

Service Manual

CD Player

Compact Disc Player

SL-CA01

COMPACT
disc
DIGITAL AUDIO
DIGITAL
MASH
multi-stage noise shaping

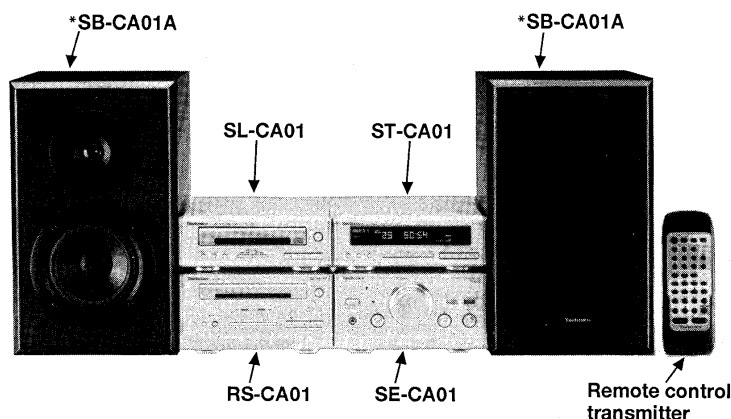
Colour

(N)...Gold Type

Area

Suffix for Model No.	Area	Colour
(E)	Europe.	(N)

System: SC-CA01



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

RAE0150Z MECHANISM SERIES

■ SPECIFICATIONS

■ Audio

DA converter

1 bit 2 DAC MASH*

■ Pickup

Wavelength

780 nm

■ General

Dimensions (W×H×D)

186×67×228 mm

Weight

1.3 kg

Notes:

1. Weight and dimensions shown are approximate.
2. Design and specifications are subject to change without notice.

* MASH is a trademark of NTT.

System	Tuner	CD Player	Amplifier	Cassette deck	Speakers
SC-CA01	ST-CA01	SL-CA01	SE-CA01	RS-CA01	*SB-CA01A

*Made in PAES

⚠ 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®

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NOTE:

Refer to the service manual for Model No. SE-CA01 (ORDER No. AD9603074C2) for information on "ACCESSORIES", "INSTALLATION", "CONNECTIONS" and "PACKAGING".

PRECAUTION OF LASER DIODE

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pickup lens.

Wave length: 780 nm

Maximum output radiation power from pickup: 100 μ W/VDE

Laser radiation from the pickup lens is safety level, but be sure the followings:

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

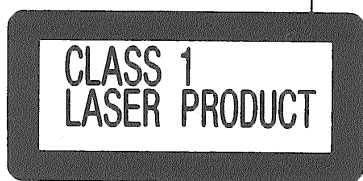
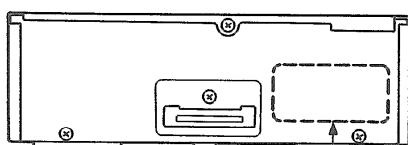
ACHTUNG: Dieses Produkt enthält eine Laserdiode. Im eingeschalteten Zustand wird unsichtbare Laserstrahlung von der Lasereinheit abgestrahlt.

Wellenlänge: 780 nm

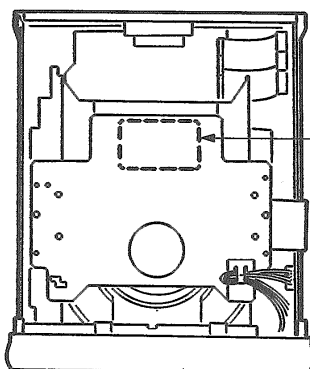
Maximale Strahlungsleistung der Lasereinheit: 100 μ W/VDE

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 werkseitig justierten Einstellregler der Lasereinheit nicht verstellen.
3. Nicht mit optischen Instrumenten in die Fokussierlines blicken.
4. Nicht über längere Zeit in die Fokussierlines blicken.



LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT



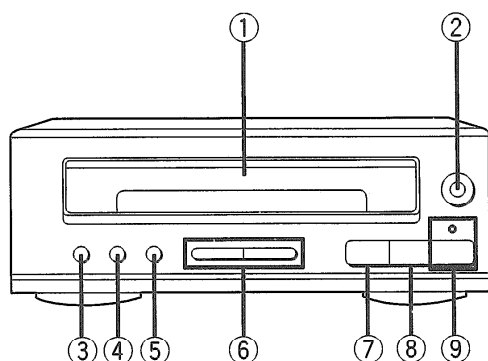
DANGER	INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
ADVARSEL	USYNLIG LASERSTRÅLING VED ÅBNING. UNØYKSKE SIKKERHEDSÅFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO!	AVATTAESSA JA SUOJALUKITUS OHJETTAESSA OLET ALLITINNA NÄKYMÄTÖN LASERLÄITELLYLLE. ÄLÄ KATSO SÄTEESSEEN
VARNING	OSYNLIG LASERSTRÅLING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRÄKTA EJ STRÅLEN.
ADVARSEL	USYNLIG LASERSTRÅLING NÄR DENSEL ÅPNES OG SIKKERHEDSLØS BRYTES. UNØYKSKE EKSPONERING FOR STRÅLEN.
VORSICHT	UNSIICHTBARE LASERSTRÄHLUNG, WEENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN. ROLSD104

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.

LOCATION OF CONTROL



CD player section

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

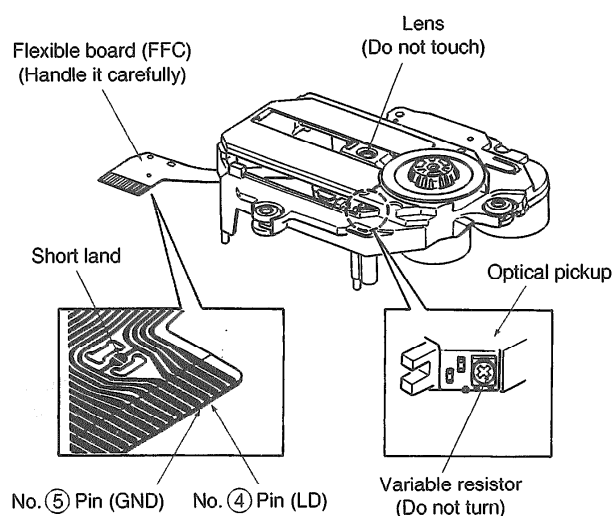
HANDLING PRECAUTIONS FOR TRAVERSE DECK

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)

- Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
- The short land between the No. ④ (LD) and No. ⑤ (GND) pins on the flexible board is shorted with a solder build-up to prevent damage to the laser diode. To connect to the PC board, be sure to open by removing the solder build-up, and finish the work quickly.
- Take care not to apply excessive stress to the flexible board (FFC).
- Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

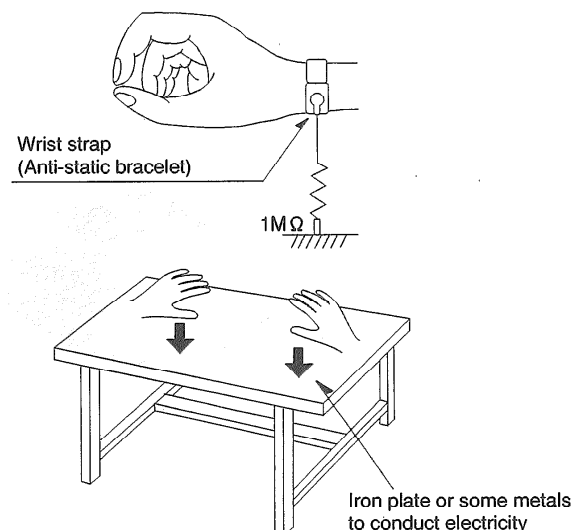


● Grounding for electrostatic breakdown prevention

- Human body grounding**
Use the anti-static wrist strap to discharge the static electricity from your body.
- Work table grounding**
Put a conductive material (sheet) or steel sheet on the area where the 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).



■ 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

• Checking Procedures for each P.C.B.

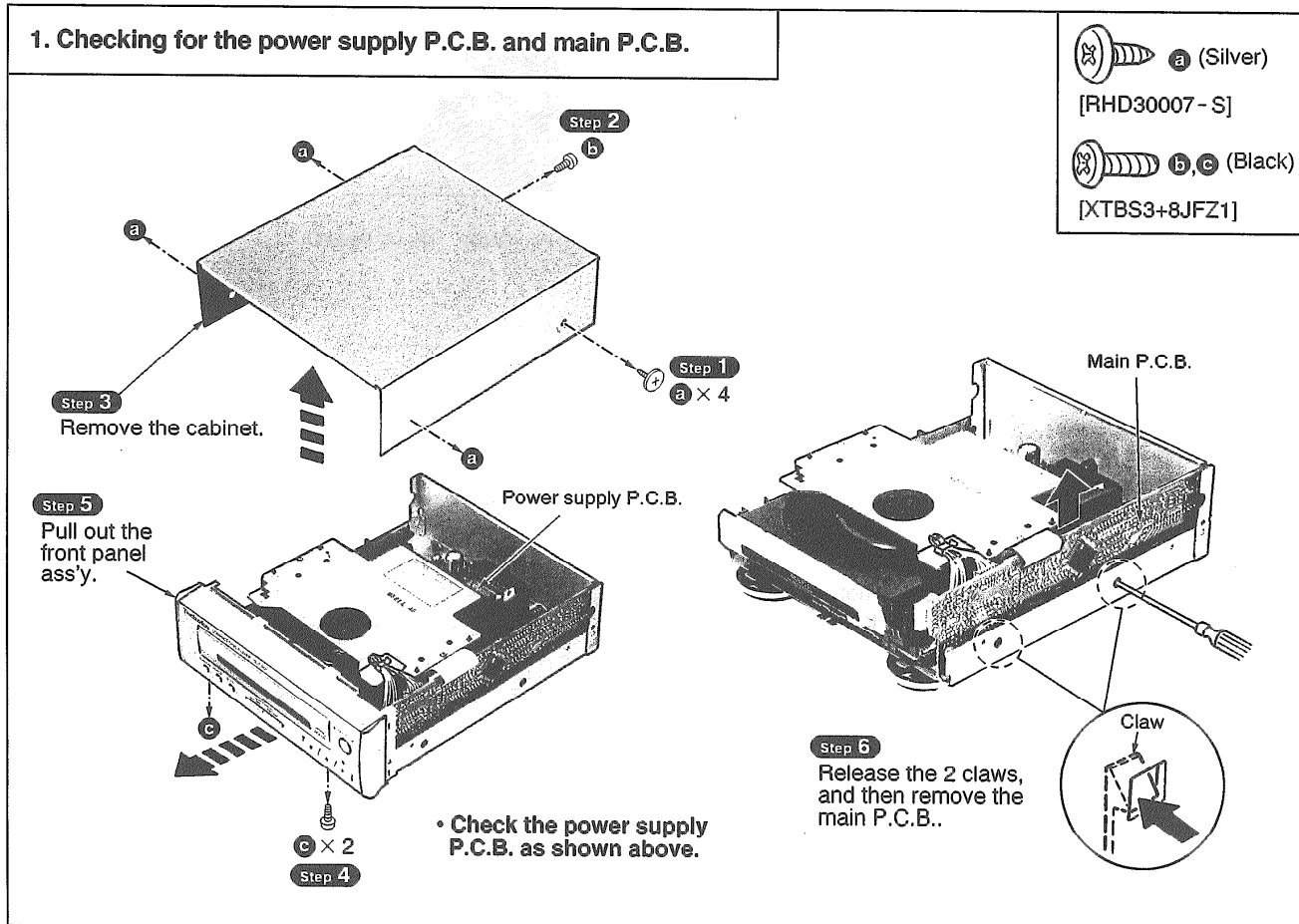
- | | Page. |
|--|-------|
| 1. Checking for the power supply P.C.B. and main P.C.B.. | 4,5. |
| 2. Checking for the servo P.C.B.. | 5. |

• 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. | 10. |

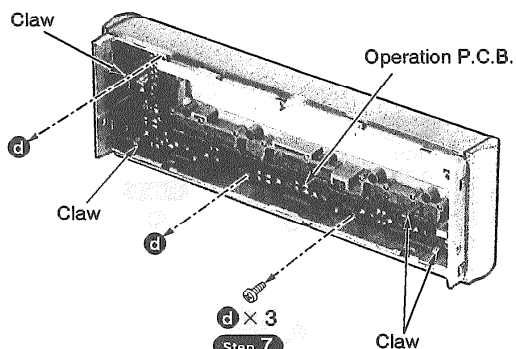
■ Checking Procedure for each P.C.B.

1. Checking for the power supply P.C.B. and main P.C.B.



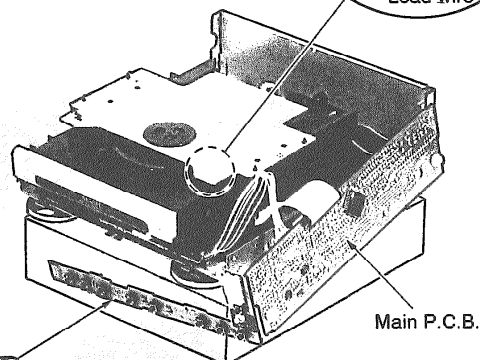
Step 8

Release the 4 claws, and then remove the operation P.C.B..

**Step 9**

Remove the lead wire from the clamber.

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

**Step 10**

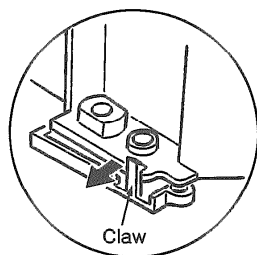
Reinstall the operation P.C.B. to the main P.C.B..

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

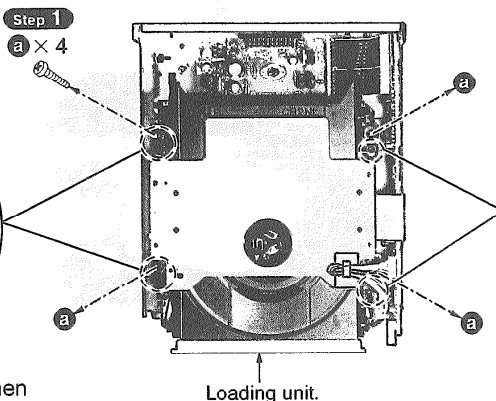
• Follow the item 1 (**Step 1** ~ **Step 5**) in checking procedures for each P.C.B. on page 4.

Step 1

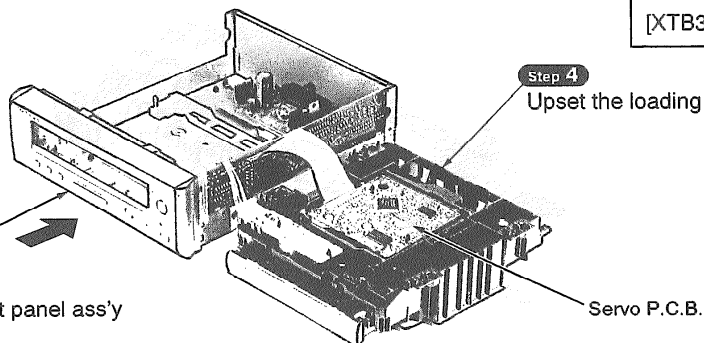
a x 4

**Step 3**

Release the 4 claws, and then remove the loading unit.



