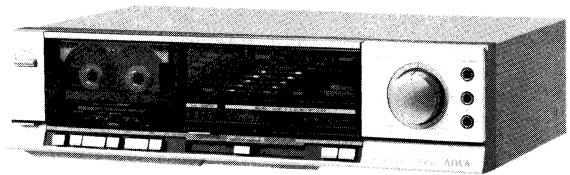


SERVICE MANUAL

STEREO CASSETTE DECK

MODEL NO.


AD-F220



TYPE H, HJ, HU, U, C, EJ, K, G, Z

SPECIFICATIONS

Semiconductors:	H, HJ, HU, U, C, EJ, K, G models 61Cs, 37 transistors, 10 diodes, 22 LEDs Z model 61Cs, 39 transistors, 10 diodes, 22 LEDs	(WTD-A)	More than 64 dB (METAL, DOLBY NR C-type) More than 64 dB (CrO ₂ , DOLBY NR C-type) More than 62 dB (NORMAL, DOLBY NR C-type) More than 30 dB
Power supply:	H, HJ, HU models AC 120V/220V ~ 240V switchable 50/60 Hz U, C models AC 120V, 60Hz EJ, Z models AC 220V, 50/60 Hz K, G models AC 240V, 50/60 Hz	Channel separation: (1 kHz, 0VU) Cross talk: (1 kHz, 0VU) Erasing ratio: (135 Hz, 0VU + 10 dB) Bias frequency: Frequency response:	85 kHz METAL 20 ~ 18,000 Hz CrO ₂ 20 ~ 17,000 Hz NORMAL 20 ~ 16,000 Hz DC Servomotor DX head (for Rec/Pb) MIC maximum input sensitivity: 0.3mV (200Ω - 10kΩ matched) LINE IN maximum input sensitivity: 50mV (more than 50kΩ) DIN max sensitivity (Z model only): 0.1mV/kΩ (3.3kΩ) LINE OUT standard output level: 0.41 V (0VU); suitable load impedance: more than 50kΩ; DIN standard level (Z model only): 0.41 V (0VU) Headphones: 8Ω
Power consumption:	H, HJ, HU, models 14W U, C, EJ, K, G, Z models 15W	Motor: Head: Inputs	
Dimensions:	420(W) x 110(H) x 280(D) mm [16-1/2" x 4-3/8" x 11-1/4"]	Outputs	
Weight:	4 kg (8.81 lbs.)	Test tape:	METAL TTA-119MX NORMAL TTA-119J H, HJ, HU, U, C, EJ, K, G models CrO ₂ TTA-119G Z model CrO ₂ TTA-119D
Track type:	4 tracks 2 channel		
Tape speed:	4.8 cm/s (1-7/8 ips)		
Wow and flutter:	Less than 0.038% (WRMS) According to DIN 45500 0.1%		
Automatic stop system:	Full auto stop		
Automatic shut-off action time:	Less than 5s.		
Pinch roller pressure:	125 ± 15 g (1.225 ± 0.147 N)		
Take-up torque:	35 ⁺¹⁵ ₋₅ g-cm (0.343 ^{+0.147} _{-0.049} mN·m)		
FF & rewind torque:	110 ± 20 g-cm (1.078 ± 0.196 mN·m)		
FF & rewind time:	90 ± 5s. (C-60)		
Playback output:	0.53 ± 0.05V (LINE) 0.49 ± 0.05V (DIN)		
Playback noise:	Less than 1.2mV (CrO ₂) Less than 1.2mV (METAL) Less than 2.3mV (NORMAL)		
Rec./PB output:	H, HJ, HU, U, C, EJ, K, G models OVU ± 1.5dB (LINE) Z model OVU ± 1.5dB		
Rec./PB distortion:	H, HJ, HU, U, C, EJ, K, G models Less than 2.5% (METAL) Less than 2.0% (CrO ₂) Less than 1.5% (NORMAL)		
Rec./Pb SN ratio:	More than 42/46 dB (METAL, DOLBY NR B-type OFF/ON) More than 42/46 dB (CrO ₂ , DOLBY NR B-type OFF/ON) More than 41/46 dB (NORMAL, DOLBY NR B-type OFF/ON)		
(WTD-A)	More than 45/52 dB (METAL, DOLBY NR B-type/C-type) More than 50/55 dB (CrO ₂ , DOLBY NR B-type/C-type) More than 45/52 dB (NORMAL, DOLBY NR B-type/C-type)		

- Specifications and external appearance are subject to change without notice due to product improvement.
- Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.
- Dolby and the  symbol are trademarks of Dolby Laboratories Licensing Corporation.

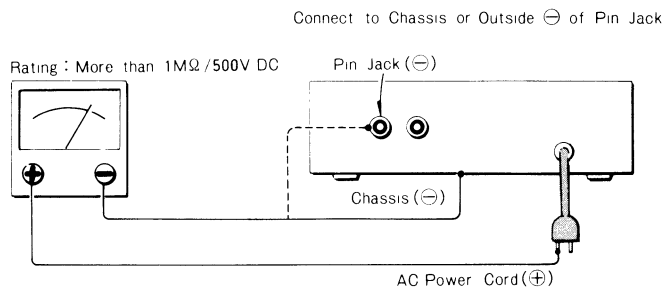
Follow the instructions carefully, which will allow the user to optimise the products' performance and give many years of service.

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 $1M\Omega$.

6. General instructions for mechanism repair

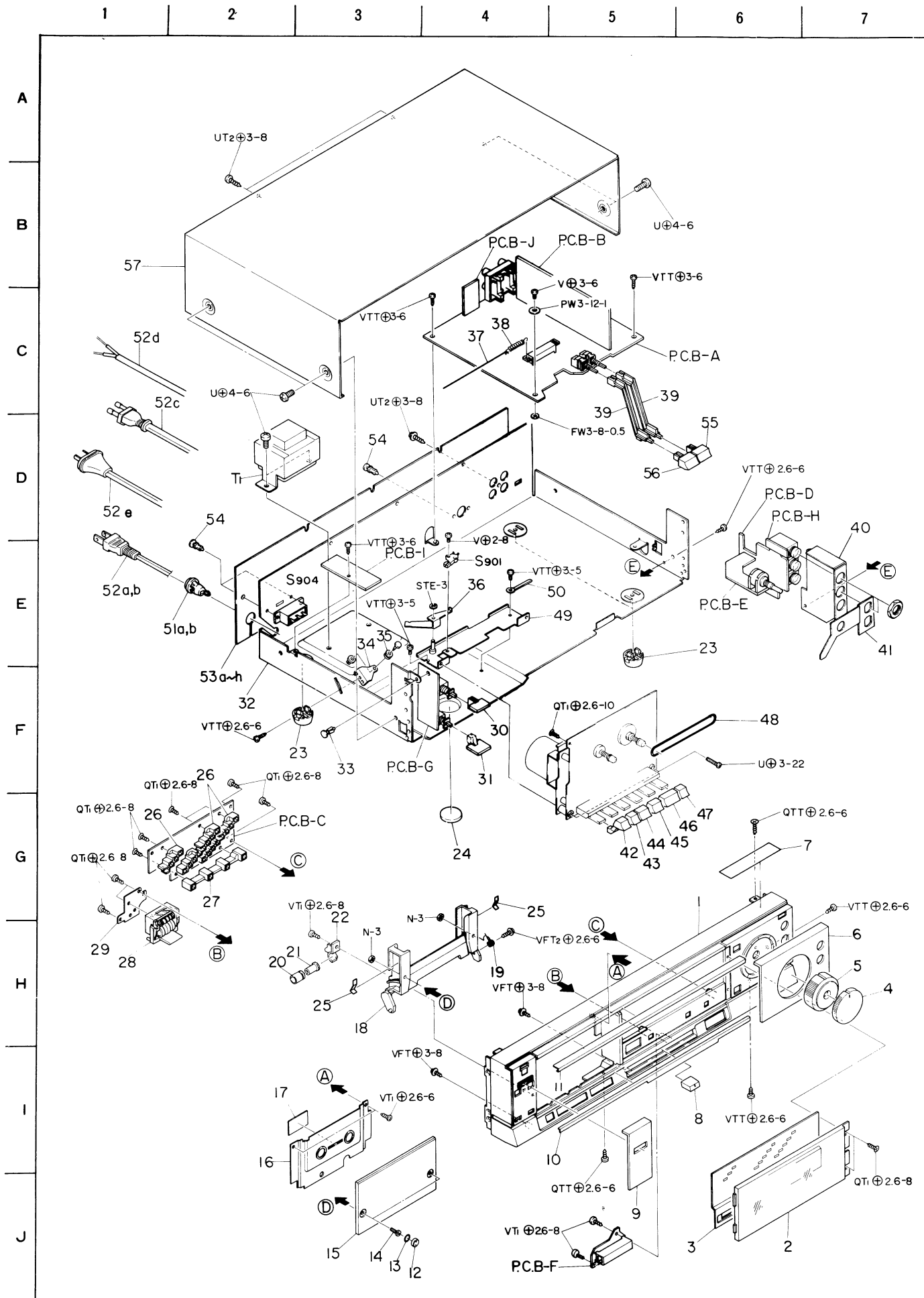
- 1) The heads, capstan and pinch roller shall be cleaned of good quality alcohol after repaired, because dirty heads shall cause distorted sounds while dirty capstan and pinch roller shall occur wow/flutter and take-up fault.
- 2) Lubricants been stained the surfaces of transmitting portion of the belts, idlers, capstan and pinch roller shall be removed, because slippery and faulty tape travel shall be caused.
- 3) 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.
- 4) E-rings and poly slider washers shall be replaced with new ones, if once those have been removed. — No re-utilization due to unreliability.
- 5) Regular spare-parts shall always be used for repair, because using irregular parts and tampering with the products shall cause deterioration, malfunction and damage.

