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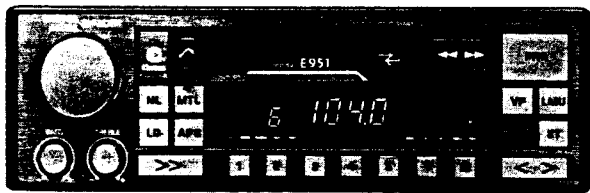
Closer Relations through  
"Clarion Service Manual"

# Service Manual

## Overseas Sales Branch Offices

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Clarion (HONG KONG) Co., Ltd. 526, Ocean Centre, Canton Road, Tsimshatsui, Kowloon, Hong Kong Tel: 3-690528 Telex: HX64293 CLAHK  
Clarion Canada Inc. 1401 Meyerside Dr. Mississauga, Ontario L5T 1G8, Canada Tel: 416-678-1367 Telex: 216968573 CLARION MSGA  
Clarion Shoji (U.K.) Ltd. 4-6, Faraday Road, Dorcan Industrial Estate, Dorcan, Swindon, Wiltshire, SN3 5HQ United Kingdom Tel: (0793) 24081 Telex: 44689

Model **E951** (PE-9006A)  
**E950** (PE-9007A)



E951



E950

## SPECIFICATIONS:

### Radio section

Circuit system: Superheterodyne  
Tuning system: Electronic tuning  
Receiving frequency: LW 155kHz to 281kHz  
MW 531kHz to 1,602kHz  
UKW(FM) 87.5MHz to 108MHz

### Intermediate frequency:

LW, MW 459kHz  
UKW(FM) 10.7MHz

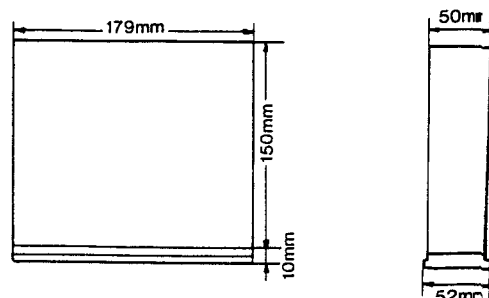
### Tape section

Reproduction system: Auto reversing  
4 track, 2 channel, 2 program stereo cassette tape playback  
(Monaural also capable)  
Tape speed: 4.76cm/sec. (1 7/8 ips)

### Composite

Speaker impedance: 4Ω×2, 4Ω×4  
Power output: 15W×2  
(at 10% distortion TYP.)  
More than 22W×2  
(at max. output TYP.)  
Power supply voltage: DC 14.4V(10.8V to 15.6V)  
Negative ground  
Power consumption: Less than 7A  
(at max. output)  
Semiconductors: 1 LSI, 21 ICs, 48 Transistors  
(Not included and 47 Diodes (E951)  
Tuner pack) 1 LSI, 19 ICs, 38 Transistors  
and 43 Diodes (E950)

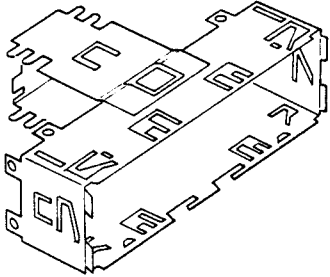
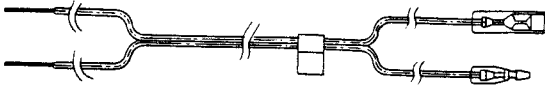
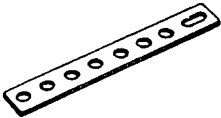
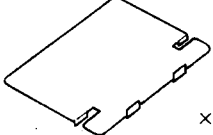
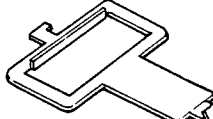




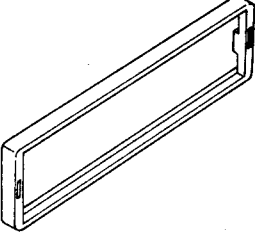

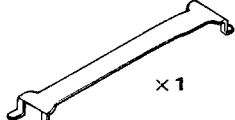


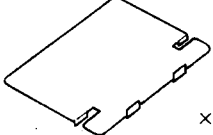
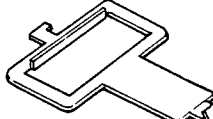




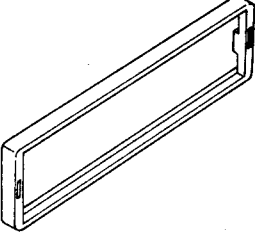

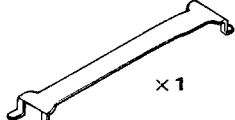


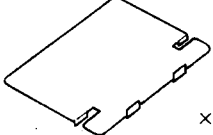
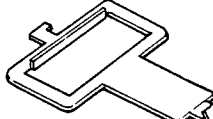




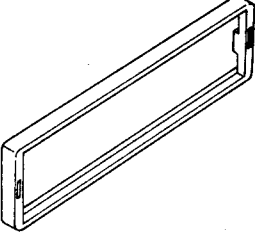

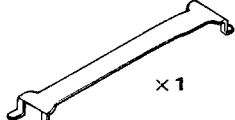


### Dimensions:



Weight: 1.8kg

## ■ COMPONENT VIEW:

- E951(PE-9006A-A)
- E950(PE-9007A-A)

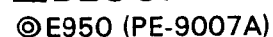
<table> <tr> <td>Main unit</td><td>1</td></tr> <tr> <td>Mounting bracket 300-6692-00</td><td>1</td></tr> </table>	Main unit	1	Mounting bracket 300-6692-00	1	<table> <tr> <td>Extension lead</td><td></td></tr> <tr> <td>852-5216-02(RIGHT REAR)</td><td>1</td></tr> <tr> <td>-03(RIGHT FRONT)</td><td>1</td></tr> <tr> <td>-04(LEFT REAR)</td><td>1</td></tr> <tr> <td>-05(LEFT FRONT)</td><td>1</td></tr> </table>	Extension lead		852-5216-02(RIGHT REAR)	1	-03(RIGHT FRONT)	1	-04(LEFT REAR)	1	-05(LEFT FRONT)	1
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	 820-0050-04 Vinyl tube														

## ■ FEATURES:

- MW/LW/UKW(FM)-MPX electronic tuning radio with auto reverse stereo cassette player (F.F., REW. lock).
- Provided radio traffic information (VF) system. (E951)
- NL (Noise Limiter).

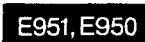
- MTL (tape selector).
- LD (Loudness).
- APC (Automatic Program Control).
- BASS & TREBLE tone control.
- Max. power 22W×2. (TYP.)
- ARK mechanism.

©E951 (PE-9006A)




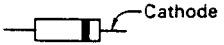
©UKW(FM) circuit

©UKW(FM) circuit





## ■ADJUSTMENT:

Adjustment item	Adjustment point	Procedure
S curve	IFT1 and IFT103	<ol style="list-style-type: none"> <li>1. Connect the output of an IF sweep generator to TP101 and the input of the vertical hold of an oscilloscope to TP104.</li> <li>2. Ground TP105.</li> <li>3. Adjust the S curve by means of IFT1 and IFT103.</li> </ol> 
S curve fine adjustment	VR102	<ol style="list-style-type: none"> <li>1. Tune at 87.5MHz (87.500Hz) and input a 28dB non-modulated SSG signal.</li> <li>2. Connect a digital volt meter between TP102 and TP103.</li> <li>3. Adjust VR102 so that the voltage between TP102 and TP103 is 0V.</li> <li>4. May adjust 0V by receiving weak broadcasting signal.</li> </ol>
Stop seek sensitivity	VR101	<ol style="list-style-type: none"> <li>1. Tune at 87.5MHz (87.500Hz), input a 28dB non-modulated SSG signal.</li> <li>2. Adjust VR101 so that the voltage of the cathode of D101 is in the range 1 to 4V.</li> </ol> 
SASC	VR105	<ol style="list-style-type: none"> <li>1. Tune at 87.5MHz (87.500Hz), input an 55dB, 7kHz modulation frequency, 30% modulation degree SSG signal, and then turn on ST. SW.</li> <li>2. Adjust the output level of the volume controller to 0dBm (0.775V).</li> <li>3. Set the SSG output to 38dB and adjust VR105 so that the output level is -3dBm.</li> </ol>
MPX 1. VCO 2. Separation	VR106 VR104	<ol style="list-style-type: none"> <li>1. Tune at 87.5MHz (87.500Hz), input a 55dB non-modulated SSG signal, and then turn on ST. SW.</li> <li>2. Connect a frequency counter to TP108 through a 100kΩ resistor and adjust VR106 so that the counter indicates 76kHz.</li> <li>1. Tune at 87.5MHz (87.500Hz), connect the output of a stereo modulator to the external modulation terminal, and input a 65dB SSG signal.</li> <li>2. Set the stereo modulator to the L or R ch and adjust VR104 so that the maximum separation is obtained.</li> </ol>
SK 1. VCO 2. 57kHz trap (E951)	VR103 L104	<ol style="list-style-type: none"> <li>1. Tune at 87.5MHz (87.500Hz), input a 55dB non-modulated SSG signal.</li> <li>2. Connect the frequency counter to TP106 and adjust VR103 so that the counter indicates 57kHz.</li> <li>1. Tune at 87.5MHz (87.500Hz), connect the output of the stereo modulator to the external modulation terminal, and then input a 55dB SSG signal.</li> <li>2. Turn on SK. SW. of stereo modulator.</li> <li>3. Adjust L104 so that the wave-form of pin 15 (TP107) of STK2200 is maximized.</li> </ol>
DK VCO (E951)	VR201	<ol style="list-style-type: none"> <li>1. Tune at 87.5MHz (87.500Hz), input a 55dB non-modulated SSG signal, and turn on VF. SW.</li> <li>2. Connect the frequency counter to TP201 through a 22kΩ resistor and adjust VR201 so that the counter indicates 125Hz. In the case, 25sec later, seeking occurs.</li> </ol>
VU level	VR601 VR602	<ol style="list-style-type: none"> <li>1. Reproduce the 315Hz -10VU tape.</li> <li>2. Adjust VR601 and VR602 so that only first one of 5 points of the VU level indicator lights up.</li> </ol>

