Original HMK-229

US Model
Canadian Model

STEREO MUSIC SYSTEM

SPECIFICATIONS

GENERAL

Power Requirements:	120 V ac, 60 Hz
Power Consumption:	60 W
Dimensions:	Approx. 598 (w) x 200 (h) x 435 (d) mm 23 5/8 (w) x 7 7/8 (h) x 17 1/8 (d) inches including projecting parts and controls
	Approx. 598 (w) x 515 (h) x 475 (d) mm 23 5/8 (w) x 20 3/8 (h) x 18 3/4 (d) inches with the top cover fully opened
Weight:	Approx. 10.1 kg (22 lb 4 oz) net Approx. 11.5 kg (25 lb 5 oz) in shipping carton without speakers

TUNER SECTION

Circuit System:	FM stereo, fm/am superheterodyne tuner	
Frequency Range:	FM	87.5 – 108 MHz
	AM	530 – 1,605 kHz
Antennas:	FM	300Ω balanced terminals, equipped with ac line antenna
	AM	Built-in ferrite-rod antenna, external antenna terminal
Intermediate Frequency:	FM	10.7 MHz
	AM	455 kHz
Sensitivity:	FM	2.2 μV (7 dB) (S/N = 30 dB)
	AM	250 μV/m (48 dB/m) (S/N = 20 dB, built-in antenna)

AMPLIFIER SECTION

Circuit System:	SEPP OTL power amplifier	
Inputs: (sensitivity /impedance)	MIC for low impedance microphone	
	AUX 220 mV/47 kΩ	
Outputs: (output voltage /impedance)	REC OUT:	220 mV/10 kΩ
	HEADPHONES:	Accepts headphones of 8 Ω or more
	SPEAKER:	Accepts 8 Ω speakers
Tone Controls:	BASS	±10 dB at 100 Hz
	TREBLE	±10 dB at 10 kHz

Power Output and Total Harmonic Distortion: With 8 Ω loads, both channels from 100 Hz to 20,000 Hz; rated 9 watts per channel minimum RMS power, with no more than 5 % total harmonic distortion

– 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.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

SONY®
SERVICE MANUAL

RECORD PLAYER SECTION

Turntable:	BSR C-129R2 auto/manual changer 28 cm (11") dia.
Speeds:	33 1/3, 45 and 78 rpm
Cartridge:	VX-60G (ceramic type)
Stylus:	ND-60G (conical, 0.5 mil diamond)
Tracking Force:	3.5 g ± 0.5 g (3.5 g recommended)

CASSETTE RECORDER SECTION

Recording System:	4-track 2-channel stereo/monaural
Wow and Flutter:	Less than 0.18 % wrms

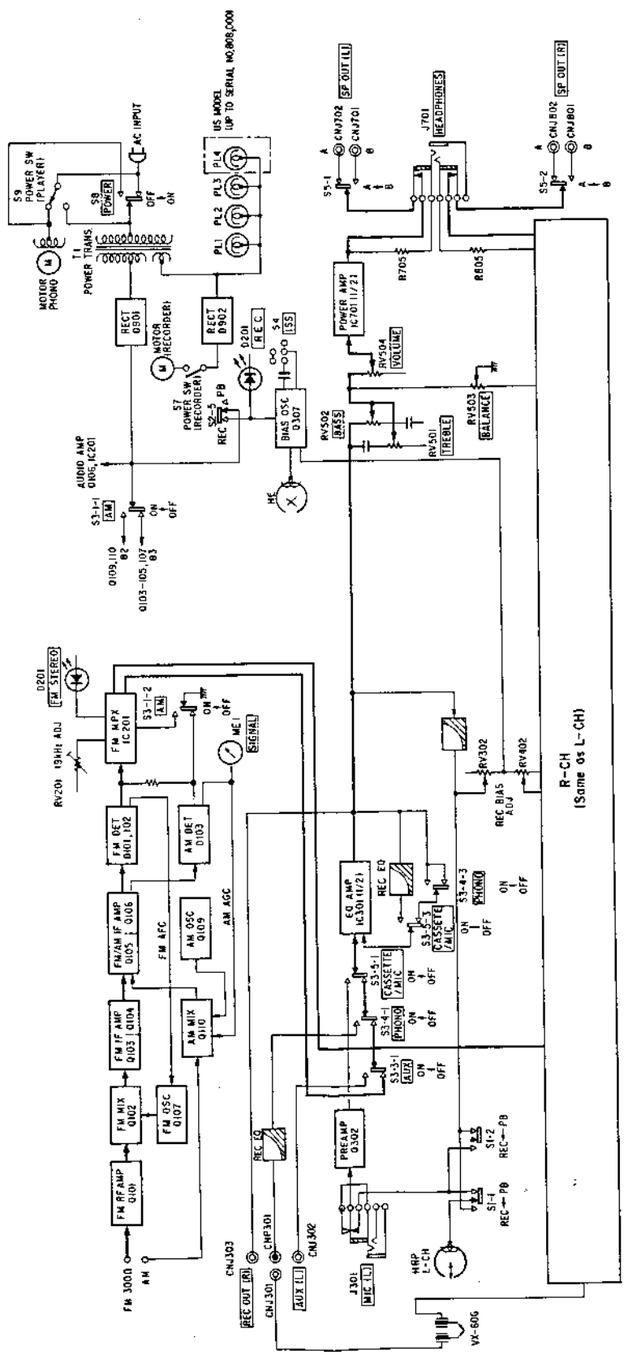
SPEAKER SECTION

	SS-440	SS-330	SS-220 SS-27 (Canadian model)
System	2-way with passive radiator 20 cm (8") woofer, cone type 5 cm (2") tweeter, cone type		1-way with passive radiator 20 cm (8") cone type
Impedance	8 ohms		
Power handling capacity	Maximum 40 W		
Dimensions per speaker, net (Approx.) (w/h/d)	369 x 650 x 274 mm (14 1/2 x 25 5/8 x 10 3/4 inches)	320 x 580 x 213 mm (12 5/8 x 22 7/8 x 8 3/8 inches)	300 x 500 x 193 mm (11 7/8 x 19 3/4 x 7 5/8 inches)
Weight (Approx.) per speaker net	9 kg (19 lb 13 oz)	6.9 kg (15 lb 3 oz)	5.4 kg (11 lb 14 oz)
in shipping carton	20.4 kg (45 lb)	15.5 kg (34 lb 3 oz)	12 kg (26 lb 7 oz)

0 dB = 0.775 V

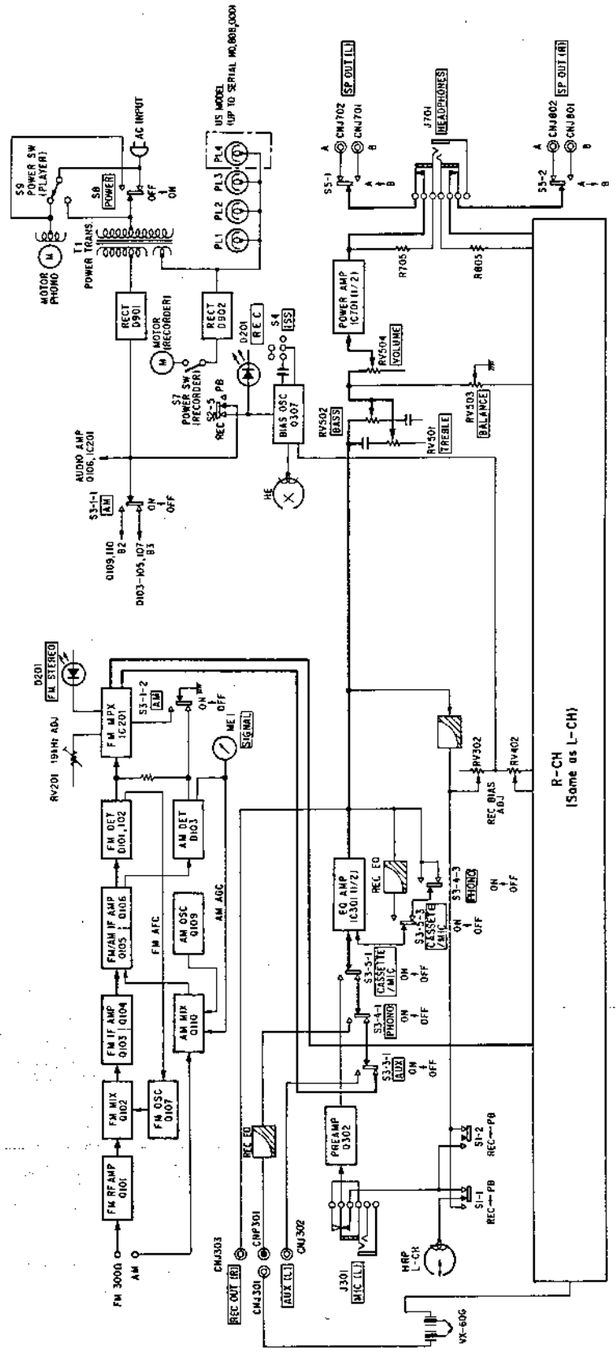
SECTION 1
BLOCK DIAGRAM

1-1. BLOCK DIAGRAM



SECTION 1
BLOCK DIAGRAM

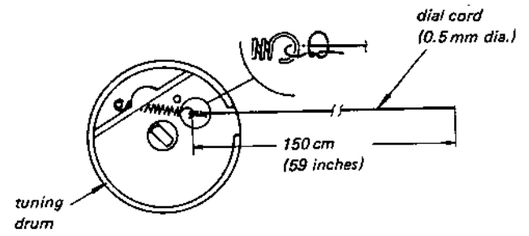
1-1. BLOCK DIAGRAM



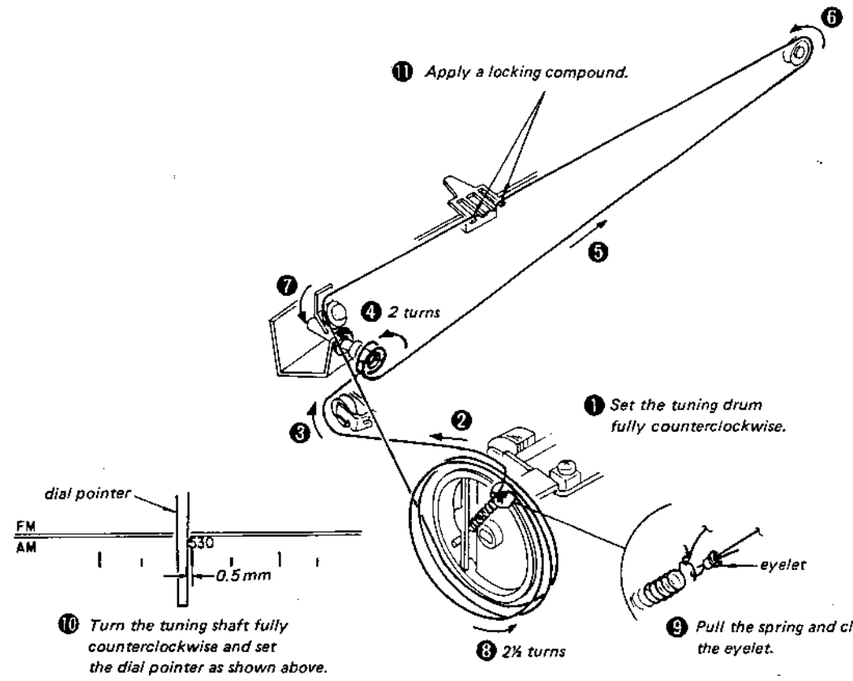
SECTION 2
DISASSEMBLY

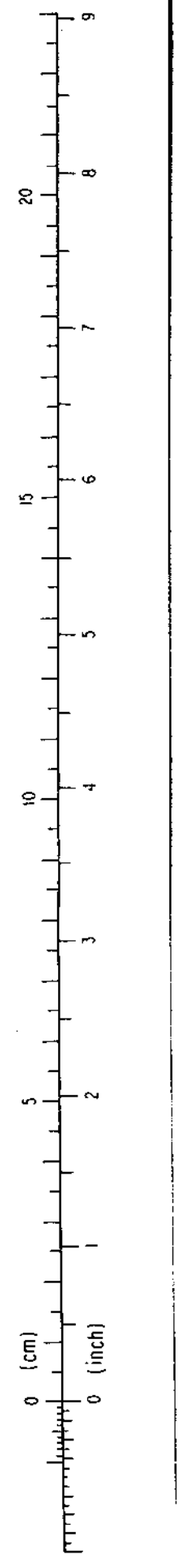
2-1. DIAL CORD STRINGING

(1) Dial Cord Preparation



(2) Stringing

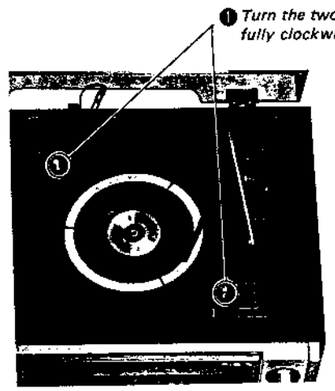


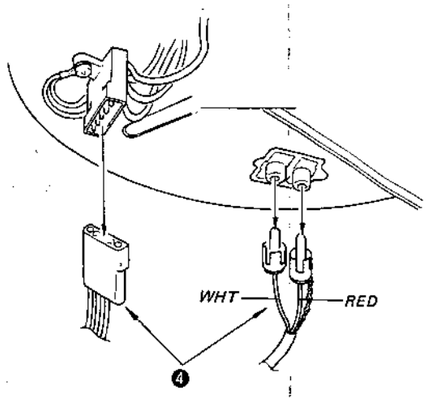


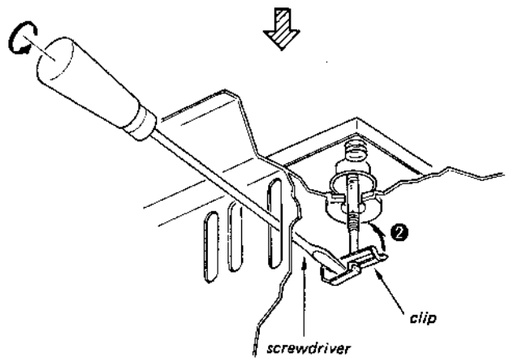
2-2. REMOVAL

- Follow the disassembly procedure in the numerical order given.

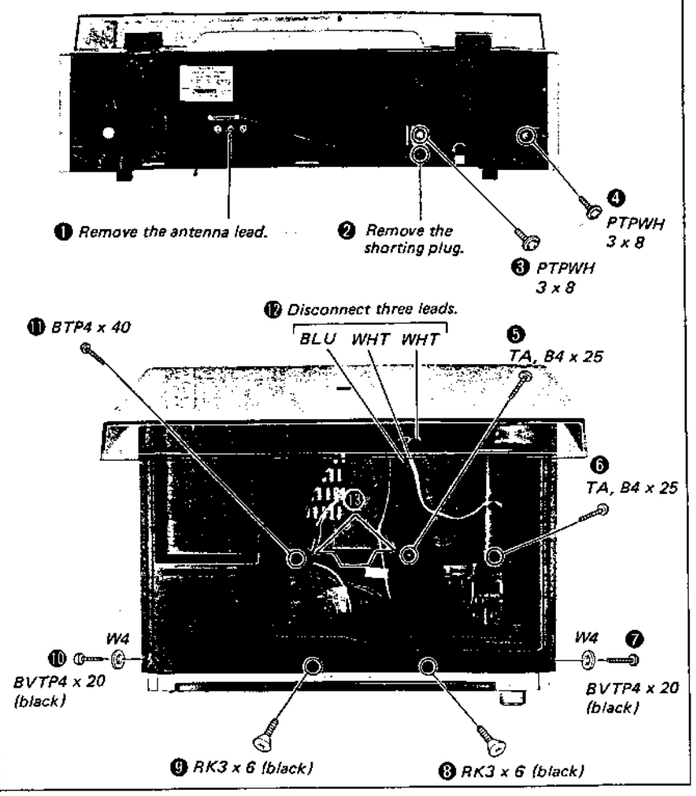
Record Player Removal



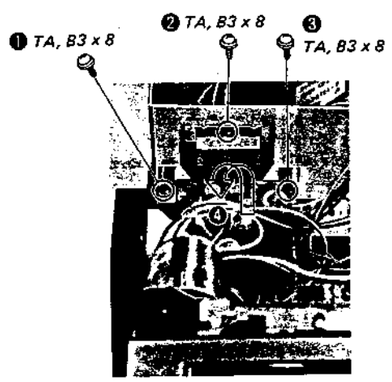




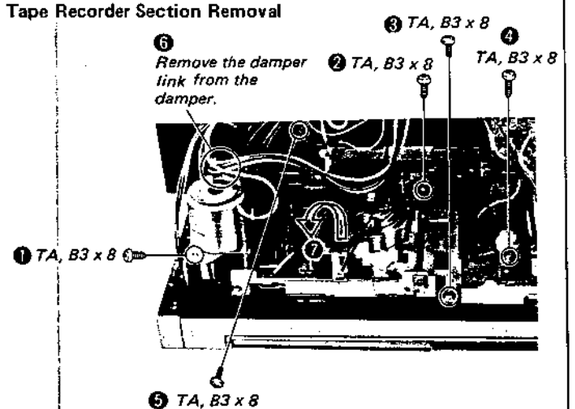
Cabinet Removal



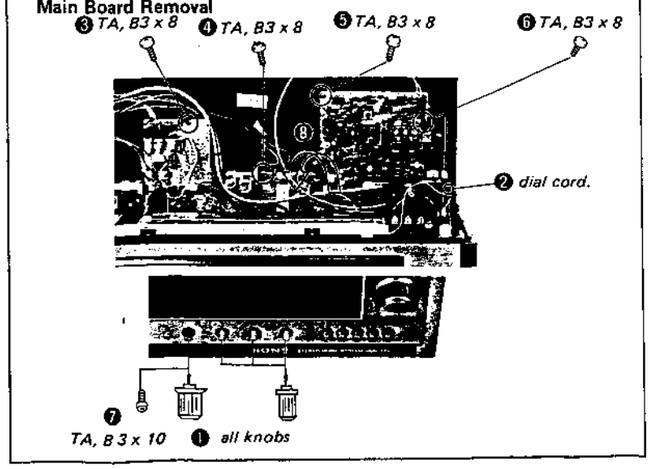
Power Supply/Power Amp Board Removal



Tape Recorder Section Removal



Main Board Removal



SECTION 3
ADJUSTMENTS

3-1. TAPE RECORDER SECTION (1)

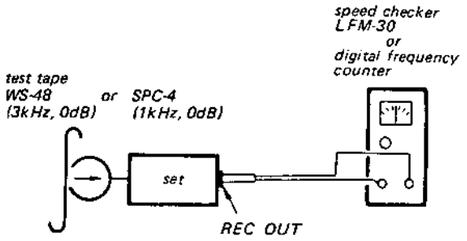
Tape Speed Adjustment

Setting:

VOLUME control: mechanical mid

Procedure:

Mode: playback

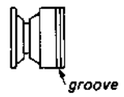


Specification:

Test tape	Speed checker	Digital frequency counter
WS-48	−2.0 to +2.5%	2,940 – 3,075 Hz
SPC-4		980 – 1,025 Hz

Frequency difference between beginning and end of tape should be within { 1% (30 Hz) . . . . WS-48. 1% (10 Hz) . . . . .SPC-4.

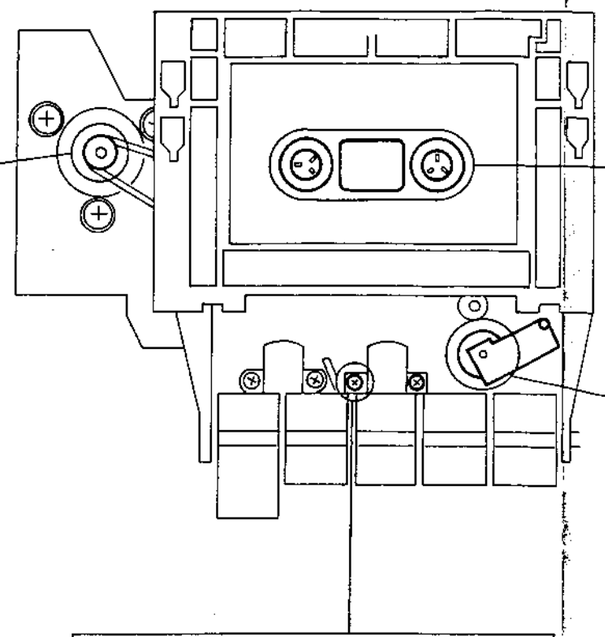
If necessary, replace the motor pulley.



Motor pulley Part No.	Grooves	Tape speed
3-549-088-01	1	up ↑
3-549-088-11	none	
3-549-088-21	2	down

PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab:
   record/playback head, erase head, capstan, pinch roller, rubber belts
2. Demagnetize the record/playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.



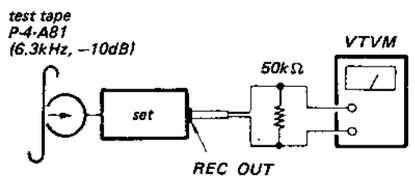
Record/playback Head Azimuth Adjustment

Setting:

VOLUME control: mechanical mid
FUNCTION switch: CASSETTE

Procedure:

1. Mode: playback



2. Turn the adjustment screw for maximum VTVM reading.

Note: Several peaks may appear, take the highest.

Forward Torque Measurement

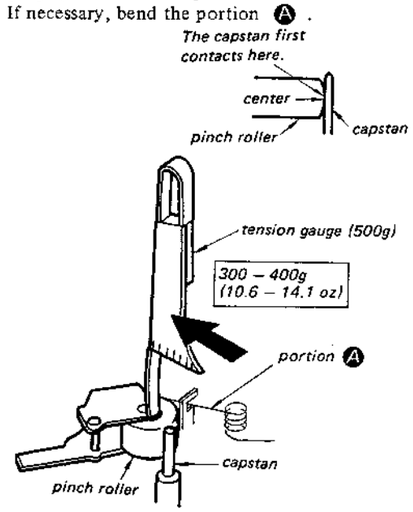
Torque meter	Meter reading
SONY CQ-101A, 102A, 103A	25 – 60g·cm (0.35 – 0.83 oz·inch)

Fast Forward and Rewind Torque Measurement

Torque meter	Meter reading
SONY CQ-201A	60 – 110g·cm (0.83 – 1.52 oz·inch)

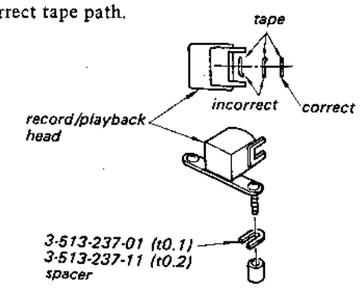
Pinch Roller Pressure Adjustment
– playback mode –

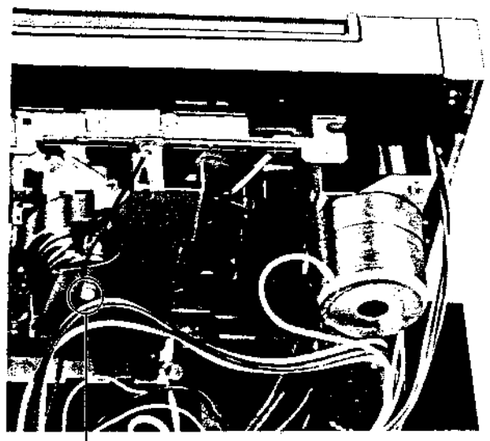
1. Pull the tension gauge.
2. Slowly return the pinch roller and read the tension gauge just when the pinch roller starts to rotate.
3. If necessary, bend the portion Ⓐ .



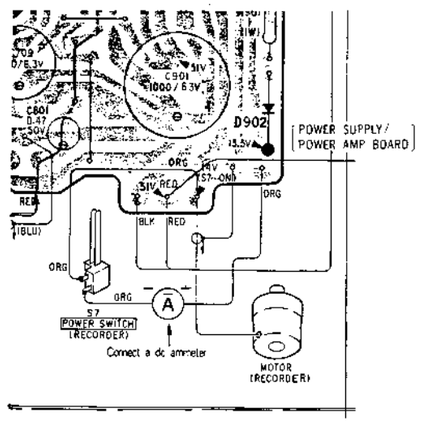
Tape Path Adjustment
– playback mode –

Adjust the head height with a spacer to obtain a correct tape path.





Flywheel Thrust Play Adjustment
– playback mode –



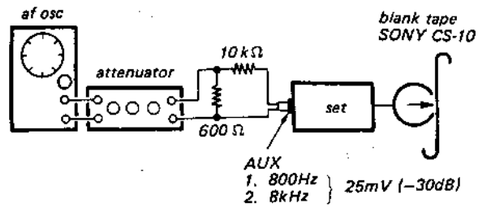
1. Turn the screw counterclockwise until the screw tip is detached from the flywheel shaft.
2. Gradually turn the screw clockwise to the position where the motor current suddenly increases.
3. Then, turn the screw counterclockwise about ¼turn from the position obtained in step 2.