Measuring Point



As to disassembling instructions, refer to the service manual of AD-F330

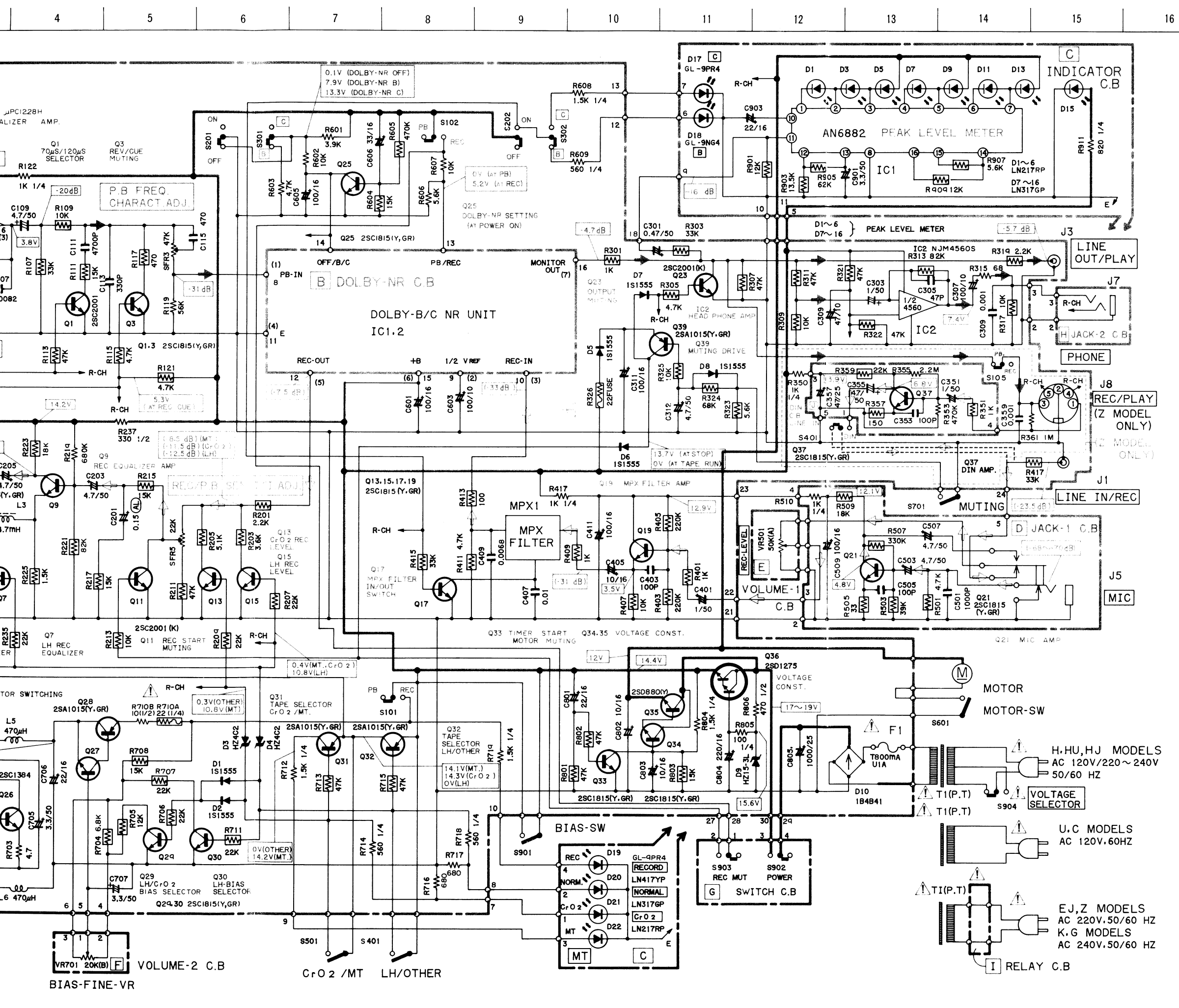
EXPLODED VIEW-1



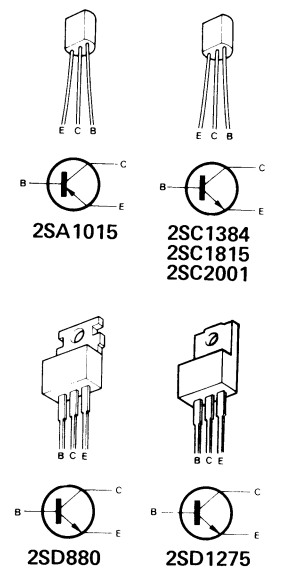
PARTS LIST

MECHANICAL PARTS

Ref. No.	Part No.	Part No. Changed to	Description	Q'ty
1-1	82-195-001-01		Cabinet, Front	1
1-2	82-185-004-01		Window, Meter	1
1-3	82-195-005-01		Plate, Meter	1
1-4	82-195-007-01		Knob, REC A	1
1-5	82-195-020-01		Knob, REC BN	1
1-6	82-195-004-01		Panel, Front R	1
1-7	82-195-017-01		Sheet, Bias insulation	1
1-8	82-185-019-11		Knob, Slide	1
1-9	82-195-003-01		Panel, Front L	1
1-10	82-195-006-01		Control Panel	1
1-11	82-185-017-11		Plate, Top	1
1-12	82-175-010-01		Cap	2
1-13	82-176-215-01		Adhesive sheet	2
1-14	82-175-213-01		Screw, 3-6.5	2
1-15	82-176-019-01		Window, Cassette	1
1-16	82-175-033-01		Plate, Cassette	1
1-17	82-185-029-01		Label, Tape indication	1
1-18	82-176-002-11		Cassette box	1
1-19	82-185-213-01		T-spring, Eject	1
1-20	82-185-212-01		Oil-damp bearing	1
1-21	82-534-264-01		Gear, Oil-damp	1
1-22	82-175-210-11		Holder, Oil-damp	1
1-23	87-055-055-01		Foot	3
1-24	82-195-055-01		Rubber foot	1
1-25	82-192-218-01		P-spring, Cassette	2
1-26	82-185-205-01		Guide, LED A	3
1-27	82-185-206-01		Guide, LED B	1
1-28	87-040-146-11		Counter	1
1-29	82-185-202-01		Holder, Counter	1
1-30	82-195-008-01		Push-button, POWER	1
1-31	82-175-024-11		Push-button, REC MUTE	1
1-32	82-195-203-01		Amp. chassis	1
1-33	87-084-078-01		Nylon rivet 3-4.5	1
1-34	82-176-204-01		Holder, Pulley	1
1-35	87-071-019-01		Roller	1
1-36	82-176-201-11		Lever, REC	1
1-37	87-096-045-01		Thread	1
1-38	82-176-205-01		E-spring, REC	1
1-39	82-195-202-01		Rod, DOLBY	2
1-40	82-185-201-01		Holder, MIC jack	1
1-41	82-195-208-01		Holder, Volume plate	1
1-42	82-185-007-01		Push-button, REC	1
1-43	82-185-011-11		Push-button, REW	1
1-44	82-185-006-11		Push-button, PLAY	1
1-45	82-185-010-11		Push-button, FF	1
1-46	82-185-008-11		Push-button, STOP	1
1-47	82-185-009-11		Push-button, PAUSE	1
1-48	82-538-210-01		Belt, Counter	1
1-49	82-185-217-01		Holder, Mechanism	1
1-50	87-038-039-01		Wire binder	1
1-51a	87-085-184-01		Cord bushing (H, HU, HJ, U, C models only)	1
b	87-085-185-01		Cord bushing (EJ, K, G, Z models only)	1
1-52a	87-034-826-01		AC power cord (H, HU, HJ models only)	1
b	87-034-951-01		AC power cord (U, C models only)	1
c	87-034-877-01		AC power cord (EJ, Z models only)	1
d	87-034-872-01		AC power cord (K model only)	1
e	87-034-892-01		AC power cord (G model only)	1



- NOTES:**
- 1) B (+) power supply
 - 2) Signal path
Rec path
 - 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:
 - For temperature compensation (SL)
 - High dielectric constant system (YY)
 - High dielectric constant system (YW, YP, YZ)
 - Semiconductor ceramic
 - 8) Explanation of symbols:
 - Mylar capacitor
 - Aluminum solid capacitor
 - Polypropylene film capacitor
 - Bi-polarized capacitor
 - Low-leakage capacitor
 - Tantalum capacitor
 - Printed resistor
 - Fuse resistor
 - Nonflammable 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.



