

ORDER No.AD0211148C3

Service Manual

Portable MD Recorder



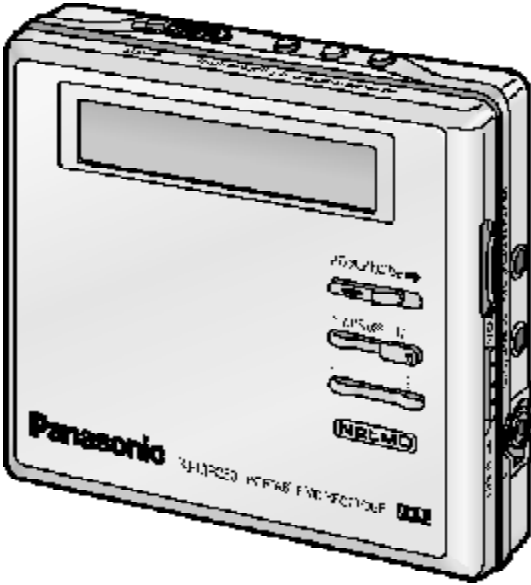
SJ-MR230DGH / SJ-MR230DGK

Colours

(S).....Silver Type

(R).....Red Type [(GK) area only.]

(A).....Blue Type



SPECIFICATIONS

Specifications

● **Audio**

System:	MiniDisc digital audio system
Laser:	Semiconductor laser (=780 nm)
Sampling frequency:	44.1 kHz
Coding:	Adaptive Transform Acoustic Coding (ATRAC / ATRAC3)
No. of channels:	2 (left and right, stereo) 1 (monaural, play only)
Frequency response:	20 Hz-20 kHz (+0 dB, -8dB)
Wow and flutter:	Below measurable limit

● **General**

Input terminal

OPT/LINE IN jack

Impedance:	22k Ω
Input level:	SENS H: 178mV SENS L: 500mV

MIC jack

Impedance:	600 Ω
Input level:	SENS H: 0.4mV SENS L: 2.5mV

Output terminal

Head phone Jack: 3.0 mW+3.0 mW, 32 Ω

Speakers (Cradle): 0.9 mW+0.9 mW, 8 Ω

Speakers

impedance: 8 Ω

Power supply

Rechargeable battery: DC 1.2V
(included rechargeable battery)

Battery: DC 1.5V (One LR6, AA, UM-3 battery)

AC adaptor: DC 4.5V (included AC adaptor)

Dimensions (WxHxD)

Cabinet dimensions: 78.2x71.6x17.9 mm

incl.projecting parts: 80.4x74.1x17.9 mm

Weight: 121 g (with battery)
94 g (without battery)

● **Play time**

(When used in hold mode, at 25°C, on a flat, stable surface)

Battery type:	Play time	Record time
Rechargeable		
Normal:	About 27 hours	About 13 hours
LP2:	About 35 hours	About 18 hours
LP4:	About 42 hours	About 23 hours
Panasonic alkaline		
Normal:	About 42 hours	About 8 hours
LP2:	About 59 hours	About 13 hours

LP4:	About 70 hours	About 21 hours
Both together		
Normal	About 77 hours	About 35 hours
LP2:	About 100 hours	About 50 hours
LP4:	About 117 hours	About 62 hours

Notes:

- The play time may be less depending on the operating conditions.
- Specifications are subject to change without notice. Weight and dimensions are approximate.

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⚠ 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.

Panasonic

1. Accessories

- Rechargeable battery ass'y.....1pc.
(RFKFFAZ01EM1)
- Rechargeable batt. case.....1pc.
(RFA0475-Q)
- External battery case.....1pc.
(RFA1537-S2)
- Carrying case.....1pc.
(RFC0069-H)
- Stereo earphones.....1pc.
(L0BAB0000174)
- Connection cable.....1pc.
(K2KA39B00001)
- Clip type headphones.....1pc.
(L0BAE0000026)
- Optical fiber cable.....1pc.
(K7CXJCA00004)
- Wired remote control.....1pc.

(N2QCBD000012)

For GH area

- **Speaker ass'y.....2pcs.**
(RFKAJMR250-S)
- **Cradle.....1pc.**
(RFE0114A)
- **AC adaptor.....1pc.**
(RFEA413H-W)

For GK area

- **Speaker ass'y.....2pcs.**
(RFKAMR230GKS)
- **Cradle.....1pc.**
(RFE0114B)
- **AC adaptor.....1pc.**
(RFEA413T-1W)

2. 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.



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 NÄKYMATÖNTÄ LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING	OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRakta EJ STRÅLEN.
ADVARSEL	USYNLIG LASERSTRÅLING NÄR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.
VORSICHT	UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.

3. Operating Instructions

4. Handling Precautions for Optical Magnetism Head Unit

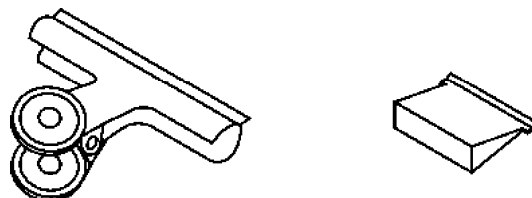
The laser diode in the optical magnetism head unit may break down due to potential difference caused by static electricity of clothes or human body.

So, be careful of electrostatic breakdown during repair of the optical magnetism head unit.

4.1. Handling the optical magnetism head unit

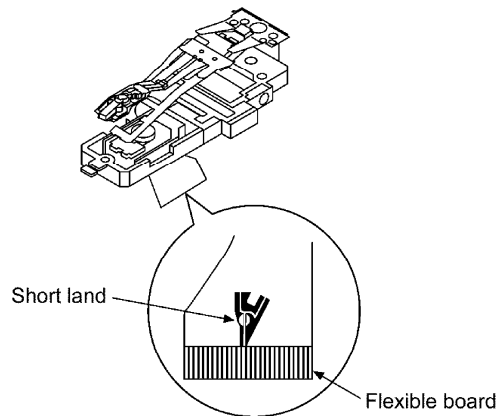
1. The optical magnetism head unit is an extremely high-precision construction and must not be subjected to impact, excessive vibration, or other types of rough handling.
2. In order to prevent static electricity damage to the laser diode, use a short pin or similar tool to short the optical pickup's flexible circuit boards after they have been disconnected from the main circuit board. (as shown in [Fig. 1](#))
3. Handle the flexible circuit boards with care; excessive force could cause them to be broken.
4. Do not turn the pre-set variable resistor (for adjustment of the laser power); it has been adjusted at the factory. (as shown in [Fig. 2](#))

Fig. 1



Clip or short-pin

Fig. 2



4.2. Grounding for electrostatic breakdown prevention

1. Human body grounding

Use the anti-static wrist strap to discharge the static electricity from your body. (as shown in [Fig. 3](#))

2. Work table grounding

Put a conductive material (sheet) or steel sheet on the area where the optical magnetism head unit is placed, and ground the sheet. (as shown in [Fig. 4](#))

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 optical magnetism head unit.

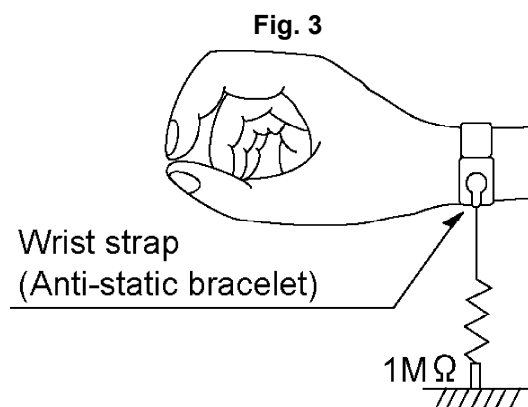
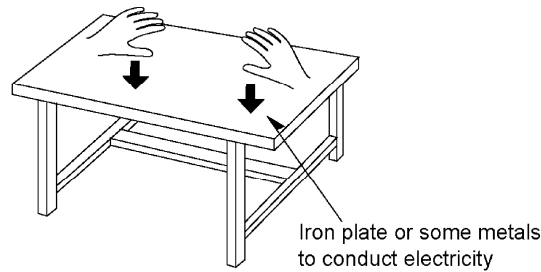


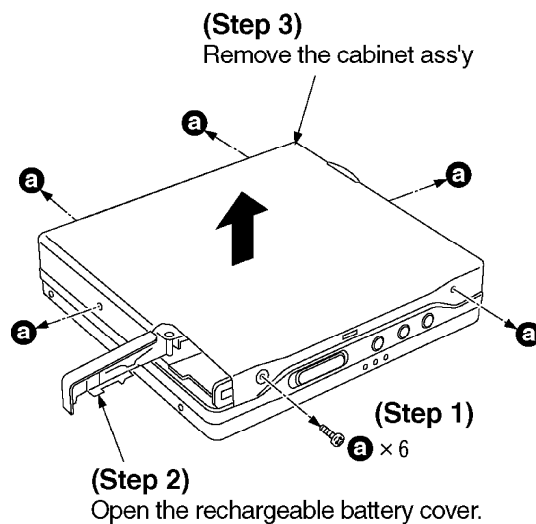
Fig. 4



5. Operation Checks and Component Replacement Procedures

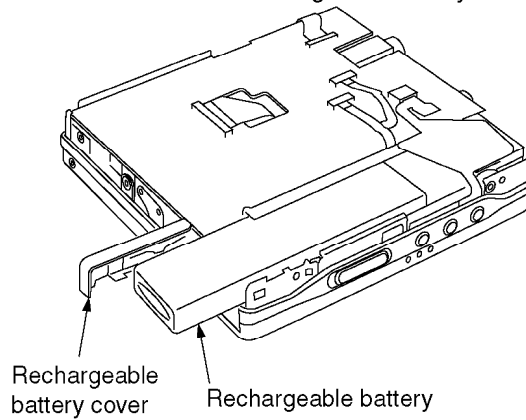
- This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.
- For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.
- After replacing the main components (optical pickup or traverse motor, etc.) of mechanism unit block, change to the adjust mode, and then perform the “ROM/RAM auto-adjustment”.

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



(Step 4)

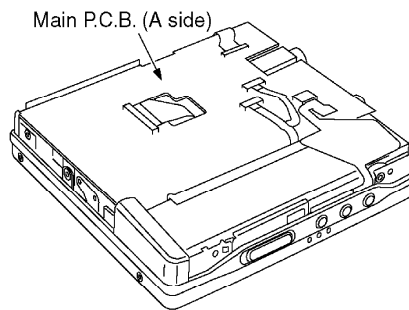
Store the rechargeable battery,
and then close the rechargeable battery cover.



NOTE:

The rechargeable battery
should be recharged fully.

- Check the main P.C.B. (A side) as shown below.



[Checking for the main P.C.B. (B side)]

- Each parts on main P.C.B. (B side) can not be checked directly.
For the checking of main component parts on P.C.B., refer to the "7. Troubleshooting Guide".

5.2. Replacement for the intermediate cabinet

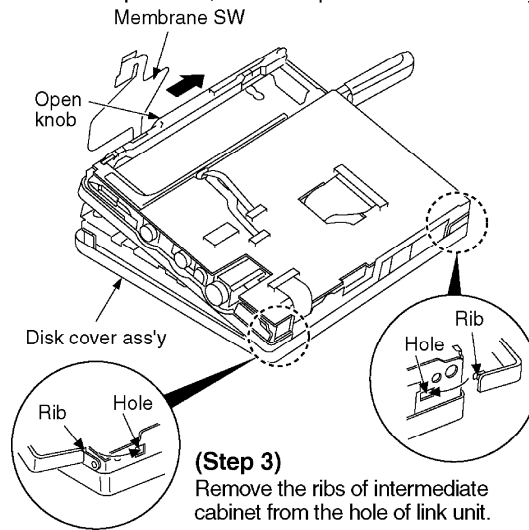
- Follow the (Step1)-(Step3) of item 5.1.

(Step 1)

Remove the membrane SW from connector.

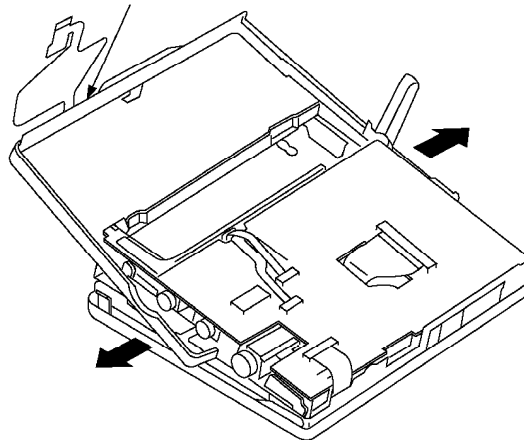
(Step 2)

Push the open knob, and then open the disc cover ass'y.



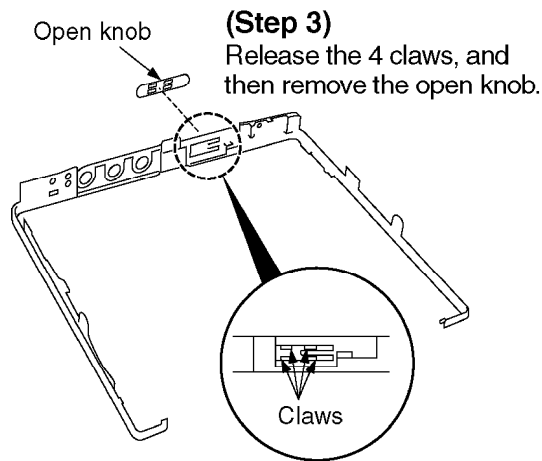
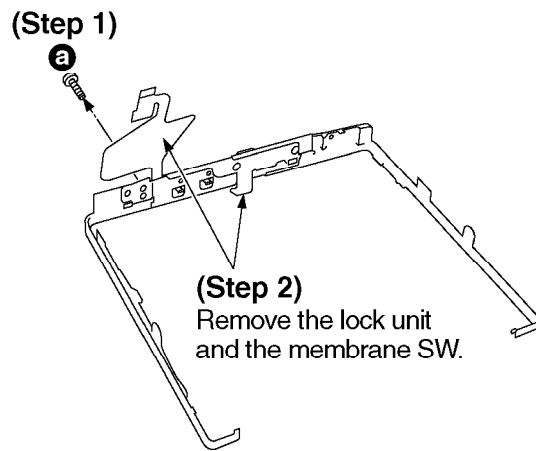
(Step 4)

Remove the intermediate cabinet.



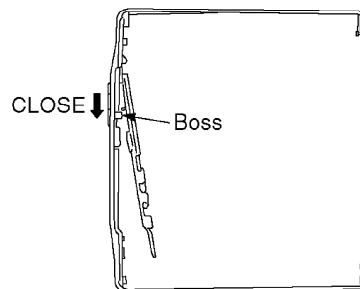
5.3. Replacement for the open knob

- Follow the (Step1)-(Step3) of item 5.1.
- Follow the (Step1)-(Step4) of item 5.2.

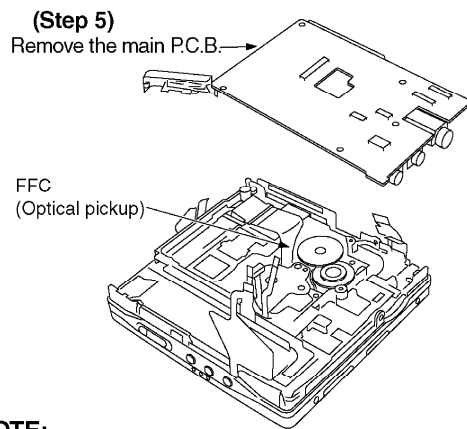
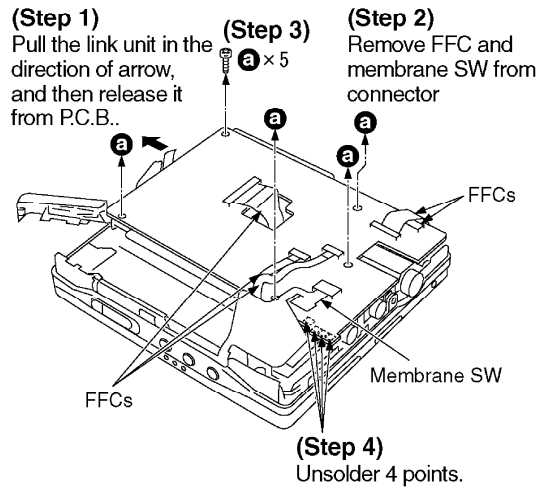


Notice for installation of the open knob

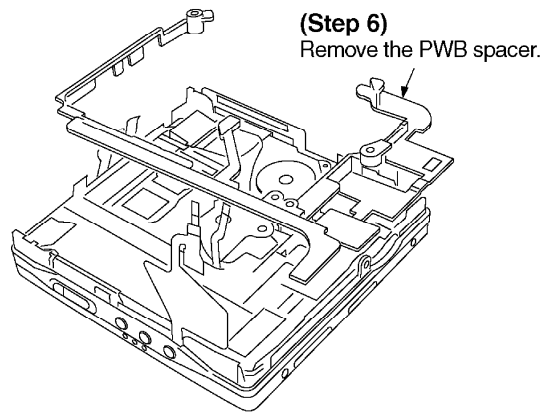
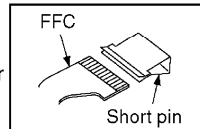
- Move the open knob in the direction of "CLOSE", and then assemble the lock unit as shown below.