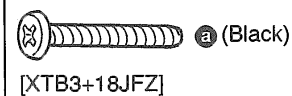
• Check the servo P.C.B. as shown below.

**Step 4**

Upset the loading unit.

Step 5

Reinstall the front panel ass'y to the main unit.

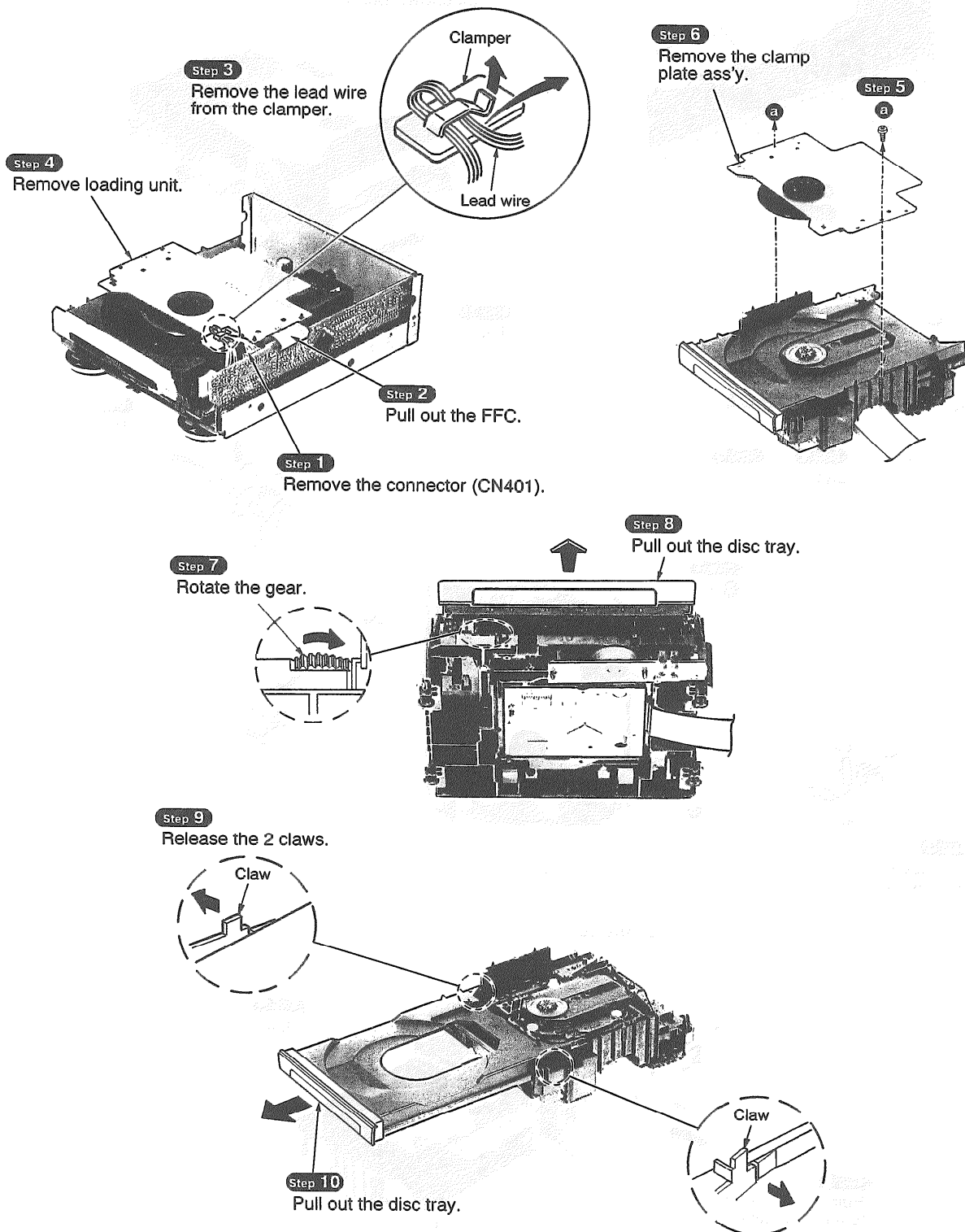


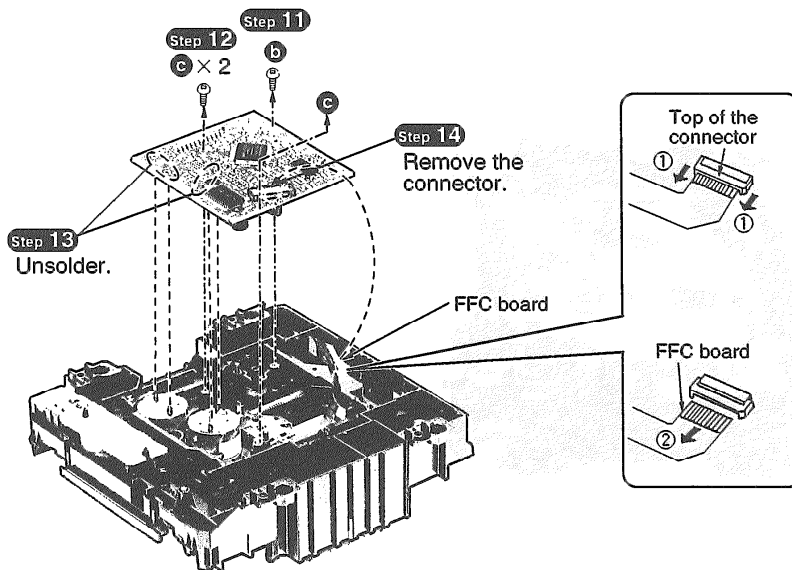
Main Component Replacement Procedures

1. Replacement for the traverse deck ass'y

[XTN26+6G]

- 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 3**) in checking procedures for each P.C.B. on page 5.



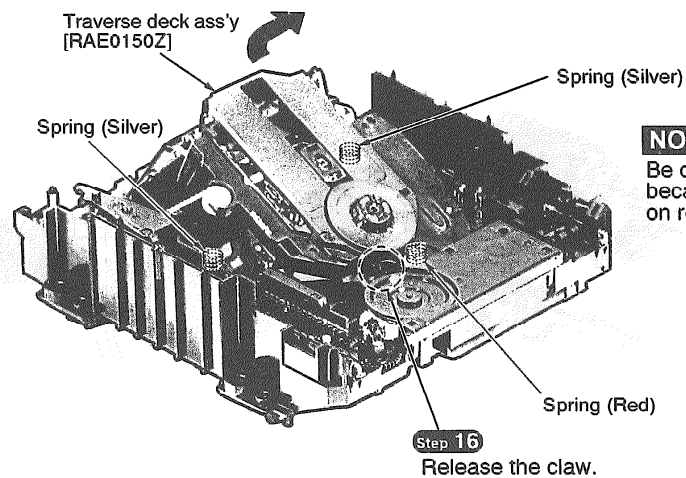
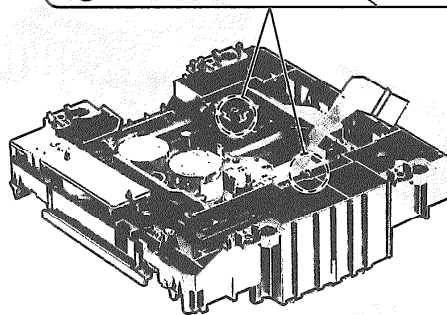


Caution:
Insert a short pin into the traverse unit FFC board.
(Refer to "Handling Precautions for Traverse Deck" on page 3.)

[XTN2+6G]

[XTV2+6G]

- Step 15
1. Widen the boss using a regular screwdriver.
 2. Pull out the pin in the direction of the arrow.
- Screwdriver
- Boss
- Pull out the pin.



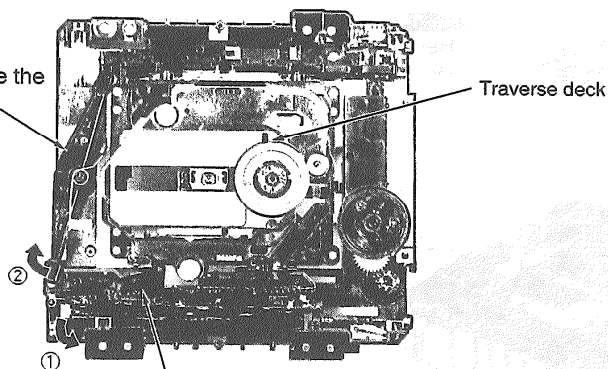
NOTE

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

Installation of the disc tray after replacement

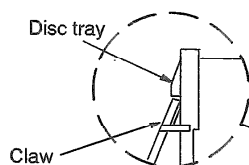
Step 2

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



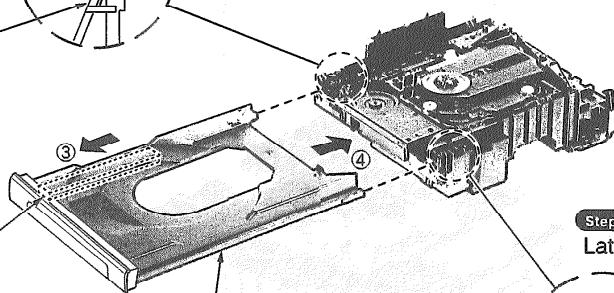
Step 1

Release the lock lever.



Step 3

Move the drive rack ass'y in the direction of arrow ③.

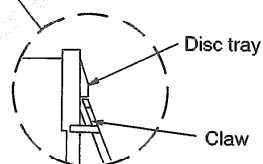


Step 4

Install the disc tray.

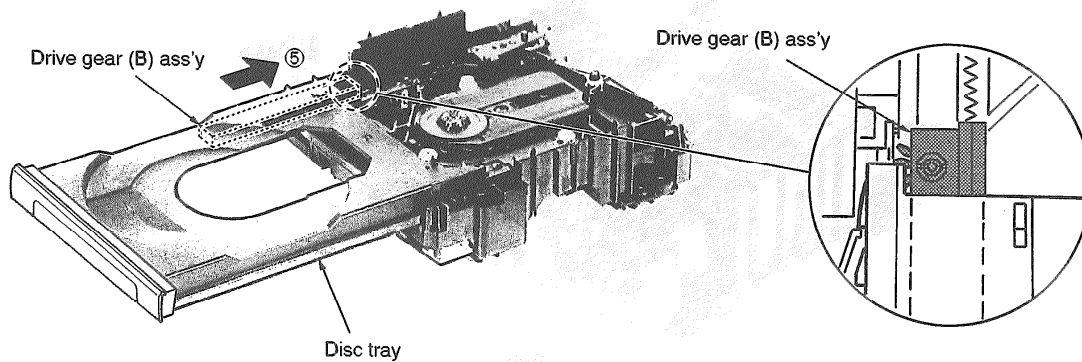
Step 5

Latch the claw to the disc tray.



Step 6

Supporting the disc tray manually, engage the drive gear (B) ass'y with the gear and then slide to stop the disc tray.

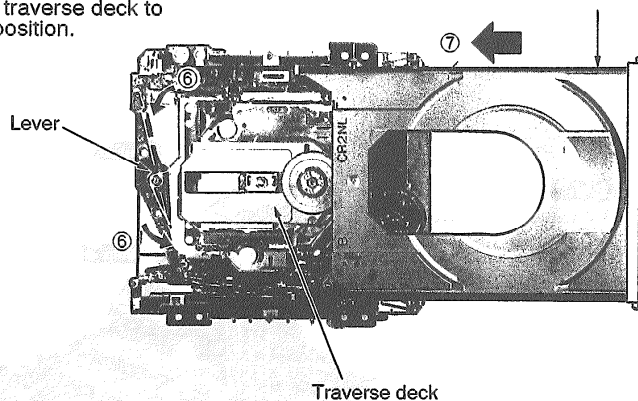


Step 7

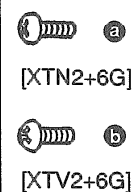
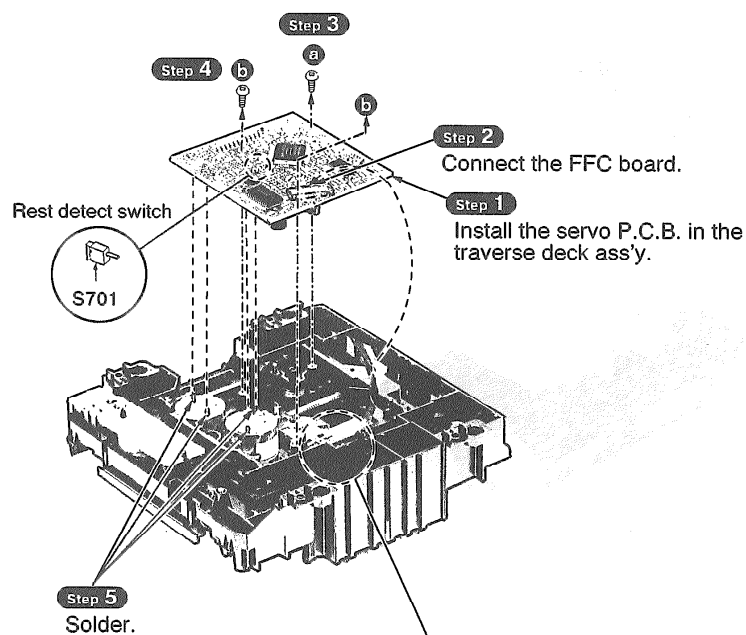
Operate the lever, and then locate the traverse deck to "DOWN" position.

Step 8

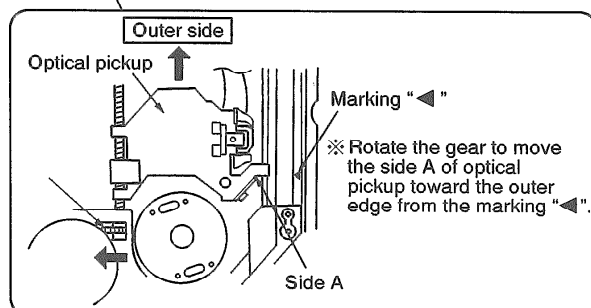
Press the disc tray.