- S101 ~ 106 REC/PB (PB)
- S201 ~ 202 DOLBY-NR (OFF)
- S301 ~ 302 DOLBY-NR B/C (B)
- S401 LH/OTHER
- S501 CrO₂/MT
- S601 MOTOR (OFF)
- S701 MUTING (OFF)
- S801 F/R (OFF)
- S901 BIAS (OFF)
- S902 POWER (OFF)
- S903 REC MUTE (OFF)
- S904 VOLTAGE SELECTOR

H, HU, HJ MODELS
AC 120V/220 ~ 240V
50/60 HZ

U.C. MODELS
AC 120V.60HZ

EJ, Z MODELS
AC 220V.50/60 HZ
K, G MODELS
AC 240V.50/60 HZ

ELECTRICAL MAIN PARTS LIST

Symbol No.	Part No.	Description
◀ MAIN CIRCUIT BOARD SECTION ▶		
PCB-A	*	Main circuit board
IC1	87-027-910-01	IC, μ PC1228H
IC2	87-027-986-01	IC, 4560S
Q1,2,3,4,5, 6,7,8,9,10, 13,14,15,16, 17,18,19,20, 25,27,29, 30,33,34	89-318-154-51	Transistor, 2SC1815 (Y, GR)
Q11,12,23, 24	89-420-011-01	Transistor, 2SC2001K
Q26	89-313-843-01	Transistor, 2SC1384
Q28,31,32, 39	89-110-153-01	Transistor, 2SA1015Y
Q35	89-408-803-01	Transistor, 2SD880Y
Q36	89-412-753-01	Transistor, 2SD1275
D1,2,5,6,7, 8	87-027-097-01	Diode, 1S1555
D3,4	87-027-393-01	Zener diode, HZ4C2
D9	87-027-449-01	Zener diode, HZ15-3L
D10	87-027-376-01	Encapsulated diode, 1B4B41
L1,2	82-196-616-01	Trap coil, 85K
L3,4	87-005-093-01	Micro inductor coil, 4,7mH
L5,6	87-003-051-01	Choke coil, 470 μ H
L7	82-192-615-01	Bias OSC coil, 85K
MPX1	87-008-271-01	MPX filter, 2CH
J1,2,3,4	87-049-055-01	PIN jack 4P-17 (LINE IN/REC, LINE OUT/PLAY)
S101 ~ 104	82-195-610-01	Slide switch (REC/PB) (H, HU, HJ, U, C, EJ, K, G models only)
S101 ~ 106	82-195-611-01	Slide switch (REC/PB) (Z model only)
S201,202, 301,302	87-031-787-01	Push switch (DOLBY-NR, DOLBY-NR B/C)
S401,402	87-031-752-01	Slide switch (INPUT SELECTOR) (Z model only)
SFR1,2	87-021-735-01	Semi-fixed resistor, 220 Ω -B
SFR3,4	87-021-745-01	Semi-fixed resistor, 47k Ω -B
SFR5,6	87-021-743-01	Semi-fixed resistor, 22k Ω -B
SFR7,8	87-021-747-01	Semi-fixed resistor, 220k Ω -B
F1	87-035-221-01	Fuse, 800mA (H, HU, HJ, EJ, K, G, Z models only)
F1	87-035-297-01	Fuse, 1A (U, C models only)
F1	87-098-317-01	Fuse label, 1A (U, C models only)
PIN1	87-049-144-01	Pin, 4P
PIN2	87-049-247-01	Pin, 2P
PIN3	87-049-148-01	Pin, 8P
PIN4,5	87-049-302-01	Pin, 2P
PIN6	87-049-276-01	Pin, 6P
R326,710A	87-029-007-01	< Resistor > 22 Ω Fuse resistor
C101,102	87-015-951-01	< Capacitors > 1 μ F 50V Electrolytic
C201,202	87-015-427-01	0.15 μ F 16V Aluminum solid
C701	87-014-061-01	1500pF PP
◀ DOLBY-NR CIRCUIT BOARD SECTION ▶		
IC1,2	87-027-905-01	Dolby-NR unit, 2H (W/PCB-B)
L1,2	87-027-862-01	IC, HA12038
PIN	87-005-160-01	Coil, 36mH
PIN	87-049-117-01	Pin, 7P
PIN	87-049-119-01	Pin, 9P
C21,22,23, 24,45,56	87-010-081-01	< Capacitor > 0.15 μ F 50V Electrolytic

Symbol No.	Part No.	Description
◀ INDICATOR CIRCUIT BOARD SECTION ▶		
PCB-C	*	Indicator circuit board
IC1,2	87-027-879-01	IC, AN6882
D1,2,3,4,5, 6,22	87-027-542-01	LED, LN217RP (REAK PLOGRAM METER, MT)
D7,8,9,10, 11,12,13,14, 15,16,21	87-027-543-01	LED, LN317GP (PEAK PROGRAM METER, LH)
D17,19	87-027-772-01	LED, GL-9PR4 (DOLBY-NR C, RECORD)
D18	87-027-773-01	LED, GL-9NG4 (DOLBY-NR B)
D20	87-027-671-01	LED, LN417YP (CrO ₂)
◀ JACK-1 CIRCUIT BOARD SECTION ▶		
PCB-D	*	Jack-1 circuit board
Q21,22	89-318-154-51	Transistor, 2SC1815 (Y, GR)
J5,6	87-049-295-01	Jack, 6.3 ϕ (MIC)
◀ VOLUME-1 CIRCUIT BOARD SECTION ▶		
PCB-E	*	Volume-1 circuit board
VR501	82-195-612-01	Volume, 50k Ω -A (REC LEVEL)
◀ VOLUME-2 CIRCUIT BOARD SECTION ▶		
PCB-F	*	Volume-2 circuit board
VR701	82-195-613-01	Slide volume (LH BIAS FINE)
◀ SWITCH CIRCUIT BOARD SECTION ▶		
PCB-G	*	Switch circuit board
S902	87-031-786-01	Push switch (POWER)
S903	87-031-789-01	Push switch (REC MUTE)
◀ JACK-2 CIRCUIT BOARD SECTION ▶		
PCB-H	*	Jack-2 circuit board
J7	87-049-083-01	Jack, 6.3 ϕ (PHONES)
◀ RELAY CIRCUIT BOARD SECTION ▶ = "EJ, K, G, Z" models only		
PCB-I	*	Relay circuit board
	82-304-743-01	1P terminal (EJ, K, G, Z models only)
◀ DIN CIRCUIT BOARD SECTION ▶ = "Z" model		
PCB-J	*	DIN circuit board
Q37, 38	89-318-154-51	Transistor, 2SC1815 (Y, GR)
J8	87-049-079-01	Jack, 5P (DIN)
PIN	87-049-116-01	Pin, 6P
◀ MISCELLANEOUS ▶		
T1	82-195-602-01	Power transformer (H, HU, HJ models only)
T1	82-195-603-01	Power transformer (U, C models only)
T1	82-195-604-01	Power transformer (EJ, Z models only)
T1	82-195-605-01	Power transformer (K, G models only)
RPH	87-046-200-01	REC/PB head
EH	87-046-196-01	Erase head
M	87-045-135-01	Motor, DC EG
T1		AC power cord (H, HU, HJ models only)
T1		AC power cord (U, C models only)
T1		AC power cord (EJ, Z models only)
T1		AC power cord (K model only)
T1		AC power cord (G model only)

Symbol No.	Part No.	Description
S401, 501	87-031-361-01	Leaf switch (LH/OTHER, CrO ₂ /MT.)
S601	87-031-548-01	Leaf switch (MOTOR)
S701, 801	87-031-615-01	Leaf switch (MUTING, F/R)
S901	87-031-491-01	Micro switch (BIAS)
S904	87-031-539-01	Slide switch (VOLTAGE SELECTOR)
S904	87-033-140-01	(H, HU, HJ models only)
S904	87-085-185-01	Splice connector (H, HU, HJ, U, C models only)
CON1	82-195-633-01	Connector ass'y, 4P
CON3	82-195-632-01	Connector ass'y, 8P
CON4	82-195-644-01	Connector ass'y, 2P
CON5	82-195-631-01	Connector ass'y, 2P
CON6	82-195-630-01	Connector ass'y, 6P

⚠ 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.

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.

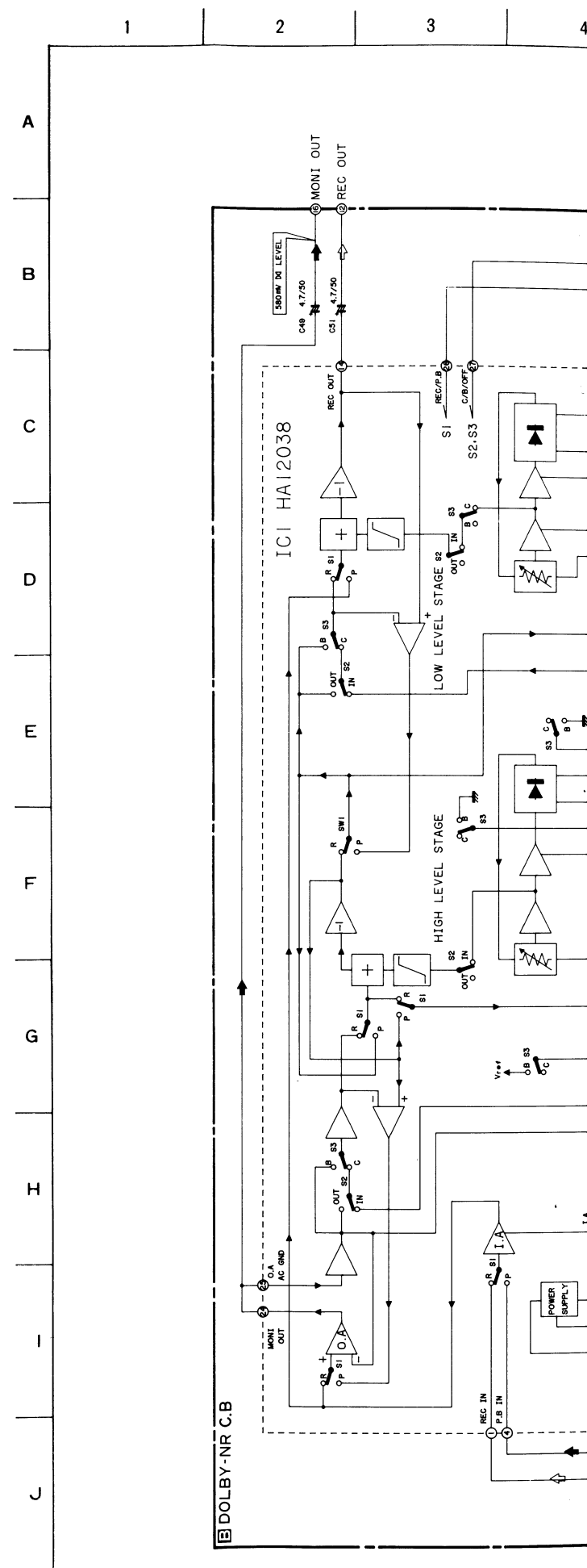
- Combination circuit board 82-195-620-01**
- PCB-A 82-195-621-01
 - PCB-C 82-195-622-01
 - PCB-D 82-195-629-01
 - PCB-E 82-195-626-01
 - PCB-F 82-195-625-01
 - PCB-G 82-195-624-01
 - PCB-H 82-195-623-01
 - PCB-I 82-195-627-01 (EJ, K, G, Z models only)
 - PCB-J 82-195-628-01 (Z model only)