TAPE RECORDER SECTION (2)

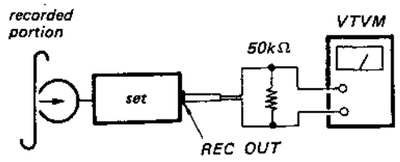
Record Bias Adjustment

Procedure:

1. Mode: Record



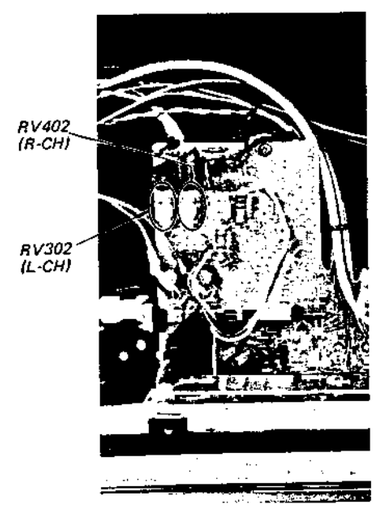
2. Mode: Playback



Adjust RV302 (L-CH) and RV402 (R-CH) to make 800Hz and 8kHz signal output levels equal.
Level difference between the two output levels: within ±1dB

Adjustment Location:

main board (component side)



3-2. RADIO SECTION

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

FM IF ALIGNMENT 1 (10.7MHz with modulation)
Adjust for maximum reading on VOM ①.
IFT101

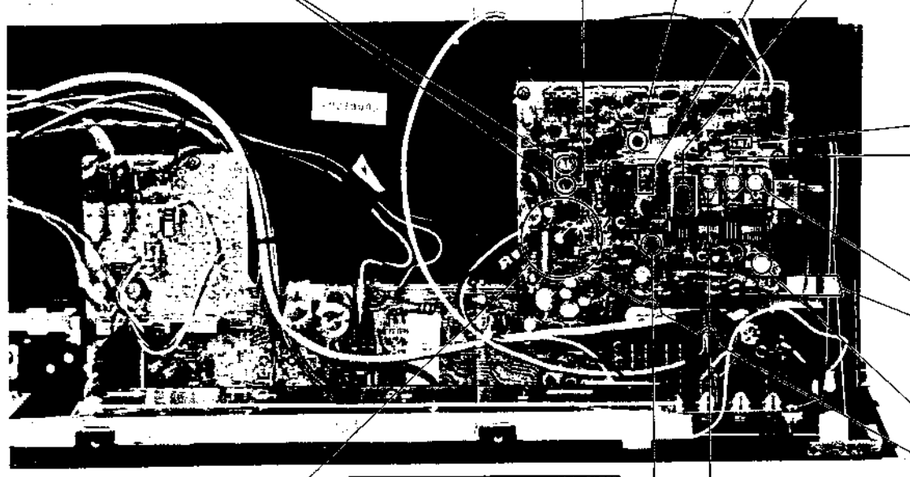
FM IF ALIGNMENT 2 (10.7MHz with no modulation)
Adjust for 0 V dc reading on VOM ②.
IFT101 (Secondary)

AM IF ALIGNMENT	
Adjust for maximum reading on VOM ①.	
IFT103	455kHz

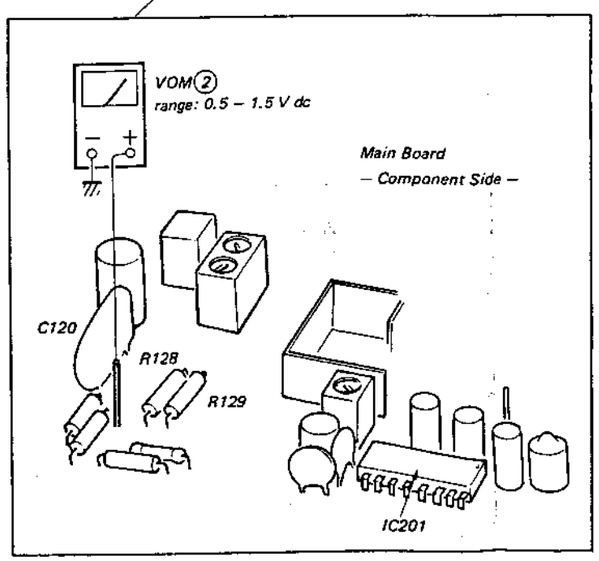
FM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM ①.	
L103	87.1MHz
CT102	108.5MHz

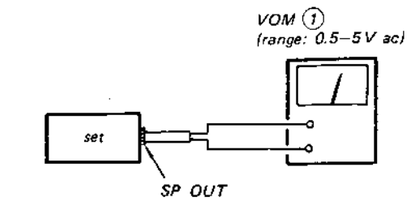
FM TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM ①.	
L101	87.1MHz
CT101	108.5MHz

AM TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM ①.	
CT103	1,400kHz
L104	620kHz

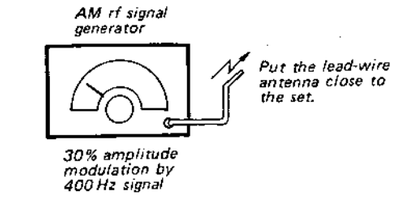


AM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM ①.	
520kHz	L105
1,680kHz	CT104

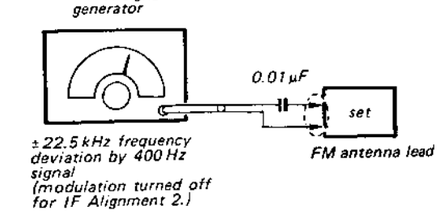




AM SECTION



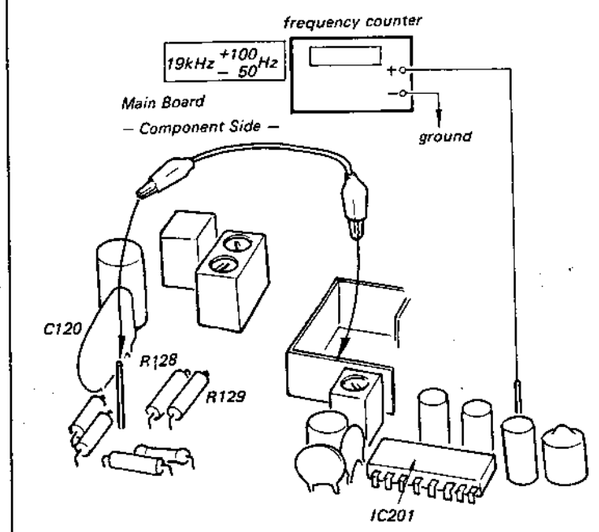
FM SECTION



19 kHz ADJUSTMENT

Setup:
Function button: FM

1. Short-circuit the test point to ground.
2. Adjust RV201 for 19kHz $^{+100}_{-\ 50}$Hz on the counter.

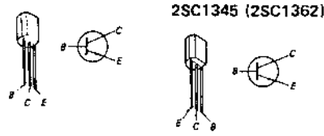


SECTION 4
DIAGRAMS

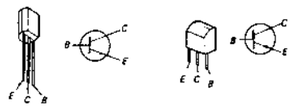
4-1. MOUNTING DIAGRAM
– Conductor Side –

Replacement Semiconductors
For replacement, use semiconductors except in ( ).

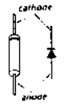
Q101–110: 2SC710 **Q302, 402: 2SC1345 (2SC1362)**



Q307: 2SD438 **(2SD438E)**

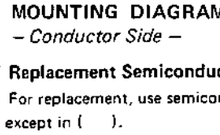


D101, 102, D202 : 1S1555 (1T40)

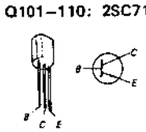


D103: 1T22AM (1T22A) **D201, 305: SLP131B**

D902: 10E2 **(RA1Z)**

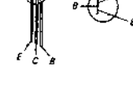


D901: S2VB20

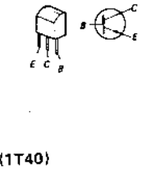


IC201: LA3350 (LA3350A)

IC301: LA3122



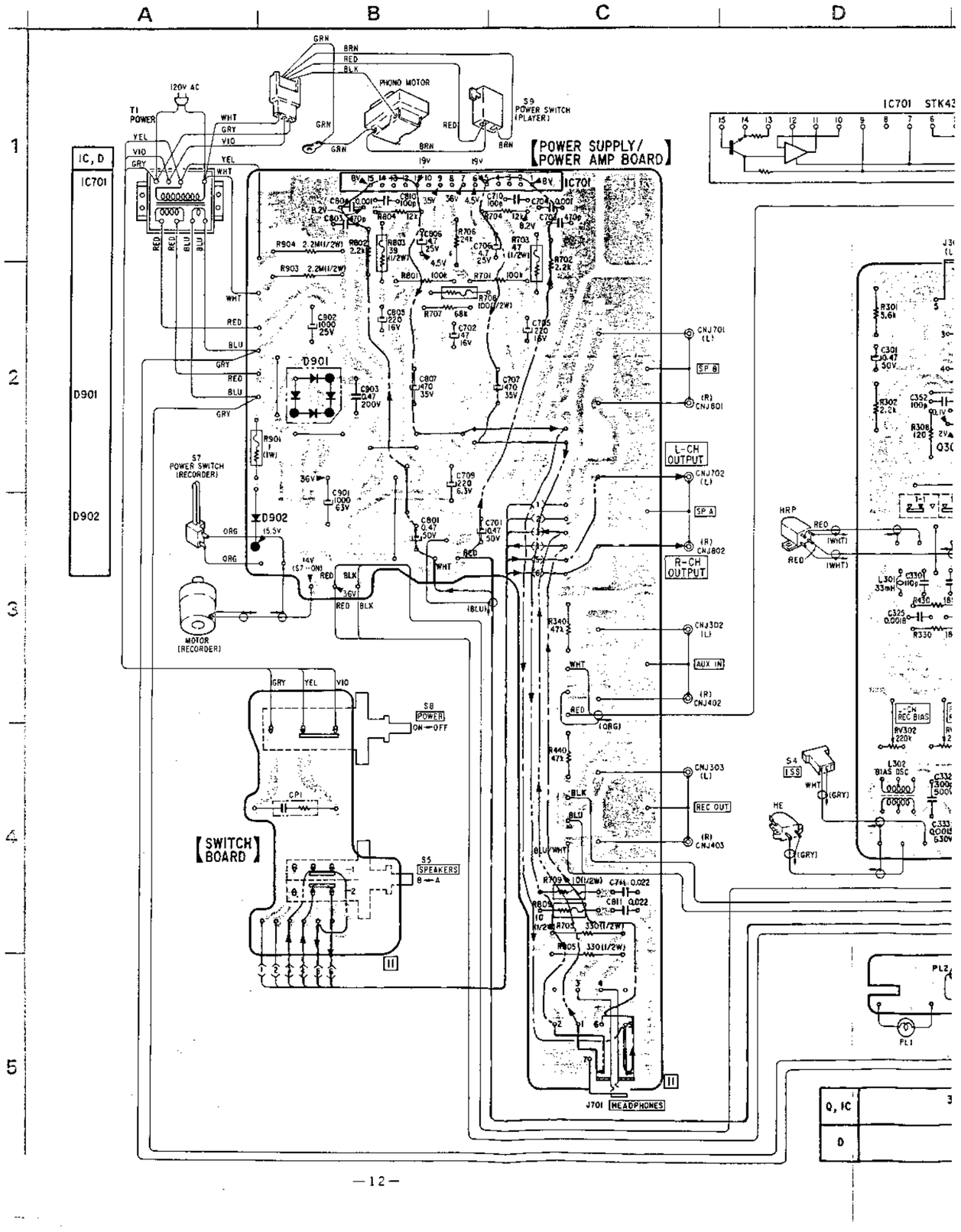
IC701: STK435



Note:

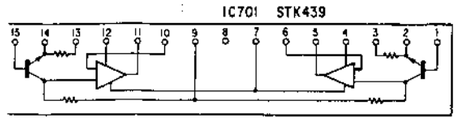
- Voltage are DC with respect to ground unless otherwise noted. Readings are taken under no-signal conditions with a VOM (20kΩ/V). Readings in ( ) are in record mode. no mark: common, < >: AM mode, (( )): FM STEREO
- Voltage variations may be noted due to normal production tolerances.
- AC voltage readings on bias oscillator circuit are taken with a VTVM.
- [ ]← : indicates side identified with part number.
- ▭ : B+ pattern.
- ——►: signal path.
  ——·►: L-CH
  ——··►: R-CH
- Color code of sleeving over the end of the jacket.

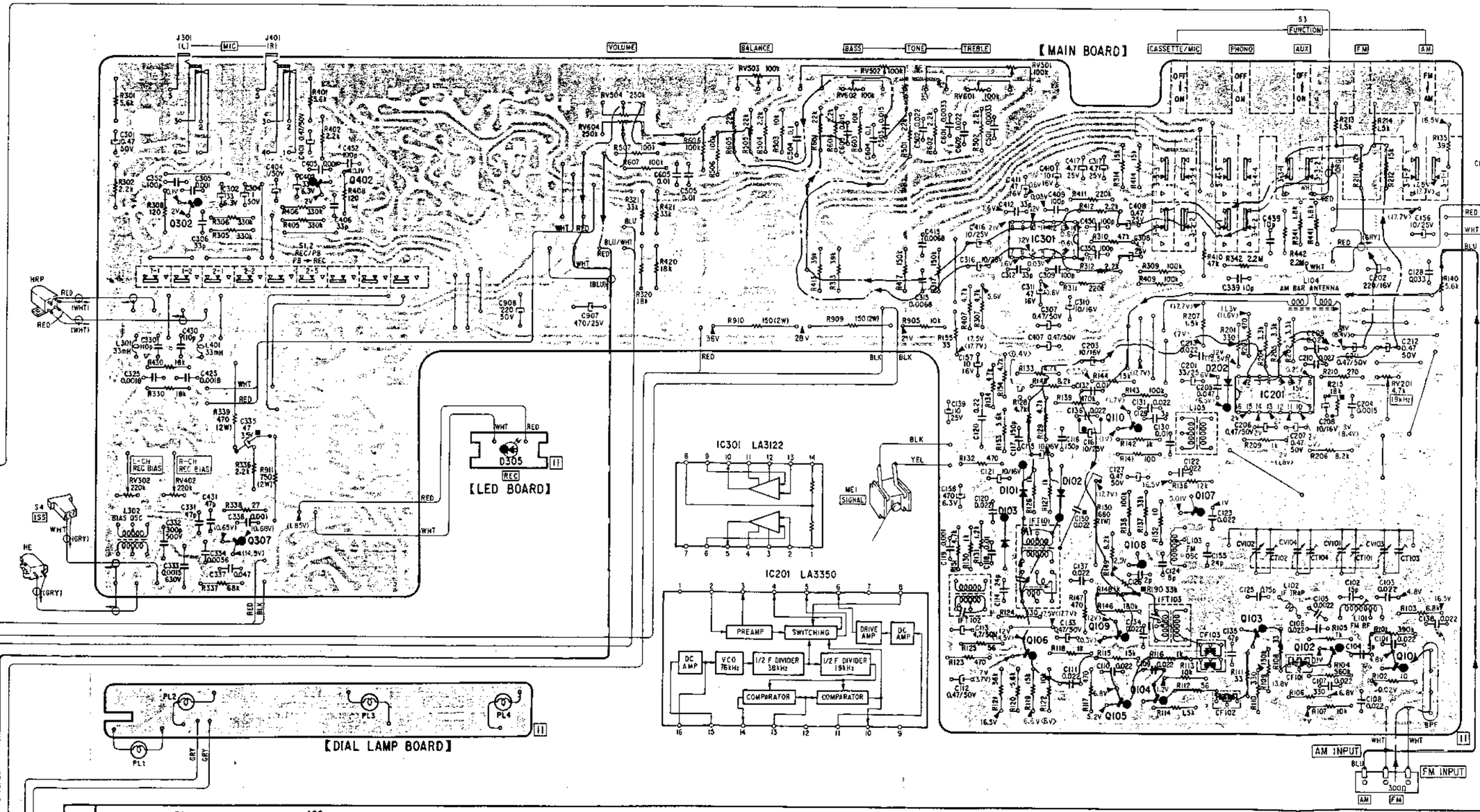
- ■ : part mounted on the conductor side.



D E F G H I J K

IC701 STK439





Q, IC	302 307	402	IC301 106	109 110 105 108 104	107	103 IC201	102	101	Q, IC
D	305		103	101 102	202			201	D

4-2. MOUNTING DIAGRAM

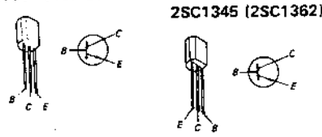
– Component Side –

Replacement Semiconductors

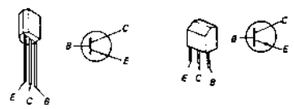
For replacement, use semiconductors except in ( ).

Q101–110: 2SC710

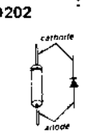
Q302, 402: 2SC1345 (2SC1362)



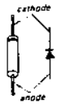
Q307: 2SD438 (2SD438E)



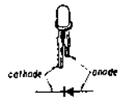
D101, 102
D202 : 1S1555 (1T40)



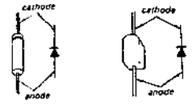
D103: 1T22AM (1T22A)



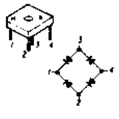
D201, 305: SLP131B



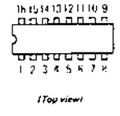
D902: 10E2 (RA1Z)



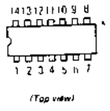
D901: S2VB20



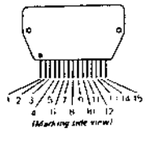
IC201: LA3350 (LA3350A)



IC301: LA3122

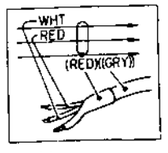


IC701: STK435

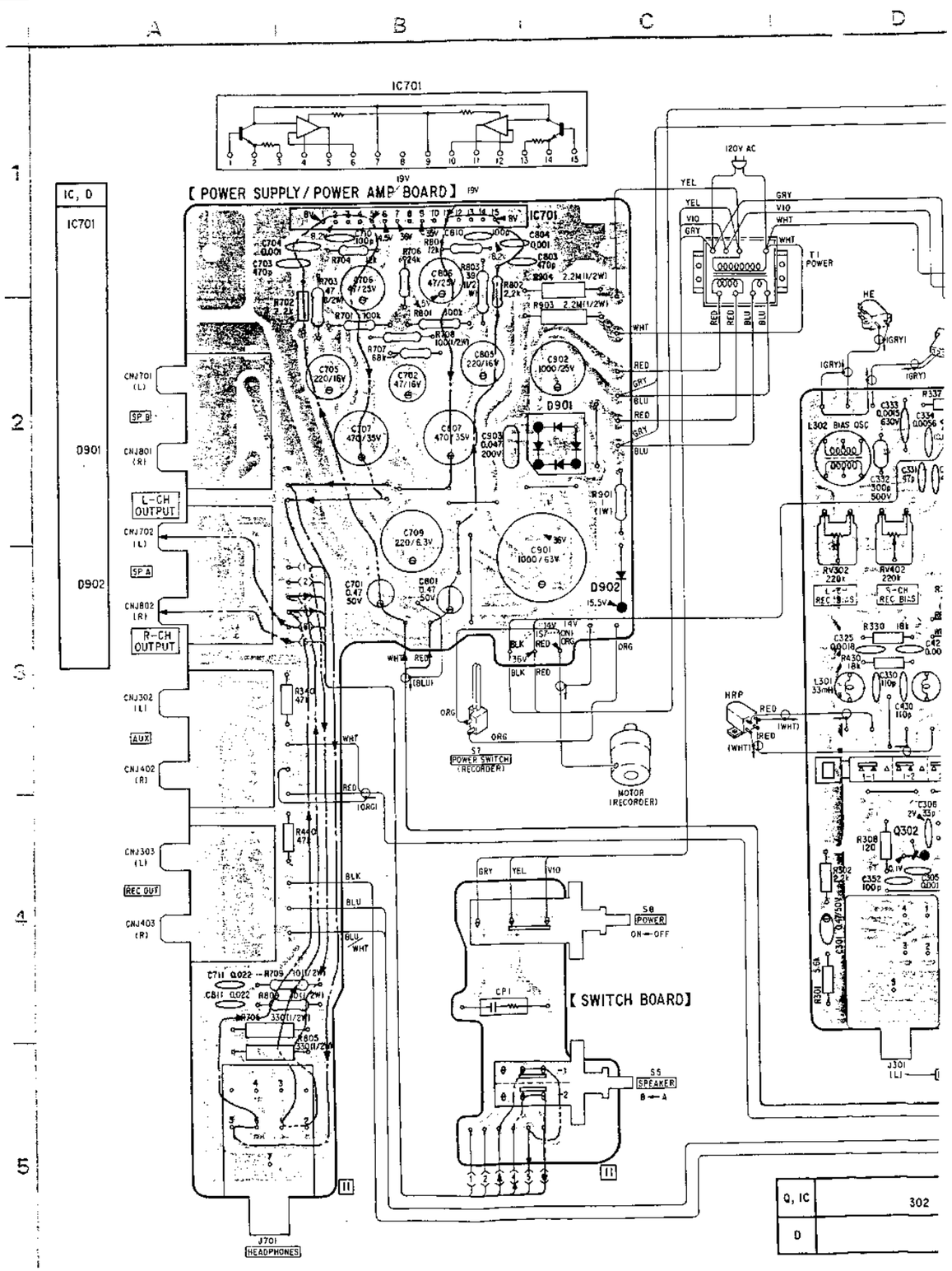


Note:

- Voltage are DC with respect to ground unless otherwise noted. Readings are taken under no-signal conditions with a VOM (20kΩ/V). Readings in ( ) are in record mode. no mark: common, < >: AM mode, (( )): FM STEREO
- Voltage variations may be noted due to normal production tolerances.
- AC voltage readings on bias oscillator circuit are taken with a VTVM.
- ⊣⊢ : indicates side identified with part number.
- ▒▒▒ : B+ pattern
- ——▶: signal path.
  - ——·——▶: L-CH
  - ——·——▶: R-CH
- Color code of sleeving over the end of the jacket.

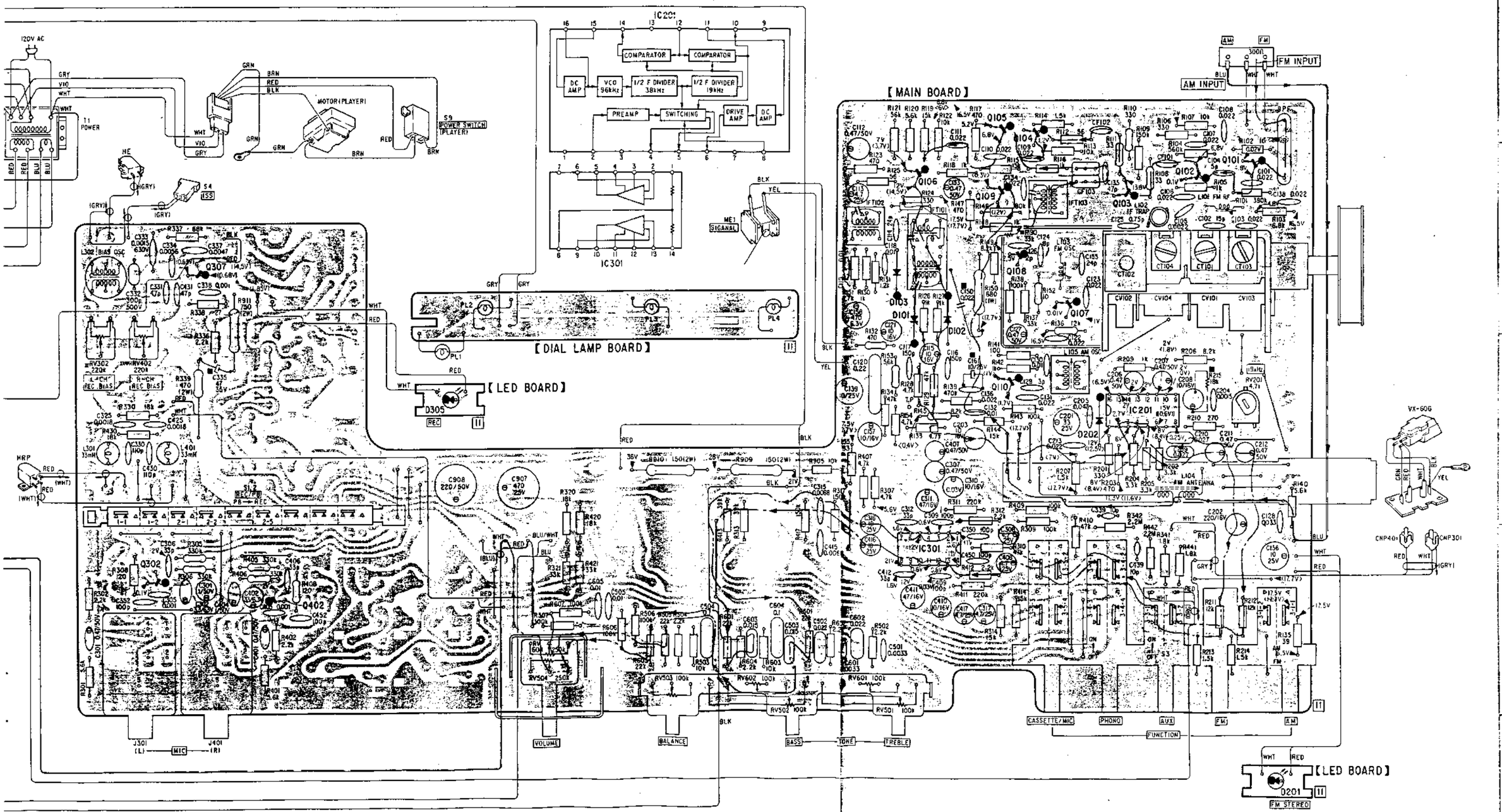


- ■ : part mounted on the conductor side.



