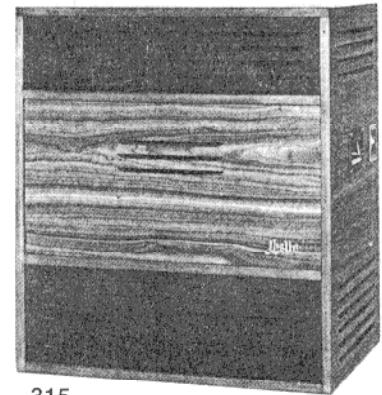


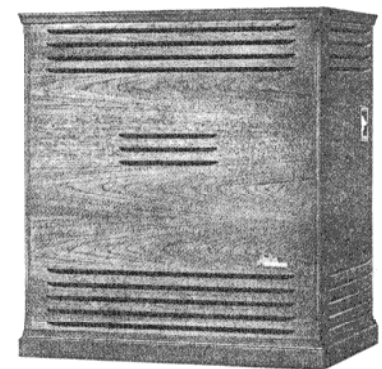
LESLIE SPEAKER 315, 415, HL422

MAJOR COMPONENTS

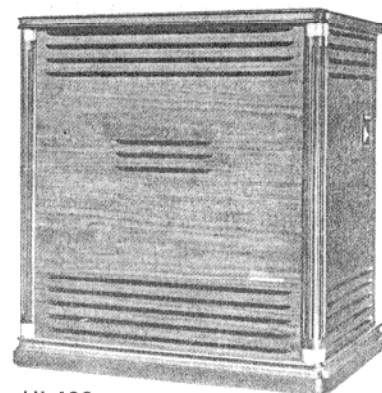
Item	Part No.
Power Supply Assembly	141191
Power Circuit Assembly	141448
Motor Oscillator Circuit Assembly	141278
Power Cord Adapter	
Amplifier	141169
Driver Amp Circuit Assembly (4)	140562
Solid-state Crossover Circuit Assembly	141172
Rotary Horn Assembly	
Horn Rotor	141155
Spindle & Speaker Assembly	140545
Rotosonic Drum Assembly	140904
Upper & Lower Motor Assembly	141294
Motor Control Circuit Assembly	141284
Treble Response Control Assembly	141121
Treble Response Control Switch (Mod. 315)	140553
Treble Response Control Switch (Mod. 415/HL422)	140709
Roll-off Assembly	140574



315

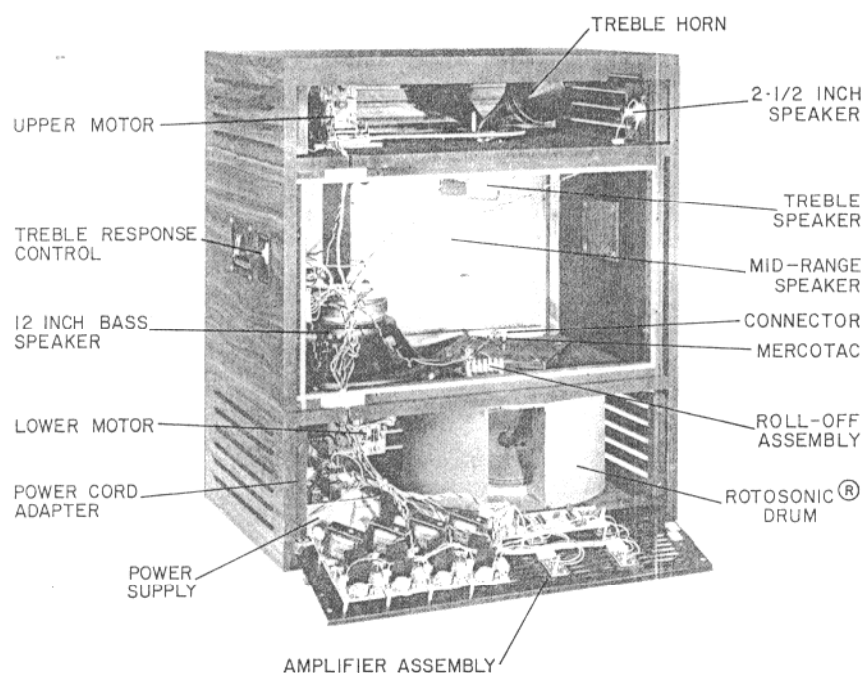


415



HL422

LESLIE SPEAKER
315, 415, HL422



SPECIFICATIONS

Loudspeakers:

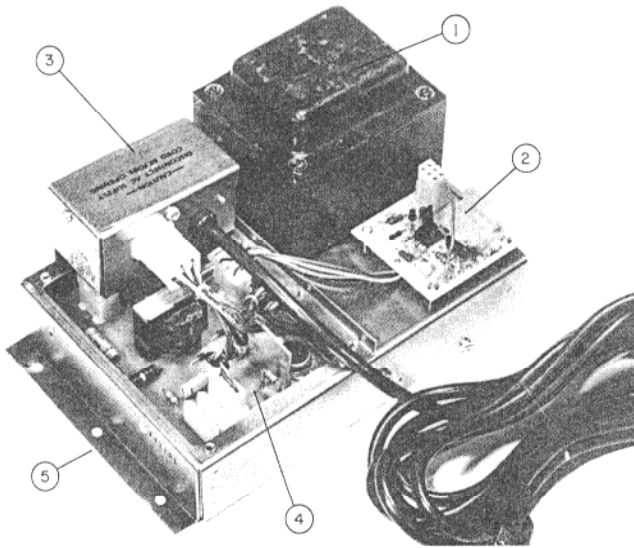
Two 8-ohm, 2 1/2" tweeters	141153
8-ohm, 6x9, midrange/treble	140431
8-ohm, high-compression driver	140491
4-ohm 12" bass	141069
8-ohm, 6x9 (Rotosonic)	043125

Fuses:

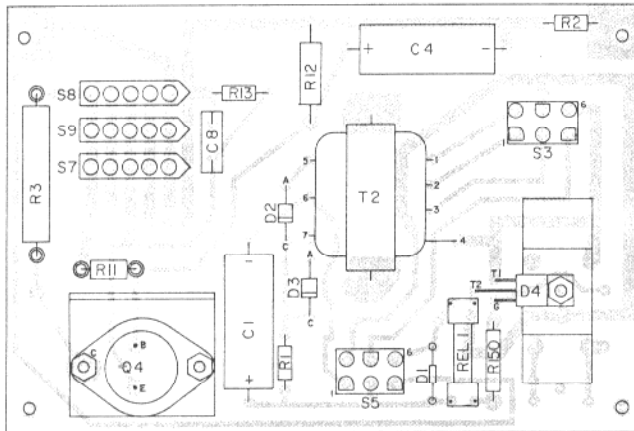
100 Volt	6.25 Amps
120	5.
200	3.2
220	3.
240	2.5
240 Australian	2.5
220 Scandinavian	3.15

POWER SUPPLY (141191) and POWER CORD ADAPTER

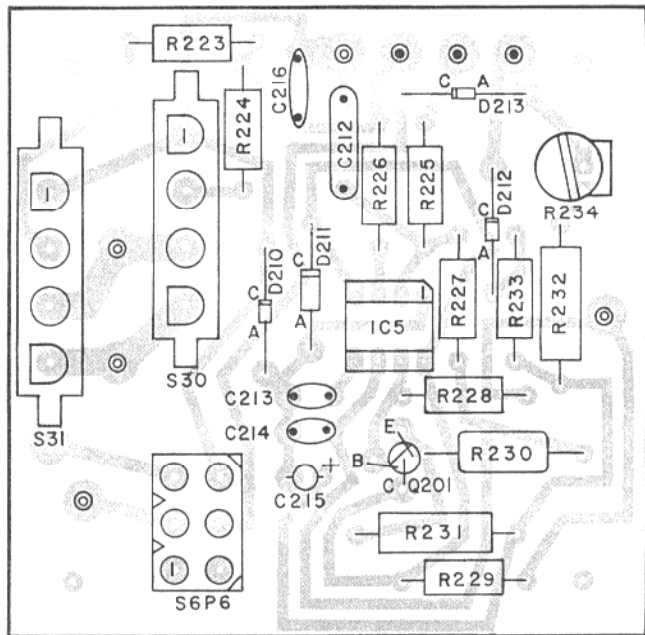
Note: The complete power supply consists of the Power Supply (141191) and the Power Cord Adapter (see Item 3)



Item	Description	Part No.
1	Transformer Assembly, Multi-volt	141193
2	Motor Oscillator Circuit Assy. (Includes Circuit Assembly 141189 and Cable & Housing Assembly 141280)	141278
3	Power Cord Adapter	
	100V	140586
	120V	140528
	200V	140587
	220V	140584
	240V	140585
	240V Australian	140588
	220V Scandinavian	140655
4	Circuit Board Assembly, power	141448
5	Capacitor, electrolytic, 3000mfd, 50V	044826
	Rectifier, bridge (mounted beneath)	140449



POWER CIRCUIT ASSEMBLY
141448



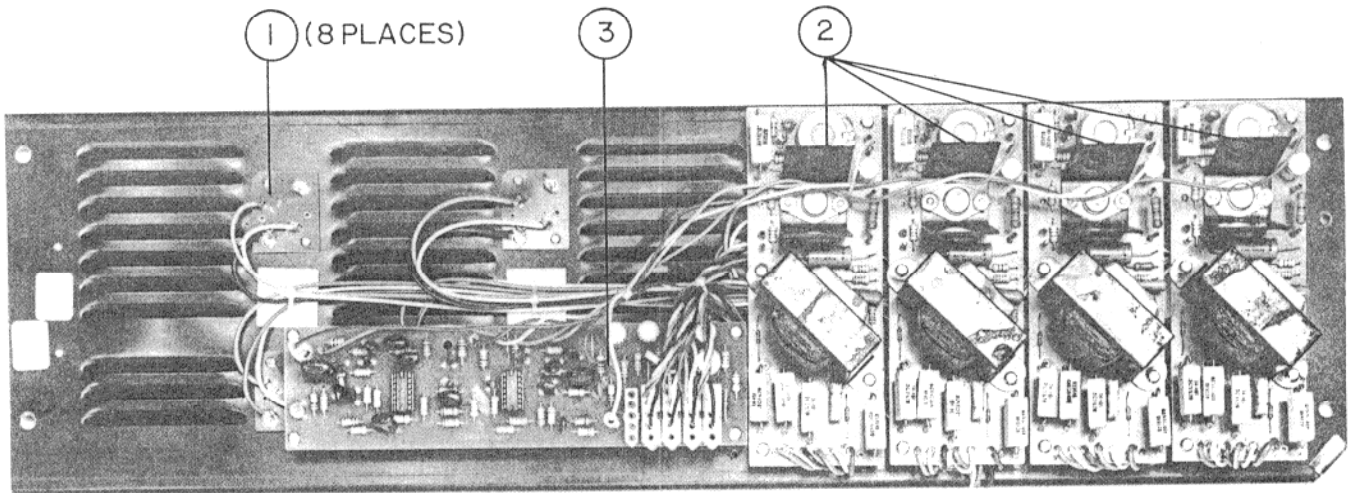
MOTOR OSCILLATOR CIRCUIT ASSEMBLY
141278

Item	Description	Part No.
	Circuit Board, Etched	140459
T2	Transformer, control	140414
Rel 1	Relay Coil and Switch, 1kV	137456
D4	Triac	067561
D2, D3	Diode, 100 PIV, 1A	021154
D1	Diode, 30PIV 500mW	041616
C1, C4	Capacitor, electrolytic, 250MF, 35V	065086
C8	Capacitor, poly, 0.1MF, 200V	022251
R1	Resistor, CF, 33ohm, .5W, 5%	137344
R150	Resistor, 220-ohm, 1W	139942
R2	Resistor, 100K, .5W, 5%	137765
R13	Resistor, 3.3K, .5W, 5%	024141
R11	Resistor, 330-ohm, .5W, 5% F.P.	141453
R12	Resistor, 1.2K, 2W	137974
R3	Resistor, ww, 8-ohm, 7W, 10%	141432
S3	Housing, Socket, 6CKT, Modified	040514
S5	Housing, Socket, 6CKT, AMP UNIV.	137258
S7	Housing, Socket, 5CKT	106970
S8	Housing, Socket, 5CKT	106970
S9	Housing, Socket, 5CKT	106970

