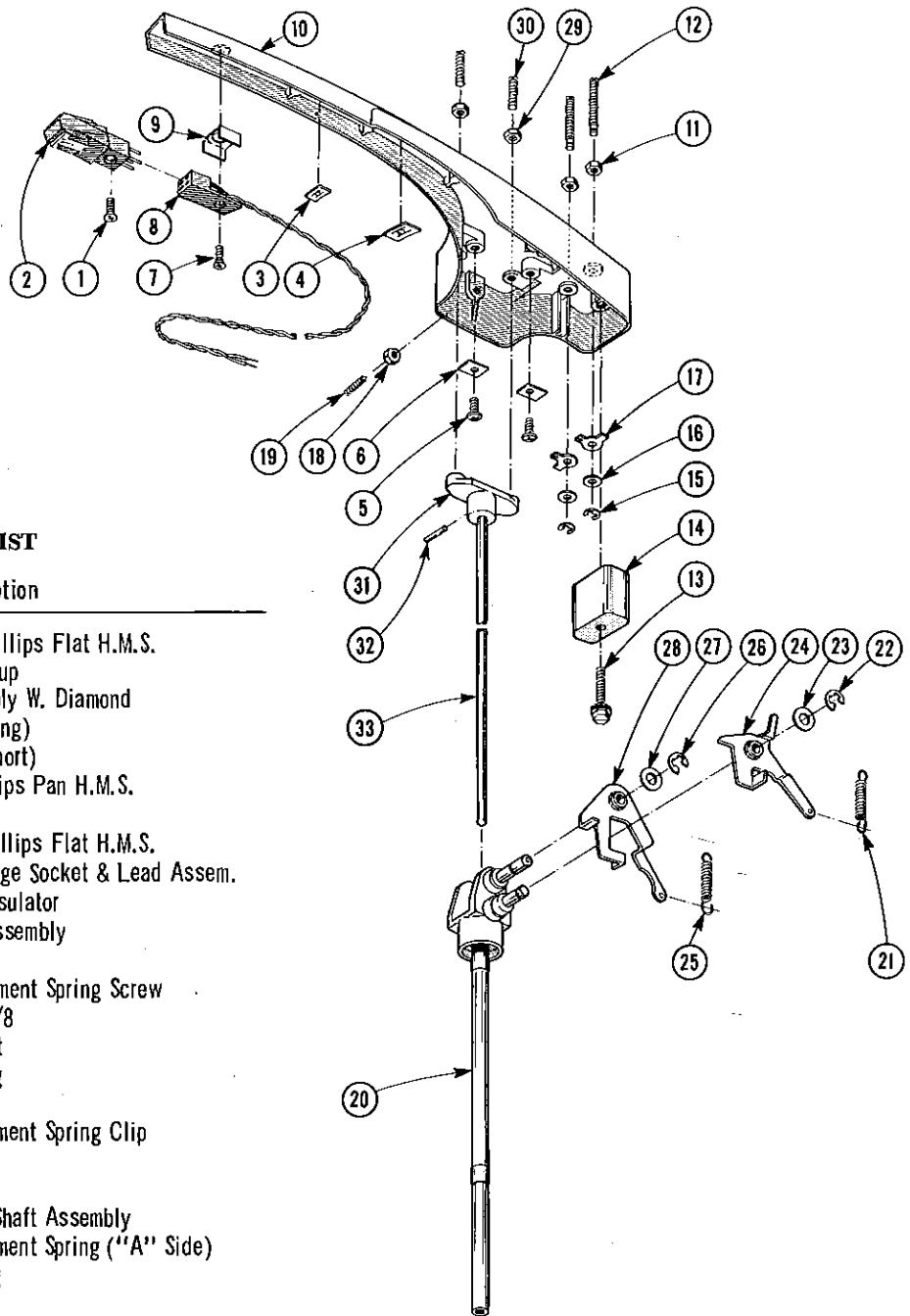
PARTS LIST
on Reverse Side

BACKGROUND MUSIC MECHANISM, Type BMM1

Item	Part No.	Description	Item	Part No.	Description
1	952110	.093 Diam. x 1/2 Spirol Pin	54	301374	Retaining Ring
2	233453	Record Release Cam	55	921061	Flatwasher
3	952110	.093 Diam. x 1/2 Spirol Pin		922141	Flatwasher
4	233360	Cam & Gear Staked Assembly	56	233354	Drive Gear & Pinion Plate Assembly
5	301374	Retaining Ring	57	233219	Spring
6	921061	Flatwasher	58	901631	8-32 Hex Nut
7	233294	Pickup Shift Pinion Rack	59	918612	8-32 x 1/2 Slotted Headless Oval Point Set Screw
8	921629	Thrust Washer	60	125448	Retaining Ring
9	233627	Ball Retainer Assembly	61	920600	Flatwasher
10	233366	Cam & Release Gear Shaft	62	233390	Pickup Lock Lever Detent Pawl Assem.
11	952110	.093 Diam. x 1/2 Spirol Pin	63	233391	Detent Pawl Spring
12	233045	Record Release Pinion	64	233327	Landing Arm & Shaft Assembly
13	952110	.093 Diam. x 1/2 Spirol Pin	65	233394	Landing Arm Spring
14	233375	Cam & Hub Assembly	66	233393	Lock Lever Spring
15	921551	Flatwasher	67	125448	Retaining Ring
*16	233403	Pickup Operating Gear & Cam Assem.	68	920600	Flatwasher
A	233432	Trip Pawl Bushing	69	233392	Lock Lever Staked Assem.
B	924712	Spring Washer	70	233389	Reject Lever Spring
C	301367	Retaining Ring	71	233323	Reject Lever & Pin Assem.
17	125448	Retaining Ring	72	913026	Sems 6-32 x 1/4
18	920600	Flatwasher	73	233429	Switch Cover Assembly
19	233373	Trip Pawl Assembly	74	912573	5-40 x 3/4 Phillips Pan H.M.S.
20	901099	6-32 Hex Nut	75	400597	Tension Plate
21	918377	6-32 x 3/8 Oval Pt. Set Screw	76	-	Mounting Plate (Part of Carry- Over Switch)
22	921551	Flatwasher	77	233410	Carry-over Switch
23	233630	Sleeve	78	914302	Sems 8-32 x 5/16
24	405203	Retaining Ring	79	920914	Flatwasher
25	921551	Flatwasher	80	233406	Switch Mounting Bracket
26	405203	Retaining Ring	81	913026	Sems 6-32 x 1/4
27	921551	Flatwasher	82	233415	Switch Cover
28	233108	Restack Yoke Link	83	912573	5-40 x 3/4 Phillips Pan H.M.S.
29	233056	Restack Yoke Link Nut	84	400597	Tension Plate
30	901631	8-32 Hex Nut	85	233414	Mute Switch
31	233108	Restack Yoke Link	86	914302	Sems 8-32 x 5/16
32	233340	Restacking Gear Staked Assem.	87	233343	Pickup Operating Slide Bracket
33	125448	Retaining Ring	88	914302	Sems 8-32 x 5/16
34	920600	Flatwasher	89	920914	Flatwasher
35	233418	Restack Gear Roller	90	602436	Plastic Cable Clamp
36	921551	Flatwasher	91	901631	8-32 Hex Nut
37	914188	Sems 8-32 x 1/4	92	245557	Adjustment Screw
38	233314	Restack Gear Bearing Hub	93	914302	Sems 8-32 x 5/16
39	233395	Actuating Lever Spring	94	233344	Release Lever Bracket
40	301374	Retaining Ring	95	301374	Retaining Ring
41	921061	Flat Washer	96	921061	Flatwasher
42	233337	Gear Actuating Lever Assem.	97	233349	Release Lever Pin
43	125448	Retaining Ring	98	233397	Record Release Lever Staked Assem.
44	920600	Flatwasher	99	301374	Retaining Ring
45	233114	Roller	100	921061	Flatwasher
46	921061	Flatwasher	101	233348	Release Lever Roller Pin
47	233333	Restack Gear Stop Lever & Hub Assem.	102	233347	Release Lever Roller
48	901631	8-32 Hex Nut	103	914188	Sems 8-32 x 1/4
49	918612	8-32 x 1/2 Oval Pt. Set Screw	104	920914	Flatwasher
50	924735	Spring Washer	105	233378	Reject Coil Assembly
51	952110	0.093 Diam. x 1/2 Spirol Pin	106	400972	Spring Clip (Tinnerman C-3555-014-4)
52	233046	Pinion	107	248186	Cable Clip (Tinnerman C-21253-017)
	921551	Flatwasher			
	921590	Flatwasher			
53	233399	Drive Gear Assembly	108	233385	Gear Train Plate Riveted Assem.

* Item 16 includes items 11, 12, 13, 14 and A, B, & C.

BACKGROUND MUSIC MECHANISM, Type BMM1

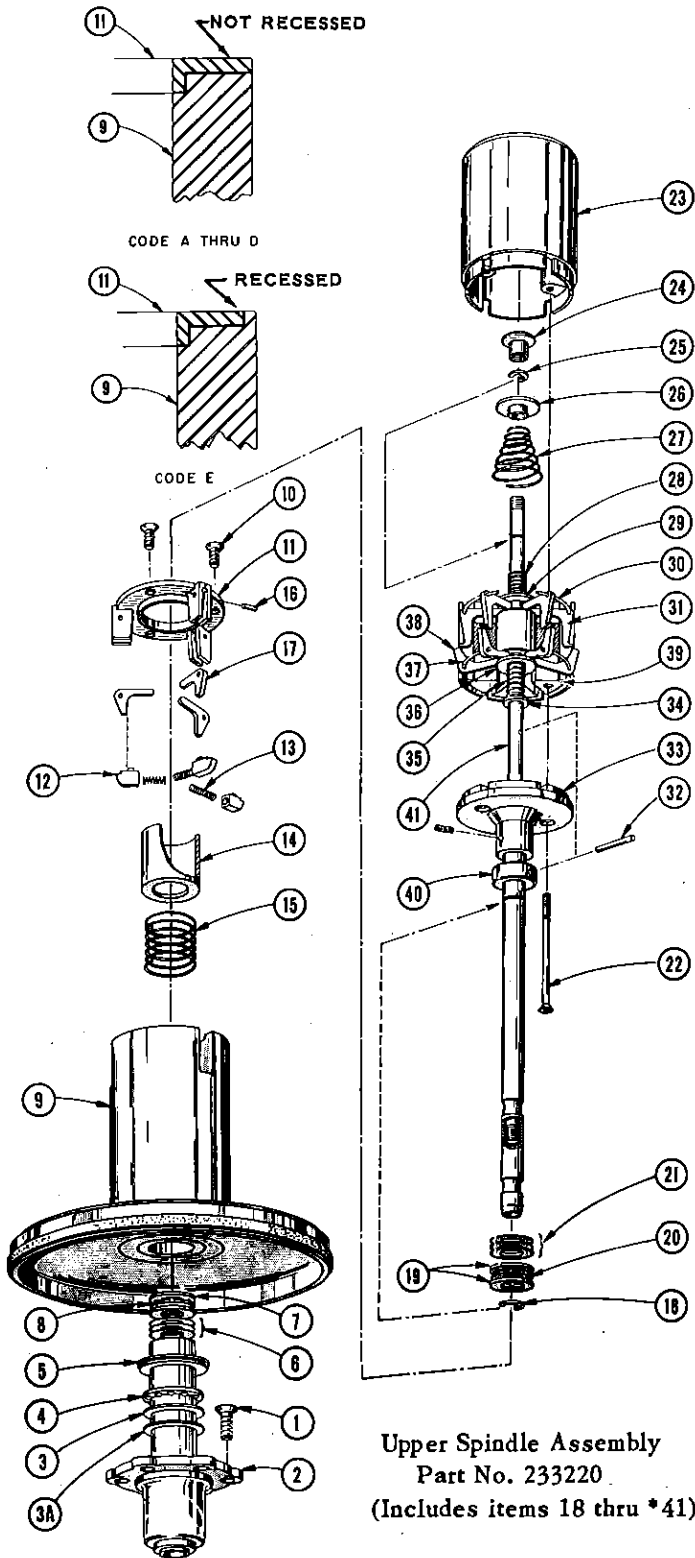


PARTS LIST

Item	Part No.	Description
1	911836	4-40 x 3/8 Phillips Flat H.M.S.
2	233155	Magnetic Pickup
	233176	Stylus Assembly W. Diamond
3	233217	Spring Clip (long)
4	233221	Spring Clip (short)
5	911712	4-40 x 1/4 Phillips Pan H.M.S.
6	940300	Solder Lug
7	911836	4-40 x 3/8 Phillips Flat H.M.S.
8	233152	Pickup Cartridge Socket & Lead Assem.
9	249729	Pickup Arm Insulator
10	233149	Pickup Arm Assembly
11	901632	8-32 Hex Nut
12	233213	Pickup Adjustment Spring Screw
13	914766	Sens 8-32 x 7/8
14	233212	Counter Weight
15	125448	Retaining Ring
16	920600	Flatwasher
17	233214	Pickup Adjustment Spring Clip
18	901631	8-32 Hex Nut
19	245777	Pivot Screw
20	233132	Pickup Pivot Shaft Assembly
21	233215	Pickup Adjustment Spring ("A" Side)
22	301374	Retaining Ring
23	921061	Flatwasher
24	233141	Pickup Shift Lever Assembly
25	233216	Pickup Adjustment Spring ("B" Side)
26	301374	Retaining Ring
27	921061	Flatwasher
28	233138	Pickup Shift Release Lever Assembly
29	901632	8-32 Hex Nut
30	918634	8-32 x 5/8 Slotted H. Oval Pt. Set Screw
31	233183	Pickup Lift Plate
32	952012	0.062 Dia. x 5/16 Spirol Pin
33	233148	Pickup Lift Shaft

Pickup Arm and Shaft Assembly, Part No. 233131

BACKGROUND MUSIC MECHANISM, Type BMM1 & BMM2



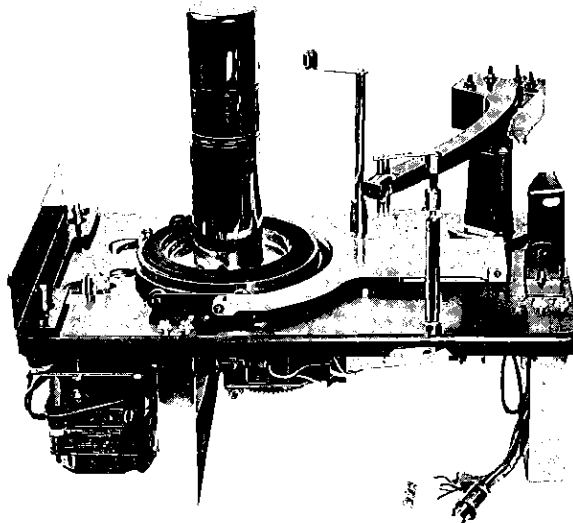
Upper Spindle Assembly
Part No. 233220
(Includes items 18 thru *41)

Lower Spindle Assembly
Part No. 233659
(Includes items 9 thru 17)

Item	Part No.	Description
1	914525	8-32 x 1/2 Phillips Flat H.M.S.
	901682	8-32 Keps Hex Nut
2	233075	Spindle Shaft & Bearing Assem.
3	923475	Thrust Washer
* 3A	923476	0.010 Shim
	923477	0.015 Shim
4	233173	Ball Retainer Assembly
5	233285	Rubber & Steel Washer Assembly
* 6	922160	0.005 Shim
	922165	0.010 Shim
	922170	0.015 Shim
7	922231	Thrust Washer
8	233263	Ball Retainer Assembly
9	233245	Lower Spindle & Pad Assem. (Code A thru D)
	233660	Lower Spindle & Pad Assem. (Code E)
10	912992	6-32 x 1/2 Phillips Flat H.M.S. (Code A thru D)
	911836	4-40 x 3/8 Phillips Flat H.M.S. (Code E)
11	233272	Lower Spindle Top (Code A thru D)
	233666	Lower Spindle Top (Code E)
12	233450	Lower Record Holder (Replace in sets of 3 in units Code A, B & C)
13	233252	Compression Spring
14	233444	Record Holder Actuator
15	233455	Actuator Spring
16	952012	0.062 Diam. x 5/16 Spirol Pin
17	233052	Record Holder Actuating Lever
18	233267	Retaining Ring
19	922231	Thrust Washer
20	233263	Ball Retainer Assembly
*21	922160	0.005 Shim
	922165	0.010 Shim
	922170	0.015 Shim
22	913829	6-32 x 2" Phillips Flat H.M.S.
23	233270	Spindle Top Section
24	902130	Capped Tee Nut (Code E only)
25	301374	Retaining Ring
26	233265	Operating Shaft Collar
27	233241	Operating Shaft Spring
28	233242	Compression Spring
29	921201	Flatwasher
30	233264	Retainer Ring
31	233204	Record Separator
32	952009	0.062 x 5/8 Spirol Pin
33	233446	Spindle Bottom Section & Shaft Assem.
34	921061	Spring Steel Spacer Washer
35	233240	Compression Spring
36	921201	Flatwasher
37	233264	Retainer Ring
38	233051	Upper Record Holder
39	233268	Spindle Center Section
40	233445	Thrust Collar
41	233232	Operating Shaft & Actuator Assem.

*Use shims as required for spindle adjustment (refer to section 400-6, page 9)

BACKGROUND MUSIC MECHANISM, TYPE BMM2



The Background Music Mechanism Type BMM2 is designed for use on 115-volt line without 25-volt control circuits such as in the Seeburg "1000" Background Music Compact, Type BMC1. Parts lists for the Type BMM1 mechanism listed in section 400-7, apply to the BMM2 except for the Gear Train Assembly as detailed below:

Reference	Part Number	Description
Page 1, Item 21 } Page 5, - }	233301	Gear Train Assembly
Page 5, Item 105	233460	Reject Coil Assembly
Page 1, Item 59	233462	Plug, Cable and Switch Assembly
Page 1, Item 60	233467	Pickup and Mute Assembly
Page 1, Item 60	233469	Mute Shielded Cable

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SEEBURG

BACKGROUND MUSIC PREAMPLIFIER, TYPE BMPA11-56

SPECIFICATIONS

POWER REQUIREMENTS:117 volts A.C., 50 or 60 cycles, 1 watt.

INPUT: 3 to 5 m. v. from magnetic low impedance pickup. (R.I.A.A. Equalization Provided)

OUTPUT:.....2 to 3.5 volts max. with 10K and 100K loads respectively.

DIMENSIONS:.....Depth - 2 inches
 Width - 3¼ inches
 Length - 6½ inches
 Weight - Net 1 pound 7 oz.
 Shipping 2 pounds

The Seeburg Background Music Preamplifier, Type BMPA11-56, is a fully transistorized, low distortion, wide frequency range unit, specifically designed for use with the Seeburg "1000" Background Music Compact, Type BMCI.

The preamplifier has three transistors and a selenium diode. The output signal of the low impedance magnetic pickup in the BMCI mechanism is connected to the preamplifier by means of a 3-prong plug. The signal passes through an equalizer circuit, to an emitter-follower and to the output stage which terminates in a coaxial type connector. Volume and tone controls are accessible on the face of the unit.

Current for the transistors is supplied through a selenium diode and a 3-section R-C filter in the preamplifier.

The preamplifier's A.C. line cord plugs into the Background Music Compact and power is turned on and off with the switch that controls the record player motor.

INSTALLATION

Install the background music preamplifier so it has free circulation of air. Exposure to high temperature resulting from installation on a radiator or in direct sunlight can effect performance and can permanently damage preamplifier transistors. If possible, set the unit in such a position as to be inaccessible to unauthorized persons.

The preamplifier may be secured to a wall or shelf by means of two (2) 6-32 x ¾ inch long sheet metal screws provided. To do so, remove the four (4) phillips head screws which retain the front panel and lift it off carefully so as not to break internal leads. Two screw holes in the bottom of the case are for the mounting screws.

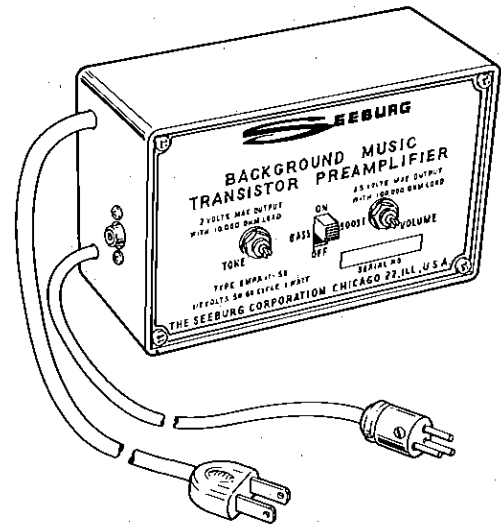


Figure 1.

