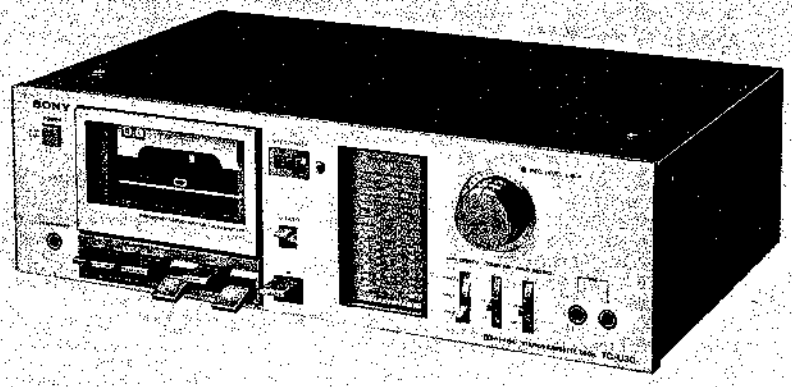
TC-U30

US Model
Canadian Model
AEP Model
UK Model
E Model
SCN Model



'Dolby' and the double-D symbol are the trade marks of Dolby Laboratories. Noise reduction system manufactured under license from Dolby Laboratories.

STEREO CASSETTE DECK

SPECIFICATIONS

GENERAL

Power Requirements:
US, Canadian model:
120 V ac, 60 Hz
AEP, SCN model:
220 V ac ~, 50/60 Hz
(or 240 V ac by internal rewiring)
UK model:
240 V ac ~ , 50/60 Hz
(or 220 V ac by internal rewiring)
E model:
110, 120, 220, 240 V ac ~, 50/60 Hz

Power Consumption: 15 W

Dimensions: Approx. 430 (w) x 135 (h) x 290 (d) mm
17 (w) x 5¾ (h) x 11½ (d) inches
including projecting parts and controls

Weight: Approx. 5.4 kg (11 lb 15 oz)

— Continued on page 2 —

Tape Transport Mechanism Type	TCM-91V2	
	Specification	**Test Equipment**
Forward Torque	30 – 50 g·cm (0.42 – 0.69 oz·inch)	Sony torque meter CQ-102
Fast Forward Torque Rewind Torque	60 – 120 g·cm (0.84 – 1.66 oz·inch)	Sony torque meter CQ-201
Back Tension Torque	2.0 – 4.5 g·cm (0.03 – 0.06 oz·inch)	Sony torque meter CQ-102
Pinch Roller Pressure	310 – 390 g (11 – 13 oz)	spring scale or tension gauge

SONY

SERVICE MANUAL

TC-U30

TAPE RECORDER SECTION

Recording System: 4-track 2-channel stereo

Fast-forward and Rewind Time: Approx. 90 sec. (with C-60)

Frequency Response:
DOLBY NR OFF
AEP, UK, E, SCN model:
- With TYPE III cassette (Sony Fe-Cr)
  30–15,000 Hz
  50–13,000 Hz (±3 dB)
  50–13,000 Hz (DIN)
- With TYPE II cassette (Sony CD-α)
  30–15,000 Hz
  50–13,000 Hz (±3 dB)
  50–13,000 Hz (DIN)
- With TYPE I cassette (Sony BHF)
  30–13,000 Hz

US, Canadian model:
- With TYPE III cassette (Sony Fe-Cr)
  20–17,000 Hz
  30–15,000 Hz (±3 dB)
- With TYPE II cassette (Sony EHF)
  20–17,000 Hz
  30–15,000 Hz (±3 dB)
- With TYPE I cassette (Sony HFX)
  20–15,000 Hz

Wow and Flutter: 0.05% WRMS (NAB) ±0.14% (DIN) (AEP, UK, E SCN model)
0.05% WRMS (US, Canadian model)

S/N Ratio:
DOLBY NR OFF
AEP, UK, E, SCN model:
- With TYPE III cassette (Sony Fe-Cr)
  56 dB at peak level (NAB)
  55 dB (DIN, 1975 rev.)
- With TYPE II cassette (Sony CD-α)
  54 dB at peak level (NAB)

US, Canadian model:
- With TYPE III cassette (Sony Fe-Cr)
  58 dB at peak level
- With TYPE II cassette (Sony EHF)
  56 dB at peak level)

DOLBY NR ON
Improved by 5 dB at 1 kHz,
10 dB above 5 kHz

Total Harmonic Distortion: 1.7% (with Sony Fe-Cr cassette)

Bias Frequency: 105 kHz

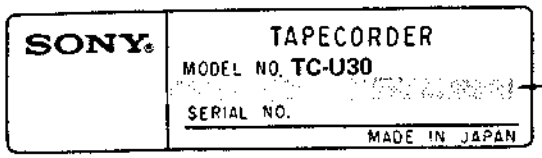
Inputs:
MIC (two phone jacks)
sensitivity 0.25 mV (–70 dB)
for a low-impedance microphone
LINE IN (two phono plugs)
sensitivity 77.5 mV (–20 dB)
input impedance 50 kΩ

Outputs:
LINE OUT (two phono plugs)
output level 0.435 V (–5 dB) at load impedance 50 kΩ
suitable load impedance more than 10 kΩ
Headphone output (binaural jack)
output level –26 dB at load impedance 8Ω

0 dB = 0.775 V

MODEL IDENTIFICATION

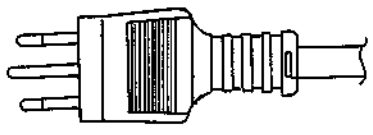
– Specification Label –



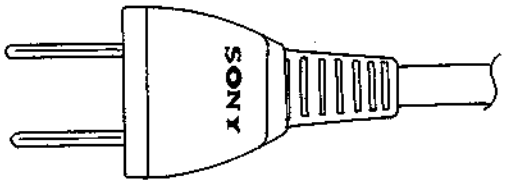
AC 120V 60Hz 15W . .US,Canadian model
AC 220V~ 50/60Hz 15W . . . AEP, SCN model
AC 240V~ 50/60Hz 15W . . . . . UK model
AC 110, 120, 220, 240V 50/60Hz 15W. . . . E model

– Power Cord –

E1 model: euro-plug 1-551-896-00



E2 model: parallel-blade plug 1-551-628-00



SECTION 1
OUTLINE

1-1. MECHANICAL OPERATION

Full-Auto Shut-Off Mechanism

When the end of the tape has been reached and the take-up reel stops rotating, shut-off lever (B) pushes against button-lock plate (A), thereby releasing the function buttons and bringing the motor to a stop.

Operation in Forward and Fast Forward Modes

(See Fig. 1-1.)

1. The mechanical parts rotate in the directions shown by the numbered arrows ❶ – ❹ .
2. Detecting lever (B) is pushed aside in the direction of arrow ❺ due to the rotational action of the take-up reel.
3. The tip of detecting lever (B) is pushed into a central position (shown by dotted line) by the guide ❻ of worm wheel. However, once the guide ❻ has passed, the rotating take-up reel spindle pulls the detecting lever (B) back across to the right ❻ , thereby maintaining the forward (or fast forward) mode.

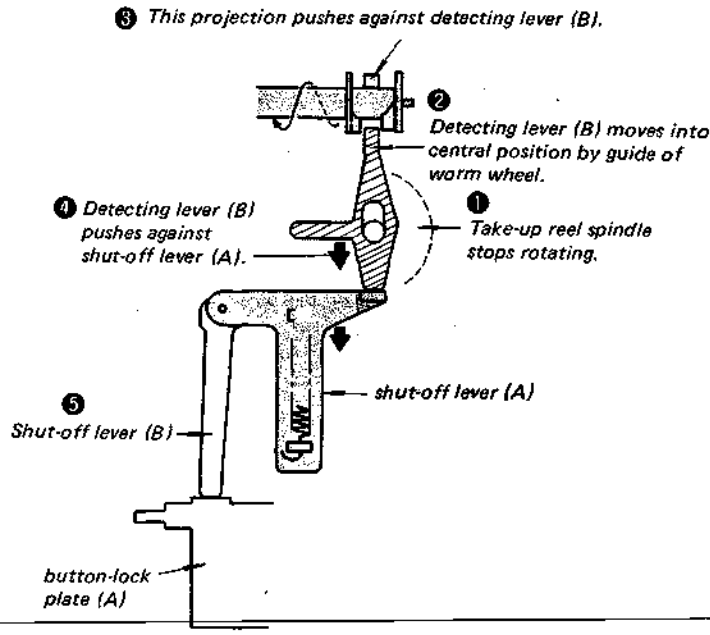


Fig. 1-2.

in forward or fast forward mode

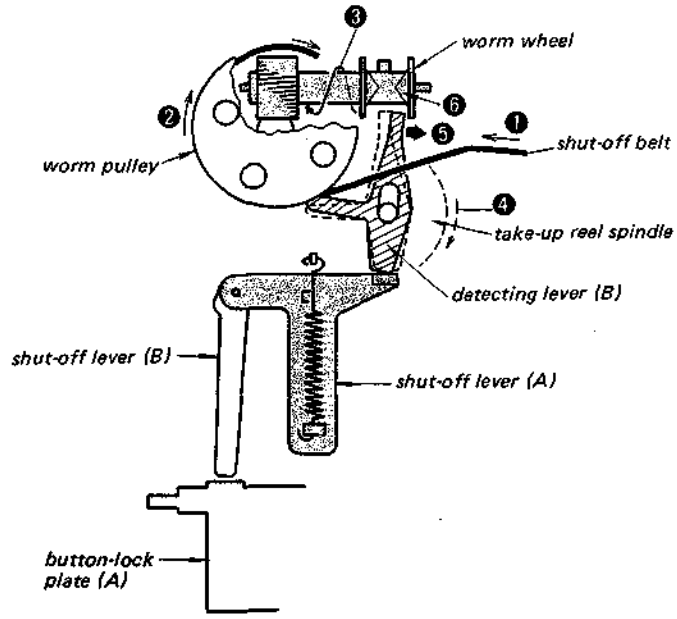


Fig. 1-1.

At the End of the Tape (in fast forward and forward modes)

When the take-up reel stops rotating, the worm wheel activates the automatic shut-off mechanism. This operation is made by shut-off lever (B) pushing against button-lock plate (A) as shown in Fig. 1-2.

In Rewind Mode

The tip of detecting lever (B) is pushed to the left side of the worm wheel by the take-up reel rotating in the reverse direction. When the take-up reel stops rotating, button-lock plate (A) is pushed again back as in forward and fast forward modes, resulting in the release of the transport mode and stopping of the motor rotation.

Pause in Forward Mode

(See Fig. 1-3.)

As pause spring pushes detecting lever (B), the automatic shut-off mechanism does not operate.

in pause mode

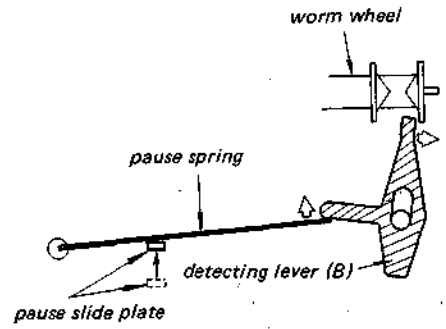


Fig. 1-3.

Auto-Play Mechanism

(See Fig. 1-4)

When the forward and rewind buttons are pressed at the same time, the tape deck is in rewind mode. When the tape has been wound onto supply reel and the reel stops rotating, only the rewind button is released, resulting in forward mode commencing automatically.

Note: When these two buttons are pressed at the same time, both forward and rewind modes are initiated. However, the auto-play lever prevents the pinch roller from pressing against the capstan. As a result, rewind mode will take priority. (The auto-play lever is not shown in Fig. 1-4.)

In Rewind Mode of Auto-Play Phase

(See Fig. 1-4.)

1. The FR lever pushes gear (A) to engage the flywheel gear, thereby driving the supply reel spindle, and resulting in rewinding of the tape.
2. The rod of the FR lever Ⓒ displaces the button-lock plate spring Ⓐ from its normal position, thereby separating button-lock plate (B) Ⓑ from button-lock plate (A) Ⓓ .
3. The take-up reel spindle rotates in the direction shown by the arrow, thereby preventing the shut-off mechanism from being activated.
4. The auto-play lever prevents the pinch roller from pressing against the capstan, but the tape is near the head ready to commence forward mode.

At the End of Tape in Rewind Mode

1. When the take-up reel stops rotating, the shut-off mechanism is activated. The button-lock plate (A) is pushed back, and the rewind button consequently released.
2. Gear (A) disengages the flywheel gear, thereby releasing rewind mode.
3. Since the button-lock plate spring has been displaced by the FR lever rod, button-lock plate (B) employed to release the forward button will remain where it is at this time. Therefore, at the end of the rewind mode, only the rewind button is released. Forward mode is then commenced automatically.

At the End of Tape in Forward Mode

1. The FR lever rod is withdrawn as soon as forward mode is commenced. Consequently, the both button-lock plates (A) and (B) are engaged again by the button-lock plate spring.
2. When the shut-off mechanism is activated again at the end of tape in forward mode, both button-lock plates (A) and (B) are pushed back by FR lever rod, thereby bringing all transport mechanism to a complete stop mode.

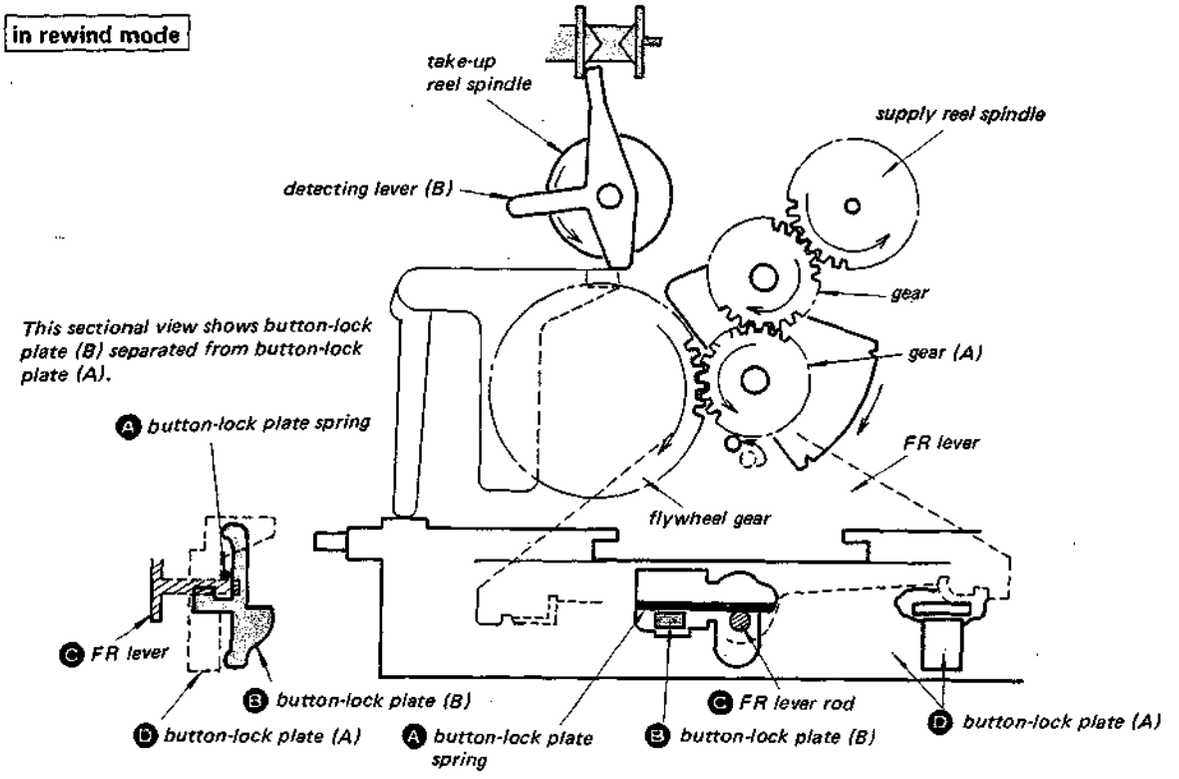


Fig. 1-4.

