

Service Manual

COMPACT
disc
DIGITAL AUDIO

MASH*
multi-stage noise shaping

Compact Disc Player

Compact Disc Player

SL-CA1060

Colour

(K) ... Black Type

Area

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

**System: SC-CA1060,
SC-CA1080**



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

TRAVERSE DECK: RAE0113Z MECHANISM SERIES

SPECIFICATIONS

Audio

DA converter

1 bit 2 DAC MASH

Pickup

Wavelength

780 nm

Laser power

No hazardous radiation is emitted
(with safety protection).

General

Dimensions (W × H × D)

280 × 89.0 × 267 mm

Weight

2.2 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	Stereo Tuner	Compact disc player	Stereo Amplifier	Cassette deck	Speakers
SC-CA1060	ST-CA1060	SL-CA1060	SE-CA1060	RS-CA1060	*SB-CA1060
SC-CA1080	ST-CA1080		SE-CA1080		*SB-CA1080

※: Made in PAES

Technics®

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Note 1: Refer to the placement, Installation, Connections and Concerning the remote control and Quick reference of remote control operation of Service manual for Model No. ST-CA1080 (E, EG), Order No. AD9406153C2 and ST-CA1060 (E, EG), Order No. AD9406170C2.

Note 2: Refer to the Accessories and Packaging of Service manual for Model No. SE-CA1080 (E, EB, EG), Order No. AD9406158C2 and SE-CA1060 (E, EB, EG, GC, GN), Order No. AD9406171C8.

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: 780nm

Maximum output radiation power from pickup: 100μW/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 Lasereinheit. Im eingeschalteten Zustand wird unsichtbare Laserstrahlung von der Lasereinheit abgestrahlt.

Wellenlänge: 780nm

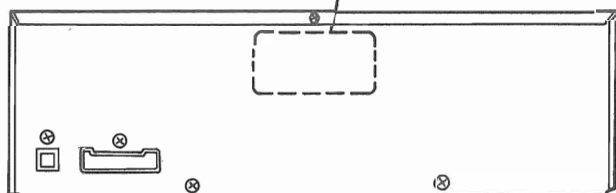
Maximale Strahlungsleistung der Lasereinheit: 100μW/VDE

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 Fokussierlinse blicken.



LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT



ADVARSEL: USYNLIG LASERSTRÅLING
VED ÅBNING, NÅR SIKKERHEDSAF-
BRYDERE ER UDE AF FUNKTION.
UNDGÅ UDSÆTTELSE FOR STRÅLING.

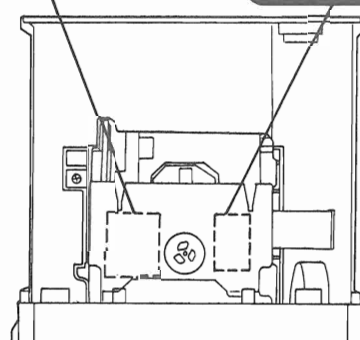
VARO! Avattaessa ja
suojalukitus ohitettaessa
olet alttiina näkymätön
lasersäteilylle.
Älä katso säteeseen.

WARNING! Osynlig
laserstråling når denna
del är öppnad och
spårren är urkopplad.
Betrakta ej strålen.

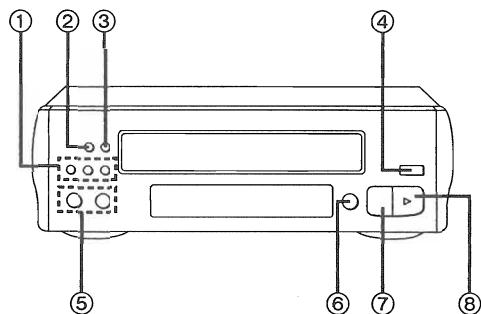
VORSICHT-Unsichtbare
Laserstrahlung, wenn
Abdeckung geöffnet.
Nicht dem Strahl
aussetzen. (HCL50071)

DANGER-Invisible
laser radiation when
open.
AVOID DIRECT EX-
POSURE TO BEAM.

ADVERSE! Usynlig
laserstråling når deksel
åpnes og sikkerheds-lås
brytes. Unngå
eksponering for strålen.



LOCATION OF CONTROLS



No.

Name

- ① Compact disc edit buttons
- ② Random play button
- ③ Repeat button
- ④ Disc tray open/close button
- ⑤ Skip/search buttons
- ⑥ Pause button
- ⑦ Stop button
- ⑧ Play button and indicator

LISTENING TO COMPACT DISCS

Sequential play

Sequential play refers to play beginning with the first track and continuing in order to the last track.

- 1 Switch on the power on the power amplifier.**

- 2 Press OPEN/CLOSE to open the disc tray.**
Insert the disc with label facing upward.

Do not put your finger through the hole in the middle of the disc holder. It could get caught when the holder closes. An adaptor for CD single is not required.

- 3 Press OPEN/CLOSE to close the disc tray.**

When there are 16 or more tracks on the disc, **16** will appear.

- 4 Press $\triangleright$.**
Disc play begins from the first track on the disc.

Play stops automatically when the last track on the disc finishes playing.

- 5 Adjust the volume level as you like on the tuner/pre-amplifier.**

To stop the disc play:

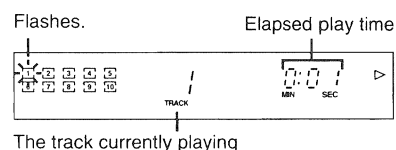
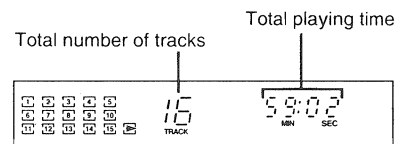
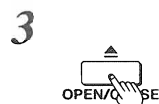
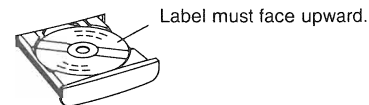
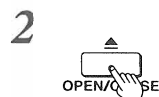
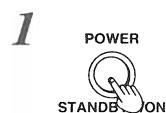
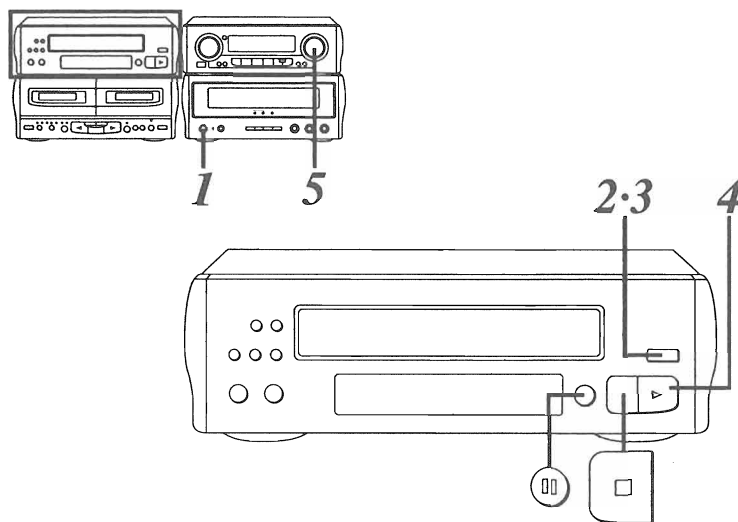
Press $\square$.

To temporarily stop the disc play:

Press $\square$.

$\triangleright$ on the button flashes.

To play again, press $\triangleright$.



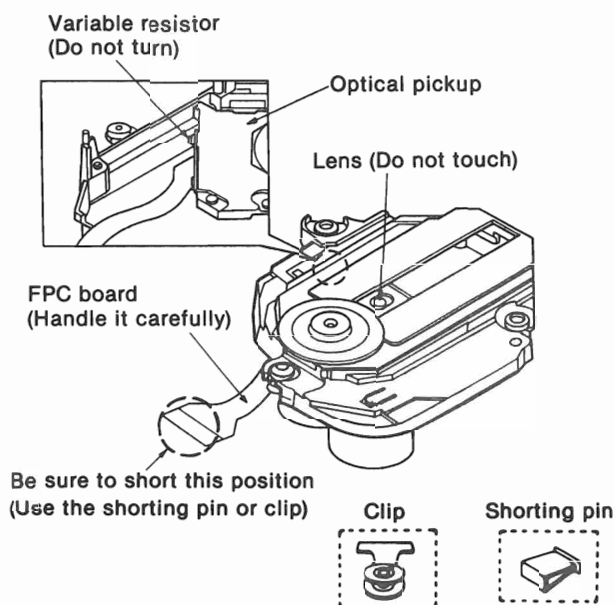
HANDLING PRECAUTIONS FOR TRAVERSE DECK

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

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

• Handling of traverse deck (optical pickup)

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

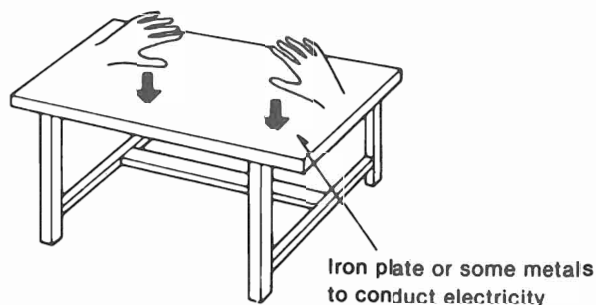
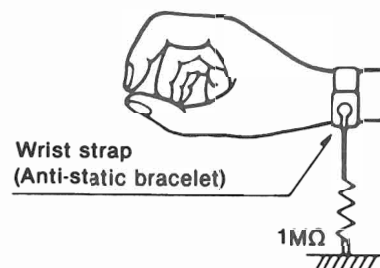


• Grounding for electrostatic breakdown prevention

1. **Human body grounding**
Use the anti-static wrist strap to discharge the static electricity from your body.
2. **Work table grounding**
Put a conductive material (sheet) or steel sheet on the area where the 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 CHECKS AND MAIN COMPONENT REPLACEMENT PROCEDURES

NOTE

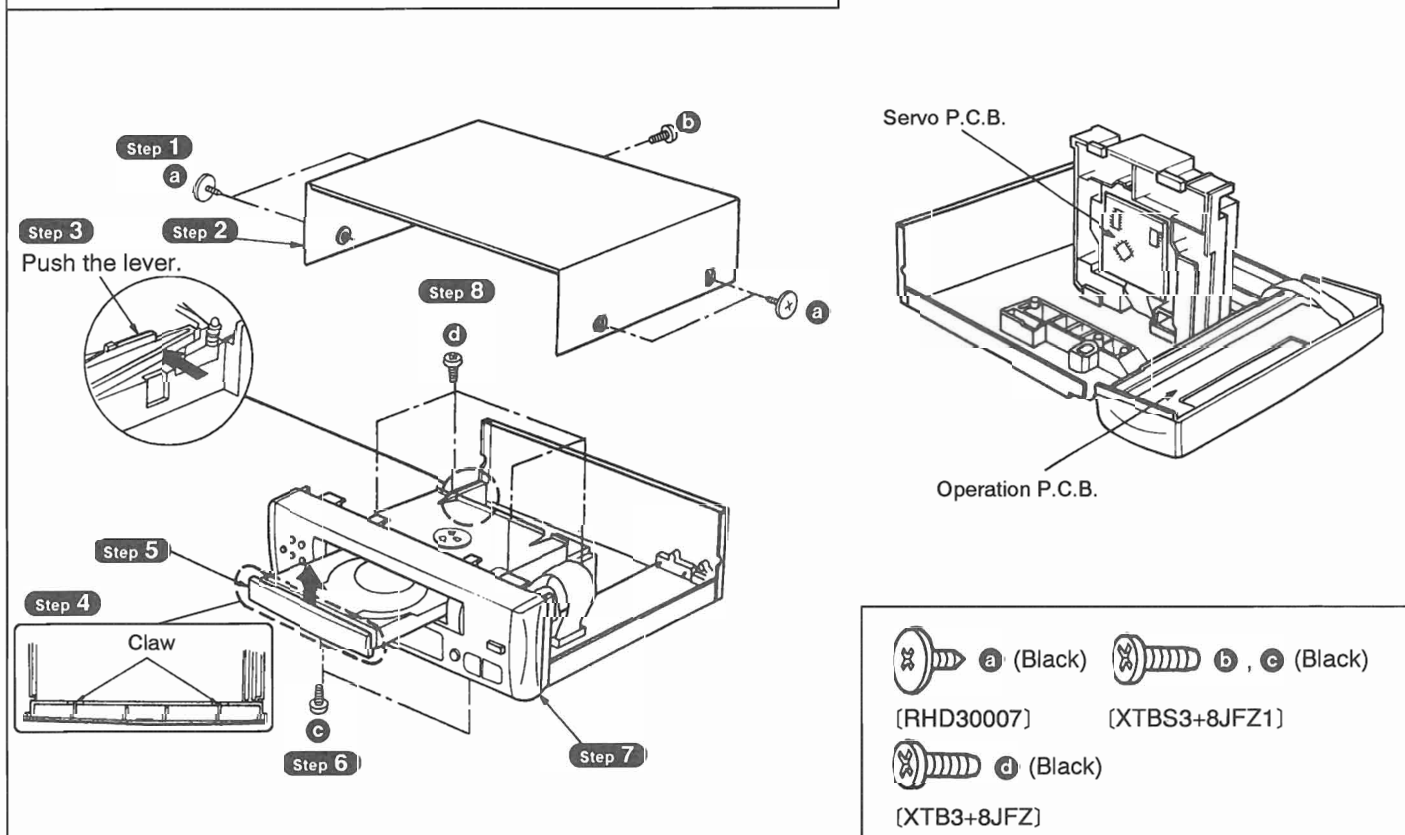
1. This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.
2. For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.
3. Select 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

