

Service Manual

CD Player

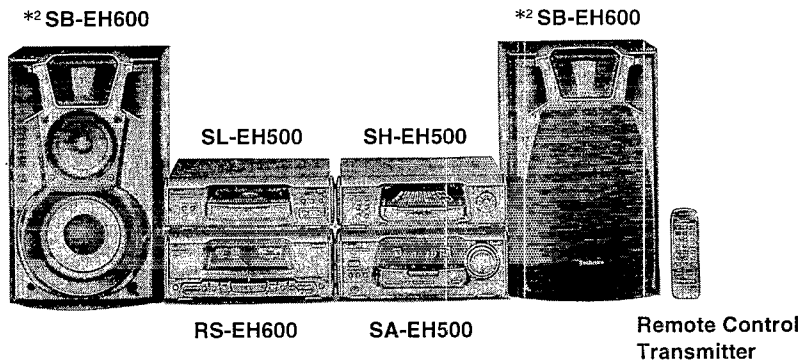
Compact Disc Player
SL-EH500

COMPACT
disc
DIGITAL AUDIO

MASH*1
multi-stage noise shaping

Colour

(H) Gray Type

Area(E) Europe, Russia, Asia,
Latin America, Middle
East and Africa.

System	SC-EH500
Sound Processor	SH-EH500
Tuner / Amplifier	SA-EH500
CD Player	SL-EH500
Cassette Deck	RS-EH600
Front Speakers*2	SB-EH600

*1 : MASH is a trademark of NTT

*2 : Made in PAES

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

RAE0152Z MECHANISM SERIES**Specifications****Audio Section**

No. of channels : 2 (left and right, stereo)
Wow and flutter : Below measurable limit
Digital filter : 8 fs
DA converter : 1 bit DAC MASH

General

Dimensions : 287(W) × 89(H) × 273(D) mm
Weight : 1.6 kg

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

Pickup Section

Wavelength : 780 nm

WARNING

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

Technics®

© 1998 Matsushita Electric Industrial Co., Ltd.
All rights reserved. Unauthorized copying
and distribution is a violation of law.

Contents

	Page	Page	
Handling Precautions for Traverse Deck	2	Printed Circuit Board Diagram	18, 19
Precaution of Laser Diode	2, 3	Type Illustration of IC's, Transistors and Diodes	20
Location of Controls	3	Wiring Connection Diagram	20
Operation Checks and Main Component Replacement Procedures	4 - 9	Block Diagram	21 - 22
To Supply Power Source	10	Terminal Function of IC's	23 - 25
To Check Signals	10	Troubleshooting Guide	26, 27
Error Code Display and Servo Adjustment Function	11, 12	Replacement Parts List	28, 29
Schematic Diagram	13 - 17	Cabinet Parts Location	30
		Loading Unit Parts Location	31

NOTE:
Refer to the service manual for Model No. SA-EH500 for information on "Accessories", "Connections", "Installation", and "Packaging".

CAUTION:

THIS PRODUCT UTILIZES A LASER.
USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

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 protect the laser diode against electrostatic breakdown, short the flexible board (FFC board) with a clip or similar object.
3. Take care not to apply excessive stress to the flexible board (FFC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

• Grounding for electrostatic breakdown prevention

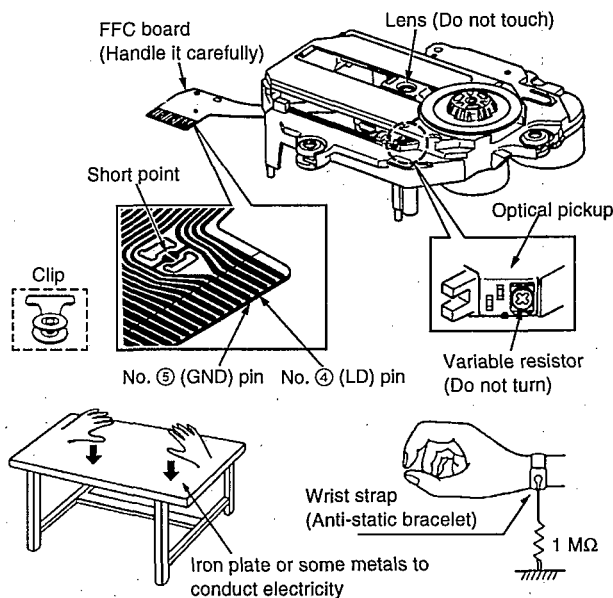
1. Human body grounding
Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table grounding
Put a conductive material (sheet) or steel sheet on the area where the traverse deck (optical pickup) is placed, and ground the sheet.

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).

Caution when Replacing the Traverse Deck:

The traverse deck has a short point shorted with solder to protect the laser diode against electrostatic breakdown. Be sure to remove the solder from the short point before making connections.



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.

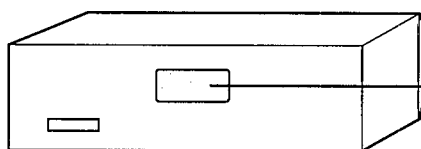
ACHTUNG: Dieses produkt enthält eine laserdiode. Im eingeschalteten zustand wird unsichtbare laserstrahlung von der lasereinheit adgestrahlt.

Wellenlänge: 780 nm

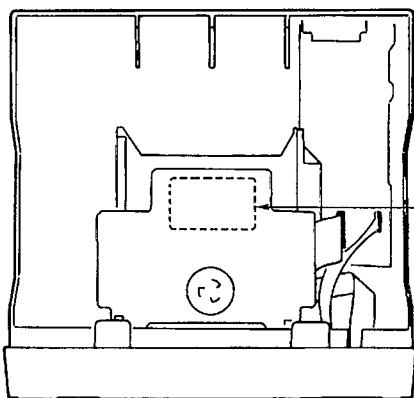
Maximale strahlungsleistung der lasereinheit: 100 μ W/VDE

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

1. Die lasereinheit nicht zerlegen, da die strahlung an der freigelegten laserdiode 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.

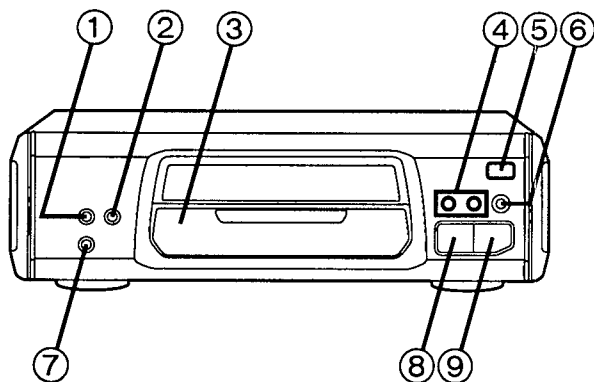


**CLASS 1
LASER PRODUCT**



DANGER	INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
ADVARSEL	USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO!	AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖNTÄ LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING	OSYNLIG LASERSTRÅLING NÅR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRakta EJ STARÄLEN.
ADVARSEL	USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNDGÅ EKSPONERING FOR STRÅLEN.
VORSICHT	UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.

Location of Controls



- ① Random play button (RANDOM)
- ② Repeat button (REPEAT)
- ③ Disc tray
- ④ Skip/search buttons (|◀◀/◀◀, ▶▶/▶▶|)
- ⑤ Disc tray open/close button (▲, OPEN/CLOSE)
- ⑥ Pause button (||)
- ⑦ AI edit button (AI EDIT)
- ⑧ Stop button (■)
- ⑨ Play button and indicator (▷)

■ Operation Checks and Main Component Replacement Procedures

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

ACHTUNG: •Die lasereinheit nicht zerlegen.

•Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.

- 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. Refer the parts No. on the page of "Main Component Replacement Procedures", if necessary.

● Contents

■ Checking Procedures for each P.C.B.

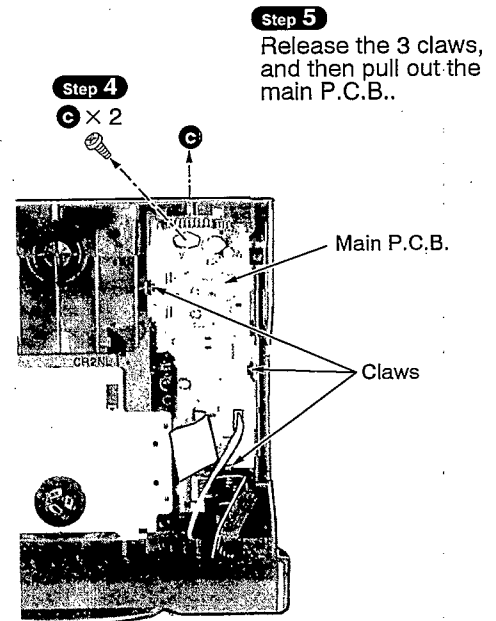
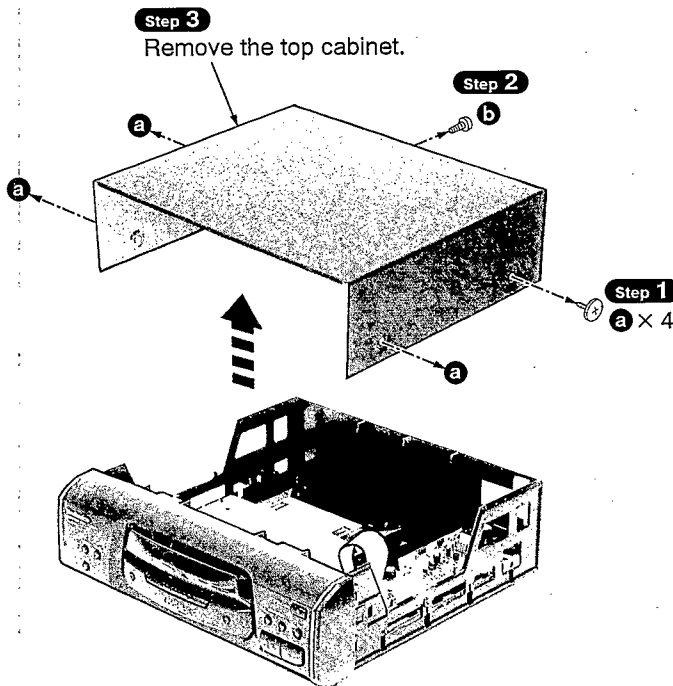
	Page.
1. Checking for the main P.C.B..	4,5.
2. Checking for the CD servo P.C.B. and operation P.C.B..	5,6.

■ Main Component Replacement Procedures

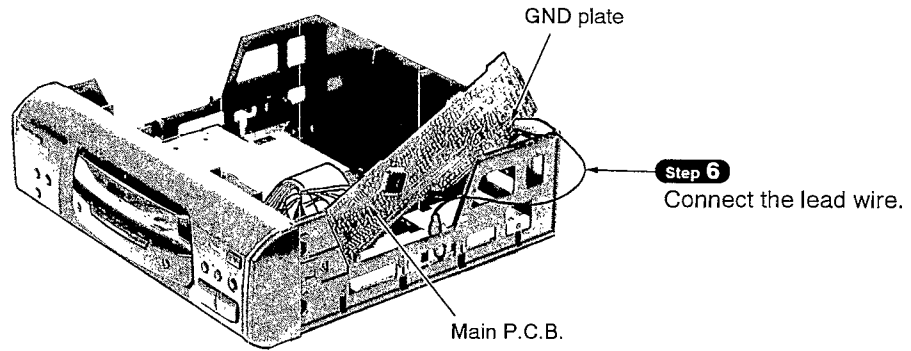
1. Replacement for the traverse deck ass'y.	6-9.
2. Replacement for the belt, loading motor ass'y and loading switch.	9.

■ Checking Procedure for each P.C.B.

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



• Check the main P.C.B. as shown below.

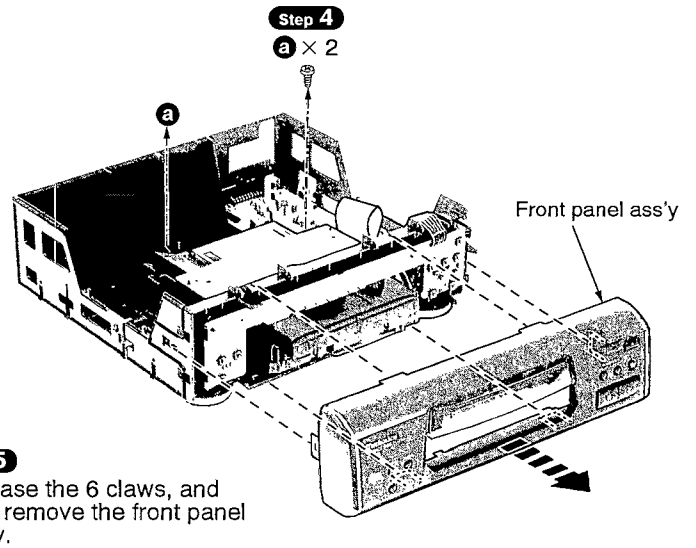
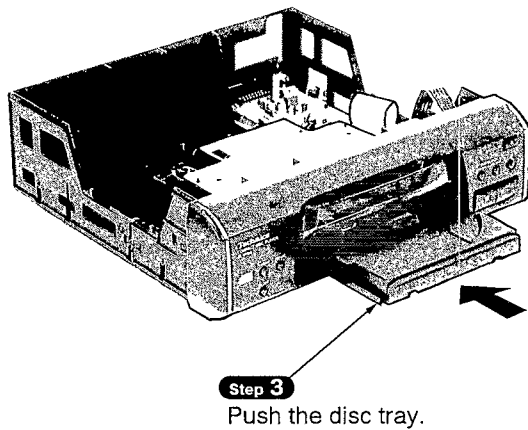
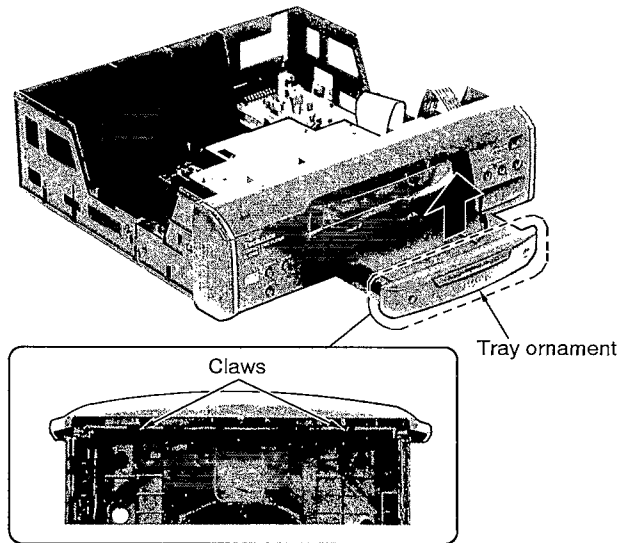
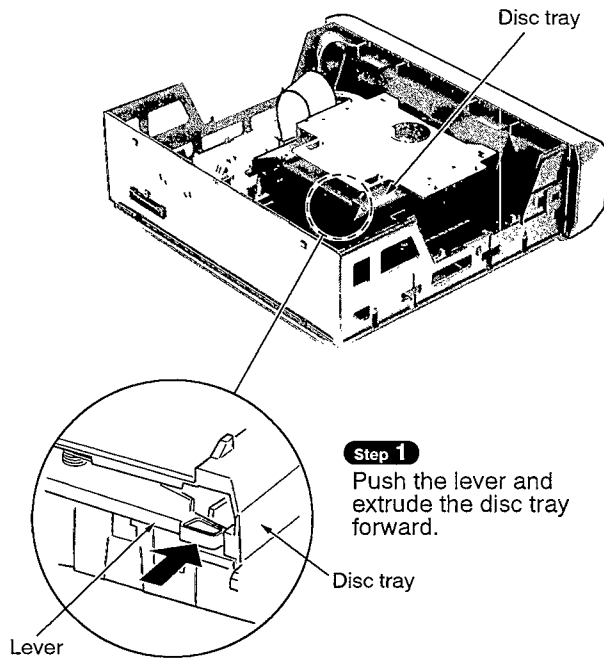


2. Checking for the servo P.C.B. and operation P.C.B.

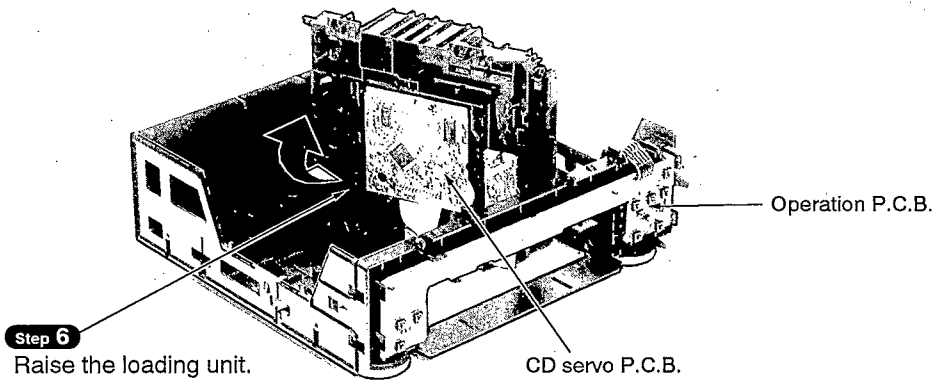
• Follow the item 1 (**Step 1** ~ **Step 3**) in checking procedures for each P.C.B. on page 4.

