



For more Hi-Fi manuals and set-up information  
please visit [www.hifiengine.com](http://www.hifiengine.com)

# AIWA®

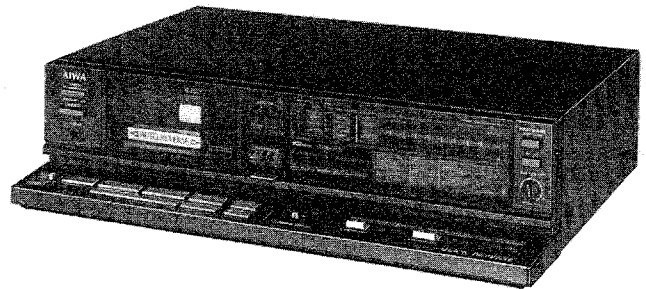
S/M Code No. 84-025

DATE OF ISSUE 9/1984

# SERVICE MANUAL


**STEREO CASSETTE  
DECK****MODEL NO.**

# AD-R450

**TYPE. HB, HUB, HJB, CB, EB, KB, GB, Z**

## SPECIFICATIONS

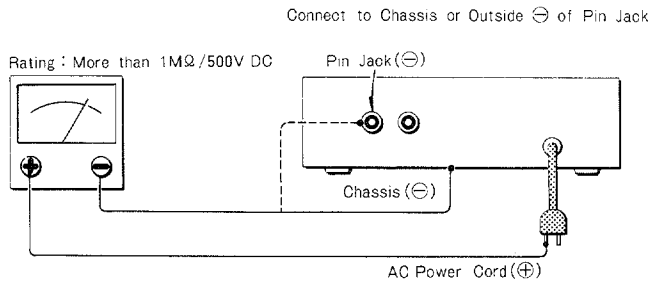
<b>Type</b>	Stereo cassette tape deck		<b>Recording system</b>	AC bias (frequency 85 kHz)
<b>Track format</b>	4 tracks 2 channels		<b>Erase system</b>	AC erase
<b>Power supply</b>	<b>AD-R450 E, Z</b>	AC 220 V, 50/60 Hz	<b>Motor</b>	DC Servomotor × 1, DC Motor × 1
	<b>AD-R450 K, G</b>	AC 240 V, 50/60 Hz	<b>Head</b>	DX head
	<b>AD-R450 U, C</b>	AC 120 V, 60 Hz	<b>Inputs</b>	LINE IN maximum input sensitivity: 50 mV (over 50 kΩ) DIN max sensitivity (Z model only): 0.1 mV/kΩ (3.3 kΩ)
	<b>AD-R450 H, HU, HJ</b>	AC 120 V/220 V-240 V switchable, 50/60 Hz	<b>Outputs</b>	LINE OUT standard output level: 0.4 V (0 VU); suitable load impedance: over 50 kΩ; DIN standard level (Z model only): 0.4 V (0 VU) Headphones: 8-32 Ω
<b>Power consumption</b>	15 W		<b>Dimensions</b>	420(W) × 110(H) × 300(D) mm
<b>Frequency response</b>	METAL tape:	20-18,000 Hz	<b>Weight</b>	4.4 kg
	CrO <sub>2</sub> position tape:	20-17,000 Hz	<b>Accessories</b>	Stereo pin cord (2)
	NORMAL tape:	20-16,000 Hz		
<b>Signal-to-noise ratio</b>	73 dB (METAL tape DOLBY C NR ON)			
<b>Wow and flutter</b>	According to DIN 45 500 0.1%			
	0.04% (WRMS)			
<b>Tape speed</b>	4.8 cm/sec. (1-7/8 ips)			
<b>Rewind time</b>	70 sec. (C-60)			
<b>Fast forward time</b>	70 sec. (C-60)			

- Design and specifications are subject to change without notice.
- Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.
- Dolby and the  symbol are trademarks of Dolby laboratories licensing corporation.

Follow the instructions carefully, which will allow the user to optimise the products' performance and give many years of service.

1. No scratch and melting shall be made to covered lead-wires of an a.c. primary circuit including mains leads.
2. No illegibility shall be given to the specification plate, the caution labels, the fuse labels and others.
3. When, on pattern sides of circuit boards, additional repair-parts have been made up, the parts shall be firmly glued to circuit boards or other components, unless the parts can be attached firmly.
4. The following matters shall be maintained as they are, when repairing.
  - 1) Soldering of lead-wire ends
    - \* Care should be taken of the space distance in an a.c. primary circuit as well as soldering.
  - 2) Wiring and holding of lead-wires with wire-clips and binders
  - 3) Materials of lead-wires
    - \* e.g.; For UL models, lead-wires to be used shall be approved or accepted by the UL.
  - 4) Location of all kinds of insulators
  - 5) Setting of voltage selector switch
    - \* Set the Voltage Selector Switch to 240V, 220V, or 120V, According to your Local Voltage.
5. After repaired, the insulation resistance or leakage current shall be measured with  $500 \pm 5V$  D.C and shall be not less than  $1M\Omega$ .

Measuring Point



#### 6. General instructions for mechanism repair

- 1) The heads, capstan and pinch roller shall be cleaned of good quality alcohol after repaired, because dirty heads shall cause distorted sounds while dirty capstan and pinch roller shall occur wow/flutter and take-up fault.
- 2) When oiling, only one or two drops shall be applied so as not to run over and be dispersed. Note should be taken of the metal fitting for the capstan and rotating portions of the idlers and pinch roller, especially.
- 3) E-rings and poly slider washers shall be replaced with new ones, if once those have been removed. — No re-utilization due to unreliability.
- 4) Regular spare-parts shall always be used for repair, because using irregular parts and tampering with the products shall cause deterioration, malfunction and damage.



Symbol No.	Part No.	Description
M901	87-045-135	MOTOR, DC/EG
M902	81-505-604	REEL MOTOR
SOL901, 902, 903	81-505-603	SOLENOID, 9ME-A
△	★87-034-958	AC POWER CORD (H, HU, HJ only)
△	★87-034-578	AC POWER CORD (C, U only)
△	★82-187-797	AC POWER CORD (E, Z only)
△	★82-187-796	AC POWER CORD (K only)
△	★82-187-795	AC POWER CORD (G only)
△	★87-085-184	AC CORD BUSHING (H, HU, HJ, C, U only)
△	★87-085-185	AC CORD BUSHING (E, K, G, Z only)
S901,904, 905	81-505-607	LEAF SWITCH(REC ENA FWD, CASSETTE, REC ENA RVS)
S902,903	81-505-602	LEAF SWITCH (70 μs/120 μs, MT)
S906,907, 908	81-505-601	LEAF SWITCH(PAUSE, PLAY, DIRECTION)
△S951	87-031-853	ROTARY SWITCH (VOLTAGE SELECTOR) (H, HU, HJ only)

△ Safety component symbol

This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

C-MOS IC handling precaution

The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.

1. Need to be put on conductive sheet, to be put in a metallic box and to be wrapped by aluminium foil for transportation and deposit.
2. To use solder iron less than 40W (less than 260°C) of power consumption for soldering. But do not overheat more than 10 second.
3. Do not perform a conductivity test with a tester, etc. Refer to the circuit voltages of each part.
4. The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark (Ⓢ).

Note; Combination Circuit Board

The parts on the electrical parts list which are indicated by an asterisk (\*) are supplied as one single combined circuit board. Therefore, they will not be supplied separately. If this becomes necessary, please order the entire circuit board.

