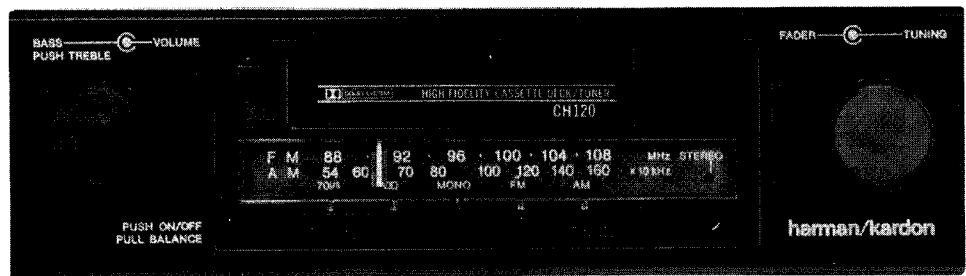


# The Harman Kardon Model CH120

Manual 90A

## HIGH FIDELITY CASSETTE DECK/TUNER

# Technical Manual



**harman/kardon**

240 Crossways Park West, Woodbury, N.Y. 11797  
1112-H15290A4 P-078506 1450 Printed in Japan

CH120

**SPECIFICATIONS**

● **TUNER SECTION**

	Nominal	Limit
<FM>		
Tuning Range	87.2 – 109.0 MHz	
50 dB Quieting Sensitivity		
Mono/Stereo	17 dBf	≤ 22 dBf
Usable Sensitivity		
Mono/Stereo	9 dBf (IHF)	≤ 15 dBf
Image Ratio	68 dB	≥ 60 dB
IF Rejection	75 dB	≥ 65 dB
Capture Ratio	2.0 dB	≤ 3.0 dB
Alternate Channel Selectivity	57 dB	≥ 45 dB
AM Rejection	45 dB	≥ 40 dB
Signal to Noise Ratio		
Mono	70 dB	≥ 65 dB
Stereo	65 dB	≥ 60 dB
Total Harmonic Distortion		
Mono	0.18%	≤ 0.3%
Stereo	0.22%	≤ 0.4%
Stereo Separation at 1 kHz	40 dB	≥ 35 dB

<AM>

Tuning Range	510 – 1660 kHz
Usable Sensitivity	40 μV ≤ 50 μV
Alternate Channel Selectivity	40 dB ≥ 35 dB
Signal to Noise Ratio	55 dB ≥ 50 dB
Image Rejection	58 dB ≥ 55 dB
IF Rejection	75 dB ≥ 70 dB

● **CASSETTE TAPE DECK SECTION**

Tape Speed	+1%	+3%	-1%
Wow and Flutter	0.1%	≤ 0.2%	
F.FWD/REW. Time	125 sec.	≤ 150 sec.	
for C-60 Cassette			
Signal to Noise Ratio			
Dolby* NR OFF	CrO <sub>2</sub>	55 dB	≥ 50 dB
	Metal	56 dB	≥ 50 dB
Dolby NR B to ON	CrO <sub>2</sub>	64 dB	≥ 58 dB
	Metal	65 dB	≥ 58 dB

	Nominal	Limit
Channel Separation	50 dB	≥ 40 dB
Crosstalk	65 dB	≥ 60 dB
Playback Distortion	1%	≤ 2%
Frequency Response	20 – 20,000 Hz	

● **AUDIO SECTION**

Tone Control Characteristics		
Bass (at 50 Hz)	10 dB	± 2 dB
Treble (at 10 kHz)	10 dB	± 2 dB
Preout Output Level	775 mV	
(10 kohm load)		
Preout Output Impedance	220 ohm	

● **GENERAL**

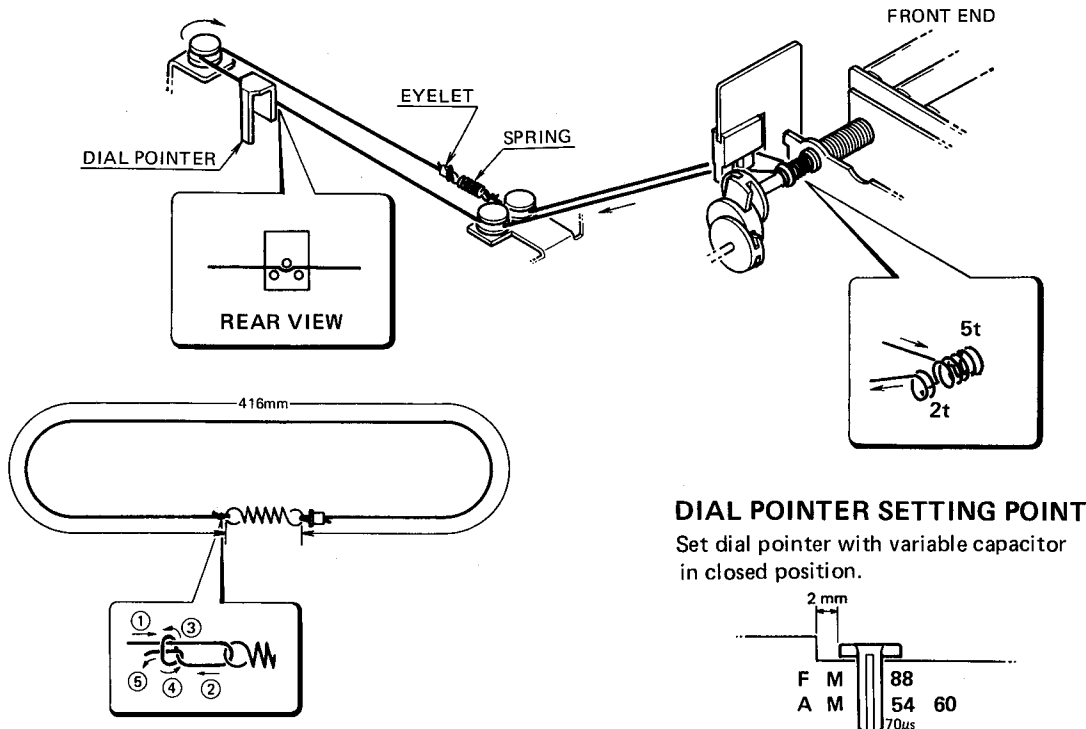
Dimensions	
Chassis (W x H x D)	7" x 2" x 5-1/8" (178 x 50 x 130 mm)
Nose Piece (W x H x D)	4-1/8" x 1-5/8" x 1-3/8" (105 x 42 x 35 mm)
Shaft Spacing	5-1/8", 5-5/8", 5-13/16" (130, 142, 148 mm)
Weight	2 lbs. 14 oz. (1.3 kg)
Power Supply	DC 13.8V (11-16V Usable), Negative Ground
Current Consumption	0.4A

This specification is the target of servicing. But, there is a case that the specification is not applicable to the measurement condition and instrument.

Specifications and components subject to change without notice. Overall performance will be maintained or improved.

\*Dolby noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

**DIAL CORD STRINGING**



**ALIGNMENT PROCEDURES**

Step	Signal Source	Output Indicator	Set Signal to	Set Radio dial to	Adjust	Adjust for
1	Set function switch to AM					
2	Sweep Gen. connected to antenna receptacle through dummy antenna	Sweep Gen. connected to R255	455 kHz	Minimum stop point	T251, 252	Fig. 1, 5, 6
3	Signal Gen. connected to antenna receptacle through dummy antenna	V.T.V.M. & oscilloscope connected to output	1650 kHz 40 dBμ	Maximum stop point	TC253	Fig. 5, 6
4			510 kHz 40 dBμ	Minimum stop point	T253	Obtain maximum sensitivity Fig. 5, 6
5	Tune in respective signals at 600 kHz, 1000 kHz and 1400 kHz to check tracking standard correctness and obtain maximum sensitivity.		600 kHz 33 dBμ	600 kHz	TC252 & antenna trimmer	Adjust at 1400 kHz Over than 20 dB Fig. 6
			1000 kHz 33 dBμ	1000 kHz		
			1400 kHz 33 dBμ	1400 kHz		
6	Set function switch to FM					
7		Multimeter connected to R215 and R216	10.7 MHz	Minimum stop point	T201	0V ± 0.05V Fig. 6
8	Signal Gen. connected to antenna receptacle through dummy antenna	V.T.V.M. & oscilloscope connected to output	92 MHz 10 dBf	92 MHz	Input level	0V ± 0.05V
					T1	Obtain maximum sensitivity Fig. 2, 3, 4, 7
9			92 MHz 65 dBf		T202	Distortion Less than 0.4% Fig. 4, 6
10			98 MHz	98 MHz	VR201	Maximum Fig. 4, 6
					Volume	220 mV Fig. 4, 6
					VR202	200mV - 3 dB S/N 38 dB ± 4 dB Fig. 4, 6
11		Frequency counter connected to R306	98 MHz 65 dBf (unmodulation)		VR302	76 kHz ± 0.3 kHz Fig. 6
12	Stereo signal Gen. connected to antenna		98 MHz 65 dBf 19 kHz pilot signal only		VR301	Obtain minimum output at 19 kHz Fig. 4, 6
					VR203	Obtain maximum separation Fig. 4, 6
					VR204	Better than -10dB Fig. 4, 6

**DOLBY NR ADJUSTMENT**

Step	Test Tape	Output Indicator	Adjust	Adjust for
1	Set function DOLBY NR switch OFF			
2	TCC-130	V.T.V.M. connected to P605	VR601	300 mV ± 0.5 dB Fig. 6
3		V.T.V.M. connected to P606	VR602	