CONNECTIONS TO SOUND SYSTEM

The Seeburg Background Music Preamplifier, Type BMPA11-56, is designed to operate in conjunction with a power amplifier and associated loud speakers or a public address system. Its output is equalized for a magnetic pickup and is designed to be used with a flat response amplifier system. The Type BMPA11-56 will provide the following output voltages depending on load impedance:

LOAD IMPEDANCE	MAX. OUTPUT (Volts)	MAX. SHUNT CAPACITY (3db Loss at 10 KC)
100,000 ohms	3.5	2000 mmf.
10,000 ohms	2.0	2000 mmf.

There is no d.c. potential across the preamplifier output terminals that might be detrimental to operation of the connected system. If such potential exists at the point in the sound system to which connection is to be made, a suitable blocking condenser should be used. Such isolation will prevent loading the system with the output circuit components of the preamplifier and will protect the preamplifier from possible damage.

Most power amplifiers having an unbalanced input will come within the load and operating limits of the preamplifier. Those having transformer inputs for use on balanced lines will require a matching transformer or rearrangement of

SEEBURG BACKGROUND MUSIC PREAMPLIFIER, TYPE BMPA11-56

the input circuit to reflect a reasonable impedance to the preamplifier. A plate-to-line transformer of good quality and reflecting an input of 15,000 ohms would probably be suitable in this application or the input transformer of the power amplifier could be eliminated by connecting directly to the input tube control grid.

Public address systems are usually provided with inputs similar to the types discussed in the preceding paragraph and can be connected in the same manner. Systems having elaborate signal line mixing facilities can usually be similarly handled.

WIRING TO SOUND SYSTEM

Wiring from the preamplifier to power amplifier or sound system should be made with single conductor shielded cable, such as Seeburg cable, Part No. 95106, and will be found generally satisfactory for installations requiring up to 75 feet of cable.

Connections at the preamplifier should be made using a coaxial connector, Part No. 246957. The cable should not be run in a conduit with telephone, light, power, loud-speaker, signal or other cables of any kind and should be kept at least six inches from such wires or conduits. It should be protected from damage and moisture.

Insure minimum audio hum by (1) routing the shielded cable away from A.C. power line cords, (2) checking all ground connections, (3) experimentally reversing the preamplifier's A.C. plug polarity at the BMC1.

The cable should be kept as short as possible although the permissible length is determined by its capacitance and the reflected load of the sound system. It is recommended that the total capacitance, as measured at the point of connection to the preamplifier, does not exceed the limit given in the load impedance specifications if the high frequency response is not to be attenuated.

OPERATION

Connect the output of the preamplifier to the input of the power amplifier or sound system as discussed in "Connections to Sound System".

Connect the preamplifier to the BMC1, and turn on the power switch. While a record is playing, proceed to balance the audio system.

1. The preamplifier Volume Control is adjusted as follows:
 - a. Turn it to its full counter-clockwise position.
 - b. Set the sound system Volume Control at an intermediate position.
 - c. Set the preamplifier Tone Control at an intermediate position and the Bass Boost Control OFF.
 - d. Turn the preamplifier Volume Control clockwise to a position that will give the desired volume of sound for prevailing noise level conditions.
 - e. Subsequent volume adjustments can be made with the volume control in the sound system. In the absence of such a control, volume adjustment may be made at the preamplifier.

If hum or noise is experienced in systems equipped with their own volume level controls, various combinations of settings should be tried to determine positions that will minimize the hum or noise.

2. Adjust the Tone Controls to the acoustic requirements of the establishment in order to achieve desired tone balance.

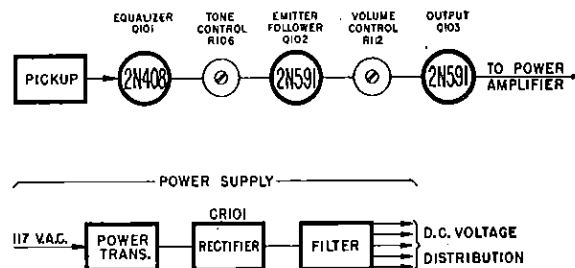


Figure 2.

Preamplifier Block Diagram.

SEEBURG BACKGROUND MUSIC PREAMPLIFIER, TYPE BMPA11-56

DRAWING NO. 233744

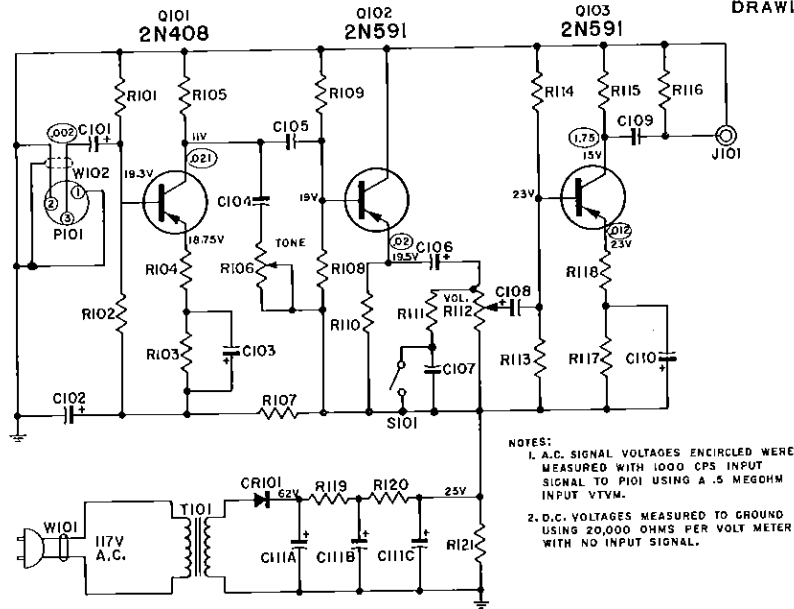
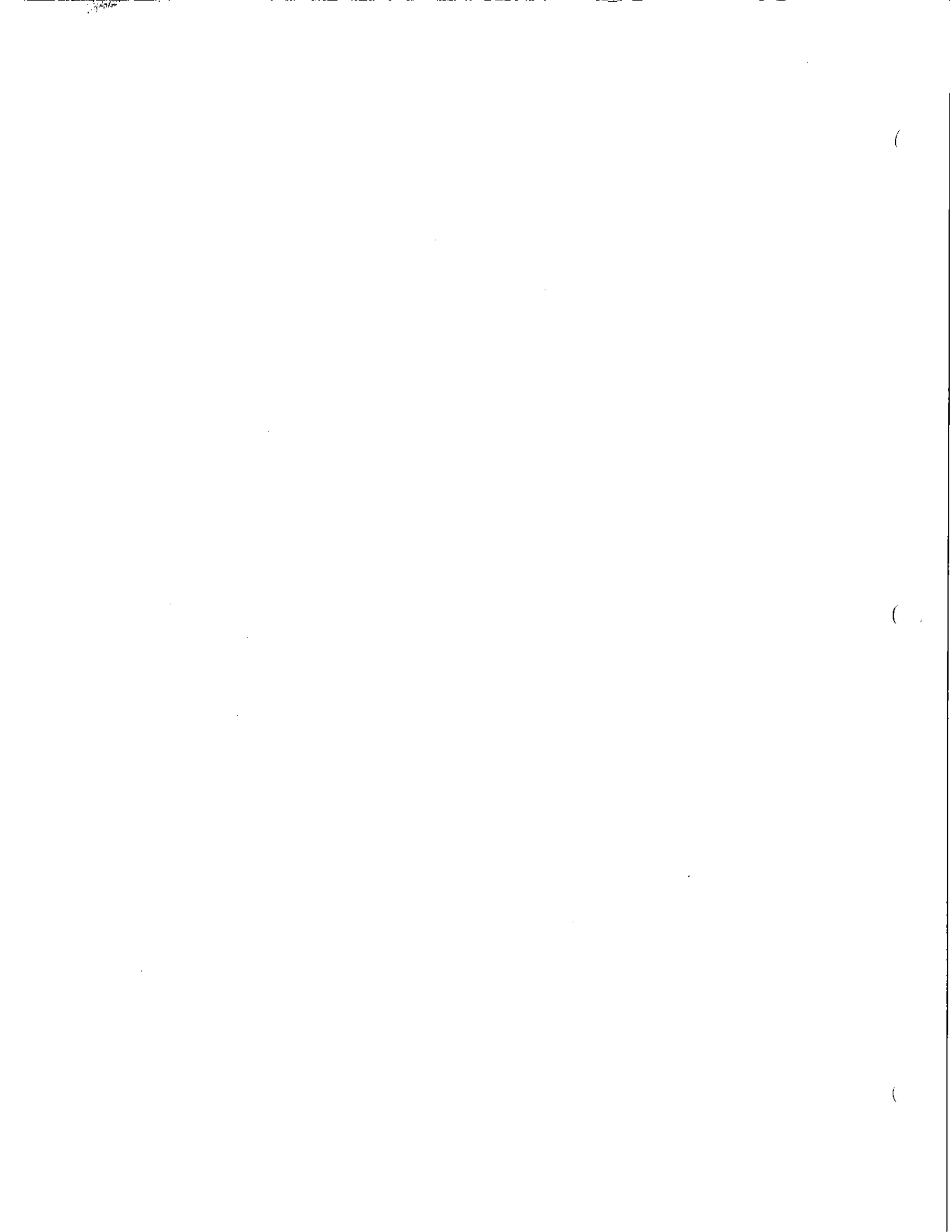


Figure 3. Preamplifier Schematic Diagram.

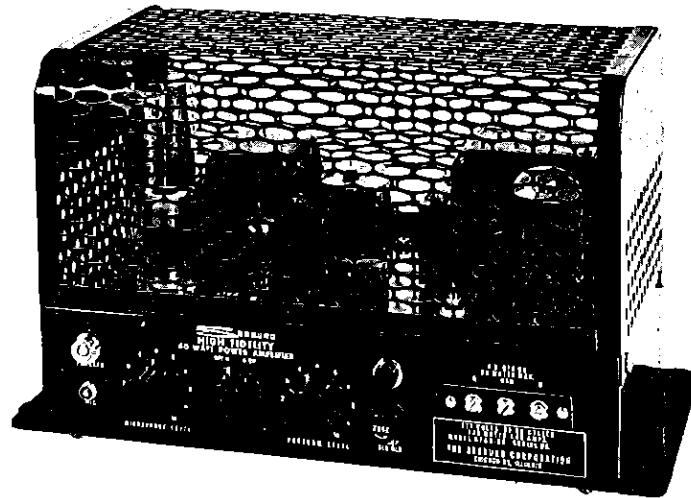
PARTS LIST

Item	Part No.	Description	Item	Part No.	Description
C101	87701	8 Mfd. 50V. Lytic	R103	82431	3,900 Ohm ½W. 10%
C102	87700	100 Mfd. 35 V. Lytic	R104	82403	18 Ohm ½W. 10%
C103	87702	200 Mfd. 6V. Lytic	R105	308978	22,000 Ohm ½ W. 10%
C104	86328	0.33 Mfd. 50V. Mylar	R106	233732	Tone Control 750 Ohm
C105	86329	0.47 Mfd. 50 V. Mylar	R107	82433	5,600 Ohm ½W. 10%
C106	87697	9 Mfd. 6 V. Lytic	R108	82440	22,000 Ohm ½W. 10%
C107	86329	0.47 Mfd. 50V. Mylar	R109	82447	82,000 Ohm ½W. 10%
C108	87697	9 Mfd. 6V. Lytic	R110	82434	6,800 Ohm ½W. 10%
C109	87701	8 Mfd. 50V. Lytic	R111	82418	330 Ohm ½W. 10%
C110	87702	200 Mfd. 6V. Lytic	R112	233733	Volume Control 3,000 Ohms
C111A		20 Mfd. 75V. Lytic	R113	82433	5,600 Ohm ½W. 10%
C111B	87699	30 Mfd. 50V. Lytic	R114	82606	75,000 Ohm ½W. 5%
C111C		150 Mfd. 35V. Lytic	R115	82434	6,800 Ohm ½W. 10%
CR101	309394	Diode (.0125 Amp. 225 PIV)	R116	82448	100,000 Ohm ½W. 10%
J101	84317	Socket (Single Contact)	R117	82422	680 Ohm ½W. 10%
-	246957	Single Prong Coax. Plug	R118	82404	22 Ohm ½W. 10%
P101	250938	3-Prong Plug	R119	82430	3,300 ½W. 10%
Q101	309401	2N408 Transistor	R120	82429	2,700 ½W. 10%
Q102	309404	2N591 Transistor	R121	82440	22,000 Ohm ½W. 10%
Q103	309404	2N591 Transistor	S101	F- 8972	Switch (S.P.S.T.) Bass Boost
R101	308977	100,000 Ohm ½ W. 10%	T101	233727	Power Transformer
R102	308976	12,000 Ohm ½ W. 10%	W101	375121	Line Cord
			W102	233759	Audio Inter-Connecting Cable
			-	233730	Front Panel Riveted Assembly
			-	233753	Case Assembly
			-	233734	Strain Relief



SEEBURG

HIGH FIDELITY POWER AMPLIFIER, Type HFA4-56



The Seeburg High Fidelity Power Amplifier, Type HFA4-56 is a 4 stage, 60-watt, wide band, low distortion power amplifier designed for use with a program source having its own tone controls and capable of supplying one volt RMS Signal Level. A high gain microphone channel complete with volume and tone controls provides an additional stage of amplification. The tone

control is designed to compensate for a wide range of paging voices and acoustic requirements.

The output transformer secondary provides a balanced high impedance output and is intended for 70 volt C.V. (constant voltage) speakers.

Volume level controls are provided for adjustment of output volume.

- INSTALLATION -

LOCATION

The amplifier should be installed on an open shelf or provided with adequate ventilation to prevent overheating. Allow a space of at least one inch on three sides, one side fully open and not less than two inches above the top of the ventilated cover.

INPUT CONNECTIONS

Input connections from the program source may be made with shielded cable, Seeburg Part No. 95106. When not using the microphone input, turn the microphone level control to zero (0).

C.V. (constant voltage) speakers must be used for all applications. Constant voltage speakers should be connected in parallel to the output terminals. This is a balanced output so care must be taken to avoid grounding either of these terminals. If shielded speaker wiring is used it must be two conductors in a shield with only the shield grounded. Installations not requiring shielded cable may be made with Seeburg speaker cable.

In order to determine the correct wire size required for a specific installation refer to the graph, Figure 2. Note that each type of wire is shown by two lines in the graph:

1. A line sloping down from left to right.
2. A line sloping up from left to right.

The lines (1) limit the transmission line length to a 10% power loss. After locating the point on the graph corresponding to a given power to the speaker load and a required speaker line length, the wire size represented by the line closest to this point above and to the right of the point is the smallest wire which can be used.

The lines (2) limit the transmission line length to a 3 db (voltage) loss at 10 KC due to wiring capacity. Note that lines (1) and (2) form a family of triangles. To illustrate the correct use of the graph, consider the example shown.

A 10 watt load is to be supplied 1,000 feet from the amplifier. This point falls below and to

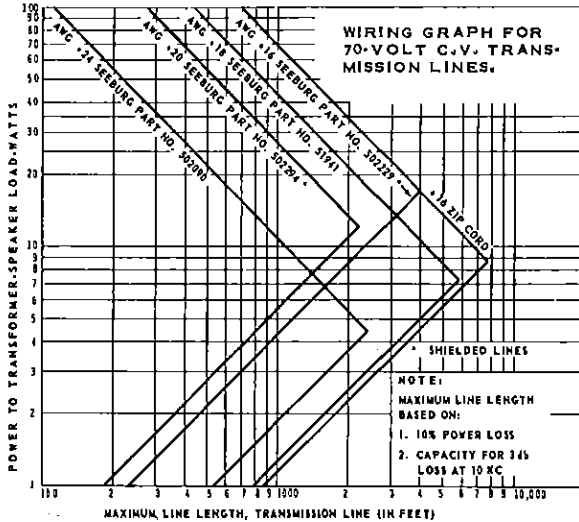


Figure 2.

the left of the line marked "AWG No. 24". It is above and to the left of the line perpendicular to the first line (or *inside* the triangle formed by these lines). Therefore, No. 24 zip cord is the smallest wire which may be used to remain within the limits of power loss and high frequency response loss on which the graph is based.

Capacitance of speaker connecting cables influence amplifier operation, and high frequency response. For stable operation, the capacitance of the cable connected to the C.V. output must not exceed 0.1 mfd.

The input power (volume) of the C.V. speakers is adjusted at each speaker to meet requirements. If volume adjusting connections are not available at the speakers, suitable line-to-voice-coil transformers should be provided.

When the multiple C.V. speakers are used, the speaker connection may be made to a position (of watts) that will provide the desired power (volume) balance between them.

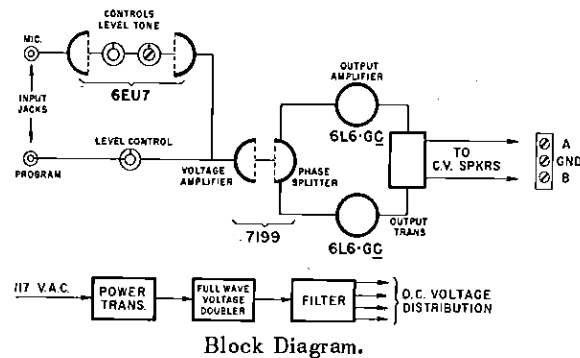
A low impedance speaker (8 or 16-ohm) must not be connected to the C.V. output.

The total power supplied to ALL the speakers connected to the amplifier must not be less than 15 watts and not more than 60 watts. If the

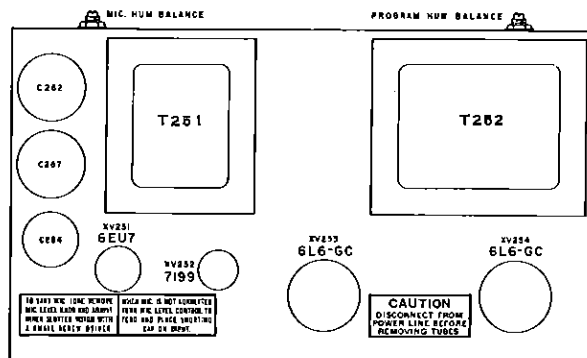
load is less than 15 watts, the speaker connection should be adjusted to a higher position and/or the C.V. speakers load increased by appropriate adjustments of power input, and the program level control should be readjusted to provide the desired output volume. If the total load is more than 60 watts, adjustments must be made for lower loading or some of the load should be transferred to additional amplifiers.

OPERATION OF MICROPHONE TONE CONTROL

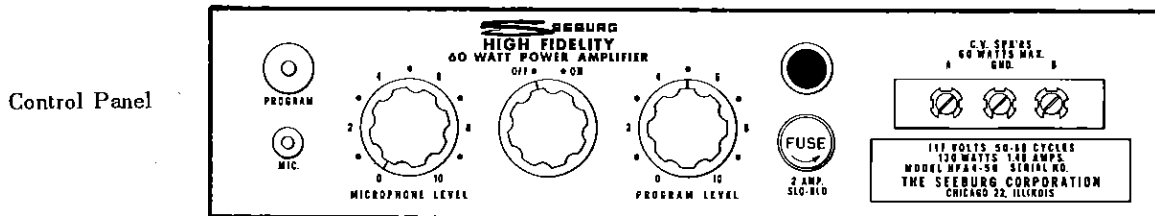
After the amplifier has been installed, the microphone tone control may be adjusted to obtain the best sound quality for its particular location. The tone control is a screwdriver adjusted potentiometer, and may be reached by removing the microphone level knob. The unit is shipped with the tone control set at about 50% rotation, which corresponds to the "flat" frequency response position. By rotating the tone control in the clockwise direction, the "lows" may be reduced in volume, while a counter-clockwise rotation will reduce the level of the "highs".



Block Diagram.



Component Layout.



Control Panel

HIGH FIDELITY POWER AMPLIFIER, Type HFA4-56

- SPECIFICATIONS -

POWER REQUIREMENTS:

117 volts A.C., 50-60 cycle, 130 watts

LINE CONNECTION:

Standard 2-conductor plug, 8 feet, 2-conductor, Type SJ-2 cord

CONTROLS:

Program Level Control
Microphone Level Control
Microphone Tone Control
On-Off Line Switch

TUBES:

1 - 6EU7
1 - 7199
2 - 6L6GC (only) Do not substitute.

