

Service  
Service  
**Service**

# Service Manual

12 V 

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COMPACT  
**disc**  
DIGITAL AUDIO

CLASS 1  
LASER PRODUCT



# PHILIPS

## SPECIFICATIONS

|                    |                             |                    |                         |
|--------------------|-----------------------------|--------------------|-------------------------|
| Power supply       | : +14.4VDC                  | Distortion         | : 0.008% (at 1 kHz)     |
| Frequency response | : 20 20,000 Hz ( $\pm$ 1dB) | Channel separation | : > 75dB (at 1 kHz)     |
| DAC resolution     | : 1 bit per channel         | Wow and flutter    | : unmeasurable          |
| Oversampling rate  | : 8 times (352.8 kHz)       | Output voltage     | : 700 mV / 10k $\Omega$ |
| Dynamic range      | : 95dB                      | Weight             | : 2 kg                  |
| S/N ratio          | : 95dB (at 1kHz / 0dB)      | Dimensions (HxWxD) | : 64 x 250 x 173 mm     |

## !!IMPORTANT!

- When disassembling ALWAYS protect the the pick-up unit against ESD damage by closing the solder connection of the pick-up unit either on the CD panel or the flexible foil pcb!
- New pick-up units are supplied with CLOSED solder connections on the flexible foil pcb. Do NOT forget to remove the solder joint AFTER replacing the unit!

## !!IMPORTANT!

## SERVICE TIPS

- To prevent magazine check (duration approx. 40 sec.) insert the magazine and press the 'eject' button SIMULTANEOUSLY. In that case disc no. 1 is loaded and the set comes in 'stand-by' mode.
- Use (self made) extension cables of approx. 30 cm to get access to the bottom side of the main pcb for measuring purposes. Two extension cables (a 2-pole and a 5-pole one) are required. To make these cables, the following parts can be ordered and used for making the extension cables:  
CS801 - cable assy 2-p - 4822 321 62668  
CS802 - cable assy 5-p - 4822 321 62669
- After EACH replace of the pick-up unit, the E-F balance should be re-adjusted and checked!
- The set can also 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
- When the CD changer has a defect while the magazine is still in, the magazine can be removed by moving the emergency eject lever to the right by a small screwdriver, as shown in figure 1 below. First the protection sheet has to be removed. DO NOT FORGET to put the sheet back to prevent dust intrusion! When a disc is chucked, turn the gear to the right until the slide lever reaches to the edge of the left side (see figure 2).

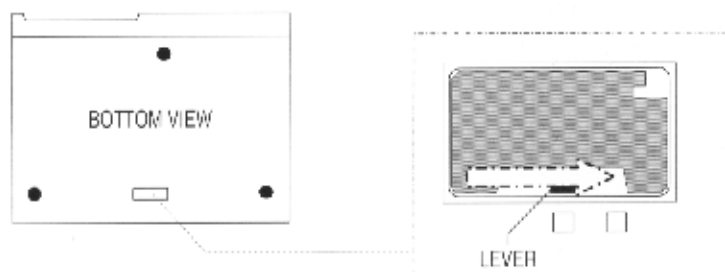


Figure 1

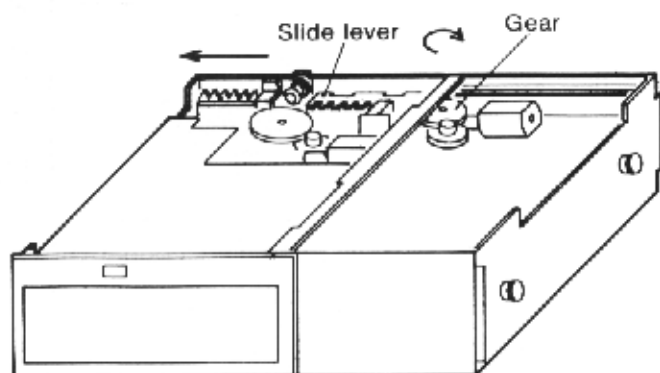
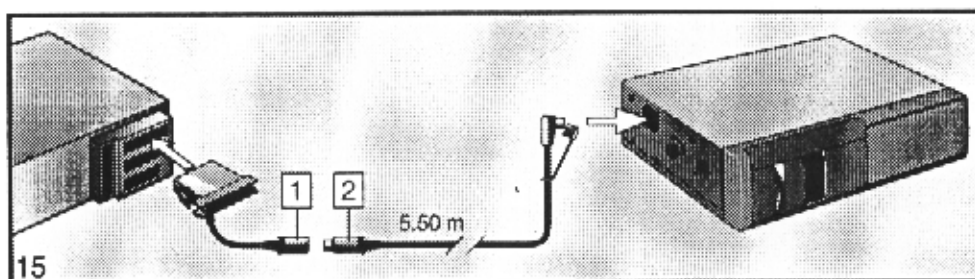


Figure 2

## CONNECTIONS



## CHECKS AND ALIGNMENTS

### Pick-up unit check

In normal condition the current through R652 should read 47mA (voltage across R652 ( $15\Omega$ ):  $15 \times 0.047 = 0.705V$ ). When the pick-up unit is defective, this current is higher. In case of defects, replace the pick-up unit.

### E-F balance adjustment

After replacing the pick-up unit, the E-F balance should be (re-)adjusted according the following procedure:

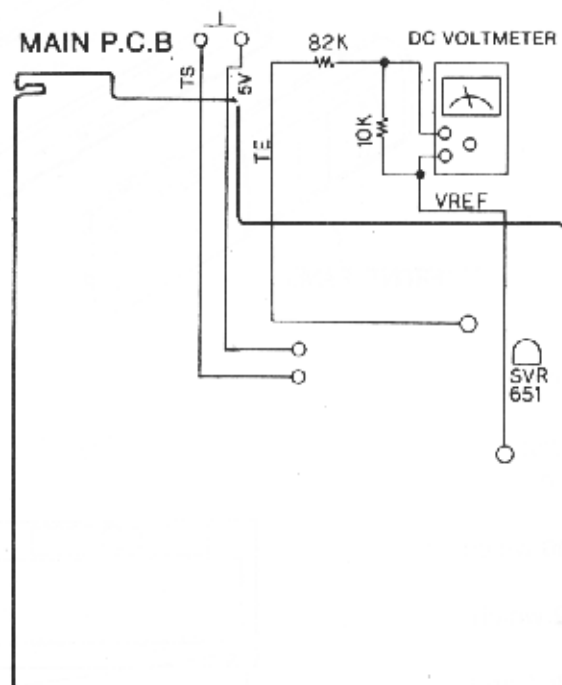
1) Necessary test CD and measuring instruments:

1. DC voltmeter
2. Test disc 4822 397 30184

2) Adjustment procedure

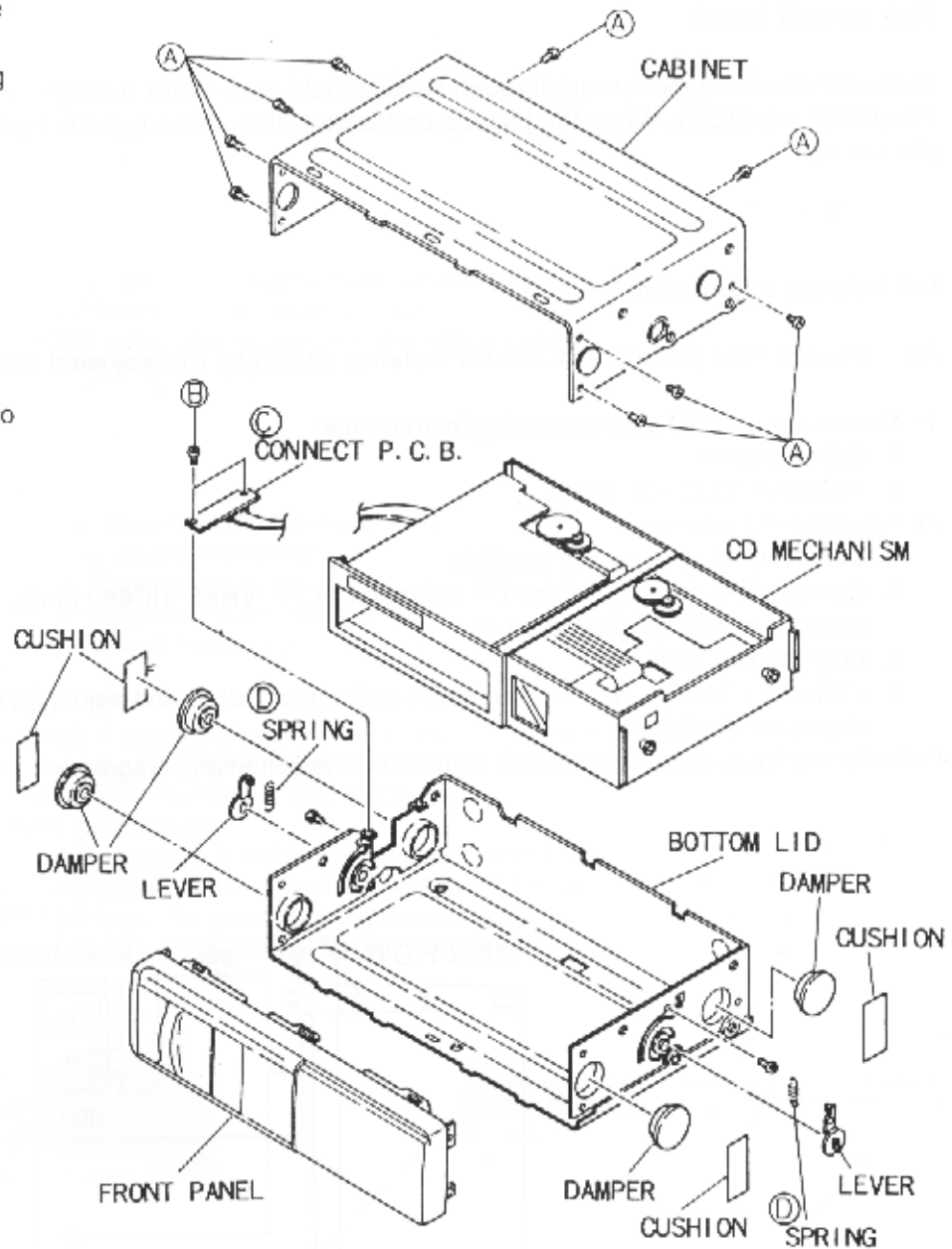
1. Set SVR651 in its centre position
2. Connect the -terminal of the DC voltmeter to TP 'VREF' (IC650 pin9), and +terminal via a resistor network to TP 'TE' (IC650 pin7).
3. Play the test disc.
4. Connect +5VDC to TP 'TS' (common cathode of D651) and adjust SVR651 until the DC voltmeter shows  $0mV \pm 2.5mV$ .

Refer to the figure below, to the pcb layout and the schematic diagrams.



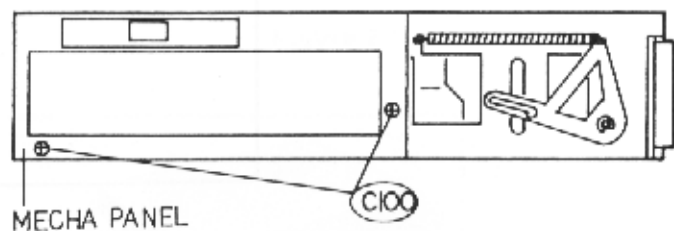
## DISASSEMBLY

1. Remove 9 screws **A** securing the cabinet.
2. Remove the cabinet with pushing the front panel stopper.
3. Remove the front panel with pushing both bottom lid stoppers.
4. Remove the 2 screws **B** and the connector **C** connect pcb can be removed.
5. Remove the cushion.
6. Remove the damper.
7. If the springs **D** are removed, also the mechanism can be removed.



## CD MECHANISM

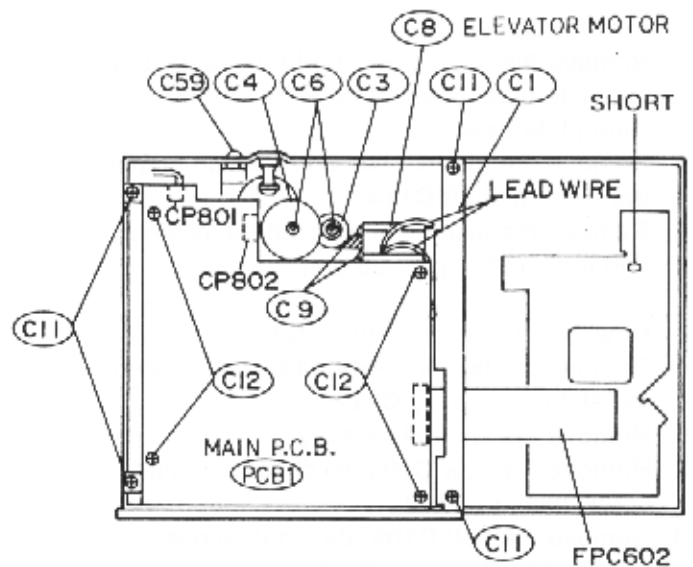
- 1) Elevator motor and loading motor removal procedure
- (1) How to remove the top chassis:
  1. Short the two solder points on the pick-up unit with solder.
  2. Remove the two screws **C100** which fasten the panel **C99**.
  3. Remove the four screws **C12** which fasten the main pcb **PCB1**.
  4. Remove the connectors CP801 and CP802.
  5. Only when you want also remove the elevator motor, remove FPC602.
  6. Remove the four screws **C11** and a screw **C59** which fasten the top chassis **C1**. The top chassis can be removed now.



## DISASSEMBLY

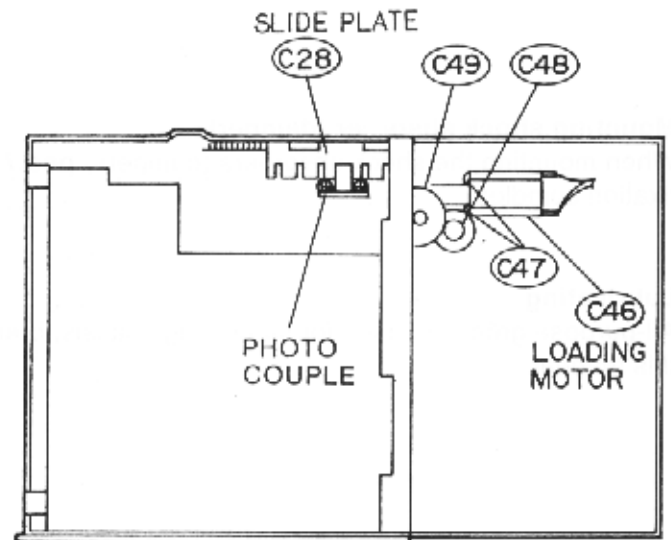
(2) How to remove the elevator motor:

1. Remove the special washer **C6** which fastens the gear A **C3** and gear B **C4**. Remove gears A and B.
2. Remove the two screws **C9** which fasten the elevator motor **C8**. Remove the elevator motor.



(3) How to remove the loading motor:

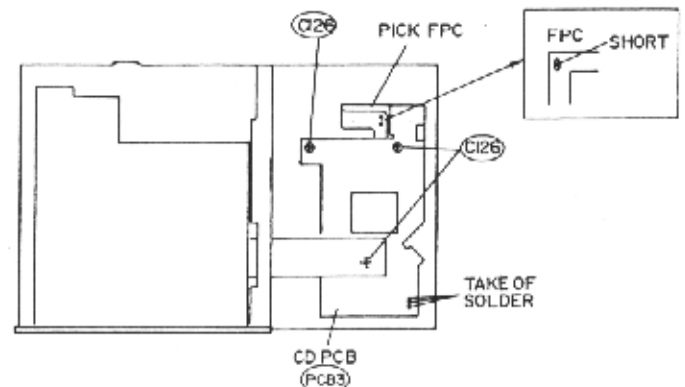
1. Remove the gear A **C48** and the gear F **C49**.
2. Moving the sliding plate (B) **C28** to the right. Lower the elevator to the third slot position.
3. Remove the two screws **C47** which fasten the loading motor and remove the loading motor.



2) Pick-up unit and feed motor removal procedure

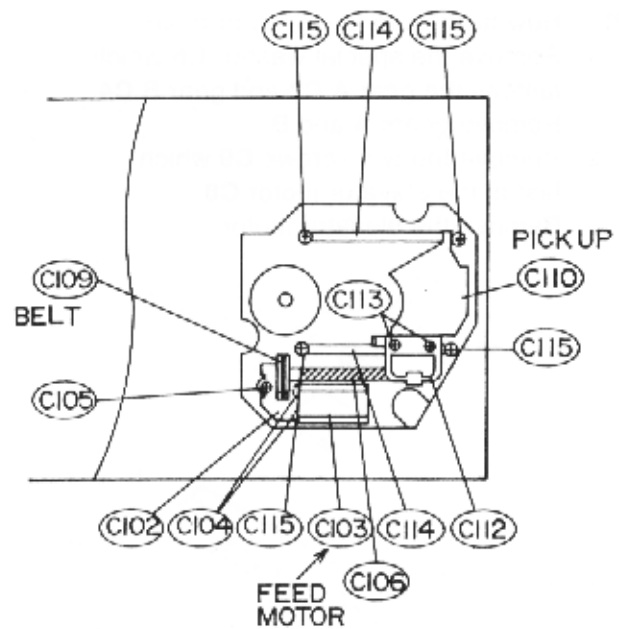
(1) How to remove the CD pcb:

1. Short the two solder points on the pick-up unit with solder.
2. Remove the solder from the connector CP906 which connects the SW1 pcb **PCB6** and the CD pcb **PCB3**.
3. Remove FPC603, FPC602 and CS904 from the connector.
4. Remove the three screws **C126** which fasten the CD pcb **PCB3**. Remove the two FPCs of the pick-up unit from the connector. Remove the CD pcb.



## DISASSEMBLY

- (2) How to remove the pick-up unit:
1. Remove the two screws **C113** which fasten the slide plate assy **C112**. Remove the slide plate assy.
  2. Remove the four screws **C115** which fasten the pick-up shaft **C114**.
  3. Remove the pick-up shaft from the pick-up and remove the pick-up unit.
- (3) How to remove the feed motor:
1. Remove the two screws **C113** which fasten the slide plate assy **C112**. Remove the slide plate assy.
  2. Remove a screw **C105** which fastens the screw fixation **C102**.
  3. Remove the belt **C109**, the shaft screw pulley assy **C106** and the two screws **C104**. Remove the feed motor.



### Mounting shock absorber (damper)

When mounting the shock absorbers (dampers) **pos.7**, use some alcohol to let the dampers slip easily to the fixation spindles.

### Lubricating

All-purpose grease is used for lubricating chassis, brackets and gears. Refer also to the lubrication scheme in this manual.

