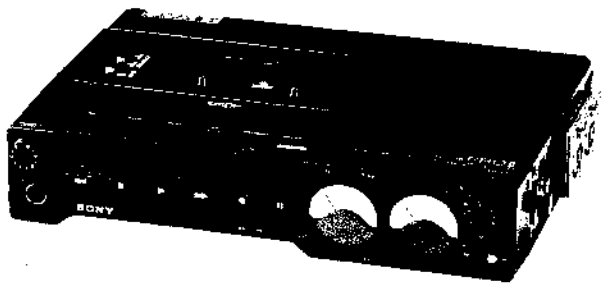
TC-D5PRO II

7090

SERVICE MANUAL

US Model
E Model

Original



SPECIFICATIONS

Recording system	4-track 2-channel stereo
Fast winding time	Approx. 150 sec with Sony C-60 cassette
Bias frequency	85 kHz
Signal-to-noise ratio	DOLBY NR OFF Type III (FeCr) cassette: 58dB at peak level (NAB) Type II (CrO_2) cassette: 56dB at peak level (NAB) Type I (Normal) cassette: 55dB at peak level (NAB) DOLBY NR ON Type III (FeCr) cassette: 64dB at peak level (NAB) Type II (CrO_2) cassette: 62dB at peak level (NAB) Type I (Normal) cassette: 61dB at peak level (NAB)
Total harmonic distortion	0.9% at 315Hz (Type II cassette)
Frequency response	Type III (FeCr) cassette: 40—16000Hz (±3dB) Type II (CrO_2) cassette: 40—15000Hz (±3dB) Type I (Normal) cassette: 40—14000Hz (±3dB)
Wow and flutter	0.06% WRMS (NAB) ±0.17% (DIN)
Inputs	Two microphone input connectors (XLR-3-31 type, balanced) Sensitivity 0.28 mV, for low impedance microphones
Outputs	Two line outputs (phono jacks): Output level 0.44 V at load impedance 47 kilohms (Output impedance: less than 4.7 kilohms) Headphones jack (stereo phone jack): Maximum output level 20 mW + 20 mW at 10% harmonic distortion, at load impedance 8 ohms (For headphones from 8 to 300 ohms)
Speaker	Approx. 5 cm (2 inches) diameter
Power output	200 mW (at 10% harmonic distortion) at DC operation
	0dB = 0.775 V
Supplied accessories	Connecting cord (1) Carrying case (1) Shoulder belt (1) Belt (1)

— Continued on page 2 —

MICROFILM

STEREO CASSETTE-CORDER

SONY

TC 7090

GENERAL

Power requirements	3V DC, Two IEC designation R20 (size D) batteries External power input jack: required voltage 6V: from optional AC power adaptor AC-D468 from 12V car battery with optional DCC-127A car battery cord
Battery life	Approx. 2.5 hours of continuous recording using Sony SUM-1(NS) New Super Batteries Approx. 4.5 hours of continuous recording using Sony AM1 Alkaline Batteries
Dimensions	Approx. 242 x 48 x 168 mm (w/h/d) ($9^{5}/_{8} \times 1^{15}/_{16} \times 6^{5}/_{8}$ inches) including projecting parts and controls
Weight	Approx. 1.7 kg (3 lb 12 oz) including batteries

FEATURES

CANNON XLR female microphone input connectors for balanced inputs.

MIC ATT switch for successful recording of very loud sources.

LIMITER switch prevents saturation of the tape by very high transient input peaks.

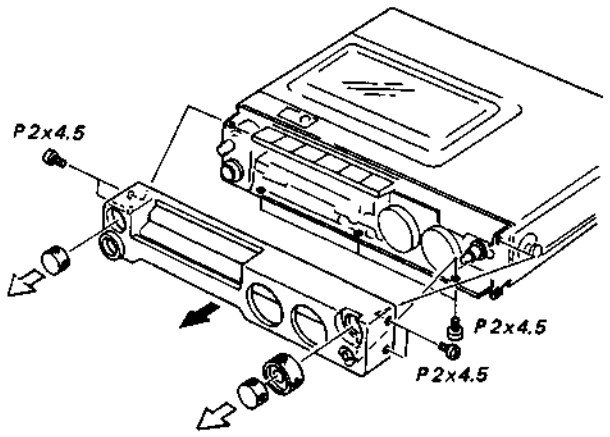
Two illuminated VU meters and LED PEAK indicator allow accurate monitoring of both average and transient input levels.