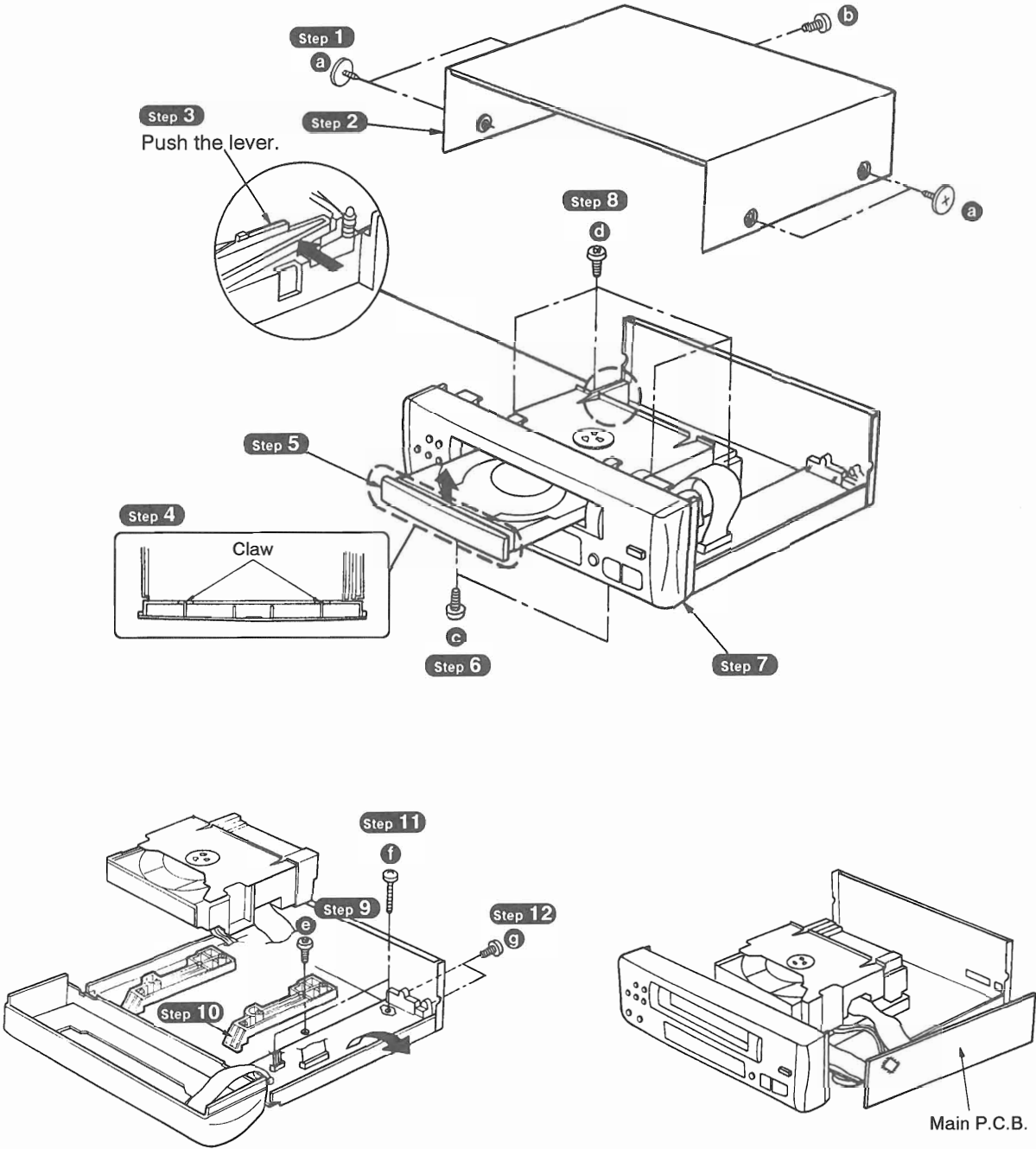
•Checking Procedure for each P.C.B.	page.
1. Checking for the operation P.C.B. and servo P.C.B.	5.
2. Checking for the main P.C.B.	6.
•Main Component Replacement Procedures	
1. Replacement for the traverse deck ass'y	7.

■ Checking Procedure for each P.C.B.

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



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

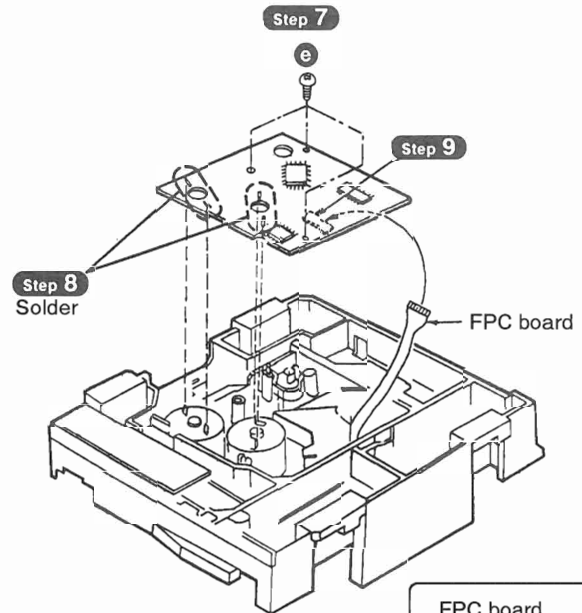
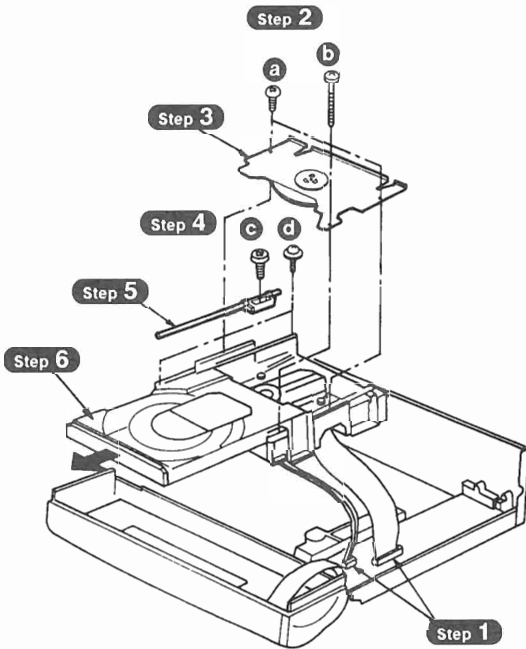


a (Black)	b, c, g (Black)
[RHD30007]	[XTBS3+8JFZ1]
d (Black)	f (Black)
[XTB3+8JFZ]	[XTB3+16JFZ]
e (Black)	
[XTB3+8FFZ]	

Main Component Replacement Procedures

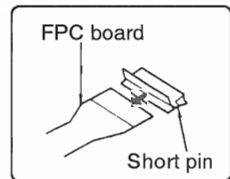
1. Replacement for the traverse deck ass'y

- Follow the item 1 in checking procedure for each P.C.B. on page 5.

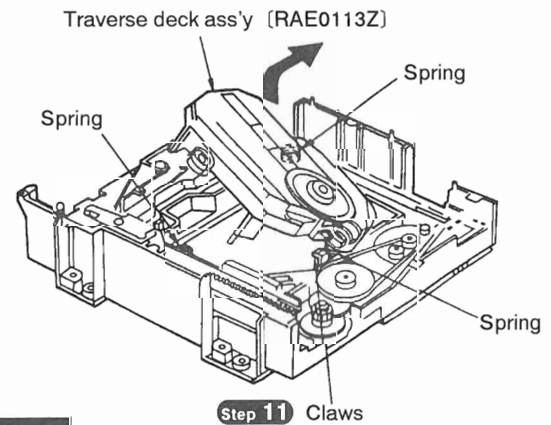
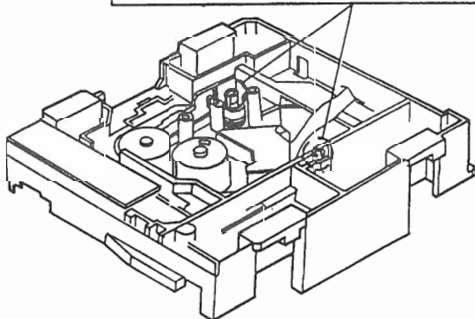
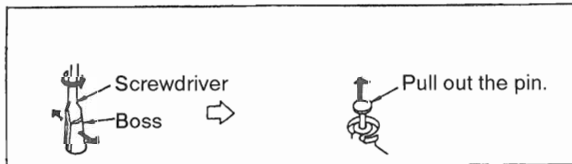


Caution:

Insert a short pin into the traverse unit FPC board.
(Refer to "handling precautions for traverse deck" on page 4.)

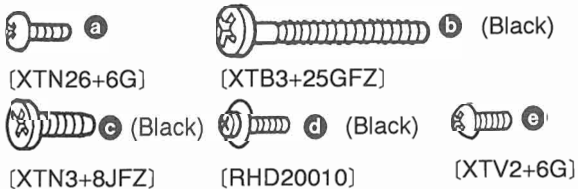


Step 10

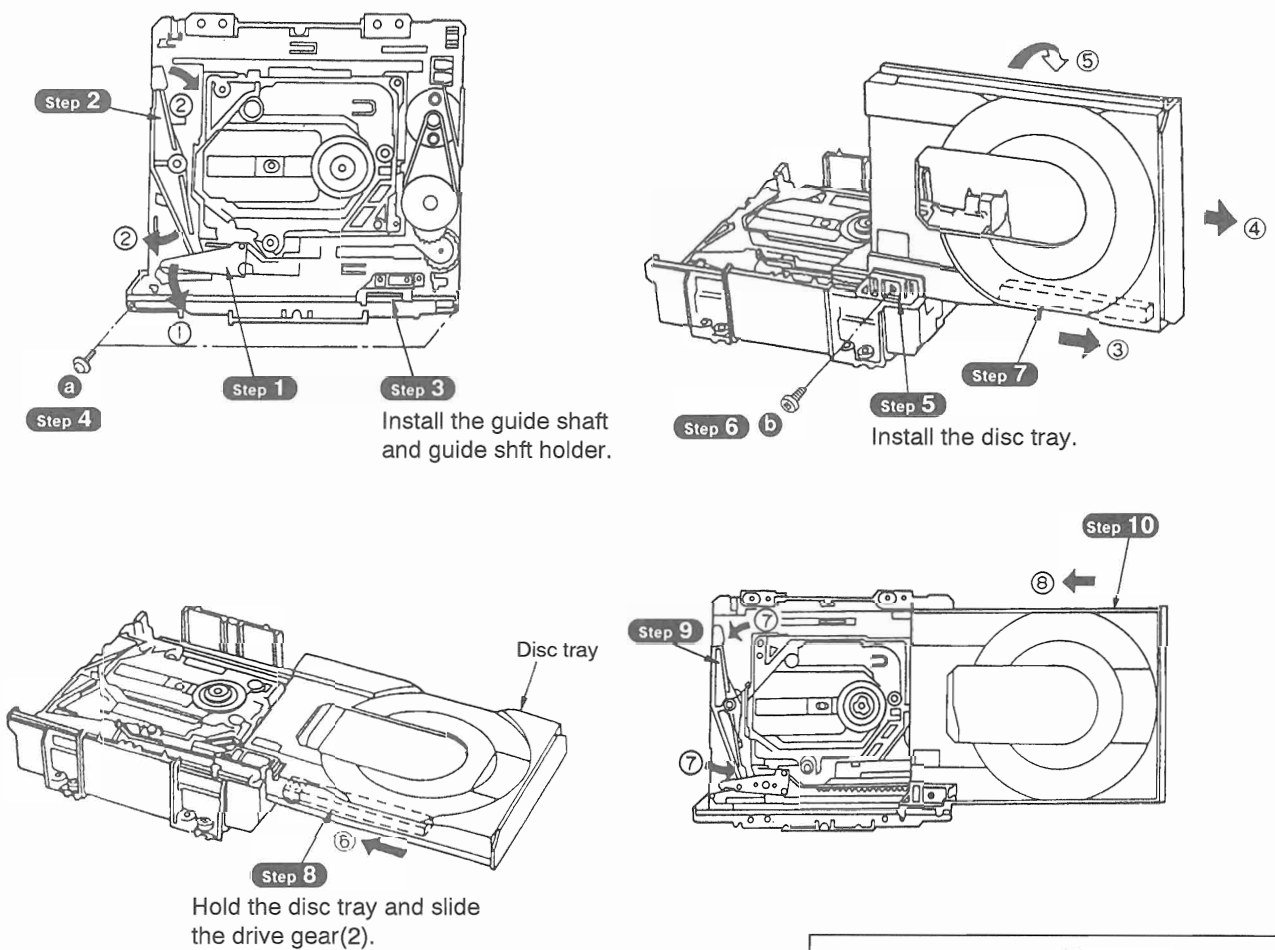


NOTE

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

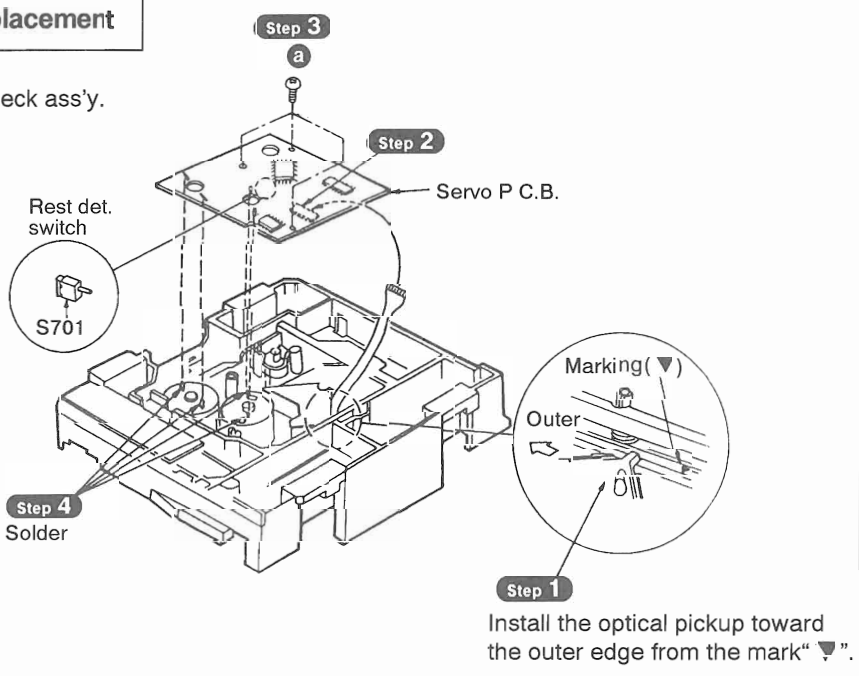


a (Black)	b (Black)
[RHD20010]	[XTN3+8JFZ]

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

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

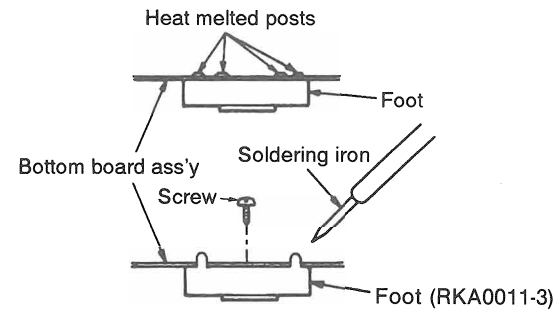
Before installing the servo P.C.B., move the optical pickup toward the outer edge from the marking "▼". [Otherwise, the rest detect switch (S701) mounted on the servo P.C.B. may be damaged.]



	a
[XTV2+6G]	

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 (RKA0011-3) on the Bottom board ass'y melt the 4 posts with a soldering iron or install it with a screw (XTB3+6J).



