Technical Manual

The Harman-Kardon Festival 1 AM-FM Stereo Control Center

The Harman-Kardon Festival 2 AM-FM Stereo Control Center with Cassette Recorder

harman kardon

90727206

DISASSEMBLY INSTRUCTIONS

TO REMOVE TOP HOUSING

1. Remove (5) hex hd. screws that hold top housing to the *rear* panel.
2. Remove (4) ph. hd. screws that hold top housing to bottom housing (located in the 4 round holes under the bottom housing).
3. Gently pull upward on front skirt of top housing until adhesive tape and top tabs disengage from escutcheon.
4. Pull top housing straight up until disengaged from rear panel and escutcheon.

NOTE: It will be easier to remove top housing if the turntable is removed first.

TO REMOVE TURNTABLE

1. Remove line cord from wall outlet.
2. Remove caution cover plate from rear panel, (held by 2 hex hd. screws) that covers an access hole to rear transit screw on turntable.
3. Screw rear turntable transit screw as far down as it will go.
4. Reach into access hole until horizontal turntable clip is felt. Push this clip upward until it snaps into a vertical position.
5. Tilt turntable upward from rear until rear transit screw is clear of top.
6. Turntable can now be removed by sliding it toward the rear of the cabinet until front transit screw comes thru slotted transit hole in housing, and lifting upward.

SERVICING ESCUTCHEON COMPONENTS

1. Certain mechanical components can not be removed and replaced without removing the escutcheon insert. The insert is removed by doing the following:
   A) Remove all knobs except function switch knob.
   B) Gently pry insert upward in different areas until it is free of adhesive tape holding it down. (Avoid touching this tape so that it will still retain its holding power when re-assembling to escutcheon).
2. With the insert removed, the screws that hold the slide switch assembly are accessible. The hex nut holding the record level control (festival 2) is also accessible.
3. All other components can be removed and replaced without removing the insert, but the escutcheon assembly has to be disassembled from the bottom housing.

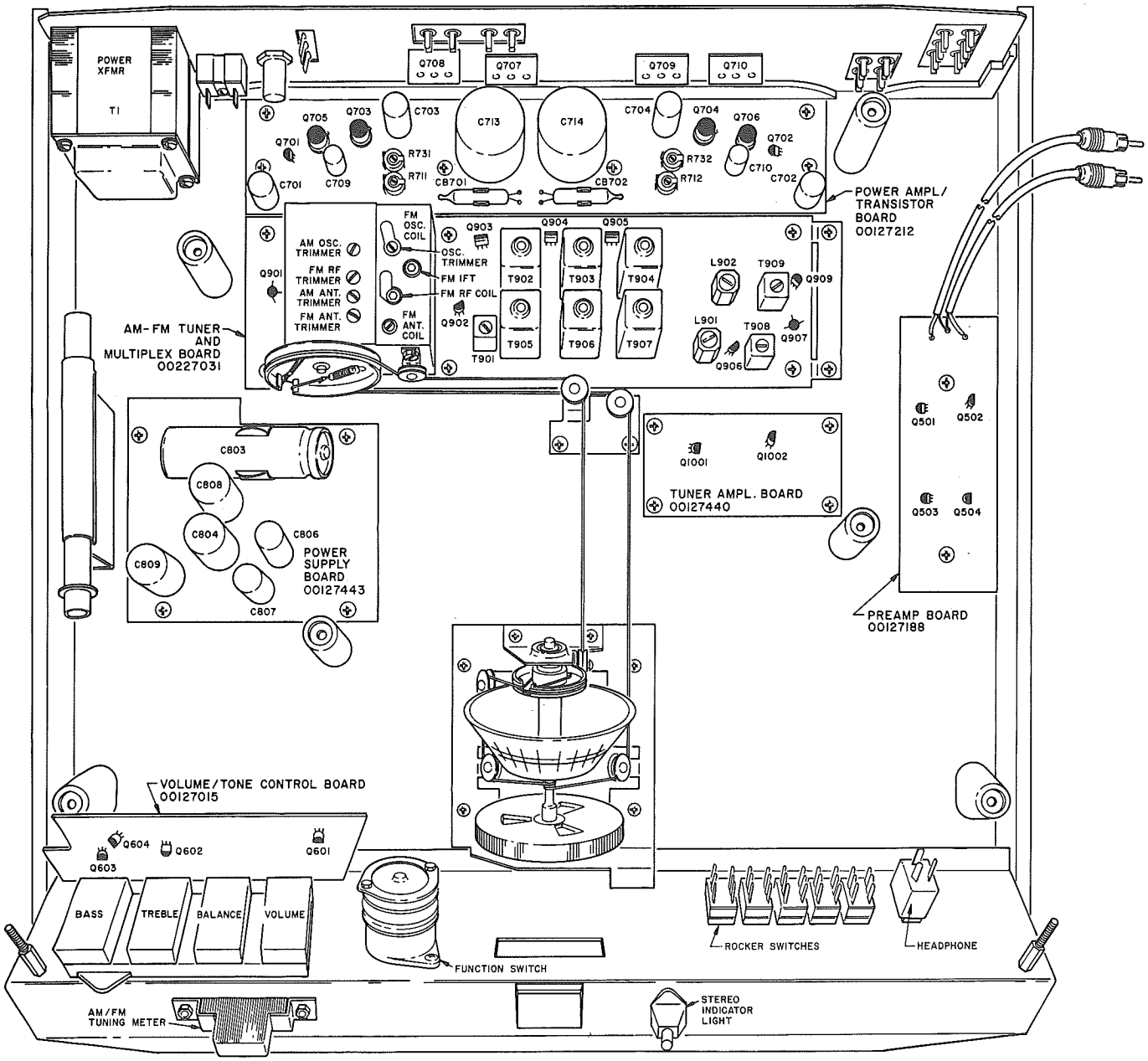
REMOVING THE ESCUTCHEON ASSY

1. The top housing should be removed first as per previous instructions.
2. There are two hex nuts that hold the escutcheon assy to the housing. They are located in access holes in the bottom of the housing. After these nuts are removed the escutcheon assy can be tipped backward until the front skirt is free of the front slot in the housing. It can now be lifted off the support bosses.

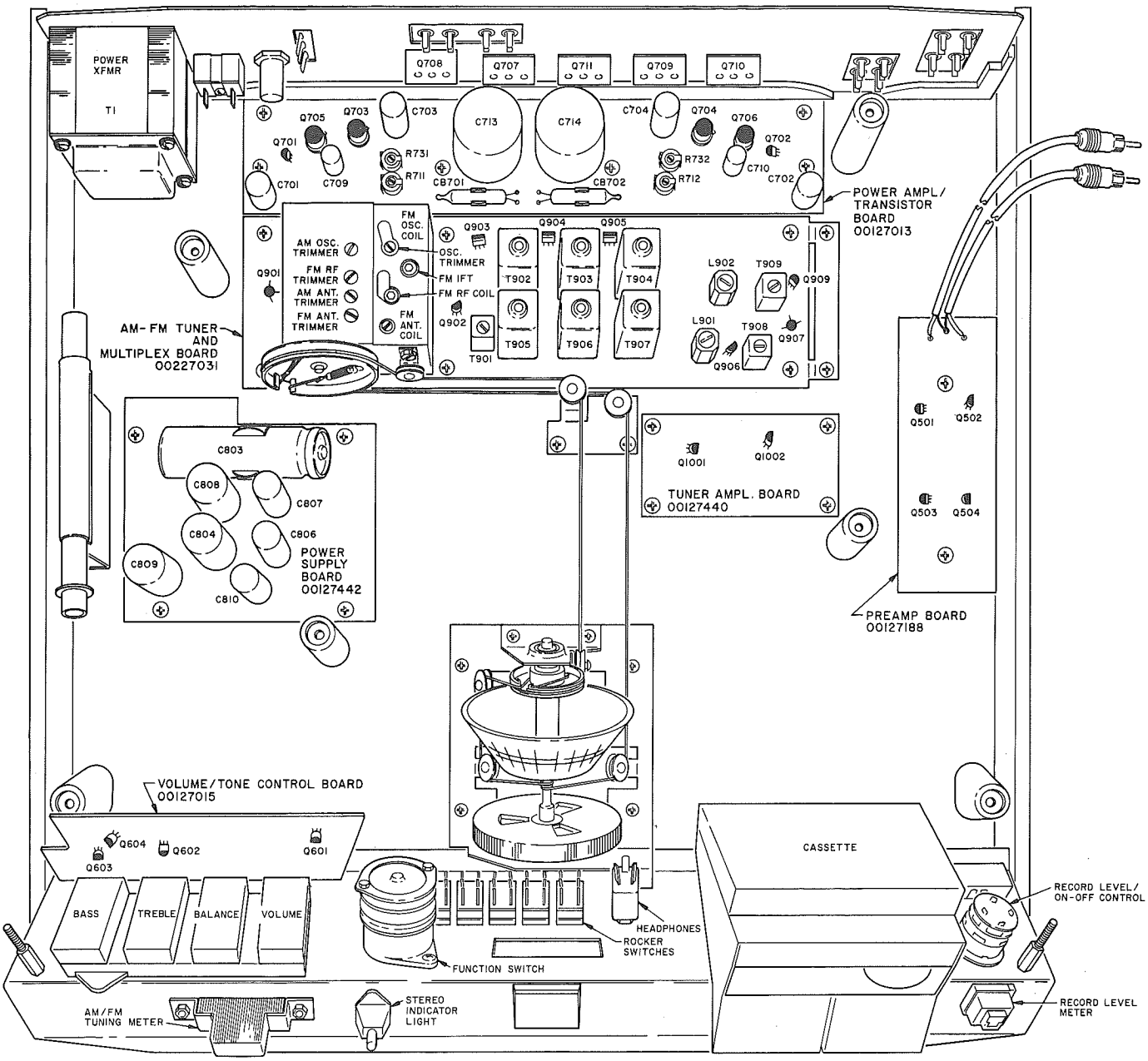
CAUTION: This panel is connected to the main unit by wires and cables -- do not break connections.

When re-assembling be sure all wires are free and cannot be pinched.