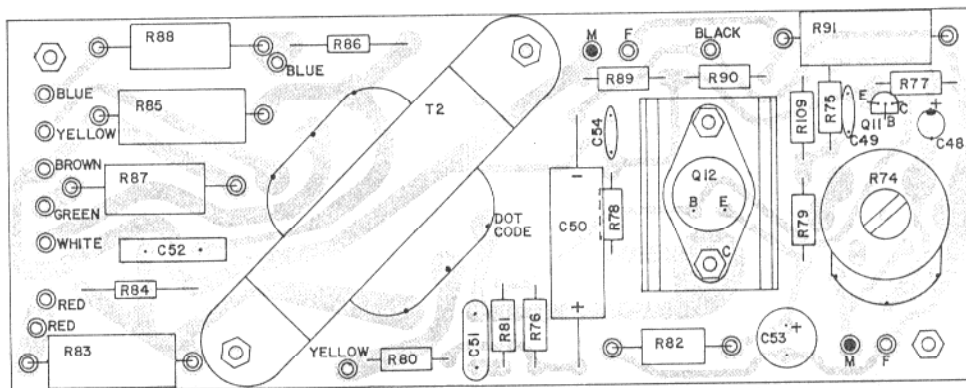
Item	Description	Part No.
	Circuit Board, Etched 415 OSC	141118
C212	Capacitor, mica, 200pf, 500V	024018
C213, C214	Capacitor, mylar, .022-100V, 5%	137751
C215	Capacitor, tantalum, 10MF, 16V	041707
C216	Capacitor, disc, 4700PF, 100V	028431
D210, D212, D213	Diode, SIL, 30PIV, 500MW	041616
D211	Diode, Zener	118870
Q201	Transistor, 2N3414	030254
R223, R224	Resistor, 1K, .5W, 5%	018044
R225	Resistor, 22K, .5W, 5%	028365
R226, R229	Resistor, 220-ohm, .5W, 5%	028381
R227	Resistor, 100K, .5W, 5%	137765
R228	Resistor, 6.8K, .5W, 5%	016501
R230	Resistor, 20K, .5W, 1%	141213
R231, R232	Resistor, 2.74K, .5W, 1%	141214
R233	Resistor, 56K, .5W, 5%	137766
R234	Potentiometer, 5K, Trimmer	141218
S30, S31	Housing Socket, 4CKT, Nat Amp Un	141215
S6, P6	Housing Socket, 6CKT, Nat Molex	023267
IC5	I.C., Timer, 555	141277
	I.C., Socket, 8CKT	128010

LESLIE SPEAKER
315, 415, HL422

AMPLIFIER (141169)



Item	Description	Part No.
1	Transistor, 2N3055 (8)	023762
	Washer, insulating, transistor	141291
	Socket, Transistor	023168
	Cover, transistor	023580
2	Circuit Assembly, driver amp (includes cable assembly 045781 and circuit board assembly 140561)	140562
3	Circuit Assembly, crossover (includes circuit board assembly 140806)	141172



DRIVER AMP CIRCUIT ASSEMBLY (140562) for PEDAL, KEYBOARD, DRUM, and HORN AMPLIFIERS

Item	Description	Part No.	Item	Description	Part No.
C48	Capacitor, tantalum, 22mfd, 15V (white dot is +)	062638	R77,R90	Resistor, 47-ohm, 1/2W	016311
C49,C54	Capacitor, disc, 4700pF, 100VDC	028431	R78	Resistor, 6.8K, 1/2W	016501
C50	Capacitor, electrolytic, 150mfd, 25VDC	031294	R79	Resistor, 27K, 1/2W	021535
C51	Capacitor, mylar, .033mfd, 100VDC	028654	R82	Resistor, 15-ohm, 1W, 5% F.P.	141455
C52	Capacitor, polyester, 0.1mfd, 200VDC	022251	R83,R85	Resistor, wire-wound, 430-ohm, 5W, 5%	023648
C53	Capacitor, electrolytic, 500mfd, 6VDC	055483	R84, R86	Resistor, 6.8-ohm, 1/4W, 5% F.P.	141454
Q11	Transistor, MSPS 7535	026237	R87, R88	Resistor, ww, .3-ohm, 2W, 5%	141451
Q12	Transistor, 2N3054	023754	R91	Resistor, wire-wound, 0.3-ohm, 5W, 5%	023218
R74	Potentiometer, 20K	037648	R89	Resistor, 820-ohm, 1/2W	028373
R75,R80,	Resistor, 1.2K, 1/2W	018036	R109	Resistor, 47K, 1/2W	063677
R81			T2	Transformer, driver	140560
R76	Resistor, 470-ohm, 1/2W	028068		Circuit Board, Etched	022848

VOLUME ADJUSTMENTS



Four separate Volume controls, two each for both the Rotary and Stationary channels, are accessible through the holes at the top of the lower back panel and can be adjusted with a small screwdriver. If volume adjustment is necessary, follow this procedure:

Set all of the instrument controls (pedal and keyboard stop tabs) to insure maximum undistorted signal to both channels. Set the TRC controls to the Bright (Dot) position. Depress the organ expression pedal to full volume. (Note — With the Hammond B-200 set the organ Volume and Brilliance controls to maximum clockwise position.)

