www.freeservicemanuals.info

STEREO CASSETTE DECK

MODEL NO. AD-3800H,E,K,G

AIWA®

[SERVICE MANUAL]

Code No. 04-380-000-53

DATE OF ISSUE 10/1981

SPECIFICATIONS

Semiconductors: 22 ICs, 125 transistors, 103 diodes, 50 LED's

Power supply: H model
AC 120V/220V/240V switchable 50/60 Hz
E model
AC220V, 50/60 Hz
K model
AC 240V, 50/60 Hz
G model
AC 240V, 50/60 Hz

Power consumption: 24W

Dimensions: 420(W) x 110(H) x 265(D) mm

Weight: 5.1kg

Track type: 4 tracks 2 channels

Tape speed: 4.8 cm/s ± 1.5%

Wow and flutter: Less than 0.025% (WRMS)

Automatic stop system: Full auto stop

Automatic shut-off action time: Less than 5s.

Pinch roller pressure: Take up 350 $^{+30}_{-20}$g (3.43 $^{+0.294}_{-0.196}$ N)
Supply 180 $^{+30}_{-20}$g (1.764 $^{+0.294}_{-0.196}$ N)

Take-up torque: 50 ± 10g-cm (0.49 ± 0.098m N.m)

FF & rewind torque: 150^{+50}_{-30} g-cm (1.47 $^{+0.49}_{-0.294}$m N.m)

FF & rewind time: 70 ± 10s. (C-60)

Playback output: (TTA-161) 706 ± 50 mV

Playback noise: 120μS/70μS
Less than 2.7/2.0mV(DOLBY NR OFF)
Less than 1.7/1.6 mV (DOLBY NR B type)
Les than 1.5/1.4mV (DOLBY NR C type)

Rec./Pb distortion: Less than 1% (METAL)
Less than (CrO_2)
Less than 1% (FeCr)
Less than 1.3% (LH)

Rec./Pb SN ratio: (Unweighted)
More than 45/49 dB (METAL, DOLBY NR B-type OFF/ON)
More than 45/49 dB (CrO_2, DOLBY NR B-type OFF/ON)
More than 45/49 dB (FeCr, DOLBY NR B-type OFF/ON)
(WTD-A)
More than 58/64 dB (METAL, DOLBY NR B-type/C-type)
More than 58/64 dB (CrO_2, DOLBY NR B-type/C-type)
More than 54/62 dB
More than 58/64 dB (FeCr, DOLBY NR B-type/C-type)
(LH, DOLBY NR B-type/C-type)

Channel separation: More than 30 dB
(1 kHz, 0 VU)

Cross talk: More than 60 dB
(1 kHz, 0 VU)

Erasing ratio: More than 60 dB
(125 Hz, 0 VU + 10 dB)

Bias frequency: 85 kHz

Frequency response:

METAL	20 ~ 20,000 Hz
CrO_2	20 ~ 19,000 Hz
FeCr	20 ~ 20,000 Hz
LH	20 ~ 17,000 Hz

Motor: DC EG motor

Head: DX head (for Rec/Pb)
Ferrite head (for Erase)

Inputs:

MIC	max. sensitivity 0.3 mV (200Ω~10kΩ suitable)
LINE IN	max. sensitivity 50 mV (Optimum load impedance more than 50 kΩ)
LINE OUT	Standard level 0.55 (0 VU) (Optimum load impedance more than 50 kΩ)
PHONES	8Ω

- 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.

www.freeservicemanuals.info

DISASSEMBLY INSTRUCTIONS

1. Removing the Cabinet, Steel

1) Remove 6 screws. (See figure 1)

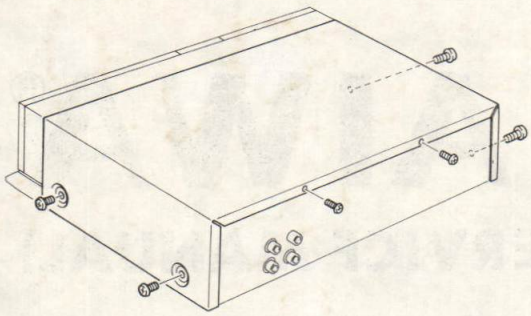


Fig. 1

3) Remove 8 screws. (See figure 4)

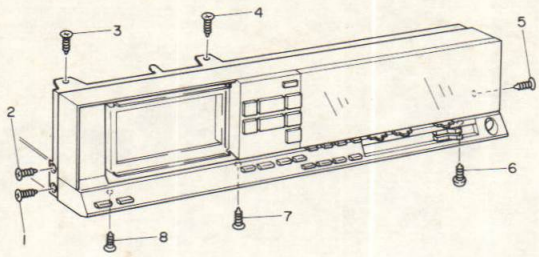


Fig. 4

2. Removing the Front, Panel

1) After depress eject button to open cassette box, pull cassette lid to remove in the direction of arrow. (See figure 2)

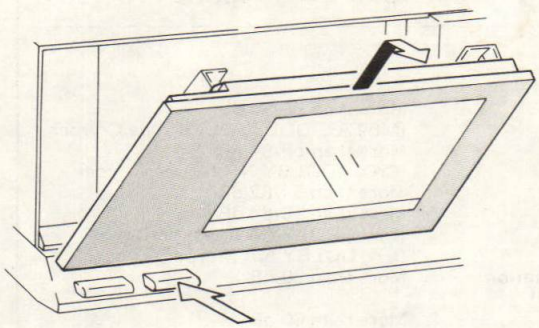


Fig. 2

2) Remove 2 screws to take off cassette plate. (See figure 3)

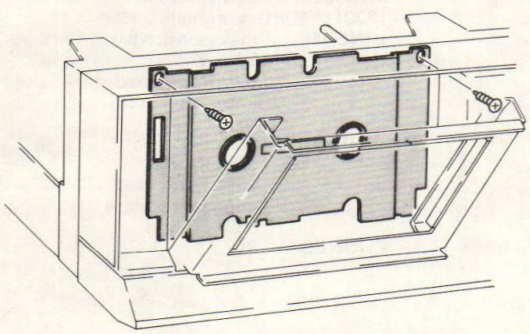


Fig. 3

3. Removing the Mechanism

1) Remove 2 screws. (See figure 5)

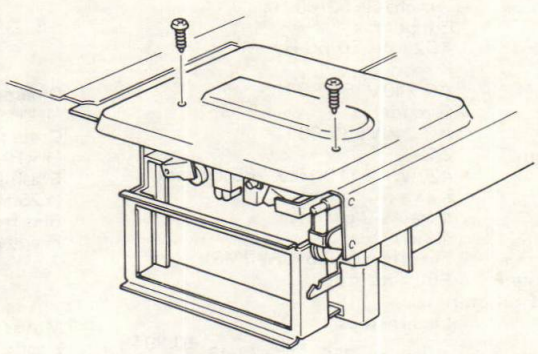


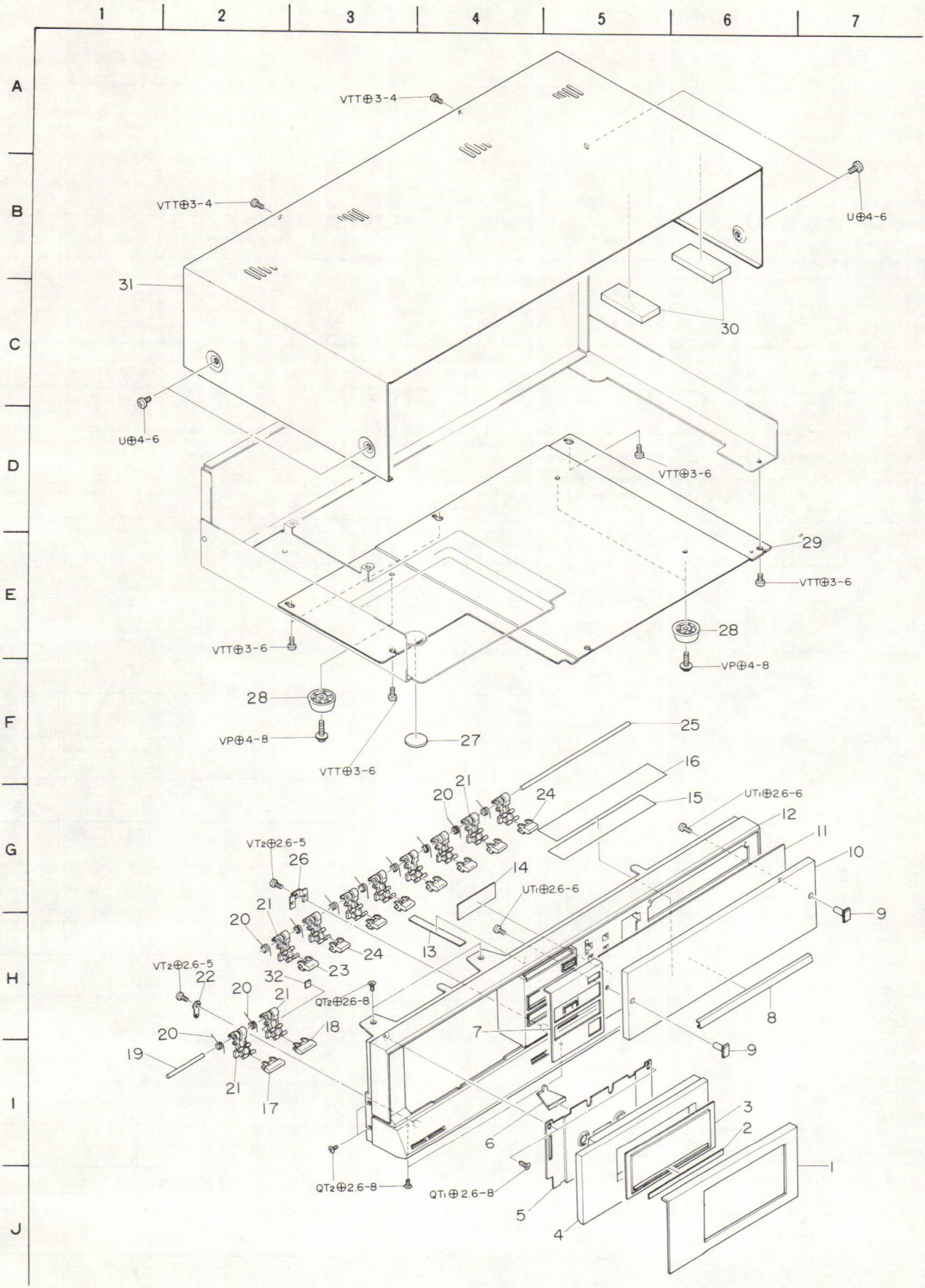
Fig. 5

www.freeservicemanuals.info

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ **MEMO** ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆

www.freeservicemanuals.info

EXPLODED VIEW–1



www.freeservicemanuals.info

PARTS LIST

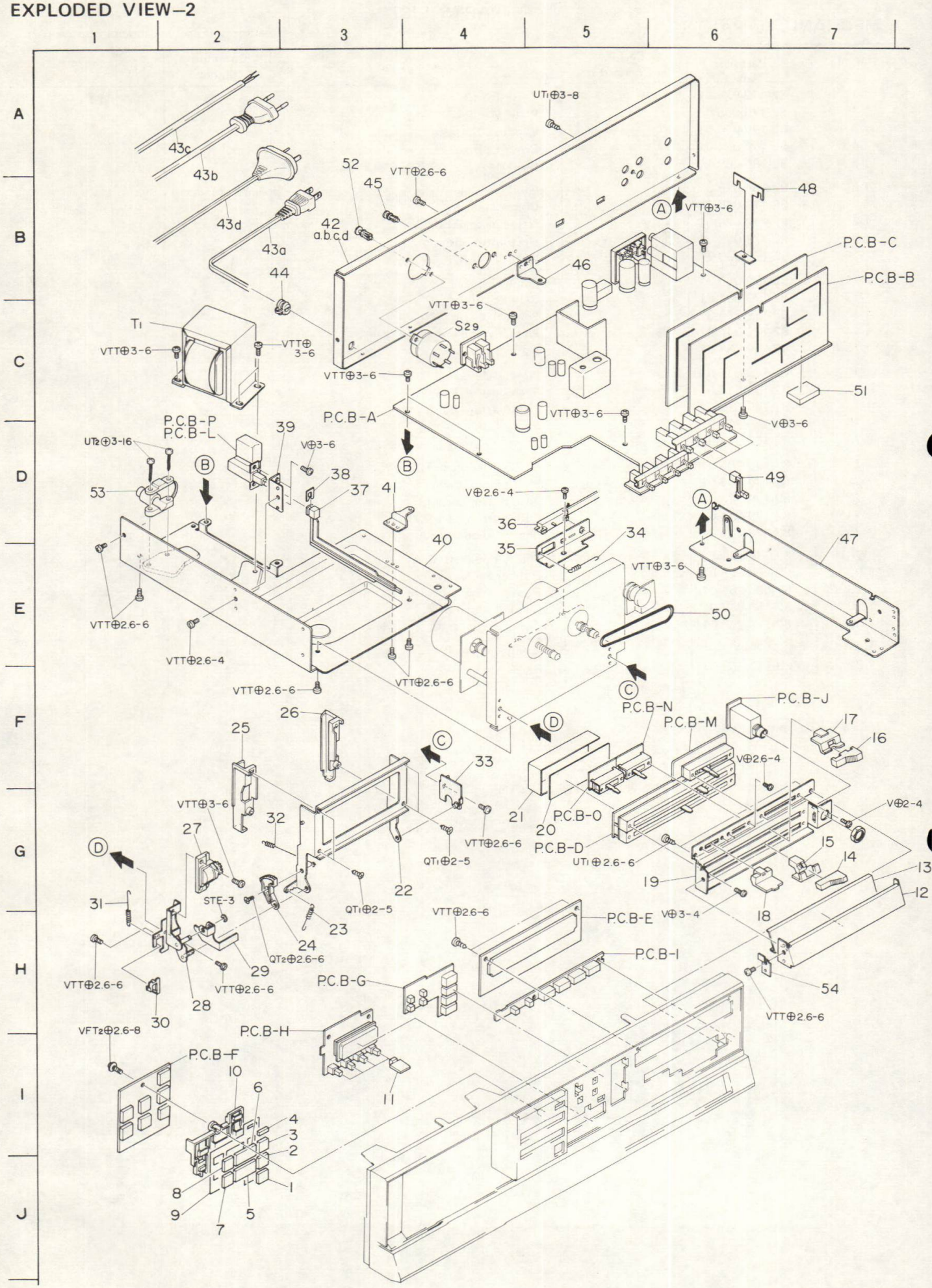
MECHANICAL PARTS

■ * mark in this part list shows exclusive part.

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1-1	82-179-036-01		Cassette lid	*	1
1-2	82-179-005-01		Plate, Window	*	1
1-3	82-179-006-01		Window, Cassette	*	1
1-4	82-179-034-01		Cover C, Box	*	1
1-5	82-180-009-01		Cassette plate		1
1-6	82-154-015-01		Guide, Light	AD-M700	1
1-7	82-179-046-01		Control panel	*	1
1-8	82-179-028-01		Name plate, REC	*	1
1-9	82-179-029-01		Decorative bushing	*	2
1-10	82-179-030-01		Window, Meter	*	1
1-11	82-179-026-01		Plate, Display	*	1
1-12	82-179-001-01		Cabinet, Front	*	1
1-13	82-179-246-01		Sheet B, Earth	*	1
1-14	82-179-044-01		Plate, Counter	*	1
1-15	82-179-258-01		Plate, Spacer	*	1
1-16	82-179-045-01		Plate, Cabinet	*	1
1-17	82-179-011-01		Push-button, POWER	*	1
1-18	82-179-012-01		Push-button, EJECT	*	1
1-19	82-179-212-01		Shaft, Guide lever B	*	1
1-20	82-179-234-01		T-spring, Guide lever	*	10
1-21	82-179-205-01		Guide lever, Push-button	*	10
1-22	82-179-236-01		Shaft, Metal fitting B	*	1
1-23	82-179-013-01		Push-button, ADMS	*	1
1-24	82-179-014-01		Push-button, SELECT	*	7
1-25	82-179-211-01		Shaft, Guide lever A		1
1-26	82-179-241-01		Shaft, Metal fitting A	*	1
1-27	82-168-025-01		Rubber foot	AD-3600	1
1-28	87-085-161-01		Foot		3
1-29	82-168-018-01		Cabinet, Bottom	AD-3600	1
1-30	82-179-243-01		Cushion, 20-50	*	2
1-31	82-179-002-01		Cabinet, Steel	*	1
1-32	82-179-259-01		P.V.C. sheet 4-12	*	1