MEASUREMENTS AND ADJUSTMENTS

Caution:

- 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-CA1060) is actuated by power supply from the tuner amplifier SE-CA1060. If you wish to actuate this unit without using the tuner amplifier SE-CA1060 for checking or repairing, follow below procedure.

- Apply AC 11V between **AC** (L1) — **J1** — **AC** (L2).

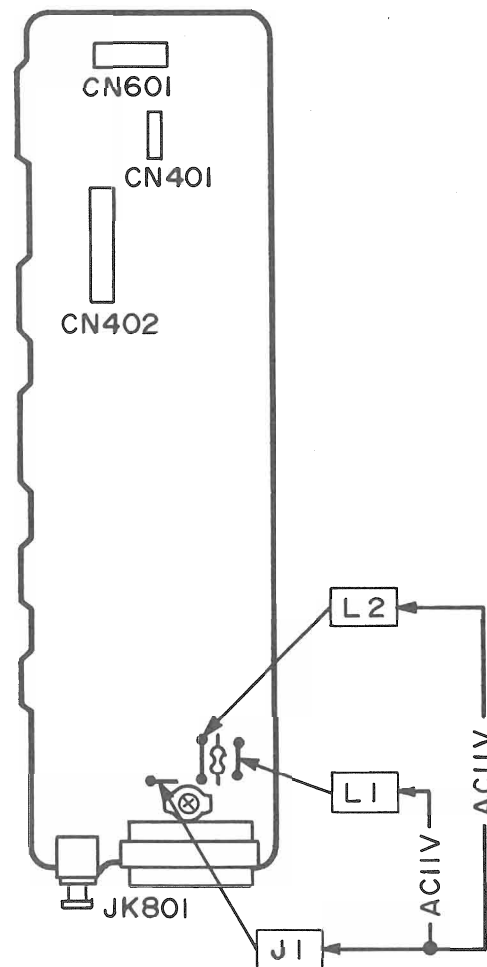


Fig. 1

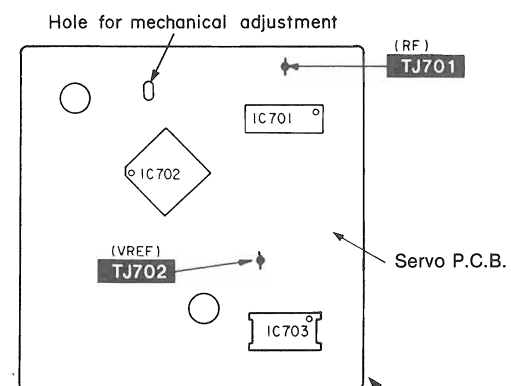


Fig. 2

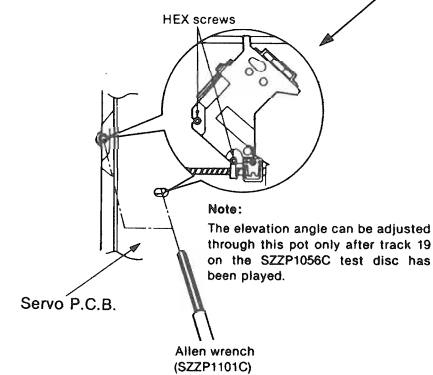


Fig. 3

Measuring Instruments and Special Tools

- * Test discs
 1. Playability test disc (SZZP1054C)
 2. Uneven test disc (SZZP1056C)
- * Musical program disc (ordinary)
- * Dual-beam oscilloscope with bandwidth of 30MHz or better (with EXT. trigger and 1:1 probe).
- * Allen wrench (M2.0) (SZZP1101C)
- * Lock paint (RZZ0L01)

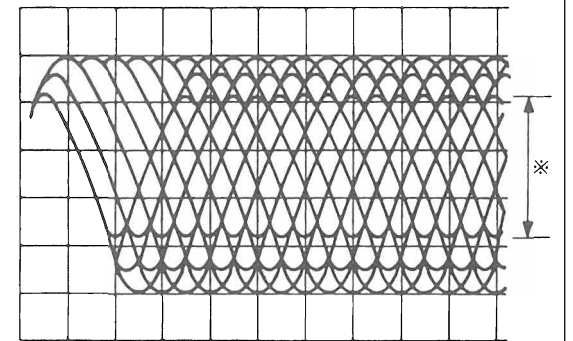
(1) MECHANICAL ADJUSTMENT

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

1. Connect the oscilloscope's CH. 1 probe across **TJ701** (RF) (+) and **TJ702** (VREF) (–) on the servo P.C.B.

Oscilloscope setting: VOLT 200mV
SWEEP 0.5μs.
Input coupling AC

2. Switch the player power **ON**, and play track **19** on the test disc (SZZP1056C). (Playing any other track will prevent, the HEX screws from being accessed.)
3. Leave the player in play mode and place it as shown Fig. 3.
4. Alternately adjust the HEX screws with the 2.0mm allen wrench (SZZP1101C) until the vertical fluctuation of RF signal is minimized and the eye pattern is most stretched. (Refer to Fig. 4)
5. After completing the adjustment, lock the HEX screws with lock paint (RZZ0L01).



* Most stretched eye pattern.

Fig. 4

(2) CHECK OF PLAY OPERATION AFTER ADJUSTMENT

* Checking Skip Search

1. Play an ordinary musical program disc.
2. Press the skip button to check for normal skip search operation (in both the forward and reverse directions).

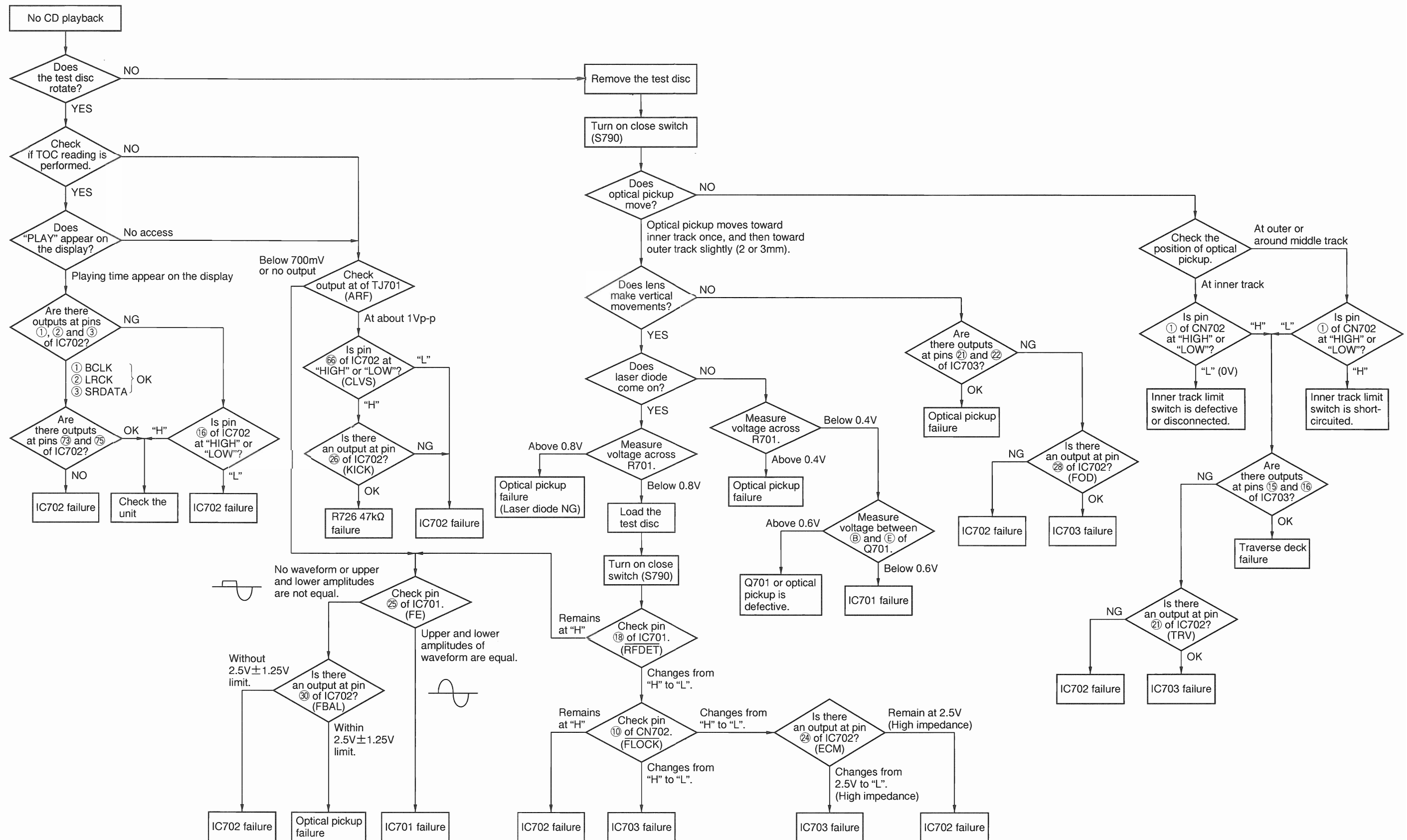
* Checking Manual Search

1. Play an ordinary musical program disc.
2. Press the manual search button to check for smooth manual search operations at either low or high speed (in both the forward and reverse directions).

