

Service Manual

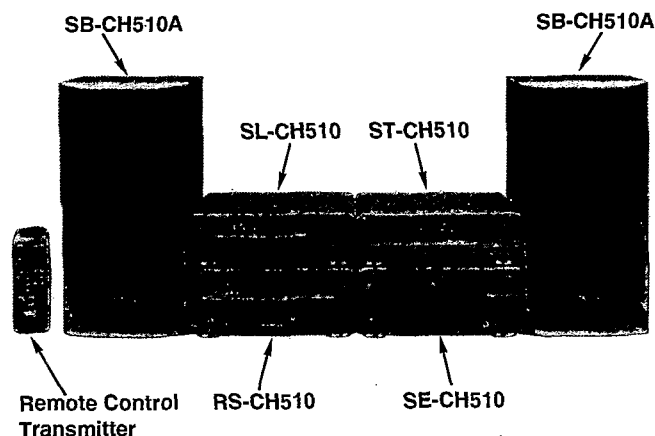
COMPACT
disc
DIGITAL AUDIO

DIGITAL

MASH *1
multi-stage noise shaping

Compact Disc Player

SL-CH510



Colour

(K) Black Type

Area

Suffix for Model No.	Area	Colour
(E)	Europe, Asia, Latin America, Middle Near East and Africa and Oceania	(K)

Because of unique interconnecting cables, when a component requires service, send or bring in the entire system.

System: SC-CH510

RAE0113Z MECHANISM SERIES

Specifications

■ Audio

DA converter 1 bit 2 DAC MASH

■ Pickup

Wavelength 780 nm

■ General

Dimensions (W × H × D) 270 × 89 × 266 mm

Weight 1.9 kg

Notes:

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

* 1

MASH is a trademark of NTT.

System	Tuner/sound processor	Compact disc player	Amplifier	Cassette Deck	Speakers
SC-CH510	ST-CH510	SL-CH510	SE-CH510	RS-CH510	*2 SB-CH510A

*2: For Europe Made in PAES
For other areas Made in NABEL

Technics®

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NOTE:

Refer to the service manual for Model No. SE-CH510 (ORDER No. AD9407197C8) for information on "Accessories", "Stacking the Components", "Connections" and "Packaging".

Handling Precautions for Traverse Deck

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body.

So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

• Handling of traverse deck (optical pickup)

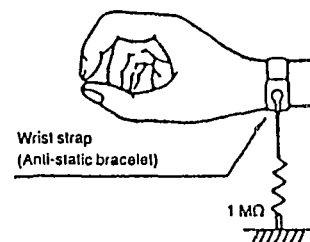
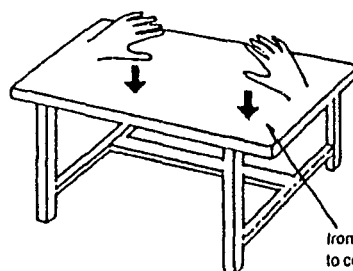
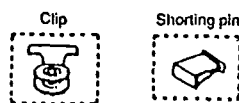
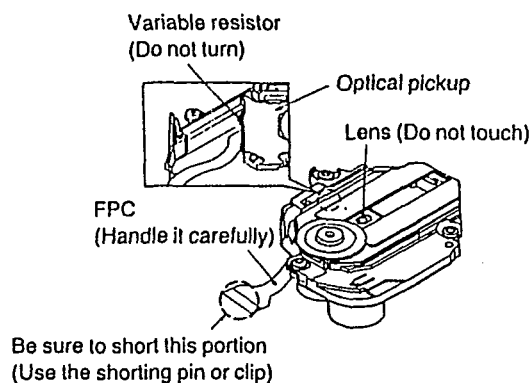
1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. To prevent the breakdown of the laser diode, an anti-static shorting pin is inserted into the flexible board (FPC board).
When removing or connecting the short pin, finish the job in as short time as possible.
3. Take care not to apply excessive stress to the flexible board (FPC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

• Grounding for electrostatic breakdown prevention

1. Human body grounding
Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table grounding
Put a conductive material (sheet) or steel sheet on the area where the traverse deck (optical pickup) is placed, and ground the sheet.

Caution:

The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).



Precaution of Laser Diode

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pick up lens.
Wave length: 780 nm
Maximum output radiation power from pick up: 100 μ W/VDE

Laser radiation from the pick up unit is safety level, but be sure the followings:

1. Do not disassemble the pick up unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pick up unit. It was already adjusted.
3. Do not look at the focus lens using optical instruments.
4. Recommend not to look at pick up lens for a long time.

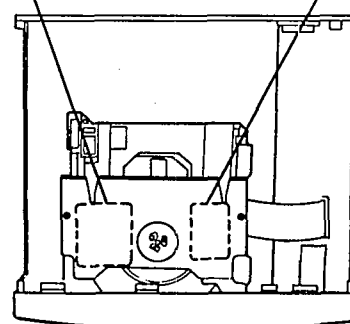
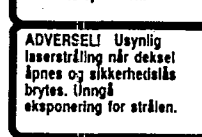
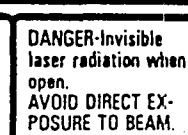
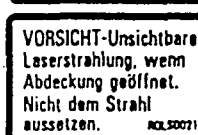
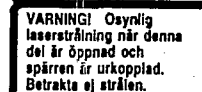
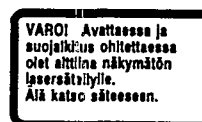
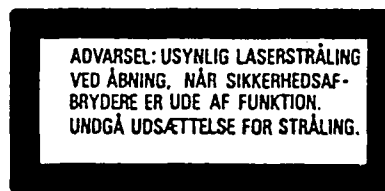
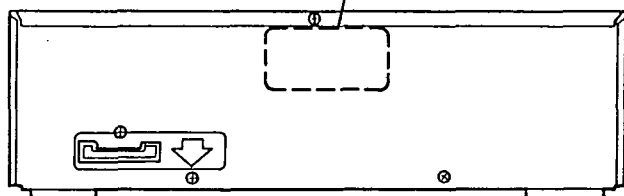
ACHTUNG: Dieses produkt enthält eine laserdioden. Im eingeschalteten zustand wird unsichtbare laserstrahlung von der lasereinheit adgestrahlt.
Wellenlänge: 780 nm
Maximale strahlungsleistung der lasereinheit: 100 µW/VDE

Die strahlung an der lasereinheit ist ungefährlich, wenn folgende punkte beachtet werden:

1. Die lasereinheit nicht zerlegen, da die strahlung an der freigelegten laserdioden gefährlich ist.
2. Den werksseitig justierten einstellregler der lasereinheit nicht verstellen.
3. Nicht mit optischen instrumenten in die fokussierlinse blicken.
4. Nicht über längere zeit in die fokussierlinse blicken.

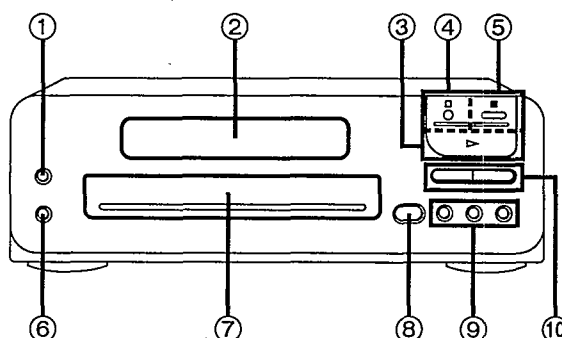


LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT



Location of Controls

- ① Repeat button
- ② Display section
- ③ Play button and indicator
- ④ Stop button
- ⑤ Pause button
- ⑥ Random play button
- ⑦ Disc tray
- ⑧ Disc tray open/close button
- ⑨ CD edit button
- ⑩ Skip/search buttons



■ Listening to Compact Discs

Sequential play

- 1 Switch on the power.**
"no disc" indicates that a CD has not been installed.
- 2 Press ▲ OPEN/CLOSE to open the tray.**
Insert the CD with label facing upward.
Do not put your finger through the hole in the middle of the tray. It could get caught when the tray closes.
An adaptor for CD single is not required.
- 3 Press ▲ OPEN/CLOSE to close the tray.**
When there are 13 or more tracks on the CD, "➤" will appear.
- 4 Press ▷.**
Press the button on the "▷" indicator to start play correctly.
Play will start from the first track on the CD.
Play will stop automatically when the last track on the CD finishes playing.
- 5 Adjust the volume level as you like.**

To stop the disc play:

Press □.

To temporarily stop the disc play:

Press ▢. ▷ flashes up green.

To play again, press ▷.

For your reference:

If you press ▷ instead of ▲ OPEN/CLOSE after inserting a CD, the tray will close and play will start directly from the track 1.

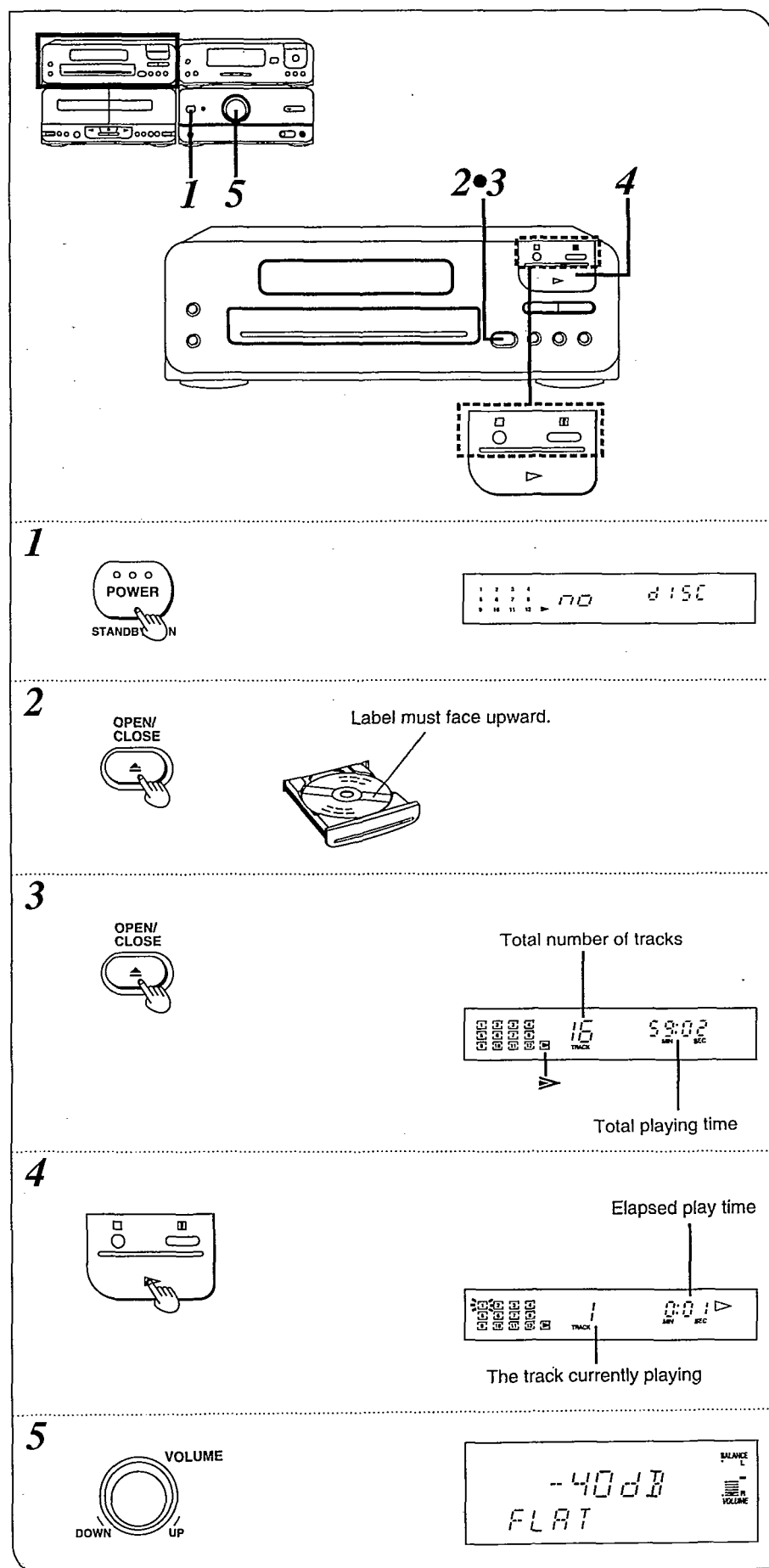
About ▷ indicator:

While halted: Lights up orange.

While playing: Lights up green.

About the total playing time:

The total playing time displayed includes the silent sections between tracks. Hence, there will be a difference between the total playing time and the liner notes.



