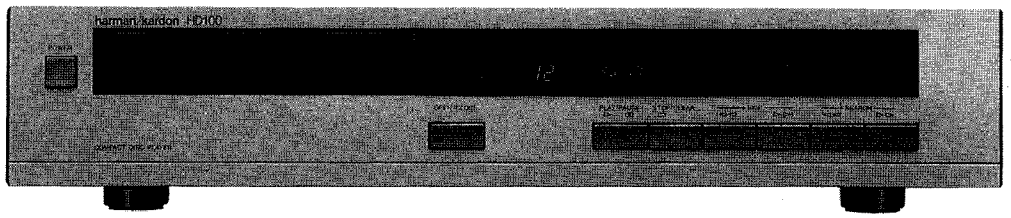
The Harman Kardon Model HD100

Manual 110A

COMPACT DISC PLAYER

Technical Manual



HD100

CLASS 1 LASER PRODUCT
Product complies with DHHS rules CFR subchapter J part 1040:10 at date of manufacture.

DANGER—invisible laser radiation when open and interlock failed or defeated. Avoid direct exposure to the beam.

CAUTION—use of all controls, adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Be Careful of the Laser Pickup

Although you cannot see it from the outside, a laser pickup is located under the disc tray and a precision lens is built in it. Since the laser pickup, including the lens element, is especially sensitive to dust, keep the disc tray closed when not in use. Also do not put your hand inside the unit.

CLASS 1 LASER PRODUCT

harman/kardon
240 Crossways Park West, Woodbury, N.Y. 11797
1112-3152110A4 P-088701 1500 Printed in Japan

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SPECIFICATIONS

System	: Compact Disc Digital Audio
Signal Detection	: 3-Beam Semiconductor Laser
Error Correction	: CIRC System
D/A Conversion Frequency	: 88.2kHz
Channels	: 2 Channel Stereo
Frequency Response	: 4Hz—20kHz ±0.8dB
Total Harmonic Distortion	: 0.03% (1kHz)
Dynamic Range	: 96dB
Signal-to-Noise Ratio	: 96dB
Channel Separation	: 83dB (1kHz)
Wow & Flutter	: Immeasurable
Line Output Level/ Load Impedance	: 2.0V/10k Ohms
Power Supply	
U.S.A. model	: AC 120V, 60Hz
General model	: AC 220/240V, 50/60Hz
Power Consumption	: 15 Watts
Dimensions (W × H × D)	: 17-3/8'' × 3-3/4'' × 10-1/8'' (443 × 93 × 260 mm)
Weight	: 8.5lbs. (3.9kg)

Specifications and components subject to change without notice. Overall performance will be maintained or improved.

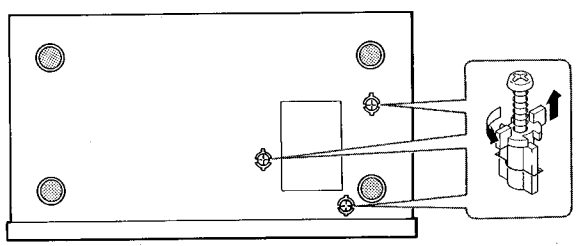
Adjustment of this unit requires following measuring instruments and jigs.

- Oscilloscope (3 or more modes, 100MHz, X-Y input possible) 1740A
- Dual Channel Voltmeter (ACVM) MN445B
- Distortion Meter 339A
- Optical Power Meter LPM8000
- Jitter Meter MJM-634
- Low Frequency Oscillator (A. F. OSC) 3312A
- Turntable Base Space Jig SJ-100
- Test Discs:
  Philips Test Sample 5 814 125-2(Non-Scratched)
  Philips Test Sample 5A814 126-2(Scratched)
  Sony Type III

IMPORTANT

Before plugging the unit in, be sure to remove the transportation screws on the bottom of the unit.

1. Place a cloth under the unit in order to prevent it from being scratched.
2. Turn the unit upside down.
3. Remove the three transportation screws with a screw driver, as shown in the illustration below.



NOTE: Be sure to tighten screws by the reverse procedure before transporting the unit.

SAFETY PRECAUTIONS

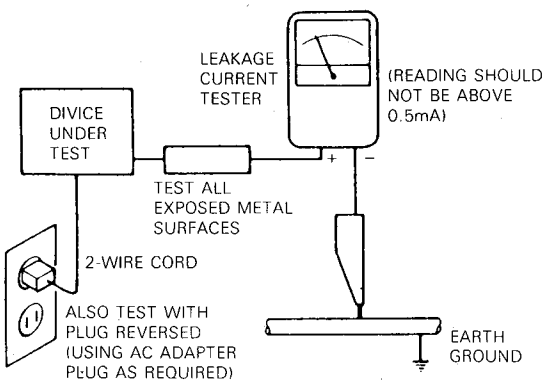
Before returning an instrument to the customer, always make a safety check of the entire instrument, including, but not limited to, the following items:

a. Be sure that no built-in protective devices are defective and/or have been defeated during servicing.
   (1) Protective shields are provided to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience.
   (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks.
   Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.

b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, both are not limited to, excessively wide cabinet ventilation slots, and an improperly fitted and/or incorrectly secured cabinet back over.

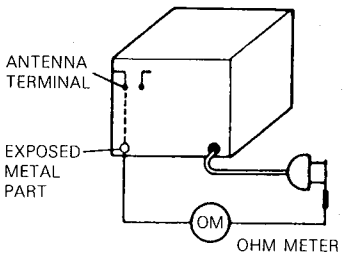
c. **Leakage Current Hot Check**—With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 "Leakage Current for Appliances" and Underwriters Laboratories (UL) 1270, (34.6). With the instrument AC switch first in the ON position and then in the OFF position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliamp. Reverse the instrument power cord plug in the outlet and repeat test. **ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER.**

AC Leakage Test



d. **Insulation Resistance Test**
   (1) Unplug the power supply cord and connect a jumper wire between the two prongs of the plug.
   (2) Turn on the power switch of the instrument.
   (3) Measure the resistance with an ohmmeter between the jumpered AC plug and each **exposed metallic** cabinet part on the instrument, such as screwheads, antenna, control shafts, handle brackets, etc. The reading should be as shown below. If it is not within the limits specified, there is the possibility of a shock hazard, and the instrument must be repaired and rechecked before it is returned to the customer.

e. **Insulation Resistance Test Cold Check**
   (1) Unplug the power supply cord and connect a jumper wire between the two prongs of the plug.
   (2) Turn on the power switch of the instrument.
   (3) Measure the resistance with an ohmmeter between the jumpered AC plug and each **exposed metallic** cabinet part on the instrument, such as screwheads, antenna, control shafts, handle brackets, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 1 and 5.2 Megohm. When there is no return path to the chassis, the reading must be "infinite". If it is not within the limits specified, there is the possibility of a shock hazard, and the instrument must be repaired and rechecked before it is returned to the customer.



PRODUCT SAFETY NOTICE

Some electrical and mechanical parts have special safety related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by shading, by (⚠) on schematics and parts listed. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. Products Safety is under review continuously and new instructions are issued whenever appropriate.

SERVICING PRECAUTIONS

CAUTION: Before servicing instruments covered by this manual and its supplements, read and follow the SAFETY PRECAUTIONS on this page.

NOTE: If unforeseen circumstances created conflict between the following servicing precautions and any of the safety precautions, **always follow the safety precautions.** Remember: Safety First.

General Servicing Precautions

a. Always unplug the instrument AC power cord from the AC power source before:
   (1) Removing or reinstalling any component, circuit board, module, or any other instrument assembly.
   (2) Disconnecting or reconnecting any instrument electrical plug or other electrical connection.
   (3) Connecting a test substitute in parallel with an electrolytic capacitor in the instrument.
   Caution: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

b. Do **not** defeat any plug/socket B+ voltage interlocks with which instruments covered by this manual might be equipped.

c. Do **not** apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.

d. Always connect a test instrument's ground lead to the instrument chassis ground before connecting the test instrument positive lead. Always remove the test instrument ground lead last.

NOTE: Refer to Safety Precautions on Page 3.
(1) The service precautions are indicated or printed on the cabinet, chassis or components. When servicing, follow the printed or indicated service precautions and service materials.
(2) The Components used in the unit has a specified conflammability and dielectric strength. When replacing any components, use components which has the same ratings. Components marked (⚠) in the circuit diagram are important for safety or for the characteristics of the unit. Always replace with the appointed components.
(3) An insulation tube or tape is sometimes used and some components are raised above the printed wiring board for safety. The internal wiring is sometimes clamped to prevent contact with heating components. Install them as they were.
(4) After servicing, always check that the removed screws, components and wiring have been installed correctly and that the portion around the service part have not been damaged and so on. Further check the insulation between the blades of attachment plug and accessible conductive parts.

Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect the insulation resistance meter (500V) to the blades of the attachment plug. The insulation resistance between the each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1M-ohm.

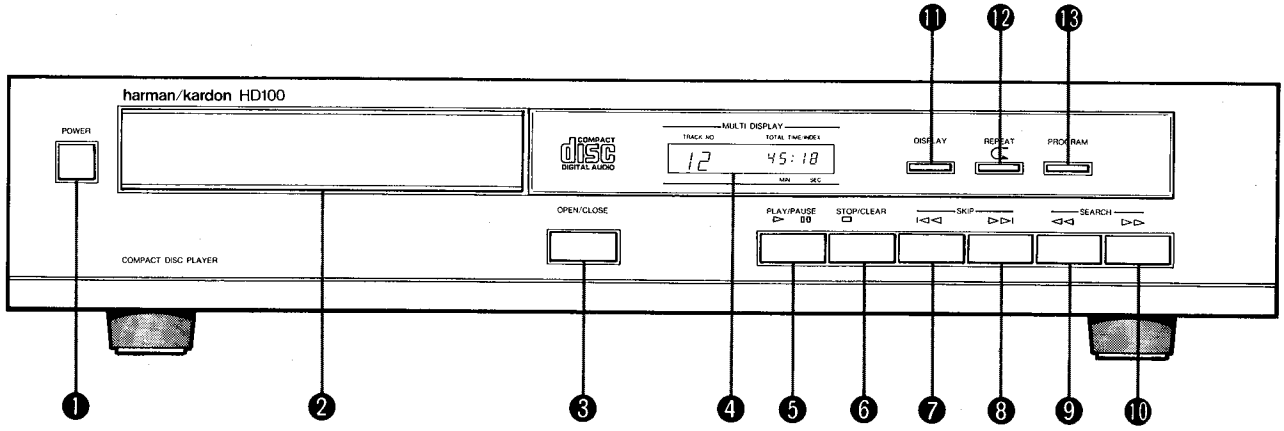
Note: Accessible Conductive Parts including Metal panels, Output jacks, etc.

ELECTROSTATICALLY SENSITIVE (ES) DEVICES

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charge sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

CONTROLS AND FUNCTIONS



❶ POWER SWITCH
Pressing this switch will turn on the power. Press the switch again to turn the power off.

❷ DISC TRAY
By pressing the "OPEN/CLOSE" button, the tray onto which the discs are loaded will slide out.

❸ OPEN/CLOSE BUTTON
Press this button to open or close the DISC TRAY. Press it once to make the DISC TRAY slide out, and again to make the DISC TRAY slide in.

❹ MULTI NUMBER DISPLAY
Displays the track number during playback, and displays elapsed playback time from the beginning of the program being played or the index number during stop mode.

❺ PLAY/PAUSE BUTTON
Press this button to start playback. Pressing this button during playback activates the pause mode. Playback continues when this button is pressed again.

❻ STOP/CLEAR BUTTON
Press this button to stop playing a disc or to cancel the pause mode. Press the button once again to erase the memory program.

❼ ⏮ BUTTON (SKIP)
Pressing this button once skips playback backward to the beginning of the present program. Pressing it once more skips it to the beginning of the previous program, pressing it twice skips it to the beginning of the program before that, and so on.

❽ ⏭ BUTTON (SKIP)
Pressing this button once skips playback forward to the beginning of the next program. Pressing it twice skips it to the beginning of the program after that, and so on.

❾ ⏪ BUTTON (REVERSE SEARCH)
Pressing this button starts low speed reverse. Holding the button down longer than two seconds changes the reverse mode to high speed. Sound can be heard at a reduced level in this mode. Also, when this button is pressed in the stop mode, the index number is decreased.

❿ ⏩ BUTTON (FAST-FORWARD SEARCH)
Pressing this button starts low speed fast-forwarding. Holding the button down longer than two seconds changes the fast-forward mode to high speed. Sound can be heard at a reduced level in this mode. Also, when this button is pressed in the stop mode, the index number is increased.

⓫ DISPLAY BUTTON
Press to change the display. When pressed, display is switched between the elapsed playback time of a track and the time remaining before the end of the last selection. The display is also switched to the remaining number of programs during program playback.

⓬ REPEAT BUTTON
Pressing this button enables continuous repeat playback of the disc. Pressing this button again disables the repeat playback mode. Pressing this button while in memory playback repeats the programs stored in the memory.

⓭ PROGRAM BUTTON
Used to program the memory for non-sequential playback of disc tracks. Up to 36 program selections can be stored in the memory.

DISASSEMBLY PROCEDURES

1. Removal of Cabinet Top

Remove 7 screws (A), then lift and remove the Cabinet Top. (Fig. 1)

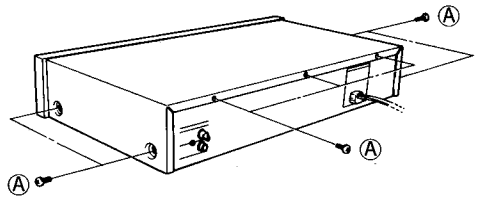


Fig. 1

2. Removal of Front Panel Assembly with Control Switches P. C. Board (PCB-2)

a) Remove the Cabinet Top, referring to the previous step 1.
b) Pull out the Power button with the Shaft.
c) Remove 7 screws (B) fastening the Front Panel Assembly, then release the catches located on both sides of the chassis. (Fig. 2)

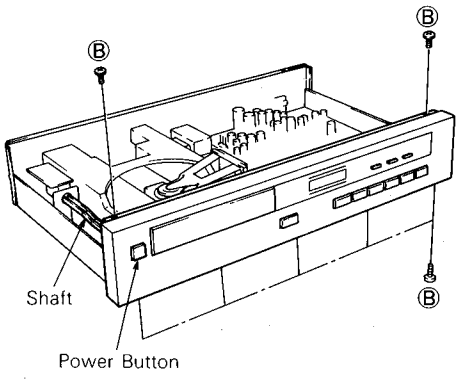


Fig. 2

3. Removal of Control Switches P. C. Board

a) Remove the Front Panel Assembly, referring to the previous step 2.
b) Remove 4 screws (C) and 4 catches (D), then remove the Control Switches P. C. Board (PCB-2). (Fig. 3) If necessary, unsolder the lead wires.

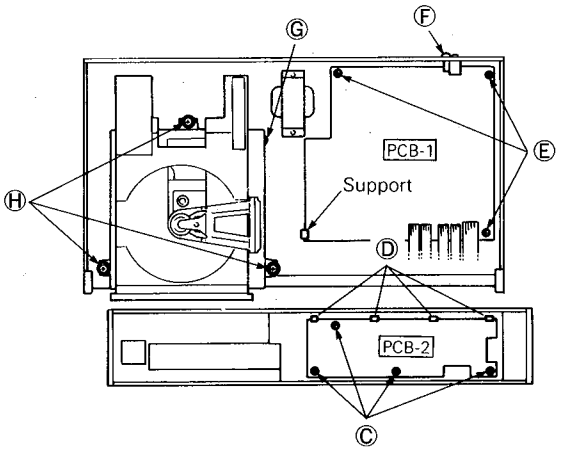


Fig. 3

4. Removal of Main P. C. Board

a) Remove the Cabinet Top, referring to the previous step 1.
b) Remove 3 screws (E), support and a screw (F) holding the Output jack. (Fig. 3) If necessary, unsolder the lead wires.

5. Removal of CD Player Mechanical Assembly

a) Remove the transportation screws and holders (refer to page 2).
b) Remove the Front Panel Assembly, referring to the previous step 2.
c) Disconnect the connector with lead wires (LCN101, LCN102, LCN103 and LCN104) from connectors (CN101, CN102, CN103 and CN104) on the Main P. C. Board (PCB-1). (Refer to Wiring Diagram on page 25.)
d) Remove a screw (G), then remove the lug terminal with lead wire.
e) Remove 3 screws (H), then remove the CD Player Mechanical Assembly.

DISASSEMBLING THE CD PLAYER MECHANICAL ASSEMBLY

1. Removal of Disc Tray

a) Remove the Cabinet Top, referring to the previous step 1 on page 6.
b) Connect the Power cord and turn on the power by pressing the Power switch.
c) Open the Disc Tray by pressing the Open/Close button.
d) With the Disc Tray opened as it is, pull out the power plug.
e) Push the Disc Tray by hand to slide it in once and then slide it out again.
f) Pull out the Disc Tray while pushing down the Tray Lock Pawl with a slotted screwdriver or the like. (Refer to Fig. 7 on page 9.)

2. Removal of Optical Pick-Up

a) Remove the Disc Tray, referring to the previous step 1.
b) Remove the CD Player Mechanical Assembly, referring to the previous step 5 on page 6.
c) Remove 3 screws (1), then remove the Optical Pick-Up. (Fig. 4)

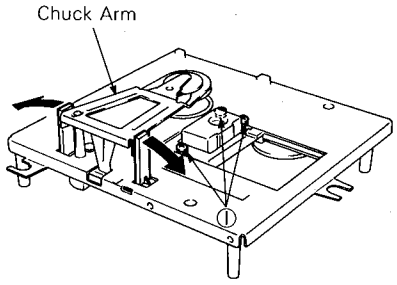


Fig. 4

3. Removal of Spindle Motor

a) Remove the Disc Tray, referring to the previous step 1.
b) Remove the CD Player Mechanical Assembly, referring to the previous step 5 on page 6.
c) Remove the Chuck Arm Spring. (Fig. 5)
d) Undo 2 catches fixing the Chuck Arm to the right and left and remove the Chuck Arm. (Fig. 4)
e) Turn the Pick-Up Gear B in the arrow direction and move the Pick-Up Base.
f) Remove 2 screws (J) fixing the Spindle Motor and then remove the Spindle Motor. (Fig. 6) Align the holes in the Spindle Table to the screw (J) positions for the screw removal.

NOTE: Undo the catches equally to the right and left when removing and reinstalling the Chuck Arm.

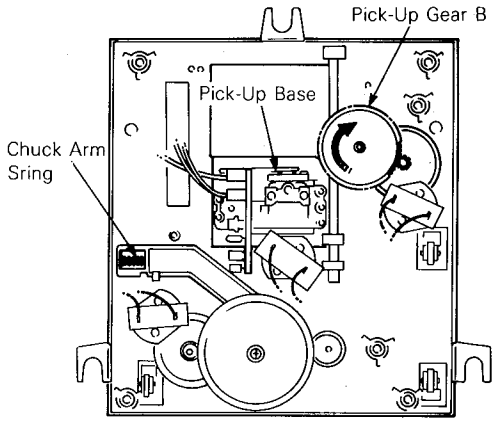


Fig. 5

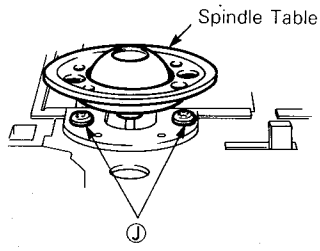
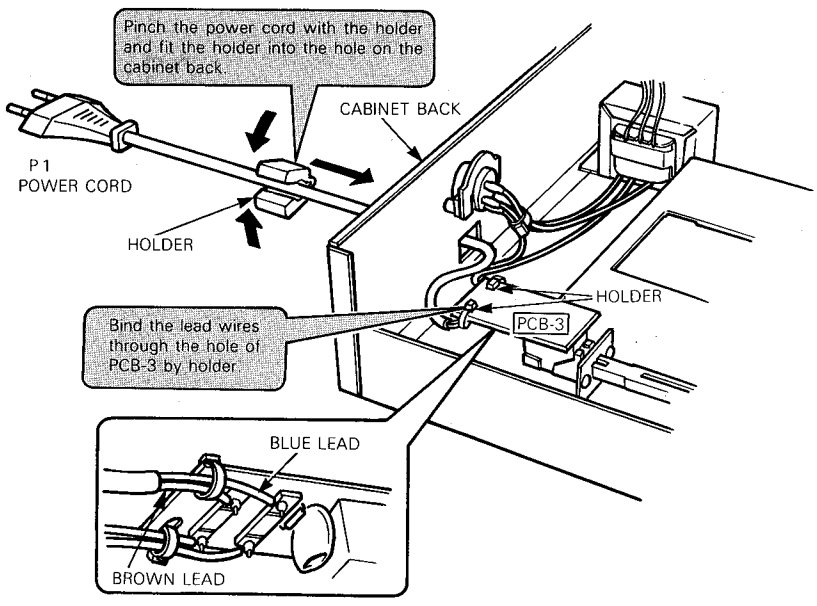
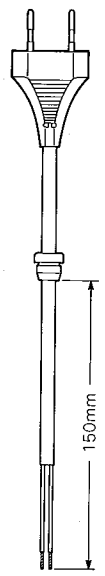


Fig. 6

POWER CORD REPLACEMENT (FOR SERVICE ENGINEERS OTHER THAN NORTH AMERICA)

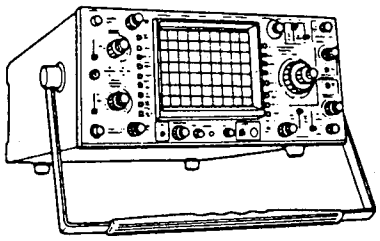
In order to prevent fire or shock hazard when replacing the power cord, follow the procedure below to replace the part with the standard supply parts.





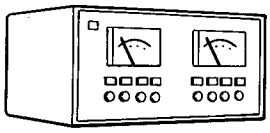
ADJUSTMENT PROCEDURE

1. Meters and Jigs

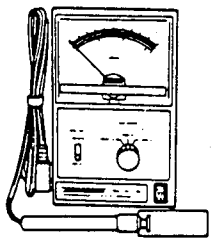


Oscilloscope (3 or more modes, 100MHz, X-Y input possible)

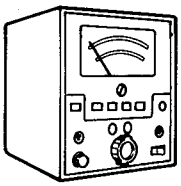
Dual Channel Voltmeter (ACVM)



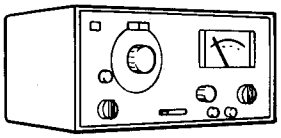
Distortion Meter



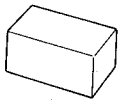
Optical Power Meter



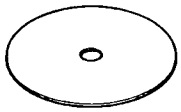
Jitter Meter



Low Frequency Oscillator (A. F. OSC)



Turntable Base Space Jig SJ-100



Test Discs

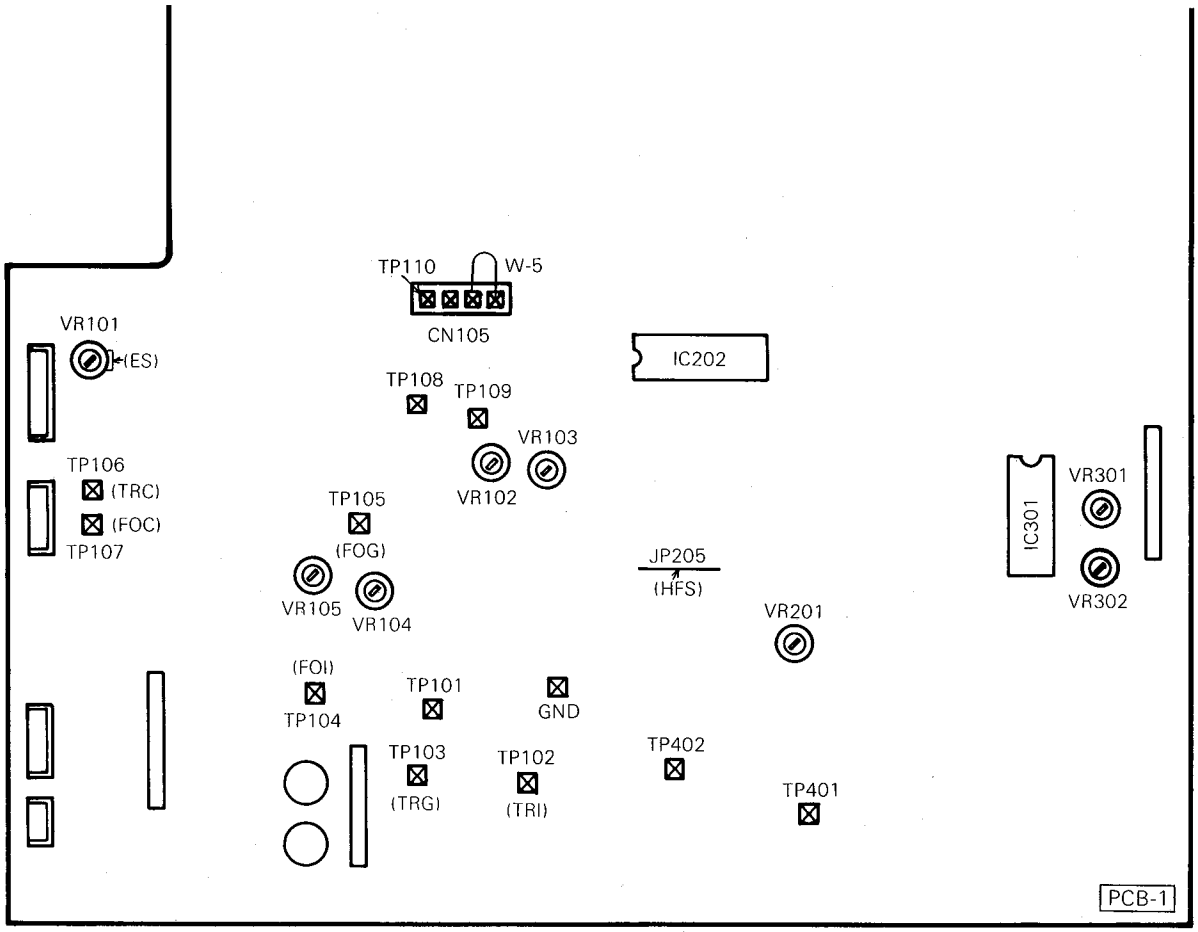
Philips Test Sample 5
814 125-2 (Non-Scratched)

Philips Test Sample 5A
814 126-2 (Scratched)

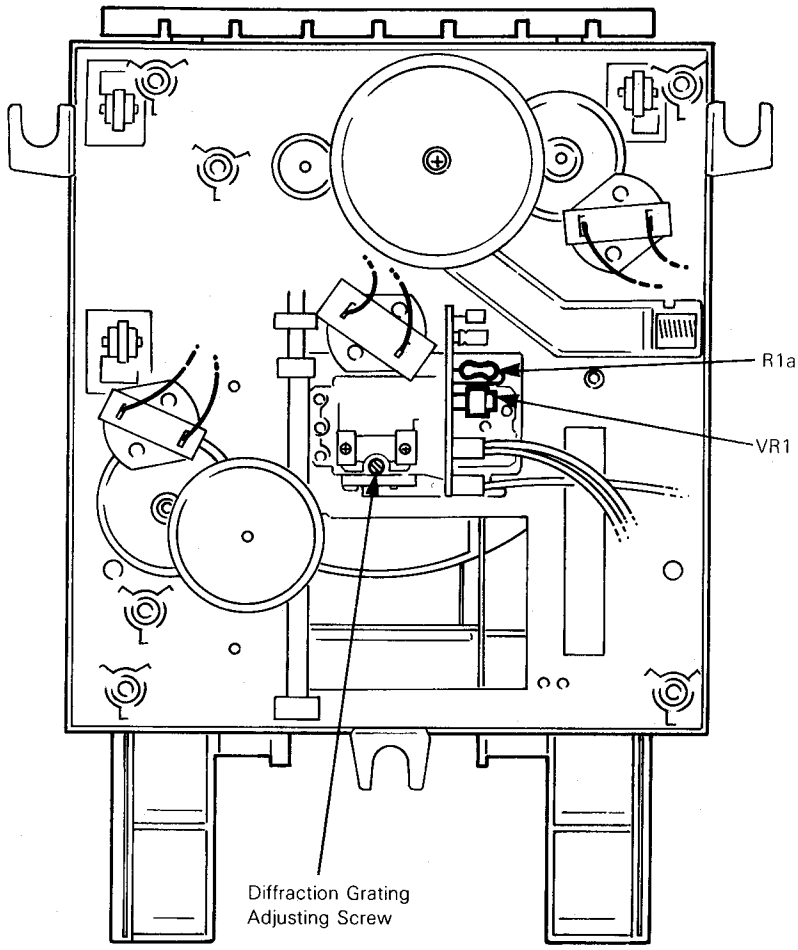
Sony Type III

2. Adjustment Points

2-1 VR and TP Layout for Main P. C. Board

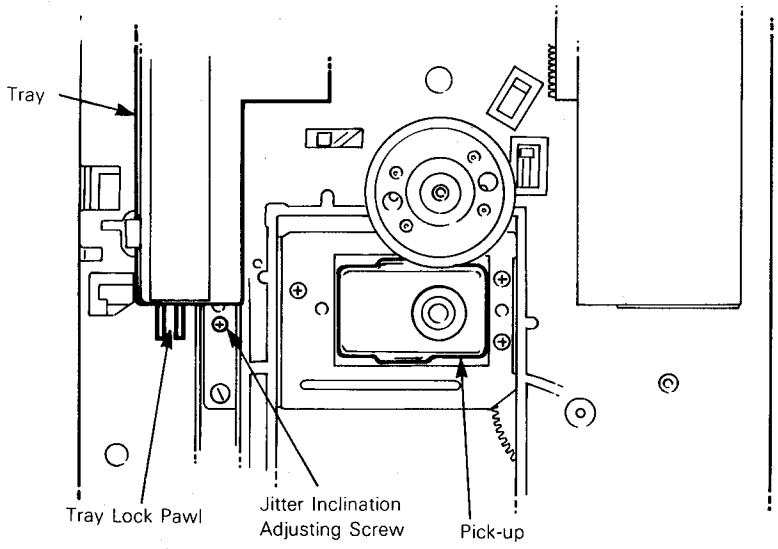


2-2 VR and Adjusting Screw Layout for CD Player Mechanical Assembly



Bottom View

Fig. 7

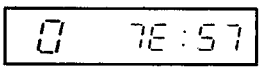
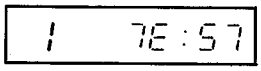
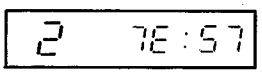
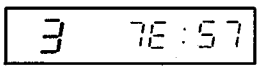
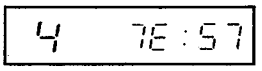
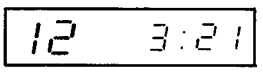
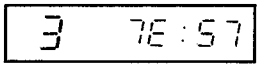


Top View Around Pick-Up

Fig. 8

3. Test Mode

- Short-circuit TP401 and GND located on the Main P. C. Board.

