Philips Car Systems

automotive mannesmann VDO

Car CD Changer 22RC047/00

Service Manual

12 V

COMPACT disc DIGITAL AUDIO

CLASS 1
LASER PRODUCT

Contents

Published by VDO Car Communication Printed in The Netherlands 4822 725 25488

1. SPECIFICATIONS

Operating voltage	:	11 – 16VDC (14.4VDC nom.)
Frequency response	:	20 – 20,000 Hz (± 0.3dB)
DAC resolution	:	1 bit per channel
Bus interface	:	D^2B
Crosstalk L<>R	:	≤ -80dB
S/N ratio	:	≥ 96dB (weighted)
Distortion	:	≤ 0.02% (at 1kHz)
Wow and flutter	:	unmeasurable
Oversampling	:	8 times
Output voltage	:	700mV
Data – Track mute	:	83 dB (weighted)
Anti-shock memory	:	3 seconds
Disc change times	:	< 12sec (to next/previous) < 13sec (to last/first disc)
Operating position	:	-10° -Horiz.-+30°
Weight	:	1.5 kg
Dimensions (HxWxD)	:	58x178x188 mm (incl. front panel)

2. SERVICE

IMPORTANT !!

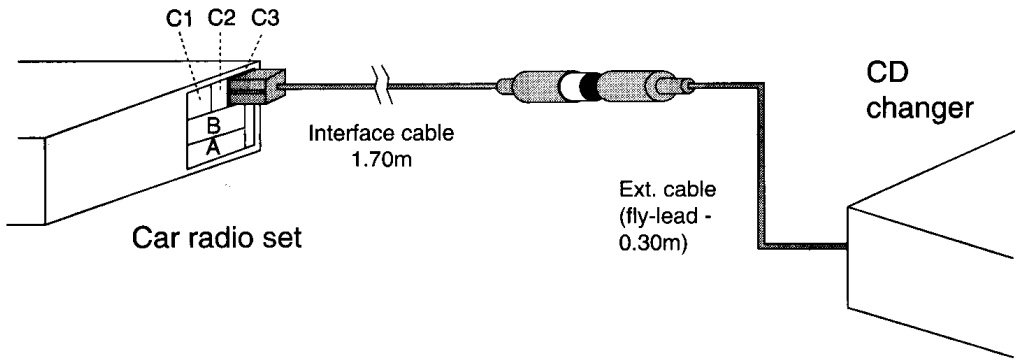
- When disassembling, ALWAYS protect the pick-up unit against ESD damage by closing the solder connection of the pick-up unit on the flexible foil PCB!
  (See also the repair notes and disassembly procedures described in this manual.)
- New pick-up units are supplied with CLOSED solder connections on the flexible foil PCB.
  Do NOT forget to REMOVE the solder connection AFTER replacing the unit!

2.1 Service hints

- To prevent magazine check (duration approx. 35 sec.), insert the magazine and press the 'Eject' button SIMULTANEOUSLY. In that case disc no.1 is loaded and the set comes into 'Standby' mode.
- Use 'home-made' extension cables of approx. 30 cm to get access to the bottom (solder side) of the main PCB for measuring purposes. To make these cables, the following parts can be ordered and used for making the extension cables:
  CP802 – 4822 320 12463
  FPC783 – 4822 320 12429
  FPC801 – 4822 320 12462
- The set also can operate without cover, but take care of the following measures:
  - ABSOLUTELY NEVER PERMIT LASER BEAMS TO ENTER THE EYES !!
  - DO NOT EXPOSE THE SET TO BRIGHT (SUN)LIGHT !!

3. INTERFACE CABLE CONNECTIONS

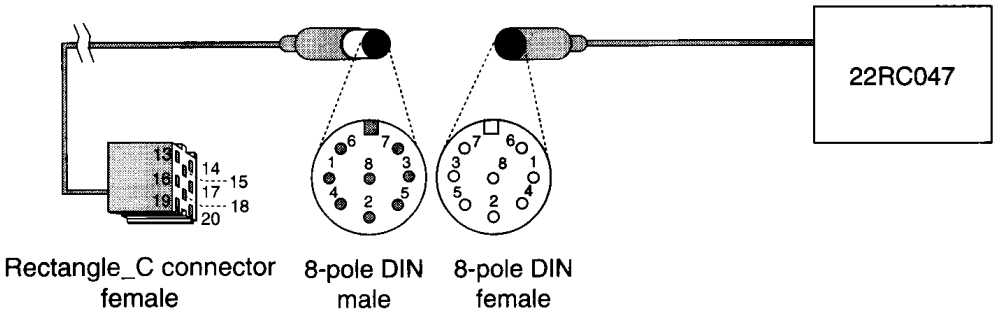
The figures on this page show the interface- and fly-lead cables of the 22RC047.



For radio sets with a C_10 (10-pole) connector, use the interface cable with service code: **4822 320 12002**.

3.1 Interface cable

The figure below shows the pin layout of the connections of the interface cable.
All connections here are seen from the *front* side of the connectors.



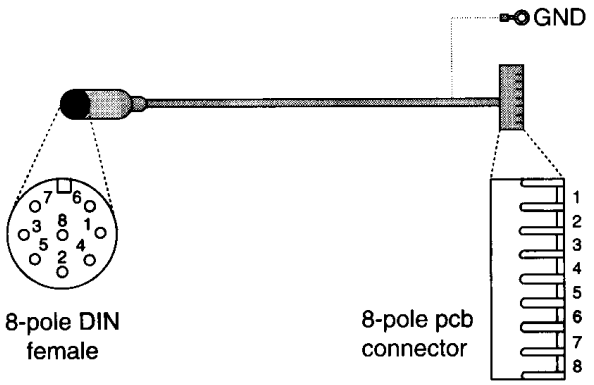
RECTANGLE_C3 CONNECTOR

Pin	Signal
13	D^2B+
14	D^2B-
15	BUS_GND
16	+12V PERM.
17	+12V SW.
18	SIGN_GND
19	L_CH
20	R_CH
(SHIELD)	(GND)

8-POLE DIN CONNECTOR (MALE/FEMALE)

Pin	Signal
1	+12V SW.
2	+12V PERM.
3	GND
4	D^2B-
5	D^2B+
6	R_CH
7	L_CH
8	SIGN_GND
(SHIELD)	GND

3.2 DIN-1 fly-lead cable



8-POLE DIN CONNECTOR (FEMALE)

Pin	Signal
1	+12V SW.
2	+12V PERM.
3	GND
4	D^2B-
5	D^2B+
6	R_CH
7	L_CH
8	SIGN_GND
(SHIELD)	GND

8-POLE PCB CONNECTOR

Pin	Signal
1	+12V SW.
2	+12V PERM.
3	GND
4	D^2B-
5	D^2B+
6	R_CH
7	L_CH
8	SIGN_GND
EYE LUG	GND

4. OPERATION

4.1 Introduction

Here a brief operation instruction of the 22RC047 CD changer follows. Following this procedure strictly will prevent unnecessary operation problems.
The figures which the description refers to are all on this page.

4.2 Loading the magazine

- Slide a CD (with the label facing *upwards*) into one of the slots.
- Up to 4 discs can be loaded.
- For 8cm CD's, use an adapter which conforms to CD standards.
- Please pay attention to the following:
  Be sure to attach the disc properly to the catches provided on the adapter; if the disc is not attached correctly, it may come free inside the magazine or play mechanism, causing the CD changer inoperative.
- *Under NO circumstances load an empty 8cm adapter into the magazine. The adapter will remain in the mechanism and will block the unit.*

4.3 Magazine insertion

- Press the 'EJECT' button to open the front (fig. **i**).
- *Hold the magazine the correct way up with the rounded side facing the opening of the CD changer.*
- Gently push the magazine into the opening of the CD changer, until you feel a click (fig. **ii**).
- Close the front to prevent dust and dirt from entering the CD changer.
- If the front is opened by pressing the 'EJECT' button, the CD changer will stop playing.
- While the front is open, the CD changer will *not* accept commands from the radio.
- If you close the front, the CD changer will continue operation.
- For security reasons you should *always* close the front while driving.

4.4 Magazine check procedure

After insertion of the magazine, the CD changer performs a magazine check to check which slots are filled with CD's and whether the CD's are put in correctly.
This procedure can be bypassed by inserting the magazine and pushing the 'EJECT' button *simultaneously*.

4.5 Eject procedure

- Press the 'EJECT' button *once* to open the front.
- Press the 'EJECT' button a *second* time to have the magazine ejected.
- Carefully take out the magazine and close the front.

4.6 Unloading the magazine

- Pull the white lever at the front of the magazine (fig. **iii**).
- Carefully remove a CD from the magazine.

4.7 Care of discs (fig. iv)

- Avoid making fingerprints on the CD.
- Put the CD back in its box immediately after removing it from the magazine
- Do *not* expose the CD to heat or direct sunlight.

4.8 Reset function (fig. v)

In case that the CD changer does not operate correctly, the CD changer circuits can be reset in the following way:

- Take a pen or an other object with a thin point and briefly press the 'RESET' button located under the 'EJECT' button.

4.9 Display

The front of the CD changer displays the following information (fig. **vi**):

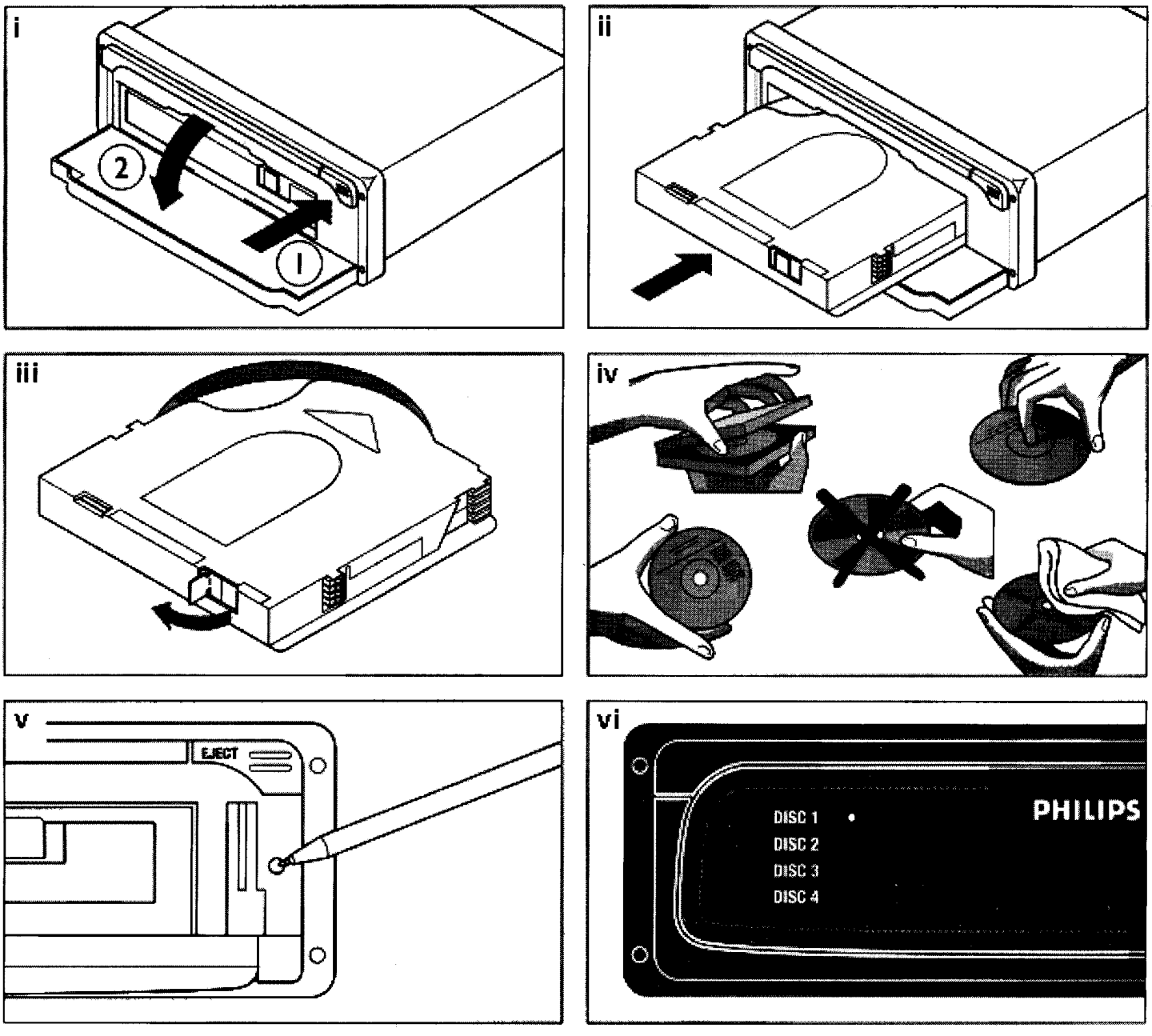
DISC 1 • (• = LED on):
The CD (in this case CD1) is currently played.

DISC 1 o (o = LED off):
The CD (in this case CD1) is present in the magazine.

DISC 1 ☼ ('DISC 1' does not light / ☼ = LED (next to 'DISC 1') flashes):

The radio set and/or the car ignition are switched off.

When the 'EJECT' button is pressed for more than 2 seconds, the flashing LED is switched off. It is re-activated automatically after switching the radio set or CD changer on or off.



5. FUNCTION EXPLANATION

This part gives a summarized description of the mechanical operation of the CD changer.
The figures in this part clarify the function of the different parts.
For more details and to locate the exact position of the parts, refer to the exploded views on the last pages of this manual.

5.1 Function of motors

1. Spindle motor (pos. C24).
   This is a brushless motor which has the disc rotated.
2. Feed motor (pos. C42).
   - Moves pick-up unit (pos. C36), when a CD is played and during track change or jump.
   - Moves the hook of 'disc chuck' mechanism (pos. C21/29/30/38) which centres and clamps the disc on the spindle.
3. Rotary motor (pos. C74).
   This motor moves the arm (pos. C19) with the pick-up unit inwards or outwards the CD magazine.
4. Magazine elevator motor (pos. C62).
   With help of this motor the magazine is opened or closed respectively just before loading or just after unloading of the selected disc, to make it the pick-up assy possible to reach the disc concerned.
5. Elevator motor (pos. C11).
   The elevator motor moves the elevator chassis assy (pos. C52) upwards or downwards, dependent on which disc is selected.
   The magazine lock (pos. C53/58) is released by the elevator (motor) during 'Eject' procedure.

5.2 Loading procedure

1. After magazine insertion:
   a) 'Magazine On' switch (pos. S782) becomes activated.
   b) Elevator chassis assy and arm of p.u. moves to disc1, controlled by elevator motor.
2. Disc1 is loaded:
   a) Magazine is opened by slides pos. C61/70 which in their turn are controlled by the magazine elevator motor.
   b) Rotary motor moves the arm into the magazine.
   c) Mag. elevator motor and slides bring the magazine into the 'Hold' position.
   d) Disc is chucked and clamped by the chuck mechanism which is controlled by the feed motor.
   e) Magazine is brought into the 'In' position by the slides and mag. elevator motor.
   f) Spindle motor starts to rotate and the disc is played.

5.3 Disc change procedure

1. Spindle motor stops.
2. Magazine is brought into 'Hold' position by mag. elevator motor.
3. Chuck mechanism releases the disc.
4. Magazine is brought into 'Open' position by mag. elevator motor.
5. Arm of p.u. moves outwards.
6. Magazine is brought into 'Closed' position by mag. elevator motor.
7. Elevator moves to the position of the disc to be played now.
8. Now this disc is loaded (see 'Loading procedure').

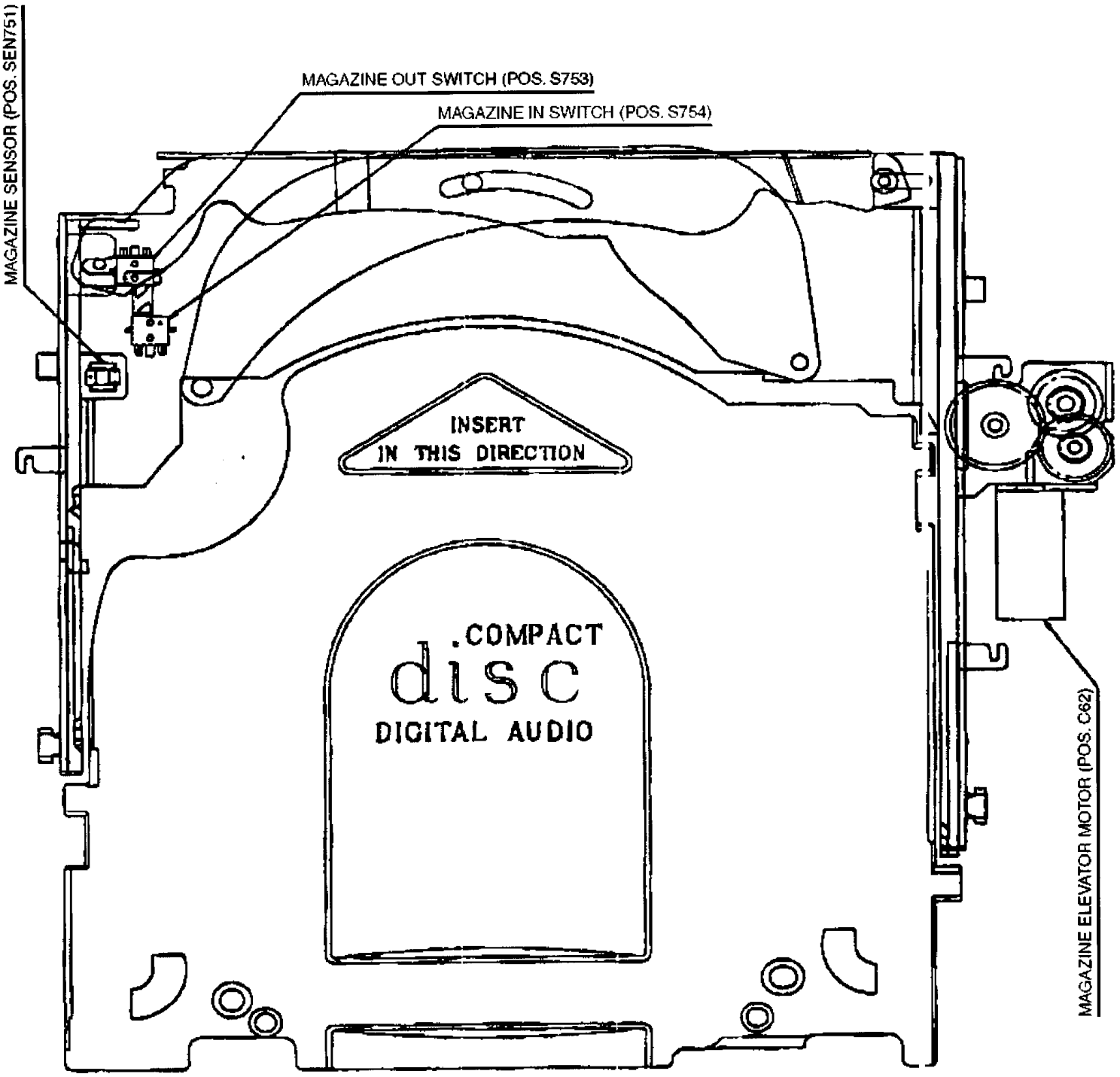
5.4 Eject procedure

1. Steps '1' until '6' (see 'Disc change procedure') are carried out first.
2. The elevator moves to the 'Eject' (beyond 'Disc4') position.
3. The magazine lock is unlocked and the magazine comes out of the changer unit.

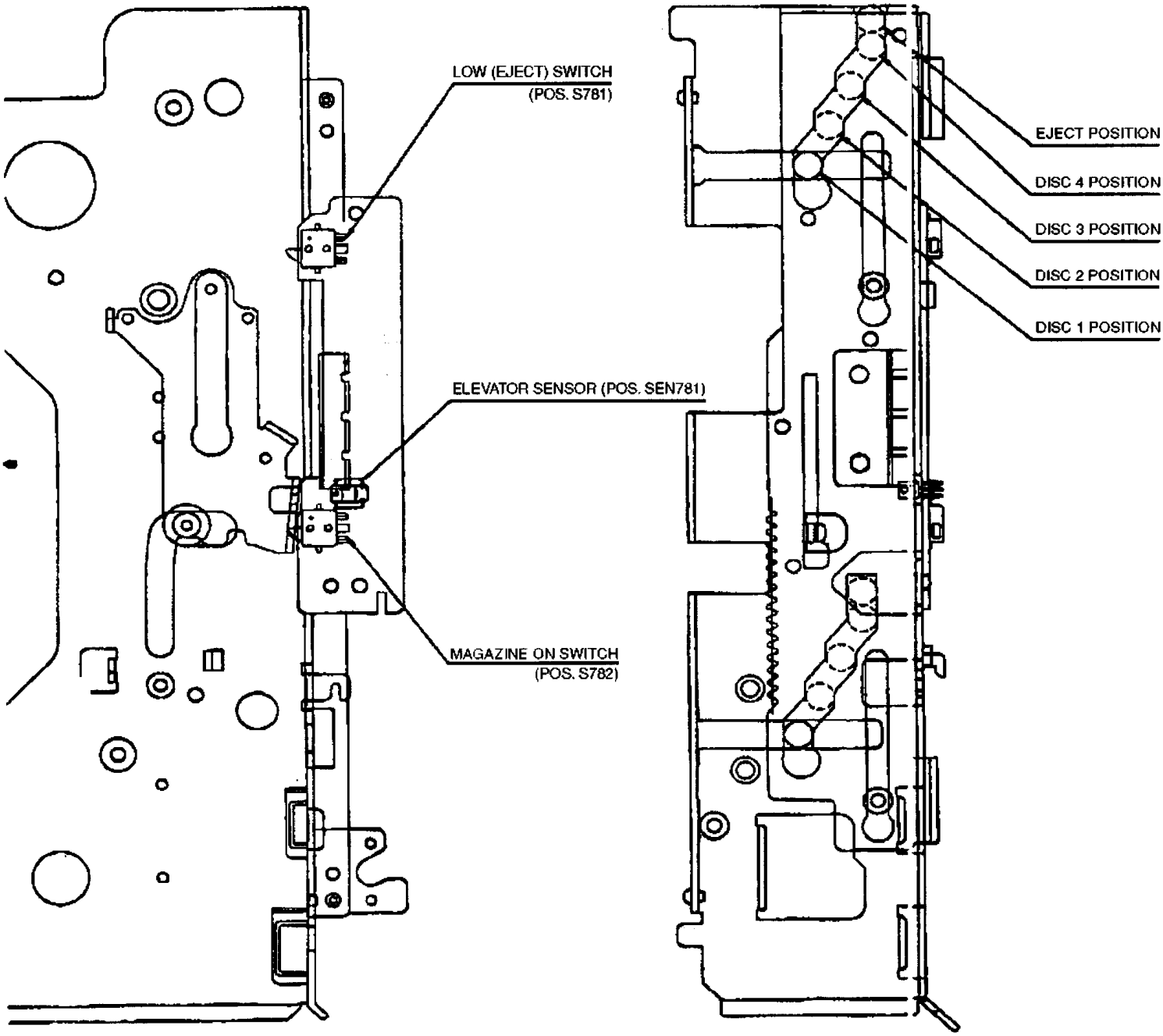
5.5 Detailed explanation of switch / sensor functions

This section explains each action by using which switch or sensor.

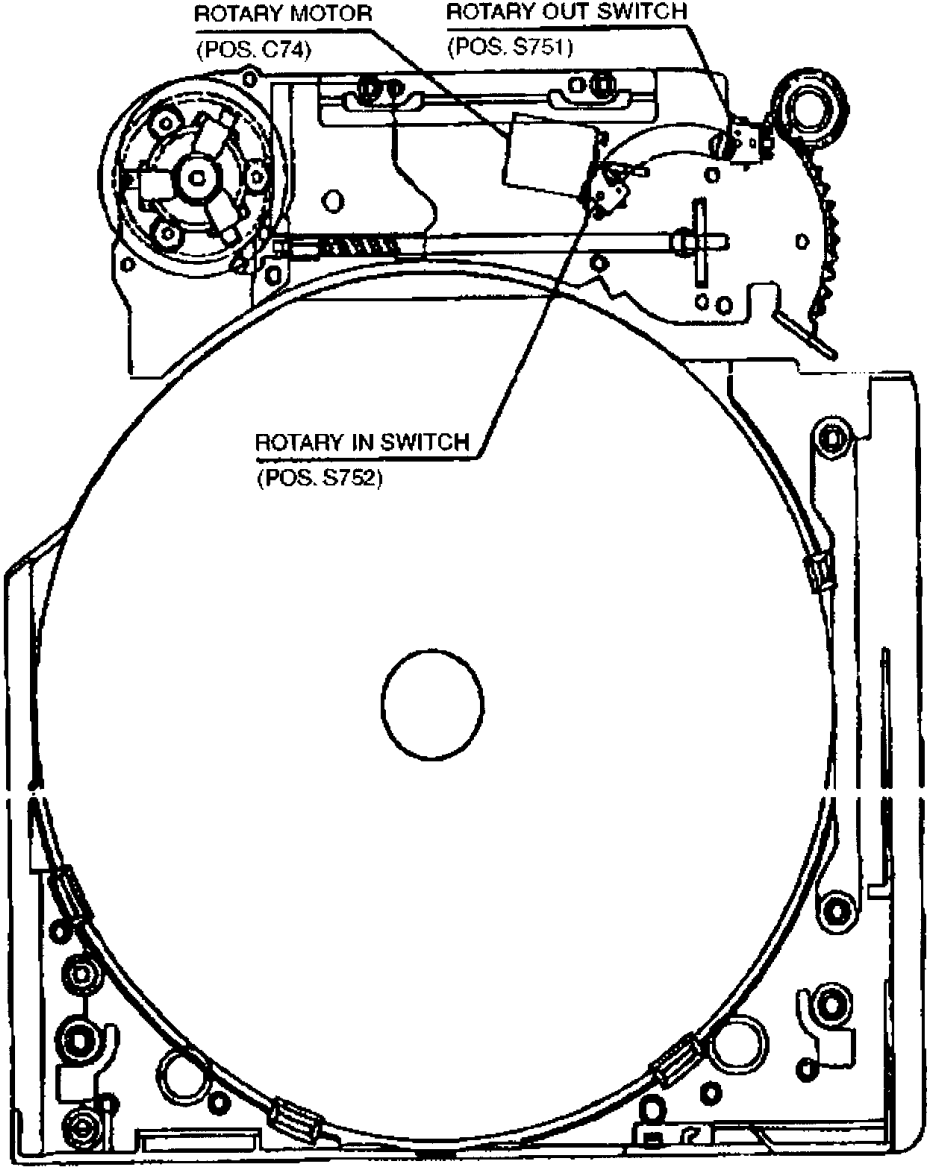
1.	Feed motor.	Condition:
	- Disc chucking release position	- 'Chuck off' switch (part of pick-up) is ON
	- Disc chucking position	- 'Chuck off' switch is OFF; 'Inside track' switch (part of spindle motor assy) is OFF; TOC (Table of contents) is read from disc
2.	Rotary motor.	Condition:
	- Move arm inside magazine	- 'Rotary In' switch (pos. S752) is ON
	- Move arm outside magazine	- 'Rotary Out' switch (pos. S751) is ON
3.	Magazine elevator motor.	Condition:
	- 'Close' position	- 'Magazine Out' switch (pos. S753) is ON
	- 'Open' / 'Hold' position	- 'Magazine sensor' (pos. SEN751) is ON Detecting 'Open' and 'Hold' position is carried out by counting the number of pulses coming from the 'Magazine sensor'; 'Open' position: magazine opening has maximum size to have the arm came in; 'Hold' position: the selected disc rests on the spindle and is in condition to have been chucked
	- 'In' position	- 'Magazine In' switch (pos. S754) is ON; Disc is lifted from its carrier and is chucked and ready for play.
4.	Elevator motor.	Condition:
	- 'Disc 4' position	- 'Elevator sensor' (pos. SEN781) is ON; 'Low (Eject)' switch (pos. S781) is ON; This position is the elevator reference point.
	- 'Disc 1/2/3' position	- Number of disc is determinated by counting the pulses coming from the 'Elevator sensor'
	- 'Eject' position	- Elevator moves beyond 'Disc 4' position during 'Elevator sensor' and 'Low (Eject)' are both ON; Magazine is ejected and 'Magazine On' switch (pos. S782) comes into OFF position



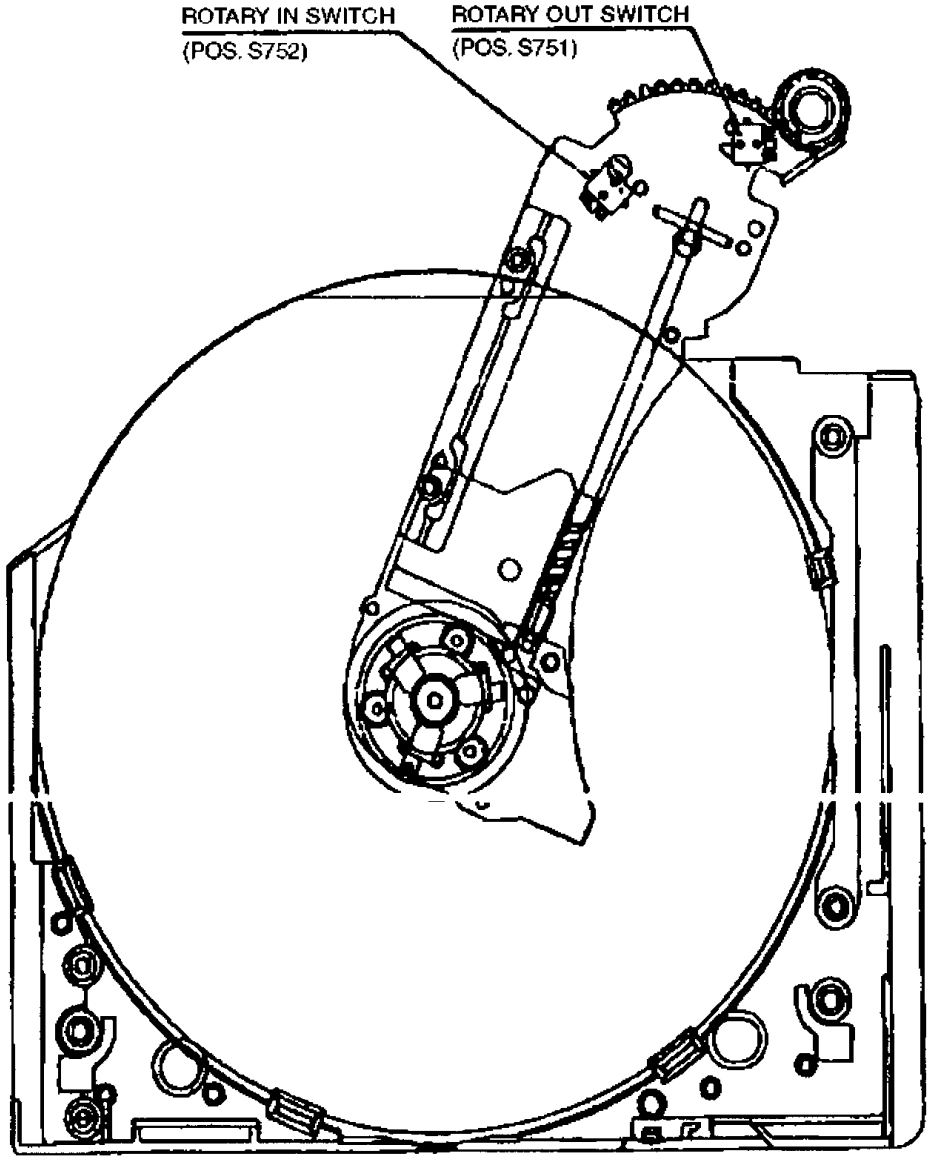
MAGAZINE HOLDER


LOW (EJECT) SWITCH
(POS. S781)
ELEVATOR SENSOR (POS. SEN781)
MAGAZINE ON SWITCH
(POS. S782)
EJECT POSITION
DISC 4 POSITION
DISC 3 POSITION
DISC 2 POSITION
DISC 1 POSITION

