TC-854-4

ISO

Set using ISO screws

USA Model

SPECIFICATIONS

Power Requirements: AC 120V, 60 Hz, 110W

Track System: 4-track 4-channel stereo

Reel Size: 10½" (267 mm) maximum

Tape Speed: 15 ips (38 cm/s), 7½ ips (19 cm/s), 3¾ ips (9.5 cm/s)

Recording Time

Tape speed	4-track 4-channel	4-track 2-channel
with 2,400 ft tape: 15 ips (38 cm/s)	1 hour	2 hours
with 1,800 ft tape: 7½ ips (19 cm/s)	45 minutes	1.5 hours
with 1,800 ft tape: 3¾ ips (9.5 cm/s)	1.5 hours	3 hours

Frequency Response

with SONY SLH tape:
20~30,000 Hz at 15 ips (38 cm/s)
20~30,000 Hz at 7½ ips (19 cm/s)
20~20,000 Hz at 3¾ ips (9.5 cm/s)

with standard tape:
20~28,000 Hz at 15 ips (38 cm/s)
20~25,000 Hz at 7½ ips (19 cm/s)
20~18,000 Hz at 3¾ ips (9.5 cm/s)

Signal-to-Noise Ratio: 59 dB (with SONY SLH tape)
56 dB (with standard tape)

Flutter and Wow: 0.03% at 15 ips (38 cm/s)
0.04% at 7½ ips (19 cm/s)
0.08% at 3¾ ips (9.5 cm/s)

Inputs: Eight MIC INPUTs
Impedance: 600Ω
Maximum sensitivity: 0.2 mV (–72 dB)
Four LINE INPUTs
Impedance: 100 kΩ
Maximum sensitivity: 0.06 V (–22 dB)

Output: Four LINE OUTPUTs
Impedance: 100 kΩ or more
Output level: 0.775 V (0 dB)
HEADPHONE output
Load impedance: 8Ω

Semiconductors: 101 transistors and 101 diodes

Dimensions: 17 5/16 (W) x 22 (H) x 10" (D)
(440 x 558.5 x 253 mm)

Weight: 61 lb 7 oz (28 kg)

SONY®
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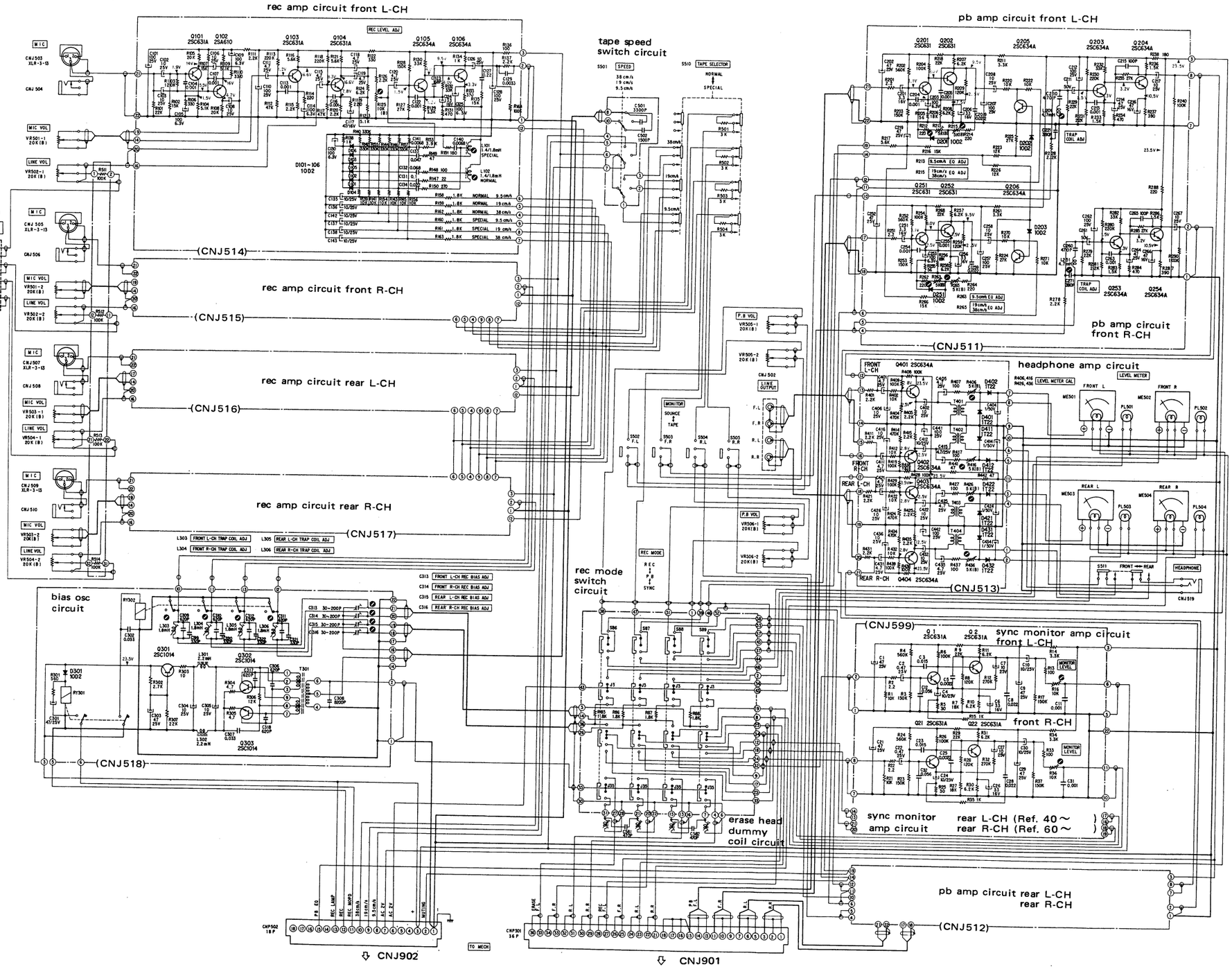
SCHEMATIC DIAGRAM



: This mark shows added or changed portion.

Ref.	Switch	Position
S501	TAPE SPEED switch	9.5 cm/s
S502	MONITOR switch (Front L-CH)	TAPE
S503	MONITOR switch (Front R-CH)	TAPE
S504	MONITOR switch (Rear L-CH)	TAPE
S505	MONITOR switch (Rear R-CH)	TAPE
S506	REC MODE switch (Front L-CH)	PB
S507	REC MODE switch (Front R-CH)	PB
S508	REC MODE switch (Rear L-CH)	PB
S509	REC MODE switch (Rear R-CH)	PB
S510	TAPE SELECTOR switch	NORMAL
S511	HEADPHONE switch	FRONT

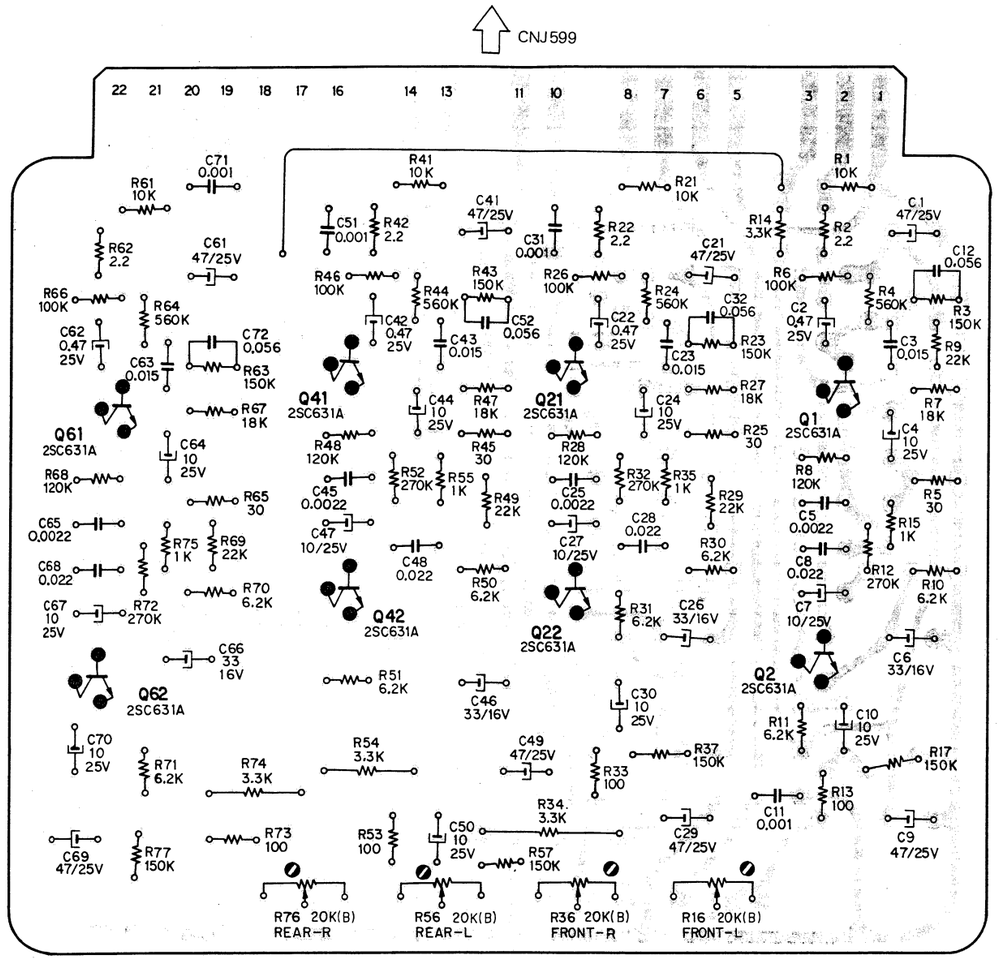
Note:

1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. Voltages shown are measured to ground by using a voltmeter (20 kΩ/V) with no signal input in STOP mode. All voltages may vary slightly due to normal component tolerances, etc.

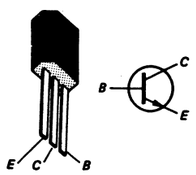
MOUNTING DIAGRAM

SYNC MONITOR Circuit Board

– Conductor Side –

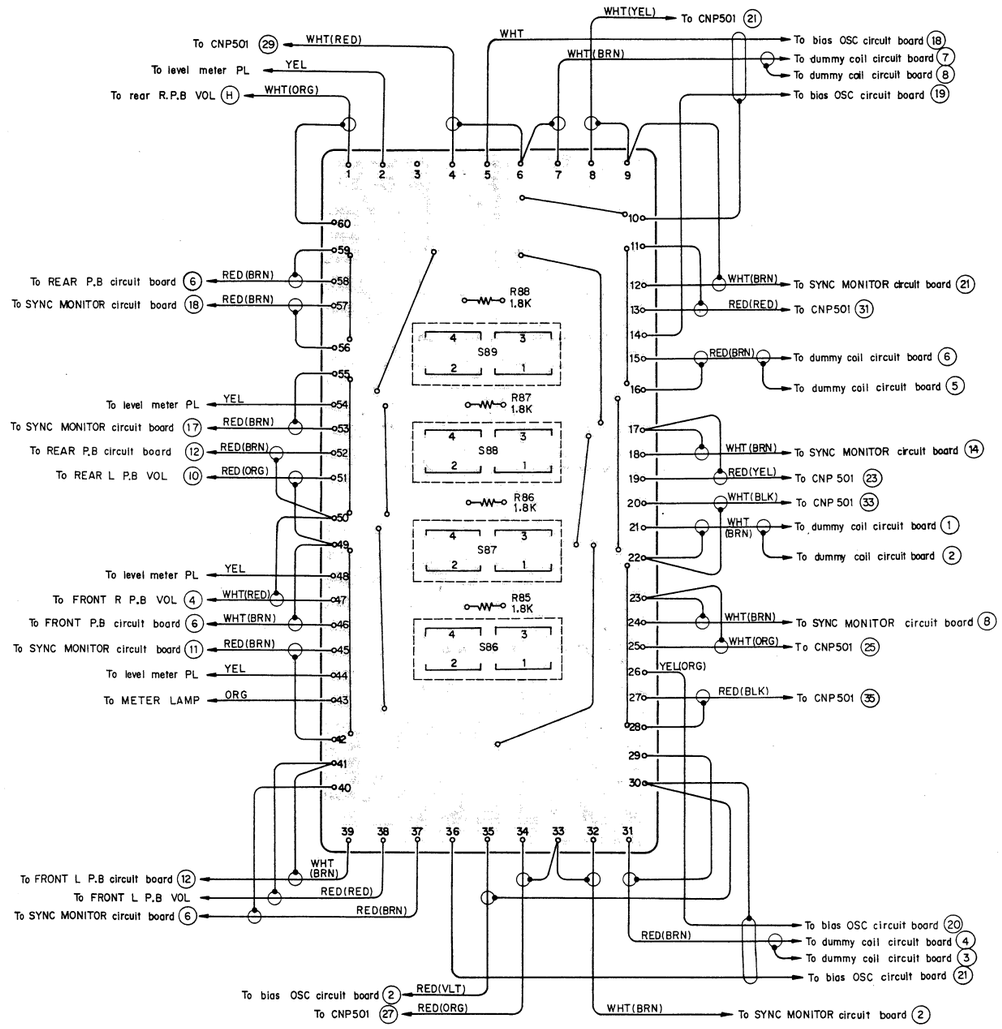


2SC631A



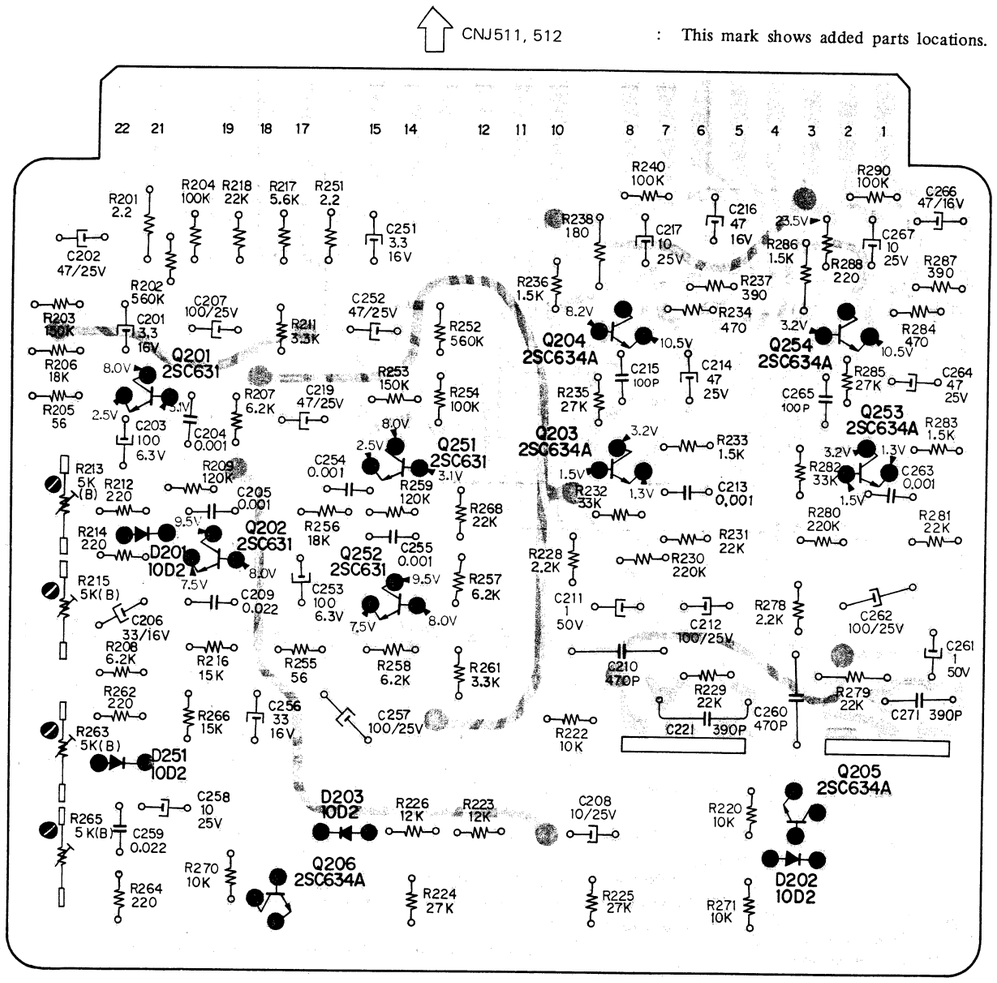
REC MODE Switch Circuit Board

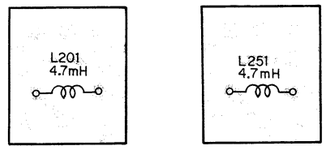
– Conductor Side –



PB AMP Circuit Board

— Conductor Side —



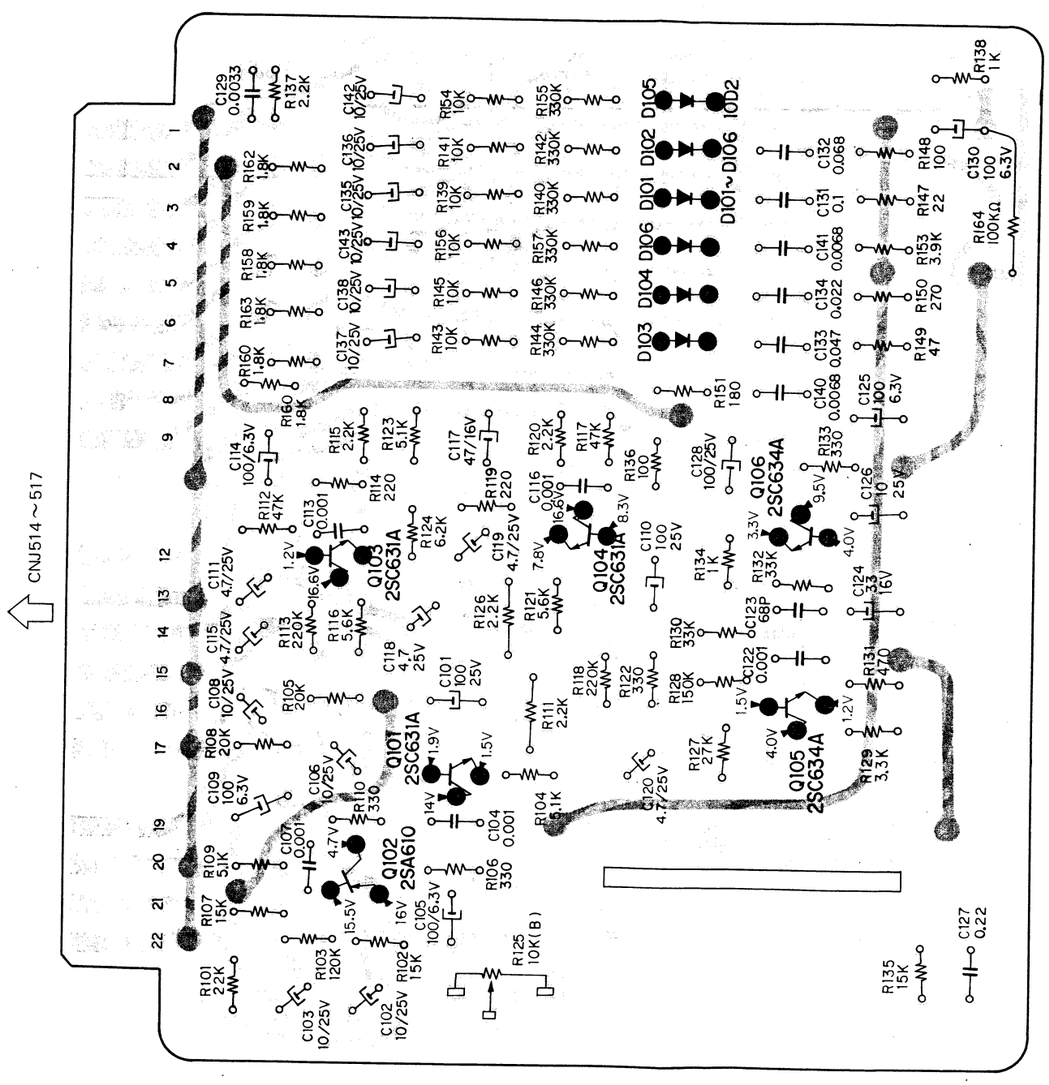


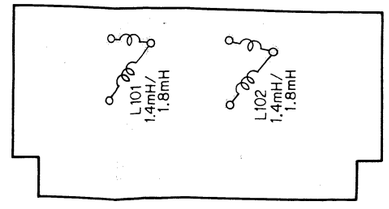
: conductor side pattern
: component side pattern

REC AMP Circuit Board

— Conductor Side —

: This mark shows added parts locations.

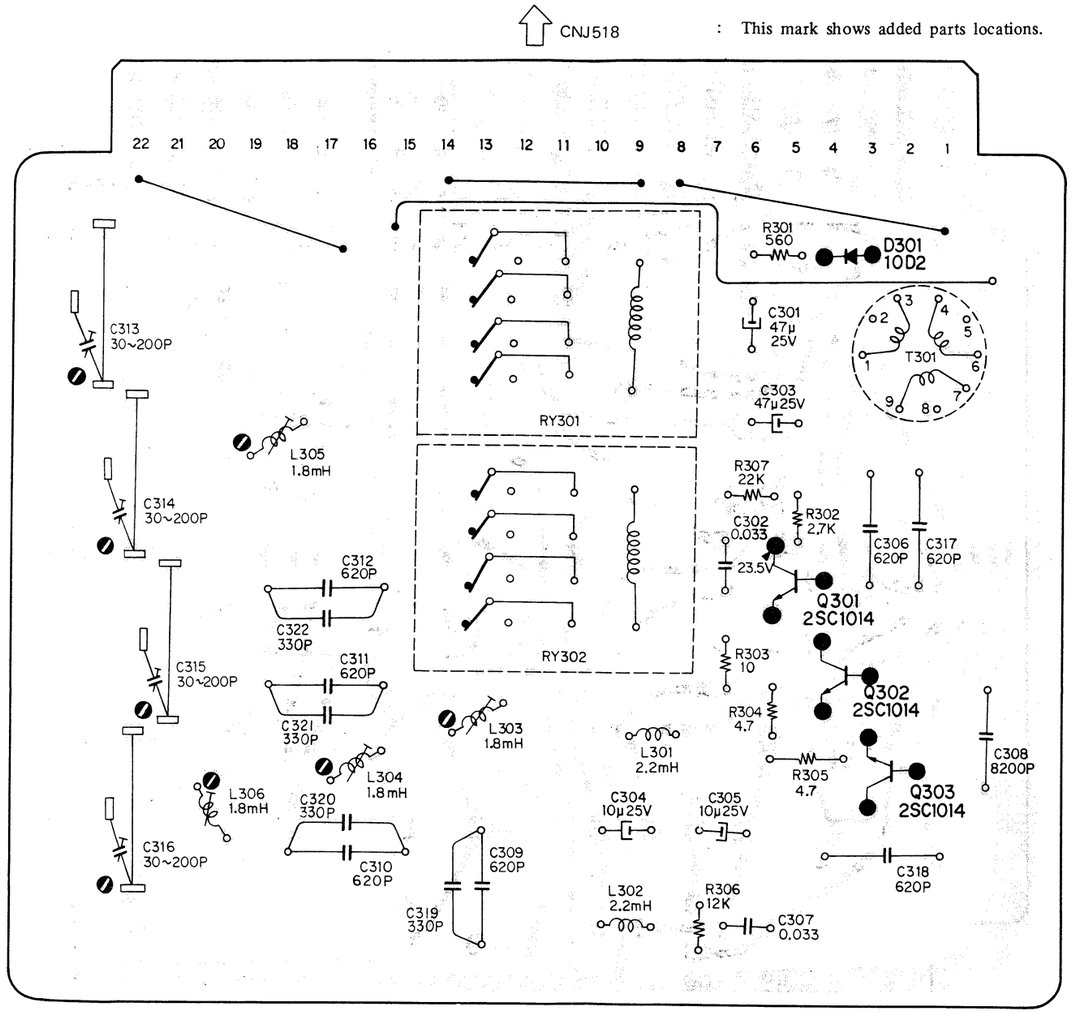




: conductor side pattern
: component side pattern

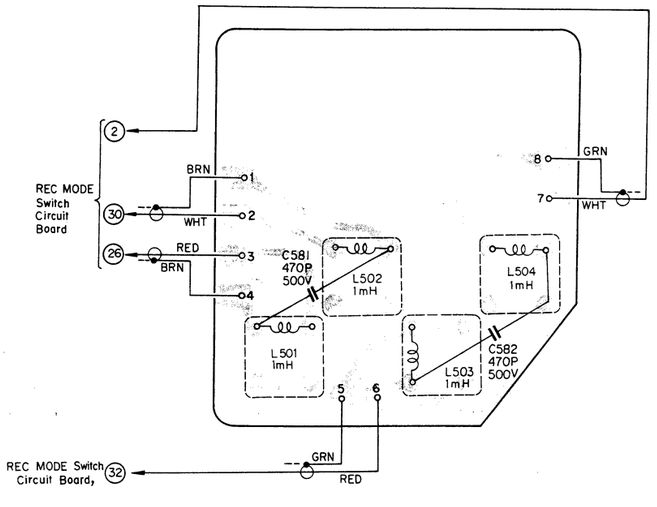
BIAS OSC Circuit Board

– Conductor Side –



ERASE HEAD DUMMY Coil Circuit Board

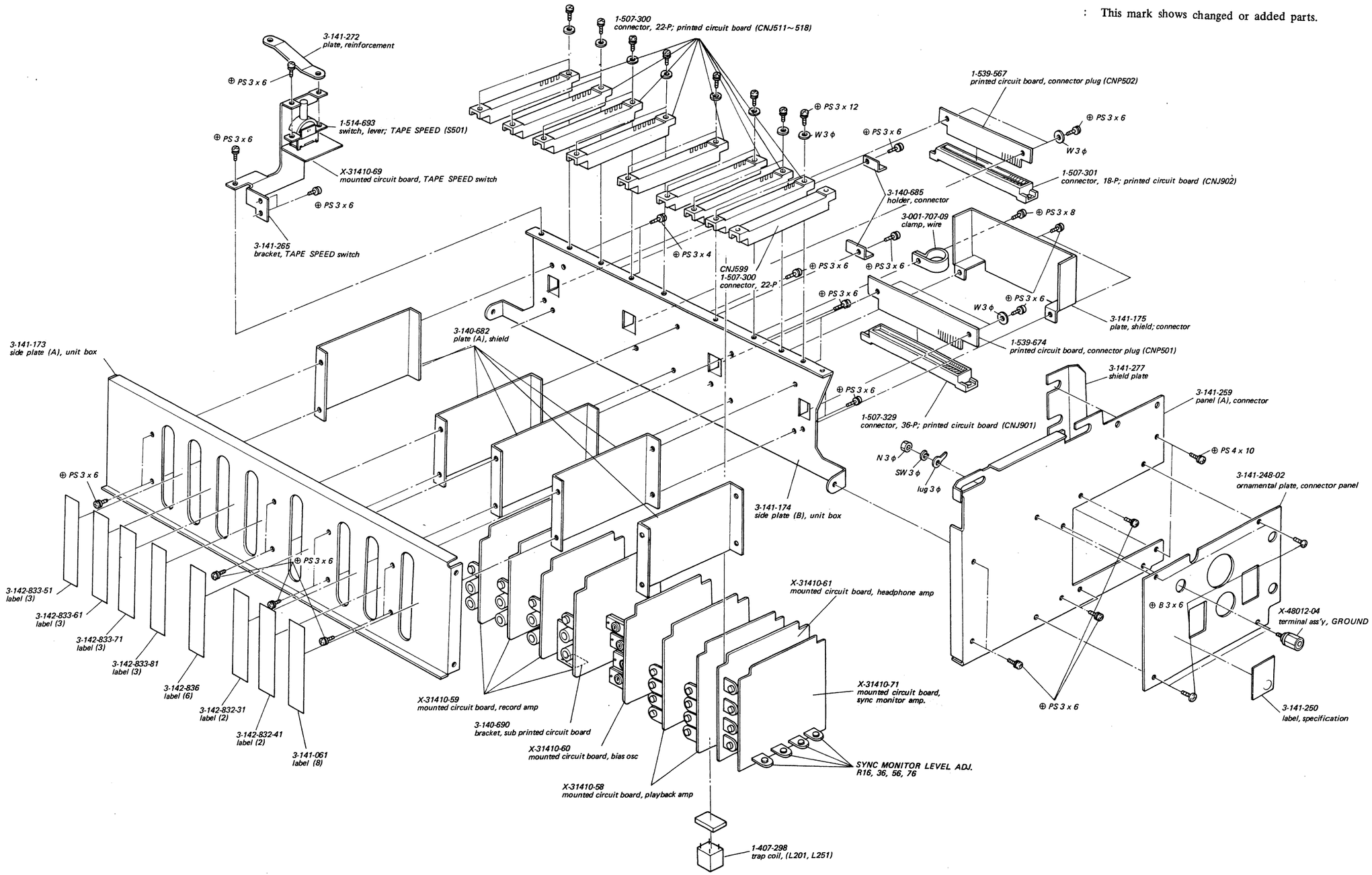
– Conductor Side –



EXPLODED VIEW

AMP Circuit Board View

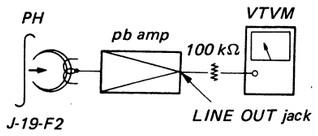
: This mark shows changed or added parts.



ELECTRICAL ADJUSTMENTS/MEASUREMENTS

17. SYNC MONITOR Level Adjustment

Setup:



Switch/Control Setting:

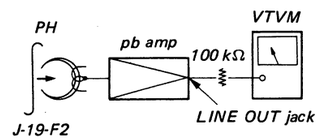
SPEED TUNING control: NORMAL (mechanical mid)
AUTO STOP switch: any
TAPE LIFT switch: ON
TAPE SPEED switch: 7½" (19 cm)
REEL SIZE switch: 7"
MONITOR switches: TAPE
REC MODE switches: SYNC MONITOR
TAPE SELECTOR switch: NORMAL
LINE REC VOLUME control: standard control-setting
PB VOLUME control: ※ standard control setting

Procedure:

1. Play 1st tone (400 Hz) of the SONY alignment tape J-19-F2.
2. Adjust the semi-fixed resistors (R16, 36, 56, 76) (see page 12) for 0 dB (0.775 V) VTVM reading.

18. SYNC MONITOR Frequency Response Measurement

Setup:



Switch/Control Setting:

SPEED TUNING control: NORMAL (mechanical mid)
AUTO STOP switch: any
TAPE LIFT switch: ON
TAPE SPEED switch: 7½" (19 cm)
REEL SIZE switch: 7"
MONITOR switches: TAPE
REC MODE switches: SYNC MONITOR
TAPE SELECTOR switch: NORMAL
LINE REC VOLUME control: standard control-setting
PB VOLUME control: ※ standard control setting

Procedure:

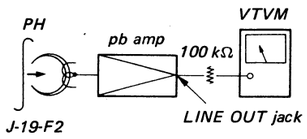
1. Play 1st tone (400 Hz) of the SONY alignment tape J-19-F2.
2. Make sure that the level diviation of each frequency against 400 Hz signal is within the range specified.

Specification

freq.	200 Hz	400 Hz	1 kHz	3 kHz	5 kHz	7 kHz
(dB)	+2 −1	0	±1	+0 −4	+0 −5	+0 −8

19. SYNC MONITOR S/N Ratio Measurement

Setup:



Switch/Control Setting:

SPEED TUNING control: NORMAL (mechanical mid)
AUTO STOP switch: any
TAPE LIFT switch: ON
TAPE SPEED switch: 7½" (19 cm)
REEL SIZE switch: 7"
MONITOR switches: TAPE
REC MODE switches: SYNC MONITOR
TAPE SELECTOR switch: NORMAL
LINE REC VOLUME control: standard control-setting
PB VOLUME control: ※ standard control setting

Procedure:

1. Play 1st tone (400 Hz) of the SONY alignment tape J-19-F2.
2. Note the VTVM reading.
3. Remove the alignment tape.
4. Hold the actuator with a rubber band so that the shut-off switch is activated.
5. Place the unit in playback mode and note VTVM reading.
6. Make sure that the level difference between Step 2 and 5 is more than 50 dB.

※ See Service Manual TC-854-4 USA Page 19.

ELECTRICAL PARTS LIST

SYNC MONITOR AMP

Ref. No.	Part No.	Description
SEMICONDUCTORS		
Q1, 2, 21, 22, Q41, 42, 61, 62	transistor	2SC631A
RESISTORS		
All resistors are ¼W and carbon type, unless otherwise indicated.		
R1, 21, 41, 61	1-242-677	10 kΩ
R2, 22, 42, 62	1-242-609	2.2Ω
R3, 23, 43, 63	1-242-725	150 kΩ
R4, 24, 44, 64	1-242-739	560 kΩ
R5, 25, 45, 65	1-242-636	30Ω
R6, 26, 46, 66	1-242-721	100 kΩ
R7, 27, 47, 67	1-242-703	18 kΩ
R8, 28, 48, 68	1-242-723	120 kΩ
R9, 29, 49, 69	1-242-705	22 kΩ
R10, 30, 50, 70	1-242-692	6.2 kΩ
R11, 31, 51, 71	1-242-692	6.2 kΩ
R12, 32, 52, 72	1-242-731	270 kΩ
R13, 33, 53, 73	1-242-649	100Ω
R14, 34, 54, 74	1-242-685	3.3 kΩ
R15, 35, 55, 75	1-242-673	1 kΩ
R16, 36, 56, 76	1-221-630	20 kΩ (B), semi-fixed
R17, 37, 57, 77	1-242-725	150 kΩ

Ref. No.	Part No.			
CAPACITORS				
All capacitors in microfarads, unless otherwise indicated. (elect = electrolytic)				
C1, 21, 41, 61	1-121-410	47	25 V	elect
C2, 22, 42, 62		0.47	25 V	elect
C3, 23, 43, 63	1-105-675-12	0.015	50 V	mylar
C4, 24, 44, 64	1-121-398	10	25 V	elect
C5, 25, 45, 65	1-105-665-12	0.0022	50 V	mylar
C6, 26, 46, 66	1-121-403	33	16 V	elect
C7, 27, 47, 67	1-121-398	10	25 V	elect
C8, 28, 48, 68	1-105-677-12	0.022	50 V	mylar
C9, 29, 49, 69	1-121-410	47	25 V	elect
C10, 30, 50, 70	1-121-398	10	25 V	elect
C11, 31, 51, 71	1-105-661-12	0.001	50 V	mylar

SONY CORPORATION

1J0636-1

Printed in Japan

TC-854-4

USA Model

October 1971

SUPPLEMENT

SUBJECT: SYNC MONITOR AMP CIRCUIT ADDITION
APPLICABLE SERIAL NO.: 10,201 AND LATER

A new function is added to the usual operation using three heads; erase, record and playback. The unused tracks of a record head is used for playback purpose in record mode.

TC-854-4 can record and play back the sound on any selected tracks because of four-track four-channel system.

However, the record and playback heads are separately installed. When recording the new sounds on one track while playing back the other track's sounds, the newly recorded sounds are relatively delayed. Of course, the same occasions occur on the conventional three-head units.

When recording the new materials on two tracks in addition to the other two tracks recorded already, you can make one master tape without delay using the new system as shown in Fig. A.

The newly recorded materials will synchronize to the pre-recorded materials.

SYNC MONITOR AMP (TC-854-4 Serial No. 10201 and later) is added to the conventional TC-854-4 and also SYNC position is added to the REC MODE switch. (See Fig. B.)

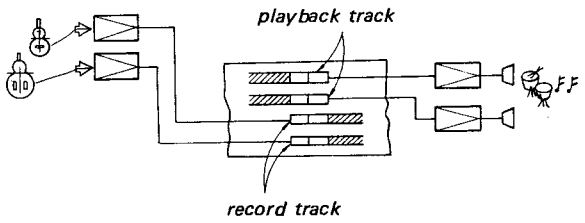


Fig. A.

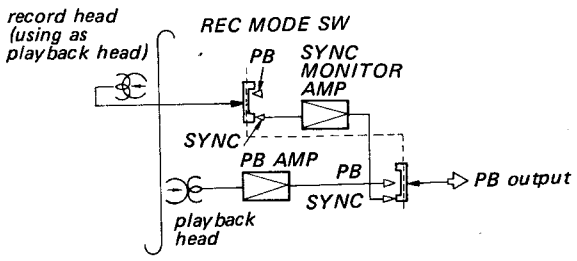


Fig. B.