www.freeservicemanuals.info

EXPLODED VIEW–2

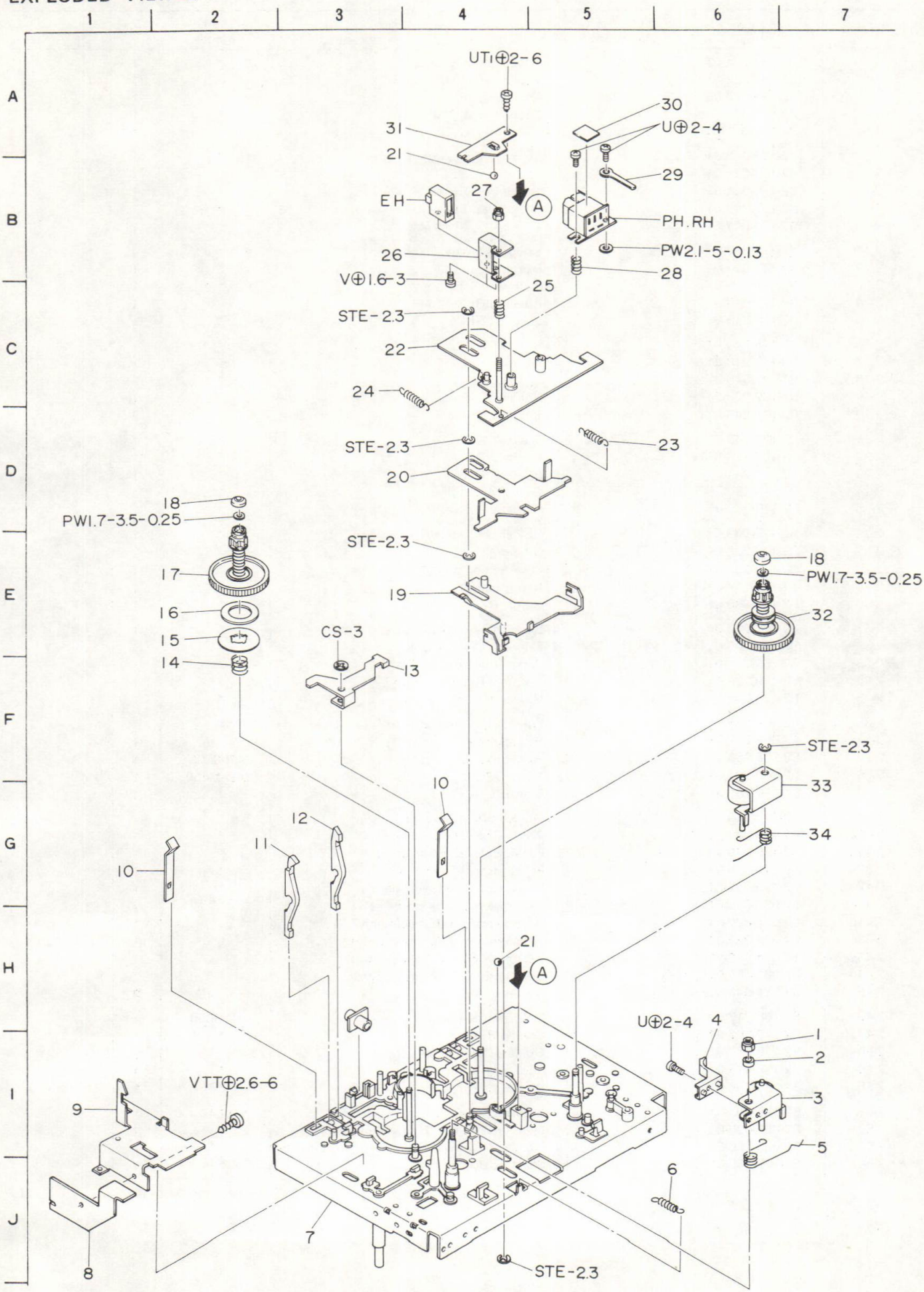


www.freeservicemanuals.info

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
2-1	82-179-024-01		Touch-key, MUTE	*	1	
2-2	82-179-023-01		Touch-key, PAUSE	*	1	
2-3	82-179-020-01		Touch-key, FF	*	1	
2-4	82-179-025-01		Touch-key, COMPU	*	1	
2-5	82-179-019-01		Touch-key, STOP	*	1	
2-6	82-179-018-01		Touch-key, PLAY	*	1	
2-7	82-179-022-01		Touch-key, REC	*	1	
2-8	82-179-021-01		Touch-key, REW	*	1	
2-9	82-179-242-01		Back sheet, LED	*	1	
2-10	82-179-007-01		Touch-key, Light guide	*	1	
2-11	82-179-010-01		Knob, Counter	*	4	
2-12	82-179-027-01		REC knob plate	*	1	
2-13	82-179-240-01		Plate, Auxiliary	*	1	
2-14	82-179-017-01		Knob R, REC	*	1	
2-15	82-179-219-01		Lever R, REC	*	1	
2-16	82-179-016-01		Knob L, REC	*	1	
2-17	82-179-218-01		Lever L, REC	*	1	
2-18	82-179-015-01		Slide knob	*	3	
2-19	82-179-203-01		Holder, Volume	*	1	
2-20	82-179-248-01		Cushion, Volume	*	2	
2-21	82-179-245-01		Sheet A, Earth	*	1	
2-22	82-179-224-01		Cassette box ass'y	*	1	
2-23	82-179-244-01		E-spring, Lid	*	1	
2-24	82-179-220-01		Gear, Oil dump	*	1	
2-25	82-179-032-01		Holder L, Cassette	*	1	
2-26	82-179-033-01		Holder R, Cassette	*	1	
2-27	82-179-228-01		Oil-dump	*	1	
2-28	82-179-207-01		Cassette box holder L ass'y	*	1	
2-29	82-179-204-01		Lever, EJECT	*	1	
2-30	82-179-233-01		Guide, Rod	*	1	
2-31	82-179-227-01		E-spring, Slide plate	*	1	
2-32	82-179-249-01		E-spring, Cassette box	*	1	
2-33	82-161-312-01		Cassette box holder R ass'y		1	
2-34	82-179-239-01		E-spring, Remote switch	*	1	
2-35	82-179-238-01		Holder, Remote switch	*	1	
2-36	82-179-635-01		Wire 280, Remote switch	*	1	
2-37	82-304-211-01		Rod, Selector		1	
2-38	82-385-383-01		Rod, Stopper	AD-6300	1	
2-39	82-160-207-01		Holder, POWER	AD-M450	1	
2-40	82-179-201-01		Chassis L, Amp.	*	1	
2-41	82-179-210-01		Holder circuit board B	*	1	
2-42a	82-179-037-01		Panel, Rear (H model only)	*	1	
2-42b	82-179-039-01		Panel, Rear (E model only)	*	1	
2-42c	82-179-040-01		Panel, Rear (K model only)	*	1	
2-42d	82-179-042-01		Panel, Rear (G model only)	*	1	
2-43a	87-034-826-01		AC power cord (H model only)		1	
2-43b	87-034-877-01		AC power cord (E model only)		1	
2-43c	87-034-872-01		AC power cord (K model only)		1	
2-43d	87-034-892-01		AC power cord (G model only)		1	
2-44	87-085-165-01		Cord bushing (H model only)		1	
2-45	87-084-078-01		Nylon rivet 3-4.5		2	
2-46	82-168-213-01		Holder circuit board	AD-3600	1	
2-47	82-179-202-01		Chassis R, Amp.	*	1	
2-48	82-179-237-01		Holder, Dolby circuit board	*	1	
2-49	82-179-213-01		Push-switch rod	*	4	
2-50	82-179-256-01		Belt A, Counter	*	1	
2-51	82-165-203-01		G cushion, P.C.B.	SD-L10	1	
2-52	87-085-090-01		Nylon rivet 3-6.5 (H model only)		2	
2-53	87-085-166-01		Holder, AC power cord (E,K,G model only)		1	
2-54	82-179-265-01		Shaft A, Holder	*	1	

www.freeservicemanuals.info

EXPLODED VIEW–3



www.freeservicemanuals.info

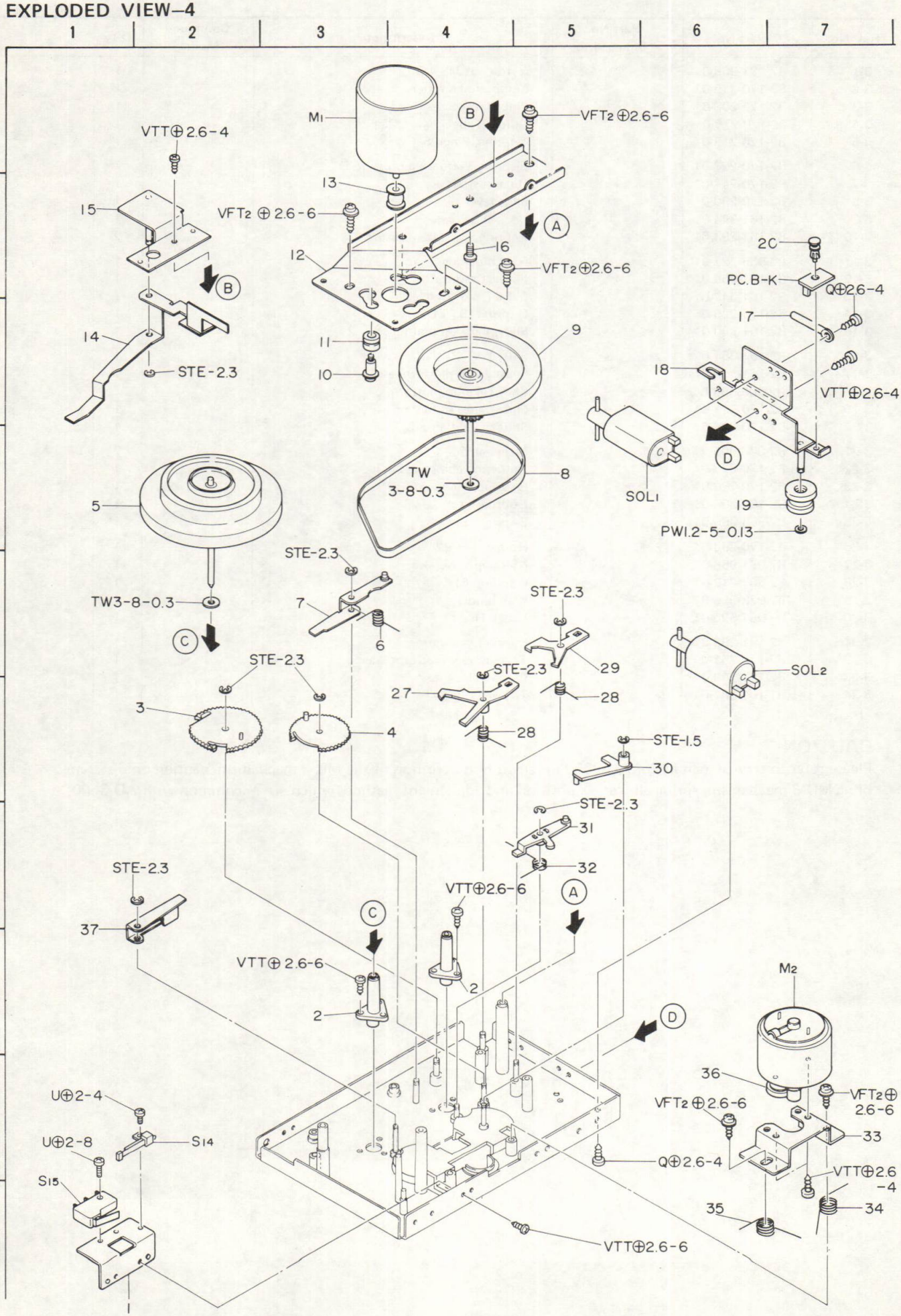
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
3-1	87-081-969-01		Nylon nut M3-4.5		1	
3-2	82-170-215-01		Collar, Pinch roller		1	
3-3	82-170-208-01		Pinch lever S ass'y		1	
3-4	82-170-216-01		Guide, Tape		1	
3-5	82-170-218-01		T-spring, Pinch S		1	
3-6	82-170-227-01		E-spring, Actuating pressure D		1	
3-7	82-170-243-01		Outsert shaft ass'y D		1	
3-8	82-179-230-01		Slide lever	*	1	
3-9	82-161-324-01		Lock slide plate		1	
3-10	82-161-293-01		P-spring, Cassette pressure		2	
3-11	82-565-327-01		REC blocking lever		1	
3-12	82-161-358-01		Lever, Cassette		1	
3-13	82-161-347-01		EJECT blocking lever		1	
3-14	82-170-225-01		C-spring (BT SD)		1	
3-15	82-161-290-01		Slide plate, Actuating ass'y 2		1	
3-16	82-161-351-01		Felt, 1-16-10		1	
3-17	82-161-259-01		Supply reel platform ass'y		1	
3-18	82-303-398-01		Cap, Take-up platform		2	
3-19	82-170-231-01		Slide plate, Actuating ass'y 2		1	
3-20	82-170-288-01		Slide plate, Pause 2		1	
3-21	82-073-005-01		Steel ball 2ϕ		2	
3-22	82-170-273-01		Actuating chassis ass'y 2		1	
3-23	82-170-226-01		E-spring, Pinch return		1	
3-24	82-161-308-01		E-spring, Actuating		1	
3-25	82-565-360-01		C-spring, EH		1	
3-26	82-170-283-01		Holder, EH B2		1	
3-27	87-081-963-01		Nylon nut, M2-3.5		1	
3-28	82-307-212-01		C-spring, EH		1	
3-29	87-038-056-01		Wire binder		1	
3-30	87-057-620-01		Label, Head		1	
3-31	82-161-292-01		P-spring, Actuating		1	
3-32	82-170-251-01		Take-up reel platform 2 ass'y		1	
3-33	82-161-249-01		Pinch roller F ass'y		1	
3-34	81-161-301-01		T-spring, Pinch F		1	

CAUTION

Please refer to service manual for AD-3600 in regard to description of the MD-3 mechanism, caution on disassembling MD-3 mechanism, spring allocation position and adjustment method, which are in common with AD-3600.

www.freeservicemanuals.info

EXPLODED VIEW–4



www.freeservicemanuals.info

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
4-1	82-161-234-01		Holder, REC switch		1
4-2	82-161-253-01		Shaft bearing ass'y		2
4-3	82-161-276-01		Gear, PLAY		1
4-4	82-161-277-01		Gear, PAUSE		1
4-5	82-170-228-01		Flywheel S2 ass'y		1
4-6	82-161-300-01		T-spring, Play lever		1
4-7	82-161-218-01		Play lever ass'y		1
4-8	82-170-292-01		Rubber belt, Main 2		1
4-9	81-170-219-01		Flywheel T ass'y		1
4-10	87-081-483-01		Motor screw, M2.6		3
4-11	87-087-029-01		Cushion, Rubber		3
4-12	82-161-227-01		Flywheel plate		1
4-13	82-170-276-01		Pulley, Motor		1
4-14	82-170-236-01		Lever indication ass'y		1
4-15	82-170-233-01		Holder, Indication ass'y		1
4-16	82-331-107-01		Thrust screw		2
4-17	87-038-039-01		Wire binder		1
4-18	82-179-214-01		Holder, Pulley ass'y		1
4-19	87-040-150-01		Counter pulley ass'y		1
4-20	87-084-085-01		Nylon rivet 3.5-4.5		1
4-21	82-161-269-01		Trigger lever, PLAY		1
4-22	82-170-272-01		T-spring, Trigger		2
4-23	82-161-270-01		Trigger lever, PAUSE		1
4-24	82-161-272-01		Eject lever, Brake		1
4-25	82-161-266-01		FRP lever ass'y		1
4-26	82-161-298-01		T-spring, Pause lever		1
4-27	82-170-242-01		Holder, Motor		1
4-28	82-161-295-01		T-spring, Brake L		1
4-29	82-161-296-01		T-spring, Brake R		1
4-30	82-170-248-01		Idler ass'y		1
4-31	82-179-261-01		Lever, FRP-2	*	1

www.freeservicemanuals.info

Circuit description

* Explanation of operation

1. Outline

The AD-FF8 system controller is composed of a closed loop dual capstan mechanism drive circuit, Compu-Brain (automatic recording frequency response control mechanism) and a FL (Fluoresent Lamp) electronic counter drive circuit using a 4-bit μ-computer.

2. Block diagram of controller and peripheral circuits

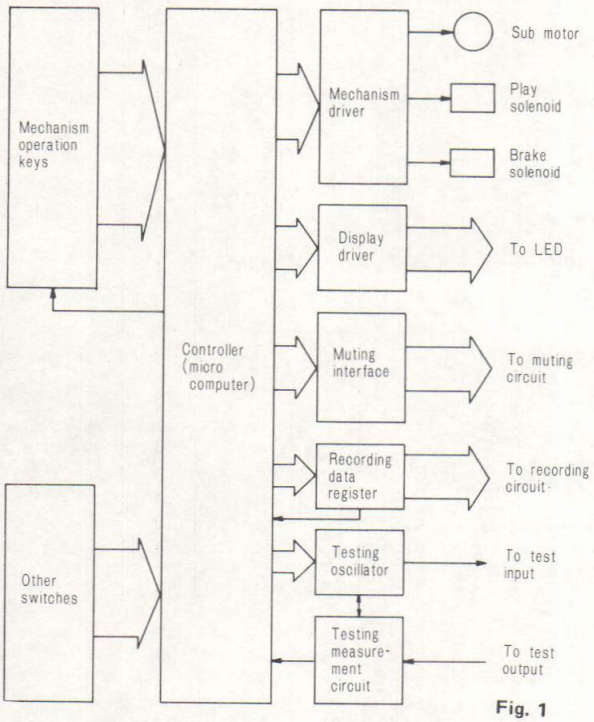


Fig. 1

3. Controller specifications

3-1. General specifications

3-1-1. It is the same as a concretional controller for STOP, PLAY, RWD, FF, REC, REC/PLAY, PLAY-PAUSE and REC/PLAY-PAUSE.

3-1-2. **CUE-REV:** Possible by double-pressing the PLAY and FF (or RWD) keys.

3-1-3. **ONE-REC:** Enters REC/PLAY-PAUSE mode only when REC key is pressed in the PAUSE mode.

3-1-4. **TIMER-REC/PLAY:** Same as in general specifications.

3-1-5. **TIMER-PLAY:** Same as in general specifications.

3-1-6. **AUTO-REPEAT:** Same as in general specifications.

3-1-7. **MEMORY-STOP:** Same as in general specifications.

3-1-8. **MEMORY-PLAY:** Same as in general specifications.

3-2. Additional functions

3-2-1. **REC-MUT-TIMER (1):** Automatically enters the REC/PLAY-PAUSE mode 4 seconds after the REC-MUT key is pressed for MS (music sensor) and released.

3-2-2. **REC-MUT-TIMER (2):** When this key is pressed continuously to leave a non-recorded section of 4 sec or more, the LED winds every 2 seconds after 4 sec.

3-2-3. **Tape slack prevention:** When the cassette is loaded, RED (120ms) — FF (120ms) operation is done to prevent the tape from becoming slack.

3-2-4. **ADMS:** This is the device to demagnetize the head.

3-3. Controller timing

Control timing of the mechanism and muting timing are taken into consideration, so a peripheral time constant circuit is not required.
(See the timing chart)

4. Compu-Brain specifications

4-1. Adjustment items

4-1-1. **Bias adjustment:** Adjusts bias so that the REC/PLAY sensitivity at the reference frequency (400 Hz) and the bias control Frequency (10 kHz) are the same.

4-1-2. **Sensitivity adjustment:** Adjusts so that the REC/PLAY sensitivity at the reference frequency is the reference value.