MECHANISM FUNCTION DESCRIPTION

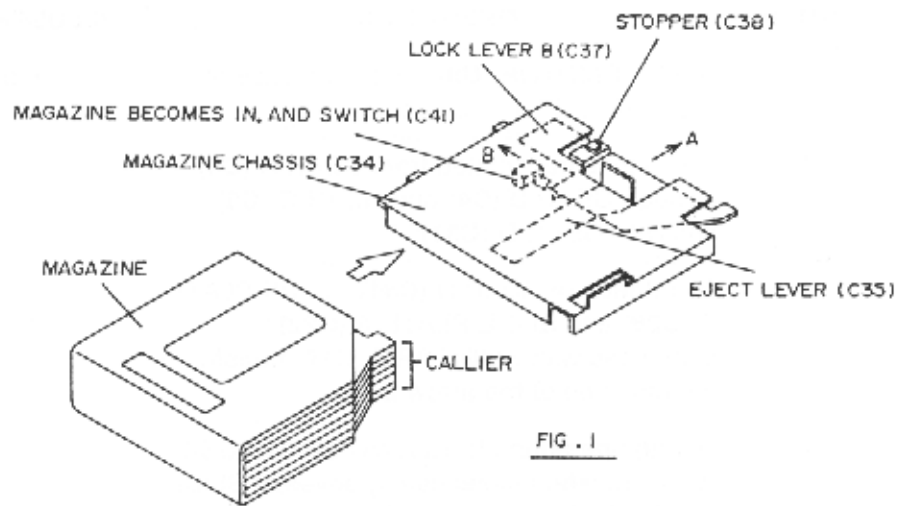


FIG. 1

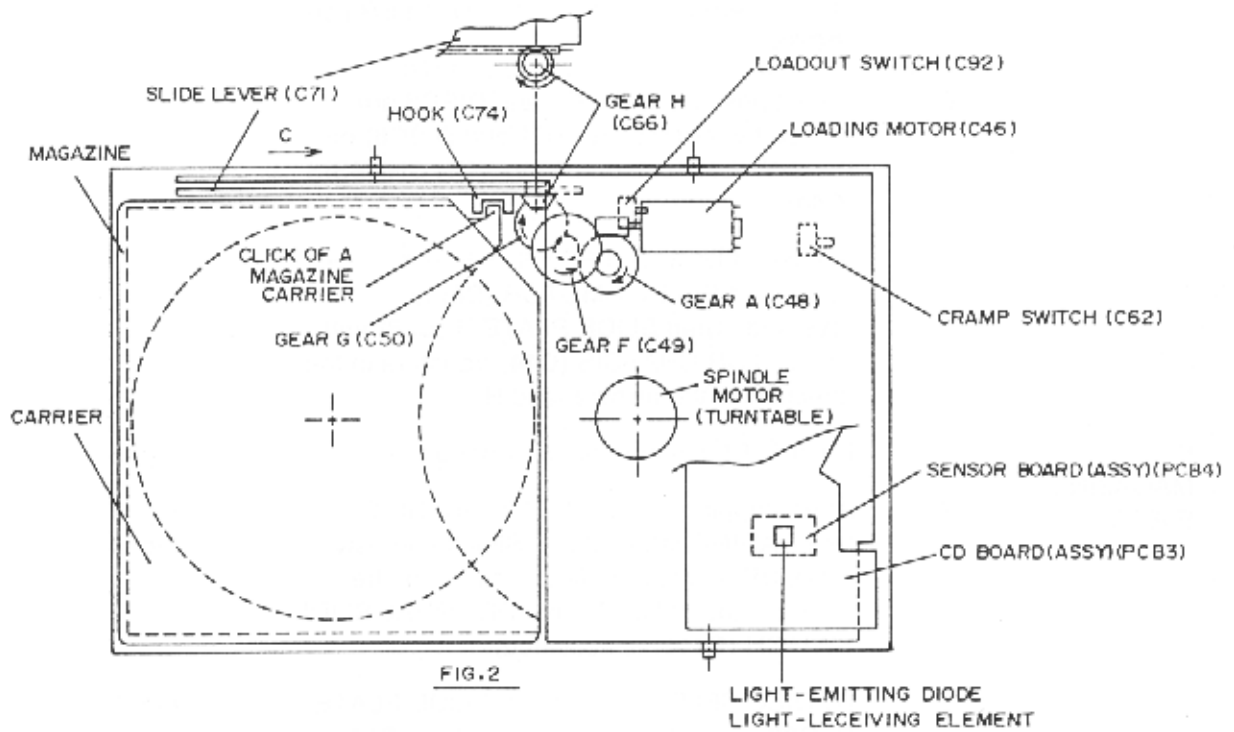


FIG. 2

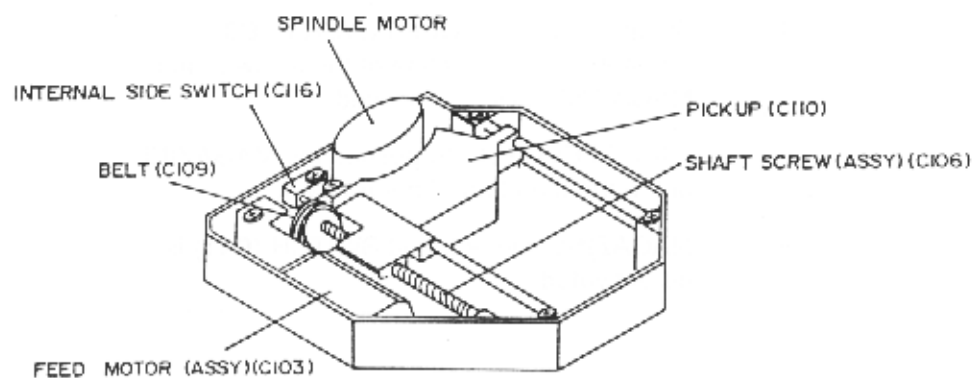


FIG. 3

**MECHANISM FUNCTION DESCRIPTION**

| <b>FUNCTION</b>          | <b>ORDER</b> | <b>OPERATION</b>   | <b>ILLUSTRATION</b> |
|--------------------------|--------------|--|---------------------|
| 1<br>MAGAZINE<br>LOADING | 1            | When a magazine is inserted, EJECT LEVER (C35) is pushed in the direction of the arrow A.  | Fig. 1              |
|                          | 2            | By the transfer of EJECT LEVER (C35), LOCK LEVER B (C37) equipped with STOPPER (C38) moves in the direction of the arrow B.  |                     |
|                          | 3            | The magazine is locked by STOPPER (C38). MAGAZINE is in play position and switch (C41) is activated.   |                     |
| 2<br>DISC<br>LOADING     | 1            | LOADING MOTOR (C46) rotates.   | Fig. 2              |
|                          | 2            | The rotation transmits from GEAR A (C48) through GEAR F (C49) and GEAR G (C50) finally to GEAR H (C66).  |                     |
|                          | 3            | By rotation of GEAR H (C66), SLIDE LEVER (C71) transfers in the direction of the arrow C.  |                     |
|                          | 4            | Simultaneously with (3), HOOK (C74) attached to SLIDE LEVER (C71) picks up a click of a magazine carrier, and pulls out both a carrier and DISC in the direction of the arrow C. |                     |
|                          | 5            | At the end of the direction of the arrow C of SLIDE LEVER (C71), DISC is cramped to the spindle motor (turntable).   | Fig. 4              |
|                          | 6            | As the sign of cramp completion, CRAMP SWITCH (C62) is activated through the lever interlocked with SLIDE LEVER (C71).   |                     |
|                          | 7            | Activating the CRAMP SWITCH (C62) stops the rotation of the LOADING MOTOR (C46).   |                     |
|                          | 8            | Light-emitting diode on the CD pcb assy (PCB3) and light-receiving element on the SENSOR pcb assy (PCB4) check presence / absence of DISC.                                       | Fig. 2              |



**MECHANISM FUNCTION DESCRIPTION**

**MECHAN**

| <b>FUNCTION</b>        | <b>ORDER</b> | <b>OPERATION</b>  | <b>ILLUSTRATION</b> |
|------------------------|--------------|---|---------------------|
| 3<br>PLAY              | 1            | Spindle motor rotates DISC.   | Fig. 3              |
|                        | 2            | PICK-UP unit (C110) begins reading DISC information.  |                     |
|                        | 3            | PICK-UP unit (C110) is transferred by operating BELT (C109) and SHAFT SCREW ASSY (C106) by rotation of FEED MOTOR (C103). Normal or reversed rotation transfers the PICK-UP unit to the internal or external side of DISC respectively. |                     |
| 4<br>DISC<br>UNLOADING | 1            | LOADING MOTOR (C46) rotates in the reversed direction with respect to the rotation during DISC LOADING.   | Fig. 4              |
|                        | 2            | Rotation is transmitted from GEAR A (C48) through GEAR F (C49) and GEAR G (C50) finally to GEAR H (C66).  |                     |
|                        | 3            | By rotation of GEAR H (C66), SLIDE LEVER (C71) transfers in the direction of the arrow D.   |                     |
|                        | 4            | DISC clamp is cancelled, and CRAMP SWITCH (C62) is de-activated.  |                     |
|                        | 5            | Operation continues until the carrier and DISC are put into the magazine.   |                     |
|                        | 6            | LOADOUT SWITCH (C92) is activated by the lever interlocked with SLIDE LEVER (C71).  |                     |
|                        | 7            | Activating the LOADOUT SWITCH (C92) stops the rotation of LOADING MOTOR (C46).  |                     |

## MECHANISM FUNCTION DESCRIPTION

| FUNCTION               | ORDER | OPERATION   | ILLUSTRATION     |
|------------------------|-------|---|------------------|
| 5<br>DISC<br>SELECT    | 1     | SELECT MOTOR (C8) rotates (in case of DISC SELECT 1 → 2 → 3..... → 6).  | Fig. 5           |
|                        | 2     | Rotation is transmitted from GEAR A (C3) through GEAR B (C4) and GEAR C (C5) finally to GEAR D (C31).   |                  |
|                        | 3     | By rotation of GEAR D (C31), SLIDE PLATE B (C28) and SLIDE PLATE A (C22) connected with SLIDE ARM (C17) transfer in the direction of the arrow E.   |                  |
|                        | 4     | During operation (3), ELEVATOR CHASSIS (C44) transfers along cam grooves of SLIDE PLATE A (C22) and SLIDE PLATE B (C28) in the direction of the arrow G.                                    |                  |
|                        | 5     | Select position is judged by counting notches cut in SLIDE PLATE B (C28), using a photo-interrupter on PHOTO COUPLER pcb (PCB5).  |                  |
|                        | 6     | Select position of DISC1 and DISC6 are judged by switches (DISC1 and DISC6) on the SWITCH1 pcb on ELEVATOR CHASSIS (C44).   |                  |
|                        | 7     | In case of DISC SELECT 6 → 5 → 4..... → 1, rotation of SELECT MOTOR (C8) is reversed. Then SLIDE PLATE B (C28) and ELEVATOR CHASSIS (C44) transfers in the direction of the arrow F and H.  |                  |
| 6<br>MAGAZINE<br>EJECT | 1     | Push EJECT button on the front panel.   | Fig. 5           |
|                        | 2     | After stopping SPINDLE MOTOR, DISC UNLOADING takes place. Simultaneously PICK-UP unit is transferred as far as the internal side of DISC (until INTERNAL SLIDE SWITCH (C116) is activated). | Fig. 3<br>Fig. 4 |
|                        | 3     | By DISC SELECT operation, SLIDE PLATE B (C28) and ELEVATOR CHASSIS (C44) are transferred as far as EJECT position.  | Fig. 5           |
|                        | 4     | By operation (3), LOCK LEVER B (C37) transfers in the direction of the arrow I, and MAGAZINE lock is cancelled.   | Fig. 6           |
|                        | 5     | EJECT LEVER (C35) pushes the MAGAZINE out in the direction of the arrow J.  |                  |
|                        | 6     | MAGAZINE ejected, and SWITCH (C41) is de-activated.   |                  |

MECHANISM FUNCTION DESCRIPTION

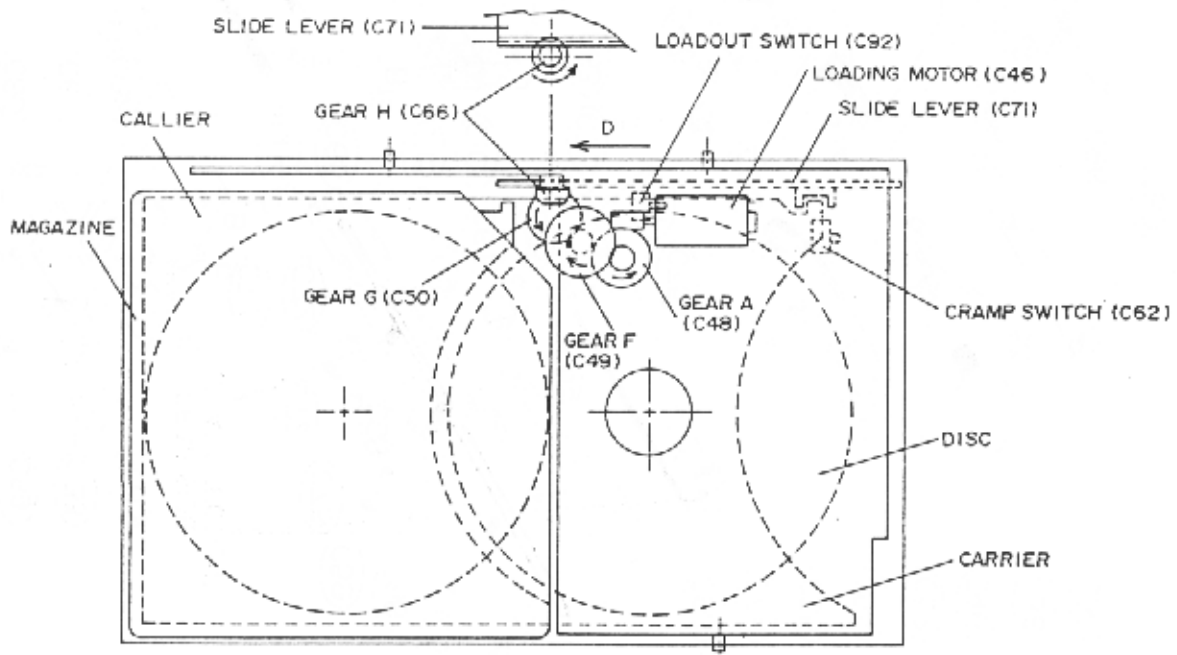
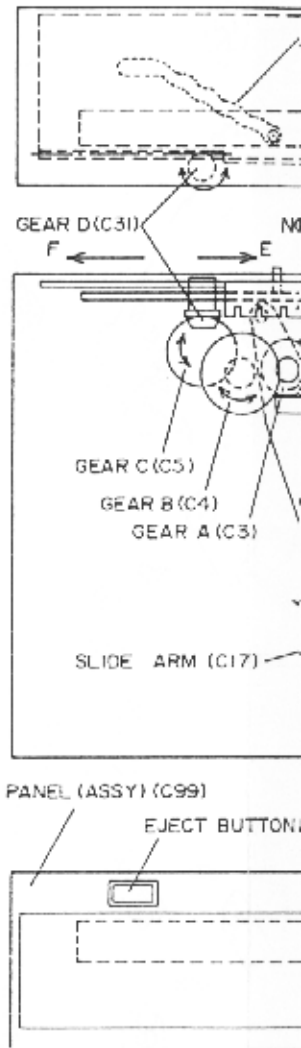
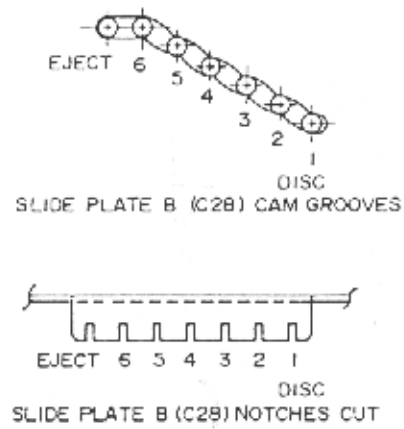
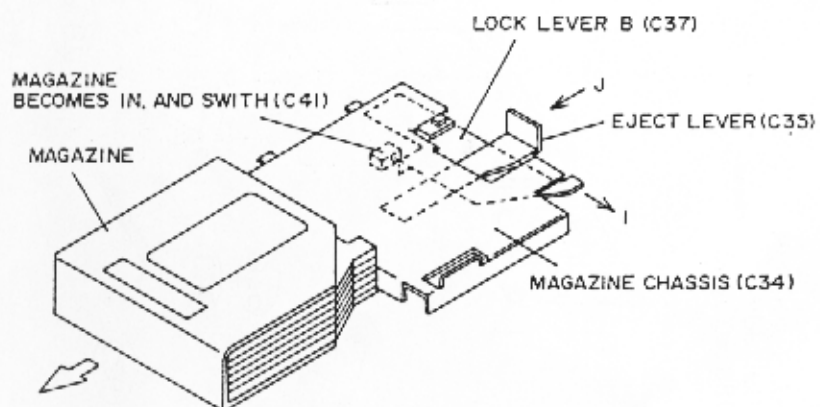
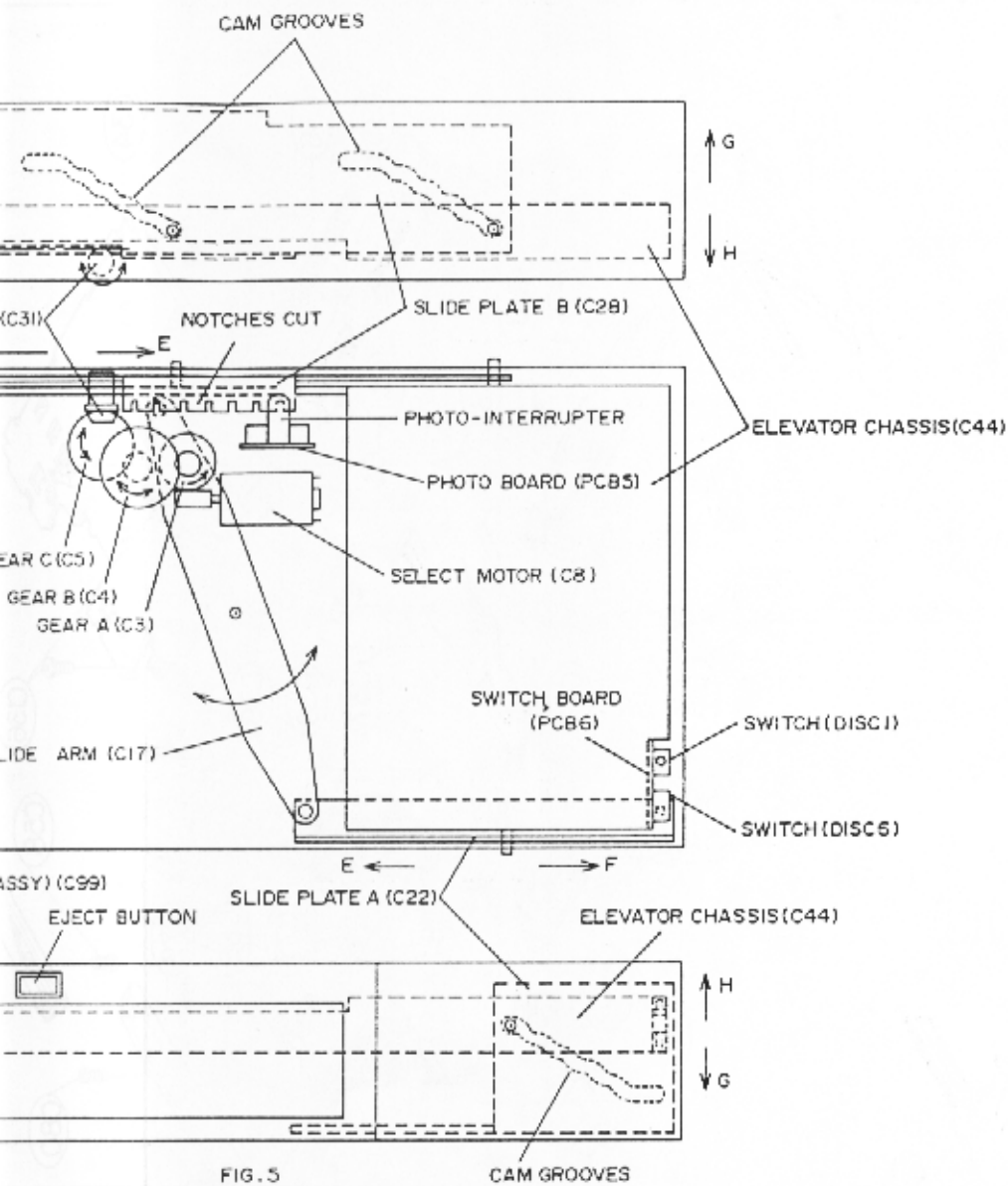
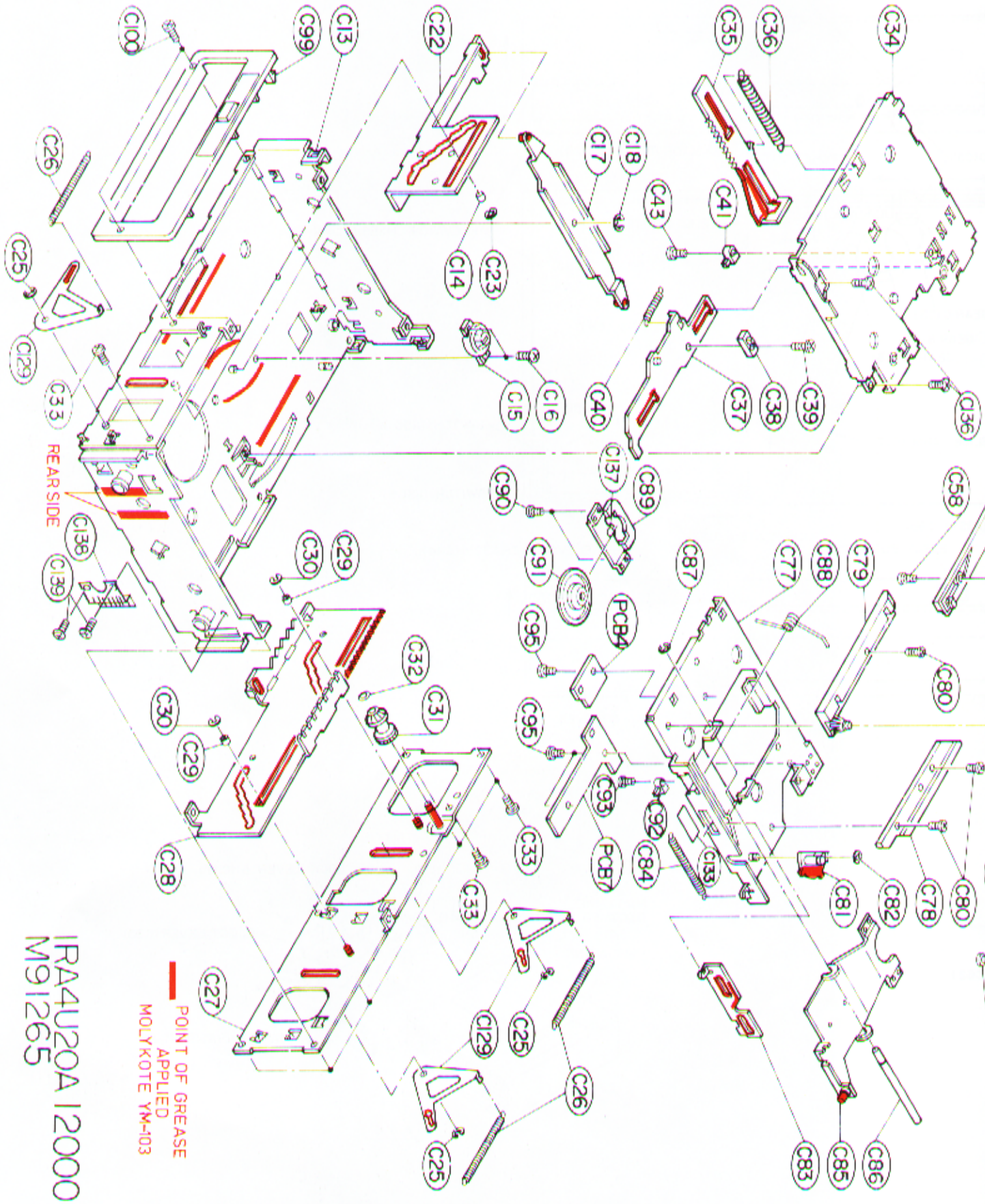