CONTENTS

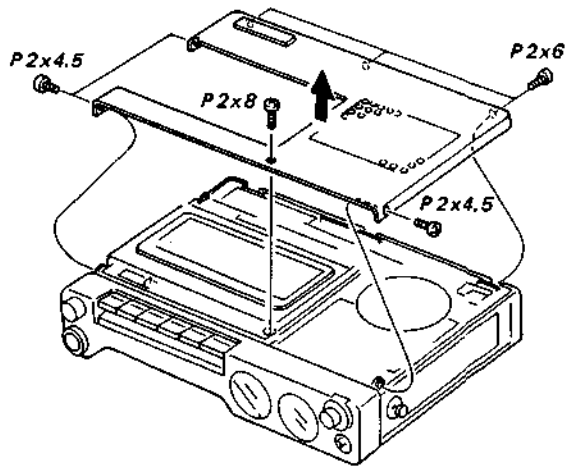
SECTION 1
DISASSEMBLY

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

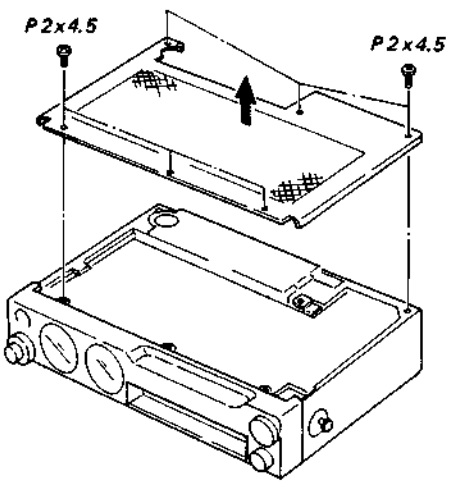
FRONT PANEL ASS'Y



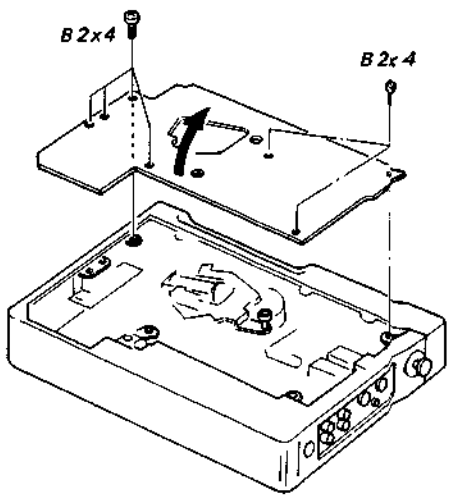
UPPER PANEL



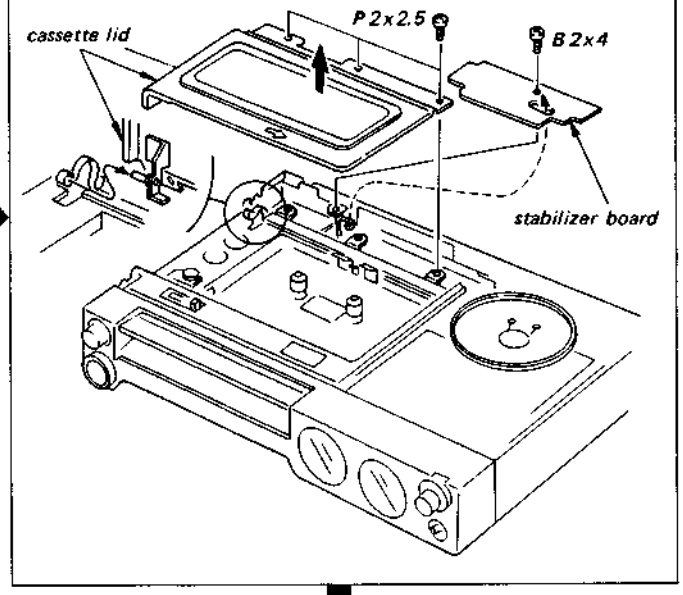
BOTTOM PANEL ASS'Y



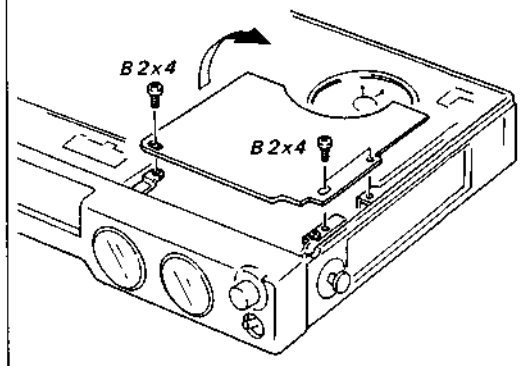
AUDIO AMP BOARD



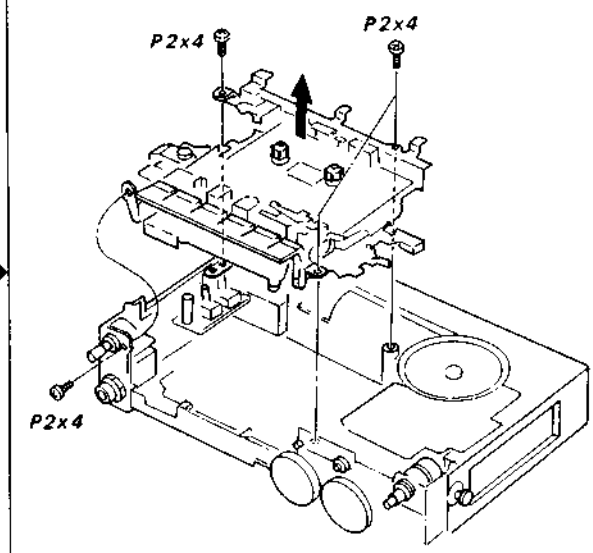
CASSETTE LID ASS'Y, STABILIZER BOARD



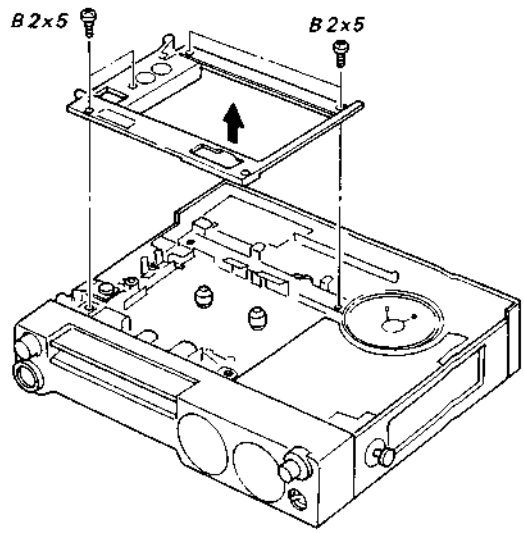
REC BOARD



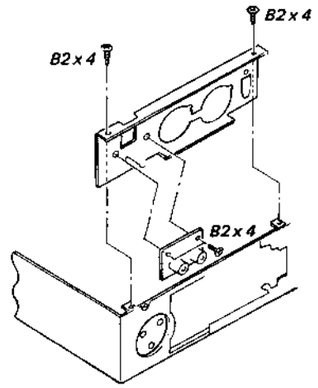
MECHANISM ASS'Y



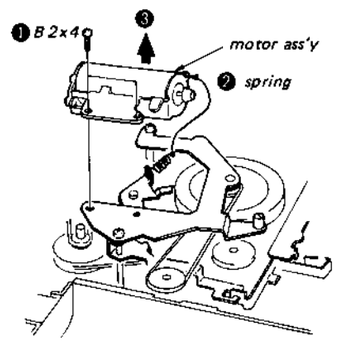
ORNAMENTAL FRAME



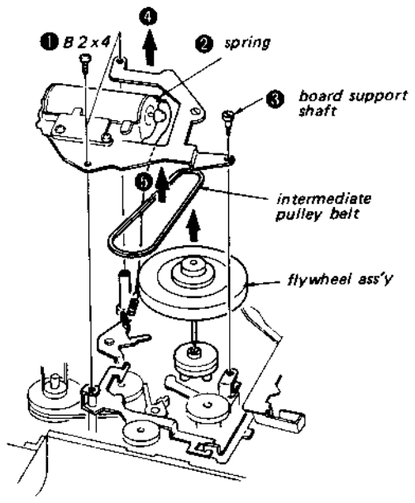
2 PIN JACK



MOTOR ASS'Y

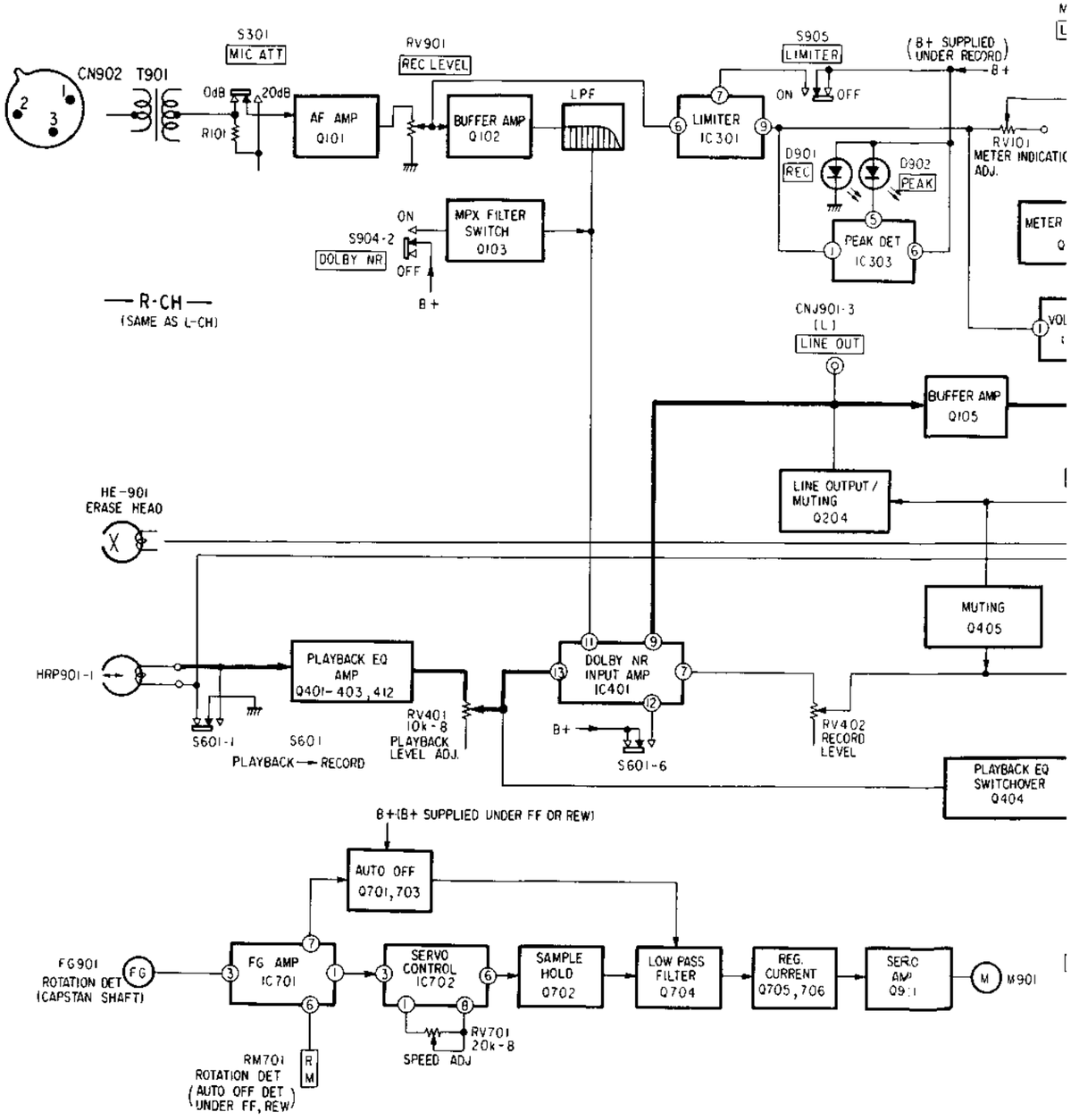


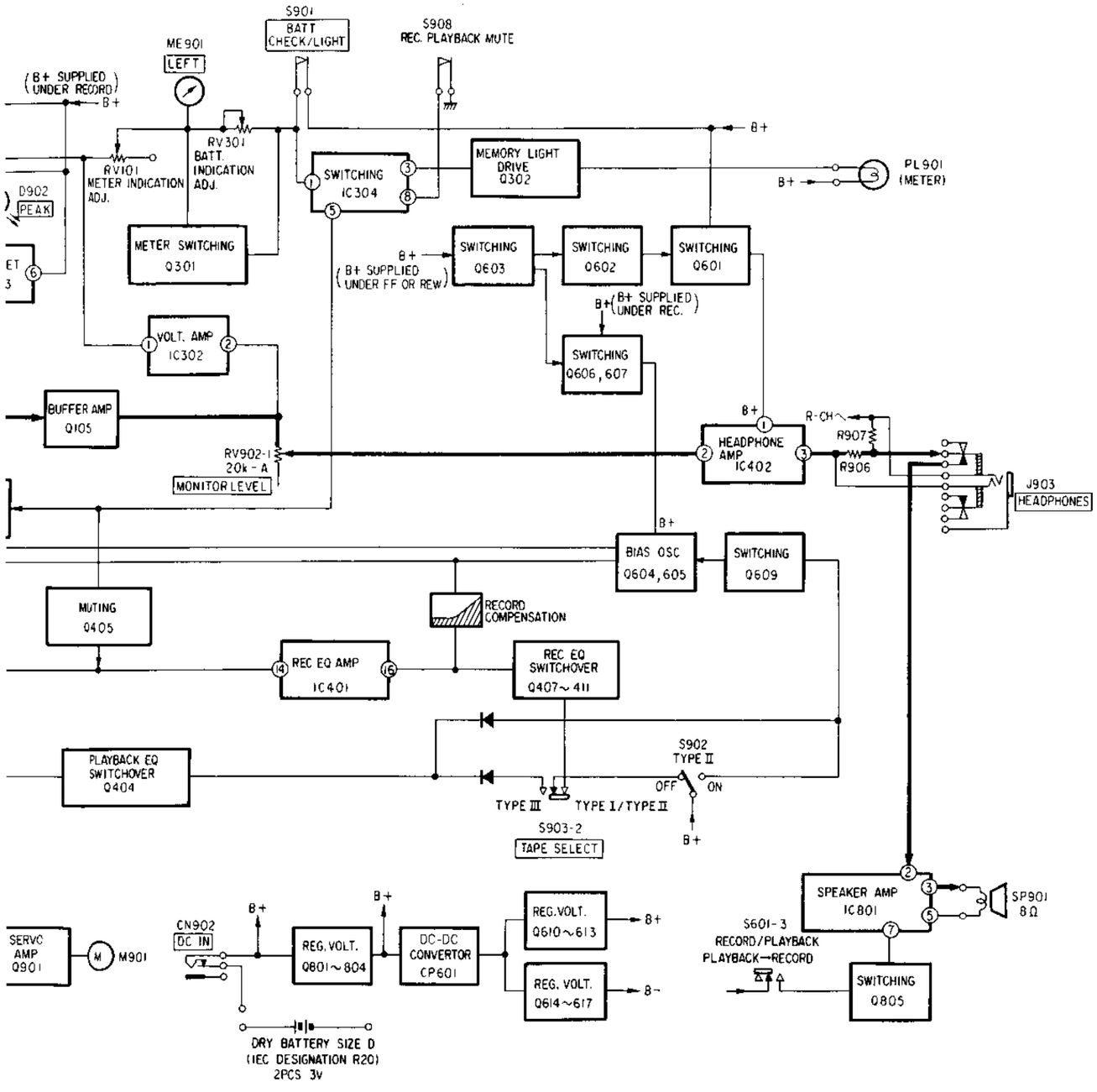
FLYWHEEL



SECTION 2
OUTLINE

2-1. BLOCK DIAGRAM





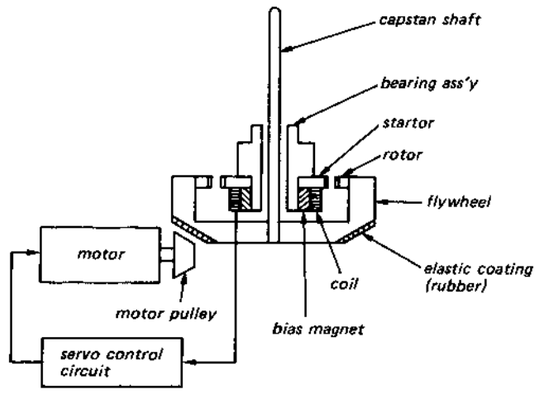
2-2. MECHANICAL OPERATION

- **Disc Drive System**

An elastic rubber coating is applied to the flywheel and the motor pulley is pressed directly against this rubber coating to drive the flywheel.
The compliance of this elastic materials and the inertial mass of the flywheel together function as a mechanical filter, to eliminate any flutter components above approximately 100 Hz.
Motor torque increases in inverse proportion to wheel.
Meanwhile, since the inertial mass of the flywheel itself is low, excellent start-up characteristics (The time from start-up to rated speed is less than 0.2 sec) and anti-rolling effect are obtained.

- **Capstan Servo Control Mechanism**

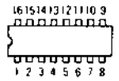
The speed is detected through the flywheel which is directly coupled to the capstan, to apply the servo control.
As shown in Fig. 1-1, the bearing assembly comprises a bias magnet, coil, and startor.
The flywheel has a rotor and the coil senses fluctuations in magnetic flux caused by variations in the air gap between the rotor and the stator, to generate the servo control frequencies.
This serves to remove any wow components from 10 Hz down to the vicinity of DC, to improve the anti-rolling effect.