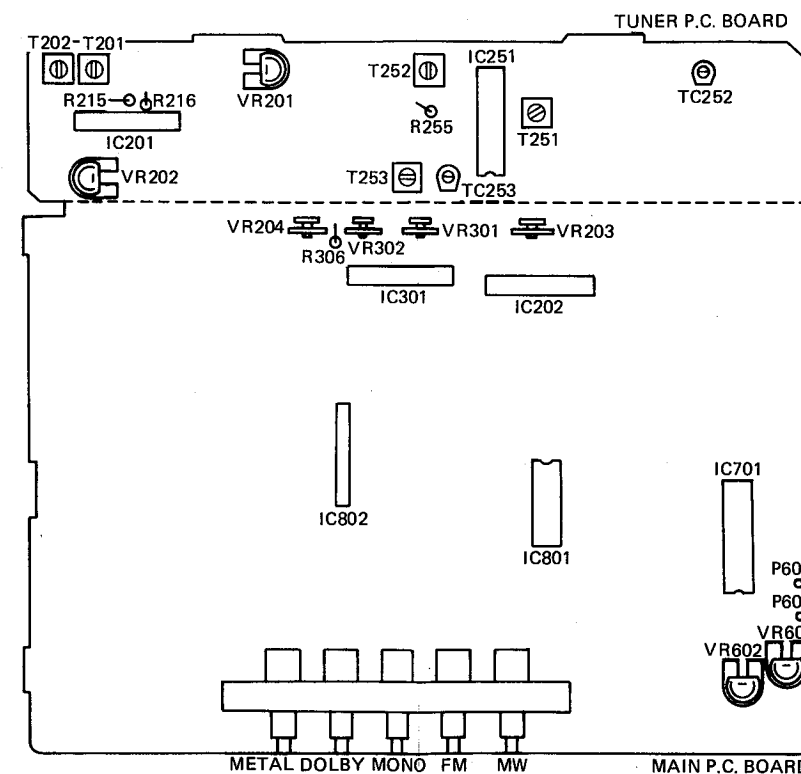
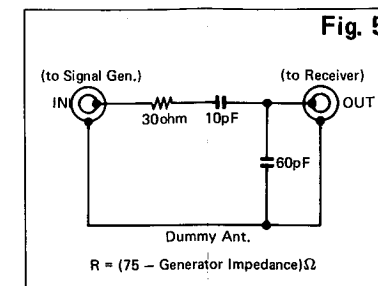
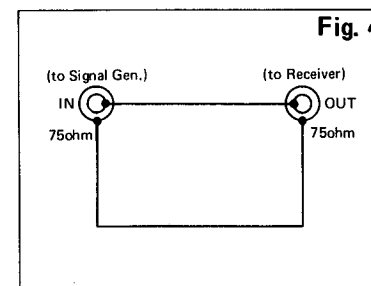
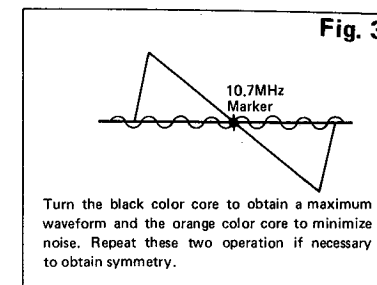
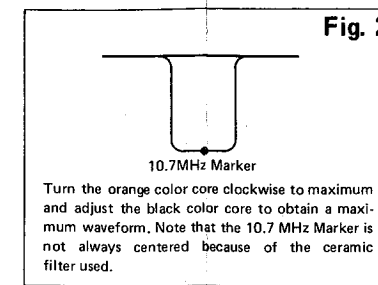
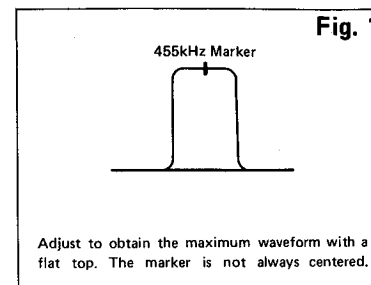


Fig. 6

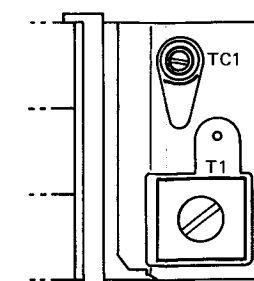


Fig. 7

## ALIGNMENT PROCEDURES

Step	Signal Source	Output Indicator	Set Signal to	Set Radio dial to	Adjust	Adjust for	
1	Set function switch to AM						
2	Sweep Gen. connected to antenna receptacle through dummy antenna	Sweep Gen. connected to R255	455 kHz	Minimum stop point	T251, 252	Fig. 1, 5, 6	
3	Signal Gen. connected to antenna receptacle through dummy antenna	V.T.V.M. & oscilloscope connected to output	1650 kHz 40 dB $\mu$	Maximum stop point	TC253	Fig. 5, 6	
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			1000 kHz 33 dB $\mu$	1000 kHz			
			1400 kHz 33 dB $\mu$	1400 kHz			
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						65 dBf	Volume
	17 dBf	VR202	200mV - 3 dB S/N 38 dB $\pm$ 4 dB Fig. 4, 6				
11		Frequency counter connected to R306	98 MHz 65 dBf (unmodulation)		VR302	76 kHz $\pm$ 0.3 kHz Fig. 6	
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					VR204	Better than -10 dB Fig. 4, 6	

## DOLBY NR ADJUSTMENT

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1	Set function DOLBY NR switch OFF			
2	TCC-130	V.T.V.M. connected to P605	VR601	300 mV $\pm$ 0.5 dB Fig. 6
3		V.T.V.M. connected to P606	VR602	

Adjust for  
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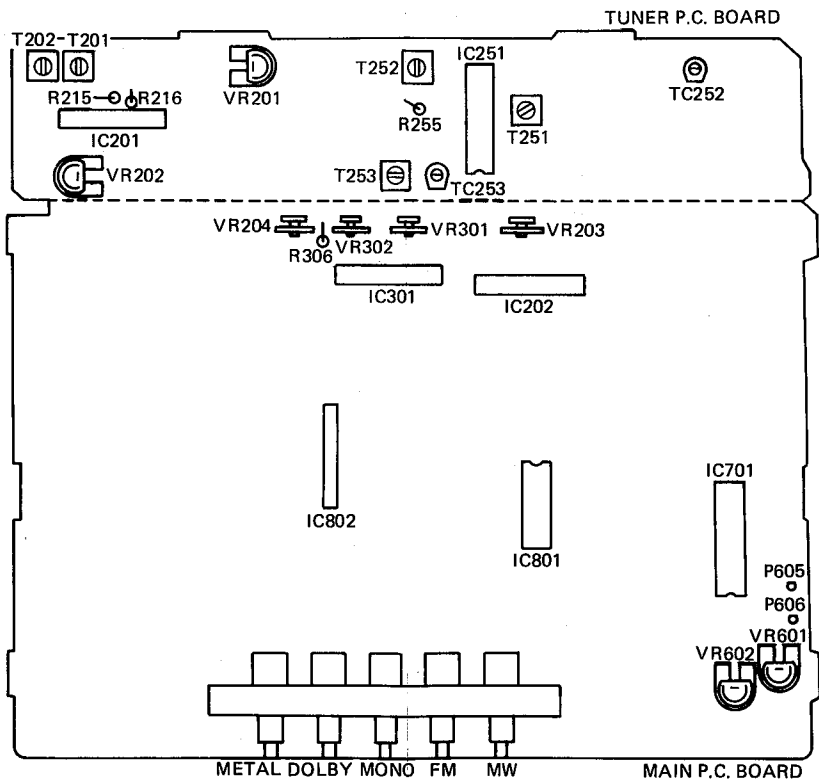
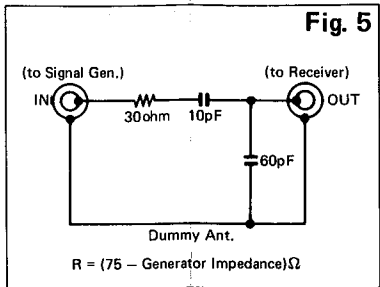
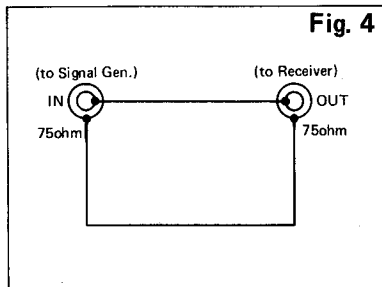
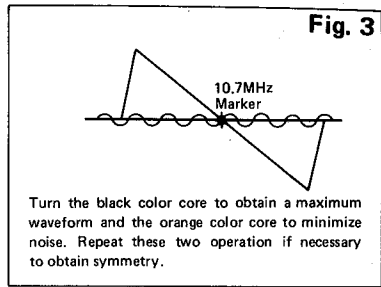
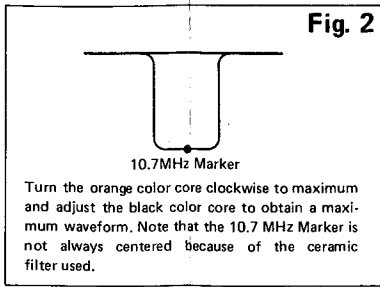
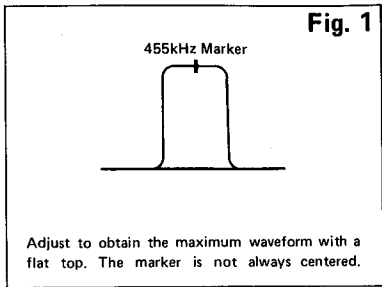


Fig. 6

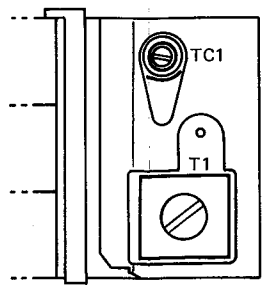


Fig. 7

Adjust for  
 V ± 0.5 dB

## HEAD REPLACEMENT AND ADJUSTMENT

### 1 Head replacement

1. Remove the Cassette Tape Player Mechanical Assembly from the main unit.
2. Remove the **A** portion of the Loading Link. (See Fig. 8.)
3. Remove the 2 screws **B** in Fig. 8 and remove the Frame Assembly, Cassette Pack Guide and Guide Arm Assembly, and then replace the head.

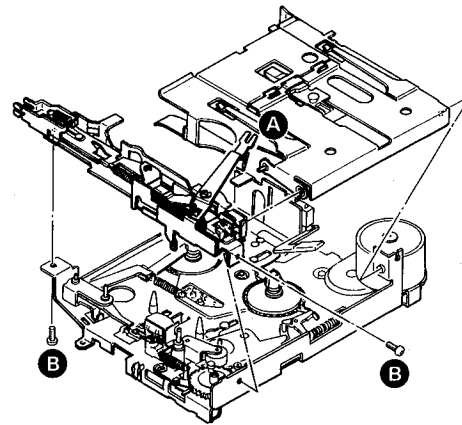


Fig. 8

### 2 Head height confirmation

1. Install the M-300 Head Gauge plate.
2. Release the Lock Link to allow the head and pinch roller to lift up (in the same state as when playing back).
3. Check to make sure that the adjustment chip does not contact the tape guide of the head. (See Fig. 9.)

- After the head replacement and height confirmation, clean the head and pinch roller where the tape runs against and then install them.

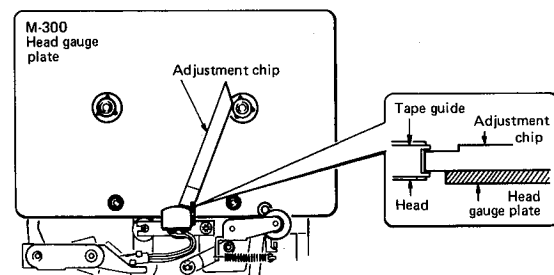


Fig. 9

### 3 Azimuth adjustment

- Adjust the azimuth upon completion of the main unit assembly (with both upper and lower covers installed).
1. Connect the power source (DC14V) to the power supply lead to make the main unit ready to operate.
  2. Connect the dual channel AC VTVM and 2ch oscilloscope to the line output.
  3. Play back the test tape (TCC-153) and adjust the azimuth screw with a phillips screwdriver inserted into the azimuth adjustment hole in the upper cover. Adjust so that the same maximum VTVM value is indicated on both Left channel and Right channel and also so that the phase is within  $0^\circ \pm 90^\circ$  while watching the lissajous's waveform.

