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Service Manual

Quartz Direct Drive Turntable System

SL-M2

[M], [MC], [E], [EK], [XL],
[EB], [EH], [EF], [Ei], [EC],
[XA], [XM], [PA], [PE], [PC], [XZ]



* Sets for [M] and [MC] areas are not provided with cartridge.

TAP is the standard mark for the "P-mount" plug-in-connector system.

Products carrying this mark are interchangeable and compatible with each other.

English

Areas

- * [M] is available in U.S.A.
- * [MC] is available in Canada.
- * [E] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [XL] is available in Australia.
- * [EB] is available in Belgium.
- * [EH] is available in Holland.
- * [EF] is available in France.
- * [Ei] is available in Italy.
- * [EC] is available in Czechoslovakia.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [XM] is available in Central South America.
- * [PA] is available in far East PX.
- * [PE] is available in European Military.
- * [PC] is available in European Audio Club.
- * [XZ] is available in New Zealand.

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply:	For U.S.A. and Canada: 120V AC, 60 Hz For others: ~ 110—120/220—240V, 50 or 60 Hz
Power consumption:	20 W
Dimensions: (W×H×D)	45.3 × 17 × 41.2 cm (17-27/32" × 6-11/16" × 16") Maximum height when dust cover is open 45.3 × 43 × 46 cm (17-27/32" × 16-15/16" × 18")
Weight:	12 kg (26.4 lb.)

■ Turntable section

Type:	Quartz direct drive Manual turntable Auto lift-up
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter:	Aluminum die-cast Diameter 32.5 cm Weight 2.5 kg (including turntable mat)
Pitch control:	± 6% range

Turntable speeds:	33-1/3 rpm and 45 rpm
Starting torque:	1.6 kg·cm
Build-up characteristics:	0.9 s. to 33-1/3 rpm
Braking system:	Electronic brake
Speed change due to load torque:	0% within 1.0 kg·cm (0.87 lb. in)
Wow and flutter:	0.008% WRMS* 0.022% WRMS (JIS C5521) ±0.031% peak (IEC 98A Weighted)

* This rating refers to turntable assembly alone, excluding effects of record, cartridge or tonearm, but including platter. Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble:	-70 dB (IEC 98A Unweighted) -82 dB (IEC 98A Weighted)
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■ Tonearm section

Type:	Statically-balanced straight tonearm Plug-in connector cartridge system
Effective length:	230 mm (9-1/16")
Overhang:	15 mm (19/32")
Effective mass:	13.5 g (including cartridge)

Technics

Matsushita Engineering and
Service Company
50 Meadowland Parkway,
Secaucus, New Jersey 07094

Panasonic Hawaii Inc.
91-238 Kauhū St. Ewa Beach
P.O. Box 774
Honolulu, Hawaii 96808-0774

Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Tracking error angle:	Within 2°32' at the outer groove of 30 cm (12") record Within 0°32' at the inner groove of 30 cm (12") record Less than 7 mg (lateral, vertical)
Friction:	
Stylus pressure adjustment range:	1.25 ±0.25 g
Applicable cartridge weight range:	6 g
Phono cable capacitance:	100 pF
■ Cartridge section (Except for U.S.A. and Canada)	
Type:	Moving magnet stereo cartridge
Magnet circuit:	All laminated core

Frequency response	10 Hz ~ 50 kHz 20 Hz ~ 10 kHz ±1 dB
Output voltage:	2.5 mV at 1 kHz, 5 cm/s. zero to peak lateral velocity (7 mV at 1 kHz, 10 cm/s. zero to peak 45° velocity [DIN 45 500])
Channel separation:	22 dB at 1 kHz
Channel balance:	Within 1.8 dB at 1 kHz
Recommended load impedance:	47 kΩ~100 kΩ
Compliance (dynamic):	12×10 ⁻⁶ cm/dyne at 100 Hz
Stylus pressure range:	1.25 ±0.25 g (12.5± 2.5 mN)
Weight:	6 g (cartridge only)
Replacement stylus:	EPS-33ES

Deutsch

TECHNISCHE DATEN

Änderungen der technischen Daten vorbehalten.

Die angegebenen Gewichts- und Abmessungsdaten sind ungefähre Werte.

■ Allgemeine Daten

Stromversorgung:	~110-120/220-240 V, 50/60 Hz
Leistungsaufnahme:	20 W
Abmessungen: (B×H×T)	45,3 × 17 × 41,2 cm Maximale Höhe bei geöffnetem Oberteil (Staubabdeckung). 45,3 × 43 × 46 cm
Gewicht:	12 kg

■ Plattenspieler

Typ:	Manueller Quartz-Direktantrieb-Plattenspieler Auto-Anhebung
Antrieb:	Direktantrieb
Motor:	Kollektorloser Gleichstrommotor
Antriebsregel-Methode:	Quarz-Steuerung QPL
Plattenteller:	Aluminium-Spritzguß Durchmesser 32,5 cm Gewicht: 2,5 kg (einschließlich Plattentellermatte)
Drehzahl-Feinregulierung:	± 6% Einstellbereich
Plattenteller-Drehzahlen:	33-1/3 und 45 U/min
Anlaufdrehmoment:	1,6 kg·cm
Drehzahl-Hochlaufzeit:	0,9 s. vom Stillstand auf 33-1/3 U/min
Bremssystem:	Elektronische Bremse
Drehzahl-Abweichung aufgrund von Lastschwankungen:	0% innerhalb 1,0 kg·cm
Gleichlaufschwankungen:	0,008% WRMS* 0,022% WRMS (JIS C5521) ±0,031% Spitze (IEC 98A bewertet)

* Diese Nennleistung bezieht sich auf den Laufwerk-Bauteil allein, ausschließlich Einflüsse von Schallplatte, Tonabnehmer oder Tonarm, aber einschließlich Plattenteller. Gemessen anhand von Signalen vom eingebauten Frequenzgenerator des Motorbauteils.

Rumpel-Fremdspannungsabstand:	-70 dB (IEC 98A unbewertet)
Rumpel-Geräuschspannungsabstand:	-82 dB (IEC 98A bewertet)

■ Tonarm

Typ:	Statisch balanciertes Tonabnehmersystem vom Einsteck-Typ
Effektive Länge:	230 mm
Überhang:	15 mm
Effektive Masse:	13,5 g (einschließlich Tonabnehmer)
Spurfehlwinkel:	Innerhalb 2°32' bei der Einlaufrille einer 30 cm-Platte Innerhalb 0°32' bei der Auslaufrille einer 30 cm-Platte
Lagerreibung:	Weniger als 7 mg (horizontal, vertikal)
Auflagekraft-Einstellbereich:	1,25 ±0,25 g
Zulässiger Tonabnehmer-Gewichtsbereich:	6 g
Phonokabel-Kapazität:	100 pF

■ Tonabnehmer

Typ:	Stereo-Magnet-Tonabnehmer mit Einpunkt-Aufhängungssystem
Magnetkreis:	Ganzlamellenkern
Frequenzgang:	10 Hz bis 50 kHz 20 Hz bis 10 kHz ±1 dB 2,5 mV bei 1 kHz 5 cm/s. Null-zu-Spitze, lateral [7 mV bei 1 kHz 10 cm/s. Null-zu-Spitze, 45° (DIN 45 500)]
Ausgangsspannung:	22 dB bei 1 kHz Innerhalb 1,8 dB bei 1 kHz
Kanaltrennung:	
Kanalabweichung:	
Empfohlene Endimpedanz:	47 kΩ ~ 100 kΩ
Nachgiebigkeit (dynamisch):	12 × 10 ⁻⁶ cm/dyn bei 100 Hz
Auflagekraft-Einstellbereich:	1,25 ±0,25 g (12,5 ±2,5 mN)
Gewicht:	6 g (nur Tonabnehmer)
Ersatznadel:	EPS-33ES

CARACTERISTIQUES

Les spécifications sont susceptibles d'être modifiées sans préavis.
Le poids et les dimensions donnés sont approximatifs.

■ Généralités

Alimentation:	Alternatif 110-120/220-240V, 50/60 Hz
Consommation:	20 W
Dimensions: (L×H×P)	45,3 × 17 × 41,2 cm Hauteur maximum lorsque le couvercle protège-poussière est ouvert: 45,3 × 43 × 46 cm
Poids:	12 kg

■ Platine de lecture

Type:	Entaînement direct à quartz Platine manuelle Soulèvement automatique
Système d'entraîne- ment:	Entraînement direct
Moteur:	Moteur C.C. sans balai
Groupe de réglage:	Réglage d'accrochage de phase par quartz
Plateau de lecture:	En aluminium moulé sous pression Diamètre 32,5 cm Poids 2,5 kg (y compris le tapis du plateau)
Réglage d'écart:	Plage de réglage de $\pm 6\%$

Vitesses de rotation:	33-1/3 et 45 t/p.m.
Couple de démarrage:	1,6 kg cm
Caractéristiques d'augmentation:	0,9 s. à 33-1/3 t/p.m.
Système de freinage:	Frein électronique
Variation de vitesse due au couple de charge:	0% en deçà de 1,0 kg.cm
Pleurage et scintille- ment:	0,008% de valeur efficace* 0,022% de valeur efficace (JIS C5521) $\pm 0,031\%$ de crête (IEC 98A Pondéré)

* Ce régime nominal se rapporte à l'ensemble du tourne-
disque seul, excluant les effets du disque, de la cellule
pick-up ou du bras de lecture, mais comprenant le plateau.
Mesuré par l'obtention d'un signal provenant du généra-
teur de fréquences incorporé de l'ensemble du moteur.

Ronflement:	-70 dB (IEC 98A Non pondéré) -82 dB (IEC 98A Pondéré)
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■ Bras de lecture

Type:	Bras de lecture rectiligne statiquement équilibré Système de cellule de lecture à connecteur enfichable.
Longueur effective:	230 mm
Porte-à-faux:	15 mm
Angle d'erreur de piste:	En deçà de $2^{\circ}32'$ au sillon extérieur d'un disque de 30 cm En deçà de $0^{\circ}32'$ au sillon intérieur d'un disque de 30 cm
Frottement:	Moins de 7 mg (latéral et vertical)
Masse réelle:	13,5 g (avec la cellule pick-up)
Plage de réglage de la pression d'appui:	1,25 $\pm$ 0,25 g
Gamme du poids des cellules pick-up utilisables:	6 g
Capacitance du câble phone:	100 pF

■ Cellule pick-up

Type:	Cellule pick-up stéréo à aimant mobile
Circuit magnétique:	Noyau entièrement feuilleté
Réponse en fréquence:	10 Hz à 50 kHz 20 Hz à 10 kHz ± 1 dB 2,5 mV à 1 kHz; 5 cm/s., zéro à vitesse latérale de crête (7 mV à 1 kHz; 10 cm/s., zéro à vitesse 45° de crête [DIN 45 500])
Tension de sortie:	22 dB à 1 kHz
Séparation des canaux:	En deçà de 1,8 dB à 1 kHz
Equilibrage des canaux:	
Impédance de charge recommandée:	47 k Ω ~100 k Ω
Elasticité (dynamique):	12×10^{-6} cm/dyne à 100 Hz
Plage de la force verticale d'appui:	1,25 $\pm$ 0,25 g (12,5 $\pm$ 2,5 mN)
Poids:	6 g (cellule seule)
Pointe de lecture de remplacement:	EPS-33ES

ESPECIFICACIONES

Las especificaciones quedan sujetas a cambios sin aviso previo.
El peso y las dimensiones indicados son aproximados.

■ En general

Alimentación de corriente:	110—120/220—240V, 50/60 Hz
Consumo de corriente:	20 W
Dimensiones: (Ancho×Alto×Prof.)	45,3 × 17 × 41,2 cm Altura máxima cuando la tapa contra el polvo está abierta: 45,3 × 43 × 46 cm
Peso:	12 kg

■ Sección del plato giratorio

Tipo:	Plato giratorio manual con accionamiento directo por cuarzo con elevación automática
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Método de acciona- miento:	Accionamiento directo
Motor:	Motor de corriente continua sin escobillas
Método de control de accionamiento:	Control enclavado de fase de cuarzo
Platillo del plato giratorio:	De aluminio fundido Diámetro 32,5 cm Peso 2,5 g (incluyendo la almohadilla del plato giratorio)
Control de altura de sonido:	Ámbito de ajuste: $\pm 6\%$
Velocidades del plato giratorio:	33-1/3 y 45 rpm

Par de arranque:	1,6 kg·cm (1,3 lb·pulg.)
Características de establecimiento:	0,9 s. a 33-1/3 r.p.m.
Sistema de frenado:	Freno electrónico
Cambio de velocidad debido al par motor de carga:	0% sin exceder 1,0 kg cm (0,87-pulg.)

Ululaciones y trémolo:	0,008% WRMS* 0,022% WRMS (JIS C5521) ±0,031% cresta (IEC 98A Ponderado)
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* Estas características se refieren únicamente al conjunto del plato giratorio, con exclusión de los efectos provenientes del disco, cartucho o del brazo sonoro, incluyendo, empero, el platillo. La medida fue tomada por medio de la señal obtenida del generador de frecuencia incorporado al conjunto del motor.

Ruido de rodadura:	-70 dB (IEC 98A No ponderado) -82 dB (IEC 98A Ponderado)
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■ Sección del brazo sonoro

Tipo:	Brazo sonoro recto equilibrado estáticamente Sistema de cartucho con conector enchufable
Longitud efectiva:	230 mm
Proyección:	15 mm
Masa efectiva:	13,5 g (incluyendo el cartucho)
Angulo de error de seguimiento:	Inferior a 2°32' en el surco exterior de un disco de 30 cm Inferior a 0°32' en el surco interior de un disco de 30 cm

Fricción:	Menos de 7 mg (en sentido lateral y vertical)
Radio de ajuste de la presión de la aguja:	1,25 ±0,25 g
Radio de peso de cartucho utilizable:	6 g
Capitancia del cable del fonógrafo:	100 pF

■ Sección del cartucho

Tipo:	Cartucho estereofónico de imán móvil
Circuito magnético:	Núcleo totalmente laminado
Respuesta de frecuencia:	10 Hz a 50 kHz 20 Hz a 10 kHz ±1 dB
Voltaje de salida:	2,5 mV a 1 kHz velocidad lateral de cero a cresta de 5 cm/s. [7 mV a 1 kHz Velocidad de 45° de cero a cresta de 10 cm/s. (DIN 45 500)]
Separación de canales:	22 dB a 1 kHz
Equilibrio de canales:	Inferior a 1,8 dB a 1 kHz
Impedancia de carga recomendada:	47 kΩ a 100 kΩ
Elasticidad (dinámica):	12 × 10 ⁻⁶ cm/dina a 100 Hz
Radio de presión de la aguja:	1,25 ±0,25 g (12,5 ±2,5 mN)
Peso:	6 g (cartucho solamente)
Aguja de recambio:	EPS-33ES

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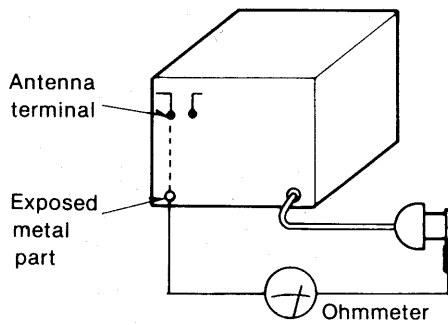
■ SAFETY PRECAUTION

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.