NUMBER OF STAGES:

3 for Program Channel
5 for Microphone Channel

INPUT:

For rated program power output1 volt
Impedance (Program Channel) . . 0.25 megohm
(Microphone Channel) . . 1 megohm
Program Channel Connection-Amphenol PC1M
Connector, Seeburg Part No. 603343.
Microphone Channel Connection Electro-Craft
455 Microphone Connector, Seeburg Part No.
302597
Source Impedance0.1 megohm, max.

OUTPUT:

Rated output power 60 watts IHFM;
55 watts, sinewave, 5% distortion.

LOAD IMPEDANCE:

82 ohms (or greater) at C.V. terminals.

CAPACITIVE LOADING:

(Maximum cable capacitance)

C.V. Output 0.1 mfd.

INTERNAL IMPEDANCE:

30 ohms at C.V. terminals.

OUTPUT REGULATION:

2.5 db at C.V. output.

POWER AND DISTORTION RATINGS:

See accompanying graphs.

INTERMODULATION DISTORTION:

At 60 cps and 7000 cps, 4:1 Amplitude Ratio.
IM Distortion is less than 5% at 60 watts
output for sinewave of equivalent peak power.

MAXIMUM OUTPUT POWER:

69 watts at 400 C.P.S. with 5 volts input.

OUTPUT CONNECTIONS:

Balanced C.V. output screw terminals.

GAIN: (400 cycles)

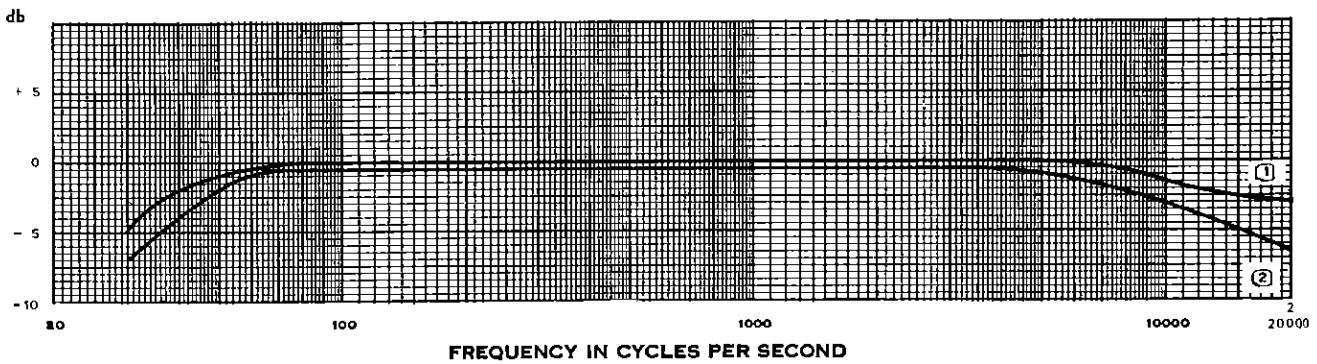
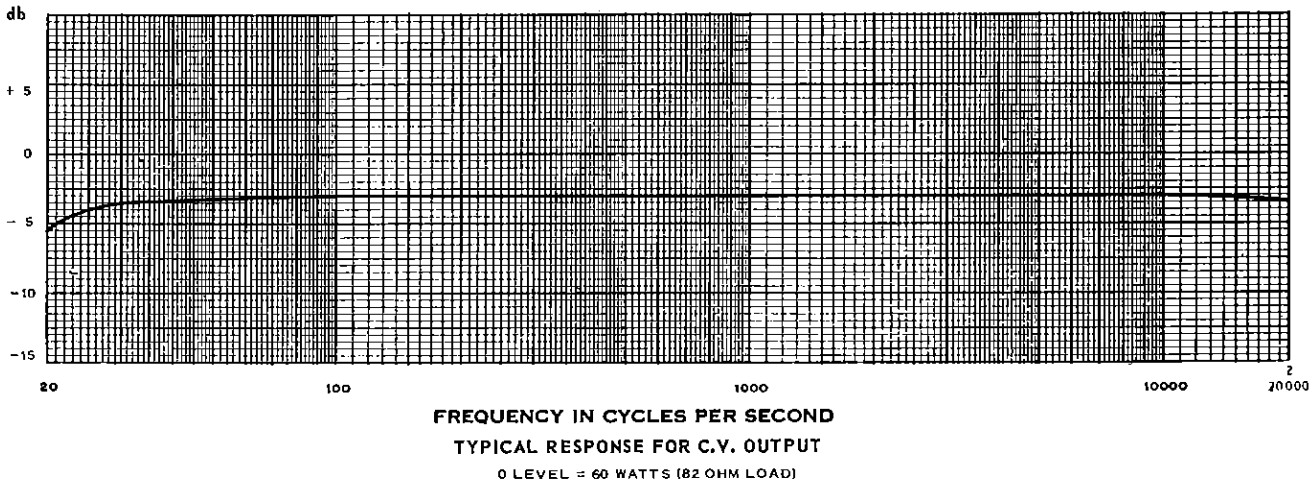
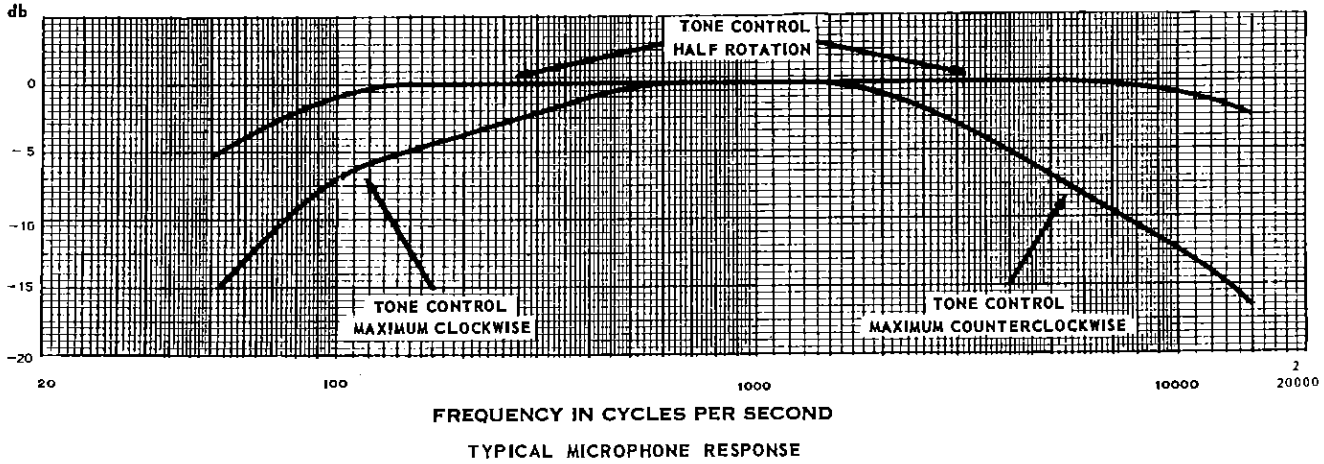
37 db at program input.

NOISE LEVEL:

70 db below rated output (Program Channel)
55 db below rated output (Microphone Channel)

DIMENSIONS AND WEIGHT:

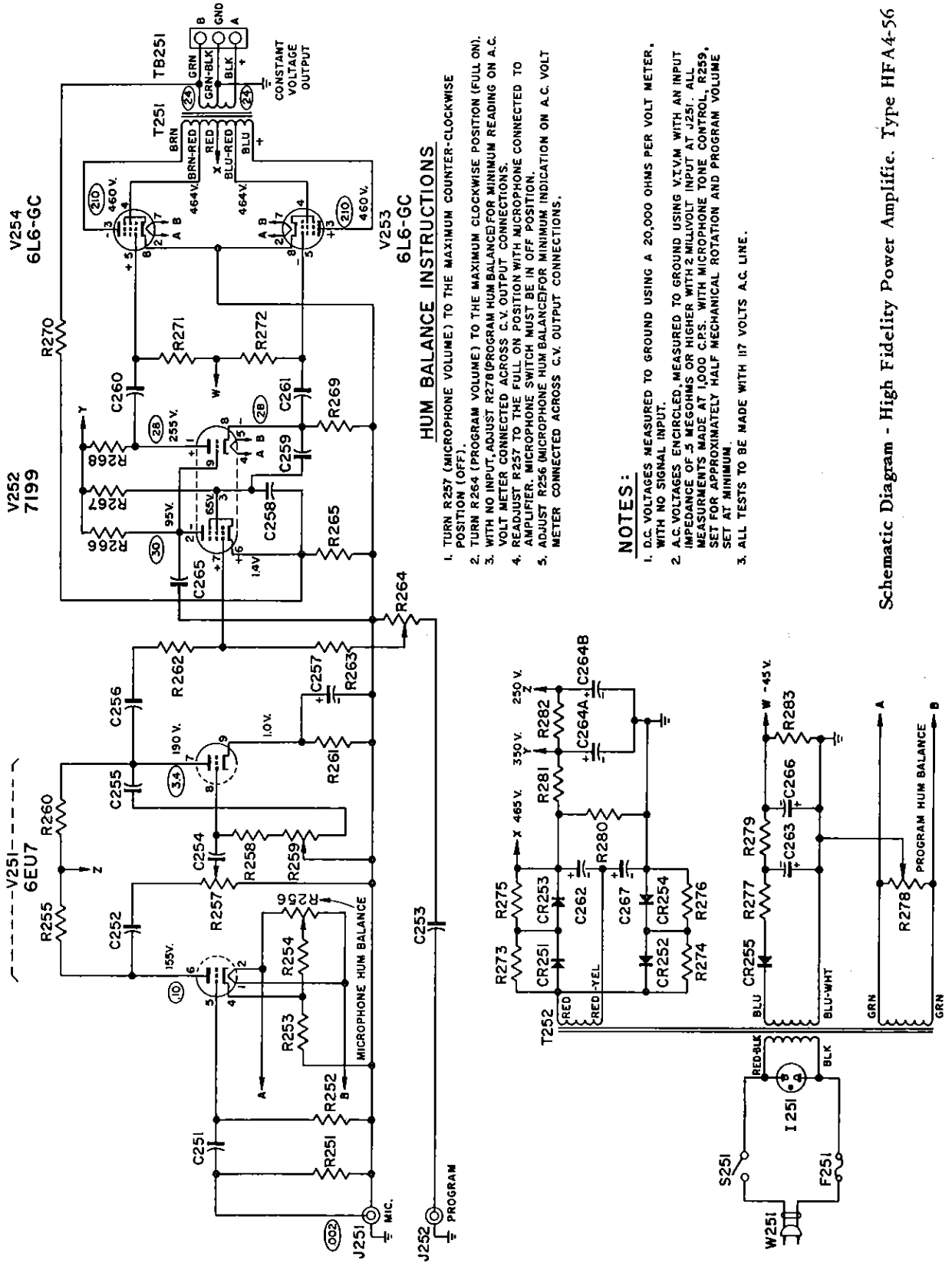
Length 14 inches
Depth 8 inches
Height 8 ¼ inches
Shipping Weight 24 pounds
Net Weight 20 pounds



NOTE: 0 db = 60 WATTS

- ① 8% DISTORTION CURVE - OUTPUT LOADING:
60 WATTS (CONTINUOUS SINE WAVE POWER)
- ② 2% DISTORTION CURVE - OUTPUT LOADING:
60 WATTS (CONTINUOUS SINE WAVE POWER)

DRAWING NO. 609329



HUM BALANCE INSTRUCTIONS

1. TURN R257 (MICROPHONE VOLUME) TO THE MAXIMUM COUNTER-CLOCKWISE POSITION (OFF).
2. TURN R264 (PROGRAM VOLUME) TO THE MAXIMUM CLOCKWISE POSITION (FULL ON).
3. WITH NO INPUT, ADJUST R278 (PROGRAM HUM BALANCE) FOR MINIMUM READING ON A.C. VOLT METER CONNECTED ACROSS C.V. OUTPUT CONNECTIONS.
4. READJUST R257 TO THE FULL ON POSITION WITH MICROPHONE CONNECTED TO AMPLIFIER. MICROPHONE SWITCH MUST BE IN OFF POSITION.
5. ADJUST R256 (MICROPHONE HUM BALANCE) FOR MINIMUM INDICATION ON A.C. VOLT METER CONNECTED ACROSS C.V. OUTPUT CONNECTIONS.

NOTES:

1. D.C. VOLTAGES MEASURED TO GROUND USING A 20,000 OHMS PER VOLT METER, WITH NO SIGNAL INPUT.
2. A.C. VOLTAGES ENCIRCLED MEASURED TO GROUND USING VTVM WITH AN INPUT IMPEDANCE OF 5 MEGOHMS OR HIGHER WITH 2 MILLIVOLT INPUT AT J251. ALL MEASUREMENTS MADE AT 1,000 C.P.S. WITH MICROPHONE TONE CONTROL, R259, SET FOR APPROXIMATELY HALF MECHANICAL ROTATION AND PROGRAM VOLUME SET AT MINIMUM.
3. ALL TESTS TO BE MADE WITH 117 VOLTS A.C. LINE.

PARTS LIST

Schematic Diagram - High Fidelity Power Amplifier, Type HFA4-56

- SCHEMATIC PARTS LIST -

Item	Part No.	Description	Item	Part No.	Description
-	603251	Type HFA4-56	R258	82458	680,000 Ohm ½ W. 10%
C251	86344	0.01 mfd 500 V. Ceramic	R259	603322	2 Meg. Mic. Tone (Rear Sec. Dual Pot.)
C252	86345	0.047 mfd 400 V. Mylar	R260	82444	47,000 Ohm ½ W. 10%
C253	86345	0.047 mfd 400 V. Mylar		* 308963	220,000 Ohm ½ W. 10%
C254	86244	680 mmfd 500 V. Ceramic	R261	82424	1000 Ohm ½ W. 10%
C255	86272	0.002 mfd 500 V. Ceramic		* 82426	1,500 Ohm ½ W. 10%
C256	86344	0.01 mfd 500 V. Ceramic	R262	82456	470,000 Ohm ½ W. 10%
C257	87696	50 mfd 6 V. Lytic	R263	82448	100,000 Ohm ½ W. 10%
C258	86347	0.22 mfd 400 V. Mylar	R264	603321	250,000 Ohm Prog. Vol. Audio Taper
C259	86262	56 mmf 500 V. Ceramic	R265	82423	820 Ohm ½ W. 10%
C260	86346	0.15 mfd 600 V. Mylar	R266	82452	220,000 Ohm ½ W. 10%
C261	86346	0.15 mfd 600 V. Mylar	R267	82459	820,000 Ohm ½ W. 10%
C262	87720	200 mfd 300 V. Lytic	R268	82811	15,000 Ohm 2 W. 5%
C263	87690	20 mfd 75 V. Lytic	R269	82811	15,000 Ohm 2 W. 5%
C264A	87713	30 mfd 450 V. Lytic	R270	82444	47,000 Ohm ½ W. 10%
C264B		40 mfd 350 V. Lytic	R271	82448	100,000 Ohm ½ W. 10%
C265	86289	3.3 mmfd 500 V. Ceramic	R272	82448	100,000 Ohm ½ W. 10%
C266	87691	50 mfd 60 V. Lytic	R273	82450	150,000 Ohm ½ W. 10%
C267	87720	200 mfd 300 V. Lytic	R274	82450	150,000 Ohm ½ W. 10%
CR251	309396	Silicon Diode	R275	82450	150,000 Ohm ½ W. 10%
CR252	309396	Silicon Diode	R276	82450	150,000 Ohm ½ W. 10%
CR253	309396	Silicon Diode	R277	82416	220 Ohm ½ W. 10%
CR254	309396	Silicon Diode	R278	602846	75 Ohm Hum Balance Pot. W.W.
CR255	309390	Selenium Diode	R279	82630	6,800 Ohm ½ W. 5%
F251	303087	Microphone Connector	R280	82871	90,000 Ohm Metal Film 4 W. 10%
I251	495300	Neon Light	R281	82870	10,000 Ohm Metal Film 3 W. 10%
J251	302597	Microphone Connector	R282	82444	47,000 Ohm ½ W. 10%
	503951	Mating Connector	R283	82605	24,000 Ohm ½ W. 5%
J252	603343	Program Connector	S251	603333	S.P.S.T. Rotary Switch
	302110	Mating Connector	T251	603320	Audio Output Transformer
R251	82460	1 Megohm ½ W. 10%	T252	603319	Power Transformer
R252	82472	10 Megohm ½ W. 10%	TB251	603336	3-Lug Terminal Board
R253	82400	10 Ohm ½ W. 10%	V251	308646	6EU7 Tube
R254	82456	470,000 Ohm ½ W. 10%	V252	308647	7199 Tube
R255	308966	56,000 Ohm ½ W. 10%	V253	308643	6L6GC Tube (Only)
	* 308964	220,000 Ohm 1 W. 10%	V254	308643	6L6GC Tube (Only)
R256	602917	75 Ohm Hum Balance Pot. W.W.	W251	603335	Line Cord Assembly
R257	603322	250 K Mic. Vol. (Frt. Sec. Dual Pot.)			

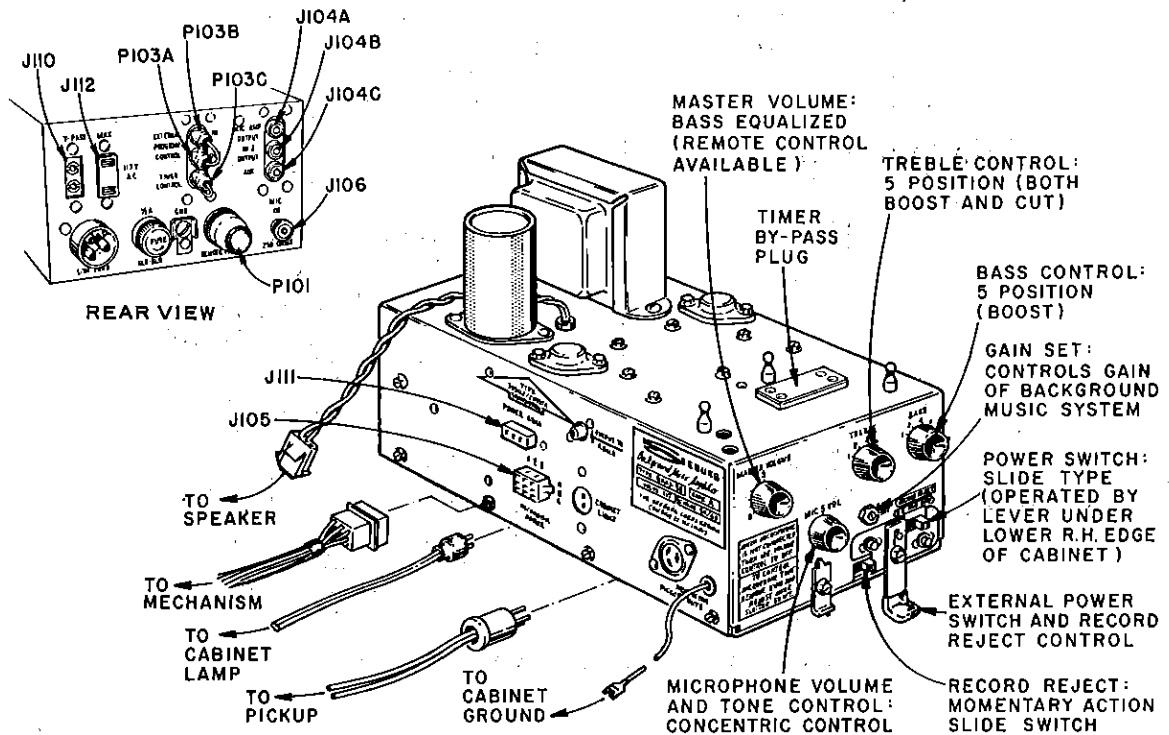
* Resistors R255, R260 and R261 must be used collectively as per Part Number and value indicated if additional gain (6 db) is desired from the microphone preamplifier channel.

- ADDITIONAL PARTS LIST -

Part No.	Description	Part No.	Description
603348	Ventilating Cover	305823	Driver Amp. Socket (for V252)
603341	Base Plate & Grommet Assembly	305823	Microphone Preamplifier Socket (for V251)
503951	Input Connector (for J 251)	603340	Tube Shield
603351	Mic. Input Connector Cap.	84306	8 Prong Octal Socket (for V253 & V254)
302110	Input Connector (for J 252)	603346	Knob (Microphone)
300061	Fuse Holder (for F 251)	603347	Knob (Program ON-OFF)

SEEBURG

BACKGROUND MUSIC AMPLIFIER, Type BMA3-56



This is a fully transistorized (eleven transistors), low distortion, wide frequency range, 20 watt amplifier. It is part of the Seeburg Background Music System (Seeburg "1000") that also includes the Background Music Mechanism, Type BMM-1 and a 6 inch x 9 inch speaker located on the door of the cabinet.