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

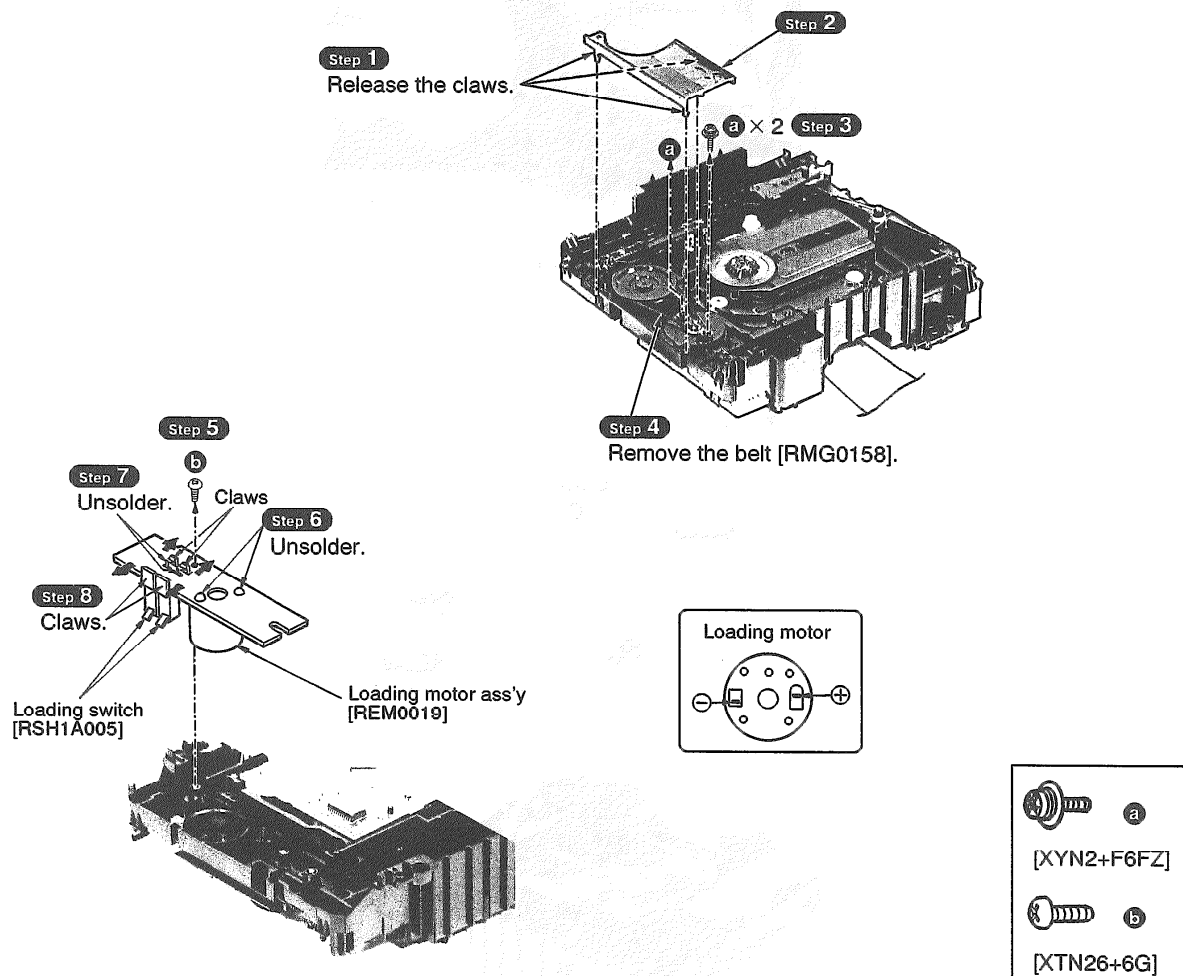
**NOTE**

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.]



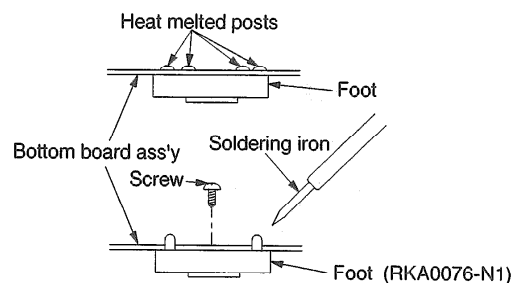
2. Replacement for the belt, loading motor ass'y and loading switch

- Follow the item 1 (**Step 1** ~ **Step 5**) in checking procedures for each P.C.B. on page 4.
- Follow the item 2 (**Step 1** ~ **Step 3**) in checking procedures for each P.C.B. on page 5.
- Follow the item 1 (**Step 1** ~ **Step 10**) in main component procedures on page 6.



REPLACEMENT OF THE FOOT

1. Remove the 4 heat melted posts on the Bottom board ass'y with a pair of nippers or similar tool.
2. To replace the foot (RKA0076-N1) on the Bottom board ass'y melt the 4 posts with a soldering iron or install it with a screw (XTB3+6J).



■ ERROR CODE DISPLAY AND SERVO ADJUSTMENT FUNCTION

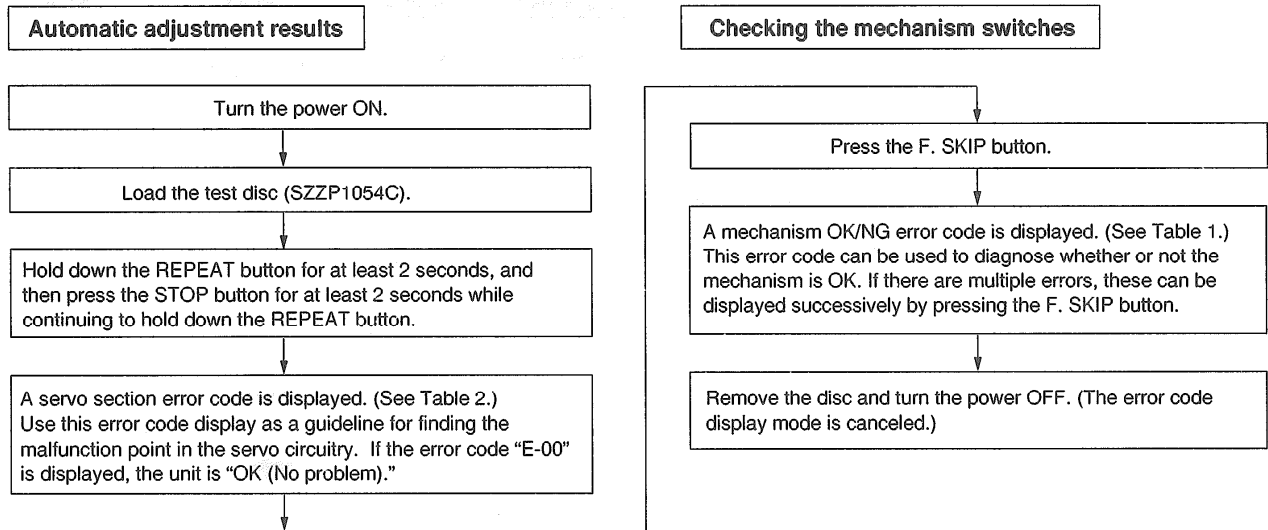
This unit has an error code display function, so that if the unit operates incorrectly, the fault is displayed using an error code on the FL display of the tuner (ST-CA01). It also has a servo adjustment function for displaying the status of servo system functions (focus, tracking, CLV) on the tuner's FL display.

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

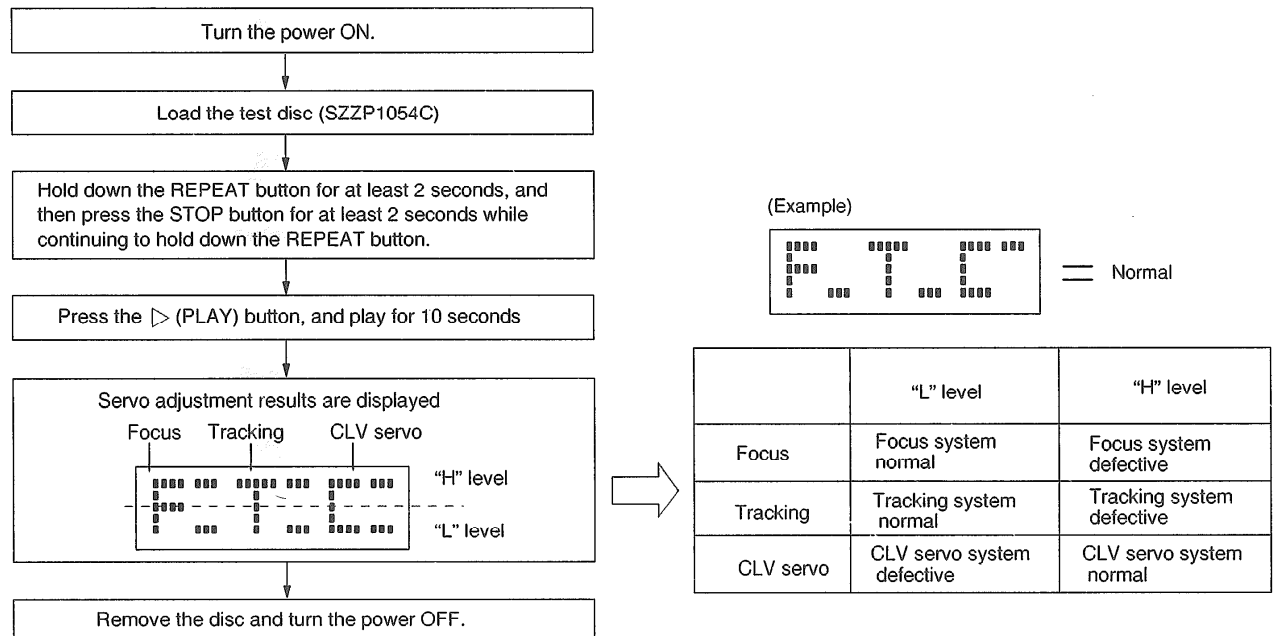
Use these two functions for guidance during fault diagnosis and repair.

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

● Error code display procedure



● Servo adjustment procedure




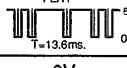
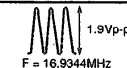
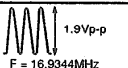
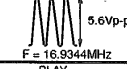
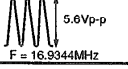

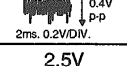


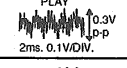

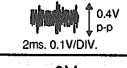
● Table 1

FL display	Symptom	Cause
H - 15	When CD tray opens, it closes by itself.	Disc tray "Open" detection switch (S791) fault.
H - 16	When CD tray closes, it opens by itself	Disc tray "Closed" detection switch (S790) fault.
F - 15	Does not play, even when CD play button is pressed.	Pickup rest position detection switch (S701) fault.
F - 26	Does not move even when "▶" (PLAY) is pressed.	System control or servo processor IC (IC401, 702) fault.

● Table 2

※ The unit is satisfactory if the error code is **E - 00** of **E - 02**

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

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 signal to/from mechanism controller.	MDATA	IC702 ⑧ pin		0V
			MCLK	IC702 ⑦ pin		4.8V
			MLD	IC702 ⑨ pin		4.9V
			SENSE	IC702 ⑩ pin	0V	0V
			/RST	IC702 ⑱ pin	4.9V	4.9V
			X1	IC702 ⑤⑧ pin		
			X2	IC702 ⑤⑨ pin		
E - 02 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.	FE	IC702 ③② pin		2.5V
			TE	IC702 ③③ pin		2.5V
			FOD	IC702 ②⑧ pin	2.5V	2.5V
			TRD	IC702 ②⑦ pin	2.5V	2.5V
			KICK	IC702 ②⑥ pin	2.5V	2.5V
			/FLOCK	IC702 ①① pin	0V	4.9V
			/RF DET	IC702 ③⑧ pin	0V	4.9V
			RF	TJ701		3.4V
			STAT	IC702 ①⑦ pin	4.9V	0V
			FBAL	IC702 ③① pin	2.5 ± 1.25V	2.5 ± 1.25V
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.	RF	TJ701		3.4V
			FE	IC702 ③② pin		2.5V
			/TLOCK	IC702 ①② pin	0V	0V
			OFT	IC702 ③⑥ pin	0V	0V
			FE	IC702 ③② pin		2.5V
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.	TE	IC702 ③③ pin		2.5V
			/TLOCK	IC702 ①② pin	0V	0V
			OFT	IC702 ③⑥ pin	0V	0V
			OFT	IC702 ③⑥ pin	0V	0V

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-CA01 is designed to operate on power supplied from the Amplifier SE-CA01 through the Tuner ST-CA01.

When connecting the unit to other system components, do not connect to the Amplifier SE-CA01 directly. Be sure to connect this unit through the Tuner ST-CA01.

When operating the unit SL-CA01 alone for testing and servicing, without having power supplied from the Amplifier SE-CA01 and the Tuner ST-CA01, use the following method.

Power Supply to This Unit alone

- Apply 11V AC power to the section between **AC IN** of the coil (L401) and the jumper (J31) **GND** as well as the section between **AC IN** of the coil (L402) and the jumper (J31) **GND**. (Shown in Fig. 1)

Operating the Unit Alone

When this unit is operated alone without system connection to other units, the switches on the front panel remain inoperative. To operate the switches, follow the procedure below.

- To play, short-circuit the points between the R431 and the jumper (J101).
- To F. SKIP, short-circuit the points between the R432 and the jumper (J101).
- To OPEN/CLOSE of disc tray, short-circuit the points between the R433 and the jumper (J101).
- To R. SKIP short-circuit the points between the R434 and the jumper (J101).