Press buttons in sequence below	Test mode number	Display	Operation
POWER	0		LD OFF All servo OFF
PLAY	1		LD ON
PLAY	2		FS ON (Focus search)
PLAY	3		FS ON (focus ON) Disc motor rotate Mute OFF
FORWARD SKIP	4		TS (Tracking servo) ON SS (Slide servo) ON
FORWARD SKIP	5		Displays the track number and playback time.
REVERSE SKIP	6		TS (Tracking servo) OFF SS (Slide servo) OFF
F.F. and REVERSE SEARCH	7	———	Move the pick-up. (Manual)
OPEN/CLOSE	8	———	Disc tray open or close This function can be activated from stop mode.

4. Adjustment of Turntable Height

(1) Loosen the turntable and insert the turntable base space jig.
(2) Rotate the turntable, check that there are no gaps or rattling.
(3) If there is no turntable base space jig, adjust to a height of 9 mm (±0.2 mm).

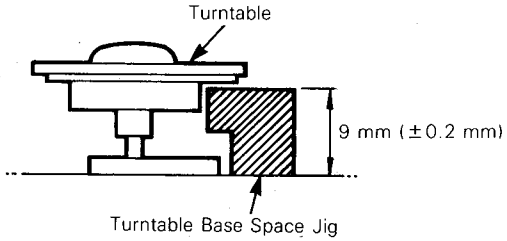


Fig. 9

5. Optical Pick-up Laser Power Check

(1) Short-circuit TP401 and GND located on the main P. C. board. (Test Mode)
(2) Push the Power switch and Play/Pause button. (Test Mode 1)
(3) Place the optical power meter against the pick-up, and check that the power is between 0.15mW and 0.4mW.

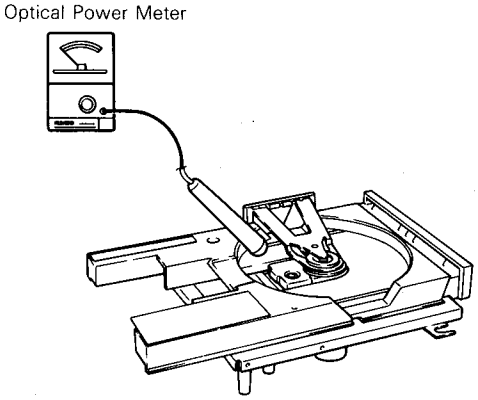


Fig. 10

6. Adjustment of Main P. C. Board

6-1 Initial Setting of Adjustment Potentiometers
Before adjusting, preset adjustment potentiometers VR101, 102, 103, 104, 105, 201, 301 and 302 for mechanical center.

6-2 Disc Used for Adjustment
Test Discs: Philips Test Sample 5
814 125-2 (non scratched)
Philips Test Sample 5A
814 126-2 (scratched)
Sony Type III

6-3 IREF Adjustment
(1) Connect oscilloscope to TP402 and GND. (Fig. 11)
(2) Insert Philips test disc #5 and place the unit in test mode 2. (See page 10)
(3) Adjust VR201 so that the period (T) is minimized. (Fig. 12)

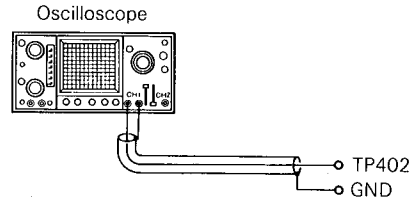


Fig. 11

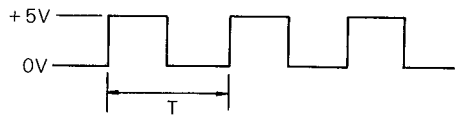


Fig. 12

6-4 Diffraction Grating Adjustment
(1) Connect oscilloscope to JP205 and GND. (Fig. 13)
(2) Insert the disc and place the unit in the Test Mode 3.
(3) Adjust diffraction grating screw so that the waveform becomes maximum.

NOTES
- Adjust at track numbers 8 and 1 of Philips test disc #5.
- There are 2 points where the waveform is maximized while turning the alignment tool once fully (360°). The servo system works at only one of them.

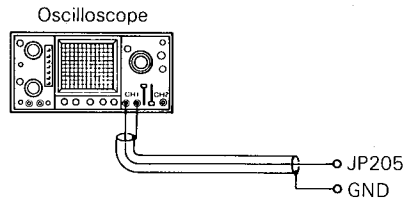


Fig. 13

6-5 Jitter Inclination Adjustment
(1) Connect the jitter meter to TP108 and GND. (Fig. 14)
(2) Insert Philips test disc #5 and place unit in play mode on track number 9.
(3) Confirm the jitter meter reading does not exceed 32ns. If 32ns is exceeded
(4) Place Philips test disc #5 on the turntable.
(5) Put unit into play mode on track number 9.
(6) Adjust the jitter inclination screw (see figure. 8) for minimum reading.

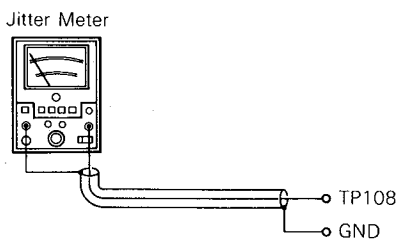


Fig. 14

6-5A Jitter Inclination Adjustment (without Jitter Meter).
(1) Place Philips test disc #5 on the turntable.
(2) Put unit into play mode on track number 9.
(3) Connect oscilloscope to TP108 and GND. (Fig. 15)
(4) Adjust the jitter inclination screw until the signal waveform (eye pattern Fig. 16) is distinct and clear.

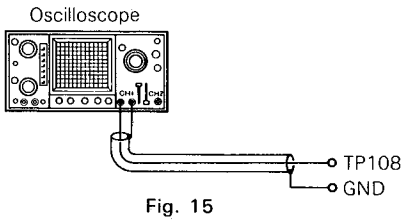
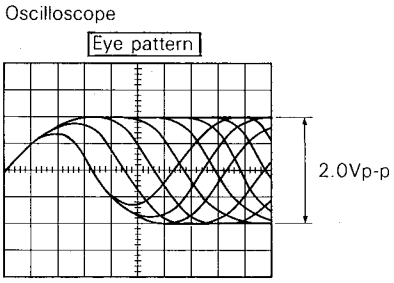
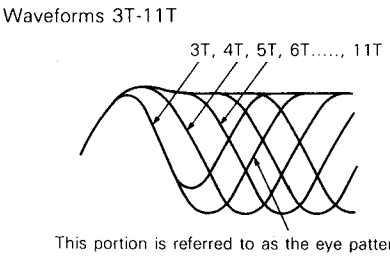


Fig. 15





The abnormal eye pattern has less distinct lines and smaller amplitude than that of the good waveform.

Adjust so that the good waveform is obtained.

Fig. 16

6-6 Focus Offset Adjustment
(1) Connect the jitter meter to TP108 and GND. (Fig. 17)
(2) Insert the disc and place the unit in the play mode.
(3) Adjust VR105 until the jitter becomes minimum.

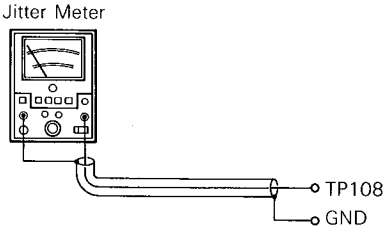


Fig. 17

6-6A Focus Offset Adjustment (without Jitter Meter)
(1) Connect oscilloscope to TP108 and GND. (Fig. 18)
(2) Insert the disc and place the unit in the play mode.
(3) Adjust VR105 until the signal waveform (eye pattern Fig. 16) is distinct and clear.

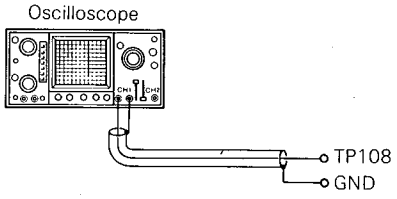


Fig. 18

6-7 Focus Gain Adjustment
(1) Connect an audio frequency oscillator with 220k ohm resistor in series to TP104 and GND. (Fig. 19)
(2) Set the audio frequency oscillator output to 800Hz, 1.0V RMS.
(3) Connect AC volt meter to B.P.F. (Fig. 20)
(4) Connect B.P.F. to test point TP105 and GND and then to TP107 and GND. Measure the output level at each point. (Fig. 20)
(5) Insert the Philips test disc #5 and place the unit in the play mode on track number 8.
(6) Adjust VR104 so that the voltage differential between TP107 and TP105 becomes 29dB ±3dB. (FOC – FOG = 29dB)

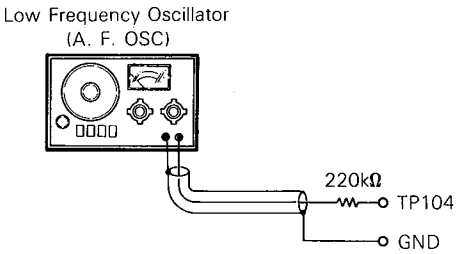


Fig. 19

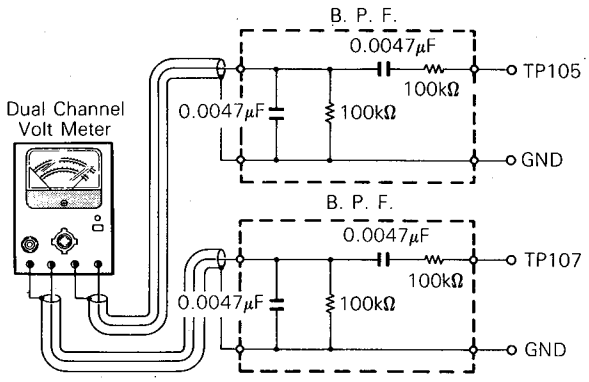


Fig. 20

6-8 EF Balance Adjustment
(1) Connect the oscilloscope to TP109 and GND. (Fig. 21)
(2) Insert the disc and place the unit in the Test Mode 3.
(3) Adjust VR101 so that the amplitude above and below the zero DC line becomes equal. (Amplitude A = amplitude B) (Fig. 22)

NOTE: Instead of using the DC input of a oscilloscope you may also use a DC null voltmeter for this alignment.

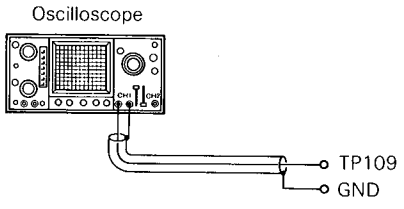


Fig. 21

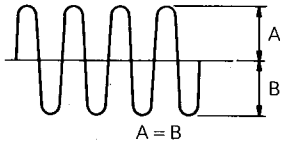


Fig. 22

6-9 Tracking Offset Adjustment
(1) Disconnect jumper wire W-5 on main P. C. board.
(2) Short circuit TP401 and GND on main P. C. board.
(3) Switch the power switch on and slide the disc tray out by pressing the open/close button.
(4) Insert the Philips test disc #5 and place the unit in test mode 4. (See chart number 3.)
(5) Connect the oscilloscope (DC input) to TP106 and GND. (Fig. 23)
(6) Adjust VR103 for zero volts DC ±5mV.
(7) Reconnect jumper W-5.

NOTE: Instead of using the DC input of a oscilloscope you may also use a DC null voltmeter for this alignment.

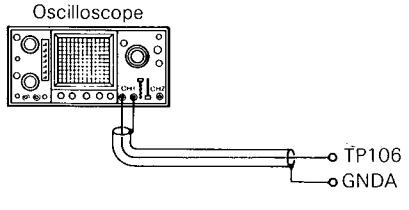


Fig. 23

6-10 Tracking Gain Adjustment
(1) Connect the audio frequency oscillator with 220k ohm resistor to TP102 and GND. (Fig. 24)
(2) Set the audio frequency oscillator for 800Hz, 200mV.
(3) Connect AC voltmeter to B.P.F. (Fig. 25)
(4) Insert the Philips test disc #5 and place the unit in the play mode on track number 8.
(5) Connect B.P.F. to test point TP103 and GND and then to TP106 and GND. Measure the output level at each point. (Fig. 25)
(6) Adjust VR102 so that the voltage difference between TP103 and TP106 becomes 8dB ±3dB. (TRG − TRC = 8dB)
(7) Check tracking offset in step 6-9 and repeat step 6-9 and step 6-10 if necessary.

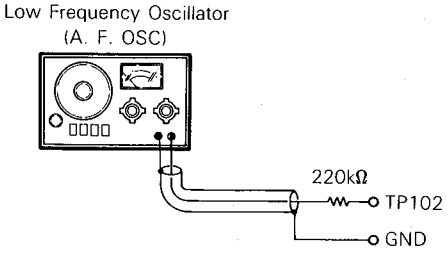


Fig. 24

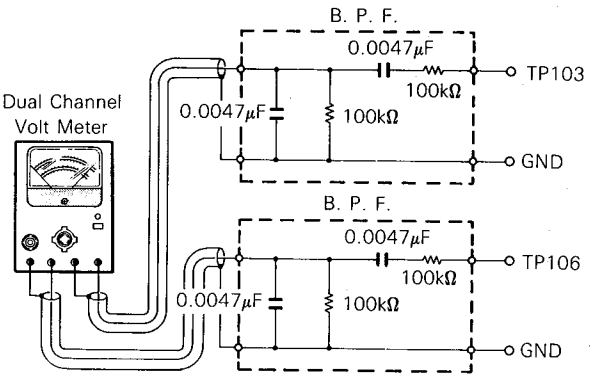


Fig. 25

6-11 Audio Distortion Adjustment
(1) Connect the distortin meter to Output jacks.
(2) Insert the Sony test disc type III and place the unit in the play mode on track number 1.
(3) Adjust VR301 and VR302 each so that the distortion is minimized.

7. Operation Check

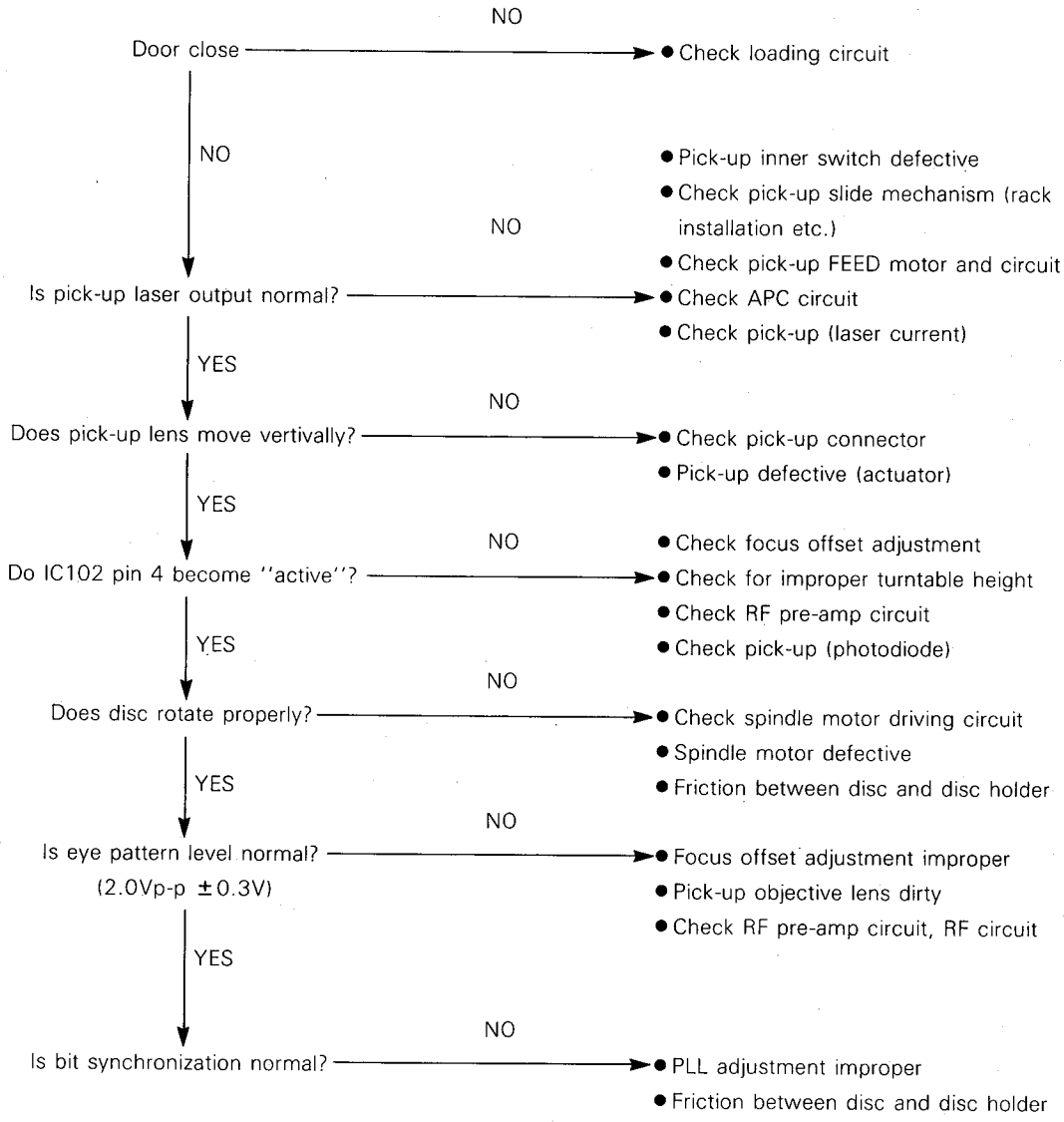
7-1 Playability
Use the Philips test 5A (scratched) test disc, play the following portions and make sure no tracks are jumped.
(1) Wedge (Interruption)
600μm Selection 7 0'00''— 0'30''
(2) Black Spot (Black Dot)
500μm Selection 13 0'00''— Selection 13 0'30''
(3) Fingerprint
Selection 19 0'00''— 0'30''

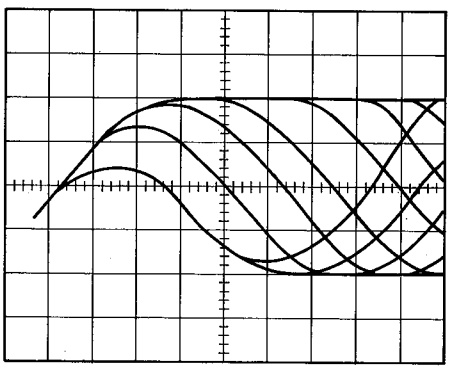
7-2 Discs for Adjustments

	Adjustment	Disc	Check
1	Frequency Response	SONY TEST CD TYPE III	20Hz—20kHz +0.5dB/−1.5dB
2	Distortion Rate	SONY TYPE III Selection 1	0.08% or below
3	S/N	SONY TYPE III Selection 1 PLAY/PAUSE	90dB or greater
4	Emphasis Response	SONY TYPE III Selection 39—41	(39) 1kHz −0.37dB ±0.5dB (40) 5kHz −4.53dB ±0.5dB (41) 16kHz −9.04dB ±0.5dB
5	Cross Talk	SONY TYPE III Selection 30 (L), Selection 34 (R)	70dB or greater

TROUBLE SHOOTING

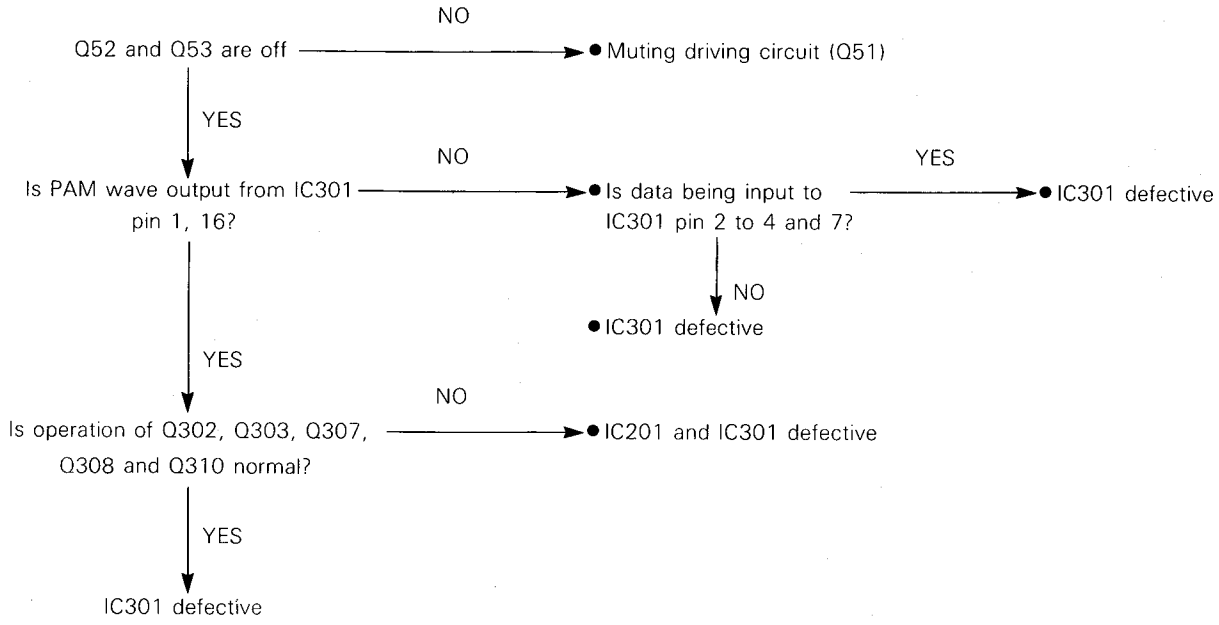
1. Does not initialize

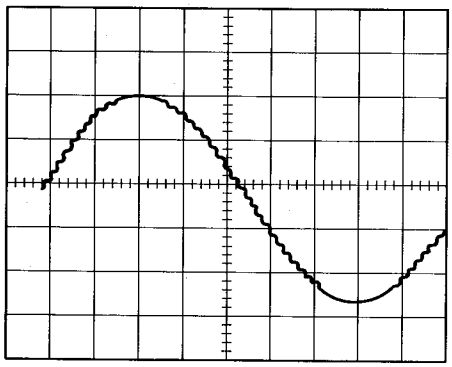




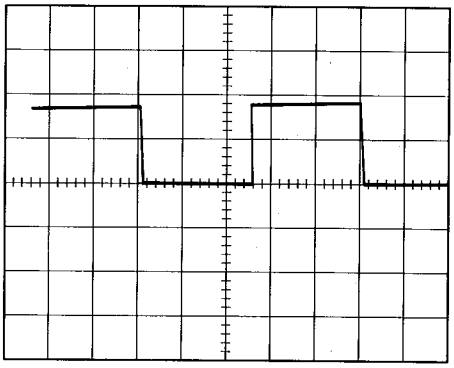
Eye Pattern

2. No sound is produced





RAM Waveform
(Test Disc: Sony Type III, 1st selection)



IC301 Pin 4 Waveform
(Test Disc: Sony Type III, 1st selection)