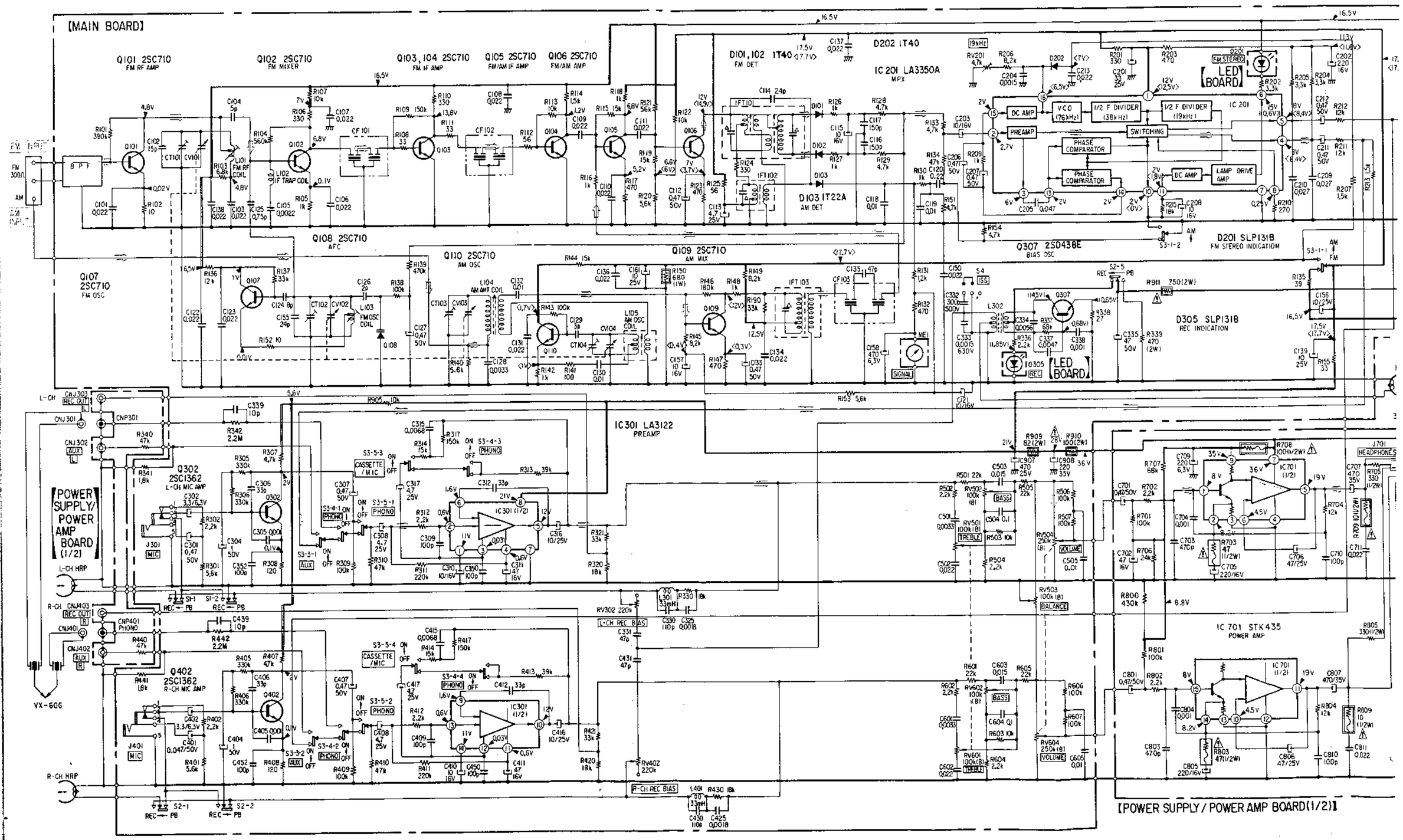
D E F G H I J K

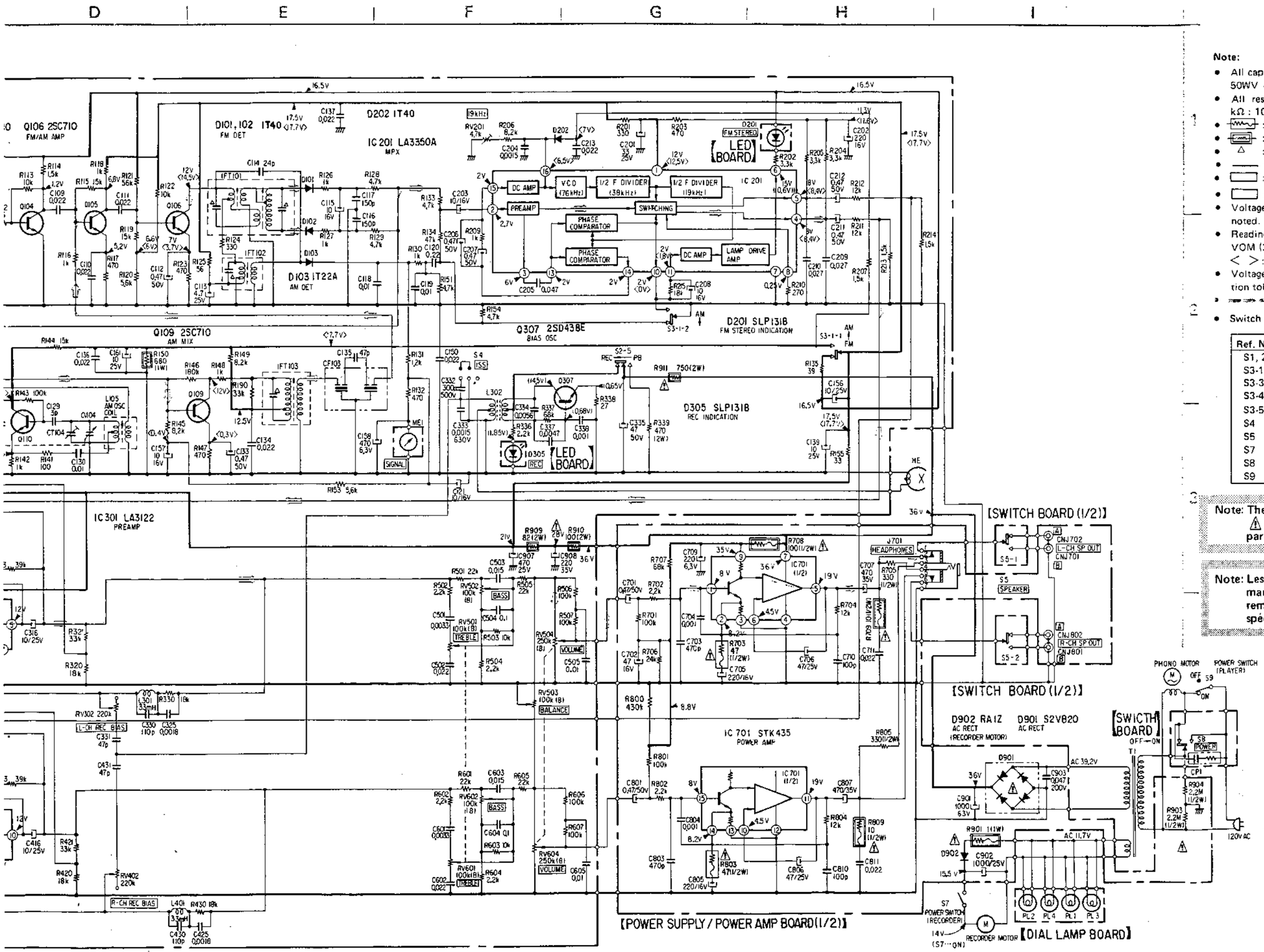
1 2 3 4 5



Q, IC	307 302 402	106 IC301 105 109 108 104 110 107 103 IC201 102 101	Q, IC
D	305	103 101 102 202 201	D

4-3. SCHEMATIC DIAGRAM





Note:

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ▭ : fusible resistor.
- ▭ : nonflammable resistor.
- △ : internal component.
- ——— : B+ bus.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal condictions with a VOM (20kΩ/V).
  < >: AM, ( ) : Record mode, (( )) : FM STEREO
- Voltage variations may be noted due to normal production tolerances.
- ▬▬ : signal path
- Switch

Ref. No.	Switch	Position
S1, 2	REC/PB	PB
S3-1	FM/AM	FM
S3-3	AUX	OFF
S3-4	PHONO	OFF
S3-5	CASSETTE/MIC	OFF
S4	ISS	
S5	SP OUT	A
S7	RECORDER POWER	OFF
S8	POWER	OFF
S9	PHONO MOTOR	ON

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

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

4-4. SCHEMATIC DIAGRAM

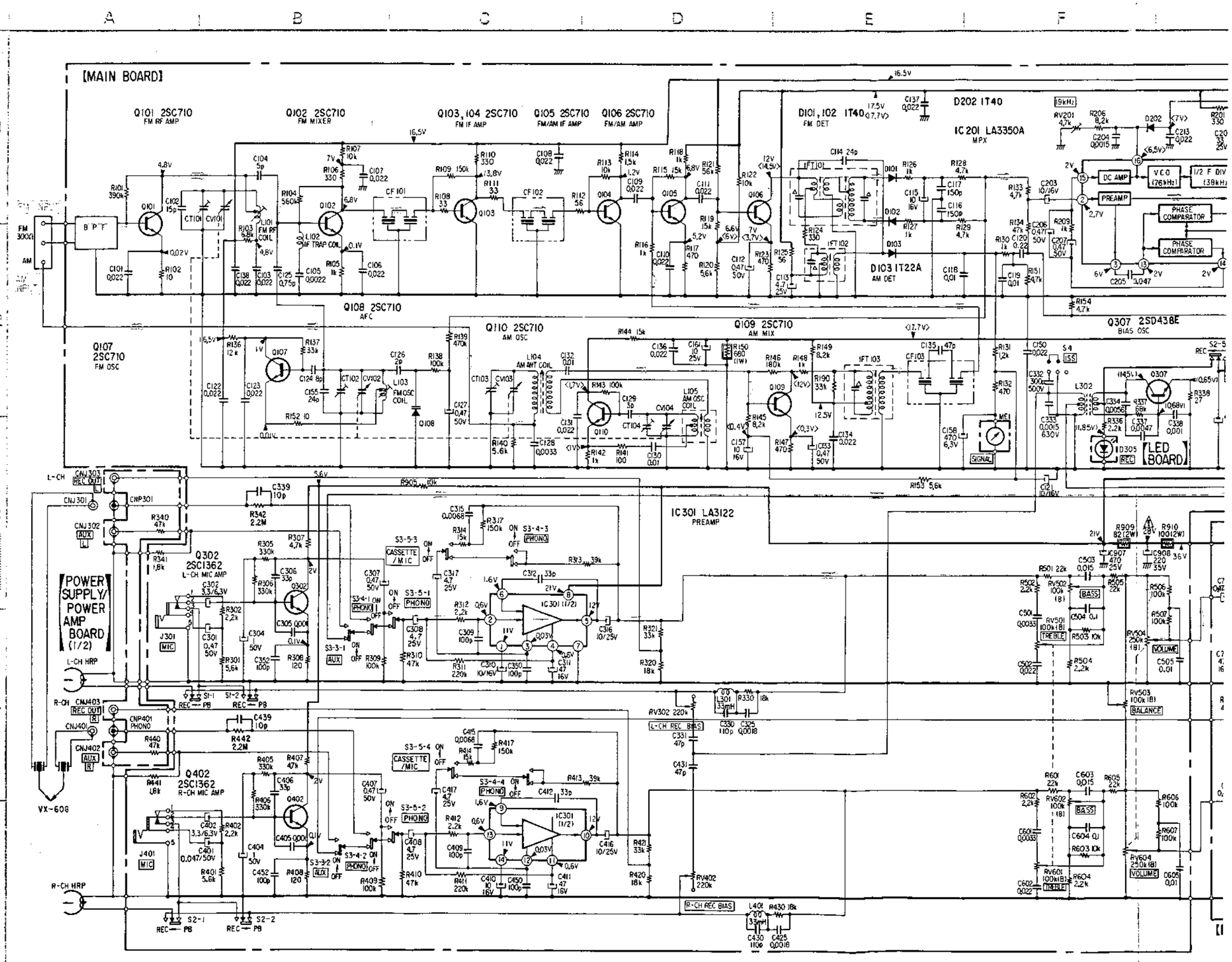
Note:

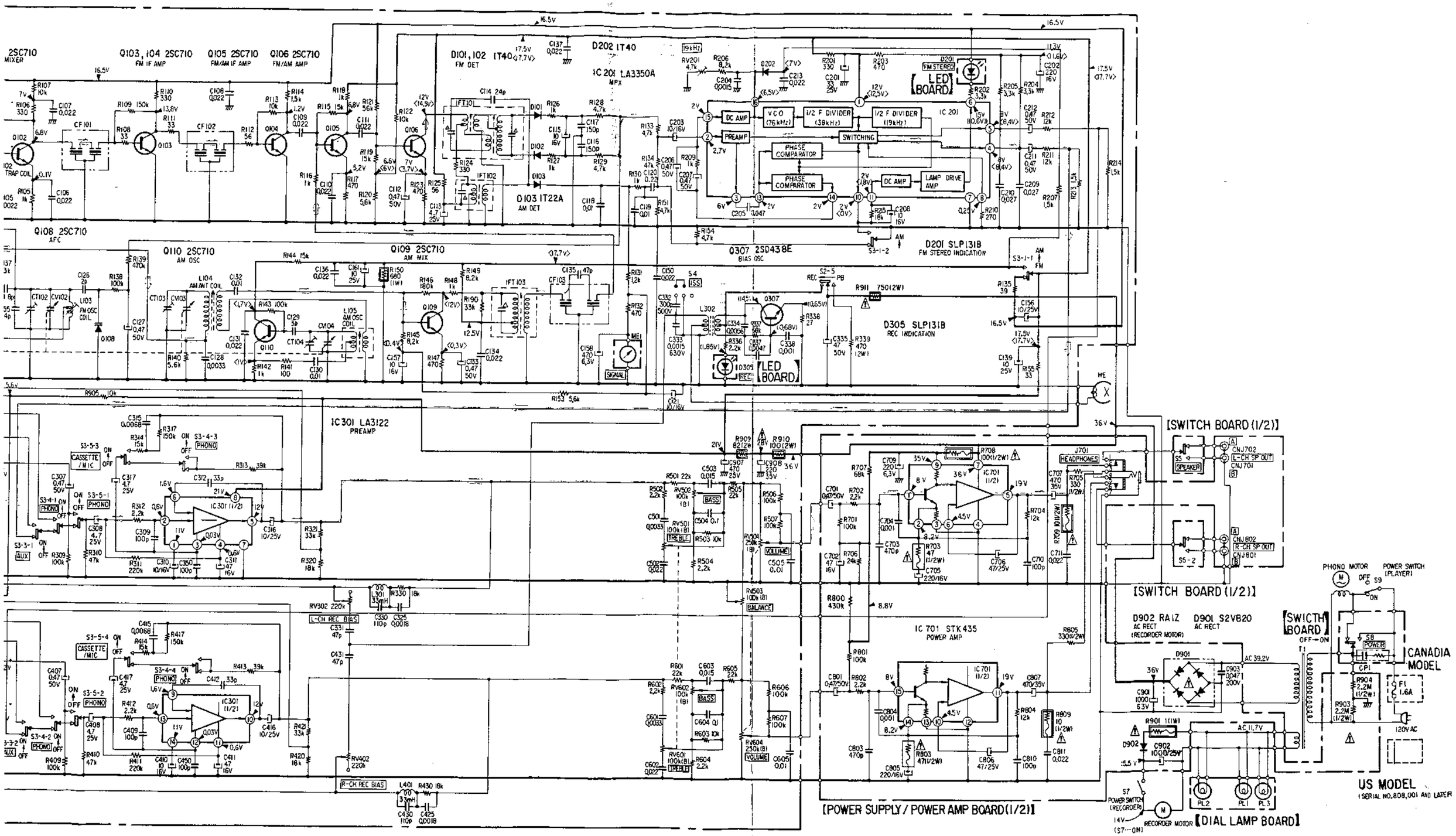
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- : fusible resistor.
- : nonflammable resistor.
- : internal component.
- : B+ bus.
- : panel designation.
- : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal condictions with a VOM (20kΩ/V).
  < >: AM, ( ) : Record mode, (( )) : FM STEREO
- Voltage variations may be noted due to normal production tolerances.
- signal path
- Switch

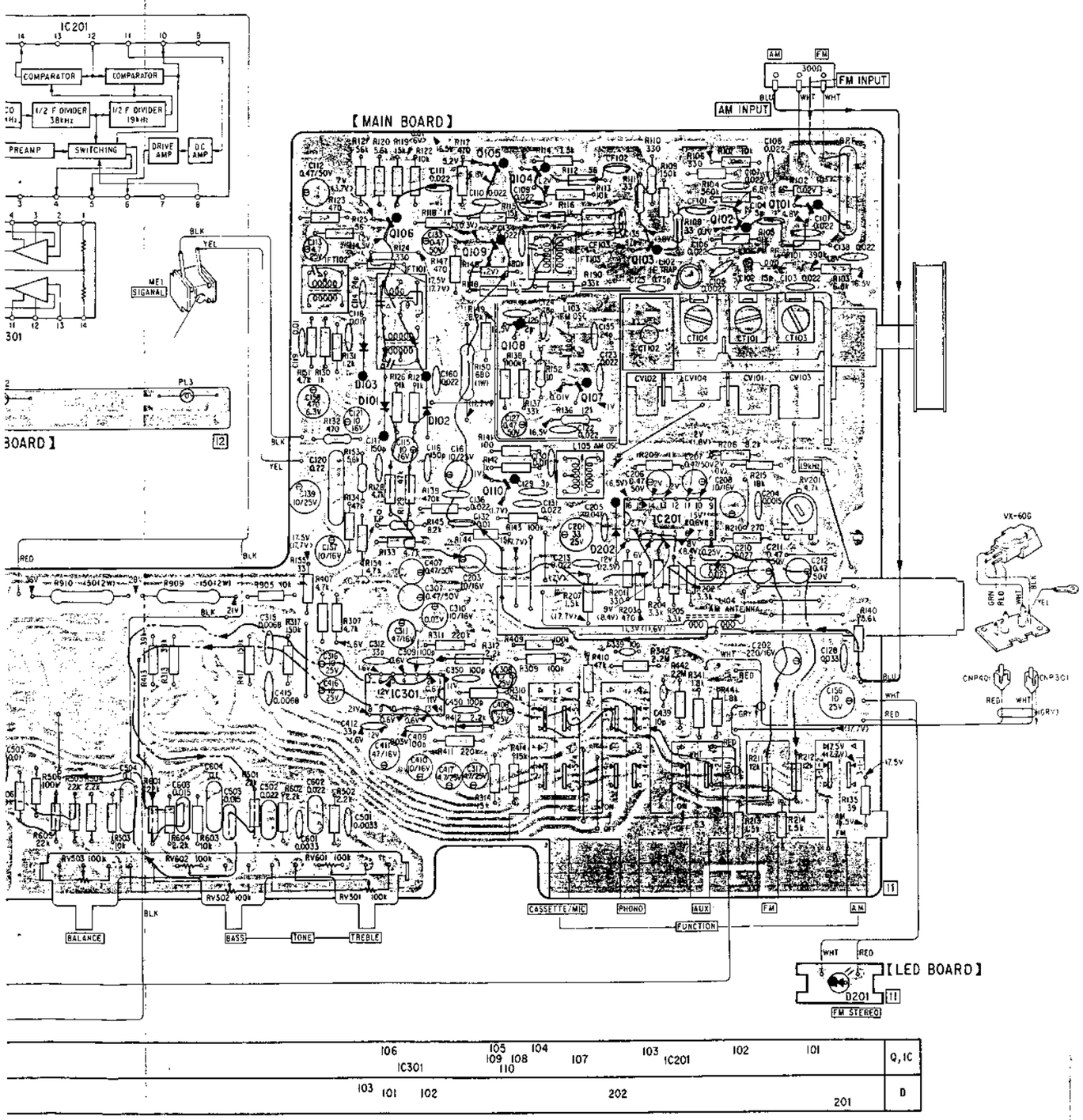
Ref. No.	Switch	Position
S1, 2	REC/PB	PB
S3-1	FM/AM	FM
S3-3	AUX	OFF
S3-4	PHONO	OFF
S3-5	CASSETTE/MIC	OFF
S4	tSS	
S5	SP OUT	A
S7	RECORDER POWER	OFF
S8	POWER	OFF
S9	PHONO MOTOR	ON

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

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




2SC710 MIXER
Q103, 104 2SC710 FM IF AMP
Q105 2SC710 FM/AM IF AMP
Q106 2SC710 FM/AM AMP
D101, 102 (T40) FM DET
D202 1T40
IC 201 LA3350A MPX
Q108 2SC710 AFC
Q110 2SC710 AM OSC
Q109 2SC710 AM MIX
D103 1T22A AM DET
Q307 2SD438E BIAS OSC
D201 SLP131B FM STEREO INDICATION
D305 SLP131B REC INDICATION
IC 201
VCO (76kHz)
1/2 F DIVIDER (38kHz)
1/2 F DIVIDER (19kHz)
DC AMP
PREAMP
PHASE COMPARATOR
SWITCHING
LAMP DRIVE AMP
LED BOARD
IC301 LA3122 PREAMP
CASSETTE /MIC
PHONO
AUX
BASS
TREBLE
VOLUME
BALANCE
L-CH REC BIAS
R-CH REC BIAS
IC 701 STK435 POWER AMP
[POWER SUPPLY / POWER AMP BOARD (1/2)]
[SWITCH BOARD (1/2)]
[DIAL LAMP BOARD]
D902 RA1Z AC RECT (RECORDER MOTOR)
D901 S2VB20 AC RECT
SWICTH BOARD
CANADIA MODEL
US MODEL
(SERIAL NO.808,001 AND LATER)
PHONO MOTOR
POWER SWITCH (PLAYER)
POWER SWITCH (RECORDER)
RECORDER MOTOR



Replacement Semiconductors

For replacement, use semiconductors except in ( ).

Q101–110: 2SC710

Q302, 402: 2SC1345 (2SC1362)

Q307: 2SD438

(2SD438E)

D101, 102 D202 : 1S1555 (1T40)

D103: 1T22AM (1T22A)

D201, 305: SLP131B

D902: 10E2

(RA1Z)

D901: S2VB20

IC201: LA3350 (LA3350A)

IC301: LA3122

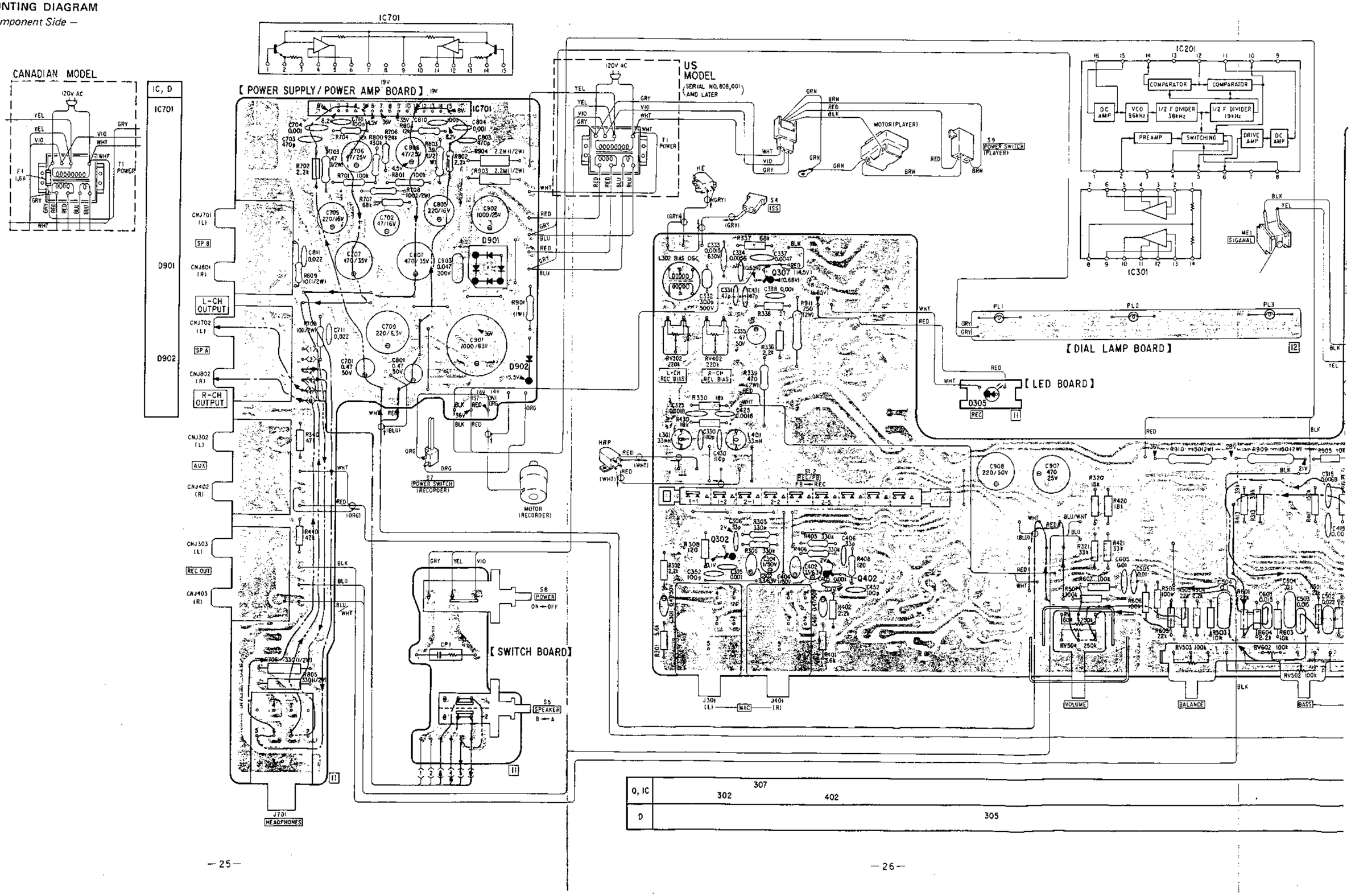
IC701: STK435

Note:

- Voltage are DC with respect to ground unless otherwise noted. Readings are taken under no-signal conditions with a VOM (20kΩ/V). Readings in ( ) are in record mode. no mark: common, < >: AM mode, (( )): FM STEREO
- Voltage variations may be noted due to normal production tolerances.
- AC voltage readings on bias oscillator circuit are taken with a VTVM.
- [ ]⊢— : indicates side identified with part number.
- ░ : B+ pattern
- ——►: signal path.
  ——-►: L-CH
  ——-►: R-CH
- Color code of sleeving over the end of the jacket.

4-5. MOUNTING DIAGRAM

– Component Side –

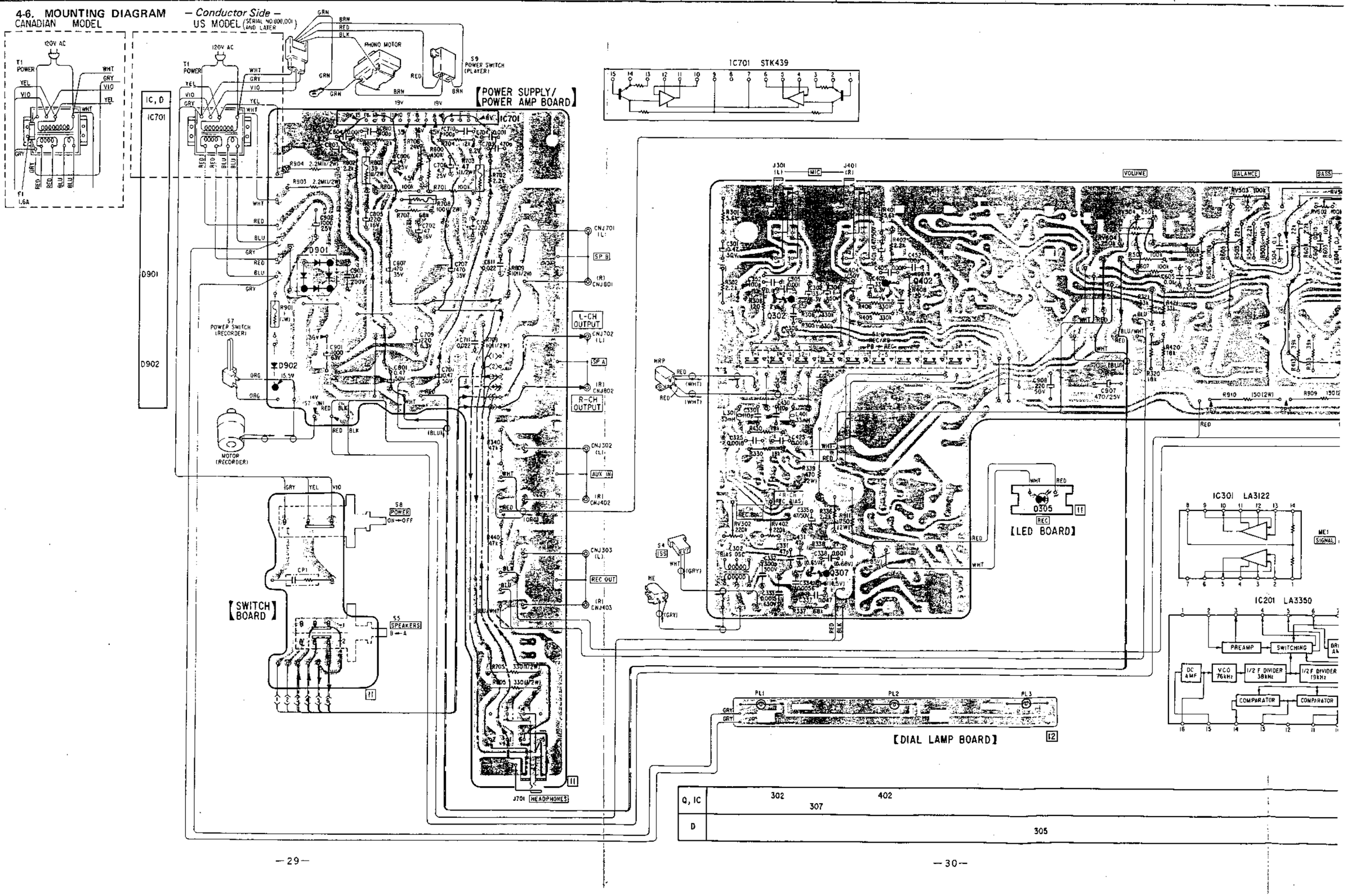


Q, IC	307 302 402
D	305

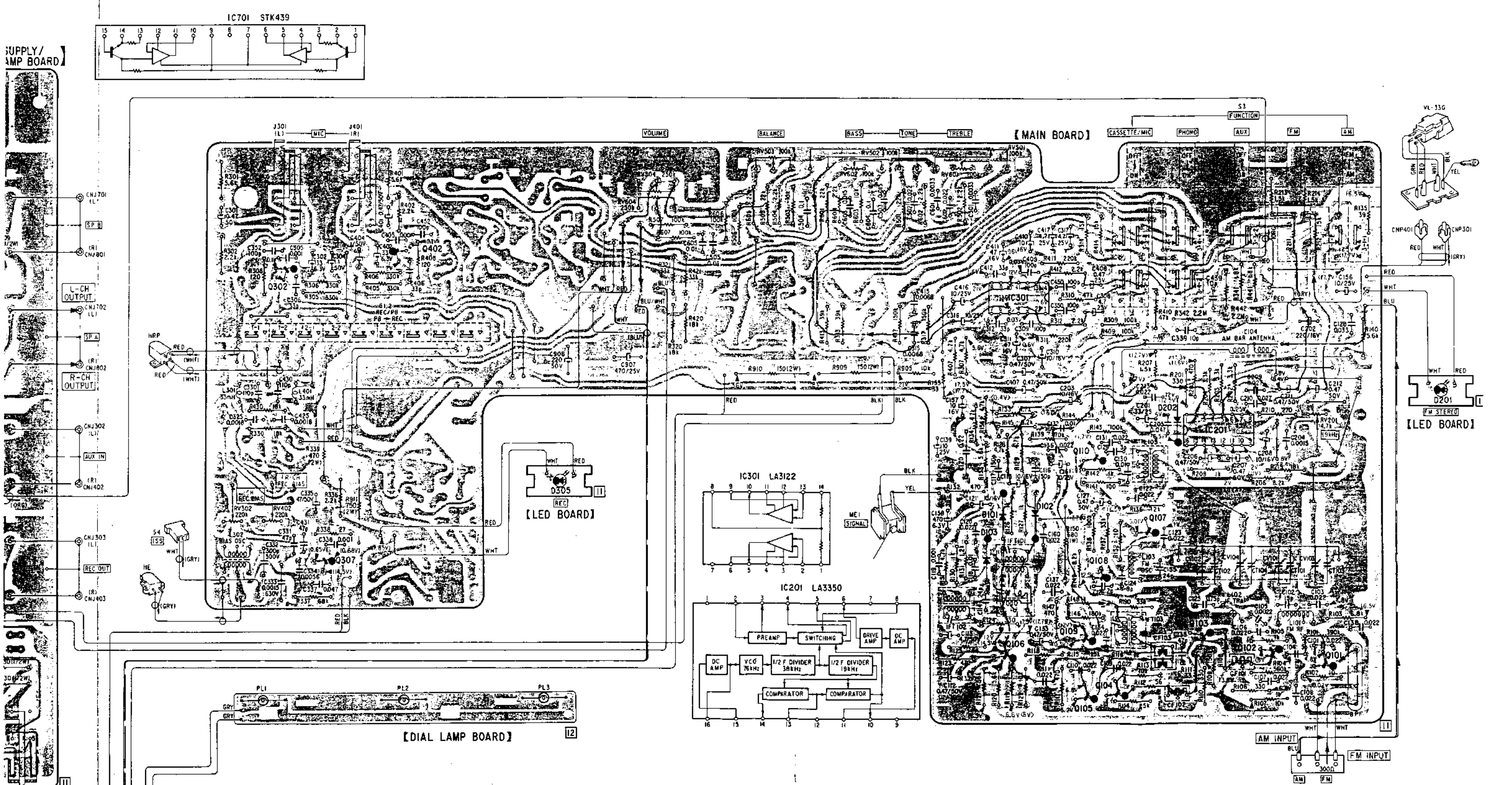
4-6. MOUNTING DIAGRAM

CANADIAN MODEL

– Conductor Side –
US MODEL (SERIAL NO.808,001 AND LATER)