Combination circuit board 82-135-601

- PCB-A 82-135-602
- PCB-B 82-135-603
- PCB-C 82-135-604
- PCB-D 82-135-605
- PCB-E 82-135-606
- PCB-F 82-135-608
- PCB-I 82-135-607

Combination circuit board 81-506-611

- PCB-G 81-506-612
- PCB-H 81-506-614

Practical Service Figure

Wow and flutter: According to DIN 45500 0.1%  
Less than 0.045% (WRMS)

Pinch roller pressure:  $215 \pm 25$  g ( $2.1 \pm 0.24$  N)

Take-up torque:  $35 \pm 5$  g-cm ( $3.4 \pm 0.49$  mN·m)

FF and rewind torque:  $120 \sim 180$  g-cm ( $11.8 \sim 17.6$  mN·m)

Playback output:  $540 \pm 20$  mV  
(TTA-161) [LINE OUT, DIN OUT (Z only)]

REC/PB output:  $+0.5 \pm 1.0$  dB  
(400 Hz, 0 VU, TTA-119 J) [LINE OUT, DIN OUT (Z only)]

REC/PB distortion: Less than 2.5% (NORMAL)  
(400 Hz)

Playback noise: Less than 3.0 mV (NORMAL, 120 μs, DOLBY-NR OFF)

REC/PB SN ratio: More than 45 dB (NORMAL, DOLBY-NR OFF)  
(Unweighted)  
(WTD-A) More than 45 dB (NORMAL, DOLBY-NR OFF)

Erasing ratio: More than 55 dB  
(125 Hz)

Bias frequency: 85 kHz

Frequency response:

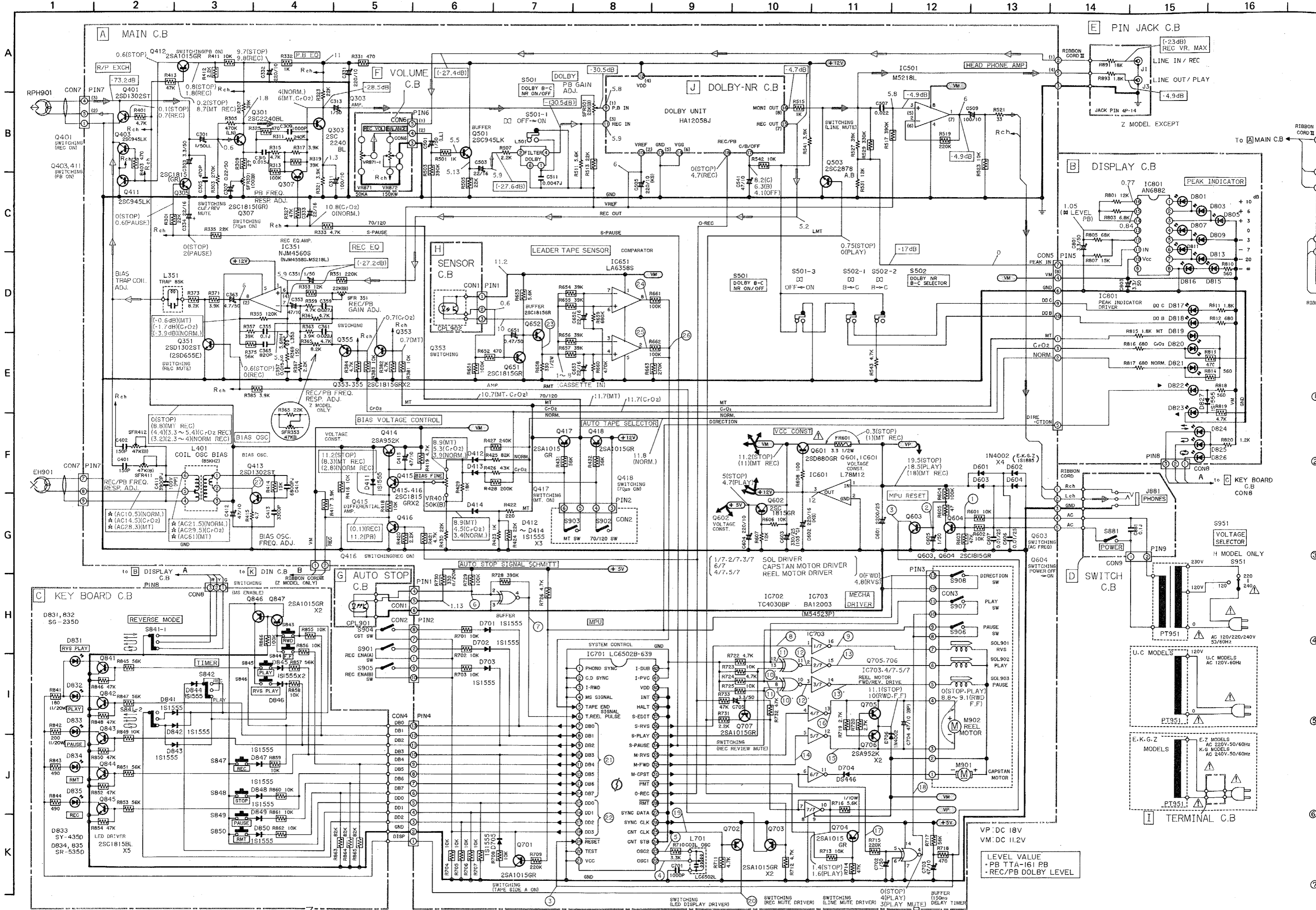
	30 ~ 60 Hz	100 ~ 650 Hz	1 kHz	2 ~ 10 kHz	13 kHz	15 kHz	16 kHz
METAL	} $\pm 3$ dB	} $\pm 3$ dB	} 0 dB	} $\pm 3$ dB	$+3$ dB	$+3$ dB	$+3$ dB
CrO <sub>2</sub>					$-4$ dB	$-4.6$ dB	$-5$ dB
NORMAL					$+3$ dB	$+3$ dB	—

Input level/impedance: LINE IN maximum input sensitivity: 50 mV (over 50 kΩ)  
DIN maximum sensitivity (Z only): 0.1 mV/kΩ (3.3 kΩ)

Output level/impedance: LINE OUT standard output level: 0.4 V (0 VU), suitable load impedance: over 50 kΩ  
DIN standard level (Z only): 0.4 V (0 VU)  
Headphones: 8 - 32 Ω

Test tape: METAL TTA-119MX  
NORMAL TTA-119J  
CrO<sub>2</sub> TTA-119G

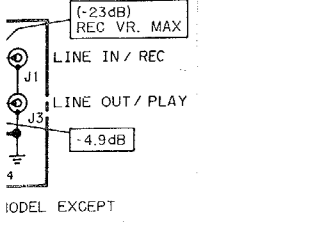
**SCHEMATIC DIAGRAM-1 (AD-R450 HB, HUB, HJB, CB, EB, KB, GB, Z models)**



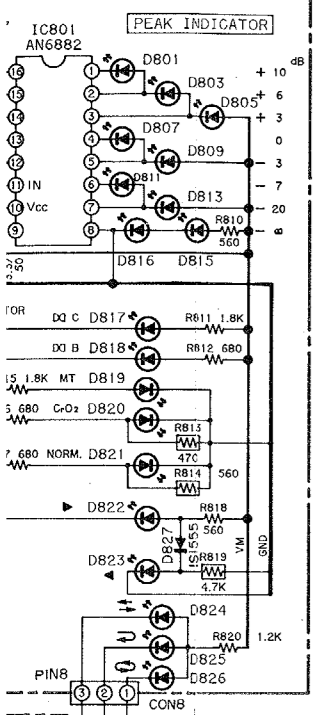
VP: DC 18V  
VM: DC 11.2V

LEVEL VALUE  
• PB TTA-161 PB  
• REC/PB DOLBY LEVEL

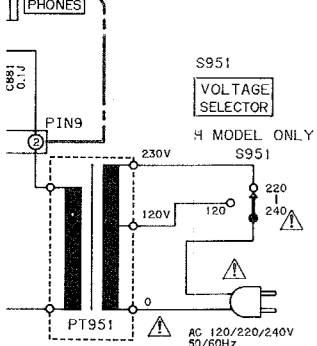
JACK C.B.



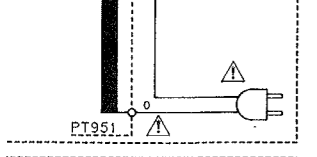
C.B.



