

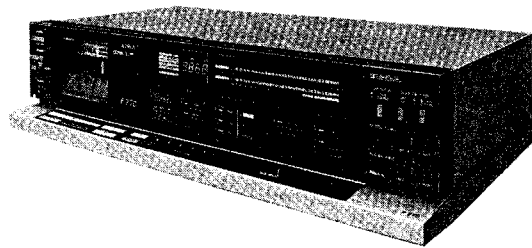
AIWA®

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SERVICE MANUAL

MODEL NO.

STEREO CASSETTE DECK **AD-F770**

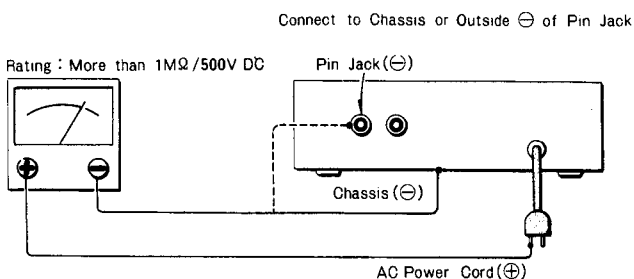


TYPE. H, HU, U, E, K, G

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



SPECIFICATIONS

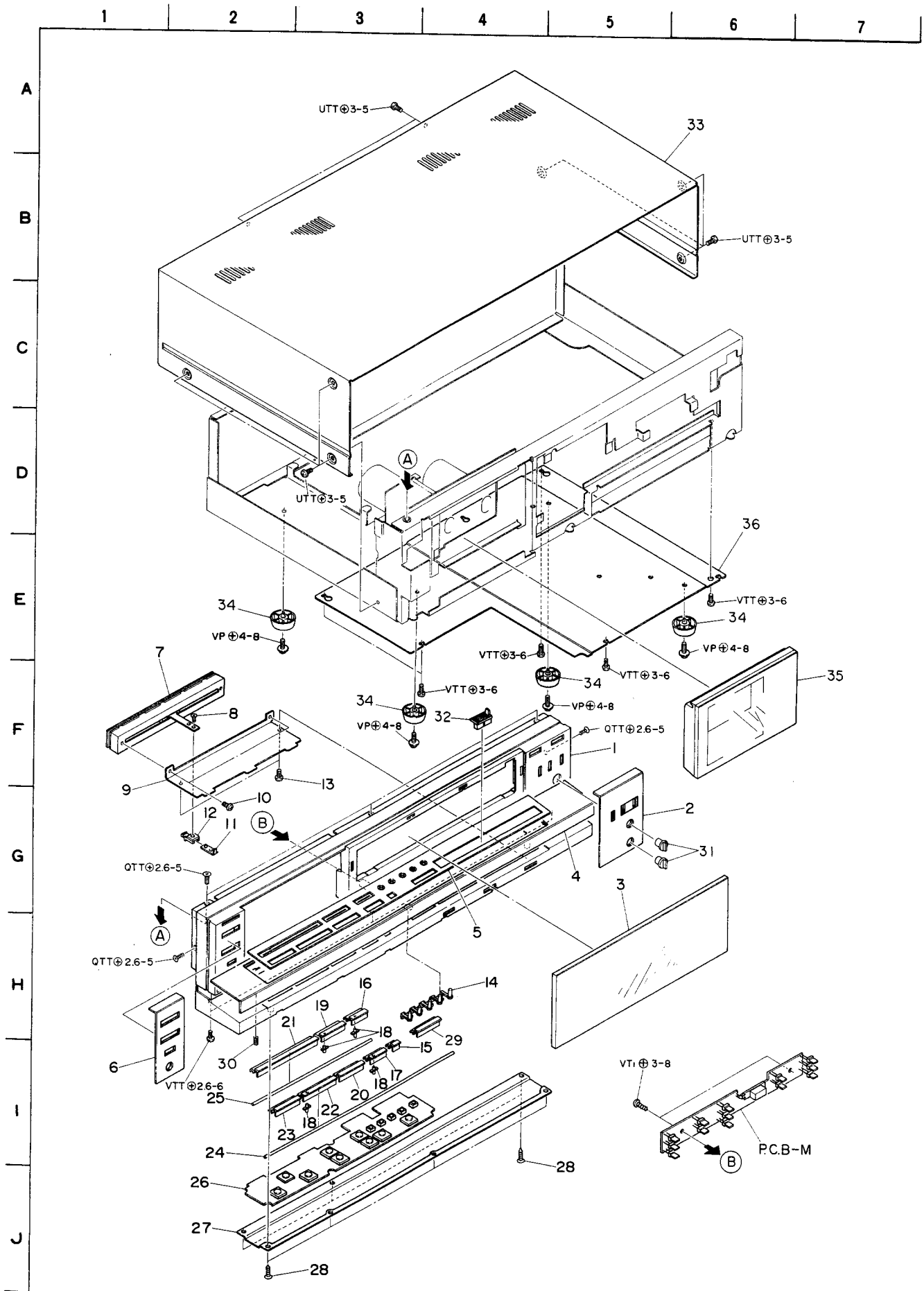
Semiconductors:	37ICs, 91 transistors, 1 FET 87 diodes, 19 LED's		
Power supply:	H, HU models AC 120V/220V/240V switchable 50/60 Hz U model AC 120V, 50/60 Hz E model AC 220V, 50/60 Hz K, G models AC 240V, 50/60 Hz		More than 48/57 dB (METAL, DOLBY-NR B OFF/ON) More than 50/59 dB (CrO ₂ , DOLBY-NR B OFF/ON) More than 46/55 dB (NORMAL, DOLBY-NR B OFF/ON) More than 48/64 dB (METAL, DOLBY-NR C OFF/ON) More than 50/60 dB (CrO ₂ , DOLBY-NR C OFF/ON) More than 46/60 dB (NORMAL, DOLBY-NR C OFF/ON) More than 30 dB
Power consumption:	33W		
Dimensions:	420(W) x 110(H) x 280(D) mm [16-1/2" x 4-3/8" x 11-1/4"]	Channel separation:	(1 kHz, 0VU)
Weight:	5.5 kg (12.11 lbs)	Cross talk:	(1 kHz, 0VU) More than 60 dB
Track type:	4 tracks 2 channels	Erasing ratio:	(125 Hz, 0VU + 10 dB, METAL) More than 60 dB
Tape speed:	4.8 cm/s (1-7/8 ips) ± 1.5%	Level drift:	(10 kHz) ± 0.5 dB
Wow an flutter:	0.025% (WRMS) According to DIN 45500 0.09%	Level indication error:	(-20VU) ± 5 dB (-10VU) ± 3 dB (0VU) ± 1 dB (+2 ~ +6VU) ± 2 dB (+8 ~ +10VU) ± 2 dB 2.0 ± 0.5s. (POWER ON)
Automatic stop system:	Full auto stop	ADMS time:	(ADMS LED light up time)
Automatic shut-off action time:	3 ± 1s.	Bias frequency:	85 kHz
Pinch roller pressure:	T side: 350 ± 30 g (3.43 ± 0.29N) S side: 165 ± 15 g (1.61 ± 0.15N)	Frequency response:	(0 dB Rec. DOLBY NR C ON) METAL : 20 ~ 20,000 Hz ± 3 dB (-20 dB Rec.) 20 ~ 17,000 Hz ± 3 dB (0 dB Rec.) CrO ₂ : 20 ~ 19,000 Hz ± 3 dB (-20 dB Rec.) 20 ~ 14,000 Hz ± 3 dB (0 dB Rec.) NORMAL : 20 ~ 18,000 Hz ± 3 dB (-20 dB Rec.) 20 ~ 11,000 Hz ± 3 dB (0 dB Rec.)
Take-up torque:	38 ± 10 g-cm (0.37 ± 0.11 mN·m)	DOLBY-NR Effect:	More than 8 dB (10 kHz, CCIR FILTER) (DOLBY NR B-type) More than 16 dB (DOLBY NR C-type)
FF & rewind torque:	150 ⁺⁴⁰ ₋₃₀ g-cm (1.47 ^{+0.39} _{-0.29} mN·m)	Motor:	DC Servomotor for capstan DC motor for reels
FF & rewind time:	60 ± 10s. (C-60)	Head:	DX Combination head (for REC/PB) Double gap seldust head (for erase)
Counter indication error:	0 ± 3 digit (C-60)	Inputs:	MIC maximum input sensitivity: 0.3 mV (200 Ω - 10 kΩ matched) LINE IN maximum input Sensitivity: 50 mV (more than 50 kΩ) LINE OUT/PLAY standard output level: 0.38V (0VU); suitable load impedance: more than 50 kΩ; Headphones: 8 Ω
Cassette lid action time:	0.8 ± 0.4s. (at normal temperature)	Outputs:	
Playback output:	540 ± 50 mV	Test tape:	METAL TTA-119MX NORMAL TTA-119J CrO ₂ TTA-119G
REC/PB output:	380 mV		
REC/PB distortion:	Less than 1.3% (METAL) Less than 1.3% (CrO ₂) Less than 1.3% (NORMAL)		
Playback noise:	Less than 2.7 mV (NORMAL DOLBY NR OFF) Less than 1.5 mV (NORMAL DOLBY NR B) Less than 1.2 mV (NORMAL DOLBY NR C) Less than 2.0 mV (METAL, CrO ₂ , DOLBY NR OFF) Less than 1.2 mV (METAL, CrO ₂ , DOLBY NR B) Less than 1.0 mV (METAL, CrO ₂ , DOLBY NR C) Less than 1.2 mV (NORMAL DOLBY NR OFF) Less than 0.6 mV (NORMAL DOLBY NR B) Less than 0.6 mV (NORMAL DOLBY NR C) Less than 1.0 mV (METAL, CrO ₂ , DOLBY NR OFF) Less than 0.5 mV (METAL, CrO ₂ , DOLBY NR B) Less than 0.5 mV (METAL, CrO ₂ , DOLBY NR C)		
REC/PB SN ratio:	(400 Hz, 0VU) More than 44/47 dB (METAL, CrO ₂ , DOLBY-NR B OFF/ON) More than 42/45 dB (NORMAL, DOLBY-NR B OFF/ON) More than 44/49 dB (METAL, CrO ₂ , DOLBY-NR C OFF/ON) More than 42/48 dB (NORMAL, DOLBY-NR C OFF/ON)		
(WTD-A)			
(Unweighted)			
(Unweighted)			

- Specifications and external appearance are subject to change without 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.
- HX professional originated by BANG & OLDFSEN.

As to the disassembling instructions, refer to the service manual of AD-F660.

Horizontal dashed lines for writing.

EXPLODED VIEW-1



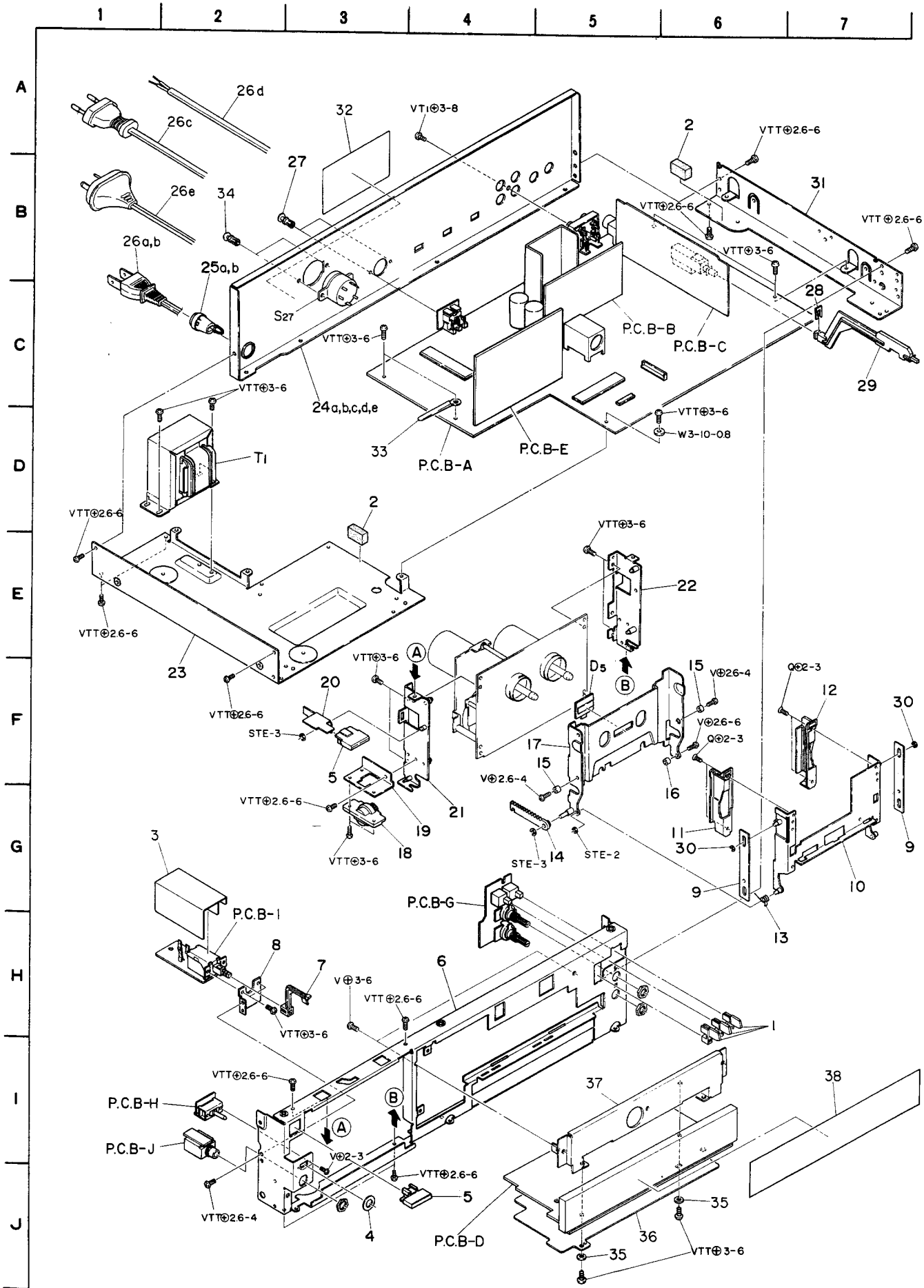
PARTS LIST

MECHANICAL PARTS

■ * mark in this part list shows exclusive part

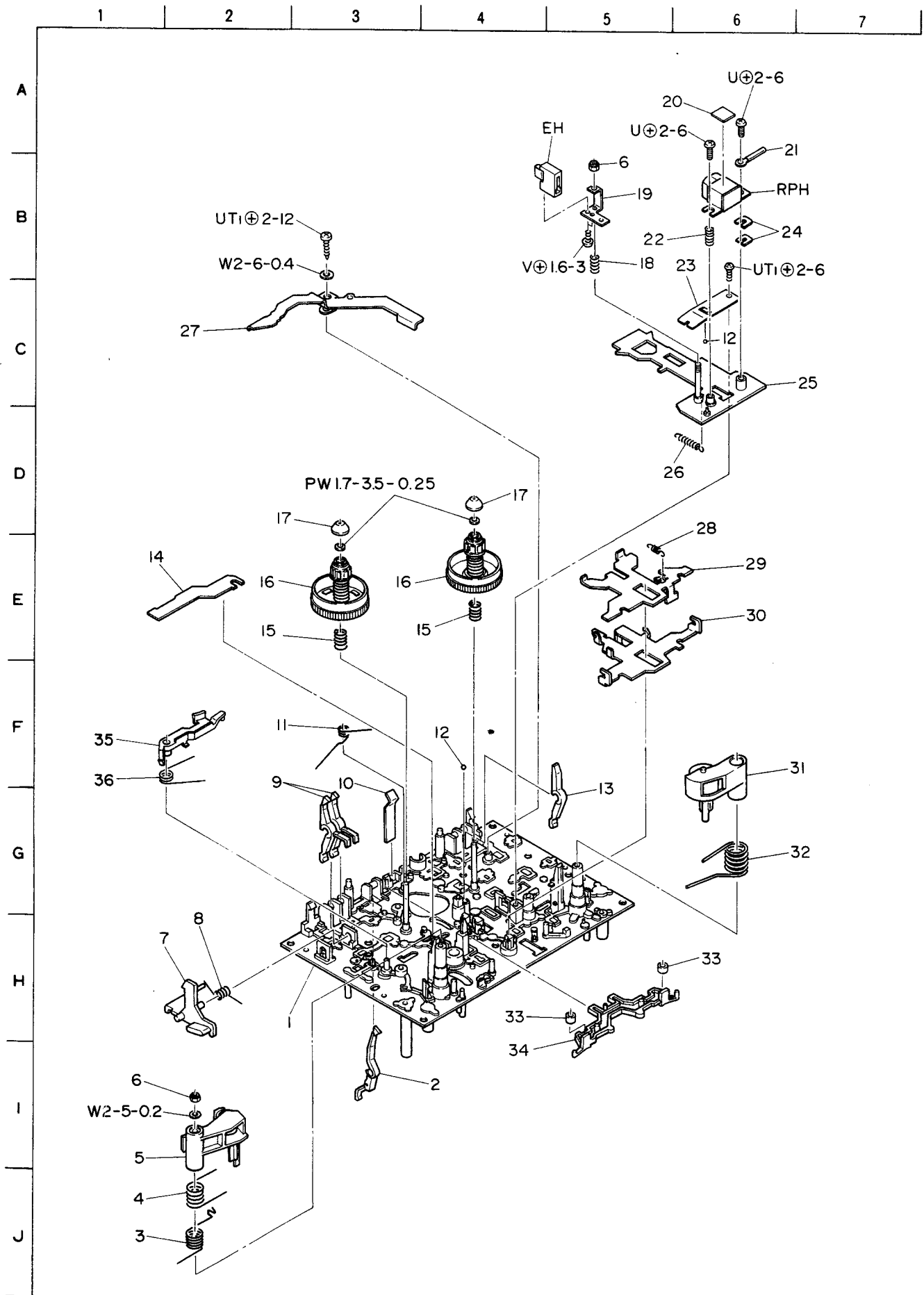
Ref. No.	Part No.	Parts No. Changed to	Description	Common Model	Q'ty
1~30	82-191-025-21		Front cabinet ass'y	*	1
1-1	82-191-007-21		Cabinet, Front	*	1
1-2	82-191-005-01		Panel, Front	*	1
1-3	82-191-028-01		Window, Meter	*	1
1-4	82-191-020-11		Panel, Control	*	1
1-5	82-191-029-11		Panel, Control	*	1
1-6	82-188-003-01		Panel L, Front		1
1-7	82-191-640-11		Volume SL ass'y	*	1
1-8	87-231-033-21		Q+2-4		1
1-9	82-191-006-11		Holder, REC volume	*	1
1-10	87-261-092-21		V+3-4		2
1-11	82-191-201-01		Slide lever	*	1
1-12	82-190-203-01		Slider, Volume	AD-F660	1
1-13	87-321-074-21		QT ₁ +2.6-8		2
1-14	82-188-034-11		Touch-key, Counter		1
1-15	82-188-045-11		Touch-key, MS		1
1-16	82-188-020-01		Touch-key, REC MUTE		1
1-17	82-188-019-01		Touch-key, REC		1
1-18	82-188-037-01		Guide, Light		4
1-19	82-188-022-01		Touch-key, PAUSE		1
1-20	82-188-017-01		Touch-key, FF		1
1-21	82-188-021-01		Touch-key, STOP		1
1-22	82-188-016-01		Touch-key, PLAY		1
1-23	82-188-018-01		Touch-key, REW		1
1-24	82-188-223-01		Shaft A, Touch-key		1
1-25	82-188-224-01		Shaft B, Touch-key		1
1-26	- - - -		Control key A ass'y		1
1-27	82-188-033-01		Cabinet A, Bottom		1
1-28	87-326-073-01		QT ₁ +2.6-6		7
1-29	82-188-023-01		Touch-key CB		1
1-30	82-190-215-01		C-spring, Earth	AD-F660	1
1-31	82-184-034-01		Knob	FX-100	2
1-32	82-191-003-01		Knob, REC volume	*	1
1-33	82-191-027-01		Cabinet, Steel	*	1
1-34	87-085-161-01		Foot		4
1-35	82-190-021-01		Cassette window ass'y	AD-F660	1
1-36	82-188-056-01		Cabinet, Bottom		1