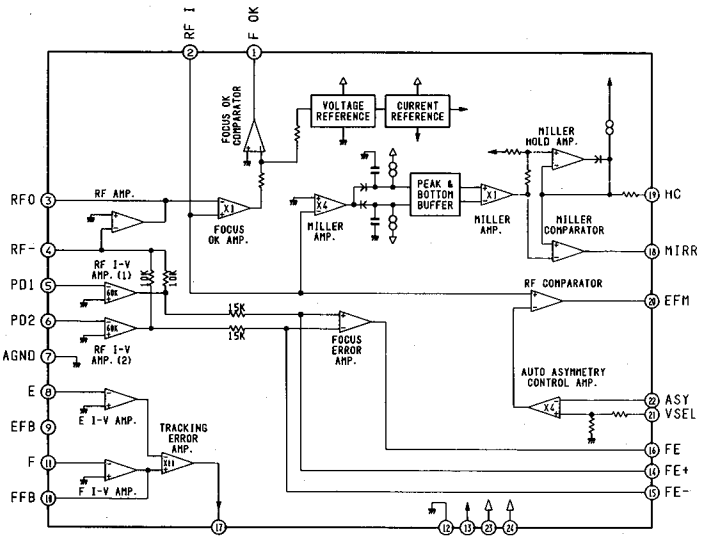
3. IC401 Terminal Functions

Terminal number	Port name	Terminal code	I/O	Outline of functions
1	P27	OPEN	O	Disc tray opening direction driving output
2	P26	CLOSE	O	Disc tray closing direction driving output
3	P25	JP1	O	
4	P24	MSD	O	Serial data output
5	P23	MCK	O	Shift clock output
6	P22	MLA	O	Data latch clock output
7	P21	MUTE	O	Mute output
8	P20	ACK	O	
9	NC	NC	—	
10	P07	DATA IN	I	Serial data input
11	P06	SYCLK	I	Frame synchronization signal output
12	P05	DRD	I	
13	P04	SCOR	I	Sub code synchronization signal ouput S0 + S1
14	P03	CRCF	I	Sub code Q CRCOK = 1
15	P02	SUBQ	I	Sub code Q Channel output
16	P01	KD4	I	
17	P00	TEST	I	
18	INT2	STB	I	
19	INT1	EFFK	I	EFM frame clock output
20	NC	NC	—	
21	CNVss	GND	—	
22	RESET	RESET	I	Reset input
23	XIN	XIN	I	Clock input
24	XOUTF	XOUTF	O	Clock output F
25	XOUTS	XOUTS	O	Clock output S
26	Vss	GND	—	

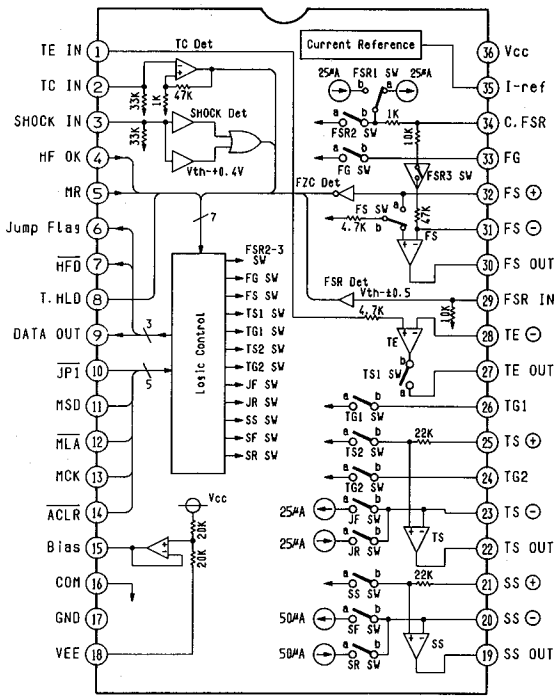
Terminal number	Port name	Terminal code	I/O	Outline of functions
27	XCIN	DATA IN	I	Serial data input
28	XCOUT	—	O	Clock output for timer
29	R3	KD3	I	Key input 3
30	R2	KD2	I	Key input 2
31	R1	KD1	I	Key input 1
32	R0	KD0	I	Key input 0
33	ϕ	—	O	Timing output
34	VP	VP	—	Bias voltage for display
35	P17	LD ON	O	Laser diode control output
36	P16	G7	O	Figure output 7
37	P15	G6	O	Figure output 6
38	P14	G5	O	Figure output 5
39	P13	G4	O	Figure output 4
40	P12	G3	O	Figure output 3
41	P11	G2	O	Figure output 2
42	P10	G1	O	Figure output 1
43	P37	i	O	Segment output i
44	P36	g	O	Segment output g
45	P35	f	O	Segment output f
46	P34	e	O	Segment output e
47	P33	d	O	Segment output d
48	P32	c	O	Segment output c
49	P31	b	O	Segment output b
50	P30	a	O	Segment output a
51	Vcc	Vcc	—	Power supply
52	Vcc	Vcc	—	Power supply

IC BLOCK DIAGRAM

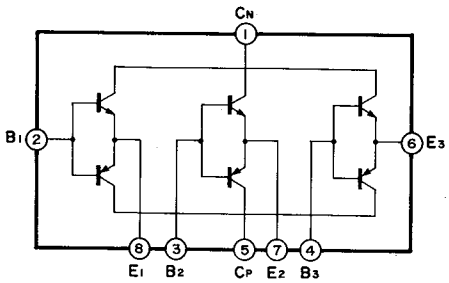
IC101 : CX20109
RF Pre Amplifier



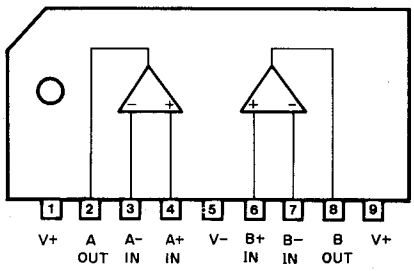
IC102 : M51564P
Optical Pick-up Servo Control



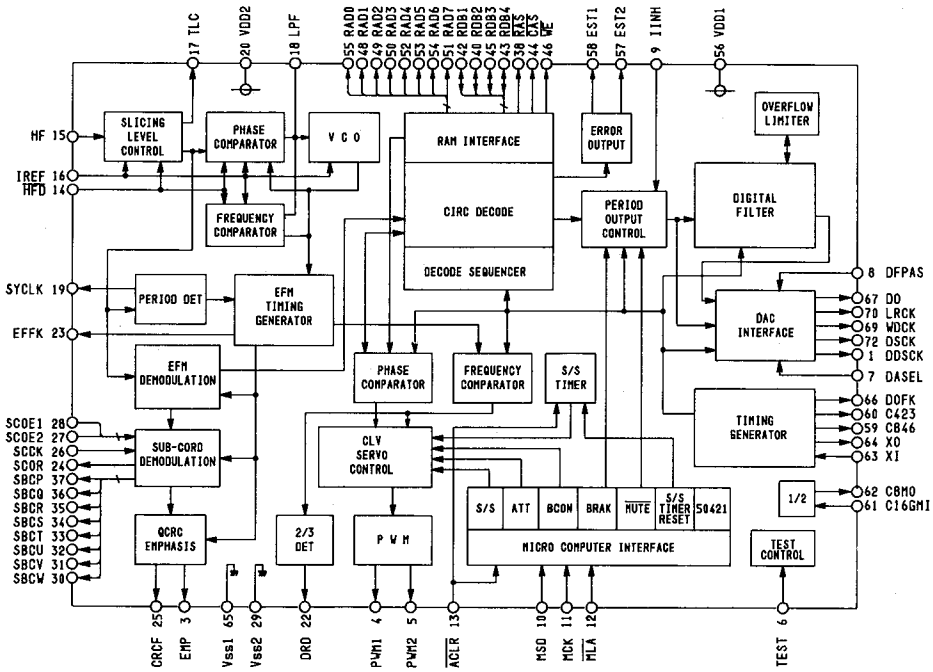
IC103 : STA341M
Transistor Array



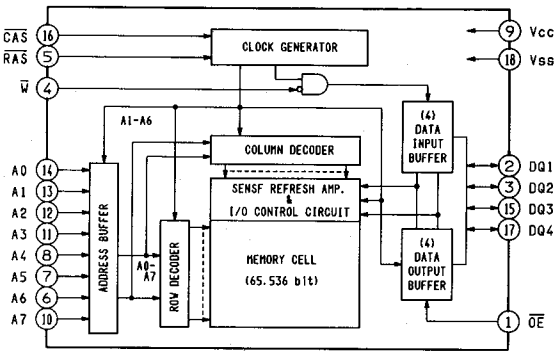
IC104 : BA715
Dual Operation Amplifier



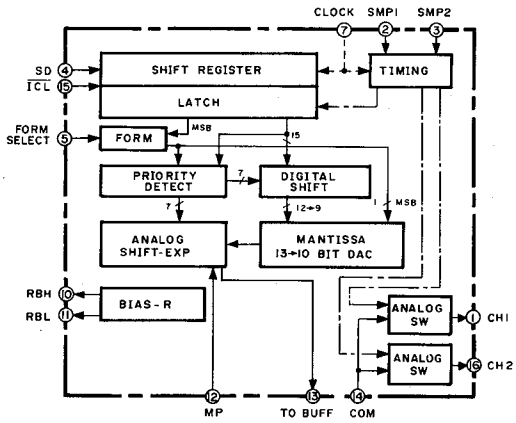
IC201 : M50421P
Digital Signal Processor



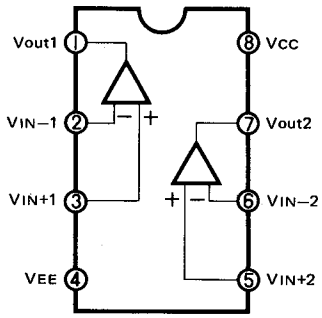
IC202 : M5M4416P
65636-Bit (16384-Word by 4-Bit)
Dynamic RAM

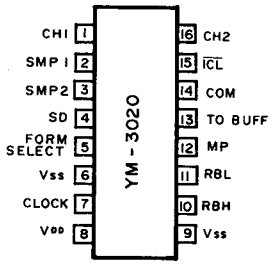


IC301 : YM3020
D/A Converter

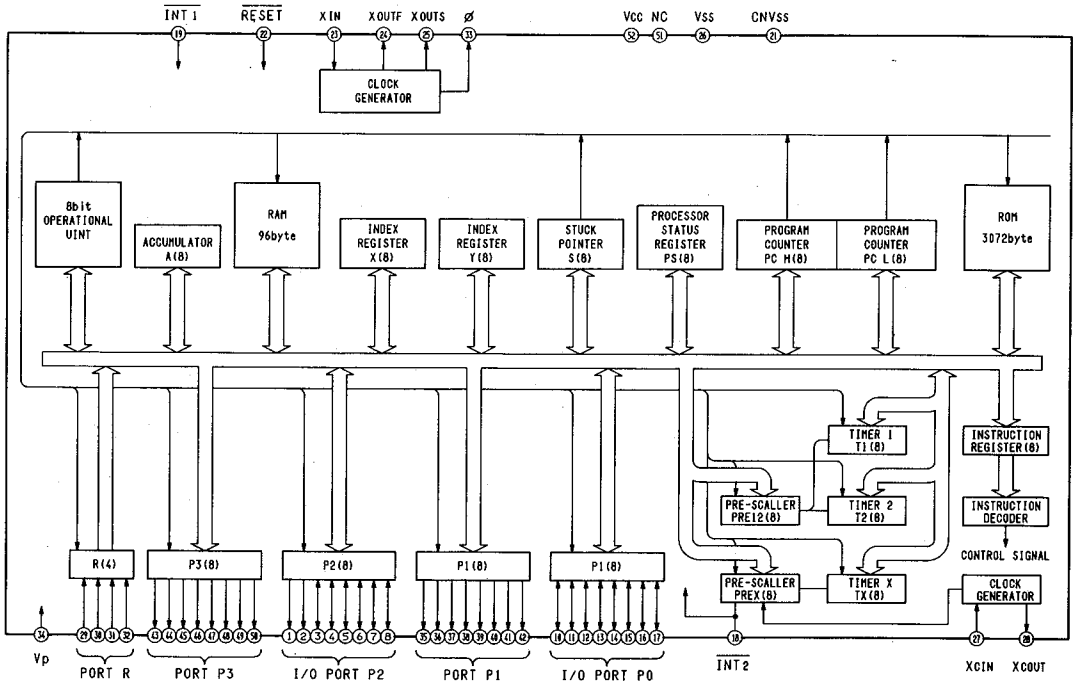


IC302 : NJM4560SB
Dual Operational Amplifier

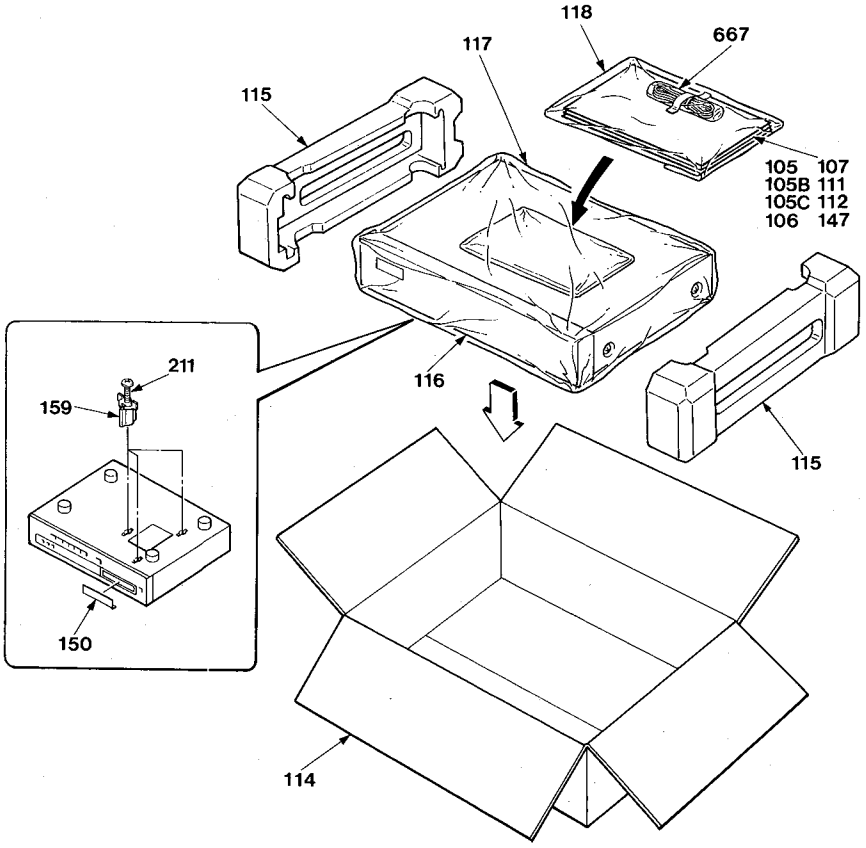


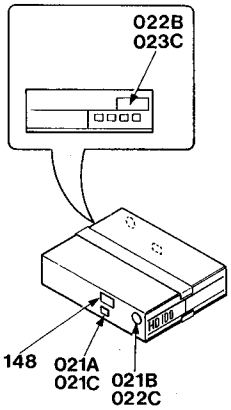


IC401 : M50752-402SP
Microcomputer



PACKAGE

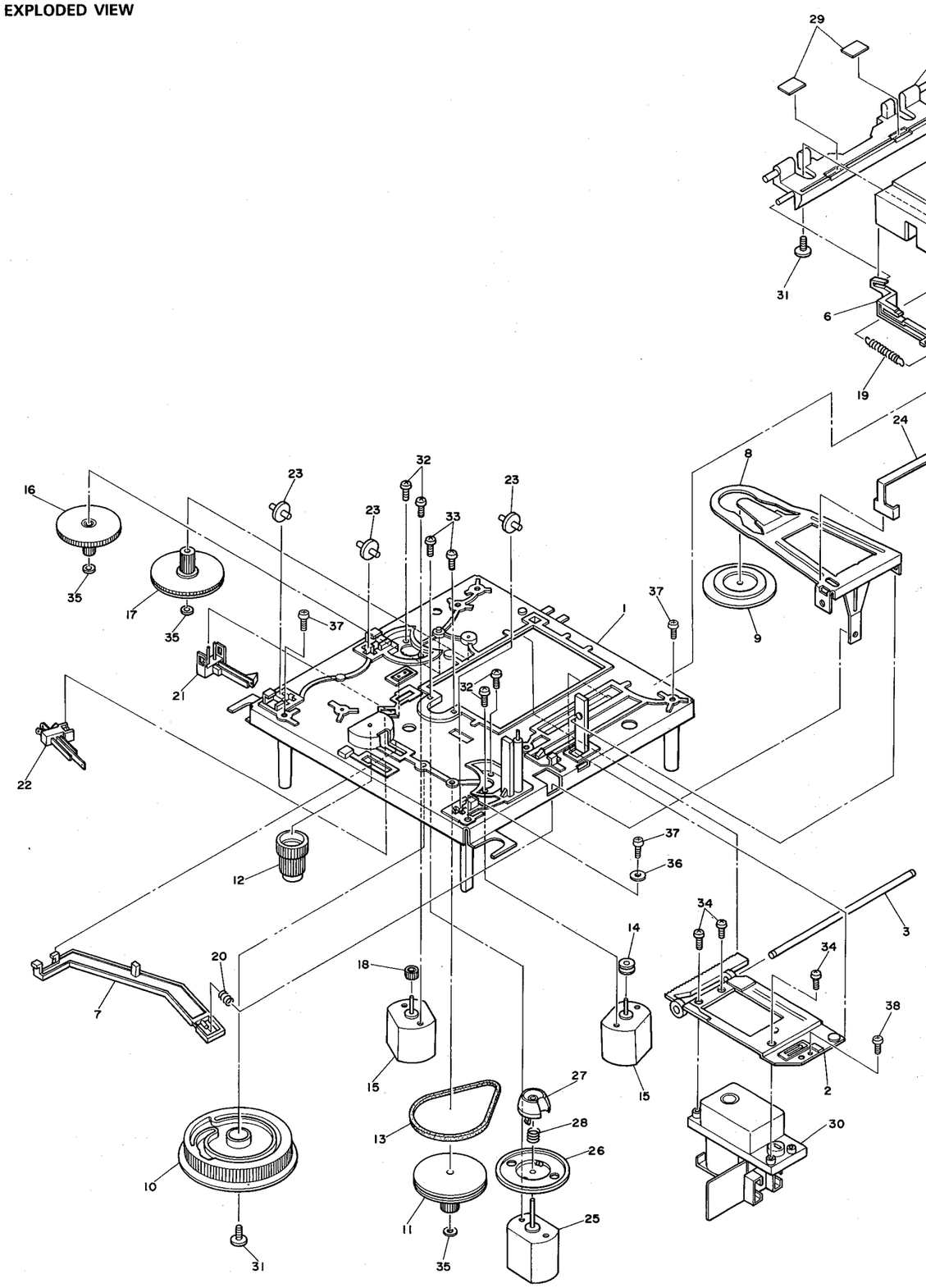




Ref. No.	Part. No.	Description
021A	1232-1901	BK LABEL (BK)
021C	1232-1901	BK LABEL (GB)
021B	1756-03108	G LABEL (G)
022C	1756-03108	G LABEL (GB)
022B	1756-06303	VOLTAGE LABEL (G)
023C	1756-06303	VOLTAGE LABEL (GB)
105	1111-J30249	OWNER GUIDE (U) (BK)
105B	1111-J30250	OWNER GUIDE (G)
105C	1111-J30250	OWNER GUIDE (GB)
106	1111-J90195	UL SAFETY GUIDE (U) (BK)
107	1113-717004	OWNER CARD (U) (BK)
111	1119-047	GUARANTY CARD (U) (BK)
112	1119-0137	GUARANTY GUIDE (U) (BK)
114	1221-717194	CARTON BOX
115	1222-7306	CUSHION
116	1223-11729	SOFT SHEET
117	1241-C1413	POLYETHY BAG, SET
118	1241-C12732	POLYETHY BAG, IB
147	1756-11601	DHHS CARD
148	1756-11701	LABEL, DHHS CARD (CARTON)
150	1756-12001	TRANSPORTATION CAUTION FOR LID
177	2240-7285	HOLDER, MECHA
199	2327-302029	SCREW BND+, MECHA
211	2347-302526	SCREW BND T+, TRANSPORTATION
667	4161-71184	CORD W/PLUG, CONNECTION

CD MECHANISM

EXPLODED VIEW

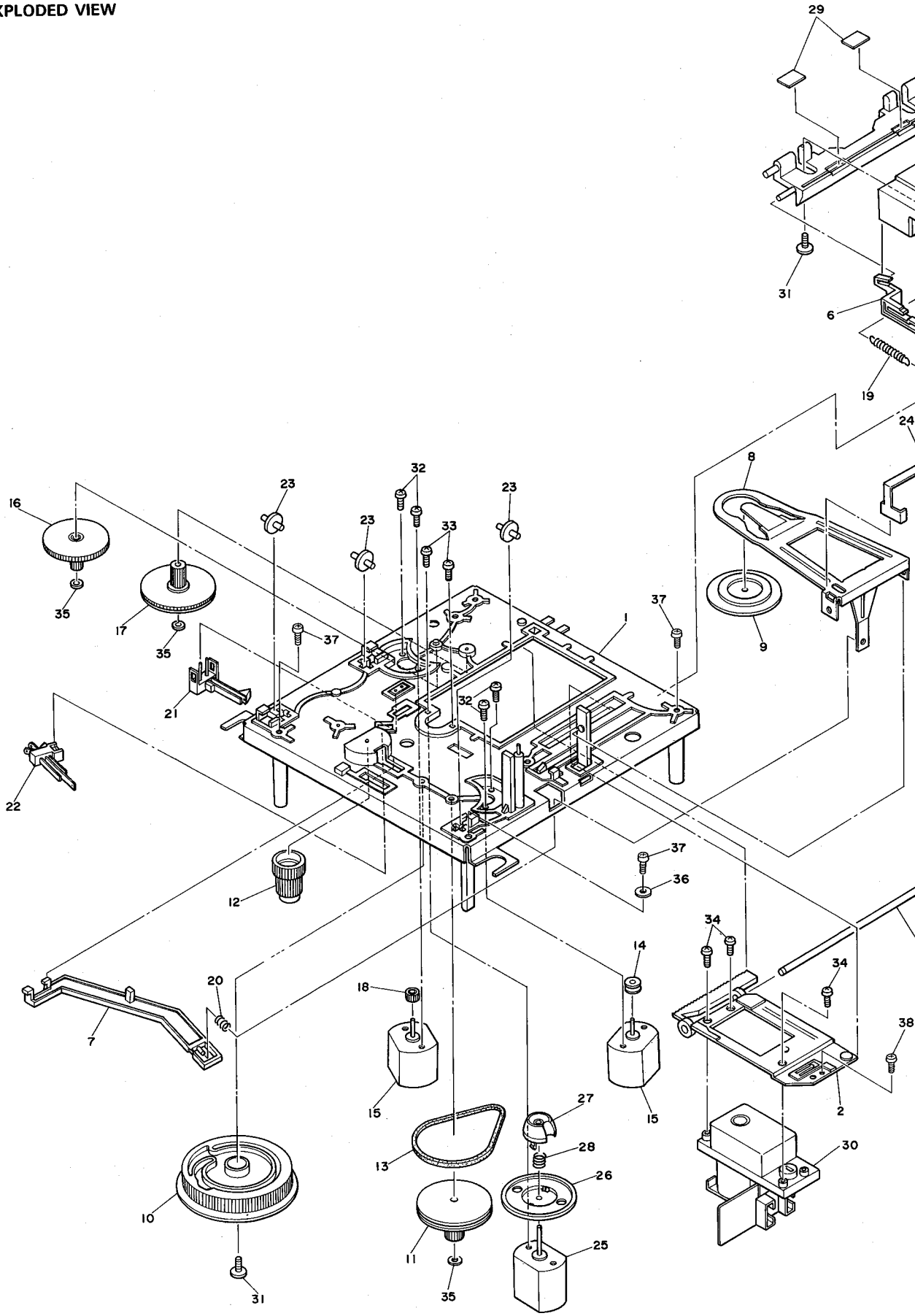


PARTS LIST

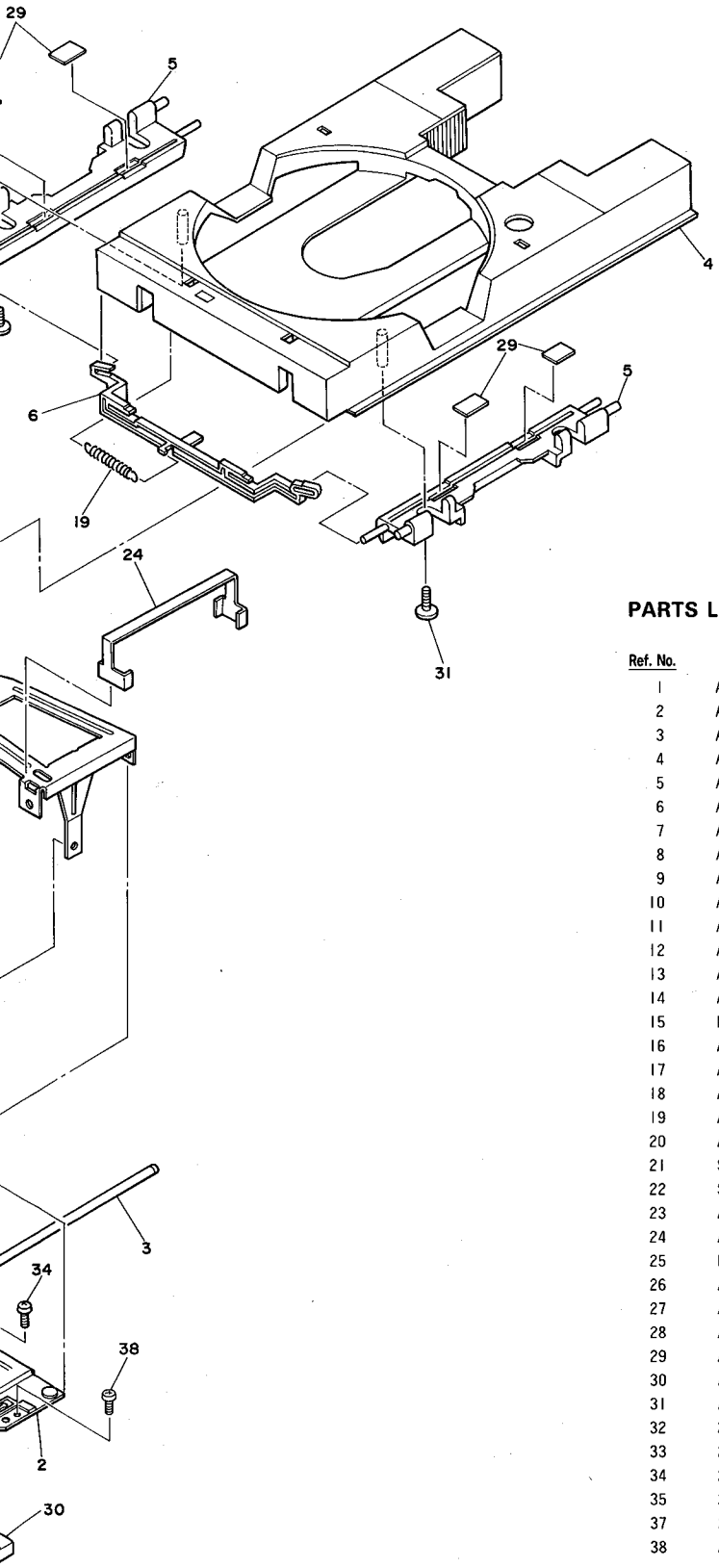
Ref. No.	Part. No.	Description
1	A81A031	CHASSIS ASS'Y
2	A81A003	PICK-UP BASE ASS'Y
3	A81H003	PICK-UP BASE SHAFT
4	A81G001	DISC TRAY
5	A81G002	TABLE
6	A81G003	SLIDER
7	A81P003	LOCK LEVER
8	A81P004	CHUCK ARM
9	A81G004	DISC HOLDER
10	A81G005	LOADING CAM
11	A81G006	LOADING GEAR A
12	A81G007	LOADING GEAR B
13	A81G070	LOADING BELT
14	A81G235	MOTOR PULLEY
15	M01T049	LOADING MOTOR
16	A81G008	PICK-UP GEAR A
17	A81G009	PICK-UP GEAR B
18	A81G010	MOTOR GEAR
19	A81S001	TABLE UP SPRING
20	A81S002	CHUCK ARM SPRING
21	S01W050	LEAF SWITCH
22	S01W051	LEAF SWITCH
23	A81S020	GUIDE ROLLER
24	A81O005	SUPPORTER
25	M01T047	SPINDLE MOTOR
26	A81G011	SPINDLE TABLE
27	A81G012	SLIDE RING
28	A81S013	SLIDE RING SPRING
29	A81P051	DISC GUARD
30	A81G021	PICK-UP
31	A81H005	P TYTE SCREW (M3×8mm)
32	2327-200429	SCREW BND+ (M2×4mm)
33	2327-200629	SCREW BND+ (M2×6mm)
34	2322-260529	SCREW PAN+ (M2.6×5mm)
35	2402-014	WASHER PLSTC (1.6×3.2×0.25mm)
37	2347-301029	SCREW BND T+ (M3×10mm)
38	A81G234	JITTER INCLINATION SCREW