4-1-3. **Equalization adjustment:** Adjusts so that the REC/PLAY sensitivity at the equalization control frequency is the reference value.

4-2. Number of control steps

32 steps for all items

4-3. Adjustment

Sequential comparison feedback adjustment with bias current value, variable sensitivity value and variable equalization value as parameters.
Adjustment uses 5 bits ($32 = 2^5$), so adjustment is complete by comparison feedback 5 times. Adjustment is possible in 5/32 of the sequential comparison time.

4-4. Error treatment

4-4-1. When a data error (non-adjustable) occurs during adjustment, FF operation is done for 1 sec and then adjustment is repeated. When the same error occurs in the 2nd adjustment, items up to the error are displayed by LEDs, the tape is rewound and the adjustment is suspended.

4-4-2. When the tape position is changed during adjustment, adjustment is discontinued and the unit enters the STOP mode. The data is set to the reference data.

4-5. Time required

4-5-1. **When an error does not occur:** Approx. 16 sec

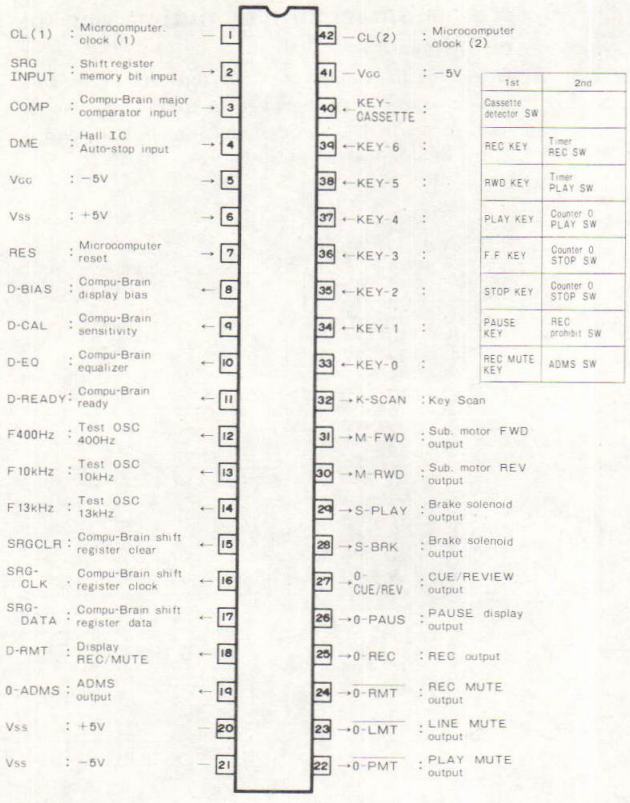
4-5-2. **When an error occurs:** Differs depending on the type of error.

4-6. Mechanism control key interruption

Mechanism control key operations are accepted during adjustment.

www.freeservicemanuals.info

5. Terminal connection diagram



* Direction of the arrow shows the direction of signal flow.

Fig. 2

6. Description of terminals (μPD546-253)

Terminal No.	Terminal symbol	Item
1 , 42	CL(1), CL(2)	μPD546 Clock oscillation terminal (400 Hz)
2	SRG INPUT	Shift register memory bit input terminal. LSB terminal of constant register (shift register) required during recording and the memory bit input. With this bit set to "1" and the Compu-Brain data set to "0", the microcomputer judges data to be reference data.
3	COMP	Detects the magnetized part of the tape during Compu-Brain adjustment (judges as magnetized when "1"). Becomes the input of the comparison result during adjustment (bias, sensitivity, equalization).
4	DME	Signal input terminal of Hall IC used for measuring the tape q'ty used during Compu-Brain operation.
5	V_{GG}	−5 V terminal (idle terminal)
6	V_{SS}	+5 V terminal (idle terminal)
7	RES	RESET input terminal of microcomputer at power ON/OFF operation
8	D-BIAS	Indicates bias adjustment process during Compu-Brain operation
9	D-CAL (D-SENS)	Indicates sensitivity adjustment process during Compu-Brain operation
10	D-EQ	Indicates equalization adjustment process during Compu-Brain operation
11	D-READY	Indicates completion of adjustment data setting during Compu-Brain operation
12	F400	Controls test tone frequency (400 Hz) used during Compu-Brain operation
13	F10K	Controls test tone frequency (10 kHz) used during Compu-Brain operation
14	F13K	Controls test tone frequency (13 kHz) used during Compu-Brain operation
15	SRG CLR	This bit is turned ON/OFF before outputting the reset pulse of the shift register when checking the memory bit and when checking the selection of the tape position while power is supplied.
16	SRG CLK	Sync. pulse output terminal used when transferring data inside the microcomputer to the data register (shift register).
17	SRG DATA	Terminal to output data for the shift register of the microcomputer.
18	D-RMT	REC MUTE operation indicator output.
19	0-ADMS	This bit is set to "1" during ADMS ON.
20 , 21	V_{SS}	+5 V terminal (power terminal)
22	0-PMT	PLAY MUTE output. Set to ON when "0".
23	0-LMT	LINE MUTE output. Set to ON when "0".
24	0-RMT	REC MUTE output. Set to ON when "0".
25	0-REC	Output set to "1" during REC operation.
26	0-PAUS	PAUSE operation indicator output.
27	0-CUE/REV	Output set to "1" during CUE/REV operation. Controls torque MUTING, etc. of sub. motor.

www.freeservicemanuals.info

Terminal No.	Terminal symbol	Item
28	S-BRK	Brake solenoid output
29	S-PLAY	Play solenoid output
30	M-RWD	Output controlling revolution direction (reverse revolution) of sub. motor
31	M-FWD	Output controlling revolution direction (normal revolution) of sub. motor
32	K-SCAN	15 key operations are input using the matrix system. This is the scan output at that time.
33 , 34 , 35 36 , 37 , 38 39 , 40	KEY-0,1,2,3,4 5,6 KEY-CASSETTE	Data input terminals for matrix key input. 1st key (mechanism control key) input is received at Low level with Key scan output at High level. With Key scan output at Low level, 2nd key (MODE key) is received at High level.
41	V_{GG}	-5 V terminal (power terminal)

Table- 1

7. KEY-SCAN circuit (15 key)

The deformed matrix input is employed as shown in figure 3, so the input levels of 1st and 2nd key inputs should satisfy the following,

V_{IH} (Input high level) > 3 V,
V_{IL} (Input low level) < 0.7 V.

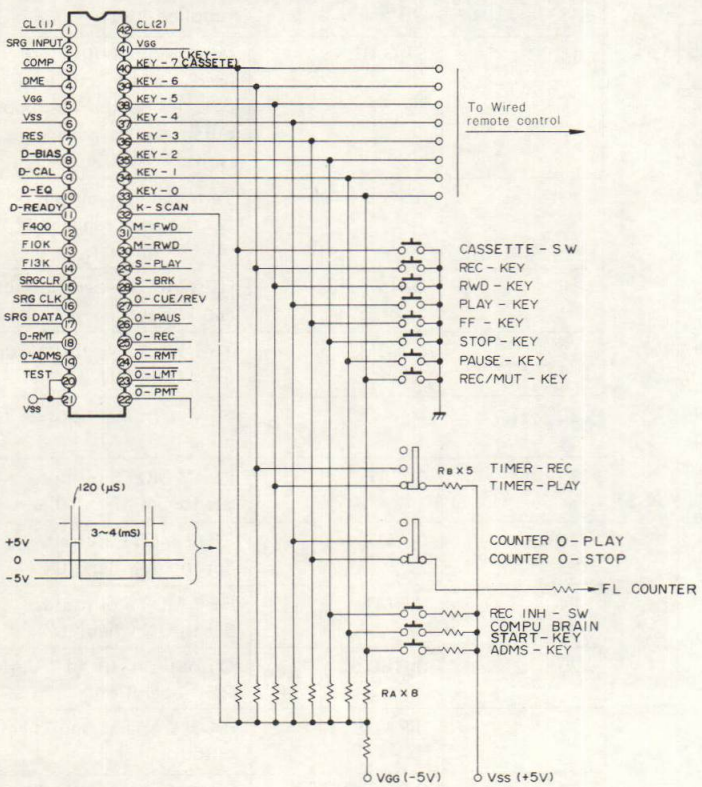


Fig. 3

8. Mechanism controller output and peripheral circuits

Refer to the timing chart in the attached diagram for the timing relationship between output terminals. The inverter used in figure 4 is an open collector output, and is composed of the open inverter or transistors.

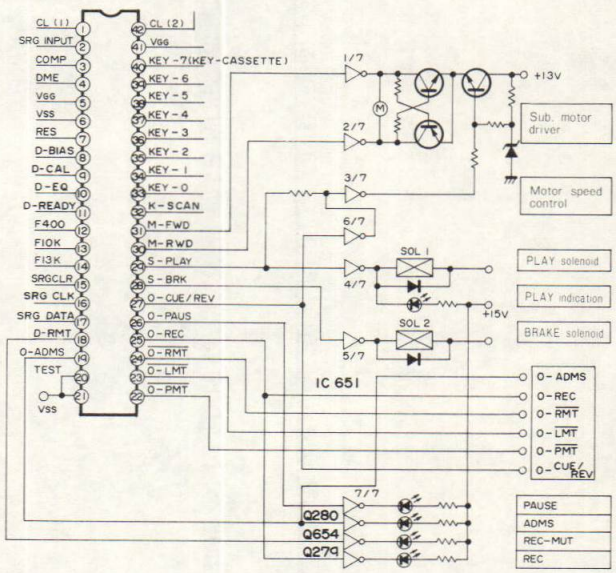
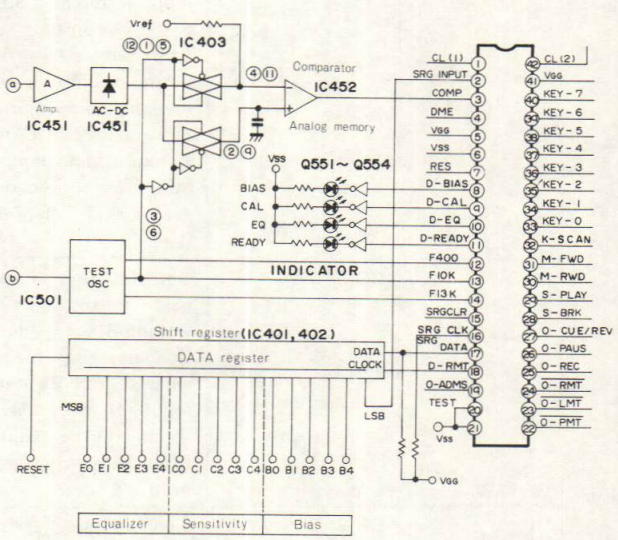


Fig. 4

9. Compu-Brain peripheral circuits

9-1. Connection diagram



ⓐ: Test signal (REC/PLAY output) input terminal
ⓑ: Test signal (REC input) output terminal

Fig. 5

www.freeservicemanuals.info

9-1-1. Shift register: This is the REC circuit drive data register; data is transferred in the direction of the arrow.
MSB (5th bit of equalization) is the 1st data item and LSB (MEMO) is the last data item.
Bits of each item have following weight.
(B,C,E)0 : 2^0
(B,C,E)1 : 2^1
(B,C,E)2 : 2^2
(B,C,E)3 : 2^3
(B,C,E)4 : 2^4

9-1-2. TEST oscillator: Testing oscillator and frequency is set by 3 outputs shown below.
F400: Reference frequency (400 Hz ~ 1 kHz)
F10K: Bias control frequency (5 k ~ 8 kHz)
F13K: Equalizer control frequency (10 k ~ 18 kHz)
F10K output is used for the control line which switches over the comparator input to the difference between F10K (output voltage) and F400 (output voltage) and transfers it to microcomputer.

9-1-3. Amp. AC-DC: Amplifies the output signal during testing and converts it to direct current.

9-1-4. Vref: Reference voltage during sensitivity adjustment and equalization adjustment.

9-1-5. Analog memory: Memorizes output voltage of F400 during bias adjustment.

9-1-6. Comparator: Comparator used for sequential comparison feedback.

9-1-7. Item indication: Indicates items following the adjustment procedure.

9-2. Detection of magnetized section

Whether or not it is a magnetized section of tape before starting adjustment. The method is:

9-2-1. Test oscillator: F400 is set to "1".

9-2-2. Contents of shift register
Bias = 10000 (binary) center value
Sensitivity = 00000 (binary) Max. value
Equalization = 10000 (binary) center value

9-2-3. Comparator: Whether or not the recorded and played back voltage (output voltage) is larger or smaller than the reference voltage is compared and discriminated.
When the COMP signal (comparator output) is set to "0" in the above condition, it is judged to be a magnetized section and when it is set to "1", it is judged to be another condition (leader tape, tape broken, etc.).

9-3. Basic principle of sequential comparison feedback adjustment

The sequential comparison feedback adjustment is frequently used for high speed in A/D (analog-digital) conversion. In this case, the voltage and current are the analog data converted to digital data via the D/A (digital/analog) converter.

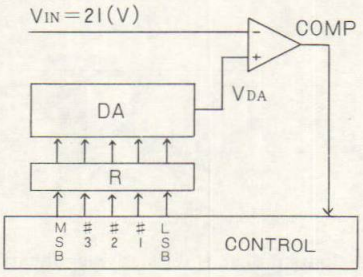


Fig. 6

V_{IN}: Input voltage to be converted
V_{DA}: Voltage with contents of R as analog value
COMP: Comparator
DA: Analog value of contents of R
R: Comparison register
CONTROL: Overall controls
* V_{IN} = 20 (V)

- Range of V_{IN} is set 0 V ~ 31 V for convenience
- Number of conversion bits is set to 5 ($0 \sim 2^5$, 0 ~ 31).
- DA is to convert the 5 bit digital value of R to 00000 = 0 V, 11111 = 31 V.

Resulting from the above, each bit has the following weight:
MSB = 16 V Most significant bit
#3 = 8 V
#2 = 4 V
#1 = 2 V
LST = 1 V Least significant bit

- When COMP = "0", it is left as it is, and when it "1", it is reset.

Conversion procedure

≠	R	DA(V)	$V_{DA} - V_{IN}$	COMP	R'	
MSB	① 0 0 0 0	16	16−21 < 0	"0"	1 0 0 0 0	Left as it is Reset
3	1 ① 0 0 0	24	24−21 > 0	"1"	1 0 0 0 0	
2	1 0 ① 0 0	20	20−21 < 0	"0"	1 0 1 0 0	Left as it is Reset
1	1 0 1 ① 0	22	22−21 > 0	"1"	1 0 1 0 0	
LSB	1 0 1 0 ①	21	21−21 = 0	Not fixed	1 0 1 0 ×	Not fixed

Table-2

As a result, it is converted to the digital value as
R = 10101 = 21 or R = 10100 = 20
with the error LSB ± 1 (bit).
The above is the principle of A/D conversion. The block diagrams of sensitivity, equalization adjustment and bias adjustment in this controller are shown in figures 7 and 8.

9-4. Sensitivity and equalization adjustment block diagram

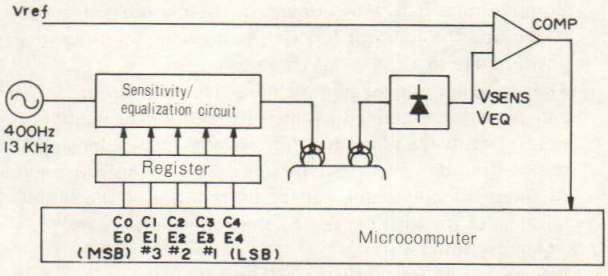


Fig. 7

9-5. Bias adjustment block diagram

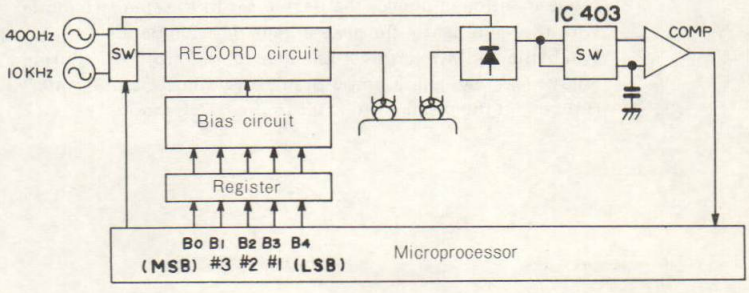


Fig. 8

www.freeservicemanuals.info

9-6. Logic of each adjustment

In the adjustment (conversion) method shown above, treatment against COMP bit is considered in the following 2 ways.

9-6-1. • Resets the corresponding bit with COMP = "0".
• Resets the corresponding bit with COMP = "1".
Significance (relation between data and bias amount, sensitivity amount, equalization amount, etc.) of adjustment circuit classified by item varies.

9-6-2. Bias adjustment

a) COMP = "1" (+) should be obtained when F400 (reference frequency) output < F10K (bias adjustment output)
b) COMP should work towards "1" as bias data gets larger.

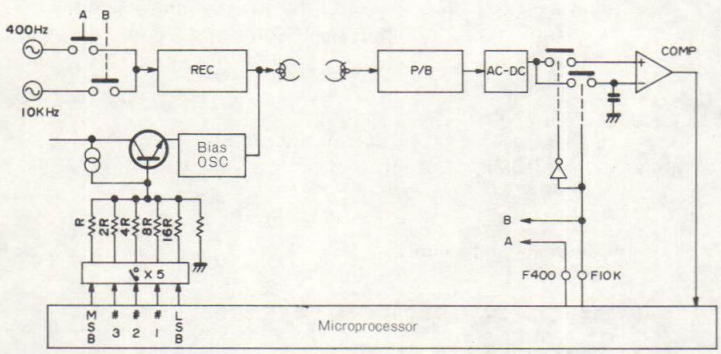


Fig. 9

a) and b) described previously are established in figure 9, so check it as reference.

9-6-3. Sensitivity, equalization adjustment

a) COMP should be set to "0" with:
Vref (reference output level) < F400 (reference frequency) output,
Vref (reference output level) < F13K (equalization adjustment frequency) output.
b) COMP should work toward "0" as sensitivity and equalization become larger.