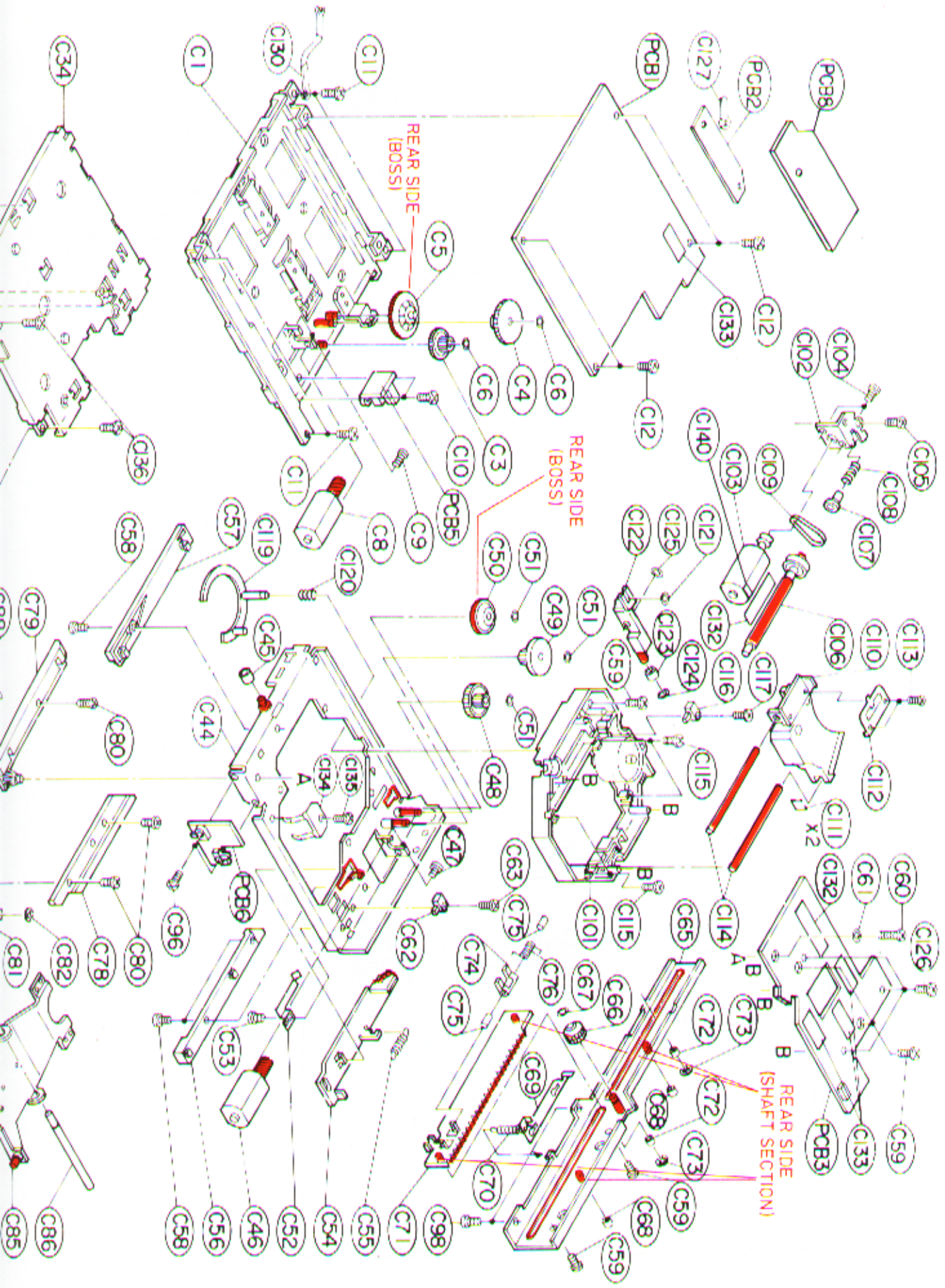
FIG. 4



LUBRICATION SCHEME

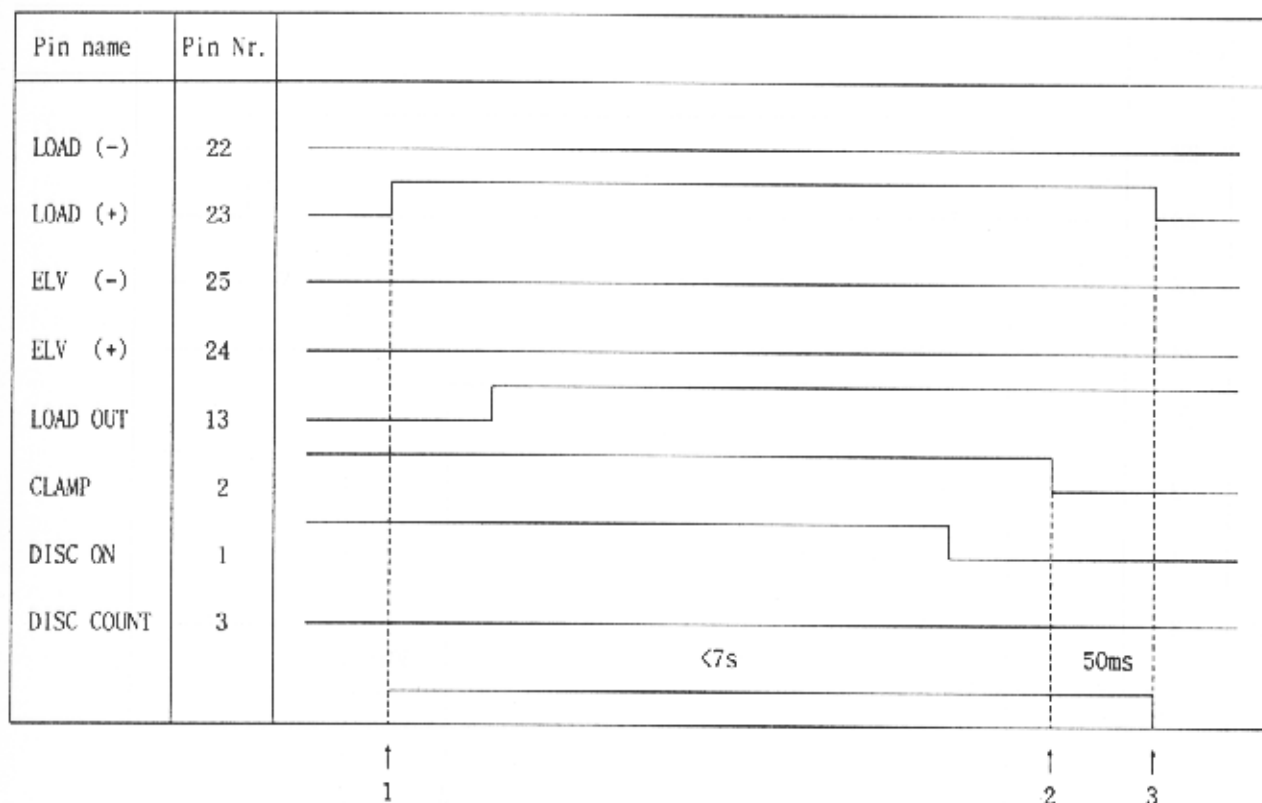


IRA4U20A 12000  
M91265



## SOFTWARE FUNCTION DESCRIPTION

### 1. Disc loading (with CD)

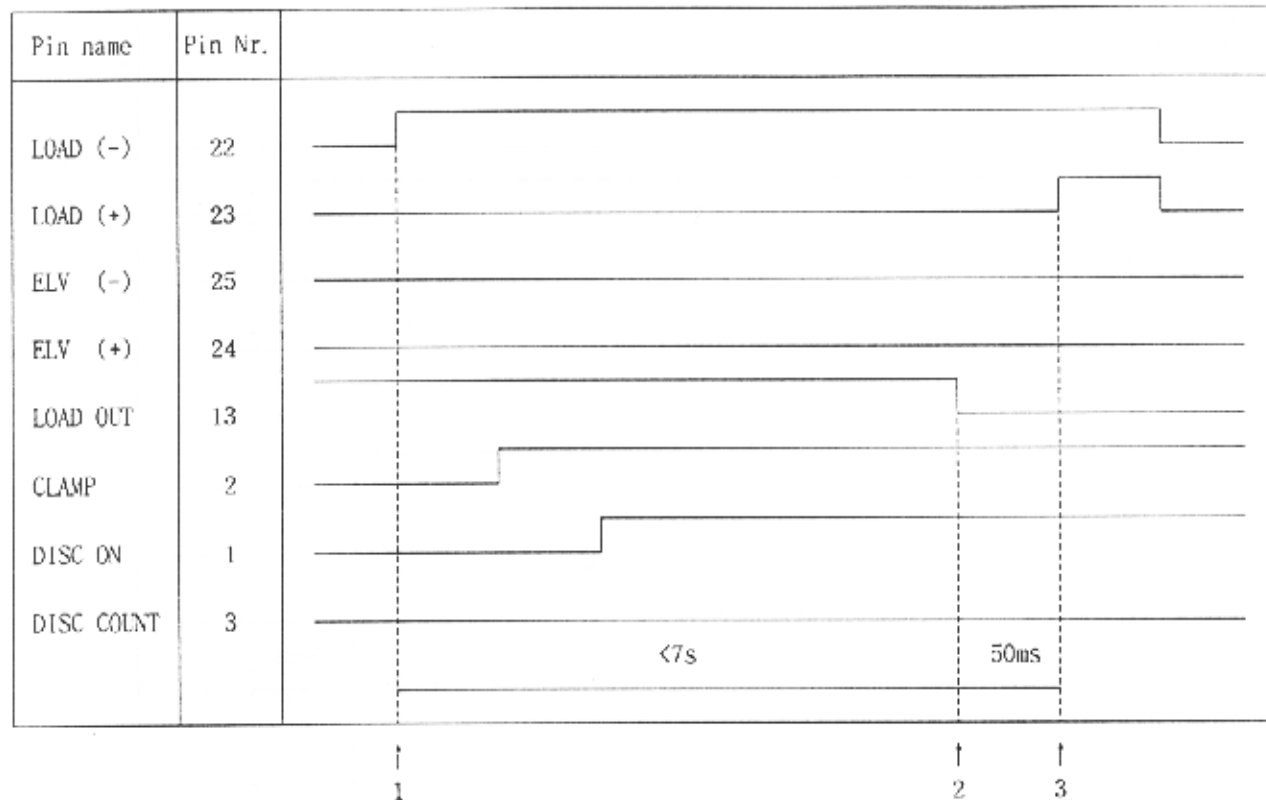


### SEQUENCE

|   |   |
|---|---|
| 1 | Pin23='H': loading motor activation (forward direction).  |
| 2 | Disc ejected from the magazine and detected pin2='L', pin1='L' within 7s.                         |
| * | If conditions are not met within 7s, the disc will be unloaded and the sequence will be repeated. |
| * | After 2 unsuccessful attempts, an error message is sent to the host set.                          |
| 3 | After sequence 2 is completed, the $\mu\text{C}$ waits for 50ms, then pin23 becomes 'L'.          |

## SOFTWARE FUNCTION DESCRIPTION

### 2. Disc unloading



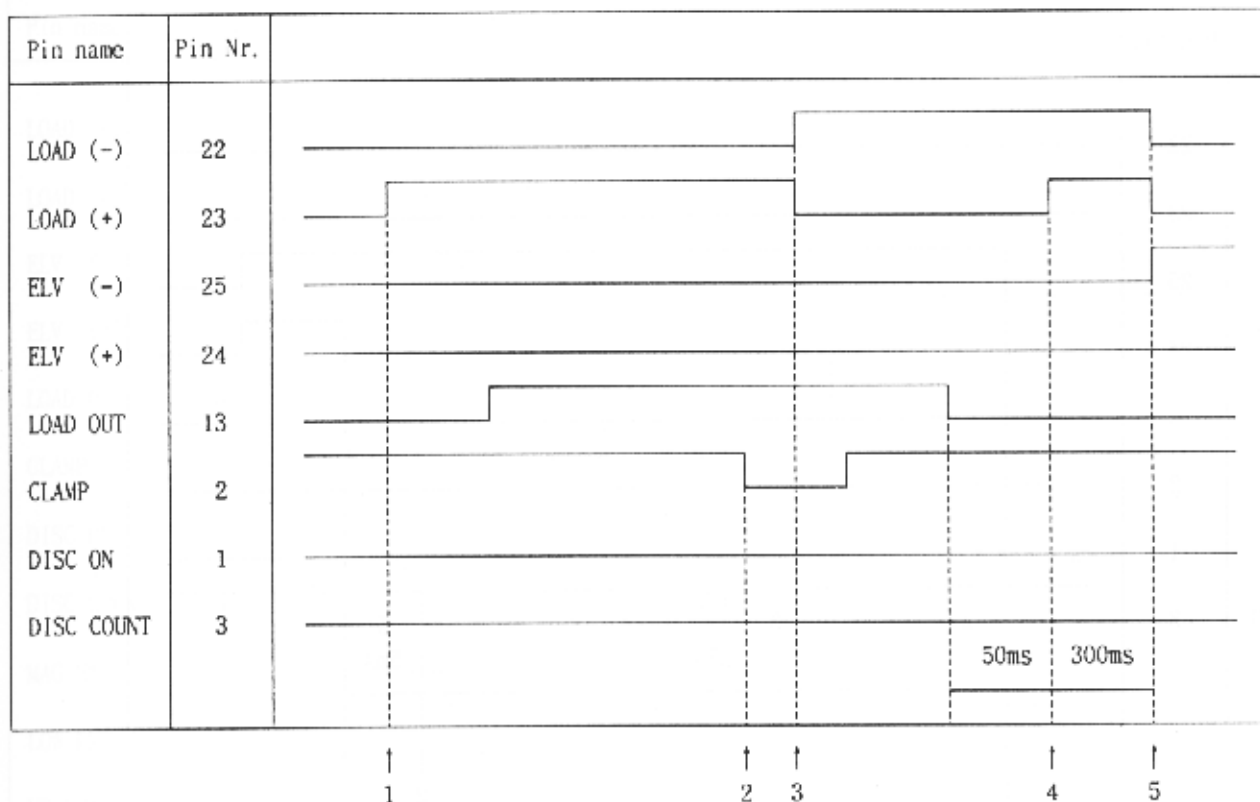
### SEQUENCE

|   |   |
|---|---|
| 1 | Pin22='H': loading motor activation (reverse direction).  |
| 2 | $\mu$ C conditions change within 7s: pin13='L'.   |
| * | If condition is not met within 7s, the disc will be reloaded and the sequence will be repeated. |
| * | After 2 unsuccessful attempts, an error message is sent to the host set.                        |
| 3 | After sequence 2 is completed, the $\mu$ C waits for 50ms, then pin23 becomes 'H'.              |