Have someone play (and hold) a pedal note and chords with both hands which encompass the organ's full frequency range. Adjust each Volume control to the desired level. If distortion can be

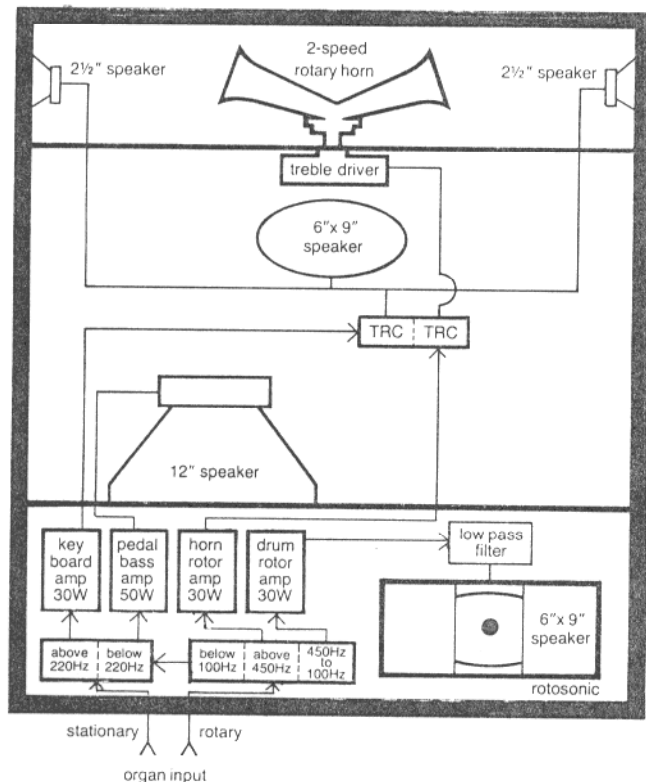
heard, back it off until the distortion just disappears. (Note — With the Hammond B-200 push the Piano Solo button on, with the B-3000, the Grand Piano tab, and if distortion is heard, back off the keyboard volume control. (Note — When using the Pre-Amp IV, first set the High Frequency Roll-Off controls to 10, set the speaker volume controls midway between the minimum and maximum settings. Play the instrument as described and set the Pre-Amp Volume controls to maximum settings without distortion.)

When the volume of the speaker is at the preferred level, try each of the other two settings of the TRC switches and choose those which give the desired treble brightness in each channel. (Note — When using the Pre-Amp IV, the High Frequency Roll-Off controls may also be used to adjust the treble response.)

CIRCUIT DESCRIPTIONS

AC POWER CONTROL CIRCUIT

The primary of transformer T2 is connected across the power line and is therefore energized whenever the AC plug is connected to a standard power outlet. The DC voltage developed across C1



is applied to relay REL 1 when contacts 5 and 6 of P1 are connected together. This applies AC power to the primary of T1, activating the cabinet power supply to turn the cabinet on.

ON/OFF SW3

Closing the ON/OFF switch completes the circuit through contacts 5 and 6 of S1,P1. Relay REL 1 is energized, turning triac D4 on, applying AC line power to the primary of transformer T1, which activates the cabinet power supply. The current through contacts 5 and 6, P1 also causes the LED in the switch assembly to glow. The three adjacent Diodes maintain essentially constant current through the LED even when several cabinets are operating simultaneously.

MOTOR CONTROL CIRCUIT

FAST/OFF/SLOW SW2

Setting this switch to FAST (Tremolo) closes SW2 contacts 5 and 6, completing the circuit from contacts 7 to 5 of S1,P1. The motor's fast speed circuitry is turned on by connecting contacts 7 and 5 of P1 together.

Setting the switch to SLOW (Chorale) closes contacts 1 and 2, completing the circuit from contacts 8 to 5 of S1,P1. (SW2 contacts 5 and 6 break

when the switch passes through the OFF position, de-energizing the motor's fast speed circuitry.) The motor's slow speed circuitry, like the fast, is similarly operated by connecting contacts 8 and 5 together.

Setting the switch to the OFF position causes either contact pairs 1 and 2 or 5 and 6 to break, de-energizing the slow & fast motor speed circuitry.

ECHO/MIX/ORGAN SW1

With the switch set at MIX (Ensemble), organ signals from the "flute/tibia" channel (designated "channel 1" on the console connector schematic) enter the speaker system through contact 1 of S3,P3 (in the console connector kit), pass through the control switch contacts 2 and 1, and return to the organ "flute/tibia" speaker. (If there is a crossover in the organ system the signal returns to the input of the crossover.) At the same time, the signal is routed through the control switch contacts 5 and 6, and through contact 1 of S1,P1 to the rotary channel amplifier.

With the switch set at ECHO, organ signals from the "flute/tibia" channel enter the system through 1 of S3,P3, pass through control switch contacts 5 and 6, and are routed through contact 1 of S1,P1 to the rotary channel of the LESLIE speaker. Signal to the organ speaker is interrupted by the opening of contacts 1 and 2.

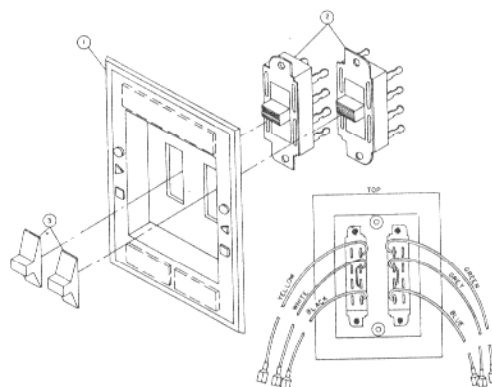
Signals from the organ "main" channel are similarly handled.

With the switch set at ORGAN (Main), the opposite condition is created: contact pairs 1,2 and 3,4 make, while contacts 5 and 6 (LESLIE speaker rotary channel) and 7 and 8 (LESLIE speaker stationary channel) break. Thus, only the organ speakers sound.

ANTI-THUMP CIRCUIT

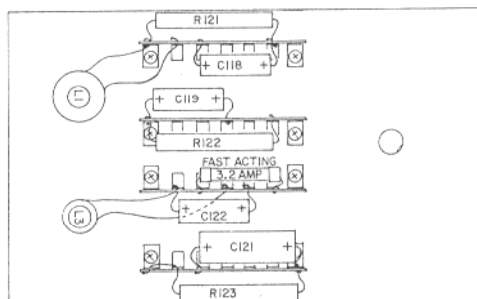
When the speaker system is first turned-on, transistor Q6 starts to conduct. As transistor Q6 starts conducting, capacitor C152 starts charging, delaying the turn-on of transistor Q5. As voltage develops across capacitor C152, transistor Q5 is biased to turn-on, delivering the proper DC voltage to the rest of the crossover board.