To Check Signals

Connect the oscilloscope or the speaker with built-in amplifier to the section between LINE OUT (Lch) of the resistor R455 and the **GND** point of the jumper (J31) as well as the section between LINE OUT (R ch) of the resistor R456 and the **GND** point of the jumper (J31) and check if the signals are outputting from this unit. (Shown in Fig. 1)

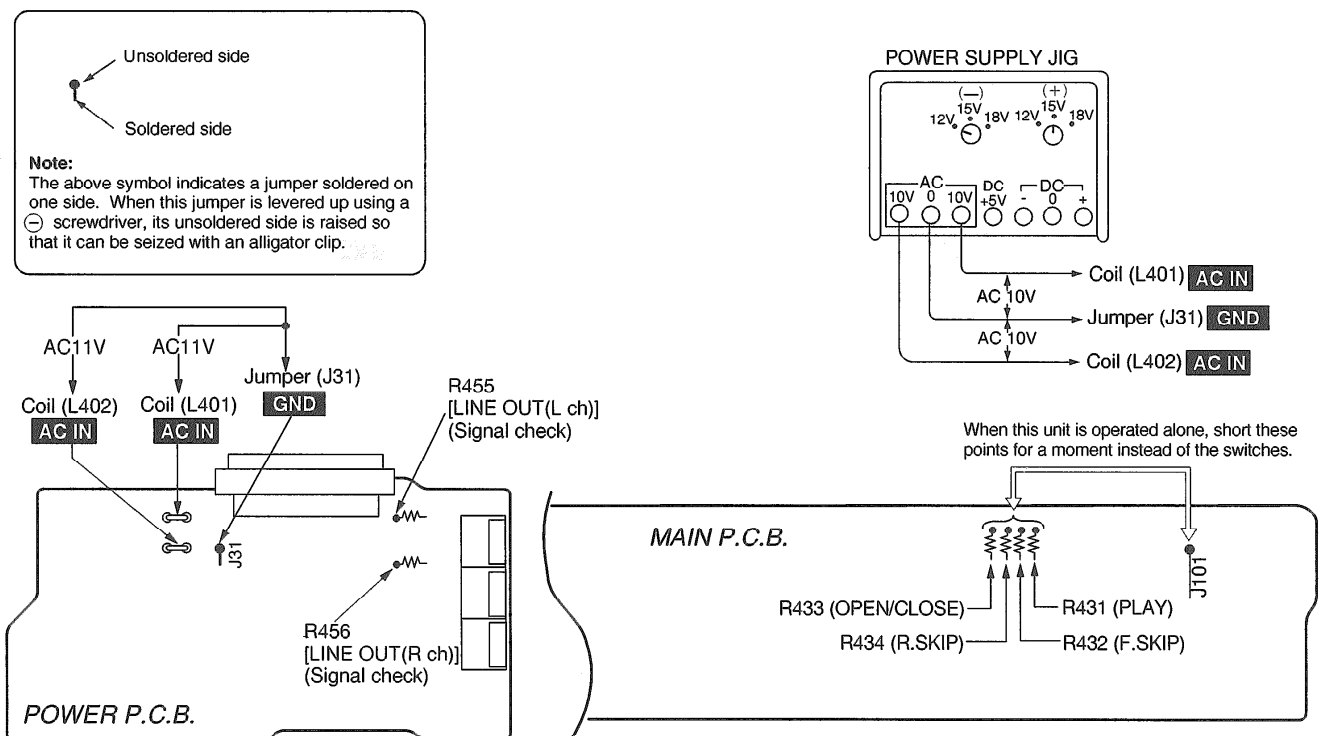
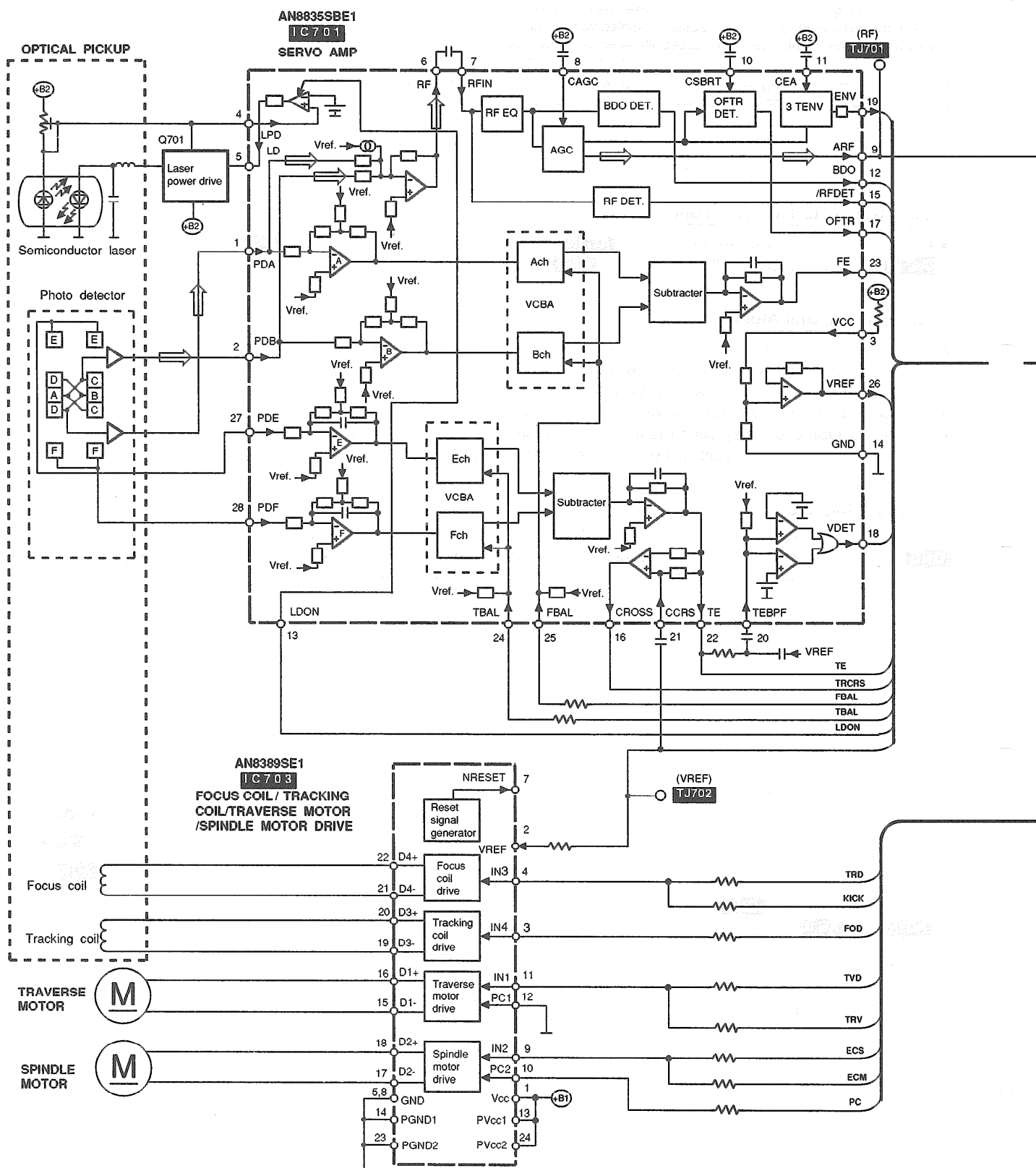
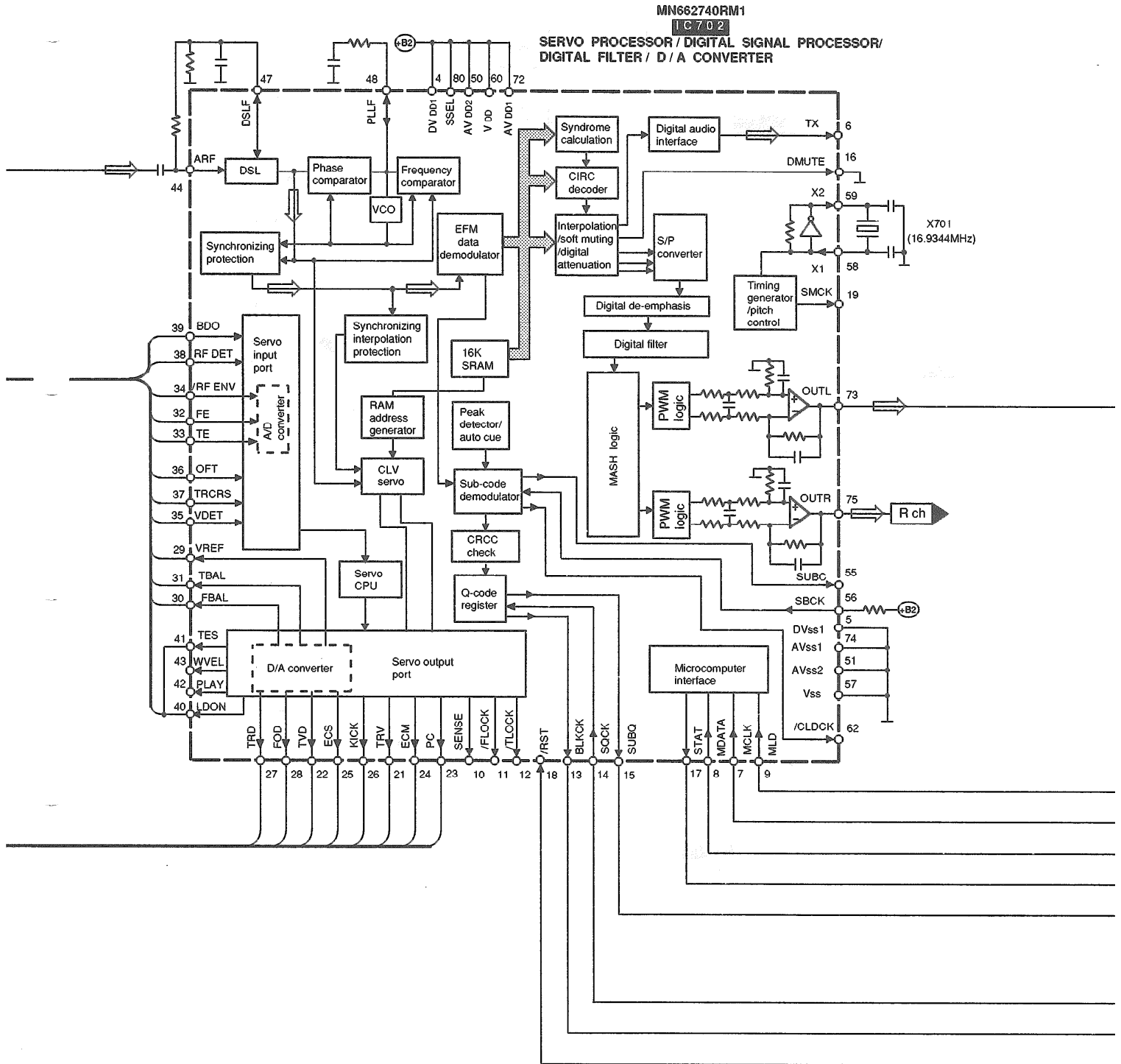


Fig. 1

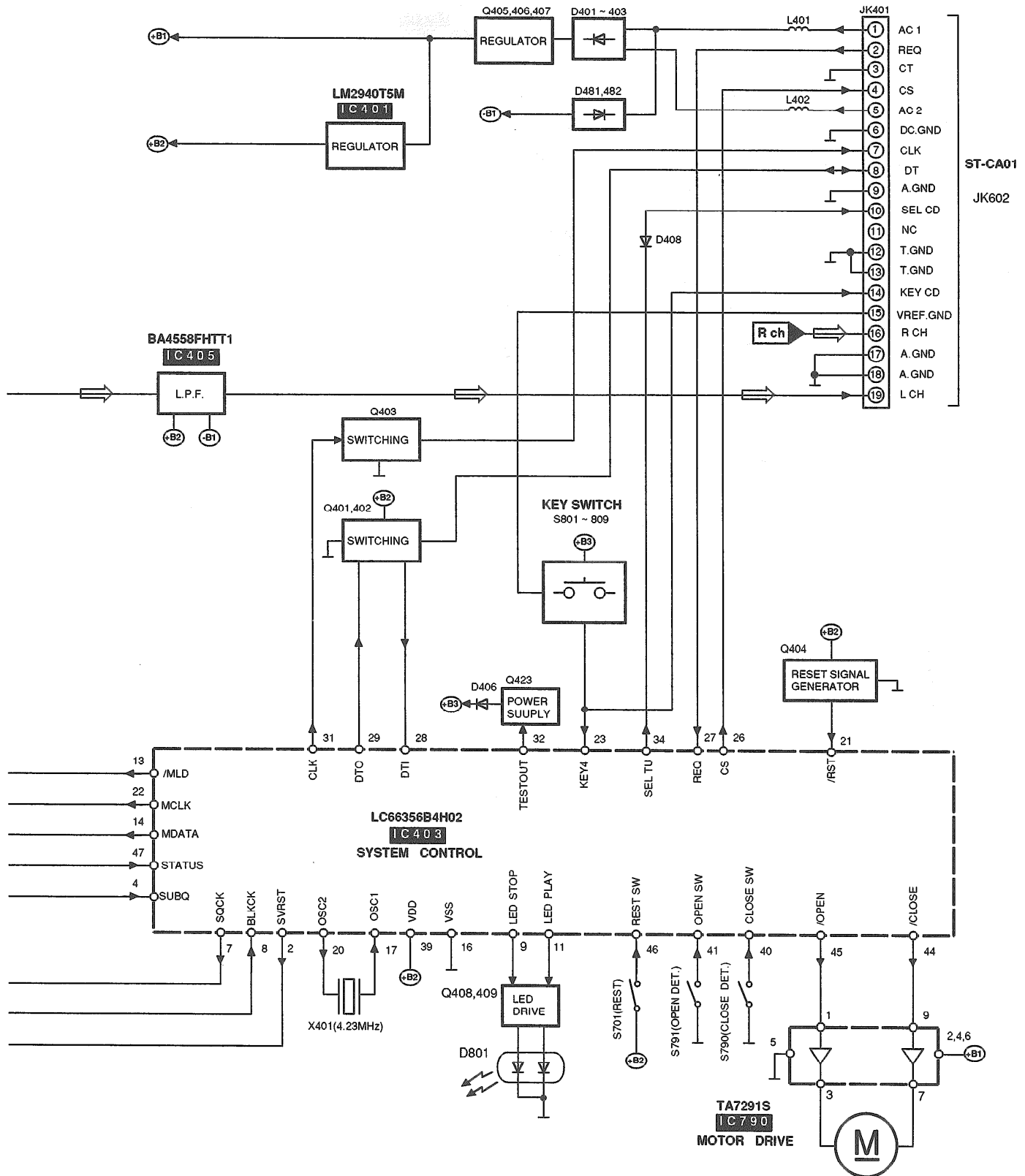
BLOCK DIAGRAM



● Signal line ➡ : CD signal



● Signal line ➡ : CD signal



■ SCHEMATIC DIAGRAM (Parts list on pages 29, 30, 33, 34.)

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

	Page		Page
A SERVO CIRCUIT	18, 19	D MAIN CIRCUIT	20, 21
B LOADING MOTOR CIRCUIT	20	E POWER SUPPLY CIRCUIT	21
C OPERATION CIRCUIT	20		

Notes:

- **S701**: Rest detect switch
- **S790**: Tray close detect switch
- **S791**: Tray open 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)
- **S808**: AI edit switch (AI EDIT)
- **S809**: 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, 0dB]

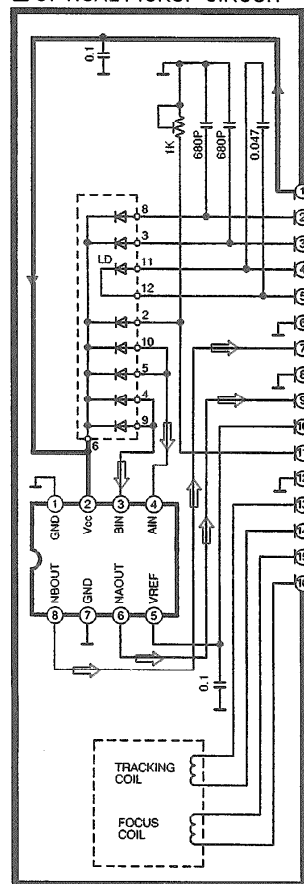
- Important safety notice:
Components identified by ▲ mark have special characteristics important for safety.
Furthermore, special parts which have purpose of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacture'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.