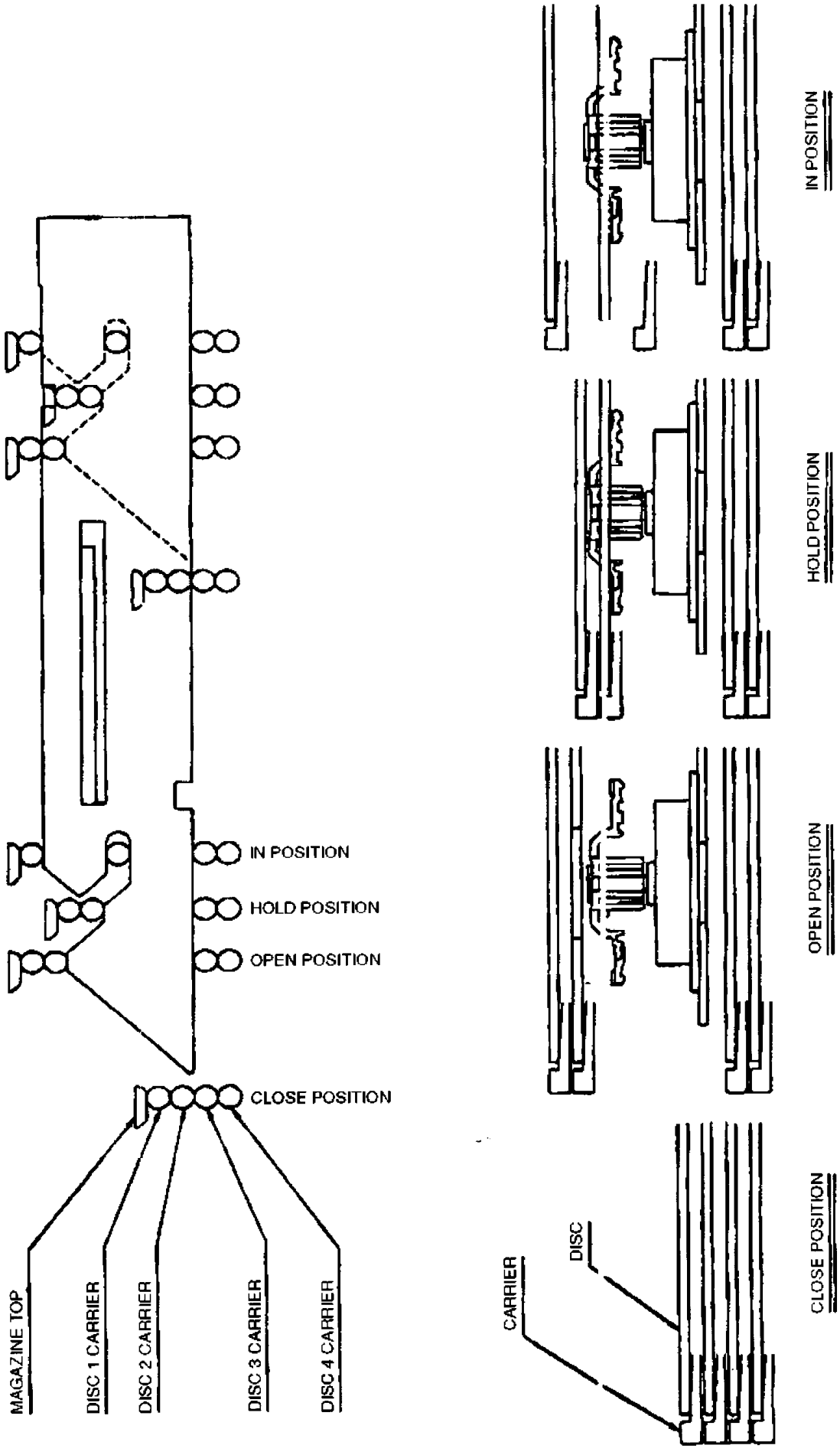
ELEVATOR



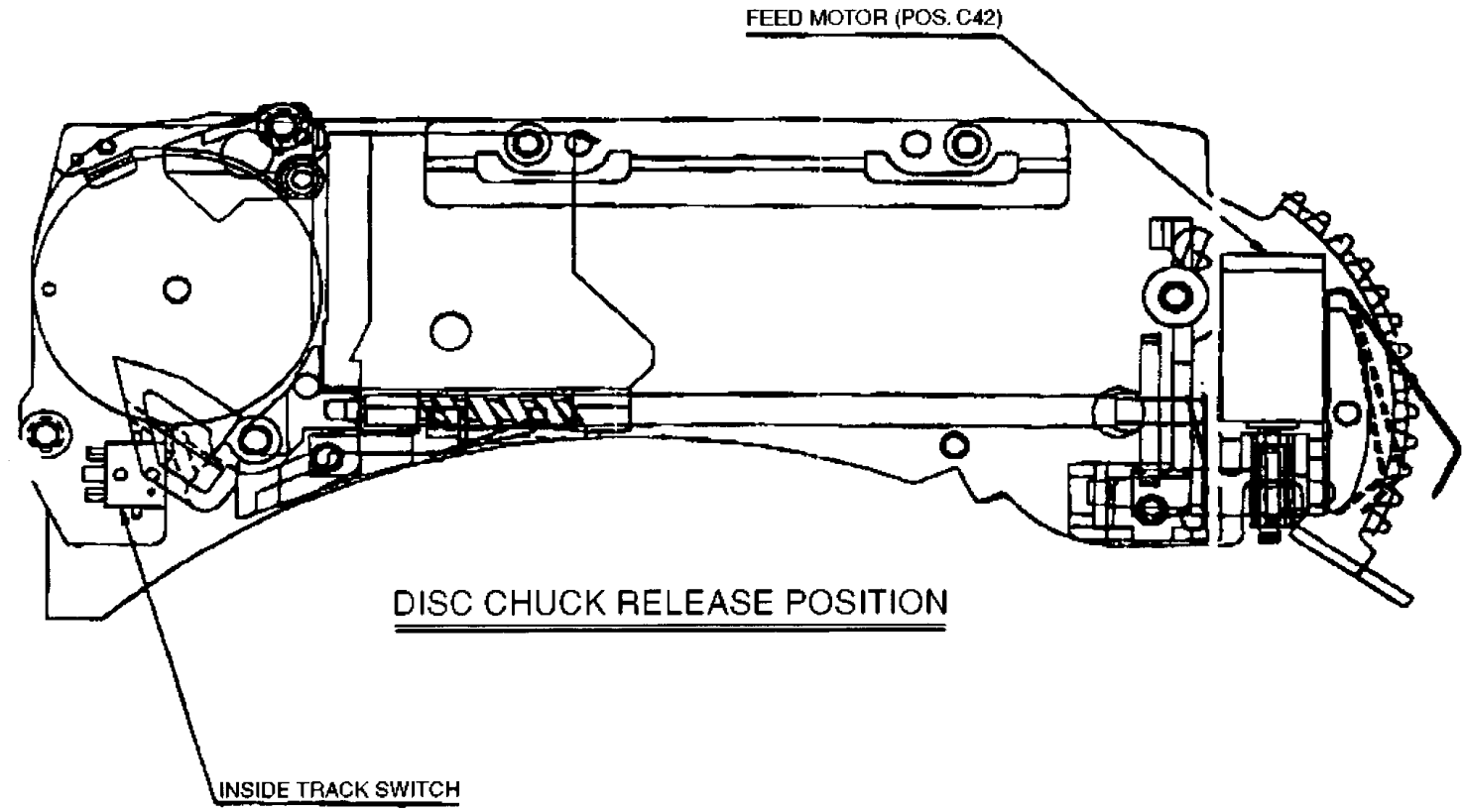
ROTARY (ARM) OUT POSITION



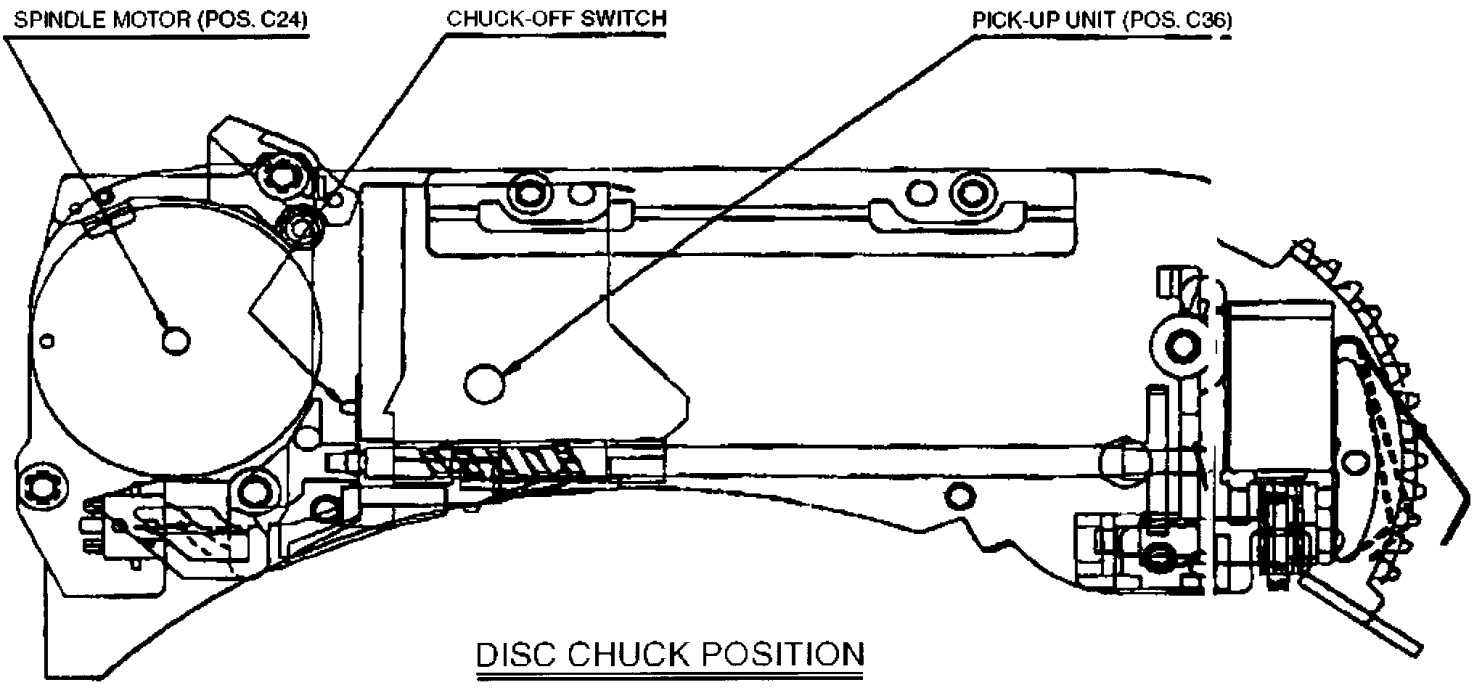
ROTARY (ARM) IN POSITION



MAGAZINE ELEVATOR



DISC CHUCK RELEASE POSITION



DISC CHUCK POSITION

5.6 Function explanation

1. *APC (Auto laser power control)*
   This is the circuit to control laser power of pickup, and laser ON/OFF is set by command from micro computer.

2. *RF Amplifier (I pattern output)*
   This inputs pickup photo diode output current (A+C) to FIN2 (1pin), and (B+D) to FIN1 (2 pin). Input current is IV-converted, and output to RFSM (41 pin) of RFSM amplifier output by way of AGC circuit. Self-contained AGC circuit has variable range of ± 3dB, and the time constant can be varied by outside-fixed condenser of PH1 (60 pin). This also controls bottom level of EFM signal (RFSM output), and this response can be varied by outside-fixed condenser of BH1 (61 pin). Central gain of AGC variable range is set by resistance value between RFSM (41 pin) and RFS-(42 pin).

3. *SLC (Slice level control)*
   SLC makes duty of EFM signal which is input to DSP 50%. This judges duty, and decides DC level by integrating EFMO signal which is output from DSP.

4. *Focus servo*
   Focus error signal can be gained by detecting the difference between (A+C) and (B+D), which is (B+D)-(A+C), and it is sent to FE (20 pin). Focus error signal gain is set by resistance value between FE (20 pin) and FE- (21 pin).
   FA amplifier is phase compensating Amplifier, and the equalizer curve is set by outside-fixed capacitor and resistance. Besides, this amplifier has muting function. FD amplifier has the following functions; phase compensating circuit, focus search signal synthesis, and offset canceling. Focus search starts by F-SEARCH command, and generates ramp wave shape by inner clock. Focus error signal by this wave shape detects infocus condition (focus zero cross), and turns on focus servo. Ramp wave shape amplitude is set by resistance between FD (16 pin) and FD-(17 pin).

5. *Tracking servo*
   This inputs pickup photo diode output current to E (3 pin) and F (4 pin). Input current is IV-converted, and output to TE (7 pin) by way of VCA circuit for balance adjustment and VCA circuit for follow-up to RFAGC circuit. Tracking error gain is set by resistance between TE- (6 pin) and TE (7 pin).
   TOFF amplifier just after TE (7 pin) turns off servo by TOFF signal from DSP.
   TH amplifier varies servo response characteristic by TGL signal from DSP, or by THLD signal of inside formation by detecting JP signal. When DEFECT is detected, inside mode changes into THLD. This can be avoided by causing short circuit in DEF (49 pin) to "L"=GND.
   In case of detection, gain can be automatically up by configurating outside DCI (9 pin) band pass filter which picks up only shock element out of tracking error signals and putting it in.
   TO amplifier has the function of synthesizing JP pulse and canceling tracking offset. JP pulse is set by JP (14 pin) (THLD is detected inside).

6. *Sled servo*
   SLEQ (28 pin) sets response characteristic. Amplifier after SLEQ (28 pin) has muting function, and mutes SLOF (38 pin) by "H" or SLED OFF command. Sled feed is operated by means of current input to SL (30 pin) and SL+ (31 pin), that is, by connecting to output port of micro computer by resistance and setting feeding gain by the resistance value.

7. *Spindle servo*
   This configurates, together with DSP, servo circuit to keep disc linear velocity at a scheduled level. This receives signal from DSP by CV- (39 pin) and CV+ (40 pin), and sets equalizer characteristic by SP (23 pin), SP- (36 pin) and SPD (27 pin) which output to SPD (27 pin). SPG (25 pin) is set by resistance with which amplifier gain of 12 cm mode is connected to standard voltage.

8. *TES, HFL (Traverse signal)*
In transferring pickup from inner track to outer track, EF output from pickup should be so connected that HFL and TES have phase relation as shown in the figure below. TES comparator has about ± 100mV hysteresis at -polarity comparator against TESI input. To pickup exclusively necessary signals out of TE signals, band pass filter is configurated outside.

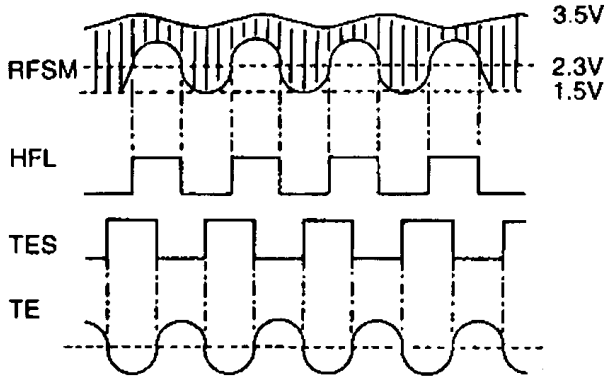


Fig. 8.1

9. *DRF (Beam level judgement)*
DRF becomes "H", when EFM signal (RFSM output) is held at peak value by capacitor of PH1 (60 pin) and peak value of RFSM gets over 2.1V. Condenser of PH1 (60 pin) is related to setting both DRF constant when detected and RFAGC response.

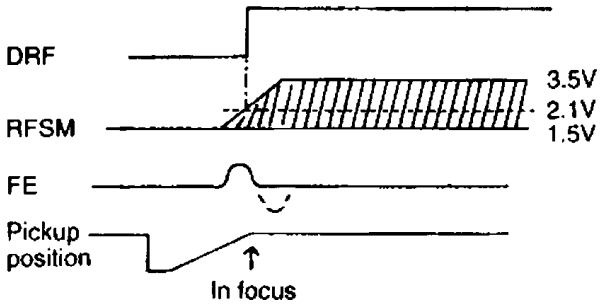


Fig. 8.2

10. *In-focus judgement*
This detects DEF+0.2V of focus error signal S curve, and then judges focus zero cross (being in focus) when S curve becomes REF.

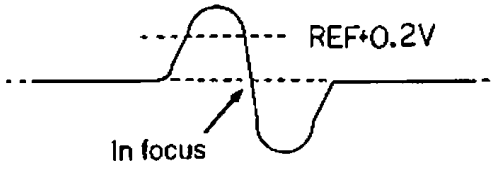


Fig. 8.3

11. *DEFECT*
This normally maintains mirror surface level by capacitor of LF2 (59 pin), and when lack of EFM signal (RFSM output) gets over 0.35V, outputs "H" to DEF (49 pin). When DEF (49 pin) becomes "H", tracking servo changes into THLD mode.

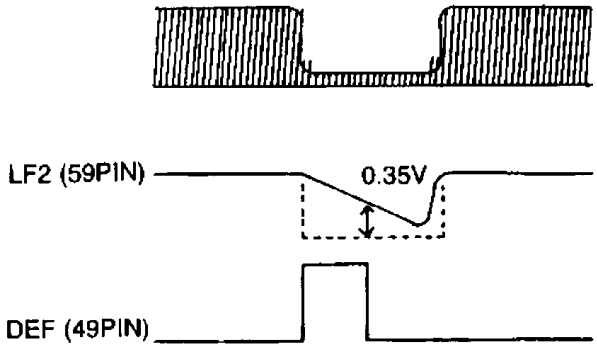


Fig. 8.4

12. *Reset circuit*
When Vcc gets over about 2.8V, Power on Reset is canceled.

6. NOTES REGARDING COMPACT DISC PLAYER REPAIRS

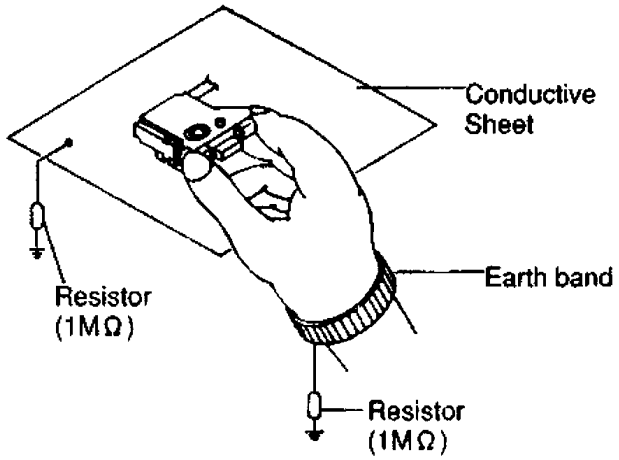
6.1 Preparations

1. Compact disc players incorporate a great many LCD as well as the pickup (laser diode). These components are sensitive to, and easily affected by, static electricity. If such static electricity is high voltage, components can be damaged, and for that reason components should be handled with care.
2. The pickup is composed of many optical components and other high-precision components. Care must be taken, therefore, to avoid repair or storage where the temperature of humidity is high, where strong magnetism is present, or where there is excessive dust.

6.2 Notes for repair

1. Before replacing a component part, first disconnect the power supply lead wire from the unit.
2. All equipment, measuring instruments and tools must be grounded.
3. The workbench should be covered with a conductive sheet and grounded.
   When removing the laser pickup from its conductive bag, do not place the pickup on the bag. (This is because there is the possibility of damage by static electricity.)
4. To prevent AC leakage, the metal part of the soldering iron should be grounded.
5. In removing short circuit solder of LASER PICKUP, use ceramic heater type of soldering iron.
6. Workers should be grounded by a earth band (1 MΩ).
7. Care should be taken not to permit the laser pickup to come in contact with clothing, in order to prevent static electricity changes in the clothing to escape from the earth band.
8. The laser beam from the pickup should NEVER be directly facing the eyes or bare skin.

Countermeasure of electrostatic

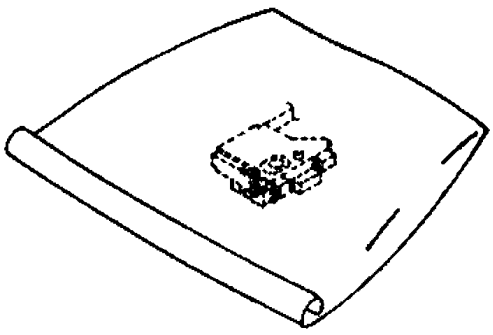


7. NOTES REGARDING HANDLING OF THE PICKUP

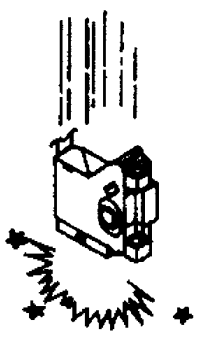
7.1 Notes for transport and storage

1. In retaining the product, high temperature, high humidity and dusty circumstances must be avoided. After taking it out of packing box, never leave it at the place where dust can occur. (Take every possible preventive means against dust.)
2. The pickup should always be left in its conductive bag until immediately prior to use.
3. As this is minutely adjusted, be careful never give it any shock from drop or careless handling.

Storage in conductive bag

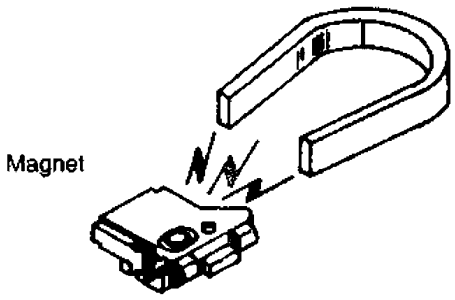


Drop Impact

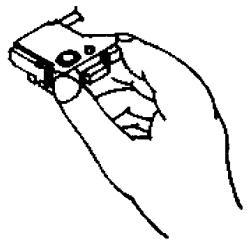


7.2 Repair notes

1. The pickup, incorporates a strong magnet, and so should never be brought close to magnetic materials.

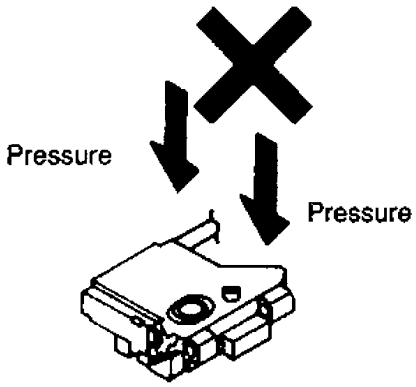


2. The pickup should always be handled correctly and carefully, taking care to avoid external pressure and impact. If it is subjected to strong pressure or impact, the result may be an operational malfunction and/or damage to the printed circuit board.

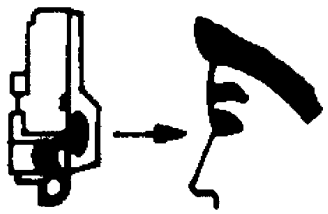


How to hold the pickup

Grabbing print circuit board or pulling connecting wire causes function deterioration or failure. Be sure to hold the whole housing.

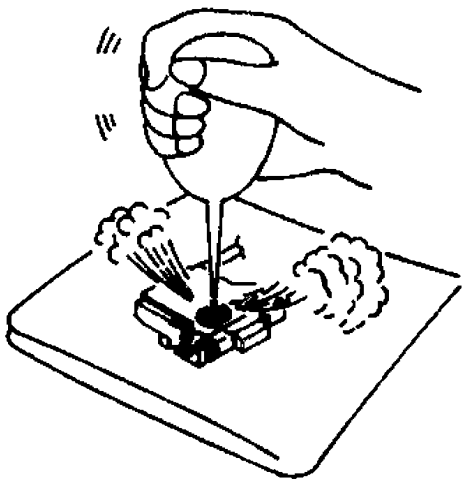


3. If LASER PICKUP or MECHA ASSY is set or reset with power supplied, LASER DIODE or PHOTO DETECTOR is damaged. Be sure to turn off power supply switch before setting or resetting LASER PICKUP or MECHA ASSY.
4. To prevent LASER DIODE or PHOTO DETECTOR from being deteriorated or damaged by static electricity, be sure to thoroughly practice earthing as a preventive means against damage from static electricity.
5. Take every possible means against damage of LASER DIODE or PHOTO DETECTOR from overcurrent or overvoltage. (Example-Use power source equipped with current limiter.)
6. If fingerprint or any other foreign material is attached on objective lens, the function is extremely deteriorated. Be sure never to touch objective lens. Particularly, be very careful in removing or fitting lens cover.
7. PICKUP is a single part, and very minutely adjusted as such. Therefore, never touch any of adjustment points, fixing screws or print circuit board of PICKUP.
   a. If you touch partially fixed volume soldered on circuit board (beam quantity adjusting volume), emitted beam quantity (RF LEVEL) can change. Never touch partially fixed volume.
   b. If there occurs even a very small shift in the circuit board fixture position, the function greatly changes. In handling LASER PICKUP, be very careful to hold metal part of housing (HOUSING).
8. If metal part of adjusting rod or driver touches circuit board when power is supplied, it can cause failure. Be careful.
9. Laser beam may damage the eyes! Absolutely never permit laser beams to enter the eyes! Also NEVER switch ON the power to tire laser output part (lens, etc.) of the pickup if it is damaged.



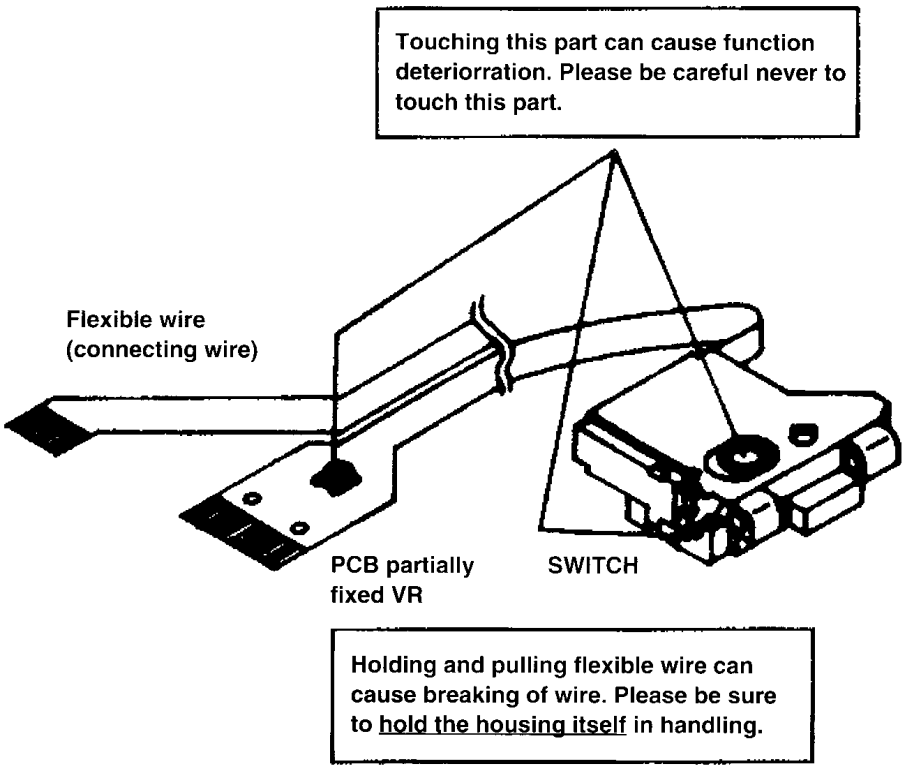
NEVER look directly at the laser beam, and don't let contact fingers or other exposed skin.

10. Cleaning the lens surface
    If there is dust on the lens surface, the dust should be cleaned away by using an air brush (such as used for camera lens). The lens is held by a delicate spring.

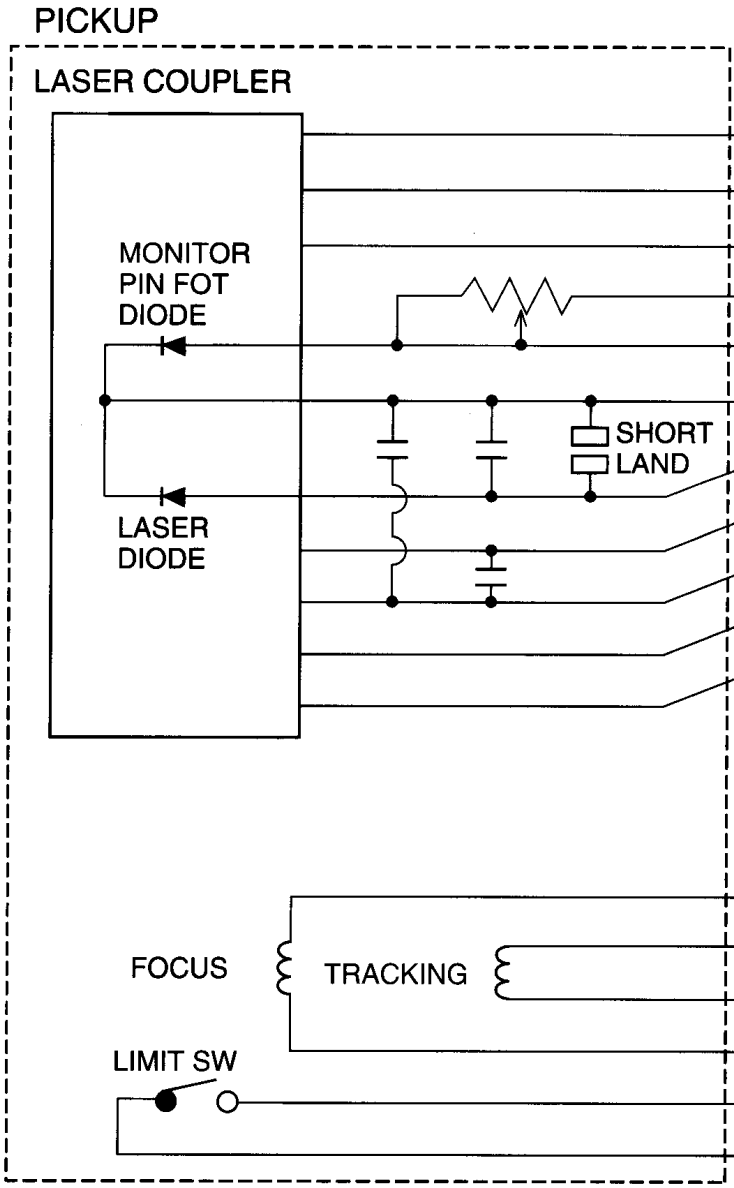


Conductive Sheet

11. Never attempt to disassemble the pickup.



8. PICKUP DETAIL



LC FLEXIBLE

PIN No.	TERMINAL	
1	PDIC	PD2
2	PDIC	PD1
3	PDIC	F
4	LD	VR
5	LD	PD
6	PDIC/LD	GND
7	LD	LD
8	PDIC	Vcc
9	PDIC	Vc
10	PDIC	E
11	PDIC	A/L
12	N.C.	

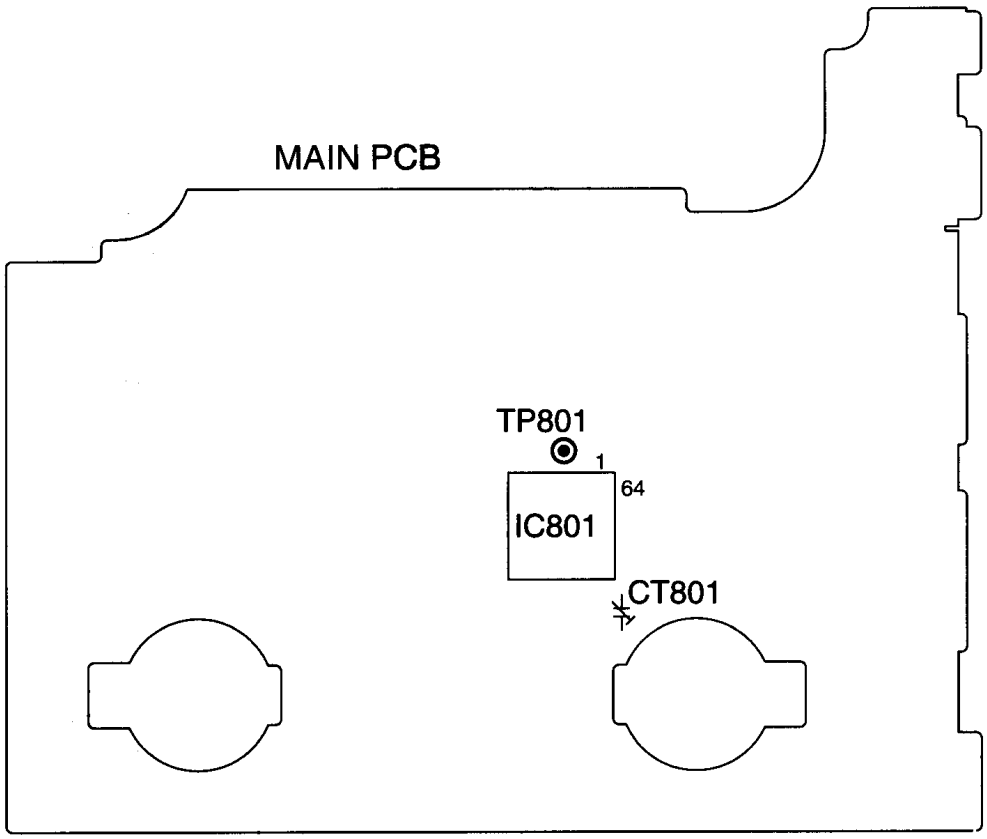
S2 FLEXIBLE

PIN No.	TERMINAL
1	FCS (+)
2	TRK (-)
3	TRK (+)
4	FCS (-)
5	SW
6	SW

9. ADJUSTMENT PROCEDURES

9.1 Clock adjustment

Connect the frequency counter between TP801 and GND while pushing M1 key with setting movement mode (OFF indication), then adjust the frequency around 1048.552 to 1048.600Hz. The adjustment is performed via CT801.



