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PS-X65

US Model
AEP Model
UK Model
E Model

Photo: E model

STEREO TURNTABLE SYSTEM

SPECIFICATIONS

GENERAL

Power Requirements: 120 V ac, 60 Hz (US model)
220 V ac, 50/60 Hz (AEP model)
240 V ac, 50/60 Hz (UK model)
110 – 120 V or 220 – 240 V ac adjustable, 50/60 Hz (E model)

Power Consumption: 18 W

Dimensions: Approx. 480 (w) x 165 (h) x 420 (d) mm
19 (w) x 6½ (h) x 16⅝ (d) inches
including projecting parts and controls

Weight: Approx. 13 kg, 28 lb 11 oz (net)
Approx. 15 kg, 33 lb 2 oz
(in shipping carton)

TURNTABLE

Platter: 32 cm (12⅝ inches), aluminum-alloy diecast

Motor: Linear BSL (brushless and slotless)motor

Drive System: Direct drive

Control System: Crystal lock control, magnedisc servo control system

Speed: 33⅓ rpm, 45 rpm

Starting Characteristics: Comes to nominal speed within a half revolution (33⅓ rpm)

Wow and Flutter: 0.015 % (WRMS)
*0.025 % (WRMS)
±0.035 % (DIN)

S/N Ratio: 78 dB (DIN-B)

Load Characteristics: 0 % up to 150 g stylus force
(at lead-in groove of a record)

Speed Deviation: Within ±0.003 %

Automatic System: Lead-in, return, reject, repeat, record size selection

*This new measuring method concerns only the turntable assembly, including the platter. It excludes wow and flutter caused by the tonearm, the cartridge, or the record.
Measured by obtaining signal from magnetic pick-up head.

– Continued on page 2 –

SAFETY-RELATED COMPONENT WARNING!!

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

SONY®

SERVICE MANUAL

TONEARM

Type:	Electronic tonearm, universal
Pivot-to-stylus length:	235 mm (9¼ inches)
Overall Arm Length:	330 mm (12¾ inches)
Overhang:	13 mm (9/16 inches)
Tracking Error:	+2°27′, −1°30′
Stylus Force Adjustment Range:	0 — 3.0 g
Cartridge Shell Weight:	11 g
Cartridge Weight Range: (including supplied headshell)	12 — 19 g 19 — 26 g (with extra weight)

MODEL IDENTIFICATION

— Specification Label —

SONY®

STEREO TURNTABLE SYSTEM

MODEL NO. PS–X65

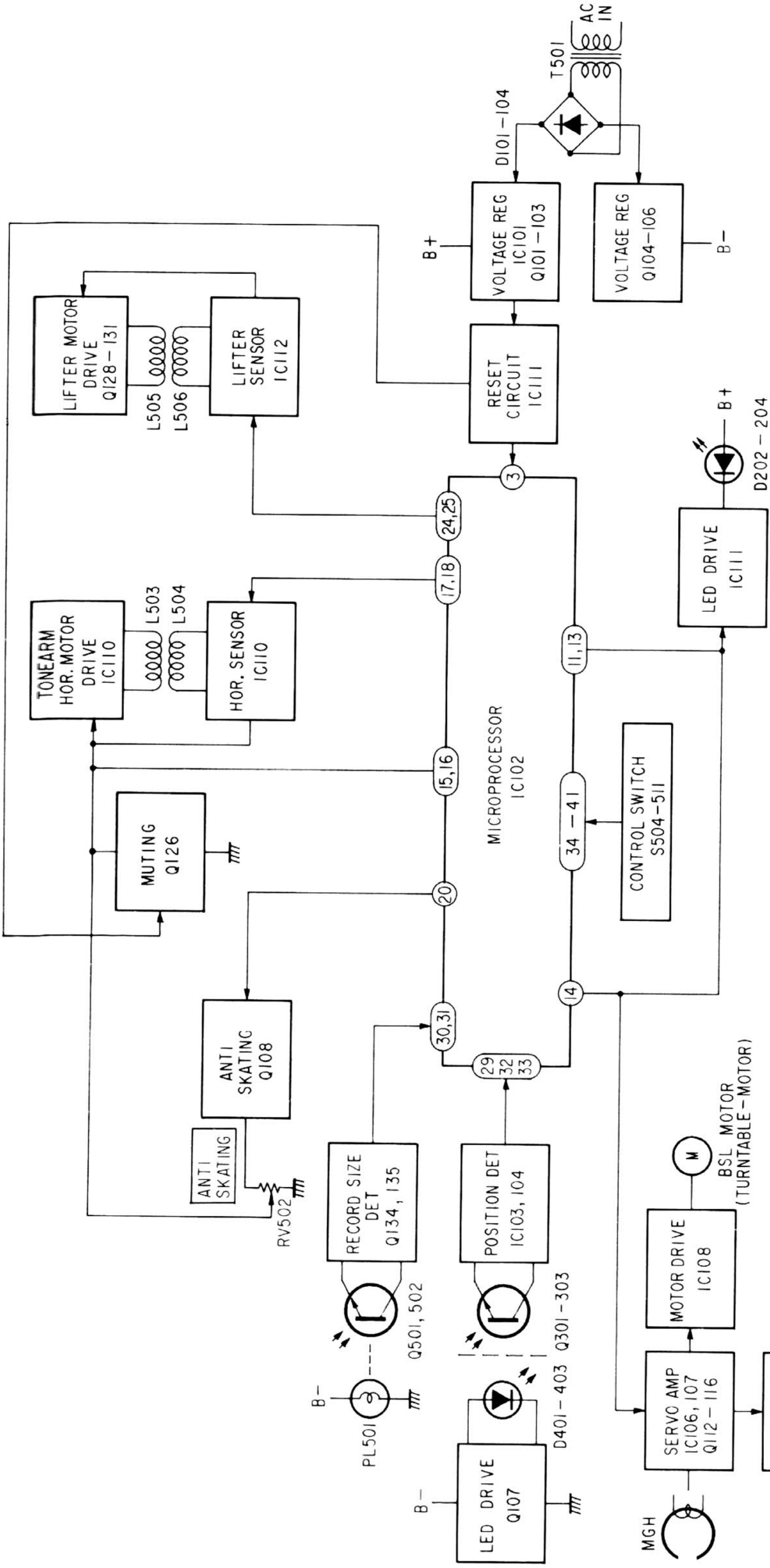
SERIAL NO.

MADE IN JAPAN

US model:	AC 120 V	60 Hz	18 W
AEP model:	AC 220 V	~50/60 Hz	18 W
UK model:	AC 240 V	~50/60 Hz	18 W
E model:	AC 110 — 120, 220 — 240 V	~50/60 Hz	18 W

SECTION 1
OUTLINE

1-1. BLOCK DIAGRAM



1-2. CIRCUIT DESCRIPTION

1. When the POWER Switch is turned on (see Fig. 1):

The waveform shaper, consisting of IC111, turns the voltage at terminal (3) of IC102 to low level "0" in half a second during which C112 is charged with B+ power. As a result, IC102 is reset.

This means that the microprocessor (IC102) does not operate for 0.5 seconds after the power switch is turned on.

Also, buttons can be effectively pressed after it is assured that the tonearm has been on the arm rest for about 0.5 seconds.

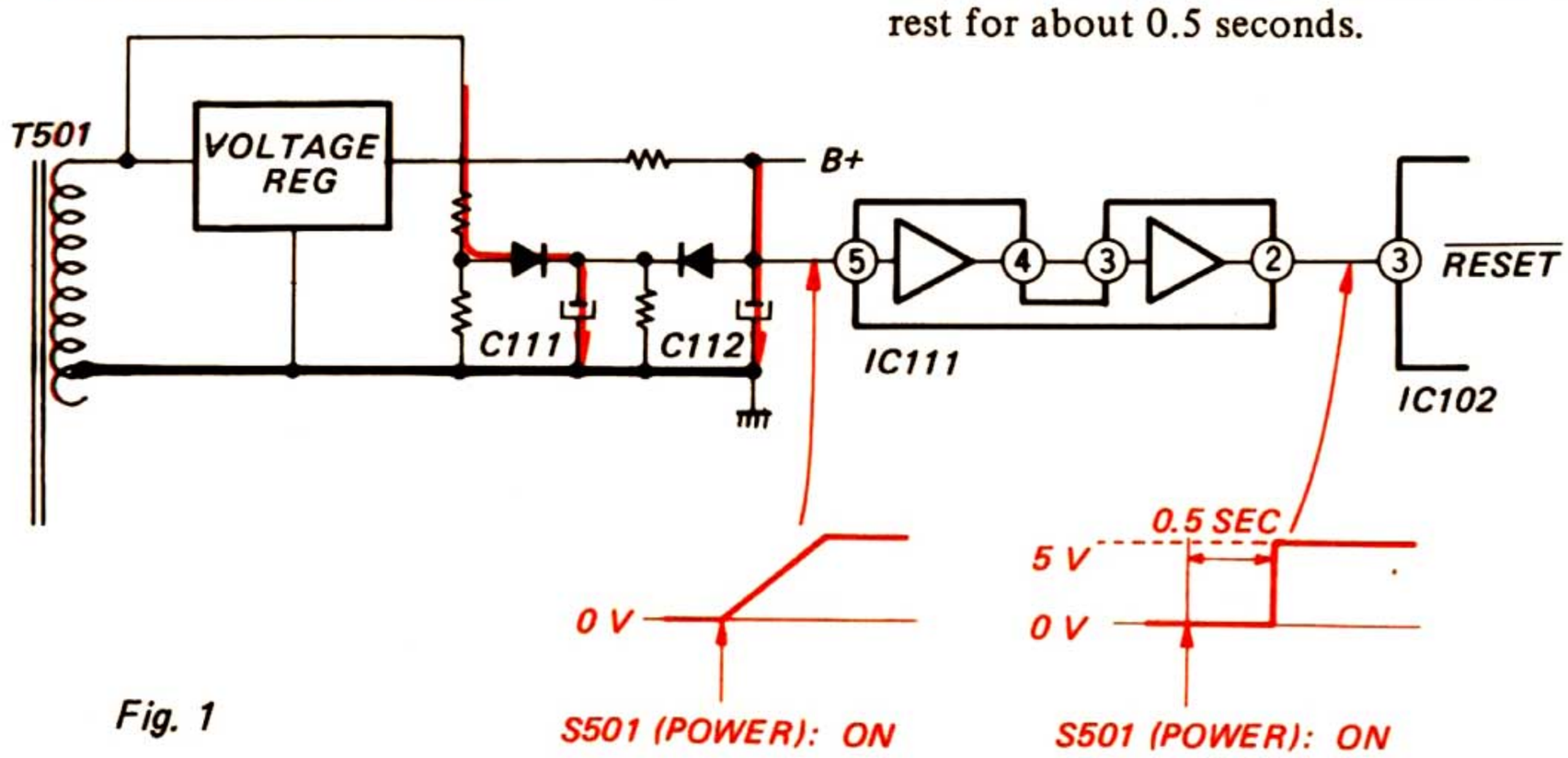


Fig. 1

2. Arm Lifter Raising/Lowering Circuit (see Fig. 2):

Turning the power switch on raises the arm lifter.

[Lowering the arm lifter]

When S508 (UP/DOWN) is depressed, the voltage at terminal (24) of IC102 becomes high "1". This turns the voltage at terminal (6) of IC112 to positive and the voltage at terminal (7) to negative. As a result, Q131 switches on.

The potential of the terminal (2) of IC112 now becomes negative and the output of the terminal (1) goes positive. This turns Q128 on.

Since both Q128 and Q131 are on, current passes through L505 (lifter drive coil) in direction A, thus lowering the arm lifter.

[Raising the arm lifter]

When S508 is depressed, the voltage at terminal (25) of IC102 becomes high "1". This turns the voltage at terminal (7) of IC112 to positive, switching Q130 on.

Since Q130 is on, a negative voltage appears at terminal (1), turning Q127 on. Now that both Q127 and Q130 are on, current passes through L505 in direction B, thus raising the arm lifter.

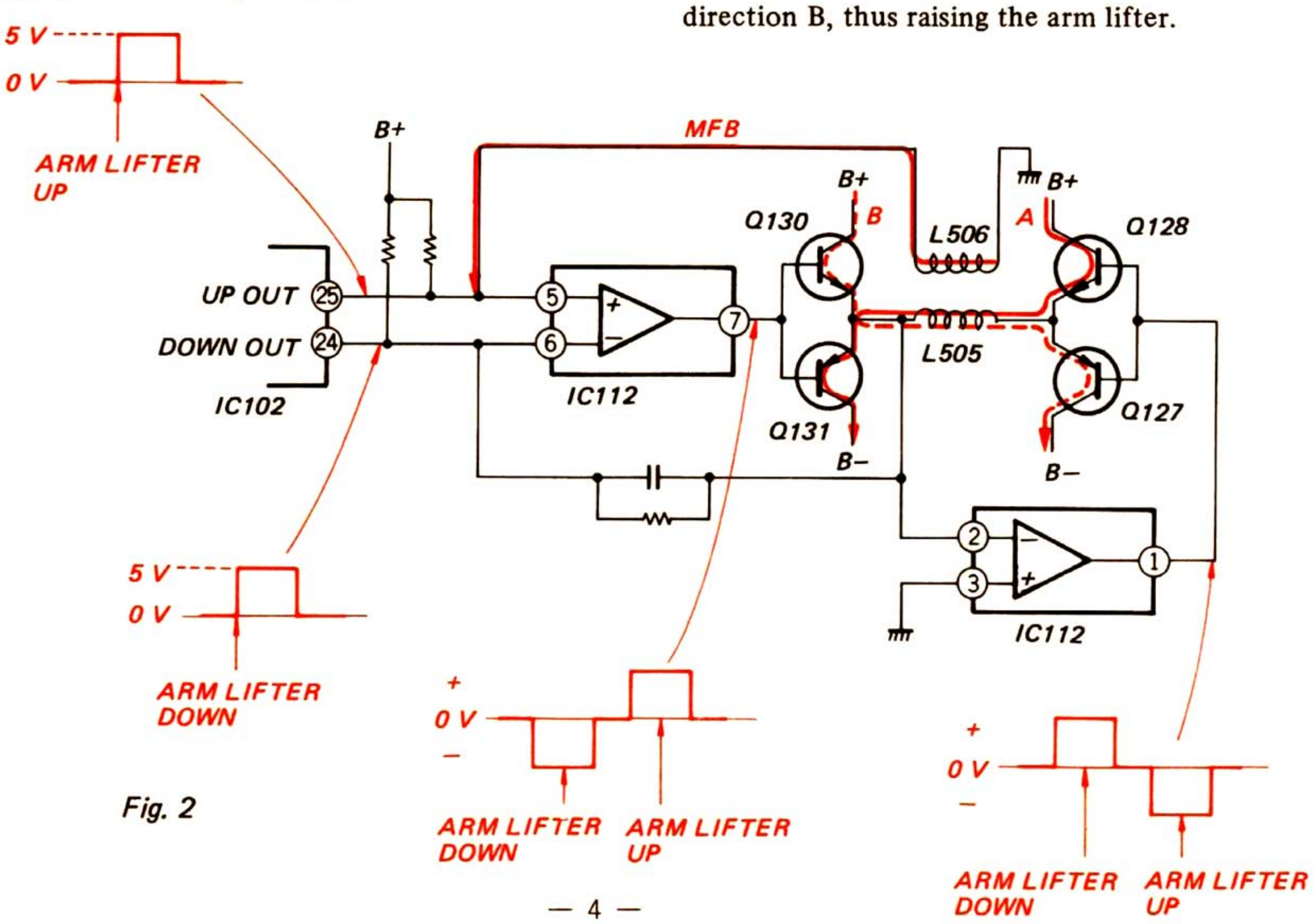


Fig. 2

3. Tonearm Swiveling Circuit (see Fig. 3):

Turning the power switch on returns the tonearm to the arm rest.

