



Deze download wordt u gratis aangeboden door Pick-upnaalden.nl

Web : www.pickupnaalden.com
Email : info@pick-upnaalden.nl
Facebook : www.facebook.com/pickupnaalden
Twitter : twitter.com/Pickupnaalden
Google+ : https://plus.google.com/+FCaris_pickupnaalden

Service Manual

FG SERVO Automatic
Turntable System



Automatic Turntable System

SL-BD22D

Colour

(K) ···· Black Type



Area

Suffix for Model No.	Area	Colour
(E)	Europe.	(K)
(EB)	Geart Britain.	
(EG)	Germany and Italy.	



is the standard mark for plug-in-connector system. Products carrying this mark are interchangeable and compatible with each other.

SPECIFICATIONS

■ TURNTABLE SECTION

Type:	Automatic turntable
Features:	Auto-return Auto-stop
Drive method:	Belt drive
Motor:	DC motor
Drive control method:	FG servo control
Turntable platter:	Aluminum die-cast Diameter 312mm
Turntable speeds:	33-1/3 r/min and 45 r/min
Wow and flutter:	0.045% WRMS (JIS C5521) ±0.06% Weight zero to peak (IEC 98A weighted)
Rumble:	-70 dB DIN-B (IEC 98A weighted)

■ TONEARM SECTION

Type:	Static-balanced straight tonearm Plug-in-connector cartridge system
Overhang:	15 mm
Effective length:	230 mm
Tracking error angle:	Within 2°32' at outer groove of 30 cm disc Within 0°32' at inner groove of 30 cm disc
Applicable cartridge weight:	6 g

■ CARTRIDGE SECTION

Type:	Moving magnet stereo cartridge
Frequency response:	20 Hz ~ 20 kHz

Output voltage:	2.5 mV at 1 kHz, 5 cm/s. zero to peak lateral velocity
Channel separation:	22 dB at 1 kHz
Channel balance:	Within 2 dB at 1 kHz
Recommended load impedance:	47 kΩ ~ 100 kΩ
Compliance (dynamic):	8×10^{-6} cm/dyne at 100 Hz
Stylus pressure range:	1.25±0.25g
Weight:	6 g (cartridge only)
Replacement stylus:	EPS-34CS

■ GENERAL

Power supply:	For (EB) area: AC 230V ~ 240V, 50/60 Hz For (E, EG) area: AC 230V, 50/60 Hz
Power consumption:	3 W
Dimensions: (W×H×D)	430×93×375 mm Maximum height when dust cover is open: 430×360×410 mm
Weight:	3.6 kg (7.9 lb.)

Specifications are subject to change without notice.
Weight and dimensions are approximate.

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Technics®

■ CONTENTS

	Page
SAFETY PRECAUTION	2
LOCATION OF CONTROLS	3
DISASSEMBLY INSTRUCTIONS	4 ~ 6
MEASUREMENTS AND ADJUSTMENTS	7
TROUBLESHOOTING	8, 9
SCHEMATIC DIAGRAM	10

	Page
BLOCK DIAGRAM	11
CIRCUIT BOARD AND WIRING	
CONNECTION DIAGRAM	11
EXPLODED VIEW	12, 13
REPLACEMENT PARTS LIST	13 ~ 15
PACKING	16

■ SAFETY PRECAUTION

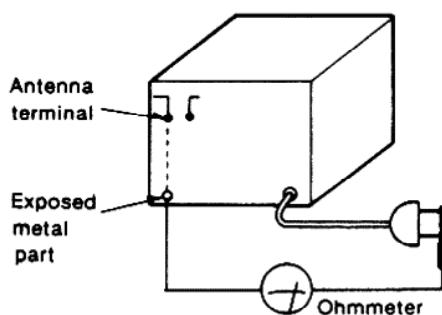
(This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

● INSULATION RESISTANCE TEST

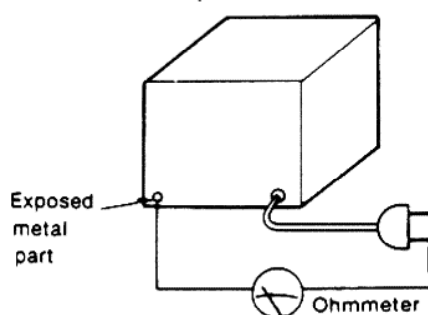
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads, antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between $3M\Omega$ and $5.2M\Omega$ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = $3M\Omega - 5.2M\Omega$



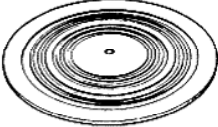
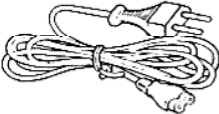
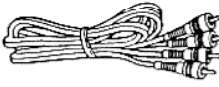
(Fig. B)

Resistance = Approx ∞

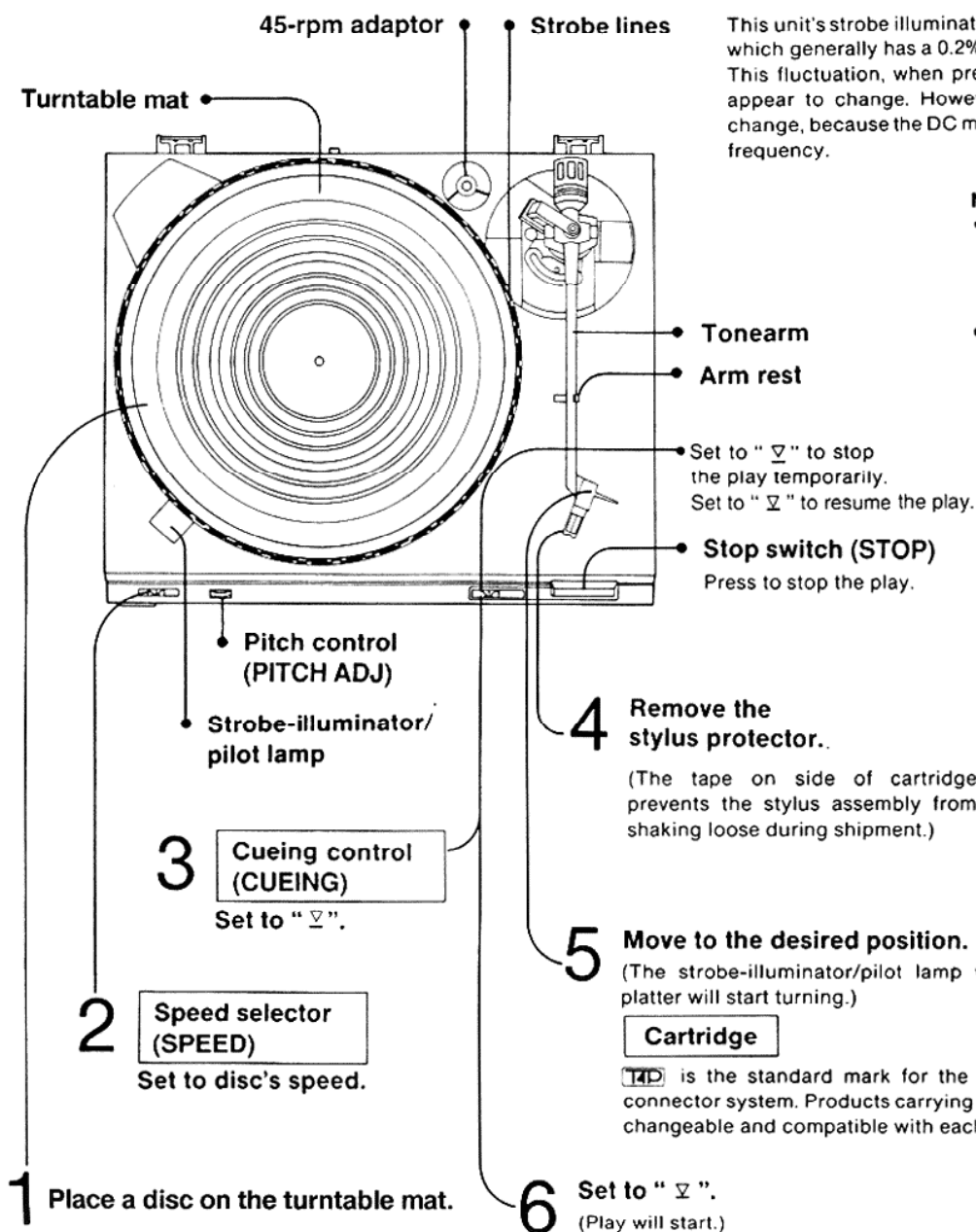
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ ACCESSORIES

Note: Configuration of AC power supply cord differs according to area.