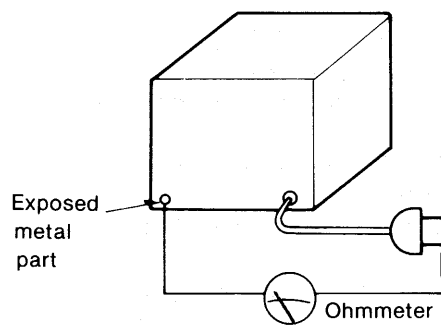
● INSULATION RESISTANCE TEST

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 3MΩ and 5.2MΩ 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)

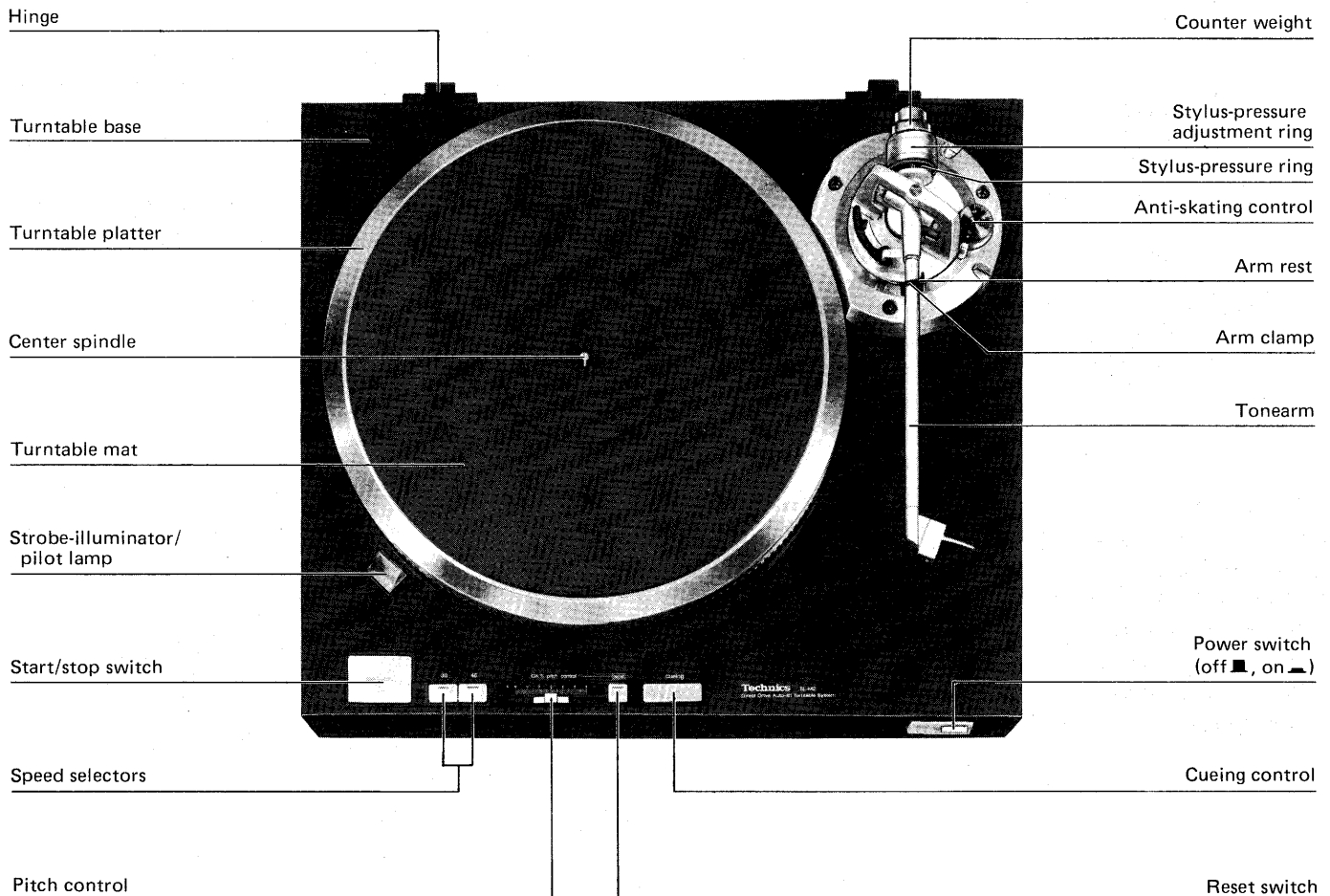
 Resistance = $3\text{ M}\Omega$ — $5.2\text{ M}\Omega$


(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.

■ LOCATION OF CONTROLS



- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
- ★ 120V (50/60 Hz) for U.S.A. and Canada.
- ★ 220V (50/60 Hz) for Continental Europe.
- ★ 240V (50/60 Hz) for United Kingdom and Australia.
- ★ 110V-120V/220V-240V (50/60 Hz) for other areas.
- ★ Sets for areas other than U.S.A. and Canada are provided with voltage selector.

■ DISASSEMBLY INSTRUCTIONS

● How to remove the bottom board

1. Remove the turntable mat and turntable platter.
2. Turn over the unit and remove the 4 setscrews (Fig. 1: ① - ④) of the bottom board.

Note: Put the unit on a soft cloth so that the dust cover will not be damaged.

3. To remove the insulator, remove the 4 setscrews (Fig. 1: ⑤ - ⑧).

Note: The front and rear insulator springs are different.

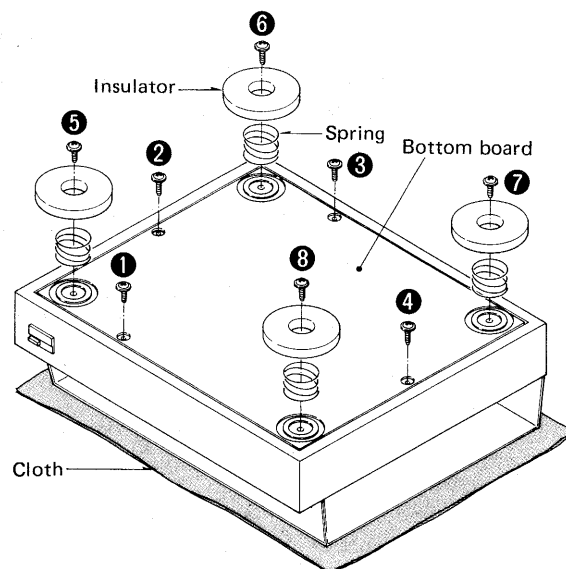


Fig. 1

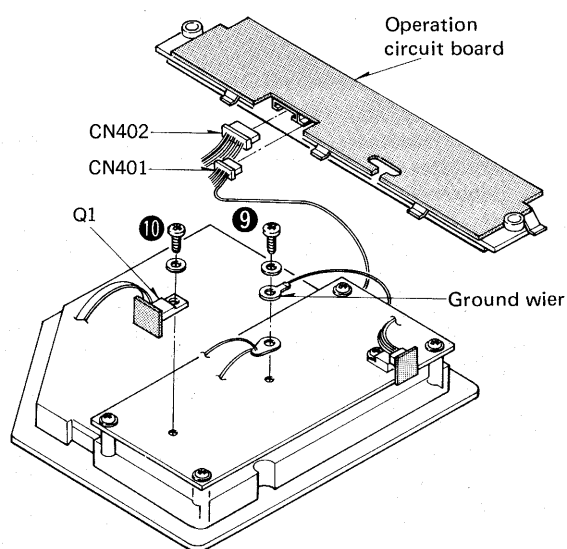


Fig. 2

● How to remove the drive circuit board.

1. Remove the bottom board. (Refer to "How to remove the bottom board").
2. Remove the connector CN401 and 402 from the operation circuit board.
3. Remove the ground lead wire setscrew (Fig. 2: ⑨) and the regulator transistor Q1 setscrew (Fig. 2: ⑩).

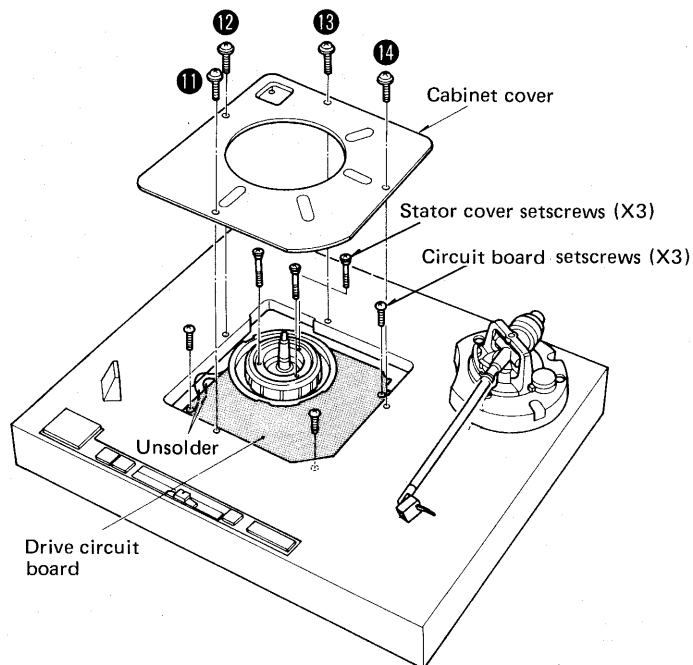


Fig. 3

4. Return the set and open the dust cover.
5. Remove the 4 cabinet cover setscrews (Fig. 3: ⑪ - ⑭).
6. Remove the 3 stator cover setscrews and 3 drive circuit board setscrews, and unsolder the 2 lead wires. Then the drive circuit board can be removed.

* When examine the drive circuit board, remove the cabinet cover and refer to "Trouble shooting".

● **How to remove the tonearm control circuit board**

1. Remove the bottom board (Refer to "How to remove the bottom board").
2. Remove the connector CN303, 304 and 306 from the tonearm control circuit board.
3. Remove the transistor setscrew (Fig. 4 : 20).
4. Release the 4 claws by pliers as shown in Fig. 4.

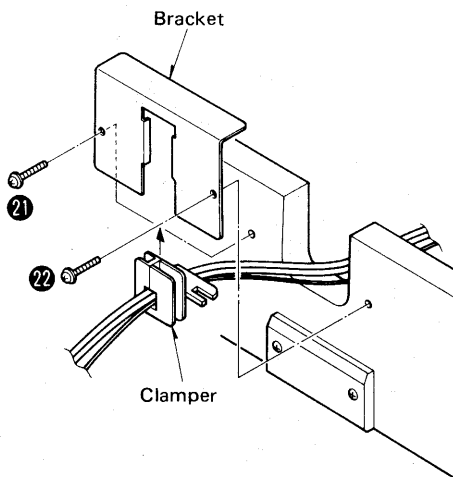


Fig. 5

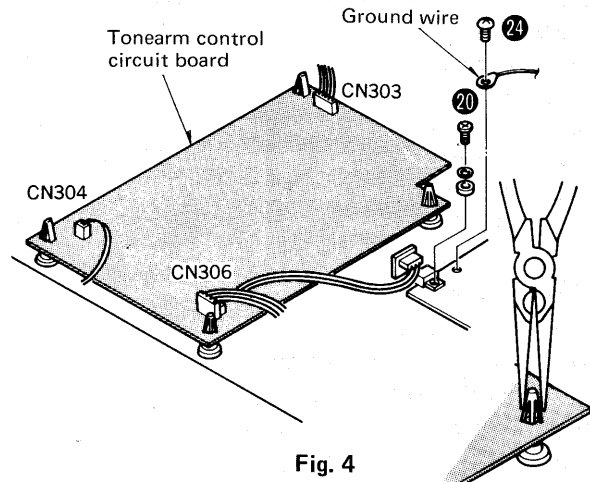


Fig. 4

● **How to remove the phono output cords**

1. Remove the bottom board (Refer to "How to remove the bottom board").
2. Remove the 2 bracket setscrews (Fig. 5 : 21, 22) and the bracket.
3. Remove the shield cover setscrew (Fig. 6 : 23) and shield cover.
4. Tear off the shield tape and unsolder the 3 lead wires from the phono output circuit board. (Fig. 6)

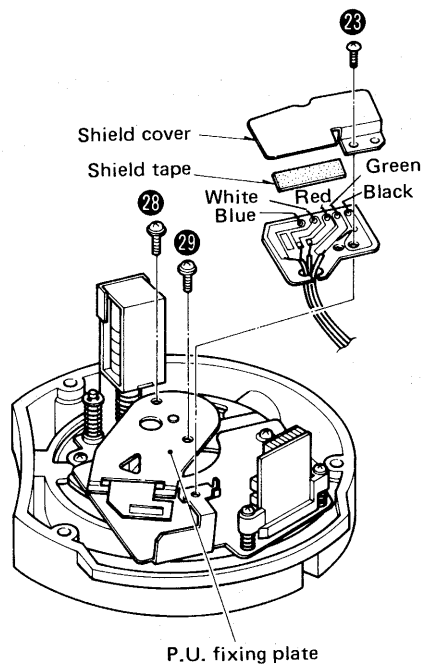


Fig. 6

● **How to remove the tonearm base ass'y**

1. Remove the phono output cords (Refer to "How to remove the phono output cords").
2. Remove the ground wire setscrew (Fig. 4: 24).
3. Remove the connector CN303 from tonearm control circuit board.
4. Remove the 3 tonearm base ass'y hex screws (Fig. 7: 25 ~ 27) and lift the tonearm base ass'y in the direction of the arrow, and then the tonearm base ass'y can be removed.

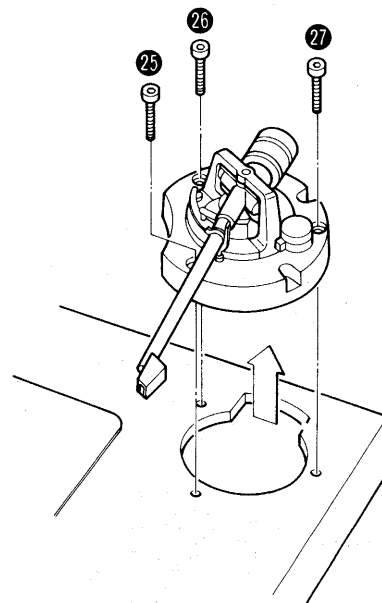


Fig. 7

• How to remove the sensor circuit board base and PU plate

1. Remove the tonearm base ass'y. (Refer to "How to remove the tonearm base ass'y").
2. Unsolder the 5 lead wires (blue, white, red, green and black) from the phono output circuit board (Fig. 6).
3. Remove the 2 PU fixing plate setscrew (Fig. 6 : 28 , 29) and the PU fixing plate.
4. Remove the 3 setscrews (Fig. 8 : 30 ~ 32), and then the sensor circuit board base and PU plate can be removed.

Notes: Fitting of PU plate.

Fit the PU plate so that the hook of canceller spring touches the PU starting shaft as shown Fig. 9 when the scale of antiskating knob is 0.6 ~ 0.9 with the arm calmped.

• How to remove the tonearm lift base

1. Remove the tonearm base ass'y (Refer to "How to remove the tonearm base ass'y").
2. Remove the tonearm lift setscrew (Fig. 10 : 33).
3. Unsolder the 2 lead wires from the sensor circuit board.
4. Remove the 2 lift base setscrews (Fig. 8 : 34 , 35) and the lift base in the direction of the arrow.