CD MECHANISM

EXPLODED VIEW



E | F | G | H | I | J

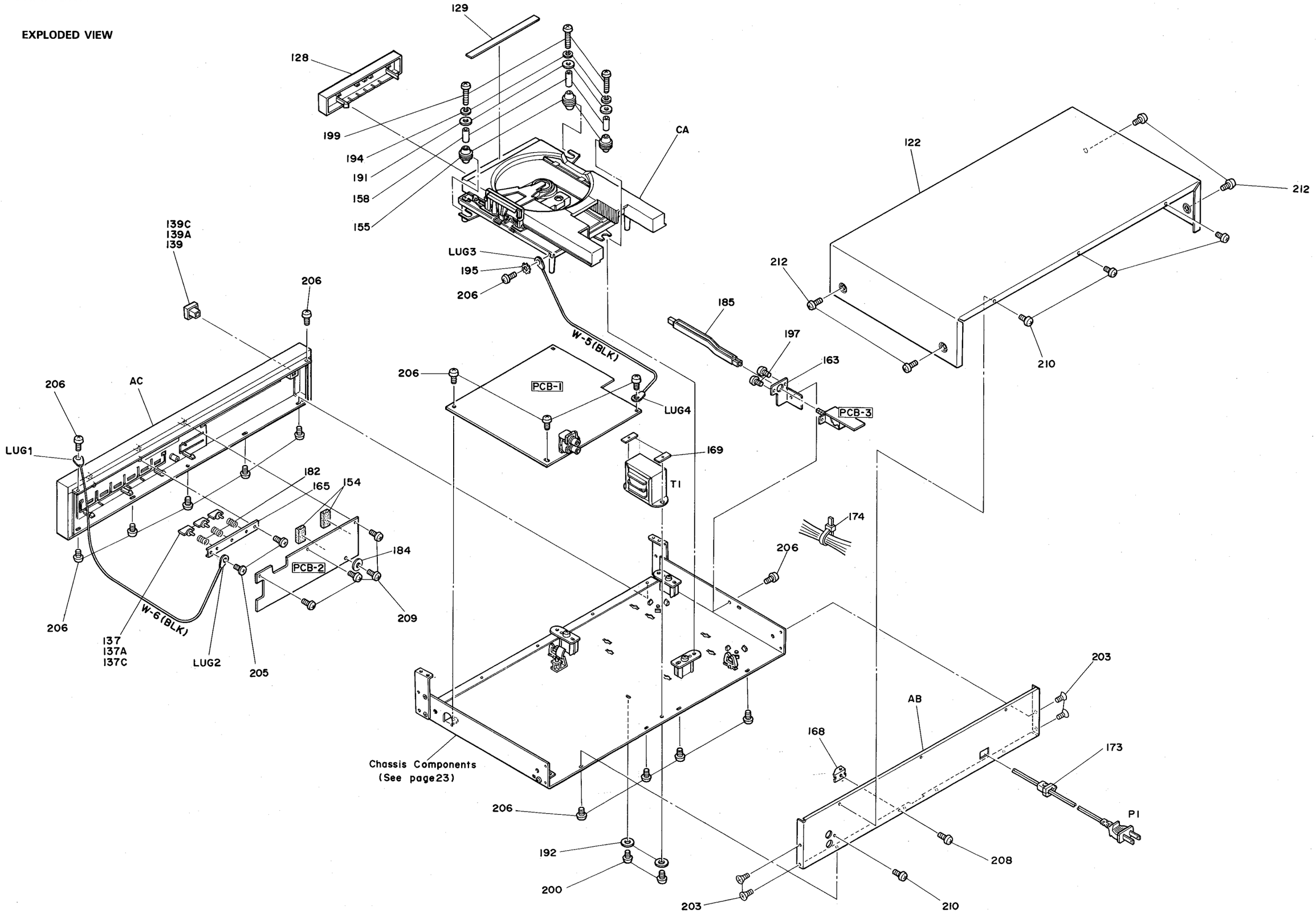


PARTS LIST

Ref. No.	Part. No.	Description
1	A81A031	CHASSIS ASS'Y
2	A81A003	PICK-UP BASE ASS'Y
3	A81H003	PICK-UP BASE SHAFT
4	A81G001	DISC TRAY
5	A81G002	TABLE
6	A81G003	SLIDER
7	A81P003	LOCK LEVER
8	A81P004	CHUCK ARM
9	A81G004	DISC HOLDER
10	A81G005	LOADING CAM
11	A81G006	LOADING GEAR A
12	A81G007	LOADING GEAR B
13	A81G070	LOADING BELT
14	A81G235	MOTOR PULLEY
15	M01T049	LOADING MOTOR
16	A81G008	PICK-UP GEAR A
17	A81G009	PICK-UP GEAR B
18	A81G010	MOTOR GEAR
19	A81S001	TABLE UP SPRING
20	A81S002	CHUCK ARM SPRING
21	S01W050	LEAF SWITCH
22	S01W051	LEAF SWITCH
23	A81S020	GUIDE ROLLER
24	A81O005	SUPPORTER
25	M01T047	SPINDLE MOTOR
26	A81G011	SPINDLE TABLE
27	A81G012	SLIDE RING
28	A81S013	SLIDE RING SPRING
29	A81P051	DISC GUARD
30	A81G021	PICK-UP
31	A81H005	P TYTE SCREW (M3×8mm)
32	2327-200429	SCREW BND+ (M2×4mm)
33	2327-200629	SCREW BND+ (M2×6mm)
34	2322-260529	SCREW PAN+ (M2.6×5mm)
35	2402-014	WASHER PLSTC (1.6×3.2×0.25mm)
37	2347-301029	SCREW BND T+ (M3×10mm)
38	A81G234	JITTER INCLINATION SCREW

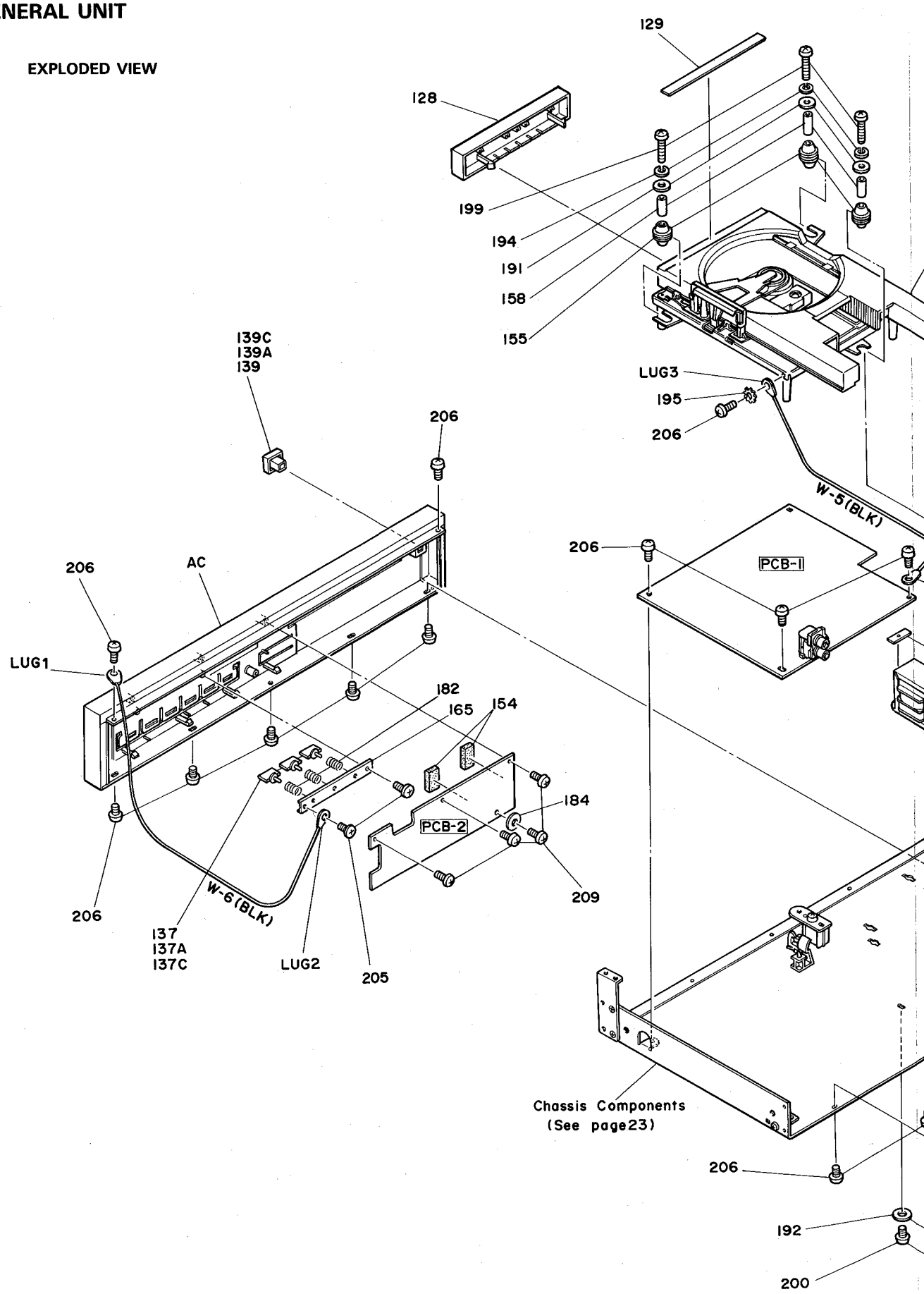
GENERAL UNIT

EXPLODED VIEW

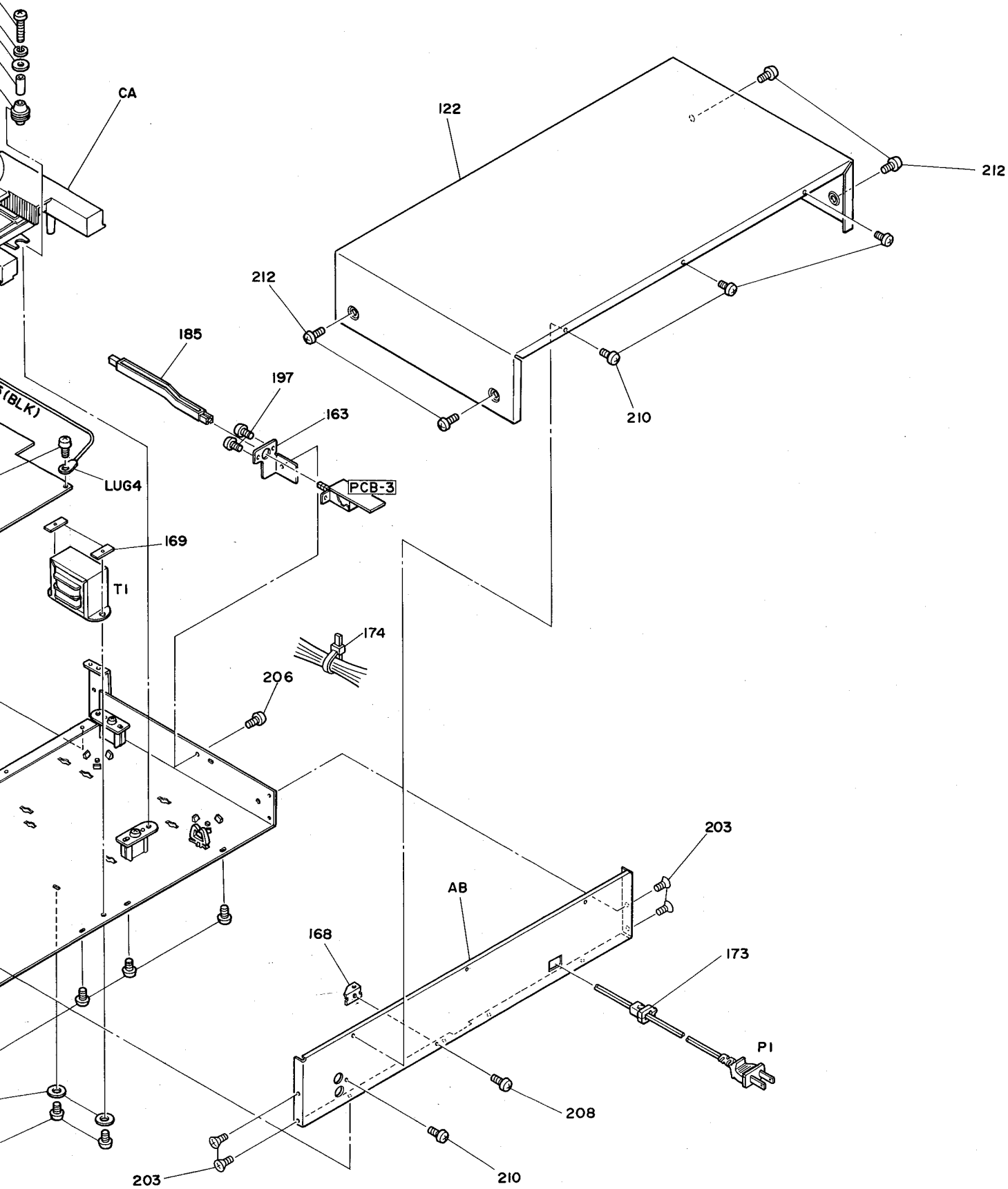


GENERAL UNIT

EXPLODED VIEW

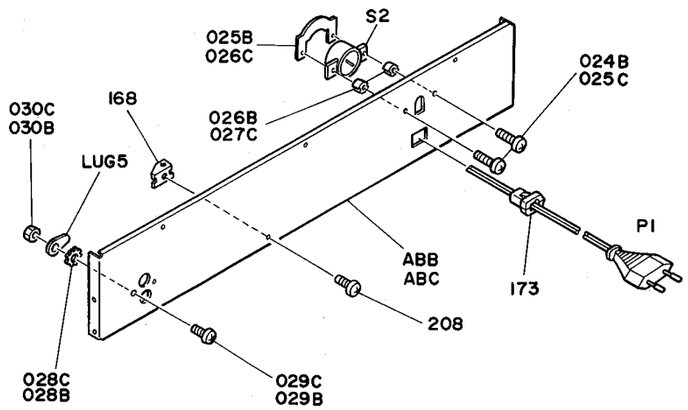


	F	G	H	I	J


CA
122
212
212
185
197
163
210
(BLK)
LUG4
PCB-3
169
T1
174
206
203
AB
168
173
P1
208
203
210

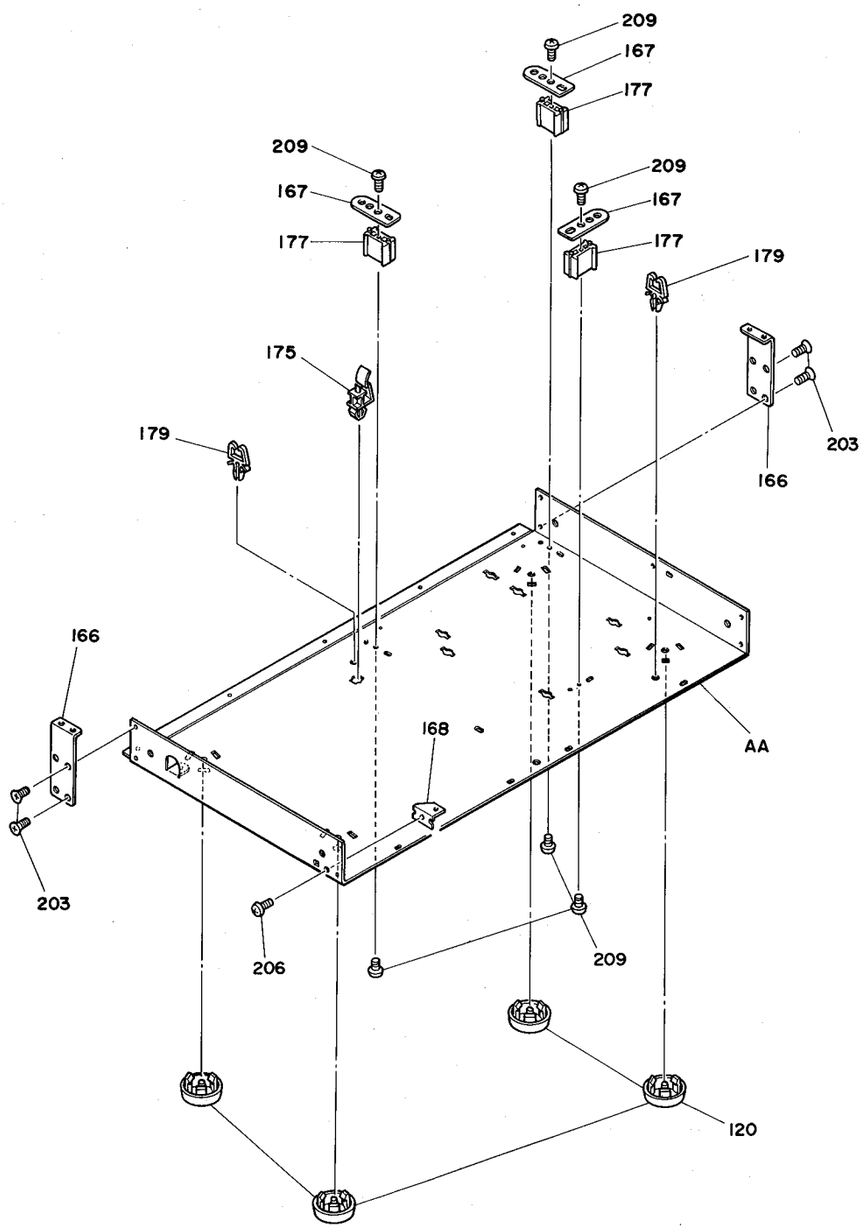
PARTS LIST

Ref. No.	Part. No.	Description
AA	A424-HD100A	CABI BACK, BOTTOM ASS'Y
AB	A424-HD100B	CABI BACK, REAR ASS'Y (U) (BK)
ABB	A424-HD100C	CABI BACK, REAR ASS'Y (G)
ABC	A424-HD100C	CABI BACK, REAR ASS'Y (GB)
AC	A443-HD100A	PANAL, FRONT ASS'Y (U) (G)
ACA	A443-HD100B	PANEL, FRONT ASS'Y (BK)
ACC	A443-HD100B	PANEL, FRONT ASS'Y (GB)
CA	C119-HD100A	CD MECHA ASS'Y (U) (BK)
CAB	C119-HD100B	CD MECHA ASS'Y (G)
CAC	C119-HD100B	CD MECHA ASS'Y (GB)
024B	2327-301449	SCREW BND+, VOLTAGE SELECTOR (G)
025C	2327-301449	SCREW BND+, VOLTAGE SELECTOR (GB)
025B	2440-7017	NUT SPE, VOLTAGE SELECTOR (G)
026C	2440-7017	NUT SPE, VOLTAGE SELECTOR (GB)
026B	2132-01406	SPACER, VOLTAGE SELECTOR (G)
027C	2132-01406	SPACER, VOLTAGE SELECTOR (GB)
028B	2414-302	WASHER, OT PIN JACK EARTH (G)
028C	2414-302	WASHER, OT PIN JACK EARTH (GB)
029B	2327-300849	SCREW BND+, PIN JACK EARTH (G)
029C	2327-300849	SCREW BND+, PIN JACK EARTH (GB)
030B	2446-301Z9	LUG, PIN JACK EARTH (G)
030C	2446-301Z9	LUG, PIN JACK EARTH (GB)
120	1319-0139	LEG
122	1414-09101	CABINET
128	1452-04701	LID, MECHA
129	1511-09701	PLATE, MECHA
137	1662-08502VN	PUSH BUTTON, DISPLAY, REPEAT, PROGRAM (U) (G)
137A	1662-08503	PUSH BUTTON, DISPLAY, REPEAT, PROGRAM (BK)
137C	1662-08503	PUSH BUTTON, DISPLAY, REPEAT, PROGRAM (GB)
139	1662-25401VN	PUSH BUTTON, POWER (U) (G)
139A	1662-25402	PUSH BUTTON, POWER (BK)
139C	1662-25402	PUSH BUTTON, POWER (GB)
154	2114-106143	BUSHING, F. L. TUBE
155	2114-01303	BUSHING, MECHA DAMPING
158	2132-3014021	SPACER, MECHA
159	2132-7148	SPACER, TRANSPORTATION
163	2215-7010	BRACKET, POWER SWITCH
165	2219-8140	METAL FITTG, PUSH BUTTON
166	2219-8141	METAL FITTG, SIDE
167	2219-8142	METAL FITTG, MECHA
168	2219-8096	METAL FITTG, P. C. B.
169	2219-7091	METAL FITTG, TRANS NUT
173	2240-364	HOLDER, AC CORD
174	2240-7120	HOLDER, WIRING
175	2240-7264	HOLDER, P. C. BOARD
177	2240-7285	HOLDER, MECHA
179	2240-7029	HOLDER, READ CRAMP
182	2651-210192	SPRING, PUSH BUTTON
184	2402-0374	WASHER, PLSTC
185	2601-7161	SHAFT, POWER SWITCH
191	2401-0373	WASHER METAL, MECHA
192	2401-0476	WASHER METAL, TRANS
194	2412-3022	WASHER SPRING, MECHA
195	2414-302	WASHER OT, MECHA EARTH
197	2327-300629	SCREW BND+, POWER SWITCH
199	2327-302029	SCREW BND+, MECHA
200	2327-401029	SCREW BND+, TRANS
203	2343-300627	SCREW CSK T+, SIDE METAL, CABINET BACK
205	2347-200626	SCREW BND T+, PUSH BUTTON METAL
206	2347-300626	SCREW BND T+
208	2347-300646	SCREW BND T+, METAL FITTG (169)
209	2347-301026	SCREW BND T+, P. C. B., HOLDER
210	2347-300846	SCREW BND T+, CABINET, JACK
212	2347-400646	SCREW BND T+, CABINET



General model (See AB section on page 22)

CHASSIS COMPONENTS



NOTES

Parts with the following marks are used only in the models intended for particular markets:

- (U) :U.S.A. model
- (BK) :U.S.A. model Black Version
- (G) :General model
- (GB) :General model Black Version

PARTS LIST

Ref. No.	Part. No.	Description
AA	A424-HD100A	CABI BACK, BOTTOM ASS'Y
AB	A424-HD100B	CABI BACK, REAR ASS'Y (U) (BK)
ABB	A424-HD100C	CABI BACK, REAR ASS'Y (G)
ABC	A424-HD100C	CABI BACK, REAR ASS'Y (GB)
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ACA	A443-HD100B	PANEL, FRONT ASS'Y (BK)
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CAB	C119-HD100B	CD MECHA ASS'Y (G)
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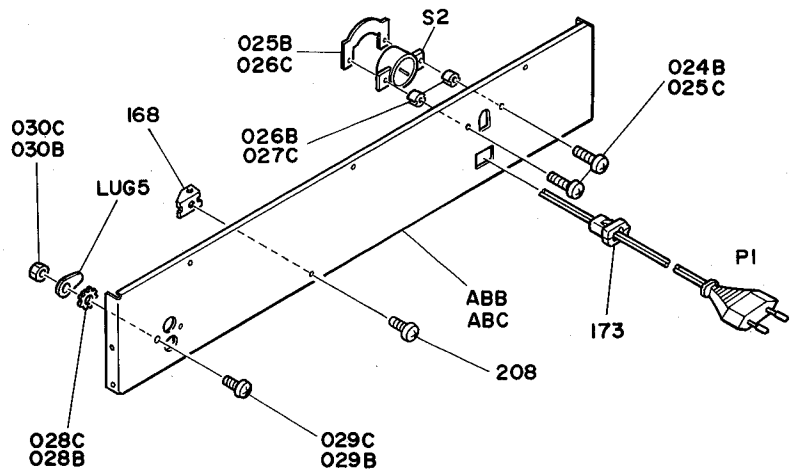
026C	2440-7017	NUT SPE, VOLTAGE SELECTOR (GB)
026B	2132-01406	SPACER, VOLTAGE SELECTOR (G)
027C	2132-01406	SPACER, VOLTAGE SELECTOR (GB)
028B	2414-302	WASHER, OT PIN JACK EARTH (G)
028C	2414-302	WASHER, OT PIN JACK EARTH (GB)
029B	2327-300849	SCREW BND+, PIN JACK EARTH (G)
029C	2327-300849	SCREW BND+, PIN JACK EARTH (GB)
030B	2446-301Z9	LUG, PIN JACK EARTH (G)
030C	2446-301Z9	LUG, PIN JACK EARTH (GB)
120	1319-0139	LEG
122	1414-09101	CABINET
128	1452-04701	LID, MECHA
129	1511-09701	PLATE, MECHA
137	1662-08502VN	PUSH BUTTON, DISPLAY, REPEAT, PROGRAM (U) (G)
137A	1662-08503	PUSH BUTTON, DISPLAY, REPEAT, PROGRAM (BK)
137C	1662-08503	PUSH BUTTON, DISPLAY, REPEAT, PROGRAM (GB)
139	1662-25401VN	PUSH BUTTON, POWER (U) (G)
139A	1662-25402	PUSH BUTTON, POWER (BK)
139C	1662-25402	PUSH BUTTON, POWER (GB)