Timer Standby Mechanism

The timer standby switch permits playback or record mode to be commenced at desired time. With the power cord of the tape deck disconnected from the ac wall outlet, turn the power switch on, and press the forward button, or the forward and record buttons. Then, turn the timer standby switch on, and connect the tape deck to the ac wall outlet through a timer for the desired time.

At Standby

(See Fig. 1-5.)

1. The timer standby switch presses up against the timer standby levers (A) and (B).
2. The pause slide plate and release lever are thereby moved in the direction shown by the arrows marked ▲, resulting in the pinch roller being separated from the capstan.
3. The timer standby lever (B) presses up against the release lever (A), thereby separating the take-up arm pulley from the tire of the take-up reel spindle.
4. The timer standby lever (A) pushes timer standby lever (C) in the direction of arrow ❶ , thereby pushing shut-off lever (B) (employed to release function buttons) away from the button-lock plate (A).

at standby mode

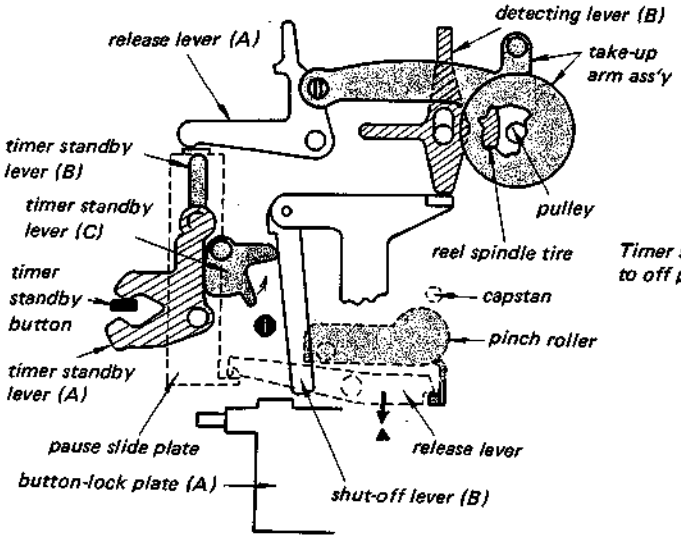


Fig. 1-5.

When Power is Switched On

(See Fig. 1-6.)

1. The motor starts to drive the worm wheel.
2. The worm wheel pushes against detecting lever (B).
3. The ■ marked section of shut-off lever (B) pushes against standby lever (C) as shown in Fig. 1-5.
4. The timer standby lever (C) pushes against standby lever (A), thereby returning the timer standby button to the off position.
5. The timer standby lever (B) and release lever (A) return to their original positions, thereby bringing the take-up arm to engage against the tire of the take-up reel spindle which is rotated by motor.
6. Since the pause slide plate and release lever also return to their original positions, the pinch roller presses against the capstan to start forward mode.

when power switched on

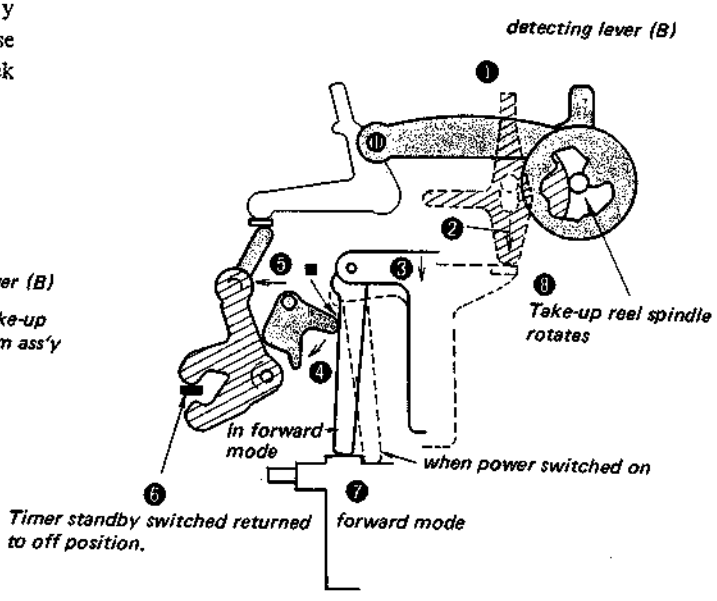


Fig. 1-6.

1-2. CIRCUIT OPERATION

This set is equipped with an LED peak program meter, which indicates the input signal level (as a bar graph).

The following explanations describe the operation of each of the circuit.

1. IC401 Input Circuit.

Input signal Ⓐ (waveform Ⓐ) is applied to IC302 in the LOG converter circuit. By the characteristic of a diode, the input signal is logarithmically compressed and waveform Ⓐ changes into waveform Ⓑ .

The peak of signal Ⓑ is detected by D103 and smoothed by C162. Then it is applied to terminal (11) of IC401 as dc voltage (waveform Ⓒ).

2. LED Indication Circuit

The LEDs turn on when the anode and the cathode signals drop to a LOW level at the same time.

ex) LINE OUT output −5dB

Ⓓ, Ⓔ : LOW level

↓

waveform Ⓗ–Ⓞ : anode, cathode: LOW level

↓

L–CH/R–CH : LEDs 1~8 turn on

(See Diagram 1.)

LED MATRIX DIAGRAM

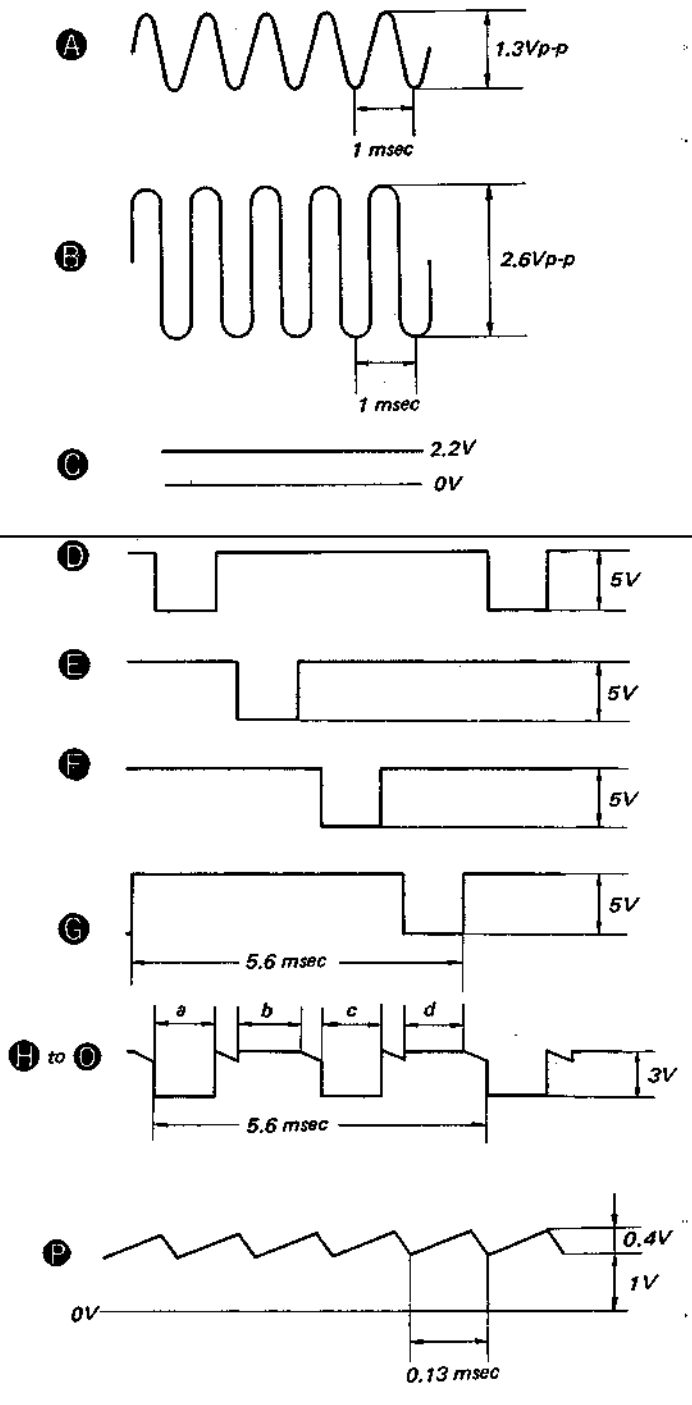
anode signal / cathode signal	R–CH		L–CH	
	Ⓓ	Ⓔ	Ⓕ	Ⓖ
Ⓗ	1	9	1	9
Ⓘ	2	10	2	10
Ⓙ	3	11	3	11
Ⓚ	4	12	4	12
Ⓛ	5	13	5	13
Ⓜ	6	14	6	14
Ⓝ	7	15	7	15
Ⓞ	8	16	8	16

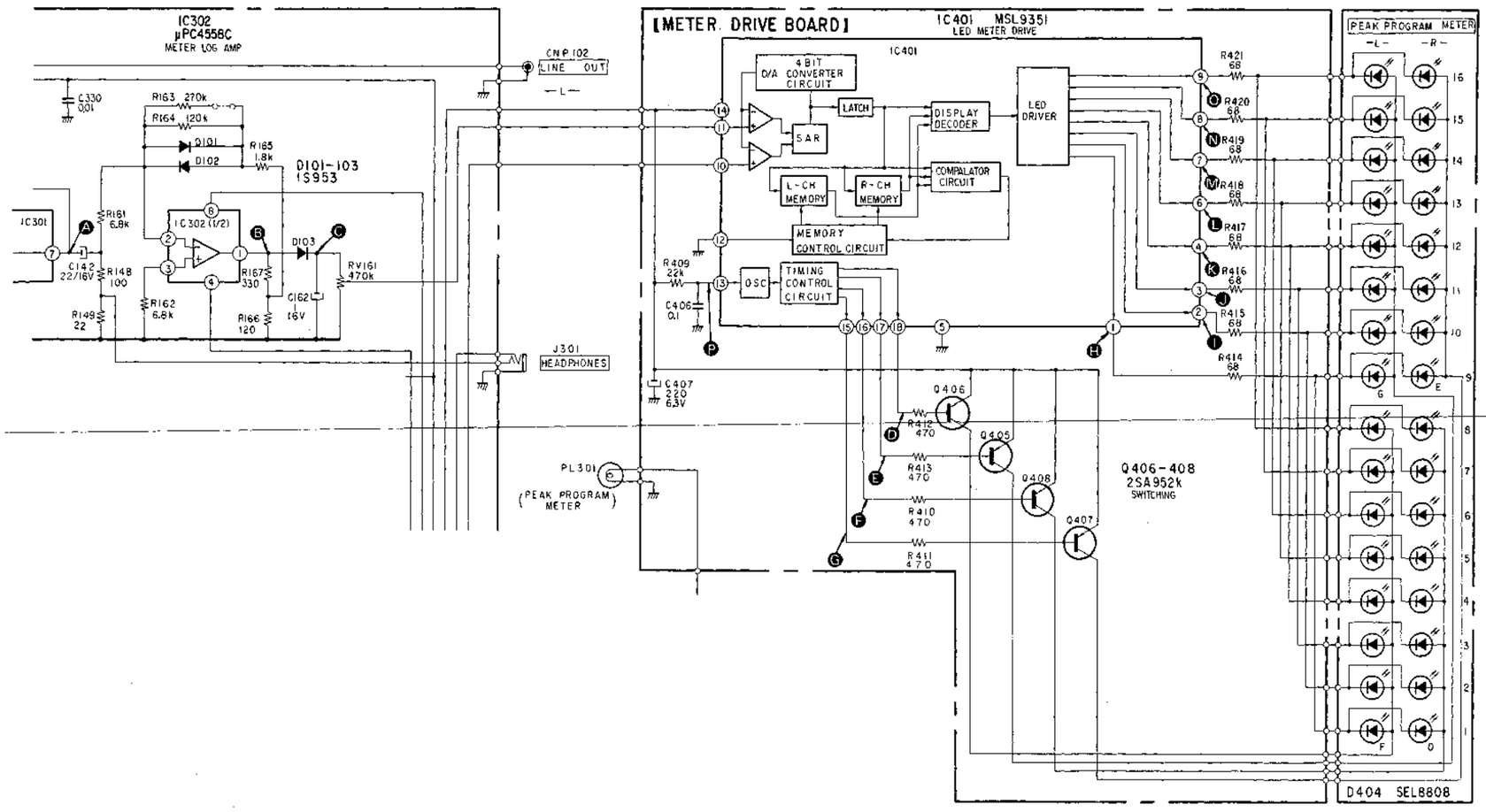
Diagram 1.

(When either two of the signals Ⓓ – Ⓖ and of Ⓗ – Ⓞ drop to LOW level, the LEDs shown in the diagram turn on.)

Measuring Condition

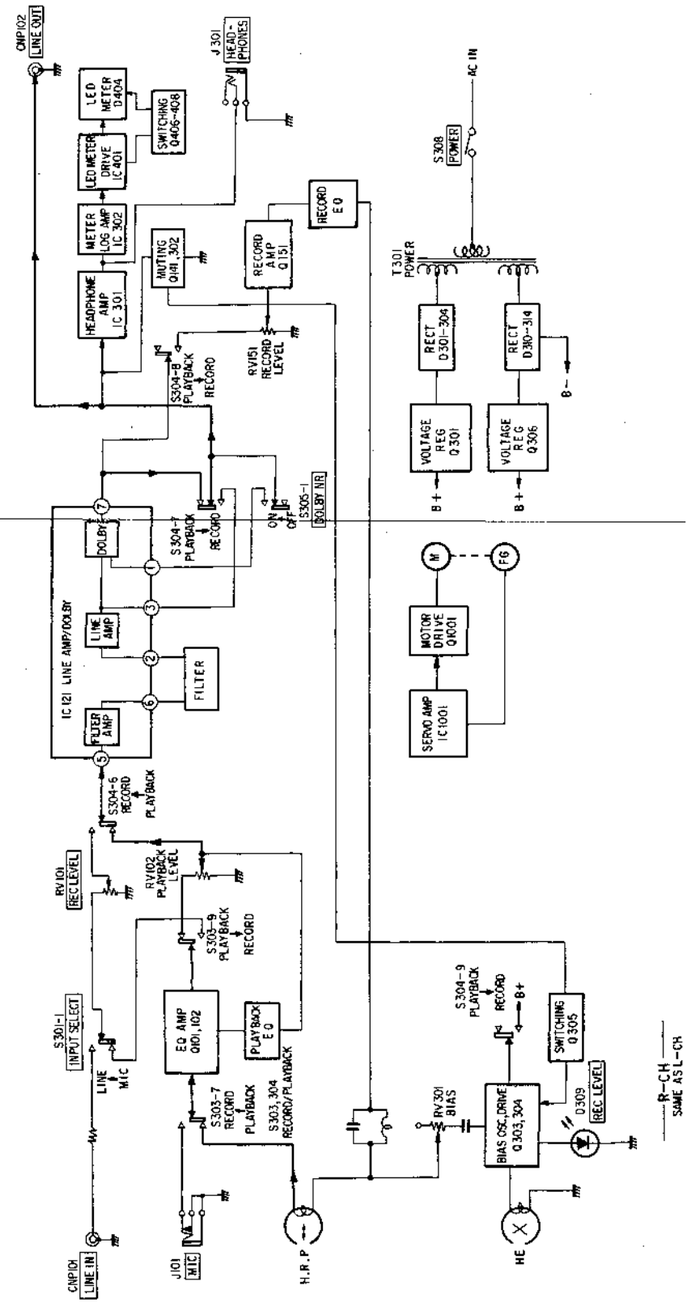
LINE IN: 1 kHz, 0.25V (−10 dB)
LINE OUT: 0.44V (−5 dB)
Mode: record/forward