## SOFTWARE FUNCTION DESCRIPTION

### 3. Disc loading (without CD)

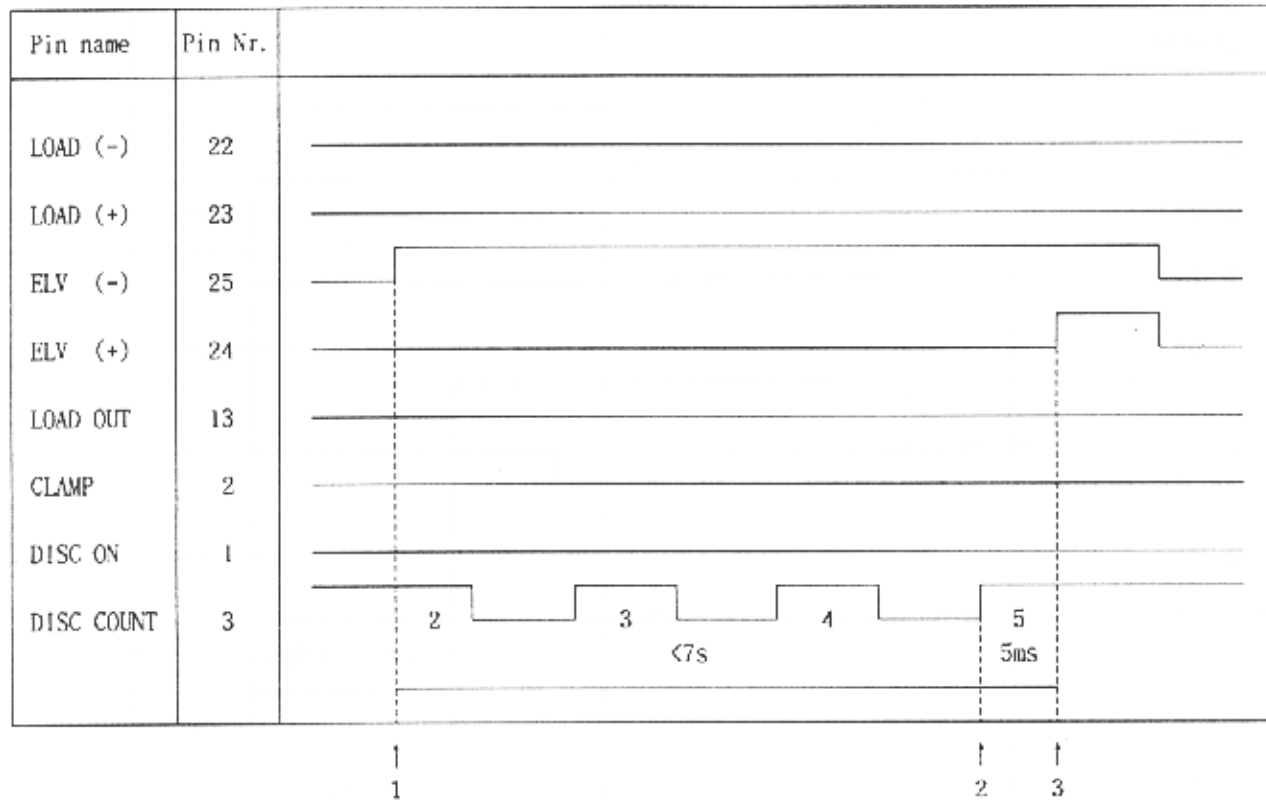


### SEQUENCE

|   |   |
|---|---|
| 1 | Pin23='H': loading motor activation (forward direction).  |
| 2 | $\mu\text{C}$ condition changes; pin1='L' before pin2='L'.  |
| * | If condition is not met, the $\mu\text{C}$ judges a 'no disc' condition.  |
| 3 | Pin22='H', pin23='L': loading motor activation (reverse direction).   |
| 4 | When pin13 is 'L', the $\mu\text{C}$ waits for 50ms, then pin23 becomes 'H'.  |
| 5 | After sequence 4 is completed, the $\mu\text{C}$ waits for 300ms, then pin22 and pin23 become 'L'. The elevator moves to the next disc housing in the magazine. |

## SOFTWARE FUNCTION DESCRIPTION

### 4. Disc Change (No. 2→5)

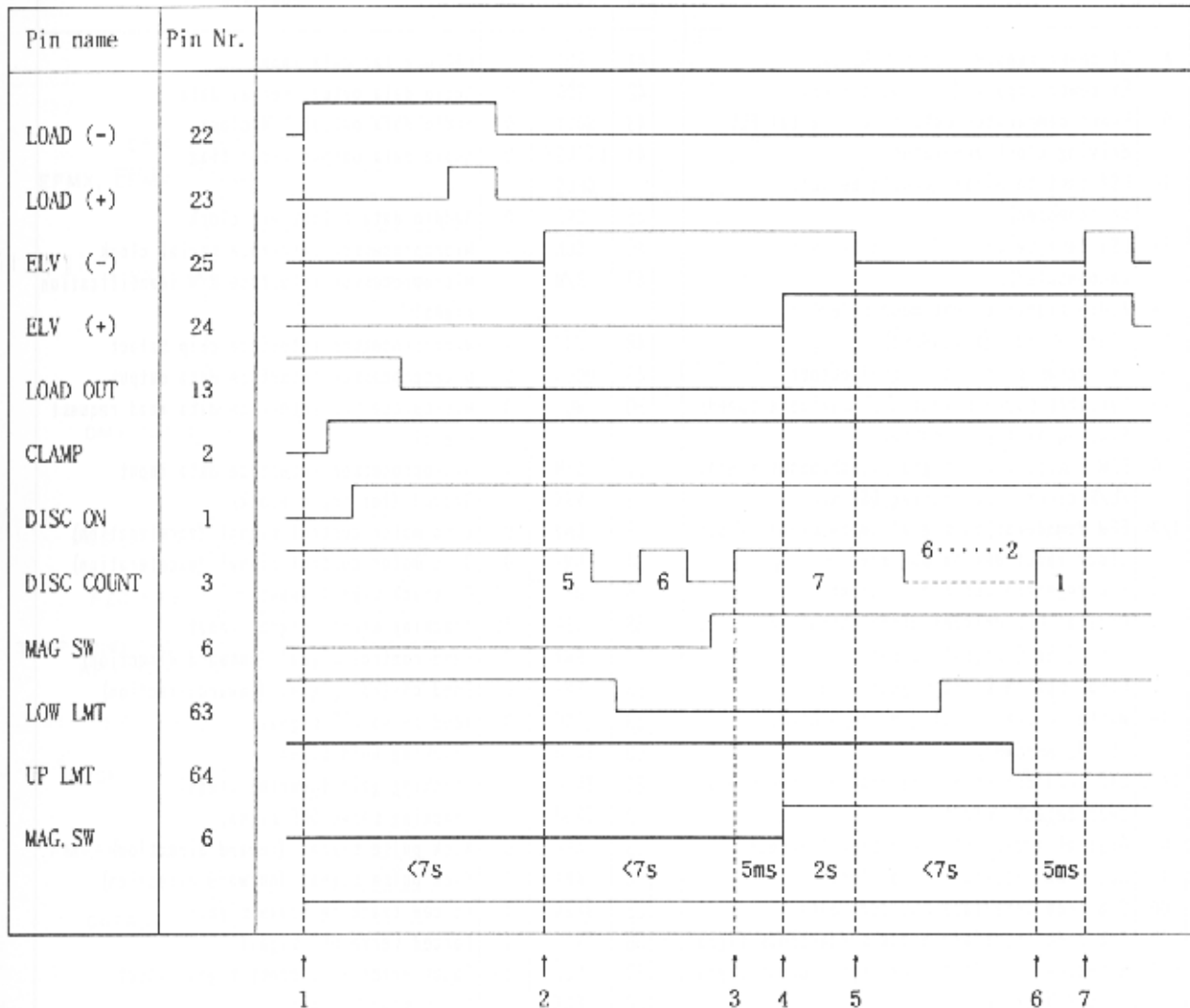


### SEQUENCE

|   |  |
|---|--|
| 1 | Pin25='H': elevator motor activation (down direction).   |
| 2 | When the elevator has reached the proper position within 7s, pin3 becomes 'H'.                 |
| * | If condition is not met within 7s, the elevator will remove and the sequence will be repeated. |
| * | After 2 unsuccessful attempts, an error message is sent to the host set.                       |
| 3 | After sequence 2 is completed, the $\mu$ C waits for 5ms, then pin24 becomes 'H'.              |

## SOFTWARE FUNCTION DESCRIPTION

### 5. Magazine Eject



### SEQUENCE

|   |  |
|---|--|
| 1 | Pin22='H': loading motor activation (reverse direction).   |
| 2 | Pin25='H': elevator motor activation (down direction).   |
| 3 | When the elevator has reached the 'no.7' position (pin3='H'), the $\mu$ C conditions change: pin6='H', pin63='L'.            |
| 4 | After sequence 3 is completed, the $\mu$ C waits for 5ms, then pin24 becomes 'H'.  |
| 5 | After sequence 4 is completed, the $\mu$ C waits for 2s, then pin25 becomes 'L'. The elevator moves in the upward direction. |
| 6 | When the elevator has reached the 'no.1' position (pin3='H'), the $\mu$ C conditions change: pin63='H', pin64='L'.           |
| 7 | After sequence 6 is completed, the $\mu$ C waits for 5ms, then pin25 becomes 'H'.  |

# CIRCUIT OPERATION DESCRIPTION

IC601 (YDC103-F)

SPC (Signal Processor & Controller)

NOTE 1: Input O: Output

| No. | Name          | I/O  | Function   |
|-----|---------------|------|--|
| 1   | AVDD          | A    | 5V power supply (for PLL block)  |
| 2   | VDD           |      | 5V power supply (for logic block)  |
| 3   | ZPCO          | O    | Phase comparator output for digital PLL driving clock generator                |
| 4   | TESTE         | I+   | LSI test terminal (should be left unconnected)                                 |
| 5   | TESTI         | I+   | LSI test terminal (should be left unconnected)                                 |
| 6   | MODE1         | I+   | Audio signal output mode select 1  |
| 7   | CK4           | O    | Clock output (4.2336MHz)   |
| 8   | DEP           | O    | De-emphasis control signal output  |
| 9   | VARI          | I+   | Variable speed select ('L': variable speed)                                    |
| 10  | SYEQ          | O    | Sync. equal signal output  |
| 11  | DSY/<br>SDSYI | I/O  | EFM demodulation signal, synchronous signal<br>L/R clock input during DSP mode |
| 12  | DATA/<br>CK2I | I/O  | EFM demodulation signal, data signal / bit<br>clock input during DSP mode      |
| 13  | CK            | OD   | EFM regeneration clock output  |
| 14  | VZW           | OD   | Digital PLL driving clock output, dividing<br>into 3 or 6 signal output        |
| 15  | FCST          | OD   | Focus search start signal output   |
| 16  | 16M/33M       | I+   | Master clock select ('H': 16, 9344MHz,<br>'L': 33, 8688MHz)                    |
| 17  | ZDT           | I+/O | DAC zero detect muting enable/sound signal<br>zero detect output               |
| 18  | DIF           | O    | Digital audio interface signal output  |
| 19  | RCX           | I-   | Sub-code interface read clock  |
| 20  | SUB           | OD   | Sub-code interface sub-code data   |
| 21  | SBSY          | OD   | Sub-code interface block synchronous signal                                    |
| 22  | SFSY          | OD   | Sub-code interface frame synchronous signal                                    |
| 23  | VSS           |      | Ground (for logic block)   |
| 24  | VDD           |      | 5V power supply (for noise shaper block)                                       |
| 25  | RVDD          | A    | 5V power supply (for DAC Rch block)  |
| 26  | AORL          | OA   | DAC stream output (L for Rch)  |
| 27  | AORH          | OA   | DAC stream output (H for Rch)  |
| 28  | RVSS          | A    | Ground (for DAC Rch)   |
| 29  | XVSS          |      | Ground (for crystal oscillation block)   |
| 30  | XOUT          | O    | Crystal oscillator connecting terminal   |
| 31  | XIN           | I    | Crystal oscillator connecting terminal<br>(16, 9344MHz or 33, 8688MHz)         |
| 32  | XVDD          |      | 5V power supply (for crystal oscillation<br>block)                             |
| 33  | LVSS          | A    | Ground (for DAC Lch)   |
| 34  | AOLH          | OA   | DAC stream output (H for Lch)  |
| 35  | AOLL          | OA   | DAC stream output (L for Lch)  |
| 36  | LVDD          | A    | 5V power supply (for DAC Lch)  |
| 37  | VSS           |      | Ground (for noise shaper block)  |
| 38  | VDD           |      | 5V power supply (for logic block)  |
| 39  | NO/DB         | I+   | Normal / double speed select   |
| 40  | MODE0         | I+   | Audio signal output mode select 0  |

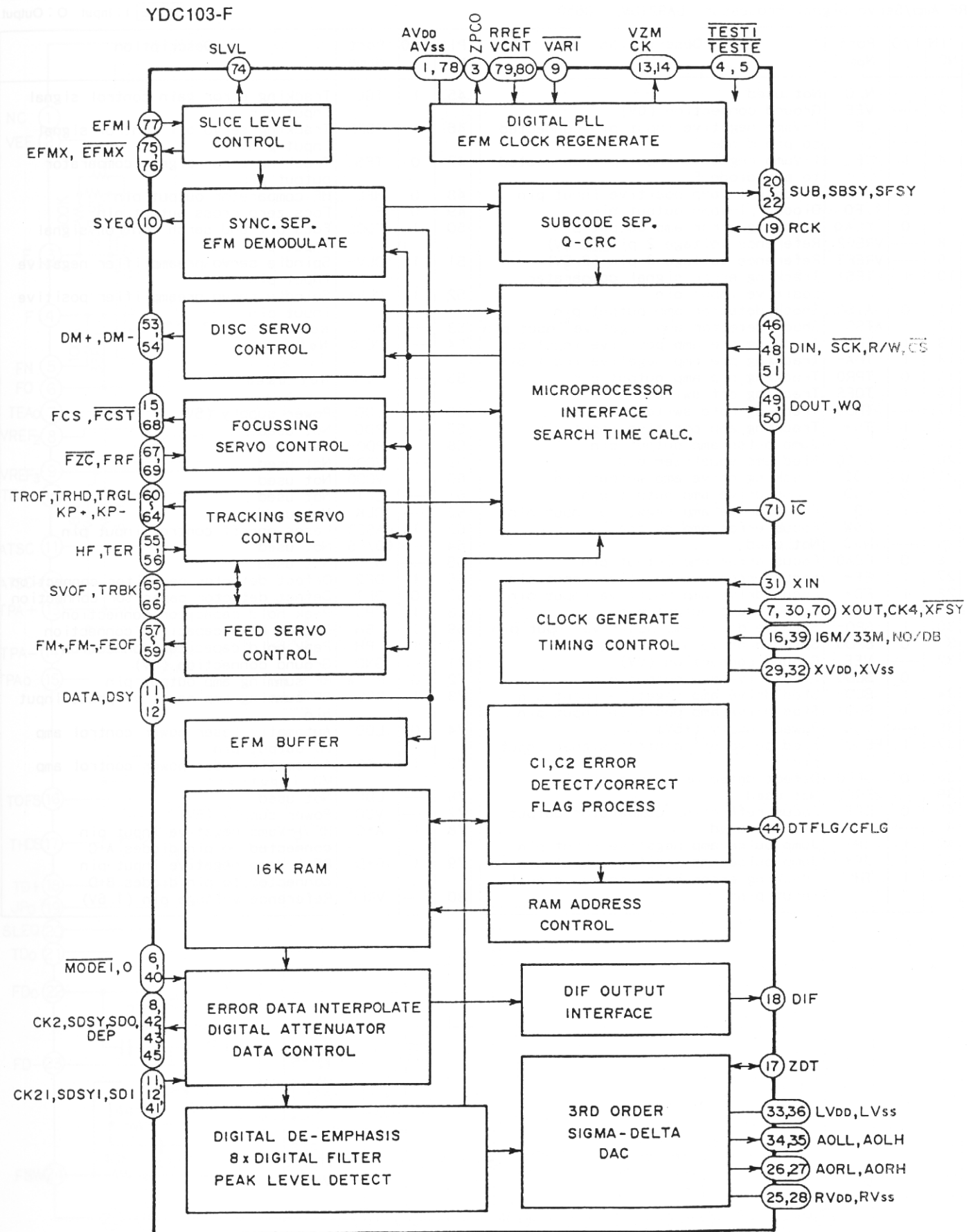
| No. | Name           | I/O | Function   |
|-----|----------------|-----|--|
| 41  | SDI            | I   | DAC digital data input   |
| 42  | SDO            | O   | Audio data output serial data  |
| 43  | SDSY           | O   | Audio data output L/R clock  |
| 44  | DTFLG/<br>CFLG | O   | Audio data output error flag   |
| 45  | CK2            | O   | Audio data output bit clock  |
| 46  | SCK            | I   | Microprocessor interface serial clock  |
| 47  | R/W            | I   | Microprocessor interface R/W identification<br>signal                                  |
| 48  | CS             | IO  | Microprocessor interface chip select   |
| 49  | DOOUT          | OT  | Microprocessor interface data output   |
| 50  | WQ             | O   | Microprocessor interface data read request<br>signal                                   |
| 51  | DIN            | I   | Microprocessor interface data input  |
| 52  | VSS            |     | Ground (for logic block)   |
| 53  | DM+            | O   | Disc motor control signal (acceleration)   |
| 54  | DM-            | O   | Disc motor control signal (deceleration)   |
| 55  | HF             | IS  | On-track signal input  |
| 56  | TER            | IS  | Tracking error signal input  |
| 57  | FM+            | O   | Feed control signal (outward direction)  |
| 58  | FM-            | O   | Feed control signal (inward direction)   |
| 59  | EFOF           | O   | feed servo OFF signal  |
| 60  | TRHD           | O   | Tracking hold signal   |
| 61  | TRGL           | O   | Tracking gain lowering signal  |
| 62  | TROF           | O   | Tracking servo OFF signal  |
| 63  | XP-            | O   | Kick pulse signal (inward direction)   |
| 64  | XP+            | O   | Kick pulse signal (outward direction)  |
| 65  | TRBK           | I   | Forced tracking brake signal   |
| 66  | SVOF           | I   | Forced servo OFF signal  |
| 67  | FZC            | I+  | Focus error zero cross signal input  |
| 68  | FCS            | O   | Focus start signal   |
| 69  | FRF            | I   | Focus reflection signal  |
| 70  | XFSY           | OD+ | Crystal frame synchronous signal (7.35kHz)   |
| 71  | TC             | IS+ | Initial clear input  |
| 72  | VDD            |     | 5V power supply (for logic block)  |
| 73  | VSS            |     | Ground (for logic block)   |
| 74  | SLVL           | OA  | EFM slice level voltage output   |
| 75  | EFMX           | OA  | Output for EFM duty detection (positive<br>phase)                                      |
| 76  | EFMX           | OA  | Output for EFM duty detection (reversed<br>phase)                                      |
| 77  | EFMI           | IA  | EFM signal input   |
| 78  | AVSS           | A   | Ground (for PLL block)   |
| 79  | RREF           | IA  | Digital PLL driving clock generator cons-<br>tant current resistor connecting terminal |
| 80  | VCNT           | IA  | Digital PLL driving clock generator control<br>terminal                                |

Note 1) Symbols in the I/O column indicate as follows.