When the speaker system is turned-off, capacitor C150 starts to discharge to ground through resistor R151 and resistor R153. The voltage developed across these two resistors biases transistor Q6 on, until the capacitor (C150 has discharged. Capacitor C152 is discharged at the same time as capacitor C150, keeping transistor Q5 in conduction. When both capacitors have lost their charge, the transistors Q5 and Q6 turn-off, cutting off the DC voltage to the crossover.



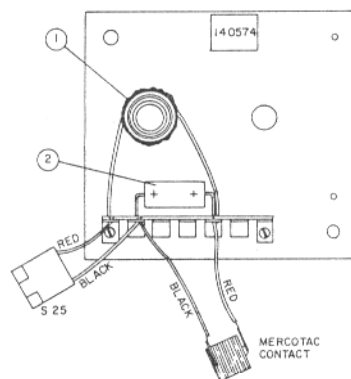
TREBLE RESPONSE CONTROL SWITCH Model 315 — 140533/Model 415, HL422 — 140709

Item	Description	Part No.
1	Plate, switch mounting (Mod. 315, black) (Mod. 415, HL422, brown)	140497 140740
2	Switch	138945
3	Cap, slide (Mod. 315) (Mod.415, HL422)	140558 140742



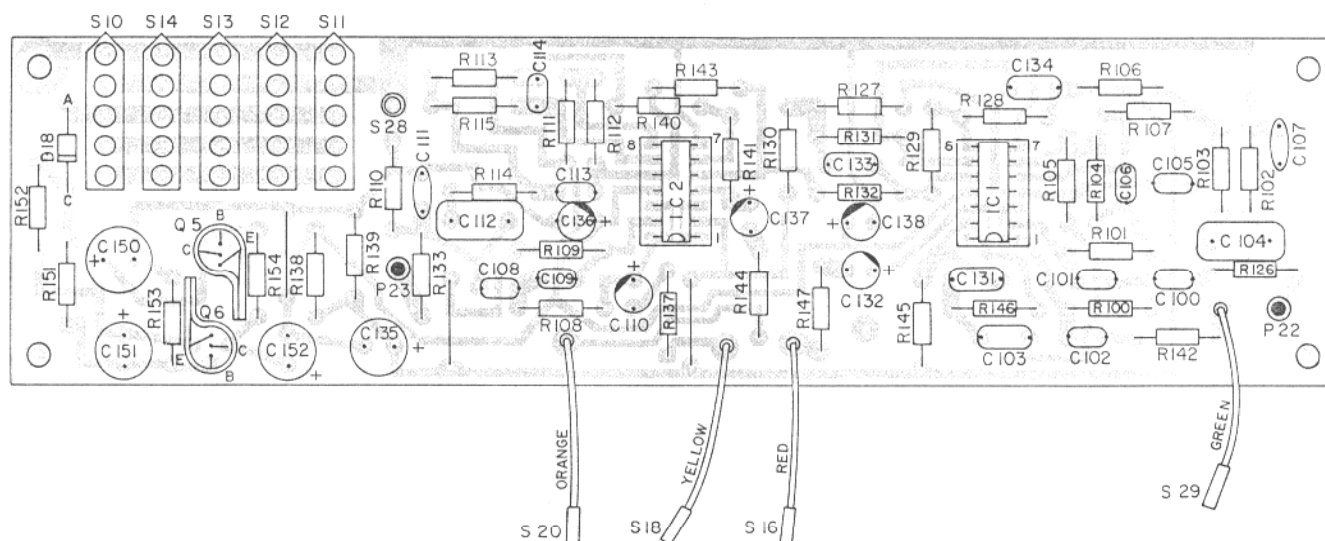
TREBLE RESPONSE CONTROL ASSEMBLY (141121)

Item	Description	Part No.
L1	Inductor, 1.6mH	138599
L3	Inductor, 0.4mH	139004
R121	Resistor, wire-wound, 2.2-ohm, 10W	110160
R122	Resistor, wire-wound, 8-ohm, 10W	010934
R123	Resistor, wire-wound, 2.2 ohm, 10W	110160
C118	Capacitor, non-polar, 12mF	133980
C119	Capacitor, non-polar, 12mF	133980
C121	Capacitor, non-polar, 39mF	134390
C122	Capacitor, non-polar, 12mF	133980
	Fuse, 3.2-amp, Fast Acting	141415



ROLL-OFF ASSEMBLY 140574

Item	Description	Part No.
1	Inductor Assembly, 2.2 mH (L2)	140520
2	Capacitor, 20mfd (non-polarized) (c120)	057679