(The above is the logic determined by software inside the microprocessor)

9-7. MEMO terminal of shift register

This controller is provided with the monitor function of the Compu-Brain data when there is an intermittent supply of power and the monitor function to prevent recording at wrong position due to a change of tape position.
That is, when non-volatile memory data backed up by C-MOS and capacitor is applied to the shift register, the memory function is possible, and the function automatically changing to the standard mode when the tape position is changed is provided. All these functions are realized by monitoring the MEMO bit terminal of the shift register by the controller.

9-7-1. Memory function:

When the MEMO terminal is set to "1" ("1" when Compu-Brain data is set to "1") when of power is supplied, it is assumed to be the READY indication. When data is protected as it is and when it is set to TIMER recording, it is set to TIMER recording by means of Compu-Brain data naturally.

9-7-2. Tape monitoring position:

When the MEMO terminal changes from "1" to "0" in the mode mentioned above, the deck is set to the standard mode with the value set by the general tape position data.
When the MEMO terminal changes to "0" from "1" during adjustment by the Compu-Brain, the adjustment is interrupted and the mechanism is set to the STOP mode.

Circuit explanation

10. System controller

10-1. MPU (Microprocessor Unit)

This is a 4-bit CPU which is the heart of the control unit. It works in the following sequence when power is applied.

Step 1:

Simultaneously with the power supply, the internal clock oscillator with a frequency of 400 Hz determined by the ceramic filter connected between CL1 (pin 1) and CL2 (pin 42) starts, and MPU starts operation. [the 400 Hz clock can be observed at pins (1) and (42) using an oscilloscope]

Step 2:

When the RESET terminal (pin 7) is in the RESET mode at "H" level (3 V or more), the output terminals (pins 8 ~ 32) are set to "L" level (0.7 V or less) and the MPU is kept at stop at the first step of the internal program.

Step 3:

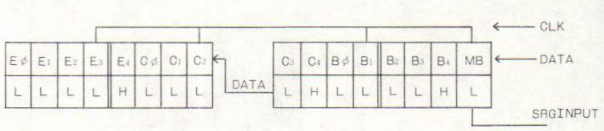
When the RESET terminal (pin 7) is set to "L" level (0.7 V or less) several hundred seconds after power is supplied, and RESET is released, CPM starts operation following the internal program.

Step 4:

At first after RESET is released, MPU outputs "H" level to SRG CLR (shift register, CLEAR) terminal (pin 5) to check whether the contents of the shift register (IC401, IC402), which is the Compu-Brain memory, is standard data or Compu-Brain data. ("H" level is output to K-SCAN terminal (pin 32) at that time; it is output to the program only, so the key input described later is not done)
This SRG CLR output signal is inhibited by D419 when the terminal voltage of the backup capacitor C401 when the shift register power voltage is OFF is more than 3 V, but when the terminal voltage of capacitor C401 is 3 V or less, the SRG CLR output signal sets the LSB (IC401-1/2) output of the shift register to CLEAR (sets to "L" level) via D418, R417 (It is inhibited via D417 when the output of IC401 pin (5) memory bit is set to "L" level).

Step 5:

After that, the CPU inputs the LSB memory bit (IC401 pin 5) of the shift register from SRG INPUT (pin 2). When it is set to "H" level, CPU judges that the contents of the shift register are Compu-Brain data and sets the READY terminal (pin 11) of the Compu-Brain indicator to "H" level and lights the READY indicator.
When it is set to "L" level, the CPU judges that the contents of the shift register are the standard data or the terminal voltage of the back-up capacitor is 3 V or less and the contents of the shift register are not kept as it was when the power was OFF, and outputs from SRGDATA (pin 17), SRGCLK (pin 16) and set the contents of the shift register to the standard data.



* Content of shift register when the data is standard

Fig. 10

www.freeservicemanuals.info

Step 6:

When the above operation is complete, MPU outputs "H" level for 3 sec to 0-ADMS (pin 19) to perform ADMS. (ADMS LED indicator lights with Q280 set to ON)

When a cassette has been inserted at that time, and when the CST switch is set to ON, the fast that K-CST (pin 40) is set to "L" level is read, and slack in the cassette is removed. (Refer to the attached timing chart, STOP → CASSETTE-PULL)

Step 7:

When ADMS is completed, MPU outputs a rectangular wave (period; 3 ~ 4 msec) to K-SCAN terminal to start key input. (See Figure-3). When key input is not present, a rectangular wave the same as that appearing at K-SCAN terminal is output to key terminals (pin 33 ~ pin 40) via the resistor block R612. MPU inputs the "L" level (0.7 V or less) of the key input terminal when K-SCAN terminal is set to "H" level. That is, with the switch set to ON, the 1st key connected to GND terminal is read. When this input condition does not change for all 32 periods of the rectangular wave, the MPU judges that the key input has been performed and operates corresponding to the key input.

The MPU inputs the "H" level of the key input when the K-SCAN terminal is set to "L" level. That is, MPU reads the 2nd key connected to +5 V via the resistor, with the switch set to ON.

• 2nd KEY

TIMER REC:	Set to REC/PLAY when it is ON after POWER ON ADMS is complete.
TIMER PLAY:	Set to PLAY when it is ON after POWER ON ADMS is complete. Set to REWIND when it is ON after AUTO-STOP in PLAY mode. Set to PLAY when it is ON after auto-stop in REWIND mode.
COUNTER 0 PLAY:	Set to PLAY when it is set to "H" level in REWIND mode.
COUNTER 0 STOP:	Set to STOP when it is set to "H" level in REWIND mode.
Compu-Brain (C, B) START:	When the content of the Compu-Brain RESET shift register is set to the standard data with the switch set to ON in the Compu-Brain mode (one of Compu-Brain indicators is lit), Compu-Brain starts with the switch set to ON during the STOP mode.
ADMS:	ADMS starts with the switch set to ON during STOP mode.

Note 1:

When the 1st key is pressed, the 2nd key of the terminal cannot be input due to the circuit configuration.

Note 2:

The peak value of the rectangular wave of the key input terminal is changed by other terminal key input, but so far as the "L" level (0.7 V or less) and "H" level (3 V or more) are observed and change syncronized with the K-SCAN waveform, the key input terminal is not affected. On the other hand, when these levels are not observed, there is a possibility that the 1st or 2nd input is judged to have been present.

Note 3:

The wired remote control can perform the 1st key input. The waveform of the rectangular wave changes according to the line capacity of the remote control cable, so there is danger of erroneous operation when a cable longer than that specified for the remote control unit is used for connection.

10-2. Mechanism control unit

This is composed of the closed loop dual capstan mechanism drive circuit (see figure 4), MUTING drive circuit, MPU RESET circuit and the mechanism display LED driver, etc.

10-2-1. Mechanism drive circuit

IR2403 is used as the mechanism driver IC. The internal connection is shown on the right.

This is the open collector/inverter with a built-in input pull-down resistor. Refer to the attached timing chart for output conditions of MPU.

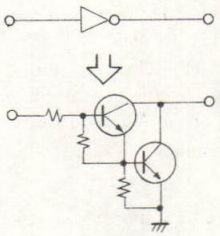


Fig. 11

IC651-1/7, -2/7 compose the bridge together with Q652, Q653 to determine ON/OFF operation of the sub. motor and polarity applied. With MPU, M-FWD set to "H" level, IC651-1/7 set to ON, Q653, ON and the sub. motor turns in the FWD direction; with MPU, M-RWD set to "H" level, IC651-2/7 is set to ON, Q652, ON and the sub. motor turns in the RWD direction. IC651-3/7 is used for control of the sub. motor voltage; this divides the voltage applied to the sub. motor when MPU S-PLAY is set to "H" level and the PLAY solenoid is set to ON, to drop it to approx. 3 V by means of R655 and R676.

It is required to boost the sub. motor voltage during the CUE-REVIEW mode approximately to that in the FF REWIND mode when MPU S-PLAY is set to "H" level and the solenoid is OFF. To do this, input to IC651-3/7 from MPU 0-CUE/REVIEW output which is set to "H" level during CUE-REVIEW mode, via IC651-6/7 to stop the sub. motor voltage drop. IC651-4/7, -5/7 drive PLAY solenoid, and BRAKE solenoid respectively. D653 and D656 are used to absorb the counter-electromotive force and are required to protect the Drive ICs. The power supply of the solenoid is as shown in Figure 12; it is set to approx. +25 V via the voltage doubling rectifier circuit composed of A_A, D_B, C_A, C_B when the solenoid is set to OFF. This is because the voltage stored in C_A via D_B when the AC input is negative is added to the AC input voltage and applied to C_B via D_A when the AC input voltage is positive. When the solenoid is set to ON, the current flowing to the solenoid is approx. 150 mA, and the voltage is determined by C_A and the AC input voltage and frequency. As the charge stored in C_A is reduced, the terminal voltage of C_B drops to around the +13 V input voltage 0.6 V clamped by D_C. This is because approx. 25 V is applied at first so the solenoid attraction force is greater, and approx. 13 V is applied to suppress heating of the solenoid during holding.

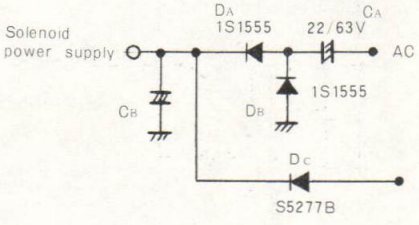


Fig. 12

www.hifiservicemanuals.info

10-2-2. MUTING drive circuit

The MUTING drive circuit is composed of Q657, Q658 and Q659. When MPU is reset during power ON and OFF, MPU 0-RMT and 0-LMT and 0-PMT terminals are set to "L" level and it works as an inverter to inverse logic at that time because it is required to set the MUTING transistor to ON later. MUTING power supply is stored using D661, D658 to maintain MUTING when the power voltage drops during power OFF.

$\overline{0\text{-RMT}}$ is set to "H" level and releases MUTING of the REC amp (REC MUTE).

$\overline{0\text{-PMT}}$ is set to "H" level and releases MUTING of PLAY amp (PLAY MUTE).

$\overline{0\text{-LMT}}$ is set to "L" level during power ON, OFF and Compu-Brain operation and inhibits LINE IN input and LINE OUT output (LINE MUTE).

10-2-3. MPU RESET circuit

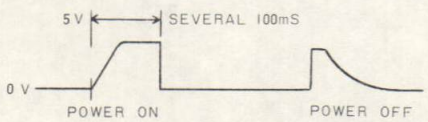


Fig. 13

MPU RESET circuit is composed of Q655 and Q656 and performs MPU RESET operation during the power ON/OFF operation.

C657 is charged via D662 or D663 by AC input simultaneously with POWER ON but as Q656 is set to ON via R658, the current flowing through R659 flows to Q656 and so Q655 is set to OFF. As a result, the "H" level is input to MPU RESET input (pin 7) via R657 and MPU is reset.

The −7.5 V power supply rises several hundred seconds after power is set to ON, so current starts flowing to zener diode D664 and the base voltage of Q656 tends to be negative. When Q656 is set to OFF, current flows to the base of Q655 via R659, so Q655 is set to ON and MPU RESET is released. The time constant of Q657, R660 is short during POWER OFF, C657 immediately discharges and the current flowing to the base of Q655 via R659 disappears, Q655 is set to OFF and MPU is reset again.

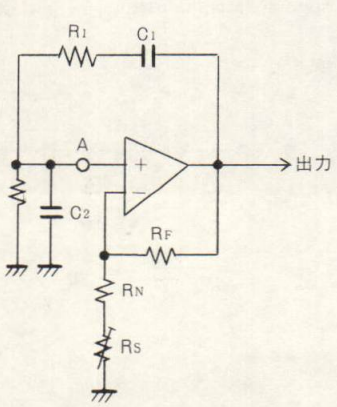
10-2-4. Mechanism display LED drive circuit

Mechanism display LED driver is composed of IC651-4/7 (PLAY ▶), IC651-7/7 (PAUSE II), Q654 (REC MUTE ●), for PLAY solenoid drive and REC LED drive Q279 is used in common for REC bias Power drive.

10-3. Compu-Brain oscillation circuit

The Compu-Brain oscillation circuit is composed of the oscillation circuit IC501-2/2 with Wynne bridge, Servo amp. IC501-1/2 and frequency select analog switch IC502.

10-3-1. Wynne bridge oscillation circuit



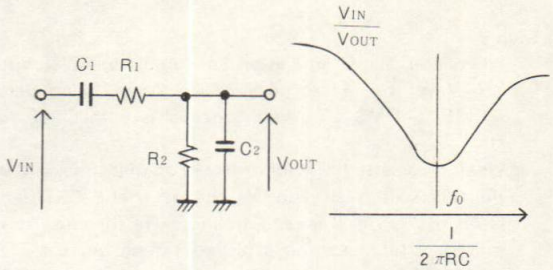


Fig. 14

Basic composition of the Wynne bridge is shownin in Figure 14.

The loss of the positive feedback circuit when R = R1 = R2, C = C1 = C2, is minimum is approx. 1/3 with the frequency $f_0 = \frac{1}{2\pi RC}$. When Rs of the negative feedback circuit is varied and controlled so that the amp gain determined by $\frac{RN + RS = RF}{RN + RS}$ is equivalent to the loss, the signal fed back from the output is amplified by attenuated component, so stable sine wave oscillation is done at a constant voltage.

10-3-2. Servo amp circuit

The servo amp IC501-1/2 performs this automatic variation of Rs and FET (Q501) is used as variable resistance element for Rs.

When the oscillation circuit output is still set to the GND potential, the (+) input of the servo amp IC501-1/2 is set to approx. +0.6 V because it is divided by R510 and R511 and connected to +7.5 V, and the output potential of the servo amp tends to be positive. The gate voltage of FET Q501 at that time is set to GND potential by R515, and the resistance R_{DS} between drain sources of FET is lowest (R_{DS} = 500Ω or less). The amp gain of the Wynne bridge oscillation circuit is 3.16 times or more at that time, so the oscillation circuit starts oscillation. When the oscillation voltage exceeds −0.6 V at its peak in the negative direction, the potential of the (+) input of the servo amp. starts to be negative, so its output amplified approx. 20 times applies reverse bias to the FET gate via R511, D503 to boost R_{DS}.

As a result, the amp. again of the oscillation circuit is decreased by boosting R_{DS}, so the oscillation output is decreased and the peak value of the negative potential is stabilized at around −0.6 V, 400 Vrms.

10-3-3. Analog switch circuit

The oscillation frequency is switched over by the analog switch IC502 IC501 terminal pins (1) ~ (2), (3) ~ (4) and (9) ~ (10) are set to ON respectively by MPU outputs F400, F10K and F13K to switch over the positive feedback time constants C1, C2, R1, R2 of the Wynne bridge oscillation circuit decribed previously. (R501 and R502 during F400Hz are not equal. This is because of the fact that R501 // R507 ≒ R502)

10-3-4. Operation during adjustment

The TEST TONE 400 Hz and 10 kHz are alternately changed over and oscillate at the period of approx. 600 ms to compare the REC/PLAY levels between 400 Hz and 10 kHz during the Compu-Brain bias adjustment. When the oscillation output voltage is rapidly boosted during selection, it is required to stabilize it due to the time constant of the servo circuit, so the output voltage is clipped by D501, D502 so that it is not boosted rapidly.

The test tone frequency is set to 400 Hz during CAL adjustment, and 13 kHz during EQ adjustment.

When the oscillation circuit is oscillating during the Compu-Brain operation, MPU 0-LMT terminal (pin 23) is set to "L" level, so IC502 pin (12) is set to "H" level via the mechanism control MUTING driver Q658. As a result, pins (10) ~ (11) are set to ON and the output of the oscillation circuit is input to the Dolby encoder INPUT of the audio circuit Dolby IC HA11226 via R516, IC502 pins (10) ~ (11) and SFR501. The LINE MUTE signal is set to

www.freeservicemanuals.info

"H" level at that time, and the Dolby encoder INPUT is grounded by R199 via Q153, so the output of the oscillator is attenuated by R199/(R199 + R516 + SFR501) and set to approx. 7.75 mV (−17 V when converted to Dolby input level).

10-3-5. Compu-Brain oscillation level adjustment

The output of the Compu-Brain oscillator should be adjusted to calibrate the Compu-Brain MEASURE.

Adjust it by the following procedure.

(Strictly observe the procedure)

(1) Remove the 1P connector between MEASURE INPUT and PB Dolby OUTPUT.
(2) Load a blank tape and turn Compu-Brain on.
(3) Connect an oscilloscope to MEASURE COMP OUTPUT test point TP-7.
(4) Connect the Dolby encoder OUTPUT test point TP-1 and MEASURE INPUT when the set enters the REWIND mode.
(5) Adjust the Compu-Brain oscillator SFR501 so that the 400 Hz rectangular wave appears on the oscilloscope.
(6) Disconnect TP-1 and MEASURE INPUT when adjustment is completed, and then connect MEASURE INPUT and PB Dolby OUTPUT again using the 1P connector.

The adjustment mentioned above should be done again when the Lch Dolby PC Board or IC is replace, or the constant of the Compu-Brain oscillator or MEASURE is replaced.

10-4. Compu-Brain MEASURE unit

This circuit amplifies (IC451-2/2), rectifies (IC451-1/2, D451) and compares (IC453, IC452-1/2) the recorded and played back TEST TONE during the Compu-Brain operation and inputs it to MPU COMP terminal (pin 3). The REC/PLAY level of the Compu-Brain TEST TONE is approx. −17 VU but it is only approx. 77.5 mV at the PB Dolby OUTPUT, so this TEST TONE of this PB Dolby OUTPUT is amplified approx. 25 times by IC451-2/2. The amplification gain is determined by R462 and C455 connected to R454 in parallel. R462, C455 determine the REC/PLAY frequency response after Compu-Brain adjustment. It is designed so that 10 kHz and 13 kHz are increased by approx. +0.5 dB ~ 1.0 dB over 400 Hz and adjusted.

The signal amplified here is set to approx. 2 Vrms, and amplified by IC451-1/2, rectified by D451, applied to C453, and by applying feedback to IC451-1/2, converted to approx. 1 : 1 DC 2 V.