+ : pull up, - : pull down, O : open drain, T : 3-state, S : schmitt trigger, A : analog terminal

Note 2) For the structural reason, the same power should be supplied to each power supply terminal.

IC BLOCK DIAGRAM



# CIRCUIT OPERATION DESCRIPTION

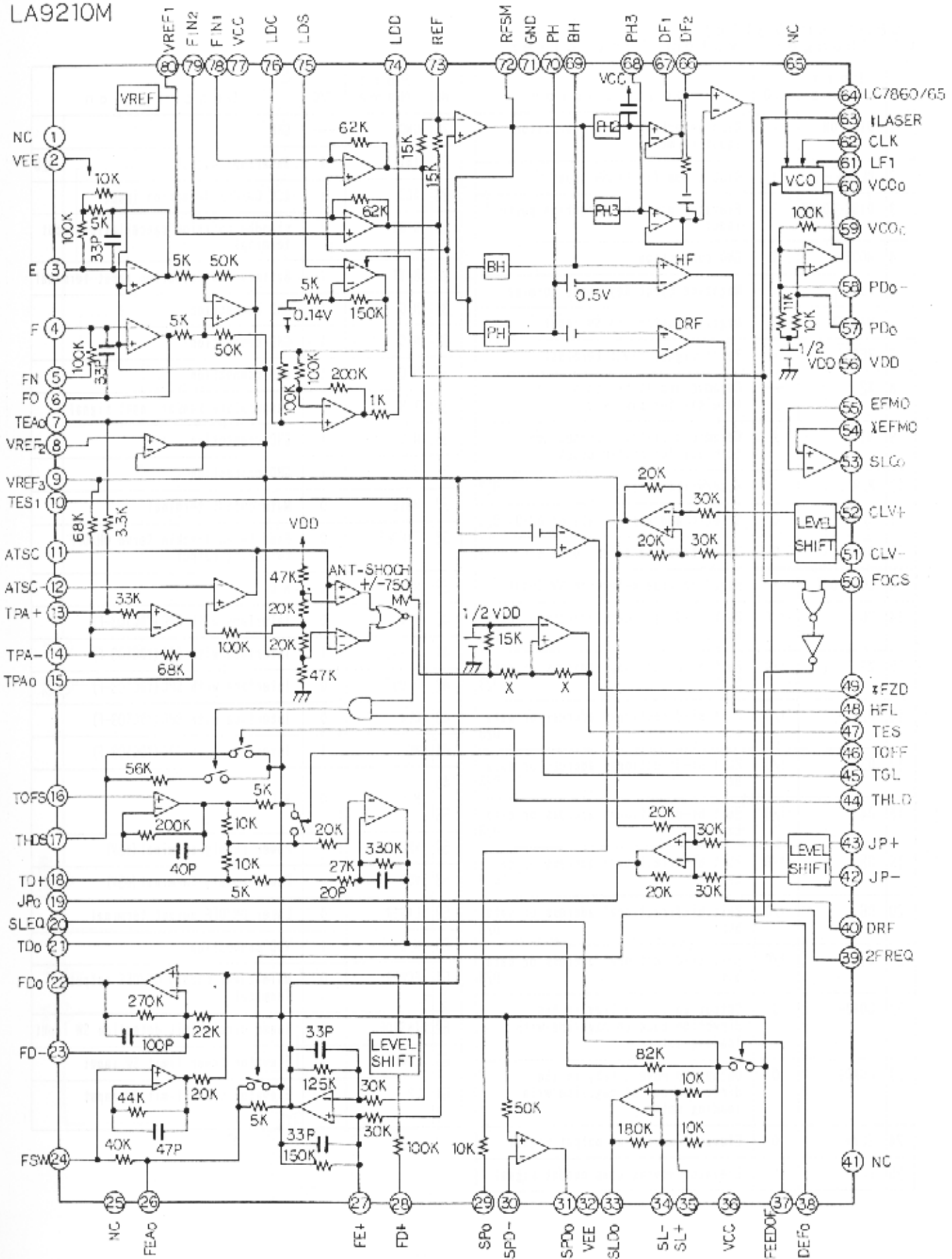
RF Amp/Servo Signal Processor LA9210M, IC650

[NOTE] I: Input O: Output

| PIN NO. | I/O | Port Name | Description   | PIN NO. | I/O | Port Name | Description  |
|---------|-----|-----------|---|---------|-----|-----------|--|
| 1       | —   | N.C       | Not used  | 45      | I   | TGL       | Tracking error gain control signal input pin             |
| 2       | —   | VEE       | Ground connection (0V)                              | 46      | I   | TOFF      | Tracking servo off control signal input pin              |
| 3       | I   | E         | I-Vamp negative input pin, connected to pin diode E | 47      | O   | TES       | Tracking error signal comparator output pin              |
| 4       | I   | F         | I-Vamp negative input pin, connected to pin diode F | 48      | O   | HFL       | HF comparator output pin                                 |
| 5       | I   | FN        | Diode F, I-Vamp positive input pin                  | 49      | O   | FZD       | Focus zero cross output pin                              |
| 6       | O   | FO        | Diode F, I-Vamp output pin                          | 50      | I   | FOCS      | Focus off and serch control signal input pin             |
| 7       | O   | TEAO      | Tracking error amp output pin                       | 51      | I   | CLV-      | Spindle servo preamplifier negative input pin            |
| 8       | —   | VREF2     | Reference voltage 2 pin (2.5V)                      | 52      | I   | CLV+      | Spindle servo preamplifier positive input pin            |
| 9       | —   | VREF3     | Reference voltage 3 pin (2.5V)                      | 53      | —   | N.C       | Not used   |
| 10      | I   | TES1      | Tracking error signal comparator positive input pin | 54      | —   | N.C       | Not used   |
| 11      | O   | ATSC      | Shock detector amp output pin                       | 55      | —   | N.C       | Not used   |
| 12      | I   | ATSC-     | Shock detector amp negative input pin               | 56      | —   | VDD       | Power supply (5V)  |
| 13      | I   | IPA+      | Tracking pre amp positive input pin                 | 57      | —   | P00       | Not used   |
| 14      | I   | TPA-      | Tracking pre amp negative input pin                 | 58      | —   | P00-      | Not used   |
| 15      | O   | TPRO      | Tracking pre amp output pin                         | 59      | —   | VCO0      | Not used   |
| 16      | I   | TOFS      | Tracking off switch                                 | 60      | —   | VCO0      | Not used   |
| 17      | —   | TIDS      | Tracking hold switch                                | 61      | —   | LFI       | Not used   |
| 18      | I   | TD+       | Tracking amp positive input pin                     | 62      | —   | CLK       | Not used   |
| 19      | O   | JPO       | Jump pulse amp output pin                           | 63      | I   | LASER     | Laser on-off control input pin                           |
| 20      | —   | SLEQ      | Sled amp equalizer pin                              | 64      | —   | 60/65     | Not used   |
| 21      | O   | TDO       | Tracking drive amp output pin                       | 65      | —   | N.C       | Not used   |
| 22      | O   | FDO       | Focus drive amp output pin                          | 66      | I   | DF2       | Defect detector capacitor connection                     |
| 23      | I   | FD-       | Focus drive amp negative input pin                  | 67      | O   | DF1       | Defect detector capacitor connection                     |
| 24      | I   | FSW       | Focus error amp switch                              | 68      | I   | PH3       | Peak hold capacitor connection                           |
| 25      | —   | N.C       | Not used  | 69      | I   | BH        | Bottom hold capacitor connection                         |
| 26      | O   | FEAO      | Focus error amp output pin                          | 70      | I   | PH        | Peak hold capacitor connection                           |
| 27      | I   | FE+       | Focus error amp positive input pin                  | 71      | —   | GND       | Ground connection (0V)                                   |
| 28      | I   | FD+       | Focus drive amp positive input pin                  | 72      | O   | RFSM      | RF summing amp output pin                                |
| 29      | O   | SPO       | Spindle amp output pin                              | 73      | I   | RFS-      | RF summing amp negative phase input pin                  |
| 30      | I   | SPO-      | Spindle drive amp positive input pin                | 74      | O   | LDD       | Automatic laser power control amp LD output pin          |
| 31      | O   | SPDO      | Spindle drive amp output pin                        | 75      | I   | LDS       | Automatic laser power control amp MD input pin           |
| 32      | —   | VEE       | Ground connection (0V)                              | 76      | —   | LDC       | Not used   |
| 33      | O   | SLDO      | Sled drive amp output pin                           | 77      | —   | VCC       | Power supply (5V)  |
| 34      | I   | SLD-      | Sled drive amp negative input pin                   | 78      | I   | A+C       | RF I-Vamp negative input pin connected to pin diodes A+C |
| 35      | I   | SLD+      | Sled drive amp positive input pin                   | 79      | I   | B+D       | RF I-Vamp negative input pin connected to pin diodes B+D |
| 36      | —   | VCC       | Power Supply (+5V)                                  | 80      | —   | VREF      | Reference voltage pin (1.6V)                             |
| 37      | I   | FEDOF     | Sled servo off control signal input pin             |         |     |           |  |
| 38      | O   | DEFO      | Defect detector output pin                          |         |     |           |  |
| 39      | —   | 2FREQ     | Not used  |         |     |           |  |
| 40      | O   | DRF       | Focus reflection comparator output pin              |         |     |           |  |
| 41      | —   | N.C       | Not used  |         |     |           |  |
| 42      | I   | JP-       | Jump pulse amp negative input pin                   |         |     |           |  |
| 43      | I   | JP+       | Jump pulse amp positive input pin                   |         |     |           |  |
| 44      | I   | THLD      | Tracking error hold control signal input pin        |         |     |           |  |

IC BLOCK DIAGRAM

LA9210M



PCS 74 415  
PCS 74 416

# CIRCUIT OPERATION DESCRIPTION

IC B

## IC801 ( $\mu$ PD75116) CD Changer System Controller

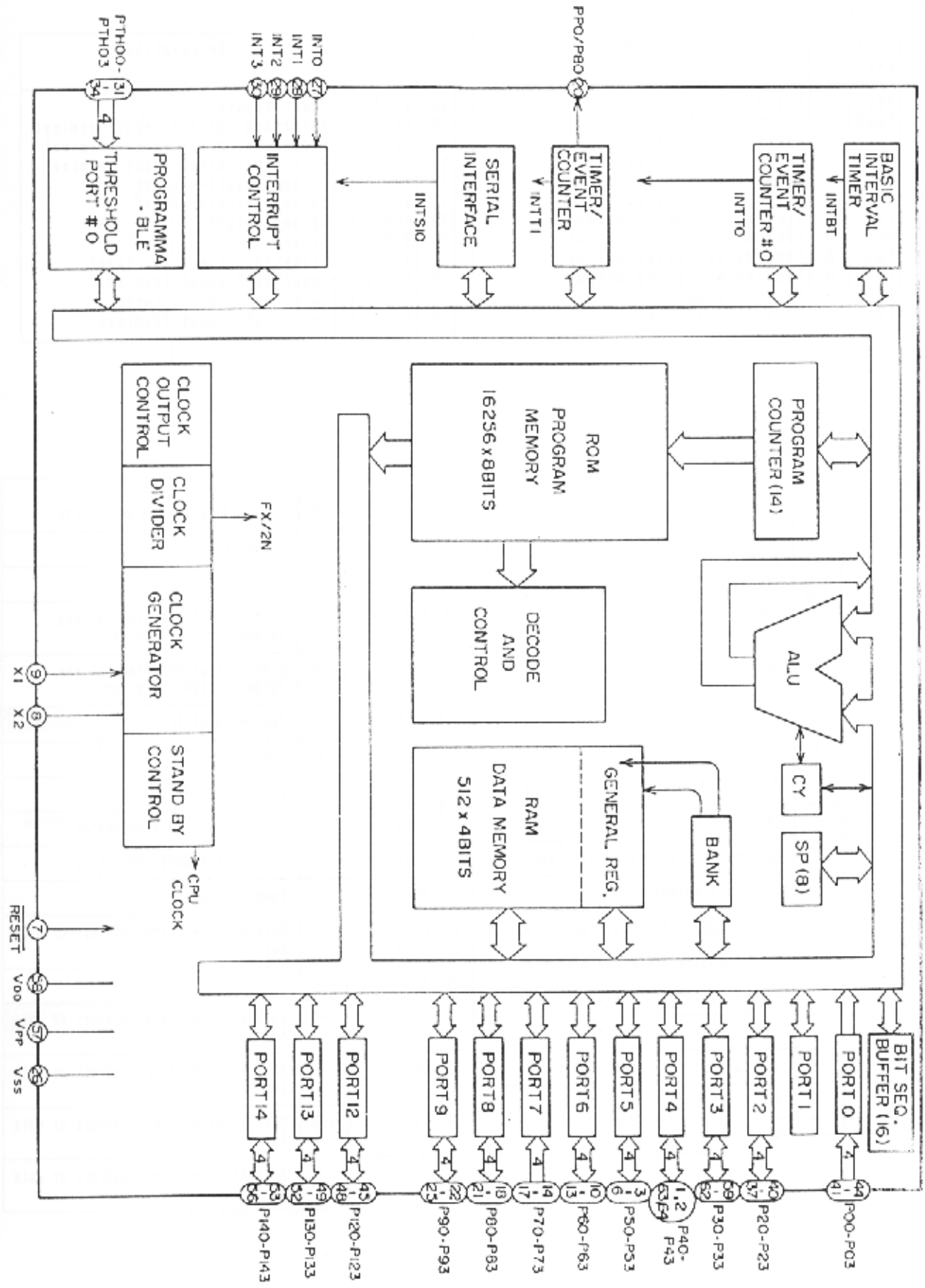
| No | Port Name  | I/O | Description  |
|----|------------|-----|--|
| 1  | DISC ON    | I   | Disc detection Photo transistor input terminal                               |
| 2  | CLAMP      | I   | DISC clamp finish SW input   |
| 3  | DISC COUNT | I   | Elevator position detection pulse input                                      |
| 4  | MODE       | I   | GND connection   |
| 5  | EJECT      | I   | Magazine Eject Key input terminal  |
| 6  | MAG. SW    | I   | Magazine detection SW input  |
| 7  | RESET      | I   | Reset signal input terminal  |
| 8  | X2         | —   | Ceramic oscillator connection terminal for system clock                      |
| 9  | X1         | I   | Ceramic oscillator connection terminal for system clock                      |
| 10 | R/W        | O   | Read/Write selector <span style="float:right">D2B</span>                     |
| 11 | A/D        | O   | Selects address or data on D0-D7 <span style="float:right">D2B</span>        |
| 12 | DS         | O   | Data strobe to access data bus <span style="float:right">D2B</span>          |
| 13 | LOAD OUT   | I   | Magazine tray detection SW input   |
| 14 | D0         | I/O | 8bit bi-directional address or data bus <span style="float:right">D2B</span> |
| 15 | D1         | I/O | 8bit bi-directional address or data bus <span style="float:right">D2B</span> |
| 16 | D2         | I/O | 8bit bi-directional address or data bus <span style="float:right">D2B</span> |
| 17 | D3         | I/O | 8bit bi-directional address or data bus <span style="float:right">D2B</span> |
| 18 | D4         | I/O | 8bit bi-directional address or data bus <span style="float:right">D2B</span> |
| 19 | D5         | I/O | 8bit bi-directional address or data bus <span style="float:right">D2B</span> |
| 20 | D6         | I/O | 8bit bi-directional address or data bus <span style="float:right">D2B</span> |
| 21 | D7         | I/O | 8bit bi-directional address or data bus <span style="float:right">D2B</span> |
| 22 | LOAD-      | O   | Output to move a tray in the direction back to magazine with loading motor   |
| 23 | LOAD+      | O   | Output to move a tray in the direction out of magazine with loading motor    |
| 24 | ELV+       | O   | Elevator moving-up output signal   |
| 25 | ELV-       | O   | Elevator moving-down output signal   |

| No | Port Name | I/O | Description   |
|----|-----------|-----|---|
| 26 | GND       | —   | GND   |
| 27 | INT       | I   | Interrupt output <span style="float:right">D2B</span> |
| 28 | ACC       | I   | ACC ON/OFF detection input                            |
| 29 | STBY      | I   | standby position cancellation input terminal          |
| 30 | BATT      | I   | Battery LOW detection input terminal                  |
| 31 | N. C      | I   | GND connection  |
| 32 | N. C      | I   | GND connection  |
| 33 | N. C      | I   | GND connection  |
| 34 | T. H.     | I   | Temperature sensor input signal                       |
| 35 | N. C      | I   | GND connection  |
| 36 | N. C      | I   | GND connection  |
| 37 | MUTE      | O   | Mute output terminal                                  |
| 38 | T/FOFF    | O   | Feed Servo/Trackin Servo ON/OFF switching output      |
| 39 | N. C      | O   | N. C  |
| 40 | R/W       | O   | Interface with SPC (YDC103-F)                         |
| 41 | D. IN     | I   | Interface with SPC (YDC103-F)                         |
| 42 | D. OUT    | O   | Interface with SPC (YDC103-F)                         |
| 43 | CLK       | O   | Interface with SPC (YDC103-F)                         |
| 44 | WQ        | I   | Interface with SPC (YDC103-F)                         |
| 45 | N. C      | O   | N. C  |
| 56 | N. C      | O   | N. C  |
| 57 | VPP       | —   | Power supply terminal (+5V)                           |
| 58 | VDD       | —   | Power supply terminal (+5V)                           |
| 59 | LASER     | O   | Laser ON/OFF output terminal                          |
| 60 | N. C      | I   | VDD connection  |
| 61 | POWER     | O   | Main power supply ON/OFF output Terminal              |
| 62 | INSIDE    | I   | Inner circle limit detection SW input                 |
| 63 | LOW       | I   | Elevator lower limit SW input                         |
| 64 | UP        | I   | Elevator upper limit SW input                         |