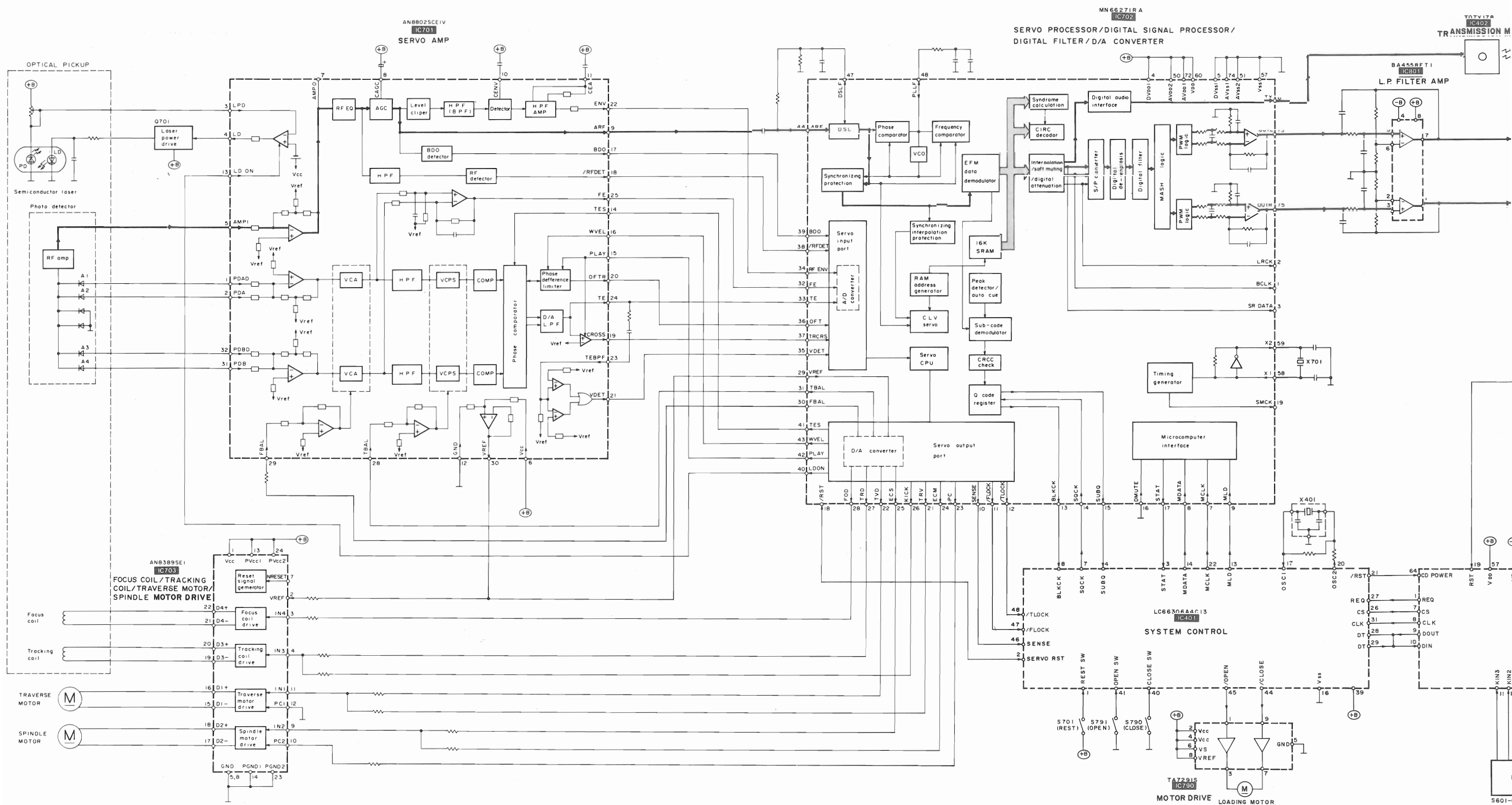
* Checking Playability

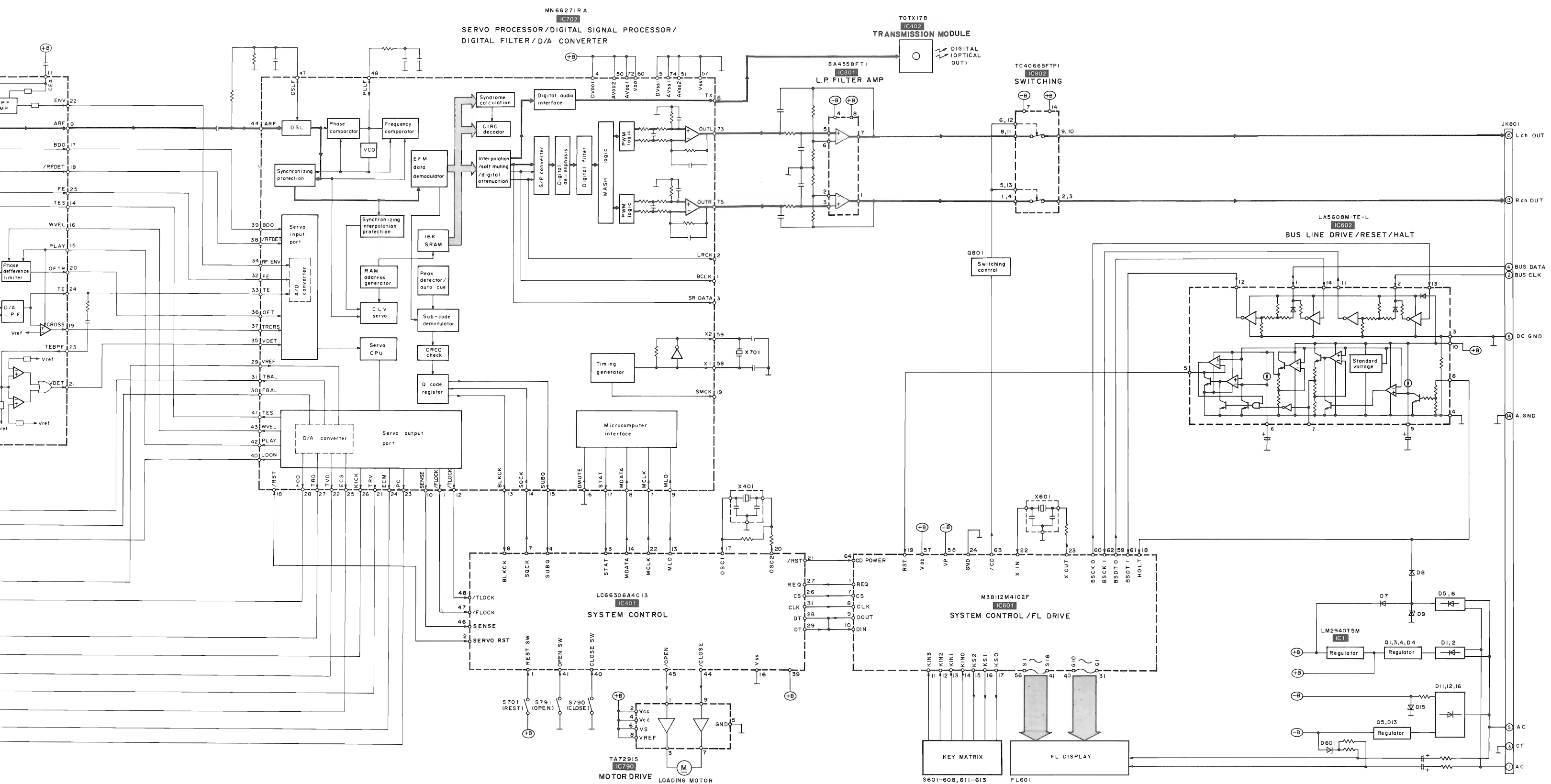
1. Play the 0.7mm black dot and the 0.7mm wedge on the test disc (SZZP1054C) and verify that no sound skip or noise occurs.
2. Play the middle tracks of the uneven test disc (SZZP1056C) and verify that no sound skip or noise occurs.

TROUBLESHOOTING GUIDE



BLOCK DIAGRAM





Note:

→ : Audio signal

SCHEMATIC DIAGRAM (Parts list on pages 32~34.)

(This schematic diagram may be modified at any time with development of new technology.)

Note:

- S601 : R. Skip/Search switch (◀◀/▶▶)
- S602 : F. Skip/Search switch (▶▶/▶▶▶)
- S603 : Repeat switch (REPEAT)
- S604 : Random play switch (RANDOM)
- S605 : CD edit switch (LAST FADE)
- S606 : Fit edit switch (J. FIT)
- S607 : Sequential CD recording switch (ALBUM)
- S608 : Disc tray open/close switch (▲ OPEN/CLOSE)
- S611 : Stop switch (□)
- S612 : Pause switch (□□)
- S613 : Play switch (▶)
- S701 : Rest detector switch.
- S790 : Disc tray close detection switch
- S791 : Disc tray open detection switch
- The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
- *The parenthesized are the values of voltage generated during playing. (Test disc 1kHz, L+R, 0dB), others are voltage values in stop mode.

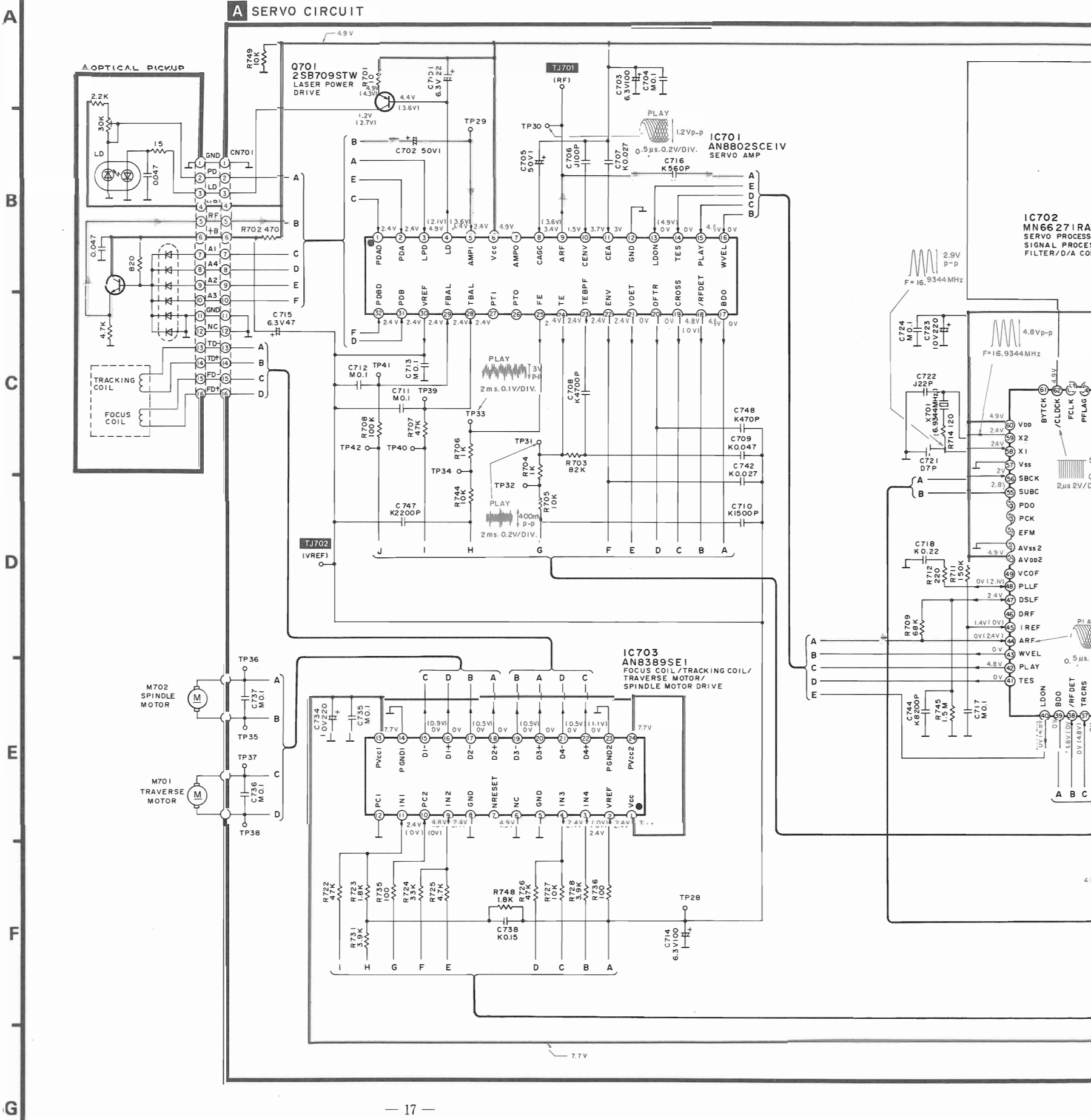
- Important safety notice:
Components identified by Δ mark have special characteristics important for safety. Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used as occasion calls. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
- The supply part number is described alone in the replacement parts.

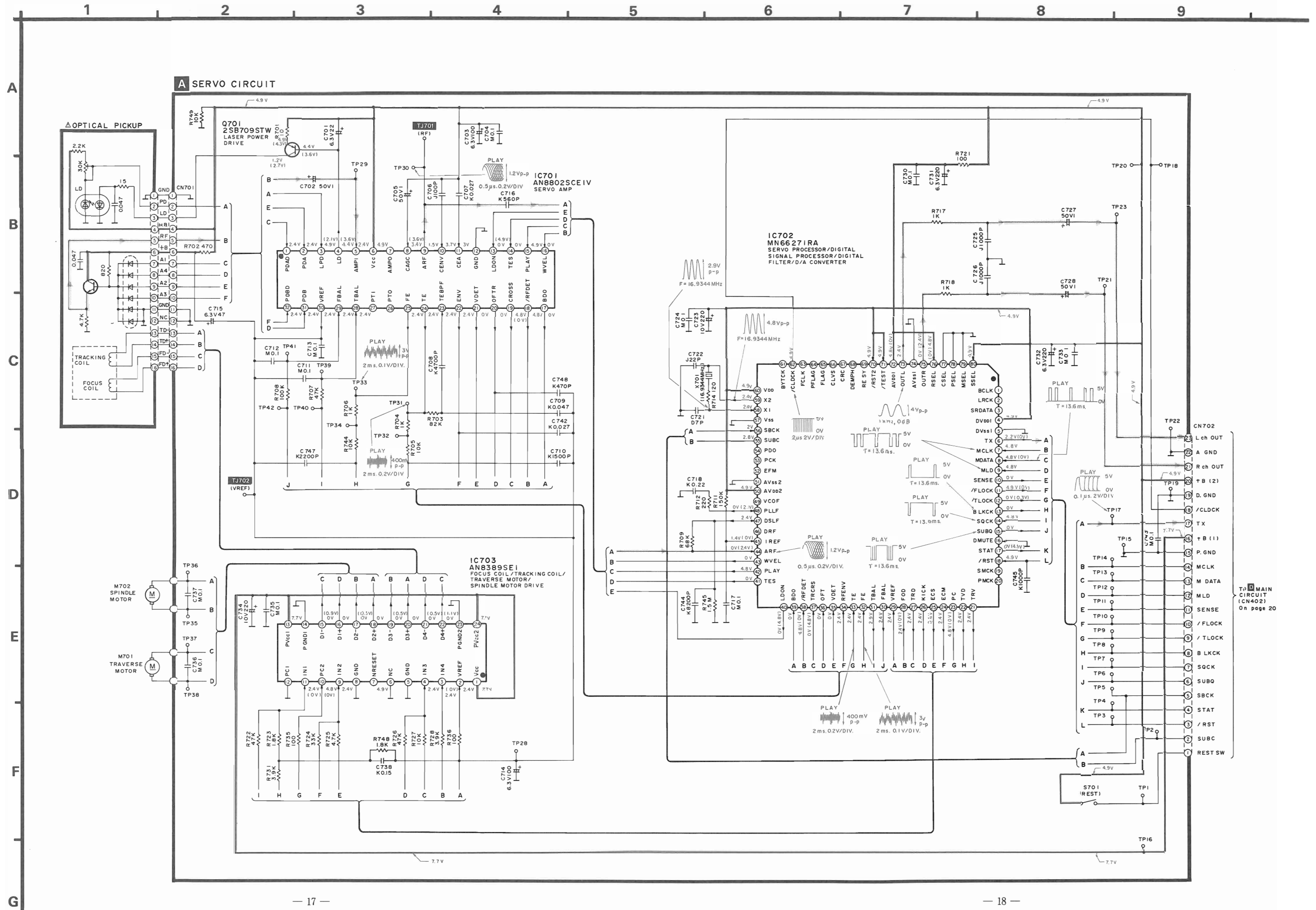
Part No.	Production Part No.	Supply Part No.
IC1	LM2940T5M	LM2940T5

- — / — : Positive voltage lines and negative voltage lines.
- — : Audio signal lines.
- 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 pins of IC or LSI with fingers directly.

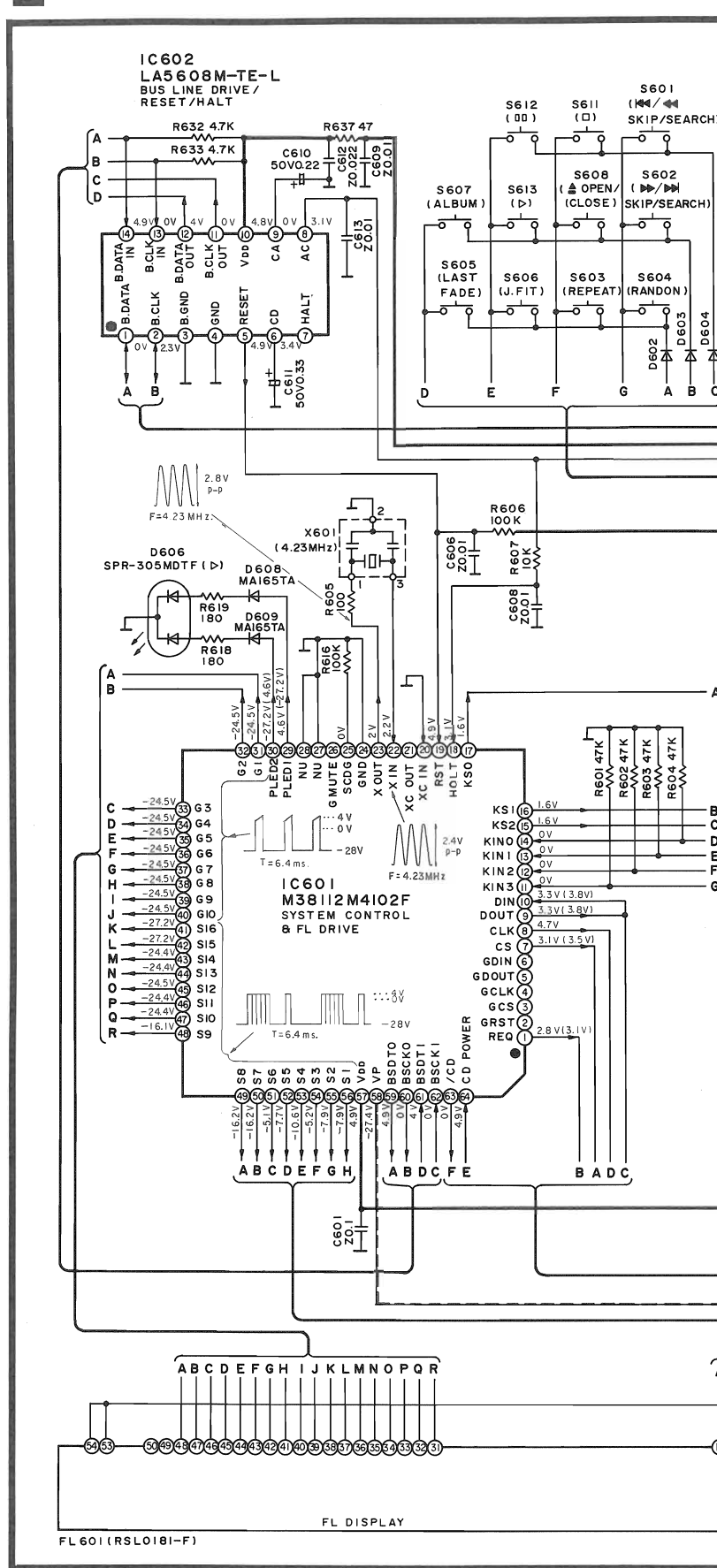
TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

