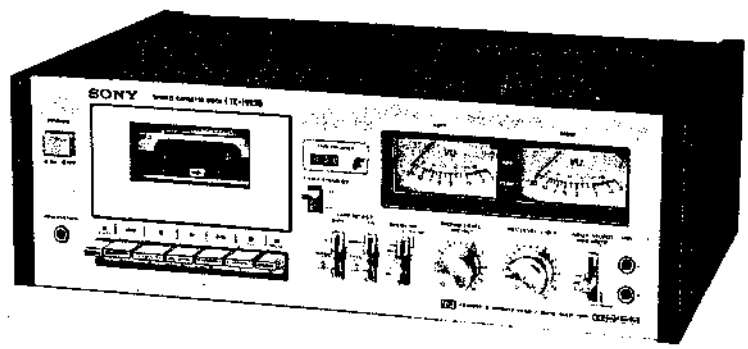
TC-199SD

AEP Model
E Model
Canadian Model



STEREO CASSETTE DECK

SPECIFICATIONS

Power Requirements: 120V ac, 60Hz (Canadian model)
110, 120, 220, 240V ac, 50/60Hz
(AEP, E model)

Power Consumption: 11W ac

Dimensions: Approx. 440 (w) x 145 (h) x 290 (d) mm
17 1/4 (w) x 5 3/4 (h) x 11 3/8 (d) inches
including projecting parts and controls

Weight: Approx. 7kg, 15lb 7oz

Track: 4-track 2-channel stereo

Fast Forward Rewind Time: Approx. 90 seconds with Sony cassette C-60

Frequency Response: DOLBY NR OFF
With Ferri-Chrome cassette
20–18,000Hz (NAB)
30–16,000Hz ±3dB (NAB)
30–16,000Hz (DIN)
With chromium dioxide cassette
20–17,000Hz (NAB)
30–15,000Hz ±3dB (NAB)
30–15,000Hz (DIN)
With regular cassette
20–15,000Hz (NAB)
30–13,000Hz (DIN)

Wow and Flutter: 0.08% (RMS) weighted NAB
±0.2% DIN

S/N Ratio: DOLBY NR OFF
With Ferri-Chrome cassette
59dB at peak level (NAB)
57dB (DIN, 1975 rev.)
49dB (DIN, old)
With chromium dioxide cassette
56dB at peak level (NAB)
DOLBY NR ON
Improved by 5dB at 1kHz, 10dB above 5kHz

— Continued on page 2 —

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SONY®
SERVICE MANUAL

SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab:

record/playback head	pinch roller
erase head	rubber belts
capstan	idlers

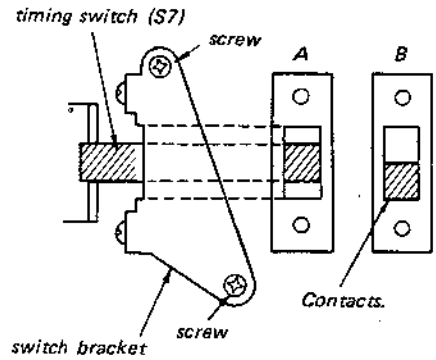
2. Demagnetize the record/playback head with a head demagnetizer. (Do not bring the head demagnetizer close to the erase head.)
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply a suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.

Timing Switch (S7) Position Adjustment

– Stop Mode –

Loosen the screws and adjust position of the switch bracket so that it is placed as shown in Fig. B.

After the adjustment, tighten the screws.

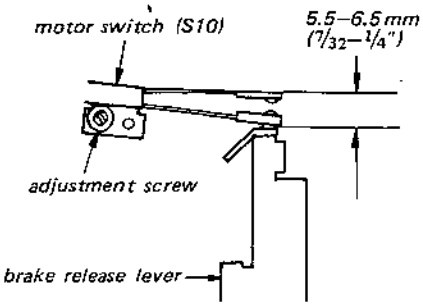


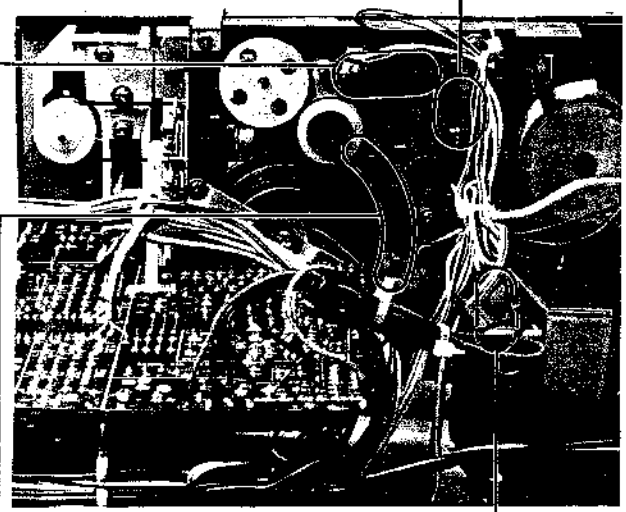
Motor Switch (S10) Position Adjustment

– Stop Mode –

Loosen adjustment screw and adjust the position of the switch for the specified clearance between the switch leaves.

After the adjustment, tighten and lock the screw with a suitable locking compound.



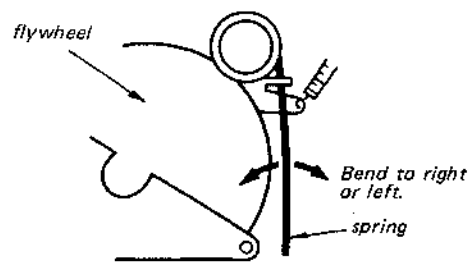


Fast Forward and Rewind Torque Adjustment

– Fast Forward and Rewind Modes –

Use type CQ-201A cassette torque meter.

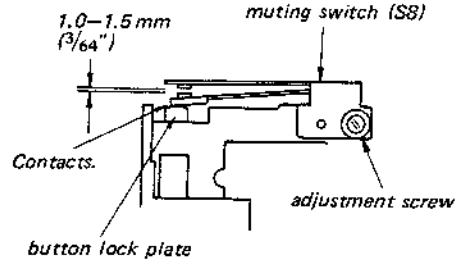
Bend the spring for the torque of 55–95 g·cm (0.8–1.3 oz·inch).



Muting Switch (S8) Position Adjustment

– Stop Mode –

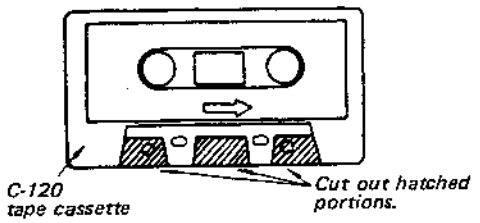
Loosen the adjustment screw and adjust the position of the switch for the specified clearance between the switch leaves.



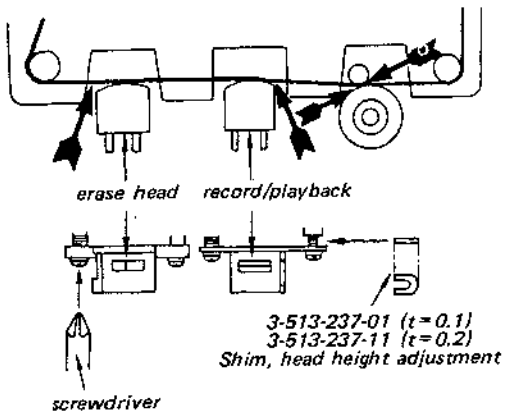
Tape Path Adjustment

– Playback Mode –

1. Make an adjustment cassette as shown below.



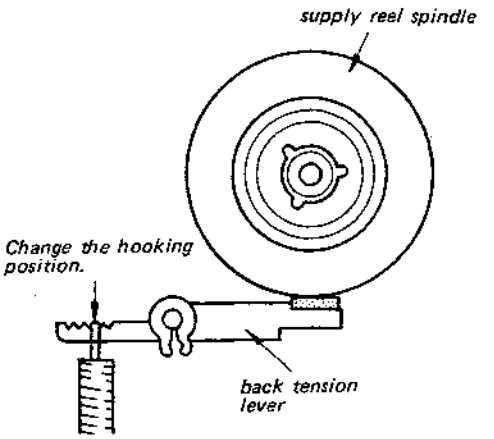
2. In playback mode and viewing from the front, adjust the head heights to eliminate tape curl and tape twist at arrowed portions.