• Ceramic capacitor
87-018-□□□-01

Capacitor	Part No.
5.6pF	006
6.8pF (RH)	067
8.2pF	008
12pF	010
12pF (CH)	055
12pF (UJ)	081
15pF	082
22pF	016
100pF	032
220pF	036
330pF	093
1500pF	094
0.01 μ F	047

0.022 μ F 87-012-105-01

SCHEMATIC DIAGRAM-1



SCHEMATIC DIAGRAM-1

Symbol No.	Part No.	Description
≪ INDICATOR CIRCUIT BOARD SECTION ≫		
PCB-C	*	Indicator circuit board
IC1,2	87-027-879-01	IC, AN6882
D1,2,3,4,5,6,22	87-027-542-01	LED, LN217RP (REAK PLOGRAM METER, MT)
D7,8,9,10,11,12,13,14,15,16,21	87-027-543-01	LED, LN317GP (PEAK PROGRAM METER, LH)
D17,19	87-027-772-01	LED, GL-9PR4 (DOLBY-NR C, RECORD)
D18	87-027-773-01	LED, GL-9NG4 (DOLBY-NR B)
D20	87-027-671-01	LED, LN417YP (CrO ₂)
≪ JACK-1 CIRCUIT BOARD SECTION ≫		
PCB-D	*	Jack-1 circuit board
Q21,22	89-318-154-51	Transistor, 2SC1815 (Y, GR)
J5,6	87-049-295-01	Jack, 6.3φ (MIC)
≪ VOLUME-1 CIRCUIT BOARD SECTION ≫		
PCB-E	*	Volume-1 circuit board
VR501	82-195-612-01	Volume, 50kΩ-A (REC LEVEL)
≪ VOLUME-2 CIRCUIT BOARD SECTION ≫		
PCB-F	*	Volume-2 circuit board
VR701	82-195-613-01	Slide volume (LH BIAS FINE)
≪ SWITCH CIRCUIT BOARD SECTION ≫		
PCB-G	*	Switch circuit board
S902	87-031-786-01	Push switch (POWER)
S903	87-031-789-01	Push switch (REC MUTE)
≪ JACK-2 CIRCUIT BOARD SECTION ≫		
PCB-H	*	Jack-2 circuit board
J7	87-049-083-01	Jack, 6.3φ (PHONES)
≪ RELAY CIRCUIT BOARD SECTION ≫ = "EJ, K, G, Z" models only		
PCB-I	*	Relay circuit board
	82-304-743-01	1P terminal (EJ, K, G, Z models only)
≪ DIN CIRCUIT BOARD SECTION ≫ = "Z" model		
PCB-J	*	DIN circuit board
Q37, 38	89-318-154-51	Transistor, 2SC1815 (Y, GR)
J8	87-049-079-01	Jack, 5P (DIN)
PIN	87-049-116-01	Pin, 6P
≪ MISCELLANEOUS ≫		
T1	82-195-602-01	Power transformer (H, HU, HJ models only)
T1	82-195-603-01	Power transformer (U, C models only)
T1	82-195-604-01	Power transformer (EJ, Z models only)
T1	82-195-605-01	Power transformer (K, G models only)
RPH	87-046-200-01	REC/PB head
EH	87-046-196-01	Erase head
M	87-045-135-01	Motor, DC EG
		AC power cord (H, HU, HJ models only)
		AC power cord (U, C models only)
		AC power cord (EJ, Z models only)
		AC power cord (K model only)
		AC power cord (G model only)

Symbol No.	Part No.	Description
S401, 501	87-031-361-01	Leaf switch (LH/OTHER, CrO ₂ /MT.)
S601	87-031-548-01	Leaf switch (MOTOR)
S701, 801	87-031-615-01	Leaf switch (MUTING, F/R)
S901	87-031-491-01	Micro switch (BIAS)
S904	87-031-539-01	Slide switch (VOLTAGE SELECTOR) (H, HU, HJ models only)
	87-033-140-01	Splice connector (H, HU, HJ, U, C models only)
	87-085-185-01	Splice connector (EJ, K, G, Z models only)
CON1	82-195-633-01	Connector ass'y, 4P
CON3	82-195-632-01	Connector ass'y, 8P
CON4	82-195-644-01	Connector ass'y, 2P
CON5	82-195-631-01	Connector ass'y, 2P
CON6	82-195-630-01	Connector ass'y, 6P

⚠ 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.

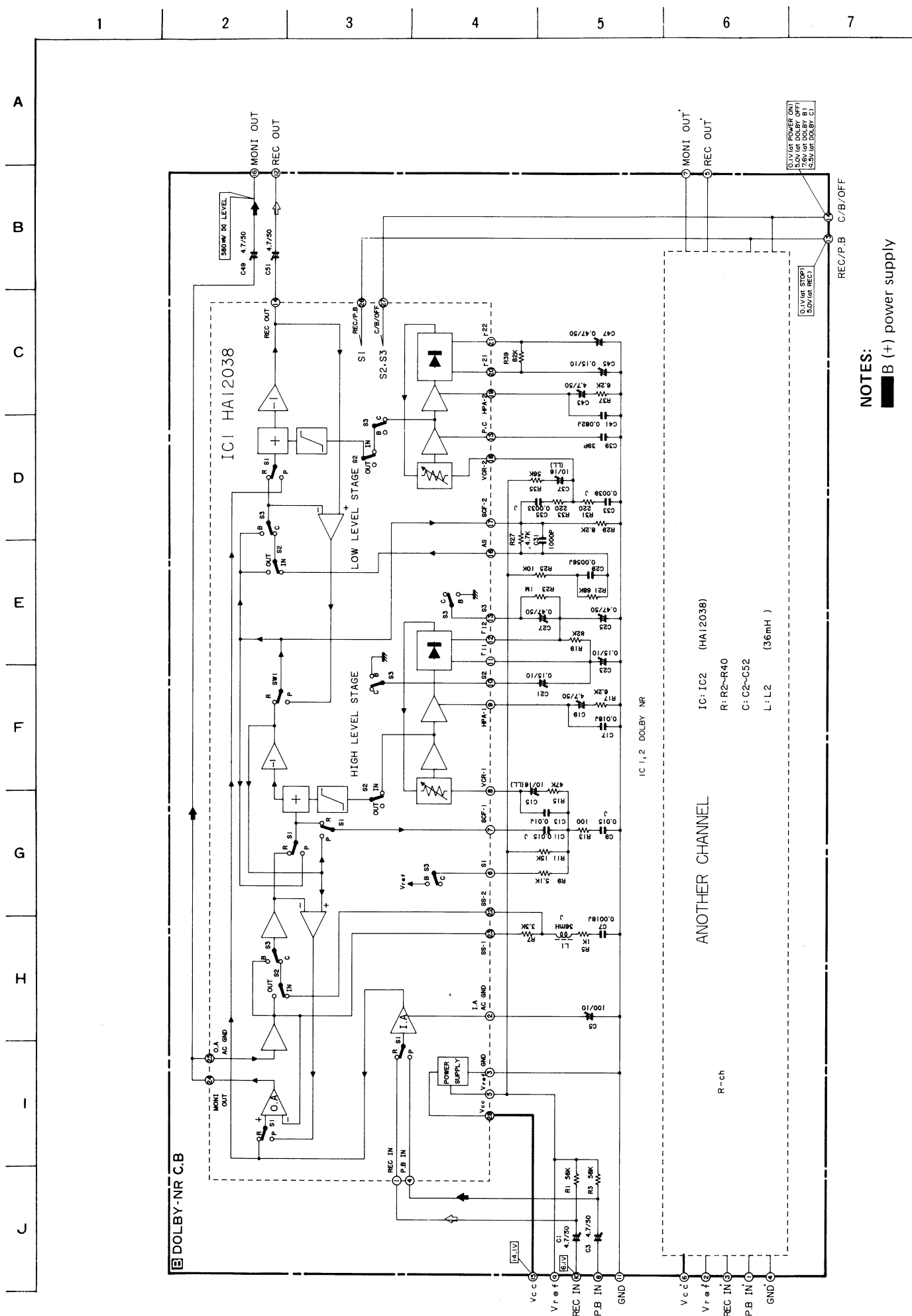
Note; Combination Circuit Board
The parts on the electrical parts list which are indicated by an asterisk (*) are supplied as one single combined circuit board. Therefore, they will not be supplied separately. If this becomes necessary, please order the entire circuit board.