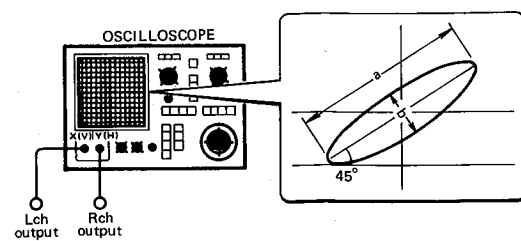
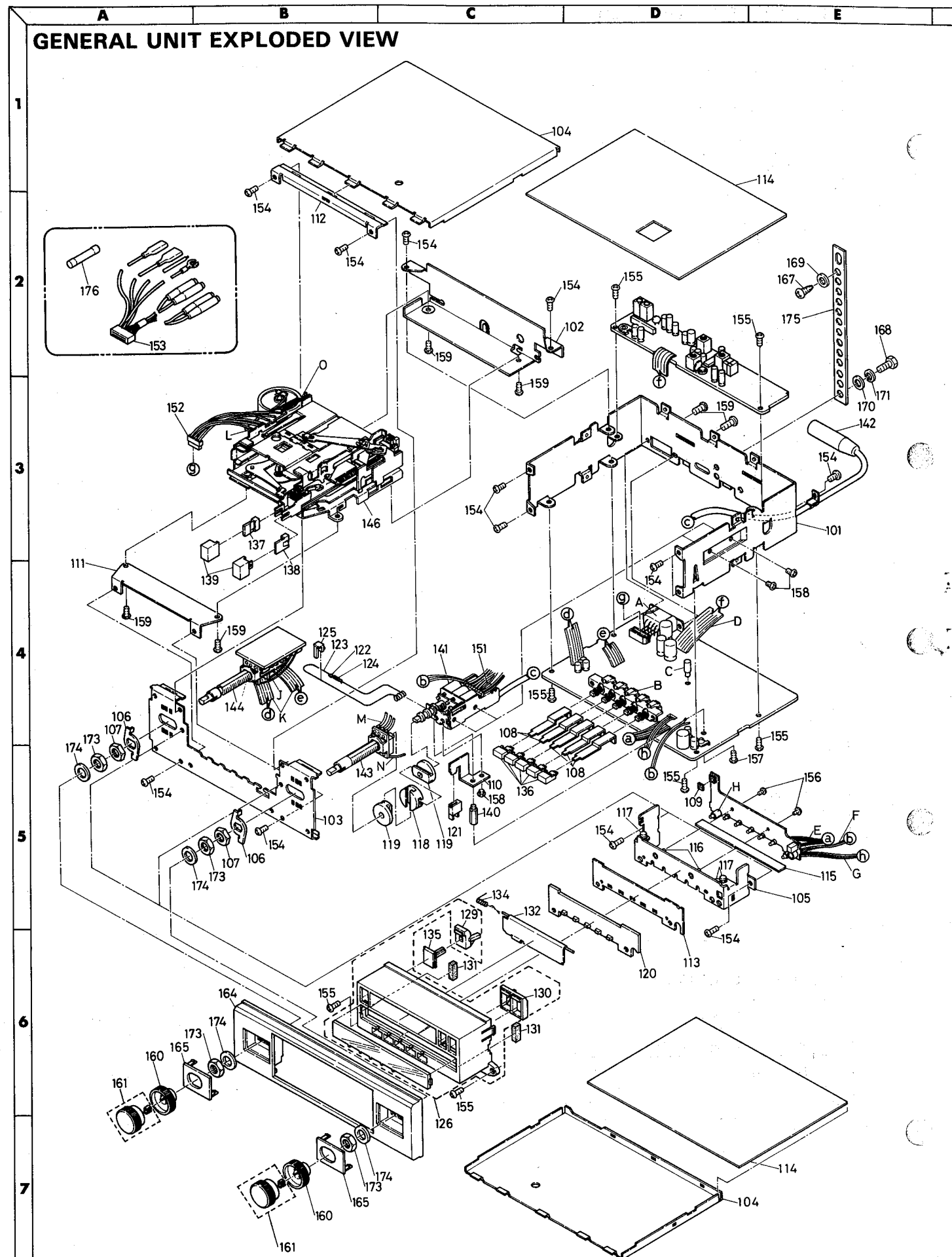


Fig. 10

## GENERAL UNIT EXPLODED VIEW



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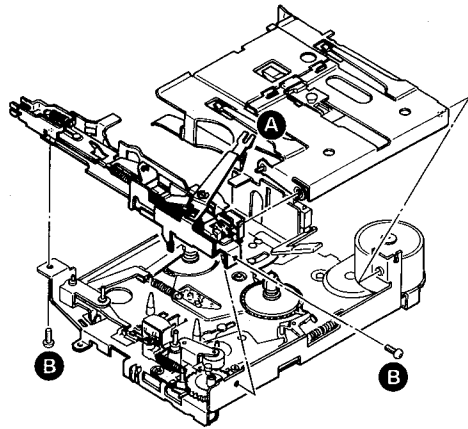


Fig. 8

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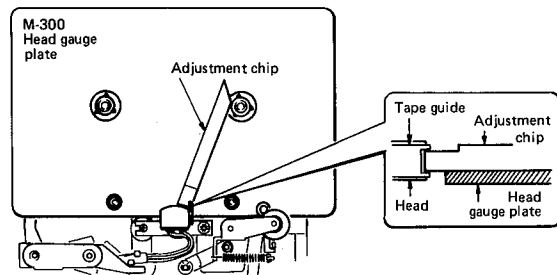


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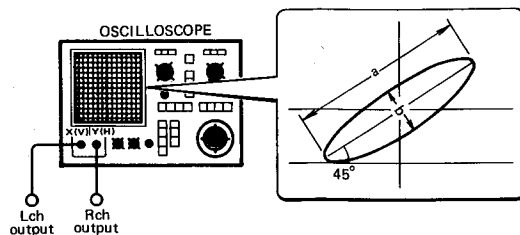


Fig. 10

GENEF

1

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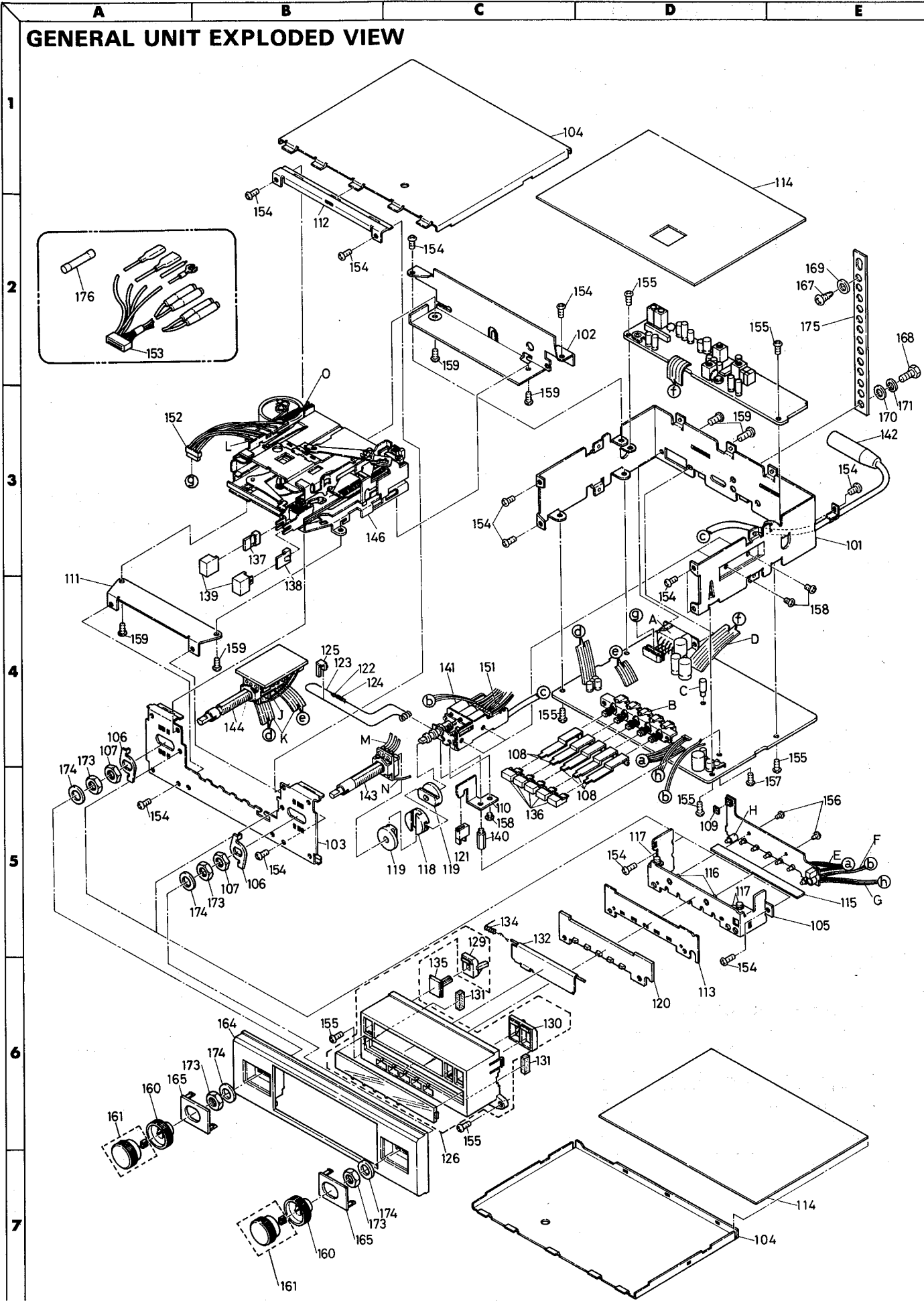
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174 173