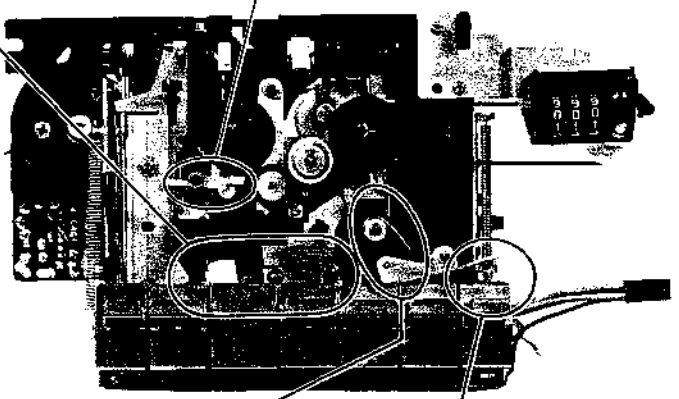
Playback Tension Torque Adjustment

– Playback Mode –

Use type CQ-101A or CQ-102A cassette torque meter.



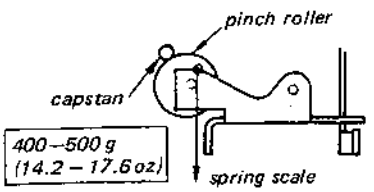
Specification: 2.5–3.5 g·cm (0.04 oz·inch)



Pinch Roller Pressure Adjustment

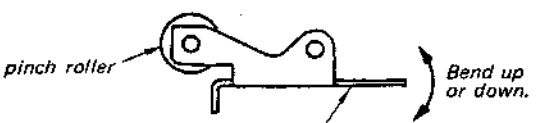
– Playback Mode –

1. Hook the pinch roller with a spring scale.
2. Pull the spring scale.
3. Slowly return the pinch roller and read the spring scale just when the pinch roller starts to rotate.



PAUSE Timing Adjustment

– PAUSE Mode –



Bend here and adjust the position of pinch roller so that the rotations of pinch roller and reel spindles stop at the same time.

Reference Data

Forward Torque:	30–60 g.cm (0.42–0.8 oz.inch)
Pinch Roller Pressure:	400–500 g (14.2 – 17.6 oz)
Shut-off Time:	Within six seconds

3-2. ELECTRICAL ADJUSTMENTS

Note: The adjustment should be performed in the order given in this service manual. The adjustments should be performed for both L-CH and R-CH.

Test Equipment/Tools Required:

audio oscillator (af osc)
VTVM
digital frequency counter
speed checker SONY LFM-30
oscilloscope
attenuator (600 Ω)
non-magnetic screwdriver
resistors ... 600 Ω (1/4 W), 10 kΩ (1/4 W), 100 kΩ (1/4 W)
blank tapes (completely erased with bulk eraser)
SONY CS-10 (HF), CS-20 (CrO_2), CS-30 (Fe-Cr)

BIAS and EQ switch settings in accordance with tape used are as follows.

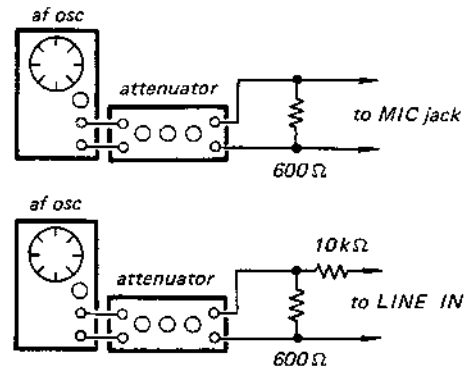
Tape	BIAS switch	EQ switch
CS-10	NORMAL	NORMAL
CS-20	HIGH	CrO_2
CS-30	NORMAL	Fe-Cr

SONY test tapes
P-4-A81S (6.3 kHz, -10 dB)
P-4-A82 (10 kHz, -10 dB)
P-4-L81 (333 Hz, 0 dB)
WS-48 (3 kHz, 0 dB)

Switches and controls should be set as follows unless otherwise specified.
DOLBY NR switch: OFF
LINE OUT control: MAX
EQ switch: NORMAL
BIAS switch: NORMAL

Test Equipment Connections:

Input side:



Standard Record:

Deliver the standard input signal level to the input jack and set the REC LEVEL control to obtain the standard output signal level.

Standard Input Level

	MIC	LINE IN	REC/PB (AEP model)
source impedance	300Ω	10 kΩ	82 kΩ
input level	0.77 mV (-60 dB)	0.25 V (-10 dB)	31 mV (-28 dB)

Standard Output Level

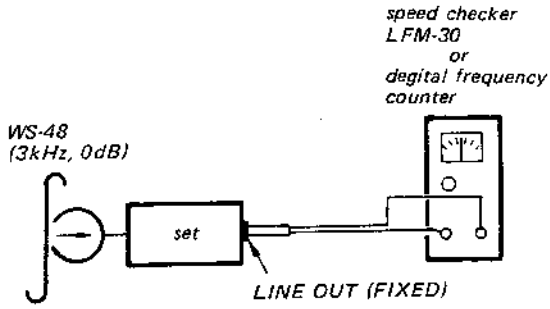
	LINE OUT	HEAD-PHONES	REC/PB (AEP model)
load impedance	100 kΩ	8Ω	50 kΩ
output level	0.44 V (-5 dB)	62 mV* (-22 dB)	0.44 V (-5 dB)

* with PHONES LEVEL LINE OUT control at "10"

1. Tape Speed Adjustment

Procedure:

Mode: Playback



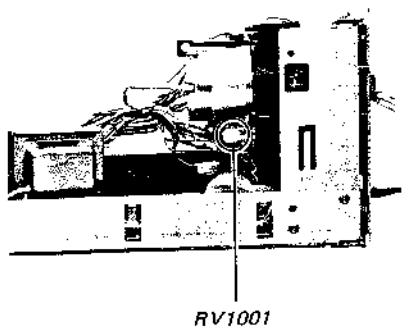
Adjust RV1001 to obtain the values specified below.

Specification:

Speed checker	Digital frequency counter
-0.7—+0.7%	2,980—3,020 Hz

Frequency difference between beginning and end of tape should be within 0.7% (20 Hz).

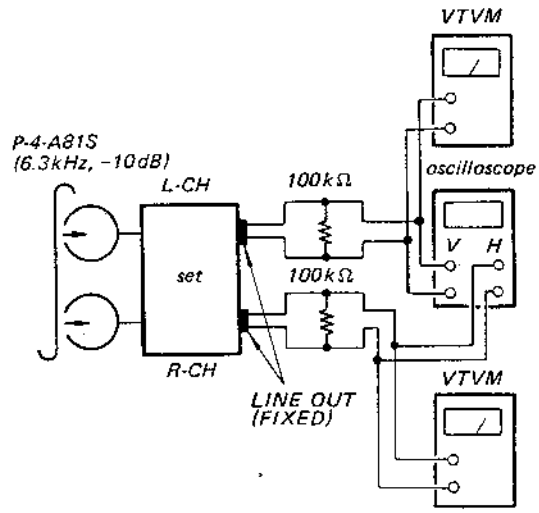
Adjustment Location:



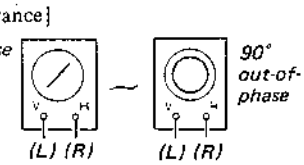
2. Record/playback Head Azimuth Adjustment

Procedure:

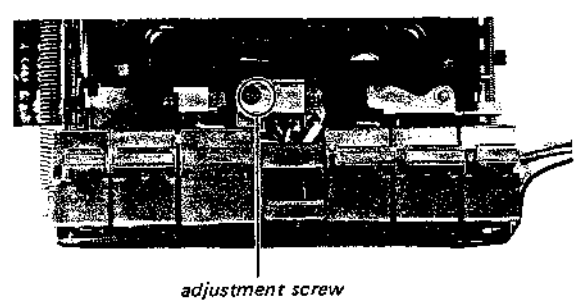
1. Mode: Playback



2.

Adjust	Oscilloscope patterns
azimuth adjustment screw to obtain the in-phase pattern around the highest VTVM readings.	[Allowance] in-phase  90° out-of-phase (L) (R) (L) (R) Level drop should be within 0.5 dB

Adjustment Location:

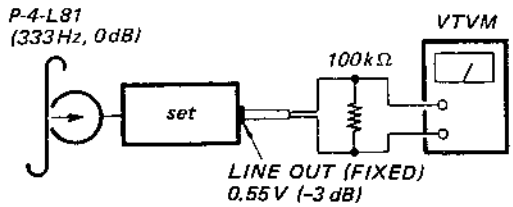


Note: This adjustment can be performed with the cassette lid (A) removed.