Step 2

Release the 2 claws, and then remove the tray ornament.



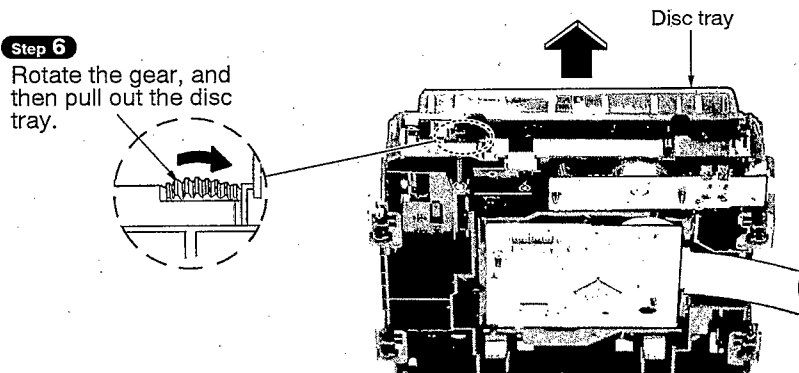
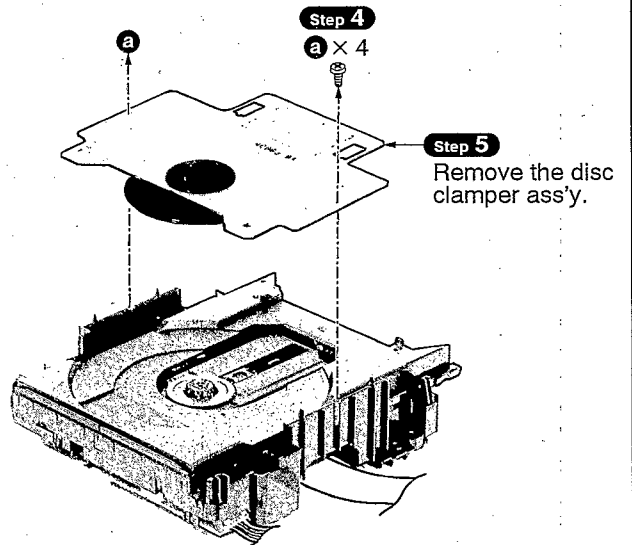
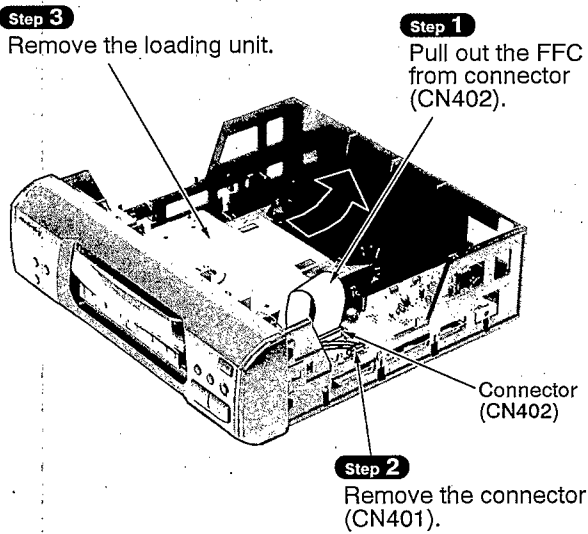
- Check the CD servo P.C.B. and operation P.C.B. as shown below.

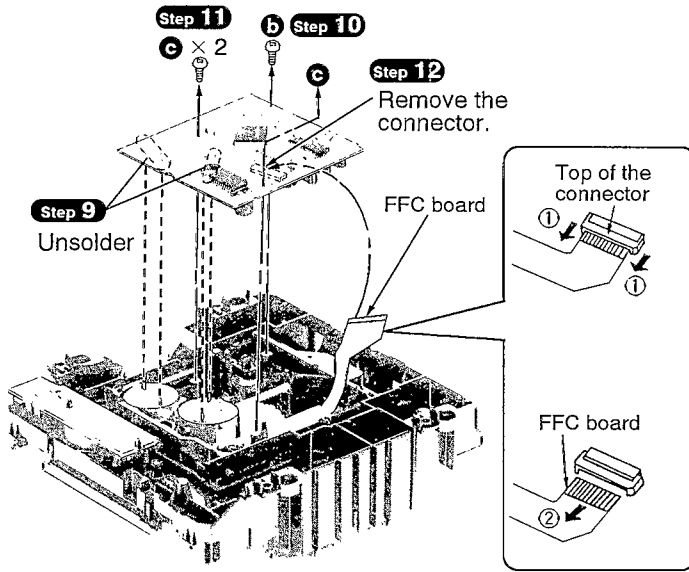
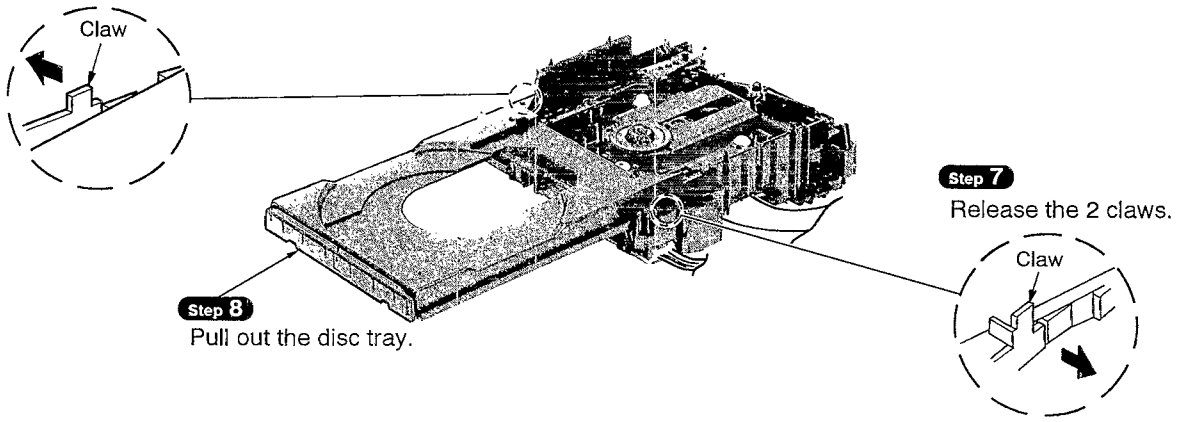


■ Main Component Replacement Procedures

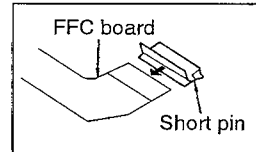
1. Replacement for the traverse deck ass'y

- Follow the item 1 (**Step 1** ~ **Step 3**) in checking procedures for each P.C.B. on page 4.
- Follow the item 2 (**Step 1** ~ **Step 4**) in checking procedures for each P.C.B. on page 5.

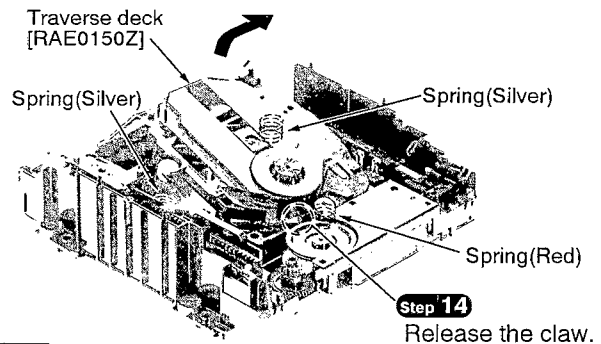
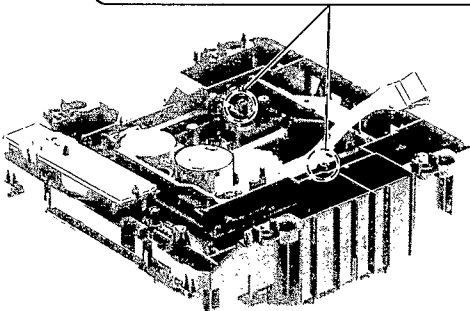
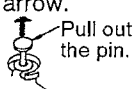
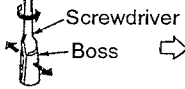




Caution:
Insert a short pin into the traverse unit FFC board.
(Refer to "Handling Precautions for Traverse Deck" on page 2.)



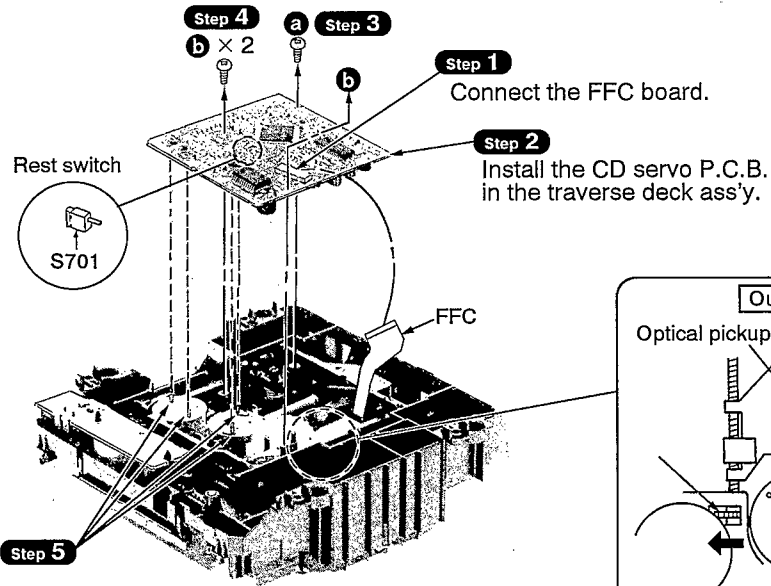
- Step 13**
1. Widen the boss using a regular screwdriver.
 2. Pull out the pin in the direction of the arrow.



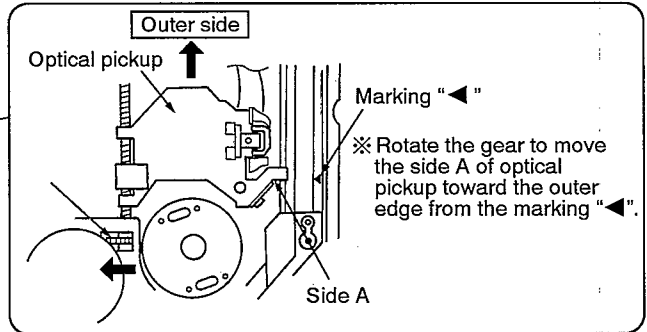
NOTE

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 CD servo P.C.B. after replacement

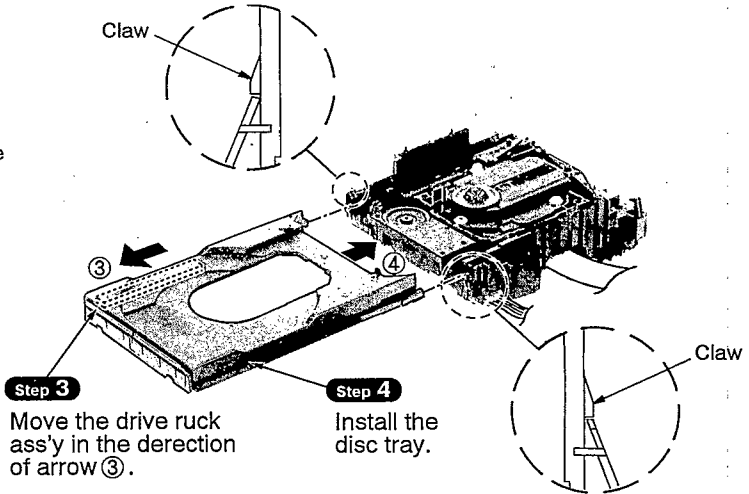
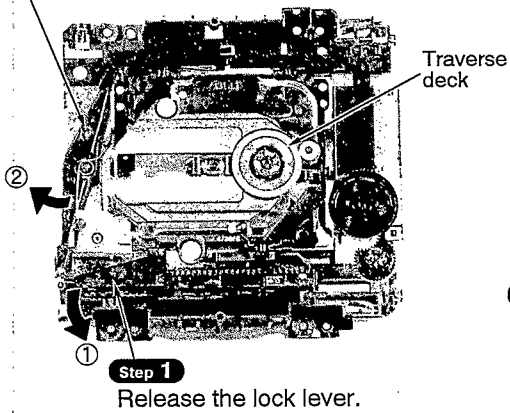


NOTE
 Before installing the CD servo P.C.B., move the optical pickup toward the outer edge from the mark "▼". [Otherwise, the rest detect switch (S701) mounted on the CD servo P.C.B. may be damaged.]

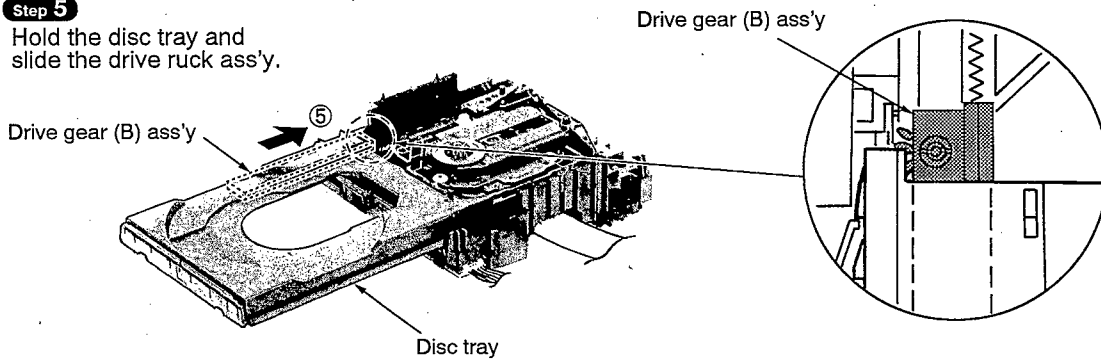


Installation of the disc tray after replacement

Step 2
 Operate the lever, and then locate the traverse deck to "UP" position.

