3-BAND STEREO RADIO CASSETTE RECORDER

MODEL NO. CS-880E,K

AIWA®

[SERVICE MANUAL]
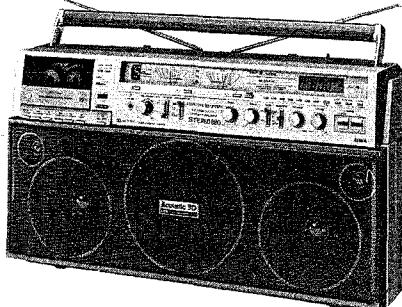
DATE OF ISSUE 7/1981

SPECIFICATIONS

GENERAL

Semiconductors:	17 ICs, 1 FET, 95 transistors, 68 diodes, 7 LED's, 1 LCD
Power source:	E model
	Batteries DC 13.5V (UM-1 x 9)
	Back-up power supply (for tuner memory)
	DC 3V (UM-3, "AA" x 2)
	AC 110 ~ 120V/220 ~ 240V
	switchable 50/60 Hz
	K model
	Batteries, DC 13.5V (UM-1 or HP-2 x 9)
	Back-up power supply (for tuner memory)
	DC 3V (UM-3 or HP-7 x 2)
	K model
	AC 120V/240V
	switchable. 50/60 Hz
	Car battery (thru car adaptor)
Power consumption:	E model
	42W
	K model
	39W
Speakers:	140mmϕ x 2 (Woofer)
	50mmϕ x 2 (Tweeter)
	170mmϕ x 1 (Passive Radiator)
Dimension:	588(W) x 325(H) x 163(D) mm
Weight:	8.6 kg

RADIO SECTION

Frequency range:	FM	87.5 ~ 108 MHz
	MW	522 ~ 1,611 kHz
	LW	146 ~ 353 kHz
Intermediate frequency:	FM	10.7 MHz
	MW,LW	450 kHz
Sensitivity:	FM	
(IHF, THD 3%)	14 ± 6 dB (at 88.0 MHz)	
	12 ± 6 dB (at 98.0 MHz)	
	12 ± 6 dB (at 108.0 MHz)	
(S/N 10 dB)	MW	
	47 ± 5 dB (at 594 kHz)	
	45 ± 5 dB (at 1008 kHz)	
	42 ± 5 dB (at 1404 kHz)	
(S/N 10 dB)	LW	
	55 ± 5 dB (at 155 kHz)	
	54 ± 5 dB (at 245 kHz)	
	55 ± 5 dB (at 344 kHz)	
Image rejection:	FM	45 ± 6 dB (at 108.0 MHz)
	MW	41 ± 5 dB (at 1,404 kHz)
	LW	45 ± 10 dB (at 344 kHz)
IF rejection:	FM	80 ± 20 dB (at 88.0 MHz)
	MW	27 ± 5 dB (at 594 kHz)
Total harmonic distortion:	FM	Less than 1.5% (at 98 MHz)
	MW	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)
	MW	60 ± 10 dB (at 1,008 kHz)
	LW	65 ± 10 dB (at 245 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:	More than 49/46 dB
(Un-weighted)	[DC/AC] (PB)
	More than 44/42 dB
	[DC/AC] (REC/PB)
Erasing ratio:	More than 60 dB
Separation:	More than 38 dB (REC/PB)
Output power:	More than 28W (14W + 14W)
FF & rewind time:	90 ± 5 s. (at C-60)
Automatic stop system:	Mechanical auto stop
Pinch roller pressure:	125 ± 15 g (1.23 ± 0.15N)
Wow and flutter:	Less than 0.038% (WRMS)
Take-up torque:	35^{+15}_{-5} g-cm (343^{+147}_{-49} mN·m)
FF & rewind torque:	110 ± 20 g-cm (1078 ± 196 mN·m)
Input terminal:	MIC 3.5ϕ jack x 2
	PHONO pin jack x 2
	DIN 5P

Input sensitivity/impedance:		
	MIC	0.3mV/3kΩ
	DIN	500mV/470kΩ
	PHONO	4mV/47kΩ
Output terminal:	DIN	5P
	EXT. SP	3.5ϕ jack x 2
	PHONES	6.3ϕ jack

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- 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.


```
Main cabinet ──► DSL circuit board

Main cabinet ──► Level meter ──► Dial plate ──► Display circuit board
                                            └──► MS circuit board

Main cabinet ──► Radio chassis
                 (Including radio chassis, tuning, display MS, AF
                 (pattern side) PC Boards)
                       │
                       ▼
                 Tuning circuit board
                       │
                       ▼
                 AF circuit board (Part side)

Main cabinet ──► MD-3 mechanism
```
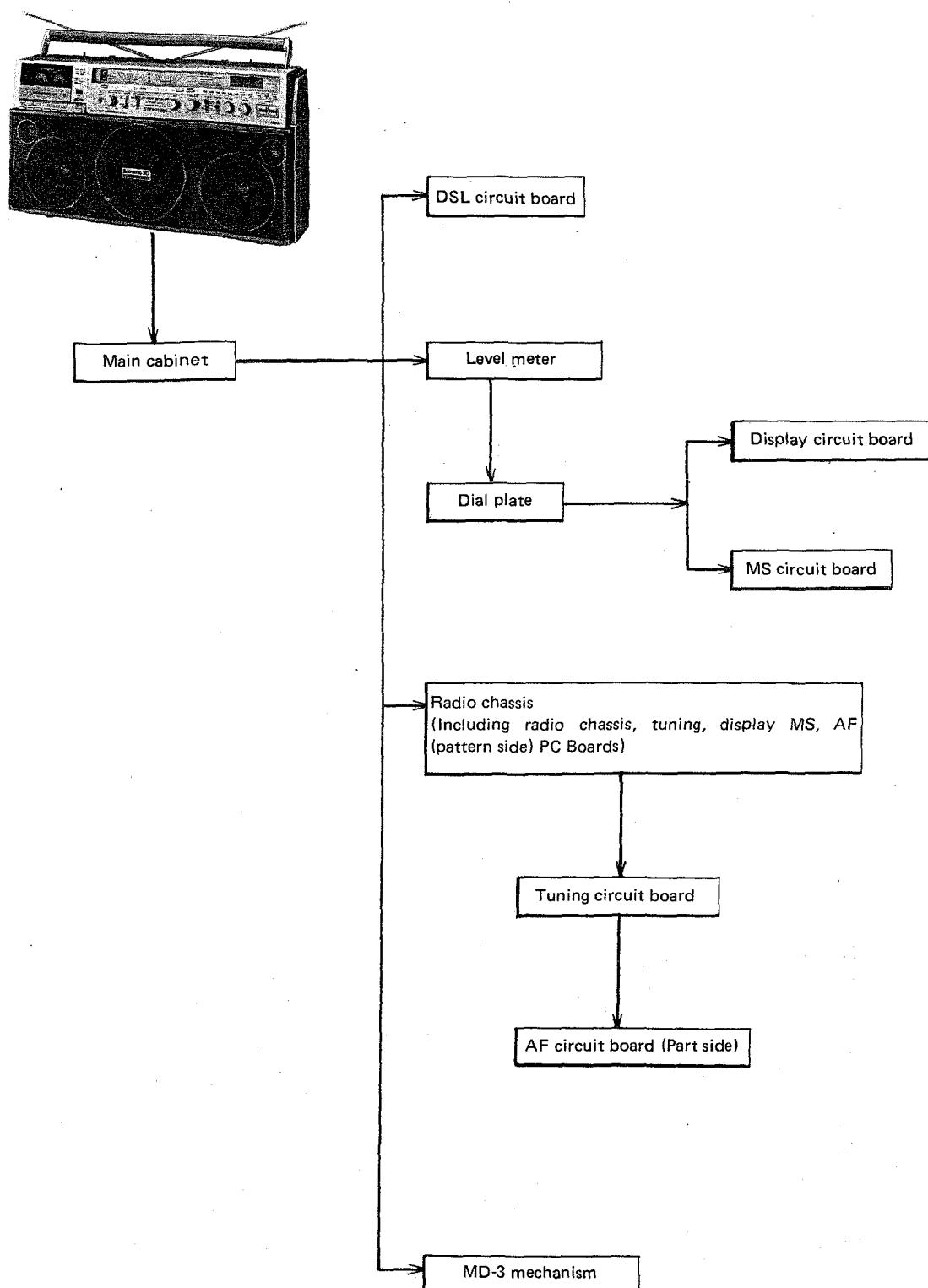
DISASSEMBLY INSTRUCTIONS

Removing the Main Case

1) Remove 11 screws on the rear lid shown by arrows ←.
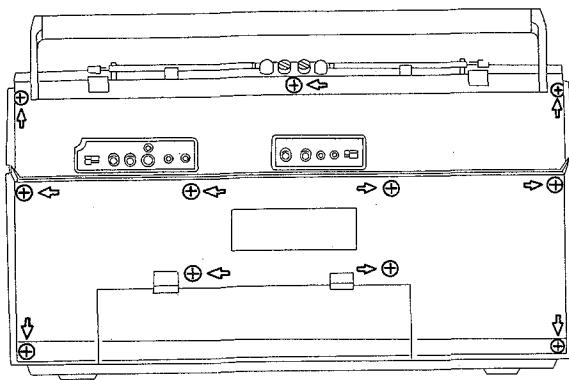
2) Remove 9 knobs.
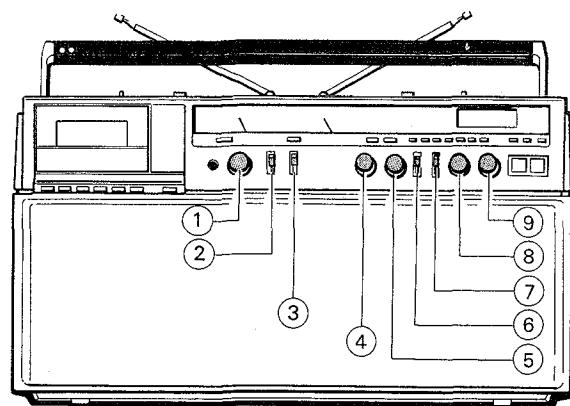
Note 3) Open the cassette lid.
(It is not required to remove the cassette lid)
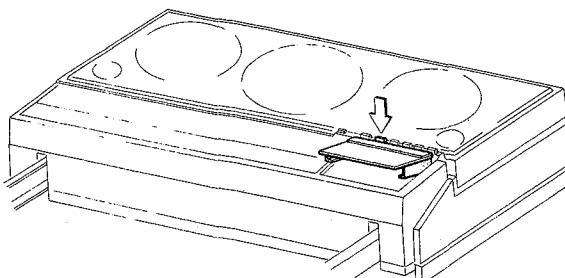
Installing the Main Case

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.

Fiber paper
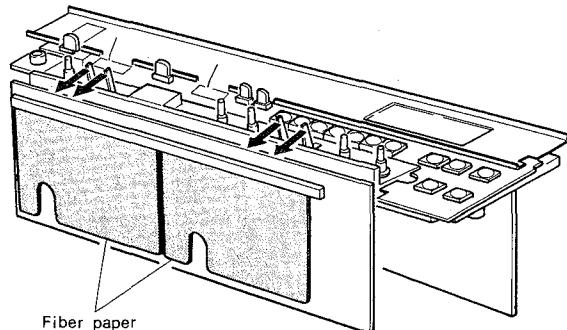
Note 3) Be sure to install in the order (1) – (3). Be careful: when it is mounted incorrectly, it may damage the dial plate and the display PC Boards, etc.
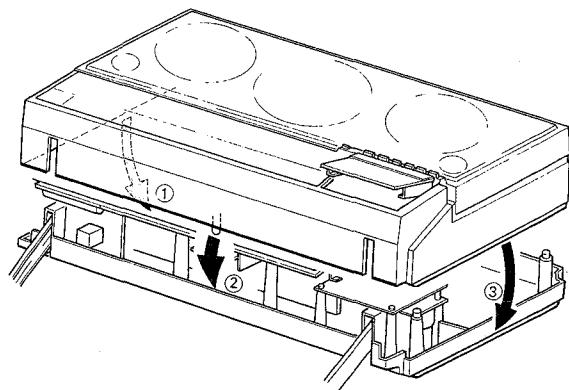
4) Match the knobs while performing item 3) and tapping the side.
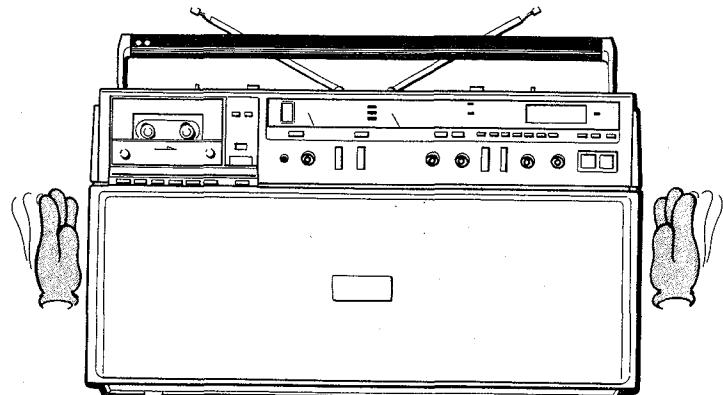
Note: Removing the radio chassis

1) Be sure to remove the level meter before starting work to prevent the pointer of the level meter from being damaged.
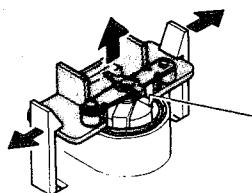
2) Loosen the screw and lift up the hook.

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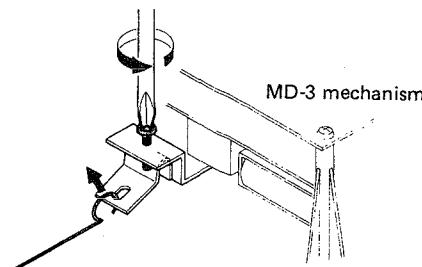
3) Remove 3 screws and lift up the radio chassis in the direction of the arrow. The radio chassis, REC/PB, tuner, MS and display PC Boards are removed at that time.
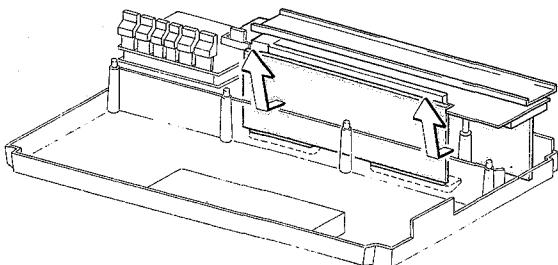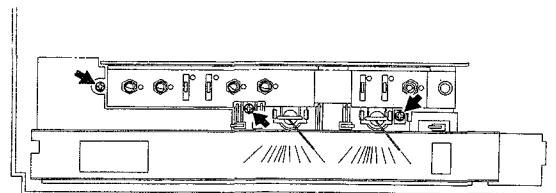
Note: Installing the radio chassis

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.

Jack plate

Tuner circuit board
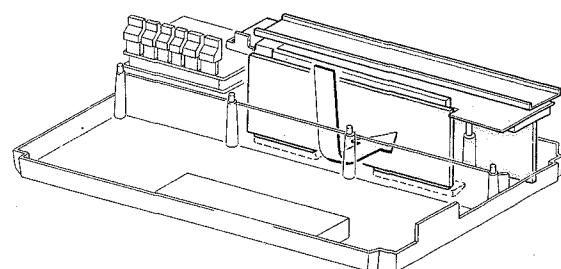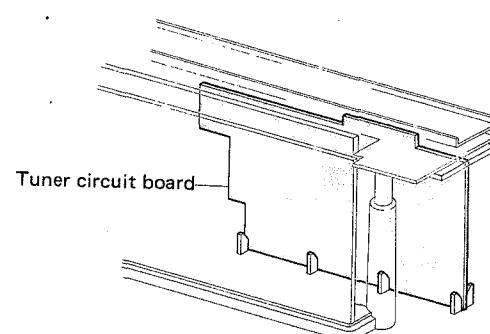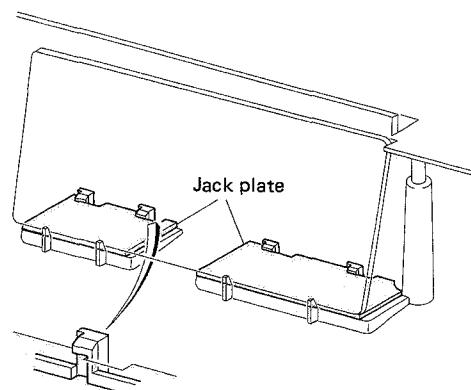
Removing Mechanism

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

MD-3 mechanism

2) Remove 4 screws.