3. Playback Level Adjustment

Procedure:

1. Mode: Playback



Adjust RV301 (L-CH) and RV401 (R-CH) to obtain 0.55 V (-3 dB) VTVM reading.

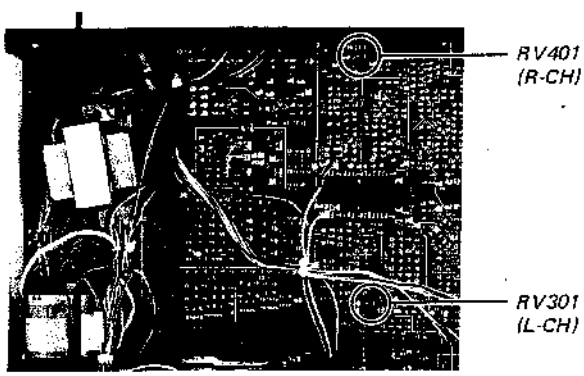
2. Assure that the LINE OUT level does not change when the mode is changed from playback to stop several times.

Specification:

LINE OUT level: 0.52–0.58 V (-2.5–-3.5 dB)

Level difference between channels: less than 0.5 dB

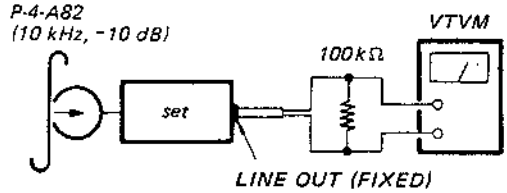
Adjustment Location:



4. Playback Equalizer Adjustment

Procedure:

Mode: Playback

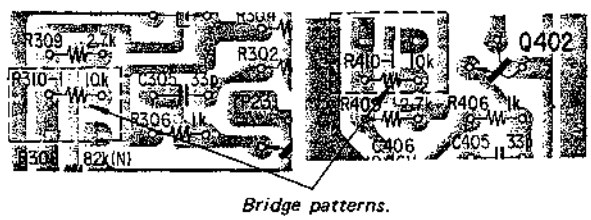


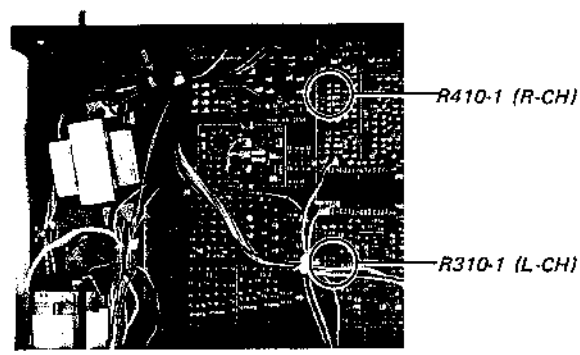
Adjust R310-1 (L-CH) and R410-1 (R-CH) for 0.12–0.25 V (-16–-10 dB) VTVM reading.

TAPE SELECT EQ switch:

Fe-Cr or CrO_2	0.069–0.14 V (-21–-15 dB)

Adjustment Location:

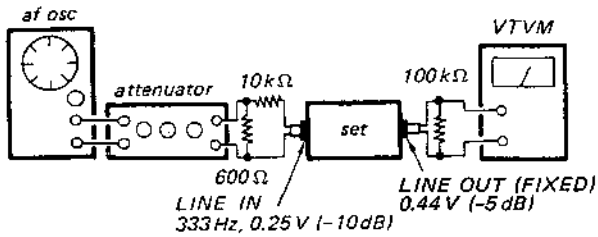




5. Level Meter Calibration

Procedure:

1. Mode: Standard record (See page 9.)



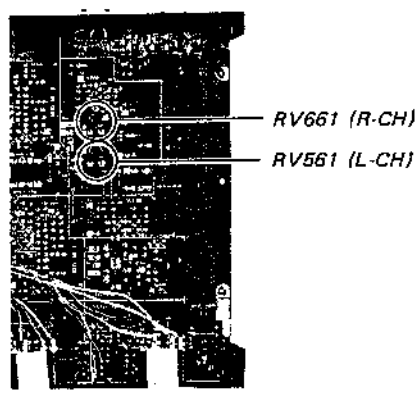
2.

Adjust	VU meter reading: 0 VU
RV561 (L-CH) RV661 (R-CH)	

Specification:

When the LINE IN level is adjusted to make 0 VU indication, VTVM reading should be 0.52–0.58 V (–3.5––2.5 dB).

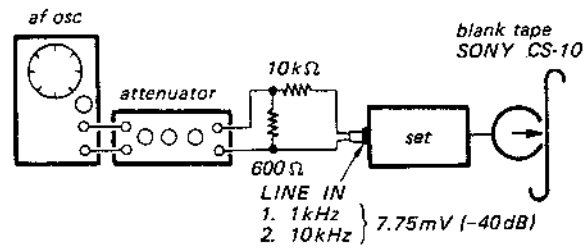
Adjustment Location:



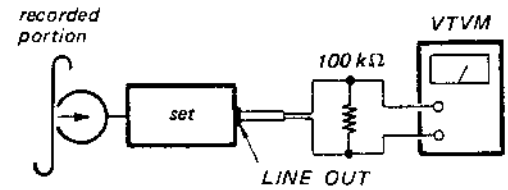
6. Record Bias Adjustment

Procedure:

1. Mode: Standard record (See page 9.)



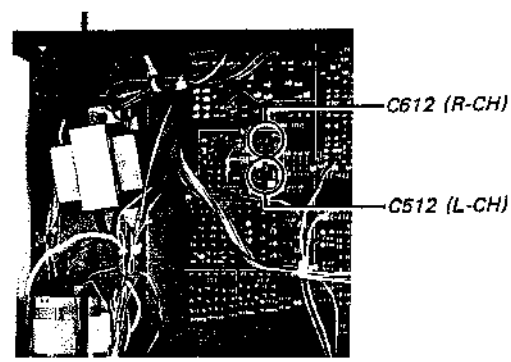
2. Mode: Playback



Adjust C512 (L-CH) and C612 (R-CH) to make 10 kHz and 1 kHz signal output levels equal.

Level difference between the two output levels: 0 dB ± 1 dB

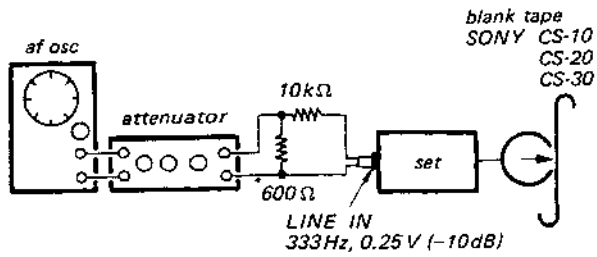
Adjustment Location:



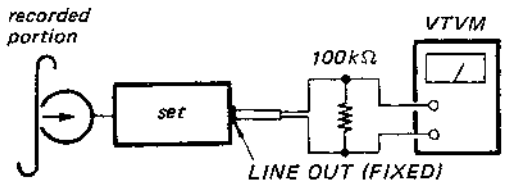
7. Record Level Adjustment

Procedure:

1. Mode: Standard record (See page 9.)



2. Mode: Playback



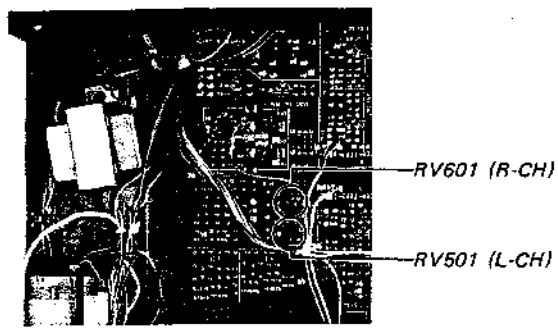
Adjust RV501 (L-CH) and RV601 (R-CH) to obtain 0.44 V (−5 dB) VTVM reading.