XRA4558FT1	TC4066BFTP1	LC66306A4C13	TA7291S	LA5608M-TE-L 14 Pin	AN8802SCE1V 32 Pin
M38112M4102F 64 Pin	LM2940T5M	AN8389SE1	T0TX178	2SB709STW	
2SB1238QRTV6	2SD2037EFTA	UN4112TA	MA165TA	RL1N4003N02	MA4051MTA
MA4270HTA	MA185TA	SPR-305MDTF			

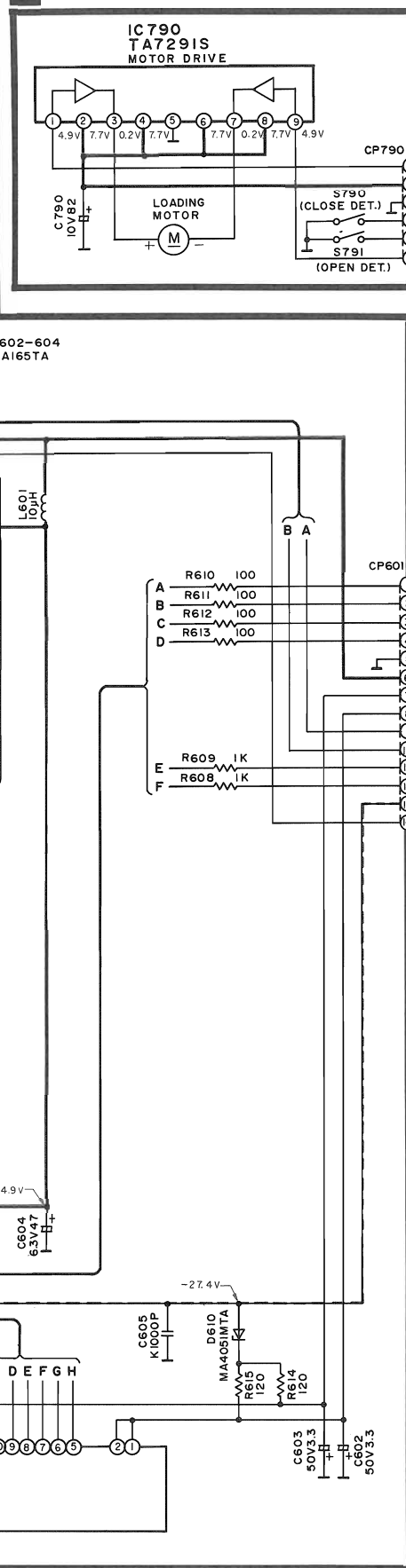




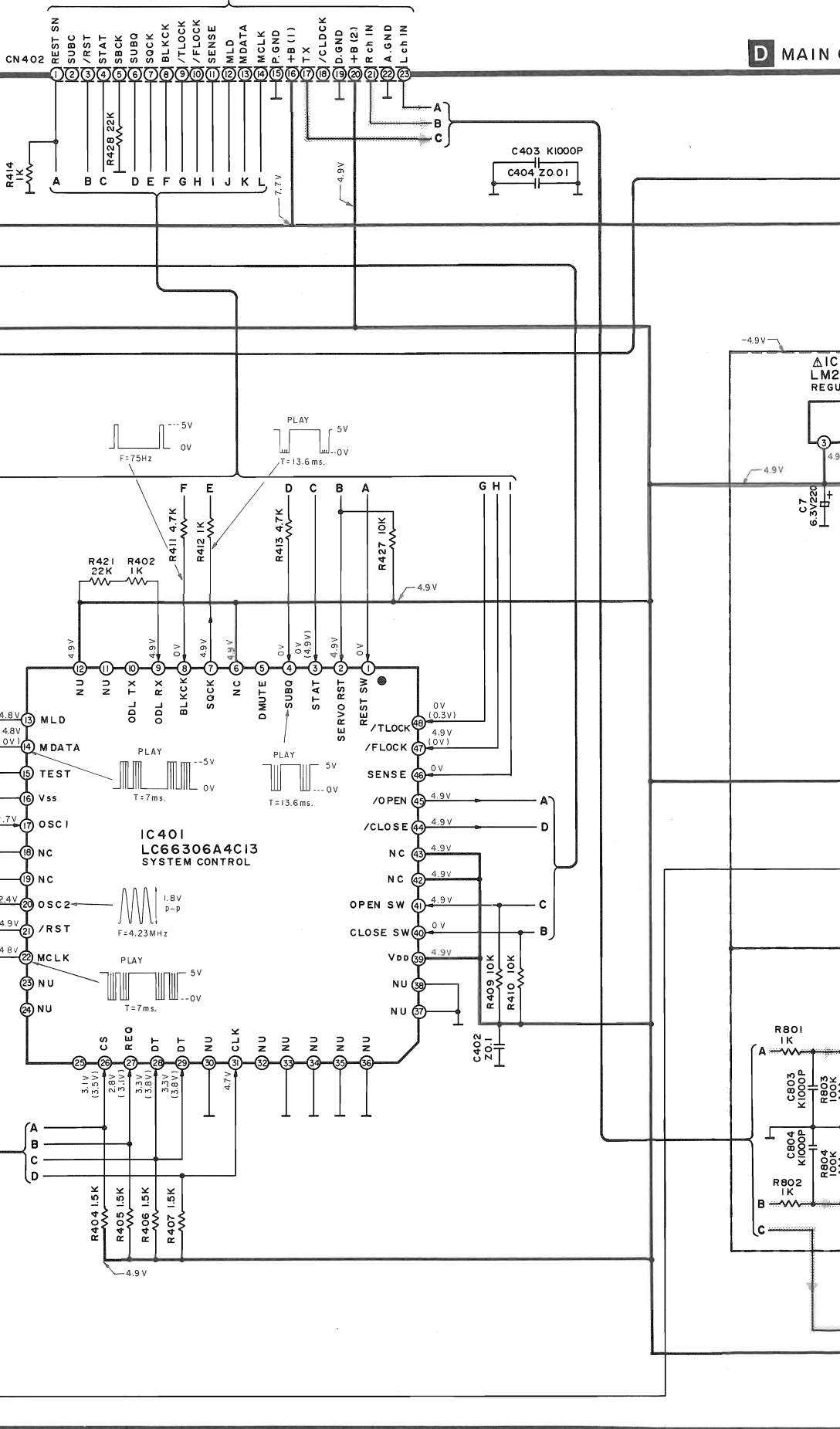
B OPERATION CIRCUIT



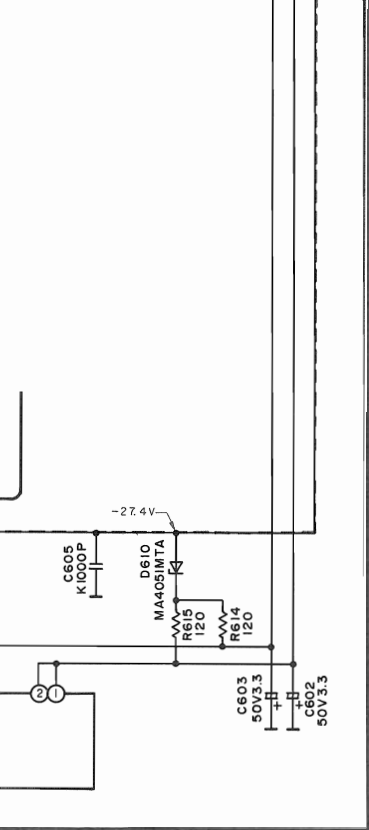
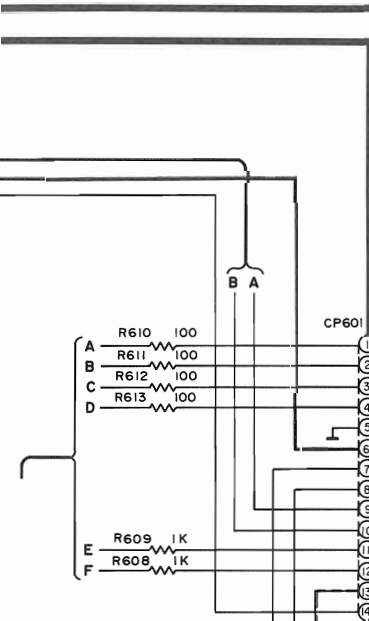
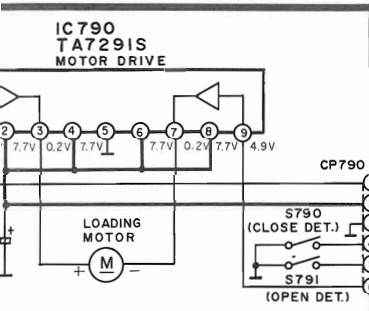
C LOADING MOTOR CIRCUIT



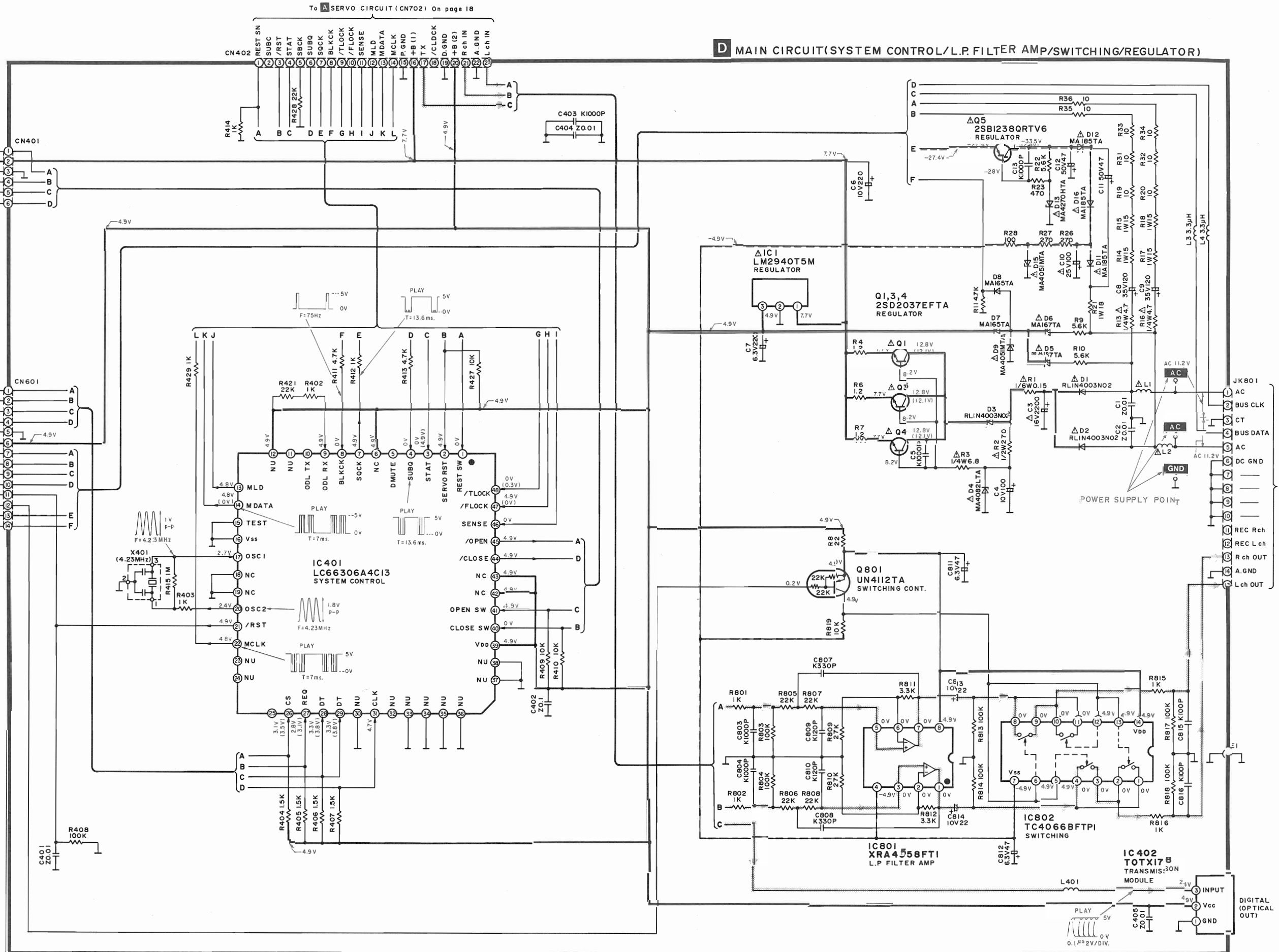
To A SERVO CIRCUIT (CN702) On page 18



LOADING MOTOR CIRCUIT



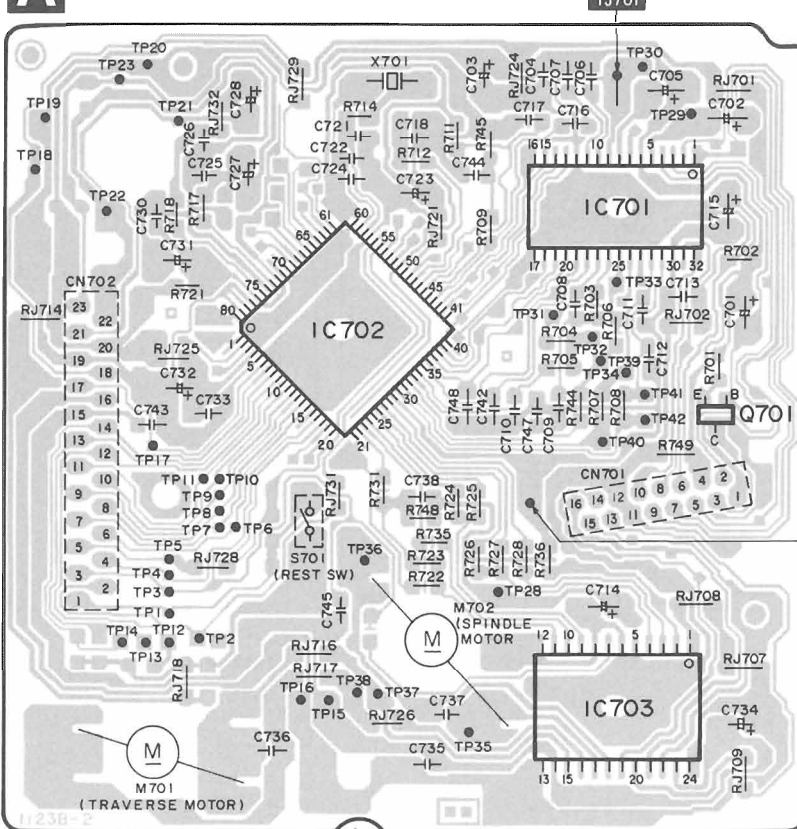
D MAIN CIRCUIT (SYSTEM CONTROL/L.P. FILTER AMP/SWITCHING/REGULATOR)