5.4. Replacement for the traverse motor
- Follow the (Step1)-(Step3) of item 5.1.

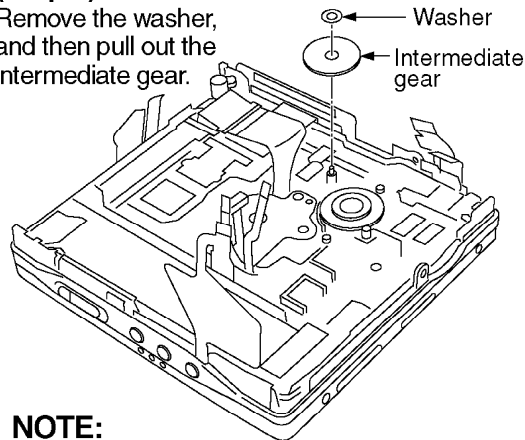


NOTE:
Insert a short pin into the traverse unit FFC board.
(Refer to "4. Handling Precautions for Optical Magnetism Head Unit".)



(Step 7)

Remove the washer,
and then pull out the
intermediate gear.

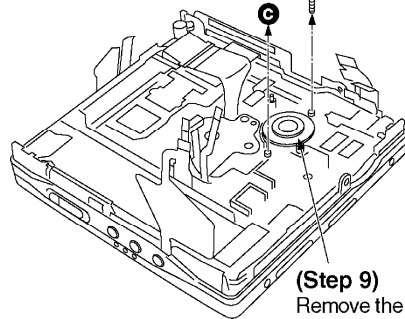


NOTE:

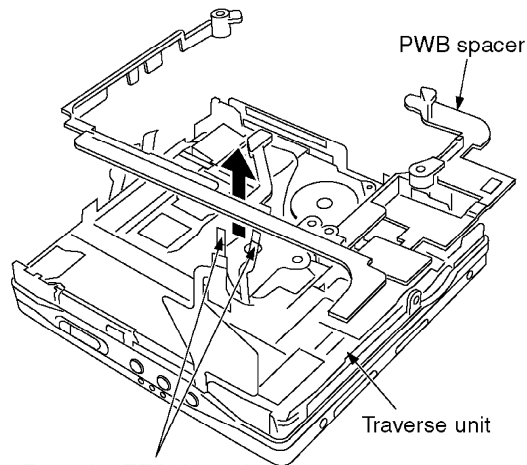
If the washer would be deformed or broken
replace it to new one.

(Step 8)

⊙ × 2



Notice for installation of the PWB spacer



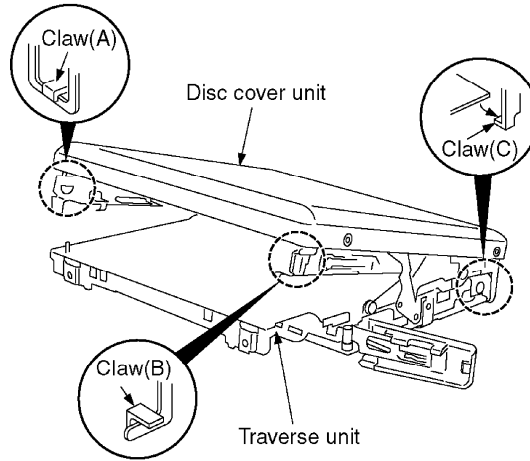
Pass the FFC through
the inside of PWB spacer.

5.5. Replacement for the LCD

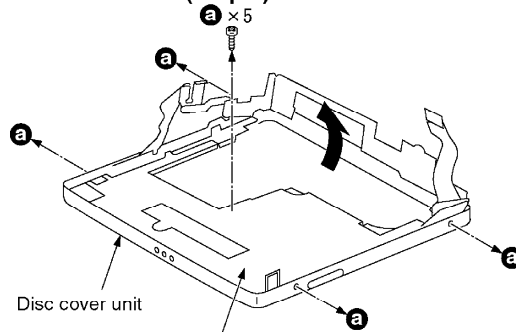
- Follow the (Step1)-(Step3) of item 5.1.
- Follow the (Step1)-(Step4) of item 5.2.

(Step 1)

Release the claw (A), (B), (C),
and then remove the disc cover unit.

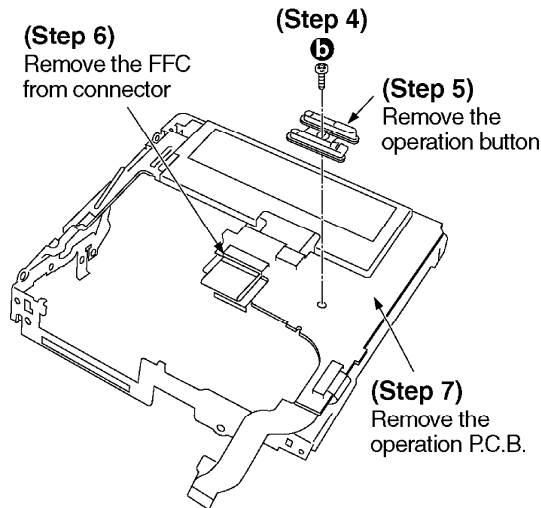


(Step 2)



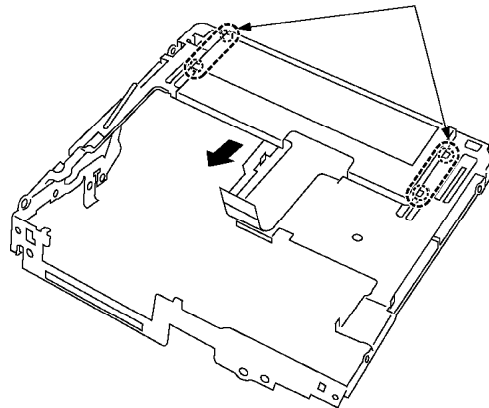
(Step 3)

Remove the link unit in the direction of arrow.



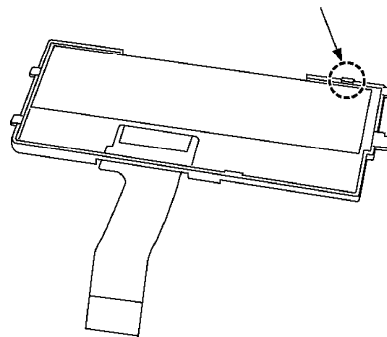
(Step 8)

Release the 4 claws of LCD panel, and then remove the LCD panel in the direction of arrow.



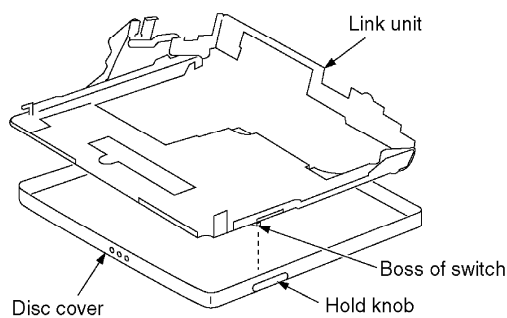
(Step 9)

Release the claw of LCD panel, and then remove the LCD.



Notice for installation of the link unit

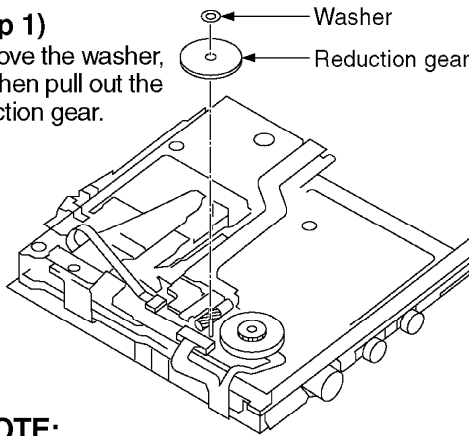
- Make sure the boss of switch are fit in the hold knob when assembling.



5.6. Replacement for the lift motor

- Follow the (Step1)-(Step3) of item 5.1.
- Follow the (Step1)-(Step4) of item 5.2.
- Follow the (Step1) of item 5.5.

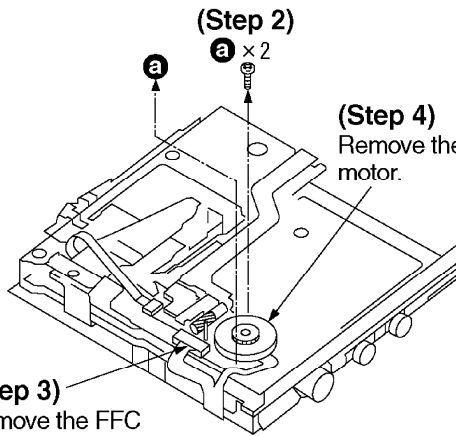
(Step 1)
Remove the washer,
and then pull out the
reduction gear.



NOTE:

If the washer would be deformed or broken,
replace it to new one.

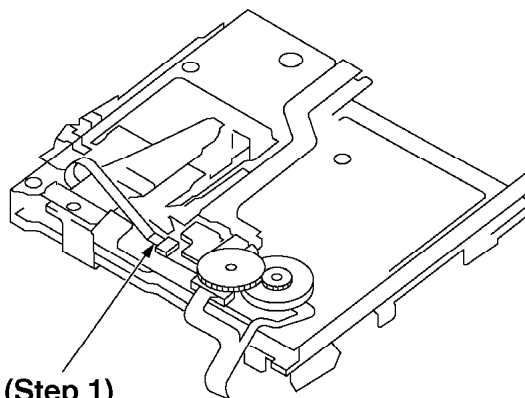
(Step 2)
a
a × 2
(Step 4)
Remove the lift
motor.
(Step 3)
Remove the FFC
from connector.



5.7. Replacement for the optical pickup

- Follow the (Step1)-(Step3) of item 5.1.
- Follow the (Step1)-(Step4) of item 5.2.
- Follow the (Step1)-(Step5) of item 5.4.
- Follow the (Step1) of item 5.5.

(Step 1)
Remove the FFC from connector.

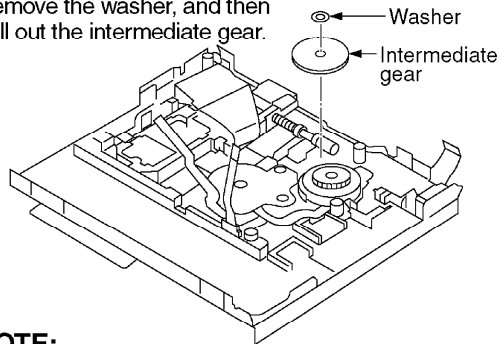


(Step 2)

Upset the main body.

(Step 3)

Remove the washer, and then pull out the intermediate gear.



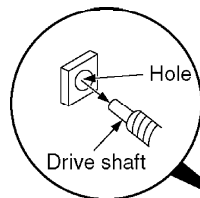
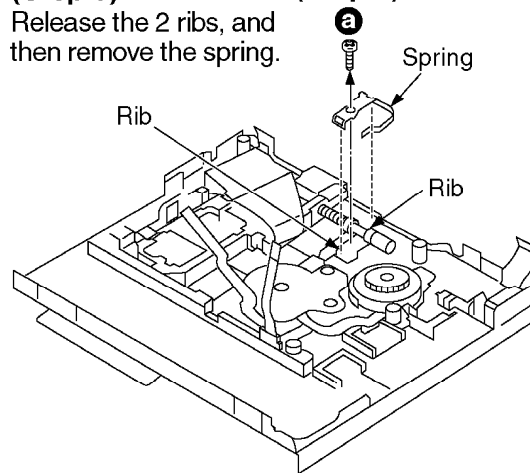
NOTE:

If the washer would be deformed or broken, replace it to new one.

(Step 5)

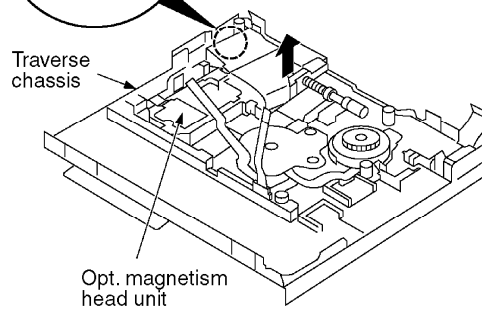
Release the 2 ribs, and then remove the spring.

(Step 4)



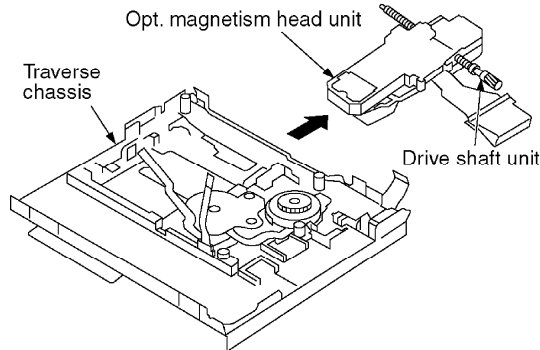
(Step 6)

Lift up the opt. magnetism head unit, and then remove the drive shaft from hole of the traverse chassis.



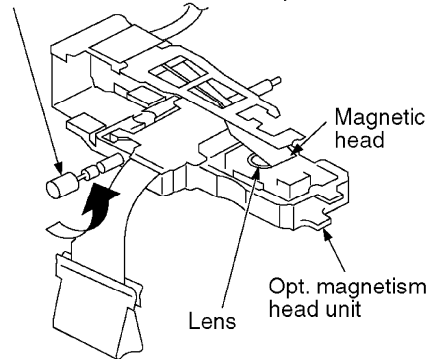
(Step 7)

Pull the opt. magnetism head unit out the traverse chassis with spreading the drive shaft unit.



(Step 8)

Rotate the drive shaft, and then pull out it.



NOTE:

1. Use care to prevent damage the optical pickup, due to the precision construction.
2. Do not touch the lens of the optical pickup.

6. Measurements and Adjustments

Note:

After replacing the main components (optical pickup or traverse motor, etc.) of mechanism unit block, change to the adjust mode, and then perform the “laser power adjustment”, “off-set auto-adjustment” and “playback-onlydisc/magneto-optical disc auto-adjustment”.

6.1. Instruments to prepare

1. Playback-only disc (Test disc RFKV0006)
2. Commercially available recordable disc (fully recorded with music) (magneto-optical disc)
3. Laser power meter (LE8010 or compatible meter)
4. Remote controller (part No. N2QCBD000012 or N2QCBD000002, is attached to SJ-MJ75 (SJ-MJ75 is GH area only.))

Note:

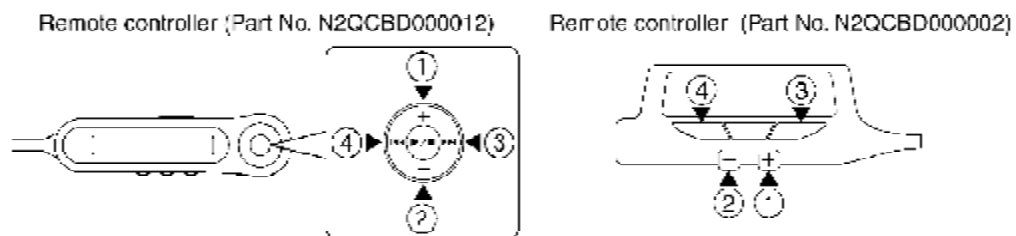
For use of MD cartridge type laser power meter, remove the intermediate cabinet before perform the laser power adjustment (as for the method of disassembly, refer to “5. Operation checks and main component replacement procedures”).

6.2. Laser power adjustment, Off-set automatic adjustment and Playback-only disc/magneto-optical disc auto- adjustment

6.2.1. Enter the adjustment mode

1. Set the battery and connect the remote controller.
2. Turn off the power, and switch main unit’s HOLD switch off.
3. Press the buttons of the remote controller in order from 1 to 4 (as shown in **Fig. 5**).

Fig. 5



4. When the adjustment mode is activated, “T0E**” will be displayed on the LCD of remote controller and unit. After “T0E**” is displayed, select the desired adjustment item with the ►► button or ◀◀ button of the remote controller. (If it is not displayed, perform the procedures written above again.)

Adjustment mode

Adjustment mode	Display
Laser power adjustment	T0E**
Off-set automatic adjustment	T1E**
Magneto-optical disc automatic adjustment	T2E**
Playback-only disc automatic adjustment	T3E**
Automatic adjustment value check	T4E**
EFM jitter measurement	T5E**
REC jitter measurement	T6E**
Area setting	T7E**
Open	T8E**
Error rate measurement (double velocity)	T9E**
Open	TAE**
ROM collection check sum	TBE**
Open	TCE**
Reliability test	TDE**
Tilt measurement (disc middle speed)	TEE**
PWB inspection (audio test)	TFE**

*In the display of T0E** ~ TFE** shown above, you must adjust T0E**, T1E**, T2E** and T3E**. You must perform the adjustment by observing the order T0E** → T1E** → T2E** → T3E**.

6.2.2. Laser Power Adjustment

Adjust each laser power: read power for reading (play) and write power for writing (record).

6.2.2.1. Set the Unit to the Adjustment Mode

Cautions

About handling the optical pickup and the magnetic head.

- The optical pickup and the magnetic head are structured precisely; therefore, they are very fragile. Be careful not to touch them with the edge of the laser power meter. Do not touch the lens.
- The sensor of the laser power meter is a very fine part. Be careful not to touch it to the optical pickup lens.
- Do not loosen or remove the magnetic head installing screw.
- The focus point of the laser reaches to 356°F. Therefore, avoid adjusting using laser power for a long time because the sensor of the laser power meter may be burned.
- Do not allow the write power to even momentarily reach or exceed 6mW. Doing so will result in damage to the optical pickup.
- Do not set the unit to the laser power adjustment mode with the MD loaded. Doing so may result in damage to the MD.
- Laser diode in the optical pickup may be destroyed by the static electricity generated in your clothes or body. Be especially careful with the static electricity.