IC453 in the next stage works as the analog MPX; when MPU F10K terminal is set to "H" level, IC453 pins (3), (6) are set to "H" level, and pins (12), (1), (5) and pins (4), (11) are set to ON. When MPU F10K terminal is set to "L" level, pins (12), (1), (5) and pins (2), (9) are set to ON. That is, when the oscillation frequency of the Compu-Brain oscillator is set to 400 Hz or 13 kHz, and the MPU F10K terminal is set to "L" level, potential Vref (approx. 2 V) of SFR451 is connected to (+) input of the comparator IC452-1/2 in the next stage, and the potential of C453 — rectified REC/PLAY output voltage of TEST TONE — is connected to (−) input, and these two are compared. This is done during Compu-Brain and EQ adjustment; data of discrimination of level between potentials Vref and C453 done by MPU via IC452-1/2 is received via COMP terminal (pin 3) to adjust sensitivity and EQ.

When the oscillation frequency of the Compu-Brain oscillator is designated to be 10 kHz and the MPU F10K terminal is set to "H" level, pins (12), (1), (5) ~ pins (4), (11) are set to ON. The ON resistance between pins (12), (1), (5) and pins (4), (11) is only approx. 1 kΩ at that time, so the potential of SFR IC452-1/2 (+) input is set approximately equivalent to the potential of C453. This is used for Compu-Brain bias adjustment.

The Compu-Brain oscillator first oscillates at 400 Hz in the bias adjustment; this sets IC453 pins (12), (1), (5) and pins (2), (9) to ON and the terminal voltage of C453 is applied to IC452-1/2 (−) input and is applied to C454 simultaneously. Next at the instant when MPU changes over the frequency of the Compu-Brain oscillator to 10 kHz, pins (12), (1), (5) and pins (2), (9) are set to OFF, and pins (12), (1), (5) and pins (4), (11) are set to ON, so the voltage produced by rectifying the 400 Hz REC/PLAY output is applied to IC452-1/2 (−) input while it is kept as it is by C454. The voltage produced by rectifying the 10 kHz REC/PLAY output is applied to the (+) input side later, so MPU inputs the IC452-1/2 COMP output produced by comparing these two from COMP terminal (pin 3) and obtains the REC/PLAY sensitivity difference between 400 Hz and 10 kHz, and varies the bias.

10-5. Compu-Brain D/A unit

The Compu-Brain D/A unit is composed of the shift register IC401, IC402 described previously in the description of MPU, capacitor back-up voltage, monitoring comparator IC452-2/2, D/A transistors Q401 ~ Q425.

10-5-1. Shift register

IC401, IC402 HD14015BPs incorporate 2 x 4 stage serial INPUT parallel OUTPUT shift registers.

By cascade-connecting IC401 and IC402, they compose a synchronized 16-bit serial INPUT parallel OUTPUT shift register.

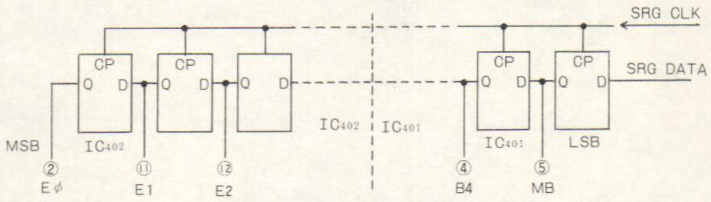


Fig. 15

The shift register is composed of the D-flip-flop as shown in Figure 15, and the D-flip-flop latches the data (D output) to the output (Q output) at the rise of the clock (CP input) signal. As a result, data shifts by one to the left; as the contents of SRG DATA shown in Figure 14 shift to MB (MEMORY BIT) by 1 clock pulse (SRG CLK), and the contents of MB shift to B4.

When MPU reloads the contents of the shift register, MPU outputs 16 pulses to the SRG CLK terminal and outputs SRG DATA following the data set in sequence starting at the MSB side (Eϕ side) in synchronization with the pulses; in this way, MPU reloads the shift register.

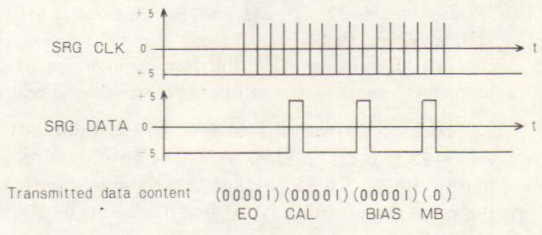


Fig. 16

www.freeservicemanuals.info

This shift register is provided with the serial/parallel conversion function which converts the REC bias, sensitivity, EQ and MB data transmitted via 2 lines — SRG CLOCK and SRG DATA — from MPU to the digital/analog converging 16-bit parallel data through the circuit shown in Figure 17, and functions as the data register (memory) which stores these data during the power ON/OFF operation.

10-5-2. D/A (Digital/Analog) conversion circuit

The parallel output of the shift register is converted to analog values used for Bias, Cal and EQ adjustment via this circuit. The D/A conversion is done by switching each bit of the resistor block's 5-bits (R425, 427, 429) using transistors. The D/A conversion principle is: The value of RX shown in Figure 17 is changed to 3.9 k ~ ∞ by the transistor switched by the 5-bit resistor block.

For example, resistance of the resistor block corresponding to each bit has approximately double the weight of the data of the shift register output B4 ~ Bϕ. e_{out}/e_{in} attenuation amount is changed as shown in Figure 16 by the data (0 ~ 31) of the BCD code of B4 ~ Bϕ to perform D/A conversion.

R_A here corresponds to the bias circuit R283 in the bias adjustment, the REC amp. R205 in the CAL adjustment and the REC amp C199 x R257 in the EQ adjustment.

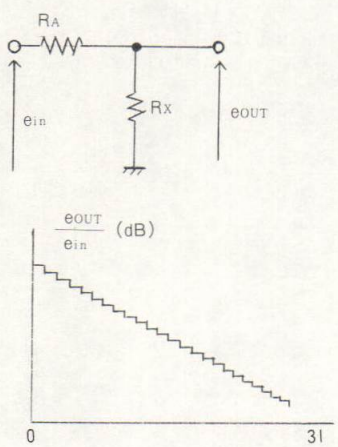


Fig. 17

10-5-3.

IC452-2/2 controls another function of the shift register as the data register (memory). C401 0.022F (scheduled to be changed to 3300μF/16V) guarantees non-volatility of the shift register during power OFF.

IC452-2/2 works as a comparator. The voltages at both terminals of R420 are set to approx. 3.3 V by R421, so when the C401 voltage plus C420 voltage (0.4 V) is 3.3 V or more, the output of IC452-2/2 is set to "L" level and inhibits the SRG CLR signal output from MPU during power ON by means of D419.

(See Explanation of microcomputer).

C401 0.22F is charged with the time constant of approx. 30 sec via R422, 5.6 kΩ and R423, 6.8 kΩ after power ON, so when the SRG CLR signal is output several hundred seconds after power ON, the terminal voltage of C401 is almost the same as the terminal voltage during power OFF.

The back-up voltage of C401 is supplied to the shift register via R422, 5.6 kΩ (MEMO Vss). The both terminal voltages of this R422, 5.6 kΩ should be as shown below to keep the contents of the shift register for 24 hrs or more during power OFF:

5 mV or less when C401 = 0.022F

1 mV or less when C401 = 3300μF.

MEMO Vss advances toward the tape selector switch. This switch turns ON instantaneously when the tape selector is switched over, and MEMO Vss passes through C420, 0.0047μF, differentiated and clears the shift register which stores MB in the 16-bit shift register.

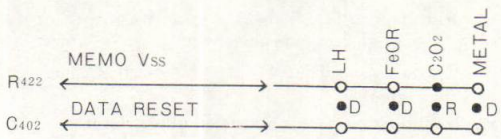


Fig. 18

This MB is set to "H" level when the CPU starts the Compu-Brain operation, and is kept at "H" level during the Compu-Brain operation or when the Compu-Brain data is stored in the shift register.

It is set to "L" level when the standard data is in the shift register. MPU always monitors this MB via the SRG INP terminal; when it is set to "L" level during power ON or when it changes to "L" level from "H" level, MPU immediately sets the shift register to the standard data by the procedure shown in Figure 16.

When the MPU starts the Compu-Brain operation, this MB is set to "H" level. When it is not set to "H" level for some reason, the Compu-Brain operation is interrupted.

(1) D419 is open and SRG CLR signal is not inhibited.
(2) IC452-2/2 output is set to "H" level and SRG CLR signal is not inhibited.
(3) Power to the shift register changes when the output of IC401 or IC402 shift register is short-circuited or D421 is open.
(4) When a mechanism control key or RM key is pressed continuously.

The shift register operation can be checked by the fact that the pulse is output when Compu-Brain operation starts; it is seen when monitoring IC402 pin (2), Eϕ output using an oscilloscope. Be sure to use the specified diode MA150 for D420, D421, D416, D417, D401 ~ D415 because the capacitor back-up time is shortened when the counter leak current is too high.

When MB is set to "L" level, the SRG CLR signal is inhibited by D417. This diode inhibits the SRG CLR signal passing through C402 when the tape selector is changed over during standard data operation. MB is originally set to "L" level, so it does not change when the shift register is cleared and set to "L" level, so MPU cannot detect that the shift register is cleared.

10-6. FL (Fluorescent Lamp) Drive unit

The FL DRIVE unit is composed of the AC CLOCK shaper Q704, FL filament power supply D704, FL counter UP/DOWN driver Q702, D702 and MEMORY REWIND circuit IC701, Q701, D702.

10-6-1. Explanation of FL electronic counter unit terminals

Terminal No.	Terminal symbol	Item
1	60/50	Output pulse only during power ON. AC CLOCK is judged as 50 Hz with this terminal connected to GND, and 60 Hz with this terminal open.
2	STA/STP	Receives START/STOP instruction of TAPE TIME function. TAPE TIME starts at "H" level.
3	WR	Set to "H" level with MEMORY REWIND SW set to ON, and the internal counter LSI memorizes the counter data at that time.
4	V_{SS}	Power GND input terminal. Connect to +5 V.
5	V_{DD}	Counter LSI power supply. Connect to −5 V.

www.freeservicemanuals.info

Terminal No.	Terminal symbol	Item
6	Vdis	FL cathode power supply. Connect to −13 V.
7	UP/DOWN	Addition/subtraction instruction input of the counter. Set to addition at "H" level, and to subtraction, at "L" level.
8	C-CLK	Counter clock input. Add or subtract 1 per pulse according to the UP/DOWN input.
9	T-CLK	TAPE TIME clock. Divides according to the pin (1) input 60/50 terminal with AC 50 Hz or 60 Hz clock input, and counts 1 per sec.
10	A, D	"H" level is output when the counter content is set to "0000".
11	M, D	"H" level is output when the counter content matches the number memorized by WR.
12	F	FL cathode electrode filament power supply. Supplies power (effective value; approx. 1.8 V) between Vdis and F.

10-6-2. AC CLOCK shaper

This produces the reference clock of the TAPE TIME function of the FL electronic counter. Q704 is set to ON in the positive half period (+1.8 V or more) of the secondary side of the power transformer, and OFF in the negative side half period (+1.8 V or less) and produces the 50 Hz or 60 Hz rectangular wave and inputs it to the FL electronic counter T-CLK terminal as CLOCK.

10-6-3. FL electronic counter UP/DOWN driver

This instructs the addition mode or subtraction mode of the electronic counter. It is in the addition mode when the sub. motor of the mechanism is rotating in the positive direction, and in the subtraction mode when it is rotating in reverse. The mechanism does not stop immediately; it is designed so that addition is kept in positive rotation → STOP, and subtraction is kept in reverse rotation → STOP. This is done by charging C703 from the MPU M-FWD terminal ("H" level during sub. motor positive rotation) via D701, and by setting Q702 by means of the MPU M-RWD terminal ("H" level during sub. motor reverse rotation) and discharging C703 during the reverse rotation.

10-6-4. MEMORY REWIND circuit

This circuit receives the MEMORY REWIND switch instruction inside the FL electronic counter and operates the MEMORY REWIND function ON/OFF. When the MEMORY REWIND function is set to ON, LSI inside the FL electronic counter memorizes the counter's content. The "H" level is output to the FL electronic counter FL terminal at that time, so the toggle flip-flop composed of IC701-1/4, -2/4, -3/4 is set. IC701-1/4 pin (3) is set to "H" level at that time and the MEMORY REWIND LED indicator is lit via Q703. S-PLAY terminal is set to "H" level when MPU is in the PLAY mode, so both IC701-4/4 pins (12), (13) are set to "H" level and the pin (11) level is set to "L" level. (The REC input is set to "L" level in the REC mode, so the pin (13) "H" level is inhibited via D703 and the operation thereafter is not done)

When the content of the FL electronic counter matches the number memorized in the LSI inside the counter, "H" level is output to the FL MD terminal, Q701 is set to ON and the REWIND instruction is given to MPU via D702.

Note 1.

The FL electronic counter unit is very vulnerable to static electricity because an LSI is used, so be careful in handling it with the connector removed.

10-6-5. Waveform of IC (HD38701) used for electronic counter

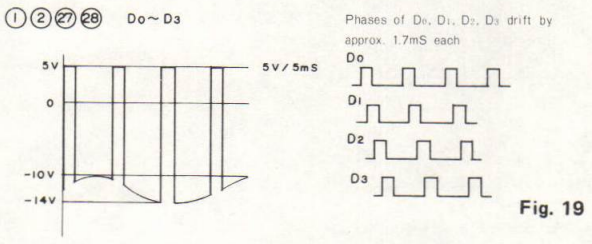


Fig. 19

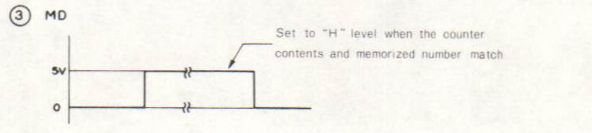


Fig. 20

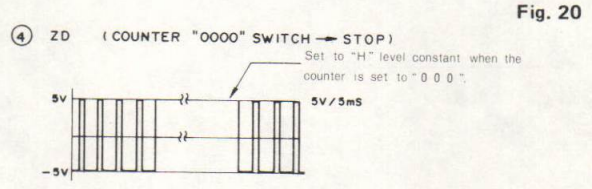


Fig. 21

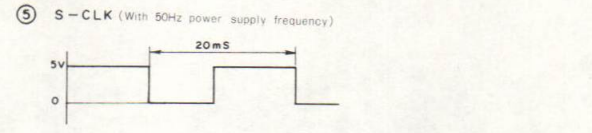


Fig. 22

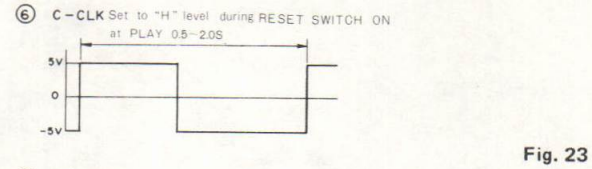


Fig. 23

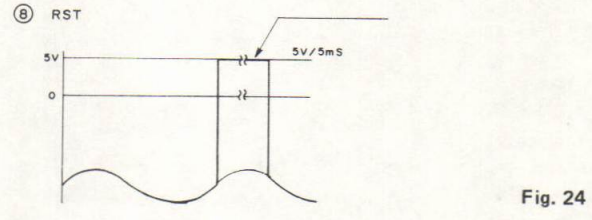


Fig. 24

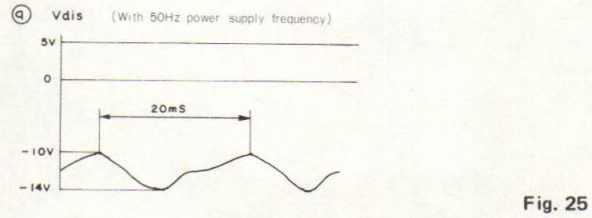


Fig. 25

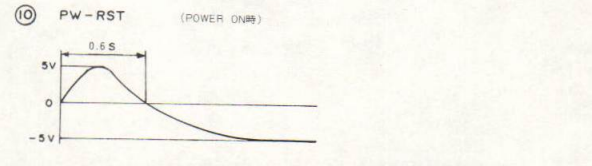


Fig. 26

www.freeservicemanuals.info

⑪ V_{DD} −5V Const

⑫ ⑭ 5V Const

⑬ OSC

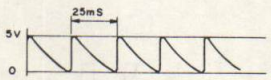


Fig. 27

⑮ WR

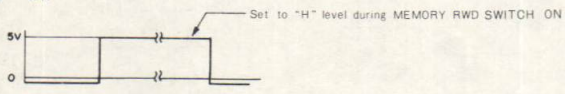


Fig. 28

⑯ 50/60 (During POWER ON)

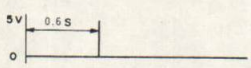


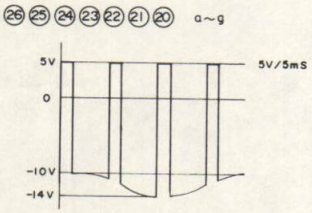
Fig. 29

⑰ W/C During WATCH display : "H" level +5V
During COUNTER display : Same as "L" level ⑨ Vdis.

⑱ START/STOP During PLAY : "H" level +5V
During STOP, FF, REW, PAUSE : "L" level 0 V

⑲ MR Power frequency select switch 50Hz : GND level
Power frequency select switch 60Hz : Same as ⑮ 50/60

㉖㉕㉔㉓㉒㉑㉐ a~g



Duty of a ~ g changes 0 ~ 100% depending on numerals displayed.