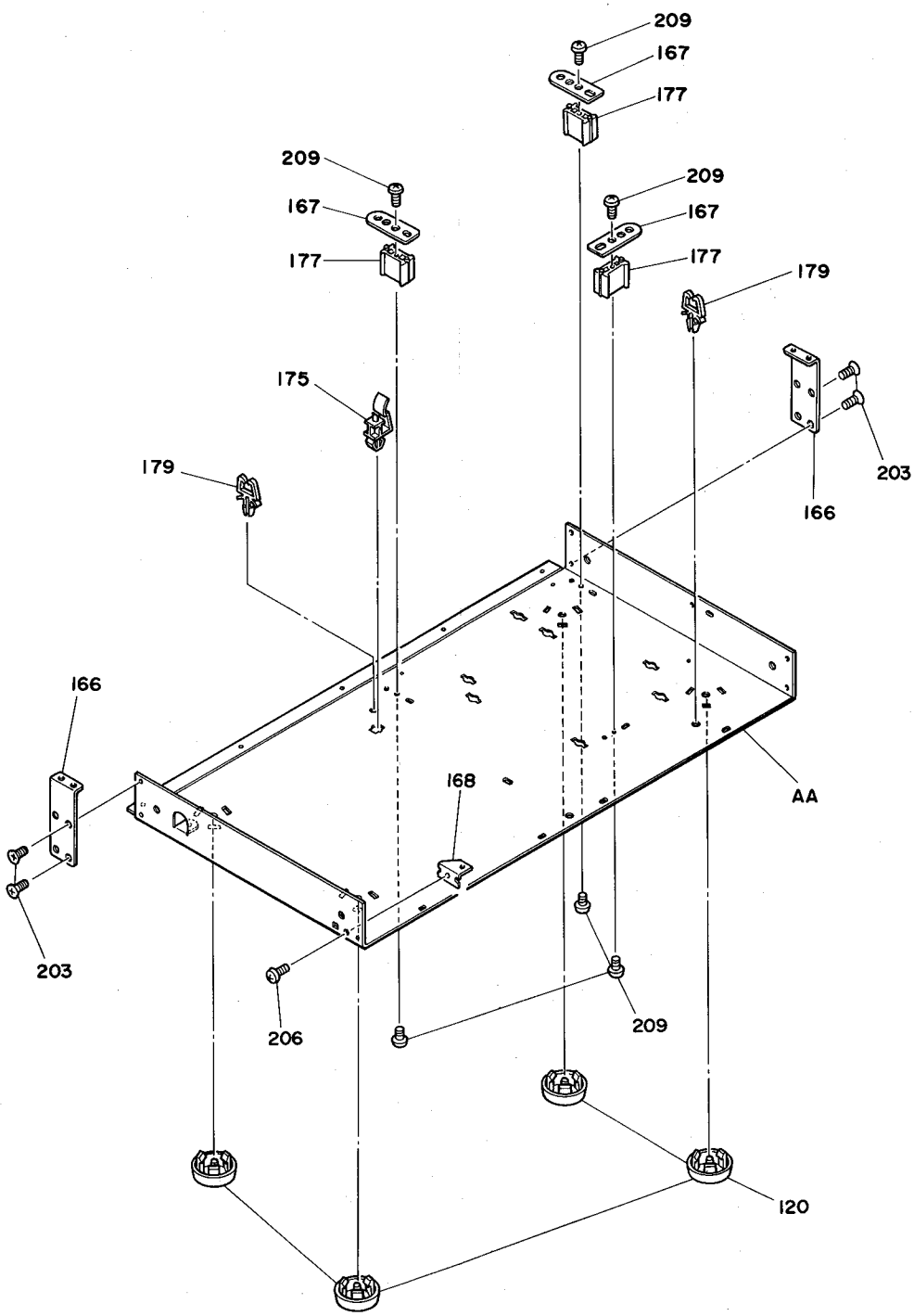
Ref. No.	Part. No.	Description
154	2114-106143	BUSHING, F. L. TUBE
155	2114-01303	BUSHING, MECHA DAMPING
158	2132-3014021	SPACER, MECHA
159	2132-7148	SPACER, TRANSPORTATION
163	2215-7010	BRACKET, POWER SWITCH
165	2219-8140	METAL FITTG, PUSH BUTTON
166	2219-8141	METAL FITTG, SIDE
167	2219-8142	METAL FITTG, MECHA
168	2219-8096	METAL FITTG, P. C. B.
169	2219-7091	METAL FITTG, TRANS NUT
173	2240-364	HOLDER, AC CORD
174	2240-7120	HOLDER, WIRING
175	2240-7264	HOLDER, P. C. BOARD
177	2240-7285	HOLDER, MECHA
179	2240-7029	HOLDER, READ CRAMP
182	2651-210192	SPRING, PUSH BUTTON
184	2402-0374	WASHER, PLSTC
185	2601-7161	SHAFT, POWER SWITCH
191	2401-0373	WASHER METAL, MECHA
192	2401-0476	WASHER METAL, TRANS
194	2412-3022	WASHER SPRING, MECHA
195	2414-302	WASHER OT, MECHA EARTH
197	2327-300629	SCREW BND+, POWER SWITCH
199	2327-302029	SCREW BND+, MECHA
200	2327-401029	SCREW BND+, TRANS
203	2343-300627	SCREW CSK T+, SIDE METAL, CABINET BACK
205	2347-200626	SCREW BND T+, PUSH BUTTON METAL
206	2347-300626	SCREW BND T+
208	2347-300646	SCREW BND T+, METAL FITTG (169)
209	2347-301026	SCREW BND T+, P. C. B., HOLDER
210	2347-300846	SCREW BND T+, CABINET, JACK
212	2347-400646	SCREW BND T+, CABINET



General model (See AB section on page 22)

E	F	G	H	I	J

CHASSIS COMPONENTS

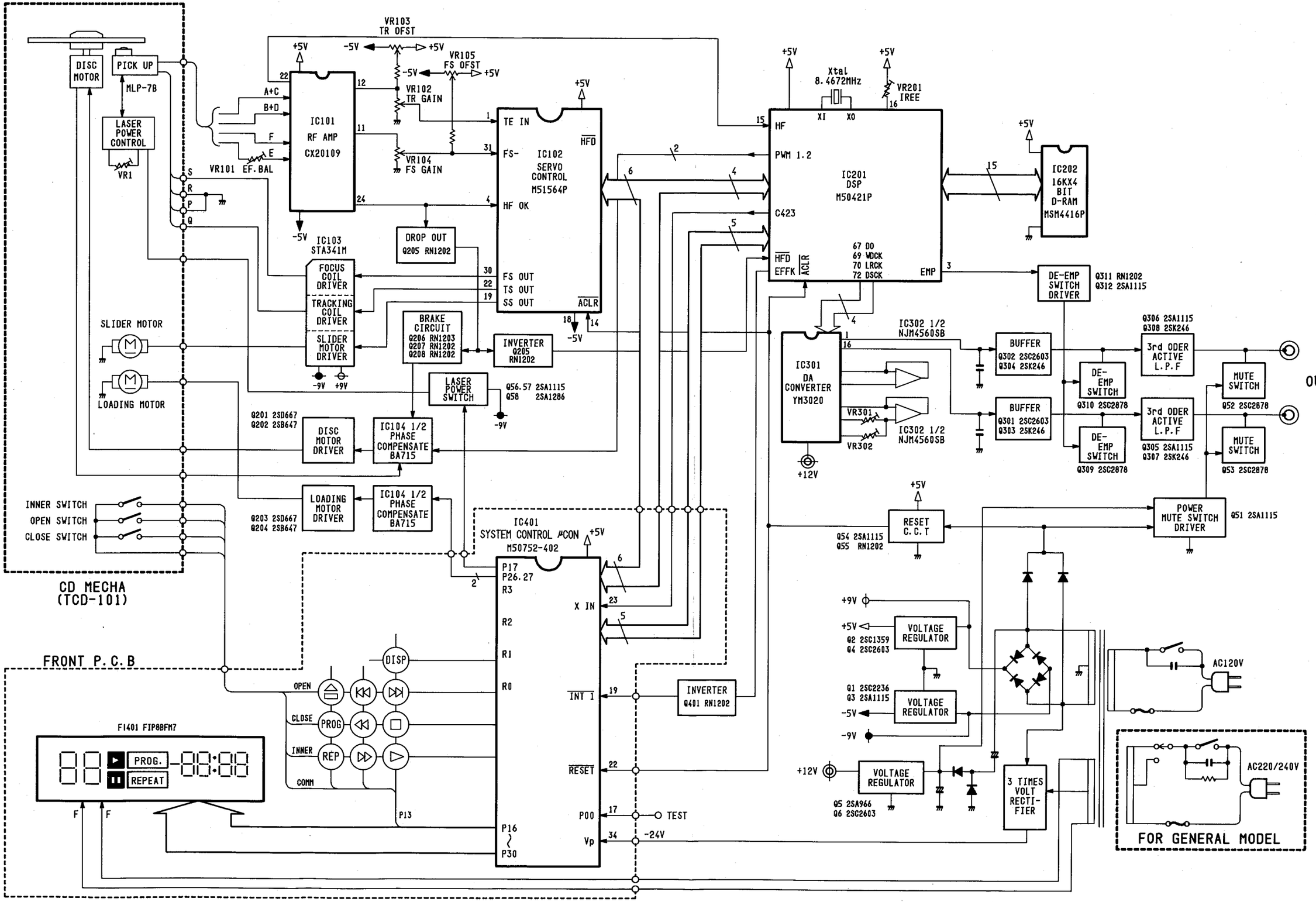


NOTES

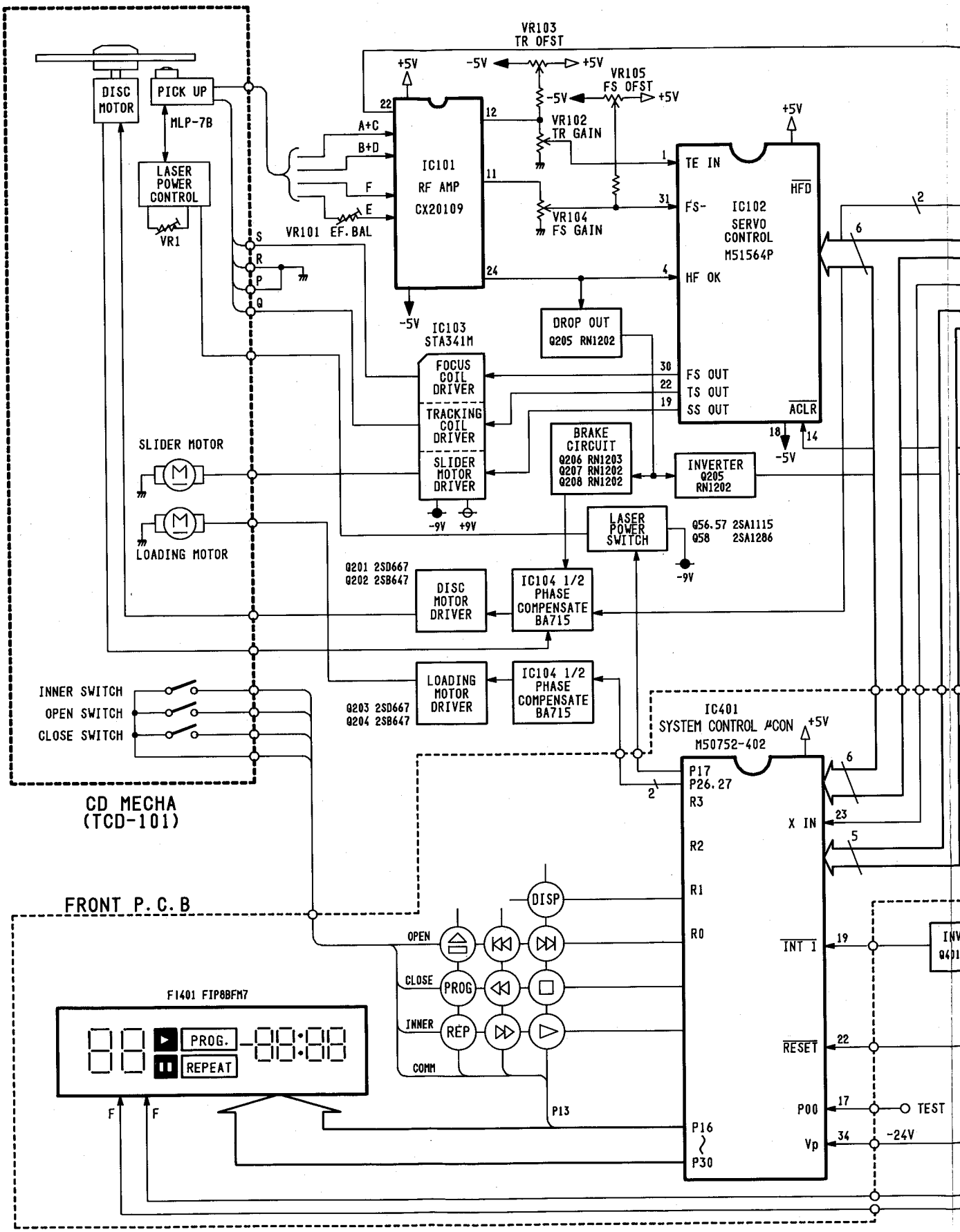
Parts with the following marks are used only in the models intended for particular markets:

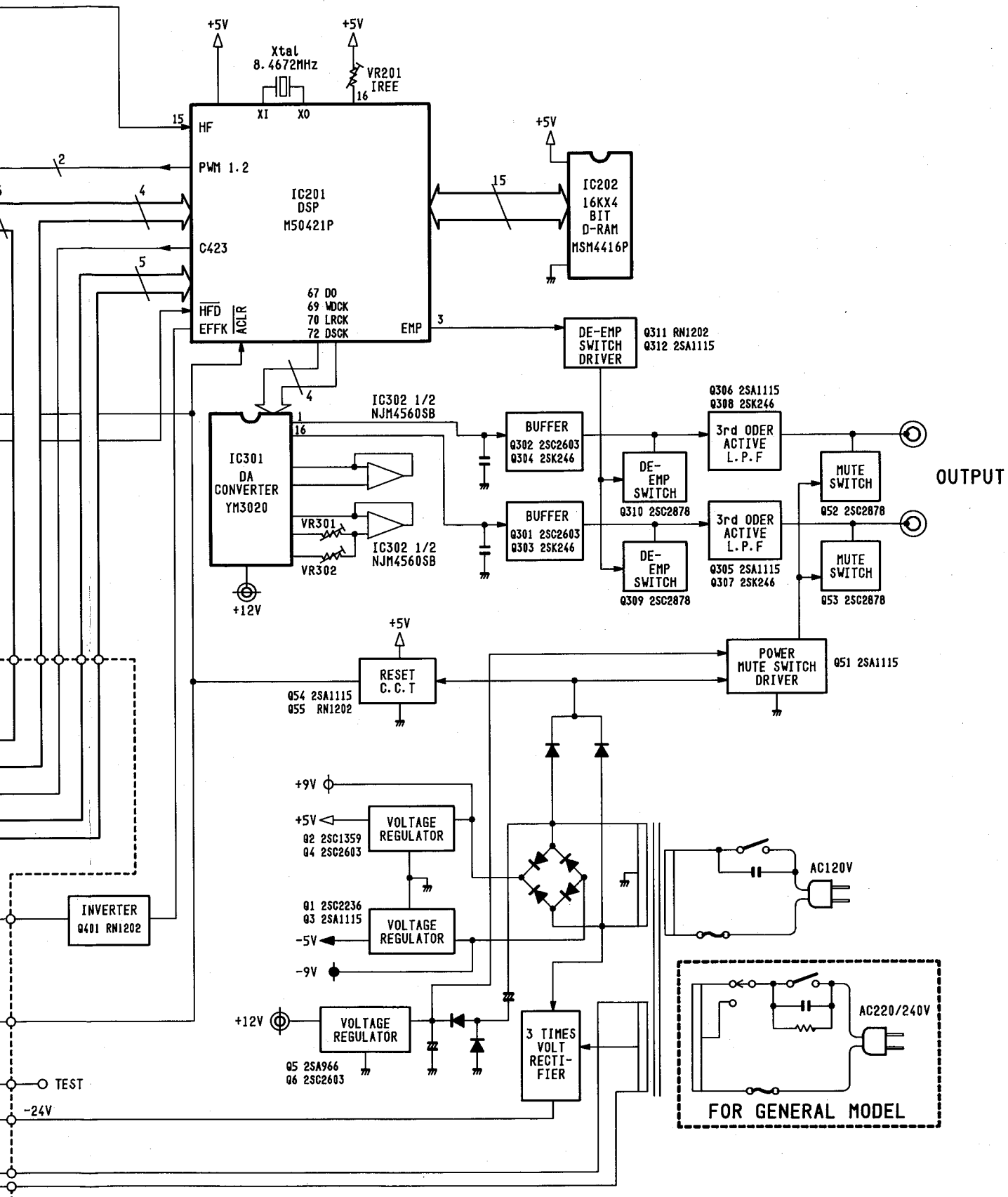
- (U) :U.S.A. model
- (BK) :U.S.A. model Black Version
- (G) :General model
- (GB) :General model Black Version

BLOCK DIAGRAM

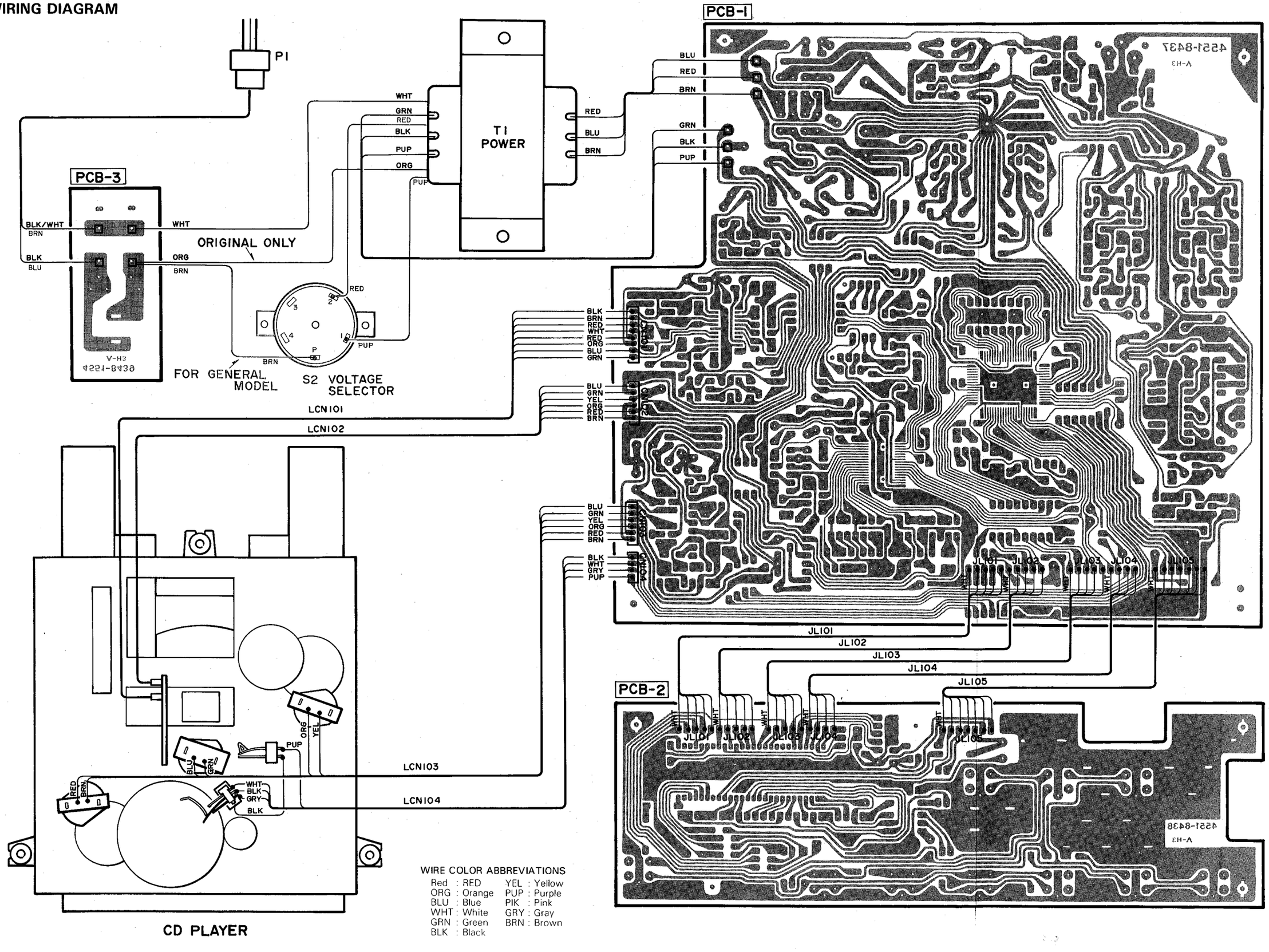


BLOCK DIAGRAM




+5V
+5V
Xtal
8.4672MHz
VR201
IREE
16
XI
XO
15
HF
2
PWM 1.2
IC201
DSP
M50421P
4
C423
5
HFD
EFFK
ACLR
67 DO
69 WDCK
70 LRCK
72 DSCK
EMP
3
+5V
IC202
16KX4
BIT
D-RAM
MSM4416P
15
DE-EMP
SWITCH
DRIVER
Q311 RN1202
Q312 2SA1115
4
IC302 1/2
NJM4560SB
IC301
DA
CONVERTER
YM3020
1
16
VR301
VR302
IC302 1/2
NJM4560SB
+12V
BUFFER
Q302 2SC2603
Q304 2SK246
BUFFER
Q301 2SC2603
Q303 2SK246
DE-
EMP
SWITCH
Q310 2SC2878
DE-
EMP
SWITCH
Q309 2SC2878
Q306 2SA1115
Q308 2SK246
3rd ODER
ACTIVE
L.P.F
3rd ODER
ACTIVE
L.P.F
Q305 2SA1115
Q307 2SK246
MUTE
SWITCH
Q52 2SC2878
MUTE
SWITCH
Q53 2SC2878
OUTPUT
+5V
RESET
C.C.T
Q54 2SA1115
Q55 RN1202
POWER
MUTE SWITCH
DRIVER
Q51 2SA1115
+9V
+5V
Q2 2SC1359
Q4 2SC2603
VOLTAGE
REGULATOR
Q1 2SC2236
Q3 2SA1115
-5V
VOLTAGE
REGULATOR
-9V
+12V
VOLTAGE
REGULATOR
Q5 2SA966
Q6 2SC2603
3 TIMES
VOLT
RECTI-
FIER
AC120V
AC220/240V
FOR GENERAL MODEL
INVERTER
Q401 RN1202
TEST
-24V

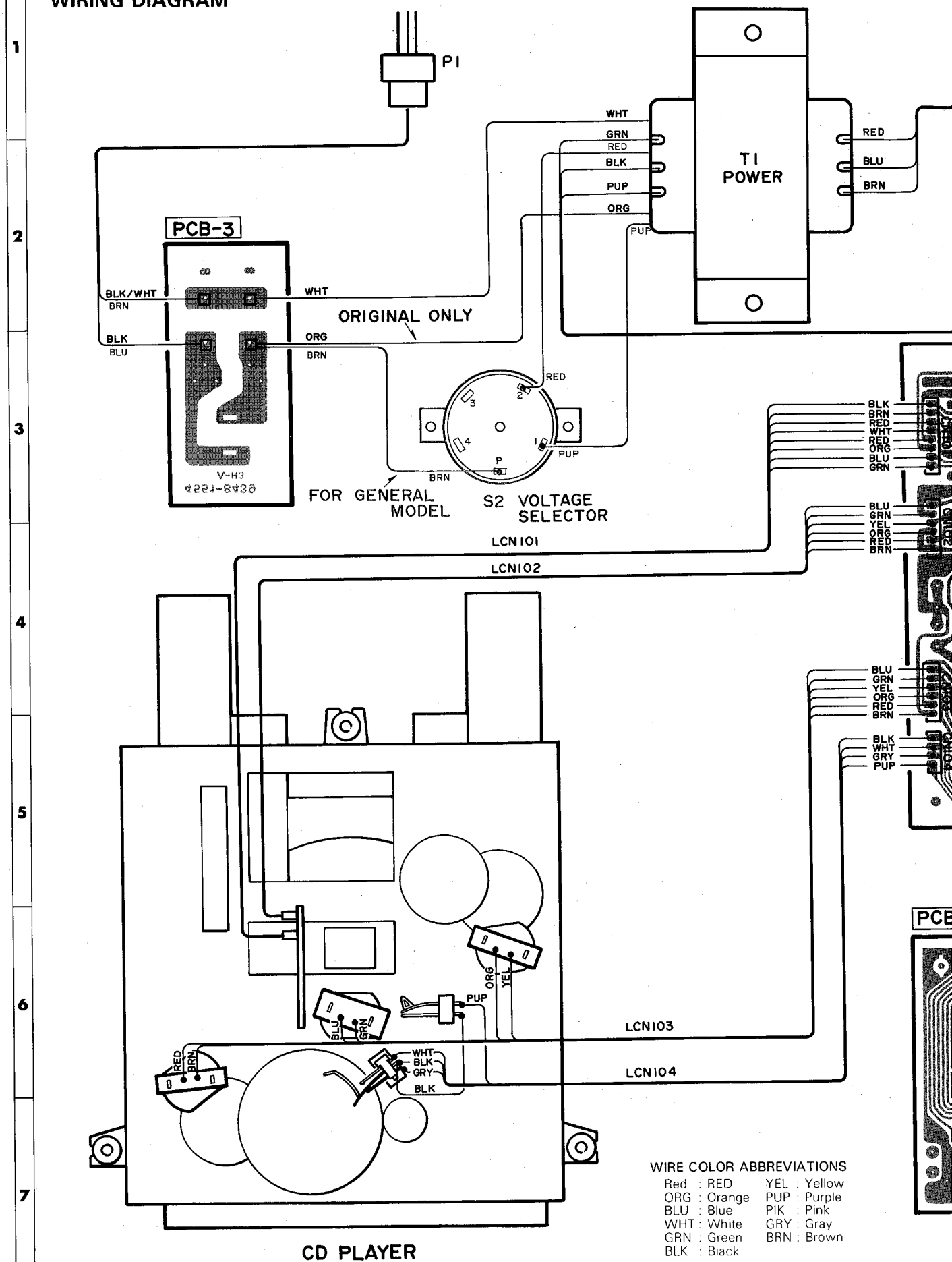
WIRING DIAGRAM



WIRE COLOR ABBREVIATIONS

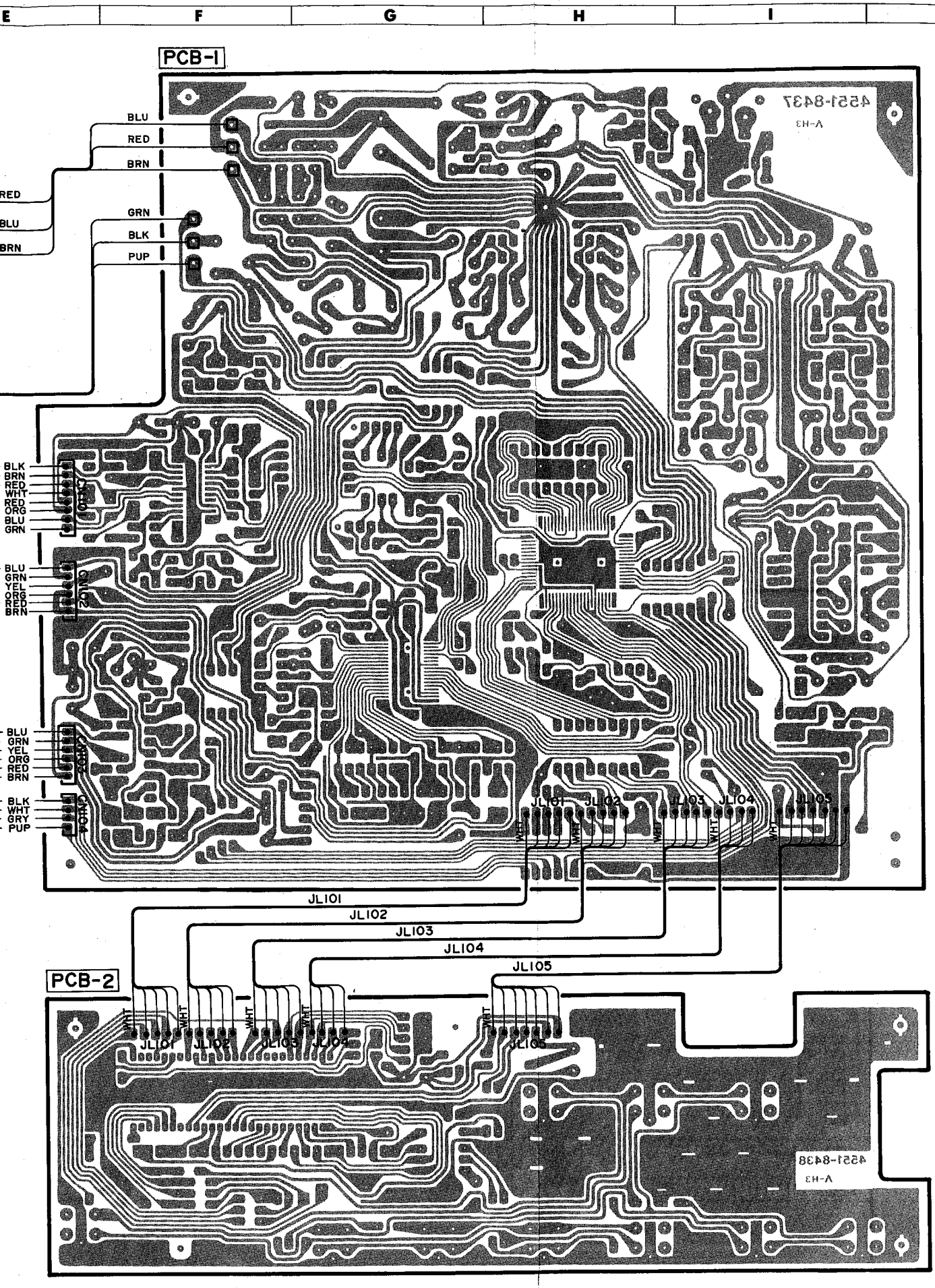
Red	: RED	YEL	: Yellow
ORG	: Orange	PUP	: Purple
BLU	: Blue	PIK	: Pink
WHT	: White	GRY	: Gray
GRN	: Green	BRN	: Brown
BLK	: Black		