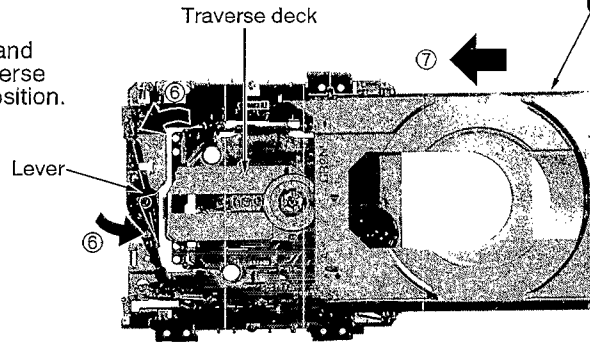


Step 5
 Hold the disc tray and slide the drive rack ass'y.



Step 6

Operate the lever, and then locate the traverse deck to "DOWN" position.

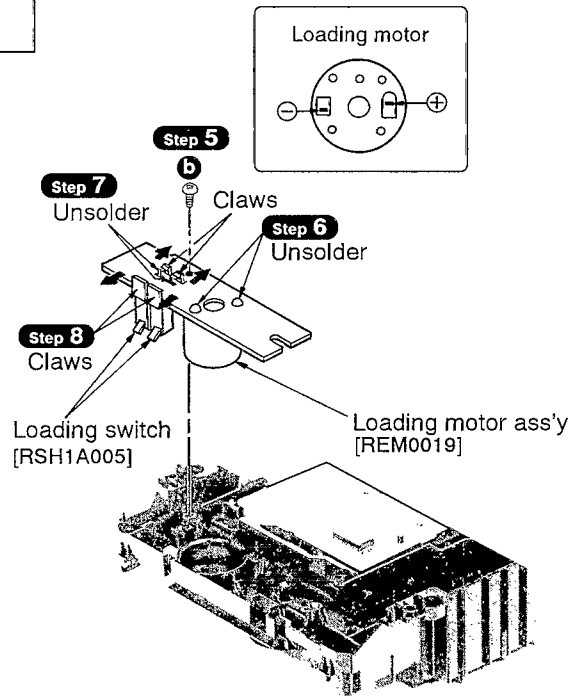
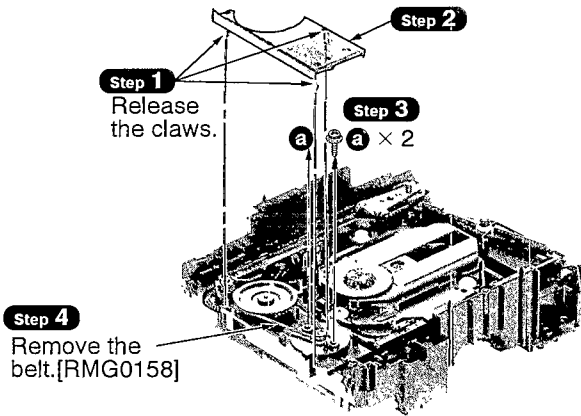


Step 7

Press the disc tray.

2. Replacement for the belt, loading motor ass'y and loading ass'y

- Follow the item 1 (**Step 1** ~ **Step 3**) in checking procedures for each P.C.B. on page 4.
- Follow the item 2 (**Step 1** ~ **Step 4**) in checking procedures for each P.C.B. on page 5.
- Follow the item 1 (**Step 1** ~ **Step 8**) in main component procedures on pages 6 and 7.



■ To Supply Power Source

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-EH500 is designed to operate on power supplied from the system connected. (For system connection, refer to Fig.1)

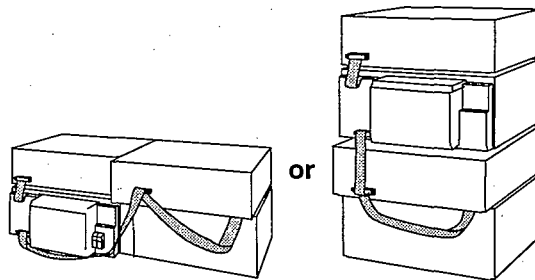


Fig. 1

When you have to test and service the unit SL-EH500 alone, use the following method to supply power source and operate the unit:

Apply +10 V DC power to the section between L402 (**DC10V**) and E401 (**GND**). (Shown in Fig.2)

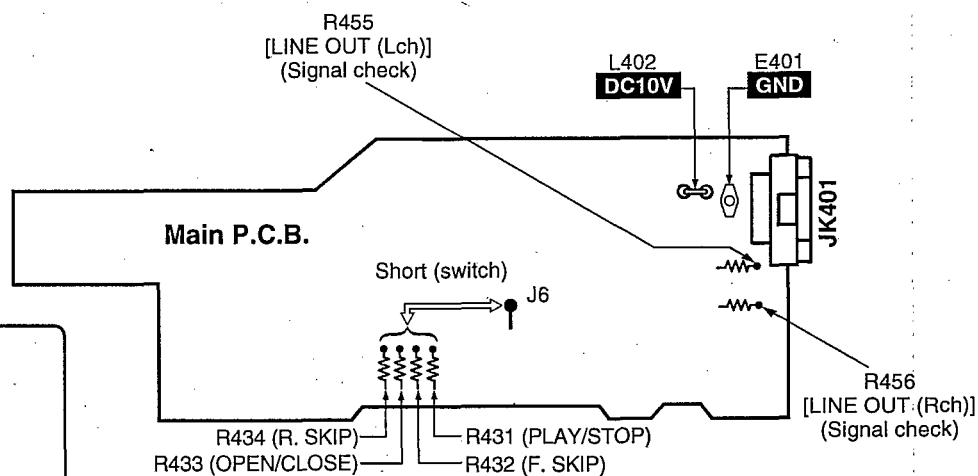
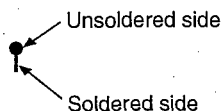


Fig. 2



Note:

The above symbol indicates a jumper soldered on one side. When this jumper is levered up using a ⊖ screwdriver, its unsoldered side is raised so that it can be seized with an alligator clip.

■ To Check Signals

Connect the oscilloscope or the speaker with built-in amplifier to the section between LINE OUT (L-ch) of the resistor R455 and the **GND** as well as the section between LINE OUT (R-ch) of the resistor R456 and the **GND** and check if the signals are outputting from this unit. (Shown in Fig. 2)

■ Error Code Display and Servo Adjustment Function

This unit has an error code display function, so that if the unit operates incorrectly, the fault is displayed using an error code on the FL display of the Tuner/Amplifier (SA-EH500). It also has a servo adjustment function for displaying the status of servo system functions (Focus, Tracking, CLV Servo) on the FL display of the Tuner/Amplifier.

The system control IC and FL display are part of the Tuner/Amplifier so make sure the system has been connected properly before using three functions. (This unit can be operated independently, although the error code display and servo adjustment functions cannot be used.)

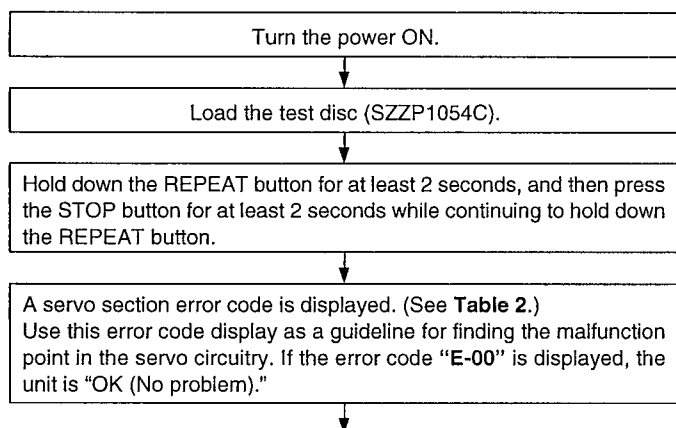
Use these two functions for guidance during fault diagnosis and repair.

Note:

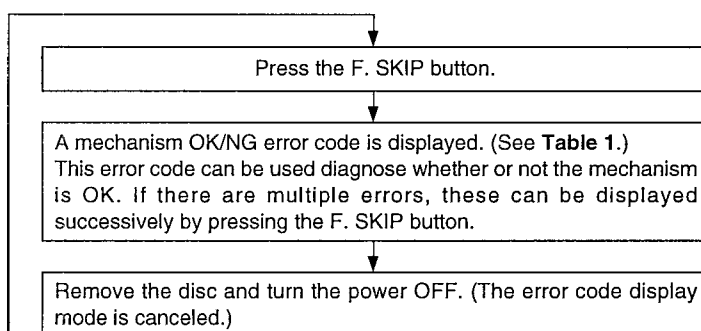
Check beforehand for scratching or soiling of the test disc (SZZP1054C), and soiling or other problems with the pickup lens.

● Error code display procedure

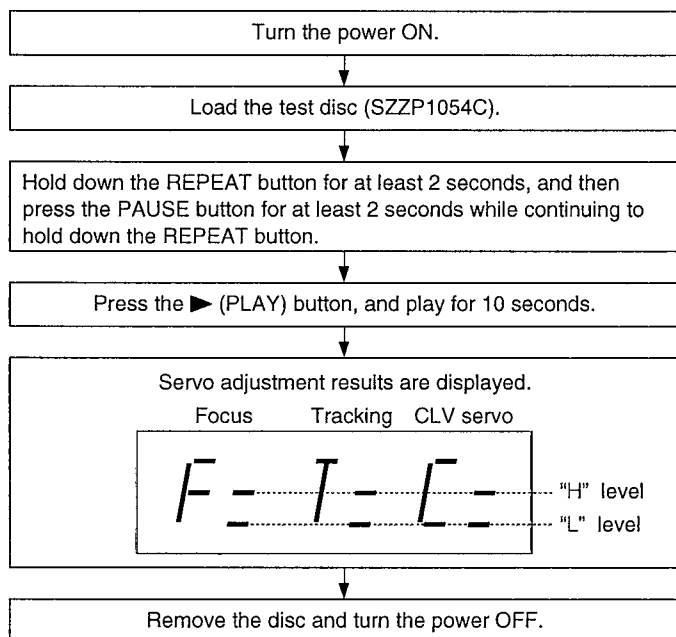
Automatic adjustment results



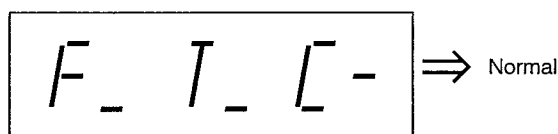
Checking the mechanism switches



● Servo adjustment procedure



(Example)



	"L" level	"H" level
Focus system	normal	defective
Tracking system	normal	defective
CLV servo system	defective	normal

● Table 1



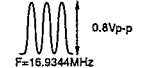
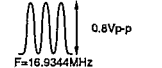
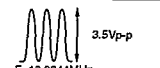
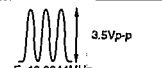
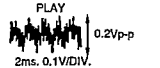

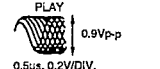
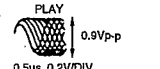
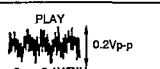

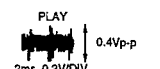
FL display	Symptom	Cause
H-15	When CD tray opens, it closes by itself.	Disc tray "Open" detection switch (S4) fault.
H-16	When CD tray close, it opens by itself.	
F-15	Does not play, even when CD play button is pressed.	Pickup rest position detection switch (S701) fault.
F-16	Traverse pushes up disc tray.	Up position detection switch (S3) fault.
F-26	Does not move even when "►" (PLAY) button is pressed.	System control or servo processor IC (IC901, IC702) fault.
F-27	Tray keeps moving for a while, or selected tray does not open.	Disc number detection switch (S5) fault.
F-28		Stocker position detection, or play position detection switch (S1, S2) fault
F-75	NO DISC is displayed and unit does not play, even when a CD is loaded.	CD circuit power supply problem.

● **Error code based troubleshooting**

※ The unit is satisfactory if the error code is "E-00" or "E-02".

※ Before testing, check that the test disc is free of scratches and optical pickup is clean.

● **Table 2**

FL error code display	Symptom	Probable cause	Signal to check		Normal voltage and waveform values	
			Signal name	Location	PLAY	STOP
E-01	Focus and tracking offset adjustments not completed in the specified time period.	1. Clocks X1 and X2, power supply V _{DD} and reset/RST, all on IC702. 2. MDATA, MCLK, MLD, and SENSE signals to/from mechanism controller.	MDATA	IC702 ⑧ pin		4.4 V
			MCLK	IC702 ⑦ pin		4.3 V
			MLD	IC702 ⑨ pin		4.4 V
			SENSE	IC702 ⑩ pin	—	—
			/RST	IC702 ⑱ pin	4.9 V	4.9 V
			X1	IC702 ⑤⑨ pin		
			X2	IC702 ⑤⑨ pin		
E-03 E-05 E-07 E-09 E-0B 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.	F E	IC702 ⑳ pin		2.5 V
T E			IC702 ㉓ pin		2.5 V	
FOD			IC702 ㉔ pin	2.5 V	2.5 V	
TRD			IC702 ㉕ pin	2.5 V	2.5 V	
KICK			IC702 ㉖ pin	2.5 V	2.5 V	
/FLOCK			IC702 ⑪ pin	—	—	
/RF DET			IC702 ㉗ pin	0 V	5.0 V	
R F			TJ701		1.7 V	
STAT			IC702 ⑰ pin	0.7 V	0 V	
E-04 E-06 E-0C E-0E	Best "Eye" (PD Balance) adjustment not completed in the 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.	FBAL	IC702 ㉚ pin	2.5V	2.5 V
R F			IC701		1.7 V	
F E			IC702 ⑳ pin		2.5 V	
/TLOCK			IC702 ⑫ pin	—	—	
OFT			IC702 ㉞ pin	0 V	0 V	
E-08 E-0A	Focus or Tracking gain adjustment not completed in the 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.	F E	IC702 ⑳ pin		2.5 V
T E			IC702 ㉓ pin		2.5 V	
/TLOCK			IC702 ⑫ pin	—	—	
OFT			IC702 ㉞ pin	0 V	0 V	

■ Schematic Diagram

	Page		Page
A CD SERVO CIRCUIT	14, 15	C OPERATION CIRCUIT	16
B LOADING MOTOR CIRCUIT	16	D MAIN CIRCUIT	16, 17

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

Notes:

- **S701** : Rest switch in " OFF " position
- **S790** : Disc tray open detect switch
- **S791** : Disc tray close detect switch
- **S801** : Disc tray open/close switch (▲ OPEN/CLOSE)
- **S802** : Pause switch (■)
- **S803** : F. Skip/Search switch (▶▶/▶▶▶)
- **S804** : Play switch (▶)
- **S805** : Stop switch (■)
- **S806** : R. Skip/Search switch (◀◀/◀◀◀)
- **S807** : Random play switch (RANDOM)
- **S809** : AI edit switch (AI EDIT)
- **S810** : Repeat switch (REPEAT)

- 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 △ 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.