3. Change the blank tape to CS-20 and CS-30, and perform the same record and playback procedure. Measure LINE OUT level.

Specification:

SONY tape	LINE OUT level
CS-10	0.41–0.46 V (−5.5–−4.5 dB)
CS-20 CS-30	0.37–0.52 V (−6.5–−3.5 dB)

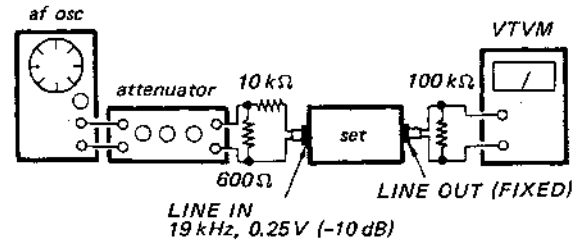
Adjustment Location:



8. 19 kHz Filter Adjustment

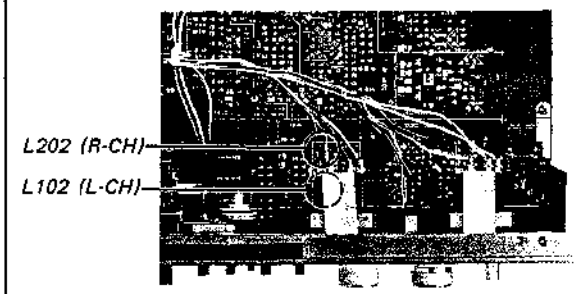
Procedure:

DOLBY NR switch: ON



Adjust L102 (L-CH) and L202 (R-CH) for 25 mV (−30 dB) or less VTVM reading.

Adjustment Location:



SECTION 4
DIAGRAMS

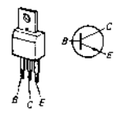
4-1. MOUNTING DIAGRAMS

– Conductor Side –

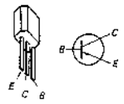
Replacement semiconductors
For replacement, use semiconductors except in ( ).

IC1001: CX065A

Q01: 2SC1760
Q1001: 2SC1760 (2SC1761)

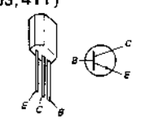


Q11, 13 / Q312, 412: 2SA678 (2SA677)

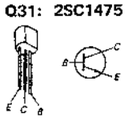


Q12, 21, 22
Q304–310
Q404–410
Q501, 551, 561
Q601, 651, 661
: 2SC634A (2SC633A)

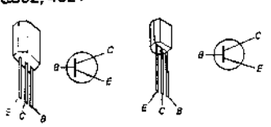
Q102, 202
Q301, 303, 311
Q401, 403, 411
: 2SC632A (2SC631A)



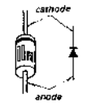
Q31: 2SC1475



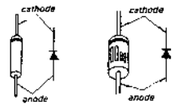
Q101, 201 / Q302, 402: 2SC632A (2SC1361)



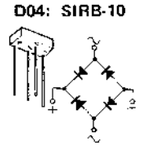
D01: EQB01-21 (EQA01-21R)
D11: EQB01-24 (EQA01-24R)



D02, 03: 10E2 (SIB01-02)

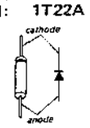


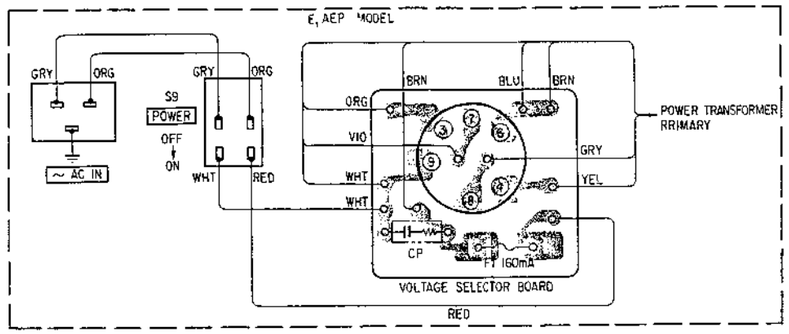
D04: SIRB-10



D21, 22: SLP24B

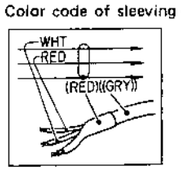
D301, 401: 1S1555 (1T22A)
D302, 402: 1T22A
D303, 403: 1S1555
D304, 404 / D563, 663: 1S1555 (1T40)
D561, 661: 1T22A (1T22)