- Combination circuit board 82-195-620-01**
- PCB-A 82-195-621-01
 - PCB-B 82-195-622-01
 - PCB-C 82-195-629-01
 - PCB-D 82-195-626-01
 - PCB-E 82-195-625-01
 - PCB-G 82-195-624-01
 - PCB-H 82-195-623-01
 - PCB-I 82-195-627-01 (EJ, K, G, Z models only)
 - PCB-J 82-195-628-01 (Z model only)

● Ceramic capacitor

Capacitor	Part No.
5.6pF	006
6.8pF (RH)	067
8.2pF	008
12pF	010
12pF (CH)	055
12pF (UJ)	081
15pF	082
22pF	016
100pF	032
220pF	036
330pF	093
1500pF	094
0.01μF	047

0.022μF 87-012-105-01



NOTES:
■ B (+) power supply

NOTES: 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.

WIRING-1

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

A

B

C

D

E

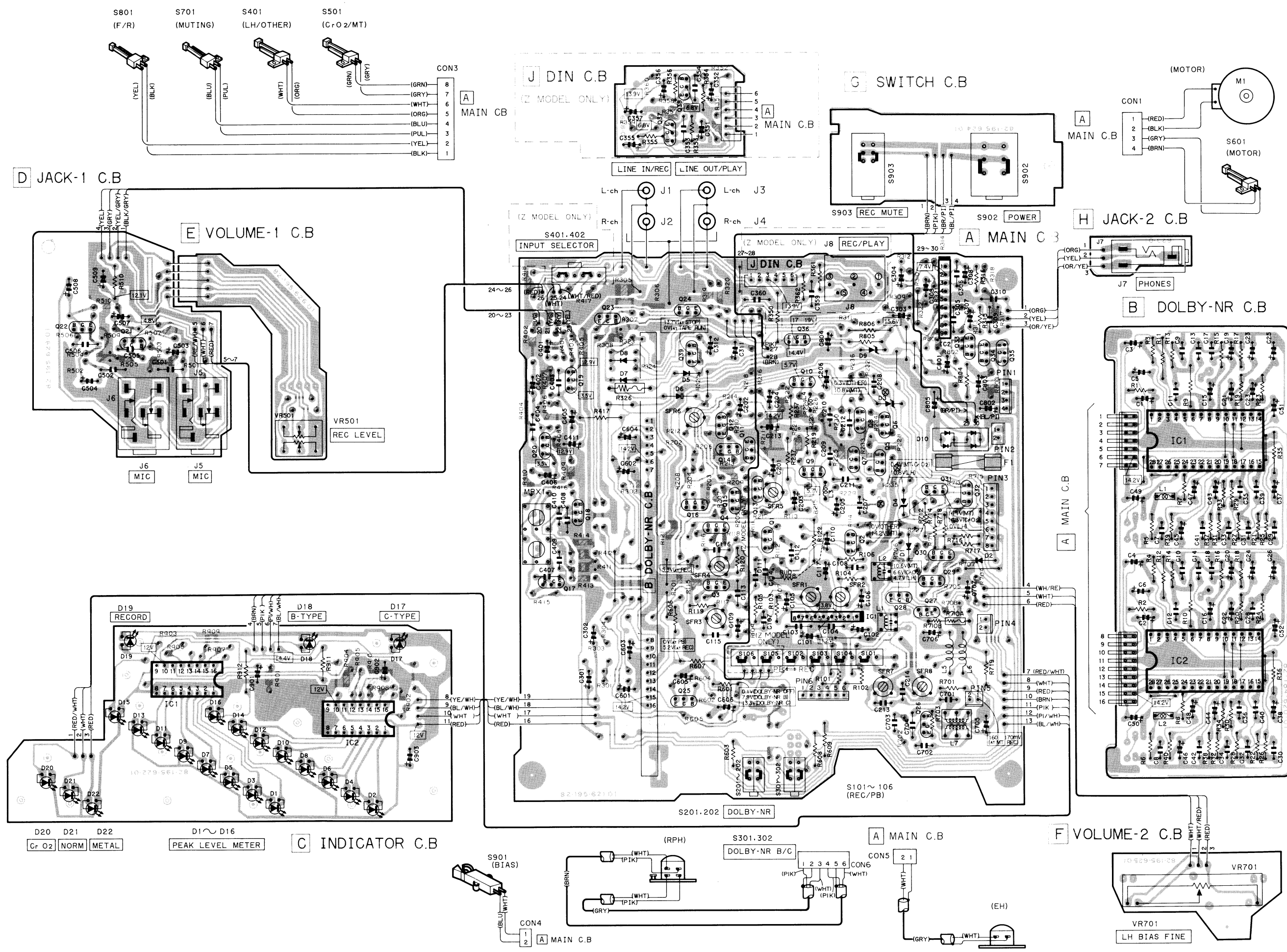
F

G

H

I

J



D JACK-1 C.B.

E VOLUME-1 C.B.

J DIN C.B.

G SWITCH C.B.

A MAIN C.B.

H JACK-2 C.B.

B DOLBY-NR C.B.

D19 RECORD, D18 B-TYPE, D17 C-TYPE

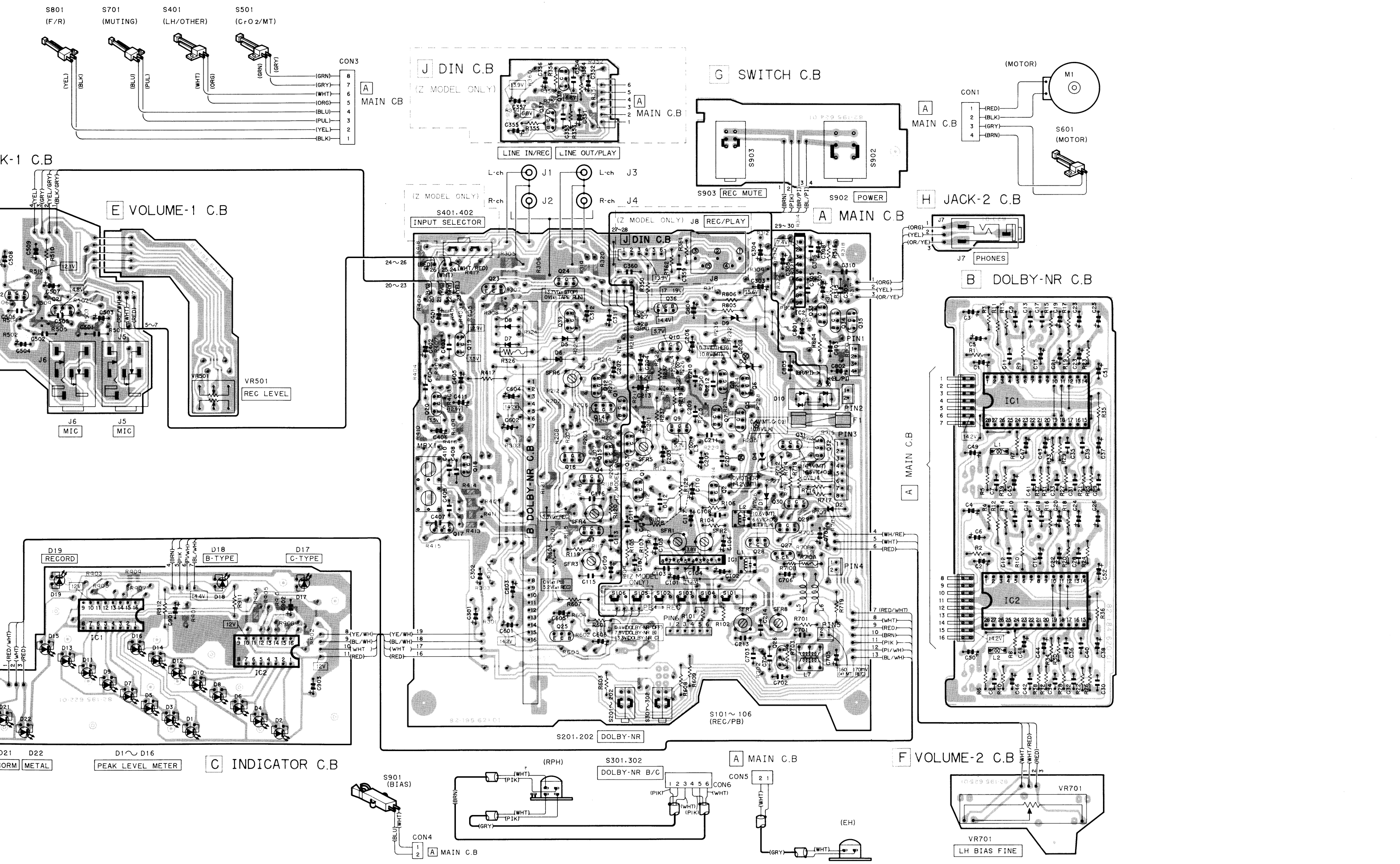
D20 D21 D22, D1~D16 PEAK LEVEL METER, C INDICATOR C.B.

A MAIN C.B.

F VOLUME-2 C.B.

NOTES: 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.