IC302
μPC4558C
METER LOG AMP
CNP102
LINE OUT
— L —
J301
HEADPHONES
D101-103
1S953
IC302 (1/2)
IC301
C330
0.01
R163 270k
R164 120k
D101
D102
R165
1.8k
R161
6.8k
C142
22/16V
R148
100
R149
22
R162
6.8k
R167
330
R166
120
C162
16V
D103
RV161
470k
[METER. DRIVE BOARD]
IC401 MSL935I
LED METER DRIVE
IC401
4 BIT
D/A CONVERTER
CIRCUIT
SAR
LATCH
DISPLAY
DECODER
LED
DRIVER
L-CH
MEMORY
R-CH
MEMORY
COMPALATOR
CIRCUIT
MEMORY
CONTROL CIRCUIT
TIMING
CONTROL
CIRCUIT
OSC
R409
22k
C406
0.1
C407
220
6.3V
R421
68
R420
68
R419
68
R418
68
R417
68
R416
68
R415
68
R414
68
PEAK PROGRAM METER
— L —
— R —
Q406
Q405
Q408
Q407
R412
470
R413
470
R410
470
R411
470
Q406-408
2SA952k
SWITCHING
PL301
(PEAK PROGRAM
METER)
D404 SEL8808

MEMO

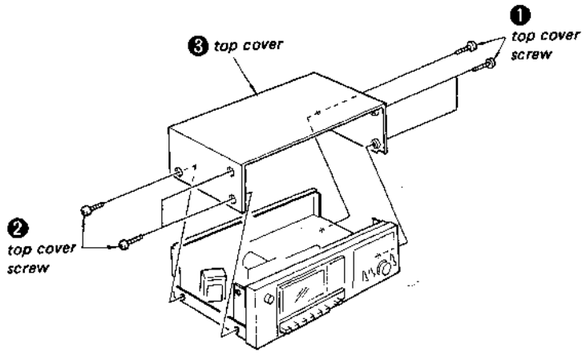
1-3. BLOCK DIAGRAM



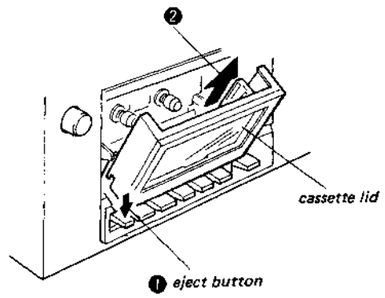
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

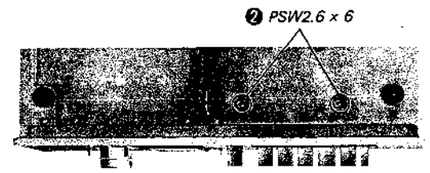
TOP COVER REMOVAL

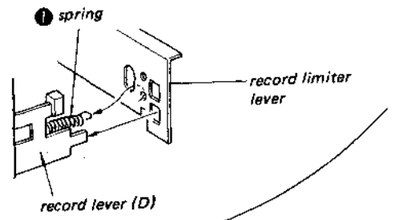


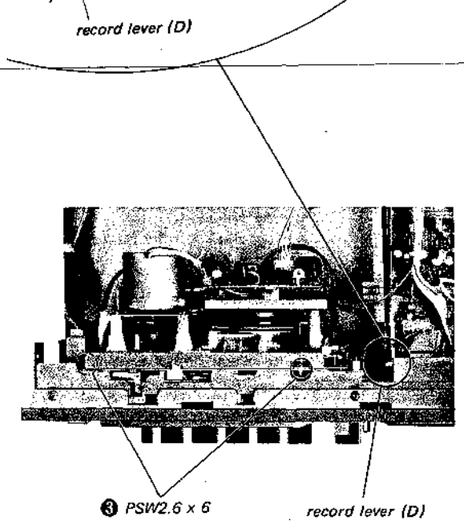
CASSETTE LID REMOVAL



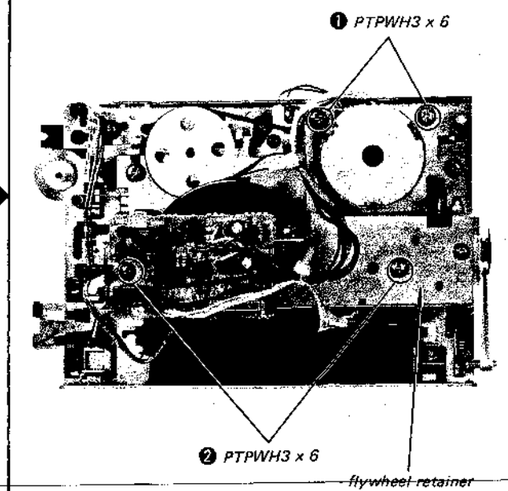
MECHANICAL BLOCK REMOVAL



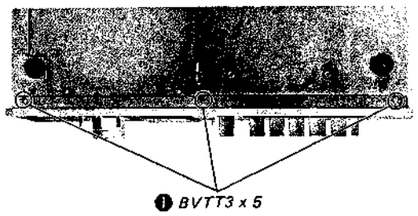


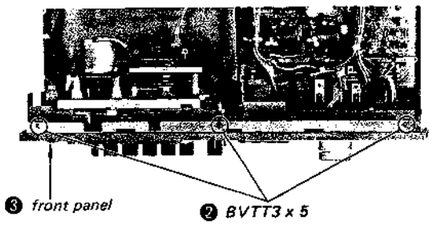


FLYWHEEL RETAINER REMOVAL

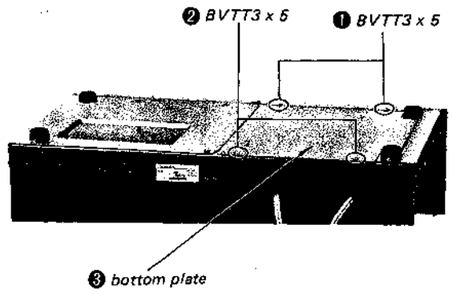


FRONT PANEL REMOVAL

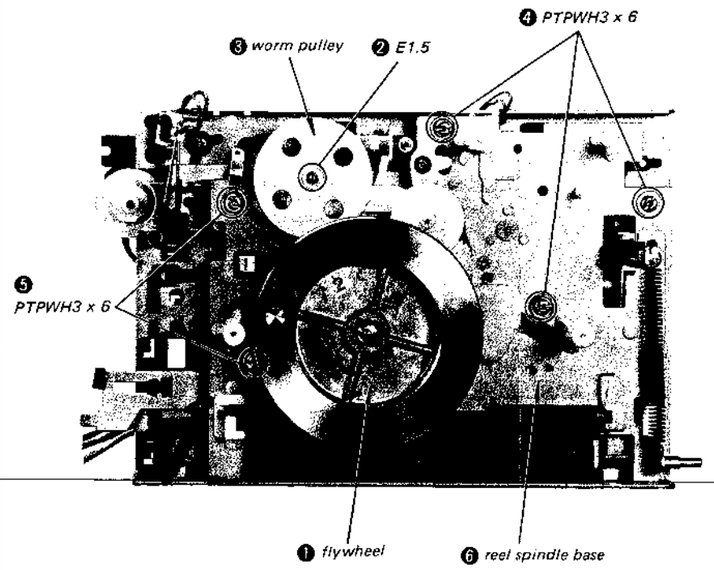




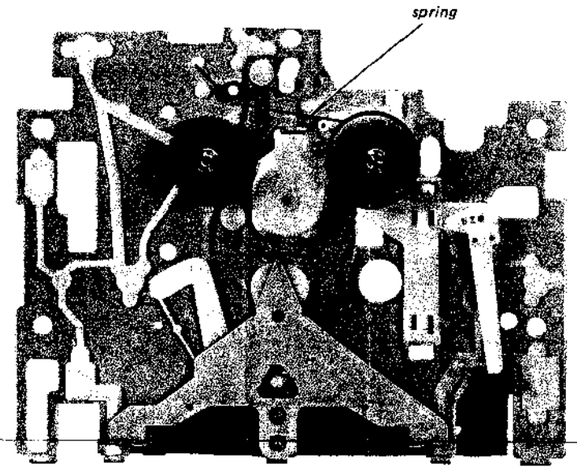
BOTTOM PLATE REMOVAL



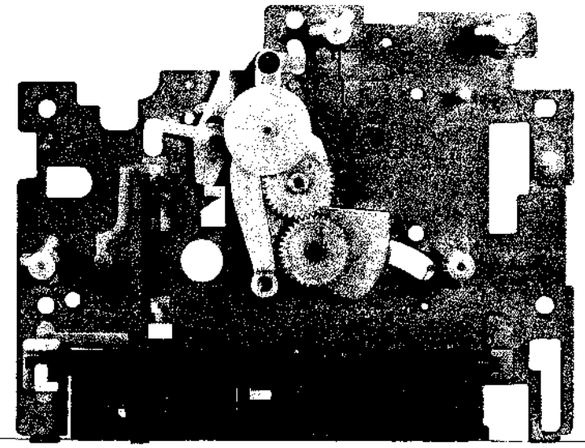
REEL SPINDLE BASE REMOVAL



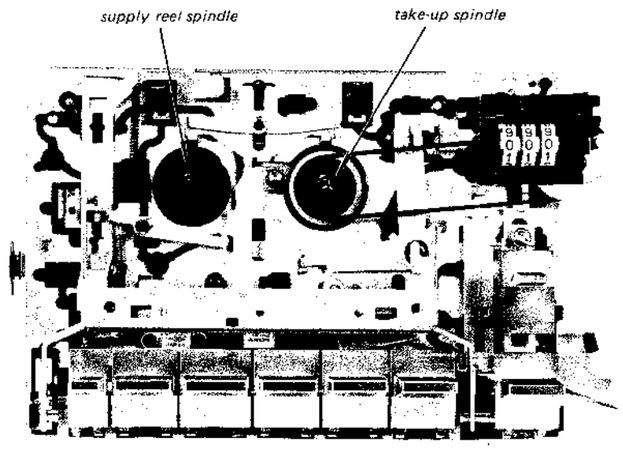
Reel spindle base front view



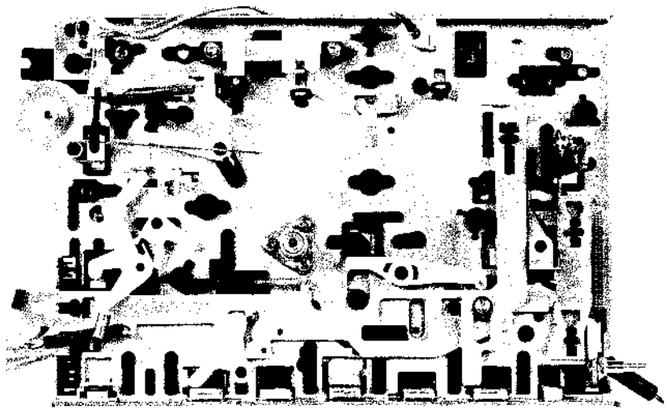
Reel spindle base rear view



Reel spindle base is not removed.
(front view)



Reel spindle base is removed.
(rear view)



SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

PRECAUTION

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

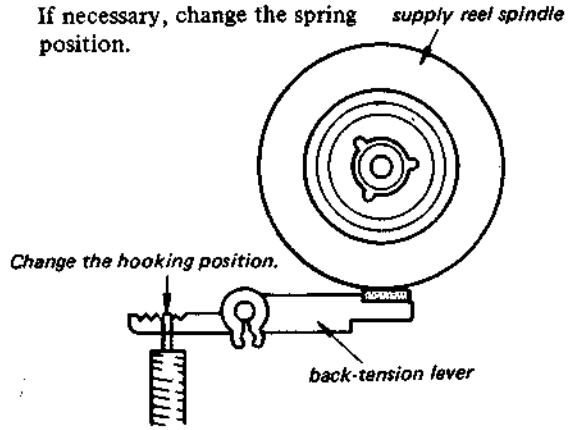
record/playback head	pinch roller
erase head	rubber belts
capstan	idlers

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

Back Tension Torque Adjustment
– playback mode –

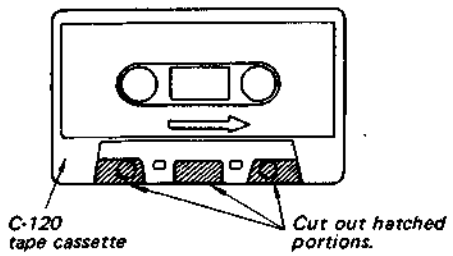
Torque meter	Meter reading
CQ-102	2.0 – 4.5g·cm (0.02 – 0.06 oz·inch)

If necessary, change the spring position.

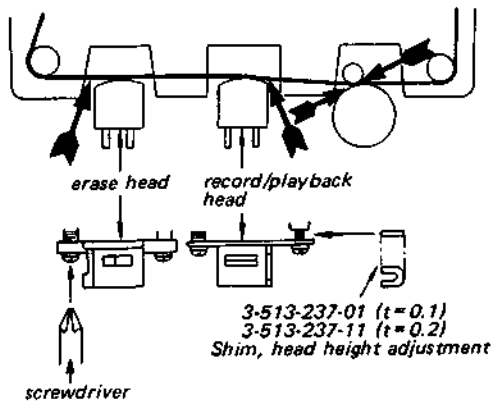


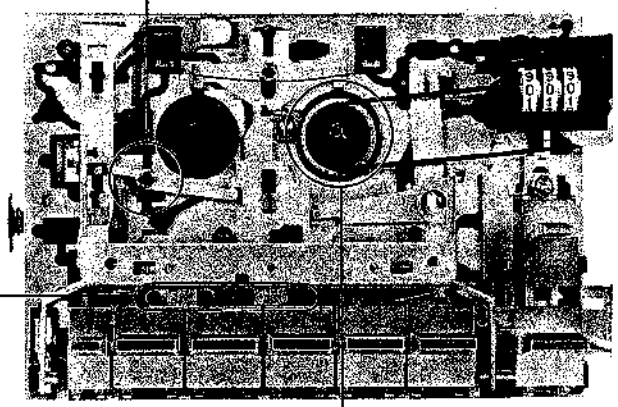
Head Height Adjustment

1. Prepare 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 portions shown by arrows.

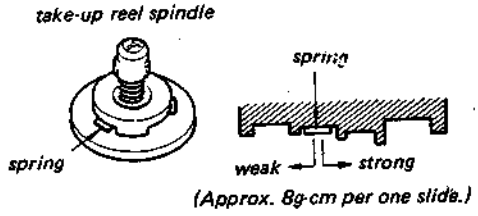




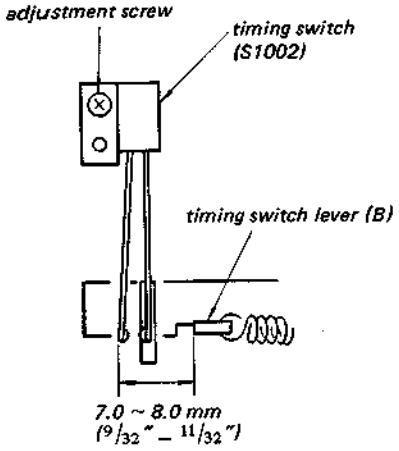
Forward Torque Adjustment
– playback mode –

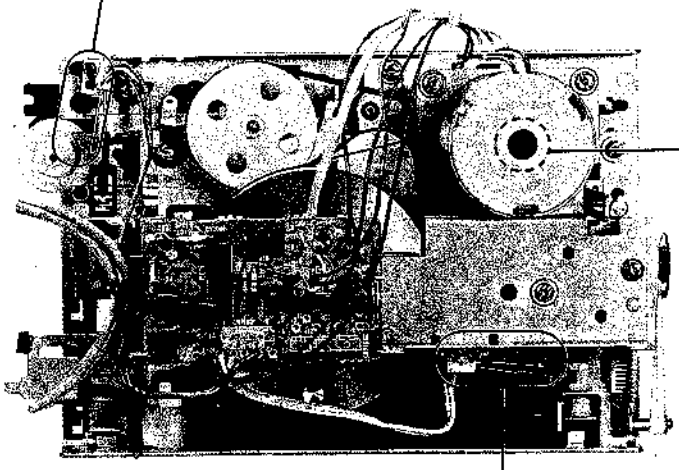
Torque meter	Meter reading
CQ-102	30 ~ 50g·cm (0.42 – 0.70 oz. inch)

If necessary, change the spring position.