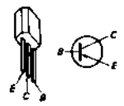
SECTION 3
DIAGRAMS

Semiconductor Lead Layouts

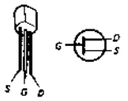
CX174



2SA844
2SA1027R

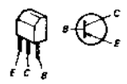


2SK30A

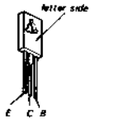


UPC358C

2SA836

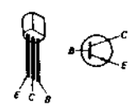


2SB731-K

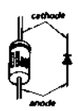


CX069
CX184

2SC1345-E
2SC1364
2SC1474
2SC1634
2SC2001-K2

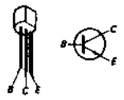


1S1555
1T22AM
1T40
10E.1
10E.2
HZ6B2N
HZ6B21

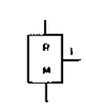


BX338

2SD788

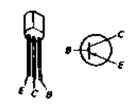


DM-1064

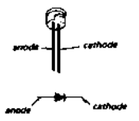


BX337

2SA1115SP
2SA739
2SA772-23
2SA952
2SA739
2SB739

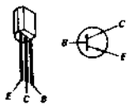


SLP24B

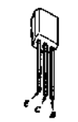


BX335

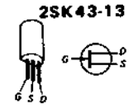
2SC633SP



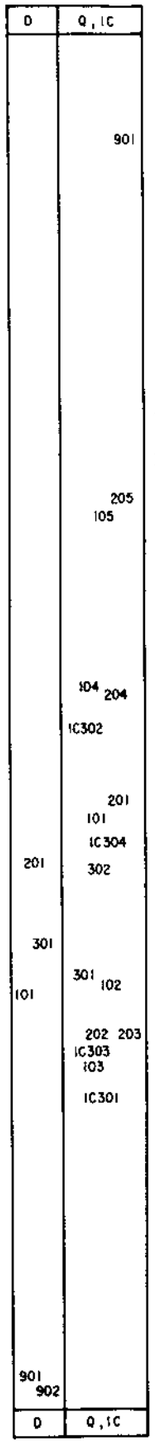
2SC634SP

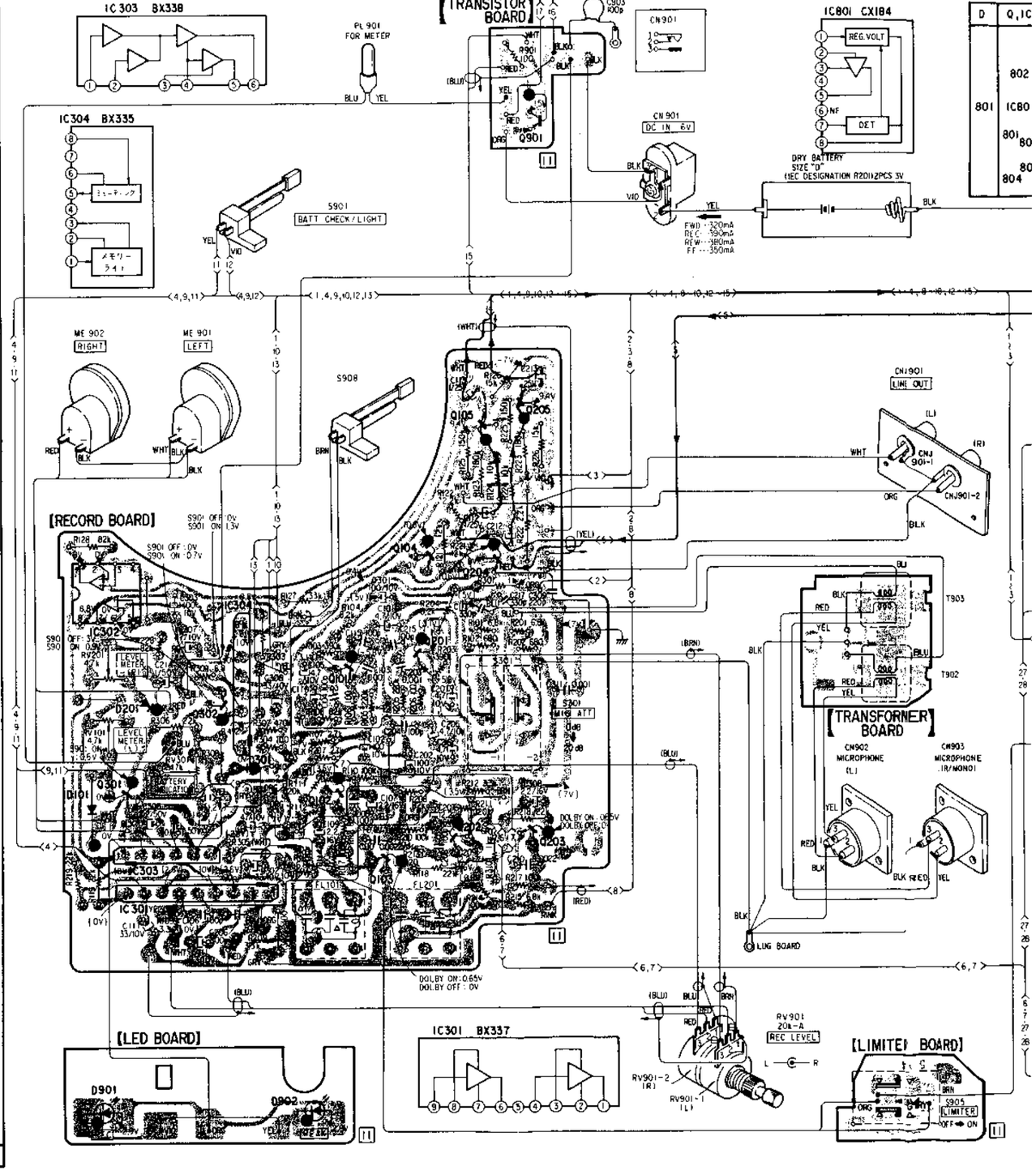


2SK43-13



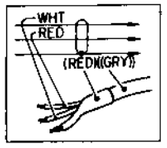
3-1. MOUNTING DIAGRAM

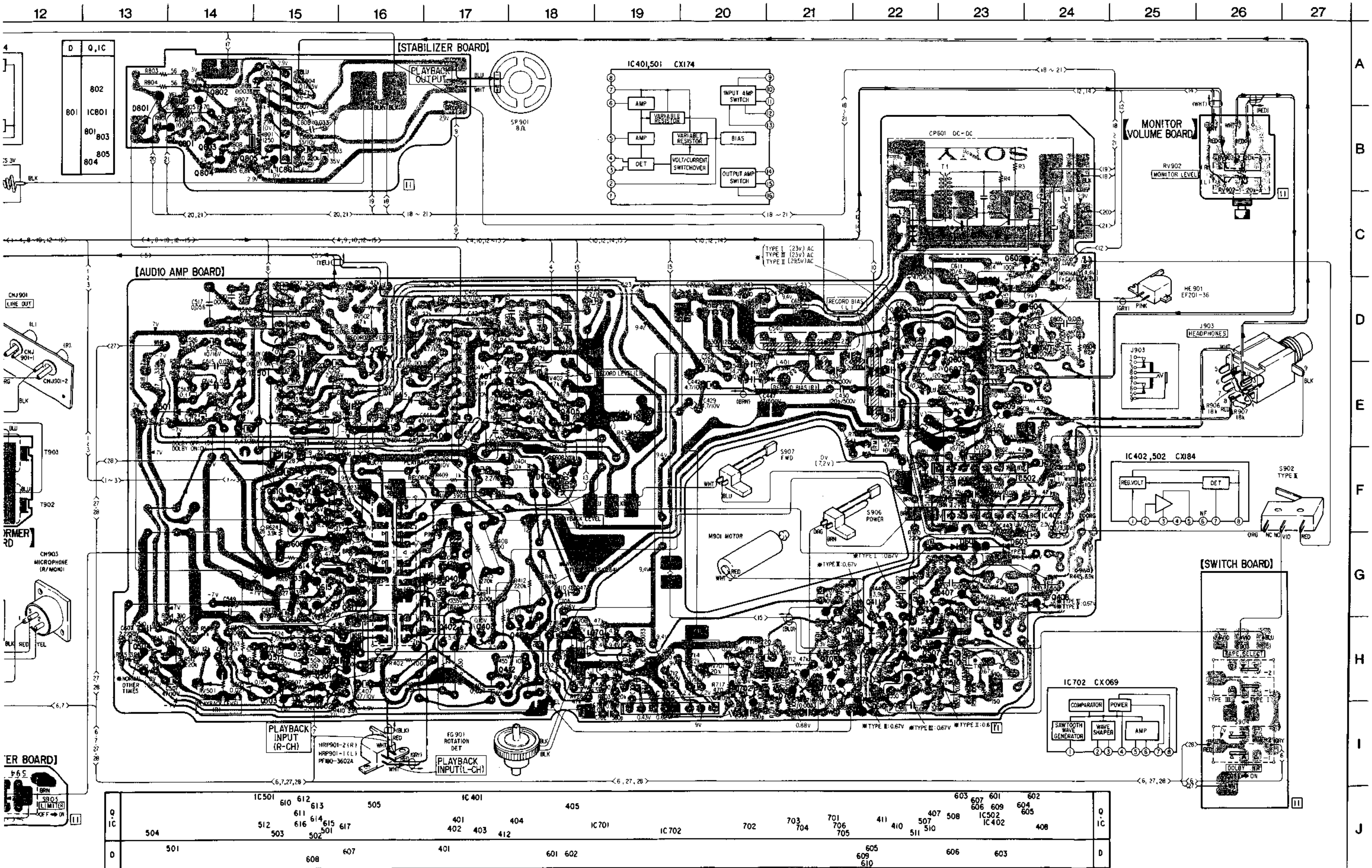




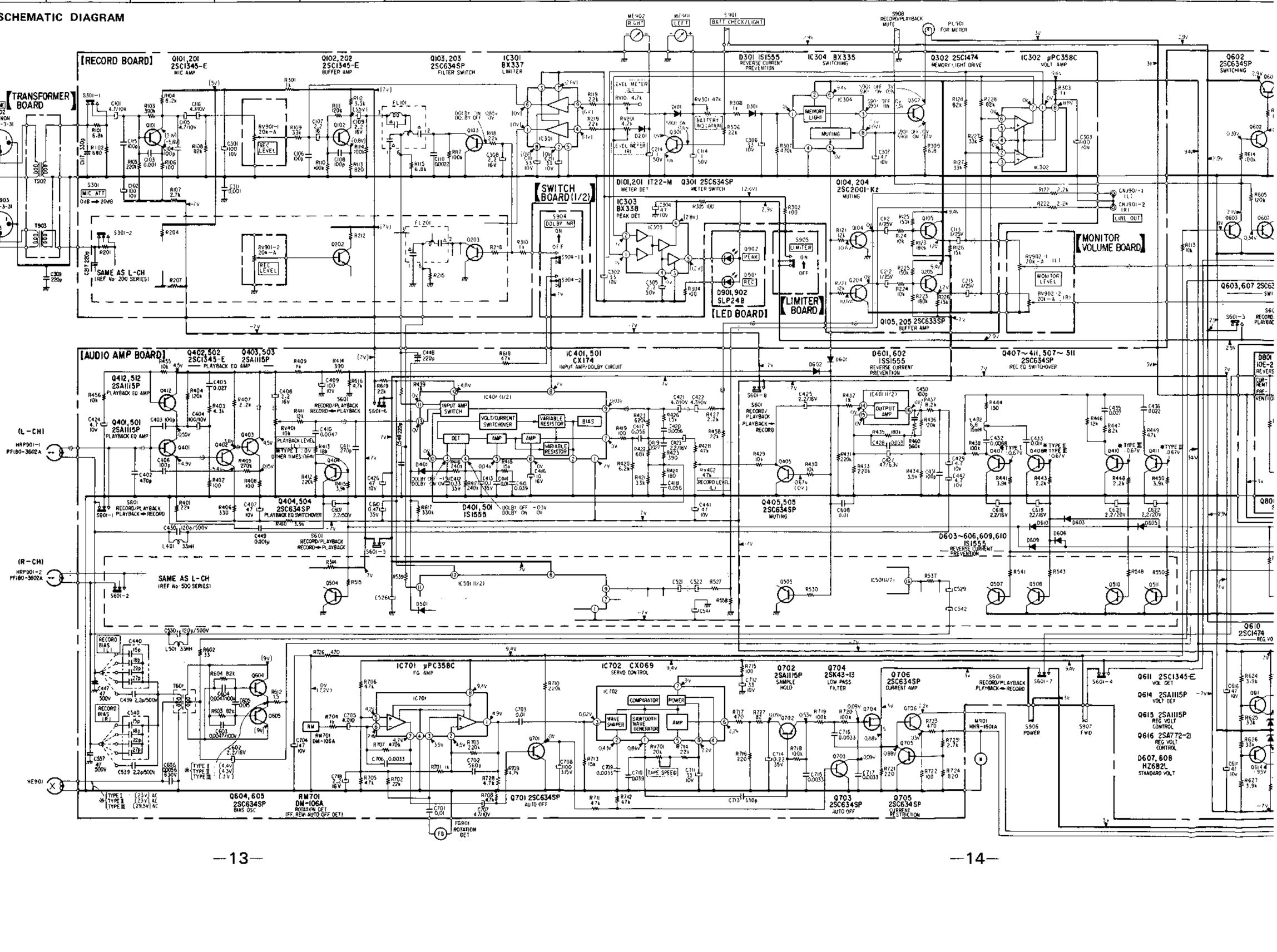
Note:

- ○— : parts extracted from the component side.
- ●— : parts extracted from the conductor side.
- ■ : part mounted on the conductor side.
- ▬▶▬ : signal path
- ▬▶▬ : L-CH signal path
- ▬▶▬ : R-CH signal path
- Color code of sleeving over the end of the jacket.



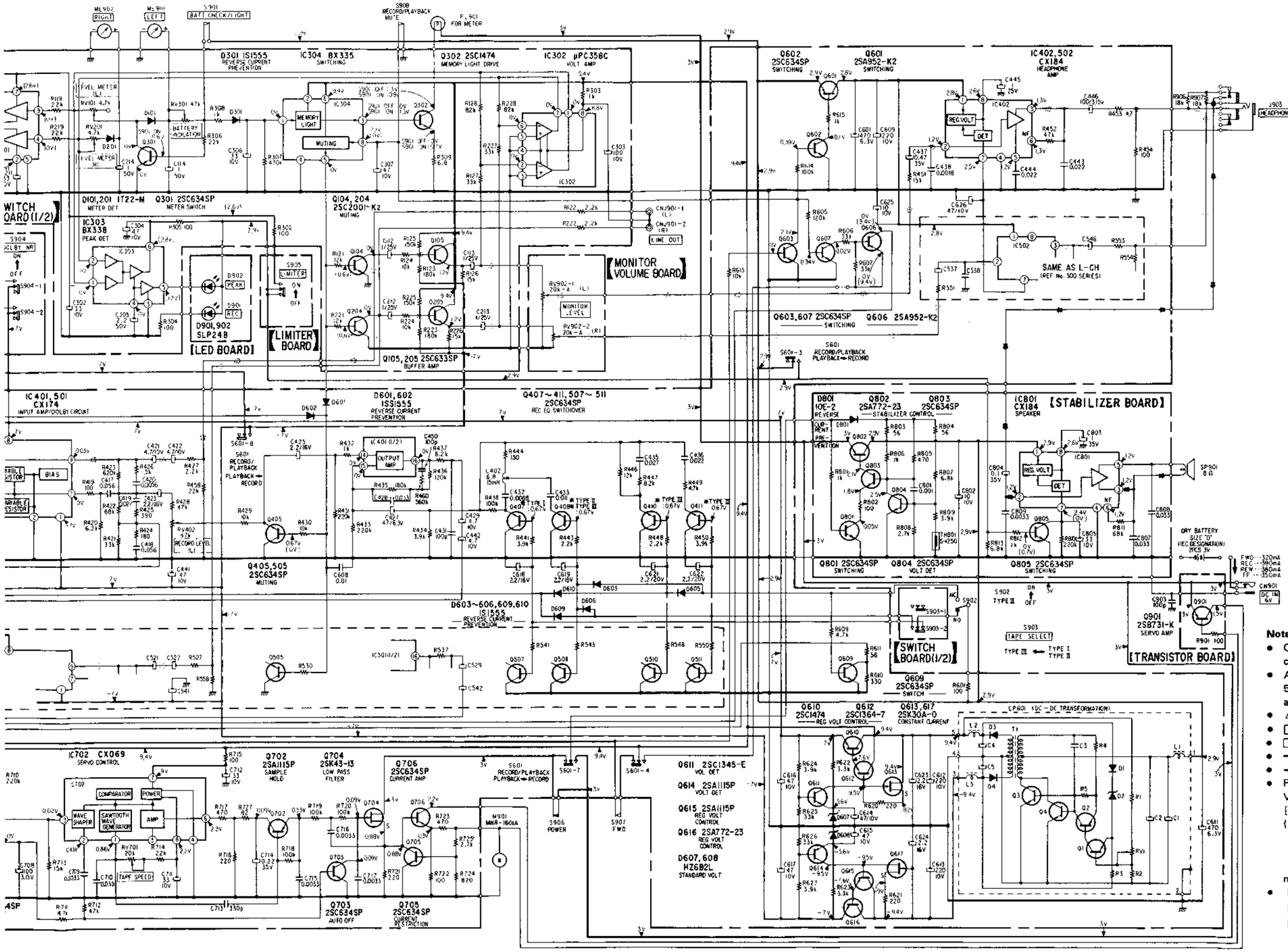

[STABILIZER BOARD]
PLAYBACK OUTPUT
SP901 8Ω
IC401,501 CX174
AMP
VARIABLE RESISTOR
DET
VOLT/CURRENT SWITCHOVER
INPUT AMP SWITCH
BIAS
OUTPUT AMP SWITCH
CP601 DC-DC
[MONITOR VOLUME BOARD]
RV902 MONITOR LEVEL
[AUDIO AMP BOARD]
CNJ901 LINE OUT
RECORD BIAS (L)
RECORD BIAS (R)
RECORD LEVEL (L)
HE901 EF201-36
J903 HEADPHONES
S907 FWD
S906 POWER
M901 MOTOR
IC402,502 CX184
REG.VOLT
S902 TYPE II
T903
T902
CN903 MICROPHONE (R/MONO)
[SWITCH BOARD]
TAPE SELECT
DOLBY NR
IC702 CX069
COMPARATOR
POWER
SAWTOOTH WAVE GENERATOR
WAVE SHAPER
S905 LIMITER
PLAYBACK INPUT (R-CH)
PLAYBACK INPUT (L-CH)
HRP901-2 (R)
HRP901-1 (L)
PF180-3602A
FG901 ROTATION DET

3-2. SCHEMATIC DIAGRAM



TC-D5PRO II

8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23



Note:

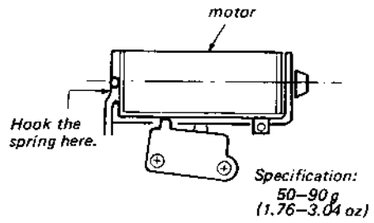
- Components for right channel have same values as for left channel. Reference numbers are coded from 200 or 500.
- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalum.
- △ : internal component.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ——— : B+ bus.
- – – – : B– bus.
- Readings are taken under no-signal conditions with a VOM (20kΩ/V).
  - [ ]: record
  - ( ): FF or REW
  - : record/S905 (LIMITER) ON
  - * : Value when S902 CrO_2/METAL, S903 (TAPE SELECT) are selected.
  - no mark: playback
- ➡ : signal path
- ▨ : L-CH signal path
- ▱ : R-CH signal path

SECTION 4
ADJUSTMENTS

4-1. MECHANICAL ADJUSTMENT

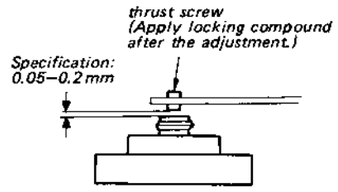
Motor Pressure Measurement

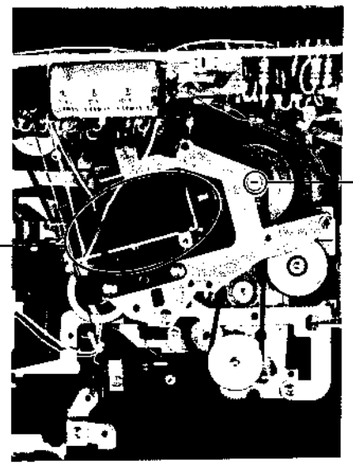
Erect the set in a perpendicular condition and push the forward (FWD) button. Pull the spring scale hooked in the position shown below. Slowly touch the flywheel with the motor pulley and read the spring scale just when the flywheel starts rotating.



Flywheel Thrust Play Adjustment

Slowly tighten the thrust screw with a screwdriver. Then loosen the thrust screw and adjust the screw position 1/5–3/5 turn from the point where the thrust screw touches the capstan shaft. There should be no play.
(The clearance should be as in the following figure.).

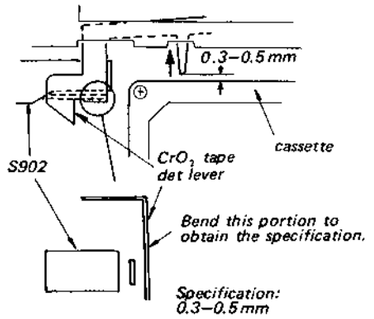


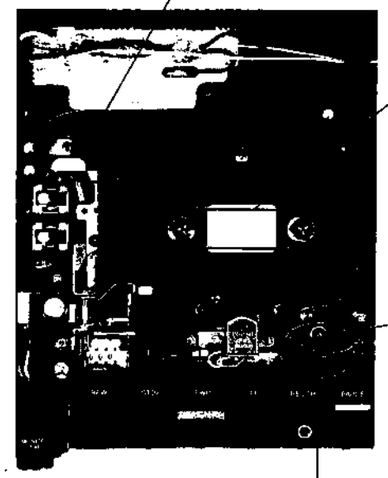


CrO_2 Tape Det Lever Adjustment

Install a cassette tape (besides CrO_2) and push the CrO_2 tape det lever in the direction of the arrow. Confirm that the clearance between the CrO_2 tape det lever and the cassette is 0.3 mm–0.5 mm.

Return the CrO_2 tape det lever in the original position and confirm that S902 is OFF. (Be sure that the miniature switch lever is pushed.)





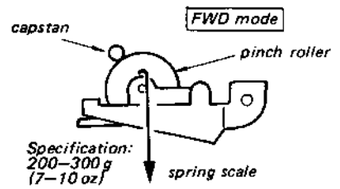
Torques (Reference)

FWD	27 – 50 g·cm (0.37 – 0.68 oz·inch)
FF	more than 80 g·cm (1.11 oz·inch)
REW	more than 70 g·cm (0.97 oz·inch)
back tension	less than 5 g·cm (0.069 oz·inch)

Pinch Roller Pressure Measurement

– Playback Mode –

1. Pull the spring scale.
2. Slowly return the pinch roller and read the spring scale just when the pinch roller starts rotating.