[▷ : BACK]

When S507 (▷ : BACK) is turned on, the voltages at terminals (17) and (18) of IC102 become high "1". This turns the voltages at terminals (6) and (7) of IC110 respectively to positive and negative. A negative voltage then appears at terminal (1) of IC110.

As a result, Q125 turns on to pass current through L503 (horizontal drive coil) in direction A, returning home the tonearm.

[◁ : FORWARD]

When S506 (◁ : FORWARD) is turned on, the voltages at terminals (15) and (16) of IC102 become high "1". This turns the voltage at terminal (1) of IC110 to positive, and, consequently, switches Q124 on.

Now that Q124 is on, current flows through L503 in direction B, moving forward the tonearm.

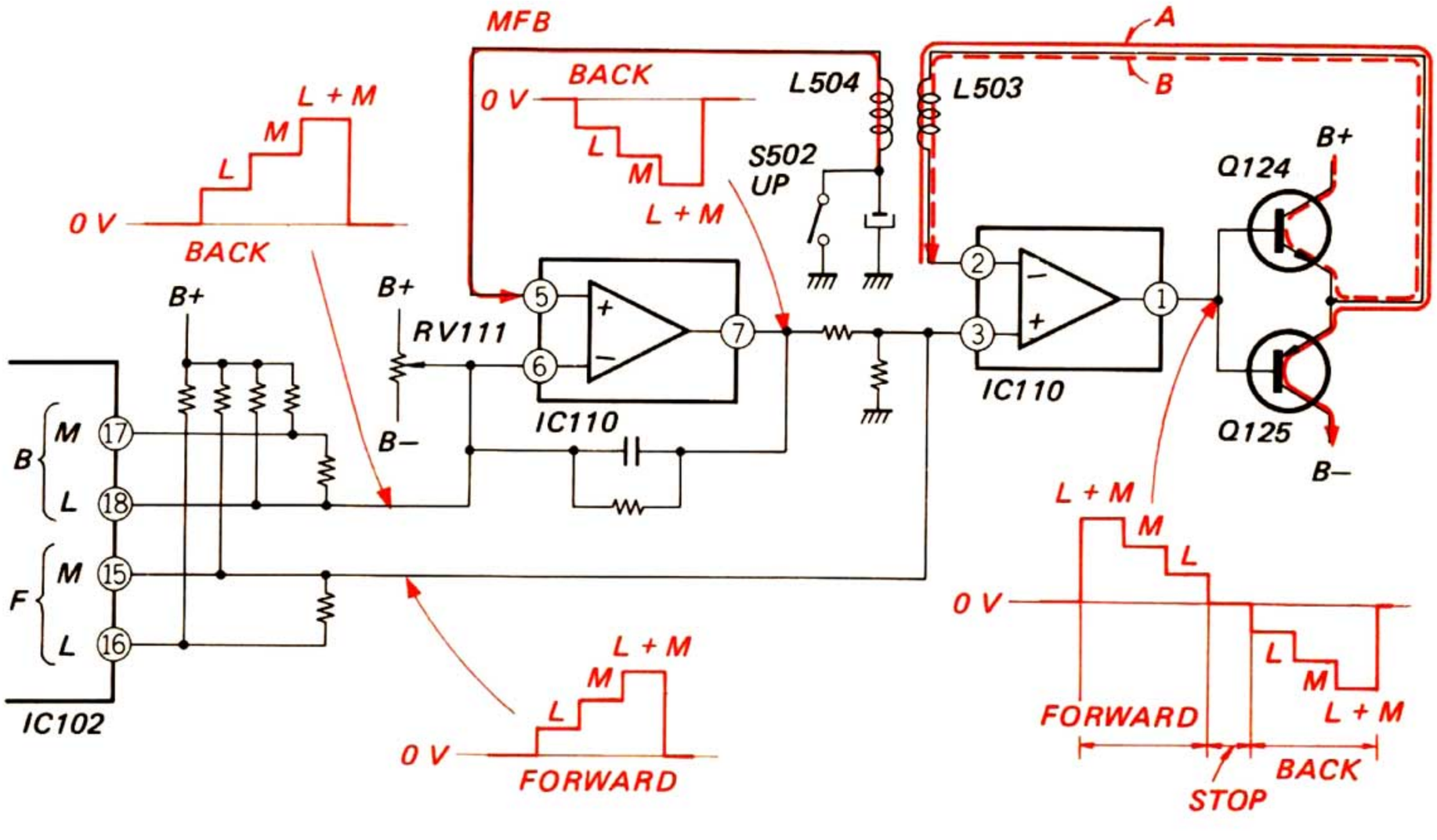


Fig. 3

4. Automatic Disk Size Detector (see Fig. 4):

As long as the turntable is rotating, the light from PL501 passes through the prism on the turntable mat and switches phototransistors Q501 and Q502.

The outputs of Q501 and Q502 are fed to terminals (30) and (31) of IC102 to be used for automatic detection of the disk size.

	IC102	
	Terminal (30)	Terminal (31)
No record	1	1
17 cm	1	0
30 cm	0	0

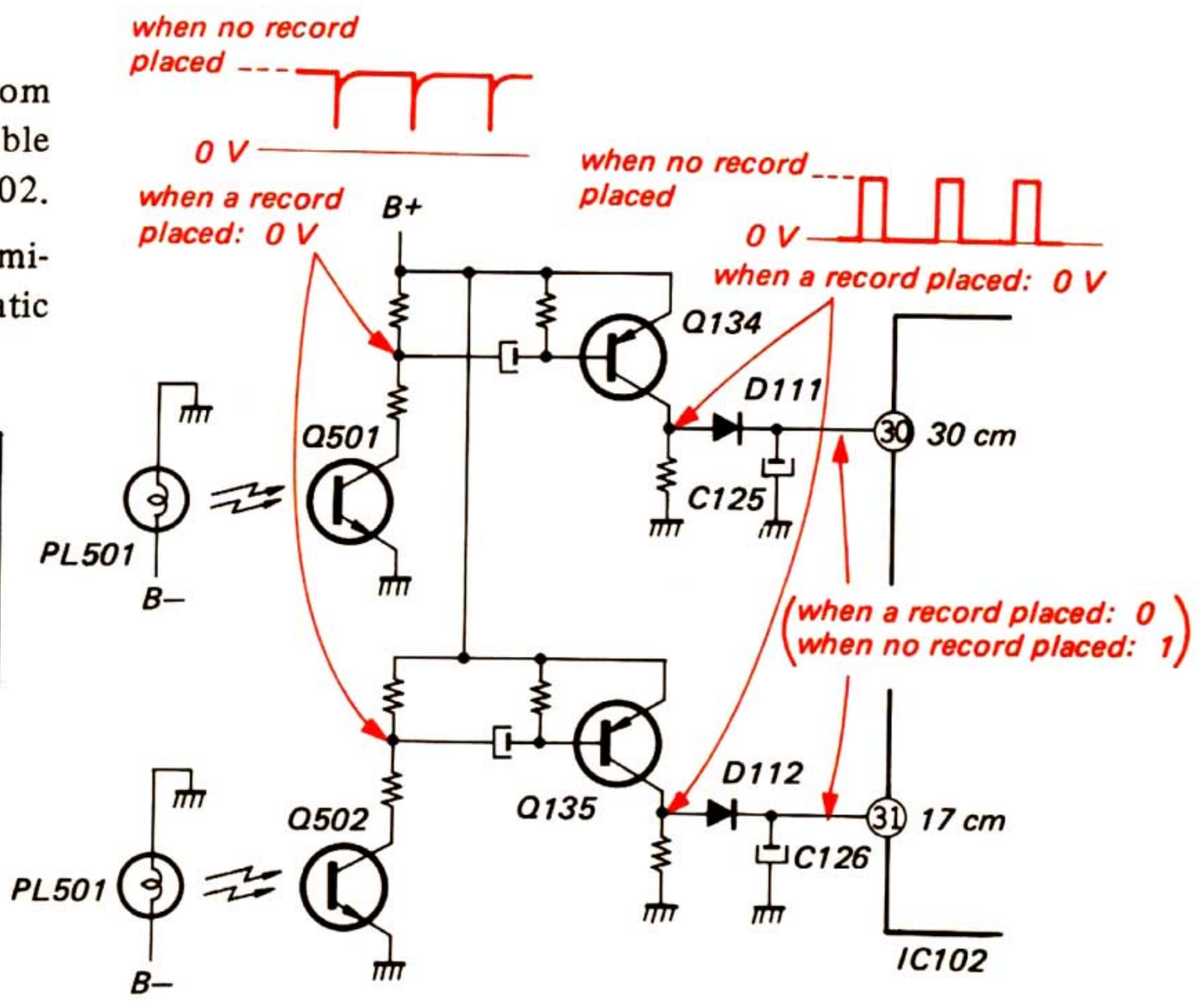


Fig. 4

5. Drop-point and End Detection (see Fig. 5 and 6):

When S504 (AUTO START) is turned on, the tonearm moves toward the disk.

The presence of a drop-point on the disk is determined by counting slits of the movable shutter rotating with the tonearm.

The end of a disk is also detected by counting slits of the movable shutter. After detecting the end, the tonearm returns.

Slits are counted as follows. The light emitted by D401 and D402 strike on the movable shutter. If the light from D401 (D402) passes a slit, it turns on Q301 (Q302). The outputs of Q301 and Q302 are fed to the Schmitt circuit consisting of IC103, where the waveforms are shaped. The shaped outputs are applied to terminals (32) and (33) of IC102.

Also, whether the tonearm is moving forward or backward is determined by comparing the phases of the signals from terminals (32) and (33) of IC102.