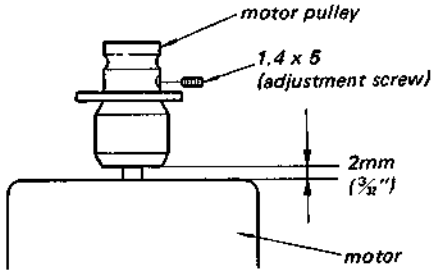


Timing Switch (S1002) Position Adjustment
– stop mode –

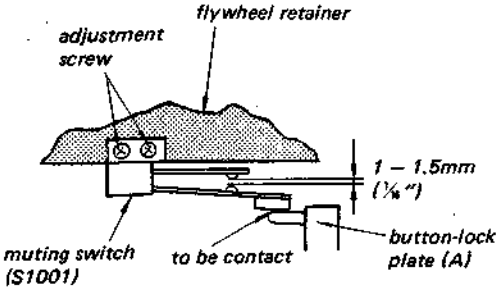




Pulley Height Adjustment
– stop mode –



Muting Switch (S1001) Position Adjustment
– stop mode –



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.

- Set the EQ switches according to the tape as follows.

Tape	EQ switch
CS-10	TYPE I
CS-25	TYPE II
CS-30	TYPE III

- Switches and controls should be set as follows unless otherwise specified.

DOLBY NR switch: OFF
EQ switch: TYPE III
INPUT SELECT switch: LINE

- 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
source impedance	300Ω	10kΩ
input level	0.77mV (−60dB)	0.25V (−10dB)

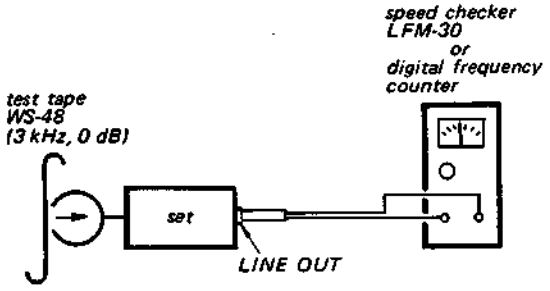
Standard Output Level

	LINE OUT	HEAD-PHONES
load impedance	47kΩ	8Ω
output level	0.44V (−5dB)	31 mV (−28dB)

Tape Speed Adjustment

Procedure:

Mode: playback



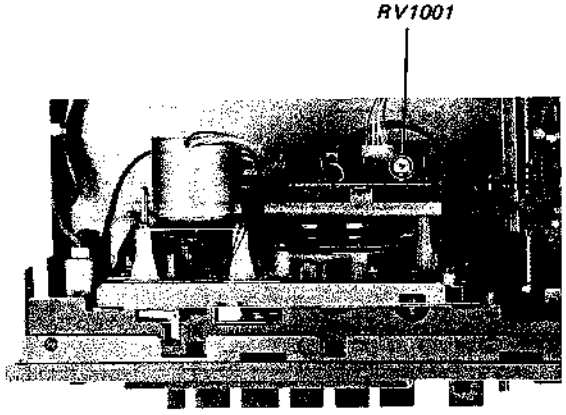
Specification:

Speed checker	Digital frequency counter
−0.6 to +0.6%	2980 – 3020Hz

Frequency difference between the beginning and the end of the tape should be within 0.6% (20Hz).

Adjustment Location:

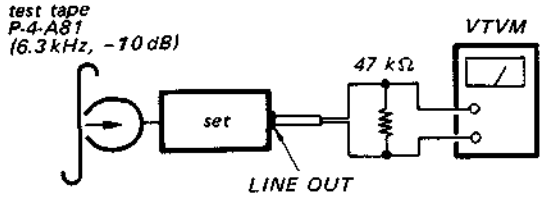
– servo amp board –



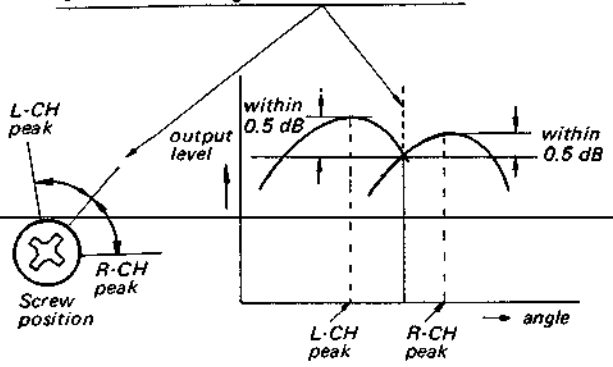
Record/playback Head Azimuth Adjustment

Procedure:

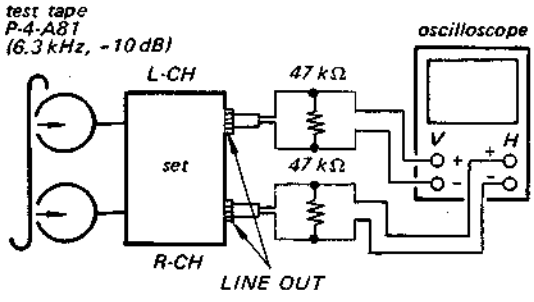
1. Mode: playback

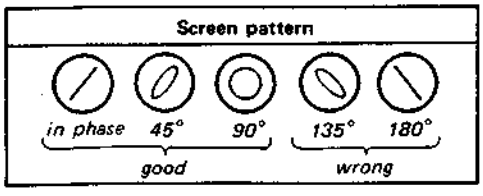


2. Turn the adjustment serew for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5 dB.

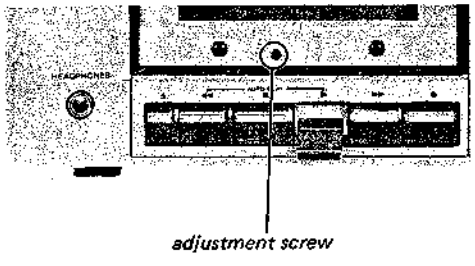


3. Phase Check
   Mode: playback





Adjustment Location:



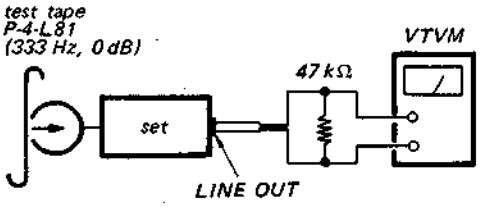
Playback Level Adjustment

Setting:

TAPE SELECT switch: TYPE I

Procedure:

Mode: playback



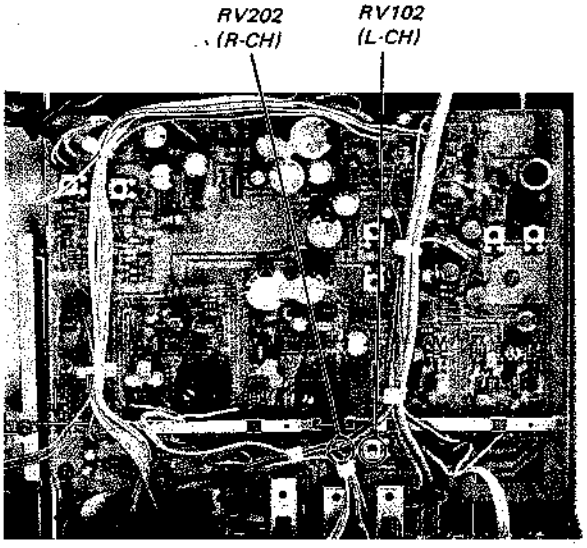
Specification:

LINE OUT level: 0.52 – 0.59V
(–3.5 to –2.5dB)
Level difference between channels:
less than 0.5dB
Level difference from TYPE I:
between –0.5dB and
+0.5dB
(TAPE SELECT switch: TYPE III)

Check that the LINE OUT level does not change in playback mode while changing the mode from playback to stop several times.

Adjustment Location:

– audio amp board –



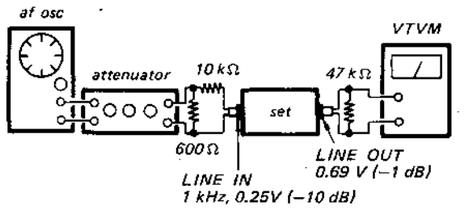
LED Peak Program Meter Calibration

Setting:

REC LEVEL control: LINE IN 1kHz, 0.25 V (−10 dB)
LINE OUT 0.69 V (−1 dB)

Procedure:

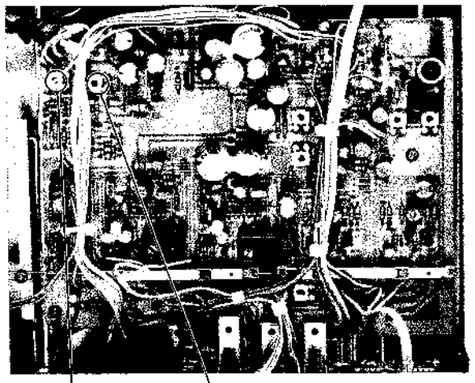
1. Mode: record



Turn RV161 (L-CH) and RV261 (R-CH), and stop them just when ninth segment from the left goes out.

Adjustment Location:

– audio amp board –



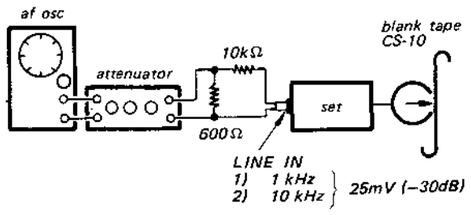
Record Bias Adjustment

Setting:

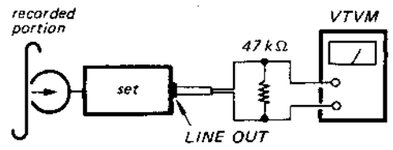
REC LEVEL control: standard record
(See page 17.)

Procedure:

1. Mode: record

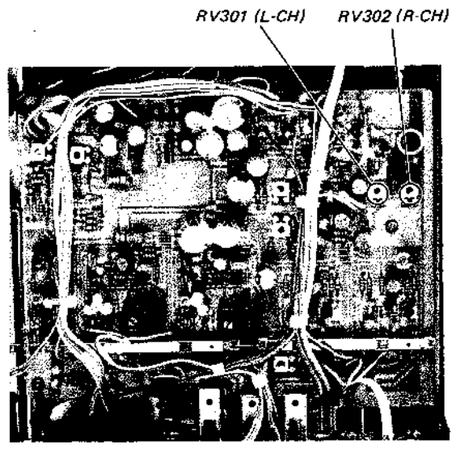


2. Mode: playback



Adjust RV301 (L-CH) and RV302 (R-CH) to make 1kHz and 10kHz signal output levels equal.

Adjustment Location: *– audio amp board –*



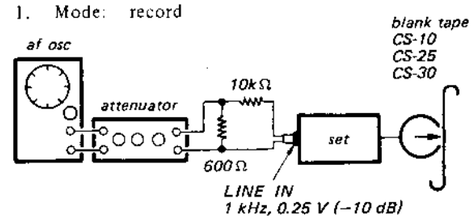
Record Level Adjustment

Setting:

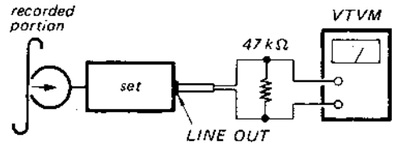
REC LEVEL control: standard record
(See page 17.)

Procedure:

1. Mode: record



2. Mode: playback

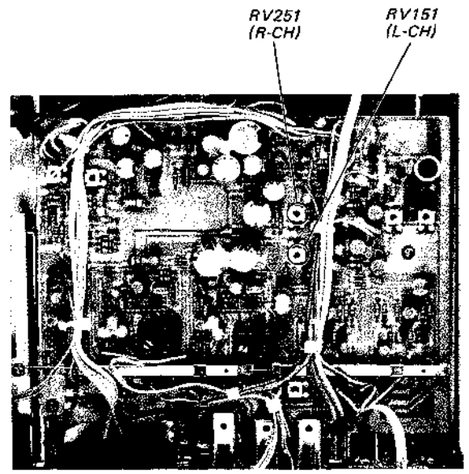


Specification:

tape	LINE OUT level
CS-10	0.41 – 0.46V (−5.5 to −4.5dB)
CS-25 CS-30	0.37 – 0.52V (−6.5 to −3.5dB)

Adjustment Location:

– audio amp board –



Replacer
For repla

Q101, 20
Q102, 20
Q304 : 2

Q141, 24
Q151, 25
Q303
Q305

Q302: 2S
Q405–4C

Q306, 10

IC121, 2

IC301, 3

IC401: M

IC1001:

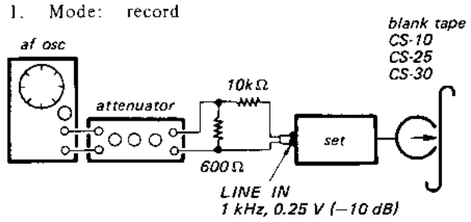
Record Level Adjustment

Setting:

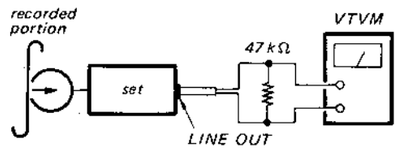
REC LEVEL control: standard record
(See page 17.)

Procedure:

1. Mode: record



2. Mode: playback

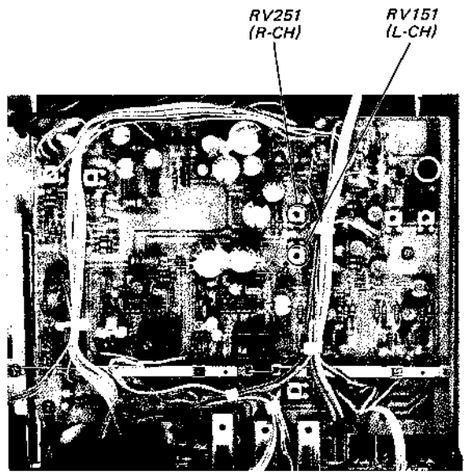


Specification:

tape	LINE OUT level
CS-10	0.41 – 0.46V (–5.5 to –4.5dB)
CS-25 CS-30	0.37 – 0.52V (–6.5 to –3.5dB)

Adjustment Location:

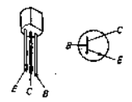
– audio amp board –



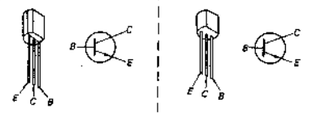
Replacement Semiconductors

For replacement, use semiconductors except in ( ).