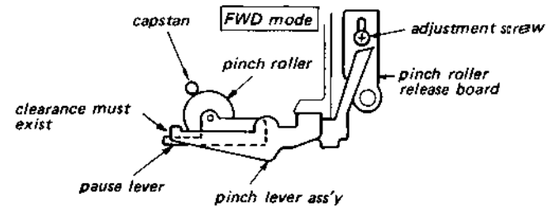
Pause Timing Adjustment

Under locked condition:

Confirm that the take-up reel spindle stops rotating without the tape being in CUE mode after the pinch roller leaves the capstan.

Under released condition:

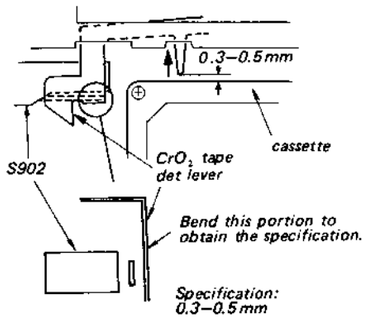
Confirm that the pinch roller touches the capstan after the take-up reel spindle starts rotating.

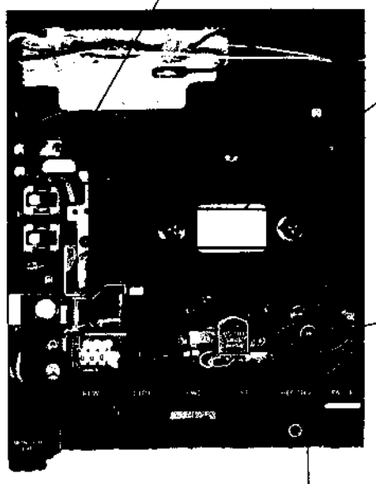


CrO_2 Tape Det Lever Adjustment

Install a cassette tape (besides CrO_2) and push the CrO_2 tape det lever in the direction of the arrow. Confirm that the clearance between the CrO_2 tape det lever and the cassette is 0.3 mm–0.5 mm.

Return the CrO_2 tape det lever in the original position and confirm that S902 is OFF. (Be sure that the miniature switch lever is pushed.)





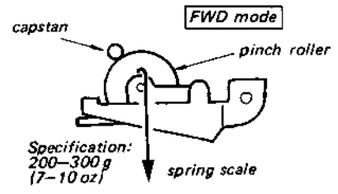
Torques (Reference)

FWD	27 – 50 g·cm (0.37 – 0.68 oz·inch)
FF	more than 80 g·cm (1.11 oz·inch)
REW	more than 70 g·cm (0.97 oz·inch)
back tension	less than 5 g·cm (0.069 oz·inch)

Pinch Roller Pressure Measurement

– Playback Mode –

1. Pull the spring scale.
2. Slowly return the pinch roller and read the spring scale just when the pinch roller starts rotating.



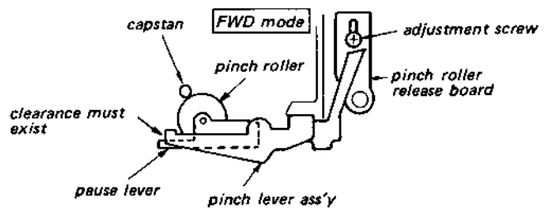
Pause Timing Adjustment

Under locked condition:

Confirm that the take-up reel spindle stops rotating without the tape being in CUE mode after the pinch roller leaves the capstan.

Under released condition:

Confirm that the pinch roller touches the capstan after the take-up reel spindle starts rotating.



4-2. ELECTRICAL ADJUSTMENT

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 TAPE SELECT switch according to the tape as follows.

Tape	TAPE SELECT
CS-121	TYPE I
CS-221	TYPE II
CS-30	TYPE III

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

DOLBY NR switch: OFF
TAPE SELECT switch: TYPE I
LIMITER switch: OFF
MIC ATT switch: 0 dB

- 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
source impedance	300 Ω
input level	0.77 mV (–60 dB)

Standard Output Level

	LINE OUT (FIXED)	HEAD-PHONES
load impedance	47 kΩ	8Ω
output level	0.44 V (–5 dB)	0.39 V (–6 dB)

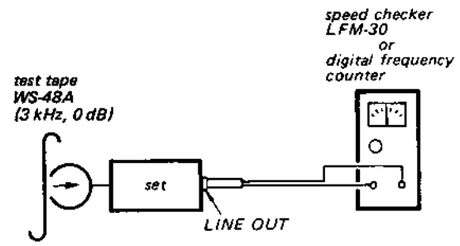
Tape Speed Adjustment

Setting:

MONITOR LEVEL : mechanical mid

Procedure:

Mode: playback



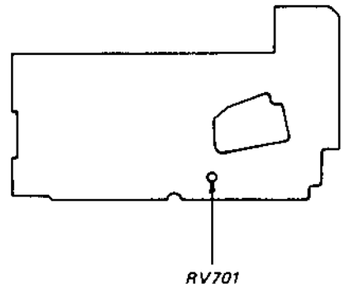
Adjust RV701 so that the tape speed is within the specification around the middle of the tape.

Specification:

Speed checker	Digital frequency counter
–0.5 – +0.5 %	2,985 – 3,015 Hz

Adjustment Location:

– audio amp board – (conductor side)



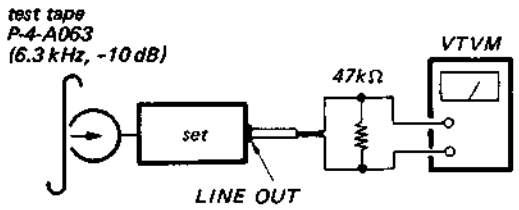
Record/playback Head Azimuth Adjustment

Setting:

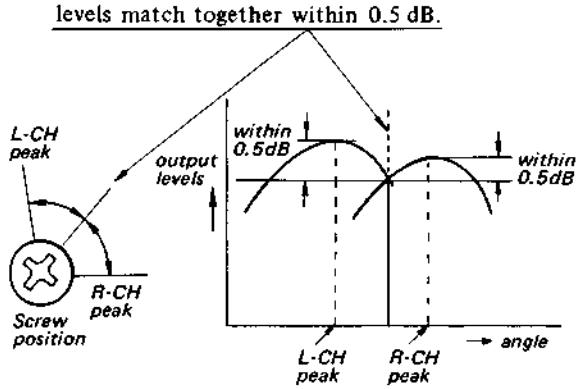
MONITOR LEVEL : mechanical mid

Procedure:

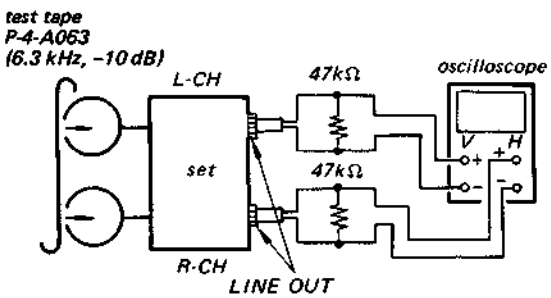
1. Mode: Playback

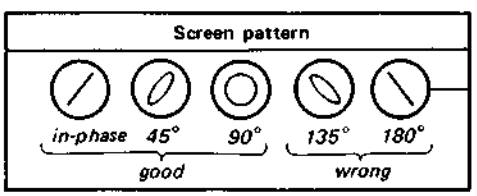


2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw where both of output levels match together within 0.5 dB.



3. Phase Check
   Mode: playback

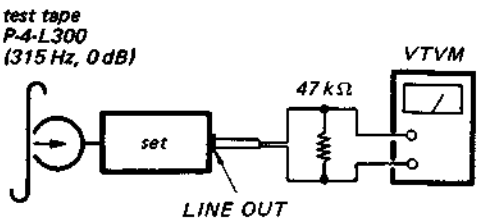




Playback Level Adjustment

Procedure:

1. Mode: Playback

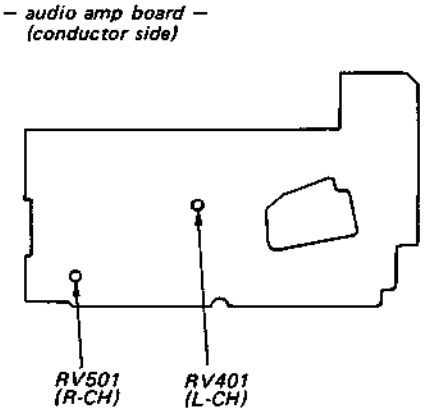


2. Adjust RV401 (L-CH) and RV501 (R-CH) so that the LINE OUT level is within the specification.

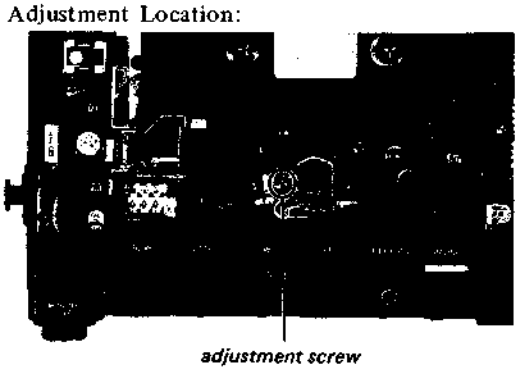
Specification:

0.47 V (-4.4 dB)

Adjustment Location:



Adjustment Location:

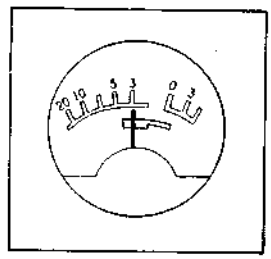


Battery Indicator Calibration Adjustment

Procedure:

Power: 2.2V dc
Mode: playback
(No cassette tape installed.)

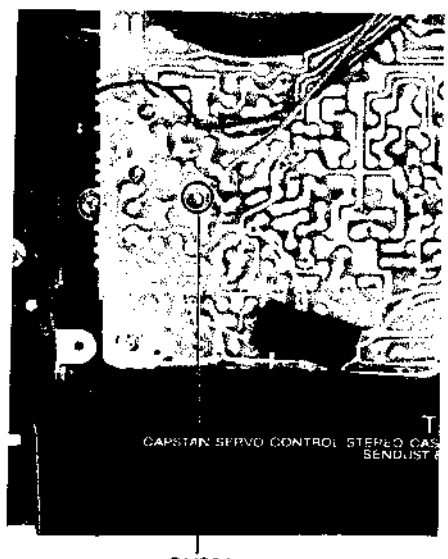
Adjust RV301 so that the pointer of the level meter is positioned as shown below when BATT CHECK/LIGHT button is pushed.



level meter

Adjustment Location:

– record board –



RV301

Record Bias Adjustment

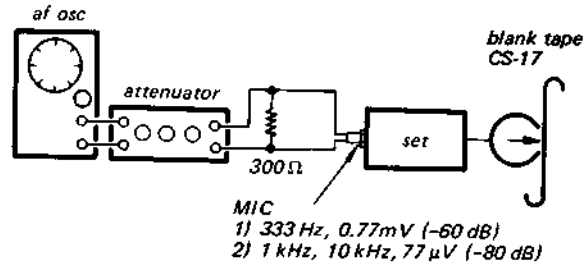
Setting:

TAPE SELECT switch: TYPE I
LIMITER switch: OFF

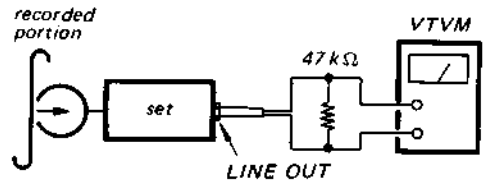
Record 333Hz signal and adjust the REC LEVEL control to obtain -5dB LINE OUT level.

Procedure:

1. Mode: record



2. Mode: playback



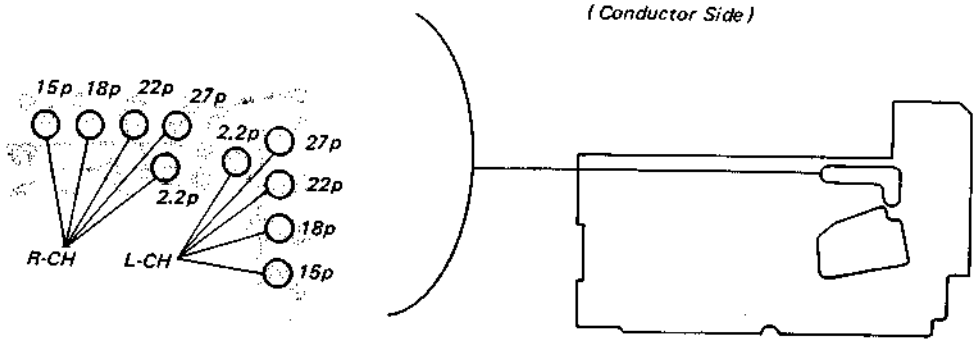
3. Playback 1kHz, 10kHz and adjust by changing the pattern to obtain the specified LINE OUT level. (When the specified value cannot be obtained by bridging only one pattern, then bridge another pattern.)
   When the 10kHz output is high
   → increase the capacitance
   When the 10kHz output is low
   → decrease the capacitance

Specification:

Within 10kHz level difference ±0.5 dB relative to 1 kHz.

Adjustment Location:

– audio amp board –
(Conductor Side)



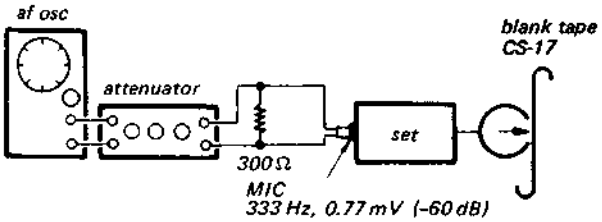
Record Level Adjustment

Setting:

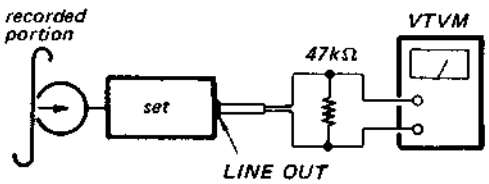
MIC ATT switch:	0 dB
LIMITER switch:	OFF
TAPE SELECT switch:	TYPE I
REC LEVEL control:	standard record (See page 11.)

Procedure:

1. Mode: record



2. Record -60 dB (0.77 mV), 333 Hz signal in a blank tape (CS-17).
3. Playback the recorded tape in step 2.
4. Mode: playback

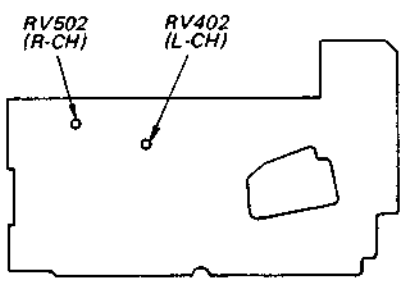


5. Repeat steps 2 and 3 and adjust RV402 (L-CH), RV502 (R-CH) so that the LINE OUT level is -5 dB.
6. Repeat steps 1 to 4 also for CS-26 and obtain the specified value.
7. Install CS-30 and set the TAPE SELECT switch to TYPE III. Then adjust as in step 6.