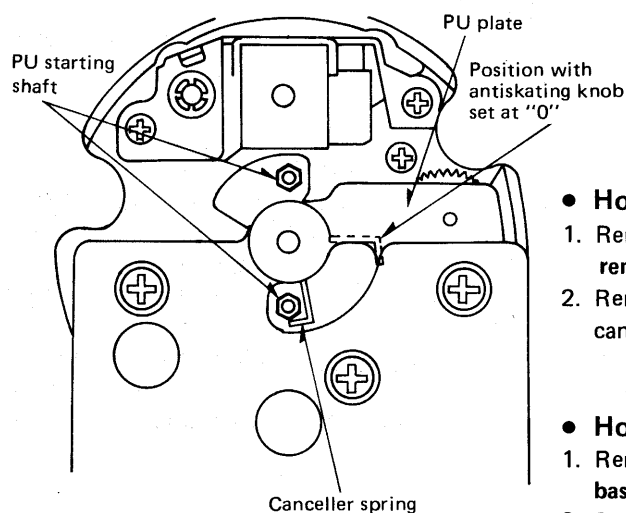


Fig. 9

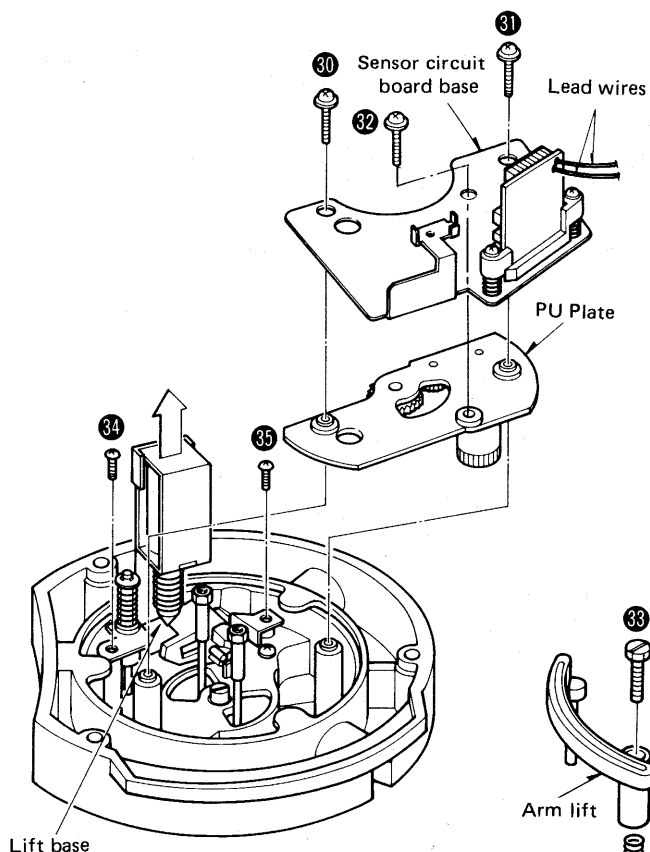


Fig. 8

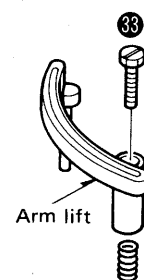


Fig. 10

• How to remove the tonearm

1. Remove the sensor circuit board base and PU plate (Refer to "How to remove the sensor circuit board base and PU plate").
2. Remove the 2 tonearm setscrews (Fig. 11 : 36 , 37), and then the tonearm can be removed.

• How to remove the tonearm base

1. Remove the tonearm lift base (Refer to "How to remove the tonearm lift base").
2. Remove the tonearm (Refer to "How to remove the tonearm").
3. Completely loosen the 2 tonearm base setscrew (Fig. 12 : 38 , 39) and then the tonearm base can be removed.

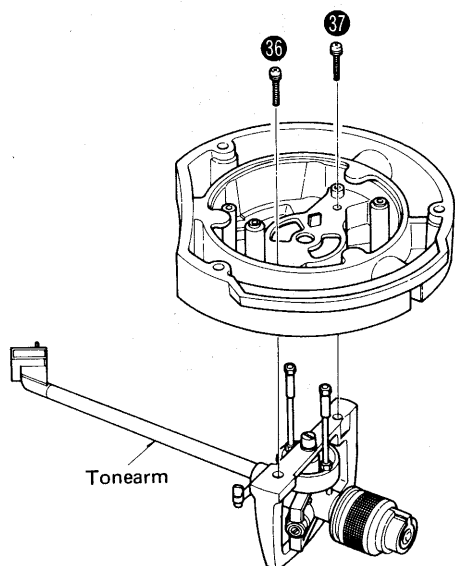


Fig. 11

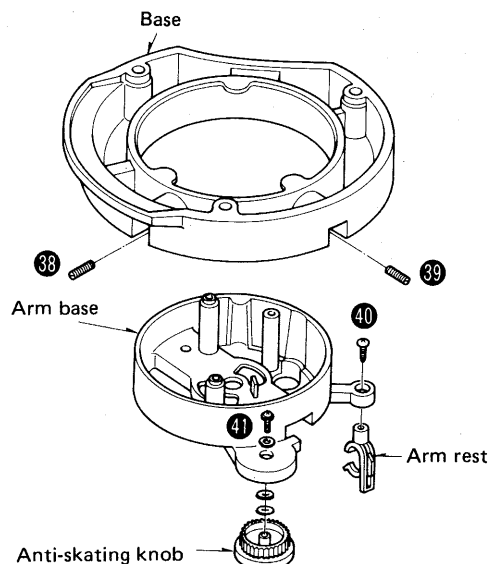


Fig. 12

● How to remove the tonearm rest and anti-skating knob

1. Remove the tonearm base (Refer to "How to remove the tonearm base").
2. Remove the tonearm rest setscrew (Fig. 12: 40), and then the tonearm rest can be removed.
3. Remove the anti skating knob setscrew (Fig. 12: 41), and then the antiskating knob can be removed.

● How to remove the power switch and the operation circuit board.

1. Remove the bottom board. (Refer to "How to remove the bottom board").
2. Remove the 2 bracket setscrews (Fig. 13: 42, 43) and pull out the power switch knob.
3. Remove the 2 power switch setscrews (Fig. 13: 44, 45), and then the power switch can be removed.
4. Remove the graduated plate of pitch control and the pitch control knob. (Fig. 14).
5. Remove the 4 operation circuit board setscrews (Fig. 14: 46 ~ 49).
6. Release the 2 claws, and then the pitch control base can be separated from the pitch control frame.

Note: When removing the ornament plate and strobe frame from the cabinet, unfasten the bond locks shown in Fig. 15. When fitting the plate, lock the same portions with bond.

7. Release the 3 claws and raise the P.C.board in the direction of the arrow, and then P.C.board can be removed.

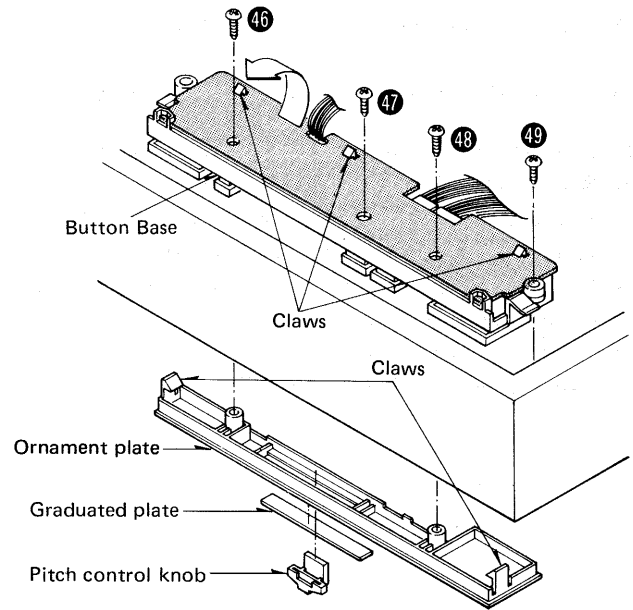


Fig. 14

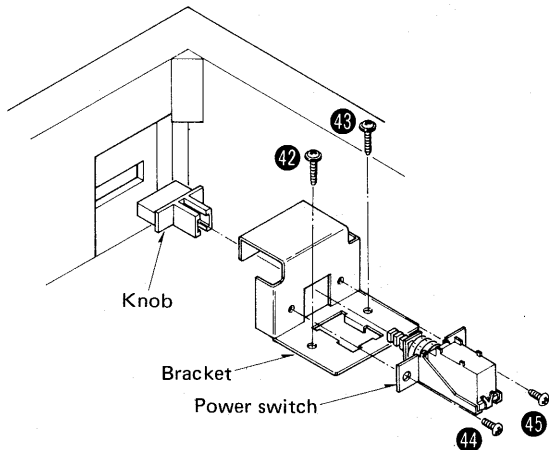


Fig. 13

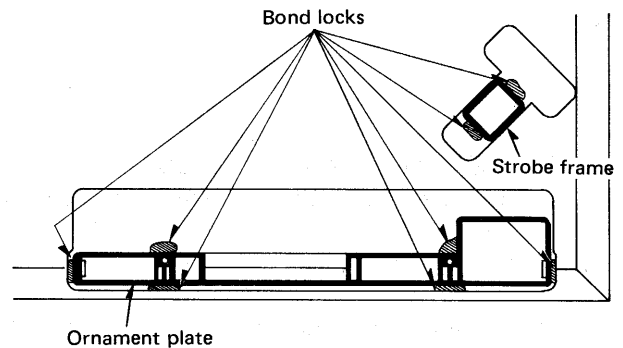


Fig. 15

● How to remove the counter weight (Fig. 16)

1. Completely loosen the adjustment ring and pull out the counter weight, and then counter weight can be removed.
2. When set the counter weight, insert the counter weight into the rear shaft cylinder by aligning the guide plate located at the bottom of the counter weight to the slit between rear shaft cylinder and adjusting ring.

*When the counter weight is removed, be sure to adjust.

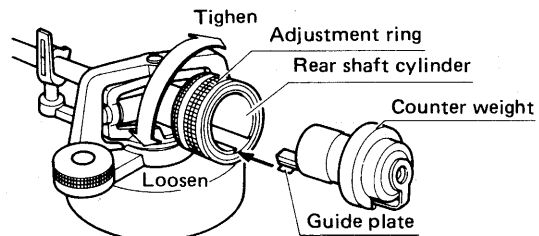


Fig. 16

TROUBLE SHOOTING

● Conditions of the set

Case 1: Refer to Fig. 17. (Check each part in stop mode.)

- (1) Remove the turntable mat and turntable platter.
- (2) Remove the cabinet cover.
- (3) Push the power switch and check each part.

Case 2: Refer to Fig. 18. (Checking each part in rotating mode.)

- (1) Remove the turntable mat and turntable platter.
- (2) Remove the cabinet cover.
- (3) Insert the tester lead wire from the bottom of the set and connect it to the part to be checked.
- (4) Connect the ground terminal of the tester to the GND terminal of the phono cable.
- (5) Put on the turntable platter.
- (6) Push the power switch and start button.

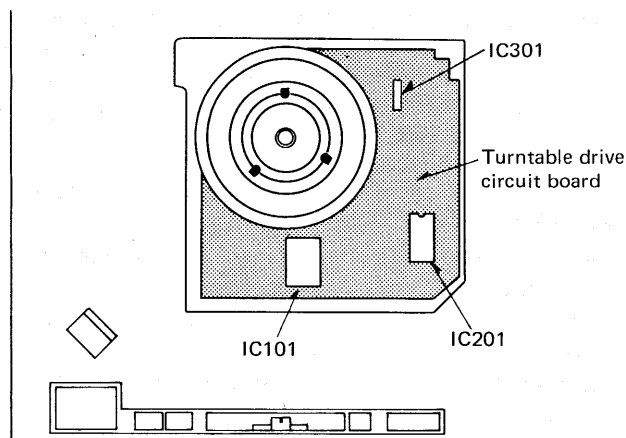


Fig. 17

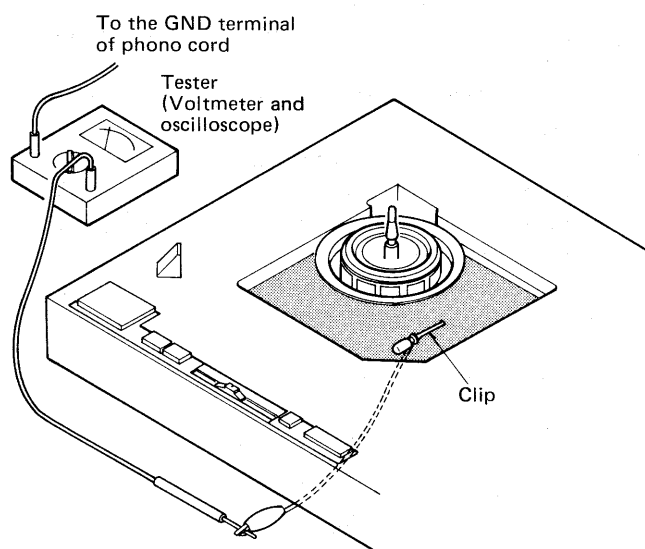


Fig. 18

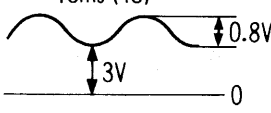
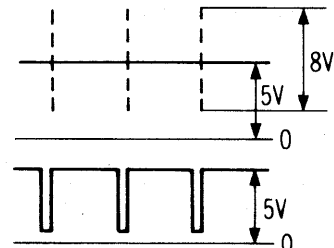
1. Turntable platter does not rotate

*In the table, "stop mode" is the initial state with power turned "on", and "start mode" is the state with S/S switch depressed.

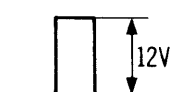
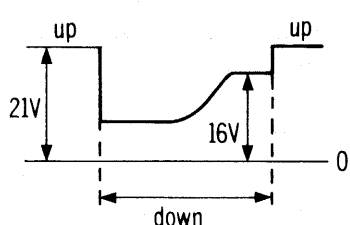
	Probably defective circuit	Check point	Possible cause															
1	Power supply circuit	DC voltage of Q1 (emitter) 21V	S601, T1, D1, Q1 ~ 3															
2	Turntable control circuit	DC voltage of IC201 <table><tr><th>Pin No.</th><th>Stop</th><th>Start</th></tr><tr><td>⑪</td><td>7.0V</td><td> S/S pulse</td></tr><tr><td>⑫</td><td>5.9V</td><td>0.3V</td></tr><tr><td>⑬</td><td>0.2V</td><td>2.8V</td></tr></table>	Pin No.	Stop	Start	⑪	7.0V	 S/S pulse	⑫	5.9V	0.3V	⑬	0.2V	2.8V	S303 IC201			
Pin No.	Stop	Start																
⑪	7.0V	 S/S pulse																
⑫	5.9V	0.3V																
⑬	0.2V	2.8V																
3	Turntable drive circuit	DC voltage and waveform of IC101 <table><tr><th>Pin No.</th><th>Stop</th><th>Start</th></tr><tr><td>①</td><td>2.9V</td><td>2.9V</td></tr><tr><td>②</td><td>2.0V</td><td>13.0V</td></tr><tr><td>②②</td><td>0.2V</td><td>2.8V</td></tr><tr><td>②④</td><td>2.0V</td><td>2.0V</td></tr></table> 	Pin No.	Stop	Start	①	2.9V	2.9V	②	2.0V	13.0V	②②	0.2V	2.8V	②④	2.0V	2.0V	IC101 Drive coil
Pin No.	Stop	Start																
①	2.9V	2.9V																
②	2.0V	13.0V																
②②	0.2V	2.8V																
②④	2.0V	2.0V																

2. Defective rotation (runaway, unstable)

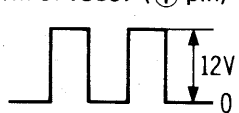
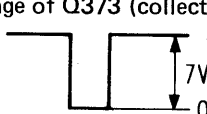
* In the table, the waveform is measured in rotating mode.

	Probably defective circuit	Check point	Possible cause
1	FG amp. circuit	Waveform of terminal ②③ of IC201 20ms (33) 15ms (45) 	FG coil Q203 IC201
2	Turntable control circuit	Waveform of terminal ⑬, ⑭ of IC201 	IC201 IC101

3. Cueing operation failure

	Probably defective circuit	Check point	Possible cause
1	Cueing circuit	DC voltage of Q358 (collector) (Press the cueing switch)  Cueing command pulse	S304 Q358
2	Cueing plunger drive circuit	DC voltage of Q357 (collector) 	IC303 Q356, 357 Cueing plunger

4. Auto stop and lift-up failure

	Probably defective circuit	Check point	Possible cause
1	End detection circuit	• Trace a 1mm pitch record. Waveform of IC307 (① pin) 	PC601 Q601 IC307 Adjustment of output voltage
2	Stop command circuit	• Trace the final groove of record. DC voltage of Q373 (collector)  (Stop command pulse)	IC303, 304 306 ~ 308 Q353, 354 371 ~ 373
3	Cueing command circuit	Refer to "Cueing operation failure" previously mentioned.	

MEASUREMENTS AND ADJUSTMENT English

1. Arm-lift height

The arm-lift height (distance between the stylus tip and record surface when the tonearm is raised) has been adjusted at the factory before shipping to approximately 5 – 7 mm.

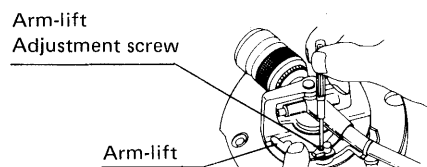
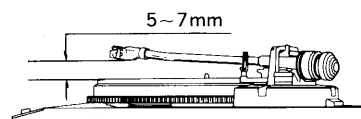
If the clearance becomes too narrow or too wide, turn the adjustment screw clockwise or counterclockwise while pushing the arm lift down.