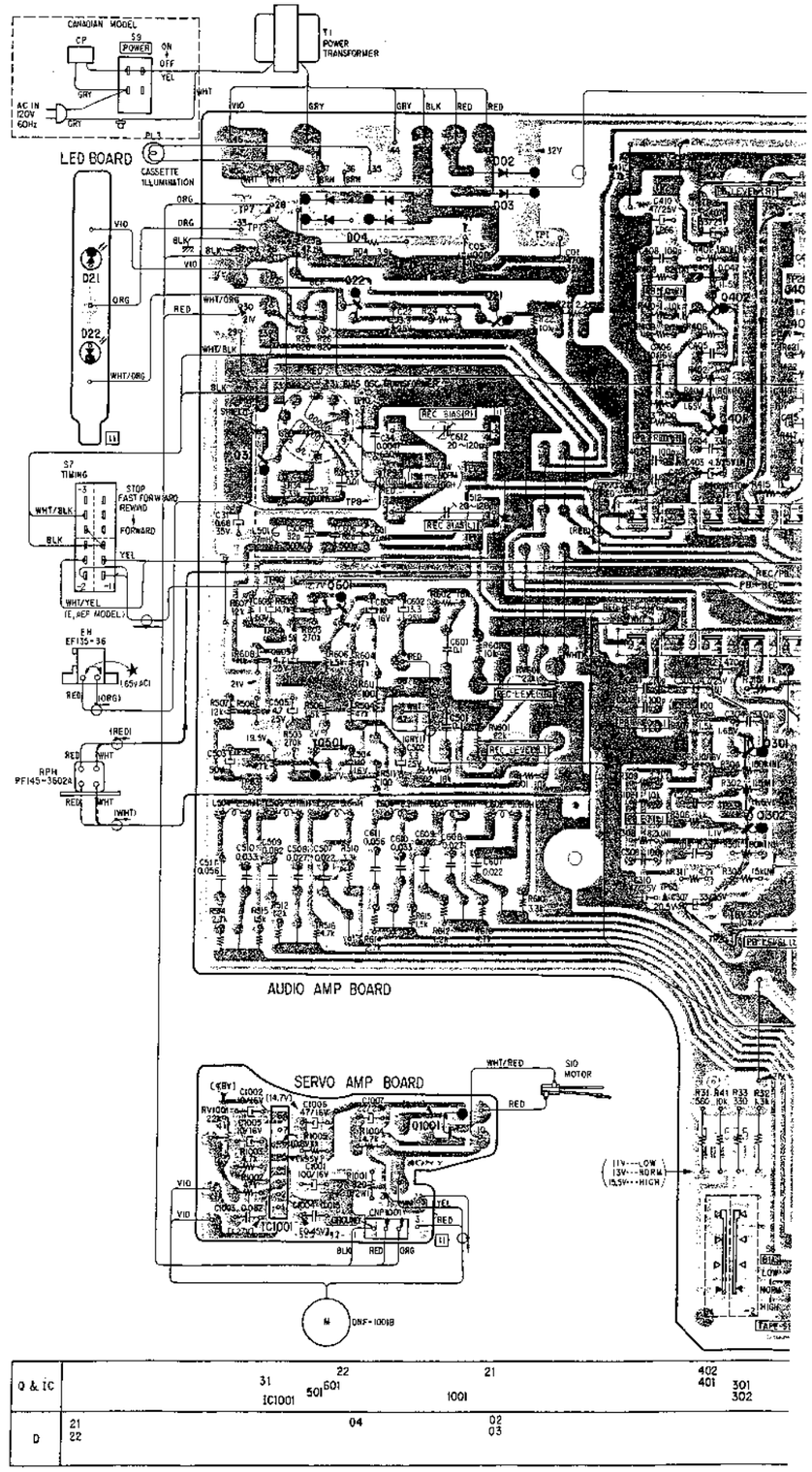




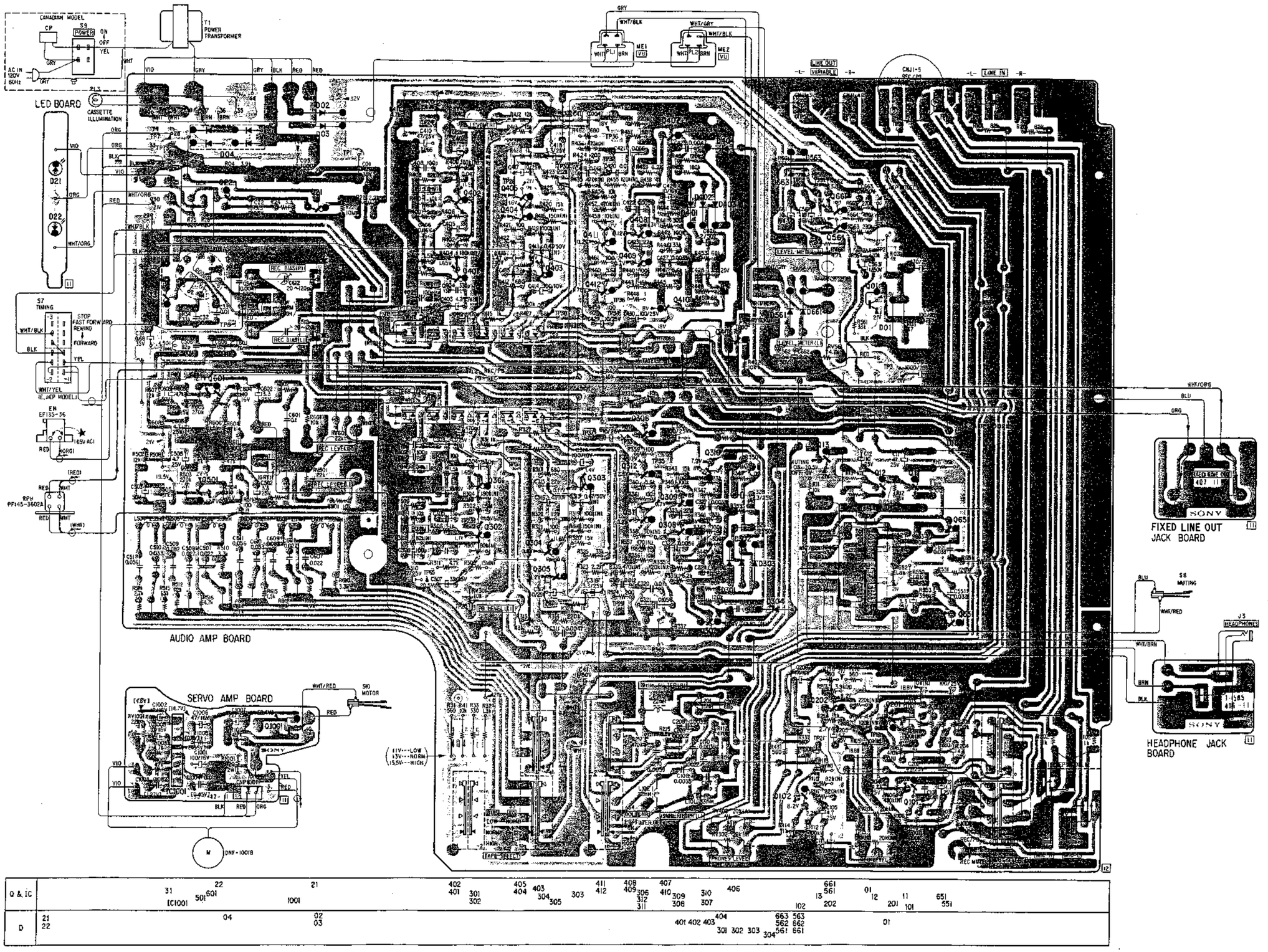
Note:

- ▨ : B+ pattern
- Signal Path
  L-ch audio playback: ▬▪▬➡
  R-ch audio playback: ▬▪▪➡
- Color code of sleeving over the end of the jacket.