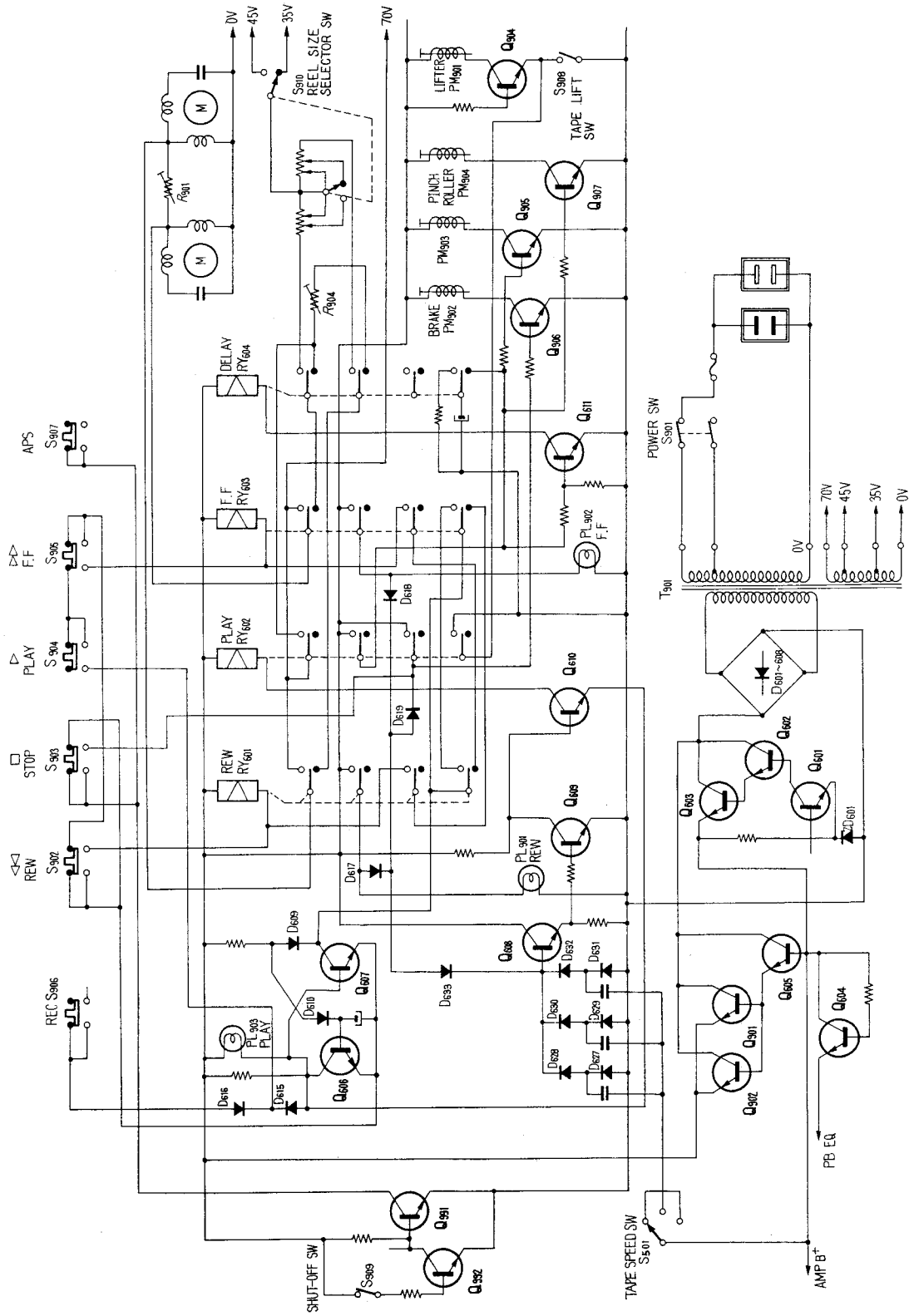
SONY®
SERVICE MANUAL

	Location	Ref. No.	Part No.		Description
ADDED	PB AMP	C221, 271	1-107-242-11		capacitor, silvered mica; 390pF: 50V
	REC AMP	R164	1-242-721-12		resistor, carbon; 100 kΩ: ¼W
	BIAS OSC	C319 ~ 322	1-107-006-11		capacitor, silvered mica; 330pF: 500V
	ERASE HEAD DUMMY COIL	C581, 582	1-107-016-11		capacitor, silvered mica; 470pF: 500V
	SYNC MONITOR AMP		X-31410-71		mounted circuit board, sync monitor (see page 14)
		CNJ599	1-507-300		connector, 22-P
DISCARDED	REC MODE Switch	R525 ~ 528	1-242-617-12		resistor, carbon; 4.7Ω: ¼W
CHANGED			Former	New	
	PB AMP	C215, 265	1-107-125-11	1-107-131-11	capacitor, silvered mica; 100pF: 50V
	HEADPHONE AMP	C441, 442	1-121-416-11	1-121-410-11	capacitor, electrolytic; 47μF: 50V
	REC MODE Switch		X-31410-65	X-31410-70	mounted circuit board, REC MODE switch
	(S506 ~ 509) → (S86 ~ 89)		1-514-769	1-514-693	switch, lever; REC MODE
	(R521 ~ 524) → (R85 ~ 88)		1-242-679-12		resistor, carbon; 1.8 kΩ: ¼W
	APS & ATS	R712	1-242-709-12	1-242-705-12	resistor, carbon; 22 kΩ: ¼W
	CABINET		3-141-254-02	3-141-254-21	ornamental panel, control
			3-142-837	3-141-061	label (7) ⟶ label (8)
			3-141-261	3-141-173	side plate (A), unit box
			3-141-262	3-141-174	side plate (B), unit box

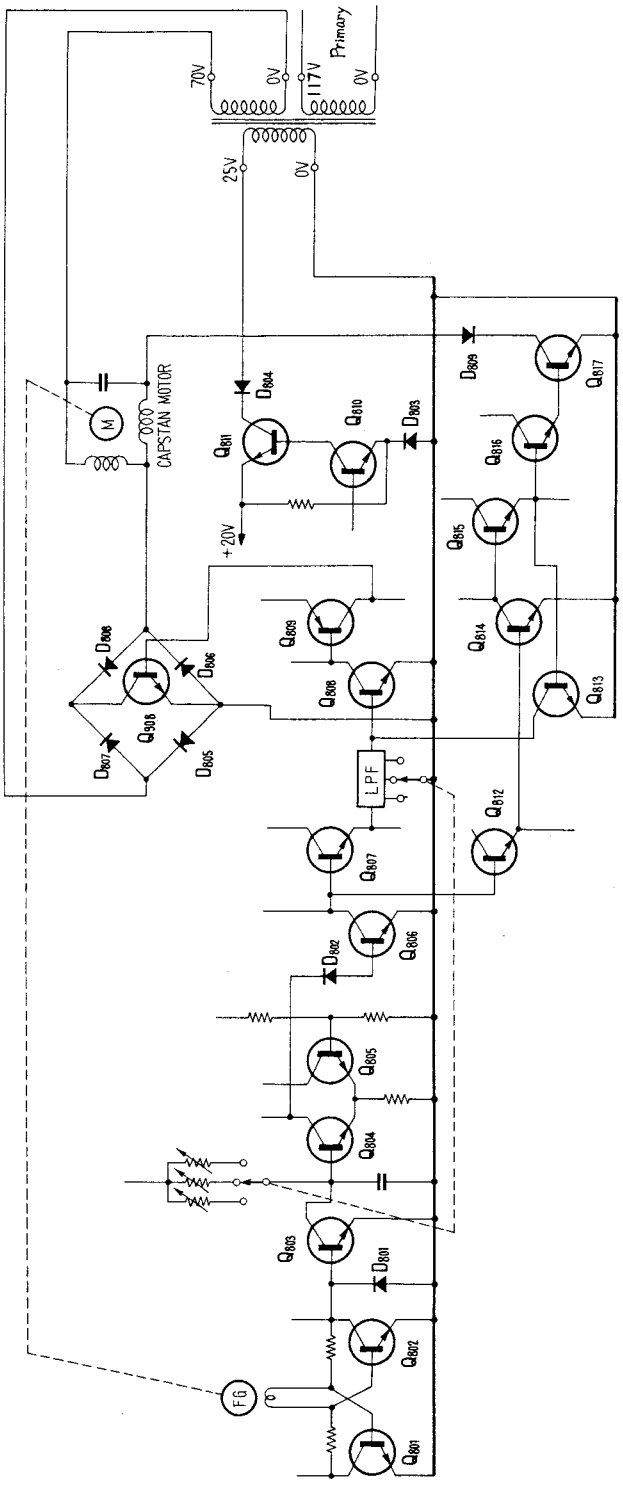
SECTION 1
OUTLINE

1-1. BLOCK DIAGRAM

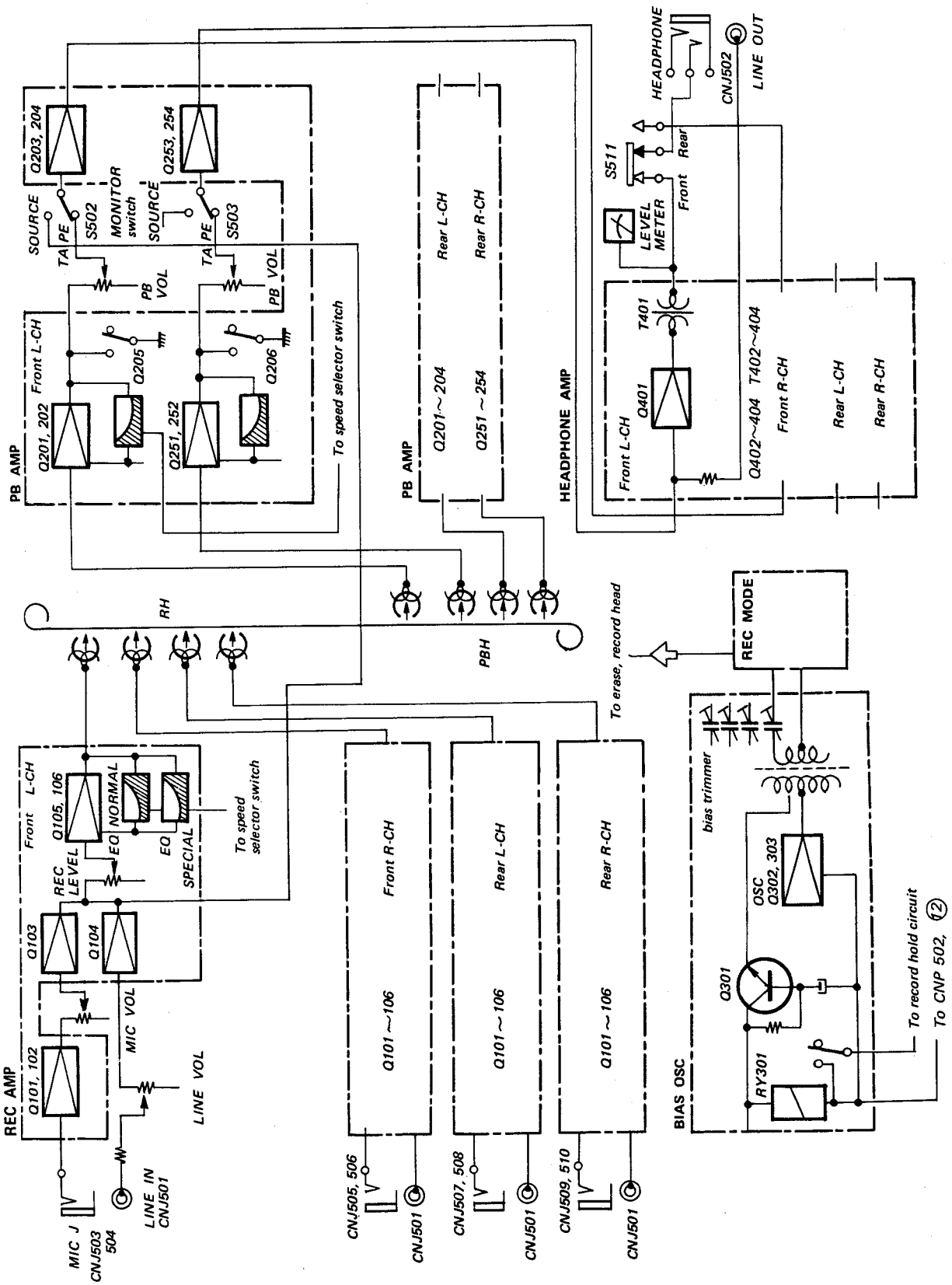
1-1-1. System Control Circuit



1-1-2. Capstan Servo Control Circuit



1-1-3. Audio Amp and Bias OSC Circuit



1-2. GENERAL

The SONY Model TC-854-4 which is a professional stereo tape recorder utilizing three motors and four heads is equipped with the following features:

* An ac servo controlled capstan drive motor for perfect speed regulation and extremely low wow and flutter regardless of voltage and load fluctuations.
* 10½" (267 mm) reel capacity and built-in reel locks.
* Closed-loop dual capstan tape drive system which permits optimum tape tension and tape-to-head contact.
* Both 2-channel and 4-channel stereo record and playback system are provided for maximum versatility and convenience.
* APS (Automatic Program Scanner) and ATS (Automatic Tape Stop) systems to start and stop the tape transport at the desired position.

1-3. TECHNICAL FEATURES

System control of the TC-854-4 is accomplished by transistor logic, relays, and solenoids. Main functions are as follows:

1-3-1. System Control Circuit

Flip-Flop Circuit

The flip-flop (Fig. 1-3-1) comprises Q606, Q607, R611 through R616, D609, D610, and C621. The normal condition of Q606 is OFF and Q607 is ON. When PLAY pushbutton S904 is depressed, the collector voltage of Q606 and base voltage of Q607 go to 0 volts. This turns Q607 OFF and Q606 ON. The resulting positive voltage developed across R614, R615, and D610 holds Q606 ON. The flip-flop remains in this condition until the automatic shut-off, STOP, FAST FORWARD, or REWIND switches are activated. These switches remove the ground from the emitters of Q606 and Q607, causing the flip-flop to reset.

The collector output of Q606 turns Q610 ON, which energizes PLAY relay RY602. The output also holds bias oscillator relay RY301 energized if RECORD MODE switch S506 and RECORD switch S906 have been activated.

Solenoid Operations

PINCH ROLLER solenoids PM903 and PM904 are energized by Q905 and Q907 respectively. Q905 and Q907 turn ON only when PLAY relay RY602 energizes. TAPE SHIFTER solenoid PM901 is energized by Q904. Q904 turns ON only when PLAY relay RY602 energizes or TAPE SHIFT switch S908 is actuated. BRAKE solenoid PM902 is energized by Q906. Q906 turns ON when the REWIND, PLAY, or FAST FORWARD relay energizes.

To avoid excessive heat built-up in the solenoids during extended operation, the following circuit is used (Fig. 1-3-2). Initially, +23 volts is applied across the solenoid. Also, +23 volts is applied to the network comprising R637 (R640, R634, R647), and C609 (C613, C608, C607). A high potential is instantaneously applied to the base of Q905 (Q907, Q906, Q904).

As the internal impedance of C609 (C613, C608, C607) approaches that of R638 (R641, R635, R648) the voltage at the base decreases. The voltage across the solenoid also decreases.

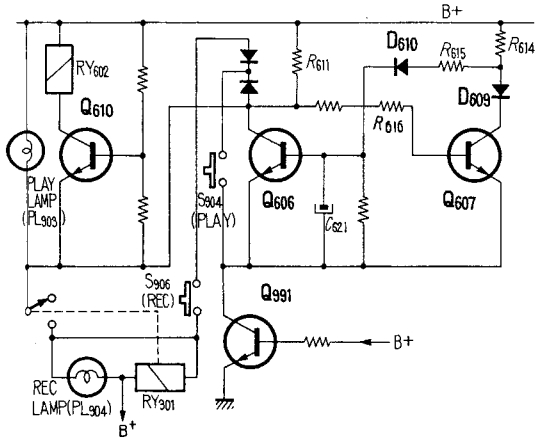


Fig. 1-3-1. Flip-flop circuit

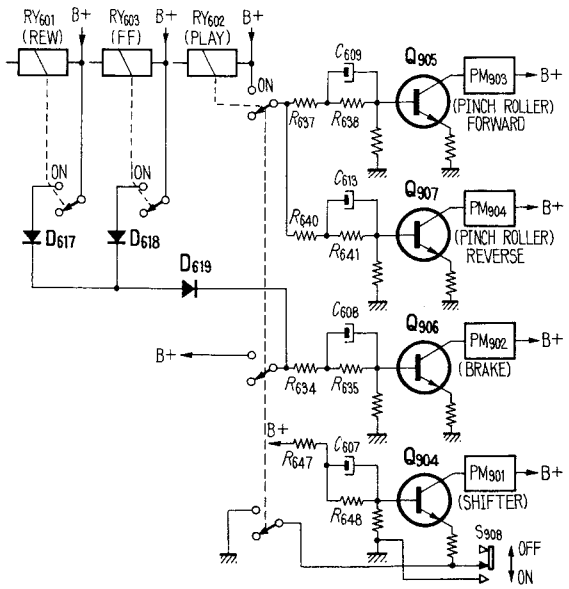


Fig. 1-3-2. Solenoid drive circuit

SHUT-OFF Stage

When a tape is threaded, the Automatic Shut-off (S909) becomes open, cutting off the positive potential applied to the base of transistor Q992 through the resistance network of R993, R994 and R995, turning Q992 OFF. This provides bias to transistor Q991 which then conducts heavily, reducing its collector voltage nearly to ground potential.

If a pulse is received at the base of transistor Q712 (supplied from the ATS circuit output), the collector of Q712 falls to ground potential. This brings the base of Q991 to ground, also, cutting off the operation of Q991 and stopping the transport.

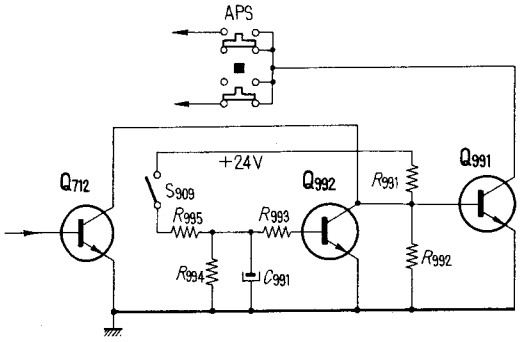


Fig. 1-3-3. SHUT-OFF circuit

1-3-2. APS-ATS Circuit

APS-ATS Oscillator Stage

A Colpitts oscillator circuit is used in the APS-ATS control circuit, operating at approximately 220 kHz. Regenerative feedback is derived from the tank circuit (consisting of the sensing head, C701 and C702 capacitors) and is applied to the emitter of Q701 through C702 and R704. Base bias for Q701 is developed across R701 and R702 while the emitter-swamping resistor is R703. This oscillator stage operates constantly. Capacitor C703 and inductor L701 form a series resonant circuit at the oscillator frequency which is coupled to the base of Q702, keeping it ON and maintaining the Q702 collector at emitter ground potential.

If a metallic object, such as the foil sensing tape, passes near the sensing head core, the inductance of the sensing head changes, also changing the oscillation intensity of the tank circuit. Inductor L701 then acts as a short to ground and Q702 is momentarily cut off, resulting in a sharp rise of voltage at the collector of Q702. This produces a positive pulse to the next stage.

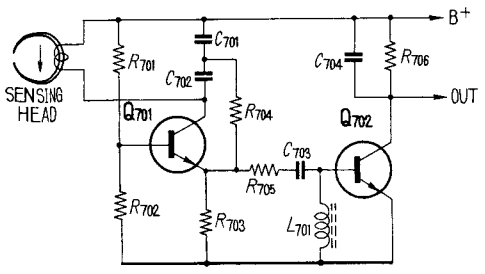


Fig. 1-3-4. APS and ATS oscillator circuit

ATS

When a positive pulse originates from transistor Q702, it is applied to the base of transistor Q703 (through R707 and D701). This turns Q703 ON and it conducts heavily, reducing its collector potential effectively to ground. The ground level of the Q703 collector drops the base of Q704 to ground potential, also, turning Q704 OFF momentarily. (Q704 is normally on.) With the collector of Q704 increasing its positive potential in its OFF condition (due increased impedance), the potential is applied to the base of Q712 which begins to conduct heavily, dropping its collector potential to ground. With the Q712 collector at ground potential, this activates the shut-off circuit as described in the shut-off stage for that function. Q711 and its associated base biasing circuit are to keep Q712 from functioning soon after the tape transport is turned from rewind to play in APS mode. When the mode changes from rewind to play, the foil which activated the change of mode passes again across the sensing head. This supplies positive pulse to base of Q712. However, potential charged in C710 keeps Q711 ON and grounds the pulse supplied from Q704 through R736 for approximately 15 seconds.

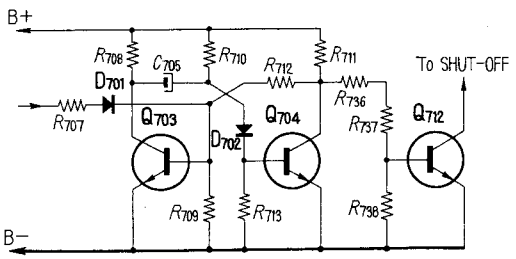


Fig. 1-3-5. ATS circuit

APS

When the APS switch is depressed (closed), the fast forward (FF) relay is activated through D703, putting the recorder in fast forward mode. At the same time, the collector of Q705 is momentarily grounded. This removes bias voltage at the base of Q706 (through R716) and Q706 turns OFF. The collector potential of Q706 rises, therefore, biasing (through R717) the base of Q705 and (through D711) the base of Q711. Both Q705 and Q711 begin to conduct heavily and their respective collectors fall to the emitter ground potential. Simultaneously,

the collector of Q607 is grounded through the FF relay contacts, which are closed as shown in the diagram. No bias is presented to the base of Q606, turning it OFF and turning Q607 ON. With Q607 conducting, the FF relay is self-locked as current flows from the B+ through the relay to ground through Q607. Positive voltage from the normally-off Q703 collector provides bias to the base of both Q707 and Q709. The collector voltage of both Q707 and Q709 is held at emitter ground potential, which in turn prevents bias from reaching the base of Q708 and the base of Q710. Q708 and Q710 are in an OFF condition which keeps the circuit from going into play or rewind modes.

TO REWIND:

When sensing foil crosses the sensing head, a pulse (from Q702) momentarily provides bias at the base of Q703, turning Q703 ON. Q703 conducts and momentarily stops supplying base bias to Q707, which turns OFF. With Q707 turned OFF, positive potential from the collector of Q707 biases the base of Q708 (through R727) and Q708 conducts with its collector dropping to emitter ground potential. This closes the REWIND relay as current flows from B+ through the relay and through Q708 to ground. At this time the self-locking contacts of the FF relay are opened and the self-locking contacts of the REWIND relay are closed. Switches are now opposite of the diagram positions. Once the REWIND relay is activated, it is self-locked in ON position through its contacts, fast forward relay contacts, and Q607.

TO STOP AND PLAY (from APS rewind mode):

When the sensing foil again crosses the sensing head (now in the APS rewind mode), Q703 again receives a momentary bias pulse (from Q702) and grounds the base of Q709, turning Q709 OFF. A positive potential is then allowed through ZD701, R722 and R733 from the FF relay coil. This potential biases Q710, which turns ON, and the collector of Q710 falls to emitter ground potential, removing bias from the base of Q607, turning it OFF. With Q607 OFF, the self-locking ground is open (remember, all switches are now opposite to the diagram positions) and the REWIND relay is released, stopping the rewind mechanism. Simultaneously, when Q710 is turned ON, its collector, now reduced to emitter ground potential, also applies this emitter ground potential to the collector of Q706 (through D709). The base of Q705 receives no bias, therefore. Q705 turns OFF and Q706 turns ON. With Q705 off, its positive collector voltage charges Q709 which delivers bias to the base of Q709 after a capacitive time-delay (through C709 and R728). This time delay is necessary to keep Q709 OFF for a short period right after Q710 is turned off.

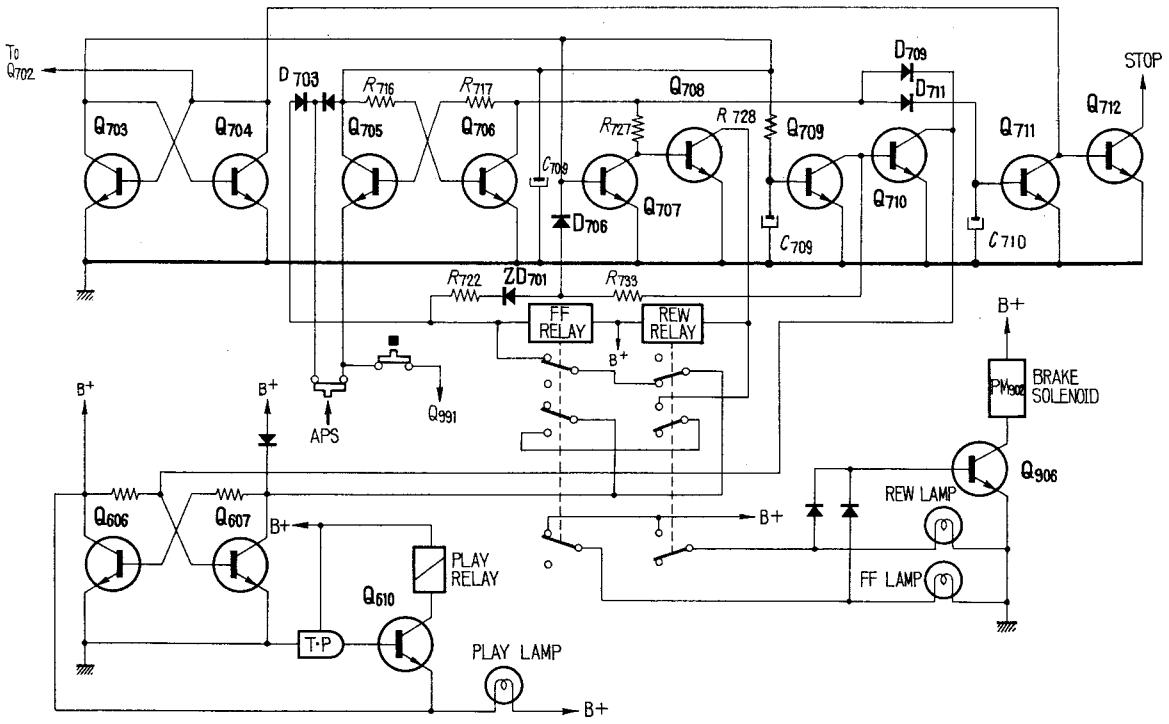


Fig. 1-3-6. APS and ATS circuit

	APS (To Fast Forward)	FOIL REACHES SENSING HEAD IN F.F. MODE (To Rewind)	FOIL REACHES SENSING HEAD IN REW. MODE (To STOP and PLAY)
Q703	OFF	ON (Momentarily)	ON (Momentarily)
Q704	ON	OFF (Momentarily)	OFF (Momentarily)
Q705	ON	ON	OFF
Q706	OFF	OFF	ON
Q707	ON	OFF	ON
Q708	OFF	ON	OFF
Q709	ON	ON	OFF
Q710	OFF	OFF	ON
Q711	ON	ON	ON
Q712	OFF	OFF	OFF

1-3-3. CAPSTAN SERVO-CONTROL Stage

Since it is a well-known fact that the capstan servo-control system brings many advantages over the conventional capstan motors driven directly by the AC power line, only technical function of the circuit is explained here, leaving the flowery words to advertising people.

The following is the basic block diagram of the capstan servo-control system used for the SONY Model TC-854-4.

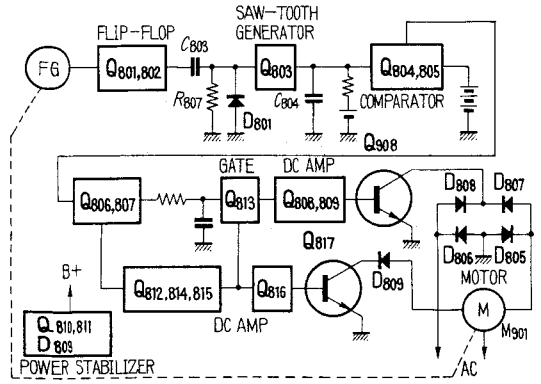


Fig. 1-3-7. Block diagram (Capstan servo-control circuit)

The motor used in this system is a type of AC torque motor, the speed and torque of which can be controlled by changing the supply voltage, with an AC frequency generator (FG) coupled coaxially to its shaft. The output of the FG is connected to the servo-control electronics to trigger the flip-flop (Q801 and Q802) which generates square wave output at the collector. This output is then differentiated and rectified by C803, R807 and D801 turning the wave form into positive pulses. These pulses trigger the saw-tooth generator (Q803). The saw-tooth output of Q803 is led to the comparator consisting of Q804 and Q805. Only for the period when the potential of saw-tooth wave becomes higher than the potential at the emitter of Q804 and Q805, Q804 becomes conductive and supplies pulsating signal to Q806, which inverts the phase of the pulse signal. The signal then goes through a buffer stage (Q807) and passes through a low-pass filter for smoothing. The smoothed DC potential, which varies in direct proportion to the duration time of the pulse at emitter of Q807, controls the output of the DC amplifier consisting of Q808 and Q809. The output at the emitter of Q809 varies the impedance between collector and emitter of Q908, which is inserted in series with the capstan drive motor.

When, by a certain cause, the motor is rotating at a speed slower than the intended speed, the frequency of FG is also lower than the predetermined figure, which results in longer interval between the pulses for saw-tooth triggering. The longer interval between the pulses causes higher saw-tooth wave height, which in turn brings in a longer duration of "ON" period of Q804. Therefore, the output pulse at the emitter of Q807 becomes wider, which means higher positive biasing of Q808 resulting in less collector-emitter impedance of Q908 to increase the speed of the motor. When the motor is running too fast, operation of the servo system is vice versa. The equilibrium of the servo system is obtained where the highest potential of the saw-tooth wave becomes equal to the emitter potential of Q804 and Q805.

Tape speed selection is accomplished by changing the time constant of the saw-tooth generator Q803 and by selecting proper parameters in the smoothing low-pass filter.

Starting: The moment when the power switch of the recorder is turned on, the situation of the servo-control circuit and motor is as follows:

Q803	Q804	Q806	Q807	Q808	Q809	Q908	MOTOR
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF

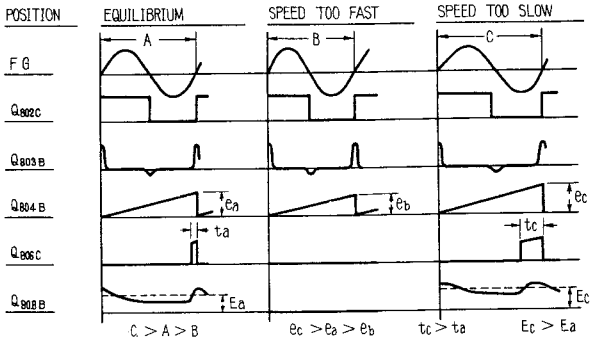
This situation continues until the charged potential across C804 becomes higher than the potential

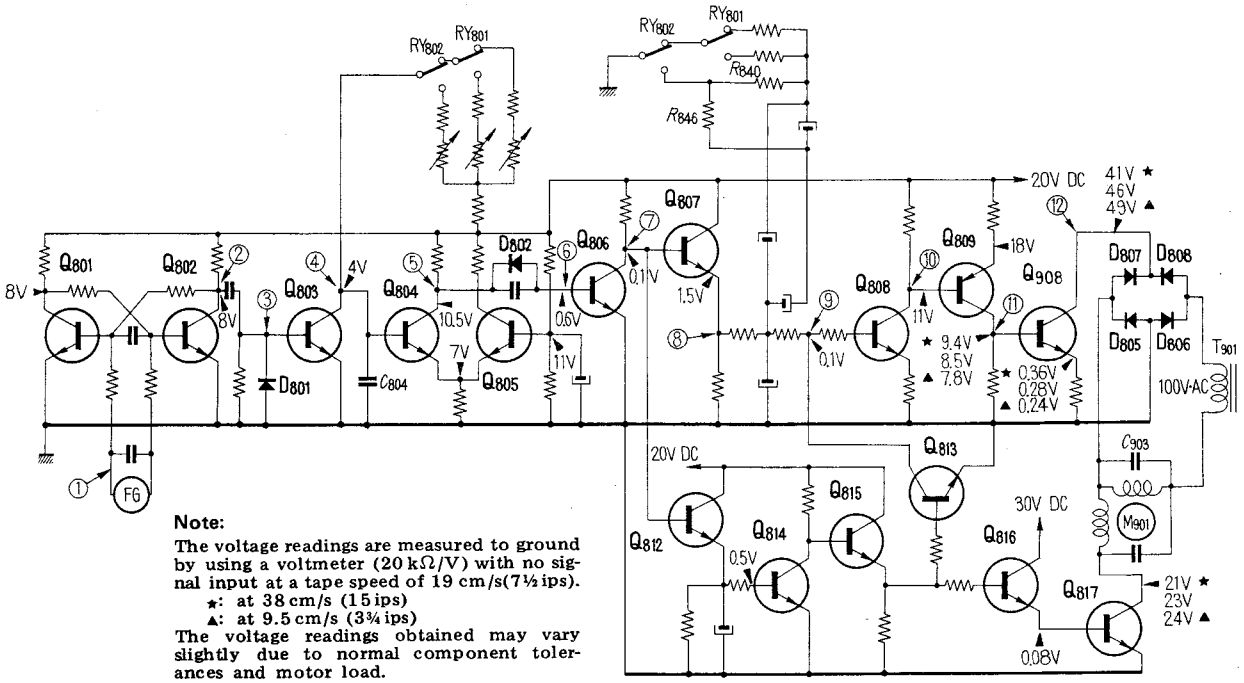
at the emitter of Q804 and Q805. When the potential across C804 becomes high enough to make Q804 conductive, the potential at collector of Q804 becomes lower than the zener voltage of D802, thus turning OFF Q806. The OFF situation of Q806 turns ON all the transistors Q807, Q808, Q809 and Q907, as well as the motor. Once the motor is started, its speed is controlled by the frequency generated by the coaxial generator as explained earlier.

Electromagnetic Braking: When changing tape speed to a slower position while the tape is in motion, it is necessary to force the speed down to make the change quick. This is accomplished by applying brake to the motor electromechanically. The change of speed selector switch to a slower position causes longer rise time of saw-tooth wave at the base of Q804 and induces base bias to Q806 to turn it ON. Then, the potential at the collector of Q806 becomes almost zero against the ground. This low potential turns OFF Q812 and, therefore, Q814. The OFF situation of Q814 turns ON Q815 generating higher potential at its emitter. This potential turns ON Q813, which shorts the servo-control signal to ground to inactivate the circuit. Meanwhile, the potential at the emitter of Q815 turns ON Q816 and Q817 to induce braking current in the motor windings through D809, Q817 and D808. Once the frequency of FG becomes low enough to turn ON Q804 (and, therefore, to turn OFF Q806), the servo-control system takes over the motor speed control.

Stability: Since the supply potential to the servo-control circuit affects the tape speed, a voltage stabilizer consisting of Q810, Q811 and D803 is used for maximum stability of the supply potential. Also, the high stability of the circuit owes to the self-compensating comparator stage (Q804 and Q805) and use of silicon transistors throughout.

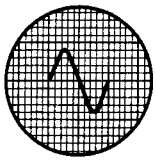
Wave Forms and Voltages: The wave forms at each stage and their relation and voltage are as follows:



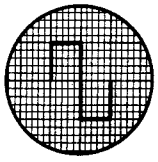


Note:
The voltage readings are measured to ground by using a voltmeter (20 kΩ/V) with no signal input at a tape speed of 19 cm/s(7½ ips).
★: at 38 cm/s (15 ips)
▲: at 9.5 cm/s (3¾ ips)
The voltage readings obtained may vary slightly due to normal component tolerances and motor load.