Fig. 30

www.freeservicemanuals.info

ACCESSORIES/PACKAGE

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1	82-179-856-01		Printed indiv., Packing	*	1
2	82-179-852-01		Cushion L, Printed indiv.	*	1
3	82-179-853-01		Cushion R, Printed indiv.	*	1
4	87-056-607-01		Poly-vinyl sack		1
5	87-051-135-11		Poly-vinyl sack (E,K,G model only)		1
6	87-051-131-11		Poly-vinyl sack (H model only)		1
7a	82-179-906-01		Instructions booklet(H model only)	*	1
7b	82-179-904-01		Instructions booklet(E model only)	*	1
7c	82-179-905-01		Instructions booklet (K model only)	*	1
7d	82-179-907-01		Instructions booklet (G model only)	*	1
8	87-056-009-41		Distributors list		1
9	87-056-008-01		Label AC power cord (K model only)		1
10	87-056-059-01		Guarantee card (G model only)		1
11	87-051-171-11		Poly-Vinyl sack		1
12	86-944-012-01		Connection cord, CW-129 BSK		2
13	87-032-845-01		Siemens plug (H model only)		1

www.freeservicemanuals.info

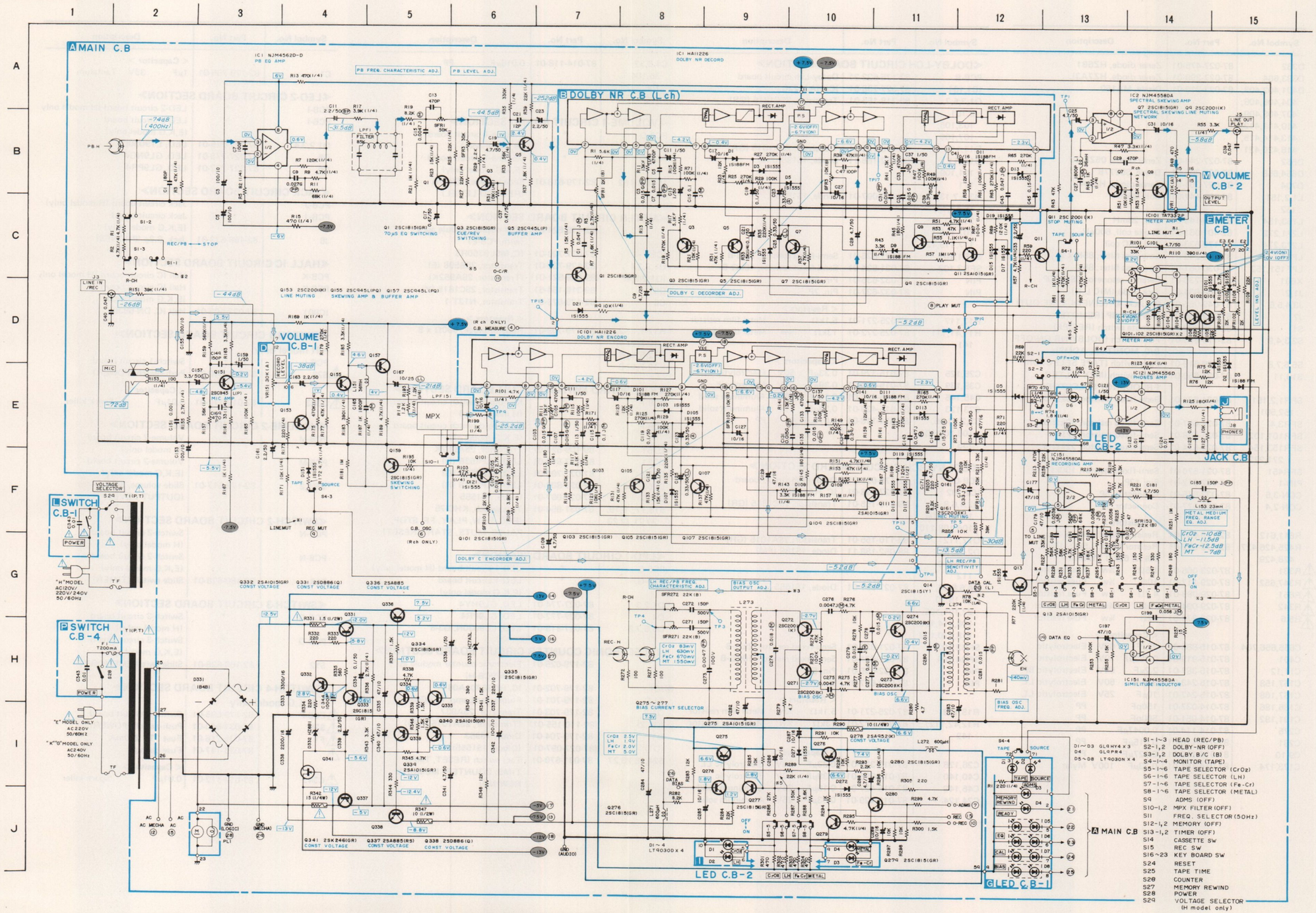
811025(1)-Z

AIWA CO., LTD.

Printed in Japan

www.freeservicemanuals.info

SCHEMATIC DIAGRAM–1



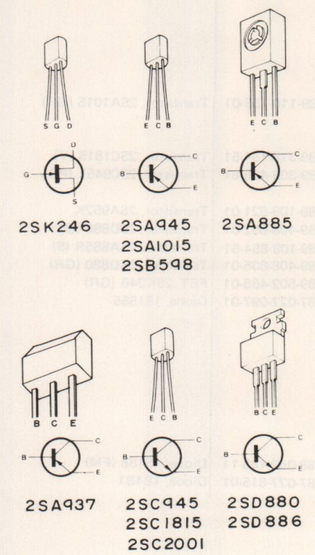
NOTES:

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
   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 dielectirc strneght of less than 50WV.
6) The only capacitor tolerance indicated are ±5% (J) and ±10% (K).
7) Ceramic capacitor symbols:
   High dielectric constant system (YY)
   High dielectric constant system (YW, YP, YZ)
8) Explanation of symbols
   (M) Mylar capacitor
   (A) Aluminum solid capacitor
   (PP) Polypropylene film capacitor
   (BP) Bi-polarized capacitor
   (LL) Low-leakage capacitor
   (T) Tantalum capacitor
   Fuse resistor

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

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

- This schematic diagram is subject to change without notice in the interests of improved performance.



S1-1~3 HEAD (REC/PB)
S2-1,2 DOLBY-NR (OFF)
S3-1,2 DOLBY B/C (B)
S4-1~4 MONITOR (TAPE)
S5-1~6 TAPE SELECTOR (CrO2)
S6-1~6 TAPE SELECTOR (LH)
S7-1~6 TAPE SELECTOR (Fe-Cr)
S8-1~6 TAPE SELECTOR (METAL)
S9 ADMS (OFF)
S10-1,2 MPX FILTER (OFF)
S11 FREQ. SELECTOR (50Hz)
S12-1,2 MEMORY (OFF)
S13-1,2 TIMER (OFF)
S14 CASSETTE SW
S15 REC SW
S16~23 KEY BOARD SW
S24 RESET
S25 TAPE TIME
S28 COUNTER
S27 MEMORY REWIND
S28 POWER
S29 VOLTAGE SELECTOR (H model only)

D1~D3 GL9HY4 x 3
D4 GL9PR4
D5~D8 LT9030N x 4

www.freeservicemanuals.info

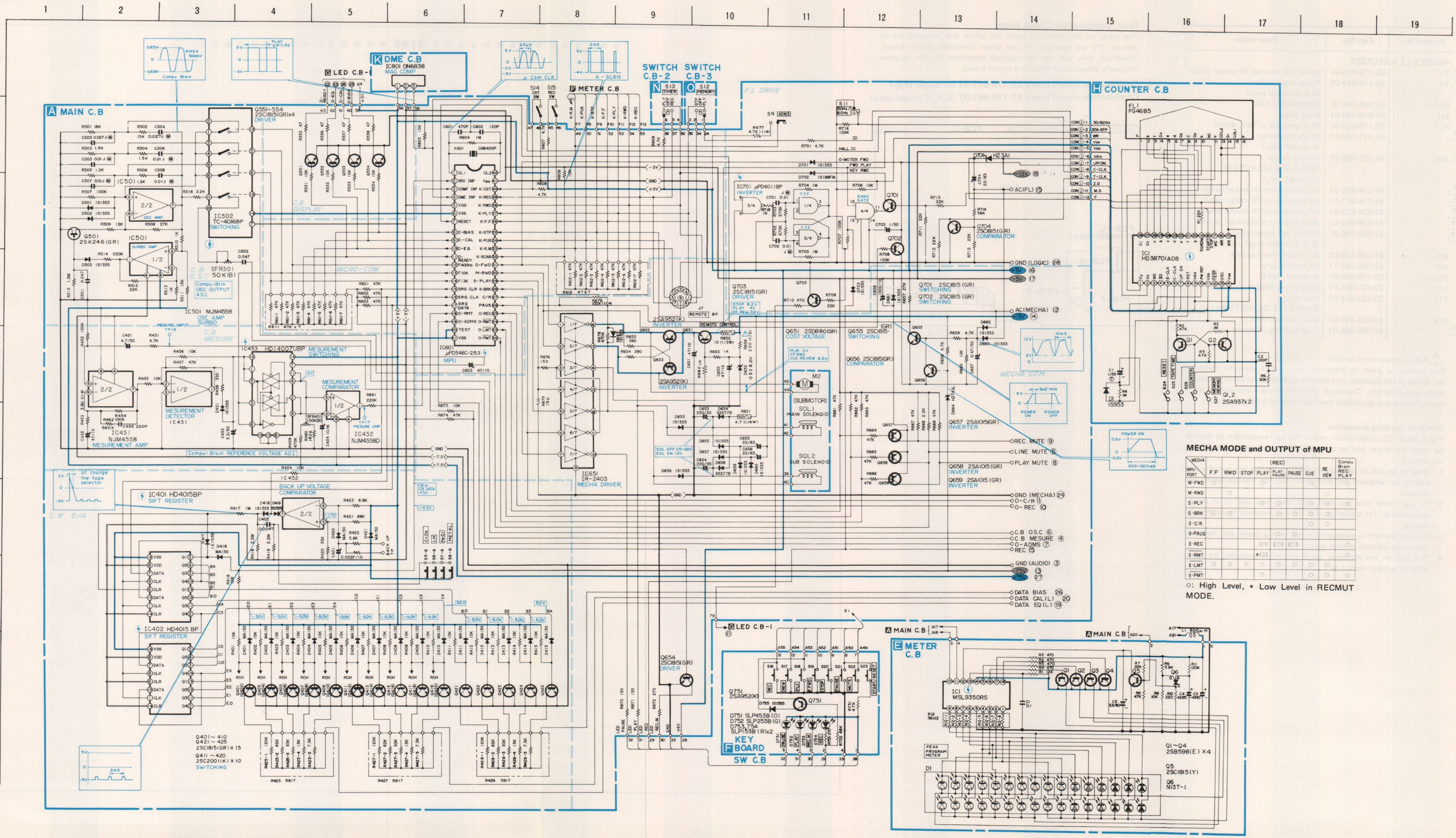
AD-3800H,E,K,G AD-3800H,E,K,G

ELECTRICAL MAIN PARTS LIST

Symbol No.	Part No.	Description
≪MAIN CIRCUIT BOARD SECTION≫		
PCB-A	*	Main circuit board (H model only)
PCB-A	*	Main circuit board (E,K,G model only)
IC1	87-027-814-01	IC, NJM4562D-D
IC2,151, 152	87-027-371-01	IC, NJM4558DA
IC101	87-027-726-01	IC, TA7332P
IC121	87-027-739-01	IC, NJM4556D
⚡ IC401,402	87-027-799-01	IC, HD14015BP
IC451,452, 501	87-027-235-01	IC, NJM4558
⚡ IC453	87-027-800-01	IC, HD14007UBP
⚡ IC502	87-027-429-01	IC, TC4016BP
⚡ IC601	82-179-626-01	IC, μPD546C-253
IC651	87-027-426-01	IC, IR-2403
⚡ IC701	87-027-706-01	IC, μPD-4011BP
Q1,2,3,4, 7,8,101, 102,159,160, 276,277,279, 280,333,334, 335,401,402, 403,404,405, 406,407,408, 409,410 421, 422,423,424, 425,551,552, 553,554,654, 655,656,701, 703,704	89-318-155-01	Transistor, 2SC1815 (GR)
Q5,6,151, 152	89-309-456-01	Transistor, 2SC945L (P)
Q9,10,11,12, 153,154,161, 162,271,272, 273,274,411, 412,413,414, 415,416,417, 418,419,420,	89-320-011-01	Transistor, 2SC2001 (K)
Q13,275,332, 339,340,657, 658,659	89-110-155-01	Transistor, 2SA1015 (GR)
Q14,702	89-318-154-51	Transistor, 2SC1815 (Y)
Q155,156,157, 158	89-309-455-61	Transistor, 2SC945L (PQ)
Q278,652,653	89-109-521-01	Transistor, 2SA952K
Q331,651	89-408-862-01	Transistor, 2SD886 (Q)
Q336,337	89-108-854-51	Transistor, 2SA885R (S)
Q338	89-408-805-01	Transistor, 2SD880 (GR)
Q341,501	89-502-465-01	FET, 2SK246 (GR)
D1,2,4,5, 101,102,151, 271,272,417, 418,419,451, 501,502,503, 653,655,656, 657,659,660, 661,662,663, 665,701,703	87-027-097-01	Diode, 1S1555
D3,702	88-052-188-11	Diode, 1S188 (FM)
D331	87-027-815-01	Diode, 1B4B1
D332	87-027-475-01	Zener diode, HZ6B1
D333,664	87-027-399-01	Zener diode, HZ7A3L
D401,402,403, 404,405,406, 407,408,409, 410,411,412, 413,414,415, 416,420,421	87-027-219-01	Diode, MA150
D652	87-027-244-01	Zener diode, 05Z8.2U
D654,658	87-027-365-01	Diode, S5277B
D704	87-027-301-01	Zener diode, HZ3A
L1,2,151, 152	87-005-147-01	Coil, 36mH
L153,154	87-005-148-01	Coil, 23mH
L271,272	82-401-661-01	Choke coil, 600μH
L273,274	82-179-633-01	Bias OSC coil
LPF1	87-008-243-01	Low-pass filter, 85K x 2
LPF151,152	87-030-061-01	Low-pass filter, 85K
X601	87-008-236-01	Ceramic resonetor CSB400P
J1,2	82-168-634-01	Jack, 6.3φ (MIC L,R)
J3,4,5,6	87-049-055-01	Pin jack, 4P (LINEIN, LINE OUT)
J7	87-032-985-01	DIN jack, 8P (REMOTE)
S1	82-179-628-01	Remote switch (REC/PB)
S2,3,4,9	82-179-620-01	Push-switch (DOLBY-NR ON/OFF, B/C, MONITOR, ADMS)
S5,6,7,8	82-179-619-01	Push-switch (TAPE SELECTOR)
S10,11	87-031-650-01	Slide switch (MPX FILTER, FREQUENCY SELECTOR)
SFR1,2,151, 152,501	87-021-624-01	Semi-fixed resistor, 50kΩ-B
SFR3,4	87-021-687-01	Semi-fixed resistor, 30kΩ-B
SFR101,102	87-021-688-01	Semi-fixed resistor, 2kΩ-B
SFR153,154 271,272	87-021-614-01	Semi-fixed resistor, 22kΩ-B
SFR451	87-021-570-01	Semi-fixed resistor, 100kΩ-B
PIN-1	87-032-912-01	Pin, 12P
CON-3,5	87-032-575-01	Connector, 5P
CON-2,4	87-032-577-01	Connector, 7P
		< **Resistors** >
R611,612	82-179-631-01	Resistor block 47kΩ x 7
R425,426,427, 428,429	82-179-632-01	Resistor block 7.5kΩ, 15kΩ, 30kΩ, 62kΩ , 120kΩ
⚠ R331	87-029-066-01	1.5Ω ½w Fuse resistor
⚠ R347,652	87-029-117-01	10Ω ½w Fuse resistor
⚠ R651	87-029-089-01	4.7Ω ¼w Fuse resistor
⚠ R342	87-029-094-01	15Ω ¼w Fuse resistor
⚠ R5,6	87-025-274-01	82Ω ¼w Fuse resistor
		< **Capacitors** >
C655,656,704	87-015-885-01	22μF 63V Electrolytic
C401	87-015-919-01	0.022μF 10V Electrolytic
C11,12	87-015-387-01	2.2μF 50V Electrolytic BP
C157,158	87-015-243-01	3.3μF 50V Electrolytic LL
C167,168	87-015-247-01	10μF 25V Electrolytic LL
C185,186	87-014-037-01	150pF PP
C191,192	87-014-051-01	560pF PP
C275	87-014-114-01	0.0047μF PP
C281	87-014-118-01	0.015μF PP
C9,10	87-014-119-01	0.027μF PP
C173,174	87-014-151-01	0.33μF 100V Mylar
≪DOLBY-LCH CIRCUIT BOARD SECTION≫		
PCB-B	82-175-622-21	Dolby-Lch circuit board
IC1,101	87-027-738-01	IC, HA11226
Q1,3,5,7, 9,101, 103,105, 107,109	89-318-155-01	Transistor, 2SC1815 (GR)
Q11,111	89-110-155-01	Transistor, 2SA1015 (GR)
D1,9,11, 101,109, 111	88-052-188-11	Diode, 1S188 (FM)
D3,5,7,13, 15,17,19, 21,103,105, 107,113,115, 117,119,121	87-027-097-01	Diode, 1S1555
SFR1,101	87-021-626-01	Semi-fixed resistor, 2kΩ-B
SFR3,103	87-021-634-01	Semi-fixed resistor, 10kΩ-B
PIN	87-032-635-01	Pin, 5P
PIN	87-032-637-01	Pin, 7P
		< **Resistors** >
R17,117	87-025-271-01	5.1kΩ ¼w Metal film resistor
R11,41,111 141	87-025-272-01	13kΩ ¼w Metal film resistor
		< **Capacitors** >
C25,125	87-015-329-01	0.33μF 50V Electrolytic LL
C39,139	87-015-895-01	0.39μF 50V Electrolytic
C45,145	87-015-427-01	0.15μF 25V Aluminum solid
C23,123	87-015-429-01	0.33μF 25V Aluminum solid
C3,7,31,35, 103,107,131, 135	87-014-118-01	0.015μF PP
≪ DOLBY-RCH CIRCUIT BOARD SECTION ≫		
PCB-C	82-175-622-21	Dolby-Rch circuit board
IC2,102	87-027-738-01	IC, HA11226
Q2,4,6,8, 10,102,104, 106,108,110	89-318-155-01	Transistor, 2SC1815 (GR)
Q12,112	89-110-155-01	Transistor, 2SA1015 (GR)
D2,12,10, 102,110, 112	88-052-188-11	Diode, 1S188 (FM)
D4,6,8,14, 16,18,20, 22,104,106, 108,114,116, 118,120,122	87-027-097-01	Diode, 1S1555
SFR2,102	87-021-626-01	Semi-fixed resistor, 2kΩ-B
SFR4,104	87-021-634-01	Semi-fixed resistor, 10kΩ-B
PIN	87-032-635-01	Pin, 5P
PIN	87-032-637-01	Pin, 7P
		< **Resistors** >
R18,118	87-025-271-01	5.1kΩ ¼w Metal film resistor
R12,42,112, 142	87-025-272-01	13kΩ ¼w Metal film resistor
		< **Capacitors** >
C26,126	87-015-329-01	0.33μF 50V Electrolytic LL
C40,140	87-015-895-01	0.39μF 50V Electrolytic
C46,146	87-015-427-01	0.15μF 25V Aluminum solid
C24,124	87-015-429-01	0.33μF 25V Aluminum solid
C4,8,32, 36,104, 108,132, 136	87-014-118-01	0.015μF PP
≪VOLUME-1 CIRCUIT BOARD SECTION≫		
PCB-D	*	Volume-1 circuit board (H model only)
PCB-D	*	Volume-1 circuit board (E,K,G model only)
VR151,152	82-179-618-01	Slide volume, 10kΩ-A (RECORD LEVEL)
≪METER CIRCUIT BOARD SECTION≫		
	82-179-624-01	LED display module ass'y (with/PCB-E)
IC1	87-027-725-01	IC, MSL9350RS
Q1,2,3,4	82-179-708-01	Transistor, 2SB598 (E)
(Q1,2,3,4)	(89-109-521-01)	(Transistor, 2SA952K)
Q5	89-318-154-51	Transistor, 2SC1815 (Y)
Q6	82-179-673-01	Transistor, N13T-1
		< **Resistors** >
R12-1,12-2, 12-3,12-4, 12-5,12-6, 12-7,12-8	82-179-709-01	Resistor block, 560Ω x 8
≪KEY-BOARD SWITCH CIRCUIT BOARD SECTION≫		
PCB-F	*	Key-board switch circuit board (H model only)
PCB-F	*	Key-board switch circuit board (E,K,G model only)
Q751	89-109-521-01	Transistor, 2SA952K
D751	87-027-810-01	LED, SLP453B (Q)
D752	87-027-790-01	LED, SLP253B (G)
D753,754	87-027-809-01	LED, SLP153B (R)
D756	87-027-097-01	Diode, 1S1555
S16,17,18,19, 20,21,22,23	87-031-654-01	Tact switch, KHC-75 (REC, REW, PLAY, FF, STOP, PAUSE, MUTE, START/RESET)
≪LED-1 CIRCUIT BOARD SECTION≫		
PCB-G	*	LED-1 circuit board (H model only)
PCB-G	*	LED-1 circuit board (E,K,G model only)
D1,2,3	87-027-774-01	LED, GL9HY4
D4	87-027-772-01	LED, GL9PR4
D5,6,7,8	87-027-819-01	LED, LT9030N, G3-8
≪ELECTRONIC COUNTER CIRCUIT BOARD SECTION≫		
	82-179-625-01	Electronic counter module ass'y (with/PCB-H)
⚡ IC1	82-179-702-01	IC, HD38701A08
FL1	82-179-701-01	Fluoresent Lamp, FG46B5
Q1,2	82-179-703-01	Transistor, 2SA937
(Q1,2)	(89-110-155-01)	(Transistor, 2SA1015 (GR))
D1	82-179-704-01	Diode, 1S953
(D1)	(87-027-097-01)	(Diode, 1S1555)
S24,25,26,27	87-031-670-01	Tact switch (RESET, TAPE, TIME, COUNTER, MEMORY REWIND)
		< **Capacitor** >
C1	82-179-705-01	1μF 35V Tantalum
≪LED-2 CIRCUIT BOARD SECTION≫		
PCB-I	*	LED-2 circuit board (H model only
PCB-I	*	LED-2 circuit board (E,K,G model only)
D1,2,3,4	87-027-775-01	LED, LT9030DI
D5	87-027-773-01	LED, GL9NG4
D6	87-027-772-01	LED, GL9PR4
≪JACK CIRCUIT BOARD SECTION≫		
PCB-J	*	Jack circuit board (H model only)
PCB-J	*	Jack circuit board (E,K,G model only)
J8	82-168-633-01	Jack, 6.3φ (PHONES)
≪HALL IC CIRCUIT BOARD SECTION≫		
PCB-K	*	Hall IC circuit board (H model only
PCB-K	*	Hall IC circuit board (E,K,G model only)
IC801	87-027-505-01	Hall IC, DN-6838
≪SWITCH-1 CIRCUIT BOARD SECTION≫		
= H model only		
PCB-L	*	Switch-1 circuit board
⚠ S28	87-031-640-01	Push-switch (POWER)
		< **Capacitor** >
⚠ C343	87-019-112-01	0.01μF Spark killer
≪VOLUME-2 CIRCUIT BOARD SECTION≫		
PCB-M	*	Volume-2 circuit board (H model only)
PCB-M	*	Volume-2 circuit board (E,K,G model only)
VR1,2	82-179-617-01	Slide volume, 30kΩ-A (OUTPUT LEVEL)
≪SWITCH-2 CIRCUIT BOARD SECTION≫		
PCB-N	*	Switch-2 circuit board (H model only)
PCB-N	*	Switch-2 circuit board (E,K,G model only)
S13	82-160-628-01	Slide switch (TIMER)
≪SWITCH-3 CIRCUIT BOARD SECTION≫		
PCB-O	*	Switch-3 circuit board (H model only)
PCB-O	*	Switch-3 circuit board (E,K,G model only)
S12	82-160-628-01	Slide switch (MEMORY)
≪SWITCH-4 CIRCUIT BOARD SECTION≫		
= E,K,G model only		
⚠ PCB-P	82-179-696-01	Switch-4 circuit board
⚠ S28	87-031-640-01	Push-switch (POWER)
⚠ F1	87-035-216-01	Fuse "T" 200mA
⚠	87-033-147-01	Fuse clamp
		< **Capacitor** >
⚠ C343	87-019-112-01	0.01μF Spark killer