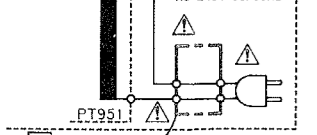
J881 PHONES



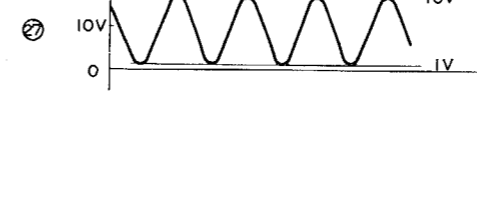
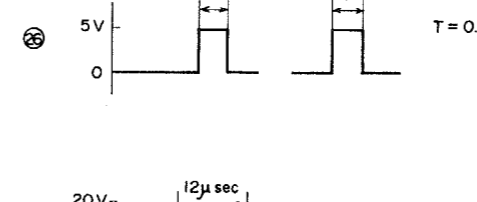
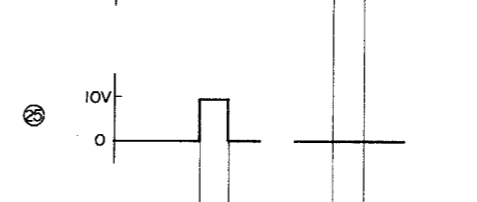
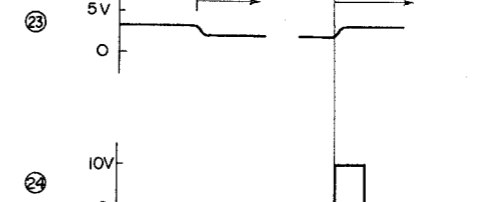
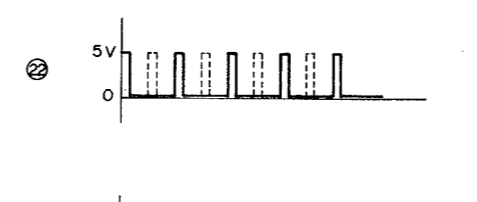
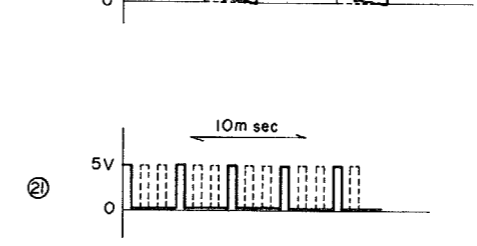
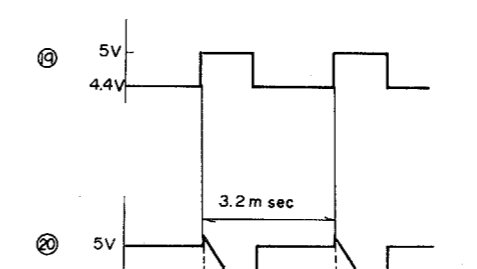
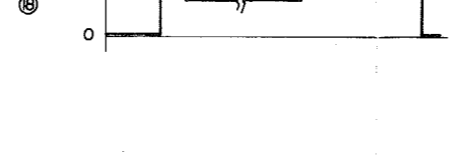
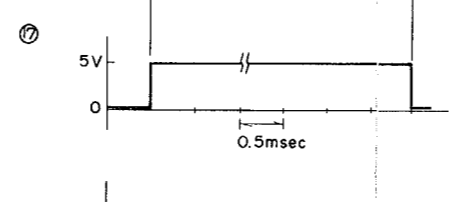
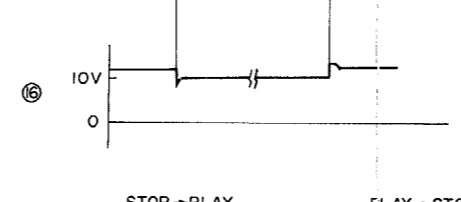
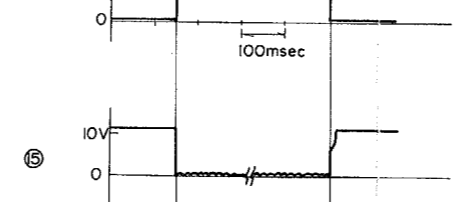
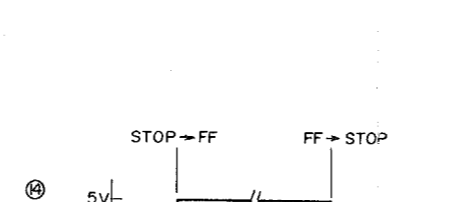
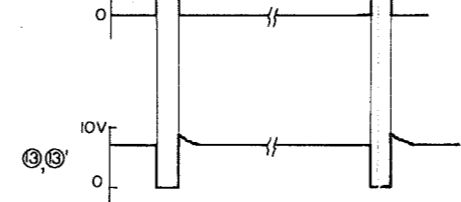
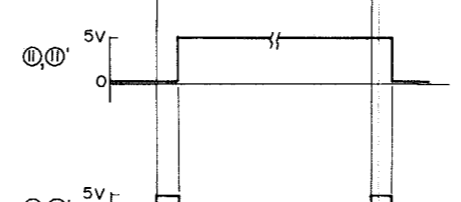
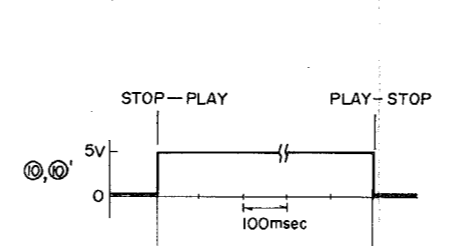
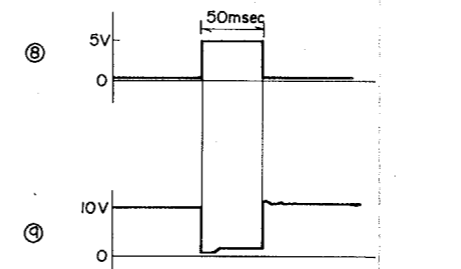
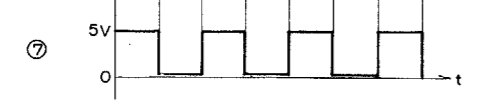
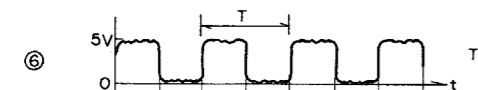
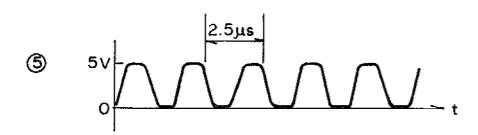
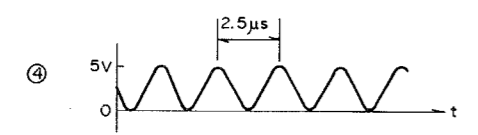
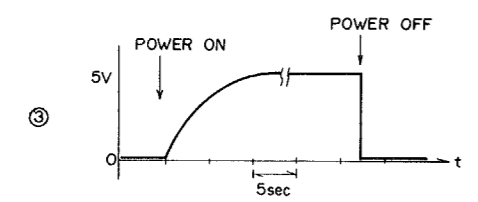
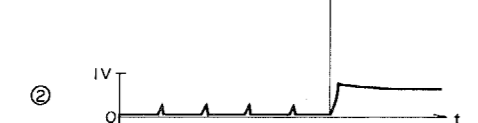
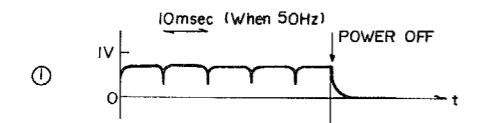
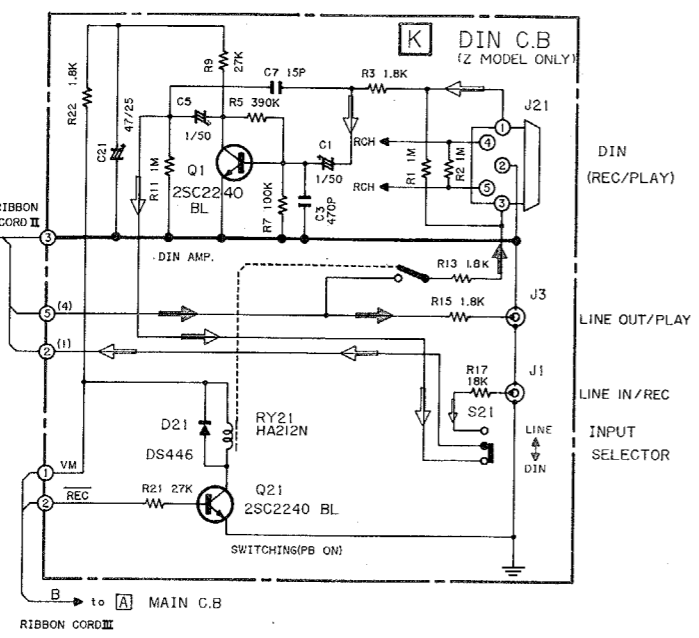
J.C. MODELS