VT₁⊕3−25

$VT_1 \oplus 3-25$

$VT_1 \oplus 3-25$

$VT_1 \oplus 3-25$

$VT_1 \oplus 3-25$
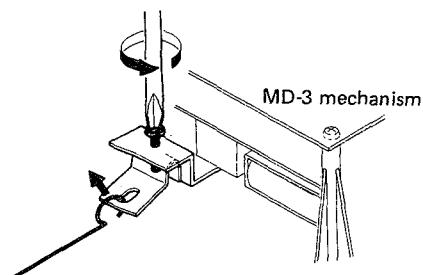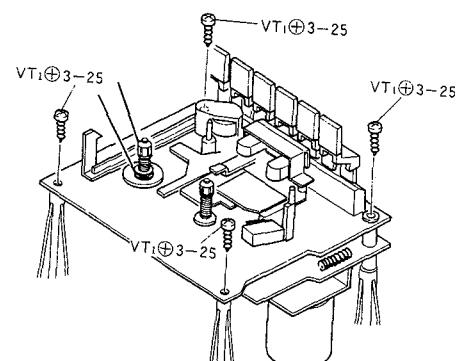
Cautions on Disassembling MD-3 Mechanism

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

1

The boss should come to this position.

Lever, Auto A

Lever, Auto eject

Boss (The boss of the lever auto A should come outside the T spring auto eject)

T-spring, Atuo eject

Gear, PLAY

2

3

Cam

Gear, PALY

Check that the cam is always kept pressed in the direction of the arrow.

T-spring, Play lever

Trigger lever, REC

Lever, REC drive

Rib

Boss (The boss should be on the right side of the lever REC driver)

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.
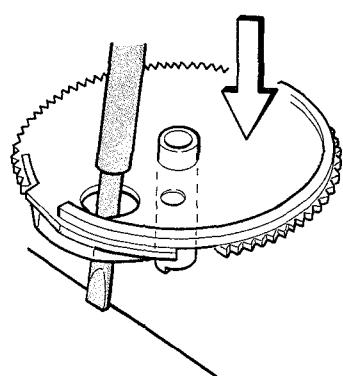
DESCRIPTION OF THE MD-3 MECHANISM

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.

Actuatng chassis

Capstan

Pinch lever ass'y

EH   RPH

Lever, PALY

Gear, Flywheel   Gear, Flywheel

Boss A   Boss

Trigger lever, PLAY

Lever, PLAY

Flywheel
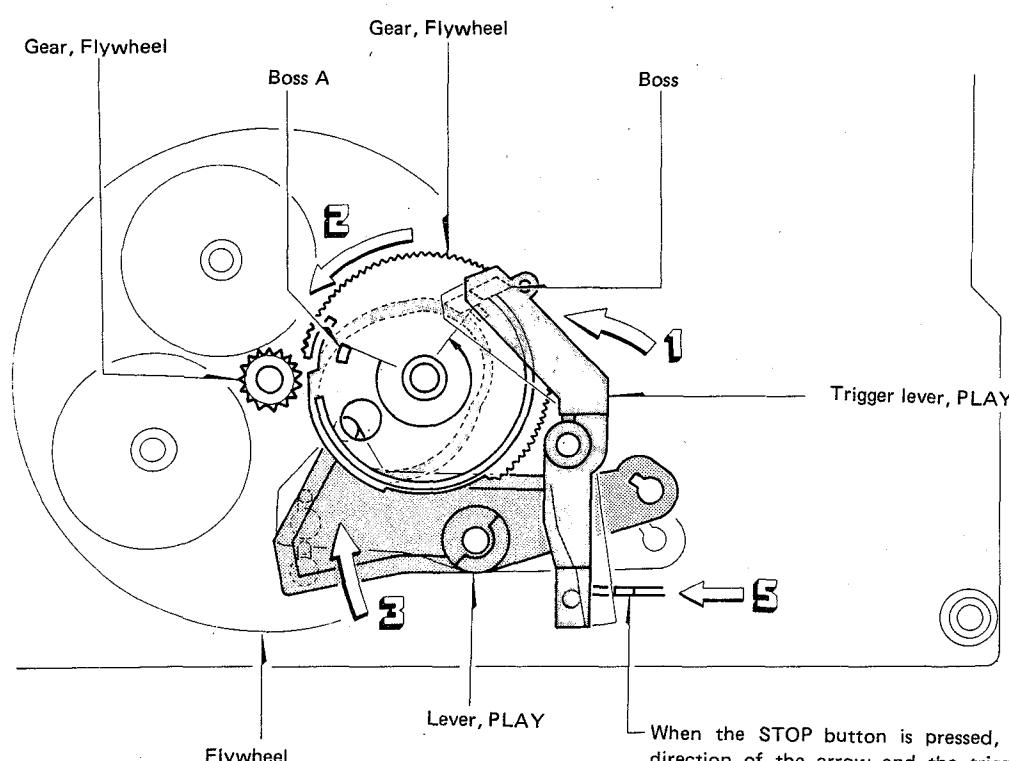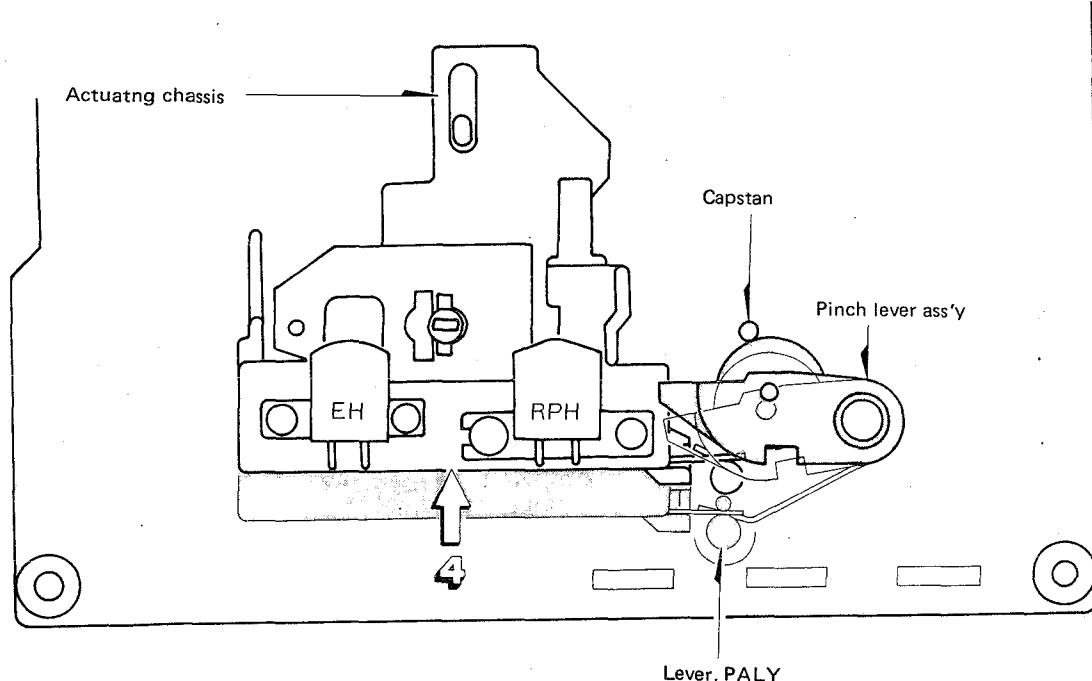
When the STOP button is pressed, the lever moves in the direction of the arrow and the trigger lever PLAY releases the boss (A) of the gear (PLAY).

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.

Boss A   FR lever B

Gear, FR

Boss B

FR lever C

Gear, Flywheel

Trigger lever, FF

FR lever ass'y

Take-up reel disc

Supply reel disc

FR lever ass'y
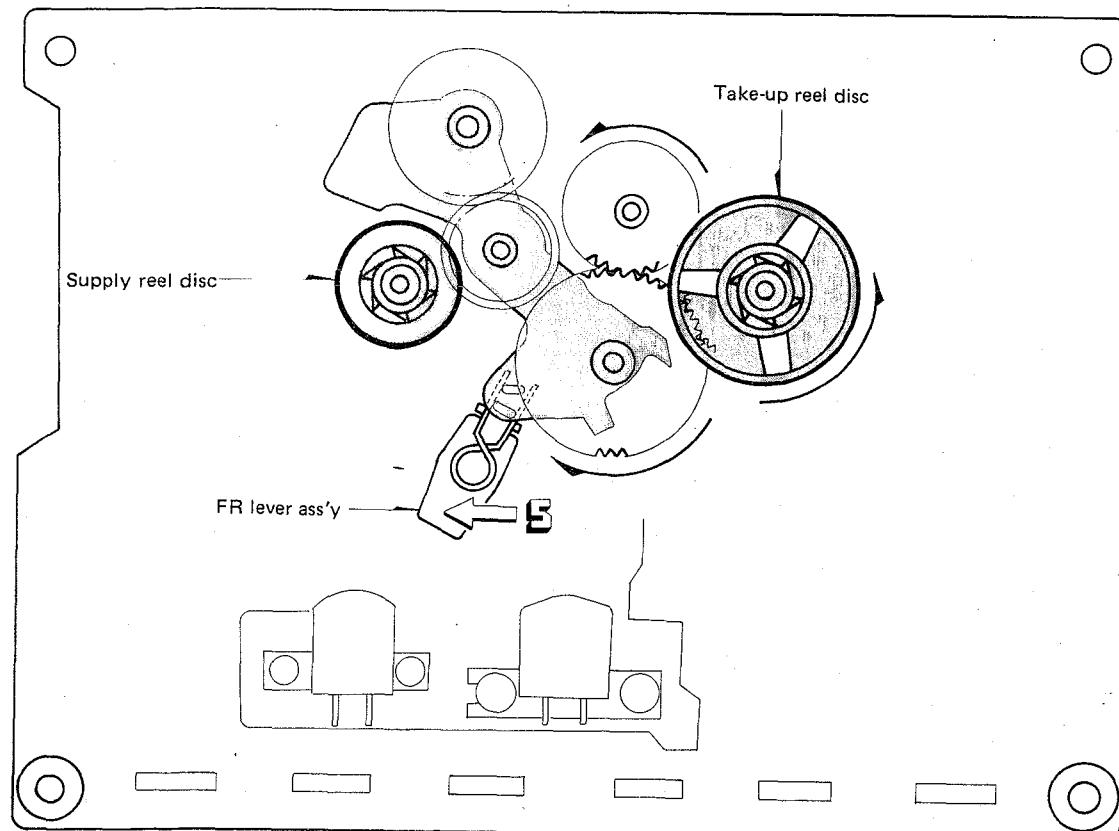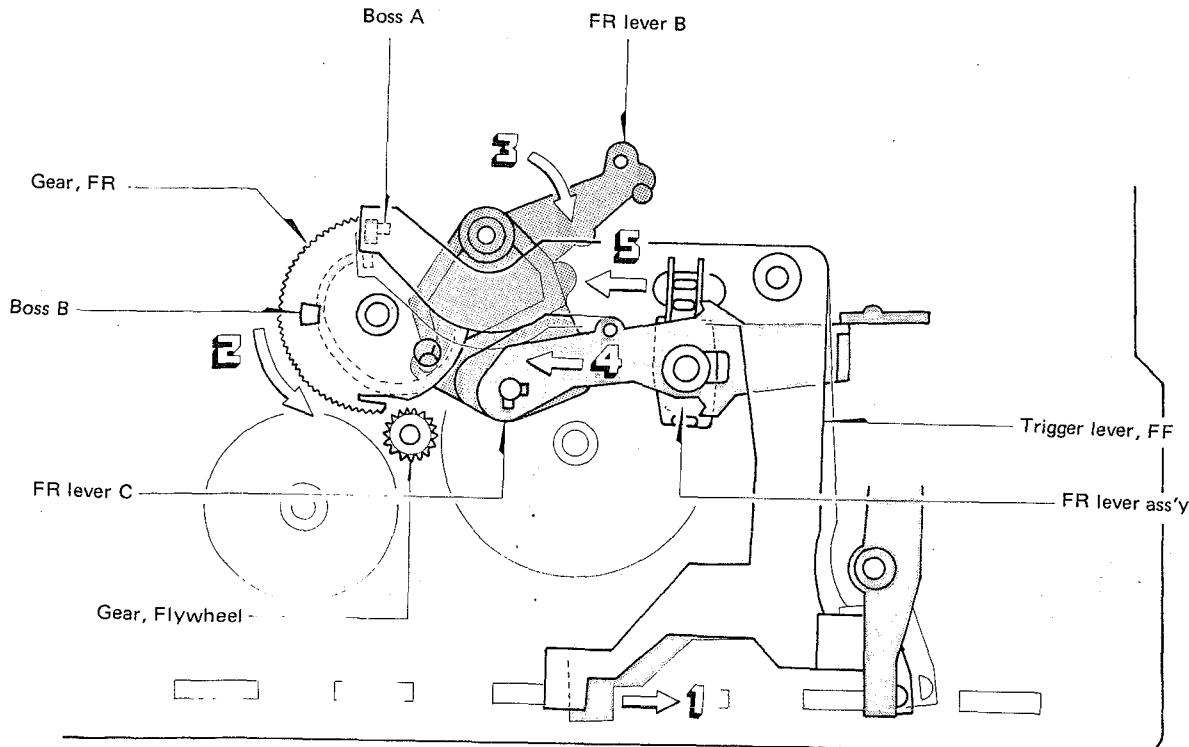
REW Operation

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.