■ Operation Check and Main Component Replacement Procedures

NOTE

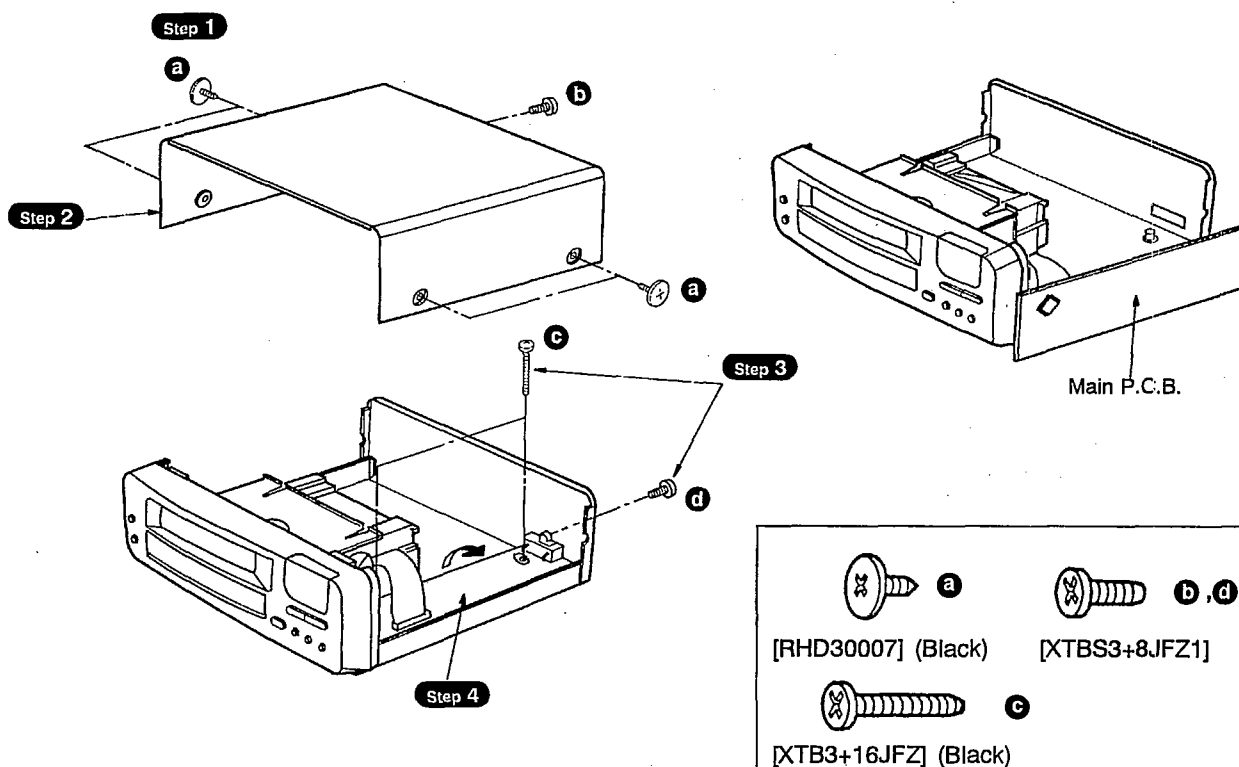
1. This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.
2. For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.
3. Select items from the following index when checks or replacement are required.
4. Illustrated screws are equivalent to actual size.
5. Refer the parts No. on the page of "Main Component Replacement Procedures", if necessary.

● Contents

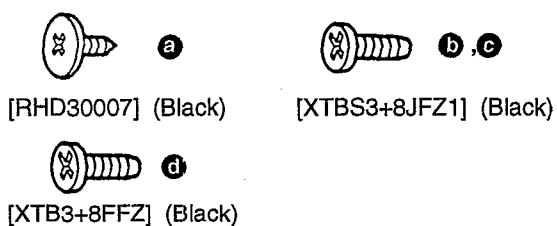
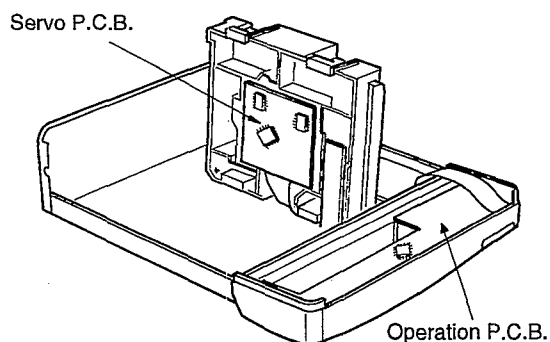
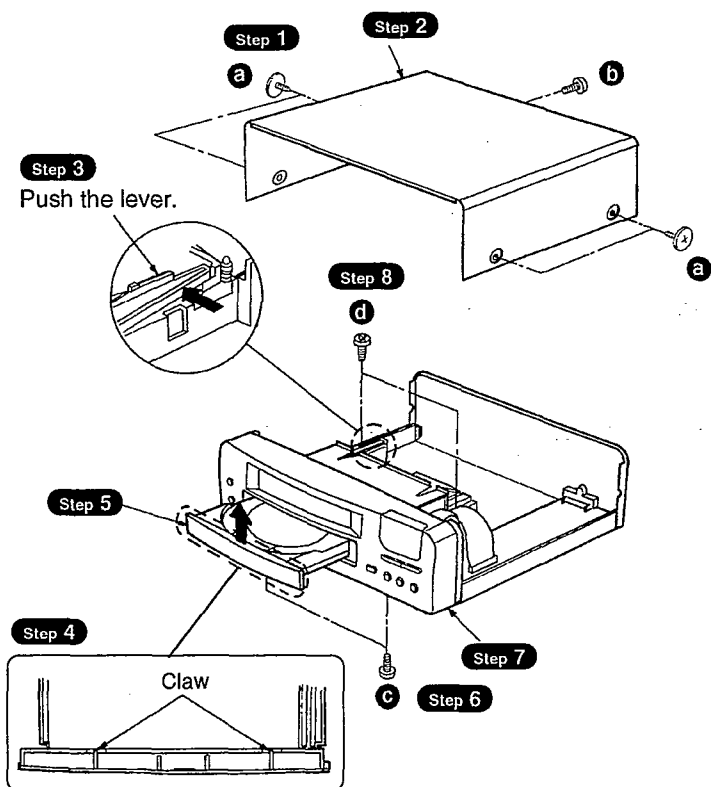
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• Main Component Replacement Procedures	
1. Replacement for the traverse deck ass'y	6~8.
2. Replacement for the loading belt and loading motor	8.

■ Checking Procedure for each P.C.B.

1. Checking for the main P.C.B.



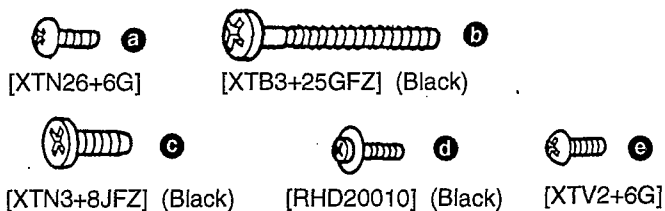
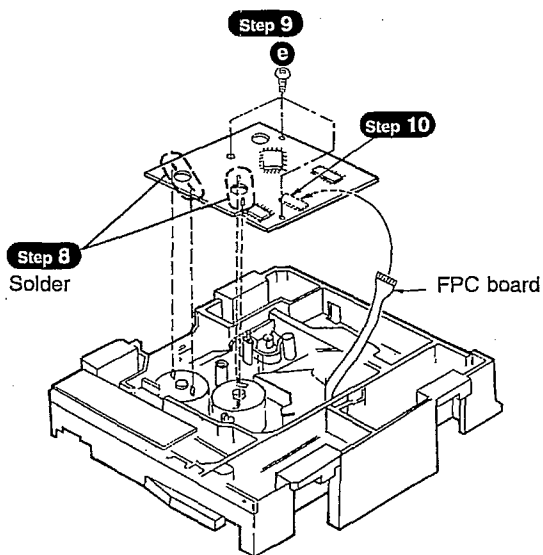
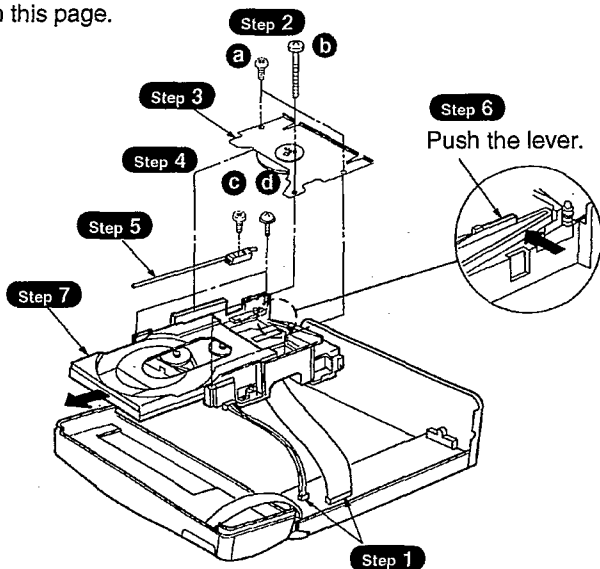
2. Checking for the operation P.C.B. and the servo P.C.B.



■ Main Component Replacement Procedures

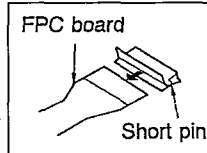
1. Replacement for the traverse deck ass'y

- Follow the item 2 in checking procedure for each P.C.B. on this page.

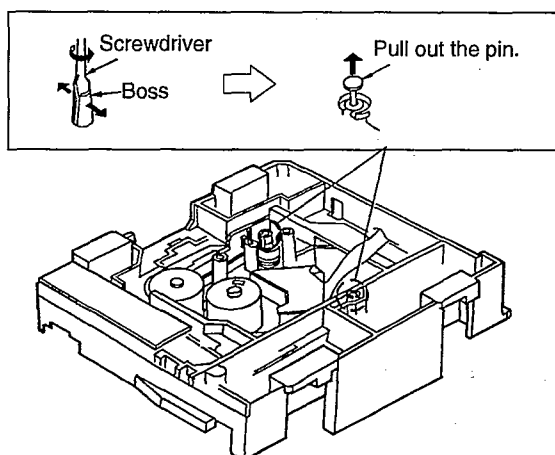


Caution:

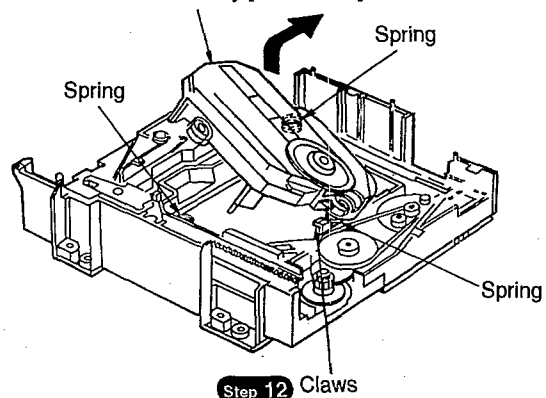
Insert a short pin into the traverse unit FPC board.
(Refer to "Handling Precautions for Traverse Deck" on page 2.)



Step 11



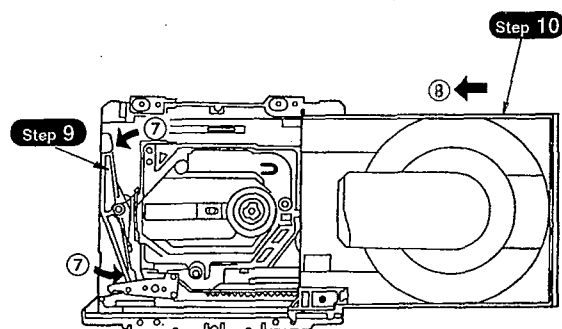
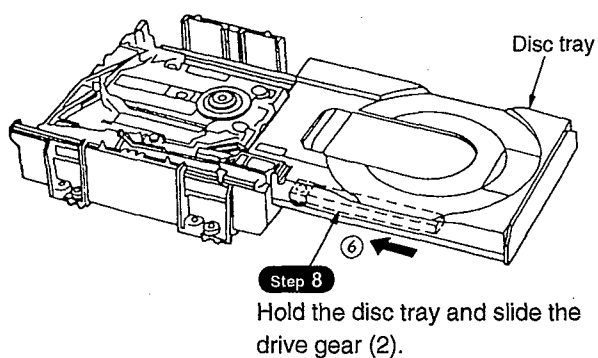
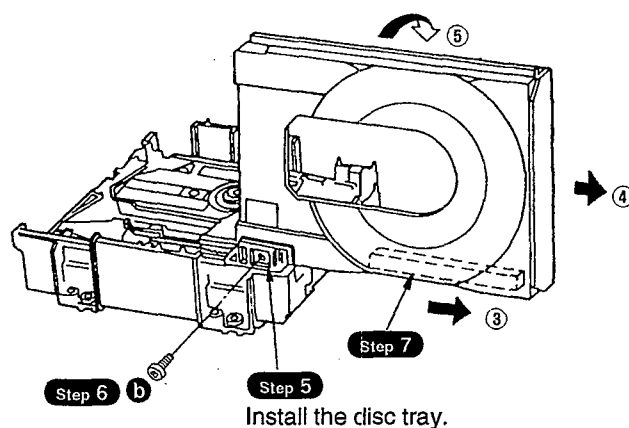
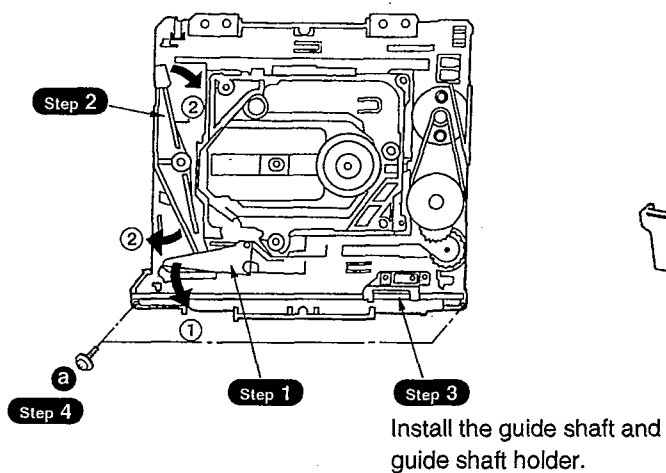
Traverse unit ass'y [RAE0113Z]



NOTE

Be careful not to lose the 3 springs because those will also be removed on removal of the traverse unit ass'y.