Q, IC	302 307 402
D	305

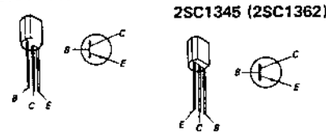

IC701 STK439
SUPPLY/ AMP BOARD
[MAIN BOARD]
VOLUME
BALANCE
BASS
TONE
TREBLE
J301 (L)
MIC
J401 (R)
S3 FUNCTION
CASSETTE/MIC
PHONO
AUX
FM
AM
L-CH OUTPUT
R-CH OUTPUT
SP B
SP A
AUX IN
REC OUT
HEADPHONES
[LED BOARD]
REC
D305
D201
FM STEREO
IC301 LA3122
IC201 LA3350
PREAMP
SWITCHING
DRIVE AMP
DC AMP
VCO 76kHz
1/2 F DIVIDER 38kHz
1/2 F DIVIDER 19kHz
COMPARATOR
ME1 SIGNAL
AM BAR ANTENNA
AM INPUT
FM INPUT
[DIAL LAMP BOARD]
PL1
PL2
PL3

Q, IC	302	307	402	IC301 106	109 110 105 108 104	107	103 IC201	102	101	Q, IC
D		305		103 101	102	202			201	D

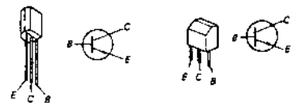
Replacement Semiconductors

For replacement, use semiconductors except in ( ).

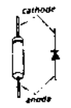
Q101–110: 2SC710 **Q302, 402: 2SC1345 (2SC1362)**



Q307: 2SD438 **(2SD438E)**

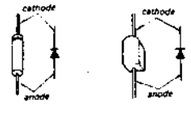


D101, 102, D202: 1S1555 (1T40)

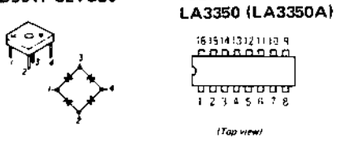


D103: 1T22AM (1T22A) **D201, 305: SLP131B**

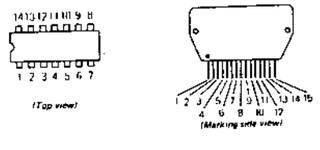
D902: 10E2 **(RA1Z)**



D901: S2VB20 **IC201: LA3350 (LA3350A)**

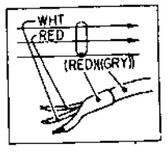


IC301: LA3122 **IC701: STK435**



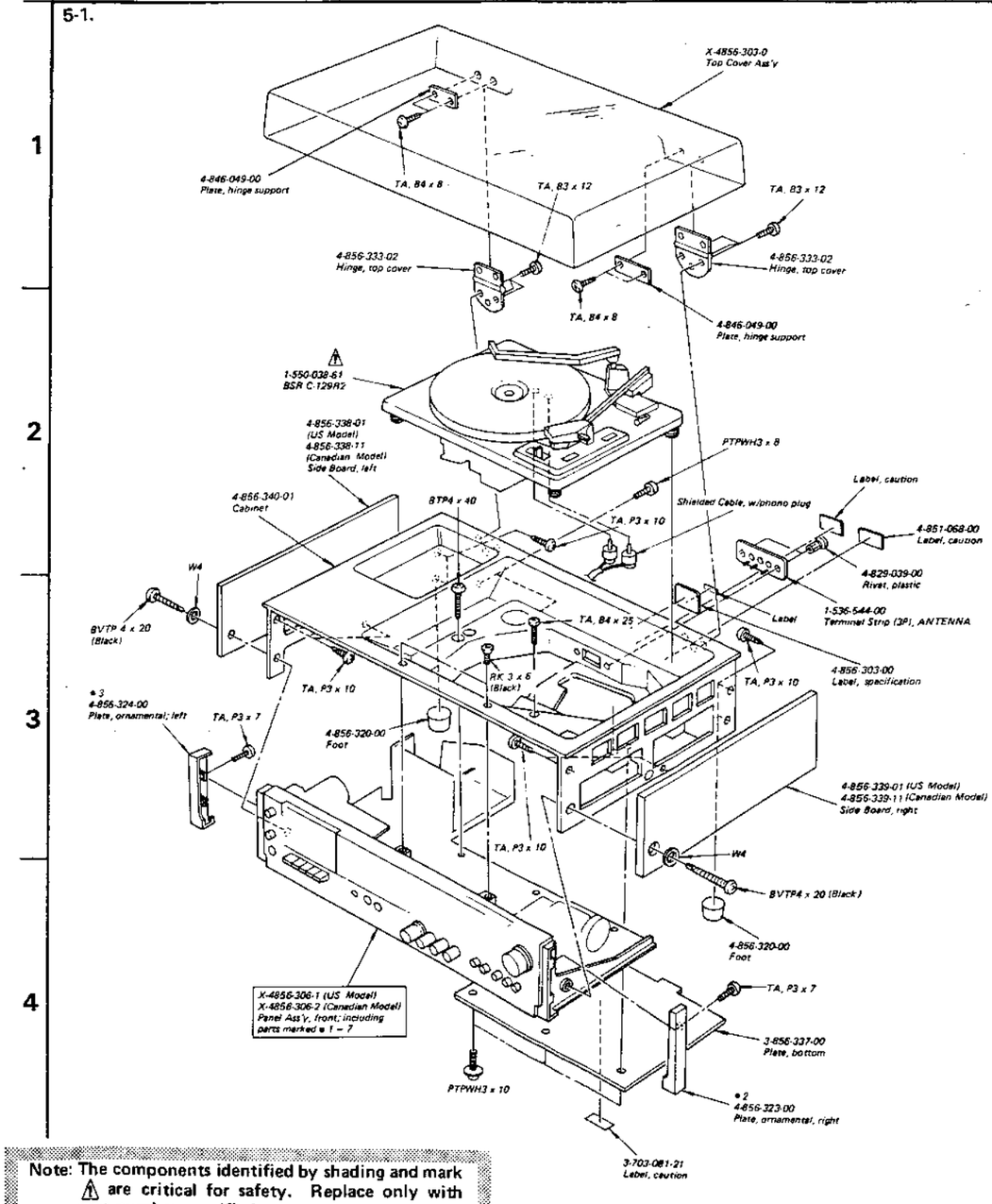
Note:

- Voltage are DC with respect to ground unless otherwise noted. Readings are taken under no-signal conditions with a VOM (20kΩ/V). Readings in ( ) are in record mode. no mark: common, < >: AM mode, (( )): FM STEREO
- Voltage variations may be noted due to normal production tolerances.
- AC voltage readings on bias oscillator circuit are taken with a VTVM.
- [ ]: indicates side identified with part number.
- : B+ pattern
- : signal path.
  : L-CH
  : R-CH
- Color code of sleeving over the end of the jacket.



SECTION 5
EXPLODED VIEWS

5-1.



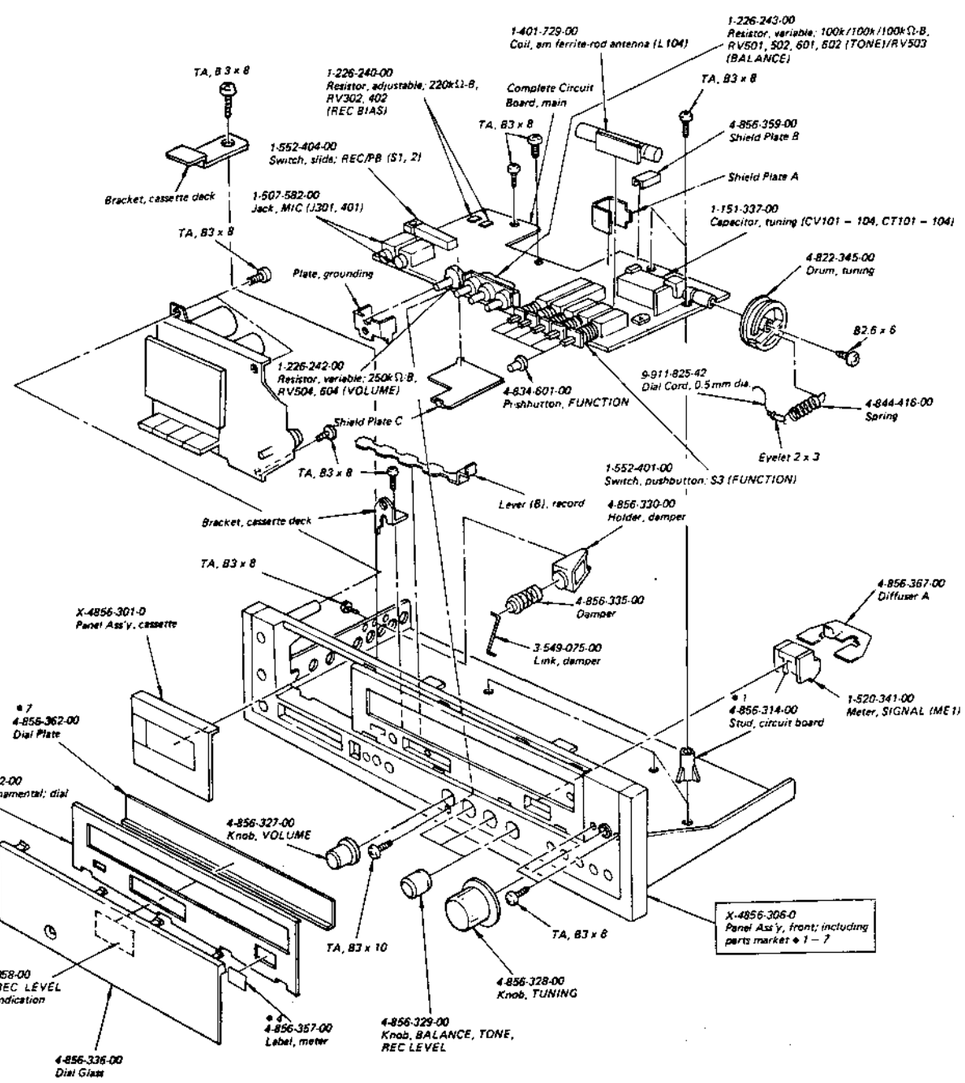
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.

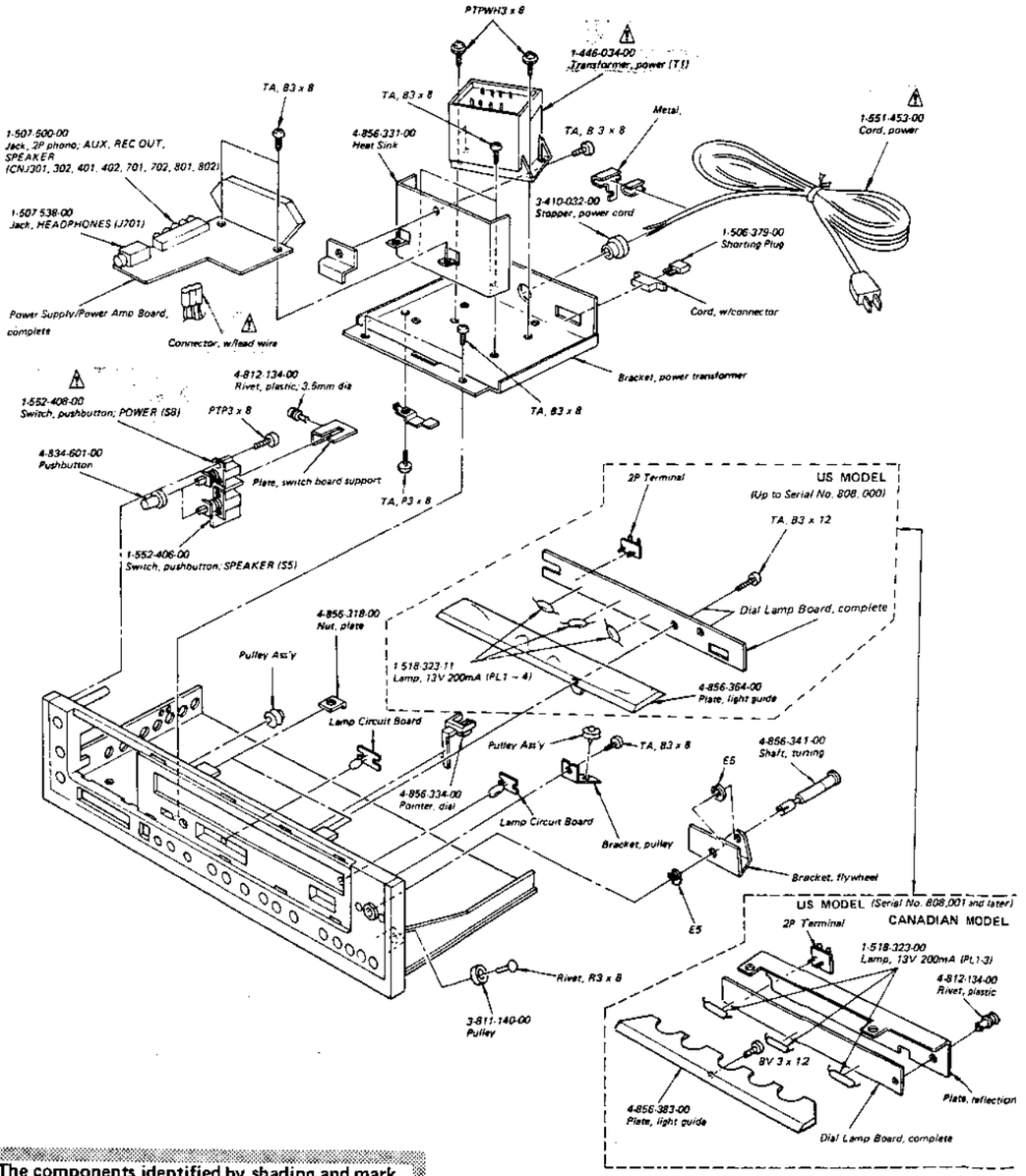
5-2.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.

5-3.



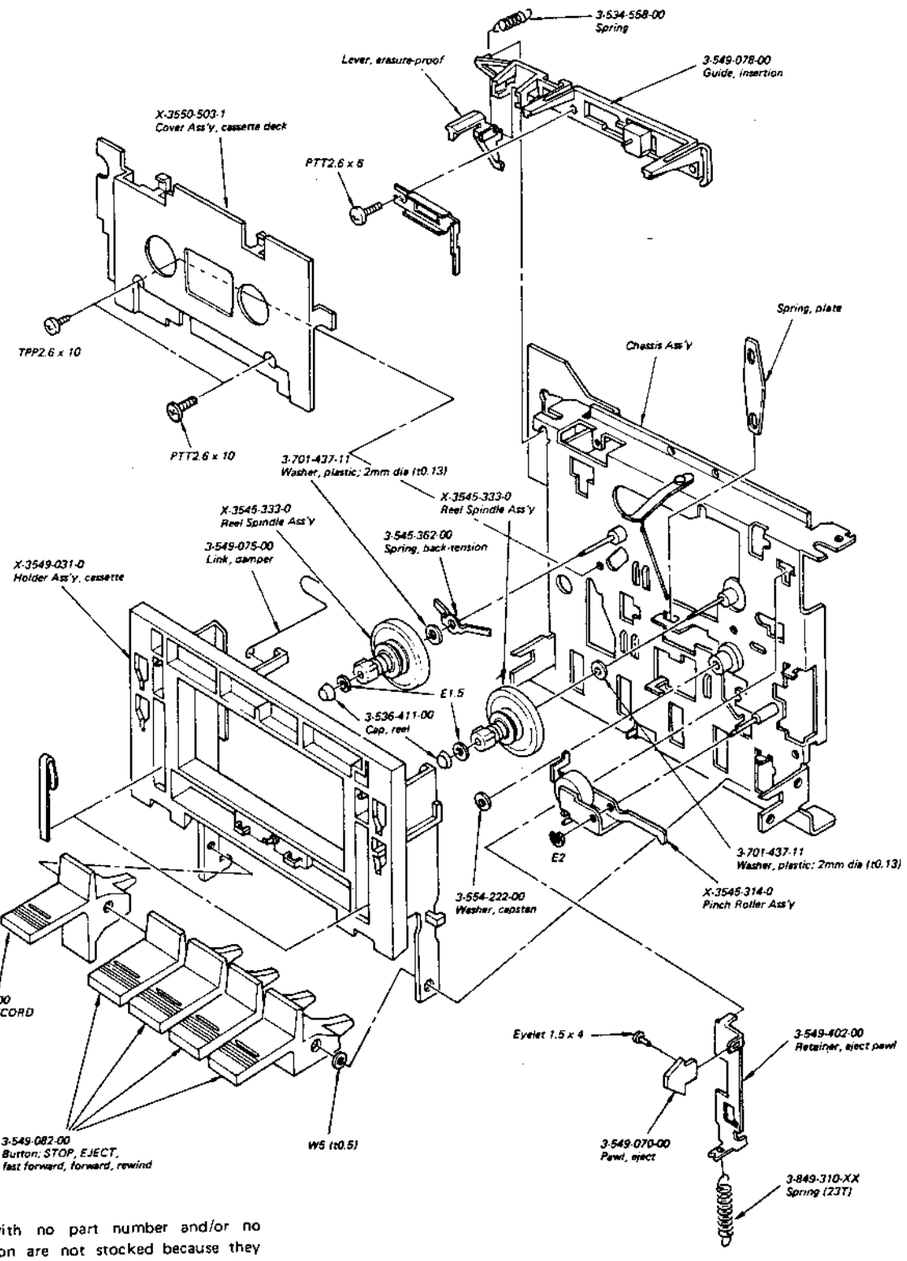
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.

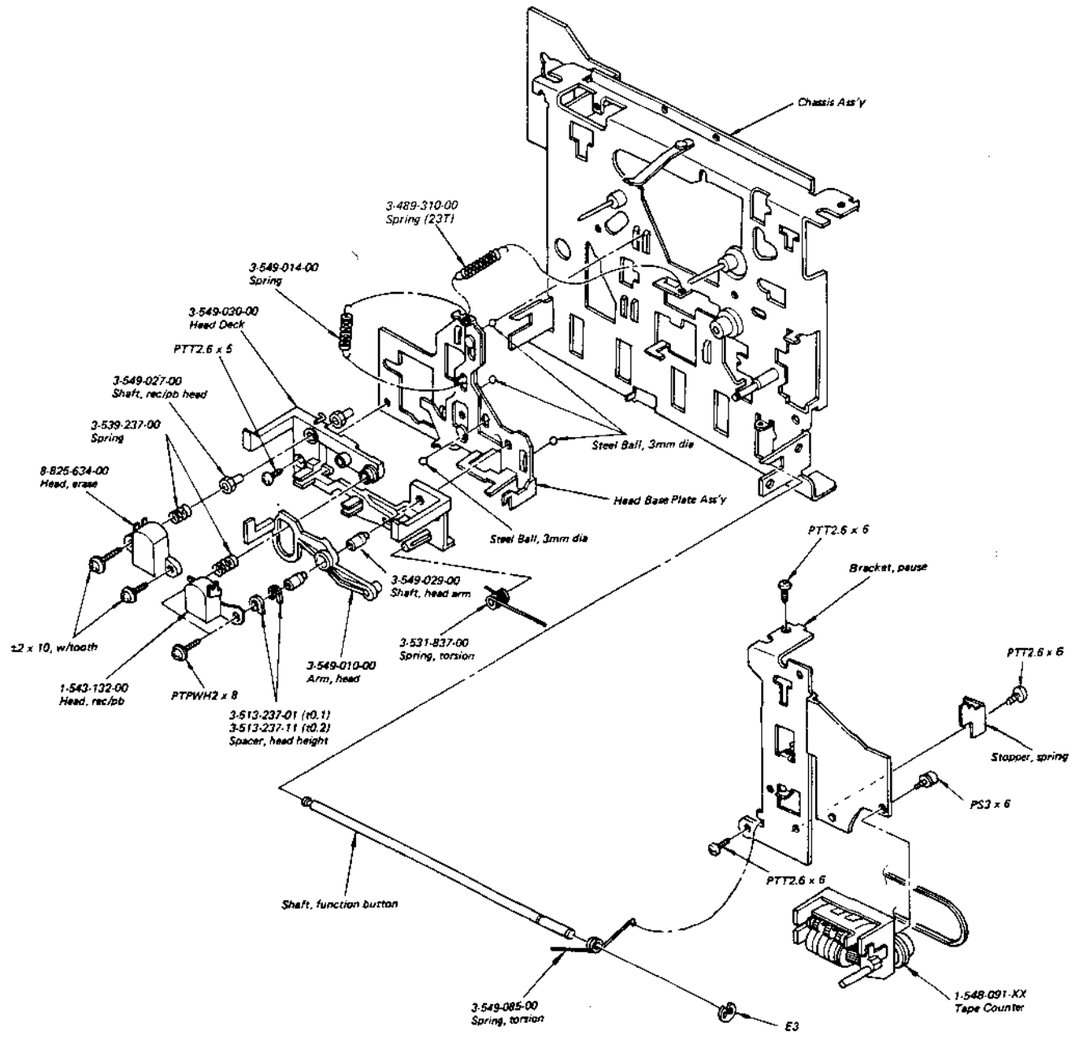
5-4.



Note:

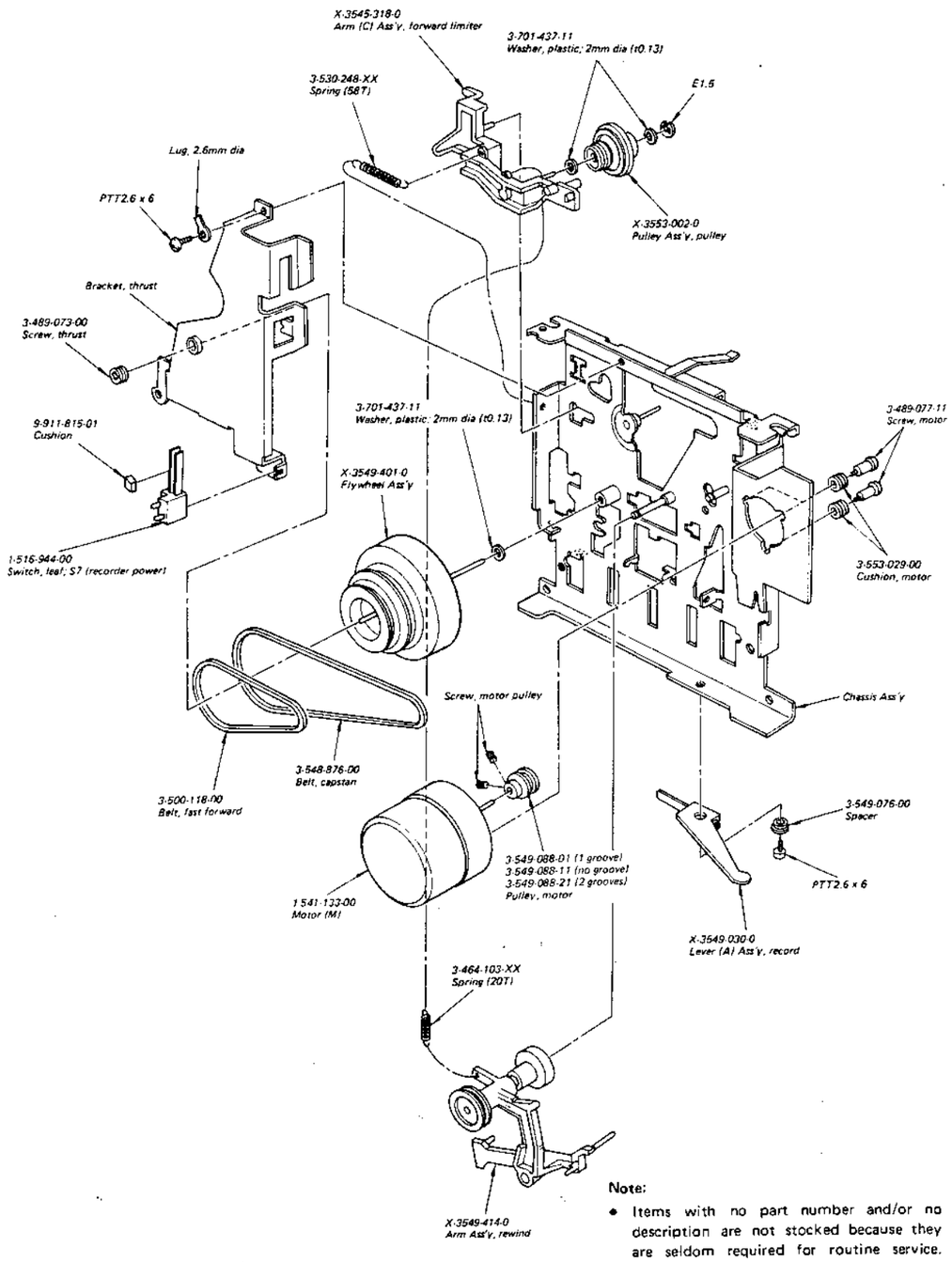
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.