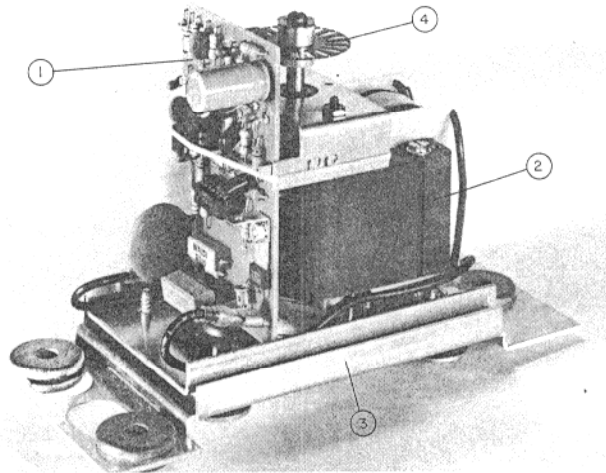


ELECTRONIC CROSSOVER CIRCUIT ASSEMBLY 141172

Item	Description	Part No.	Item	Description	Part No.
Capacitors					
C100,C101	mylar, .0068mfd, 10%	140451	R111	56K, ½W, 5%	137766
C102	mylar, .022mfd, 5%	137751	R112	36K, ½W, 5%	140548
C103	mylar, 0.1mfd, 10%	140504	R113	56K, ½W, 5%	137766
C104	mylar, 0.22mfd, 10%	140366	R114	36K, ½W, 5%	140548
C105,C106	mylar, .022mfd, 5%	137751	R115	22K, ½W, 5%	028365
C108			R126	1K, ½W, 5%	018044
C109	mylar, .022mfd, 5%	137751	R127	27K, ½W, 5%	021535
C110	tantalum, 10mfd, 16V	041707	R128	56K, ½W, 5%	137766
C111,C107	disc, .0047mfd, 1000V, 20%	028431	R129	33K, ½W, 5%	137767
C112	mylar, 0.22mfd, 10%	140366	R130	43K, ½W, 5%	140549
C113	mylar, .033mfd, 10%	140450	R131	16K, ½W, 5%	140546
C114	mylar, .033mfd, 10%	140450	R132	33K, ½W, 5%	137767
C131	mylar, 0.1mfd, 10%	140504	R133	1K, ½W, 5%	018044
C132	tantalum, 10mfd, 16V	041707	R137	100-ohm, ½W, 5%	137762
C133,C134	mylar, 0.1mfd, 10%	140504	R138,R139	6.8K, ½W, 5%	016501
C135	electrolytic, 47mfd, 35V	140826	R140	33K, ½W, 5%	137767
C136	tantalum, 1mfd, 35V	067538	R141	33K, ½W, 5%	137767
C137	tantalum, 10mfd, 16V	041707	R142	100-ohm, ½W, 5%	137762
C138	tantalum, 1mfd, 35V	067538	R143	33K, ½W, 5%	137767
C150	electrolytic, 220mfd, 35V	140827	R144	100-ohm, ½W, 5%	137762
C151	electrolytic, 500mfd, 6V	055483	R145	22K, ½W, 5%	028365
	(alternate value 470mfd, 6V)		R146	11K, ½W, 5%	140544
C152	electrolytic, 47mfd, 35V	140826	R147	100-ohm, ½W, 5%	137762
D18	DIODE, 1 amp, 100PIV	021154	R151	8.2K, ½W, 5%	131220
IC1, IC2	INTEGRATED CIRCUIT, TL075CN	140505	R152	1.8K, ½W, 5%	049676
			R153	100K, ½W, 5%	137765
			R154	1K, ½W, 5%	018044
Resistors					
R100	36K ½W, 5%	140548	Transistors		
R101	75K, ½W, 5%	140550	Q5	NPN, 2N4425	033563
R102	100K, ½W, 5%	137765	Q6	PNP, TZ554	033589
R103	27K, ½W, 5%	021535	Circuit Board, Etched		
R104	56K, ½W, 5%	137766	Connectors		
R105	33K, ½W, 5%	137767	S10,S11,S12		
R106	43K, ½W, 5%	140549	S13,S14	Housing, Socket, 5CKT	106970
R107	16K, ½W, 5%	140546	(not shown)	Contact, Socket Insert, Female	108660
R108	24K, ½W, 5%	140547	S28	Contact, Female, PCB	023549
R109	47K, ½W, 5%	063677	P22	Contact, Male, PCB	023531
R110	100K, ½W, 5%	137765	P23	Contact, Male, PCB	023531

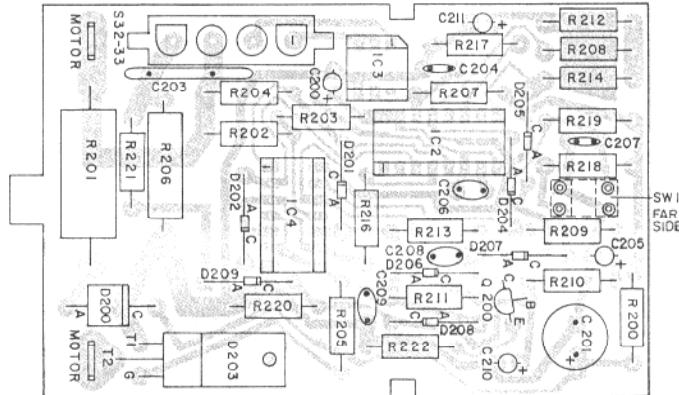
LESIE SPEAKER
315, 415, HL422

UPPER & LOWER MOTOR ASSEMBLY 141294



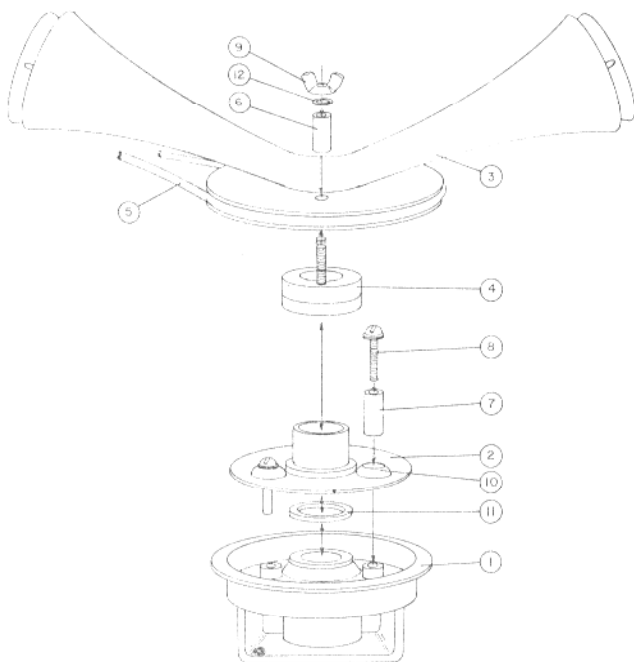
Item	Description	Part No.
1	Circuit Board Assembly Bracket Assembly (only) 141408	141284
2	Motor, AA-12, 117V, 50/60 Hz	141105
3	Pulley, 50/60 Hz (underneath)	140947
4	Shutter Wheel Bracket (only) 141211	141341

If a problem develops in the Circuit Board (141284) it is recommended that the entire assembly be replaced.