**GENERAL UNIT EXPLODED VIEW**



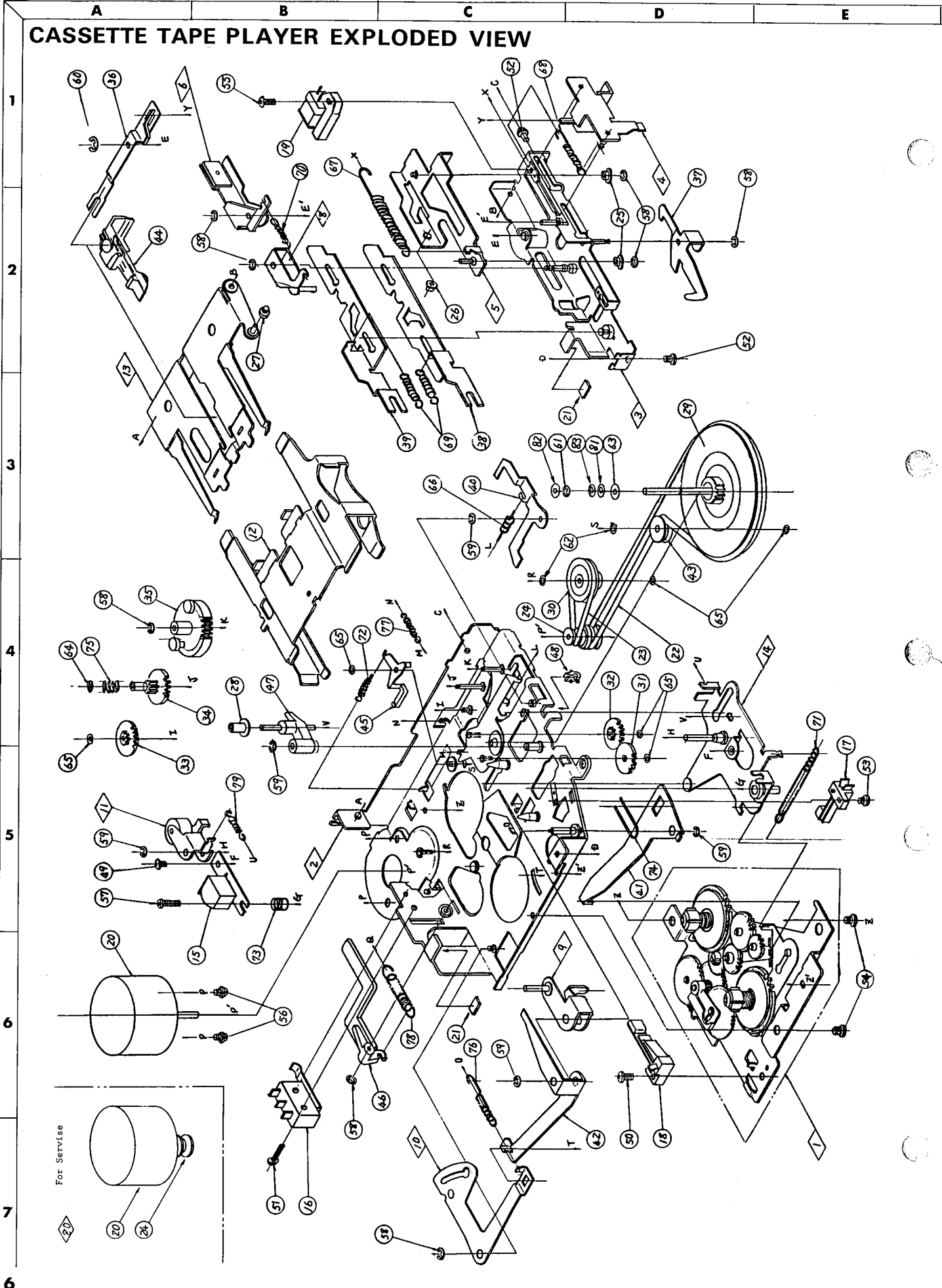


## GENERAL UNIT PARTS LIST

Ref. No.	Part No.	Description
101	PSEGCB31700	Out Panel
102	PSEGCB31900	Mecha Bracket (B)
103	PSEGCB32000	Front Panel
104	PSEGCB32100	Cover
105	PSEGCB31800	Front Chassis
106	PSEGCB32300	Volume Lock Washer
107	XHHNTSP9-2C	Volume Nut
108	PSEGCB32400	Switch Lever
109	PSMOLB35200	Switch Mask
110	PSEGCB32500	Tun-Bracket
111	PSEGCB32600	Mecha Bracket (A)
112	PSEGCB32200	Front Bracket
113	PSENB32800	Dial Back Plate
114	PSFIBB33100	Insulator
115	PSENB35400	L.E.D. Mask
116	HIBSBO-B079	Stud (A)
117	HIBSBO-B081	Post
118	INPOAA01800	Joint Plate (A)
119	INPOAA01900	Joint Plate (B)
120	INACLB17101	Dial Scale
121	INPOAA02300	String Hunger
122	XEY1.6-2	Eyelet
123	MP-DCTS44	Dial String
124	SUSUSO-B029	Dial Spring A
125	INPOCB17201	Dial Pointer
126	SC-CA1SE-BB	Nose Piece Assembly
129	INACLB16901	Illumination (L)
130	INACLB17001	Illumination (R)
131	PSMOLB35300	Shading Mask
132	PSALPB32700	Cassette Door Assembly
133	SUSUSO-B027	Door Shaft
134	SUSUSO-B034	Door Spring
135	INABSB17301	Eject Knob
136	INABSB17501	Push Knob
137	1356-7003	Button Base
138	1356-7004	Button Base
139	1662-176	Push Button
140	HIBSBO-B080	Stud (B)
141	FE-R-17-1419	Front End
142	CN-AJ01A591	Antenna Jack Cord
143	EVK-INAS07B13	Tuning Volume
144	EVK-5VBS02133	Main Volume
146	ME-930-0505-4	Mecha
151	CN-KP07A569	Tuner Connector Assembly
152	CN-KP06A570	Mecha Connector Assembly
153	CN-KJ09A592	Outer Connector Assembly
154	+PHTT2.6-4C	Screw Pan Head 2.6 x 4 (Tap Tite)
155	+PHTT2.6-5C	Screw Pan Head 2.6 x 5 (Tap Tite)
156	+PHMS2-5C	Screw Pan Head 2 x 5
157	+PHMS2.6-5C	Screw Pan Head 2.6 x 5
158	+BHMS3-3C	Screw Binding Head 3 x 3
159	+BHMS3-4C	Screw Binding Head 3 x 4
160	INABSB17401	Volume Knob
161	SC-CA1SE-AB28	Rotary Knob Assembly
162	MP-DSPR2900	D-Spring No. 2900
*164, 165	SC-CA1SE-AB58	Face Plate Assembly
*167, 168, 169, 170, 171	MPSCRA02600	Accessory Screw Kit
*173, 174	MPNUTB12900	Volume Nut Set
175	PSEGCB28100	Rear Hunger
176	MPFUSB12800	Spare Fuse 1A

\* Sold in kits

CASSETTE TAPE PLAYER EXPLODED VIEW



## CASSETTE TAPE PLAYER PARTS LIST

Ref. No.	Part No.	Description
1	960-3420-04	Bottom Sub Assembly
2	960-3423-03	Deck Plate Assembly
3	960-3424-07	Frame Assembly
4	960-3425-03	Loading-P Assembly
5	960-3426-07	Eject-P Assembly
6	960-3427-02	Core-P-A Assembly
8	960-3429-02	Lock-Plate-Assembly
9	960-3430-02	F.FWD-Link-A Assembly
10	960-3431-01	Replay-L-A Assembly
11	960-3437-02	P-Roller Assembly
12	606-0075-03	Pack Guide
13	960-3439-02	Guide-Arm Assembly
14	960-3440-02	Head Plate Assembly
15	011-0293-00	Head
16	013-2690-03	Switch
17	013-3470-05	Switch
18	013-3558-02	Switch
19	015-0232-00	Plunger
20	020-0366-00	DC-Motor
21	340-0398-00	Spacer
22	602-0074-00	Belt A
23	602-0075-00	Belt B
24	603-0083-07	Motor Pulley
25	620-0225-00	Guide Roller
26	610-0225-01	Guide Roller
27	610-0226-00	Guide Arm Roller
28	610-0227-01	Eject Roller
29	611-0065-01	Flywheel
30	613-0021-01	Pulley Gear
31	613-0029-00	Loading Gear A
32	613-0030-00	Loading Gear B
33	613-0031-00	Loading Gear C
34	613-0032-00	Loading Gear D
35	613-0033-00	Power Gear
36	630-1511-03	Loading Link
37	630-1513-01	Lock Link
38	630-1514-09	F.FWD Lever
39	630-1515-09	Rew. Lever
40	630-1518-00	Lock Arm
41	630-1521-01	F.FWD Link B
42	630-1526-00	Replay Link B
43	631-0370-00	Tension Pulley
44	631-0392-04	Pack Stopper
45	631-0394-00	Cancel Link
46	631-0395-01	Switch-Link
47	631-0398-00	Eject Link
48	631-0419-00	Clump
49	714-2003-81	Machine Screw
50	714-2306-81	Machine Screw
51	714-2308-81	Machine Screw
52	714-2603-81	Machine Screw
53	714-2604-11	Machine Screw
54	714-2604-81	Machine Screw
55	714-2606-11	Machine Screw
56	716-0347-00	Special Screw
57	716-0482-01	Special Screw
58	743-1500-10	E-Ring
59	743-2000-10	E-Ring
60	744-0006-01	Special E-Ring
61	744-0024-01	Special E-Ring
62	745-0645-00	Special Washer
63	745-0646-00	Special Washer
64	745-0647-00	Special Washer
65	746-0628-01	Special Washer
66	750-2219-00	Spring
67	750-2220-01	Spring
68	750-2221-01	Spring
69	750-2222-00	Spring
70	750-2233-01	Spring
71	750-2224-01	Spring
72	750-2225-00	Spring
73	750-2226-00	Spring
74	750-2227-00	Spring
75	750-2228-00	Spring
76	750-2229-00	Spring
77	750-2230-01	Spring
78	750-2231-00	Spring
79	750-2232-00	Spring
80	960-3528-00	Motor Assembly
81	746-0730-00	Special Washer

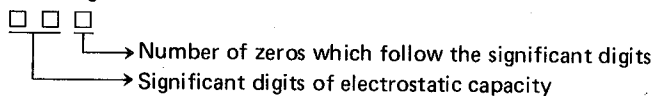
## SCHEMATIC DIAGRAM NOTES

The capacitors are provided with the indication of type at the back of the ref. No. Example: C251C, C266M

A: Al. Solid Capacitor                      C: Ceramic Capacitor  
 M: Mylar Capacitor                        P: Polypropylene Capacitor  
 S: Stylor Capacitor                        T: Tantalum Electrolytic Capcitor  
 No indication: Electrolytic Capacitor

In regards to the indication of electrostatic capacity values of the capacitors except the electrolytic capacitor, when the indicated value consists of three digits, the first and second digits indicate the significant figures of electrostatic capacity and the third digits indicates the number of zeros which follow the significant figures. When the value consists of two or one digit, the digits or digit indicates the electrostatic capacity value. (The unit of capacity value is pF.)

