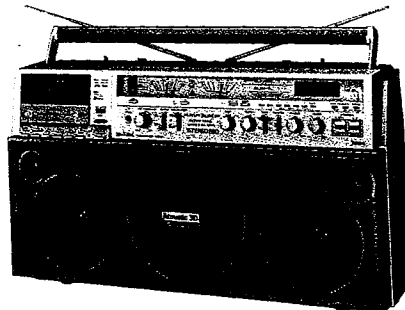


2-BAND STEREO RADIO CASSETTE RECORDER

MODEL No. CS-880H, HG, U, UC

CS-880H, HG, U, UC

AIWA® (SERVICE MANUAL)



Code No. 29-880-000-78

DATE OF ISSUE 5/1981

SPECIFICATIONS

GENERAL


Semiconductors:	16 ICs, 1 FET, 99 transistors, 68 diodes, 8 LED's, 1 LCD
Power source:	Batteries DC 13.5V (UM-1 x 9) Back-up power supply (for tuner memory) DC 3V (UM-3, "AA" x 2) H, HG model AC 110 ~ 120V/220 ~ 240V switchable 50/60 Hz U, UC model AC 120V/220 ~ 240V switchable, 60 Hz Car battery (thru car adaptor) H, HG model
Power consumption:	27W U, UC model 39W
Speakers:	140mmφ x 2 (Woofer) (5-5/8") 50mmφ x 2 (Tweeter) (2") 170mmφ x 1 (Passive Radiator) (6-3/4")
Dimension:	588(W) x 325(H) x 163(D) mm [23-1/4" x 12-7/8" x 6-1/2"]
Weight:	8.6 kg (18.6 lbs.)

RADIO SECTION

Frequency range:	FM 87.9 ~ 107.9 MHz AM 522 ~ 1,611 kHz
Intermediate frequency:	FM 10.7 MHz AM 450 kHz
Sensitivity: (IHF, THD 3%)	FM (H, HG model) 13 ± 6 dB (at 87.9 MHz) 12 ± 6 dB (at 98.0 MHz) 13 ± 6 dB (at 107.9 MHz) (U, UC model) 14 ± 6 dB (at 87.9 MHz) 13 ± 6 dB (at 98.0 MHz) 14 ± 6 dB (at 107.9 MHz) 47 ± 5 dB (at 594 kHz) 45 ± 5 dB (at 1,008 kHz) 42 ± 5 dB (at 1,404 kHz)
(S/N 10 dB)	
Image rejection:	FM 45 ± 5 dB (at 107.9 MHz) AM 41 ± 5 dB (at 1,404 kHz)
IF rejection:	FM 80 ± 10 dB (at 87.9 MHz) AM 31 ± 5 dB (at 594 kHz)
Total harmonic distortion:	FM Less than 1.5% (at 98 MHz) AM 1.7 ± 1.0% (at 1,008 kHz)
FM stereo separation:	22 ± 3 dB (at 1 kHz)
Auto stop level:	FM 22 ± 10 dB (at 98 MHz) AM 60 ± 10 dB (at 1,008 kHz)

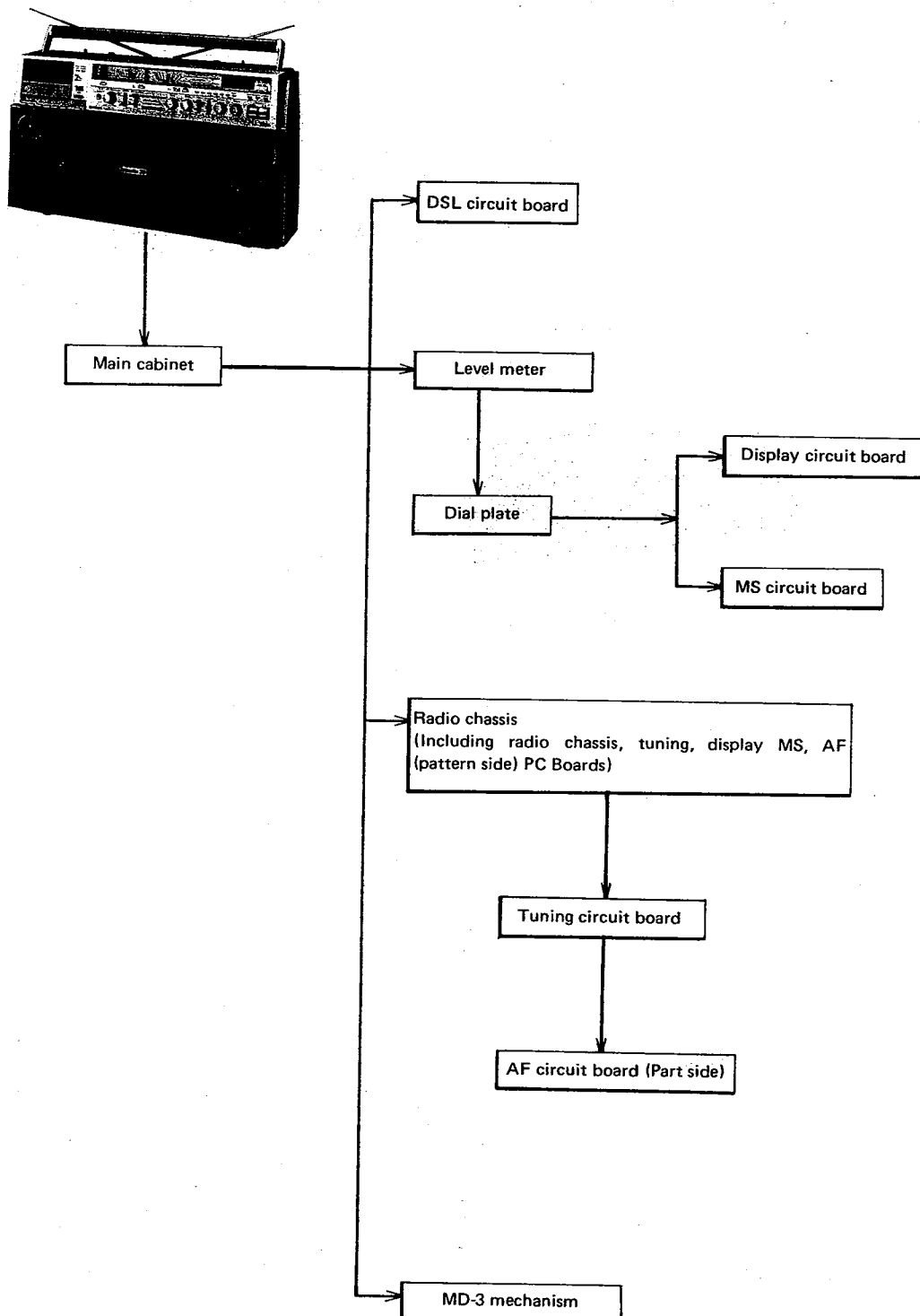
TAPE RECORDER SECTION

Tape speed:	4.8 cm/s. ± 3%
Recording system:	AC bias
Erasing system:	AC erase
Record bias frequency:	61 ± 0.5 kHz
Distortion:	Less than 1.5% (PB) Less than 1.5% (REC/PB)
Frequency response:	METAL tape 35 ~ 16,000 Hz CrO ₂ tape 35 ~ 13,000 Hz LH tape 35 ~ 12,500 Hz
Signal to noise ratio: (Un-weighted)	More than 49/46 dB [DC/AC] (PB) More than 44/42 dB [DC/AC] (REC/PB)
Erasing ratio:	More than 60 dB
Separation:	More than 39 dB (REC/PB)
Output power:	H, HG model More than 24W [12W + 12W] U, UC model 7 watts per channel, Min. RMS at 8 ohms, from 200 Hz to 10 kHz, with no more than 10% Total Harmonic Distortion
FF & rewind time:	90 ± 5 s. (at C-60)
Automatic stop system:	Mechanical auto stop
Pinch roller pressure:	125 ± 15 g
Wow and flutter:	Less than 0.038% (WRMS)
Take-up torque:	35 ⁺¹⁵ ₋₅ g-cm
FF & rewind torque:	110 ± 20 g
Input terminal:	MIC 3.5φ jack x 2 PHONO/LINE IN pin jack x 2
Input sensitivity/impedance:	MIC 0.3mV/3kΩ LINE IN 150mV/47kΩ PHONO 4mV/47kΩ LINE OUT pin jack x 2 EXT. SP 3.5φ jack x 2 PHONES 6.3φ jack
Output terminal:	

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

DISASSEMBLING CHART OF MAIN PARTS

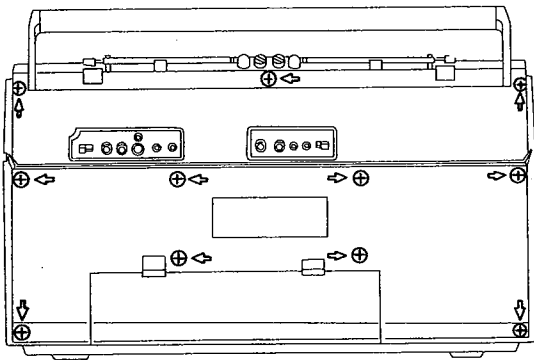
- To avoid troubles when disassembling or replacing the main parts, follow the chart diagram as below.



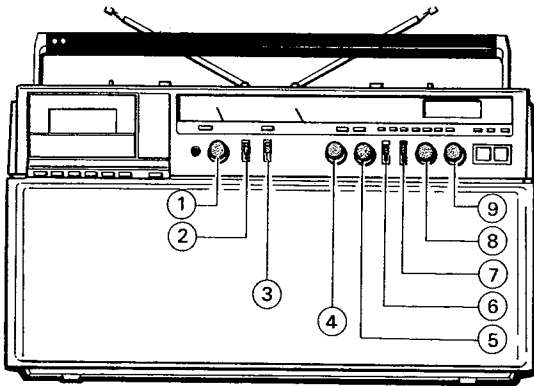
DISASSEMBLY INSTRUCTIONS

Removing the Main Case

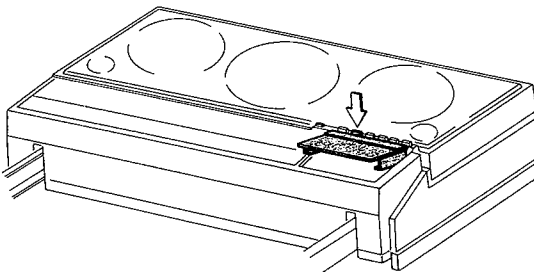
- 1) Remove 11 screws on the rear lid shown by arrows ←.



- 2) Remove 9 knobs.



- Note 3)** Open the cassette lid.
(It is not required to remove the cassette lid)

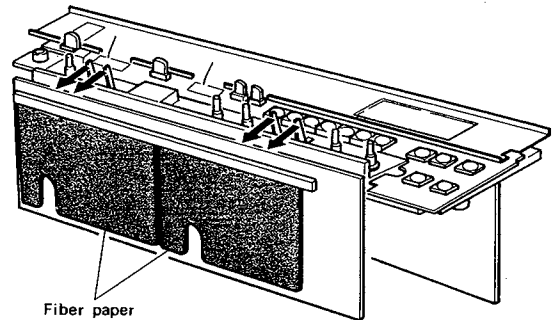


Installing the Main Case

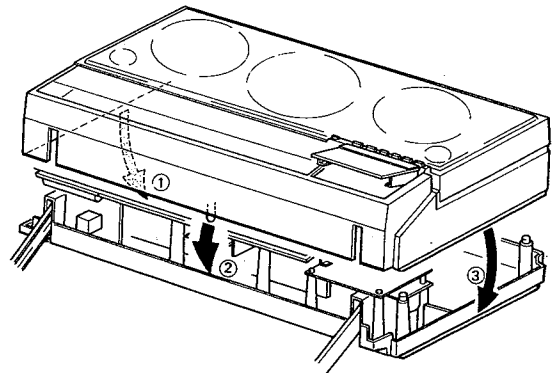
- 1) Check that the fibre apper of the REC/PB PC Board (pattern die) is fixed properly.

Note: Firmly fix the fibre paper using two-sided tape, etc. because it is likely to lift up when it is peeled off once.

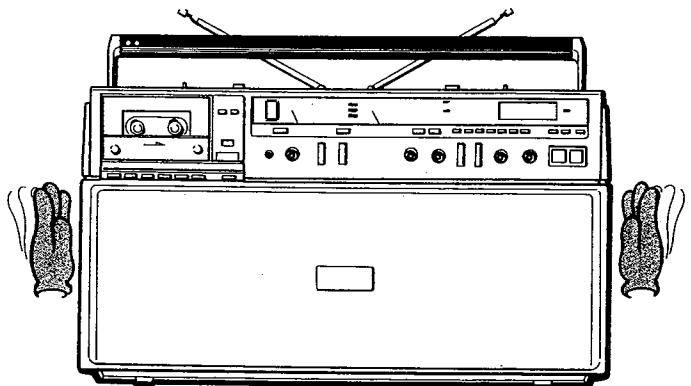
- 2) Lower all the lever switches in the direction of the arrow.



- Note 3)** Be sure to install in the order (1) — (3). Be careful: when it is mounted incorrectly, it may damage the dial plate and the display PC Boards, etc.

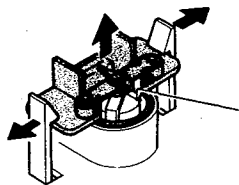


- 4) Match the knobs while performing item 3) and tapping the side.

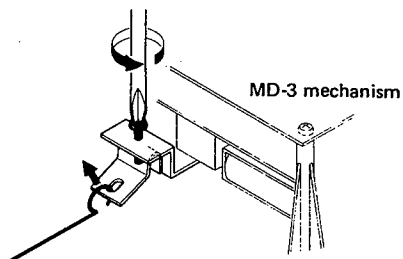


Note: Removing the radio chassis

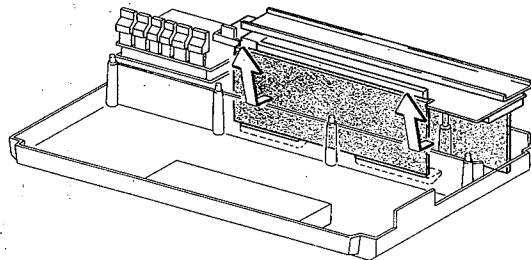
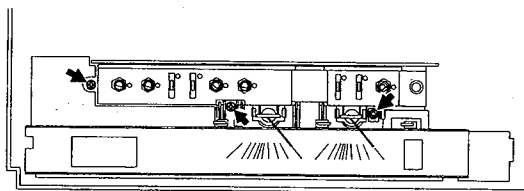
- 1) Be sure to remove the level meter before starting work to prevent the pointer of the level meter from being damaged.



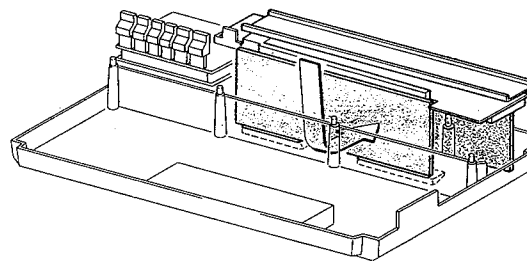
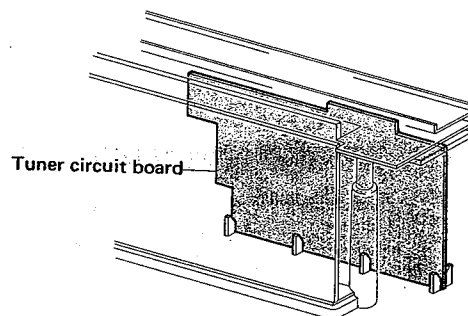
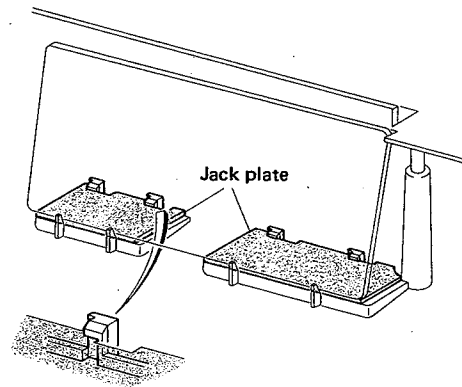
- 2) Loosen the screw and lift up the hook.



- 3) Remove 3 screws and lift up the radio chassis in the direction of the arrow. The radio chassis, REC/PB, tuner, MS and display PC Boards are removed at that time.

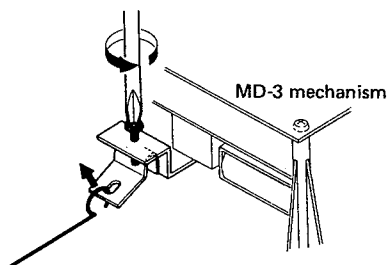
**Note:** Installing the radio chassis

- 1) Hook the jack plate to the tab of the rear lid while paying attention not to pinch the wire. Compress the radio chassis against the direction of the arrow after checking that the tuner PC Board is inserted into the rib.

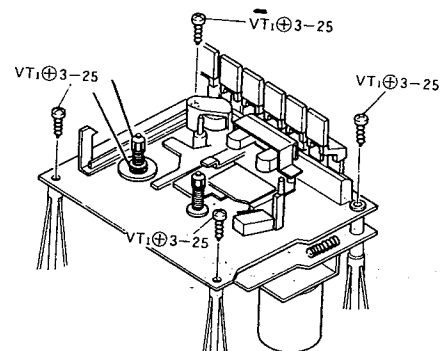


Removing Mechanism

- 1) Loosen the screw and remove the hook of the rod.