Installation of the disc tray after replacement



a



b

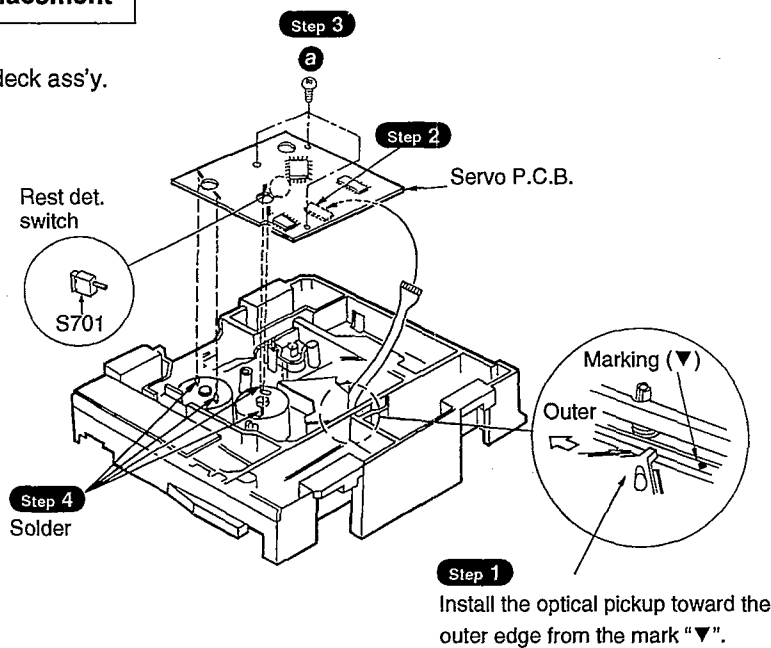
[RHD20010] (Black)

[XTN3+8JFZ] (Black)

Installation of the servo P.C.B. after replacement

Step 1 Install the servo P.C.B. in the traverse deck ass'y.

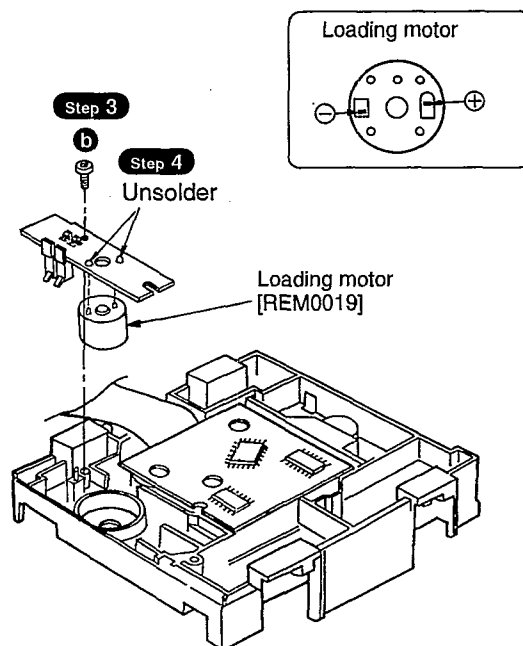
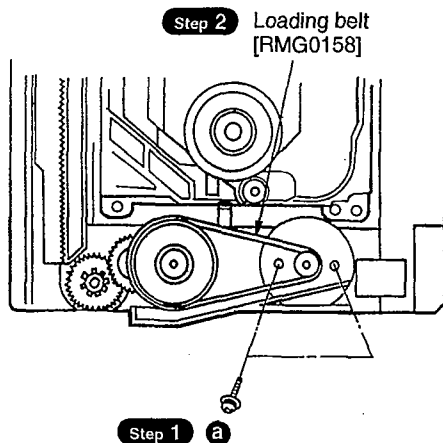
Before installing the servo P.C.B., move the optical pickup toward the outer edge from the mark "▼".
[Otherwise, the rest detect switch (S701) mounted on the servo P.C.B. may be damaged.]



a
[XTV2+6G]

2. Replace for the loading belt and loading motor

- Follow the item 2 in checking procedure for each P.C.B. on page 6.
- Follow the **Step 1** ~ **Step 7** of item 1 in main component replacement procedures on page 6.



a
[XYN2+F6FZ]

b
[XTN26+6G]

Measurements and Adjustments

Cautions:

- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.)
With the unit turned "on", laser radiation is emitted from the pickup lens.
- Avoid exposure to the laser beam, especially when performing adjustments.

This unit SL-CH510 is designed to operate on power supplied from the Amplifier SE-CH510 through the Tuner/Sound Processor ST-CH510.

When connecting the unit to other system components, do not connect to the Amplifier SE-CH510 directly. Be sure to connect this unit through the Tuner/Sound Processor ST-CH510.

When operating the unit SL-CH510 alone for testing and servicing, without having power supplied from the Amplifier SE-CH510 and the Tuner/Sound Processor ST-CH510, use the following method.

Power Supply to This Unit alone

Apply 11V AC power to the section between **AC11V (AC)** of the coil (L1) and the jumper J1 (**GND**) as well as the section between **AC11V (AC)** of the coil (L2) and the jumper J1 (**GND**). (10V AC power can be also applied when using power supply tool.) (Shown in Fig. 1)

To Check Signals

Connect the oscilloscope or the speaker with built-in amplifier to the section between LINE OUT (Lch) of the resistor R815 and the GND point of the jumper J1 as well as the section between LINE OUT (Rch) of the resistor R816 and the GND point of the jumper J1 and check if the signals are outputting from this unit. (Shown in Fig. 1)

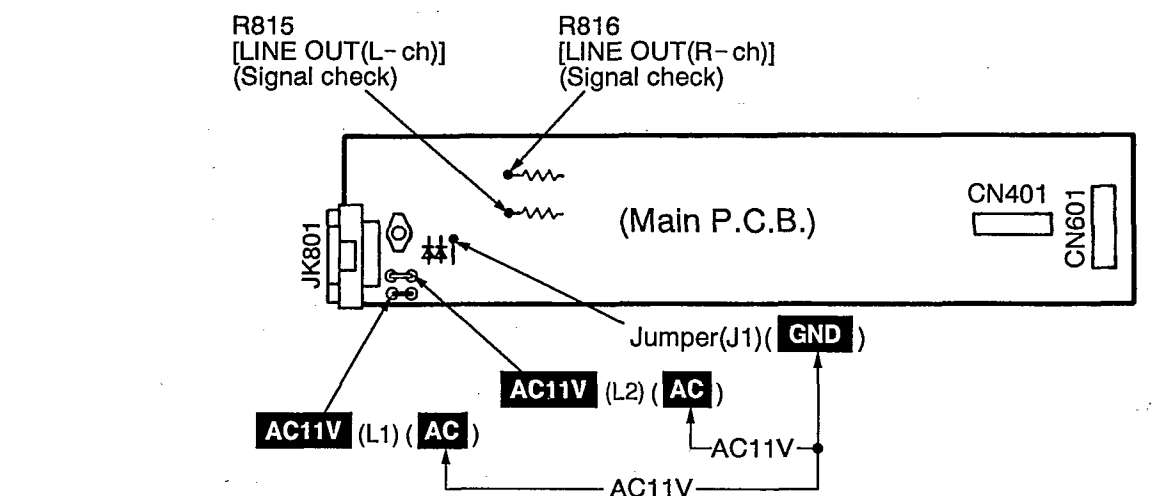


Fig. 1

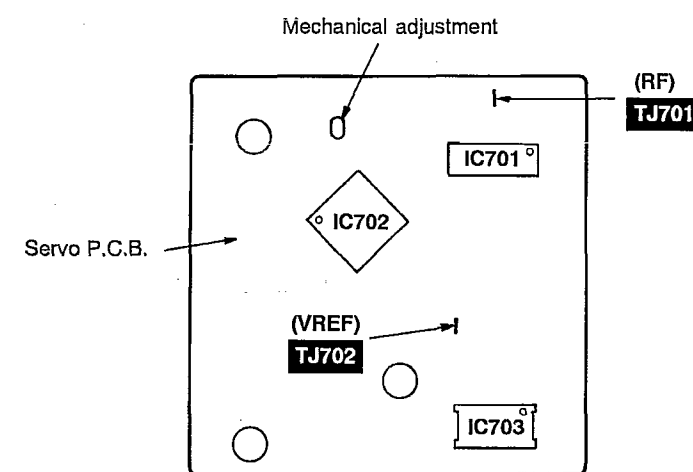


Fig. 2

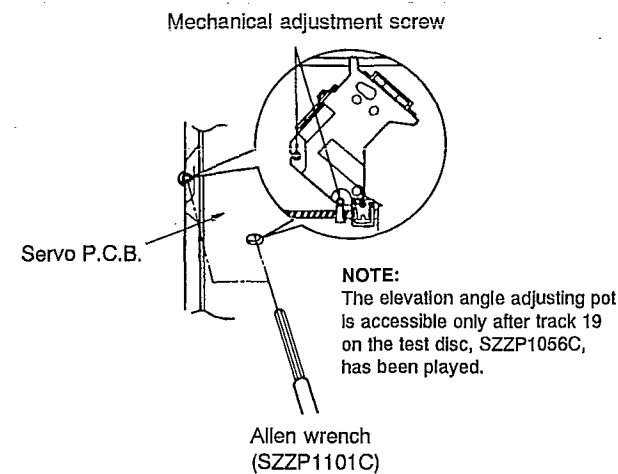


Fig. 3

Preparation of Adjustment

1. Insert test disc into the unit.
2. Turn the power of this unit off and then turn it on. (The CD unit is adjusted automatically with it stood.)

Measuring Instruments and Special Tools

- Test disc
 1. Playability test disc (SZZP1054C)
 2. Uneven test disc (SZZP1056C)
- Allen wrench (M2.0) (SZZP1101C)
- Oscilloscope

(1) MECHANICAL ADJUSTMENT

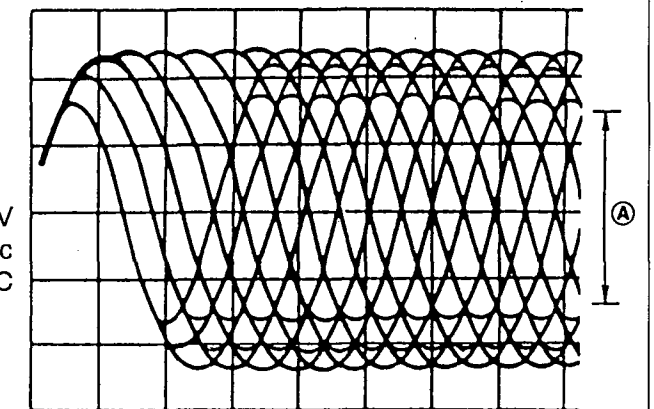
- When the traverse deck is replaced, making adjustments is not necessary. (The traverse deck ass'y is already adjusted.)
- Make adjustments to improve playability when the traverse deck has not been replaced. Make the electrical adjustments first.

1. Connect the oscilloscope's CH. 1 probe across **TJ701 (+)** and **TJ702 (VREF)** on the Servo P.C.B. (Shown in Fig. 2)

Oscilloscope setting:

VOLT 200 mV
SWEEP 0.5 μ sec
Input coupling AC

2. Switch the player power ON, and play track 19 on the test disc (SZZP1056C).
3. Leave the player in Play mode and place it as shown in the figure on the right.
4. Alternately adjust the two mechanical adjusting screws with the 2.0 mm allen wrench (SZZP1101C) until the RF signal amplitude on the oscilloscope is maximize. (Shown in Fig. 3)
5. After completing the adjustment, lock the mechanical adjustments with lock paint (RZZ0L01).