6.2.2.2. Adjustment Procedure

1. Have "T0E**" indicated on display, and move the optical pickup to the most inside (only when a MD cartridge type laser power meter is used).
2. Set the laser power meter.
 - [For use of stick type laser power meter.]
 - 2-1 Uncover the laser power meter. (as shown in **Fig. 6**)
 - 2-2 Locate the sensor of the laser power meter right over above the optical pickup (horizontally at a level of the disc position). (as shown in **Fig. 7**)
 - [For use of MD cartridge type laser power meter.]
 - 2-1 Set the laser power meter and close the disc cover, fix it with tape as not to open. (as shown in **Fig. 8**)

Fig. 6

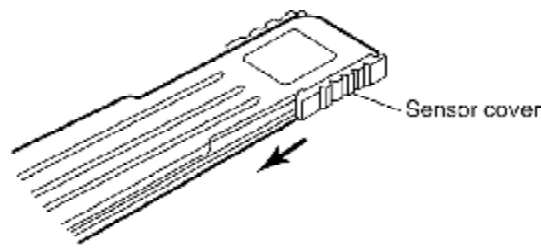


Fig. 7

<Stick type>

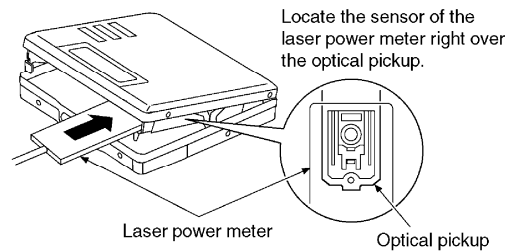
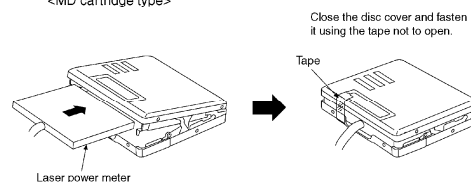


Fig. 8

<MD cartridge type>



3. Press the PLAY key of the remote controller ("T0E**" changes to "LD" of the LCD).
4. Press the ►► key of the remote controller ("LD" changes to "LP" of the LCD).

5. Perform the read power adjustment. Set the light power at $600 \mu W \pm 10\%$ by using VOL+, VOL-, EQ and PLAY MODE keys of the remote controller. In the laser power adjustment, EQ and PLAY MODE keys change every 8 steps for VOL+ and VOL- keys change 1 step.

Caution:

Proceeding on to the subsequent adjustment procedure with the read power exceeding $600 \mu W \pm 10\%$ will result in damage to the optical pickup.

6. Press the  key of the remote controller (“LP ” changes to “RLDA ” in the LCD).


Specified range (read power): $600 \mu W \pm 10\%$ or lower

7. Perform the light power adjustment. Set the light power at 5.7mW by using VOL+, VOL-, EQ and PLAY MODE keys of the remote controller. If at this time the voltage between TP406 and TP407 is 85mA or higher, it is conceivable that the optical pickup is defective.

Specified range (light power): 5.7mW


Caution:

Do not allow the write power to even momentarily reach or exceed 6 mW. Doing so will result in damage to the optical pickup.

8. Press the  key of the remote controller (“RLDA ” changes to “LP ” on the LCD. At this time, the data is written to EEPROM.).
9. Press the PLAY key on the remote controller (“LP ” changes to “T0E** ” on the LCD.).

10. Remove the laser power meter. Laser power adjustment is finished.

6.2.3. Off-set automatic adjustment

1. After laser power adjustment performed, press the  key of the remote controller and make “T1E** ” display on the LCD .
2. Make the optical pickup move to center.
3. Press the PLAY key of remote controller without insert disc (change the display of the LCD to “0FADJ ” , adjustment will be started.).

4. When it ends normally, "0FOK" is displayed on LCD of remote control and a main part.


It is set to "0FNG" at the time of abnormalities.

5. Press the PLAY key of the remote controller (change the display of the LCD to "T1E**", off-set automatic adjustment will be finished.).

Note)

When "0FNG" is displayed, check "7. Troubleshooting Guide" in order.

6.2.4. Magneto-optical disc automatically adjustment

1. After "Off-set automatic adjustment" is finished, press the  key of the remote control and make "T2E**" display on LCD. And move the optical pickup to around the center.

2. Set the full-recorded magneto-optical disc with the prevention erase situation.

3. Press the PLAY key of the remote controller ("T2E**" changes to "0AADJ" on the LCD, adjustment is started.).


4. If it has been finished normally, "0ADDJ" changes to "0AOK" on LCD. If it is abnormally, it changes to "0ANG".

5. Press the PLAY key ("0AOK" or "0ANG" changes to "T2E**", magneto-optical disc adjustment is finished.).

Note:

When "0ANG" is displayed, check "7. Troubleshooting Guide" in order.

6.2.5. Playback-only disc automatically adjustment

1. After "Magneto-optical disc automatically adjustment" is finished, press the  key of the remote control and make "T3J**" displayed on LCD. And move the optical pickup to around center.

2. Set the playback-only disc.

3. Press the PLAY key of the remote controller ("T3E**" changes to "00ADJ" on the LCD, adjustment is started.).

4. If it has been finished normally, "00ADJ" changes to "00OK" on

LCD. If it is abnormally, it changes to “00NG ”.

5. Press the PLAY key (“00OK ” or “00NG ” changes to “T3E** ”, playback-only disc adjustment is finished.).

Note:

When “00NG” is displayed, check “7. Troubleshooting Guide” in order.

6.2.6. How to get out the adjustment mode

Remove the battery when you finish the adjustment mode.

6.3. Checking the main unit's keys

1. Set the battery and connect the remote controller.
2. Turn off the power. Then, with the main unit’s HOLD switch at ON, press the buttons of the remote controller in order from 4 to 1. (as shown in [Fig. 5](#))
3. When entering the main unit’s key check mode, “E KEX ” will be displayed on the LCD of main unit and remote controller. (If it is not displayed, perform the procedures written above again.)
4. Confirm the display of LCD by pressing any keys on the main unit. There is no order to press the keys.

Mian unit's keys	Letters on LCD
PLAY	A
STOP	B
FOW	C
REV	D
HOLD OFF	E
REC	F
VOL+	G
VOL-	H
MARK MODE	I
MODE	J
EQ	K

5. Remote controller’s LCD lights “E*** ” and main unit’s LCD lights all when you can detect all keys.
6. Perform below voltage check about the keys come under if you cannot detect the key.

Main unit's key	Check point	Voltage (ON)	Voltage (OFF)
PLAY	IC501 100pin	0V	2.2V
STOP	IC501 100pin	1.76V	2.2V
FOW	IC501 99pin	0.66V	2.2V
REV	IC501 99pin	0.88V	2.2V
HOLD OFF	IC501 42pin	0V	2.2V
REC	IC501 100pin	0.22V	2.2V
VOL+	IC501 99pin	1.1V	2.2V
VOL-	IC501 99pin	1.32V	2.2V
MARK MODE	IC501 99pin	0V	2.2V
MODE	IC501 99pin	0.22V	2.2V
EQ	IC501 99pin	0.44V	2.2V

7. “Checking the main unit’s key” is finished. Remove the battery when you exit from this mode.

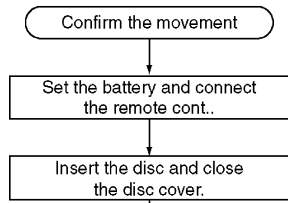
Note:

Refer to “12. Printed Circuit Board Diagram” for the test points.

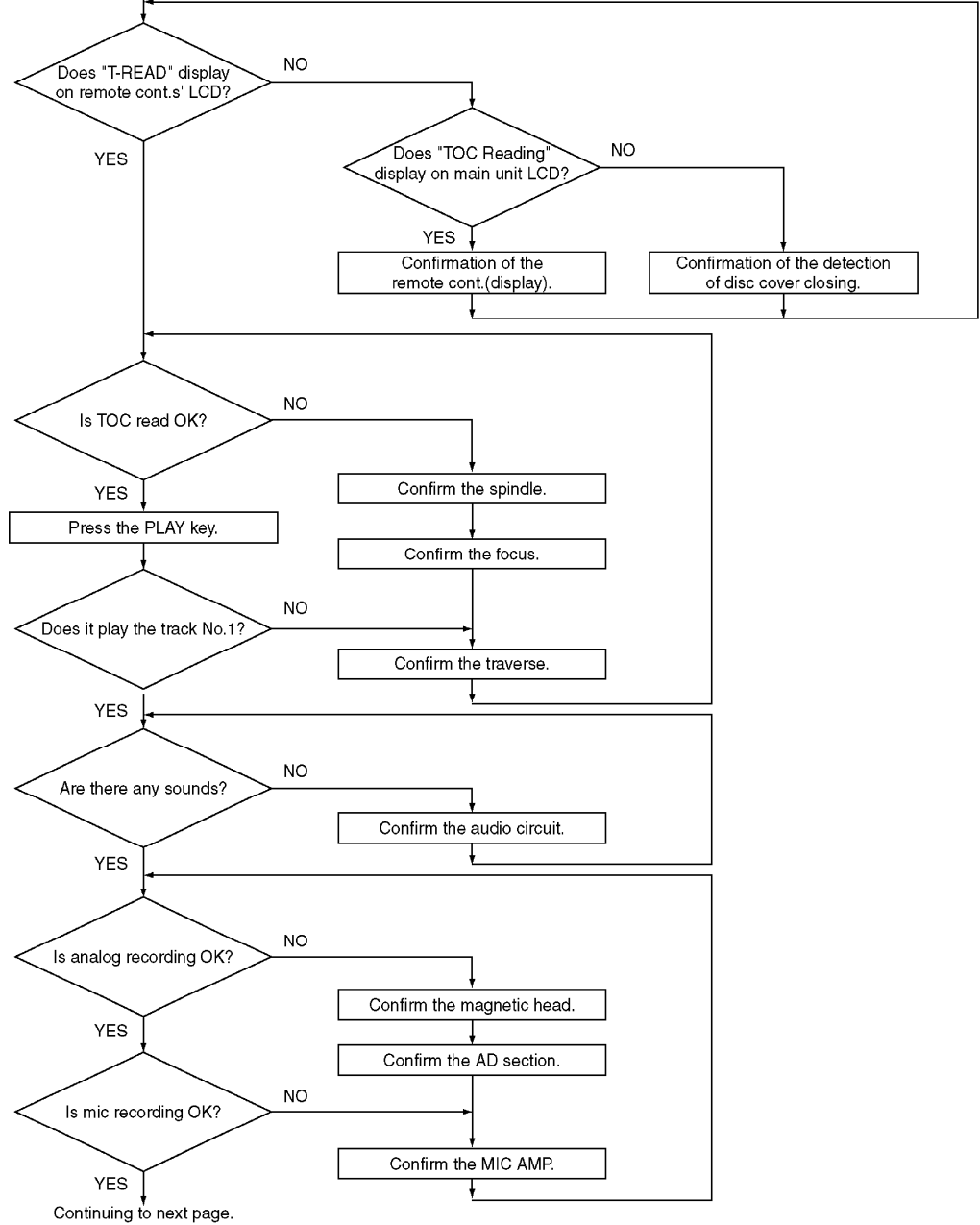
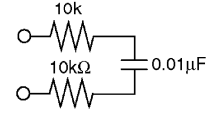
7. Troubleshooting Guide

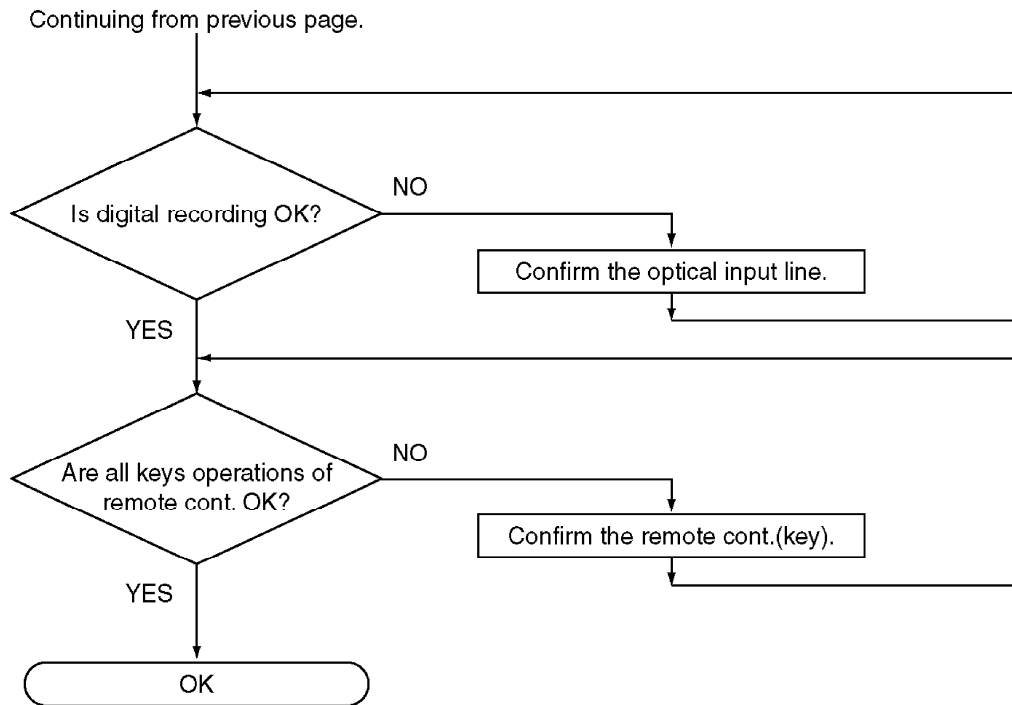
7.1. Overall Flow Chart

7.1.1. Confirmation of main unit and remote control

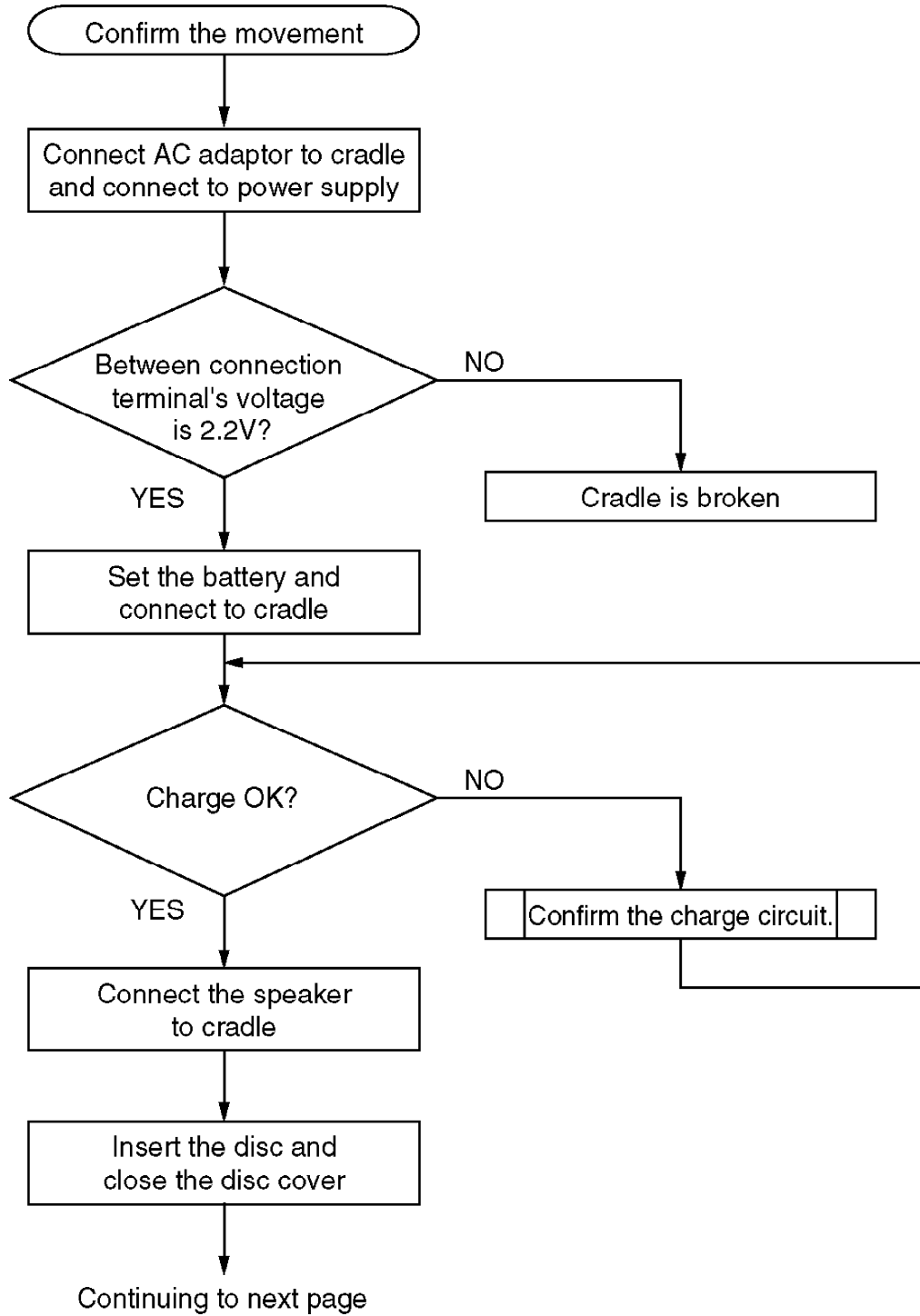


Note) We mentioned "※Filter" beside the waveform about the points for necessary the filter when you check the waveforms. Check it with setting the band width of the meter about 5~10kHz, or connecting the filter shown below.