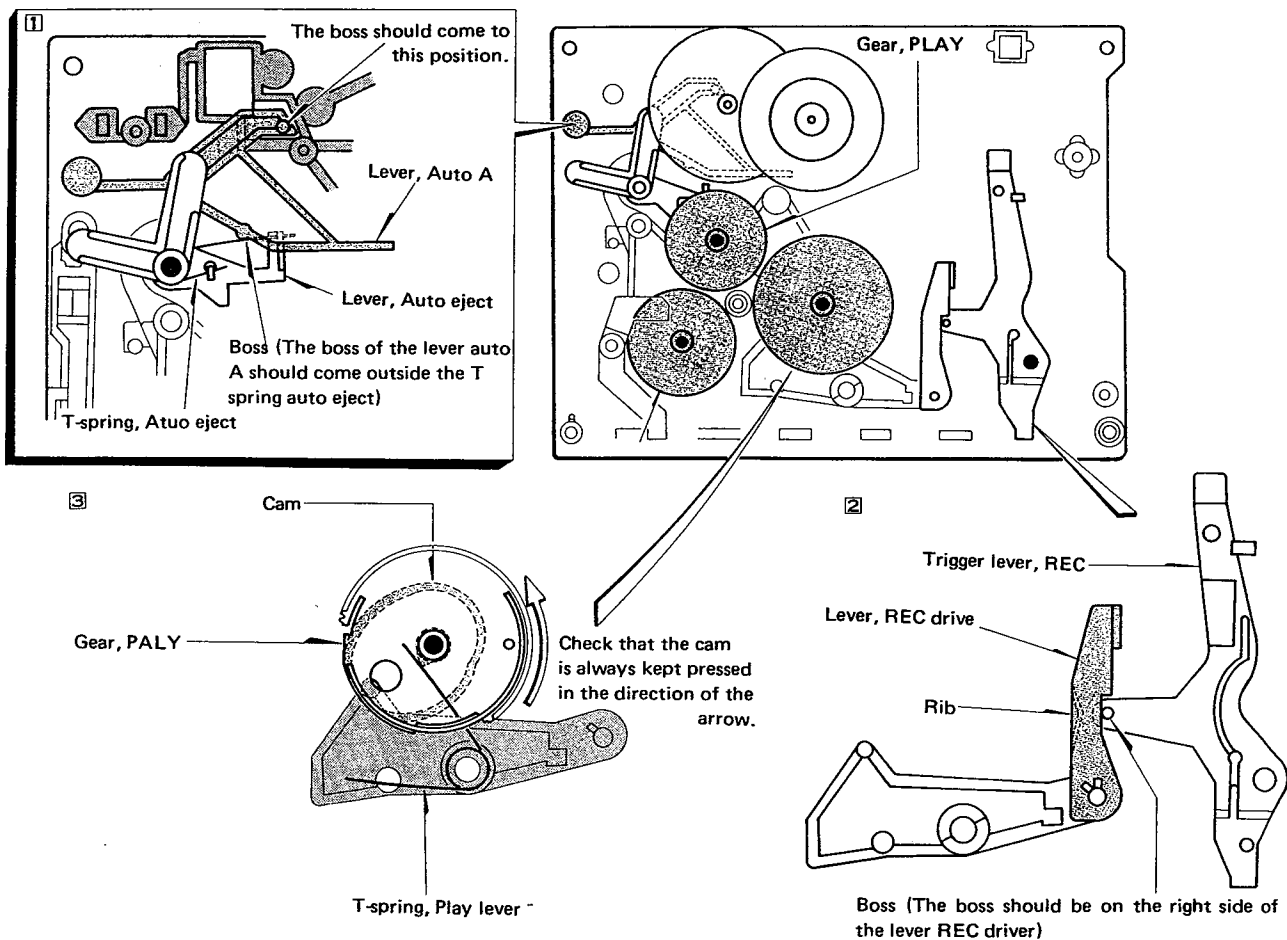


- 2) Remove 4 screws.

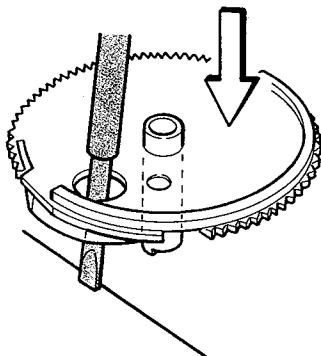


Cautions on Disassembling MD-3 Mechanism

Disassemble or repair the MD-3 mechanism while paying attention to the springs and levers, etc. shown in the figure below.



Be sure to hook the T-spring (PLAY lever) to the cam of the gear when installing the gear PLAY. Hook it from the inside of the gear using a clock screwdriver as shown in the figure. Perform the same for the gear FR and cam gear PAUSE.



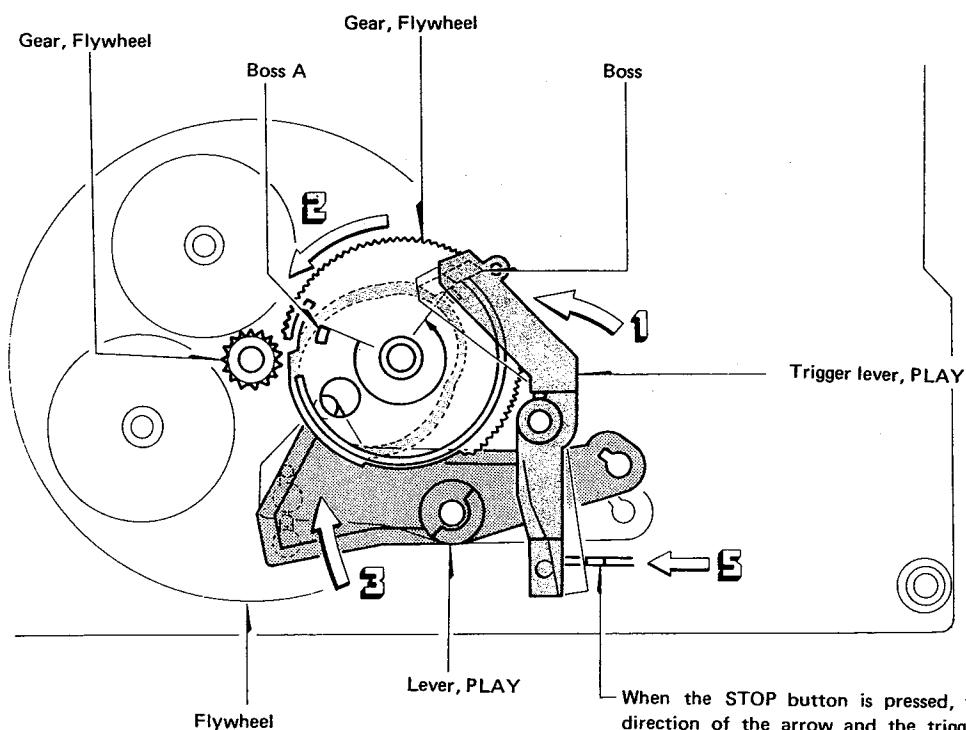
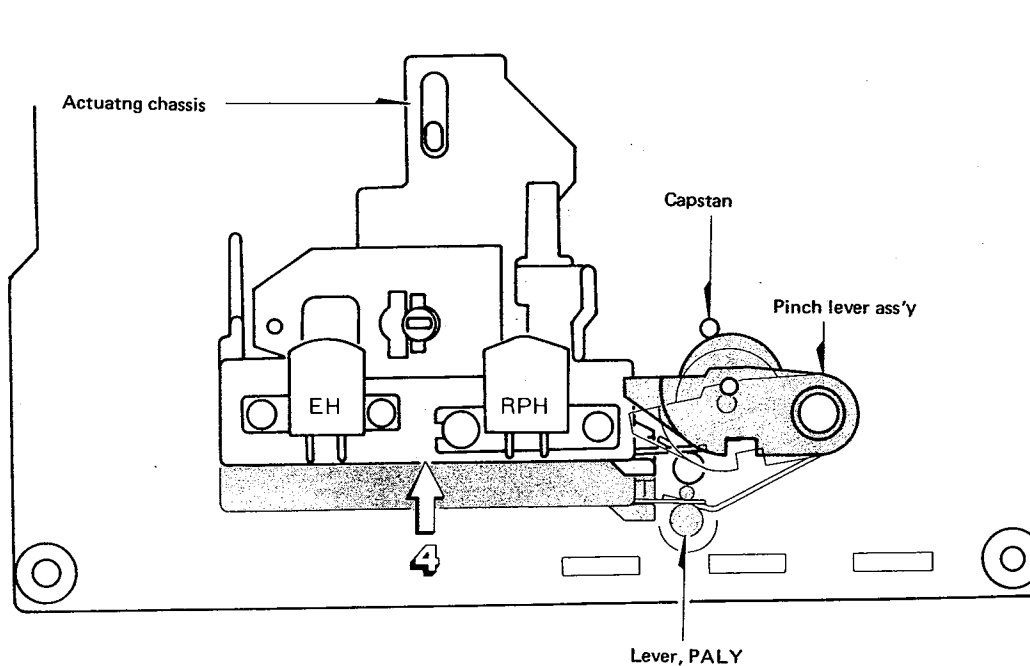
DESCRIPTION OF THE MD-3 MECHANISM

Description of the PLAY Operation

With the plate button pressed, the trigger lever (PLAY) moves in the direction of the arrow ← (1), the gear (PLAY) is released from the boss of the trigger lever (PLAY) engages with the gear flywheel and rotates in the direction of the arrow ← (2), the boss (A) of the gear (PLAY) touches the trigger lever (PLAY) and the gear stops rotating.

When the gear (PLAY) rotates, the lever (PLAY) moves in the direction of the arrow ← (3) along the cam groove on the rear of the gear to push up the operation chassis in the direction of the arrow ← (4).

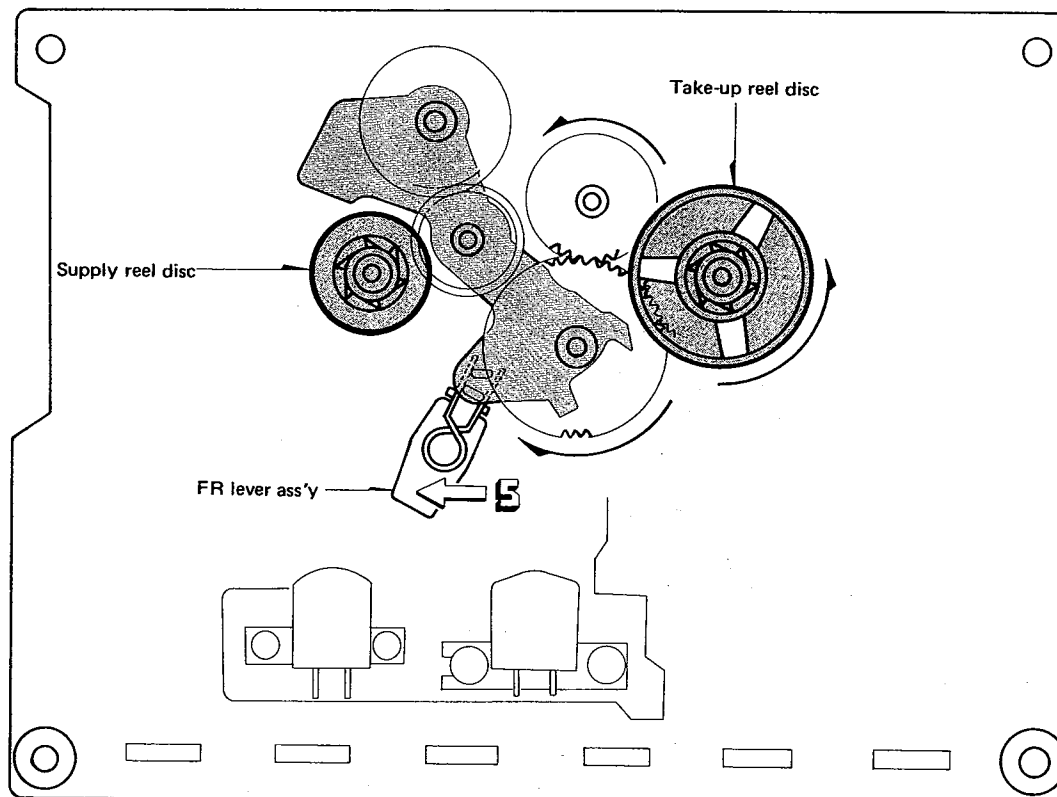
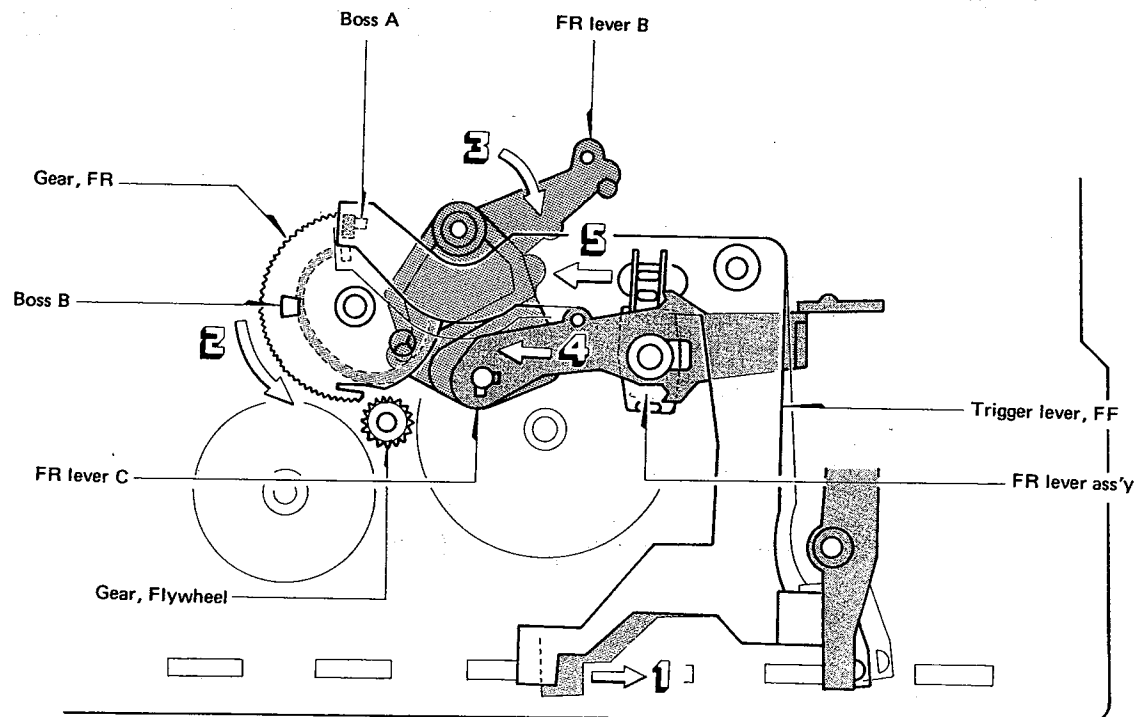
The PLAY button which has been locked is released by pressing the STOP button, the trigger lever (PLAY) moves in the direction of the arrow ← (5), the boss (A) of the gear (PLAY) is released and the PLAY operation stops.



Description of the FF Operation

When the FF button is pressed, the trigger lever FF moves in the direction of the arrow ← (1), the boss of the gear FR cam is released and engages with the gear wheel to rotate in the direction of the arrow ← (2), the boss (A) touches the boss of the trigger lever FF