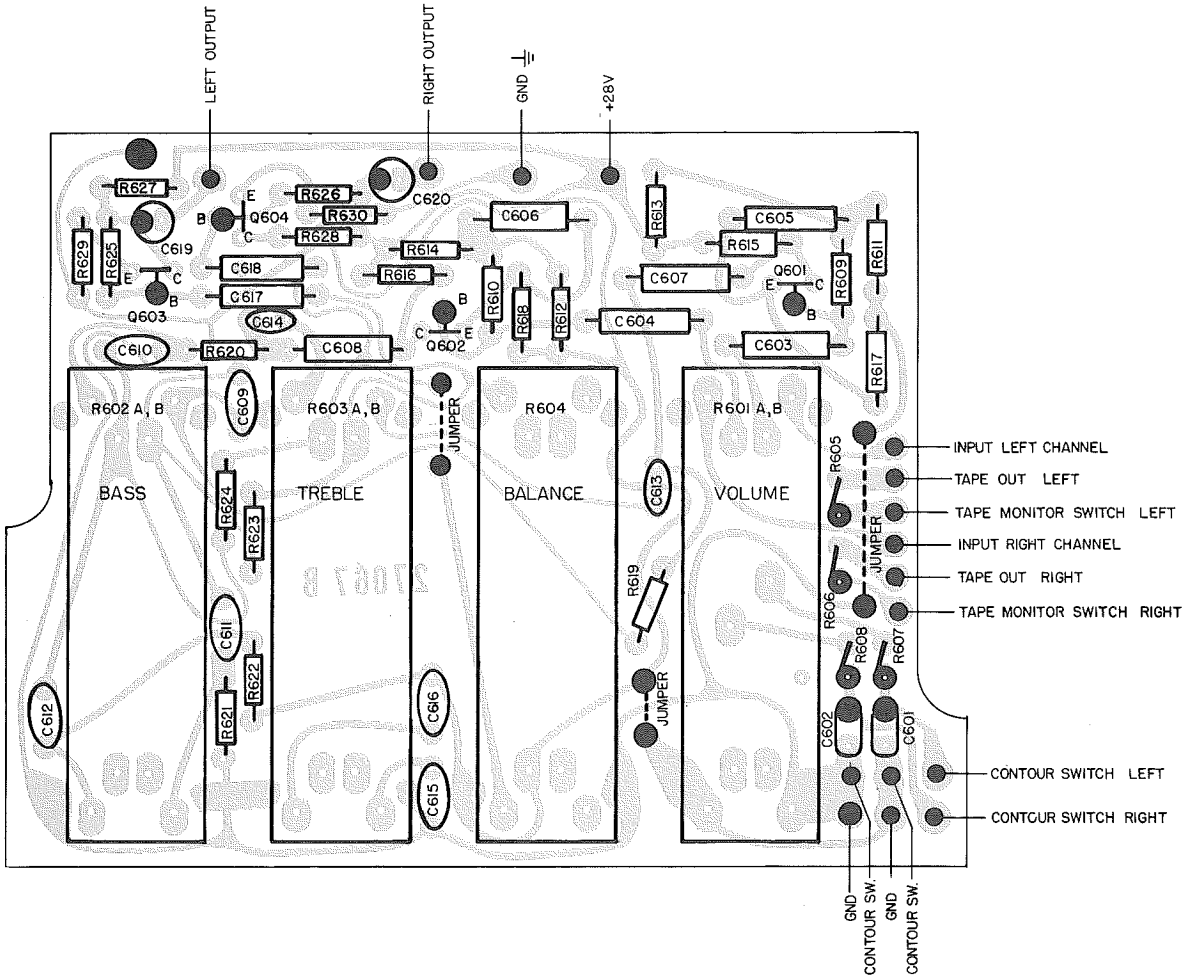
CHASSIS LAYOUT — FESTIVAL 1



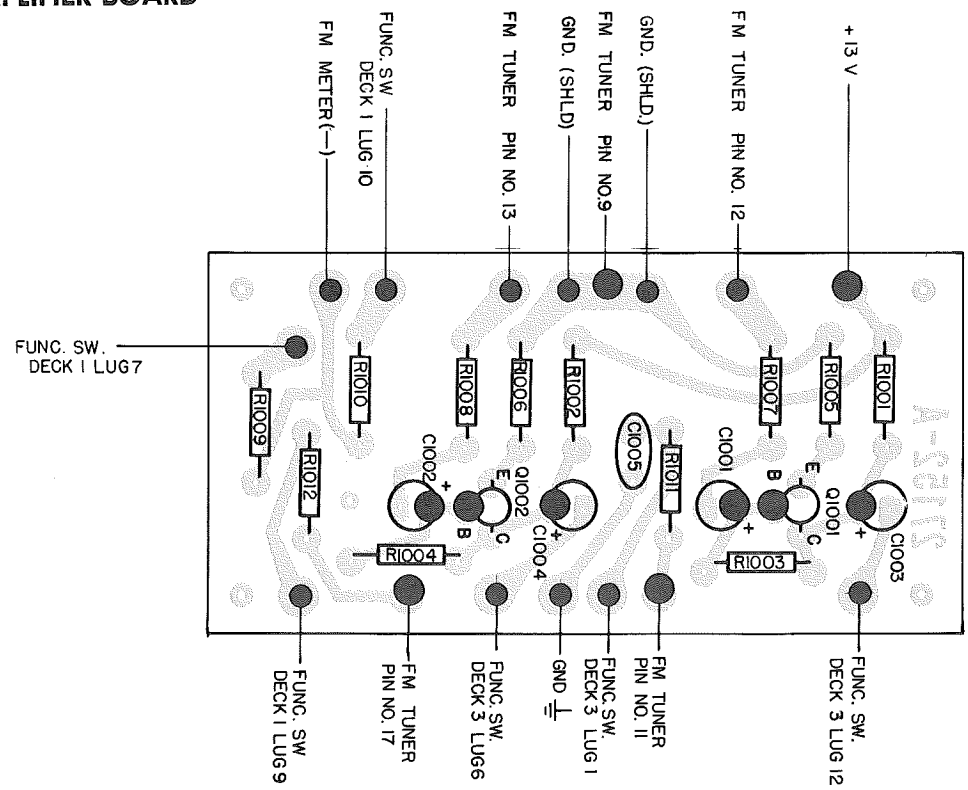
CHASSIS LAYOUT — FESTIVAL 2



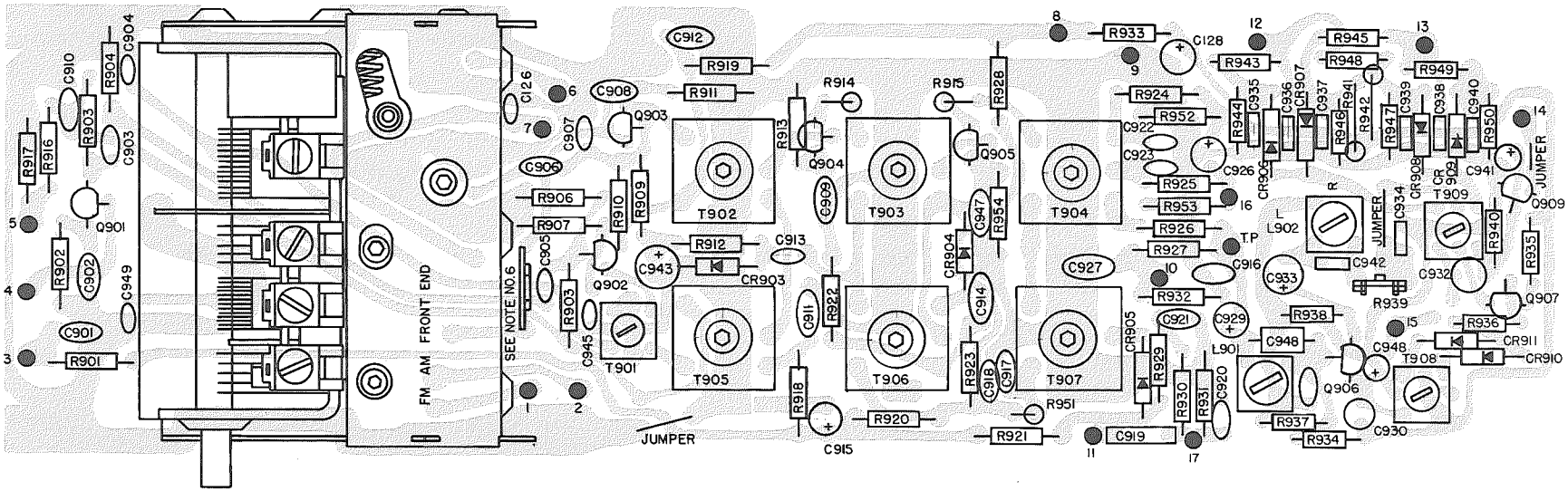
VOLUME — TONE CONTROL PC BOARD



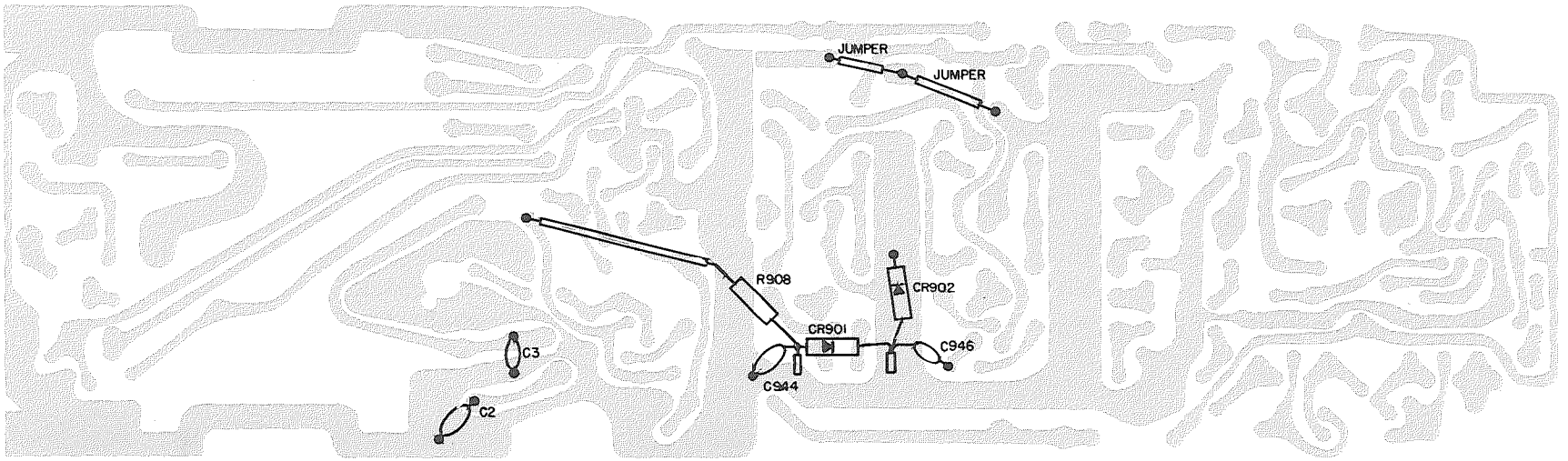
TUNER AMPLIFIER BOARD



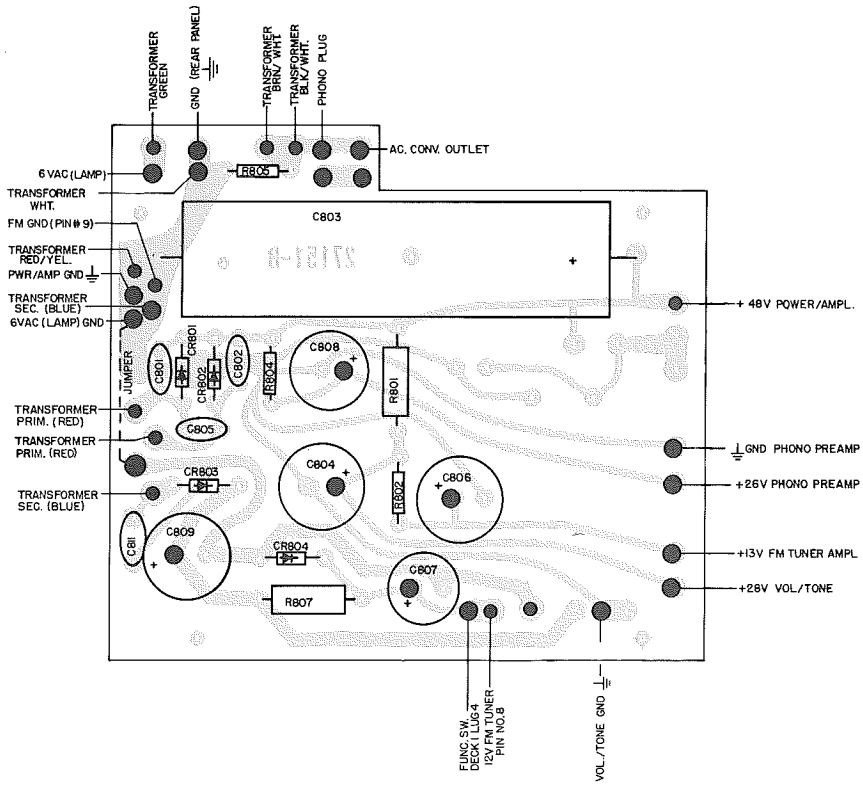
COMPOSITE TUNER PC BOARD (TOP)



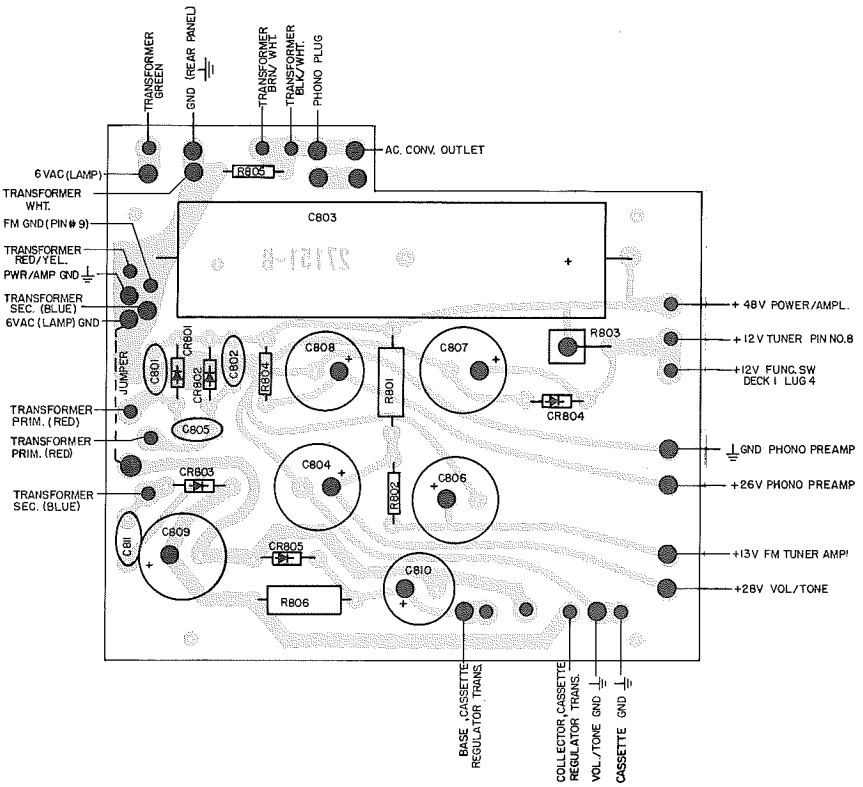
COMPOSITE TUNER PC BOARD (BOTTOM)



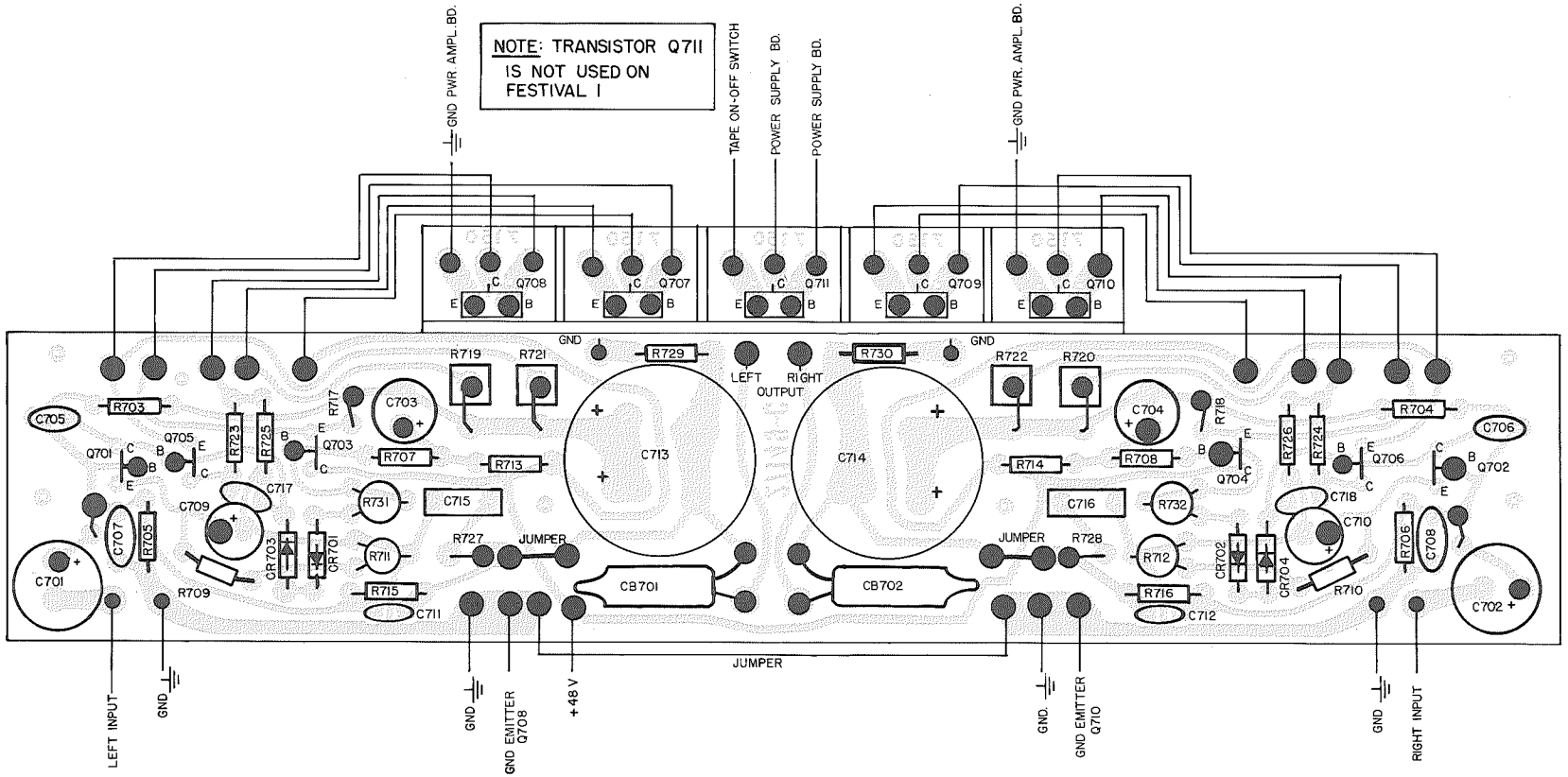
POWER SUPPLY PC BOARD — FESTIVAL 1



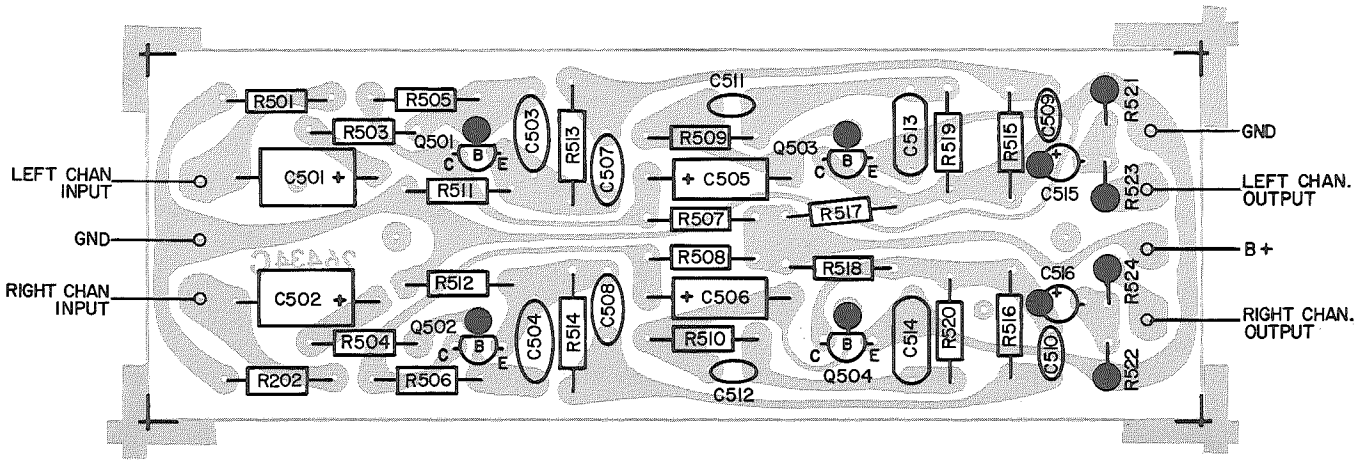
POWER SUPPLY PC BOARD — FESTIVAL 2



POWER AMPLIFIER/OUTPUT TRANSISTOR PC BOARD



PHONO PREAMP PC BOARD



ALIGNMENT PROCEDURES

ALIGNMENT PROCEDURES

Do not attempt alignment unless the following equipment is available.