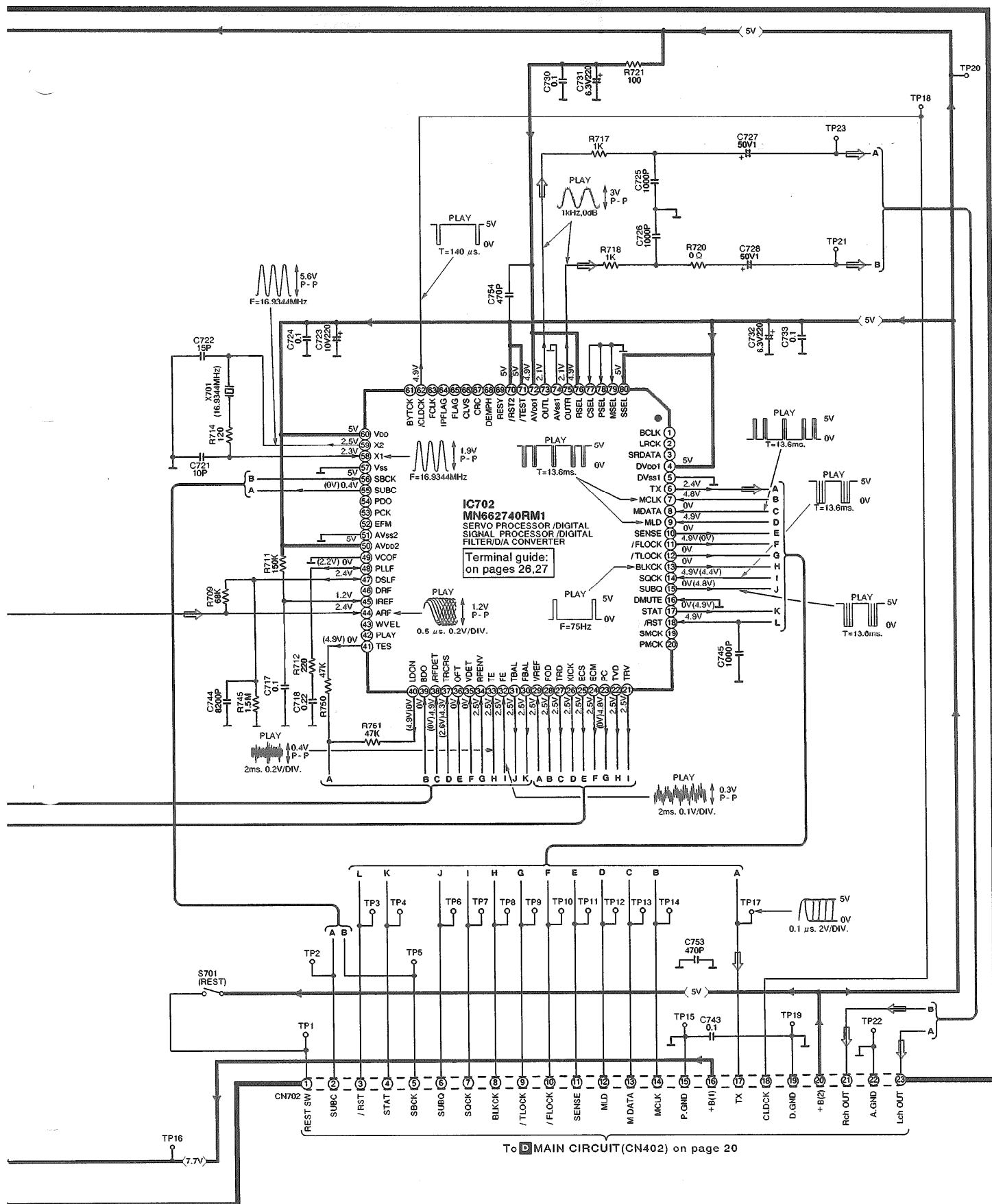
• Voltage and signal line

————▶ : Positive voltage line

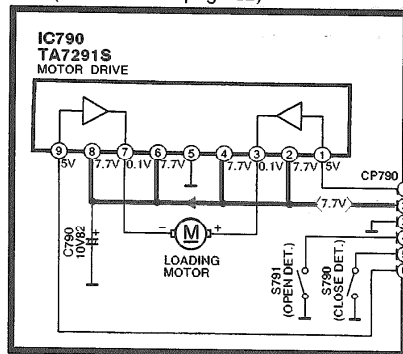
-----▶ : Negative voltage line

⇨ : CD signal line

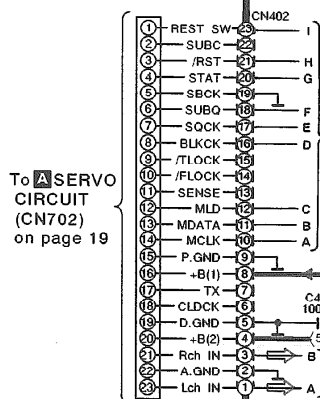
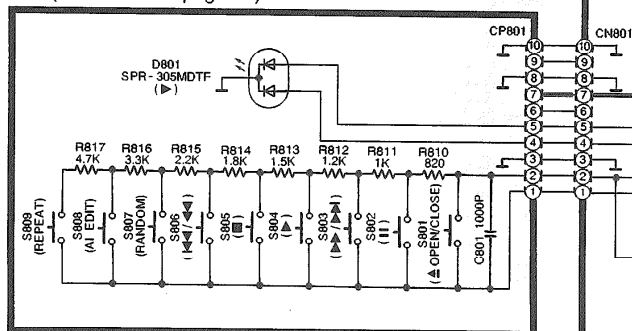




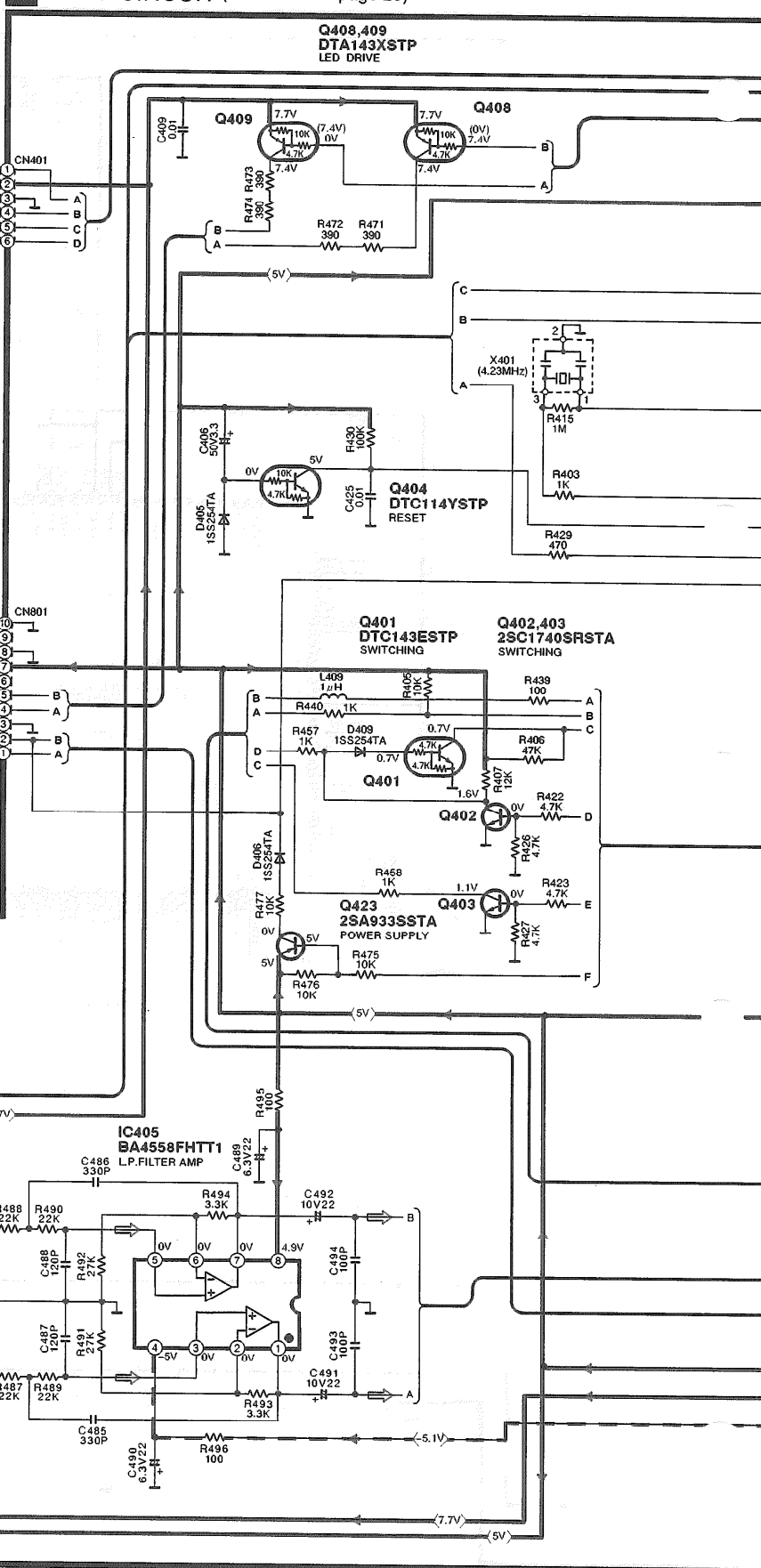
B **LOADING MOTOR CIRCUIT**
(P.C.Board: on page 22)

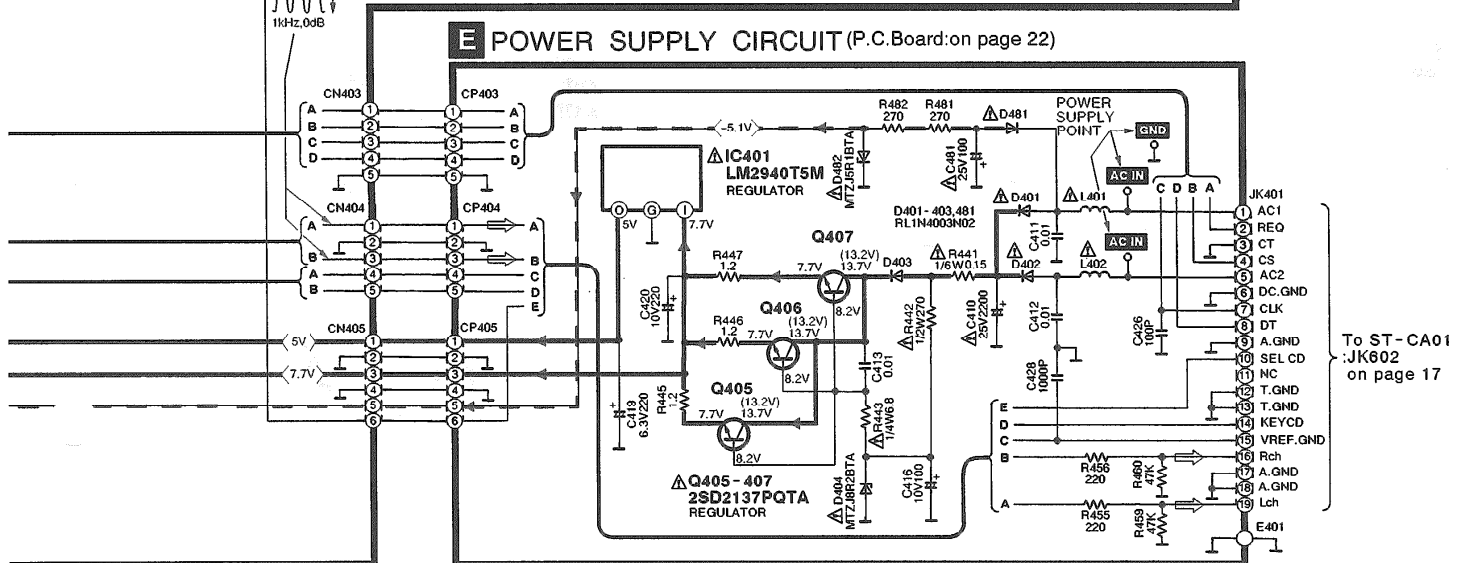
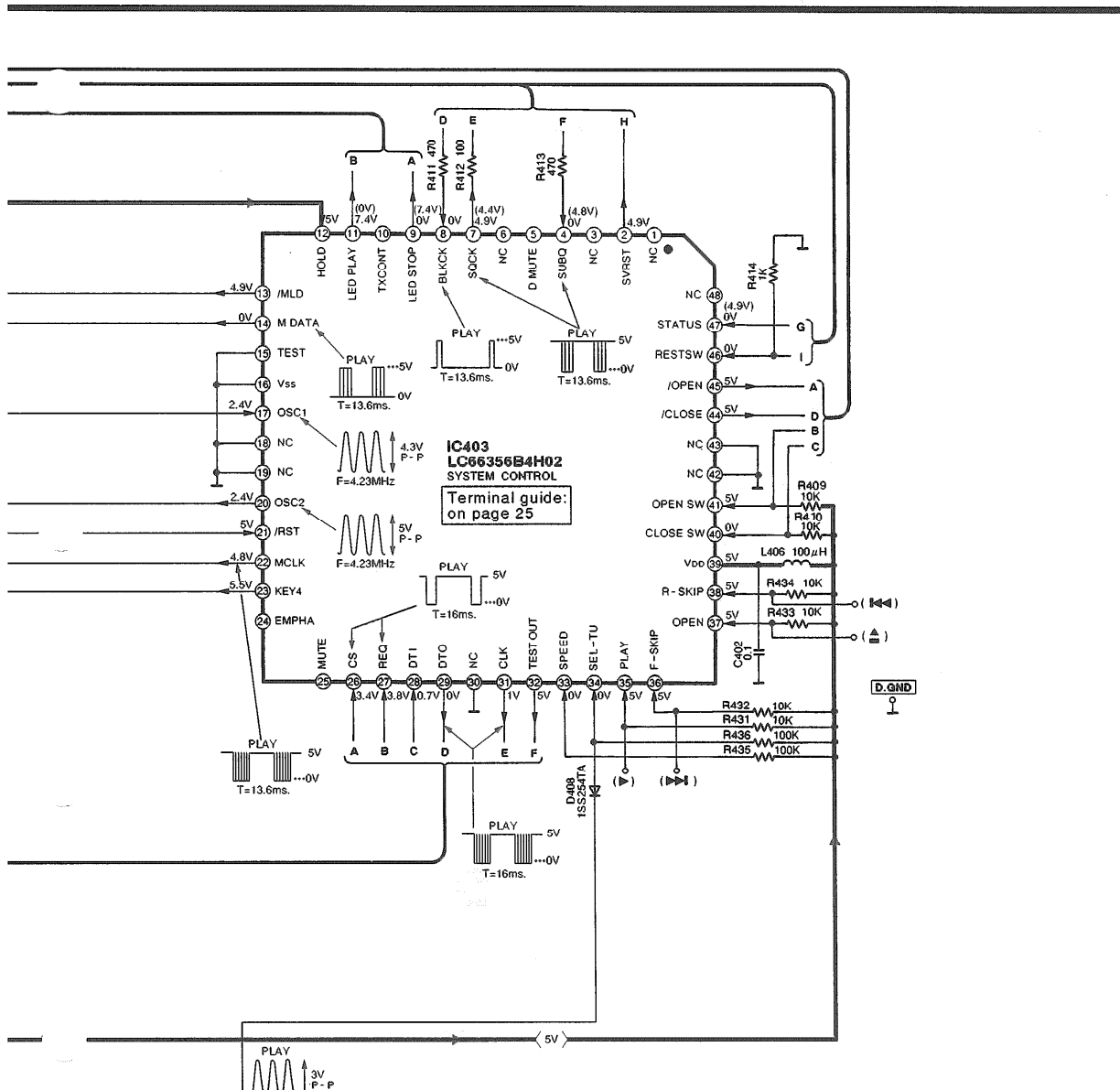