Three digits:



Example:

222 → 2200pF  
 403 → 40000pF (0.04μF)

Two digits:



Example:

33 → 33pF

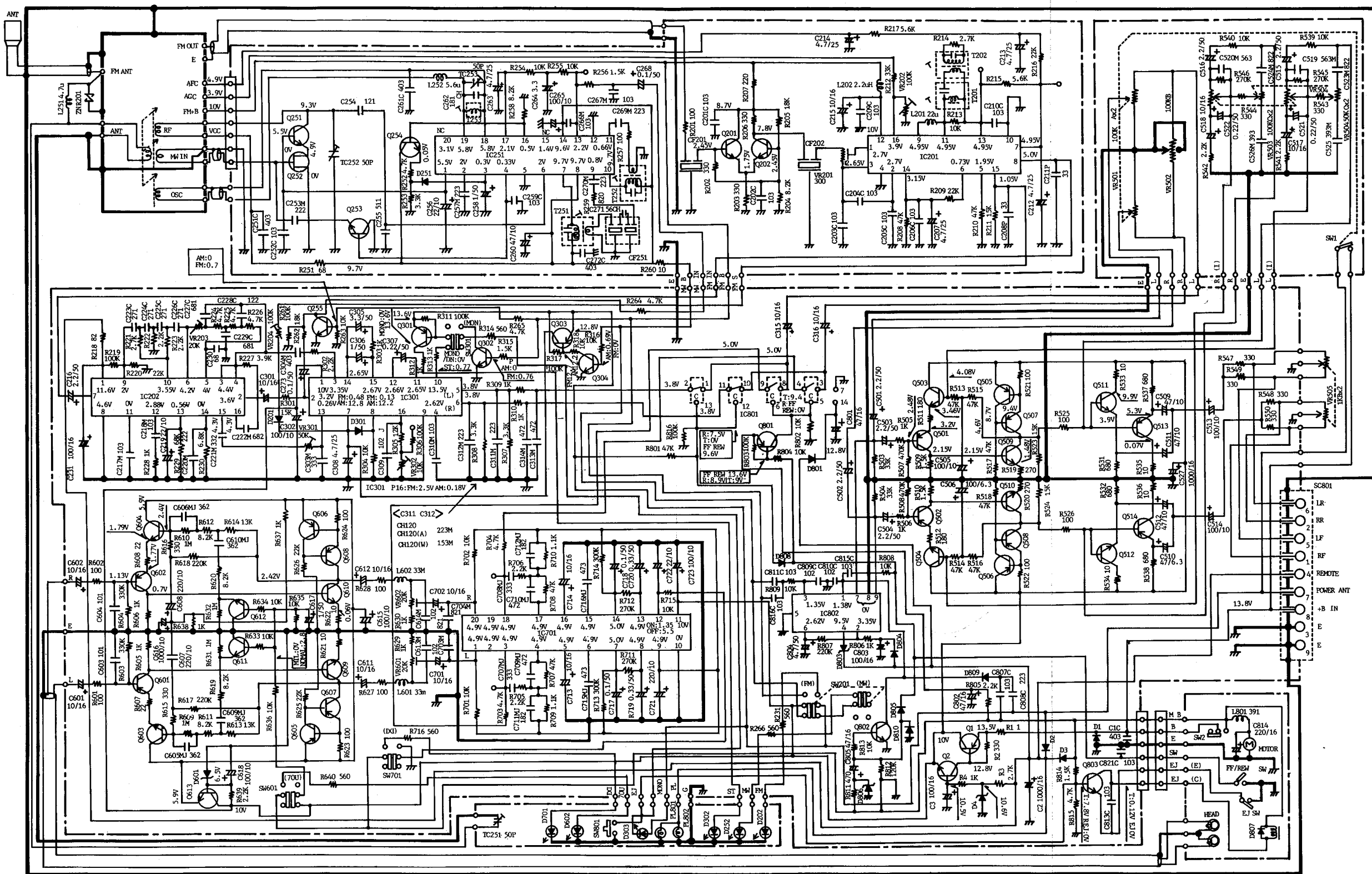
One digits:



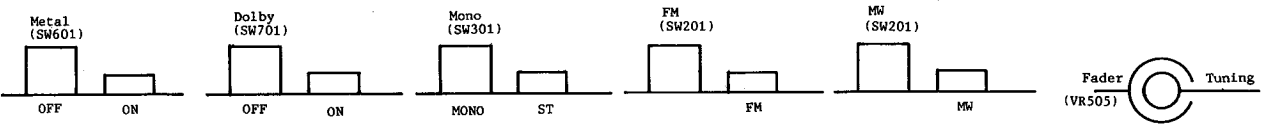
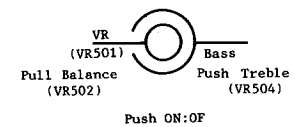
Example:

5 → 5pF

# SCHEMATIC DIAGRAM

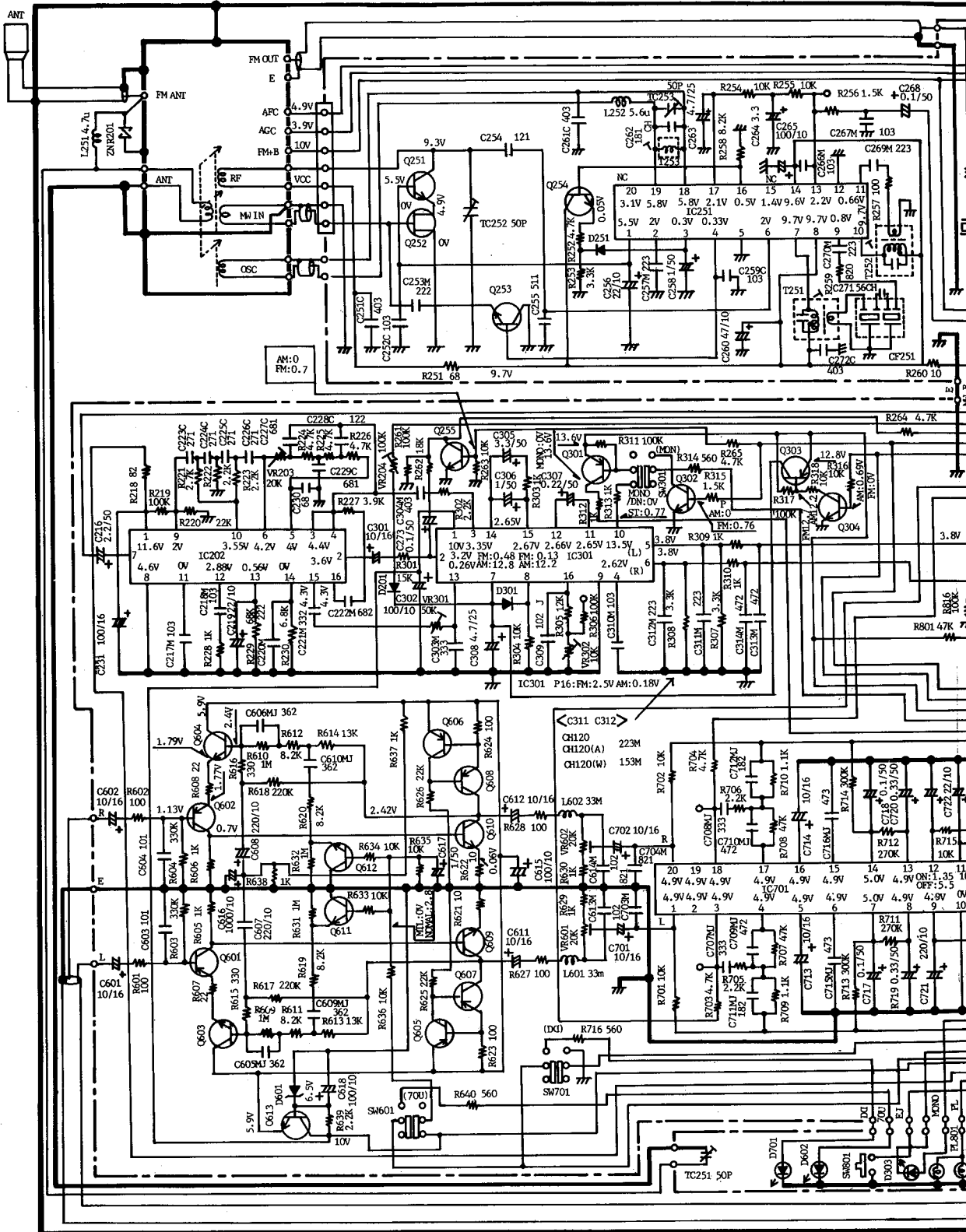


- |                         |                                       |                         |
|-------------------------|---------------------------------------|-------------------------|
| IC201 : LA1140          | Q2, 253, 254 : 2SC2458Y, GR           | D201, 251, 301 : 1S1588 |
| IC202 : LA2110          | 255, 302, 304 : 2SC536SPE, SPF, SPC   | 801, 804, 805 : 1S2075K |
| IC301 : LA3376          | 611, 612, 613 : 2SC2785RF, JF, HF, FF | 807, 808, 809 : M855    |
| IC251 : LA1135          | 802 : S180-02                         | 810 : M150              |
| IC701 : TA7719P         | Q251, 503, 504 : 2SC2458CR            | D1, 2, 3 : SR1K-4       |
| IC802 : TA7324P         | 509, 510, 609 : W03C                  | (F14BP)                 |
| IC801 : TC4068P         | 610 : H211BL                          |                         |
| Q803 : 2SC1815Y, GR     | Q601, 602 : 2SA1048L, GR              | D4 : H27A21             |
| Q252 : 2SK161Y, GR      | Q301, 303, 305 : 2SA1048Y, GR         | D803 : 052A, 3X, Y      |
| Q1 : 2SB834Y, O         | 506, 507, 508 : 2SA1048Y, GR          | D806 : 05210Y, Z        |
| Q201, 202 : 2SC2669Y, O | 605, 606, 607 : 608, 801              |                         |
| Q603, 604 : 2SC2458     | Q501, 502 : 2SA1048GR                 |                         |
| (2SC1815L)              | Q513, 514 : 2SA1048Y                  |                         |



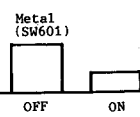
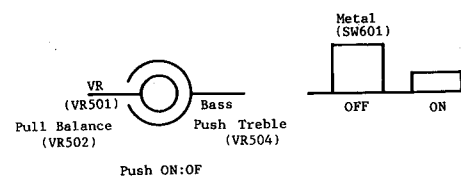
# SCHEMATIC DIAGRAM