10. DISASSEMBLY

10.1 Chassis, top

1. Undo the (A) screw that holds the CHASSIS, TOP. Push up the four hooks with tweezers, for example, and the CHASSIS, TOP comes off.

10.2 Assy, panel, front

1. Undo the four (B) screws that hold the ASSY, PANEL, FRONT and the CHASSIS. Remove the FPC and the socket, and the ASSY, PANEL, FRONT comes off.

10.3 CD changer mechanism

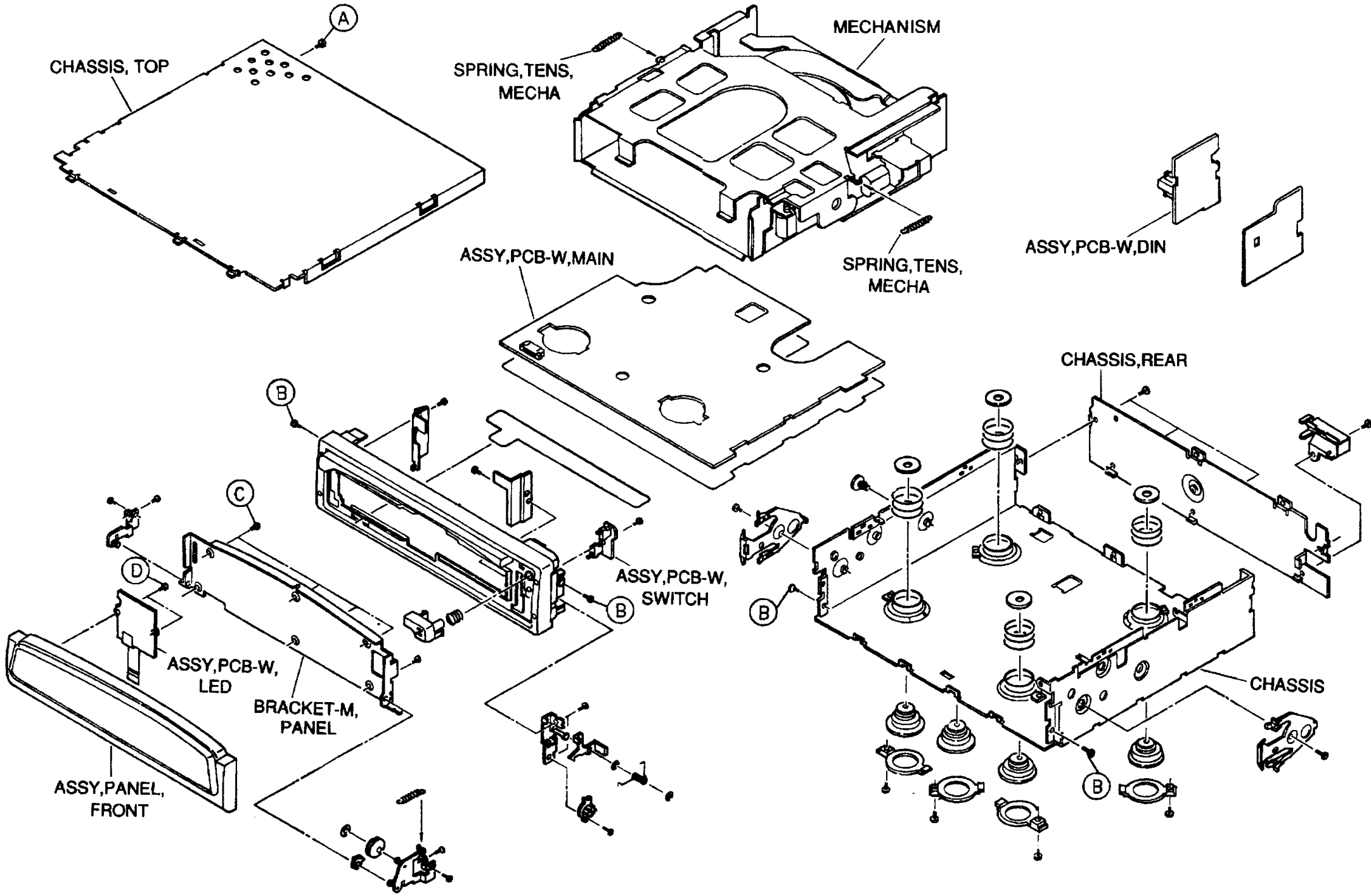
1. Dismount the two SPRING, TENS, MECHAs that hold the CD CHANGER MECHA and the CHASSIS.
2. Pull up the CD CHANGER MECHA and undo the four shafts below the MECHA from the DAMP.
3. Bridge the short round of FPC that comes out of the PICKUP. Undo the four FPCs that come out of the CD CHANGER MECHA, and the CD CHANGER MECHA comes off.

10.4 Assy, PCB-W, main

1. Straighten the six hooks of the CHASSIS that hold the ASSY, PCB-W, MAIN, and the ASSY, PCB-W, MAIN comes off.

10.5 Assy, PCB-W, LED

1. Undo the six (C) screws that hold the ASSY, PANEL, FRONT and the BRACKET-M, PANEL.
2. Undo the two (D) screws that hold the ASSY, PCB-W, LED, and the ASSY, PCB-W, LED comes off.


A
CHASSIS, TOP
SPRING,TENS,
MECHA
MECHANISM
SPRING,TENS,
MECHA
ASSY,PCB-W,DIN
ASSY,PCB-W,MAIN
CHASSIS,REAR
B
C
D
ASSY,PCB-W,
SWITCH
ASSY,PCB-W,
LED
BRACKET-M,
PANEL
CHASSIS
ASSY,PANEL,
FRONT
22RC047

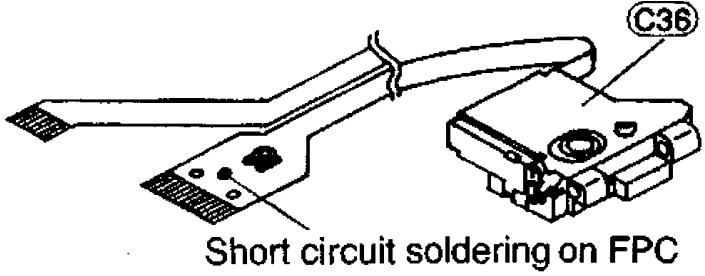


Fig.1

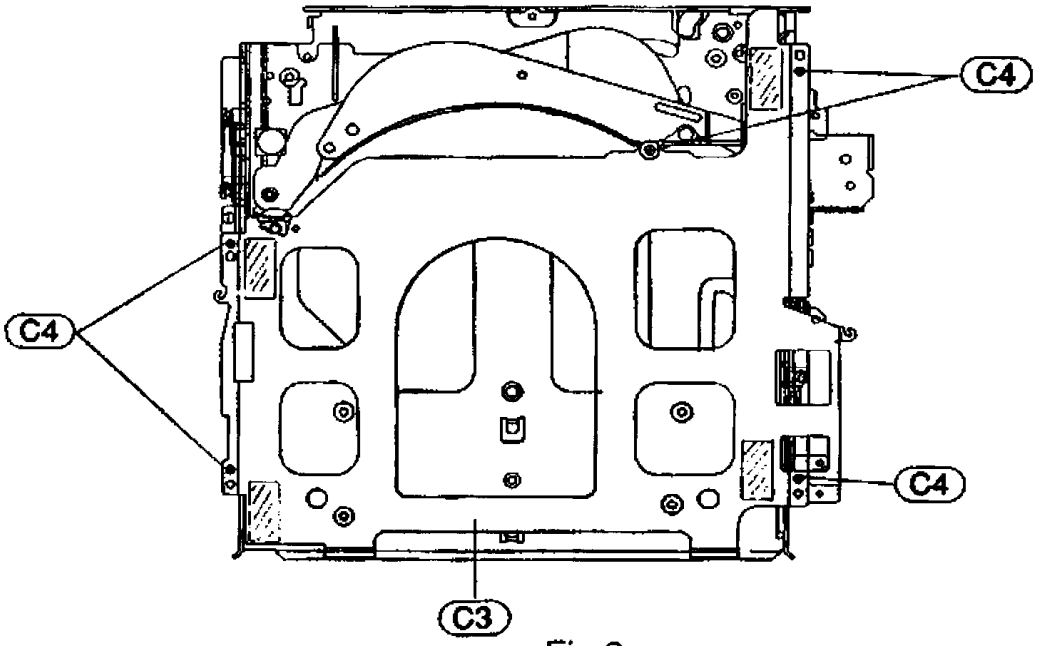


Fig.2

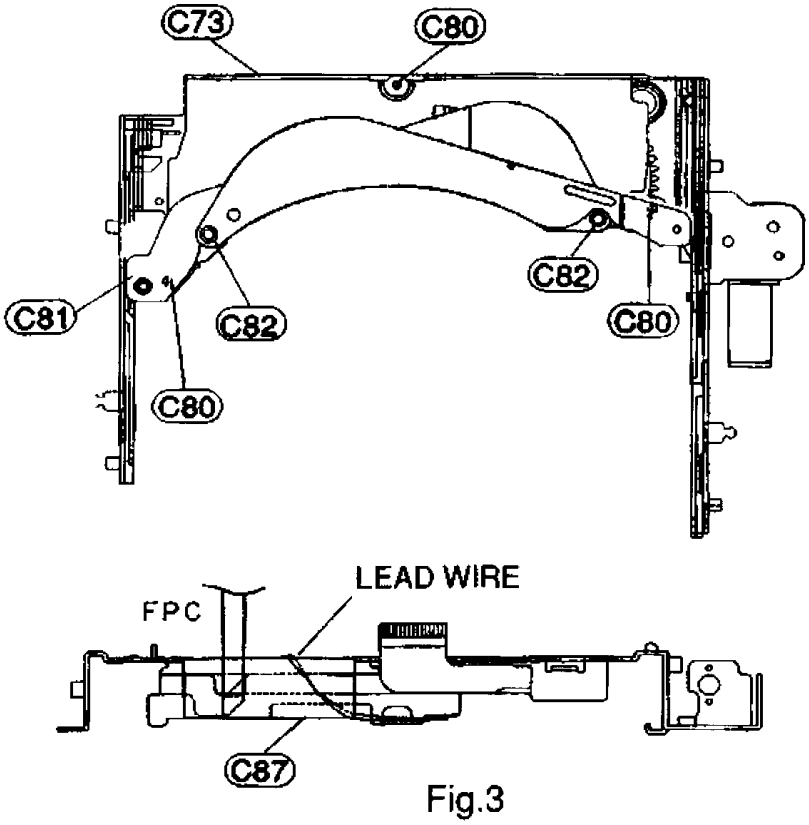


Fig.3

10.6 CD Changer Mechanism

A. How to dismount the Pickup (C36): [Refer to Figures 1, 2, 3 and 4]

1. When dismounting the Mechanism from the set, bridge the short round of FPC that comes out of the Pickup.
2. Undo the five special screws (C4) that hold the ASSY Chassis Top (C3).
3. Remove the two Ring E 2 (C82) and then the Lever ASSY "PANTA" (C81).
4. Undo the three special screws (C80) that mount the ASSY Chassis Top "ELV" (C73).
5. Loosen the Mount-M "SCREW OUT" (C44) and remove the Gear "FB" (C47).
6. Undo the two screws (C46) and the lead wire that comes out of the Feed Motor ASSY (C42). Remove the Mount-M "SCREW OUT" (C44).
7. Dismount the Pickup (C36) and remove the Plate Spring "FEED" (C37), Mount-E "FEED" (C38), special screws (C39) (C40) and the Screw Shaft ASSY (C41).
8. Remove the Sheet (C87) and the Pickup (C36) comes off.

B. How to dismount the Rotary Motor ASSY (C74): [Refer to Figures 1,2,3,4, and 5]

1. Refer to instructions 1 to 4 of "A. How to dismount the Pickup".
2. Undo the Mount-M "SPECIAL WASHER" Top Chassis Fix (C79) and remove the Gears "RA, RB, RC" (C76), (C77), (C78).
3. Undo the two screws (C75). Remove the lead wire of the Rotary Motor ASSY (C74), and the Rotary Motor ASSY (C74) comes off.

C. How to dismount the Feed Motor (C42) [Refer to Figures 1, 2, 3 and 4]:

1. Refer to instructions 1 to 6 of "A. How to dismount the Pickup".
2. Undo the two screws (C43). And the Feed Motor ASSY (C42) comes off.

D. How to dismount the Spindle Motor ASSY (C24) [Refer to Figures 1, 2, 3, 4 and 6]:

1. Refer to instructions 1 to 6 of "A. How to dismount the Pickup".
2. Dismount the Pickup (C36) (with (C37) to (C41) attached).
3. Undo the screw (C23) and remove the Mount-M "SCREW IN" (C20), the Lever "DISC SLEEVE" (C21), the Torsion Spring "CHUCK" (C22).
4. Undo the screws (C46) (C27), unstick FPC of the Spindle Motor ASSY from the CD Chassis ASSY (C19) and dismount the Spindle Motor ASSY (C24). Undo the screw (C33) and dismount the Mount-M ASSY "DISC SLEEVE R" (C29). And the Spindle Motor ASSY (C24) comes off.

E. How to dismount the Elevator Motor ASSY (C11) [Refer to Figures 1, 2 and 7]:

1. Refer to instructions 1 and 2 of "A. How to dismount the Pickup".
2. Remove the Gear "EA" (C13) and the Gear "EB" (C14).
3. Undo the two screws (C12) and the Elevator Motor ASSY (C11). When removing the lead wire, the Elevator Motor ASSY (C11) comes off.

F. How to dismount the Elevator Motor ASSY (Magazine Motor ASSY) (C62) [Refer to Figure 8]:

1. Remove the Mount-M "SPECIAL WASHER" Top Chassis Fix (C69). Remove the Gears "MA, MB, MC, MD, ME" (C64), (C65), (C66), (C67), (C68).
2. Undo the two screws (C63) and dismount the Elevator Motor ASSY (Magazine Motor ASSY) (C62).
3. Remove the Sheet (C86) and the lead wire.
   And the Elevator Motor ASSY (Magazine Motor ASSY) (C62) comes off.

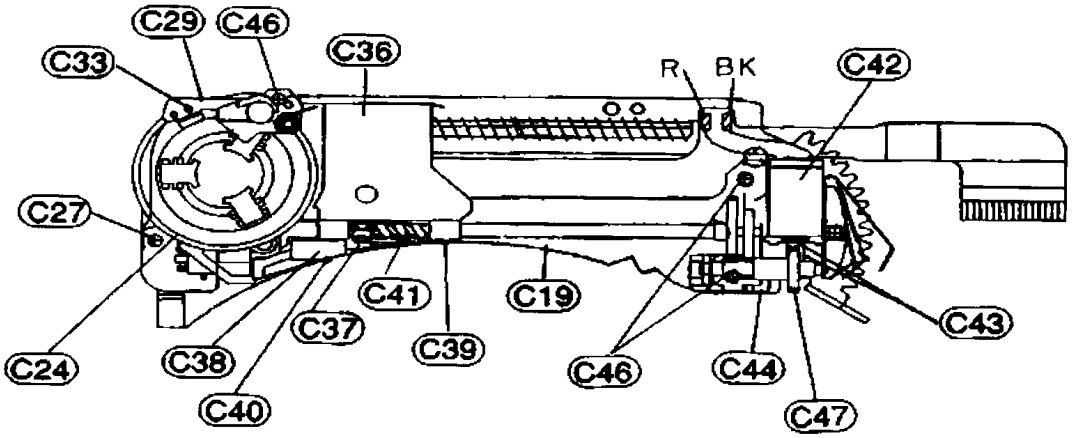


Fig.4

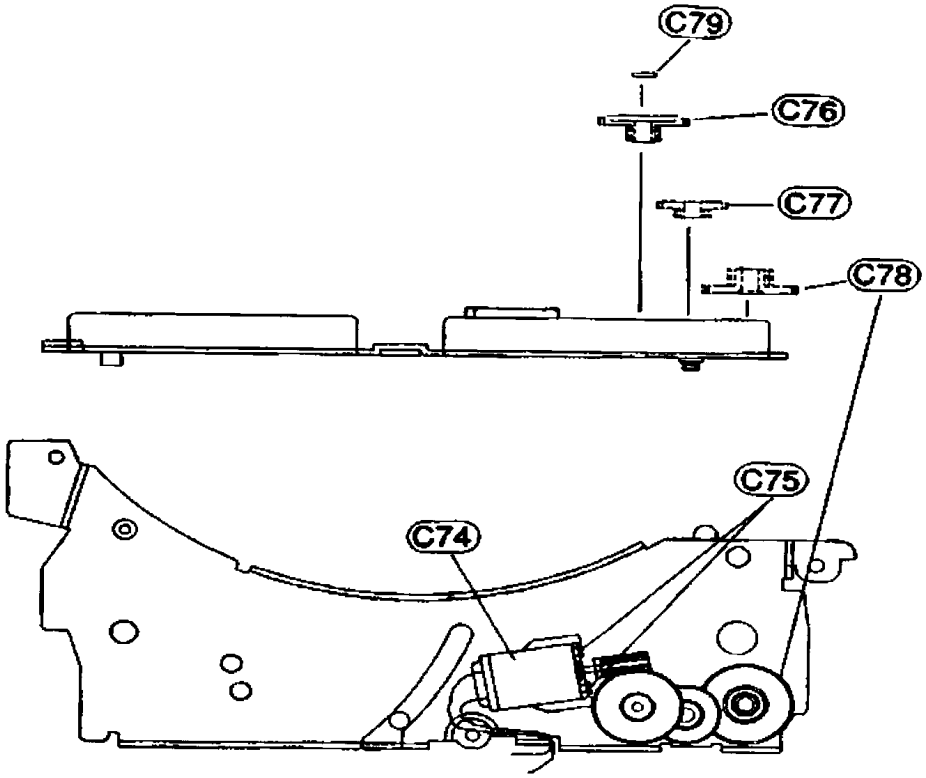


Fig.5

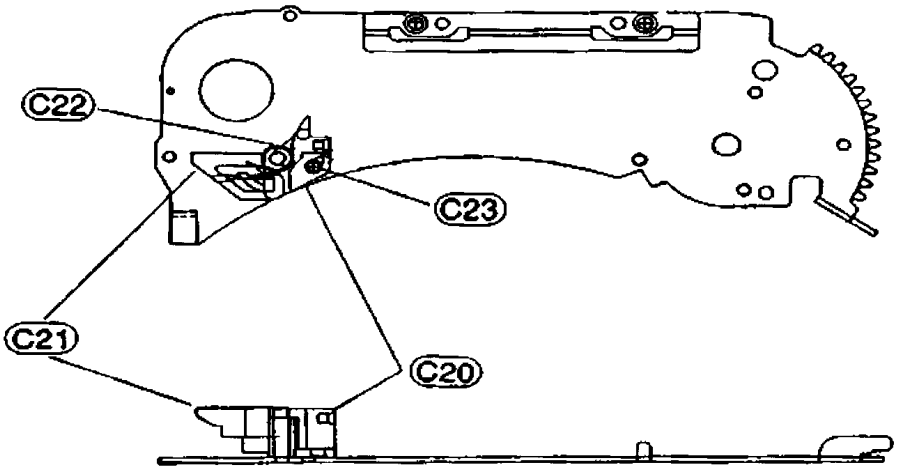


Fig.6

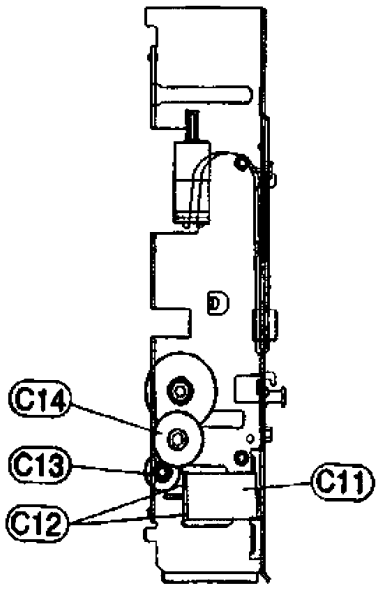


Fig.7

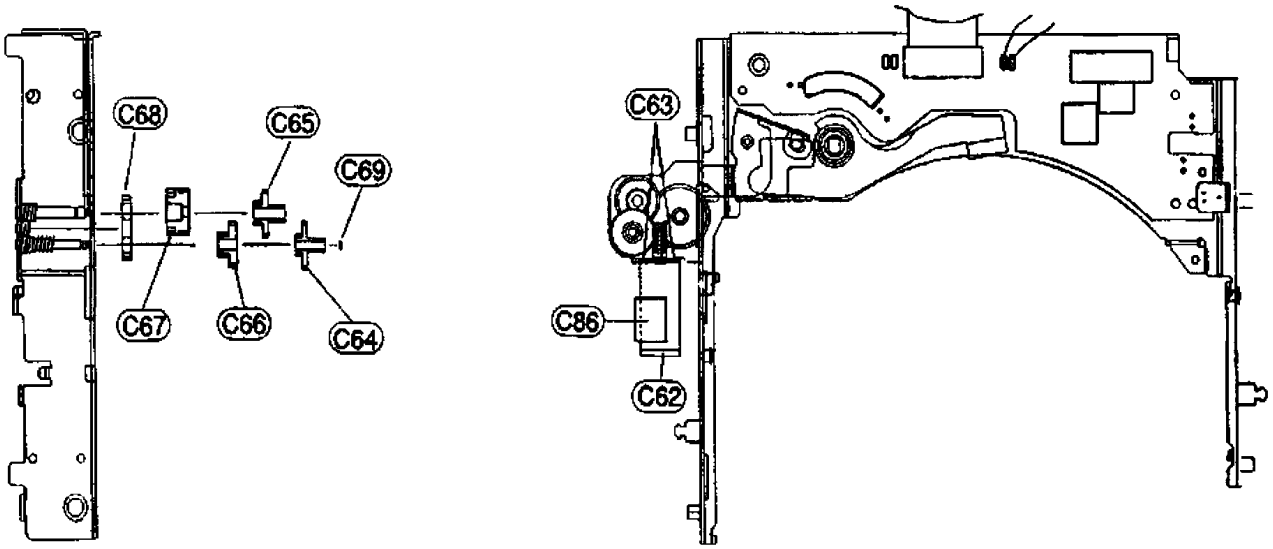


Fig.8

11. OSCILLOGRAM CHARTS AND REFERENCES

Notes:

- *All voltages given in these tables are average DC values, unless otherwise noted!*
- *'Fig. ..-1 / -2 / ..' means: 'Fig. ..-channel 1 (lowest signal) / -channel 2 / ..' (etc.).*

IC601 – LC78620E

1:	0V
2:	N.C.
3:	3.0V
4:	0V
5:	1.8V
6:	5.0V
7:	1.5V
8:	0V
9:	N.C.
10:	*Fig.5-1*
11:	2.5V
12:	N.C.
13:	*Fig.5-3*
14-15:	0V
16-17:	N.C.
18-19:	0V
20:	*Fig.5-4*
21-22:	N.C.
23:	0V
24:	*Fig.5-2*
25-26:	N.C.
27:	5.0V
28:	*Fig.6-1*
29:	*Fig.6-2*
30-37:	N.C.
38-41:	0V
42:	*Fig.3-1*
43:	*Fig.3-2*
44:	*Fig.3-3*
45:	*Fig.4-1*
46:	N.C.
47:	5.0V
48-49:	N.C.
50-51:	0V
52-53:	N.C.
54:	5.0V
55-60:	N.C.
61:	0V
62:	N.C.
63:	*Fig.1-1*
64:	*Fig.4-4*
65:	*Fig.4-3*
66:	*Fig.4-2*
67:	*Fig.1-2*
68:	5.0V
69-70:	N.C.
71:	*Fig.3-4*
72:	*Fig.2-1*
73-74:	N.C.
75-76:	0V
77:	*Fig.2-3*
78:	*Fig.2-2*
79:	5.0V
80:	N.C.

IC650 – LA9240M

1-21:	2.5V
22:	0V
23-31:	2.5V
32:	*Fig.6-2*
33:	*Fig.6-1*
34:	5.0V
35:	0V
36:	*Fig.6-4*
37:	*Fig.6-3*
38-39:	0V
40:	*Fig.7-3*
41:	*Fig.7-1*
42-44:	2.5V
45:	0V
46-47:	2.5V
48:	N.C.
49:	0V
50:	*Fig.7-2*
51:	*Fig.7-4*
52:	*Fig.8-1*
53:	*Fig.8-2*
54:	5.0V
55:	N.C.
56:	5.0V
57-60:	2.5V
61:	2.0V
62:	3.8V
63:	0.2V
64:	0.5V

IC651 – BA6999FP

1-3:	2.5V
4:	N.C.
5-6:	2.5V
7:	8.0V
8:	0V
9:	8.0V
10:	0V
11:	0.5V
12:	0V
13:	*Fig.10-2*
14:	*Fig.10-1*
15-16:	N.C.
17-19:	0V
20:	8.0V
21-23:	0V
24-25:	N.C.
26:	2.5V
27-28:	N.C.

IC652 – LA6393M

1:	0V
2:	3.0V
3:	*Fig.9-1*
4:	0V
5-6:	2.3V
7:	*Fig.9-2*
8:	5.0V

Q602 – DTC144

B:	0V
C:	*Fig.9-1*
E:	0V

Q606 – DTC114

B:	*Fig.9-2*
C:	*Fig.9-1*
E:	0V

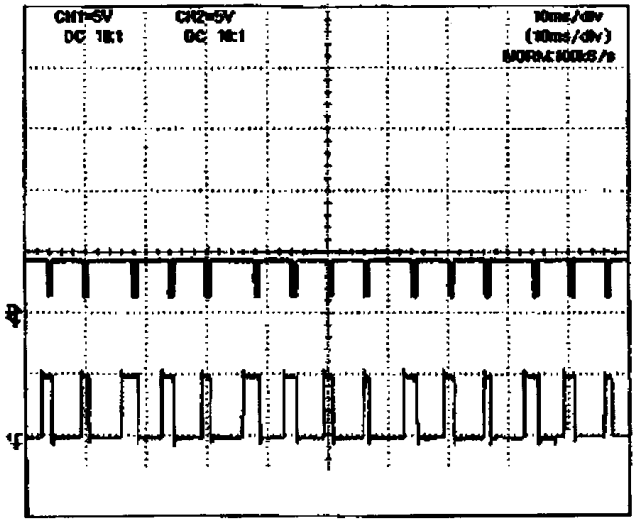


Fig1

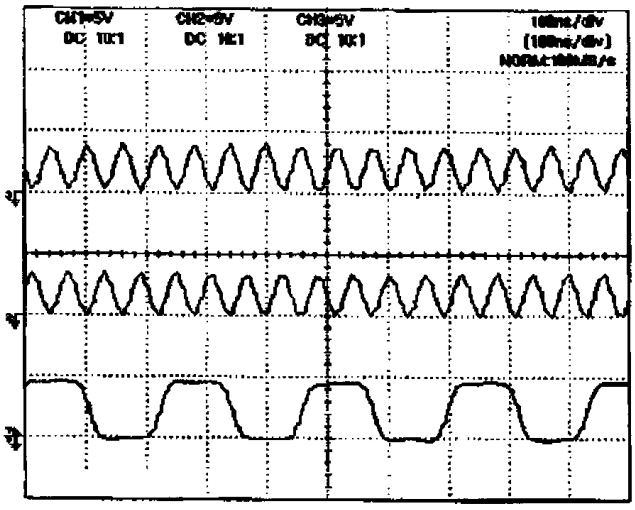


Fig2

Fig3

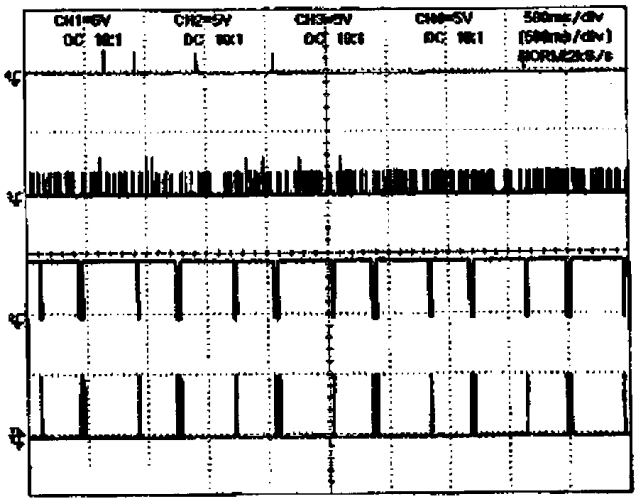


Fig4

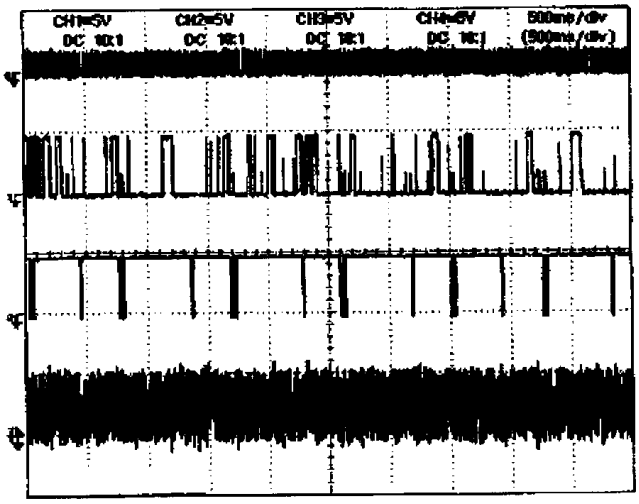


Fig5

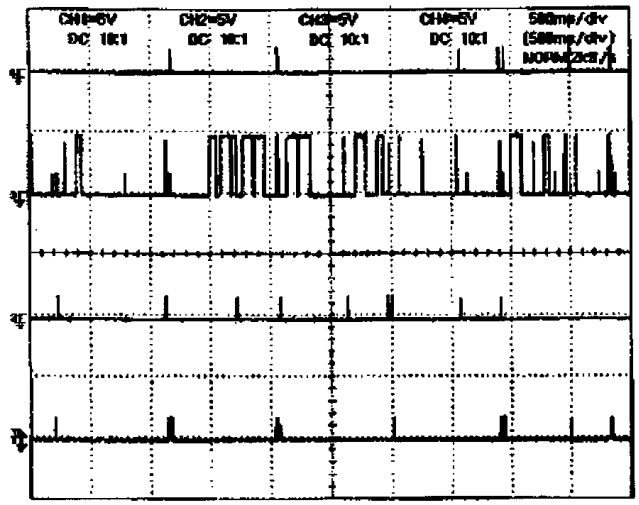


Fig6

Note:
The lowest signal represents channel 1; the signal just over it is the channel 2 signal etc.
This is valid for each oscillogram chart.