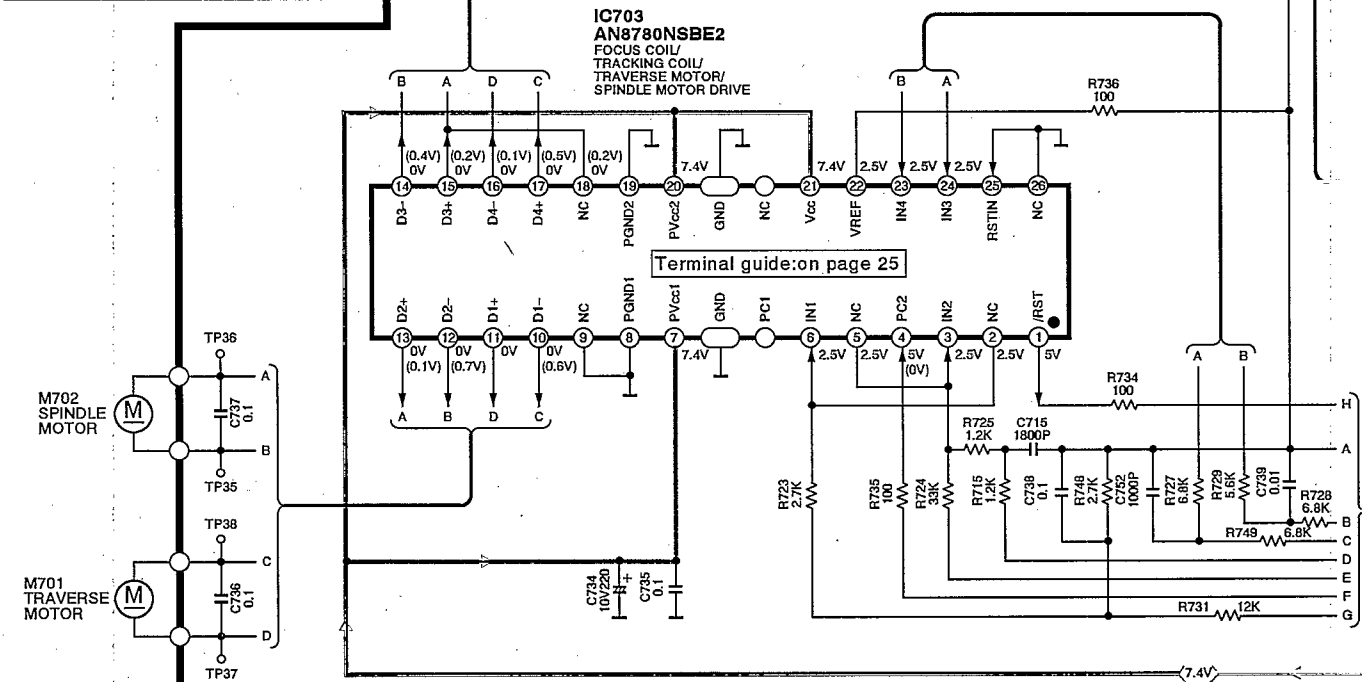
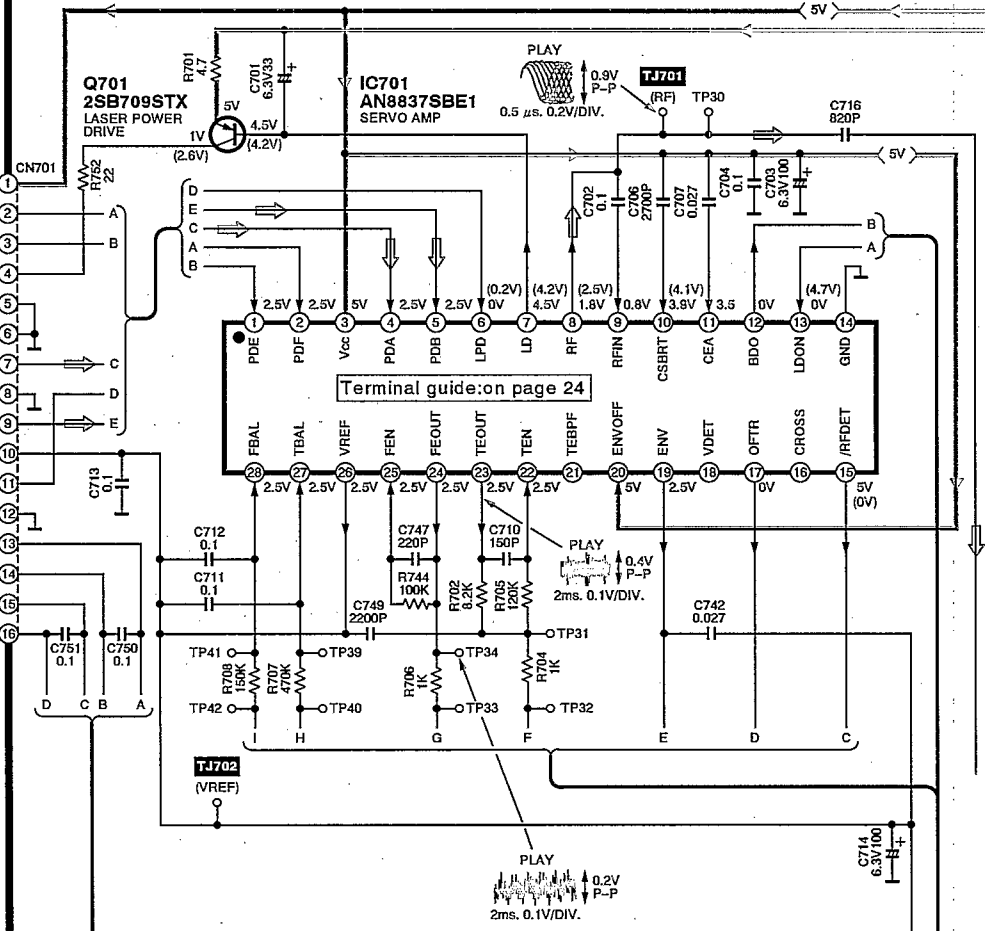
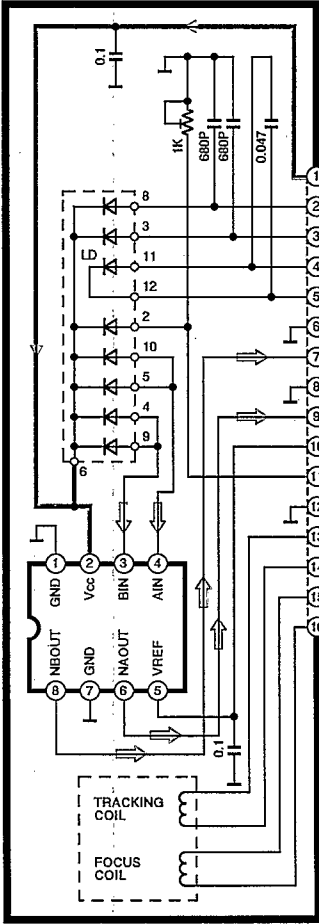
- **Voltage and signal line**

 : Positive voltage line

 : CD signal line

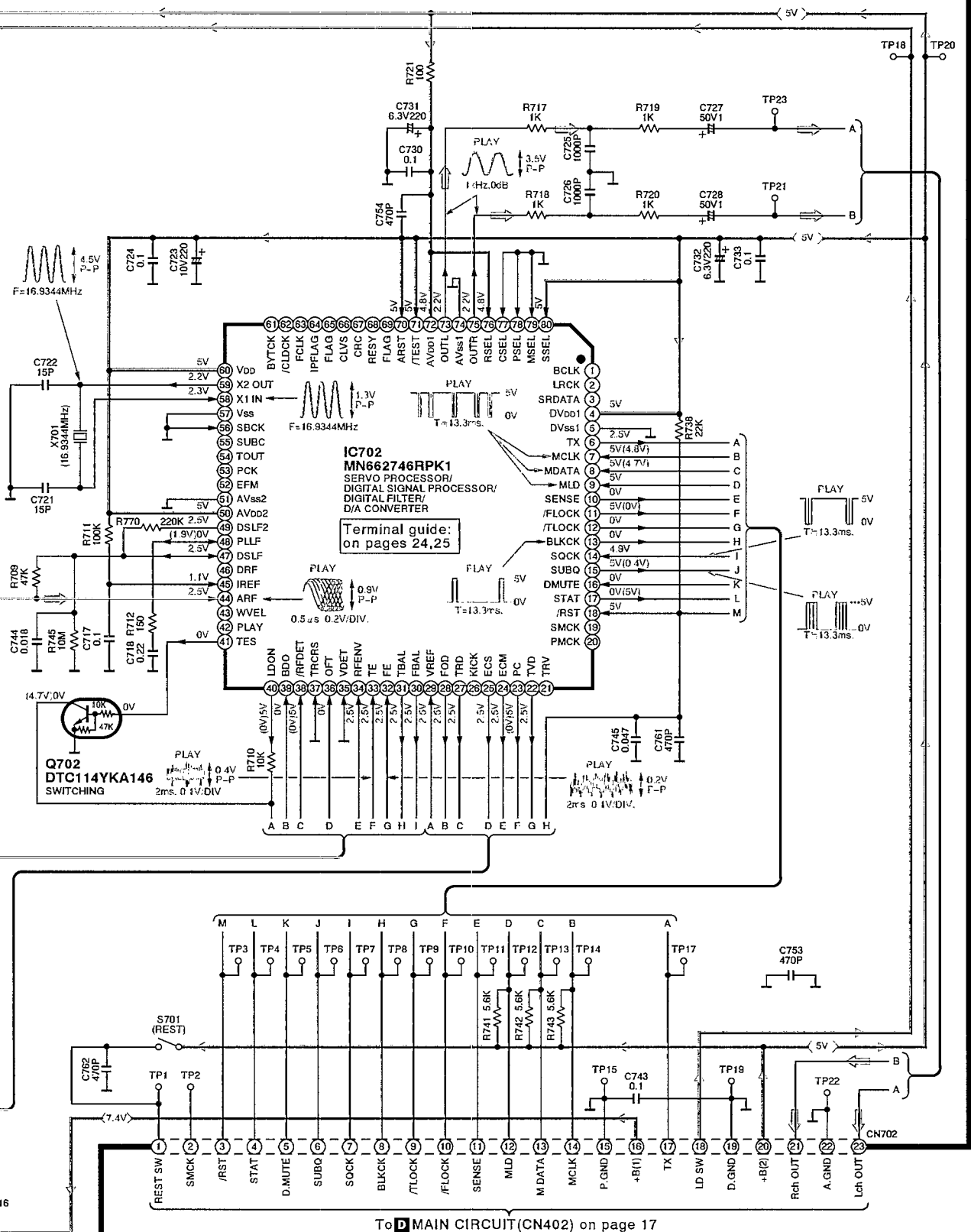
A CD SERVO CIRCUIT (P.C.Board: on page 18)

Δ OPTICAL PICKUP

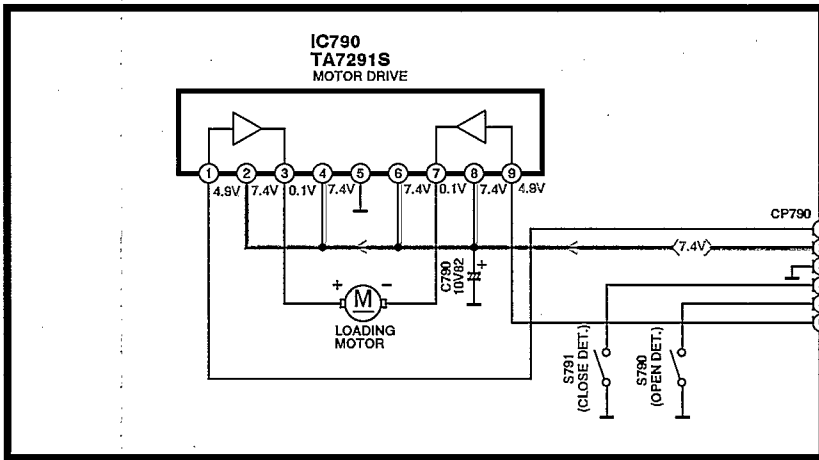


⇨ : Positive voltage line

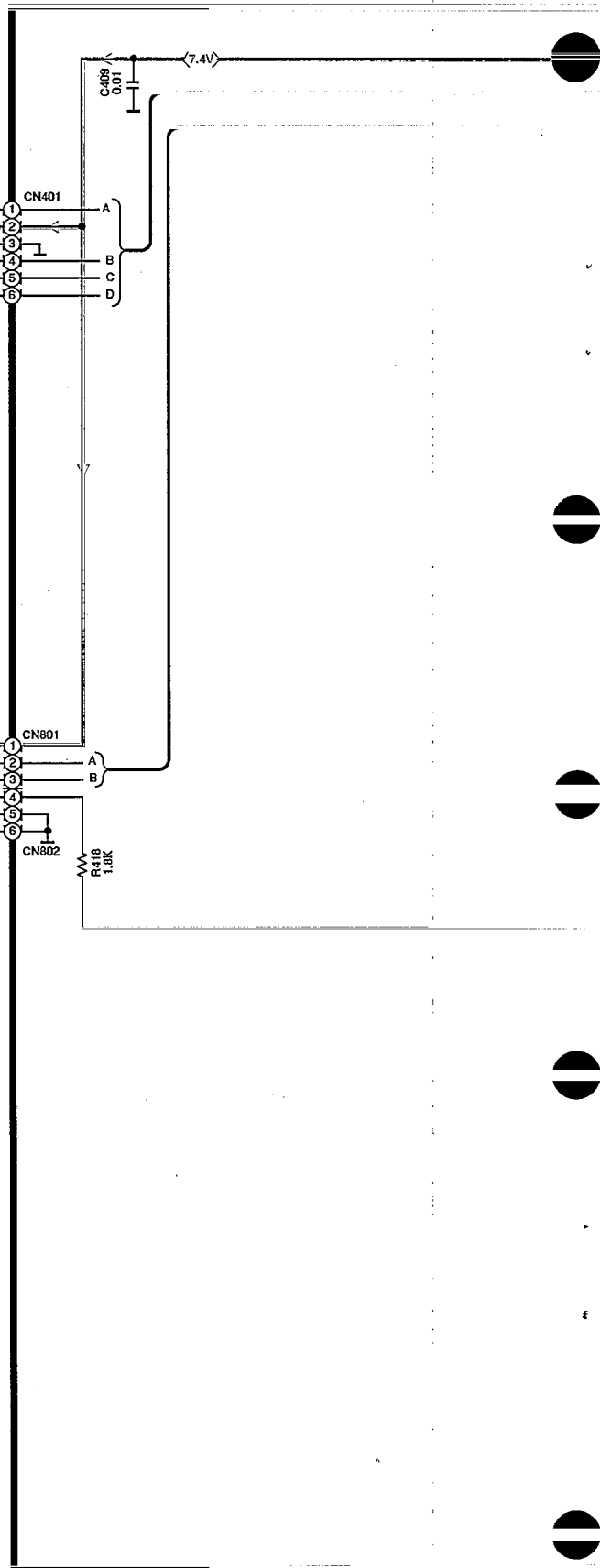
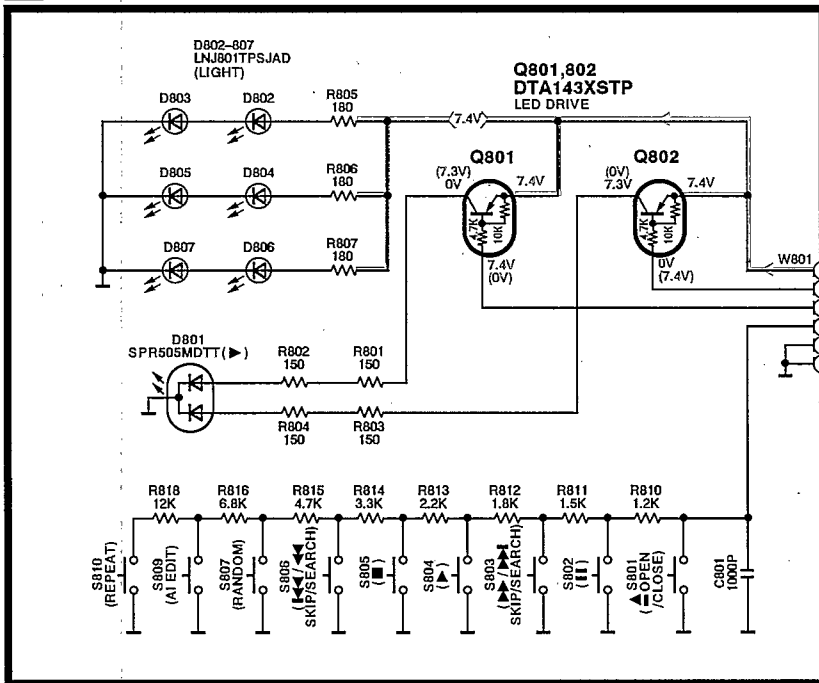
⇨ : CD signal line