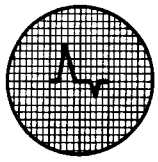
Fig. 1-3-8. Capstan servo-control circuit

① 

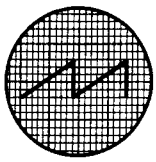
15 ips – 1,151 Hz, 7.6 Vp-p
7½ ips – 575 Hz, 3.2 Vp-p
3¾ ips – 288 Hz, 1.52 Vp-p

② 

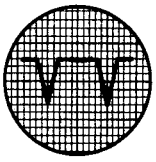
18 Vp-p

③ 

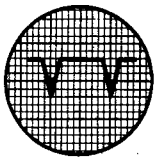
1.2 Vp-p

④ 

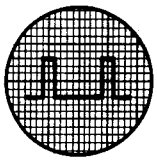
9 Vp-p

⑤ 

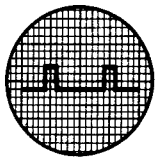
3 Vp-p

⑥ 

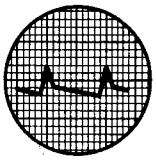
3 Vp-p

⑦ 

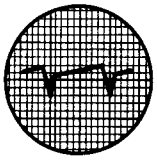
7.6 Vp-p

⑧ 

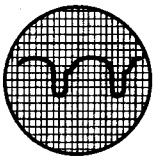
5.2 Vp-p

⑨ 

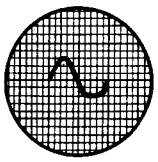
0.08 Vp-p

⑩ 

0.3 Vp-p

⑪ 

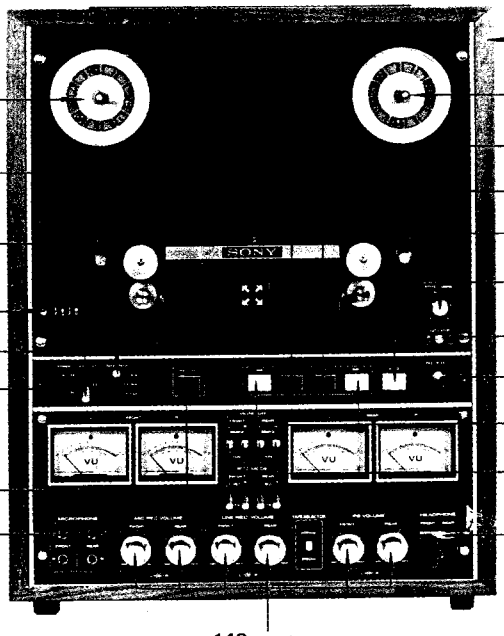
0.5 Vp-p

⑫ 

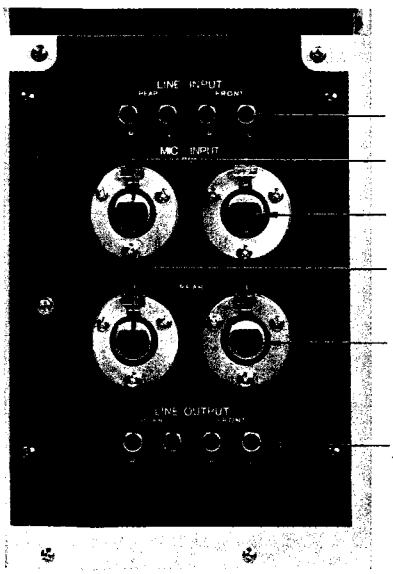
80 Vp-p

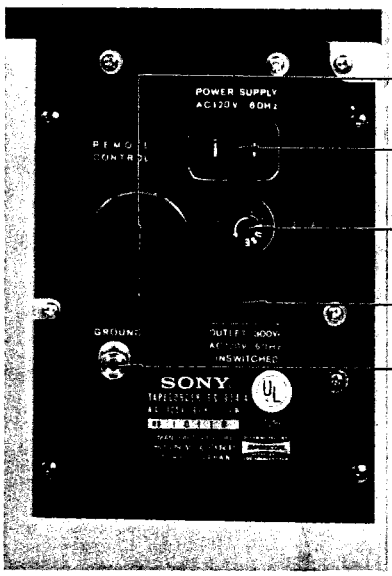
1-4. MAJOR PARTS LOCATIONS

— Cabinet front view —

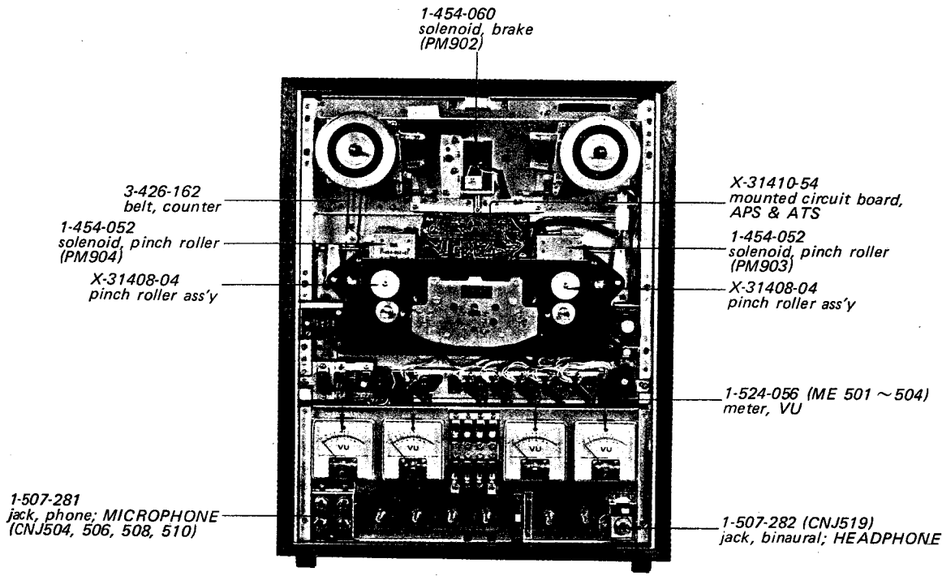


— Jack Panel —

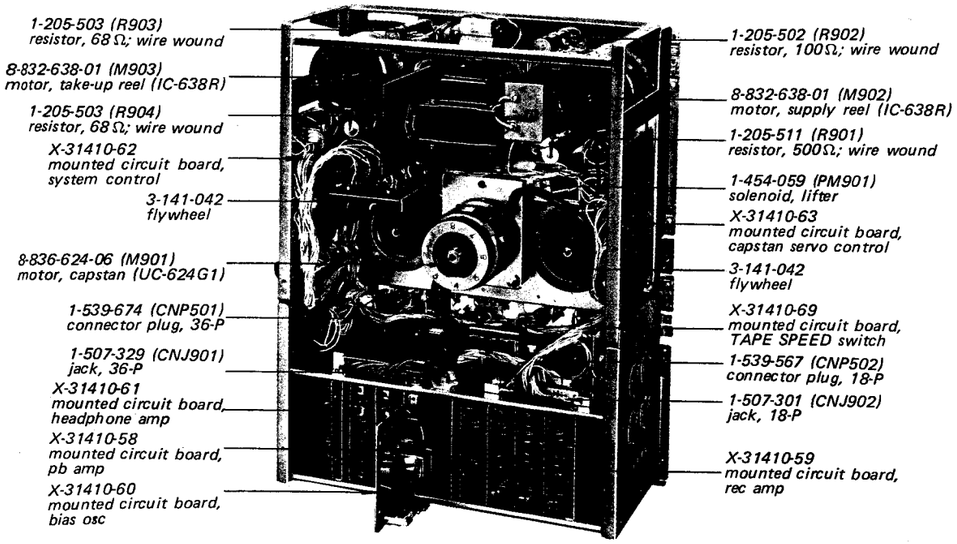




— Chassis front view —



— Chassis back view —



SECTION 2
DISASSEMBLY

2-1. REEL PANEL REMOVAL

Remove the four screws marked ☆ in Fig. 2-1.

2-2. AMP PANEL REMOVAL

(1) Remove the control knob marked □ in Fig. 2-1 by loosening their set screws.

(2) Remove the four screws marked △ in Fig. 2-1.

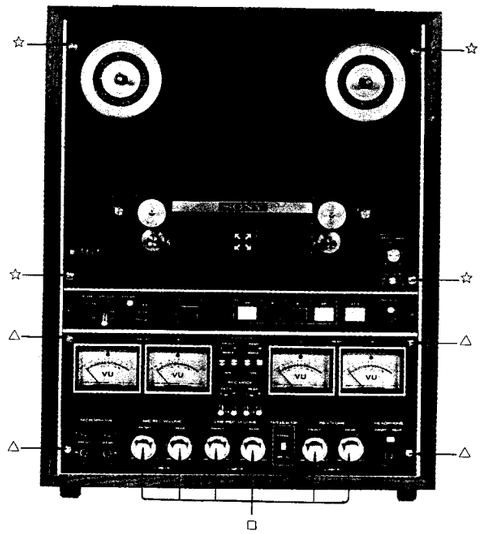


Fig. 2-1. Reel panel and amp panel removal

2-3. CABINET REMOVAL

(1) Remove the six screws marked ● in Fig. 2-2.

(2) Take out the chassis from the cabinet.

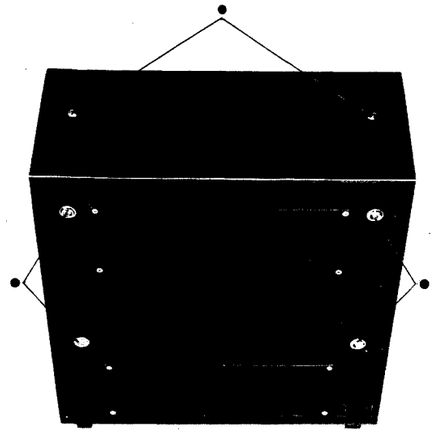
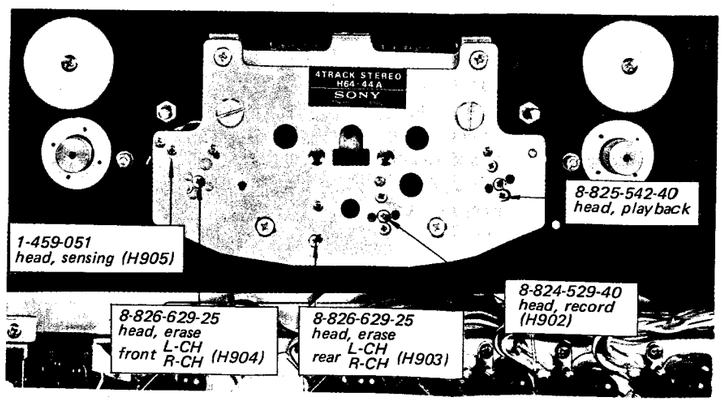


Fig. 2-2. Cabinet removal

MAJOR PARTS LOCATIONS — Continued —

— Head deck top view —



SECTION 3
ADJUSTMENT PROCEDURES

3-1. MECHANICAL ADJUSTMENTS

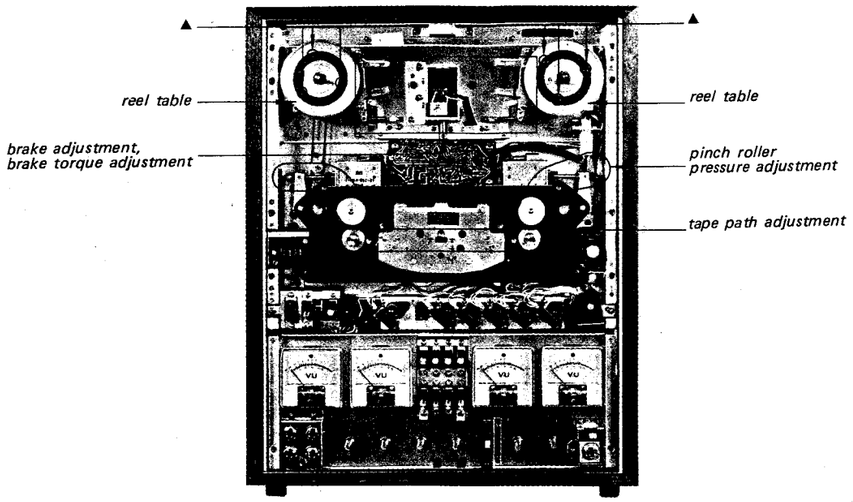


Fig. 3-1-1. Adjusting parts location

3-1-1. Brake Adjustment
(See Fig. 3-1-2.)

Make the brake adjustment, if proper tape tensioning is not maintained in the STOP mode.

Steps:

(1) Remove the reel panel, referring to "Reel Panel Removal" on page 14.

(2) Remove the reel table by removing the six screws marked with ▲ in Fig. 3-1-1.

(3) Place the unit in the STOP mode.

(4) Loosen the two screws marked with ● at the take-up and the supply brake bands.

(5) Temporarily tighten the screws marked with ● while pulling the brake band in the direction shown by the arrow as far as it will go.

(6) When pushing the pole piece of solenoid slowly into its housing by the hand, the releasing plates of the take-up side and the supply side should touch the each brake lever at a time. If not, loosen the screw marked with ● of the part at which the releasing plate touches the brake lever faster than the other one and adjust the length of the brake band.

(7) Place the unit in the PLAY mode.

(8) Be sure that the brake solenoid is energized.

(9) Loosen the three screws marked with ■ and adjust by positioning the brake solenoid holding plate so that the three screws are in the middle of the respective oval-shaped holes of the brake solenoid holding plate.

(10) There should be a clearance of approximately 0.5 mm (1/64") equally between the brake lining and the brake drum.
If not, loosen the screw marked with ● and adjust by positioning the brake band.

Note: If the 0.5 mm clearance is not obtained yet, loosen the three screws marked with ■ and adjust by positioning the brake solenoid holding plate.

(11) Repeat the steps (6) through (10) until the satisfactory result is obtained.

(12) Place the unit in the STOP mode..

(13) Loosen the two screws marked with △ and adjust by positioning the stopper so that a clearance between the releasing plate and the brake lever is 1 ~ 2 mm (3/64 ~ 5/64") as shown in Fig. 3-1-2.

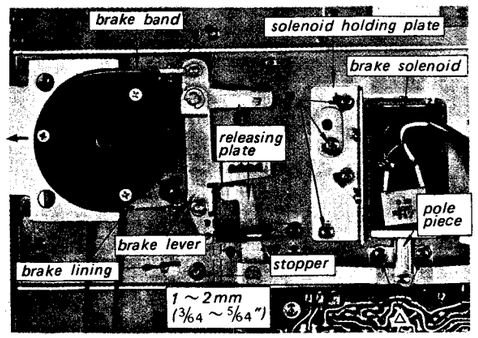


Fig. 3-1-2. Brake adjustment

(14) Be sure that the pole piece surely comes in contact with the stopper in the STOP mode.

3-1-2. Brake Torque Adjustment
(See Fig. 3-1-3.)

This adjustment should be performed for both supply and take-up sides after the brake adjustment.

Note: Words in [ ] are applied to the take-up brake torque adjustment.

Steps:

(1) Place the unit in the STOP mode.

(2) Place a 7" reel with string wound several turns counterclockwise [clockwise] on the hub (44 mm) onto the reel table.
Tie the string to a spring scale.

(3) Pull the scale in the direction shown by the red arrow, making sure that the string does not touch either flange of the reel. The reel table will rotate counterclockwise [clockwise].
Take a reading only when the reel table is in steady motion.

(4) Adjust the position of spring A so that a scale reading is between 1,800 g·cm and 2,200 g·cm (25.0 oz·inch and 30.6 oz·inch).

(5) Rewind the string by turning the reel counterclockwise [clockwise].

(6) Turn string several times clockwise [counterclockwise] on the hub (44 mm) onto the reel table.

(7) Pull the scale in the direction shown by the black arrow, making sure that the string does not touch either flange of the reel. The reel table will rotate clockwise [counterclockwise].
Take a reading only when the reel table is in steady motion.

(8) Adjust the angle of the spring hook by loosening the screw (E) so that a scale reading is between 650 g·cm and 750 g·cm (8.95 oz·inch and 10.4 oz·inch).

SPECIFICATION:

Brake Torque of Supply Reel
in clockwise turning ..... 650 ~ 750 g·cm (8.95 ~ 10.4 oz·inch)
in counterclockwise turning ..... 1,800 ~ 2,200 g·cm (25.0 ~ 30.6 oz·inch)

Brake Torque of Take-up Reel
in clockwise turning ..... 1,800 ~ 2,200 g·cm (25.0 ~ 30.6 oz·inch)
in counterclockwise turning ..... 650 ~ 750 g·cm (8.95 ~ 10.4 oz·inch)

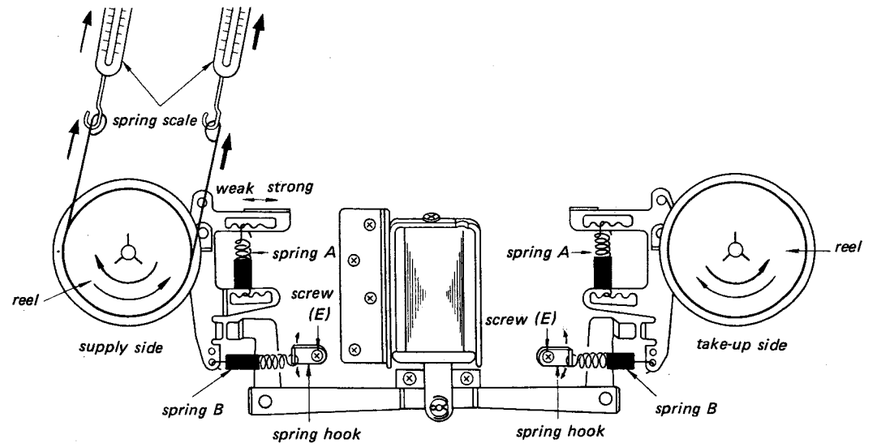


Fig. 3-1-3. Brake torque adjustment

3-1-3. Take-up Tension and Back Tension Adjustment of Reel Table
(See Fig. 3-1-4 and Fig. 3-1-5.)

Note: Set the TAPE SPEED switch to 7½ ips (19 cm/s).
Hold the actuator so that the SHUT-OFF switch is activated (a rubber band or piece of masking tape will hold the actuator as though tape were threaded on the unit).

A Take-up Tension Adjustment

(1) Set the reel size selector switch S910 to 10"

(2) Place a 10″ reel with string wound several turns clockwise on the hub (76 mm) onto the take-up reel table.
Tie the string to a spring scale.

(3) Place the unit in the PLAY mode.

(4) Pull a spring scale and then allow to take up the string on the reel while approaching the scale to the reel at the same speed of tape running [7½ ips (19 cm/s)].

(5) Adjust the upper side slider on resistor R903 so that a scale reading is between 430 g·cm and 470 g·cm (6.0 oz·inch and 6.5 oz·inch).

(6) Place the unit in the STOP mode.

(7) Set the reel size selector switch S910 to 7″.

(8) Place a 7″ reel with string wound several turns clockwise on the hub (44 mm) onto the take-up reel table.
Tie the string to the spring scale.

(9) Perform the steps (3) and (4) in order.

(10) Adjust the lower side slider on resistor R903 so that a scale reading is between 280 g·cm and 320 g·cm (3.9 oz·inch and 4.5 oz·inch).

B Back Tension Adjustment

(1) Set the reel size selector switch S910 to 10″.

(2) Place a 10″ reel with string wound several turns counterclockwise on the hub (76 mm) onto the supply reel table.
Tie the string to the spring scale.

(3) Place the unit in the PLAY mode.

(4) Pull a spring scale and then allow to take up the string on the reel while approaching the scale to the reel at the same speed of tape running [7½ ips (19 cm/s)].

(5) Adjust the upper side slider on resistor R902 so that a scale reading is between 450 g·cm and 550 g·cm (6.3 oz·inch and 7.6 oz·inch).

(6) Place the unit in the STOP mode.

(7) Set the reel size selector switch S910 to 7″.

(8) Place a 7″ reel with string wound several turns counterclockwise on the hub (44 mm) onto the supply reel table.
Tie the string to the spring scale.

(9) Perform the steps (3) and (4) in order.

(10) Adjust the lower side slider on resistor R902 so that a scale reading is between 180 g·cm and 220 g·cm (2.5 oz·inch and 3.1 oz·inch).

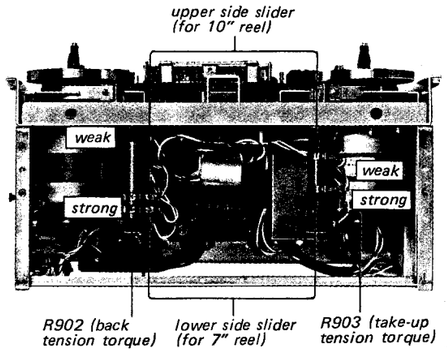


Fig. 3-1-4. Adjusting parts location

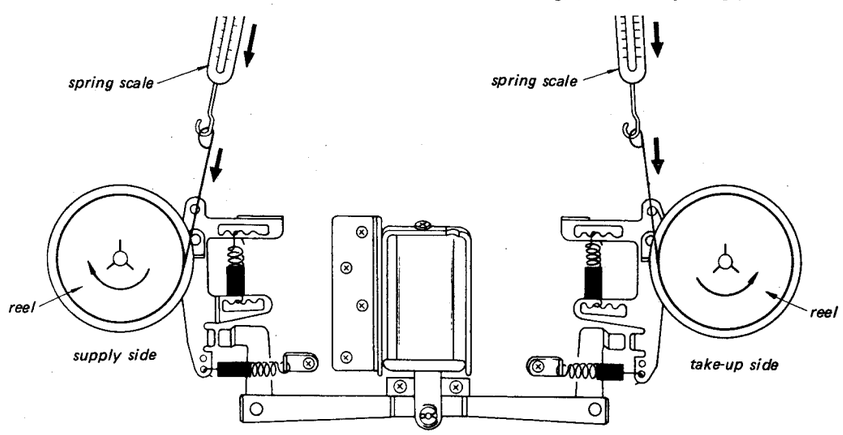


Fig. 3-1-5. Take-up tension and back-tension adjustment of reel table

3-1-4. Pinch Roller Pressure Adjustment
(See Fig. 3-1-6 and Fig. 3-1-7.)

Steps:

(1) Remove the reel panel referring to "Panel Removal" on page 14.

(2) Place the unit in the STOP mode.

(3) Push the pole piece of the solenoid into its housing by the hand, and make sure that the clearance between the ring and the pinch roller lever is 0.5 ~ 1 mm (1/64 ~ 3/64″).

(4) Make a loop with a piece of string and attach the spring scale to the pinch roller shaft with the loop of string. See Fig. 3-1-6.

(5) Hold the actuator so that the SHUT-OFF switch is activated (a rubber band or piece of masking tape will hold the actuator as though tape were threaded on the unit).

(6) Place the unit in the PLAY mode.

(7) Pull the scale horizontally in the direction shown by the arrow. The capstan shaft, pinch roller and the scale should be in a line.

(8) Check a scale reading when the pinch roller just leaves the capstan shaft.

(9) Adjust the adjusting nut so that a scale reading is between 1 kg and 1.4 kg (2.2 lb and 3.1 lb).

(10) Make sure that the solenoid operates normally when a mode is changed from the PLAY to the STOP and vice versa several times. If the tape slips, readjust the above steps.

(11) Lock the adjusting nut with the lock nut.
Note: Be careful not to move the adjusting nut.

(12) Apply lock paint to the nuts.

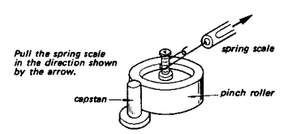


Fig. 3-1-6. Pinch roller pressure adjustment

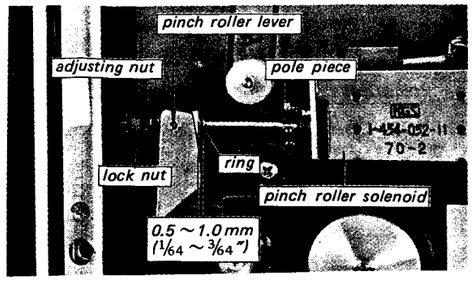


Fig. 3-1-7. Pinch roller pressure adjustment

3-1-5. Tape Path Adjustment
(See Fig. 3-1-8.)

Note: 1. This adjustment should be performed in playback mode with a transparent tape threaded.
2. Tape guides (A) and (D) should be adjusted for tape height difference caused by tape guide (B) and (C) adjustment.

After individual head replacement, make head height adjustment for the replaced head, referring to Fig. 3-1-8.

After head assembly replacement, check as follows:

(1) Make sure that tape runs as shown in Fig. 3-1-8.

(2) If not, adjust tape guides (B) and (C).

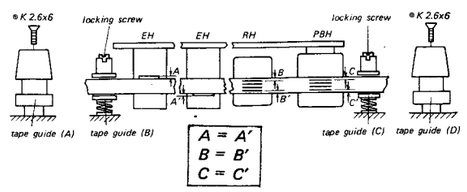


Fig. 3-1-8. Tape Path Adjustment

3-2. ELECTRICAL ADJUSTMENTS/ MEASUREMENTS

Precautions:

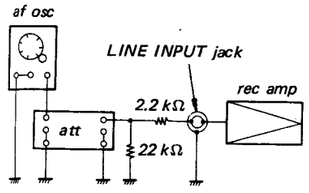
1. Clean the following parts with alcohol moistened swab:
   - record head
   - playback head
   - erase heads
   - capstans
   - pinch rollers
   - rubber belts
2. Demagnetize record and playback heads with a head demagnetizer.
3. Do not use magnetized screwdrivers for these adjustments.
4. Apply locking compound to the parts after these adjustments.
5. Follow the sequence in completing these adjustments.
6. Adjustments and measurements should be performed for each channel.

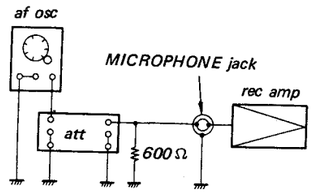
Equipment Required:

audio oscillator (af osc)
attenuator (att)
VTVM
1-kHz band-pass filter (BPF)
SONY alignment tapes
  J-19-F2
  J-9-F1
fixed resistors
  100 kΩ 2.2 kΩ
  600 Ω 22 kΩ

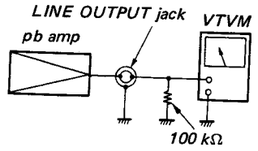
Equipment Connections:

Input connection





Output connection



Standard Levels (unless otherwise specified):

Input

	Impedance	Signal level
MIC	300 Ω	−60 dB (0.77 mV)
LINE INPUT	10 kΩ	−10 dB (0.25 V)

Output

	Load resistor	Signal level
LINE OUTPUT	100 kΩ	0 dB (0.77 V)

Standard Control-Setting:

PB VOLUME Control:

1. Set MONITOR switch to TAPE position and TAPE SPEED switch to 7½" (19 cm) position.
2. Play 1st tone (400 Hz) on SONY alignment tape J-19-F2.
3. Adjust PB VOLUME control for 0 dB (0.77 V) at LINE OUTPUT jack.

MIC REC VOLUME Control:

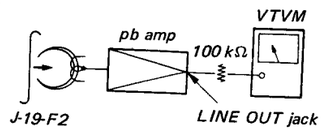
1. Set MONITOR switch to SOURCE position.
2. Deliver 1 kHz signal of −60 dB (0.77 mV) to MICROPHONE jack.
3. Adjust MIC REC VOLUME control for 0 dB (0.77 V) at LINE OUTPUT jack.

LINE REC VOLUME Control:

1. Set MONITOR switch to SOURCE position.
2. Deliver 1 kHz signal of −10 dB (0.25 V) to LINE INPUT jack.
3. Adjust LINE REC VOLUME control for 0 dB (0.77 V) at LINE OUTPUT jack.

1. Playback Head Azimuth Adjustment

Setup:



Switch/Control Setting:

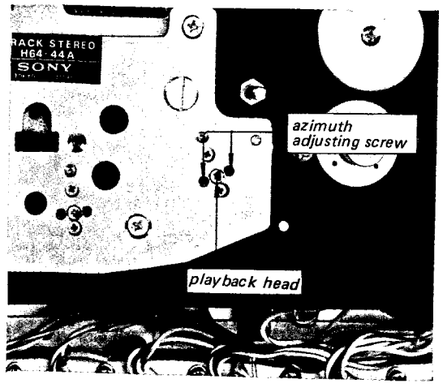
SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	PB
TAPE SELECTOR switch:	NORMAL
PB VOLUME control:	proper position

Procedure:

1. Play 4th tone (12.5 kHz) on SONY alignment tape J-19-F2.
2. Adjust the adjusting screw for the biggest peak VTVM reading.

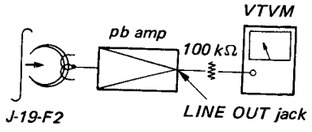
   Note: If the biggest peak reading for all the channels cannot be obtained at the same screw position, take the mid between the both extreme positions of the screw.

Adjusting Parts Location:



2. Playback Equalizer Adjustment (7½ ips, 19 cm/s)

Setup:



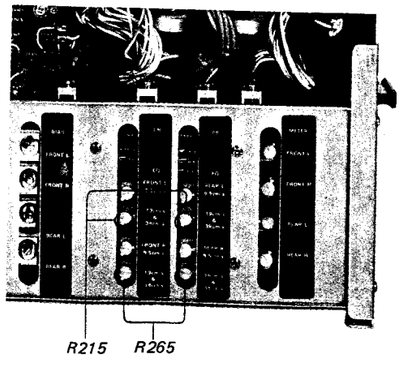
Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	PB
TAPE SELECTOR switch:	NORMAL

Procedure:

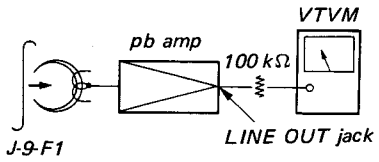
1. Play 2nd tone (400 Hz) on SONY alignment tape J-19-F2.
2. Adjust PB VOLUME control for 0 dB (0.77 V) VTVM reading.
3. Play 3rd tone (10 kHz) on the alignment tape.
4. Adjust the semi-fixed resistor for 0 dB (0.77 V) VTVM reading.

Adjusting Parts Location:



3. Playback Equalizer Adjustment (3¾ ips, 9.5 cm/s)

Setup:



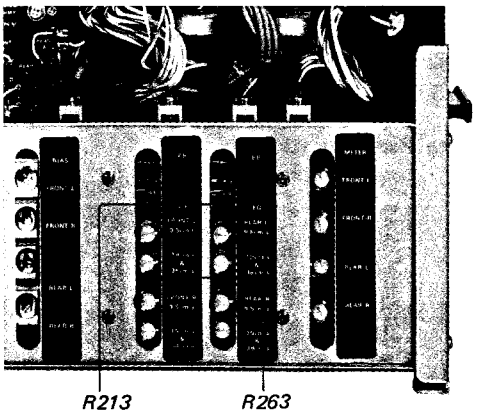
Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	3¾" (9.5 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	PB
TAPE SELECTOR switch:	NORMAL

Procedure:

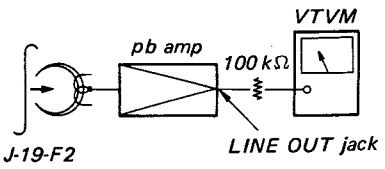
1. Play 3rd tone (400 Hz) on SONY alignment tape J-9-F1.
2. Adjust PB VOLUME control for 0 dB (0.77 V) VTVM reading.
3. Play 1st tone (5 kHz) on the alignment tape.
4. Adjust the semi-fixed resistor for 0 dB (0.77 V) VTVM reading.

Adjusting Parts Location:



4. Level Meter Calibration

Setup:



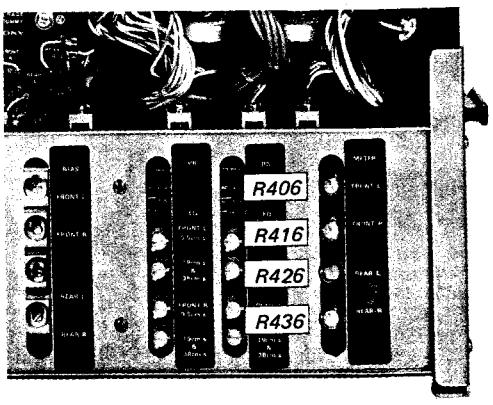
Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	PB
TAPE SELECTOR switch:	NORMAL

Procedure:

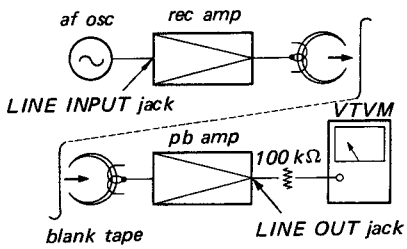
1. Play 1st tone (400 Hz) on SONY alignment tape J-19-F2.
2. Adjust PB VOLUME control for 0 dB (0.77 V) VTVM reading.
3. Adjust the semi-fixed resistor for 0VU on the level meter.

Adjusting Parts Location:



5. Record Head Azimuth Adjustment

Setup:



Switch/Control Setting:

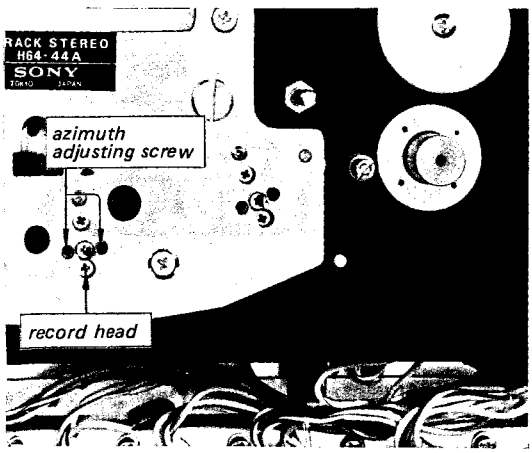
SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	3¾" (9.5 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	NORMAL
LINE REC VOLUME control:	standard control-setting (Page 19)
PB VOLUME control:	proper position

Procedure:

1. Deliver 5 kHz signal of -20 dB (77 mV) to LINE INPUT jack.
2. Place the unit in record mode.
3. Adjust the adjusting screw for the biggest peak VTVM reading.

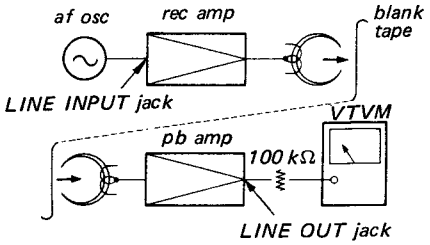
   Note: If the biggest peak reading for all the channels cannot be obtained at the same screw position, take the mid between the both extreme positions of the screw.

Adjusting Parts Location:



6. Recording Bias Adjustment

Setup:



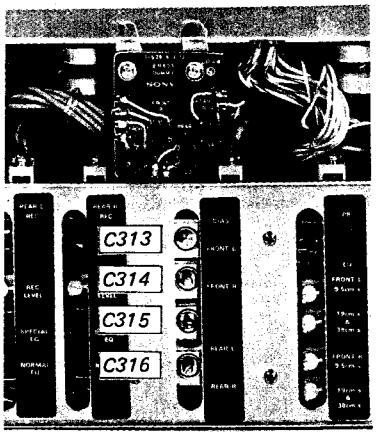
Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	15" (38 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	NORMAL
LINE REC VOLUME control:	standard control-setting (Page 19)
PB VOLUME control:	proper position

Procedure:

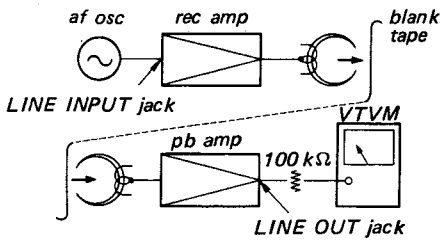
1. Deliver 1 kHz signal of -30 dB (24.5 mV) to LINE INPUT jack.
2. Place the unit in record mode.
3. Turn the trimmer capacitor counterclockwise three or four turns.
4. Slowly turn the trimmer capacitor clockwise for maximum VTVM reading.
5. Turn the trimmer capacitor clockwise for 0.5 dB below the maximum reading.

Adjusting Parts Location:



7. Erase Dummy Coil Adjustment

Setup:



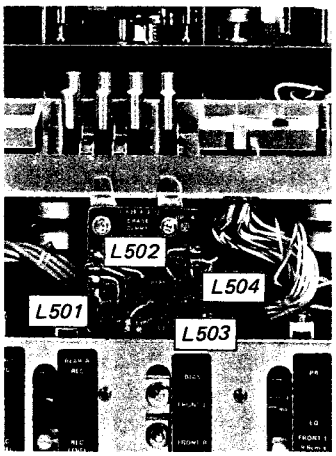
Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	NORMAL
LINE REC VOLUME control:	standard control-setting (Page 19)
PB VOLUME control:	standard control-setting (Page 19)

Procedure:

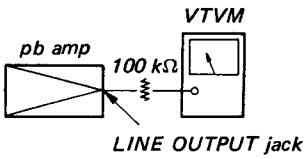
1. Deliver 10 kHz signal of −30 dB (24.5 mV) to LINE INPUT jack.
2. Place the unit in record mode.
3. When setting a REC MODE switch to PB position, adjust the ERASE DUMMY coil for no change of the other channel LINE OUTPUT levels.