Clockwise rotation

—distance between the record and stylus tip is decreased.

Counterclockwise rotation

—distance between the record and stylus tip is increased.



2. Automatic lift-up position

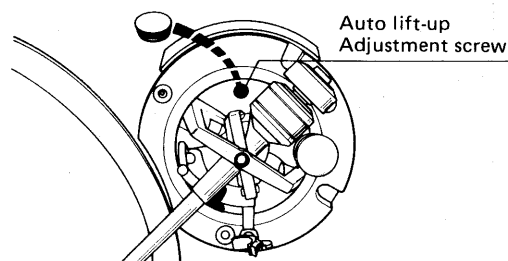
1. Put the stylus protector on the cartridge.
2. Remove the rubber cap.
3. Release the arm clamp and move the tonearm toward the center of the record.
The auto lift-up adjustment screw will appear.
4. Turn the screw with a screwdriver, clockwise or counterclockwise as necessary.

If the tonearm tends to lift up from the record surface before the play has finished.

—turn counterclockwise

If the tonearm fails to lift up after the final groove.

—turn clockwise.



3. Adjustment of brake

1. Turn power switch "on" and set the speed selector to "33 r.p.m."
2. Depress the stop button in rotating mode and adjust VR201 so that the turntable platter stops within a range of 90° ~ 180° (See Fig. 19.)

4. Adjustment of pitch control

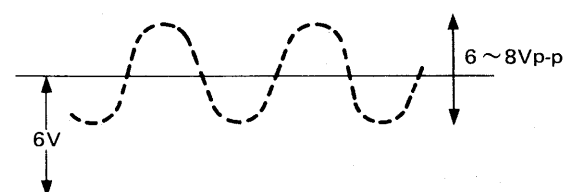
1. Connect a frequency counter between TP27 and terminal G. (See Fig. 19.)
2. Set the pitch control knob to "0", and the reset switch to "off".
3. Adjust VR301 so that the frequency is 262.075 ~ 262.085 kHz on the frequency counter.

5. Adjustment of slit plate gap

1. Adjust the 2 adjust screws so that the gap between the slit plate and photo coupler is 1.0 ± 0.2 mm. (See Fig. 20.)
2. Make sure that the slit plate is parallel to the coupler.

6. Adjustment of output voltage

1. Remove the bottom board and connect an oscilloscope to pin ② of sensor board BT601.
2. Let it trace a 1 mm pitch record at 33 r.p.m. and then adjust VR601 so that the waveform is as shown below in the position within 65 mm from the center of the record.



• Adjustment points

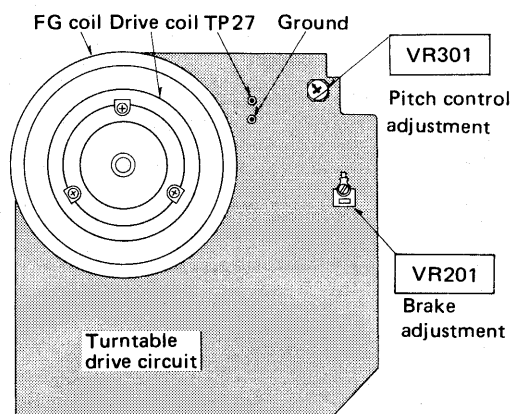


Fig. 19 Abb. 19

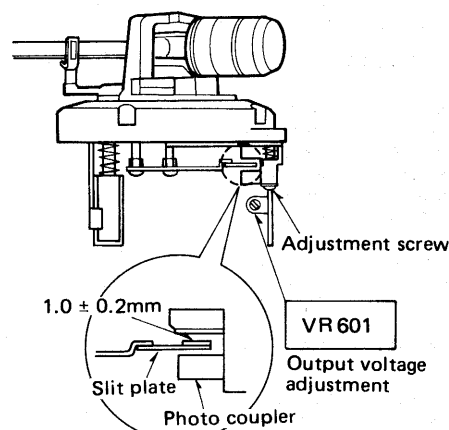


Fig. 20 Abb. 20

■ MESSUNGEN UND JUSTIERUNGEN ■ Deutsch

1. Justierung der Tonarmlifthöhe

Die Anhebehöhe des Tonarms (Distanz zwischen Nadelspitze und Plattenoberfläche bei angehobenem Tonarm) wurde in der Fabrik vor dem Versand auf ca. 5–7 mm eingestellt.

Falls der Abstand zu groß oder zu klein wird, drehen Sie die Justierschraube im Uhrzeigersinn oder Gegenuhrzeigersinn während Sie die Tonarmlifführung nach unten drücken.

Drehung im Uhrzeigersinn

–Der Abstand wird kleiner.

Drehung im Gegenuhrzeigersinn

–Der Abstand wird größer.

2. Einetellung der automatischen Anhebeposition (Lift)

1. Setzen Sie den Nadelschutz auf den Tonabnehmer auf.
2. Die Gummikappe abnehmen.
3. Führen Sie den Tonarm gegen die Plattenmitte. Die Auto-Anhebungseinstellschraube wird erscheinen.
4. Drehen Sie die Justierschraube mit einem Schraubenzieher im Uhrzeigersinn oder entgegen dem Uhrzeigersinn, wie erforderlich.

Falls der Tonarm die Neigung hat, sich vor dem Beenden des Abspiels von der Schallplatte abzuheben,

–im Gegenuhrzeigersinn drehen.

Falls der Tonarm sich nach der Endrinne nicht abhebt,

–im Uhrzeigersinn drehen.

3. Justierung der Bremse

1. Die Stromzufuhr einschalten und den Drehzahl-Wahlschalter auf "33 UpM" einstellen.
2. Die Stoptaste im rotierenden Zustand drücken und VR201 so abstimmen, daß der Plattenteller innerhalb $90^\circ - 180^\circ$ stoppt. (Siehe Abb. 19.)

4. Justierung des Drehzahlreglers

1. Einen Frequenzzähler zwischen TP27 und Anschluß G anschließen. (Siehe Abb. 19.)
2. Den Drehzahlreglerknopf auf "0" stellen und den Rückstellschalter auf "off" stellen.
3. VR301 so justieren, daß die Frequenz $262,075 \sim 262,085 \text{ kHz}$ auf dem Frequenzzähler beträgt.

5. Justierung der Schlitzplatten-Abstands

1. Die beiden Justierschrauben so einstellen, daß der Abstand zwischen der Schlitzplatte und dem Fotokoppler $1,0 \pm 0,2\text{mm}$ beträgt. (Siehe Abb. 20.)
2. Überprüfen, da die Schlitzplatte parallel zum Koppler ist.

6. Justierung der Ausgangsspannung.

1. Die Bodenplatte entfernen und ein Oszilloskop an Stift 2 der Sensorplatine BT601 anschließen.
2. Eine Platte mit 1mm-Rillenabstand bei 33 UpM abspielen und dann VR601 justieren, so daß die Wellenform wie nachstehend gezeigt ist, und zwar bei einer Position innerhalb 65mm von der Plattenmitte.

MESURAGES ET RÉGLAGES Français

1. Mise au point de la hauteur de l'élevateur du bras

La hauteur d'élévation du bras (distance entre l'extrémité de la pointe de lecture et la surface du disque lorsque le bras de lecture est soulevé) a été ajustée à l'usine avant l'expédition sur approximativement 5–7 mm.

Si l'écartement devient trop étroit ou trop large, tourner la vis de réglage dans le sens des aiguilles d'une montre ou en sens inverse, tout en abaissant l'élevateur du bras.

Rotation dans le sens des aiguilles d'une montre.

—La distance entre la surface du disque et l'extrémité de la pointe de lecture diminue.

Rotation dans le sens contraire des aiguilles d'une montre.

—La distance entre la surface du disque et l'extrémité de la pointe de lecture augmente.

2. Ajustement de la position de soulèvement automatique

1. Placer le capot protecteur de la pointe de lecture sur la cellule pick-up.
2. Retirer le capuchon en caoutchouc.
3. Libérer le clip de retenue du bras et déplacer le bras de lecture vers le centre du disque.
La vis d'ajustement de soulèvement automatique apparaîtra.
4. Avec un tournevis, tourner la vis de réglage dans le sens des aiguilles d'une montre ou dans le sens inverse selon la nécessité.
Si le bras de lecture a tendance à se soulever de la surface du disque avant que l'audition de soit achevée:
— **Tourner dans le sens inverse des aiguilles d'une montre.**
Si le bras de lecture ne réussit pas à se soulever après le sillon final:
— **Tourner dans le sens des aiguilles d'une montre.**

3. Ajustement du frein

1. Tourner l'alimentation en courant sur "on" (en circuit) et régler le sélecteur de vitesse sur "33 r.p.m." (33t/p.m.).
2. Appuyer sur la touche d'arrêt dans le mode de rotation et ajuster VR201 de telle sorte que le plateau de lecture s'arrête en deçà d'une plage de 90°–180°. (Voir la Fig. 19.)

4. Ajustement du réglage d'écart

1. Raccorder un fréquencemètre entre TP27 et la borne G. (Voir la Fig. 19.)
2. Régler la manette de réglage d'écart sur "0" et l'interrupteur de réenclenchement sur "off" (hors circuit).
3. Ajuster VR301 de telle sorte que la fréquence soit de 262,075 ~ 262,085 kHz sur la fréquencemètre.

5. Ajustement de l'intervalle de la plaque à fente

1. Régler les deux vis d'ajustement de telle sorte que l'intervalle entre la plaque à fente et le coupleur photoélectrique soit de $1,0 \pm 0,2$ mm. (Voir la Fig. 20.)
2. S'assurer que la plaque à fente soit parallèle au coupleur.

6. Ajustement de la tension de sortie

1. Retirer la plaquette de la face inférieure et raccorder un oscilloscope à la broche 2 de la plaquette du dispositif de détection BT601.
2. Le laisser tracer un disque à l'écart de 1 mm à 33t/p.m., puis ajuster VR601 de telle sorte que la forme d'onde soit telle qu'elle est montrée ci-dessous dans une position d'en deçà 65 mm à partir du centre du disque.

MEDICIONES Y AJUSTE Español

1. Ajuste de la altura de elevación del brazo

La altura de elevación del brazo (o sea, la distancia entre la punta de la aguja y la superficie del disco cuando el brazo sonoro está alzado) ha sido regulada aproximadamente entre 5 y 7 mm antes de despachar el equipo de la fábrica. En caso que la distancia se vuelve demasiado abundante o demasiado escasa, habrá que girar el tornillo de ajuste hacia la derecha o hacia la izquierda mientras se empuja para abajo la elevación del brazo.

Rotación hacia la derecha

—reduce la distancia entre el disco y la punta de la aguja.

Rotación hacia la izquierda

—aumenta la distancia entre el disco y la punta de la aguja.

2. Ajuste de la posición de elevación automática

1. Colocar la protección de la aguja en el cartucho.
2. Quitar la tapita de goma.
3. Soltar la grapa del brazo y mover el brazo sonoro hacia el centro del disco.
Aparecerá el tornillo de ajuste de elevación automática.
4. Girar el tornillito de ajuste hacia la derecha o hacia la izquierda usando un destornillador, según sea necesario.
En caso que el brazo tienda a levantarse de la superficie del disco antes de que se acabe de tocar el disco,
—Girar hacia la izquierda.
En caso que el brazo sonoro no se alce después de tocar el último surco,
—Girar hacia la derecha.

3. Ajuste de freno

1. Encender la alimentación de corriente y poner el selector de velocidad en "33 r.p.m.".
2. Apretar el botón de parada en estado giratorio y regular VR201 de manera tal que el platillo del plato giratorio cese de girar en un ámbito de 90° — 180° . (Ver la Fig. 19.)

4. Ajuste de control del paso

1. Conecte un contador de frecuencia entre TP27 y terminal G. (Vea la Fig. 19.)
2. Ponga la perilla de control del paso en "0" y el interruptor de reposición en "off" (desconectado).
3. Ajuste VR301 de manera que la frecuencia sea 262,075 ~ 262,085 kHz en el contador de frecuencia.

5. Ajuste de intervalo de la place de la hendidura

1. Regular los dos tornillos de ajuste de manera que el intervalo entre la placa de la hendidura y el fotoacoplador resulte $1,0 \pm 0,2$ mm. (Ver la Fig. 20.)
2. Cerciorarse de que la placa de la hendidura quede paralela al acoplador.

6. Ajuste de voltaje de salida

1. Quitar la tabla del fondo y conectar un osciloscopio al pasador 2 del tablero sensor BT601.
2. Dejarlo recorrer un disco con paso de 1mm a 33 revoluciones pasando luego a regular VR601 de manera tal que la forma de onda resulte como se ilustra a continuación en la posición comprendida entre 65mm a partir del centro del disco.

REPLACEMENT PARTS LIST

- Notes:**
1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
 2. Important safety notice:
Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.
 3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
 4. The "S" mark is service standard parts and may differ from production parts.
 5. The parenthesized numbers in the columns of description stand for the quantity per set.

Areas

- * [M] is available in U.S.A.
- * [MC] is available in Canada.
- * [E] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [XL] is available in Australia.
- * [EB] is available in Belgium.
- * [EH] is available in Holland.
- * [EF] is available in France.
- * [Ei] is available in Italy.
- * [EC] is available in Czechoslovakia.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [XM] is available in Central South America.
- * [PA] is available in far East PX.
- * [PE] is available in European Military.
- * [PC] is available in European Audio Club.
- * [XZ] is available in New Zealand.