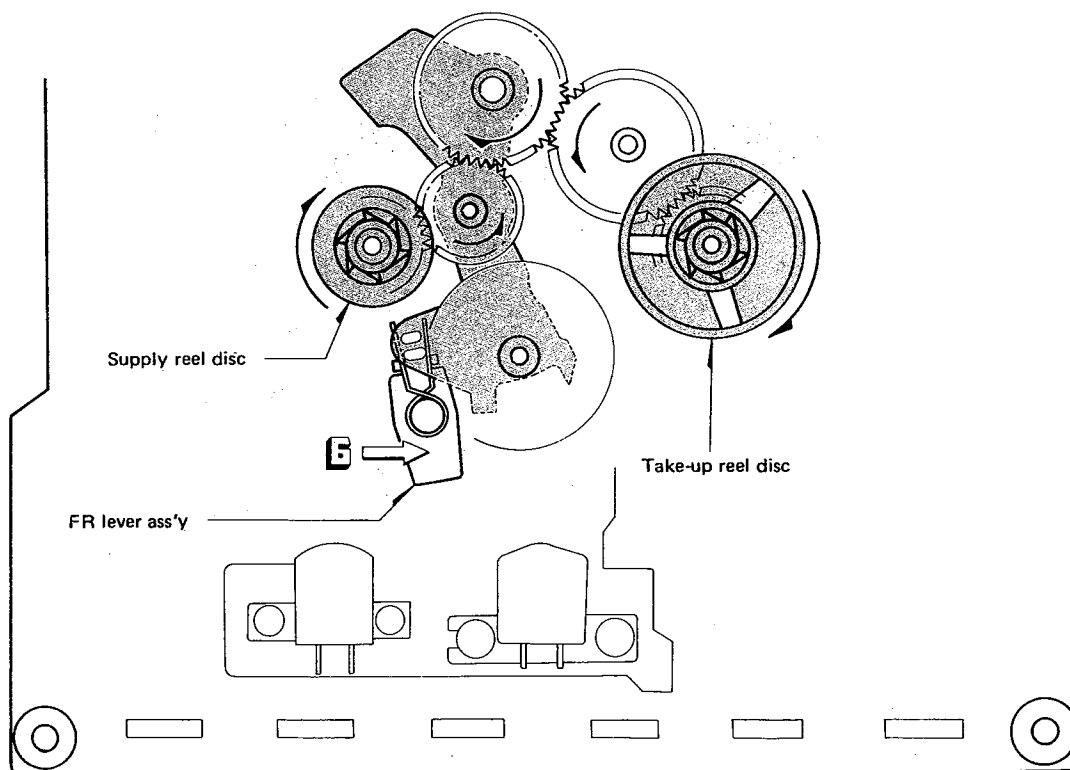
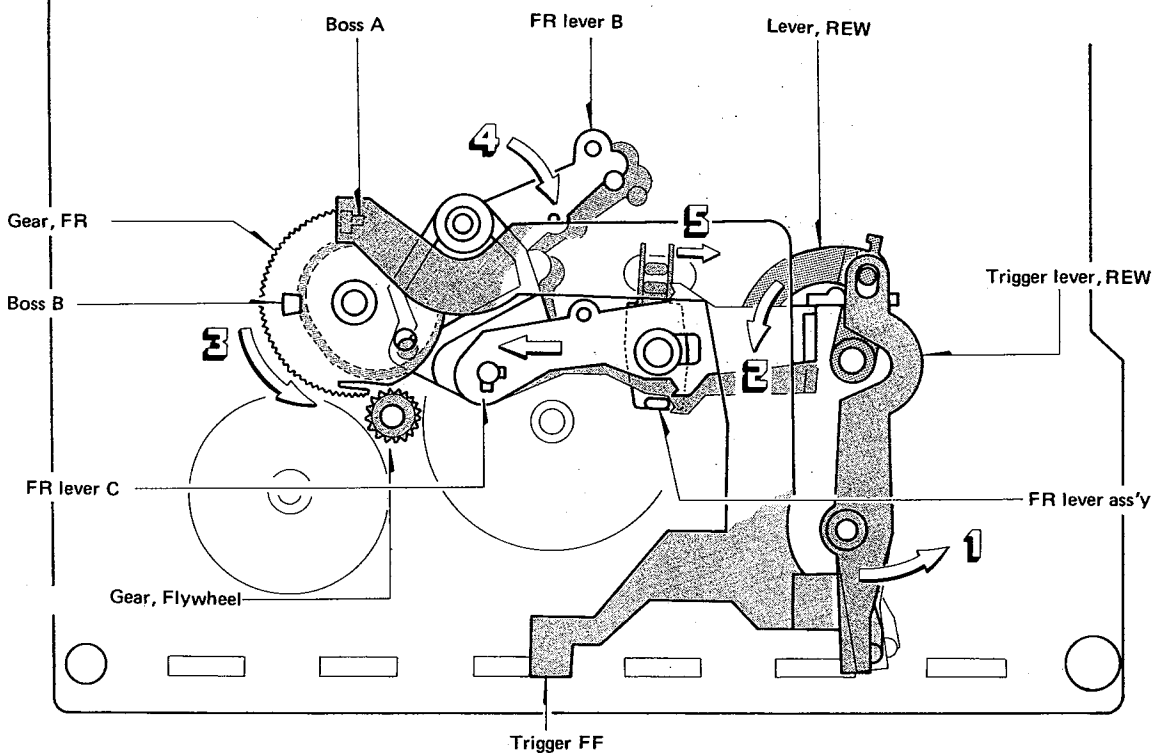
and the gear FR cam stops. The FR lever B moves in the direction of the arrow ← (3) along the groove of the gear FR cam, the FR lever B moves in the direction of the arrow ← (3), the FR lever C compresses the gear of the FR lever Ass'y against the Take-up reel disc ass'y to perform the FF operation.



REW Operation

When the REW button is pressed, the trigger lever REW moves in the direction of the arrow ← (1) and pushes the lever REW in the direction of the arrow ← (2). The trigger lever FF releases the boss A of the gear at that time, the gear FR engages with the gear flywheel, rotates in the direction of the arrow ← (3), boss B touches the trigger lever FF and rotation stops.

The FR gear B is moved in the direction the arrow ← (4) by means of the cam of the gear FR following the rotation of the gear FR; pulls the FR lever C in the direction of the arrow ← (5) and moves the FR lever ass'y in the direction of the arrow ← (6) to rotate the Take-up reel disc reel disc ass'y to perform the REW operation.

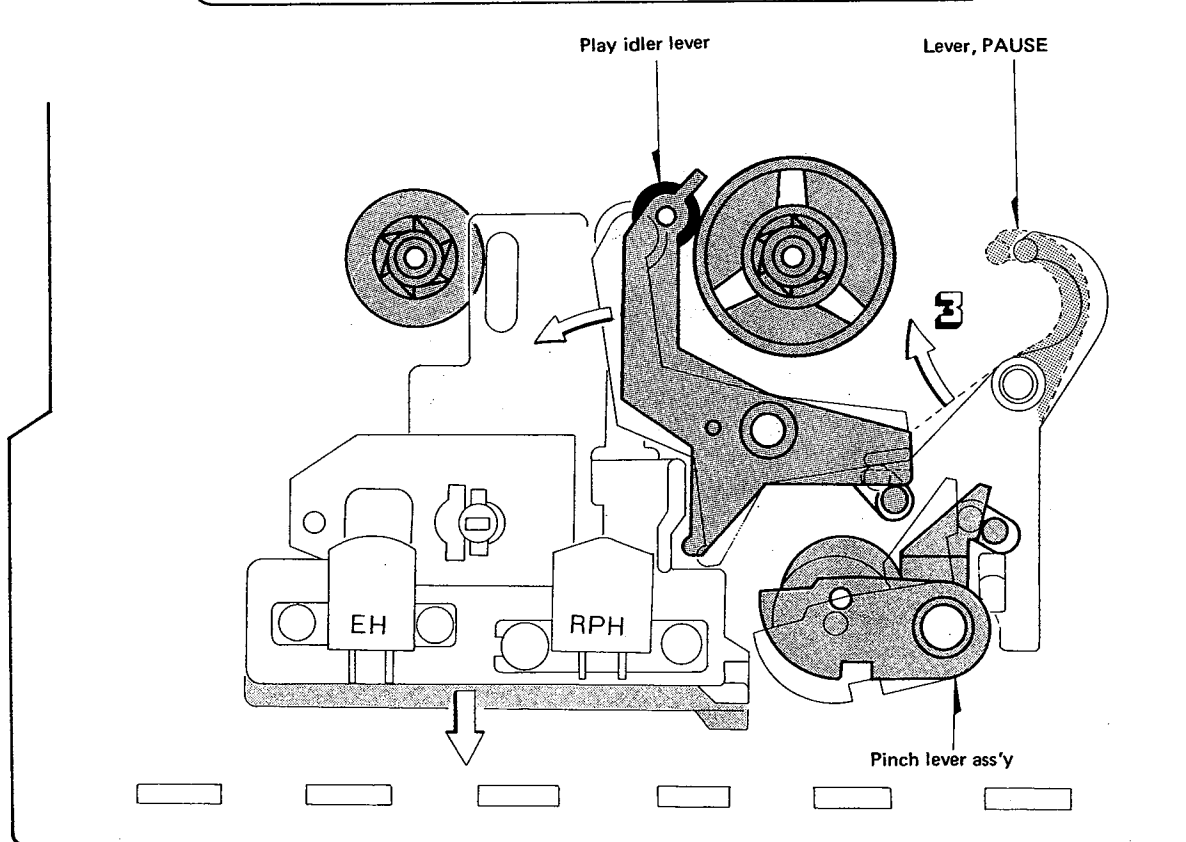
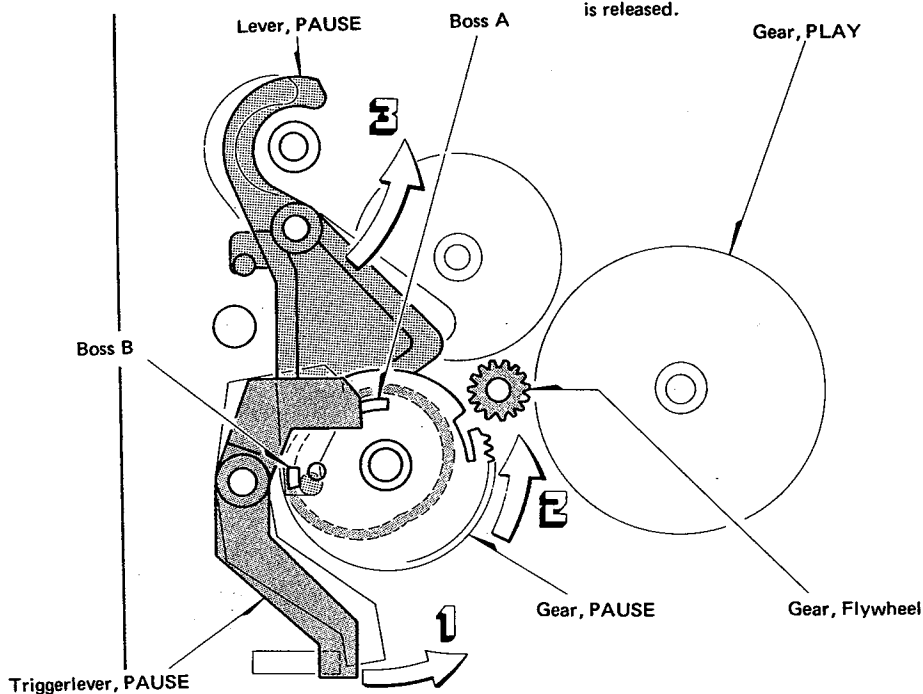


Description of the PAUSE Operation

When the PAUSE button is pressed, the trigger lever PAUSE moves in the direction of the arrow ← (1), the boss A of the gear PAUSE is released, engages with the gear flywheel and rotates in the direction of the arrow ← (2), the boss B touches the trigger PAUSE and rotation stops.

The PAUSE lever moves in the direction of the arrow ← (3) along the cam groove of the PAUSE gear at that time. The PLAY idler lever and the pinch lever ass'y is moved to perform the PAUSE operation at that time.

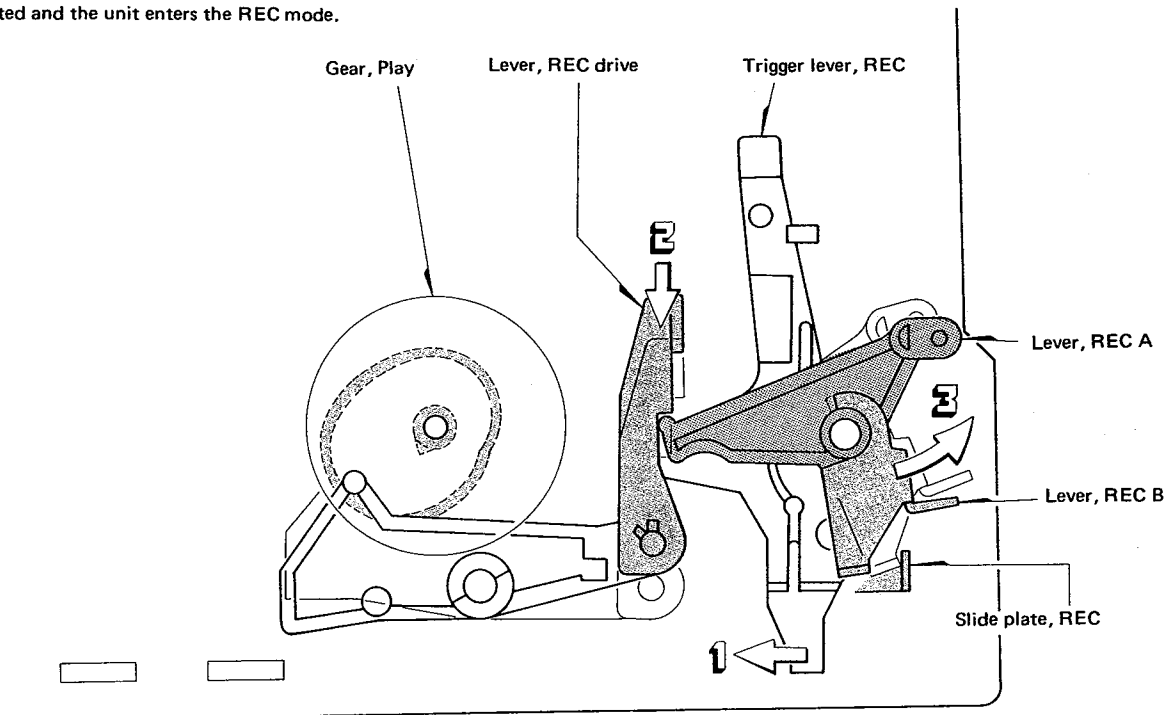
When the PAUSE button is pressed again, the button is released from locking and simultaneously the boss B of the gear PAUSE is released from the trigger lever PAUSE and the PAUSE operation is released.



REC Operation

When the REC and PLAY buttons are pressed simultaneously, the trigger lever REC moves in the direction of the arrow ← (1). The PLAY operation is performed simultaneously at that time, so the REC lever driver moves in the direction of the arrow ← (2), pushes the lever REC A, B in the direction of the arrow ← (3), the interlocked slide REC plate pulls the rod, the slide switch is operated and the unit enters the REC mode.

When one of the STOP, FF and REW buttons is pressed, the REC trigger lever is released from the REC lever driver and only the REC operation is released.



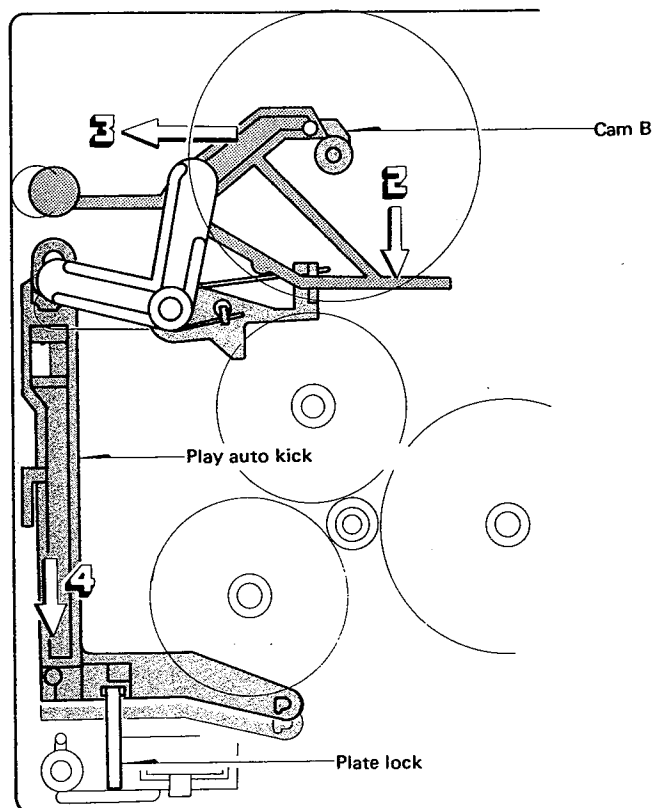
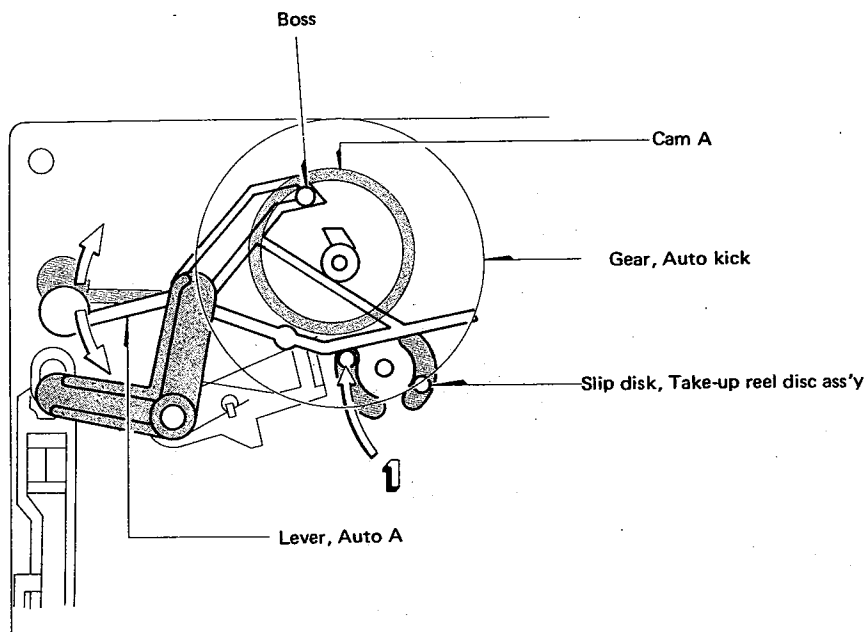
Description of the Auto-stop Operation

The motor rotation is transmitted to the gear auto-kick of the MD-3 mechanism via the slip pulley FR ass'y.