EXPLODED VIEW-2



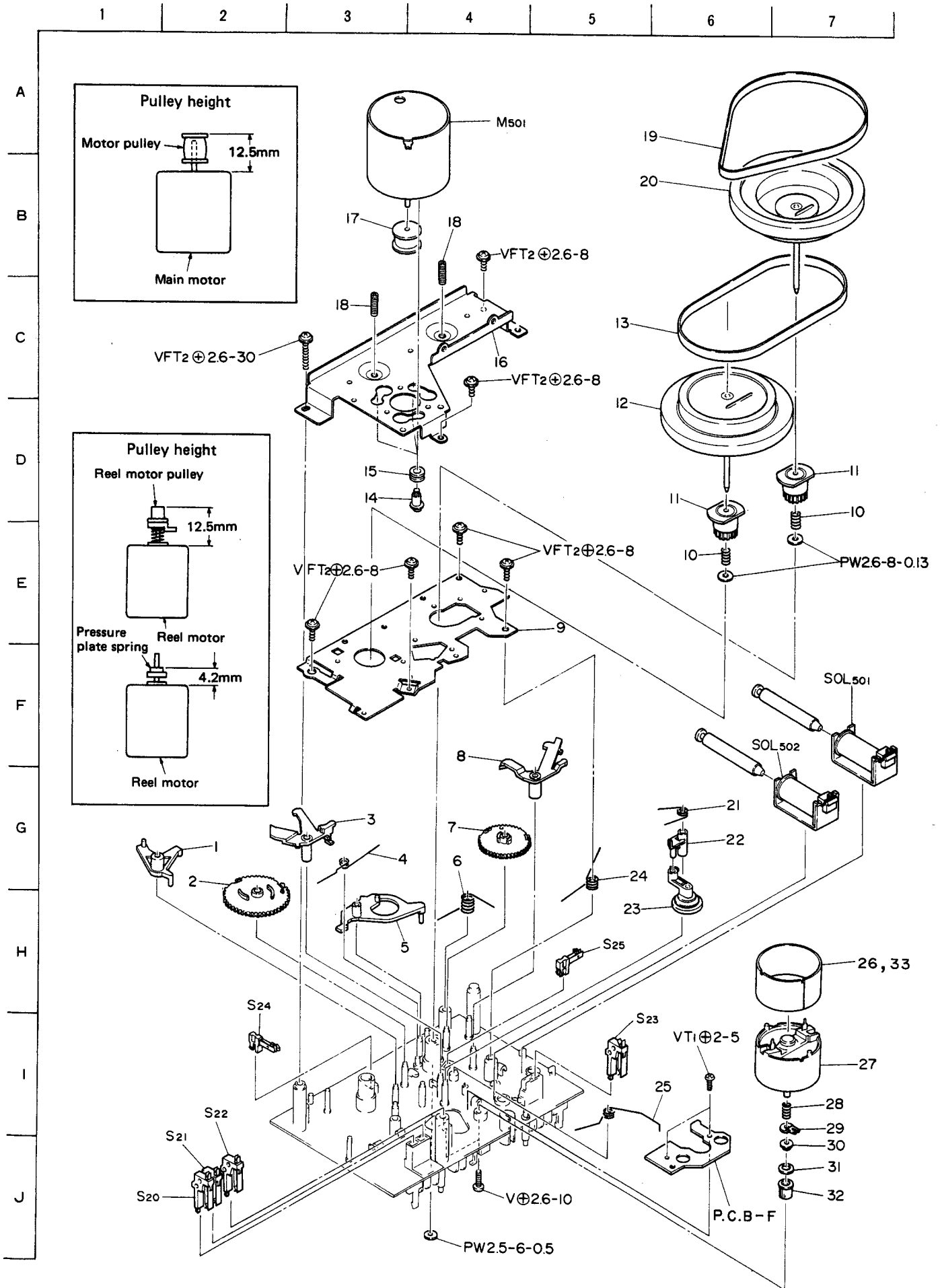
Ref. No.	Part No.	Parts No. changed to	Description	Common Model	Q'ty
2-1	82-191-001-01		Knob, TAPE/SOURCE	*	3
2-2	82-190-213-01		Rubber cushion	AD-F660	2
2-3	82-190-217-01		Cover, Power (E, K models only)	AD-F660	1
2-4	82-422-073-11		Himeron cloth, Blind		1
2-5	82-188-012-01		Push-button, POWER		2
2-6	82-188-201-01		Front chassis		1
2-7	82-757-210-01		Rod	ST-RIO	1
2-8	82-162-215-01		Holder, POWER	AD-R500	1
2-9	82-188-210-21		Lever C, Box		2
2-10	82-188-205-21		Cassette box ass'y		1
2-11	82-188-219-01		Holder L, Cassette		1
2-12	82-188-220-01		Holder R, Cassette		1
2-13	82-188-233-11		T-spring, OPEN		1
2-14	82-541-240-11		Lever, Oil-damp	TPR-950	1
2-15	82-188-229-01		Collar, Cassette box lever L		2
2-16	82-188-232-01		Collar, Cassette box lever R		1
2-17	82-188-039-11		Cassette plate ass'y		1
2-18	82-179-228-01		Oil-damper	AD-3800	1
2-19	82-188-211-01		Holder, Oil-damp		1
2-20	82-188-212-11		Plate, EJECT slide		1
2-21	82-188-213-41		Mechanism holder L ass'y		1
2-22	82-188-214-21		Mechanism holder R ass'y		1
2-23	82-188-204-01		Chassis L, Amp.		1
2-24a	82-191-015-01		Panel, Rear (H, HU models only)	*	1
b	82-191-016-01		Panel, Rear (U model only)	*	1
c	82-191-017-01		Panel, Rear (E model only)	*	1
d	82-191-018-01		Panel, Rear (K model only)	*	1
e	82-191-019-01		Panel, Rear (G model only)	*	1
2-25a	87-085-184-01		Cord bushing (H, HU, U models only)		1
b	87-085-185-01		Cord bushing (E, K, G models only)		1
2-26a	87-034-958-01		AC power cord (H, HU models only)		1
b	87-034-574-01		AC power cord (U model only)		1
c	87-034-877-01		AC power cord (E model only)		1
d	87-034-975-01		AC power cord (K model only)		1
e	87-034-892-01		AC power cord (G model only)		1
2-27	87-084-078-01		Nylon rivet 3-4.5		2
2-28	82-385-383-11		Stopper, Rod		1
2-29	82-309-208-21		Rod, Selector		1
2-30	82-190-206-01		STE-2 (Black)	AD-F660	2
2-31	82-188-209-01		Chassis R, Amp.		1
2-32	82-191-023-01		Name plate, Spec. (U model only)	*	1
2-33	87-038-039-01		Wire binder		1
2-34	87-084-063-01		Nylon rivet 3-5.5 (H, HU models only)		2
2-35	82-191-203-01		Spacer	*	2
2-36	82-188-239-01		FL shield sheet		1
2-37	82-188-218-01		FL holder		1
2-38	82-191-204-01		Filter	*	1

EXPLODED VIEW-3



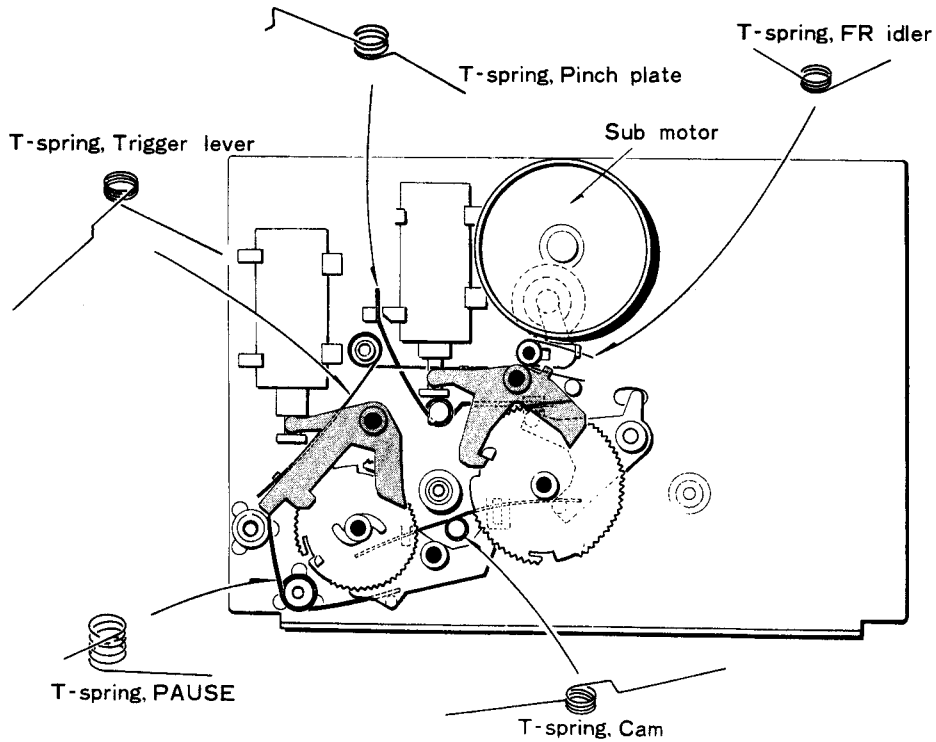
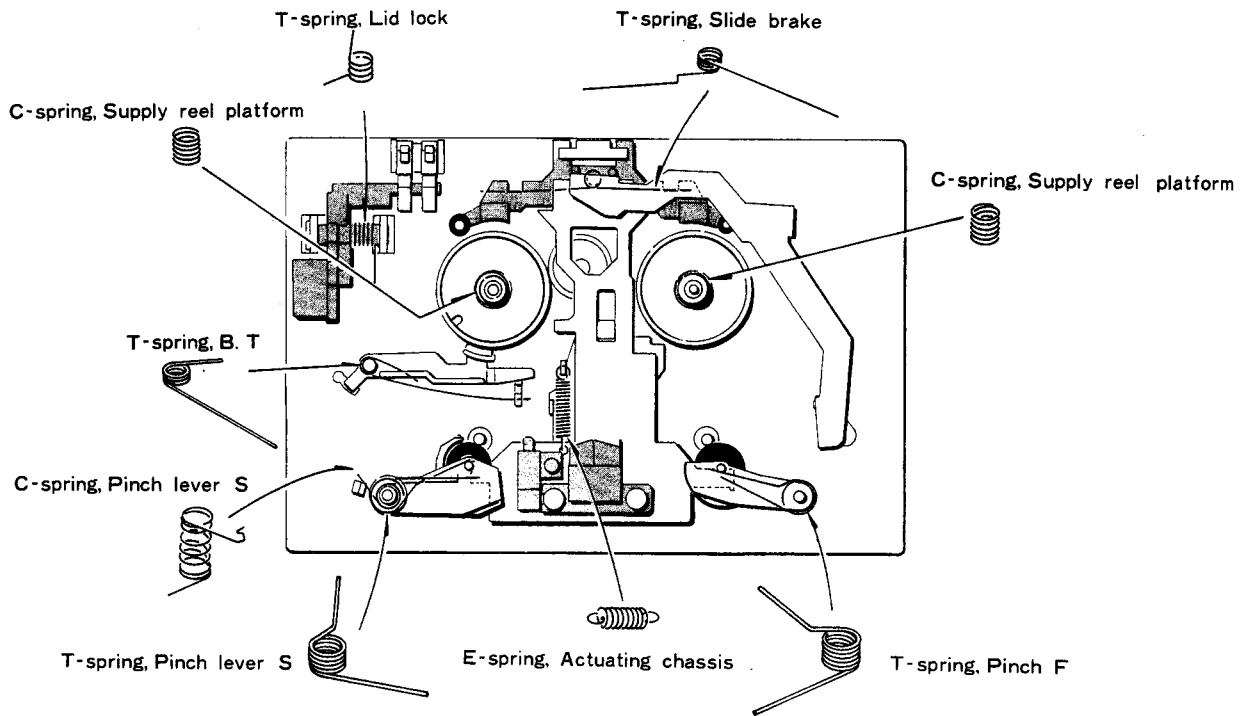
Ref. No.	Part No.	Parts No. Changed to	Description	Common Model	Q'ty
3-1	81-507-201-11		Outsert chassis ass'y		1
3-2	81-505-242-11		Lever, Metal		1
3-3	81-507-228-01		C-spring, Pinch lever S		1
3-4	81-507-217-11		T-spring, Pinch lever S		1
3-5	81-507-207-11		Pinch lever S ass'y		1
3-6	87-081-963-01		Nylon nut M2-3.5		2
3-7	81-505-239-01		Lever, Eject		1
3-8	81-505-273-01		T-spring, Lid lock		1
3-9	81-505-241-21		REC blocking lever		2
3-10	81-505-260-01		P-spring, Pressure cassette		1
3-11	81-505-268-01		T-spring, Slide brake		1
3-12	87-073-005-01		Steel ball 2φ		2
3-13	81-505-240-21		Lever, Cassette sensor		1
3-14	81-505-238-01		Blocking plate, EJECT		1
3-15	81-507-219-01		C-spring, Supply reel platform		2
3-16	81-505-226-11		Take-up reel platform ass'y		2
3-17	82-303-298-01		Cap, Take-up reel platform		2
3-18	82-565-360-01		C-spring, EH		1
3-19	81-507-215-01		Holder, EH		1
3-20	87-057-620-01		Label, Head		1
3-21	87-038-056-01		Wire binder		1
3-22	82-307-212-01		C-spring, EH		1
3-23	81-507-224-01		P-spring, Actuating chassis		1
3-24	81-507-227-01		Spacer		2
3-25	81-507-214-21		Actuating chassis ass'y		1
3-26	81-505-265-11		E-spring, Actuating chassis		1
3-27	81-505-307-01		Lever, Brake eject		1
3-28	81-505-266-01		E-spring, PAUSE plate		1
3-29	81-505-207-01		Plate, PAUSE		1
3-30	81-507-220-01		Plate, Pinch lever		1
3-31	81-505-210-11		Pinch lever F ass'y		1
3-32	81-505-267-01		T-spring, Pinch F		1
3-33	81-507-229-01		G brake		2
3-34	81-505-236-11		Lever, Slide brake		1
3-35	81-507-222-01		Lever, Back tension		1
3-36	81-507-223-01		T-spring, B.T		1

EXPLODED VIEW-4



Ref. No.	Part No.	Parts No. Changed to	Description	Common Model	Q'ty
4-1	81-505-230-01		Lever, PLAY		1
4-2	81-505-234-01		Gear, PLAY cam		1
4-3	81-505-231-01		Trigger lever, PLAY		1
4-4	81-505-272-01		T-spring, Cam		1
4-5	81-505-308-01		Lever B, PAUSE		1
4-6	81-505-283-01		T-spring, PAUSE lever		1
4-7	81-505-235-01		Gear, PAUSE cam		1
4-8	81-505-233-01		Trigger lever, PAUSE		1
4-9	81-505-204-01		Chassis B, Mechanism		1
4-10	81-505-261-01		C-spring, Flywheel F		2
4-11	81-505-225-01		Gear, Flywheel		2
4-12	81-507-205-01		Flywheel S ass'y		1
4-13	81-507-225-01		Rubber belt B		1
4-14	87-081-483-01		Motor screw, M2.6		3
4-15	87-087-029-01		Rubber cushion		3
4-16	81-507-221-01		Holder, Motor		1
4-17	81-505-245-01		Motor pulley 2-10-6.8		1
4-18	82-565-373-01		Screw, Thrust		2
4-19	81-507-216-01		Rubber belt A		1
4-20	81-507-203-31		Flywheel T ass'y		1
4-21	81-505-282-01		T-spring, FR idler		1
4-22	81-505-254-01		Lever A, FR idler		1
4-23	81-505-250-21		FR idler ass'y		1
4-24	81-505-271-01		T-spring, Trigger lever		1
4-25	81-505-269-01		T-spring, Pinch plate		1
26~33	09-011-038-01		Reel motor ass'y		1
4-26	81-505-606-01		Shield plate		1
4-27	81-505-604-11		Motor, Reel		1
4-28	81-505-290-01		C-spring, FR idler C		1
4-29	81-505-287-11		Lever C, FR idler		1
4-30	81-505-289-01		Pressure plate spring		1
4-31	81-505-292-11		Felt 4.5-7.2-0.8		1
4-32	81-505-320-01		Pulley, Reel motor		1
4-33	81-505-608-01		Shield plate B		1

SPRING APPLICATION POSITION



Circuit description

1. Outline (Logic)

This controller is composed of three 4-bit microcomputers combined with the deck's mechanism logic controller with the dual capstan CUE, REV feature, the electronic counter controller including the remaining tape meter and the compu-brain controller.