IC BLOCK DIAGRAM

JPD75P116



## CIRCUIT OPERATION DESCRIPTION

(IC651) AN8388SR  
4ch Linear Driver (motor&actuator)

| Pin No. | Port Name | I/O | Description              |
|---------|-----------|-----|--------------------------|
| 1       | PVcc      | -   | Driver power supply      |
| 2       | PGND      | -   | Driver Ground            |
| 3       | F+        | 0   | Focus +Drive output      |
| 4       | F-        | 0   | Focus -Drive output      |
| 5       | T+        | 0   | Track +Drive output      |
| 6       | T-        | 0   | Track -Drive output      |
| 7       | DM-       | 0   | Disc Motor -Drive output |
| 8       | DM+       | 0   | Disc Motor +Drive output |
| 9       | FM+       | 0   | Feed Motor +Drive output |
| 10      | FM-       | 0   | Feed Motor -Drive output |
| 11      | PGND      | -   | Driver Ground            |
| 12      | PVDD      | -   | Driver power supply      |

| Pin No. | Port Name | I/O | Description                      |
|---------|-----------|-----|----------------------------------|
| 13      | VDD       | -   | Power supply                     |
| 14      | VREF      | 1   | Reference voltage input terminal |
| 15      | FMI       | 1   | Feed motor error input terminal  |
| 16      | DMI       | 1   | Disc motor error input terminal  |
| 17      | IN-       | 1   | Op amp negative input            |
| 18      | IN+       | 1   | Op amp positive input            |
| 19      | OPO       | 0   | Op amp output                    |
| 20      | GND       | -   | Ground                           |
| 21      | TD1       | 1   | Tracking drive error input       |
| 22      | PC2       | 1   | Power cut2 input terminal        |
| 23      | FD1       | 1   | Focus drive error input          |
| 24      | PC1       | 1   | Power cut1 input terminal        |

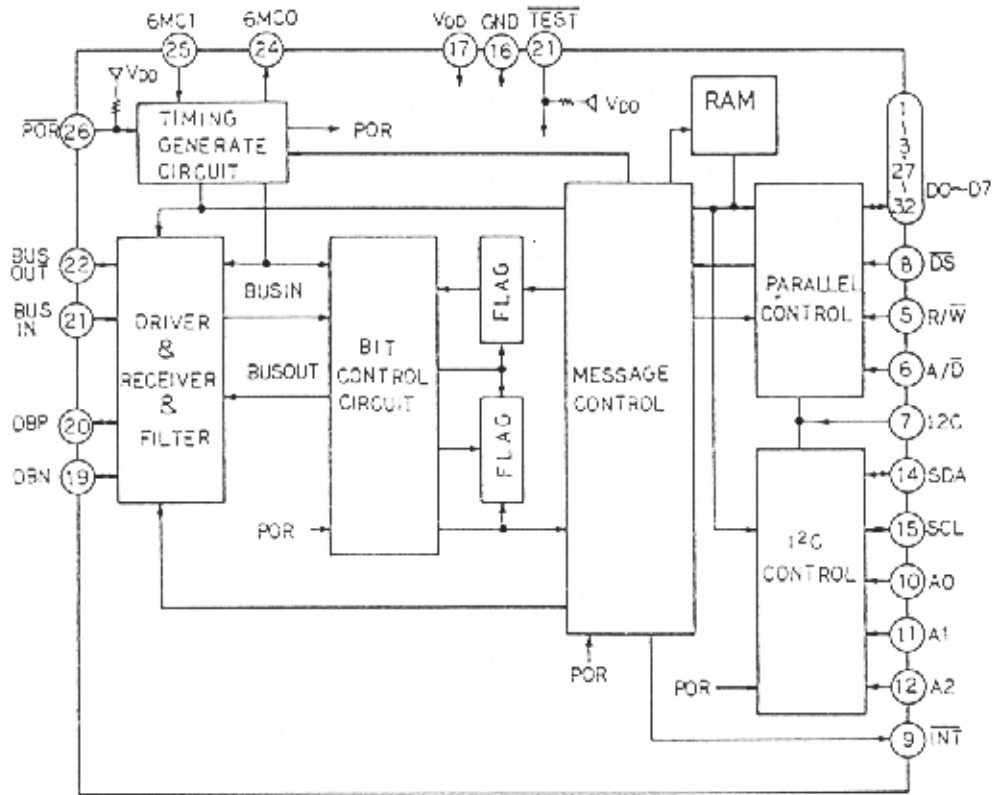
IC851 (MSM6307GS)  
D2B Inter Face

| No | Port Name        | I/O | Description                                    |
|----|------------------|-----|--|
| 1  | D5               | I/O | 8bit bi-directional address or data bus        |
| 2  | D6               | I/O | 8bit bi-directional address or data bus        |
| 3  | D7               | I/O | 8bit bi-directional address or data bus        |
| 4  | N.C              | —   |  |
| 5  | R/W              | 1   | Read/Write selector                            |
| 6  | A/D              | 1   | Selects address or data on D0-D7               |
| 7  | I <sup>2</sup> C | 1   | Selects I <sup>2</sup> C or parallel interface |
| 8  | DS               | 1   | Data strobe to access data bus                 |
| 9  | INT              | 0   | Interrupt output                               |
| 10 | A0               | 1   | Programmables I <sup>2</sup> C slave addresses |
| 11 | A1               | 1   | Programmables I <sup>2</sup> C slave addresses |
| 12 | A2               | 1   | Programmables I <sup>2</sup> C slave addresses |
| 13 | N.C              | —   |  |
| 14 | SDA              | I/O | I <sup>2</sup> C data signal input/output      |
| 15 | SCL              | I/O | I <sup>2</sup> C clock signal input/output     |
| 16 | GND              | —   | GND  |

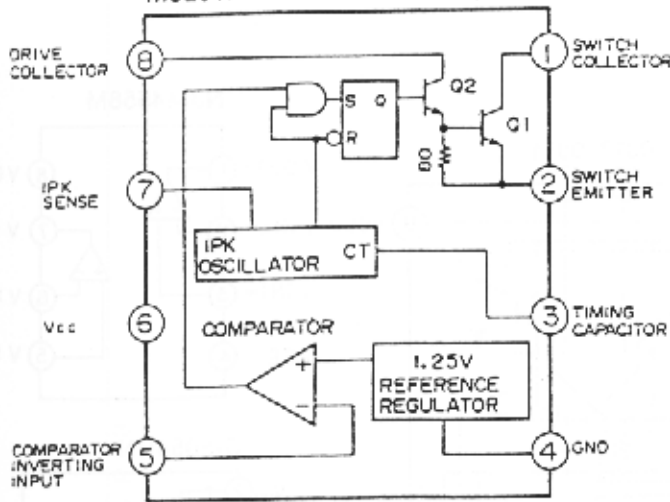
| No | Port Name | I/O | Description   |
|----|-----------|-----|---|
| 17 | VDD       | —   | VDD (+5V)   |
| 18 | N.C       | —   |   |
| 19 | DBN       | I/O | Differential D <sup>2</sup> B lines of the internal driver/receiver |
| 20 | DBP       | I/O | Differential D <sup>2</sup> B lines of the internal driver/receiver |
| 21 | TEST      | 1   | Test mode of IC   |
| 22 | BUS OUT   | 0   | D <sup>2</sup> B output (TTL level)                                 |
| 23 | BUS IN    | 1   | D <sup>2</sup> B input (TTL level)                                  |
| 24 | ECMO      | 0   | Clock output 6MHz resonator   |
| 25 | ECMI      | 1   | Clock input 6MHz resonator  |
| 26 | POR       | 1   | Power on reset  |
| 27 | D0        | I/O | 8bit bi-directional address or data bus                             |
| 28 | N.C       | —   |   |
| 29 | D1        | I/O | 8bit bi-directional address or data bus                             |
| 30 | D2        | I/O | 8bit bi-directional address or data bus                             |
| 31 | D3        | I/O | 8bit bi-directional address or data bus                             |
| 32 | D4        | I/O | 8bit bi-directional address or data bus                             |