The output signal of the low impedance magnetic pickup in the mechanism is connected to the amplifier by means of a 3-prong plug. The signal passes through an equalizer circuit, to the treble and bass tone control circuits, to the driver stage and a power stage employing two power transistors which in turn drive a speaker load through a transformer assembly which provides a 70-volt C.V. line as well as a low impedance (16 ohm) output circuit.

A high gain microphone channel is incorporated. It is complete with volume and tone controls and is designed for use with low impedance (250 ohm) microphones such as the Seeburg Part No. 503940.

A Program Timer unit may be plugged into the top of the Type BMA3 amplifier by means of an integral 10-prong plug. The timer is adjustable to determine the number of selections played per half hour period. It is designed so the program signal overrides the timer motor switch-off circuit so as to continue playing a recording until it is completed and only then to shut off the motor power after the mechanism pick-up is in the unmodulated grooves that follow each selection on the records.

Current for the transistors in the amplifier and timer is supplied through 2 silicon diodes and a three-section filter in the amplifier.

Controls for the various functions of the amplifier are provided on its front panel. A remote volume control, Type BMRVC-1, may be used to remotely control the volume and cancel selections in the Seeburg "1000". It is plugged into the rear panel of the amplifier after removing the existing 9-prong dummy plug.

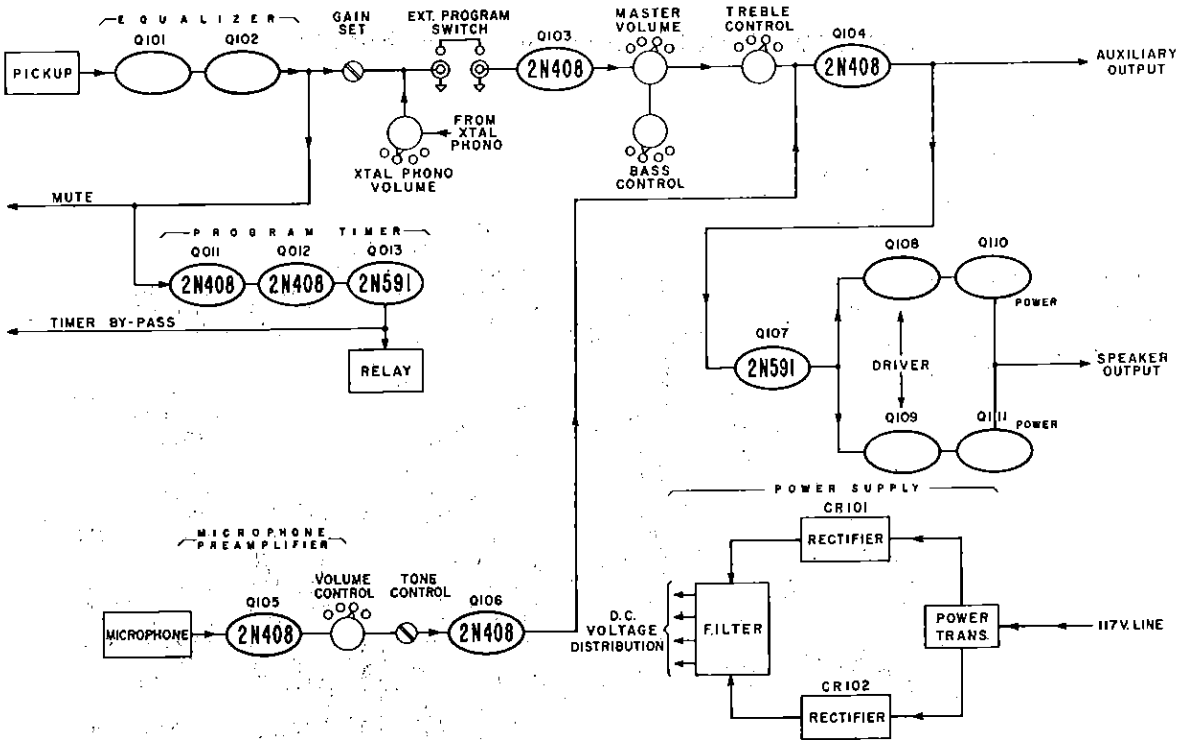


Figure 2. Block Diagram of BMA3-56 Amplifier.

SPECIFICATIONS

Power Requirements:

117 Volts A.C., 60 cycles, 0.7 amp., 65 watts
 Accessory Receptacles 1
 Maximum Accessory Power270 watts

Program Timer Connector:

12-prong dummy plug is removed to plug in Type BMPT1 Program Timer (Accessory Unit)

Audio Amplifier:

(Fully Transistorized) Type BMA3-56, 11 transistors, 2 Silicon Diodes

Audio Power Rating:

Program Material (Music) 20 watts at less than 5% distortion (IHFM)

Microphone:

Miniature threaded collar, Coaxial connector, 250 ohms, 1 M.V. for full output..... Seeburg Part No. 503940

Output Connections:

HI-Z Output:(for driving external power amplifiers)Plug-in Coaxial Connector, 0.7 volts into 100,000 ohms (min).

Microphone Preamp Output: Plug-in Coaxial Connector, 1 volt into 20,000 ohms (min).

External Program Control:

Out: Plug-in Coaxial Connector which is output of Selector Switch; 0.5 volts into 50,000 ohm (min).

In: Plug-in Coaxial Connector, 0.5 volts (max) into 50,000 ohms.

Remote Volume and Record Reject Control, Type BMRVC-1:

Plugs into 9-pin noval socket at rear of amplifier chassis.

Line Cord:

3-contact polarized receptacle on amplifier rear panel. (2-wire line cord supplied), (3-wire line cord accessory, Part No. 495158).

Dimensions:

Height 6 inches
 Width 6 inches
 Length 11 inches

SEEBURG BACKGROUND MUSIC AMPLIFIER, Type BMA3-56

Item	Part No.	Description	Item	Part No.	Description	Item	Part No.	Description
C101	86328	0.33 Mfd. 50 V. Mylar	P101	375076	Dummy Plug	R146	82626	3,900 Ohms ½ W. 5%
C102	86330	0.0047 Mfd. 50 V. Mylar	P103A	375089	Remote Program Jumper	R147	82620	1,000 Ohms ½ W. 5%
C103	86327	0.047 Mfd. 50 V. Mylar	P103B			R148	82678	43,000 Ohms ½ W. 5%
C104	87703	50 Mfd. 12 V. Lytic	P103C			R149	82426	1,500 Ohms ½ W. 10%
C105	86328	0.33 Mfd. 50 V. Mylar	Q101	309413	- Transistor	R150	82427	1,800 Ohms ½ W. 10%
C106	87717	130 Mfd. 25 V. Lytic	Q102	309414	- Transistor	R151	81201	250 Ohms 5 W. 10%
C107	86303	0.15 Mfd. 50 V. Mylar	Q103	309401	2N408 Transistor	R152	81201	250 Ohms 5 W. 10%
C108	87707	4 Mfd. 15 V. Lytic	Q104	309401	2N408 Transistor	R153	82620	1,000 Ohms ½ W. 5%
C109	87717	130 Mfd. 25 V. Lytic	Q105	309401	2N408 Transistor	R154	82795	36,000 Ohms ½ W. 5%
C110	87707	4 Mfd. 15 V. Lytic	Q106	309401	2N408 Transistor	R155	82670	2,700 Ohms ½ W. 5%
C111	86303	0.15 Mfd. 50 V. Mylar	Q107	309404	2N591 Transistor	R156	82610	6,200 Ohms ½ W. 5%
C112	86334	0.1 Mfd. 50 V. Mylar	Q108	309411	- Transistor	R157	82619	430 Ohms ½ W. 5%
C113	86303	0.15 Mfd. 50 V. Mylar	Q109	309410	- Transistor	R158	375088	100 Ohms Thermistor
C114	86328	0.33 Mfd. 50 V. Mylar	Q110	309412	- Transistor	R159	375099	250 Ohms Thermistor
C115	86329	0.47 Mfd. 50 V. Mylar	Q111	309412	- Transistor	R160	375099	250 Ohms Thermistor
C116	86325	0.0033 Mfd. 50 V. Mylar	R101	82435	8,200 Ohms ½ W. 10%	R161	81220	1 Ohm 5 W. 10%
C117	86325	0.0033 Mfd. 50 V. Mylar	R102	82409	56 Ohms ½ W. 10%	R162	81220	1 Ohm 5 W. 10%
C118	86330	0.0047 Mfd. 50 V. Mylar	R103	82436	10,000 Ohms ½ W. 10%	S101	375052	Bass Switch
C119	86332	0.0068 Mfd. 50 V. Mylar	R104	82649	75 Ohms ½ W. 5%	S102	375052	Treble Switch
C120	87706	10 Mfd. 15 V. Lytic	R105	82999	4,300 Ohms ½ W. 5%	S103	375079	On-Off Switch
C121	87696	50 Mfd. 6 V. Lytic	R106	82439	18,000 Ohms ½ W. 10%	S104	305635	Reject Switch
C122	87707	4 Mfd. 15 V. Lytic	R107	82435	8,200 Ohms ½ W. 10%	T101	375323	Transformer
C123	87707	4 Mfd. 15 V. Lytic	R108	82432	4,700 Ohms ½ W. 10%			
C124	87696	50 Mfd. 6 V. Lytic	R109	82408	47 Ohms ½ W. 10%			
C125	87717	130 Mfd. 25 V. Lytic	R110	375050	1 Meg. Ohm. Gain Set			
C126	87707	4 Mfd. 15 V. Lytic	R111	82620	1,000 Ohms ½ W. 5%			
C127	86327	0.047 Mfd. 50 V. Mylar	R112	82666	100,000 Ohms ½ W. 5%			
C128	86240	1500 MMfd. 500 V. Ceramic	R113	82634	10,000 Ohms ½ W. 5%			
C129	87707	4 Mfd. 15 V. Lytic	R114	82666	100,000 Ohms ½ W. 5%			
C130	87696	50 Mfd. 6 V. Lytic	R115	82620	1,000 Ohms ½ W. 5%			
C131	86303	0.15 Mfd. 50 V. Mylar	R116	82570	510 Ohms ½ W. 5%			
C132	87717	130 Mfd. 25 V. Lytic	R117	82423	820 Ohms ½ W. 10%			
C133	87716	1300 Mfd. 50 V. Lytic	R118	82425	1,200 Ohms ½ W. 10%			
C134	87700	100 Mfd. 35 V. Lytic	R119	82435	8,200 Ohms ½ W. 10%			
C135	87707	4 Mfd. 15 V. Lytic	R120	82433	5,600 Ohms ½ W. 10%			
C136	87700	100 Mfd. 35 V. Lytic	R121	82427	1,800 Ohms ½ W. 10%			
C137	86333	220 MMfd. 500 V. Ceramic	R122	375045	25,000 Ohms Master Vol. Control			
C138	86340	0.003 Mfd. 500 V. Ceramic	R123	82637	15,000 Ohms ½ W. 5%			
C139	87702	200 Mfd. 6 V. Lytic	R124	82682	62,000 Ohms ½ W. 5%			
C140	87718	1200 Mfd. 35 V. Lytic	R125	82610	6,200 Ohms ½ W. 5%			
C141	86313	0.01 Mfd. 500 V. Ceramic	R126	82626	3,900 Ohms ½ W. 5%			
C142	87717	130 Mfd. 25 V. Lytic	R127	82620	1,000 Ohms ½ W. 5%			
CR101	309387	Diode 200 PVI	R128	82798	360 Ohms ½ W. 5%			
CR102	309387	Diode 200 PVI	R129	82480	2,000 Ohms ½ W. 10%			
F101	503636	½ Amp. Slow Blowing Fuse	R130	82612	2,000 Ohms ½ W. 5%			
J101	12034	Audio Input 3 Pin Socket	R131	82612	2,000 Ohms ½ W. 5%			
J102	84305	Remote Volume Socket	R132	82445	56,000 Ohms ½ W. 10%			
J103	84313	Triple Input Socket	R133	82445	56,000 Ohms ½ W. 10%			
J104	84313	Triple Input Socket	R134	82434	6,800 Ohms ½ W. 10%			
J105	300152	Output Socket	R135	82428	2,200 Ohms ½ W. 10%			
J106	302597	Microphone Connector	R136	82404	22 Ohms ½ W. 10%			
J107	301019	Light Socket	R137	82418	330 Ohms ½ W. 10%			
J108	307154	Output Plug	R138	82423	820 Ohms ½ W. 10%			
J109	306014	Timer Socket	R139	375047	25K Mic. Volume Control			
J110	375230	Timer By Pass Socket	R140	200K Mic. Tone Control				
J111	602386	Convenience Socket	R141	82439	18,000 Ohms ½ W. 10%			
J112	602386	Convenience Socket	R142	82439	18,000 Ohms ½ W. 10%			
J113	84315	Mechanism Socket	R143	82634	10,000 Ohms ½ W. 5%			
J114	84314	Linecord Receptacle	R144	82793	68,000 Ohms ½ W. 5%			
			R145	82422	680 Ohms ½ W. 10%			
						B011	-	Clock Motor (see note)
						C011	86327	0.047 Mfd. 50 V. Mylar
						C012	86329	0.47 Mfd. 50 V. Mylar
						C013	87706	10 Mfd. 15 V. Lytic
						C014	87673	2,000 Mfd. 25 V. Lytic
						K011	375193	Relay
						P011	375189	Plug
						Q011	309401	2N408 Transistor
						Q012	309401	2N408 Transistor
						Q013	309400	2N591 Transistor
						R011	82458	680,000 Ohms ½ W. 10%
						R012	82676	47,000 Ohms ½ W. 5%
						R013	82642	33,000 Ohms ½ W. 5%
						R014	82634	10,000 Ohms ½ W. 5%
						R015	82634	10,000 Ohms ½ W. 5%
						R016	82642	33,000 Ohms ½ W. 5%
						R017		(see note)
						R018	82404	22 Ohms ½ W. 10%
						S011	375175	Switch
						S012	305365	SPDT Switch
						T011	375183	Transformer

Background Music Program Timer
Type BMPT1.

* FOR BMPT1 (60 CPS TIMER) USE CLOCK NO. 375187.
FOR BMPT1-5 (50 CPS TIMER) USE CLOCK NO. 375225.

◆ THIS RESISTOR MAY APPEAR IN SOME UNITS. IT IS USED
TO ADJUST RELAY TIMING AND WILL VARY.

SEEBURG

BACKGROUND WALL SPEAKER, Type BWS3-8CV & CORNER SPEAKER, Type BCS7-8CV

SPECIFICATIONS

- Speaker Size 8 Inch
 Type Constant Voltage, 70-volt Line
 Power Rating.. 4 Watts (Taps at 4, 2, 1, ½ and ¼ Watts)
 Speaker Frequency Response 70 to 10,000 Cycles
 Net Weight:
 Type BWS3-8CV..... 17 pounds (2 speakers)
 Type BCS7-8CV..... 23 pounds (2 speakers)
- Shipping Weight:
 Type BWS3-8CV..... 22 pounds (2 speakers)
 Type BCS7-8CV..... 33 pounds (2 speakers)

The Seeburg Background Wall Speaker, Type BWS3-8CV (not shown) and the Seeburg Background Corner Speaker, Type BCS7-8CV are intended for wall or corner mounting respectively. The wall type BWS3-8CV may be converted for corner mounting with the Type CA1 Corner Speaker Adapter.

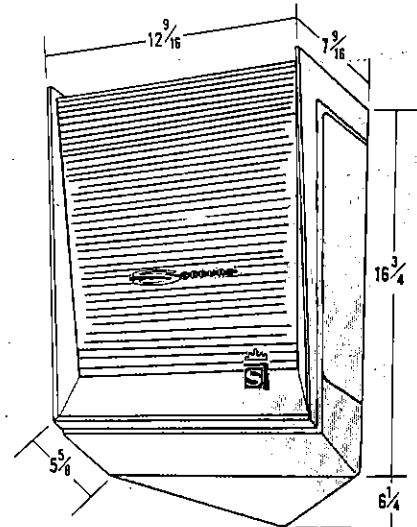
INSTALLATION

Locate the speaker mounting holes as shown in Figure 2. Use a plumb line or level to insure vertical alignment. Allow a minimum of 2 inches beyond the 1-7/8 inch dimension to provide ceiling clearance. Screw in the No. 8 wood screws (provided) allowing about ½ inch clearance between the heads and the wall. Place the cabinet into position and, allowing the screw heads to enter the slots in the back, move the cabinet downward until the screw shanks are wedged in the slots.

SPEAKER WIRING

Connection to the speaker is made at the terminal board located at the top of the cabinet. The 70-volt CV line output terminals of the amplifier are connected by means of suitable speaker cable. To select the desired power output, plug the SPEAKER WATTS selector pin into the desired position. This speaker is designed so that it is possible to connect as many speakers as desired to an amplifier, provided that the sum of the wattage settings of all speakers is equal to or less than the amplifier power rating.

The volume of any group of speakers may be independently controlled by installing a Type 12LC-1, 12LC-2 or 25LC-1 Line Control in the 70-volt line serving the group.



Type BCS7-8CV

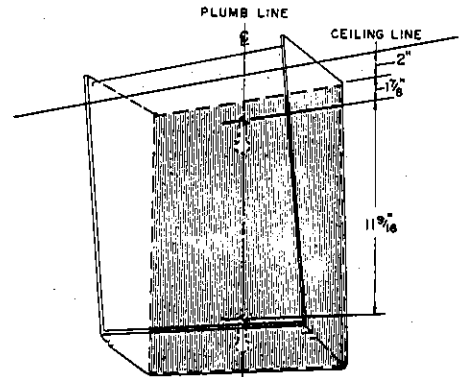
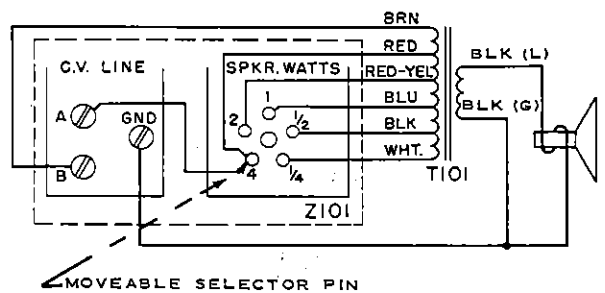


Figure 2. Speaker Mounting



PARTS LIST

PART NO.	DESCRIPTION
502830	Speaker Housing (Less Logo)
502945	"Seeburg" Logo
502835	Speaker Housing Back (BWS3-8CV)
512291	Constant Voltage Transformer (T101)
512168	Terminal Panel Assembly (Z101)
512425	8 Inch Speaker

BACKGROUND CORNER SPEAKER ADAPTER, Type "CA1"

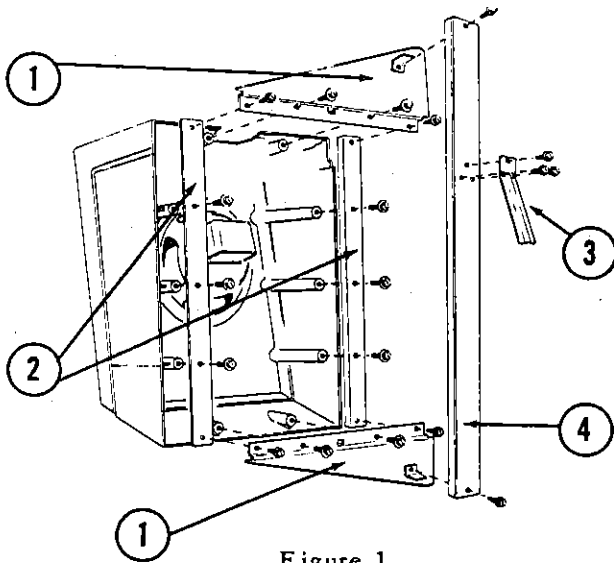


Figure 1

CORNER SPEAKER ADAPTER PARTS LIST

Item	Part No.	Description
1	502874	End Plate Assembly
2	502872	Side Rail
3	502726	Mounting Bracket
4	502877	Channel
-	502718	Corner Strap
-	502880	Mounting Screw Kit
-	960980	8-32 x 1/4 Self Tapping Screw

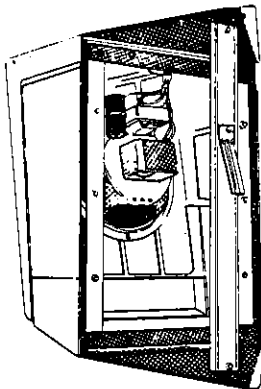


Figure 2

The Seeburg Corner Adapter, Part No. 502881 is to be used in converting the BWS3-8CV Background Wall Speaker for Corner Mounting.