2. Controller and peripheral circuit diagram

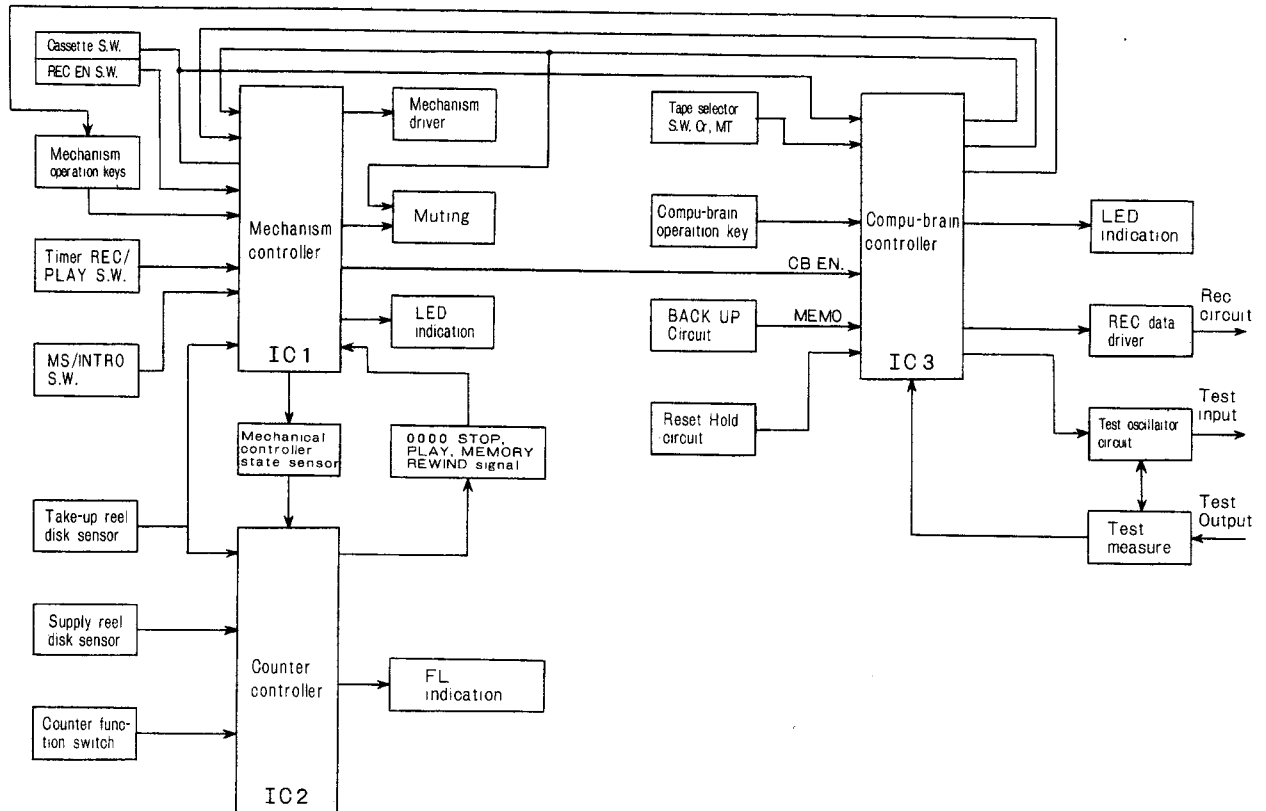


Fig-1

3. Mechanism controller specifications

3-1. General specifications

- 3-1-1. **STOP, PLAY, RWD, FF, REC, PLAY/PAUSE:** Same as the general controller
- 3-1-2. **CUE, REVIEW:** Possible by pressing the PLAY key and FF (or RWD) key together.
- 3-1-3. **ONE TOUCH REC:** It is set to the REC/PLAY-PAUSE mode by pressing only the REC key in the PAUSE mode.
- 3-1-4. **TIMER-REC/PLAY:** Same as the general specifications
- 3-1-5. **Counter 0000 STOP/PLAY, MEMORY-REWIND:** This cannot be operated when the remaining tape is displayed. This does not operate during the REC, MS, INTRO-PLAY operations.

- 3-1-6. **REC-MUT-TIMER (1):** The unit automatically enters the REC/PLAY-PAUSE mode 4 sec after the REC-MUT KEY is pressed and released. This makes it easy to leave non-recorded sections for MS operation.
- 3-1-7. **REC-MUT-TIMER (2):** When the key is pressed continuously to leave a non-recorded section for 4 sec or more, the LED blinks every 1 sec.
- 3-1-8. **REC-MUTE:** When the REC-MUT KEY is pressed again within 4 sec after it is first pressed, the REC-MUT mode is released.
- 3-1-9. **Tape slack prevention:** When the cassette tape is loaded, rewind operation is done for one pulse from the take-up reel disk to remove slack tape.
- 3-1-10. **ADMS:** The head is automatically demagnetized when power is switched ON.

3-2. Additional functions

3-2-1. MS: Same as general specifications

3-2-2. INTRO PLAY: By setting to CUE or REV with INTRO PLAY ON, it plays the first 8 seconds of each tune.

3-2-3. Controller timing: The control timing and muting timing of the mechanism are taken into consideration, so a special peripheral time constant circuit is not required.

3-3. Description of microcomputer terminal

3-3-1. Terminal name

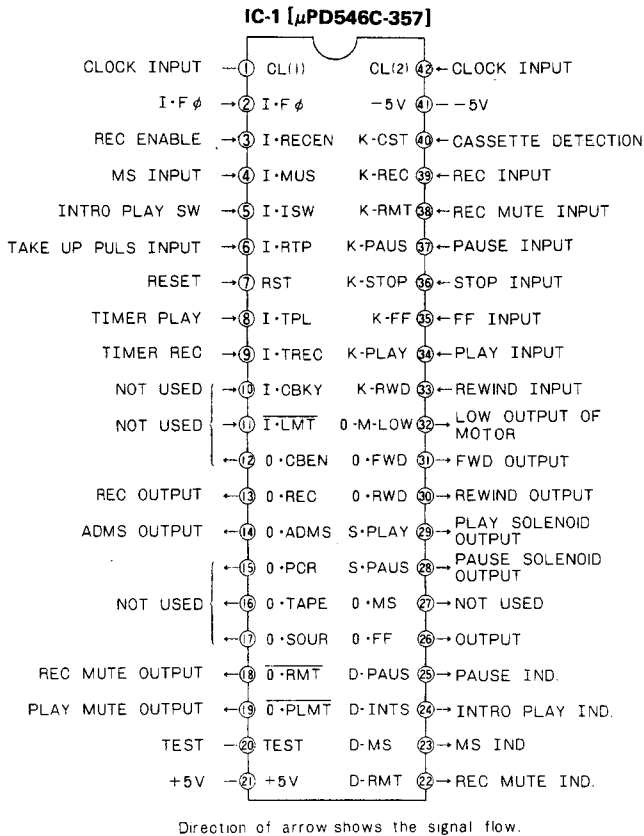


Fig-2

3-3-2. Terminal functions

"H": High level, 5V
"L": Low level, 0 or -5V

Pin No.	Terminal symbol	Function
①	CL (1)	The clock receives only 400 kHz
②	I · Fφ	Terminal to inhibit ME.RWD during REC. Set to "L" from "H" when the RWD command is input from the microcomputer.
③	I · RECEN	The terminal is set to "L" and reoceding is not done when the safety tab is broken off.
④	I · MUS	Signal input during INTRO PLAY and MS. Set to "H" for tunes and to "L" between tunes.

⑤	I · ISW	Switch to select the INTRO PLAY and MS. Repeats OFF → INTRO PLAY → MS → OFF.
⑥	I · RTP	Inputs the pulse from the takeup reel disk sensor. For AUTOSTOP.
⑦	RST	RESET terminal. Set to "H" instantaneously when power is switched ON; also set to "H" instantaneously when power is switched OFF. Set to "L" in general.
⑧	T · PL	Set to "H" during timer play and recording.
⑨	T · REC	Set to "L" during OFF.
⑩	I · CBKY	KEY REQUEST from the compu-brain. The REC/PLAY, FF and REW keys can be accepted when this pin is set to Hi.
⑪	I · LMT	Input from the compu-brain. Set to Hi during the compu-brain mode. Reads the counter during compu-brain operation.
⑫	O · CBEN	Outputs Hi when the compu-brain operation is possible (when the mechanism is in the STOP mode and recording is possible).
⑬	O · REC	Set to "H" during recording. For erase, bias oscillator.
⑭	O · ADMS	Set to "H" for approx. 1.5 sec during power ON. For ADMS.
⑮	O · RCR	Not used in F770 OPEN terminal
⑯	O · TAPE	
⑰	O · SOUR	
⑱	O · RMT	Set to "H" during recording, and "L" during REC-MUTE in recording.
⑲	O · PLMT	Set to "H" during REC/PLAY, CUE/REV to release muting. Set to "L" during INTRO PLAY, MS.
⑳	TEST	Connect to +5V.
㉓ ~ ㉔	D-...	Indication output. Set to "H" during operation.
㉕	O-FF	Set to "H" during FF, CUE.
㉖	S-PAUS	Set to "H" during PAUSE, FF/REW CUE/REV.
㉗	S-PLAY	Set to "H" during PLAY/REC, CUE/REV.
㉘	O-RWD	Set to "H" during RWD/REV.
㉙	O-FWD	Set to "H" during REC/PLAY/FF/CUE.
㉚	O-M-LOW	Set to "H" during PLAY, REC/PLAY.
㉛ ~ ㉜	K-...	Key input. Set to "H" in general. Accepts key input when changed to "L" from "H"

Table-1

3-4. Description of solenoid circuit

3-4-1 Description of PLAY solenoid

- 1 S24 is set to OFF during the stop mode and when S-PLAY of the microcomputer is set to Hi, IC5 3/7 is set to ON and pin 14, Lo, so SOL502 is pulled. When SOL502 is pulled, the gear PLAY cam rotates and S24 enters the ON region. S-PLAY is set to Hi, so IC5 1/7 is set to ON, pin 16 Lo, and simultaneously when S24 is set to ON, IC5 3/7 is set to OFF.
The gear PLAY cam continues turning when SOL502 is set to OFF, and stops at the PLAY position.
- 2 When the S-PLAY pin is set to Hi → Lo, IC5 1/7 is set to OFF, current flows via R30, S24, IC5 3/7 is set to ON and SOL502 is set to ON again. Then, the gear PLAY cam turns again and SOL502 is set to OFF when S24 enters the OFF region. The gear PLAY cam turns to the STOP position after SOL502 is set to OFF.

3-4-2. Description of PAUSE solenoid: The operation is same as that of the PLAY solenoid mechanism. The PAUSE operation also works to release braking applied to the reel disk, so SOL501 is set to ON during FF.RWD other than during PAUSE.

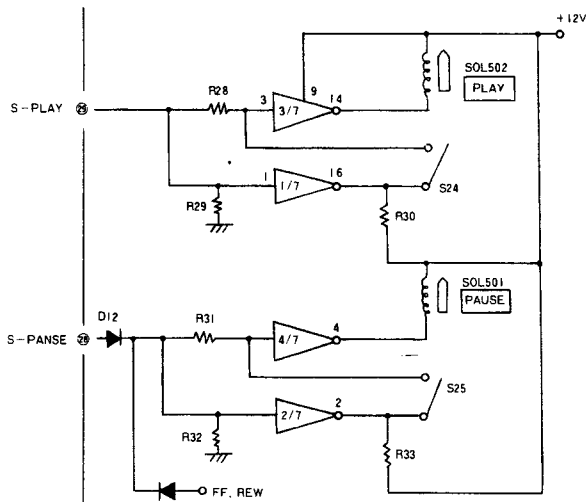


Fig-3

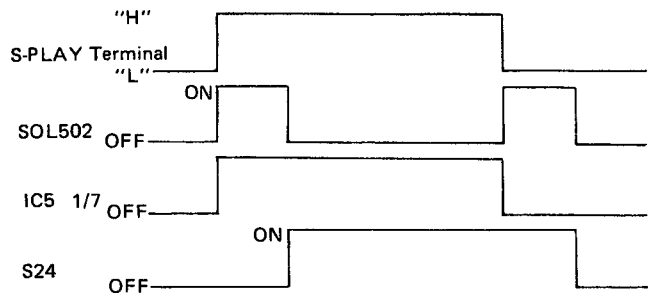
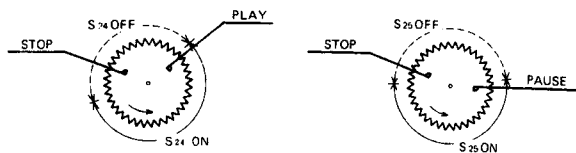


Fig-4

4. Counter controller specifications

4-1. Counter function

- 4-1-1. Addition and subtraction are same as with a general counter. However, when the eject operation is done, it is reset.
- 4-1-2. MEMORY-RWD function: 0000-STOP, REPLAY function is processed via this microcomputer and commands are transmitted to the controller.

4-2. Remaining tape function

- 4-2-1. The remaining tape is indicated in minute/second units during play/recording. When the unit enters the STOP and PAUSE modes while the remaining tape is displayed, the display is held.
- 4-2-2. When the unit enters the FF/RWD modes during minute/second indication, the residual amount time is indicated in minute units.

4-3. FL indication functions

- 4-3-1. The counter controller can be connected directly to the FL grid and plate and all the indication terminals are pulled down to -V-DIFP inside the microcomputer.

4.4. Description of microcomputer terminal

4.4.1. Terminal name

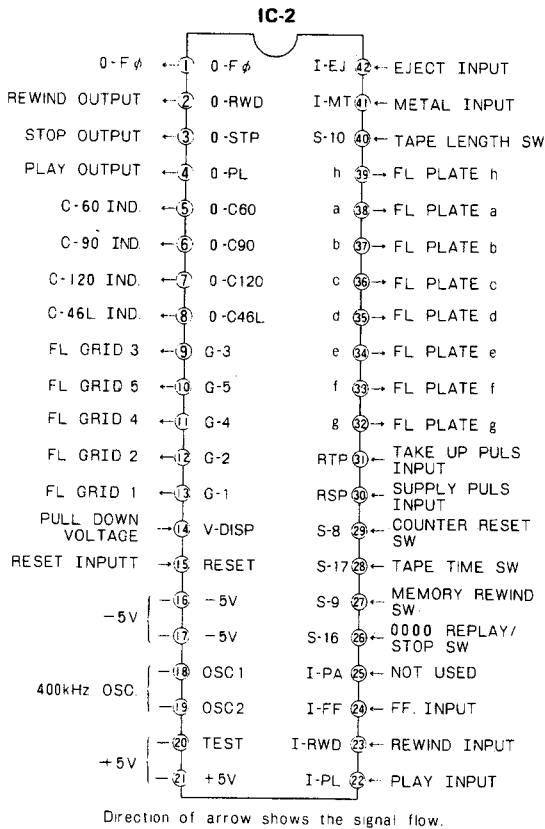


Fig-5

4.4.2. Terminal functions

"H": High level, +5
 "L": Low level, 0 or -5V

Pin No.	Terminal symbol	Function
①	0-F ϕ	This is set to "L" in general and to "H" when 0-RWD, 0-STOP or 0-PL is output. This is used to discriminate between the key inputs of the mechanism controller.
②	0-RWD	"L" is output to perform memory-RWD in the counter mode. Set to "H" in general.
③	0-STP	"L" is output to perform 0000 STOP in the counter mode. Set to "H" in general.
④	0-PL	"L" is output to perform 0000 REPLAY in the counter mode. Set to "H" in general.
⑤ ~ ⑧	0-C...	This is used for TAPE LENGTH indication.
⑨ ~ ⑬	G...	Connected to the FL grid.
⑭	V-DISP	This terminal determines the internal pull-down potential.
⑮	RESET	Internal reset is possible. Reset is applied when this is connected to -5V.