Turntable mat (1) (SFTGB93M02EM)	AC power supply cord (1) (RJA0019-2K)...(E, EG) (RJA0733)(EB)	Stereo connection cable (1) (SFDHBD2N01)	Ground wire (1) (SJPB7M)	45-rpm adaptor (1) (SFWE212-01)
				

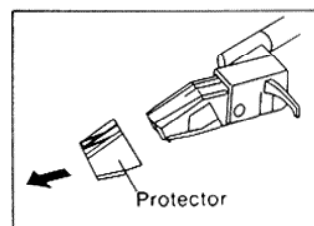
■ LOCATION OF CONTROLS



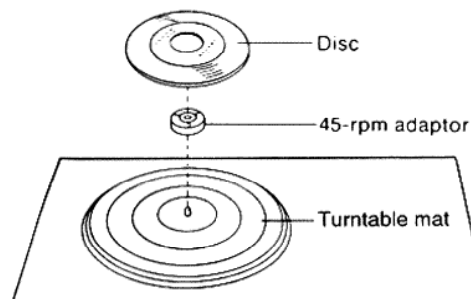
This unit's strobe illuminator operates at the AC line frequency which generally has a 0.2% fluctuation. This fluctuation, when present, may make the strobe pattern appear to change. However, actual platter speed does not change, because the DC motor is not affected by AC power line frequency.

Notes:

- Do not try to clean the dust cover while a disc is playing, because static electricity might cause the tonearm to rise.
- The unit is in the standby condition when the AC power supply cord is connected. The primary circuit is always "live" as long as the power cord is connected to an electrical outlet.



■ For a 17-cm (7") (large center hole) disc

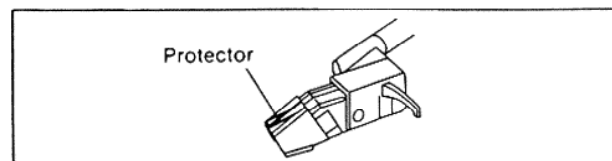


■ When play ends

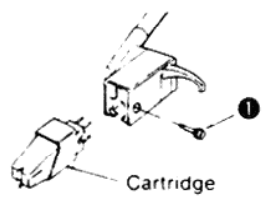
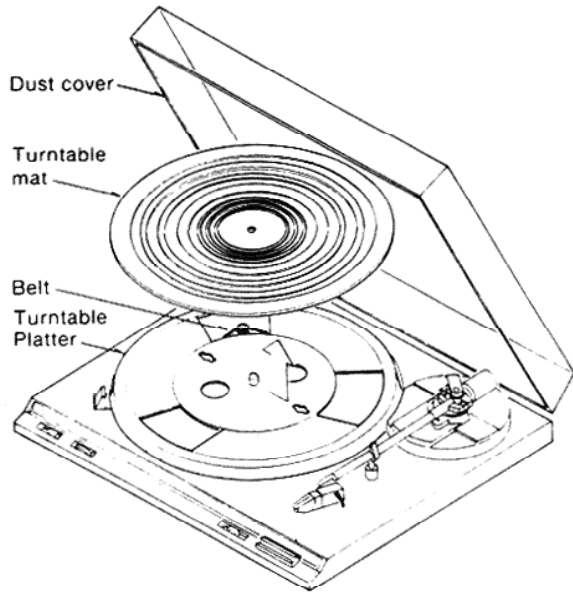
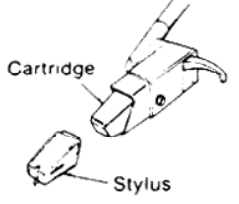
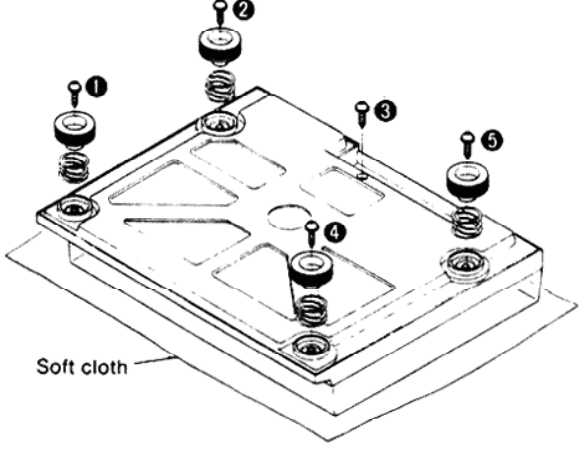
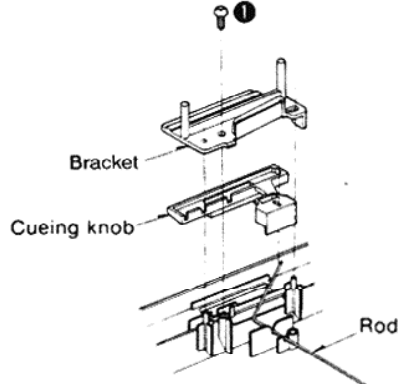
1. The tonearm will automatically return to the arm rest (the automatic return feature).
2. Rotation will stop.

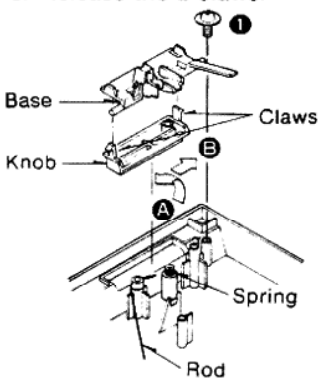
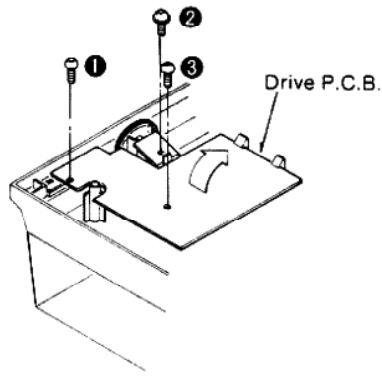
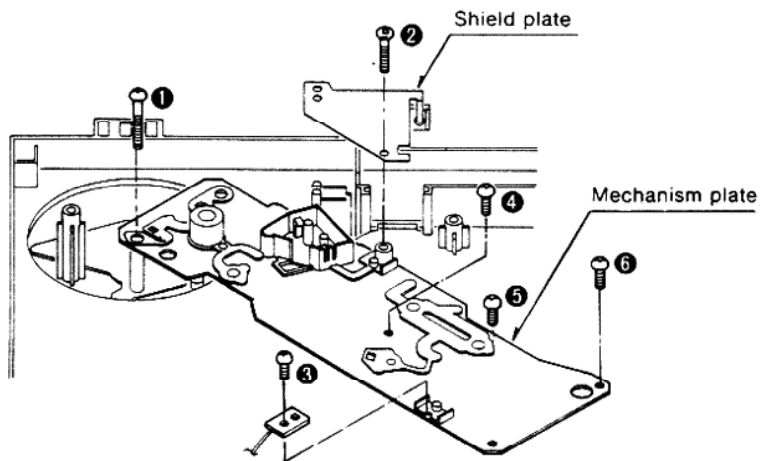
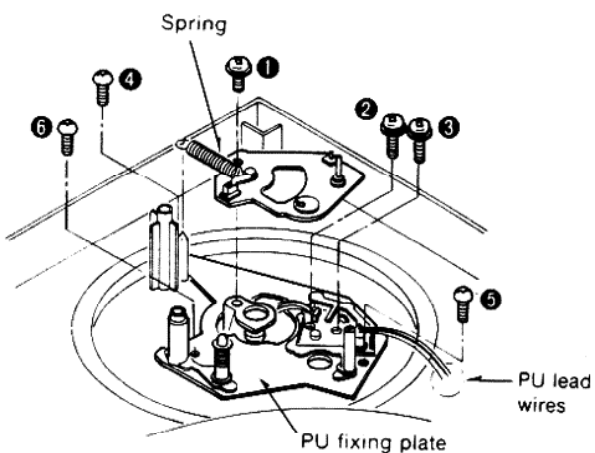
After use

Attach the stylus protector.