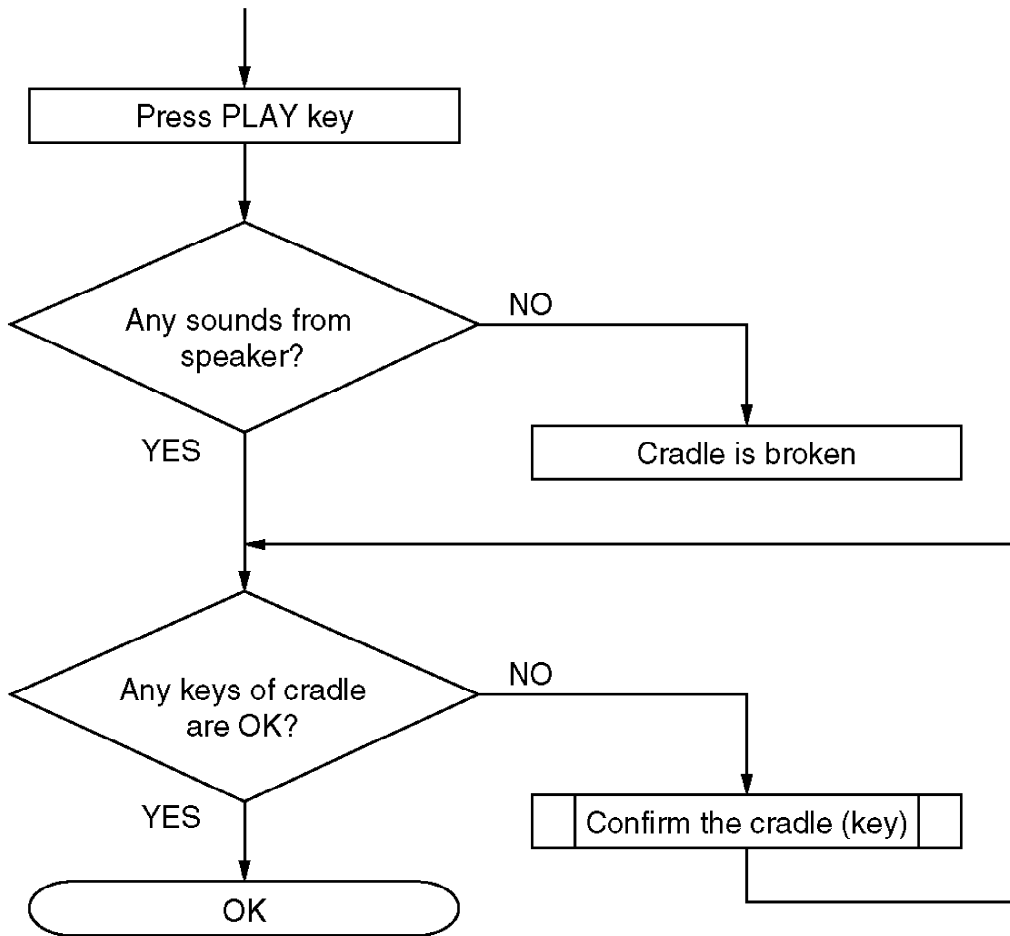




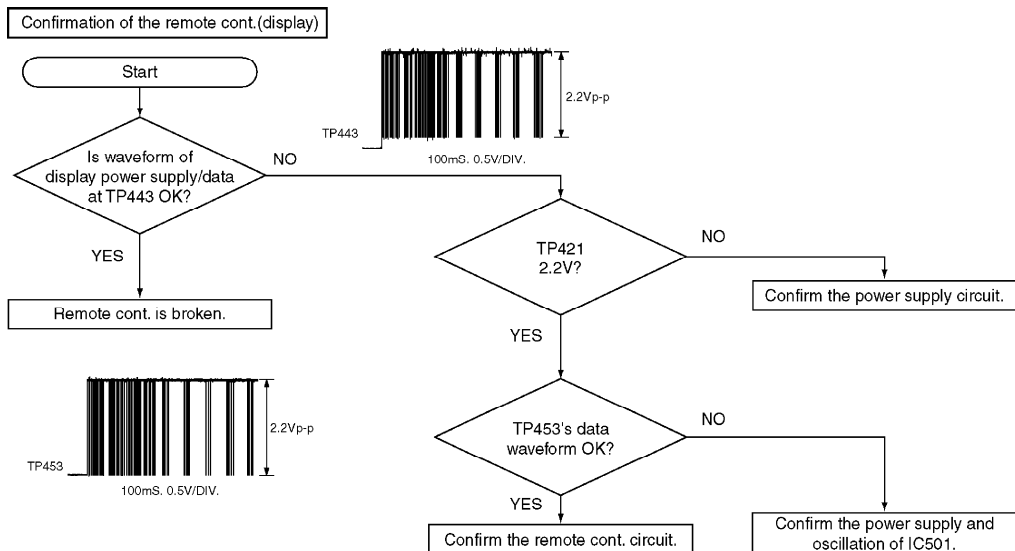
7.1.2. Confirmation of main unit and cradle



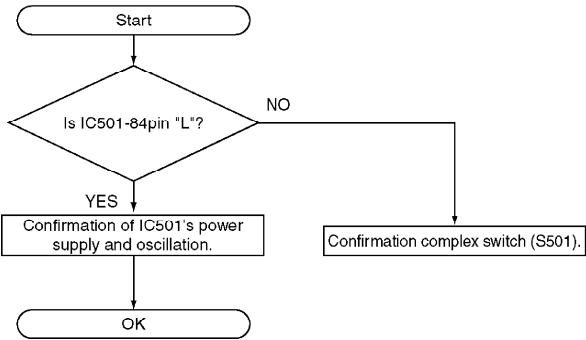
Continuing from previous page



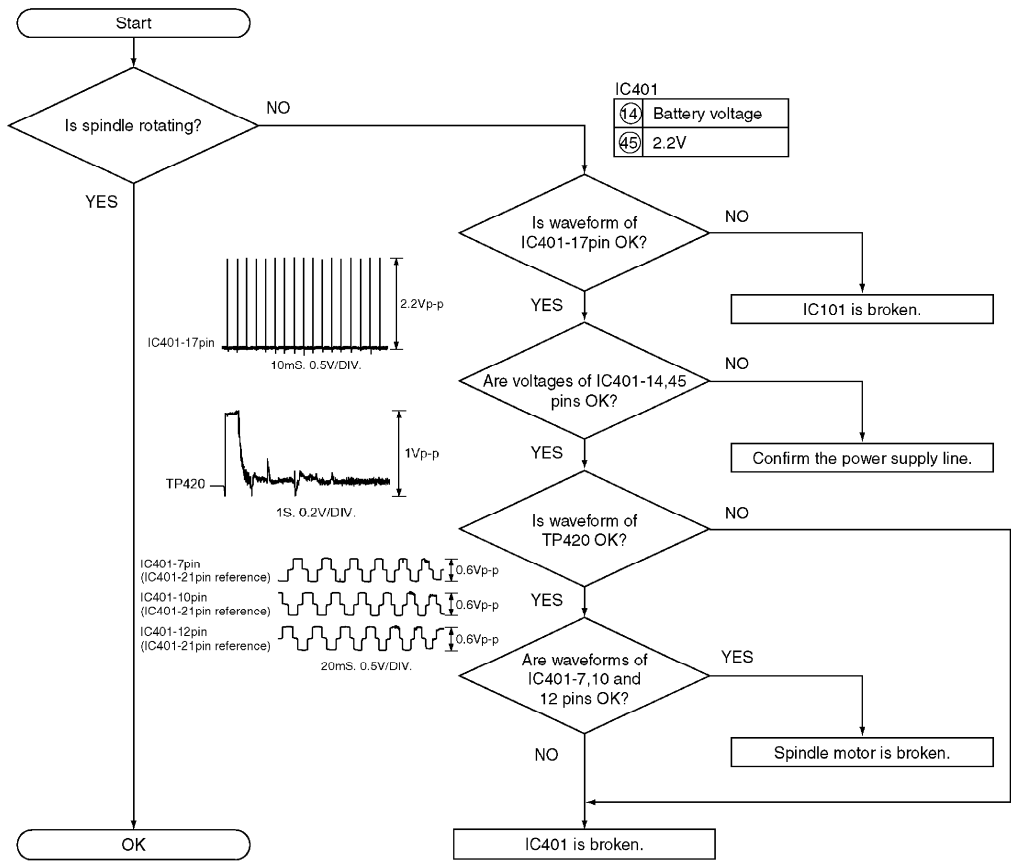
7.2. Flow Chat of Each Part

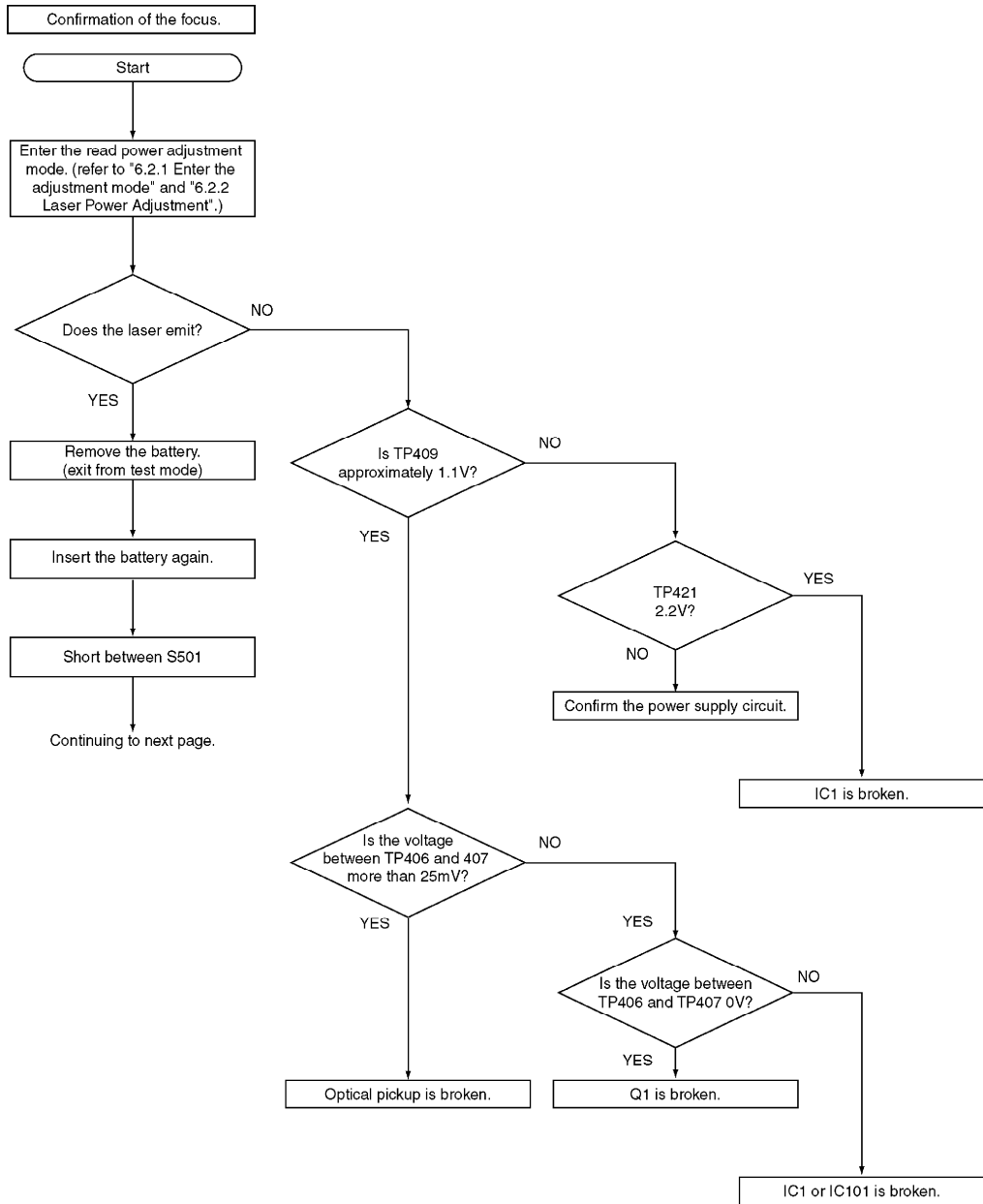


Confirmation of the detection of the disc cover closing.

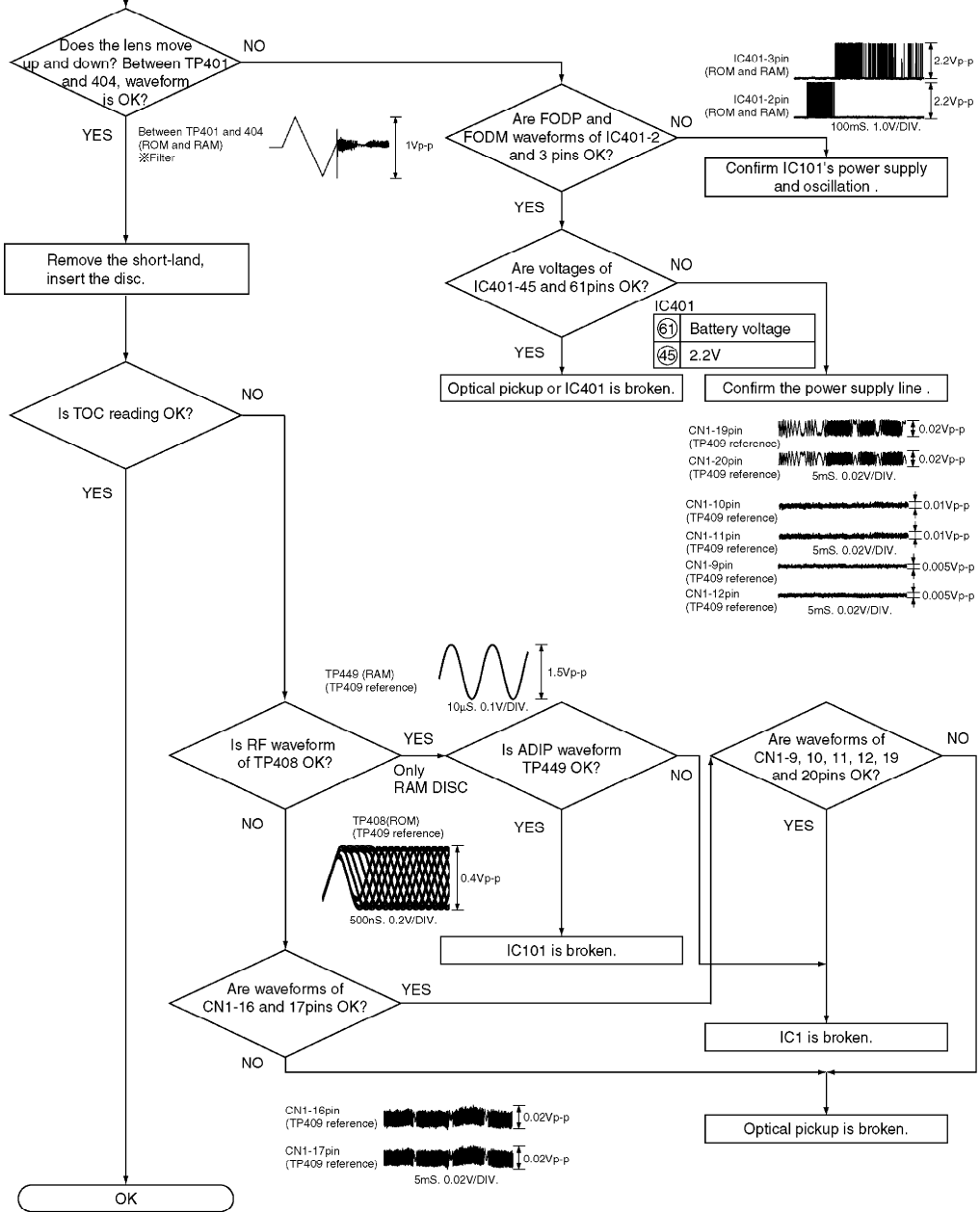


Confirmation of spindle.