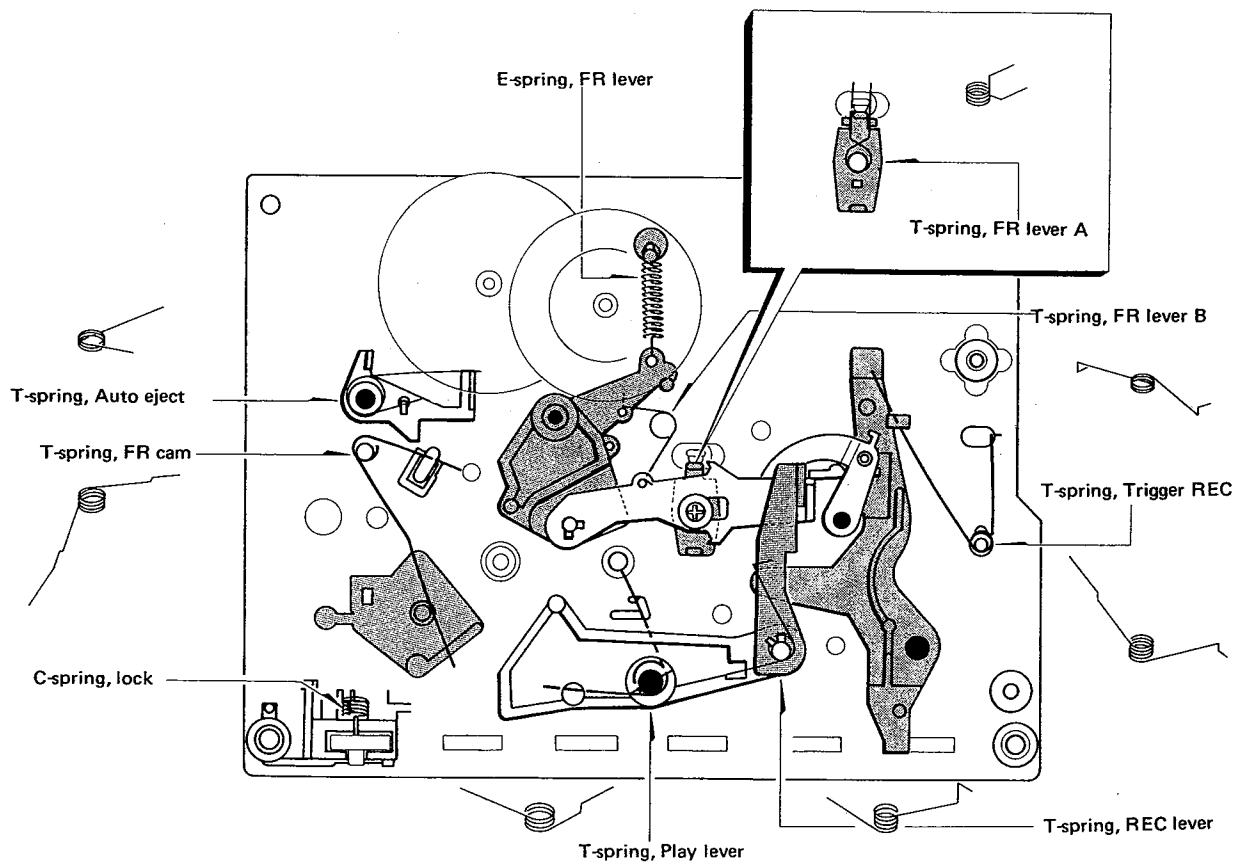
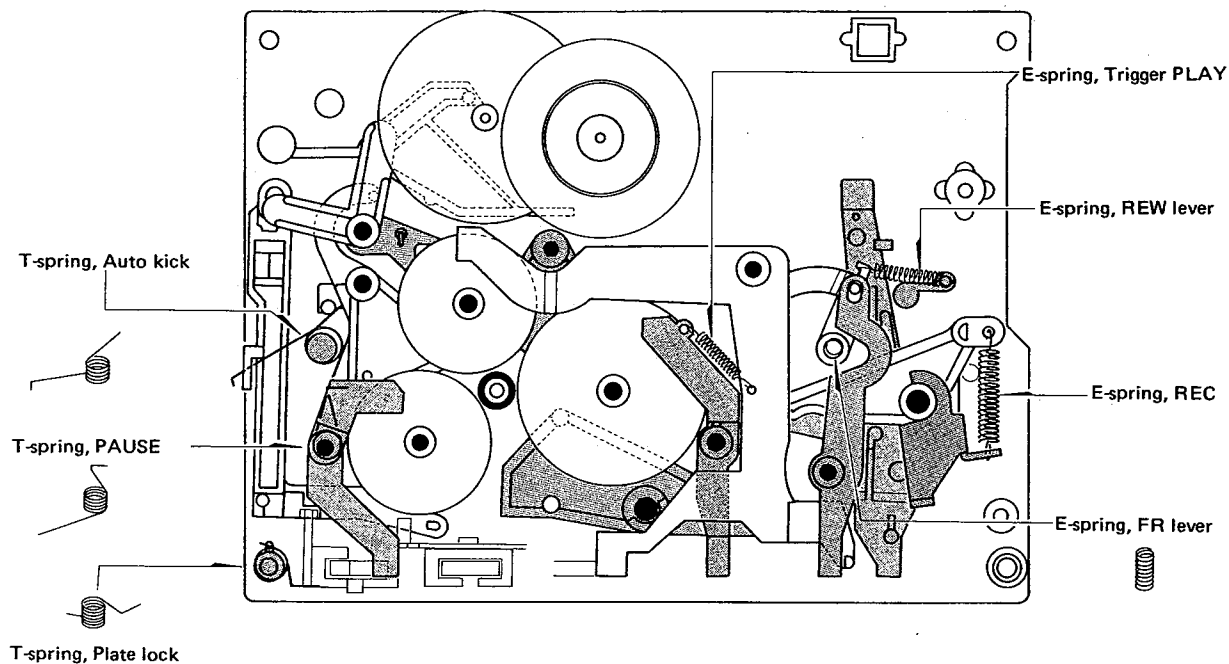
The slip disk presses the lever auto A in the direction of the arrow ← (1) when the Take-up reel disc ass'y is rotating, so the boss of the lever auto A moves along the cam (A) groove of the gear auto-kick.

When the reel discs (S, T sides) stop, the lever auto A stops in the condition being moves in the direction of the arrow ← (2).

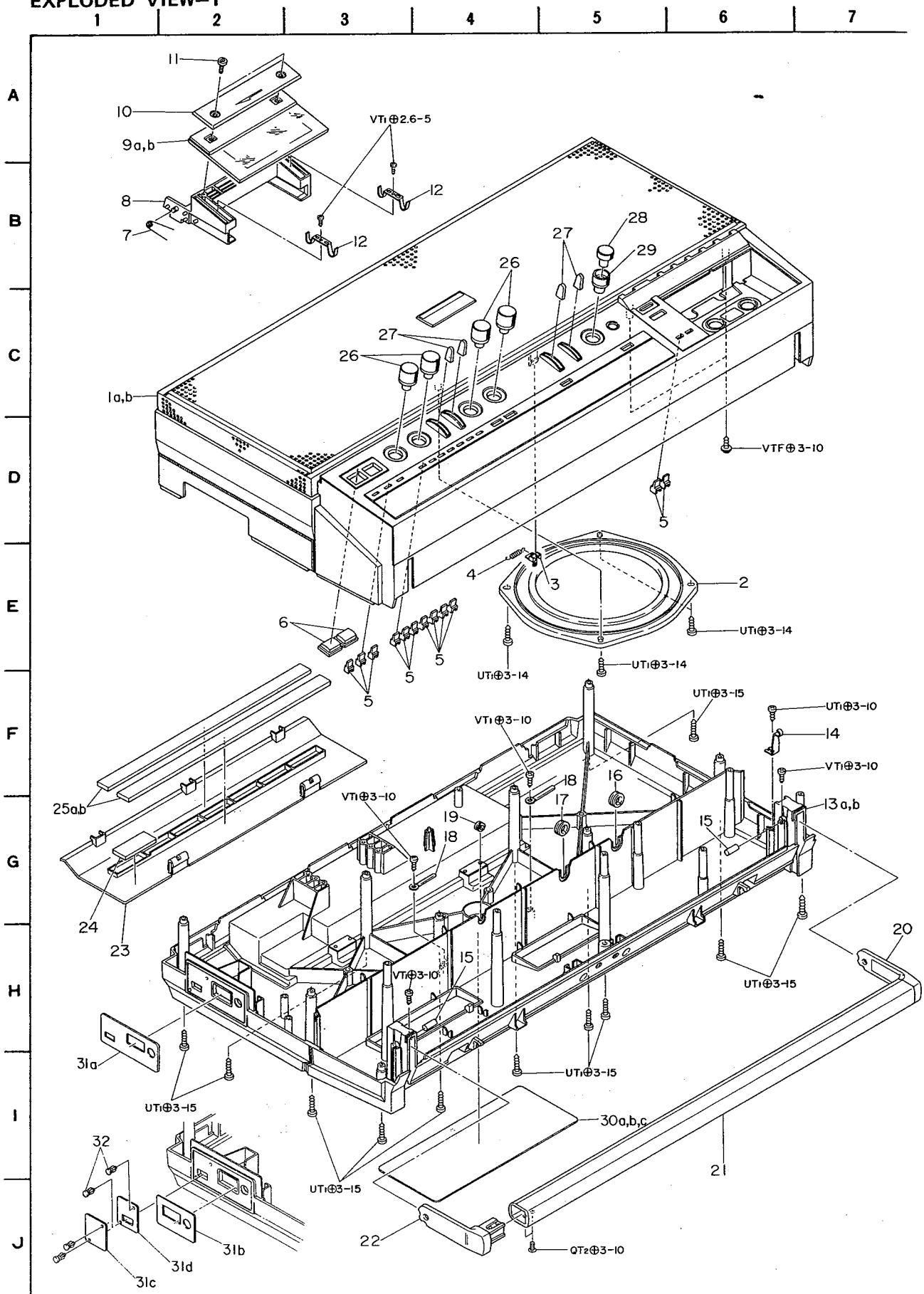
The cam (B) of the gear auto-kick moves the lever auto A in the direction of the arrow ← (3), operates the plate auto-kick in the direction of the arrow ← (4) to release the plate lock and performs the AUTO STOP operation.



SPRING APPLICATION POSITION



EXPLODED VIEW-1



PARTS LIST

MECHANICAL PARTS

■ * mark in this part list shows exclusive part.

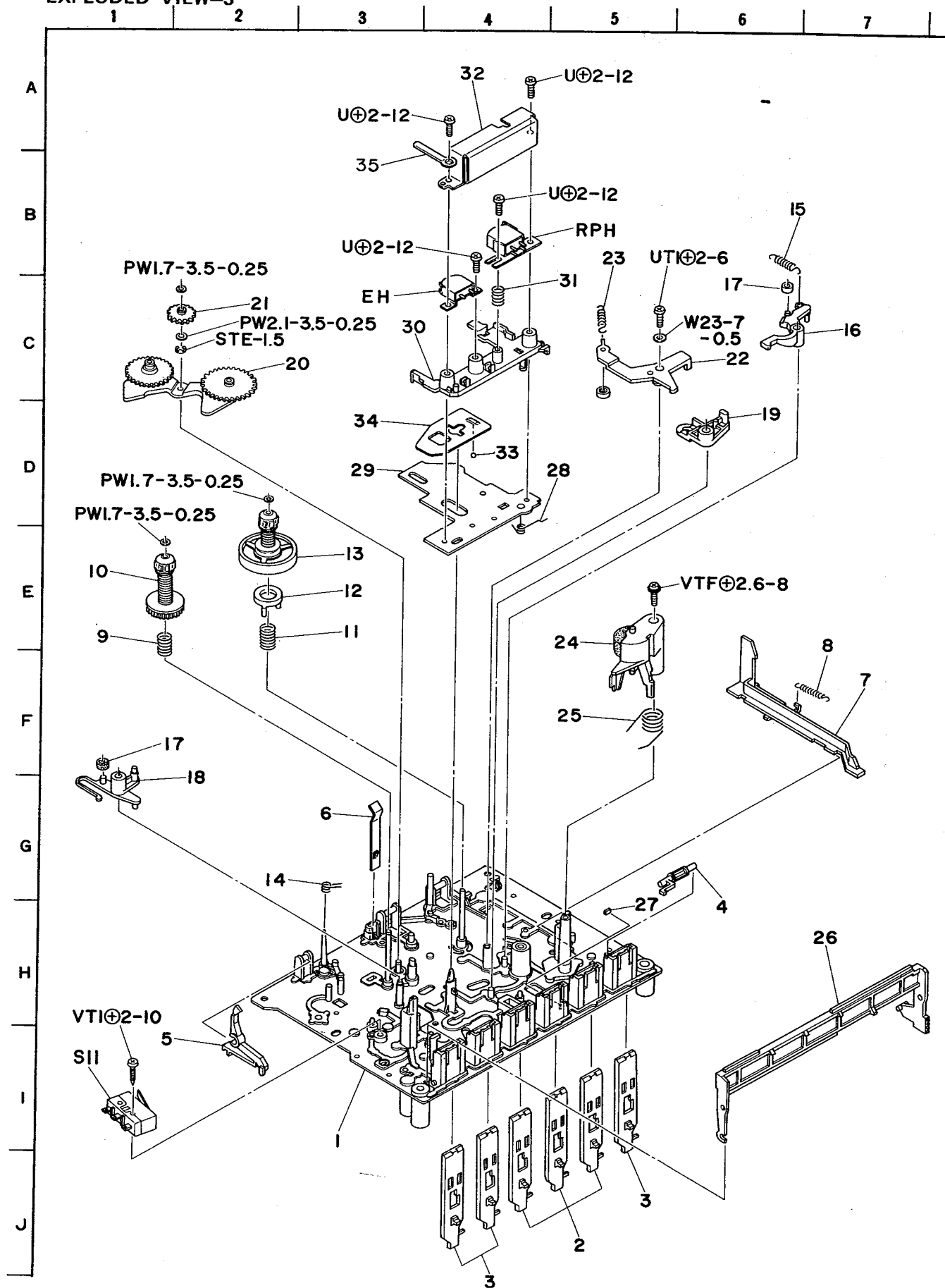
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1-1a	09-017-839-01		Main case ass'y (Silver) (H,U,UC model only)	*	1
1-1b	09-017-840-01		Main case ass'y (Blue)	*	1
	82-587-001-01		Cabinet, Main (Silver)	*	1
	82-587-044-01		Cabinet, Main (Blue)	*	1
	82-587-234-01		Damper A, Rubber	*	14
	82-587-235-01		Damper B, Rubber	*	4
	82-587-007-01		Punching (Silver)	*	1
	82-587-045-01		Punching (Blue)	*	1
	82-587-036-01		Badge (Silver)	*	1
	82-587-060-01		Badge (Blue)	*	1
	82-587-009-01		Side panel R	*	1
	82-587-010-01		Side panel L	*	1
	82-587-027-01		Panel, Front	*	1
	82-563-032-01		Cassette plate	CS-990	1
	82-587-003-01		Window, Dial	*	1
	82-587-221-01		E-spring (tact)	*	1
	82-587-040-01		Label, DSL	*	1
	82-587-239-01		P-spring, Tact A	*	1
	87-392-003-01		Nut, Speed		2
	87-321-097-21		QT ₁ + 3 - 12		6
1-2	82-587-635-01		Drone cone ass'y	*	1
1-3	82-587-227-01		P-spring, Earth	*	1
1-4	82-576-241-01		E-spring, Earth	CS-350	1
1-5	82-587-020-01		Tact push-key	*	12
1-6	82-587-021-01		Push-button	*	2
1-7	82-587-218-01		T-spring, Cassette lid	*	1
1-8	82-587-202-01		Cassette box	*	1
1-9a	82-587-004-01		Window, Cassette (Silver) (H,U,UC model only)	*	1
1-9b	82-587-047-01		Window, Cassette (Blue)	*	1
1-10	82-587-011-01		Decorative panel, Cassette		1
1-11	87-081-979-01		Decorative screw 3-12		2
1-12	82-587-219-01		P-spring, Cassette holder	*	2
1-13a	09-017-841-01		Back cover ass'y (H,HG model only)	*	1
1-13b	09-017-842-01		Back cover ass'y (U,UC model only)	*	1
	82-587-038-01		Back cover ass'y (H,HG model only)	*	1
	82-587-042-01		Back cover ass'y (U,UC model only)	*	1
	82-587-236-01		Rubber cushion 4-6-4	*	2
	82-587-213-01		C-spring, Terminal A	*	1
	82-587-214-01		C-spring, Terminal B	*	1
	82-587-216-01		C-spring, Terminal C	*	1
	82-587-215-01		Terminal plate U ₁	*	1
	82-587-217-01		Terminal plate U ₃	*	1
	82-587-226-01		Sheet, Faiber	*	2
	82-277-382-01		Spring, Terminal		1
	81-235-211-01		Terminal plate D		1
	87-349-095-21		UT ₁ + 3 - 8		1
1-14	82-534-203-01		Click plate spring R		1
1-15	82-587-212-01		Shaft, Handle	*	2
1-16	82-587-231-01		Rubber bushing 6 x 10	*	1
1-17	82-587-233-01		Rubber bushing 7 x 10	*	1
1-18	87-038-039-01		Wire binder		2
1-19	82-587-208-01		Rubber bushing 3 x 5	*	1
1-20	82-587-013-01		Handle L	*	1
1-21	82-587-014-01		Handle grip	*	1
1-22	82-587-012-01		Handle R	*	1
1-23	82-587-005-01		Battery room lid	*	1
1-24	82-587-237-01		M cushion 14 x 35 x 5	*	1
1-25a	82-587-211-01		Cushion, Battery (H,HG model only)	*	2
1-25b	82-588-223-01		M cushion 7 x 281 x 7	CS-770	2
1-26	82-587-017-01		Knob	*	4
1-27	82-563-014-01		Knob, TOGGLE	CS-990	4
1-28	82-587-023-01		Knob, VOLUME (UP)	*	1
1-29	82-587-024-01		Knob, VOLUME (DOWN)	*	1
1-30a	82-587-029-01		Name plate, Spec. (H model only)	*	1
1-30b	82-587-033-01		Name plate, Spec. (HG model only)	*	1
1-30c	82-587-032-01		Name plate, Spec. (U,UC model only)	*	1
1-31a	82-587-025-01		AC jack plate (H,HG model only)	*	1
1-31b	82-587-026-01		AC jack plate (U,UC model only)	*	1
1-31c	82-587-034-01		AC jack plate S-1 (UC model only)	*	1
1-31d	82-587-035-01		AC jack plate S-2 (U,UC model only)	*	1