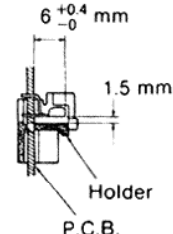
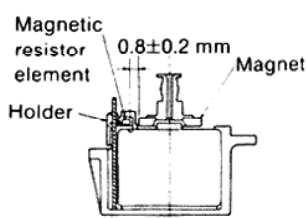
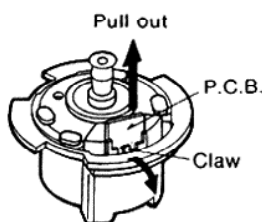
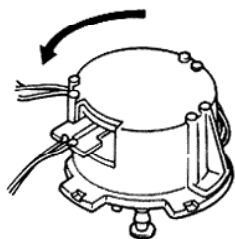
■ DISASSEMBLY INSTRUCTIONS

Ref. No 1	How to remove the cartridge	Ref. No 3	How to remove the turntable platter
Procedure 1	1. Remove the setscrew ❶. 2. Pull out the cartridge, taking care that your hand does not touch the stylus tip.	Procedure 3	1. Open the dust cover and remove the turntable mat. 2. Remove the belt. 3. Lift up the turntable platter.
 Cartridge		 Dust cover Turntable mat Belt Turntable Platter	
Ref. No 2	How to remove the stylus		
Procedure 2	• Pull out the stylus, taking care not to touch the stylus tip.		
 Cartridge Stylus			
Ref. No 4	How to remove the bottom board	Ref. No 5	How to remove the cueing knob
Procedure 3 ▶ 4	1. Turn over the unit on a soft cloth. 2. Remove the 5 setscrews (❶ ~ ❺).	Procedure 3 ▶ 4 ▶ 5	• Remove the setscrew ❶.
 Soft cloth		 Bracket Cueing knob Rod	

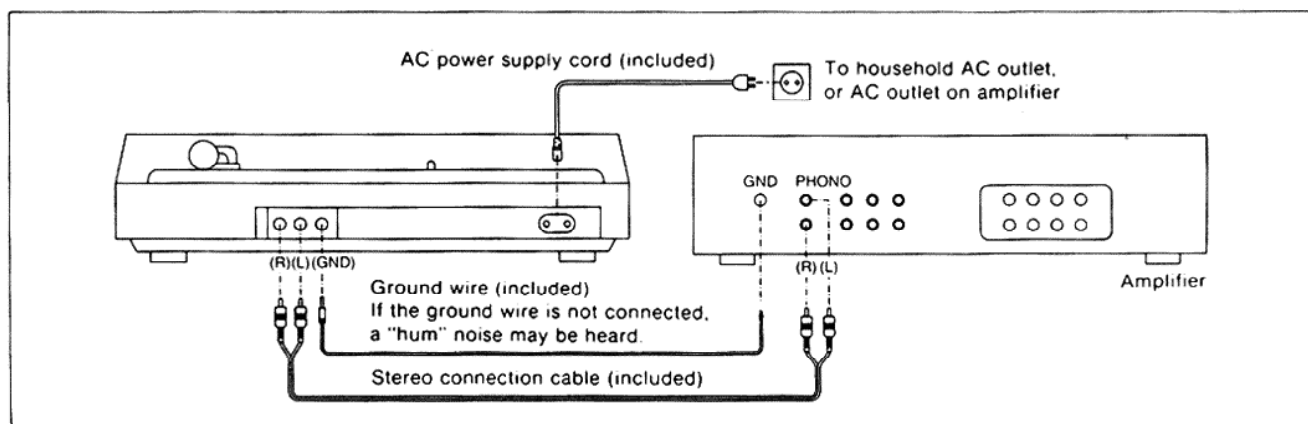
Ref. No 6	How to remove the stop switch knob	Ref. No 7	How to remove the drive P.C.B.
Procedure 3 ▶ 4 ▶ 6	1. Remove the setscrew ❶. 2. Remove the base (with knob) in the direction of the arrows (A, B). 3. Release the 2 claws.  Note: When attaching the stop knob, do not forget to attach the spring.	Procedure 3 ▶ 4 ▶ 7	1. Remove the 3 setscrews (❶ ~ ❸). 2. Remove the drive P.C.B. in the direction of the arrow. 
Ref. No 8	How to remove the mechanism plate		
Procedure 3 ▶ 4 ▶ 8	1. Remove the 6 setscrews (❶ ~ ❷). 2. Lift up the mechanism plate. 		
Ref. No 9	How to remove the tonearm and PU fixing plate		
Procedure 3 ▶ 4 ▶ 8 ▶ 9	1. Unsolder the 5 PU lead wires from the phono terminal. 2. Remove the setscrew ❶ and spring. 3. To remove the tonearm, remove the 2 setscrews (❷, ❸). 4. To remove the PU fixing plate, remove the 3 setscrews (❹, ❺, ❻). • PU lead wiring method WhiteL channel (+) terminal BlueL channel (-) terminal RedR channel (+) terminal GreenR channel (-) terminal BlackGround terminal 		

Ref. No 10	How to remove the cueing cam	Note: If the cueing time of the tonearm becomes too short, or if the cueing cam is replaced, apply silicon oil (Part No. SZZ0L11) according to the following procedure. 1. Remove the cueing cam. 2. Apply silicon oil to the cueing cam and oil tank.
Procedure 3 ▶ 4 ▶ 8 ▶ 10	1. Push the pin with a driver. 2. Remove the pin and spring. 3. Remove the cueing cam.	
Ref. No 11	How to remove the magnetic resistor element	Note: If the magnetic resistor element has been replaced, observe the following mounting precaution. •The magnetic resistor element is supplied with the center lead bent. Be sure the seat the bent lead flush to the P.C.B. •This will ensure the proper clearance (0.8 ± 0.2 mm) between the magnet and the magnetic resistor element as shown below.
Procedure 3 ▶ 4 ▶ 11	1. Unsolder the 3 lead wires from the magnetic resistor P.C.B. 2. Release the claw and pull out the P.C.B. 3. Unsolder the 3 terminals of the magnetic resistor element.	

•Remove the motor assembly in the direction of the arrow.



■ CONNECTIONS



■ MEASUREMENTS AND ADJUSTMENTS

ARM-LIFT HEIGHT ADJUSTMENT

The arm-lift height (distance between the stylus tip and the record surface when the cueing control is at the "∞" position) has been adjusted at the factory to approximately 5 to 7 mm ($3/16"$ — $9/32"$).

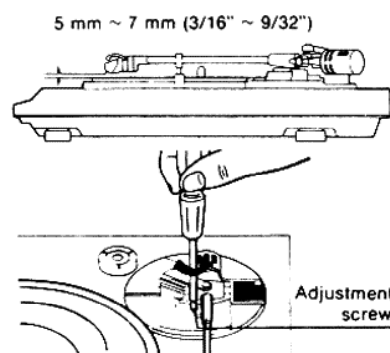
If the clearance is too narrow or too wide, turn the adjustment screw clockwise or counterclockwise.