5-5.



- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.

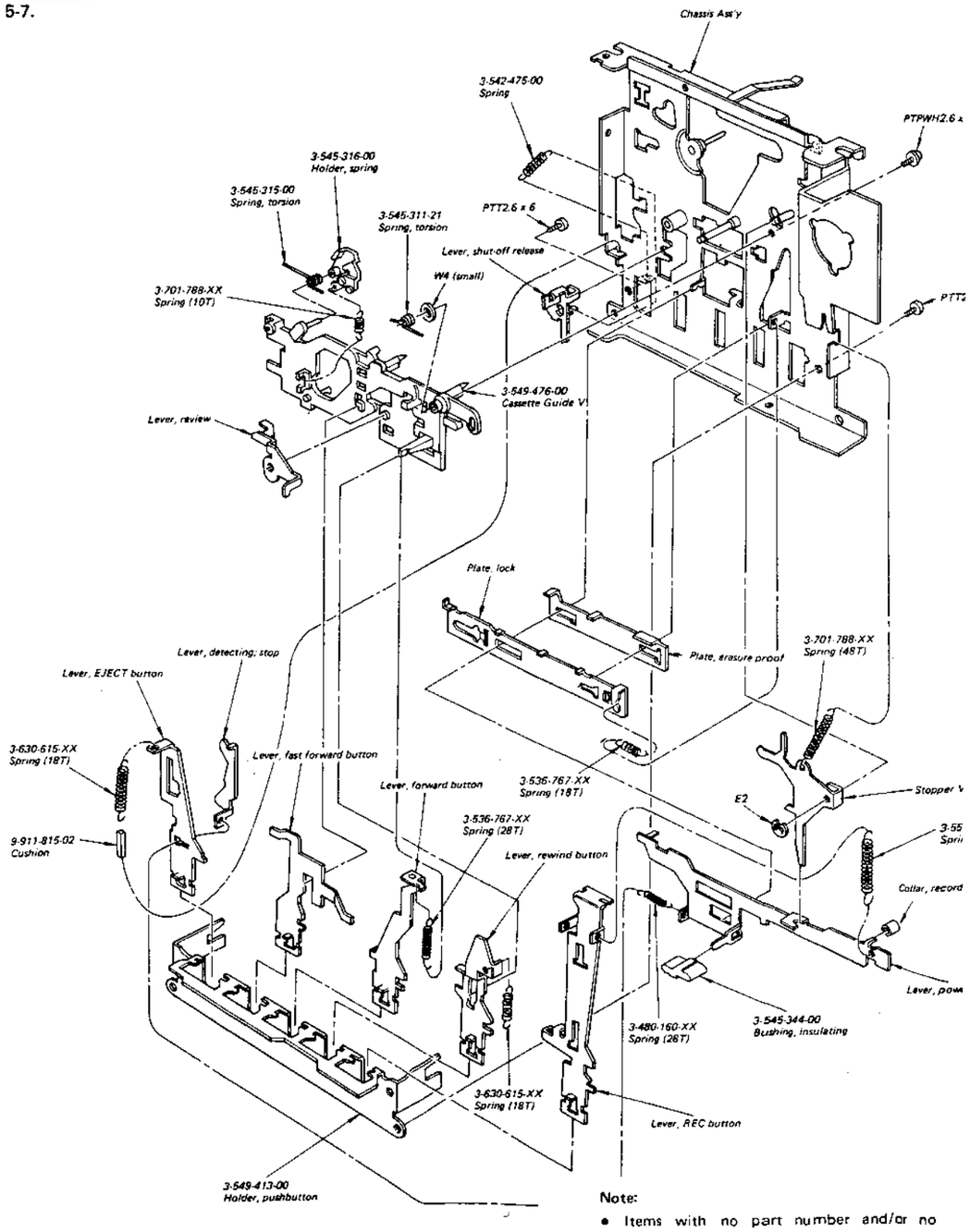
5-6.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.

5-7.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- (□□T) shows the number of coils in spring.

SECTION 6

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
		SEMICONDUCTORS
		Transistors
Q101–110	8-729-671-15	2SC710
⇒Q302, 402	8-729-334-58	2SC1345
⇒Q307	8-729-843-82	2SD438
		ICs
IC201	8-759-833-50	LA3350
IC301	8-759-831-22	LA3122
IC701	8-759-843-50	STK435
		Diodes
⇒D101, 102	8-719-815-55	1S1555
⇒D103	8-719-422-21	1T22AM
D201	8-719-901-31	SLP131B
⇒D202	8-719-815-55	1S1555
D305	8-719-901-31	SLP131B
D901	⚠8-719-502-20	S2VB20
⇒D902	⚠8-719-200-02	10E2
		COILS
L104	1-401-729-00	AM Ant
L105	1-405-729-00	AM Osc
L301, 401	1-407-964-00	Microinductor, 33 mH
L302	1-433-199-00	Bias Osc
		TRANSFORMERS
T1	⚠1-446-034-11	Power (US model)
T1	⚠1-446-034-21	Power (Canadian model)
IFT101	1-403-822-00	FM IFT
IFT102	1-404-064-00	AM IFT
IFT103	1-404-089-00	AM IFT

Ref. No.	Part No.	Description		
		CAPACITORS		
All capacitors are in μF and ceramic unless otherwise noted. 50V or less working voltages are not indicated except for electrolytics. pF = μμF, elect = electrolytic				
C101	1-101-924-00	0.022		
C102	1-102-951-00	15 p		
C103	1-101-924-00	0.022		
C104	1-102-924-00	5 p		
C105	1-102-121-00	0.0022		
C106–111	1-101-924-00	0.022		
C112	1-121-726-00	0.47	50 V	elect
C113	1-121-395-00	4.7	25 V	elect
C114	1-102-960-00	24 p		
C115	1-121-651-00	10	16 V	elect
C116, 117	1-101-361-00	150 p		
C118, 119	1-101-118-00	0.01		
C120	1-108-611-00	0.22		mylar
C121	1-121-651-00	10	16 V	elect
C122, 123	1-101-924-00	0.022		
C124	1-102-684-00	8 p		
C125	1-101-586-00	0.75 p		
C126	1-102-681-00	2 p		
C127	1-121-726-00	0.47	50 V	elect
C128	1-102-123-00	0.0033		
C129	1-102-734-00	3 p		
C130	1-101-923-00	0.01		
C131	1-101-924-00	0.022		
C132	1-101-923-00	0.01		
C133	1-121-726-00	0.47	50 V	elect
C134	1-101-924-00	0.022		
C135	1-101-880-00	47 p		
C136, 137	1-101-924-00	0.022		
C139	1-121-398-00	10	25 V	elect
C150	1-101-924-00	0.022		
C155	1-101-982-00	24 p		
C156	1-121-398-00	10	25 V	elect
C157	1-121-651-00	10	16 V	elect
C158	1-121-424-00	470	6.3 V	elect

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

Ref. No.	Part No.	Description		
C160	1-101-924-00	0.022		
C161	1-121-398-00	10	25 V	elect
C201	1-121-404-00	33	25 V	elect
C202	1-121-421-00	220	16 V	elect
C203	1-121-651-00	10	16 V	elect
C204	1-104-081-00	0.0015		styrol
C205	1-101-925-00	0.047		
C206, 207	1-121-726-00	0.47	50 V	elect
C208	1-121-651-00	10	16 V	elect
C209, 210	1-108-589-00	0.027		
C211, 212	1-121-726-00	0.47	50 V	elect
C213	1-101-924-00	0.022		
C301, 401	1-121-726-00	0.47	50 V	elect
C302, 402	1-131-422-00	3.3	6.3 V	tantalum
C303	1-101-074-00	0.001		
C304, 404	1-121-391-00	1	50 V	elect
C305, 405	1-101-074-00	0.001		
C306, 406	1-102-963-00	33 p		
C307, 407	1-121-726-00	0.47	50 V	elect
C308, 408	1-121-395-00	4.7	25 V	elect
C309, 409	1-102-975-00	100 p		
C310, 410	1-121-651-00	10	16 V	elect
C311, 411	1-121-409-00	47	16 V	elect
C312, 412	1-102-963-00	33 p		
C315, 415	1-102-127-00	0.0068		
C316, 416	1-121-398-00	10	25 V	elect
C317, 417	1-121-395-00	4.7	25 V	elect
C325, 425	1-102-120-00	0.0018		
C330, 430	1-102-815-00	110 p		
C331, 431	1-101-881-00	47 p		
C332	1-107-180-00	300 p	500 V	mica
C333	1-129-704-00	0.0015	630 V	film
C334	1-102-126-00	0.0056		
C335	1-121-411-00	47	50 V	elect
C337	1-102-125-00	0.0047		
C338	1-102-074-00	0.001		
C339, 439	1-102-947-00	10 p		

Ref. No.	Part No.	Description		
C350, 450, C352, 452	1-102-975-00	100 p		
C501, 601	1-102-123-00	0.0033		
C502, 602	1-108-587-00	0.022		mylar
C503, 603	1-108-583-00	0.015		mylar
C504, 604	1-108-870-00	0.1		mylar
C505, 605	1-102-129-00	0.01		
C701, 801	1-121-911-00	0.47	50 V	elect
C702	1-123-192-00	47	16 V	elect
C703, 803	1-102-836-00	470 p		
C704, 804	1-102-074-00	0.001		
C705, 805	1-121-421-00	220	16 V	elect
C706, 806	1-121-410-00	47	25 V	elect
C707, 807	1-121-361-00	470	35 V	elect
C709	1-123-264-00	220	6.3 V	elect
C710, 810	1-102-975-00	100 p		
C711, 811	1-101-005-00	0.022		
C901	1-125-171-00	1000	63 V	elect
C902	1-123-388-00	1000	25 V	elect
C903	1-108-429-00	0.047	200 V	mylar
C907	1-121-733-00	470	25 V	elect
C908	1-121-423-00	220	35 V	elect
CV101–104, CT101–104	1-151-337-00	Capacitor, tuning		

RESISTORS

All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the schematic diagram.

R150	1-213-141-11	680	1 W	metal oxide (nonflammable)
R339	1-206-656-11	470	2 W	metal oxide
R703, 803	⚠1-212-974-11	47	½W	fusible
R705, 805	1-244-861-00	330	½W	composition
R708	⚠1-212-982-11	100	½W	fusible (nonflammable)
R709, 809	⚠1-212-958-11	10	½W	fusible (nonflammable)
R901	⚠1-213-036-11	1	1 W	fusible (nonflammable)

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

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

Ref. No.	Part No.	Description
R903, 904	⚠1-202-723-11	2.2 M ½ W composition
R909	⚠1-206-485-11	82 2 W metal oxide (nonflammable)
R910	⚠1-206-640-11	100 2 W metal oxide (nonflammable)
R911	⚠1-206-661-11	750 2 W metal oxide (nonflammable)
RV201	1-226-235-00	4.7 k-B, adjustable; 19 kHz
RV302, 402	1-226-240-00	220 k-B, adjustable; REC BIAS
RV501, 601	1-226-243-00	100 k-B, variable; TREBLE
RV502, 602	1-226-243-00	100 k-B, variable; BASS
RV503	1-226-243-00	100 k-B, variable; BALANCE
RV504, 604	1-226-242-00	100 k-B, variable; VOLUME

JACKS

CNJ301, 401	1-507-500-00	2 P-phono, PHONO
CNJ302, 402	1-507-500-00	2 P-phono, AUX
CNJ303, 403	1-507-500-00	2 P-phono, REC OUT
CNJ701, 801 CNJ702, 802	1-507-500-00	2 P-phono, SP OUT
J301, 401	1-507-582-00	Phone, MIC
J701	1-507-583-00	Phone, HEADPHONES

SWITCHES

S1, 2	1-552-404-00	Lever-slide, REC/PB
S3	1-552-401-00	Pushbutton, FUNCTION
S5	1-552-406-00	Pushbutton, SPEAKER
S7	1-516-944-00	Leaf, recorder power
S8	⚠1-552-408-00	Pushbutton, POWER

MISCELLANEOUS

BPF101	1-231-313-00	Bandpass Filter
CF101, 102	1-527-338-00	Ceramic Filter
CF103	1-527-347-00	Ceramic Filter
CP1	⚠1-231-326-00	Encapsulated Component (USA model)
CP1	⚠1-231-341-21	Encapsulated Component (Canadian model)
F1	⚠1-532-267-00	Fuse, 1.6 A (Canadian model)

Ref. No.	Part No.	Description
HE	8-825-634-00	Head, erase
HRP	1-543-132-00	Head, rec/pb
M	⚠1-541-133-00	Motor
ME1	1-520-341-00	Meter, SIGNAL
※ PL1–4	1-518-323-00	Lamp, 13 V 200 mA
	1-536-544-00	Terminal Strips, 3 P; ANTENNA
	1-549-084-00	Cartridge, VX-60G
	⚠1-550-038-61	Record Changer, BSR-C129R2
	⚠1-551-280-31	Lead Wire, record changer
	⚠1-551-453-00	Cord, power

※: PL4 is used in the sets with Serial No. up to 808,000 (US model)

ACCESSORIES AND PACKING MATERIALS

Part No.	Description
2-070-134-00	Spindle, auto
3-701-630-00	Bag, plastic
3-701-806-00	Adaptor, 45 rpm
3-770-488-21	Manual, instruction (US model)
3-770-488-21 3-794-210-31	Manual, instruction (Canadian model)
4-851-051-00	Bag, plastic
4-856-322-00	Spindle, manual
4-856-369-00	Sheet (A), protection
4-856-371-00	Carton
4-856-374-00	Cushion (A)
4-856-375-00	Cushion (B)
4-856-376-00	Cushion (C)
4-856-377-00	Cushion (D)
4-856-378-00	Sheet (B), protection

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

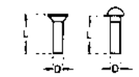
Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

1/4 WATT CARBON RESISTORS

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-244-601-11	10	1-244-625-11	100	1-244-649-11	1.0k	1-244-673-11	10k	1-244-697-11	100k	1-244-721-11	1.0M	1-244-745-11
1.1	1-244-602-11	11	1-244-626-11	110	1-244-650-11	1.1k	1-244-674-11	11k	1-244-698-11	110k	1-244-722-11	1.1M	1-244-746-11
1.2	1-244-603-11	12	1-244-627-11	120	1-244-651-11	1.2k	1-244-675-11	12k	1-244-699-11	120k	1-244-723-11	1.2M	1-244-747-11
1.3	1-244-604-11	13	1-244-628-11	130	1-244-652-11	1.3k	1-244-676-11	13k	1-244-700-11	130k	1-244-724-11	1.3M	1-244-748-11
1.5	1-244-605-11	15	1-244-629-11	150	1-244-653-11	1.5k	1-244-677-11	15k	1-244-701-11	150k	1-244-725-11	1.5M	1-244-749-11
1.6	1-244-606-11	16	1-244-630-11	160	1-244-654-11	1.6k	1-244-678-11	16k	1-244-702-11	160k	1-244-726-11	1.6M	1-244-750-11
1.8	1-244-607-11	18	1-244-631-11	180	1-244-655-11	1.8k	1-244-679-11	18k	1-244-703-11	180k	1-244-737-11	1.8M	1-244-751-11
2.0	1-244-608-11	20	1-244-632-11	200	1-244-656-11	2.0k	1-244-680-11	20k	1-244-704-11	200k	1-244-728-11	2.0M	1-244-752-11
2.2	1-244-609-11	22	1-244-633-11	220	1-244-657-11	2.2k	1-244-681-11	22k	1-244-705-11	220k	1-244-729-11	2.2M	1-244-753-11
2.4	1-244-610-11	24	1-244-634-11	240	1-244-658-11	2.4k	1-244-682-11	24k	1-244-706-11	240k	1-244-730-11	2.4M	1-244-754-11
2.7	1-244-611-11	27	1-244-635-11	270	1-244-659-11	2.7k	1-244-683-11	27k	1-244-707-11	270k	1-244-731-11	2.7M	1-244-755-11
3.0	1-244-612-11	30	1-244-636-11	300	1-244-660-11	3.0k	1-244-684-11	30k	1-244-708-11	300k	1-244-732-11	3.0M	1-244-756-11
3.3	1-244-613-11	33	1-244-637-11	330	1-244-661-11	3.3k	1-244-685-11	33k	1-244-709-11	330k	1-244-733-11	3.3M	1-244-757-11
3.6	1-244-614-11	36	1-244-638-11	360	1-244-662-11	3.6k	1-244-686-11	36k	1-244-710-11	360k	1-244-734-11	3.6M	1-244-758-11
3.9	1-244-615-11	39	1-244-639-11	390	1-244-663-11	3.9k	1-244-687-11	39k	1-244-711-11	390k	1-244-735-11	3.9M	1-244-759-11
4.3	1-244-616-11	43	1-244-640-11	430	1-244-664-11	4.3k	1-244-688-11	43k	1-244-712-11	430k	1-244-736-11	4.3M	1-244-760-11
4.7	1-244-617-11	47	1-244-641-11	470	1-244-665-11	4.7k	1-244-689-11	47k	1-244-713-11	470k	1-244-737-11	4.7M	1-244-761-11
5.1	1-244-618-11	51	1-244-642-11	510	1-244-666-11	5.1k	1-244-690-11	51k	1-244-714-11	510k	1-244-738-11	5.1M	1-244-762-11
5.6	1-244-619-11	56	1-244-643-11	560	1-244-667-11	5.6k	1-244-691-11	56k	1-244-715-11	560k	1-244-739-11		
6.2	1-244-620-11	62	1-244-644 11	620	1-244-668-11	6.2k	1-244-692-11	62k	1-244-716-11	620k	1-244-740-11		
6.8	1-244-621-11	68	1-244-645-11	680	1-244-669-11	6.8k	1-244-693-11	68k	1-244-717-11	680k	1-244-741-11		
7.5	1-244-622-11	75	1-244-646-11	750	1-244-670-11	7.5k	1-244-694-11	75k	1-244-718-11	750k	1-244-742-11		
8.2	1-244-623-11	82	1-244-647-11	820	1-244-671-11	8.2k	1-244-695-11	82k	1-244-719-11	820k	1-244-743-11		
9.1	1-244-624-11	91	1-244-648-11	910	1-244-672-11	9.1k	1-244-696-11	91k	1-244-720-11	910k	1-244-744-11		

HARDWARE NOMENCLATURE

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



Nut, Washer, Retaining ring: N 3
- *Diameter of usable screw or shaft*
- *Reference designation*

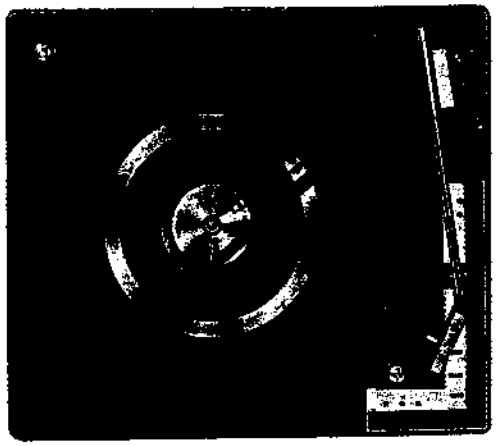
Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement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

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2 6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW'		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

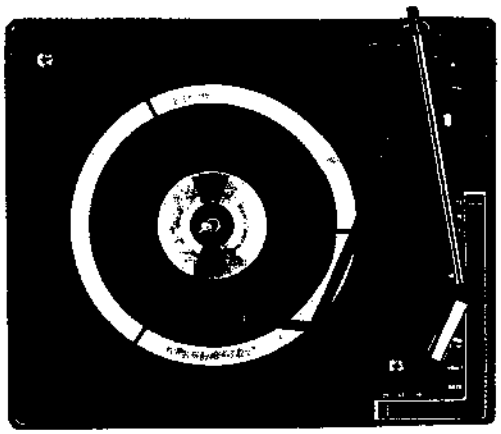
Original

BSR C-123R
BSR C-123R2
BSR C-129R2

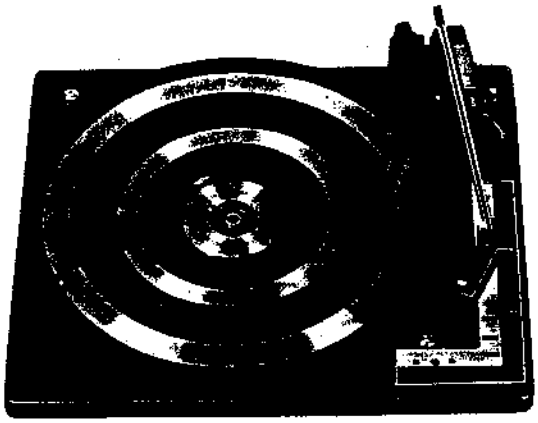
RECORD CHANGER



BSR C-123R



BSR C-129R2



BSR C-123R2

SONY

SERVICE MANUAL

SPECIFICATIONS

Record changer:	Three speeds (33⅓, 45, 78 rpm)
Drive system:	Idler-drive
Number of records played automatically:	Up to 5 LP records

TABLE OF CONTENTS

SECTION 1
OPERATING INSTRUCTIONS

The BSR C-123R, C-123R2, C-129R2 will play automatically a stack of up to five (depending on thickness) 7" (17 cm), 10" (25 cm) or 12" (30 cm) diameter records of the same speed. 7" (17 cm) diameter records having a large center hole may be played using a BSR 45 rpm spindle adaptor.

1-1. INITIAL PREPARATION

(1) Check that the two transit screws are fully screwed down to the mainplate and that the unit floats freely on the mounting springs.

(2) Rotate the turntable by hand, five times to ensure that the mechanism is in neutral position.

(3) If the center spindle is not already fitted, place it into the turntable bearing, ensuring that the projection on the spindle locates in the slot at the top of the turntable bearing. Press downwards until the spindle snaps onto the circlip.

Note: The pick-up arm is automatically released when the starting lever is operated.

1-2. AUTOMATIC OPERATION

(1) According to the type of record to be played,
(a) Move the speed control (Fig. 1, A) against the required speed.
(b) Set record size selector (Fig. 1, B).

(2) To Load
Lift the control arm at the rear and swing it to the right. Carefully place one record on the ledge of the center spindle and hold there while the remaining stack of up to five records are also loaded.
All records in any one stack must be of the same speed, diameter. Swing the control arm back to the center and gently lower onto the records.

(3) To Start
Move the starting lever (Fig. 1, C) to the AUTO position and hold there momentarily until the turntable revolves, then return it gently to the START position.

(4) To Reject
To reject a record at any time when the unit is in operation, move the starting lever to the AUTO position and then return it gently to the START position.

(5) To Stop
After playing the last record the unit will shut off automatically. If it becomes necessary to stop the unit during play, raise the cueing lever (Fig. 2) and move the pick-up arm on the pick-up arm rest (Fig. 1, D) lower the cueing lever and move the starting lever to the STOP position.

Note: To manually interrupt the record, raise the cueing lever to lift the pick-up arm. When the cueing lever is lowered, the pick-up will descent to the record and resume playing in the same groove.

1-3. MANUAL OPERATION

(1) Check all settings as indicated in (1) (a) and (b) under Automatic Operation.

(2) Where a stub spindle is provided, remove center spindle assembly by lifting and twisting and replace with the shorter spindle.

Note: Records may be played with the long spindle fixed, but the record must be manipulated carefully over the spindle ledge.

(3) Lift the control arm at the rear and swing to the right. Place the record on the turntable.

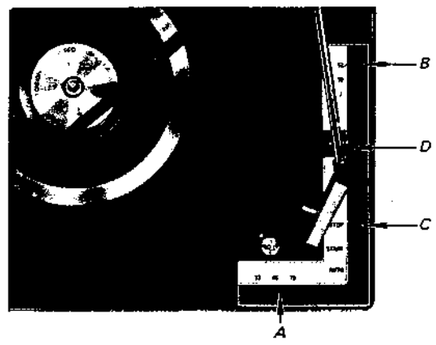


Fig. 1. Control panel with automatic pick-up lock

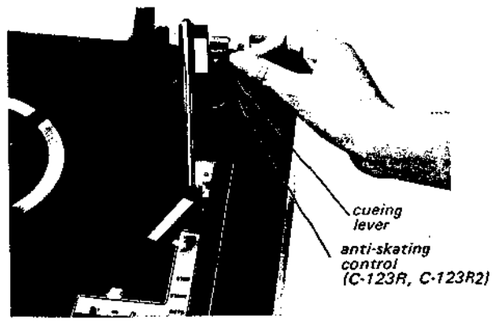


Fig. 2. Cueing lever and anti-skating control

(4) To Start

Move the starting lever to the START position and raise the cueing lever. Move the pick-up arm above the record to the desired point and lower to the groove by returning the cueing lever to the lower position.

At the end of the record the pick-up arm will return to the pick-up arm rest and the unit will shut off automatically.

(5) To Reject or Stop

The procedure for stopping or rejecting a record while playing is as described in paragraphs (4) and (5) under Automatic Operation.

Note: (a) Single records may be played semi-automatically by leaving the control arm in the raised position at the right then moving the starting lever to the AUTO position, returning it gently to the START position. The pick-up will automatically set down on the record. If the control arm is left in the raised position the record will continue to play repeatedly. The unit will shut off and the pick-up returns to its rest only if the control arm is lowered after the stylus has set down on the record.

(b) Records which do not have a starting or fast finishing groove must be played manually.

Important:

(1) Always remember to use the correct stylus on the pick-up. If the wrong one is in use it may not be apparent from the music, however, the stylus itself may become damaged by continuous playing on the wrong point.

(2) Never force the pick-up arm. This unit is robust but due to the featherweight action of the pick-up and the delicate balance required, any force will upset the adjustment.

(3) When playing new records a certain amount of fluff will gather on the stylus point. This should be carefully removed from time to time.

(4) Do not leave records on the unit when not in use; store as recommended by the manufactures.

(5) If the unit is to be moved the transit screws should be raised to secure the unit to the turntable base by turning them counterclockwise.

SECTION 2
ADJUSTMENTS

Note: This unit has been subjected to the most rigorous checks and tests before leaving the factory where all necessary adjustments have been made to ensure the satisfactory playing of records.
The following information is provided, should it become necessary to make any minor adjustments.