EQUIPMENT DESCRIPTION

1. FM Signal Generator
2. Oscilloscope
3. AC VTVM
4. Audio Generator
5. Multiplex Stereo Generator
6. AM Signal Generator

RF AND IF ALIGNMENT

Function Selector in FM STEREO

STEP	CONNECT SIGNAL GENERATOR	GENERATOR FREQUENCY	DIAL SETTING	OUTPUT INDICATOR	ADJUST	ADJUST FOR	NOTES
1	Connect Generator Through a Dummy Antenna 120 Ohm Resistor On The Hot Side & a 150 Ohm Res. On The Ground Side To The Antenna Terminals.	90 MHZ 400 CPS MOD 75 KHZ Deviation	90 MHZ	Scope at Tape Output Jack	T101 – Antenna Coil L102 – RF Coil T102 – 1st IF Primary & Sec. T902 – 2nd IF T906 – 3rd IF Primary & Sec.	Maximum Output at Tape Output Jack	Use Lowest RF Input for Usable Indication
2	Same as Above	106 MHZ 400 CPS MOD 75 KHZ Deviation	106 MHZ	Same as Above	C101 – Antenna Trimmer C110 – RF Trimmer		Maintain low enough Input
3	Same as Above	106 MHZ 400 CPS MOD 75 KHZ Deviation	106 MHZ	Same as Above	C107 – OSC. Trimmer Adjust ONLY if Calibration Error is Noted	Generator Freq. and Dial Setting to be the same. Adjust C107 @ 106 MHZ and L103 @ 90 MHZ for correct Dial Calibration. Adjust L103 by Squeezing or Expanding.	At this point, the Gen. Freq. & the Dial Setting should be the same. If a difference is noted adjust C107 @ 106 MHZ and L103 @ 90 MHZ until Dial Calibration & Gen. Freq. agree.
		90 MHZ 400 CPS MOD 75 KHZ Deviation	90 MHZ		L103 – OSC. Coil		
4	Same as Above	No Signal Input	Tune to Noise Either Extreme of the Band.	Tuning Meter on Front Panel	T904 Ratio Detector	With Secondary (Top Slug) Detuned Counterclockwise, adjust Primary Slug for Maximum Tuning Meter Deflection.	After Primary (Bottom Slug) is adjusted for max. Meter Deflection, Retune Secondary Slug and Adjust for Zero Center on Tuning Meter

MULTIPLEX ALIGNMENT PROCEDURE

Function Selector in FM STEREO

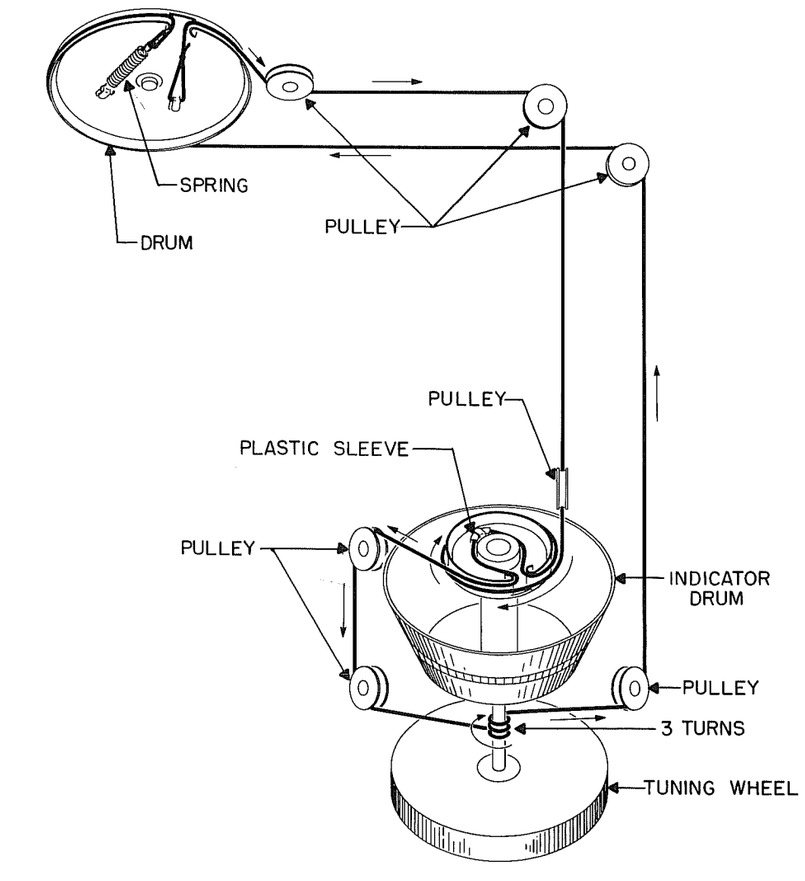
STEP	CONNECT SIGNAL GENERATOR	GENERATOR FREQUENCY	DIAL SETTING	OUTPUT INDICATOR	ADJUST	ADJUST FOR	NOTES
1	Junction of R927, C929	Audio Generator 67 KHZ		AC VTVM at junction of C934 & R939	L901 L902	Minimum	FM Mode
2	Antenna Terminals through dummy Resistor		100 MHZ Modulated 100% by Stereo MPX Generator	Scope at 38 KHZ Transformer Secondary Junction of T909 & CR907	19 KHZ Coil, T908	Maximum Amplitude on Scope	Stereo Indicator should be lit after this adjustment.
3	Same as Above	Same as Above	Same as Above	Scope at Tape Output Jack, Minimum Channel	38 KHZ Transformer T909 & R939	Minimum in Unmodulated Channel	Maximum separation should now be achieved between channels.

AM ALIGNMENT PROCEDURE

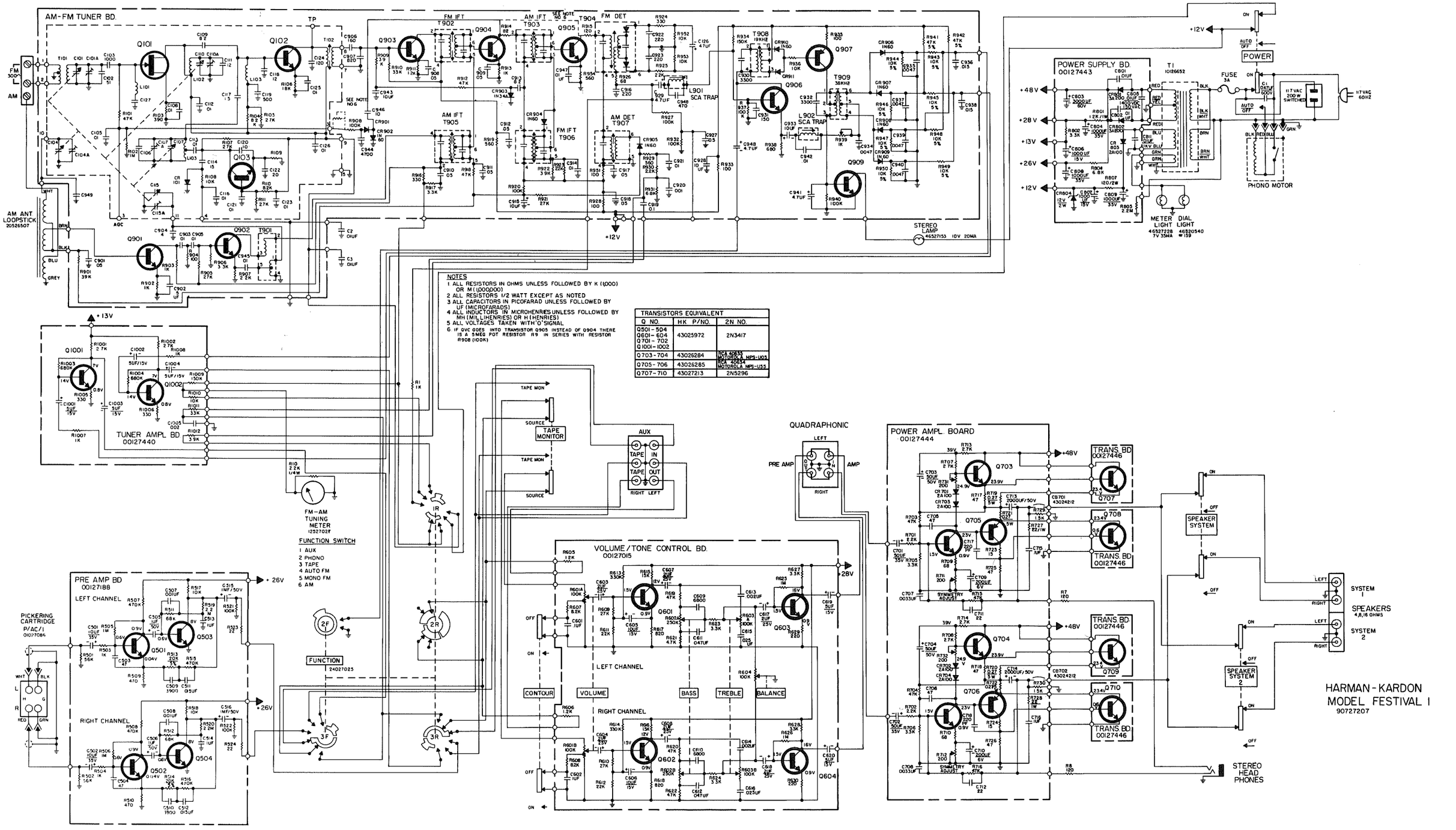
STEP	DIAL SETTING	GENERATOR	INDICATOR	ADJUST	ADJUST FOR
1	Quiet point in band	455 KHz 400 Hz Modulation	Scope at Tape Out	T905 (1st IF) T903 (2nd IF) T907 (3rd IF)	Maximum
2	600 KHz	600 KHz 400 Hz Modulation	Scope at Tape Out	T901 (Osc. Coil)	Maximum
3	600 KHz	600 KHz 400 Hz Modulation	Scope at Tape Out	Loopstick Ring	Maximum
4	1400 KHz	1400 KHz 400 Hz Modulation	Scope at Tape Out	C115 (Osc. Trimmer)	Maximum
5	1400 KHz	1400 KHz 400 Hz Modulation	Scope at Tape Out	C104 (Ant. Trimmer)	Maximum
6	Repeat	Steps 3 & 5	Scope at Tape Out		

a) All frequencies 30% modulated.
b) Couple signal loosely by means of one turn loop on generator cable.
c) Use lowest signal for usable indication.