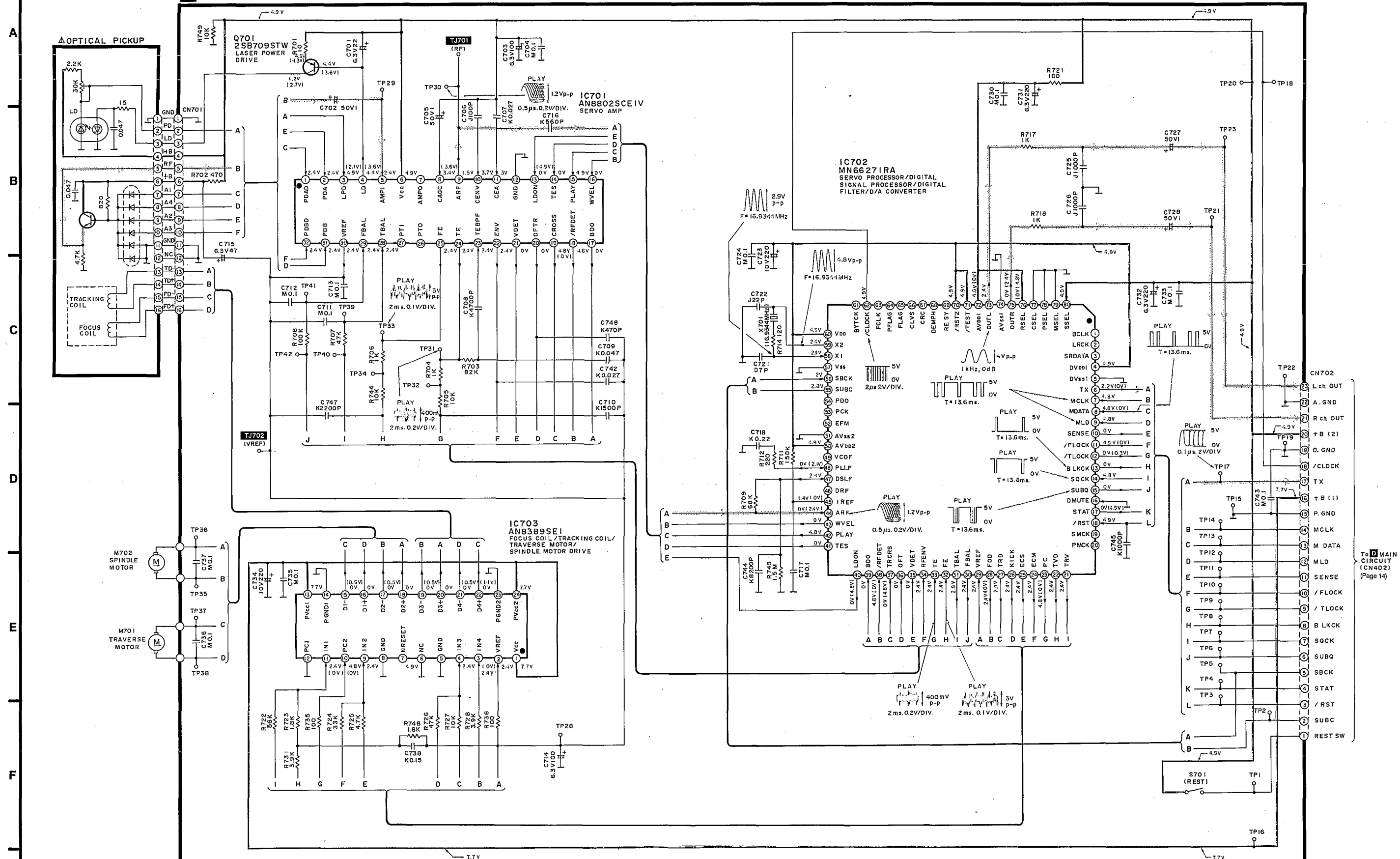
A Maximize the amplitude.

(2) CHECK OF PLAY OPERATION AFTER ADJUSTMENT

- Checking Skip Search
 1. Play an ordinary musical program disc.
 2. Press the skip button to check for normal skip search operation (in both the forward and reverse direction).
- Checking Manual Search
 1. Play an ordinary musical program disc.
 2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and reverse directions).
- Checking playability
 1. Play the 0.7 mm black dot and the 0.7 mm wedge on the test disc (SZZP1054C) and verify that no sound skip or noise occurs.
 2. Play the middle tracks of the uneven test disc and verify that no sound skip or noise occurs.

Schematic Diagram • Optical Pickup/Servo circuit (Parts list on Pages 33~35)

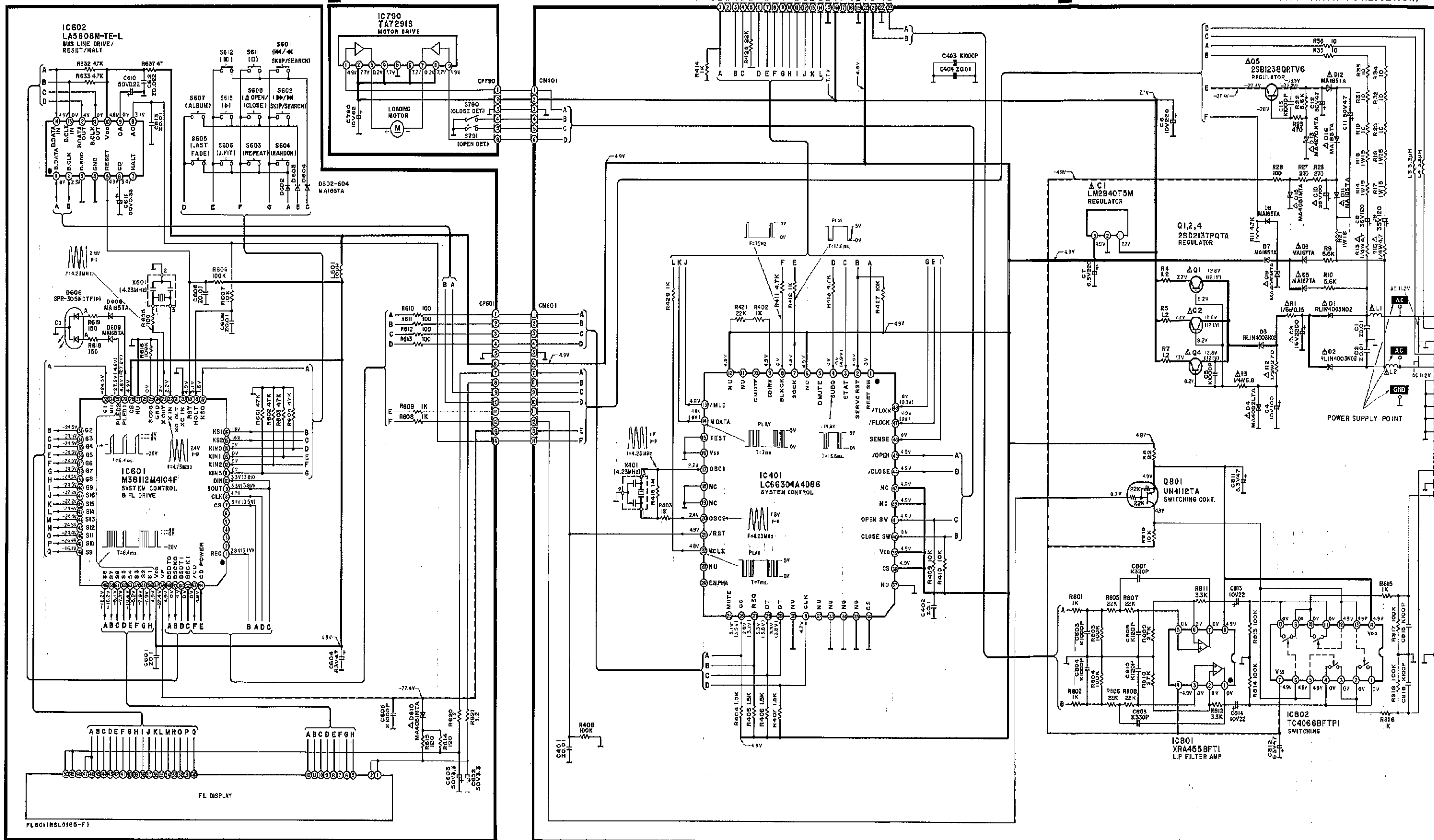
A SERVO CIRCUIT



B OPERATION CIRCUIT

C LOADING MOTOR CIRCUIT

D MAIN CIRCUIT(SYSTEM CONTROL/L.P.FILTER AMP/SWITCHING/REGULATOR)



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

Notes:

- S601 : R. Skip/Search switch (◀◀◀)
- S602 : F. Skip/Search switch (▶▶▶)
- S603 : Repeat switch (REPEAT)
- S604 : Random play switch (RANDOM)
- S605 : AI edit (LAST FADE) switch
- S606 : AI edit (J.FIT) switch
- S607 : AI edit (ALBUM) switch
- S608 : Disc tray open/close switch (▲ OPEN/CLOSE)
- S611 : Stop switch (□)
- S612 : Pause switch (⏸)
- S613 : Play switch (▶)
- S701 : Reset switch
- S790 : Disc tray close detection switch
- S791 : Disc tray open detection switch

● Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

No mark : CD STOP
() : CD PLAY [1kHz, L + R, 0 dB]

● Important safety notice:

Components identified by Δ mark have special characteristics important for safety. Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

● Caution!

IC and LSI are sensitive to static electricity. Secondary trouble can be prevented by taking care during repair. Cover the parts boxes made of plastics with aluminum foil. Ground the soldering iron. Put a conductive mat on the work table. Do not touch the legs of IC or LSI with the fingers directly.