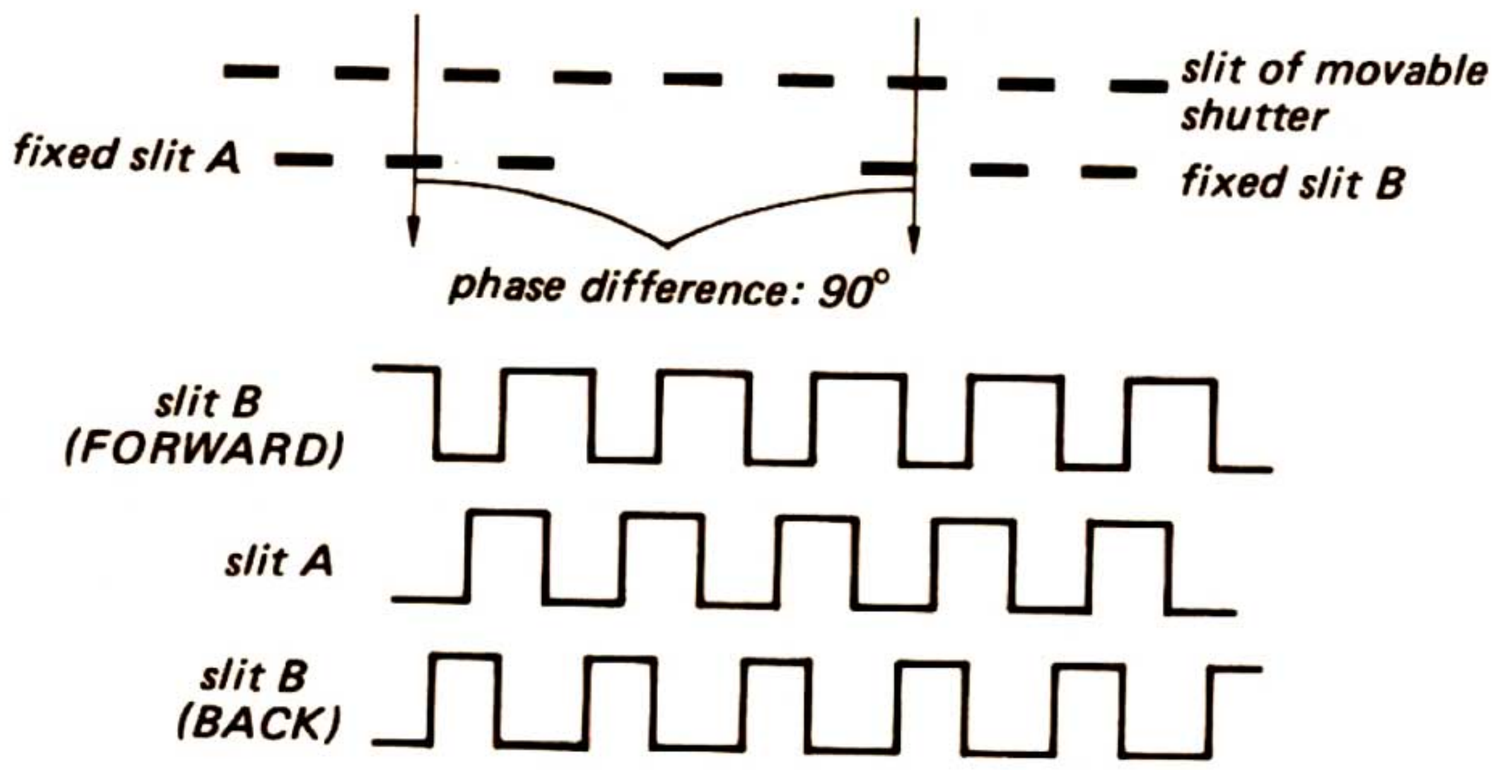


Fig. 5

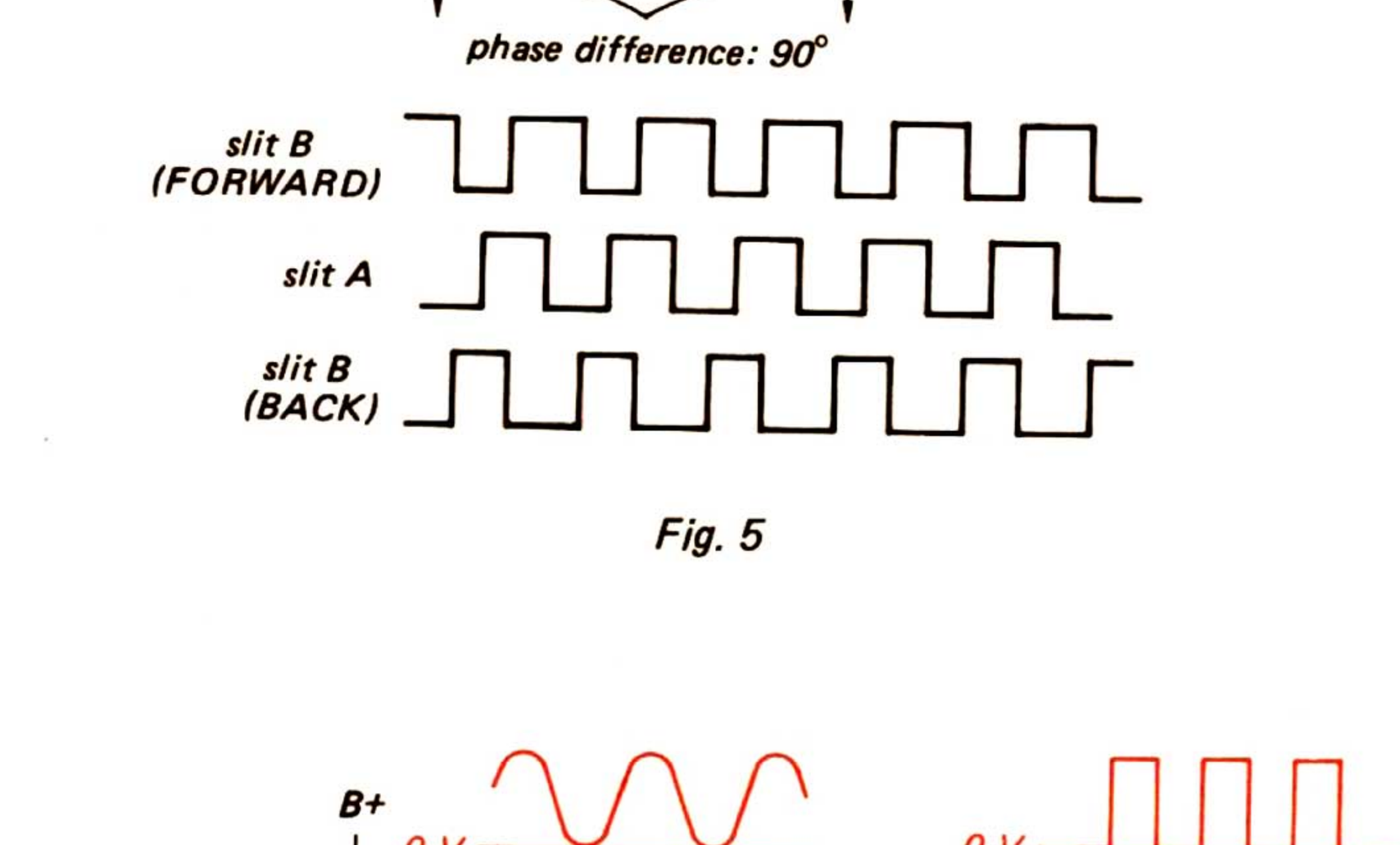


Fig. 6

6. Waveform

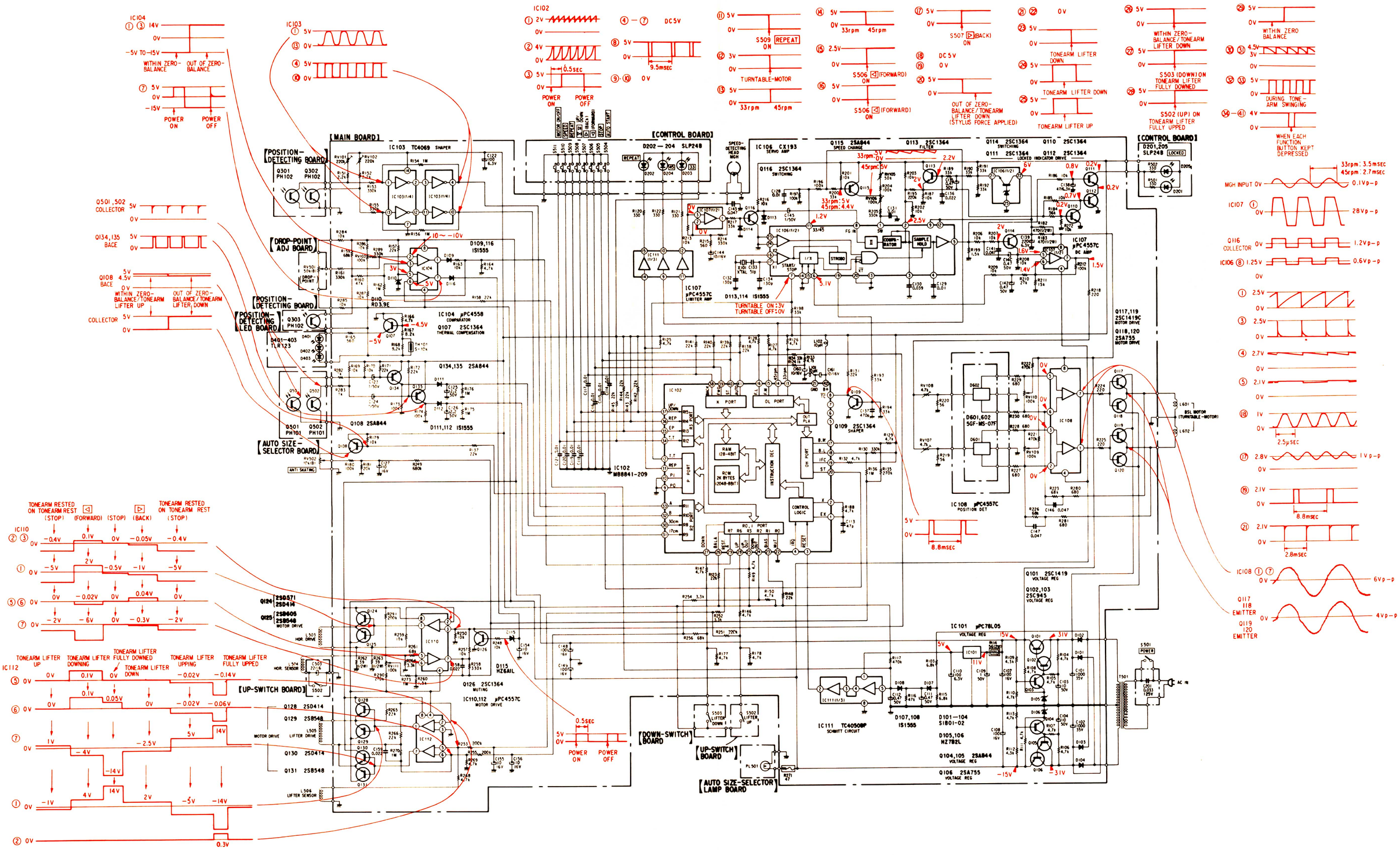


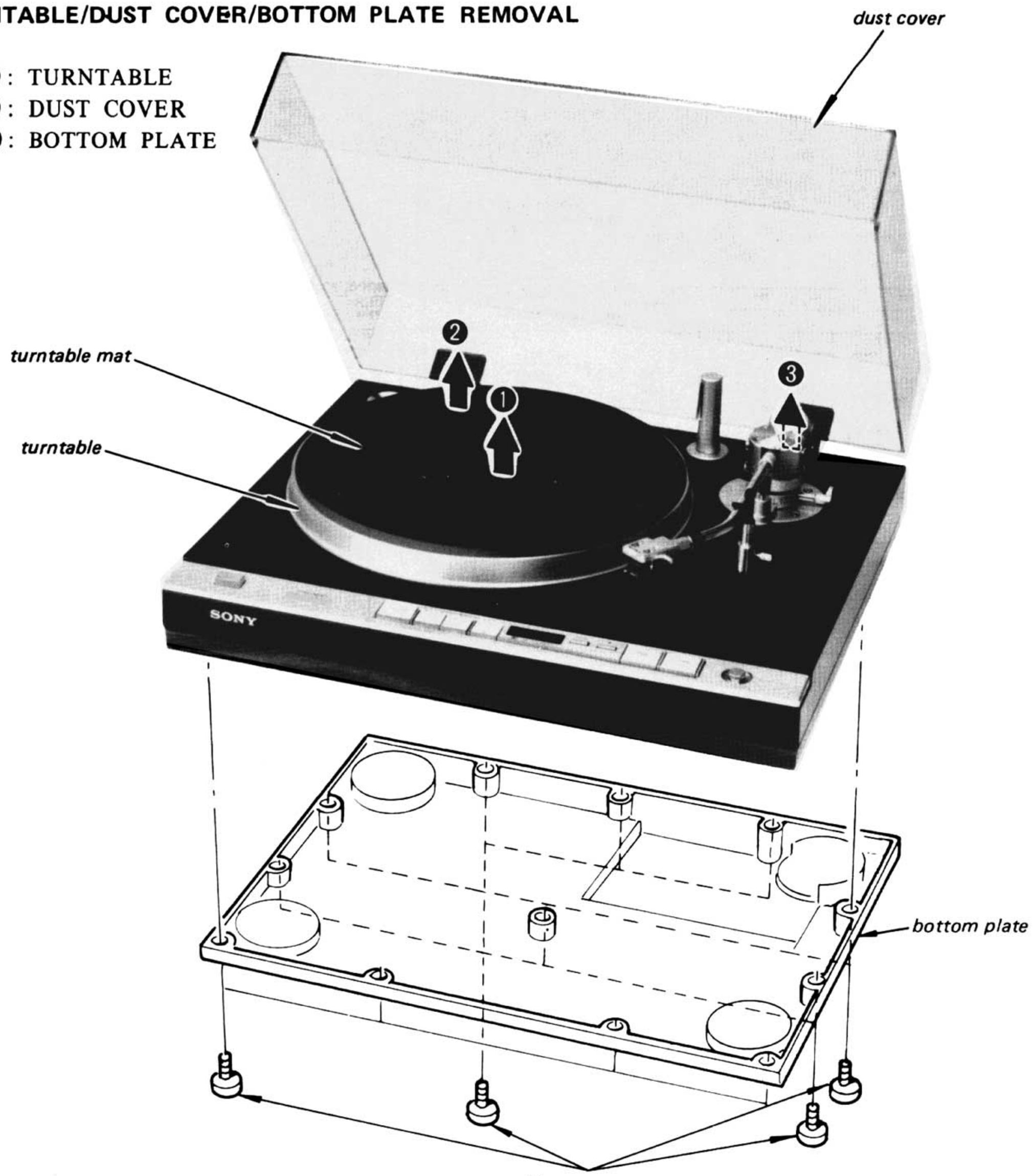
Fig. 7

SECTION 2
DISASSEMBLY

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

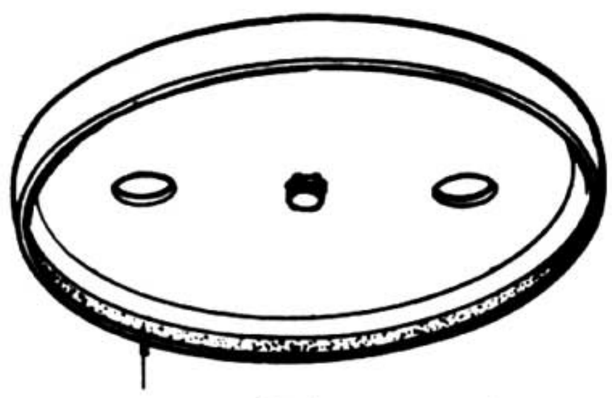
TURNTABLE/DUST COVER/BOTTOM PLATE REMOVAL