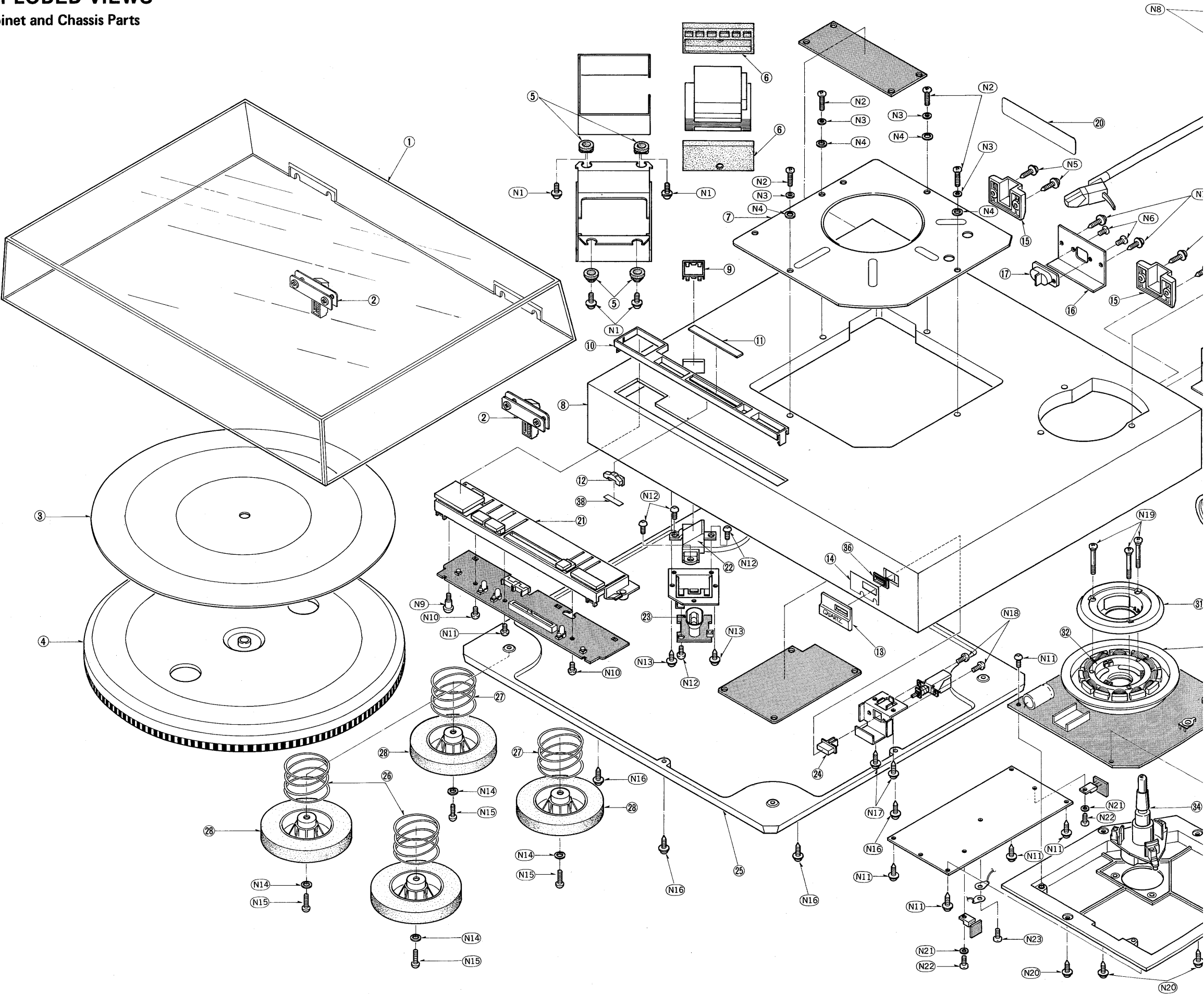
Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN6675	Drive
IC201	AN6680	Control
IC301	AN6682	Pitch Control
IC302	MN4011B	NAND Gate
IC303	MN4027B	JK Flip Flop
IC304	MN4011B	NAND Gate
IC305	MN4516B	4Bit Binary Counter
IC306	AN78M12	Regulator
IC307	AN6914	Operation Amplifier
IC308	MN4027B	JK Flip Flop
IC401	MN4013B	D Flip Flop
TRANSISTORS		
Q1	2SD1265	Regulator
Q2,3	2SD637	Regulator
Q201	2SC1846-R	Regulator
Q202	2SD637	LED Drive
Q203	2SC1328-T	FG Amplifier
Q353,354	2SD636	Stop Control
Q356,357	2SD893A	Cueing Control
Q358	2SD636	Switching
Q371	2SB641	Switching
Q372	2SB643	Stop Control
Q373	2SD636	Stop Control
Q374	2SD636	Switching
Q401	2SD636	Switching
Q601	2SC1684-Q	End Detector
DIODES		
D1	SVDS1RBA20Z	Rectifier
D2	MA1051M	5.1V, Zener
D204	MA162A	Switching
D301	MA1051M	5.1V, Zener
D353	MA162A	Switching
D355,356	MA162A	Switching
D358	MA162A	Switching
D401,402	MA162A	Switching
D403,404,405	SVDSLH54VT3	Reset & Speed Indicator
D501,502,503	SVDSLH54DC3	Strobe
D601	MA162A	Pulse Killer
VARIABLE RESISTORS		
VR201	EVT53MA00B54	Brake Adj., 50kΩ (B)
VR301	EVMH9GA00B53	Pitch Control Adj., 5kΩ (B)
VR401	EWAPF5X05AU4	Pitch Control, 17kΩ
VR601	EVN60AA00B15	Output Voltage Adj., 100kΩ (B)
SWITCHES		
S401~405	EVQQS405K	Start/Stop, Speed Selector, Reset and Cueing
S601	ESB823V	Power
S602 Except for (M, MC)	SFDSHXW01317	Voltage Selector
CRYSTAL		
X201	SVQMS4193	4.193MHz
COILS		
L301,302	SPO305-1R2K	Choke
POWER TRANSFORMER		
T1 (M)	SLT66DTL3A	Power Source
T1 (MC)	SLT66DT14C	Power Source
T1 (Other areas)	SLT66DTE13E	Power Source
FUSE		
F1 (MC Only)	XBA1F16NU14	125V, 1.6A
F1 Except For (M, MC)	XBA2C025TR0	250V, T250mA

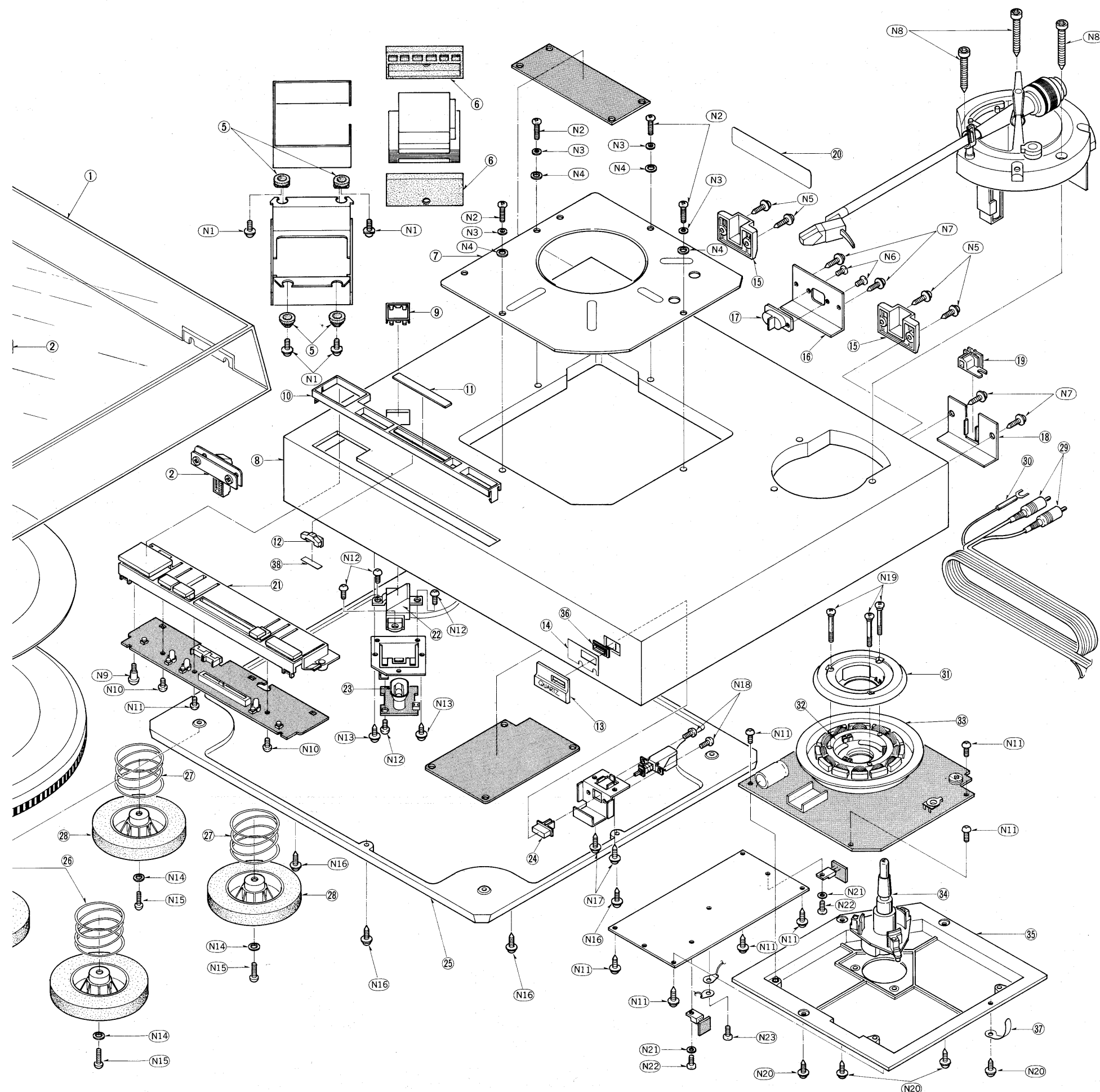
Ref. No.	Part No.	Description
CABINET PARTS		
1	SFADM01N01E	Dust Cover (1)
2	SFATM02N01A	Hinge (2)
3	SFTGM01N01	Turntable Mat (1)
4	SFTEM01N01Z	Turntable Platter (1)
5	SFGCM01N02	Cushion Rubber, Power Transformer (4)
6	SFGCM01N01	Cushion Rubber, Power Transformer (2)
7	SFUPM02N04	Cover, Cabinet (1)
8	SFACM02N01R	Cabinet (1)
9	SFUMM02N05	Guide, Strobe (1)
10	SFUMM02N02	Guide, Operation Button (1)
11	SFUZM02N01	Scale, Pitch Control (1)
12	SFKTM02N01	Knob, Pitch Control (1)
13	SFKBM02N01	Badge, Cabinet (1)
14	SFUZM02N02	Tape, Badge (1)
15	SFUMM02N04	Case, Hige (2)
16	SFUPM01N07	Bracket, AC Socket (1)
17 (M, MC, XL, XA, XM, PA, PE, PC)	SFDJHSC0491	AC Socket (1)
17 (XZ)	SFDJHSC516-1	AC Socket (1)
17 (Other areas)	SFDJHSC0498	AC Socket (1)
18	SFUPM01N08	Bracket, Phono Output Cord (1)
19	SFUMQ34N10	Clamper, Phono Output Cord (1)
20 (M)	SFNNM02M01	Name Plate (1)
20 (MC)	SFNNM02C01	Name Plate (1)
20 (E, EC)	SFNNM02S01	Name Plate (1)
20 (EK, XL, XZ)	SFNNM02G01	Name Plate (1)
20 (XA, XM)	SFNNM02X01	Name Plate (1)
20 (PC)	SFNNM02P02	Name Plate (1)
20 (PA, PE)	SFNNM02P01	Name Plate (1)
20 (Other areas)	SFNNM02R01	Name Plate (1)
21	SFUMM02N01R	Operation Button (1)
22	SFUM130-01	Cover, Strobe (1)
23	SFGZM02N02	Spacer, Strobe L.E.D (1)
24	SFKTM02N02	Button, Power Switch (1)
25	SFAUM02N01	Bottom Board (1)
26	SFQAM02N01	Spring (Front), Insulator (2)
27	SFQAM02N02	Spring (Rear), Insulator (2)
28	SFGAM02N01E	Insulator (4)
29	SFDHM01N01	Phono Output Cord (1)
30	SFEL028-01E	Ground Cord (1)
31	SFMGQ20-01	Cover, Stator Frame (1)
32	SFMGS20-31A	Drive Coil Ass'y (1)
33	SFMZ172-01E	FG Coil Ass'y (1)
34	SFMZM01N01A	Shaft Ass'y, Turntable (1)
35	SFUMM02N03	Base, Drive Circuit Board (1)
36	SFUMM02N06	Bracket, Power Switch (1)
37	SXE513	Clamper, Lead Wires (1)
38	SFUZM02N04	Spacer, Pitch Control Knob (1)
TONEARM PARTS		
40	SFPAM0M102R	Tonearm Ass'y (1)
41	SFPWG0M102A	Counter Weight Ass'y (1)
42	SFPRT0M102E	Tonearm Lift Ass'y (1)

Ref. No.	Part No.	Description
43	SFQA829-03	Spring, Tonearm Lift (1)
44	SFPRT0M101E	Tonearm Rest (1)
45	SFPAB17206	Knob, Anti-Skating (1)
46	SFPKD0M101E	Tonearm Base Ass'y (1)
47	SFPZB0M109	Spacer, Fixing Base (1)
48	SFPAB0M106Z	Solenoid Ass'y (1)
49	SFPAB0M101A	P.U. Base Ass'y (1)
50	SFPKD0M102	Fixing Base, Tonearm Base (1)
51	SFPAB0M104A	P.U. Fixing Plate Ass'y (1)
52	SFPAB0M102E	Base, Sensor (1)
53	SFQA172-52	Spring (1)
54	SFPZB0M103	Holder, Sensor Circuit Board (1)
55	SFPAB0M108	Spacer, Photo Sensor (1)
56	SFGK170-01	Cap (1)
58	EPC-P33S	★ Cartridge (1)
59	EPS-33ES	★ Stylus (1)
60	SFCNC03301	Cover, Stylus (1)
SCREWS, NUT AND WASHERS		
N1	SFXGM02N02	Screw, Power Transformer (4)
N2	Ⓢ XSN3+12BVS	Screw, Cabinet Cover (4)
N3	Ⓢ XWA3BFZ	Washer, Cabinet Cover (4)
N4	Ⓢ XWG3FZ	Washer, Cabinet Cover (4)
N5	XTWS3+20QFZ	Screw, Hinge Case (4)
N6	XTV4+6GFZ	Screw, AC Socket (2)
N7	XTWS3+14QFZ	Screw, AC Cord and Phono Output Cord Holder (4)
N8	SFXGM01N02	Screw, Tonearm Base (3)
N9	SFXG066N01	Screw, (1)
N10	Ⓢ XTV3+10BFN	Screw, Operation Circuit Board (2)
N11	Ⓢ XTV3+8BFN	Screw, Operation P.C.B. and Drive P.C.B. (4)
N12	Ⓢ XTN3+8B	Screw, Strobe P.C.B. (4)
N13	XTWS3+12QFZ	Screw, Strobe P.C.B. (2)
N14	Ⓢ XWA3BFZ	Washer, Insulator (4)
N15	Ⓢ XSN3+16BVS	Screw, Insulator (4)
N16	XTWS3+25QFZ	Screw, Bottom Board (4)
N17	XTWS3+14QFZ	Screw, Power Switch (2)
N18	Ⓢ XTV3+6BFN	Screw, Power Switch (2)
N19	SFXGM02N01	Screw, Stator Coil (3)
N20	SFXGM02N03	Screw, Stator Base (4)
N21	Ⓢ XWA3B	Washer (2)
N22	Ⓢ XSN3+6S	Screw (2)
N23	XYE3+EJ8	Screw (1)
N25	SFPEV0M101	Screw, Lift Ass'y (1)
N26	Ⓢ XTN3+6B	Screw, Tonearm Rest (4)
N27	SFXW701-02	Washer, Anti-Skating Knob (1)
N28	SFPEW17201	Washer, Anti-Skating Knob (1)
N29	XTW26+5E	Screw, Anti-Skating Knob (1)
N30	Ⓢ XWA3B	Washer, Tonearm Ass'y (4)
N31	Ⓢ XSN3+10S	Screw, Tonearm Ass'y (2)
N32	Ⓢ XE4D12FNS	Screw, Fixing Base (2)
N33	Ⓢ XSN3+6S	Screw, PU Fixing Plate (2)
N35	Ⓢ XTW3+10TFZ	Screw, Sensor Base (3)
N36	Ⓢ XSN2+5	Screw, Sensor P.C.B. (2)
N37	Ⓢ XWA2B	Washer, Sensor P.C.B. (2)
N38	SFPEN0P301	Nut, Sensor P.C.B. (2)
N39	Ⓢ XWE26BW	Washer, Sensor P.C.B. (2)
N40	Ⓢ XSN26+6	Screw, Sensor P.C.B. (2)
N41	SFPEV0Q601	Screw, Head Shell (1)