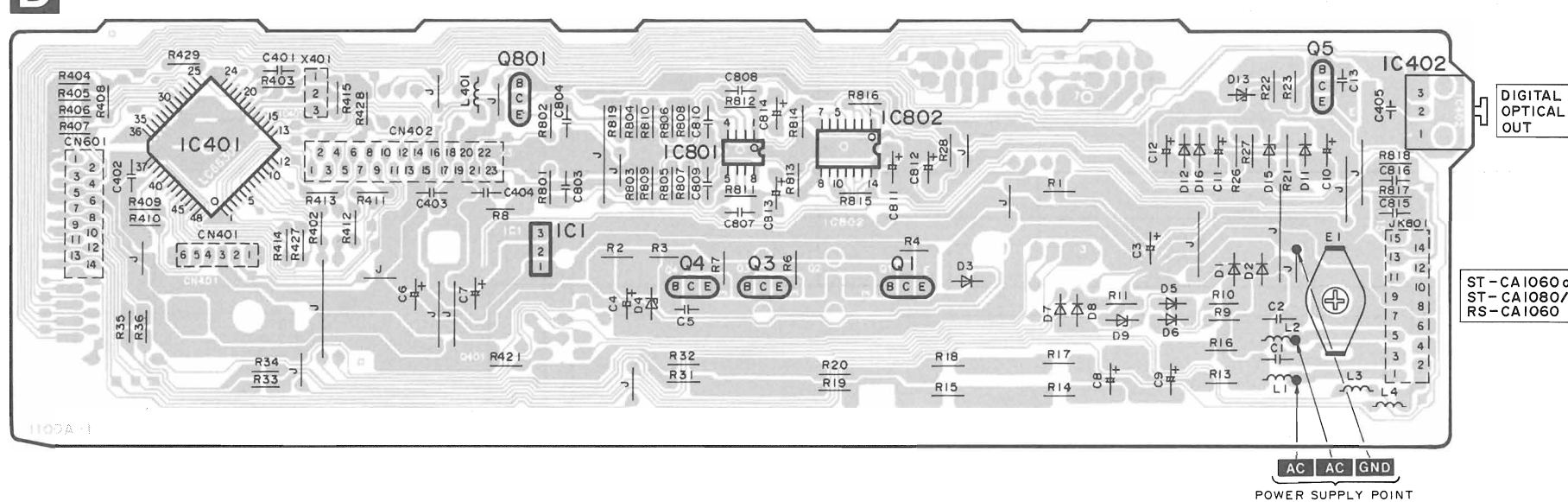
PRINTED CIRCUIT BOARDS

WIRING CONNECTIONS

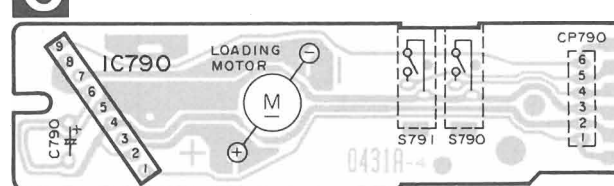
A SERVO P.C.B. (REP1650B-N)



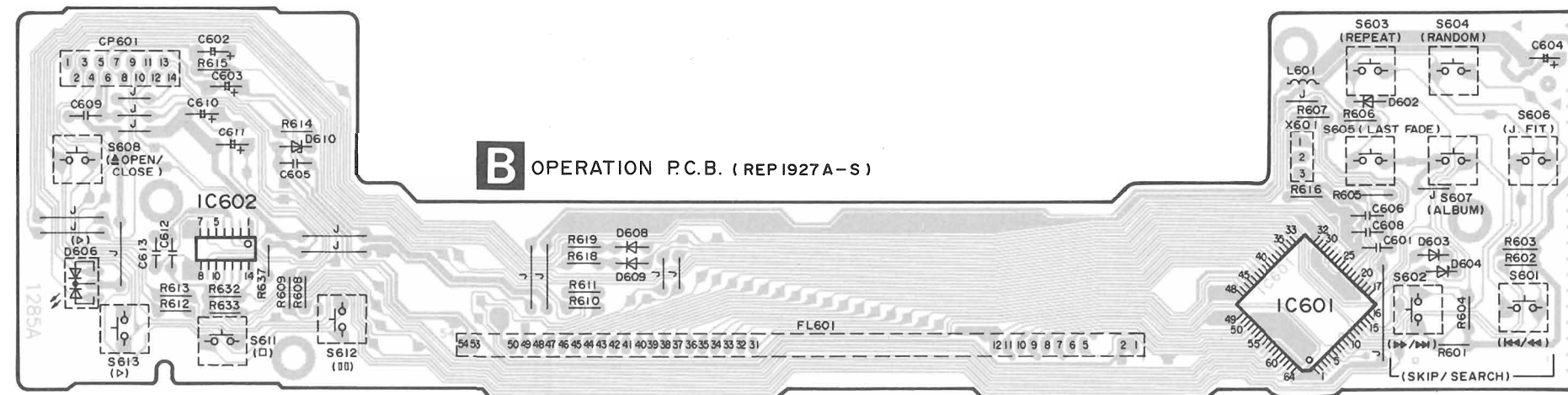
D MAIN P.C.B. (REP1658C-M)



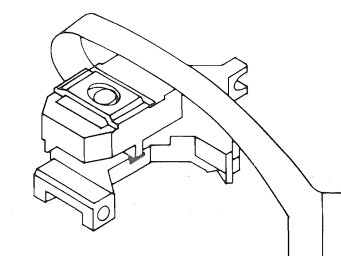
C LOADING MOTOR P.C.B. (REP0767)



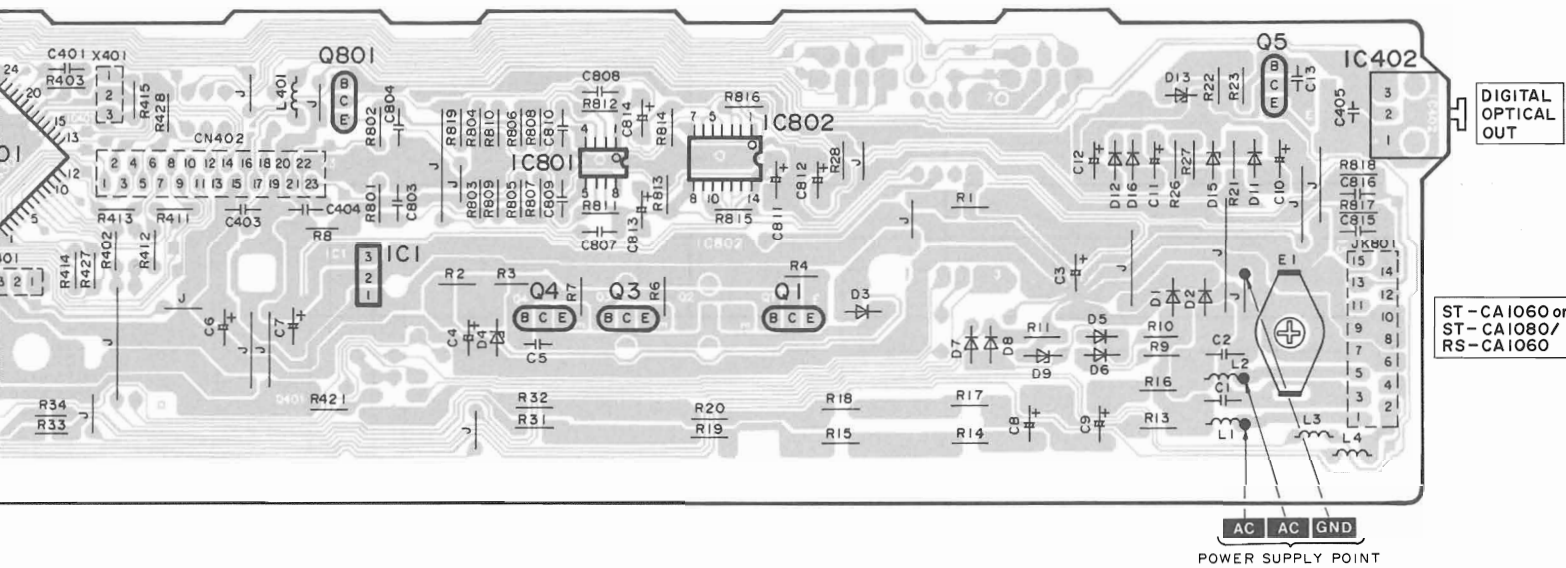
B OPERATION P.C.B. (REP1927A-S)



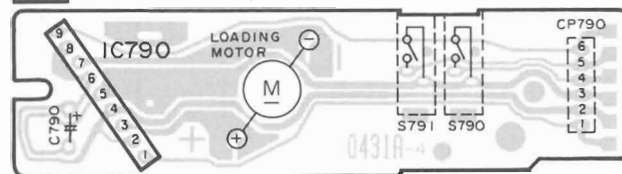
OPTICAL PICKUP

DIGITAL
OPTICAL
OUTST-CA1060 or
ST-CA1080/
RS-CA1060AC AC GND
POWER SUPPLY POINTNotes
WHT... White
BLU... Blue

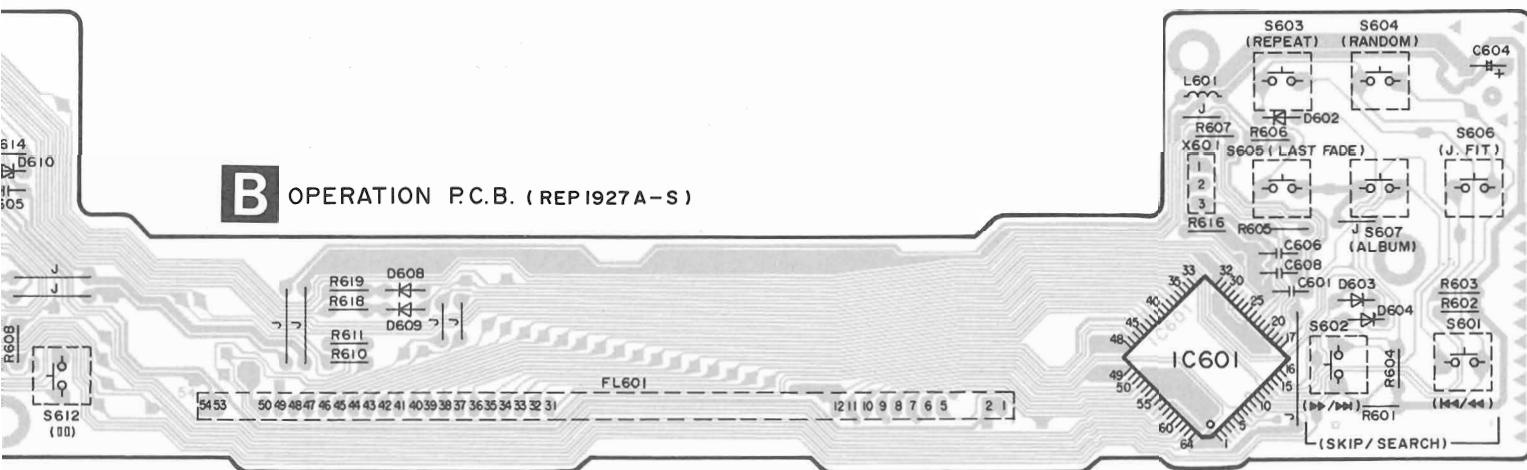
REP1658C-M)



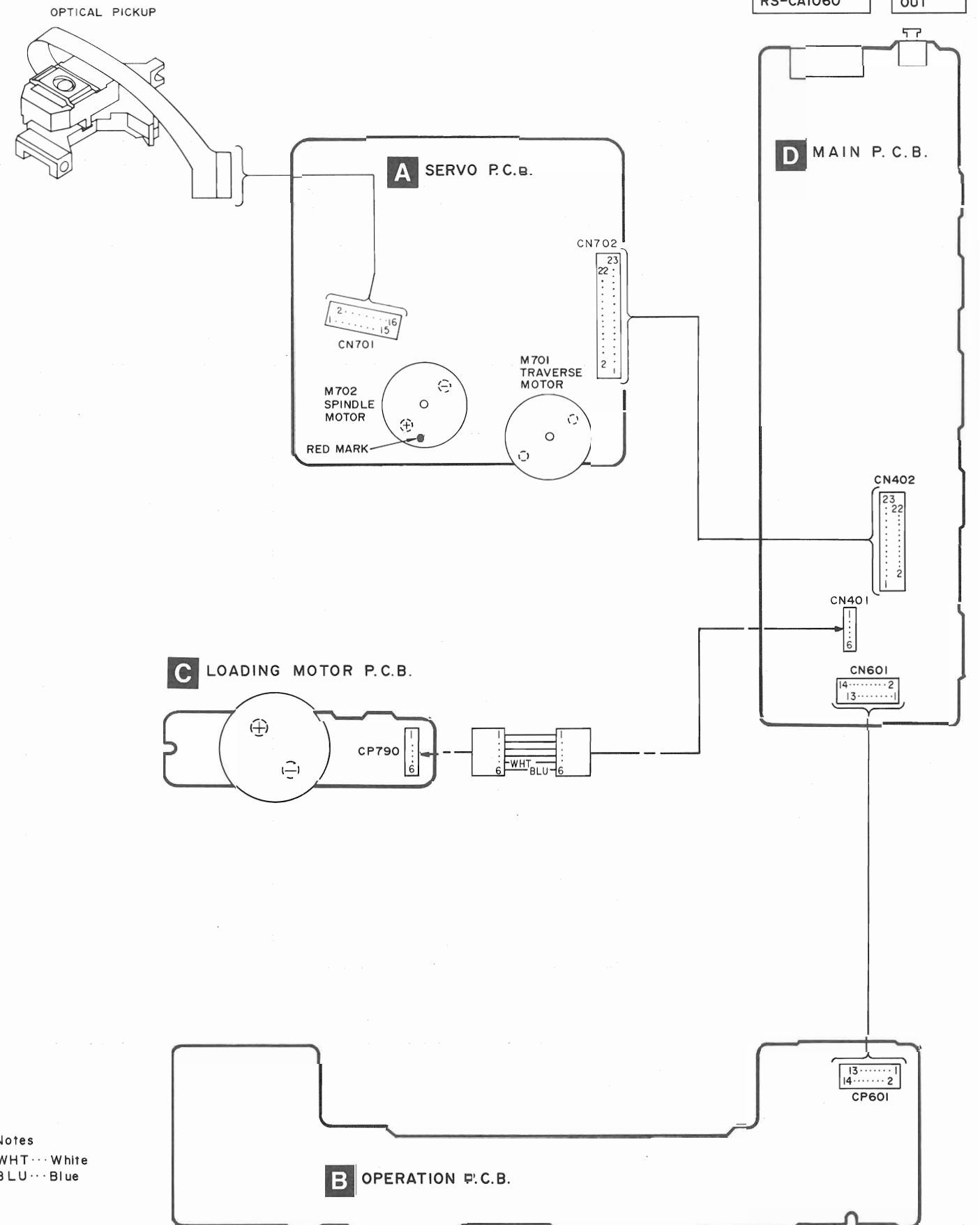
C LOADING MOTOR P.C.B.(REP0767)