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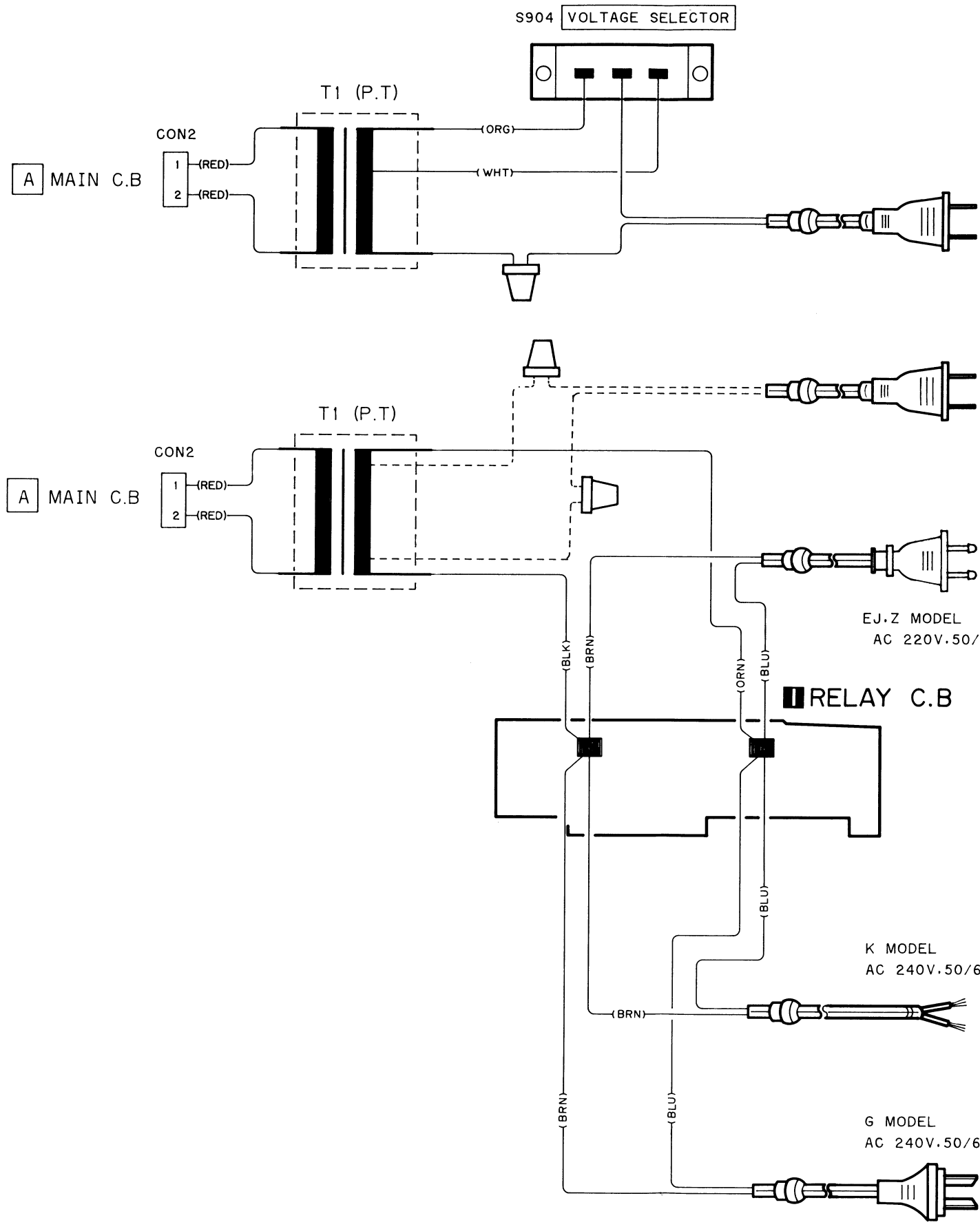


NOTES: The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.
An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

WIRING-2

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

A
B
C
D
E
F
G
H
I
J



H, HU, HJ MODEL
AC 120V/220 ~ 240V
50/60HZ

U.C MODEL
AC 120V, 60HZ

EJ.Z MODEL
AC 220V, 50/60HZ

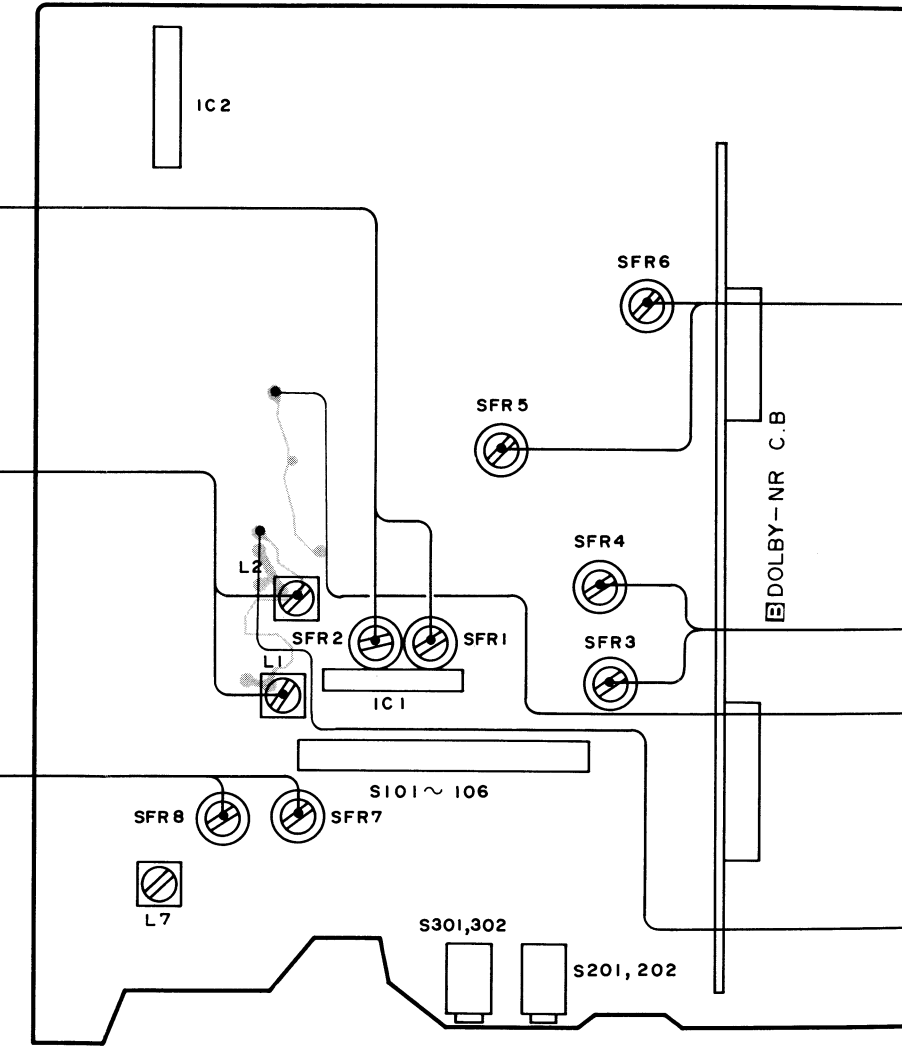
K MODEL
AC 240V, 50/60HZ

G MODEL
AC 240V, 50/60HZ

4. Play back Level Adjustment
Settings:
• Test tape: TTA-161
• Dolby-NR switch: OFF
• Adjustment locations: SFR1 (L-ch)
SFR2 (R-ch)
Method:
Play back the test tape and adjust SFR1, 2 so that the LINE output become 520 ~ 540 mv.

7. Bias Trap Coil Adjustment
Setting:
• Test tape: TTA-119MX
• Test point: TP1 (L-ch), TP2 (R-ch)
• Adjustment Locations: L1 (L-ch), L2 (R-ch)
Method:
Adjust L1, 2 so that the bias leakage become minimum value.