Boss A   FR lever B   Lever, REW

Gear, FR

Boss B

Trigger lever, REW

FR lever C

FR lever ass'y

Gear, Flywheel

Trigger FF

Supply reel disc

FR lever ass'y

Take-up reel disc
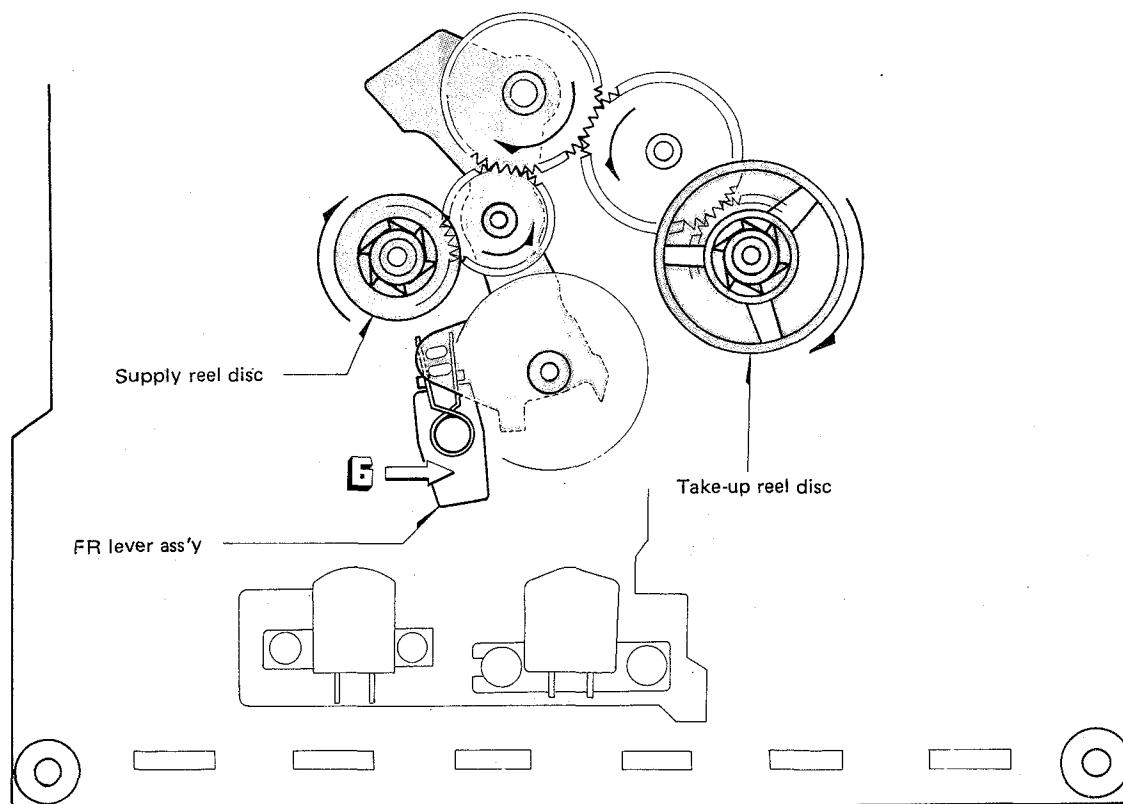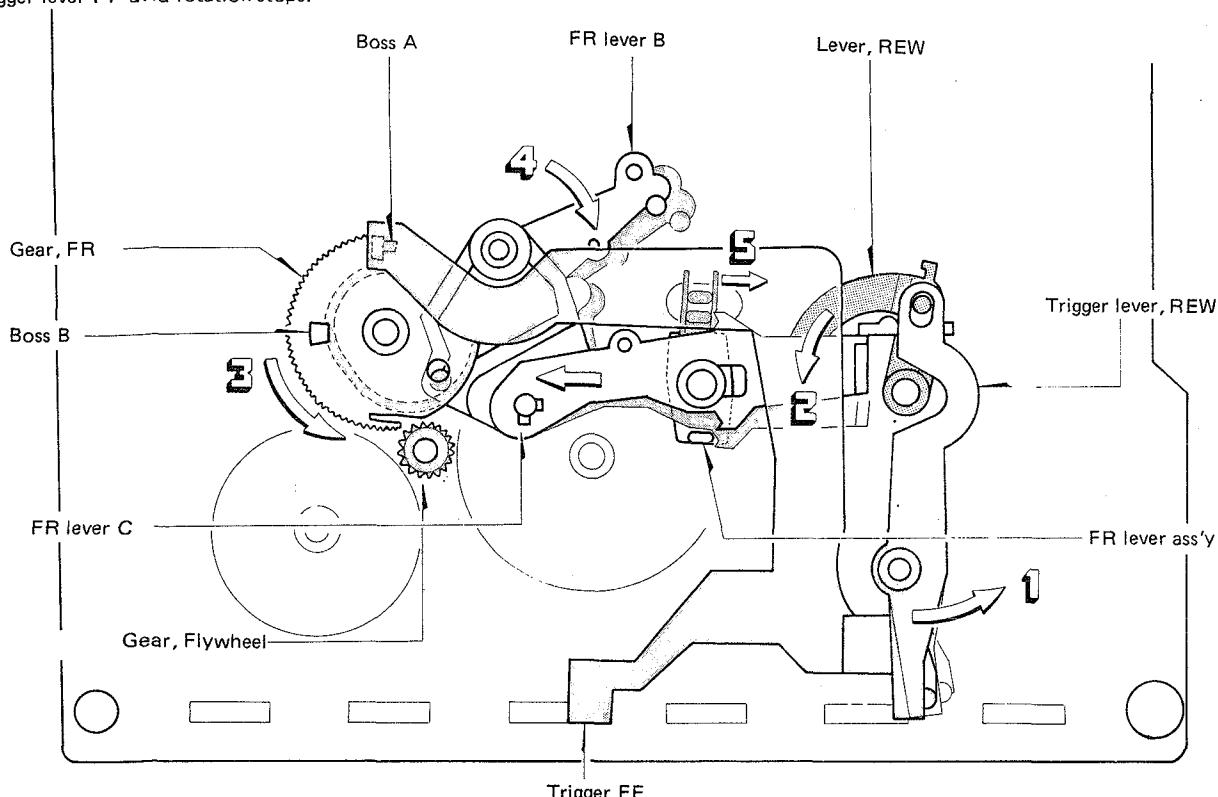
Description of the PAUSE Operation

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, enages 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.

Lever, PAUSE   Boss A   Gear, PLAY

Boss B

Triggerlever, PAUSE

Gear, PAUSE   Gear, Flywheel

Play idler lever   Lever, PAUSE

EH   RPH

Pinch lever ass'y
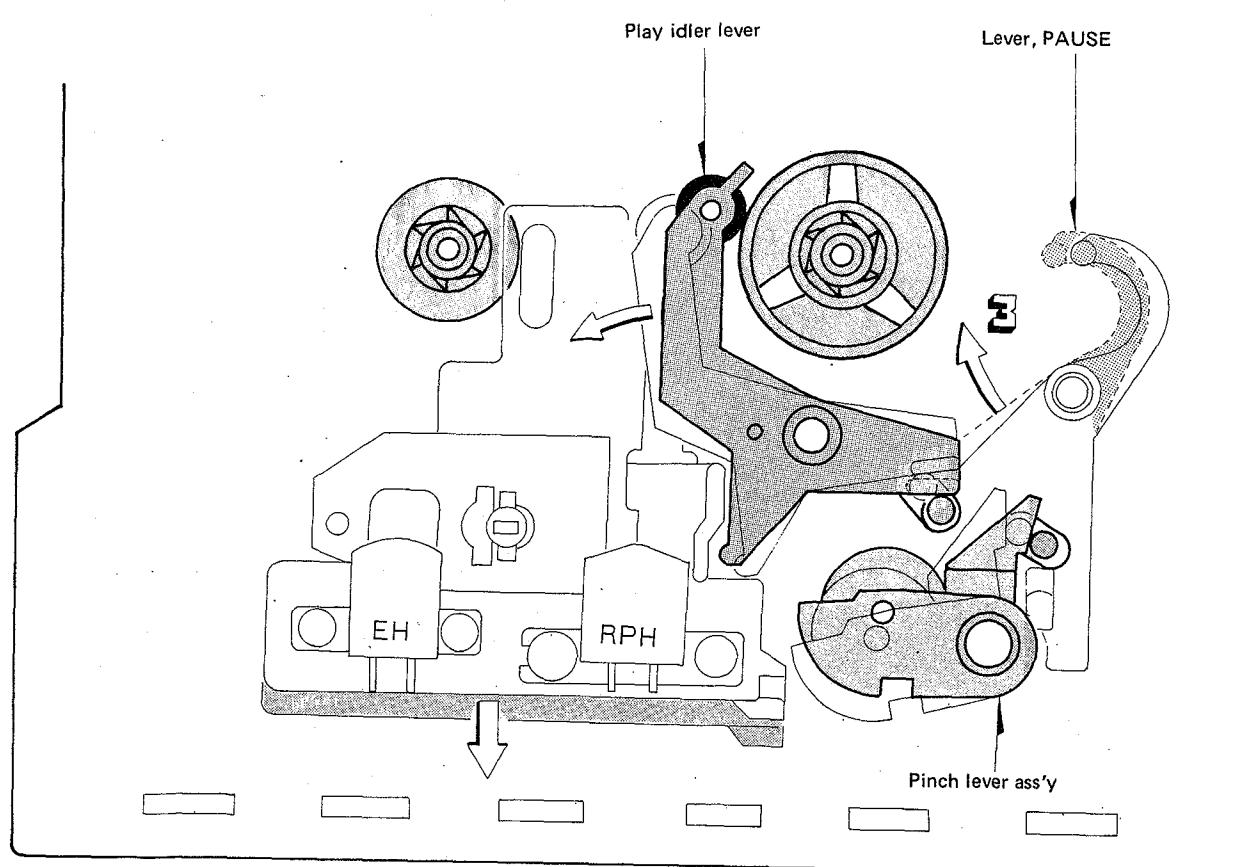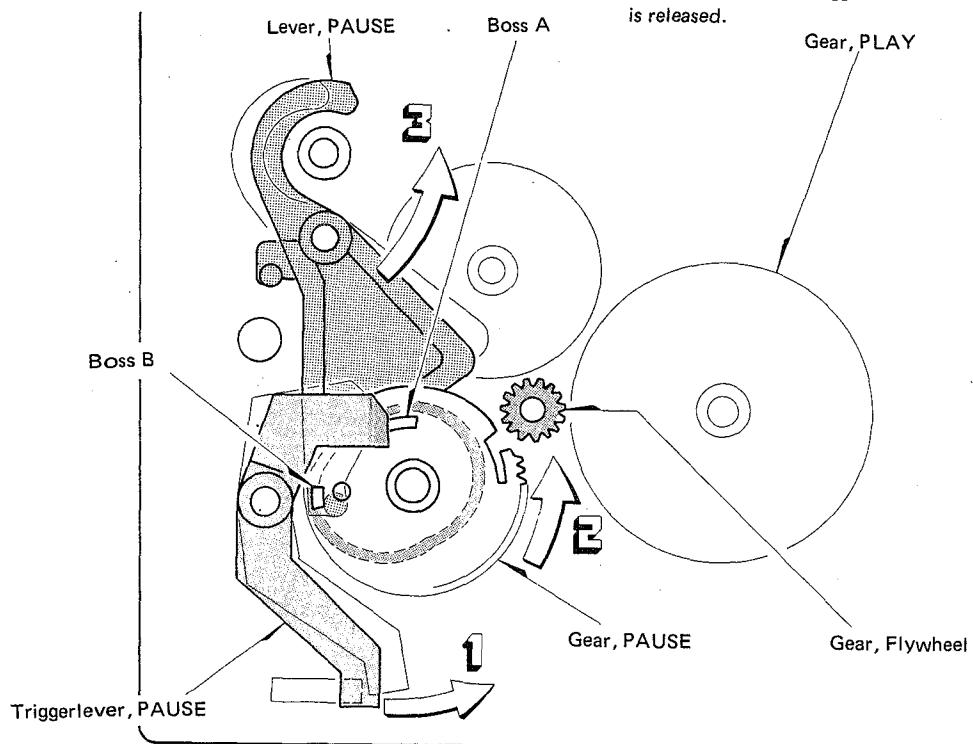
REC Operation

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.

Gear, Play   Lever, REC drive   Trigger lever, REC

Lever, REC A

Lever, REC B

Slide plate, REC
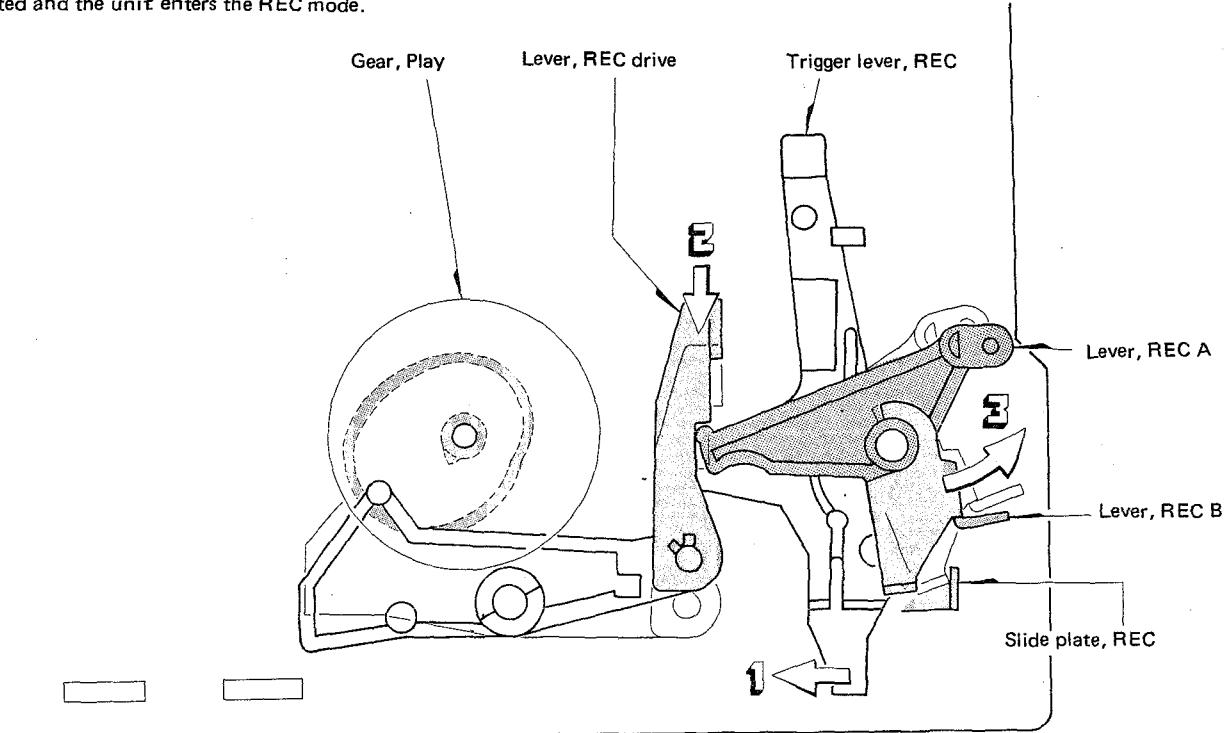
Description of the Auto-stop Operation

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.