WIRING DIAGRAM



WIRE COLOR ABBREVIATIONS

Red	: RED	YEL	: Yellow
ORG	: Orange	PUP	: Purple
BLU	: Blue	PIK	: Pink
WHT	: White	GRY	: Gray
GRN	: Green	BRN	: Brown
BLK	: Black		


E
F
G
H
I
J
PCB-1
BLU
RED
BRN
RED
BLU
BRN
GRN
BLK
PUP
BLK
BRN
RED
WHT
RED
ORG
BLU
GRN
PCN-7
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GRN
YEL
ORG
RED
BRN
PCN-3
BLK
WHT
GRY
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JL105
WHT
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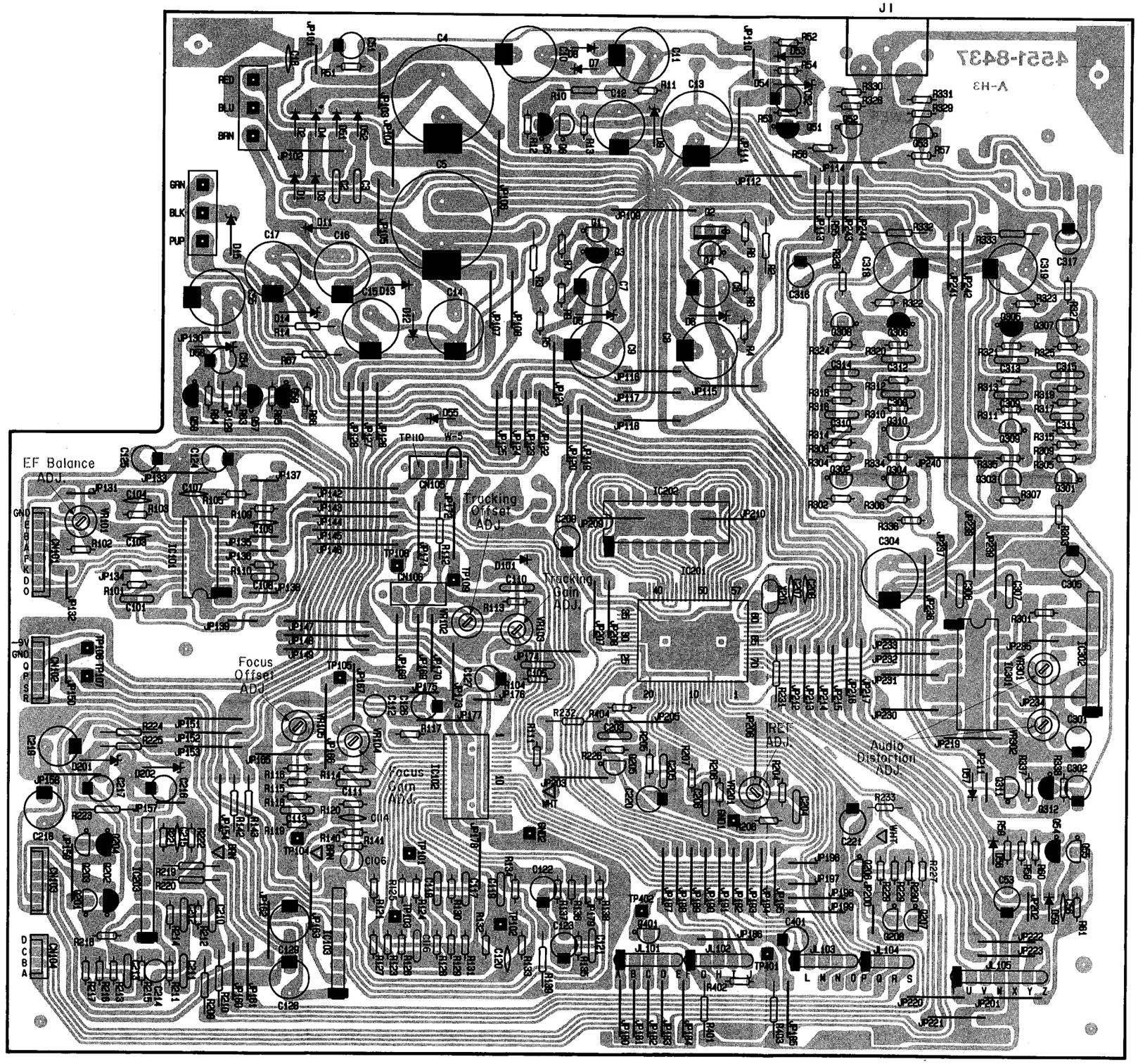
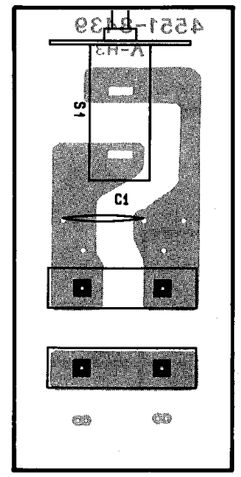
JL101
JL102
JL103
JL104
JL105
WHT
4551-8437
V-H3
4551-8438
V-H3

P. C. BOARDS (1)

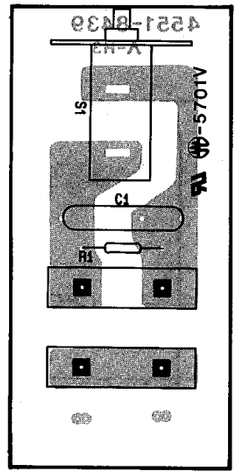
PCB-1 Main P. C. Board



PCB-3 Power Switch

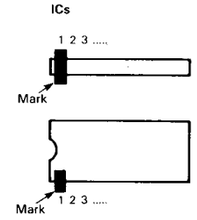


General model

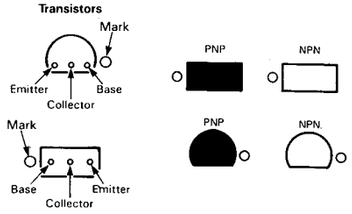


NOTE:
In the figures of the P. C. Boards, a mark is provided on the base side of the transistor.

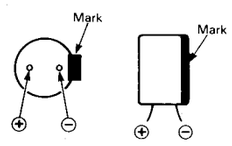
ICs



Transistors

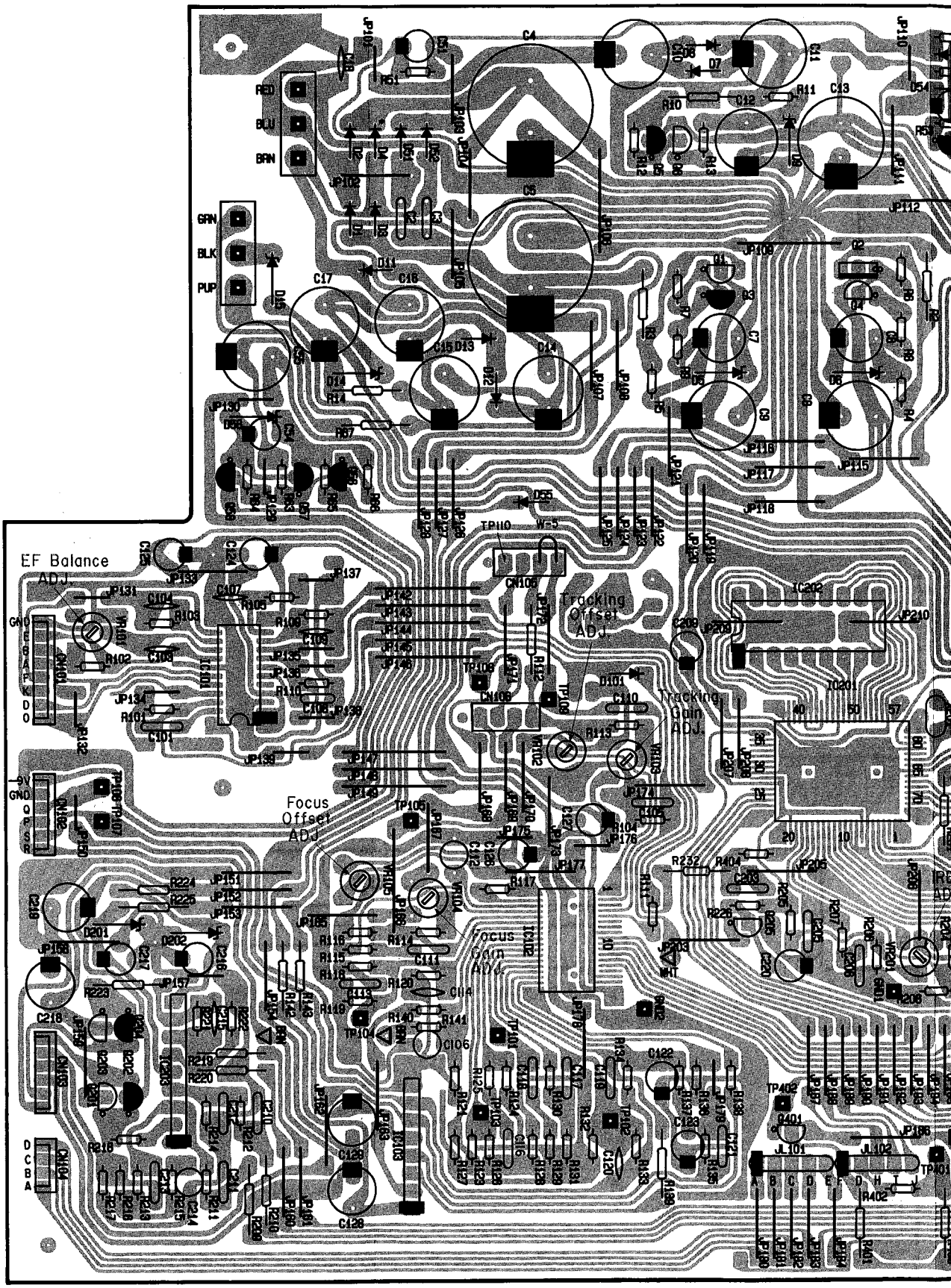


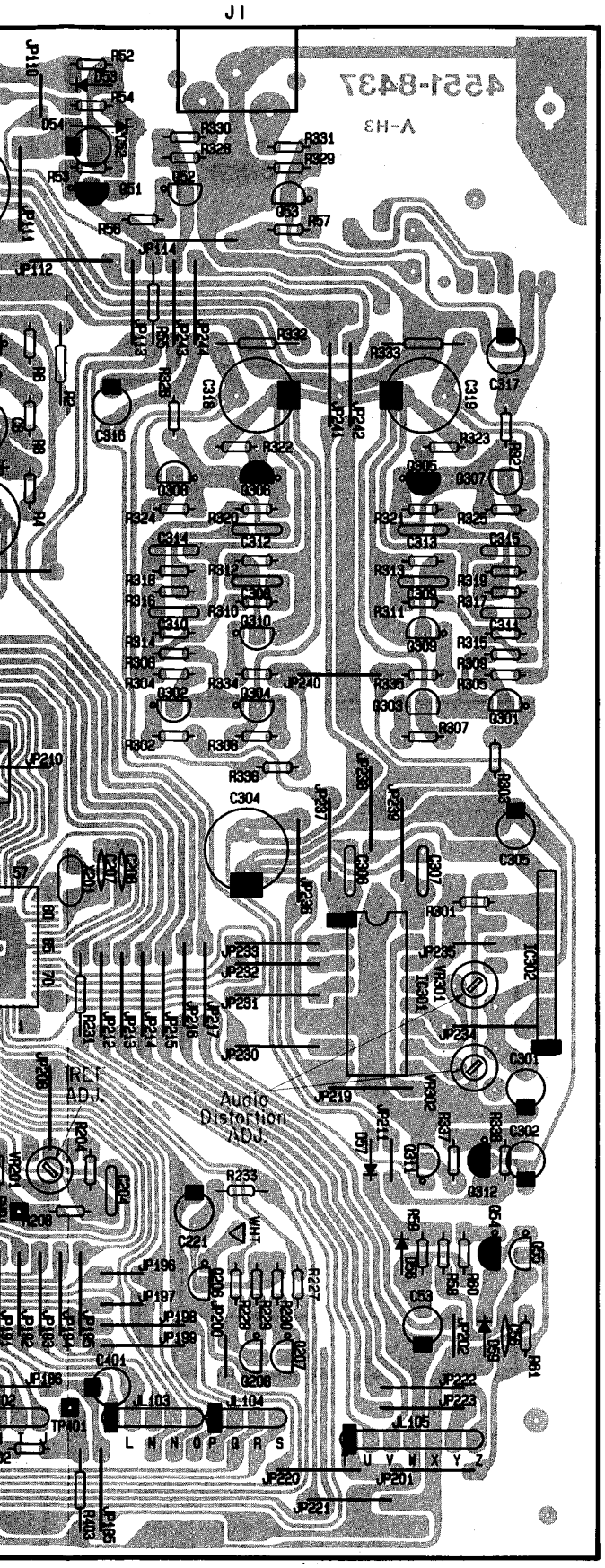
Electrolytic Capacitors



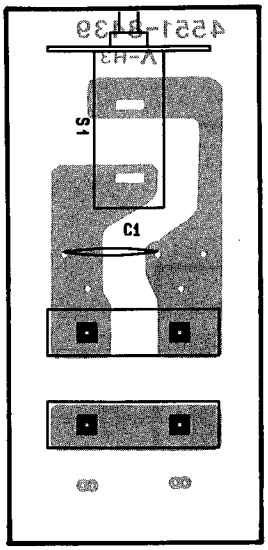
P. C. BOARDS (1)

PCB-1 Main P. C. Board

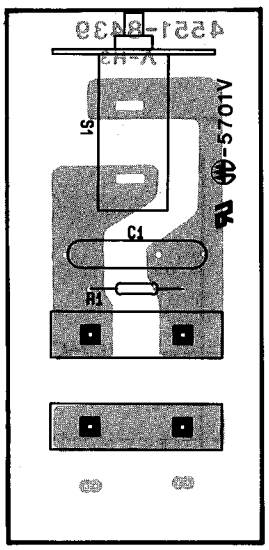




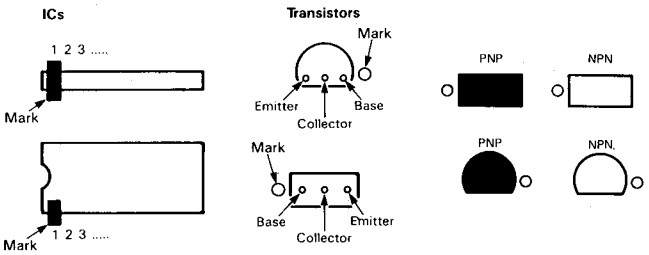
PCB-3 Power Switch



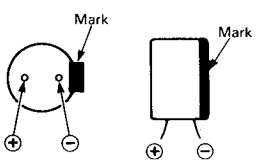
General model



NOTE:
In the figures of the P. C. Boards, a mark is provided on the base side of the transistor.

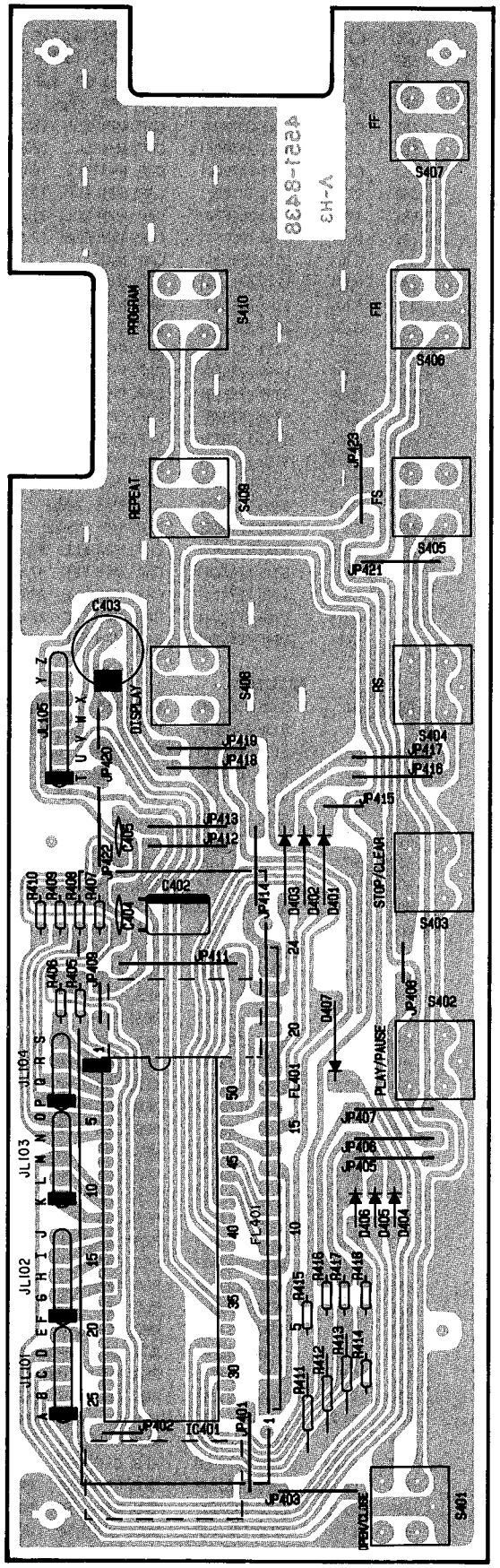


Electrolytic Capacitors

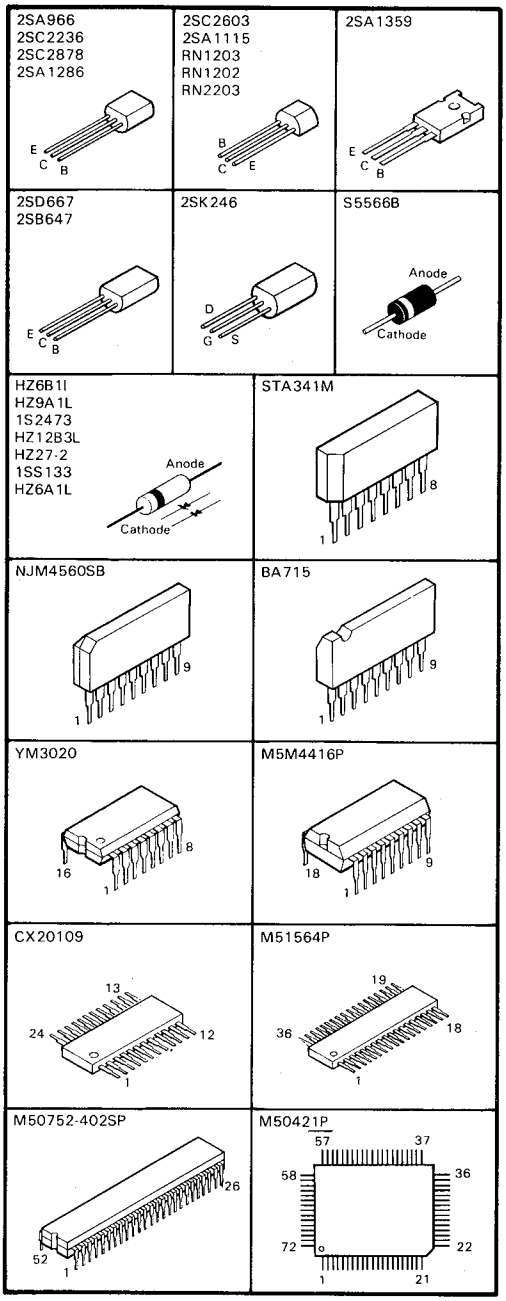


P. C. BOARDS (2)

PCB-2 Control Switches P. C. Board



PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS



ELECTRICAL PARTS LIST

⚠ SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACMENT PART AS SPECIFIED.

SER. No.	Ref. No.	Part. No.	Description
		CHASSIS MISCELLANEOUS	
⚠ 666	PI	4161-01147	CORD W/PLUG (AC CORD) U BK
⚠ 666B	PI	4161-7256	CORD W/PLUG (AC CORD) G
⚠ 666C	PI	4161-7256	CORD W/PLUG (AC CORD) GB
⚠ 683	TI	5584-701548	TRANSFORMER, POWER U BK
⚠ 683B	TI	5584-702548	TRANSFORMER, POWER G
⚠ 683C	TI	5584-702548	TRANSFORMER, POWER GB
	LCN101	A81G-270	6P CONNECTOR W/W (PICK-UP)
	LCN102	A81G-269	8P CONNECTOR W/W (PICK-UP)
676	LCN103	4163-016144	CONNECTOR W/W (MOTOR)
677	LCN104	4163-017144	CONNECTOR W/W (INNER LOD SW)
678	LUGI-5	4211-4	LUG
⚠ 041B	S2	4411-102729	SWITCH, ROTARY G
⚠ 041C	S2	4411-102729	SWITCH, ROTARY GB
DA		**PCB-1 MAIN P. C. BOARD**	
		CAPACITORS	
571	C2	5354-104593	CAP, MYL 0.1μF
571	C3	5354-104593	CAP, MYL 0.1μF
544	C4	5345-478C045	CAP, MINI ELE 4700μF/16V
544	C5	5345-478C045	CAP, MINI ELE 4700μF/16V
549	C6	5345-227A041	CAP, MINI ELE 220μF/6.3V
545	C8	5345-108A041	CAP, MINI ELE 1000μF/6.3V
545	C9	5345-108A041	CAP, MINI ELE 1000μF/6.3V
548	C10	5345-227C041	CAP, MINI ELE 220μF/16V
546	C11	5345-337D041	CAP, MINI ELE 330μF/25V
547	C12	5345-477C041	CAP, MINI ELE 470μF/16V
543	C13	5345-108C041	CAP, MINI ELE 1000μF/16V
548	C14	5345-227C041	CAP, MINI ELE 220μF/16V
550	C15	5345-107E041	CAP, MINI ELE 100μF/35V
550	C16	5345-107E041	CAP, MINI ELE 100μF/35V
550	C17	5345-107E041	CAP, MINI ELE 100μF/35V
565	C18	5361-223ZF	CAP, CER 0.022μF
554	C51	5345-226C041	CAP, MINI ELE 22μF/16V
556	C52	5345-106C041	CAP, MINI ELE 10μF/16V
556	C53	5345-106C041	CAP, MINI ELE 10μF/16V
554	C54	5345-226C041	CAP, MINI ELE 22μF/16V
547	C55	5345-477C041	CAP, MINI ELE 470μF/16V
578	C56	5354-103JIHM	CAP, MYL 0.01μF
578	C101	5354-103JIHM	CAP, MYL 0.01μF
568	C103	5361-680KSL	CAP, CER 68pF
568	C104	5361-680KSL	CAP, CER 68pF
571	C105	5354-104593	CAP, MYL 0.1μF
582	C106	5342-336B041	CAP, MINI BP 33μF/10V
567	C107	5361-470KSL	CAP, CER 47pF
576	C108	5354-333JIHM	CAP, MYL 0.033μF
567	C109	5361-470KSL	CAP, CER 47pF
579	C110	5354-472JIHM	CAP, MYL 4700pF
572	C111	5354-154593	CAP, MYL 0.15μF
564	C112	5342-226B041	CAP, ELE BP 22μF/10V
574	C113	5354-683593	CAP, MYL 0.068μF
591	C114	5361-561KSL	CAP, CER 560pF
573	C116	5354-224593	CAP, MYL 0.22μF
575	C117	5354-273JIHM	CAP, MYL 0.027μF
573	C118	5354-224593	CAP, MYL 0.22μF
567	C119	5361-470KSL	CAP, CER 47pF
583	C120	5359-151585I	CAP, PPP 150pF
577	C121	5354-223JIHM	CAP, MYL 0.022μF
558	C122	5345-335D041	CAP, MINI ELE 3.3μF/25V
554	C123	5345-226C041	CAP, MINI ELE 22μF/16V
551	C124	5345-107B041	CAP, MINI ELE 100μF/10V
551	C125	5345-107B041	CAP, MINI ELE 100μF/10V
551	C126	5345-107B041	CAP, MINI ELE 100μF/10V
551	C127	5345-107B041	CAP, MINI ELE 100μF/10V
561	C128	5345-107C041	CAP, MINI ELE 100μF/16V
561	C129	5345-107C041	CAP, MINI ELE 100μF/16V
586	C203	5359-182585I	CAP, PPP 1800pF
578	C204	5354-103JIHM	CAP, MYL 0.01μF
585	C205	5359-101585I	CAP, PPP 100pF
573	C206	5354-224593	CAP, MYL 0.22μF
566	C207	5361-300JCH	CAP, CER 30pF
566	C208	5361-300JCH	CAP, CER 30pF
555	C209	5345-476B041	CAP, MINI ELE 47μF/10V
578	C210	5354-103JIHM	CAP, MYL 0.01μF
578	C211	5354-103JIHM	CAP, MYL 0.01μF
578	C212	5354-103JIHM	CAP, MYL 0.01μF
580	C213	5354-152JIHM	CAP, MYL 1500pF
563	C214	5342-105F041	CAP, ELE BP 1μF/50V
569	C215	5361-220KSL	CAP, CER 22pF
552	C216	5345-227B041	CAP, MINI ELE 220μF/10V
552	C217	5345-227B041	CAP, MINI ELE 220μF/10V
562	C218	5345-107C041	CAP, MINI ELE 100μF/16V
562	C219	5345-107C041	CAP, MINI ELE 100μF/16V
581	C220	5345-336B041	CAP, MINI ELE 33μF/10V
556	C301	5345-106C041	CAP, MINI ELE 10μF/16V
558	C302	5345-335D041	CAP, MINI ELE 3.3μF/25V
547	C304	5345-477C041	CAP, MINI ELE 470μF/16V
554	C305	5345-226C041	CAP, MINI ELE 22μF/16V
587	C306	5359-332585I	CAP, PPP 3300pF
587	C307	5359-332585I	CAP, PPP 3300pF
590	C308	5359-223585I	CAP, PPP 0.022μF
590	C309	5359-223585I	CAP, PPP 0.022μF
589	C310	5359-152585I	CAP, PPP 1500pF
589	C311	5359-152585I	CAP, PPP 1500pF
588	C312	5359-392585I	CAP, PPP 3900pF
588	C313	5359-392585I	CAP, PPP 3900pF
584	C314	5359-221585I	CAP, PPP 220pF
584	C315	5359-221585I	CAP, PPP 220pF
553	C316	5345-476C951	CAP, MINI ELE 47μF/16V
553	C317	5345-476C095I	CAP, MINI ELE 47μF/16V
548	C318	5345-227C041	CAP, MINI ELE 220μF/16V
548	C319	5345-227C041	CAP, MINI ELE 220μF/16V
557	C401	5345-105F041	CAP, MINI ELE 1μF/50V
		RESISTORS	
⚠ 042B	RI	5135-335J50P	RES, CBN 1/2P G
⚠ 042C	RI	5135-335J50P	RES, CBN 1/2P GB
⚠ 601	R2	5102-1004715	RES, FUSE 10Ω
⚠ 601	R3	5102-1004715	RES, FUSE 10Ω
614	R4	5232-152J16P	RES, CBN 1/6P 1.5kΩ
614	R5	5232-152J16P	RES, CBN 1/6P 1.5kΩ
610	R6	5232-471J16P	RES, CBN 1/6P 470Ω
610	R7	5232-471J16P	RES, CBN 1/6P 470Ω
606	R8	5232-101J16P	RES, CBN 1/6P 100Ω
606	R9	5232-101J16P	RES, CBN 1/6P 100Ω
⚠ 601	R10	5102-1004715	RES, FUSE 10Ω
617	R11	5232-332J16P	RES, CBN 1/6P 3.3kΩ
610	R12	5232-471J16P	RES, CBN 1/6P 470Ω
606	R13	5232-101J16P	RES, CBN 1/6P 100Ω
⚠ 603	R14	5102-1514715	RES, FUSE 150Ω
614	R51	5232-152J16P	RES, CBN 1/6P 1.5kΩ
637	R52	5232-564J16P	RES, CBN 1/6P 560kΩ
633	R53	5232-104J16P	RES, CBN 1/6P 100kΩ
614	R54	5232-152J16P	RES, CBN 1/6P 1.5kΩ
649	R55	5135-154583	RES, CBN 1/2P 150kΩ
615	R56	5232-182J16P	RES, CBN 1/6P 1.8kΩ
615	R57	5232-182J16P	RES, CBN 1/6P 1.8kΩ
622	R58	5232-103J16P	RES, CBN 1/6P 10kΩ
634	R59	5232-274J16P	RES, CBN 1/6P 270kΩ
633	R60	5232-104J16P	RES, CBN 1/6P 100kΩ
622	R61	5232-103J16P	RES, CBN 1/6P 10kΩ
625	R63	5232-223J16P	RES, CBN 1/6P 22kΩ
616	R64	5232-222J16P	RES, CBN 1/6P 2.2kΩ
629	R65	5232-473J16P	RES, CBN 1/6P 47kΩ
622	R66	5232-103J16P	RES, CBN 1/6P 10kΩ
⚠ 601	R67	5102-1004715	RES, FUSE 10Ω
628	R101	5232-393J16P	RES, CBN 1/6P 39kΩ
633	R102	5232-104J16P	RES, CBN 1/6P 100kΩ
635	R103	5232-154J16P	RES, CBN 1/6P 150kΩ
633	R104	5232-104J16P	RES, CBN 1/6P 100kΩ
628	R105	5232-393J16P	RES, CBN 1/6P 39kΩ
628	R109	5232-393J16P	RES, CBN 1/6P 39kΩ
622	R110	5232-103J16P	RES, CBN 1/6P 10kΩ
611	R111	5232-102J16P	RES, CBN 1/6P 1kΩ
644	R112	5135-822583	RES, CBN 1/2P 8.2kΩ
636	R113	5232-224J16P	RES, CBN 1/6P 220kΩ

⚠ SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACMENT PART AS SPECIFIED.