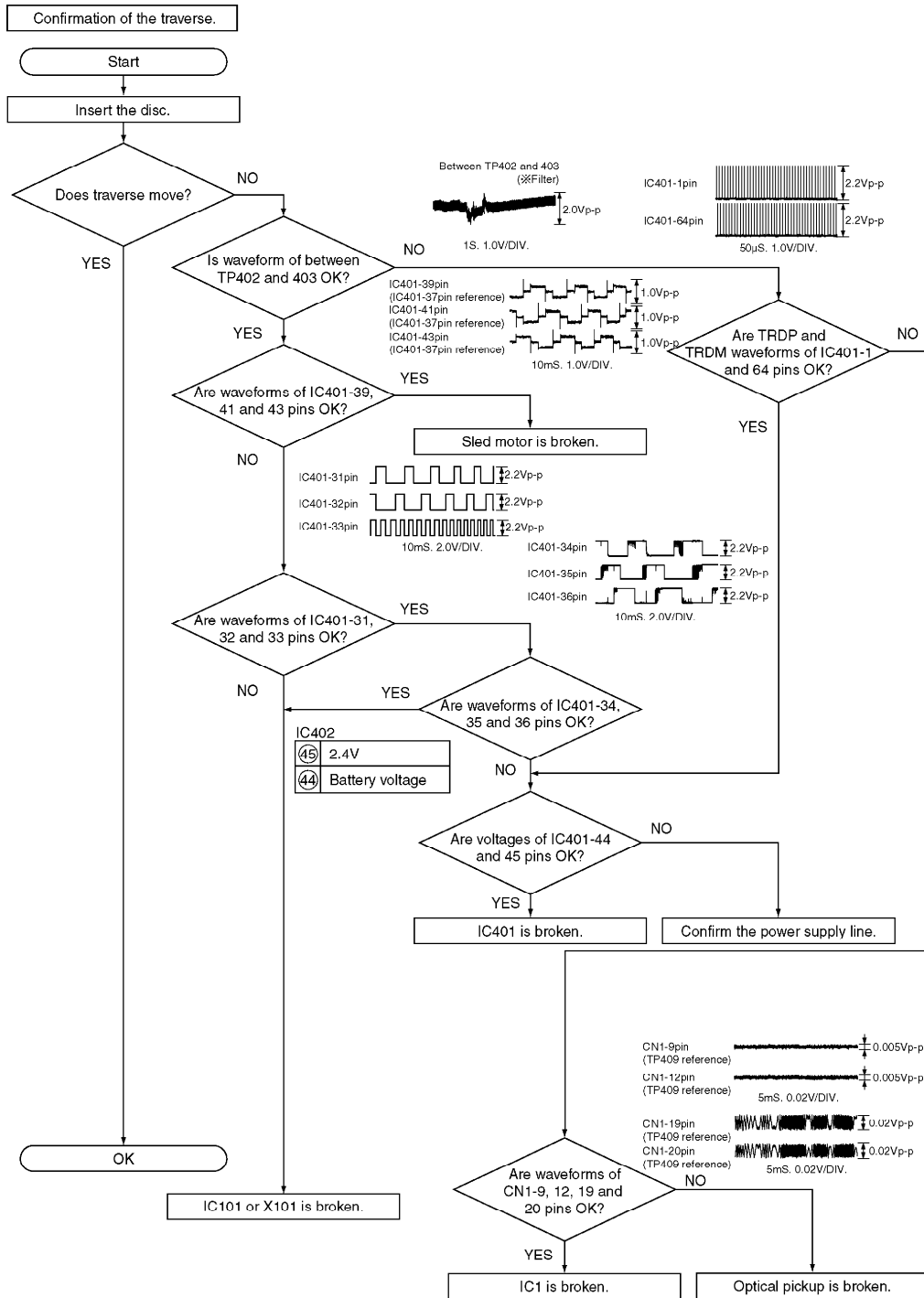




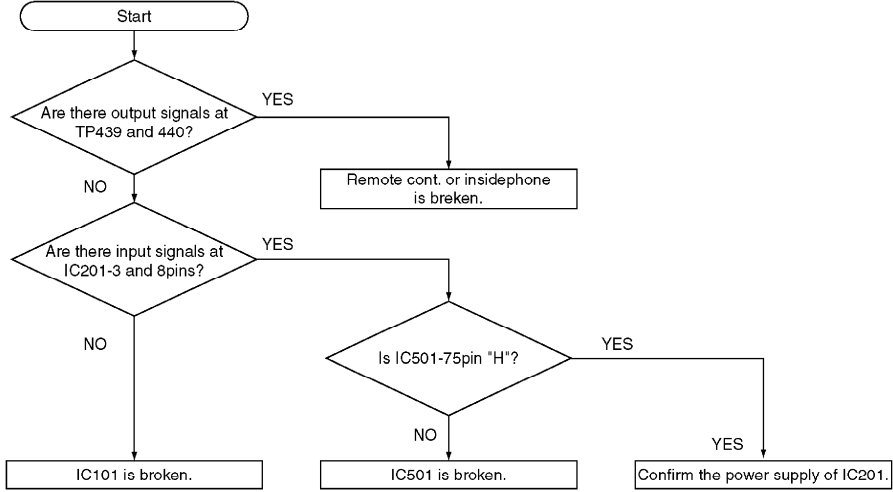
Continuing from previous page.



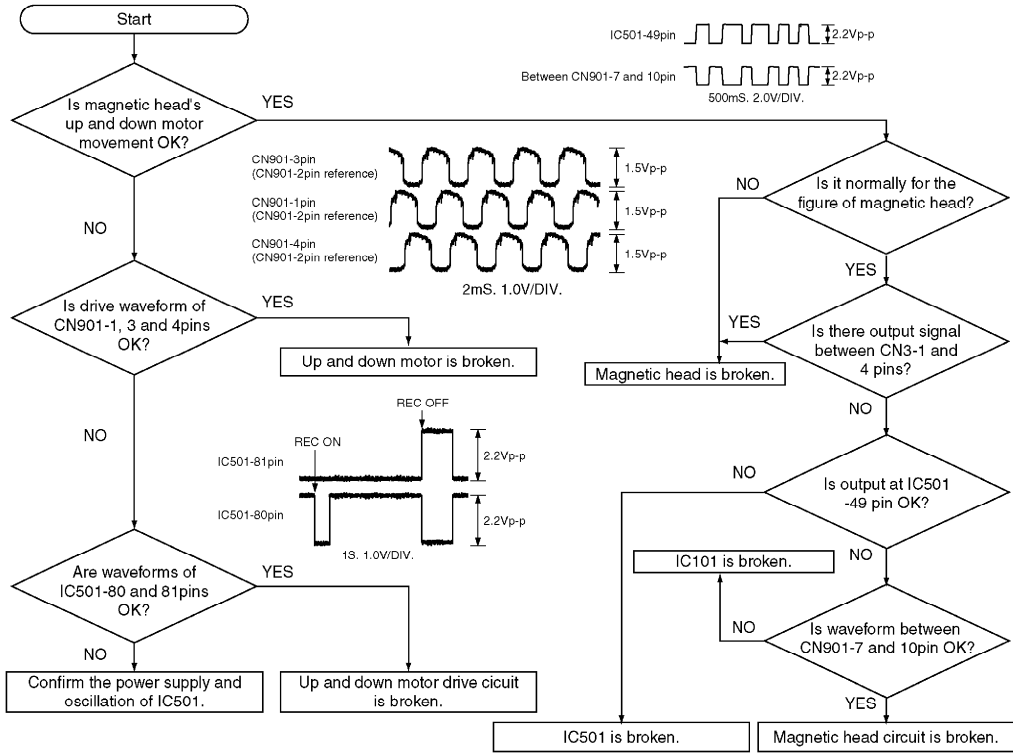
※) When you confirm RF waveform, perform "EFM jitter measurement" in "Adjustment mode" (refer to "6.Measurements and Adjustments"). And you'll be able to observe the continuous waveforms.

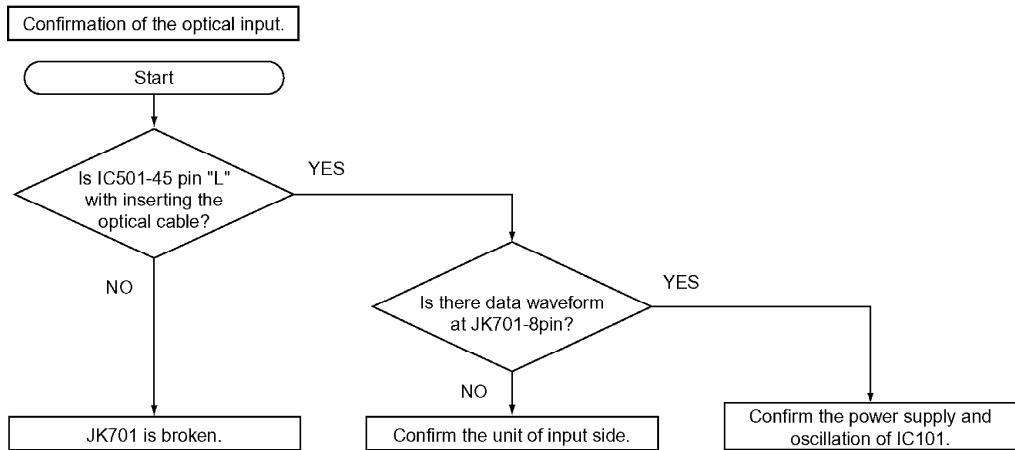
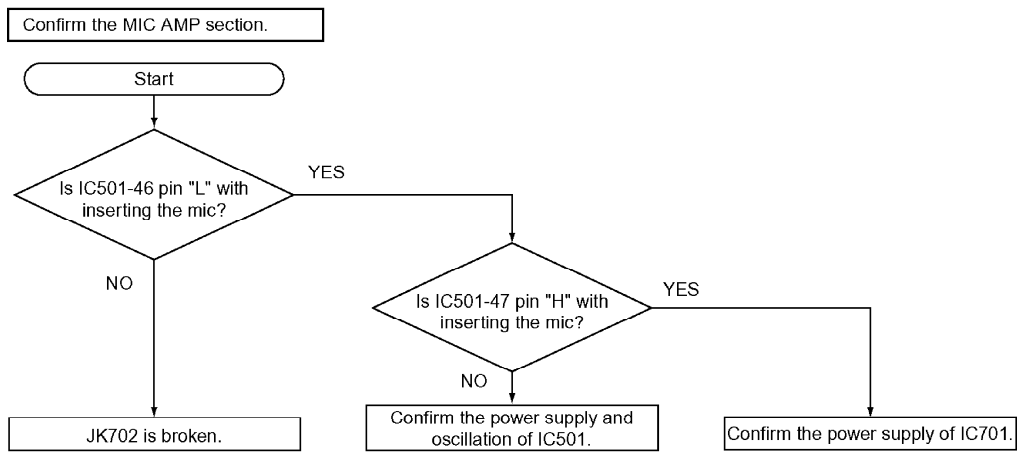
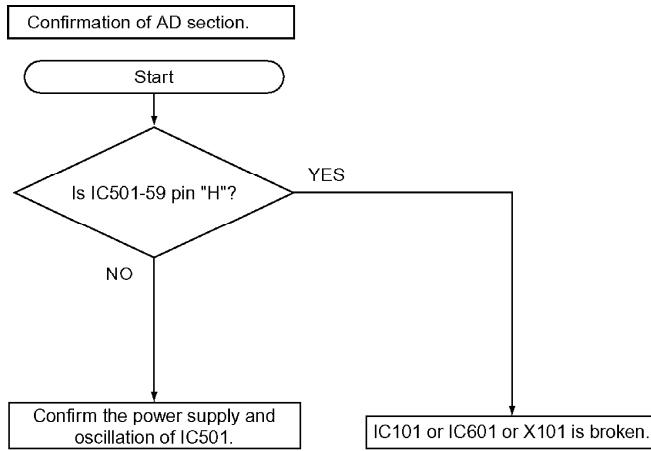


Confirmation of audio circuit.

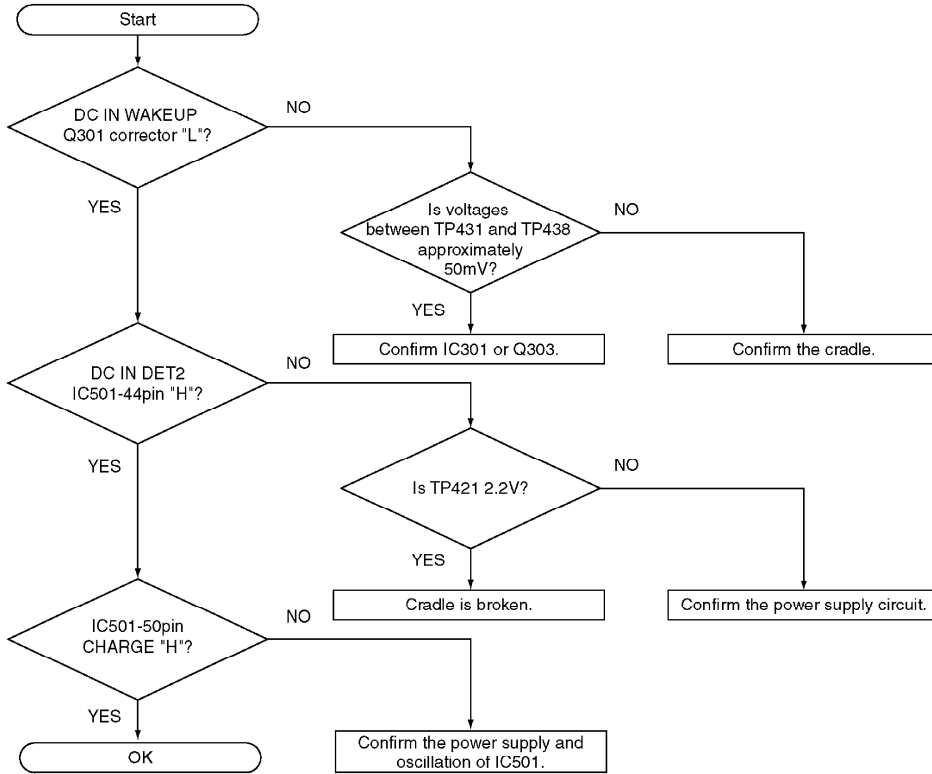


Confirmation of the magnetic head.



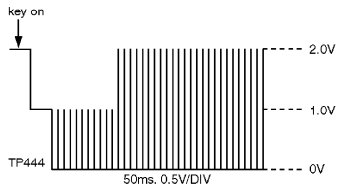


Confirmation of the recharging circuit.



Confirmation of remote cont. (key)

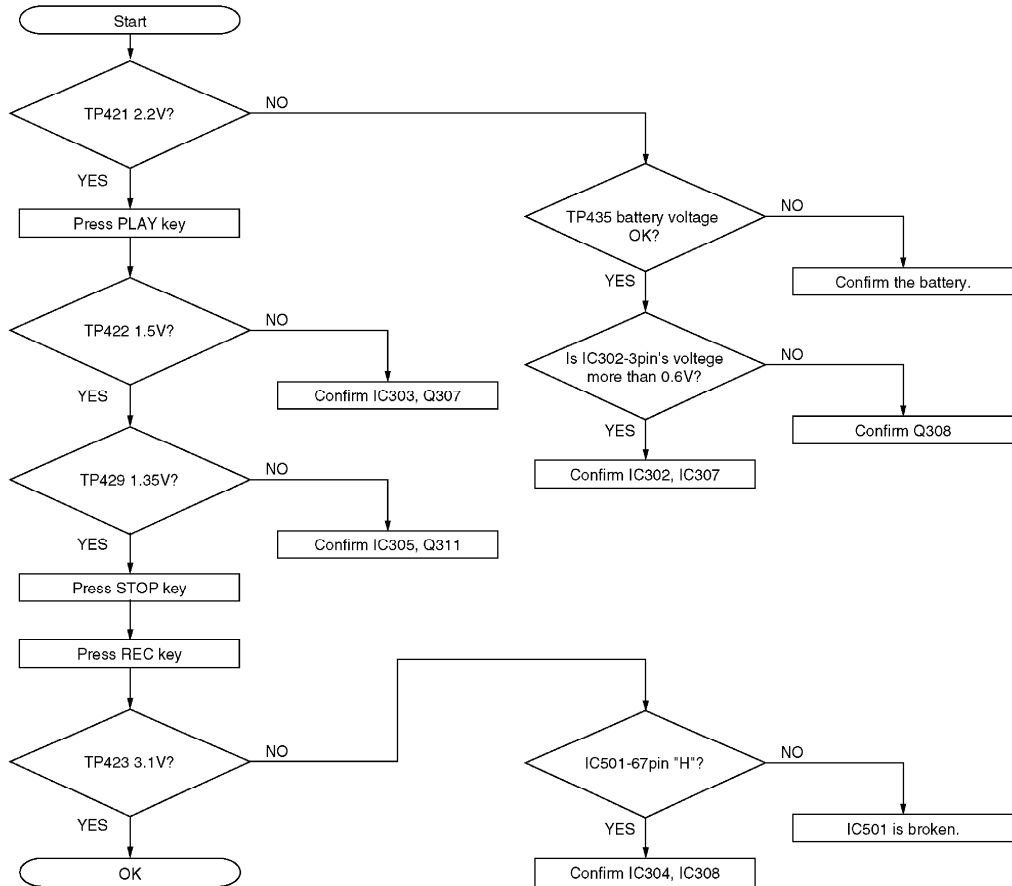
o Confirm the waveform at TP444 and the voltage when the keys are pressed.



MAIN	BOUNDARY VOLTAGE(V)
PLAY/STOP	0.2
VOLUME+	0.4
VOLUME-	0.6
EQ MODE/TRACK MARK	0.8
PLAY MODE	1.0
F SKIP	1.2

MAIN	BOUNDARY VOLTAGE(V)
DISPLAY/LIGHT	1.4
R SKIP	1.6
KEY-OFF	1.8
HOLD	2.0
WITHOUT REMOTE CONT.	2.2

Confirmation of power supply circuit.



Confirmation of cradle (key)

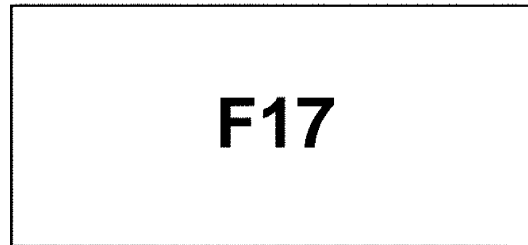
Cradle key	Measurement point	Voltage
EDIT	IC501 98Pin	0V
VOL+	IC501 97Pin	0V
VOL-	IC501 97Pin	0.22V
DELETE	IC501 97Pin	0.44V
ENTER	IC501 97Pin	0.66V
SPACE	IC501 97Pin	0.88V
CHARA	IC501 97Pin	1.1V
1	IC501 96Pin	0V
2	IC501 96Pin	0.22V

Cradle key	Measurement point	Voltage
3	IC501 96Pin	0.44V
4	IC501 96Pin	0.66V
5	IC501 96Pin	0.88V
6	IC501 96Pin	1.1V
7	IC501 96Pin	1.32V
8	IC501 96Pin	1.54V
9	IC501 96Pin	1.76V
0	IC501 96Pin	1.98V

8. Display of Self-Diagnostic Function

This model is equipped with a self-diagnosis function and shows, when necessary, the following indication in the LCD section of the set.

(LCD display)



“F17”---This indication appears when the Down switch fails to turn ON since the magnetic head fails to move up/down normally (Due to trouble of the magnetic head or trouble of the magnetic head up/down motor) or the magnetic head P.C.B. is out of position or a foreign matter has mixed in or for some other reason.