B LOADING MOTOR CIRCUIT (P.C.Board: on page 18)



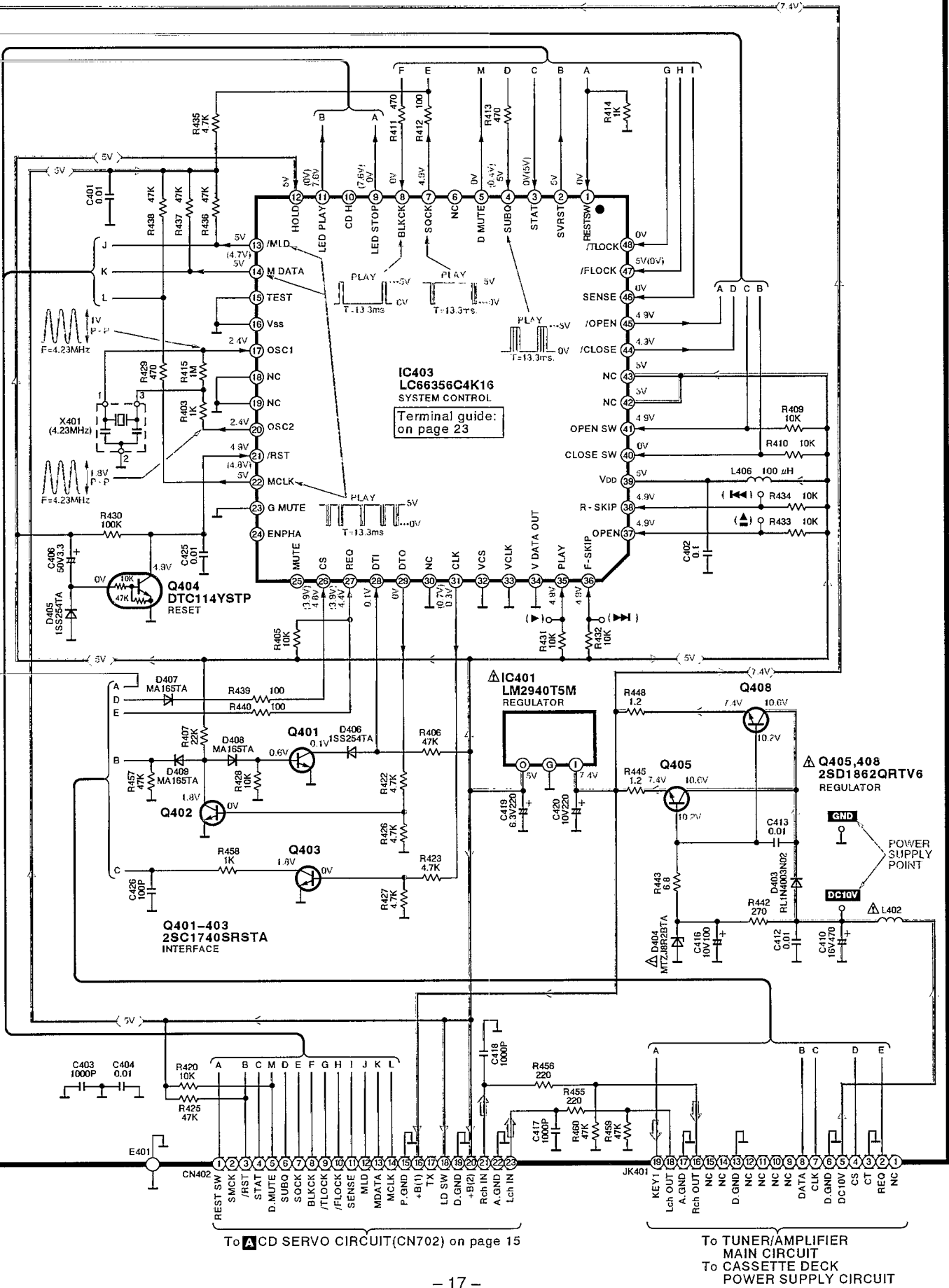
C OPERATION CIRCUIT (P.C.Board: on page 19)



↔ : Positive voltage line

→ : CD signal line

D MAIN CIRCUIT (P.C.Board: on page 19)



IC403
LC66356C4K16
SYSTEM CONTROL
Terminal guide:
on page 23

Q401-403
2SC1740SRSTA
INTERFACE

IC401
LM2940T5M
REGULATOR

Q405,408
2SD1862QRTV6
REGULATOR

To **CD SERVO CIRCUIT**(CN702) on page 15

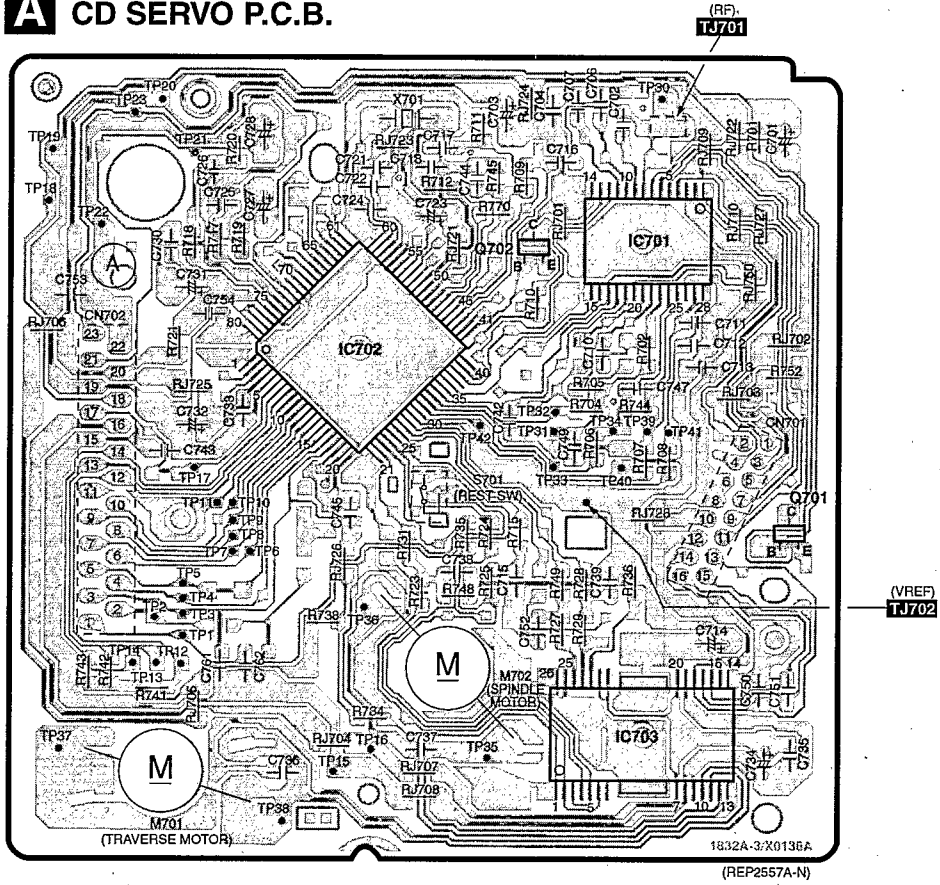
To **TUNER/AMPLIFIER**
MAIN CIRCUIT
To **CASSETTE DECK**
POWER SUPPLY CIRCUIT

Printed Circuit Board Diagram

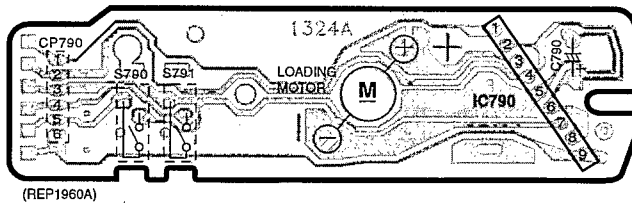
Note:

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

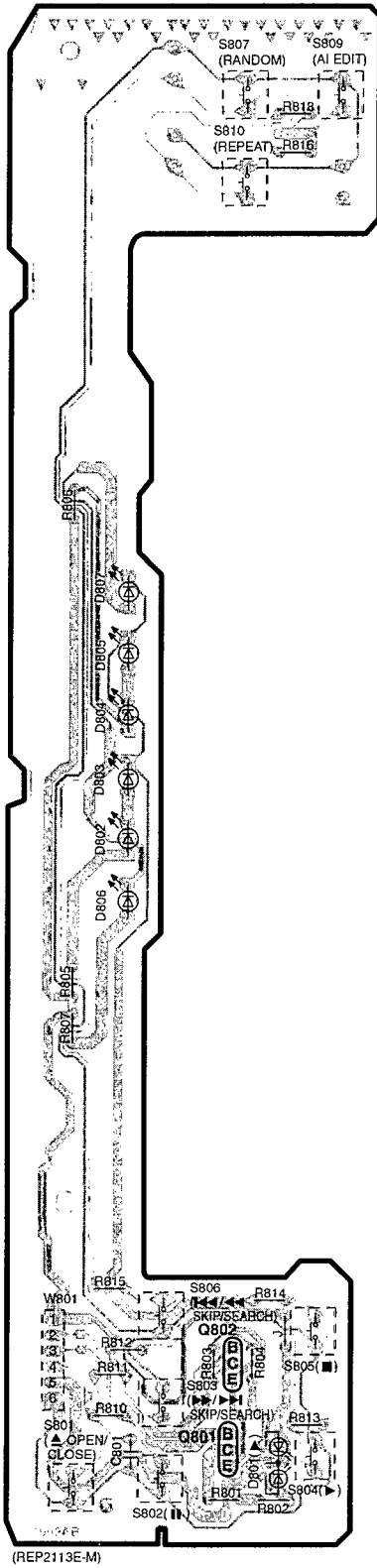
A CD SERVO P.C.B.



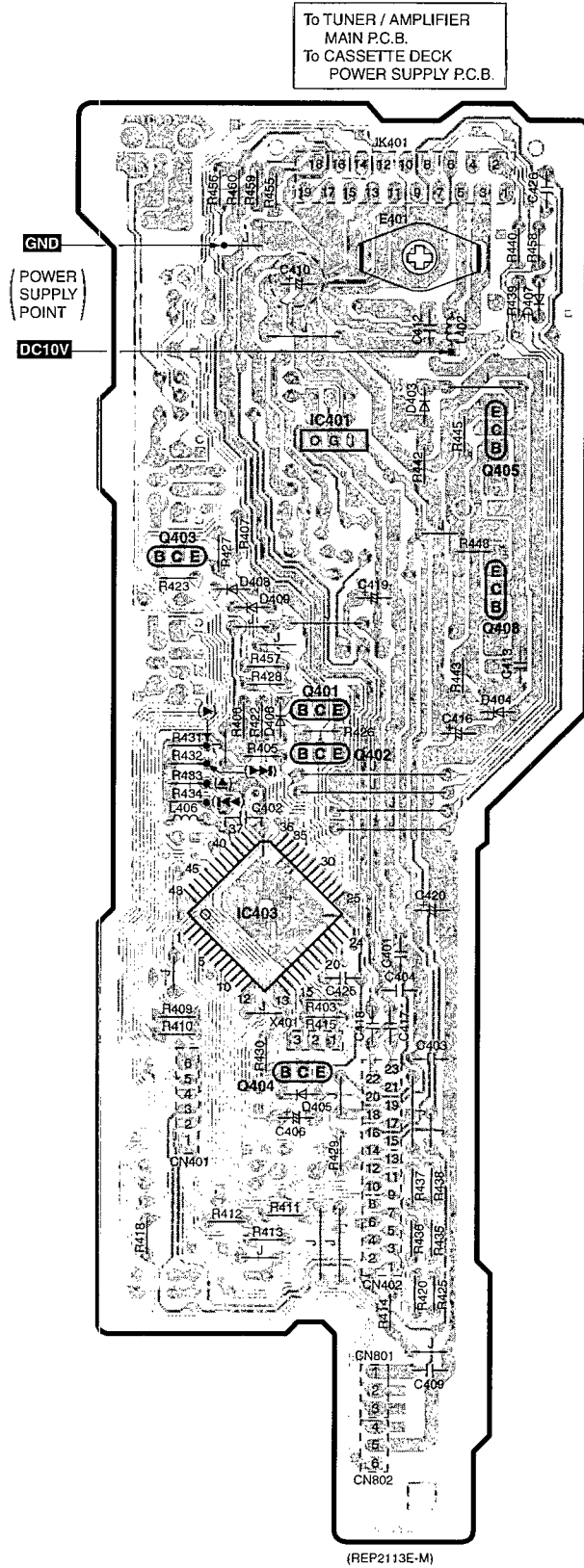
B LOADING MOTOR P.C.B.



C OPERATION P.C.B.



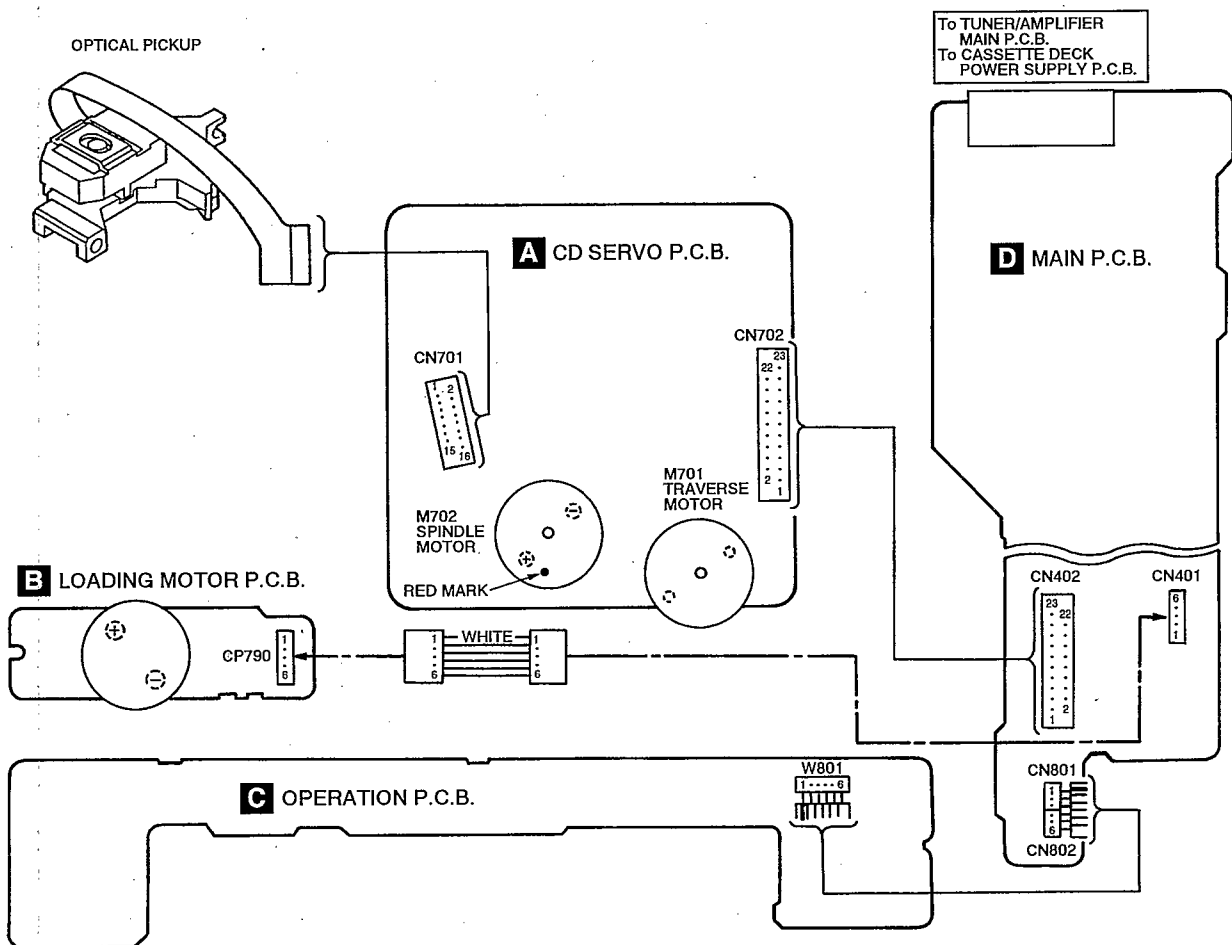
D MAIN P.C.B.