Clockwise rotation

—distance between the record and stylus tip is decreased.

Counterclockwise rotation

—distance between the record and stylus tip is increased.



AUTOMATIC RETURN ADJUSTMENT

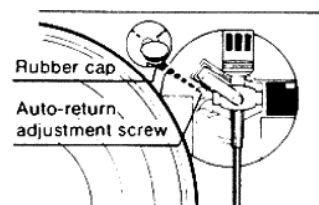
1. Clamp the tonearm to the arm rest.
2. Remove the rubber cap.
3. Turn the screw with a screwdriver, clockwise or counterclockwise as necessary.

If the tonearm tends to return to the arm rest before the play has finished,

—turn **counterclockwise**.

If the tonearm fails to return after the final groove,

—turn **clockwise**.

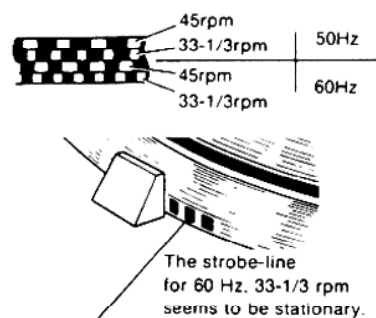


SPEED ADJUSTMENT (PITCH CONTROL)

There are strobe-lines cut on this turntable platter to indicate correct rotational speed.

If the strobe-line appears to be moving as the turntable rotates, adjust while playing a record.

1. Set the speed selector to the speed to be adjusted.
2. Push the power switch. The strobe-illuminator/pilot lamp will light up and the platter will rotate.
3. Watch the dot pattern on the side of the platter. Turn the pitch control one way or the other until the dots appear to stand still. This is the correct speed.
4. Turning the pitch control in the "+" direction increases the speed.
5. Turning the pitch control in the "-" direction decreases the speed.

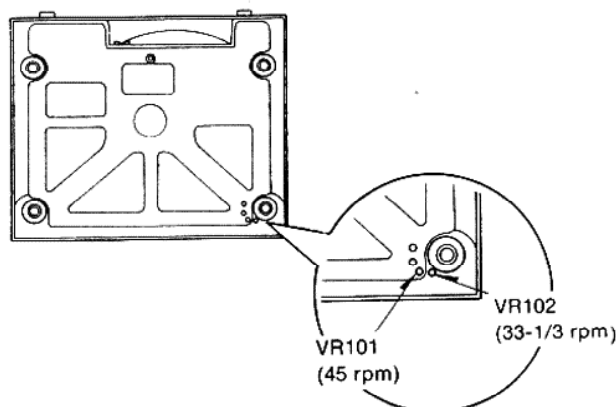


ROTATING SPEED

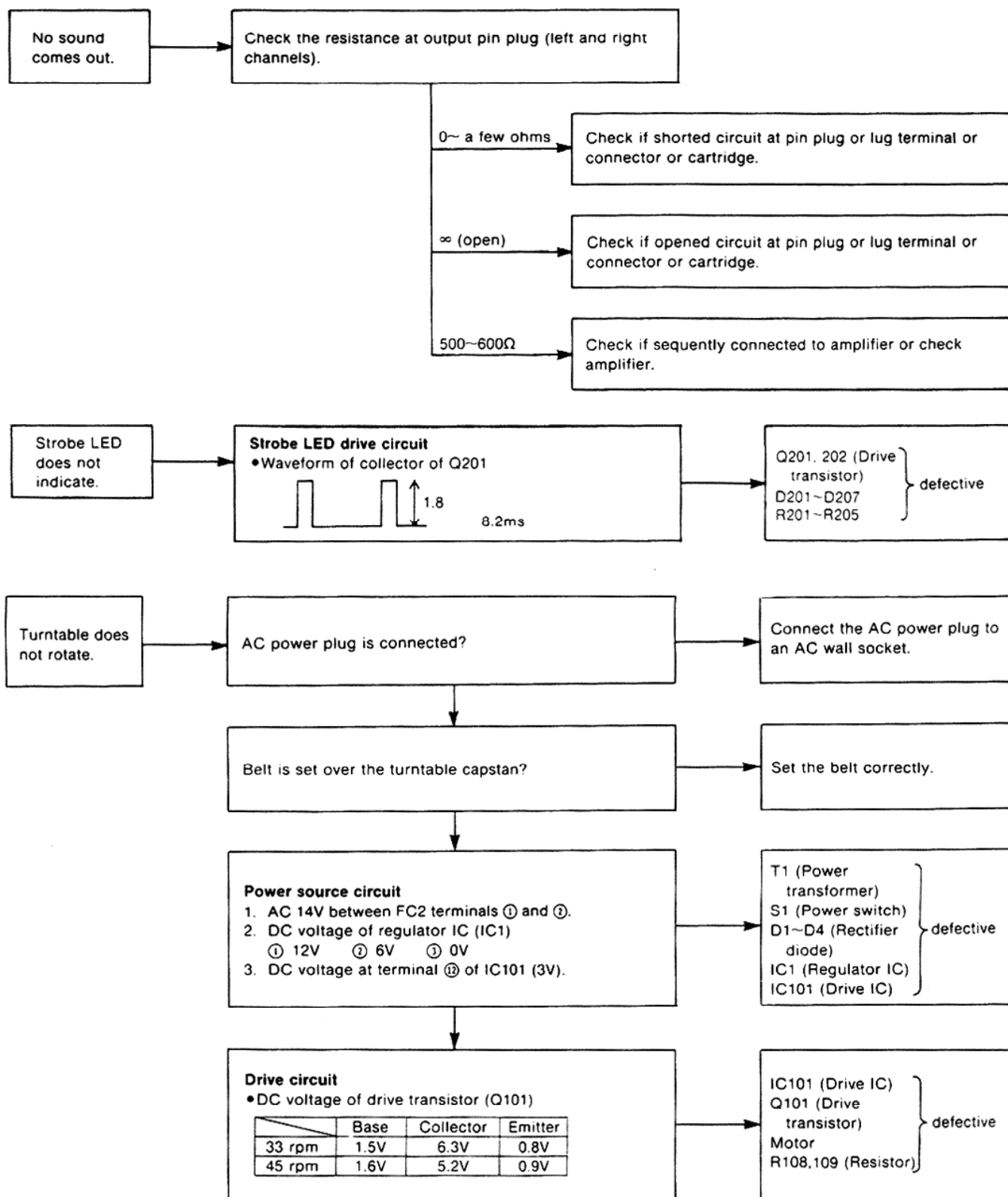
When the turntable drive/control IC (IC101) or the variable resistors (VR101, 102) are changed, or if the rated rotation is not reached even when the pitch control knob is turned, adjust the rotating speed in the following procedure.