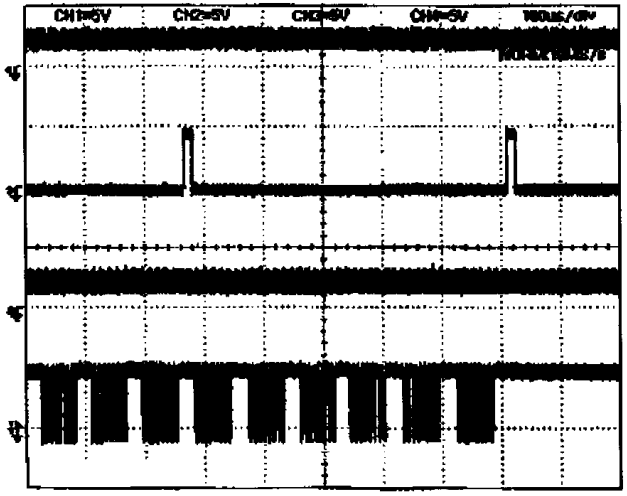


Fig7

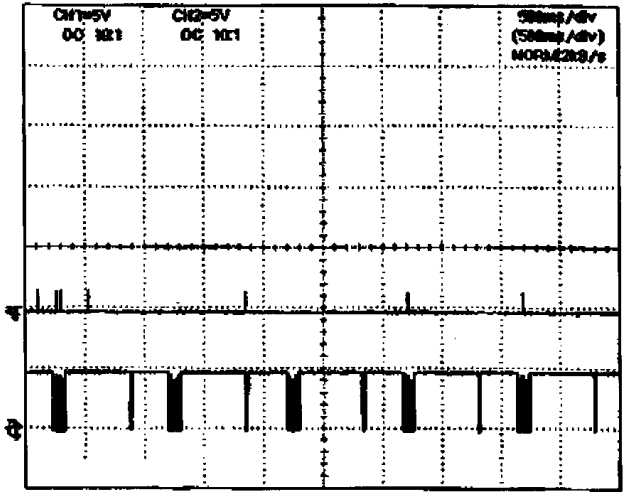


Fig8

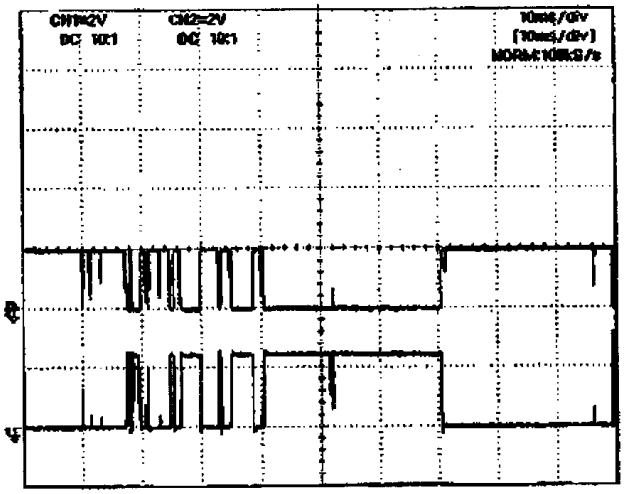


Fig9

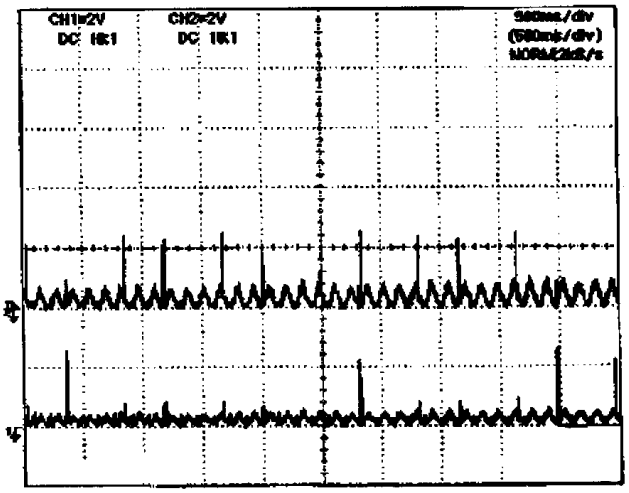


Fig10

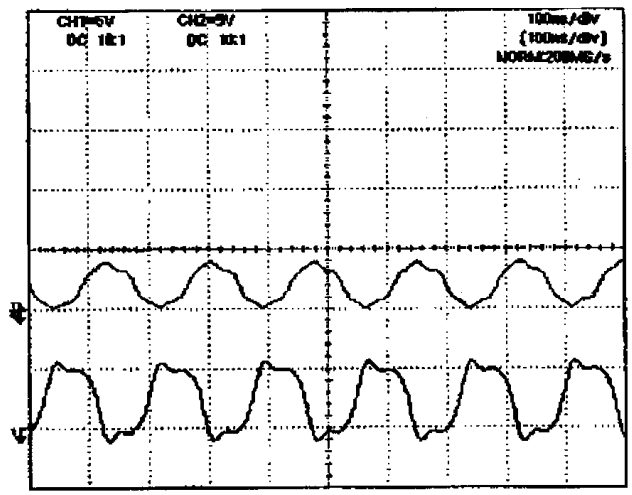


Fig11

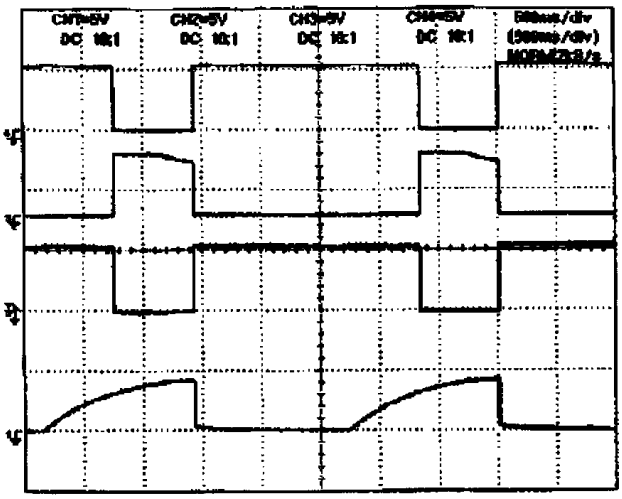


Fig12

Note:
The lowest signal represents channel 1; the signal just over it is the channel 2 signal etc. This is valid for each oscillogram chart.

Notes:

- *All voltages given in these tables are average DC values, unless otherwise noted!*
- *'Fig. ..-1 / -2 / ..' means: 'Fig. ..-channel 1 (lowest signal) / -channel 2 / ..' (etc.).*

IC1 – MSM514400D

1:	*Fig.22-4*
2:	*Fig.22-3*
3:	*Fig.21-2*
4:	*Fig.21-4*
5:	*Fig.20-1*
6-8:	N.C.
9:	*Fig.18-2*
10:	*Fig.18-1*
11:	*Fig.19-4*
12:	*Fig.19-3*
13:	5.0V
14:	*Fig.19-2*
15:	*Fig.19-1*
16:	*Fig.20-4*
17:	*Fig.20-3*
18:	*Fig.20-2*
19-21:	N.C.
22:	*Fig.21-1*
23:	*Fig.21-3*
24:	*Fig.22-2*
25:	*Fig.22-1*
26:	0V

IC101 – MSM6307

1-4:	N.C.
5:	5.0V
6:	0V
7-8:	5.0V
9:	*Fig.17-4*
10-12:	0V
13:	N.C.
14:	5.0V
15:	*Fig.17-3*
16:	0V
17:	5.0V
18:	N.C.
19-20:	2.3V
21:	5.0V
22:	N.C.
23:	5.0V
24:	*Fig.11-2*
25:	*Fig.11-1*
26:	5.0V
27-32:	N.C.

IC701 – PCM1710U

1:	*Fig.16-1*
2:	*Fig.16-2*
3:	*Fig.13-3*
4:	*Fig.13-4*
5:	*Fig.13-1*
6:	*Fig.13-2*
7:	0V
8-9:	5.0V
10:	0V
11-13:	2.5V
14:	0V
15:	5.0V
16-18:	2.5V
19:	0V
20-21:	5.0V
22:	0V
23:	5.0V
24:	0V
25:	5.0V
26:	0V
27:	0V
28:	5.0V

IC801 – UPD78P018FGC

1:	5.0 / 0V
2:	0 / 5.0V
3:	5.0V
4-8:	5.0 / 0V
9:	0V
10-11:	5.0V
12-13:	0V
14:	*Fig.4-4*
15:	*Fig.4-2*
16:	*Fig.1-2*
17:	5.0V
18:	*Fig.4-3*
19:	*Fig.1-1*
20-21:	5.0V
22:	0V
23:	5.0V
24-26:	0V
27:	5.0V
28:	0V
29:	5.0V
30-31:	0V
32:	5.0V
33:	0V
34-37:	5.0V
38:	0V
39-40:	5.0V
41:	*Fig.14-2*
42:	*Fig.14-1*
43:	0V
44:	5.0V
45-46:	0V
47:	3.5V
48:	0V
49:	*Fig.4-1*
50:	5.0V
51:	*Fig.17-2*
52:	*Fig.17-3*
53:	*Fig.17-1*
54-57:	5.0V
58-59:	0V
60:	5.0V
61-62:	0V
63:	*Fig.17-4*
64:	5.0 / 0V

IC901 – LC89153

1:	5.0V
2-3:	0V
4:	5.0V
5-10:	N.C.
11:	0V
12:	*Fig.17-1*
13:	*Fig.17-2*
14:	5.0V
15-17:	0V
18:	*Fig.3-2*
19:	*Fig.3-1*
20:	*Fig.3-3*
21:	*Fig.4-1*
22-23:	N.C.
24:	5.0V
25-27:	N.C.
28:	0V
29-30:	N.C.
31-32:	5.0V
33:	*Fig.22-1*
34:	*Fig.22-2*
35:	*Fig.22-3*
36:	*Fig.22-4*
37:	*Fig.21-1*
38:	*Fig.21-2*
39:	*Fig.21-3*
40:	*Fig.21-4*
41:	5.0V
42-43:	N.C.
44:	*Fig.20-1*
45:	*Fig.20-2*
46:	*Fig.20-3*
47:	*Fig.20-4*
48:	*Fig.19-1*
49:	0V
50:	*Fig.19-2*
51:	*Fig.19-3*
52:	*Fig.19-4*
53:	*Fig.18-1*
54:	*Fig.18-2*
55:	0V
56:	5.0V
57-60:	0V
61:	5.0V
62:	*Fig.16-2*
63:	*Fig.16-1*
64:	*Fig.13-3*

IC951 – TC74HC14AF
(Note: all voltages measured at ACC = off)

1:	*Fig.15-1*
2:	*Fig.15-2*
3:	*Fig.15-3*
4:	*Fig.15-4*
5:	*Fig.12-1*
6:	*Fig.12-2*
7:	0V
8:	*Fig.12-3*
9:	*Fig.12-4*
10:	N.C.
11:	0V
12:	N.C.
13:	0V
14:	5.2V

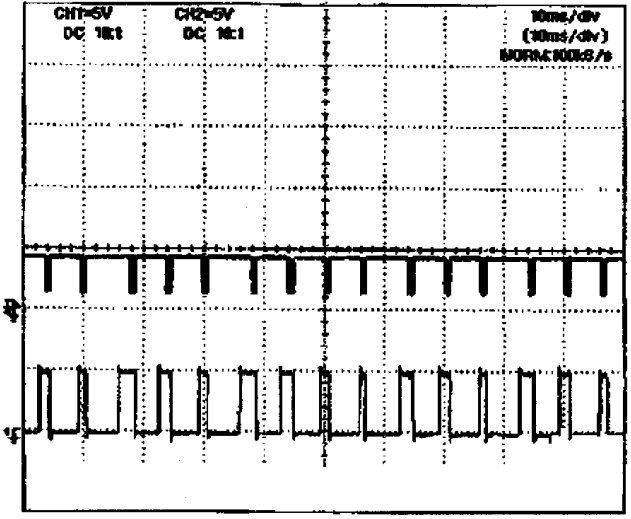


Fig1

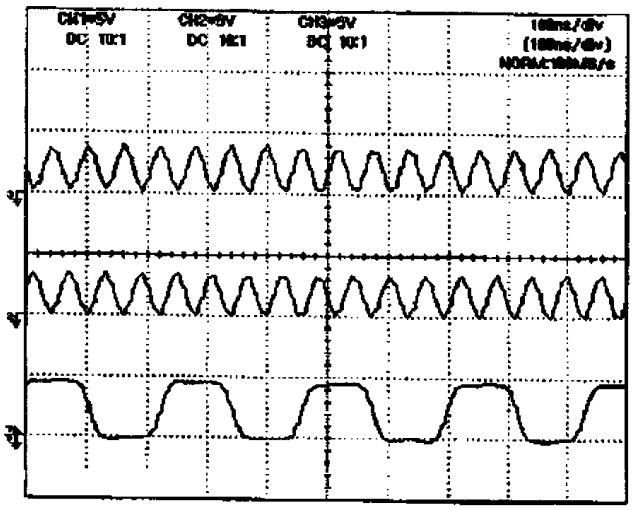


Fig2

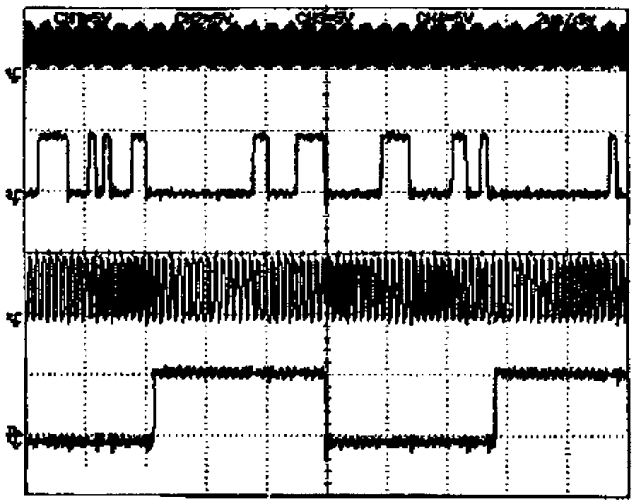


Fig3

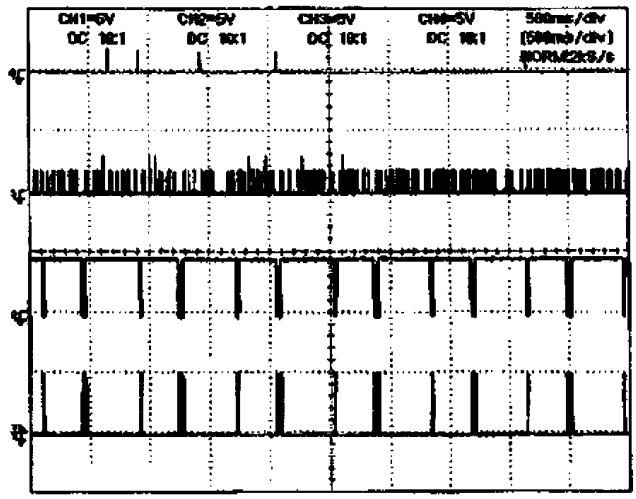


Fig4

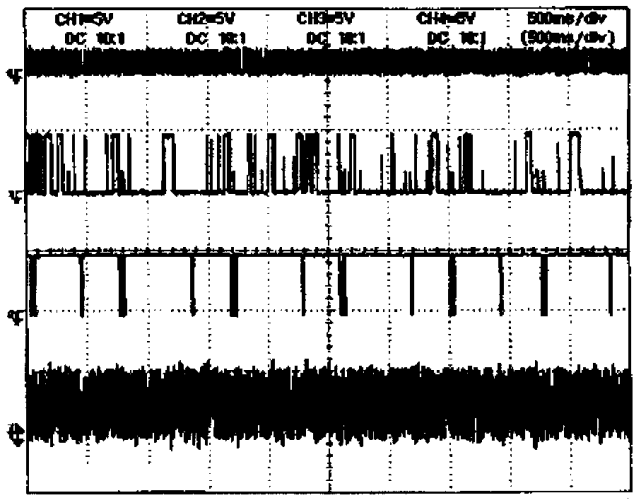


Fig5

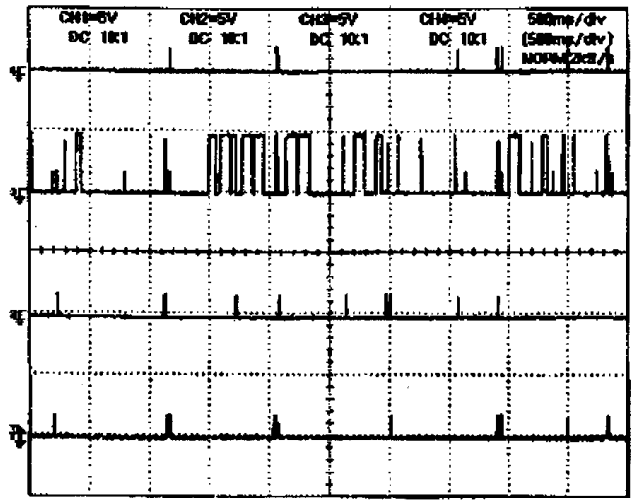


Fig6

Note:
The lowest signal represents channel 1; the signal just over it is the channel 2 signal etc. This is valid for each oscillogram chart.

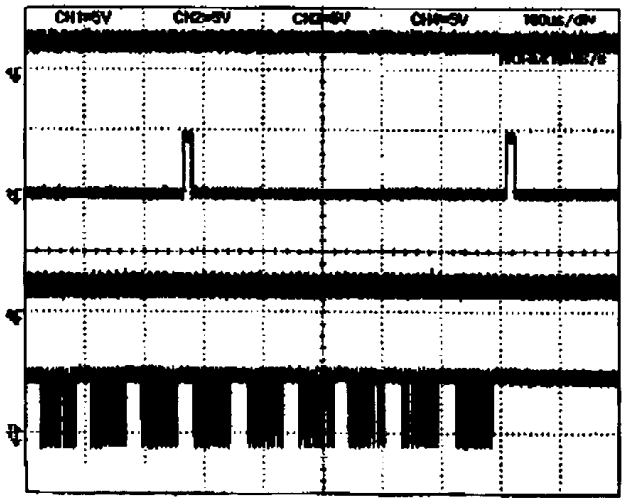


Fig7

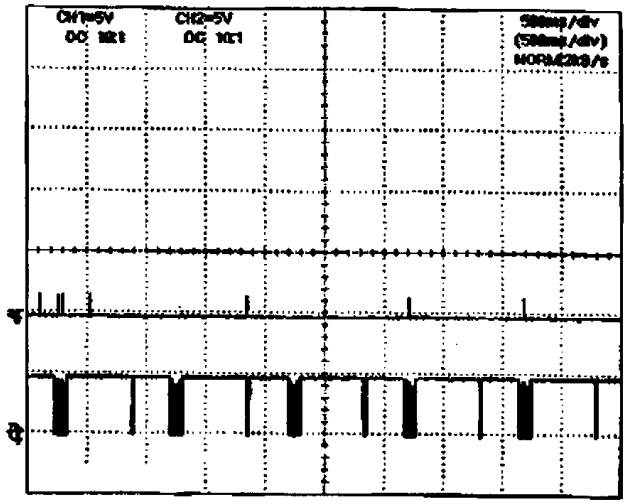


Fig8

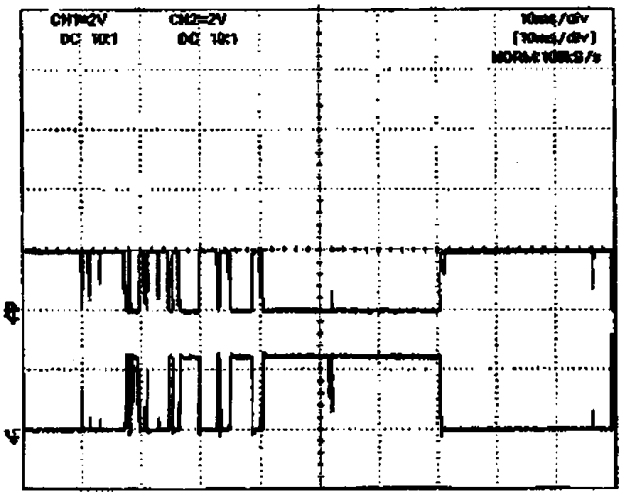


Fig9

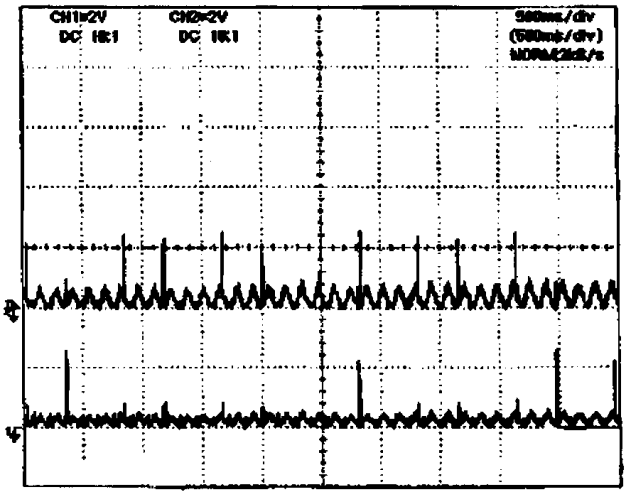


Fig10

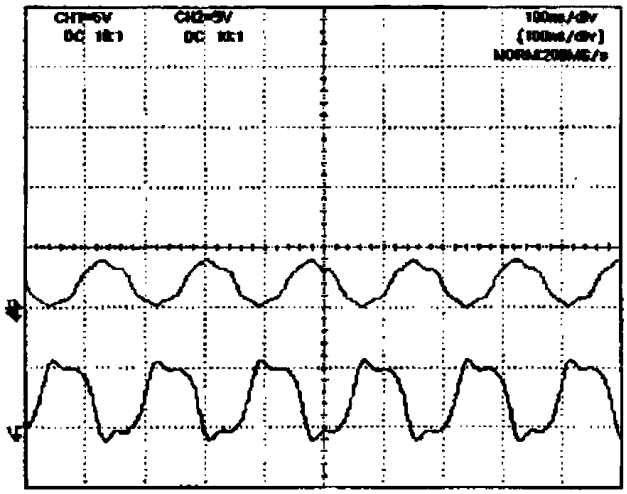


Fig11

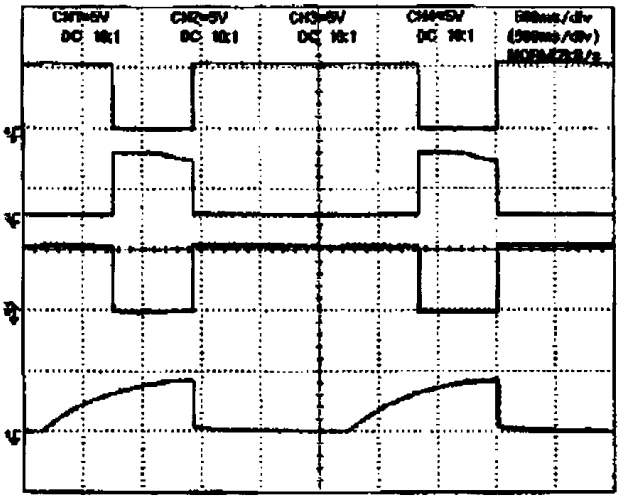


Fig12

Note:
The lowest signal represents channel 1; the signal just over it is the channel 2 signal etc.
This is valid for each oscillogram chart.

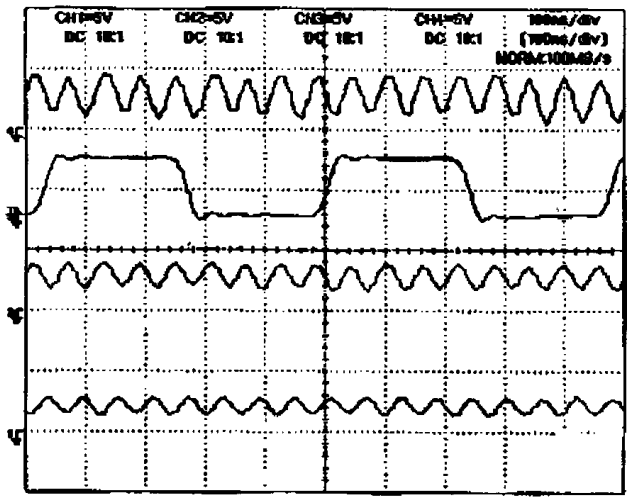


Fig13

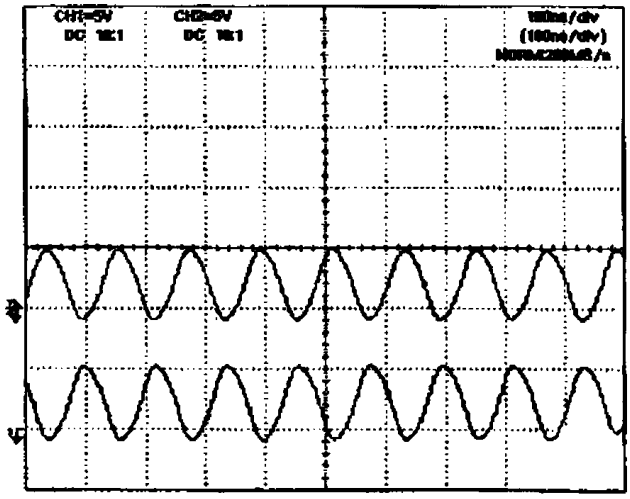


Fig14

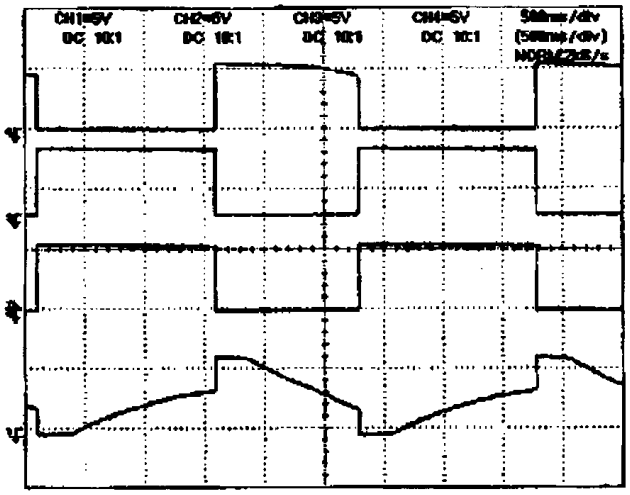


Fig15

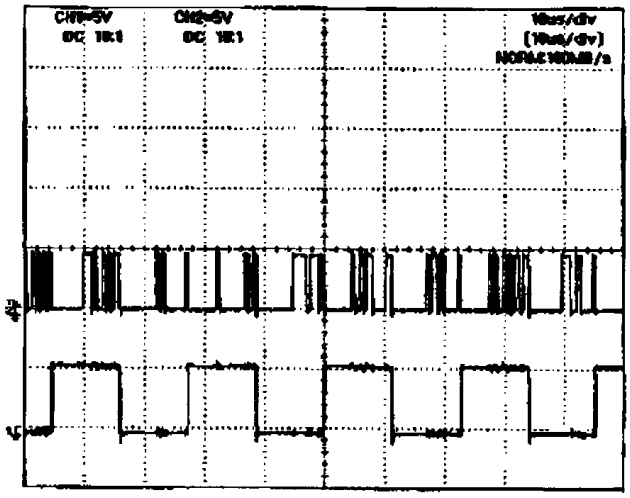


Fig16

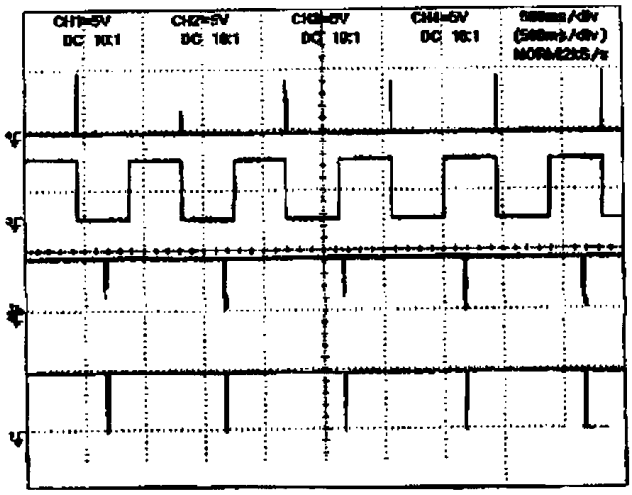


Fig17

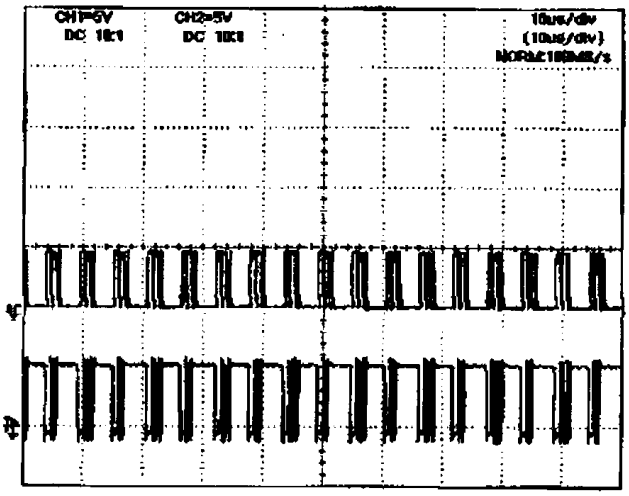


Fig18

Note:
The lowest signal represents channel 1; the signal just over it is the channel 2 signal etc. This is valid for each oscillogram chart.

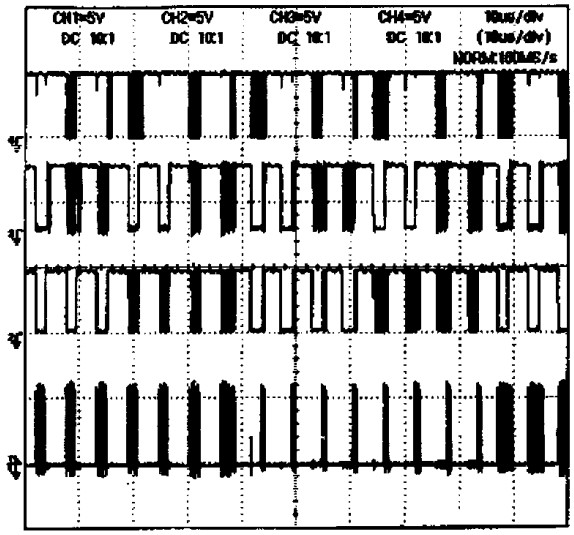


Fig19

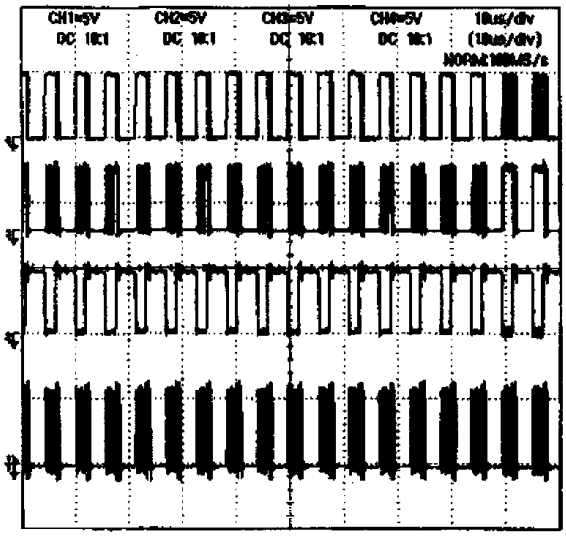


Fig20

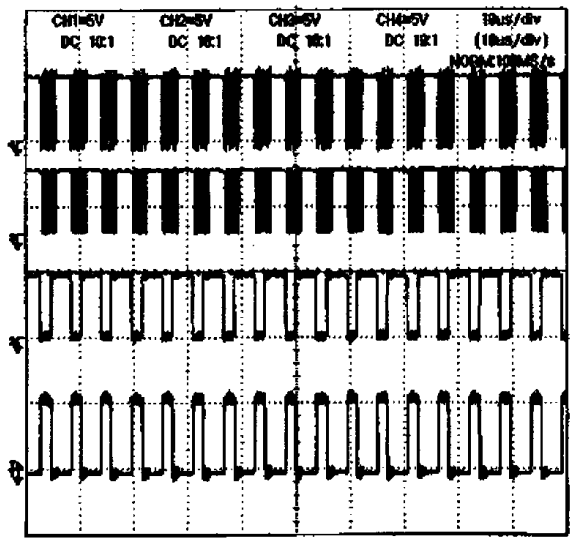


Fig21

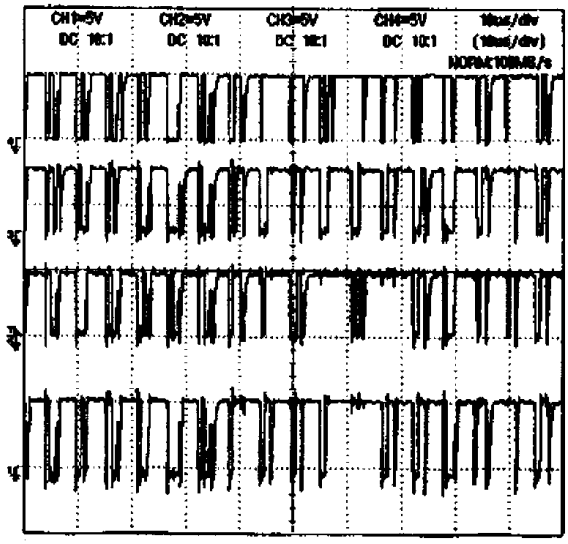
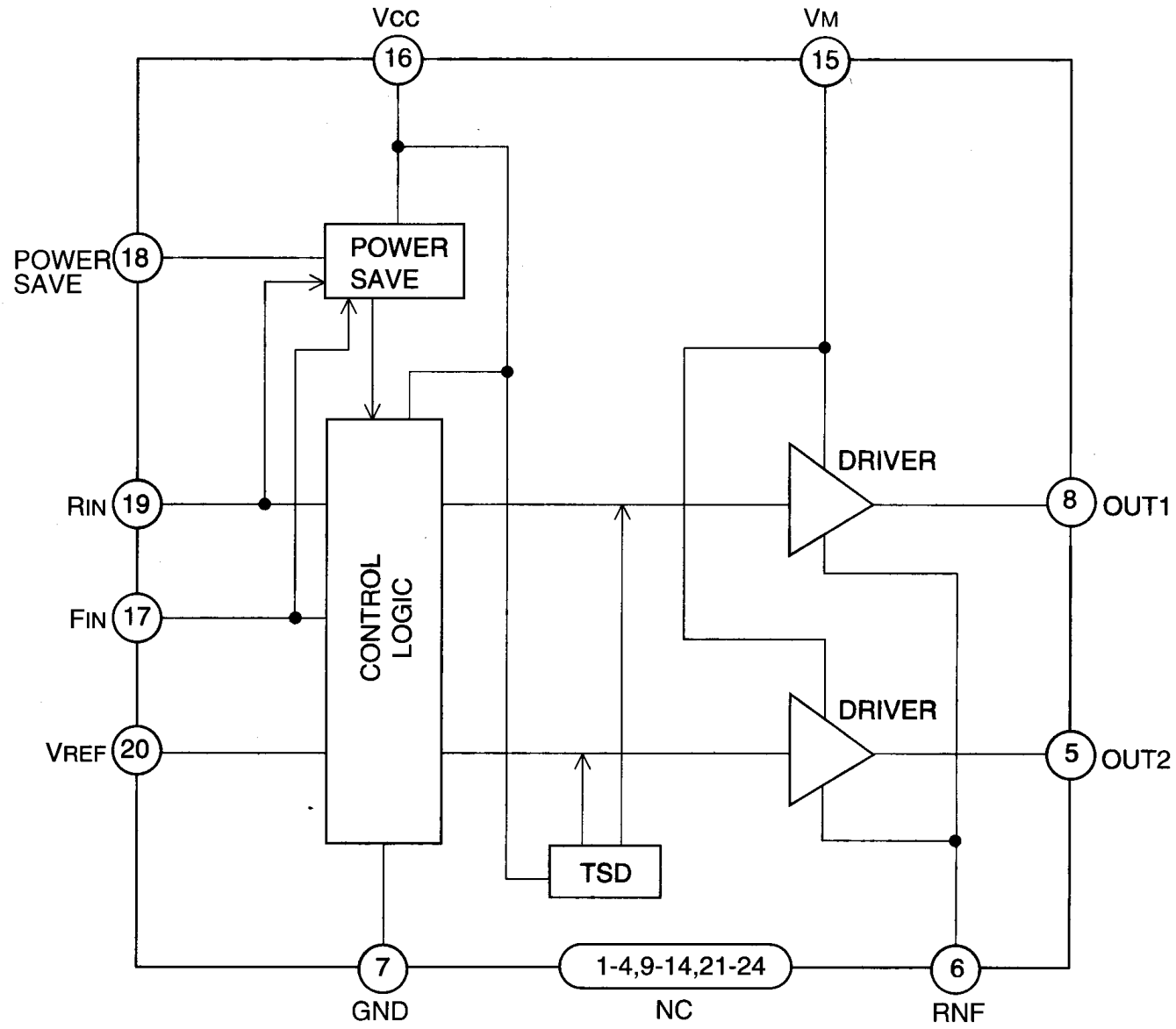


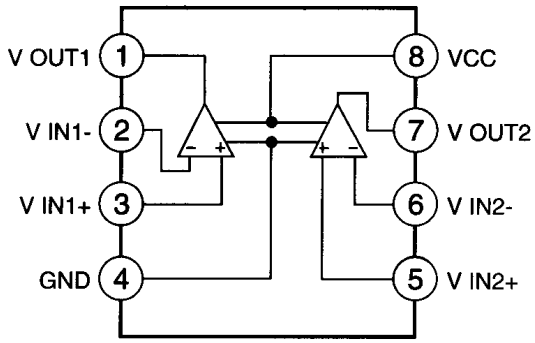
Fig22

Note:
The lowest signal represents channel 1; the signal just over it is the channel 2 signal etc.
This is valid for each oscillogram chart.