2-1. STYLUS PRESSURE

The stylus pressure should always be set as recommended by the cartridge manufacturer. The stylus pressure is adjusted by means of the stylus pressure adjustment screw (Fig. 3).

Turning clockwise reduces the stylus pressure, counterclockwise increases the pressure.

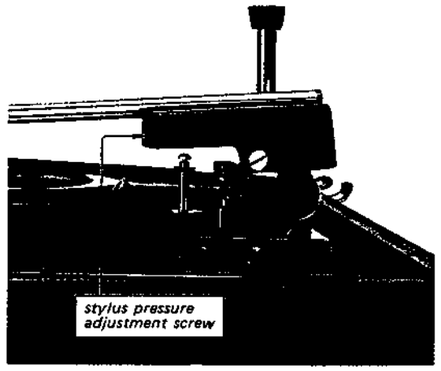


Fig. 3. Stylus pressure adjustment screw

2-2. PICK-UP ARM ANTI-SKATING (C-123R, C-123R2)

Having set the required stylus pressure, the anti-skating control (Fig. 2) is adjusted to a figure corresponding to the stylus pressure applied. The control is continuously adjustable so settings between the figures indicated.

Note: The anti-skating control settings described are those required under ideal conditions. Slight variation from the optimum may be necessary depending on the tracking condition. If, after setting the adjustment, the pick-up tends to skate outward, lower the setting, if it skates inward, increase the setting.

2-3. STYLUS SET-DOWN

The correct position for stylus set-down is 1/8" (3 mm) from the edge of the record. The position is adjusted by the stylus set-down adjustment screw (Fig. 4) and is best done with a stack of 10" records on the turntable. When correctly positioned for a 10" record the set-down will also be corrected for 7" and 12" records.

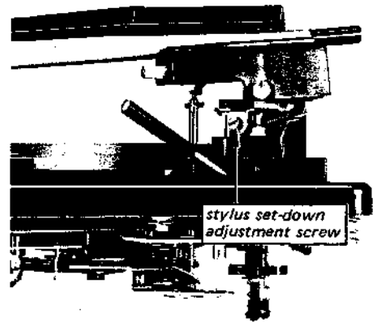


Fig. 4. Stylus set-down adjustment screw

2-4. PICK-UP ARM HEIGHT

The pick-up arm height is correct when the stylus clears the top of a stack of five average thickness records on the turntable by 1/8" (3 mm). The pick-up arm height may be raised by turning the pick-up arm height adjustment screw (Fig. 5) counterclockwise and lowered by turning it clockwise. After any adjustment a check must be made to ensure that the pick-up clears the underside of records held on the center spindle ledge and also is secured by the pick-up arm rest.

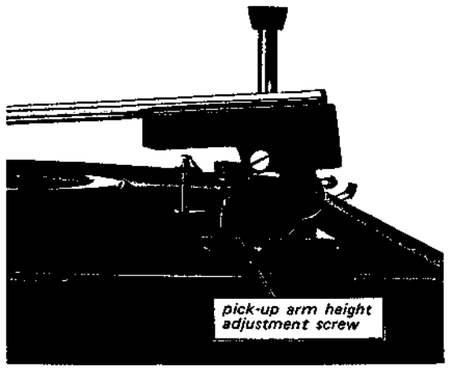
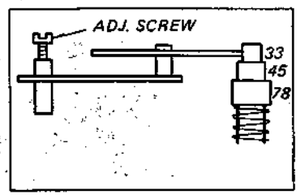


Fig. 5. Pick-up arm height adjustment screw

SECTION 3
TROUBLE CHART

Symptom	Cause	Remedy
Turntable does not revolve when starting lever is set to "START".	1. No current to motor	1. a) Check to see that current is reaching motor. b) Check that AC cord is plugged into outlet. c) Check that 4p connector is positively in place underneath changer.
	2. Idler pulley (A) not engaging turntable rim.	2. Check if the idler arm is free to pivot: Check that idler pulley spring (B) is properly positioned.
	3. Idler pulley (A) not driving.	3. Clean the inside rim of turntable and rubber tire of idler pulley (A) to ensure that they are free from residue and oil.
Turntable revolves when starting lever is set to "START", but pick-up arm raises then returns to rest and changer shuts off.	1. Pick-up arm height adjustment.	1. Adjust height as described under "ADJUSTMENTS".
Turntable stops or slows down in middle of change cycle.	1. Idler pulley (A) slips.	1. Clean the inside rim of turntable and rubber tire of idler pulley (A). These drive surfaces must be free from oil and residue.
	2. Insufficient tension on idler pulley spring (B).	2. Check that idler pulley spring (B) is properly positioned and not distorted.
Pick-up arm fails to move to position to play last record. Pick-up arm returns to rest and changer shuts off.	1. Control Arm (C) sticking or binding.	1. Free control arm (C) by moving backward and forward several times.
Record fails to drop when changer cycles.	1. Bent or distorted center spindle (G).	1. Replace center spindle (G).
	2. Center spindle (G) not fully inserted.	2. Make sure center spindle (G) is locked in place and fully engaged.
Turntable speed too slow.	1. Light motor bearings.	1. Bearings are self-aligning lightly tap side of motor laminations to free bearings.
	2. Binding turntable bearings.	2. Check turntable bearings for freedom. If turntable does not turn easily when idler pulley (A) is disengaged, remove turntable, clean off any accumulation of foreign matter, and lubricate bearings with light motor oil.
	3. Idler pulley (A) slips.	3. Check that idler arm riveting ass'y (D) is free in speed change arm ass'y (E). Check that end of idler arm riveting ass'y is not binding on unit plate. Check proper tension of sping (B).
	4. Ambient temperature too low.	4. Prolonged exposure to temperatures below 45° will result in slow initial speed.
	5. Idler pulley (A) height adjustment incorrect.	5. Make idler pulley (A) adjustment. a) Disconnect unit from A.C. supply. b) Remove turntable. c) Switch unit on so that idler pulley (A) is engaged against pulley. d) Set speed control to 33. e) Using a screwdriver, turn adjustment screw higher or lower to position idler pulley (A) in center of 33 step of motor pulley. f) Check alignment of pulley at all speeds and reassemble turntable.



Note: Refer to exploded views on pages 8 to 16.
BSR C-123R : page 8 to 10.
BSR C-123R2: page 11 to 13.
BSR C-129R2: page 14 to 16.

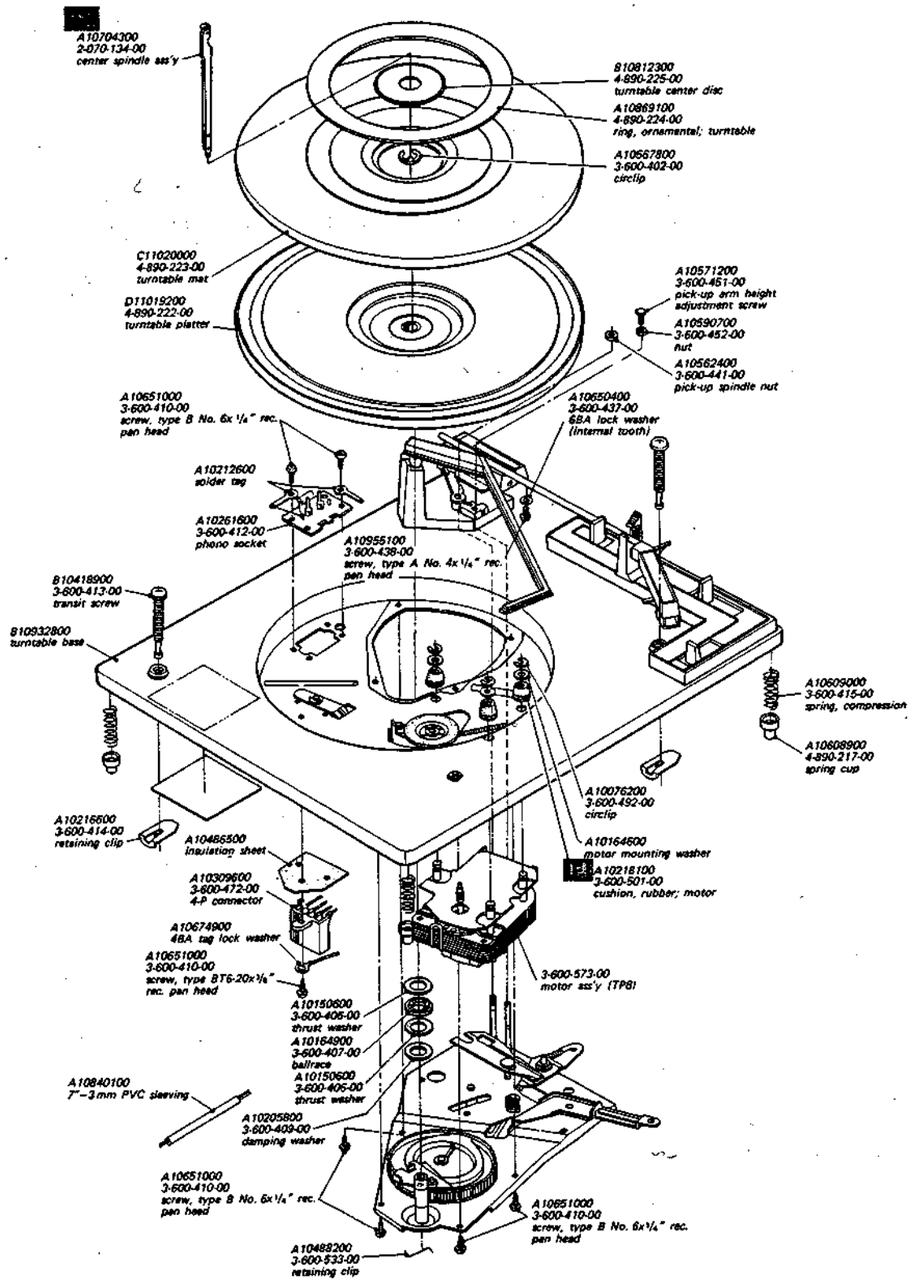
Symptom	Cause	Remedy
Pick-up arm strikes underside of record on spindle ledge, or stylus catches on top of last record while moving into playing position.	1. Incorrect pick-up arm height adjustment.	1. Adjust height as described under "ADJUSTMENTS".
Stylus set-down on wrong portion of record.	1. Incorrect stylus set-down adjustment.	1. Adjust stylus set-down as described under "ADJUSTMENTS".
Pick-up arm does not track correctly across record.	1. Stylus clogged with an accumulation of dust, stylus badly worn.	1. Check for foreign matter around tip of stylus. Check for broken tip; replace if badly worn or broken.
	2. Cartridge output leads too tight.	2. Allow enough slack in cable to allow pick-up arm to move freely across record.
	3. Changer mechanism not level.	3. Check that changer is mounted in a LEVEL position before operating.
	4. Insufficient stylus pressure.	4. Adjust stylus pressure as described under "ADJUSTMENTS".
Changer fails to shut off after playing last record, and pick-up arm has returned to rest.	1. Leads from power supply binding switch.	1. Re-dress leads away from switch and switch lever.
Noise during playing of record.	1. Motor rumble.	1. If a low pitched rumbling sound comes from the speaker, check rubber motor cushion (F) to ensure the motor is finaling free. Motor leads should have enough slack to allow motor to float on its rubber cushion (F).
	2. Defective idler pulley (A).	2. A rapid thumping sound while the motor is running is indicative of uneven wear on the rubber tire of idler pulley (A). Check for smooth surface of rubber tire; if surface is rough, replace idler pulley.
Two records drop together.	1. Hole in record too large.	1. Replace record.
	2. Control Arm (C) not firmly seated (probably due to incorrect loading of records).	2. Check control arm shaft for burrs and foreign matter carefully clean and remove any burrs. DO NOT OIL. It should fail in position from its own weight.
	3. Control Arm (C) not holding records level.	3. Gently twist control arm (C) until it will hold record stack parallel to the top of turntable.

Note: Refer to exploded views on pages 8 to 16.
BSR C-123R : page 8 to 10.
BSR C-123R2: page 11 to 13.
BSR C-129R2: page 14 to 16.

SECTION 4
EXPLODED VIEWS

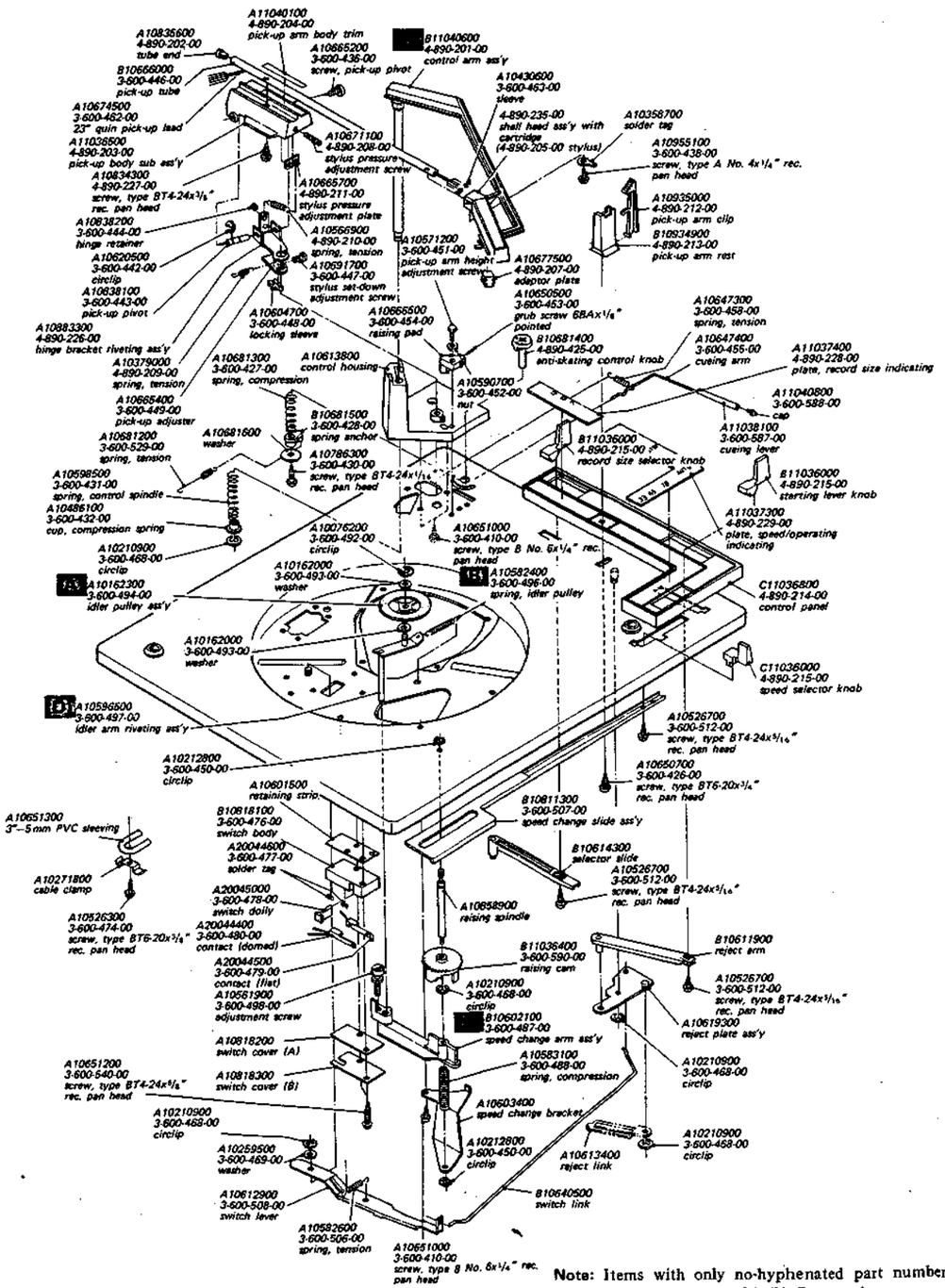
4-1. C-123R

(1)



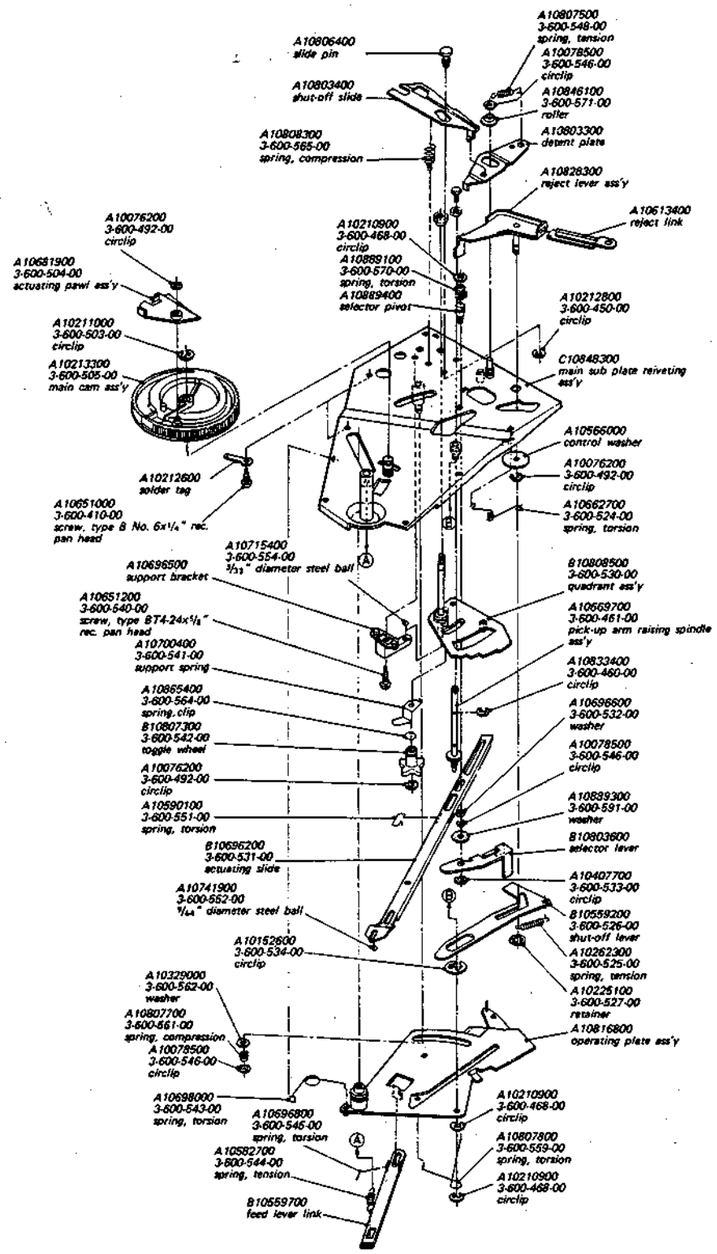
Note: Items with only no-hyphenated part number are not stocked at SONY Corporation.

(2)



Note: Items with only no-hyphenated part number are not stocked at SONY Corporation.

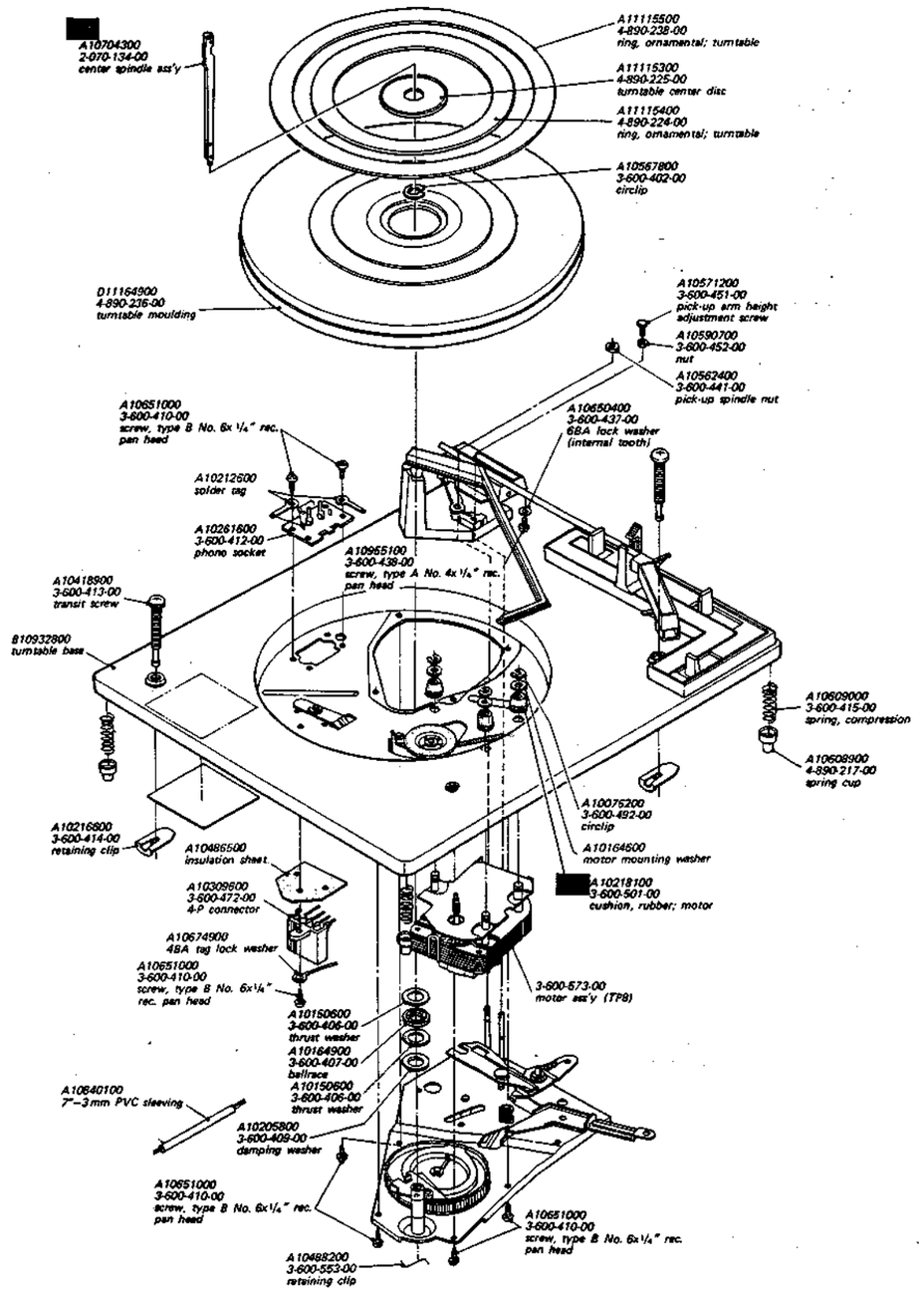
(3)



Note: Items with only no-hyphenated part number are not stocked at SONY Corporation.

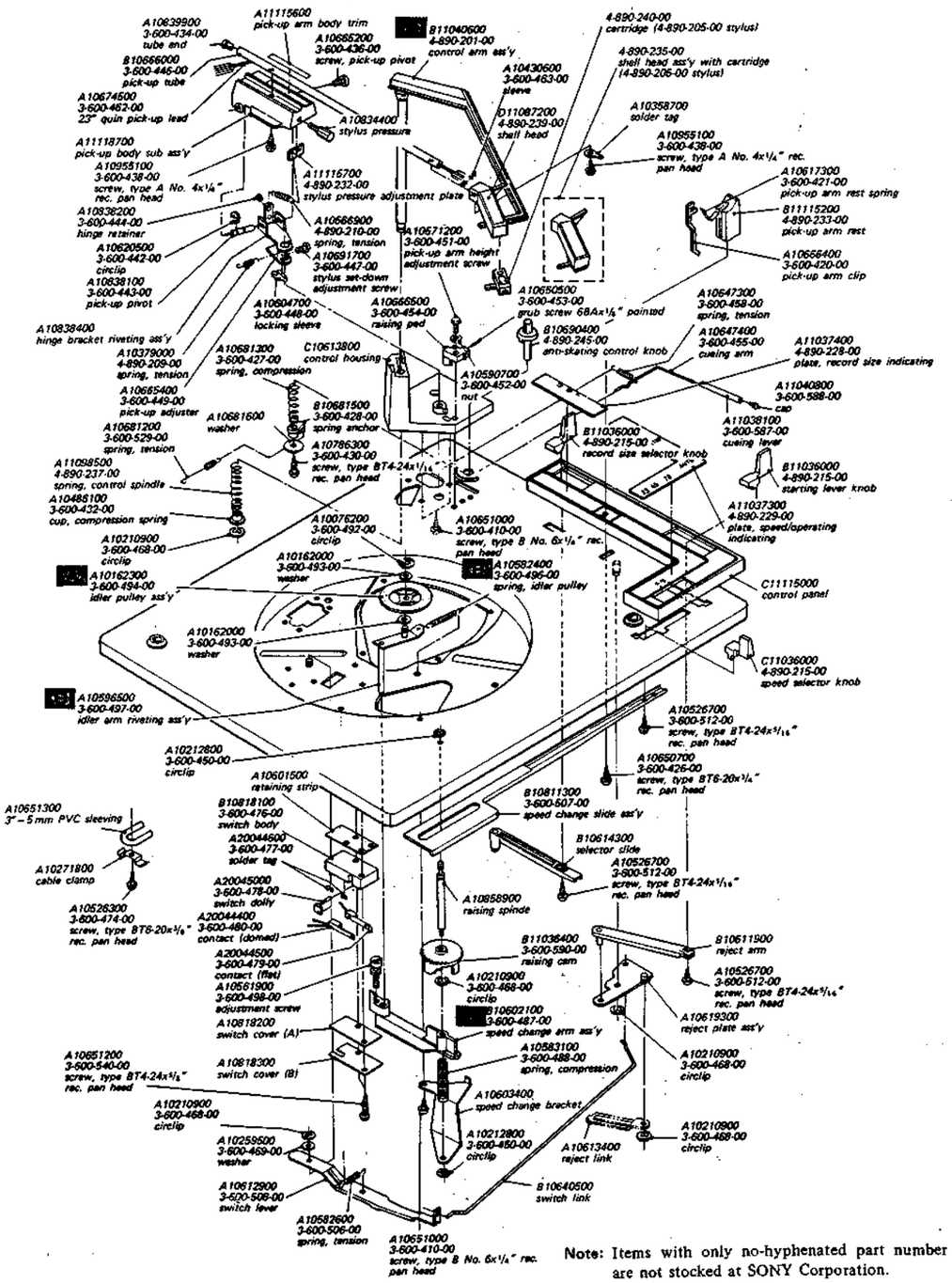
4-2. C-123R2

(1)



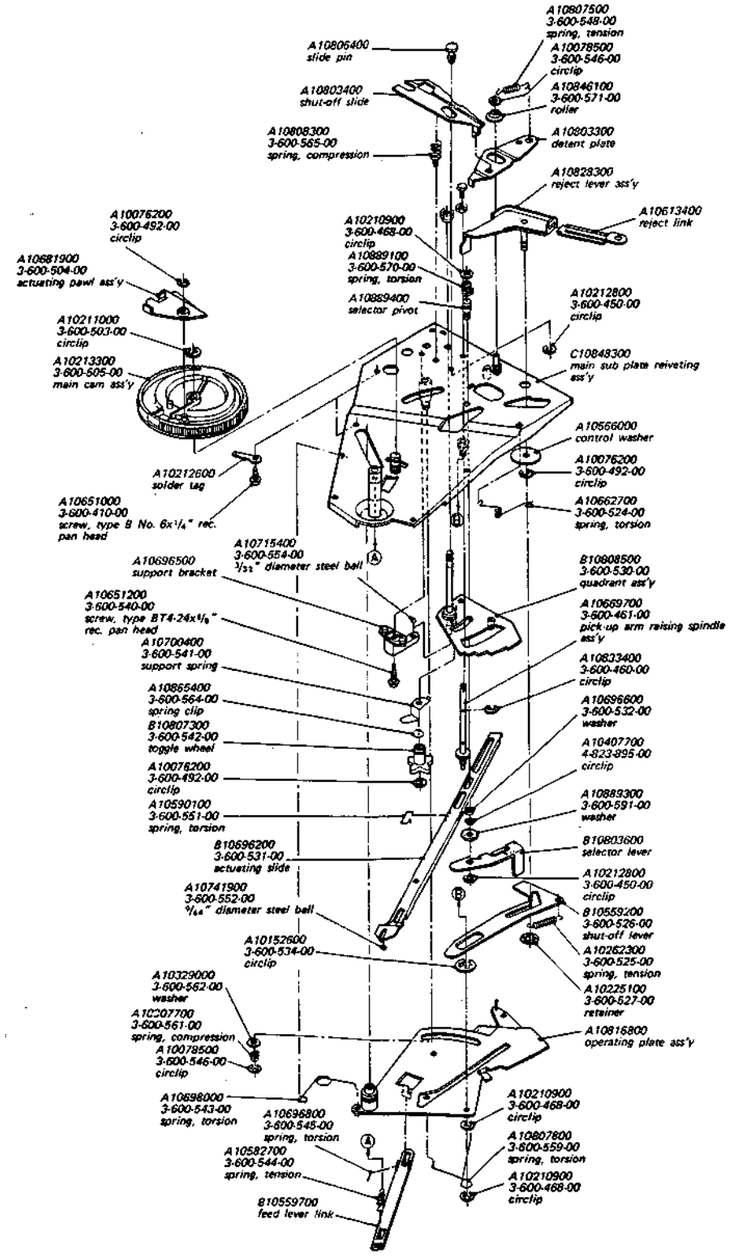
Note: Items with only no-hyphenated part number are not stocked at SONY Corporation.