SER. No.	Ref. No.	Part. No.	Description
629	R114	5232-473J16P	RES, CBN 1/6P 47kΩ
629	R115	5232-473J16P	RES, CBN 1/6P 47kΩ
638	R116	5232-105J16P	RES, CBN 1/6P 1MΩ
629	R117	5232-473J16P	RES, CBN 1/6P 47kΩ
613	R118	5232-331J16P	RES, CBN 1/6P 330Ω
618	R119	5232-472J16P	RES, CBN 1/6P 4.7kΩ
631	R120	5232-683J16P	RES, CBN 1/6P 68kΩ
614	R121	5232-152J16P	RES, CBN 1/6P 1.5kΩ
629	R123	5232-473J16P	RES, CBN 1/6P 47kΩ
632	R124	5232-823J16P	RES, CBN 1/6P 82kΩ
624	R125	5232-153J16P	RES, CBN 1/6P 15kΩ
629	R126	5232-473J16P	RES, CBN 1/6P 47kΩ
623	R127	5232-123J16P	RES, CBN 1/6P 12kΩ
627	R128	5232-333J16P	RES, CBN 1/6P 33kΩ
627	R129	5232-333J16P	RES, CBN 1/6P 33kΩ
611	R130	5232-102J16P	RES, CBN 1/6P 1kΩ
611	R131	5232-102J16P	RES, CBN 1/6P 1kΩ
626	R132	5232-273J16P	RES, CBN 1/6P 27kΩ
627	R133	5232-333J16P	RES, CBN 1/6P 33kΩ
628	R134	5232-393J16P	RES, CBN 1/6P 39kΩ
631	R135	5232-683J16P	RES, CBN 1/6P 68kΩ
620	R136	5232-562J16P	RES, CBN 1/6P 5.6kΩ
625	R137	5232-223J16P	RES, CBN 1/6P 22kΩ
605	R138	5232-470J16P	RES, CBN 1/6P 47Ω
640	R139	5135-470583	RES, CBN 1/2P 47Ω
605	R140	5232-470J16P	RES, CBN 1/6P 47Ω
611	R141	5232-102J16P	RES, CBN 1/6P 1kΩ
⚠ 600	R142	5102-4R74715	RES, FUSE 4.7Ω
⚠ 600	R143	5102-4R74715	RES, FUSE 4.7Ω
627	R204	5232-333J16P	RES, CBN 1/6P 33kΩ
615	R205	5232-182J16P	RES, CBN 1/6P 1.8kΩ
619	R206	5232-512J16P	RES, CBN 1/6P 5.1kΩ
622	R207	5232-103J16P	RES, CBN 1/6P 10kΩ
638	R208	5232-105J16P	RES, CBN 1/6P 1MΩ
648	R209	5135-823583	RES, CBN 1/2P 82kΩ
648	R210	5135-823583	RES, CBN 1/2P 82kΩ
637	R211	5232-564J16P	RES, CBN 1/6P 560kΩ
637	R212	5232-564J16P	RES, CBN 1/6P 560kΩ
630	R213	5232-563J16P	RES, CBN 1/6P 56kΩ
631	R214	5232-683J16P	RES, CBN 1/6P 68kΩ
626	R215	5232-273J16P	RES, CBN 1/6P 27kΩ
623	R216	5232-123J16P	RES, CBN 1/6P 12kΩ
604	R217	5232-2R2J16P	RES, CBN 1/6P 2.2Ω
605	R218	5232-470J16P	RES, CBN 1/6P 47Ω
647	R219	5135-104583	RES, CBN 1/2P 100kΩ
647	R220	5135-104583	RES, CBN 1/2P 100kΩ
639	R221	5232-124J16P	RES, CBN 1/6P 120kΩ
639	R222	5232-124J16P	RES, CBN 1/6P 120kΩ
640	R223	5135-470583	RES, CBN 1/2P 47Ω
⚠ 602	R224	5102-1014715	RES, FUSE 100Ω
⚠ 602	R225	5102-1014715	RES, FUSE 100Ω
627	R226	5232-333J16P	RES, CBN 1/6P 33kΩ
643	R227	5232-183583	RES, CBN 1/6P 18kΩ
643	R228	5232-183583	RES, CBN 1/6P 18kΩ
633	R229	5232-104J16P	RES, CBN 1/6P 100kΩ
633	R230	5232-104J16P	RES, CBN 1/6P 100kΩ
650	R232	5135-102583	RES, CBN 1/2P 1kΩ
633	R233	5232-104J16P	RES, CBN 1/6P 100kΩ
609	R301	5232-181J16P	RES, CBN 1/6P 180Ω
610	R302	5232-471J16P	RES, CBN 1/6P 470Ω
610	R303	5232-471J16P	RES, CBN 1/6P 470Ω
608	R304	5232-221J16P	RES, CBN 1/6P 220Ω
608	R305	5232-221J16P	RES, CBN 1/6P 220Ω
606	R306	5232-101J16P	RES, CBN 1/6P 100Ω
606	R307	5232-101J16P	RES, CBN 1/6P 100Ω
612	R308	5232-122J16P	RES, CBN 1/6P 1.2kΩ
612	R309	5232-122J16P	RES, CBN 1/6P 1.2kΩ
621	R310	5232-391J16P	RES, CBN 1/6P 390Ω
621	R311	5232-391J16P	RES, CBN 1/6P 390Ω
638	R312	5232-105J16P	RES, CBN 1/6P 1MΩ
638	R313	5232-105J16P	RES, CBN 1/6P 1MΩ
616	R314	5232-222J16P	RES, CBN 1/6P 2.2kΩ
616	R315	5232-222J16P	RES, CBN 1/6P 2.2kΩ
618	R316	5232-472J16P	RES, CBN 1/6P 4.7kΩ
618	R317	5232-472J16P	RES, CBN 1/6P 4.7kΩ
618	R318	5232-472J16P	RES, CBN 1/6P 4.7kΩ
618	R319	5232-472J16P	RES, CBN 1/6P 4.7kΩ
613	R320	5232-331J16P	RES, CBN 1/6P 330Ω
613	R321	5232-331J16P	RES, CBN 1/6P 330Ω
608	R322	5232-221J16P	RES, CBN 1/6P 220Ω
608	R323	5232-221J16P	RES, CBN 1/6P 220Ω
606	R324	5232-101J16P	RES, CBN 1/6P 100Ω
606	R325	5232-101J16P	RES, CBN 1/6P 100Ω
608	R326	5232-221J16P	RES, CBN 1/6P 220Ω
608	R327	5232-221J16P	RES, CBN 1/6P 220Ω
622	R328	5232-103J16P	RES, CBN 1/6P 10kΩ
622	R329	5232-103J16P	RES, CBN 1/6P 10kΩ
⚠ 602	R330	5102-1014715	RES, FUSE 100Ω
⚠ 602	R331	5102-1014715	RES, FUSE 100Ω
641	R332	5135-4R7583	RES, CBN 1/2P 4.7Ω
641	R333	5135-4R7583	RES, CBN 1/2P 4.7Ω
618	R334	5232-472J16P	RES, CBN 1/6P 4.7kΩ
618	R335	5232-472J16P	RES, CBN 1/6P 4.7kΩ
635	R336	5232-154J16P	RES, CBN 1/6P 150kΩ
632	R337	5232-823J16P	RES, CBN 1/6P 82kΩ
627	R338	5232-333J16P	RES, CBN 1/6P 33kΩ
642	R401	5135-103583	RES, CBN 1/2P 10kΩ
606	R402	5232-101J16P	RES, CBN 1/6P 100Ω
645	R403	5135-473583	RES, CBN 1/2P 47kΩ
629	R404	5232-473J16P	RES, CBN 1/6P 47kΩ

CONTROLS

597	VR101	5101-10401938	RES, SEMI FIX 100kΩB
598	VR102	5101-10301937	RES, SEMI FIX 10kΩB
596	VR103	5101-10301938	RES, SEMI FIX 10kΩB
598	VR104	5101-10301937	RES, SEMI FIX 10kΩB
598	VR105	5101-10301937	RES, SEMI FIX 10kΩB
597	VR201	5101-10401938	RES, SEMI FIX 100kΩB
595	VR301	5101-20101937	RES, SEMI FIX 200Ω
595	VR302	5101-20101937	RES, SEMI FIX 200Ω

INTEGRATED CIRCUIT

507	IC101	5653-CX20109	IC, LINEAR CX20109
502	IC102	5654-M51564P	IC, DIGITAL M51564P
508	IC103	5653-STA341M	IC, LINEAR STA341M
503	IC201	5654-M50421P	IC, DIGITAL M50421P
504	IC202	5654-M5M4416P	IC, DIGITAL M5M4416P
511	IC203	5653-BA715	IC, LINEAR BA715
505	IC301	5654-YM3020	IC, DIGITAL YM3020
509	IC302	5653-NJ4560SB	IC, LINEAR NJM4560SB

TRANSISTORS

520	Q1	5613-2236(Y)	TRANSISTOR, NPN R 2SC2236(Y)
514	Q2	5611-1359(Y)	TRANSISTOR, PAP R 2SA1359(Y)
513	Q3	5611-1115(F)	TRANSISTOR, PNP R 2SA1115 (F)OR(E)
519	Q4	5613-2603(F)	TRANSISTOR, NPN R 2SC2603 (F)OR(E)
515	Q5	5611-966(Y)	TRANSISTOR, PNP R 2SA966(Y)
519	Q6	5613-2603(F)	TRANSISTOR, NPN R 2SC2603 (F)OR(E)
513	Q51	5611-1115(F)	TRANSISTOR, PNP R 2SA1115 (F)OR(E)
522	Q52	5613-2878(B)	TRANSISTOR, NPN R 2SC2878(B)
522	Q53	5613-2878(B)	TRANSISTOR, NPN R 2SC2878(B)
513	Q54	5611-1115(F)	TRANSISTOR, PNP R 2SA1115 (F)OR(E)
521	Q55	5613-RN1202	TRANSISTOR, NPN R RN1202
513	Q56	5611-1115(F)	TRANSISTOR, PNP R 2SA1115 (F)OR(E)
513	Q57	5611-1115(F)	TRANSISTOR, PNP R 2SA1115 (F)OR(E)
517	Q58	5611-1286(H)	TRANSISTOR, PNP R 2SA1286(H)
524	Q201	5614-667(C)	TRANSISTOR, NPN A 2SD667(C)
518	Q202	5612-647(C)	TRANSISTOR, PNP A 2SB647(C)
524	Q203	5614-667(C)	TRANSISTOR, NPN A 2SD667(C)
518	Q204	5612-647(C)	TRANSISTOR, PNP A 2SB647(C)
521	Q205	5613-RN1202	TRANSISTOR, NPN R RN1202
521	Q206	5613-RN1202	TRANSISTOR, NPN R RN1202

SER. No.	Ref. No.	Part. No.	Description
519	Q207	5613-2603(F)	TRANSISTOR, NPN R 2SC2603 (F)OR(E)
519	Q208	5613-2603(F)	TRANSISTOR, NPN R 2SC2603 (F)OR(E)
519	Q301	5613-2603(F)	TRANSISTOR, NPN R 2SC2603 (F)OR(E)
519	Q302	5613-2603(F)	TRANSISTOR, NPN R 2SC2603 (F)OR(E)
526	Q303	5616-2SK246GR	FET, N-CH 2SK246(GR)
526	Q304	5616-2SK246GR	FET, N-CH 2SK246(GR)
513	Q305	5611-1115(F)	TRANSISTOR, PNP R 2SA1115 (F)OR(E)
513	Q306	5611-1115(F)	TRANSISTOR, PNP R 2SA1115 (F)OR(E)
526	Q307	5616-2SK246GR	FET, N-CH 2SK246(GR)
526	Q308	5616-2SK246GR	FET, N-CH 2SK246(GR)
522	Q309	5613-2878(B)	TRANSISTOR, NPN R 2SC2878(B)
522	Q310	5613-2878(B)	TRANSISTOR, NPN R 2SC2878(B)
521	Q311	5613-RN1202	TRANSISTOR, NPN R RN1202
513	Q312	5611-1115(F)	TRANSISTOR, PNP R 2SA1115 (F)OR(E)
521	Q401	5613-RN1202	TRANSISTOR, NPN R RN1202
		DIODES	
531	D1	5632-S5566B	DIODE, RECT S5566B
531	D2	5632-S5566B	DIODE, RECT S5566B
531	D3	5632-S5566B	DIODE, RECT S5566B
531	D4	5632-S5566B	DIODE, RECT S5566B
540	D5	5635-HZ6B1L	DIODE, ZENER HZ6B1L
540	D6	5635-HZ6B1L	DIODE, ZENER HZ6B1L
531	D7	5632-S5566B	DIODE, RECT S5566B
531	D8	5632-S5566B	DIODE, RECT S5566B
539	D9	5635-HZ12B3L	DIODE, ZENER HZ12B3L
531	D11	5632-S5566B	DIODE, RECT S5566B
531	D12	5632-S5566B	DIODE, RECT S5566B
531	D13	5632-S5566B	DIODE, RECT S5566B
537	D14	5635-HZ27-2	DIODE, ZENER HZ27-2
538	D15	5635-HZ5B-2	DIODE, ZENER HZ5B-2
531	D51	5632-S5566B	DIODE, RECT S5566B
531	D52	5632-S5566B	DIODE, RECT S5566B
533	D53	5631-1SS133	DIODE, DET 1SS133
541	D54	5635-HZ6A1L	DIODE, ZENER HZ6A1L
533	D55	5631-1SS133	DIODE, DET 1SS133
533	D56	5631-1SS133	DIODE, DET 1SS133
533	D57	5631-1SS133	DIODE, DET 1SS133
542	D58	5635-HZ9A1L	DIODE, ZENER HZ9A1L
533	D59	5631-1SS133	DIODE, DET 1SS133
533	D101	5631-1SS133	DIODE, DET 1SS133
542	D201	5635-HZ9A1L	DIODE, ZENER HZ9A1L
542	D202	5635-HZ9A1L	DIODE, ZENER HZ9A1L
		COILS	
656	L101	5995-221098	COIL W/CORE 220μH
		MISCELLANEOUS	
664	J1	4482-0131	PIN JACK, 2P OUTPUT
528	X201	5691-0084673I	CRYSTAL, OSC
672	CN101	4443-0801140	CONNECTOR 8 POS.
671	CN102	4443-0601140	CONNECTOR 6 POS.
671	CN103	4443-0601140	CONNECTOR 6 POS.
670	CN104	4443-0401140	CONNECTOR 4 POS.
669	CN105	4443-040185	CONNECTOR 4 POS.
669	CN106	4443-040185	CONNECTOR 4 POS.
687		4214-11031	TERMINAL
686		4214-132	TERMINAL

DB **PCB-2 CONTROL SWITCHES P.C. BOARD**

		CAPACITORS	
559	C402	5345-226A0961	CAP, MINI ELE 22μF/6.3V
560	C403	5345-226E0961	CAP, MINI ELE 22μF/35V
570	C404	5361-102KSL	CAP, CER 1000pF
570	C405	5361-102KSL	CAP, CER 1000pF

⚠ SAFETY RELATED COMPONENT. USE ONLY EXACT REPLACMENT PART AS SPECIFIED.

SER. No.	Ref. No.	Part. No.	Description
		RESISTORS	
652	R405	5232-103J16P	RES, CBN 1/6P 10kΩ
652	R406	5232-103J16P	RES, CBN 1/6P 10kΩ
652	R407	5232-103J16P	RES, CBN 1/6P 10kΩ
652	R408	5232-103J16P	RES, CBN 1/6P 10kΩ
652	R409	5232-103J16P	RES, CBN 1/6P 10kΩ
652	R410	5232-103J16P	RES, CBN 1/6P 10kΩ
654	R411	5135-103583	RES, CBN 1/2P 10kΩ
654	R412	5135-103583	RES, CBN 1/2P 10kΩ
654	R413	5135-103583	RES, CBN 1/2P 10kΩ
652	R414	5232-103J16P	RES, CBN 1/6P 100kΩ
651	R415	5232-101J16P	RES, CBN 1/6P 100Ω
651	R416	5232-101J16P	RES, CBN 1/6P 100Ω
651	R417	5232-101J16P	RES, CBN 1/6P 100Ω
651	R418	5232-101J16P	RES, CBN 1/6P 100Ω
		INTEGRATED CIRCUITS	
501	IC401	5654-M752-402	IC, DIGITAL M50752-402SP
		DIODES	
535	D401	5631-1S2473	DIODE, DET 1S2473
535	D402	5631-1S2473	DIODE, DET 1S2473
535	D403	5631-1S2473	DIODE, DET 1S2473
534	D404	5631-1SS133	DIODE, DET 1SS133
534	D405	5631-1SS133	DIODE, DET 1SS133
534	D406	5631-1SS133	DIODE, DET 1SS133
535	D407	5631-1S2473	DIODE, DET 1S2473
		MISCELLANEOUS	
660	S401	4431-A017240	SWITCH, PUSH OPEN/CLOSE
660	S402	4431-A017240	SWITCH, PUSH PLAY/PAUSE
660	S403	4431-A017240	SWITCH, PUSH STOP/CLEAR
660	S404	4431-A017240	SWITCH, PUSH SKIP (BACKWARD)
660	S405	4431-A017240	SWITCH, PUSH SKIP (FORWARD)
660	S406	4431-A017240	SWITCH, PUSH REVERSE
660	S407	4431-A017240	SWITCH, PUSH FAST-FORWARD
661	S408	4431-A017169	SWITCH, PUSH DISPLAY
661	S409	4431-A017169	SWITCH, PUSH REPEAT
661	S410	4431-A017169	SWITCH, PUSH PROGRAM
658	FL401	5722-26	TUBE DISPLAY
680	JL101	4242-R0105181	JUMPER LEAD
680	JL102	4242-R0105181	JUMPER LEAD
680	JL103	4242-R0105181	JUMPER LEAD
681	JL104	4242-R0104181	JUMPER LEAD
679	JL105	4242-R0107181	JUMPER LEAD

DC **PCB-3 POWER SWITCH P. C. BOARD**

			CAPACITORS	
⚠	593	C1	5361-1030419	CAP, CER 0.01μF (U) (BK)
⚠	593B	C1	5352-1030958	CAP, MTL (G)
⚠	593C	C1	5352-1030958	CAP, MTL (GB)
			MISCELLANEOUS	
⚠	662	S1	4431-A01056	SWITCH, PUSH POWER
	685		4214-11024	TERMINAL

NOTES

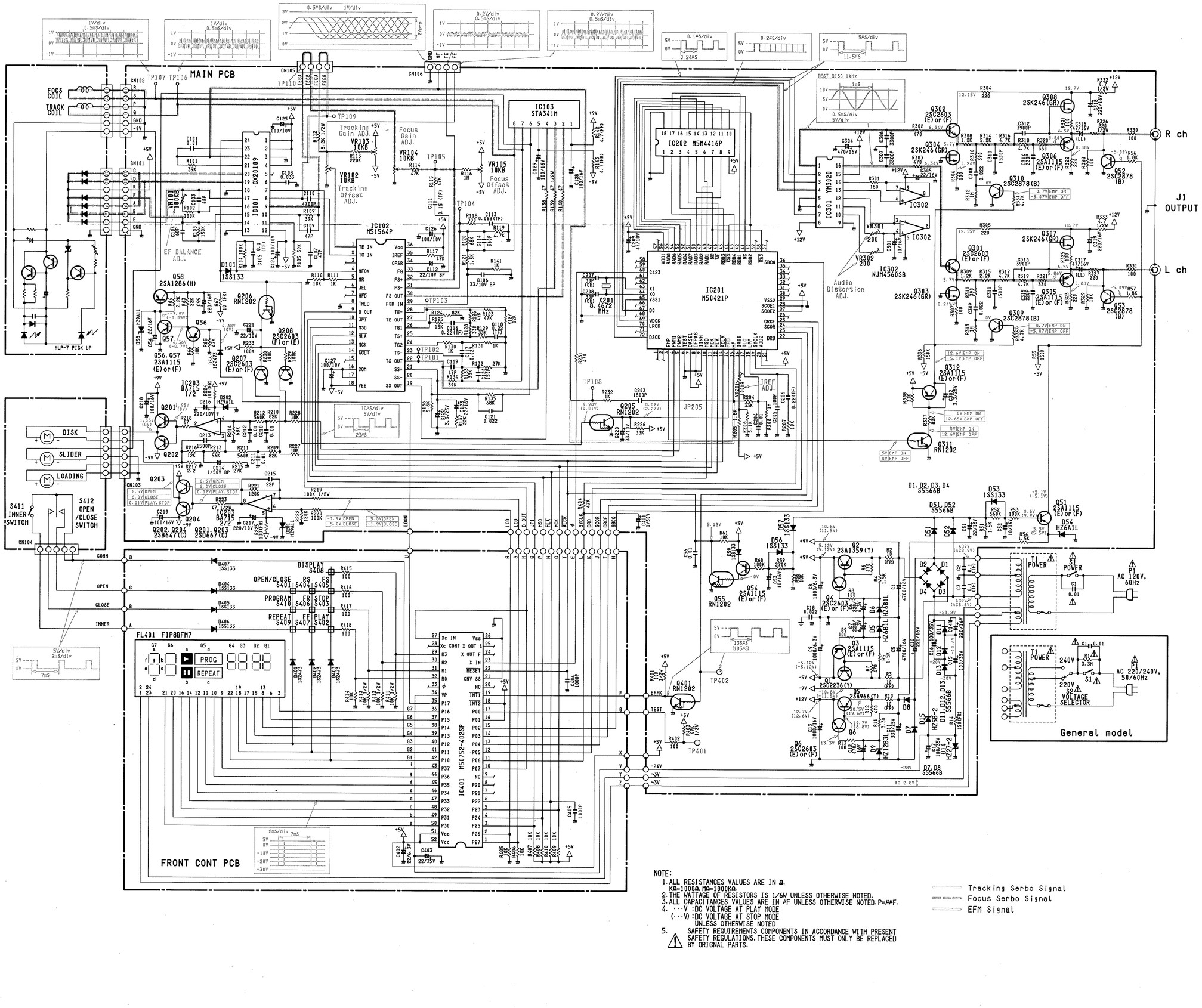
Parts with the following marks are used only in the models intended for particular markets:

- (U) :U.S.A. model
- (BK) :U.S.A. model Black Version
- (G) :General model
- (GB) :General model Black Version