C OPERATION CIRCUIT
(P.C.Board: on page 23)



D MAIN CIRCUIT (P.C.Board: on page 23)

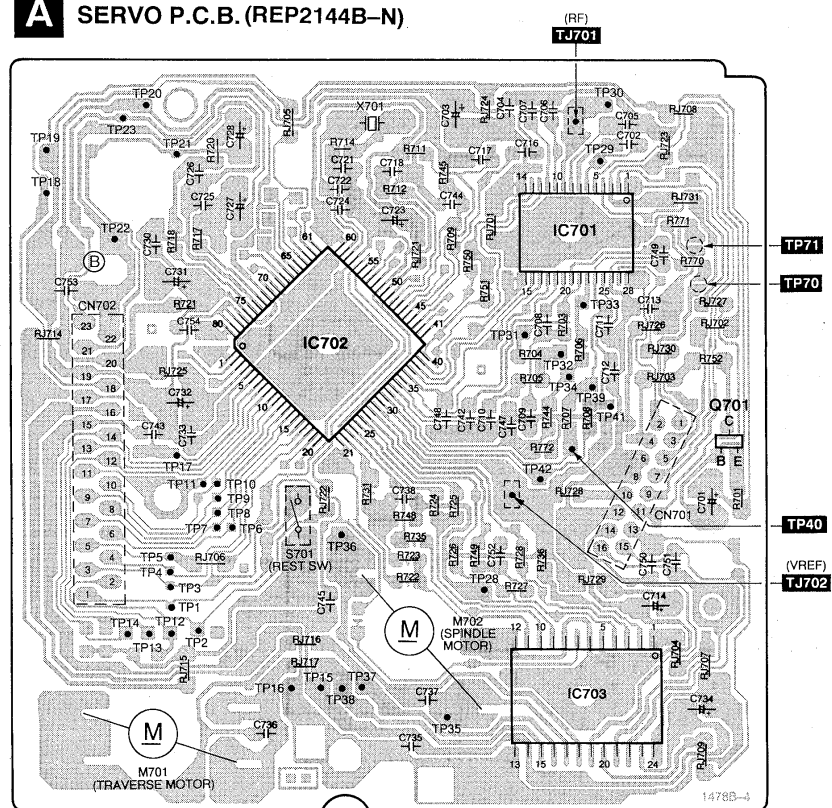




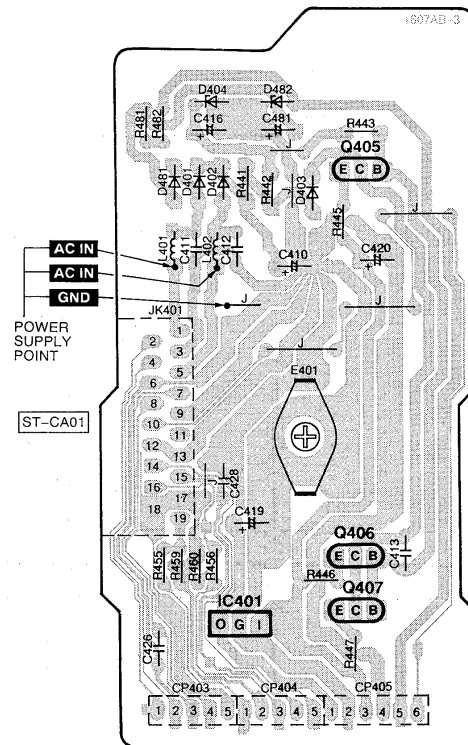
PRINTED CIRCUIT BOARD DIAGRAM

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

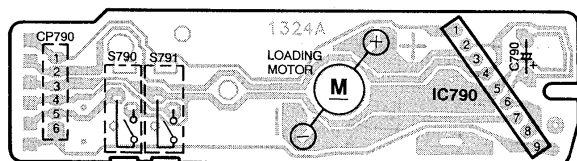
A SERVO P.C.B. (REP2144B-N)

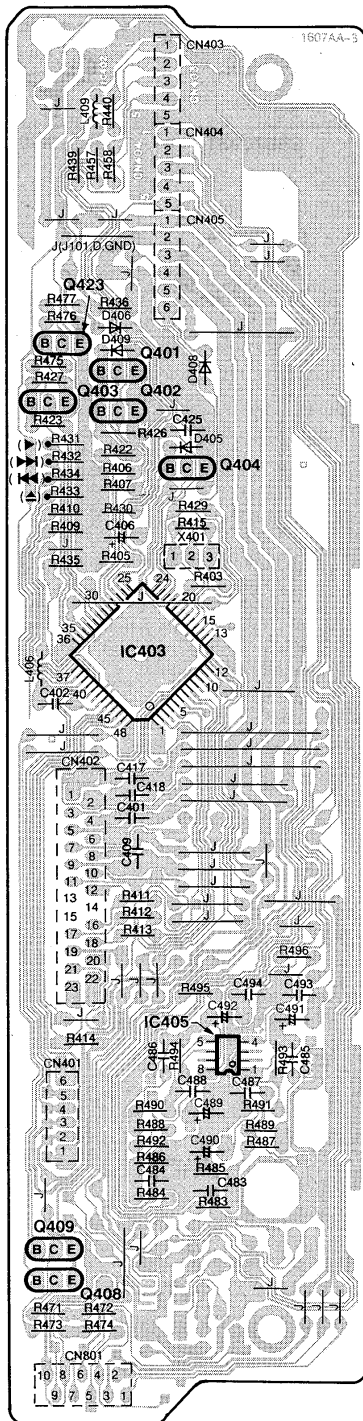


E POWER SUPPLY P.C.B. (REP2269B-M)

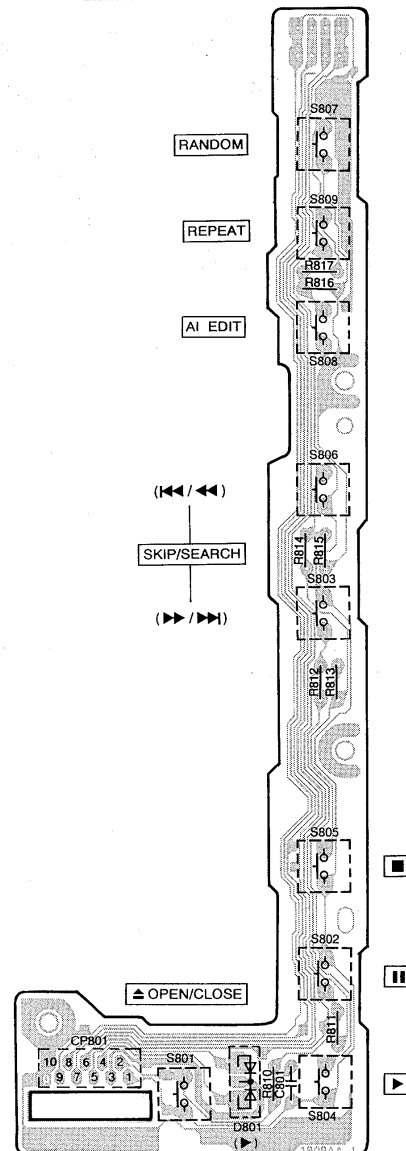


B LOADING MOTOR P.C.B. (REP1960A)



D MAIN P.C.B. (REP2269B-M)

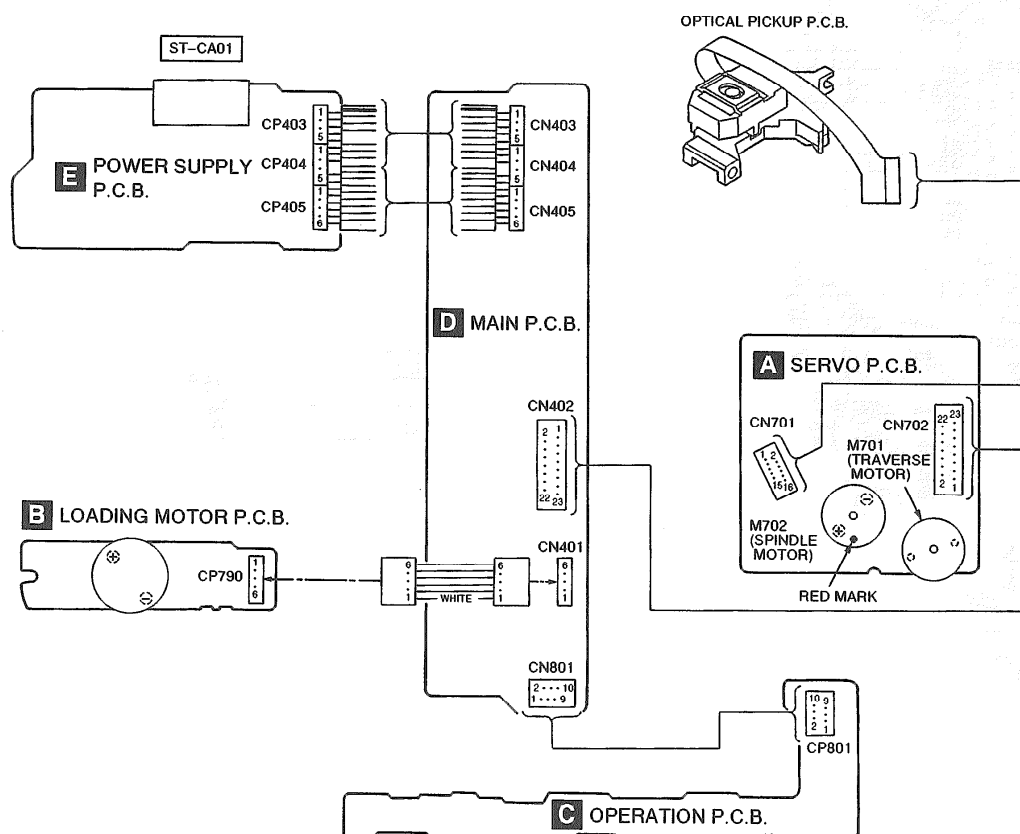
C OPERATION P.C.B. (REP2270B-S)



● Terminal guide of IC's transistors and diodes

AN8835SBE1 	BA4558FHTT1 	AN8389SE1 	TA7291S 	LM2940T5M 	LC66356B4H02
MN662740RM1 	2SC1740SRSTA 2SA933SSTA DTC114YSTP DTC143ESTP DTA143XSTP 		2SD2137PQTA 	2SB709STX 	RL1N4003N02
MTZJ5R1BTA MTZJ8R2BTA 	1SS254TA 	SPR-305MDTF 			

■ WIRING CONNECTION DIAGRAM



■ TERMINAL GUIDE

● IC403 (LC66356B4H02): System Control

Pin No.	Mark	I/O Division	Function
1	NC	—	Not used, open
2	SVRST	O	Reset signal output terminal
3	NC	—	Not used, open
4	SUBQ	I	Sub-code Q data input terminal
5	DMUTE	—	Not used, open
6	NC	—	Not used, open
7	SQCK	O	Sub-code Q register clock output terminal
8	BLKCK	I	Sub-code block clock input terminal (f=75Hz)
9	LED STOP	O	LED drive signal output terminal
10	TX CONT	—	Not used, open
11	LED PLAY	O	LED drive signal output terminal
12	HOLD	I	Not used, connected to power supply
13	/MLD	O	Command load signal output terminal
14	MDATA	O	Command data signal output terminal
15	TEST	—	Test terminal
16	VSS	—	GND terminal
17	OSC1	I	Crystal OSC terminal (f=4.2336MHz)
18	NC	—	Not used, connected to GND
19	NC	—	
20	OSC2	O	Crystal OSC terminal (f=4.2336MHz)
21	/RST	I	Reset signal input terminal
22	MCLK	O	Command clock signal output terminal
23	KEY4	O	Key switch det. terminal
24	EMPHA	—	Not used, open

Pin No.	Mark	I/O Division	Function
25	MUTE	—	Not used, open
26	CS	I	Communication chip select signal input terminal
27	REQ	I	Communication request signal input terminal
28	DTI	I	Communication data signal input/output terminal
29	DTO	O	
30	NC	—	Not used, open
31	CLK	O	Communication clock signal output
32	TEST OUT	O	Not used, connected to power supply
33	SPEED	I	Not used, connected to register
34	SEL-TU	I	Communication data signal input terminal
35	PLAY	I	Not used, connected to register
36	F-SKIP	I	Not used, connected to register
37	OPEN	I	Not used, connected to register
38	R-SKIP	I	Not used, connected to register
39	VDD	I	Power supply input terminal
40	CLOSE SW	I	Disc tray "CLOSE" det. input terminal
41	OPEN SW	I	Disc tray "OPEN" det. input terminal
42	NC	—	Not used, connected to GND
43	NC	—	Not used, connected to GND
44	/CLOSE	O	Loading motor "CLOSE" signal output terminal
45	/OPEN	O	Loading motor "OPEN" signal output terminal
46	RESTSW	I	Rest position det. input terminal
47	STATUS	I	Status signal input terminal
48	NC	—	Not used, open

● IC702 (MN662740RM1): Servo processor/ digital signal processor/ digital filter/ D/A converter

Pin No.	Mark	I/O Division	Function
1	BCLK	O	Serial bit clock terminal (Not used, open)
2	LRCK	O	L/R discriminating signal (Not used, open)
3	SRDATA	O	Serial data (Not used, open)
4	DVDD1	I	Power supply (digital circuit) terminal
5	DVSS 1	—	GND (digital circuit) terminal
6	TX	O	Digital audio interface signal
7	MCLK	I	Command clock signal
8	MDATA	I	Command data signal
9	MLD	I	Command load signal ("L":LOAD)
10	SENSE	O	Sense signal (OFT, FESL, NACEND, NAJEND, POSAD, SFG)
11	/FLOCK	O	Optical servo condition (focus) ("L": lead-in)
12	/TLOCK	O	Optical servo condition (tracking) ("L": lead-in)
13	BLKCK	O	Sub-code block clock (f=75Hz) (Not used, open)
14	SQCK	I	Sub-code Q register clock
15	SUBQ	O	Sub-code Q data
16	DMUTE	I	Muting input ("H": MUTE) (Not used, connected to GND)
17	STAT	O	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK)
18	/RST	I	Reset signal ("L": reset)
19	SMCK	O	System clock (f=4.2336MHz) (Not used, open)
20	PMCK	O	Frequency division clock signal (No used, open) $(f = \frac{1}{1.92} \times ck = 88.2kHz)$
21	TRV	O	Traverse servo control