(2)



Note: Items with only no-hyphenated part number are not stocked at SONY Corporation.

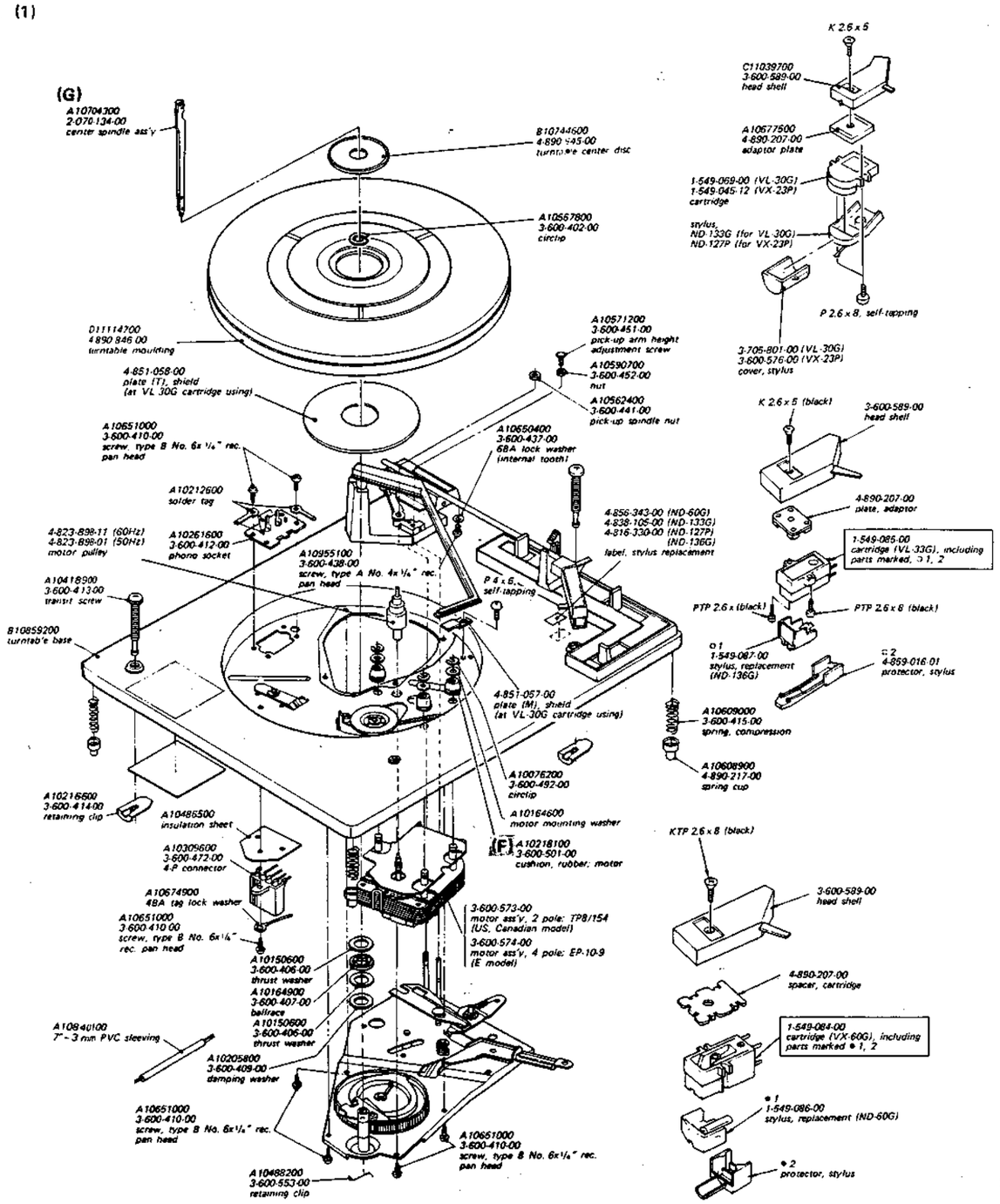
(3)



Note: Items with only no-hyphenated part number are not stocked at SONY Corporation

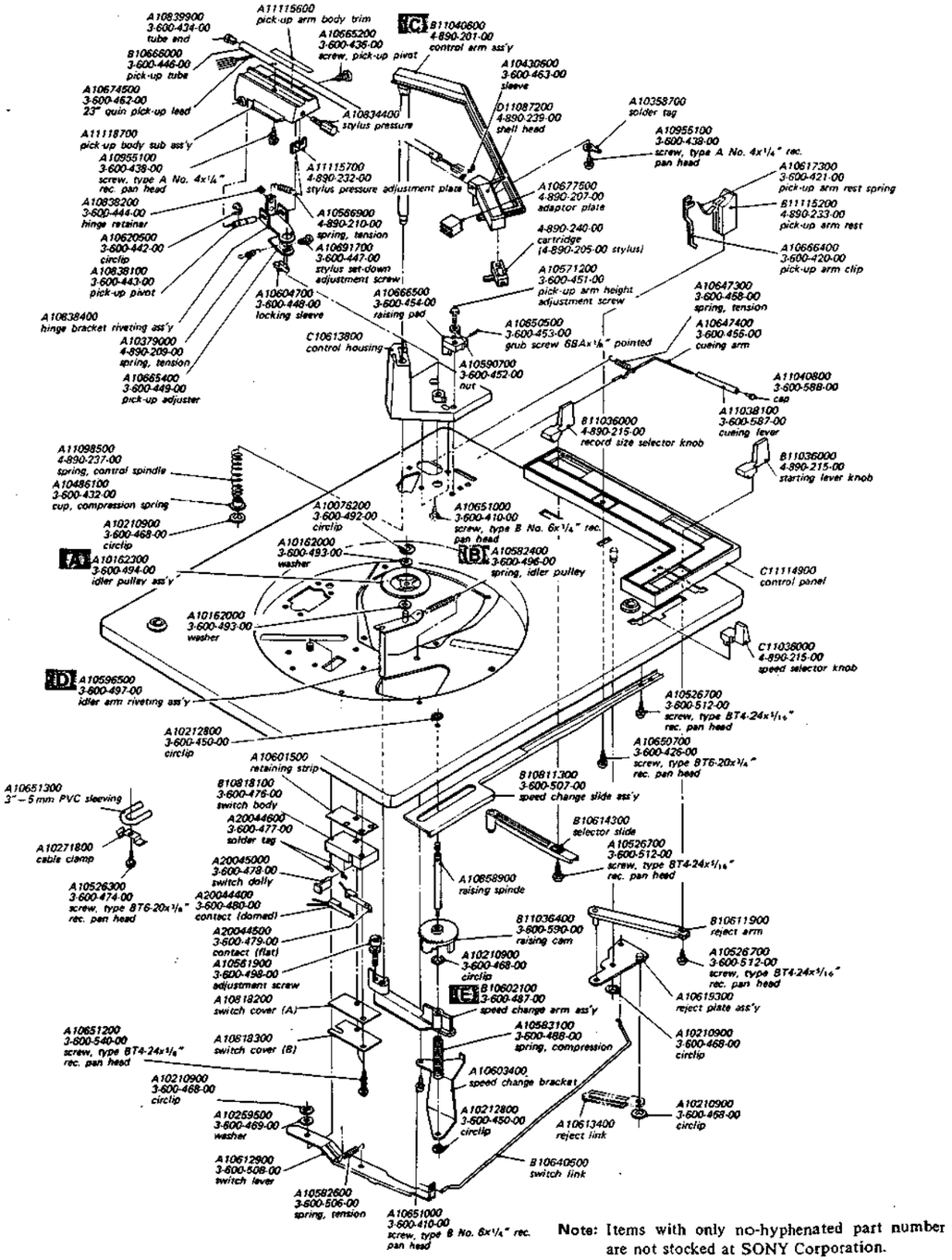
4-3. C-129R2

(1)



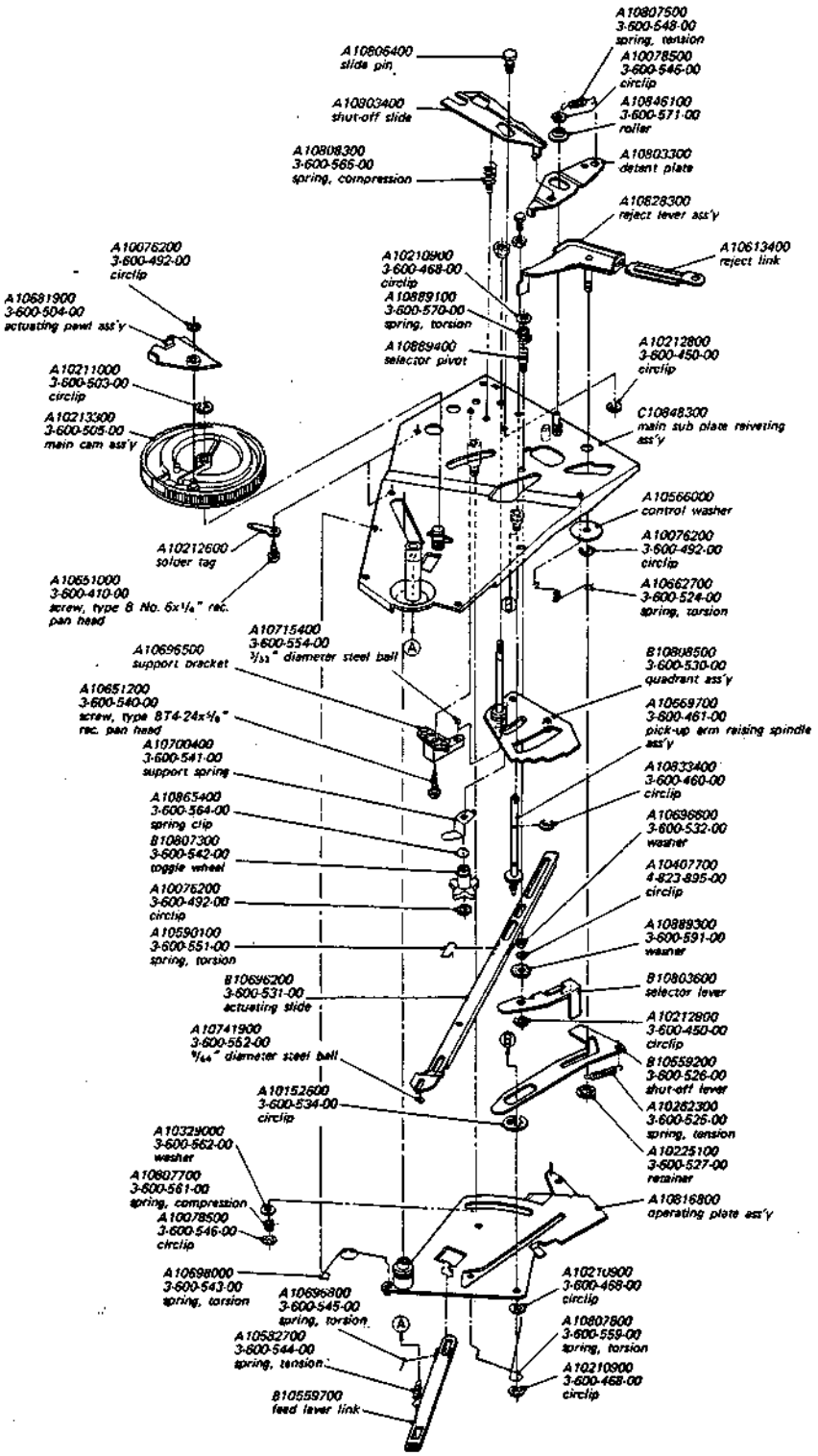
Note: Items with only no-hyphenated part number are not stocked at SONY Corporation.

(2)



Note: Items with only no-hyphenated part number are not stocked at SONY Corporation.

(3) C-129R2



Note: Items with only no-hyphenated part number are not stocked at SONY Corporation.

Sony Corporation

STEREO MUSIC SYSTEM

HMK-229

US Model
E Model

SUPPLEMENT

No. 1
September, 1979

File this supplement with the Service Manual.

Subject: Production Changes

Record Changer has been changed to **BSR-C197** from certain Serial No. and the suffix of the Part No. of the Instruction Manual has been changed. Refer to the list below.

Model	Serial No.	Part No. of Instruction Manual
US	842,201 and later	3-770-488-22
E1	411,001 and later	3-770-488-53
E2	471,001 and later	

SONY
SERVICE MANUAL

Original

BSR-C197

RECORD CHANGER

SPECIFICATIONS

Turntable:	auto/manual changer 11" (28 cm) dia.
Speed:	33⅓, 45 and 78 rpm
Cartridge:	VX-60G (ceramic type)
Stylus:	ND-60G (conical, 0.5 mil diamond)
Tracking Force:	3.5 g ± 0.5 g (3.5 g recommended)

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.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

SONY®
SERVICE MANUAL

SECTION 1

OPERATING INSTRUCTIONS

The model C197 will play automatically a stack of up to five average thickness records of the same speed and diameter. 7" (17 cm) diameter records having a large center hole may be played using a BSR 45 rpm spindle-adaptor. Records may also be played singly.

1-1. INITIAL PREPARATION

1. If the unit is fitted with transit screws, make sure they are screwed right down into the mainplate and that the unit floats freely on its mounting springs.

2. Depress the control arm directly over the spindle at the rear and swing it to the center of the turntable.

3. Rotate the turntable by hand five times to ensure that the mechanism is in a neutral position.

4. If the center spindle is not already fitted, place it into the turntable bearing, making certain that the projection on the spindle locates in the slot at the top of the turntable bearing. Press downwards until the spindle snaps onto the circlip.

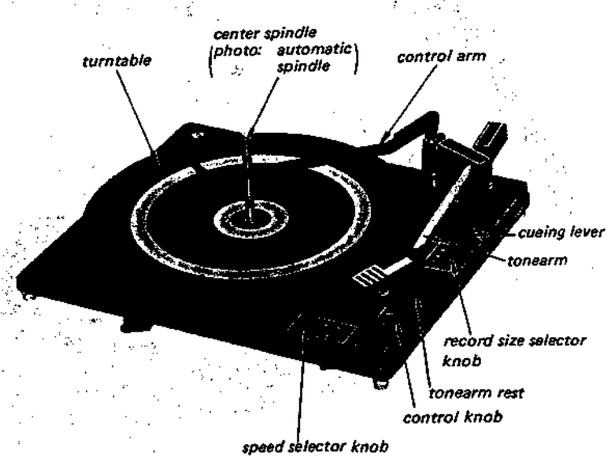


Fig. 1

1-2. AUTOMATIC OPERATION

Grasp the control arm at the rear, raise it to its highest position and swing counterclockwise until it is positioned over the tonearm in the tonearm rest. Place a maximum of five records (all the same size and speed) on the spindle. The first record to be played must be located carefully on the ledge of the spindle and held in place until the rest of the records are placed on the spindle. Return the control arm to its center position and lower it onto the stack of records. Move the record size selector knob to the 12, 10 or 7 position for the 12" (30 cm), 10" (25 cm) or 7" (17 cm) records to be played. Move the speed selector knob to the 33, 45, or 78 position for the 33, 45, or 78 rpm records to be played.

If the cartridge is equipped with more than one stylus, be sure the correct stylus is positioned for the records to be played.

If 45 rpm (large center hole) records without center hole adaptors are to be played, slip the 45 rpm adaptor spindle over the automatic spindle. The arrow on top of the 45 rpm adaptor spindle must point toward the front left corner of the unit.

To Start

Be sure the tonearm is free and is resting on the tonearm rest. Move the control knob to the AUTO position and hold until the turntable starts to revolve, then release.

To Reject

To reject a record at any time while the unit is in operation, move the control knob to the AUTO position and then release. If the record being played is not the last one in the stack, the next record will be dropped and played. If the record being played is the last record in the stack, the tonearm will move to the tonearm rest and the unit will shut off.

To Stop

The unit can be stopped at any time by moving the control knob to the OFF position. If the unit is stopped during the "change cycle," it must be allowed to complete the cycle (by manual rotation of the turntable, if necessary) before moving the tonearm and removing the records. During normal automatic operation, with the control arm in the center position, the unit will stop automatically after the last record has been played.

1-3. SEMI-AUTOMATIC OPERATION

For semi-automatic operation and repeat of a single record, lift the control arm, move it to its position over the tonearm and leave it there. Place the record on the turntable and set the controls for correct record size and speed. Select correct stylus.

To start, move the control knob to the AUTO position and release, allowing the knob to move back to the ON position. The turntable will revolve, the first (bottom) record will drop to the turntable and the tonearm will place the stylus in the starting groove to play the record.

If the control arm is returned to the center position over the turntable, after the stylus is in the starting groove, the tonearm will be returned to the tonearm rest and the unit will shut off automatically at the end of the record.

Note: Records that do not have the "lead-in" or "out-of" grooves must be played manually.

Cueing Lever

Raising or lowering the cueing lever raises or lowers the tonearm, under positive control, from any point on or off the record. Lift the cueing lever and the tonearm is lifted into position where it can be moved manually to any position over the record and then lowered gently to the selected groove by lowering the cueing lever.

To pause while playing, raise the cueing lever to lift the stylus from the record for the desired length of time and lower the cueing lever to return the stylus to the same record groove.

The cueing lever must be in the lowered position during automatic operation of the unit.

1-4. MANUAL OPERATION

To play a record manually, move the control arm to its position over the tonearm rest. With the correct speed and stylus selected, the record is placed on the turntable and the control arm moved to the center position.

The control knob is moved to the ON position to start the turntable.

Using the finger lift, raise the tonearm from the rest and move it to the playing position on the record.

At the end of the record, the tonearm will return to the tonearm rest and the unit will shut off automatically.

IMPORTANT:

1. Always remember to use the correct stylus on the tonearm. If a wrong one is used, it may not be apparent from the music, however, the stylus itself may be damaged by continuous playing on the wrong point.

2. Never force the tonearm. This unit is robust but due to the featherweight action of the tonearm and the delicate balance required, any force will upset the adjustment.

3. If the unit is to be moved, the transit screws should be raised to secure the unit to the motor board.

SECTION 2
DISASSEMBLY

- Refer to Fig. 1 and the exploded views.

AUTOMATIC SPINDLE

To remove the automatic spindle, turn clockwise to release from the retaining spring, pull the automatic spindle straight up and lift out of the center hole of the turntable. To install the automatic spindle, insert the automatic spindle into the center hole of the turntable. Rotate the automatic spindle until the projecting lug on the side of the automatic spindle enters the slot in the turntable bearing and is locked in position by the retaining spring.

CONTROL ARM ASSEMBLY

Remove the center spindle before control arm assembly removal. To remove the control arm, turn fully clockwise in depressing near the shaft of the control arm. Pull the control arm up and out of the control housing.

TURNTABLE ASSEMBLY

Move the control knob to the OFF position. Remove the circlip and lift the turntable off the unit. When replacing the turntable, make certain the control knob is in the OFF position so that the idler pulley is not damaged by the driving rim of the turntable.

TONEARM ASSEMBLY

To remove the tonearm assembly, first unsolder the lead wires at the phono jack and release the lead wires from all fastenings. Remove the tonearm pivot screw to release the tonearm from the tonearm hinge assembly. Unhook the tonearm balance spring from the hook on the tonearm hinge assembly. The tonearm may be removed.

SECTION 3
ADJUSTMENTS

This unit has been accurately pre-adjusted for correct stylus drop-point, stylus force and stylus height, if new adjustments should ever be needed, perform them with a 12" (30 cm) record; then position will be correct for all sizes.

IDLER PULLEY ADJUSTMENT (Refer to Fig. 1 – 4)

Disconnect the unit from AC source and remove the turntable. Set the speed selector knob to the 33 position and the control knob to the ON position so the idler pulley rests against the 33 rpm step on the motor shaft. Using a screwdriver, turn the adjustment screw on the speed change arm until the idler pulley is centered on the 33 rpm step of the motor shaft. Check the alignment of the idler pulley at all speeds and readjust if necessary. Move the control knob to the OFF position and replace the turntable taking care not to damage the idler pulley.

STYLUS HEIGHT ADJUSTMENT

To raise, turn the stylus height adjustment screw by hand counterclockwise; to lower, turn clockwise. Adjust the stylus to clear a full stack of records by ⅛" (3 mm).

STYLUS DROP-POINT ADJUSTMENT

The stylus drop-point position on the record is adjusted by means of the stylus drop-point adjustment screw. This screw is adjusted to obtain correct drop-point for a 12" (30 cm) record. It should be adjusted so the stylus will set down ⅛" (3 mm) from the outside of the record. This adjustment should be made with a 12" (30 cm) record on the turntable. When the stylus drop-point is adjusted correctly for 12" (30 cm) record, it will automatically be correct for 7" (17 cm) and 10" (25 cm) records.

STYLUS FORCE ADJUSTMENT

Note: It is necessary to use a stylus force gauge in adjusting the stylus force of the tonearm. One can be obtained from a local hi-fi store. The stylus force indicator on the side of the tonearm is for reference only and indicates an increase or decrease in the nominal stylus force setting.

Turn the stylus force adjustment screw clockwise to reduce stylus force; counterclockwise to increase force.

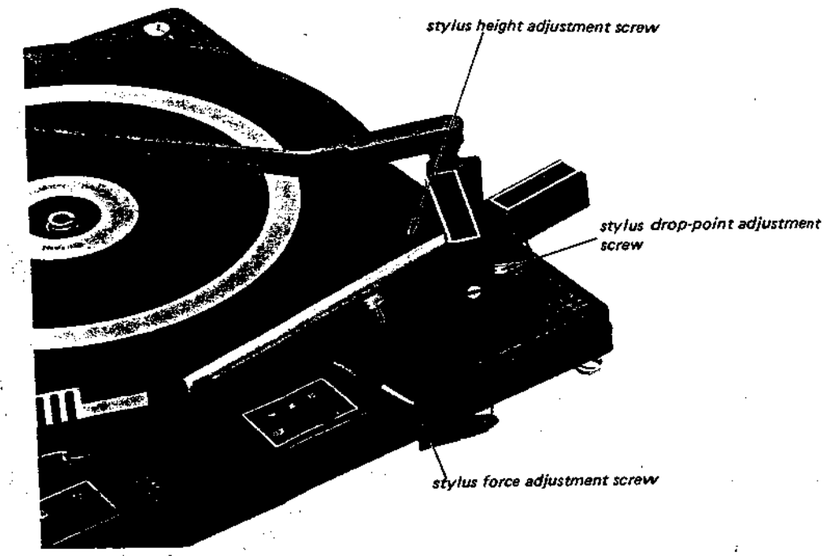


Fig. 2

SECTION 4

CHANGE CYCLE

● Refer to Fig. 1, 3, 4 and the exploded views.

GENERAL INFORMATION

The change cycle is started by moving the control knob to the AUTO position, then releasing it. The tonearm lifts and a record is dropped to the turntable. The tonearm moves toward the center spindle, stops at the point determined by the setting of the record size selector knob, where it is lowered to the lead-in groove of the record.

When the stylus reaches the end of the recorded grooves and enters the out-of groove at the end of the record, the tonearm movement toward the center spindle accelerates rapidly to actuate the velocity trip mechanism. The tonearm is lifted and returned to a position over the tonearm rest, and the bottom record on the center spindle drops into playing position on the turntable. The tonearm returns to the starting point of the record and is lowered to the lead-in groove. The previously described action takes place each time the end of a record is reached until the last record has been played. At this time, the velocity trip mechanism starts another change cycle and the tonearm returns to its position over the tonearm rest. The tonearm is then lowered to the tonearm rest and automatic shut-off occurs.

Note: The following is a description of the functions that the various parts perform during a change cycle. Observe the change cycle operation while slowly rotating the turntable by hand. The following description can then be readily followed and the function of each part more easily understood.

SPEED CHANGE MECHANISM

The model C197 is driven by a 2-pole motor, through the 3-step motor shaft. Power is transmitted to the turntable by the idler pulley pressing against the driving rim of the turntable and against one of the three steps of the motor shaft.

When the speed selector knob is moved to the 78 position, the idler pulley is positioned to engage the largest diameter step on the motor shaft. As the speed selector knob is moved to the 45 and 33 positions, the idler pulley is progressively positioned to engage smaller diameter steps on the motor shaft for slower speeds.

STARTING THE CHANGE CYCLE

When the control knob is pushed toward the AUTO position, the reject slide plate moves the reject plate assembly causing the switch link to activate the switch lever. In turn, the switch lever depresses the switch plunger to turn the miniature switch assembly on. This applies the necessary voltage on the mechanism drive motor. At the same time, the switch lever pivots away from the idler arm to allow the idler pulley spring to move the idler pulley against the driving rim of the turntable and against the motor shaft. This action starts the turntable rotating in a clockwise direction.

When the control knob is moved from the OFF position toward the AUTO position, the angled tip of the reject lever assembly contacts the actuating-slide plate spring causing the actuating-slide plate to move toward the turntable bearing. The actuating-slide plate contacts and pivots the actuating pawl into the path of the projection on the turntable boss and gear.

Since the turntable is rotating clockwise, the projection on the turntable boss and gear strikes the actuating pawl to move the drive gear far enough to mesh with the teeth on the turntable gear. This action starts the drive gear rotating in a counter-clockwise direction to initiate the change cycle.