B OPERATION P.C.B. (REP1927A-S)



WIRING CONNECTION DIAGRAM



Notes
WHT...White
BLU...Blue

■ TERMINAL FUNCTION OF IC'S

• IC401 (LC66306A4C13)

Pin No.	Terminal Name	I/O	Function
1	REST SW	I	Innermost track sense switch status
2	SERVO RST	I	Reset signal input
3	STAT	I	Status signal input
4	SUBQ	I	Subcode Q input
5	D MUTE	O	Muting signal output (No use)
6	NC	—	—
7	SQCK	O	External clock for subcode Q register
8	BLKCK	I	Subcode block clock input
9	ODL RX	I	—
10	ODL TX	—	—
11	NU	—	—
12	NU	—	Tied high
13	MLD	O	Microprocessor command load signal
14	M DATA	O	Microprocessor command data
15	TEST	—	GND
16	V _{SS}	—	GND
17	OSC1	I	Clock input from X401 (4.23MHz)
18	NC	—	GND
19	NC	—	GND
20	OSC2	—	—
21	/RST	O	Reset signal output
22	M CLK	O	Microprocessor command clock

Pin No.	Terminal Name	I/O	Function
23, 24	NU	—	—
25	—	—	—
26	CS	I	Input of Serial communication starting to IC601 for system control
27	REQ	I	Input of Request signal from IC601 for system control
28	DT	I	Data Signal in/output from IC601 for system control
29			
30	NU	—	GND
31	CLK	I	Clock for communication with IC601
32	NU	—	—
33~38	NU	—	GND
39	V _{DD}	I	Power supply
40	CLOSE SW	I	Disc tray "close" sense switch status
41	OPEN SW	I	Disc tray "open" sense switch status
42, 43	NC	—	Connected to V _{SS}
44	/CLOSE	O	Close Disc Tray command output
45	/OPEN	O	Open Disc Tray command output
46	SENSE	I	Sense signal input
47	/FLOCK	I	Focus servo pull-in signal
48	/TLOCK	I	Tracking servo pull-in signal

• IC601 (M38112M4102F)

Pin No.	Terminal Name	I/O	Function
1	REQ	O	Request signal output to IC401 for system control
2	GRST	O	Reset signal output
3~6	GCS, GCLK, GDOUT, GDIN	—	—
7	CS	O	Output of Serial communication starting to IC401 for system control
8	CLK	O	Clock signal output to IC401 for system control
9	DOUT	O	Data signal output to IC401 for system control
10	DIN	I	Data signal input from IC401 for system control
11~14	KIN3~KIN0	I	Signal input from operation key
15~17	KS2~KS0	O	Strobe signal output for operation key scanning
18	HOLT	I	Detection signal input for an electricity failure
19	RST	I	Reset signal input
20	XCIN	—	—
21	XCOUT	—	—
22	XIN	I	Clock signal input

Pin No.	Terminal Name	I/O	Function
23	XOUT	O	Clock signal output
24	GND	—	Connected to GND
25	SCDG	I	—
26	GMUTE	—	—
27, 28	NU	—	—
29	PLED1	O	Output signal for PLAY LED lighting
30	PLED2		
31~40	G1~G10	O	Grid signal output for FL display tube
41~56	S16~S1	O	Segment signal output for FL display tube
57	V _{DD}	—	Supplied +5V
58	VP	—	Supplied power to FL display tube for pulling down
59	BSDTO	O	Data signal output to bus
60	BCKO	O	Clock signal output to bus
61	BSDTI	I	Data signal input from bus
62	BCKI	I	Clock signal input from bus
63	/CD	O	Muting signal output to CD
64	CD POWER	I	AF switching input to CD for power control

• IC701 (AN8802SCE1V): Servo amp

Pin No.	Mark	I/O Division	Function
1	PDAD	I	Photo detector Bch input without delay
2	PDA	I	Photo detector Ach input without delay
3	LPD	I	Laser PD signal
4	LD	O	Laser power auto control output
5	AMPI	I	RF amp terminal
6	V _{CC}	I	Power supply terminal
7	AMPO	O	RF amp signal
8	CAGC	I	AGC detection capacitor input
9	ARF	O	RF signal
10	CENV	I	RF detect capacitor connection terminal
11	CEA	I	HPF-AMP capacitor connection terminal
12	GND	—	GND terminal
13	LDON	I	LD APC ON/OFF ("H": ON, "L": OFF)
14	TES	I	Tracking error shunt input ("H": shunt)
15	PLAY	I	Play signal ("H": ON, "L": OFF)
16	WVEL	I	Double velocity ("H": double, "L": single)

Pin No.	Mark	I/O Division	Function
17	BDO	O	Dropout detection control
18	/RFDET	O	RF det. signal ("L": det.)
19	CROSS	O	Tracking error zero cross output
20	OFTR	O	Off track detection ("H": det.)
21	VDET	O	Oscillation det. signal ("H": det.)
22	ENV	O	Envelope output terminal
23	TEBPF	I	Oscillation detect input terminal
24	TE	O	Tracking error signal
25	FE	O	Focusing error signal
26	PTO	O	Potention amp output
27	PTI	I	Potention amp input
28	TBAL	I	Tracking balance adj. input
29	FBAL	I	Focus balance adj. input
30	VREF	O	Reference voltage output
31	PDB	I	Photo detector Ach input with delay
32	PDBD	I	Photo detector Bch input with delay

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

Pin No.	Mark	I/O Division	Function
1	V _{CC}	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	—	No connection
7	NRESET	I	Reset terminal
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, open)

Pin No.	Mark	I/O Division	Function
13	PV _{CC} 1	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	PV _{CC} 2	I	Driver power supply (2)

• IC702 (MN66271RA): Digital servo processor/digital signal processor/digital filter/D/A converter

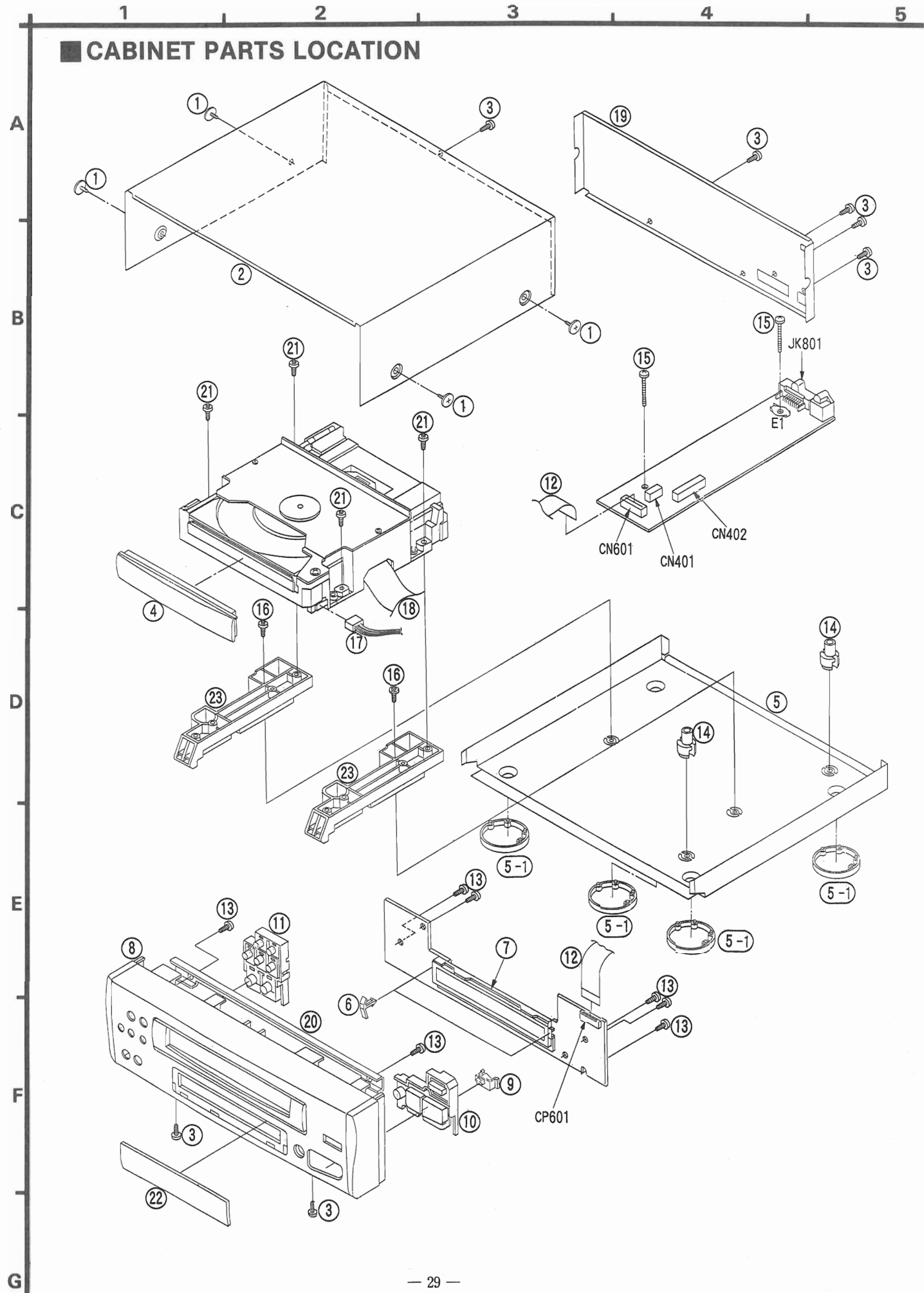
Pin No.	Mark	I/O Division	Function
1	BCLK	O	Serial bit clock terminal
2	LRCK	O	L/R discriminating signal
3	SRDATA	O	Serial data (Not used, open)
4	DV _{DD} 1	I	Power supply (digital circuit) terminal
5	DV _{SS} 1	—	GND (digital circuit) terminal
6	TX	O	Digital audio interface signal
7	MCLK	I	Command 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=75 Hz)
14	SQCK	I	Sub-code Q register clock
15	SUBQ	O	Sub-code Q data
16	DMUTE	I	Muting input ("H": MUTE)
17	STAT	O	Status signal (CRC, CUE, CLVS, TTSTOP, FCLV, SQCK)
18	/RST	I	Reset signal ("L": reset)
19	SMCK	O	System clock (f=4.2336 MHz)
20	PMCK	O	Frequency division clock signal (Not used, open) ($f = \frac{1}{1.92} \times ck = 88.2 \text{ kHz}$)
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 drive output (TVD, ECS, TRD, FOD, FBAL, TBAL) normal voltage input terminal
30	FBAL	O	Focus balance adj. output
31	TBAL	O	Tracking balance 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	IBDO	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)

Pin No.	Mark	I/O Division	Function
43	WVEL	O	Double velocity status signal ("H": double)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	I	DSL bias terminal (Not used, open)
47	DSL F	I/O	DSL loop filter terminal
48	PLL F	I/O	PLL loop filter terminal
49	VCO F	I/O	VCO loop filter terminal (Not used, open)
50	AV _{DD} 2	I	Power supply (analog circuit) terminal (2)
51	AV _{SS} 2	—	GND (analog circuit) terminal
52	EFM	O	EFM signal (Not used, open)
53	PCK	O	PLL extract clock (f=4.3218MHz)
54	PDO	O	Phase compared signal of EFM and PCK (Not used, open)
55	SUBC	O	Sub-code serial output data (Not used, open)
56	SBCK	I	Sub-code serial output clock (Not used, open)
57	V _{SS}	—	GND terminal
58	X1	I	Crystal oscillator terminal (f=16.9344MHz)
59	X2	O	
60	V _{DD}	I	Power supply terminal
61	BYTCK	O	Byte clock signal
62	/CLDCK	O	Sub-code frame clock signal (f CLDCK=7.35kHz: Normal) (Not used, open)

Pin No.	Mark	I/O Division	Function
63	FCLK	O	Crystal frame clock (Not used, open)
64	PFLAG	O	Interpolation flag terminal
65	FLAG	O	Flag terminal
66	CLVS	O	Turntable servo phase synchro signal ("H": CLV, "L": Rough servo)
67	CRC	O	Sub-code CRC check terminal ("H": OK, "L": NG)
68	DEMPH	O	De-emphasis ON signal ("H": ON)
69	RESY	O	Re-synchronizing signal of frame sync. (Not used, open)
70	/RST2	I	Reset terminal after "MASH" circuit
71	/TEST	I	Test terminal (Normal: "H")
72	AV _{DD} 1	I	Power supply (analog circuit) terminal (1)
73	OUTL	O	
74	AV _{SS} 1	—	GND (analog circuit) terminal (1)
75	OUTR	O	Rch audio signal
76	RSEL	I	Polarity direction control terminal of RF signal
77	CSEL	I	Frequency control terminal of crystal oscillator
78	PSEL	I	Test terminal (Normal: "L")
79	MSEL	I	"SMCK" terminal frequency select ("L": SMCK=4.2336MHz)
80	SSEL	I	"SUBQ" terminal mode select ("H": Q code buffer)

CABINET PARTS LOCATION



REPLACEMENT PARTS LIST

Notes: *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.