1	2	3	4	5	6	7
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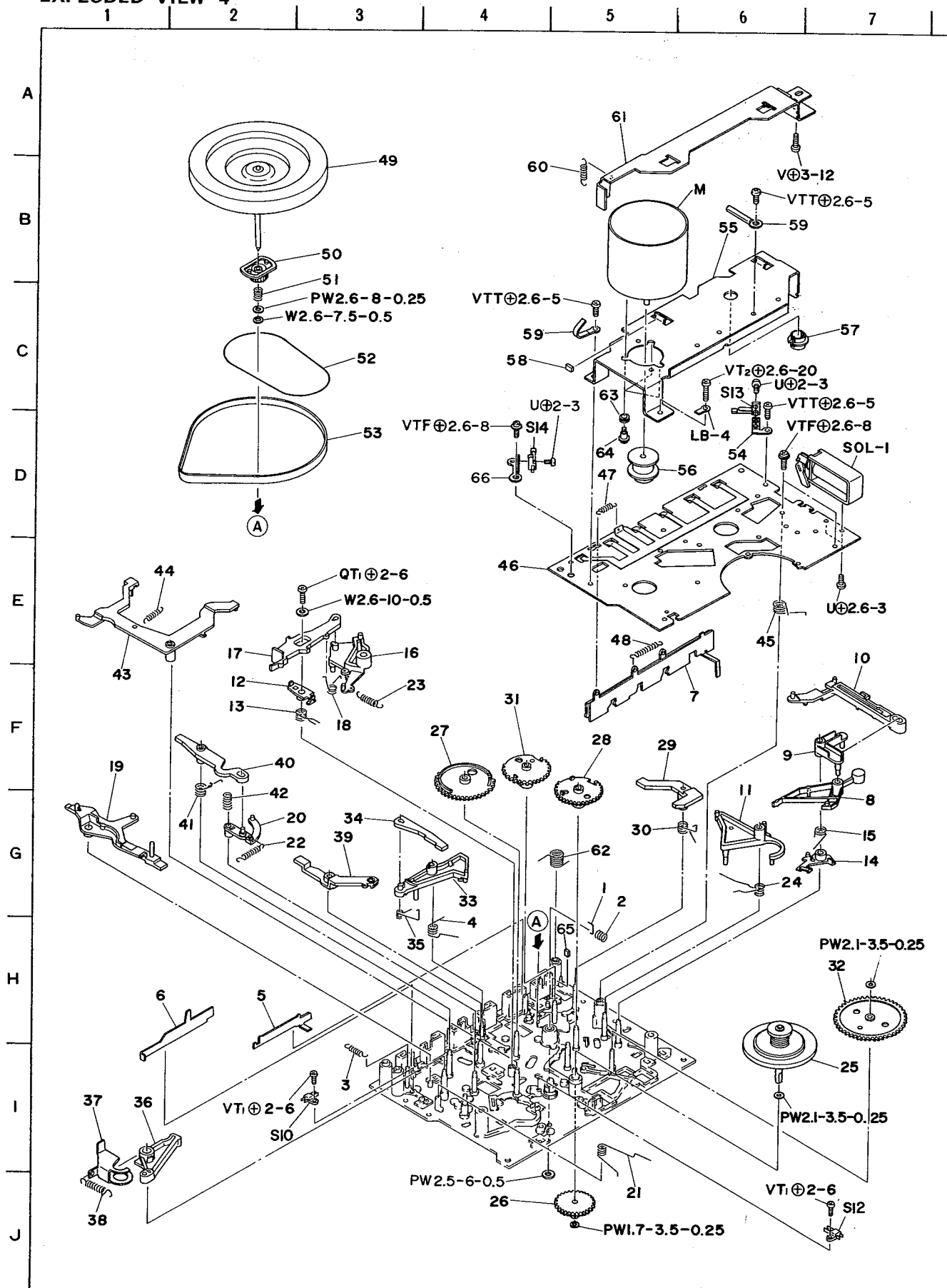
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
2-1	87-043-058-01		Whip antenna		2	
2-2	87-033-166-01		Antenna terminal	*	2	
2-3	82-587-220-01		Terminal plate, Antenna	*	2	
2-4	82-587-205-01		Rod, REC	*	1	
2-5	82-588-209-01		Cushion 15 x 15 x 41	CS-770	1	
2-6	82-587-242-01		Sheet, Fiber A	*	2	
2-7	82-587-211-01		Cushion, Battery	*	1	
2-8	82-587-225-01		Rod 37.8	*	1	
2-9	82-587-206-01		Rod 87.8	*	2	
2-10	82-587-608-01		Shield, Front	*	1	
2-11	82-587-238-01		Rubber cushion 10 x 25 x 14	*	1	
2-12	82-587-201-01		Chassis	*	1	
2-13	82-587-207-01		Holder, Dial plate	*	2	
2-14	82-162-037-01		Push-button B ₂	AD-R500	H,U,UC:4 HG:3	
2-15	82-588-634-01		Earth, REC	CS-770	1	
2-16a	82-587-008-01		Dial plate (Silver) (H,U,UC model only)	*	1	
2-16b	82-587-061-01		Dial plate (Blue) (H,HG model only)	*	1	
2-16c	82-587-062-01		Dial plate (Blue) (U,UC model only)	*	1	
2-17	87-064-084-01		Holder, ECM 30		2	
2-18	82-587-019-01		Push-key, REC mute	*	1	
2-19	82-563-247-01		E-spring, Air-damp	CS-990	1	
2-20	87-096-045-01		String, Dial		1	
2-21	87-078-003-01		Air-damp unit ass'y		1	
2-22	82-587-240-01		LED reflector	*	1	
2-23	82-587-224-01		Holder, Switch	*	1	
2-24	87-040-143-01		Counter		1	
2-25	82-587-209-01		Rubber belt	*	1	
2-26	82-587-203-01		Holder, Counter	*	1	
2-27	82-587-037-01		Push-key, REC	*	1	
2-28	82-587-018-01		Push-key, Tape recorder	*	5	
2-29	82-588-208-01		Rubber cushion 33-6-3	CS-770	1	
2-30	87-063-113-01		Cushion WA		2	
2-31	82-587-049-01		Push-button, DSL	*	1	

EXPLODED VIEW-3



Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
3-1	82-585-325-01		Outsert chassis	-	1	
3-2	82-585-277-01		Plate button, FR		3	
3-3	82-585-337-01		Plate button, REC		3	
3-4	82-585-279-01		Lever A, Eject		1	
3-5	82-585-255-01		REC blocking lever		1	
3-6	82-585-319-01		P-spring, Cassette pressure		1	
3-7	82-585-254-01		Slide plate, Eject		1	
3-8	82-585-311-01		E-spring, Lid lock		1	
3-9	82-585-290-01		C-spring, Back tension		1	
3-10	82-585-215-01		Supply reel platform ass'y		1	
3-11	82-585-292-01		C-spring, Slip disk		1	
3-12	82-585-272-01		Slip disk T		1	
3-13	82-585-210-01		Take-up reel platform ass'y		1	
3-14	82-585-294-01		T-spring, Center shift		1	
3-15	82-585-312-01		E-spring, Brake R		1	
3-16	82-585-253-01		Lever, Brake R		1	
3-17	82-585-286-01		Rubber cushion, Brake		2	
3-18	82-585-252-01		Lever, Brake L		1	
3-19	82-585-265-01		REV lever		1	
3-20	82-585-231-01		FR lever ass'y		1	
3-21	82-585-235-01		Gear A, REW		1	
3-22	82-585-223-01		Play idler lever ass'y		1	
3-23	82-585-313-01		F-spring, Play idler		1	
3-24	82-585-364-01		Pinch lever B ass'y		1	
3-25	82-585-296-01		T-spring, Pinch lever		1	
3-26	82-585-340-01		Plate lock ass'y		1	
3-27	82-585-338-01		Rubber cushion, Play lever		1	
3-28	82-585-295-01		T-spring, Actuating		1	
3-29	82-585-208-01		Actuating chassis		1	
3-30	82-585-209-01		Head base		1	
3-31	82-585-291-01		C-spring, RPH	CS-770	1	
3-32	82-588-628-01		Shield plate		1	
3-33	87-073-005-01		Steel ball 2φ		1	
3-34	82-585-284-01		P-spring, Actuating		1	
3-35	87-038-056-01		Wire binder		1	

EXPLODED VIEW-4



Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
4-1	82-585-289-01		Shaft lock		1	
4-2	82-585-285-01		C-spring lock		1	
4-3	82-585-317-01		E-spring, Button lock	-	1	
4-4	82-585-306-01		T-spring, Play lever		1	
4-5	82-585-283-01		Slide plate, FR auto		1	
4-6	82-585-282-01		Slide plate, Motor switch		1	
4-7	82-585-327-01		Slide plate key ass'y		1	
4-8	82-585-268-01		Auto A lever		1	
4-9	82-585-269-01		Auto B lever		1	
4-10	82-585-270-01		Plate auto kick		1	
4-11	82-585-248-01		Lever, PAUSE		1	
4-12	82-585-264-01		FR lever D		1	
4-13	82-585-297-01		T-spring, FR lever A		1	
4-14	82-585-271-01		Auto eject lever		1	
4-15	82-585-299-01		T-spring, Auto eject		1	
4-16	82-585-262-01		FR lever B		1	
4-17	82-585-263-01		FR lever C		1	
4-18	82-585-298-01		T-spring, FR lever B		1	
4-19	82-585-261-01		Trigger lever, REC		1	
4-20	82-585-260-01		Lever, REW		1	
4-21	82-585-303-01		T-spring, Trigger (REC)		1	
4-22	82-585-308-01		E-spring, REW lever		1	
4-23	82-585-341-01		E-spring, FR lever		1	
4-24	82-585-300-01		T-spring, FR cam		1	
4-25	82-585-217-01		Slip pulley FR ass'y		1	
4-26	82-585-216-01		Drive gear		1	
4-27	82-585-244-01		Play cam gear		1	
4-28	82-585-245-01		FR cam gear		1	
4-29	82-585-256-01		Trigger lever, PAUSE		1	
4-30	82-585-304-01		T-spring, Trigger (PAUSE)		1	
4-31	82-585-246-01		Gear, PAUSE		1	
4-32	82-585-247-01		Gear, Auto kick		1	
4-33	82-585-249-01		PLAY lever		1	
4-34	82-585-250-01		Lever, REC drive		1	
4-35	82-585-307-01		T-spring, REC lever		1	
4-36	82-585-266-01		REC A lever		1	
4-37	82-585-267-01		REC B lever		1	
4-38	82-585-314-01		E-spring, REC		1	
4-39	82-585-258-01		Trigger lever, PLAY		1	
4-40	82-585-259-01		Trigger lever, REW		1	
4-41	82-585-308-01		T-spring, REW lever		1	
4-42	82-585-331-01		C-spring, REW lever		1	
4-43	82-585-257-01		FF trigger lever		1	
4-44	82-585-301-01		E-spring, Trigger PLAY		1	
4-45	82-585-321-01		T-spring, Auto kick		1	
4-46	82-585-203-01		Mechanism chassis B ass'y		1	
4-47	82-585-315-01		E-spring, Slide plate		1	
4-48	82-585-332-01		E-spring, REC lock		1	
4-49	82-585-229-01		Flywheel ass'y		1	
4-50	82-585-243-01		Gear, Flywheel		1	
4-51	82-585-324-01		C-spring, Flywheel		1	
4-52	82-585-336-01		Rubber belt FR B		1	
4-53	82-585-287-01		Rubber belt, Flywheel		1	
4-54	82-585-323-01		Holder, Pause switch		1	
4-55	82-585-281-01		Holder, Motor		1	
4-56	82-585-242-01		Motor pulley		1	
4-57	82-585-326-01		Thrust bearing B		1	
4-58	82-588-206-01		Rubber cushion, REC lever	CS-770	1	
4-59	87-038-039-01		Wire binder		1	
4-60	82-587-241-01		E-spring, Slide plate	*	1	
4-61	82-587-228-01		Slide plate REC ass'y	*	1	
4-62	82-585-335-01		T-spring, Plate lock		1	
4-63	87-087-029-01		Rubber cushion		3	
4-64	87-081-483-01		Motor screw, M2.6		3	
4-65	82-585-342-01		Rubber cushion, PAUSE lock		1	
4-66	82-587-232-01		Holder, REC switch	*	1	

Description of Circuitry

1. Block Diagram of Synthesizer Tuner

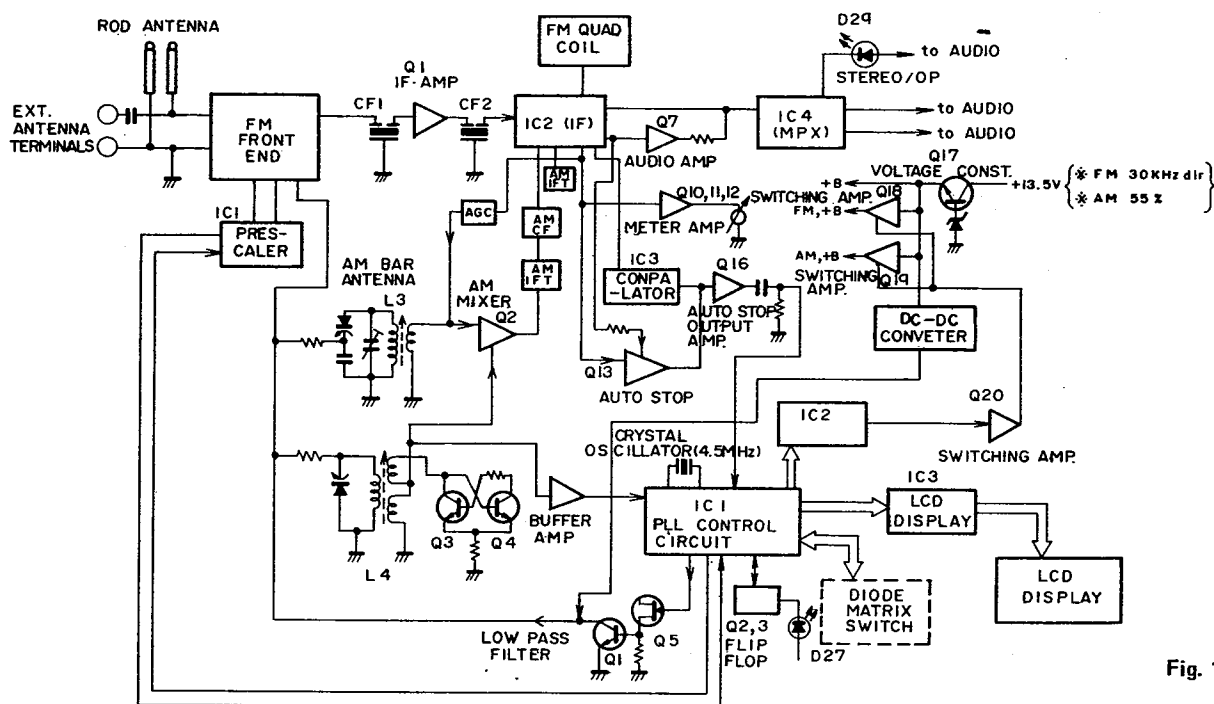


Fig. 1

2. Outline of PLL Frequency Synthesizer

The PLL (phase-locked loop) frequency synthesizer is a circuit which uses the extremely stable frequency of a crystal oscillator as the reference signal to produce the frequencies desired. For instance, to pick up a station broadcasting on a frequency of 100 MHz, a local oscillation frequency (f_o : output frequency of voltage-controlled oscillator) supplied to the mixer of 110.7 MHz ($100 + 10.7$) is required. This particular unit adopts a prescaler which employs a pulse swallow system to divide the frequency, and send it to the programmable counter inside the controller IC. The output frequency f_n then enters the phase comparator. The frequency of the extremely stable 4.5 MHz crystal oscillator is counted down (1/180) at the same time and the reference frequency f_{ref} of 25 kHz is sent to the phase comparator. The phases of f_n and f_{ref} are compared and the difference between the two is detected. If there is no difference, the loop is locked; if there is a difference, the control voltage passes through the low-pass filter, it is fed out to the VCO and the VCO is controlled until f_n is made equivalent to 25 kHz. The reference frequency f_{ref} for AM reception is 9 kHz (or 10 kHz). The VCO frequency signal is sent directly to the programmable counter.

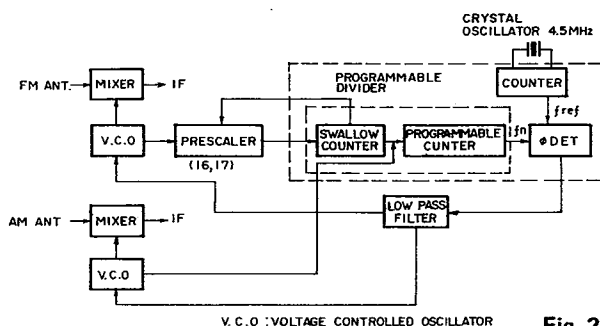


Fig. 2

2-1. Operation During FM Reception

The pulse swallow system is first outlined.

The relationship between f_{osc} and f_{ref} is expressed as:

$$f_{osc} = N \times f_{ref} \quad (1)$$

If N is assumed to be P notation:

$$f_{osc} = (n_1 + p n_2 + p^2 n_3 + \dots + p^{n-1} n_n) f_{ref}$$

$$= P (n_1 / P + n_2 / P + p n_3 + \dots + p^{n-2} n_n) f_{ref}$$

If, now, the part including the second digit and above is made N_p :

$$f_{osc} = P (n_1 / P + N_p) f_{ref}$$

This is modulated to become:

$$f_{osc} = (n_1 + P N_p + P n_1 - P n_1) f_{ref}$$

$$= [(N_p - n_1) P + n_1 (P + 1)] f_{ref} \quad (2)$$

The above represents the principle of the pulse swallow system. In order to achieve the relationship expressed in formula (2) by physical means, this unit has a prescaler with two frequency division ratios, 1/16 and 1/17. In formula (1), this corresponds to $P = 16$. Actual operation is as follows: when the signal produced by dividing f_{osc} by $(P + 1)$ is counted down n_1 times at the first programmable divider digit and n_1 becomes 0, the P -divided signal is counted down $(N_p - n_1)$ times equivalent to the number of the first digit subtracted from the number of the second and higher digits of the programmable divider, and the cycle ends. This cycle is performed with f_{ref} equal to 25 kHz.