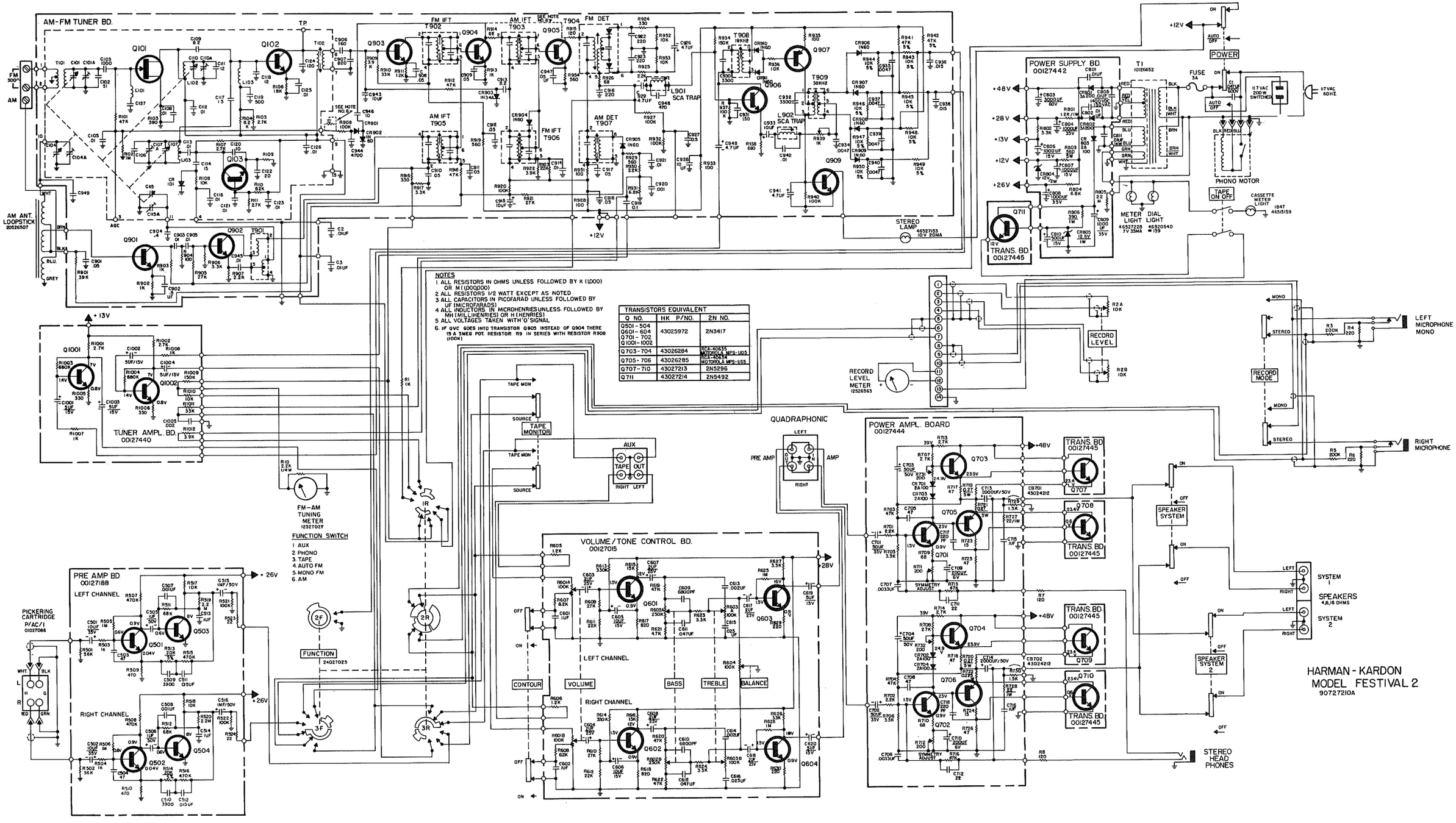
STRINGING DIAGRAM



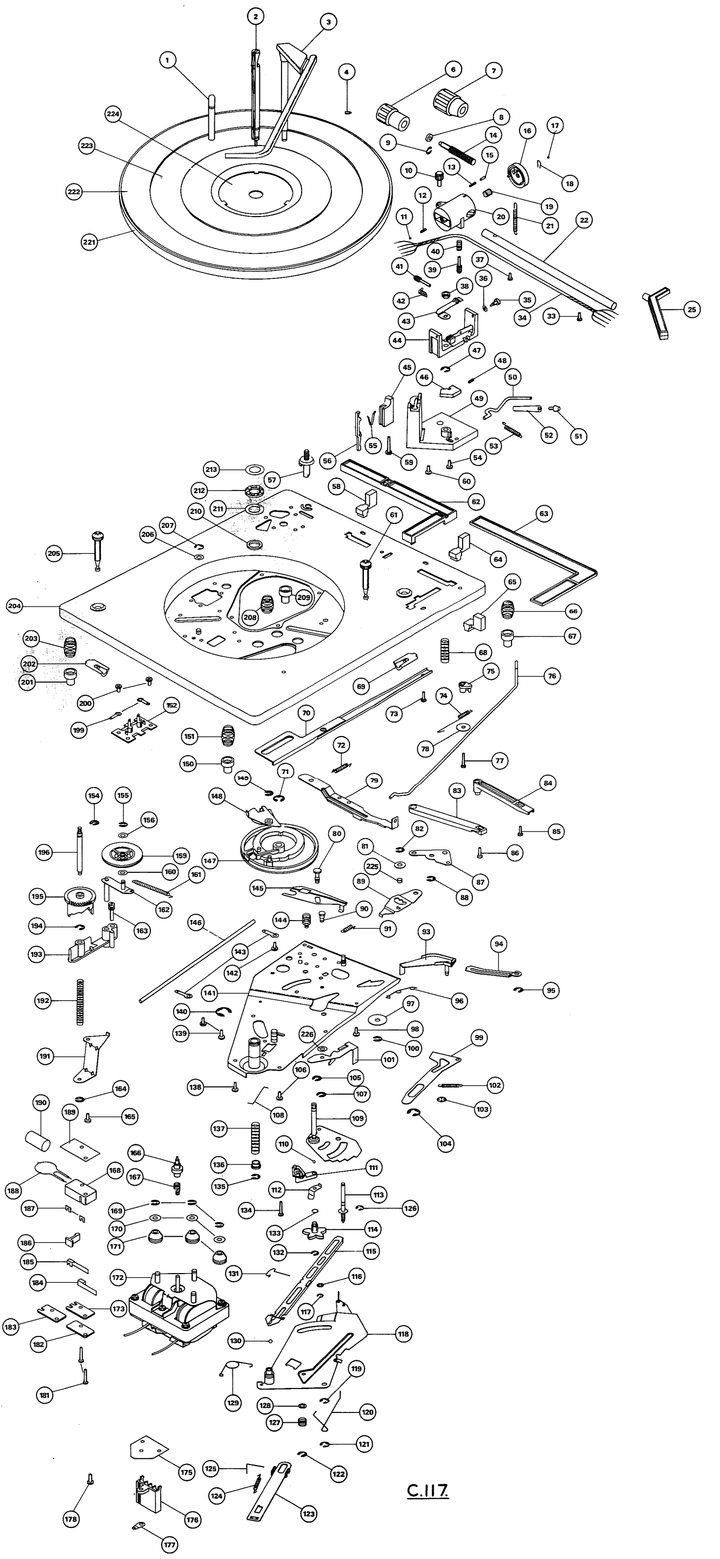
SCHEMATIC — FESTIVAL I



SCHEMATIC — FESTIVAL 2



EXPLODED VIEW — CHANGER



C.117.

1	A.106174	Stub Spindle
2	A.107043	Centre Spindle Ass'y
3	B.108086	Control Arm Ass'y
4	A.106746	4 B.A. x 1/8" Grub Screw
6	A.107090	P.U. Balance Weight
7	A.107091	Ring Weight
8	A.106182	Friction Washer
9	A.100785	Circlip
10	A.106158	Weight Clamping Screw
11	A.106500	1/16" Dia. Ball Bearing
12	A.106394	P.U. Pivot Spring
13	A.106394	P.U. Pivot Spring
14	A.107092	Weight Adjusting Screw
15	A.106126	Detent Peg
16	A.106199	Pressure Wheel Ass'y
17	A.106500	1/16" Dia. Ball Bearing
18	A.106399	Retaining Spring
19	A.106576	Collar Spring
20	B.106123	P.U. Body
21	A.107804	P.U. Pressure Spring
22	B.107093	P.U. Tube
25		'Customer Designed' Head
33	A.107654	Screw Type 125-4-24x1/4" Pan. Hd. Rec.
34	1-54	23" of Quin. P.U. Lead
35	A.106159	P.U. Pivot Screw
36	A.106504	6 B.A. External Lockwasher
37	A.106502	Screw Type 25-4-24 x 3/16" Rec. Pan. Hd.
38	A.106503	2 B.A. Half Nut
39	A.106153	Height Adjusting Screw
40	A.100807	Spring
41	A.106156	Position Adjusting Screw
42	A.106395	P.U. Hinge Spring
43	A.106133	P.U. Adjuster
44	A.106195	P.U. Hinge Ass'y
45	A.106114	P.U. Rest
46	A.106120	Raising Pad
47	A.102109	Circlip
48	A.106505	6 B.A. x 1/8" Grub Screw
49	C.106138	Control Housing
50	A.106474	Raising Arm
51	A.106472	Cap
52	A.106471	Knob
53	A.106473	Spring
54	A.106510	Screw Type Z No. 6 x 1/4" B. Hd.
55	A.106173	P.U. Rest Spring
56	A.106116	P.U. Clip
57	B.106904	Anti-Skate Control Knob Ass'y
58	B.106122	Knob
59	A.106507	Screw Type 25-6-20 x 3/4" B. Hd.
60	A.106510	Screw Type Z No. 6 x 1/4" B. Hd.
61	A.104189	Transit Screw
62	C.106667	Control Cover
63	B.106661	Escutcheon
64	B.106122	Knob
65	B.106122	Knob
66	A.106090	Unit Mounting Spring
67	A.106089	Spring Cup
68	A.106813	Spring (Anti-Skate Co[illegible]
69	A.102166	Retaining Clip
70	B.108113	Speed Change Slide Ass'y
71	A.102110	Circlip
72	A.105826	Spring (Switch Lever)
73	A.105267	Screw Type 25-4-24 x 5/16" B. Hd.
74	A.106812	Spring (Anti-Skate)
75	B.106815	Spring Anchor
76	B.106405	Switch Link
77	A.107863	Screw Type 25-4-24 x 5/16" B. Hd.
78	A.106816	Washer
79	A.106129	Switch Lever
80	A.108064	Slide Pin
81	A.101646	Washer
82	A.102109	Circlip
83	B.106119	Reject Slide
84	B.106143	Selector Slide
85	A.105267	Screw Type 25-4-24 x 5/16"
86	A.105267	Screw Type 25-4-24 x 5/16"
87	A.106193	Reject Plate Ass'y
88	A.102109	Circlip
89	A.108033	Detent Plate
90	A.108062	Selector Pivot
91	A.108075	Spring (Detent Plate)
93	A.108283	Reject Lever Ass'y
94	A.106134	Reject Link
95	A.102109	Circlip
96	A.106627	Spring (Detent)
97	A.105660	Control Washer
98	A.106510	Screw Type Z No. 6 x 1/4" B. Hd.
99	B.105592	Cut-Off Lever
100	A.100762	Circlip
101	B.108036	Selector Lever
102	A.102623	Spring (Cut-Off Lever)
103	A.102251	Retainer
104	A.101526	Circlip
105	A.102128	Circlip
106	A.106510	Screw Type Z No. 6 x 1/4" B. Hd.
107	A.102128	Circlip
108	A.104882	Retaining Clip
109	B.108085	Quadrant Ass'y
110	A.107154	Ball Bearing 3/32" Dia.
111	A.106965	Support Bracket
112	A.107004	Support Spring
113	A.108297	P.U. Raising Spindle Ass'y
114	B.108073	Toggle Wheel
115	B.106962	Actuating Slide
116	A.106966	Washer
117	A.104077	Circlip
118	B.108298	Operating Plate Ass'y
119	A.102109	Circlip
120	A.108078	Spring (Selector Drive)
121	A.102109	Circlip
122	A.100785	Circlip
123	B.105597	Feed Lever Link
124	A.105827	Spring (Link Return)
125	A.106968	Spring (Feed Lever Link)
126	A.108334	Circlip
127	A.108077	Spring
128	A.103290	Washer
129	A.106980	Spring (Operating Plate)
130	A.107419	3/64" Dia. Ball Bearing
131	A.105901	Actuating Slide Spring
132	A.100762	Circlip
133	A.108654	Spring Clip
134	A.106512	Screw Type 25-4-24 x 5/8" B. Hd.
135	A.102109	Circlip
136	A.104861	Spacer
137	A.105985	Spring (Control Spindle)
138	A.106510	Screw Type Z No. 6 x 1/4" B. Hd.
139	A.106510	Screw Type Z No. 6 x 1/4" B. Hd.
140	A.105678	Circlip
141	C.108104	Main Sub Plate Riveting Ass'y
142	A.106510	Screw Type Z No. 6 x 1/4" B Hd.
143	A.102126	Solder Tag
144	A.108083	Spring (Cut-Off Slide)
145	A.108034	Cut-Off Slide
146	A.108401	7" 3MM P.V.C. Sleeving
147	A.102133	Cam Gear Riveting Ass'y
148	A.106819	Actuating Pawl Ass'y
149	A.100462	Circlip
150	A.106089	Spring Cup
151	A.106090	Unit Mounting Spring
152	A.102616	Phono Socket
154	A.102128	Circlip
155	A.100762	Circlip
156	A.101620	J.P. Spindle Washer
159	A.101623	Jockey Pulley Ass'y
160	A.101620	J.P. Spindle Washer
161	A.105824	Spring (Jockey Pulley)
162	A.105965	Jockey Arm Riveting Ass'y
163	A.105619	Adjusting Screw
164	A.102128	Circlip
165	A.106510	Screw Type Z No. 6 x 1/4" B. Hd.
166	A.106714	Motor Pulley 50 C.
166	A.106715	Motor Pulley 60 C.
167	A.104765	Drive Spring
168	B.108181	Switch Body
169	A.100762	Circlip
170	A.101646	Motor Mounting Washer
171	A.102181	Rubber Mounting
172	FP10/4	F.P.10 Motor Ass'y (See List Below)
173	A.108184	Switch Cover
175	A.104865	Insulating Strip
176	A.103096	Amp Plug Housing
177	A.106749	4 B.A. Tag Lockwasher
178	A.105263	Screw Type 25-6-20 x 3/8" B. Hd.
181	A.107418	Screw Type 25-4-24 x 3/4" B. Hd.
182	A.108182	Switch Cover
183	A.108183	Switch Cover
184	A.200444	Contact (Domed)
185	A.200445	Contact (Flat)
186	A.200450	Switch Dolly
187	A.200446	Solder Tag
188	A.106970	Capacitor
189	A.106015	Retaining Strip
190	A.107148	Insulating Sleeve
191	A.106034	Speed Change Bracket
192	A.105831	Spring (Raising Spindle)
193	A.107429	Speed Change Arm Ass'y
194	A.102109	Circlip
195	B.106113	Raising Cam
196	A.108589	Raising Spindle
199	A.102352	Solder Tag
200	A.106510	Screw Type Z, No. 6 x 1/4" B. Hd.
201	A.106089	Spring Cup
202	A.102166	Retaining Clip
203	A.106090	Unit Mounting Spring
204	B.106190	Mainplate Sub Ass'y
205	A.104189	Transit Screw
206	A.102595	Washer
207	A.102109	Circlip
208	A.106090	Unit Mounting Spring
209	A.106089	Spring Cup
210	A.102058	Damping Washer
211	A.101506	Thrust Washer
212	A.101649	Ballrace
213	A.101506	Thrust Washer
221	C.106194	Turntable Ass'y
222	C.106752	Turntable Mat
223	B.106139	T.T. Trim
224	B.106024	T.T. Centre Disc
225	A.108641	Roller
226	A.101620	Washer