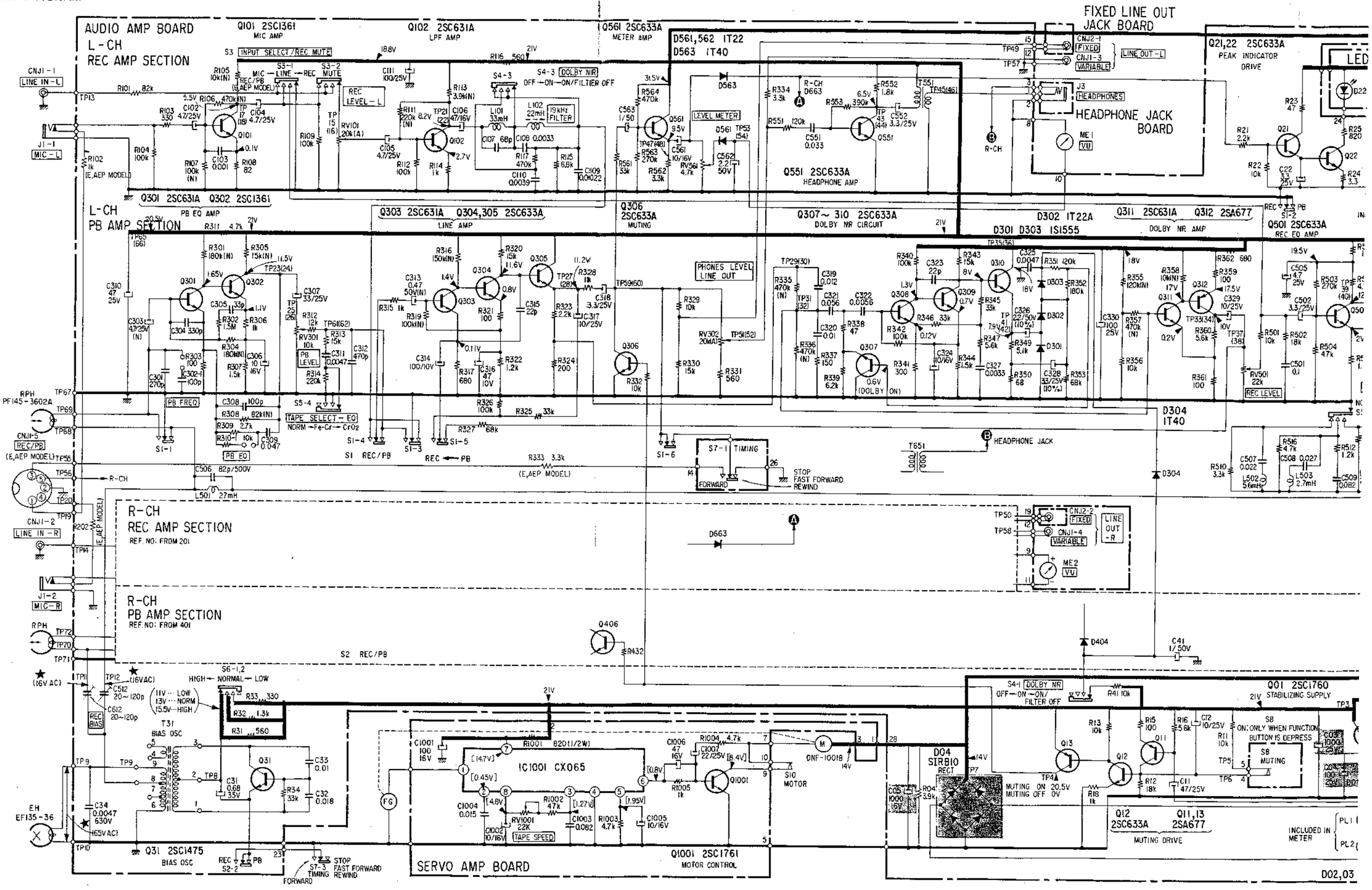


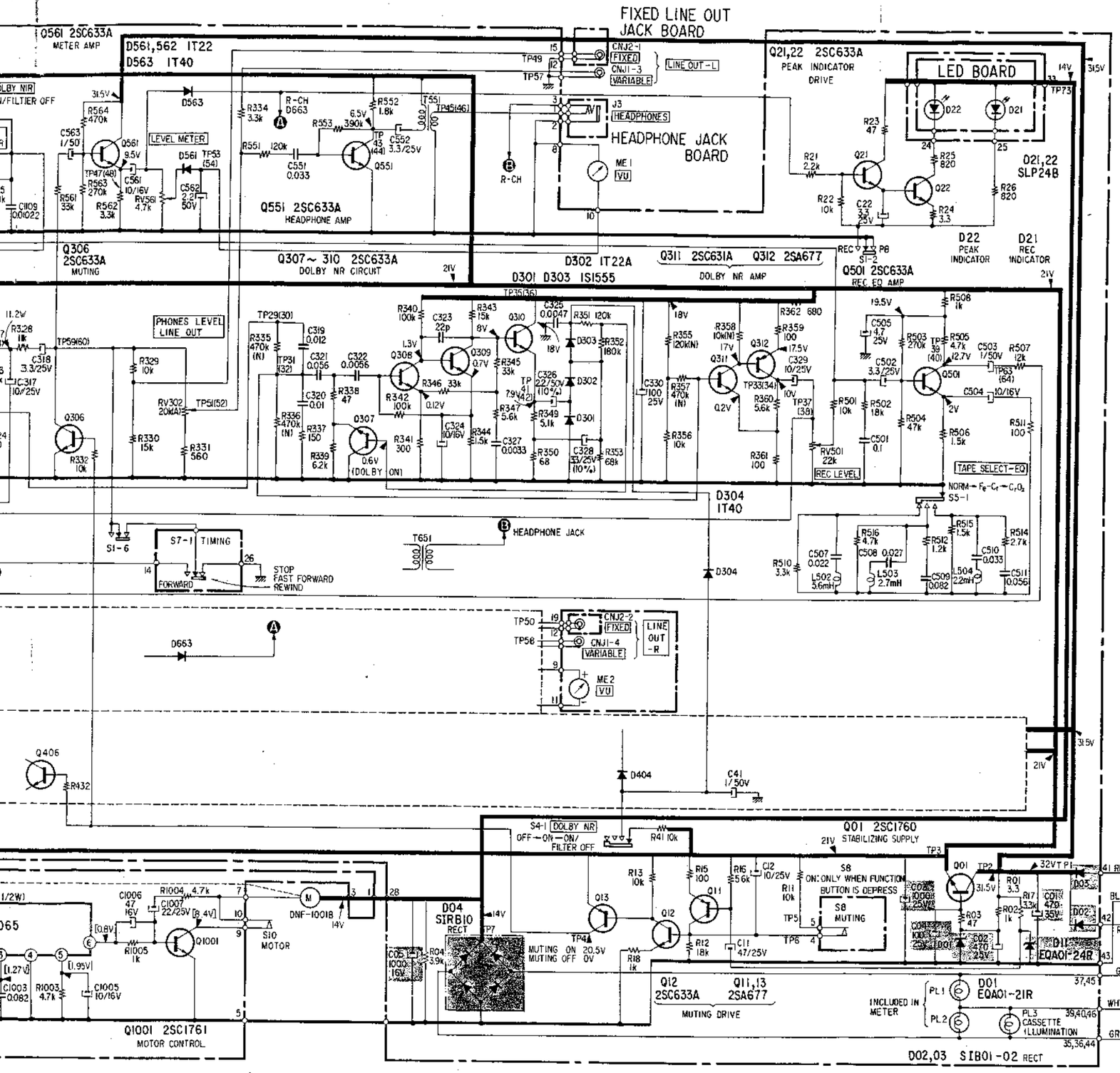
Q & IC	31 IC1001	501	601	22	1001	21	402	401	301	302
D	21 22			04		02 03				



Q & IC	31 (IC1001)	22 501 601	21 1001	402 401 301 302	405 404 403 304 305	303	411 412	408 409 306 312 311	407 410 309 308	310 307	406	102	661 561 13 202	01 12	11 201	101	651 551
D	21 22	04	02 03	401 402 403	404 301 302 303	304	663 562 561	563 662 661	01								

4-2. SCHEMATIC DIAGRAM

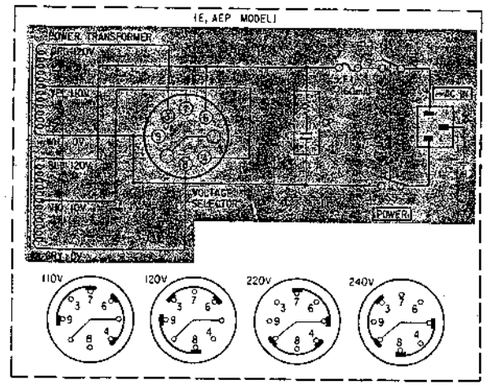




Note:

- Components for right channel have the same values as for left channel. Reference numbers are coded from 201 or 401.
- All capacitors are in μF unless otherwise noted. pF = μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000Ω, MΩ = 1000kΩ
- (N) : low-noise capacitor and resistor.
- 10% indicates component tolerance.
- ▬ : B+ bus.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ⏚ : direct connection to points marked ⏚ on the chassis.
- ⏚ : chassis ground.
- TP□□ (□□) indicates test point.
  ( ) : R-ch test point.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (20kΩ/V).
  ( ) : record mode
  [ ] : forward mode
- AC voltage readings indicated by * in the bias oscillator circuit are taken with a VTVM.
- Voltage variations may be noted due to normal production tolerances.
- Switch

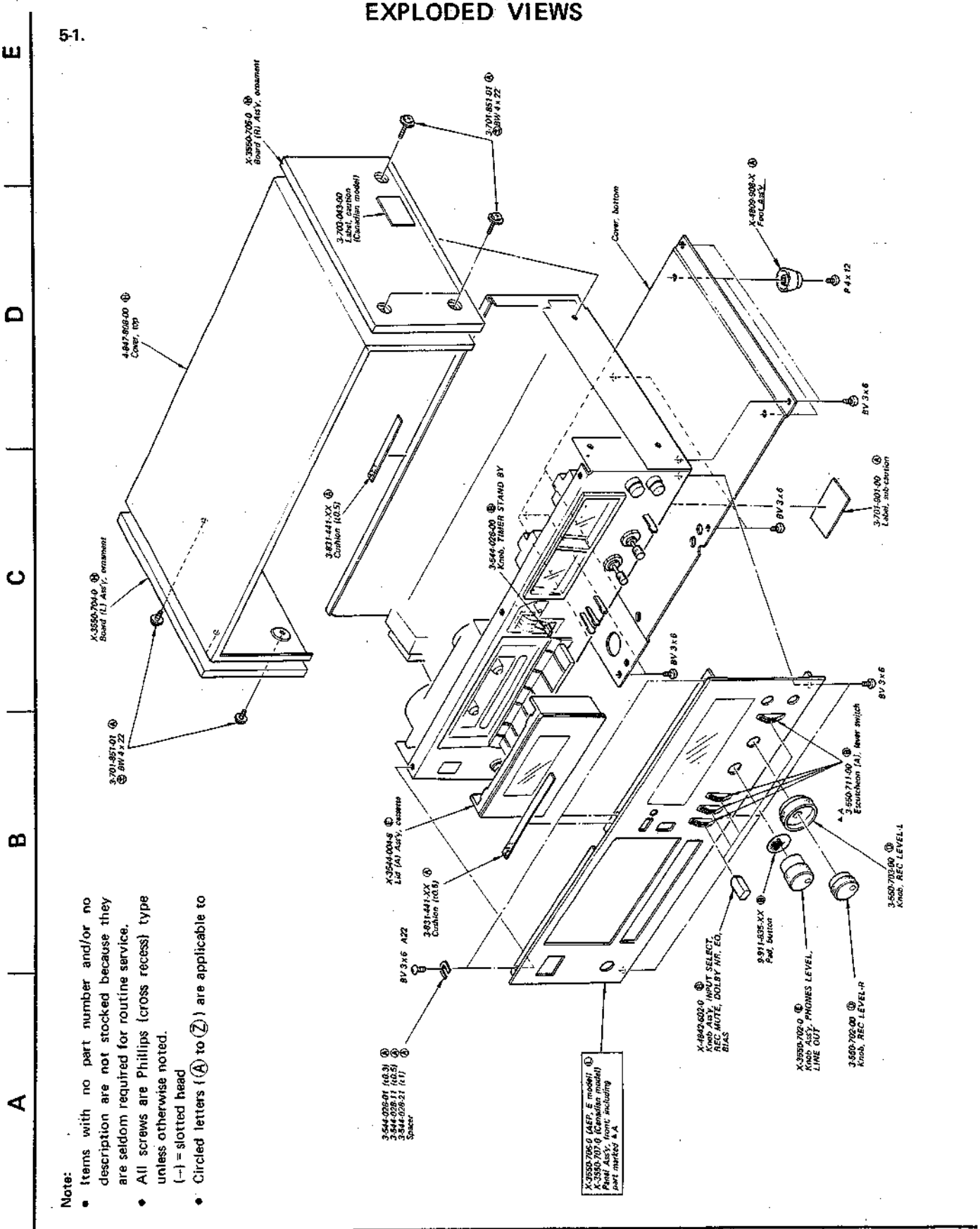
Ref. No.	Switch	Position
S1	REC/PB (L-CH)	PB
S2	REC/PB (R-CH)	PB
S3	INPUT SELECT REC MUTE	MIC
S4	DOLBY NR	OFF
S5	EQ	NORMAL
S6	BIAS	LOW
S7	TIMING	STOP FAST FORWARD REWIND
S8	MUTING	OFF
S9	POWER	OFF
S10	MOTOR	OFF



Note: The components identified by shading are critical for safety. Replace only with part number specified.