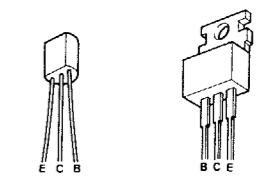
K.G.Z MODELS



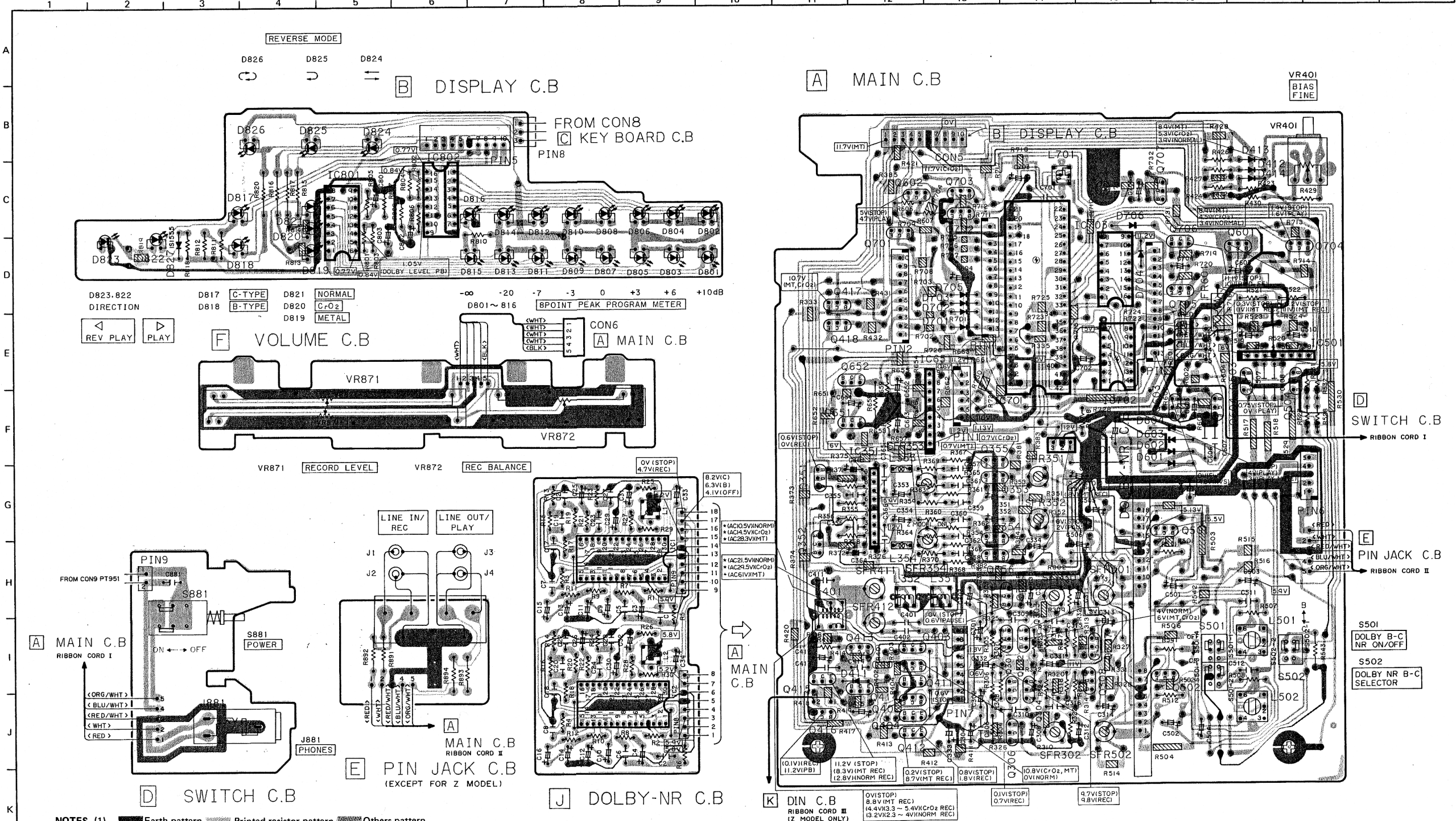
I TERMINAL C.B.



- NOTES:**
- 1) B (+) power supply
  - 2) Signal path (solid arrow), Rec path (open arrow)
  - 3) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals. But ( ) is with recording. An asterisk (\*) indicates that the value was measured with a vacuum-tube voltmeter during recording.
  - 4) Resistors with no designation have a rated power of 1/8W and a tolerance of ±5%.
  - 5) Capacitors with no designation have a dielectric strength of less than 50WV.
  - 6) The only capacitor tolerance indicated are ±5% (J) and ±10% (K).
  - 7) Ceramic capacitor symbols:
    - SL: For temperature compensation
    - YY: High dielectric constant system
    - YW, YP, YZ: High dielectric constant system
    - SH: Semiconducter ceramic
  - 8) Explanation of symbols:
    - M: Mylar capacitor
    - A: Aluminum solid capacitor
    - PP: Polypropylene film capacitor
    - BP: Bi-polarized capacitor
    - LL: Low-leakage capacitor
    - Printed resistor
    - Fuse resistor
- Safety component symbol**  
 This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.
- This schematic diagram is subject to change without notice in the interests of improved performance.



2SA952  
 2SA1015  
 2SC945  
 2SC1815  
 2SC2240  
 2SC2878  
 2SD1302  
 2SD880



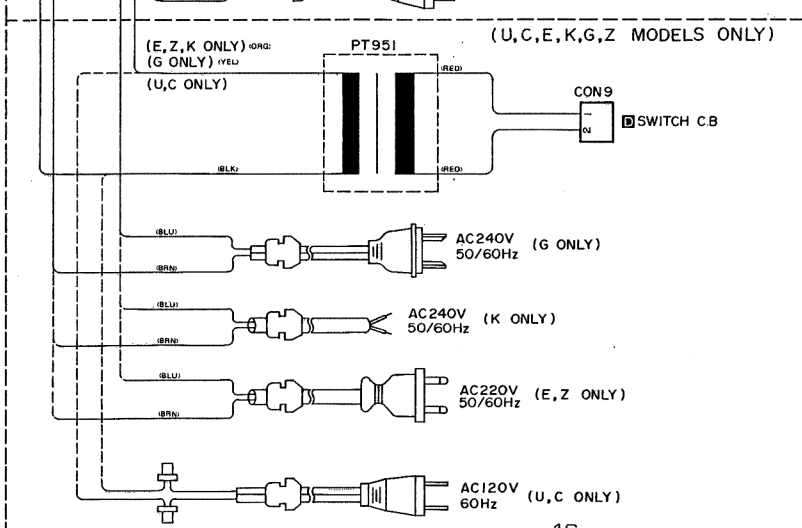
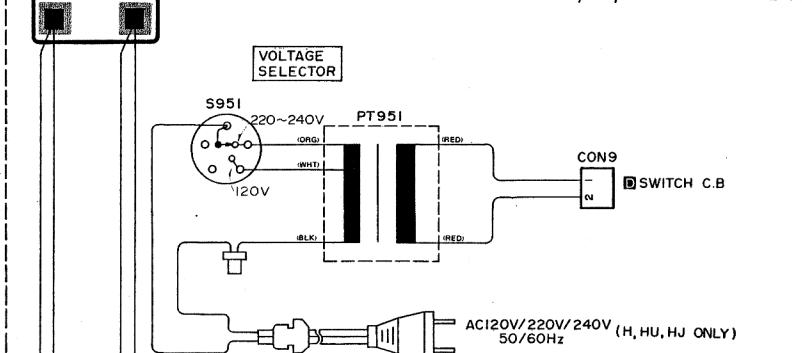
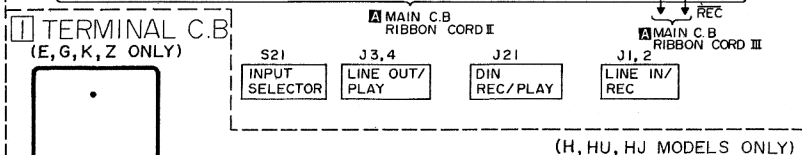
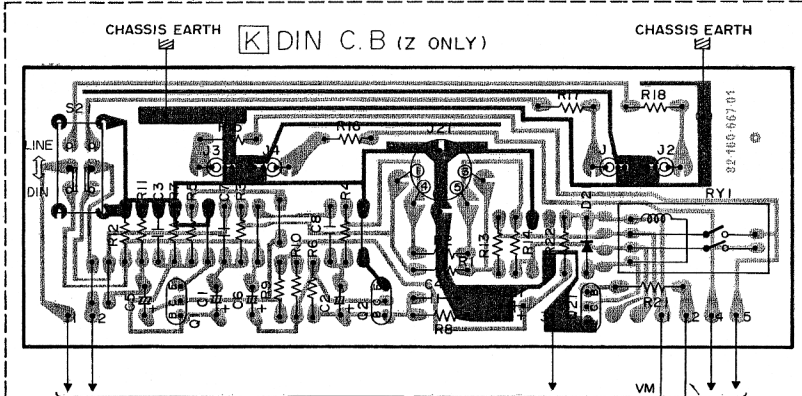
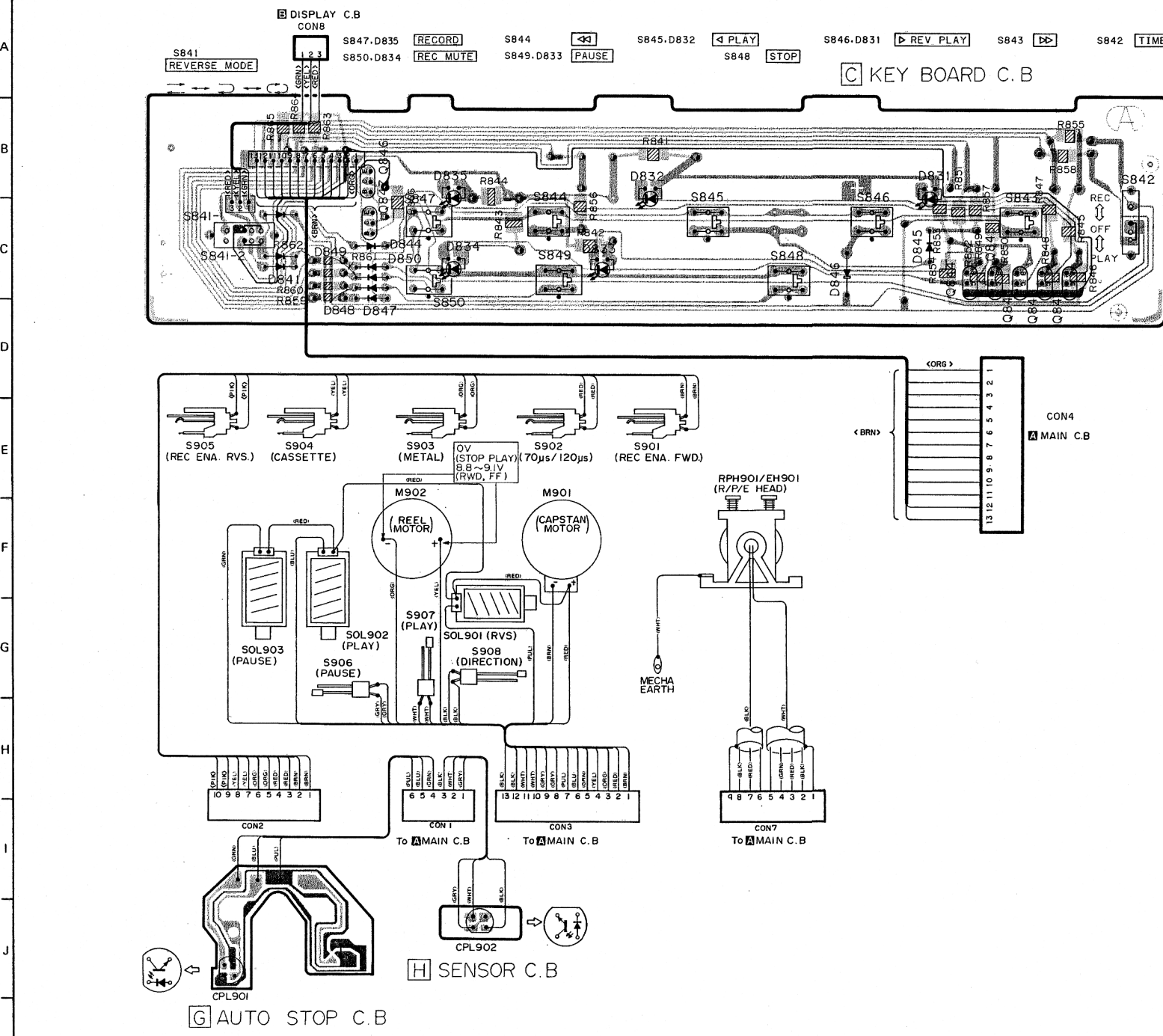
NOTES (1) [Symbol] Earth pattern [Symbol] Printed resistor pattern [Symbol] Others pattern  
 (2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.  
 An asterisk (\*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