● Voltage and signal line

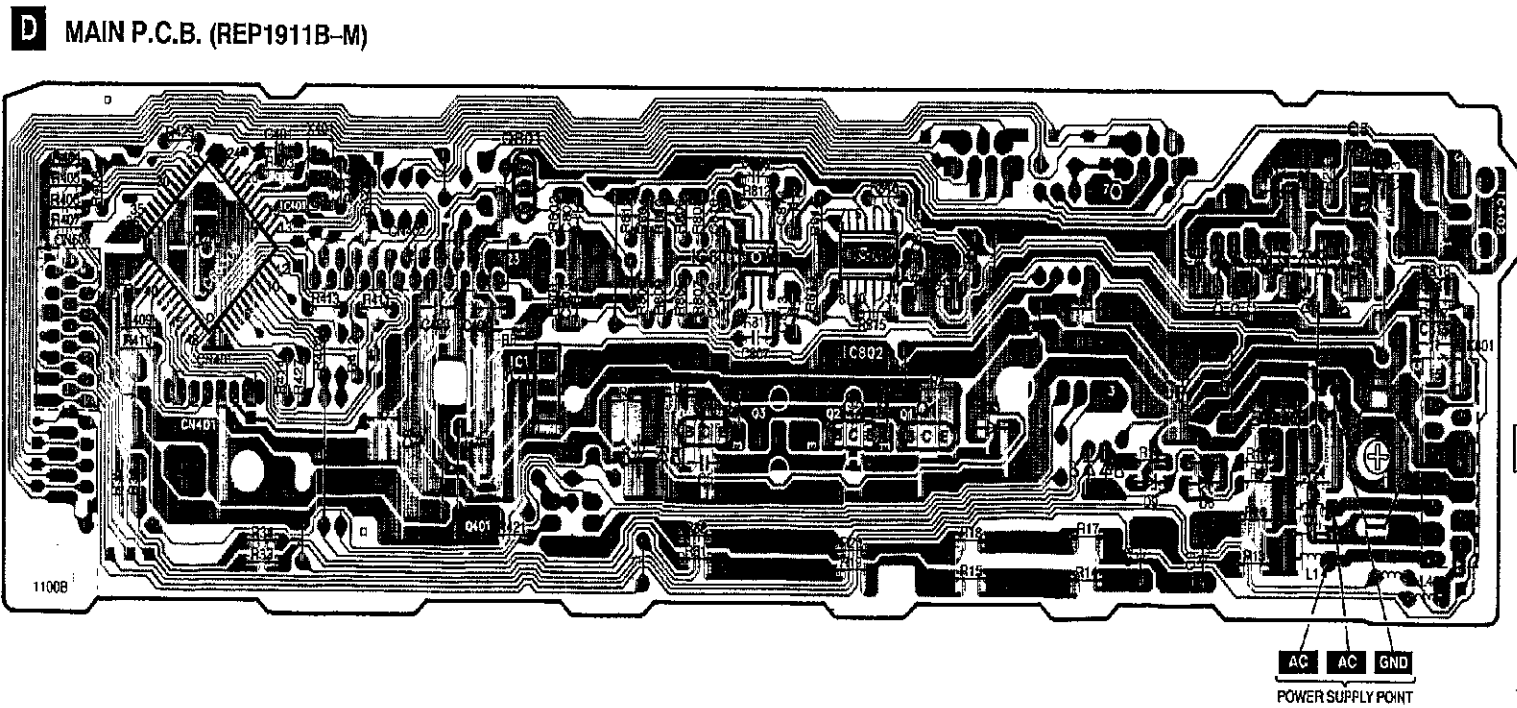
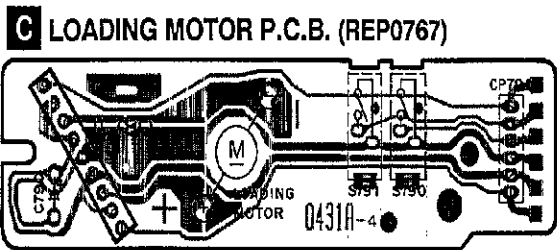
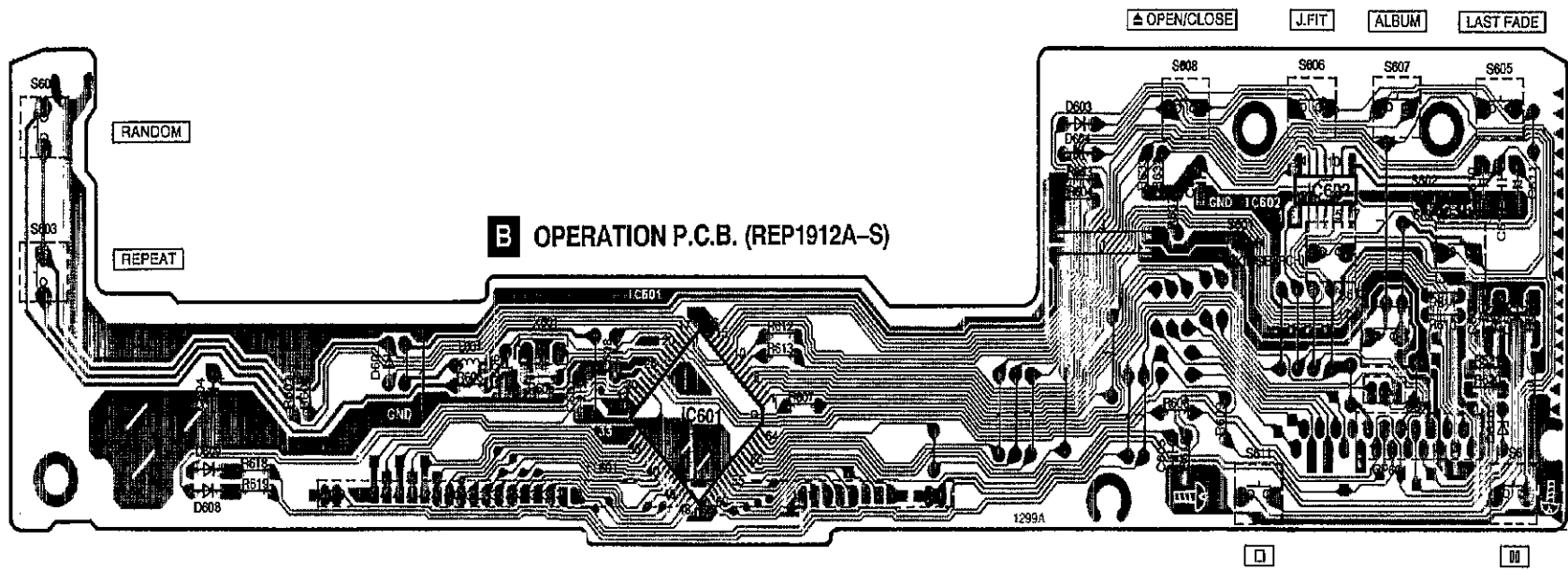
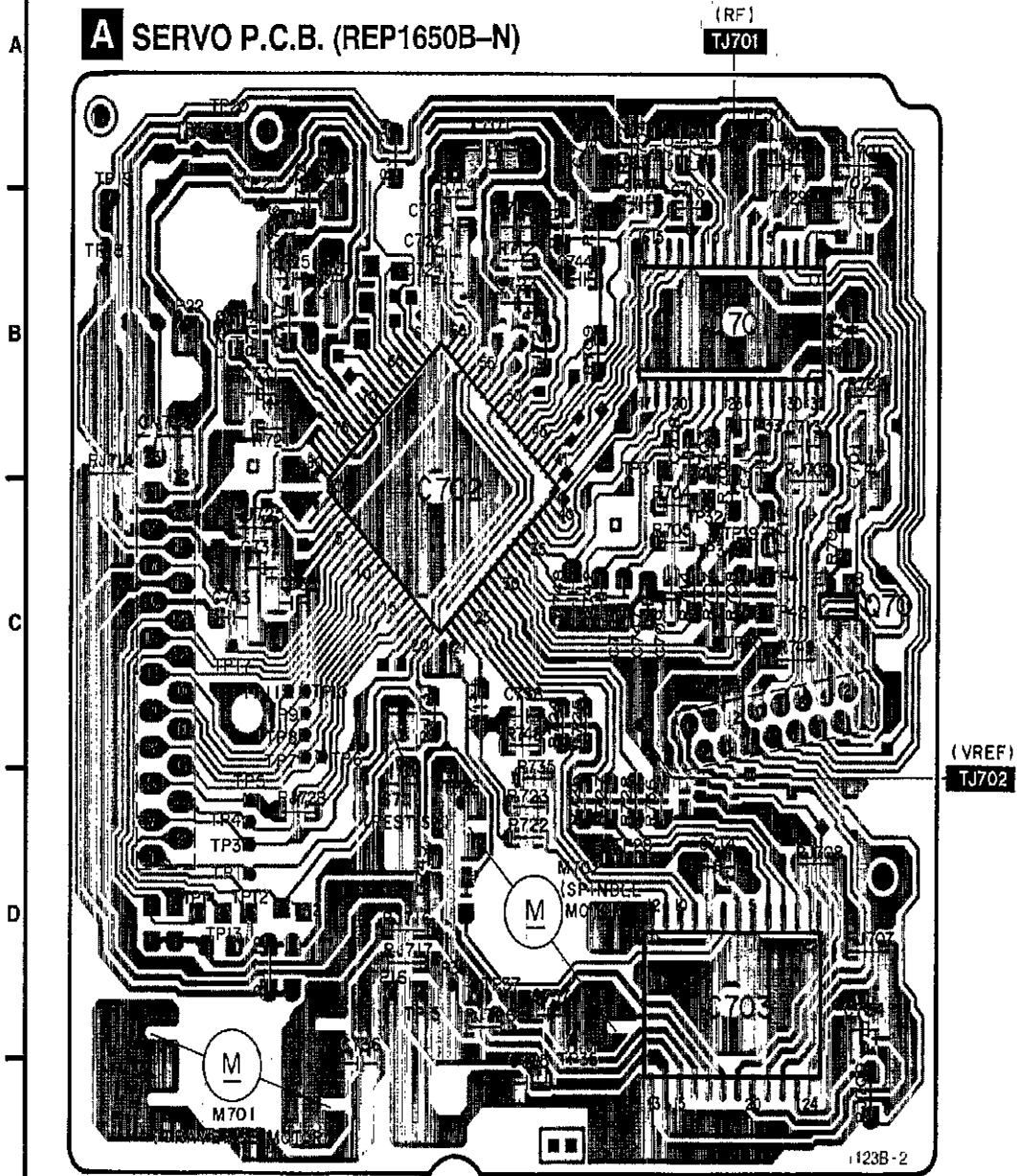
— : Positive voltage line
- - - : Negative voltage line
~ : CD signal line

● The supply part number is described alone in the replacement parts list.

Part No.	Production Part No.	Supply Part No.
IC1	LM2940T5M	LM2940T5

Printed Circuit Board Diagram

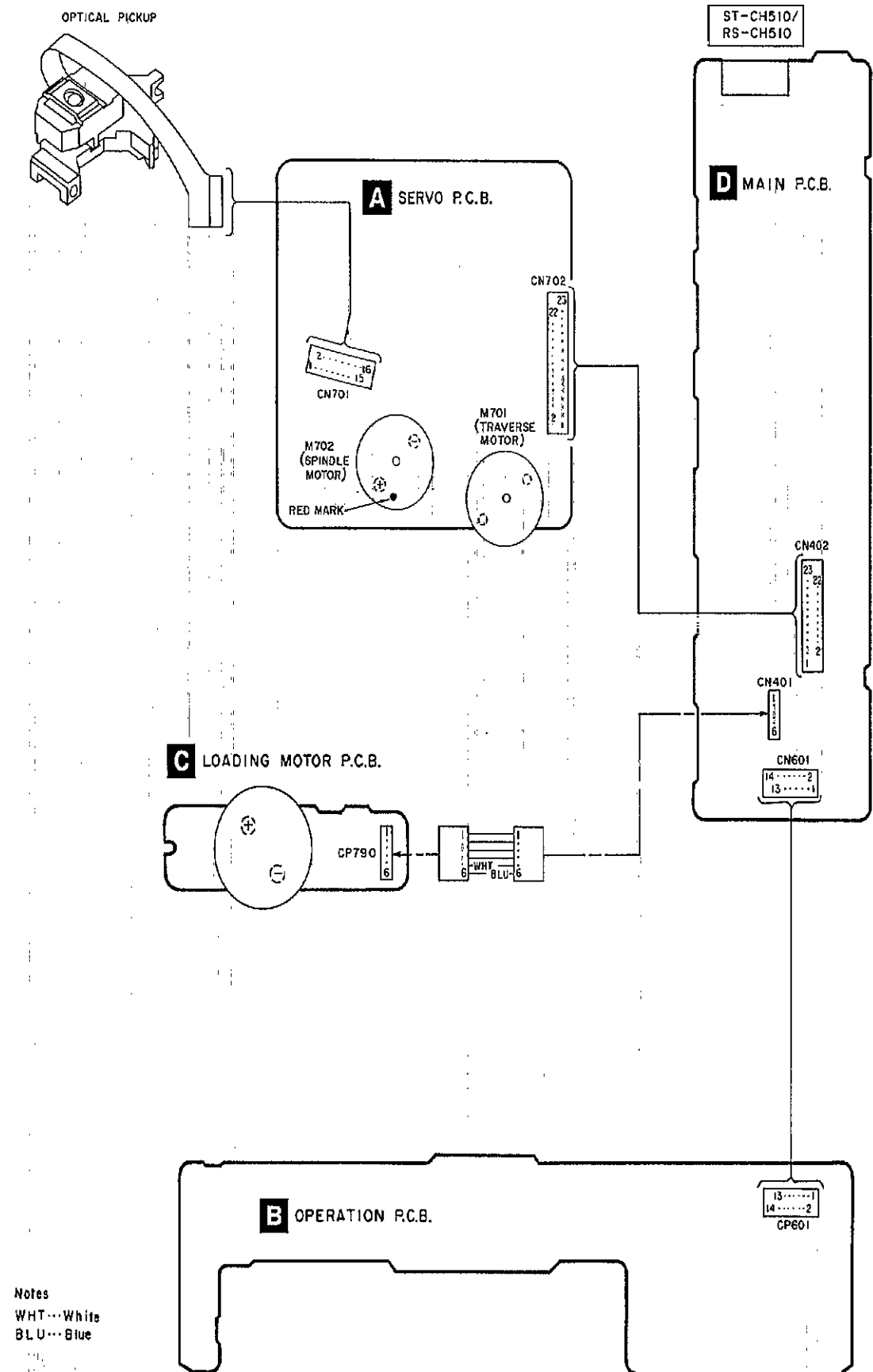
This circuit board diagram may be modified at any time with the development of new technology.



Terminal Guide of IC's, Transistors and Diodes

XRA4558FT1	TC4066BFTP1	LC66304A4DB6
TA7291S	LA5603M-TE-L 14Pin AN8602SCE1V 32Pin	
M38112M4104F 64Pin MN66271RA 80Pin	LM2940TS	
AN8389SE1	2SB709S	2SB1236QRTV6
2SD2137PQTA	UN4112	MA165 MA167
RL1N4003N02	MA4051MTA MA4082LTA	MA4270HTA
MA185TA	SPR-305MDTF	