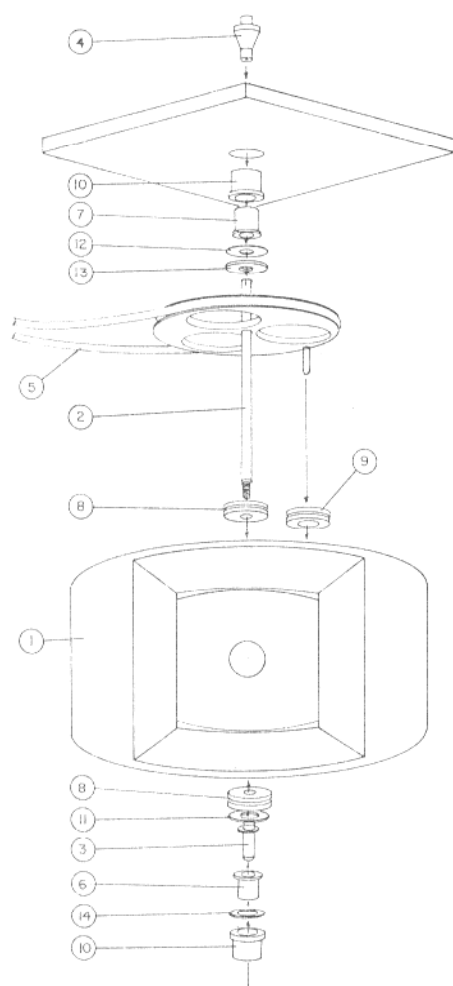
CIRCUIT BOARD ASSEMBLY 141284

Item	Description	Part No.	
	Circuit Board, Etched	141198	Q200 Transistor, SPS, 7535 026237
IC2	Socket IC 16 Contact	141204	R200,R218 Resistor, 330-ohm, .5W, 5% 137763
IC3	Socket IC 6 Contact	141205	R201 Resistor, ww, 2.2k, 3W, 10% 141283
IC4	Socket IC 14 Contact	140365	R202,R204, R217 Resistor, 220k, .5W, 5% 020222
SW1	Switch Optical - Optron	141200	R203,R216,R222, R209 Resistor, 100k, .5W, 5% 137765
C200,C205,C210,			R205 Resistor, 470-ohm, .5W, 5% 028068
C211	Capacitor, tantalum, IMF 35V	067538	R206 Resistor, ww, 1-ohm, 2W, 5% 141223
C201	Capacitor, electrolytic 220/35	140827	R207,R219 Resistor, 15k, .5W, 5% 131210
C203	Capacitor, disc .01mf, 1.4kV, 20%	111600	R208,R213,R214, R220 Resistor, 1 meg, .5W, 5% 137764
C204,C207	Capacitor, disc 33PF, 1kV, 10%	118030	R210,R211, R221 Resistor, 470k, .5W, 5% 018002
C206,C208,			R212 Resistor, 180k, .5W, 5% 059270
C209	Capacitor, mylar, .022-100V, 5%	137751	S32,S33 Housing Socket, 4CKT, Nat Amp Un 141215
D200	Diode, SIL, 400PIV, 1A	025056	
D201,D202,D204,D205,D206,D207,D208,			
D209	Diode, SIL, 30PIV, 500MW	041616	
D203	Triac, sensitive gate	141222	



HORN ROTOR ASSEMBLY

Item	Description	Part No.
1	Speaker, treble driver	140491
2	Spindle Assembly	137804
3	Horn with pulley assembly	141155
4	Hub Assembly	141297
5	Belt, drive	141182
6	Bushing, .144ID x .75	020941
7	Bushing, .144ID x .813	050294
8	Screw, M, 6-32 x 1 1/8 RH with lock washer	016832
9	Wing nut, 6-32	141203
10	Grommet, neoprene	050211
11	Washer, neoprene	050286
12	Washer, internal, lock, #6	028993



ROTONSONIC DRUM ASSEMBLY

Item	Description	Part No.
1	Drum, with 6x9 speaker	140904
2	Shaft and pulley	141295
3	Shaft extension	137836
4	Rotary connector (Mercotac)	015941
5	Belt, 4mm x 810mm	141182
6	Bearing, closed end	137264
7	Bearing, open end	141157
8	Grommet, neoprene, 1/4 ID	141102
9	Grommet, neoprene, 1/2 ID	051326
10	Grommet, shoulder	137255
11	Washer, FW, 5/16 x 3/4 x 1/32	026724
12	Washer, shim, .254ID x .75OD	141103
13	Washer, neoprene, .265ID x .745OD	141104
14	Washer, shim, /46ID x .75OD	141159