[NOTE] After the adjustment of frequency range, be sure that;

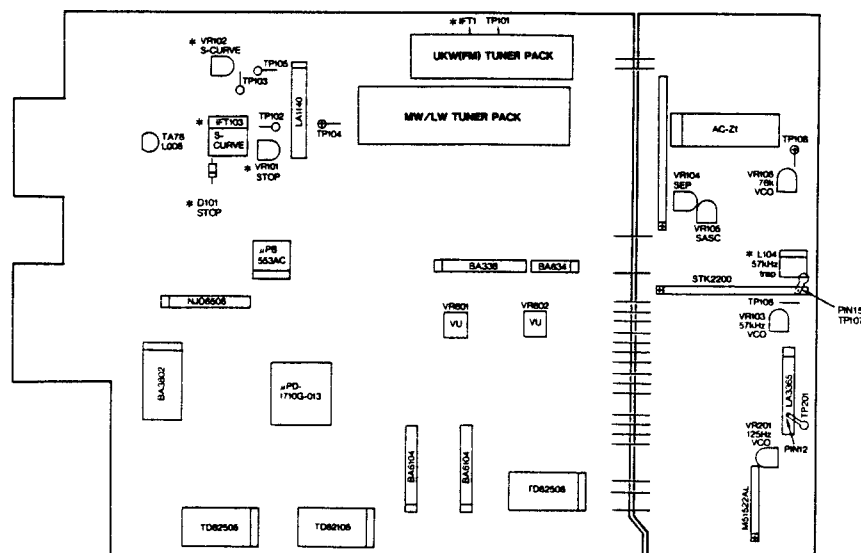
(1) Band edge frequency of LW shall be 148.5kHz -20kHz

(2) Band edge frequency of UKW shall be 87.5MHz +100kHz -160kHz

at low end. And shall be lower than 108.16MHz at upper end.

- SPECIFICATION -LIMIT- Quieting sensitivity: MW Less than 33dB(at 20dB S/N)  
LW Less than 39dB(at 20dB S/N)  
UKW Less than 12dB(at 30dB S/N)
- Stereo separation: UKW More than 20dB

### ●ADJUSTMENT POINT



(NOTE) The part marked "\*" should be adjusted from parts side, and the other adjustment should be done from P.W.B. pattern side.

## ■ADJUSTMENT:

### <TAPE MECHANISM>

#### 1. AZIMUTH ADJUSTMENT

Play the 6.3kHz, -10VU section of the AZIMUTH tape and adjust the head azimuth adjustment screw (716-0429-00) so that the output levels are maximized in both tape running directions. (Figure 1)

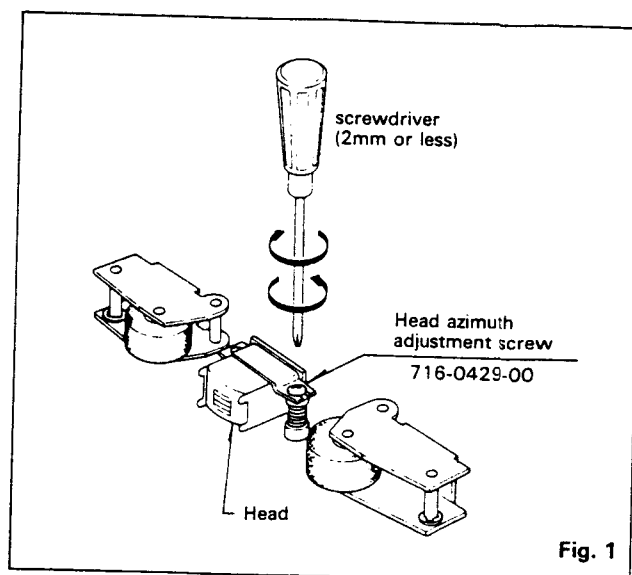


Fig. 1

#### 2. FF/REW GEAR ENGAGEMENT ADJUSTMENT

If any abnormal sound is heard during FF/REW operation, adjust gear engagement as follows.

First identify the gear causing the abnormal sound. Then, adjust projection of the reel base plate ass'y by bending it in an appropriate direction as shown in Fig. 2; (A) when the FF gear causes abnormal sound; (B) when the REW gear causes abnormal sound.

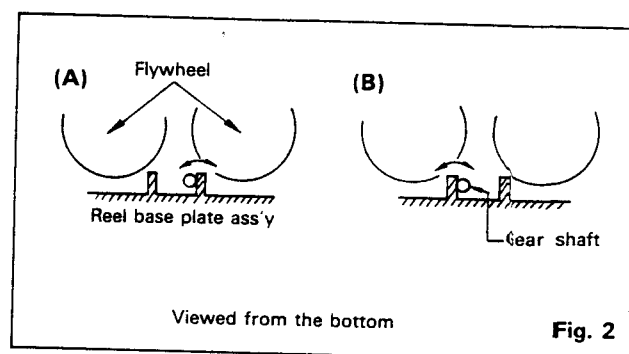


Fig. 2

#### 3. IDLER GEAR ENGAGEMENT ADJUSTMENT

If any abnormal sound is heard during PLAY operation, adjust gear engagement as follows. First identify the gear causing the abnormal sound. Then, adjust projection of the roller plate A ass'y by bending it in an appropriate direction as shown in Fig. 3; (A) when the FWD gear causes abnormal sound; (B) when the REV gear causes abnormal sound.

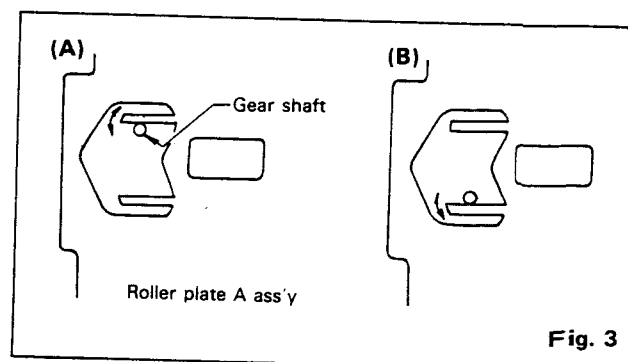


Fig. 3

#### 4. LEAF SWITCH POSITION ADJUSTMENT

When replacing the leaf switch, first remove P.W.B from the mechanism, remove the solder on the leaf switch, adjust the position of the leaf switch from the P.W.B switch position adjustment hole, and then solder the switch. (Figure 4)

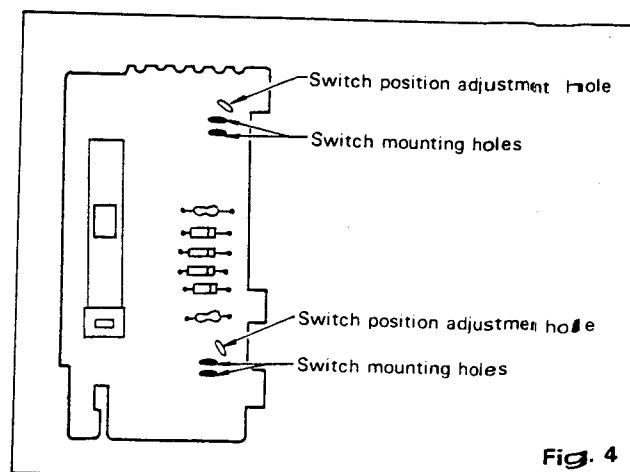
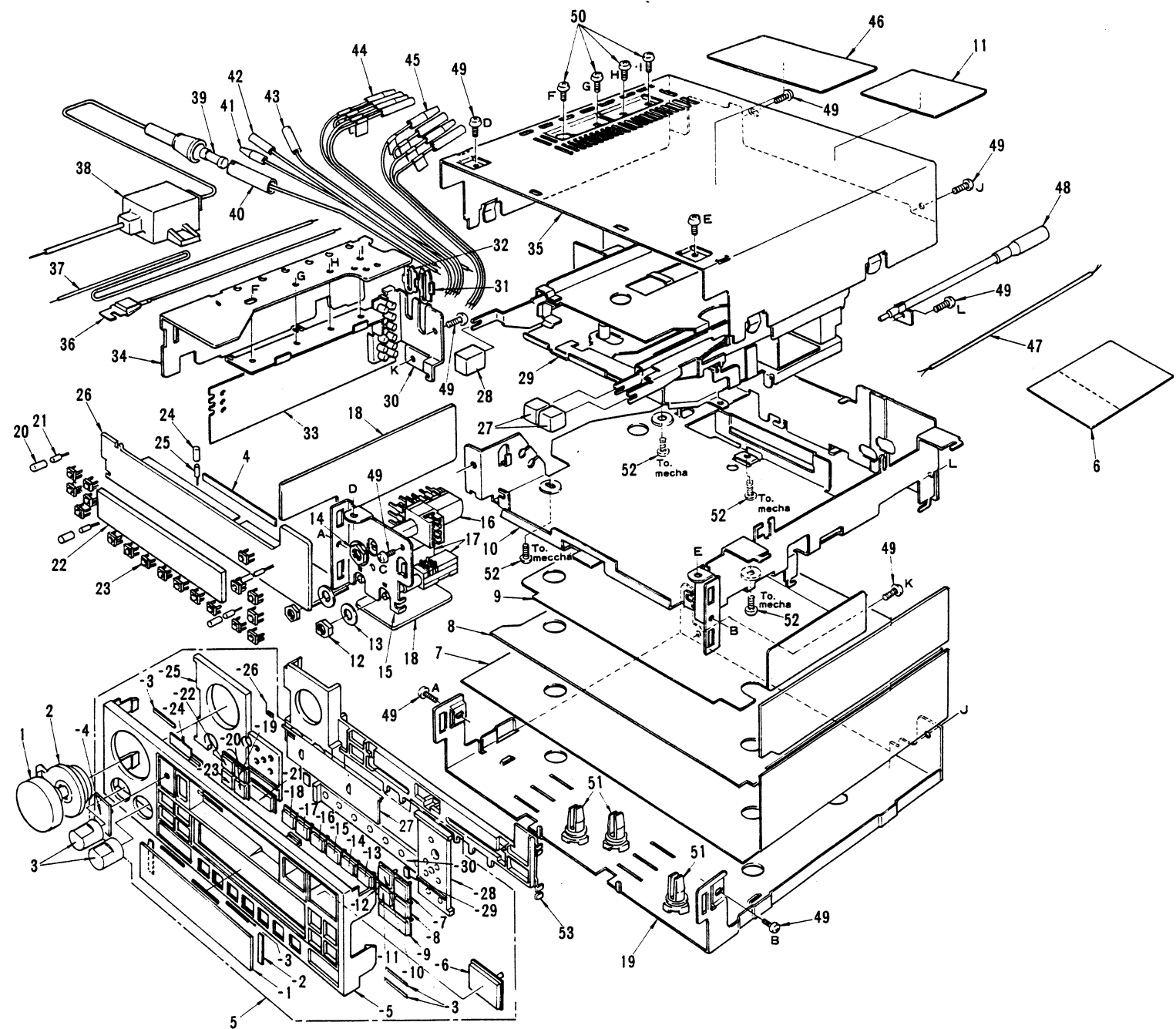