In such a case, check the peripheral parts of the magnetic head, repair or replace defective parts with normal ones.

9. Caution for Replacing EEPROM IC (IC502) and System Control IC (IC501)

Please be sure to perform “Laser power adjustment”, “Off-set automatic adjustment”, “Playback -only disc auto-adjustment” and “Magneto-optical disc auto-adjustment” after exchanging either EEPROM IC (IC502) or the system control IC (IC501). (Please refer to “6. Measurements and Adjustment” about the adjustment method)

10. Schematic Diagram Notes

10.1. Schematic Diagram Notes

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

Notes:

- : Magnetic head up switch (M.HEAD UP)
S1
- : PROTECT det., OP/ CL switch
S501
- : Play / record / pause switch (▶ / ||)
S801
- : Recording pause / LP recording switch (REC
S802 / LP MODE)
- : Stop / operation off switch (■OPR OFF)
S803
- : Forward skip switch (▶▶)
S804
- : Reverse skip switch (◀◀)
S805
- : Volume + switch (VOL+)
S806
- : Volume - switch (VOL-)
S807

● : Hold switch in “OFF” position. (HOLD)
S806


- 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: MD STOP

(): MD PLAY

< >: MD REC

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

: Playback signal line

: Recording signal “digital” line

: Recording signal “analog” line

: Mic signal line

10.2. Type Illustration of IC's, Transistors and Diodes

11. Schematic Diagram

12. Printed Circuit Board Diagram

13. Block Diagram

14. Wiring Connection Diagram

15. Terminal Function of IC's

15.1. IC1 (AN22010A-VF) : RF AMP

Pin No.	Mark	I/O Division	Function
1	LDO	O	Laser amp output terminal
2	LD IN	I	Laser amp reverse input terminal
3	APCPD	I	Photo diode light quantity det. input terminal
4	APC REF	I	APC amp reference voltage input terminal
5	ARFO	O	RF amp. output terminal
6	NC	—	Not used, open
7	EQ IN	I	EQ input terminal
8	CRF AGC	I	RFAGC capacitor connection input terminal (Connected to GND through capacitor)
9	OUT RF	O	EFM signal output terminal
10	NC	—	Not used, open
11	PEAK	O	EFM bright side det. output terminal
12	GND	—	GND terminal
13	BOTM	O	EFM dark side det. output terminal
14	CEA	I	3T envelope det. capacitor connection terminal (Connected to power supply through capacitor)
15	MON3T	O	AS/3TMON signal output terminal
16	CC	O	C signal dark side det. / amplifier output terminal
17	DD	O	D signal dark side det. / amplifier output terminal
18	Vcc	I	Power supply terminal (+3V)
19	BB	O	B signal I/V converter output terminal
20	AA	O	A signal I/V converter output terminal

Pin No.	Mark	I/O Division	Function
21	FF2	O	F2 signal I/V converter output terminal
22	FF1	O	F1 signal I/V converter output terminal
23,24	NC	—	Not used, open
25	ADIP	O	ADIP signal output terminal
26	NC	—	Not used, open
27	NREC	I	REC/PLAY select signal input terminal
28	RFSWHL	I	Reflect H/L select signal input terminal
29	RFSWPG	I	Pit / group select signal input terminal
30	GND	—	GND terminal
31	NC	—	Not used, open
32	MONIOFF	I	3TMON circuit control signal input terminal
33	CLV2	I	ADIP BPF select signal input terminal
34	LDON	I	ACP circuit control signal input terminal
35	NRFSTBY	I	Standby control signal input terminal
36	TEMP	O	Temperature sensor amp output terminal
37	TEMP IN	I	Temperature sensor amp input terminal
38	F1	I	F1 signal input terminal
39	F2	I	F2 signal input terminal
40	A	I	Main beam A signal input terminal
41	B	I	Main beam B signal input terminal
42	VREF	O	Reference voltage output terminal
43	RF2	I	RF2 signal input terminal
44	RF1	I	RF1 signal input terminal
45	CENVD	I	D signal det. capacitor input terminal (Not used, open)
46	CENVC	I	C signal detection capacitor input terminal (Not used, open)

Pin No.	Mark	I/O Division	Function
47	D	I	Main beam D signal input terminal
48	C	I	Main beam C signal input terminal

15.2. IC101 (M66621BSG) : ATRAC ENCORDER/DECORDER, SERVO SIGNAL PROCESSOR

Pin No.	Mark	I/O Division	Function
1	TS0	I	Test input terminal (Not used, connected to GND)
2	APCD	O	Laser power setting PWM output terminal
3	RFSWPG	O	Pit / group setting signal output terminal
4	RFSWHL	O	High / low reflection setting signal output terminal
5	CLV2	O	High speed select signal output terminal
6	REFM	O	EFM signal output terminal
7	SPDM	O	Spindle (-) drive signal output terminal
8	SPDP	O	Spindle (+) drive signal output terminal
9	FODM	O	Focus (-) drive signal output terminal
10	FODP	O	Focus (+) drive signal output terminal
11	TRDM	O	Tracking (-) drive signal output terminal
12	TRDP	O	Tracking (+) drive signal output terminal
13	DVDD0	—	Power supply input terminal (For digital circuit)
14	LDON	O	LD lighting control signal output terminal
15	TVDM/ STPO0	O	Traverse (-) drive signal / stepper drive signal 0 output terminal

Pin No.	Mark	I/O Division	Function
16	TVDP/ STPO1	O	Traverse (+) drive signal / stepper drive signal 1 output terminal
17	SBCK/ STPO2	O	Sub code Q clock for resistor / stepper drive signal 2 output terminal
18	SUBC/ STPI0	I	Sub code Q / stepper status 0 input terminal
19	BLKCK/ STPI1	I	Sub code block clock signal / stepper status 1 input terminal
20	NCLDCK / STPI2	I	Sub code flame clock signal / stepper status 2 input terminal
21	NREC	O	REC / PLAY select signal output terminal
22	DRVSEL	I	Driver mode select input terminal (Connected to GND)
23	DATA/FG	I	CD data / FG input terminal
24	BCK	I	CD bit clock input terminal
25	LRCK	I	CD word clock input terminal
26	MONI4	O	External ADC / DAC clock output terminal (384FS)
27	SDAR	I	Audio data input terminal
28	SDAP	O	Audio data output terminal (Not used, open)
29	SWS	O	Word clock output terminal
30	SCL	O	Bit clock output terminal
31	RX2	I	Digital audio interface 2 input terminal (Not used, open)
32	RX1	I	Digital audio interface 1 input terminal
33	TX	O	Digital audio interface output terminal (Not used, open)
34	DVDD1	—	Power supply terminal
35	DVSS1	—	GND terminal
36	SGSYNC	O	Frame synchronous signal output terminal
37	MDISY	O	Leader synchronous signal output terminal

Pin No.	Mark	I/O Division	Function
38	SCTSY	O	ADIP synchronous noise output terminal
39	SSDR	O	System control read data output terminal
40	SSDW	I	System control write data input terminal
41	SSCK	I	System sift clock signal input terminal
42	SELAD	I	System control address signal select input terminal
43	MONI1	O	Monitor 1 output terminal (Not used, open)
44	MONI2	O	Monitor 2 output terminal (Not used, open)
45	MONI3	O	Monitor 3 output terminal (Not used, open)
46	NRST	I	Hardware reset signal input terminal
47	PWMVSS	—	GND terminal
48	ADACR	O	Audio Rch output terminal
49	ADACL	O	Audio Lch output terminal
50	PWMVDD	—	Power supply terminal
51	AVSS0	—	GND terminal
52	PEAK	I	Servo A/D converter input terminal
53	BOTM	I	Servo A/D converter input terminal
54	OSC	I	Servo A/D converter input terminal
55	MON3T	I	Servo A/D converter input terminal
56	VREF1	I	Reference voltage input terminal
57	FF2	I	Servo A/D converter input terminal
58	FF1	I	Servo A/D converter input terminal
59	AVDD0	—	Power supply terminal
60	DD	I	Servo A/D converter input terminal
61	CC	I	Servo A/D converter input terminal

Pin No.	Mark	I/O Division	Function
62	BB	I	Servo A/D converter input terminal
63	AA	I	Servo A/D converter input terminal
64	AVSS1	—	GND terminal
65	PEFMS	I	EFM signal input terminal
66	PEFM1	O	EFM data slice roop filter 1 output terminal
67	EFMFIL	O	EFM data slice roop filter 2 output terminal
68	EFMPLL	O	Filter for EFMPLL output terminal
69	EFMIREF	I	Reference voltege for EFMPLL setting input terminal
70	ADIP	I	ADIP signal input terminal
71	AVDD1	—	Power supply terminal
72	MONI0	O	Monitor 0 output terminal (Not used, open)
73	RAD11	O	Address for DRAM 11 output terminal (Not used, open)
74	RAD10	O	Address for DRAM 10 output terminal
75	RAD9	O	Address for DRAM 9 output terminal
76	RAD8	O	Address for DRAM 8 output terminal
77	RAD7	O	Address for DRAM 7 output terminal
78	RAD6	O	Address for DRAM 6 output terminal
79	DVSS2	—	Connected to GND
80	RAD5	O	Address for DRAM 5 output terminal
81	RAD4	O	Address for DRAM 4 output terminal
82	RAD3	O	Address for DRAM 3 output terminal
83	RAD2	O	Address for DRAM 2 output terminal
84	RAD1	O	Address for DRAM 1 output terminal

Pin No.	Mark	I/O Division	Function
85	DVDD2	I	Power supply input terminal
86	RAD0	O	Address for DRAM 0 output terminal
87	RDT3	I/O	Data for DRAM 3 input / output terminal
88	IVDD1	—	Power supply for I/O pad
89	RDT2	I/O	Data for DRAM 2 input / output terminal
90	RDT1	I/O	Data for DRAM 1 input / output terminal
91	RDT0	I/O	Data for DRAM 0 input / output terminal
92	NRAS	O	Load address strobe for DRAM signal output terminal
93	NCAS	O	Calam address strobe for DRAM signal output terminal
94	NWE	O	Write enable signal for DRAM output terminal
95	TS2	I	Test input terminal (Not used, connected to GND)
96	DVSS0	—	GND terminal
97	XO	O	Crystal oscillator output terminal (F=16.9344MHz)
98	XI	I	Crystal oscillator input terminal (F=16.9344MHz)
99	IVDD0	—	Power supply for I/O pad
100	TS1	I	Test input terminal (Not used, connected to GND)

15.3. IC401 (C0GBZ000020) : FOCUS/TRACKING COIL, TRAVERSE MOTOR DRIVE, SPINDLE MOTOR DRIVE, ROTARY DETECTOR

Pin No.	Mark	I/O Division	Function
1	IN 1R	I	H bridge 1 reverse input terminal
2	IN 2F	I	H bridge 2 forward input terminal
3	IN 2R	I	H bridge 2 reverse input terminal
4	STALL	I	Standby input terminal
5	STHB	I	H1, H2 bridge mute input terminal
6	SP VM1	I	Half bridge 1 input terminal
7	SP U OUT	O	Spindle motor coil (U) output terminal
8	SP PG1	—	GND terminal
9	NC	—	Not used, open
10	SP V OUT	O	Spindle motor coil (V) output terminal
11	SP VM2	I	Half bridge input terminal
12	SP W OUT	O	Spindle motor coil (W) output terminal
13	SP PG2	—	GND terminal
14	PWVM	I	Power supply terminal
15	PWOUT	O	Half bridge 1 output terminal (Not used, open)
16	PWPG	—	GND terminal
17	PWIN1	—	Half bridge 1 input terminal
18	SP U IN	I	Roter position detect comparater (U) input terminal
19	SP V IN	I	Roter position detect comparater (V) input terminal
20	SPWIN	I	Roter position detect comparater(W) input terminal
21	SPCOM	I	Spindle motor coil center input terminal
22	RIB	—	Connected to GND through resistor
23	CST	—	Connected to GND through capacitor
24	CSL1	I	Slope capacitor connection terminal

Pin No.	Mark	I/O Division	Function
25	CSL2	I	Slope capacitor connection terminal
26	FG	O	Speed pulse output terminal
27	BRK+	I	Brake comparater+ input terminal (Connected to power supply through resistor)
28	BRK-	I	Brake comparater- input terminal
29	ASGND	—	GND terminal
30	SGND	—	GND terminal
31	S1	I	Stepping decorder 1 input terminal
32	S2	I	Stepping decorder 2 input terminal
33	S3	I	Stepping decorder 3 input terminal
34	BEMFU	O	Step detect comparater (U) output terminal
35	BEMFV	O	Step detect comparater (V) output terminal
36	BEMFW	O	Step detect comparater (W) output terminal
37	SLCOM	I	Step motor coil center input terminal
38	SLPG2	—	GND terminal
39	SLWOUT	O	Stepping motor (W) output terminal
40	SLVM2	I	Power supply terminal
41	SLVOUT	O	Stepping motor (V) output terminal
42	SLPG1	O	Stepping motor (V) output terminal (Connected to GND)
43	SLUOUT	O	Stepping motor (U) output terminal
44	SLVM1	I	Power supply terminal
45	Vcc 2	I	Power supply terminal
46	Vcc 1	I	Power supply terminal
47	VG	O	Charge pump output terminal (Connected to GND through capacitor)

Pin No.	Mark	I/O Division	Function
48	C2M	—	Charge pump capacitor 2(-) connect terminal
49	C2P	—	Charge pump capacitor 2(+) connect terminal
50	C1M	—	Charge pump capacitor 1(-) connect terminal
51	C1P	—	Charge pump capacitor 1(+) connect terminal
52	EXTCLK	—	Not used, open
53	NC	—	Not used, open
54	H2 PG2	—	GND terminal
55	H2 R OUT	O	H bridge 2 reverse output terminal
56	H2 VM	I	Power supply terminal
57	H2 F OUT	O	H bridge 2 forward output terminal
58	H2 PG1	—	GND terminal
59	H1 PG2	—	GND terminal
60	H1 R OUT	O	H bridge 1 reverse output terminal
61	H1 VM	I	Power supply terminal
62	H1 F OUT	O	H bridge 1 forward output terminal
63	H1 PG1	—	GND terminal
64	IN 1F	I	H bridge 1 forward input terminal

15.4. IC501 (C2DBKJ000062) : SYSTEM CONTROL

Pin No.	Mark	I/O Division	Function
1	AVREFO	I	Reference voltage input terminal for A/V converter
2	AVDD	—	Power supply terminal for A/V converter (+2.2V)
3	AVSS	—	Connected to GND
4	P80/ ANO0	—	Connected to GND
5	P80/ ANO1	—	Connected to GND
6	AVREF1	I	Reference voltage input terminal for D/A converter (Connected to GND)
7	NMI	—	Connected to GND
8	LINK RXD	I	LINK serial communication RXD input terminal
9	REM_DATA	O	Remote control LCD driver data output terminal
10	P32/ SCK1	—	Not used, open
11	VDD	—	Power supply terminal (+2.2V)
12	VSS	—	GND terminal
13	X1	I	Main clock input terminal (f=10.0MHz)
14	X2	O	Main clock output terminal (f=10.0MHz)
15	RESET	I	RESET input terminal
16	XT1	—	Sub clock input terminal (Not used, connected to GND)
17	XT2	—	Sub clock output terminal (Not used, open)
18	VSSBU	—	Not used, connected to GND
19	VDDBU	—	Power supply input terminal (+2.2V)
20	DEBUG1	O	Microcomputer debug terminal (Open)
21	DEBUG2	O	Microcomputer debug terminal (Open)
22	KEY_WAKEUP	I	Unit key WAKE UP signal input terminal

Pin No.	Mark	I/O Division	Function
23	REM_KEY_WAKEUP	I	Remote control key WAKE UP signal input terminal
24	DOCTOR	I	Doctor mode signal input terminal (Open)
25	M_REQ	O	NET MD microcomputer (IC1101) communication request signal output terminal (Not used, open)
26	M_RST	O	NET MD microcomputer (IC1101) communication reset signal output terminal (Not used, open)
27	M_CS	I	NET MD microcomputer (IC1101) communication chip select signal output terminal (Connected to GND through resistor)
28	SP_CNT	O	Cradle control signal output terminal
29	P99/A9/TXD1	—	Not used, open
30	SSDR	I	MSP/MDA I/F reading data input terminal
31	SSDW	O	MSP/MDA I/F writing data output terminal
32	SSCLK	O	MSP/MDA I/F clock output terminal
33	LSI_STAT	I	Test terminal (Open)
34	LCD_DATA	O	Unit LCD driver data output terminal
35	LCD_CK	O	Unit LCD driver clock output terminal
36	EVSS	—	GND terminal
37	EVDD	—	Power supply terminal (+2.2V)
38	SELAD	O	MSP/MDA I/F address select signal output terminal
39	LCD_CNT	O	Unit LCD power control output terminal (+2.2V)
40	LCD_STB	O	LCD driver strobe signal output terminal
41	PROTECT	I	Erase prevention switch input terminal (H : protect)