❶ : TURNTABLE
❷, ❸ : DUST COVER
❹ : BOTTOM PLATE



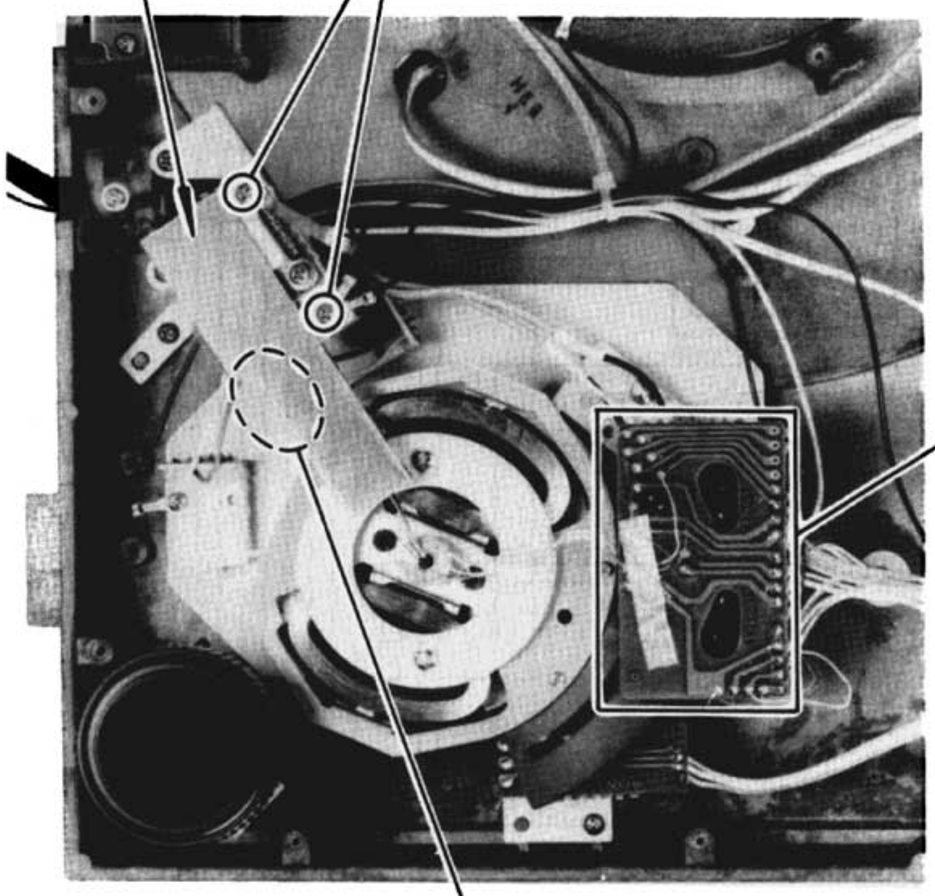
SERVICING NOTE

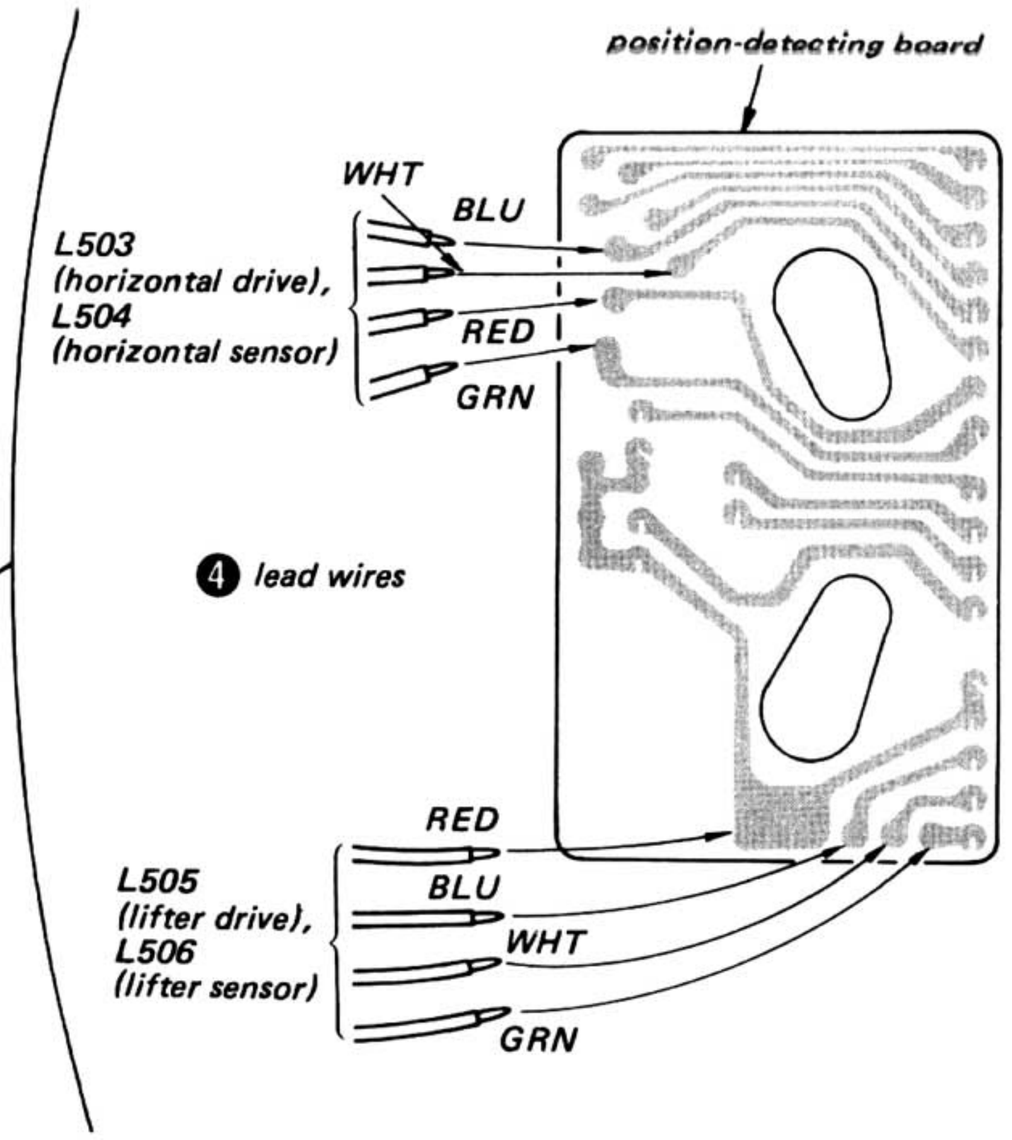
Bottom view of turntable

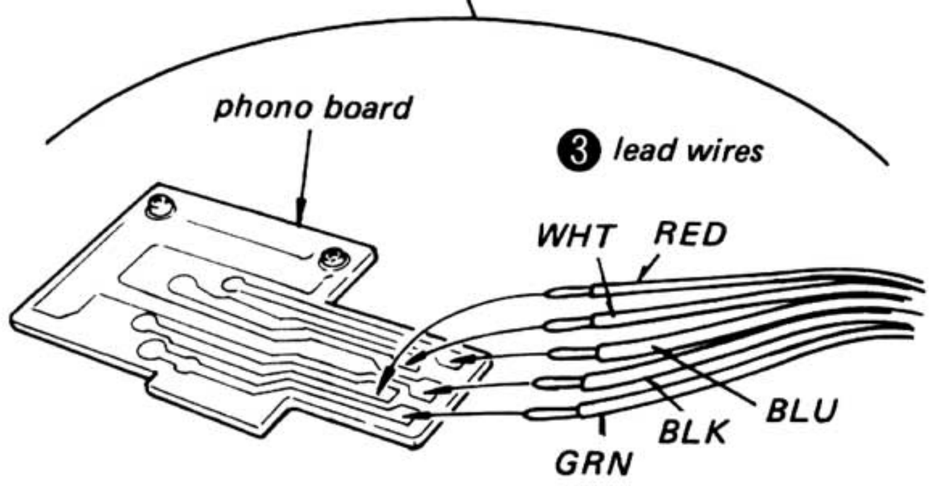


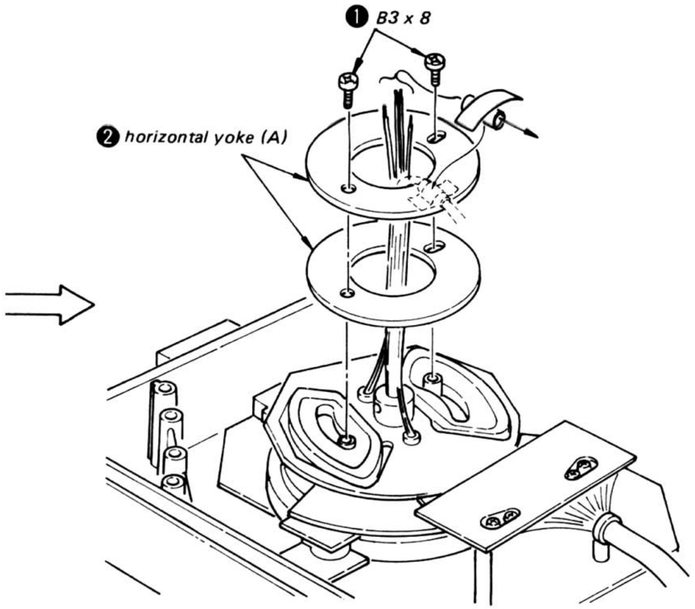
Be sure not to spoil the magnetic coating (dark brown color).

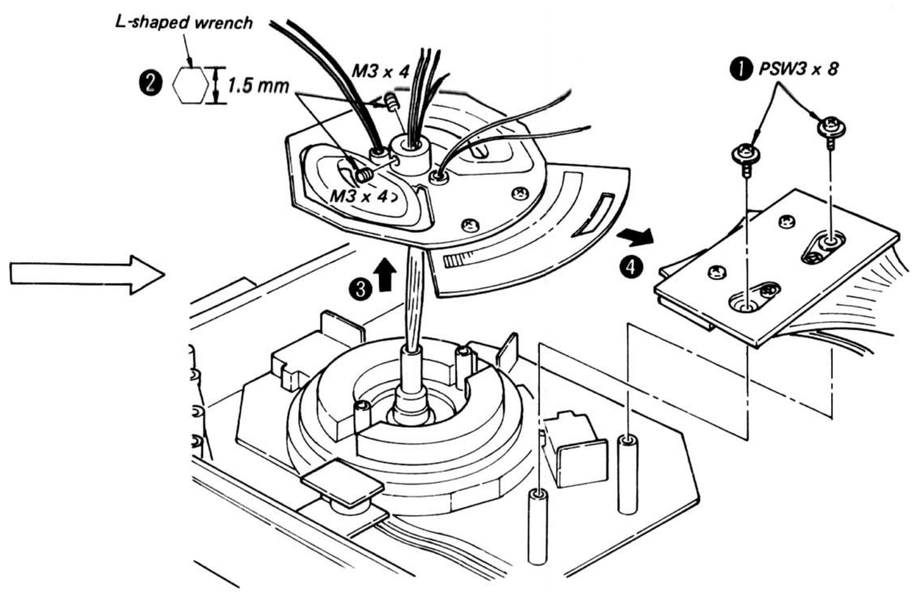
TONEARM SECTION REMOVAL

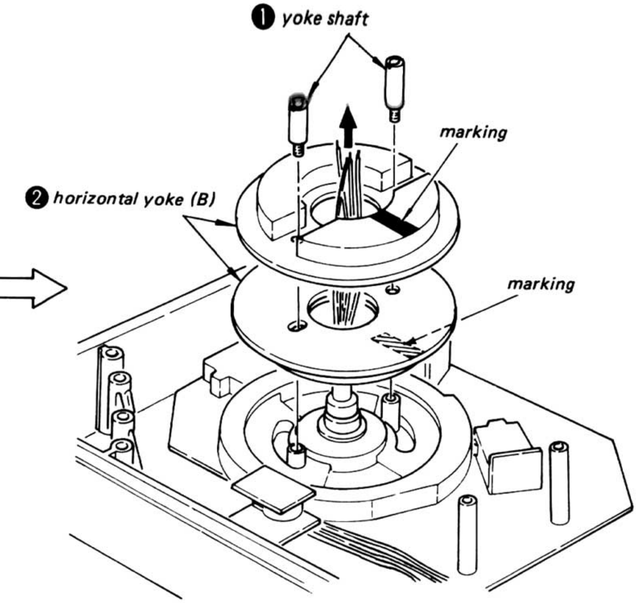


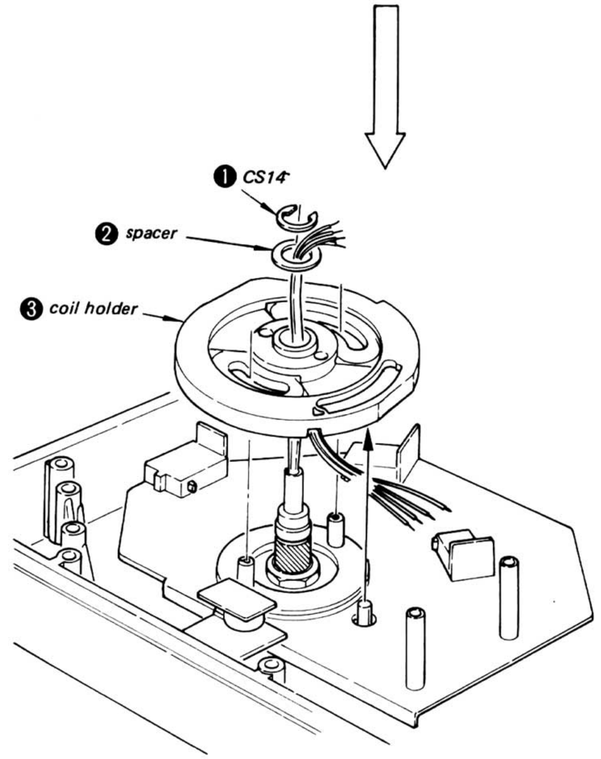


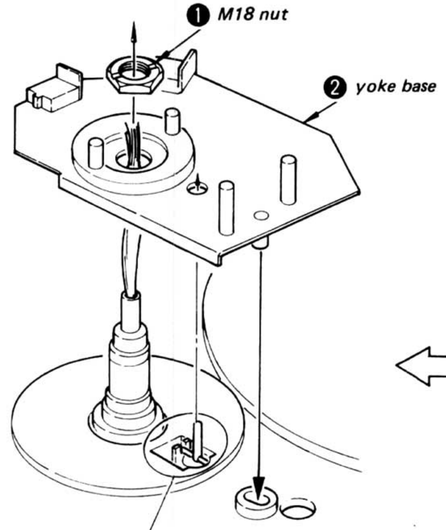


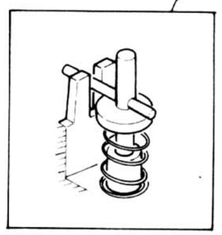

❶ B3 x 8
❷ horizontal yoke (A)

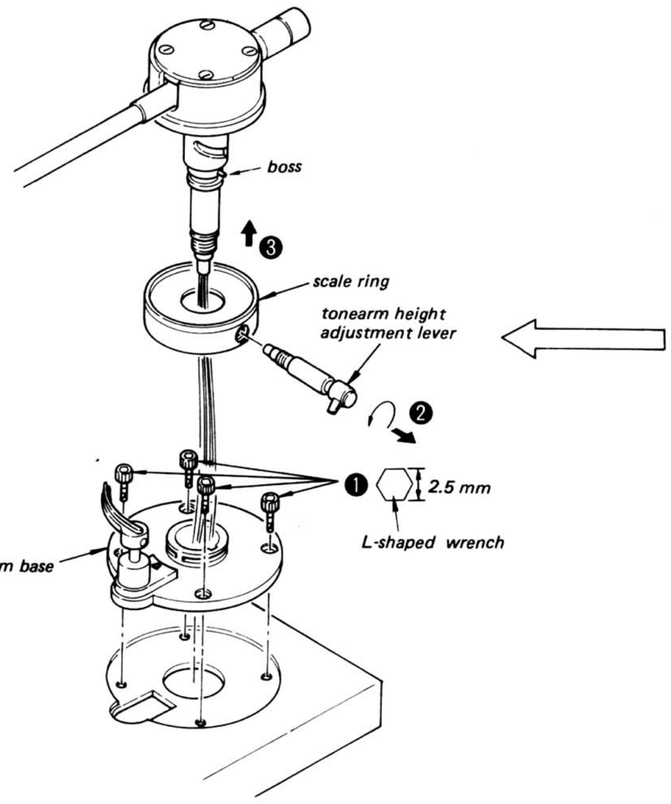

L-shaped wrench
❷ 1.5 mm
M3 x 4
M3 x 4
❸
❶ PSW3 x 8
❹


❶ yoke shaft
marking
❷ horizontal yoke (B)
marking


❶ CS14
❷ spacer
❸ coil holder


❶ M18 nut
❷ yoke base




boss
❸
scale ring
tonearm height
adjustment lever
❷
❶ 2.5 mm
L-shaped wrench
tonearm base