Tape	Specification	TAPE SELECT
CS-17	-5 dB ± 0.5 dB	TYPE I
CS-26	-5 dB ± 2 dB	TYPE II
CS-30	-5 dB ± 2 dB	TYPE III

Adjustment Location:

– audio amp board –



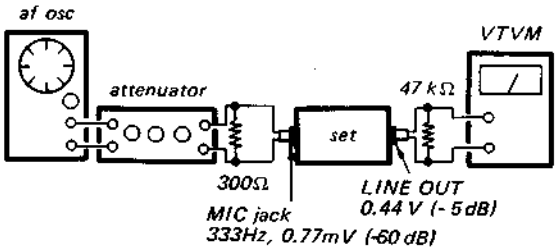
Meter Level Adjustment

Setting:

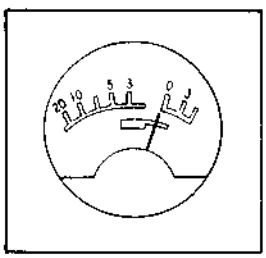
MIC ATT switch:	0 dB
LIMITER switch:	OFF
REC LEVEL control:	standard record (See page 11.)

Procedure:

1. Mode: record



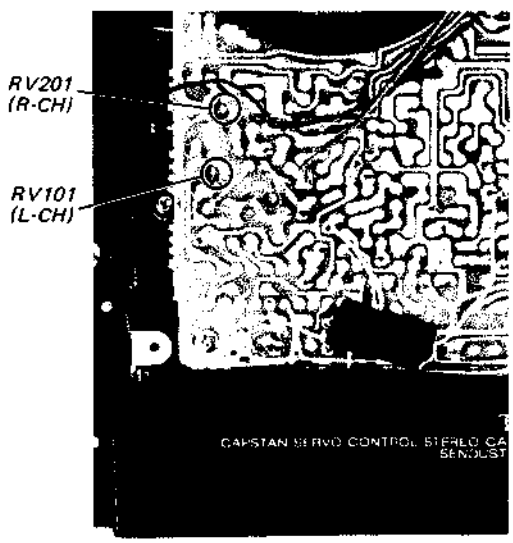
2. Adjust RV101 (L-CH) and RV201 (R-CH) so that the pointer of the level meter points 0dB as shown below.



level meter

Adjustment Location:

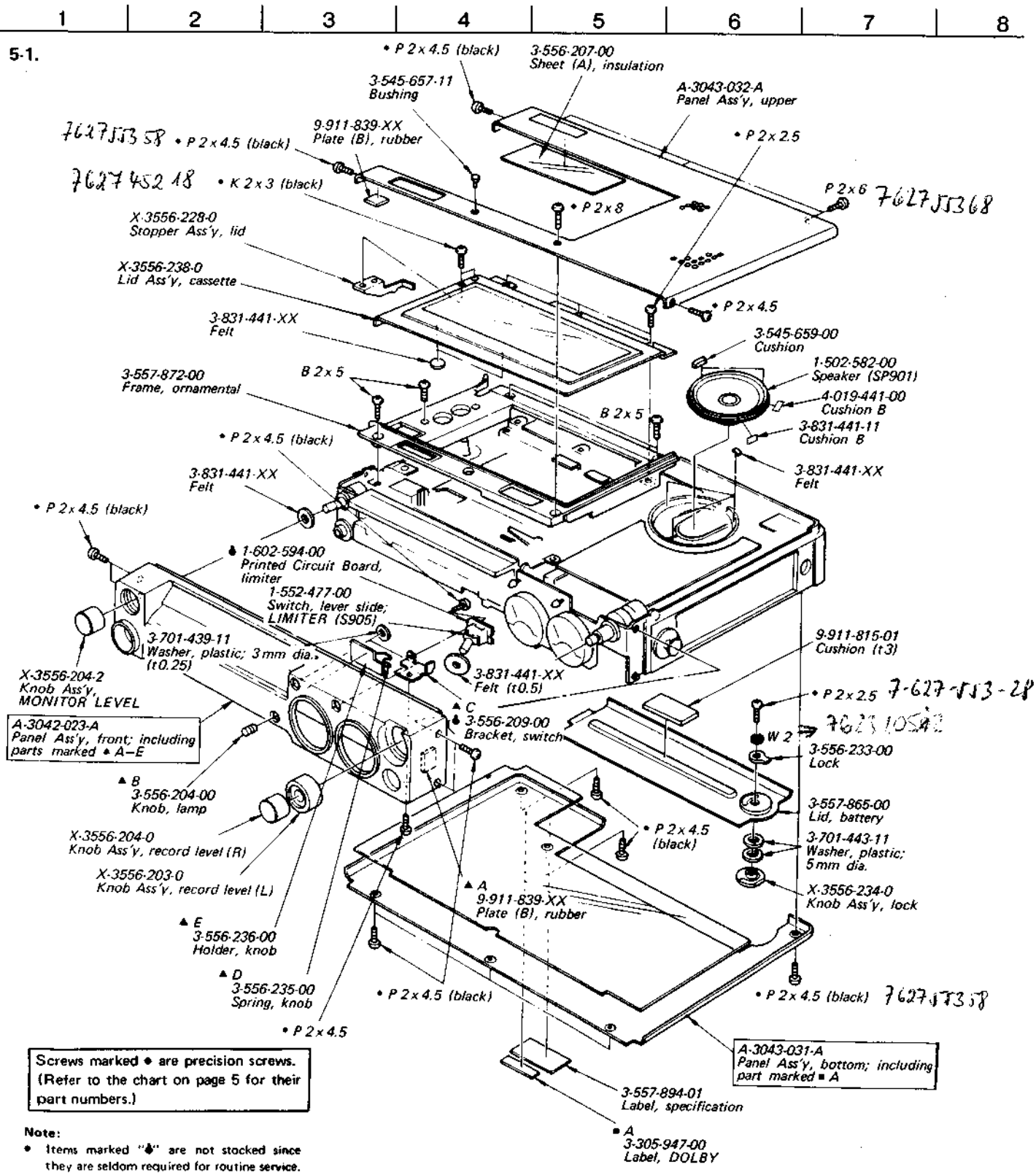
– record board –



SECTION 5
EXPLODED VIEWS

Refer to page 5 for notes on screws.

5-1.



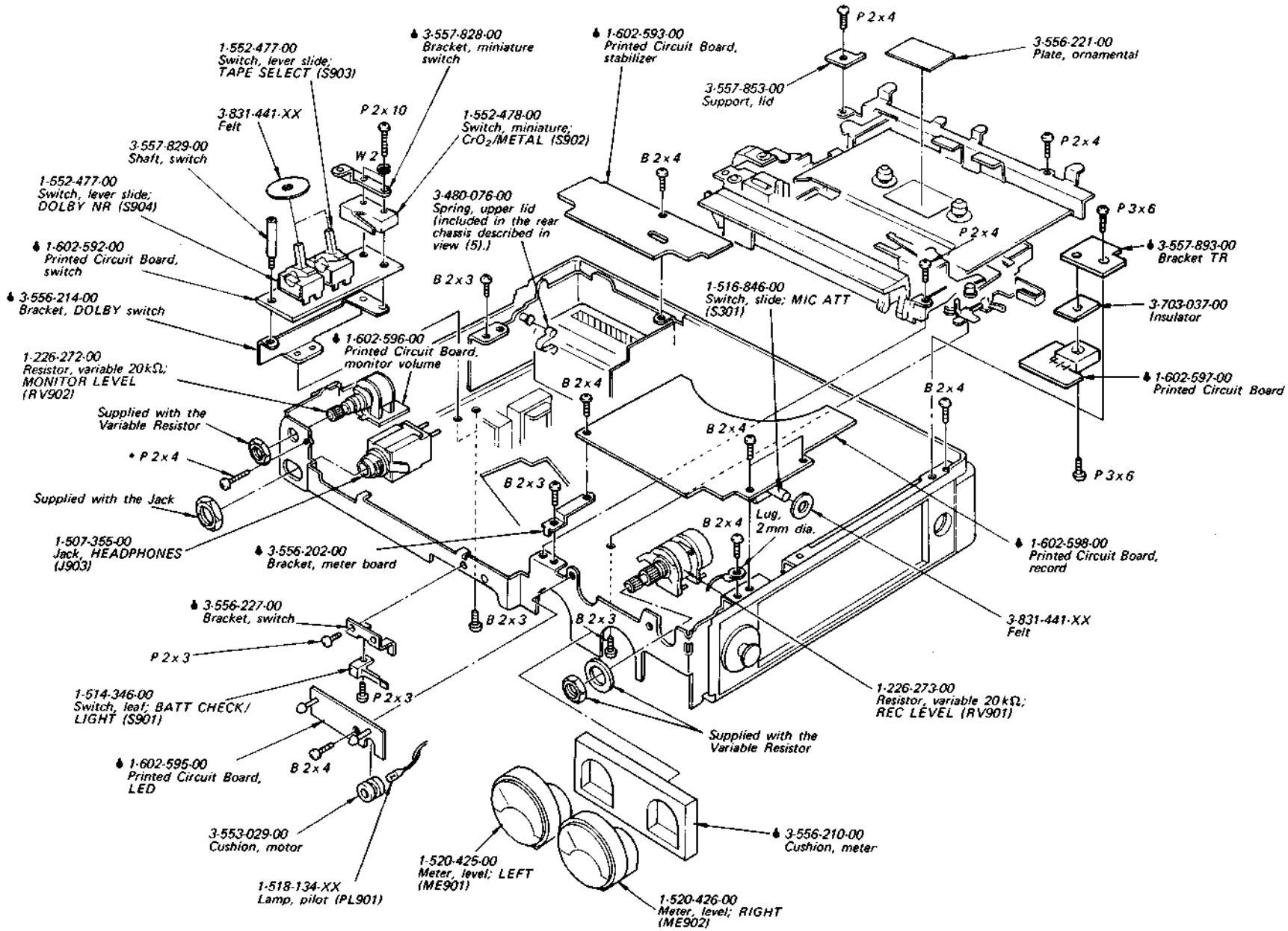
Screws marked • are precision screws. (Refer to the chart on page 5 for their part numbers.)

Note:

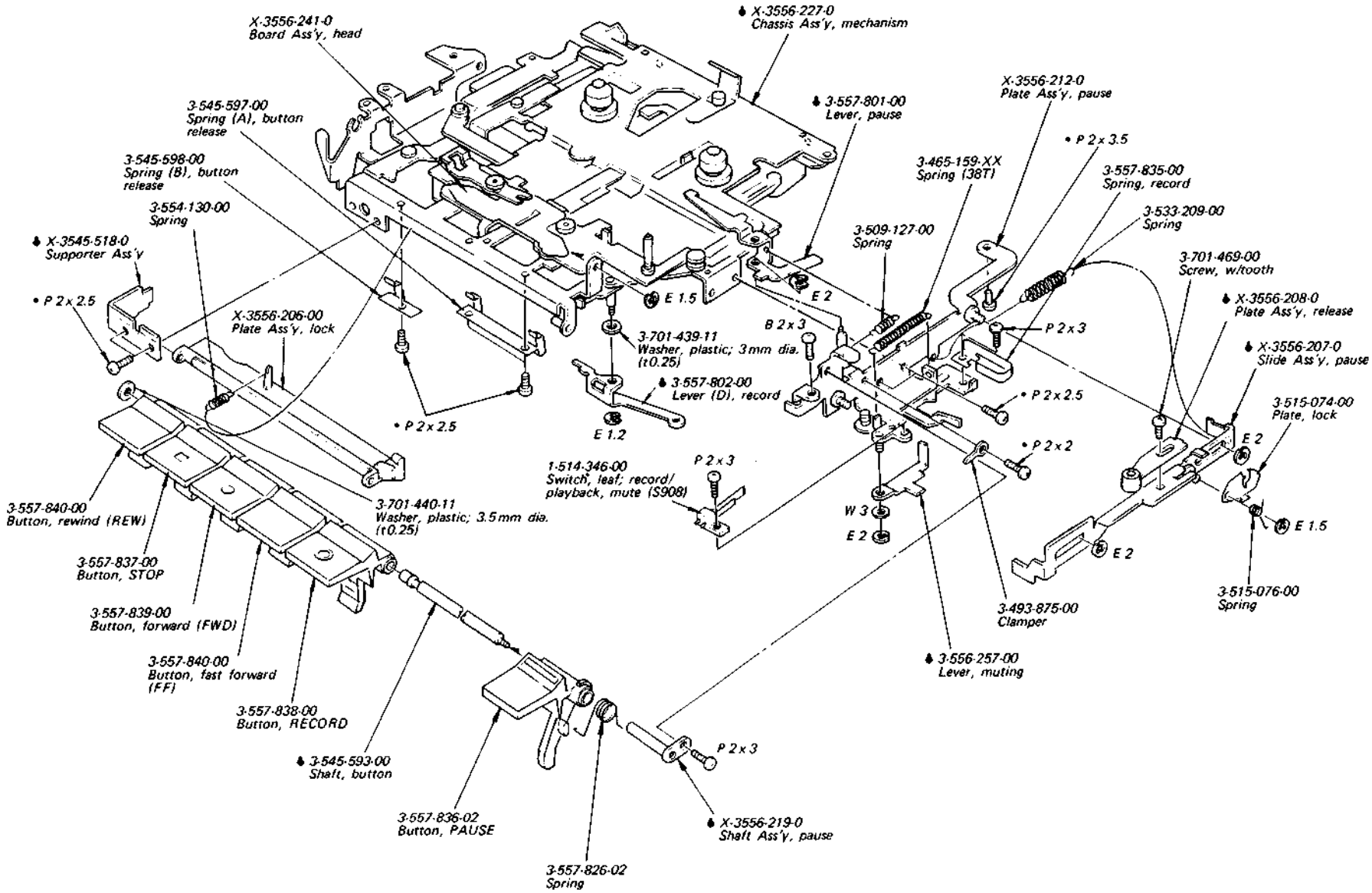
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- (□□T) shows the number of coils in spring.