When $f_s = 100$ MHz is received:

$$f_{IF} \text{ is } 10.7 \text{ MHz and so therefore } f_{osc} = 100 + 10.7 = 110.7 \text{ MHz}$$

$$\text{From formula (1): } N = \frac{110.7 \text{ MHz}}{25 \text{ KHz}} = 4428$$

If this figure is re-expressed in the hexadecimal notation, and made to correspond with 114C formula (2):

$$N_p = 114, n_1 = C$$

$$\text{Therefore, } f_{ref} \times [(114 - C) \times 10 + C \times 11] = f_{osc}$$

If this is re-expressed in the decimal notation:

$$25 \text{ kHz} \times [(16^2 + 16^1 + 4 - 12) \times 16 + 12 \times 17] = 110.7 \text{ MHz}$$

What happens is that the prescaler divides the frequency by 1/17 for the first 12 counts and then by 1/16 until 264 counts, and this switching operation is repeated. The swallow counter is locked at 12 and the programmable counter is locked at 264.

2-2. Operation During AM Reception

When $f_s = 594$ kHz is received:

$$f_s = 594 \text{ kHz and } f_{IF} = 450 \text{ kHz}$$

$$\text{Therefore: } f_{osc} = 594 + 450 = 1044 \text{ kHz}$$

$$\text{Since } f_{ref} = 9 \text{ kHz (or } 10 \text{ kHz), (at LW } f_{ref} = 1 \text{ kHz)}$$

$$4.5 \text{ MHz} \div 9 \text{ kHz} = 500$$

$$f_{osc} (1044 \text{ kHz}) \div 9 \text{ kHz} = 116$$

Therefore, the crystal oscillator frequency division is locked at 500 and that of the programmable counter at 116.

3. Description of ICs Used

Fig. 3 is a block diagram of the ICs in the PLL frequency synthesizer section and LCD indicator section.

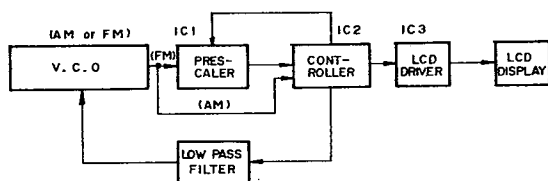


Fig. 3

3-1. Prescaler μ PB553AC

This IC is energized during FM reception, it selects either the 1/16 or 1/17 frequency division ratio in accordance with the command from the swallow counter inside the controller, and it sends the signal to the controller's programmable divider.

3-1-1. Pin Configuration

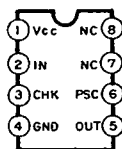


Fig. 4

Pin no.	Name	Function
1	V _{CC}	Power supply
2	IN	VCO input pin
3	CHK	Check pin, connected to GND at all times
4	GND	Ground
5	OUT	Output pin
6	PSC	Frequency division ratio setting pin (frequency division setting input from controller)
7	NC	Not used
8	NC	Not used

3-2. Controller μ PD1703C-515

Contained in this IC are the conventional programmable divider section and control section.

3-2-1. Pin Configuration

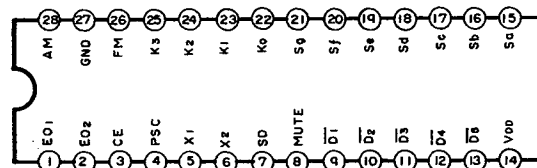


Fig. 5

Pin no.	Name	Function
1, 2	EO1, EO2	Charge pump output pins of phase detector; since signals are fed out during AM/FM reception, one or other is connected to LPF.
3	CE	High: Normal operation Low: Memory held, operation stops
4	PSC	Feeds out frequency division ratio switching signal to prescaler.
5, 6	X1, X2	Crystal oscillator pins
7	SD	High: Auto tuning stop mode Low: Auto tuning enable mode
8	MUTE	Feeds out high level signal during key operation. (Used for muting of signal system)
9~13	D1~D5	Display digit signal output pins Only D1 and D2 are used with this unit and are connected to LCD driver.
14	V _{DD}	Power supply pin
15~21	Sa~Sg	Key matrix key return signal source pins
22~25	K0~K3	Key matrix key return signal input pins
26	FM	Input pin for FM prescaler output
27	GND	Ground
28	AM	AM f_{osc} input pin

3-2-2. Key Matrix Functions

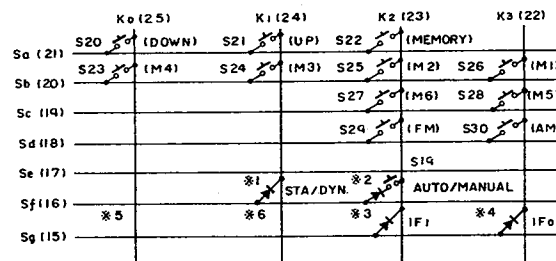


Fig. 6

- The function in parentheses is displayed by key operation based on a momentary switch (marked σ).
- Manual/auto selection (*1)**
Manual/auto selection is performed by a fixed switch but in this unit the key operations are carried out with momentary switches which, thanks to the flip-flop circuit, have the same functions as fixed switches.
When connected: Auto tuning
When disconnected: Manual tuning
- LCD static/dynamic selection (*2)**
This determines whether the LCD display system should be static or dynamic. In this unit, static specifications apply and so the diode is shorted.
- IF frequency selection (*3, *4)**
Alignment is made with the FM IF frequency by IF_1 and IF_0 shorting and open combinations. The IF frequencies used by this unit are 10.675 MHz, 10.700 MHz and 10.725 MHz and so the combinations appear as follows:

IF offset frequency	IF_1	IF_0
10.675 MHz (blue)	Open	Shorted
10.700 MHz (red)	Open	Open
10.725 MHz (orange)	Shorted	Shorted

Color of ceramic filter indicated in parentheses.

- Japan/US use selection (*5)**
When connected: US specifications
When disconnected: Japan specifications
- AM frequency interval selection (*6)**
The AM channel frequency intervals are selected to 10 kHz or 9 kHz.
When connected: 10 kHz
When disconnected: 9 kHz

3-3. LCD driver (MSM5829GS)

Indication is provided on the LCD by connecting the three serial output data from the controller (μ PD1703C-515)

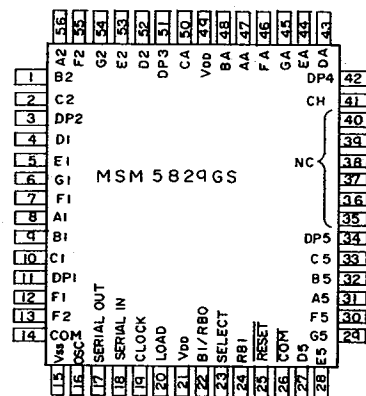


Fig. 7

Pin no.	Name	Function
8, 9, 10, 4 5, 7, 6, 56, 1, 2, 52 53, 55, 54 31, 32, 33, 27 28, 30, 29 47, 48, 50, 43 44, 46, 45 12, 13 11, 3, 51, 42, 34, 41	SEGMENT OUT A1, B1, C1, D1 E1, F1, G1 A2, B2, C2, D2 E2, F2, G2 A5, B5, C5, D5 E5, F5, G5 AA, BA, CA, DA EA, FA, GA F1, F2 DP1, DP2, DP3, DP4, DP5 CH	LCD segment output pins (see Fig. 8*) -
15	VSS	Ground Pin
16	OSC	LCD AC drive frequency pin; with this unit, the circuit is con- figured as below.
17	SERIAL OUT	Not used
18	SERIAL IN	Data indicated with shift regis- ter data input pins are fed into this pin in synchronization with clock pulses. (Connected to pin 19 of controller IC)
19	CLOCK	Sync. input pin when data is fed into, or fed out of shift register. (Connected to pin 9 of control- ler IC)
20	LOAD	Input pin for latching shift register contents. High: Shift register contents are transmitted to decoder. Low: Final contents at high level are held (Connect- ed to pin 10 of controller IC)
21, 49	VDD	Power supply pin
22	BI/RBO	Not used
23	SELECT	This function is not used and so pin is always at high level or, in other words, it is connected to VDD.
24	RBI	Pin for determining whether or not leftmost display digit is to indicate a numeral or not. In this unit, it displays only signifi- cant figures and so it is used at the low level, or in other words, it is connected to VSS (ground).
25	RESET	Pin for switching display to segment or dot; since segment is used in this unit, it is set to high level or, in other words, it is connected to VDD.
26	COM	This pin feeds out an output with the reverse phase to that of COM. In this unit, it is not used for direct display but for AM and FM +B selection as men- tioned later.
14	COM	This pin feeds out a signal with the reverse phase to that of out- put and 7 segments for AC drive of the LCD; it drives the LCD common pin.
35, 36, 37 38, 39, 40		Not used

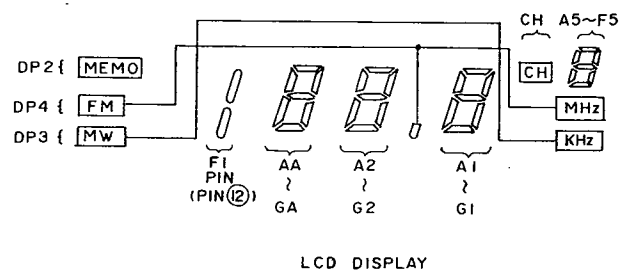


Fig. 8

4. Other Circuits

4-1. FM/AM +B Power Selector Circuit

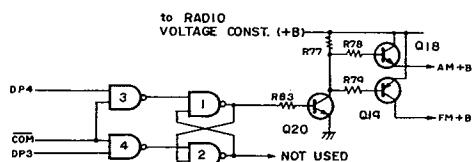
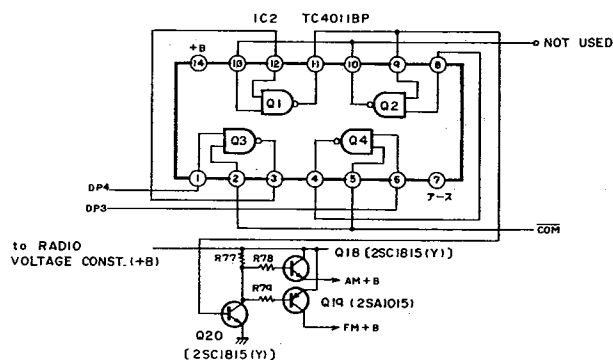


Fig. 9

Switching is performed with a 4-NAND gate IC (IC2).

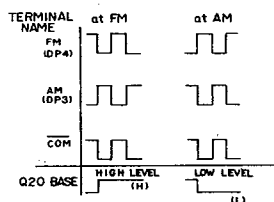


Fig. 10

When the FM band selector key is depressed, pulses with the same phase are fed out to IC3 (MSG5829G) DP4 and COM. As this output passes through the NAND gate IC (TC4011BP), a high level output is produced at NAND gate 1 output and this causes Q20 to turn ON. As a result, Q19 turns ON and the FM +B is obtained. With AM reception, no output appears at DP4, the NAND gate 1 output is set to the low level and with Q20 OFF, Q18 turns ON and the AM +B is obtained.

4-2. Scan Auto Stop Circuit

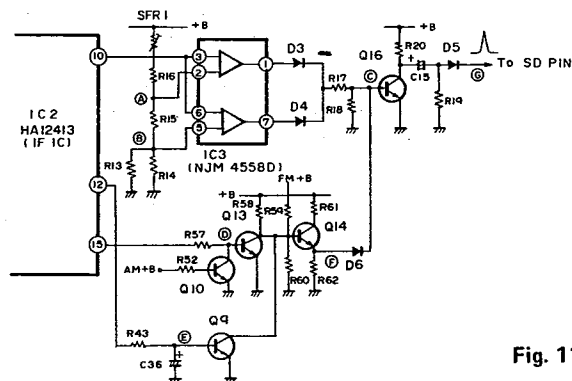


Fig. 11

4-2-1. Operation During FM Reception

The S-curve output pin 10 and meter output pin 15 of IF IC (IC2, HA12413) are used. If pin 10 has a voltage where $V(B) < V(10) < V(A)$ with respect to the preset point A and point B voltages (about ± 0.5 V with respect to pin 10 voltage during tuning), no output appears at point (C) and when there is an output at pin 15, point (F) is set to a low level and no signal is fed out to point (C). A trigger pulse is produced at point (G) by the above two AND circuits, this is applied to the SD pin of the controller IC and the scanning is stopped.

4-2-2. Operation During AM Reception

The IF output from pin 12 is smoothed and point (F) is reduced to the low level by the output. As with FM reception, a trigger pulse is produced at point (G) and the scanning stops. [IC3 (NJM4558D) does not work during AM reception.]

5. Dynamic Super Loudness (DSL) Circuit

If the DSL circuit is compared with the loudness circuit, it is seen that both function to boost the low-range (bass) and high-range (treble) frequencies with respect to the midrange frequencies but there are the following major differences.

5-1. Characteristics

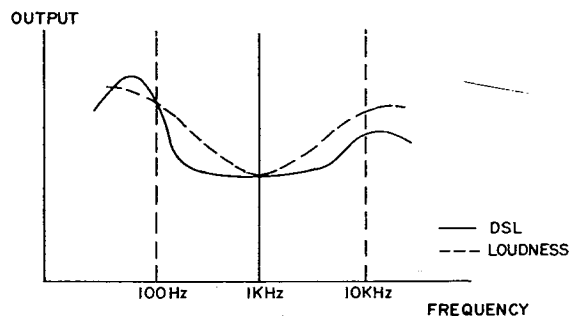


Fig. 12

The loudness system functions to boost the midrange frequencies too. However, the DSL system keeps this increase down to the bare minimum.

With the loudness system, the characteristics do not change with the strength of the signal entering the volume control for providing a tape in the control [normally scale unit 5 (center position)], and the volume control's tap position is mechanical,

meaning that the characteristics change. At a scale position lower than the volume control's tap position, the loudness characteristics are provided regardless of the strength of the sound level and, in contrast, even when the sound level is low, the effect is impaired by the control's scale position. However, the DSL system judges the strength of the sound level by electrical means and features a configuration which produces dynamic super loudness characteristics.

5-2. DSL Circuit Configuration

The DSL circuit comprises the equalizer circuit which produces the DSL characteristics, the detector circuit which judges the strength of the sound level and the control circuit which suppresses the DSL characteristics when the sound is high.

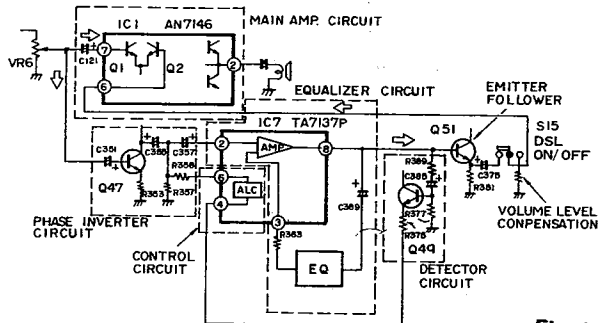


Fig. 13

5-2-1. Equalizer Circuit

An ordinary direct-coupled amplifier feedback circuit (T-type bridge circuit) is provided with time constants, and its characteristics generated.

Tow T-type bridge circuits are connected in series and the time constants are divided into the left side for bass [R361, 359, C359, 361] and right side for treble. The characteristics of each of the twin filters connected to pins 3 and 8 of IC351 (TA7137P) are attenuated by frequency f_1 determined by constants R1, R2 and C1.

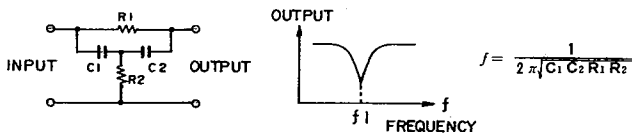


Fig. 14

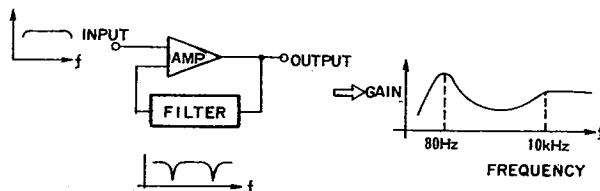


Fig. 15

5-2-2. Detector Circuit

The level of this circuit is set by the frequency division ratio of two resistors.

5-2-3. Control Circuit

This circuit is the same as an ALC circuit used for normal recording although it differs in that its attack time and recovery time are extremely short.

Because of the boosted level, the output must be not distorted. When a signal exceeding a certain fixed level is fed out, it is taken out by the Q49 emitter, the IC7 ALC circuit functions and the input of pin 2 is controlled.

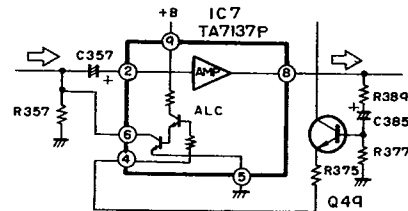


Fig. 16

The DSL circuit with the above-mentioned configuration is mixed with a main amplifier. The IC1 (AN7146) input has a differential amplifier configuration, and when a flat signal enters transistor Q1 at one side of the differential amplifier from the volume control, a flat signal also enters the DSL circuit simultaneously. Q2 is basically a negative feedback pin but when the output (signal with DSL characteristics) of the DSL circuit is fed into the Q2 input, differential operation is provided by Q1 and Q2.