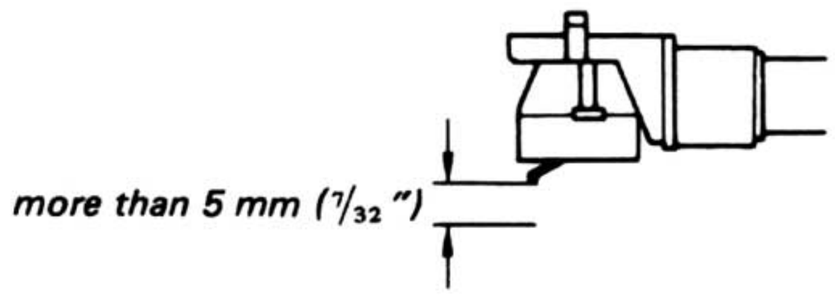
SECTION 3
ADJUSTMENTS

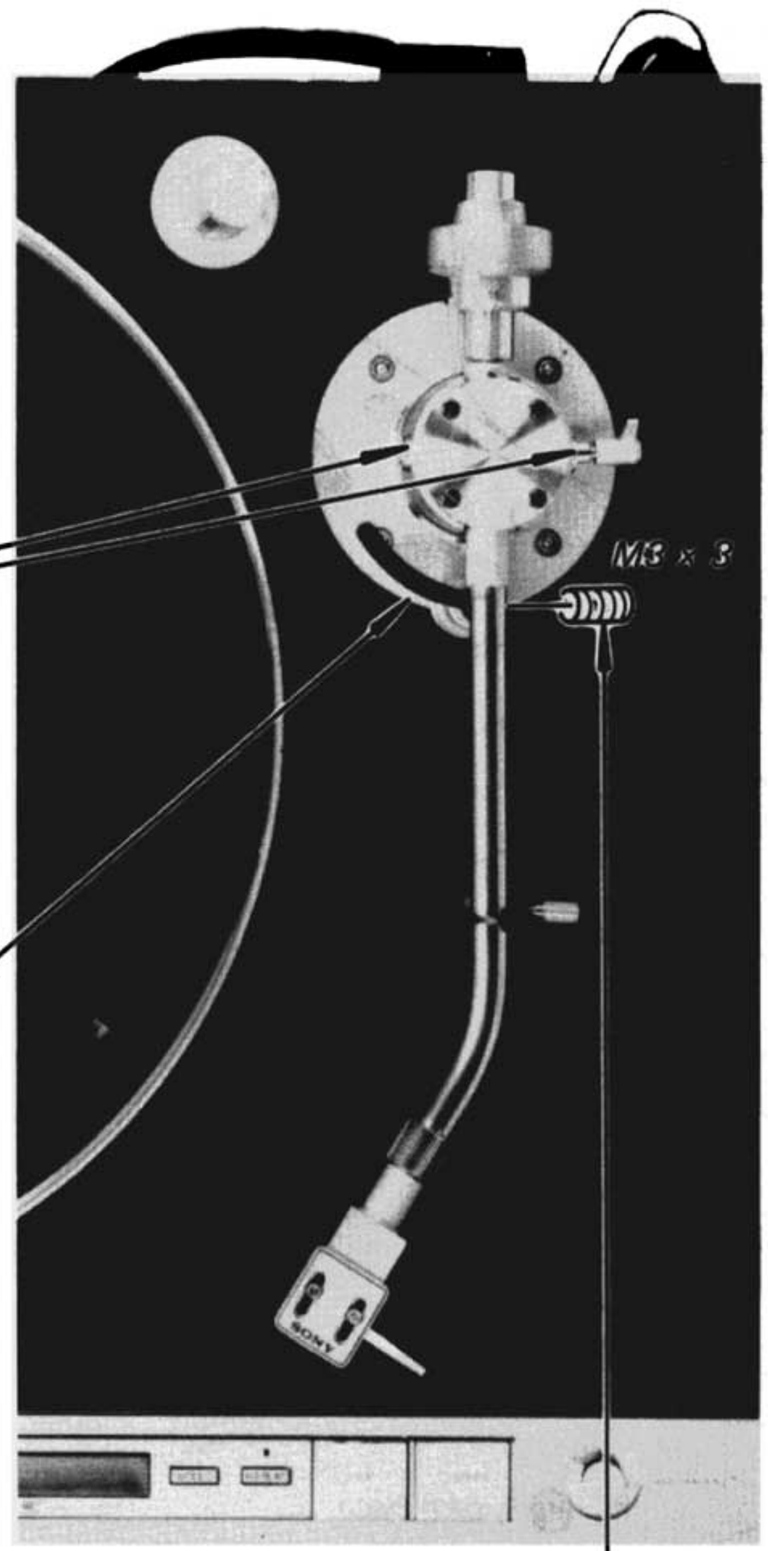
3-1. MECHANICAL ADJUSTMENTS

Vertical-sensitivity Adjustment

1. Perform the longitudinal adjustment.
2. Adjust the pivot bearings and the pivot-locking nuts so that the tonearm sinks more than 5 mm (7/32 inches) when the 40 mg weight is placed on the head shell, and the tonearm is in a horizontally balanced position when the weight is removed.

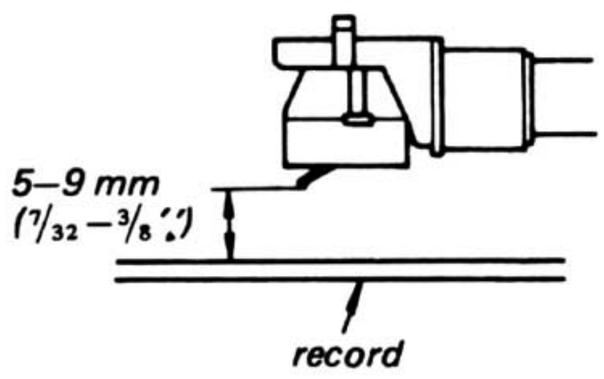
Note: Tighten the pivot bearings as shown below.

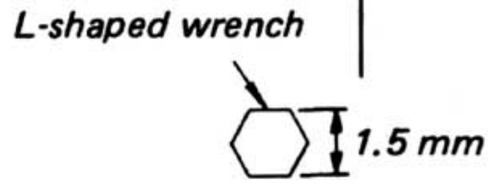


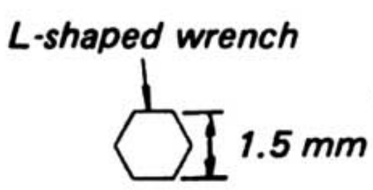


Stylus Height Adjustment

1. Bring the tonearm above the record.
2. Lift the cueing lever up and make sure that the clearance between the stylus tip and the record is 5–9 mm (7/32–3/8 inches).
3. If necessary, loosen the adjustment screw (M3 x 3) and adjust the arm lifter height.

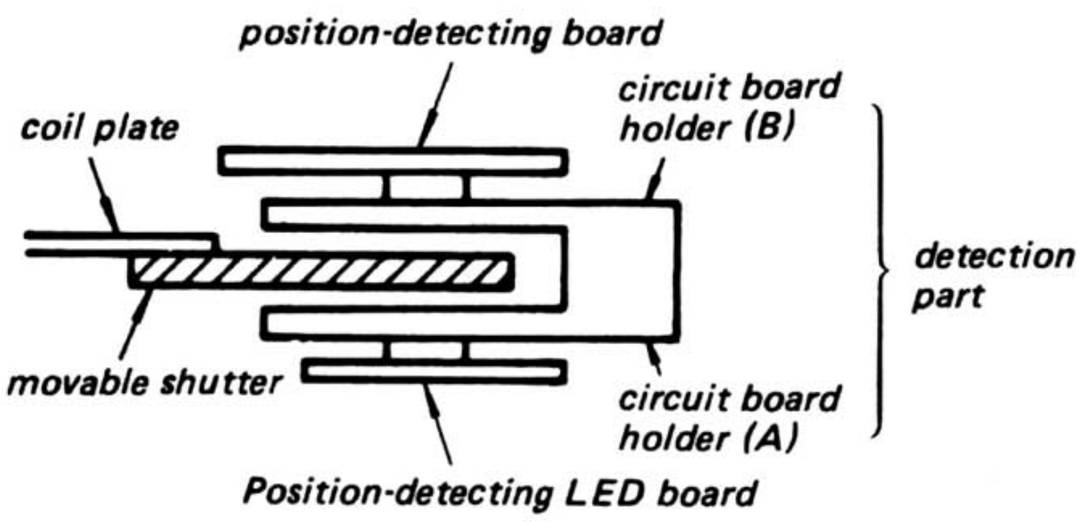


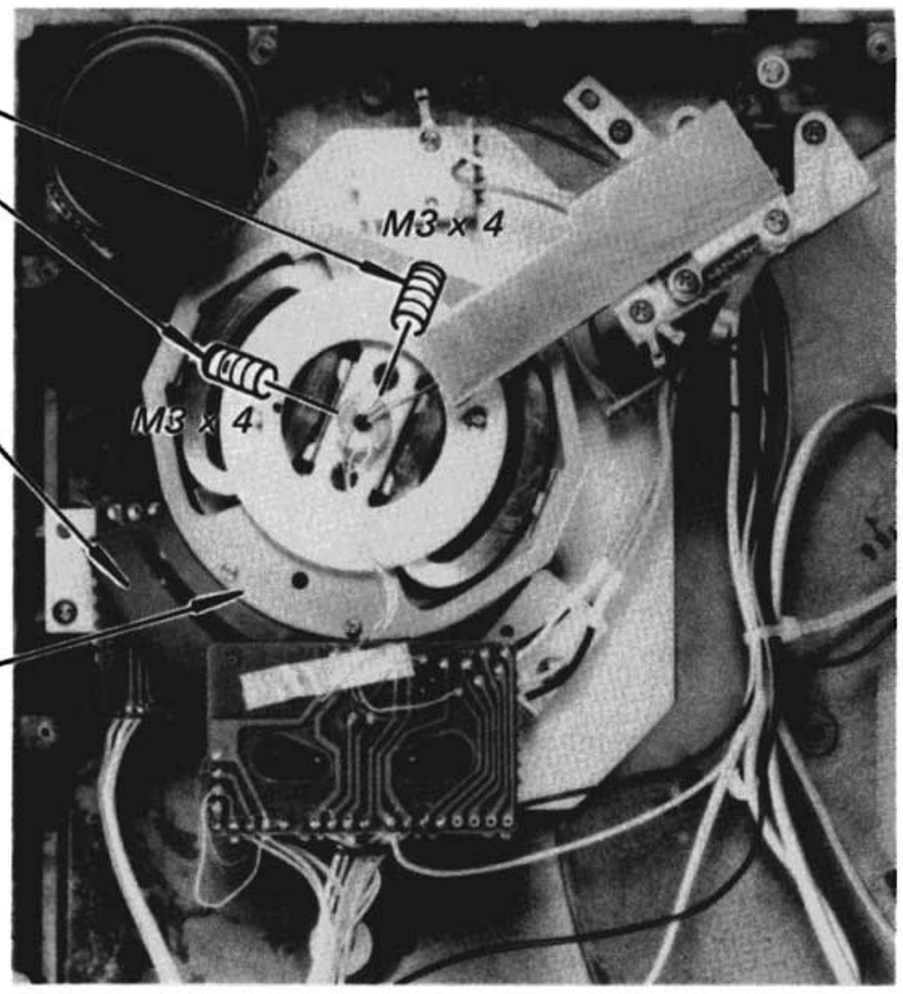




Coil Plate Position Adjustment

1. Adjust the coil plate position so that the movable shutter does not touch the detection part when the arm pipe is moved horizontally.





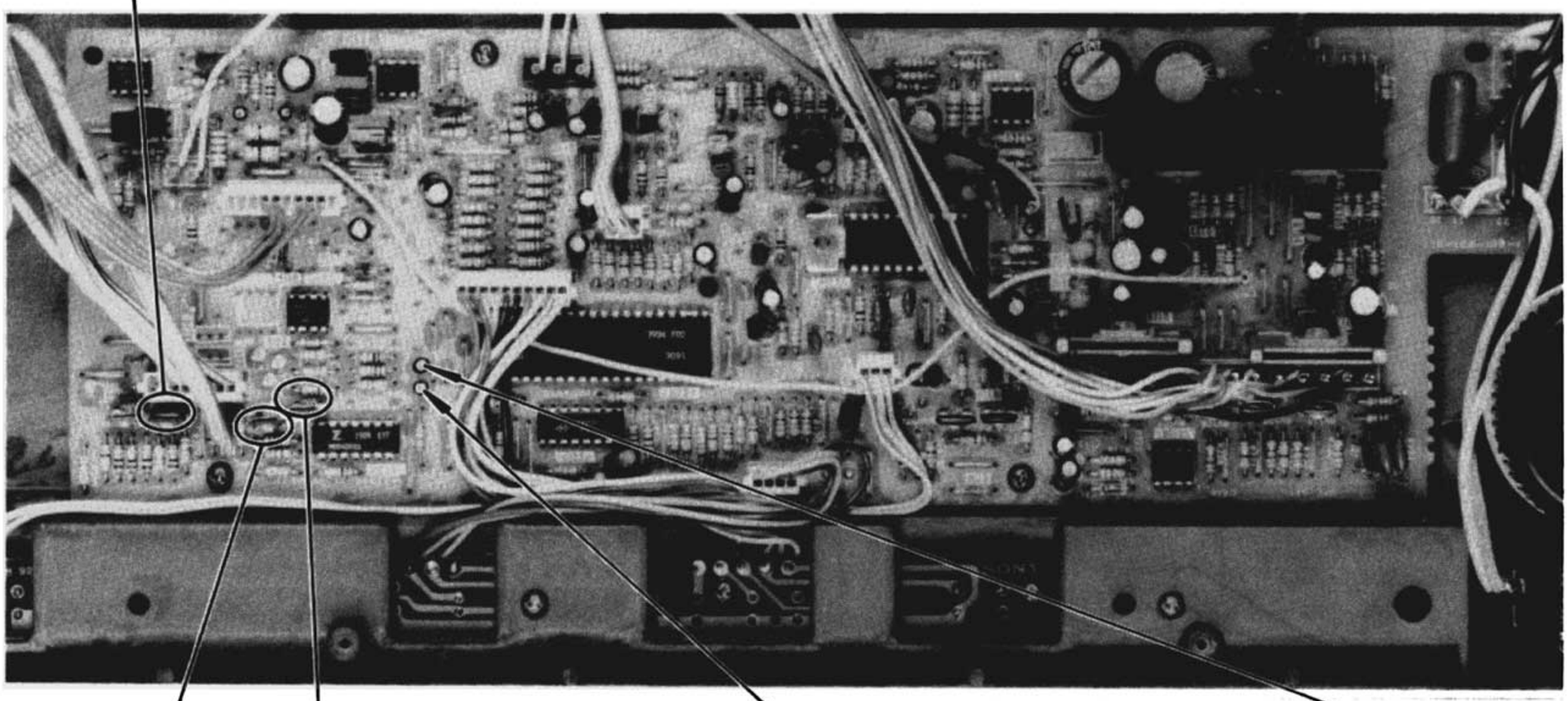
3-2. ELECTRICAL ADJUSTMENTS

Drop-point Adjustment

1. Set RV501 to the mechanical-mid position.
2. Adjust RV103 so that the stylus drops on the specified point of the test record.