Fig. 4

●SPECIFICATION -LIMIT- Wow and flutter: Less than 0.25%(W.R.M.S)

EXPLODED VIEW • PARTS LIST:

©Main section E951 (PE-9006A)



REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
1	380-4293-01	Knob (VOL)	1
2	380-4295-00	Knob (FAD)	1
3	380-4294-01	Knob (BASS, TREB)	2
4	347-0607-00	Insulator	1
5	940-2688-02	Escutcheon ass'y	1
5-1	373-0364-04	Dial cover	1
5-2	347-0645-00	Adhesive paper	2
5-3	347-0815-00	Adhesive paper	6
5-4	378-0088-00	Badge	1
5-5	370-3561-04	Escutcheon	1
5-6	382-0508-00	Button (PRO)	1

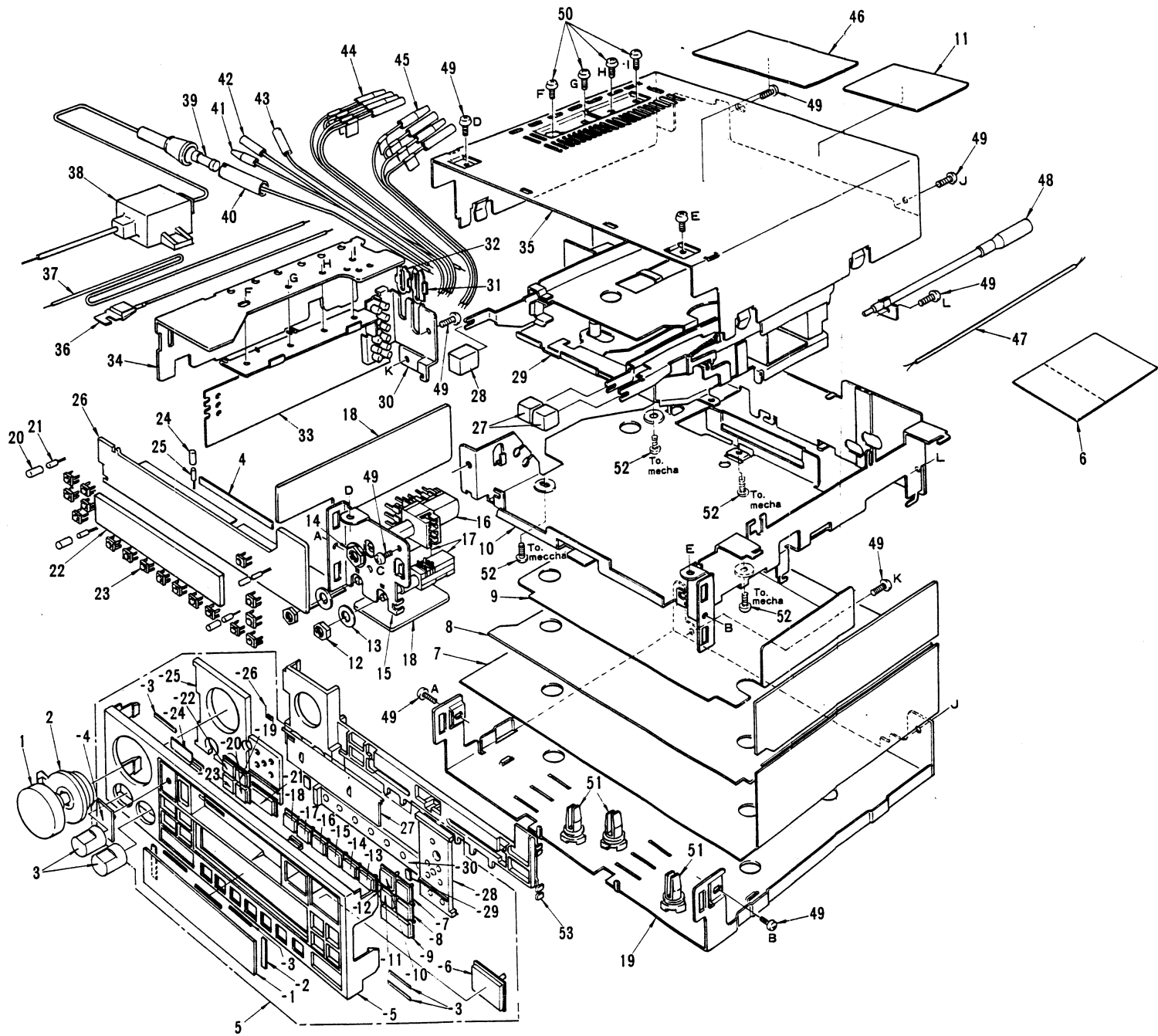
REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
5-7	382-0509-03	Button (L/M/U)	1
5-8	382-0509-00	Button (ST)	1
5-9	382-0511-00	Button (< >)	1
5-10	382-0509-01	Button (VF)	1
5-11	382-0507-00	Dummy button	1
5-12	382-0510-00	Button (M)	1
5-13	382-0510-06	Button (6)	1
5-14	382-0510-05	Button (5)	1
5-15	382-0510-04	Button (4)	1
5-16	382-0510-03	Button (3)	1
5-17	382-0510-02	Button (2)	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
5-18	382-0510-01	Button (1)	1
5-19	382-0509-07	Button (MTL)	1
5-20	382-0509-06	Button (APC)	1
5-21	382-0511-01	Button (> >)	1
5-22	382-0509-05	Button (NL)	1
5-23	382-0509-02	Button (LD)	1
5-24	347-0872-00	Adhesive paper	1
5-25	371-3078-01	Trim plate	1
5-26	750-2309-01	Spring	1
5-27	320-0326-15	Dustproof cover	1
5-28	371-3077-01	Trim plate	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
5-29	347-0772-00	Adhesive paper	2
5-30	371-3079-01	Trim plate	1
6	285-1096-00	Guide label	1
7	347-1244-00	Insulator	1
8	099-6808-00	P.W.B	1
9	347-1217-01	Insulator	1
10	312-0231-01	Chassis	1
11	286-5060-00	Set plate	1
12	722-0332-00	Hex-nut	2
13	745-0560-00	Flat washer	2
14	722-0417-00	Nut	1
15	330-7674-01	VR bracket	1
16	012-4068-00	Variable resistor (VOL)	1
17	012-4070-00	Variable resistor (BASS, TREB)	2
18	099-6811-00	P.W.B	1
19	304-0357-01	Lower cover	1
20	345-3619-00	P.L cap	4
21	017-0338-06	Pilot lamp	4
22	379-0051-05	Indicator	1
23	013-3694-00	Switch	18
24	345-2830-07	P.L cap	1
25	017-0345-14	Pilot lamp	1
26	099-6814-00	P.W.B	1
27	382-0506-01	Button (◀)	2
28	382-0505-01	Button (↶)	1
29	930-0514-01	Tape mechanism	1
30	944-0650-00	Filter ass'y	1
31	335-0818-00	Lead holder	1
32	335-0580-00	Lead holder	1
33	347-1218-01	Insulator	1
34	313-1163-01	Heat sink	1
35	310-1125-01	Upper case	1
36	840-0386-00	Bonding wire	1
37	850-2110-01	A-lead	1
38	009-0626-06	Choke	1
39	120-0070-00	Fuse (7A)	1
40	850-2005-00	A-lead	1
41	850-1580-01	A-lead	1
42	852-5322-02	Extension lead	1
43	852-6652-01	Extension lead	1
44	851-2442-02	Speaker lead (Gray)	1
45	851-2443-03	Speaker lead (White)	1
46	285-0915-00	Guide label	1
47	815-2061-00	Head lead wire	1
48	092-0522-06	Antenna receptacle	1
49	731-3006-80	Tap tight (M3x6)	10
50	714-3010-81	Machine screw (M3x10)	4
51	335-1603-00	Bush	3
52	714-3003-81	Machine screw (M3x3)	4
53	374-0833-02	Back plate	1

EXPLODED VIEW • PARTS LIST:

©Main section E950 (PE-9007A)



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3	380-4294-01	Knob (BASS, TREB)	2
4	347-0607-00	Insulator	1
5	940-2688-03	Escutcheon ass'y	1
5-1	373-0364-04	Dial cover	1
5-2	347-0645-00	Adhesive paper	2
5-3	347-0815-00	Adhesive paper	6
5-4	378-0088-00	Badge	1
5-5	370-3561-04	Escutcheon	1
5-6	382-0508-00	Button (PRO)	1