Boss

Cam A

Gear, Auto kick

Slip disk, Take-up reel disc ass'y

Lever, Auto A

Cam B

Play auto kick

Plate lock
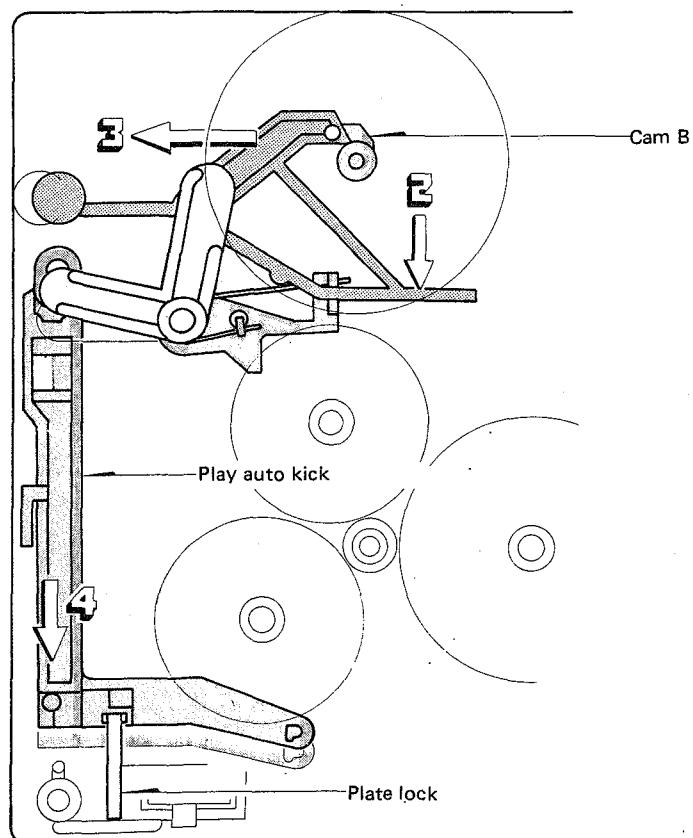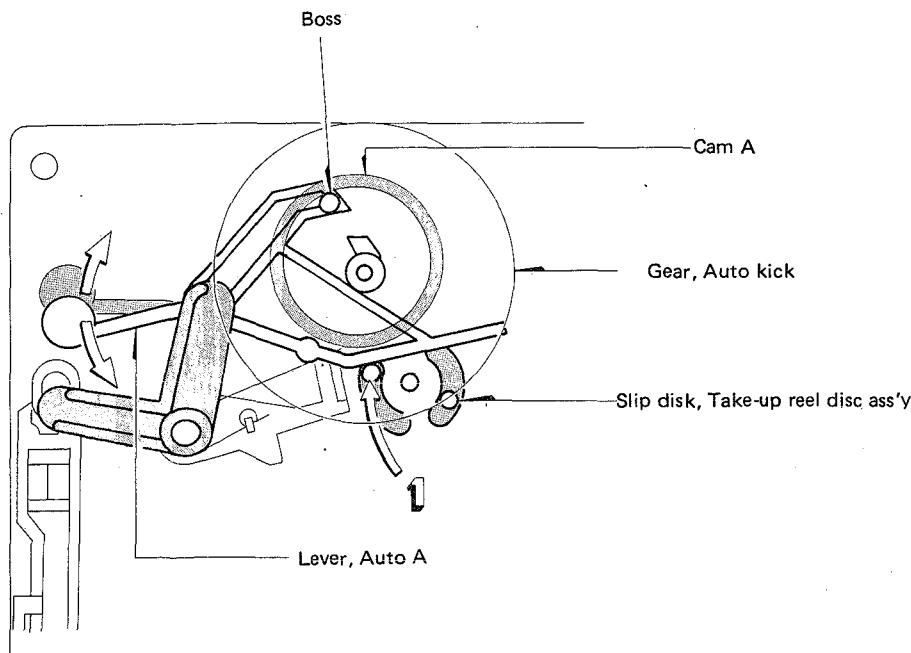
SPRING APPLICATION POSITION
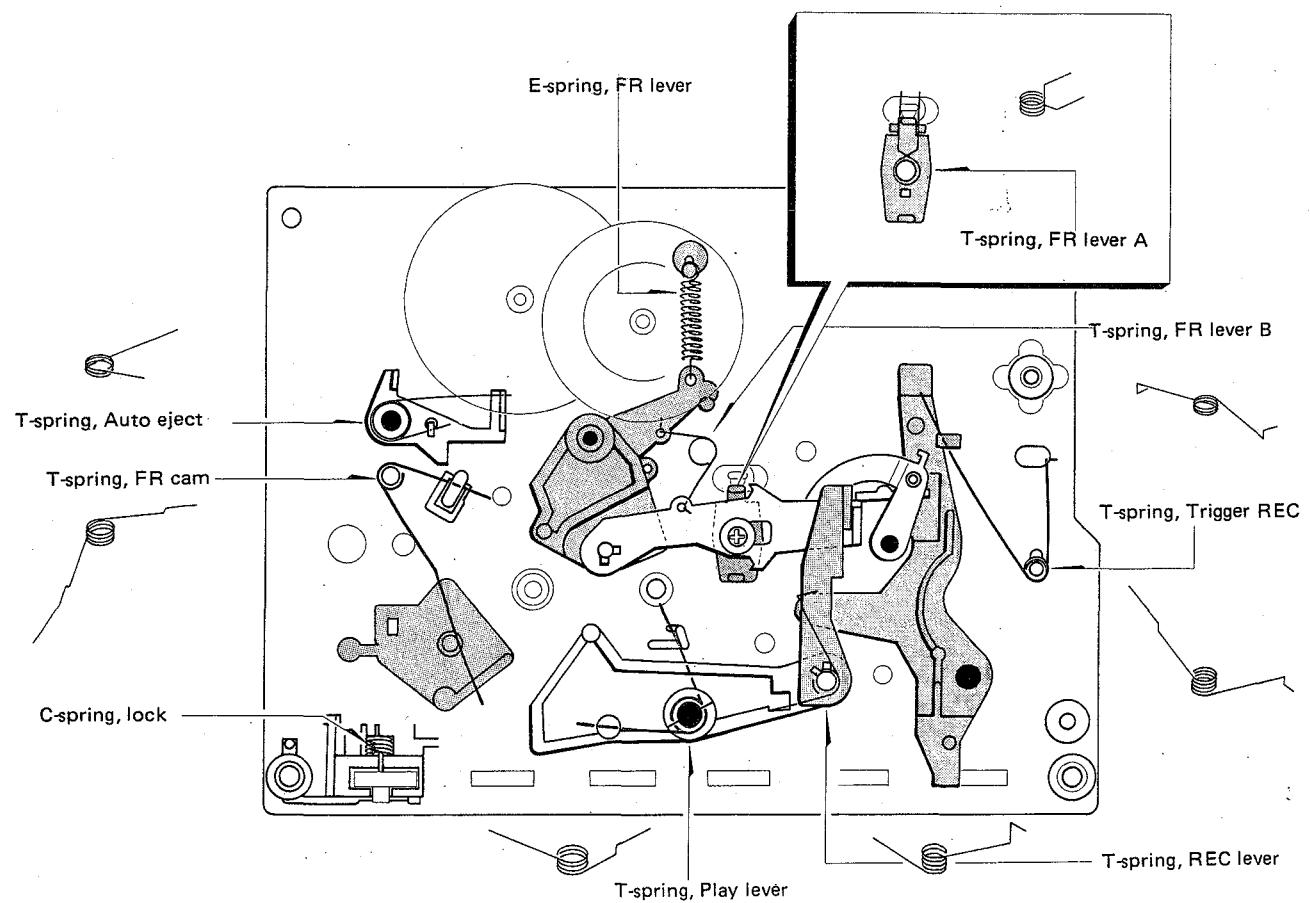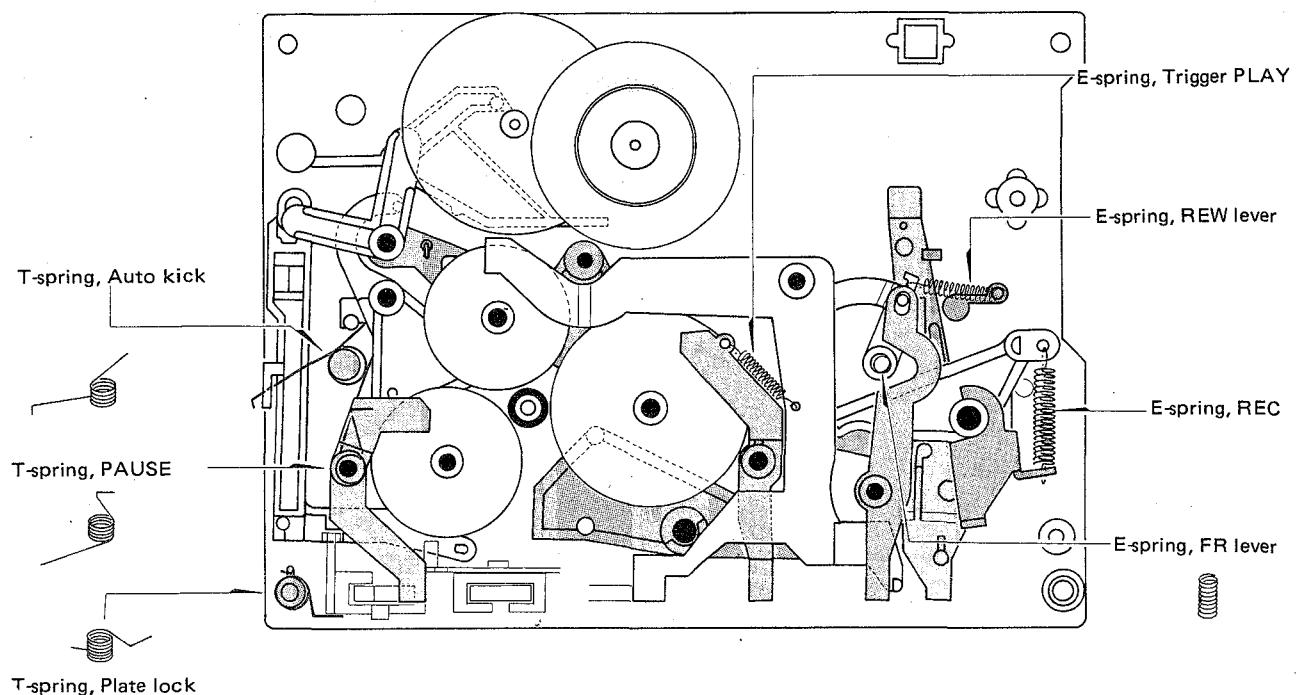
E-spring, Trigger PLAY

E-spring, REW lever

E-spring, REC

E-spring, FR lever

T-spring, Auto kick

T-spring, PAUSE

T-spring, Plate lock

E-spring, FR lever

T-spring, FR lever A

T-spring, FR lever B

T-spring, Auto eject

T-spring, FR cam

T-spring, Trigger REC

C-spring, lock

T-spring, REC lever

T-spring, Play lever

EXPLODED VIEW-1

VTı ⊕ 2.6-5

VTF ⊕ 3-10

UTı ⊕ 3-14

UTı ⊕ 3-14

UTı ⊕ 3-14

UTı ⊕ 3-15

VTı ⊕ 3-10

UTı ⊕ 3-10

VTı ⊕ 3-10

VTı ⊕ 3-10

VTı ⊕ 3-10

UTı ⊕ 3-15

UTı ⊕ 3-15

UTı ⊕ 3-15

UTı ⊕ 3-15

QT₂ ⊕ 3-10

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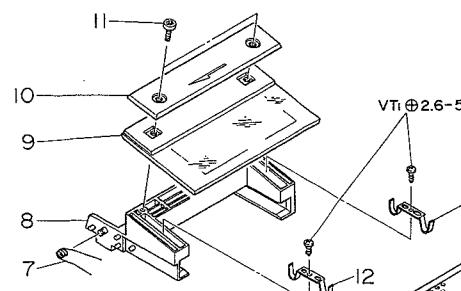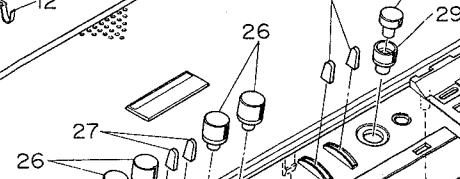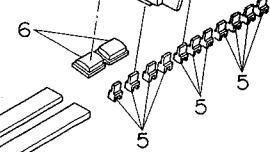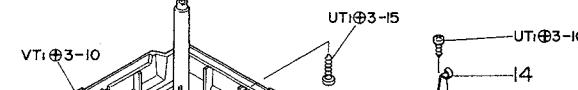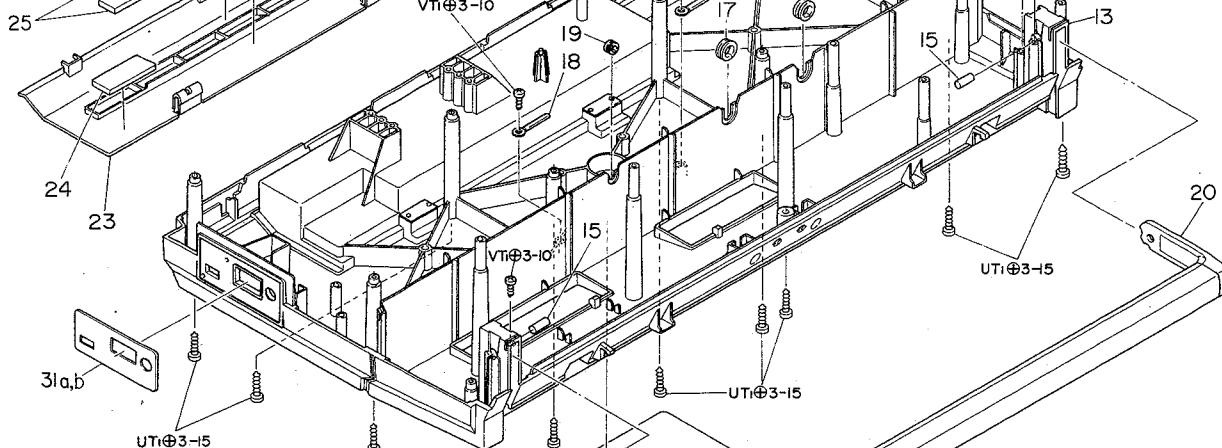
PARTS LIST

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	09-017-850-01		Main case ass'y	*	1	
	82-587-001-01		Cabinet, Main		1	
	82-587-234-01		Damper A, Rubber	*	18	
	82-587-007-01		Panching	*	1	
	82-587-036-01		Badge	*	1	
	82-587-009-01		Side panel R	*	1	
	82-587-010-01		Side panel L	*	1	
	82-587-028-01		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	
	82-587-239-01		P-spring, Tact A	*	1	
	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	*	13	
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	
1-9	82-587-004-01		Window, Cassette	*	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	
1-13	09-017-851-01		Back cover ass'y	*	1	
	82-587-038-01		Back cover ass'y	*	1	
	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	
1-25	82-587-247-01		M cushion 7 x 281 x 7	*	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	82-587-030-01		Name plate, Spec. (E model only)	*	1	
1-30b	82-587-031-01		Name plate, Spec. (K model only)	*	1	
1-31a	82-587-025-01		AC jack plate (E model only)	*	1	
1-31b	82-587-041-01		AC jack plate (K model only)	*	1	

EXPLODED VIEW-2
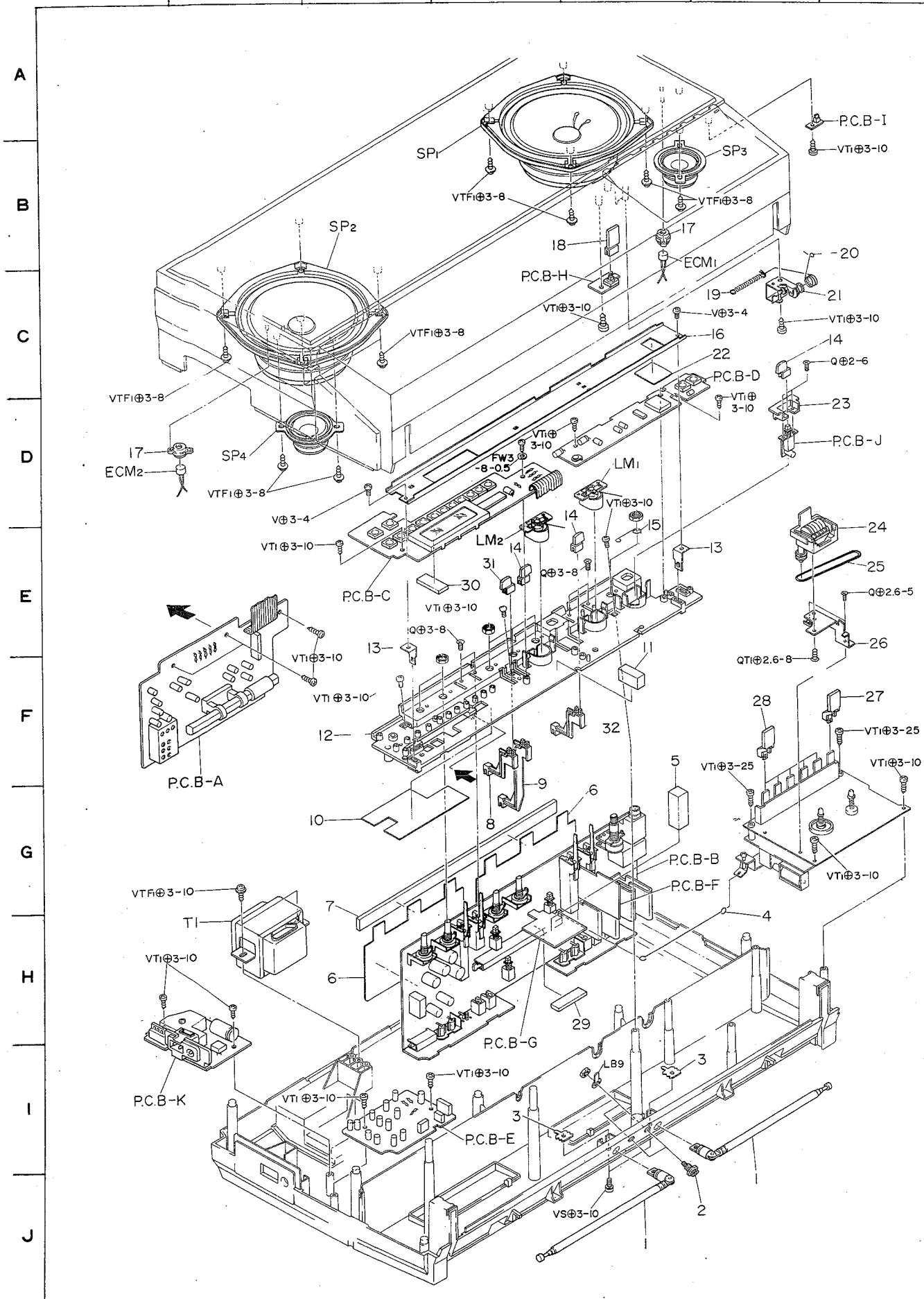
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
2-1	87-043-058-01		Whip antenna		2	
2-2	87-033-166-01		Antenna terminal		2	
2-3	82-587-220-01		Terminal plate, Antenna	*	2	
2-4	82-587-205-01		Rod, REC	*	1	
2-5	82-588-209-01		Cushion 15 x 15 x 41	CS-770	1	
2-6	82-587-242-01		Sheet, 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		1	
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	3	
2-15	82-588-634-01		Earth, REC	CS-770	1	
2-16	82-587-008-01		Dial plate (Silver)	*	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	
2-32	82-587-254-01		Rod 38.3	*	1	