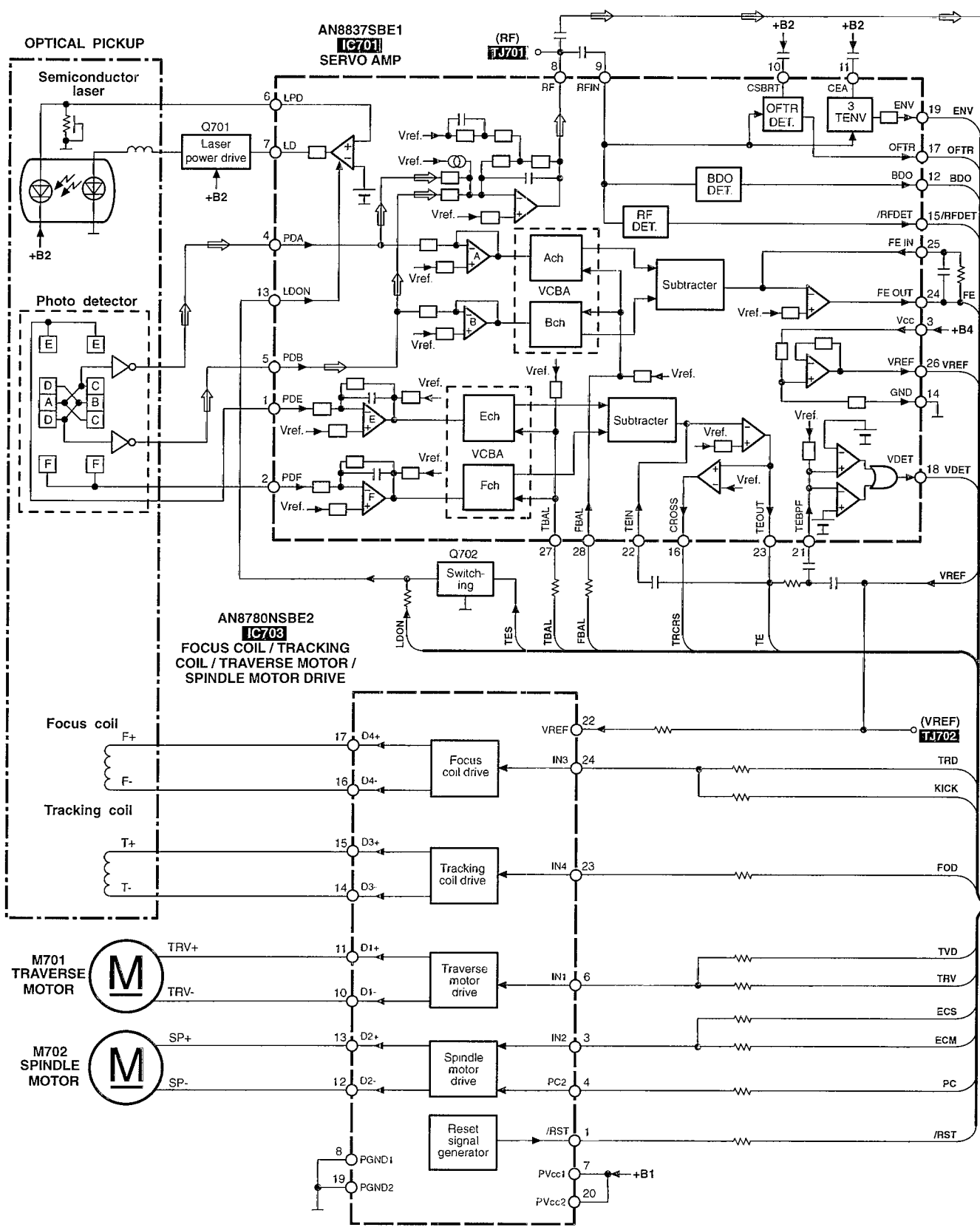
■ Type Illustration of IC's, Transistors and Diodes

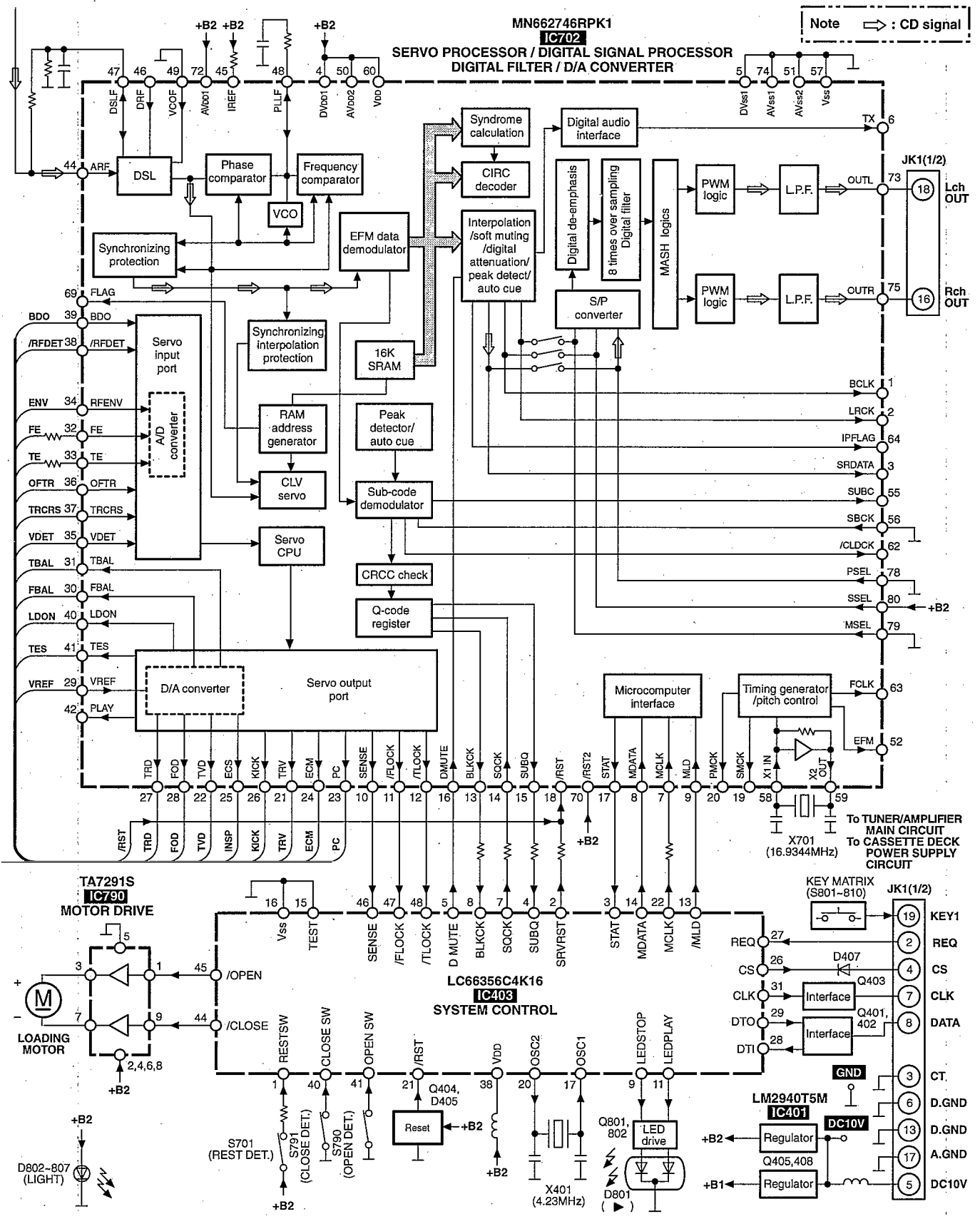
<p>AN8780NSBE2</p>	<p>AN8837SBE1</p>	<p>MN662746RPK1</p>	<p>LC66356C4K16</p>	<p>TA7291S</p>	<p>LM2940T5M</p>
<p>2SC1740SRSTA DTA143XSTP DTC114YSTP</p>	<p>2SD1862QRTV6</p>	<p>2SB709STX DTC114YKA146</p>	<p>RL1N4003N02</p>	<p>MTZJ8R2BTA</p>	<p>MA165TA 1SS254TA</p>
<p>LNJ801TPSJAD</p>	<p>SPR505MDTT</p>				

■ Wiring Connection Diagram



Block Diagram





Terminal Function of IC's

● IC403 (LC66356C4K16): System control

Pin No.	Terminal Name	I/O	Function
1	REST SW	I	Innermost track sense switch (S701: rest switch) signal input
2	SVRST	O	Servo IC (IC702) reset signal output
3	STAT	I	Status signal input
4	SUBQ	I	Sub-code Q data input
5	DMUTE	—	Not used
6	NC	—	Not used
7	SQCK	O	Sub-code Q data clock output
8	BLKCK	I	Sub-code block clock input
9	LED STOP	O	LED (D801) drive signal output
10	CD H	—	Not used
11	LED PLAY	O	LED (D801) drive signal output
12	HOLD	—	Not used (Connected to VDD)
13	/MLD	O	IC702 command load signal output
14	MDATA	O	IC702 command data output
15	TEST	—	Test terminal (Not used) (Connected to GND)
16	VSS	—	GND terminal
17	OSC1	I	Clock signal input
18	NC	—	Not used (Connected to GND)
19	NC	—	Not used (Connected to GND)
20	OSC2	O	Clock signal output
21	/RST	I	Reset signal input
22	MCLK	O	IC702 command clock output
23	G MUTE	—	Not used (Connected to GND)
24	ENPHA	—	Not used
25	MUTE	—	Not used
26	CS	I	Serial data communication starting signal input
27	REQ	I	Command request data input
28	DTI	I	Serial data input
29	DTO	O	Serial data output
30	NC	—	Not used (Connected to GND)
31	CLK	O	Serial clock output
32	VCS	—	Not used (Connected to GND)

Pin No.	Terminal Name	I/O	Function
33	VCLK	—	Not used (Connected to GND)
34	V DATA OUT	—	Not used (Connected to GND)
35	PLAY	I	Play/stop switch signal input
36	F-SKIP	I	F. Skip switch signal input
37	OPEN	I	Disc tray open/close switch signal input
38	R-SKIP	I	R. Skip switch signal input
39	VDD	—	Power supply (+5V)
40	CLOSE SW	I	Disc tray "close" detection switch signal input
41	OPEN SW	I	Disc tray "open" detection switch signal input
42	NC	—	Not used
43	NC	—	Not used
44	/CLOSE	O	Disc tray "close" command signal output
45	/OPEN	O	Disc tray "open" command signal output
46	SENCE	I	IC702 sense signal input
47	/FLOCK	I	IC702 focus lock signal input
48	/TLOCK	I	IC702 tracking signal input

• IC701 (AN8837SBE1): Servo Amp.

No.	Terminal Name	I/O	Function
1	PDE	I	Tracking signal input terminal 1 (E ch)
2	PDF	I	Tracking signal input terminal 2 (F ch)
3	VCC	I	Power supply terminal
4	PDA	I	Focus signal input terminal 1 (A ch)
5	PDB	I	Focus signal input terminal 2 (B ch)
6	LPD	I	Laser PD signal
7	LD	O	Laser power auto control output
8	RF	O	RF amp terminal
9	RF IN	I	AGC input terminal
10	CSBRT	I	OFTR capacitor connection terminal
11	CEA	I	HPF-AMP capacitor connection terminal
12	BDO	O	Dropout detection control
13	LDON	I	LD APC ON/OFF ("H": ON, "L": OFF)
14	GND	—	GND terminal
15	/RFDET	O	RF det. signal output terminal ("L": det.)
16	CROSS	O	Tracking error zero cross output
17	OFTR	O	Off track detection ("H": det.)
18	VDET	O	Oscillation det. signal ("H": det.)
19	ENV	O	Envelope signal output terminal
20	ENVOFF	I	Not used, connected to power supply
21	TEBPF	O	Oscillation detect input terminal
22	TEN	I	Tracking error signal
23	TEOUT	O	Tracking error signal
24	FEOUT	O	Focus error signal
25	FEN	I	Focusing error signal
26	VREF	O	Reference voltage output terminal
27	TBAL	I	Tracking balance adj. input
28	FBAL	I	Focus balance adj. input

• IC702 (MN662746RPK1) : Servo Processor, Digital Signal Processor, Digital Filter, D/A Converter

Pin No.	Terminal Name	I/O	Function
1	BCLK	—	Bit clock output for serial data (Not used, open)
2	LRCK	—	L/R clock signal output (Not used, open)
3	SRDATA	—	Serial data output (Not used, open)
4	DVDD1	—	Power supply input (for digital circuit)
5	DVSS1	—	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	Sense 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 (fBLKCK = 75 Hz during normal playback)
14	SQCK	I	External clock signal input for sub-code Q resistor
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 signal input
19	SMCK	—	1/2-divided clock signal of crystal oscillating at MSEL = "H" (fSMCK = 8.4672 MHz) 1/4-divided clock signal of crystal oscillating at MSEL = "L" (fSMCK = 4.2336 MHz) (Not used, open)
20	PMCK	—	1/192-divided clock signal of crystal oscillating (fPMCK = 88.2 kHz) (Not used, open)
21	TRV	—	Traverse forced feed output (Not used, open)
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	—	Kick pulse output (Not used, open)
27	TRD	O	Tracking drive output
28	FOD	O	Focus drive output
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)