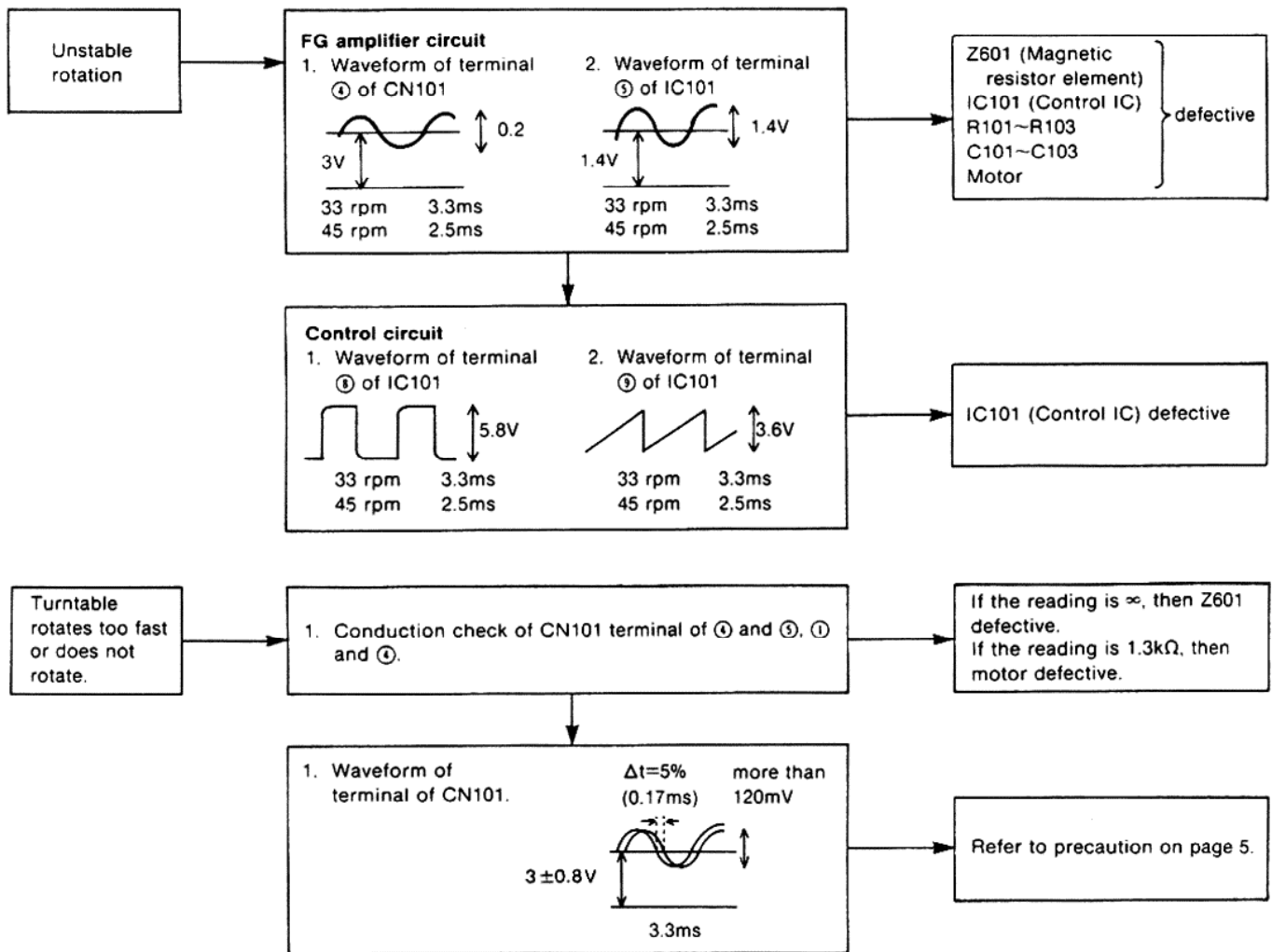
1. Set the speed selector switch to the "45" position.
2. Turn VR101 with a screwdriver from the bottom of the set to the rated rotation (45 rpm) and check the rotation with a strobe while adjusting the speed.
3. Set the speed selector switch to the "33" position.
4. Turn VR102 with a screwdriver from the bottom of the set to the rated rotation (33-1/3 rpm) and check the rotation with a strobe while adjusting the speed.

Note: Be sure to make the adjustment for 45 rpm first.



■ TROUBLESHOOTING





• **Terminal guide of IC's, transistors and diodes**

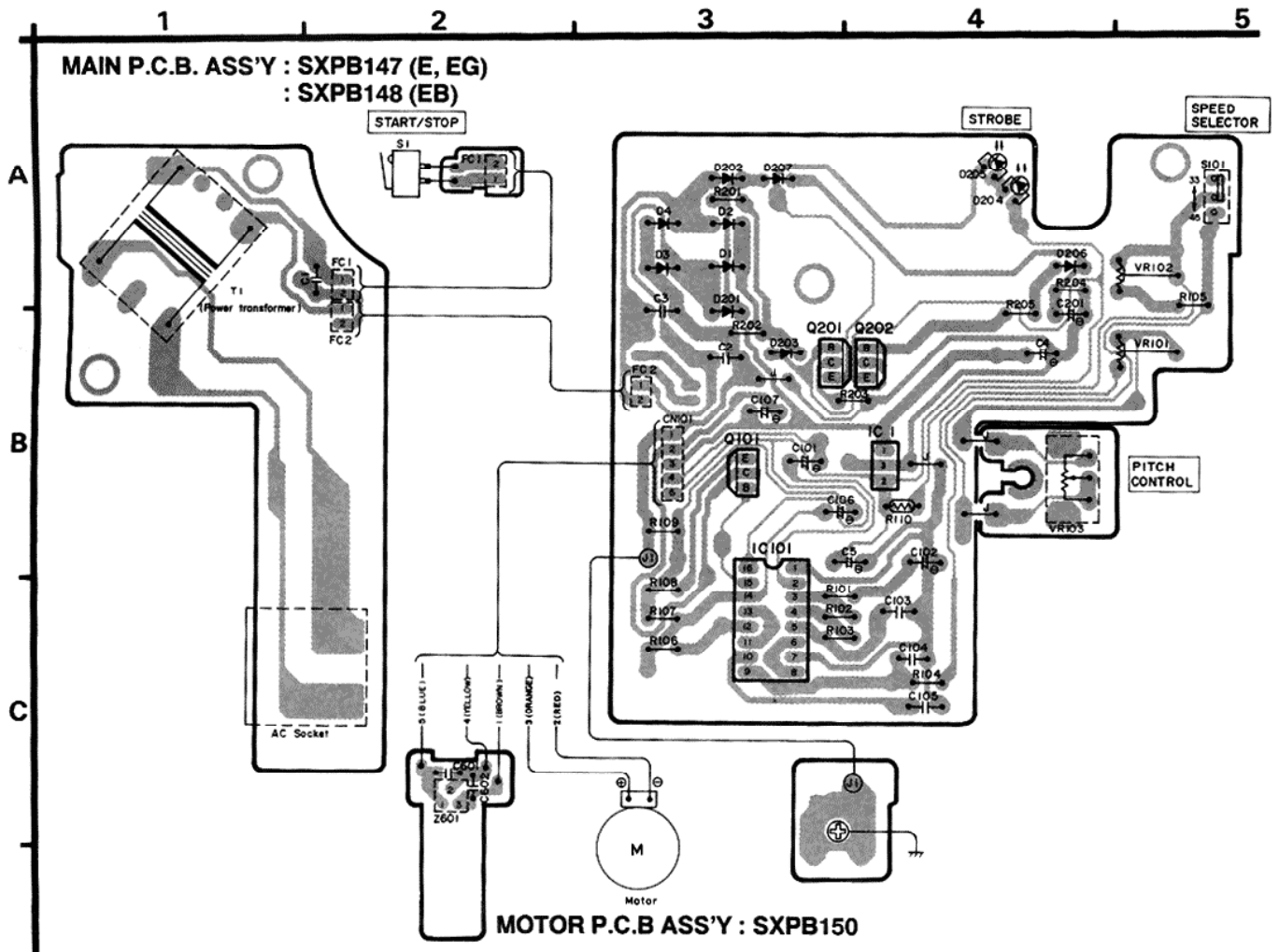
SVIBA6301 	AN78L06 	SVDBR5505SA SVDBR5505SB
2SD1423 2SA1309 	SVD1SR35200V SVD1SS254 	2SC1383

Caution!