The adapter is shipped disassembled as a package of 2 each and must be put together as shown in *Figure 1*.

The Speaker housing back is then removed and the corner adapter screwed in its place *Figure 2*, with screws removed. *Exercise caution to avoid stripping threads in speaker housing.*

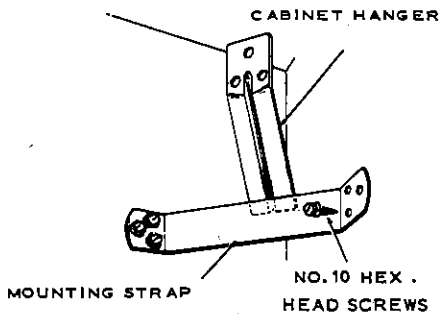


Figure 3

Attach the mounting strap to the wall with the No. 10 self tapping screws (two different lengths are provided). A minimum of 11 inches should be allowed between the ceiling and the top of the mounting strap to insure sufficient clearance so that the cabinet may be lifted high enough for the cabinet hanger to clear the mounting strap (*Figure 3.*)

SEEBURG

BACKGROUND RECESSED SPEAKER, Type BRRS1-8CV

SPECIFICATIONS

Speaker Size	8 Inches
Type	Constant Voltage, 70-Volt Line
Finish	Brushed Aluminum
Power Rating..	4 watts (Taps at 4, 2, 1, ½ and ¼ watts)
Speaker Frequency Response.....	70 to 10,000 cycles
Net Weight	12 pounds (2 speakers)
Shipping Weight	15 pounds (2 speakers)

The Type BRRS1-8CV speaker is designed for use in recessed wall and ceiling installations of Seeburg Background Music Systems.

INSTALLATION

The speakers may be installed directly in a wall or ceiling as follows:

1. THE MINIMUM DEPTH REQUIRED FOR RECESSING THIS SPEAKER IS $4\frac{1}{2}$ INCHES FROM THE SURFACE OF THE WALL OR CEILING. However, sufficient additional clearance should be available to prevent any interference. Locate the exact position in which the speaker is to be mounted. Make certain no stud will interfere with mounting of the speaker by tapping the surface or drilling a series of very fine holes.
2. Scribe an $8\frac{3}{4}$ inch diameter circle.
3. Cut out with a compass saw.
4. The speaker, with its attached grille, is now ready to be fastened in place after wiring.
5. The volume of the space in back of the speaker should be as large as possible. The back of the speaker should not be enclosed or "boxed" in. For optimum performance, the minimum air space in back of the speaker should not be less than 6 cubic feet.

Use Mounting Rings, Part No. 502931, available from your Seeburg Distributor, when installing the speakers in a plaster or composition wall or ceiling.

1. Follow the instructions outlined in previous step 1.
2. Mark midpoints in the ring. They must coincide with a plumb line (Figure 3a) to insure vertical alignment of the installed wall speaker. A similar center-line mark should be used for orientation in ceiling installations.
3. Scribe a 9 inch diameter circle about the center mark and cut out the wall or ceiling along the circle.
4. Fasten the mounting ring as shown in Figure 3b.
5. The speaker, with its attached grille, is now fastened in place (Figure 3c) after wiring.

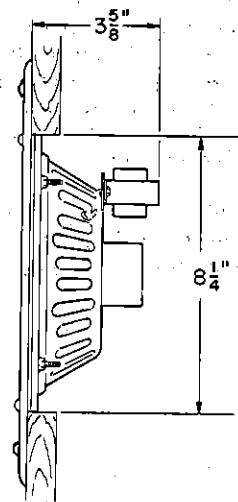
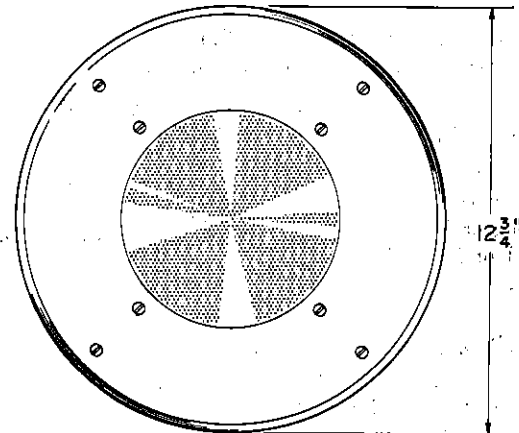


Figure 2. Dimensions

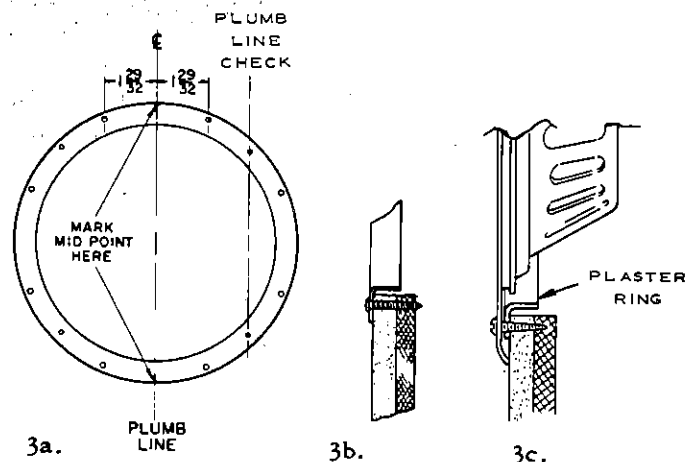


Figure 3.

BACKGROUND RECESSED SPEAKER, Type BRRS1-8CV

Installations of speakers in new construction require the use of Plaster Rings, Part No. 502932, available from your Seeburg Distributor.

1. Apply previous step 1.
2. Nail 2 by 2's in place, and install Plaster Ring as shown in Figure 4 after lath has been applied.
3. After plastering is completed, install the speaker (Figure 5).

The speaker and grille assembly can be removed for adjustment or service without disturbing the Mounting Ring or Plaster Ring. All that is necessary is the removal of four screws on the outer edge of the speaker grill.

SPEAKER WIRING

Connection to the speaker is made at the solder lugs located at the transformer. The 70-volt CV line output terminals of the amplifier are connected by means of suitable speaker cable. To select the desired power output, connect the incoming CV line to terminal "B", and the appropriate "A" terminal. This speaker is designed so that it is possible to connect as many speakers as desired to an amplifier, provided that the sum of the wattage settings of all speakers is equal to or less than the amplifier power rating.

The volume of any group of speakers may be independently controlled by installing a Type 12LC-1 or 12LC-2 or 25LC-1 Line Control in the 70-volt line serving the group.

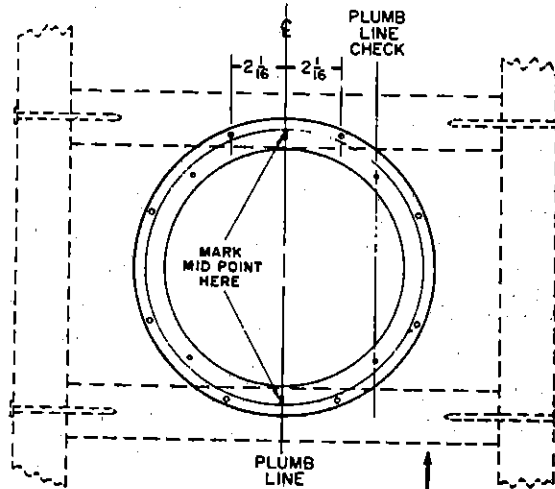


Figure 4.

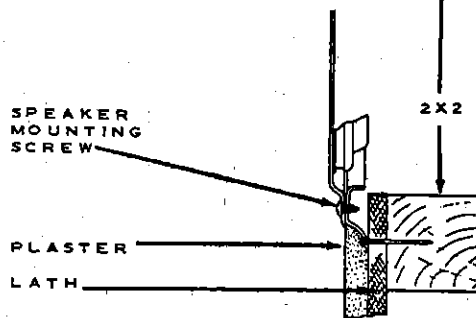
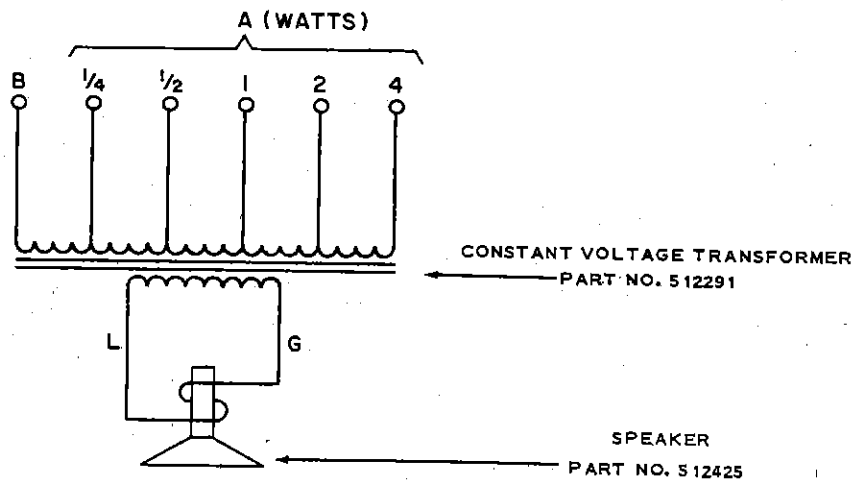


Figure 5.

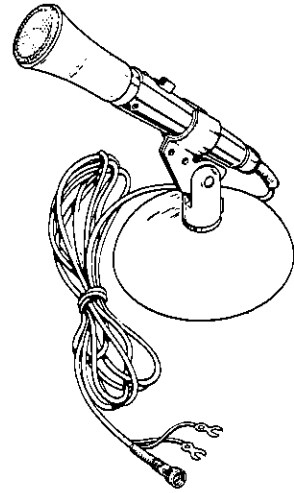


SEEBURG

MICROPHONE PART NO. 503940

The Seeburg Microphone, Part No. 503940, is a general purpose microphone having frequency response that makes it suitable for studio, stage or public address use. It is a low impedance, magnetic type that may be hand held or placed in an adjustable desk stand. It has a press-to-talk control switch which may be locked in the "on" position.

NOTE: The microphone cable may be extended up to 200 feet by the addition of Seeburg cable Part No. 503950. However, if the control circuit is to be used it may be necessary to run an individual line to avoid hum pickup. At all times, the microphone cable should be dressed away from any power lines.



SPECIFICATIONS

Type - Magnetic.

Operation - Low impedance, unbalanced line.

Nominal Impedance - 200 ohms at 1 kc.

Frequency Response - 85 cycles to 10 kc with 2200 ohms load impedance.

Sensitivity - 2 millivolts at 1 kc with 2200 ohms load impedance and 1 microbar input level.

Horizontal Polar Pattern - Omnidirectional.

Cable - 12 feet. 1-conductor shielded with connector (Microphone); 2-conductor unshielded with spade terminals for remote relay operation.

Switch - Two circuit-circuit closing for relay control and circuit opening to activate microphone.

PARTS LIST

Item	Part No.	Part Name
1	503962	Microphone, Handle & Switch
2	503959	Desk Stand
3	503958	Swivel Adaptor
4	503941	Cartridge and Case Assembly
5	503942	Handle Assembly
6	503944	Switch
7	503949	Cable with Connectors & Terminals
8	503950	Cable Only
9	503951	Microphone Connector

SECRET

CONFIDENTIAL

The following information is being provided for your information. It is classified as SECRET and should be handled accordingly. The information pertains to the activities of the [redacted] and is of a sensitive nature. It is intended for the use of [redacted] and should not be disseminated to other personnel without the express approval of [redacted].

The information is being provided to you for your information and is not to be used for any other purpose. It is classified as SECRET and should be handled accordingly. The information pertains to the activities of the [redacted] and is of a sensitive nature. It is intended for the use of [redacted] and should not be disseminated to other personnel without the express approval of [redacted].

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SEEBURG

LINE TRANSFORMER ASSEMBLY, TYPE 4LT-1 and 25LT-3

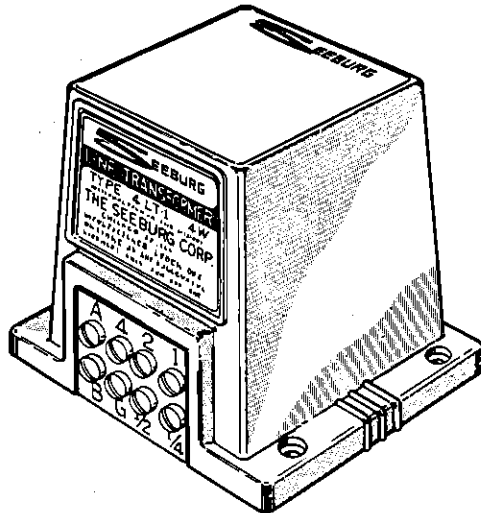


Figure 1.

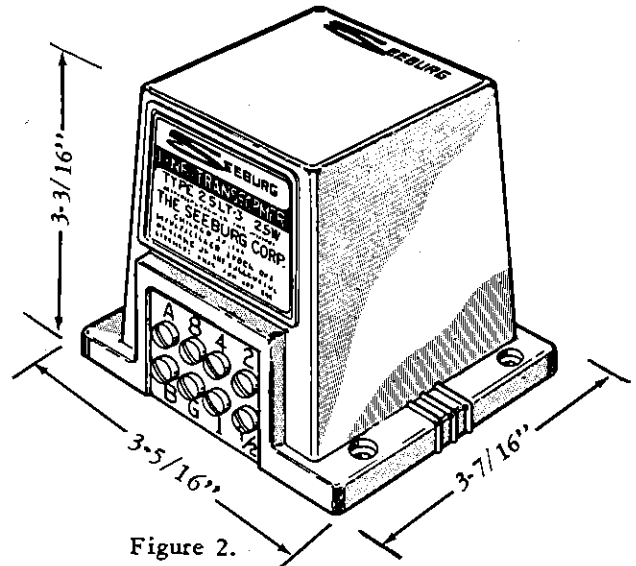


Figure 2.

SPECIFICATIONS

	<u>4LT-1</u>	<u>25LT-3</u>
Connections:	70 Volt C.V. Line To 16 ohm Speaker	70 Volt C.V. Line To 16 ohm Speaker
Wattage: (Taps)	4, 2, 1, ½ or ¼ watt	8, 4, 2, 1 or ½ watt
Wattage: (Max. Load)	4 watts	25 watts
Net Weight:	1½ pounds	1½ pounds
Shipping Weight:	1½ pounds	2 pounds

The Type 4LT-1 and Type 25LT-3 Line Transformer Assemblies are connected to the far end of a 70-volt C.V. speaker line to supply power to one or more 16 ohm speakers. The two types differ only in their power ratings indicated in the specifications.

INSTALLATION

When a group of speakers are to be served, the Line Transformer should be mounted at a central location and one or more low impedance lines run from the transformer terminals to the speakers. To maintain correct phasing all speakers must be connected in parallel observing marked polarity — "L" terminals connected together and "G" terminals connected together.

The "A" and "B" C.V. input terminal of the transformer must be connected to the corresponding "A" and "B" supply line from the amplifier C.V. transformer.

LOW IMPEDANCE (16 ohm) SPEAKER OPERATION

Speaker lines connected to the low impedance terminals must be limited in length as shown in the chart, Figure 6. The speakers may be connected to draw 4, 2, 1, ½ or ¼ watt with the Type 4LT-1 or 8, 4, 2, 1 or ½ watt with the Type 25LT-3 as required. In any case the total speaker load must not exceed the power rating of the respective Line Transformer.

The volume of one or more low impedance (16 ohm) speakers may be controlled by inserting a Type 12LIC-1 or 12LIC-2 Low Impedance Control in the speaker line.

70-VOLT C.V. TRANSFORMER TO AMPLIFIER CONNECTIONS

The volume of any group of speakers connected to the Line Transformer may be controlled by installing a Type 12LC-1, 12LC-2 or

LINE TRANSFORMER ASSEMBLY, TYPE 4LT-1 and 25LT-3

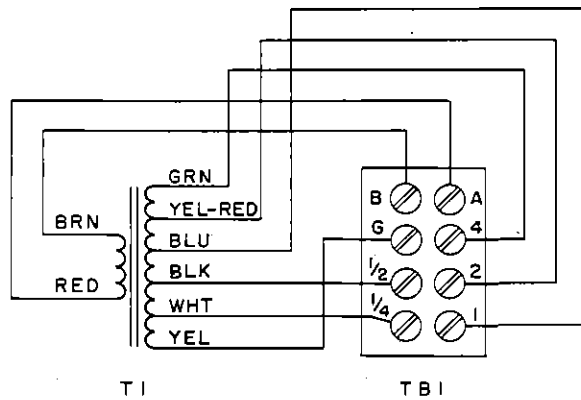
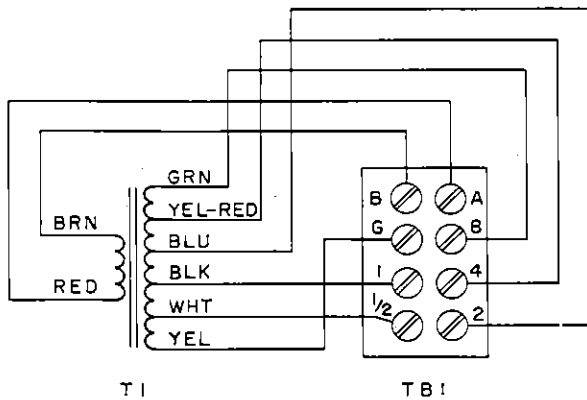


Figure 3. Schematic Diagram For Type 25LT-3

Figure 4. Schematic Diagram For 4LT-1

25LC-1 Line Control in the 70-volt line serving the group.

In order to determine the correct wire size required for a specific installation refer to the graph, Figure 5. Note that each type of wire is shown by two lines in the graph:

1. A line sloping *down* from left to right.
2. A line sloping *up* from left to right.

The lines (1) limit the transmission line length to 10% power loss. After locating the point on the graph corresponding to a given power to the speaker load and a required speaker line length, the wire size represented by the line closest to this point above and to the right of the point is the smallest wire which can be used.

The lines (2) limit the transmission line length to a 3 db (voltage) loss at 10 KC due to wiring capacity. Note that lines (1) and (2) form a family of triangles. To illustrate the correct use of the graph, consider the example shown.

A 10 watt load is to be supplied 1,000 feet from the amplifier. This point falls below and to the left of the line marked "AWG No. 24". It is above and to the left of the line perpendicular to the first line (or *inside* the triangle formed by these lines). Therefore, No. 24 zip cord is the smallest wire which may be used to remain within the limits of power loss and high frequency response loss on which the graph is based.

PARTS LIST

Part No.	Description
508333	Housing
508336	Transformer (T1) 4LT-1
508356	Transformer (T1) 25LT-3
508282	Terminal Panel (4LT-1)
508357	Terminal Panel (25LT-3)

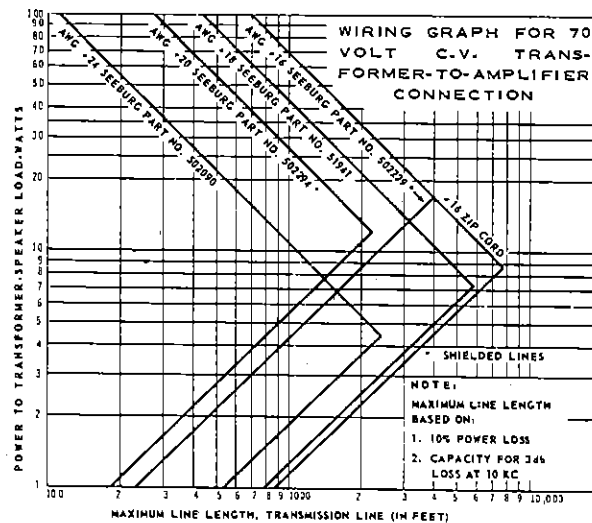


Figure 5.

LINE TRANSFORMER ASSEMBLY, TYPE 4LT-1 and 25LT-3

MAXIMUM LENGTH OF SPEAKER LINE IN FEET FOR 16 OHM SPEAKERS (ASSUMING SPEAKERS ARE UNIFORMLY SPACED ALONG LINE) FOR 1DB AVERAGE POWER LOSS.