EXPLODED VIEW-3
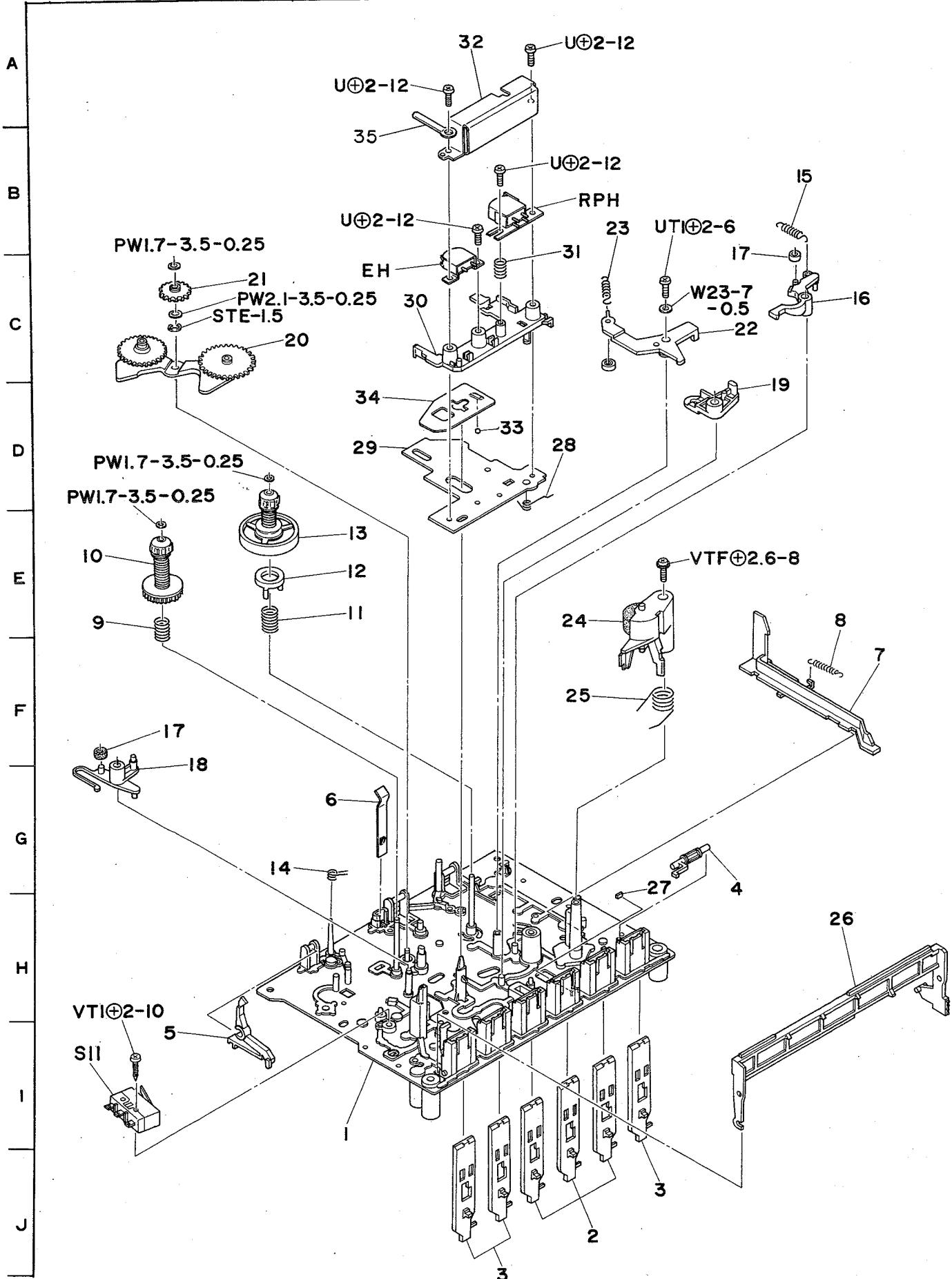
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
3-1	82-585-325-01		Outsert chassis		1	
3-2	82-585-277-01		Plate button, FR		3	
3-3	82-585-337-01		Plate button, REC		3	
3-4	82-585-279-01		Lever A, Eject		1	
3-5	82-585-255-01		REC blocking lever		1	
3-6	82-585-319-01		P-spring, Cassette 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		1	
3-32	82-588-628-01		Shield plate	CS-770	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
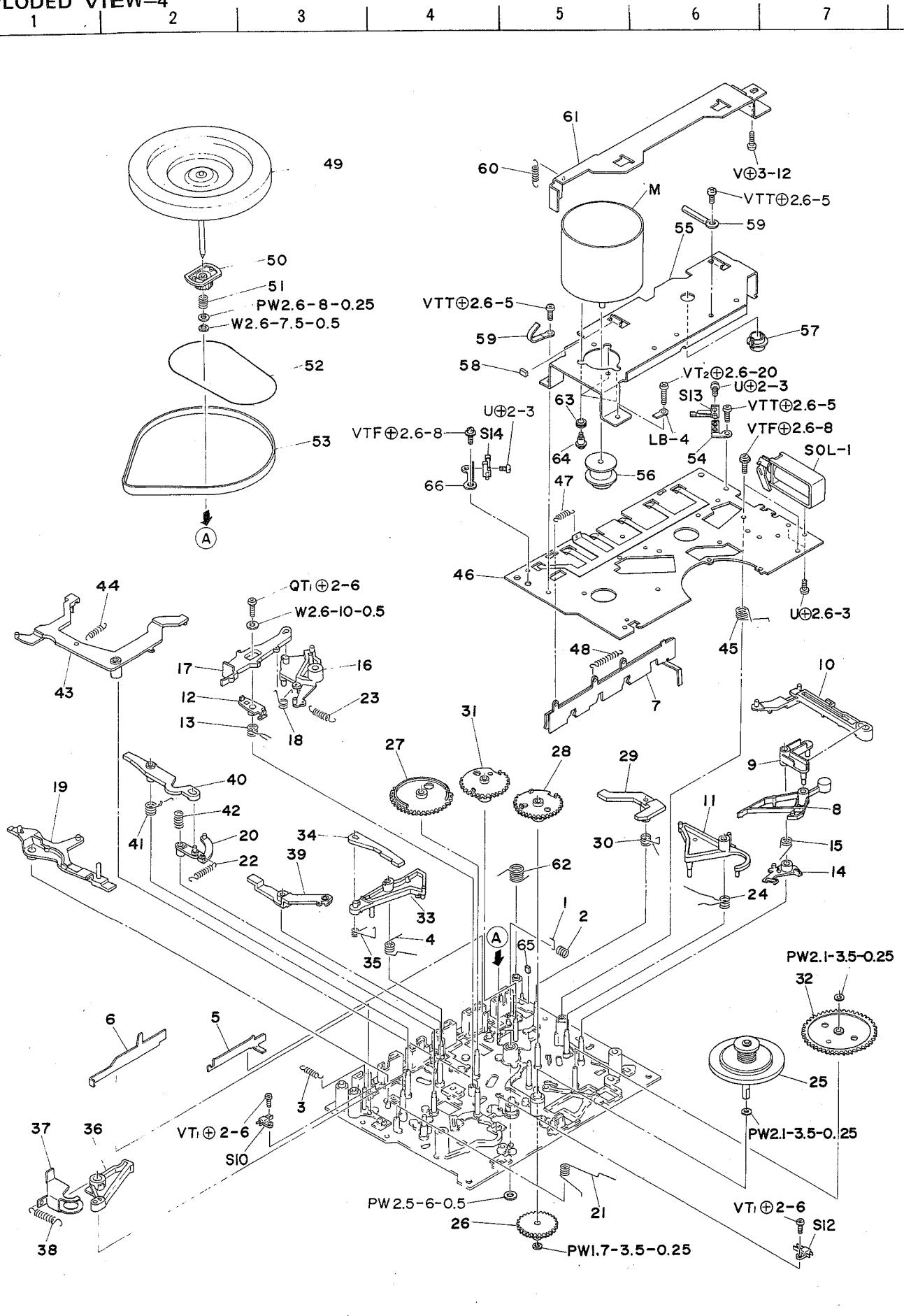
Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty	
4-1	82-585-289-01		Shaft lock		1	
4-2	82-585-285-01		C-spring lock		1	
4-3	82-585-317-01		E-spring, Button lock		1	
4-4	82-585-306-01		T-spring, Play lever		1	
4-5	82-585-283-01		Slide plate, FR auto		1	
4-6	82-585-282-01		Slide plate, 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
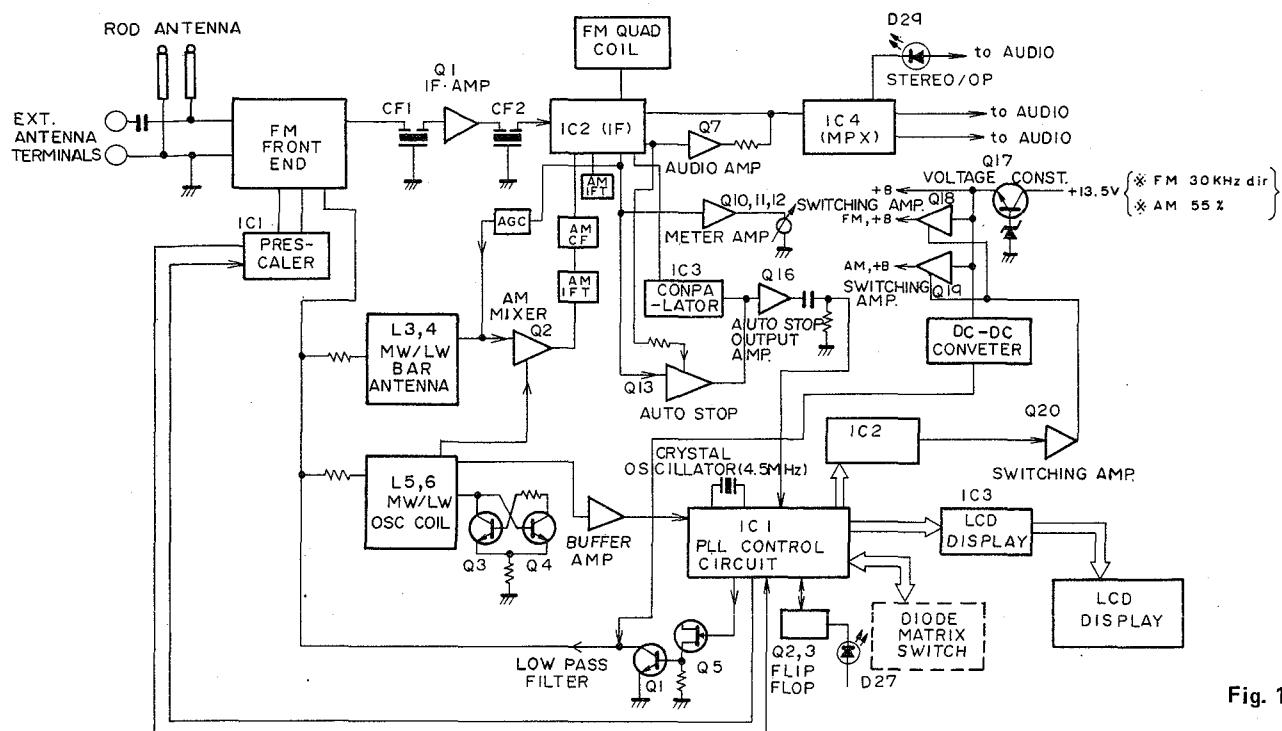
Fig. 1

2. Outline of PLL Frequency Synthesizer

The PLL (phase-locked loop) frequency synthesizer is a ciruict 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_0 : 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.

V.C.O : VOLTAGE CONTROLLED OSCILLATOR   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:

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

If N is assumed to be P notation:

$$f_{osc} = (n_1 + pn_2 + P^2 n_3 + \dots + P^{n-1} n_n) f_{ref}$$
$$= P (n_1/P + n_2 + Pn_3 + \dots + P^{n-2} n_n) f_{ref}$$

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

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

This is modulated to become:

$$f_{osc} = (n_1 + PNp + Pn_1 - Pn_1) f_{ref}$$
$$= [(Np - n_1) P + n_1 (P + 1)] f_{ref} \quad \dots \dots (2)$$

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 (Np $- n_1$) 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} is 10.7 MHz and so therefore f_{osc} =100 + 10.7 = 110.7 MHz

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

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

Np = 114, n_1 = C

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

If this is re-expressed in the decimal notation:

25 kHz x [($16^2 + 16^1 + 4 - 12$) x 16 + 12 x 17] = 110.7 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.
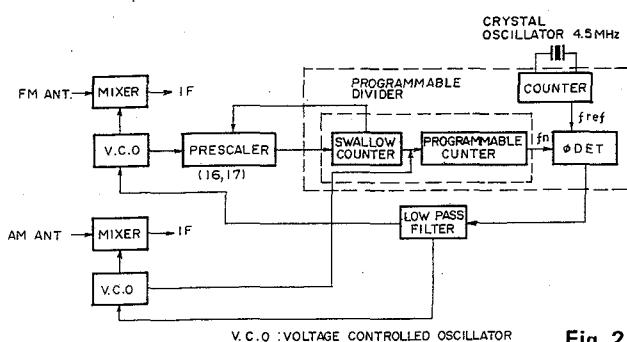
2-2. Operation During AM Reception

When f_s = 594 kHz is received:

f_s = 594 kHz and f_{IF} = 450 kHz

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

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

4.5 MHz ÷ 9 kHz = 500

f_{osc} (1044 kHz) ÷ 9 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.
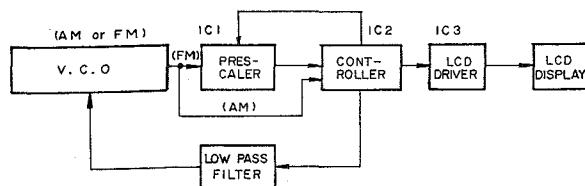
Fig. 3

3-1. Prescaler μPB553AC

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 codntroller, and it sends the signal to the controller's programmable divider.

3-1-1. Pin Configuration
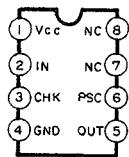
Fig. 4

Pin no.	Name	Function
1	Vcc	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 μPD1703C-515

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

3-2-1. Pin Configuration
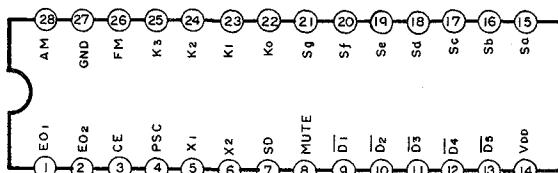
Fig. 5

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	$\overline{D1}$~$\overline{D5}$	Display digit signal output pins Only D1 and D2 are used with this unit and are connected to LCD driver.
14	VDD	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
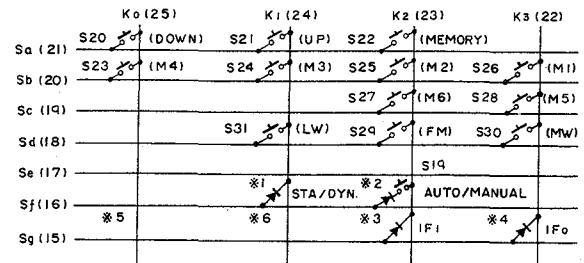
Fig. 6

- The function in parentheses is displayed by key operation based on a momentary switch (marked $\frac{\perp}{oo}$).
- 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 (μPD1703C-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	V_{SS}	Ground Pin
16	OSC	LCD AC drive frequency pin; with this unit, the circuit is configured as below.
17	SERIAL OUT	Not used
18	SERIAL IN	Data indicated with shift register 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 controller 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 (Connected to pin 10 of controller IC)
21, 49	V_{DD}	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 V_{DD}.
24	RBI	Pin for determining whether or not leftmost display digit is to indicate a numeral or not. In this unit, it displays only significant figures and so it is used at the low level, or in other words, it is connected to V_{SS} (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 V_{DD}.
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 mentioned later.
14	COM	This pin feeds out a signal with the reverse phase to that of output and 7 segments for AC drive of the LCD; it drives the LCD common pin.
35, 36, 37 38, 39, 40		Not used

LCD DISPLAY

Fig. 8

4. Other Circuits
4-1. FM/AM +B Power Selector Circuit
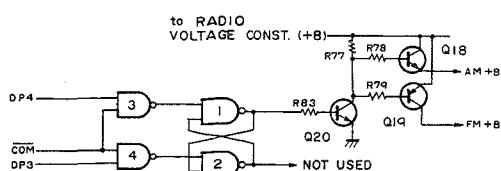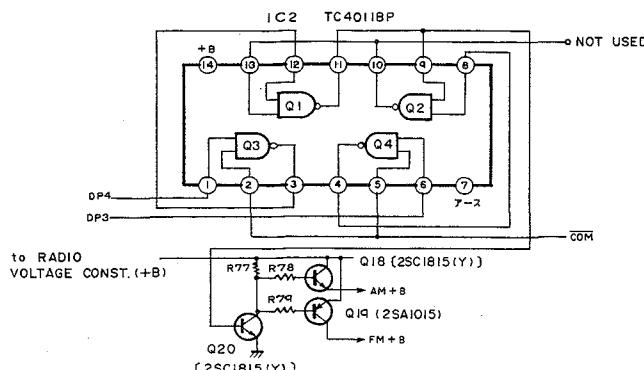
Switching is performed with a 4-NAND gate iC (IC2).