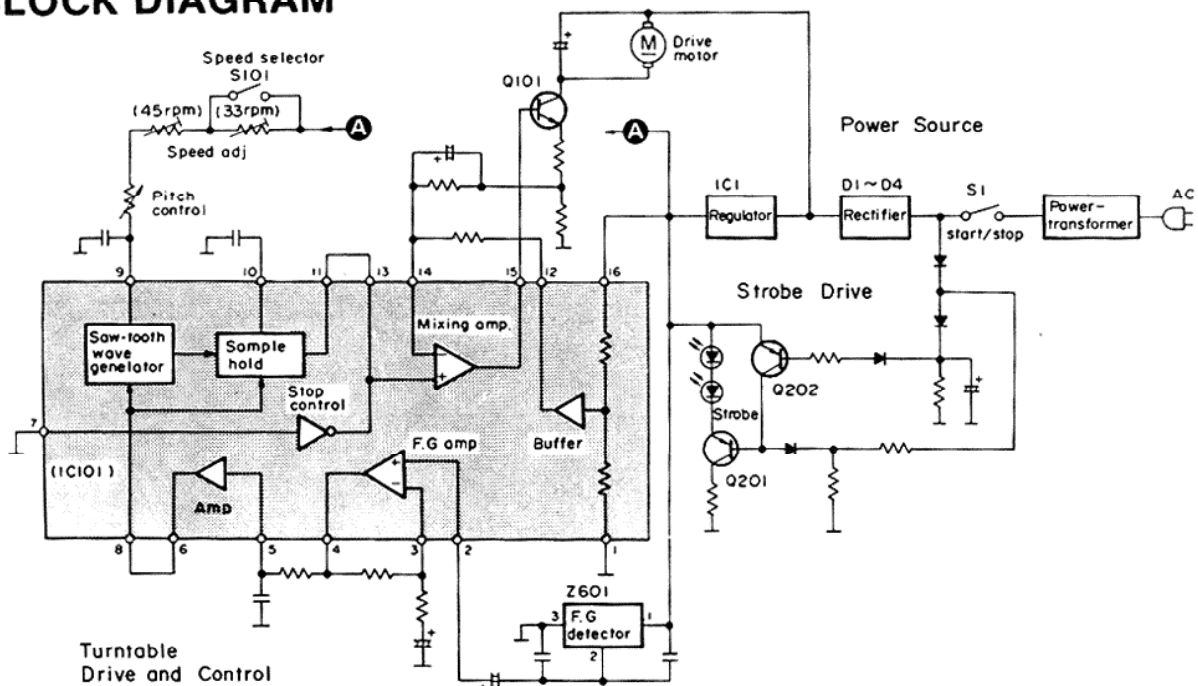
IC and LSI are sensitive to static electricity.
 Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

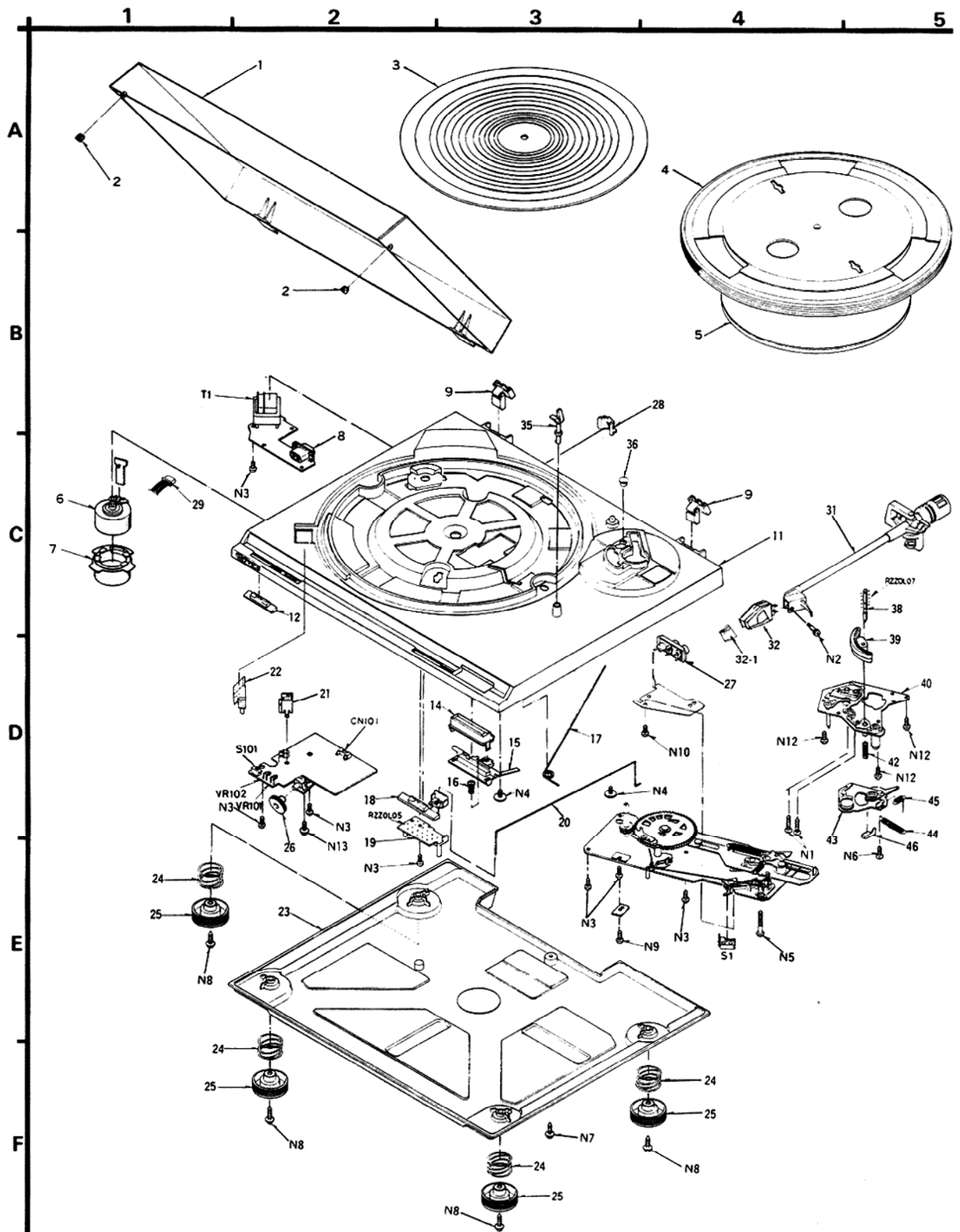
CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