Wiring Connection Diagram



Notes
WHT...White
BLU...Blue

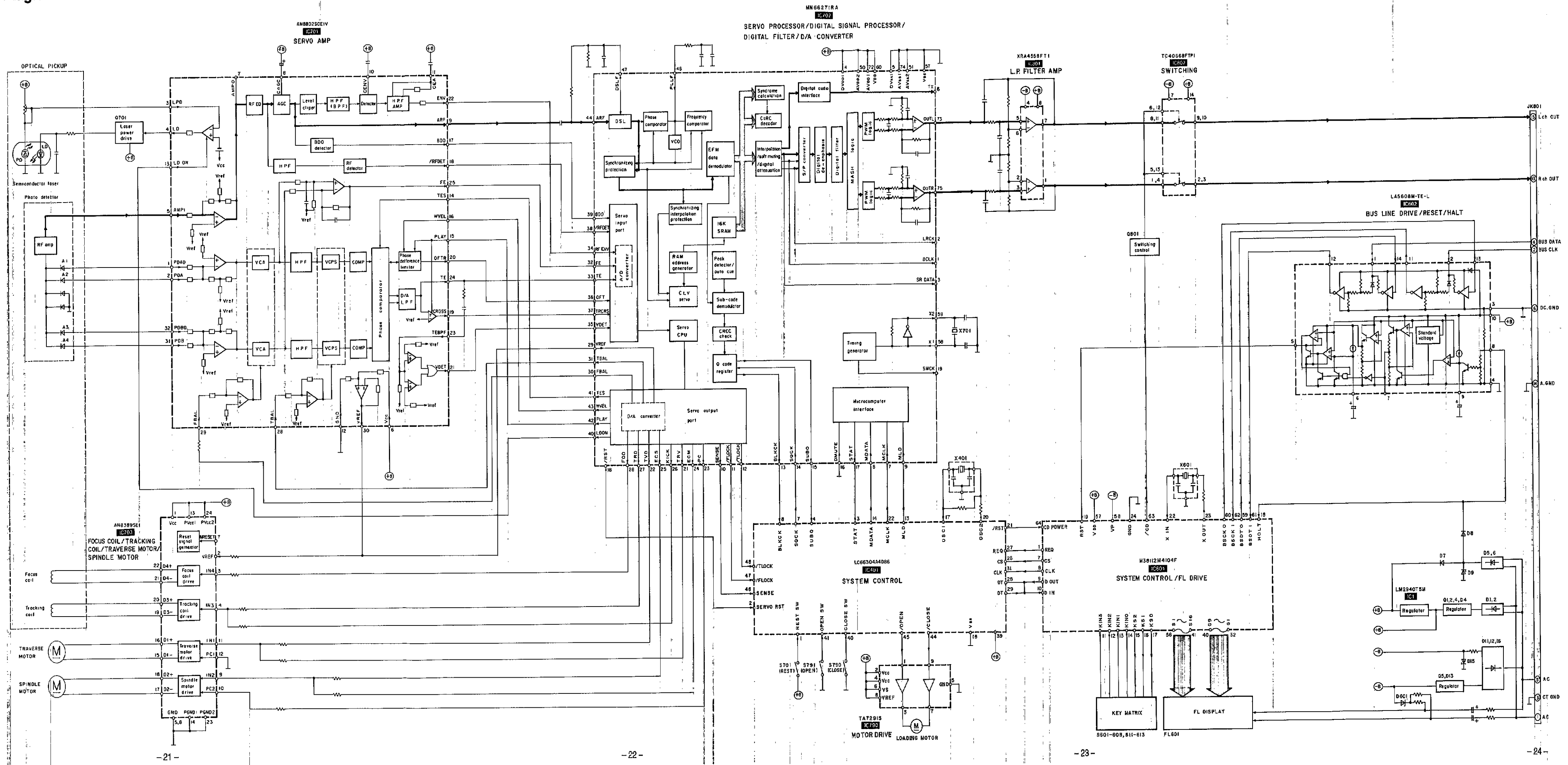
Block Diagram

SL-CH510

SL-CH510

SL-CH510

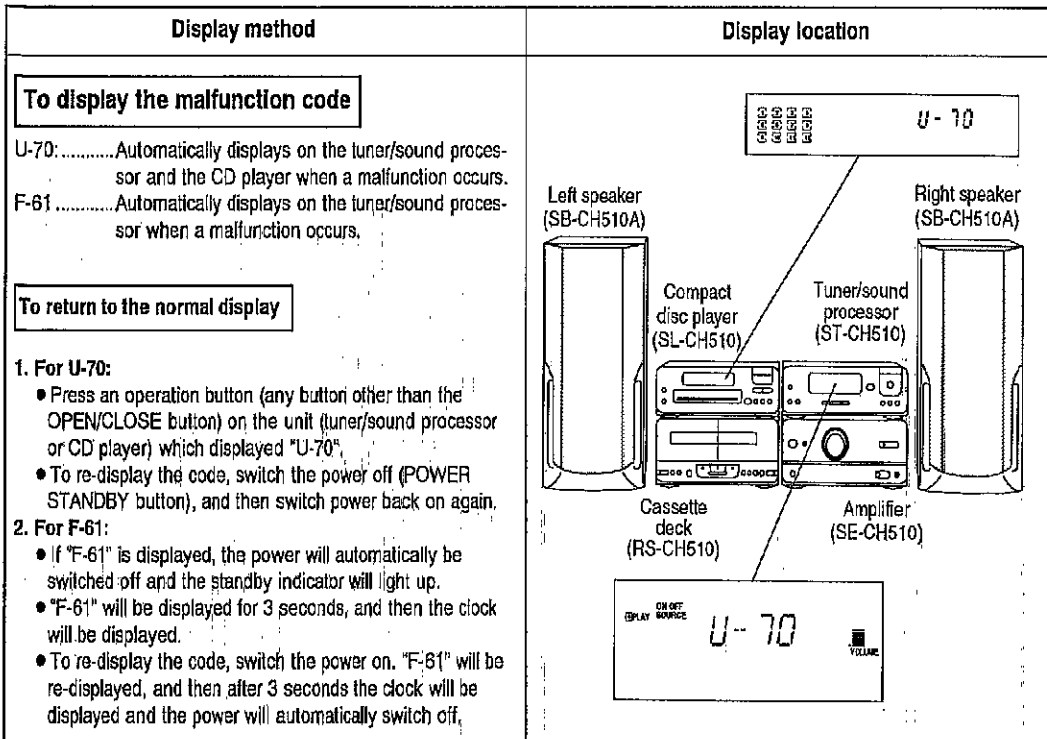
SL-CH510



About the Self-Diagnostic Mode

This unit is equipped with a self-diagnostic function which, in the event of a malfunction, automatically displays a code indicating the nature of the malfunction. Use this self-diagnostic function when servicing the unit.

SC-CH510 (SL-CH510, ST-CH510, SE-CH510, RS-CH510, SB-CH510A)



Display contents

Display code	Problem or condition	Correction procedure
U-70 (displayed automatically)	A bus-line communications error has occurred as a result of the flat cables being inserted incorrectly, thus preventing the system from operating. 1. If "U-70" is displayed on the tuner/sound processor, the tape deck cannot be operated by remote control. 2. If "U-70" is displayed on the CD player, the CD player cannot be operated by remote control.	 1. To check for correct insertion of the flat cables ① Match each connector with the color (black/white) of the connection port and insert until you hear a click. ② Insert the flat cables at the back of the unit in the order indicated. Make sure the which side of the cable is on your right side. 2. Breakage of flat cable (Check and replace as necessary.) 3. If the problem is not corrected by items (1.) and (2.) above, this indicates a faulty IC. SL-CH510: IC601 (M38112M4102F) IC602 (LA5608M-TE-L) Check these IC's and replace as necessary.
F-61	When the power switch is switched on, it automatically switches back off, making it impossible to switch power on.	1. Faulty amplifier (SE-CH510) output IC (IC501). 2. Fan motor is burnt out, locked, or stopped. 3. Replace the output IC or fan motor as necessary.

Automatic Adjustment Results Display Function

Self-Check Function

The SL-CH510 unit has a function that uses the FL display board to indicate the results of automatic adjustment of the servo-circuit (tracking, focus, offset, etc.) as error codes. The error code display indicates the location of failures from automatic adjustment circuit.

The following procedure displays the error codes from the self-diagnostic function.

Procedure for displaying automatic adjustment codes

1. Set the unit in the servo P.C.B. checking mode (refer to page 6).
2. Turn on the power supply switch (refer to page 9) while pressing the STOP (■) and REPEAT buttons at the same time.
3. The "C-2" code is displayed 2 or 3 seconds later to indicate the automatic adjustment mode.

Note:

When the SL-CH510 is removed from its set and then operated, "U-70" is displayed on the FL display as an error code.

Even if the buttons are pushed continuously after this indication, the display will automatically change to "C-2".

4. After automatic adjustment, the code display indicates the location of failures in the servo circuit.

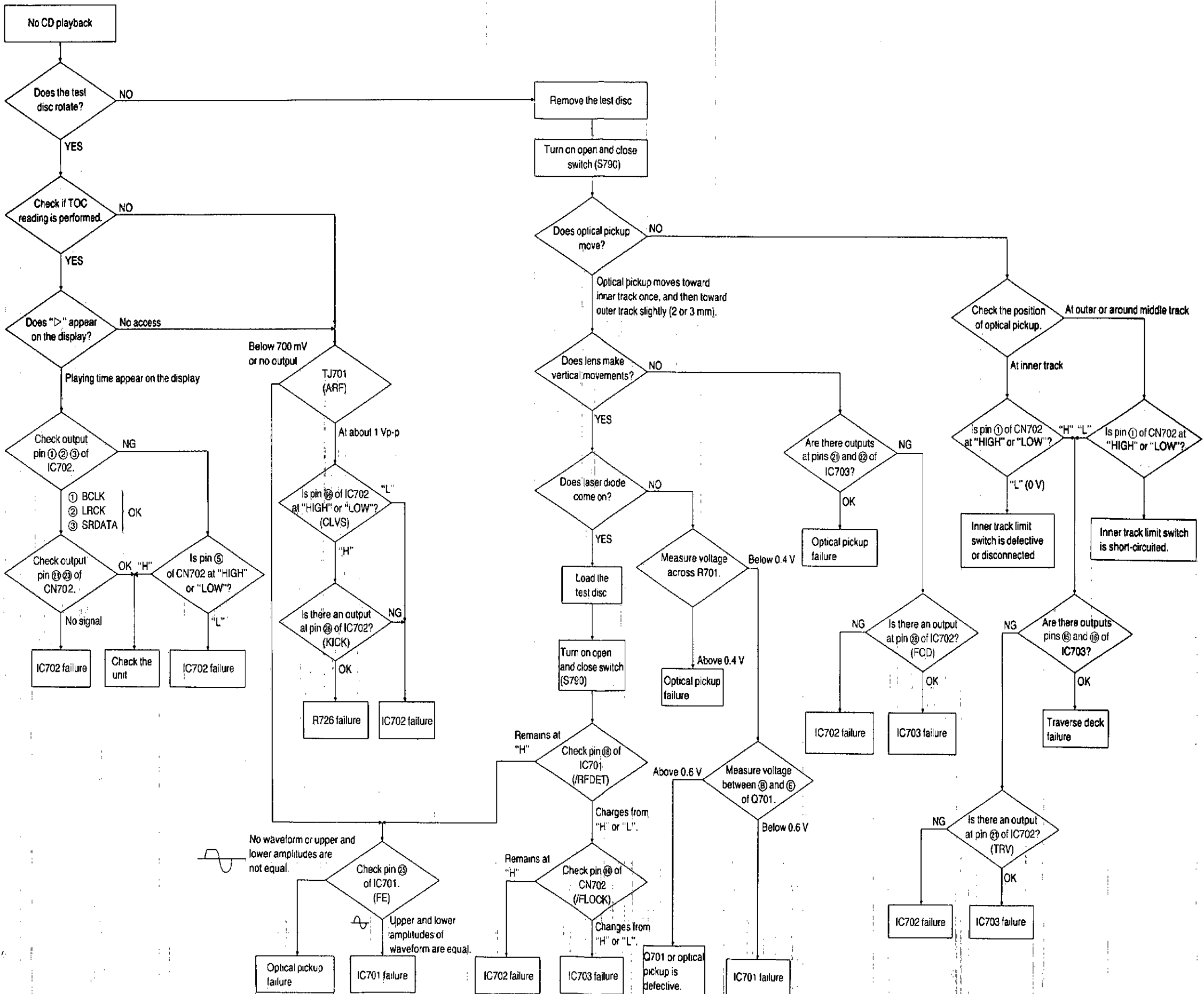
Troubleshooting using the automatic adjustment code

Notes:

1. If "E-00" is displayed as an error code, this means no error was found.
2. Check the disc and laser-detector lens for damage, contamination or stains.

FL error code display	Symptom	Probable cause	Signal to check		Normal voltage and waveform values	
			Location	Signal name	PLAY	STOP
E-01	Focus and tracking offset adjustments not completed in specified time period.	① Clocks X1 and X2, power supply VDD, and reset/RST, all on IC702. ② MDATA, MCLK, MLD, and SENSE signals to/from mechanism controller.	IC702 ⑥ pin	MDATA		4.8V
			IC702 ⑦ pin	MCLK		4.8V
			IC702 ⑨ pin	MLD		
			IC702 ⑩ pin	SENSE	0V	0V
			IC702 ⑪ pin	/RST	4.9V	4.9V
			IC702 ⑫ pin	X1		
			IC702 ⑬ pin	X2		
			IC702 ⑭ pin			
E-03 E-05 E-07 E-08 E-0D E-0F	Disc play unstable	① Scratches or contaminants on disc surface ② Focus and Tracking servo circuits (check waveforms, voltages, and part values.) ③ Spindle driver circuit ④ Optical pickup	IC702 ⑮ pin	FE		2.4V
			IC702 ⑯ pin	TE		2.4V
			IC702 ⑰ pin	FOD	2.4V	2.4V
			IC702 ⑱ pin	TRD	2.4V	2.4V
			IC702 ⑲ pin	KICK	2.4V	2.4V
			IC702 ⑳ pin	/FLOCK	0V	4.9V
			IC702 ㉑ pin	/RFDET	0V	4.8V
			TJ701	RF		3.4V
			IC702 ㉒ pin	STAT	4.9V	0V
			IC702 ㉓ pin	FBAL	2.5V ± 1.25V	2.5V ± 1.25V
E-4 E-6 E-C E-E	Best "eye" (PD balance) adjustment not completed in specified time period.	① Scratches or contaminants on disc surface ② Focus servo circuits (check waveforms, voltages, and part values.) ③ Optical pickup	TJ701	RF		3.4V
			IC702 ㉔ pin	FE		0V
			IC702 ㉕ pin	QFT	0V	0V
			IC702 ㉖ pin	/FLOCK	0V	0V
			IC702 ㉗ pin			
E-8 E-A	Focus or Tracking gain adjustment not completed in specified time period.	① Scratches or contaminants on disc surface ② Focus and Tracking servo circuit (check waveforms, voltages, and part values.) ③ Optical pickup	IC702 ㉘ pin	FE		2.4V
			IC702 ㉙ pin	TE		2.4V
			IC702 ㉚ pin	QFT	0V	0V
			IC702 ㉛ pin	/FLOCK	0V	0V

Troubleshooting Guide



■ Function of IC Terminals

● IC401 (LC66304A4D86)

Pin No.	Terminal Name	I/O	Function
1	REST SW	I	Innermost track sense switch detection signal input
2	SERVO RST	O	Reset signal output
3	STAT	I	Status signal input
4	SUBQ	I	Sub-code Q data input
5	D MUTE	—	Unused, open
6	NC	—	Connected to VDD (+5 V)
7	SQCK	O	Sub-code Q data clock output
8	BLKCK	I	Sub-code block data clock input
9	ODI RX	I	Connected to VDD (+5V)
10	GMUTE	—	Unused, open
11	NU	—	Connected to VDD (+5 V)
12	NU	—	Connected to VDD (+5 V)
13	/MLD	O	Microprocessor command load signal output
14	MDATA	O	Microprocessor command data output
15	TEST	—	Connected to GND
16	VSS	—	Connected to GND
17	OSC1	I	Clock signal input from X401 (4.23 MHz)
18	NC	—	Connected to GND
19	NC	—	Connected to GND
20	OSC2	O	Clock signal output for X401 (4.23 MHz)
21	/RST	I	Reset signal input
22	MCLK	O	Microprocessor command clock output
23	NU	—	Unused, open
24	ENPHA	—	Unused, open
25	MUTE	—	Unused, open