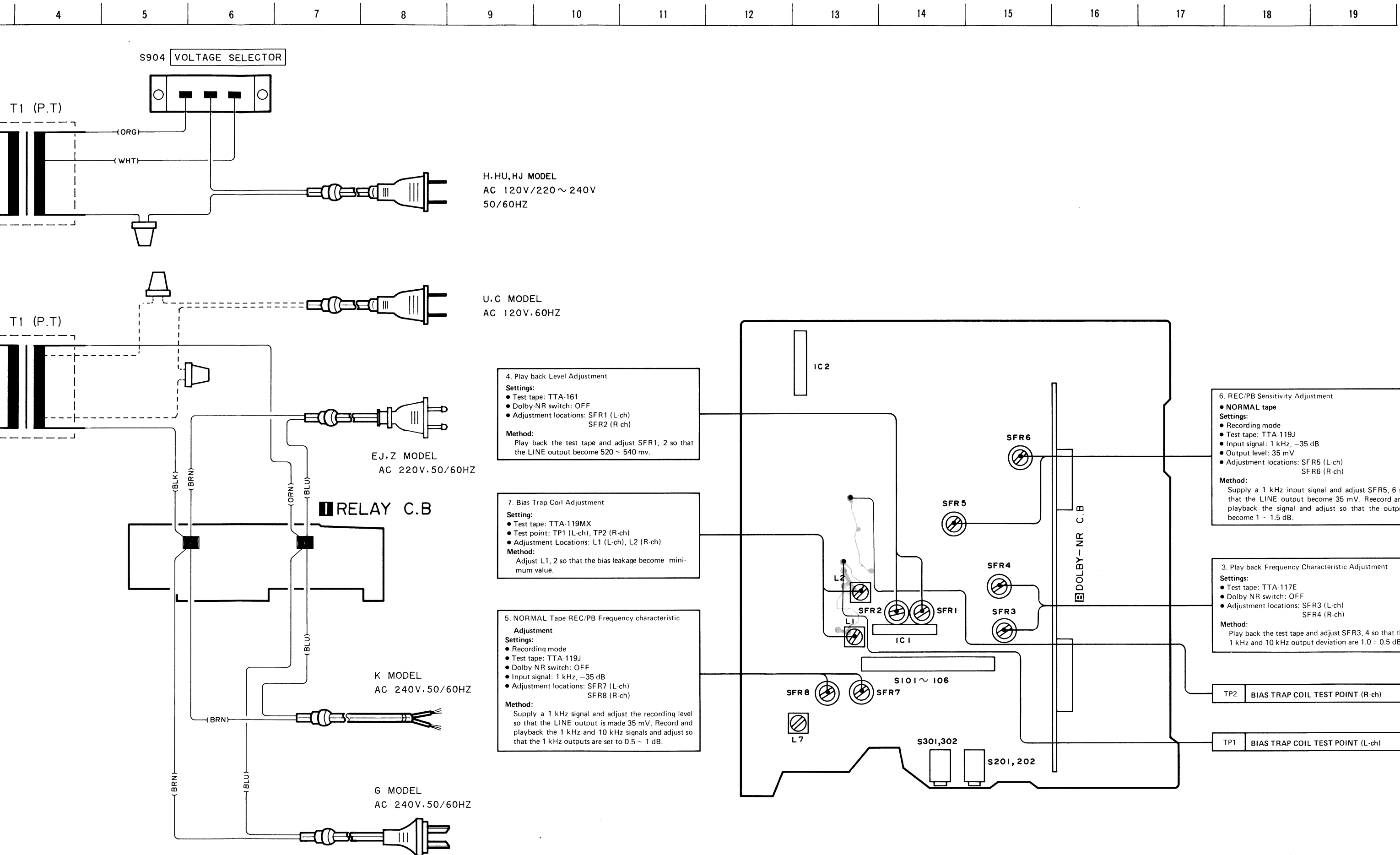
5. NORMAL Tape REC/PB Frequency characteristic
Adjustment
Settings:
• Recording mode
• Test tape: TTA-119J
• Dolby-NR switch: OFF
• Input signal: 1 kHz, -35 dB
• Adjustment locations: SFR7 (L-ch)
SFR8 (R-ch)
Method:
Supply a 1 kHz signal and adjust the recording level so that the LINE output is made 35 mV. Record and playback the 1 kHz and 10 kHz signals and adjust so that the 1 kHz outputs are set to 0.5 ~ 1 dB.



NOTES: 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.

AD-F220<sup>H,HU,HJ,U,C,
EJ,K,G,Z</sup> AD-F220<sup>H,HU,HJ,U,C,
EJ,K,G,Z</sup>

AI



H. HU, HJ MODEL
AC 120V/220 ~ 240V
50/60HZ

U.C MODEL
AC 120V, 60HZ

EJ.Z MODEL
AC 220V, 50/60HZ

K MODEL
AC 240V, 50/60HZ

G MODEL
AC 240V, 50/60HZ

4. Play back Level Adjustment
Settings:
• Test tape: TTA-161
• Dolby-NR switch: OFF
• Adjustment locations: SFR1 (L-ch)
SFR2 (R-ch)
Method:
Play back the test tape and adjust SFR1, 2 so that the LINE output become 520 ~ 540 mv.

7. Bias Trap Coil Adjustment
Setting:
• Test tape: TTA-119MX
• Test point: TP1 (L-ch), TP2 (R-ch)
• Adjustment Locations: L1 (L-ch), L2 (R-ch)
Method:
Adjust L1, 2 so that the bias leakage become minimum value.

5. NORMAL Tape REC/PB Frequency characteristic
Adjustment
Settings:
• Recording mode
• Test tape: TTA-119J
• Dolby-NR switch: OFF
• Input signal: 1 kHz, -35 dB
• Adjustment locations: SFR7 (L-ch)
SFR8 (R-ch)
Method:
Supply a 1 kHz signal and adjust the recording level so that the LINE output is made 35 mV. Record and playback the 1 kHz and 10 kHz signals and adjust so that the 1 kHz outputs are set to 0.5 ~ 1 dB.

6. REC/PB Sensitivity Adjustment
• NORMAL tape
Settings:
• Recording mode
• Test tape: TTA-119J
• Input signal: 1 kHz, -35 dB
• Output level: 35 mV
• Adjustment locations: SFR5 (L-ch)
SFR6 (R-ch)
Method:
Supply a 1 kHz input signal and adjust SFR5, 6 so that the LINE output become 35 mV. Record and playback the signal and adjust so that the output become 1 ~ 1.5 dB.

3. Play back Frequency Characteristic Adjustment
Settings:
• Test tape: TTA-117E
• Dolby-NR switch: OFF
• Adjustment locations: SFR3 (L-ch)
SFR4 (R-ch)
Method:
Play back the test tape and adjust SFR3, 4 so that the 1 kHz and 10 kHz output deviation are 1.0 ± 0.5 dB.

TP2 BIAS TRAP COIL TEST POINT (R-ch)

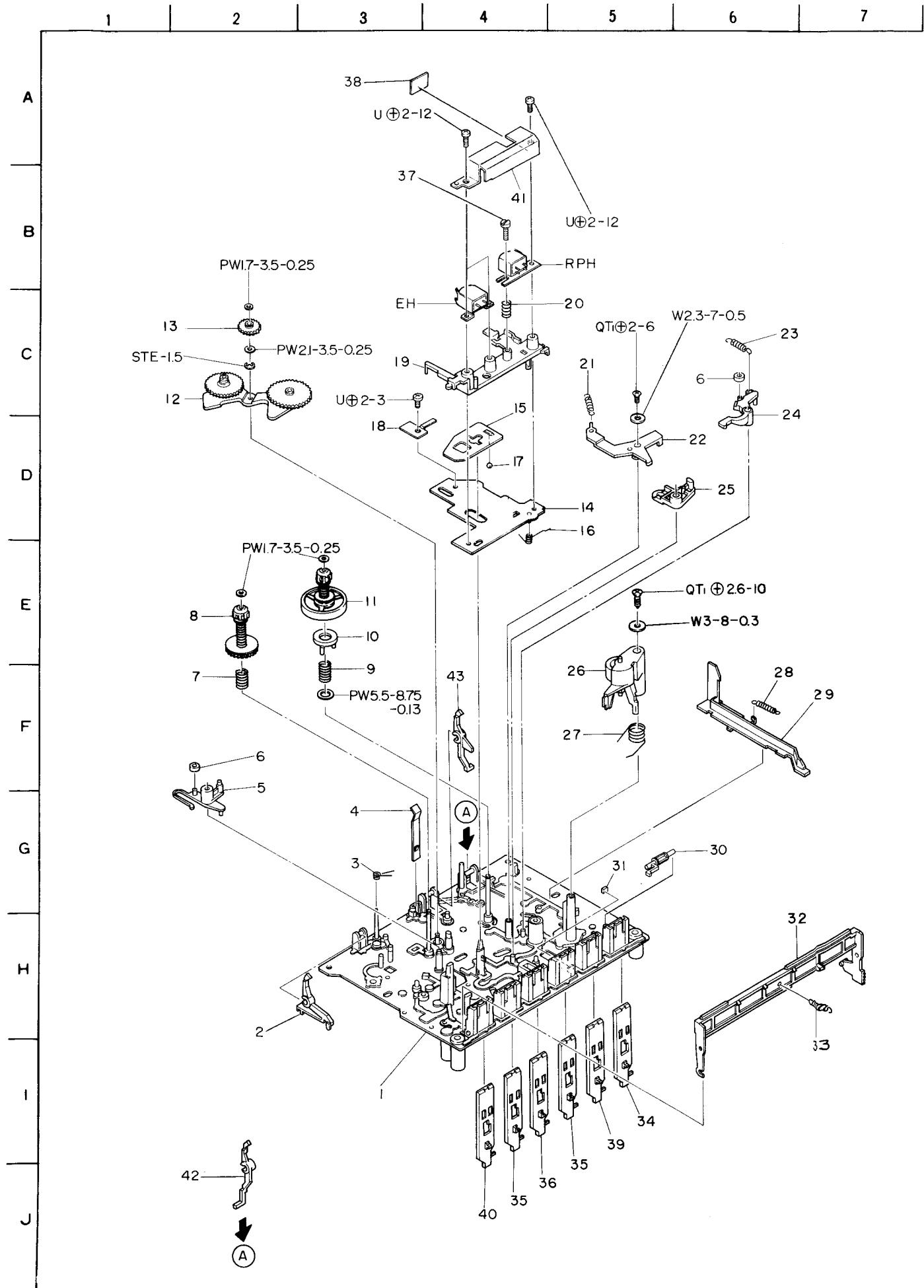
TP1 BIAS TRAP COIL TEST POINT (L-ch)