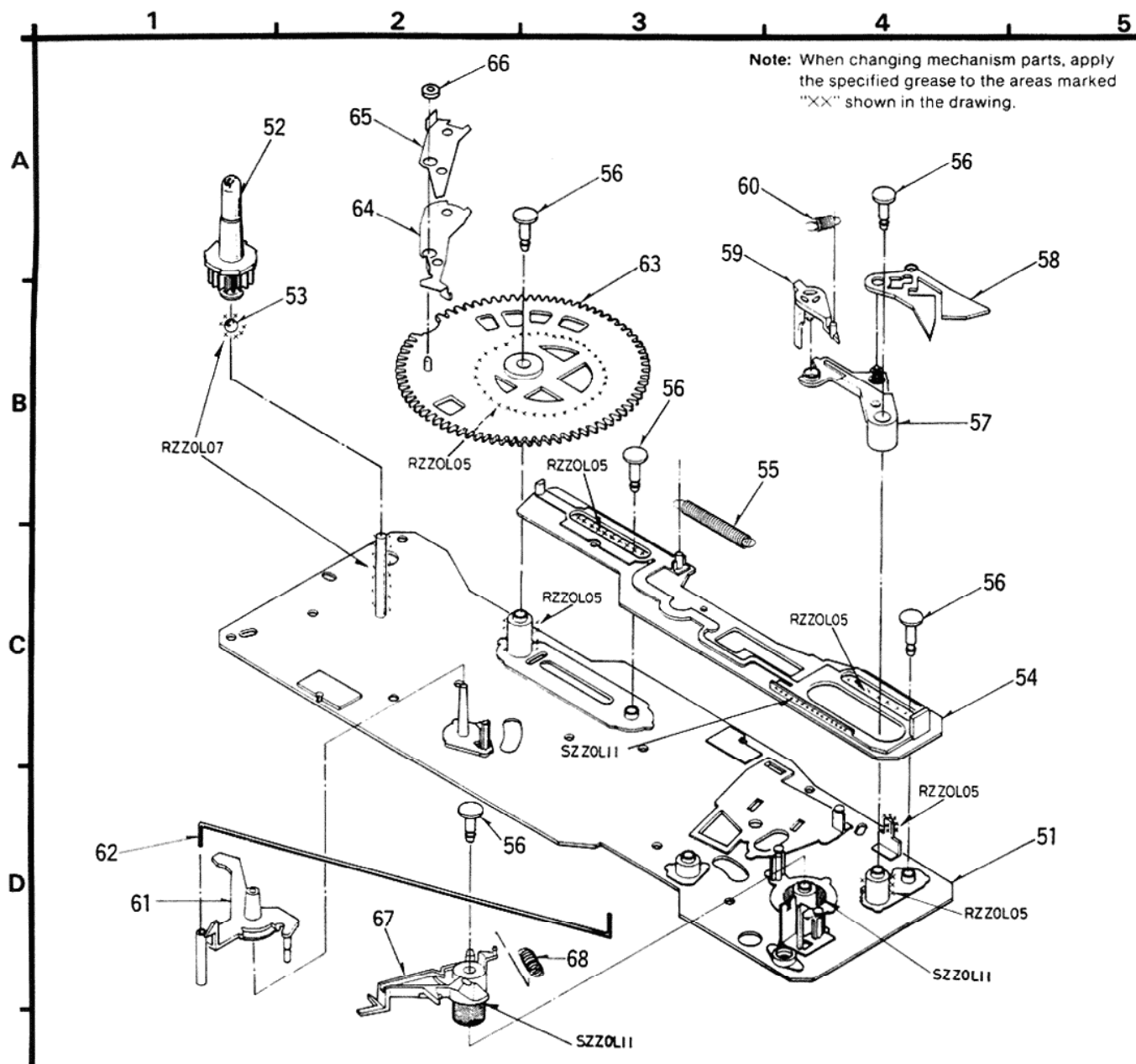
BLOCK DIAGRAM



EXPLODED VIEW



• Mechanism parts



REPRACEMEN PARTS LIST

Notes: *Important safety notice:

Components identified by Δ mark have special characteristics important for safety.

Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.

When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.

* The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)

Parts without these indications can be used for all areas.

* The "(SF)" mark denotes the standard part.

* <VRD>: indicates parts that are supplied by Video Recorder Division.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)				TRANSISTOR(S)	
IC1	AN78L06	IC, REGULATOR		Q101	2SC1383-QRS	TRANSISTOR	(E, EG)
IC101	SV1BA6301	IC, FG SERVO		Q101	2SD1423QRS	TRANSISTOR	(EB)
				Q201, 202	2SA1309A-R	TRANSISTOR	

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		DIODE(S)				MAGNET RESISTOR ELEMENT(S)	
D1-4	SVD1SR35200A	DIODE		Z601	EZM-BL01	F. G DETECTOR	
D201, 202	SVD1SR35200A	DIODE	△			TRANSFORMER(S)	
D203	ISS254TA	DIODE					
D204	SVDBR5505SA	DIODE		T1	RTP114E001	POWER TRANSFORMER	△ (E, EG)
D205	SVDBR5505SB	DIODE		T1	SLT35KE61E	POWER TRANSFORMER	△ (EB)
D206, 207	ISS254TA	DIODE				SWITCH(ES)	
		VARIABLE RESISTOR(S)					
VR101, 102	EVN61AA00B24	VR, SPEED ADJUSTMENT		S1	SFSDS72R01	SW, POWER	△
VR103	EVJE1AF20B14	VR, PITCH CONTROL		S101	SFDSHSW0834	SW, SPEED SELECTOR	
		THERMISTOR(S)				CONNECTOR(S)	
R110	ERTD2ZFK251S	THERMISTOR		CN101	EMCS0551ML	CONNECTOR (5P)	

Notes : • Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
• Resistance values are in ohms, unless specified otherwise, 1 K=1,000 (OHM), 1 M=1,000k (OHM)

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS	R201	ERDS2TJ472	1/4W 4.7K	C4	ECEA1EU331E	25V 330U
			R202	ERDS2TJ332	1/4W 3.3K	C5	ECEA0JU470BV	6.3V 47U
			R203	ERDS2TJ330	1/4W 33	C101	ECQG1H104KZT	50V 0.1U
R101	ERDS2TJ152	1/4W 1.5K	R204	ERDS2TJ332	1/4W 3.3K (E, EG)	C102	ECEA1HU010BV	50V 1U
R102	ERDS2TJ683	1/4W 68K	R204	ERDS2TJ562	1/4W 5.6K (EB)	C103	ECQG1H223KZT	50V 0.022U
R103	ERDS2TJ682T	1/4W 6.8K	R205	ERDS2TJ102	1/4W 1K	C104	ECQP2A823JZW	200V 0.082U
R104	ERDS2TJ223	1/4W 22K			CAPACITORS	C105	ECQG1H103KZT	50V 0.01U
R105	ERDS2TJ272T	1/4W 2.7K				C106	ECEA1HUR33BV	50V 0.33U
R106	ERDS2TJ682T	1/4W 6.8K				C107	ECEA1HKA2R2B	50V 2.2U
R107	ERDS2TJ104	1/4W 100K	C1	ECQG1223KZ	100V 0.022U △	C201	ECEA1HU010BV	50V 1U
R108, 109	ERDS2TJ220T	1/4W 22	C2, 3	ECKT1H223ZF	50V 0.022U	C601, 602	ECUX1H102MBM	50V 0.001U

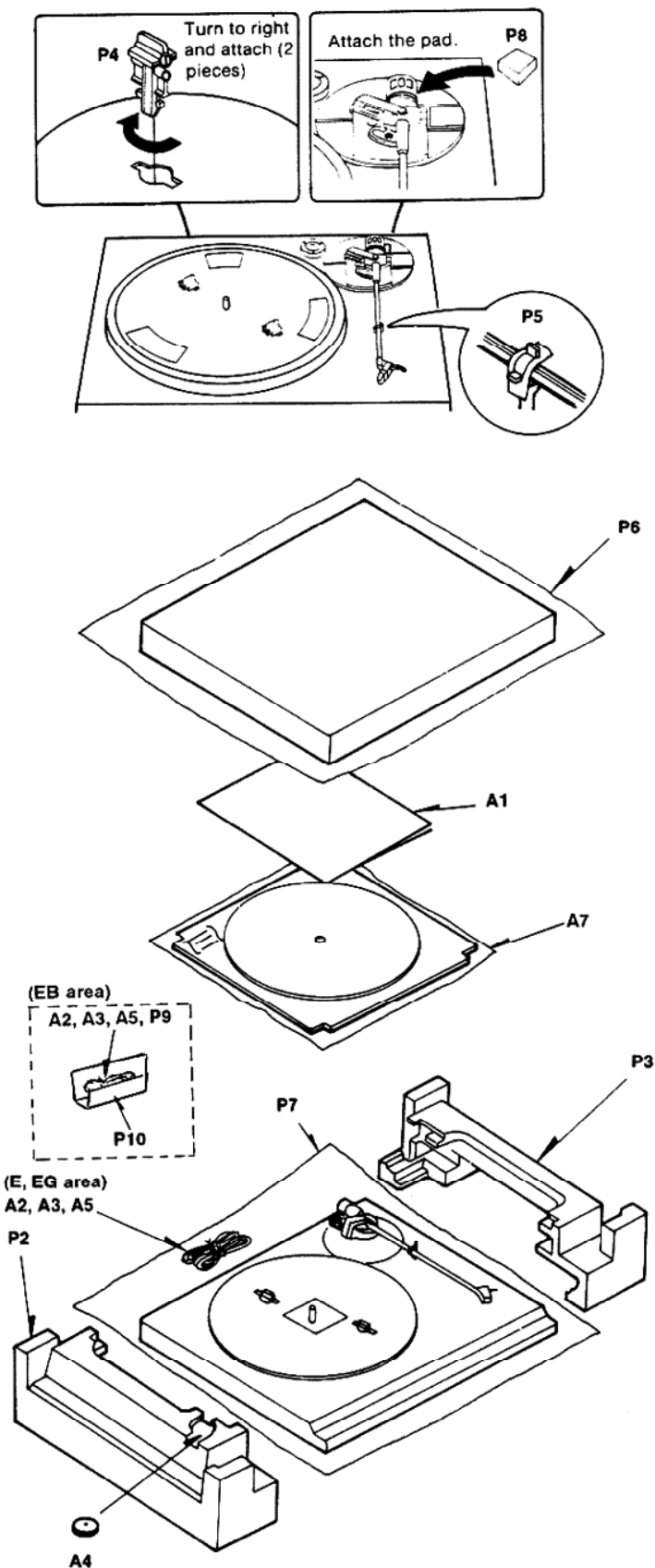
Notes: *Important safety notice:

Components identified by △ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*The "[SF]" mark denotes the standard part.
*<VRD>: indicates parts that are supplied by Video Recorder Division.

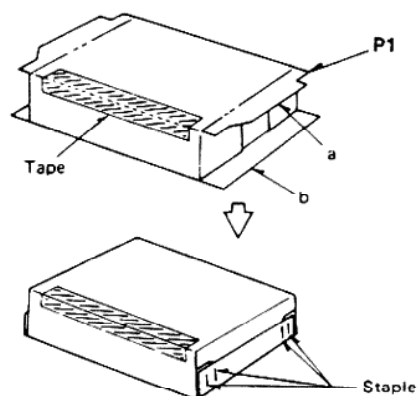
Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS		7	SHGB7	RUBBER CUSHION, MOTOR	
				8	SFDJHSC0515	AC SOCKET	△
				9	SBHB7	HINGE	
1	SFADZ15R01E	DUST COVER		11	RFKKBD22DE-K	CABINET ASS'Y	(E)
2	SHGB26	RUBBER CUSHION, DUST COVER		11	RFKKBD22DEBK	CABINET ASS'Y	(EB)
3	SFTGB93M02EM	TURNABLE MAT		11	RFKKBD22DEGK	CABINET ASS'Y	(EG)
4	SFTEBD2N01	TURNABLE		12	SBCB70-0C	KNOB, SPEED SELECTOR	
5	SJY90080-3	BELT		14	SBCB30-0C	KNOB, STOP	
6	SDMB5E	MOTOR ASS'Y		15	SFLMBD2N01-1	BASE, STOP KNOB	

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
16	SFQHZ15R01	SPRING		N4	SFXGQ06N01	SCREW	
17	SFUZZ15R01	ROD, STOP KNOB		N5	XTB3+30J	SCREW	
18	SBCB61-0C	KNOB, CUEING		N6	XYC3+CG10	SCREW	
19	SKMB140	BRACKET, CUEING KNOB		N7	XTW3+14Q	SCREW	
20	STZB4	ROD, CUEING KNOB		N8	SNSB4-1	SCREW	
21	SFUMB02N06	HOLDER, LED		N9	XYE3+EJ8	SCREW	
22	SFUMB02N07	STROBE		N10	XTB3+16J	SCREW	
23	RFKJBD20DE-K	BOTTOM COVER ASS'Y	(E)	N12	XTB3+8G	SCREW	
23	RFKJBD20DEBK	BOTTOM COVER ASS'Y	(EB, EG)	N13	XTW3+10Q	SCREW	
24	SUSB38	SPRING, INSULATOR					
25	SKLB3	INSULATOR				PACKING MATERIALS	
26	SBCB80-0C	KNOB, SPEED ADJUSTER					
27	SFDJBD2N03	JACK, OUTPUT		P1	RPC2600	PACKING CASE	(E, EG)
28	SKMB160-0K	COVER		P1	RPC2601	PACKING CASE	(EB)
29	SWKBB42052	CONNECTOR ASS'Y (5P)		P2	SPSB4	PAD, LEFT	
31	SFAB14A	TONEARM ASS'Y		P3	SPSB5	PAD, RIGHT	
32	RFE0022	CARTRIDGE		P4	SPEB3	CLAMPER, TURNTABLE	
32-1	RMJ0005	PROTECTOR		P5	SPEB5	CLAMPER, TONEARM	
35	SHRB14	TONEARM REST		P6	SPPB1-4	POLYETHYLENE BAG, DUST COVER	
36	SFGK171F01	CAP		P7	XZB60X65A01X	POLYETHYLENE BAG, UNIT	
38	SFXJBD2N51	SHAFT, ARM LIFT		P8	SPEB4	PAD, TONEARM WEIGHT	
39	SFUMB02N51	ARM LIFT		P9	XZB10X30C03	POLYETHYLENE BAG, CORD	(EB)
40	SFUPB02N51E	ARM BASE		P10	RPQ0353	PAD, CORD	(EB)
42	SUSB12	SPRING					
43	SFUPB02N52E	PLATE, PICK-UP FIXING				ACCESSORIES	
44	SFQHZ15R55	SPRING					
45	SFQHZ15R61	SPRING		A1	RFKSD22DE-K	INST. MANUAL ASS'Y	(E)
46	SFUMZ15R57	SPRING PIN		A1	RFKSD22DEBK	INST. MANUAL ASS'Y	(EB)
51	SUKB4E	MECHANISM PLATE		A1	RFKSD22DEGK	INST. MANUAL ASS'Y	(EG)
52	SDWB1A	TURNTABLE SHAFT		A2	SFDHBD2N01	STEREO CONNECTION CABLE	
53	SFYB5-32	BALL		A3	SJPB7M	GROUND WIRE	
54	SFUBZ15R51	PLATE, DRIVE		A4	SFWE212-01	45-rpm ADAPTOR	
55	SFQHZ15R64	SPRING, DRIVE PLATE		A5	RJA0019-2K	AC POWER SUPPLY CORD	△(SF) (E, EG)
56	SFUMZ15R56	PIN		A5	VJA0733	AC POWER SUPPLY CORD	△(SF) (EB) <VRD>
57	SFUMZ15R54	SWITCH LEVER (A)		A7	SFTGB93M02EM	TURNTABLE MAT	
58	SFUMB02N52	SWITCH, LEVER (B)					
59	SFUMZ15R59	SWITCH LEVER (C)				GREASE	
60	SFQHZ15R62	SPRING					
61	SFUMZ15R52	LEVER, ACTUATING		SA1	RZ20L05	DYNAMIC GREASE	
62	SFQSZ15R51	ROD, ACTUATING		SA2	RZ20L07	MORITON GREASE	
63	SFUGZ15R51-3	MAIN GEAR		SA3	SZ20L11	SILICON OIL	
64	SUWB17-1	RINK(A), MAIN GEAR					
65	SFURZ15R51	RINK(B), MAIN GEAR					
66	SHRB106	WASHER					
67	SHRB11-1	CAM, CUEING					
68	SFQHZ15R63	SPRING					
		SCREWS					
N1	SNSB1	SCREW					
N2	SFPEVOQ601	SCREW					
N3	XTB3+10G	SCREW					

■ PACKING



1. Place the unit (with cushions attached) as illustrated.
2. Fold the flaps according to the line marks.
3. Seal the top with adhesive tape.
 - Use gum tape or adhesive cloth tape of 50mm wide at least.
4. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple.)



- Stapling positions are shown below.