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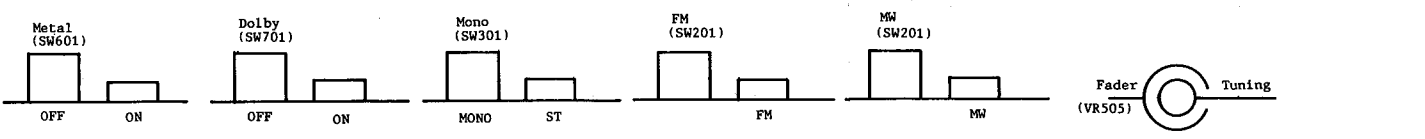
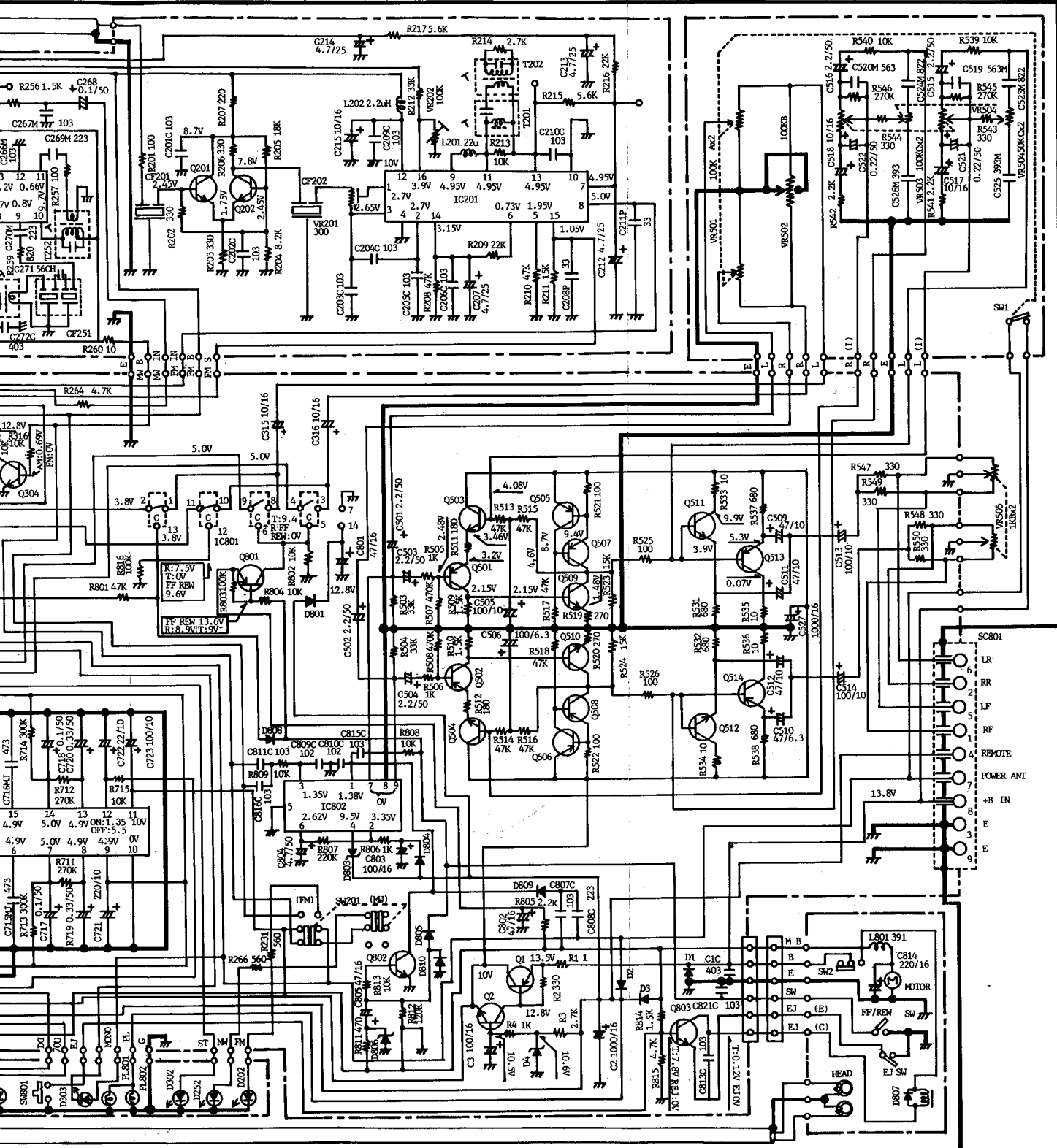


- |                         |                                       |                         |
|-------------------------|---------------------------------------|-------------------------|
| IC201 : LA1140          | Q2, 253, 254 : 2SC2458Y, GR           | D201, 251, 301 : 1S1588 |
| IC202 : LA2110          | 255, 302, 304 : 2SC536SPE, SPF, SPG   | 801, 804, 805 : 1S2075K |
| IC301 : LA3376          | 611, 612, 613 : 2SC2785RF, JF, HF, FF | 807, 808, 809 : 1M8555  |
| IC251 : LA1135          | Q251, 503, 504 : 2SC2458GR            | 810 : M150              |
| IC701 : TA7719P         | 509, 510, 609                         | D1, 2, 3 : S1B0-02      |
| IC802 : TA7324P         | 610                                   | (SR1K-4)                |
| IC801 : TC4066BP        | Q601, 602 : 2SA1048L, GR              | (W03C)                  |
| Q803 : 2SC1815Y, GR     | Q301, 303, 305 : 2SA1015L, GR         | F148P                   |
| Q252 : 2SK161Y, GR      | Q501, 502 : 2SA1048GR                 | H2181L                  |
| Q1 : 2SB834Y, O         | Q513, 514 : 2SA1048Y                  | H7A2L                   |
| 2SB596Y, O              |                                       | O524, 3X, Y             |
| Q201, 202 : 2SC2669Y, O |                                       | O5210, Z                |
| Q603, 604 : 2SC2458L    |                                       |                         |
| (2SC1815L)              |                                       |                         |

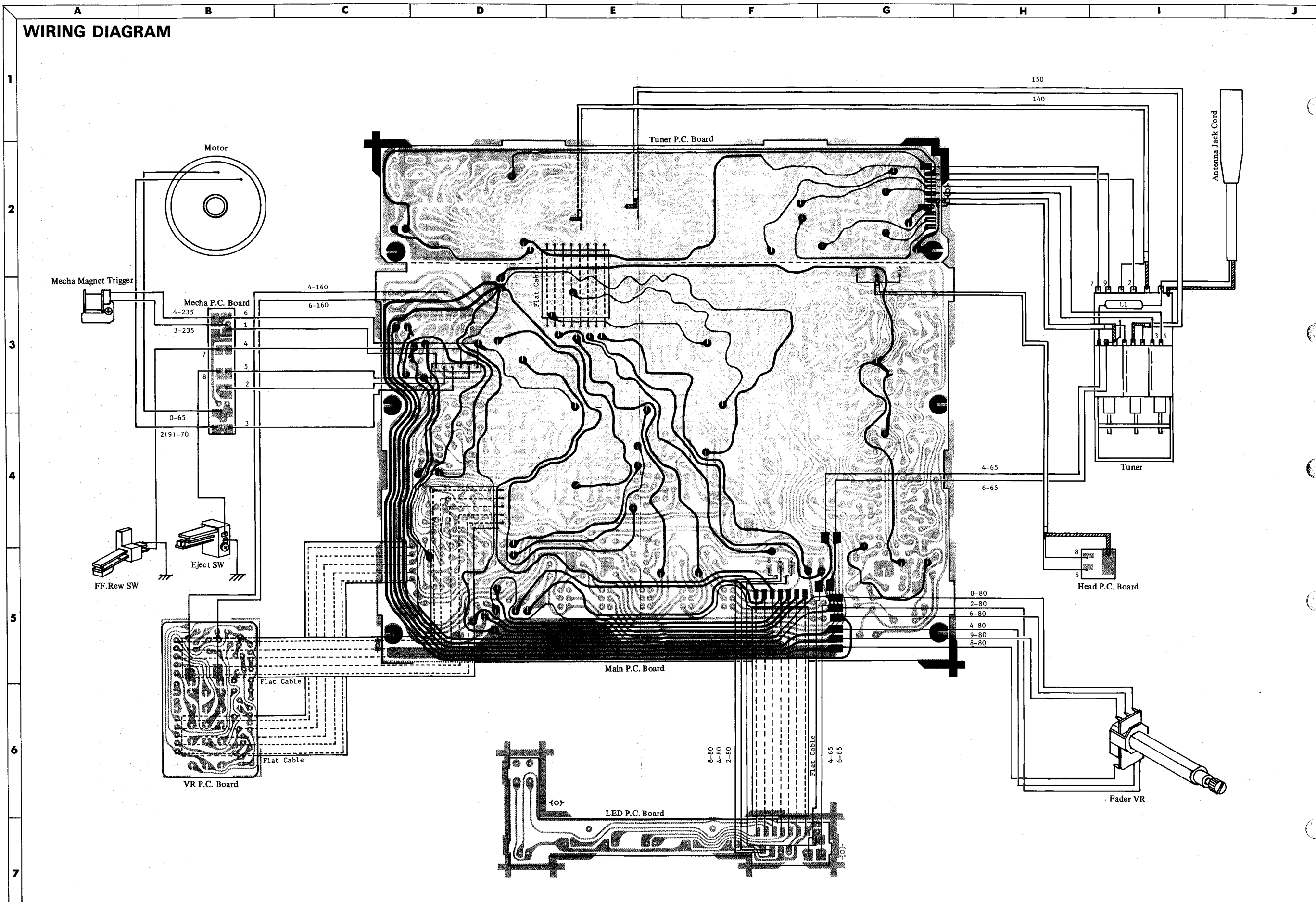
- |                         |
|-------------------------|
| D201, 251, 301 : 1S1588 |
| 801, 804, 805 : 1S2075K |
| 807, 808, 809 : 1M8555  |
| 810 : M150              |
| D1, 2, 3 : S1B0-02      |
| (SR1K-4)                |
| (W03C)                  |
| F148P                   |
| H2181L                  |
| D601 : H7A2L            |
| D803 : O524, 3X, Y      |
| D806 : O5210, Z         |