www.freeservicemanuals.info

SCHEMATIC DIAGRAM-2



MECHA MODE and OUTPUT of MPU

MECHA / MPU PORT	F.F	RWD	STOP	(REC) PLAY	(REC) PLAY PAUSE	(REC) PAUSE	CUE	RE VIEW	Compu Brain REC PLAY
M-FWD	○			○			○		○
M-RWD		○						○	
S-PLY				○	○		○	○	○
S-BRK	○	○			○	○	○	○	
0-C/R							○	○	
0-PAUS					○	○			
0-REC				(○)	(○)	(○)			○
$\overline{\text{0-RMT}}$				*(○)					○
$\overline{\text{0-LMT}}$	○	○	○	○	○	○	○	○	
$\overline{\text{0-PMT}}$				○			○	○	○

○: High Level, * Low Level in RECMUT MODE.

www.freeservicemanuals.info

AD-3800H,E,K,G AD-3800H,E,K,G

Symbol No.	Part No.	Description
		≪MISCELLANEOUS≫
⚠T1	82-179-615-01	Power transformer (H model only)
⚠T1	82-179-614-01	Power transformer (E,K,G model only)
PH,EH	87-046-194-01	Combination head
EH	87-046-192-01	Erase head
PL1	82-179-623-01	Pilot lamp ass'y, 15V, 40mA
⚠	87-033-140-01	Splice connecter (H model only)
⚠S29	87-031-586-01	Rotary switch (VOLTAGE SELECTOR) (H model only)
⚠	87-034-826-01	AC power cord (H model only)
⚠	87-034-877-01	AC power cord (E model only)
⚠	87-034-872-01	AC power cord (K model only)
⚠	87-034-892-01	AC power cord (G model only)
⚠	87-085-166-01	Holder, AC power cord (E,K,G model only)
M1	87-045-175-01	DC motor, servo system
M2	87-045-164-11	DC motor ass'y
SOL1,2	82-179-630-01	Solenoid, DM-6
L1	82-401-661-01	Choke coil, 600μH
S14	82-283-631-01	Leaf switch (CASSETTE DETECTION)
S15	87-031-610-01	Micro switch (REC)
⚠	87-085-165-01	Cord bushing (H model only)

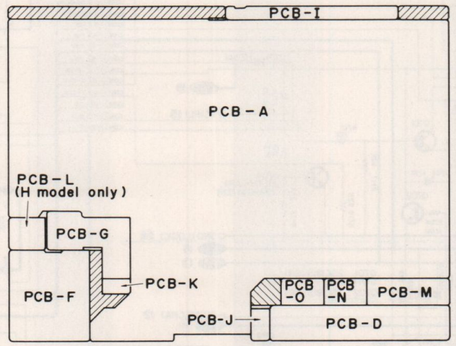
⚠ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.

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

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

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 82-179-601-11 (H model only)
Combination circuit board 82-179-681-01 (E,K,G model only)



☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆ MEMO ☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

www.freeservicemanuals.info

NOTES (1) B(+) Pattern 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.
An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.

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 (④).

WIRING–1

3. Playback frequency Characteristic Adjustment
Settings:
- Test tape: TTA-117E
- TAPE SELECTOR switch: CrO2
- Adjustment location: SFR1 (L ch) SFR2 (R ch)

Method:
Playback the test tape and adjust SFR1,2 so that the 1 kHz and 10 kHz output deviation are +0.5 dB.

10. METAL medium Frequency Range EQ Adjustment
Settings:
- Test tape: AC-711
- Input signal: 400 Hz/7 kHz
- Tape selector switch: METAL
- Adjustment locations: SFR153 (L ch) SFR154 (R ch)

Method:
Same as 8 LH REC/PLAY frequency characteristics, adjust so that the output of 7 kHz is the same based on the output of 400 Hz.

6. Bias Osc. frequency Adjustment
Settings:
- Recording mode
- Test point: TP3
- Adjustment locations: L274

Method:
Adjust L274 so that the bias OSC. frequency become 85 kHz ± 0.1 kHz.

7. Bias Osc. Output Adjustment
Settings:
- Recording mode
- Test point: TP4
- Adjustment locations: L273

Method:
Adjust L273 so that the OSC. output is maximum where the lead of resistor (R289) connected with earth part.

8. LH REC/PB Frequency Characteristic Adjustment
Settings:
- Recording mode
- Test tape: TTA-119J
- Output level: MAX
- TAPE SELECTOR switch: LH
- Input signal: 1 kHz, 30mV
- Adjustment locations: SFR271 (L ch) SFR272 (R ch)

Method:
Supply a 1 kHz, 30 mV signal and adjust the recording level so that the LINE output is made 77.5mV. Record and playback the 1 kHz and 10 kHz signals and adjust so that the 1 kHz and 10 kHz outputs are set to +0.5 dB.

TP 5 COMPU-BRAIN OSC OUTPUT TEST POINT

TP 4 BIAS OSC OUTPUT TEST POINT

TP 3 BIAS OSC FREQ. TEST POINT

TP 7 COMPU-BRAIN REFERENCE VOLTAGE TEST POINT

TP 6 COMPU-BRAIN REFERENCE VOLTAGE TEST POINT

13. Erase Head Adjustment
Settings:
- Test tape: TTA-119MX
- Tape selector switch: METAL
- Input signal: 125 Hz, 0 VU + 10 dB
- Output level: Max.
- Adjustment location: Erase head adjustment screw

Method:
Record a signal (125 Hz, 0 VU + 10 dB) for approx. 15 sec and then rewind the tape. Erase the signal with no input and adjust so that the erase ratio is 60 dB or more for both the L and R channels.
Check that no over-erasing of the opposite tracks occurs.

2. Azimuth Adjustment
Settings:
- Playback mode
- Test tape: TTA-117E
- TAPE SELECTOR switch: CrO2
- Adjustment location: Azimuth adjusting screw

Method:
Playback the test tape and adjust so that the output of the 10 kHz section reaches the maximum and same phase for both the left and right channel.

5. Level Indicator Adjustment
Settings:
- Test tape: TTA-119MX
- Input signal: 1 kHz, 300 mV
- Monitor switch: SOURCE
- Output level: Max
- Adjustment locations: SFR101 (L ch) SFR102 (R ch)

Method:
Apply a signal (1 kHz, 300 mV) and adjust the recording level so that the output is 500 mV. Adjust so that the 0 dB LED indicator lights at that time. Check that the +2 dB LED lights when the input is reised by 2 dB.

4. Playback Level Adjustment
Settings:
- Test tape: TTA-161
- TAPE SELECTOR switch: LH
- Test point: TP1 (L ch), TP2 (R ch)
- Adjustment locations: SFR3 (L ch) SFR4 (R ch)

Method:
Playback the test tape and adjust so that the output is V.

TP1 P.B OUTPUT TEST POINT(L-ch)

TP2 P.B OUTPUT TEST POINT(R-ch)

9. LH REC/PB Sensitivity Adjustment
Settings:
- Recording mode
- Test tape: TTA-119J
- Input signal: 1 kHz, 30mV
- TAPE SELECTOR switch: LH
- Adjustment locations: SFR151 (L ch) SFR152 (R ch)

Method:
Make the characteristics identical to the 8. LH REC/PB frequency characteristic.
Adjustment and adjust so that the LINE output is made 77.5 mV.

1. Tape Speed Adjustment
Settings:
- Test tape: TTA-111S
- Adjustment location: SFR of M1

Method:
Playback the test tape and adjust so that the frequency is 2,990~3,000 Hz, both at the start and the end of tape winding.

A MAIN C.B
D VOLUME C.B-1
O SWITCH C.B-3
J JACK C.B
N SWITCH C.B-2
M VOLUME C.B-2
E METER C.B
SWITCH C.B-4
SWITCH C.B-1
"H" MODEL
"E" MODEL AC220V 50/60Hz
"K" MODEL AC240V 50/60Hz
"G" MODEL AC240V 50/60Hz
"E""K""G" MODEL
"H" MODEL AC120V/220V/240V 50/60Hz
G LED-1基板 ①
I LED C.B-2
K HALL IC C.B
F KEY BOARD SW C.B
G LED-I C.B
M1 (MAIN MOTOR)
M2 (SUB MOTOR)
SOL.1 (MAIN SOLENOID)
SOL.2 (SUB SOLENOID)
S15 (REC SW)
S14 (CASSETTE SW)
PL1 (CASSETTE LAMP)
J1, 2 MIC
J8 PHONES
J3 LEFT LINE IN/REC RIGHT J4
J5 LEFT LINE OUT/PLAY RIGHT J6
J7 REMOTE CONTROL
S12 MEMORY
S13 TIMER
S10 MPX FILTER
S11 FREQ. SELECTOR
S1 POWER
S28 POWER
S29 VOLTAGE SELECTOR
F1 200mA
VR1,2 OUTPUT LEVEL
VR151,152 RECORD LEVEL
S8 METAL
S7 Fe-Cr
S6 LH
S5 CrO2
S4 MONITOR
S3 B/C DOLBY NR
S2 ON/OFF
S9 ADMS
EH
PH.RH
B DOLBY B,C NR C CrO2 LH Fe-Cr METAL

11. Compu-Brain Oscillation Output Adjustment
Settings:
- Test tape: Blank tape
- Test point: TP5
- Adjustment locations: SFR501

Method:
Load a blank tape and press the compu-brain START button. Check that the recording mode is completed twice, the tape idles, and the BIAS LED lights. Adjust so that the output at the test point is 77.6 mV at that time.

12. Compu-Brain Reference Voltage Adjustment
Settings:
- Test point: TP6,7
- Adjustment location: SFR451

Method:
Apply a signal 1 kHz, 77.5 mV to test point TP6. Connect the DC oscilloscope to TP7 and adjust SFR451 to the point where the level is switched over.

www.freeservicemanuals.info

NOTES (1) B(+) Pattern 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.

15. Dolby C Decoder Adjustment

Settings:
- Input signal: 700 Hz
- DOLBY-NR switch: OFF, B type → ON, C type
- Test point: Input TP15 (L-ch), TP16 (R-ch)
  Output TP17,19 (L-ch), TP18,20 (R-ch)
- Adjustment locations: SFR1,3 (L-ch), SFR2,4 (R-ch)

Method:
Supply 700 Hz signal and adjust the input level so that the test point TP17,18 output is made 775 mV. Adjust SFR1,3 so that the test point TP19,20 output is made 775 mV. Next adjust the input level so that the point TP19,20 output is made 83 mV. DOLBY-NR switch to ON, C type and adjust SFR2,4 so that test point TP19,20 output is made 23.5 mV.