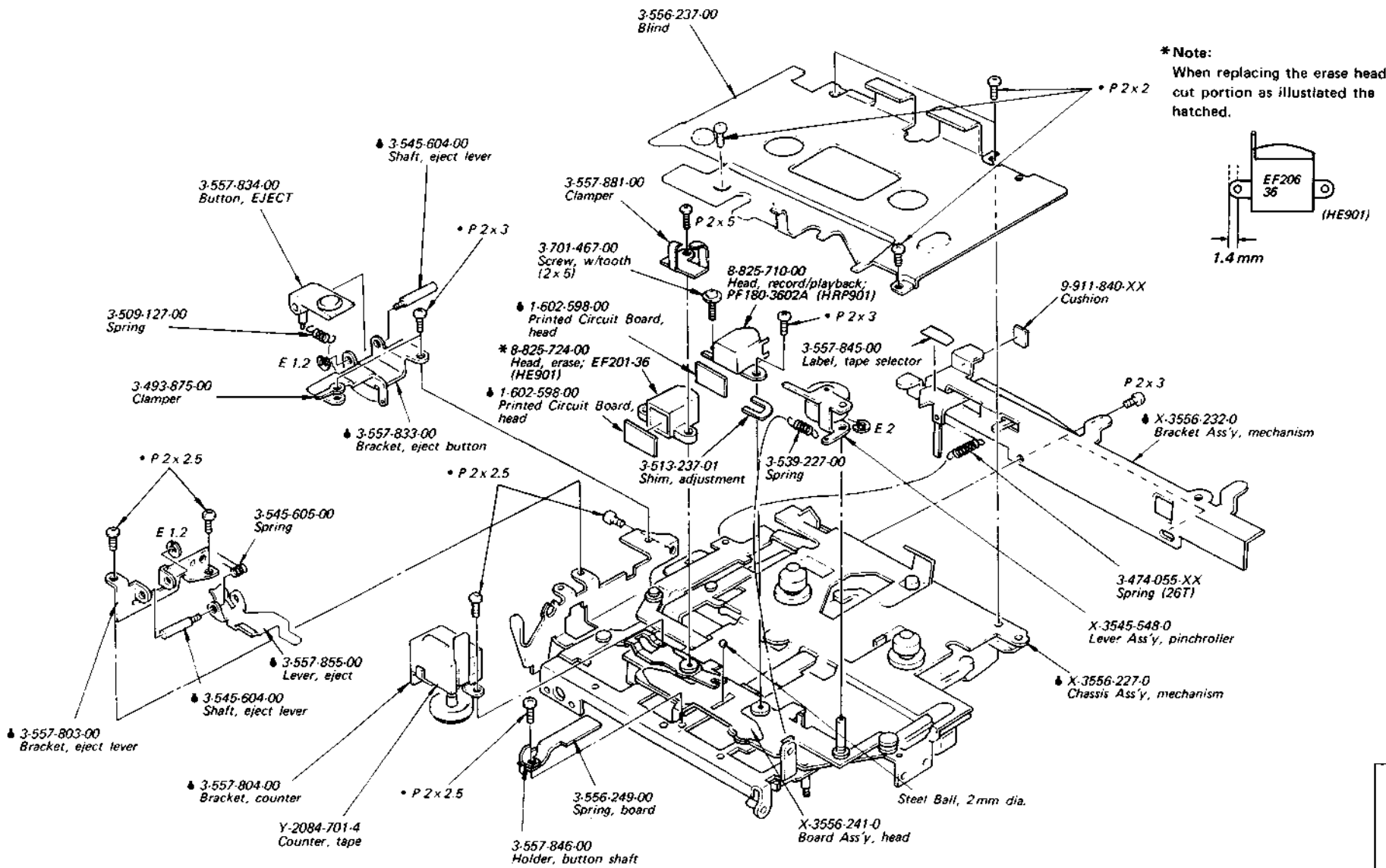
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

5-2.


1-552-477-00 Switch, lever slide; TAPE SELECT (S903)
3-557-828-00 Bracket, miniature switch
1-602-593-00 Printed Circuit Board, stabilizer
P 2 x 4
3-556-221-00 Plate, ornamental
3-557-853-00 Support, lid
3-831-441-XX Felt
P 2 x 10
W 2
1-552-478-00 Switch, miniature; CrO2/METAL (S902)
B 2 x 4
P 2 x 4
3-557-829-00 Shaft, switch
1-552-477-00 Switch, lever slide; DOLBY NR (S904)
3-480-076-00 Spring, upper lid (included in the rear chassis described in view (5).)
P 3 x 6
3-557-893-00 Bracket TR
1-602-592-00 Printed Circuit Board, switch
B 2 x 3
1-516-846-00 Switch, slide; MIC ATT (S301)
3-703-037-00 Insulator
3-556-214-00 Bracket, DOLBY switch
1-602-596-00 Printed Circuit Board, monitor volume
1-602-597-00 Printed Circuit Board
1-226-272-00 Resistor, variable 20kΩ; MONITOR LEVEL (RV902)
B 2 x 4
Supplied with the Variable Resistor
* P 2 x 4
B 2 x 3
Supplied with the Jack
Lug, 2mm dia.
1-507-355-00 Jack, HEADPHONES (J903)
3-556-202-00 Bracket, meter board
1-602-598-00 Printed Circuit Board, record
3-556-227-00 Bracket, switch
3-831-441-XX Felt
P 2 x 3
1-514-346-00 Switch, leaf; BATT CHECK/ LIGHT (S901)
1-226-273-00 Resistor, variable 20kΩ; REC LEVEL (RV901)
Supplied with the Variable Resistor
1-602-595-00 Printed Circuit Board, LED
3-553-029-00 Cushion, motor
3-556-210-00 Cushion, meter
1-520-425-00 Meter, level; LEFT (ME901)
1-518-134-XX Lamp, pilot (PL901)
1-520-426-00 Meter, level; RIGHT (ME902)

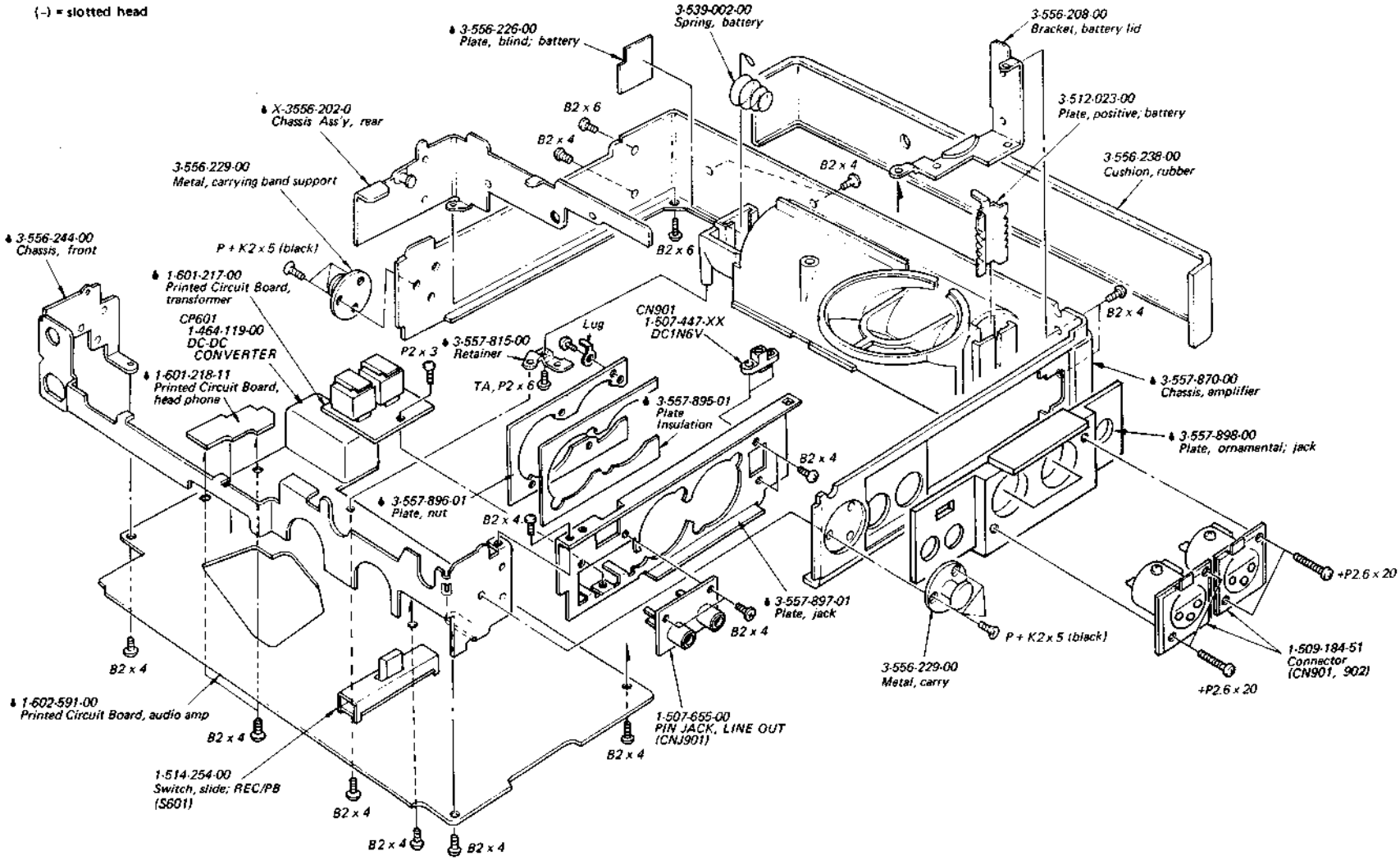
5-3.


X-3556-241-0
Board Ass'y, head
X-3556-227-0
Chassis Ass'y, mechanism
3-545-597-00
Spring (A), button release
3-557-801-00
Lever, pause
X-3556-212-0
Plate Ass'y, pause
3-545-598-00
Spring (B), button release
3-465-159-XX
Spring (38T)
3-557-835-00
Spring, record
3-554-130-00
Spring
3-533-209-00
Spring
X-3545-518-0
Supporter Ass'y
3-509-127-00
Spring
3-701-469-00
Screw, w/tooth
X-3556-208-0
Plate Ass'y, release
X-3556-206-00
Plate Ass'y, lock
3-701-439-11
Washer, plastic; 3mm dia. (t0.25)
X-3556-207-0
Slide Ass'y, pause
3-557-802-00
Lever (D), record
3-515-074-00
Plate, lock
3-557-840-00
Button, rewind (REW)
3-701-440-11
Washer, plastic; 3.5mm dia. (t0.25)
1-514-346-00
Switch, leaf; record/playback, mute (S908)
3-557-837-00
Button, STOP
3-557-839-00
Button, forward (FWD)
3-557-840-00
Button, fast forward (FF)
3-557-838-00
Button, RECORD
3-545-593-00
Shaft, button
3-557-836-02
Button, PAUSE
3-557-826-02
Spring
X-3556-219-0
Shaft Ass'y, pause
3-493-875-00
Clamper
3-556-257-00
Lever, muting
3-515-076-00
Spring
• P 2 x 2.5
• P 2 x 3.5
• P 2 x 3
• P 2 x 2
E 1.5
E 2
E 1.2
B 2 x 3
P 2 x 3
W 3

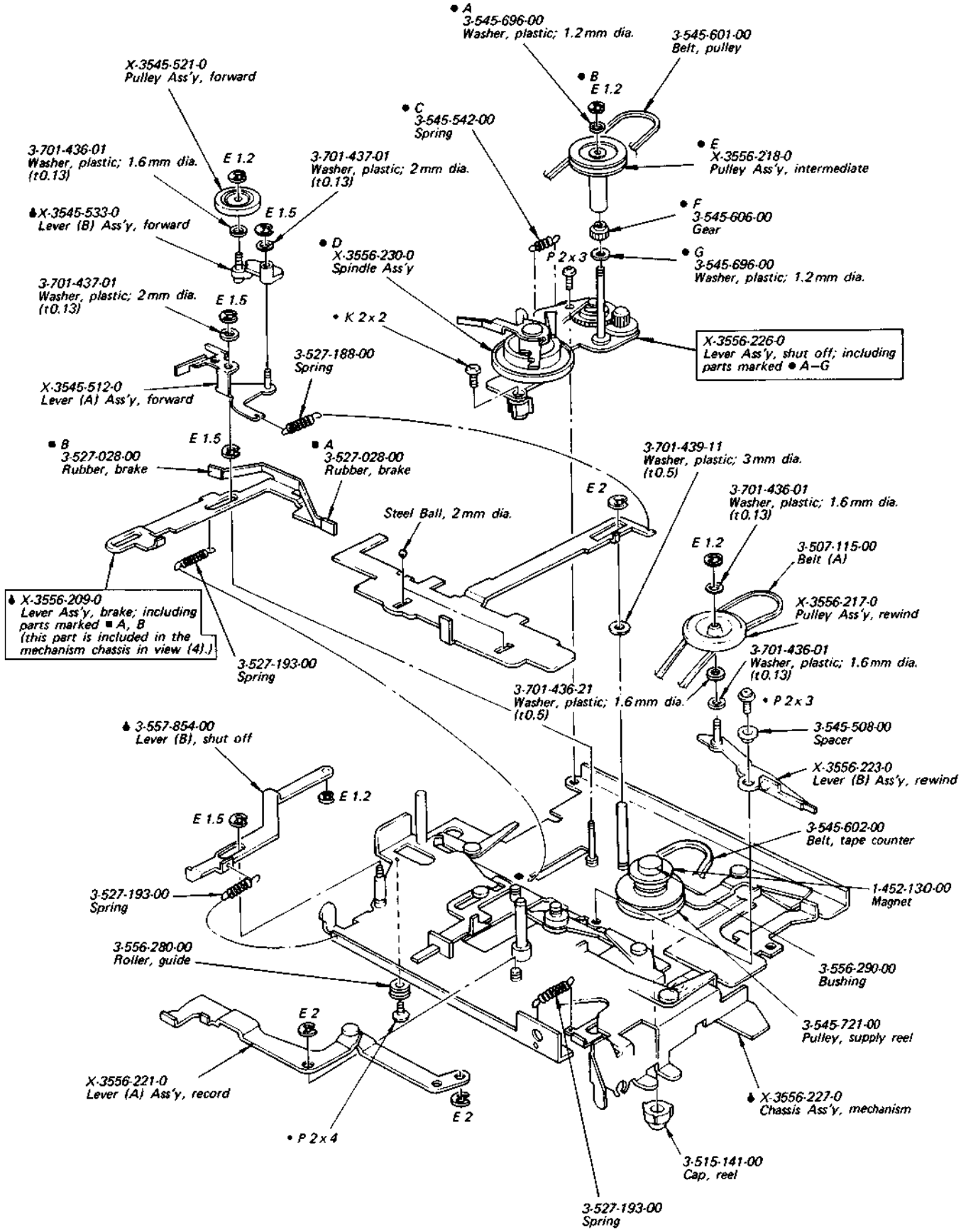

3-556-237-00
Blind
• P 2 x 2
* Note:
When replacing the erase head cut portion as illustiated the hatched.
EF206
36
(HE901)
1.4 mm
♦ 3-545-604-00
Shaft, eject lever
3-557-834-00
Button, EJECT
• P 2 x 3
3-557-881-00
Clamper
P 2 x 5
3-701-467-00
Screw, w/tooth
(2 x 5)
8-825-710-00
Head, record/playback;
PF180-3602A (HRP901)
♦ 1-602-598-00
Printed Circuit Board,
head
• P 2 x 3
9-911-840-XX
Cushion
3-509-127-00
Spring
E 1.2
3-557-845-00
Label, tape selector
* 8-825-724-00
Head, erase; EF201-36
(HE901)
3-493-875-00
Clamper
♦ 1-602-598-00
Printed Circuit Board,
head
P 2 x 3
♦ X-3556-232-0
Bracket Ass'y, mechanism
E 2
3-513-237-01
Shim, adjustment
3-539-227-00
Spring
♦ 3-557-833-00
Bracket, eject button
• P 2 x 2.5
• P 2 x 2.5
3-545-605-00
Spring
E 1.2
3-474-055-XX
Spring (26T)
X-3545-548-0
Lever Ass'y, pinchroller
♦ 3-557-855-00
Lever, eject
♦ 3-545-604-00
Shaft, eject lever
♦ X-3556-227-0
Chassis Ass'y, mechanism
♦ 3-557-803-00
Bracket, eject lever
♦ 3-557-804-00
Bracket, counter
• P 2 x 2.5
3-556-249-00
Spring, board
Steel Ball, 2mm dia.
Y-2084-701-4
Counter, tape
X-3556-241-0
Board Ass'y, head
3-557-846-00
Holder, button shaft

5-5.