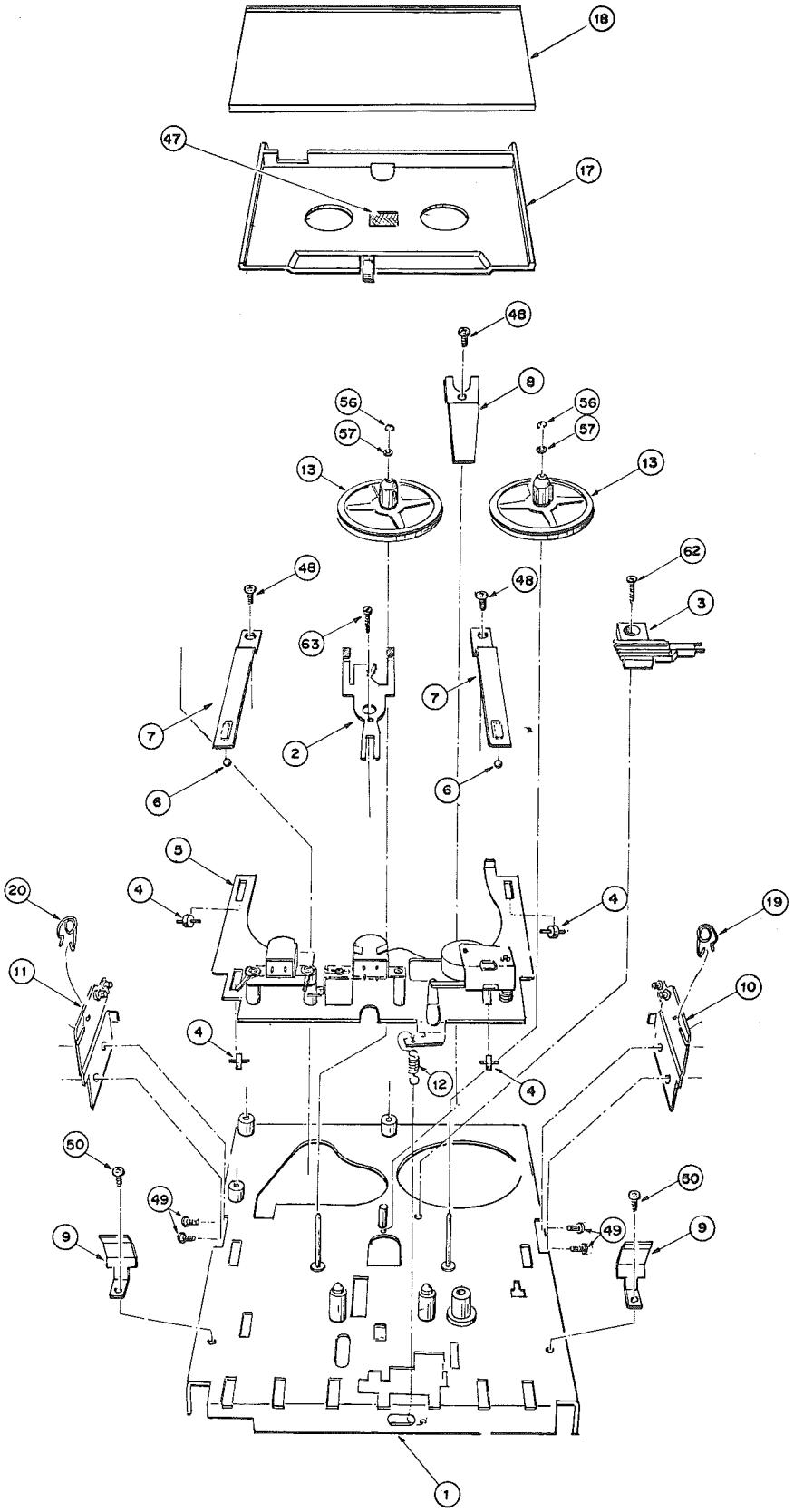
REPLACEMENT PARTS LIST (CASSETTE EXCLUDED)

HK PART NO.	DWG REF. NO.	DESCRIPTION
		TRANSFORMERS & COILS
10126652	T1	Transformer, Power
11027603	T902	Transformer, FM, 1st IF
11027603	T906	Transformer, FM, 2nd IF
11027604	T904	Transformer, FM Detector
11027605	T903	Transformer, AM, 1st IF
11027605	T905	Transformer, AM, 2nd IF
11027606	T907	Transformer, AM, 3rd IF
12027607	T901	Coil, AM Osc.
12027608	L901	Coil, 1st SCA Trap
12027609	L902	Coil, 2nd SCA Trap
12027610	L908	Coil, 19 KHz
12027611	L909	Coil, 38 KHz
		DIODES
41027063	CR801-02	Diode, Power 200V
42027065	CR804	Diode, Zener 12V/2W
41020618	CR701-04	Diode, Bias and Power 100V
41027612	CR904	Diode, 1N60M3
41027613	CR901-03 905-10	Diode, 1N60 or 1N34A
		TRANSISTORS
43027614	Q901	Transistor, AM, RF Amp.
43027615	Q902	Transistor, AM Osc.
43027616	Q903	Transistor, FM, IF
43027617	Q904	Transistor, AM, IF
43027617	Q905	Transistor, FM Detector
43027618	Q906	Transistor, 19 KHz Amp.
43027619	Q907	Transistor, Freq. Doubler
43027620	Q909	Transistor, Stereo Light Switch
43025972	Q501-04 Q601-04 Q701-02 Q1001-02	Transistor, 2N3417
43026284	Q703-04	Transistor, Driver NPN
43026285	Q705-06	Transistor, Driver PNP
43027213	Q707-10	Transistor, Pwr. Out, 2N5296
		CAPACITORS
31818924	C808-09	Lytic, 1000 MFD, 15V
31818925	C804-06-07	Lytic, 1000 MFD, 35V
31526657	C803	Lytic, 3000 MFD, 60V
31818811	C701-02	Lytic, 50 MFD, 35V
31818813	C703-04	Lytic, 50 MFD, 50V
31818829	C709-10	Lytic, 200 MFD, 6V
31827044	C713-14	Lytic, 2000 MFD/50V
		CONTROLS
22126569	R601	Control, Volume, 100K
21426570	R604	Control, Balance, 100K
22126571	R603	Control, Treble, 100K
22126572	R602	Control, Bass, 250K
22026597	R2	Control, Record Level
23527050	R711-12 R731-32	Trimpot
45024212	CB701-02	Circuit Breaker
		MISCELLANEOUS
65426605		Speaker Output Board
65426606		Quadriphonic Board Assy.
61627074		Spacer (Function Switch)
60126966		Tuning Drum Mounting Bracket
60126967		Aux Tuning Drum Mounting Bracket
65427001		Fuse Holder, Buss AGC
45013291		Fuse 3 Amp
53021115		Line Cord
65421116		Strain Relief
65416751		AC Receptacle
12527027		Meter – Tuning
63226540		Knob – Slide Control
63026690		Knob Insert – Slide Control
63226681		Knob – Function
46527153		Lamp (Stereo Ind.)
65426283		Headset Jack
46527228		Pilot Lamp (Impectron #RM-5)
00227031		AM/FM Tuner & Multiplex Assy.
61626968		Dial Drum
91227175		Dial Scale
63226969		Knob Tuning
46520540		Lamp #159 (Dial Drum)
20526507		Loopstick
61626287		Cabinet Housing – Top Section
61627191		Cabinet Housing – Bottom Section
61626381		Side Insert – Left
61626382		Side Insert – Right
61626288		Front Insert
51027143		Shorting Jumper (Quad. Input)
01026471		Record Changer BSR MA70 A1
90126943		Poly Pack – Top
90126944		Poly Pack – Bottom
90126948		Carton
90126947		Carton Filler – Top
65427162		Input Board Assy.
61627135		Plexiglas Insert
63027164		Escutcheon Insert
90727203		Owners Manual
65426529		Input Board Assy.
61627157		Plexiglas Insert
63027023		Escutcheon Insert
90727208		Owners Manual
00226509		Cassette Deck
63026694		Insert – Cassette Knob
63027167		Insert – Cassette Door
63226658		Knob
12526563		Meter – Record Level
65426661		Jack – Microphone
41020618	CR701-04 CR803	Diode, 100V
42023425	CR805	Diode, Zener 12.6V/1W
43027214	Q711	Transistor, Reg. Pwr. 2N5492
31818814	C810	Lytic, 500 MFD, 15V

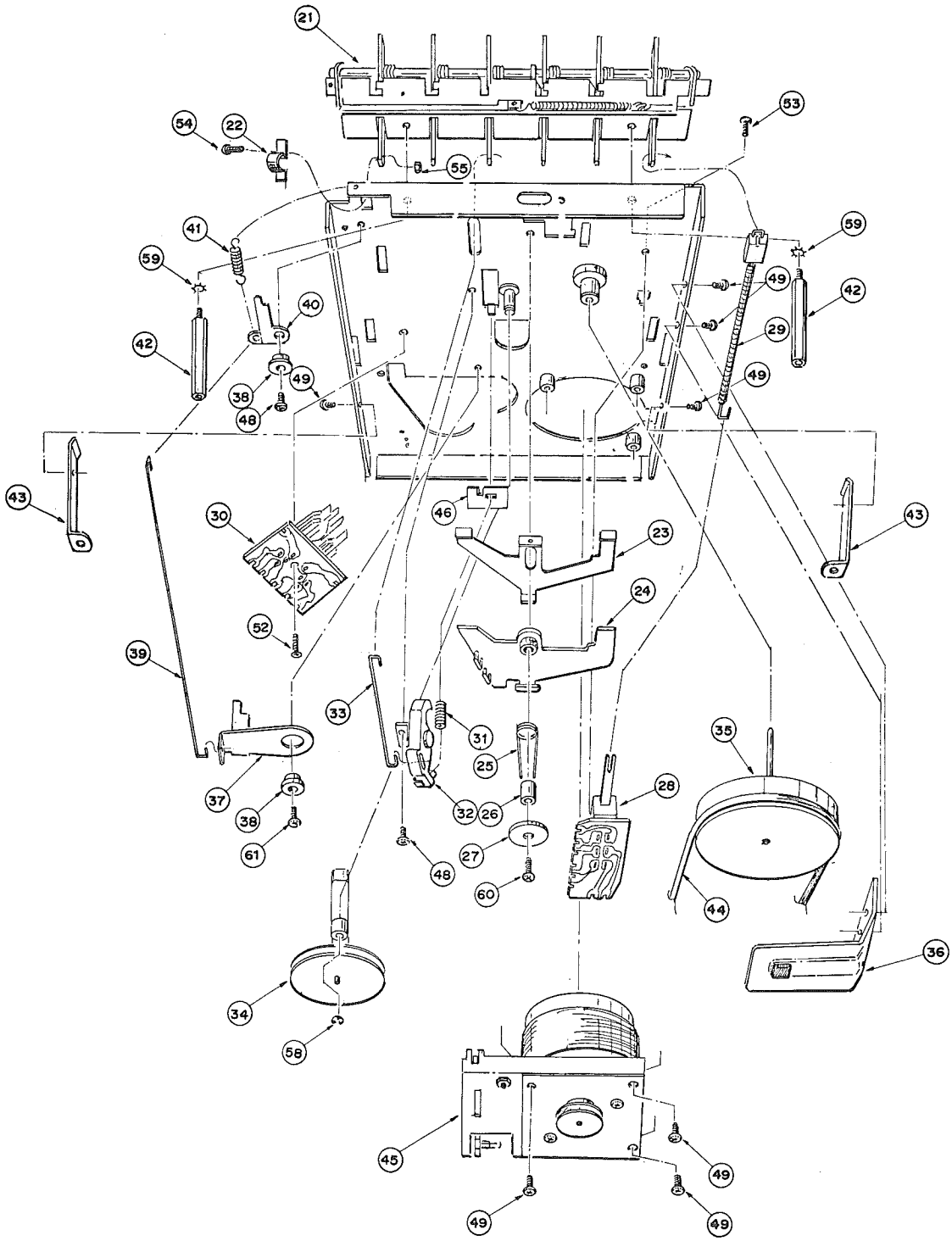
NOTE: To speed handling of your order be sure to include both the model and serial numbers which appear at the back of the chassis, in addition to the quantity, part number and part description of the items ordered. Orders from independent dealers, independent servicemen, and retail customers will be quoted, as we do not ship C.O.D. Harman-Kardon reserves the right to substitute equivalent parts for those originally installed in this chassis. All parts should be ordered from Harman-Kardon, Plainview, L.I., N.Y., Att: Parts Department.

CASSETTE TECHNICAL INFORMATION FOR FESTIVAL 2 ONLY

CASSETTE TRANSPORT MECHANISM (ABOVE CHASSIS)

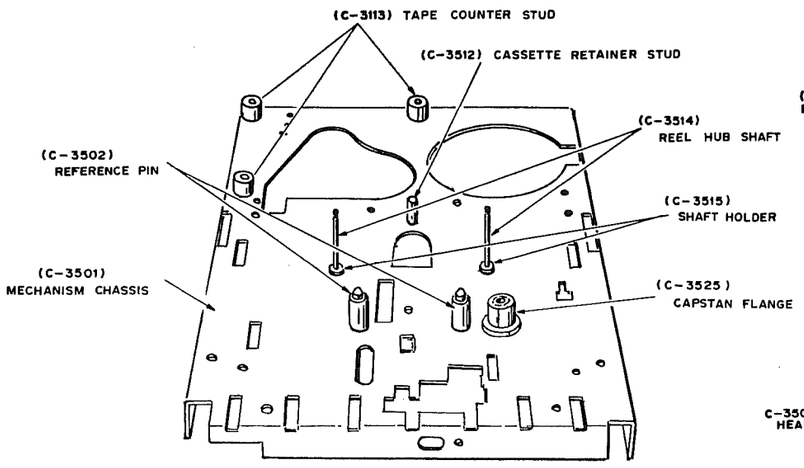


CASSETTE TRANSPORT MECHANISM (BELOW CHASSIS)



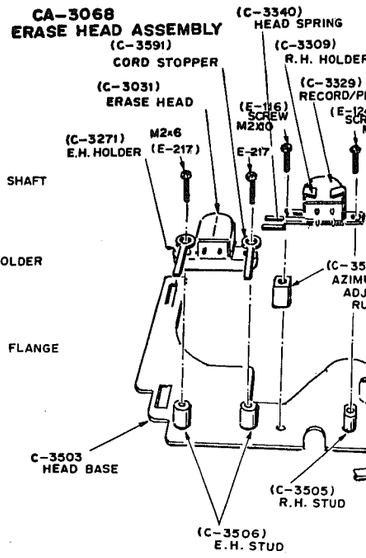
CASSETTE SUBASSEMBLIES

(1) CA-3101 CHASSIS ASSEMBLY

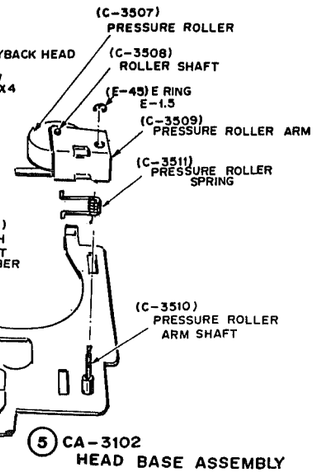


CA-3096 RECORD/PLAYBACK ASSEMBLY

CA-3068 ERASE HEAD ASSEMBLY

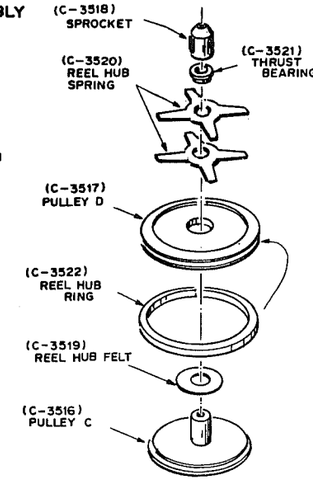


CA-3105 PRESSURE ROLLER ASSEMBLY

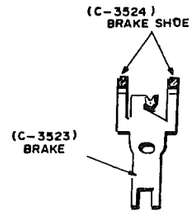


(5) CA-3102 HEAD BASE ASSEMBLY

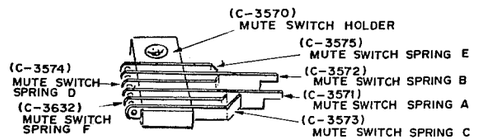
(13) CA-3103 REEL HUB ASSEMBLY



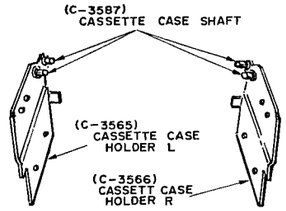
(2) CA-3104 BRAKE ASSMBLY



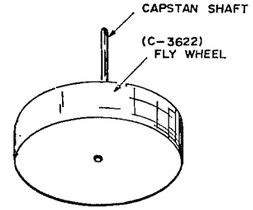
(3) CA-3107 MUTE SWITCH ASSEMBLY



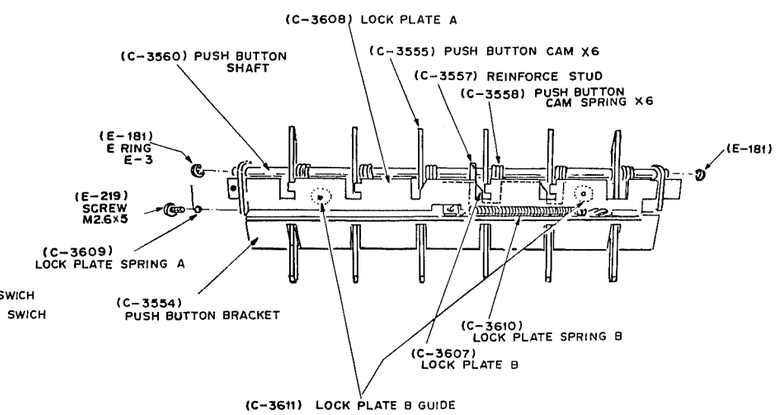
(11) CA-3109 (10) CA-3108 CASSETTE CASE HOLDER R.L. ASSEMBLY