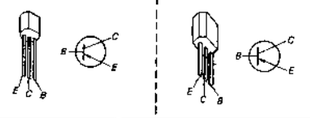
Q101, 201
Q102, 202 : 2SC1362 (2SC900E)
Q304 : 2SC2001 (2SC2001K)



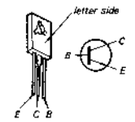
Q141, 241
Q151, 251
Q303
Q305 : 2SC1364 (2SC945Q)



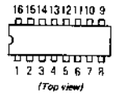
Q302: 2SA1027R
Q405–408: 2SA952 (2SA733Q)



~~Q306, 1001: 2SD414 (2SD414Q)~~

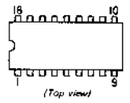


IC121, 221: NE646B



IC301, 302: μPC4558C

IC401: MSL9351

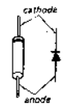


IC1001: CX069

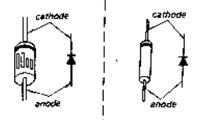
D101, 201
D102, 202
D103, 203
D306, 307
D314 : 1S1555 (1S953)

D301–304
D308
D310–313 : 10E2 (1N4002)

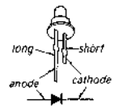
D315 : RD5·1EC (RD5·1EB)



D305: EQB01-22 (RD22EB)



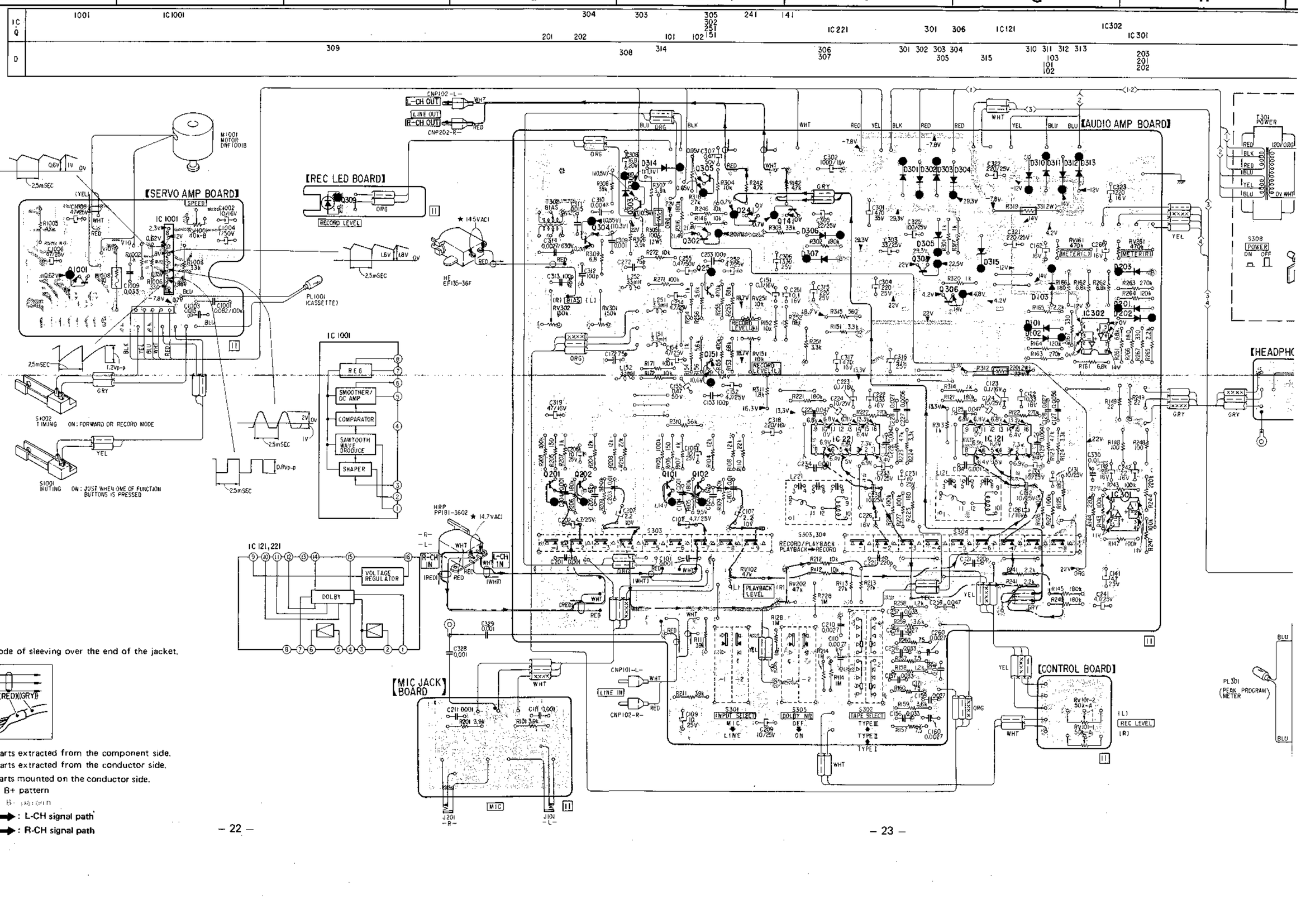
~~D309: AR3131D~~



4-1. MOUNTING DIAGRAM

Replacement Semiconductors : See page 21.

– Conductor Side –



Note:

- Color code of sleeving over the end of the jacket.

- ○—: parts extracted from the component side.
- ●—: parts extracted from the conductor side.
- ■ : parts mounted on the conductor side.
- : B+ pattern
- : B- pattern
- ▬▬▶ : L-CH signal path
- ▬▬▶ : R-CH signal path

D E F G H I J K

304 303 305 302 251 241 141 IC 221 301 306 IC 121 1C302 IC 301 IC 401 408 406 405 407 IC Q D

201 202 101 102 151 308 314 306 307 301 302 303 304 305 315 310 311 312 313 103 101 102 203 201 202 404

1 2 3 4 5

[AUDIO AMP BOARD]

[HEADPHONE BOARD]

J301 HEADPHONES

US, CANADIAN MODEL

T301 POWER

S308 POWER ON OFF

AC IN

[VOLTAGE SELECTOR BOARD]

UK MODEL

240V 220V 0V

AEP/SCN MODEL

E1, E2 MODEL

VOLTAGE SELECTOR

110V 120V 220V 240V

(INTERNL CONNECTION)

AC IN (E2 MODEL) (E1 MODEL)

AEP, UK, SCN MODEL

IC 401

B+

OSC TIMING CONTROL CIRCUIT

MEMORY CONTROL CIRCUIT

SAR

4 BIT D/A CONVERTER CIRCUIT

L-CH MEMORY R-CH MEMORY

LATCH

DISPLAY DECODER

COMPARATOR CIRCUIT

LED DRIVER

GND

[METER DRIVE BOARD]

PL301 (PEAK PROGRAM METER)

4.4mSEC

Q408 Q406 Q405 Q407

PEAK PROGRAM METER

-R-

-L-

RED LIGHT GREEN

D404

[CONTROL BOARD]

REC LEVEL

(L) (R)

S301 INPUT SELECT MIC LINE

S305 DOLBY NR OFF ON

S302 TAPE SELECT TYPE II TYPE I

S303, 304 RECORD/PLAYBACK PLAYBACK←RECORD

PLAYBACK LEVEL

RECORD LEVEL

LINE IN

CNP101-L CNP102-R

4-2. SCHEMATIC DIAGRAM See page 28 for the notes.

Note: The ⚠ part

TC-U30

D E F G H I J K

1 2 3 4 5

【METER DRIVE BOARD】

IC401 MSL9351
LED METER DRIVE

IC401
4BIT D/A CONVERTER CIRCUIT
LATCH
SAR
DISPLAY DECODER
LED DRIVER
L-CH MEMORY
R-CH MEMORY
COMPALATOR CIRCUIT
MEMORY CONTROL CIRCUIT
TIMING CONTROL CIRCUIT
OSC

PEAK PROGRAM METER
-L- -R-
RED
LIGHT GREEN

D404 SEL8808

Q406-408
2SA952k
SWITCHING

Q141
2SC945Q
MUTING

IC301
μPC4558C
HEADPHONE AMP

IC302
μPC4558C
METER LOG AMP

CNP102 LINE OUT -L-
CNP202 LINE OUT -R-
J301 HEADPHONES
PL301 (PEAK PROGRAM METER)

D101-103
1S953

TAPE SELECT
TYPE I → TYPE II → TYPE III

Q151
2SC945Q
RECORD AMP

RECORD LEVEL

DOLBY
DOLBY NR
OFF → ON

Q241

Q301
2SC1096K
VOLTAGE REG

D301-304
IN4002
RECT

D305
RD22EB

Q306 2SD414Q
VOLTAGE REG

D315
RD5.1EB

D310-314 IN4002
RECT

T301 POWER

【SERVO AMP BOARD】

IC1001
CX069
SERVO AMP

REG
SHAPER
SAWTOOTH WAVE PRODUCE
COMPARATOR
SMOOTHER/DC AMP

Q1001
2SD414
MOTOR DRIVE

M1001
MOTOR
DNF-100HB

PL1001 (CASSETTE)

FG

SPEED

0.8Vp-p 2.5mSEC
1.2Vp-p 2.5mSEC
1.6V 1.8V 0V 2.5mSEC
0.6V 1V 0V 2.5mSEC

US,CANADIAN MODEL

AEP,UK,SCN MODEL
【VOLTAGE SELECTOR BOARD】

E1,E2 MODEL

VOLTAGE SELECTOR
110V 120V 220V 240V

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

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

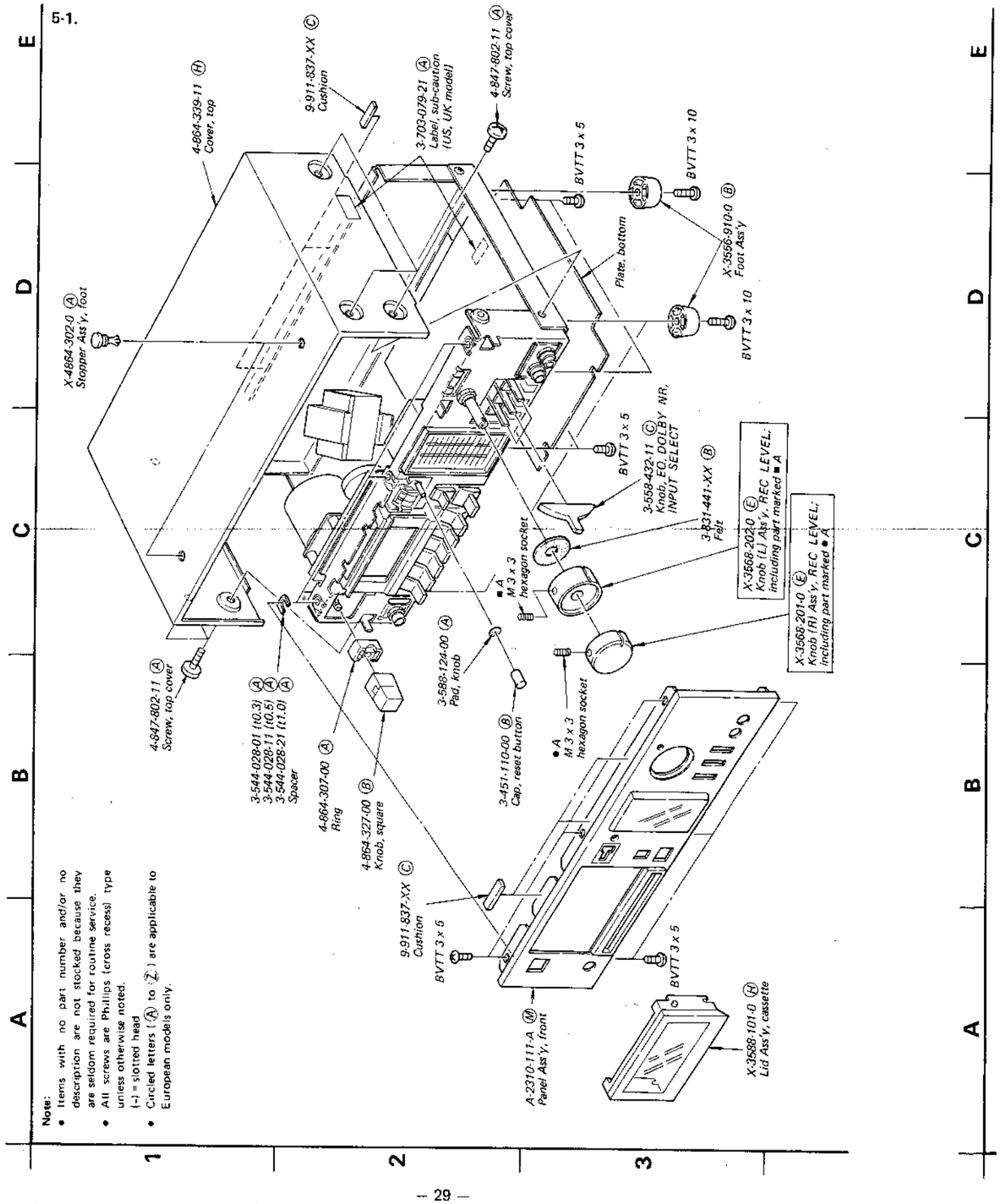
Note: (For schematic diagram)

- Components for right channel have same values as for left channel. Reference numbers are coded from 200.
- 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 : 1000 Ω, MΩ : 1000 kΩ.
- : nonflammable resistor.
- : fusible resistor.
- ——— : B+ bus.
- – – – : B– bus.
- : panel designation.
- : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).
  ( ): RECORD
  ★ : Measured with a VTVM
- Voltage variations may be noted due to normal production tolerances.
- Switch

Ref. No.	Switch	Position
S301-1, 301-2	INPUT SELECT	LINE
S302-1 to 302-4	TAPE SELECT	TYPE 1
S303, 304	RECORD/PLAYBACK	PLAYBACK
S305-1, 305-2	DOLBY NR	OFF
S308	POWER	OFF
S1001	MUTING	OFF
S1002	TIMING	OFF

SECTION 5
EXPLODED VIEWS

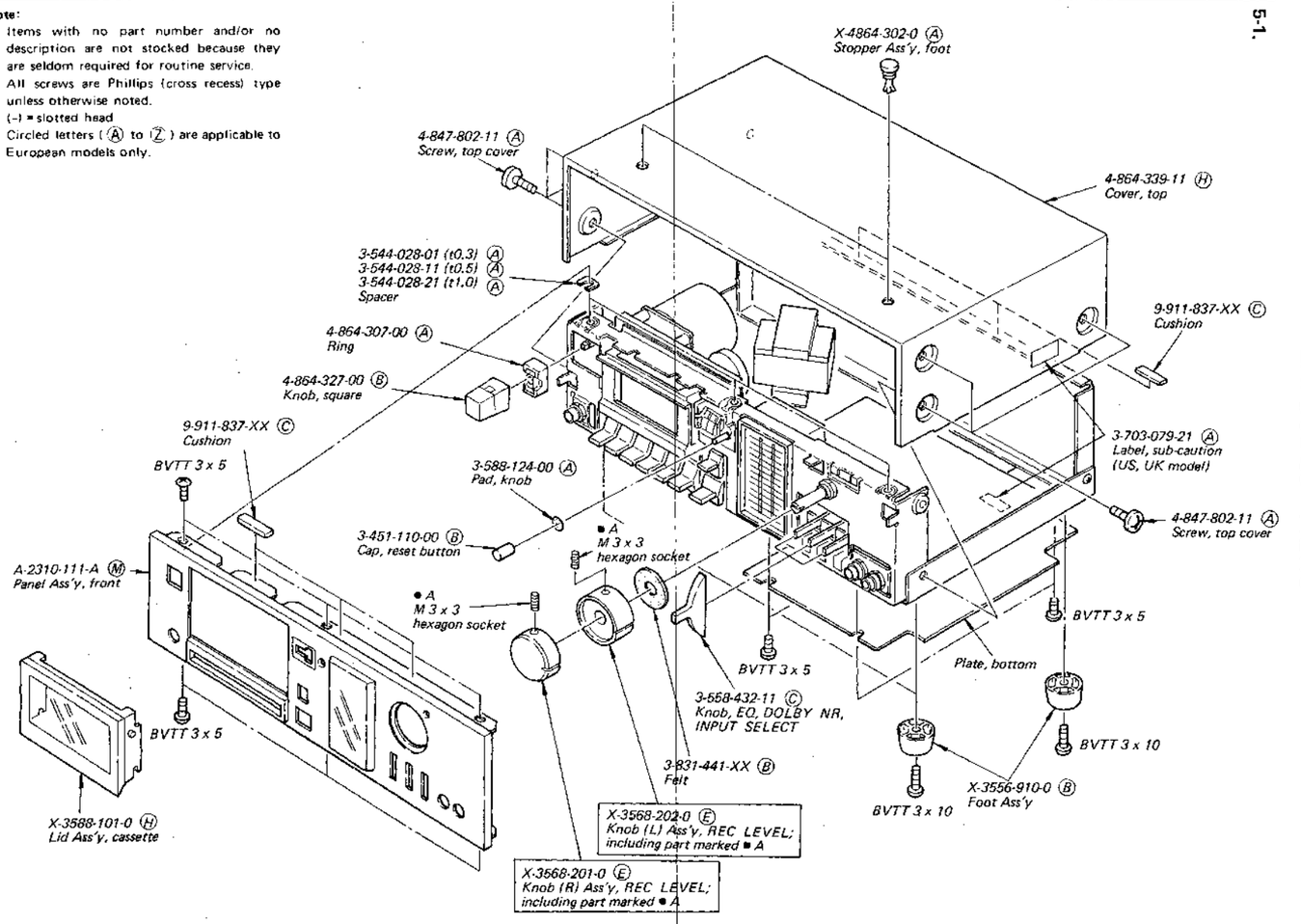
5-1.