Adjusting Parts Location



8. Trap Coil Adjustment

Setup:



Switch/Control Setting:

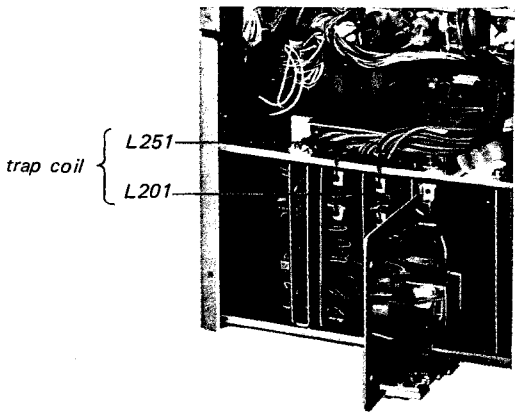
TAPE LIFT switch:	ON
MONITOR switches:	TAPE
REC MODE switches:	REC
PB VOLUME control:	standard control-setting (Page 19)

Procedure:

1. Place the unit in record mode without tape.
2. Adjust the trap coil for minimum VTVM reading.

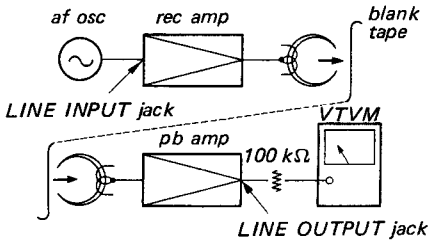
   Note: The coil core can be adjusted by one turn only. Turn it no more than one turn.

Adjusting Parts Location:



9. Recording Level Adjustment

Setup:



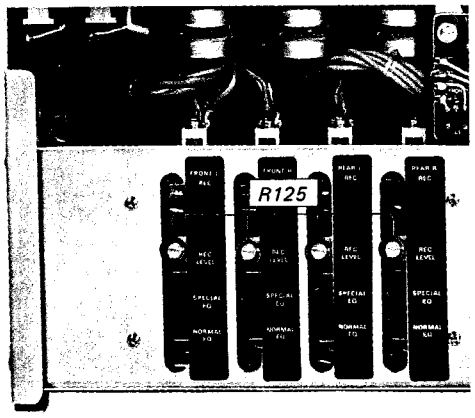
Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	SOURCE
REC MODE switches:	REC
TAPE SELECTOR switch:	NORMAL
PB VOLUME control:	standard control-setting (Page 19)

Procedure:

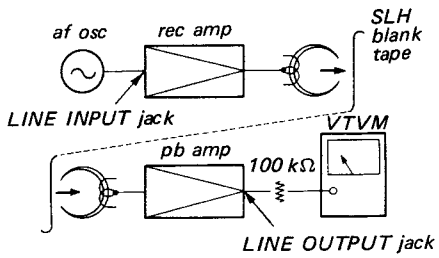
1. Deliver 1 kHz signal of −10 dB (0.25 V) to LINE INPUT jack.
2. Place the unit in record mode.
3. Adjust LINE REC VOLUME control for 0 dB (0.77 V) VTVM reading.
4. Set MONITOR switch to TAPE position.
5. Adjust the semi-fixed resistor for 0 dB (0.77 V) VTVM reading.

Adjusting Parts Location:



10. Record Equalizer (SPECIAL) Adjustment

Setup:



Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	SPECIAL
LINE REC VOLUME control:	standard control-setting (Page 19)
PB VOLUME control:	standard control-setting (Page 19)

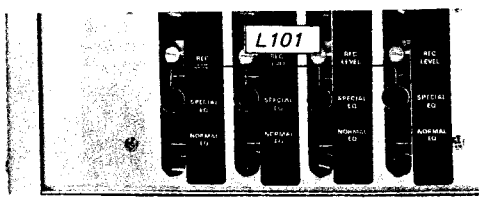
Procedure:

Note: Use SLH blank tape.

1. Deliver 1 kHz signal of −30 dB (24.5 mV) to LINE INPUT jack.
2. Place the unit in record mode.
3. Read the output level on VTVM.
4. Deliver 20 kHz signal of −30 dB (24.5 mV) to LINE INPUT jack.
5. Adjust SPECIAL EQ coil for 0.5 dB below the level in Step 3.

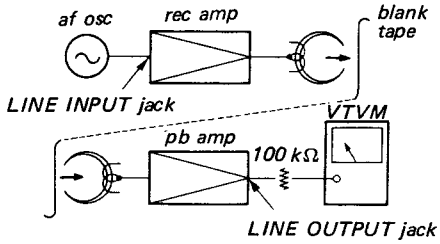
Note: 1. No adjustment is required for the other tape speeds.
2. Frequency response should be as follows:
15 ips (38 cm/s): 30 to 25,000 Hz ±3 dB
7½ ips (19 cm/s): 30 to 20,000 Hz ±3 dB
3¾ ips (9.5 cm/s): 40 to 12,000 Hz ±3 dB

Adjusting Parts Location:



11. Record Equalizer (NORMAL) Adjustment

Setup:



Switch/Control Setting:

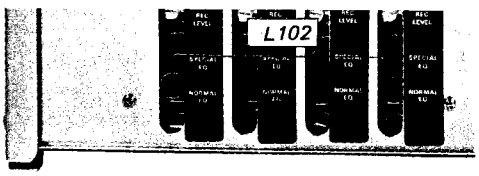
SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	3¾" (9.5 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	NORMAL
LINE REC VOLUME control:	standard control-setting (Page 19)
PB VOLUME control:	standard control-setting (Page 19)

Procedure:

1. Deliver 1 kHz signal of −30 dB (24.5 mV) to LINE INPUT jack.
2. Place the unit in record mode.
3. Read the output level on VTVM.
4. Deliver 10 kHz signal of −30 dB (24.5 mV) to LINE INPUT jack.
5. Adjust NORMAL EQ coil for the same level as the level in Step 3.

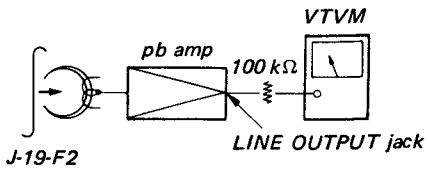
Note: 1. No adjustment is required for the other tape speeds.
2. Frequency response should be as follows:
15 ips (38 cm/s): 30 to 20,000 Hz ±3 dB
7½ ips (19 cm/s): 30 to 15,000 Hz ±3 dB
3¾ ips (9.5 cm/s): 40 to 10,000 Hz ±3 dB
3. If the frequency response at 15 ips (38 cm/s) tape speed is not satisfied, perform the Record Equalizer (SPECIAL) Adjustment on Page 24.

Adjusting Parts Location:



12. Playback Signal-to-Noise Ratio Measurement

Setup:



Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	PB
TAPE SELECTOR switch:	NORMAL

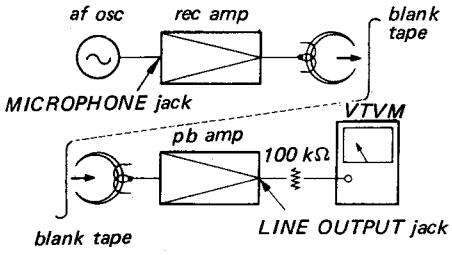
Procedure:

1. Play 1st tone (400 Hz) on SONY alignment tape J-19-F2.
2. Adjust PB VOLUME control for 0 dB (0.77 V) VTVM reading.
3. Remove the tape and place the unit in playback mode.
4. Measure the output level on VTVM.

   Specification: less than −51 dB (2.2 mV)

13. Overall Signal-to-Noise Ratio Measurement

Setup:



Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	NORMAL
MIC REC VOLUME control:	standard control-setting (Page 19)
PB VOLUME control:	standard control-setting (Page 19)

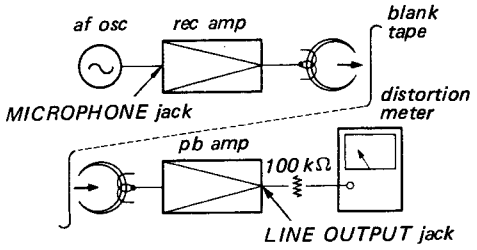
Procedure:

1. Deliver 1 kHz signal of −60 dB (0.77 mV) to MICROPHONE jack.
2. Place the unit in record mode.
3. After about one minute, remove the input connection and terminate MICROPHONE jack with 600 Ω resistor. Continue recording.
4. Play back the 1 kHz signal recorded portion and no-signal recorded portion, and measure output level difference between the two portions.

   Specification: greater than 47 dB

14. Overall Distortion Measurement

Setup:



Switch/Control Setting:

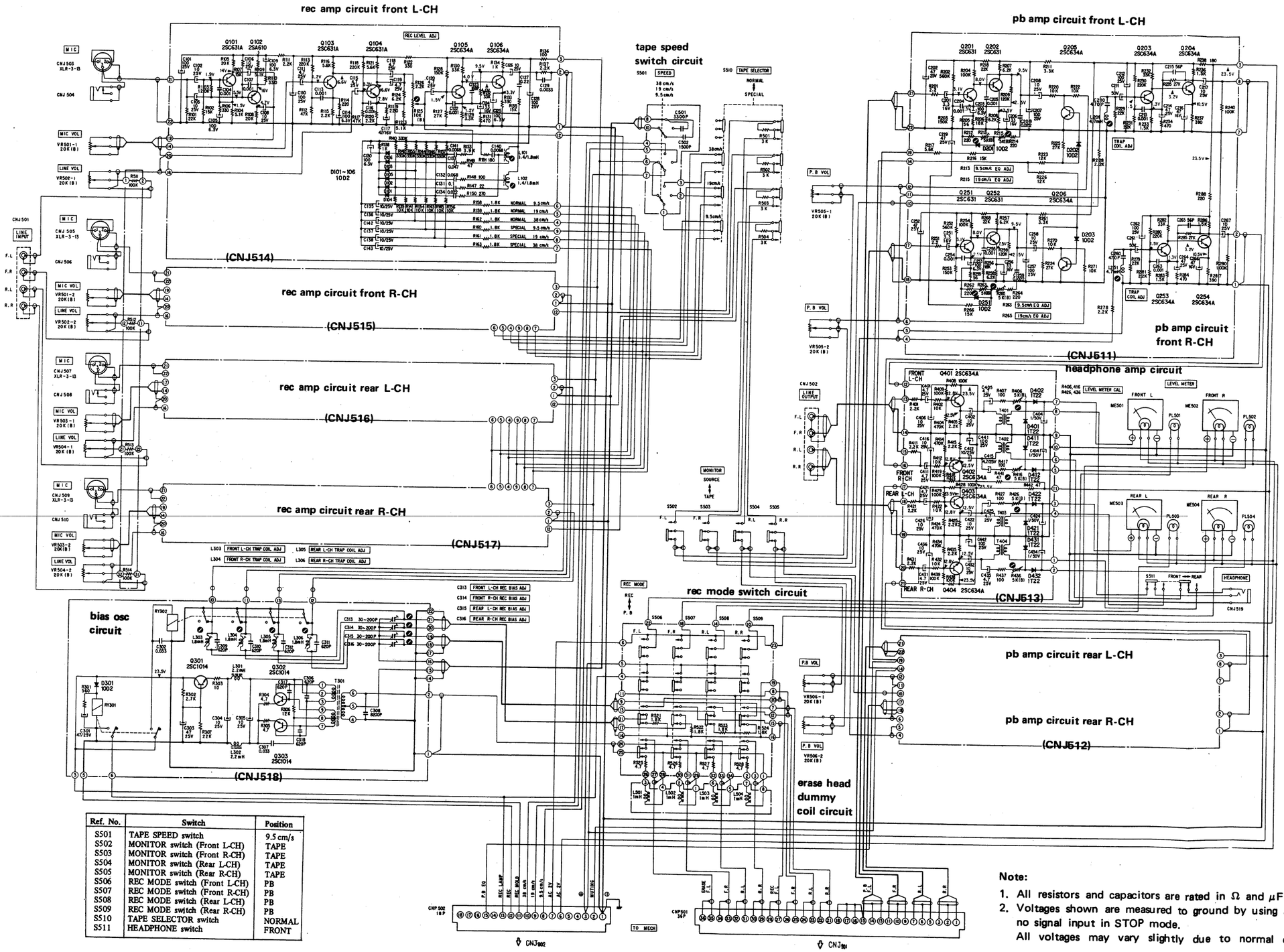
SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	NORMAL
MIC REC VOLUME control:	standard control-setting (Page 19)
PB VOLUME control:	standard control-setting (Page 19)

Procedure:

1. Deliver 1 kHz signal of −60 dB (0.77 mV) to MICROPHONE jack.
2. Place the unit in record mode.
3. Rewind the recorded portion.
4. Play back the signal and measure distortion.

   Specification: less than 1.5%

4-2. SCHEMATIC DIAGRAM (AMPLIFIER)



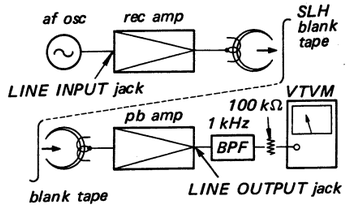
Ref. No.	Switch	Position
S501	TAPE SPEED switch	9.5 cm/s
S502	MONITOR switch (Front L-CH)	TAPE
S503	MONITOR switch (Front R-CH)	TAPE
S504	MONITOR switch (Rear L-CH)	TAPE
S505	MONITOR switch (Rear R-CH)	TAPE
S506	REC MODE switch (Front L-CH)	PB
S507	REC MODE switch (Front R-CH)	PB
S508	REC MODE switch (Rear L-CH)	PB
S509	REC MODE switch (Rear R-CH)	PB
S510	TAPE SELECTOR switch	NORMAL
S511	HEADPHONE switch	FRONT

Note:

1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. Voltages shown are measured to ground by using a voltmeter (20 kΩ/V) with no signal input in STOP mode.
   All voltages may vary slightly due to normal component tolerances, etc.

15. Erase Ratio Measurement

Setup:



Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	SPECIAL
LINE REC VOLUME control:	standard control-setting (Page 19)
PB VOLUME control:	standard control-setting (Page 19)

Procedure:

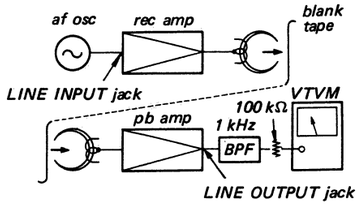
Note: Use SLH blank tape.

1. Deliver 1 kHz signal of +4 dB (1.2V) to LINE INPUT jack.
2. Place the unit in record mode.
3. Rewind a half of the recorded portion.
4. Remove the input connection and turn LINE REC VOLUME control and MIC REC VOLUME control to fully counterclockwise position.
5. Place the unit in record mode. (erase mode)
6. Rewind the tape up to the recording start position.
7. Play back the signal recorded portion and the erased portion, and measure the difference between the two portions.

   Specification: greater than 65 dB

16. Cross-Talk Measurement

Setup:



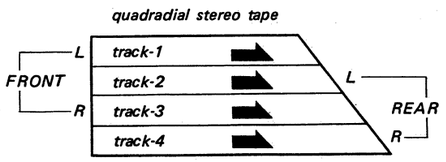
Switch/Control Setting:

SPEED TUNING control:	NORMAL (mechanical mid)
AUTO STOP switch:	any
TAPE LIFT switch:	ON
TAPE SPEED switch:	7½" (19 cm)
REEL SIZE switch:	7"
MONITOR switches:	TAPE
REC MODE switches:	REC
TAPE SELECTOR switch:	NORMAL
LINE REC VOLUME control:	standard control-setting (Page 19)
MIC REC VOLUME control:	fully counterclockwise position
PB VOLUME control:	standard control-setting (Page 19)

Procedure:

1. Deliver 1 kHz signal of +4 dB (1.2V) to LINE INPUT jacks of both FRONT-L and REAR-R channels.
2. Place the unit in record mode.
3. Rewind and play back the recorded portion.
4. Measure output level differences between FRONT-L and REAR-L channels, and between REAR-R and FRONT-R channels.
5. Record the signal to REAR-L and FRONT-R channels, and repeat Step 4.

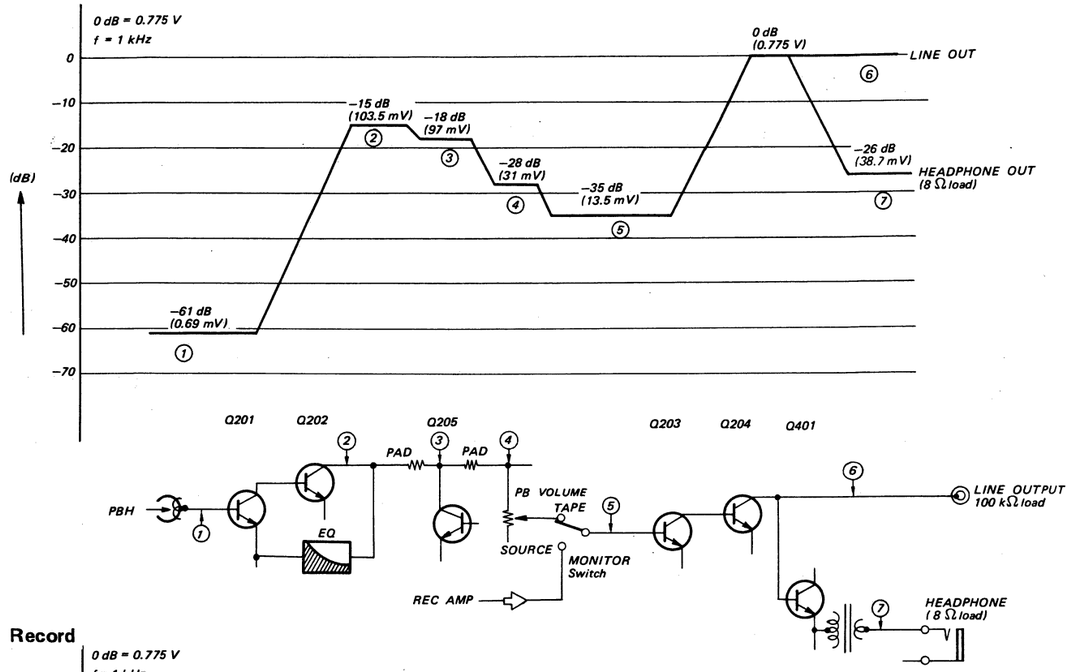
   Specification: greater than 50 dB



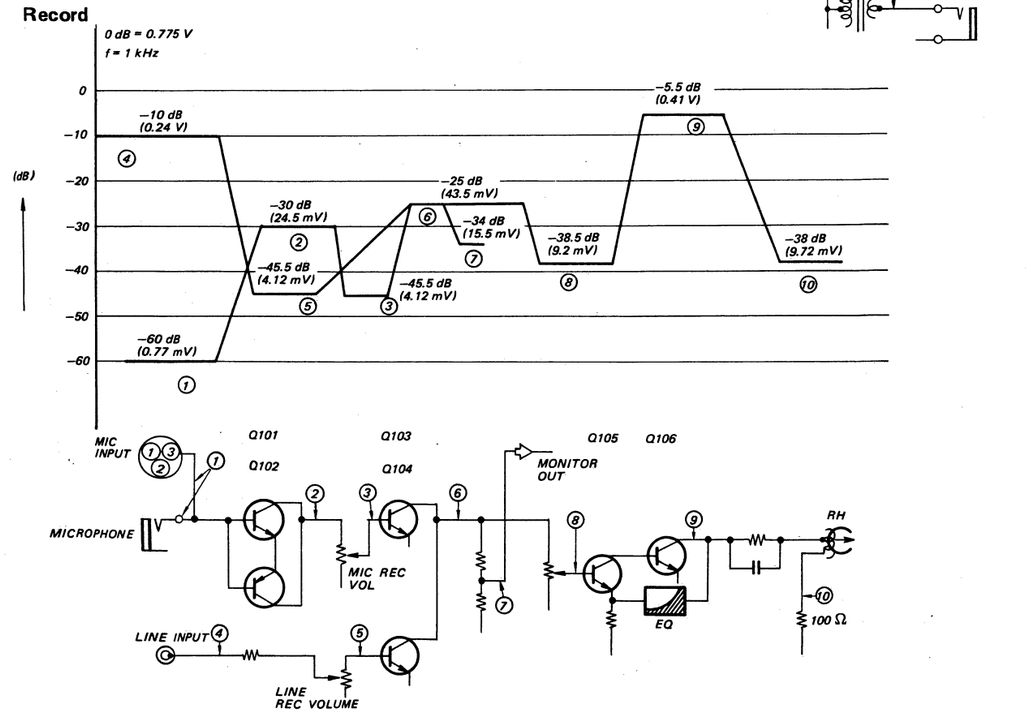
SECTION 4
DIAGRAMS

4-1. LEVEL DIAGRAMS

Playback

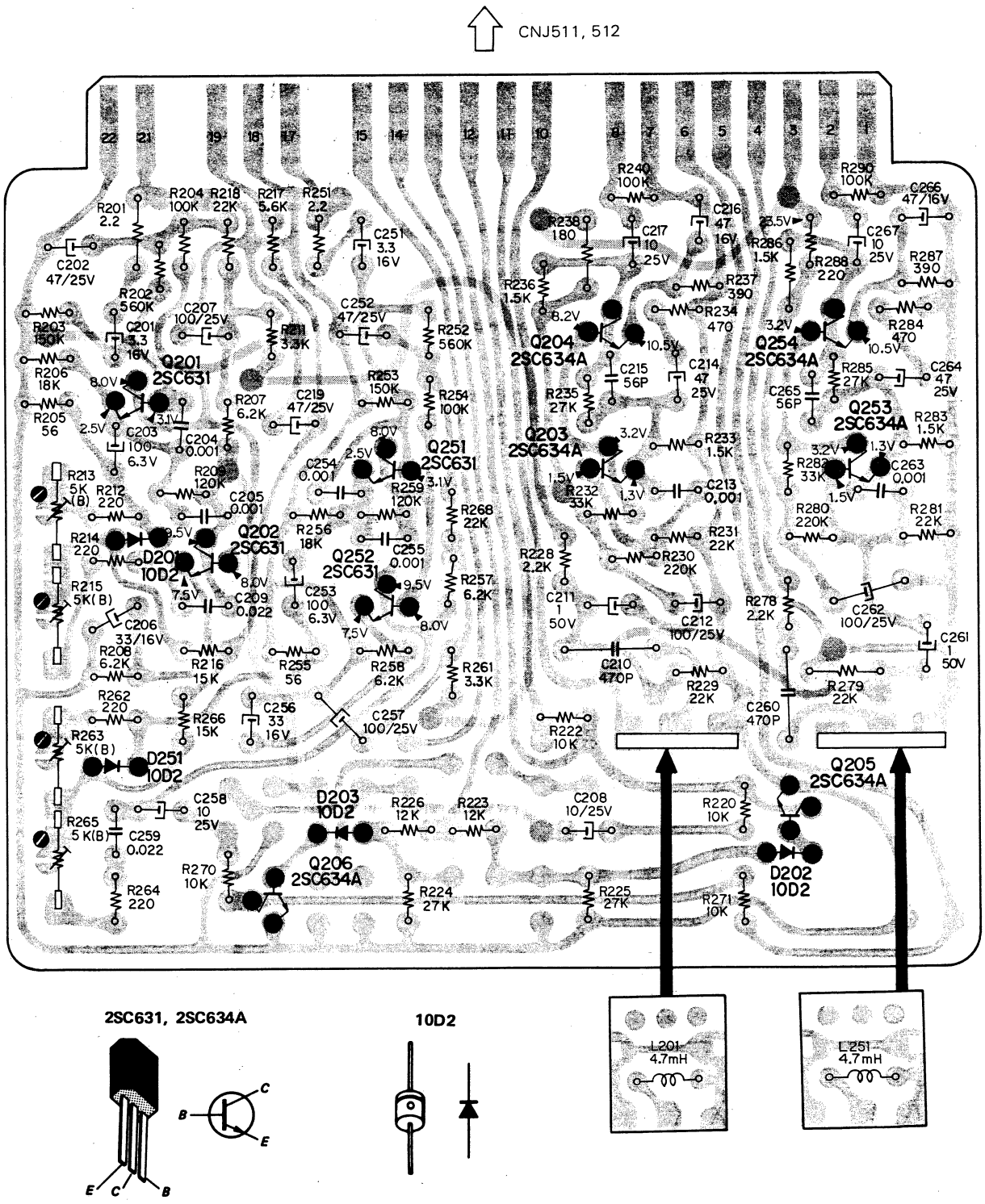


Record



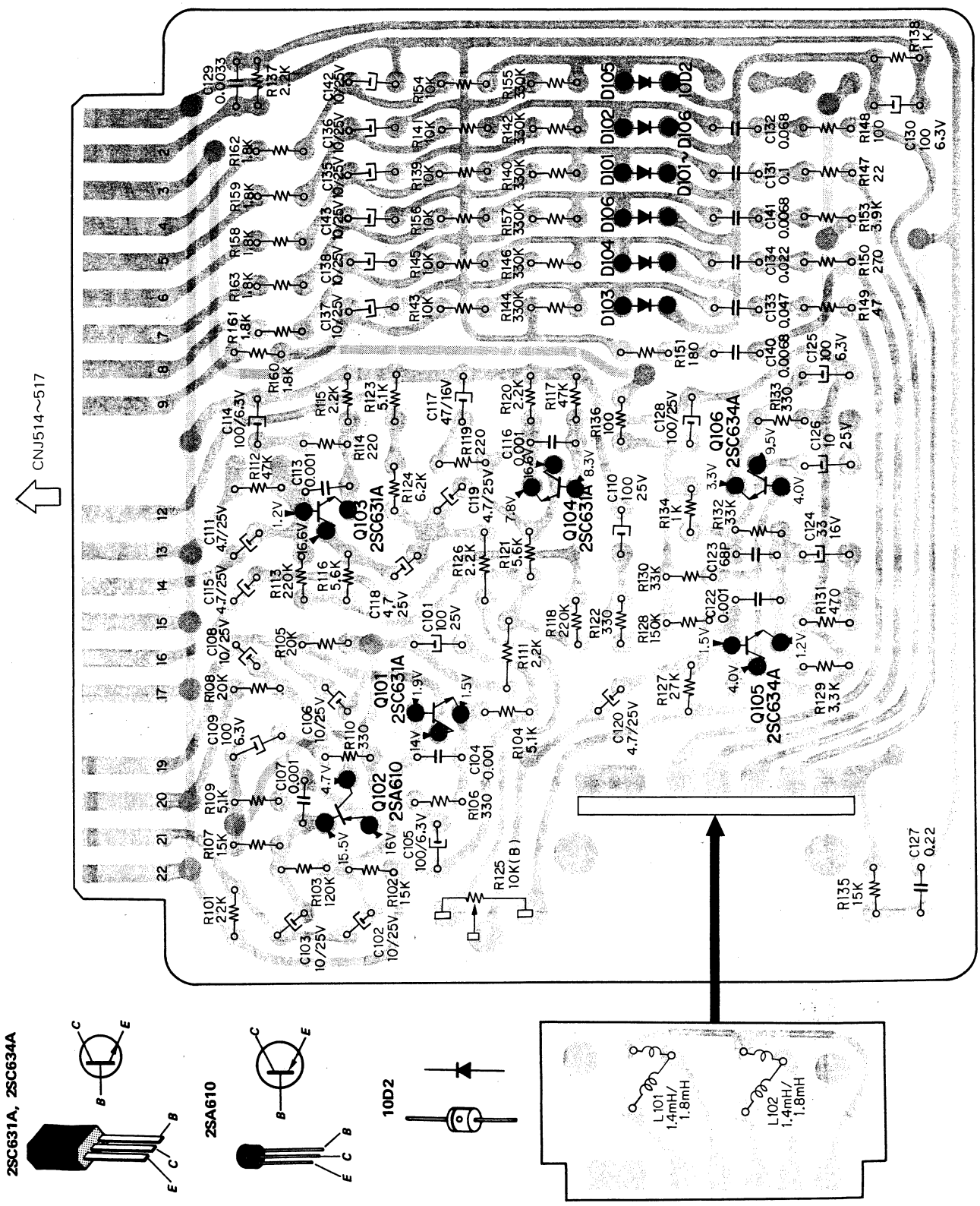
4-3. MOUNTING DIAGRAM (PB AMP)

– Conductor Side –



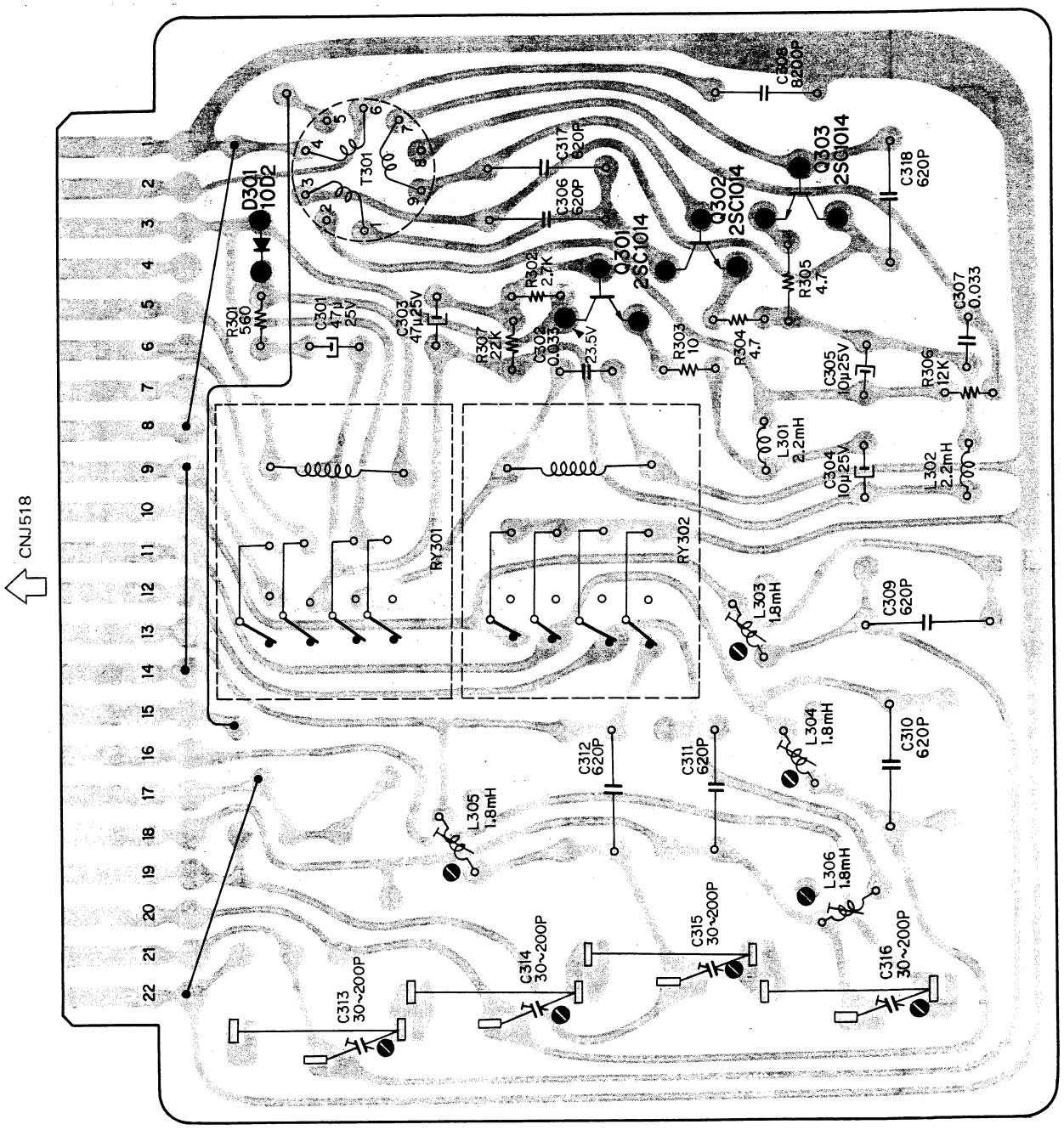
4-4. MOUNTING DIAGRAM (REC AMP)

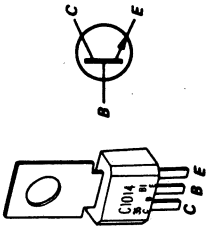
– Conductor Side –

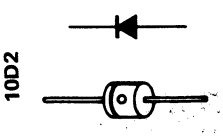


4-5. MOUNTING DIAGRAM (BIAS OSC)

– Conductor Side –

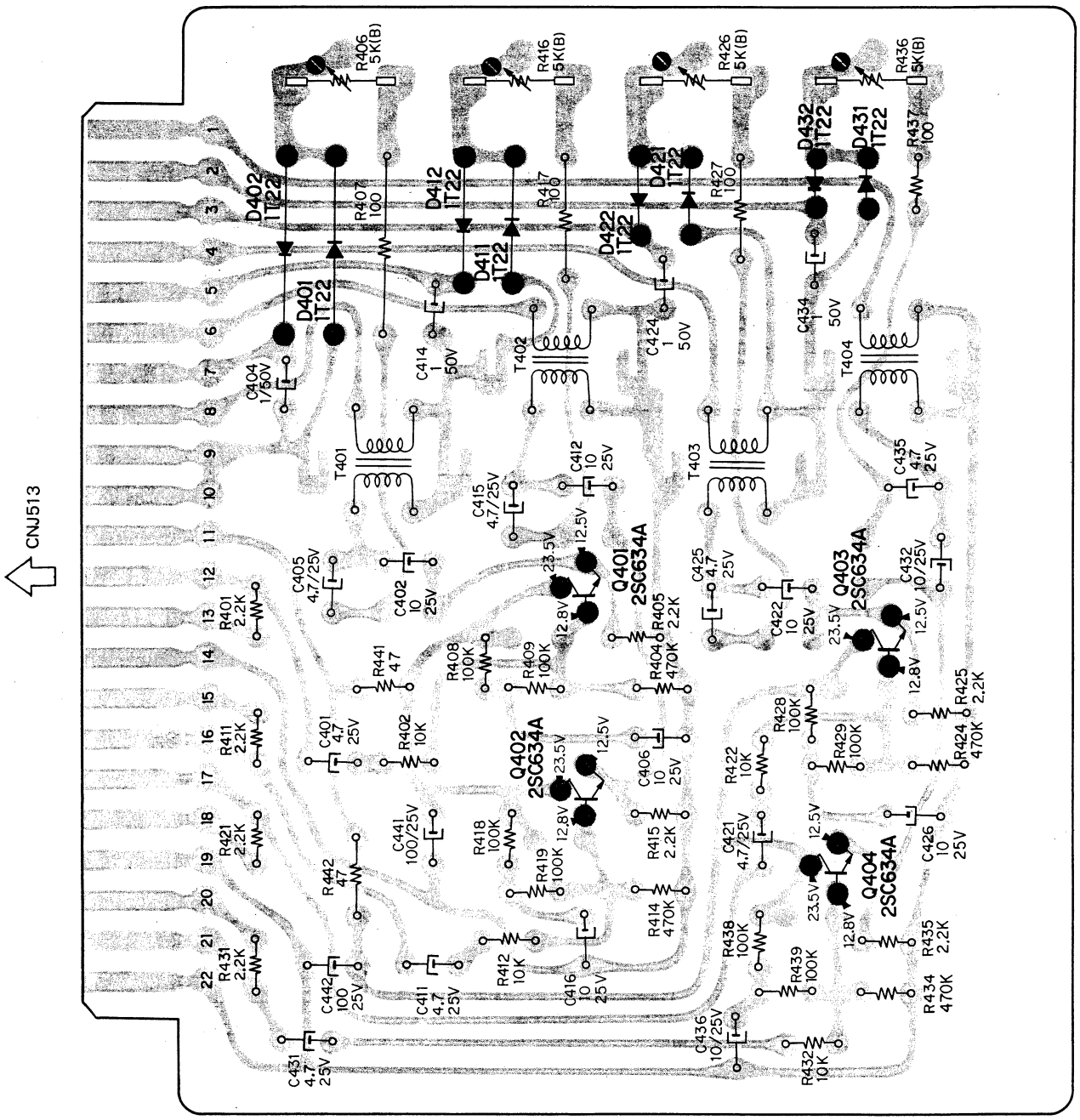


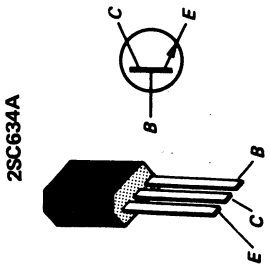


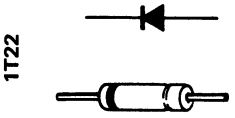


4-6. MOUNTING DIAGRAM (HEADPHONE AMP)