⑯, ⑰	-5V	-5V
⑱, ⑲	OSC	This is 400 kHz ceramic oscillator.
⑳, ㉑	+5V	+5V
㉒	I-PL	"H" is input during play, record/play and the remaining minutes and seconds are calculated.
㉓	I-RWD	"H" is input during RWD, and the remaining tape in the RWD direction is calculated.
㉔	I-FF	"H" is input during FF and the remaining tape in the FF direction is calculated.
㉕ ~ ㉙ ⑳	S...	Counter function input switch. Set to "L" in general, and "H" is input when the key is set to ON.
㉚	RSP	Inputs the pulse output from the supply reel disk. This is used to measure the time it takes the supply reel disk to complete 1 revolution during play.
㉛	RTP	Inputs the pulse output from the take-up reel. This is used for the counter.
㉜ ~ ㉞	a ~ h	Connected to the FL plate.
㉟	I-MT	Set to "L" in general and to "H" when METAL TAPE is used. The remaining tape is corrected for the thickness of METAL TAPE.
㊱	I-EJ	This is used to reset the counter to "0000" when the cassette is not inserted during the counter mode. The remaining amount is erased during EJECT in the remaining tape mode.

Table-2

4.5. Description of FL (Fluorescent lamp) counter

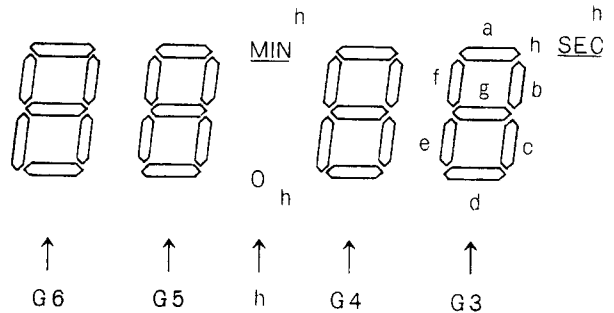


Fig-6

The filament voltage is approx. 1.5V. (AC50 kHz).

4-6. Description of indication

4-6-1. Tape length indication

When 5 ~ 8 are set to H, 60/46, 90, 120 or 46L light in the fluorescent display.

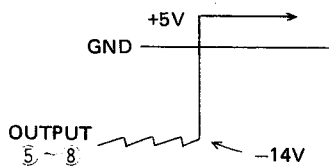


Fig-7

4-6-2. "0000" STOP, REPLAY, MEMORY REWIND indications:

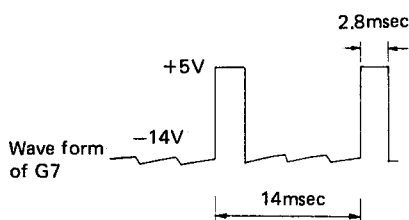


Fig-8

The current flowing to G7 is not DC current but the pulse divided by 5.

	G3 ~ G6 "H"	G7 "H"
a	7 segment figures	TAPE COUNTER
b		"0 0 0 0" REPLAY
c		"0 0 0 0" STOP
d		MEMORY REWIND
e		TAPE TIME
f		—
g		—
h	—	A colon is indicated TAPE TIME.

Table 3

4-6-3. NORMAL, CrO₂ and METAL indicators light when the input is set to Hi.

Indication imports

4-6-4. This circuit cancels the 0000 STOP, REPLAY and MEMORY REWIND functions during the CUE, REV, MS modes and during compu-brain.

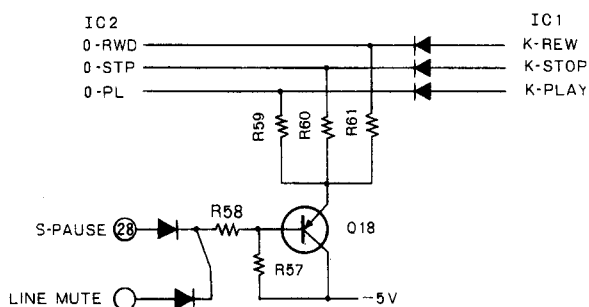


Fig-9

When the S-PAUSE or LINE MUTE is set to Hi, 3 outputs of IC2 are not pulled down, so IC1 does not accept the key input.

When S-PAUSE or LINE MUTE is set to Lo, the output of IC2 is pulled down during operation by R59 ~ 61, and IC1 accept the operation.

IC2 terminal 22 circuit description

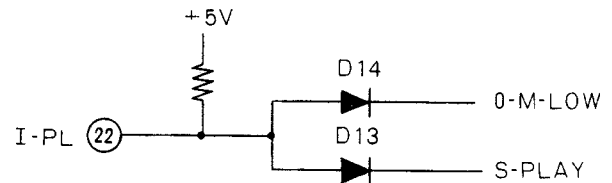


Fig-10

When S-PLAY is set to "H" and OM-LOW is also set to "H", "H" is input to I-PL.

5. Compu-brain specifications

5-1. Adjustment Item

5-1-1. **Bias adjustment:** Adjust to the bias so that the record/play sensitivities of the reference frequency (400 Hz) and the bias adjustment frequency (10 kHz) are equal.

5-1-2. **Sensitivity adjustment:** Adjust so that the record/play sensitivity at the reference frequency is set to the reference value.

5-1-3. **Equalizer adjustment:** Adjust so that the record/play sensitivity is set to the reference value at the reference frequency.

5-2. Number of Adjustment Steps

32 steps for all items.

5-3. Adjustment Method

This is a sequence of comparative feedback adjustments of the bias current, sensitivity and equalizer set as parameters.

5 bits ($32 = 2^5$) are adjusted, so it is completed with 5 cycles of comparative feedback. Adjustment is possible in 5/32 the time when compared with a sequency comparison type.

5-3-1. **Bias adjustment:** When the best point cannot be obtained in one adjustment, set the MEQ ϕ (MEQ 1 of pin 37) of IC3 pin 36 to Hi when the BIAS DATA are set to $\phi\phi\phi\phi$ (when it is set to 11111), change the recording equalizer and re-adjust from the beginning.

5-4. Error Processing

5-4-1. When any error in the data occurs during adjustment which makes adjustment impossible, the tape is fast-forwarded for 1 sec and adjustment is done again. When an error occurs during the 2nd adjustment, the LED indicates this, tape is rewound and adjustment is released. (Returns to the standard data.)

5-5. Time Required

5-5-1. When no error occurs: Approx. 16 sec.

5-5-2. When an error occurs: it differs depending on the type of the error.

5-6. Interruption of Mechanism Control Key

When any mechanism control key is pressed during adjustment, the unit enters the stop mode. The compu-brain data is set to the standard data.

5-7. Description of microcomputer

5-7-1. Terminal name

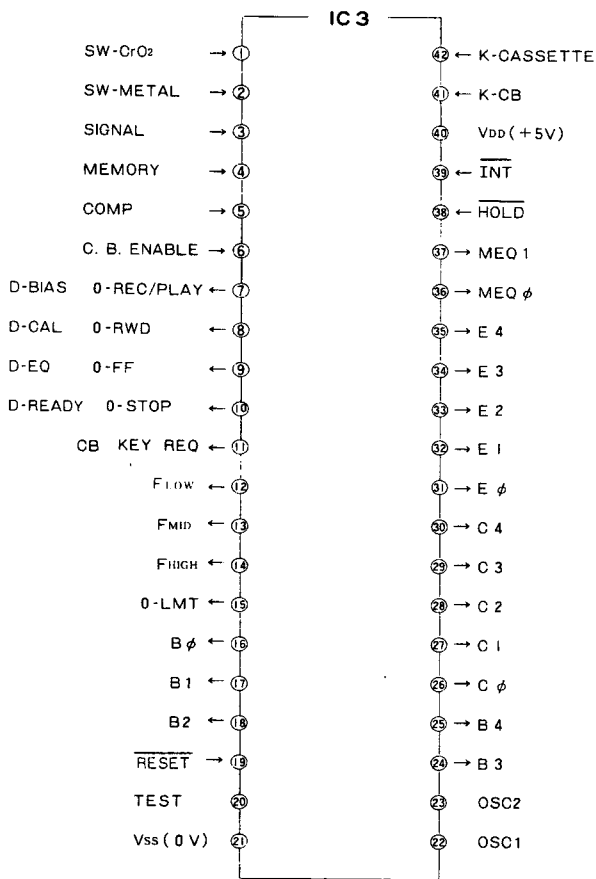
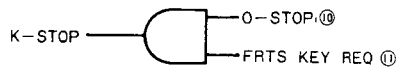


Fig-11

INPUT : K-CB "L" START/RESET
 K-CASSETTE "H" CASSETT ON
 SIGNAL "L" Magnetic coating provided
 C.B.ENABLE "H" C.B. START possible
 MEMORY "H" BACK UP ON

OUTPUT : FRTS KEY REQ. KEY REQ from "H" FRTS
 MEQ φ BIAS DATA φ φ φ φ φ "H"
 MEQ 1 " I I I I I "H"



5-7-2. Terminal functions

"H": High level 5V, "L": Low level "0V" LC6505C-609

Pin No.	Pin mark	Function
①	SW-Cr	Tape selector logic input
②	SW-MT	WRITE/READ of the compu-brain data to/from memory
③	SIGNAL	Record/Play signal input during the compu-brain adjustment. (Detects the magnetic coating.) "L" shows that the magnetic coating is present.

Pin No.	Pin mark	Function
④	MEMORY	Detects presence/absence of back-up operation. Back-up is present when this pin is set to Hi: Call of compu-brain adjusted data (memory data). Back-up is not present when this pin is set to Lo: Call-up of standard data.
⑤	COMP	Comparison result input during compu-brain adjustment
⑥	CB-EN	Detects possibility of compu-brain. START is possible when this pin is set to Hi.
⑦	D-BIAS/ 0-REC/PLAY	Pin 11 is set to Hi and REC/PB key is pressed with pin 7 set to Hi. Bias LED is lit when pin 11 is set to Lo.
⑧	C-CAL/ 0-REW	Pin 11 is set to Hi and REW key is pressed when pin 8 is set to Hi. CAL LED is lit when pin 11 is set to Lo.
⑨	D-EQ/0-FF	Pin 11 is set to Hi and FF key is pressed when pin 9 is set to Hi. EQ LED is lit when pin 11 is set to Lo.
⑩	D-READY/ 0-STOP	Pin 11 is set to Hi and STOP key is pressed when pin 10 is set to Hi. READY LED is lit when pin 11 is set to Lo.
⑪	KEY REQ	When this pin is set to Hi, the mechanism key is requested from the compu-brain.
⑫	OSL FL	Controls the test tone 400 Hz used during compu-brain.
⑬	OSL FM	Controls the test tone 10 kHz used during compu-brain.
⑭	OSC FH	Controls the test tone 13 kHz used during compu-brain.
⑮	0-LMT	LINE MUTE output. Hi output in general. MUTE on when this output is set to Lo. Set to Lo for approx. 2.5 sec during compu-brain or after power is set to ON.
⑯	Bφ	Compu-brain data output BIAS φ: Set to Hi when 2 ⁰ bit is set.
⑰	B1	Compu-brain data output BIAS 1: Set to Hi when 2 ¹ bit is set.
⑱	B2	Compu-brain data output BIAS 2: Set to Hi when 2 ² bit is set.
⑳	B3	Compu-brain data output BIAS 3: Set to Hi when 2 ³ bit is set.
㉑	B4	Compu-brain data output BIAS 4: Set to Hi when 2 ⁴ bit is set.
⑲	RESET	Reset pin input
⑳	TEST	Connected to the 0V power supply
㉑	Vss	

Pin No.	Pin mark	Function
22	OSC1	This pin supplies external operation clock. Inputs the mechanism control 400 Hz.
23	OSC2	Internal clock oscillating pin attached to the external resonance circuit. Not connected.
26	C ϕ	Compu-brain data output CAL ϕ : Set to Hi when 2 ⁰ bit is set.
27	C1	Compu-brain data output CAL 1: Set to Hi when 2 ¹ bit is set.
28	C2	Compu-brain data output CAL 2: Set to Hi when 2 ² bit is set.
29	C3	Compu-brain data output CAL 3: Set to Hi when 2 ³ bit is set.
30	C4	Compu brain data output CAL 4: Set to Hi when 2 ⁴ bit is set.
31	E ϕ	Compu-brain data output EQ ϕ : Set to Hi when 2 ⁰ bit is set.
32	E1	Compu-brain data output EQ 1: Set to Hi when 2 ¹ bit is set.
33	E2	Compu-brain data output EQ 2: Set to Hi when 2 ² bit is set.
34	E3	Compu-brain data output EQ 3: Set to Hi when 2 ³ bit is set.
35	E4	Compu-brain data output EQ 4: Set to Hi when 2 ⁴ bit is set.

Pin No.	Pin mark	Function
36	MEQ ϕ	Set to Hi when B0, B1, B2, B3, B4 of the data are set to $\phi\phi\phi\phi$ during bias adjustment. To change recording equalizer.
37	MEQ1	Set to Hi when B0, B1, B2, B3, B4 of the data are set to 11111 during bias adjustment. To change recording equalizer.
38	HOLD	HOLD mode demand input pin.
39	INT	Interruption demand input pin. Not connected.
40	VDD	Power pin. Connected to the back-up capacitor circuit. Approx. 5.3V in general. Approx. 5.6V just after power OFF, and then gradually drops in several hours.
41	K-CB	Compu-brain key. Compu-brain start/reset when this is set to Lo.
42	K-CST	For cassette detection. Set to Hi when a cassette is present.

Table-4

5-7-3. Logic of Tape selector
"H" 5V, "L" 0V

	NORMAL	CrO ₂	Metal
SW-Cr	"H"	"L"	"L"
SW-MT	"H"	"H"	"L"

Table-5

5-8. Compu-brain Peripheral Circuit

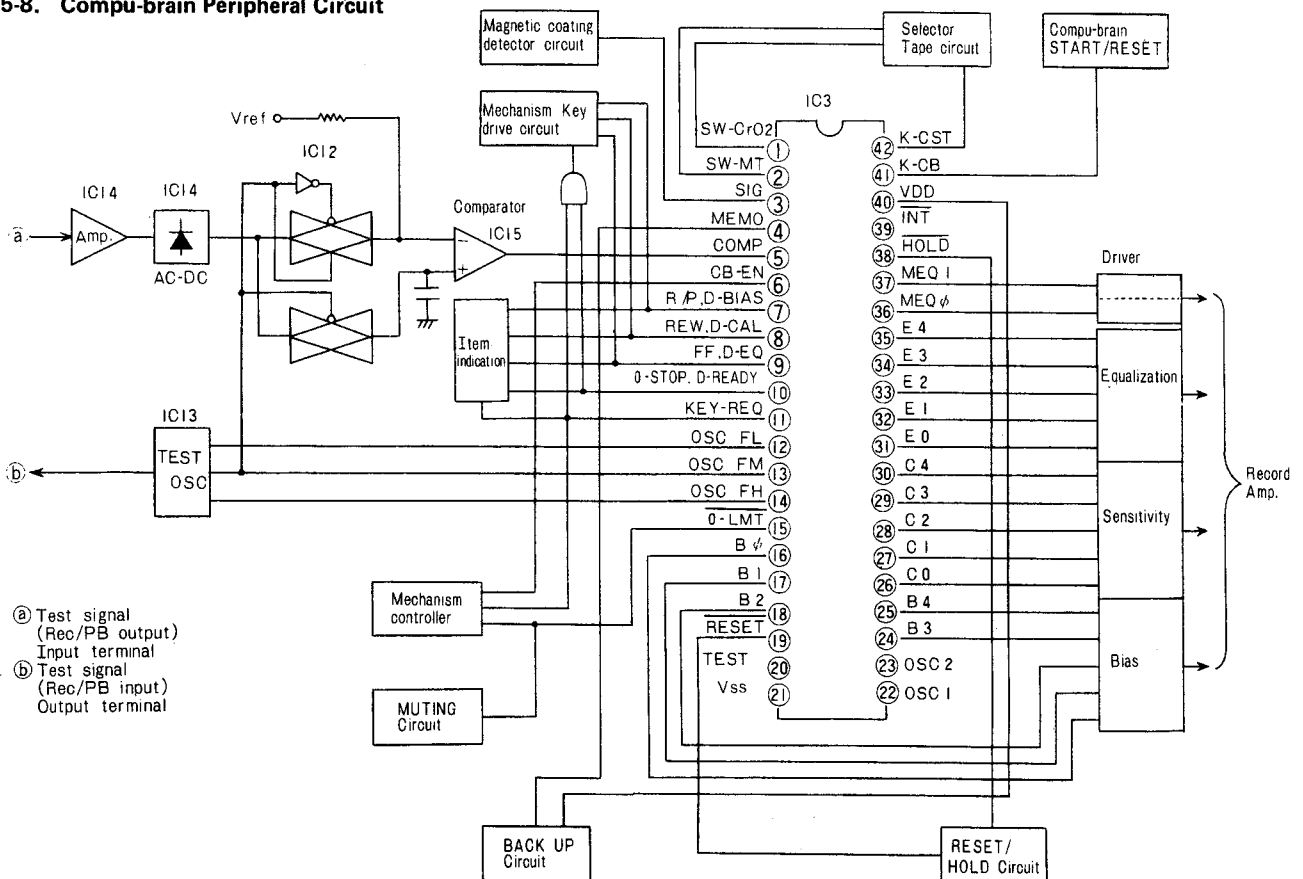


Fig-12

5-8-1. Test oscillator: This is the testing oscillator and sets the frequency via 3 outputs shown below.