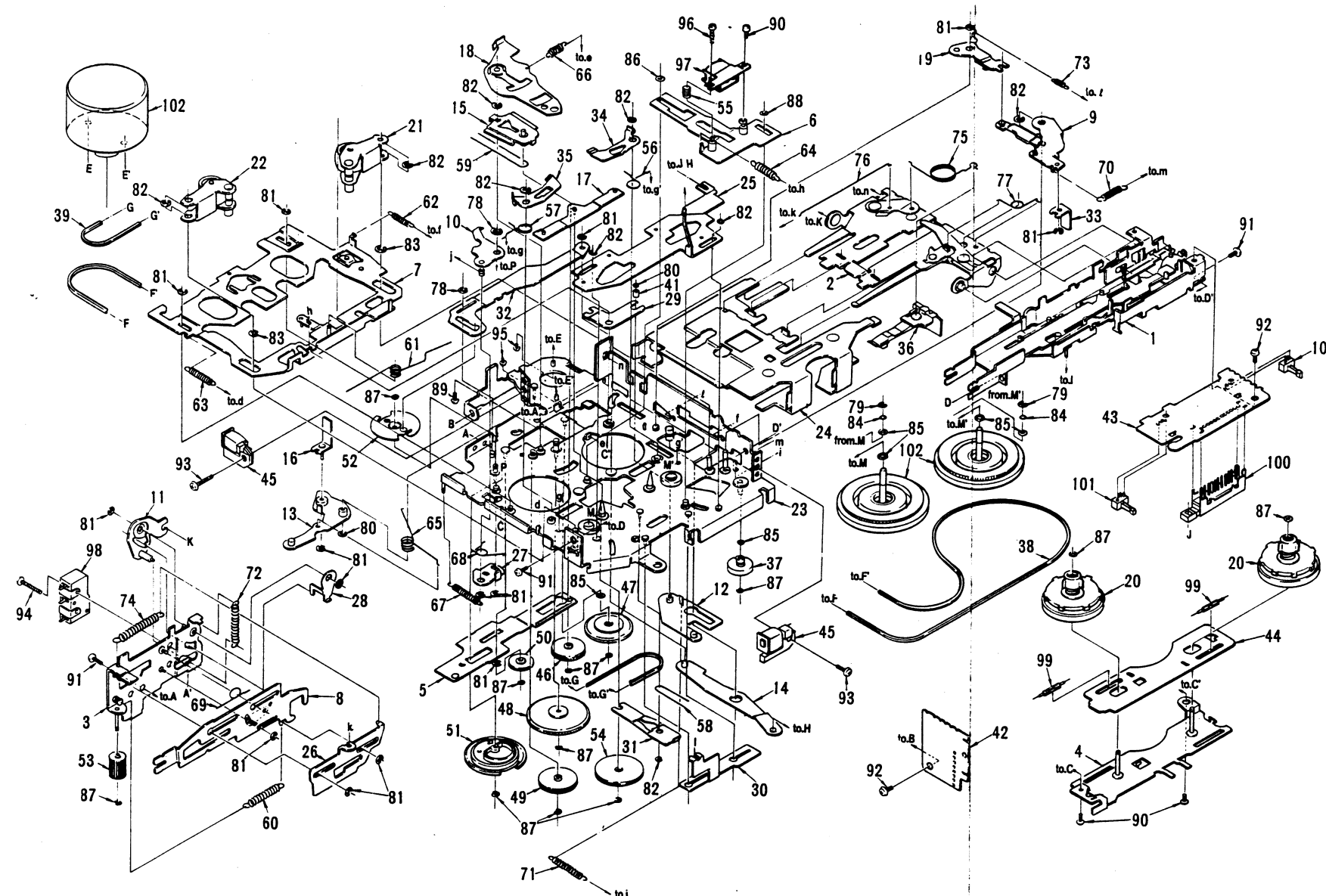
REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
5-7	382-0509-03	Button (L/M/U)	1
5-8	382-0509-00	Button (ST)	1
5-9	382-0511-00	Button (< >)	1
5-10	382-0507-00	Dummy button	1
5-11	382-0507-00	Dummy button	1
5-12	382-0510-00	Button (M)	1
5-13	382-0510-06	Button (6)	1
5-14	382-0510-05	Button (5)	1
5-15	382-0510-04	Button (4)	1
5-16	382-0510-03	Button (3)	1
5-17	382-0510-02	Button (2)	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
5-18	382-0510-01	Button (1)	1
5-19	382-0509-07	Button (MTL)	1
5-20	382-0509-06	Button (APC)	1
5-21	382-0511-01	Button (> >)	1
5-22	382-0509-05	Button (NL)	1
5-23	382-0509-02	Button (LD)	1
5-24	347-0872-00	Adhesive paper	1
5-25	371-3078-01	Trim plate	1
5-26	750-2309-01	Spring	1
5-27	320-0326-16	Dustproof cover	1
5-28	371-3077-01	Trim plate	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
5-29	347-0772-00	Adhesive paper	2
5-30	371-3079-01	Trim plate	1
6	285-1096-00	Guide label	1
7	347-1244-00	Insulator	1
8	099-6808-00	P.W.B	1
9	347-1217-01	Insulator	1
10	312-0231-01	Chassis	1
11	286-5061-00	Set plate	1
12	722-0332-00	Hex-nut	2
13	745-0560-00	Flat washer	2
14	722-0417-00	Nut	1
15	330-7674-01	VR bracket	1
16	012-4068-00	Variable resistor (VOL)	1
17	012-4070-00	Variable resistor (BASS, TREB)	2
18	099-6811-00	P.W.B	1
19	304-0357-01	Lower cover	1
20	345-3619-00	P.L cap	4
21	017-0338-06	Pilot lamp	4
22	379-0051-05	Indicator	1
23	013-3694-00	Switch	17
24	345-2830-07	P.L cap	1
25	017-0345-14	Pilot lamp	1
26	099-6814-00	P.W.B	1
27	382-0506-01	Button (◀)	2
28	382-0505-01	Button (↶)	1
29	930-0514-00	Tape mechanism	1
30	944-0650-00	Filter ass'y	1
31	335-0818-00	Lead holder	1
32	335-0580-00	Lead holder	1
33	347-1218-01	Insulator	1
34	313-1163-01	Heat sink	1
35	310-1125-01	Upper case	1
36	840-0386-00	Bonding wire	1
37	850-2110-01	A-lead	1
38	009-0626-06	Choke	1
39	120-0070-00	Fuse (7A)	1
40	850-2005-00	A-lead	1
41	850-1580-01	A-lead	1
42	852-5322-02	Extension lead	1
43	852-6652-01	Extension lead	1
44	851-2442-02	Speaker lead (Gray)	1
45	851-2443-03	Speaker lead (White)	1
46	285-0915-00	Guide label	1
47	815-2061-00	Head lead wire	1
48	092-0522-06	Antenna receptacle	1
49	731-3006-80	Tap tight (M3x6)	10
50	714-3010-81	Machine screw (M3x10)	4
51	335-1603-00	Bush	3
52	714-3003-81	Machine screw (M3x3)	4
53	374-0833-01	Back plate	1

# EXPLODED VIEW • PARTS LIST:

©Tape mechanism section



REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
1	960-3475-01	Frame sub ass'y	1
2	960-3476-02	Guide arm ass'y	1
3	960-3477-01	Side panel ass'y	1
4	960-3479-01	Reel base-P ass'y	1
5	960-3480-03	Power-P ass'y	1
6	960-3481-01	Head plate ass'y	1
7	960-3482-02	Roller-P-A ass'y	1
8	960-3483-03	E-lever ass'y	1
9	960-3484-00	Plunger-P ass'y	1
10	960-3487-02	C-gear-L-P ass'y	1
11	960-3488-02	Eject link ass'y	1
12	960-3490-02	P-sub-P ass'y	1
13	960-3492-02	Cam-G-L-P ass'y	1
14	960-3493-02	Change arm ass'y	1
15	960-3494-02	Idler-P ass'y	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
16	960-3495-00	H-piece-B ass'y	1
17	960-3496-01	FF gear-P ass'y	1
18	960-3497-01	H-P-lock-P ass'y	1
19	960-3498-01	Hold plate ass'y	1
20	960-3499-01	Reel base ass'y	2
21	960-3500-01	Roller-F ass'y	1
22	960-3501-01	Roller-R ass'y	1
23	960-3504-02	Deck plate ass'y	1
24	606-0077-03	Pack guide	1
25	630-1576-01	Change plate	1
26	630-1579-00	Eject plate	1
27	960-3561-00	Timing plate ass'y	1
28	630-1581-01	Switch plate	1
29	630-1582-01	Power line	1
30	630-1583-00	FF plate	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
31	630-1584-01	FF gear arm	1
32	630-1585-00	Idler-C-plate	1
33	630-1586-00	Holding piece A	1
34	630-1587-00	Brake plate-F	1
35	630-1588-00	Brake plate-R	1
36	631-0412-02	Pack stopper	1
37	631-0370-01	Tension pulley	1
38	602-0079-00	Belt	1
39	602-0080-00	Belt	1
40	960-3532-00	Motor ass'y	1
41	610-0242-00	P-roller	1
42	099-6794-00 099-6704-01	P.W.B E951 E950	1
43	099-6703-01	P.W.B	1
44	099-6702-01	P.W.B	1
45	015-0232-00	Plunger	2

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
46	613-0044-01	Idler gear	1
47	613-0045-00	Pulley gear	1
48	613-0046-01	Gear A	1
49	613-0047-01	Gear B	1
50	613-0048-01	Gear C	1
51	613-0049-03	Cam gear	1
52	613-0050-02	Channel-C-gear	1
53	613-0051-00	Gear	1
54	613-0052-01	FF gear	1
55	750-1910-00	Azimuth spring	1
56	750-2278-02	Brake-F-spring	1
57	750-2279-02	Brake-R-spring	1
58	750-2281-01	FF-U-spring	1
59	750-2282-03	Idler-U-spring	1
60	750-2283-00	EJ-lever spring	1
61	750-2284-00	P-roller spring	1
62	750-2286-00	Roll-P-A-spring	1
63	750-2287-00	Roll-P-B-spring	1
64	750-2288-00	Head-P-spring	1
65	750-2291-01	Cam-G-spring	1
66	750-2292-00	Head-L-spring	1
67	750-2293-00	Change-G-spring	1
68	750-2294-01	Timing-P-spring	1
69	750-2295-01	Hook arm spring	1
70	750-2296-00	Plunger-P-spring	1
71	750-2297-01	P-sub spring	1
72	750-2298-00	E-link spring	1
73	750-2299-00	P-lock spring	1
74	750-2300-02	E-plate spring	1
75	750-2301-03	Slot in spring	1
76	750-2302-00	Rod spring	1
77	750-2320-00	E-lock spring	1
78	744-0018-01	E-ring	2
79	744-0022-00	E-ring	2
80	743-1200-10	E-ring	2
81	743-1500-10	E-ring	13
82	743-2000-10	E-ring	10
83	743-2500-10	E-ring	2
84	745-0645-00	Washer	2
85	746-0617-00	Washer	6
86	746-0622-01	Washer	1
87	746-0628-01	Washer	12
88	746-0717-01	Washer	1
89	732-2604-11	Sems screw (M2.6x4)	1
90	714-2003-81	Machine screw (M2.3x3)	3
91	714-2603-81	Machine screw (M2.6x3)	3
92	714-2604-81	Machine screw (M2.6x4)	2
93	714-2606-11	Machine screw (M2.6x6)	2
94	714-2308-81	Machine screw (M2.3x8)	1
95	716-0347-00	Screw	2
96	716-0429-00	Screw	1
97	011-0285-00	Head	1
98	013-3580-00	Switch	1
99	013-3601-00	Switch	2
100	013-3666-00	Switch	1
101	013-3687-00	Switch	2
102	611-0067-00	Fly wheel	2