The ICs on the electrical parts which are indicated by an C-MOS IC symbol mark (Ⓜ).

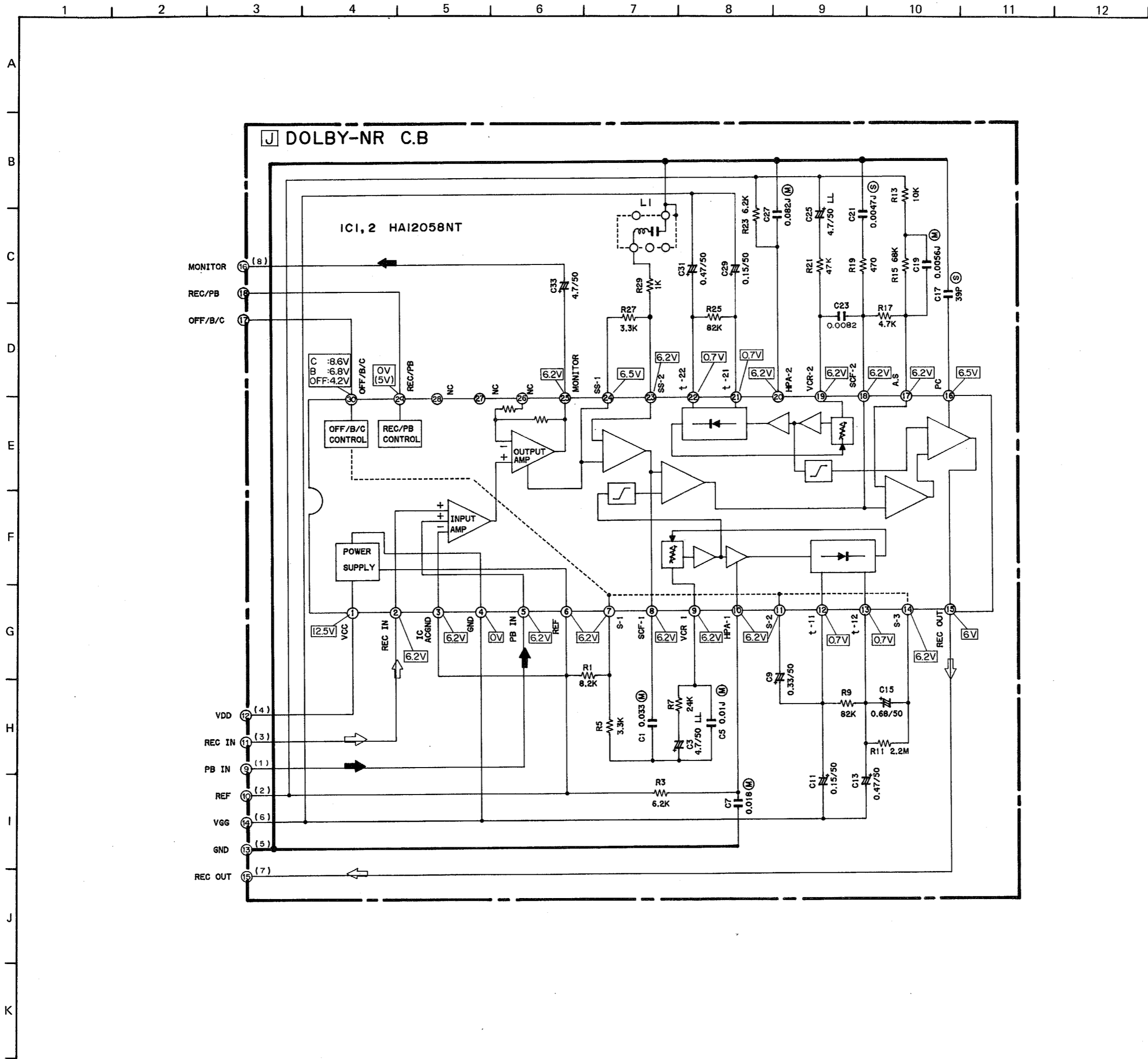


WIRING-2 (AD-R450 HB, HUB, HJB, CB, EB, KB, GB, Z models)