SPEAKER CABLE WIRE SIZE (AWG)	NUMBER OF 16 OHM SPEAKERS ON LINE									
	* 1	† 2	3	4	5	6	7	8	9	10
24	60 ft	40 ft	-	-	-	-	-	-	-	-
22	100 ft	70 ft	50 ft	-	-	-	-	-	-	-
20	160 ft	105 ft	80 ft	65 ft	55 ft	-	-	-	-	-
18	250 ft	165 ft	125 ft	100 ft	85 ft	70 ft	-	-	-	-
16	400 ft	265 ft	200 ft	160 ft	130 ft	115 ft	100 ft	85 ft	-	-
14	620 ft	410 ft	310 ft	255 ft	215 ft	180 ft	160 ft	140 ft	130 ft	120 ft

* SPEAKER AT END OF LINE.
 † ONE SPEAKER AT FAR END OF LINE AND ONE IN CENTER

Figure 6.

TYPICAL INSTALLATIONS

Figures 7 and 8 illustrate typical installations of Line Transformers and Line Controls in speaker systems.

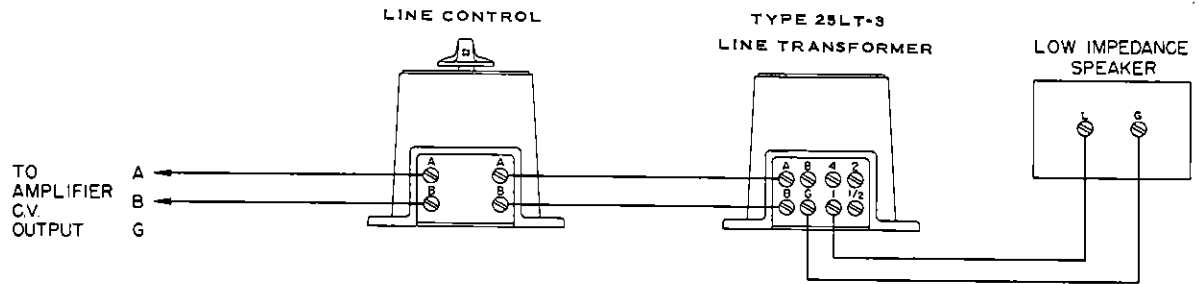


Figure 7. Single Speaker Installation.

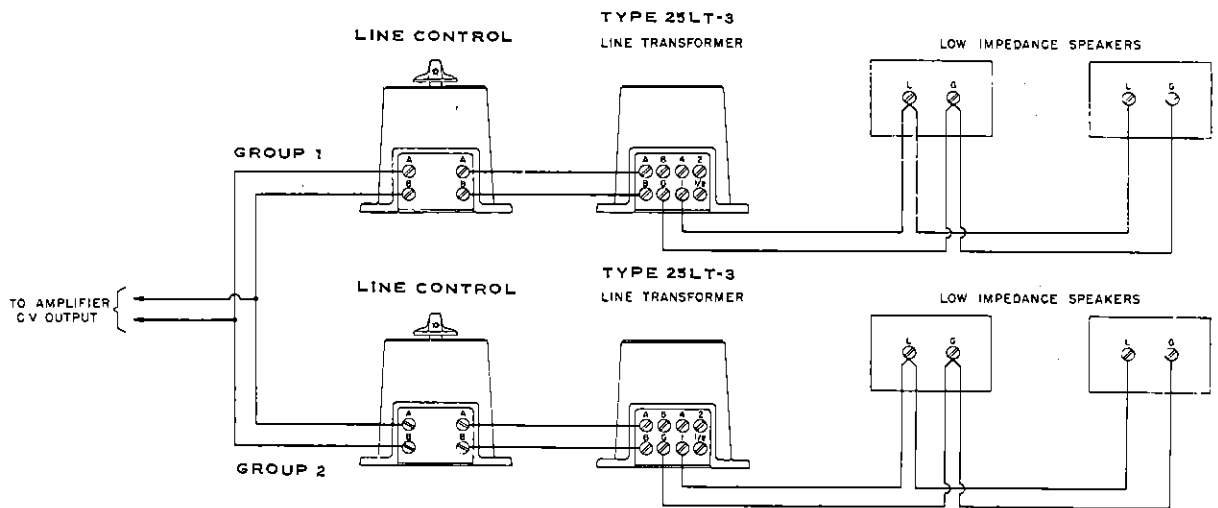
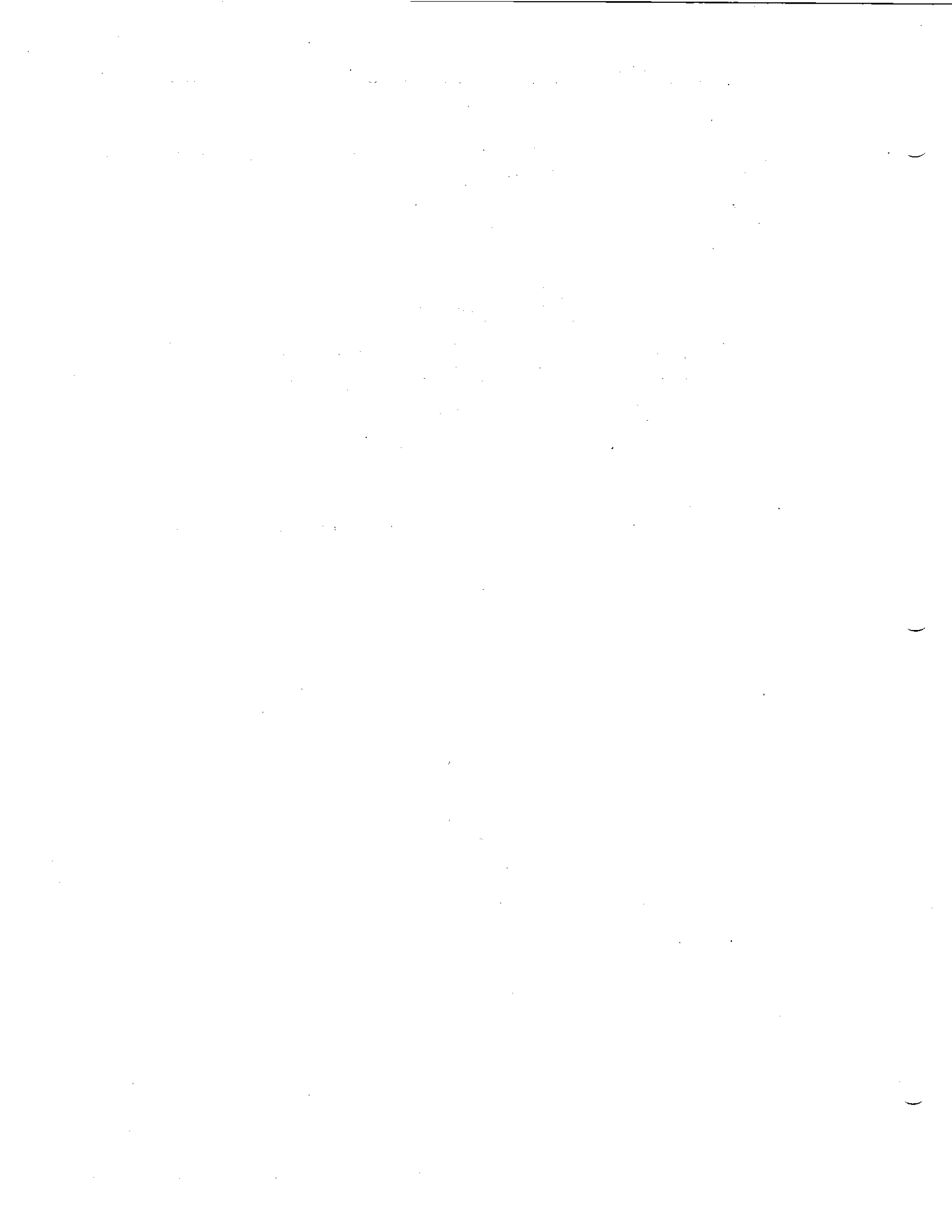


Figure 8. Group Speaker Installation.



SEEBURG

LINE CONTROL, Type 12LC-1

For Use On 70 Volt (Constant Voltage) Speaker Distribution Lines
Maximum Speaker Load - 12 Watts

The Line Control, Type 12LC-1 is for volume level adjustment of speakers connected to a 70-volt, constant voltage speaker line. It is designed for use in sound distribution systems in which extended frequency range and low distortion are important. This Control may be used to control 70-volt C.V. Type speakers or, in conjunction with a line transformer, 16 ohm speakers as shown in *Figure 2*.

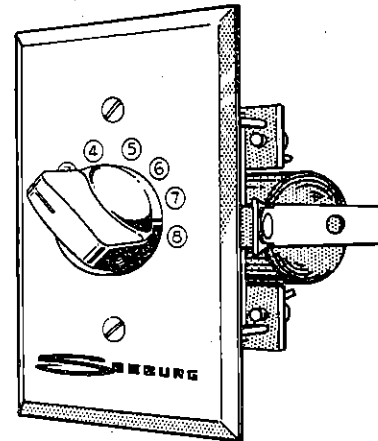
One or more speakers may be controlled in seven 3 db steps (or turned off) without affecting other speakers on the line. It may be installed by flush mounting in a control panel or wall mounting using conventional conduit and outlet boxes.

Use of this Control in a C. V. speaker line does not affect speaker or amplifier connections. Information contained in speaker or amplifier instruction folders must be applied as though the Line Control were not used.

INSTALLATION

The Line Control may be located at any convenient place between the amplifier and the speakers. The speaker line should be cut and the Control connected as shown in *Figure 2*.

Connections for a single speaker are shown in *Figure 2*. The same circuit can be used for connecting two or more speakers for group control provided the total speaker load does not exceed the amplifier power rating. *Figure 3* shows connections for controlling two speaker groups.



NOTE: Make certain that maximum total speaker load on each Line Control does not exceed 12 watts.

PANEL MOUNTING

Provide a rectangular panel opening 2" wide by 2 $\frac{3}{4}$ " high to permit front entry of the Line Control. Secure to the panel (maximum panel thickness - $\frac{1}{4}$ ") by means of two flat head screws indicated as "A" in *Figure 5*. Mount the escutcheon to the control with oval head screws "B" and push the control knob on the switch shaft.

WALL MOUNTING

A typical installation is illustrated in *Figure 6* using a conventional outlet box and conduit. After the conduit work has been completed, the Line Control may be wired in and installed by using the mounting screws provided.

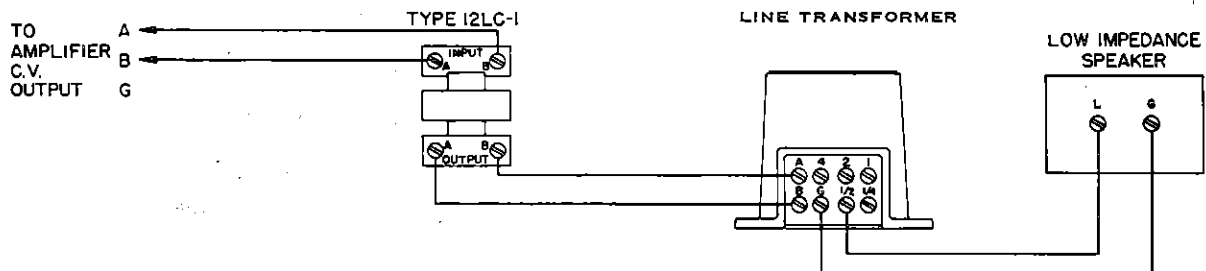


Figure 2.

LINE CONTROL, TYPE 12LC-1

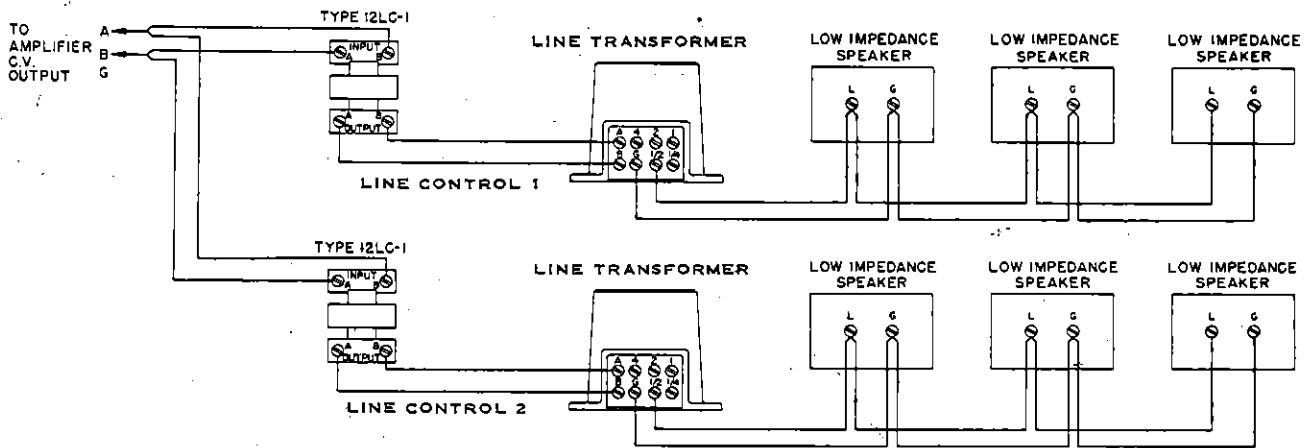


Figure 3. Group Connections

PARTS LIST

Part No.	Description
508214	Switch Transformer Assembly
503572	Transformer (T1)
503574	Switch (S1)
503571	Input Terminal Strip
503586	Output Terminal Strip

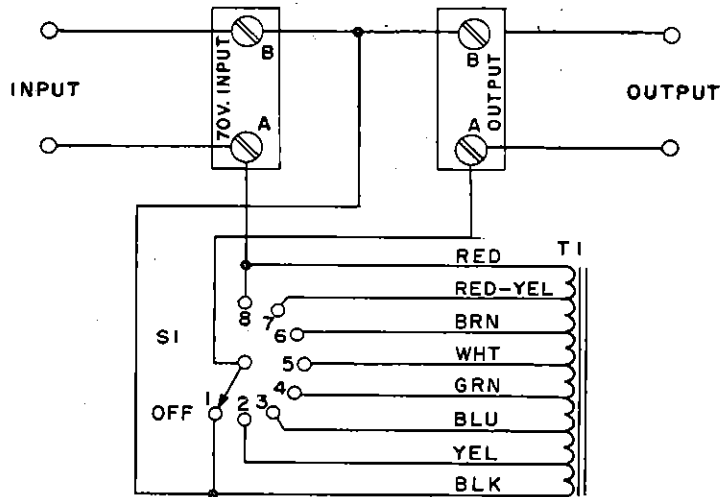


Figure 4. Schematic Diagram

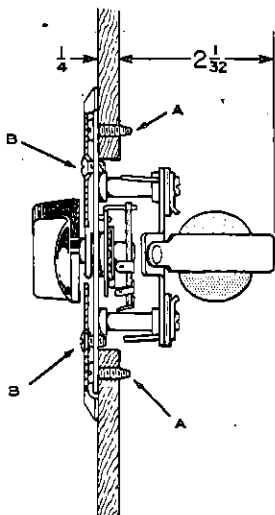


Figure 5.

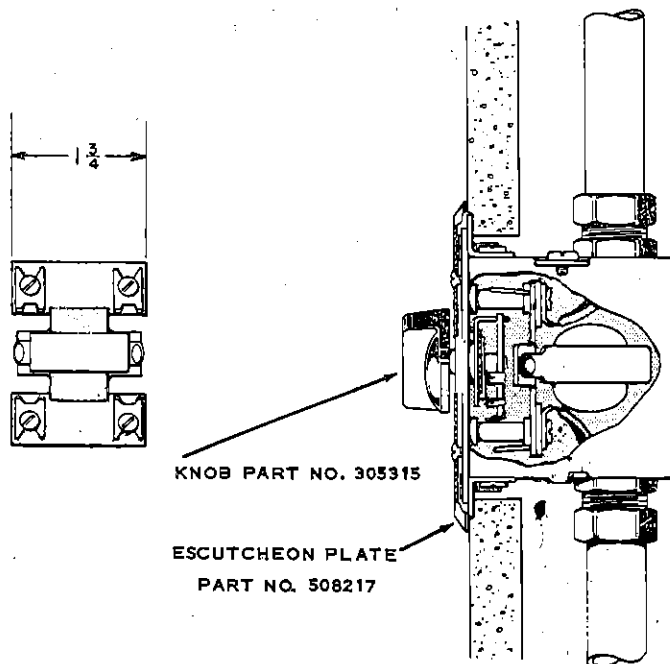


Figure 6.

SEEBURG

LINE CONTROL TYPE 12LC-2 and 25LC-1

FOR USE ON 70-VOLT (Constant Voltage) SPEAKER DISTRIBUTION LINES
 MAXIMUM SPEAKER LOAD 12 WATTS (12LC-2) and 25 WATTS (25LC-1)

The Type 12LC-2 (illustrated) and Type 25LC-1 Line Controls are for volume level adjustment of speakers connected to a 70-volt, constant voltage speaker line. They are designed for use in sound distribution systems in which extended frequency range and low distortion are important. These controls may be used to control 70-volt C.V. speakers or, in conjunction with a line transformer, 16 ohm speakers as shown in *Figure 2*.

One or more speakers may be controlled in seven 3 db steps (or turned off) without affecting other speakers on the line.

Use of these controls in a C.V. speaker line does not affect speaker or amplifier connections. Information contained in speaker or amplifier instructions must be applied as though the Line Controls were not used.

INSTALLATION

The Line Control may be located at any convenient place in the C.V. line. The line should be cut and the Control connected as shown in *Figure 2*. Two or more C.V. speakers can be controlled as a group provided the total speaker load does not exceed the amplifier power rating. *Figure 3* shows connections for controlling two speaker groups.

NOTE: Make certain that maximum total speaker load on each Line Control does not exceed its rated wattage (12 watts for Type 12LC-2 and 25 watts for 25LC-1).

To facilitate placement of Unit actual dimensions are shown in Figure 5.

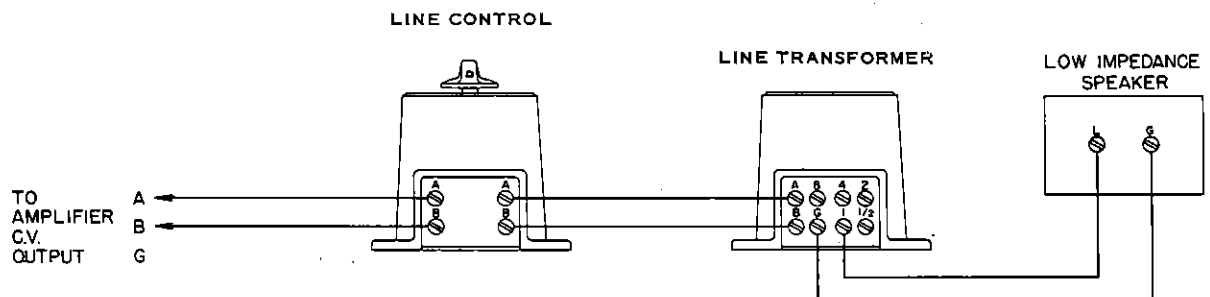
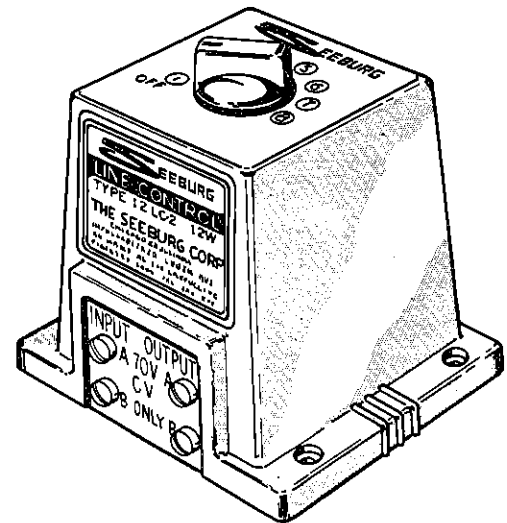


Figure 2.