- F_L : Reference frequency (400 Hz ~ 1 kHz)
- F_M : Bias adjustment frequency (5 k ~ 8 kHz)
- F_H : Equalizer adjustment frequency (10 k ~ 18 kHz)

The F_M output switches the comparator input for bias adjustment, and is used for the control line transferred to the microcomputer as the difference between F_M (output voltage) and F_L (output voltage).

5-8-2. Amp, AC-DC: This amplifies the output signal and makes it direct current during testing.

Vref: Reference voltage during sensitivity adjustment and equalizer adjustment.

5-8-3. Analog memory: Holds the F_L output voltage during bias adjustment.

5-8-4. Comparator: Comparator of the sequence comparative feedback.

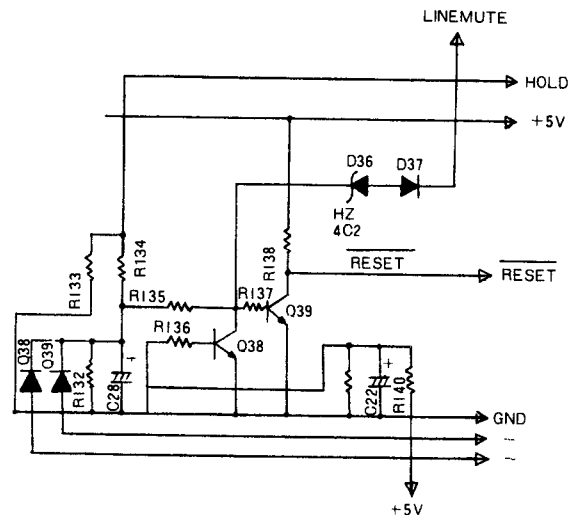
5-8-5. Item indication: Indicates items according to the adjustment procedure.

5-8-6. Magnetic coating detector circuit: Outputs Hi to the SIGNAL pin when the record/play output is present and outputs Lo when it is not present.

5-8-7. Data driver: Outputs the memory data inside the microcomputer to the recording circuit.

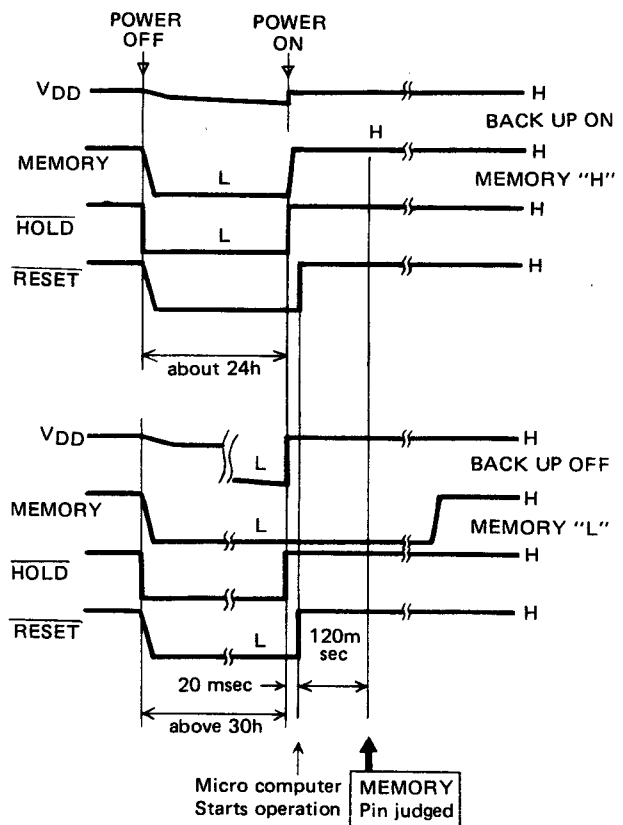
5-8-8. RESET/HOLD circuit: Produces the RESET/HOLD condition during power ON/OFF.

5-8-9. Mechanism key drive circuit: When a mechanism key is pressed during the compu-brian.



5-9. Detecting the Magnetic Coating

The magnetic coating of the tape is detected during compu-brain. Q37 is set to ON/OFF according to presence/absence of the record/play output; it is judged that the magnetic coating is present with the SIGNAL pin 3 set to Lo and it is not (leader tape, tape finish, etc.) with the SIGNAL pin 3 set to Hi. When it is judged that the magnetic coating is not present, the microcomputer outputs the standard data.



5-10. Operation after Power ON

- 1 When the power is set to ON, the voltage of the secondary winding of the transformer rises instantaneously, it is rectified via D38, D39, R132, C21 and the HOLD pin is set to Hi. Q39 is set to ON at this time, so the RESET pin is set to Lo. LINE MUTE during power ON is applied via D36, D37.
- 2 +5V rises and Q38 is set to ON with the time constant (approx. 20 msec) of R139, C22, so Q39 is set to OFF and the RESET pin is set to Hi via R138. (RESET completed)
- 3 When the RESET pin is set to Hi, the microcomputer starts operation and judges whether or not the MEMORY pin is set to Hi or Lo after 120 msec.

Fig-13

5-11. Operation after Power OFF

The $\overline{\text{HOLD}}$ pin is dropped to Lo instantaneously after power OFF and the reset pin to Lo. Then, the microcomputer enters the $\overline{\text{HOLD}}$ mode.

Operation of combination of $\overline{\text{HOLD}}$ and $\overline{\text{RESET}}$.

$\overline{\text{HOLD}}$	$\overline{\text{RESET}}$	OPERATION
H	H	Normal operation
L	H	HOLD
L	L	HOLD
H	L	RESET

Table 6

5-12. HOLD Mode

With this microcomputer, the internal operation is stopped and power consumption is reduced by apply a Lo level to the $\overline{\text{HOLD}}$ pin. When the $\overline{\text{HOLD}}$ signal is applied, the unit enters the HOLD mode after the command being executed at present is completed. In the HOLD mode, the oscillation circuit is stopped, all the memories and registers, etc. except the interruption demand plug and timer keep the condition just before the HOLD mode.

The output port is set to high impedance, so the power voltage can be lowered to minimize power consumption in the HOLD mode.

The HOLD mode is released by returning the $\overline{\text{HOLD}}$ pin to Hi level while applying Lo level to the RESET pin to set the unit to the reset mode. When it is set to the timing shown in Fig. 13, the unit is set to the HOLD mode with power OFF and to the reset mode with power ON.

	VDD
During normal operation	4.5 ~ 5.5V
During HOLD mode	More than 1.8V

Table 7

5-13. Compu-brain Flow Chart

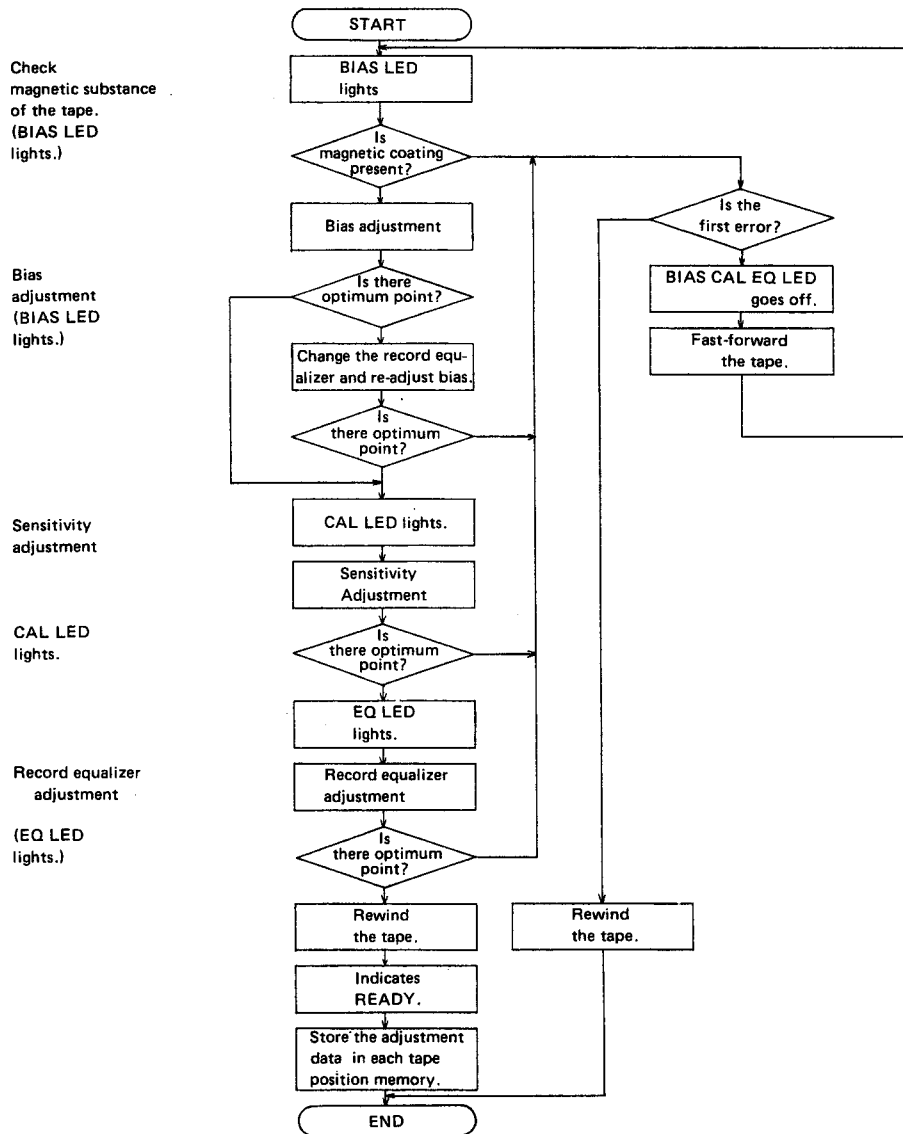


Table 8

ELECTRICAL MAIN PARTS LIST

Symbol No.	Part No.	Description
◀ MAIN CIRCUIT BOARD SECTION ▶		
PCB-A	*	Main circuit board
④IC1	82-191-645-01	IC, μ PD546C-357
IC4, 202	87-027-538-01	IC, μ PD4069
IC5	87-027-909-01	IC, M54523P
IC6	87-027-840-01	IC, M54519P
IC11	87-027-429-01	IC, TC4016BP
④IC12	87-027-800-01	IC, HD14007UBP
IC13, 14, 15	87-027-235-01	IC, NJM4558D
IC16	87-027-510-01	IC, μ PD4001
IC201	87-027-949-01	IC, NJM2043S-A
IC301, 401, 402, 501, 502, 503, 504	87-027-895-01	IC, M5218L
IC601	87-027-739-01	IC, NJM4556D
IC901	87-027-919-01	IC, M5230L
Q3, 4, 5, 6, 18, 33, 34, 35, 36	89-107-335-61	Transistor, 2SA733K (P)
Q7, 8	89-109-521-01	Transistor, 2SA952 (K)
Q9	89-408-862-01	Transistor, 2SD886Q
Q10, 11, 12, 13, 14, 15, 16, 17, 37, 201, 202, 203, 204, 301, 302, 413, 504, 505, 506, 507, 508, 809	89-309-455-61	Transistor, 2SC945L (PQ)
Q40, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 802	89-318-155-01	Transistor, 2SC1815 (GR)
Q41	89-110-155-01	Transistor, 2SA1015 (GR)
Q42	87-027-245-01	FET, 2SK68-AK
Q411, 412, 501, 502, 803, 804, 805, 806, 807, 808, Q904	89-320-011-01	Transistor, 2SC2001K
Q509, 510	89-108-854-01	Transistor, 2SA885R
Q503, 901	89-321-204-01	Transistor, 2SC2120Y
Q902	89-210-154-51	Transistor, 2SB1015Y (GR)
Q903	89-414-064-51	Transistor, 2SD1406Y (GR)
Q905	89-408-804-51	Transistor, 2SD880Y (GR)
Q906	89-408-804-51	Transistor, 2SD880Y (GR)
Q906	89-105-054-01	Transistor, 2SA505 (Y)
D1 ~ 19, 24, 25, 31, 32, 40, 41, 42, 46 ~ 49, 201 ~ 204, 501, 502, 503, 507 ~ 510, 804, 805, 808, 809	87-027-219-01	Diode, MA150
D26, 27, 28, 29	88-052-188-11	Diode, IS188FM

Symbol No.	Part No.	Description
D30, 801	87-027-365-01	Diode, S5277B
D33, 34, 35, 43, 44, 45	87-027-097-01	Diode, IS1555
D505	87-027-555-01	Zener diode, HZ-5C2
D803, 904	87-027-244-01	Zener diode, 05Z-8.2U
D901	87-027-815-01	Diode, 1B4B1
D902, 903	87-027-475-01	Zener diode, HZ-6B1
D905	87-027-393-01	Zener diode, HZ4C2
D906	87-027-469-01	Zener diode, HZ-16-2
L1	82-191-656-01	Coil, 400K 10EZ
L301, 302	82-190-629-01	Filter LP, 85K-2
L303, 304	87-030-061-01	Filter LP, 85K
L501	82-190-660-01	Coil, OSC EH
L502, 503	87-003-051-01	Choke coil, 470 μ H
L505, 506	82-190-627-01	Coil, F10
L507, 508	82-371-622-01	Coil, 23mH
RY301	87-031-751-01	SW solenoid
J1, 2	82-191-648-01	Jack, 6.3 ϕ W/switch (MIC)
J3, 4, 5, 6	87-049-055-01	Pin jack, 4P (LINE IN, LINE OUT)
J8	87-032-985-01	DIN socket (REMOTE)
S2	82-191-655-01	Push-switch (MONITOR)
S18	87-031-752-01	Slide switch (MPX FILTER)
SFR1	87-021-570-01	Semi-fixed resistor, 100k Ω -B
SFR201, 202	87-021-624-01	Semi-fixed resistor, 50k Ω -B
SFR203, 204	87-021-687-01	Semi-fixed resistor, 30k Ω -B
SFR403, 404	87-021-568-01	Semi-fixed resistor, 20k Ω -B
SFR501, 502	87-021-622-01	Semi-fixed resistor, 10k Ω -B
PIN1	87-049-279-01	Pin, 9P
PIN2	87-049-276-01	Pin, 6P
PIN3	87-049-150-01	Pin, 10P
PIN4	87-049-152-01	Pin, 12P
PIN5, 6, 8, 13	87-049-038-01	Pin, 3P
PIN7	87-049-044-01	Pin, 7P
PIN9	87-049-050-01	Pin, 6P
PIN10	87-049-035-01	Pin, 8P
PIN11, 16, 17	87-049-065-01	Pin, 5P
PIN15	87-049-034-01	Pin, 4P
PIN18	87-049-143-01	Pin, 3P
CON19	82-191-687-01	Connector, 3P-B
CON20	82-191-689-01	Connector ass'y, 3P-A
CON 21	82-191-688-01	Connector, 4P
< Resistors >		
△R505	87-029-089-01	4.7 Ω 1/4W Fuse resistor
△R541, 542, 901, 902	87-029-023-01	47 Ω 1/4W Fuse resistor
△R903, 904	87-029-007-01	22 Ω 1/4W Fuse resistor
△R912, 913	87-029-017-01	10 Ω 1/4W Fuse resistor
△R915	87-029-108-01	1 Ω 1/4W Fuse resistor
△R918, 919	87-029-019-01	2.2 Ω 1/4W Fuse resistor
< Capacitors >		
C28	82-191-665-01	0.022F 5V Super capacitor
C205, 206	87-014-119-01	0.027 μ F PP
C209, 210, 309, 310	87-015-425-01	0.1 μ F Aluminum solid
C401, 402	87-014-049-01	470pF PP
C411, 412	87-014-051-01	560pF PP
C501	87-014-118-01	0.015 μ F PP
C507	87-015-379-01	1 μ F 50V Electrolytic BP
C403, 404, 515, 516	88-707-789-81	0.33 μ F 100V TF
C523, 524	87-014-061-01	1500pF PP
C525, 526	87-004-055-01	820pF PP
C531, 532	87-014-037-01	150pF PP