Pin No.	Mark	I/O Division	Function
42	HOLD_SW	I	HOLD switch input terminal (H : hold)
43	DCIN_DET	I	DC IN detection input terminal (H : DC IN)
44	DCIN_DET2	I	DC IN2 detection input terminal (H : DC IN2)
45	INSEL	I	Input select detection input terminal
46	MIC_DET	I	Mic input detection input terminal (L : Mic)
47	MIC/LINE	O	Mic/LINE select output terminal
48	MIC_SENS	O	Mic sensitivity select output terminal
49	EFMON	O	Magnetic head EFM drive control output terminal
50	CHARGE	O	Charge select output terminal (H : charge)
51	EL_ON	I/O	EL lighting control input/output terminal (L : lighting)
52	EE_P_CS	O	EEPROM (IC502) chip select output terminal
53	EE_P_CK	O	EEPROM (IC502) clock output terminal
54	EE_P_DATAO	O	EEPROM (IC502) data output terminal
55	EE_P_DATAI	I	EEPROM (IC502) data input terminal
56	AKM_CDTI	O	ADC/PGA I/F data output terminal
57	AKM_CSN	O	ADC/PGA I/F chip select output terminal
58	AKM_CCLK	O	ADC/PGA I/F clock output terminal
59	AKM_PDN	O	ADC/PGA I/F reset output terminal
60	USB_SELECT	O	USB connection select output terminal (Not used, open)
61	USB_CNT	O	USB connection power control output terminal (Not used, open)
62	IC	—	GND terminal

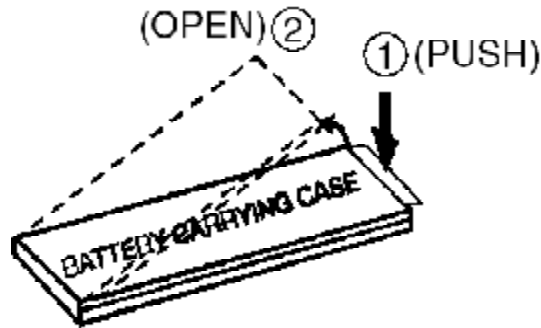
Pin No.	Mark	I/O Division	Function
63	EVSS	—	GND terminal
64	EVDD	—	Power supply terminal (+2.2V)
65	HFON1	O	HF module ON signal output terminal
66	MONIOFF	O	3T monitor OFF output terminal (H : OFF)
67	REC_CNT2	O	REC control output terminal 2
68	REC_CNT1	O	REC control output terminal 1
69	RF_CNT	O	RF power control terminal
70	PWR_CNT	O	Power control terminal
71	PC	O	4ch driver stand-by signal output terminal (L : stand-by)
72	STBY2	O	FD/TR coil power control output terminal
73	NRFSTBY	O	RF amp stand-by output terminal (L : stand-by)
74	MSPRST	O	MSP reset signal output terminal (L : reset)
75	MUTE_A	O	Analog mute A signal output terminal
76	USB_SELECT2	O	USB connection MD LSI power select terminal
77	M_DATA_I	I	NET MD I/F data input terminal (Connected to GND through resistor)
78	M_DATA_O	O	NET MD I/F data output terminal (Not used, open)
79	M_CLK_O	O	NET MD I/F clock output terminal (Not used, open)
80	LOAD0	O	Magnetic head moving control output terminal
81	LOAD1	O	Magnetic head moving direction control output terminal
82	MHEAD_UP	I	Magnetic head DOWN detection input terminal (L : DOWN)
83	BUZZER	O	Buzzer signal output terminal

Pin No.	Mark	I/O Division	Function
84	OPENSW	I	Disc cover open/close detection terminal (H : open)
85	WAKEUP	I	Microcomputer wake up signal input terminal
86	SCTSY	I	ADIP synchronize signal input terminal from IC101
87	CFSYNC	I	MDA synchronized signal input terminal from IC101
88	MDISY	I	Header synchronize signal input terminal from IC101
89	P711/ ANI11	—	Not used, connected to GND
90	P710/ ANI10	—	Not used, connected to GND
91	DCIN	I	DC IN connection terminal
92	USBIN	I	USB connection terminal
93	ONDO	I	Temperature sensor input terminal
94	BATT1	I	Battery voltage detection terminal 1
95	REM_KEY	I	Remote control key input terminal
96	P_KEY3	I	Key pat input terminal 3
97	P_KEY2	I	Key pat input terminal 2
98	P_KEY1	I	Key pat input terminal 1
99	H_KEY2	I	Unit key input terminal 2
100	H_KEY1	I	Unit key input terminal 1

16. Caution in Use of Rechargeable Battery Ass'y

- Take Rechargeable Battery Ass'y out of Battery Carrying Case and use it.
- Be sure to carry Rechargeable Battery Carrying Case. If not, it may either heat or ignite by shorting with a metal. (as shown in **Fig. 10**)

Fig. 10



17. Replacement Parts List

Notes:

*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 manufacture's specified parts shown in the parts list.

*Warning: This product uses a laser diode. Refer to caution statements.

***ACHTUNG:**Die lasereinheit nicht zerlegen.Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.

*Capacity values are in microfarads (μF) 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)

*The marking <RTL> indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, it will no longer be available.

*"<IA>"-"<IB>" marks in Remarks indicate languages of instruction manuals.

[<IA>: English,<IB>: Chinese]

*All parts are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
1	RHD14080	SCREW	1	
2	RDG0510	INTERMEDIATE GEAR	1	
3	RHD14078	SCREW	1	
4	RHW11011	WASHER	1	
5	RMC0437	SPRING	1	
6	BRL1A1CWD	LIFT MOTOR	1	
7	RDG0482-1	REDUCTION GEAR	1	
8	RHW06001	WASHER	1	
9	RMB0650	EJECT SPRING	1	
10	RML0586-3	LIFTER	1	
11	RML0587-3	LINK	1	
12	RMM0230-1	EJECT ROD A	1	
13	RXG0050	TRANSFER GEAR	1	
14	RXK0318-5	HOLDER UNIT	1	
15	RXM0071-1	EJECT ROD B	1	
16	RFKQMR220S	OPT MAGNETISM HEAD UNIT	1	📎
17	RXM0074-1	ARM	1	
19	RXJ0030	DRIVE SHAFT UNIT	1	
20	RJC99039-1	RECHARGE.BATT.TERMINAL(+)	1	
21	RJR0220	BATTERY SHAFT	1	
22	RHD14104-X	SCREW	5	
23	RMR1476-X	PWB SPACER	1	
24	L5AC AFC00003	LCD	1	
25	RGP0950-Q	LCD PANEL	1	
26	RGU2135-S2	OPERAITON BUTTON	1	
27	RHQ0083-S	SCREW	5	
28	RJB2640A	OPERATION FPC	1	
29	RXM0077	LINK UNIT	1	
30	RMZ0644	INSULATION SHEET	1	
32	RYF0647A-A	DISC COVER ASS'Y	1	(GHA)
32	RYF0647A-S	DISC COVER ASS'Y	1	(GHS)
32	RYF0647B-A	DISC COVER ASS'Y	1	(GKA)
32	RYF0647B-R	DISC COVER ASS'Y	1	(GKR)
32	RYF0647B-S	DISC COVER ASS'Y	1	(GKS)
32-1	RGV0286-S	HOLD KNOB	1	
32-2	RGV0303-S	REC KNOB	1	
32-3	RMA1587	REC LEVER	1	
32-4	RMQ1145	REC KNOB SHEET	1	
33	K0RE00300010	MEMBRANE SW	1	
34	RGK1545-S1	INTERMEDIATE CABINET	1	
35	RGU2137-S	BUTTON,EQ/MODE/MARK	1	
36	RGV0304-S	OPEN KNOB	1	
37	RHQ0083-S	SCREW	1	
38	RMQ1144	OPEN KNOB SHEET	1	
39	RXQ0921-1	LOCK UNIT	1	
39-1	RMB0725-1	LOCK SPRING	1	
40	XQN14+B2FC	SCREW	1	
41	RYK1245B-S	CABINET ASS'Y	1	(GHA)(GHS)
41	RYK1245C-S	CABINET ASS'Y	1	(GKA)(GKR)(GKS)
42	RHD14094-S	SCREW	6	
43	RKK0165-S	RECHARGEABLE BATT.COVER	1	
44	RXK0383	TRAVERSE CHASSIS ASS'Y	1	
44-1	BRL1A1CWF	TRAVERSE MOTOR	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
44-2	K0L2LF000002	SWITCH(S501)	1	
44-3	RHD14082	SCREW	1	
44-4	RMA1364-2	HOLDER ANGLE	1	
44-5	RMX0156-1	STOPPER RUBBER	2	
44-6	XQN14+B4FC	SCREW	1	
44-7	XQN14+C12FZ	SCREW	2	
45	XQN14+A12FC	SCREW	2	
46	RMZ0670	SPACER	1	
A1	RQT6862-B	INSTRUCTION MANUAL	1	<IA>
A1	RQT6864-K	INSTRUCTION MANUAL	1	(GH)<IB>
A1	RQT6863-K	INSTRUCTION MANUAL	1	(GK)<IB>
A2	L0BAB0000174	STEREO EARPHONES	1	
A3	N2QCBD000012	WIRED REMOTE CONTROL	1	
A3-1	RFKY0003	PANEL ASS'Y	1	
A3-2	RFKY0004	CLIP ASS'Y	1	
A4	RFKFFAZ01EM1	RECHARGEABLE BATT.ASS'Y	1	
A4-1	RFA0475-Q	RECHARGEABLE BATT.CASE	1	
A5	RFA1537-S2	EXTERNAL BATTERY CASE	1	
A6	RFKAJMR250-S	SPEAKER ASS'Y	2	(GHA)(GHS)
A6	RFKAMR230GKS	SPEAKER ASS'Y	2	(GKA)(GKR)(GKS)
A7	RFC0069-H	CARRYING CASE	1	
A8	RFE0114A	CLADRE	1	(GHA)(GHS)
A8	RFE0114B	CLADRE	1	(GKA)(GKR)(GKS)
A9	RFEA413H-W	AC ADAPTER	1	G4C4CAD00002 (GH) 
A9	RFEA413T-1W	AC ADAPTER	1	G4C4CAJ00010 (GK) 
A11	K2KA39B00001	CONNECTION CABLE	1	
A12	K7CXJCA00004	OPTICAL FIBER CABLE	1	
A13	L0BAE0000026	CLIP TYPE HEADPHONES	1	
A13-1	RFX3558	EAR PAD	2	
A14	RQCB1205-1	SERVICE CENTER LIST	1	(GKA)(GKR)(GKS)
C1	F1G1H221A416	50V 220P	1	
C2	ECUVNA154KBV	10V 0.15U	1	F1H1A154A028
C3	ECUVNC104ZFN	16V 0.1U	1	F1J1C104A081
C4	F1G1E472A059	25V 4700P	1	
C5	ECJ1VB0J105K	6.3V 1U	1	
C20	F5A422240001	4V 0.22U	1	
C30	F1J0J4750016	6.3V 4.7U	1	
C34	F3E0G106A001	4V 10U	1	
C35	F5A421040002	4V 0.1U	1	
C50	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C51	ECJ0EB1H102K	50V 1000P	1	
C52	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C53	ECUVNJ474KBV	6.3V 0.47U	1	F1H0J474A002
C101	F3E0G106A001	4V 10U	1	
C102	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C103	F3E0G106A001	4V 10U	1	
C104	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C105	F3E0G106A001	4V 10U	1	
C106	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C107	F3G0G2270001	4V 220U	1	
C109,10	F1G1H100A420	50V 10P	2	
C111	ECUE1H470JCQ	50V 47P	1	F1G1H470A422

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
C113	F1G1C103A044	16V 0.01U	1	
C120	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C121	ECUE1C223KBQ	16V 0.022U	1	F1G1C223A044
C122	F1G0J224A004	6.3V 0.22U	1	
C123	ECUE1E681KBQ	25V 680P	1	
C130	F1G1E472A059	25V 4700P	1	
C140	F1G1C103A044	16V 0.01U	1	
C201	F1J0J4750016	6.3V 4.7U	1	
C202	ECUVNJ334KBV	6.3V 0.33U	1	F1H0J334A002
C204,05	F3E0G106A001	4V 10U	2	
C206	F5A421040002	4V 0.1U	1	
C207	F1G1H331A416	50V 330P	1	
C211	F5A421050001	4V 1U	1	
C212	F5A421020001	4V 1000P	1	
C213,14	ECJ1VB0J105K	6.3V 1U	2	
C215,16	F3G0G2270001	4V 220U	2	
C220	ECJ0EB1H101K	50V 100P	1	
C301	RCST0EC397RE	2.5V 390U	1	F3H0J397A012
C302	RCST0JX107RG	6.3V 100U	1	F3G0J1070002
C303	F3Z0G107A003	4V 100U	1	
C304	RCST0JX107RG	6.3V 100U	1	F3G0J1070002
C305	ECJ1VB0J105K	6.3V 1U	1	
C306	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C307	F1J0J106A013	6.3V 10U	1	
C308	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C310	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C312	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C313	F1G1C103A044	16V 0.01U	1	
C316	F1J0J106A013	6.3V 10U	1	
C317	F1J0J4750016	6.3V 4.7U	1	
C318	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C401	F1J0J4750016	6.3V 4.7U	1	
C402	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C403	ECJ1VB0J105K	6.3V 1U	1	
C404	F5A421040002	4V 0.1U	1	
C411	F3E0G2260001	4V 22U	1	
C412-14	F1G1H222A416	50V 2200P	3	
C415-17	ECUENC333KBQ	16V 0.033U	3	F1G1C333A004
C418	ECUVNJ334KBV	6.3V 0.33U	1	F1H0J334A002
C419	F5A421040002	4V 0.1U	1	
C501	F3E0G2260001	4V 22U	1	
C502	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C505	F1G1C103A044	16V 0.01U	1	
C506,07	ECJ0EB1H101K	50V 100P	2	
C508	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C510	ECUVNJ474KBV	6.3V 0.47U	1	F1H0J474A002
C513	F1G1C103A044	16V 0.01U	1	
C516	ECJ1VB0J105K	6.3V 1U	1	
C601	F1J0J4750016	6.3V 4.7U	1	
C602	F1G1C103A044	16V 0.01U	1	
C603	F1J0J4750016	6.3V 4.7U	1	
C605	F3E0G156A001	4V 15U	1	
C606	ECJ1VB0J105K	6.3V 1U	1	
C608	ECJ0EB1H102K	50V 1000P	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
C701	RCST0JY226RG	6.3V 22U	1	F3F0J2260002
C702	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C704	F3E0G106A001	4V 10U	1	
C711	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C713,14	F5A421050001	4V 1U	2	
C721	F5A421040002	4V 0.1U	1	
C722	F5A421020001	4V 1000P	1	
C725,26	F1J0J4750016	6.3V 4.7U	2	
C727,28	F3E0G106A001	4V 10U	2	
C801	F5A421050001	4V 1U	1	
C802	F5A421040002	4V 0.1U	1	
C803	F1G1C103A044	16V 0.01U	1	
C804	ECJ1VB0J105K	6.3V 1U	1	
C805	F1G1E472A059	25V 4700P	1	
C808	F1G1C103A044	16V 0.01U	1	
C901	F3E0G2260001	4V 22U	1	
C902	F5A422240001	4V 0.22U	1	
C903	ECUENA473KBQ	10V 0.047U	1	F1G1A473A014
C904-06	F1G1E472A059	25V 4700P	3	
C907	F1G1C103A044	16V 0.01U	1	
C908	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C911	ECUENA104KBQ	10V 0.1U	1	F1G1A104A014
C912	F1J0J4750016	6.3V 4.7U	1	
C914	ECJ0EC1H030C	50V 3P	1	
C915	ECUENA473KBQ	10V 0.047U	1	F1G1A473A014
CN1	K1MN21B00045	CONNECTOR(21P)	1	
CN2	K1MN06B00069	CONNECTOR(6P)	1	
CN3	K1MN04B00034	CONNECTOR(4P)	1	
CN403,04	K1MN04B00034	CONNECTOR(4P)	2	
CN501	K1MN10B00064	CONNECTOR(10P)	1	
CN502	K1MN06B00114	CONNECTOR(6P)	1	
CN901	K1MN10B00064	CONNECTOR(10P)	1	
CN1301	K4BZ14E00001	CONNECTOR(14P)	1	
CP801	K1MN10B00097	CONNECTOR(10P)	1	
CP802	K1MN15B00092	CONNECTOR(15P)	1	
D1	MA2S11100L	DIODE	1	
D301	MA2S11100L	DIODE	1	
D304	B0JCJB000001	DIODE	1	
D501	MA3S781D0L	DIODE	1	
D910	MA3S13300L	DIODE	1	
D911,12	MA2YD2600L	DIODE	2	
IC1	AN22010A-VF	IC	1	
IC101	MN66621BSG	IC	1	
IC102	C3ABMB000026	IC	1	
IC201	C1BB00000720	IC	1	
IC301	C0ABHA000037	IC	1	
IC302	C0DBAFZ00021	IC	1	
IC303	XC6367A151MR	IC	1	C0DBAFZ00012
IC304	C0DBAGZ00018	IC	1	
IC305	C0CBAAG00012	IC	1	