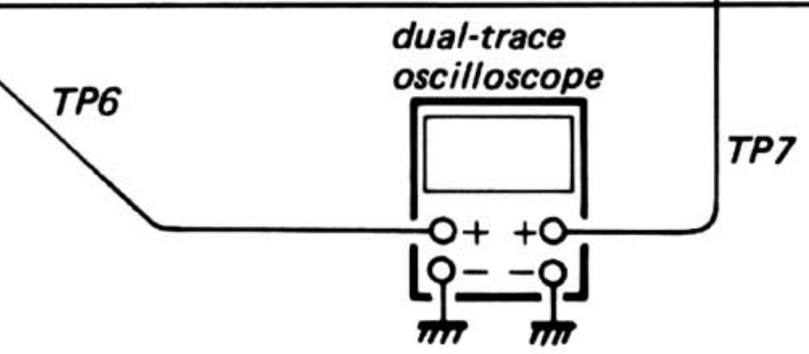
Test record	Count of drop-point
YFSC-16	9 to 16
YFSB-6	14 to 32

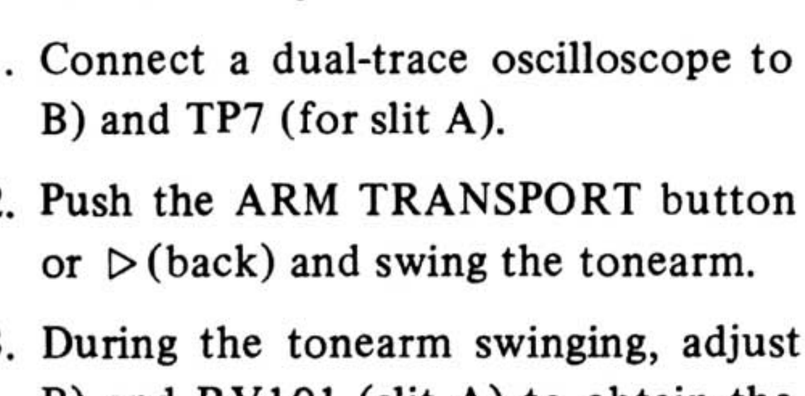
3. When RV501 is turned clockwise, the count of drop-point should be smaller than the specified.

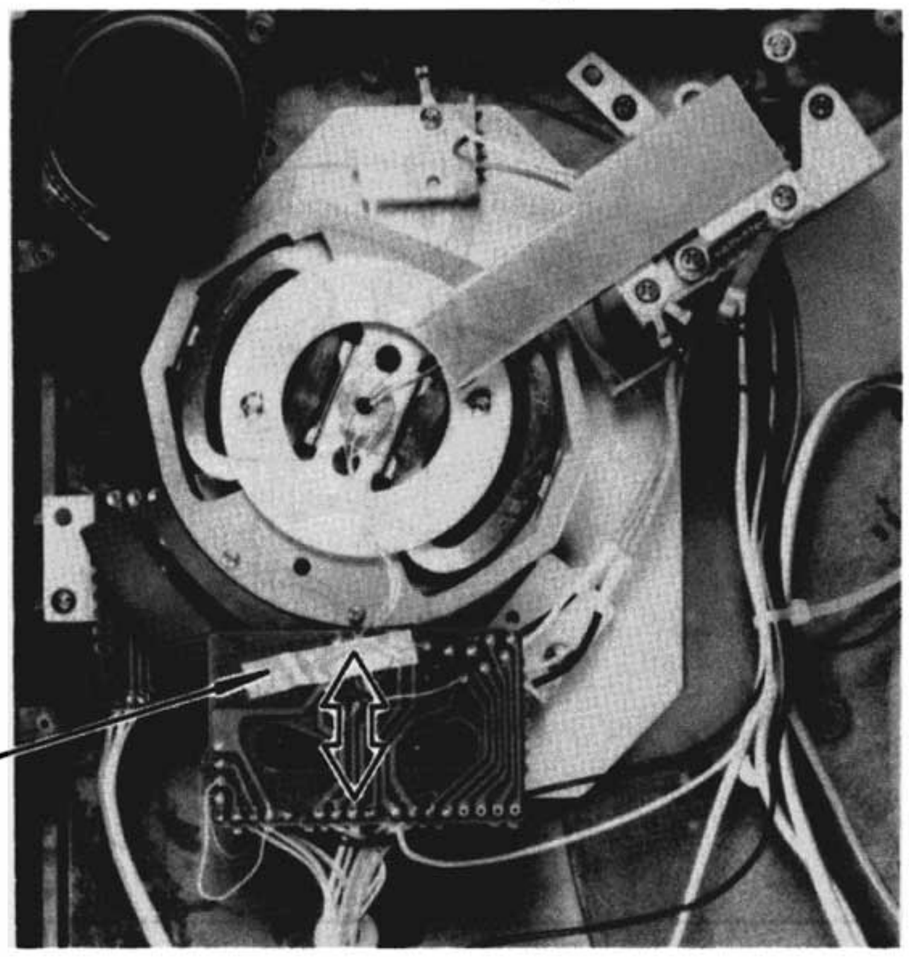


Slit A and B Adjustments

1. Connect a dual-trace oscilloscope to TP6 (for slit B) and TP7 (for slit A).
2. Push the ARM TRANSPORT button ◁ (forward) or ▷ (back) and swing the tonearm.
3. During the tonearm swinging, adjust RV102 (slit B) and RV101 (slit A) to obtain the square waves as shown below.
4. Push the ARM TRANSPORT button ◁ (forward) or ▷ (back) and swing the tonearm.
5. Move the position-detecting board for the phase difference shown below.

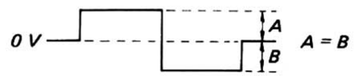


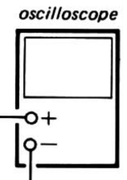




Tonearm Horizontal Motor Offset Adjustment

1. Secure the tonearm on the arm rest.
2. Connect an oscilloscope to TP5.
3. Push the ARM TRANSPORT (▽, ▽) button and move the arm rest up and down several times.
4. Adjust RV111 to make A and B shown below equal.

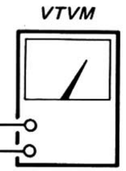


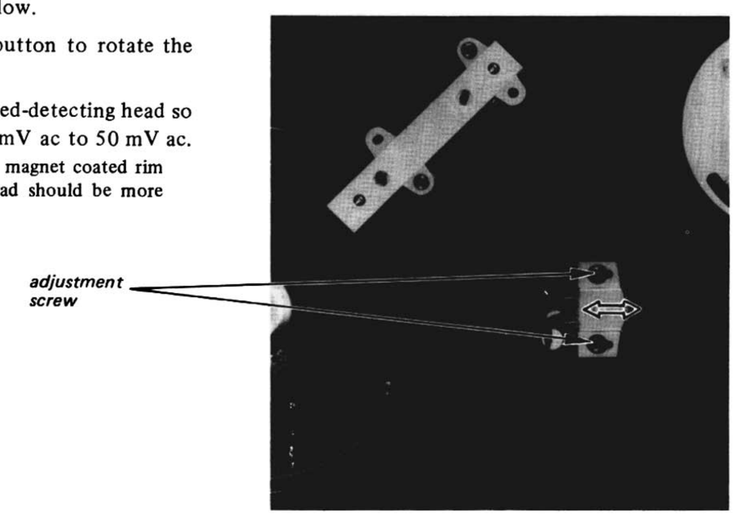


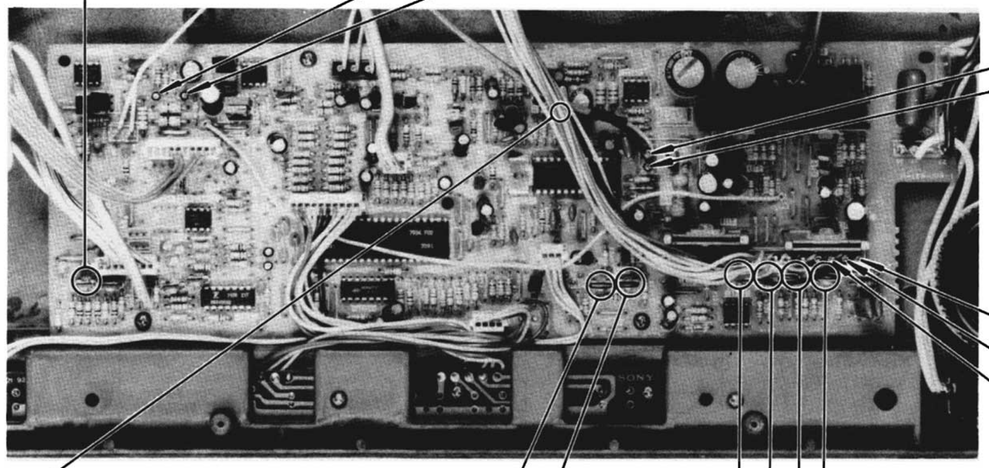
Speed-detecting Head Output Level Adjustment

1. Set the SPEED to 33 rpm.
2. Connect a VTVM as shown below.
3. Push the MOTOR ON/OFF button to rotate the turntable.
4. Adjust the position of the speed-detecting head so that the VTVM reading is 20 mV ac to 50 mV ac.

Note: The clearance between the magnet coated rim and the speed-detecting head should be more than 0.3 mm.

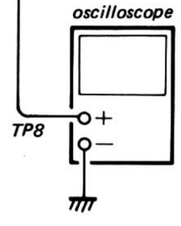


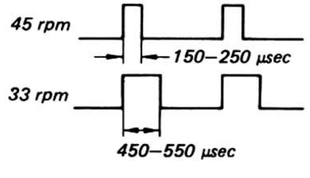




Speed Adjustment

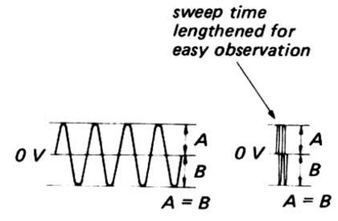
1. Set the SPEED to 45 rpm.
2. Connect an oscilloscope to TP8.
3. Adjust RV106 for a waveform as shown below.
4. Set the SPEED to 33 rpm.
5. Adjust RV105 for a waveform as shown below.
6. Confirm that the LOCKED indication is lighting up.

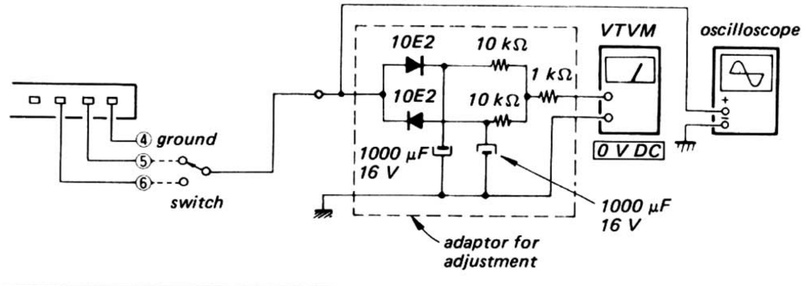




Turntable Motor Adjustment

1. Make an adaptor for adjustment as shown below.
2. Connect a VTVM and an oscilloscope as shown.
3. Set the SPEED to 33 rpm.
4. Throw the switch to terminal ⑤ and adjust RV108 for a 4 $V_{p\text{-}p}$ reading on the oscilloscope.
5. Throw the switch to terminal ⑥ and adjust RV107 for a 4 $V_{p\text{-}p}$ reading on the oscilloscope.
6. Throw the switch to terminal ⑤ and adjust RV110 for a 0 V dc reading on the VTVM or for a waveform as shown right.
7. Throw the switch to terminal ⑥ and adjust RV109 for a 0 V dc reading on the VTVM or for a waveform as shown right.

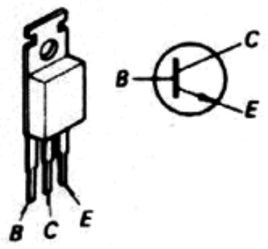




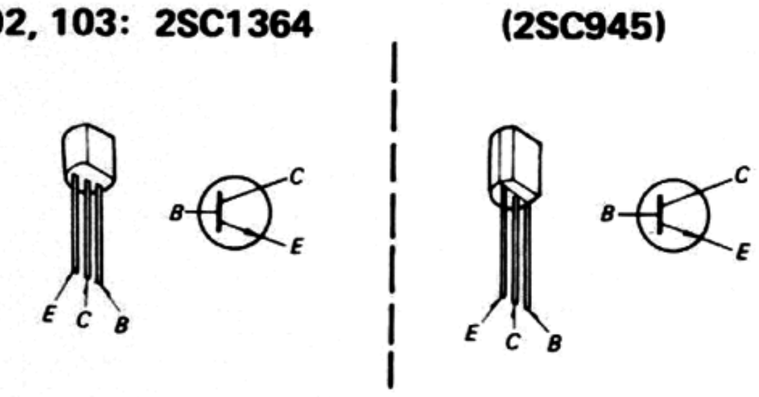
Replacement Semiconductors

For replacement, use semiconductors except in ( ).

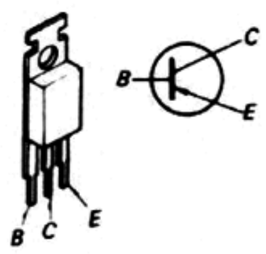
Q101: 2SC1061 (2SC1419)
Q117, 119: 2SC1061 (2SC1419C)



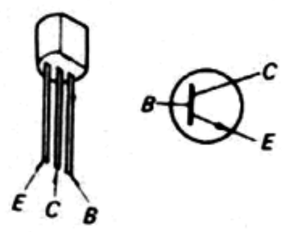
Q102, 103: 2SC1364 (2SC945)



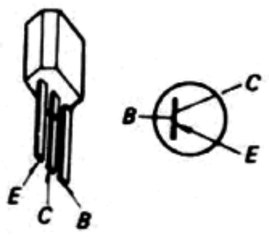
Q106, 118, 120: 2SA671 (2SA755)



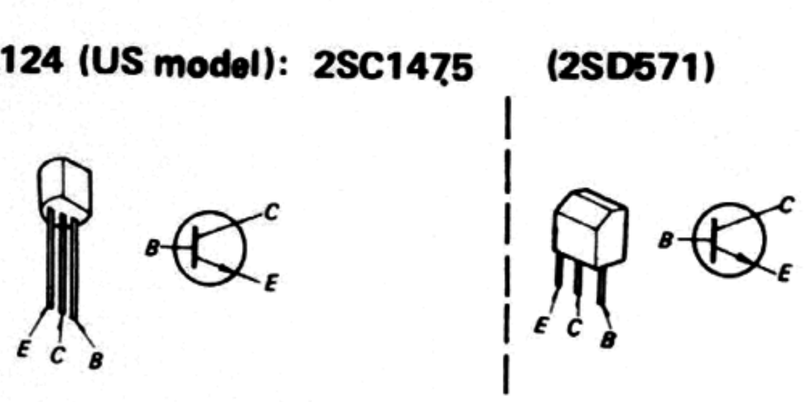
Q107
Q109–114 } **: 2SC1364**
Q116, 126



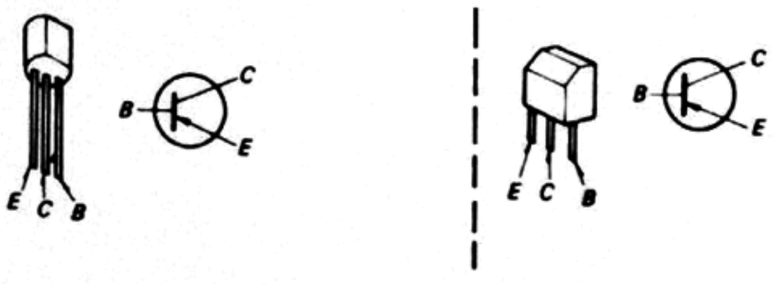
Q104, 105
Q108, 115 } **: 2SA1027R (2SA844)**
Q134, 135