Symbol No.	Part No.	Description
◀ DOLBY-NR1, 2 CIRCUIT BOARD SECTION ▶		
IC1, 2	87-027-918-01	IC HA12038-01
L1, 2	87-005-155-01	Coil, 36mH
PIN	87-049-117-01	Pin, 7P
PIN	87-049-119-01	Pin, 9P
< Resistors >		
R9, 10	87-025-271-01	5.1k Ω 1/4W Metal film resistor
R11, 12	87-025-295-01	15k Ω 1/4W Metal film resistor
R35, 36	87-025-296-01	56k Ω 1/4W Metal film resistor
< Capacitors >		
C15, 16	87-015-617-01	10 μ F 16V Electrolytic LL
C21, 22, 23, 24, 45, 46	87-015-366-01	0.15 μ F 10V Aluminum solid
◀ FL CIRCUIT BOARD SECTION ▶		
PCB-D	*	FL circuit board
④IC2	82-191-644-01	IC, HD 38755A62
IC17	87-027-920-01	IC, AN6870N
IC18	87-027-564-01	IC, TC4011BP
④IC19, 20, 21, 22	87-027-565-01	IC, TC4081BP
IC701	87-027-895-01	IC, M5218L
Q19 ~ 21, 701, 702	89-309-455-61	Transistor, 2SC945L (PQ)
Q22	89-318-156-01	Transistor, 2SC1815 (BL)
Q907, 908	89-313-846-01	Transistor, 2SC1384 (R)
D20, 21, 22, 23, 63, 64, 65, 66, 67, 68, 70, 703, 704, 705		
D69	87-027-475-01	Zener diode, HZ-6B1
D705	87-027-469-01	Zener diode, HZ-16-2
L901	82-401-661-01	Choke coil, 600 μ H
L902	82-191-658-01	Coil, OSC FL
X1	87-008-236-01	Ceramic resonator CSB400P
FL1	82-191-650-01	FIP 76AW18Y
SFR701, 702	87-021-564-01	Semi-fixed resistor, 1k Ω -B
SFR703	87-021-622-01	Semi-fixed resistor, 10k Ω -B
PIN12	87-049-050-01	Pin, 6P
PIN14	87-049-034-01	Pin, 4P
PIN19, 20	87-049-038-01	Pin, 3P
CON6	82-191-690-01	Connector ass'y, 3P-B
CON7	82-191-696-01	Connector ass'y, 7P
CON8	82-191-698-01	Connector ass'y, 3P-C
< Resistor >		
△R924	87-029-017-01	10 Ω 1/4W Fuse resistor
< Capacitors >		
C40	87-014-118-01	0.015 μ F PP
C45	87-015-141-01	10 μ F 16V Electrolytic BP
◀ FRTS CIRCUIT BOARD SECTION ▶		
PCB-E	*	FRTS circuit
④IC3	82-191-643-01	IC, LA6505C-609
IC8, 9, 10	87-027-948-01	IC, M54514AP
Q23 ~ 32	89-320-011-01	Transistor, 2SC2001K
Q38, 39	89-309-455-61	Transistor, 2SC945L (PQ)
D36	87-027-393-01	Zener diode, HZ4C2
D37, 38, 39	87-027-219-01	Diode, MA150
	87-049-114-01	Pin, 4P
	87-049-115-01	Pin, 5P
	87-049-117-01	Pin, 7P
	87-049-119-01	Pin, 9P

Symbol No.	Part No.	Description
◀ AUTO STOP CIRCUIT BOARD SECTION ▶		
PCB-F	*	Auto stop circuit board
CP501, 502	87-027-644-01	Photo sensor, NJL-5141EA
◀ SWITCH-1 CIRCUIT BOARD SECTION ▶		
PCB-G	*	Switch-1 circuit board
S3, 4	87-031-692-01	Push-switch (DOLBY ON/OFF, DOLBY B/C)
VR1	82-191-646-01	Volume, 10k Ω -A (OUTPUT LEVEL)
VR3	82-191-647-01	Volume 250k Ω -W
◀ SWITCH-2 CIRCUIT BOARD SECTION ▶		
PCB-H	*	Switch-2 circuit board
S1	82-191-657-01	Slide switch (TIMER)
◀ SWITCH-3 CIRCUIT BOARD SECTION ▶		
PCB-I	*	Switch-3 circuit board
△S26	87-031-753-01	Push-switch (POWER)
△F1	87-035-216-01	Fuse, "T" 200mA (E, K, G model only)
	87-033-147-01	Fuse clamp
< Capacitor >		
△C918	87-019-112-01	0.01 μ F Spark killer
◀ JACK CIRCUIT BOARD SECTION ▶		
PCB-J	*	Jack circuit board
J7	82-191-649-01	Jack (HEADPHONES)
◀ VOLUME CIRCUIT BOARD SECTION ▶		
PCB-K	*	Volume circuit board
VR3	82-190-642-01	Volume circuit board
	82-191-641-01	Slide volume, 100k Ω -A (REC LEVEL)
CON9	82-191-697-01	Connector, 6P
◀ KEY BOARD CIRCUIT BOARD SECTION ▶		
PCB-L	*	Key board circuit board
D52	87-027-922-01	LED, SR206D (PAUSE)
D53	87-027-923-01	LED, SY406D (PLAY)
D54, 55	87-027-921-01	LED, SR506D (REC, REC MUTE)
S5, 6, 7, 11, 12, 13, 14, 15, 19	87-031-498-01	Push-switch (STOP, PAUSE, REC MUTE, REW, PLAY, FF, REC, MS COMPU BRAIN)
S8, 9, 10, 16, 17	87-031-642-01	Tact switch (RESET, MEMO REWIND, REPLAY/STOP, TAPE TIME)
CON10	82-191-654-01	Connector ass'y, 8P
CON11	82-191-653-01	Connector ass'y, 5P
CON12	82-191-652-01	Connector ass'y, 6P
◀ LED CIRCUIT BOARD SECTION ▶		
PCB-M	*	LED circuit board
D51, 60, 808	87-027-542-01	LED, LN217RP (METAL, C, INTRO)
D50, 56, 57, 58, 62, 807, 809	87-027-543-01	LED, LN317GP (MS, BIAS, CAL, EQ, NORMAL, TAPE, B,)
D59	87-027-819-01	LED, LT-9030N, G3-8 (READY)
D60, 504, 806	87-027-671-01	LED, LN417YP (CrO ₂ , ADMS, SOURCE)
CON13	82-191-651-01	Connector ass'y, 3P
CON14	82-191-692-01	Connector ass'y, 4P-B
CON15	82-191-691-01	Connector ass'y, 4P-A
CON16	82-191-695-01	Connector ass'y, 5P-B
CON17	82-191-694-01	Connector ass'y, 5P-A

Description	Symbol No.	Part No.	Description
T BOARD SECTION			
1-01 Auto stop circuit board	△ T1	82-191-632-01	Power transformer (H, HU models only)
1-01 Photo sensor, NJL-5141EA	△ T1	82-191-633-01	Power transformer (U model only)
BOARD SECTION			
1-01 Switch-1 circuit board	△ T1	82-191-634-01	Power transformer (E model only)
1-01 Push-switch (DOLBY ON/OFF, DOLBY B/C)	△ T1	82-191-635-01	Power transformer (K, G models only)
1-01 Volume, 10kΩ-A (OUTPUT LEVEL)	RPH	87-046-194-11	REC/PB head
1-01 Volume 250kΩ-W	EH	87-046-192-01	Erase head
BOARD SECTION			
1-01 Switch-2 circuit board	M501	87-045-175-01	DC servo motor system
1-01 Slide switch (TIMER)	M502	09-011-038-01	Reel motor ass'y
BOARD SECTION			
1-01 Switch-3 circuit board	D907	87-027-944-01	LED, SLF 301C
1-01 Push-switch (POWER)	△	87-034-958-01	AC power cord (H, HU models only)
1-01 Fuse, "T" 200mA (E, K, G model only)	△	87-034-951-01	AC power cord (U model only)
1-01 Fuse clamp	△	87-034-877-01	AC power cord (E model only)
< Capacitor >	△	87-034-975-01	AC power cord (K model only)
1-01 0.01μF Spark killer	△	87-034-892-01	AC power cord (G model only)
BOARD SECTION			
1-01 Jack circuit board	△	87-085-184-01	AC power cord bushing D (H, HU, U models only)
1-01 Jack (HEADPHONES)	△	82-085-184-01	AC power cord bushing (E, K, G models only)
BOARD SECTION			
1-01 Volume circuit board	S20, 21, 22, 23	81-505-607-01	Leaf switch (REC, CrO ₂ , METAL, CASSETTE)
1-01 Slide volume, 100kΩ-A (REC LEVEL)	S24, 25	81-505-601-01	Leaf switch (PLAY, PAUSE)
1-01 Connector, 6P	S27	87-031-586-01	Rotary switch (VOLTAGE SELECTOR) (H, HU models only)
T BOARD SECTION			
1-01 Key board circuit board	CON1	81-505-631-11	Connector ass'y, 9P
1-01 LED, SR206D (PAUSE)	CON2	81-507-602-01	Connector ass'y, 6P
1-01 LED, SY406D (PLAY)	CON3	81-505-632-01	Connector ass'y, 10P
1-01 LED, SR506D (REC, REC MUTE)	CON4	81-507-601-01	Connector ass'y, 12P
1-01 Push-switch (STOP, PAUSE, REC MUTE, REW, PLAY, FF, REC, MS COMPU BRAIN)	CON5	81-051-003-01	Connector ass'y, 3P
1-01 Tact switch (RESET, MEMO REWIND, REPLAY/STOP, TAPE TIME)			
1-01 Connector ass'y, 8P			
1-01 Connector ass'y, 5P			
1-01 Connector ass'y, 6P			
BOARD SECTION			
1-01 LED circuit board			
1-01 LED, LN217RP (METAL, C, INTRO)			
1-01 LED, LN317GP (MS. BIAS, CAL, EQ, NORMAL, TAPE, B.)			
1-01 LED, LT-9030N, G3-8 (READY)			
1-01 LED, LN417YP (CrO ₂ , ADMS, SOURCE)			
1-01 Connector ass'y, 3P			
1-01 Connector ass'y, 4P-B			
1-01 Connector ass'y, 4P-A			
1-01 Connector ass'y, 5P-B			
1-01 Connector ass'y, 5P-A			

△ 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.

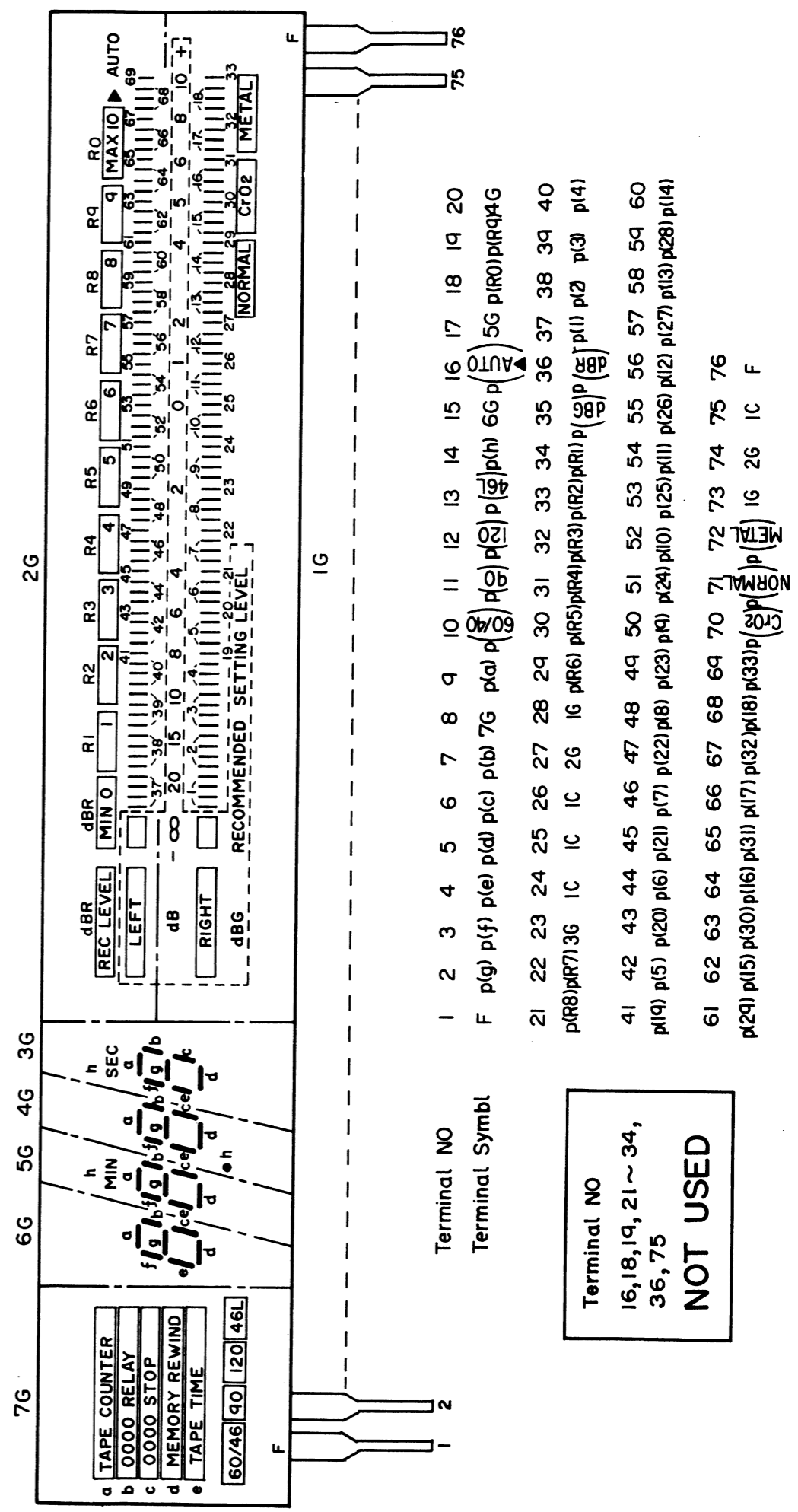
C-MOS IC handling precaution
The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care in regard to following articles.
1. Need to be put on conductive sheet, to be put in a metallic box and to be wrapped by aluminium foil for transportation and 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 A 82-191-601-11**
PCB-A 82-191-602-11
PCB-G 82-191-603-11
PCB-J 82-191-604-11
PCB-H 82-191-605-11
PCB-M 82-191-606-11
- Combination circuit board B 82-191-611-21**
PCB-D 82-191-612-21
PCB-E 82-191-614-21

■ Ceramic capacitor
87-018-□□□-01

Capacitor	Parts code
100 P	0 3 2
150 P	0 3 4
180 P	0 3 5
220 P	0 3 6
470 P	0 4 0
1000 P	0 4 4
0.01	0 4 7

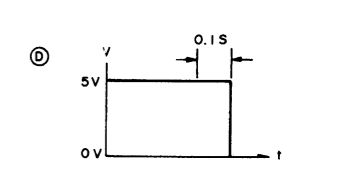
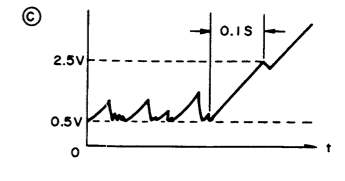
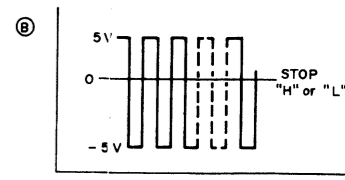
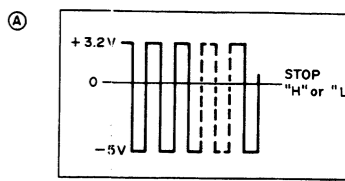
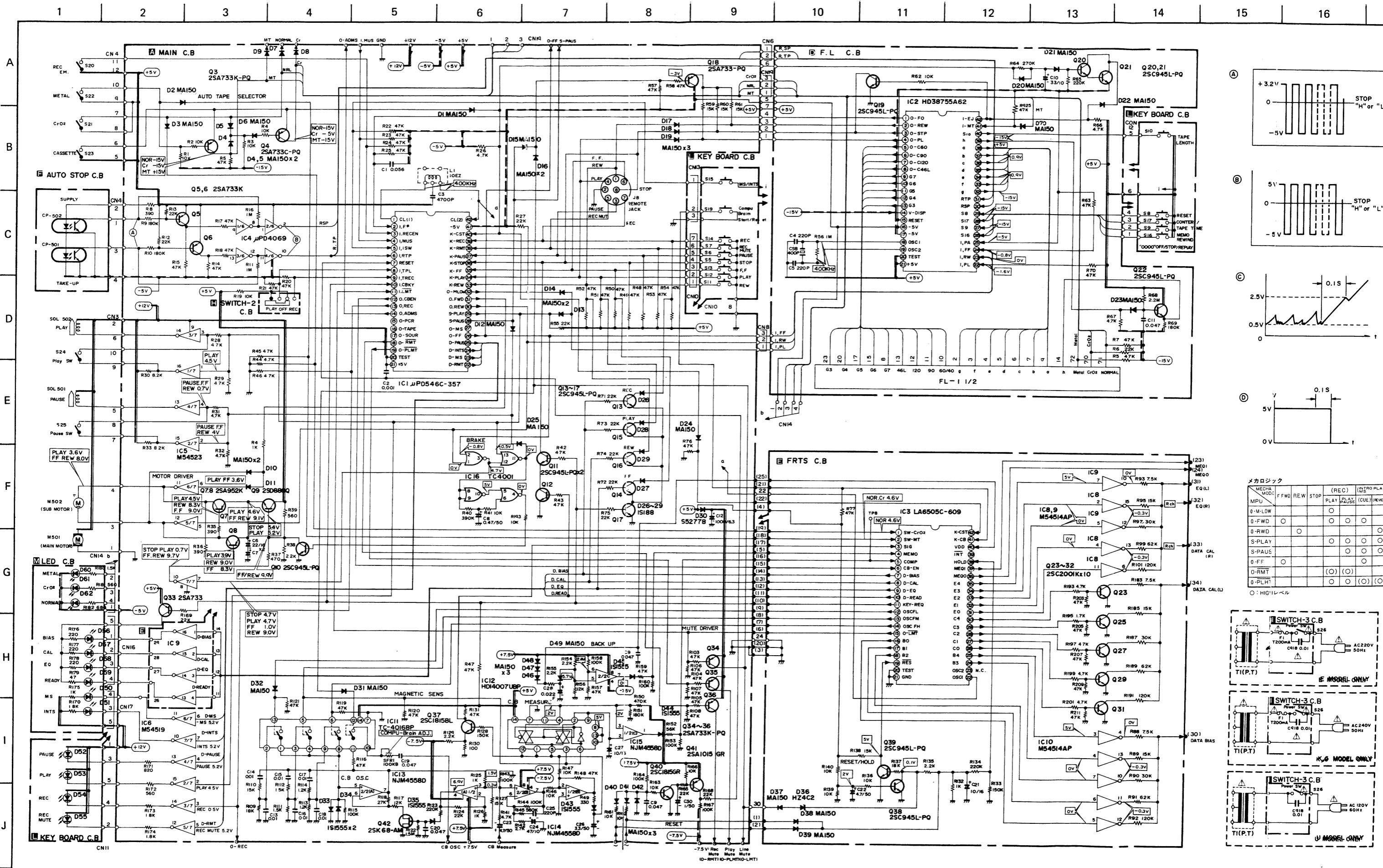