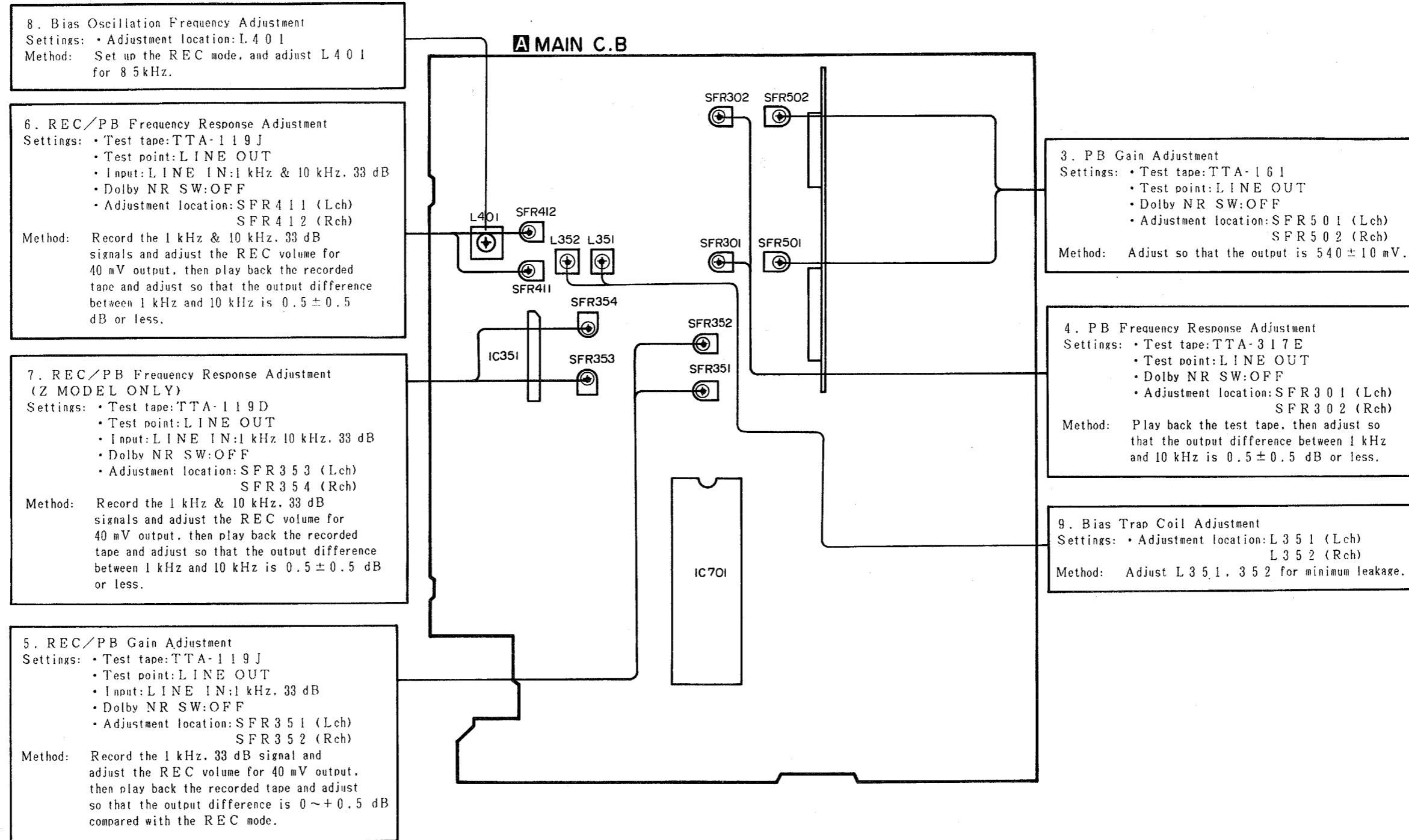
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19



NOTES (1) Earth pattern Printed resistor pattern Others pattern  
 (2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals. An asterisk (\*) indicates that the value was measured with a vacuum-tube voltmeter during recording.



ADJUSTMENT

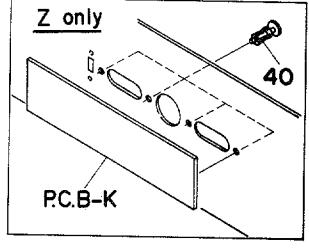
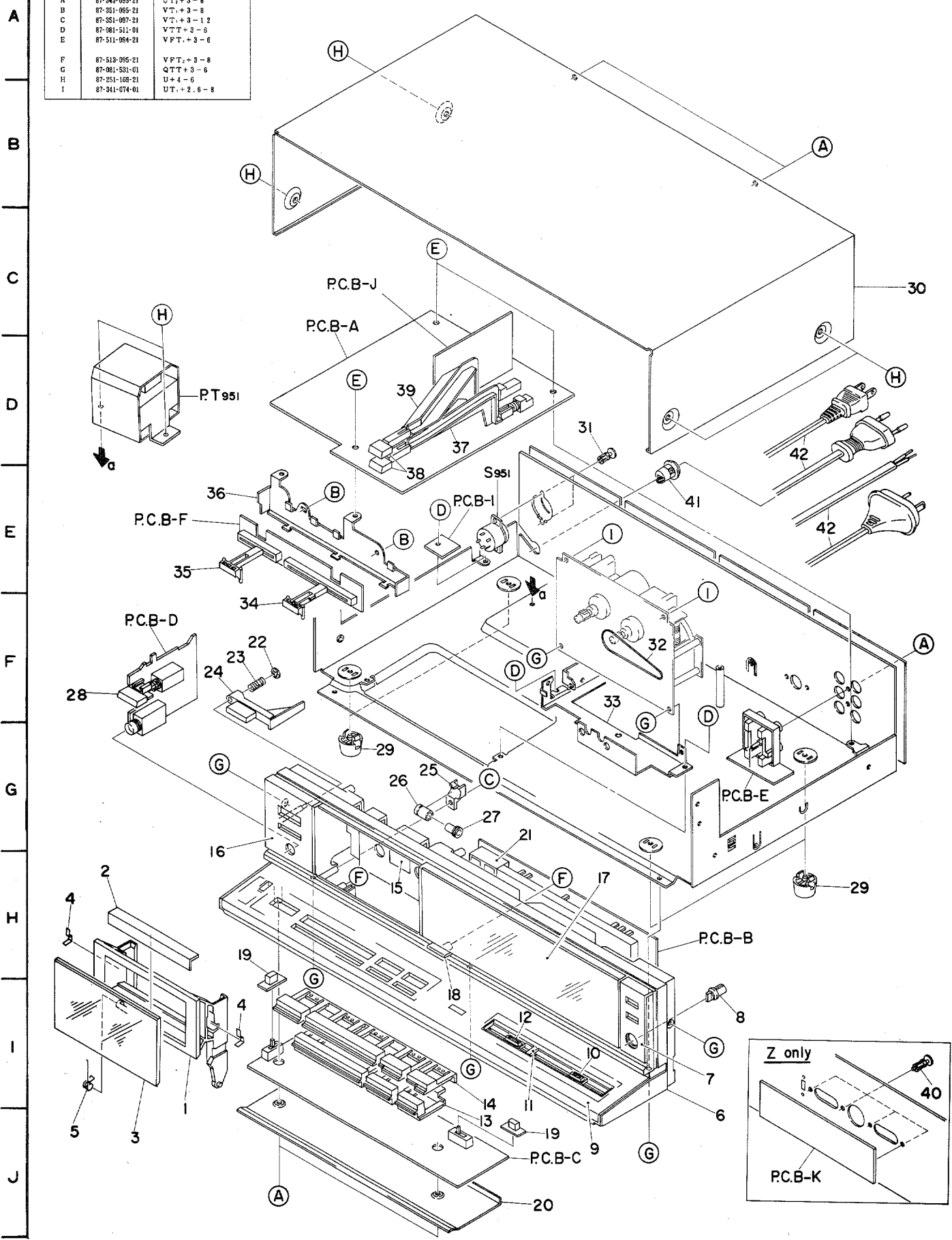




# EXPLODED VIEW-1

1      2      3      4      5      6      7

Ref. No.	Part No.	Description
A	87-343-065-21	UT <sub>1</sub> +3-8
B	87-351-065-21	VT <sub>1</sub> +3-8
C	87-351-067-21	VT <sub>1</sub> +3-1.2
D	87-061-511-01	VTT+3-6
E	87-511-064-21	VFT <sub>1</sub> +3-6
F	87-513-095-21	VFT <sub>2</sub> +3-8
G	87-061-531-01	QTT+3-6
H	87-251-168-21	U+4-6
I	87-341-074-01	UT <sub>1</sub> +2.6-8



## PARTS LIST

### MECHANICAL PARTS LIST

● ★-mark means less required items and availabilities may be limited.