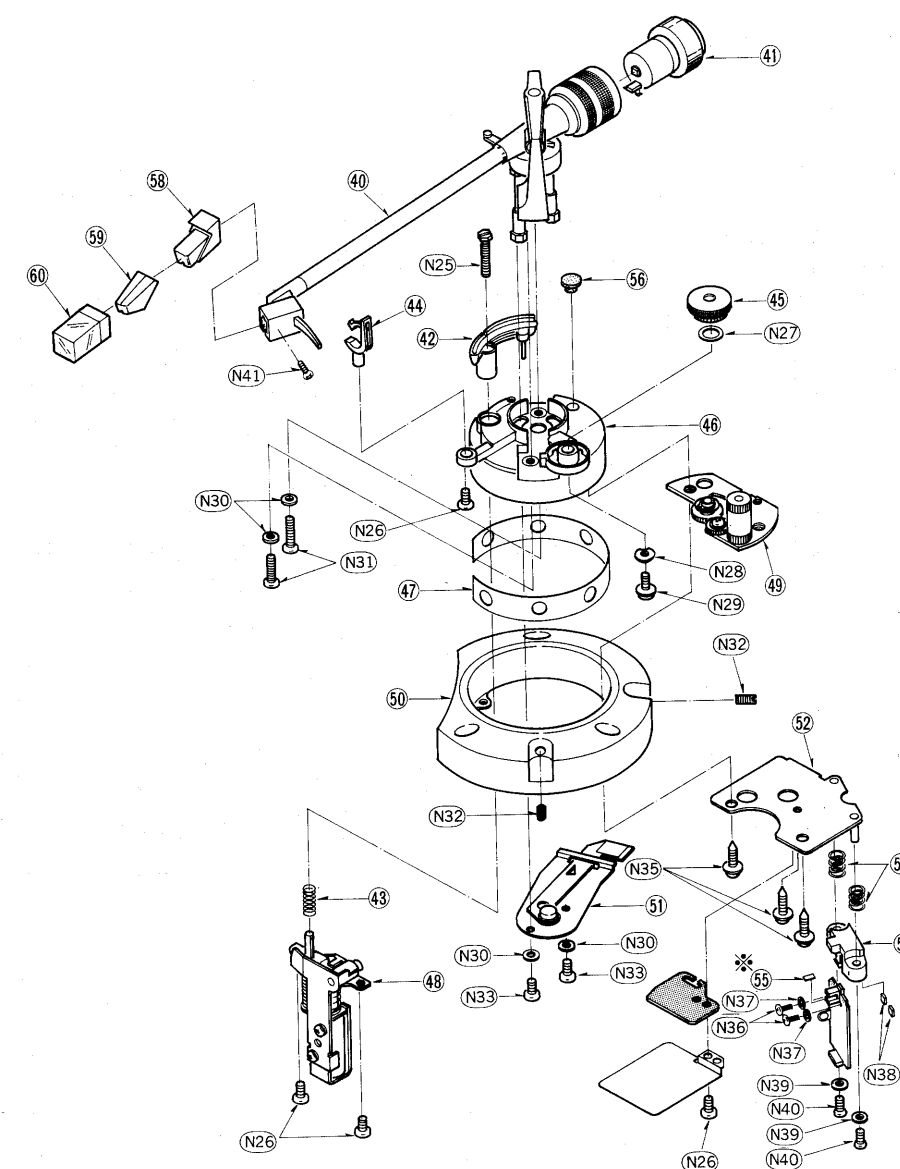
EXPLODED VIEWS
Cabinet and Chassis Parts

Ref. No.	Part No.	Description	
ACCESSORIES			
A1 (M)	SFNUM02M01	Instruction Book	(1)
A1 (MC)	SFNUM02C01E	Instruction Book	(1)
A1 (EK)	SFNUM02G01	Instruction Book	(1)
A1 (PA, PE, PC)	SFNUM02P01E	Instruction Book	(1)
A1 (Ei)	SFNUM02I01	Instruction Book	(1)
A1 (Other areas)	SFNUM02S01	Instruction Book	(1)
A2	SFWE010	45 Adaptor	(1)
A3 (M, MC)	SFDAC05M01	AC Cord	(1)
A3 (EK)	SFDAC05G02	AC Cord	(1)
A3 (XL)	SFDAC05L01	AC Cord	(1)
A3 (XA, XM)	SFDAC05X02	AC Cord	(1)
A3 (PA, PE, PC)	SFDAC05N01	AC Cord	(1)
A3 (XZ)	SRDA007L01	AC Cord	(1)
A3 (Other areas)	SFDAC05E02	AC Cord	(1)
A4 (XA, XM) only	SFDK119118	2 Pin Plug	(1)
A5 (PA, PE, PC) only	QJP0603S	Gimens Adaptor	(1)
PACKING PARTS			
P1 (MC, EF)	SFHPM02C01	Carton Box	(1)
P1 (Other areas)	SFHPM02M01	Carton Box	(1)
P2	SFHMM01N01	Pad(Front),Unit	(1)
P3	SFHMM01N02	Pad(Rear),Unit	(1)
P4	SFHDM01N01	Pad,Turntable Platter	(1)
P5	SFHZM01N05	Pad,Unit(Side)	(1)
P6	SFHZM01M01	Pad,Counter Weight	(1)
P7	SFHZD03M01	Cover Sheet,Dust Cover	(1)
P8	SFYH60X80	Polyethylene Bag, Unit	(1)
P9	SFYH60X60	Polyethylene Bag, Dust Cover	(1)
P10	SFYH40X45	Polyethylene Bag, Turntable Platter	(1)
P11	SPB1083	Polyethylene Bag, Accessories	(1)

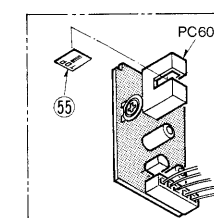




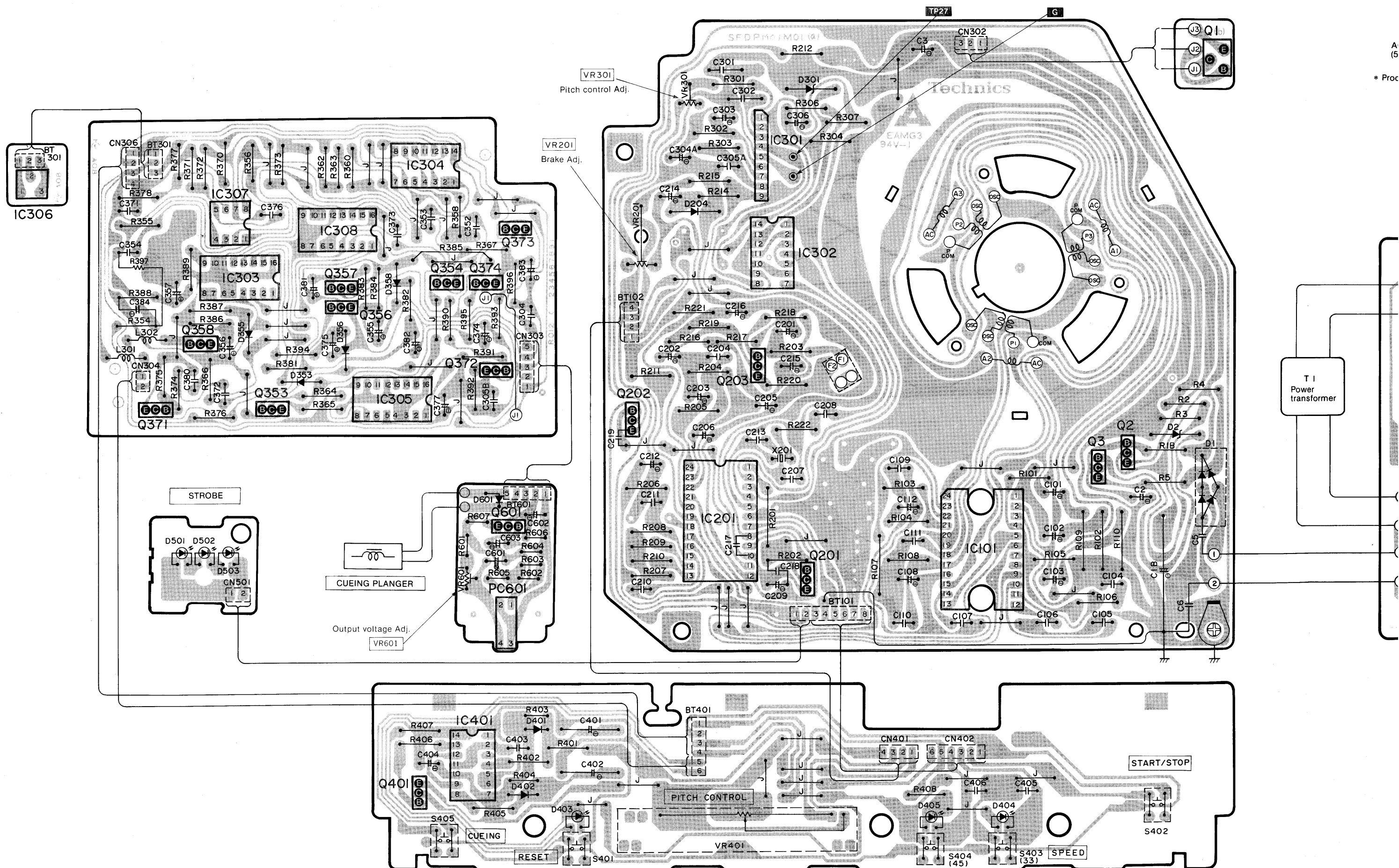
- **Tonearm Parts**

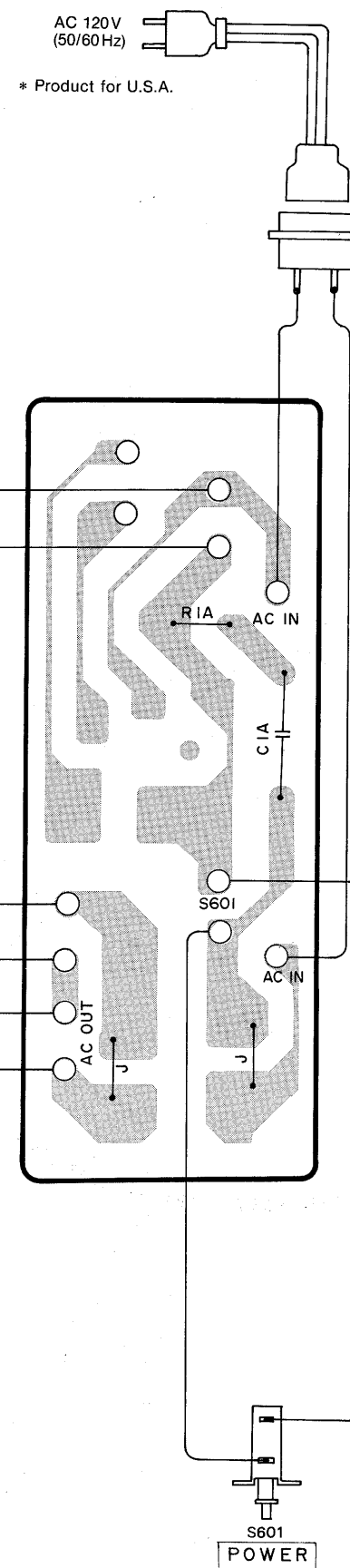
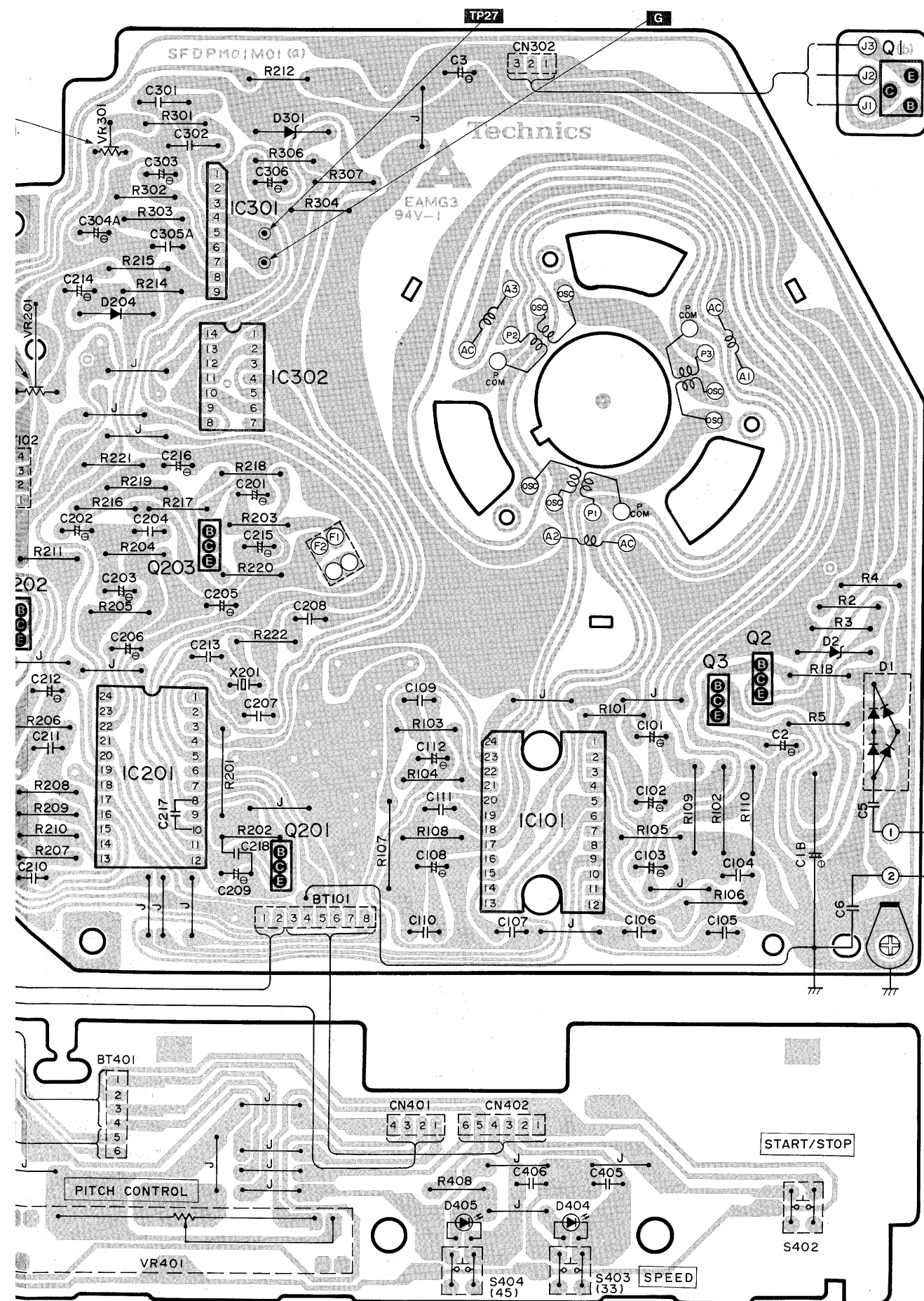


※ Attach the spacer ⑤⑤ of PC601 in the position shown above.