IC BLOCK DIAGRAM

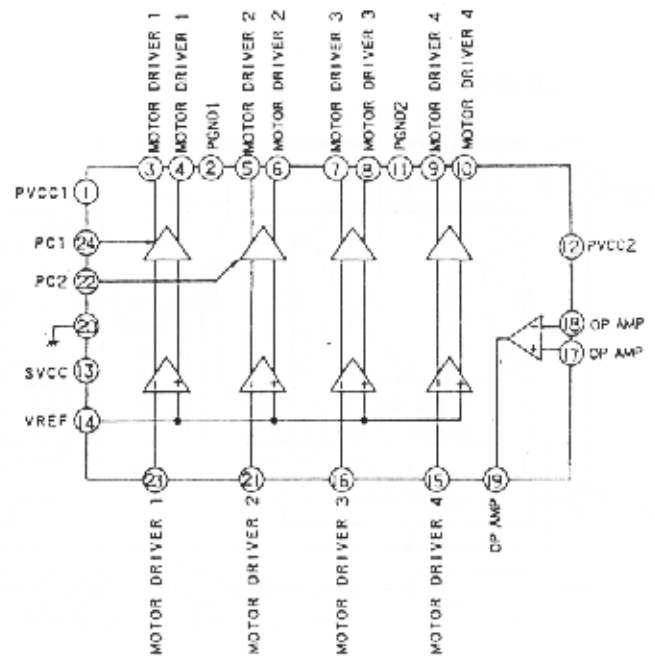
MSM6307GS



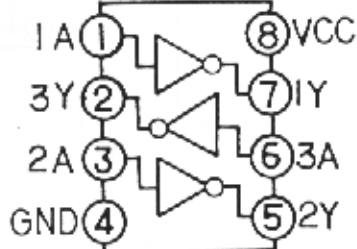
M5291FP



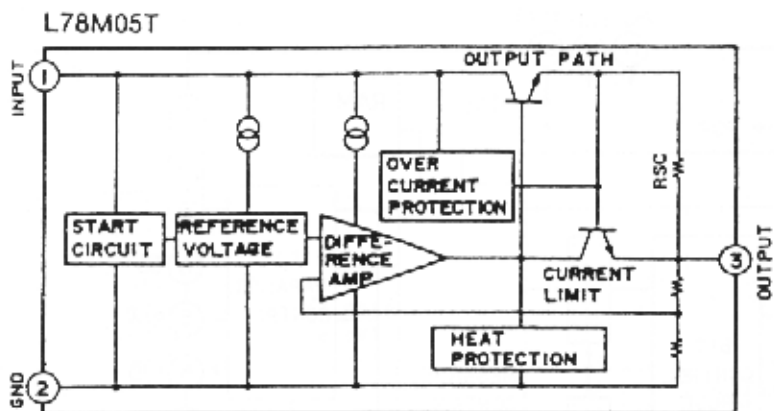
AN8388SR



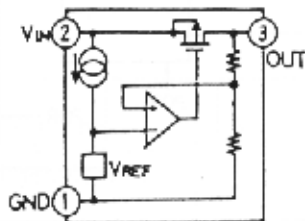
TC7WU04FU



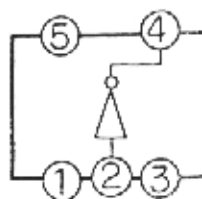
IC BLOCK DIAGRAM



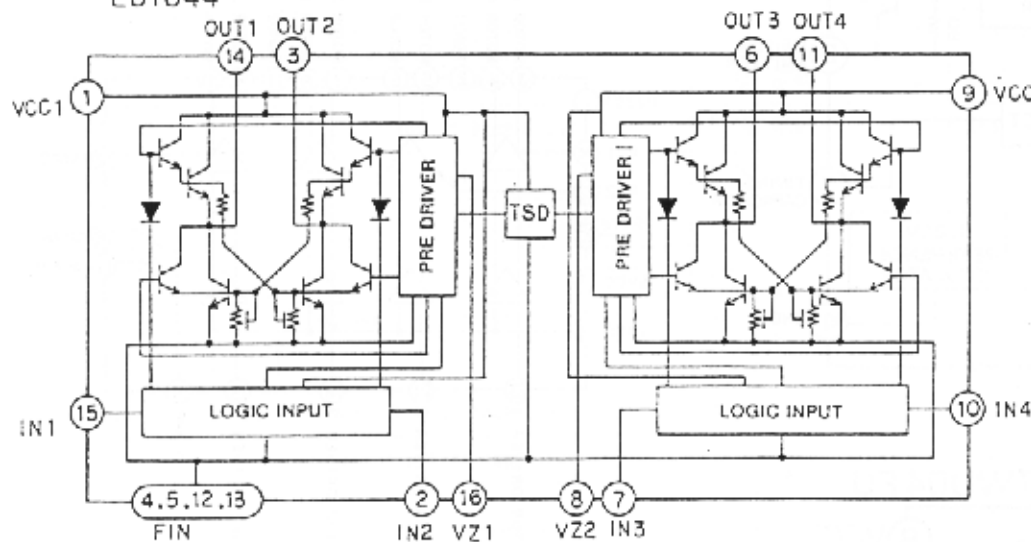
S-81250HG-RD



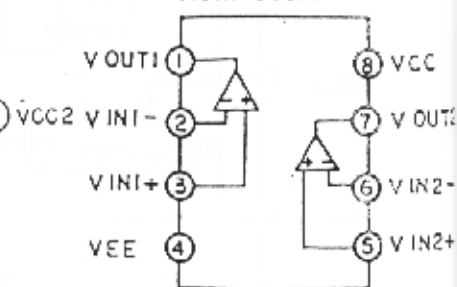
TC7SU04F



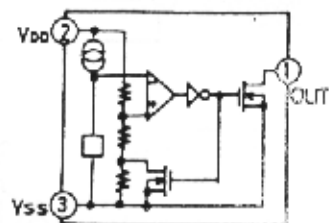
LB1644



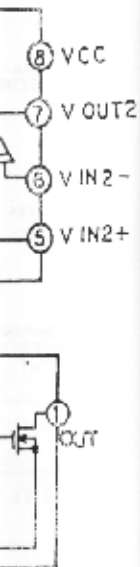
NJM4558M



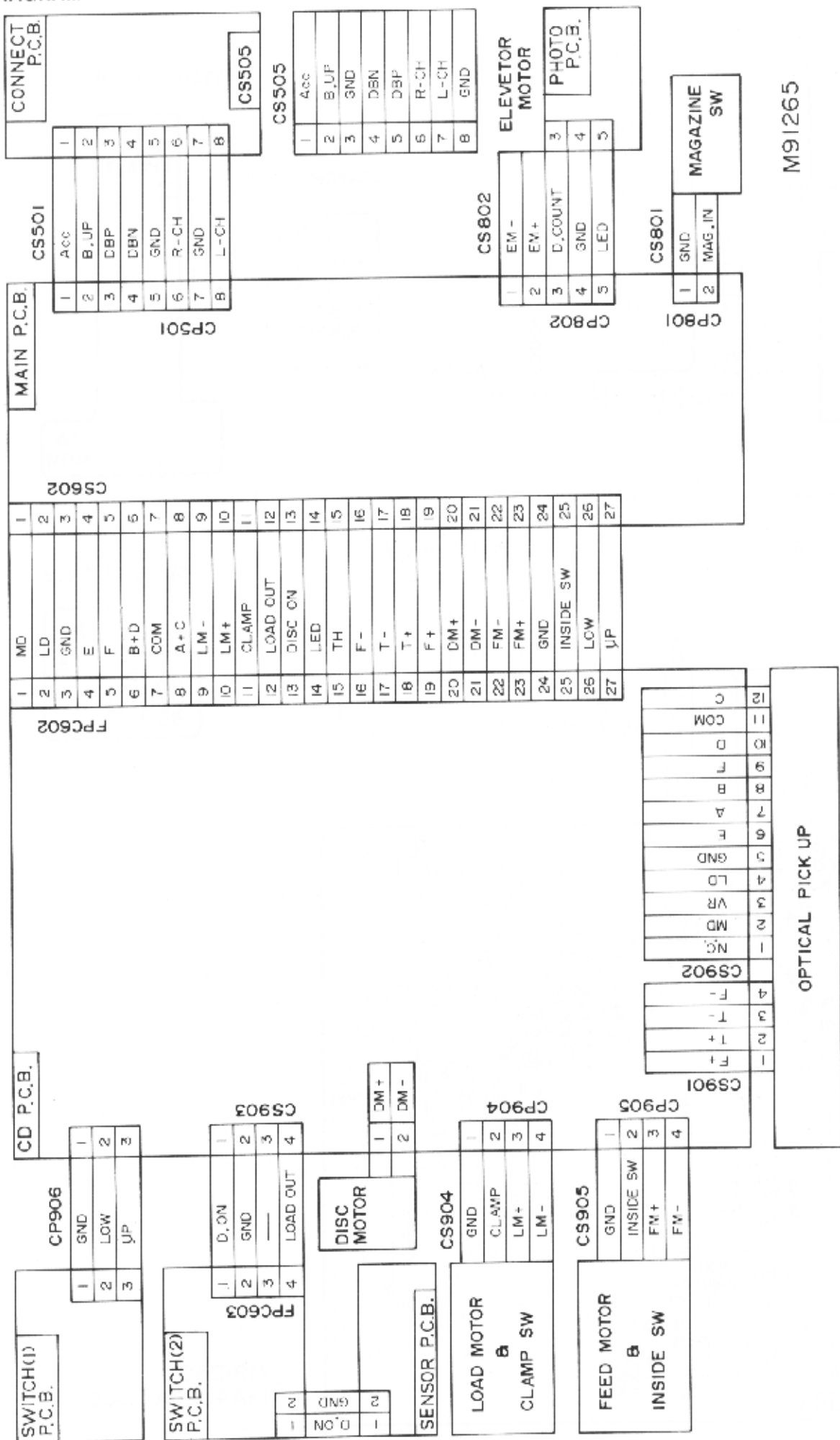
S-8054HN



WIRING DIAGRAM

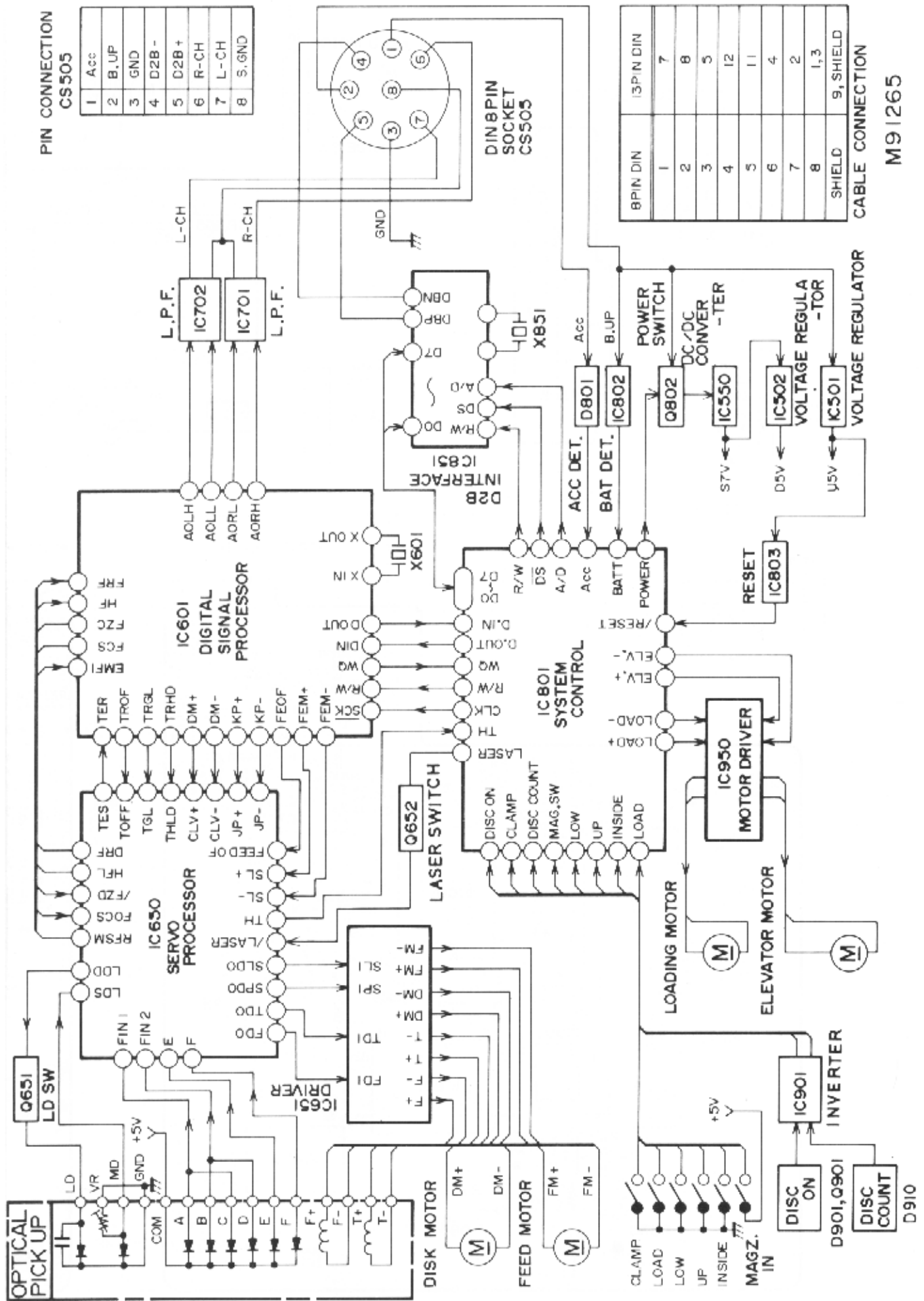


PCS 74 421  
PCS 74 422



M91265

BLOCK DIAGRAM



PIN CONNECTION CS505

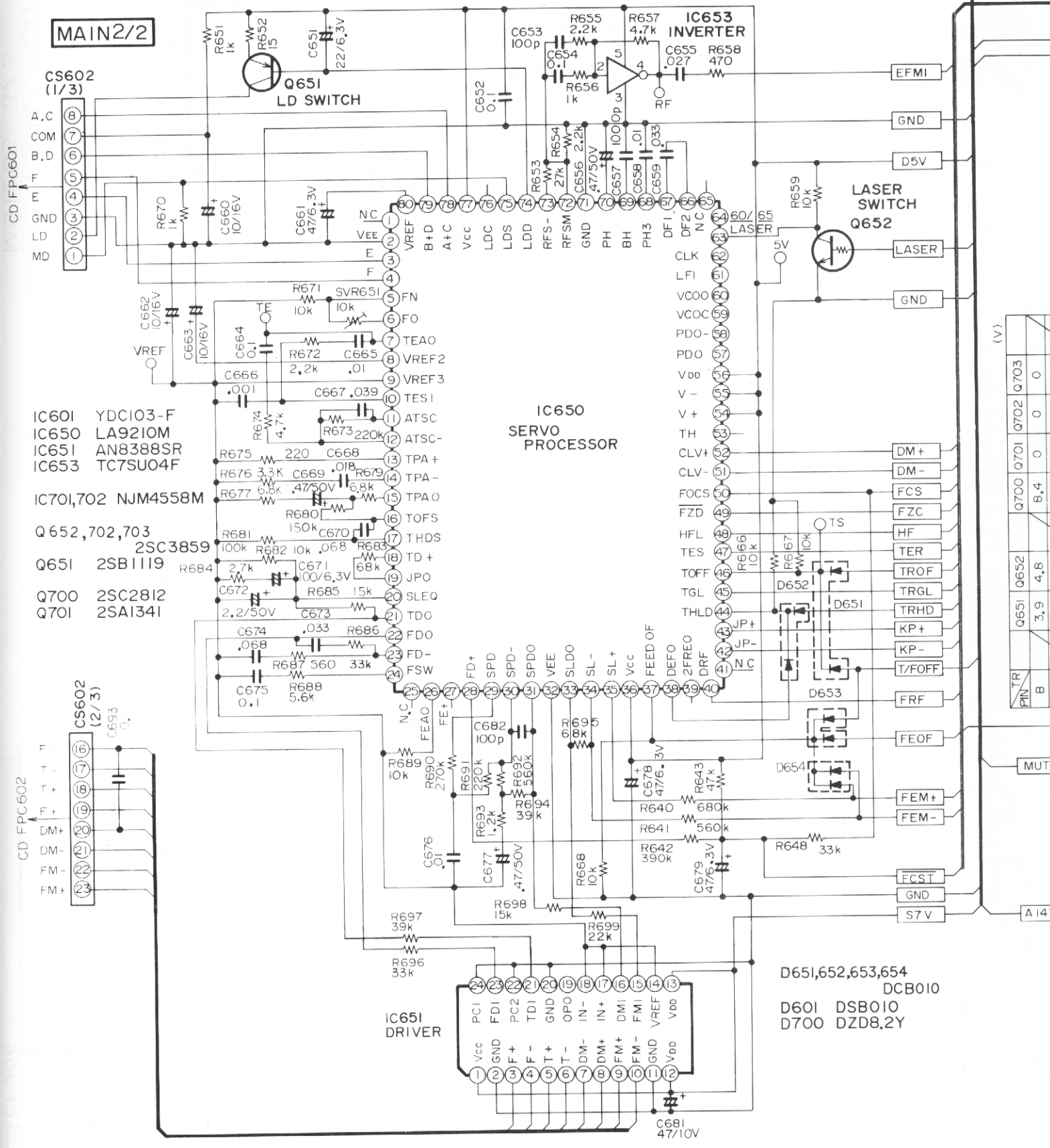
|   |       |
|---|-------|
| 1 | Acc   |
| 2 | B.U.P |
| 3 | GND   |
| 4 | D2B-  |
| 5 | D2B+  |
| 6 | R-CH  |
| 7 | L-CH  |
| 8 | S.GND |

BIN PIN 13PIN DIN

|        |           |
|--------|-----------|
| 1      | 7         |
| 2      | 8         |
| 3      | 5         |
| 4      | 12        |
| 5      | 11        |
| 6      | 4         |
| 7      | 2         |
| 8      | 1,3       |
| SHIELD | 9, SHIELD |

CABLE CONNECTION M91265

SCHEMATIC DIAGRAM (MAIN PCB 2/2)



MAIN2/2

CD FPC601  
A,C (8)  
COM (7)  
B,D (6)  
F (5)  
E (4)  
GND (3)  
LD (2)  
MD (1)

IC601 YDCI03-F  
IC650 LA92IOM  
IC651 AN8388SR  
IC653 TC7SU04F  
IC701,702 NJM4558M  
Q652,702,703 2SC3859  
Q651 2SB1119  
Q700 2SC2812  
Q701 2SA1341

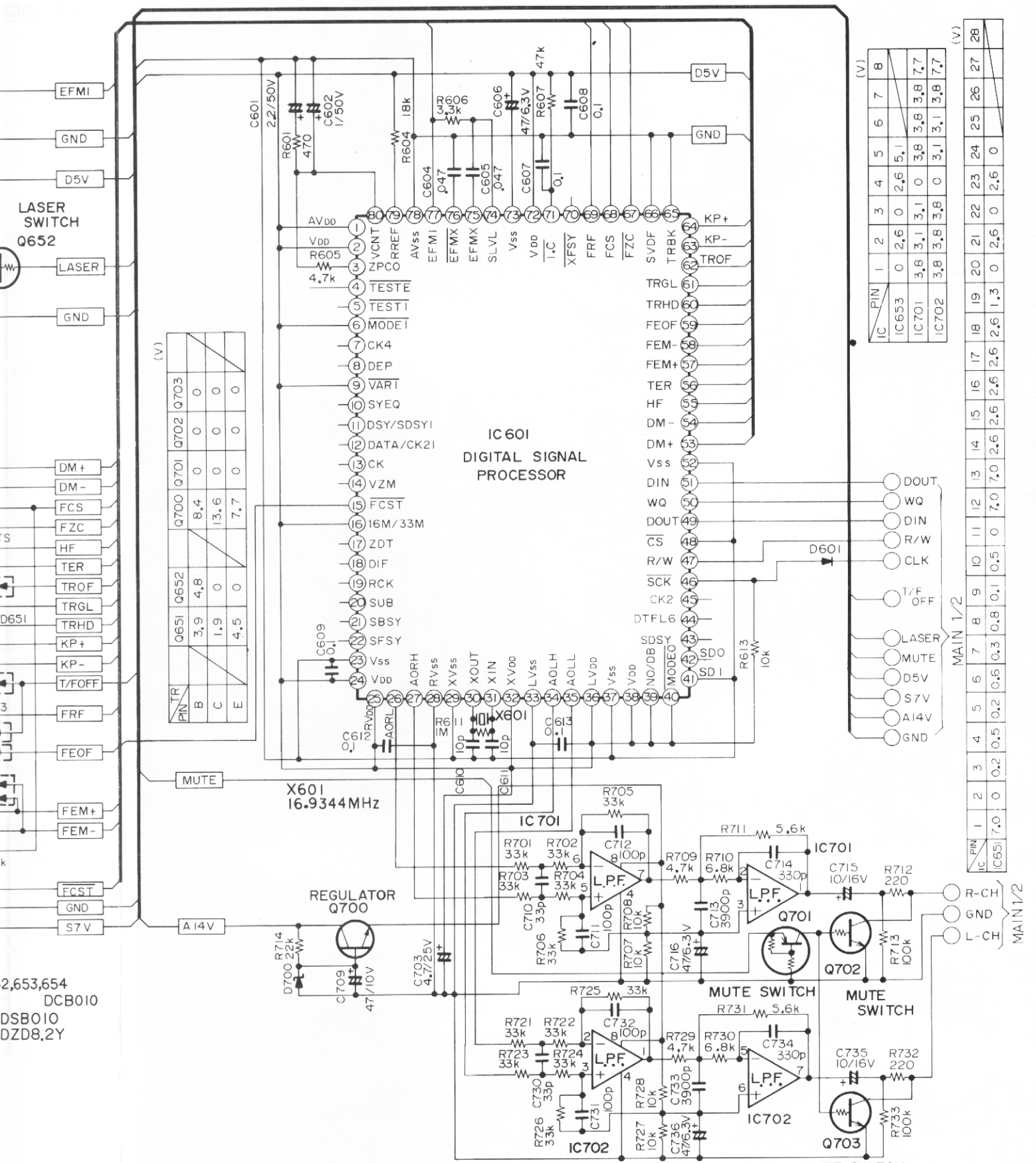
CD FPC602  
T (16)  
T+ (17)  
F+ (18)  
DM+ (19)  
DM- (20)  
FM- (21)  
FM+ (22)

| IC    | PIN | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21  | 22  | 23  | 24  | 25  | 26  | 27  | 28  | 29  |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| IC601 |     | 5.1 | 5.1 | 2.6 | 5.1 | 5.1 | 5.1 | -   | -   | 5.1 | -   | -   | -   | -   | 2.2 | 5.1 | -   | -   | -   | -   | -   | 0   | 0   | 5.1 | 5.1 | -   | -   | 0   | 0   |     |
| IC650 |     | 0   | 0   | 2.6 | 2.6 | 2.5 | 2.4 | 2.7 | 2.7 | 2.7 | 2.7 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.8 | 2.7 | 2.7 | 0   | 2.7 | 2.3 | 2.4 | 2.6 |
|       |     | 4.1 | 4.2 | 4.3 | 4.4 | 4.5 | 4.6 | 4.7 | 4.8 | 4.9 | 5.0 | 5.1 | 5.2 | 5.3 | 5.4 | 5.5 | 5.6 | 5.7 | 5.8 | 5.9 | 6.0 | 6.1 | 6.2 | 6.3 | 6.4 | 6.5 | 6.6 | 6.7 | 6.8 | 6.9 |
|       |     | 2.0 | -   | -   | -   | 5.0 | 0.1 | 0   | 0.3 | 0.5 | 0   | 0   | 0.5 | 0   | 0   | 2.0 | 5.1 | 2.8 | 2.8 | 2.8 | 3.8 | 1.7 | 2.7 | 0.2 | 2.7 | 0   | 3.8 | 4.1 | 3.5 | 2.4 |
|       |     | 0   | 0   | 0   | 0   | 5.1 | 0   | 2.0 | 0   | 4.5 | 0   | 0   | 0.5 | 0.9 | 0.8 | 2.0 | 5.1 | 2.8 | 2.8 | 2.8 | 3.8 | 1.7 | 2.7 | 0.2 | 2.7 | 0   | 3.8 | 4.1 | 3.5 | 2.4 |

| PIN | TR | Q651 | Q652 | Q700 | Q701 | Q702 | Q703 |
|-----|----|------|------|------|------|------|------|
| B   |    | 3.9  | 4.8  | 8.4  | 0    | 0    | 0    |

MUTB  
A14V

D651,652,653,654 DCB010  
D601 DSB010  
D700 DZD8.2Y



(V)

| TR | Q651 | Q652 | Q700 | Q701 | Q702 | Q703 |
|----|------|------|------|------|------|------|
| B  | 3.9  | 4.8  | 8.4  | 0    | 0    | 0    |
| C  | 1.9  | 0    | 13.6 | 0    | 0    | 0    |
| E  | 4.5  | 0    | 7.7  | 0    | 0    | 0    |

(V)

| IC    | PIN | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| IC653 |     | 0   | 2.6 | 0   | 2.6 | 5.1 |     |     |     |
| IC701 |     | 3.8 | 3.1 | 3.1 | 0   | 3.8 | 3.8 | 3.8 | 7.7 |
| IC702 |     | 3.8 | 3.8 | 3.8 | 0   | 3.1 | 3.1 | 3.8 | 7.7 |

(V)

| IC    | PIN | 1   | 2 | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11 | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21 | 22  | 23 | 24  | 25 | 26  | 27 | 28  |
|-------|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|
| IC651 |     | 7.0 | 0 | 0.2 | 0.5 | 0.2 | 0.6 | 0.3 | 0.8 | 0.1 | 0.5 | 0  | 7.0 | 7.0 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 1.3 | 0  | 2.6 | 0  | 2.6 | 0  | 2.6 | 0  | 2.6 |

MAIN 1/2

| IC    | PIN | 1   | 2 | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11 | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  | 21 | 22  | 23 | 24  | 25 | 26  | 27 | 28  |
|-------|-----|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|----|-----|----|-----|
| IC651 |     | 7.0 | 0 | 0.2 | 0.5 | 0.2 | 0.6 | 0.3 | 0.8 | 0.1 | 0.5 | 0  | 7.0 | 7.0 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 2.6 | 1.3 | 0  | 2.6 | 0  | 2.6 | 0  | 2.6 | 0  | 2.6 |

2,653,654  
DCB010  
DSB010  
DZD8.2Y

(V)

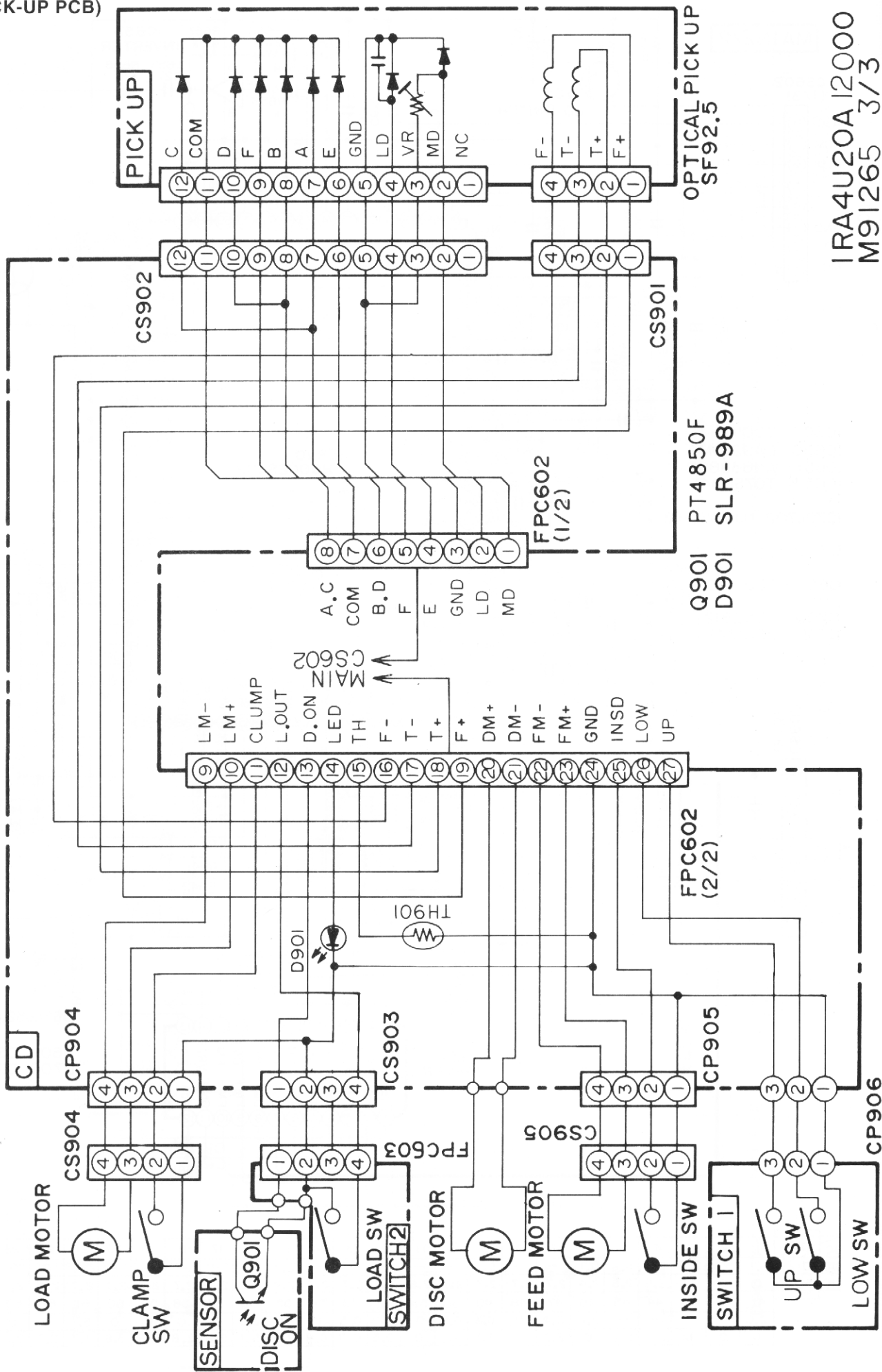
|    | 23  | 24  | 25  | 26  | 27  | 28  | 29  | 30  | 31  | 32  | 33  | 34  | 35  | 36  | 37  | 38  | 39  | 40 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| 0  | 5.1 | 5.1 | -   | -   | 0   | 0   | 2.5 | 2.5 | 5.1 | 0   | -   | -   | 5.1 | 0   | 5.1 | 5.1 | 5.1 |    |
| 7  | 2.7 | 0   | 2.7 | 2.3 | 2.4 | 2.6 | 2.7 | 2.8 | 0   | 2.9 | 2.7 | 2.7 | 5.1 | 0   | 0   | 0   | 4.5 |    |
| 33 | 64  | 65  | 66  | 67  | 68  | 69  | 70  | 71  | 72  | 73  | 74  | 75  | 76  | 77  | 78  | 79  | 80  |    |
| 0  | 0   | 0   | 0   | 4.2 | 0   | 4.2 | -   | 4.9 | 5.1 | 0   | 2.0 | 2.5 | 2.5 | 2.1 | 0   | 2.6 | 2.6 |    |
| 2  | 2.7 | 0   | 3.8 | 4.1 | 3.5 | 2.4 | 3.9 | 0   | 3.1 | 1.7 | 4.0 | 0.3 | 3.8 | 5.1 | 1.6 | 1.6 | 1.7 |    |