Fig. 9
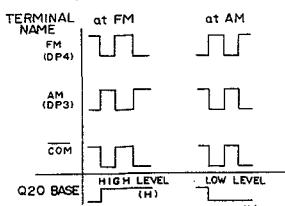
Fig. 10

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
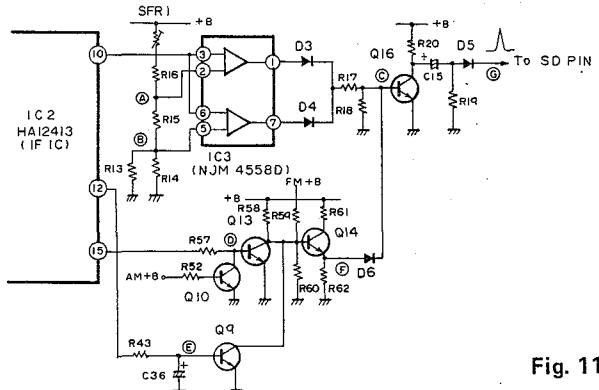
Fig. 11

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
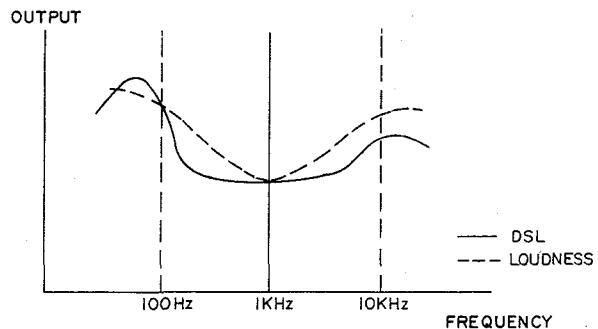
Fig. 12

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.
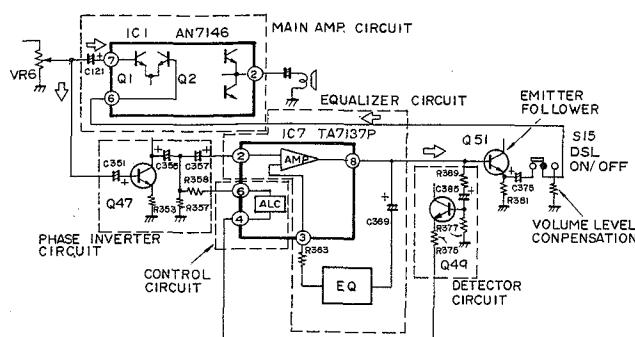
Fig. 13

5-2-1. Equalizer Circuit

An ordiany 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.

$$f = \frac{1}{2\pi\sqrt{C_1 C_2 R_1 R_2}}$$
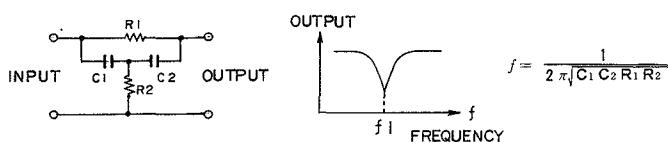
Fig. 14
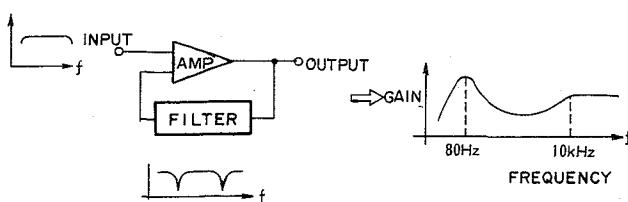
Fig. 15

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 differes 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.
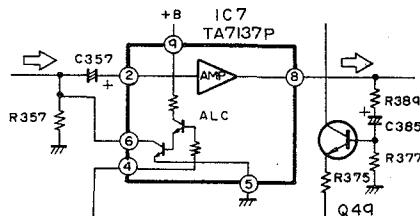
Fig. 16

The DSL circuit with the above-mentioned configuration is mixed with a main amplifier. The ICI (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 nad 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	82-587-908-01		Instructions booklet (E model only)	*	1	
6b	82-587-909-01		Instructions bookelt (K model only)	*	1	
7	82-587-907-01		Sticker, POP	*	1	
8	87-051-171-11		Poly-vinyl sack (for instruction)		1	
9	87-056-009-41		Distributors list		1	
10	87-056-008-11		Label, AC power cord (K model only)		1	
11	87-056-016-01		Tag, Main voltage (K model only)		1	
12	82-916-740-01		Tape cassette, DMC-164		1	
13a	87-034-883-01		AC power cord (E model only)		1	
13b	87-034-871-01		AC power cord (K model only)		1	

AIWA

ELECTRICAL MAIN PARTS LIST

Symbol No.	Part No.	Description
≪TUNER CIRCUIT BOARD SECTION≫		
PCB-A	82-587-611-21	Tuner circuit board
CP1	82-587-626-11	FM front end
⊕IC1	87-027-752-01	IC, 553AC
IC2	87-027-734-01	IC, HA12413
IC3	87-027-235-01	IC, NJM4558D
IC4	87-027-430-11	IC, LA3361
Q1	89-319-233-01	Transisotr, 2SC1923 (O)
Q2	89-303-803-01	Transistor, 2SC380 (O)
Q3,4,5,7, 8,9,10,11, 13,14,15,16, 18,20,21,22 25,26,27	89-318-154-01	Transistor, 2SC1815 (Y)
Q6,23,24	89-318-156-01	Transistor, 2SC1815 (BL)
Q12,19	89-110-154-01	Transistor, 2SA1015 (Y)
Q17	89-403-135-01	Transistor, 2SD313 (E)
D1,2	87-027-753-01	Diode, KV1236Z
D3,4,5,6, 7,8,9,11	87-027-097-01	Diode, 1S1555
D10	87-027-431-01	Zener diode, RD6.2EB2
L1,10,11,13	87-003-051-01	Choke coil, 470µH
L2	87-005-121-01	FM coil
L3,4	82-587-680-01	MW/LW bar antenna coil
L5	82-755-607-01	MW OSC coil
L6	82-587-681-01	LW OSC coil
L7,8	87-005-126-01	Coil, 1mH
L9	87-008-227-01	FM coil
L12	87-003-045-01	Choke coil, 22µH
TC1	87-011-108-01	Trimmer, 8pF
TC2	87-011-109-01	Trimmer, 15pF
CF1,2	87-008-245-01	Ceramic filter kid
CF3	87-008-225-01	AM ceramic filter
IFT1	87-008-226-01	AM IFT
IFT2	87-008-223-01	AM IFT
SFR1	87-021-566-01	Semi-fixed resistor, 5kΩ-B
SFR2	87-021-567-01	Semi-fixed resistor, 10kΩ-B
PIN-1	87-049-045-01	Pin, 12P
		< Resistor >
R50	87-025-317-01	47Ω ½w Nonflammable resistor
		< Capacitors >
C108	87-014-040-41	200pF PP
C19	87-014-048-41	430pF PP
C48	87-014-057-41	1000pF PP
C105	87-014-065-01	2200pF PP
≪REC/PB CIRCUIT BOARD SECTION≫		
PCB-B	82-587-658-01	REC/PB circuit board
IC1,2	87-027-540-01	IC, AN7146
IC3,4	87-027-754-01	IC, LM1111C
IC5,9	87-027-539-01	IC, LA3161
IC10	87-027-656-01	IC, TC4066BP
Q1,2	89-322-405-01	Transistor, 2SC2240 GR)
Q3,4,5,6, 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)

Symbol No.	Part No.	Description	
Q39,40	89-318-155-01	Transistor, 2SC1815 (GR)	
Q41	89-318-464-01	Transistor, 2SC1846 (R)	
Q43	89-322-364-01	Transistor, 2SC2236 (Y)	
Q45,46	89-320-011-21	Transistor, 2SC2001 (K,L)	
D1,2,7,8, 9,10,11,12, 13,17,18,19, 352	87-027-097-01	Diode, 1S1555	
D3,4,5,6	88-052-188-11	Diode, 1S188 (FM)	
D14	87-027-346-01	Zener diode, HZ11A2L	
D16	87-027-199-01	Zener diode, 05Z-15U	
L1,2	87-008-173-01	Trap coil, 10mH	
L3,4	82-487-654-01	Coil, 10mH	
L7,9,13,14,17	87-003-039-01	Choke coil, 36µH	
L8	82-491-661-01	Choke coil, 600µH	
L11,12	87-003-051-01	Choke coil, 470µH	
L15,16	87-005-088-01	Coil, 5.6mH	
CP1	82-587-641-11	Bias OSC unit	
LPF1	87-030-070-01	Low-pass filter	
J1,2,3,4,6	82-587-633-01	Jack plate ass'y (PHONO, MIC-L,R, PLAYER SYNC)	
J5, S34	87-049-059-01	DIN jack w/switch (DIN)	
J7,8	82-587-632-01	Jack plate ass'y (EXT SP-L,R)	
J9	87-049-043-01	Jack, 6.3φ (PHONES)	
VR1	87-021-671-01	Volume, 50kΩ-A (REC VOLUME)	
VR2,3	87-021-668-01	Volume, 50kΩ-A (BASS, TREBLE)	
VR4	87-021-669-01	Volume, 100kΩ-W (BALANCE)	
VR5	87-021-667-01	Volume, 20kΩ-A (VOLUME)	
S1	87-031-655-01	Lever switch (FUNCTION)	
S2	82-588-622-21	Slide switch (REC/PB)	
S3	87-031-631-01	Lever switch (TAPE SELECTOR)	
S4	87-031-620-01	Lever switch (RECORD)	
S5	82-563-609-01	Slide switch (PHONO/AUX)	
S6	87-031-622-01	Lever switch (MODE)	
S7,8,15	87-031-619-01	Push-swtich (DOLBY-NR, POWER, DSL)	
S32	82-431-604-01	Slide switch (OSC)	
SFR1,2	87-021-564-01	Semi-fixed resistor, 1kΩ-B	
SFR3,7,8	87-021-624-01	Semi-fixed resistor, 50kΩ-B	
SFR4	87-021-514-01	Semi-fixed resistor, 200kΩ-B	
SFR5,6	82-587-634-01	Semi-fixed resistor, 100Ω-B	
	82-588-634-01	Earth terminal	
		< Resistors >	
R83,84	87-025-209-01	3.3kΩ	Metal film resistor
R245	87-025-313-01	4.7Ω	Nonflammable resistor
R164	87-025-320-01	100Ω 2w	Nonflammable resistor
⚠R202	87-029-108-01	1Ω ½w	Fuse resistor
⚠R153,154, 220,246	87-029-089-01	4.7Ω	Fuse resistor
⚠R162,163	87-029-090-01	22Ω ¼w	Fuse resistor
⚠R172	87-029-365-01	22Ω ¼w	Fuse resistor
		< Capacitors >	
C49,50,89, 90	87-014-053-01	680pF PP	
C17,18	87-014-055-01	820pF PP	
C13,14,75, 76	87-015-311-01	0.1µF 10V Aluminum solid	
C115,116	87-015-367-01	0.15µF 10V Aluminum solid	
C107,108, 117,118	87-015-312-01	0.22µF 10V Aluminum solid	

Symbol No.	Part No.	Description
C77,78	87-015-313-01	0.33μF 10V Aluminum solid

≪ CONTROL CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-C	82-587-604-11	Control circuit board
⊕IC1	87-027-750-01	IC, μPD1703C514
⊕IC2,4	87-027-564-01	IC, TC4011BP
⊕IC3	87-027-751-01	IC, MSM5829GS
Q1,2,3,4	89-318-154-01	Transistor, 2SC1815 (Y)
Q5	89-500-303-01	FET, 2SK30 (O)
D1,2,3,4, 5,6,7,11, 12,13,14,15, 16,17,18,19, 20,21,22,23, 24,25,26	87-027-097-01	Diode, 1S1555
D27,29	87-027-716-01	LED, GL-PPR22 (AUTO OPERATE/FM STEREO)
D28	87-027-758-01	LED, GL-9PG22 (DOLBY-NR)
D30	82-587-603-01	LCD (FREQUENCY INDICATOR)
X1	87-030-083-01	Crystal resonator
S19,20,21, 22,23,24, 25,26,27, 28,29,30, 31	87-031-498-01	Push-switch (TUNING, DOWN, UP, MEMORY, 1,2,3,4,5,6, FM, MW, LW)
PL1,2	82-587-605-01	Pilot lamp
	82-587-606-01	Electric conduction rubber

≪ MS CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-D	82-587-615-21	MS circuit board
⊕IC6	87-027-713-01	IC, TC9138P
Q401,402,403, 404,405,411, 412,413,414, 415,416	89-327-854-01	Transistor, 2SC2785 (E)
Q406	89-111-154-51	Transistor, 2SA1115 (E,F)
Q407,409	89-313-834-01	Transistor, 2SC1383 (S)
Q408	89-106-834-51	Transistor, 2SA683 (RS)
D401	87-027-756-01	LED, SL-1160L (MS PROGRAM)
D402	87-027-365-01	Diode, S5277B
D403	87-027-332-01	Zener diode, HZ6B1L
D404,405, 406,407, 408,409, 410,411, 415	87-027-097-01	Diode, 1S1555
D412,413, 414	87-027-716-01	LED, GL-9PR22 (PEAK 0, +3, +7)
D416	87-027-228-01	Zener diode, 05Z-7.5U
S17,18	87-031-496-01	Tact switch (PROGRAM, RESET)
SFR401,402	87-021-624-01	Semi-fixed resistor, 50kΩ-B
		< Capacitors >
C412	87-015-318-01	0.1μF 10V Aluminum solid
C407	87-015-425-01	1μF 25V Aluminum solid

≪ DSL CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-E	82-587-617-21	DSL circuit board
IC7,8	87-027-176-01	IC, TA-7137P Stereo type
Q47,48,49, 50,51,52, 73,74	89-318-154-01	Transistor, 2SC1815 (Y)
D351	87-027-097-01	Diode, 1S1555
L10	82-587-610-01	Coil, DC-DC
PIN-4	87-049-038-01	Pin, 3P
PIN-2	82-481-647-01	Pin, 4P

Symbol No.	Part No.	Description
PIN-3	87-049-034-01	Pin, 4P
		< Capacitors >
C361,362	87-015-311-01	0.1μF 10V Aluminum solid
C359,360	87-015-313-01	0.33μF 10V Aluminum solid

≪ REC AMP CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-F	82-588-617-11	REC amp circuit board
Q23,24,25, 26	89-318-154-01	Transistor, 2SC1815 (Y)
L5,6	87-005-088-01	Micro inductor, 5.6mH
SFR9,10	87-021-672-01	Semi-fixed resistor, 50kΩ-B
		< Capacitor >
C81,82	87-015-311-01	0.1μF 10V Aluminum solid

≪ MONITOR CIRUCIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-G	82-588-633-21	Monitor circuit board
Q9,10	89-322-405-01	Transistor, 2SC2240 (GR)
Q11,12,13, 14,15,16	89-318-154-01	Transistor, 2SC1815 (Y)
PIN	87-032-634-01	Pin, 4P

≪ REC MUTE CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-H	82-587-618-21	REC mute circuit board
Q72	89-110-154-01	Transistor, 2SA1015 (Y)
D1	87-027-097-01	Diode, 1S1555
S9	82-587-642-01	Push-switch (REC MUTE)

≪ LED CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-I	82-587-619-21	LED circuit board
D1	87-027-731-01	LED, SR-535D (RECORD)

≪ LIGHT SWITCH CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-J	82-587-648-21	Light switch circuit board
S33	86-992-604-01	Push-switch (LIGHT)

≪ POWER CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
⚠PCB-K	82-551-672-21	Power circuit board
D501	87-027-609-01	Encapsulated diode
J10,11	87-032-958-01	AC-DC jack
⚠S16	87-031-466-01	Slide switch (VOLTAGE SELECTOR)
⚠F1	87-035-192-01	Fuse, "T" 4A
	87-098-022-01	Fuse lable, "T" 4A
⚠F2	87-035-219-01	Fuse, "T" 500mA
	87-098-013-01	Fuse label, "T" 500mA
⚠	87-033-147-01	Fuse clamp
		< Resistor >
R501	87-025-194-01	220Ω 2w Metal film resistor

≪ MISCELLANEOUS ≫

Symbol No.	Part No.	Description
⚠T1	82-587-651-01	Power transformer (E model only)
⚠T1	82-587-652-01	Power transformer (K model only)
RPH	87-046-159-01	REC/PB head
EH	87-046-189-01	Erase head
SOL1	82-585-601-21	Solenoid
SP1,2	82-587-644-11	Speaker (Woofer)
SP3,4	82-563-602-01	Speaker (Tweeter)
SP5	82-587-635-11	Passive radiator ass'y
LM1,2	82-588-642-01	Level meter
ECM1,2	87-041-015-01	ECM, ESM-10PB
M1	87-045-135-01	Motor DC EG
S10,14	87-031-548-01	Leaf switch (MOTOR, SYNCRATE)
S11	87-031-537-01	Micro switch (PLAY)

Symbol No
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CON-3
CON-2
CON-1
C1,2