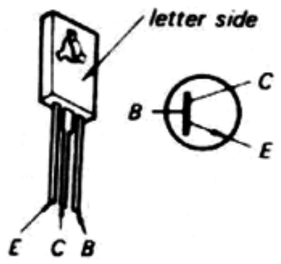
Q124 (US model): 2SC1475 (2SD571)



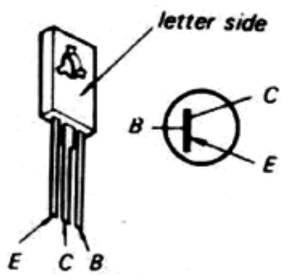
Q125 (US model): 2SA684 (2SB605)



Q124 (AEP, UK, E model)
Q128, 130 } **: 2SD414**

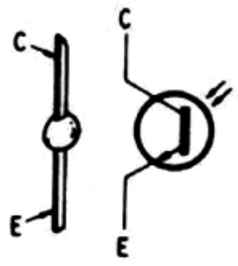


Q125 (AEP, UK, E model)
Q129, 131 } **: 2SB548**



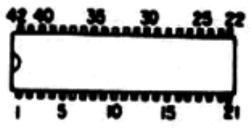
Q301–303: PH102

Q501, 502: PH101

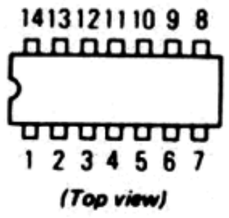


IC101: μPC78L05

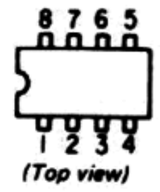
IC102: MB8841-209



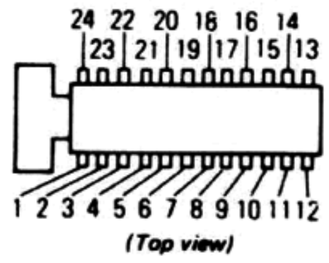
IC103: MSM4069
(TC4069)



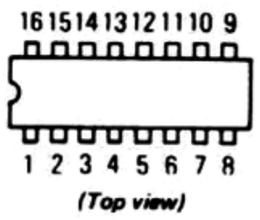
IC104: μPC4557C (μPC4558)
IC107, 108 } **: μPC4557C**
IC110, 112



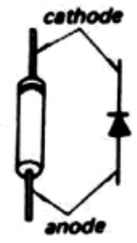
IC106: CX193



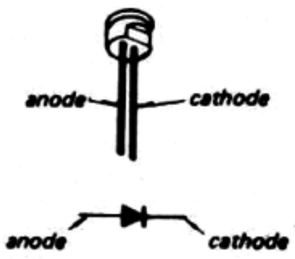
IC111: TC4050BP



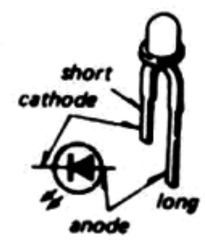
D101–104: 10E2 (SIB01-02)
D105, 106: HZ7B2L
D107–109
D111–114 } **: 1S1555**
D116
D110: RD3.9E
D115: HZ6A3L (HZ6AIL)



D201–205: SLP24B



D401–403: TLR123



D601, 602: 5GF-MS-07F

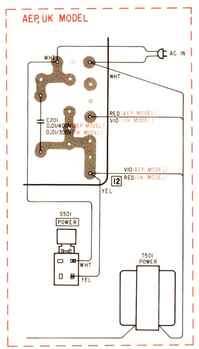
SECTION 4
DIAGRAMS

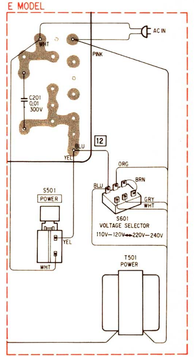
4-1. MOUNTING DIAGRAM
— Conductor Side —

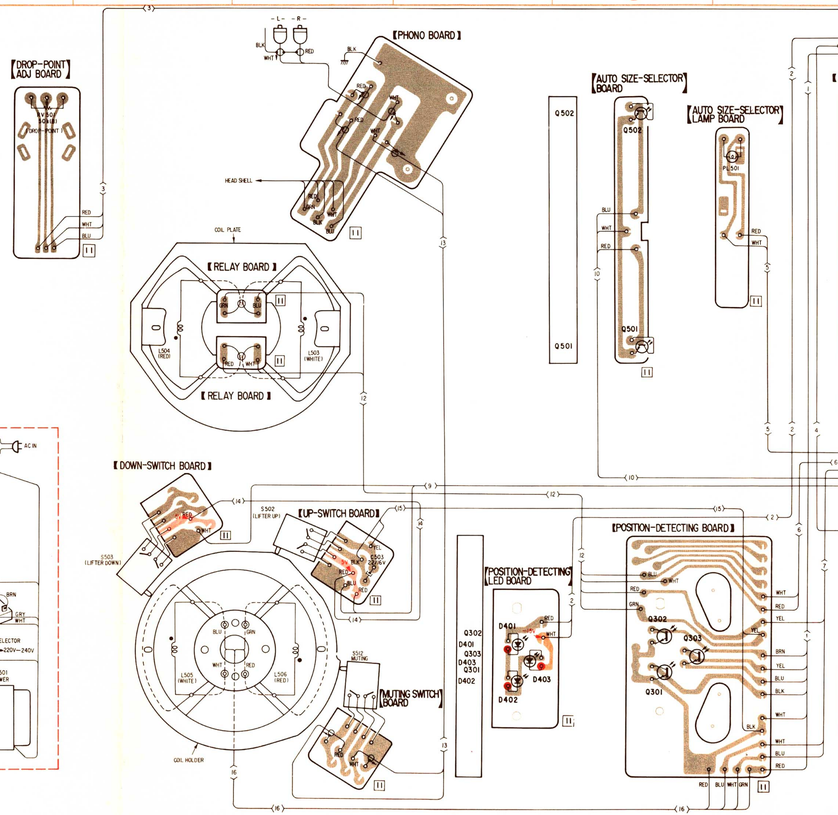
Note:

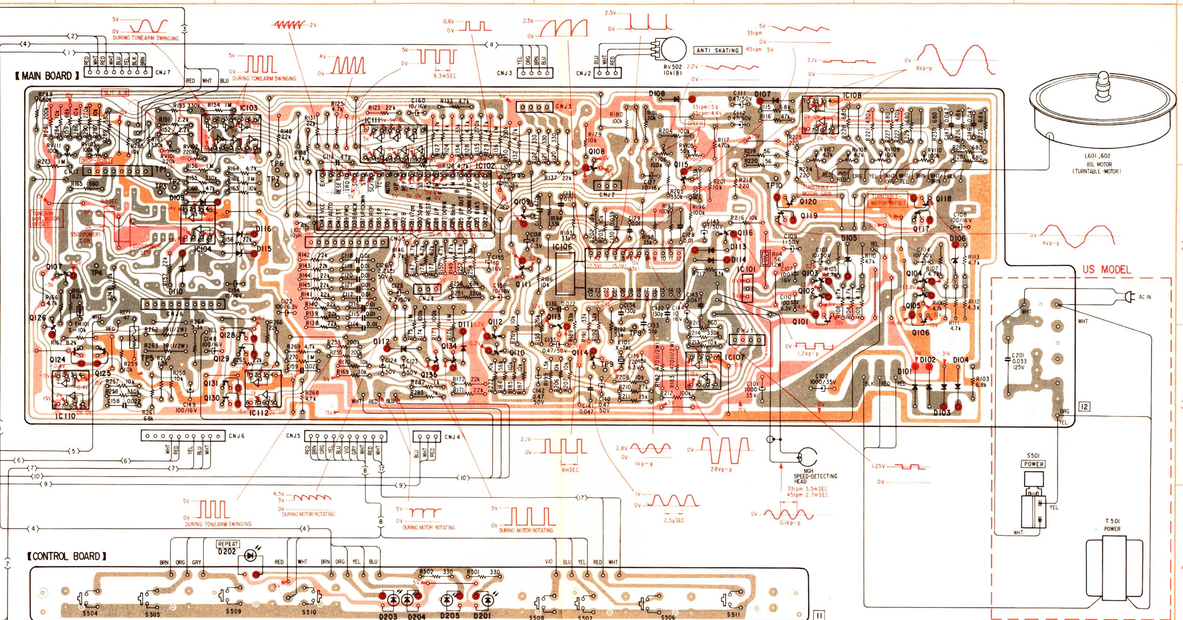
- Color code of sleeving over the end of the jacket.

- ○— : parts extracted from the component side.
- : B + pattern
- : B — pattern
- Readings are taken in stop mode with a VOM (20 kΩ/V), (2) turntable motor rotating.
- Waveforms are taken under conditions as follows.
  turntable motor rotation: stop and 33 rpm
  tonearm position: arm rest
  arm lifter position: up
  waveforms in servo amp circuit: turntable motor rotating



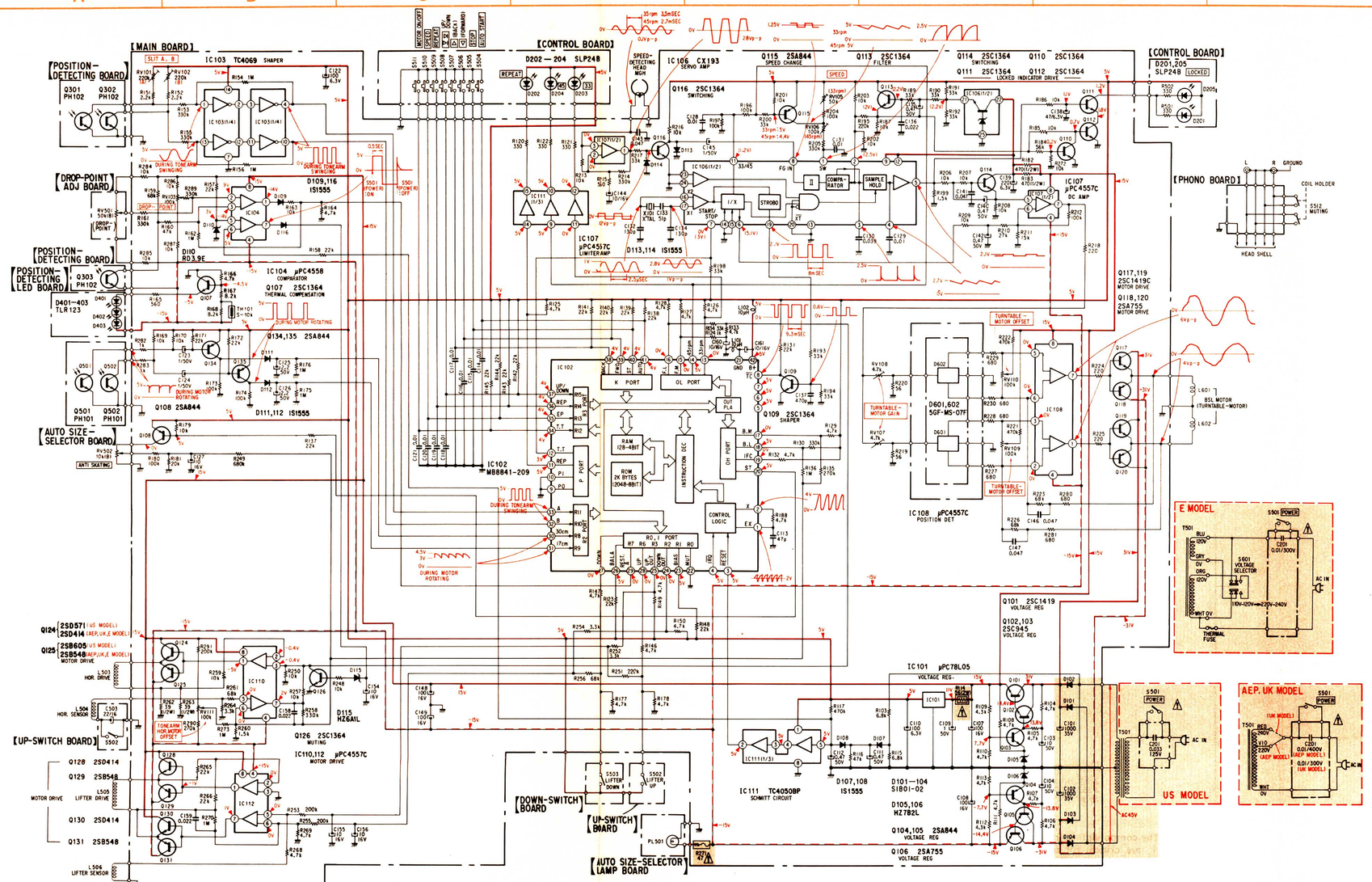






IC - Q	107	126	124	125	IC110	IC104	IC103	131	128	130	129	IC112	IC102	IC111	135, 134	112	110	109	111	113	114	IC106	115	116	IC101	120	119	IC108	103	102	101	118	117, 104	105	106
D	110	109	116	115	202	112	203	204	111	205	201	108	113	114	107	105	106	101, 102, 103, 104																		

PS-X65 PS-X65



Note:

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ——: B+ bus.
- — — —: B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken in stop mode with a VOM (20 kΩ/V). ( ): turntable motor rotating.
- Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken under conditions as follows.
  turntable motor rotation: stop and 33 rpm
  tonearm position: arm rest
  arm lifter position: up
  waveforms in servo amp circuit: turntable motor rotating
- Switch

Ref. No.	Switch	Position
S501	POWER	OFF
S502	LIFTER UP	OFF
S503	LIFTER DOWN	OFF
S504	AUTO START	OFF
S505	STOP	OFF
S506	◁ (FORWARD)	OFF
S507	▷ (BACK)	OFF
S508	▽, ▽ (UP/DOWN)	OFF
S509	REPEAT	OFF
S510	SPEED	OFF
S511	MOTOR ON/OFF	OFF
S512	MUTING	OFF

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

SECTION 5
EXPLODED VIEWS

A | B | C

(1)

Note:

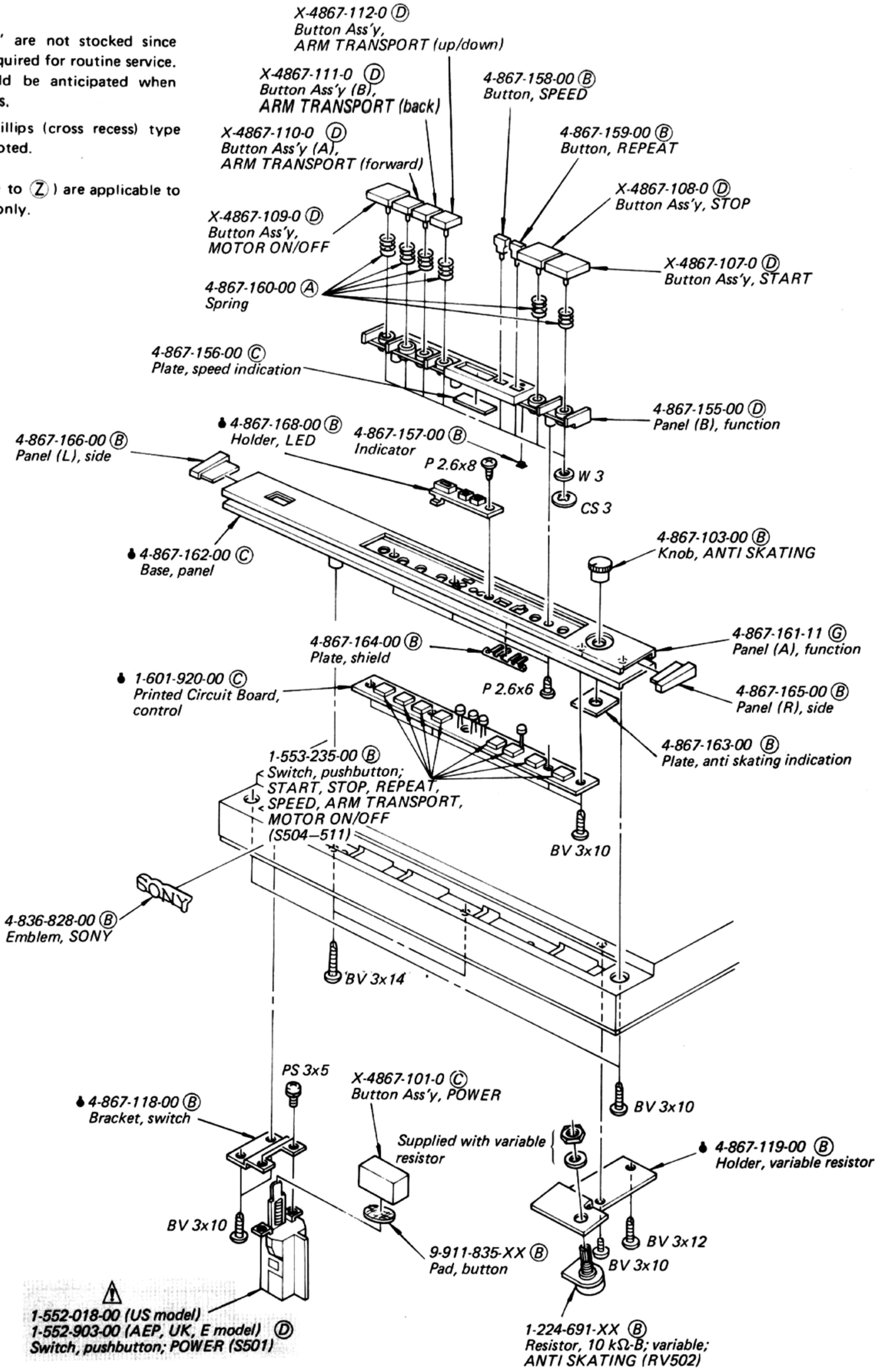
- Items marked "●" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

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

(2)

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
- 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.

(3)

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

(4)

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
- 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	8-729-316-12 Ⓓ	2SC1061
⇒Q102, 103	8-729-663-47 Ⓒ	2SC1364
⇒Q104, 105	8-729-612-77 Ⓑ	2SA1027R
⇒Q106	8-729-317-12 Ⓔ	2SA671
Q107	8-729-663-47 Ⓒ	2SC1364
⇒Q108	8-729-612-77 Ⓑ	2SA1027R
Q109–114	8-729-663-47 Ⓒ	2SC1364
⇒Q115	8-729-612-77 Ⓑ	2SA1027R
Q116	8-729-663-47 Ⓒ	2SC1364
⇒Q117	8-729-316-12 Ⓓ	2SC1061
⇒Q118	8-729-317-12 Ⓔ	2SA671
⇒Q119	8-729-316-12 Ⓓ	2SC1061
⇒Q120	8-729-317-12 Ⓔ	2SA671
⇒Q124	8-760-413-10	2SC1475 (US model)
	8-729-141-43 Ⓑ	2SD414 (AEP, UK, E model)
⇒Q125	8-729-468-43	2SA684 (US model)
	8-729-154-83 Ⓑ	2SB548 (AEP, UK, E model)
Q126	8-729-663-47 Ⓒ	2SC1364
Q128	8-729-141-43 Ⓑ	2SD414
Q129	8-729-154-83 Ⓑ	2SB548
Q130	8-729-141-43 Ⓑ	2SD414
Q131	8-729-154-83 Ⓑ	2SB548
⇒Q134, 135	8-729-612-77 Ⓑ	2SA1027R
Q301-303	8-729-101-02 Ⓒ	PH102
Q501, 502	8-729-101-01 Ⓒ	PH101
	ICs	
IC101	8-759-178-05 Ⓒ	μPC78L05
IC102	8-759-982-09 Ⓞ	MB8841-209
⇒IC103	8-759-904-69 Ⓒ	MSM4069
⇒IC104	8-759-145-57 Ⓓ	μPC4557C
IC106	8-751-930-00 Ⓚ	CX193
IC107, 108, IC110	8-759-145-57 Ⓓ	μPC4557C
IC111	8-759-240-50 Ⓔ	TC4050BP
IC112	8-759-145-57 Ⓓ	μPC4557C

Ref. No.	*Part No.*	*Description*
	Diodes	
⇒D101–104	⚠ 8-719-200-02 Ⓑ	10E2
D105, 506	8-719-910-75 Ⓑ	HZ7B2L
D107–109	8-719-815-55 Ⓑ	1S1555
D110	8-719-139-07 Ⓑ	RD3.9E
D111–114	8-719-815-55 Ⓑ	1S1555
⇒D115	8-719-910-63 Ⓑ	HZ6A3L
D116	8-719-815-55 Ⓑ	1S1555
D201–205	8-719-900-24 Ⓒ	SLP24B
D401–403	8-719-812-31 Ⓑ	TLR123
D601, 602	8-719-905-07 Ⓓ	5GF-MS-07F

CAPACITORS

All capacitors are in μF. Common capacitors are omitted.
Refer to the lists on pages 33 and 34 for their part numbers.
p: μμF.

C101, 102	⚠ 1-123-349-00 Ⓒ	1000	35 V	electrolytic
C133	1-102-491-00 Ⓐ	51 p	50 V	ceramic
C137	1-161-319-00 Ⓐ	470 p	50 V	ceramic
C201	⚠ 1-130-230-00 Ⓑ	0.01	300 V	film (UK, E model)
	⚠ 1-130-233-00	0.033	125 V	film (US model)
	⚠ 1-161-744-00 Ⓑ	0.01	400 V	ceramic (AEP model)

RESISTORS

All resistors are in ohms. Common ¼ W carbon resistors are omitted. Refer to the list on page 32 for their part numbers.

R114	⚠ 1-206-481-00 Ⓐ	56	2 W	metal-oxide (nonflammable)
R271	⚠ 1-217-395-00 Ⓑ	47	¼ W	fusible
RV101, 102	1-226-435-00 Ⓑ	220 k-B, adjustable; slit A, B		
RV103	1-226-434-00 Ⓑ	100 k-B, adjustable; drop point		
RV105	1-226-433-00 Ⓓ	50 k-B, adjustable; speed (33 rpm)		
RV106	1-226-434-00 Ⓑ	100 k-B, adjustable; speed (45 rpm)		
RV107, 108	1-226-430-00 Ⓑ	4.7 k-B, adjustable; turntable-motor gain		
RV109, 110	1-226-434-00 Ⓑ	100 k-B, adjustable; turntable-motor offset		

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

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

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

Ref. No.	*Part No.*		*Description*
RV111	1-226-434-00	Ⓑ	100 k-B, adjustable; hor. motor offset
RV501	1-224-524-00	Ⓒ	50 k-B, variable; drop-point
RV502	1-224-691-XX	Ⓑ	10 k-B, variable; ANTI SKATING
	MISCELLANEOUS		
L101, 102	1-407-157-XX	Ⓑ	Coil, 10 μH; microinductor
L503	1-454-245-00	Ⓓ	Coil, hor. drive (white)
L504	1-454-244-00	Ⓓ	Coil, hor. sensor (red)
L505	1-454-245-00	Ⓓ	Coil, lifter drive (white)
L506	1-454-244-00	Ⓓ	Coil, lifter sensor (red)
L601, 602	A-4608-144-A	Ⓟ	BSL Motor Ass'y
MGH	1-543-123-00	Ⓚ	Head, speed-detecting
PL501	1-518-305-00	Ⓑ	Lamp, 8 V 50 mA
S501	**⚠1-552-018-00**		**Switch, pushbutton; POWER (US model)**
	⚠1-552-903-00	Ⓓ	**Switch, pushbutton; POWER (AEP, UK, E model)**
S502	1-553-195-00	Ⓓ	Switch, miniature; lifter-up
S503	1-553-195-00	Ⓓ	Switch, miniature; lifter-down
S504–511	1-553-235-00	Ⓑ	Switch, pushbutton; START, STOP, REPEAT, SPEED, ARM TRANSPORT, MOTOR ON/OFF
S512	1-553-195-00	Ⓓ	Switch, miniature; muting
S601	**⚠1-552-535-00**		**Switch, voltage selector (E model)**
T501	**⚠1-446-758-00**		**Transformer, power (US model)**
	⚠1-446-759-00	Ⓛ	**Transformer, power (AEP, UK model)**
	⚠1-446-768-00		**Transformer, power (E model)**
TH101	1-800-202-XX	Ⓐ	Thermistor, S-10k
X101	1-527-380-21	Ⓓ	Crystal, OSC
	1-452-199-00	Ⓒ	Magnet
	⚠1-534-817-XX	Ⓓ	**Cord, power (AEP model)**
	⚠1-534-986-XX		**Cord, power (US model)**
	● 1-535-115-00	Ⓐ	Terminal Pin, 2 p
	● 1-535-116-00	Ⓐ	Terminal Pin, 3 p
	● 1-535-117-00	Ⓐ	Terminal Pin, 4 p
	● 1-535-122-00	Ⓐ	Terminal Pin, 9 p
	1-551-063-21	Ⓕ	Cord, phono
	⚠1-551-473-31		**Cord, power; parallel-blade plug (E2 model)**
	⚠1-551-530-00		**Cord, power; euro-plug (E1 model)**
	1-551-559-11	Ⓑ	Wire, lead; white
	1-551-559-21	Ⓑ	Wire, lead; blue
	1-551-559-31	Ⓑ	Wire, lead; red
	1-551-559-41	Ⓑ	Wire, lead; green
	⚠1-551-884-00	Ⓔ	**Cord, power (UK model)**
	● 1-560-062-00	Ⓑ	Connector Pin
	1-561-202-00	Ⓖ	Connector, neck-cylinder
	COMPLETE CIRCUIT BOARDS		
	● A-4619-141-A		Main (US model)
	● A-4619-142-A		Main (AEP model)
	● A-4619-143-A		Main (UK model)
	● A-4619-150-A		Main (E model)
	PRINTED CIRCUIT BOARDS		
	● 1-601-920-00	Ⓒ	Control
	● 1-601-921-00	Ⓐ	Up-switch
	● 1-601-922-00	Ⓐ	Down-switch
	● 1-601-923-00	Ⓐ	Muting
	● 1-601-924-00	Ⓑ	Phono
	● 1-601-925-00	Ⓐ	Relay
	● 1-601-926-00	Ⓐ	Relay
	● 1-601-927-00	Ⓑ	Position-detecting
	● 1-601-928-00	Ⓑ	Auto Size-selector Lamp
	● 1-601-929-00	Ⓑ	Auto Size-selector
	● 1-601-930-00	Ⓑ	Position-detecting LED
	● 1-601-933-00	Ⓑ	Drop-point ADJ

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

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

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

ACCESSORIES & PACKING MATERIALS

Part No.	*Description*
2-056-532-00	Ⓑ Screw (A), cartridge (US, AEP, UK model)
2-224-081-00	Ⓐ Screw (E), cartridge (US, AEP, UK model)
2-227-313-00	Ⓐ Spacer (US, AEP, UK model)
2-229-507-00	Ⓐ Washer, cartridge (US, AEP, UK model)
3-701-614-00	Ⓐ Bag, plastic; for cartridge screw (US, AEP, UK model)
3-701-616-00	Ⓐ Bag, plastic; for head shell
3-701-630-00	Ⓐ Bag, plastic; for accessories
3-701-634-00	Ⓐ Bag, plastic; for turntable
3-701-806-00	Ⓐ Adaptor, 45 rpm
3-783-064-11	Manual, instruction (AEP, UK, E model)
3-783-064-21	Manual, instruction (US model)
3-794-748-11	Instruction Card, tonearm balance adjustment (AEP, UK, E model)
3-794-748-21	Instruction Card, tonearm balance adjustment
3-794-750-11	Ⓑ Instruction Card, turntable-mat placing

Part No.	*Description*
4-815-655-01	Ⓐ Nut (A), cartridge (US, AEP, UK model)
4-858-407-00	Ⓑ Adjuster, drop-point
4-858-588-00	Ⓐ Bag, protection
4-858-589-00	Ⓐ Protector
4-867-194-00	Ⓓ Cushion, right
4-867-195-00	Ⓓ Cushion, left
4-867-196-00	Ⓒ Carton, for accessories
4-867-197-00	Ⓑ Case, accessories
4-867-301-00	Ⓓ Sub-weight
4-867-324-00	Ⓗ Carton, for set

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		

ELECTROLYTIC CAPACITORS

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

CAP. (μF)	RATING → : Use the high voltage rated one.					
	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 Ⓐ

CAP. (pF)	RATING 50 VOLT. PART No.	CAP. (pF)	50 VOLT. PART No.	CAP. (pF)	50 VOLT. PART No.	CAP. (μF)	50 VOLT. 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 Ⓐ

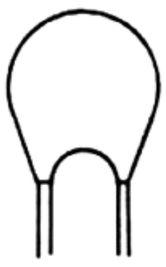
CAP. (μF)	RATING → : Use the high voltage rated one. 25 VOLT. PART No.	50 VOLT. PART No.	CAP. (μF)	25 VOLT. PART No.	50 VOLT. PART No.
0.001	→	1-161-039-00	0.018	1-161-016-00	1-161-054-00
0.0012	→	1-161-040-00	0.022	1-161-017-00	1-161-055-00
0.0015		1-161-041-00	0.027	1-161-018-00	1-161-056-00
0.0018		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.

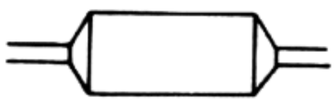
CAP. (μF)	RATING 50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.
0.001	1-108-227-00	1-108-365-00	1-108-409-00	0.01	1-108-239-00	1-108-377-00	1-108-421-00	0.1	1-108-251-00	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



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 Ⓓ					

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