LINE CONTROL, TYPE 12LC-2 and 25LC-1

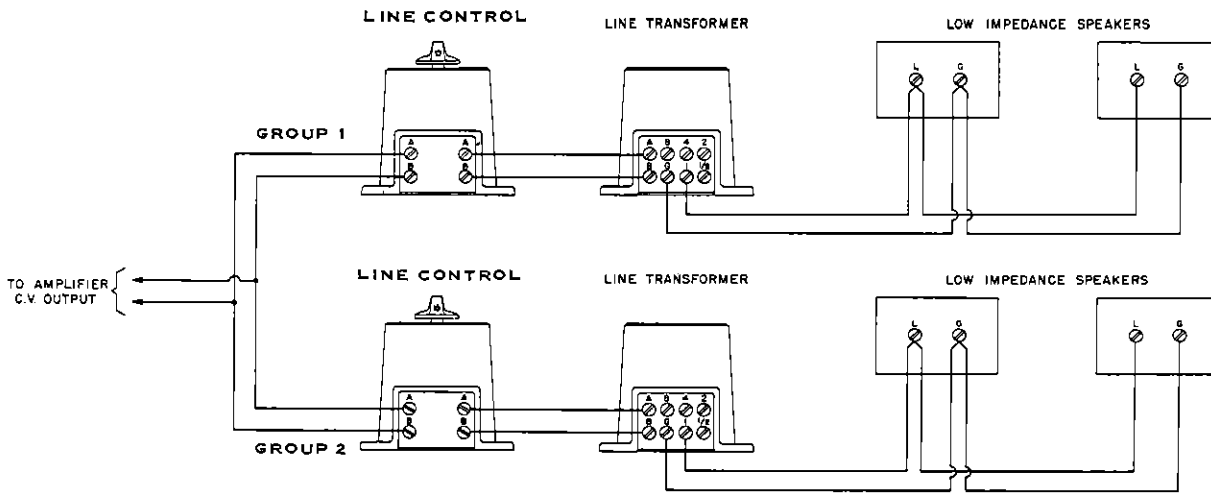


Figure 3. Group Connections

PARTS LIST

Part No.	Description
508296	Housing Assembly
508280	Terminal Panel
508294	Transformer (12LC-2)
508270	Transformer (25LC-1)
305315	Knob

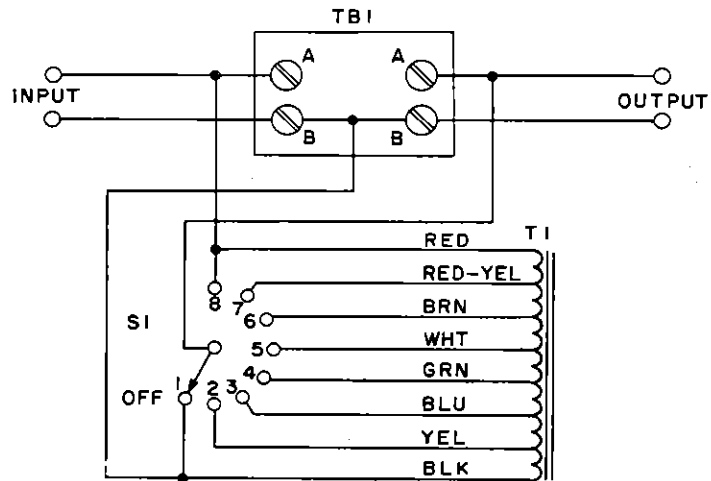


Figure 4. Schematic Diagram

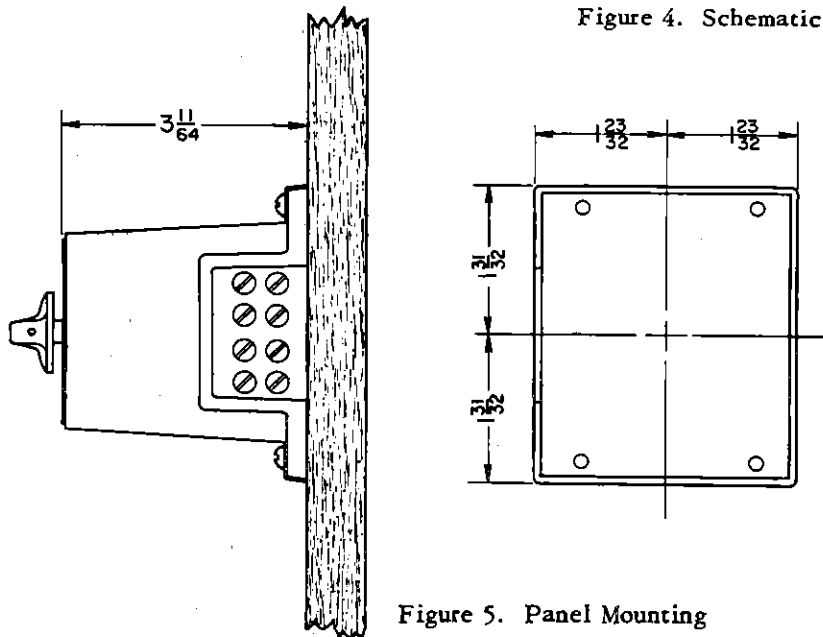


Figure 5. Panel Mounting

SEEBURG

LINE CONTROL, TYPE 12LIC-1

For Use on (16 ohm) Low Impedance Speaker Distribution Lines
Maximum Speaker Load - 12 Watts

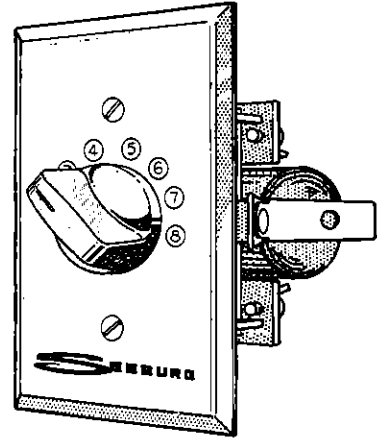
The Line Control, Type 12LIC-1 is for volume level adjustment of 16 ohm speakers when connected in the speaker line. It is designed for use in sound distribution systems in which extended frequency range and low distortion are important. One or more low impedance speakers may be controlled in seven 3 db steps (or turned off) without affecting other speakers connected to the same amplifier. It may be installed by flush mounting in a control panel or wall mounting using conventional conduit and outlet boxes.

Use of this Control in a speaker line does not affect speaker or amplifier connections. Information contained in speaker or amplifier instruction folders must be applied as though the Line Control were not used.

INSTALLATION

The Line Control may be located at any convenient place in the low impedance speaker line originating at the amplifier or at the output (speaker side) of a Line Transformer. The speaker line should be cut and the Type 12LIC-1 Line Control connected for a single speaker as shown in *Figure 2*. To maintain proper speaker phasing, observe polarity - connect "L" terminals together and "G" terminals together.

The same circuit can be used for connecting two or more speakers for group control provided the total speaker load does not exceed the amplifier power rating. *Figure 3* shows connections for controlling two speaker groups.



NOTE: Make certain that maximum total speaker load on each Line Control does not exceed 12 watts.

PANEL MOUNTING

Provide a rectangular panel opening 2" wide by 2 $\frac{3}{4}$ " high to permit front entry of the Line Control. Secure to the panel (maximum panel thickness - $\frac{1}{4}$ ") by means of two flat head screws indicated as "A" in *Figure 5*. Mount the escutcheon to the control with oval head screws "B" and push the control knob on the switch shaft.

WALL MOUNTING

A typical installation is illustrated in *Figure 6* using a conventional outlet box and conduit. After the conduit work has been completed, the Line Control may be wired in and installed by using the mounting screws provided.

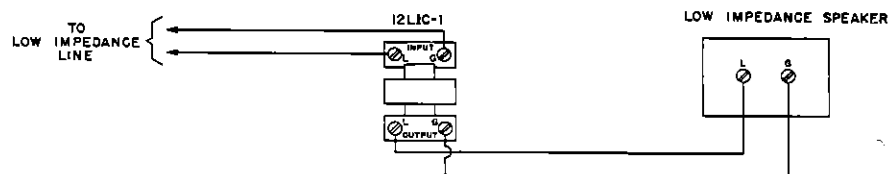


Figure 2.

LINE CONTROL, TYPE 12LIC-1

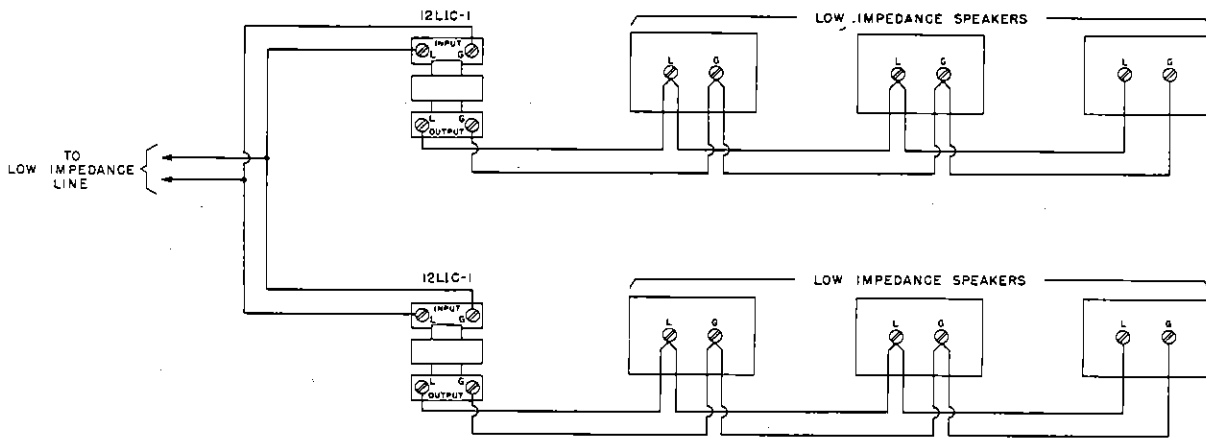


Figure 3. Group Connections.

PARTS LIST

Part No.	Description
508235	Switch Transformer Assembly
508238	Transformer (T1)
508237	Input Terminal Strip
508246	Output Terminal Strip
503574	Switch (S1)

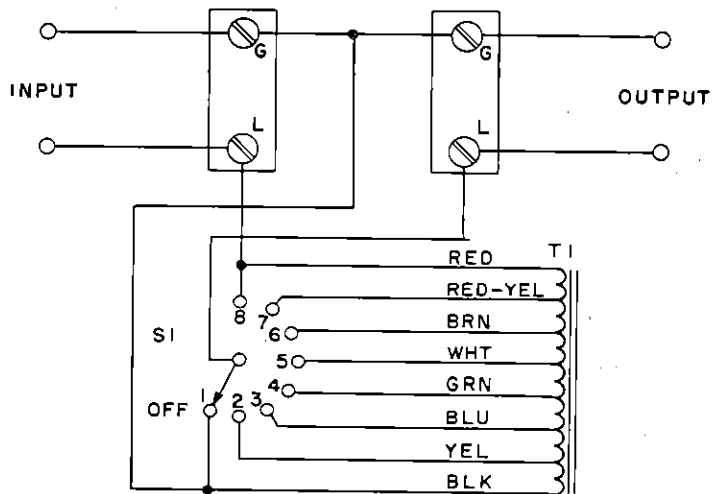


Figure 4. Schematic Diagram

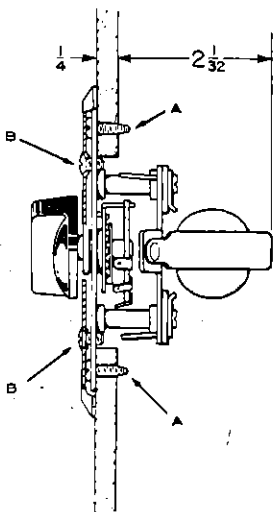


Figure 5.

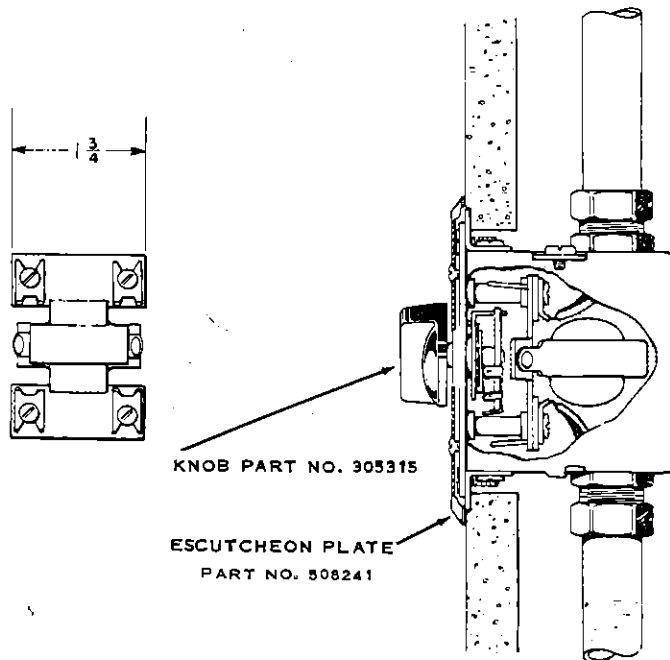


Figure 6

SEEBURG

LINE CONTROL, TYPE 12LIC-2

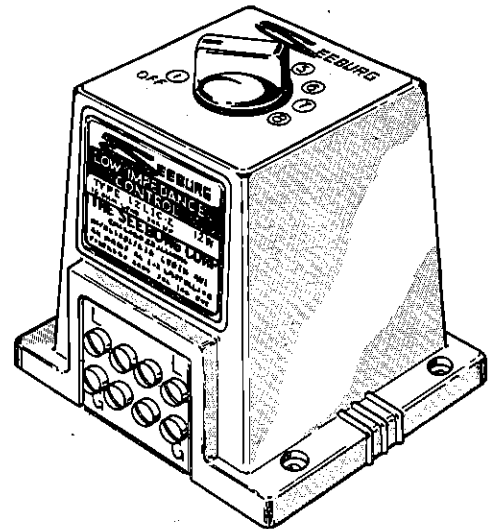
For Use On (16 ohm) Low Impedance Speaker Distribution Lines
Maximum Speaker Load - 12 Watts

The Line Control, Type 12LIC-2 is for volume level adjustment of 16 ohm speakers when connected in the speaker line. It is designed for use in sound distribution lines in which extended frequency range and low distortion are important. One or more low impedance speakers may be controlled in seven 3 db steps (or turned off) without affecting other speakers connected to the same amplifier. It may be installed by fastening to a wall or cabinet surface.

Use of this Control in a speaker line does not affect speaker or amplifier connections. Information contained in speaker or amplifier instructions folders must be applied as though the Line Control were not used.

INSTALLATION

The Line Control may be located at any convenient place in the low impedance speaker line originating at the amplifier or at the output (speaker side) of a Line Transformer. The speaker line should be cut and the Type 12LIC-2 Line Control connected for a single speaker as shown in Figure 2. To maintain proper speaker phasing, observe polarity - connect "L" terminals together and "C" terminals together.



The same circuit can be used for connecting two or more speakers for group control provided the total speaker load does not exceed the amplifier power rating. Figure 3 shows connections for controlling two speaker groups.

NOTE: Make certain that maximum total speaker load on each Line Control does not exceed 12 watts.

To facilitate placement of unit, actual dimensions are shown in Figure 5.

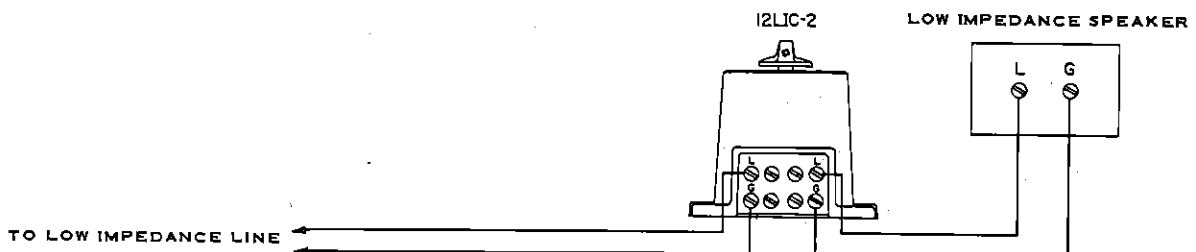


Figure 2.

LINE CONTROL, TYPE 12LIC-2

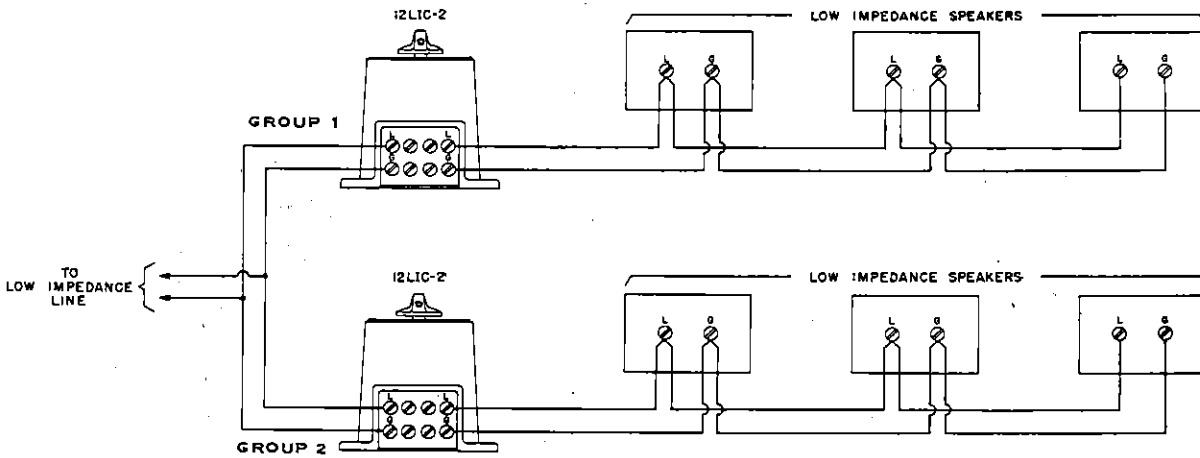


Figure 3. Group Connections

PARTS LIST

Part No.	Description
305315	Knob
508296	Housing
508271	Switch
508281	Terminal Panel
508317	Transformer

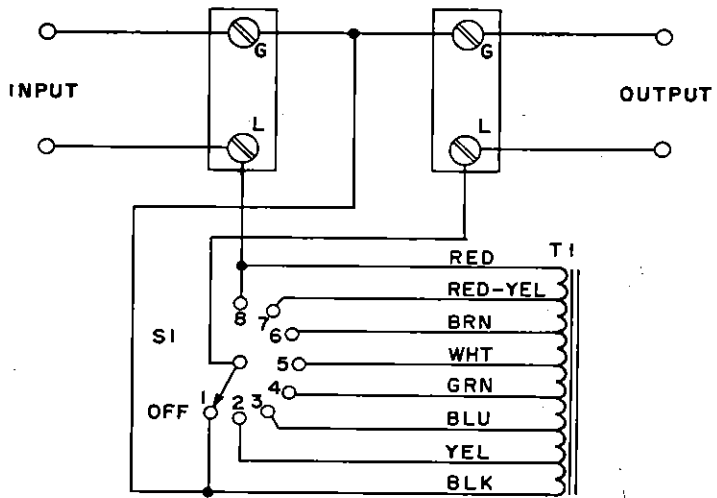


Figure 4. Schematic Diagram

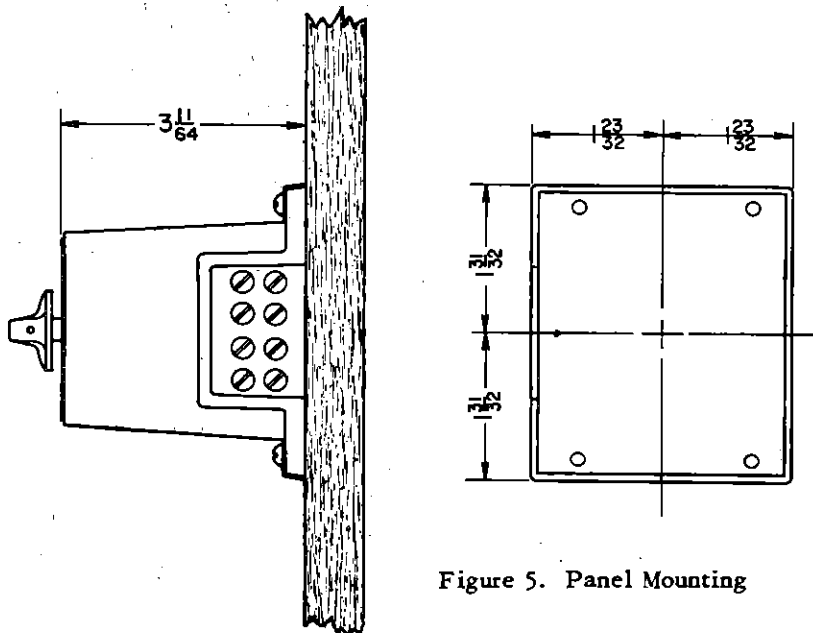


Figure 5. Panel Mounting

SEEBURG

POWER TIMER ACCESSORY KIT, Type BMPTAK1 and BMPTAK1-5

The Power Timer Accessory Kits, Type BMPTAK1 (60 cycle) and BMPTAK1-5 (50 cycle) are specifically designed for use with the Seeburg Background Music System, Model BMS1 and BMS1-5 respectively, in applications requiring daily automatic on-off control and cut-out on one or more days of the week. Use of this kit does not affect the operation of the Program Timer in the Seeburg "1000".