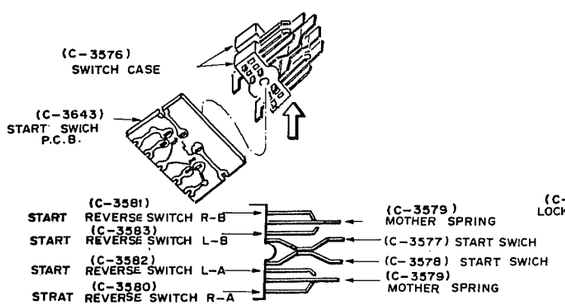
(35) CA-3115 CAPSTAN FLYWHEEL ASSEMBLY

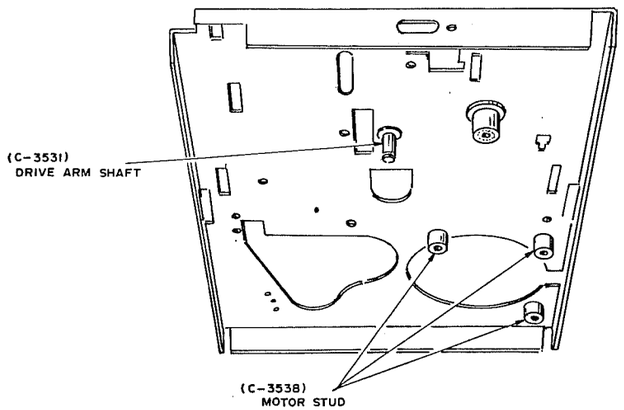


(21) CA-3114 PUSH BUTTON ASSEMBLY

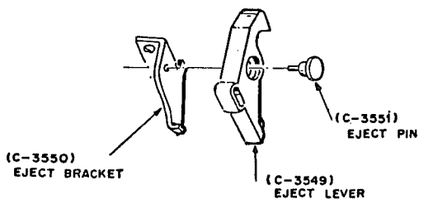


(30) CA-3113 START SWICH ASSEMBLY

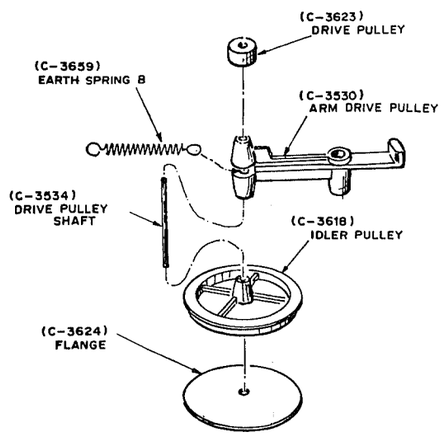




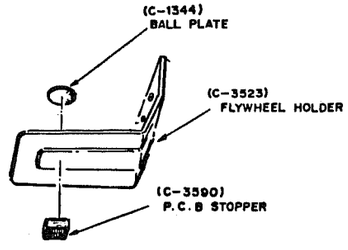
(32) CA-3118 EJECT ARM ASS'Y



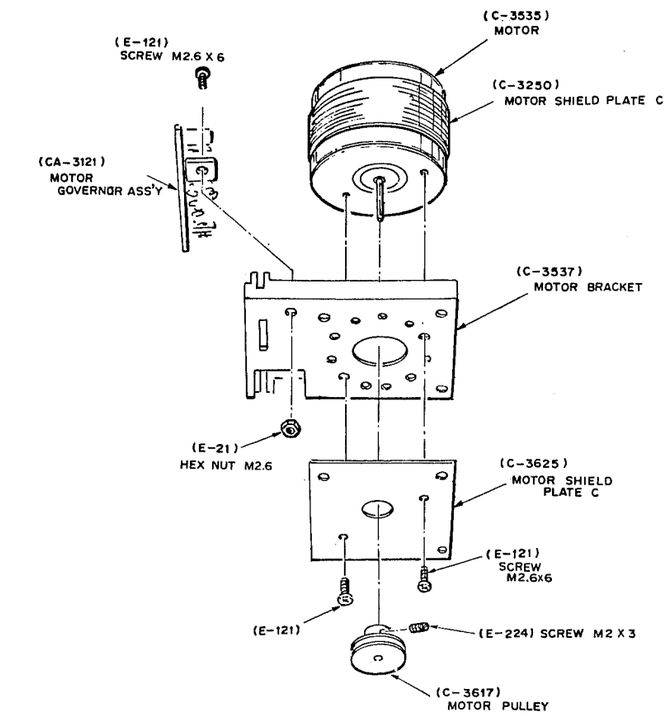
(34) CA-3116 IDLER PULLEY ASS'Y

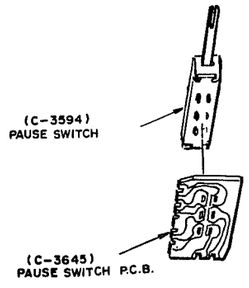


(36) CA-3119 FLYWHEEL HOLDER ASS'Y



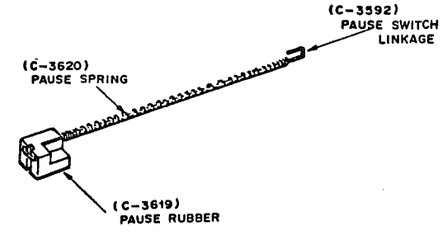
(45) CA-3100 MOTOR ASS'Y





(28) CA-3128 PAUSE SWITCH ASS'Y

(29) CA-3117 PAUSE SWITCH LINKAGE ASS'Y



CASSETTE PARTS

HK Part No.	Dwg. Ref. No.	Part No.	Description
			TRANSPORT MECHANISM
*	1	CA-3101	Chassis Ass'y
*		C-3501	Mechanism Chassis
*		C-3502	Reference Pin
*		C-3512	Cassette Retainer Stud
*		C-3113	Tape Counter Stud
*		C-3514	Reel Hub Shaft
*		C-3515	Shaft Holder
*		C-3525	Capstan Flange
*		C-3531	Drive Arm Shaft
*		C-3538	Motor Stud
01527314	2	CA-3104	Brake Ass'y
*		C-3523	Brake
*		C-3524	Brake Shoe
01527315	3	CA-3107	Mute Switch Ass'y
*		C-3570	Mute Switch Holder
*		C-3571	Mute Switch Spring A
*		C-3572	Mute Switch Spring B
*		C-3573	Mute Switch Spring C
*		C-3574	Mute Switch Spring D
*		C-3575	Mute Switch Spring E
*		C-3632	Mute Switch Spring F
01527316	4	C-3504	Head Base Guide Roller
*	5	CA-3102	Head Base Ass'y
*		C-3503	Head Base
*		C-3506	E. H. Stud
*		C-3505	R. H. Stud
*		C-3510	Pressure Roller Arm Shaft
01527317		C-3588	Azimuth Adjust Rubber
01527318		C-3511	Pressure Roller Spring
01527319		CA-3105	Pressure Roller Ass'y
*		C-3509	Pressure Roller Arm
01527320		C-3507	Pressure Roller
*		C-3508	Pressure Roller Shaft
*		E-45	E Ring E-1.5
01527321		CA-3096	Record/Playback Head Ass'y
*		C-3340	Head Spring
*		C-3309	R. H. Holder
01527322		C-3329	Record/Playback Head
*		E-124	M2 x 4 Pan Head
*		E-116	Screw M2 x 10 Phillips Pan Head
01527323		CA-3068	Erase Head Ass'y
*		C-3271	E. H. Holder
01527324		C-3031	Erase Head
*		C-3591	Cord Stopper
*		E-217	M2 x 6 Pan Head
*	6	C-3595	3MM Steel Ball
*	7	C-3513	Ball Retainer Spring
01527325	8	C-3564	Cassette Case Spring
*	9	C-3544	Cassette Guide
01527326	10	CA-3108	Cassette Case Holder R Ass'y
*		C-3566	Cassette Case Holder R
*		C-3587	Cassette Case Shaft
01527327	11	CA-3109	Cassette Case Holder L Ass'y
*		C-3565	Cassette Case Holder L
*		C-3587	Cassette Case Shaft
01527328	12	C-3562	Head Base Return Spring
01527329	13	CA-3103	Reel Hub Ass'y
*		C-3516	Pulley C
01527330		C-3519	Reel Hub Felt
01527331		C-3522	Reel Hub Ring
*		C-3517	Pulley D
*		C-3520	Reel Hub Spring
*		C-3521	Thrust Bearing
*		C-3518	Sprocket
01527337	17	C-3586	Cassette Case B
01527338	18	C-3585	Cassette Lid A-1
01527339	19	C-3654	Lid Spring R
01527340	20	C-3653	Lid Spring L
01527341	21	CA-3114	Pushbutton Ass'y
*		C-3554	Pushbutton Bracket
*		C-3611	Lock Plate B Guide
*		C-3607	Lock Plate B
*		C-3610	Lock Plate Spring B
*		C-3608	Lock Plate A
*		C-3555	Pushbutton Cam
*		C-3557	Reinforce Stud
*		C-3558	Pushbutton Cam Spring
*		C-3560	Pushbutton Shaft
*		E-181	E Ring E-3
*		C-3609	Lock Plate Spring A
*		E-219	M2.6 x 5 Pan Head
*	22	C-3589	Record Switch Spring
*	23	C-3647	See Saw Arm
*	24	C-3646	F. R. P. Lever B
*	25	C-3650	Lever Spring B
*	26	C-3648	See Saw Arm Pipe
*	27	E-142	2.6ϕ Flat Washer (2.6 x 7.5 x 0.5)
01527342	28	CA-3128	Pause Sw Ass'y
*		C-3594	Pause Sw
*		C-3645	Pause Sw P.C.B.
01527343	29	CA-3117	Pause Switch Linkage Ass'y
*		C-3619	Pause Rubber
*		C-3620	Pause Spring
*		C-3592	Pause Switch Linkage
01527344	30	CA-3113	Start Switch Ass'y
*		C-3576	Switch Case
*		C-3579	Mother Spring
*		C-3580	Start Reverse R-A
*		C-3581	Start Reverse Switch R-B
*		C-3582	Start Reverse Switch L-A
*		C-3583	Start Reverse Switch L-B
*		C-3643	Start Switch P.C.B.
*		C-3577	Start Switch A
*		C-3578	Start Switch B
01527345	31	C-3552	Eject Spring
01527346	32	CA-3118	Eject Arm Ass'y
*		C-3549	Eject Lever
*		C-3550	Eject Bracket
*		C-3551	Eject Pin
*	33	C-3553	Eject Linkage Wire
01527347	34	CA-3116	Idler Pulley Ass'y
01527348		C-3618	Idler Pulley
*		C-3534	Drive Pulley Shaft
*		C-3659	Earth Spring B
01527349		C-3530	Drive Pulley Arm
01527350		C-3623	Drive Pulley
01527351		C-3624	Flange
01527352	35	CA-3112	Capstan Flywheel Ass'y
*		C-3526	Capstan Shaft
*		C-3622	Flywheel

*These parts are listed for reference only. They will not be supplied by Harman-Kardon.

HK Part No.	Dwg. Ref. No.	Part No.	Description
01527353	36	CA-3119	Flywheel Holder Ass'y
*		C-3528	Flywheel Holder
*		C-3590	P.C.B. Stopper
*		C-1344	Ball Plate
*	37	C-3545	Record Censor
*	38	C-3546	Record Lock Shaft (Washer Type)
*	39	C-3548	Record Censor Linkage
*	40	C-3652	Record Lock Lever B
*	41	C-3561	Record Lock Lever Spring
*	42	C-3197	Amp Stud
*	43	C-3563	P.C.B. Stud
01527354	44	C-3616	Driving Belt
01527558	45	CA-3100	Motor Ass'y
01527559		C-3535	Motor
*		C-3250	Motor Shield Plate C
*		C-3537	Motor Bracket
*		C-3625	Motor Shield Plate C
*		E-121	M2.6 x 6 Pan Head
*		C-3617	Motor Pulley
*		E-224	Screw M2 x 3
01527560		CA-3110	Motor Governor Ass'y
*		E-121	Screw M2.6 x 6 Pan Head
*		E-21	Hex Nut M2.6
*	46	C-3644	Spring Stopper
*	47	M-3016	Silver Tape
*	48	E-228	Screw M2.6 x 6 Philips
*	49	E.219	Screw M2.6 x 5 Philips Pan Head
*	50	E-226	Screw M2.6 x 4 Pan Head
*	52	E-223	Screw M2 x 10 Flat Head
*	53	E-227	Screw M2.6 x 4 Flat Head
*	54	E-217	Screw M2 x 6 Philips Pan Head
*	55	E-176	M2 Nut
*	56	E-165	E Ring E-1.2
*	57	C-3613	1.6ϕ Mylar Washer
*	58	E-222	E Ring E-2
*	59	E-172	3ϕ Washer
*	60	E-229	M2.6 x 10 Pan Head
*	61	E-231	M2.6 x 8 Pan Head
*	62	E-230	M2.6 x 10 Counter Sunk
*	63	E-124	M2 x 4 Pan Head

MAIN P.C. BOARD ASS'Y

HK Part No.	Schem. Ref. No.	Part No.	Description
			TRANSISTORS
43025055	X101,201	B-1421	2SC458LG (B) or (C)
43025056	X102,202	B-1433	2SC458LG (D)
43027379	X103,203,104, 204	B-1666(C)	2SC458L (C)
43025059	X105,205	B-1338	2SC735 (O) or (Y)
			DIODE
41527380	D101,201	B-30P	IN60P
			RESISTORS
*	R4	B-1437	Carbon, 1Ω, ¼W
*	R104,204	B-1354	Carbon, 100Ω, ¼W
*	R1,129,229	B-1262	Carbon, 220Ω, ¼W
*	R6,116,216	B-1233	Carbon, 1K, ¼W
*	R111,211,128, 228,130,230	B-1225	Carbon, 1.5K, ¼W
*	R118,218	B-108	Carbon, 2.2K, ¼W
*	R108,208,125,225	B-1249	Carbon, 3.3K, ¼W
*	R110,210,121, 221,127,227,7	B-428	Carbon, 4.7K, ¼W
*	R132,232,113, 213	B-1141	Carbon, 10K, ¼W
*	R119,219	B-652	Carbon, 12K, ¼W
*	R122,222,124, 224,131,231	B-45	Carbon, 22K, ¼W
*	R109,209,117, 217,123,223	B-1314	Carbon, 100K, ¼W
*	R114,214	B-1488	Carbon, 150K
*	R107,207	B-1453	Carbon, 68Ω (N), ¼W
*	R112,212	B-1335	Carbon, 82K (N), ¼W
*	R105,205,106 206	B-1334	Carbon, 100K (N), ¼W
*	R5	B-1432	Carbon, 6.8Ω, ½W
*	R3	B-1440	Wirewound, 22Ω