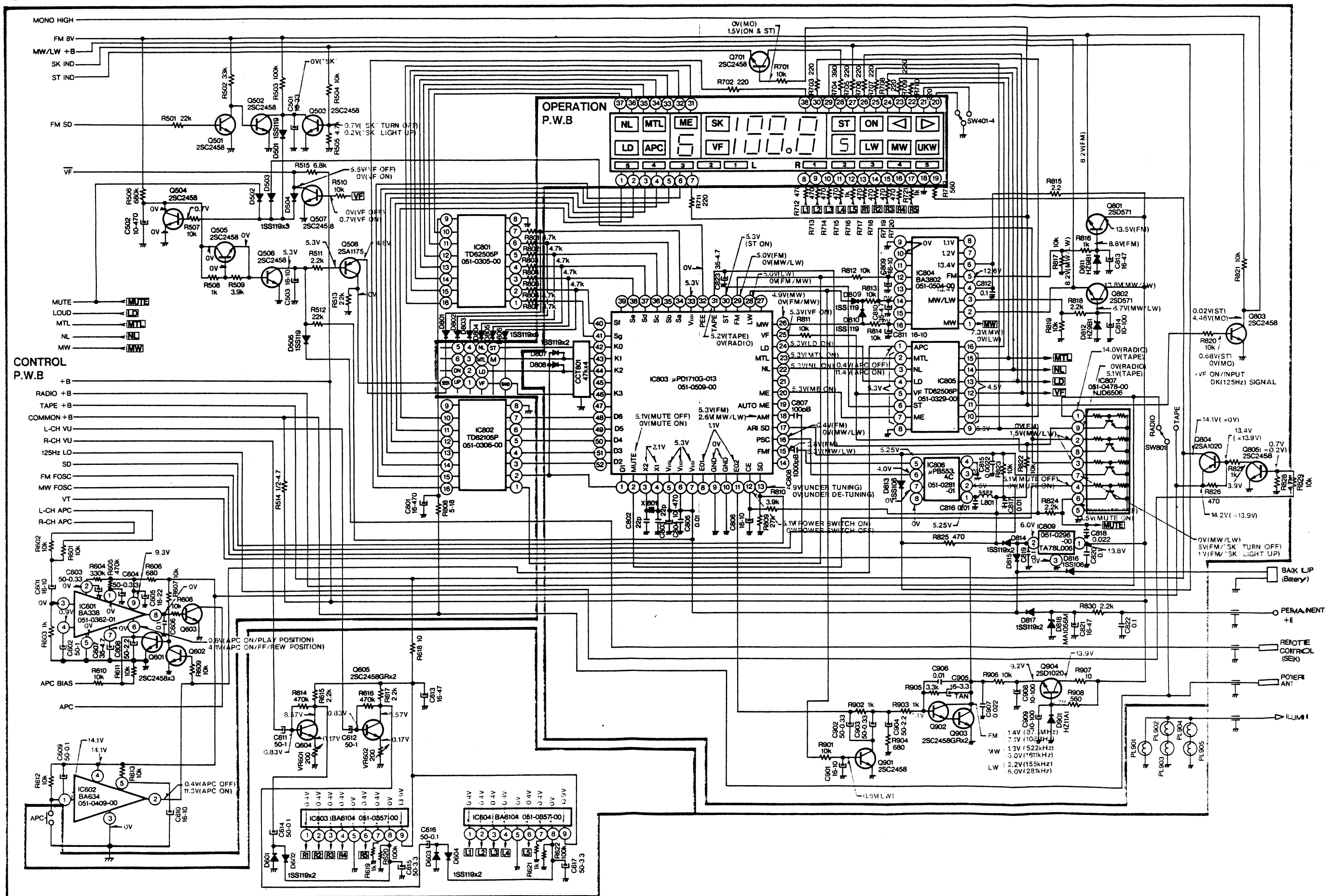
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# ■CIRCUIT DIAGRAM:

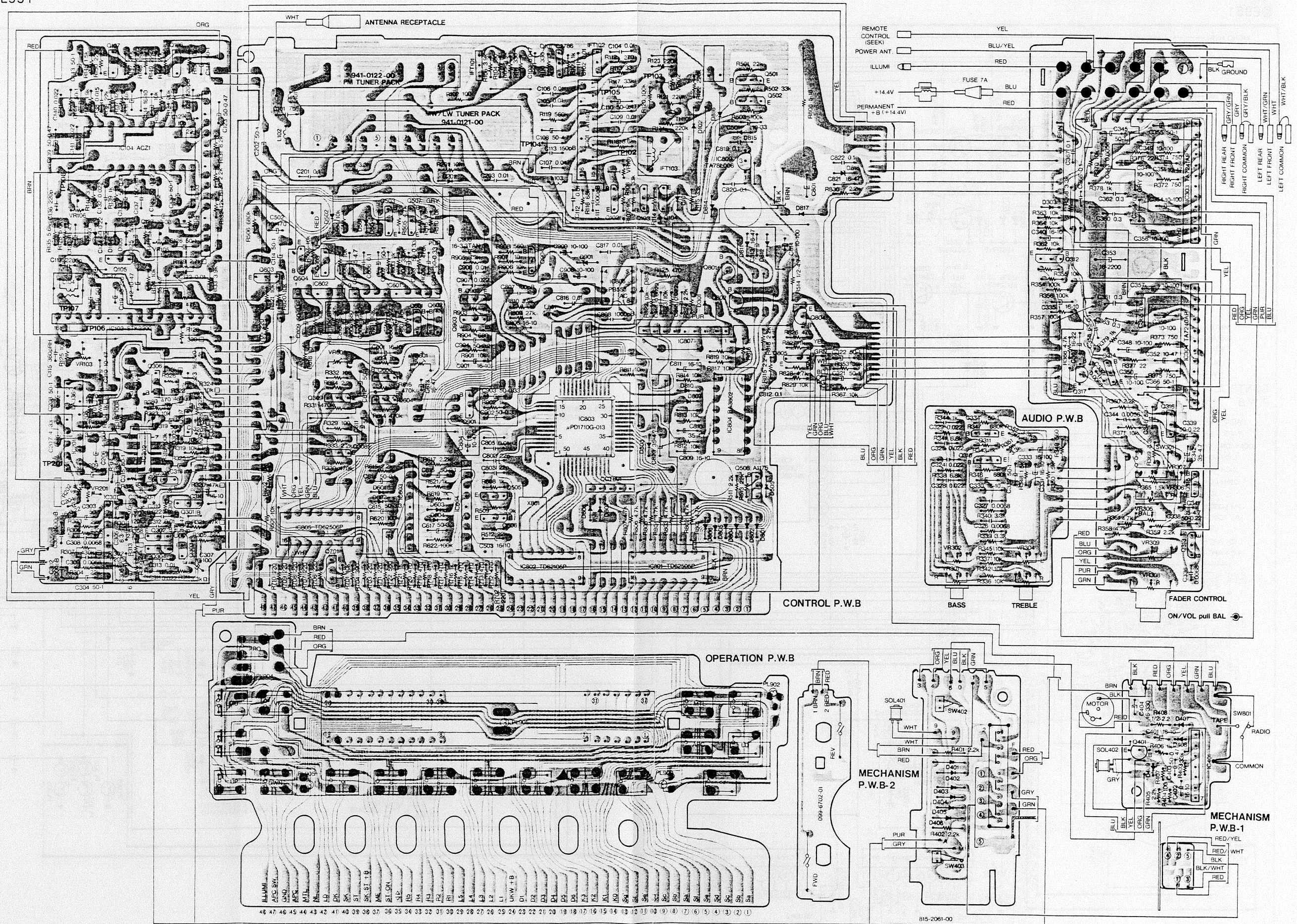
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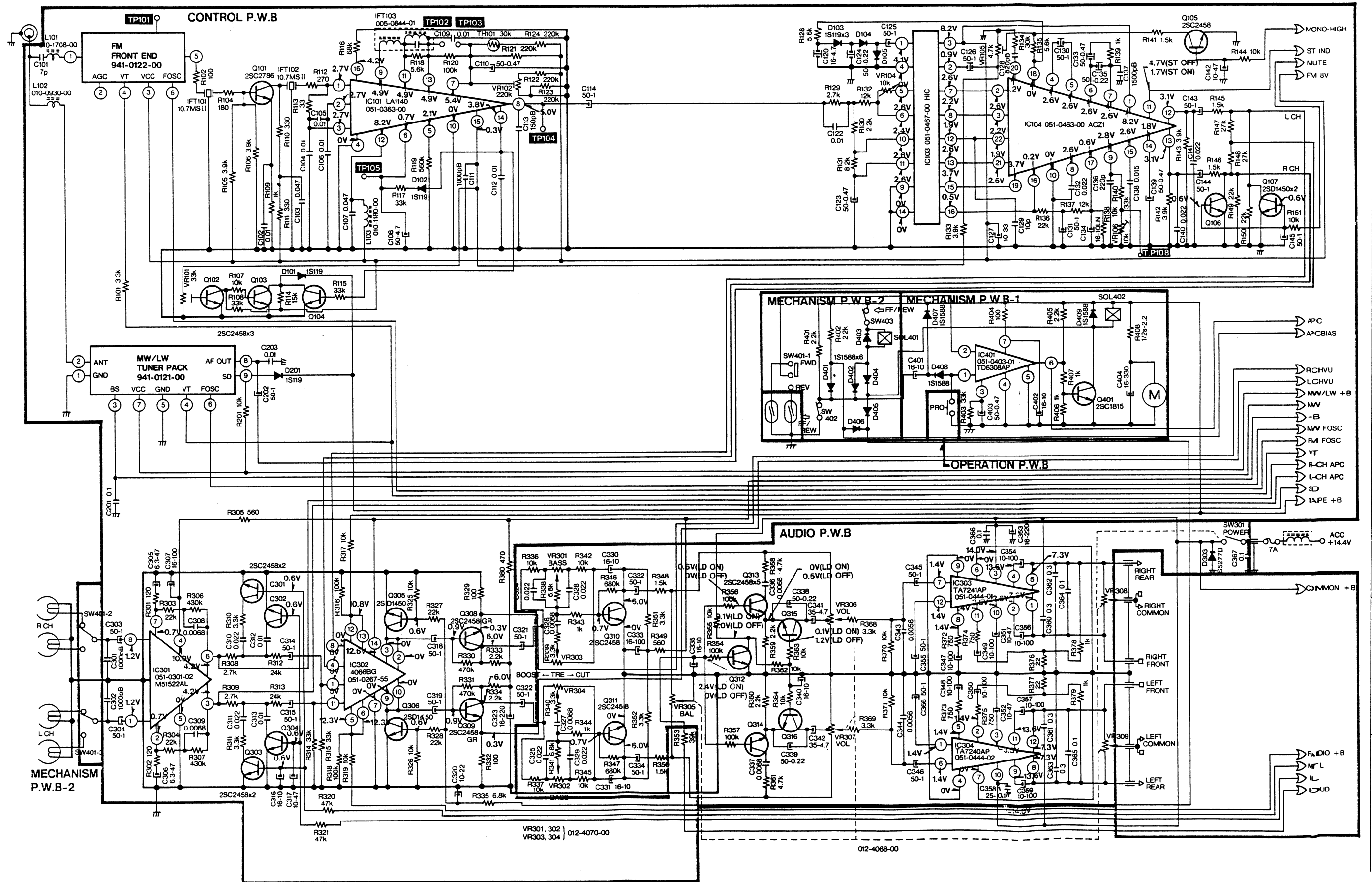
# ■ PRINTED WIRING BOARD:

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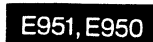




■CIRCUIT DIAGRAM:  
©E950



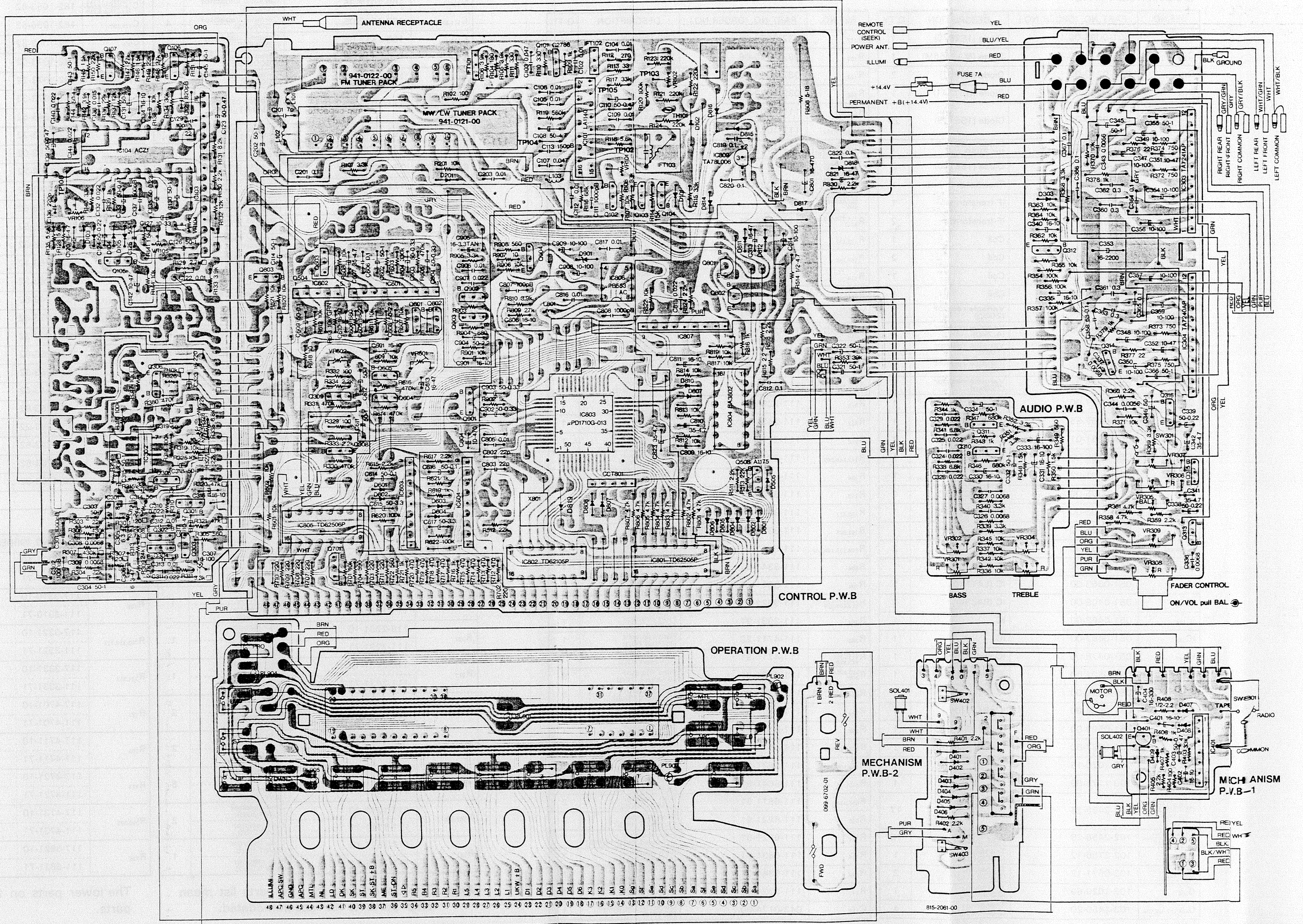
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# PRINTED WIRING BOARD:

©E950





# PARTS LIST:

©Electrical section  
 ©CONTROL P.W.B

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
D302	001-0095-00	Diode (1S2076)	1
D818	001-0170-00	Diode (MA1056M)	1
D811,812	001-0213-03	Diode (HZ9B1)	2
D901	001-0286-00	Diode (HZ11A1)	1
101-105,201 301,501-505 D601-604 801-810,814 815,817	001-0330-00	Diode (1SS119)	29
D819	001-0330-00	Diode (1SS119) for E950	1
D813,816	001-0361-00	Diode (1SS106)	2
TH101	002-0184-00	Thermistor (30kΩ)	1
IFT103	005-0844-01	IF-transformer	1
IFT101,102	005-0865-01	IF-transformer	2
L102	010-0930-00	Coil	1
L103,801	010-1180-00	Coil	2
L101	010-1708-00	Coil	1
L104	010-1853-01	Coil	1
VR601,602	012-3708-00	Variable resistor (200Ω)	2
VR103,105,201	012-3808-05	Variable resistor (4.7kΩ)	3
VR104,106	012-3808-06	Variable resistor (10kΩ)	2
VR101	012-3808-68	Variable resistor (33kΩ)	1
VR102	012-3808-71	Variable resistor (220kΩ)	1
CCT801	050-0077-00	Component circuit (47kΩx4)	1
IC302	051-0267-55	IC (μPD4066BG)	1
IC806	051-0281-01	IC (μPB553AC)	1
IC809	051-0296-00	IC (TA78L006P)	1
IC301	051-0301-02	IC (M51522AL)	1
IC801	051-0305-00	IC (TD62505P)	1
IC802	051-0306-00	IC (TD62105P)	1
IC805	051-0329-00	IC (TD62506P)	1
IC803,804	051-0357-00	IC (BA6104)	2
IC601	051-0362-01	IC (BA338)	1
IC101	051-0363-00	IC (LA1140)	1
IC602	051-0409-00	IC (BA634)	1
IC104	051-0463-00	IC	1
IC103	051-0467-00	IC	1
IC807	051-0478-00	IC (NJD8506)	1
IC201	051-0501-00	IC (LA3365)	1
IC102	051-0502-00	IC (STK2200)	1
IC804	051-0504-00	IC (BA3802)	1
IC803	051-0509-00	IC (μPD1710G013)	1
X801	061-1037-00	Crystal (4.5MHz)	1
Q804	100-1020-15	Transistor (2SA1020-O)	1
Q508	100-1175-69	Transistor (2SA1175HF)	1
102-104,501 502,503,504,505 Q306,507,501,602 603,701,803,805 901	102-2458-25	Transistor (2SC2458Y)	17
105,301-304 Q307,308,309,604 605,602,903	102-2458-28	Transistor (2SC2458GR)	12
Q101	102-2786-12	Transistor (2SC2786L)	1
Q801,802	103-0571-12	Transistor (2SD571L)	2
Q804	103-1020-69	Transistor (2SD1020)	1
Q106,107,305,306	103-1450-20	Transistor (2SD1450T)	4