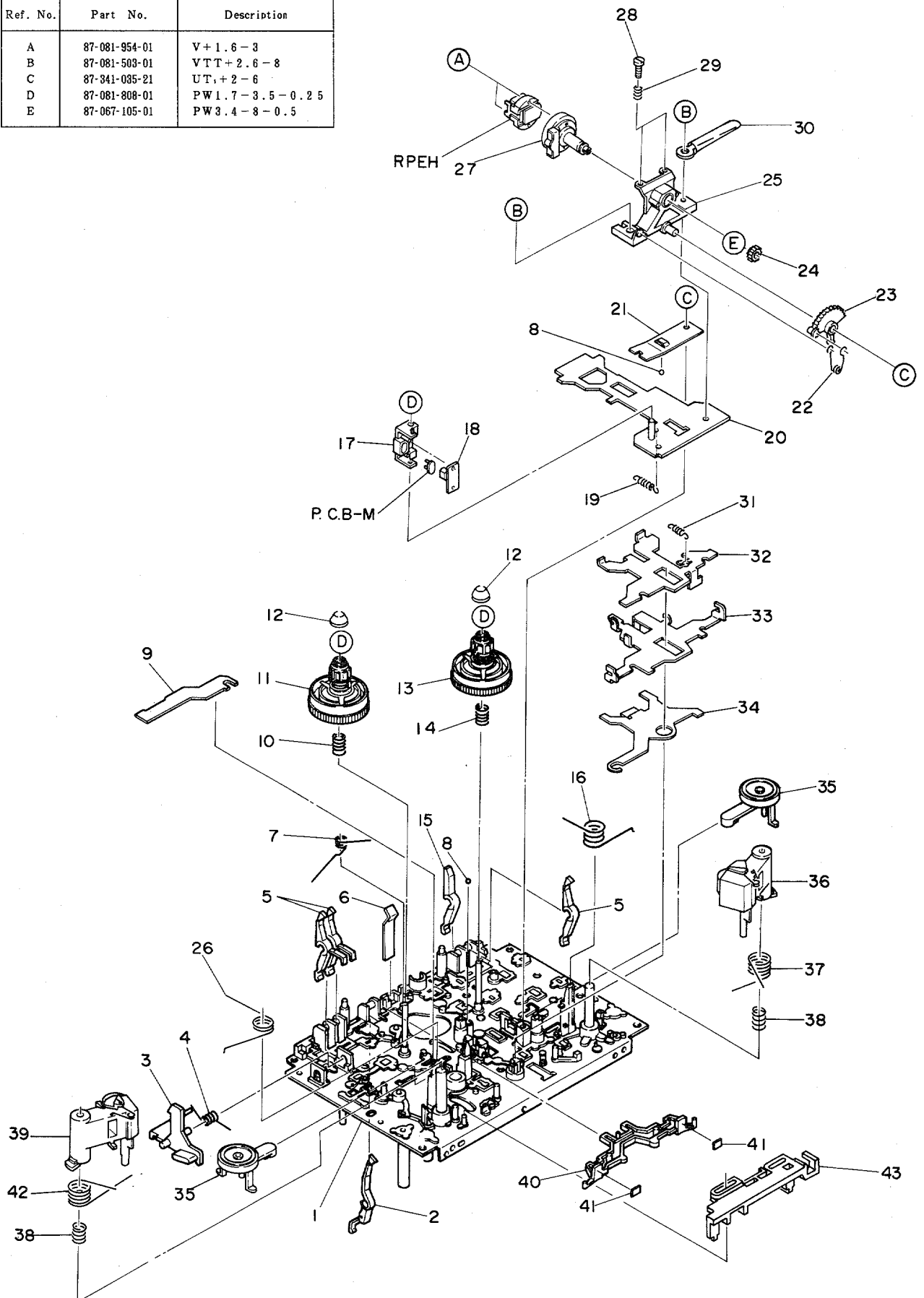
Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	1-1	82-197-008	CASSETTE BOX	FX-90	1
	1-2	★82-135-010	CASSETTE PLATE R	※	1
	1-3	★82-135-011	CASSETTE WINDOW R	※	1
	1-4	★82-192-218	P-SPRING. CASSETTE HOLDER	FX-30	2
	1-5	★82-135-210	T-SPRING. EJECT		1
	1-6	★82-135-002	FRONT CABINET	※	1
	1-7	★82-135-004	FRONT PANEL R		1
	1-8	82-192-040	KNOB B	FX-30	1
	1-9	★82-135-005	FRONT PANEL FR	※	1
	1-10	82-194-005	KNOB. REC	AD-F330	1
	1-11	★82-194-012	GUIDE. VR	AD-F330	1
	1-12	82-194-006	KNOB. BALANCE	AD-F330	1
	1-13	★82-135-007	TOUCH-KEY, STOP C	※	1
	1-14	★82-199-009	TOUCH-KEY, PLAY	AD-R550	1
	1-15	★82-648-025	LABEL. TAPE INDICATION	HS-F01	1
	1-16	★82-135-003	FRONT PANEL L	※	1
	1-17	★82-135-006	METER, WINDOW	※	1
	1-18	★87-040-172	COUNTER		1
	1-19	82-135-013	KNOB. TIMER	※	2
	1-20	★82-135-014	BOTTOM COVER	※	1
	1-21	★82-135-206	GUIDE. LED	※	1
	1-22	★87-081-903	STOPPER RING, CS-2		1
	1-23	★82-135-209	C-SPRING. EJECT		1
	1-24	82-135-008	EJECT KNOB		1
	1-25	★82-683-212	HOLDER. OIL-DAMP		1
	1-26	★82-175-207	OIL-DAMP BEARING	AD-3500	1
	1-27	★82-534-264	GEAR. OIL-DAMP		1
	1-28	82-188-012	KNOB. POWER		1
	1-29	★87-055-055	FOOT		4
	1-30	★82-199-012	STEEL CABINET	AD-R550	1
	1-31	★87-085-083	NYLON RIVET 3-5.5 (HB. HUB. HJB only)		2
	1-32	★82-542-209	BELT. COUNTER		1
	1-33	★82-197-203	HOLDER. MECHANISM	FX-90	1
	1-34	★82-135-218	SLIDE VOLUME R	※	1
	1-35	★82-135-208	SLIDE VOLUME L	※	1
	1-36	★82-135-207	HOLDER. CIRCUIT BOARD	※	1
	1-37	★82-135-205	ROD, B/C	※	1
	1-38	★82-135-012	PUSH-BUTTON. DOLBY	※	2
	1-39	82-135-204	ROD, ON/OFF	※	1
	1-40	★87-085-102	NYLON RIVET 3.5-5.5 (Z only)		4
	1-41	★87-085-184	CORD BUSHING (HB. HUB. HJB. CB only)		1
		★87-085-185	CORD BUSHING (EB. KB. GB. Z only)		1
	1-42	★87-034-958	AC POWER CORD (HB. HUB. HJB only)		1
		★87-034-578	AC POWER CORD (CB only)		1
		★82-187-797	AC POWER CORD (EB. Z only)	AD-3150	1
		★82-187-796	AC POWER CORD (KB only)	AD-3150	1
		★82-187-795	AC POWER CORD (GB only)	AD-3150	1

# EXPLODED VIEW-2

1      2      3      4      5      6      7

Ref. No.	Part No.	Description
A	87-081-954-01	V+1.6-3
B	87-081-503-01	VTT+2.6-8
C	87-341-035-21	UT.+2-6
D	87-081-808-01	PW1.7-3.5-0.25
E	87-067-105-01	PW3.4-8-0.5