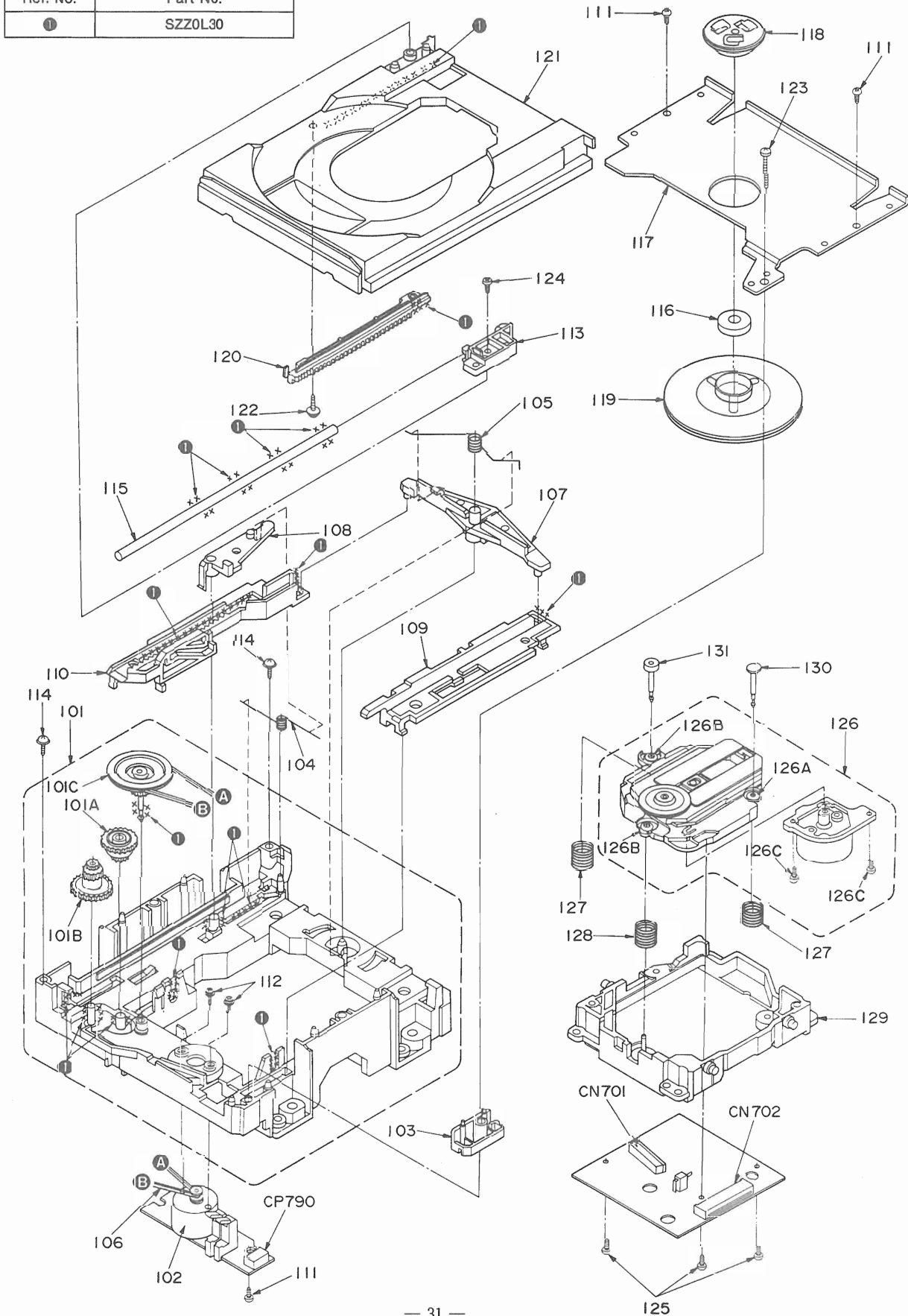
Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS		115	RMU0046	GUIDE SHAFT	
				116	RHM245ZA	MAGNET	
				117	RFKNACH350EK	CLAMP PLATE ASS'Y	
1	RHD30007	SCREW		118	RMRO334	FIXED PLATE	
2	RKMO203A-2K	CABINET		119	RXQ0123	MAGNET HOLDER ASS'Y	
3	XTBS3+8JFZ1	SCREW		120	RFKNLPG440-K	DRIVE GEAR (2) ASS'Y	
4	RGK0640-K	TRAY PANEL		121	RGQ0088-K1	DISC TRAY	
5	RFKJLCA1060E	BOTTOM BOARD ASS'Y		122	RHD20009-1	SCREW	
5-1	RKA0011-3	FOOT		123	XTB3+25GFZ	SCREW	
6	RMNO195	FL SPACER		124	XTN3+8JFZ	SCREW	
7	RMNO197	FL HOLDER		125	XTV2+6G	SCREW	
8	RFKGLCA1060E	FRONT PANEL ASS'Y		126	RAE0113Z	TRAVERSE DECK ASS'Y	
9	RGL0232-Q	PANEL LIGHT		126A	SHGD112	FLOATING RUBBER(1)	
10	RFKNL1060EA	PLAY BUTTON ASS'Y		126B	SHGD113-1	FLOATING RUBBER(2)	
11	RFKNL1060EB	EDIT BUTTON ASS'Y		126C	XQS17+A35FZ	SCREW	
12	RWJ5414120EE	FLEXIBLE CABLE		127	RME0109	FLOATING SPRING	
13	XTBS26+8J	SCREW		128	RME0142	FLOATING SPRING	
14	SHE185-2	P. C. B. SPACER		129	RMRO698-K	TRAVERSE CHASSIS	
15	XTB3+16JFZ	SCREW		130	RMS0123-1	FIXED PIN(1)	
16	XTB3+8FFZ	SCREW		131	RMS0350	FIXED PIN(2)	
17	REX0510	LEAD CABLE (6P)					
18	REZ0537	FLEXIBLE CABLE (23P)					
19	RGRO175A-F	REAR PANEL					
20	RMA0791	REINFORCING PLATE					
21	XTB3+8JFZ	SCREW					
22	RKWO339-V	FL PANEL					
23	RMRO770-W	MECHANISM SPACER					
		LOADING MECHANISM					
101	RFKJLPG440BK	TRAVERSE CHASSIS ASS'Y					
101A	RDG0142	INTERMEDIATE GEAR					
101B	RDG0193	DRIVE GEAR(1)					
101C	RDP0065	INTERMEDIATE PULLEY					
102	REM0019	LOADING MOTOR ASS'Y					
103	RMA0339	TRAY HOLDER					
104	RME0063	LOCK LEVER SPRING					
105	RME0087	ASSISTANCE SPRING					
106	RMGO158	BELT					
107	RML0177	CONVERSION LEVER					
108	RML0178-1	LOCK LEVER					
109	RMM0059-1	SLIDE PLATE (2)					
110	RMM0079	SLIDE PLATE (1)					
111	XTN26+6G	SCREW					
112	XYN2+F6FZ	SCREW					
113	RDB0036	GUIDE SHAFT HOLDER					
114	RHD20010	SCREW					

LOADING PARTS LOCATION

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

Ref. No.	Part No.
1	SZZ0L30

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.



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.

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)		X601	EF0EC4234T3	OSCILLATOR (4.23MHz)	
		DISPLAY(S)					
IC1	LM2940T5	REGULATOR	Δ				
IC401	LC66306A4C13	SYSTEM CONTROL		FL601	RSL0181-F	FL DISPLAY	
IC402	T0TX178	DIGITAL OUTPUT				SWITCH(ES)	
IC601	M38112M4102F	FL DRIVE/SYSTEM CONT.					
IC602	LA5608M-TE-L	BUS LINE/HALT/RESET		S601	EVQ21405R	R SKIP/R SEARCH	
IC790	TA7291S	MOTOR DRIVE		S602	EVQ21405R	F SKIP/F SEARCH	
IC801	XRA4558FT1	L. P. F.		S603	EVQ21405R	REPEAT	
IC802	TC4066BFTP1	SWITCHING		S604	EVQ21405R	RANDOM	
		TRANSISTOR(S)		S605	EVQ21405R	LAST FADE	
Q1	2SD2037EFTA	TRANSISTOR	Δ	S606	EVQ21405R	JUST FIT	
Q3, 4	2SD2037EFTA	TRANSISTOR	Δ	S607	EVQ21405R	ALBUM	
Q5	2SB1238QRTV6	TRANSISTOR	Δ	S608	EVQ21405R	OPEN/CLOSE	
Q801	UN4112	TRANSISTOR		S611	EVQ21405R	STOP	
		DIODE(S)		S612	EVQ21405R	PAUSE	
D1, 2	RL1N4003N02	DIODE	Δ	S613	EVQ21405R	PLAY	
D3	RL1N4003N02	DIODE		S790	RSH1A005	LOADING CLOSE DETECT	
D4	MA4082LTA	DIODE	Δ	S791	RSH1A005	LOADING OPEN DETECT	
D5, 6	MA167	DIODE	Δ			CONNECTOR(S)	
D7, 8	MA165	DIODE		CN401	SJTD613	CONNECTOR (6P)	
D9	MA4051MTA	DIODE	Δ	CN402	RJS1A6823	CONNECTOR (23P)	
D11, 12	MA185TA	DIODE	Δ	CN601	RJS1A6814	CONNECTOR (14P)	
D13	MA4270HTA	DIODE	Δ	CP601	RJS1A6714	CONNECTOR (14P)	
D15	MA4051MTA	DIODE	Δ	CP790	RJP6G172A	CONNECTOR (6P)	
D16	MA185TA	DIODE	Δ			JACK(S)	
D602-604	MA165	DIODE					
D606	SFR-305MDTF	L. E. D.		JK801	RJT065K15	CONNECTOR (15P)	
D608, 609	MA165	DIODE				EARTH TERMINAL(S)	
D610	MA4051MTA	DIODE					
		COIL(S)		E1	SNE1004-2	GND PLATE	
L1, 2	BLO2RN2R62T4	COIL	Δ			<SERVO P. C. B. >	
L3, 4	ELEFT3R3KA9	COIL				INTEGRATED CIRCUIT(S)	
L401	BLO2RN2R62T4	COIL		IC701	AN8802SCE1V	SERVO AMP	
L601	RLQA100JT-Y	COIL		IC702	MN66271RA	SERVO PROCESSOR	
		OSCILLATOR(S)		IC703	AN8389SE1	MOTOR DRIVE	
						TRANSISTOR(S)	
X401	EF0EC4234T3	OSCILLATOR (4.23MHz)					

Ref. No.	Part No.	Part Name & Description	Remarks				
Q701	2SB709S	TRANSISTOR					
		OSCILLATOR(S)					
X701	RSXB16MSJ01T	OSCILLATOR (16. 9344MHz)					
		SWITCH(ES)					
S701	RSM0006-P	REST DETECTOR					
		CONNECTOR(S) AND SOCKET(S)					
CN701	RJU035T016-1	SOCKET (16P)					
CN702	RJS1A6723-1Q	CONNECTOR (23P)					

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, 1 K=1,000 (OHM), 1 M=1,000k (OHM)

Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks	Ref. No.	Part No.	Values & Remarks
		RESISTORS	R413	ERDS2TJ472	1/4W 4. 7K			CAPACITORS
			R414	ERDS2TJ102	1/4W 1K			
			R415	ERDS2TJ105T	1/4W 1M	C1, 2	ECBT1E103ZF	25V 0. 01U
R1	ERQ16NWR15E	1/6W 0. 15 Δ	R421	ERDS2TJ223	1/4W 22K	C3	ECA1CM222B	16V 2200U Δ
R2	ERDS1FVJ271T	1/2W 270 Δ	R427	ERDS2TJ103	1/4W 10K	C4	ECEA1AKA101B	10V 100U
R3	ERD2FCVJ6R8T	1/4W 6. 8 Δ	R428	ERDS2TJ223	1/4W 22K	C5	ECBT1H102KB5	50V 1000P
R4	ERDS2TJ1R2	1/4W 1. 2	R429	ERDS2TJ102	1/4W 1K	C6	ECEA1AKA221B	10V 220U
R6, 7	ERDS2TJ1R2	1/4W 1. 2	R601-604	ERDS2TJ473	1/4W 47K	C7	RCE0JKA221BV	6. 3V 220U
R8	ERDS2TJ220T	1/4W 22	R605	ERDS2TJ101	1/4W 100	C8, 9	ECA1VFQ121B	35V 120U
R9, 10	ERDS2TJ562	1/4W 5. 6K	R606	ERDS2TJ104	1/4W 100K	C10	ECA1EM101B	25V 100U Δ
R11	ERDS2TJ472	1/4W 4. 7K	R607	ERDS2TJ103	1/4W 10K	C11, 12	ECA1HM470B	50V 47U
R13	ERD2FCVJ4R7T	1/4W 4. 7 Δ	R608, 609	ERDS2TJ102	1/4W 1K	C13	ECBT1H102KB5	50V 1000P
R14, 15	ERG1SJ150E	1W 15	R610-613	ERDS2TJ101	1/4W 100	C401	ECBT1E103ZF	25V 0. 01U
R16	ERD2FCVJ4R7T	1/4W 4. 7 Δ	R614, 615	ERDS2EJ121	1/4W 120	C402	ECBT1H104ZF5	50V 0. 1U
R17, 18	ERG1SJ150E	1W 15	R616	ERDS2TJ104	1/4W 100K	C403	ECBT1H102KB5	50V 1000P
R19, 20	ERDS2TJ100	1/4W 10	R618, 619	ERDS2TJ181T	1/4W 180	C404, 405	ECBT1E103ZF	25V 0. 01U
R21	ERG1SJ180E	1W 18	R632, 633	ERDS2TJ472	1/4W 4. 7K	C601	ECBT1H104ZF5	50V 0. 1U
R22	ERDS2TJ562	1/4W 5. 6K	R637	ERDS2TJ470	1/4W 47	C602, 603	ECEA1HKS3R3B	50V 3. 3U
R23	ERDS2TJ471	1/4W 470	R801, 802	ERDS2TJ102	1/4W 1K	C604	ECEA0JKA470B	6. 3V 47U
R26, 27	ERDS2TJ271	1/4W 270	R803, 804	ERDS2TJ104	1/4W 100K	C605	ECBT1H102KB5	50V 1000P
R28	ERDS2TJ101	1/4W 100	R805-808	ERDS2TJ223	1/4W 22K	C606	ECBT1E103ZF	25V 0. 01U
R31-36	ERDS2TJ100	1/4W 10	R809, 810	ERDS2TJ273	1/4W 27K	C608, 609	ECBT1E103ZF	25V 0. 01U
R402, 403	ERDS2TJ102	1/4W 1K	R811, 812	ERDS2TJ332	1/4W 3. 3K	C610	ECEA1HKS22B	50V 0. 22U
R404-407	ERDS2TJ152	1/4W 1. 5K	R813, 814	ERDS2TJ104	1/4W 100K	C611	ECEA1HKS33B	50V 0. 33U
R408	ERDS2TJ104	1/4W 100K	R815, 816	ERDS2TJ102	1/4W 1K	C612	ECBT1E223ZF	25V 0. 022U
R409, 410	ERDS2TJ103	1/4W 10K	R817, 818	ERDS2TJ104	1/4W 100K	C613	ECBT1E103ZF	25V 0. 01U
R411	ERDS2TJ472	1/4W 4. 7K	R819	ERDS2TJ103	1/4W 10K	C790	ECA1AKF820E	10V 82U
R412	ERDS2TJ102	1/4W 1K				C803, 804	ECBT1H102KB5	50V 1000P

[illegible]