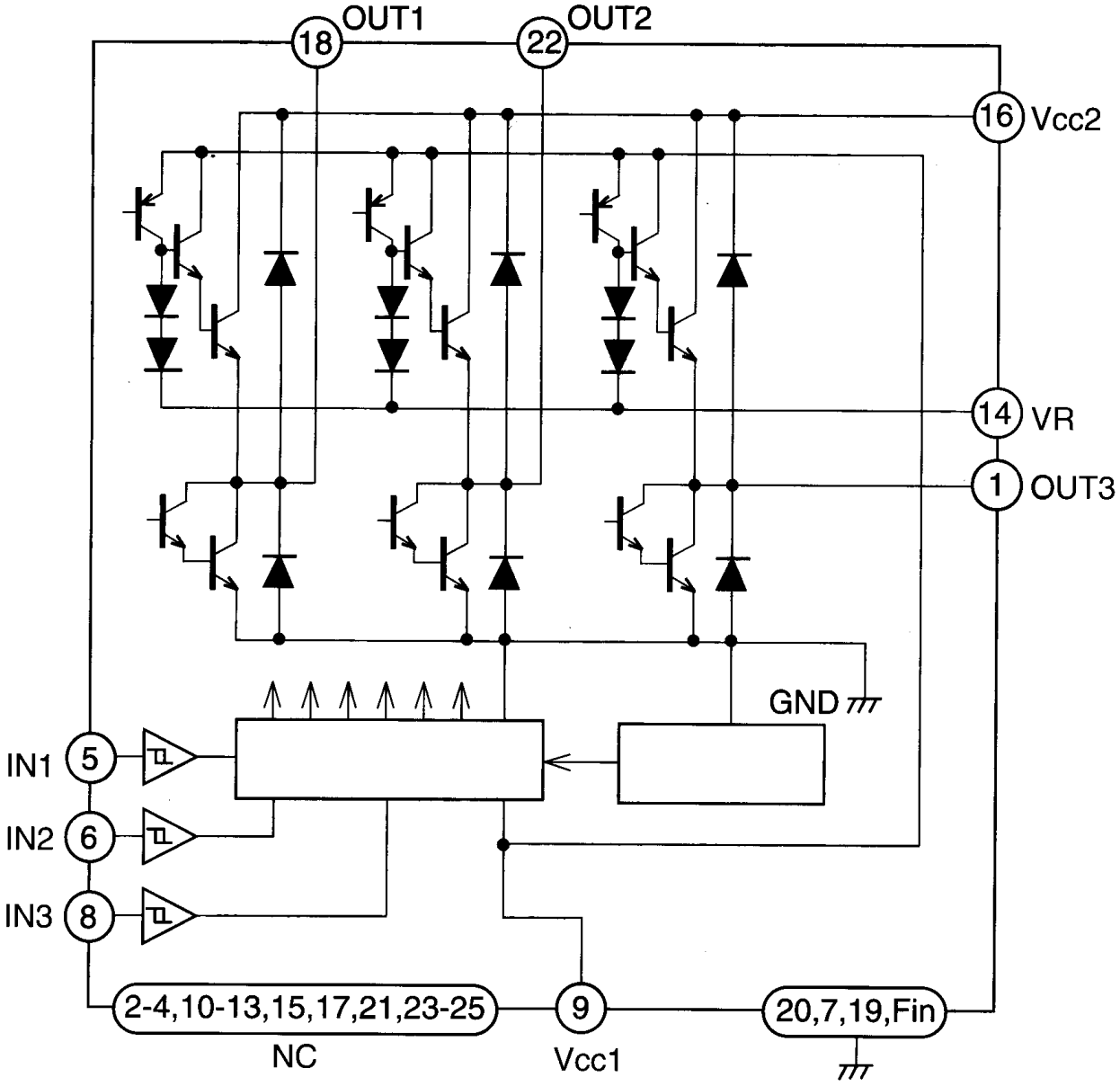
IC502
BA6285FP



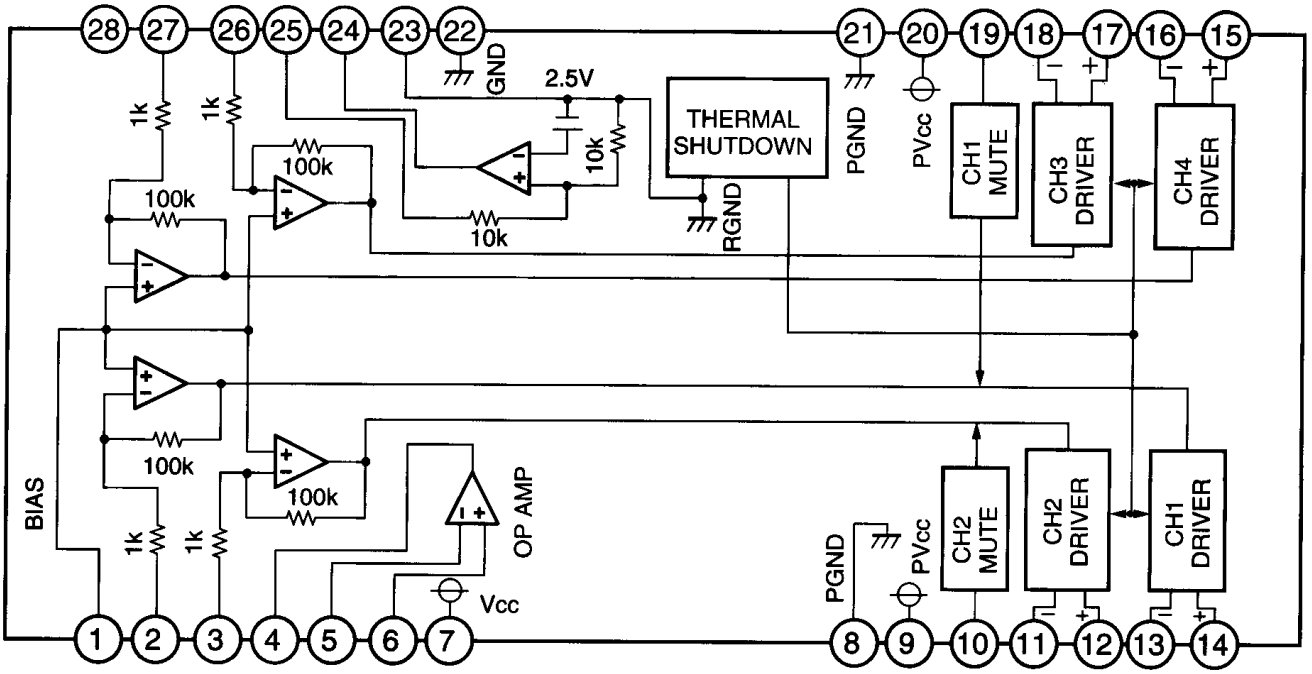
IC652
LA6393M



IC503
BA6247FP-Y

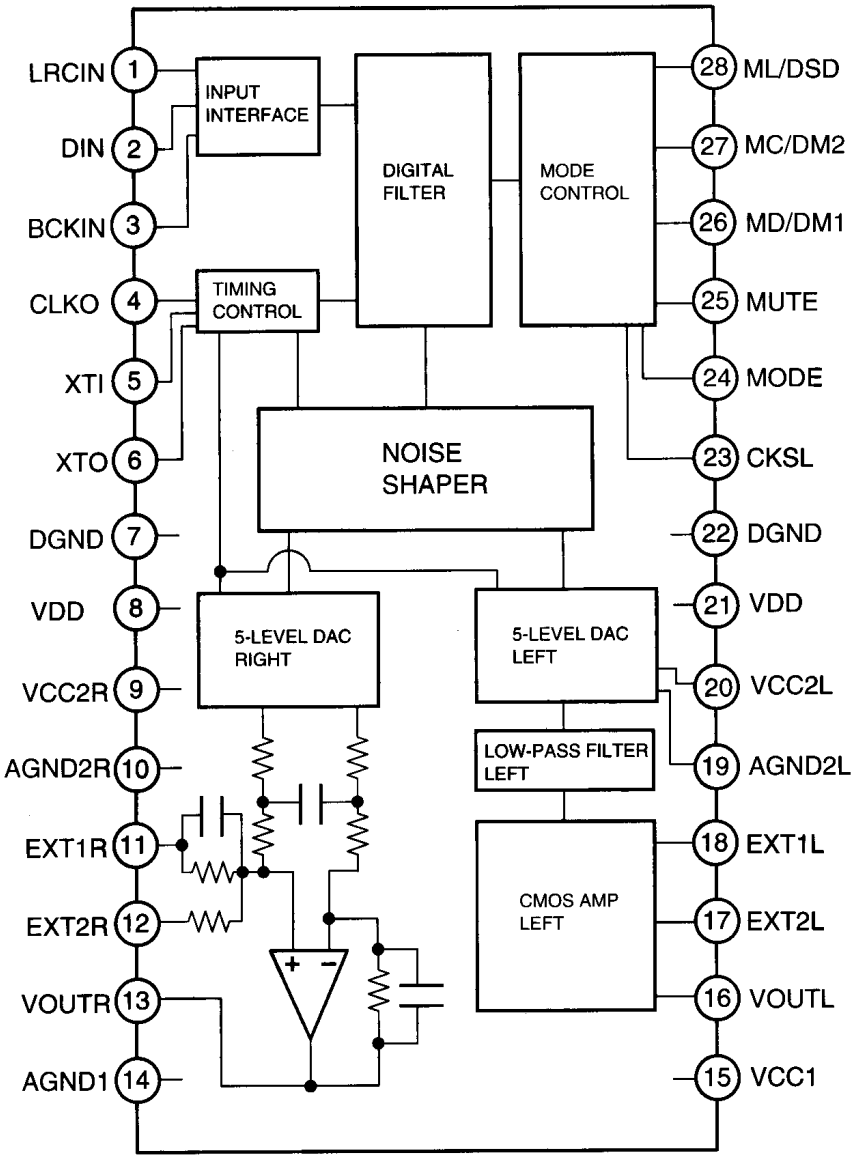


IC651
BA6999FP

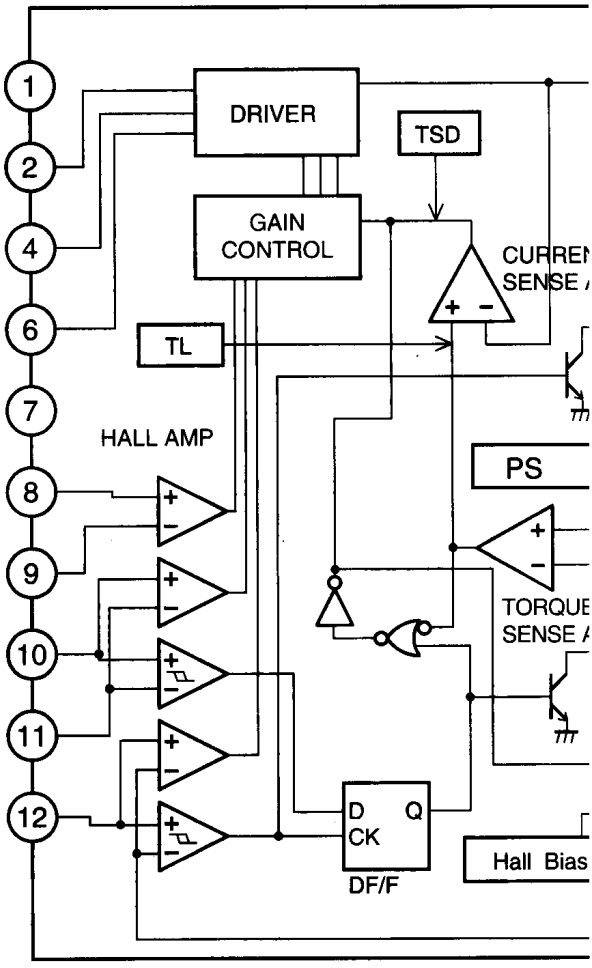


PCS 92 145

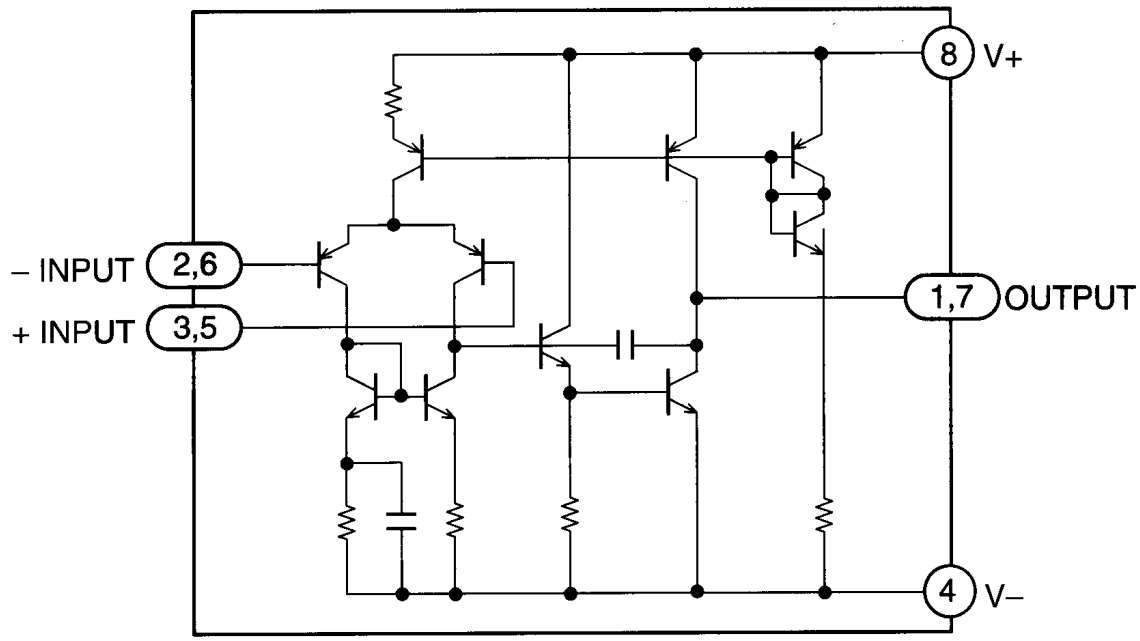
IC701
PCM1710U



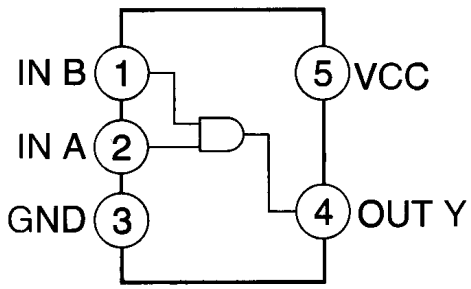
IC751
BA6843AFS



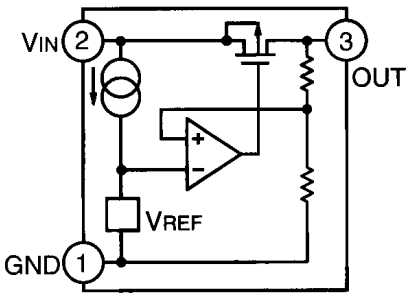
IC702
NJM2100M

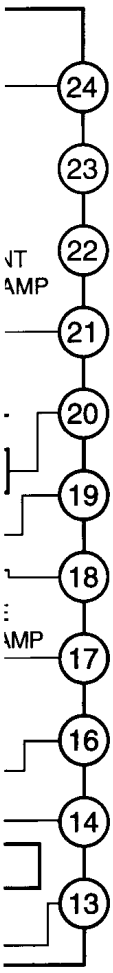


IC752/781
TC7S08FU

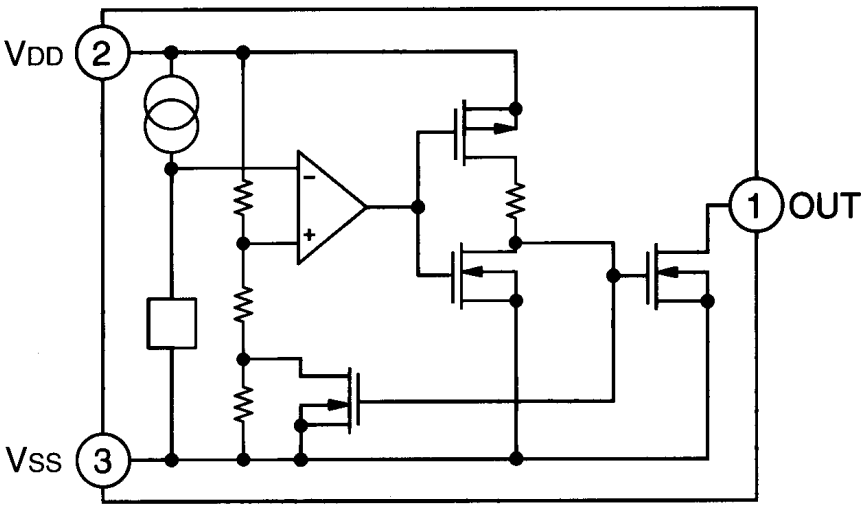


IC804
S-81250HG-RD

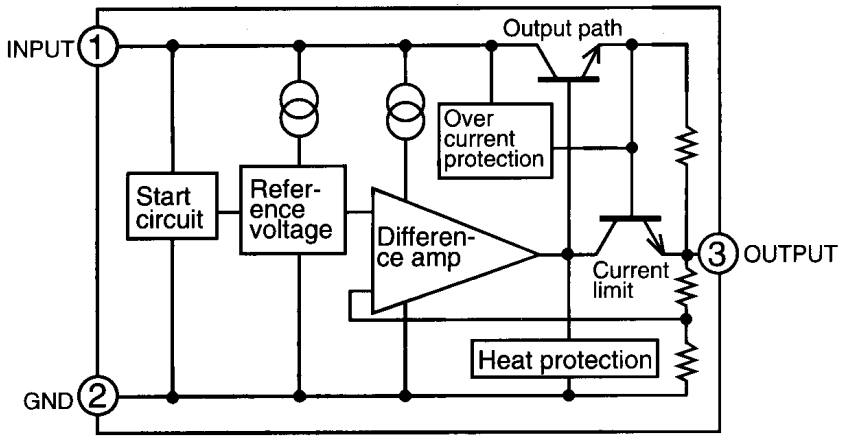




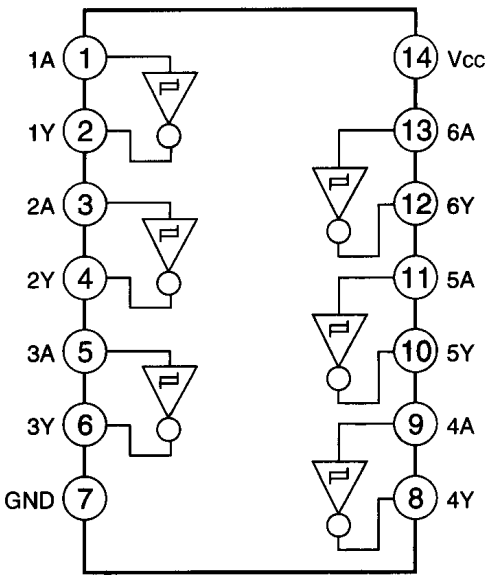
IC802/803
S-80732AN



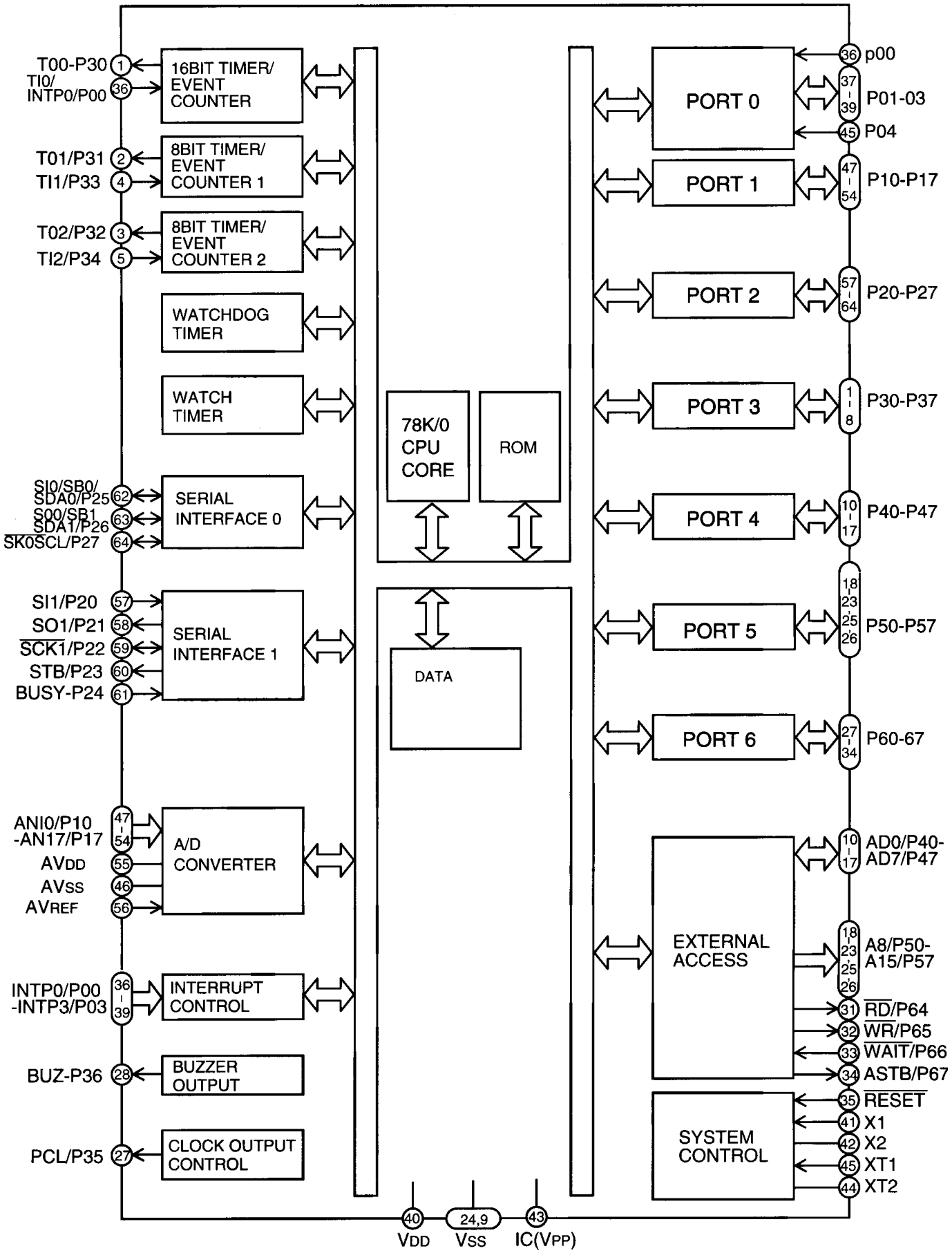
IC851
L78M05T



IC951
TC74HC14AP



IC801
UPD78P018FGC



PCS 92 146

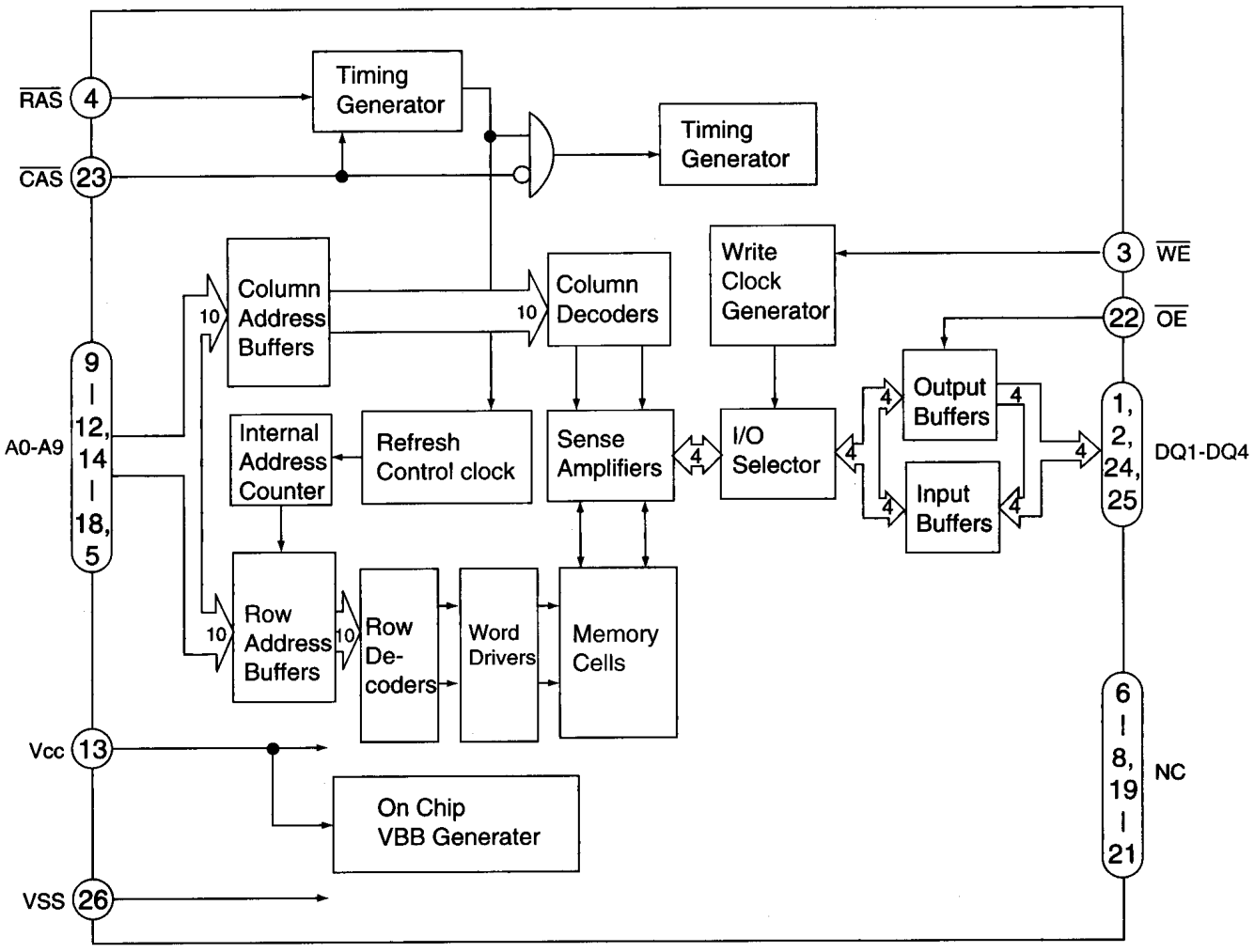
22RC047

IC801 - UPD78P018FG

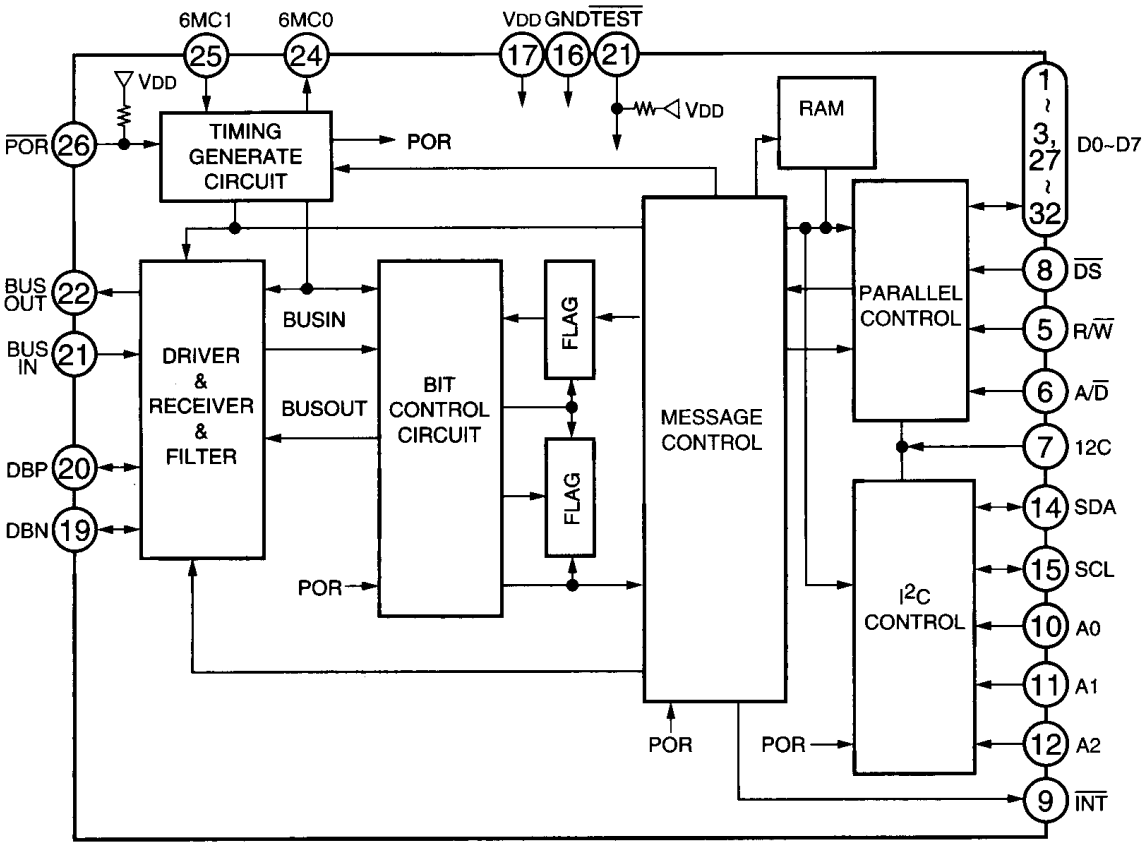
PIN	PORT NAME	I/O	DESCRIPTION
1	LED6	O	LED for DISC No.2 exist or not exist
2	AFMUTE	O	Mute output terminal
3	CD+B	O	Main power supply ON/OFF output
4	LED5	O	LED for DISC No.1 exist or not exist
5	LED4	O	LED for DISC No.4 chucking or not chucking
6	LED3	O	LED for DISC No.3 chucking or not chucking
7	LED2	O	LED for DISC No.2 chucking or not chucking
8	LED1	O	LED for DISC No.1 chucking or not chucking
9	VSS		Ground
10	Fin	O	Rotary motor control signal output (toward inside)
11	Rin	O	Rotary motor control signal output (toward outside)
12	FEM+	O	Pickup moving-outside output signal
13	FEM-	O	Pickup moving-inside output signal
14	RWC	O	Interface with DSP (LC78620E)
15	COIN	O	Interface with DSP (LC78620E)
16	CQCK	O	Interface with DSP (LC78620E)
17	DSRST	O	Reset signal for DSP (LC78620E)
18	SQOUT	I	Interface with DSP (LC78620E)
19	WRQ	I	Interface with DSP (LC78620E)
20	INSIDE	I	Inner circle limit SW signal input
21	CHUCKOFF	I	Chuck off SW signal input
22	ROTIN	I	Rotary-in (toward inside) SW signal input
23	ROTOUT	I	Rotary-out (toward outside) SW signal input
24	VSS		Ground
25	IN1	O	Mag/elv motor control signal output
26	IN2	O	Mag/elv motor control signal output
27	SENELV	I	Elevator position detection pulse input
28	LOW	I	Low SW signal input
29	DA	I/O	Interface with MSM6307
30	IN3	O	Mag/elv motor control signal output
31	DRF	I	Focus OK signal input
32	SENMG	I	Magazine position detection pulse input
33	MAGIN	I	Magazine open SW signal input
34	MAGOUT	I	Magazine close SW signal input
35	RESET	I	Reset signal input
36	BATT	I	Battery LOW detection input
37	CE	I	ACC ON/OFF detection input
38	MAGON	I	Magazine SW signal input
39	EJECT	I	Eject SW signal input
40	VDD		Power supply (+5V)
41	X1	I	Ceramic oscillator connection terminal for system clock
42	X2	O	Ceramic oscillator connection terminal for system clock
43	IC	I	Connection to ground
44	XT2	O	No connection
45	NC	I	Connection to ground
46	AVSS		Connection to ground
47	TH	I	Temperature sensor ON/OFF signal input
48	2SPEED	O	Spindle gain switching signal output
49	C2F	I	Interface with LC89153
50	EMPN	I	Interface with LC89153
51	CNTOK	I	Interface with LC89153
52	CL	O	Interface with MSM6307
53	OVR	I	Interface with LC89153
54	FMT	O	Interface with LC89153
55	AVDD		Connection to vdd
56	AVREF		Connection to +5V
57	SHOCK	O	Interface with LC89153
58	PAUSEIN	O	Interface with LC89153