TP17 DOLBY DECODER OUTPUT (L-ch)

TP18 DOLBY DECODER OUTPUT (R-ch)

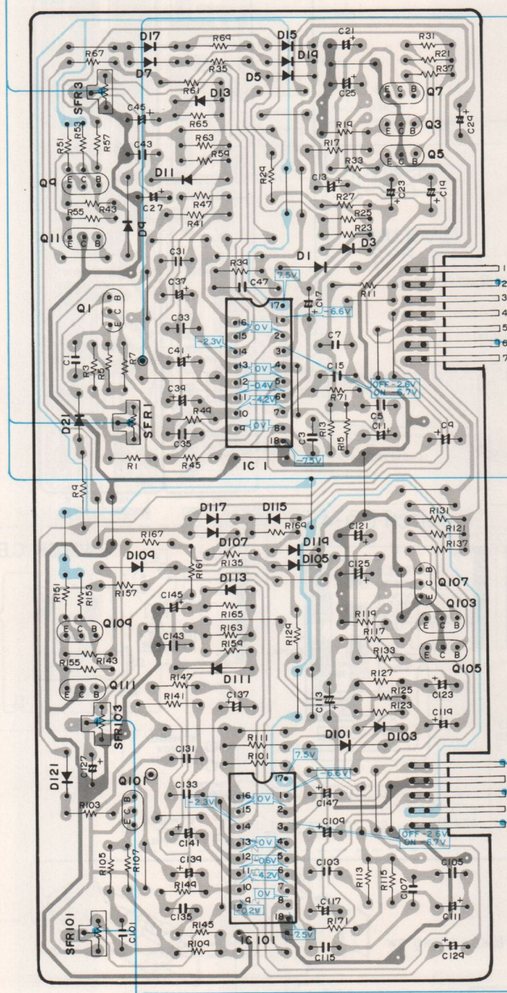
TP15 DOLBY DECODER INPUT (L-ch)

TP19 DOLBY DECODER OUTPUT (L-ch)

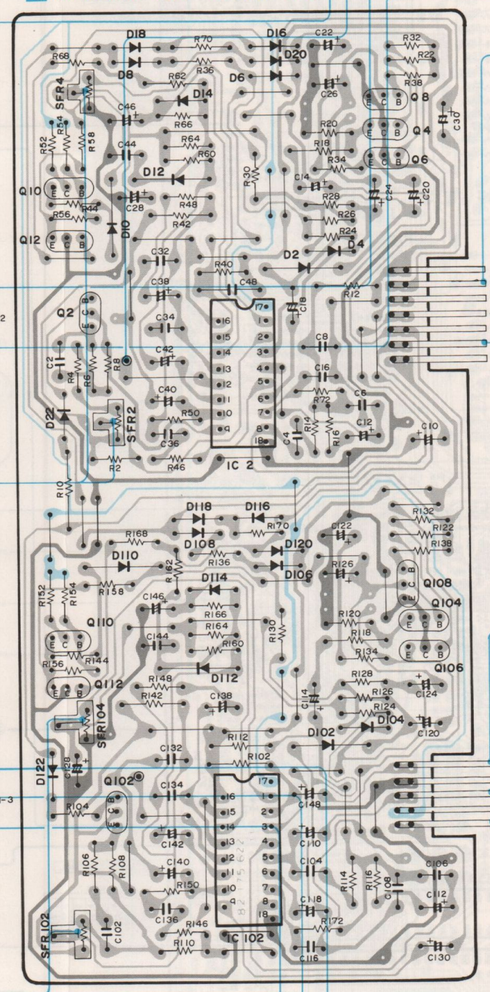
TP16 DOLBY DECODER INPUT (R-ch)

TP20 DOLBY DECODER OUTPUT (R-ch)

B DOLBY NR C.B (Lch)



C DOLBY NR C.B (Rch)



CON-4

CON-5

⇨ A MAIN C.B

TP10 DOLBY ENCODER INPUT (R-ch)

TP12 DOLBY ENCODER OUTPUT (R-ch)

TP14 DOLBY ENCODER OUTPUT (R-ch)

14. Dolby C Encorder Adjustment

Settings:
- Input signal: 700 Hz
- DOLBY-NR switch: OFF, B type → ON, C type
- Test point: Input TP9 (L-ch), TP10 (R-ch)
  Output TP11,13 (L-ch), TP12,14 (R-ch)
- Adjustment locations: SFR101,103 (L-ch), SFR102,104 (R-ch)

Method:
Supply a 700 Hz signal and adjust the input level so that the test point TP11,12 output is made 775 mV. Adjust SFR 101,102 so that the test point TP13,14 output is made 775 mV. Next adjust the input level so that the test point TP13,14 output is made 23.5 mV. DOLBY-NR switch to ON, C type and adjust SFR103,104 so that the test point TP13,14 output is made 83 mV.

TP9 DOLBY ENCODER INPUT (L-ch)

TP11 DOLBY ENCODER OUTPUT (L-ch)

TP13 DOLBY ENCODER OUTPUT (L-ch)

A MAIN C.B ⇦ CON-1

H COUNTER C.B

S24 RESET S25 TAPE TIME S26 COUNTER S27 MEMORY REWIND

F KEY BOARD SW C.B

START / RESET F·FWD PAUSE MUTE REW PLAY REC STOP

G LED C.B-1

READY EQ CAL BIAS

ADMS MEMORY REWIND TAPE SOURCE

⇩ A MAIN C.B

E METER C.B

D1 PEAK PROGRAM METER

A17~21 ② A MAIN C.B

IWA www.freeservicemanuals.info

11. Timing charts

11-1. Bias adjustment

• BIAS ADJUSTMENT

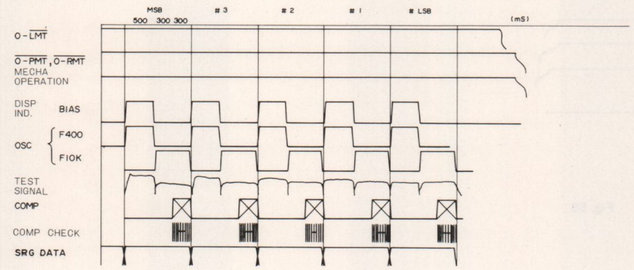


Fig. 31

11-2. Transfer from STOP mode

• STOP → PLAY or (REC/PLAY) KEY = PLAY or REC/PLAY

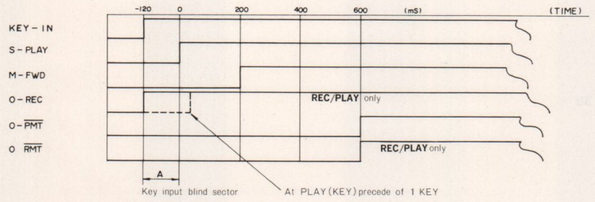


Fig. 32

• STOP → RWD KEY = RWD

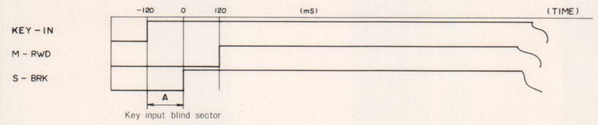


Fig. 33

• STOP → FF KEY = FF

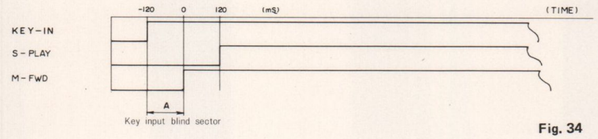


Fig. 34

• STOP → REC KEY = REC

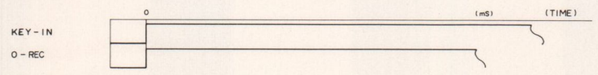


Fig. 35

• STOP → PAUSE KEY = PAUSE

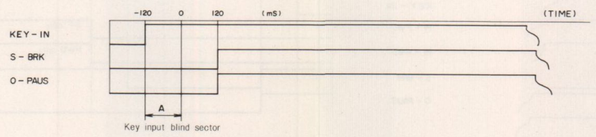


Fig. 36

• STOP → ADMS KEY = ADMS

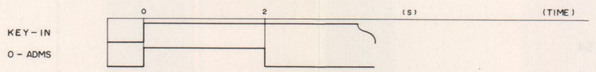


Fig. 37

• STOP → CASSETTE-PULL KEY = Cassette in

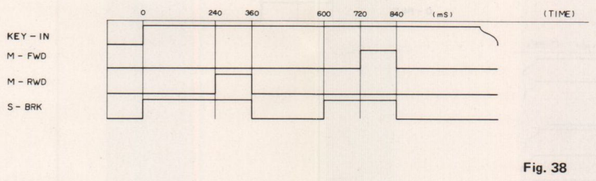


Fig. 38

11-3. Transfer from PLAY or REC/PLAY

• PLAY or REC/PLAY → STOP KEY = STOP

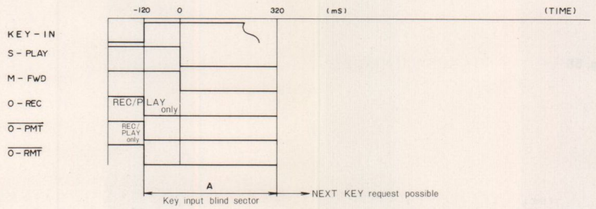


Fig. 39

• PLAY or REC/PLAY → PLAY or REC/PLAY - PAUSE KEY = PAUSE

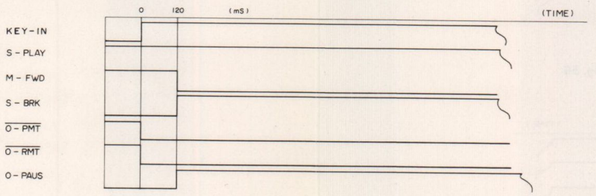


Fig. 40

• PLAY or REC/PLAY → RWD or FF KEY = RWD or FF

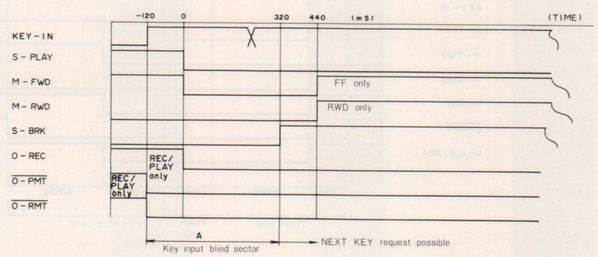


Fig. 41

• PLAY or REC/PLAY → CUE or REV KEY = FF/PLAY or RWD/PLAY

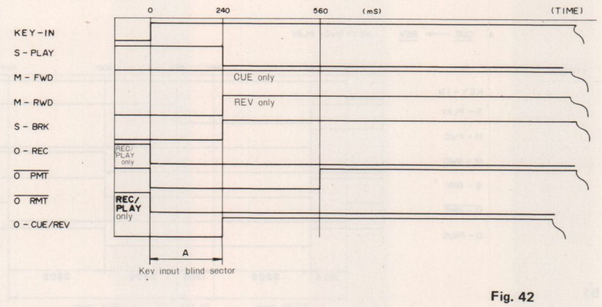


Fig. 42

• PLAY → REC/PLAY KEY = REC/PLAY

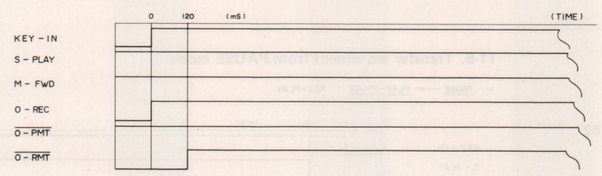


Fig. 43

• REC/PLAY → REC-MUT → REC/PLAY-PAUSE KEY = REC MUT

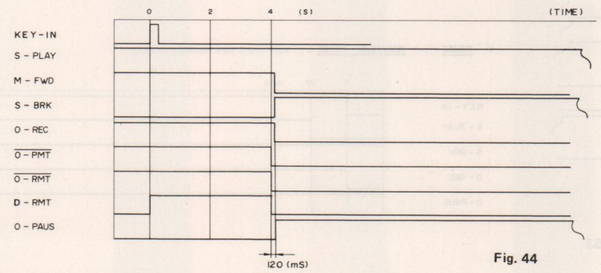


Fig. 44

• REC/PLAY → REC-MUT → REC/PLAY KEY = REC MUT (Push twice)

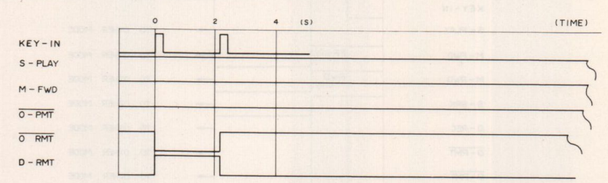


Fig. 45

• REC/PLAY → REC-MUT → REC/PLAY KEY = REC MUT (WINK)

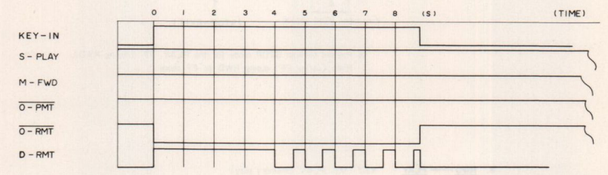


Fig. 46

• PLAY → RWD KEY = AUTO-STOP (Auto-repeat)

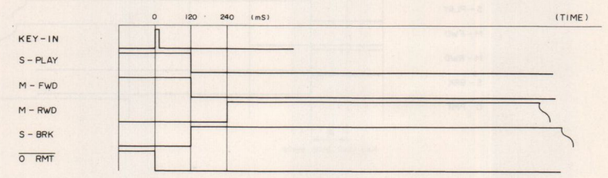


Fig. 47

• PLAY REC/PLAY - PAUSE → PLAY REC/PLAY KEY = PAUSE

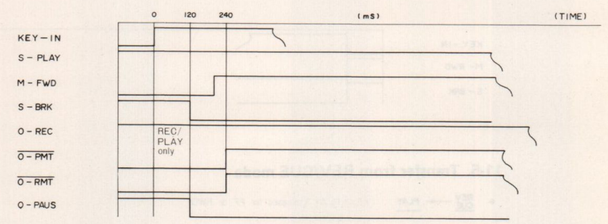


Fig. 48

11-4. Transfer from RWD/FF mode

• RWD or FF → STOP KEY = STOP

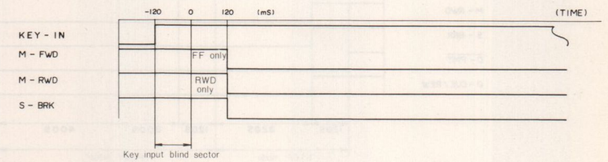


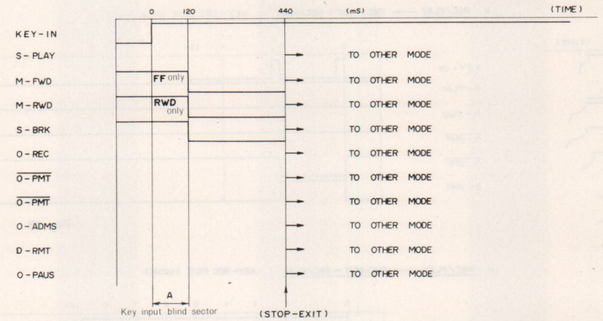
Fig. 49

www.freeservicemanuals.info

AD-3800H,E,K,G

AD-3800H,E,K,G

• **RWD or FF → STOP(OTHER MODE)** KEY = PLAY, FF(RWD), RWD(FF)



※ Passes through STOP mode for the PLAY, FF (during RWD), RWD (during FF) during RWD or FF mode.

Fig. 50

• **RWD → PLAY** KEY=ME PLAY (memory play)

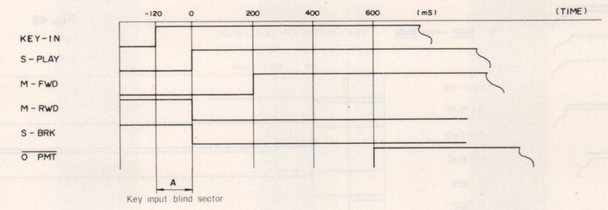


Fig. 51

• **RWD → STOP** KEY=ME STOP (memory stop)

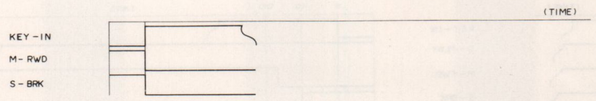


Fig. 52

11-5. Transfer from REV/CUE mode

• **REV/CUE → PLAY** KEY=PLAY (released for FF or RWD)

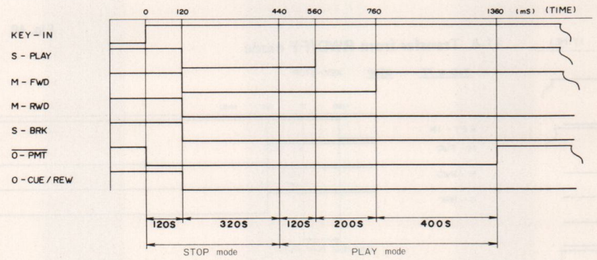


Fig. 53

• **REV → CUE** KEY = FF/PLAY

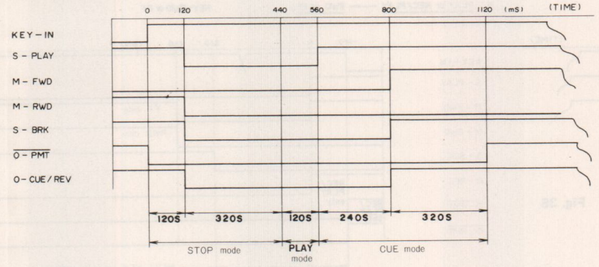


Fig. 54

• **CUE → REV** KEY = RWD/PLAY

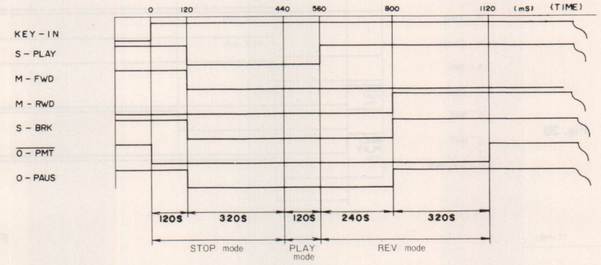


Fig. 55

11-6. Transfer movement from PAUSE mode

• **PAUSE → PLAY-PAUSE** KEY = PLAY

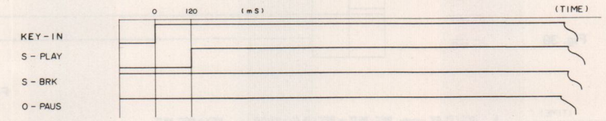
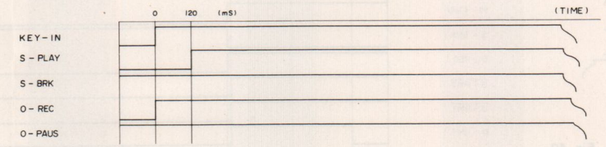


Fig. 56

• **PAUSE → REC/PLAY-PAUSE** KEY=REC (one recording PAUSE)



• **PAUSE → FF or RWD** KEY = FF or RWD

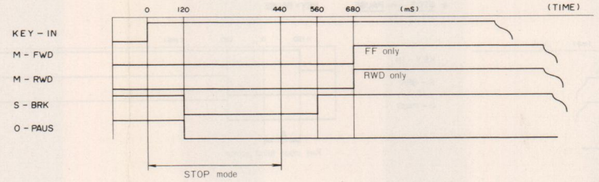


Fig. 58

• **PAUSE → STOP** KEY = PAUSE

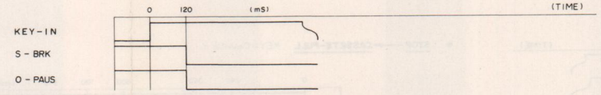


Fig. 59