Pin No.	Terminal Name	I/O	Function
26	CS	I	Input the serial data communication starting signal from IC601 of system control
27	REQ	I	Input the command request data signal from IC601 of system control
28	DT	I/O	Input/output the serial data signal
29			
30	NC	—	Connected to GND
31	CLK	O	Output the serial clock signal from IC601 of system control
32	NU	—	Unused, open
33	NU	—	Connected to GND
34			
35			
36	CS	—	Connected to VDD (+5 V)
37	NU	—	Connected to VDD (+5 V)
38	CS	—	Connected to VDD (+5 V)
39	VDD	I	Power supply (+5 V)
40	CLOSE SW	I	Disc tray "close" sense switch detection signal input
41	OPEN SW	I	Disc tray "open" sense switch detection signal input
42	NC	—	Connected to VDD (+5 V)
43			
44	/CLOSE	O	Disc tray "close" command signal output
45	/OPEN	O	Disc tray "open" command signal output
46	SENSE	I	Sense signal input
47	/FLOCK	I	Focus servo command signal input
48	/TLOCK	I	Tracking servo command signal input

● IC601 (M38112M4104F)

Pin No.	Terminal Name	I/O	Function
1	REQ	O	Output the command request data signal for IC401 of system control
2	GRST	—	Unused, open
3 4 6	NC	—	Unused, open
7	CS	O	Output the serial communication starting signal for IC401 of system control
8	CLK	I	Input the serial clock signal for IC401 of system control
9	DOUT	O	Output the serial data signal for IC401 of system control
10	DIN	I	Input the serial data signal from IC401 of system control
11 14	KIN3 KIN0	I	Signal input from operation key
15 17	KS2 KS0	O	Strobe signal output for operation key scanning
18	HOLT	I	Detection signal input for an electricity failure
19	RST	I	Reset signal input
20	XCIN	—	Connected to GND
21	XCOUT	—	Unused, open
22	XIN	I	Clock signal input from X601 (4.23 MHz)
23	XOUT	O	Clock signal output for X601 (4.23 MHz)
24	GND	—	Connected to GND

Pin No.	Terminal Name	I/O	Function
25	SCDG	I	Connected to GND
26	GMUTE	—	Unused, open
27	NU	—	Connected to GND
28	CS	—	Connected to VDD (+5 V)
29	PLED1	O	Output signal for PLAY LED lighting
30	PLED2		
31	NU	—	Unused, open
32 40	G1 G9	O	Grid signal output for FL display
41 56	S16 S1	O	Segment signal output for FL display
57	VDD	—	Supplied +5 V
58	VP	—	Supplied power to FL display for pulling down
59	BSDTO	O	Data signal output to bus
60	BCKO	O	Clock signal output to bus
61	BSDTI	I	Data signal input from bus
62	BCKI	I	Clock signal input from bus
63	/CD	O	AF signal switching
64	OD POWER	O	Reset signal output for IC401

● IC703 (AN8389SE1)

Pin No.	Terminal Name	I/O	Function
1	Vcc	I	Power supply
2	VREF	I	VREF input
3	IN4	I	Motor driver (4) input
4	IN3	I	Motor driver (3) input
5	GND	—	Ground connection
6	NC	—	Ground connection
7	NRESET	—	Reset input
8	GND	—	Ground connection
9	IN2	I	Motor driver (2) input
10	PC2	I	PC2 (power cut) input
11	IN1	I	Motor driver (1) input
12	PC1	I	PC1 (power cut) input (no use, open)

Pin No.	Terminal Name	I/O	Function
13	PVcc1	I	Power supply (1) for driver
14	PGND1	—	Ground connection (1) for driver
15	D1—	O	Motor driver (1) reverse-action output
16	D1+	O	Motor driver (1) forward-action output
17	D2—	O	Motor driver (2) reverse-action output
18	D2+	O	Motor driver (2) forward-action output
19	D3—	O	Motor driver (3) reverse-action output
20	D3+	O	Motor driver (3) forward-action output
21	D4—	O	Motor driver (4) reverse-action output
22	D4+	O	Motor driver (4) forward-action output
23	PGND2	—	Ground connection (2) for driver
24	PVcc2	I	Power supply (2) for driver

●IC701 (AN8802SCE1V)

Pin No.	Terminal Name	I/O	Function
1	PDAD	I	PD A channel signal input with delay
2	PDA	I	PD A channel signal input without delay
3	LPD	I	Laser PD connection
4	LD	O	Power supply for LD driving
5	AMPI	I	RF amplifier input
6	Vcc	I	Power supply connection
7	AMPO	O	RF amplifier output (no use, open)
8	CAGC	I	AGC loop filter connection
9	ARF	O	RF AGC output
10	CENV	I	Capacitor connection for RF detection
11	CEA	I	Capacitor connection for HPF amplifier
12	GND	—	Ground connection
13	LDON	I	ON/OFF input of LD APC ("H": ON, "L": OFF)
14	TES	I	Tracking error shunt signal input ("H": shunt)
15	PLAY	I	Play signal input ("H": PLAY)
16	WVEL	I	WVEL control
17	BDO	O	BDO output
18	/RFDET	O	NRFDET output
19	CROSS	O	CROSS output
20	OFTR	O	OFTR output
21	VDET	O	VDET output
22	ENV	O	ENV output
23	TEBPF	I	Vibration detection input
24	TE	O	Tracking error output
25	FE	O	Focus error output
26	PTO	O	Potential amplifier output (no use, open)
27	PTI	I	Potential amplifier inversion input (no use, open)
28	TBAL	I	Tracking balance input
29	FBAL	I	Focus balance input
30	VREF	O	VREF output
31	PDB	I	PD B channel signal input without delay
32	PDBD	I	PD B channel signal input with delay

●IC702 (MN66271RA)

Pin No.	Terminal Name	I/O	Function
1	BCLK	—	Bit clock output for serial data (no used, open)
2	LRCK	—	L/R identification signal output (no use, open)
3	SRDATA	—	Serial data output (no used, open)
4	DV ₀₀ 1	I	Power supply input (for digital circuit)
5	DV _{ss} 1	—	GND (for digital circuit)
6	TX	O	Digital audio interface signal output
7	MCLK	I	Microprocessor command clock signal input (Latches data at first transition)
8	MDATA	I	Microprocessor command data signal input
9	MLD	I	Microprocessor command load signal input
10	SENSE	O	Sence signal output (OFT, FESL, MAGEND, NAJEND, POSAD, SFG)
11	/FLOCK	O	Focus servo feeding signal output ("L": Feed)
12	/TLOCK	O	Tracking servo feeding signal output ("L": Feed)
13	BLKCK	O	Sub-code block clock signal output (IBLKCK=75 Hz during normal playback)
14	SQCK	I	External clock signal input for sub-code Q register
15	SUBQ	O	Sub-code Q code output
16	DMUTE	I	Muting input ("H": Mute)
17	STAT	O	Status signal output (CRC, CUE, CLVS, TTSTVP, FCLV, SQCK)
18	/RST	I	Reset input
19	SMCK	—	1/2-divided clock signal of crystal oscillating at MSEL="H" (ISMCK=8.4672 MHz) 1/4-divided clock signal of crystal oscillating at MSEL="L" (ISMCK=4.2336 MHz)
20	PMCK	—	1/192-divided clock signal of crystal oscillating (IPMCK=88.2 KHz) (no use, open)
21	TRV	O	Traverse forced feed output
22	TVD	O	Traverse drive output
23	PC	O	Spindle motor ON signal output ("L": ON)
24	ECM	O	Spindle motor drive signal output (forced mode output)
25	ECS	O	Spindle motor drive signal output (servo error signal output)
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive output
28	FOD	O	Focus drive output

Pin No.	Terminal Name	I/O	Function
29	VREF	I	D/A (drive) output (TVD, ECS, TRD, FOD, FBAL, TBAL) Reference voltage input
30	FBAL	O	Focus balance adjustment output
31	TBAL	O	Tracking balance adjustment output
32	FE	I	Focus error signal input (analog input)
33	TE	I	Tracking error signal input (analog input)
34	RFENV	I	RF envelope signal input
35	VDET	I	Vibration detection signal input ("H": detection)
36	OFT	I	Off-track signal input ("H": off track)
37	TRCRS	I	Track cross signal input
38	/RFDET	I	RF detection signal input ("L": detection)
39	BDO	I	Dropout signal input ("H": Dropout)
40	LDON	O	Laser on signal output ("H": ON)
41	TES	O	Tracking error shunt signal output ("H": shunt)
42	PLAY	O	Play signal out ("H": PLAY)
43	WVEL	O	Double speed status signal output ("H": Double speed)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias (no use, open)
47	DSLIF	I/O	DSL loop filter
48	PLLIF	I/O	PLL loop filter
49	VCOF	—	VCO loop filter (no use, open)
50	AV ₀₀ 2	I	Power supply input (for analog circuit)
51	AV _{ss} 2	—	GND (for analog circuit)
52	EFM	—	EFM signal output (not use, open)
53	PCK	—	PLL extraction clock output (IPCK=4.321 MHz during normal playback) (no use, open)
54	PDO	—	Phase comparison signal of EFM and PCK signals (no use, open)
55	SUBC	O	Sub-code serial data output (no use, open)
56	SBCK	I	Clock input for sub-code serial data (no use, open)
57	Vss	—	GND
58	X1	I	Crystal oscillating circuit input (f=16.9344 MHz)
59	X2	O	Crystal oscillation circuit output (f=16.9344 MHz)
60	V ₀₀	I	Power supply input (for oscillating circuit)
61	BYTCK	—	Byte clock output (no use, open)

Pin No.	Terminal Name	I/O	Function
62	/CLDCK	O	Sub-code frame clock signal output (ICLDCK=7.35 kHz during normal playback)
63	FCLK	—	Crystal frame clock signal output (IFCLK=7.35 kHz, double = 14.7 kHz)
64	PFLAG	O	Interpolation flag output ("H": Interpolation) (no use, open)
65	FLAG	O	Flag output (no use, open)
66	CLVS	O	Spindle servo phase synchronizing signal output ("H": CLV, "L": rough servo) (no use, open)
67	CRC	O	Sub-code CRC checked output ("H": OK, "L": NG) (no use, open)
68	DEMPH	O	De-emphasis ON signal output ("H": ON) (no use, open)
69	RESY	—	Frame resynchronizing signal output (no use, open)
70	/RST2	I	Reset input through MASH circuit ("L": Reset)
71	/TEST	I	Test input
72	AV ₀₀ 1	I	Power supply input (for analog circuit)
73	OUTL	O	Left channel audio signal output
74	AV _{ss} 1	—	GND
75	OUTR	O	Right channel audio signal output
76	RSEL	I	RF signal polarity assignment input (at "H" level, RSEL="H"; at "L" level, RSEL=L)
77	CSEL	—	Crystal oscillating frequency designation input ("L": 16.9344 MHz, "H": 33.8688 MHz)
78	PSEL	—	Test input (normally, "L") (no use, open)
79	MSEL	—	Output frequency switching for SMCK terminal "H": SMCK=8.4672 MHz "L": SMCK=4.2336 MHz (no use, open)
80	SSEL	I	Output mode switching of SUBQ terminal ("H": Q code buffer mode)

Replacement Parts List

Notes: *Important safety notice:

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

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

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

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

Parts without these indications can be used for all areas.

*Warning: This product uses a diode. Refer to caution statements on page 2.

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

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)					
IC1	LM2940T5	IC, REGULATOR	Δ	X401	EFOEC4234T3	OSCILLATOR (4. 23MHz)	
IC401	LC66304A4D86	IC, SYSTEM CONTROL		X601	EFOEC4234T3	OSCILLATOR (4. 23MHz)	
IC601	M38112M4104F	IC, FL DRIVE/SYSTEM CONT.		X701	RSXB16M9J01T	OSCILLATOR (16. 9344MHz)	
IC602	LA5608M-TE-L	IC, BUS LINE/HALT/RESET				DISPLAY TUBE	
IC701	AN8802SCE1V	IC, SERVO AMP.		FL601	RSL0185-F	DISPLAY TUBE	
IC702	MN66271RA	IC, SERVO PROCESSOR				SWITCH(ES)	
IC703	AN8389SE1	IC, MOTOR DRIVE					
IC790	TA7291S	IC, MOTOR DRIVE		S601	EVQ21405R	SW, R. SKIP/R. SEARCH	
IC801	XRA4558FT1	IC, L. P. F.		S602	EVQ21405R	SW, F. SKIP/F. SEARCH	
IC802	TC4066BFTP1	IC, SWITCHING		S603	EVQ21405R	SW, REPEAT	
		TRANSISTOR(S)		S604	EVQ21405R	SW, RANDOM	
				S605	EVQ21405R	SW, LAST FADE	
Q1, 2	2SD2137PQTA	TRANSISTOR	Δ	S606	EVQ21405R	SW, JUST FIT	
Q4	2SD2137PQTA	TRANSISTOR	Δ	S607	EVQ21405R	SW, ALBUM	
Q5	2SB1238QTV6	TRANSISTOR	Δ	S608	EVQ21405R	SW, TRAY OPEN/CLOSE	
Q701	2SB709S	TRANSISTOR		S611	EVQ21405R	SW, STOP	
Q801	UN4112	TRANSISTOR		S612	EVQ21405R	SW, PAUSE	
		DIODE(S)		S613	EVQ21405R	SW, PLAY	
				S701	RSM0006-P	SW, REST	
D1, 2	RL1N4003N02	DIODE	Δ	S790	RSH1A005	SW, LOADING CLOSE DETECT	
D3	RL1N4003N02	DIODE		S791	RSH1A005	SW, LOADING OPEN DETECT	
D4	MA4082LTA	DIODE	Δ			CONNECTOR(S)	
D5, 6	MA167	DIODE	Δ				
D7, 8	MA165	DIODE		CN401	RJP6G18ZA	CONNECTOR(6P)	
D9	MA4051MTA	DIODE	Δ	CN402	RJS1A6823	SOCKET (23P)	
D11, 12	MA185TA	DIODE	Δ	CN601	RJS1A6814	SOCKET (14P)	
D13	MA4270HTA	DIODE	Δ	CN701	RJU035T016-1	SOCKET (16P)	
D15	MA4051MTA	DIODE	Δ	CN702	RJS1A6723-1Q	SOCKET (23P)	
D16	MA185TA	DIODE	Δ	CP601	RJS1A6714	SOCKET (14P)	
D602-604	MA165	DIODE		CP790	RJP6G17ZA	CONNECTOR(6P)	
D606	SPR-305MDTF	LED					
D608, 609	MA165	DIODE				GND PLATE	
D610	MA4051MTA	DIODE	Δ	E1	SNE1004-2	GND PLATE	
		COIL(S)				JACK	
				JK801	RJT065K15	SYSTEM CONNECTOR	
L1, 2	BL02RN2R65T2	COIL	Δ			TEST JUMPER(S)	
L3, 4	ELEXT3R3KA9	COIL				TEST JUMPER	
L601	RLQA100JT-Y	COIL					
		OSCILLATOR(S)					