PIN	PORT NAME	I/O	DESCRIPTION
59	WOK	O	Interface with LC89153
60	ASRESET	O	Reset signal for LC89153
61	LED8	O	LED for DISC No.4 exist or not exist
62	OPEN	I	Door open SW signal input
63	INT	I	Interface with MSM6307
64	LED7	O	LED for DISC No.3 exist for not exist

IC1
MSM51440D



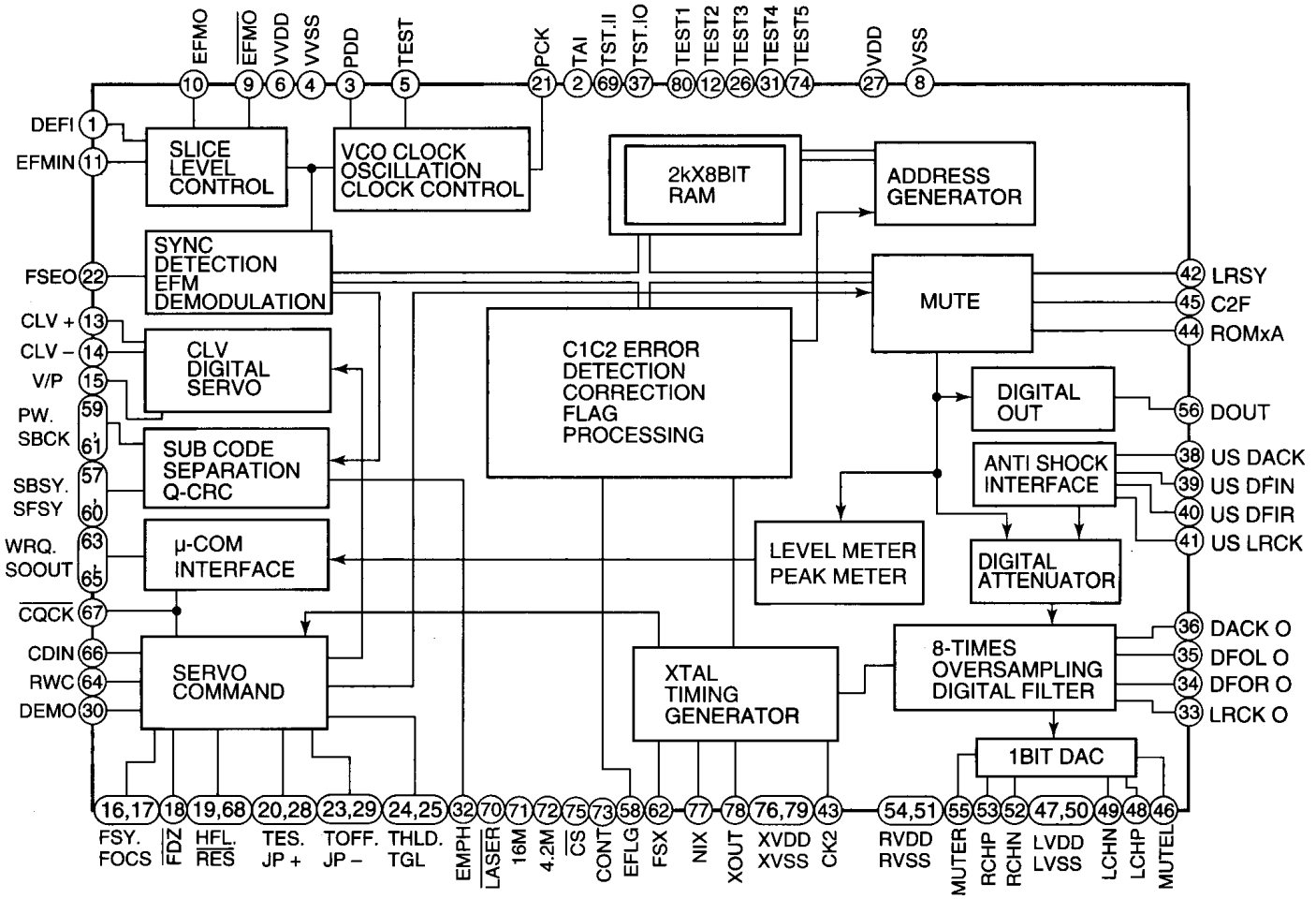
IC101 - MSM6307GS



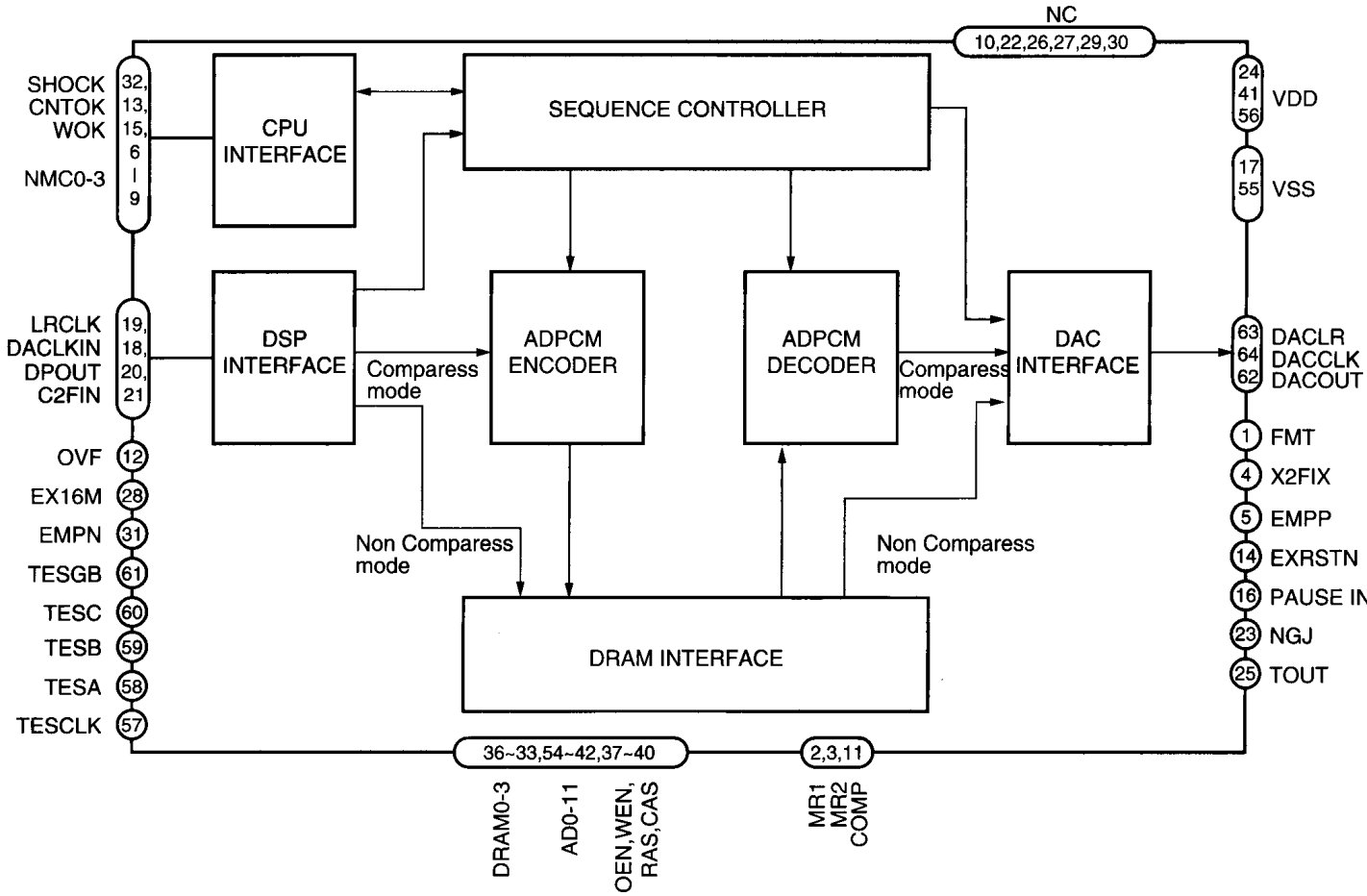
MSM6307GS

PIN	PORT NAME	I/O	DESCRIPTION
1	N.C	-	
2	N.C	-	
3	N.C	-	
4	N.C	-	
5	R/W	I	Read/Write selector
6	A/D	I	Selects address or data on D0-D7
7	I2C	I	Selects I2C or parallel interface
8	DS	I	Data strobe to access data bus
9	INT	O	Interrupt output
10	A0	I	Programmable I2C slave address
11	A1	I	Programmable I2C slave address
12	A2	I	Programmable I2C slave address
13	N.C	-	
14	SBA	I/O	I2C data signal input/output
15	SCL	I/O	I2C clock signal input/output
16	GND	-	GND
17	VDD	-	VDD(+5V)
18	N.C	-	
19	DBN	I/O	Differential D2B lines of the internal driver/receiver
20	DBP	I/O	Differential D2B lines of the internal driver/receiver
21	TEST	I	Test mode of IC
22	BUS OUT	O	D2B output (TTL level)
23	BUS IN	I	D2B input (TTL level)
24	6CM0	O	Clock output 6HMz resonator
25	6CM1	I	Clock input 6HMz resonator
26	POR	I	Power on reset
27	N.C	-	
28	N.C	-	
29	N.C	-	
30	N.C	-	
31	N.C	-	
32	N.C	-	

IC601
LC78620E



IC901
LC89153



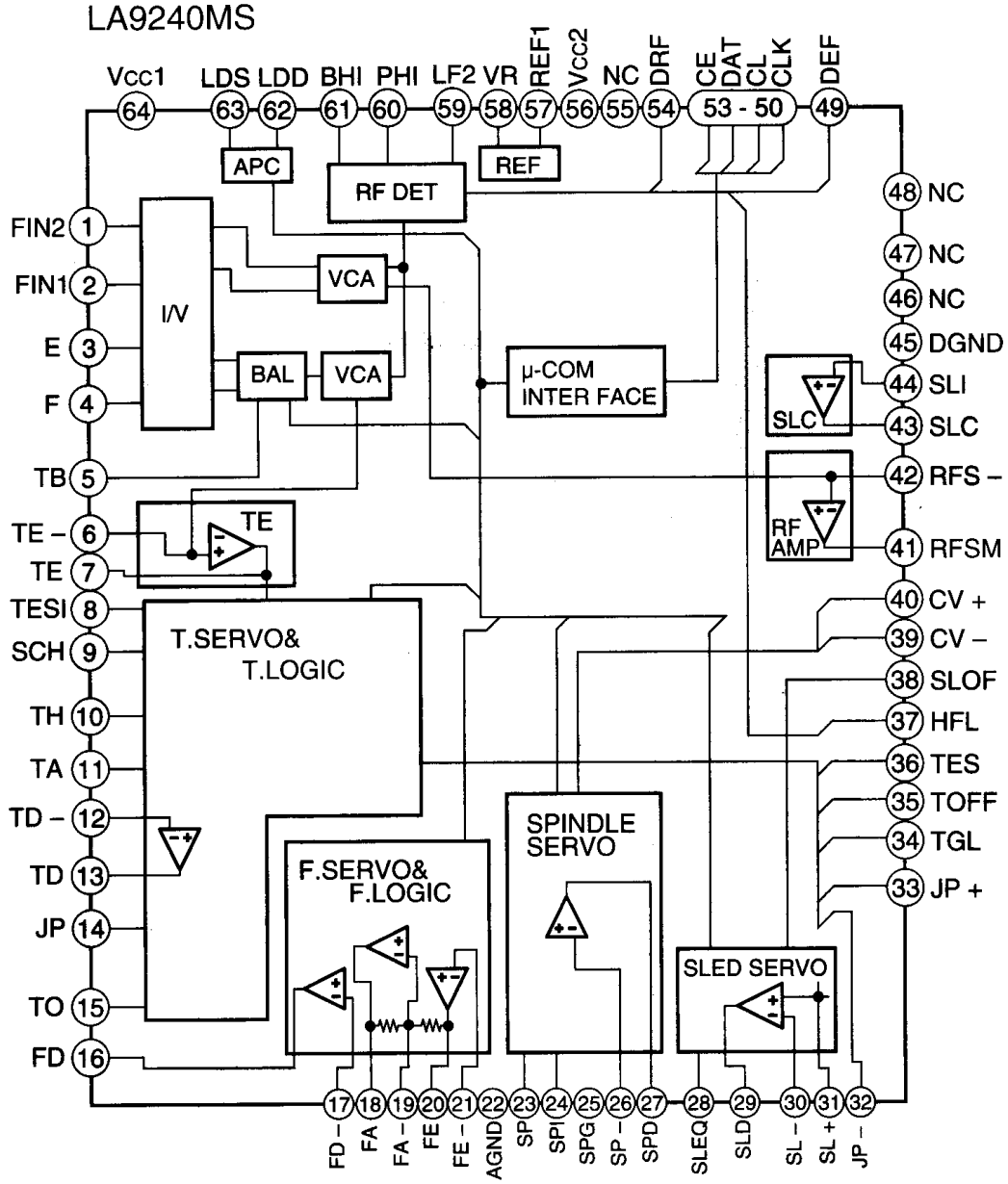
22RC047

Terminal Number	Terminal Code	I/O	Function Explanation	
1	DEFI	I	Defect detection signal (DEF) input terminal. (When unused, "L".)	
2	TAI	I	For PLL	Input terminal for testing. Pulldown resistance is self-contained.
3	PDO	O		Phase comparison output terminal for outer VCO control.
4	VVss			Power supply terminal for self-contained VCO. Normally 0V.
5	ISET	AI		Resistance connecting terminal for PDO output current adjustment.
6	VV_{DD}			Earthing terminal for self-contained VCO. Normally 5V.
7	FR	AI		For VCO range frequency adjustment.
8	Vss		Earthing terminal for digital system. Normally 0V.	
9	EFMO	O	For slice level control	EFM signal reverse output terminal.
10	$\overline{EFMO}$	O		EFM signal output terminal.
11	EFMIN	I		EFM signal input terminal.
12	TEST2	I	Input terminal for testing. Pulldown resistance is self-contained.	
13	CLV+	O	Output terminal for spindle servo control. Accelelates when CLV+ is "H", slows down when CLV- "H".	
14	CLV-	O		
15	V/P	O	Output terminal for automatic switchover monitor by rough servo / phase control. "H" causes rough servo, "L" phase control mode.	
16	FOCS	O	Output terminal for focus servo on/off. "L" causes focus servo ON.	
17	FST	O	Output terminal for focus start pulse. Open drain output.	
18	$\overline{FZD}$	I	Input terminal for focus error zero cross signal. (When unused, "L".)	
19	HFL	I	Input terminal for track detecting signal. Schmidt input.	
20	TES	I	Input terminal for tracking error signal. Schmidt input.	
21	PCK	O	Clock monitoring terminal for EFM data playback. At the time of phase lock, 4.3218MHz.	
22	FSEQ	O	Output terminal for synchronous signal detection. When synchronous signal detected from EFM signal and synchronous signal occurring inside correspond, "H".	
23	TOFF	O	Output terminal for tracking OFF.	
24	TGL	O	Output terminal for tracking gain switchover. "L" raises gain.	
25	THLD	O	Output terminal for tracking hold.	
26	TESTS	O	Output terminal for testing. Pulldown resistance is self-contained.	
27	V_{DD}		Power supply terminal for digital system. Normally 5V.	
28	JP+	O	Output terminal for track jump. When JP+ is "H", accelerates at the time of outer track direction jump, or slows down at the time of inner track direction jump. When JP- is "H", accelerates at the time of inner track direction jump, or slows down at the time of outer track direction. 3 value output is possible by command.	
29	JP–	O		
30	DEMO	I	Input terminal for sound turn-on function at the time of set adjustment process. Pulldown resistance is self-containd.	
31	TEST4	I	Input terminal for testing. Pulldown resistance is self-containd.	
32	EMPH	O	Output terminal for deemphasis monitor. At the time of "H", deemphasis disc is in playback.	
33	LRCKO	O	Digital filter output.	Word clock output.
34	DFORO	O		RCH data output.
35	DFOLO	O		LCH data output.
36	DACKO	O		Bit clock output.
37	TESTIO	O	Output terminal for testing. Open (Normally "L" output).	
38	USDACK	I	Anti-shock correspondence	Bit clock input.
39	USDFIN	I	input. (unused, "L".)	LRch data.

40	USDFIR	I	Anti-shock correspondence input. (unused, "L".)	Input terminal for testing. Normally "L".
41	USLRCK	I		Word clock output. (When unused, "L".)
42	LRSY	O	ROMXA correspondence input	L/R clock output.
43	CK2	O		Bit clock output. DACLK (At the time of RES) Polarity reverse (CK2CON mode)
44	ROMAX	O		Data output. Data (Supplement) (At the time of RES) ROMOUT (ROMXA mode)
45	C2F	O		C2 Flag output.
46	MUTEL	O	For 1bit DAC	Mute output terminal.
47	LV_{DD}			Power supply terminal for L channel. Normally 5V.
48	LCHP	O		L channel P output terminal.
49	LCHN	O		L channel N output terminal.
50	LVss			Earthing terminal for L channel. Normally 0V.
51	RVss			Earthing terminal for R channel. Normally 0V.
52	RCHN	O		R channel N output terminal.
53	RCHP	O		R channel P output terminal.
54	RV_{DD}			Earthing terminal for R channel. Normally 5V.
55	MUTER	O		Mute output terminal.
56	DOUT	O	Digital OUT output terminal.	
57	SBSY	O	Output terminal for synchronous signal of sub-code block.	
58	EFLG	O	Terminal for monitoring C1, C2, single, double correction.	
59	PW	O	Output terminal for sub-code P, Q, R, S, T, U, W.	
60	SFSY	O	Output terminal for synchronous signal of sub-code frame. When sub-code is in standby, " = L ".	
61	SBCK	I	Input terminal for sub-code readout clock. Schmidt input.	
62	FSX	O	Output terminal for 7.35KHz synchronous signal which is divided frequency from crystal oscillation.	
63	WRQ	O	Output terminal for sub-code Q output standby.	
64	RWC	I	Input terminal for read/write control.	
65	SQOUT	O	Sub-code Q output terminal.	
66	$\overline{COIN}$	I	Input terminal for command from micro computer.	
67	CQCK	I	Input terminal for command input intake clock, or sub- code offtake clock from SQOUT. Schmidt input.	
68	$\overline{RES}$	I	Chip reset input terminal. When power is supplied, changeover to "L" once.	
69	TST11	O	Input terminal for testing. Open (normally "L" output).	
70	$\overline{LASER}$	O	Output terminal for laser ON/OFF. Controls by serial data command from micro computer.	
71	16M	O	16.9344MHz output terminal. But outputs 33.8688MHz, only in case of quadruple speed playback mode.	
72	4.2M	O	4.2336MHz output terminal.	
73	CONT	O	Spare output terminal. Controls by serial data command from micro computer.	
74	TEST5	I	Input terminal for testing. Pulldown resistance is self-contained.	
75	CS	I	Chip select input terminal. Pulldown resistance is self-contained.	
76	XVss		Earthing terminal for crystal oscillation. Normally 0V.	
77	X_{IN}	I	Connecting terminal for 16.9344MHz crystal oscillator.	
78	X_{OT}	O	Connects 33.8688MHz crystal oscillator, in case of quadruple speed playback system.	
79	XV_{DD}		Power supply terminal for crystal oscillation. Normally 5V.	
80	TEST1	I	Input terminal for testing. Pulldown resistance is self- contained.	

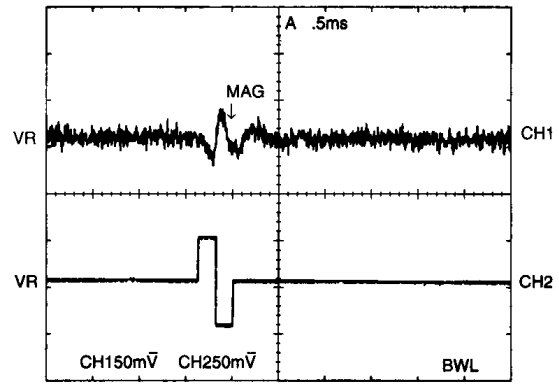
IC650

LA9240MS

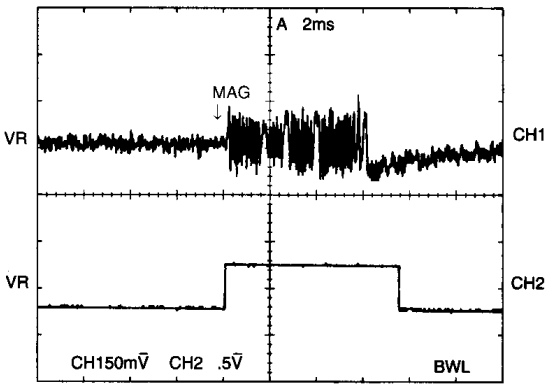


PIN No.	PART NAME	EXPLANATION
1	FIN2	Pickup photo-diode connecting pin. Forms RF signal by addition to FIN1 pin, and FE signal by subtraction.
2	FIN1	Pickup photo-diode connecting pin.
3	E	Pickup photo-diode connecting pin. Forms TE signal by subtraction from F pin.
4	F	Pickup photo-diode connecting pin.
5	TB	Pin for inputting DC constituent of TE signal.
6	TE-	Pin for connecting gain setting resistence of TE signal to TE pin.
7	TE	TE signal output pin.
8	TESI	TES (TRACK ERROR SENCE) comparator input pin. Band Pass TE signal, and input.
9	SCI	Input pin for shock detection.
10	TH	Constant setting pin at the time of tracking gain.
11	TA	Pin for connecting high pass elimination condensor of servo.
12	TD-	Pin for constituting tracking phase compensation constant between TD and VR pin.
13	TD	Pin for setting tracking phase compensation.
14	JP	Pin for setting tracking jump signal (kick pulse) amplitude.
15	TO	Tracking control signal output pin.
16	FD	Focusing control signal output pin.
17	FD-	Pin for constituting focussing phase compensation constant between FD and FA pin.
18	FA	Pin for constituting focussing phase compensation constant between FA- and FE- pin.
19	FA-	Pin for constituting focussing phase compensation constant between FA and FE pin.
20	FE	FE signal output pin.
21	FE-	Pin for connecting FE signal gain setting resistance to TE pin.
22	AGND	GND for analog signal.
23	SP	Single end output of CV+ and CV- pin input signal.
24	SPI	Spindle amplifier input.
25	SPG	Connecting pin for gain setting resistance at the time of spindle 12cm mode.
26	SP-	Connecting pin for Spindle phase compensation constant together with SPD pin.
27	SPD	Spindle control signal output pin.
28	SLEQ	Connecting pin for sled phase compensation constant.
29	SLD	Sled control signal output pin.
30	SL-	Input pin for sled delivery signal from micro computer.
31	SL+	Input pin for sled delivery signal from micro computer.
32	JP-	Input pin for tracking jump signal from DSP.
33	JO+	Input pin for tracking jump signal from DSP.
34	TGL	Input pin for tracking gain control signal from DSP. Gain low in case of TGL="H".
35	TOFF	Input pin for tracking off control signal from DSP. Off in case of TOFF="H".
36	TES	Output pin of TES signal to DSP.
37	HFL	(HIGH FREQENCY LEVEL) is used to judge whether main beam is located above pit or above mirror.
38	SLOF	Sled servo off control input pin.
39	CV-	Input pin for CLV error signal from DSP.
40	CV+	Input pin for CLV error signal from DSP.
41	RFSM	RF output pin.
42	RFS-	Pin for setting RF gain and EFM signal 3T compensation constant together with RFSM pin.
43	SLC	(SLICE LEVEL CONTROL) is output pin for controlling data slice level by RF waveshape DSP.
44	SLI	Input pin for controlling data slice level by DSP.
45	DGND	GND pin of digital system.
46	NC	NO CONNECT.
47	NC	NO CONNECT.
48	NC	NO CONNECT.
49	DEF	Output pin for detecting disc defect.
50	CLK	Standard clock input pin. DSP4.23MHz is input.
51	CL	Micro computer command clock input pin.
52	DAT	Micro computer command data input pin.
53	CE	Micro computer command chip enable input pin.
54	DRF	(DEFECT RF) RF level detecting output.
55	NC	NO CONNECT.
56	VCC2	VCC pin for servo system and digital system.
57	REF1	Connection pin for standard voltage capacitor.
58	VR	Standard voltage output pin.
59	LF2	Pin for setting constant at the time of detecting disc defect.
60	PH1	Pin for connecting condensor for RF signal peak hold.
61	BH1	Pin for connecting condensor for RF signal bottom hold.
62	LDD	APC circuit output pin.
63	LDS	APC circuit input pin.
64	VCC1	RF system VCC pin.

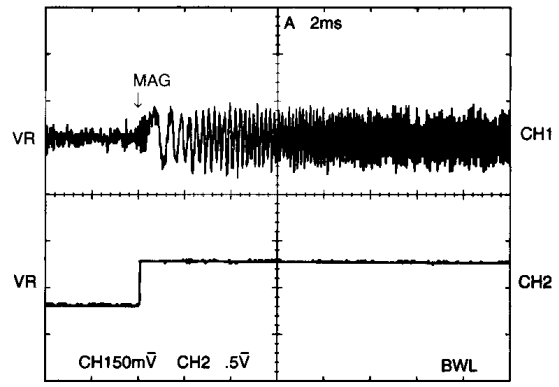
MODE PAUSE
CH1 TE (TP, TE)
CH2 TP (IC650 14PIN)



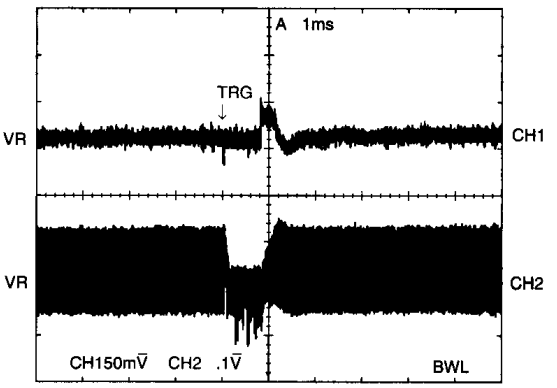
MODE FORWARD SEARCH (128 Track jump)
CH1 TE (TP, TE)
CH2 FEM+ (IC801 1PIN)



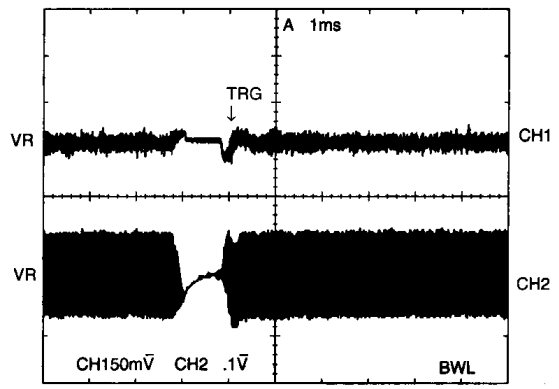
MODE FORWARD SEARCH (Track count)
CH1 TE (TP, TE)
CH2 FEM+ (IC801 1PIN)



MODE PLAY (The interruption part passes 1mm)
CH1 TE (TP, TE)
CH2 RF (TP, RF)



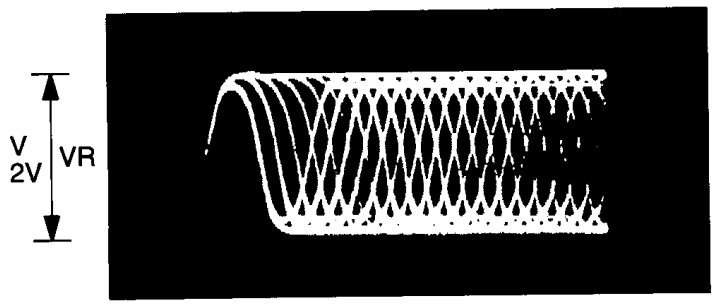
MODE PLAY (The black dots part passes 1mm)
CH1 TE (TP, TE)
CH2 RF (TP, RF)



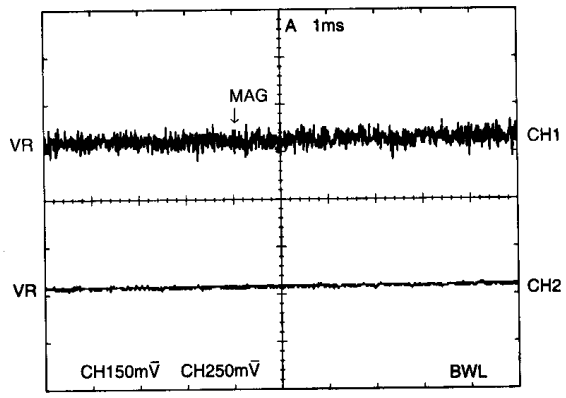
WAVE FORMS

Note: Reference voltage VR → TP, VR (2.50)

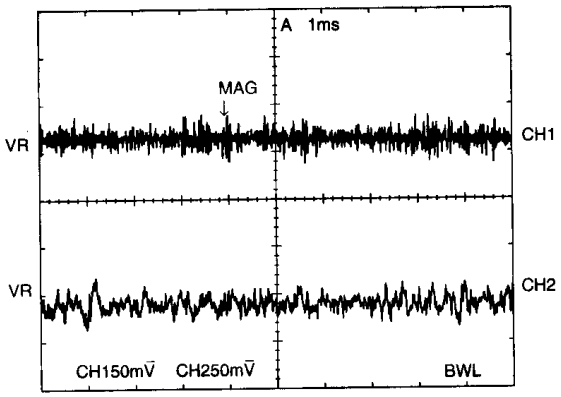
MODE PLAY
RF (TP, RF) 0.5µs



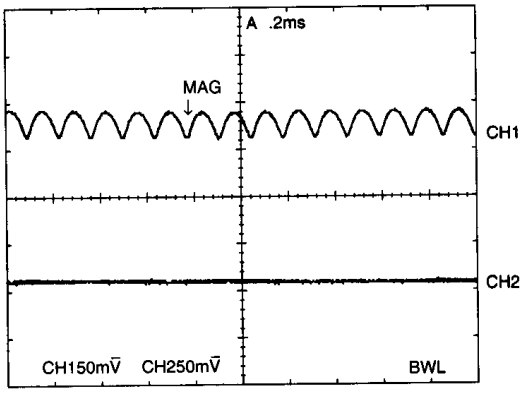
MODE PLAY
CH1 TE (TP, TE)
CH2 FE (TP, FE)