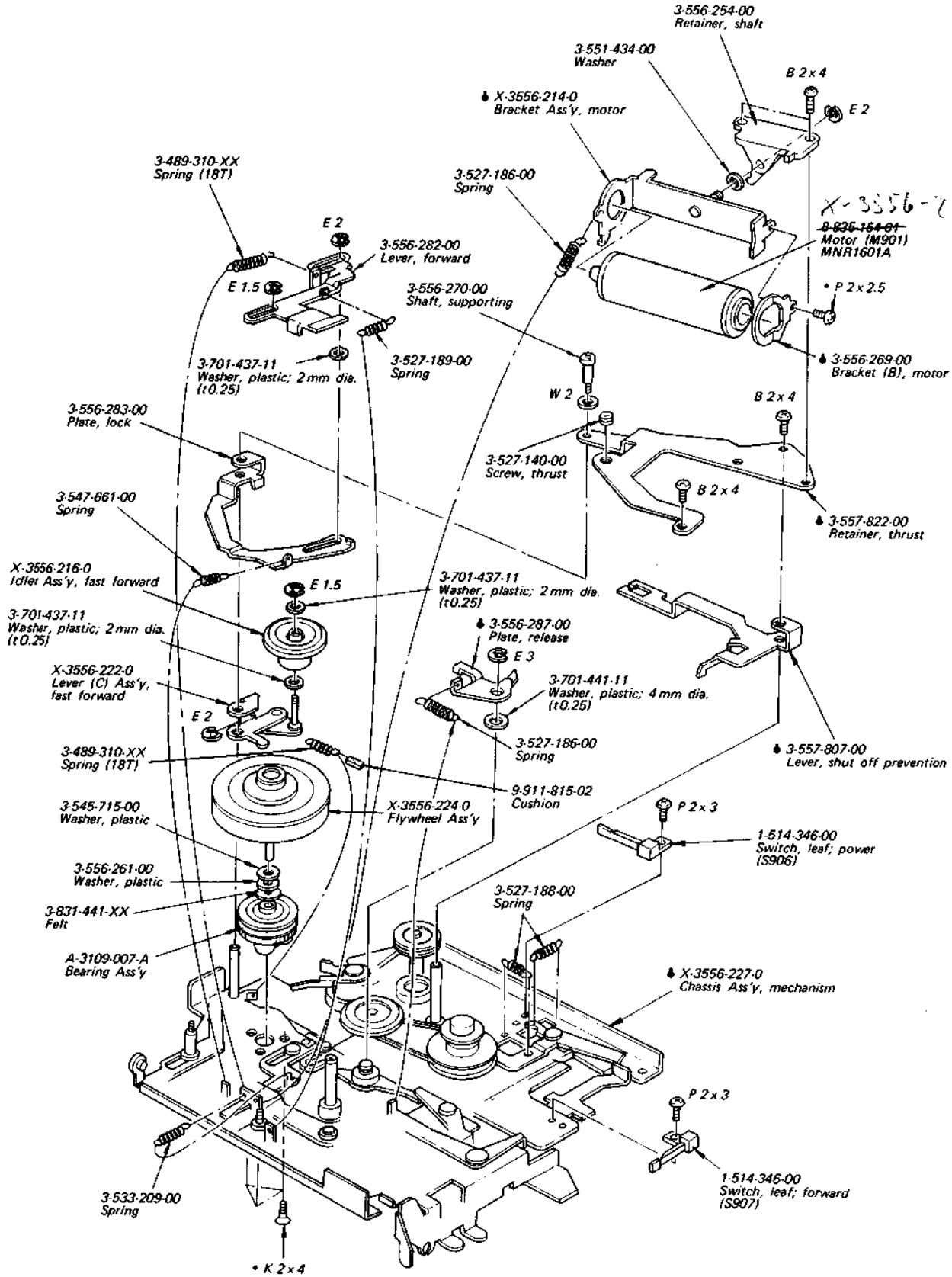
Note:
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head



5-6.


• A
3-545-696-00
Washer, plastic; 1.2mm dia.
3-545-601-00
Belt, pulley
X-3545-521-0
Pulley Ass'y, forward
• B
E 1.2
• C
3-545-542-00
Spring
3-701-436-01
Washer, plastic; 1.6mm dia.
(t0.13)
E 1.2
3-701-437-01
Washer, plastic; 2mm dia.
(t0.13)
• E
X-3556-218-0
Pulley Ass'y, intermediate
♦X-3545-533-0
Lever (B) Ass'y, forward
E 1.5
• F
3-545-606-00
Gear
• D
X-3556-230-0
Spindle Ass'y
P 2 x 3
• G
3-545-696-00
Washer, plastic; 1.2mm dia.
3-701-437-01
Washer, plastic; 2mm dia.
(t0.13)
E 1.5
• K 2 x 2
X-3556-226-0
Lever Ass'y, shut off; including
parts marked • A–G
3-527-188-00
Spring
X-3545-512-0
Lever (A) Ass'y, forward
E 1.5
■ B
3-527-028-00
Rubber, brake
■ A
3-527-028-00
Rubber, brake
3-701-439-11
Washer, plastic; 3mm dia.
(t0.5)
E 2
3-701-436-01
Washer, plastic; 1.6mm dia.
(t0.13)
Steel Ball, 2mm dia.
E 1.2
3-507-115-00
Belt (A)
♦X-3556-209-0
Lever Ass'y, brake; including
parts marked ■ A, B
(this part is included in the
mechanism chassis in view (4).)
X-3556-217-0
Pulley Ass'y, rewind
3-701-436-01
Washer, plastic; 1.6mm dia.
(t0.13)
3-527-193-00
Spring
3-701-436-21
Washer, plastic; 1.6mm dia.
(t0.5)
• P 2 x 3
♦ 3-557-854-00
Lever (B), shut off
3-545-508-00
Spacer
X-3556-223-0
Lever (B) Ass'y, rewind
E 1.2
E 1.5
3-545-602-00
Belt, tape counter
3-527-193-00
Spring
1-452-130-00
Magnet
3-556-280-00
Roller, guide
3-556-290-00
Bushing
E 2
3-545-721-00
Pulley, supply reel
X-3556-221-0
Lever (A) Ass'y, record
E 2
♦ X-3556-227-0
Chassis Ass'y, mechanism
• P 2 x 4
3-515-141-00
Cap, reel
3-527-193-00
Spring

5-7.


3-556-254-00
Retainer, shaft
3-551-434-00
Washer
B 2 x 4
X-3556-214-0
Bracket Ass'y, motor
E 2
3-489-310-XX
Spring (18T)
3-527-186-00
Spring
X-3556-235-A
8-935-154-01
Motor (M901)
MNR1601A
E 2
3-556-282-00
Lever, forward
E 1.5
3-556-270-00
Shaft, supporting
P 2 x 2.5
3-701-437-11
Washer, plastic; 2 mm dia.
(t0.25)
3-527-189-00
Spring
3-556-269-00
Bracket (B), motor
W 2
B 2 x 4
3-556-283-00
Plate, lock
3-527-140-00
Screw, thrust
B 2 x 4
3-547-661-00
Spring
3-557-822-00
Retainer, thrust
X-3556-216-0
Idler Ass'y, fast forward
E 1.5
3-701-437-11
Washer, plastic; 2 mm dia.
(t0.25)
3-701-437-11
Washer, plastic; 2 mm dia.
(t0.25)
3-556-287-00
Plate, release
E 3
X-3556-222-0
Lever (C) Ass'y,
fast forward
E 2
3-701-441-11
Washer, plastic; 4 mm dia.
(t0.25)
3-527-186-00
Spring
3-489-310-XX
Spring (18T)
3-557-807-00
Lever, shut off prevention
9-911-815-02
Cushion
3-545-715-00
Washer, plastic
X-3556-224-0
Flywheel Ass'y
P 2 x 3
1-514-346-00
Switch, leaf; power
(S906)
3-556-261-00
Washer, plastic
3-527-188-00
Spring
3-831-441-XX
Felt
A-3109-007-A
Bearing Ass'y
X-3556-227-0
Chassis Ass'y, mechanism
P 2 x 3
1-514-346-00
Switch, leaf; forward
(S907)
3-533-209-00
Spring
K 2 x 4

SECTION 6
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	COMPLETE CIRCUIT BOARDS	
♝	A-3070-178-A	Audio Amp
♝	A-3073-024-A	Record
	PRINTED CIRCUIT BOARDS	
♝	1-602-592-00	Switch
♝	1-602-593-00	Stabilizer
♝	1-602-594-00	Limiter
♝	1-602-595-00	LED
♝	1-602-596-00	Monitor Volume
♝	1-602-597-00	Transistor
♝	1-602-598-00	Head
♝	1-601-217-00	Trans
	SEMICONDUCTORS	
	Transistors	
Q101,201 Q102,202	8-729-334-58	2SC1345-E
Q103,203	8-729-600-27	2SC634SP
Q104,204	8-729-100-13	2SC2001-K2
Q105,205	8-729-600-27	2SC634SP
Q301	8-729-600-27	2SC634SP
Q302	8-760-335-10	2SC1474
Q401,501	8-729-600-60	2SA1115P
Q402,502	8-729-334-58	2SC1345E
Q403,503	8-729-600-60	2SA1115P
Q404,405 Q407–411	8-729-600-27	2SC634SP
Q412	8-729-600-60	2SA1115P
Q504,505 Q507–511	8-729-600-27	2SC634SP
Q512	8-729-600-60	2SA1115P
Q601,606	8-729-195-23	2SA952-K2
Q602–605 Q607	8-729-600-27	2SC634SP
Q609	8-729-600-27	2SC634SP
Q610	8-760-335-10	2SC1474
Q611	8-729-334-58	2SC1345E
Q612	8-729-60027	2SC634SP
Q613,617	8-729-203-02	2SK30A-0
Q614,615	8-729-600-60	2SA1115P
Q616	8-760-523-10	2SA772-23
Q701,703	8-729-600-27	2SC634SP
Q702	8-729-600-60	2SA1115P
Q704	8-723-303-13	2SK43-13
Q705,706	8-729-600-27	2SC634SP
Q801	8-729-600-27	2SC634SP
Q802	8-760-523-10	2SA772-23
Q803–805	8-729-600-27	2SC634SP
Q901	8-729-173-13	2SB731
	ICs	
IC301	8-743-370-00	BX337
IC302	8-759-135-80	μPC358C
IC303	8-743-380-00	BX338
IC304	8-743-350-00	BX335
IC401,501	8-759-101-74	CX174
IC402,502	8-751-840-00	CX184
IC701	8-759-135-80	μPC358C
IC702	8-750-690-00	CX069A
IC801	8-751-840-00	CX184
	Diodes	
D101,201	8-719-422-21	1T22AM
D301,401 D501 D601–606	8-719-815-55	1S1555
D607,608	8-719-910-65	HZ6B2L
D609,610	8-719-815-55	1S1555
D801	8-719-200-02	10E2
D901,902	8-719-900-24	SLP24B
	Magnetic Element	
RM701	8-749-016-01	DM-106A
	CAPACITORS	
	All capacitors are in μF. Common capacitors are omitted. Refer to the list on pages 31 and 32 for their part numbers.	
C440,540	1-107-253-00	15+18+22+27p 500V mica
C606	1-130-062-00	0.0056 630V film
C710	1-130-140-00	0.039 100V film

Items marked "♝" are not stocked because they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description
		RESISTORS
		All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on page 5 for their part numbers.
R403,503	1-214-147-00	4.3 k ¼W metal-oxide
R624	1-214-146-00	3.9 k ¼W metal-oxide
R625,626	1-214-168-00	33 k ¼W metal-oxide
R627	1-214-146-00	3.9 k ¼W metal-oxide
R714	1-214-164-00	22 k ¼W metal-oxide
R906,907	1-246-798-00	18 k ⅛W carbon
RV101,201	1-224-251-XX	4.7 k, adjustable; level meter L, R
RV301	1-224-254-XX	47 k, adjustable; battery indication
RV401,501	1-224-252-XX	10 k, adjustable; playback level (L, R)
RV402,502	1-224-254-XX	47 k, adjustable; record level (L, R)
RV701	1-226-490-00	20 k, adjustable; tape speed
RV901	1-226-273-00	20 k-A, variable; REC LEVEL
RV902	1-226-272-00	20 k-A, variable; MONITOR LEVEL
		SWITCHES
S301	1-516-846-00	Slide, MIC ATT
S601	1-514-254-00	Slide, record/playback
S901	1-514-346-00	Leaf, BATT CHECK, LIGHT
S902	1-552-478-00	Miniature, TYPE I
S903,904	1-552-477-00	Lever Slide, TAPE SELECT, DOLBY NR
S905	1-552-477-00	Lever Slide, LIMITER
S906	1-514-346-00	Leaf, POWER
S907	1-514-346-00	Leaf, forward (PLAY)
S908	1-514-346-00	Leaf, record/playback, mute
		MISCELLANEOUS
CN901	1-507-447-XX	Jack, power; DC IN 6V
CNJ901	1-507-655-00	Jack, 2P; LINE OUT
CP601	1-464-119-00	Convertor, dc-dc

Ref. No.	Part No.	Description
FL101,201	1-231-388-00	Filter, low pass
HE901	8-825-724-00	Head, erase; EF201-36
HRP901	8-825-710-00	Head, record/playback, PF180-3602A
CN901,902	1-509-184-51	CONNECTOR; MICROPHONE L, R
J903	1-507-477-XX	Jack, HEADPHONES
L401,501	1-407-879-00	33 mH, microinductor
L402,502	1-408-352-00	6.8 μH, microinductor
	X-3556-215-1	
M901	~~8-835-154-01~~	Motor (MNR1601A)
ME901	1-520-425-00	Meter, level; LEFT
ME902	1-520-426-00	Meter, level; RIGHT
PL901	1-518-134-XX	Lamp, pilot
SP901	1-502-582-00	Speaker
T901,T902	1-423-242-00	Input, Transformer
T601	1-433-223-00	Transformer, bias osc
TH801	1-800-199-XX	Thermistor
	1-452-130-00	Magnet

ACCESSORIES AND PACKING MATERIALS

Part No.	Description
X-3556-239-0	Strap Ass'y, carrying
1-551-734-11	Cord, connection (RK-74A)
3-557-874-00	Band, fixed X
3-557-848-00	Box, accessory
3-557-850-00	Cushion
3-557-878-00	Protector (accessory box)
3-701-625-00	Bag, polyethylene (for instruction manual)
3-701-631-00	Bag, polyethylene
3-557-899-00	Carton, individual
3-765-529-11	Manual, instruction

ELECTROLYTIC CAPACITORS

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

RATING → : Use the high voltage rated one.