SECTION 5
EXPLODED VIEWS

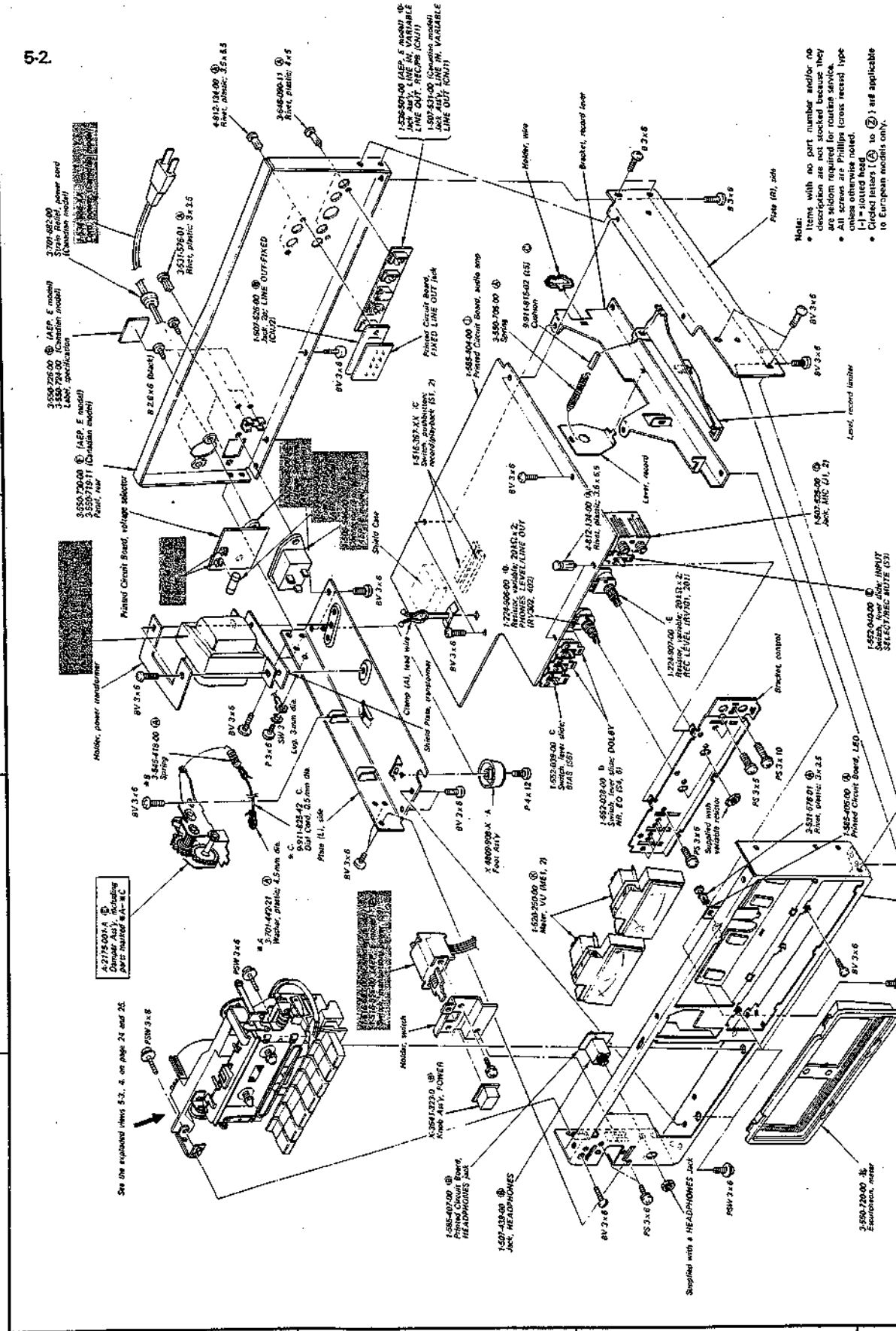
5-1.



Note:

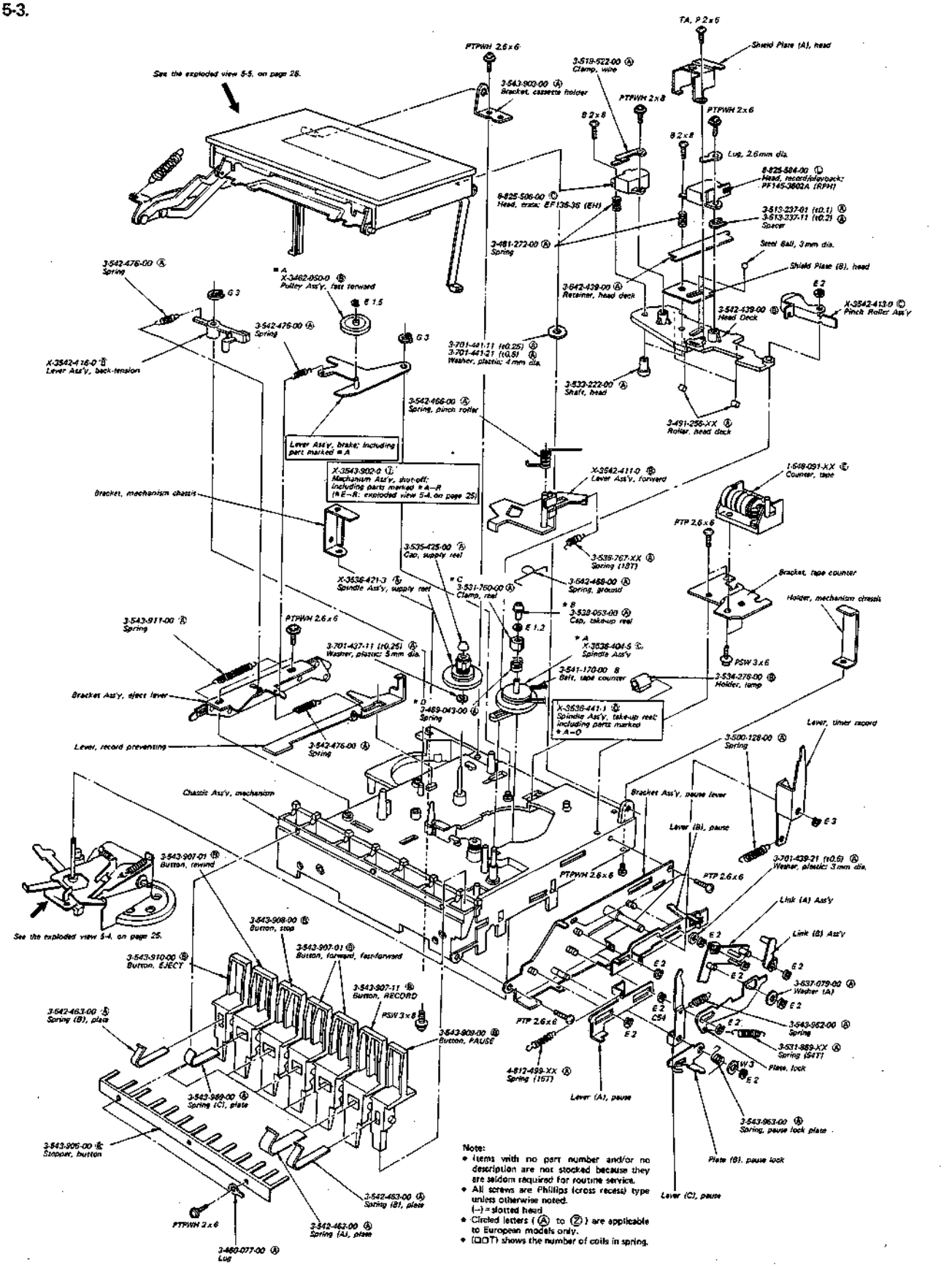
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (—) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to