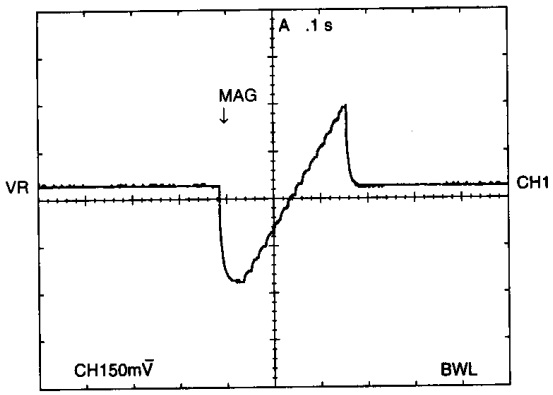
MODE PLAY
CH1 TO (IC650 15PIN)
CH2 FD (IC650 16PIN)



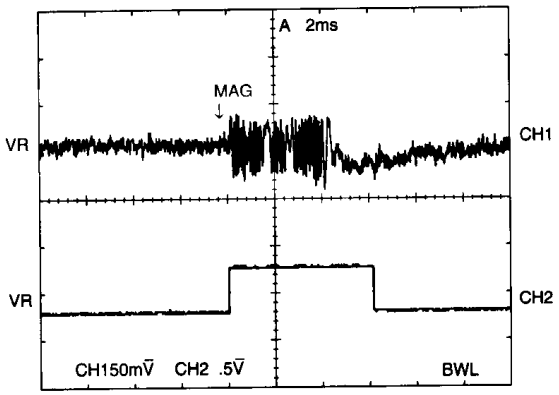
MODE PLAY
CH1 SPD (IC650 27PIN)
CH2 SLEQ (IC650 28PIN)



MODE FOCUS SEARCH
CH1 FD (IC650 16PIN)



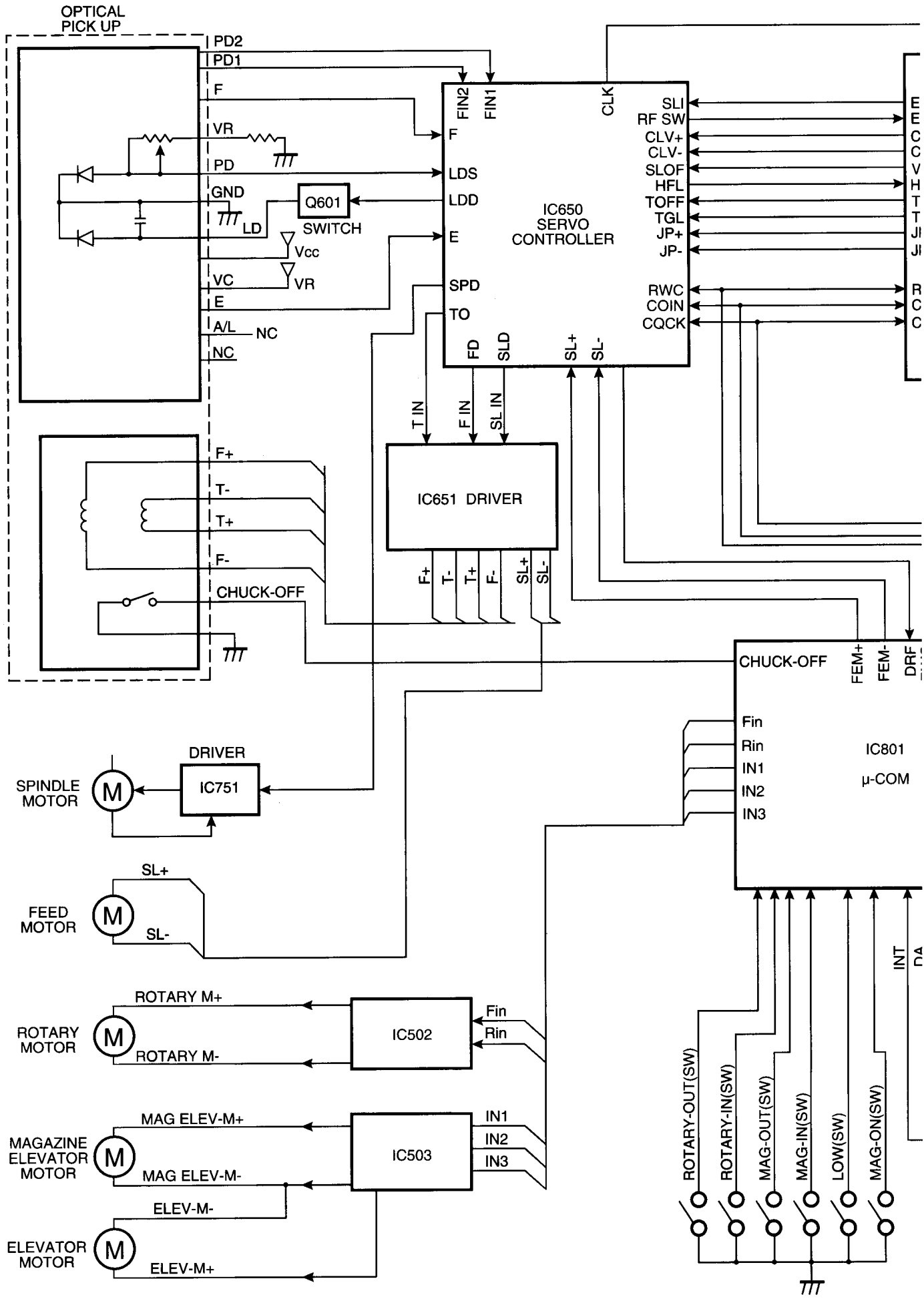
MODE FORWARD SEARCH (64 Track jump)
CH1 TE (TP, TE)
CH2 FEM+ (IC801 1PIN)

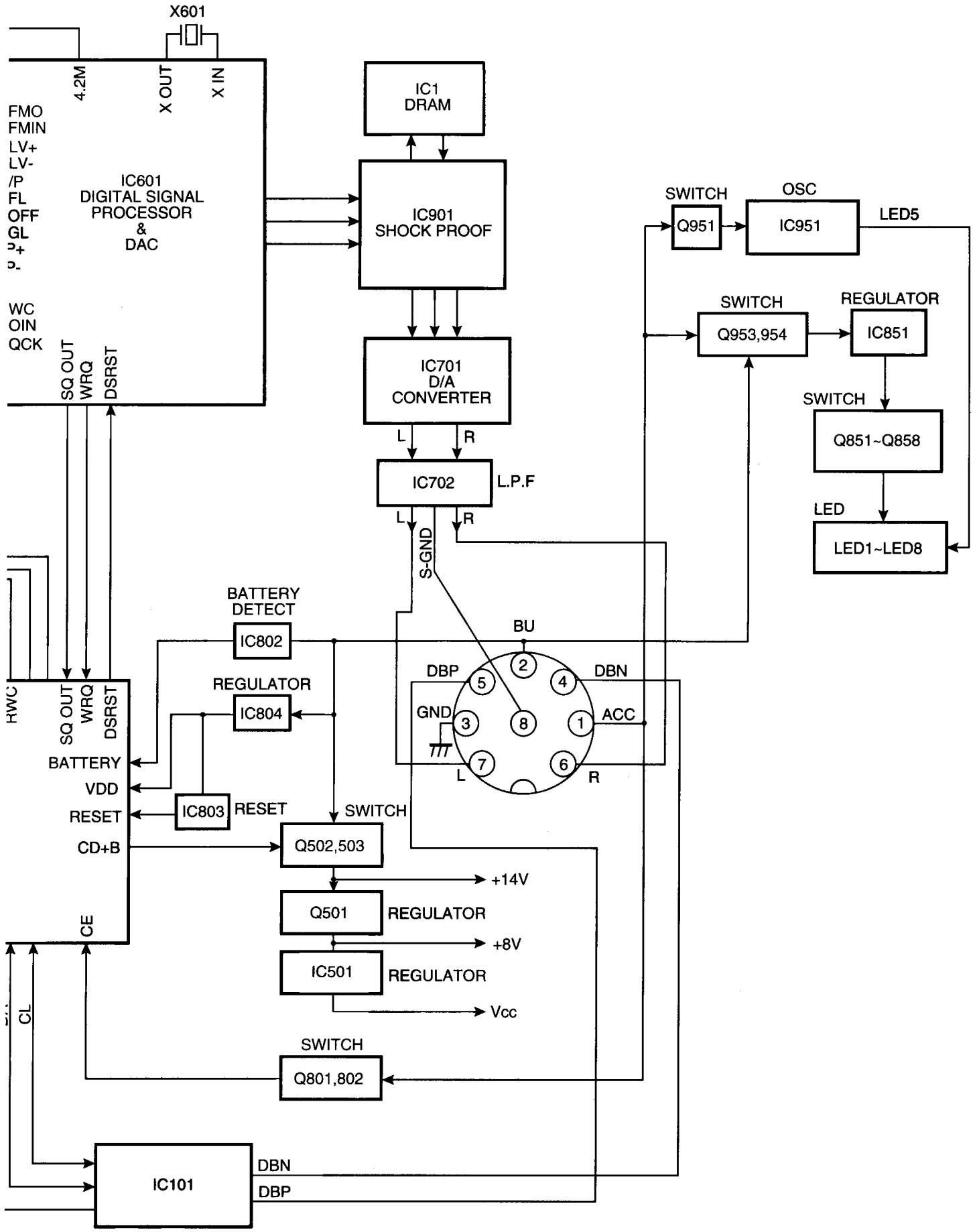


13. TROUBLE-SHOOTING

SYMPTOM	DEFECTIVE CIRCUIT	DEFECTIVE POINT
Disc Turning	Inferiority Feed Motor Circuit	· Check inner circlelimit SW and CS602 28pin
		· Check voltage of IC801
		· Check voltage of IC651 17, 18pin
		· Check Feed Motor and Mechanism
	Focus Search Circuit	· Check voltage of IC650 16pin
		· Check voltage of IC651 11, 12pin
		· Check CS602 18, 21pin
		· Check pickup
	APC	· Check Q601 short or open
		· Check IC601 62,63pin
		· Check pickup
	Disc Motor Circuit	· Check IC601 13pin and IC650 27pin
		· Check IC651 15, 16pin
		· Check Disc Motor and Mechanism
	Power Supply Circuit	· Check IC801 11,13pin
		· Check Q803, Q804
		· Check Q550 and IC551
Track Search	Tracking Servo Circuit	· Check voltage of TP. TE and adjustment Inferiority of SVR651
		· Check IC650 15pin and IC651 13,14pin
		· Check IC651 3, 4pin
		· Check pickup
	Kick Pulse Circuit	· Check IC601 28, 29pin and IC650 14pin
	Feed Motor Circuit	· Check IC650 29pin
		· Check Feed Motor and Mechanism
Noise	RF Circuit	· Check waveform of TP RF
	Mechanism	· Check eccentricity of Mechanism and Disc rub
	Audio Circuit	· Check IC701,702
		· Check Q700~703
		· Check CP501 6, 7, 8pin

14. BLOCK DIAGRAM

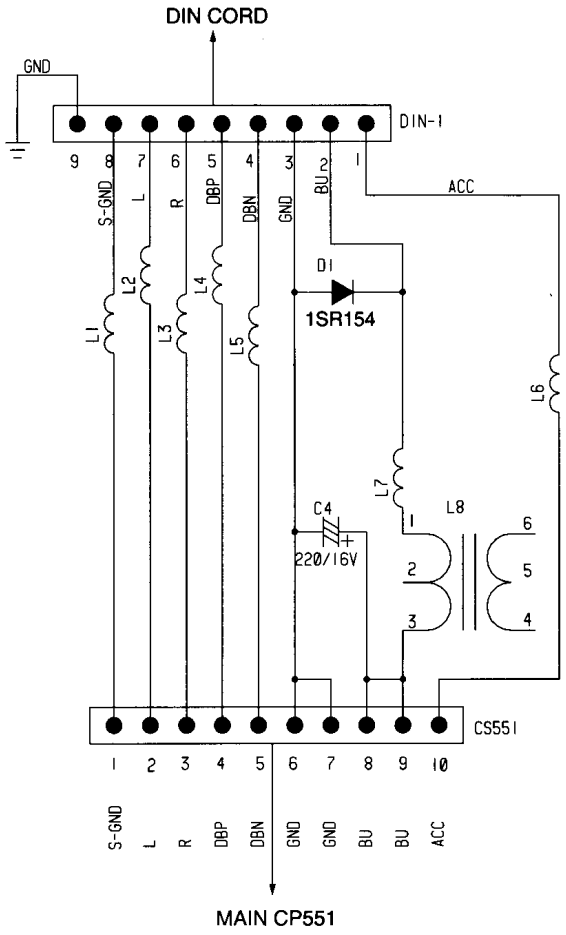




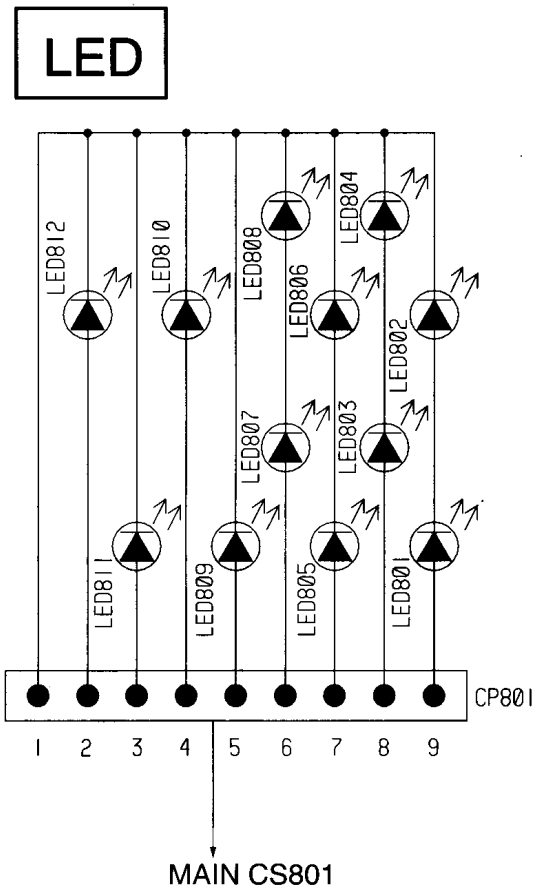
22RC047
BLOCK DIAGRAM

16. CIRCUIT DIAGRAMS (DIN- / LED- / SWITCH PCB)

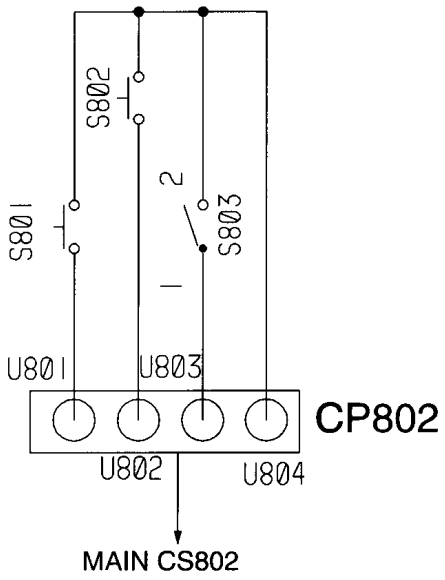
DIN



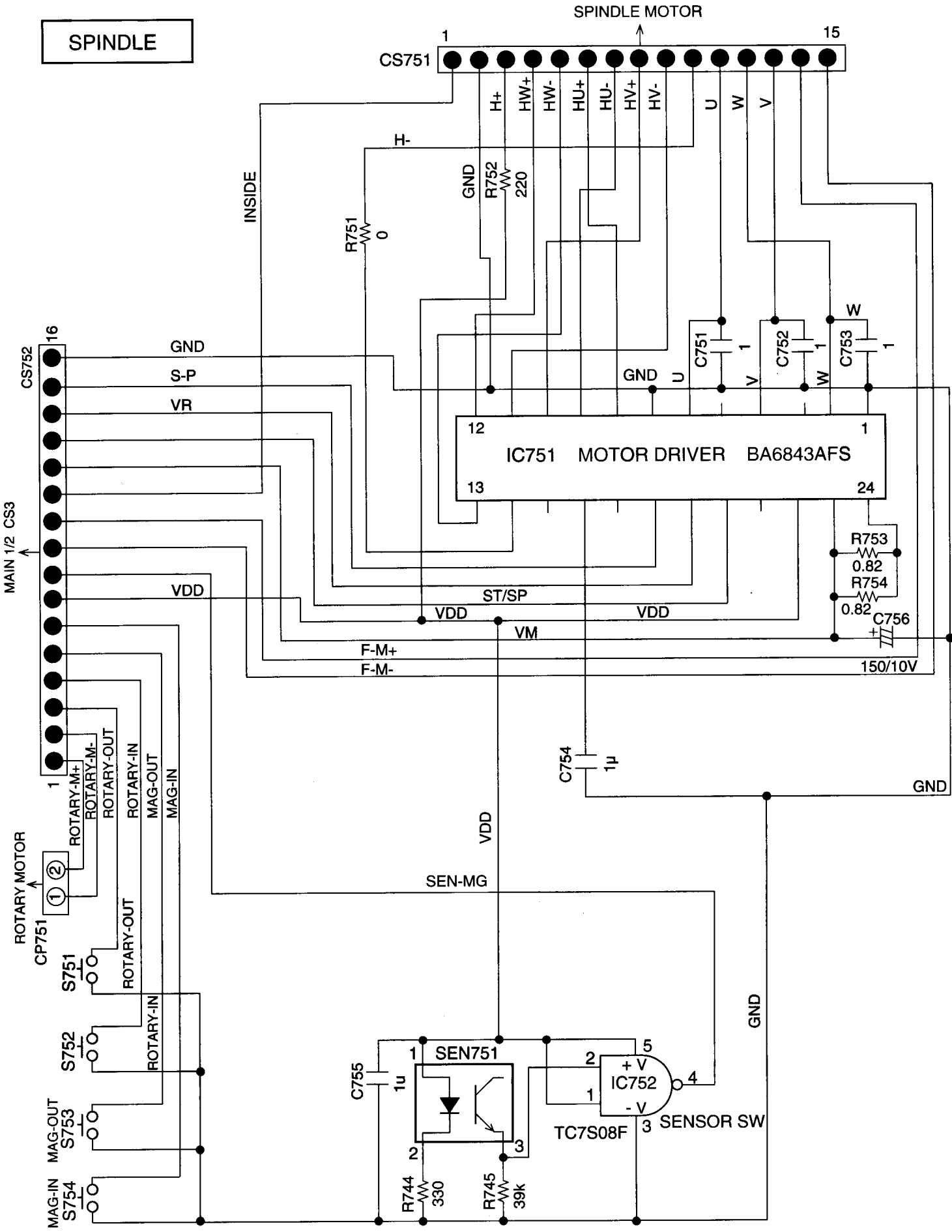
LED



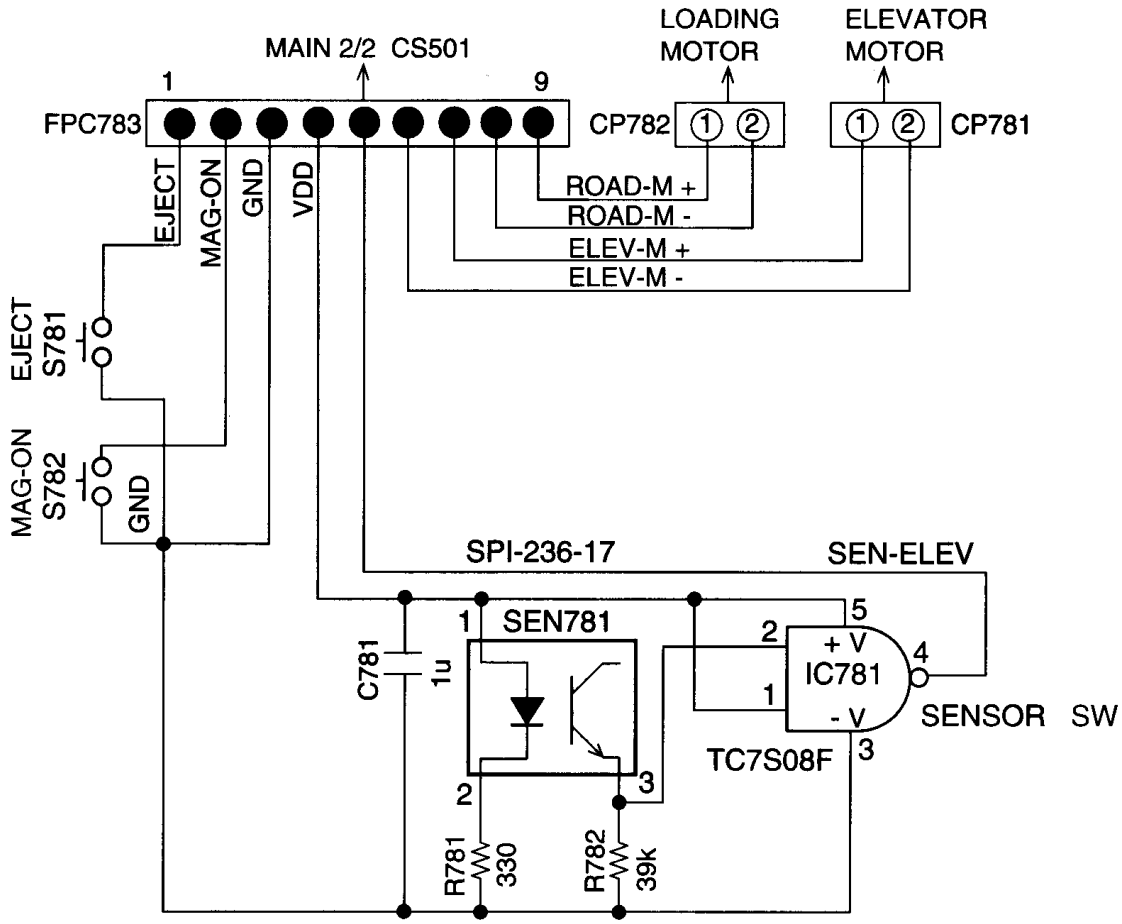
SWITCH



18. CIRCUIT DIAGRAMS (SPINDLE & LOADING / ELEVATOR PCB)



LOADING
ELEVATOR



VOLTAGE MEASUREMENT TABLES

(Note: all voltages given in these tables are average DC values, unless otherwise noted)

IC751 – BA6843AFS

1:	0V
2:	PULSES
3:	N.C.
4:	PULSES
5:	N.C.
6:	PULSES
7:	0V
8-13:	1.7V
14:	1.1V
15:	N.C.
16:	0.7V
17:	N.C.
18:	2.7V
19:	2.6V
20:	5.1V
21:	N.C.
22:	5.1V
23:	8.9V
24:	8.9V