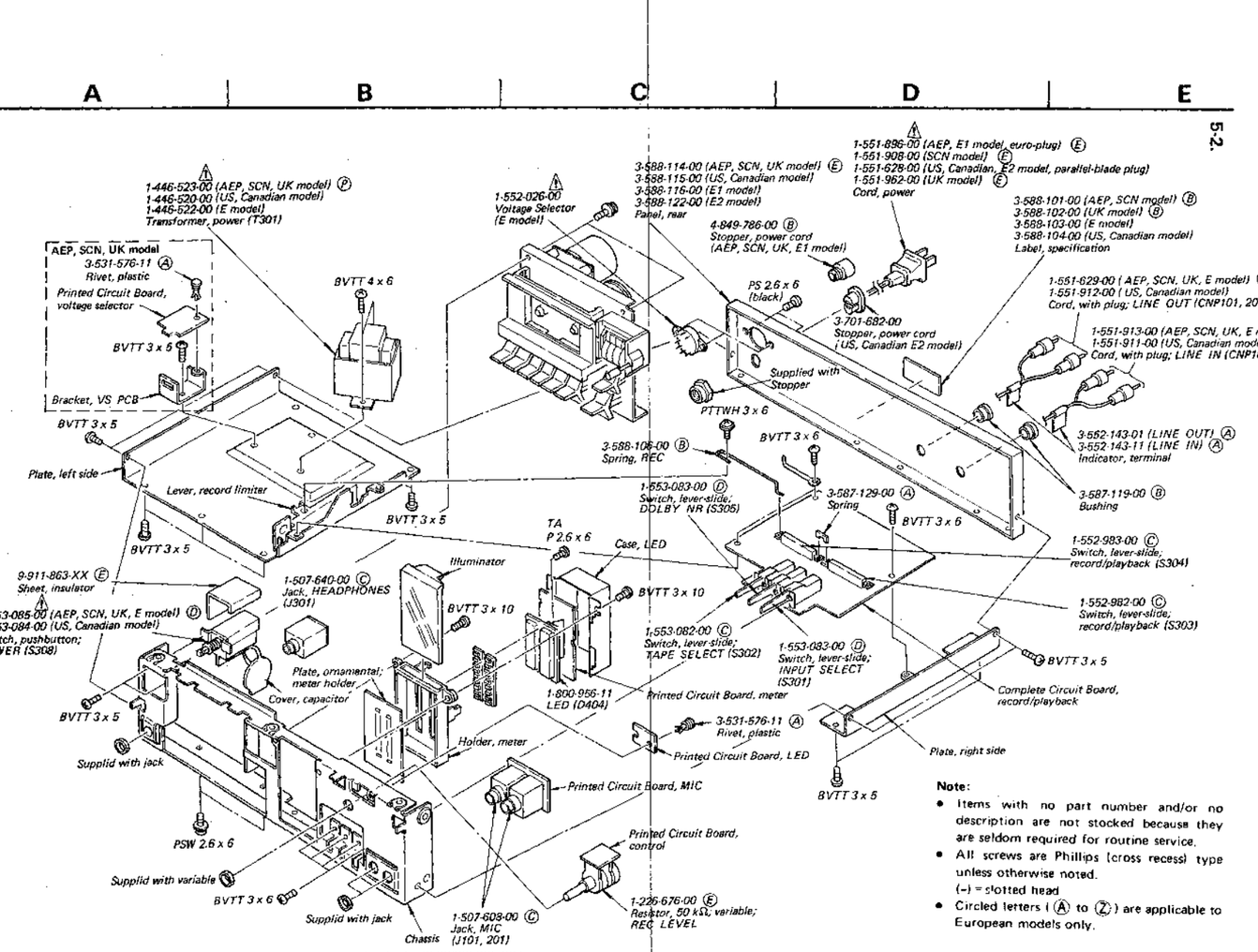
Note:
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

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 European models only.



5-2.



Note:
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- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

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

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note:

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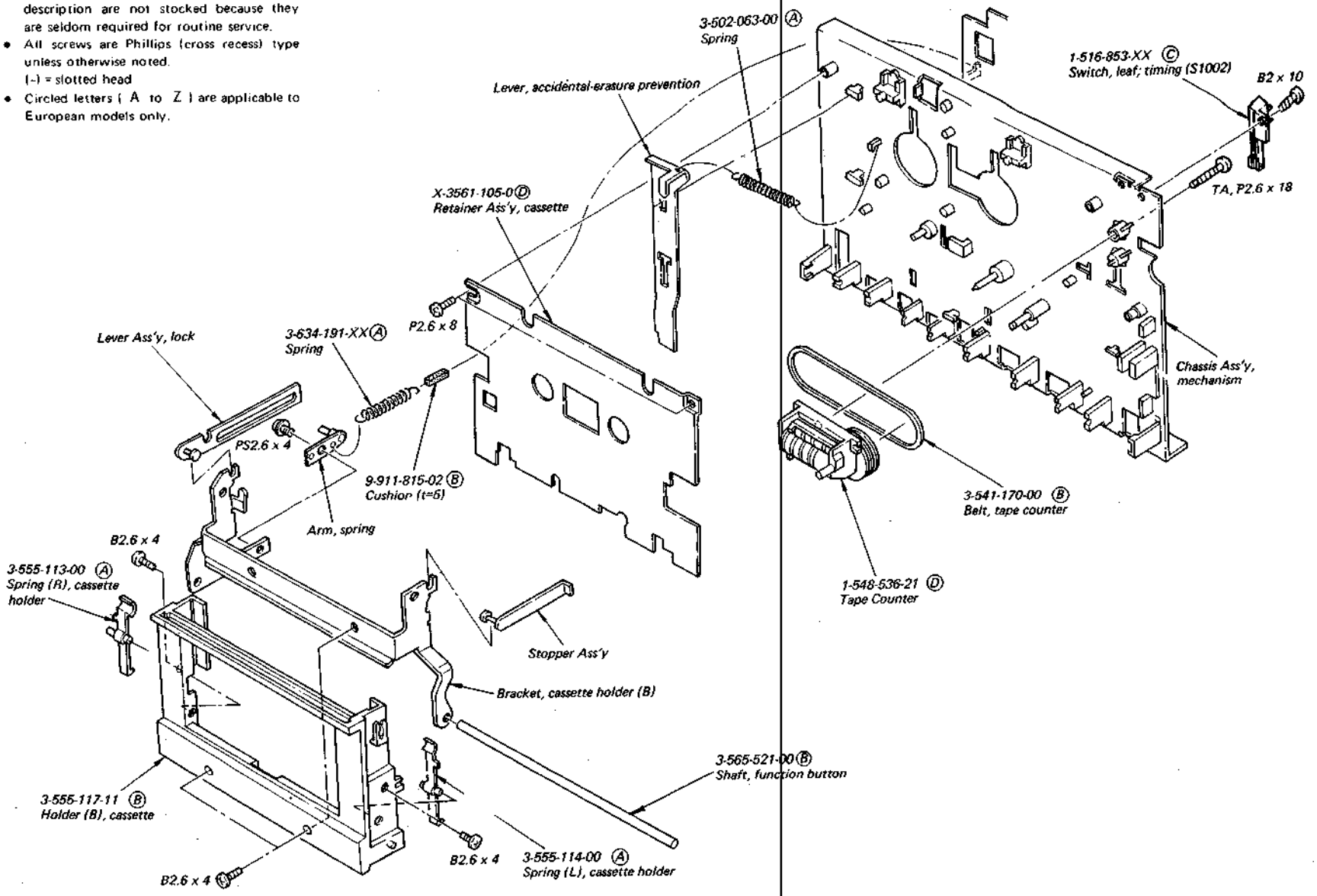
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- Circled letters (A to Z) are applicable to European models only.



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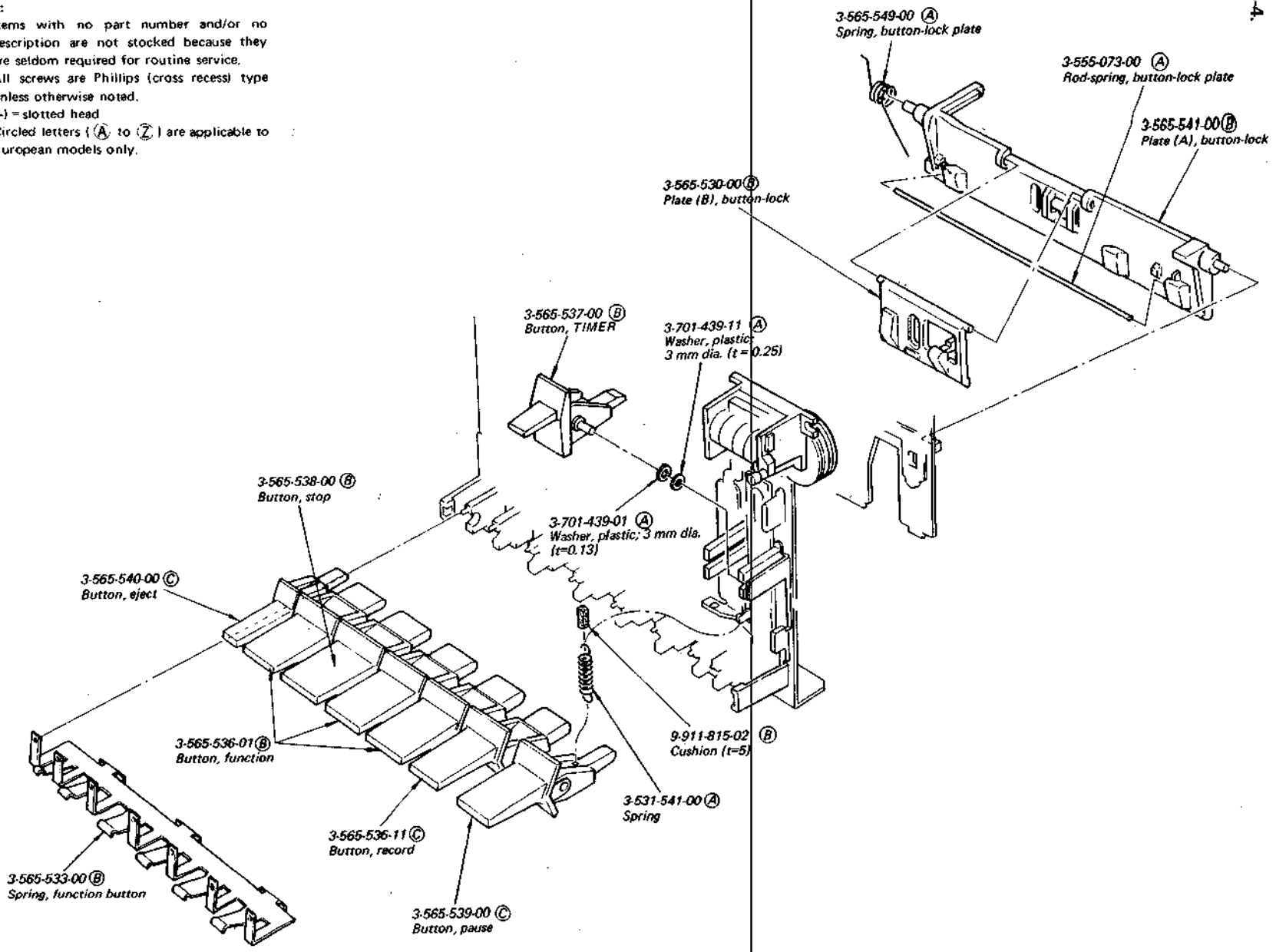
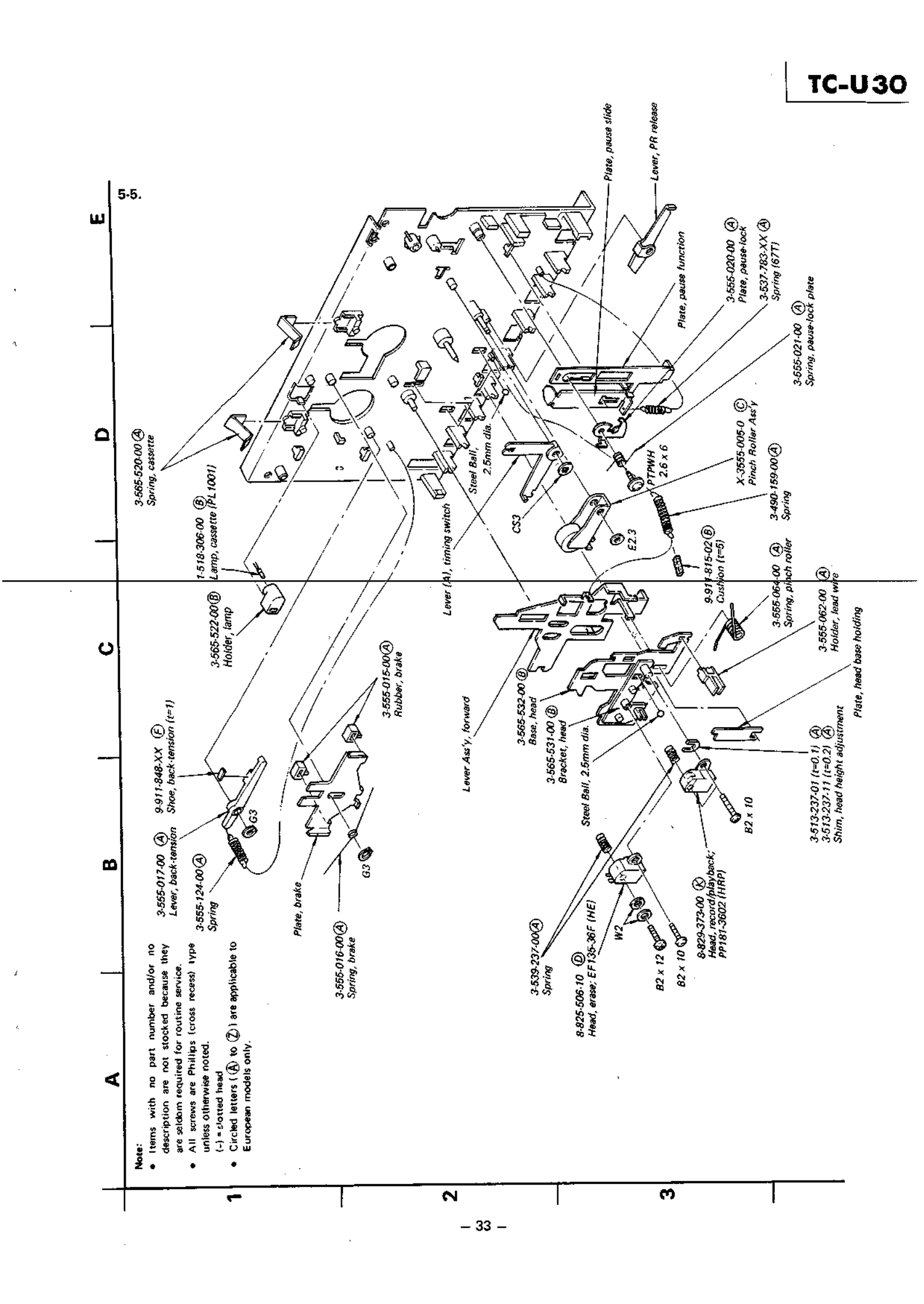
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.