INSTALLATION:

The Power Timer Accessory Kit includes an Automatic Timer and a Junction Box and Cable Assembly which are installed and connected as follows:

1. Remove the Plug Button and two Push Rivet Studs from rear of the cabinet.
2. Feed the Junction Box plug and cable assembly through the rear of the cabinet and secure as shown in *Figure 2* using hardware provided. Note that the lower keps nut is also used to retain the cable clamp.

CAUTION: Make certain that cable dressing does not restrict free movement of mechanism on shockmounts.

3. Unplug the 9-prong Mechanism Plug from the amplifier and plug into the 9-prong socket (J021) of the Interconnecting Cable.
4. Plug the 9-prong plug (P021) into the Amplifier Socket vacated in step 3.
5. Dress the cable assembly as shown in *Figure 3*.
6. Mount the Power Timer (using the key-hole slot at rear of timer cabinet, and No. 8 wood screw) on any convenient wall. Make connections as shown in *Figure 4*. **NOTE:** Wiring should conform to the local code. Knockouts are provided for standard 1/2 inch rigid or flexible conduit and fittings.

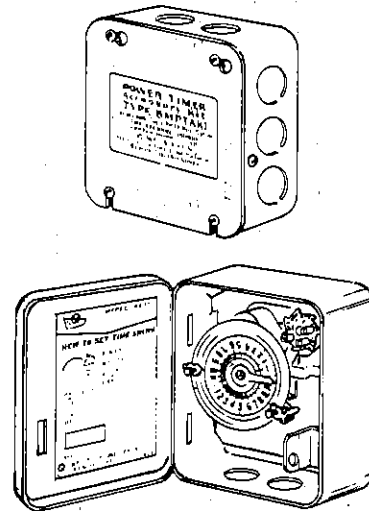


Figure 1. Power Timer Accessory Kit.

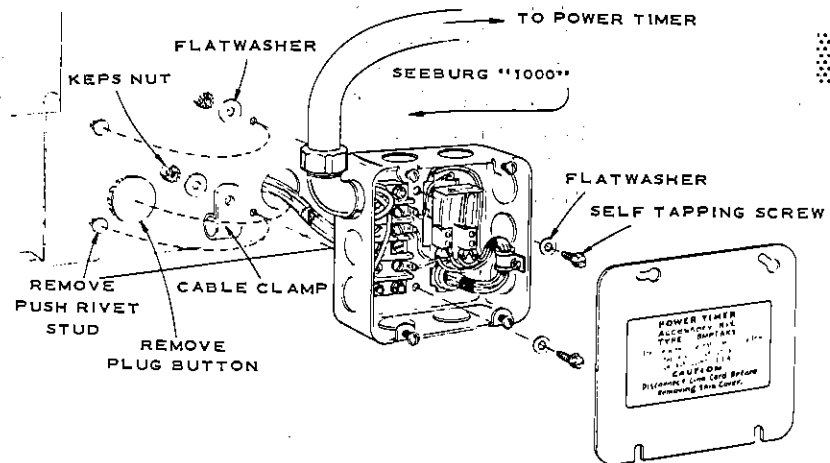


Figure 2. Junction Box Assembly.

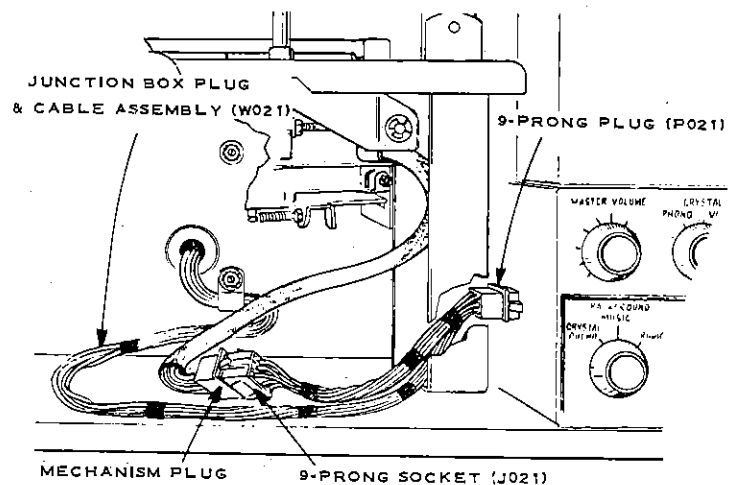
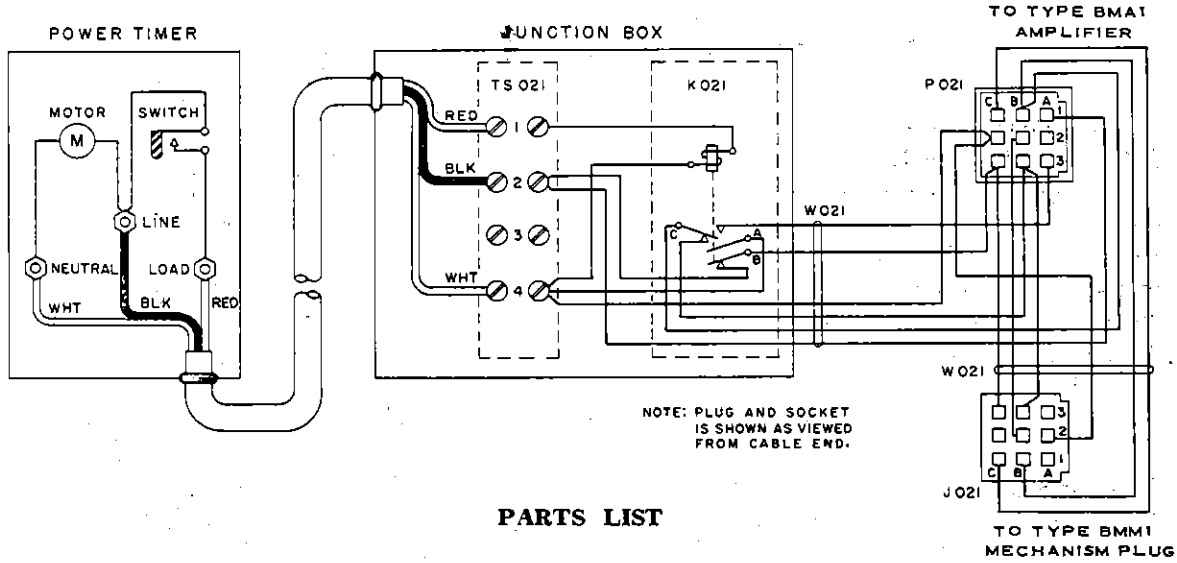


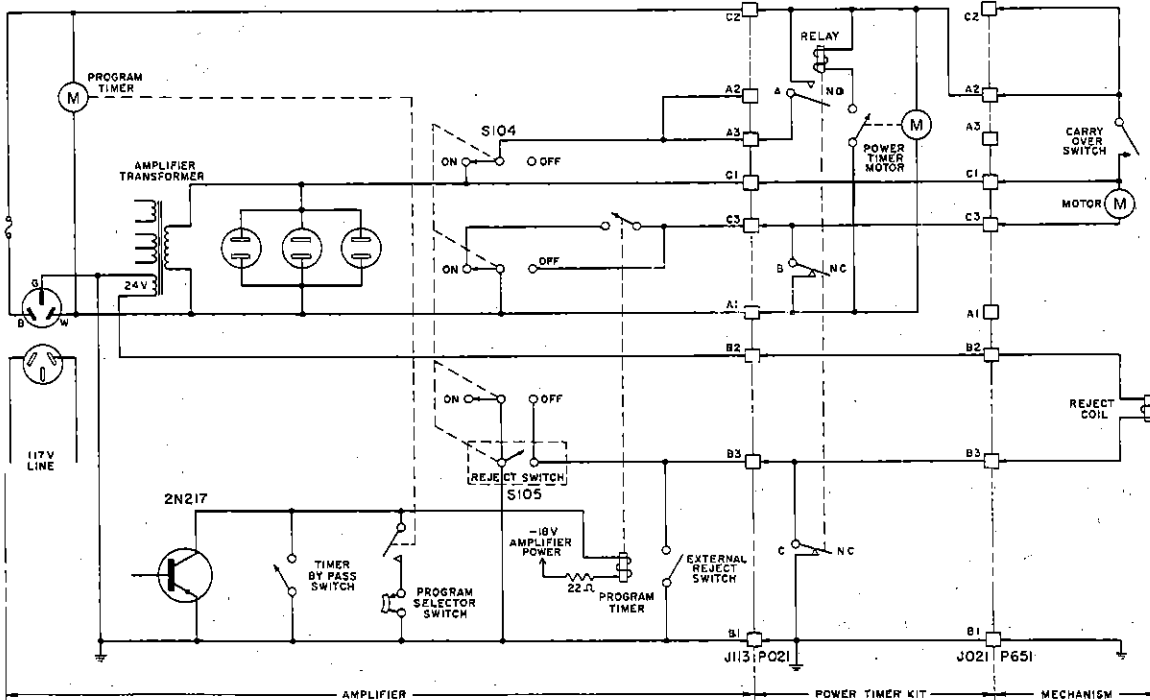
Figure 3. Cable Connection.

POWER TIMER ACCESSORY KIT, TYPE BMPTAK1 AND BMPTAK1-5



PARTS LIST

Part No.	Description	Part No.	Description
753136	Intermatic Timer Assembly (60 cycle)	901682	8-32 Keps Hex Nut
757170	Intermatic Timer Assembly (50 cycle)	941641	Terminal
503307	Insulated Bushing	602190	Cable Clamp
508436	Electrical Box Cover	913229	6-32 x 3/8 Washer H.M.S.
508439	Relay (K021)	901160	6-32 Keps Hex Nut
912992	6-32 x 1/4 Phillips Flat H.M.S.	508440	Cable Assembly (W021)
503306	Terminal Strip (TS021)	233409	Plug (Amp. 480086-1) (P021)
914728	8-32 x 3/4 Phillips Flat H.M.S.	84315	9 Contact Socket (Amp. 480086-1) (J021)
920914	Flatwasher	941750	Contact
		508441	Mounting Screw Kit



Power and Control Circuit for Seeburg "1000".

BACKGROUND MUSIC PROGRAM TIMER KIT, Type BMPT1 and BMPT1-5

The Seeburg Program Timer is for use in the Seeburg "1000" Background Music System to make available intermittent music - adjustable to give any number of selections per each half-hour period. Program Timer Kit Part No. 508540 contains a Type BMPT1 timer and is for 60 cycle operation. Program Timer Kit Part No. 508541 contains a Type BMPT1-5 timer and is for 50 cycle operation.

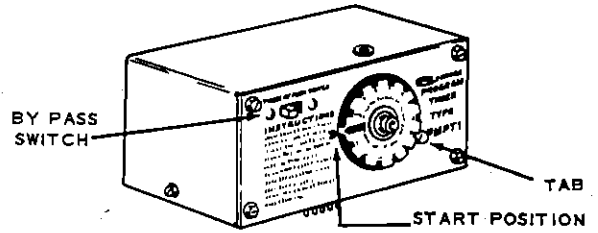


Figure 1. Program Timer.

The Program Timer determines the number of selections played during each 30-minute cycle (period) as indicated on the periphery of the dial. A Timer By-Pass Switch permits the playing of a single selection during the time the instrument is not playing. Hold the By-Pass Switch in the "ON" position (to the right) until music starts.

INSTALLATION:

Remove the 10-prong dummy plug from the top of the background music amplifier and plug in the Program Timer and set up in the following manner:

1. Disconnect the power line cord of the amplifier. Make certain that the pick-up arm of the Background Music Mechanism is in "REST" Position.
2. Set Tab, Figure 1, by depressing to clear slots, and rotate to position indicating selections desired per 1/2 hour period (cycle). Release Tab to latch in place.
3. Turn timer dial to line up "START" arrow with reference arrow on the timer panel.

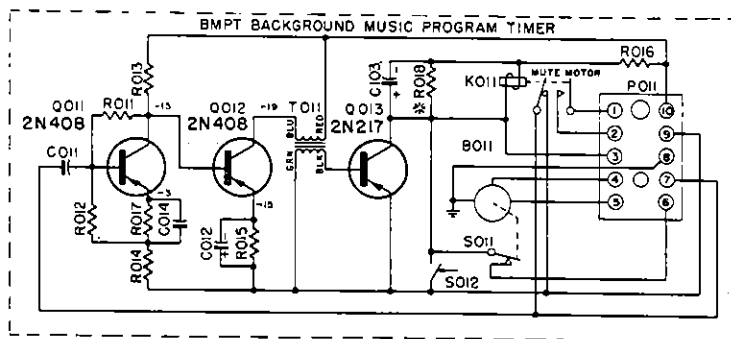
4. At the desired Starting Time, plug the line cord into the A.C. outlet.

NOTE: If program starting time is to be 15 minutes before the hour and 15 minutes after the hour, and the installation is completed at 2 P.M. for example; plug the line cord in at 2:15 P.M. Otherwise, plug the cord in on the hour or 1/2 hour.

5. The instrument must be turned off at the main power switch only and turned on again when the program is to start. This insures continuous operation of the timer motor and consequent correct program scheduling.

CAUTION: Power must be connected to the amplifier at all times (by keeping line cord plugged in) to permit the Program Timer to keep correct time. The Seeburg "1000" may be turned off at its own power switch only.

Note that when the Program Timer is set for "Continuous" operation, a quiet period of up to 1 minute may occur each half hour.

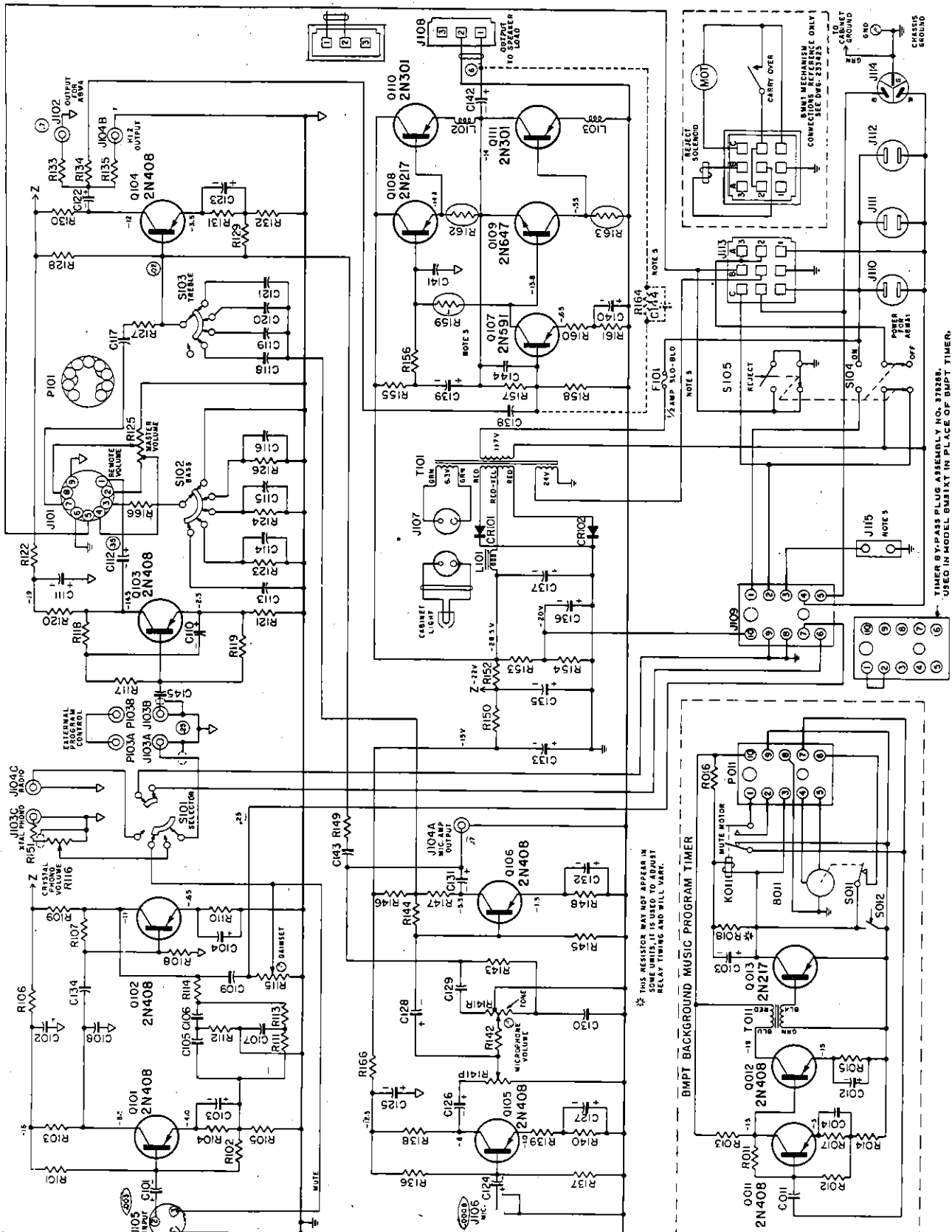


* THIS RESISTOR MAY NOT APPEAR IN SOME UNITS, IT IS USED TO ADJUST RELAY TIMING AND WILL VARY.

Figure 2. Schematic Diagram for Program Timer, Part No. 375150 (60 cycles) & 375151 (50 cycles).

ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION	ITEM	PART NO.	DESCRIPTION
B011	375187	TIMER MOTOR (60 CYCLES)	Q011	309401	2N408 TRANSISTOR	R016	82404	22 OHM 1/2 WATT. 10%
	375225	TIMER MOTOR (50 CYCLES)	Q012	309400	2N217 TRANSISTOR	R017	82436	10,000 OHM 1/2 WATT. 10%
C011	86327	0.047 MFD. 50 V. MYLAR	R011	82458	680,000 OHM 1/2 WATT. 10%	S011	375175	SWITCH
C012	87674	10 MFD. 15 V. LYTC	R012	82676	47,000 OHM 1/2 WATT. 5%	S012	305635	SPDT SWITCH
C013	87673	2000 MFD. 25 V. LYTC	R013	82642	33,000 OHM 1/2 WATT. 5%	T011	375183	TRANSFORMER
C014	86329	0.47 MFD. 50 V. MYLAR	R014	82634	10,000 OHM 1/2 WATT. 5%			
K011	375193	RELAY	R015	82642	33,000 OHM 1/2 WATT. 5%			
P011	375189	PLUG						

PROGRAM TIMER, TYPE BMPT1, AS USED WITH BACKGROUND MUSIC AMPLIFIER, TYPE BMA1



(FI) Issue 1

THE SEEBURG SALES CORPORATION, CHICAGO 22, ILL.

6. SIGNAL VOLTAGES (ENCIRCLED) ARE MEASURED AT 1000 CPS USING A VTVM WITH CONTROLS SET AS FOLLOWS: SELECTOR...BACKGROUND BASS CONTROL..... 5 TREBLE CONTROL..... 5 MASTER VOL.....MAX. CW MIC. TONEMIDWAY

TIMER BY PASS PLUG ASSEMBLY NO. 312888. USED IN MODEL BM81KT IN PLACE OF BMPT1.

1. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
2. ALL RECEPTACLES ARE AS VIEWED FROM SOLDER SIDE.
3. Φ CHASSIS GROUND & SIGNAL GROUND.
4. D.C. VOLTAGE MEASUREMENTS ARE MADE WITH 25,000 OHM/VOLT METER.
5. COMPONENTS IDENTIFIED BY CIRCLED NUMBERS ARE LOCATED ON THE REVERSE SIDE OF J108/P011.

CODE C CHANGED F101 FROM MAIN LINE (B), J114, TO ONLY PRIMARY OF T101.
CODE D ADDED THERMISTERS, R102 AND R103, ADDED CHOKE L103, DELETED R104 AND RELOCATED CAPACITOR C144.