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Symbol No.	Part No.	Description
Q39,40	89-318-155-01	Transistor, 2SC1815 (GR)
Q41	89-318-464-01	Transistor, 2SC1846 (R)
Q43	89-322-364-01	Transistor, 2SC2236 (Y)
Q45,46	89-320-011-21	Transistor, 2SC2001 (K,L)
D1,2,7,8, 9,10,11,12, 13,17,18,19, 352	87-027-097-01	Diode, 1S1555
D3,4,5,6	88-052-188-11	Diode, 1S188 (FM)
D14	87-027-346-01	Zener diode, HZ11A2L
D16	87-027-199-01	Zener diode, 05Z-15U
L1,2	87-008-173-01	Trap coil, 10mH
L3,4	82-487-654-01	Coil, 10mH
L7,9,13,14,17	87-003-039-01	Choke coil, 36μH
L8	82-491-661-01	Choke coil, 600μH
L11,12	87-003-051-01	Choke coil, 470μH
L15,16	87-005-088-01	Coil, 5.6mH
CP1	82-587-641-11	Bias OSC unit
LPF1	87-030-070-01	Low-pass filter
J1,2,3,4,6	82-587-633-01	Jack plate ass'y (PHONO, MIC-L,R, PLAYER SYNC)
J5, S34	87-049-059-01	DIN jack w/switch (DIN)
J7,8	82-587-632-01	Jack plate ass'y (EXT SP-L,R)
J9	87-049-043-01	Jack, 6.3ϕ (PHONES)
VR1	87-021-671-01	Volume, 50kΩ-A (REC VOLUME)
VR2,3	87-021-668-01	Volume, 50kΩ-A (BASS, TREBLE)
VR4	87-021-669-01	Volume, 100kΩ-W (BALANCE)
VR5	87-021-667-01	Volume, 20kΩ-A (VOLUME)
S1	87-031-655-01	Lever switch (FUNCTION)
S2	82-588-622-21	Slide switch (REC/PB)
S3	87-031-631-01	Lever switch (TAPE SELECTOR)
S4	87-031-620-01	Lever switch (RECORD)
S5	82-563-609-01	Slide switch (PHONO/AUX)
S6	87-031-622-01	Lever switch (MODE)
S7,8,15	87-031-619-01	Push-swtich (DOLBY-NR, POWER, DSL)
S32	82-431-604-01	Slide switch (OSC)
SFR1,2	87-021-564-01	Semi-fixed resistor, 1kΩ-B
SFR3,7,8	87-021-624-01	Semi-fixed resistor, 50kΩ-B
SFR4	87-021-514-01	Semi-fixed resistor, 200kΩ-B
SFR5,6	82-587-634-01	Semi-fixed resistor, 100Ω-B
	82-588-634-01	Earth terminal

< Resistors >

Symbol No.	Part No.			Description
R83,84	87-025-209-01	3.3kΩ		Metal film resistor
R245	87-025-313-01	4.7Ω		Nonflammable resistor
R164	87-025-320-01	100Ω	2w	Nonflammable resistor
⚠R202	87-029-108-01	1Ω	½w	Fuse resistor
⚠R153,154, 220,246	87-029-089-01	4.7Ω		Fuse resistor
⚠R162,163	87-029-090-01	22Ω	¼w	Fuse resistor
⚠R172	87-029-365-01	22Ω	¼w	Fuse resistor

< Capacitors >

Symbol No.	Part No.			Description
C49,50,89, 90	87-014-053-01	680pF		PP
C17,18	87-014-055-01	820pF		PP
C13,14,75, 76	87-015-311-01	0.1μF	10V	Aluminum solid
C115,116	87-015-367-01	0.15μF	10V	Aluminum solid
C107,108, 117,118	87-015-312-01	0.22μF	10V	Aluminum solid

Symbol No.	Part No.			Description
C77,78	87-015-313-01	0.33μF	10V	Aluminum solid

≪ CONTROL CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-C	82-587-604-11	Control circuit board
④IC1	87-027-750-01	IC, μPD1703C514
④IC2,4	87-027-564-01	IC, TC4011BP
④IC3	87-027-751-01	IC, MSM5829GS
Q1,2,3,4	89-318-154-01	Transistor, 2SC1815 (Y)
Q5	89-500-303-01	FET, 2SK30 (O)
D1,2,3,4, 5,6,7,11, 12,13,14,15, 16,17,18,19, 20,21,22,23, 24,25,26	87-027-097-01	Diode, 1S1555
D27,29	87-027-716-01	LED, GL-PPR22 (AUTO OPERATE/FM STEREO)
D28	87-027-758-01	LED, GL-9PG22 (DOLBY-NR)
D30	82-587-603-01	LCD (FREQUENCY INDICATOR)
X1	87-030-083-01	Crystal resonator
S19,20,21, 22,23,24, 25,26,27, 28,29,30, 31	87-031-498-01	Push-switch (TUNING, DOWN, UP, MEMORY, 1,2,3,4,5,6, FM, MW, LW)
PL1,2	82-587-605-01	Pilot lamp
	82-587-606-01	Electric conduction rubber

≪ MS CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-D	82-587-615-21	MS circuit board
④IC6	87-027-713-01	IC, TC9138P
Q401,402,403, 404,405,411, 412,413,414, 415,416	89-327-854-01	Transistor, 2SC2785 (E)
Q406	89-111-154-51	Transistor, 2SA1115 (E,F)
Q407,409	89-313-834-01	Transistor, 2SC1383 (S)
Q408	89-106-834-51	Transistor, 2SA683 (RS)
D401	87-027-756-01	LED, SL-1160L (MS PROGRAM)
D402	87-027-365-01	Diode, S5277B
D403	87-027-332-01	Zener diode, HZ6B1L
D404,405, 406,407, 408,409, 410,411, 415	87-027-097-01	Diode, 1S1555
D412,413, 414	87-027-716-01	LED, GL-9PR22 (PEAK 0, +3, +7)
D416	87-027-228-01	Zener diode, 05Z-7.5U
S17,18	87-031-496-01	Tact switch (PROGRAM, RESET)
SFR401,402	87-021-624-01	Semi-fixed resistor, 50kΩ-B

< Capacitors >

Symbol No.	Part No.			Description
C412	87-015-318-01	0.1μF	10V	Aluminum solid
C407	87-015-425-01	1μF	25V	Aluminum solid

≪ DSL CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-E	82-587-617-21	DSL circuit board
IC7,8	87-027-176-01	IC, TA-7137P Stereo type
Q47,48,49, 50,51,52, 73,74	89-318-154-01	Transistor, 2SC1815 (Y)
D351	87-027-097-01	Diode, 1S1555
L10	82-587-610-01	Coil, DC-DC
PIN-4	87-049-038-01	Pin, 3P
PIN-2	82-481-647-01	Pin, 4P

Symbol No.	Part No.	Description
PIN-3	87-049-034-01	Pin, 4P
		< Capacitors >
C361,362	87-015-311-01	0.1µF 10V Aluminum solid
C359,360	87-015-313-01	0.33µF 10V Aluminum solid

≪ REC AMP CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-F	82-588-617-11	REC amp circuit board
Q23,24,25, 26	89-318-154-01	Transistor, 2SC1815 (Y)
L5,6	87-005-088-01	Micro inductor, 5.6mH
SFR9,10	87-021-672-01	Semi-fixed resistor, 50kΩ-B
		< Capacitor >
C81,82	87-015-311-01	0.1µF 10V Aluminum solid

≪ MONITOR CIRUCIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-G	82-588-633-21	Monitor circuit board
Q9,10	89-322-405-01	Transistor, 2SC2240 (GR)
Q11,12,13, 14,15,16	89-318-154-01	Transistor, 2SC1815 (Y)
PIN	87-032-634-01	Pin, 4P

≪ REC MUTE CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-H	82-587-618-21	REC mute circuit board
Q72	89-110-154-01	Transistor, 2SA1015 (Y)
D1	87-027-097-01	Diode, 1S1555
S9	82-587-642-01	Push-switch (REC MUTE)

≪ LED CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-I	82-587-619-21	LED circuit board
D1	87-027-731-01	LED, SR-535D (RECORD)

≪ LIGHT SWITCH CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
PCB-J	82-587-648-21	Light switch circuit board
S33	86-992-604-01	Push-switch (LIGHT)

≪ POWER CIRCUIT BOARD SECTION ≫

Symbol No.	Part No.	Description
⚠ PCB-K	82-551-672-21	Power circuit board
D501	87-027-609-01	Encapsulated diode
J10,11	87-032-958-01	AC-DC jack
⚠ S16	87-031-466-01	Slide switch (VOLTAGE SELECTOR)
⚠ F1	87-035-192-01	Fuse, "T" 4A
	87-098-022-01	Fuse lable, "T" 4A
⚠ F2	87-035-219-01	Fuse, "T" 500mA
	87-098-013-01	Fuse label, "T" 500mA
⚠	87-033-147-01	Fuse clamp
		< Resistor >
R501	87-025-194-01	220Ω 2w Metal film resistor

≪ MISCELLANEOUS ≫

Symbol No.	Part No.	Description
⚠ T1	82-587-651-01	Power transformer (E model only)
⚠ T1	82-587-652-01	Power transformer (K model only)
RPH	87-046-159-01	REC/PB head
EH	87-046-189-01	Erase head
SOL1	82-585-601-21	Solenoid
SP1,2	82-587-644-11	Speaker (Woofer)
SP3,4	82-563-602-01	Speaker (Tweeter)
SP5	82-587-635-11	Passive radiator ass'y
LM1,2	82-588-642-01	Level meter
ECM1,2	87-041-015-01	ECM, ESM-10PB
M1	87-045-135-01	Motor DC EG
S10,14	87-031-548-01	Leaf switch (MOTOR, SYNCRATE)
S11	87-031-537-01	Micro switch (PLAY)

Symbol No.	Part No.	Description
S12	87-031-615-01	Leaf switch (MUSIC SENSOR)
S13	87-031-361-01	Leaf switch (PAUSE)
CON-4	82-587-623-11	Connector ass'y, 3P
CON-3	82-587-622-11	Connector ass'y. 4P
CON-2	82-587-646-01	Connector ass'y, 4P
CON-1	82-587-613-11	Connector ass'y, 12P
	87-033-166-01	Antenna terminal (EXT-ANT)
		< Capacitor >
C1,2	82-918-610-01	3.3µF 50V Electrolytic BP

⚠ 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 (⊕).

SCHEMATIC DIAGRAM—1
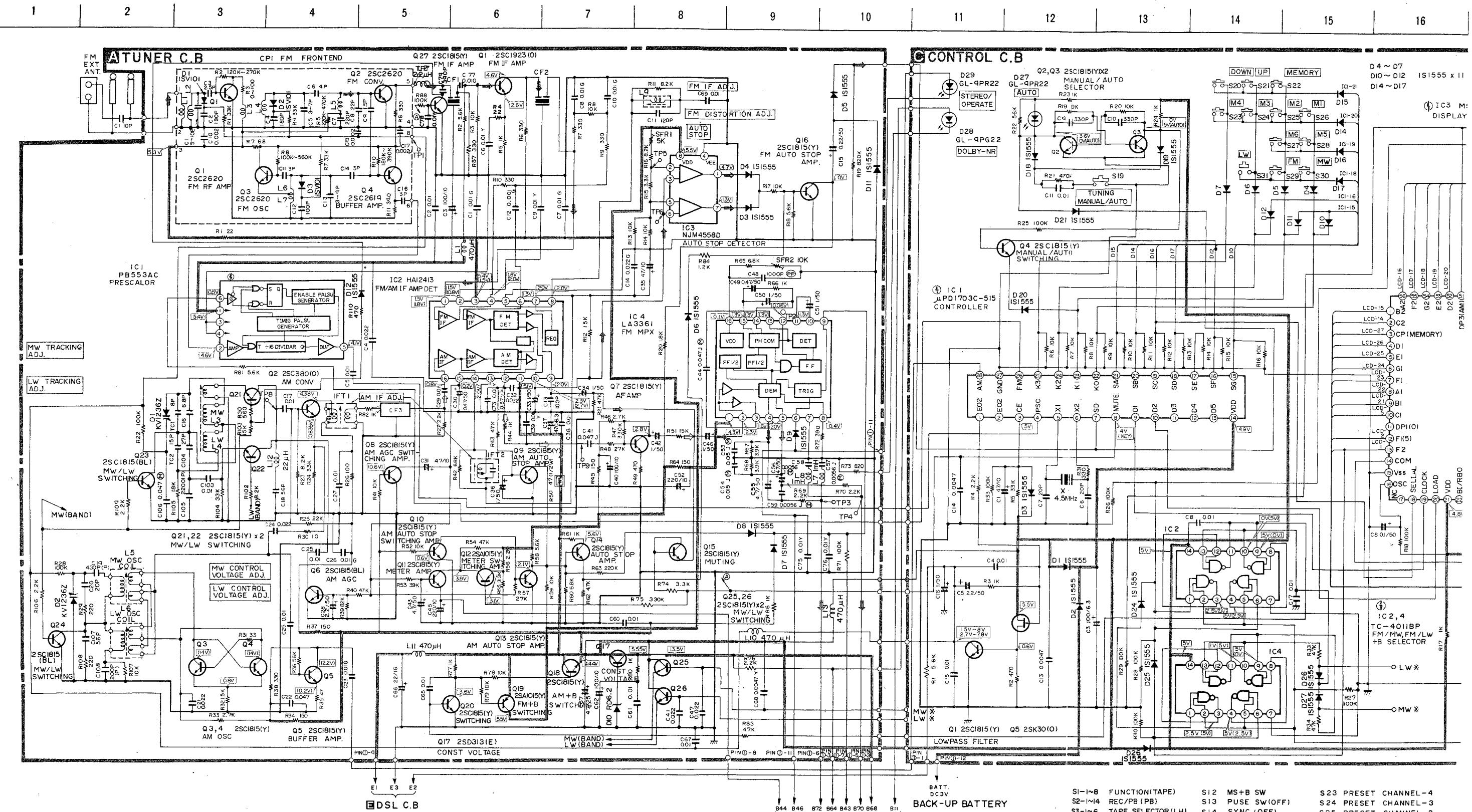
NOTES:

1) ▨ B (+) power supply
2) → Signal path
   ⇨ Rec path, AM signal 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 AM reception or recording. An asterisk (*) indicates that the value was measured with a vacuum-tube voltmeter during recording.
4) Resistors with no designation have a rated power of ¼W and a tolerance of ±5%.
5) Capacitors with no designation have a dielectric strength of less than 50WV.

6) The only capacitor tolerances indicated are ±5% (J) and ±10% (K).
7) Ceramic capacitor symbols:
   ─∘│─ For temperature compensation (SL)
   ─│├─ High dielectric constant system (YY)
   ─│├─ High dielectric constant system (YW, YP, YZ)
8) Explanation of symbols
   Ⓜ Mylar capacitor
   Ⓐ Aluminum solid capacitor
   ⓅⓅ Polypropylene film capacitor
   ⒷⓅ Bi-polarized capacitor
   ⓁⓁ Low-leakage capacitor
   Ⓣ Tantalum capacitor

─Ⱳ─ Fuse resistor
─Ⱳ─ Nonflammable resistor
Ⓛ Ⓝ Low noise resistor
⚠ Safety component symbol
This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.
This schematic diagram is subject to change without notice in the interests of improved performance.

S1-1~8	FUNCTION(TAPE)	S12	MS+B SW	S23 PRESET CHANNEL-4
S2-1~14	REC/PB (PB)	S13	PUSE SW(OFF)	S24 PRESET CHANNEL-3
S3-1~6	TAPE SELECTOR(LH)	S14	SYNC.(OFF)	S25 PRESET CHANNEL-2
S4-1~4	RECORD (ALC)	S15-1,2	DSL SW (OFF)	S26 PRESET CHANNEL-1
S5-1~4	PHONO/AUX (AUX)	S16	VOLTAGE SELECTOR	S27 PRESET CHANNEL-6
S6-1,2	MODE (STEREO)	S17	PROGRAM SW(OFF)	S28 PRESET CHANNEL-5
S7	DOLBY-NR	S18	RESET SW(OFF)	S29 FM
S8	SLEEP(OFF)	S19	TUNING	S30 MW
S9	REC MUT(OFF)	S20	DOWN	S31 LW
S10	MOTOR SW(OFF)	S21	UP	S32 OSC
S11	PLAY SW(OFF)	S22	MEMORY	S33 LIGHT
				S34 DIN

AIWA

CS-880E,K   CS-880E,K

The only capacitor tolerances indicated are ±5% (J) and ±10% (K).