– Conductor Side –

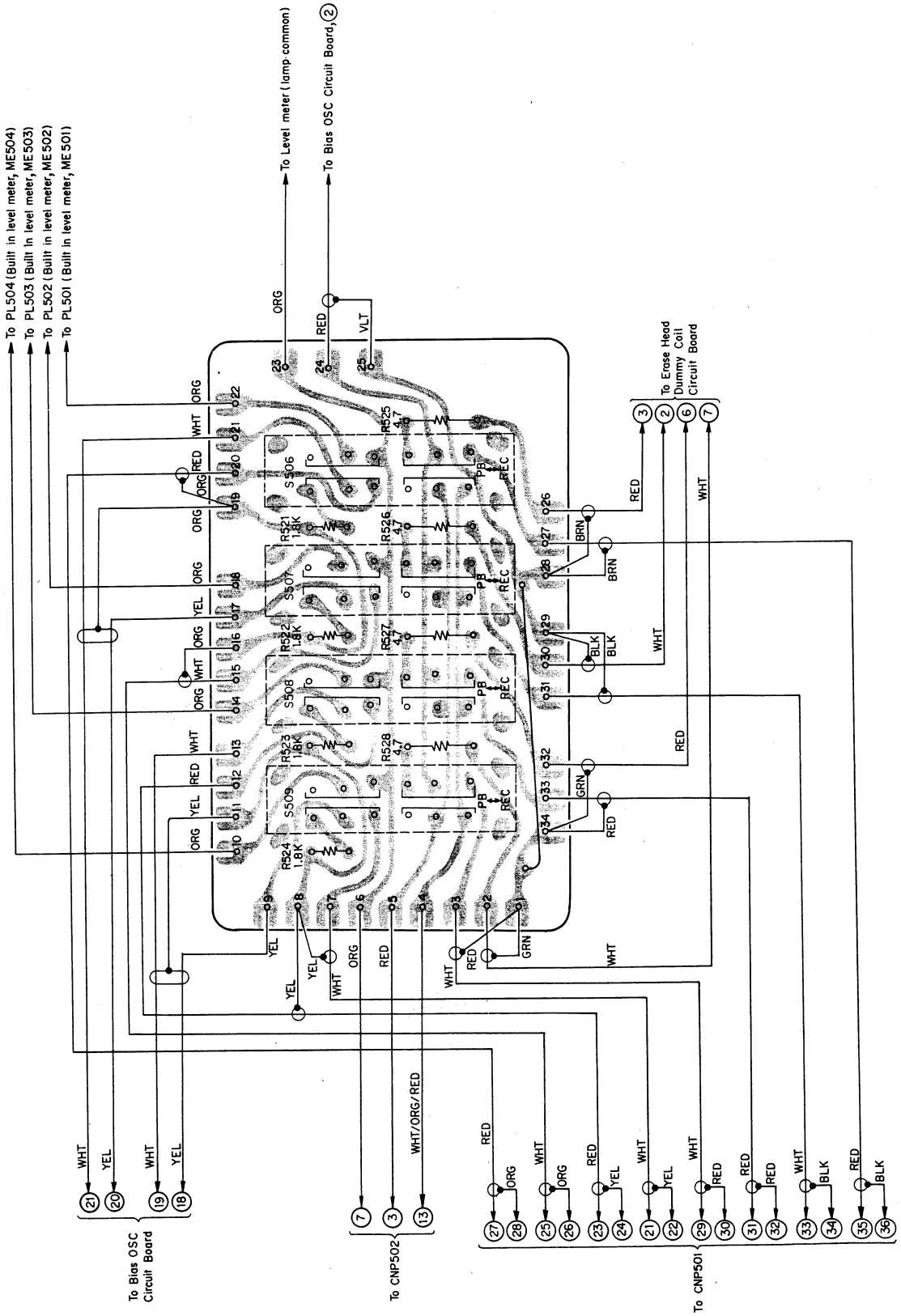






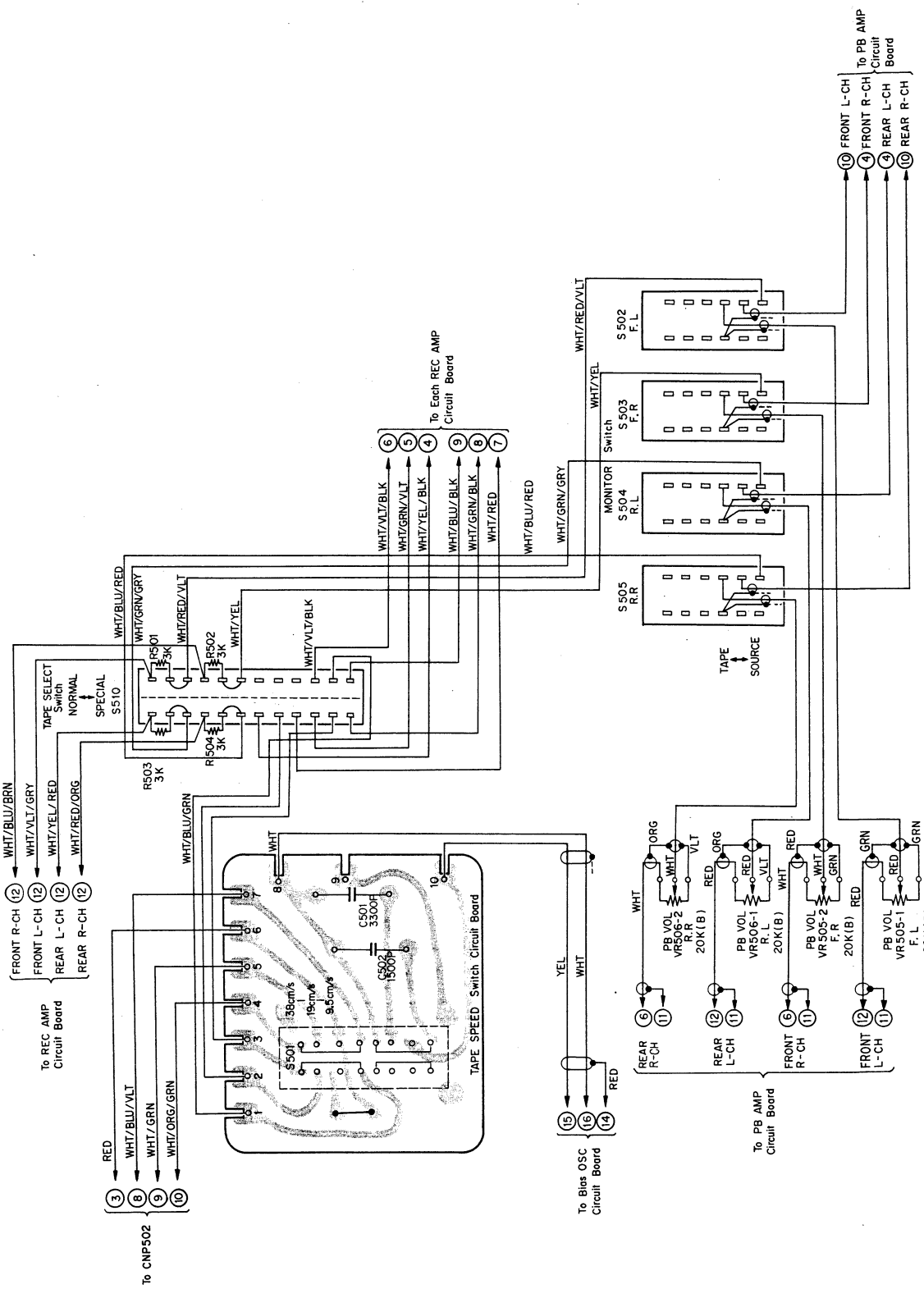
4-7. MOUNTING DIAGRAM (REC MODE SWITCH)

– Conductor Side –

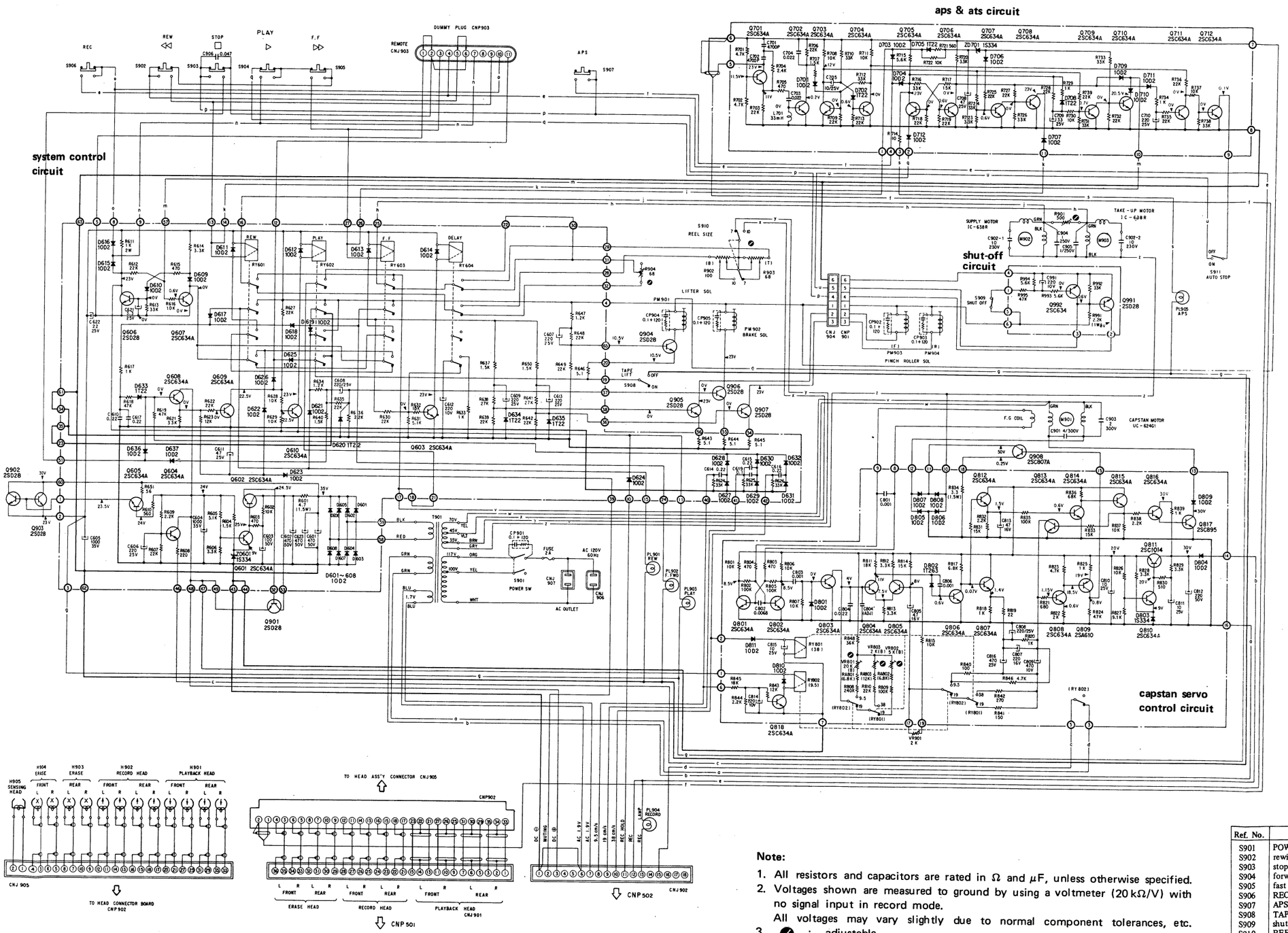


4-8. MOUNTING DIAGRAM (TAPE SPEED SWITCH)

– Conductor Side –



4-12. SCHEMATIC DIAGRAM (MECHANICAL CHASSIS)



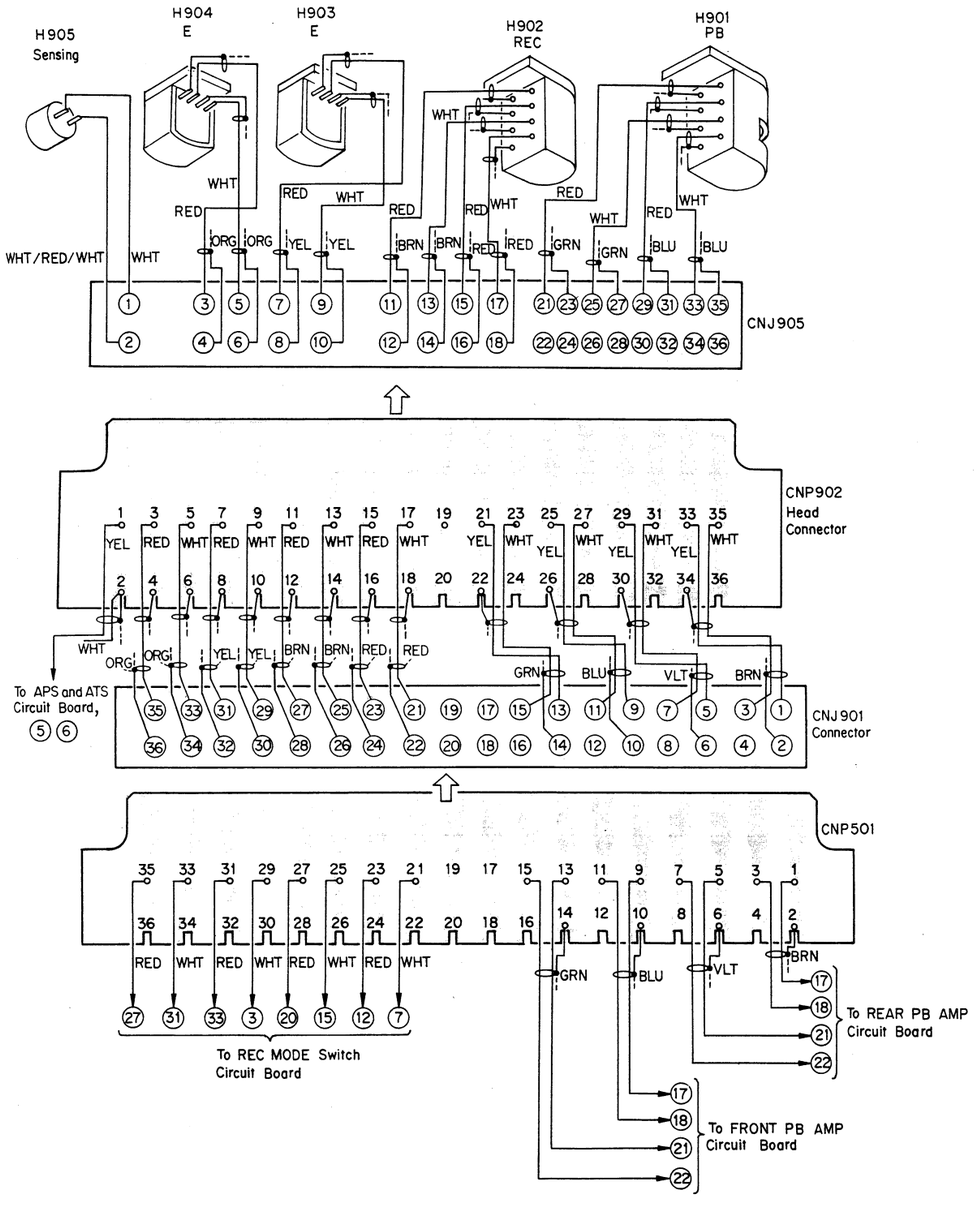
Note:

1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. Voltages shown are measured to ground by using a voltmeter (20 kΩ/V) with no signal input in record mode.
   All voltages may vary slightly due to normal component tolerances, etc.
3. ⊘ : adjustable.

Ref. No.	Switch	Position
S901	POWER switch	OFF
S902	rewind function switch	not push
S903	stop function switch	not push
S904	forward function switch	not push
S905	fast forward function switch	not push
S906	RECORD function switch	not push
S907	APS function switch	not push
S908	TAPE LIFT switch	ON
S909	shut-off switch	ON
S910	REEL SIZE switch	7
S911	AUTO STOP	OFF

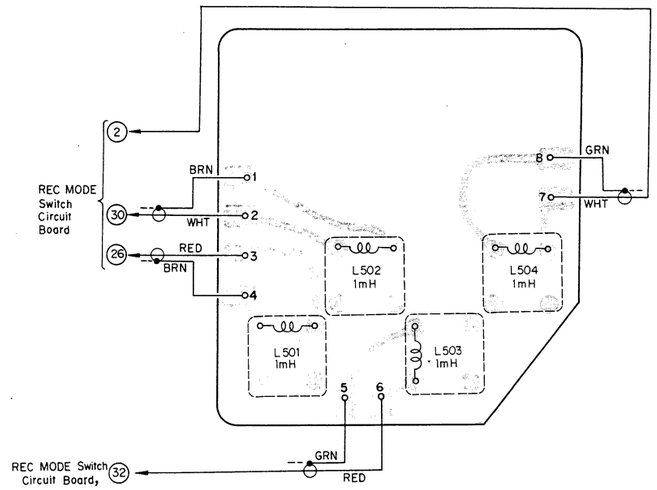
4-9. MOUNTING DIAGRAM (HEAD CONNECTOR)

– Conductor Side –



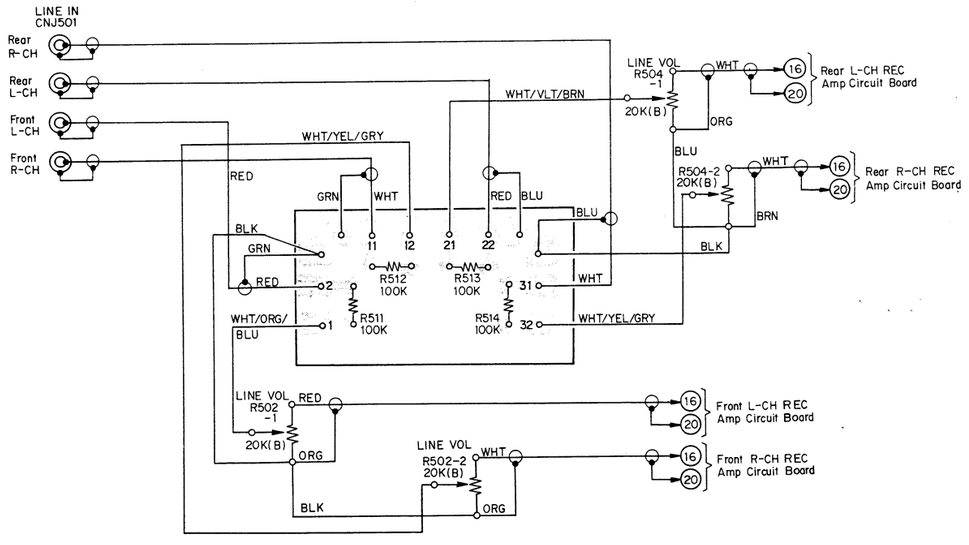
4-10. MOUNTING DIAGRAM (ERASE HEAD DUMMY COIL)

– Conductor Side –



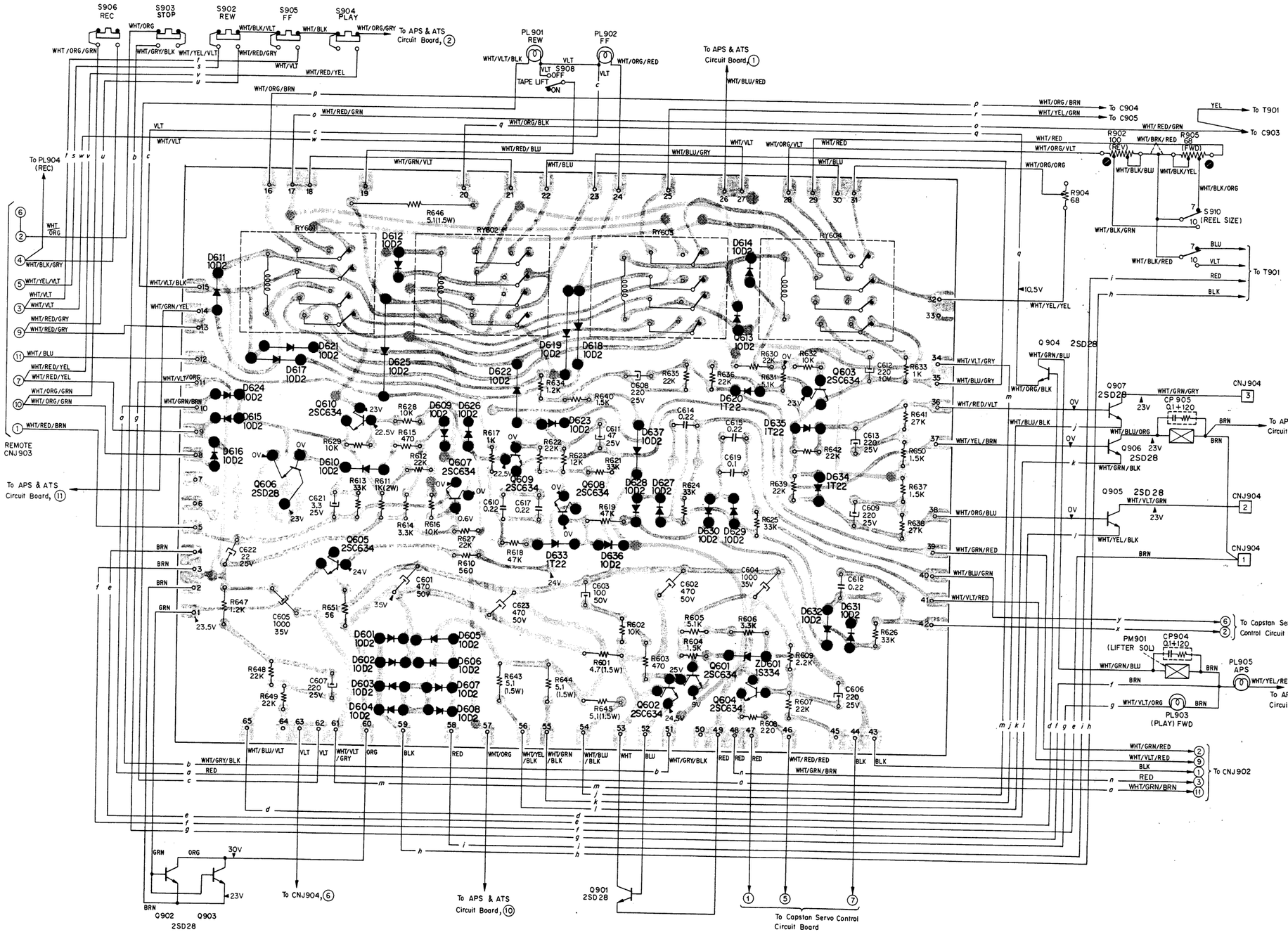
4-11. MOUNTING DIAGRAM (RESISTOR TERMINAL)

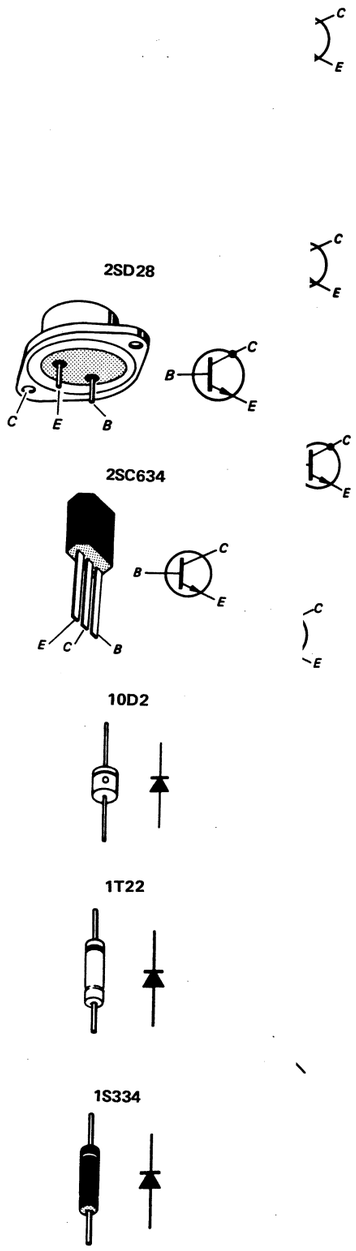
– Conductor Side –



4-13. MOUNTING DIAGRAM (SYSTEM CONTROL)

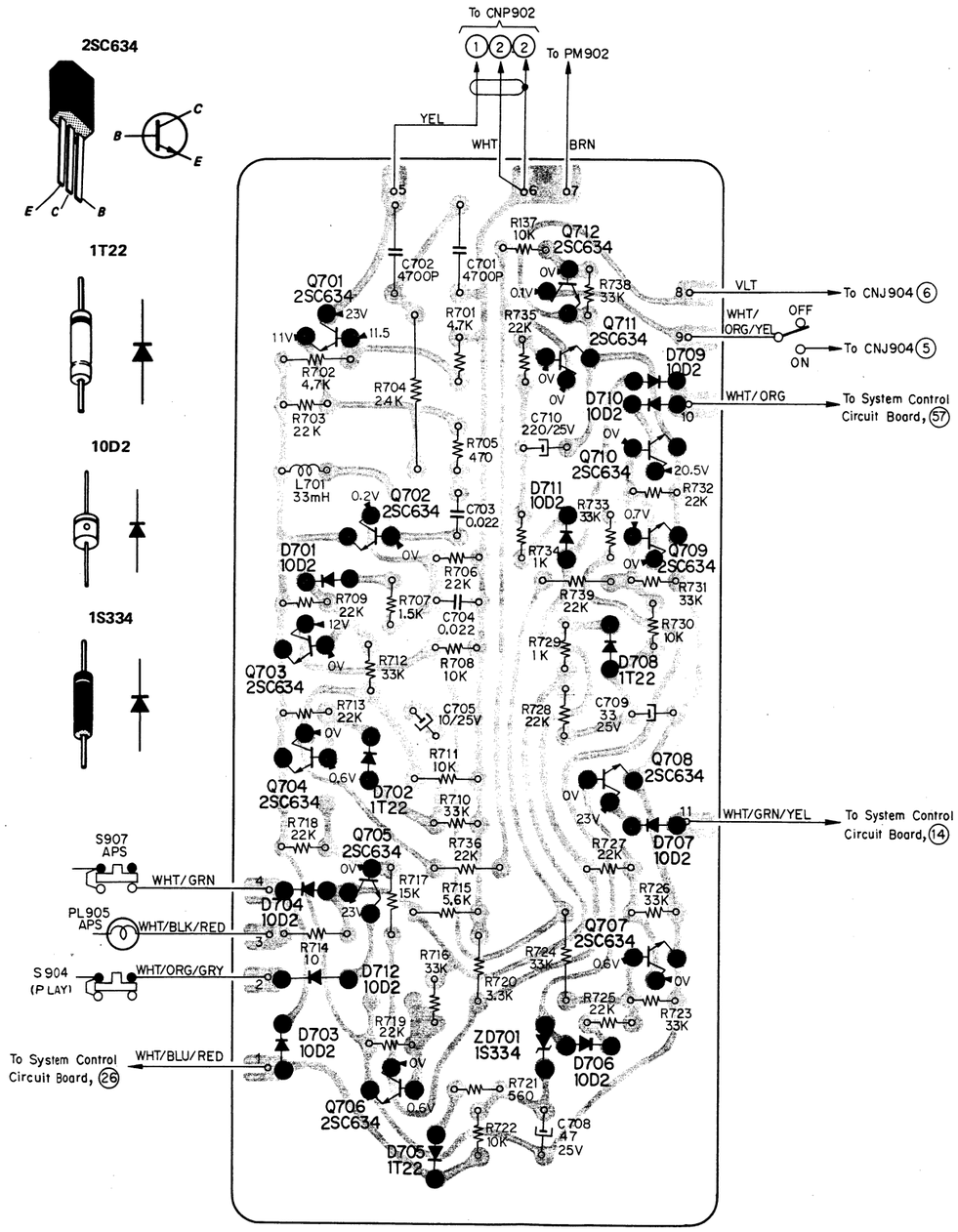
– Conductor Side –





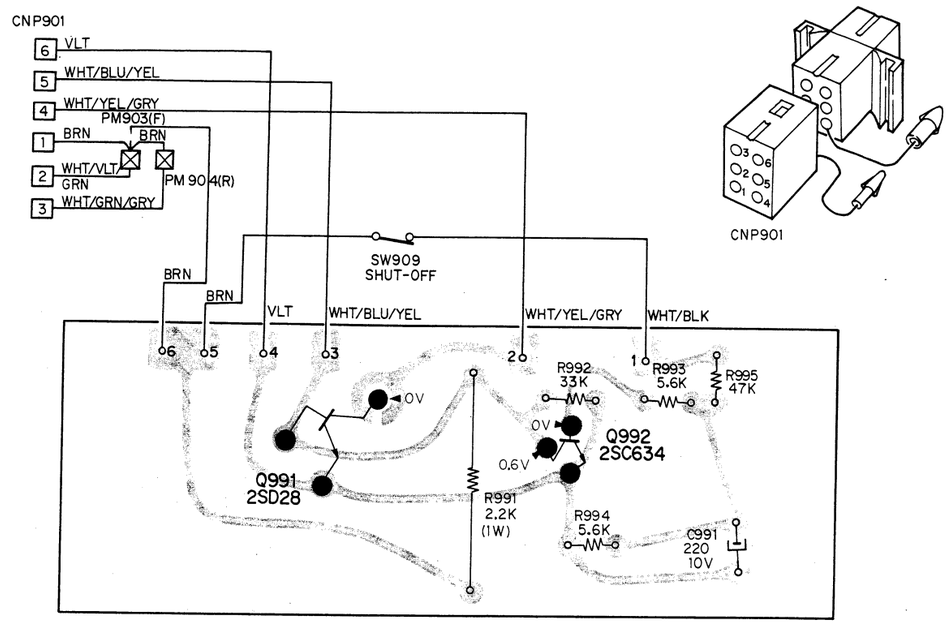
4-14. MOUNTING DIAGRAM (APS & ATS)

– Conductor Side –

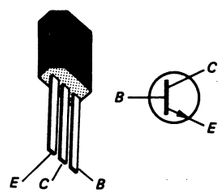


4-15. MOUNTING DIAGRAM (SHUT-OFF)

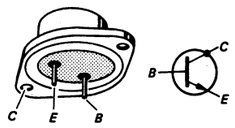
– Conductor Side –



2SC634

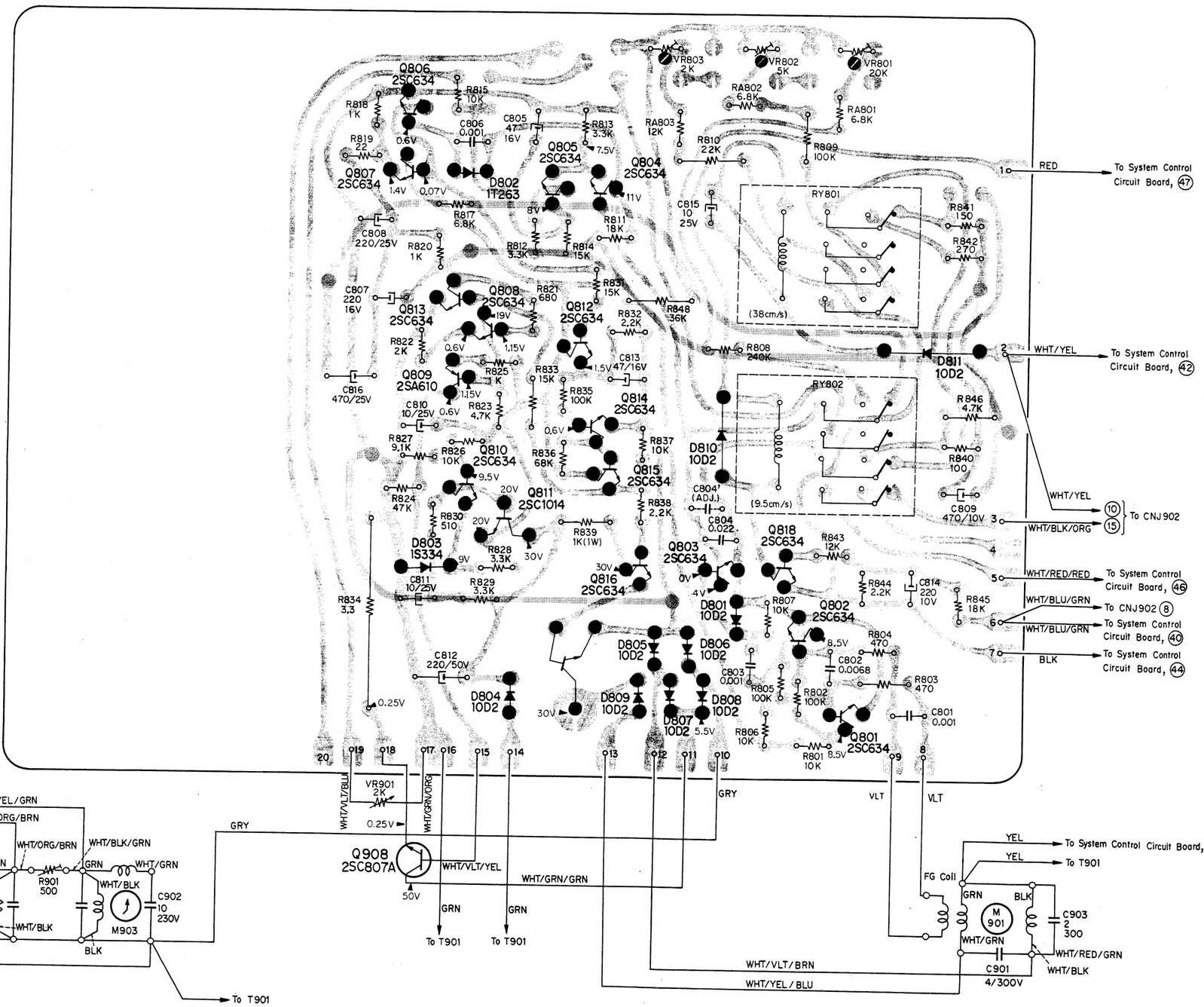


2SD28

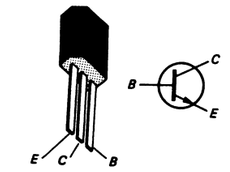


4-16. MOUNTING DIAGRAM (CAPSTAN SERVO CONTROL)