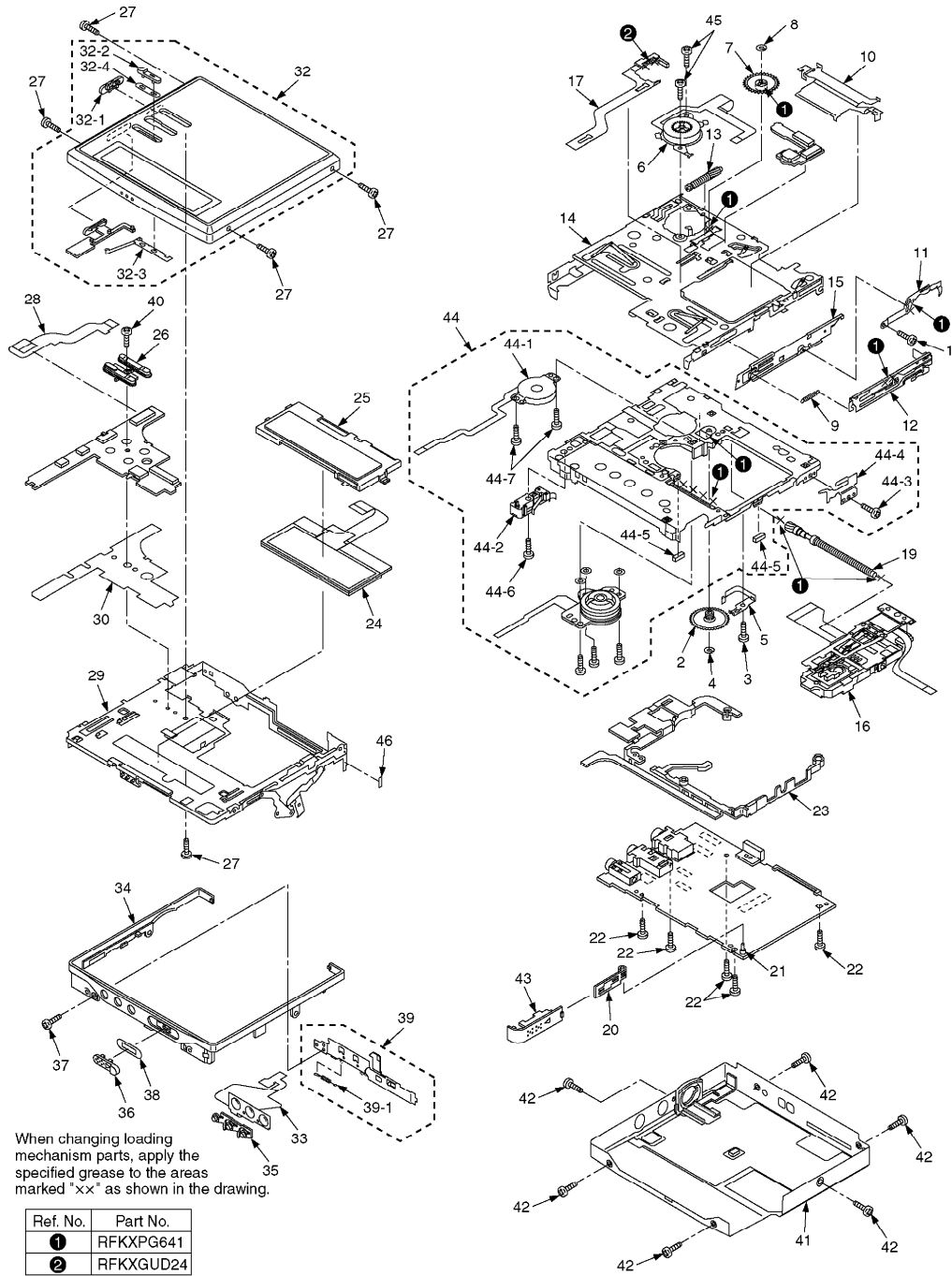
Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
IC306	C0CBAAB00036	IC	1	
IC307,08	B1KBB0000006	IC	2	
IC401	C0GBD0000022	IC	1	
IC501	C2DBKJ000062	IC	1	
IC502	C3EBDG000039	IC	1	
IC503	C0EBC0000035	IC	1	
IC601	C0FBAJ000008	IC	1	
IC701	C1BB00000609	IC	1	
IC901	C0GBE0000003	IC	1	
IC902	C0JBAZ001928	IC	1	
JK201	RJJ36TK03-1C	JACK,HEADPHONE	1	K2HC106E0001
JK701	B3MAZ0000026	JACK,OPT/LINE	1	
JK702	K2HC103E0016	JACK,MIC	1	
L1,L2	RLQP100MT-W	COIL	2	G1C100M00016
L101	RLQP100MT-W	COIL	1	G1C100M00016
L201,02	RLBV601V-W	COIL	2	J0JCC0000059
L204,05	RLBV601V-W	COIL	2	J0JCC0000059
L301	G1A330D00007	COIL	1	
L302	G1A220D00002	COIL	1	
L303	G1A330D00009	COIL	1	
L411	ELJEA470KF	COIL	1	
L501	RLQP100MT-W	COIL	1	G1C100M00016
L701-03	RLBV601V-W	COIL	3	J0JCC0000059
L720-22	RLBV601V-W	COIL	3	J0JCC0000059
P1	RPK1869	PACKING CASE	1	(GHA)
P1	RPK1868	PACKING CASE	1	(GHS)
P1	RPK1871	PACKING CASE	1	(GKA)
P1	RPK1872	PACKING CASE	1	(GKR)
P1	RPK1870	PACKING CASE	1	(GKS)
P2	RPQ1486	PAD	1	(GH)
P2	RPQ1488	PAD	1	(GK)
P3	RPQ1489	PAD	1	
P4	RPQ1487	PAD	1	
PCB1	REP3036A-M	REC.HEAD P.C.B.	1	[RTL]
PCB2	REP3418B-M	MAIN P.C.B.	1	[RTL]
PCB3	REP3417A-S	OPERATION P.C.B.	1	[RTL]
Q1	B1ADMB000003	TRANSISTOR	1	
Q2	B1GD CFJJ0001	TRANSISTOR	1	
Q3	DTC144EETL	TRANSISTOR	1	B1GBCFNN0001
Q202	B1ADMB000003	TRANSISTOR	1	
Q203	B1ABDF000001	TRANSISTOR	1	
Q301	B1ABDF000001	TRANSISTOR	1	
Q303	B1HFCFA00005	TRANSISTOR	1	
Q304	B1CFNC000001	TRANSISTOR	1	
Q305	B1CHMC000001	TRANSISTOR	1	
Q307	B1CFNC000001	TRANSISTOR	1	
Q308	2SB1462STX	TRANSISTOR	1	2SB14620SL
Q310	B1MBADA00001	TRANSISTOR	1	
Q311	B1ADKB000003	TRANSISTOR	1	

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
Q312	B1CHMC000001	TRANSISTOR	1	
Q313	B1CHHD000003	TRANSISTOR	1	
Q315	DTC144EETL	TRANSISTOR	1	B1GBCFNN0001
Q701	B1HFCFA000005	TRANSISTOR	1	
Q702	DTC144TETL	TRANSISTOR	1	B1GBCFNA0001
Q703	2SB1462STX	TRANSISTOR	1	2SB14620SL
Q901	DTC144EETL	TRANSISTOR	1	B1GBCFNN0001
Q910	DTC144EETL	TRANSISTOR	1	B1GBCFNN0001
Q911,12	B1DFCC000008	TRANSISTOR	2	
Q913,14	B1DFBG000004	TRANSISTOR	2	
R1	D1H447220001	4.7K	1	
R2	ERJ2GEJ272	1/4W 2.7K	1	
R3	ERJ2GEJ1R5X	1/4W 1.5	1	
R5	ERJ2GEJ271	1/4W 270	1	
R6	ERJ2GEJ150	1/4W 15	1	
R7	ERJ2GEJ474X	1/4W 470K	1	ERJ2RMJ474X
R9	ERJ2GEJ223X	1/4W 22K	1	ERJ2RMJ223X
R11	ERJ2GEJ222X	1/4W 2.2K	1	ERJ2RMJ222X
R41	ERJ2GEJ103	1/4W 10K	1	
R42	ERJ2GEJ473X	1/4W 47K	1	ERJ2RMJ473X
R101	ERJ2GEJ105	1/4W 1M	1	D0GA105JA001
R102	ERJ2GEJ221	1/4W 220	1	
R110	D1H84704A024	47	1	
R120	ERJ2GEJ123	1/4W 12K	1	
R121	D1H433320002	33K	1	
R122	ERJ2GE0R00X	1/4W 0	1	D0YAR0000003
R123	ERJ2GEJ221	1/4W 220	1	
R130	ERJ2GEJ222X	1/4W 2.2K	1	ERJ2RMJ222X
R201	ERJ2GEJ221	1/4W 220	1	
R202	ERJ2GEJ471X	1/4W 470	1	ERJ2RMJ471X
R203	D1BA2702A007	27K	1	
R204	D1H410320002	10K	1	
R205	ERJ2GEJ104	1/4W 100K	1	
R206	D1H410320002	10K	1	
R207	D1H433220001	3.3K	1	
R208	EXB24V225JX	1/4W 2.2M	1	
R209	D1H410020002	10	1	
R210	D1H422120001	220	1	
R212	D1H447320001	47K	1	
R215	D1H422120001	220	1	
R301	ERJ2GEJ334X	1/4W 330K	1	ERJ2RMJ334X
R302	D1H410420002	100K	1	
R303	D1BA8202A007	82K	1	
R304	ERJ2GEJ103	1/4W 10K	1	
R305	ERJ2GEJ101	1/4W 100	1	
R306,07	ERJ8GEY0R00V	1/8W 0	2	D0YFR0000002
R308	D1H447420001	470K	1	
R309	ERJ2GEJ394X	1/4W 390K	1	ERJ2RMJ394X
R310	D1BA3302A007	33K	1	
R311	D1BA1203A007	120K	1	
R312	ERJ3GEYJ335V	1/16W 3.3M	1	
R313	D1H81044A024	100K	1	
R314	ERJ2GEJ154	1/4W 150K	1	

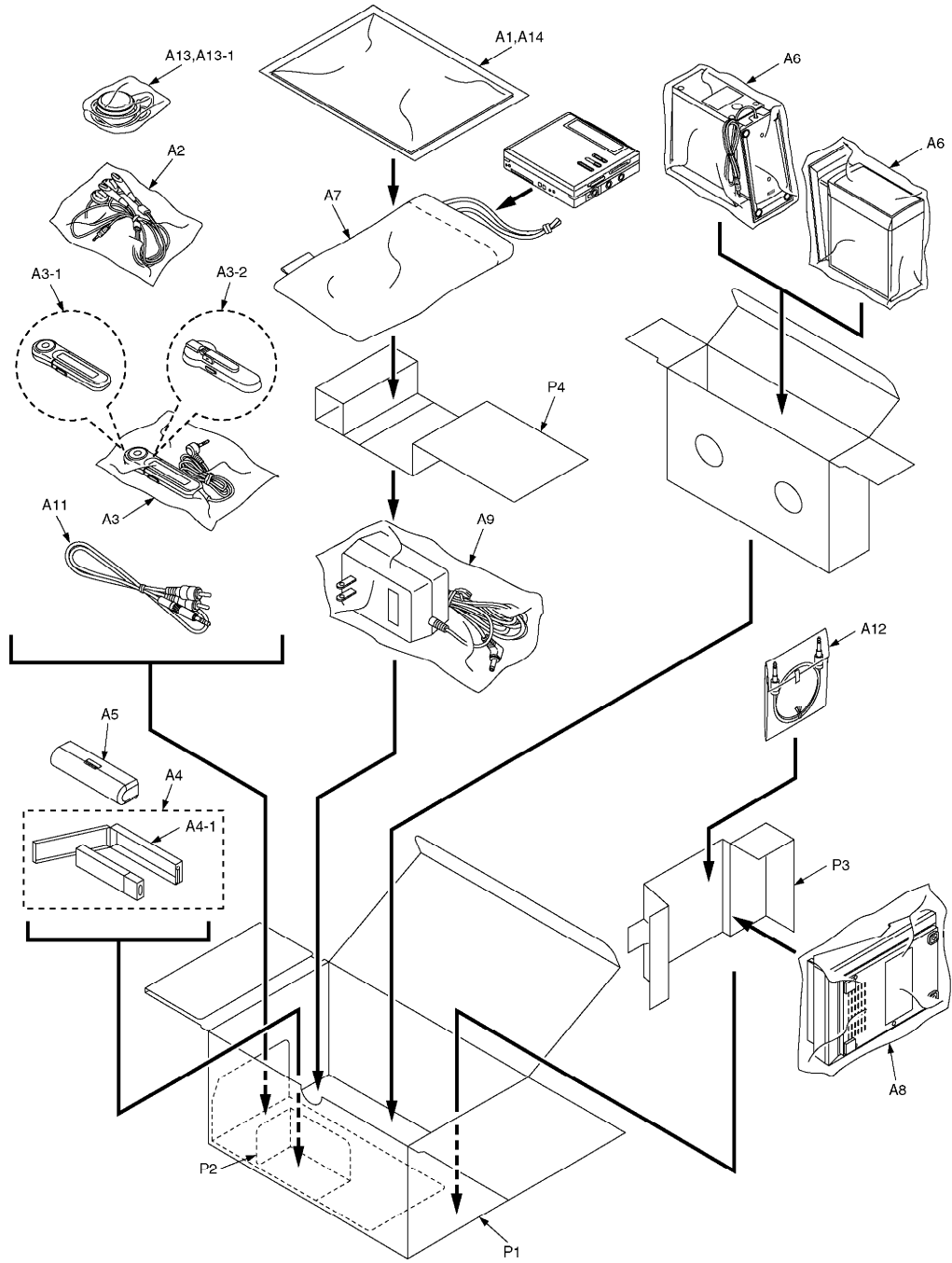
Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
R315	ERJ2GED513X	1/4W 51K	1	ERJ2RHD513X
R317	ERJ6RSJR10V	1/10W 0.1	1	
R318	ERJ2RKD474X	1/4W 470K	1	
R320	D1H81044A024	100K	1	
R321	ERJ2GEJ394X	1/4W 390K	1	ERJ2RMJ394X
R322	ERJ2GEJ225X	1/4W 2.2M	1	ERJ2RMJ225X
R323	ERJ2GEJ105	1/4W 1M	1	D0GA105JA001
R324	D1BA3303A007	330K	1	
R325	D1BA2203A007	220K	1	
R326	ERJ2GEJ474X	1/4W 470K	1	ERJ2RMJ474X
R328	ERJ2GEJ474X	1/4W 470K	1	ERJ2RMJ474X
R401	D1H447320001	47K	1	
R411	ERJ2GEJ471X	1/4W 470	1	ERJ2RMJ471X
R412	ERJ2GEJ682X	1/4W 6.8K	1	ERJ2RMJ682X
R431	ERJ2GEJ103	1/4W 10K	1	
R501	ERJ2GEJ473X	1/4W 47K	1	ERJ2RMJ473X
R502	ERJ2GEJ104	1/4W 100K	1	
R503	D1H83344A024	330K	1	
R504	ERJ2GEJ104	1/4W 100K	1	
R505	ERJ2GEJ221	1/4W 220	1	
R506	D1H422420001	220K	1	
R508	ERJ2GEJ103	1/4W 10K	1	
R509	ERJ2GEJ223X	1/4W 22K	1	ERJ2RMJ223X
R510	ERJ2GEJ334X	1/4W 330K	1	ERJ2RMJ334X
R511	D1H82244A024	220K	1	
R512	D1H81034A024	10K	1	
R514,15	ERJ2GEJ122	1/4W 1.2K	2	
R516	ERJ2GEJ102X	1/4W 1K	1	ERJ2RMJ102X
R601	ERJ2GEJ4R7X	1/4W 4.7	1	ERJ2RMJ4R7X
R701	ERJ2GEJ101	1/4W 100	1	
R702	ERJ2GEJ224	1/4W 220K	1	
R703	D1H410420002	100K	1	
R704	ERJ2GEJ334X	1/4W 330K	1	ERJ2RMJ334X
R705	ERJ2GEJ473X	1/4W 47K	1	ERJ2RMJ473X
R706	D1H418220001	1.8K	1	
R707	D1H422320002	22K	1	
R708	D1H418220001	1.8K	1	
R709	D1H410320002	10K	1	
R711	ERJ2GEJ471X	1/4W 470	1	ERJ2RMJ471X
R712	D1H81044A024	100K	1	
R713	ERJ2GEJ101	1/4W 100	1	
R714	ERJ2GEJ103	1/4W 10K	1	
R801	ERJ2GEJ122	1/4W 1.2K	1	
R802	ERJ2GEJ393X	1/4W 39K	1	ERJ2RMJ393X
R803	ERJ2GEJ272	1/4W 2.7K	1	
R804	ERJ2GEJ332X	1/4W 3.3K	1	ERJ2RMJ332X
R805	ERJ2GEJ472X	1/4W 4.7K	1	ERJ2RMJ472X
R806	ERJ2GEJ182	1/4W 1.8K	1	
R807	ERJ2GEJ154	1/4W 150K	1	
R808	ERJ2GEJ334X	1/4W 330K	1	ERJ2RMJ334X
R901	ERJ2GEJ682X	1/4W 6.8K	1	ERJ2RMJ682X
R902	ERJ2GEJ153	1/4W 15K	1	
R903	ERJ2GEJ182	1/4W 1.8K	1	
R904	ERJ2GEJ331X	1/4W 330	1	ERJ2RMJ331X

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
R905	ERJ2GEJ102X	1/4W 1K	1	ERJ2RMJ102X
R911	D1H447320001	47K	1	
R912	ERJ2GEJ6R8X	1/4W 6.8	1	
RX111	D1H410420002	100K	1	
RX112	ERJ2GE0R00X	1/4W 0	1	D0YAR0000003
RX517,18	ERJ2GE0R00X	1/4W 0	2	D0YAR0000003
S1	ABC1111P	SW,HEAD	1	K0L1BA000050
S801	RSG0051-P	SW,PLAY	1	
S802	ABC1112P	SW,REC	1	K0L1BA000051
S803-05	RSG0051-P	SW,STOP/FF/FR	3	
S806,07	EVQP7L01K	SW,VOL	2	
S808	K0D112A00114	SW,HOLD	1	
TH40	D4CC11030009	THERMISTORS	1	
TH901	D4CC11030009	THERMISTORS	1	
X101	H0J169500011	OSCILLATOR	1	
X501	H2D100500004	OSCILLATOR	1	
Z301	RJH9209-1	TERMINAL	1	K4BC02E00005

18. Cabinet Parts Location



19. Packaging



**20. Schematic Diagram for printing with A4
H0211 TN/HH**