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
R117	032-0059-06	Film resistor ( $\frac{1}{4}$ W 33kΩ)	1
R120	032-0059-08	Film resistor ( $\frac{1}{4}$ W 100kΩ)	1
R118	032-0059-49	Film resistor ( $\frac{1}{4}$ W 5.6kΩ)	1
R808	032-0072-00	Film resistor (5W 18Ω)	1
R618,907	111-1001-91	Film resistor ( $\frac{1}{4}$ W 10Ω)	2
R102,329,332	111-1011-91	Film resistor ( $\frac{1}{4}$ W 100Ω)	3
109,119,308,603 R19,227,115,223 816,827,902,903	111-1021-91	Film resistor ( $\frac{1}{4}$ W 1kΩ)	12
107,125,138,144 151,201,367,504 507,510,601,602 R608,609,610 R11,612,613,701 811,812,813,814 817,819,820,821 822,823,829,901 906	111-1031-91	Film resistor ( $\frac{1}{4}$ W 10kΩ)	33
R216,318,503,620 822	111-1041-91	Film resistor ( $\frac{1}{4}$ W 100kΩ)	5
R132,137	111-1231-91	Film resistor ( $\frac{1}{4}$ W 1.2kΩ)	2
R145,146	111-1521-91	Film resistor ( $\frac{1}{4}$ W 1.5kΩ)	2
R114	111-1531-91	Film resistor ( $\frac{1}{4}$ W 15kΩ) for E950	1
R104	111-1811-91	Film resistor ( $\frac{1}{4}$ W 180Ω)	1
R702,703 705-710,711	111-2211-91	Film resistor ( $\frac{1}{4}$ W 220Ω)	9
130,333,334,511 R10,617,818,824 830	111-2221-91	Film resistor ( $\frac{1}{4}$ W 2.2kΩ)	9
R328	111-2231-72	Film resistor ( $\frac{1}{4}$ W 22kΩ)	1
R136,149,150,303 304,501,512,513	111-2231-91	Film resistor ( $\frac{1}{4}$ W 22kΩ)	8
R121,122,123,124	111-2241-91	Film resistor ( $\frac{1}{4}$ W 220kΩ)	4
R815	111-2291-91	Film resistor ( $\frac{1}{4}$ W 2.2Ω)	1
R312	111-2431-72	Film resistor ( $\frac{1}{4}$ W 24kΩ)	1
R112	111-2711-91	Film resistor ( $\frac{1}{4}$ W 270Ω)	1
R147,148,809	111-2731-91	Film resistor ( $\frac{1}{4}$ W 27kΩ)	3
R134	111-3031-71	Film resistor ( $\frac{1}{4}$ W 30kΩ)	1
R113	111-3301-91	Film resistor ( $\frac{1}{4}$ W 33Ω)	1
R110,111	111-3311-91	Film resistor ( $\frac{1}{4}$ W 330Ω)	2
R101,905	111-3321-91	Film resistor ( $\frac{1}{4}$ W 3.3kΩ)	2
R108,115,140,502	111-3331-91	Film resistor ( $\frac{1}{4}$ W 33kΩ)	4
R604	111-3341-91	Film resistor ( $\frac{1}{4}$ W 330kΩ)	1
R704	111-3911-91	Film resistor ( $\frac{1}{4}$ W 390Ω)	1
105,106,133,142 R143,509,810	111-3921-91	Film resistor ( $\frac{1}{4}$ W 3.9kΩ)	7
R353	111-3931-91	Film resistor ( $\frac{1}{4}$ W 39kΩ)	1
R380	111-4711-22	Film resistor ( $\frac{1}{4}$ W 470Ω)	1
R117-715 825,826	111-4711-91	Film resistor ( $\frac{1}{4}$ W 470Ω)	10
R505,801-807 828	111-4721-91	Film resistor ( $\frac{1}{4}$ W 4.7kΩ)	9
R330,331,505,614 616	111-4741-91	Film resistor ( $\frac{1}{4}$ W 470kΩ)	5
R514	111-4791-81	Film resistor ( $\frac{1}{2}$ W 4.7Ω)	1
R202	111-5121-72	Film resistor ( $\frac{1}{4}$ W 5.1kΩ)	1
R305,722,908	111-5611-91	Film resistor ( $\frac{1}{4}$ W 560Ω)	3
R128,135	111-5621-91	Film resistor ( $\frac{1}{4}$ W 5.6kΩ)	2
R119	111-5641-91	Film resistor ( $\frac{1}{4}$ W 560kΩ)	1
R606,904	111-6811-91	Film resistor ( $\frac{1}{4}$ W 680Ω)	2
R515	111-6821-91	Film resistor ( $\frac{1}{4}$ W 6.8kΩ)	1
R114	111-6821-91	Film resistor ( $\frac{1}{4}$ W 6.8kΩ) for E951	1
R116	111-6831-91	Film resistor ( $\frac{1}{4}$ W 68kΩ)	1
R506	111-6841-91	Film resistor ( $\frac{1}{4}$ W 680kΩ)	1
R131	111-8221-91	Film resistor ( $\frac{1}{4}$ W 8.2kΩ)	1
C117	043-0174-00	Ceramic capacitor (220pF)	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
C136	043-0200-00	Ceramic capacitor (220pF)	1
C807	160-1012-05	Ceramic capacitor (100pF)	1
C111,301,302,808	160-1022-05	Ceramic capacitor (1000pF)	4
C113	160-1512-05	Ceramic capacitor (150pF)	1
C137	160-1522-05	Ceramic capacitor (1500pF)	1
C128	160-8212-05	Ceramic capacitor (820pF)	1
102,104,105,106 109,112,122,203 312,313,805,816 817,906	171-1033-06	Ceramic capacitor (25V0.01μF)	14
C138	171-1533-06	Ceramic capacitor (25V0.015μF)	1
C815	171-2223-06	Ceramic capacitor (25V0.0022μF)	1
C132,140,141,310 311,818,907	171-2233-06	Ceramic capacitor (25V0.022μF)	7
C103,107	171-4733-06	Ceramic capacitor (25V0.047μF)	2
C308,309	171-6823-06	Ceramic capacitor (25V0.0068μF)	2
C129	174-1000-13	Ceramic capacitor (10pFCH)	1
C802,803	174-2200-13	Ceramic capacitor (22pFCH)	2
C115	174-3610-37	Ceramic capacitor (360pFCH)	1
C101	174-7090-13	Ceramic capacitor (7pFCH)	1
C605,812,819,820 822	172-1042-20	Polyester capacitor (50V0.1μF)	5
C201	173-1042-10	Polyester capacitor (50V0.1μF)	1
C905	042-0201-00	Electrolytic capacitor (16V3.3μF TAN)	1
C204	042-0249-00	Electrolytic capacitor (16V0.22μF TAN)	1
C303,304	179-1053-62	Electrolytic capacitor (50V1μF)	2
C179	179-2273-22	Electrolytic capacitor (10V220μF)	1
C323	179-2273-33	Electrolytic capacitor (16V220μF)	1
C110	179-4743-62	Electrolytic capacitor (50V0.47μF)	1
C108	179-4753-62	Electrolytic capacitor (50V4.7μF)	1
C118,142,210,317	179-4763-22	Electrolytic capacitor (10V47μF)	4
C502,504	179-4773-23	Electrolytic capacitor (10V470μF)	2
C801	179-4773-33	Electrolytic capacitor (16V470μF)	1

## ©CONTROL P.W.B (CHIP RESISTOR)

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
R204	116-1021-10	Chip resistor ( $\frac{1}{4}$ W 1kΩ)	1
	111-1021-71	Film resistor ( $\frac{1}{4}$ W 1kΩ)	
R322	116-1031-10	Chip resistor ( $\frac{1}{4}$ W 10kΩ)	1
	111-1031-71	Film resistor ( $\frac{1}{4}$ W 10kΩ)	
R327	116-2231-10	Chip resistor ( $\frac{1}{4}$ W 22kΩ)	1
	111-2231-71	Film resistor ( $\frac{1}{4}$ W 22kΩ)	
R313	116-2431-10	Chip resistor ( $\frac{1}{4}$ W 24kΩ)	1
	111-2431-71	Film resistor ( $\frac{1}{4}$ W 24kΩ)	
R129,309	116-2721-10	Chip resistor ( $\frac{1}{4}$ W 2.7kΩ)	2
	111-2721-71	Film resistor ( $\frac{1}{4}$ W 2.7kΩ)	
R306,307	116-4341-10	Chip resistor ( $\frac{1}{4}$ W 430kΩ)	2
	111-4341-71	Film resistor ( $\frac{1}{4}$ W 430kΩ)	
R317,319,324,325 326	117-1031-10	Chip resistor ( $\frac{1}{4}$ W 10kΩ)	5
	111-1031-71	Film resistor ( $\frac{1}{4}$ W 10kΩ)	
R301,302	117-1211-10	Chip resistor ( $\frac{1}{4}$ W 120Ω)	2
	111-1211-71	Film resistor ( $\frac{1}{4}$ W 120Ω)	
R141	117-1521-10	Chip resistor ( $\frac{1}{4}$ W 1.5kΩ)	1
	111-1521-71	Film resistor ( $\frac{1}{4}$ W 1.5kΩ)	

Note) The upper parts on the parts list mean chip parts to be accommodated.

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
C134	181-1063-32	Electrolytic capacitor (16V10μF)	1
116,125,131,143 314,315,318,319	182-1053-62	Electrolytic capacitor (50V1μF)	12
C126,130	182-1056-62	Electrolytic capacitor (50V1μF NP)	2
C316	182-1063-32	Electrolytic capacitor (16V10μF)	1
C208	182-1073-02	Electrolytic capacitor (4V100μF)	1
C814,908,909	182-1073-22	Electrolytic capacitor (10V100μF)	3
C307	182-1073-32	Electrolytic capacitor (16V100μF)	1
C124,135	182-2246-62	Electrolytic capacitor (50V0.22μF NP)	2
C320	182-2263-22	Electrolytic capacitor (10V22μF)	1
C207	182-3363-02	Electrolytic capacitor (4V33μF)	1
C127	182-3363-22	Electrolytic capacitor (10V33μF)	1
C139	182-4743-62	Electrolytic capacitor (50V0.47μF)	1
C133	182-4746-62	Electrolytic capacitor (50V0.47μF NP)	1
C121,209	182-4753-52	Electrolytic capacitor (35V4.7μF)	2
C120	182-4756-32	Electrolytic capacitor (16V4.7μF NP)	1
C305,306	182-4763-12	Electrolytic capacitor (6.3V47μF)	2
C613	182-4763-32	Electrolytic capacitor (16V47μF)	1
C609,614,616	183-1043-62	Electrolytic capacitor (50V0.1μF)	3
C114,292,321,322 602,611,612	183-1053-62	Electrolytic capacitor (50V1μF)	7
C503,601,610,606 609,611,901	183-1063-32	Electrolytic capacitor (16V10μF)	7
C608,904	183-2253-62	Electrolytic capacitor (50V2.2μF)	2
C605	183-2263-32	Electrolytic capacitor (16V22μF)	1
C603,604,902,903	183-3343-62	Electrolytic capacitor (50V0.33μF)	4
C615,617	183-3353-62	Electrolytic capacitor (50V3.3μF)	2
C501	183-3363-22	Electrolytic capacitor (10V33μF)	1
C123	183-4743-62	Electrolytic capacitor (50V0.47μF)	1
C607,810,823	183-4753-52	Electrolytic capacitor (35V4.7μF)	3
C813,821	183-4763-32	Electrolytic capacitor (16V47μF)	2