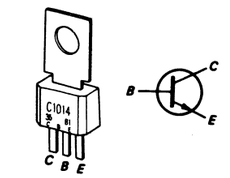
– Conductor Side –



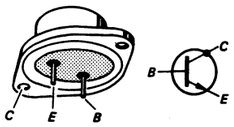
2SC634



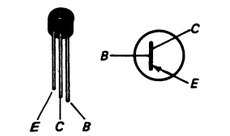
2SC1014



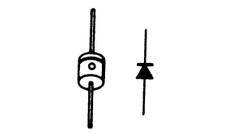
2SC807A



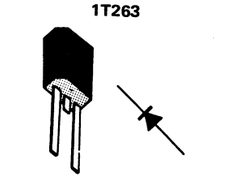
2SA610



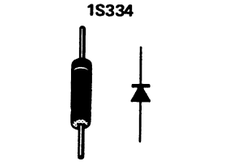
10D2



1T263

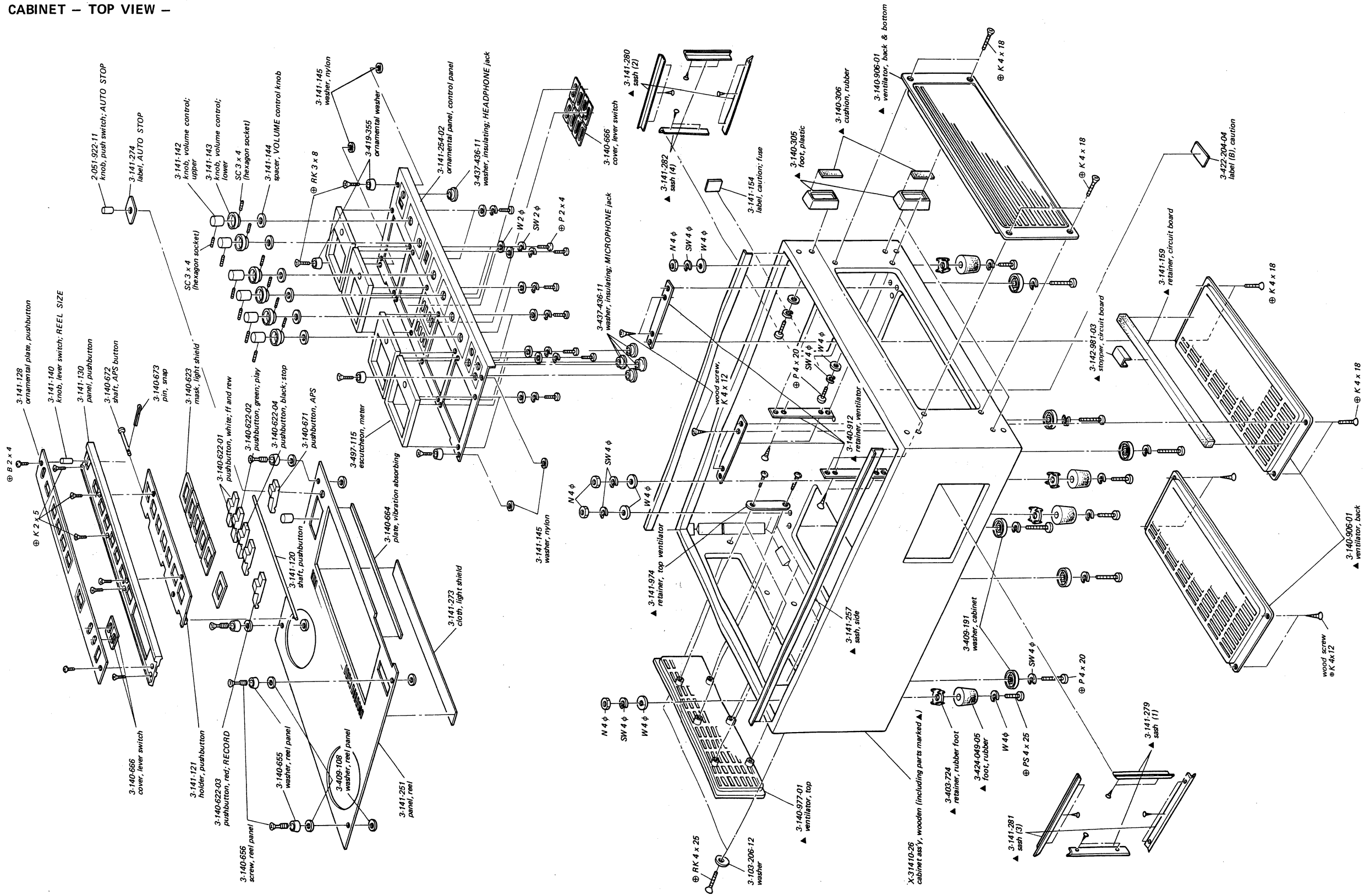


1S334

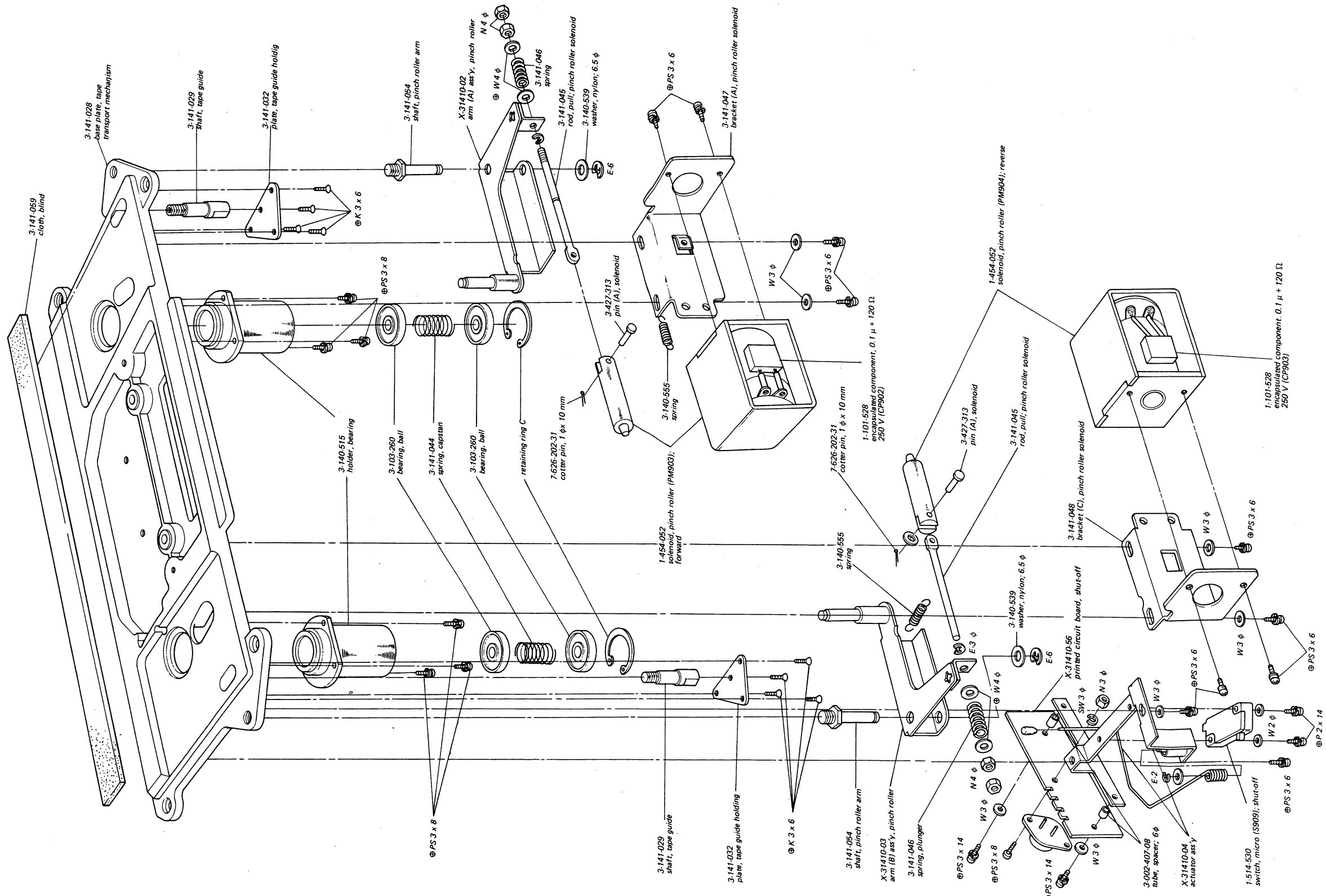


SECTION 5
EXPLODED VIEW

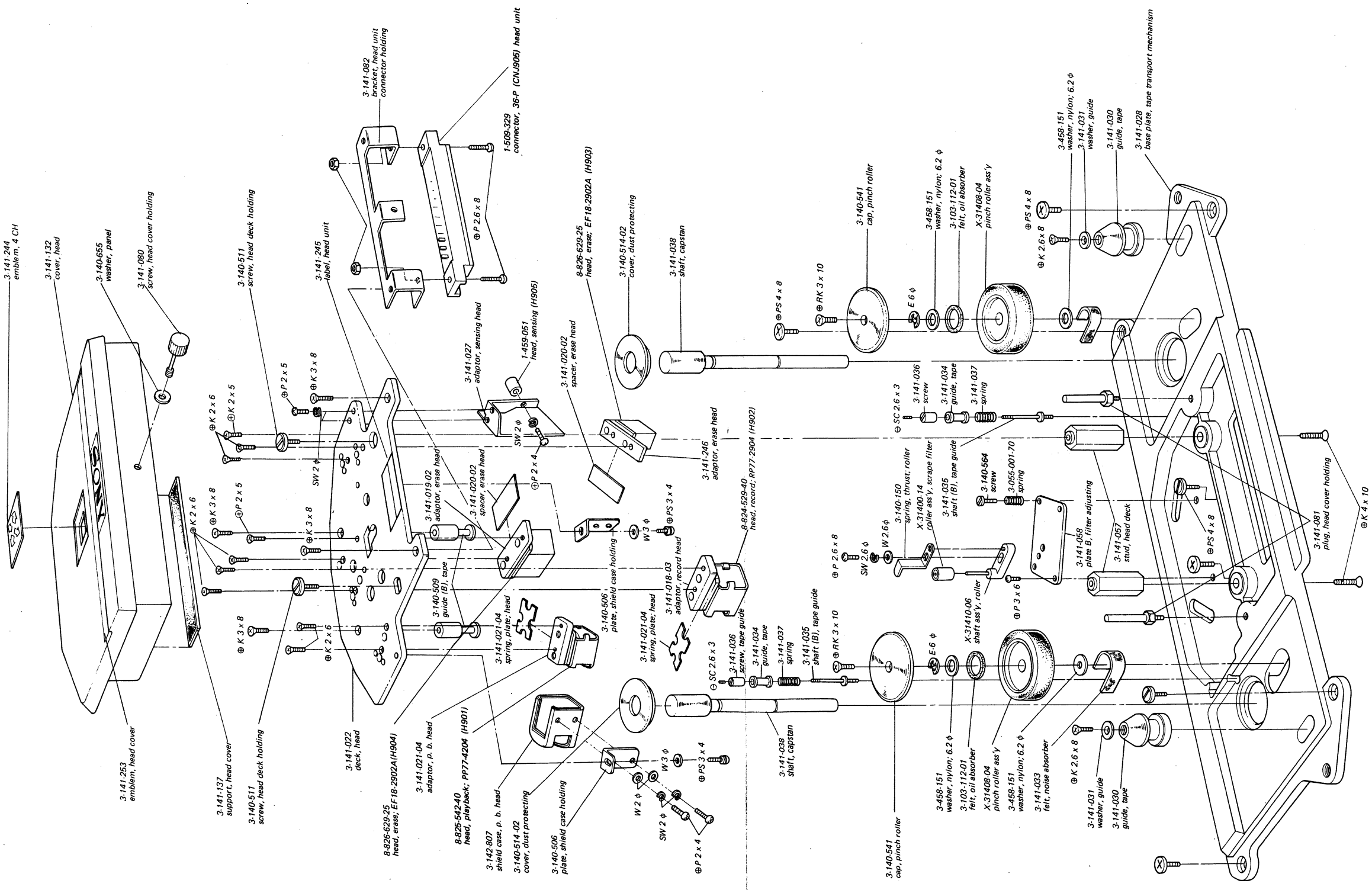
5-1. CABINET — TOP VIEW —



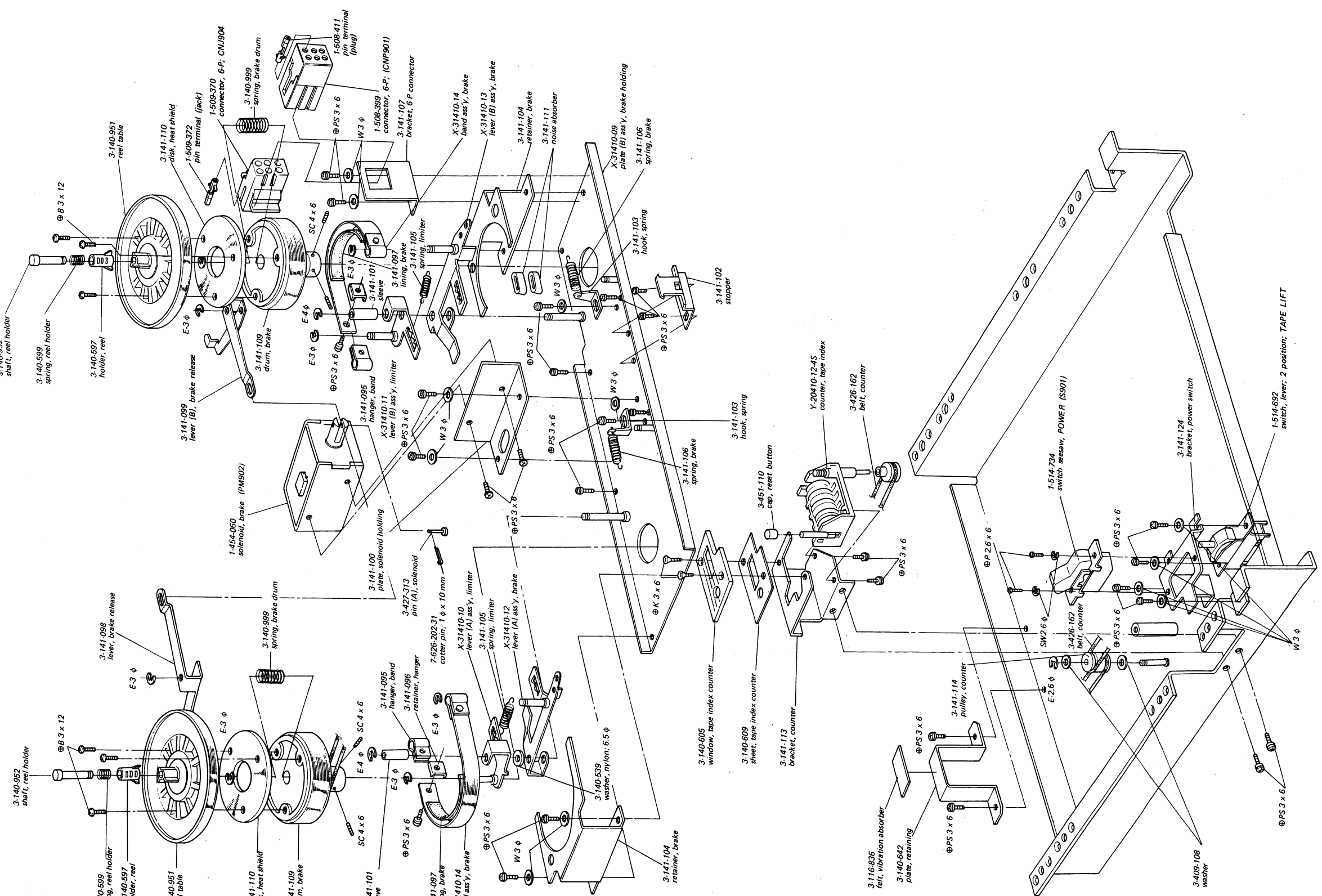
5-3. TAPE TRANSPORT MECHANISM VIEW

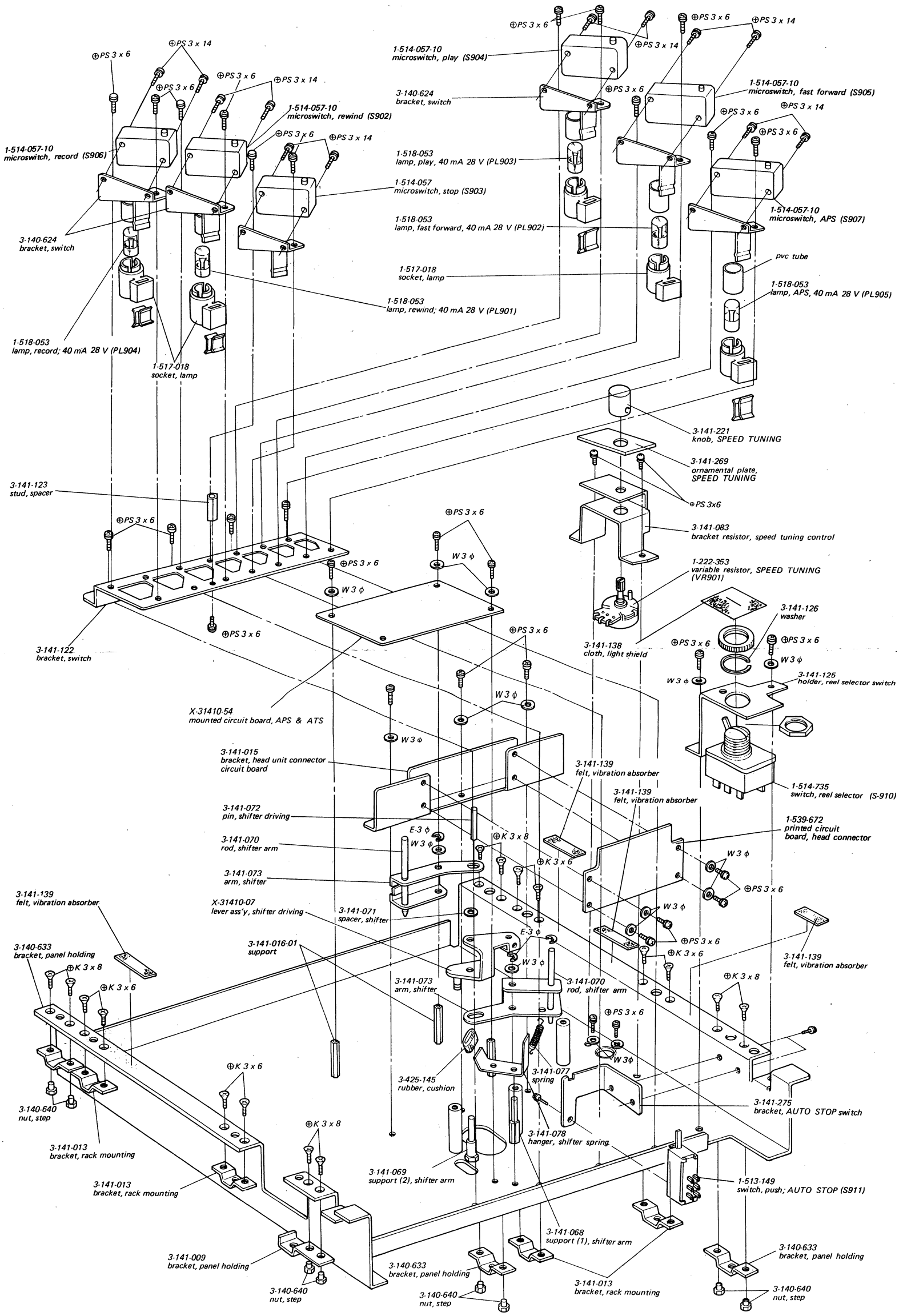


5-2. HEAD DECK – TOP VIEW –

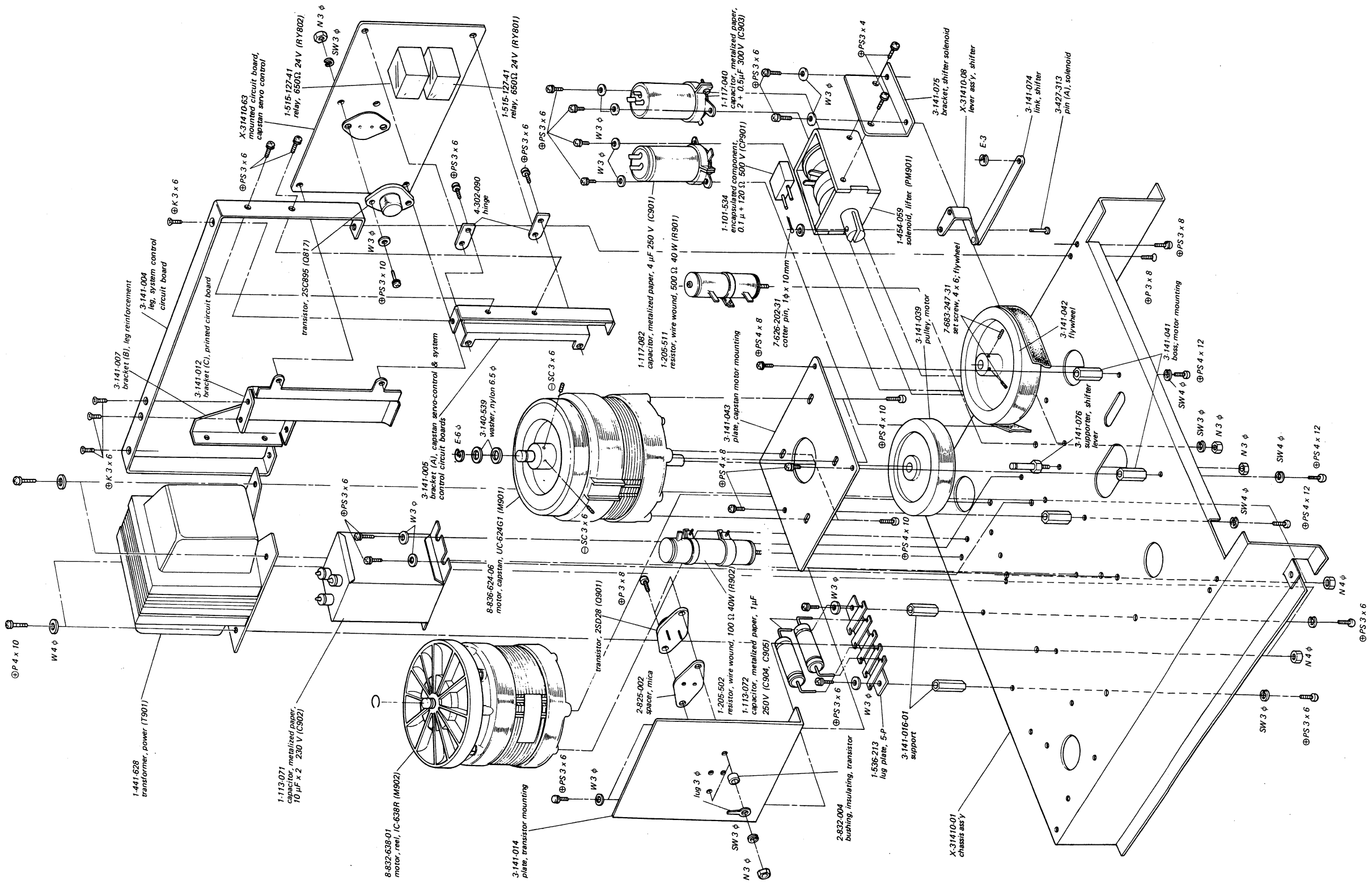


5-4. CHASSIS – TOP VIEW – (1)

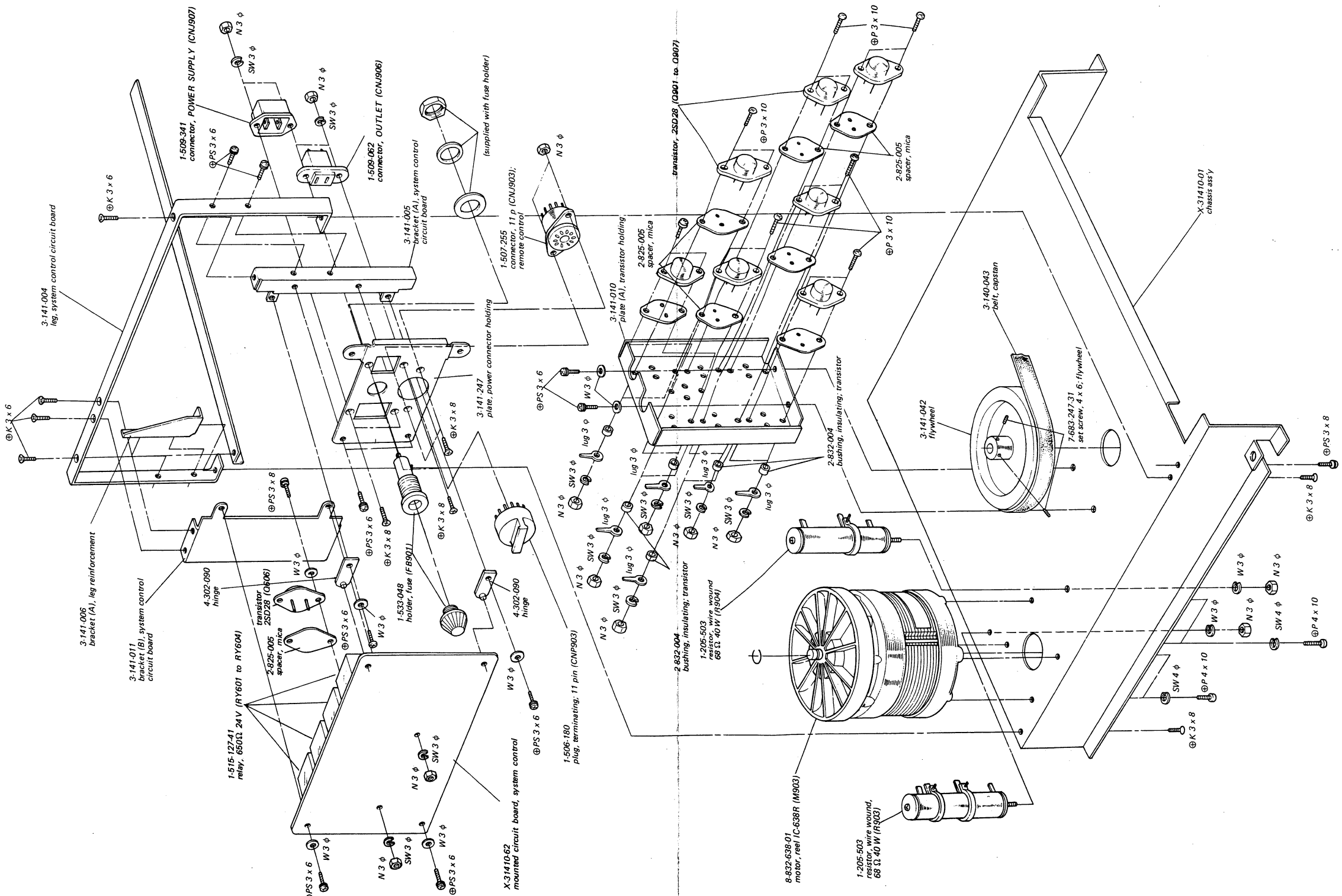



⊕PS 3 x 6
⊕PS 3 x 14
1-514-057-10
microswitch, play (S904)
3-140-624
bracket, switch
1-514-057-10
microswitch, fast forward (S905)
1-514-057-10
microswitch, rewind (S902)
1-514-057-10
microswitch, record (S906)
1-518-053
lamp, play, 40 mA 28 V (PL903)
1-514-057
microswitch, stop (S903)
1-518-053
lamp, fast forward, 40 mA 28 V (PL902)
1-514-057-10
microswitch, APS (S907)
pvc tube
1-517-018
socket, lamp
1-518-053
lamp, APS, 40 mA 28 V (PL905)
1-518-053
lamp, rewind; 40 mA 28 V (PL901)
1-518-053
lamp, record; 40 mA 28 V (PL904)
1-517-018
socket, lamp
3-141-221
knob, SPEED TUNING
3-141-269
ornamental plate,
SPEED TUNING
3-141-123
stud, spacer
3-141-083
bracket resistor, speed tuning control
1-222-353
variable resistor, SPEED TUNING
(VR901)
3-141-126
washer
3-141-138
cloth, light shield
3-141-125
holder, reel selector switch
3-141-122
bracket, switch
W 3 ϕ
X-31410-54
mounted circuit board, APS & ATS
1-514-735
switch, reel selector (S-910)
3-141-015
bracket, head unit connector
circuit board
3-141-139
felt, vibration absorber
3-141-072
pin, shifter driving
1-539-672
printed circuit
board, head connector
E-3 ϕ
⊕K 3 x 8
⊕K 3 x 6
3-141-070
rod, shifter arm
3-141-073
arm, shifter
X-31410-07
lever ass'y, shifter driving
3-141-071
spacer, shifter
3-141-139
felt, vibration absorber
3-140-633
bracket, panel holding
3-141-016-01
support
3-425-145
rubber, cushion
3-141-077
spring
3-141-275
bracket, AUTO STOP switch
3-140-640
nut, step
3-141-078
hanger, shifter spring
3-141-013
bracket, rack mounting
3-141-069
support (2), shifter arm
1-513-149
switch, push; AUTO STOP (S911)
3-141-068
support (1), shifter arm
3-141-009
bracket, panel holding

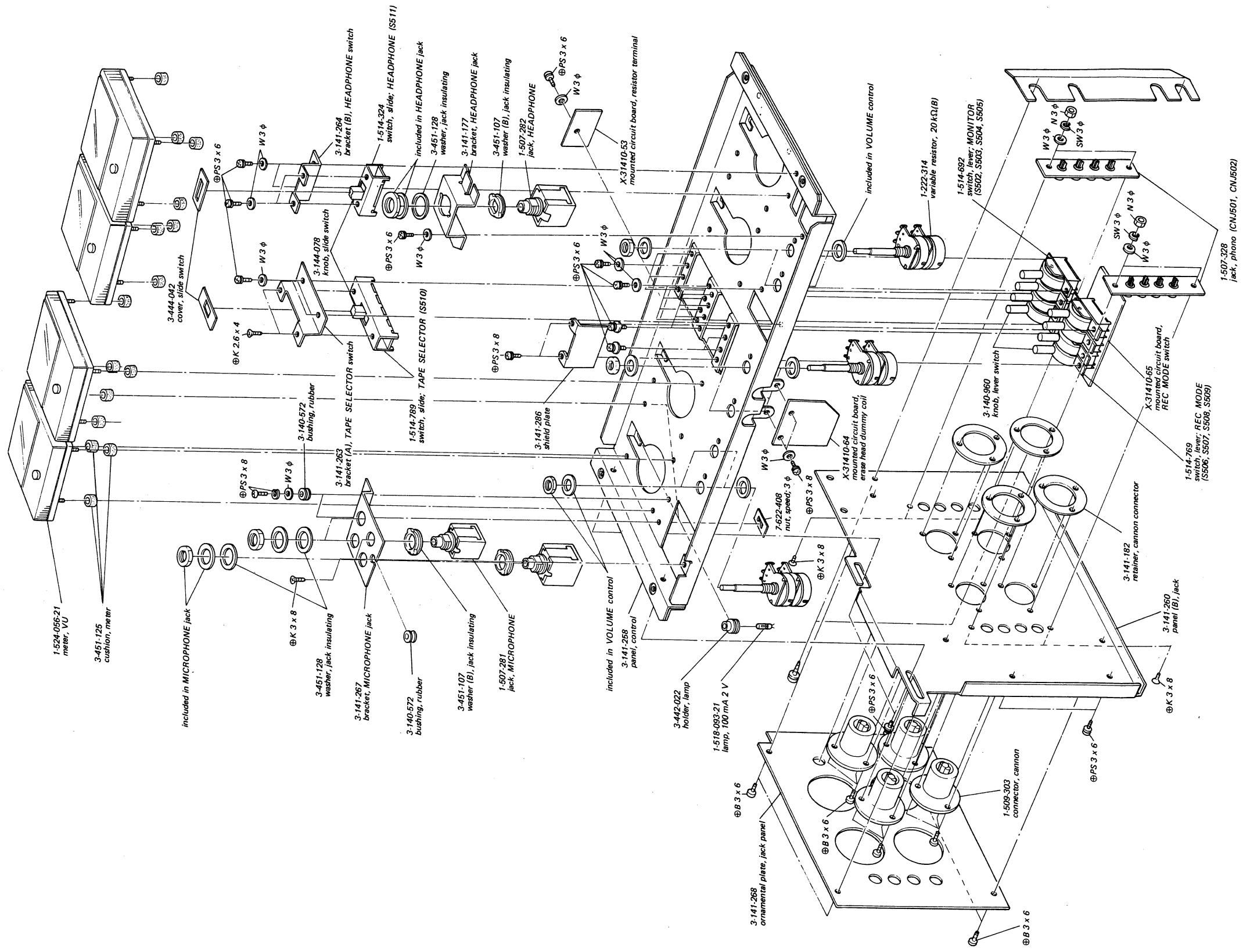
5-6. CHASSIS – BOTTOM VIEW – (1)



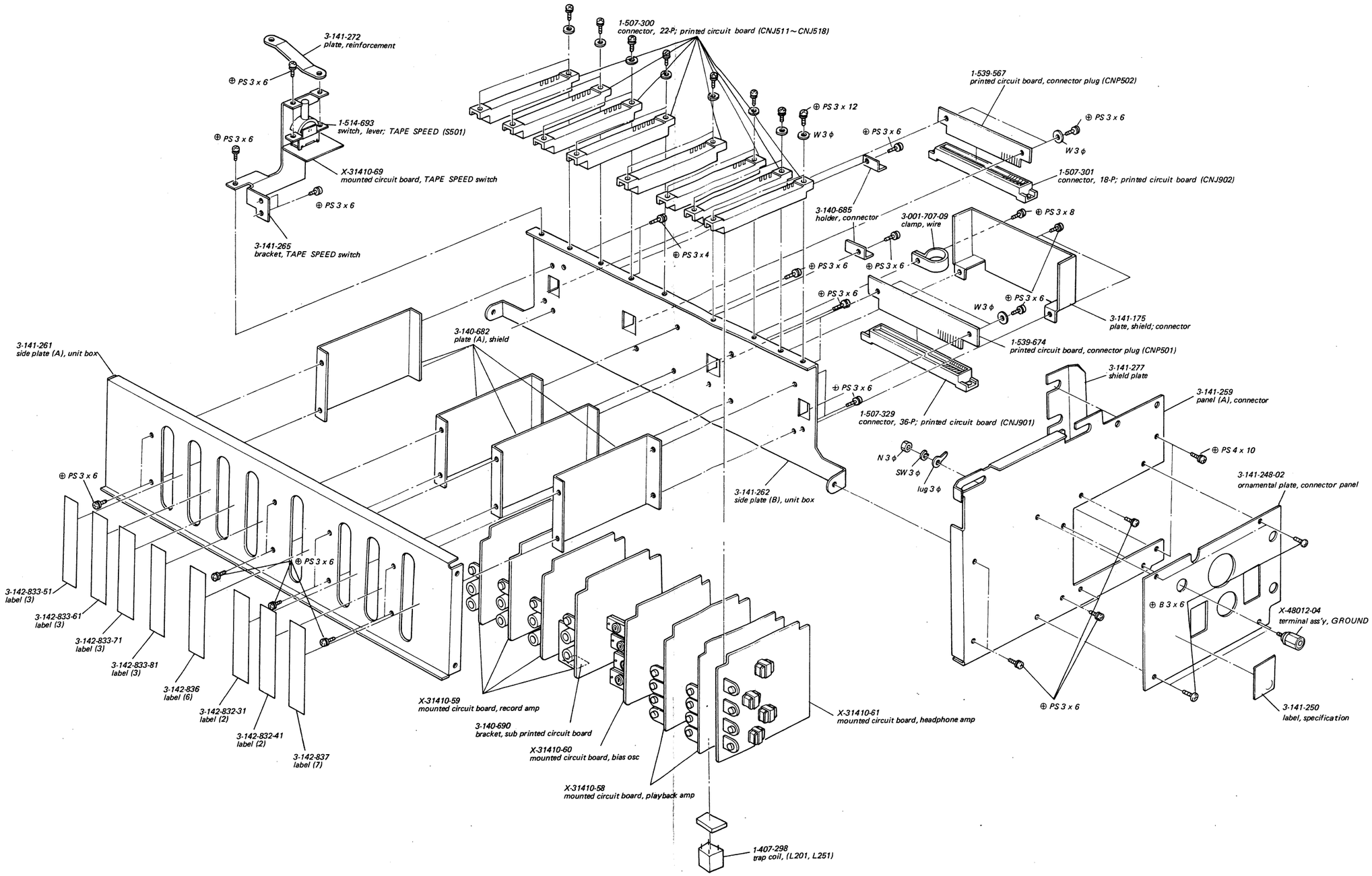
5-7. CHASSIS – BOTTOM VIEW – (2)