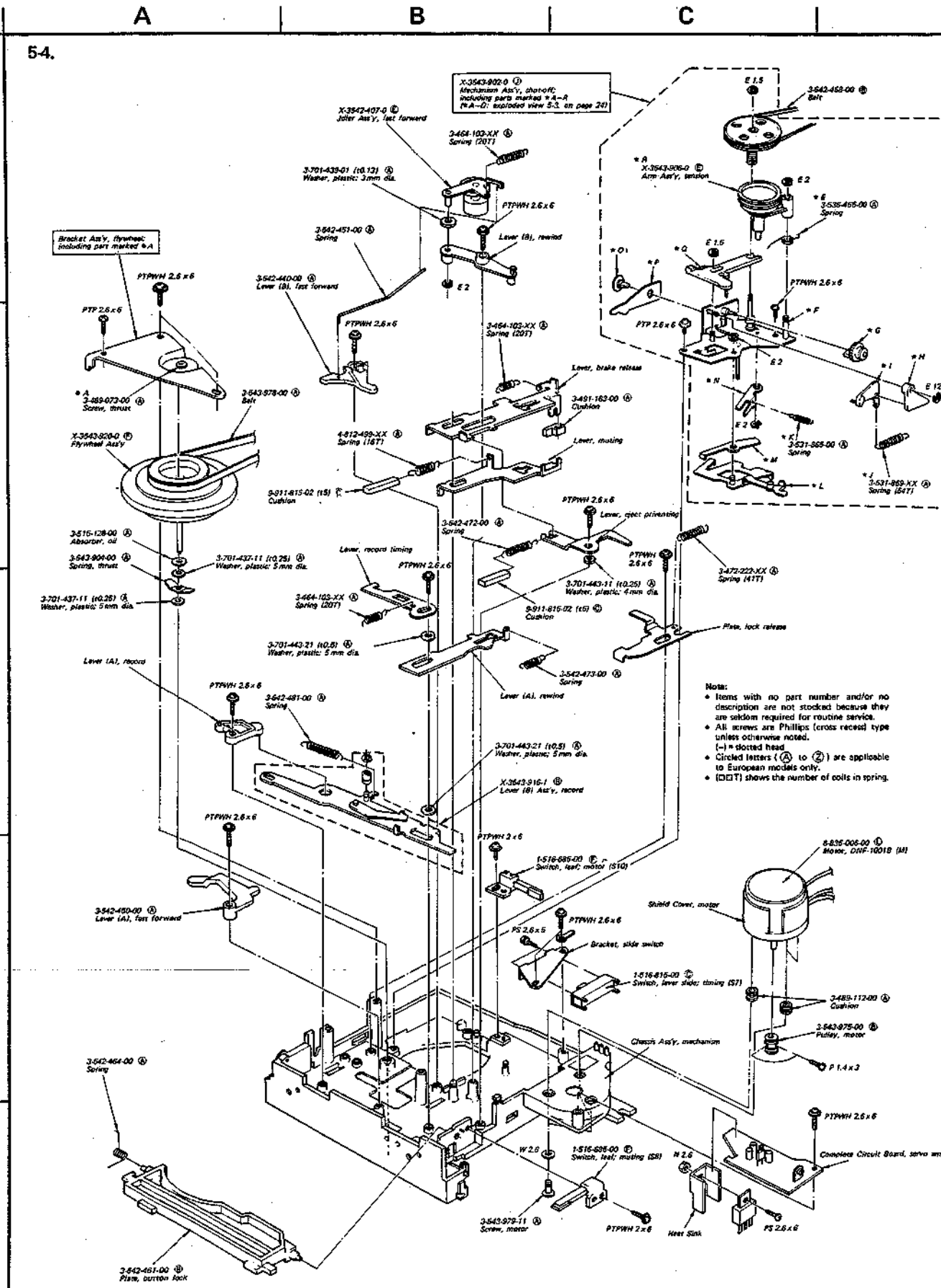
5-2.



Note: The components identified by shading are critical for safety. Replace only with part number specified.

5-3.


See the exploded view 5-5, on page 28.
See the exploded view 5-4, on page 25.
Note:
• Items with no part number and/or no description are not stocked because they are seldom required for routine service.
• All screws are Phillips (cross recess) type unless otherwise noted.
(–) = slotted head
• Circled letters (Ⓐ to Ⓩ) are applicable to European models only.
• (□□T) shows the number of coils in spring.


A
B
C
D
1
2
3
4
5
54.
X-3543-902-0 Ⓓ
Mechanism Ass'y, chart-off;
including parts marked *A–A
(*A–O: exploded view 5-3, on page 24)
Bracket Ass'y, flywheel;
including part marked *A
X-3542-407-0 Ⓒ
Idler Ass'y, fast forward
3-464-103-XX Ⓐ
Spring (20T)
3-701-439-01 (t0.13) Ⓐ
Washer, plastic; 3mm dia.
PTPWH 2.6x6
3-542-451-00 Ⓐ
Spring
Lever (B), rewind
E 2
3-542-440-00 Ⓐ
Lever (B), fast forward
PTPWH 2.6x6
PTP 2.6x6
PTPWH 2.6x6
*A
3-489-073-00 Ⓐ
Screw, thrust
3-543-978-00 Ⓐ
Belt
X-3543-920-0 Ⓔ
Flywheel Ass'y
3-464-103-XX Ⓐ
Spring (20T)
Lever, brake release
3-491-163-00 Ⓐ
Cushion
4-812-499-XX Ⓐ
Spring (18T)
Lever, muting
9-911-815-02 (t5) Ⓒ
Cushion
3-515-128-00 Ⓐ
Absorber, oil
3-543-904-00 Ⓐ
Spring, thrust
3-701-437-11 (t0.25) Ⓐ
Washer, plastic; 5mm dia.
3-701-437-11 (t0.25) Ⓐ
Washer, plastic; 5mm dia.
3-542-472-00 Ⓐ
Spring
Lever, direct preventing
PTPWH 2.6x6
3-472-222-XX Ⓐ
Spring (41T)
Lever, record timing
PTPWH 2.6x6
3-464-105-XX Ⓐ
Spring (20T)
3-701-443-11 (t0.25) Ⓐ
Washer, plastic; 4mm dia.
9-911-815-02 (t5) Ⓒ
Cushion
Plate, lock release
3-701-443-21 (t0.5) Ⓐ
Washer, plastic; 5mm dia.
3-542-473-00 Ⓐ
Spring
Lever (A), rewind
Lever (A), record
PTPWH 2.6x6
3-542-481-00 Ⓐ
Spring
3-701-443-21 (t0.5) Ⓐ
Washer, plastic; 5mm dia.
X-3543-916-1 Ⓑ
Lever (B) Ass'y, record
PTPWH 2.6x6
PTPWH 2x6
1-516-685-00 Ⓒ
Switch, leaf; motor (S10)
6-835-005-00 Ⓓ
Motor, DMF-10018 (M)
3-542-460-00 Ⓐ
Lever (A), fast forward
Shield Cover, motor
PTPWH 2.6x6
PS 2.6x5
Bracket, slide switch
1-516-815-00 Ⓒ
Switch, lever slide; timing (S7)
3-489-112-00 Ⓐ
Cushion
3-543-975-00 Ⓑ
Pulley, motor
P 1.4x3
Chassis Ass'y, mechanism
3-542-464-00 Ⓐ
Spring
PTPWH 2.6x6
W 2.6
1-516-686-00 Ⓒ
Switch, leaf; muting (S8)
H 2.6
Complete Circuit Board, servo amp
3-543-979-11 Ⓐ
Screw, motor
PTPWH 2x6
Heat Sink
PS 2.6x6
3-542-461-00 Ⓑ
Plate, button lock
E 1.5
3-542-458-00 Ⓑ
Belt
*A
X-3543-906-0 Ⓒ
Arm Ass'y, tension
E 2
*E
3-535-465-00 Ⓐ
Spring
*O
*P
E 1.5
*Q
PTPWH 2.6x6
PTP 2.6x6
*F
*G
E 2
*H
*I
E 12
*N
*K
3-531-865-00 Ⓐ
Spring
*M
*L
*J
3-531-869-XX Ⓐ
Spring (54T)
Note:
• Items with no part number and/or no description are not stocked because they are seldom required for routine service.
• All screws are Phillips (cross recess) type unless otherwise noted.
(–) = slotted head
• Circled letters (Ⓐ to Ⓔ) are applicable to European models only.
• (□□T) shows the number of coils in spring.