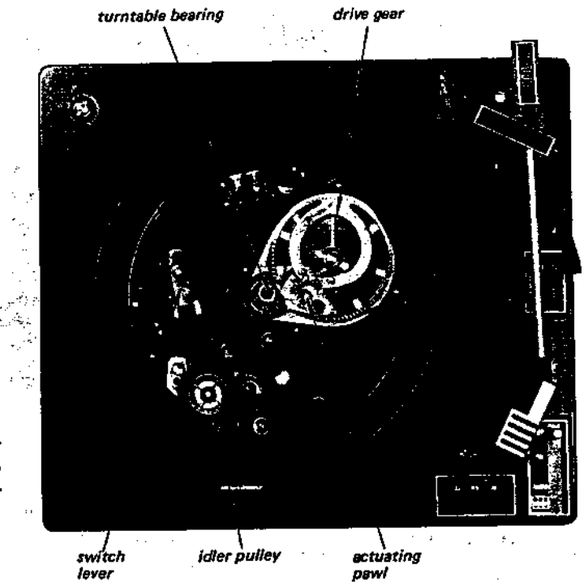


Fig. 3

● Refer to Fig. 1, 3, 4 and the exploded views.

TONEARM ACTION AND RECORD DROP

The stud and roller on the operating plate follows the eccentric groove in the bottom of the drive gear. The resulting pivoting action of the operating plate controls the vertical and horizontal movements of the tonearm. As the operating plate pivots, the tonearm raising spindle rides up the inclined portion of the operating plate to lift the tonearm from the tonearm rest. As the operating plate continues to pivot, the feed lever link retracts the feed lever in the automatic spindle to slide the bottom record off the automatic spindle ledge so the record will drop to the turntable.

The tonearm drop-point is determined by the position of the record size selector knob. When the record size selector knob is moved to the desired position, the selector slide plate moves the detent plate to hold the cut-off slide plate in position to stop the selector lever at the correct position to fit into the notch of the quadrant plate for the tonearm drop-point for the record size selected.

As the operating plate continues to pivot during the change cycle the spring fitted to the operating plate engages with the toggle wheel causing the quadrant plate to move in the opposite direction the operating plate is pivoting. The movement of the quadrant plate is stopped by the selector lever at the point determined by the record size selector knob. Since the tonearm hinge is mounted on the spindle of the quadrant plate, the tonearm is now positioned at the drop-point for the record size selected. After the drop-point is reached the toggle wheel slips off the spring on the operating plate. The operating plate continues to cycle, reversing the direction and allowing the tonearm raising spindle to ride down the inclined portion of the operating plate lowering the tonearm to the record surface.

After the tonearm is placed on the record, the operating plate continues to move, pushing the selector lever clear of the quadrant plate. This allows the quadrant plate and the tonearm to move freely as the stylus follows the record grooves. The operating plate now stops since the drive gear which drives it has made a complete revolution and, being no longer meshed with the turntable gear, the drive gear stops.

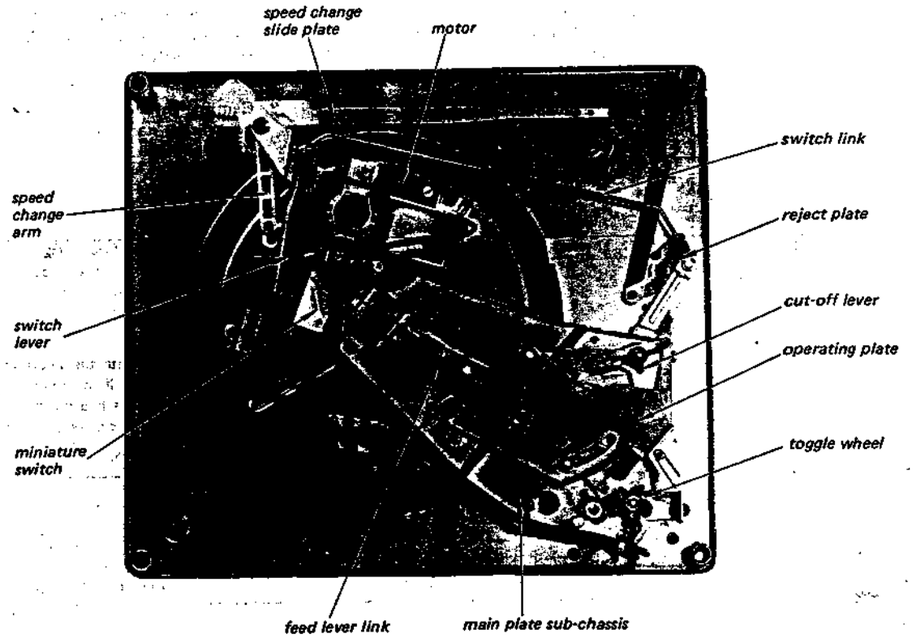


Fig. 4

● Refer to Fig. 1, 3, 4 and the exploded views.

VELOCITY TRIP MECHANISM

After a record has been played, a velocity type trip mechanism initiates a new change cycle. This is due to the accelerated inward movement of the tonearm as the stylus enters the out-of groove at the end of the record.

While the record is playing, the tonearm moves slowly toward the center spindle. The actuating-slide plate is moved by the pin on the quadrant plate to make contact with the actuating pawl. As the record continues to play, the actuating-slide plate moves the actuating pawl toward the turntable boss and gear. On each revolution of the turntable, the projection on the turntable boss pushes the actuating pawl out of the way to prevent a premature change cycle. This is possible because of the slow movement of the tonearm while the record is playing.

When the stylus enters the out-of groove of the record, the tonearm accelerates rapidly and the actuating pawl is moved far enough to cause engagement with the projection on the turntable boss. The contact between the actuating pawl and the projection on the turntable boss gives the necessary push for the teeth in the drive gear to mesh with the teeth on the turntable gear and initiate a change cycle.

AUTOMATIC SHUT-OFF

When the last record drops to the turntable, the control arm drops below the ledge of the automatic spindle. The shaft of the control arm contacts the cut-off slide plate and pivots the cut-off slide plate down away from the selector lever during the next change cycle.

At the end of the last record, the unit goes into a change cycle and the tonearm is lifted from the record and moved to its position over the tonearm rest. As the operating plate moves and the tonearm reaches the position over the tonearm rest since the selector lever is not stopped by the cut-off slide plate, the selector drive spring pushes the selector lever as the operating plate changes the direction, into the position where, it blocks the quadrant plate and holds the tonearm in the rest position during the remainder of the change cycle.

The operating plate continues to move in this direction until the drive gear is unmeshed from the turntable gear. Before it stops, the moving operating plate lowers the tonearm to the tonearm rest and the released selector lever is pushed against the cut-off lever. The cut-off lever moves the reject lever and the reject link turns the reject plate. When the reject plate turns, the switch link pushes the switch lever to open the miniature switch and moves the speed change arm to retract the idler pulley from the turntable driving rim and the motor shaft. The reject plate being connected to the control knob by means of the reject slide plate moves the control knob to the STOP position.

LUBRICATION

The mechanism has been thoroughly lubricated at the factory and under normal use should not require additional lubrication for at least one year. However, after prolonged use, it may be necessary to lubricate parts as specified.

Use a medium grade grease only on these parts.

1. Speed change arm
2. Idler arm assembly
3. Bearing surfaces of the operating plate
4. Gear teeth, bearing and cam track on the drive gear
5. Ball bearing

Use a light machine oil on these parts.

1. Tonearm raising spindle assembly
2. Idler pulley spindle on the idler arm assembly
3. Upper and lower bearings of the motor

Note: Oil or grease should never be applied to or allowed to collect on the rubber tire of the idler pulley assembly, the inside surface of the driving rim of the turntable or on the motor shaft.

BSR-C197

SECTION 5

TROUBLE CHART

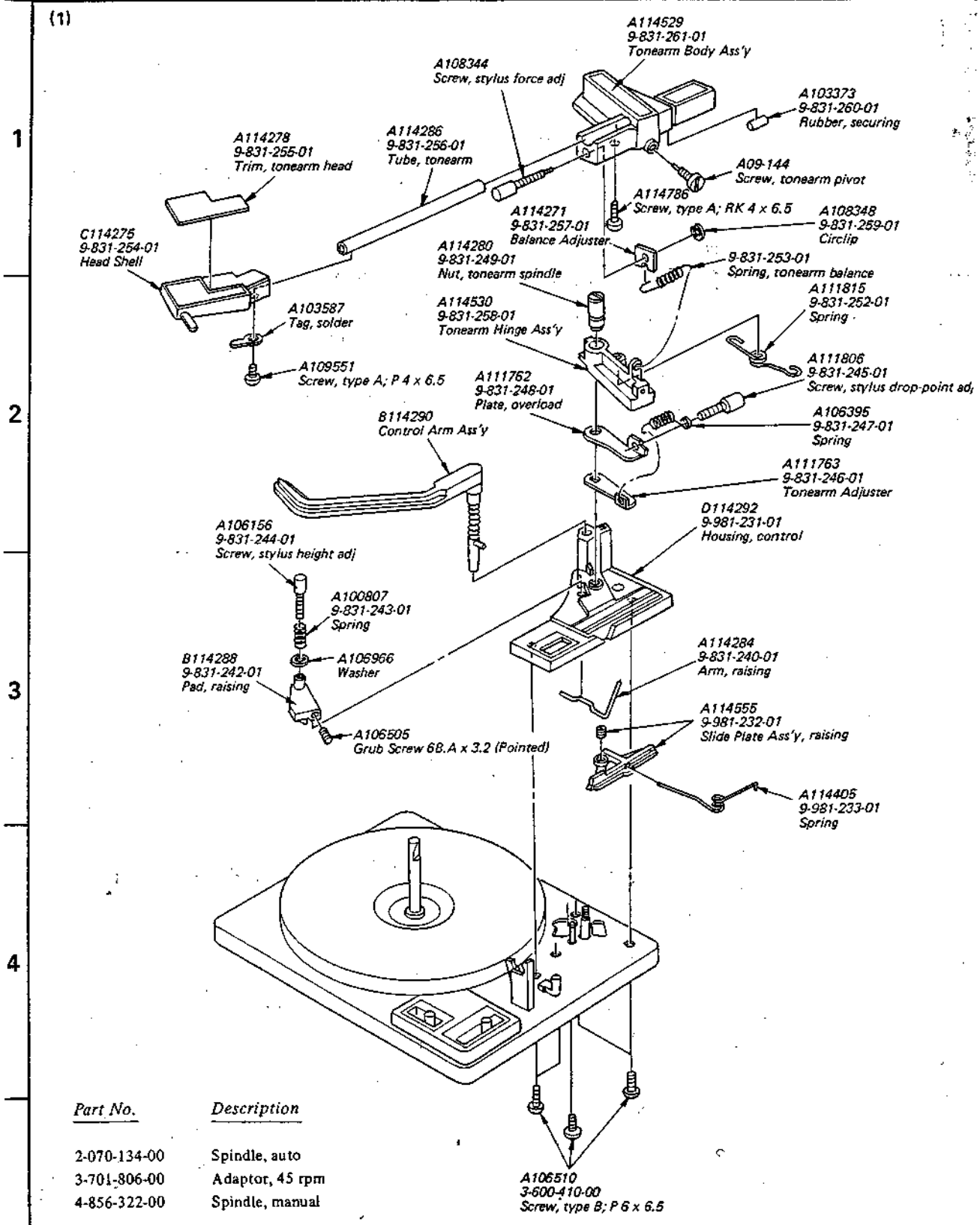
- Refer to the exploded views.

Symptom	Cause	Remedy
The turntable does not revolve when the control knob is moved to the AUTO position.	1. No current to the motor. 2. Defective motor. 3. The idler pulley not engaging the driving rim of the turntable. 4. The idler pulley not driving.	1. Make sure that the current is reaching the AC leads. Check the miniature switch and the molex plug, replace if necessary. 2. Remove the turntable and check the motor. Repair or replace the motor. 3. Connect or replace the idler pulley spring. Check that the idler arm pivots freely. 4. Clean the idler pulley and the driving rim of the turntable to ensure that the driving surfaces are free from oil and dirt.
The turntable revolves when the control knob is moved to the AUTO position but the tonearm does not leave the tonearm rest.	1. The tonearm not adjusted for the correct height. 2. The spring of the actuating slide plate bent or missing.	1. Adjust the screw as described under "ADJUSTMENTS". 2. Adjust or replace.
The turntable stops or slows down in the middle of change cycle.	1. The idler pulley slips. 2. Insufficient tension on the idler pulley spring.	1. Clean the inside of the driving rim of the turntable and the rubber tire of the idler pulley to remove any oil or dirt. 2. Check the tension of the idler pulley spring and replace if necessary.
Turntable speed too slow.	1. Tight motor bearings. 2. Binding turntable bearing. 3. The idler pulley slips. 4. AC line voltage too low. 5. Operating temperature too low. 6. The idler pulley height incorrect.	1. Lightly tap the side of the motor laminations to free the self-aligning bearings. Lubricate the bearings. 2. If the turntable does not turn freely when the idler pulley is disengaged, remove the turntable and clean the turntable bearing. Lubricate the bearing with light machine oil. 3. The idler arm must pivot freely in the speed change arm. Check the tension of the idler pulley spring. Replace the idler pulley spring if necessary. 4. The line voltage should not be less than 100V. 5. Prolonged exposure to temperature below 45 degrees F will cause slow initial speed. 6. Adjust as outlined under "ADJUSTMENTS."
The record fails to drop when the unit cycles.	1. The spindle not fully inserted in the center of the turntable. 2. Bent record feed lever in the spindle. 3. The spring missing or detached from the feed lever link.	1. Make certain the spindle is fully engaged and locked in place. 2. Replace the spindle. 3. Replace or reposition.
The tonearm strikes under the side of the record on the ledge of the spindle, or the stylus catches on the top of the last record while moving into the playing position.	1. Incorrect tonearm height adjustment.	1. Adjust the screw as described under "ADJUSTMENTS."
The tonearm does not correctly locate on the record.	1. The tonearm drop-point not adjusted correctly.	1. Adjust the screw as described under "ADJUSTMENTS."

- Refer to the exploded views.

Symptom	Cause	Remedy
The tonearm does not track correctly on the record.	1. The stylus may be clogged with an accumulation of dust, or the stylus may be chipped or worn. 2. Tonearm leads too tight. 3. Unit not level. 4. Insufficient stylus force. 5. The record with worn or damaged grooves. Lateral friction caused by: 6. Excessive tension on the anti-skating spring. 7. Excessive anti-skate compensation. 8. Weak anti-skating spring. 9. Actuating pawl assembly sticking.	1. Clean the foreign material from around the stylus. Replace the stylus if badly worn or broken. 2. Give the tonearm leads enough slack to allow the tonearm to move freely across the record. 3. See that the unit is level before operating. 4. Adjust the force stylus as described under "ADJUSTMENTS." 5. Replace the record. 6. Bend the anti-skating spring out slightly to release the tension. 7. Reduce the anti-skate setting. 8. Bend the anti-skating spring inwards. 9. Release or replace the actuating pawl assembly.
The unit will not re-cycle at the end of the record.	1. Actuating pawl assembly binding. 2. Stylus drop-point inside music groove.	1. Check for the friction and the free movement. 2. Adjust the stylus to set down at the center of the lead-in groove.
Two record drop together.	1. The hole in the record too large. 2. The control arm not fully down possibly due to incorrectly loaded records. 3. The control arm not holding records level.	1. Replace the record. 2. Carefully clean the shaft of the control arm and remove burrs, if any. Do not oil the shaft. The control arm should fall in the position of its own weight. 3. Gently twist the control arm until it will hold record stack parallel to the top surface of the turntable.
The unit fails to shut off after the last record has been played and the tonearm has returned to the tonearm rest.	1. The miniature fouled by the AC leads. 2. Faulty miniature switch.	1. Move the leads clear of the miniature switch. 2. Replace the miniature switch.
The noise during playing of the record.	1. The motor rumble. 2. Turntable bearings and ball bearing. 3. Defective idler pulley.	1. The motor must float freely on the motor cushion. Replace the motor cushion, if necessary. The motor leads must be positioned to allow the free movement of the motor. 2. Clean and lubricate the bearings. Replace the ball bearing if necessary. Use light machine oil on the bearing of the turntable and medium grade grease on the ball bearing. 3. Replace the idler pulley.

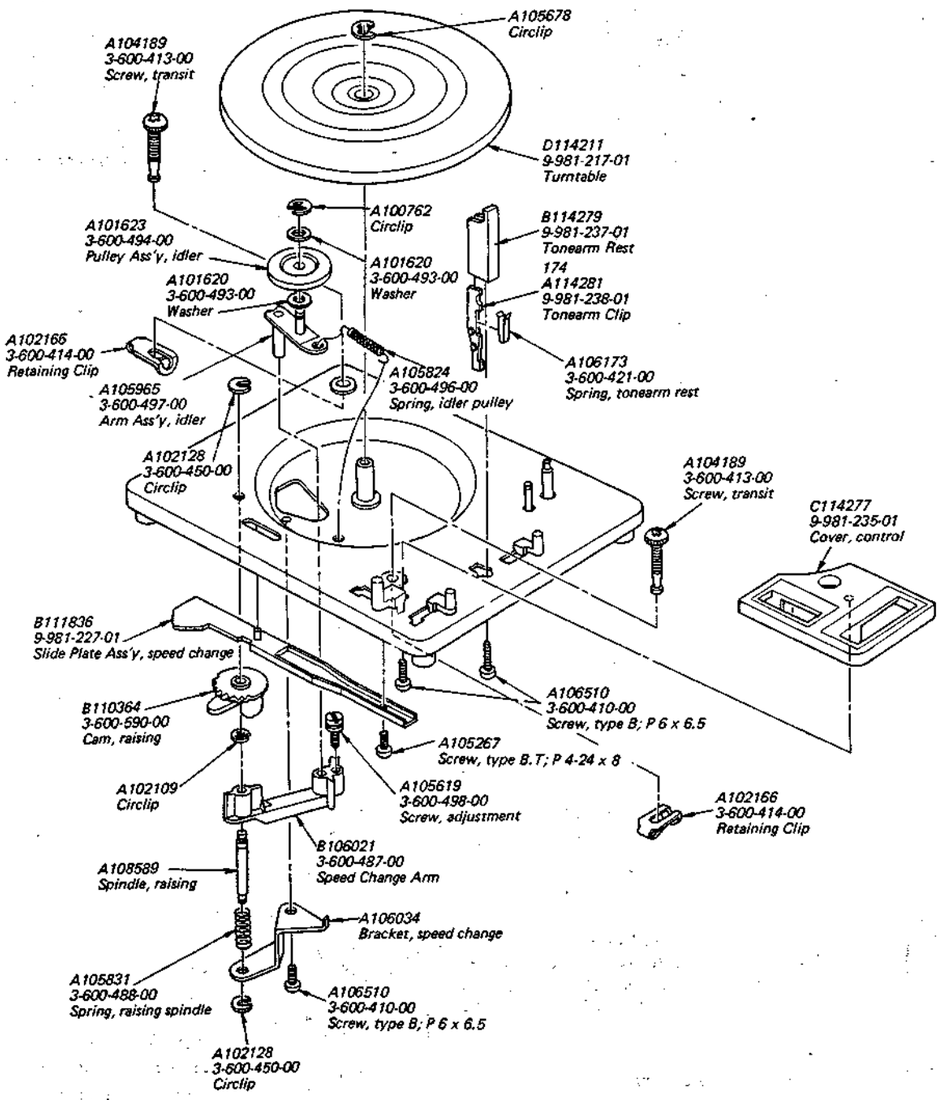
SECTION 6
EXPLODED VIEWS



Part No.	Description
2-070-134-00	Spindle, auto
3-701-806-00	Adaptor, 45 rpm
4-856-322-00	Spindle, manual

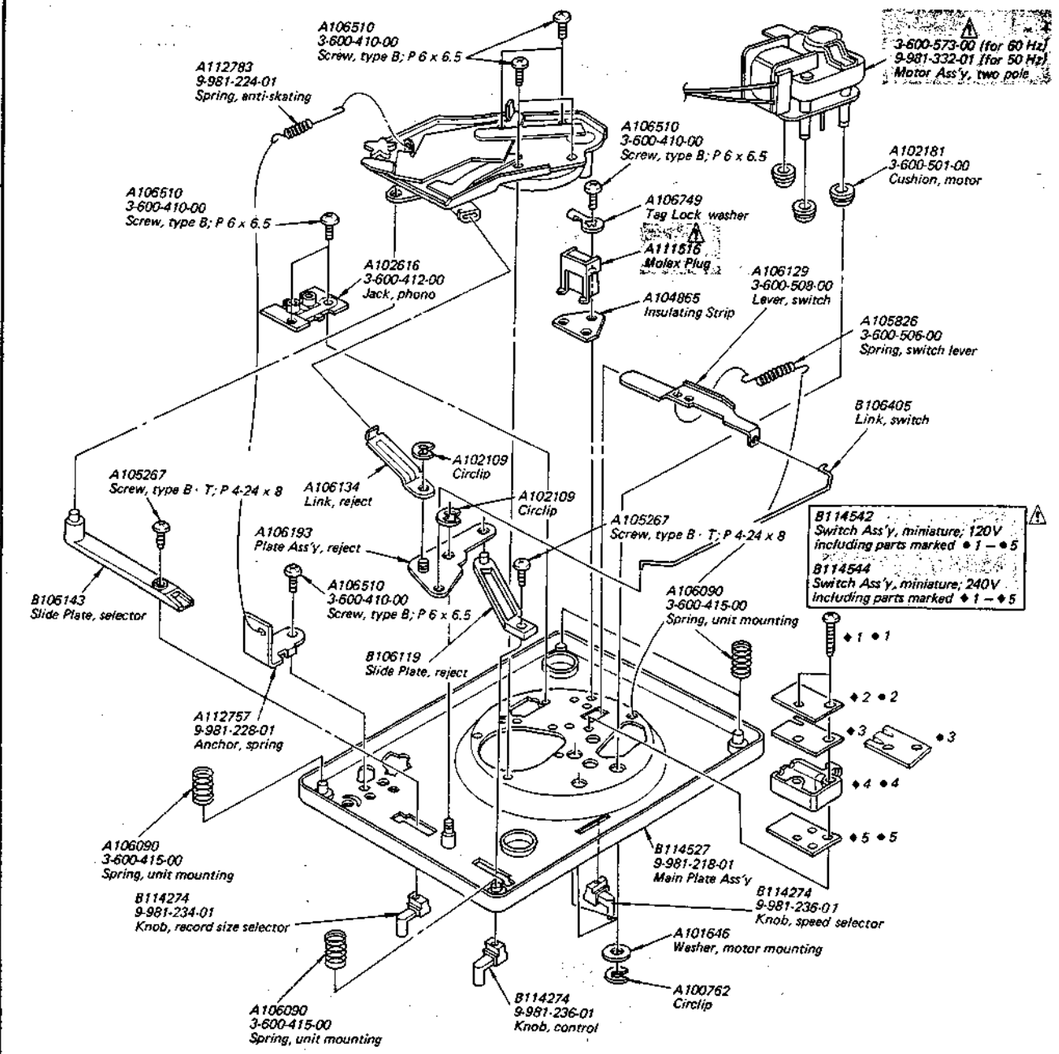
Note: Items with only no-hyphenated part number are not stocked at Sony Corporation.

(2)



Note: Items with only no-hyphenated part number are not stocked at Sony Corporation.

(3)

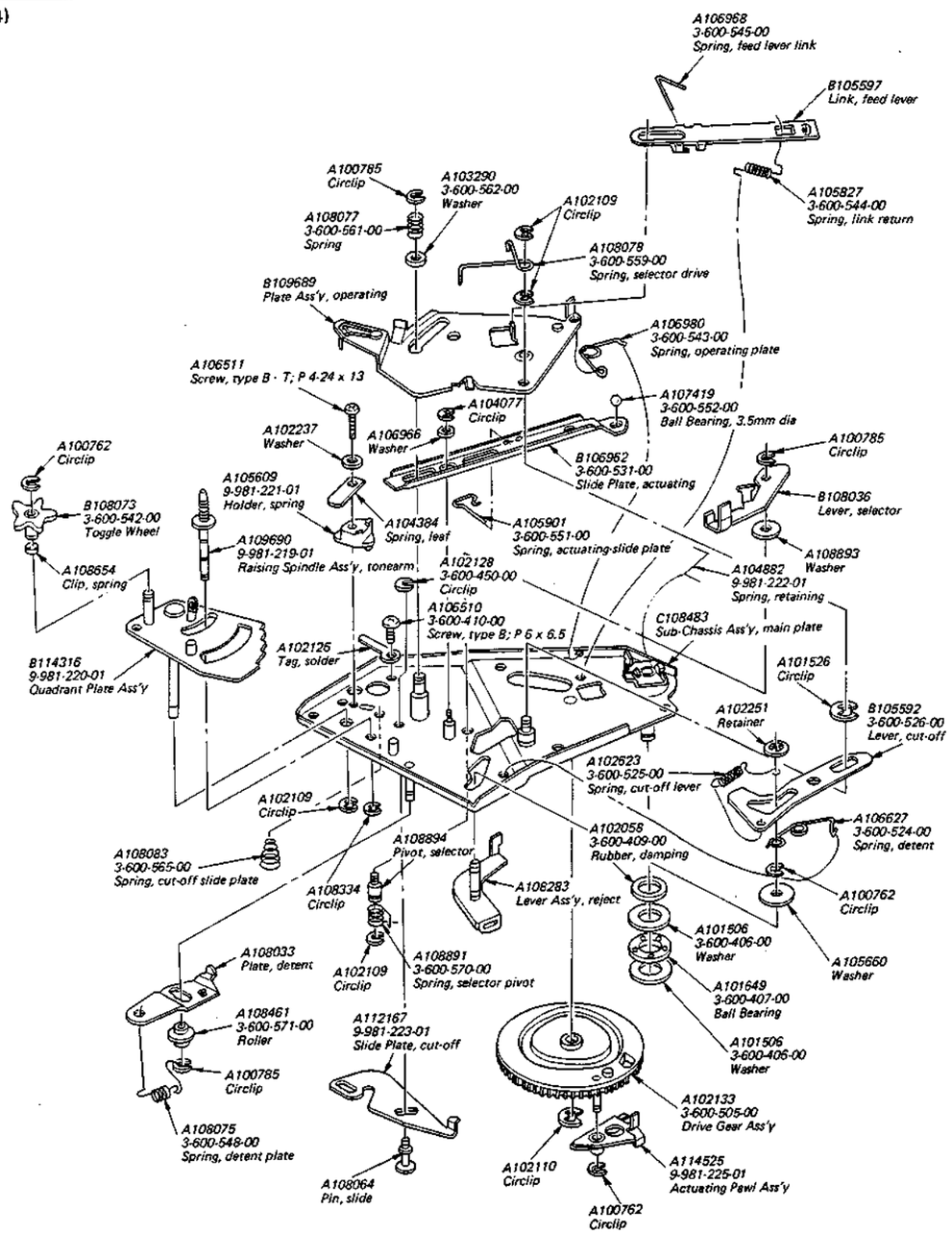


Note: Items with only no-hyphenated part numbe are not stocked at Sony Corporation.

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

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

(4)



Note: Items with only no-hyphenated part number are not stocked at Sony Corporation.

9-958-644-01

Sony Corporation

7910589-3
Printed in Japan