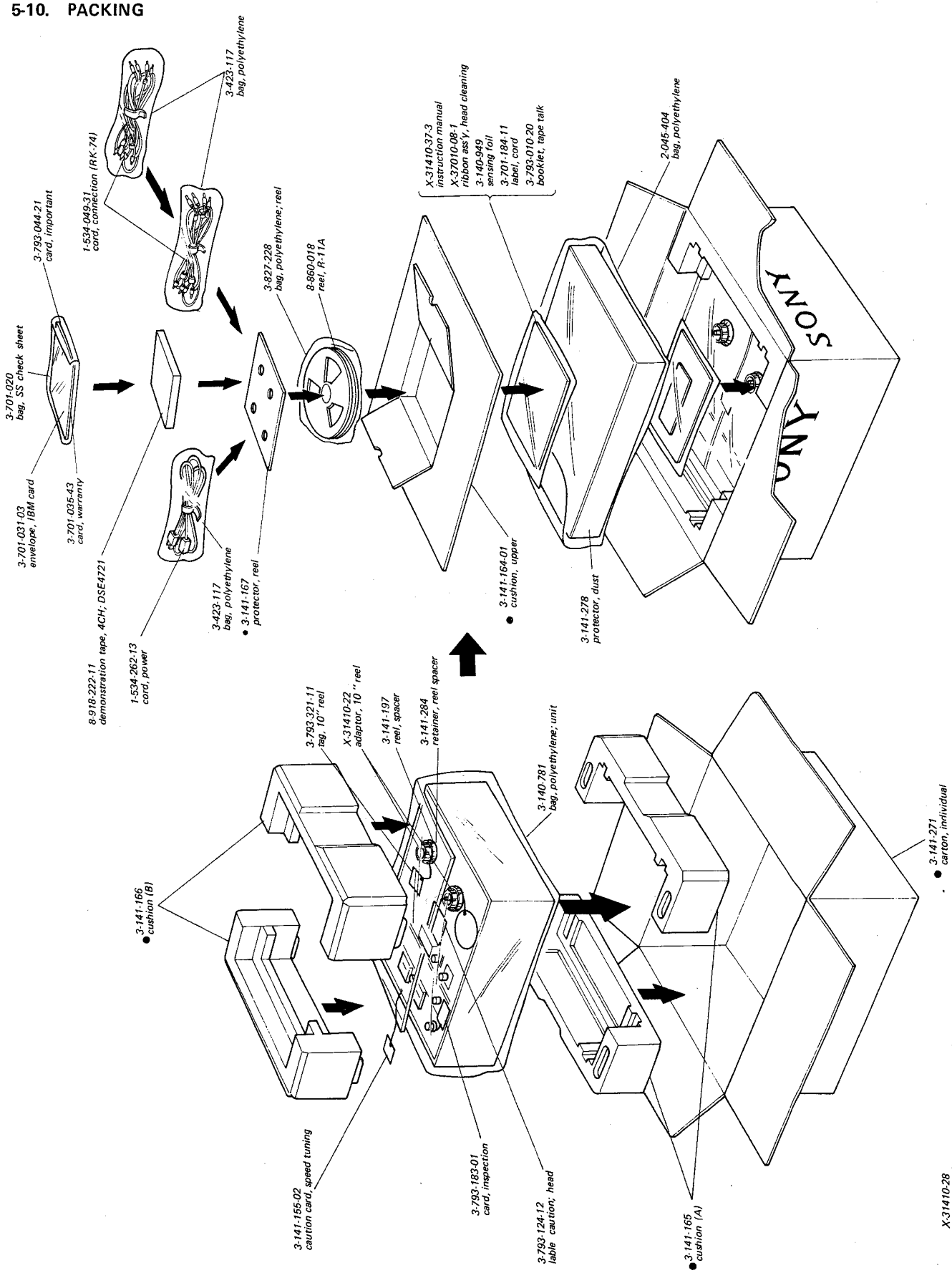
5-8. CONTROL PANEL VIEW



5-9. AMP CIRCUIT BOARD VIEW



5-10. PACKING


3-701-020
bag, SS check sheet
3-793-044-21
card, important
1-534-049-31
cord, connection (RK-74)
3-423-117
bag, polyethylene
3-701-031-03
envelope, IBM card
3-701-035-43
card, warranty
8-918-222-11
demonstration tape, 4CH; DSE4721
1-534-262-13
cord, power
3-423-117
bag, polyethylene
• 3-141-167
protector, reel
3-827-228
bag, polyethylene; reel
8-860-018
reel, R-11A
X-31410-37-3
instruction manual
X-37010-08-1
ribbon ass'y, head cleaning
3-140-949
sensing foil
3-701-184-11
label, card
3-793-010-20
booklet, tape talk
• 3-141-164-01
cushion, upper
3-141-278
protector, dust
2-045-404
bag, polyethylene
SONY
3-793-321-11
tag, 10" reel
X-31410-22
adaptor, 10 " reel
3-141-197
reel, spacer
3-141-284
retainer, reel spacer
3-140-781
bag, polyethylene; unit
• 3-141-271
carton, individual
• 3-141-166
cushion (B)
3-141-155-02
caution card, speed tuning
3-793-183-01
card, inspection
3-793-124-12
lable caution; head
• 3-141-165
cushion (A)
X-31410-28
carton ass'y (including parts marked •)

SECTION 6
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
		MOUNTED CIRCUIT BOARDS
	X-31410-53	resistor terminal
	X-31410-54	APS & ATS
	X-31410-56	shut-off
	X-31410-58	pb amp
	X-31410-59	rec amp
	X-31410-60	bias osc
	X-31410-61	headphone amp
	X-31410-62	system control
	X-31410-63	capstan servo control
	X-31410-64	erase head dummy coil
	X-31410-65	REC MODE switch
	X-31410-69	TAPE SPEED switch
		SEMICONDUCTORS
Q101		transistor 2SC631A
Q102		transistor 2SA610
Q103		transistor 2SC631A
Q104		transistor 2SC631A
Q105		transistor 2SC634A
Q106		transistor 2SC634A
Q201, 251		transistor 2SC631A
Q202, 252		transistor 2SC631A
Q203, 253		transistor 2SC634A
Q204, 254		transistor 2SC634A
Q205		transistor 2SC634A
Q206		transistor 2SC634A
Q301		transistor 2SC1014
Q302		transistor 2SC1014
Q303		transistor 2SC1014
Q401~404		transistor 2SC634A
Q601		transistor 2SC634A
Q602		transistor 2SC634A
Q603		transistor 2SC634A
Q604		transistor 2SC634A
Q605		transistor 2SC634A
Q606		transistor 2SD28
Q607~611		transistor 2SC634A
Q701~712		transistor 2SC634A
Q801~808		transistor 2SC634A
Q809		transistor 2SA610
Q810		transistor 2SC634A
Q811		transistor 2SC1014
Q812~816		transistor 2SC634A
Q817		transistor 2SC895
Q818		transistor 2SC634A
Q901~907		transistor 2SD28
Q908		transistor 2SC807A
Q991		transistor 2SD28
Q992		transistor 2SC634
D101~106		diode 10D2
D201		diode 10D2
D202		diode 10D2
D203		diode 10D2
D251		diode 10D2
D301		diode 10D2
D401		diode 1T22
D402		diode 1T22
D411		diode 1T22
D412		diode 1T22
D421		diode 1T22
D422		diode 1T22
D431		diode 1T22
D432		diode 1T22
D601~619		diode 10D2
D620		diode 1T22
D621~632		diode 10D2
D633~637		diode 1T22
ZD601		diode, zener 1S334
D701		diode 10D2
D702		diode 1T22
D703		diode 10D2
D704		diode 10D2
D705		diode 1T22
D706		diode 10D2
D707		diode 10D2
D708		diode 1T22
D709		diode 10D2
D710		diode 10D2
D711		diode 10D2
D712		diode 10D2
ZD701		diode, zener 1S334
D801		diode 10D2
D802		diode 1T263
D803		diode 1S334
D804~811		diode 10D2
		COILS & TRANSFORMERS
L101	1-231-069	equalizer, 1.4/1.8 mH
L102	1-231-069	equalizer, 1.4/1.8 mH
L201	1-407-298	bias trap (TRAP COIL ADJ.)
L251	1-407-298	bias trap (TRAP COIL ADJ.)
L301	1-407-198-21	micro inductor, 2.2 mH
L302	1-407-198-21	micro inductor, 2.2 mH
L303	1-231-069	equalizer, 1.8 mH; FRONT L-CH TRAP COIL ADJ.
L304	1-231-069	equalizer, 1.8 mH; FRONT R-CH TRAP COIL ADJ.
L305	1-231-069	equalizer, 1.8 mH; REAR L-CH TRAP COIL ADJ.
L306	1-231-069	equalizer, 1.8 mH; REAR R-CH TRAP COIL ADJ.
L501~504	1-409-038	dummy, 1 mH
L701	1-407-212	micro inductor, 33 mH
T301	1-433-148	bias osc

Ref. No.	Part No.	Description		
T401~404	1-427-284	headphone		
T901	1-441-628	power		
		CAPACITORS		
C101	1-121-416	100μF	25V	electrolytic
C102	1-121-398	10μF	25V	electrolytic
C103	1-121-398	10μF	25V	electrolytic
C104	1-105-661-12	0.001μF	50V	mylar
C105	1-121-413	100μF	6.3V	electrolytic
C106	1-121-398	10μF	25V	electrolytic
C107	1-105-661-12	0.001μF	50V	mylar
C108	1-121-398	10μF	25V	electrolytic
C109	1-121-413	100μF	6.3V	electrolytic
C110	1-121-416	100μF	25V	electrolytic
C111	1-121-395	4.7μF	25V	electrolytic
C112				
C113	1-105-661-12	0.001μF	50V	mylar
C114	1-121-413	100μF	6.3V	electrolytic
C115	1-121-395	4.7μF	25V	electrolytic
C116	1-105-661-12	0.001μF	50V	mylar
C117	1-121-409	47μF	16V	electrolytic
C118	1-121-395	4.7μF	25V	electrolytic
C119	1-121-395	4.7μF	25V	electrolytic
C120	1-121-395	4.7μF	25V	electrolytic
C121				
C122	1-105-661-12	0.001μF	50V	mylar
C123	1-107-127	68pF	50V	silvered mica
C124	1-121-403	33μF	16V	electrolytic
C125	1-121-413	100μF	6.3V	electrolytic
C126	1-121-398	10μF	25V	electrolytic
C127	1-105-689-12	0.22μF	50V	mylar
C128	1-121-416	100μF	25V	electrolytic
C129	1-105-679-12	0.0033μF	50V	mylar
C130	1-121-413	100μF	6.3V	electrolytic
C131	1-105-685-12	0.1μF	50V	mylar
C132	1-105-683-12	0.068μF	50V	mylar
C133	1-105-681-12	0.047μF	50V	mylar
C134	1-105-677-12	0.022μF	50V	mylar
C135	1-121-398	10μF	25V	electrolytic
C136	1-121-398	10μF	25V	electrolytic
C137	1-121-398	10μF	25V	electrolytic
C138	1-121-398	10μF	25V	electrolytic
C139				
C140	1-105-671-12	0.0068μF	50V	mylar
C141	1-105-671-12	0.0068μF	50V	mylar
C142	1-121-398	10μF	25V	electrolytic
C143	1-121-398	10μF	25V	electrolytic
C201, 251	1-127-304	3.3μF	16V	electrolytic
C202, 252	1-121-410	47μF	25V	electroltyic
C203, 253	1-121-413	100μF	6.3V	electrolytic
C204, 254	1-105-661-12	0.001μF	50V	mylar
C205, 255	1-105-661-12	0.001μF	50V	mylar
C206, 256	1-121-403	33μF	16V	electrolytic
C207, 257	1-121-416	100μF	25V	electrolytic
C208, 258	1-121-398	10μF	25V	electrolytic
C209, 259	1-105-677-12	0.022μF	50V	mylar
C210, 260	1-107-244	470pF	50V	silvered mica
C211, 261	1-121-391	1μF	50V	electrolytic
C212, 262	1-121-416	100μF	25V	electrolytic
C213, 263	1-105-661-12	0.001μF	50V	mylar
C214, 264	1-121-410	47μF	25V	electrolytic
C215, 265	1-107-125	56pF	50V	silvered mica
C216, 266	1-121-409	47μF	16V	electrolytic
C217, 267	1-121-398	10μF	25V	electrolytic
C218				
C219	1-121-410	47μF	25V	electrolytic
C301	1-121-410	47μF	25V	electrolytic
C302	1-105-679-12	0.033μF	50V	mylar
C303	1-121-410	47μF	25V	electrolytic
C304	1-121-398	10μF	25V	electrolytic
C305	1-121-398	10μF	25V	electrolytic
C306	1-107-188	620pF	500V	silvered mica
C307	1-105-679-12	0.033μF	50V	mylar
C308	1-109-523	8,200pF	500V	silvered mica
C309	1-107-188	620pF	500V	silvered mica
C310	1-107-188	620pF	500V	silvered mica
C311	1-107-188	620pF	500V	silvered mica
C312	1-107-188	620pF	500V	silvered mica
C313~316	1-141-076	30~200pF		trimmer
C317	1-107-188	620pF	500V	silvered mica
C318	1-107-188	620pF	500V	silvered mica
C401, 411 C421, 431	1-121-395	4.7μF	25V	electrolytic
C402, 412 C422, 432	1-121-398	10μF	25V	electrolytic
C403, 413 C423, 433				
C404, 414 C424, 434	1-121-391	1μF	50V	electrolytic
C405, 415 C425, 435	1-121-395	4.7μF	25V	electrolytic
C406, 416 C426, 436	1-121-398	10μF	25V	electrolytic
C441	1-121-416	100μF	25V	electrolytic
C442	1-121-416	100μF	25V	electrolytic
C501	1-109-506	3,300pF	500V	silvered mica
C502	1-109-503	1,500pF	500V	silvered mica
C601	1-121-810	470μF	50V	electrolytic
C602	1-121-810	470μF	50V	electrolytic
C603	1-121-417	100μF	50V	electrolytic
C604	1-121-388	1,000μF	35V	electrolytic
C605	1-121-388	1,000μF	35V	electrolytic
C606	1-121-422	220μF	25V	electrolytic

Ref. No.	Part No.			Description
C607	1-121-422	220μF	25V	electrolytic
C608	1-121-422	220μF	25V	electrolytic
C609	1-121-422	220μF	25V	electrolytic
C610	1-105-689-12	0.22μF	50V	mylar
C611	1-121-410	47μF	25V	electrolytic
C612	1-121-420	220μF	10V	electrolytic
C613	1-121-422	220μF	25V	electrolytic
C614	1-105-689-12	0.22μF	50V	mylar
C615	1-105-689-12	0.22μF	50V	mylar
C616	1-105-689-12	0.22μF	50V	mylar
C617	1-105-687-12	0.22μF	50V	mylar
C618				
C619	1-105-685-12	0.1μF	50V	mylar
C620				
C621	1-121-392	3.3μF	25V	electrolytic
C622	1-121-480	22μF	25V	electrolytic
C623	1-121-810	470μF	50V	electrolytic
C701	1-103-891	4,700pF	50V	polystyrol
C702	1-103-891	4,700pF	50V	polystyrol
C703	1-105-677-12	0.022μF	50V	mylar
C704	1-105-677-12	0.022μF	50V	mylar
C705	1-121-398	10μF	25V	electrolytic
C706				
C707				
C708	1-121-410	47μF	25V	electrolytic
C709	1-121-404	33μF	25V	electrolytic
C710	1-121-422	220μF	25V	electrolytic
C801	1-105-661-12	0.001μF	50V	mylar
C802	1-105-671-12	0.0068μF	50V	mylar
C803	1-105-661-12	0.001μF	50V	mylar
C804	1-105-677-12	0.022μF	50V	mylar
C805	1-121-409	47μF	16V	electrolytic
C806	1-105-611-12	0.001μF	50V	mylar
C807	1-121-421	220μF	16V	electrolytic
C808	1-121-422	220μF	25V	electrolytic
C809	1-121-425	470μF	10V	electrolytic
C810	1-121-398	10μF	25V	electrolytic
C811	1-121-398	10μF	25V	electrolytic
C812	1-121-423	220μF	50V	electrolytic
C813	1-121-409	47μF	16V	electrolytic
C814	1-121-420	220μF	10V	electrolytic
C815	1-121-398	10μF	25V	electrolytic
C816	1-121-733	470μF	25V	electrolytic
C901	1-117-082	4μF	300V	metalized paper
C902-1~2	1-113-071	10μF	230V	(block type) metalized paper
C903	1-117-040	0.5+2μF	300V	(block type) metalized paper
C904	1-113-072	1μF	250V	metalized paper
C905	1-113-072	1μF	250V	metalized paper
C906	1-105-681-12	0.047μF	50V	mylar

Ref. No.	Part No.			Description
C991	1-121-420	220μF	10V	electrolytic

RESISTORS

All resistors are ¼W and carbon type, unless otherwise indicated.

R101	1-242-705	22kΩ
R102	1-242-701	15kΩ
R103	1-242-723	120kΩ
R104	1-242-690	5.1kΩ
R105	1-242-704	20kΩ
R106	1-242-661	330Ω
R107	1-242-701	15kΩ
R108	1-242-704	20kΩ
R109	1-242-690	5.1kΩ
R110	1-242-661	330Ω
R111	1-242-681	2.2kΩ
R112	1-242-713	47kΩ
R113	1-242-729	220kΩ
R114	1-242-657	220Ω
R115	1-242-681	2.2kΩ
R116	1-242-691	5.6kΩ
R117	1-242-713	47kΩ
R118	1-242-729	220kΩ
R119	1-242-657	220Ω
R120	1-242-681	2.2kΩ
R121	1-242-691	5.6kΩ
R122	1-242-661	330Ω
R123	1-242-690	5.1kΩ
R124	1-242-692	6.2kΩ
R125	1-221-383	10kΩ(B) semi-fixed (REC LEVEL ADJ.)
R126	1-242-681	2.2kΩ
R127	1-242-707	27kΩ
R128	1-242-725	150kΩ
R129	1-242-685	3.3kΩ
R130	1-242-709	33kΩ
R131	1-242-665	470Ω
R132	1-242-709	33kΩ
R133	1-242-661	330Ω
R134	1-242-673	1kΩ
R135	1-242-701	15kΩ
R136	1-242-649	100Ω
R137	1-242-681	2.2kΩ
R138	1-242-673	1kΩ
R139	1-242-697	10kΩ
R140	1-242-733	330kΩ
R141	1-242-697	10kΩ
R142	1-242-733	330kΩ
R143	1-242-697	10kΩ
R144	1-242-733	330kΩ
R145	1-242-697	10kΩ
R146	1-242-733	330kΩ
R147	1-242-633	22Ω

Ref. No.	Part No.	Description
R148	1-242-649	100Ω
R149	1-242-641	47Ω
R150	1-242-659	270Ω
R151	1-242-655	180Ω
R152		———
R153	1-242-687	3.9 kΩ
R154	1-242-697	10 kΩ
R155	1-242-733	330 kΩ
R156	1-242-697	10 kΩ
R157	1-242-733	330 kΩ
R158～163	1-242-679	1.8 kΩ
R201, 251	1-242-609	2.2Ω
R202, 252	1-242-739	560 kΩ
R203, 253	1-242-725	150 kΩ
R204, 254	1-242-721	100 kΩ
R205, 255	1-242-643	56Ω
R206, 256	1-242-703	18 kΩ
R207, 257	1-242-692	6.2 kΩ
R208, 258	1-242-692	6.2 kΩ
R209, 259	1-242-723	120 kΩ
R211, 261	1-242-685	3.3 kΩ
R212, 262	1-242-657	220Ω
R213, 263	1-221-311	5 kΩ (B) (9.5 cm/s EQ ADJ.)
R214, 264	1-242-657	220Ω
R215, 265	1-221-311	5 kΩ (B) (9.5 cm/s EQ ADJ.)
R216, 266	1-242-701	15 kΩ
R217	1-242-691	5.6 kΩ
R218, 268	1-242-705	22 kΩ
R220, 270	1-242-697	10 kΩ
R222, 271	1-242-697	10 kΩ
R223	1-242-699	12 kΩ
R224	1-242-707	27 kΩ
R225	1-242-707	27 kΩ
R226	1-242-699	12 kΩ
R228, 278	1-242-681	2.2 kΩ
R229, 279	1-242-705	22 kΩ
R230, 280	1-242-729	220 kΩ
R231, 281	1-242-705	22 kΩ
R232, 282	1-242-709	33 kΩ
R233, 283	1-242-677	1.5 kΩ
R234, 284	1-242-665	470Ω
R235, 285	1-242-707	27 kΩ
R236, 286	1-242-677	1.5 kΩ
R237, 287	1-242-663	390Ω
R238	1-242-655	180Ω
R240, 290	1-242-721	100 kΩ
R288	1-242-657	220Ω
R301	1-242-667	560Ω
R302	1-242-683	2.7 kΩ
R303	1-242-625	10Ω
R304	1-242-617	4.7Ω
R305	1-242-617	4.7Ω
R306	1-242-699	12 kΩ
R307	1-242-705	22 kΩ
R401, 411, R421, 431	1-242-681	2.2 kΩ
R402, 412, R422, 432	1-242-697	10 kΩ
R403, 413, R423, 433		———
R404, 414, R424, 434	1-242-737	470 kΩ
R405, 415, R425, 435	1-242-681	2.2 kΩ
R406, R416	1-221-311	5 kΩ (B) semi-fixed LEVEL METER CAL (FRONT L-CH) (FRONT R-CH)
R426, R436	1-221-311	5 kΩ (B) semi-fixed LEVEL METER CAL (FRONT L-CH) (FRONT R-CH)
R407, 417, R427, 437	1-242-649	100Ω
R408, 418, R428, 438	1-242-721	100 kΩ
R409, 419, R429, 439	1-242-721	100 kΩ
R441	1-242-641	47Ω
R442	1-242-641	47Ω
VR501-1	1-222-314	20 kΩ (B) variable MIC VOL (FRONT L-CH)
VR501-2	1-222-314	20 kΩ (B) variable MIC VOL (FRONT R-CH)
VR502-1	1-222-314	20 kΩ (B) variable LINE VOL (FRONT L-CH)
VR502-2	1-222-314	20 kΩ (B) variable LINE VOL (FRONT R-CH)
VR503-1	1-222-314	20 kΩ (B) variable MIC VOL (REAR L-CH)
VR503-2	1-222-314	20 kΩ (B) variable MIC VOL (REAR R-CH)
VR504-1	1-222-314	20 kΩ (B) variable LINE VOL (REAR L-CH)
VR504-2	1-222-314	20 kΩ (B) variable LINE VOL (REAR R-CH)
VR505-1	1-222-314	20 kΩ (B) variable PB VOL (FRONT L-CH)
VR505-2	1-222-314	20 kΩ (B) variable PB VOL (FRONT R-CH)
VR506-1	1-222-314	20 kΩ (B) variable PB VOL (REAR L-CH)
VR506-2	1-222-314	20 kΩ (B) variable PB VOL (REAR R-CH)

Ref. No.	Part No.			Description
R501~504	1-242-684	3 kΩ		
R511~514	1-242-721	100 kΩ		
R521~524	1-242-679	1.8 kΩ		
R525~528	1-242-617	4.7 Ω		
R601	1-207-272	4.7 Ω	1.5 W	wire wound
R602	1-242-697	10 kΩ		
R603	1-242-665	470 Ω		
R604	1-242-677	1.5 kΩ		
R605	1-242-690	5.1 kΩ		
R606	1-242-685	3.3 kΩ		
R607	1-242-705	22 kΩ		
R608	1-242-657	220 Ω		
R609	1-242-681	2.2 kΩ		
R610	1-242-667	560 Ω		
R611	1-206-016	1 kΩ	2 W	metal oxide film
R612	1-242-705	22 kΩ		
R613	1-242-709	33 kΩ		
R614	1-242-685	3.3 kΩ		
R615	1-242-665	470 Ω		
R616	1-242-697	10 kΩ		
R617	1-242-673	1 kΩ		
R618	1-242-713	47 kΩ		
R619	1-242-713	47 kΩ		
R620		———		
R621	1-242-709	33 kΩ		
R622	1-242-705	22 kΩ		
R623	1-242-699	12 kΩ		
R624	1-242-709	33 kΩ		
R625	1-242-709	33 kΩ		
R626	1-242-709	33 kΩ		
R627	1-242-705	22 kΩ		
R628	1-242-697	10 kΩ		
R629	1-242-697	10 kΩ		
R630	1-242-705	22 kΩ		
R631	1-242-690	5.1 kΩ		
R632	1-242-697	10 kΩ		
R633	1-242-673	1 kΩ		
R634	1-242-675	1.2 kΩ		
R635	1-242-705	22 kΩ		
R636	1-242-705	22 kΩ		
R637	1-242-677	1.5 kΩ		
R638	1-242-707	27 kΩ		
R639	1-242-705	22 kΩ		
R640	1-242-677	1.5 kΩ		
R641	1-242-707	27 kΩ		
R642	1-242-705	22 kΩ		
R643	1-207-273	5.1 Ω	1.5 W	wire wound
R644	1-207-273	5.1 Ω	1.5 W	wire wound
R645	1-207-273	5.1 Ω	1.5 W	wire wound
R646	1-207-273	5.1 Ω	1.5 W	wire wound
R647	1-242-675	1.2 kΩ		
R648	1-242-705	22 kΩ		
R649	1-242-705	22 kΩ		
R650	1-242-677	1.5 kΩ		
R651	1-242-643	56 Ω		
R701	1-242-689	4.7 kΩ		
R702	1-242-689	4.7 kΩ		
R703	1-242-705	22 kΩ		
R704	1-244-682	2.4 kΩ		
R705	1-242-665	470 Ω		
R706	1-242-705	22 kΩ		
R707	1-242-677	1.5 kΩ		
R708	1-242-697	10 kΩ		
R709	1-242-705	22 kΩ		
R710	1-242-709	33 kΩ		
R711	1-242-697	10 kΩ		
R712	1-242-709	33 kΩ		
R713	1-242-705	22 kΩ		
R714	1-242-625	10 Ω		
R715	1-242-691	5.6 kΩ		
R716	1-242-709	33 kΩ		
R717	1-242-701	15 kΩ		
R718	1-242-705	22 kΩ		
R719	1-242-705	22 kΩ		
R720	1-242-685	3.3 kΩ		
R721	1-242-667	560 Ω		
R722	1-242-697	10 kΩ		
R723	1-242-709	33 kΩ		
R724	1-242-709	33 kΩ		
R725	1-242-705	22 kΩ		
R726	1-242-709	33 kΩ		
R727	1-242-705	22 kΩ		
R728	1-242-705	22 kΩ		
R729	1-242-673	1 kΩ		
R730	1-242-697	10 kΩ		
R731	1-242-709	33 kΩ		
R732	1-242-705	22 kΩ		
R733	1-242-709	33 kΩ		
R734	1-242-673	1 kΩ		
R735	1-242-705	22 kΩ		
R736	1-242-705	22 kΩ		
R737	1-242-697	10 kΩ		
R738	1-242-709	33 kΩ		
R739	1-242-705	22 kΩ		
R801	1-242-697	10 kΩ		
R802	1-242-721	100 kΩ		
R803	1-242-665	470 Ω		
R804	1-242-665	470 Ω		
R805	1-242-721	100 kΩ		
R806	1-242-697	10 kΩ		
R807	1-242-697	10 kΩ		
R808	1-242-730	240 kΩ		
R809	1-242-721	100 kΩ		
R810	1-242-705	22 kΩ		
R811	1-242-703	18 kΩ		

Ref. No.	Part No.			Description
R812	1-242-685	3.3 kΩ		
R813	1-242-685	3.3 kΩ		
R814	1-242-701	15 kΩ		
R815	1-242-697	10 kΩ		
R816		———		
R817	1-242-693	6.8 kΩ		
R818	1-242-673	1 kΩ		
R819	1-242-633	22 Ω		
R820	1-242-673	1 kΩ		
R821	1-242-669	680 Ω		
R822	1-242-680	2 kΩ		
R823	1-242-689	4.7 kΩ		
R824	1-242-713	47 kΩ		
R825	1-242-673	1 kΩ		
R826	1-242-697	10 kΩ		
R827	1-242-696	9.1 kΩ		
R828	1-242-685	3.3 kΩ		
R829	1-242-685	3.3 kΩ		
R830	1-242-666	510 Ω		
R831	1-242-701	15 kΩ		
R832	1-242-681	2.2 kΩ		
R833	1-242-701	15 kΩ		
R834	1-207-268	3.3 Ω	1.5 W	metal oxide film
R835	1-242-721	100 kΩ		
R836	1-242-717	68 kΩ		
R837	1-242-697	10 kΩ		
R838	1-242-681	2.2 kΩ		
R839	1-206-093	1 kΩ	1 W	metal oxide film
R840	1-242-649	100 Ω		
R841	1-242-653	150 kΩ		
R842	1-242-659	270 Ω		
R843	1-242-699	12 kΩ		
R844	1-242-681	2.2 kΩ		
R845	1-242-703	18 kΩ		
R846	1-242-689	4.7 kΩ		
R847		———		
R848	1-242-710	36 kΩ		
RA801	1-242-693	6.8 kΩ		
RA802	1-242-693	6.8 kΩ		
RA803	1-242-699	12 kΩ		
VR801	1-221-175	20 kΩ (B), semi-fixed		
VR802	1-221-173	5 kΩ (B), semi-fixed		
VR803	1-221-172	2 kΩ (B), semi-fixed		
VR901	1-222-353	2 kΩ, semi-fixed		
R901	1-205-511	500 Ω	40H	wire wound
R902	1-205-502	100 Ω	40H	wire wound
R903	1-205-503	68 Ω	40H	wire wound
R904	1-205-503	68 Ω	40H	wire wound
R991	1-206-097	2.2 kΩ	1 W	metal oxide film
R992	1-242-709	33 kΩ	¼W	
R993	1-242-691	5.6 kΩ	¼W	
R994	1-242-691	5.6 kΩ	¼W	
R995	1-242-713	47 kΩ	¼W	

SWITCHES

S501	1-514-693	lever, 3 position; TAPE SPEED
S502	1-514-692	lever, 2 position; MONITOR (FRONT L-CH)
S503	1-514-692	lever, 2 position; MONITOR (FRONT R-CH)
S504	1-514-692	lever, 2 position; MONITOR (REAR L-CH)
S505	1-514-692	lever, 2 position; MONITOR (REAR R-CH)
S506~509	1-514-769	lever, 2 position; REC MODE
S510	1-514-789	slide, TAPE SELECTOR
S511	1-514-324	slide, HEADPHONE
S901	1-514-734	seesaw; POWER
S902~906	1-514-057-10	micro; REW, STOP, PLAY, FF, REC
S907	1-514-057-10	micro; APS
S908	1-514-692	lever; 2 position; TAPE LIFT
S909	1-514-530-21	mirco; SHUT OFF
S910	1-514-735	reel selector; REEL SIZE
S911	1-513-149	push; AUTO STOP

JACKS/CONNECTORS/PLUGS

CNJ501	1-507-328	phono; LINE INPUT
CNJ502	1-507-328	phono; LINE OUTPUT
CNJ503	1-509-303	cannon; MIC INPUT FRONT L-CH
CNJ504	1-507-281	phone; MICROPHONE FRONT L-CH
CNJ505	1-509-303	cannon; MIC INPUT FRONT R-CH
CNJ506	1-507-281	phone; MICROPHONE FRONT R-CH
CNJ507	1-509-303	cannon; MIC INPUT REAR L-CH
CNJ508	1-507-281	phone; MICROPHONE REAR L-CH
CNJ509	1-509-303	cannon; MIC INPUT REAR R-CH
CNJ510	1-507-281	phone; MICROPHONE REAR R-CH
CNJ511~518	1-507-300	connector, 22-P
CNJ5194	1-507-282	binaural, HEADPHONE
CNP501	1-539-674	connector plug, 36-P
CNP502	1-539-567	connector plug, 18-P
CNJ901	1-507-329	36-P
CNJ902	1-507-301	18-P
CNJ903	1-507-255	11-P
CNJ904	1-509-370	6-P
CNJ905	1-507-329	36-P
CNJ906	1-509-062	OUTLET
CNJ907	1-509-341	POWER SUPPLY
CNP901	1-508-399	6-P
CNP902	1-539-672	printed circuit board 36-P; head
CNP903	1-506-180	terminating; 11-P

Ref. No.	Part No.		Description
PM901	1-454-059	lifter	
PM902	1-454-060	brake	
PM903	1-454-052	pinch roller (forward)	
PM904	1-454-052	pinch roller (reverse)	
PL501~504	1-518-093-21	100 mA, 2V	(included in METER ME501 ~ 504)
PL901~905	1-518-053-00	40 mA, 28V	(REW, FF, PLAY, REC, APS)
CP901	1-101-534	0.1 + 120 Ω	500 V
CP902~905	1-101-528	0.1 + 120 Ω	250 V
M901	8-836-624-06	capstan (UC-624G1)	
M902	8-832-638-01	supply reel (IC-638R)	
M903	8-832-638-01	take-up reel (IC-638R)	

SOLENOIDS

LAMPS

ENCAPSULATED COMPONENTS C-R

MOTORS

Ref. No.	Part No.		Description
ME501~504	1-524-056	VU, with PL 501 ~ 504	
RY301	1-515-127-11	650 Ω	24 V
RY601~604	1-515-127-41	650 Ω	24 V
RY801, 802	1-515-127-41	650 Ω	24 V
H901	8-825-542-40	playback (PP77-4204)	
H902	8-824-529-40	record (RP77-2904)	
H903	8-826-629-25	erase (EF18-2902A) (REAR)	
H904	8-826-629-25	erase (EF18-2902A) (FRONT)	
H905	1-459-051	sensing	
FB901	1-533-048	holder, fuse	
	1-536-213	lug plate, 5-P	
	1-508-411	pin terminal (plug)	
	1-517-018	socket, lamp; swan type	
	1-509-372	pin terminal (jack)	

METERS

RELAYS

HEADS

MISCELLANEOUS

TC-854-4

SECTION 7
HARDWARE

Part No.	*Description*
	SCREWS
0-503-222-00	⊕ P 3 x 8
7-621-255-24	⊕ P 2 x 4
7-621-255-34	⊕ P 2 x 5
7-621-255-44	⊕ P 2 x 6
7-621-255-54	⊕ P 2 x 8
7-621-255-74	⊕ P 2 x 12
7-621-259-44	⊕ P 2.6 x 6
7-621-259-54	⊕ P 2.6 x 8
7-621-259-64	⊕ P 2.6 x 10
7-621-555-34	⊕ K 2 x 5
7-621-555-44	⊕ K 2 x 6
7-621-559-24	⊕ K 2.6 x 4
7-621-559-44	⊕ K 2.6 x 6
7-621-712-22	⊖ SC 2.6 x 3
7-621-770-34	⊕ B 2 x 5
7-682-146-02	⊕ P 3 x 5
7-682-147-15	⊕ P 3 x 6
7-682-150-02	⊕ P 3 x 12
7-682-166-02	⊕ P 4 x 20
7-682-247-02	⊕ K 3 x 6
7-682-248-02	⊕ K 3 x 8
7-682-348-14	⊕ RK 3 x 8
7-682-367-14	⊕ RK 4 x 25
7-682-547-15	⊕ B 3 x 6
7-682-548-15	⊕ B 3 x 8
7-682-647-02	⊕ PS 3 x 6
7-682-648-02	⊕ PS 3 x 8
7-682-649-02	⊕ PS 3 x 10
7-682-651-02	⊕ PS 3 x 14
7-682-661-02	⊕ PS 4 x 8
7-682-662-02	⊕ PS 4 x 10

Part No.	*Description*
7-683-273-31	3 x 3, lock w/ hexagon socket
7-683-238-01	3 x 4, lock w/ hexagon socket
7-683-240-31	3 x 6, lock w/ hexagon socket
7-683-247-31	4 x 6, lock w/ hexagon socket
	2 x 4, lock w/ hexagon socket
	NUTS
7-622-107-04	2.6ϕ, hexagon socket
7-684-013-02	3ϕ, hexagon socket
7-684-014-02	4ϕ, hexagon socket
	WASHERS
7-623-105-14	2ϕ (middle)
7-623-107-14	2.6ϕ (middle)
7-623-108-14	3ϕ (middle)
7-623-110-14	4ϕ (middle)
7-623-205-21	2ϕ, spring
7-623-207-21	2.6ϕ, spring
7-623-208-21	3ϕ, spring
7-623-210-21	4ϕ, spring
	RETAINING RINGS
7-624-104-01	E-2
7-624-105-01	E-2.3
7-624-106-01	E-3
7-624-108-01	E-4
7-624-109-01	E-5
	LUG PLATE
7-623-508-01	3ϕ
	COTTER PIN
7-626-202-31	1ϕ x 10

– Hardware Nomenclature –

P – Pan Head Screw .....

PS – Pan Head Screw with Spring Washer .....

K – Flat Countersunk Head Screw ...

B – Binding Head Screw .....

RK – Oval Countersunk Head Screw ..

T – Truss Head Screw .....

R – Round Head Screw .....

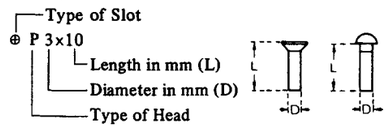
F – Flat Fillister Head Screw .....

SC – Set Screw .....

E – Retaining Ring (E Washer) .....