Terminal NO
16, 18, 19, 21 ~ 34,
36, 75
NOT USED

NOTES:

- 1) B (+) power supply B (-) power supply
- 2) Signal path
- Rec path

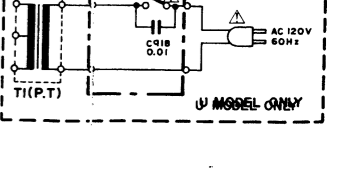
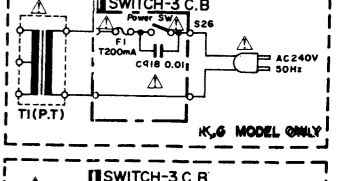
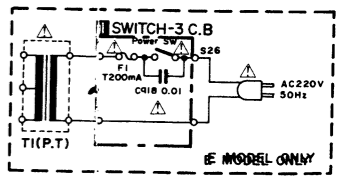
SCHEMATIC DIAGRAM -1

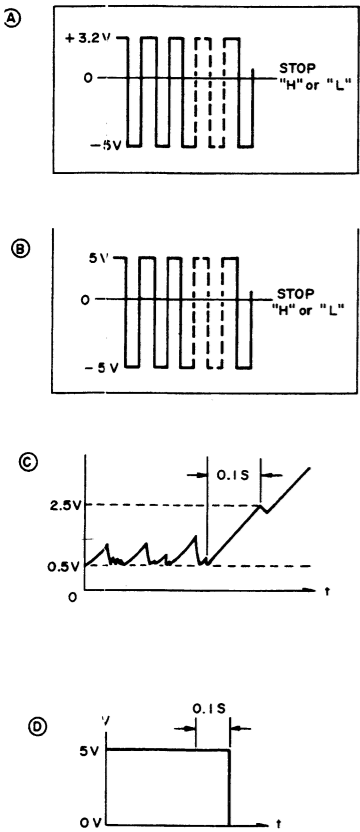


メカロジック

MECHA MODE	F.WD	REW	STOP	(REC)	INTRO PLAY
MPU	PLAY	PAUSE	(CUE)	REW	
B-M-LWD	○	○	○	○	○
B-RWD	○	○	○	○	○
S-PLAY	○	○	○	○	○
S-PAUS	○	○	○	○	○
O-FF	○	○	○	○	○
O-RMT	○	○	○	○	○
B-PLH	○	○	○	○	○

○: HIGHレベル

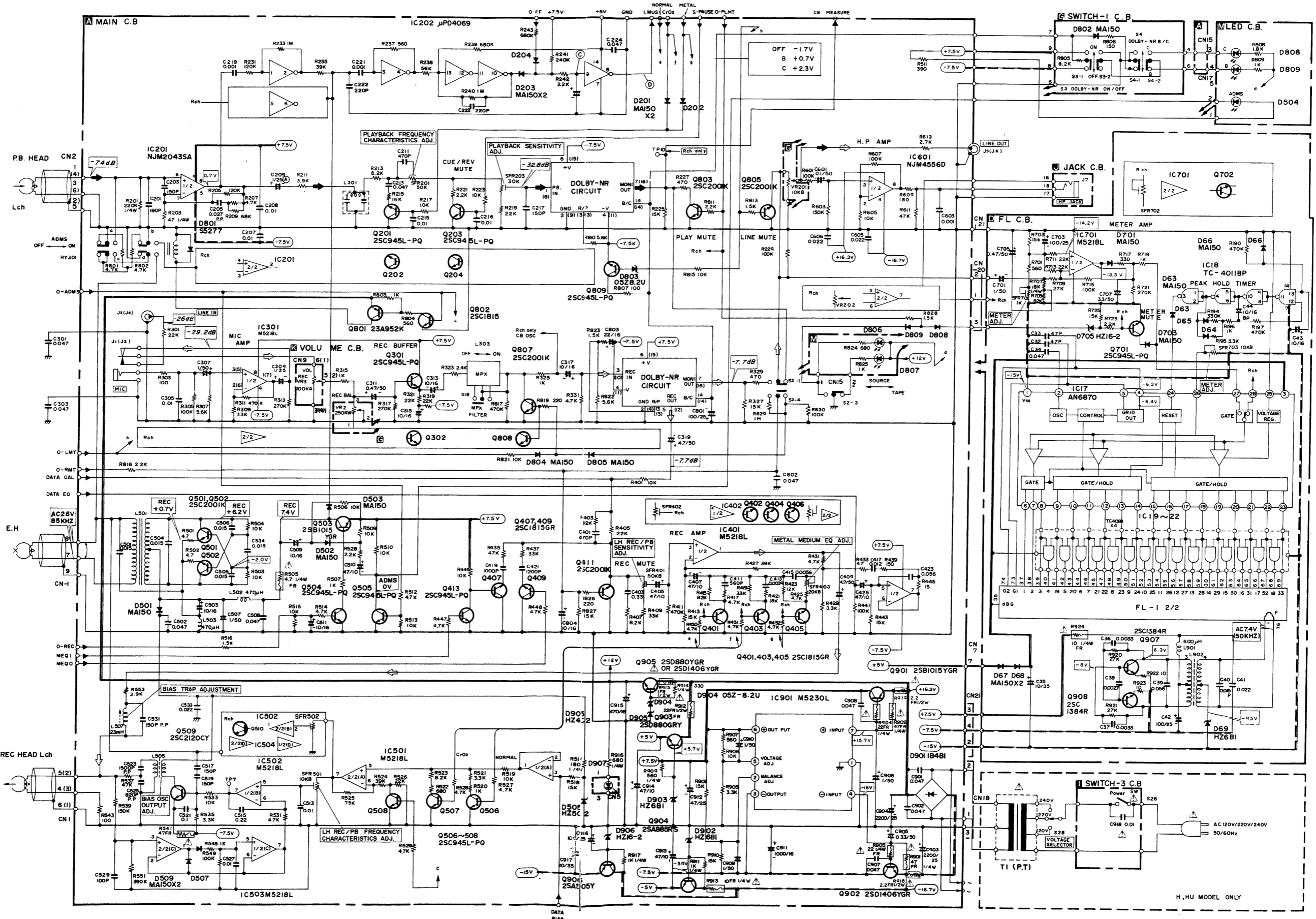
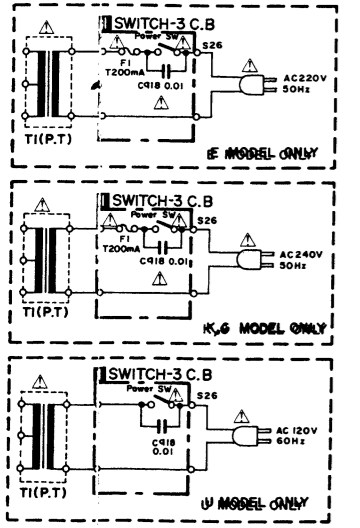




メカログック

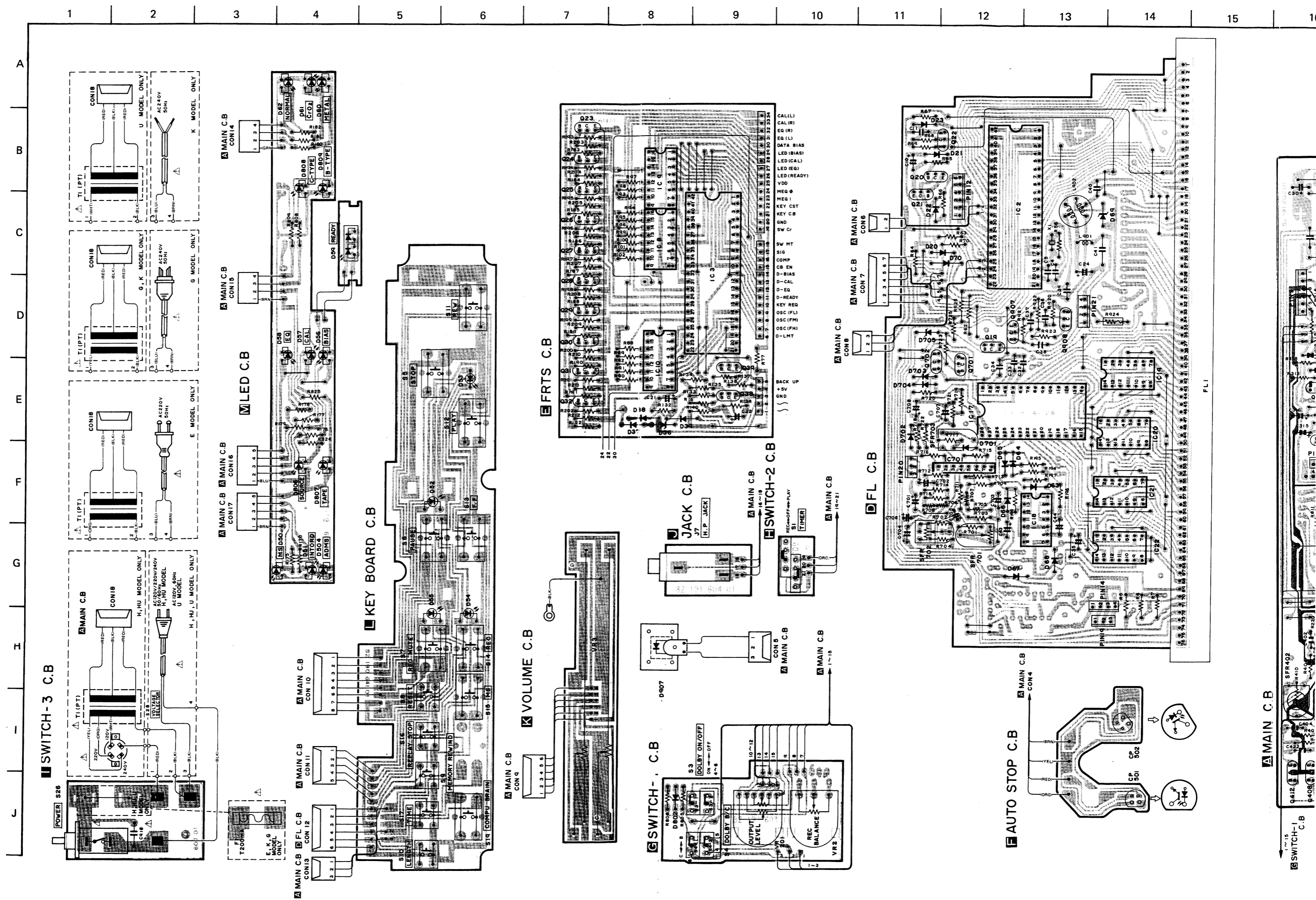
MECHA. MOD.	FWD	REW	STOP	(REC)	(NO PLAY)
MPU	0-M-LW	0-FWD	0-RWD	S-PLAY	S-PAUS
0-M-LW					
0-FWD					
0-RWD					
S-PLAY					
S-PAUS					
0-FF					
0-RMT					
0-PLH					

○: HIGHレベル



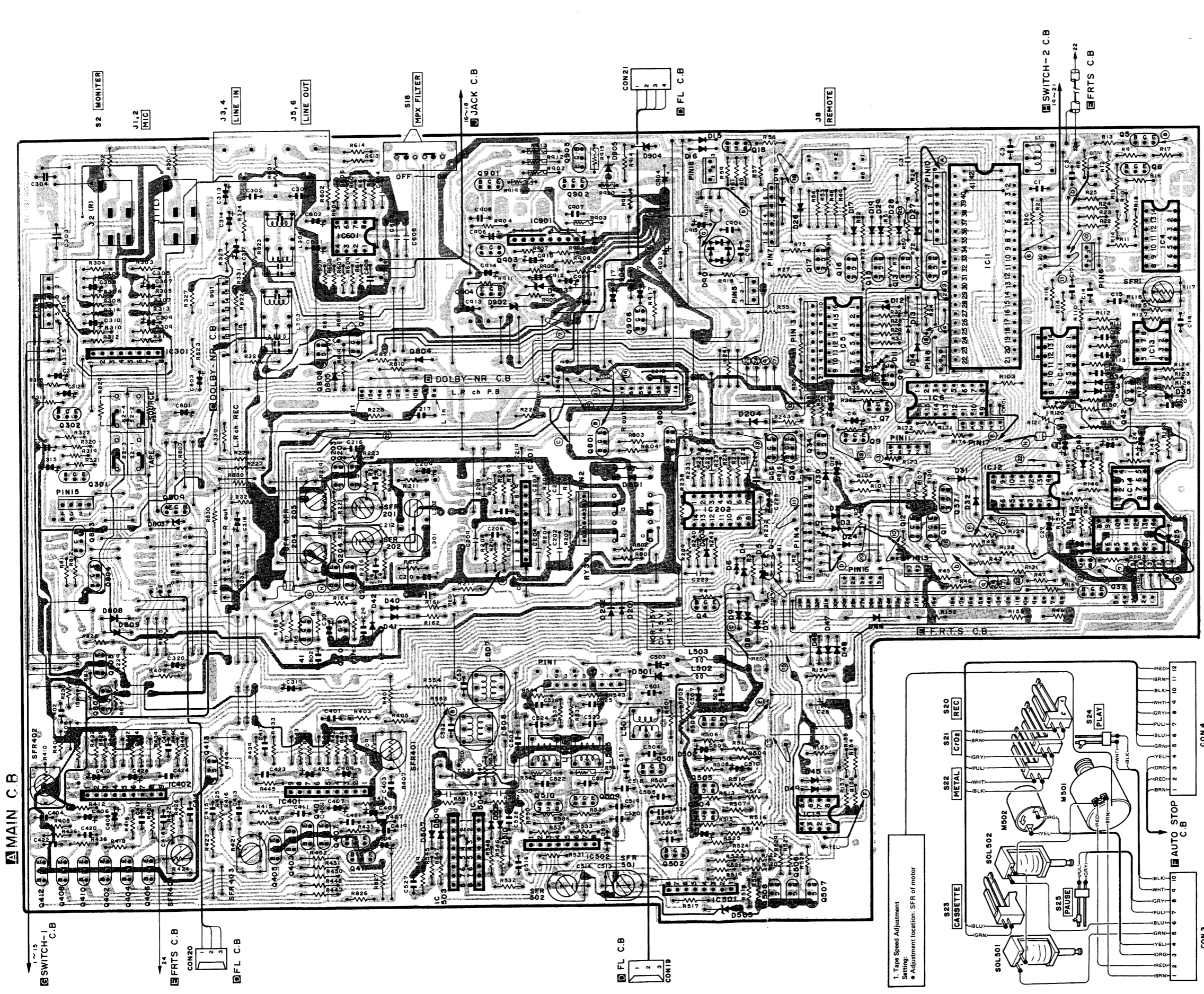
NOTES (1) B(+) Pattern Others pattern
(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.