E F G H I

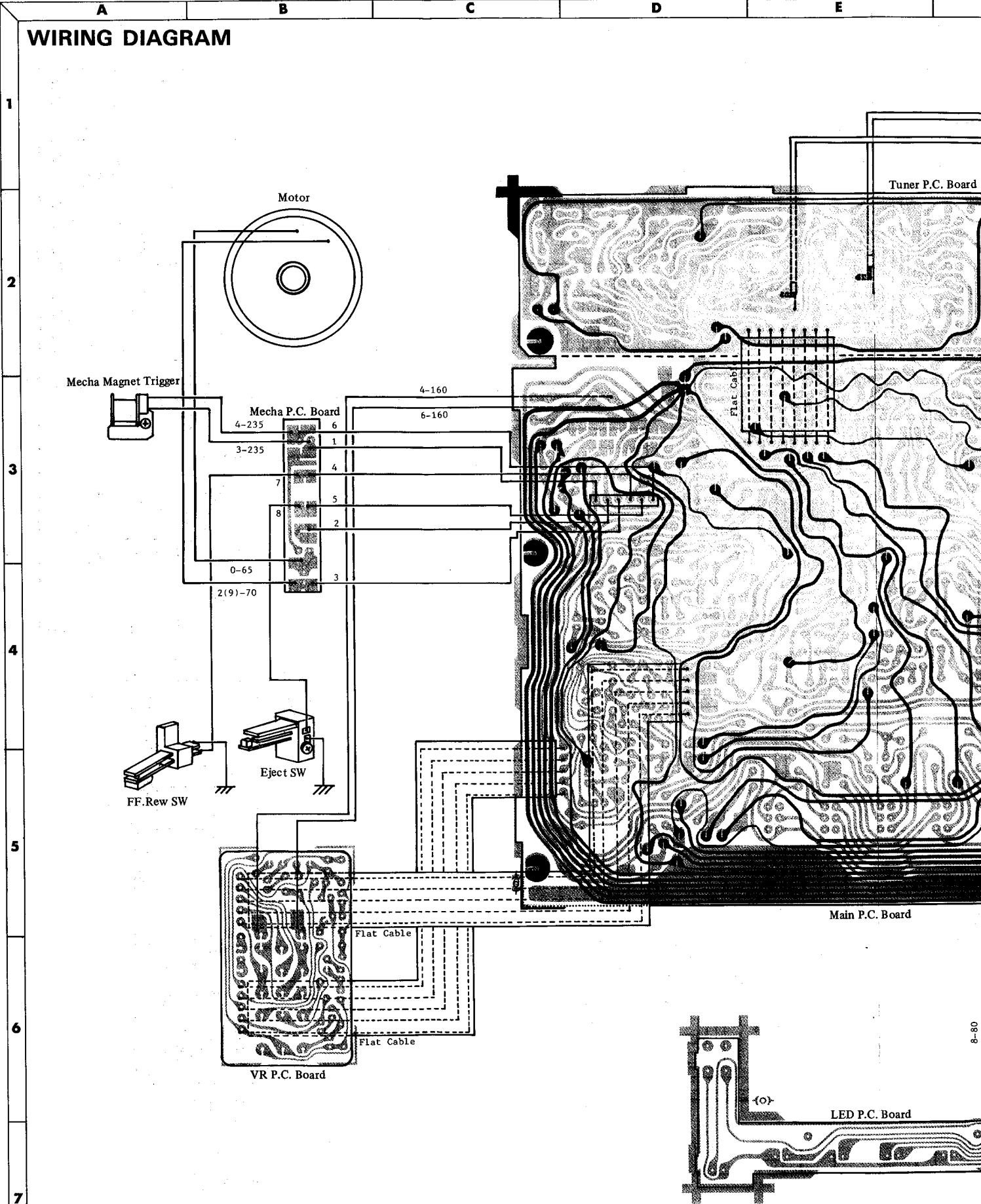


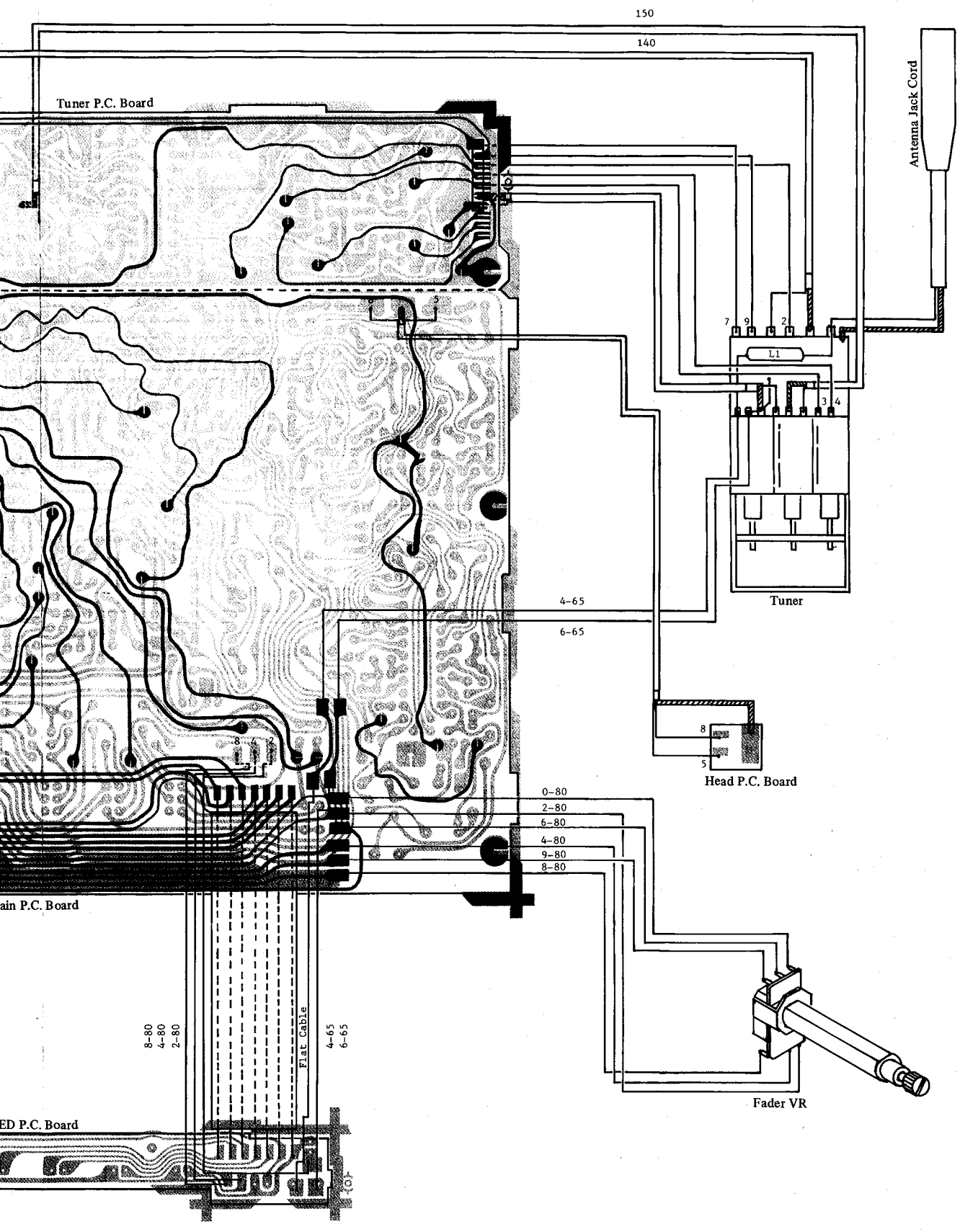
WIRING DIAGRAM





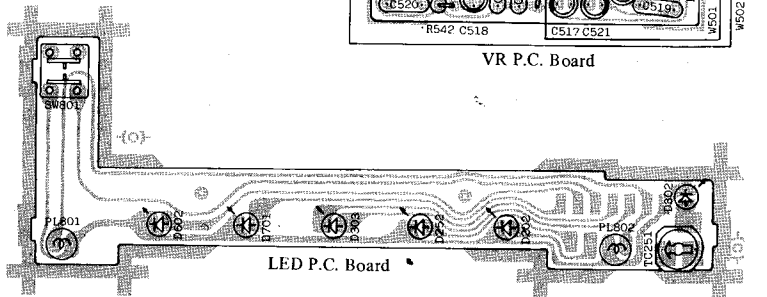
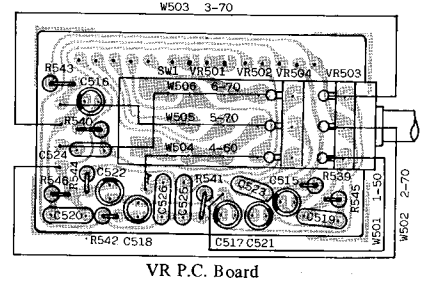
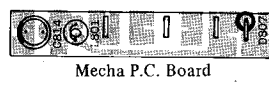
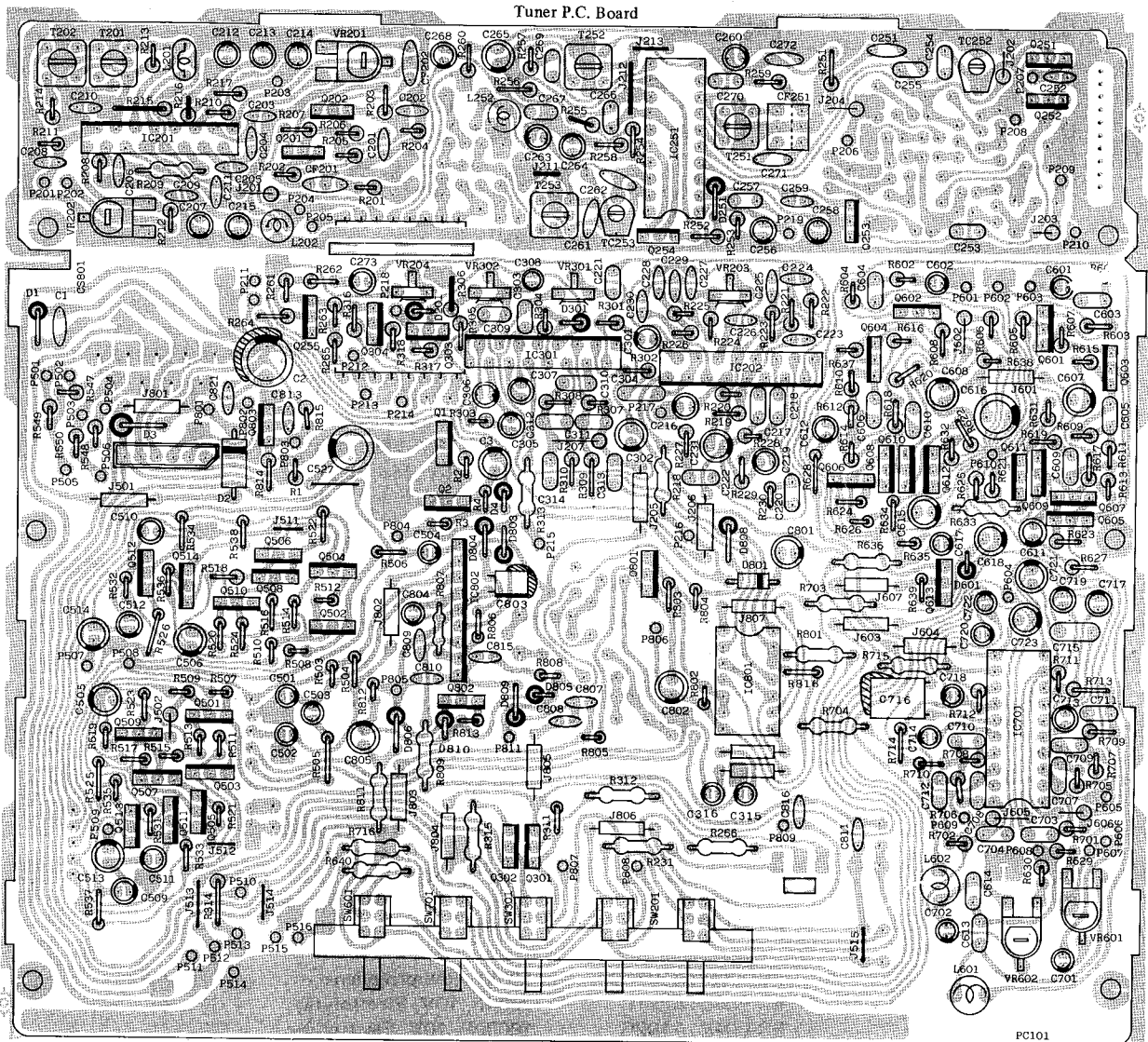
# WIRING DIAGRAM