The DSL block input transistor Q47 is used to invert the phase. As a result, the phase is inverted at the DSL block input and output sides and so the differential operation of Q1 and Q2 becomes a mixing operation. Meanwhile, the feedback from the output inside IC7 does not change and negative feedback operation results.

When the signal level is low in Fig. 13, there is a high degree of mixing by Q1 and Q2 inside IC1 so that the DSL feeds out a strong signal, and the bass and treble are greatly boosted. However, when the signal level is high, the DSL block output is suppressed, the amount of mixing by Q1 and Q2 inside IC1 is reduced, and since the Q2 input is reduced to a fraction, almost all of it becomes the signal fed in from Q1.

The resistor inserted across the ground and OFF side pin of the DSL ON/OFF switch functions to compensate for the difference in the volume when the switch is selected.

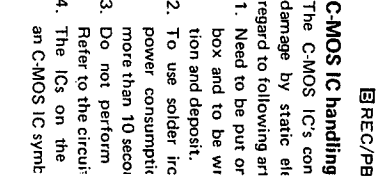
ACCESSORIES/PACKAGE

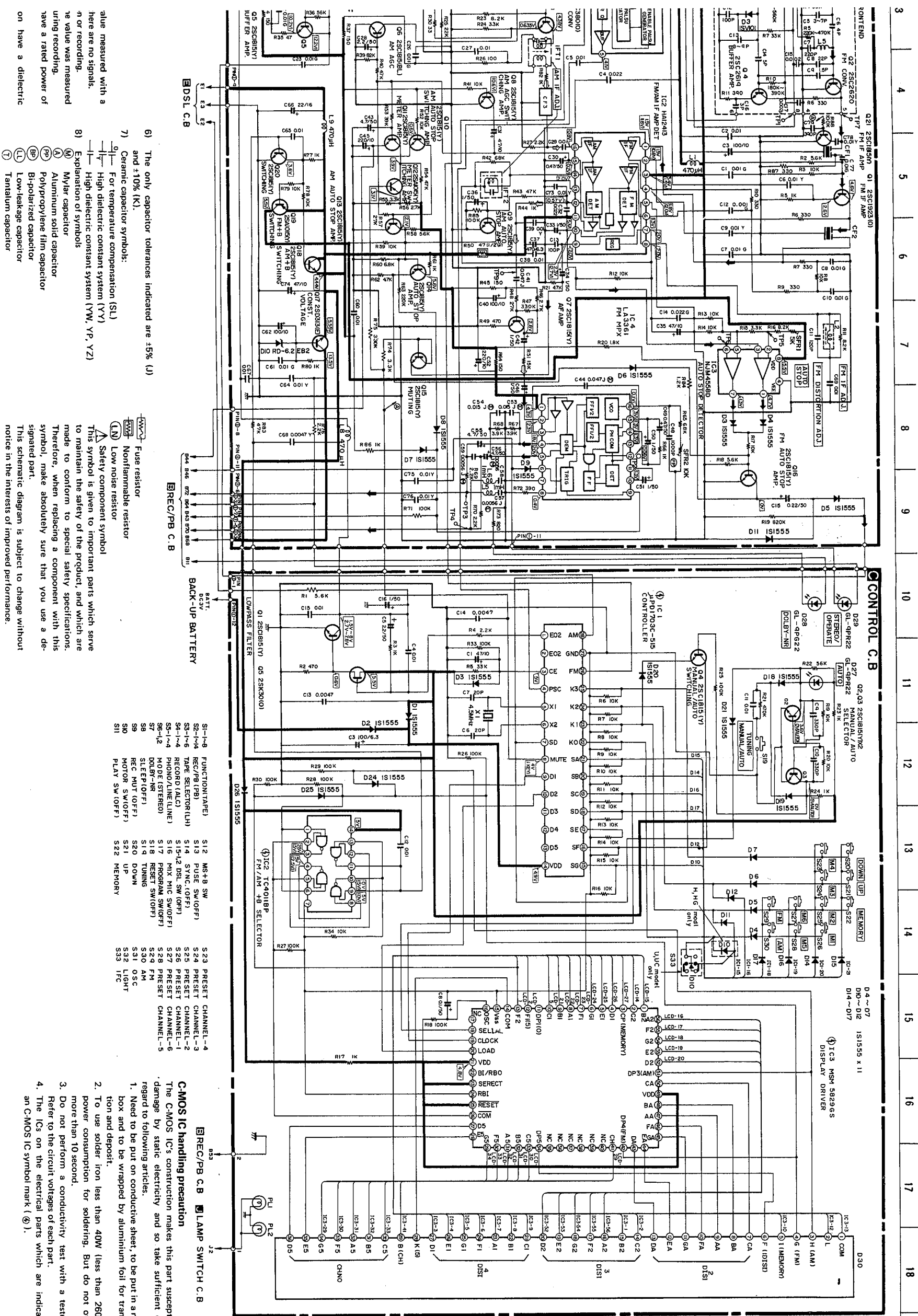
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1	82-587-855-01		Printed indiv., Packing	*	1
2	82-587-852-21		Cushion L, Printed indiv.	*	1
3	82-587-853-21		Cushion R, Printed indiv.	*	1
4	87-051-137-11		Poly-vinyl sack		1
5	87-056-626-01		Poly-vinyl sack		1
6a	82-587-904-01		Instructions booklet (H,HG model only)	*	1
6b	82-587-905-01		Instructions booklet (U,UC model only)	*	1
7	82-587-907-01		Sticker, POP (U model only)	*	1
8	87-051-171-11		Poly-vinyl sack (for instruction)		1
9	87-056-009-41		Distributors list (H,HG,UC model only)		1
10a	87-056-059-01		Guarantee card G (HG model only)		1
10b	87-056-045-01		Guarantee card U (U model only)		1
10c	87-056-013-01		Guarantee card C (UC model only)		1
11	87-056-050-01		Safety instruction (U model only)		1
12	87-056-057-01		Service station list (U model only)		1
13	87-056-061-01		Voltage selector instruction (U model only)		1
14	82-916-740-01		Tape cassette, DMC-164		1
15	87-032-845-01		Siemens plug (H model only)		1
16a	87-034-880-01		AC power cord (H model only)		1
16b	87-034-893-01		AC power cord (HG model only)		1
16c	87-034-928-01		AC power cord (U,UC model only)		1

AIWACO.,LTD.

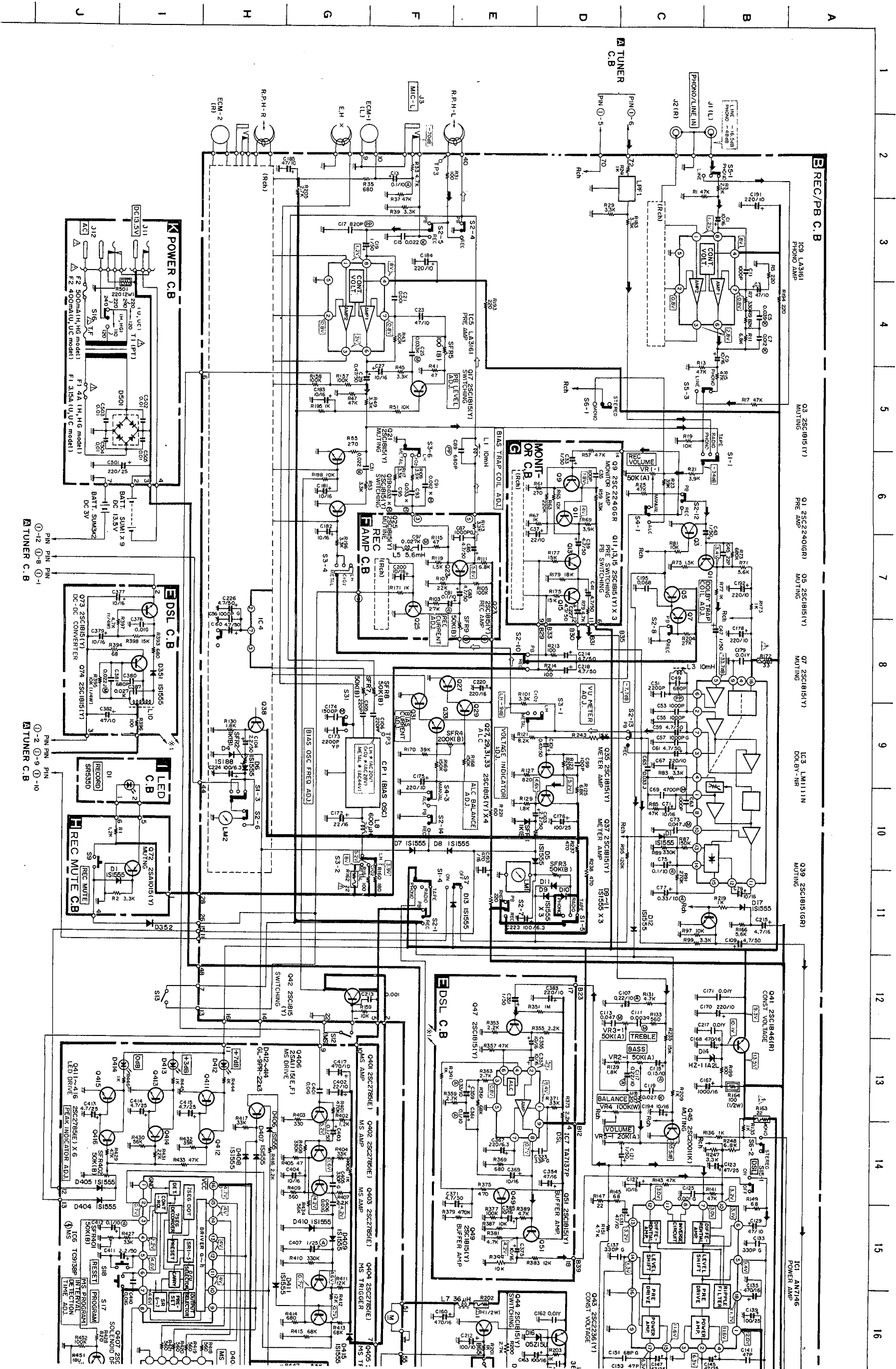
ELECTRICAL MAIN PART LIST

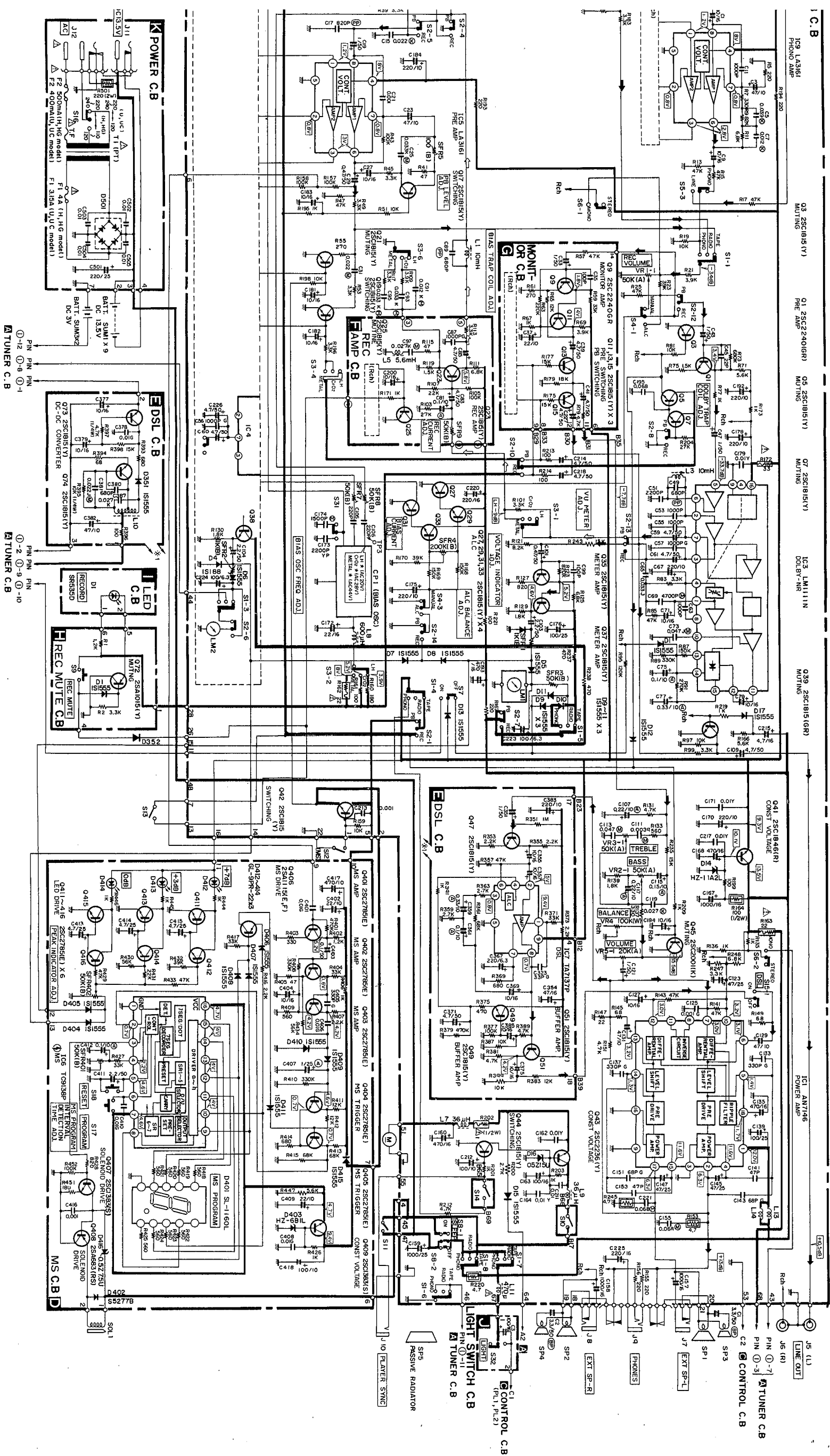
Symbol No.	Part No.	Description	Symbol No.*	Part No.	Description	Symbol No.	Part No.	Description	Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
≪ TUNER CIRCUIT BOARD SECTION ≫														
PCB-A	82-587-609-01	Tuner circuit board	Q45.46	89-320-011-21	Transistor, 2SC2001 (K,L)	PCB-C	82-587-604-01	Control circuit board	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
CP1	82-587-626-01	FM front end	D1,2,5,6, 7,8,9,10, 11,12,13,15, 17	87-027-097-01	Diode, 1S1555	IC1	87-027-749-01	IC, μ PD1703CG15	IC3	87-027-751-01	IC, TC4011BP	IC5	89-318-154-01	FET, 2SK30 (O)
IC1	87-027-752-01	IC, 535AC				IC2	87-027-564-01	IC, TC4011BP	IC, TC4011BP	IC, MSM6829GS	Transistor, 2SC1815 (Y)	Diode, 1S1555		
IC2	87-027-734-01	IC, HA12413				IC3	87-027-751-01	IC, MSM6829GS	Transistor, 2SC1815 (Y)	Diode, 1S1555				
IC3	87-027-235-01	IC, NJM4558D	D3,4	88-052-188-11	Diode, 1S188 (FM)	O1,2,3,4	89-318-154-01	Transistor, 2SC1815 (Y)	FET, 2SK30 (O)	Diode, 1S1555				
IC4	87-027-430-11	IC, LA3361	D14	87-027-346-01	Zener diode, HZ11A2L	O5	89-500-303-01	FET, 2SK30 (O)	Diode, 1S1555					
O1	89-319-233-01	Transistor, 2SC380 (O)	D16	87-027-199-01	Zener diode, 05Z-15U	D1,2,3,4, 5,6,7,8, 9,10,11,12, 13,14,15,16, 17,18,19,20, 21,22,23,24, 25,26	87-027-097-01	Diode, 1S1555						
O2	89-303-803-01	Transistor, 2SC380 (O)	L1,2	87-008-173-01	Trap coil, 10mH									
O3,4,5,7, 8,9,10,11, 13,14,15,16, 18,20,21	89-318-154-01	Transistor, 2SC1815 (Y)	L3,4	82-487-654-01	Coil, 10mH									
			L7,9(13,14) L8	87-003-039-01	Choke coil, 36 μ H									
O6	89-318-156-01	Transistor, 2SC1815 (BL)	L11,12	87-003-051-01	Choke coil, 470 μ H									
O12,19	89-110-154-01	Transistor, 2SA1015 (Y)	CP1	82-587-641-11	Bias OSC unit									
O17	89-403-135-01	Transistor, 2SD313 (E)	LPF1	87-030-070-01	Low-pass filter									
D1,2	87-027-753-01	Diode, KY1236Z	J1,2,3,4, 10	82-587-633-01	Jack plate ass'y (PHONE/LINE IN, MIC-L,R, PLAYER SYNC)	D28	87-027-758-01	LED, GL-9PR22 (AUTO OPERATE/FM STEREO)	O9,10	89-322-405-01	REC amp circuit board	CON-3	82-587-649-01	Power transformer (H,HG model only)
D3,4,5,6, 7,8,9,11	87-027-097-01	Diode, 1S1555	J5,6,7,8	82-587-632-01	EXT SP-L,R (H,HG model only)	D30	82-587-603-01	LCD (FREQUENCY INDICATOR)	O11,12,13, 14,15,16	89-318-154-01	Transistor, 2SC1815 (Y)	CON-4	82-587-649-01	Power transformer (H,HG model only)
D10	87-027-431-01	Zener diode, RD6,2EBZ				X1	87-030-083-01	Crystal resonator	PIN	87-032-634-01	Pin, 4P	CON-5	82-587-649-01	Power transformer (H,HG model only)
L1,8,9	87-003-051-01	Choke coil, 470 μ H										CON-6	82-587-649-01	Power transformer (H,HG model only)
L2	87-008-227-01	FM coil										CON-7	82-587-649-01	Power transformer (H,HG model only)
L3	82-587-609-01	AM bar antenna coil										CON-8	82-587-649-01	Power transformer (H,HG model only)
L4	82-755-607-01	AM OSC coil										CON-9	82-587-649-01	Power transformer (H,HG model only)
L5,6	87-005-126-01	Coil, 1mH										CON-10	82-587-649-01	Power transformer (H,HG model only)
L10	87-003-045-01	Choke coil, 22 μ H										CON-11	82-587-649-01	Power transformer (H,HG model only)
L11	87-003-064-01	Choke coil, 0.39 μ H										CON-12	82-587-649-01	Power transformer (H,HG model only)
TC1	87-011-108-01	Trimmer, 8pF										CON-13	82-587-649-01	Power transformer (H,HG model only)
CF1,2	87-008-228-01	Ceramic filter SFE, 10.7 MASH										CON-14	82-587-649-01	Power transformer (H,HG model only)
CF2	87-008-235-01	Ceramic filter 10.7 (U,UC model only)										CON-15	82-587-649-01	Power transformer (H,HG model only)
CF3	87-008-225-01	Ceramic filter 10.7 (U,UC model only)										CON-16	82-587-649-01	Power transformer (H,HG model only)
IFT1	87-008-226-01	AM IFT										CON-17	82-587-649-01	Power transformer (H,HG model only)
IFT2	87-008-223-01	AM IFT										CON-18	82-587-649-01	Power transformer (H,HG model only)
SFR1	87-021-566-01	Semi-fixed resistor, 5k Ω -B										CON-19	82-587-649-01	Power transformer (H,HG model only)
SFR2	87-021-567-01	Semi-fixed resistor, 10k Ω -B										CON-20	82-587-649-01	Power transformer (H,HG model only)
PIN-1	87-049-045-01	Pin, 12P										CON-21	82-587-649-01	Power transformer (H,HG model only)
R50	87-025-317-01	< Resistor > 47 Ω $\frac{1}{4}$ w Nonflammable resistor										CON-22	82-587-649-01	Power transformer (H,HG model only)
C19	87-014-048-01	< Capacitors > 430pF PP										CON-23	82-587-649-01	Power transformer (H,HG model only)
C48	87-014-057-01	1000pF PP										CON-24	82-587-649-01	Power transformer (H,HG model only)
≪ REC/PB CIRCUIT BOARD SECTION ≫														
PCB-B	82-587-614-21	REC/PB circuit board (H,HG model only)	R83,84 R153,154, 220,245, 246 R164	87-025-209-01 87-025-313-01 87-025-316-01	3.3k Ω Metal film resistor 4.7 Ω Nonflammable resistor 100 Ω $\frac{1}{4}$ w Nonflammable resistor	PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
PCB-B	82-587-657-01	REC/PB circuit board (U,UC model only)				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
IC1,2	87-027-540-01	IC, AN7146				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
IC3,4	87-027-754-01	IC, LM1111C				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
IC5,9	87-027-539-01	IC, LA3161				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
O1,2	89-322-405-01	Transistor, 2SC2240 (GR)				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
O3,4,5,6, 7,8,17, 18,19,20, 21,22,27, 28,29,30, 31,32,33, 34,35,36, 37,38,42, 44	89-318-154-01	Transistor, 2SC1815 (Y)				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
Q39,40	89-318-155-01	Transistor, 2SC1815 (GR)				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
O41	89-318-464-01	Transistor, 2SC1846 (R)				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
O43	89-322-364-01	Transistor, 2SC2236 (Y)				PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
≪ CONTROL CIRCUIT BOARD SECTION ≫														
PCB-C	82-587-604-01	Control circuit board	PCB-D	82-587-615-21	MS circuit board (H,HG model only)	PCB-E	82-587-617-21	DSL circuit board	PCB-F	82-587-617-21	DSL circuit board	PCB-G	82-588-633-11	Monitor circuit board
IC1	87-027-749-01	IC, μ PD1703CG15	IC2	87-027-564-01	IC, TC4011BP	IC3	87-027-751-01	IC, MSM6829GS	IC4	87-027-430-11	IC, LA3361	IC5	89-318-154-01	FET, 2SK30 (O)
IC2	87-027-752-01	IC, 535AC	IC3	87-027-751-01	IC, MSM6829GS	IC4	87-027-430-11	IC, LA3361	IC5	89-318-154-01	FET, 2SK30 (O)	IC6	89-318-154-01	FET, 2SK30 (O)
IC3	87-027-235-01	IC, NJM4558D	O1,2,3,4	89-318-154-01	Transistor, 2SC1815 (Y)	O5	89-500-303-01	FET, 2SK30 (O)	Diode, 1S1555					
IC4	87-027-430-11	IC, LA3361	D1,2,3,4, 5,6,7,8, 9,10,11,12, 13,14,15,16, 17,18,19,20, 21,22,23,24, 25,26	87-027-097-01	Diode, 1S1555									
O1	89-319-233-01	Transistor, 2SC380 (O)	L1,2	87-008-173-01	Trap coil, 10mH									
O2	89-303-803-01	Transistor, 2SC380 (O)	L3,4	82-487-654-01	Coil, 10mH									
O3,4,5,7, 8,9,10,11, 13,14,15,16, 18,20,21	89-318-154-01	Transistor, 2SC1815 (Y)	L7,9(13,14) L8	87-003-039-01	Choke coil, 36 μ H									
O6	89-318-156-01	Transistor, 2SC1815 (BL)	L11,12	87-003-051-01	Choke coil, 470 μ H									
O12,19	89-110-154-01	Transistor, 2SA1015 (Y)	CP1	82-587-641-11	Bias OSC unit									
O17	89-403-135-01	Transistor, 2SD313 (E)	LPF1	87-030-070-01	Low-pass filter									
D1,2	87-027-753-01	Diode, KY1236Z	J1,2,3,4, 10	82-587-633-01	Jack plate ass'y (PHONE/LINE IN, MIC-L,R, PLAYER SYNC)	D28	87-027-758-01	LED, GL-9PR22 (AUTO OPERATE/FM STEREO)	O9,10	89-322-405-01	REC amp circuit board	CON-3	82-587-649-01	Power transformer (H,HG model only)
D3,4,5,6, 7,8,9,11	87-027-097-01	Diode, 1S1555	J5,6,7,											