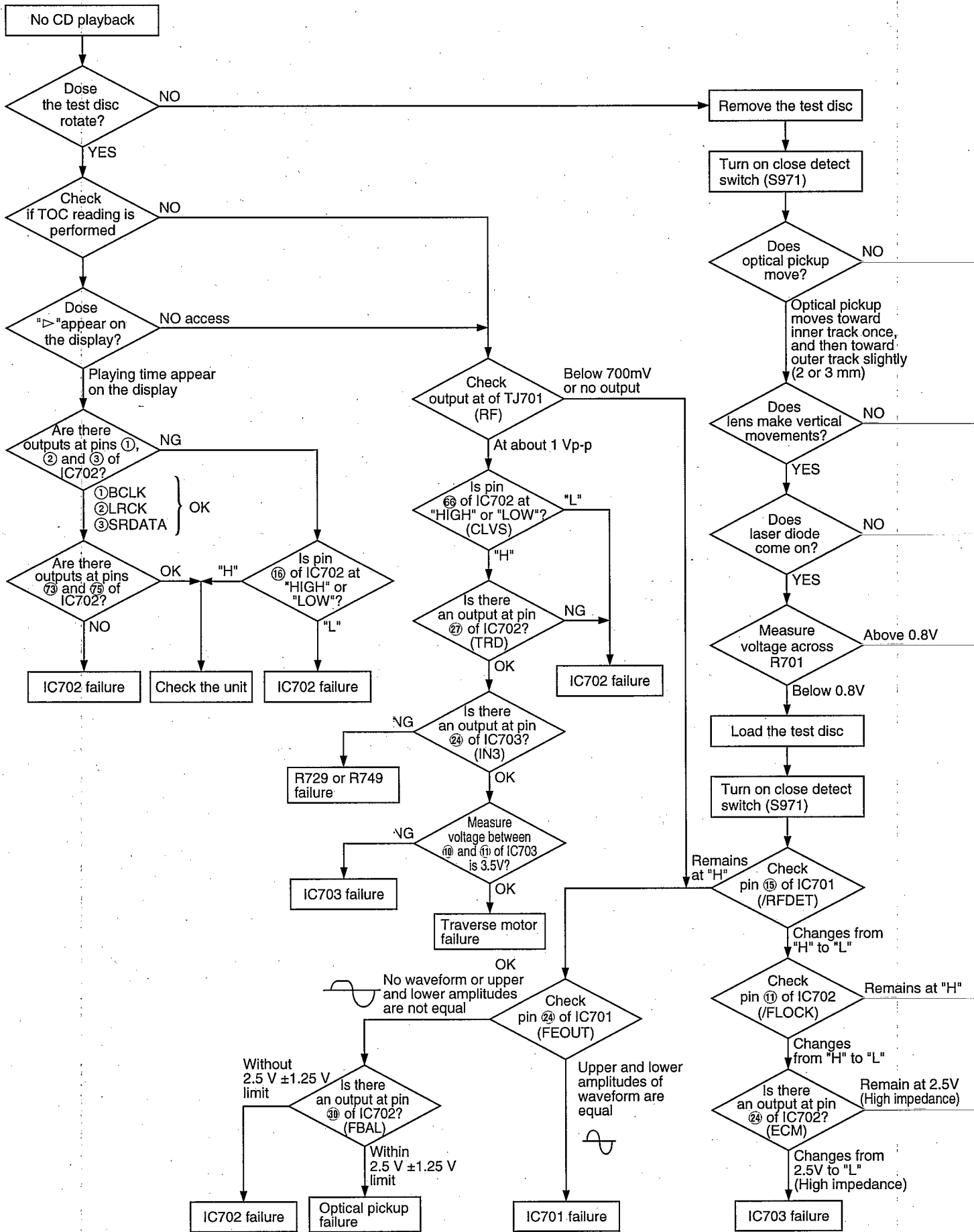
Pin No.	Terminal Name	I/O	Function
36	OFT	I	Off-track signal input ("H": off track)
37	TRCRS	I	Track cross signal input
38	/RFDET	I	RF detection signal input ("L": detection)
39	BDO	I	Dropout signal input ("H": Dropout)
40	LDON	O	Laser on signal output ("H": ON)
41	TES	O	Tracking error shunt signal output ("H": shunt)
42	PLAY	—	Play signal out ("H": PLAY) (Not used, open)
43	WVEL	—	Double speed status signal output ("H": Double speed) (Not used, open)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias (Not used, open)
47	DSLIF	I/O	DSL loop filter
48	PLLIF	I/O	PLL loop filter
49	DSLIF	I/O	DSL loop filter
50	AVDD2	—	Power supply input (for analog circuit)
51	AVSS2	—	GND (for analog circuit)
52	EFM	—	EFM signal output (Not used, open)
53	PCK	—	PLL extraction clock output (fPCK= 4.321 MHz during normal playback) (Not used, open)
54	TOUT	—	Phase comparison signal of EFM and PCK signals (Not used, open)
55	SUBC	—	Sub-code serial data output (Not used, open)
56	SBCK	I	Clock input for sub-code serial data
57	VSS	—	GND
58	X1 IN	I	Crystal oscillating circuit input (f = 16.9344 MHz)
59	X2 OUT	O	Crystal oscillating circuit output (f = 16.9344 MHz)
60	VDD	—	Power supply input (for oscillating circuit)
61	BYTCK	—	Byte clock output (Not used, open)
62	/CLDCK	—	Sub-code frame clock signal output (fCLDCK = 7.35 kHz during normal playback)
63	FCLK	—	Crystal frame clock signal output (fFCLK = 7.35 kHz, double = 14.7 kHz) (Not used, open)
64	IPFLAG	—	Interpolation flag output ("H": Interpolation)
65	FLAG	—	Flag output (Not used, open)
66	CLVS	—	Spindle servo phase synchronizing signal output ("H": CLV, "L": rough servo) (Not used, open)
67	CRC	—	Sub-code CRC checked output ("H": OK, "L": NG) (Not used, open)
68	RESY	—	De-emphasis ON signal output ("H": ON) (Not used, open)
69	FLAG	—	Frame re-synchronizing signal output (Not used, open)
70	ARST	I	Reset input through MASH circuit ("L": Reset)
71	/TEST	I	Test input

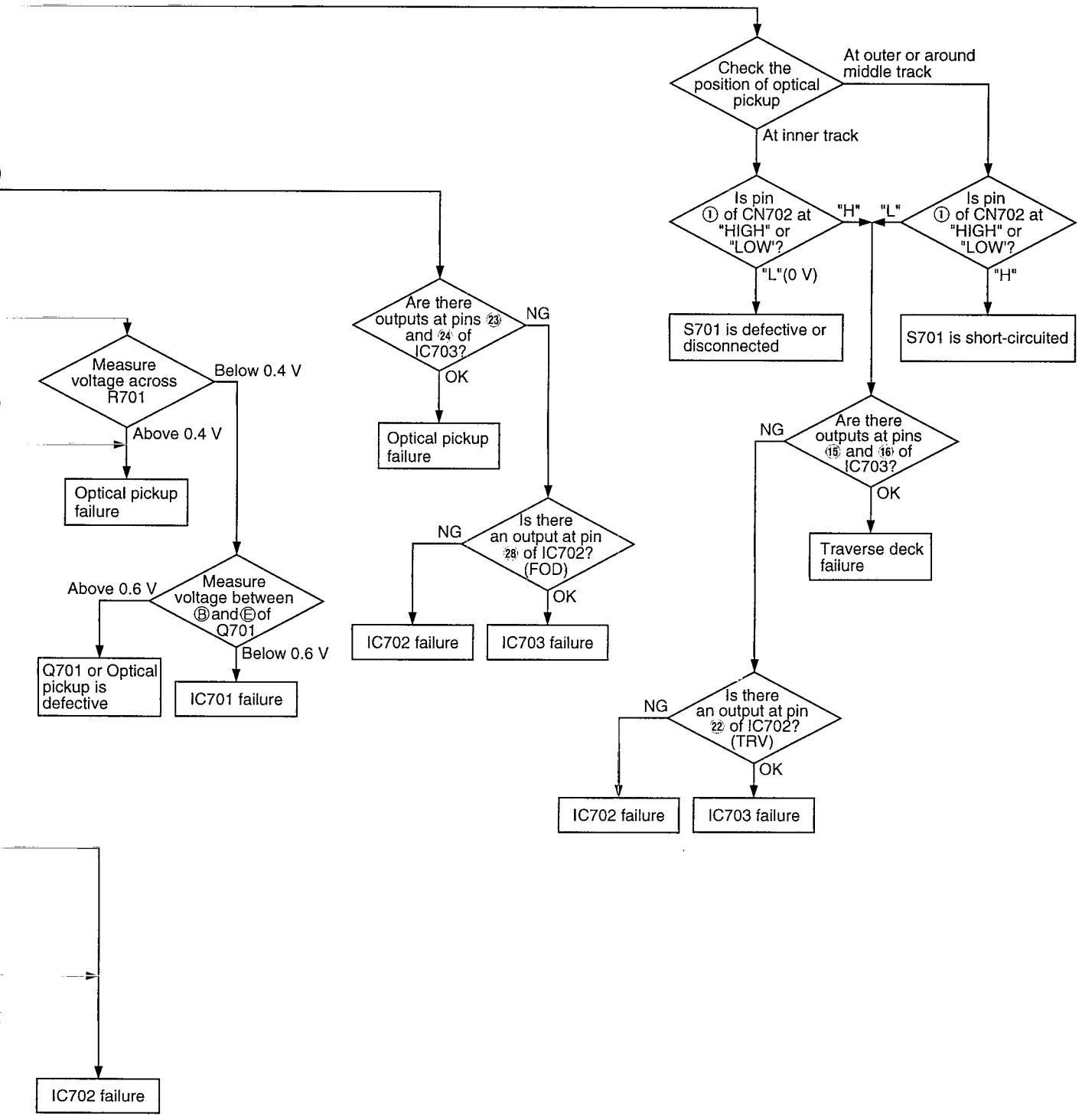
Pin No.	Terminal Name	I/O	Function
72	AVDD1	—	Power supply input (for analog circuit)
73	OUTL	O	Left channel audio signal output
74	AVSS1	—	GND
75	OUTR	O	Right channel audio signal output
76	RSEL	I	RF signal polarity assignment input (at "H" level: RSEL = "H") (at "L" level: RSEL = "L")
77	CSEL	I	Crystal oscillating frequency designation input ("L": 16.9344 MHz, "H": 33.8688 MHz)
78	PSEL	I	Test terminal (Connected to GND)
79	MSEL	I	SMCK oscillating frequency designation input ("L": 4.2336 MHz, "H": 8.4672 MHz)
80	SSEL	I	SUBQ output mode select ("H": Q-code buffer mode)

• IC703 (AN8780NSBE2): Focus Coil / Tracking Coil / Traverse Motor / Spindle Motor Drive

No.	Terminal Name	I/O	Function
1	/RST	—	Not used, open
2	NC	—	—
3	IN2	I	Motor driver (2) input
4	PC2	I	Turntable motor drive signal ("L": ON)
5	NC	—	Not used, open
6	IN1	I	Motor driver (1) input
7	PVCC1	I	Driver power supply terminal (1)
8	PGND1	—	Driver GND terminal (1)
9	NC	—	Not used, connected to GND
10	D1-	O	Motor driver (1) output terminal (-)
11	D1+	O	Motor driver (1) output terminal (+)
12	D2-	O	Motor driver (2) output terminal (-)
13	D2+	O	Motor driver (2) output terminal (+)
14	D3-	O	Motor driver (3) output terminal (-)
15	D3+	O	Motor driver (3) output terminal (+)
16	D4-	O	Motor driver (4) output terminal (-)
17	D4+	O	Motor driver (4) output terminal (+)
18	NC	—	Not used, open
19	PGND2P	—	Driver GND terminal (2)
20	PVCC2	I	Driver power supply (2)
21	VCC	I	Power supply terminal
22	VREF	I	Reference voltage input terminal
23	IN4	I	Motor driver (4) input
24	IN3	I	Motor driver (3) input
25	RSTIN	I	Reset terminal (Not used, connected to GND)
26	NC	—	Not used, connected to GND

Troubleshooting Guide for CD Servo circuit





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.

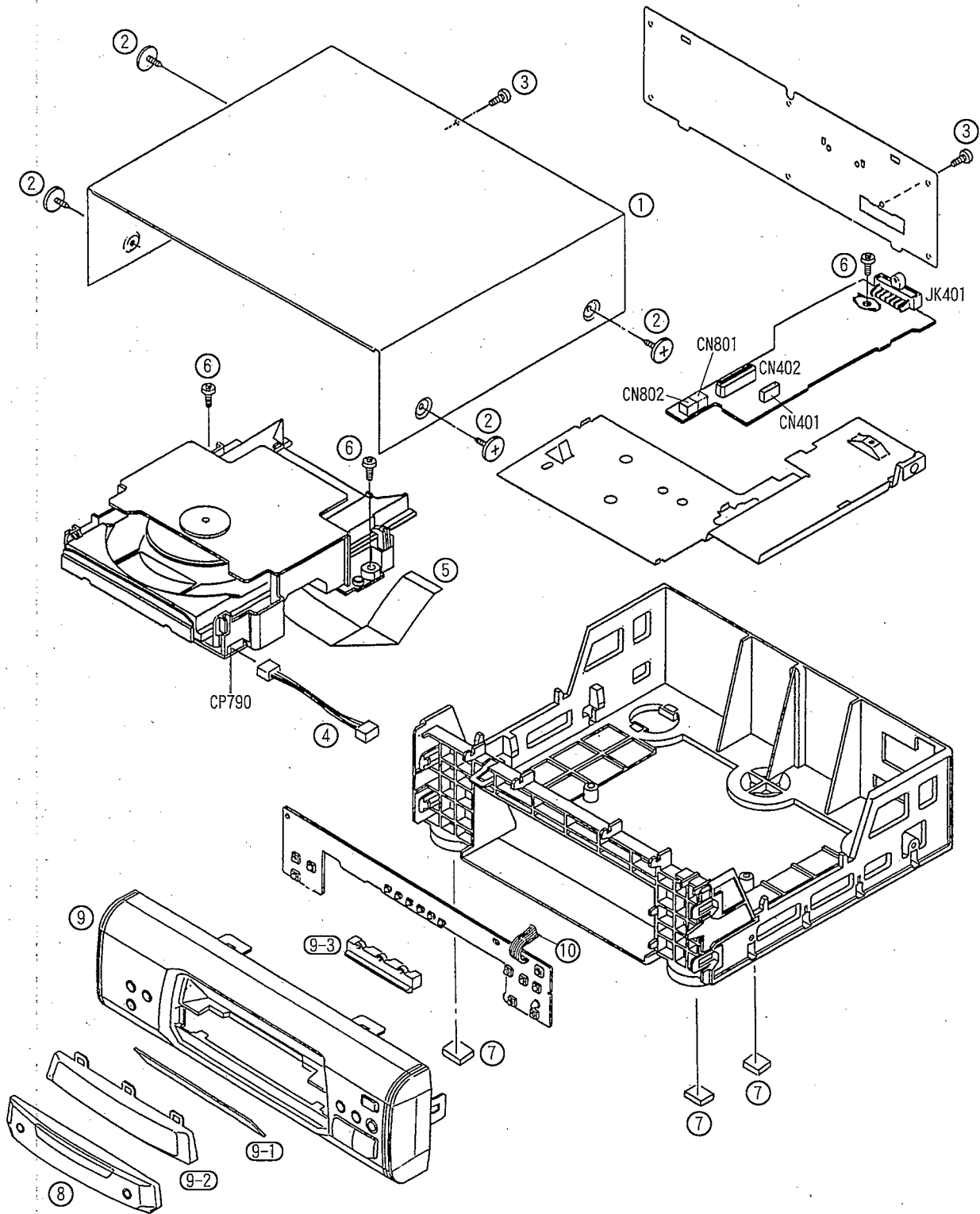
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

*All parts are supplied by MESA.