5-5.



Note:

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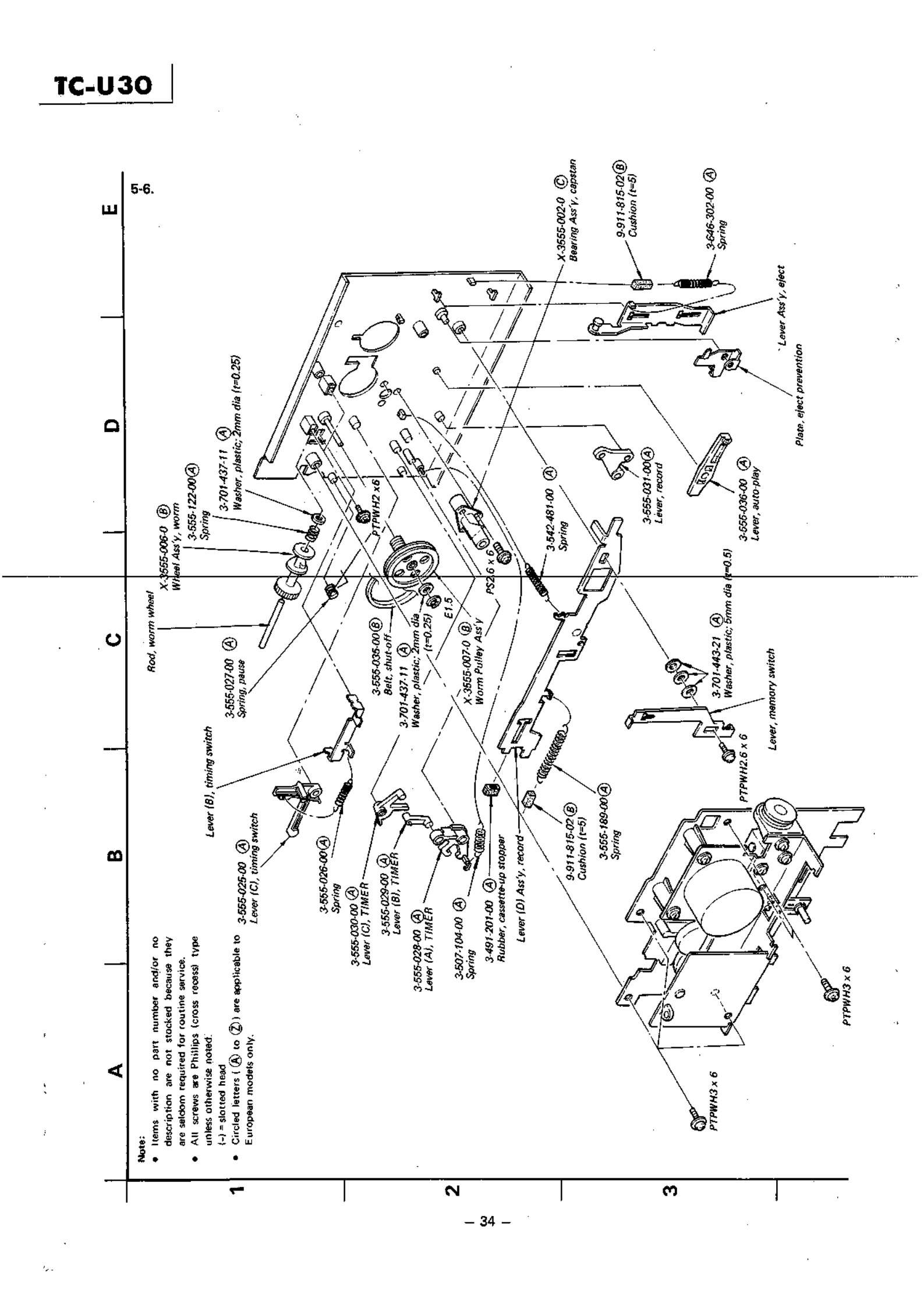
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

5-6.


A
B
C
D
E
1
2
3
Note:
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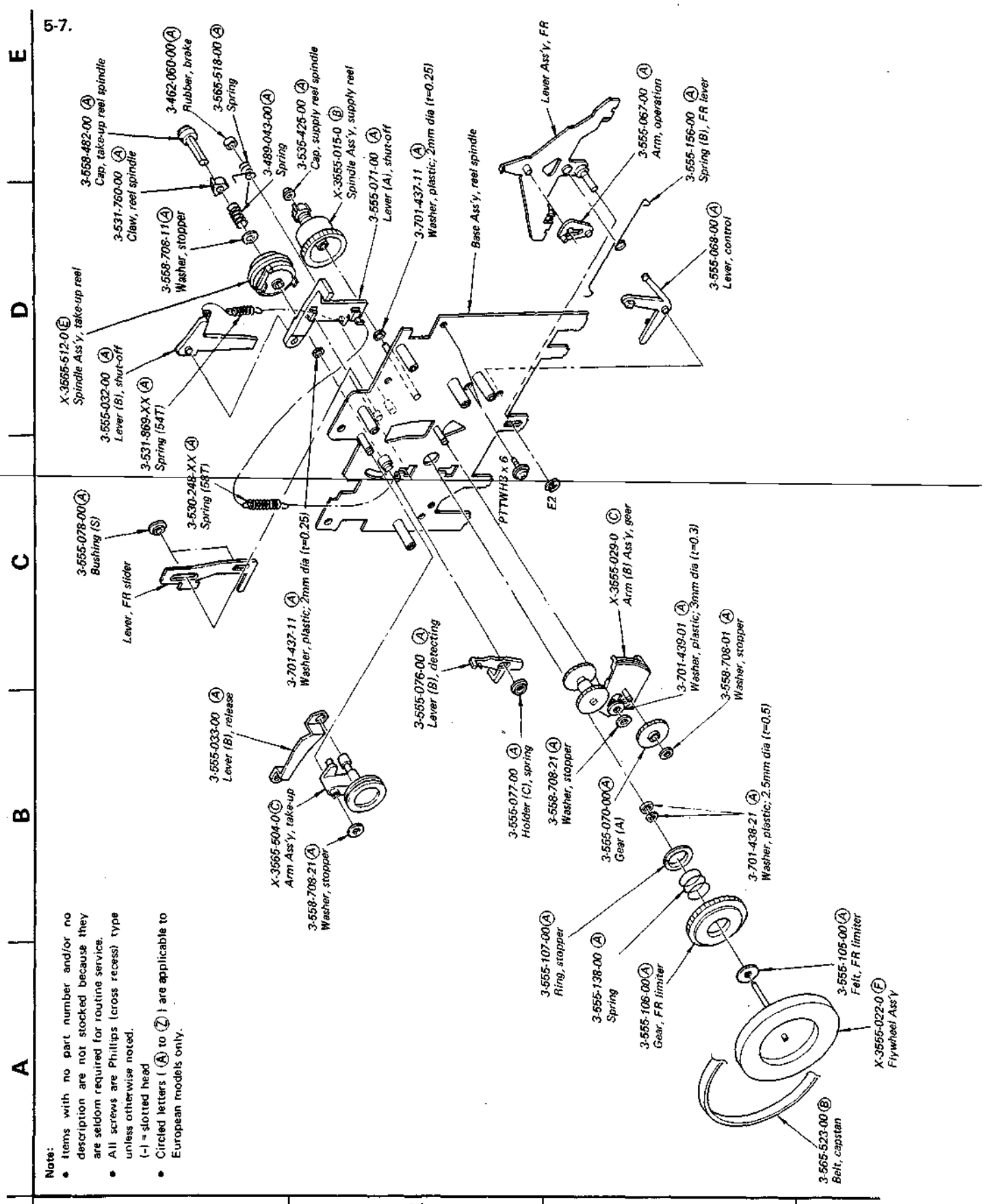
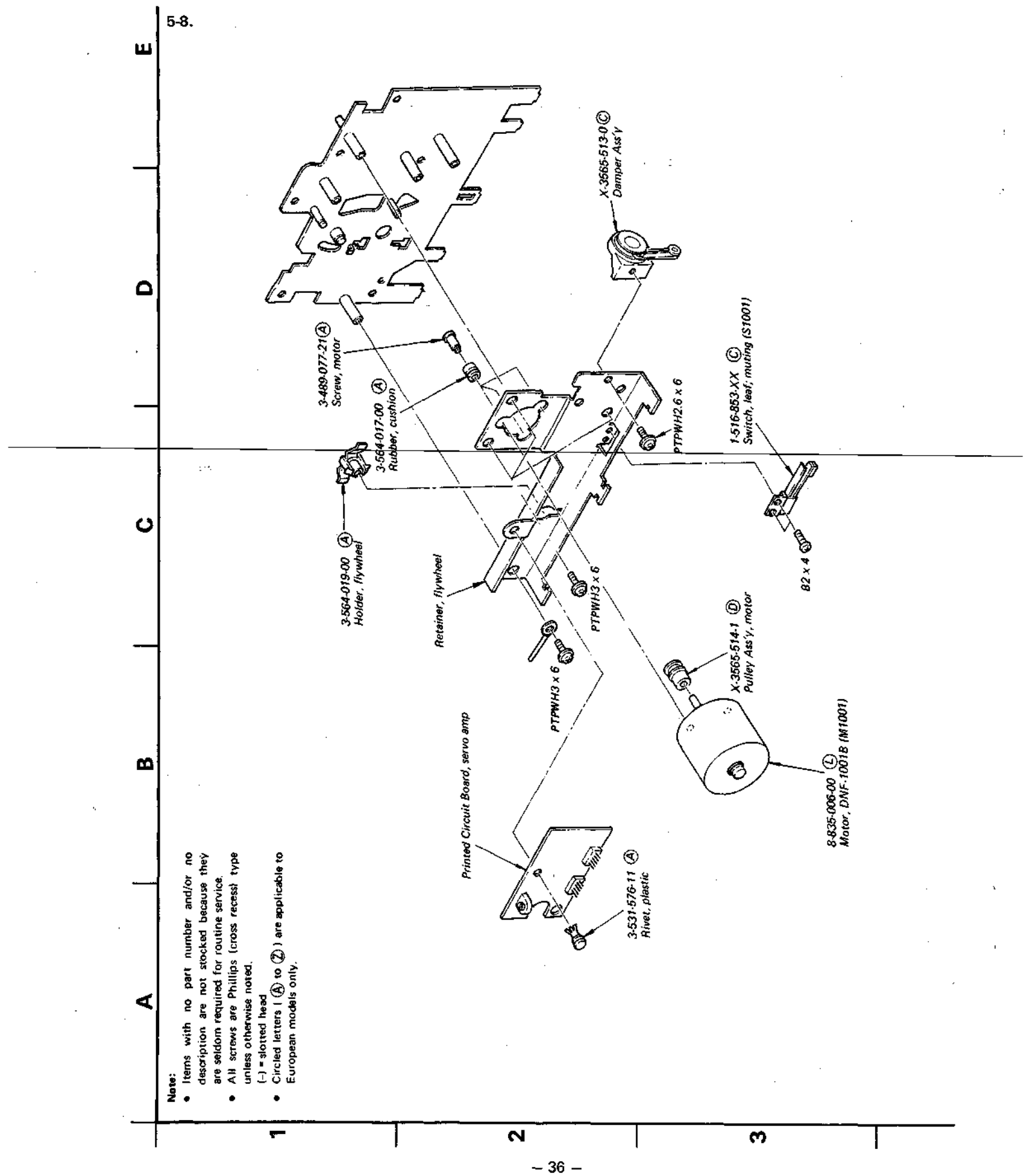
• All screws are Phillips (cross recess) type unless otherwise noted.
(-) = slotted head
• Circled letters (Ⓐ to Ⓩ) are applicable to European models only.
X-3555-002-0 Ⓒ Bearing Ass'y, capstan
9-911-815-02 Ⓑ Cushion (t=5)
3-646-302-00 Ⓐ Spring
Lever Ass'y, eject
Plate, eject prevention
X-3555-006-0 Ⓑ Wheel Ass'y, worm
3-555-122-00 Ⓐ Spring
3-701-437-11 Ⓐ Washer, plastic, 2mm dia (t=0.25)
Rod, worm wheel
PTPWH2 x6
3-555-027-00 Ⓐ Spring, pause
3-555-035-00 Ⓑ Belt, shut-off
3-701-437-11 Ⓐ Washer, plastic, 2mm dia (t=0.25)
E1.5
X-3555-007-0 Ⓑ Worm Pulley Ass'y
PS2.6 x 6
3-542-481-00 Ⓐ Spring
3-555-031-00 Ⓐ Lever, record
3-556-036-00 Ⓐ Lever, auto-play
3-701-443-21 Ⓐ Washer, plastic, 5mm dia (t=0.5)
Lever, memory switch
PTPWH2.6 x 6
Lever (B), timing switch
3-555-025-00 Ⓐ Lever (C), timing switch
3-555-026-00 Ⓐ Spring
3-555-030-00 Ⓐ Lever (C), TIMER
3-555-029-00 Ⓐ Lever (B), TIMER
3-555-028-00 Ⓐ Lever (A), TIMER
3-507-104-00 Ⓐ Spring
3-491-201-00 Ⓐ Rubber, cassette-up stopper
Lever (D) Ass'y, record
9-911-815-02 Ⓑ Cushion (t=5)
3-555-189-00 Ⓐ Spring
PTPWH3 x 6
PTPWH3 x 6


5-7.
A
B
C
D
E
1
2
3
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.
X-3565-512-0 Ⓔ Spindle Ass'y, take-up reel
3-555-032-00 Ⓐ Lever (B), shut-off
3-531-869-XX Ⓐ Spring (54T)
3-558-482-00 Ⓐ Cap, take-up reel spindle
3-531-760-00 Ⓐ Claw, reel spindle
3-558-708-11 Ⓐ Washer, stopper
3-462-060-00 Ⓐ Rubber, brake
3-565-518-00 Ⓐ Spring
3-489-043-00 Ⓐ Spring
3-535-425-00 Ⓐ Cap, supply reel spindle
X-3555-015-0 Ⓑ Spindle Ass'y, supply reel
3-555-071-00 Ⓐ Lever (A), shut-off
3-701-437-11 Ⓐ Washer, plastic; 2mm dia (t=0.25)
Base Ass'y, reel spindle
Lever Ass'y, FR
3-555-067-00 Ⓐ Arm, operation
3-555-156-00 Ⓐ Spring (B), FR lever
3-555-068-00 Ⓐ Lever, control
3-555-078-00 Ⓐ Bushing (S)
Lever, FR slider
3-530-248-XX Ⓐ Spring (58T)
3-701-437-11 Ⓐ Washer, plastic; 2mm dia (t=0.25)
PTTWH3 x 6
E2
X-3555-029-0 Ⓒ Arm (B) Ass'y, gear
3-555-033-00 Ⓐ Lever (B), release
3-555-076-00 Ⓐ Lever (B), detecting
3-701-439-01 Ⓐ Washer, plastic; 3mm dia (t=0.3)
3-558-708-01 Ⓐ Washer, stopper
X-3555-504-0 Ⓒ Arm Ass'y, take-up
3-558-708-21 Ⓐ Washer, stopper
3-555-077-00 Ⓐ Holder (C), spring
3-558-708-21 Ⓐ Washer, stopper
3-555-070-00 Ⓐ Gear (A)
3-701-438-21 Ⓐ Washer, plastic; 2.5mm dia (t=0.5)
3-555-107-00 Ⓐ Ring, stopper
3-555-138-00 Ⓐ Spring
3-555-106-00 Ⓐ Gear, FR limiter
3-555-105-00 Ⓐ Felt, FR limiter
X-3555-022-0 Ⓕ Flywheel Ass'y
3-565-523-00 Ⓑ Belt, capstan

5-8.