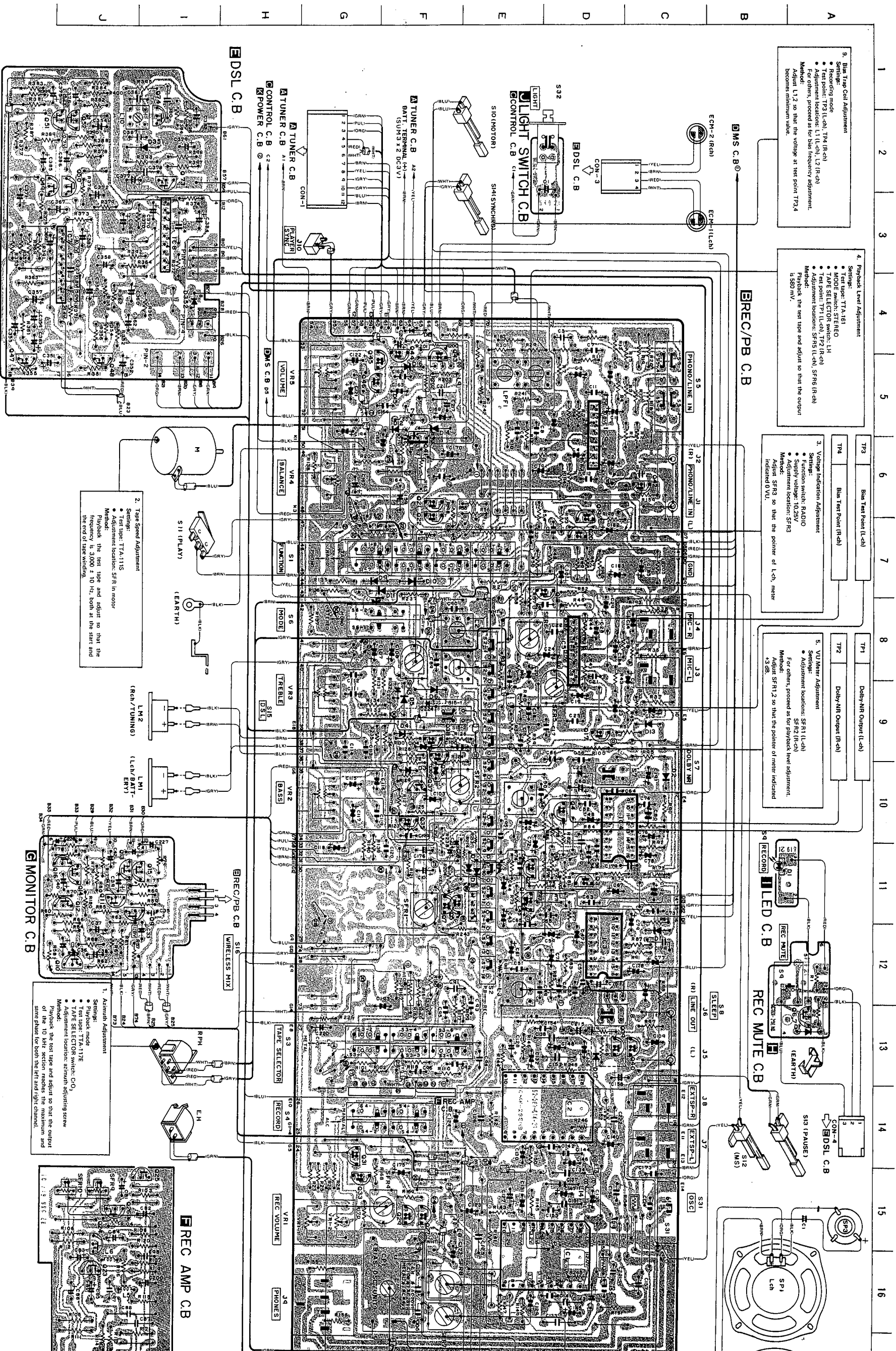


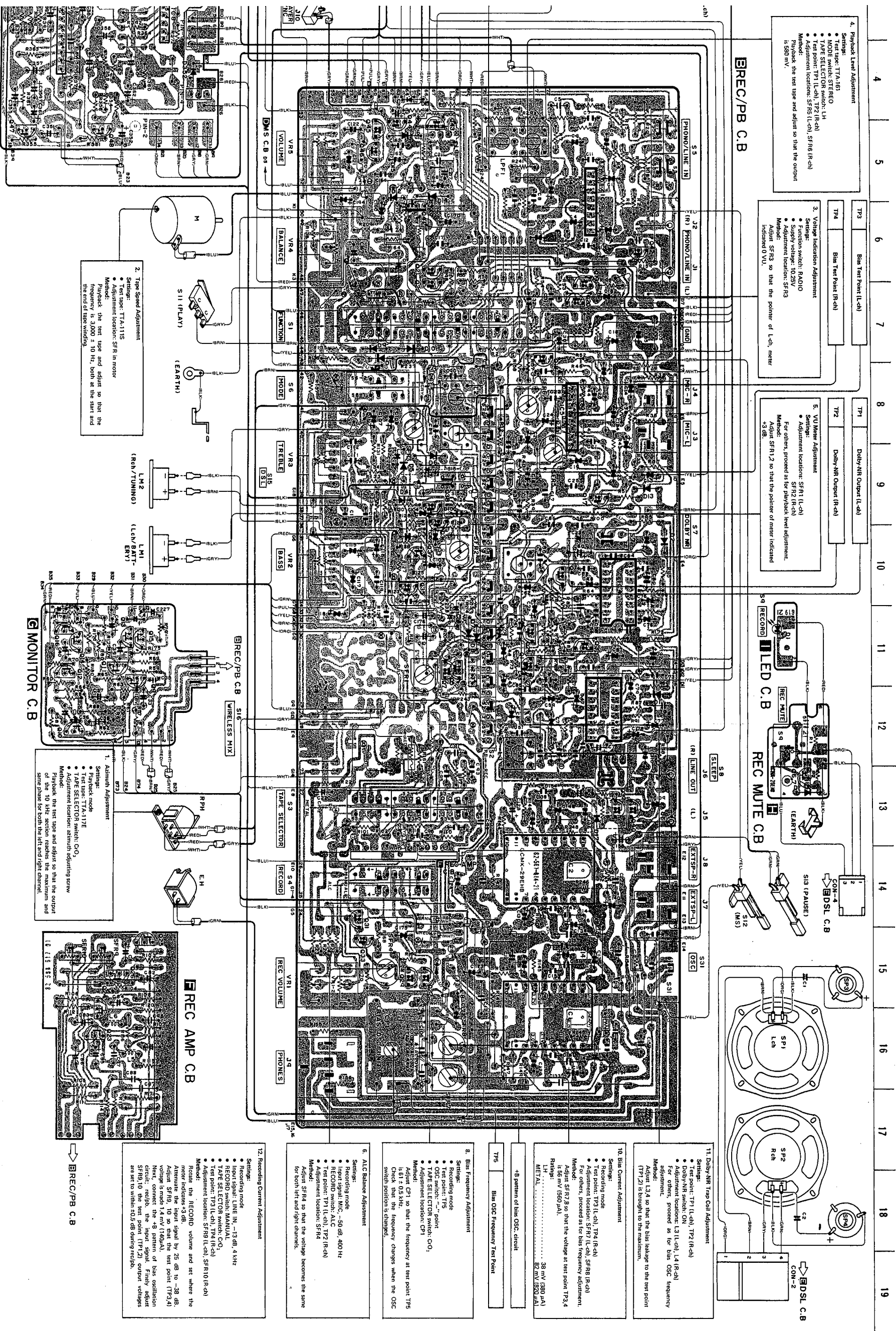
SCHEMATIC DIAGRAM-2

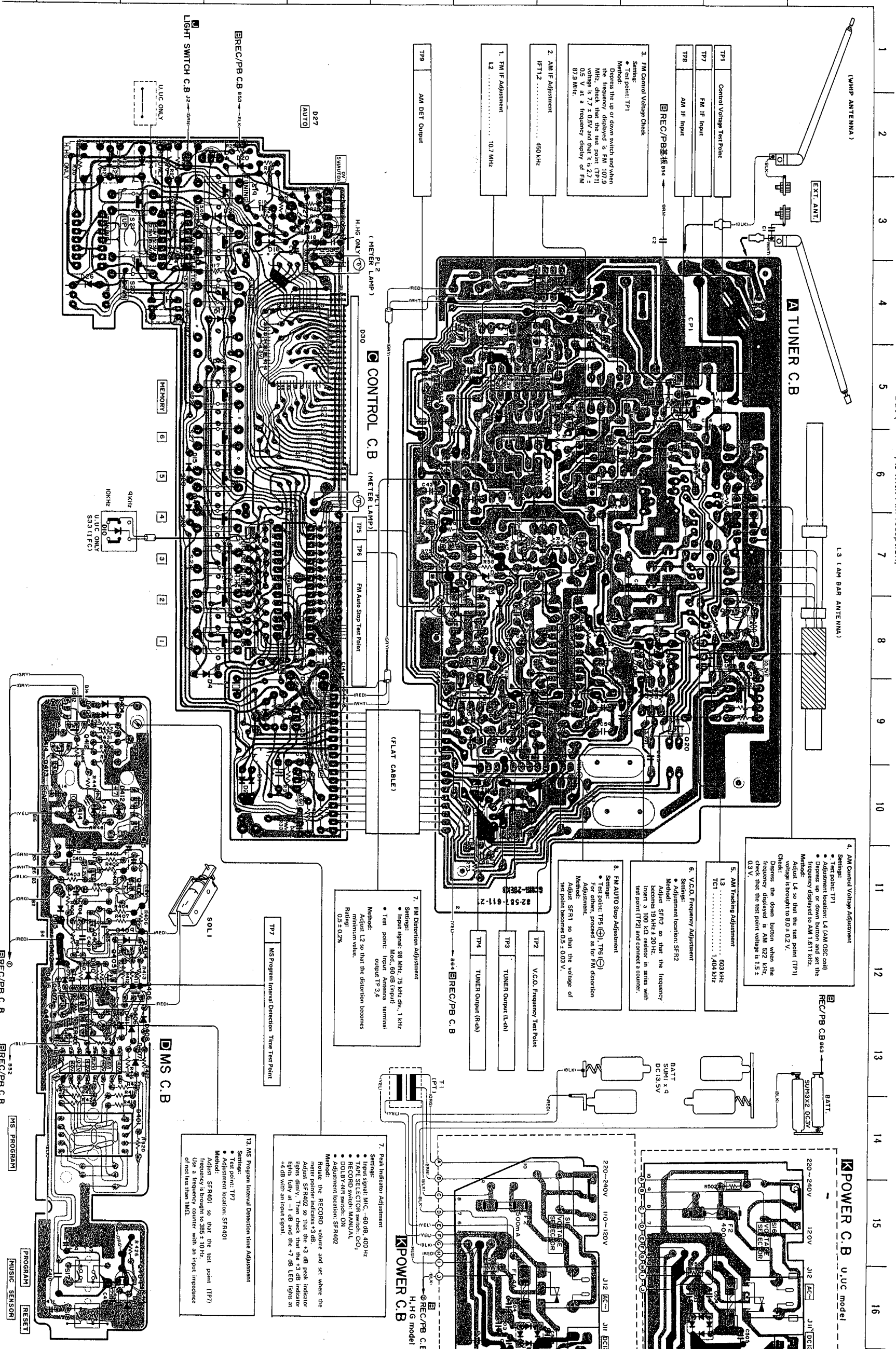




(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals. An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.







NOTES (1) Bl(+) Pattern Component side pattern Others pattern

(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals. But () is with AM reception.