KEY TO ABBREVIATIONS

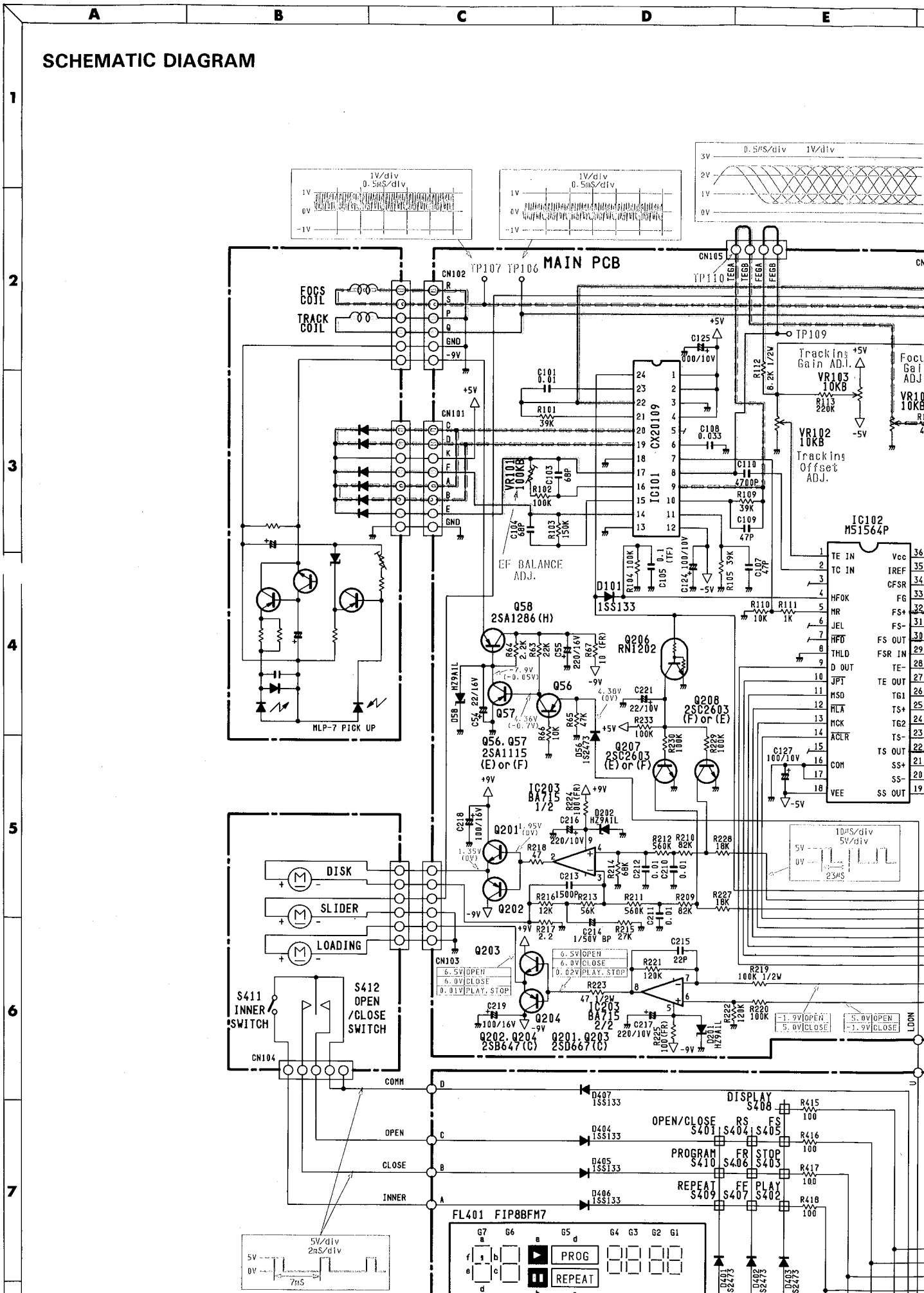
Capacitors		Resistors	
CAP, MYL	: Mylar	RES, CBN	: Carbon
CAP, MINI ELE	: Electrolytic	RES, FUSE	: Fuse
CAP, CER	: Ceramic		
CAP, MINI BP	: Bipolar		
CAP, ELE BP	: Electrolytic Bipolar		
CAP, PPP	: Polypropylene		

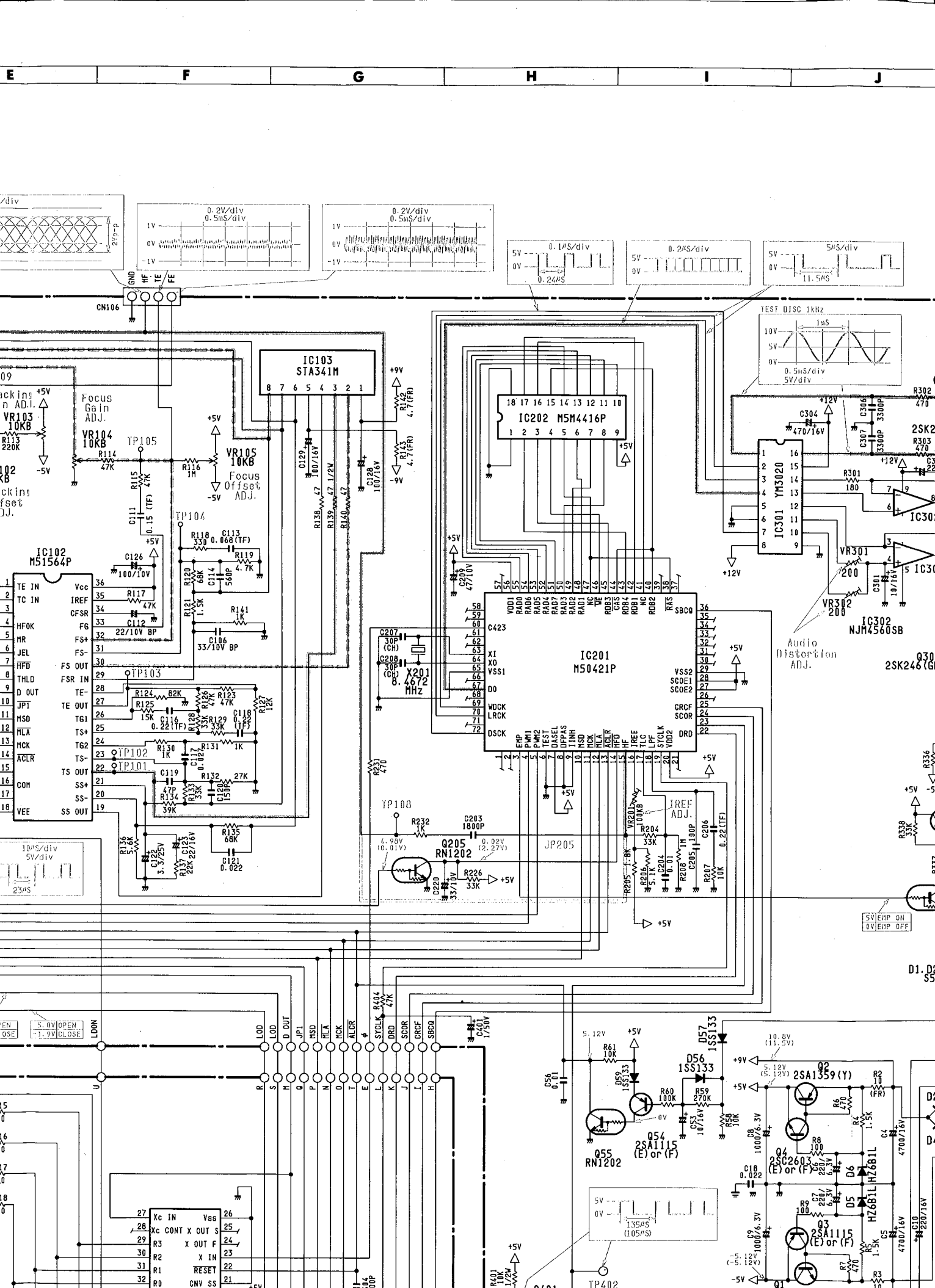
SCHEMATIC DIAGRAM



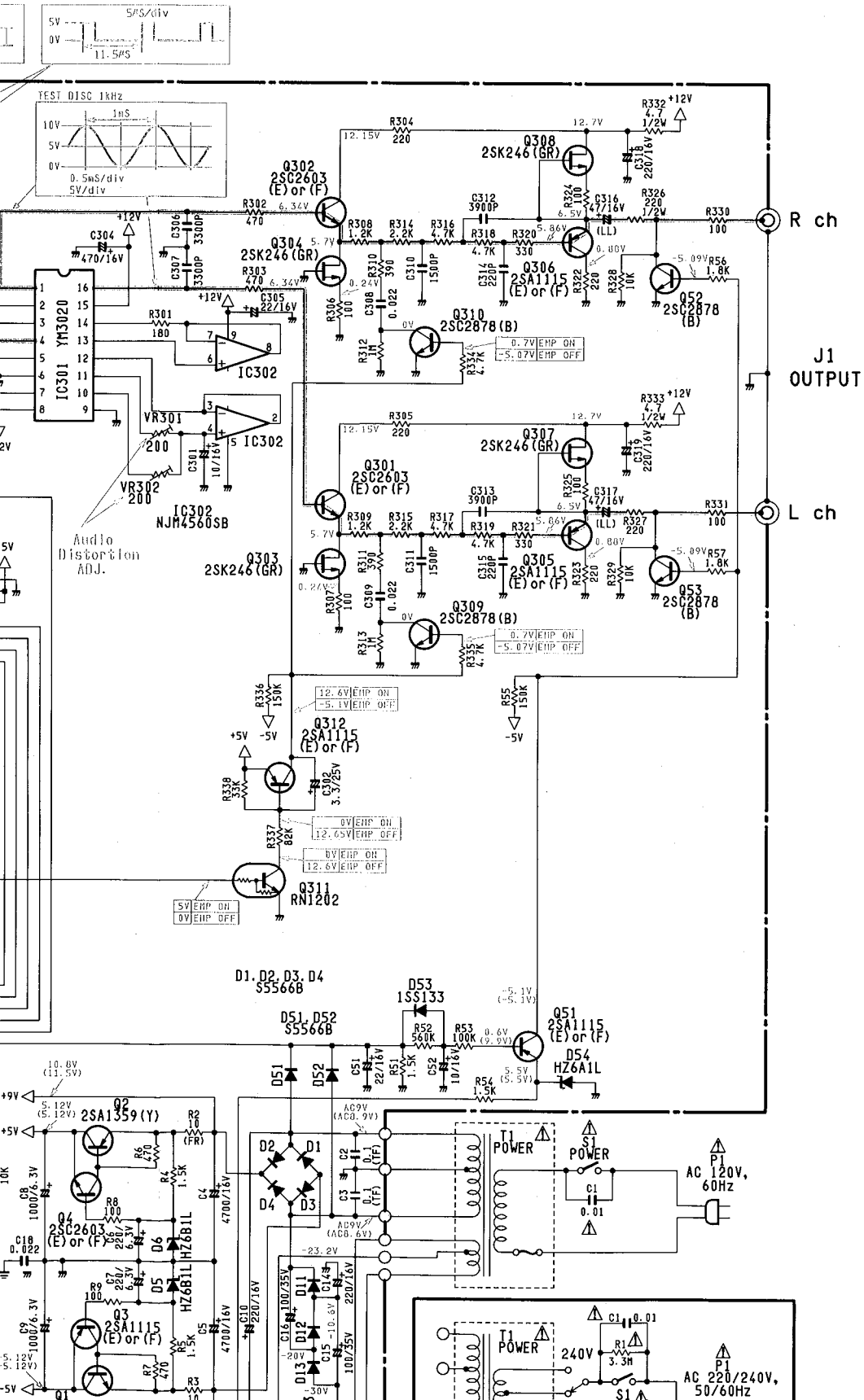
NOTE:
1. ALL RESISTANCES VALUES ARE IN Ω.
   KΩ=1000Ω, MΩ=1000KΩ.
2. THE WATTAGE OF RESISTORS IS 1/6W UNLESS OTHERWISE NOTED.
3. ALL CAPACITANCES VALUES ARE IN μF UNLESS OTHERWISE NOTED. P=μμF.
4. ···V :DC VOLTAGE AT PLAY MODE
   (···V) :DC VOLTAGE AT STOP MODE
   UNLESS OTHERWISE NOTED
5. ⚠ SAFETY REQUIREMENTS COMPONENTS IN ACCORDANCE WITH PRESENT SAFETY REGULATIONS. THESE COMPONENTS MUST ONLY BE REPLACED BY ORIGNAL PARTS.

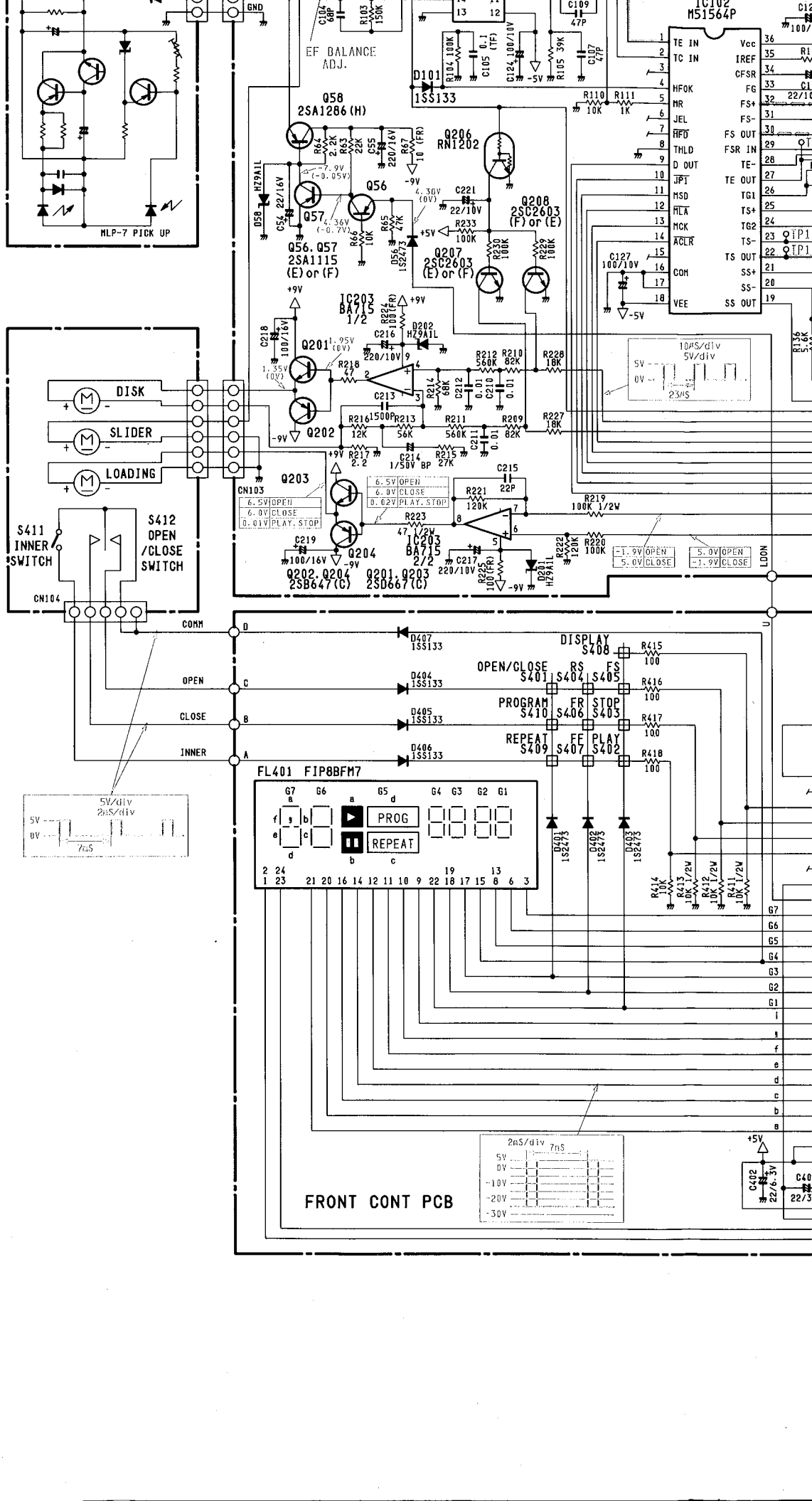
SCHEMATIC DIAGRAM

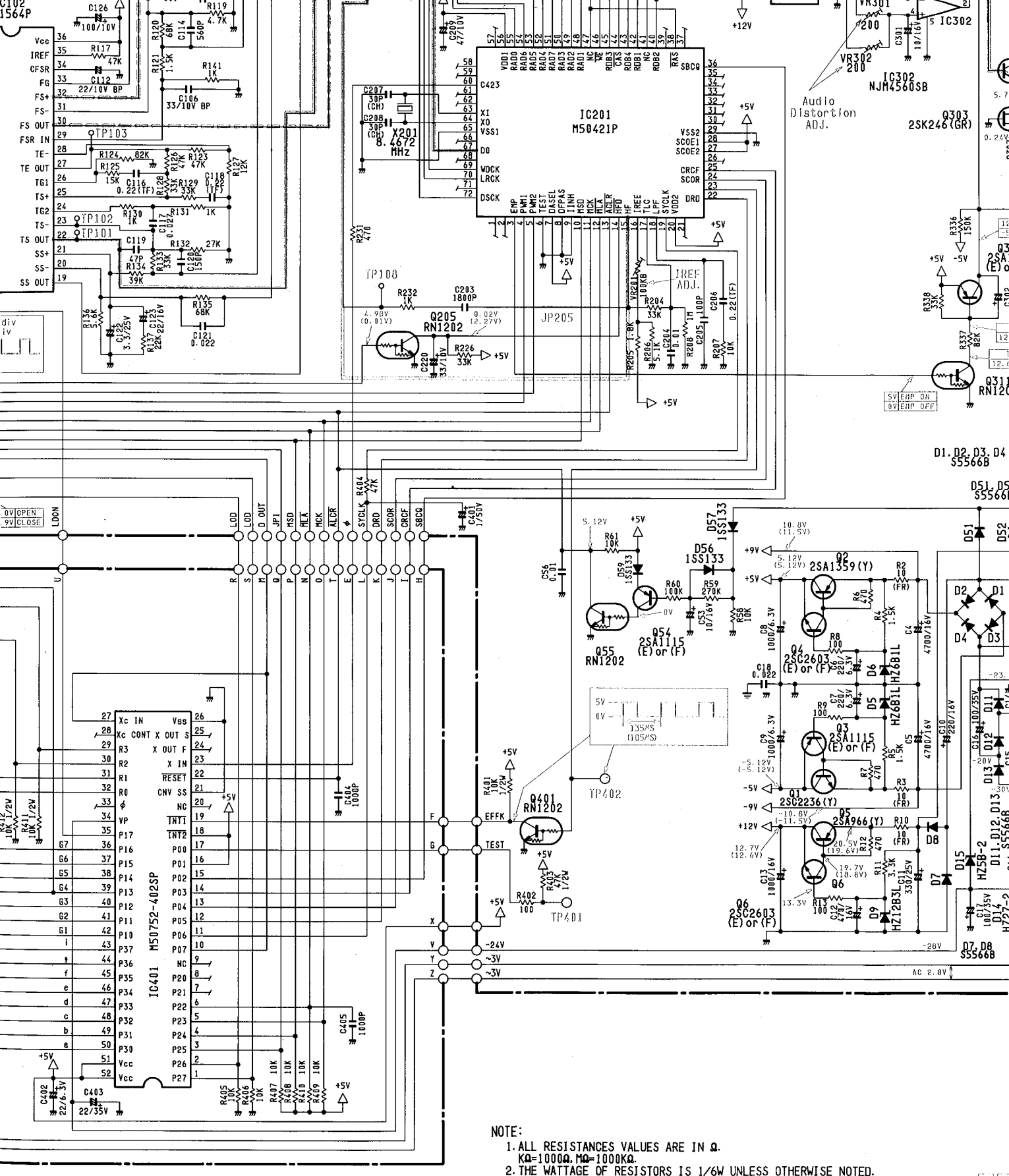



E
F
G
H
I
J
CN106
GND
HF
TE
FE
IC103
STA341M
IC102
M51564P
IC201
M50421P
IC202 M5M4416P
IC301 YM3020
IC302
NJM4560SB
X201
8.4672
MHz
Focus
Gain
ADJ.
Focus
Offset
ADJ.
Audio
Distortion
ADJ.
IREF
ADJ.
TEST DISC 1kHz
Q205
RN1202
Q54
2SA1115
(E) or (F)
Q55
RN1202
Q2
2SA1359(Y)
Q4
2SC2603
(E) or (F)
Q3
2SA1115
(E) or (F)
D56
1SS133
D57
1SS133
D59
1SS133
D5
HZ6B1L
D6
HZ6B1L
TP101
TP102
TP103
TP104
TP105
TP108
TP402
JP205
5V EMP ON
0V EMP OFF

J	K	L	M	N


TEST DISC 1kHz
1mS
10V
5V
0V
0.5mS/div
5V/div
5V/DIV
11.5μS
IC301 YM3020
IC302
IC302
NJM4560SB
VR301
200
VR302
200
Audio
Distortion
ADJ.
Q302
2SC2603
(E) or (F)
Q304
2SK246(GR)
Q303
2SK246(GR)
Q301
2SC2603
(E) or (F)
Q308
2SK246(GR)
Q307
2SK246(GR)
Q306
2SA1115
(E) or (F)
Q305
2SA1115
(E) or (F)
Q310
2SC2878(B)
Q309
2SC2878(B)
Q52
2SC2878
(B)
Q53
2SC2878
(B)
Q312
2SA1115
(E) or (F)
Q311
RN1202
Q51
2SA1115
(E) or (F)
D54
HZ6A1L
D53
1SS133
D51, D52
S5566B
D1, D2, D3, D4
S5566B
R332 +12V
4.7
1/2W
R333 +12V
4.7
1/2W
R304
220
R305
220
R330
100
R331
100
R326
220
1/2W
R327
220
R56
1.8K
R57
1.8K
R336
150K
R55
150K
R338
33K
R337
82K
R52
560K
R53
100K
R54
1.5K
R51
1.5K
C316
47/16V
(LL)
C317
47/16V
(LL)
C312
3900P
C313
3900P
C304
470/16V
C305
22/16V
C306
3300P
C307
3300P
C301
10/16V
C302
3.3/25V
C51
22/16V
C52
10/16V
C53
220/16V
C54
220/16V
R1
3.3M
C1
0.01
J1
OUTPUT
R ch
L ch
+12V
-5V
+5V
T1
POWER
S1
POWER
P1
AC 120V,
60Hz
240V
AC 220/240V,
50/60Hz
Q1
2SA1359(Y)
Q2
2SA1359(Y)
Q3
2SA1115
(E) or (F)
Q4
2SC2603
(E) or (F)
D5
HZ6B1L
D6
HZ6B1L
D1
D2
D3
D4
D11
D12
D13
AC9V
(AC8.6V)
-23.2V
-20V
-30V


MLP-7 PICK UP
EF BALANCE ADJ.
IC102 M51564P
TE IN
TC IN
HFOK
MR
JEL
HFD
THLD
D OUT
JPI
MSD
MLA
MCK
ACLR
COM
VEE
Vcc
IREF
CFSR
FG
FS+
FS-
FS OUT
FSR IN
TE-
TE OUT
TG1
TS+
TG2
TS-
TS OUT
SS+
SS-
SS OUT
D101 1SS133
Q58 2SA1286(H)
Q56
Q57
Q56, Q57 2SA1115 (E) or (F)
Q206 RN1202
Q208 2SC2603 (F) or (E)
Q207 2SC2603 (E) or (F)
IC203 BA715 1/2
IC203 BA715 2/2
Q201
Q202
Q203
Q204
Q202, Q204 2SB647(C)
Q201, Q203 2SD667(C)
D202 HZ9A1L
D211 HZ9A1L
D58 HZ9A1L
D56 1S2473
DISK
SLIDER
LOADING
CN103
CN104
S411 INNER SWITCH
S412 OPEN /CLOSE SWITCH
6.5V OPEN
6.0V CLOSE
0.01V PLAY. STOP
0.02V PLAY. STOP
-1.9V OPEN
5.0V CLOSE
5.0V OPEN
-1.9V CLOSE
LDON
COMM
OPEN
CLOSE
INNER
D407 1SS133
D404 1SS133
D405 1SS133
D406 1SS133
DISPLAY S408
OPEN/CLOSE S401
RS S404
FS S405
PROGRAM S410
FR S406
STOP S403
REPEAT S409
FF S407
PLAY S402
FL401 FIP8BFM7
PROG
REPEAT
D401 1S2473
D402 1S2473
D403 1S2473
FRONT CONT PCB
10μS/div 5V/div
23μS
5V/div 2μS/div
7μS
2μS/div 7nS
-9V
+9V
+5V
-5V



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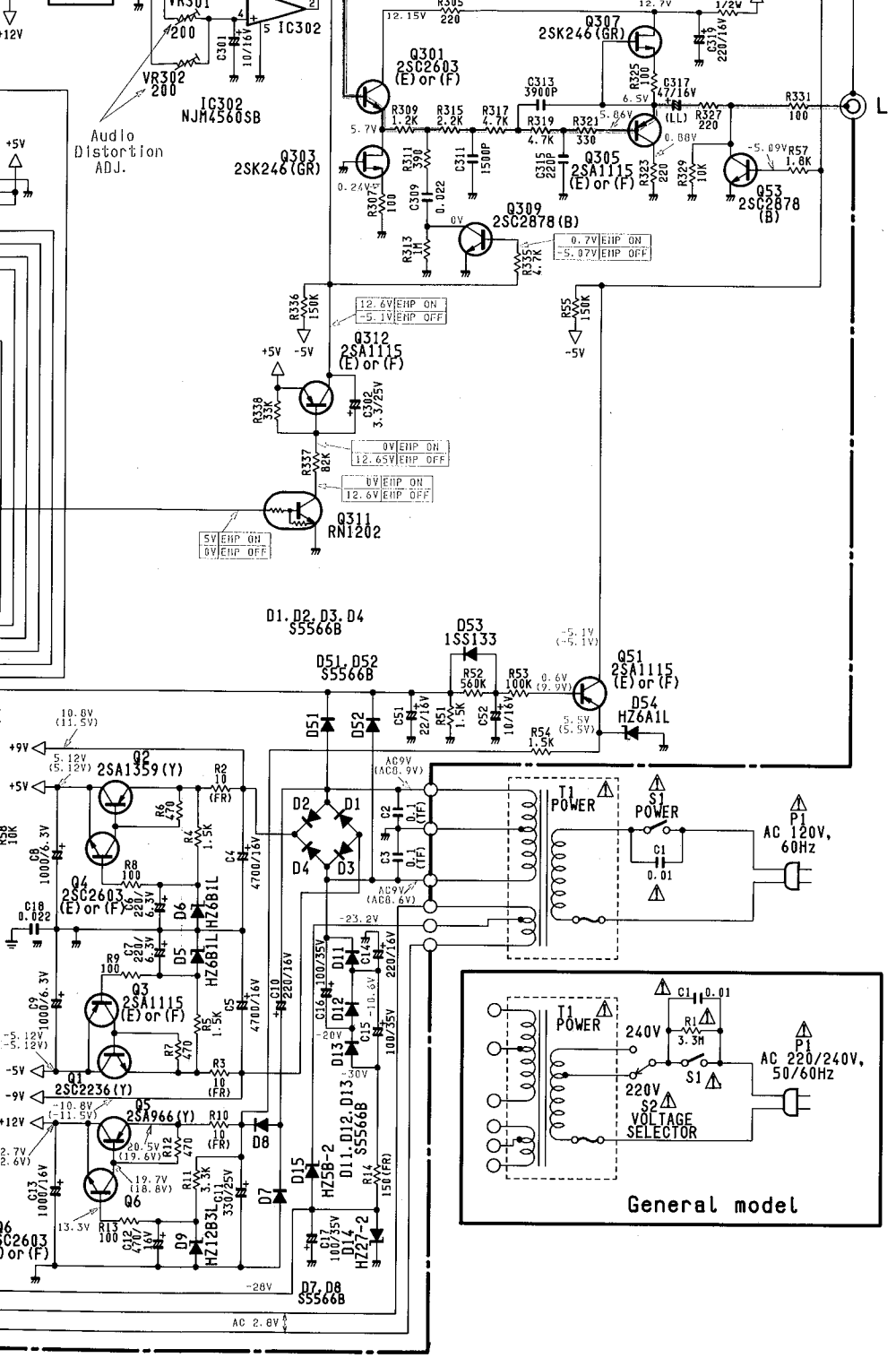

ILESS OTHERWISE NOTED.
NLESS OTHERWISE NOTED. P=μμF.

IN ACCORDANCE WITH PRESENT
NENTS MUST ONLY BE REPLACED

Tracking Serbo Signal
Focus Serbo Signal
EFM Signal