Ceramic capacitor symbols:
- For temperature compensation (SL)
- High dielectric constant system (YY)
- High dielectric constant system (YW, YP, YZ)

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
Nonflammable resistor
(LN) Low noise resistor
Safety component symbol

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

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

S1-1~8	FUNCTION(TAPE)	S12 MS+B SW	S23 PRESET CHANNEL-4
S2-1~14	REC/PB (PB)	S13 PUSE SW(OFF)	S24 PRESET CHANNEL-3
S3-1~6	TAPE SELECTOR(LH)	S14 SYNC.(OFF)	S25 PRESET CHANNEL-2
S4-1~4	RECORD (ALC)	S15-1,2 DSL SW (OFF)	S26 PRESET CHANNEL-1
S5-1~4	PHONO/AUX (AUX)	S16 VOLTAGE SELECTOR	S27 PRESET CHANNEL-6
S6-1,2	MODE (STEREO)	S17 PROGRAM SW(OFF)	S28 PRESET CHANNEL-5
S7	DOLBY-NR	S18 RESET SW(OFF)	S29 FM
S8	SLEEP(OFF)	S19 TUNING	S30 MW
S9	REC MUT (OFF)	S20 DOWN	S31 LW
S10	MOTOR SW(OFF)	S21 UP	S32 OSC
S11	PLAY SW (OFF)	S22 MEMORY	S33 LIGHT
			S34 DIN

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 ( ).

SCHEMATIC DIAGRAM –2

CS-880E,K

WIRING—1

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

9. Bias Trap Coil Adjustment
   Settings:
   ● Recording mode
   ● Test point: TP3 (L-ch), TP4 (R-ch)
   ● Adjustment locations: L1 (L-ch), L2 (R-ch)
   For others, proceed as for bias frequency adjustment.
   Method:
      Adjust L1,2 so that the voltage at test point TP3,4
      becomes minimum value.

4. Playback Level Adjustment
   Settings:
   ● Test tape: TTA-161
   ● MODE switch: STEREO
   ● TAPE SELECTOR switch: LH
   ● Test point: TP1 (L-ch), TP2 (R-ch)
   ● Adjustment locations: SFR5 (L-ch), SFR6 (R-ch)
   Method:
      Playback the test tape and adjust so that the output
      is 580 mV.

TP3   Bias Test Point (L-ch)
TP4   Bias Test Point (R-ch)

3. Voltage Indication Adjustment
   Settings:
   ● Function switch: RADIO
   ● Supply voltage: 10.25V
   ● Adjustment location: SFR3
   Method:
      Adjust SFR3 so that the pointer of L-ch, meter
      indicated 0 VU.

TP1   Dolby-NR Output (L-ch)
TP2   Dolby-NR Output (R-ch)

5. VU Meter Adjustment
   Settings:
   ● Input signal: DIN, −80 dB, 400 Hz
   ● Adjustment locations: SFR1 (L-ch)
                            SFR2 (R-ch)
   For others, proceed as for playback level adjustment.
   Method:
      Adjust SFR1,2 so that the pointer of meter indicated
      +3 dB.

2. Tape Speed Adjustment
   Settings:
   ● Test tape: TTA-111S
   ● Adjustment location: SFR in motor
   Method:
      Playback the test tape and adjust so that the fre-
      quency is 3,000 ± 30 Hz, both at the start and the
      end of tape winding.

1. Azimuth Adjustment
   Settings:
   ● Playback mode
   ● Test tape: TTA-117E
   ● TAPE SELECTOR switch: CrO_2
   ● 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.

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.

| TP3 | Bias Test Point (L-ch) |
| TP4 | Bias Test Point (R-ch) |

| TP1 | Dolby-NR Output (L-ch) |
| TP2 | Dolby-NR Output (R-ch) |

3. Voltage Indication Adjustment
Settings:
- Function switch: RADIO
- Supply voltage: 10.25V
- Adjustment location: SFR3
Method:
Adjust SFR3 so that the pointer of L-ch, meter indicated 0 VU.

5. VU Meter Adjustment
Settings:
- Input signal: DIN, −80 dB, 400 Hz
- Adjustment locations: SFR1 (L-ch) SFR2 (R-ch)
For others, proceed as for playback level adjustment.
Method:
Adjust SFR1,2 so that the pointer of meter indicated +3 dB.

11. Dolby-NR Trap Adjustment
Settings:
- Input signal: DIN, 4 kHz, −6 dB
- Test point: TP1 (L-ch), TP2 (R-ch)
- Dolby-NR switch: ON
- Adjustment locations: L3 (L-ch), L4 (R-ch)
For others, proceed as for bias OSC frequency adjustment.
Method:
Adjust L3,4 so that the bias leakage to the test point (TP1,2) is brought to the minimum.

10. Bias Current Adjustment
Settings:
- Recording mode
- Test point: TP3 (L-ch), TP4 (R-ch)
- Adjustment location: SFR7 (L-ch), SFR8 (R-ch)
For others, proceed as for bias frequency adjustment.
Method:
Adjust SFR7,8 so that the voltage at test point TP3,4 is 56 mV (560 µA).
Ratings:
LH .... 38 mV (380 µA)
METAL .... 82 mV (820 µA)

+B pattern of bias OSC. circuit

| TP5 | Bias OSC Frequency Test Point |

8. Bias Frequency Adjustment
Settings:
- Recording mode
- Test point: TP5
- OSC switch: "−" point
- TAPE SELECTOR switch: CrO_2
- Adjustment location: CP1
Method:
Adjust CP1 so that the frequency at test point TP5 is 61 ± 0.5 kHz.
Check that the frequency changes when the OSC switch position is changed.

6. ALC Balance Adjustment
Settings:
- Recording mdoe
- Input signal: DIN, −60 dB, 400 Hz
- RECORD switch: ALC
- Test point: TP1 (L-ch), TP2 (R-ch)
- Adjustment location: SFR4
Method:
Adjust SFR4 so that the voltage becomes the same for both left and right channels.

12. Recording Current Adjustment
Settings:
- Recording mode
- Input signal: DIN, −31 dB, 4 kHz
- RECORD switch: MANUAL
- TAPE SELECTOR switch: CrO_2
- Test point: TP3 (L-ch), TP4 (R-ch)
- Adjustment location: SFR9 (L-ch), SFR10 (R-ch)
Method:
Rotate the RECORD volume and set where the meter indicates +3 dB.
Attenuate the input signal by 25 dB to −31 dB.
Adjust SFR9, 10 so that the test point (TP3,4) voltage is made 1.4 mV (140µA).
Next, connect the +B pattern of bias oscillation circuit; rec/pb. the input signal. Finely adjust SFR9,10 the test point (TP1,2) output voltages are set to within ±0.5 dB during rec/pb.

2. Tape Speed Adjustment
Settings:
- Test tape: TTA-111S
- Adjustment location: SFR in motor
Method:
Playback the test tape and adnust so that the frequency is 3,000 ± 30 Hz, both at the start and the end of tape winding.

1. Azimuth Adjustment
Settings:
- Playback mode
- Test tape: TTA-117E
- TAPE SELECTOR switch: CrO_2
- 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.

NOTES (1) ▓▓ B(+) 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.

WIRING-2

(WHIP ANTENNA)

L3,4 (MW/LW BAR ANTENNA)

EXT. ANT.

Ⓐ TUNER C.B

BREC/PB基板 B54

TP1	Control Voltage Test Point
TP7	FM IF Input
TP8	AM IF Input

CP1 (FM FRONT END)

3. FM Control Voltage Check
Setting:
● Test point: TP1
Method:
Depress the up or down switch and when the frequency displayed is FM 108.0 MHz, check that the test point (TP1) voltage is 7.7 ± 0.5V and that it is 2.7 ± 0.5V at a frequency display of FM 87.5 MHz.

2. AM IF Adjustment
IFT1,2 .... 450 kHz

1. FM IF Adjustment
L9 .... 10.7 MHz

| TP9 | AM DET Output |

PL2 (METER LAMP)

Ⓒ CONTROL C.B (METER LAMP) PL1

| TP5 | TP6 | FM Auto Stop, Test Point |

D27 AUTO

BREC/PB C.B B53

LIGHT SWITCH C.B J2

MEMORY | 6 | 5 | 4 | 3 | 2 | 1

11. Ceramic Filter Adjustment

Color of CF1,2		D11	D12
BLUE	(10.675MHz)	Connect	Connect
RED	(10.700MHz)	Cut	Cut
ORANGE	(10.725MHz)	Connect	Cut

4. MW Control Voltage Adjustment
Settings:
● Test point: TP1
● Adjustment location: L5 (MW OSC coil)
● Depress up or down button and set the frequency displayed to MW 1,611 kHz.
Method:
Adjust L5 so that the test point (TP1) voltage is brought to 8.0 ± 0.2 V.
Check:
Depress the down button when the frequency displayed is MW 522 kHz, check that the test point voltage is 1.5 ± 0.3V.

5. MW Tracking Adjustment
L3 .... 594 kHz
TC1 .... 1,404 kHz

8. V.C.O. Frequency Adjustment
Settings:
● Adjustment location: SFR2
Method:
Adjust SFR2 so that the frequency becomes 19 kHz ± 20 Hz.
Insert a 100 kΩ resistor in series with test point (TP2) and connect a counter.

9. FM AUTO Stop Adjustment
Settings:
● Test point: TP5 (⊕), TP6 (⊖)
For others, proceed as for FM distortion Adjustment.
Method:
Adjust SFR1 so that the voltage of test point becomes 0.5 ± 0.03 V.

TP2	V.C.O. Frequency Test Point
TP3	TUNER Output (L-ch)
TP4	TUNER Output (R-ch)

(FLAT CABLE)

10. FM Distortion Adjustment
Settings:
● Input signal: 98 MHz, 75 kHz div., 1 kHz Mod., 17 dB (input)
● Test point: Input Antenna terminal output TP3,4
Method:
Adjust L9 so that the distortion becomes minimum value.
Rating:
Less than 3%.

Ⓑ REC/PB C.B B63

BATT. SUM3X2 DC3V

BATT. SUM1 x 9 DC13.5V

6. LW Control Voltage Adjustment
Settings:
● Test point: TP1
● Adjustment location: L6
● Depress up or down button and set the frequency displayed to LW 353 kHz.
Method:
Adjust L6 so that the test point (TP1) voltage is brought to 8.5 ± 0.2V.
Check:
Depress the down button when the frequency displayed is LW 146 kHz, check that the point voltage is 1.1 ± 0.3V.

7. LW Tracking Adjustment
L4 .... 155 kHz
TC2 .... 344 kHz

220~240V 110~120V J12

S16 VOLTAGE SELECTOR

□ : K model
< > : E model
T1 (PT)

F1 4A
F 500mA

Ⓚ POWER

7. Peak Indicator Adjustment
Settings:
● Input signal: MIC, −60 dB, 400 Hz
● TAPE SELECTOR switch: CrO₂
● RECORD switch: MANUAL
● DOLBY-NR switch: ON
● Adjustment location: SFR402
Method:
Rotate the RECORD volume and set when meter pointer indicates +3 dB.
Adjust SFR402 so that the +3 dB peak in lights dimly. Then check that the +3 dB in lights fully at +1 dB and the +7 dB LED 1 +5 dB with an input signal.

| TP7 | MS Program Interval Detection Time Test Point |

13. MS Program Interval Detection Time Adjustment
Settings:
● Test point: TP7
● Adjustment location: SFR401
Method:
Adjust SFR401 so that the test point (TP) quency is brought to 385 ± 10 Hz.
Use a frequency counter with an input imp of not less than 1MΩ.

SOL1

Ⓓ MS C.B

BREC/PB C.B BREC/PB C.B

MS PROGRAM

PROGRAM
MUSIC

NOTES (1) ▓▓ B(+) 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.

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

Ⓐ TUNER C.B

L4   L3,4 (MW/LW BAR ANTENNA)   L3

4. MW Control Voltage Adjustment
Settings:
● Test point: TP1
● Adjustment location: L5 (MW OSC coil)
● Depress up or down button and set the frequency displayed to MW 1,611 kHz.
Method:
Adjust L5 so that the test point (TP1) voltage is brought to 8.0 ± 0.2 V.
Check:
Depress the down button when the frequency displayed is MW 522 kHz, check that the test point voltage is 1.5 ± 0.3V.

Ⓑ REC/PB C.B B63   BATT.   SUM3X2 DC3V   (BLK)

5. MW Tracking Adjustment
L3 .... 594 kHz
TC1 .... 1,404 kHz

6. LW Control Voltage Adjustment
Settings:
● Test point: TP1
● Adjustment location: L6
● Depress up or down button and set the frequency displayed to LW 353 kHz.
Method:
Adjust L6 so that the test point (TP1) voltage is brought to 8.5 ± 0.2V.
Check:
Depress the down button when the frequency displayed is LW 146 kHz, check that the test point voltage is 1.1 ± 0.3V.

7. LW Tracking Adjustment
L4 .... 155 kHz
TC2 .... 344 kHz

BATT
SUM1 x 9
DC 13.5V

8. V.C.O. Frequency Adjustment
Settings:
● Adjustment location: SFR2
Method:
Adjust SFR2 so that the frequency becomes 19 kHz ± 20 Hz.
Insert a 100 kΩ resistor in series with test point (TP2) and connect a counter.

9. FM AUTO Stop Adjustment
Settings:
● Test point: TP5 (⊕), TP6 (⊖)
For others, proceed as for FM distortion Adjustment.
Method:
Adjust SFR1 so that the voltage of test point becomes 0.5 ± 0.03 V.

220~240V 110~120V   J12 AC~   J11 DC13.5V
S16 VOLTAGE SELECTOR
F2 500mA   F1 4A

TP2	V.C.O. Frequency Test Point
TP3	TUNER Output (L-ch)
TP4	TUNER Output (R-ch)

B64 Ⓑ REC/PB C.B

10. FM Distortion Adjustment
Settings:
● Input signal: 98 MHz, 75 kHz div., 1 kHz Mod., 17 dB (input).
● Test point: Input Antenna terminal output TP3,4
Method:
Adjust L9 so that the distortion becomes minimum.
Rating:
Less than 3%.

Ⓚ POWER C.B

Ⓒ CONTROL C.B   PL1 (METER LAMP)

| TP5 | TP6 | FM Auto Stop Test Point |

(FLAT CABLE)

7. Peak Indicator Adjustment
Settings:
● Input signal: MIC, −60 dB, 400 Hz
● TAPE SELECTOR switch: CrO₂
● RECORD switch: MANUAL
● DOLBY-NR switch: ON
● Adjustment location: SFR402
Method:
Rotate the RECORD volume and set where the meter pointer indicates +3 dB.
Adjust SFR402 so that the +3 dB peak indicator lights dimly. Then check that the +3 dB indicator lights fully at +1 dB and the +7 dB LED lights at +5 dB with an input signal.

| TP7 | MS Program Int[erval] Detection Time Test Point |

13. MS Program Interval Detection Time Adjustment
Settings:
● Test point: TP7
● Adjustment location: SFR401
Method:
Adjust SFR401 so that the test point (TP7) frequency is brought to 385 ± 10 Hz.
Use a frequency counter with an input impedance of not less than 1MΩ.

SOL1

Ⓓ MS C.B

| MEMORY | 6 | 5 | 4 | 3 | 2 | 1 |

11. Ceramic Filter Adjustment

Color of CF1,2	D11	D12
BLUE (10.675MHz)	Connect	Connect
RED (10.700MHz)	Connect	Cut
ORANGE (10.725MHz)	Cut	Cut

☐ : K model
< > : E model
T1 (PT) YEL

① REC/PB C.B   Ⓑ REC/PB C.B   Ⓑ REC/PB C.B   B52   MS PROGRAM

PROGRAM RESET
MUSIC SENSOR

2SA1015 2SA683   2SA1115

2SC1846   2SC2001
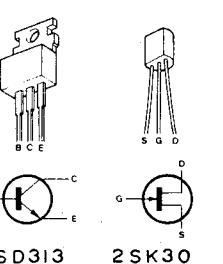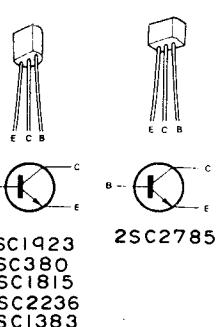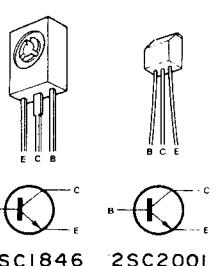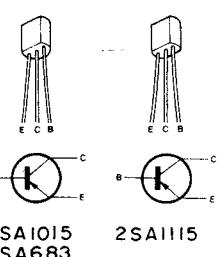
2SC1923 2SC380 2SC1815 2SC2236 2SC1383   2SC2785

2SD313   2SK30

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 ( )