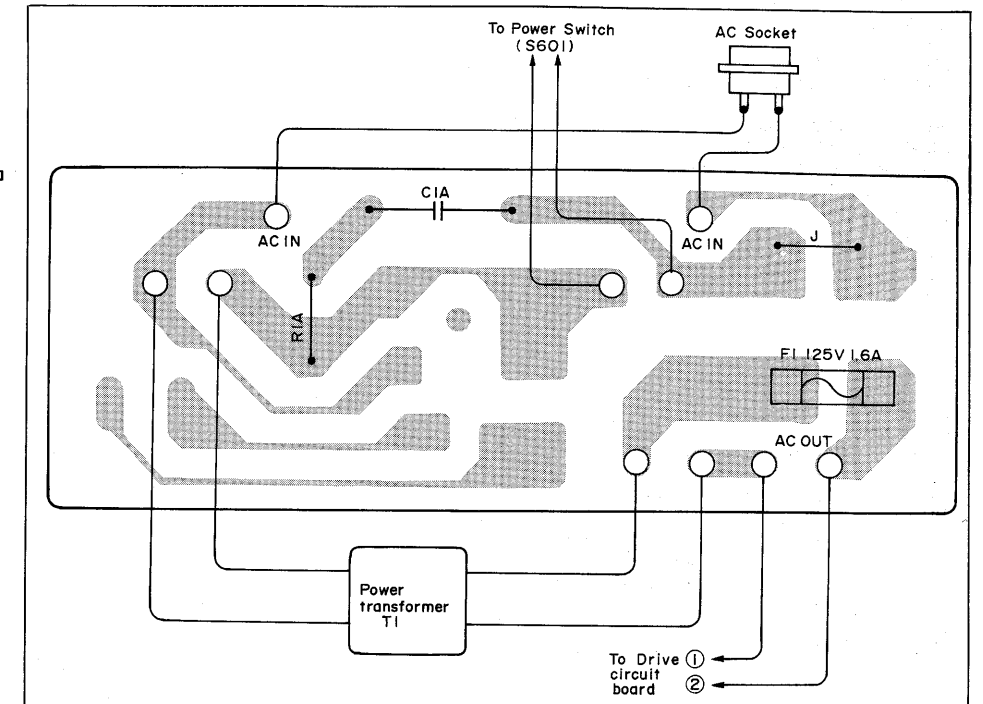


■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

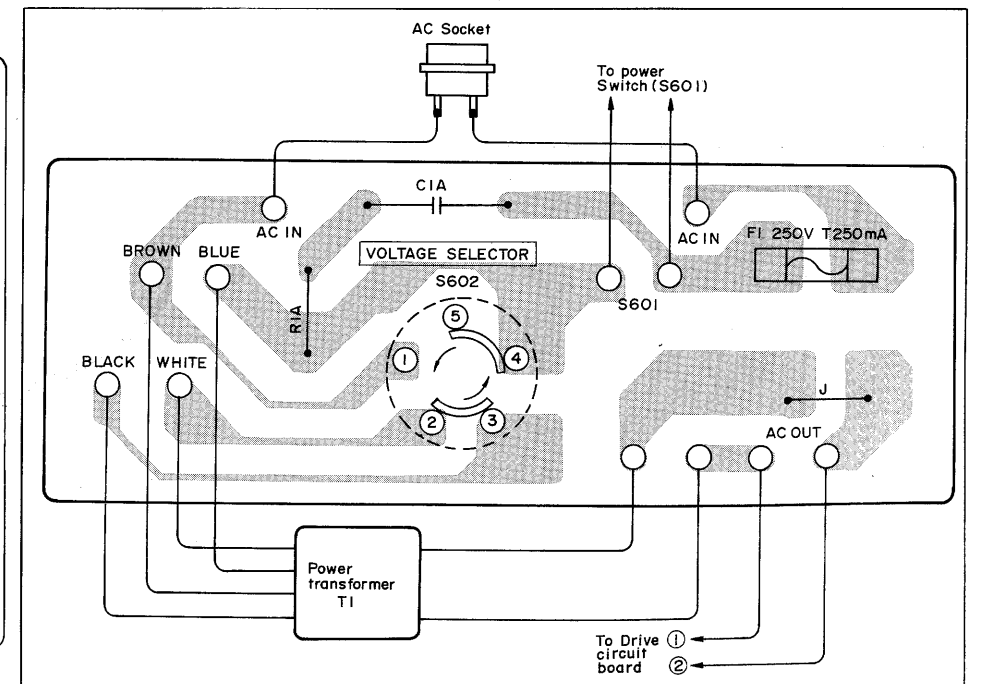




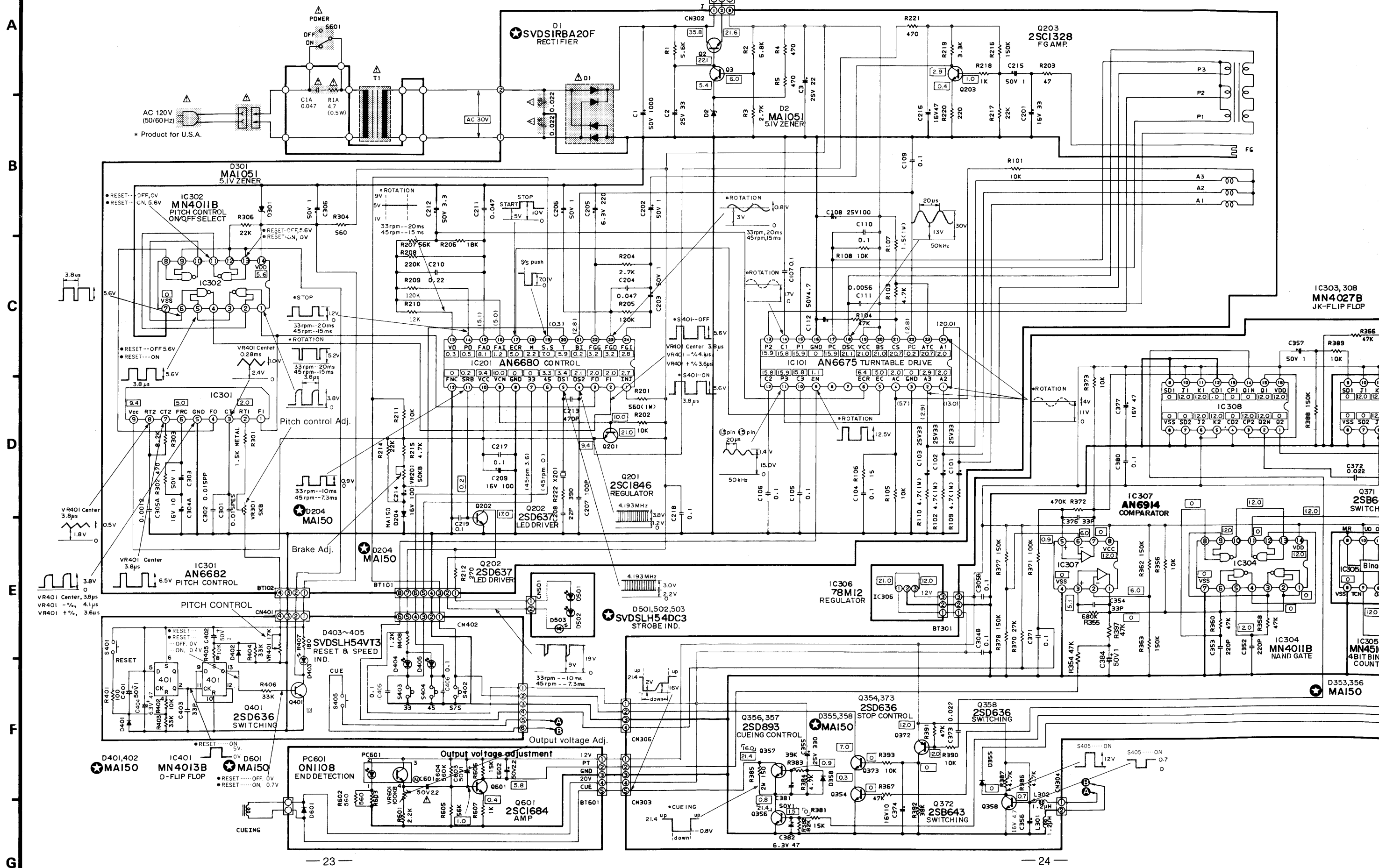
• Power source circuit for Canada.

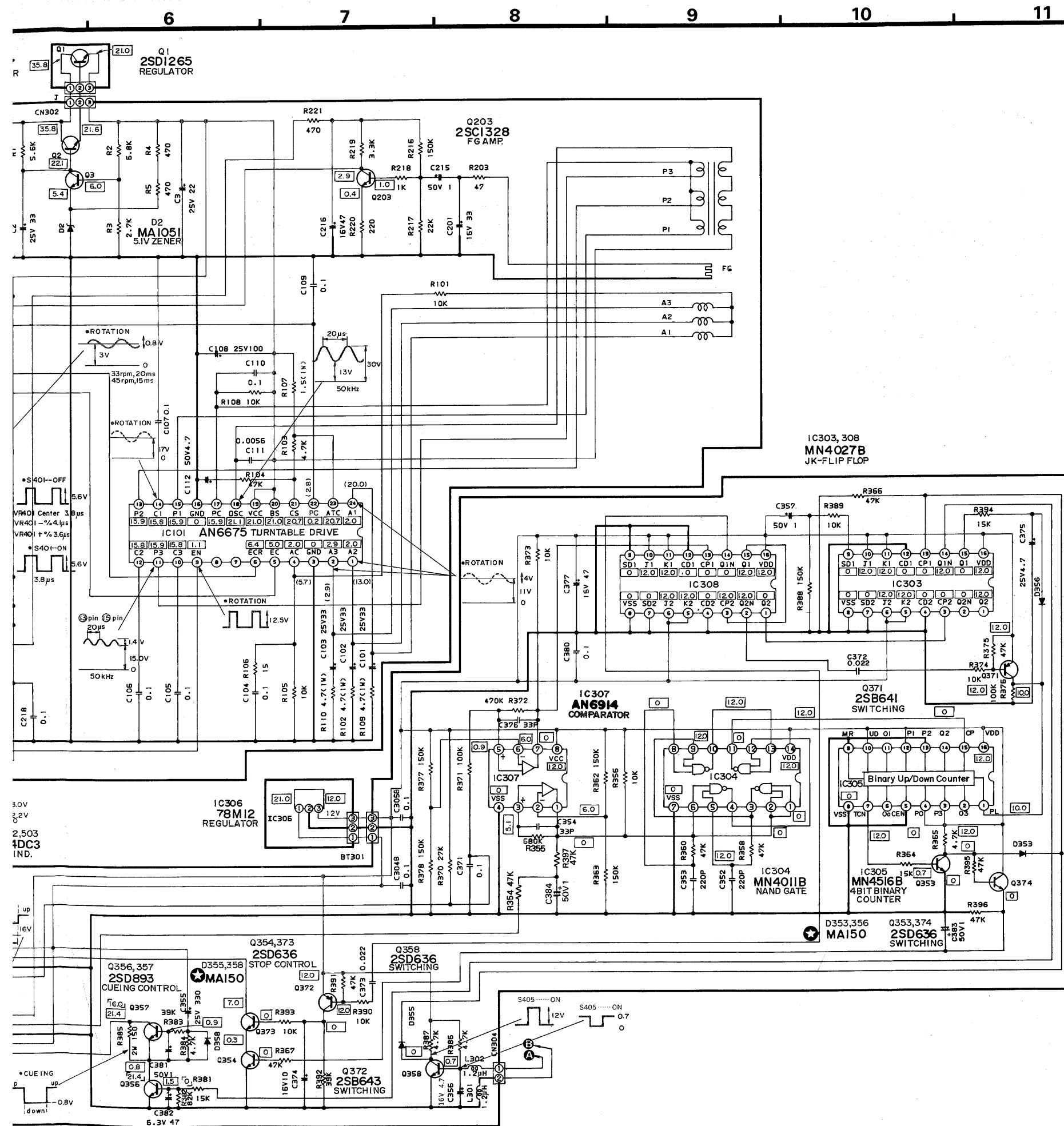


• Power source circuit for other areas.

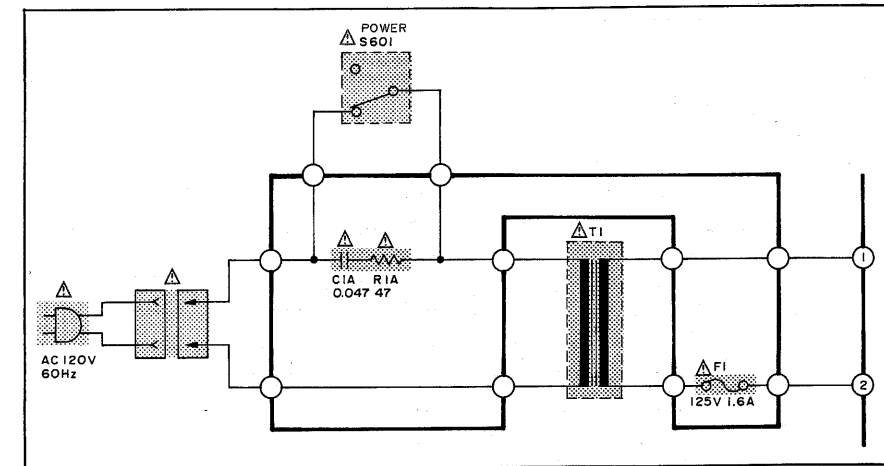


(This schematic diagram may be modified at any time with the development of new technology.)

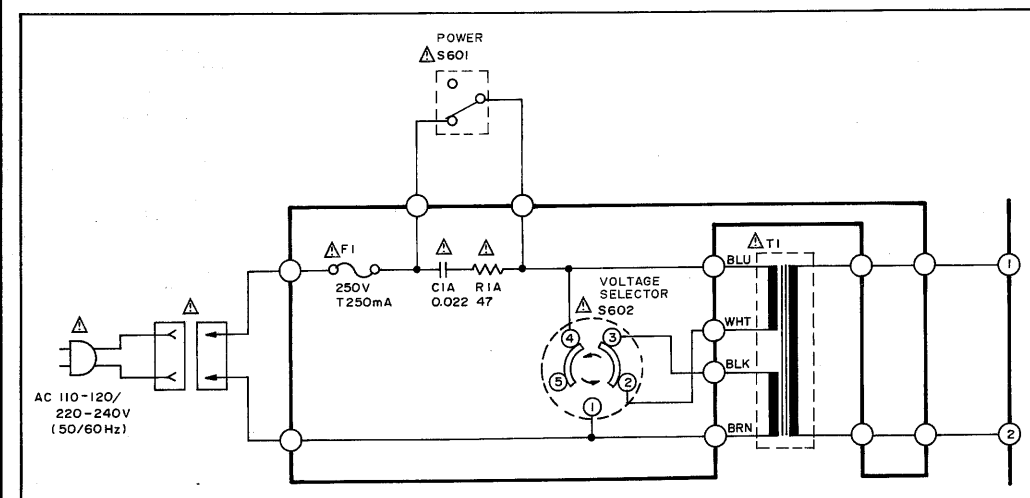




- **Power source circuit for Canada.**



- **Power source circuit for other area.**



Notes:

1. **S301, 302** : Speed selector switch.
2. **S303** : Start/stop switch.
3. **S304** : Cueing switch.
4. **S401** : Reset switch in "off" position.
5. **S601** : Power switch in "on" position.
6. The voltage value, and waveforms are the reference voltage values of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Therefore, the voltage value and waveform may include some error due to the internal impedance of the tester or the measuring set.
 - *  is the voltage when turntable is in stop.
 - *  is the voltage when turntable is in rotation. (at 33 rpm)
 - *  is the voltage when cueing is down.
7.  +B voltage lines.
8. Important safety notice:
Components identified by  mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
9. The part No. of diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with  mark the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement parts list.

IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards. When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

• Product for MC only

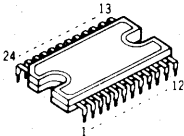
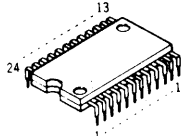
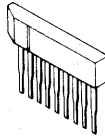
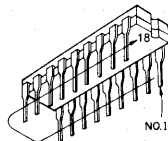
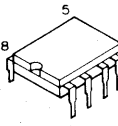
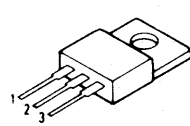
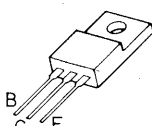
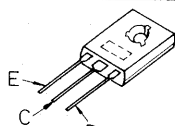
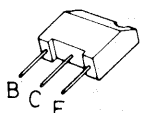
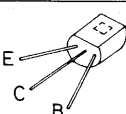
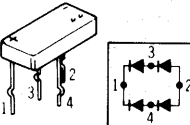
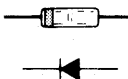
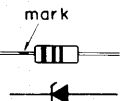
FUSE REPLACEMENT

 Symbol located near the fuse indicates fast operating type. For continued protection against fire hazard, replace with same type fuse. Refer to the symbol for fuse rating.

FUSIBLE REMPLACEMENT

 Le symbole qui se trouve près du fusible signifie un fusible à action rapide. Pour une protection continue contre les risques d'incendie, n'utiliser que des fusibles du même type. Se rapporter au symbole pour la valeur des fusibles.

• Terminal guide of transistors, diodes and IC's

AN6675 	AN6680 	AN6682 	<table border="1"><tr><td>MN4011B</td><td>14 Pin</td></tr><tr><td>MN4027B</td><td>16 Pin</td></tr><tr><td>MN4516B</td><td>16 Pin</td></tr></table> 	MN4011B	14 Pin	MN4027B	16 Pin	MN4516B	16 Pin
MN4011B	14 Pin								
MN4027B	16 Pin								
MN4516B	16 Pin								
AN6914 	AN78M12 	2SD1265 	2SC1846 	2SD637 2SB641 2SD636 2SB643 					
2SC1328 2SD893 	SVDS1RBA20F 	MA150 	MA1051 	SVDSLH54VT3 SVDSLH54DC3 					

■ RESISTORS AND CAPACITORS

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
 - Important safety notice:
Components identified by Δ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
 - This "S" mark is service standard parts and may differ from production parts.
 - Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all area.
 - Unless otherwise specified.
All resistors are in OHMS (Ω) K = 1000 Ω , M = 1000k Ω
All capacitors are in MICROFARADS (μ F) P = 10⁻⁶ μ F.