Ref. No.	Part No.	Part No. Changed to	Description	Q'ty	
1-53a	82-195-010-01		Jack plate (H, HU models only)	1	
b	82-195-018-01		Jack plate (HJ model only)	1	
c	82-195-011-01		Jack plate (U model only)	1	
d	82-195-014-01		Jack plate (C model only)	1	
e	82-195-012-01		Jack plate (EJ model only)	1	
f	82-195-013-01		Jack plate (K model only)	1	
g	82-195-015-01		Jack plate (G model only)	1	
h	82-195-016-01		Jack plate (Z model only)	1	
1-54	87-084-063-01		Nylon rivet 3—5.5(H, HU, HJ, Z models only)	2	(Z model)
1-55	82-185-013-01		Push-button, DOLBY R	1	
1-56	82-185-012-01		Push-button, DOLBY L	1	
1-57	82-195-002-01		Cabinet, Steel	1	

Part No.	Description
87-171-033-21	V+2-4
87-261-036-11	V+2-8
87-261-094-21	V+3-6
87-351-035-01	VT ₁ +2-6
87-356-073-01	VT ₂ +2.6-6
87-351-074-21	VT ₁ +2.6-8
87-352-081-21	VT ₂ +2.6-20
87-355-095-21	VT ₂ +3-8
87-081-480-01	VTT+2.6-5
87-081-502-01	VTT+2.6-6
87-081-481-01	VTT+3-5
87-081-511-01	VTT+3-6
87-321-035-01	QT ₁ +2.6-6
87-321-074-21	QT ₁ +2.6-8
87-321-075-21	QT ₁ +2.6-10
87-081-522-01	QTT+2.6-6
87-251-032-21	U+2-3
87-261-038-21	U+2-12
87-251-070-21	U+2.6-3
87-067-012-01	U+3-22

Part No.	Description
87-253-169-11	U+4-6
87-512-074-21	VFT+2.6-8
87-511-095-21	VFT+3-8
87-081-920-01	VFT ₂ +2.6-6
87-391-717-11	N-3
87-441-003-01	STE-1.5
87-441-009-01	STF-3
87-450-403-01	LA-3
87-410-308-01	W2.3-7-0.5
82-585-356-01	W2.6-8-0.3
87-081-242-01	W2.6-10-0.5
87-410-214-01	W3-8-0.3
87-081-808-01	PW1.7-3.5-0.25
87-081-978-01	PW2.1-3.5-0.25
87-081-976-01	PW2.6-8-0.25
87-081-129-01	PW3-12-1
82-585-394-01	PW5.5-8.75-0.13
87-081-015-01	FW3-8-0.5

EXPLODED VIEW-2



Ref. No.	Part No.	Part No. Changed to	Description	Q'ty
2-1	82-585-395-21		Outsert ass'y	1
2-2	82-585-255-11		REC blocking lever	1
2-3	82-585-294-21		T-spring, Center shift	1
2-4	82-585-319-01		P-spring, Cassette holder	1
2-5	82-585-252-01		Lever, Brake L	1
2-6	82-585-286-01		G-cushion, Brake	2
2-7	82-585-290-01		C-spring, Back tension	1
2-8	82-585-215-11		Supply reel platform ass'y	1
2-9	82-585-292-01		C-spring, Slip disk	1
2-10	82-585-272-11		Slip disk T	1
2-11	82-585-210-31		Take-up reel platform ass'y	1
2-12	82-585-231-21		FR lever ass'y	1
2-13	82-585-235-01		Gear, REW A	1
2-14	82-585-208-11		Chassis, Actuating	1
2-15	82-585-284-01		P-spring, Actuating	1
2-16	82-585-295-21		T-spring, Actuating	1
2-17	87-073-005-01		Steel ball 2φ	1
2-18	92-585-349-01		Holder, Idler lever	1
2-19	82-585-209-31		Head base	1
2-20	82-177-202-01		C-spring, RPH	1
2-21	82-585-313-31		E-spring, Play idler	1
2-22	82-585-446-01		Play idler lever ass'y	1
2-23	82-585-312-01		E-spring, Brake R	1
2-24	82-585-253-11		Lever, Brake R	1
2-25	82-585-265-21		Lever, REV	1
2-26	82-585-364-01		Pinch lever B ass'y	1
2-27	82-585-296-11		T-spring, Pinch roller	1
2-28	82-585-311-01		E-spring, Lid lock	1
2-29	82-585-254-01		Eject slide plate	1
2-30	82-585-279-21		Eject lever A	1
2-31	82-585-338-01		G-cushion, Play lever	1
2-32	82-585-377-21		Lock plate	1
2-33	82-585-317-41		E-spring, Lock button	1
3-34	82-585-361-01		Plate button, PAUSE	1
2-35	82-585-360-01		Plate button, FR B	2
2-36	82-585-355-01		Plate button, PLAY	1
2-37	81-176-219-01		Azimuth adjust screw	1
2-38	82-598-406-01		Sheet 11-15-0.1	1
2-39	82-585-382-01		Plate button, STOP B	1
2-40	82-585-383-11		Plate button, REC B	1
2-41	82-594-625-01		Shield plate, Head	1
2-42	82-785-211-01		Lever, CrO ₂	1
2-43	82-186-203-01		Lever, Metal	1

Ref. No.	Part No.	Part No. Changed to	Description	Q'ty
3-1	82-585-383-11		E-spring, REC	1
3-2	82-585-267-01		REC lever B	1
3-3	82-585-413-01		REC lever C	1
3-4	82-585-282-11		Slide plate, Motor switch	1
3-5	82-585-283-01		Slide plate, FR auto	1
3-6	82-585-306-11		T-spring, Play lever	1
3-7	82-585-307-01		T-spring, REC lever	1
3-8	82-585-428-01		Play lever ass'y	1
3-9	82-585-216-11		Gear, Drive	1
3-10	82-585-258-11		Trigger lever, PLAY	1
3-11	82-585-308-21		E-spring, REW lever	1
3-12	82-585-260-31		Lever, REW	1
3-13	82-439-369-11		Slip spring	1
3-14	82-585-259-11		Trigger lever, REW	1
3-15	82-585-387-11		Trigger lever, REC	1
3-16	82-585-257-21		Trigger lever, FF	1
3-17	82-585-301-01		E-spring, Trigger PLAY	1
3-18	82-585-297-01		T-spring, FR lever A	1
3-19	82-585-403-01		FR lever G	1
3-20	82-585-386-01		FR lever F	1
3-21	82-585-298-01		T-spring, FR lever B	1
3-22	82-585-311-01		E-spring, Lid lock	1
3-23	82-585-385-01		FR lever E	1
3-24	82-176-207-01		Rubber belt, Flywheel B	1
3-25	82-585-336-01		Rubber belt, FRB	1
3-26	82-176-208-01		C-spring, Flywheel B	1
3-27	82-585-243-11		Gear, Flywheel	1
3-28	82-585-229-21		Flywheel ass'y	1
3-29	82-195-207-01		Holder, Tape select	1
3-30	87-038-039-01		Wire binder	1
3-31	82-585-281-31		Holder, Motor	1
3-32	82-585-326-11		Thrust bearing B	1
3-33	82-585-242-11		Motor pulley	1
3-34	82-585-303-21		T-spring, Trigger REC	1
3-35	82-175-289-01		E-spring, Slide plate	1
3-36	82-585-442-01		Mechanism chassis C ass'y	1
3-37	82-585-321-41		T-spring, Auto kick	1
3-38	82-585-332-01		E-spring, REC lock	1
3-39	82-585-327-11		Slide plate key ass'y	1
3-40	82-585-244-01		Gear, PLAY cam	1
3-41	82-585-246-01		Gear, PAUSE cam	1
3-42	82-585-245-21		Gear, FR cam	1
3-43	82-585-256-31		Trigger lever, PAUSE	1
3-44	82-585-304-21		T-spring, Trigger PAUSE	1
3-45	82-585-362-01		Shaft lock	1
3-46	82-585-285-11		C-spring, Lock	1
3-47	82-585-270-51		Plate, Auto kick	1
3-48	82-585-269-11		Lever, auto B	1
3-49	82-585-268-01		Lever, auto A	1
3-50	82-585-299-01		T-spring, Auto eject	1
3-51	82-585-271-01		Lever, Auto eject	1
3-52	82-585-431-01		Lever, PAUSE	1
3-53	82-585-300-11		T-spring, FR cam	1
3-54	82-585-247-11		Gear, Auto kick	1
3-55	82-585-217-41		FR slip pulley ass'y	1

■ ACCESSORIES/PACKAGE LIST

Ref. No.	Part No.	Part No. Changed to	Description	Q'ty
1a	82-195-852-01		Box gift (H, HU, U, C, K, G, Z models only)	1
b	82-195-999-01		Box gift (HJ, EJ models only)	1
2	82-176-852-11		Poly-foam L	1
3	82-176-853-11		Poly-foam R	1
4	87-051-135-11		Poly-bag	1
5	87-056-628-01		Poly-bag	1
6	82-195-901-01		Instructions booklet	1
7	87-056-009-51		Distributors list (H, HJ, C, EJ, K, G, Z models only)	1
8	87-056-057-01		Service station list (HU, U models only)	1
9	87-056-050-21		Safety instruction (HU, U models only)	1
10a	87-056-045-01		Guarantee card (HU, U models only)	1
b	87-056-013-01		Guarantee card (C model only)	1
c	87-056-059-01		Guarantee card (G model only)	1
11	87-051-171-11		Poly-bag	1
12	87-056-008-11		Label, AC power cord (K model only)	1
13	82-195-902-01		POP sticker (H, HJ, C, EJ, K, G, Z models only)	1
14	86-944-012-01		Connection cord CW-129 BSK	2
15	87-049-137-01		Siemens plug (H, HJ models only)	1

AIWA Co., Ltd. Tokyo Japan