NOTE: (N) DENOTES LOW NOISE RESISTOR

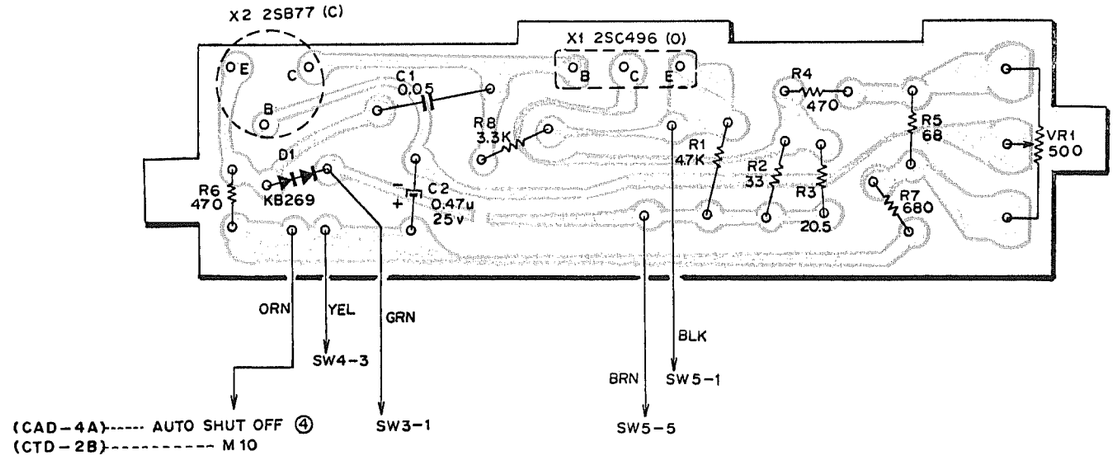
			CAPACITORS
*	C-119,209,111, 211,116,216,9	B-1389	Lytic, 4.7 UF, 16V
*	C-8,108,208,101 201	B-78	Lytic, 10 UF, 10V
*	C-123,223	B-1412	Lytic, 10 UF, 16V
*	C-107,207	B-81	Lytic, 100 UF, 3V
*	C-4	B-1400	Lytic, 100 UF, 16V
*	C-124,224	B-1502	Lytic, 330 UF, 16V
*	C-2	B-1392	Lytic, 470 UF, 16V
*	C-114,214	B-96	Mylar, 500 PF, 50V, 20%
*	C-125,225	B-1711	Mylar, 1500 PF, 50V, 10%
*	C-112,212,119, 219,120,220	B-1156	Mylar, .003 UF, 50V, 20%
*	C-113,213	B-94	Mylar, .005 UF, 50V, 20%
*	C-103,203,104, 204	B-95	Mylar, 0.1 UF, 50V, 20%
*	C-7	B-90	Mylar, 0.2 UF, 50V, 20%
*	C-112,212	B-329	Mylar, 0.4 UF, 50V, 20%
*	C-115,215	B-1676	Mylar, 0.56 UF, 50V, 20%

HK Part No.	Schem. Ref. No.	Part No.	Description
*	C-6	B-1694	Mylar, 0.068 UF, 50V, 20%
*	C-5,105,205	B-93	Mylar, 0.1 UF, 50V, 20%
*	C-106,206	B-1056	Ceramic, 47 PF, 50V, 20%
*	C-102,202	B-1289	Ceramic, 220 PF, 50V, 20%
*	C-117,217	B-1180	Ceramic, 300 PF, 100V, 20%
			CONTROLS
23527565	VR103,203	B-1505	Record Level Adj., 10K
23527565	VR106,206	B-1505	Record Current Adj., 10K
23527567	VR105,205	B-1436	Bias Current Adj., 20K
23527568	VR102,202	B-1176	P.B. Level Adj., 50K
23527569	VR104,204	B-1202	Meter Level Adj., 100K
			SWITCH
25527564		B-3033	Record Switch
			COILS
12027381	L1	B-3503	OSC Coil
12025066	L101,201	B-1434	Bias Trap Coil
12027563	L102,202	B-1352	Bias Trap Coil

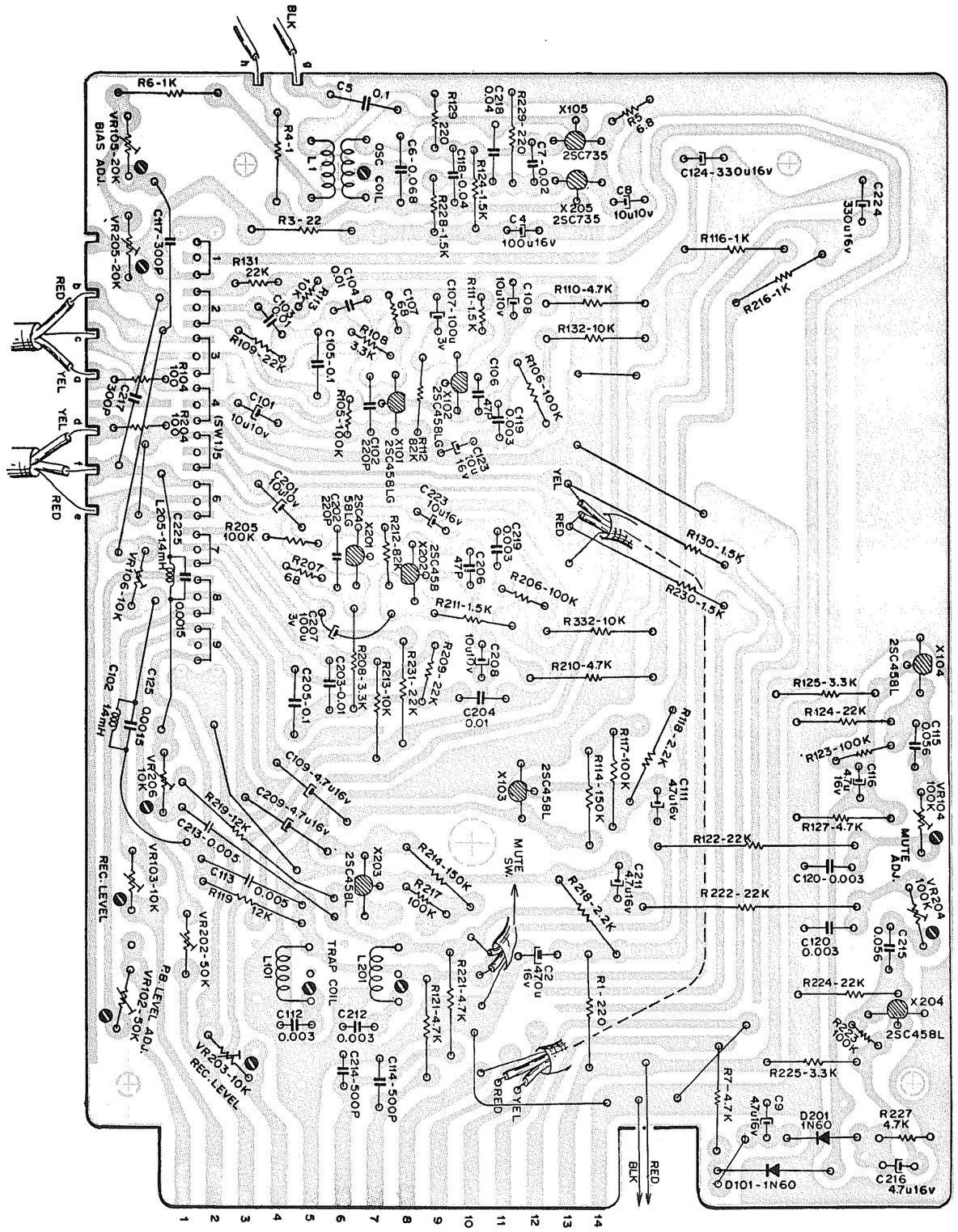
MOTOR GOVERNOR ASS'Y

HK Part No.	Schem. Ref. No.	Part No.	Description
23527374	VR1	B-1708	500Ω
43027571	X1	B-1790	2SC496 (O)
41527570	D1	B-1702	KB-269 Diode
*	C1	B-98	0.05 UF, 50V
*	C2	B-1376	0.47 UF, 25V
*	R1	B-1795	4.7K, 5%, ¼W
*	R2	B-1822	33Ω, 5%, ¼W
*	R3	B-1821	20.5Ω, 1%
*	R4	B-1707	470Ω, 1%, ¼W
*	R5	B-1796	68Ω, 5%, ¼W
*	R6	B-1792	470Ω, 5%, ¼W
*	R7	B-1583	680Ω, 1%, ¼W
*	R8	B-1793	3.3K, 5%, ¼W

MOTOR GOVERNOR PC BOARD



MAIN PC BOARD


BLK
R6-1K
VR103-20K BIAS ADJ.
VR205-20K
C117-300P
C5 0.1
R4-1
L1
OSC COIL
C6-0.068
R3-22
R129-220
C218 0.04
C118 0.04
R124-1.5K
R228-1.5K
R229-220
C7-0.02
X105
2SC735
X205 2SC735
R5 6.8
C8 10u10v
C4 100u16v
C124-330u16v
C224 330u16v
R116-1K
R216-1K
R131 22K
C103 0.01
R113 10K
C104 0.01
R109-22K
C107 68
C107-100u 3v
R111-1.5K
C108 10u10v
R110-4.7K
R132-10K
R108 3.3K
C105-0.1
R103-100K
C102 220P
X101 2SC458LG
R112 82K
X102 2SC458LG
C106 47P
C123 10u 16v
C119 0.003
R106-100K
C101 10u10v
R104 100
R204 100
C217 300P
(SW1)5
L205-14mH
C225 0.0015
VR106-10K
C102 14mH
C125 0.0015
R205 100K
C201 100u10v
R207 68
C202 220P
2SC458LG
X201
R212-82K
X202 2SC458LG
C203 0.01 10u16v
C219 0.003
C206 47P
R206-100K
R211-1.5K
R332-10K
R210-4.7K
C207 100u 3v
R208-3.3K
C205-0.1
R213-10K
R231-22K
R209-22K
C208 10u10v
C204 0.01
R130-1.5K
R230-1.5K
YEL
RED
R125-3.3K
R124-22K
R123-100K
C115 0.056
C116 4.7u 16v
R118-2.2K
C111 47u16v
R117-100K
R114-150K
X103 2SC458L
C109-4.7u16v
C209-4.7u16v
R219-12K
C213-0.005
C113 0.005
R119-12K
VR206 10K
VR103-10K REC. LEVEL
VR202-50K
P.B. LEVEL ADJ. VR102-50K
VR203-10K REC. LEVEL
L101 TRAP COIL
C112 0.003
C212 0.003
L201
C214-500P
C114-500P
X203 2SC458L
R214-150K
R217 100K
MUTE SW.
R221-4.7K
R121-4.7K
C2 470u 16v
R1-220
R218-2.2K
C211 4.7u16v
R122-22K
R222-22K
C120-0.003
C120 0.003
C215 0.056
R224-22K
X204 2SC458L
R223 100K
R225-3.3K
R7-4.7K
C9 4.7u16v
D201 1N60
D101-1N60
R227 4.7K
C216 4.7u16v
VR104 100K MUTE ADJ.
VR204 100K
X104 2SC458L
R127-4.7K
C122-330u16v
C121 0.01
C110 0.01
C101-0.1
C103-0.01
C105-0.01
C120-0.01
C201-0.01
C202-0.01
C203-0.01
C204-0.01
C205-0.1
C206-0.01
C207-0.01
C208-0.01
C209-0.01
C210-0.01
C211-0.01
C212-0.01
C213-0.01
C214-0.01
C215-0.01
C216-0.01
C217-0.01
C218-0.01
C219-0.01
C220-0.01
C221-0.01
C222-0.01
C223-0.01
C224-0.01
C225-0.01
R101-22K
R102-22K
R103-22K
R104-22K
R105-22K
R106-22K
R107-22K
R108-22K
R109-22K
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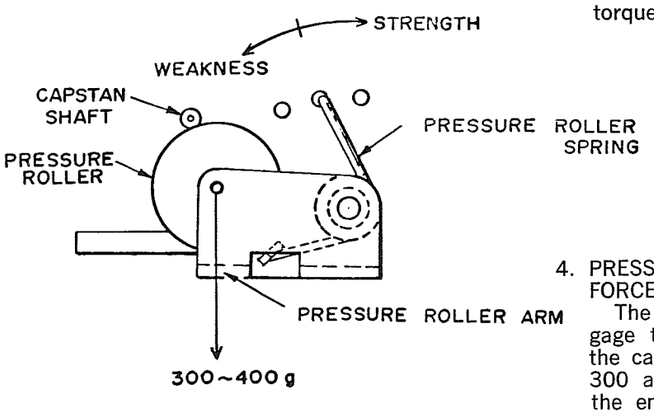
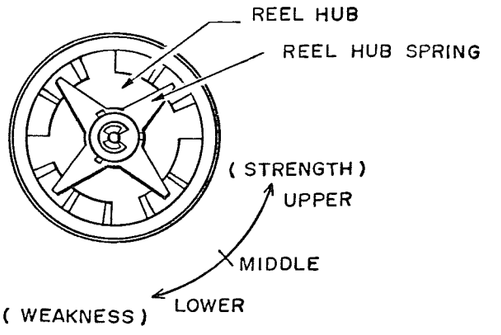
R129-22K
R130-22K
R131-22K
R132-22K
R201-22K
R202-22K
R203-22K
R204-22K
R205-22K
R206-22K
R207-22K
R208-22K

CASSETTE MECHANICAL ADJUSTMENTS

1. CLEANING
   Using isopropyl (rubbing) alcohol, carefully clean the Erase Head, Record/Playback Head, capstan, and pressure roller. This operation should be routine on units to be serviced and always done before demagnetizing, head alignment, tape speed adjustment, wow and flutter measurement, and before making any electrical adjustments.
2. DEMAGNETIZING
   Following the instructions supplied with your demagnetizer, carefully demagnetize the Erase Head, Record/Playback Head, and capstan.