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.

SECTION 6
ELECTRICAL PARTS LIST

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.	Description
		SEMICONDUCTORS
		Transistors
⇒ Q101, 201 ⇒ Q102, 202	8-729-665-47	Ⓑ 2SC1362
⇒ Q141, 241 ⇒ Q151, 251	8-729-663-47	Ⓑ 2SC1364
Q301	8-729-316-12	Ⓓ 2SC1061
⇒ Q302	8-729-612-77	Ⓑ 2SA1027R
⇒ Q303	8-729-663-47	Ⓑ 2SC1364
⇒ Q304	8-729-100-13	Ⓑ 2SC2001
⇒ Q305	8-729-663-47	Ⓑ 2SC1364
⇒ Q306	8-729-141-43	Ⓑ 2SD414
Q405–408	8-729-195-23	Ⓑ 2SA952
⇒ Q1001	8-729-141-43	Ⓑ 2SD414
		ICs
IC121, 221	8-759-906-46	Ⓖ NE646B
IC301, 302	8-759-145-58	Ⓓ μPC4558C
IC401	8-759-993-51	Ⓗ MSL9351
IC1001	8-750-690-00	Ⓓ CX069
		Diodes
⇒ D101, 201 ⇒ D102, 202 ⇒ D103, 203	8-719-815-55	Ⓑ 1S1555
⇒ D301–304	8-719-200-02	Ⓑ 10E2
⇒ D305	8-719-931-22	Ⓑ EQB01-22
⇒ D306, 307	8-719-815-55	Ⓑ 1S1555
⇒ D308	8-719-200-02	Ⓑ 10E2
D309	1-800-960-11	Ⓑ AR3131D
⇒ D310–313	8-719-200-02	Ⓑ 10E2
⇒ D314	8-719-815-55	Ⓑ 1S1555
⇒ D315	8-719-151-77	Ⓑ RD5-1EC
D404	1-800-956-11	Ⓚ SEL8808
		COILS
L121, 221	1-231-576-00	Ⓒ Filter, MPX
L151, 251	1-407-962-00	Ⓑ 3.3 mH, microinductor
L152, 252	1-407-964-00	Ⓑ 33 mH, microinductor

⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Ref. No.	Part No.	Description
		TRANSFORMERS
T301	⚠ 1-446-520-00	Power (US, Canadian model)
T301	⚠ 1-446-522-00	Power (E model)
T301	⚠ 1-446-523-00 Ⓟ	Power (AEP, SCN, UK model)
T302	1-405-856-00 Ⓑ	Osc
		CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics and tantalums. pF: μμF, elect: electrolytic

C101, 201	1-102-074-00 Ⓐ	0.001		
C102, 202	1-131-419-00 Ⓑ	2.2	10 V	tantalum
C104, 204	1-102-074-00 Ⓐ	0.001		
C105, 205	1-101-886-00 Ⓐ	62p		
C106, 206	1-121-398-00 Ⓑ	10	25 V	elect
C107, 207	1-121-726-00 Ⓑ	0.47	50 V	elect
C108, 208	1-108-579-00 Ⓑ	0.01		mylar
C109, 209	1-121-398-00 Ⓑ	10	25 V	elect
C110, 210	1-108-565-00 Ⓑ	0.0027		mylar
C111, 211	1-102-074-00 Ⓐ	0.001		
C121, 221	1-102-110-00 Ⓐ	220p		
C122, 222	1-131-405-00 Ⓑ	0.33	16 V	tantalum
C123, 223	1-131-451-00 Ⓑ	0.1	16 V	tantalum
C124, 224	1-121-398-00 Ⓑ	10	25 V	elect
C125, 225	1-108-246-00 Ⓑ	0.047		mylar
C126, 226	1-131-347-00 Ⓑ	1	16 V	tantalum
C127, 227	1-108-573-00 Ⓑ	0.0056		mylar
C128, 228	1-108-359-00 Ⓑ	0.027		mylar
C129, 229	1-108-571-00 Ⓑ	0.0047		mylar
C131, 231 C132, 232 C133, 233	1-121-398-00 Ⓑ	10	25 V	elect
C134, 234	1-102-074-00 Ⓐ	0.001		
C141, 241	1-121-395-00 Ⓑ	4.7	25 V	elect
C142, 242	1-121-479-00 Ⓑ	22	16 V	elect
C151, 251	1-131-451-00 Ⓑ	0.1	16 V	tantalum
C152, 252	1-121-395-00 Ⓑ	4.7	25 V	elect
C153, 253	1-102-106-00 Ⓐ	100p		
C154, 254	1-121-395-00 Ⓑ	4.7	25 V	elect

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

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	*Part No.*	*Description*		
C155, 255	1-121-726-00 Ⓑ	0.47	50 V	elect
C156, 256, C157, 257	1-108-591-00 Ⓑ	0.033		mylar
C158, 258	1-108-246-00 Ⓑ	0.047		mylar
C159, 259	1-108-359-00 Ⓑ	0.027		mylar
C160, 260	1-108-565-00 Ⓑ	0.0027		mylar
C162, 262	1-131-347-00 Ⓑ	1	16 V	tantalum
C172, 272	1-101-890-00 Ⓐ	75p		
C301	1-121-361-00 Ⓑ	470	35 V	elect
C302	1-121-245-00 Ⓑ	1000	16 V	elect
C303	1-121-404-00 Ⓑ	33	25 V	elect
C304	1-121-422-00 Ⓑ	220	25 V	elect
C305	1-121-622-00 Ⓑ	22	35 V	elect
C306	1-121-654-00 Ⓑ	330	25 V	elect
C307	1-121-726-00 Ⓑ	0.47	50 V	elect
C308	1-131-234-00 Ⓑ	6.8	20 V	tantalum
C309	1-108-227-00 Ⓐ	0.001		mylar
C310	1-108-234-00 Ⓐ	0.0047		mylar
C311	1-108-379-00 Ⓐ	0.015	100 V	mylar
C312, 313	1-107-169-00 Ⓑ	100p	500 V	mica
C314	1-129-928-00 Ⓑ	0.0027	630 V	film
C315	1-121-422-00 Ⓑ	220	25 V	elect
C316	1-121-733-00 Ⓑ	470	25 V	elect
C317	1-121-426-00 Ⓑ	470	16 V	elect
C318	1-119-135-00 Ⓑ	220	16 V	elect
C319	1-121-409-00 Ⓑ	47	16 V	elect
C321, 322	1-121-422-00 Ⓑ	220	25 V	elect
C323	1-119-135-00 Ⓑ	220	16 V	elect
C325	1-121-357-00 Ⓑ	100	35 V	elect
C326	⚠1-161-749-00	0.01	125 V	(US, Canadian model)
C326, 327	⚠1-130-196-00 Ⓓ	0.01	250 V	film (AEP, SCN, UK, E model)
C328, 329	1-102-074-00 Ⓐ	0.001		
C330	1-108-579-00 Ⓑ	0.01		mylar
C406	1-108-251-00 Ⓑ	0.1		mylar
C407	1-123-465-00 Ⓑ	220	6.3 V	elect

Ref. No.	*Part No.*	*Description*		
C1001	1-130-134-00 Ⓑ	0.082	100 V	film
C1002	1-123-316-00 Ⓑ	10	16 V	elect
C1003	1-108-240-00 Ⓑ	0.015	50 V	mylar
C1004	1-123-352-00 Ⓑ	1	50 V	elect
C1006, 1008	1-123-332-00 Ⓑ	47	25 V	elect

RESISTORS

All resistors in ohms. Common ¼W carbon resistors are omitted. Refer to the list on page 40 for their part numbers.
(kΩ: 1000Ω, MΩ: 1000 kΩ)

R305	1-206-640-00 Ⓐ	330	½ W	metal oxide
R312	⚠1-206-648-00 Ⓑ	220	2 W	metal oxide (nonflammable)
R319	⚠1-206-475-00 Ⓑ	33	2 W	metal oxide (nonflammable)
R1001	1-214-765-00 Ⓐ	33 k	¼W(1%)	metal oxide
R1008	⚠1-217-523-00 Ⓑ	10	¼ W	fusible
RV101	1-226-676-00 Ⓔ	Variable, 50 k-A; REC LEVEL		
RV102, 202	1-226-238-00 Ⓑ	adjustable, 50 k-B; playback level		
RV151, 251	1-226-236-00 Ⓑ	adjustable, 10 k-B; record level		
RV161, 261	1-226-241-00 Ⓑ	adjustable, 470 k-B; meter		
RV301, 302	1-226-478-00 Ⓑ	adjustable, 150 k-B; bias		
RV1001	1-226-431-00 Ⓑ	adjustable, 10 k-B; tape speed		

SWITCHES

S301	1-553-083-00 Ⓓ	Lever-slide, INPUT SELECT
S302	1-553-082-00 Ⓒ	Lever-slide, TAPE SELECT
S303	1-552-982-00 Ⓒ	Lever-slide, record/playback
S304	1-552-983-00 Ⓒ	Lever-slide, record/playback
S305	1-553-083-00 Ⓓ	Lever-slide, DOLBY NR
S308	⚠1-553-084-00	Pushbutton, POWER (US, Canadian model)
S308	⚠1-553-085-00 Ⓓ	Pushbutton, POWER (AEP, SCN, UK, E model)
S1001, 1002	1-516-853-XX Ⓒ	Leaf, muting, timing

MISCELLANEOUS

CNP101,201	1-551-629-00 Ⓓ	Cord, with plug; LINE OUT (AEP, SCN, UK, E model)
CNP101,201	1-551-911-00	Cord, with plug; LINE OUT (US, Canadian model)

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

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	*Part No.*		*Description*
CNP102,202	1-551-913-00	Ⓓ	Cord, with plug; LINE IN (AEP, SCN, UK, E model)
CNP102,202	1-551-912-00		Cord, connection; LINE IN (US, Canadian model)
HE	8-825-506-10	Ⓓ	Head, erase; EF135-36F
HRP	8-829-373-00	Ⓚ	Head, record/playback; PP181-3602
J101, 201	1-507-608-00	Ⓒ	Jack, MIC
J301	1-507-640-00	Ⓒ	Jack, HEADPHONES
M1001	8-835-006-00	Ⓛ	Motor, DNF-1001B
PL1001	1-518-306-00	Ⓑ	Lamp, 8 V 50 mA; cassette
	1-548-536-21	Ⓓ	Counter, tape
⚠	1-551-628-00		Cord, power; parallel-blade plug (US, Canadian, E2 model)
⚠	1-551-896-00	Ⓔ	Cord, power; euro-plug (AEP, E1 model)
⚠	1-551-908-00	Ⓔ	Cord, power (SCN model)
⚠	1-551-962-00	Ⓔ	Cord, power (UK model)
⚠	1-552-026-00		Voltage Selector (E model)

ACCESSORIES AND PACKING MATERIALS

Part No.		*Description*
X-3701-105-0	Ⓐ	Tips Ass'y, head cleaning
⚠1-551-966-00	Ⓔ	Adaptor, power cord (AEP, E model)
⚠1-551-967-00	Ⓔ	Adaptor, power cord (UK model)
3-588-118-00	Ⓒ	Carton (AEP, SCN, E model)
3-588-119-00	Ⓒ	Carton (US, Canadian, UK model)
3-588-120-00	Ⓒ	Cushion
3-701-630-00	Ⓐ	Bag, plastic; instruction manual
3-770-951-11	Ⓓ	Manual, instruction (AEP, E, UK, SCN model)
3-770-951-21		Manual, instruction (US model)
3-770-951-21, 3-794-589-21		Manual, instruction (Canadian model)
3-793-828-11	Ⓑ	Card, cassette caution
3-794-233-21	Ⓐ	Separate Sheet, consumper products
4-818-924-00	Ⓑ	Bag, plastic

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

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

1/4 WATT CARBON RESISTORS Ⓐ

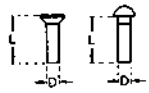
Note: Circled letter Ⓐ is applicable to European models only.

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00	1.0M	1-246-545-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00	1.1M	1-210-814-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00	1.2M	1-210-815-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-576-00	13k	1-246-500-00	130k	1-246-524-00	1.3M	1-210-816-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-577-00	15k	1-246-501-00	150k	1-246-525-00	1.5M	1-210-817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-578-00	16k	1-246-502-00	160k	1-246-526-00	1.6M	1-210-818-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-579-00	18k	1-246-503-00	180k	1-246-527-00	1.8M	1-210-819-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-580-00	20k	1-246-504-00	200k	1-246-528-00	2.0M	1-210-820-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-581-00	22k	1-246-505-00	220k	1-246-529-00	2.2M	1-210-821-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-582-00	24k	1-246-506-00	240k	1-246-530-00	2.4M	1-244-754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-583-00	27k	1-246-507-00	270k	1-246-531-00	2.7M	1-244-755-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-584-00	30k	1-246-508-00	300k	1-246-532-00	3.0M	1-244-756-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-585-00	33k	1-246-509-00	330k	1-246-533-00	3.3M	1-244-757-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-586-00	36k	1-246-510-00	360k	1-246-534-00	3.6M	1-244-758-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-587-00	39k	1-246-511-00	390k	1-246-535-00	3.9M	1-244-759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00	4.3M	1-244-760-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00	4.7M	1-244-761-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00	5.1M	1-244-762-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00		
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00		
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00		
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00		
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00		

HARDWARE NOMENCLATURE

Screw:

P 3 x 10
- *L: Length in mm*
- *D: Diameter in mm*
- *Type of head*
- *Indicated slotted-head only.*
- *Unless otherwise indicated, it means cross-recessed head (Phillips type).*



Nut, Washer, Retaining ring:

N 3
- *Diameter of usable screw or shaft*
- *Reference designation*

Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		brazier-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH	Ⓐ	pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

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