A  
B  
C  
D  
E  
F  
G  
H  
I  
J



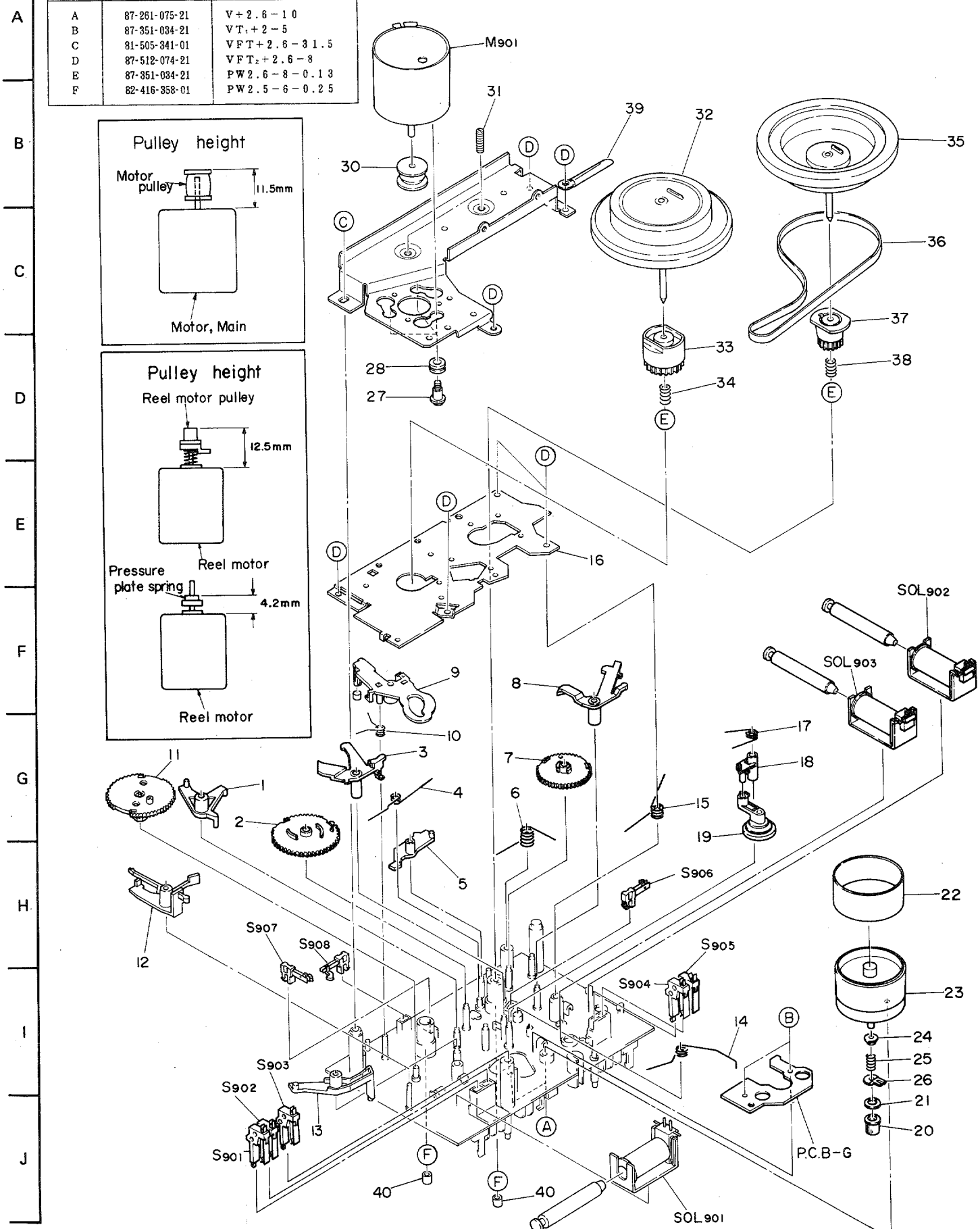
Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	2-1	★81-506-201	OUTSERT CHASSIS Ass'y		1
	2-2	★81-505-242	LEVER, METAL		1
	2-3	★81-505-239	EJECT, LEVER		1
	2-4	★81-505-273	T-SPRING, LID LOCK		1
	2-5	★81-505-241	REC BLOCKING LEVER		3
	2-6	★81-505-260	P-SPRING, CASSETTE HOLDER		1
	2-7	★81-505-268	T-SPRING, SLIDE BLAKE		1
	2-8	★87-073-005	STEEL BALL		2
	2-9	★81-505-238	BLOCKING PLATE, EJECT		1
	2-10	★81-505-274	C-SPRING, SUPPLY REEL PLATFORM		1
	2-11	★81-506-239	SUPPLY REEL PLATFORM RP Ass'y		1
	2-12	★82-303-398	CAP. TAKE-UP REEL PLATFORM		2
	2-13	★81-506-240	TAKE-UP REEL PLATFORM FP Ass'y		1
	2-14	★81-506-227	C-SPRING, REEL PLATFORM		1
	2-15	★81-505-240	LEVER, CASSETTE SENSOR		1
	2-16	★81-505-270	T-SPRING, IDLER LEVER		1
	2-17	★81-506-236	GUIDE, TAPE		1
	2-18	★81-506-274	GUIDE, LIGHT		1
	2-19	★81-505-265	E-SPRING, ACTUATING CHASSIS		1
	2-20	81-506-238	ACTUATING CHASSIS Ass'y		1
	2-21	★81-507-224	P-SPRING, ACTUATING CHASSIS		1
	2-22	★81-506-348	T-SPRING, SEGMENT		1
	2-23	★81-506-219	GEAR, SEGMENT		1
	2-24	★81-506-237	GEAR, HEAD HOUSING		1
	2-25	★81-506-319	HEAD BASE Ass'y		1
	2-26	★81-506-220	T-SPRING, IDLER LEVER R		1
	2-27	★81-506-208	HEAD HOUSING Ass'y		1
	2-28	★81-506-230	ADJUST SCREW, AZIMUTH		2
	2-29	81-506-293	C-SPRING, AZIMUTH		2
	2-30	★87-038-056	WIRE BINDER		1
	2-31	★81-505-266	E-SPRING, PAUSE PLATE		1
	2-32	★81-506-301	PLATE, PAUSE		1
	2-33	★81-506-281	PLATE, PINCH LEVER R		1
	2-34	★81-506-203	SELECT LEVER, PINCH ROLLER		1
	2-35	★81-505-344	IDLER LEVER Ass'y		2
	2-36	★81-506-275	PINCH LEVER FG Ass'y		1
	2-37	★81-506-222	T-SPRING, PINCH FG		1
	2-38	81-506-311	C-SPRING		1
	2-39	★81-506-276	PINCH LEVER RG Ass'y		1
	2-40	★81-505-236	LEVER, SLIDE BRAKE		1
	2-41	81-505-237	FELT		2
	2-42	★81-506-223	T-SPRING, PINCH RG		1
	2-43	★81-506-215	SLIDE LEVER, HEAD SELECT		1



# EXPLODED VIEW-3

1      2      3      4      5      6      7

Ref. No.	Part No.	Description
A	87-261-075-21	V+2.6-1.0
B	87-351-034-21	VT,+2-5
C	81-505-341-01	VFT+2.6-31.5
D	87-512-074-21	VFT <sub>2</sub> +2.6-8
E	87-351-034-21	PW2.6-8-0.13
F	82-416-358-01	PW2.5-6-0.25



Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	3-1	★81-505-230	PLAY LEVER		1
	3-2	★81-505-234	GEAR, PLAY CAM		1
	3-3	★81-505-231	TRIGGER LEVER, PLAY		1
	3-4	★81-505-272	T-SPRING, CAM		1
	3-5	★81-505-232	PAUSE LEVER		1
	3-6	★81-505-283	T-SPRING, PAUSE LEVER		1
	3-7	★81-505-235	GEAR, PAUSE CAM		1
	3-8	★81-505-233	TRIGGER LEVER, PAUSE		1
	3-9	★81-506-214	REVERSE LEVER		1
	3-10	★81-506-221	T-SPRING, REVERSE LEVER		1
	3-11	★81-506-241	GEAR, REVERSE		1
	3-12	★81-506-242	TRIGGER LEVER, REVERSE		1
	3-13	★81-506-216	LEVER, ACTUATING CHASSIS		1
	3-14	★81-505-269	T-SPRING, PINCH PLATE		1
	3-15	★81-505-271	T-SPRING, TRIGGER LEVER		1
	3-16	★81-505-204	MECHANISM CHASSIS B		1
	3-17	★81-505-282	T-SPRING, FR IDLER		1
	3-18	★81-505-254	IDLER LEVER FR A		1
	3-19	★81-505-301	FR IDLER Ass'y		1
	3-20~26	09-047-198	REEL MOTOR Ass'y		1
	3-27	★87-081-483	MOTOR SCREW, M2.6		3
	3-28	★87-087-029	RUBBER CUSHION		3
	3-29	★81-506-202	HOLDER, MOTOR		1
	3-30	★82-565-334	MOTOR PULLEY		1
	3-31	★82-565-373	THRUST SCREW		2
	3-32	★81-506-287	FLYWHEEL RB Ass'y		1
	3-33	★81-506-243	GEAR, FLYWHEEL		1
	3-34	★81-506-228	C-SPRING, FLYWHEEL R		1
	3-35	★81-506-205	FLYWHEEL F Ass'y		1
	3-36	81-506-229	RUBBER BELT, 3H		1
	3-37	★81-505-225	GEAR, FLYWHEEL		1
	3-38	★81-505-261	C-SPRING, FLYWHEEL F		1
	3-39	★87-038-039	WIRE BINDER		1
	3-40	81-505-246	RUBBER, DRIVE		2

## ■ ACCESSORIES/PACKAGE LIST

Part No. changed to	Ref. No.	Part No.	Description	Common Model	Q'ty
	1	82-135-901	BOOKLET, INSTRUCTION	※	1
	2	★87-049-137	SIEMENS PLUG (H, HJ only)		1
	3	★87-034-978	CONNECTION CORD CW-254BSK		2
	4	82-135-851	BOX, GIFT (H, HU, C, K, G, Z only)	※	1
		82-135-854	BOX, GIFT (HJ, E only)	※	1



**AIWA Co., Ltd. Tokyo Japan**