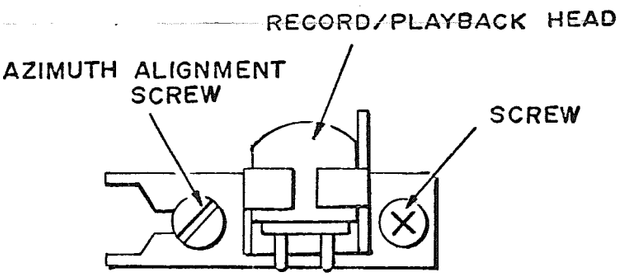
3. CLUTCH TORQUE ADJUSTMENT
   Insert a Phillips Clutch Drive Test Cassette No. 4822-395-80037. The torque should be between 35 and 55 gm-cm. Rotate the reel hub spring as shown to obtain the proper torque required.



4. PRESSURE ROLLER FORCE ADJUSTMENT
   The force required to disengage the pressure roller from the capstan should be between 300 and 400 grams. Relocate the end of the pressure roller spring as shown if necessary.

5. RECORD/PLAYBACK HEAD AZIMUTH ADJUSTMENT

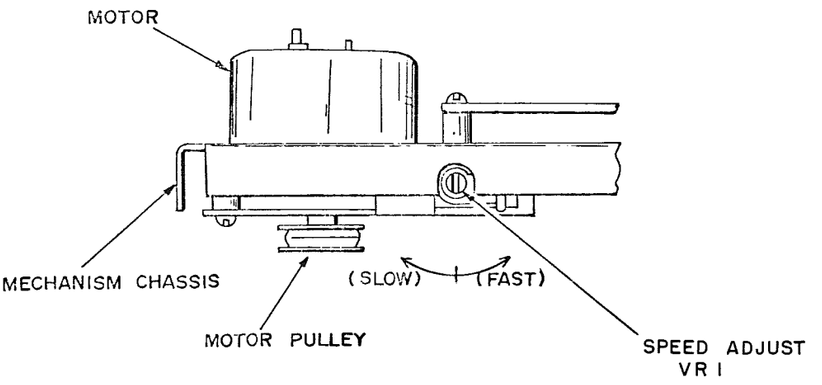
Signal Source	Connections	Mode	Adjust	Remarks
Alignment Test Tape, Phillips 10KHz No. TCA-10	VTVM to "Record Out" Jacks	Playback	Azimuth Alignment Screw	Adjust the screw to obtain maximum reading on VTVM.



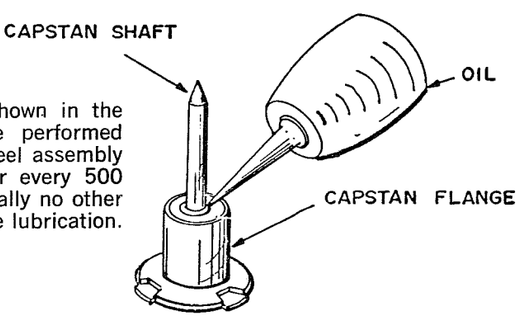
6. TAPE SPEED ADJUSTMENT AND WOW AND FLUTTER MEASUREMENT

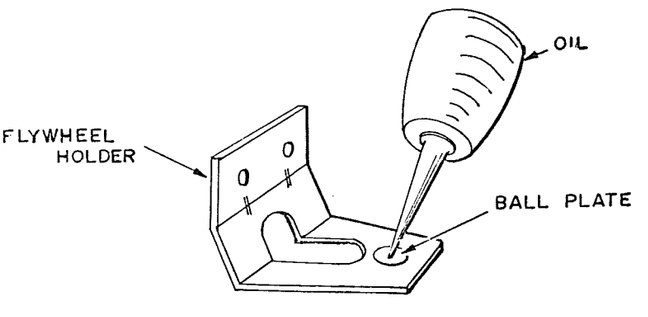
Signal Source	Connections	Mode	Adjust	Remarks *
3KHz Test Tape, Phillips No. TC-FL	Standard 3KHz Wow & Flutter Meter	Playback	VRI on Motor Governor P.C. Board	Adjust VRI to obtain the smallest % drift. The wow & flutter meter should read 0.15% (nominal).

*If there is excessive wow and flutter examine the pressure roller, drive belts, and rubber reel hub rings for grease, oil, dirt, and/or wear. Also examine the tape counter assembly for eveness of operation.

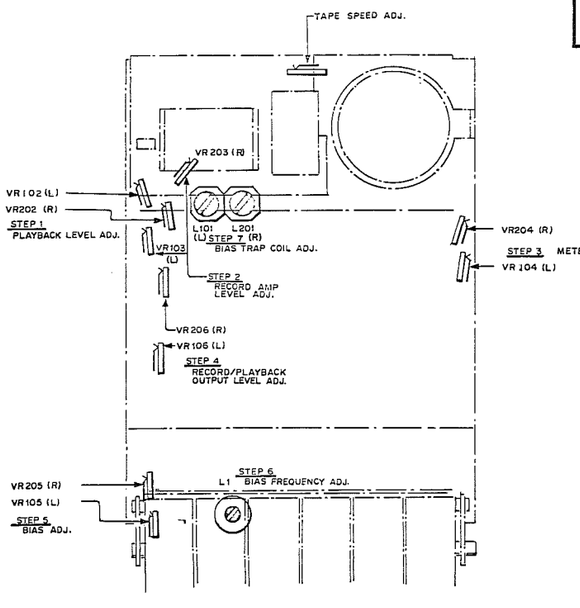


7. LUBRICATION
   Lubrication as shown in the drawing should be performed whenever the flywheel assembly is replaced or after every 500 hours of use. Normally no other parts should require lubrication.

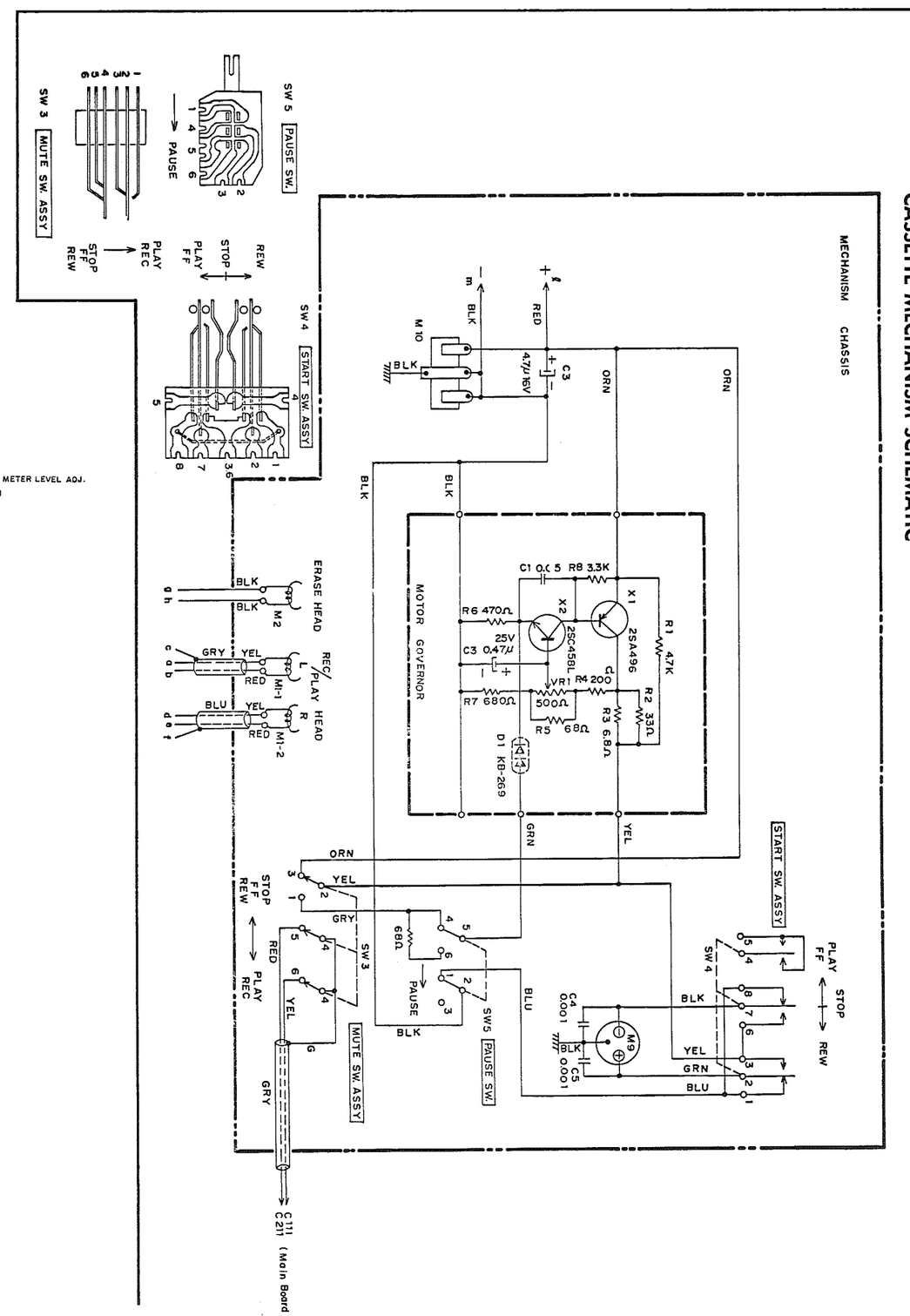




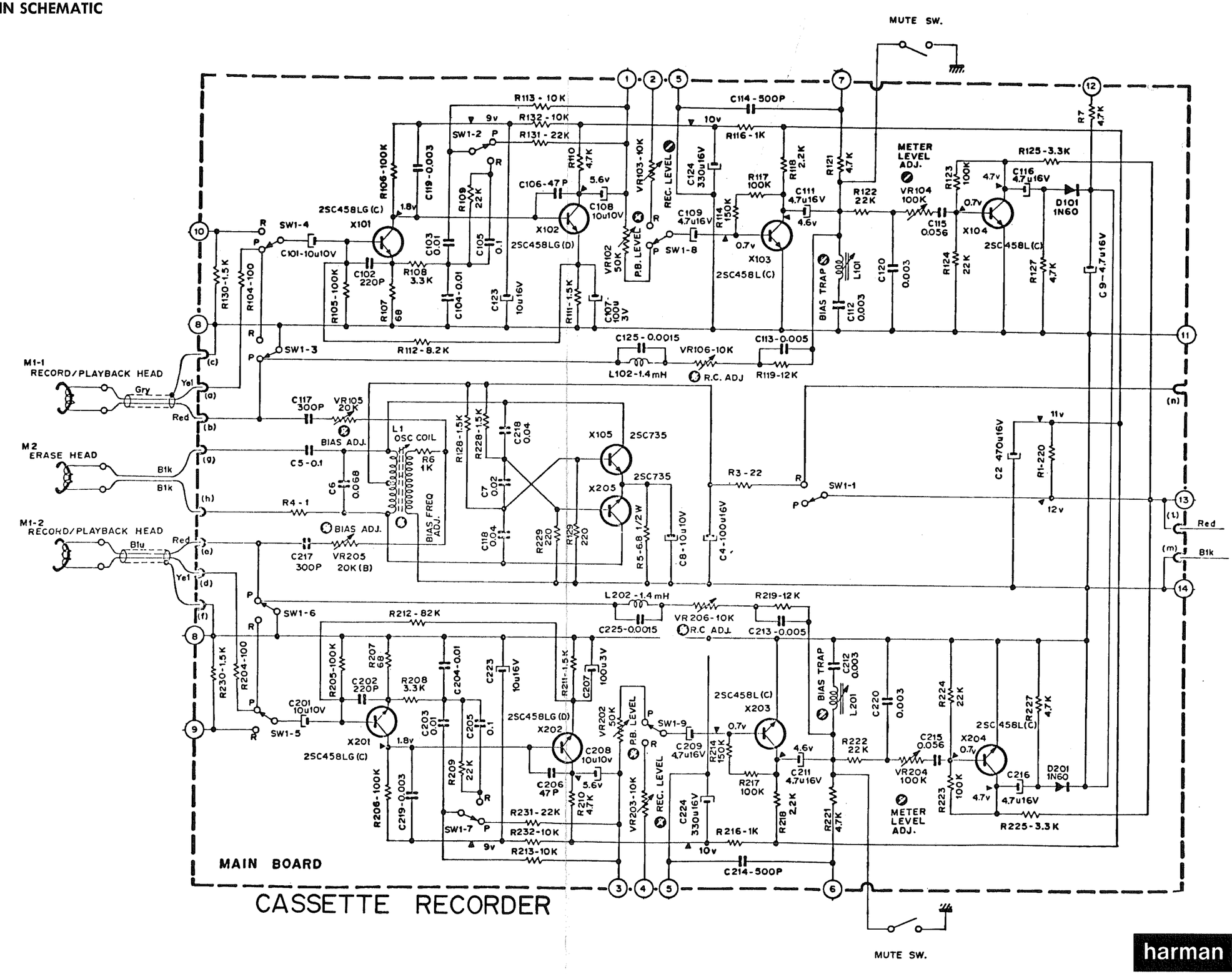
	ITEM	SIGNAL SOURCE	MEASUREMENT CONNECTION	MODE	ADJUST	INSTRUCTIONS
1	Playback Output Level	400Hz, 20 mM/mm or 200 nW/M Test Tape	VTVM to RECORD OUT Jacks	Playback	VR102 VR 202	Adjust to obtain 1 volt on VTVM.
2	Record Amp Level	1KHz @ 200 mV to RECORD IN-LOW Jacks	VTVM to RECORD OUT Jacks	Record Pause	VR103 VR203	1. Set the RECORD LEVEL control on the front panel to maximum. 2. Adjust to obtain 1 volt on VTVM.
3	Meter Level	1KHz @ 200 mV to RECORD IN-LOW Jacks (One channel at a time only!)	VTVM to RECORD OUT Jacks	Record Pause	VR104 VR204	Adjust to obtain "OVU" on VU meter.
4	Record-Playback Output Level	1KHz @ 200 mV to RECORD IN-LOW Jacks	VTVM to RECORD OUT Jacks	Record		1. Record signal on blank tape.
				Playback		2. Note VTVM readings.
					VR106 VR206	3. Repeat steps 1 and 2 until 1 volt readings are obtained during step 2.
5	Recording Bias	1KHz @ 0.5V & 10KHz @ 0.5V to RECORD IN-LOW Jacks (One channel at a time only!)	VTVM to RECORD OUT Jacks	Record		1. Adjust RECORD LEVEL control on the front panel to obtain -20VU on VU meter. 2. Record signal.
				Playback		3. Note VTVM readings for 1KHz and 10KHz.
					VR105 VR205	4. Repeat steps 1, 2, and 3 until the difference between the 1KHz and 10KHz signals is OdB for each channel.
						5. Repeat "Record-Playback Output Level" adjustment.
6	Bias Frequency	Generator 105KHz to Oscilliscope Horizontal Input	Erase Head to Oscilliscope Vertical Input	Record Pause	L1	Adjust to obtain circle pattern on oscilloscope.
			Erase Head to Frequency Counter	Record Pause	L1	Adjust to obtain 105KHz on counter.
7	Bias Trap		VTVM to RECORD OUT Jacks	Record Pause	L101 L201	Adjust to obtain minimum readings on VTVM.



CASSETTE MECHANISM SCHEMATIC



CASSETTE MAIN SCHEMATIC



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