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
R308	117-2721-10	Chip resistor ( $\frac{1}{4}$ W 2.7kΩ)	1
	111-2721-71	Film resistor ( $\frac{1}{4}$ W 2.7kΩ)	
R126	117-3310-10	Chip resistor ( $\frac{1}{4}$ W 330Ω)	1
	111-3310-71	Film resistor ( $\frac{1}{4}$ W 330Ω)	
R203,310,311	117-3321-10	Chip resistor ( $\frac{1}{4}$ W 3.3kΩ)	3
	111-3321-71	Film resistor ( $\frac{1}{4}$ W 3.3kΩ)	
R314,315	117-3331-10	Chip resistor ( $\frac{1}{4}$ W 33kΩ)	2
	111-3331-71	Film resistor ( $\frac{1}{4}$ W 33kΩ)	
R127	117-4701-10	Chip resistor ( $\frac{1}{4}$ W 47Ω)	1
	111-4701-71	Film resistor ( $\frac{1}{4}$ W 47Ω)	
R205	117-4711-10	Chip resistor ( $\frac{1}{4}$ W 470Ω)	1
	111-4711-71	Film resistor ( $\frac{1}{4}$ W 470Ω)	
R323	117-4721-10	Chip resistor ( $\frac{1}{4}$ W 4.7kΩ)	1
	111-4721-71	Film resistor ( $\frac{1}{4}$ W 4.7kΩ)	
R320,321	117-4731-10	Chip resistor ( $\frac{1}{4}$ W 47kΩ)	2
	111-4731-71	Film resistor ( $\frac{1}{4}$ W 47kΩ)	
R335	117-6821-10	Chip resistor ( $\frac{1}{4}$ W 6.8kΩ)	1
	111-6821-71	Film resistor ( $\frac{1}{4}$ W 6.8kΩ)	

The lower parts on the list mean equivalent parts.

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REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
D <sub>303</sub>	001-0276-01	Diode (S5277B)	1
IC <sub>303</sub>	051-0444-01	IC (TA7241AP)	1
IC <sub>304</sub>	051-0444-02	IC (TA7240AP)	1
Q <sub>312,313,314,315</sub> Q <sub>316</sub>	102-2458-25	Transistor (2SC2458Y)	5
Q <sub>310,311</sub>	102-2458-28	Transistor (2SC2458GR)	2
Q <sub>317</sub>	103-0655-05	Transistor (2SD655E)	1
R <sub>379</sub>	111-1021-22	Film resistor (1/4 Ws 1kΩ)	1
R <sub>343,344,378</sub>	111-1021-91	Film resistor (1/4 Ws 1kΩ)	3
R <sub>371</sub>	111-1031-22	Film resistor (1/4 Ws 10kΩ)	1
R <sub>336,337,342,345</sub> R <sub>355,362,363,364</sub> R <sub>370</sub>	111-1031-91	Film resistor (1/4 Ws 10kΩ)	9
R <sub>354,356,357</sub>	111-1041-91	Film resistor (1/4 Ws 100kΩ)	3
R <sub>348,350,365</sub>	111-1521-91	Film resistor (1/4 Ws 1.5kΩ)	3
R <sub>376,377</sub>	111-2201-91	Film resistor (1/4 Ws 22Ω)	2
R <sub>360</sub>	111-2221-22	Film resistor (1/4 Ws 2.2kΩ)	1
R <sub>359</sub>	111-2221-91	Film resistor (1/4 Ws 2.2kΩ)	1
R <sub>351,352</sub>	111-3321-22	Film resistor (1/4 Ws 3.3kΩ)	2
R <sub>339,340,368,369</sub>	111-3321-91	Film resistor (1/4 Ws 3.3kΩ)	4
R <sub>358,361,366</sub>	111-4721-91	Film resistor (1/4 Ws 4.7kΩ)	3
R <sub>349</sub>	111-5611-91	Film resistor (1/4 Ws 560Ω)	1
R <sub>338</sub>	111-6821-22	Film resistor (1/4 Ws 6.8kΩ)	1
R <sub>341</sub>	111-6821-91	Film resistor (1/4 Ws 6.8kΩ)	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
R <sub>346,347</sub>	111-6841-91	Film resistor (1/4 Ws 680kΩ)	2
R <sub>372,373,374,375</sub>	111-7511-71	Film resistor (1/4 W 750Ω)	4
C <sub>360,361,362,363</sub>	043-0122-00	Ceramic capacitor (12V0.3μF)	4
C <sub>364</sub>	043-0165-00	Ceramic capacitor (12V0.1μF)	1
C <sub>365</sub>	043-0165-01	Ceramic capacitor (12V0.1μF)	1
C <sub>343,344</sub>	160-5622-05	Ceramic capacitor (50V0.0056μF)	2
C <sub>324,325,328,329</sub>	171-2233-06	Ceramic capacitor (25V0.022μF)	4
C <sub>326,327,336,337</sub>	171-6823-06	Ceramic capacitor (25V0.0068μF)	4
C <sub>358</sub>	172-1042-20	Polyester capacitor (63V0.1μF)	1
C <sub>366,367</sub>	173-1042-10	Polyester capacitor (50V0.1μF)	2
C <sub>353</sub>	042-0246-01	Electrolytic capacitor (16V2200μF)	1
C <sub>335,340</sub>	179-1063-32	Electrolytic capacitor (16V10μF)	2
C <sub>347,348,349,350</sub> C <sub>354,356,357,359</sub>	179-1073-22	Electrolytic capacitor (10V100μF)	8
C <sub>351,352</sub>	179-4763-22	Electrolytic capacitor (10V47μF)	2
C <sub>332,334,345,346</sub> C <sub>355,366</sub>	182-1053-62	Electrolytic capacitor (50V1μF)	6
C <sub>330,331</sub>	182-1063-32	Electrolytic capacitor (16V10μF)	2
C <sub>333</sub>	182-1073-32	Electrolytic capacitor (16V100μF)	1
C <sub>338,339</sub>	182-2243-62	Electrolytic capacitor (50V0.22μF)	2
C <sub>367</sub>	182-2263-32	Electrolytic capacitor (16V22μF)	1
C <sub>341,342</sub>	182-4753-52	Electrolytic capacitor (35V4.7μF)	2

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REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
D <sub>401-409</sub>	001-0112-00	Diode (1S1588)	9
IC <sub>401</sub>	051-0403-01	IC (TD6308AP)	1
Q <sub>401</sub>	102-1815-25	Transistor (2SC1815Y)	1
R <sub>404</sub>	111-1011-22	Film resistor (1/4 Ws 100Ω)	1
R <sub>406,407</sub>	111-1021-22	Film resistor (1/4 Ws 1kΩ)	2
R <sub>405</sub>	111-2221-22	Film resistor (1/4 Ws 2.2kΩ)	1

REF.NO.	PART NO. (ORDER NO.)	DESCRIPTION	Q'TY
R <sub>401,402</sub>	111-2221-71	Film resistor (1/6 W 2.2kΩ)	2
R <sub>408</sub>	111-2291-82	Film resistor (1/2 Ws 2.2Ω)	1
R <sub>403</sub>	111-3331-22	Film resistor (1/4 Ws 33kΩ)	1
C <sub>404</sub>	179-3373-33	Electrolytic capacitor (16V330μF)	1
C <sub>401,402</sub>	182-1063-32	Electrolytic capacitor (16V10μF)	2
C <sub>403</sub>	182-4743-62	Electrolytic capacitor (50V0.47μF)	1

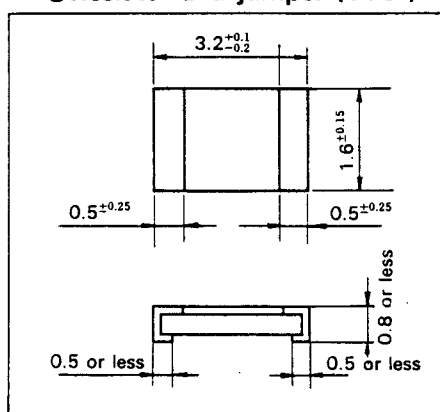
# ■CHIP PARTS:

This set partially uses chip parts. The chip parts is directly soldered to a P.W.B pattern face instead of conventional lead type resistors. Normally, data such as capacitance is not indicated on the body of chip parts; however, such data is printed on the pattern face for reference. When replacing chip parts, equivalent parts can be also used instead of chip parts.

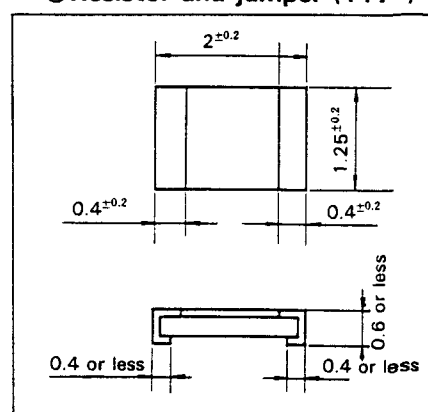
When soldering chip parts, use a 40W or less solder iron whose edge is small.

When soldering equivalent parts, be sure that they do not contact the case, mechanism, or so. Moreover, if the pattern is pressed remarkably by back side soldered parts, there is a possibility that the pattern is broken. Therefore, adhere the parts with proper bonding agent.

## ©Resistor and jumper (116-)



## ©Resistor and jumper (117-)



# WAVE-FORM OF CONTROLLER