Pin No.	Mark	I/O Division	Function
22	TVD	O	Traverse drive signal
23	PC	O	Turntable motor drive signal ("L": ON)
24	ECM	O	Turntable motor drive signal (Forced mode)
25	ECS	O	Turntable motor drive signal (Servo error signal)
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive signal output
28	FOD	O	Focus drive signal output
29	VREF	I	D/A driven output (TVD, ECS, TRD, FOD, FBAL, TBAL) normal voltage input terminal
30	FBAL	O	Focus balance adj. output
31	TBAL	O	Tracking balancef adj. output
32	FE	I	Focus error signal (analog input)
33	TE	I	Tracking error signal (analog input)
34	RFENV	I	RF envelope signal
35	VDET	I	Oscillation det. signal ("H": det.)
36	OFT	I	Off track signal ("H": Off track)
37	TRCRS	I	Track cross signal input
38	/RFDET	I	RF detection signal ("L": detection)
39	BDO	I	Dropout detection signal ("H": dropout)
40	LDON	O	Laser power control ("H": ON)
41	TES	O	Tracking error shunt output ("H": dropout)
42	PLAY	O	Play signal ("H": play) (Not used, open)

Pin No.	Mark	I/O Division	Function	Pin No.	Mark	I/O Division	Function
43	WVEL	O	Double velocity status signal ("H": double) (Not used, open)	65	FLAG	O	Flag terminal (Not used, open)
44	ARF	I	RF signal input	66	CLVS	O	Turntable servo phase synchro signal ("H": CLV, "L": Rough servo) (Not used, open)
45	IREF	I	Reference current input	67	CRC	O	Sub-code CRC check terminal ("H": ON, "L": NG) (Not used, open)
46	DRF	I	DSL bias terminal (Not used, open)	68	DEMPH	O	De-emphasis ON signal ("H": ON) (Not used, open)
47	DSL F	I/O	DSL loop filter terminal	69	RESY	O	Re-synchronizing signal of frame sync. (Not used, open)
48	PLL F	I/O	PLL loop filter terminal	70	/RST2	I	Reset terminal after "MASH" circuit (Not used, connected to power supply)
49	VCO F	I/O	VCO loop filter terminal	71	/TEST	I	Test terminal (Normal: "H") (Not used, connected to power supply)
50	AVDD2	I	Power supply (analog circuit) terminal(2)	72	AVDD1	I	Power supply (analog circuit) terminal (1)
51	AVSS2	—	GND (analog circuit) terminal	73	OUTL	O	Lch audio signal
52	EFM	O	EFM signal (Not used, open)	74	AVSS1	—	GND (analog circuit) terminal (1)
53	PCK	O	PLL extract clock (f= 4.3218MHz) (Not used, open)	75	OUTR	O	Rch audio signal
54	PDO	O	Phase comparated signal of EFM and PCK (Not used, open)	76	RSEL	I	Polarity direction control terminal of RF signal (Not used, connected to power supply)
55	SUBC	O	Sub-code serial output clock (Not used, open)	77	CSEL	I	Frequency control terminal of crystal oscillator (Not used, connected to GND)
56	SBCK	I	Sub-code serial data (Not used, connected to power supply)	78	PSEL	I	Test terminal (Normal:"L") (Not used, connected to GND)
57	VSS	—	GND terminal	79	MSEL	I	"SMCK" terminal frequency select ("L": SMCK=4.2336MHz) (Not used, connected to GND)
58	X1	I	Crystal oscillator terminal (f=16.9344MHz)	80	SSEL	I	"SUBQ" terminal mode select ("H": Q code buffer) (Not used, connected to power supply)
59	X2	O					
60	VDD	I	Reset signal ("L": reset)				
61	BYTCK	O	Byte clock signal (Not used, open)				
62	/CLDCK	O	Sub-code frame clock signal (f CLDCK=7.35KHz: Normal) (Not used, open)				
63	FCLK	O	Crystal frame clock (Not used, open)				
64	IPFLAG	O	Interpolation flag terminal (Not used, open)				

● IC701 (AN8835SBE1): Servo amp

Pin No.	Mark	I/O Division	Function
1	PDA	I	Focus signal input terminal 1 (Ach)
2	PDB	I	Focus signal input terminal 2 (Bch)
3	VCC	I	Power supply terminal
4	LPD	I	Laser PD signal
5	LD	O	Laser power auto control output
6	RF	O	RF amp terminal
7	RF IN	I	AGC input terminal
8	CAGC	I	AGC detection capacitor input
9	ARF	O	RF signal
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

Pin No.	Mark	I/O Division	Function
15	/RFDET	O	RF det. signal ("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 output terminal
20	TEBPF	I	Oscillation detect input terminal (Not used, open)
21	CCRS	I	CROSS capacitor connection terminal
22	TE	O	Tracking error signal
23	FE	O	Focusing error signal
24	TBAL	I	Tracking balance adj. input
25	FBAL	I	Focus balance adj. input
26	VREF	O	Reference voltage output
27	PDE	I	Tracking signal input terminal 1 (Ech)
28	PDF	I	Tracking signal input terminal 2 (F ch)

● IC703 (AN8389SE1): Focus coil/tracking coil/traverse motor/spindle motor drive

Pin No.	Mark	I/O Division	Function
1	Vcc	I	Power supply terminal
2	VREF	I	Reference voltage input
3	IN4	I	Motor driver (4) input
4	IN3	I	Motor driver (3) input
5	GND	—	GND terminal
6	NC	—	Not used, connected to GND
7	NRESET	O	Reset terminal (Not used, open)
8	GND	—	GND terminal
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 (Not used, connected to GND)

Pin No.	Mark	I/O Division	Function
13	PVcc1	I	Driver power supply (1)
14	PGND1	—	Driver GND terminal (1)
15	D1-	O	Motor driver (1) output terminal (-)
16	D1+	O	Motor driver (1) output terminal (+)
17	D2-	O	Motor driver (2) output terminal (-)
18	D2+	O	Motor driver (2) output terminal (+)
19	D3-	O	Motor driver (3) output terminal (-)
20	D3+	O	Motor driver (3) output terminal (+)
21	D4-	O	Motor driver (4) output terminal (-)
22	D4+	O	Motor driver (4) output terminal (+)
23	PGND2	—	Driver GND terminal (2)
24	PVcc2	I	Driver power supply (2)

RESISTORS AND CAPACITORS

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)

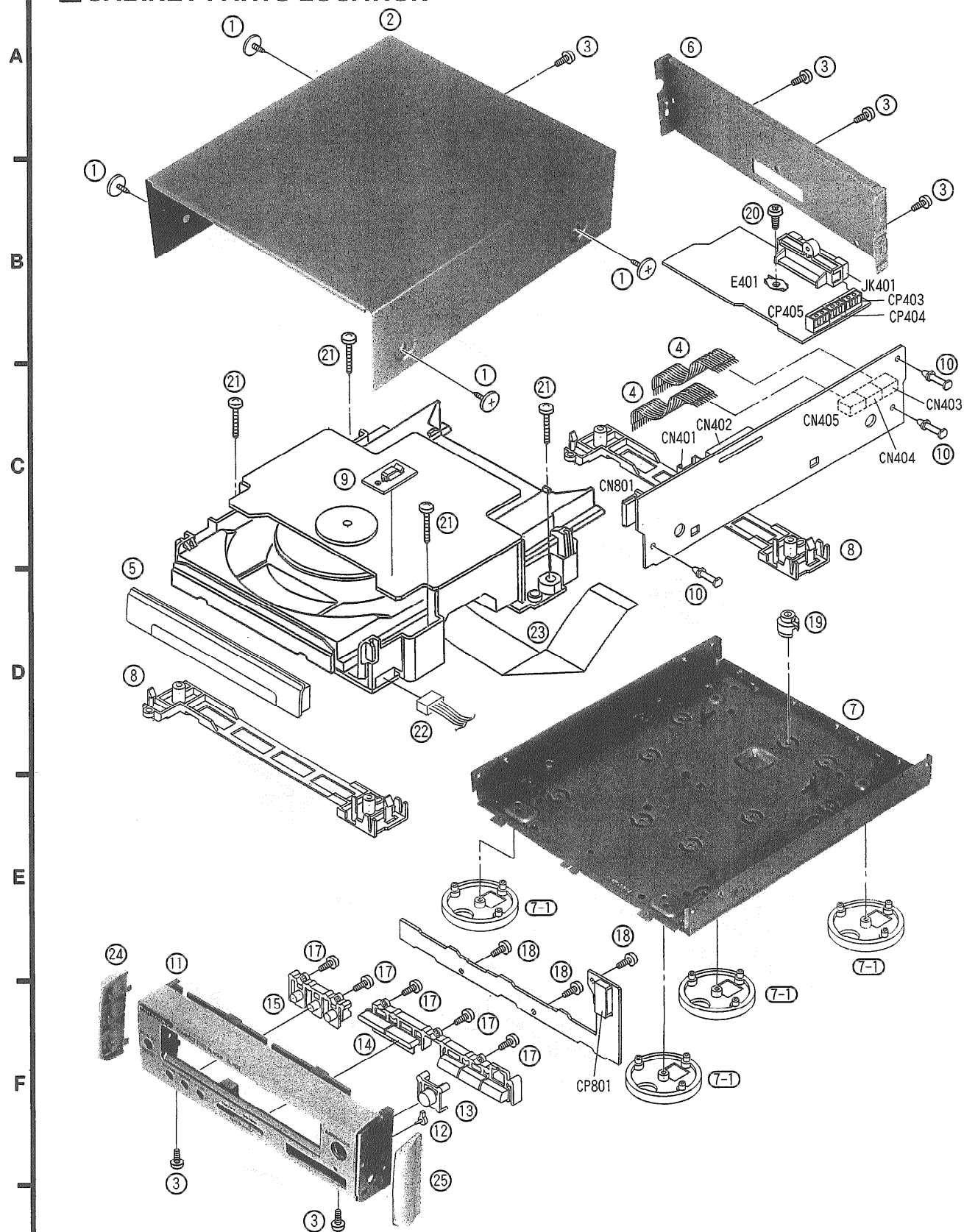
Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS	C402	ECBT1H104ZF5	50V 0.1U	R745	ERJ6GEYJ155V	1/10W 1.5M
			C406	RCE1HKS3R3BV	50V 3.3U	R748	ERJ6GEYJ182V	1/10W 1.8K
			C409	ECBT1E103ZF	25V 0.01U	R749	ERJ6GEYJ682V	1/10W 6.8K
R403	ERDS2TJ102	1/4W 1K	C410	ECA1EM222B	25V 2200 Δ	R750, 751	ERJ6GEYJ473V	1/10W 47K
R405	ERDS2TJ103	1/4W 10K	C411-413	ECBT1E103ZF	25V 0.01U	R752	ERJ6GEYJ220V	1/8W 22
R406	ERDS2TJ473	1/4W 47K	C416	RCE1AKA101BG	10V 100U	R770, 771	ERJ6GEYJ155V	1/10W 1.5M
R407	ERDS2TJ123	1/4W 12K	C417, 418	ECBT1H102KB5	50V 1000P	R772	ERJ6GEYJ273V	1/10W 27K
R409, 410	ERDS2TJ103	1/4W 10K	C419	ECEA0JKA221B	6.3V 220U			
R411	ERDS2TJ471	1/4W 470	C420	ECEA1AKA221B	10V 220U			CHIP JUMPERS
R412	ERDS2TJ101	1/4W 100	C425	ECBT1E103ZF	25V 0.01U			
R413	ERDS2TJ471	1/4W 470	C426	ECBT1H101KB5	50V 100P	RJ701-709	ERJ8GEYOR00A	CHIP JUMPER
R414	ERDS2TJ102	1/4W 1K	C428	ECBT1H102KB5	50V 1000P	RJ714-717	ERJ8GEYOR00A	CHIP JUMPER
R415	ERDS2TJ105T	1/4W 1M	C481	ECA1EM101B	25V 100U Δ	RJ721-731	ERJ6GEYOR00A	CHIP JUMPER
R422, 423	ERDS2TJ472	1/4W 4.7K	C483, 484	ECBT1H102KB5	50V 1000P			
R426, 427	ERDS2TJ472	1/4W 4.7K	C485, 486	ECBT1H331KB5	50V 330P			CAPACITORS
R429	ERDS2TJ471	1/4W 470	C487, 488	ECBT1H121KB5	50V 120P			
R430	ERDS2TJ104	1/4W 100K	C489, 490	ECEA0JKS220B	6.3V 22U	C701	ECEA0JKA330I	6.3V 33U
R431-434	ERDS2TJ103	1/4W 10K	C491, 492	ECEA1AKA220B	10V 22U	C702	ECUZNE104MBN	25V 0.1U
R435, 436	ERDS2TJ104	1/4W 100K	C493, 494	ECBT1H101KB5	50V 100P	C703	ECEA0JKA101I	6.3V 100U
R439	ERDS2TJ101	1/4W 100	C790	ECA1AKF820E	10V 82U	C704, 705	ECUZNE104MBN	25V 0.1U
R440	ERDS2TJ102	1/4W 1K	C801	ECBT1H102KB5	50V 1000P	C706	ECUV1H272KBN	50V 2700P
R441	ERQ16NKR15E	1/6W 0.15 Δ				C707	ECUV1E273KBN	25V 0.027U
R442	ERDS1FVJ271T	1/2W 270 Δ			<SERVO P.C.B.>	C708	ECUE1H472KBN	50V 4700P
R443	ERD2FCVJ6R8T	1/4W 6.8 Δ			RESISTORS	C709	ECUE1C473KBN	16V 0.047U
R445-447	ERDS2TJ1R2	1/4W 1.2				C710	ECUV1H182KBN	50V 1800P
R455, 456	ERDS2TJ221	1/4W 220	R701	ERJ6GEYJ47V	1/10W 4.7	C711, 712	ECUWNE104ZFN	25V 0.1U
R457, 458	ERDS2TJ102	1/4W 1K	R703	ERJ6GEYJ823	1/10W 82K	C713	ECUV1C104MBM	16V 0.1U
R459, 460	ERDS2TJ473	1/4W 47K	R704	ERJ6GEYJ102A	1/10W 1K	C714	ECEA0JKA101I	6.3V 100U
R471-474	ERDS2TJ391	1/4W 390	R705	ERJ6GEYJ103V	1/10W 10K	C716	ECUE1H561KBN	50V 560P
R475-477	ERDS2TJ103	1/4W 10K	R706	ERJ6GEYJ102A	1/10W 1K	C717	ECUWNE104ZFN	25V 0.1U
R481, 482	ERDS2TJ271	1/4W 270	R707	ERJ6GEYJ474V	1/10W 470K	C718	ECUVNC224KBN	16V 0.22U
R483, 484	ERDS2TJ102	1/4W 1K	R708	ERJ6GEYJ154V	1/10W 150K	C721	ECUV1H100DCN	50V 10P
R485, 486	ERDS2TJ104	1/4W 100K	R709	ERJ6GEYJ683V	1/10W 68K	C722	ECUV1H150JCN	50V 15P
R487-490	ERDS2TJ223	1/4W 22K	R711	ERJ6GEYJ154V	1/10W 150K	C723	ECEA1AKA221I	10V 220U
R491, 492	ERDS2TJ273	1/4W 27K	R712	ERJ6GEYJ221V	1/10W 220	C724	ECUV1C104MBM	16V 0.1U
R493, 494	ERDS2TJ332	1/4W 3.3K	R714	ERJ6GEYJ121V	1/10W 120	C725, 726	ECUE1H102KBN	50V 1000P
R495, 496	ERDS2TJ101	1/4W 100	R717, 718	ERJ6GEYJ102A	1/10W 1K	C727, 728	ECEA1HPK010I	50V 1U
R810	ERDS2TJ821	1/4W 820	R720	ERJ6GEYOR00A	1/10W 0.00	C730	ECUWNE104ZFN	25V 0.1U
R811	ERDS2TJ102	1/4W 1K	R721	ERJ6GEYJ101V	1/10W 100	C731, 732	ECEA0JKA221I	6.3V 220U
R812	ERDS2TJ122	1/4W 1.2K	R722	ERJ6GEYJ563V	1/10W 56K	C733	ECUZNE104MBN	25V 0.1U
R813	ERDS2TJ152	1/4W 1.5K	R723	ERJ6GEYJ182V	1/10W 1.8K	C734	ECEA1AKA221I	10V 220U
R814	ERDS2TJ182	1/4W 1.8K	R724	ERJ6GEYJ333V	1/10W 33K	C735-737	ECUWNE104ZFN	25V 0.1U
R815	ERDS2TJ222	1/4W 2.2K	R725	ERJ6GEYJ472V	1/10W 4.7K	C738	ECUV1C154KBN	16V 0.15U
R816	ERDS2TJ332	1/4W 3.3K	R726	ERJ6GEYJ473V	1/10W 47K	C742	ECUV1E273KBN	25V 0.027U
R817	ERDS2TJ472	1/4W 4.7K	R727	ERJ6GEYJ822V	1/10W 8.2K	C743	ECUWNE104ZFN	25V 0.1U
		CAPACITORS	R728	ERJ6GEYJ103V	1/10W 10K	C744	ECUE1E822KBN	25V 8200P
			R731	ERJ6GEYJ822V	1/10W 8.2K	C745	ECUE1H102KBN	50V 1000P
			R735, 736	ERJ6GEYJ101V	1/10W 100	C747	ECUE1H222KBN	50V 2200P
C401	ECBT1H102KB5	50V 1000P	R744	ERJ6GEYJ103V	1/10W 10K	C748	ECUV1H471KBM	50V 470P