Areas

- * [M] is available in U.S.A.
- * [MC] is available in Canada.
- * [E] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [XL] is available in Australia.
- * [EB] is available in Belgium.
- * [EH] is available in Holland.
- * [EF] is available in France.
- * [Ei] is available in Italy.
- * [EC] is available in Czechoslovakia.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [XM] is available in Central South America.
- * [PA] is available in far East PX.
- * [PE] is available in European Military.
- * [PC] is available in European Audio Club.
- * [XZ] is available in

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

ERG	1	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	G : $\pm$ 2%
ERG : Metal Oxide	1 : 1W	J : $\pm$ 5%
ERO : Metal Film	S2 : 1/4W	K : $\pm$ 10%
ERQ : Fuse		

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

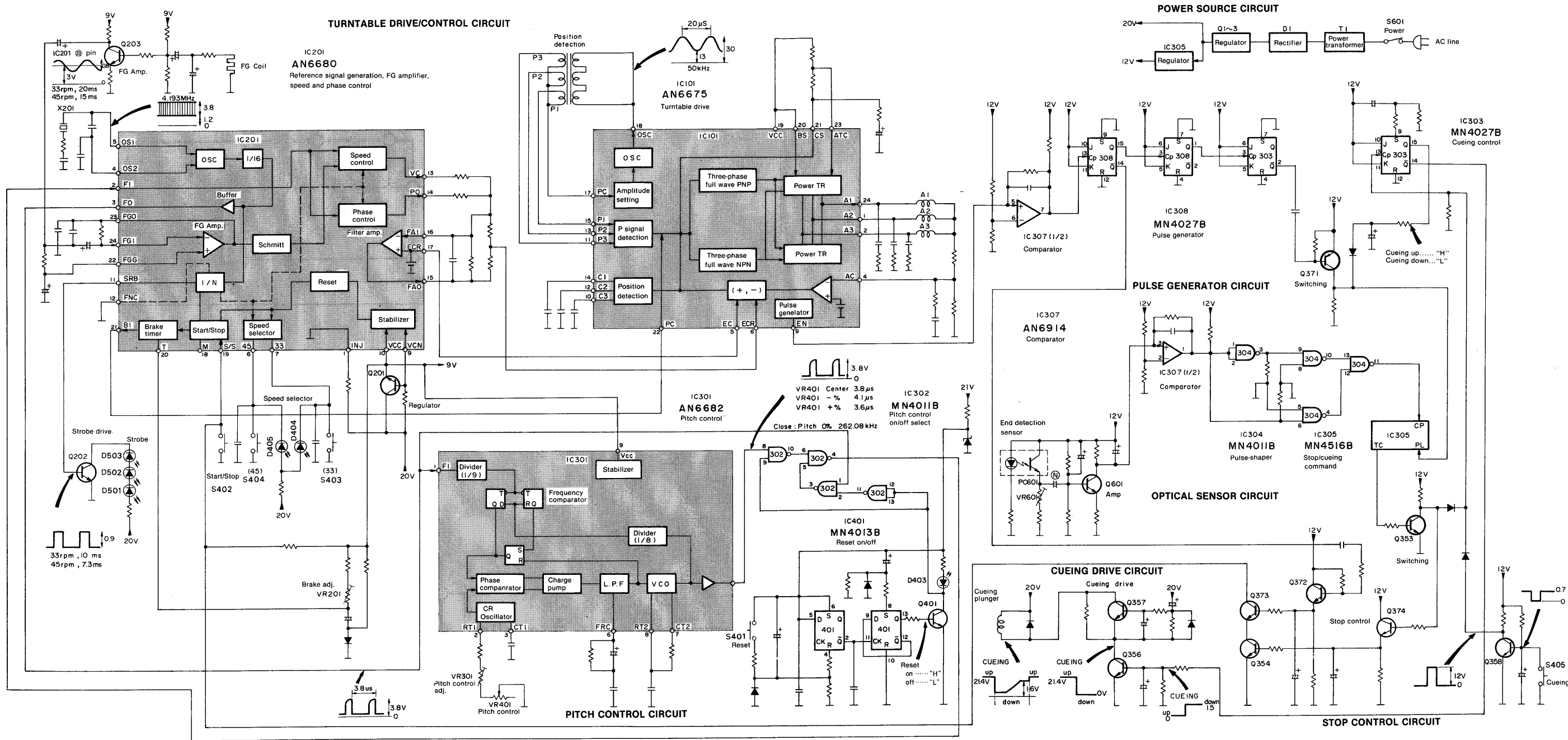
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type	Voltage	Tolerance
ECEA : Electrolytic	OJ : 6.3V	C : $\pm$ 0.25pF
ECEB : Electrolytic	1A : 16V	G : $\pm$ 2%
ECEA...N : Non Polar Electrolytic	1C : 16V	J : $\pm$ 5%
ECCD : Ceramic	1E : 25V	K : $\pm$ 10%
ECCR : Ceramic	25 : 25V	M : $\pm$ 20%
ECKD : Ceramic	1V : 35V	P : +100%, -0%
ECQM : Polyester	1H : 50V	Z : +80%, -20%
ECQP : Polypropylene	MY : 125VAC	
ECES : Electrolytic	ECQP1 : 100V	

● RESISTORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
R1A	Δ S ERD50FJ4R7	4.7K	R208	S ERD25TJ224	220K	R356	S ERD25FJ103	10K	R389,390	S ERD25FJ103	10K
R1B	S ERD25FJ562	5.6K	R209	S ERD25TJ124	120K	R358	S ERD25TJ473	47K	R391	S ERD25TJ473	47K
R2	S ERD25FJ682	6.8K	R210	S ERD25TJ123	12K	R360	S ERD25TJ473	47K	R392	S ERD25TJ393	39K
R3	S ERD25FJ272	2.7K	R211	S ERD25FJ103	10K	R362,363	S ERD25TJ154	150K	R393	S ERD25FJ103	10K
R4,5	S ERD25FJ471	470	R212	S ERD25FJ271	270	R364	S ERD25TJ153	15K	R394	S ERD25TJ153	15K
R101	S ERD25FJ103	10K	R214	S ERD25TJ223	22K	R365	S ERD25FJ472	4.7K	R395,396	S ERD25TJ473	47K
R102	S ERX1ANJ4R7	4.7	R215	S ERD25FJ472	4.7K	R366,367	S ERD25TJ473	47K	R397	S ERD25TJ473	47K
R103	S ERD25FJ472	4.7K	R216	S ERD25TJ154	150K	R370	S ERD25TJ273	27K	R401	S ERD25FJ101	100
R104	S ERD25TJ473	47K	R217	S ERD25TJ223	22K	R371	S ERD25TJ104	100K	R402	S ERD25FJ103	10K
R105	S ERD25FJ103	10K	R218	S ERD25FJ102	1K	R372	S ERD25TJ474	470K	R403,404	S ERD25TJ333	33K
R106	S ERD25FJ150	15	R219	S ERD25FJ332	3.3K	R373,374	S ERD25FJ103	10K	R405	S ERD25FJ103	10K
R107	S ERX1ANJ1R5	1.5	R220	S ERD25FJ221	220	R375	S ERD25TJ473	47K	R406	S ERD25TJ333	33K
R108	S ERD25FJ103	10K	R221	S ERD25FJ471	470	R376	S ERD25TJ104	100K	R407	S ERD25FJ181	180
R109,110	S ERX1ANJ4R7	4.7	R222	S ERD25FJ391	390	R377,378	S ERD25TJ154	150K	R408	S ERD25FJ122	1.2K
R201	S ERG1ANJ561	560	R301	S ERO25CKF1501	1.5K	R381	S ERD25TJ153	15K	R601	S ERD25FJ222	2.2K
R202	S ERD25FJ103	10K	R302	S ERD25FJ471	470	R382	S ERD25TJ823	82K	R602,603	S ERD25FJ561	560
R203	S ERD25FJ470	47	R303	S ERD25FJ822	8.2K	R383	S ERD25TJ393	39K	R604	S ERD25TJ564	560K
R204	S ERD25FJ272	2.7K	R304	S ERD25FJ561	560	R384	S ERD25FJ472	4.7K	R605	S ERD25TJ563	56K
R205	S ERD25TJ124	120K	R306	S ERD25TJ223	22K	R385	S ERG2ANJ151	150	R606	S ERD25TJ153	15K
R206	S ERD25TJ183	18K	R354	S ERD25TJ473	47K	R386,387	S ERD25FJ472	4.7K	R607	S ERD25FJ102	1K
R207	S ERD25TJ563	56K	R355	S ERD25TJ684	680K	R388	S ERD25TJ154	150K			

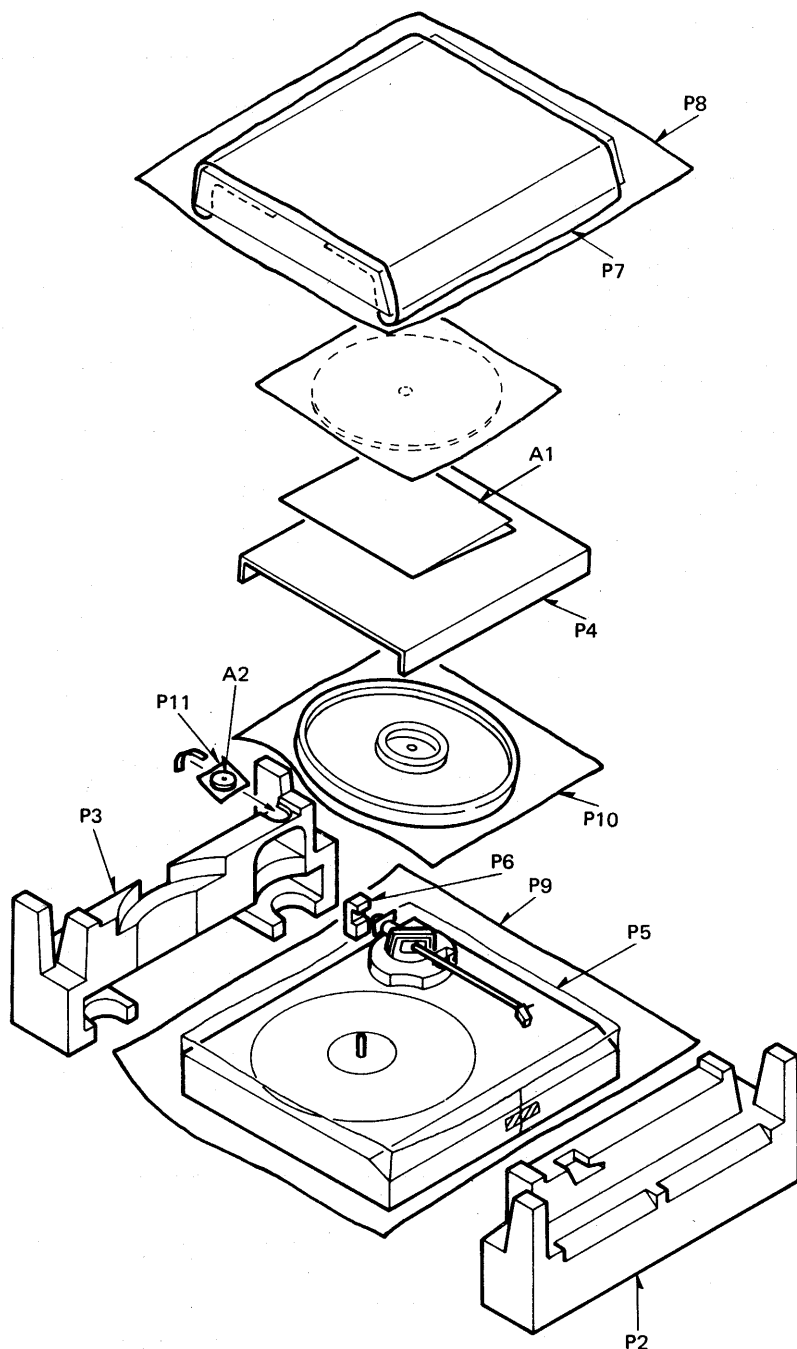
BLOCK DIAGRAM



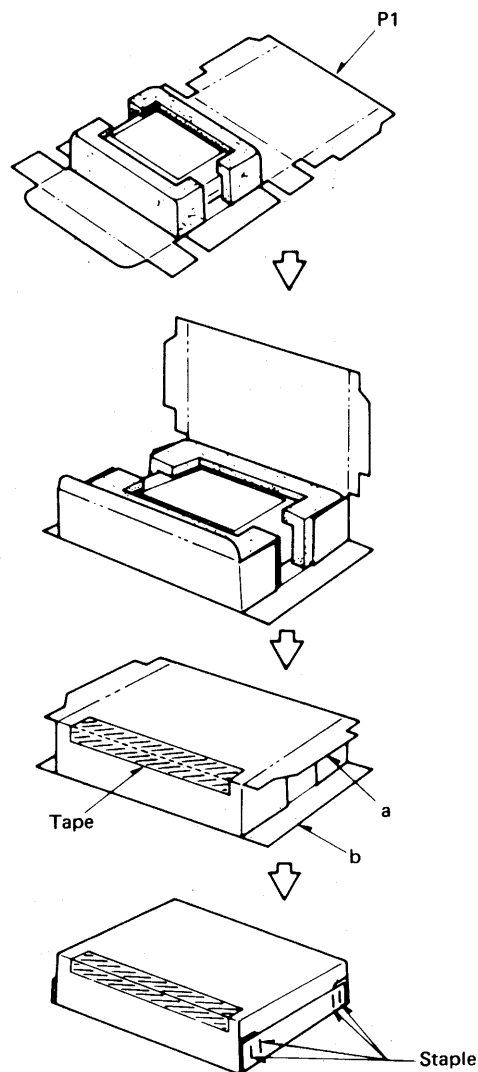
CAPACITORS

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
C1A(MMC)	ECQU1A473ME	0.047	C202,203	ECEA1HU010	1	C301	ECQP1153JZ	0.015	C375	ECEA1VU4R7	4.7
C1A(XA, XM, PA, PE, PC)	ECQE2A223ME	0.022	C204	ECQM1H473JZ	0.047	C302	ECQM1H153JZ	0.015	C376	ECCD1H330K	33P
C1A(Other areas)	ECQU2A223MF	0.022	C205	ECEA0JU221	220	C303	ECEA1HU010	1	C377	ECEA1CU470	47
C1B	ECEB1HU102	1000	C206	ECEA1HU010	1	C304A	ECEA1HU100	10	C378,379	ECFR1H104ZF	0.1
C2	ECEA1EU330	33	C207	ECCD1H101K	100P	C304B	ECQM1H104JZ	0.1	C380	ECFR1H104ZF	0.1
C3	ECEA1EU220	22	C208	ECCD1H220K	22P	C305A	ECQM1H122JZ	0.0012	C381	ECEA1HU010	1
C5,6	ECQM1223KZ	0.022	C209	ECEA1CU101	100	C305B	ECQM1H104JZ	0.1	C382	ECEA0JU470	47
C101,102	ECEA1EU330	33	C210	ECQM1H224JZ	0.22	C306	ECEA1HU010	1	C383	ECEA1HU010	1
C103	ECEA1EU330	33	C211	ECQM1H473JZ	0.047	C352,353	ECCD1H221K	220P	C384	ECEA1HU010	1
C104,105	ECQM1H104JZ	0.1	C212	ECEA1HU3R3	3.3	C354	ECCD1H330K	33P	C401,402	ECEB1HU010	1
C106,107	ECQM1H104JZ	0.1	C213	ECCD1H471K	470P	C355	ECEA1EU331	330	C403	ECCD1H330K	33P
C108	ECEA1EU101	100	C214	ECEA1CU101	100	C356	ECEA50Z4R7	4.7	C404	ECEA0JU470	47
C109,110	ECQM1H104JZ	0.1	C215	ECEA1HU010	1	C357	ECEA1HU010	1	C405,406	ECFR1H104ZF	0.1
C111	ECQM1H562JZ	0.0056	C216	ECEA1CU470	47	C371	ECQM1H104JZ	0.1	C601	ECEA1HN2R2S	2.2
C112	ECEA1HU4R7	4.7	C217,218	ECKD1H104KB	0.1	C372,373	ECQM1H223JZ	0.022	C602	ECEA1HU2R2	2.2
C201	ECEA1CU330	33	C219	ECKD1H104KB	0.1	C374	ECEA1CU100	10	C603	ECEA1HU010	1

■ 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.