IC752 – TC7S08F

1:	5.1V
2:	5.0V
3:	0V
4:	5.1V
5:	5.1V

IC781 – TC7S08F

1:	5.1V
2:	5.0V
3:	0V
4:	5.1V
5:	5.1V

SEN751 – SPI-236-17

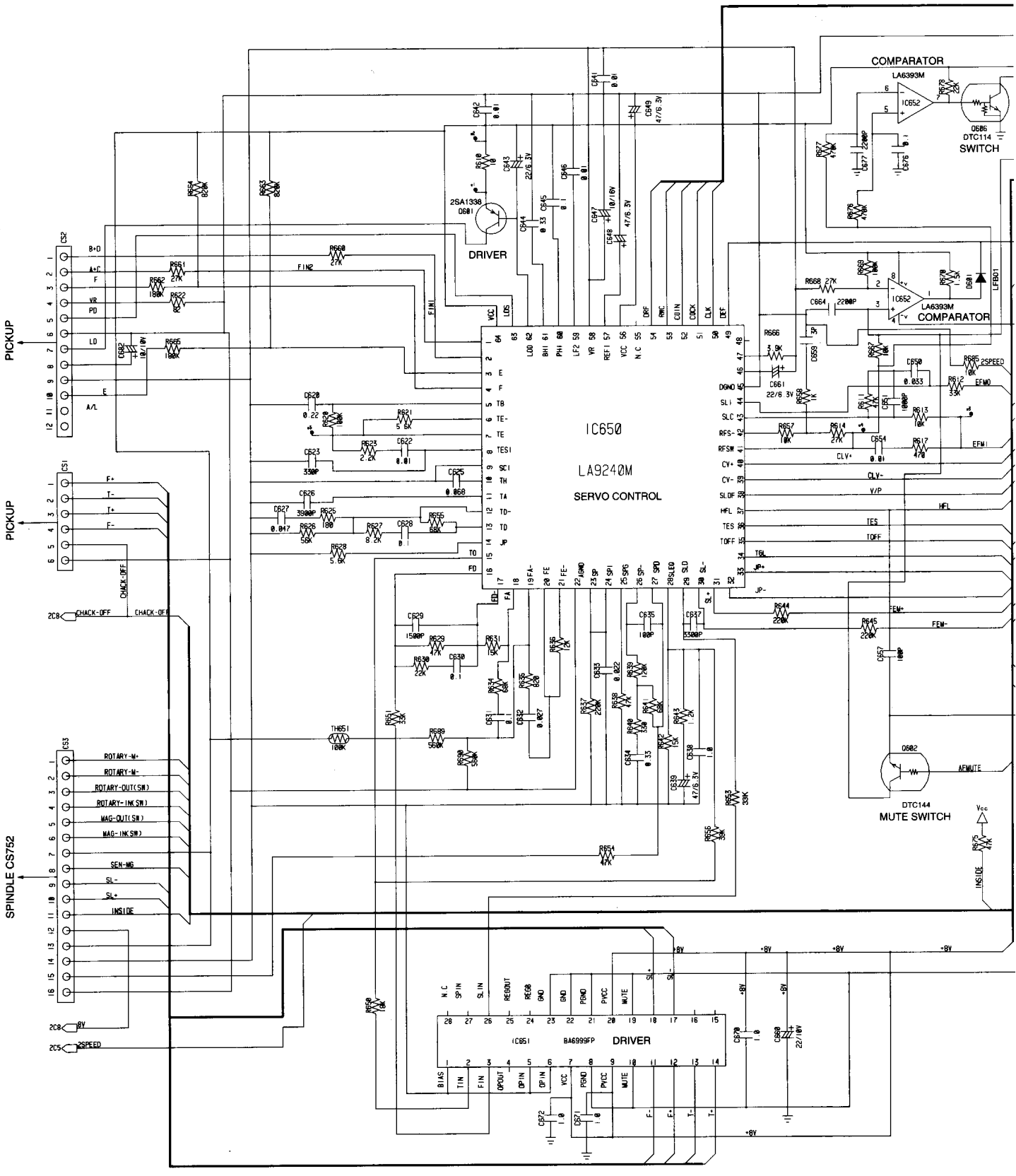
1:	5.1V
2:	3.9V
3:	5.0V

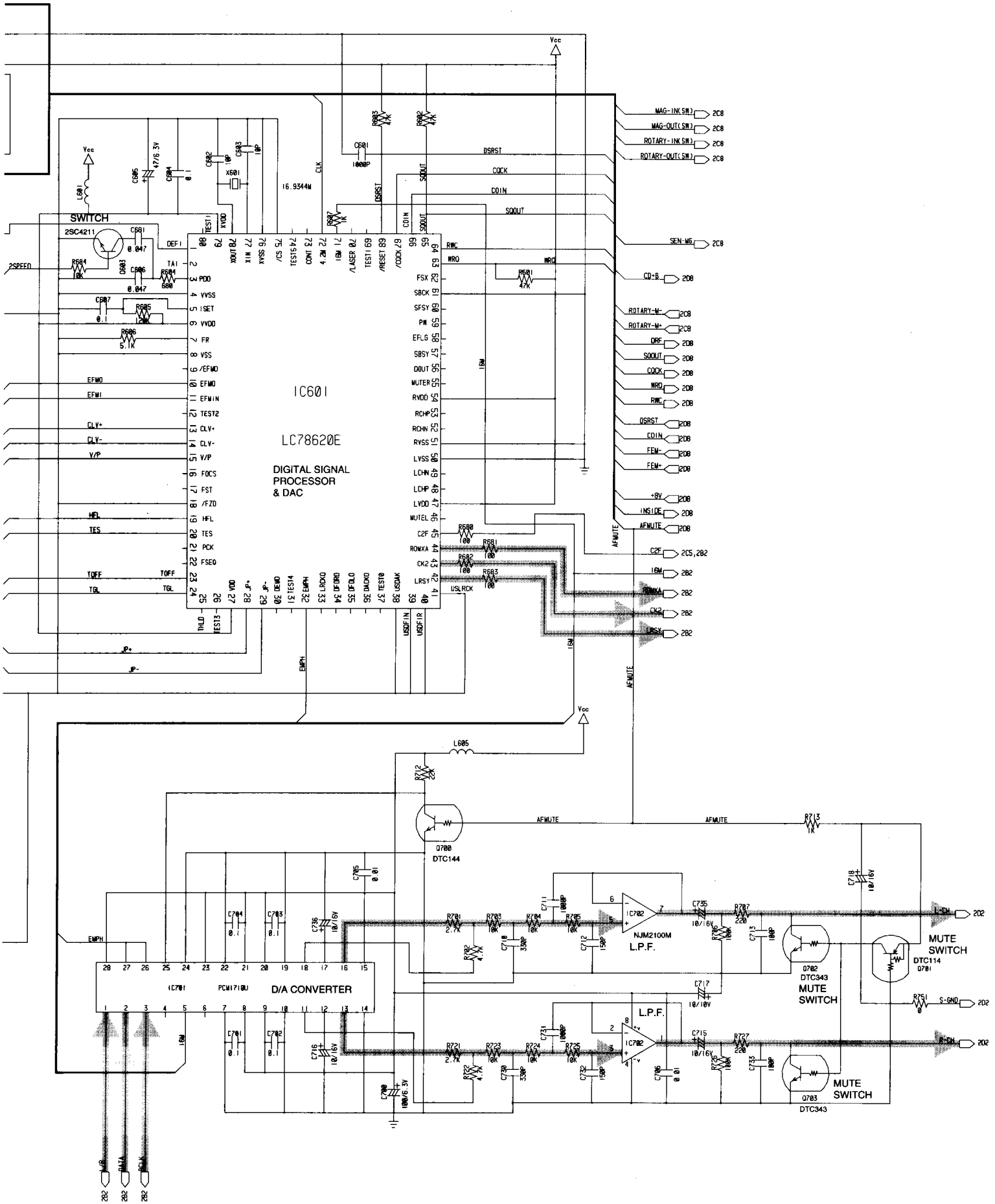
SEN781 – SPI-236-17

1:	5.1V
2:	3.9V
3:	5.0V

19. MAIN CIRCUIT DIAGRAM 1

MAIN 1/2

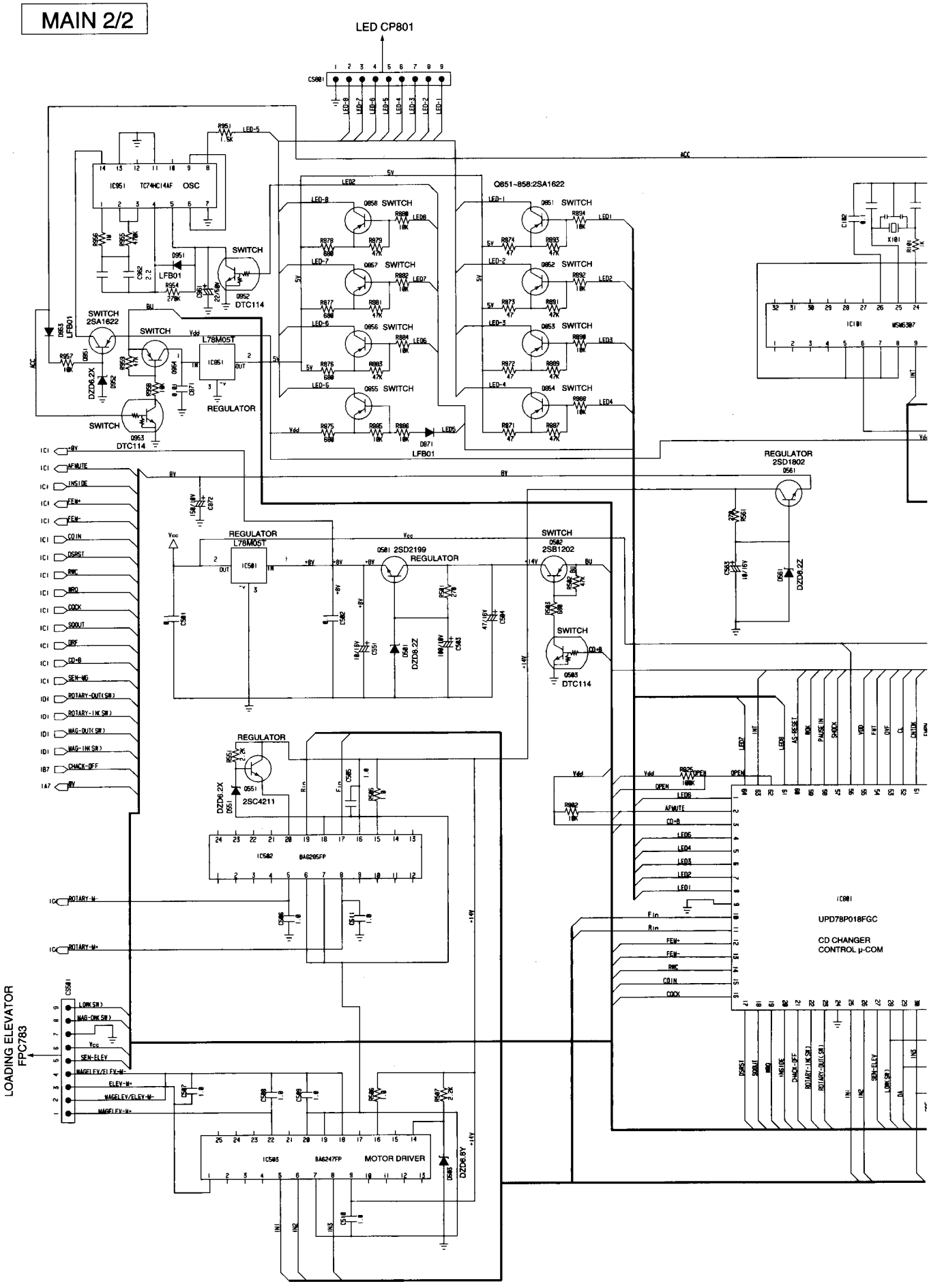


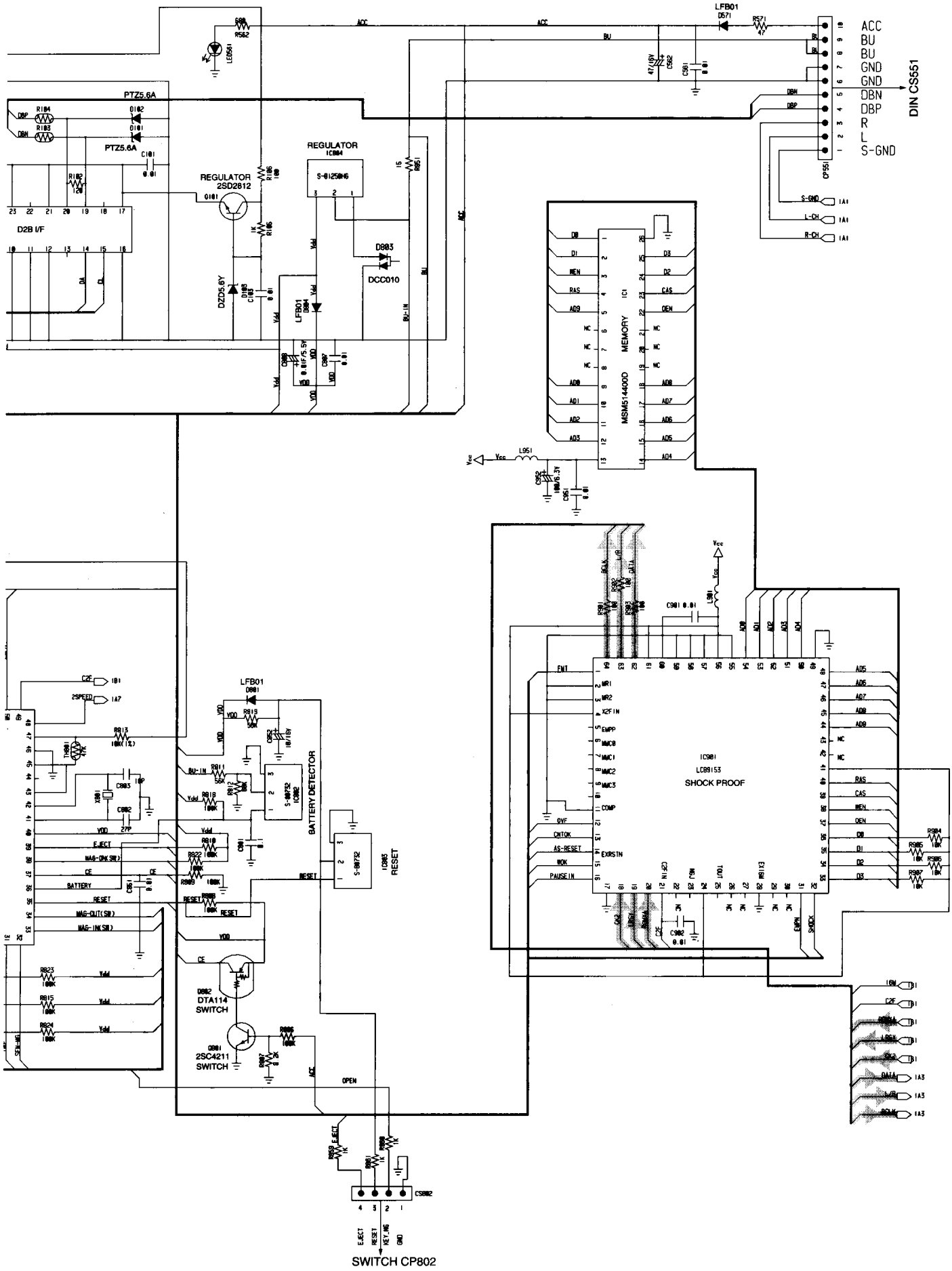

IC601
LC78620E
DIGITAL SIGNAL PROCESSOR & DAC
SWITCH
2SC4211
D/A CONVERTER
PCM1710U
NJM2100M
L.P.F.
MUTE SWITCH
DTC144
DTC343
DTC114
Vcc
DSRST
SQOUT
COCK
CDIN
WRQ
RWC
AFMUTE
EMPH
MAG-IN(SW)
MAG-OUT(SW)
ROTARY-IN(SW)
ROTARY-OUT(SW)
SEN-MS
CD-B
ROTARY-M-
ROTARY-M+
ORF
FEM-
FEM+
+8V
INSIDE
C2F
16M
SCOR
CK2
LRSY
R-CH
L-CH
S-GND
LR
DATA
BCLK

PCS 92 157

21. MAIN CIRCUIT DIAGRAM 2

MAIN 2/2

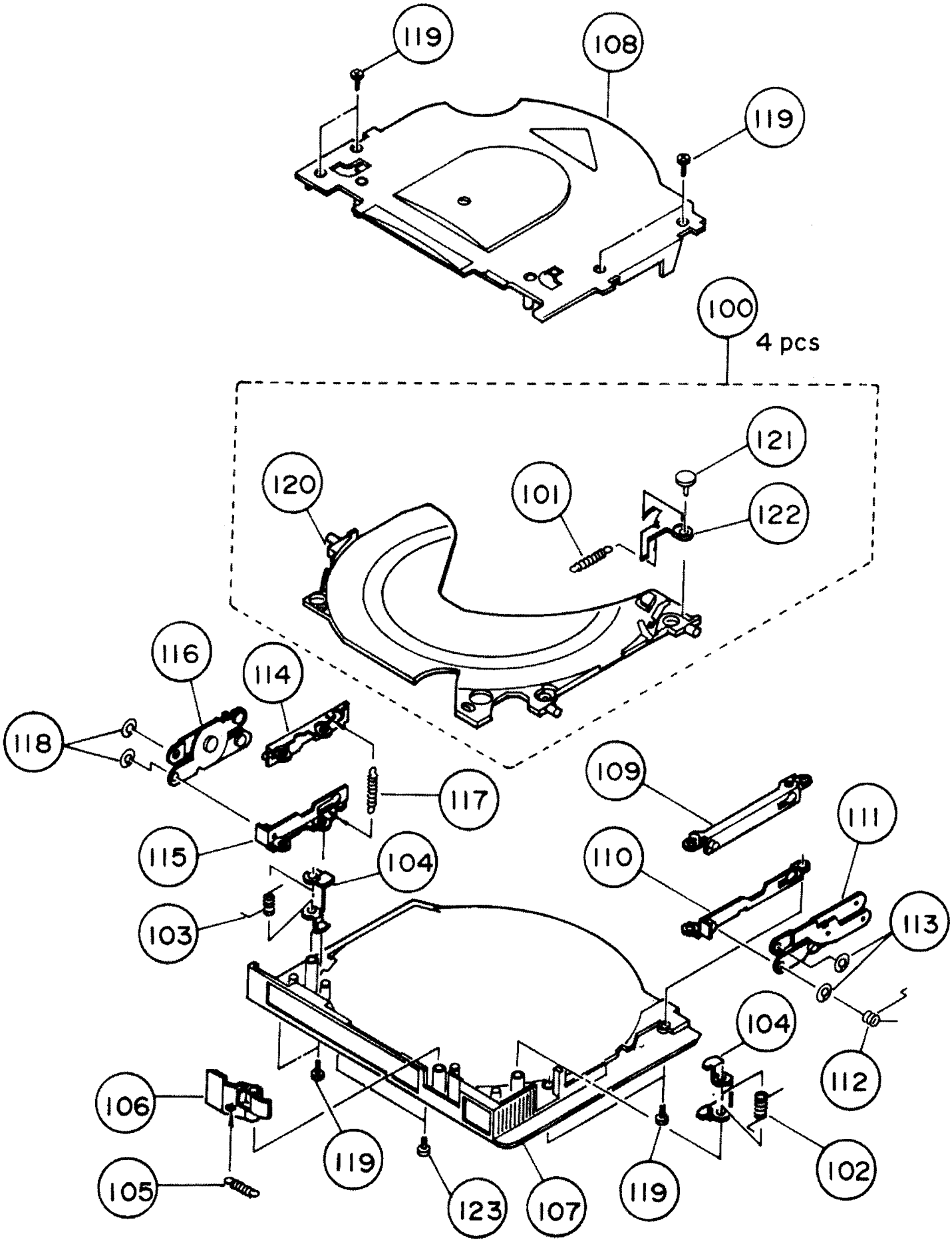




22RC047

PCS 92 161

22. EXPLODED VIEW MAGAZINE



Cabinet parts

1	4822 459 05076	Front panel assy
2	4822 426 10683	Rear panel
3	4822 402 11136	Lock lever bracket assy
4	4822 410 11951	Eject button
5	4822 402 11137	Lock lever
6	4822 492 11677	Lock lever torsion spring
8	4822 529 10409	Gear damper
15	4822 402 11138	Bracket assy L
16	4822 402 11139	Bracket assy R
17	4822 522 10717	Gear, B
20	4822 522 10718	Gear, A
37	4822 529 10411	Damper assy FL, RR, RL
39	4822 492 11679	Damper spring 1 RR
40	4822 492 11681	Damper spring 2 FL, FR
41	4822 492 11682	Damper spring 3 RL
43	4822 532 13046	Damper sheet
44	4822 529 10412	Damper assy FR

Magazine parts

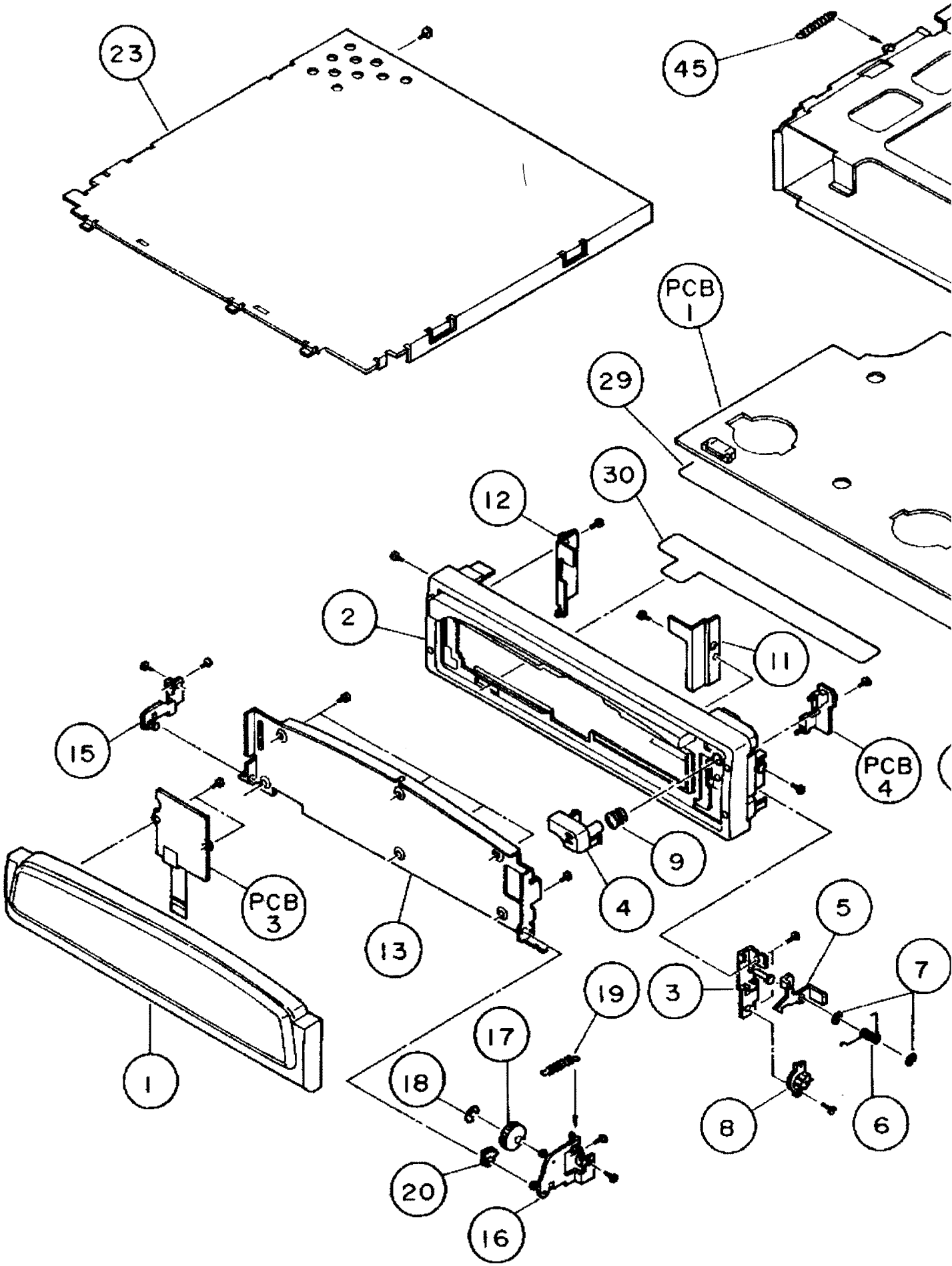
100	4822 464 10459	Disc carrier assy
104	4822 402 11141	Magazine lock lever
106	4822 402 11142	Magazine eject lever
107	4822 442 01492	Magazine bottom
108	4822 442 01493	Magazine top
109	4822 402 11143	Magazine bracket assy top
110	4822 402 11144	Magazine bracket assy bottom
111	4822 402 11145	Magazine link lever assy
113	4822 532 13045	Mount-M special washer
114	4822 402 11146	Magazine bracket assy top
115	4822 402 11147	Magazine bracket assy bottom
116	4822 402 11148	Magazine link lever assy
118	4822 532 13045	Mount-M special washer

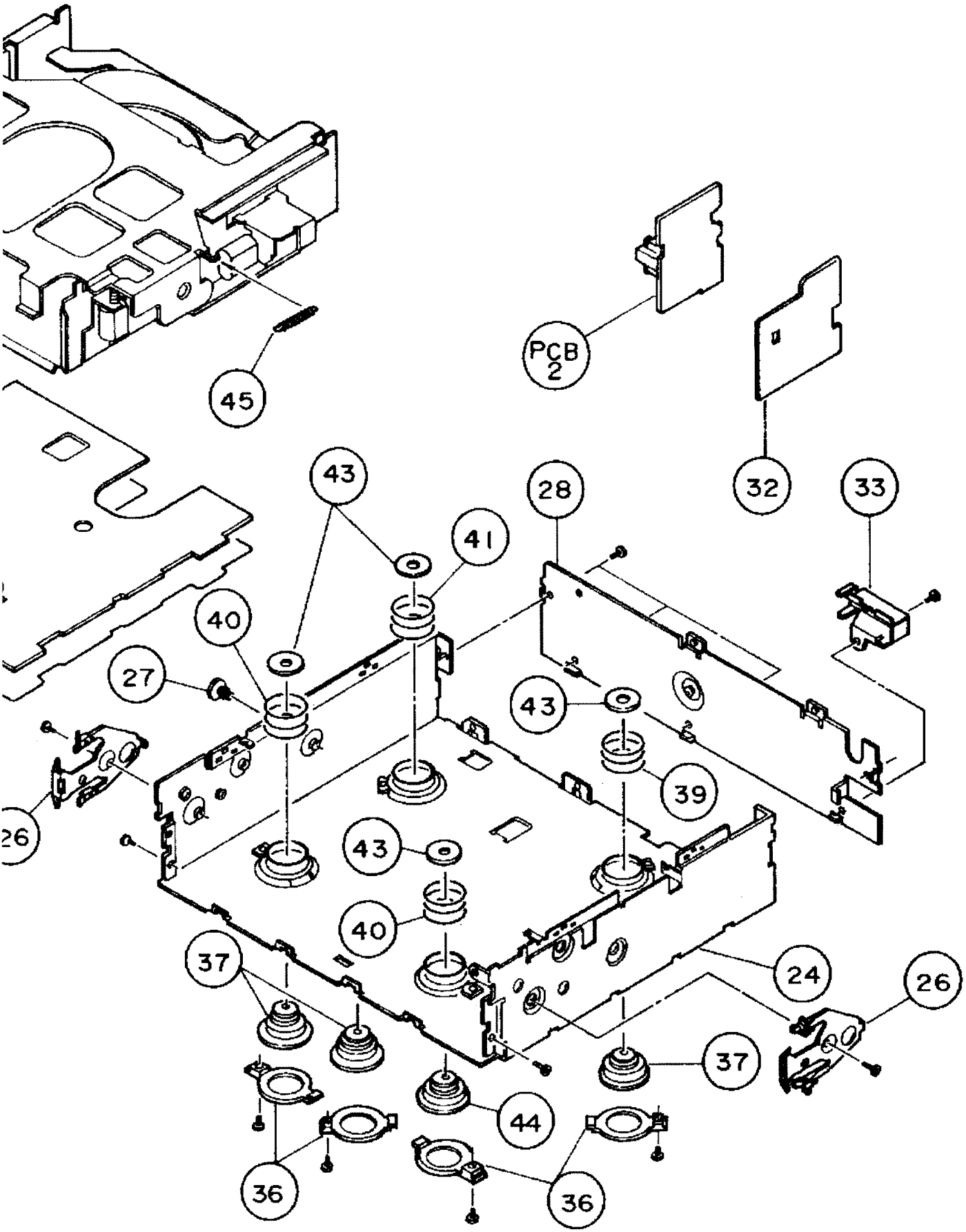
Accessories

4822 736 16342	Instructions for use
4822 441 12224	Case assy
4822 492 11678	Shaft wire spring
4822 502 14606	Special transport screw

*(**Note:** all parts not mentioned here are NO service parts!)*

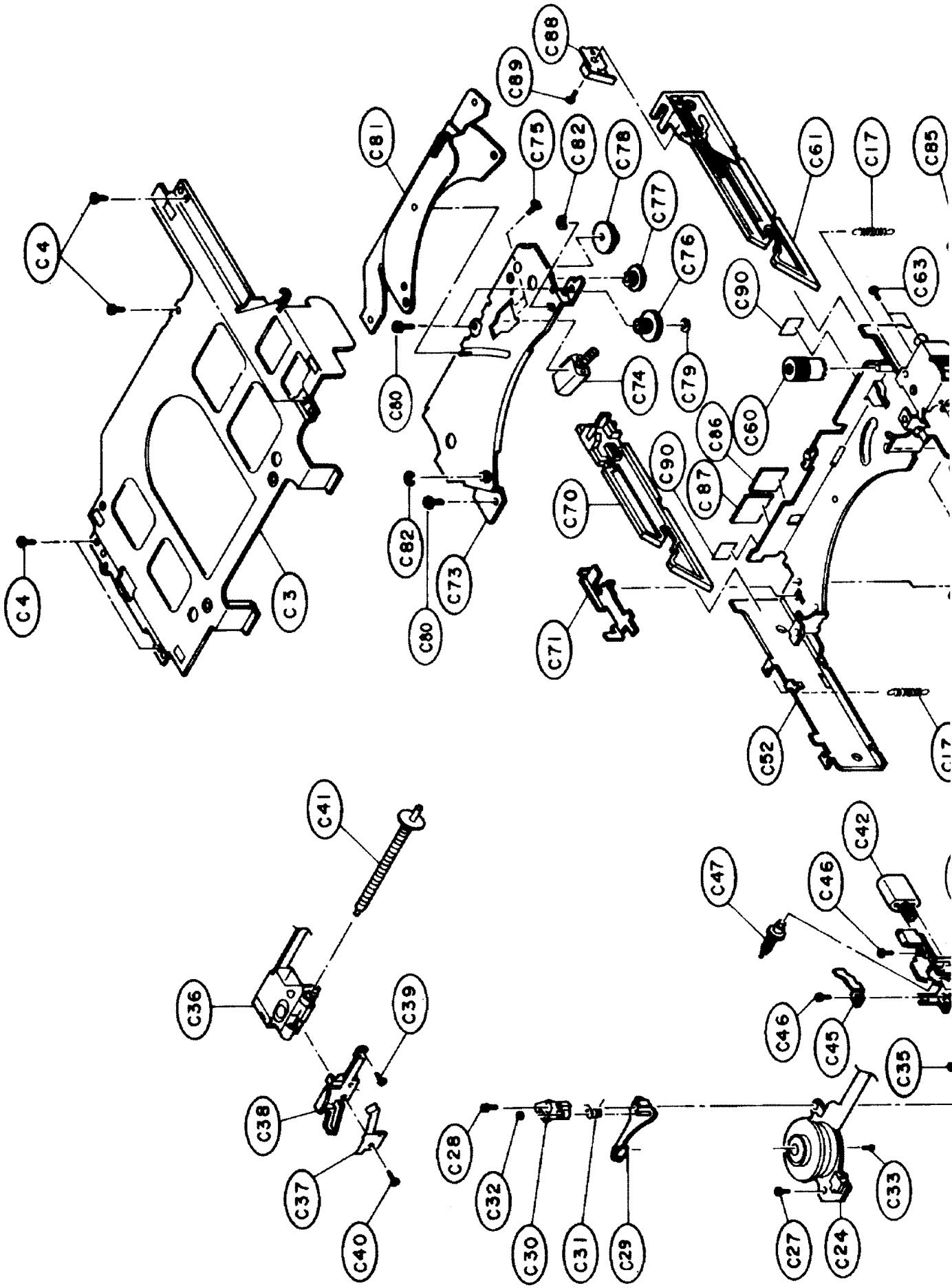
24. EXPLODED VIEW (CABINET PARTS)

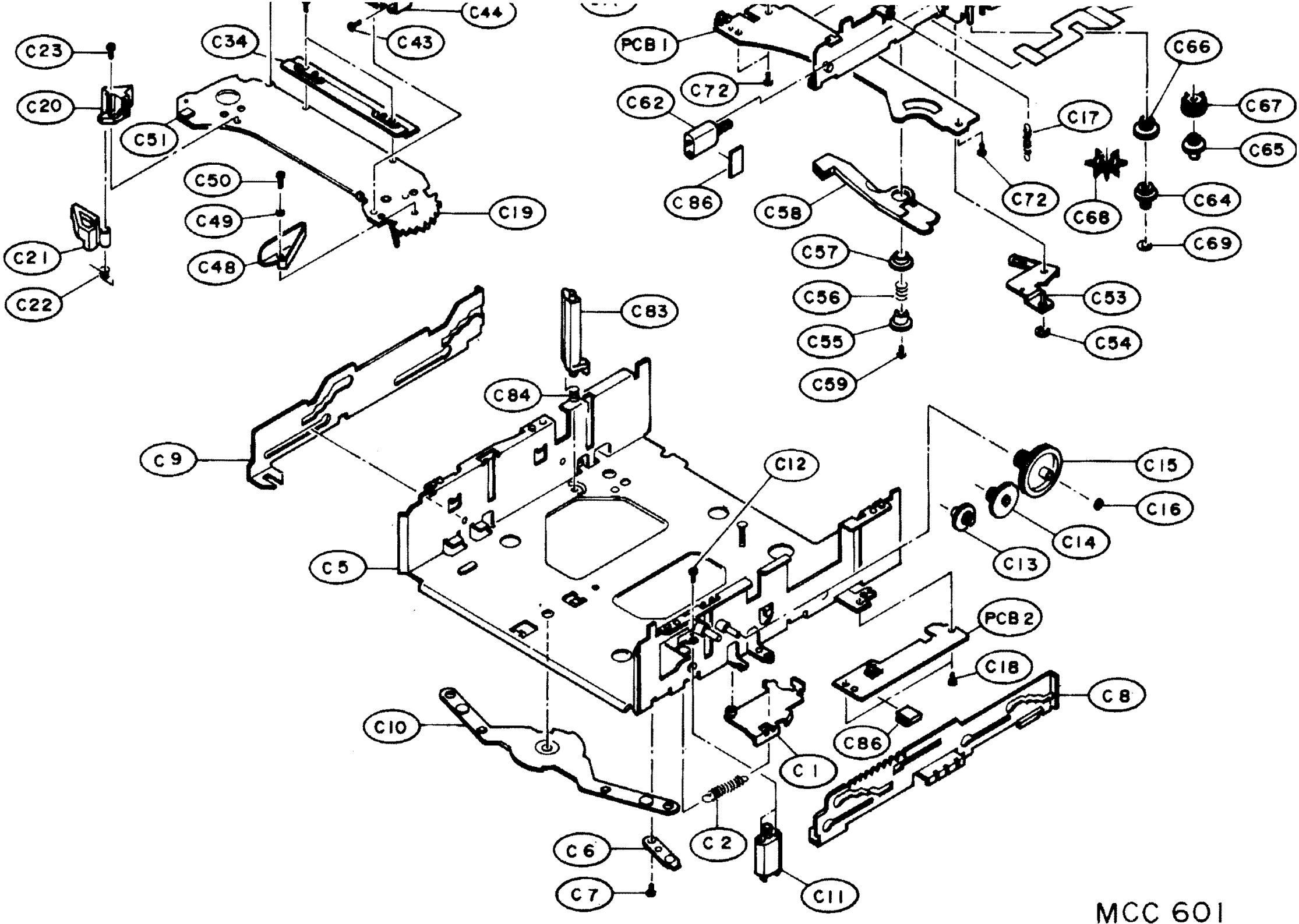




22RC047

25. EXPLODED VIEW CD MECHANISM




C44
C43
C34
C23
C20
C51
C50
C49
C48
C19
C21
C22
PCB1
C72
C62
C86
C17
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C83
C84
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C12
C15
C16
C14
C13
C5
PCB2
C18
C8
C10
C86
C1
C2
C6
C7
C11

MCC 601

Mechanical parts

*(**Note:** All parts not mentioned here are NO service parts!)*

C11	4822 361 11102	Elevator motor assy
C13	4822 522 10719	Gear, EA
C14	4822 522 10721	Gear, EB
C15	4822 522 10722	Gear, EC
C16	4822 532 12295	Mount-M special washer
C20	4822 502 14607	Mount-M special screw (in)
C21	4822 402 11149	Disc sleeve lever
C24	4822 361 11103	Spindle motor assy
C32	4822 532 12735	Special washer
C36	4822 691 10734	Laser pick-up unit
C38	4822 691 10735	Mount-E feed
C42	4822 361 11104	Feed motor assy
C44	4822 502 14608	Mount-M special screw (out)
C47	4822 522 10723	Gear, FB
C60	4822 522 10724	Gear, RD
C62	4822 361 11102	Mag. elevator motor assy
C64	4822 522 10725	Gear, MA
C65	4822 522 10726	Gear, MB
C66	4822 522 10727	Gear, MC
C67	4822 522 10728	Gear, MD
C68	4822 522 10729	Gear, ME
C74	4822 361 11105	Rotary assy motor
C76	4822 522 10731	Gear, RA
C77	4822 522 10732	Gear, RB
C78	4822 522 10733	Gear, RC
C79	4822 532 12295	Mount-m special washer
C85	4822 320 12432	Flat foil PCB

Electrical parts

*(**Note:** For all parts not mentioned here (common resistors / capacitors etc.) refer to a standard component catalogue.)*

D1	4822 130 10655	Diode 1SR154-400
D101	4822 130 11347	Zener 5.6V
D102	4822 130 11347	Zener 5.6V
D103	4822 130 83765	Zener 5.6V
D501	4822 130 11348	Zener 8.2V
D503	4822 130 11349	Zener 6.8V
D551	4822 130 11355	Zener 6.2V
D561	4822 130 11348	Zener 8.2V
D571	4822 130 11354	Diode LFB01
D601	4822 130 11354	Diode LFB01
D801	4822 130 11354	Diode LFB01
D803	4822 130 82557	Diode MPG03B
D804	4822 130 11354	Diode LFB01
D871	4822 130 11354	Diode LFB01
D951	4822 130 11354	Diode LFB01
D952	4822 130 11355	Zener 6.2V
D953	4822 130 11354	Diode LFB01
LED561	4822 130 82018	BR1102W
LED801 – LED808	4822 130 11359	BG1101W-730-C-TR
LED809 – LED812	4822 130 82018	BR1102W

Q101	4822 130 60753	Transistor 2SC2812L6
Q501	4822 130 10786	Transistor 2SD2199S
Q502	4822 130 62912	Transistor 2SB1202(ST)
Q503	4822 130 63886	Transistor DTC114YU
Q551	4822 130 11356	Transistor 2SC4211-6
Q561	4822 130 11351	Transistor 2SD1802-S
Q601	4822 130 10786	Transistor 2SD2199S
Q602	4822 130 11352	Transistor DTC144TU
Q603	4822 130 11356	Transistor 2SC4211-6
Q606	4822 130 63886	Transistor DTC114YU
Q700	4822 130 11352	Transistor DTC144TU
Q701	4822 130 11357	Transistor DTA114YU
Q702	4822 130 62861	Transistor DTC343TK
Q703	4822 130 62861	Transistor DTC343TK
Q801	4822 130 11356	Transistor 2SC4211-6

Q802	4822 130 11357	Transistor DTA114YU
Q851 – Q858	4822 130 11358	Transistor 2SA1622-6
Q951	4822 130 11358	Transistor 2SA1622-6
Q952	4822 130 63886	Transistor DTC114YU
Q953	4822 130 63886	Transistor DTC114YU
Q954	4822 130 10785	Transistor 2SA1179M6

IC1	4822 209 16795	Memory MSM51440
IC101	4822 209 32743	D²B bus interface MSM6307GS
IC501	4822 209 33094	Voltage regulator MC78M05
IC502	4822 209 16792	Rotary motor driver BA6285FP
IC503	4822 209 16793	Elev. motor driver BA6247FP
IC601	4822 209 15225	Dig. signal processor LC78620
IC650	4822 209 15227	Servo controller LA9240M
IC651	4822 209 15228	Servo coil driver BA6999FP
IC652	4822 209 16794	Comparator amp LA6393M
IC701	4822 209 15226	D/A converter PCM1710U
IC702	4822 209 30455	Op-amp NJM2100M
IC751	4822 209 16798	Motor driver BA6843AFS
IC752	4822 209 63557	Gate TC7S08F
IC781	4822 209 63557	Gate TC7S08F
IC801	4822 209 16796	µ-processor UPD78P018FGC
IC802	4822 209 33759	Voltage check S-80732AN-DW
IC803	4822 209 33759	Voltage check S-80732AN-DW
IC804	4822 209 33241	Voltage regulator S-81250HG
IC851	4822 209 33094	Voltage regulator MC78M05
IC901	4822 209 16797	Shock detect / correct LC89153
IC951	4822 209 61493	Oscillator HD74HC14P
SEN751	4822 130 11353	Photo coupler SPI236-17
SEN781	4822 130 11353	Photo coupler SPI236-17

Miscellaneous

C808	4822 124 12242	Back-up capacitor 10mF / 5.5V
CP551	4822 265 11376	Socket 10-pole
CP802	4822 320 12463	Cable assy
CS501	4822 265 11377	Socket 9-pole
CS551	4822 265 11382	Plug 10-pole
CS751	4822 265 11379	Socket 15-pole
CS752	4822 265 11381	Socket 16-pole
CS801	4822 265 11377	Socket 9-pole
CS802	4822 265 11378	Plug 4-pole
DIN-1	4822 320 12431	DIN cable
FPC783	4822 320 12429	Cable wire 9-pole 70mm
FPC801	4822 320 12462	Flexible foil PCB
L8	4822 157 11124	Coil SK 5mH
L601	4822 157 11703	Core
L605	4822 157 11703	Core
L901	4822 157 11703	Core
L951	4822 157 11703	Core
R103	4822 116 10078	Thermistor PTH60G01AR
R104	4822 116 10078	Thermistor PTH60G01AR
S751	4822 277 11802	Micro switch
S752	4822 277 11802	Micro switch
S753	4822 277 11803	Micro switch
S754	4822 277 11803	Micro switch
S781	4822 277 11801	Micro switch
S782	4822 277 11801	Micro switch
S801	4822 276 14001	Tact switch
S802	4822 277 11804	Microswitch
S803	4822 277 11804	Microswitch
TH651	4822 116 10079	Thermistor NTH5G1M
TH801	4822 116 10081	Thermistor
X101	4822 242 10942	Crystal 5.75MHz
X601	4822 242 10941	Crystal 16.9344MHz
X801	4822 242 10943	Crystal 8.3886MHz