Ref. No.	Part No.	Values & Remarks						
C749	ECUZNE104MBN	25V 0.1U						
C750	ECUV1C104MBM	16V 0.1U						
C751	ECUZNE104MBN	25V 0.1U						
C752	ECUE1H152KBN	50V 1500P						
C753	ECUV1H471KBM	50V 470P						
C754	ECUE1H471KBN	50V 470P						

■ REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS		11	RFKGLCA01E-N	FRONT PANEL ASS'Y	
				12	RGL0335-1Q	LED CONDUCTIVE CHIP	
				13	RFKNLHD7NB	OPEN/CLOSE BUTTON ASS'Y	
1	RHD30007-S	SCREW		14	RFKNLHD7NC	PLAY/STOP BUTTON ASS'Y	
2	RKMD327A-S	CABINET		15	RFKNLHD7ND	RAN./REP./AI BUTTON ASS'Y	
3	XTBS3+8JFZ1	SCREW		17	XQN26+AJ6FZ	SCREW	
4	RWJ1808063KX	FLAT CABLE		18	XTBS26+8J	SCREW	
5	RFKNLHD7NA	TRAY ORNAMENT ASS'Y		19	SHE170-2	P. C. B. SUPPORT	
6	RGR0243B-A1	BACK PANEL		20	XTB3+12JFZ	SCREW	
7	RFKJLHD7-N	BOTTOM CHASSIS ASS'Y		21	XTB3+18JFZ	SCREW	
7-1	RKA0076-N1	FOOT		22	REX0510	CONNECTOR ASS'Y	
8	RMNO382	MECHA SPACER		23	REZ0887	FFC (23P)	
9	RMRO483	FLAT CABLE CLIP		24	RGK0821-S	SIDE ORNAMENT (L)	
10	RMRO502	SPACER		25	RGK0822-S	SIDE ORNAMENT (R)	

CABINET PARTS LOCATION

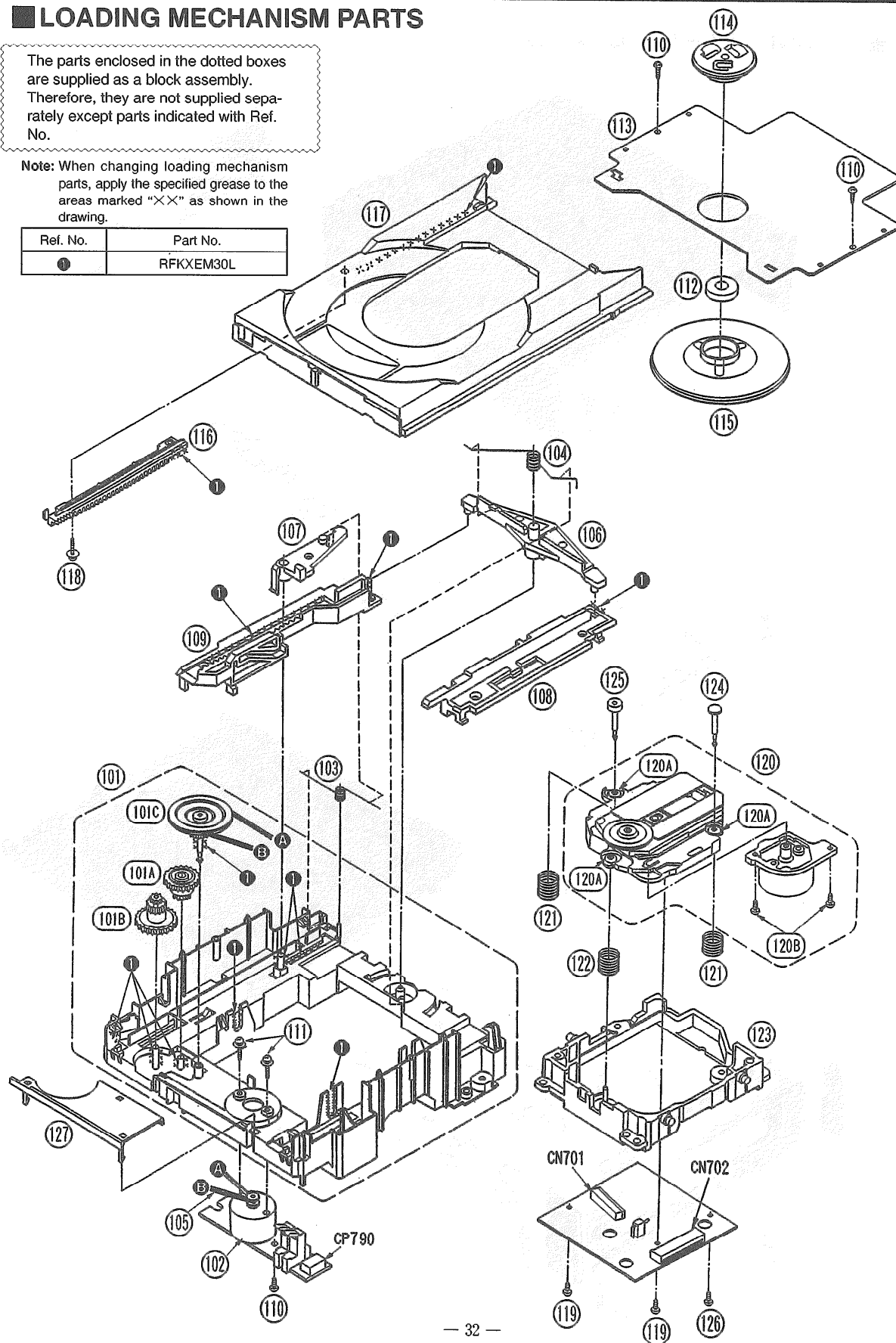


LOADING MECHANISM PARTS

The parts enclosed in the dotted boxes are supplied as a block assembly. Therefore, they are not supplied separately except parts indicated with Ref. No.

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

Ref. No.	Part No.
1	RFKXEM30L



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.
- * Warning: This product uses a laser diode. Refer to caution statements on page 2.
- * [M] indicates in Remarks columns parts that are supplied by MESA.
- * ACHTUNG: Die Lasereinheit nicht zerlegen.
Die Lasereinheit darf nur gegen eine vom Hersteller spezifizierte Einheit ausgetauscht werden.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		LOADING MECHANISM		Q402, 403	2SC1740SRSTA	TRANSISTOR	
				Q404	DTC114YSTP	TRANSISTOR	
				Q405-407	2SD2137PQTA	TRANSISTOR	Δ
101	RFKJXD707-K	LOADING MECH CHASSIS ASS'Y		Q408, 409	DTA143XSSTP	TRANSISTOR	
101A	RDG0142	INTERMEDIATE GEAR		Q423	2SA933SSTA	TRANSISTOR	
101B	RDG0193	DRIVE GEAR(A) ASS'Y				DIODE (S)	
101C	RDP0065	INTERMEDIATE PULLEY					
102	REM0019	LOADING MOTOR ASS'Y					
103	RME0063	LOCK LEVER SPRING		D401, 402	RL1N4003N02	DIODE	Δ
104	RME0087	ASSIST SPRING		D403	RL1N4003N02	DIODE	
105	RMG0158	BELT		D404	MTZJ8R2BTA	DIODE	Δ [M]
106	RML0349	CONVERSION LEVER		D405, 406	1SS254TA	DIODE	
107	RML0178-1	LOCK LEVER		D408, 409	1SS254TA	DIODE	
108	RMM0059-1	SLIDE PLATE (1)		D481	RL1N4003N02	DIODE	Δ
109	RMM0079-1	SLIDE PLATE (2)		D482	MTZJ5R1BTA	DIODE	Δ
110	XTN26+6G	SCREW		D801	SPR-305MDTF	L. E. D.	
111	XYN2+F6FZ	SCREW				COIL (S)	
112	RHM245ZA	MAGNET	[M]				
113	RFKNLCH530EA	CLAMP PLATE ASS'Y		L401, 402	BLO2RN2R65T2	COIL	Δ
114	RMRO334	FIXED PLATE	[M]	L406	ELEXT101KA9	COIL	
115	RXQ0380	MAGNET HOLDER ASS'Y		L409	ELEXT1R0KA9	COIL	
116	RFKNLPG440-K	DRIVE GEAR(B) ASS'Y				OSCILLATOR (S)	
117	RGQ0144-K	DISC TRAY					
118	RHD20009-1	SCREW		X401	EF0EC4234T3	OSCILLATOR (4.23 MHz)	
119	XTV2+6G	SCREW				SWITCH (ES)	
120	RAE0150Z	TRAVERSE DECK ASS'Y					
120A	SHGD113-1	FLOATING RUBBER		S790	RSHLA005	CD TRAY CLOSE	
120B	SNSD38	SCREW		S791	RSHLA005	CD TRAY OPEN	
121	RME0109	FLOATING SPRING (1)		S801	EVQ21405R	OPEN/CLOSE	
122	RME0142	FLOATING SPRING (2)		S802	EVQ21405R	PAUSE	
123	RMRO698-K	TRAVERSE CHASSIS		S803	EVQ21405R	F. SKIP/SEARCH	
124	RMS0123-1	TRAVERSE FIXED PIN (1)		S804	EVQ21405R	PLAY	
125	RMS0350	TRAVERSE FIXED PIN (2)		S805	EVQ21405R	STOP	
126	XTN2+6G	SCREW		S806	EVQ21405R	R. SKIP/SEARCH	
127	RMK0255	BELT COVER		S807	EVQ21405R	RANDOM	
		INTEGRATED CIRCUIT (S)		S808	EVQ21405R	AI EDIT	
				S809	EVQ21405R	REPEAT	
IC401	LM2940T5	REGULATOR	Δ			CONNECTOR (S) AND SOCKET (S)	
IC403	LC66356B4H02	SYSTEM CONTROL		CN401	RJP6G17ZA	CONNECTOR (6P)	
IC405	BA4558FHTT1	L. P. F. AMP		CN402	RJS1A6223-1	CONNECTOR (23P)	
IC790	TA7291S	MOTOR DRIVE		CN403, 404	RJS1A6605	CONNECTOR (5P)	
		TRANSISTOR (S)					
Q401	DTC143ESTP	TRANSISTOR					

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
CN405	RJS1A6606	CONNECTOR (6P)					
CN801	RJU099W10	SOCKET (10P)				OSCILLATOR (S)	
CP403, 404	RJS1A6605	CONNECTOR (5P)					
CP405	RJS1A6606	CONNECTOR (6P)		X701	RSXB16M9J02T	OSCILLATOR (16. 9344MHz)	
CP790	RJP6G17ZA	CONNECTOR (6P)					
CP801	RJT099W10-1	CONNECTOR (10P)				SWITCH (ES)	
JK401	RJT065K19	CONNECTOR (19P)					
				S701	RSM0006-P	REST DETECTOR	
		EARTH PLATE (S)					
						CONNECTOR (S) AND SOCKET (S)	
E401	SNE1004-2	EARTH PLATE					
				CN701	RJU035T016-1	SOCKET (16P)	
		<SERVO P. C. B. >		CN702	RJS1A6723-1Q	CONNECTOR (23P)	
		INTEGRATED CIRCUIT (S)					
						<GREASE OR JIG/TOOL>	
IC701	AN8835SBE1	SERVO AMP				TEST DISC	
IC702	MN662740RM1	SERVO PROCESSOR					
IC703	AN8389SE1	COIL & MOTOR DRIVE		SA1	SZZP1054C	PLAYABILITY TEST DISC	
		TRANSISTOR (S)				GREASE	
Q701	ZSB709S	TRANSISTOR		SA2	RFKXEM30L	MOLYCOAT GREASE EM30L	