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –

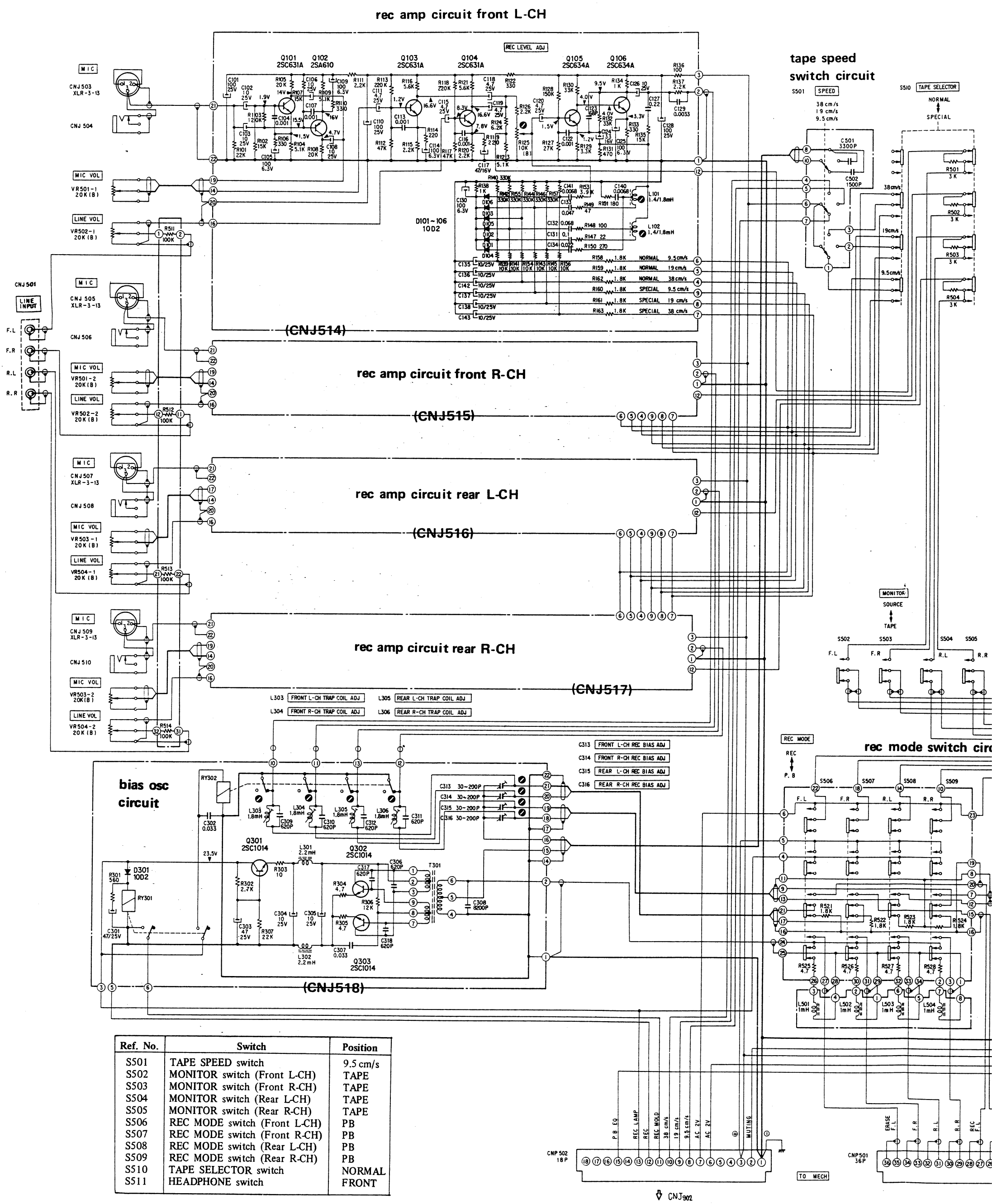


1J0636-1

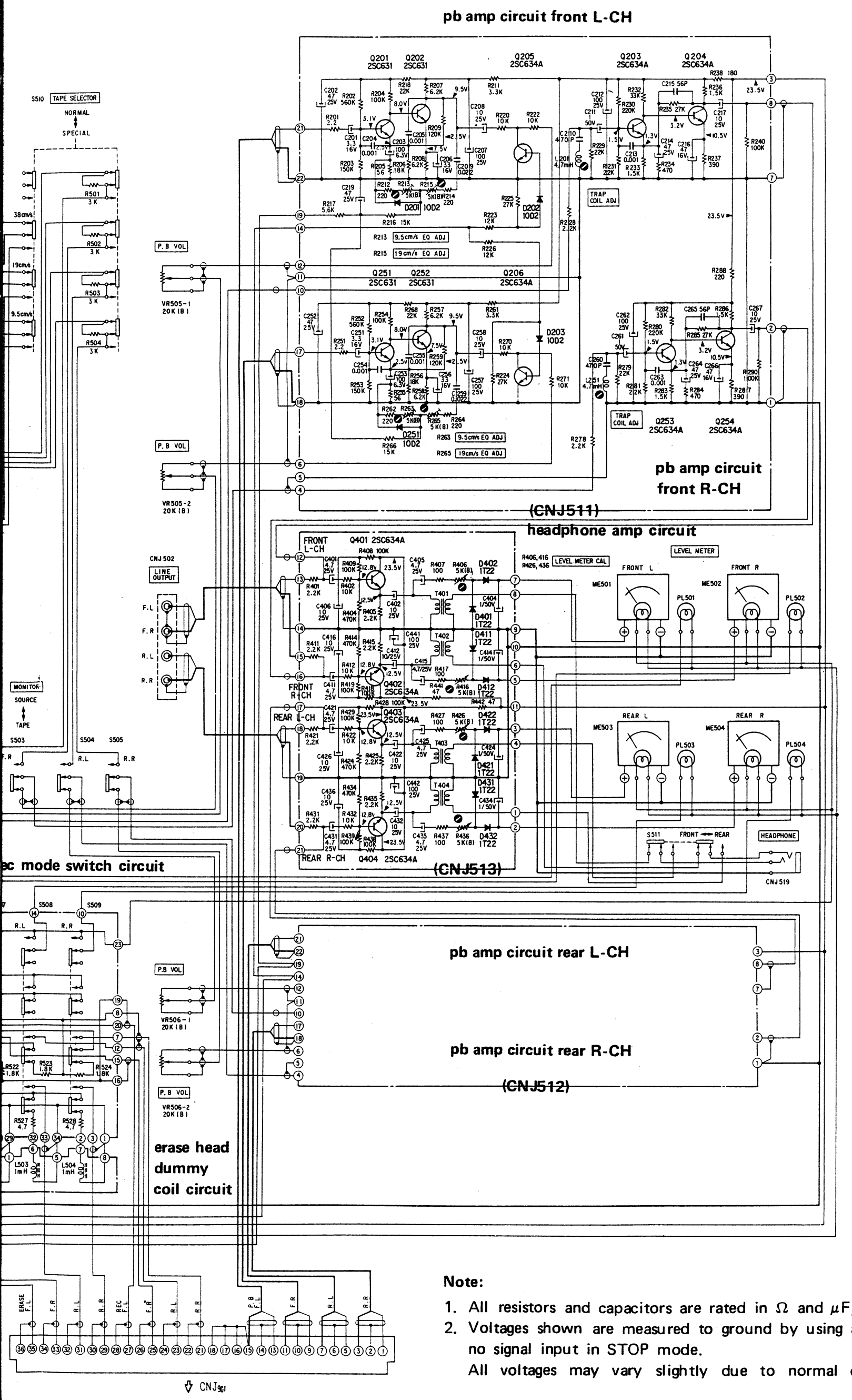
SONY CORPORATION

Printed in Japan

TC-854-4
SCHEMATIC DIAGRAM — Amplifier —



Ref. No.	Switch	Position
S501	TAPE SPEED switch	9.5 cm/s
S502	MONITOR switch (Front L-CH)	TAPE
S503	MONITOR switch (Front R-CH)	TAPE
S504	MONITOR switch (Rear L-CH)	TAPE
S505	MONITOR switch (Rear R-CH)	TAPE
S506	REC MODE switch (Front L-CH)	PB
S507	REC MODE switch (Front R-CH)	PB
S508	REC MODE switch (Rear L-CH)	PB
S509	REC MODE switch (Rear R-CH)	PB
S510	TAPE SELECTOR switch	NORMAL
S511	HEADPHONE switch	FRONT

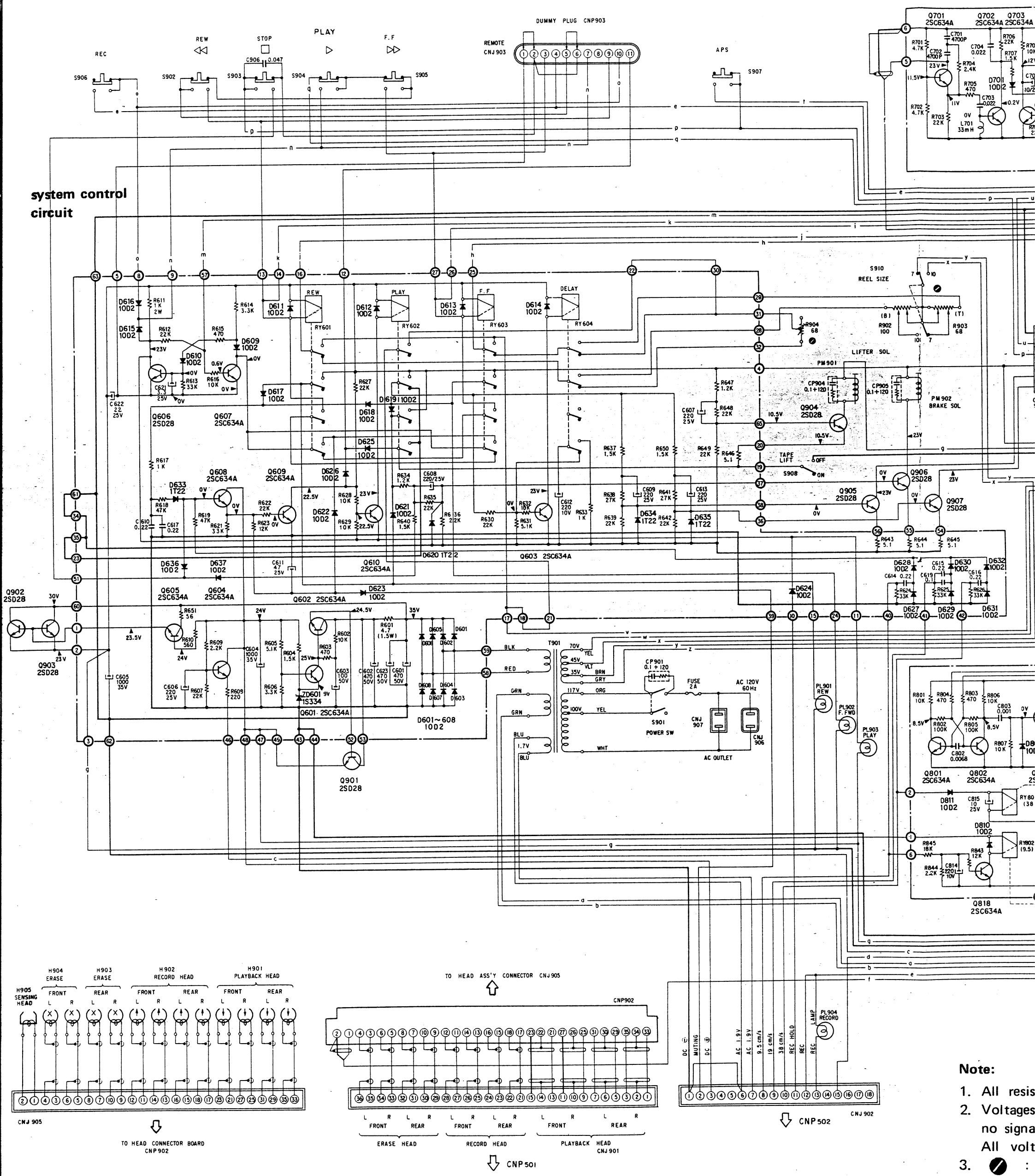


Note:

1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. Voltages shown are measured to ground by using a voltmeter (20kΩ/V) with no signal input in STOP mode.
   All voltages may vary slightly due to normal component tolerances, etc.

TC-854-4

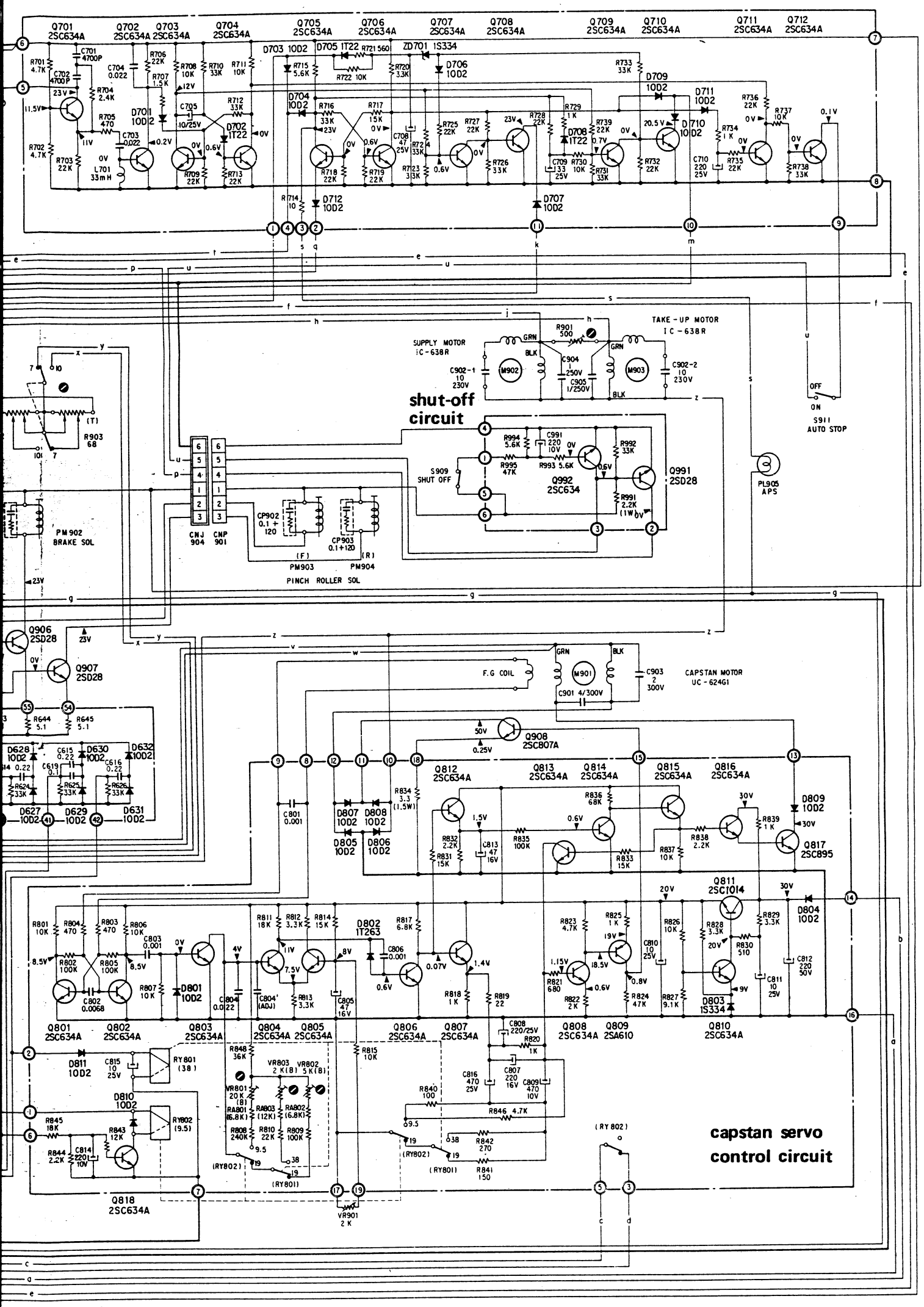
SCHEMATIC DIAGRAM — Mechanical Chassis —



Note:

1. All resis
2. Voltages
   no signa
   All volt
3. ⊘ :

aps & ats circuit

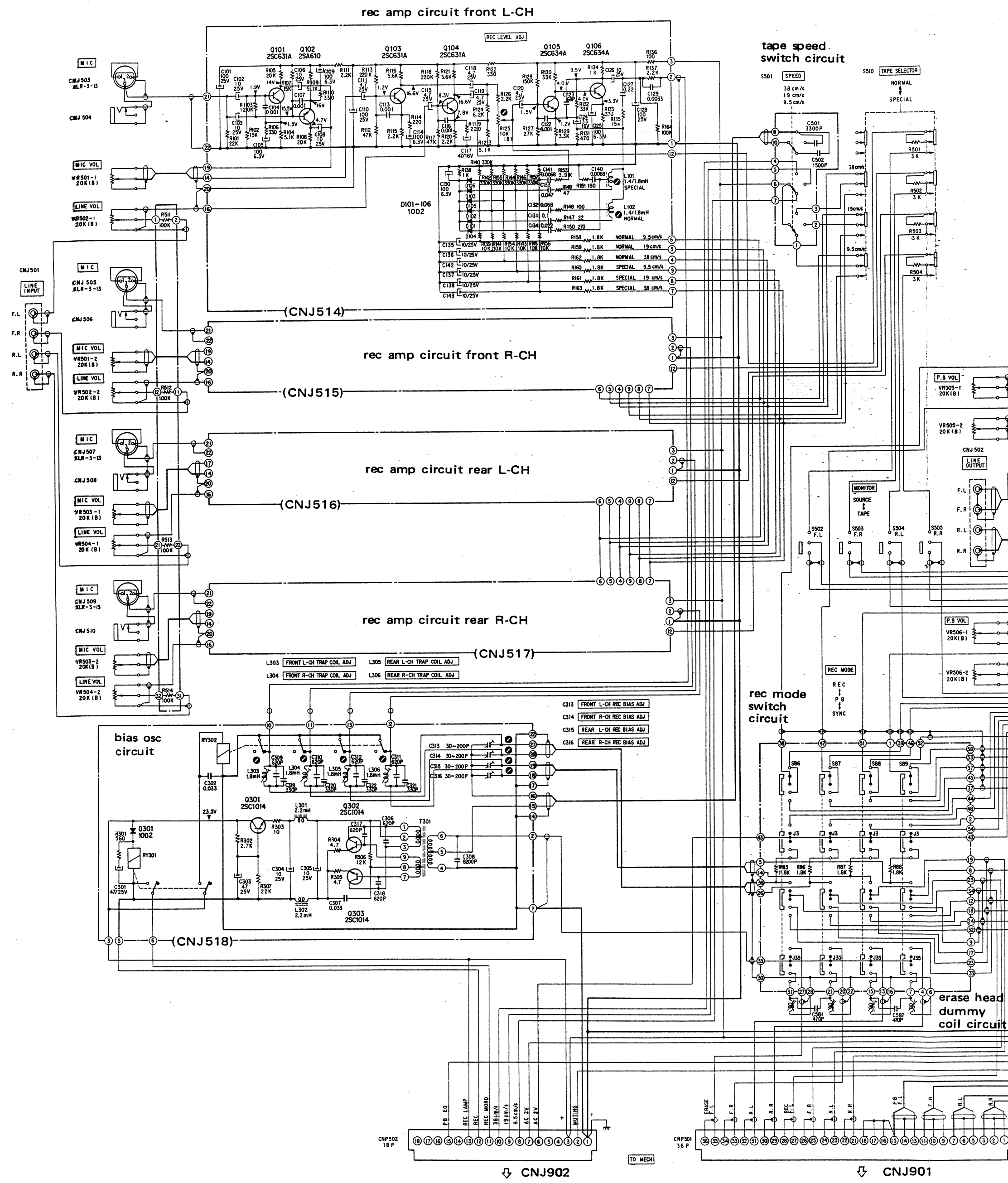


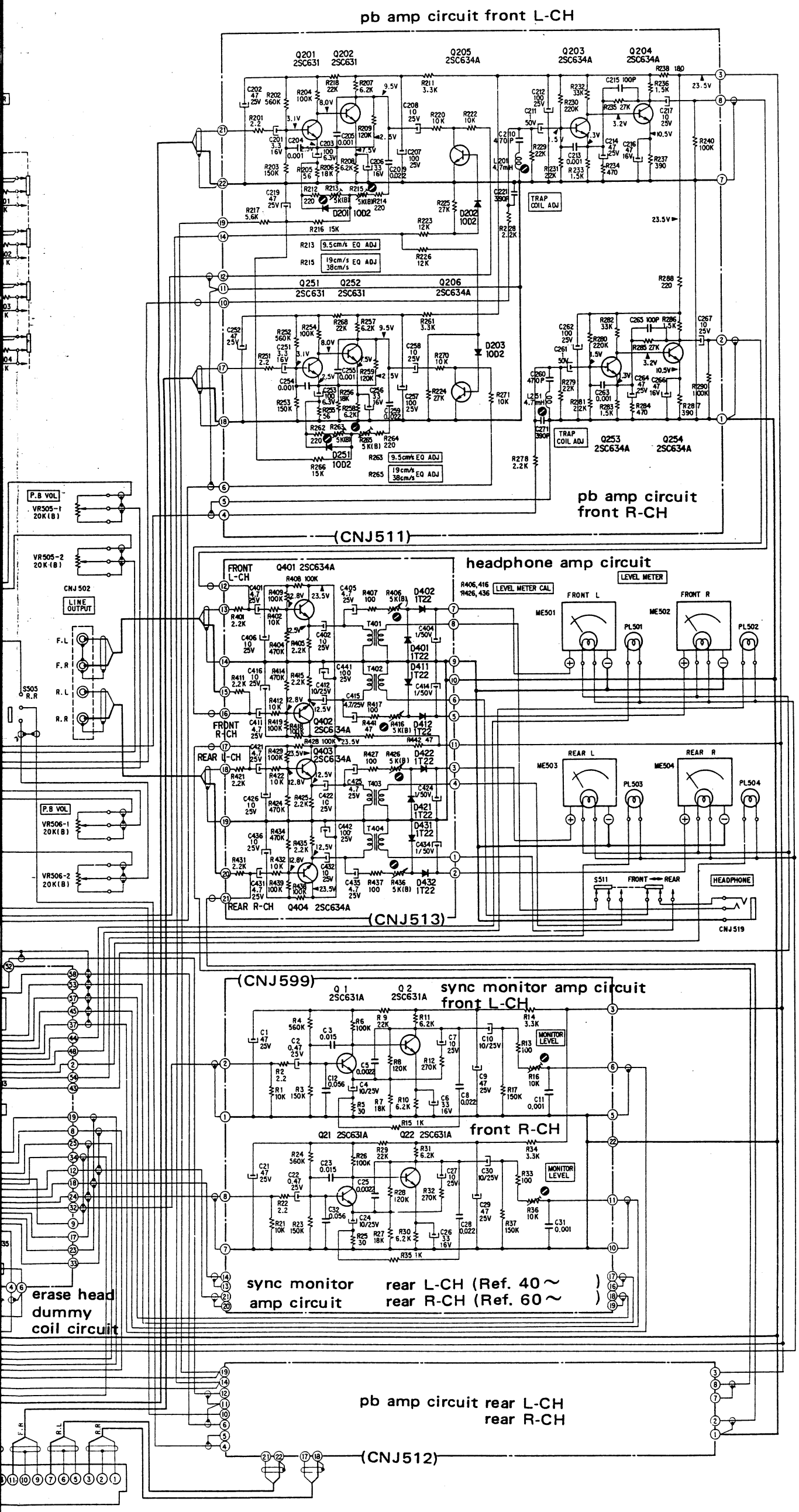
Note:

1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. Voltages shown are measured to ground by using a voltmeter (20 kΩ/V) with no signal input in record mode.
   All voltages may vary slightly due to normal component tolerances, etc.
3. ⊘ : adjustable.

Ref. No.	Switch	Position
S901	POWER switch	OFF
S902	rewind function switch	not push
S903	stop function switch	not push
S904	forward function switch	not push
S905	fast forward function switch	not push
S906	RECORD function switch	not push
S907	APS function switch	not push
S908	TAPE LIFT switch	ON
S909	shut-off switch	ON
S910	REEL SIZE switch	7
S911	AUTO STOP	OFF

TC-854-4
SCHEMATIC DIAGRAM — Applicable Serial No.: 10,201 and Later —





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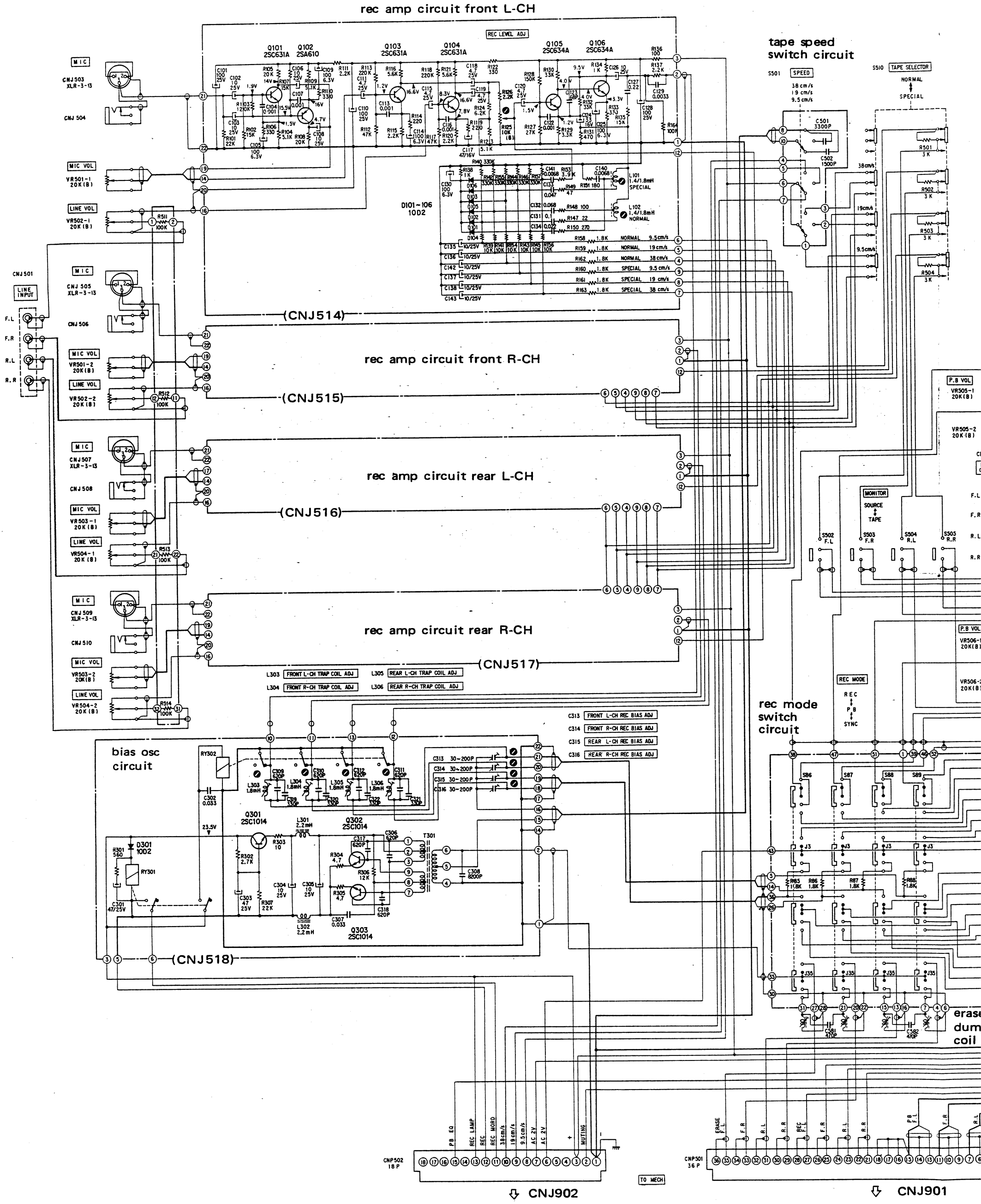
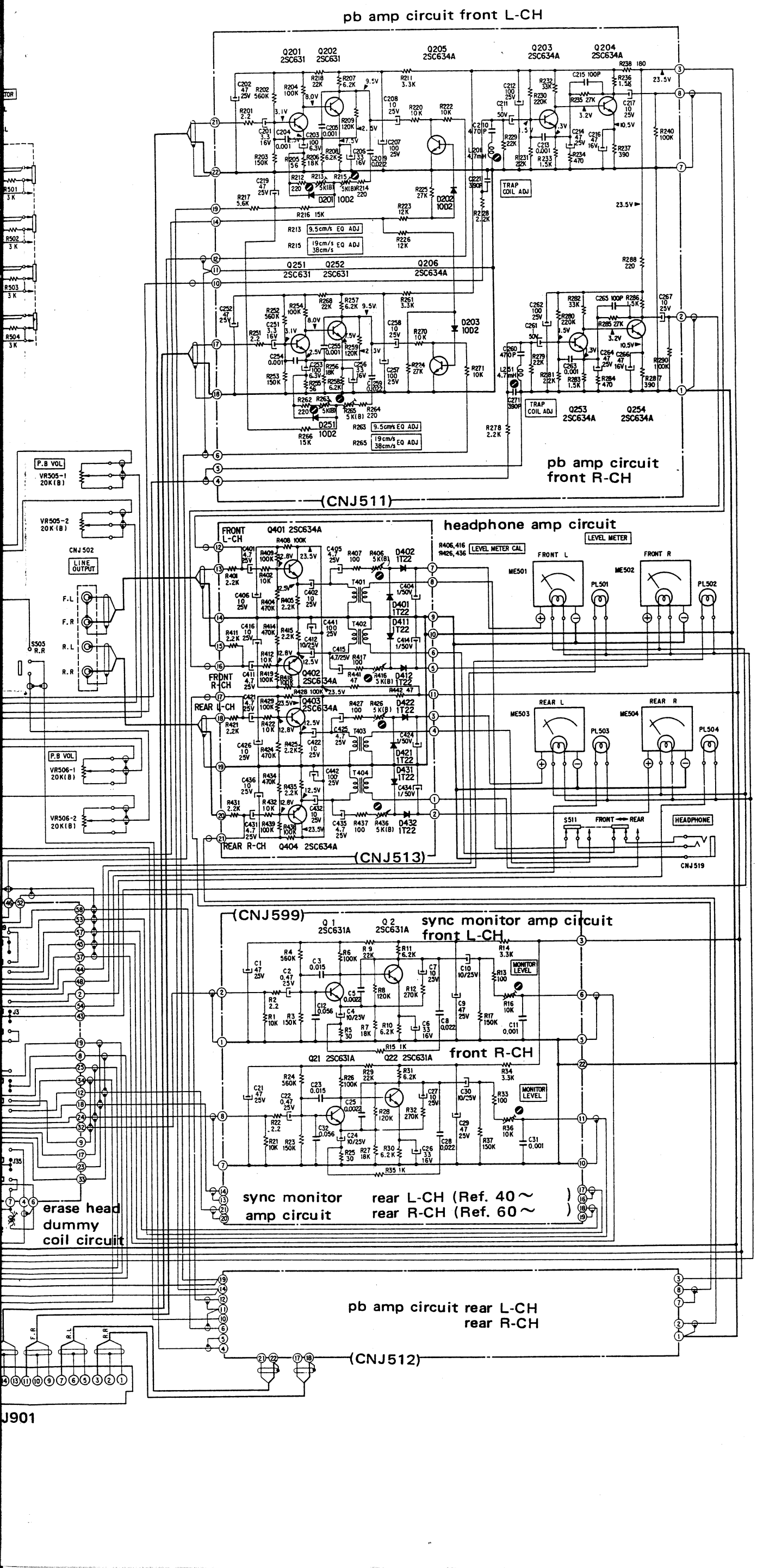
S507	REC MODE switch (Front R-CH)	PB
S508	REC MODE switch (Rear L-CH)	PB
S509	REC MODE switch (Rear R-CH)	PB
S510	TAPE SELECTOR switch	NORMAL
S511	HEADPHONE switch	FRONT

Note:

1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. Voltages shown are measured to ground by using a voltmeter (20kΩ/V) with no signal input in STOP mode. All voltages may vary slightly due to normal component tolerances, etc.

TC-854-4
SCHEMATIC DIAGRAM — Applicable Serial No.: 10,201 and Later —





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Note:

1. All resistors and capacitors are rated in Ω and μF, unless otherwise specified.
2. Voltages shown are measured to ground by using a voltmeter (20kΩ/V) with no signal input in STOP mode. All voltages may vary slightly due to normal component tolerances, etc.

■ Parts List (A Mechanism)

Item	Part Number	Part Name	Q'ty	Description	Area
1	188801501T	CHASSIS BASE	1		
2	18800102T	PACK SPRING	1		
3	SPST2004Z	SCREW	2		
4	18650250AT	TAPE GUIDE	2		
5	18650252T	SCREW	2		
6	18650254T	GUIDE SPRING	2		
7	188802307T	HEAD BASE ASSY	1		
8	18880202T	HEAD PANEL (A)	1		
9	18800204T	RC SPRING	1		
10	188802501T	HEAD PANEL (B) ASSY	1		
11	18800206T	CHP LEVER	1		
12	18800405T	PINCH ROLLER SPRING	1		
13	18650228T	CHP LEVER COLLAR	2		
14	9C0117301T	SCREW	2		
15	62020722T	HEAD	1		
16	9F1316482T	SCREW	2		
17	9P1520063T	SCREW	2		
18	9P0220051T	SCREW	2		
19	18650961T	SPACER	1		
20	18650234T	RELAY BOARD	1		
21	18650249T	WIRE CLAMP	1		
22	9P1220051T	SCREW	1		
23	18880204T	HEAD PANEL SPRING	1		
24	188807307T	RF. CLUTCH ASSY	1		
25	18880709T	RF. PULLER ARM SPRING	1		
26	18880707T	RF BELT	1		
27	11140302T	CORD CLAMP	1		
28	18880212T	SHIELD PLATE	1		
29	188805301T	T. REEL ASSY (F)	1		
30	188805302T	T. REEL ASSY (R)	1		
31	18880515T	B. T. SPRING	2		
32	18880508T	FF. GEAR	1		
33	18880509T	RF. TRIGGER ARM	1		
34	18880216T	PANEL COLLAR	1		
35	9C2520503T	SCREW	1		
36	9W0640030T	HL. WASHER CUT	2		
37	MMI-6H2LWK	DC MOTOR	1		
38	18881210T	MOTOR PULLEY (U)	1		
39	18881202T	MOTOR BRACKET	1		
40	19211202T	SCREW	2		
41	SPST2005Z	SCREW	5		
42	18880925T	M. BELT	1		
43	9W0640040T	HL. WASHER CUT	2		
44	18882109T	TRIGGER ARM SPRING	1		
45	18802105T	PLUNGER	2		
46	18802106T	PLUNGER HOLDER	2		
47	18882108T	SOLENOID	2		
48	18882104T	P. KICK LEVER	1		
49	18802111T	P. K. LEVER SPRING	1		
50	18882101T	CH. SLIDE LEVER	1		
51	18882102T	M. GEAR	1		
52	18882103T	M. TRIGGER ARM	1		
53	18882110T	RF. CAM GEAR	1		
54	REE2000X	E. RING	1		
55	9W0650040T	HL. WASHER CUT	1		

Item	Part Number	Part Name	Q'ty	Description	Area
56	18885306T	P. BASE	1		
57	18885303T	IC PROTECTOR	1		
58	640101193T	LEAF SWITCH	2		
59	640101194T	LEAF SWITCH	1		
60	640101195T	LEAF SWITCH	1		
61	68040604T	HALL IC	1		
62	68150206T	CONNECTOR	1		
63	18885304T	P. BASE STAND	2		
64	SPST2004Z	SCREW	1		
65	188805501T	T. GEAR ARM (F) ASSY	1		
66	18880507T	T. GEAR	2		
67	188805502T	T. GEAR ARM (R) ASSY	1		
68	18880513T	T. G. ARM (F) SPRING	1		
69	18880514T	T. G. ARM (R) SPRING	1		
70	188804301T	PINCH ROLLER ARM (F) ASSY	1		
71	18800403T	P. ARM (F) SPRING	1		
72	188804302T	PINCH ROLLER ARM (R) ASSY	1		
73	18800404T	P. ARM (R) SPRING	1		
74	188809301T	FL METAL (F) ASSY	1		
75	188809302T	FL METAL (R) ASSY	1		
76	9W0650050T	HL. WASHER CUT	1		
77	188809311T	FLYWHEEL (F) ASSY	1		
78	9W0650080T	HL. WASHER CUT	1		
79	188809312T	FLYWHEEL (R) ASSY	1		
80	9W0520030T	HL. WASHER	2		
81	18881309T	EJECT STOPPER	1		
82	18881302T	EJECT STOPPER	1		
83	99991404T	SCREW	1		
84	18801320T	SPRING	1		
85	18801305T	E. STOPPER COLLAR	1		

JVC
VICTOR COMPANY OF JAPAN, LIMITED
AUDIO PRODUCTS DIVISION, 1664, SHIMOTSURUMA, YAMATO-SHI, KANAGAWA-KEN, 242, JAPAN