CAP. (μF)	6.3 VOLT.	10 VOLT.	16 VOLT.	25 VOLT.	35 VOLT.	50 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.47					→	1-121-726-00 Ⓐ
1.0					→	1-121-391-00 Ⓐ
2.2					→	1-121-450-00 Ⓐ
3.3	→	→	→	1-121-392-00 Ⓐ	→	1-121-393-00 Ⓐ
4.7	→	→	→	1-121-395-00 Ⓐ	→	1-121-396-00 Ⓐ
10	→	→	1-121-651-00 Ⓐ	1-121-398-00 Ⓐ	→	1-121-738-00 Ⓐ
22	→	→	1-121-479-00 Ⓐ	1-121-480-00 Ⓐ	1-121-662-00 Ⓐ	1-121-152-00 Ⓐ
33	→	→	1-121-403-00 Ⓐ	1-121-404-00 Ⓐ	1-121-652-00 Ⓑ	1-121-405-00 Ⓐ
47	→	1-121-352-00 Ⓐ	1-121-409-00 Ⓐ	1-121-410-00 Ⓐ	1-121-653-00 Ⓑ	1-121-411-00 Ⓐ
100	→	1-121-414-00 Ⓐ	1-121-415-00 Ⓐ	1-121-416-00 Ⓐ	1-121-357-00 Ⓑ	1-121-417-00 Ⓑ
220	1-121-419-00 Ⓑ	1-121-420-00 Ⓑ	1-121-421-00 Ⓐ	1-121-422-00 Ⓑ	1-121-261-00 Ⓒ	1-121-423-00 Ⓑ
330	1-121-751-00 Ⓑ	1-121-805-00 Ⓑ	1-121-521-00 Ⓒ	1-121-654-00 Ⓑ	1-121-655-00 Ⓓ	1-121-656-00 Ⓒ
470	1-121-424-00 Ⓑ	1-121-425-00 Ⓒ	1-121-426-00 Ⓒ	1-121-733-00 Ⓑ	1-121-361-00 Ⓔ	1-121-810-00 Ⓓ
1000	-	1-121-736-00 Ⓒ	1-121-245-00 Ⓓ	1-121-657-00 Ⓓ	1-121-388-00 Ⓔ	1-123-061-00 Ⓕ
2200	1-121-658-00 Ⓑ	1-121-659-00 Ⓒ	1-121-660-00 Ⓓ	1-123-067-00 Ⓕ	1-121-984-00 Ⓕ	-
3300	1-121-661-00 Ⓓ	1-123-075-00 Ⓔ	1-123-071-00 Ⓕ	-	-	-

CAP. (μF)	100 VOLT.	160 VOLT.	250 VOLT.	350 VOLT.
	PART No.	PART No.	PART No.	PART No.
0.47	-	-	-	-
1.0	1-123-249-00 Ⓐ	1-123-252-00 Ⓐ	1-123-003-00 Ⓑ	1-121-168-00 Ⓑ
2.2	1-123-250-00 Ⓐ	1-123-026-00 Ⓑ	-	1-123-028-00 Ⓑ
3.3	1-121-995-00 Ⓐ	-	1-123-004-00 Ⓑ	1-123-006-00 Ⓒ
4.7	1-123-255-00 Ⓐ	1-121-246-00 Ⓑ	1-121-759-00 Ⓑ	1-123-007-00 Ⓓ
10	1-121-126-00 Ⓑ	1-121-999-00 Ⓑ	1-123-254-00 Ⓒ	1-123-008-00 Ⓓ
22	1-121-996-00 Ⓒ	1-123-253-00 Ⓒ	1-123-005-00 Ⓓ	1-123-022-00 Ⓓ
33	1-121-997-00 Ⓒ	1-121-757-00 Ⓒ	-	-
47	1-123-251-00 Ⓒ	1-121-919-00 Ⓒ	-	-
100	1-123-084-00 Ⓔ	-	-	-

CERAMIC CAPACITORS Ⓐ

RATING

CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (μF)	50 VOLT.
	PART No.		PART No.		PART No.		PART No.
0.5	1-101-837-00	22	1-102-959-00	150	1-101-361-00	0.001	1-102-074-00
0.75	1-101-586-00	24	1-102-960-00	160	1-101-367-00	0.0012	1-102-118-00
1.0	1-102-934-00	27	1-102-961-00	180	1-102-976-00	0.0015	1-102-119-00
1.5	1-101-576-00	30	1-102-962-00	200	1-102-977-00	0.0018	1-102-120-00
2.0	1-102-935-00	33	1-102-963-00	220	1-102-978-00	0.0022	1-102-121-00
3	1-102-936-00	36	1-102-964-00	240	1-102-979-00	0.0027	1-102-122-00
4	1-102-937-00	39	1-102-965-00	270	1-102-980-00	0.0033	1-102-123-00
5	1-102-942-00	43	1-102-966-00	300	1-102-981-00	0.0039	1-102-124-00
6	1-102-943-00	47	1-101-880-00	330	1-102-820-00	0.0047	1-102-125-00
7	1-102-944-00	51	1-101-882-00	360	1-102-821-00	0.0056	1-102-126-00
8	1-102-945-00	56	1-101-884-00	390	1-102-822-00	0.0068	1-102-127-00
9	1-102-946-00	62	1-101-886-00	430	1-102-823-00	0.0082	1-102-128-00
10	1-102-947-00	68	1-101-888-00	470	1-102-824-00	0.01	1-102-129-00
11	1-102-948-00	75	1-101-890-00	510	1-101-059-00	0.022	1-101-005-00
12	1-102-949-00	82	1-102-971-00	560	1-102-115-00	0.047	1-101-006-00
13	1-102-950-00	91	1-102-972-00	680	1-102-116-00		
15	1-102-951-00	100	1-102-973-00	820	1-102-117-00		
16	1-102-952-00	110	1-102-815-00				
18	1-102-953-00	120	1-102-816-00				
20	1-102-958-00	130	1-101-081-00				

0.001μF = 1,000pF

CERAMIC (SEMICONDUCTOR) CAPACITORS Ⓐ

RATING → : Use the high voltage rated one.

CAP. (μF)	25 VOLT.	50 VOLT.	CAP. (μF)	25 VOLT.	50 VOLT.
	PART No.	PART No.		PART No.	PART No.
0.001	→	1-161-039-00	0.018	1-161-016-00	1-161-054-00
0.0012	→	1-161-040-00	0.022	1-161-017-00	1-161-055-00
0.0015		1-161-041-00	0.027	1-161-018-00	1-161-056-00
0.0018		1-161-042-00	0.033	1-161-019-00	1-161-057-00
0.0022		1-161-043-00	0.039	1-161-010-00	1-161-058-00
0.0027	→	1-161-044-00	0.047	1-161-021-00	1-161-059-00
0.0033	→	1-161-045-00	0.056	→	1-161-060-00
0.0039	→	1-161-046-00	0.068	→	1-161-061-00
0.0047	→	1-161-047-00	0.082	1-161-024-00	1-161-062-00
0.0056	→	1-161-048-00	0.1	1-161-025-00	1-161-063-00
0.0068	→	1-161-049-00			
0.0082	1-161-012-00	1-161-050-00			
0.01	1-161-013-00	1-161-051-00			
0.012	→	1-161-052-00			
0.015	1-161-015-00	1-161-053-00			

MYLAR CAPACITORS Ⓐ

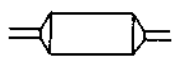
Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

CAP. (μF)	RATING 50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.
0.001	1-108-227-00	1-108-365-00	1-108-409-00	0.01	1-108-239-00	1-108-377-00	1-108-421-00	0.1	1-108-251-00	1-108-389-00	1-108-433-00
0.0012	1-108-351-00	1-108-366-00	1-108-410-00	0.012	1-108-357-00	1-108-378-00	1-108-422-00	0.12	1-108-363-00	1-108-390-00	1-108-434-00
0.0015	1-108-228-00	1-108-367-00	1-108-411-00	0.015	1-108-240-00	1-108-379-00	1-108-423-00	0.15	1-108-252-00	1-108-391-00	1-108-435-00
0.0018	1-108-352-00	1-108-368-00	1-108-412-00	0.018	1-108-358-00	1-108-380-00	1-108-424-00	0.18	1-108-364-00	1-108-392-00	1-108-436-00
0.0022	1-108-230-00	1-108-369-00	1-108-413-00	0.022	1-108-242-00	1-108-381-00	1-108-425-00	0.22	1-108-254-00	1-108-393-00	1-108-437-00
0.0027	1-108-353-00	1-108-370-00	1-108-414-00	0.027	1-108-359-00	1-108-382-00	1-108-426-00	0.27	1-108-854-00	–	–
0.0033	1-108-232-00	1-108-371-00	1-108-415-00	0.033	1-108-244-00	1-108-383-00	1-108-427-00	0.33	1-108-855-00	–	–
0.0039	1-108-354-00	1-108-372-00	1-108-416-00	0.039	1-108-360-00	1-108-384-00	1-108-428-00	0.39	1-108-856-00	–	–
0.0047	1-108-234-00	1-108-373-00	1-108-417-00	0.047	1-108-246-00	1-108-385-00	1-108-429-00	0.47	1-108-857-00	–	–
0.0056	1-108-355-00	1-108-374-00	1-108-418-00	0.056	1-108-361-00	1-108-386-00	1-108-430-00				
0.0068	1-108-237-00	1-108-375-00	1-108-419-00	0.068	1-108-249-00	1-108-387-00	1-108-431-00				
0.0082	1-108-356-00	1-108-376-00	1-108-420-00	0.082	1-108-362-00	1-108-388-00	1-108-432-00				

TANTALUM CAPACITORS

→: Use the high voltage rated one.

CAP. (μF)	RATING 3.15 VOLT. PART No.	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	20 VOLT. PART No.	25 VOLT. PART No.	35 VOLT. PART No.
0.01					→	→	1-131-396-00 Ⓑ
0.015						→	1-131-397-00 Ⓑ
0.022						→	1-131-398-00 Ⓑ
0.033						→	1-131-399-00 Ⓑ
0.047						→	1-131-400-00 Ⓑ
0.068					→	→	1-131-401-00 Ⓑ
0.1					→	→	1-131-402-00 Ⓑ
0.15					→	→	1-131-403-00 Ⓑ
0.22					→	→	1-131-404-00 Ⓑ
0.33					→	1-131-409-00 Ⓑ	1-131-405-00 Ⓑ
0.47	–	–	–	–	1-131-412-00 Ⓑ	→	1-131-406-00 Ⓑ
0.68	–	–	–	1-131-415-00 Ⓑ	→	1-131-410-00 Ⓑ	1-131-407-00 Ⓑ
1.0	–	–	1-131-418-00 Ⓑ	–	1-131-413-00 Ⓑ	→	1-131-408-00 Ⓑ
1.5	–	1-131-421-00 Ⓑ	–	1-131-416-00 Ⓑ	→	1-131-411-00 Ⓑ	1-131-348-00 Ⓑ
2.2	1-131-424-00 Ⓑ	–	1-131-419-00 Ⓑ	–	1-131-414-00 Ⓑ	1-131-355-00 Ⓑ	1-131-349-00 Ⓑ
3.3	–	1-131-422-00 Ⓑ	–	1-131-417-00 Ⓑ	1-131-362-00 Ⓑ	1-131-356-00 Ⓑ	1-131-350-00 Ⓑ
4.7	1-131-425-00 Ⓑ	–	1-131-420-00 Ⓑ	1-131-369-00 Ⓒ	1-131-363-00 Ⓑ	1-131-357-00 Ⓑ	1-131-351-00 Ⓒ
6.8	–	1-131-423-00 Ⓑ	1-131-376-00 Ⓑ	1-131-370-00 Ⓑ	1-131-364-00 Ⓑ	1-131-358-00 Ⓒ	1-131-352-00 Ⓒ
10	1-131-426-00 Ⓑ	1-131-383-00 Ⓑ	1-131-377-00 Ⓑ	1-131-371-00 Ⓑ	1-131-365-00 Ⓒ	1-131-359-00 Ⓒ	1-131-353-00 Ⓓ
15	1-131-390-00 Ⓑ	1-131-384-00 Ⓑ	1-131-378-00 Ⓑ	1-131-372-00 Ⓑ	1-131-366-00 Ⓒ	1-131-360-00 Ⓓ	
22	1-131-391-00 Ⓑ	1-131-385-00 Ⓑ	1-131-379-00 Ⓒ	1-131-373-00 Ⓒ	1-131-367-00 Ⓓ		
33	1-131-392-00 Ⓑ	1-131-386-00 Ⓒ	1-131-380-00 Ⓒ	1-131-374-00 Ⓓ			
47	1-131-393-00 Ⓒ	1-131-387-00 Ⓒ	1-131-381-00 Ⓓ	–			
68	1-131-394-00 Ⓑ	1-131-388-00 Ⓒ	–	–			
100	1-131-395-00 Ⓓ	–	–	–			



TANTALUM CAPACITORS

CAP. (μF)	RATING 3 VOLT. PART No.	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	20 VOLT. PART No.	35 VOLT. PART No.
0.033						1-131-273-00 Ⓔ
0.047						1-131-274-00 Ⓔ
0.068						1-131-275-00 Ⓔ
0.1						1-131-276-00 Ⓓ
0.15						1-131-277-00 Ⓓ
0.22			–	–	1-131-262-00 Ⓓ	1-131-278-00 Ⓓ
0.33			–	–	1-131-263-00 Ⓓ	1-131-279-00 Ⓓ
0.47			1-131-169-00 Ⓓ	–	1-131-264-00 Ⓓ	1-131-280-00 Ⓓ
0.68			–	1-131-258-00 Ⓓ	1-131-265-00 Ⓓ	1-131-281-00 Ⓓ
1.0			1-131-254-00 Ⓓ	–	1-131-266-00 Ⓓ	1-131-282-00 Ⓓ
1.5		1-131-250-00 Ⓓ	–	–	1-131-267-00 Ⓓ	1-131-283-00 Ⓔ
2.2		–	–	1-131-259-00 Ⓓ	1-131-268-00 Ⓓ	1-131-284-00 Ⓔ
3.3		–	1-131-255-00 Ⓓ	–	1-131-269-00 Ⓓ	–
4.7		1-131-251-00 Ⓔ	1-131-171-00 Ⓓ	–	1-131-270-00 Ⓓ	–
6.8		–	–	1-131-260-00 Ⓓ	1-131-271-00 Ⓔ	–
10	–	–	1-131-256-00 Ⓓ	–	1-131-272-00 Ⓔ	–
15	–	1-131-252-00 Ⓓ	–	1-131-261-00 Ⓔ		
22	–	–	1-131-257-00 Ⓔ	–		
33	1-131-176-00 Ⓓ	1-131-253-00 Ⓔ	1-131-173-00 Ⓒ	–		
47	1-131-288-00 Ⓘ	1-131-174-00 Ⓓ	–	–		
100	1-131-177-00 Ⓓ					