A B C D E  
P.C. BOARDS

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## ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
<b>CHASSIS MISCELLANEOUS</b>		
NZR201	ERZD03DK331	Zener
L251	ET-LF24BZ14R7	Choke Coil, 4.7 $\mu$ H
M	LERLWXB299-01	Ribbon Lead
N	LERLWXB299-02	Ribbon Lead
O	LERLWXB299-05	Ribbon Lead
<b>MAIN P.C. BOARD</b>		
<b>CONTROLS</b>		
VR203	EVN-K0-203B	20k $\Omega$ , Separation Adjust
VR204	EVN-K0-104B	100k $\Omega$ , Separation Adjust
VR301	EVN-K0-503B	50k $\Omega$ , MPX Adjust
VR302	EVN-K0-103B	10k $\Omega$ , MPX Adjust
VR601, 602	EVN-K4-203B	20k $\Omega$ , Dolby NR Adjust
<b>CAPACITORS</b>		
C2	EC-E04E1C102K	1000 $\mu$ F, 16V, Electrolytic
C3, 231	EC-E04E1C101C	100 $\mu$ F, 16V, Electrolytic
C216	EC-E04E1H2R2A	2.2 $\mu$ F, 50V, Electrolytic
C219	EC-E04E1A220A	2.2 $\mu$ F, 10V, Electrolytic
C273, 717	EC-E04E1H0R1A	0.1 $\mu$ F, 50V, Electrolytic
C301, 611, 612, 713	EC-E04E1C100A	10 $\mu$ F, 16V, Electrolytic
C302, 618, 723	EC-E04E1A101C	100 $\mu$ F, 10V, Electrolytic
C307	EC-E04E1HR22A	0.22 $\mu$ F, 50V, Electrolytic
C308	EC-E04E1E4R7Z	4.7 $\mu$ F, 25V, Electrolytic
C309	ECQ92M1H102JX	0.001 $\mu$ F, Polypropylene
C315, 316, 714	EC-E04E1C100C	10 $\mu$ F, 16V, Electrolytic
C501, 502, 503, 504	EC-E04E1H2R2C	2.2 $\mu$ F, 50V, Electrolytic
C505, 513, 514, 615	EC-E04E1A101B	100 $\mu$ F, 10V, Electrolytic
C506	EC-E04E0J101E	100 $\mu$ F, 6.3V, Electrolytic
C509, 511, 512	EC-E04E1A470B	47 $\mu$ F, 10V, Electrolytic
C510	EC-E04E0J470D	47 $\mu$ F, 6.3V, Electrolytic
C527	EC-E04E1C102L	1000 $\mu$ F, 16V, Electrolytic
C601, 602, 701, 702	EC-E04E1C100Z	10 $\mu$ F, 16V, Electrolytic
C603, 604	ECQ92M1H101KX	100pF, Polypropylene
C607, 608, 721	EC-E04E1A221C	220 $\mu$ F, 10V, Electrolytic
C616	EC-E04E1A102G	1000 $\mu$ F, 10V, Electrolytic
C617	EC-E04E1H1ROC	1 $\mu$ F, 50V, Electrolytic
C718	EC-E04E1H0R1C	0.1 $\mu$ F, 50V, Electrolytic
C719	EC-E04E1HR33A	0.33 $\mu$ F, 50V, Electrolytic
C720	EC-E04E1HR33Z	0.33 $\mu$ F, 50V, Electrolytic
C722	EC-E04E1A220A	22 $\mu$ F, 10V, Electrolytic
C801, 802, 805	EC-E04E1C470E	47 $\mu$ F, 16V, Electrolytic
C803	EC-E04E1C101B	100 $\mu$ F, 16V, Electrolytic
C807	EC-E04E1E4R7C	4.7 $\mu$ F, 25V, Electrolytic
<b>INTEGRATED CIRCUITS</b>		
IC202	5652-LA2110	LA2110
IC301	5652-LA3376	LA3376
IC701	5652-TA7719P	TA7719P
IC801	5654-TC4066BP	TC4066BP or MN4066B
IC802	IC-TA7324P	TA7324P
<b>TRANSISTORS</b>		
Q1	TR-2SB834O	2SB834(O) or (Y), or 2SB596(O) or (Y)
Q2, 255, 302, 304, 611, 612, 613, 802	TR-2SC2458Y	2SC2458(Y) or (GR), or 2SC536S(PE) or (PF) or (PG), or 2SC2785(RF) or (JF) or (HF) or (FF)

Ref. No.	Part No.	Description
Q301, 303, 505, 506, 507, 508, 605, 606, 607, 608, 801	TR-2SA1048Y	2SA1048(Y) or (GR)
Q501, 502	TR-2SA1048GR	2SA1048(GR)
Q503, 504, 509, 510, 609, 610	TR-2SC2458GR	2SC2458(GR)
Q511, 512	TR-2SC2458Y	2SC2458(Y)
Q513, 514	TR-2SA1048Y	2SA1048(Y)
Q601, 602	TR-2SA1048LGR	2SA1048L(GR) or 2SA1015L(GR)
Q603, 604	TR-2SC2458LGR	2SC2458L(GR) or 2SC1815L(GR)
Q803	TR-2SC1815Y	2SC1815(Y) or (GR)
<b>DIODES</b>		
D1, 2, 3	DI-SR1K-4	SR1K-4 or SIB01-02 or W03C or F14BP
D4	DI-HZ11B1L	Zener, HZ11B1L
D201, 301, 801, 804, 805, 808, 809, 810	DI-1S1588	1S1588 or 1S2075K or M8555 or M150
D601	DI-HZ7A2L	Zener, HZ7A2L
D803	DI-05Z4.3X	Zener, 05Z4.3(X) or (Y)
D806	DI-05Z10Y	Zener, 05Z10(Y) or (Z)
<b>COILS</b>		
L601, 602	FS0712-333K	33mH
<b>MISCELLANEOUS</b>		
P211~218, 501~ 516, 604, 607~ 610, 801~809, 811	PN-S-R8-4R5	Through Hole Pin (0.8 x 0.8 x 4.5 mm)
P601~603, 605, 606	PN-MK-10160	Through Hole Pin (1.0 $\phi$ x 16 mm)
A	5267-06A	Connector
B	SW-PV1255-033	Push Switch
C	INABSB17600	P.C. Board Spacer
D	LEWLWXB301-02	Flat Cable
	+PHTPB3-5C	Screw Pan Head (3 x 5 mm) (Tapping)
	PSALPB35800	Heat Sink
	MP-AC223	Spacer
	MP-AC316A	Washer
	PSFIBB33100	Insulator
<b>TUNER P.C. BOARD</b>		
<b>CONTROLS</b>		
VR201	EVN-K4-301B	300 $\Omega$ , Noise Difference Adjust
VR202	EVN-K4-104B	100k $\Omega$ , Muting On Level Adjust
<b>CAPACITORS</b>		
C207, 212, 213, 214, 263	EC-E04E1E4R7A	4.7 $\mu$ F, 25V, Electrolytic
C215	EC-E04E1C100A	10 $\mu$ F, 16V, Electrolytic
C254	ECQ92M1H121KX	120pF, Polypropylene
C255	ECQ92M1H511KX	510pF, Polypropylene
C256	EC-E04E1A220A	22 $\mu$ F, 10V, Electrolytic
C258	EC-E04E1H1R0A	1 $\mu$ F, 50V, Electrolytic
C260	EC-E04E1A470A	47 $\mu$ F, 10V, Electrolytic
C264	EC-E04E1H3R3A	3.3 $\mu$ F, 50V, Electrolytic
C265	EC-E04E1A101C	100 $\mu$ F, 10V, Electrolytic
C268	EC-E04E1HOR1A	0.1 $\mu$ F, 50V, Electrolytic
TC252, 253	ECV-1ZW50x53T	Trimmer Capacitor
<b>INTEGRATED CIRCUITS</b>		
IC201	5652-LA1140	LA1140
IC251	IC-LA1135	LA1135

Ref. No.	Part No.	Description
<b>TRANSISTORS</b>		
Q201, 202	TR-2SC2669Y	2SC2669(Y) or (O)
Q251	TR-2SC2458GR	2SC2458(GR)
Q252	TR-2SK161Y	F.E.T., 2SK161(Y) or (GR)
Q253, 254	TR-2SC2458Y	2SC2458(Y) or (GR), or 2SC536S(PE) or (PF) or (PG), or 2SC2785(RF) or (JF) or (HF) or (FF)
<b>DIODE</b>		
D251	DI-1S1588	1S1588 or 1S2075K or M8555 or M150
<b>COILS</b>		
L201	EL0606SK1220K	22 $\mu$ H
L202	EL4H2R2K	2.2 $\mu$ H
L252	EL4H5R6K	5.6 $\mu$ H
<b>TRANSFORMERS</b>		
T201	ET-R12-6703A	FM DFT Coil 1st
T202	ET-R12-6661A	FM DFT Coil 2nd
T251	ET-R12-4494	AM IFT Coil
T252	ET-R12-6660A	AM DFT IFT Coil
T253	ET-OSC-L5K7H5	AM OSC Coil
<b>MISCELLANEOUS</b>		
CF201	5671-7147A	Ceramic Filter
CF202	5671-7117A	Ceramic Filter
CF251	SFZ455F	Ceramic Filter
P201~210, 219	PN-S-R8-4R5	Through Hole Pin (0.8 x 0.8 x 4.5 mm)
<b>LED P.C. BOARD</b>		
<b>DIODES</b>		
D202, 252, 303, 602, 701	DI-LN48YP	L.E.D., Orange
D302	DI-GL-9PR4	L.E.D., Red
<b>MISCELLANEOUS</b>		
PL801, 802	LA3000001826X	Lamp
SW801	SW-EVQ-QS205K	Tact Switch
TC251	ECTZ51G	Trimmer Capacitor
E	LEWLWX-B302	L.E.D. Flat Cable
F	LERLWXB299-03	Ribbon Lead
G	LERLWXB299-04	Ribbon Lead
H	INGUMB18200	Lamp Holder
<b>VR P.C. BOARD</b>		
I(144)	EVK-5VBS02133	Main Volume
C515, 516	EC-E04E1C100Z	10 $\mu$ F, 16V, Electrolytic
C521, 522	EC-E04E1HR22Z	0.22 $\mu$ F, 50V, Electrolytic
J	LERLWXB299-06	Volume Ribbon Lead
K	LEWLWXB301-01	Flat Cable
<b>MECHA P.C. BOARD</b>		
L801	SP0406-391M-6	Micro Inductor, 390mH
D807	DI-1S1588	Diode, 1S1588 or 1S2075K or M8555 or M150
C814	EC-E04E1C221F	220 $\mu$ F, 16V, Electrolytic Capacitor