Ref.No.	Part No.	Part Name & Description	Pcs	Remarks	Ref.No.	Part No.	Part Name & Description	Pcs	Remarks
1	RKW0302-H	CABINET	1		C721, 22	ECUE1H150JCN	50V 15P	2	
2	RHD30007-K1	SCREW	4		C723	ECEA1AKA2211	10V 220U	1	
3	XTBS3+8JFZ1	SCREW	2		C724	ECUZNE104MBN	25V 0.1U	1	
4	REX0510	WIRE ASS'Y (6P)	1		C725, 26	ECUE1H102KBN	50V 1000P	2	
5	REZ0537	FFC	1		C727, 28	ECEA1HPK0101	50V 1U	2	
6	XTB3+8JFZ	SCREW	3		C730	ECUWNE104ZFN	25V 0.1U	1	
7	RKA0089-K	RUBBER	3		C731, 32	ECEA0JKA2211	6.3V 220U	2	
8	RK0893-H	TRAY ORNAMENT	1		C733	ECUZNE104MBN	25V 0.1U	1	
9	RYP0732A-H	FRONT PANEL ASS'Y	1		C734	ECEA1AKA2211	10V 220U	1	
9-1	RCCD013-S	DISC MIRROR	1		C735-37	ECUWNE104ZFN	25V 0.1U	3	
9-2	RKW0505-Q	ORNAMENT PANEL	1		C738	ECUZNE104MBN	25V 0.1U	1	
9-3	RGL0289-Q	PANEL LIGHT	1		C739	ECUE1H103KBN	50V 0.01U	1	
10	REZ0762-J	FLAT CABLE (#801/6P)	1		C742	ECUV1E273KBN	25V 0.027U	1	
301	RFKJXDT07-K	LOADING CHASSIS ASS'Y	1		C743	ECUWNE104ZFN	25V 0.1U	1	
301-1	RDG0142	GEAR	1		C744	ECUV1E183KBN	25V 0.018U	1	
301-2	RDG0193	GEAR	1		C745	ECUE1C473KBN	16V 0.047U	1	
301-3	RDP0065	PULLEY	1		C747	ECUE1H221KBN	50V 220P	1	
302	REW0019	MOTOR	1		C749	ECUE1H222KBN	50V 2200P	1	
303	RMK0255	BELT COVER	1		C750, 51	ECUZNE104MBN	25V 0.1U	2	
304	RGQ0144-K	DISC TRAY	1		C752	ECUE1H102KBN	50V 1000P	1	
Δ 305	RAE0152Z	TRAVERSE DECK	1		C753	ECUV1H471KBM	50V 470P	1	
305-1	SHGD113-1	RUBBER	3		C754	ECUE1H471KBN	50V 470P	1	
305-2	SNSD38	SCREW	2		C761, 62	ECUE1H471KBN	50V 470P	2	
306	RMS0350-1	PIN (A)	1		C790	ECA1AKF820E	10V 82U	1	
307	RMS0627	PIN (B)	1		C801	ECBT1H102KB5	50V 1000P	1	
308	RME0109	SPRING (A)	2		CN401	SJTD613	CONNECTOR (6P)	1	
309	RME0142	SPRING (B)	1		CN402	RJS1A6823	CONNECTOR (23P)	1	
310	RMRO698-K	TRAVERSE CHASSIS	1		CN701	RJU035T016-1	CONNECTOR (16P)	1	
311	XTV2+6G	SCREW	2		CN702	RJS1A6723-1Q	CONNECTOR (23P)	1	
312	RME0063	SPRING	1		CN801, 02	RJS1A6603T1	CONNECTOR (3P)	2	
313	RMW0079-1	SLIDE PLATE	1		CP790	RJP6G17ZA	CONNECTOR (6P)	1	
314	RML0178-1	LEVER	1		D403	RL1N4003N02	DIODE	1	
315	RFKNLPG440-K	GEAR ASS'Y	1		Δ D404	MTZJ8R2BTA	DIODE	1	
316	RHD20009-1	SCREW	1		D405, 06	1SS254TA	DIODE	2	
317	RME0087	SPRING	1		D407-09	MA165	DIODE	3	
318	RML0349	LEVER	1		D801	SPR505MDTT	LED	1	
319	RMW0059-1	SLIDE PLATE	1		D802-07	LNJ801TPSJA	LED	6	
320	RMW0334	HOLDER	1		E401	SNE1004-2	EARTH TERMINAL	1	
321	RHM245ZA	MAGNET	1		Δ IC401	LM2940T5M	IC	1	
322	RXQ038D	MAGNET HOLDER	1		IC403	LC66356C4K16	IC	1	
323	XTH26+6G	SCREW	3		IC701	AN8837SBE1	IC	1	
324	RMA0793	CLAMPER	1		IC702	MN662746RPK1	IC	1	
325	XYH2+6FZ	SCREW	2		IC703	AN8780NSBE2	IC	1	
326	RMG0158	BELT	1		IC790	TA7291S	IC	1	
327	XTH2+6G	SCREW	1		JK401	RJT065K19	SYSTEM	1	
C401	ECBT1E103ZF5	25V 0.01U	1		Δ L402	BL02RN2R62T4	COIL	1	
C402	ECBT1H104ZF5	50V 0.1U	1		L406	ELEXT101KA9	COIL	1	
C403	ECBT1H102KB5	50V 1000P	1		Q401-03	2SC1740SRSTA	TRANSISTOR	3	
C404	ECBT1E103ZF5	25V 0.01U	1		Q404	DTC114YSTP	TRANSISTOR	1	
C406	RCE1HKA3R3BG	50V 3.3U	1		Δ Q405	2SD1862QRTV6	TRANSISTOR	1	
C409	ECBT1E103ZF5	25V 0.01U	1		Δ Q408	2SD1862QRTV6	TRANSISTOR	1	
C410	ECA1CM471B	16V 470UF	1		Q701	2SB709STX	TRANSISTOR	1	
C412, 13	ECBT1E103ZF5	25V 0.01U	2		Q702	DTC114YKA146	TRANSISTOR	1	
C416	RCE1AKA101BG	10V 100U	1		Q801, 02	DTA143XSTP	TRANSISTOR	2	
C417, 18	ECBT1H102KB5	50V 1000P	2		R403	ERDS2FJ102	1/4W 1K	1	
C419	ECEA0JKA221B	6.3V 220U	1		R405	ERDS2FJ103	1/4W 10K	1	
C420	ECEA1AKA221B	10V 220U	1		R406	ERDS2TJ473T	1/4W 47K	1	
C425	ECBT1E103ZF5	25V 0.01U	1		R407	ERDS2TJ223T	1/4W 22K	1	
C426	ECBT1H101KB5	50V 100P	1		R409, 10	ERDS2FJ103	1/4W 10K	2	
C701	ECEA0JKA3301	6.3V 33U	1		R411	ERDS2TJ471T	1/4W 470	1	
C702	ECUZNE104MBN	25V 0.1U	1		R412	ERDS2FJ101	1/4W 100	1	
C703	ECEA0JKA1011	6.3V 100U	1		R413	ERDS2TJ471T	1/4W 470	1	
C704	ECUZNE104MBN	25V 0.1U	1		R414	ERDS2FJ102	1/4W 1K	1	
C706	ECUE1H272KBN	50V 2700P	1		R415	ERDS2FJ105	1/4W 1M	1	
C707	ECUV1E273KBN	25V 0.027U	1		R418	ERDS2TJ182T	1/4W 1.8K	1	
C710	ECUE1H151KCN	50V 150P	1		R420	ERDS2FJ103	1/4W 10K	1	
C711, 12	ECUWNE104ZFN	25V 0.1U	2						
C713	ECUZNE104MBN	25V 0.1U	1						
C714	ECEA0JKA1011	6.3V 100U	1						
C715	ECUE1H182KBN	50V 1800P	1						
C716	ECUE1H821KBN	50V 820P	1						
C717	ECUWNE104ZFN	25V 0.1U	1						
C718	ECUVNC224KBN	16V 0.22U	1						

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
R422, 23	ERDS2FJ472	1/4W 4.7K	2						
R425	ERDS2TJ473T	1/4W 47K	1						
R426, 27	ERDS2FJ472	1/4W 4.7K	2						
R428	ERDS2FJ103	1/4W 10K	1						
R429	ERDS2TJ471T	1/4W 470	1						
R430	ERDS2FJ104	1/4W 100K	1						
R431-34	ERDS2FJ103	1/4W 10K	4						
R435	ERDS2FJ472	1/4W 4.7K	1						
R436-38	ERDS2TJ473T	1/4W 47K	3						
R439, 40	ERDS2FJ101	1/4W 100	2						
R442	ERDS2TJ271T	1/4W 270	1						
R443	ERDS2TJ6R8T	1/4W 6.8	1						
R445	ERDS2TJ1R2T	1/4W 1.2	1						
R448	ERDS2TJ1R2T	1/4W 1.2	1						
R455, 56	ERDS2TJ221T	1/4W 220	2						
R457	ERDS2TJ473T	1/4W 47K	1						
R458	ERDS2FJ102	1/4W 1K	1						
R459, 60	ERDS2TJ473T	1/4W 47K	2						
R701	ERJ6GEYJ4R7Z	1/10W 4.7	1						
R702	ERJ6GEYJ822V	1/10W 8.2K	1						
R704	ERJ6GEYJ102A	1/10W 1K	1						
R705	ERJ6GEYJ124Z	1/10W 120K	1						
R706	ERJ6GEYJ102A	1/10W 1K	1						
R707	ERJ6GEYJ474Z	1/10W 470K	1						
R708	ERJ6GEYJ154V	1/10W 150K	1						
R709	ERJ6GEYJ473Z	1/10W 47K	1						
R710	ERJ6GEYJ103V	1/10W 10K	1						
R711	ERJ6GEYJ104Z	1/10W 100K	1						
R712	ERJ6GEYJ151V	1/10W 150	1						
R715	ERJ6GEYJ122Z	1/10W 1.2K	1						
R717-20	ERJ6GEYJ102A	1/10W 1K	4						
R721	ERJ6GEYJ101Z	1/10W 100	1						
R723	ERJ6GEYJ272Z	1/10W 2.7K	1						
R724	ERJ6GEYJ333Z	1/10W 33K	1						
R725	ERJ6GEYJ122Z	1/10W 1.2K	1						
R727, 28	ERJ6GEYJ682Z	1/10W 6.8K	2						
R729	ERJ6GEYJ562V	1/10W 5.6K	1						
R731	ERJ6GEYJ123Z	1/10W 12K	1						
R734-36	ERJ6GEYJ101Z	1/10W 100	3						
R738	ERJ6GEYJ223Z	1/10W 22K	1						
R741-43	ERJ6GEYJ562V	1/10W 5.6K	3						
R744	ERJ6GEYJ104Z	1/10W 100K	1						
R745	ERJ6GEYJ106V	1/10W 10M	1						
R748	ERJ6GEYJ272Z	1/10W 2.7K	1						
R749	ERJ6GEYJ682Z	1/10W 6.8K	1						
R752	ERJ8GEYJ220V	1/8W 22	1						
R770	ERJ6GEYJ224Z	1/10W 220K	1						
R801-04	ERDS2TJ151T	1/4W 150	4						
R805-07	ERDS2FJ181	1/4W 180	3						
R810	ERDS2TJ122T	1/4W 1.2K	1						
R811	ERDS2TJ152T	1/4W 1.5K	1						
R812	ERDS2TJ182T	1/4W 1.8K	1						
R813	ERDS2FJ222	1/4W 2.2K	1						
R814	ERDS2TJ332T	1/4W 3.3K	1						
R815	ERDS2FJ472	1/4W 4.7K	1						
R816	ERDS2FJ682	1/4W 6.8K	1						
R818	ERDS2TJ123T	1/4W 12K	1						
RJ701-09	ERJ6GEYR00A	CHIP JUMPER	9						
RJ710	ERJ8GEYR00A	CHIP JUMPER	1						
RJ721-28	ERJ6GEYR00A	CHIP JUMPER	8						
RJ750	ERJ6GEYR00A	CHIP JUMPER	1						
S701	RSH1A043-U	SW	1						
S790, 91	RSH1A005	SW	2						
S801-07	EVQPTD05Q	SW	7						
S809, 10	EVQPTD05Q	SW	2						
SA1	SZZP1054C	TEST DISC	1						
SA2	RFKXPG671	GREASE	1						
TJ701, 02	EYF8CU	TEST JUMPER	2						
X401	EFOEC4234T3	OSCILLATOR	1						
X701	RSXZ16W9M01T	OSCILLATOR	1						

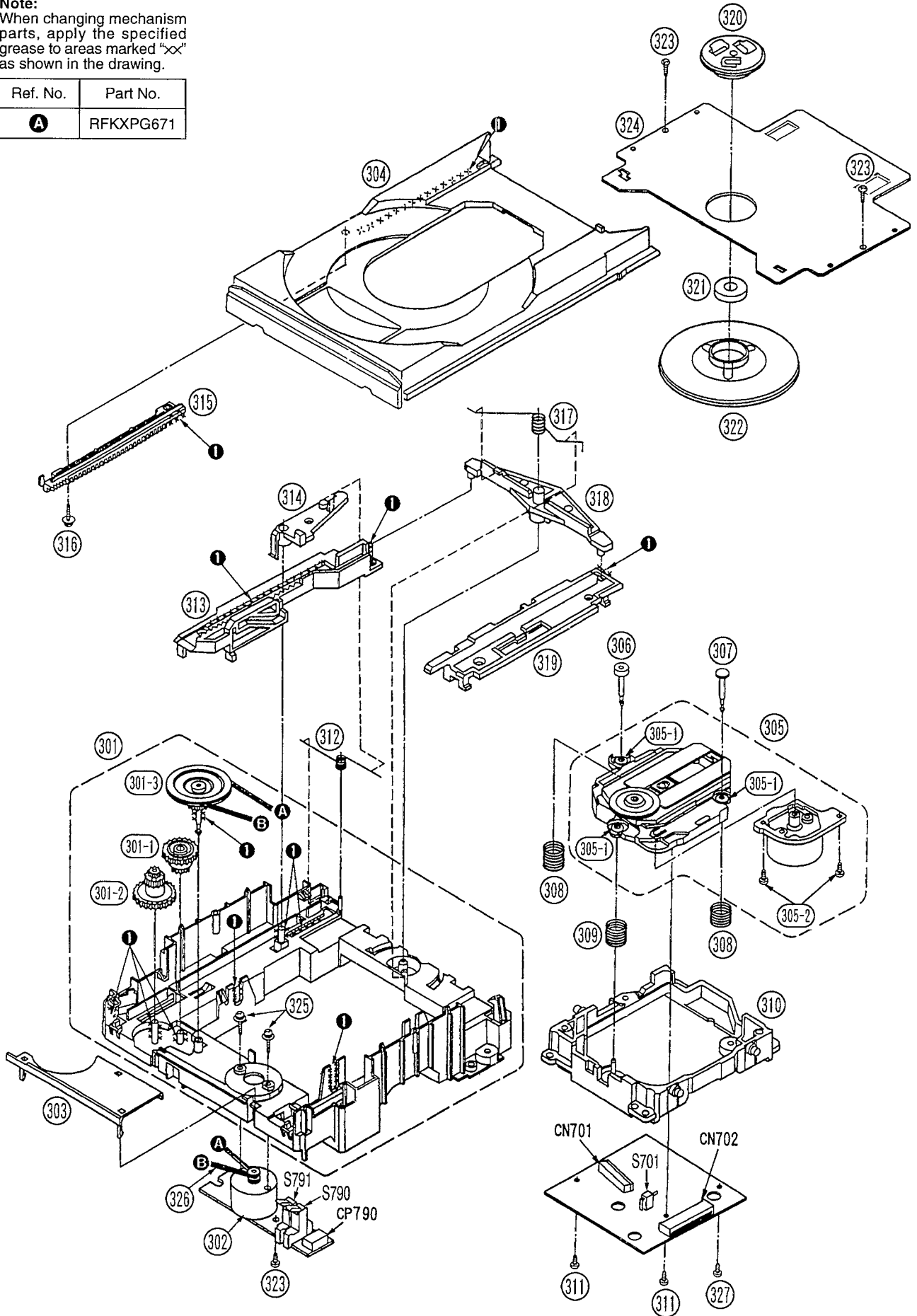
■ Cabinet Parts Location



Loading Unit Parts Location

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

Ref. No.	Part No.
A	RFKXPG671



415