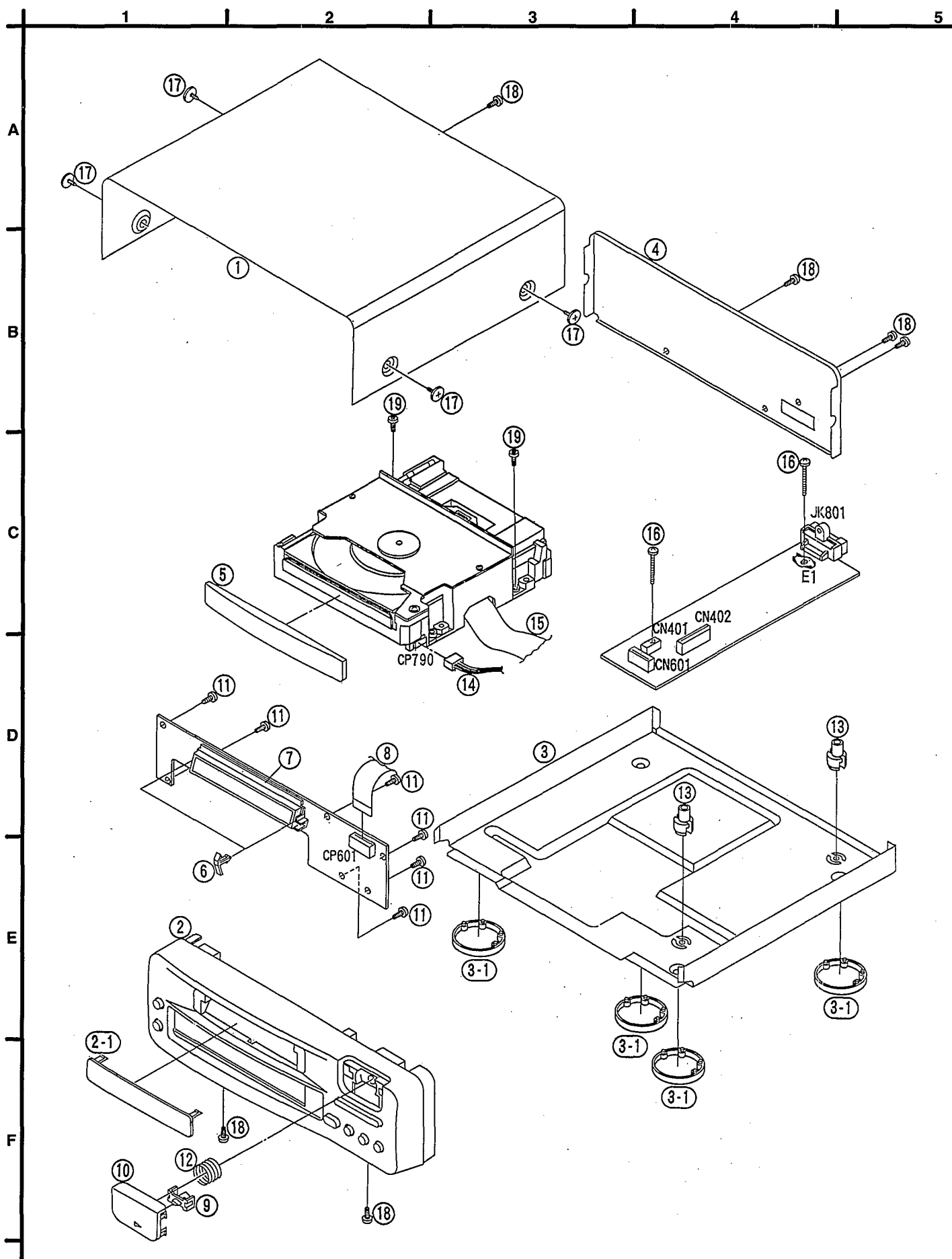
Notes : * Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
 * Resistance values are in ohms, unless specified otherwise, 1K=1,000(OHM) , 1M=1,000k(OHM)

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS	R702	ERJ6GEYJ471V	1/10W 470	C1, 2	ECBT1E103ZF	25V 0.01U
			R703	ERJ6GEYJ823	1/10W 82K	C3	ECA1CM222B	16V 2200U Δ
			R704	ERJ6GEYJ102A	1/10W 1K	C4	ECEA1AKA101B	10V 100U
R1	ERQ16NKR15E	1/6W 0.15 Δ	R705	ERJ6GEYJ103V	1/10W 10K	C5	ECBT1H102KB5	50V 1000P
R2	ERDS1FVJ271T	1/2W 270 Δ	R706	ERJ6GEYJ102A	1/10W 1K	C6	ECEA1AKA221B	10V 220U
R3	ERD2FCVJ6R8T	1/4W 6.8 Δ	R707	ERJ6GEYJ473V	1/10W 47K	C7	RCE0JKA221BV	6.3V 220U
R4, 5	ERDS2TJ1R2	1/4W 1.2	R708	ERJ6GEYJ104V	1/10W 100K	C8, 9	ECA1VFQ121B	35V 120U
R7	ERDS2TJ1R2	1/4W 1.2	R709	ERJ6GEYJ683V	1/10W 68K	C10	ECA1EM101B	25V 100U Δ
R8	ERDS2TJ220T	1/4W 22	R711	ERJ6GEYJ154V	1/10W 150K	C11, 12	ECA1HM470B	50V 47U
R9	ERDS2TJ562	1/4W 5.6K	R712	ERJ6GEYJ221V	1/10W 220	C13	ECBT1H102KB5	50V 1000P
R10	ERDS2TJ562	1/4W 5.6K	R714	ERJ6GEYJ121V	1/10W 120	C401	ECBT1E103ZF	25V 0.01U
R11	ERDS2TJ472	1/4W 4.7K	R717, 718	ERJ6GEYJ102A	1/10W 1K	C402	ECBT1H104ZF5	50V 0.1U
R13	ERD2FCVJ4R7T	1/4W 4.7 Δ	R721	ERJ6GEYJ101V	1/10W 100	C403	ECBT1H102KB5	50V 1000P
R14, 15	ERG1SJ150E	1W 15	R722	ERJ6GEYJ563V	1/10W 56K	C404	ECBT1E103ZF	25V 0.01U
R16	ERD2FCVJ4R7T	1/4W 4.7 Δ	R723	ERJ6GEYJ182V	1/10W 1.8K	C601	ECBT1H104ZF5	50V 0.1U
R17, 18	ERG1SJ150E	1W 15	R724	ERJ6GEYJ333V	1/10W 33K	C602, 603	ECEA1HKA3R3B	50V 3.3U
R19, 20	ERDS2TJ100	1/4W 10	R725	ERJ6GEYJ472V	1/10W 4.7K	C604	ECEA0JKA470B	6.3V 47U
R21	ERG1SJ180E	1W 18	R726	ERJ6GEYJ473V	1/10W 47K	C605	ECBT1H102KB5	50V 1000P
R22	ERDS2TJ562	1/4W 5.6K	R727	ERJ6GEYJ103V	1/10W 10K	C606	ECBT1E103ZF	25V 0.01U
R23	ERDS2TJ471	1/4W 470	R728	ERJ6GEYJ392V	1/10W 3.9K	C608	ECBT1E103ZF	25V 0.01U
R26, 27	ERDS2TJ271	1/4W 270	R731	ERJ6GEYJ392V	1/10W 3.9K	C610	ECEA1HKAR22B	50V 0.22U
R28	ERDS2TJ101	1/4W 100	R735, 736	ERJ6GEYJ101V	1/10W 100	C611	ECEA1HKAR33B	50V 0.33U
R31-36	ERDS2TJ100	1/4W 10	R744	ERJ6GEYJ103V	1/10W 10K	C612	ECBT1E223ZF	25V 0.022U
R402, 403	ERDS2TJ102	1/4W 1K	R745	ERJ6GEYJ155V	1/10W 1.5M	C613	ECBT1E103ZF	25V 0.01U
R404-407	ERDS2TJ152	1/4W 1.5K	R748	ERJ6GEYJ182V	1/10W 1.8K	C701	ECEA0JKA220	6.3V 22U
R408	ERDS2TJ104	1/4W 100K	R749	ERJ8GEYJ103V	1/8W 10K	C702	ECEA1HKA010I	50V 1U
R409, 410	ERDS2TJ103	1/4W 10K	R801, 802	ERDS2TJ102	1/4W 1K	C703	ECEA0JKA101I	6.3V 100U
R411	ERDS2TJ472	1/4W 4.7K	R803, 804	ERDS2TJ104	1/4W 100K	C704	ECUZ1E104MBN	25V 0.1U
R412	ERDS2TJ102	1/4W 1K	R805-808	ERDS2TJ223	1/4W 22K	C705	ECEA1HKA010I	50V 1U
R413	ERDS2TJ472	1/4W 4.7K	R809, 810	ERDS2TJ273	1/4W 27K	C706	ECUE1H101JCN	50V 100P
R414	ERDS2TJ102	1/4W 1K	R811, 812	ERDS2TJ332	1/4W 3.3K	C707	ECUV1E273KBN	25V 0.027U
R415	ERDS2TJ105T	1/4W 1M	R813, 814	ERDS2TJ104	1/4W 100K	C708	ECUE1H472KBN	50V 4700P
R421	ERDS2TJ223	1/4W 22K	R815, 816	ERDS2TJ102	1/4W 1K	C709	ECUE1C473KBN	16V 0.047U
R427	ERDS2TJ103	1/4W 10K	R817, 818	ERDS2TJ104	1/4W 100K	C710	ECUE1H152KBN	50V 1500P
R428	ERDS2TJ223	1/4W 22K	R819	ERDS2TJ103	1/4W 10K	C711, 712	ECUZ1E104MBN	25V 0.1U
R429	ERDS2TJ102	1/4W 1K				C713	ECUV1C104MBM	16V 0.1U
R601-604	ERDS2TJ473	1/4W 47K			CHIP JUMPER(S)	C714	ECEA0JKA101I	6.3V 100U
R605	ERDS2TJ101	1/4W 100				C715	ECEA0JKA470I	6.3V 47U
R606	ERDS2TJ104	1/4W 100K	J701, 702	ERJ8GEYOR00A	1/8W 0	C716	ECUE1H561KBN	50V 560P
R607	ERDS2TJ103	1/4W 10K	J707-709	ERJ8GEYOR00A	1/8W 0	C717	ECUZ1E104MBN	25V 0.1U
R608, 609	ERDS2TJ102	1/4W 1K	J714	ERJ8GEYOR00A	1/8W 0	C718	ECUV1C224KBM	16V 0.22U
R610-613	ERDS2TJ101	1/4W 100	J716-718	ERJ8GEYOR00A	1/8W 0	C721	ECUV1H070PCN	50V 7P
R614, 615	ERDS2EJ121	1/4W 120	J721	ERJ6GEYOR00A	1/10W 0	C722	ECUV1H220JCN	50V 22P
R616	ERDS2TJ104	1/4W 100K	J724-726	ERJ6GEYOR00A	1/10W 0	C723	ECEA1AKA221I	10V 220U
R618, 619	ERDS2TJ151	1/4W 150	J728, 729	ERJ8GEYOR00A	1/8W 0	C724	ECUV1C104MBM	16V 0.1U
R620, 621	ERDS2TJ1R2	1/4W 1.2	J731, 732	ERJ6GEYOR00A	1/10W 0	C725, 726	ECUV1H102JCN	50V 1000P
R632, 633	ERDS2TJ472	1/4W 4.7K				C727, 728	ECEA1HPK010I	50V 1U
R637	ERDS2TJ470	1/4W 47			CAPACITORS	C730	ECUZ1E104MBN	25V 0.1U
R701	ERJ6GEYJ100	1/10W 10				C731, 732	ECEA0JK221I	6.3V 220U

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Cabinet Parts Location



Loading Unit Parts Location

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Note:

When changing mechanism parts, apply the specified grease to areas marked "XX" as shown in the drawing.

Ref No.	Part No.
①	RFKXEM30L