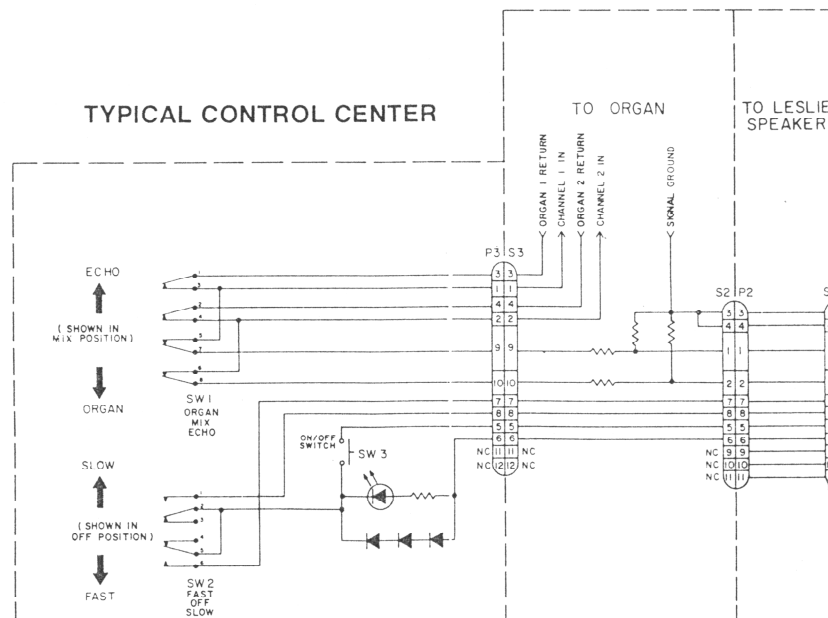
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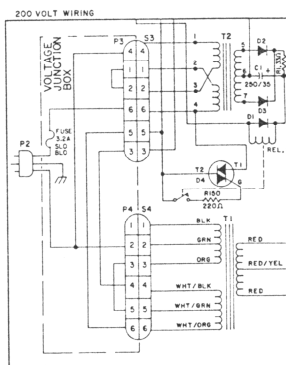
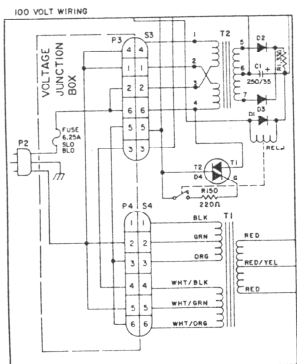
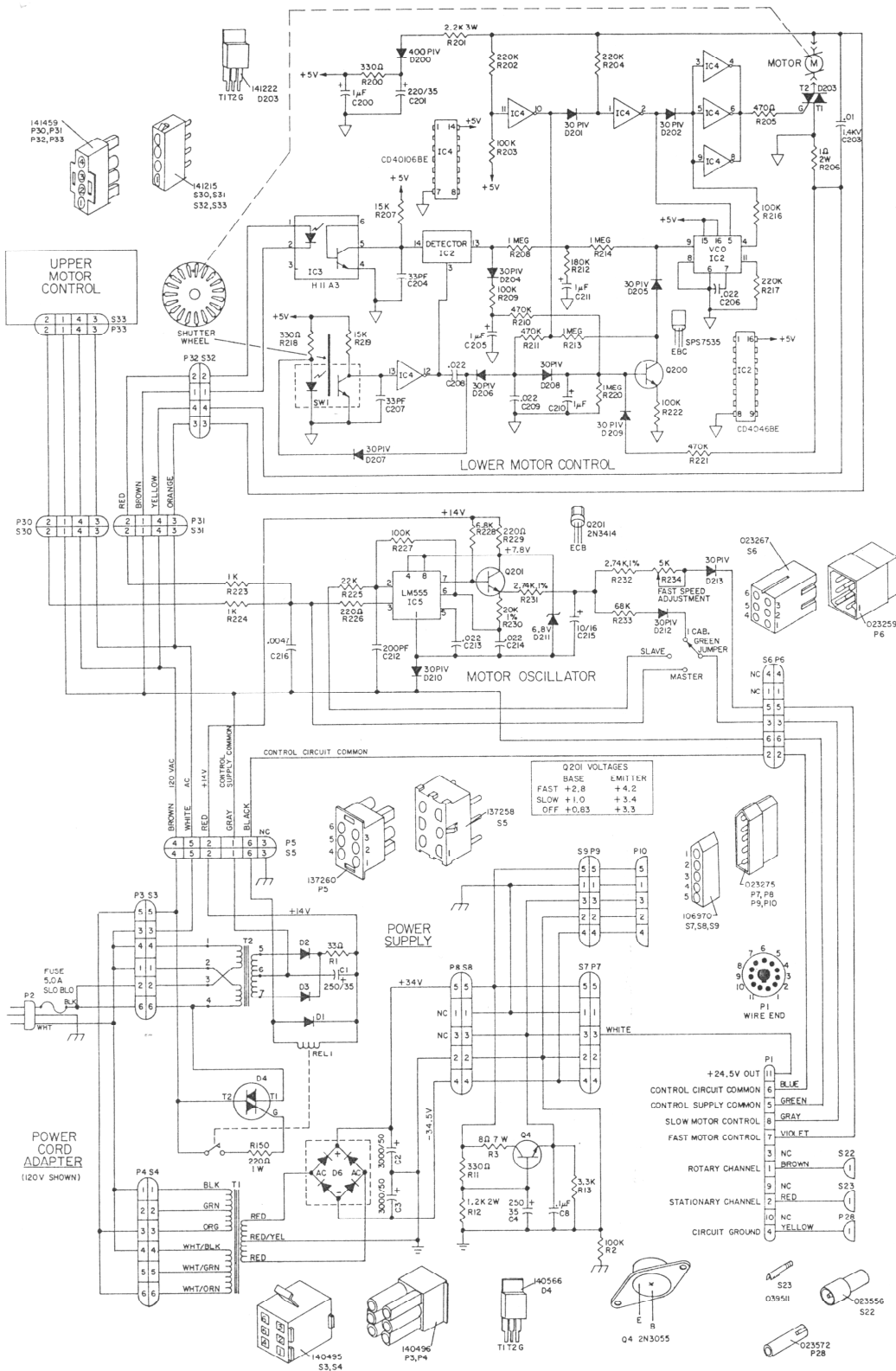
Electro Music/CBS Musical Instruments, A Division of CBS Inc. 56 W. Del Mar Blvd., Pasadena, Calif. 91105

NOTES:

1. AC LINE VOLTAGE TO BE AS INDICATED ON CABINET SERIAL PLATE, WITH PINS 5 & 6 OF P1 CONNECTED TOGETHER TO APPLY POWER.
2. VOLTAGES ARE REFERENCED TO EACH RESPECTIVE CIRCUIT COMMON.
3. DC VOLTAGES MEASURED WITH NO SIGNAL USING A 10 MEGOHM INPUT IMPEDANCE METER.
4. AC VOLTAGES MEASURED WITH LEVEL CONTROLS AT MAXIMUM USING FREQUENCIES INDICATED ON SCHEMATIC; READINGS TAKEN USING H.P. 10 MEGOHM INPUT IMPEDANCE METER.
5. ALL RESISTORS ARE 1/2 WATT, 5% UNLESS OTHERWISE NOTED.

6. SYMBOLS:
- | | |
|---|----------------|
|  | CIRCUIT GROUND |
|  | CIRCUIT COMMON |
|  | CHASSIS GROUND |





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	CIRCUIT GROUND
	CIRCUIT COMMON
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