WIRING

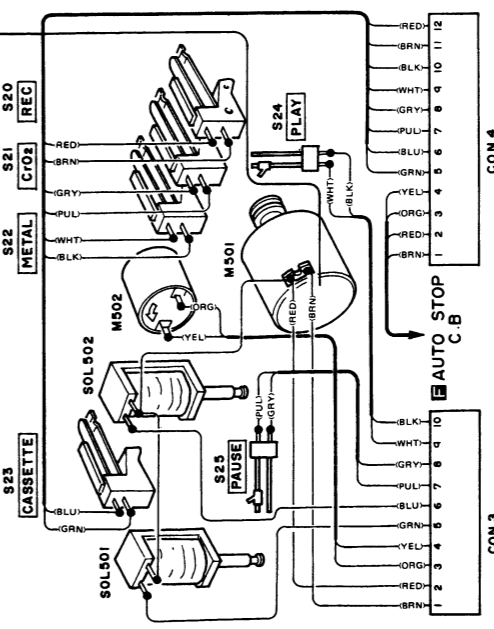


15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

此圖為零件清單及零件圖，請參閱零件清單及零件圖，以瞭解零件之規格及安裝位置。

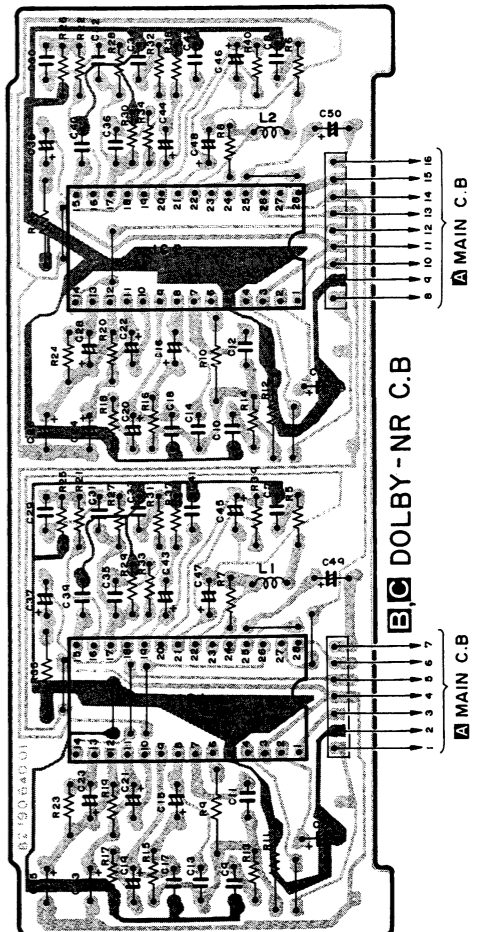
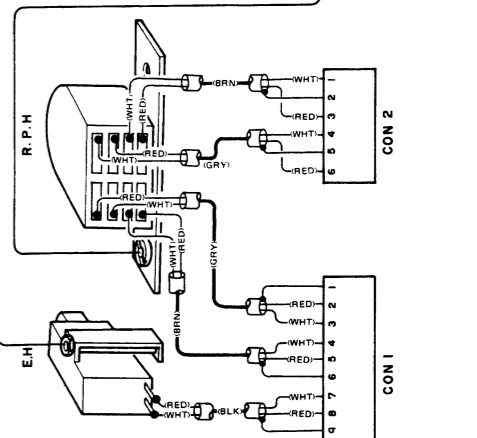


1. Tape Speed Adjustment
Screwdriver
• Adjustment location: SFR of motor



13. Erase Head Adjustment
Settings: TTA-119MX
• Tape selector: METAL
• Input signal: 25Hz, Indicator +10dB
• Adjustment location: Erase head adjustment screw
Method:
Record a signal and rewind the tape.
Erase the signal with no input signal and adjust so that the erase ratio is 0dB or more for both L and R channels.
Check no over-erasing of the opposite tracks occurs.

2. Azimuth adjustment
Settings: TTA-117E
• Adjustment location: Azimuth adjustment screw.



12. Compu-Brain Adjustment
Settings:
 • Test point: TP8
 • Adjustment locations: SFR1
Method:
 Replace the wire from the (A) to the (B) and connect the resistors on the pins 12, 13 and 14 of IC11.
 Adjust so that the waveform at the test point is square wave.
 After adjustment, replace the wire as it was and disconnect the resistors.

6. Bias OSC Frequency Adjustment
Settings:
 • Test point: TP3
 • Adjustment location: L501
Method:
 Adjust so that the frequency at test point becomes 85kHz \pm 1kHz.

7. Bias OSC Output Adjustment
Settings:
 • Test tape: TTA-119G
 • Test points: TP5 (Lch)
 TP4 (Rch)
 • Adjustment locations: L505 (Lch)
 L506 (Rch)
Method:
 Record the test tape in CrO₂ position and adjust so that the output at the test point is minimum (-3.8 ~ -4V).

9. LH REC/PB Frequency Characteristics Adjustment
Settings:
 • Test tape: TTA-119J
 • Input signals: LINE IN 1kHz/10kHz (1V)
 • Test point: LINE OUT
 • Adjustment locations: SFR501 (Lch)
 SFR502 (Rch)
Method:
 Supply a 1kHz signal in SOURCE position and adjust the recording level so that the LINE output is 38mV.
 Then, change in TAPE position, recording and playback the 1kHz and 10kHz signals and adjust so that the output of 10kHz is +0.5dB to 1dB based on the 1kHz output.

5. Meter Adjustment
Settings:
 • Test point: TP1 (Lch)
 TP2 (Rch)
 • Adjustment locations: SFR701 (Lch)
 SFR702 (Rch)
 SFR703 (L, Rch)
 Before adjustment turn the SFR701, SFR702 and SFR703 fully clockwise.
Method:
 Connect a DC voltmeter (⊖ pin is a Zener diode as shown in the diagram) to the TP in the SOURCE mode.
 Gradually lower the SFR from its max. to adjust so that it is +1.7V. Adjust both R and L channels.
 Next, input the 1kHz signal to LINE IN and adjust REC VR so that LINE OUT is 380mV.
 Gradually lower the SFR in this condition to adjust so that the +1dB of the FL meter goes out and the 0dB is lit.
 Then vary the input level of LINE IN to check that the meter lights and goes off depending on each input (+1, +2, +3dB, +10dB, -10dB).

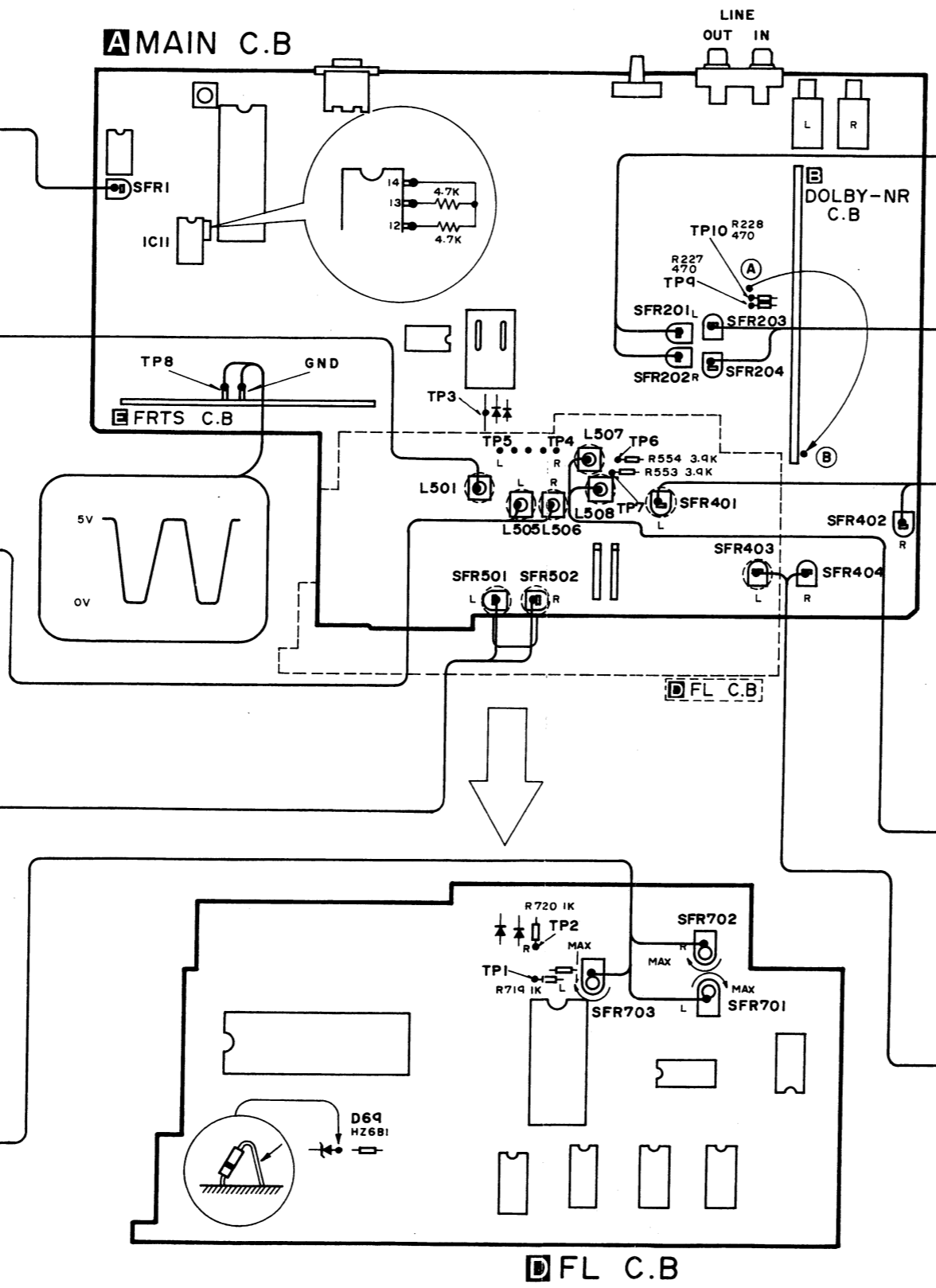
3. Playback Frequency Characteristics Adjustment
Settings:
 • Test tape: TTA-117E
 • DOLBY-NR: OFF
 • Test points: LINE OUT
 • Adjustment locations: SFR201 (Lch)
 SFR202 (Rch)
Method:
 Playback the test tape and adjust so that the output of 10kHz is 0.5dB to 1.0dB based on the 1kHz output.

4. Playback Sensitivity Adjustment
Settings:
 • Test tape: TTA-161
 • DOLBY-NR: OFF
 • Test point: LINE OUT
 • Adjustment locations: SFR203 (Lch)
 SFR204 (Rch)
Method:
 Playback the test tape and adjust so that the output of TP9 and TP10 is set to 580mV.

10. LH REC/PB Sensitivity Adjustment
Settings:
 • Test tape: TTA-119J
 • DOLBY-NR: OFF
 • Input signal: 1kHz (1V)
 • Adjustment locations: SFR401 (Lch)
 SFR402 (Rch)
Method:
 Supply a 1kHz signal in SOURCE position and adjust the recording level so that the LINE output is 38mV.
 Recording and playback and adjust so that the tape output is 38mV.

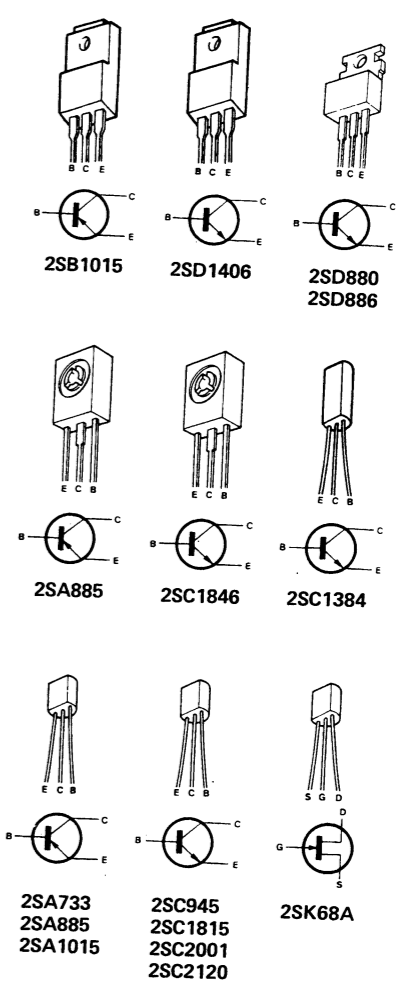
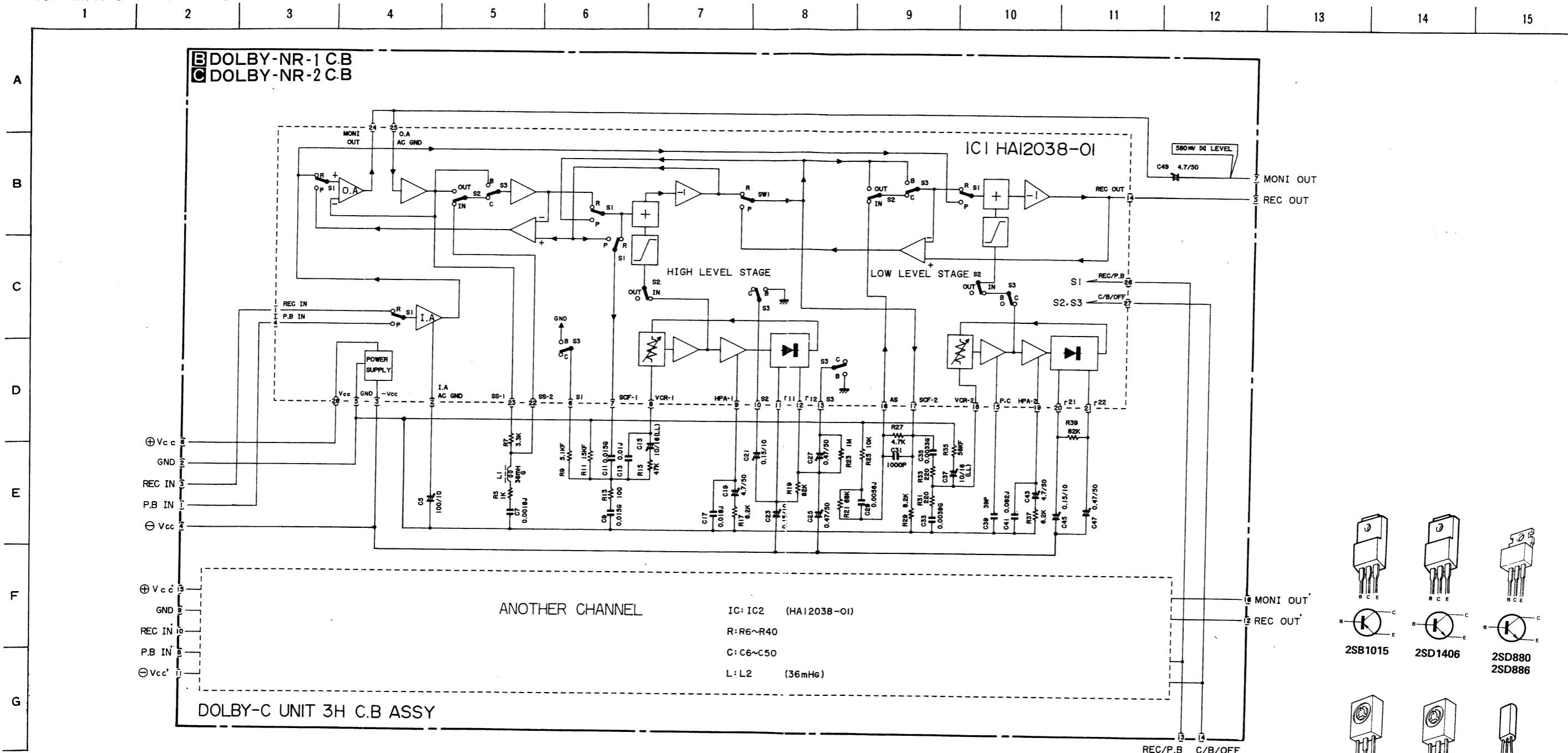
8. Bias Trap Adjustment
Settings:
 • Test tape: TTA-119MX
 • Test points: TP7 (Lch)
 TP6 (Rch)
 • Adjustment locations: L507 (Lch)
 L508 (Rch)
Method:
 Record the test tape in METAL position and adjust so that the output at the test point is minimum.

11. METAL Medium EO Adjustment
Settings:
 • Test tape: TTA-119MX
 • DOLBY-NR: OFF
 • Input signals: 1kHz, 10kHz
 • Adjustment locations: SFR403 (Lch)
 SFR404 (Rch)
Method:
 Supply a 1kHz signal in SOURCE position and adjust the recording level so that the LINE output is 38mV.
 Then, change in TAPE position, recording and playback the 1kHz signals and adjust so that the output of 10kHz is 0dB to 0.5dB based on the 1kHz output.



- NOTES:**
- 1) B (+) power
 - 2) Signal path
 - 3) Rec path
 - 4) The voltage is tester (20 k-ohm But () is with An asterisk (*) with a vacuum-t
 - 5) Resistors with 1/4W and a toler
 - 6) Capacitors with strength of less than 1
 - 7) The only capacitor and \pm 10% (K).
 - 8) Ceramic capacitor
 - 9) For temper
 - 10) High dielec
 - 11) High dielec
 - 12) Semicondu
 - 13) For temper

SCHMATIC DIAGRAM-2



- NOTES:**
- 1) B (+) power supply 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 1/4W 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
 For temperature compensation (SH)

- 8) Explanation of symbols
- Mylar capacitor
 - Aluminum solid capacitor
 - Polypropylene film capacitor
 - Bi-polarized capacitor
 - Low-leakage capacitor
 - Tantalum capacitor
 - 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.

ACCESSORIES/PACKAGE LIST

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1	82-191-852-01		Printed indiv., Packing	*	1
2	82-188-852-01		Cushion L, Printed indiv.		1
3	82-188-853-01		Cushion R, Printed indiv.		1
4	82-191-853-01		Outer carton (H, HU, E, K, G models only)	*	1/3
5	82-191-854-01		Outer carton (U model only)	*	1/3
6	87-051-131-11		Poly-vinyl sack (H, HU, U models only)		1
7	87-051-135-11		Poly-vinyl sack (E, K, G models only)		1
8	87-056-627-01		Poly-vinyl sack		1
9	82-191-904-01		Instructions booklet	*	1
10	87-051-171-11		Poly-vinyl sack		1
11	87-056-008-11		Label, AC power cord (K model only)		1
12	87-056-009-51		Distributors list (H, E, K, G models only)		1
13	87-056-045-01		Guarantee card (HU, U models only)		1
14	87-056-057-01		Service station list (HU, U models only)		1
15	87-056-059-01		Guarantee card (G model only)		1
16	87-056-050-01		Safety instruction (U model only)		1
17	87-032-845-01		Siemens plug (H models only)		1
18	87-034-978-01		Connection cord CW-254 BSK		2

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