IRA4U20A12000  
M91265 1/3





**SCHEMATIC DIAGRAM**  
(CD / PICK-UP PCB)



|       |    |     |    |     |     |    |    |     |     |     |     |     |     |     |    |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |   |
|-------|----|-----|----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|---|
| IC801 | 0  | 0   | 0  | 4.9 | 0   | 0  | 0  | 4.9 | 2.5 | 2.3 | 4.9 | 0   | 5.0 | 4.8 | —  | —   | —  | —   | —   | —   | —   | 0.5 | 0.5 | 0.5 | 0.5 | 0   | 5.0 | 5.0 | 4.6 | 4.9 | 0   | 0  |   |
| IC851 | —  | —   | —  | NC  | 4.9 | 0  | 0  | 5.0 | 5.0 | 0   | 0   | 0   | NC  | 0   | 0  | 5.1 | NC | 2.0 | 5.1 | 5.1 | 5.1 | 2.4 | 2.4 | 4.5 | —   | —   | —   | —   | —   | —   | —   | —  | — |
|       | 33 | 34  | 35 | 36  | 37  | 38 | 39 | 40  | 41  | 42  | 43  | 44  | 45  | 46  | 47 | 48  | 49 | 50  | 51  | 52  | 53  | 54  | 55  | 56  | 57  | 58  | 59  | 60  | 61  | 62  | 63  | 64 | — |
|       | 0  | 2.7 | 0  | 0   | 0   | 0  | 0  | NC  | 0   | —   | NC  | 4.8 | —   | NC  | NC | NC  | NC | NC  | NC  | NC  | NC  | NC  | NC  | NC  | NC  | 4.9 | 4.9 | 4.9 | 5.0 | 5.0 | 5.0 | 0  | 0 |

IRA4U20A12000  
M91265 3/3

## TROUBLE SHOOTING

### Relation between errors and sensor switches

| μC (IC801):<br>Pin name/number | Sensor<br>Status  | ERROR<br>Status   |
|--------------------------------|-------------------|---|
| LOAD OUT / 13                  |                   | Detect sw for loading   |
|                                | not on (H)        | Disc unload → load → unload → load → stop   |
|                                | not off (L)       | Stop at loading complete position   |
| CLAMP / 2                      |                   | Detect sw for unloading   |
|                                | not on (H)        | Disc load → unload → load → unload → stop   |
|                                | not off (L)       | Disc unload → ELV down → ELV up → ELV down → stop at 'no.6' position<br>(ex. Disc change 1 → 2)   |
| LOW / 63                       |                   | ELV Low limit sw  |
|                                | not on (H)        | ELV down → magazine eject → ELV up → ELV down → stop<br>(only eject mode)   |
|                                | not off (L)       | ELV down → magazine eject → ELV up → ELV down → stop<br>(ex. Disc change 1 → 2)<br>* Disc change 1 → 6<br>Disc no.2 play; if disc select, ELV up → stop |
| UP / 64                        |                   | ELV Up limit sw   |
|                                | not on (H)        | magazine eject → ELV up → ELV down → ELV up → stop (only eject mode)  |
|                                | not off (L)       | Disc unload → ELV up → ELV down → ELV up → stop<br>(ex. disc change 5 → 2)<br>Magazine eject → stop (eject mode)  |
| DISC ON / 1                    |                   | Detect sw for presence/absence disc ('L'=presence)  |
|                                | not on (L)        | Disc unload → load → unload → load → stop   |
|                                | not off (H)       | "No disc"   |
| DISC COUNT / 3                 |                   | Detect sw for ELV position  |
|                                | not on<br>not off | * Disc select up<br>ELV down → magazine eject → ELV up → ELV down → stop<br>* Disc select down<br>ELV up → ELV down → ELV up → stop                     |
| MAG.SW. / 6                    |                   | Detect sw for Magazine  |
|                                | not on (H)        | When magazine insert, not loading   |
|                                | not off (L)       | Magazine eject → ELV up → ELV down → stop (only eject mode);<br>No magazine, but disc check starts and 'no disc' condition occurs                       |
| INSIDE / 62                    |                   | Detect sw for 'INSIDE' limit  |
|                                | not on (H)        | Error detection < > disc change   |
|                                | not off (L)       |   |

## TROUBLE SHOOTING

| SYMPTOM      | DEFECTIVE CIRCUIT              | DEFECTIVE POINT  |
|--------------|--------------------------------|--|
| Disc Turning | Inferiority Feed Motor Circuit | <ul style="list-style-type: none"> <li>·Check inner circle limit SW and CS602 25pin</li> <li>·Check voltage of IC601 57, 58pin</li> <li>·Check voltage of IC651 9, 10pin</li> <li>·Check Feed motor and Mechanism</li> </ul> |
|              | Focus Search Circuit           | <ul style="list-style-type: none"> <li>·Check Voltage of IC601 15, 67-69pin</li> <li>·Check IC650 22pin</li> <li>·Check voltage of IC651 3, 4pin</li> <li>·Check CS602 16, 19pin</li> <li>·Check Pickup</li> </ul>           |
|              | APC                            | <ul style="list-style-type: none"> <li>·Check Q651, short or open</li> <li>·Check IC650 74, 75pin</li> <li>·Check Pickup</li> </ul>  |
|              | Disc Motor Circuit             | <ul style="list-style-type: none"> <li>·Check IC601 53pin and IC650 31pin</li> <li>·Check IC652 20, 21pin</li> <li>·Check Disc Motor and Mechanism</li> </ul>  |
|              | Power Supply Circuit           | <ul style="list-style-type: none"> <li>·Check IC801 61pin</li> <li>·Check Q801, 802</li> <li>·Check Q550, IC550</li> </ul>   |
| Track Search | Tracking Servo Circuit         | <ul style="list-style-type: none"> <li>·Check voltage of TP, TE and adjustment inferiority of SVR651</li> <li>·Check IC650 21pin and IC651 5, 6pin</li> <li>·Check Pickup</li> </ul>   |
|              | kick pulse Circuit             | <ul style="list-style-type: none"> <li>·Check IC601 63, 64pin and IC650 18, 19pin</li> </ul>   |
|              | Feed Motor Circuit             | <ul style="list-style-type: none"> <li>·Check IC650 33pin</li> <li>·Check Feed Motor and Mechanism</li> </ul>  |
| Noise        | RF Circuit                     | <ul style="list-style-type: none"> <li>·Check waveform of TP RF</li> </ul>   |
|              | Mechanism                      | <ul style="list-style-type: none"> <li>·Check eccentricity of Mechanism and Disc rub</li> </ul>  |
|              | Audio Circuit                  | <ul style="list-style-type: none"> <li>·Check IC701 1pin and IC702 7pin</li> <li>·Check CP501 6, 7, 8pin</li> </ul>  |

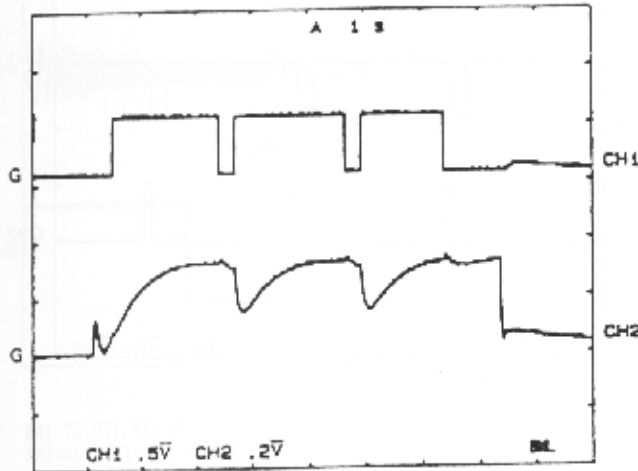
# TROUBLE SHOOTING

Note: Reference voltage

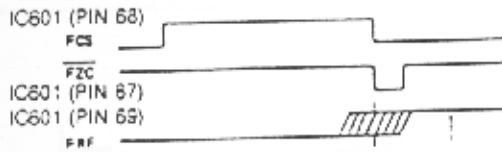
G: GND  
VR: Pin 9 of IC650 (2.5V)

CH1: FCS (pin 68 of IC601) 5V/div  
CH2: FO (pin 22 of IC650) 2V/div 1s/div

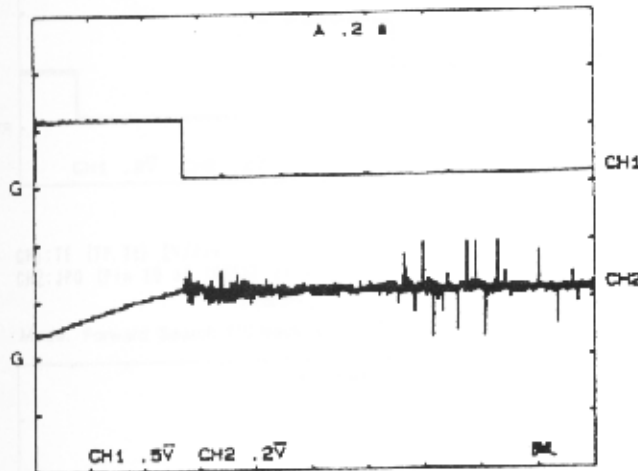
Mode: Focus Search is performed



### FOCUS SEARCH SIGNAL

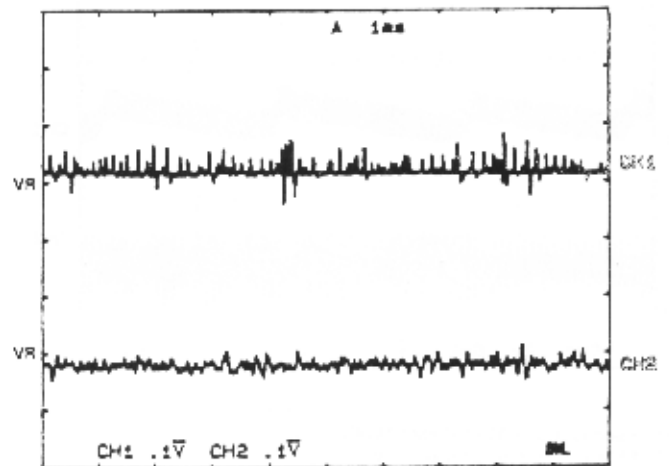


CH1: FCS (pin 68 of IC601) 5V/div 0.2s/div  
CH2: FO (pin 22 of IC650) 2V/div  
Mode: Focus close



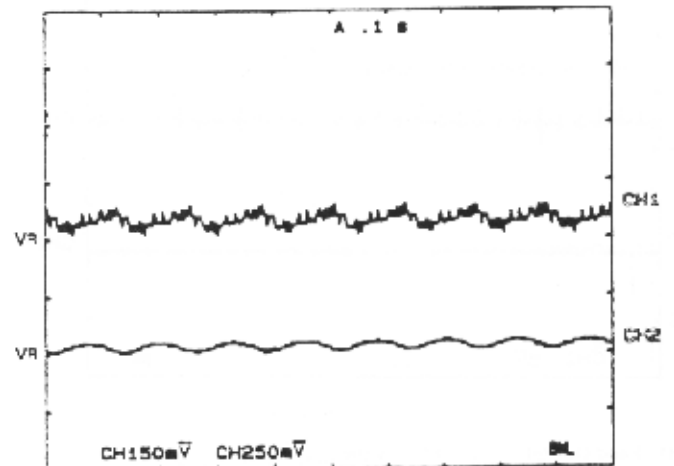
CH1: TO (pin 21 of IC650) 1V/div  
CH2: FO (pin 22 of IC650) 1V/div 1ms/div

Mode: Play



CH1: Disc Out (pin 31 of IC650) 0.5V/div  
CH2: Feed Out (pin 33 of IC650) 0.5V/div 0.1s/div

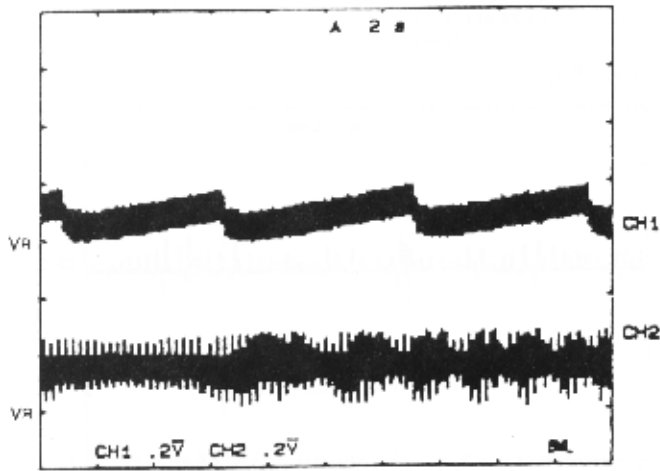
Mode: Play



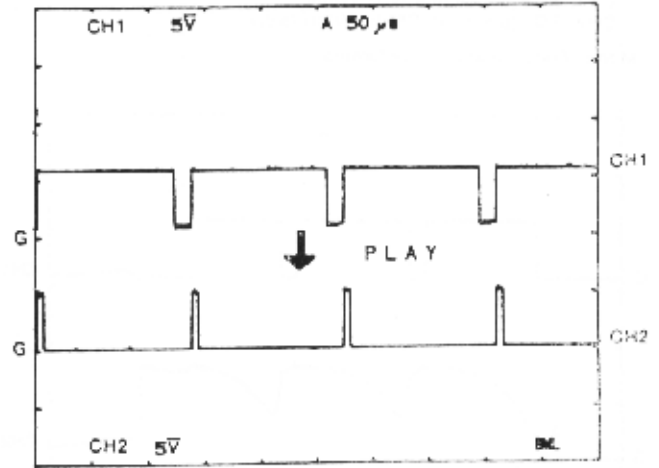
# TROUBLE SHOOTING

CH1: Feed Out (Pin 33 of IC650) 2V/div  
 CH2: Disc Out (Pin 31 of IC650) 2V/div  
 2s/div

Mode: Play

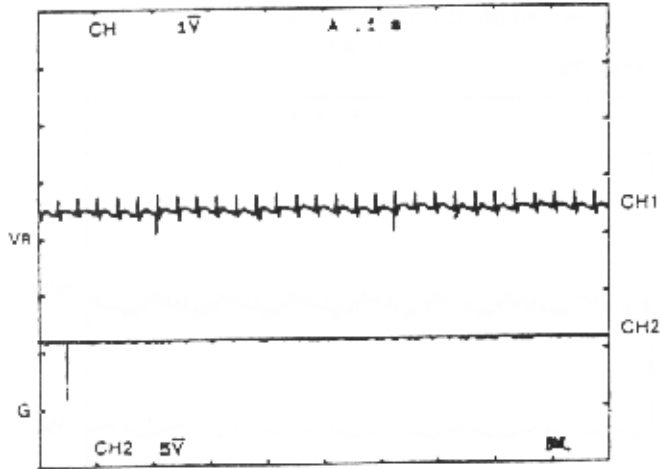


CH1: DM+ (pin 53 of IC601) 5V/div  
 CH2: DM+ (pin 53 of IC601) 5V/div  
 Mode: Disc Start → Play 50μs/div



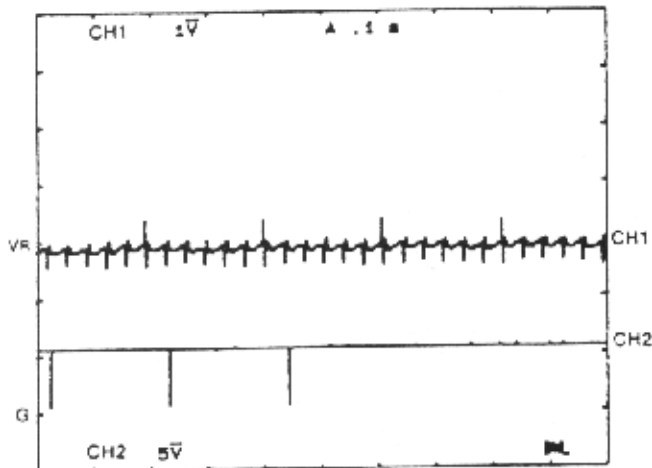
CH1: Feed Out (pin 33 of IC650) 1V/div  
 CH2: FEM+ (pin 57 of IC601) 5V/div  
 0.1s/div

Mode: Forward Search



CH1: Feed Out (pin 33 of IC650) 1V/div  
 CH2: FEM- (pin 58 of IC601) 5V/div  
 0.1s/div

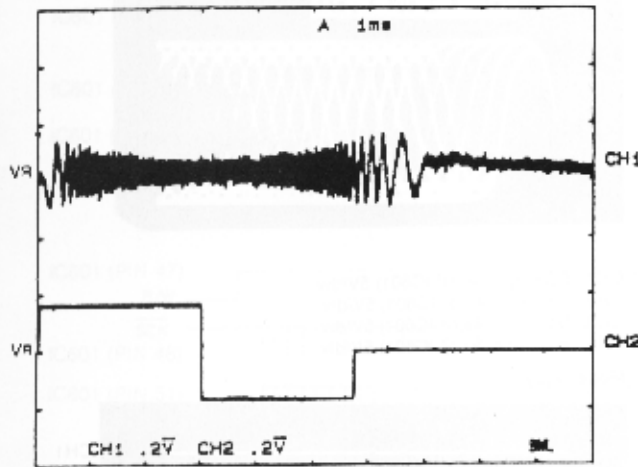
Mode: Backward Search



# TROUBLE SHOOTING

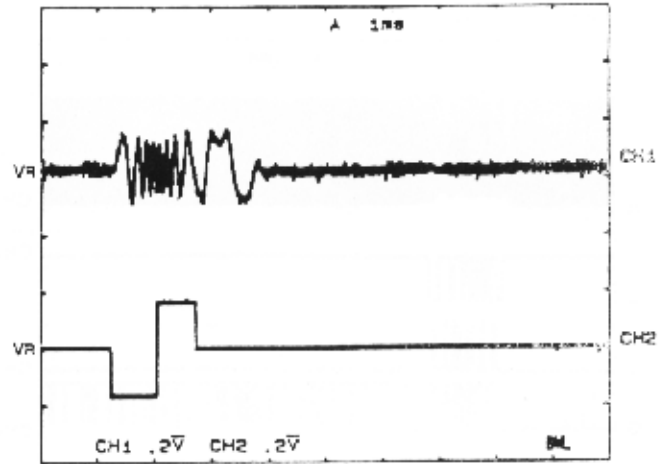
CH1:TE (TP, TE) 2V/div  
 CH2:JPO (Pin 19 of IC650) 2V/div  
 1ms/div

Mode: Forward Search (100 track jump)



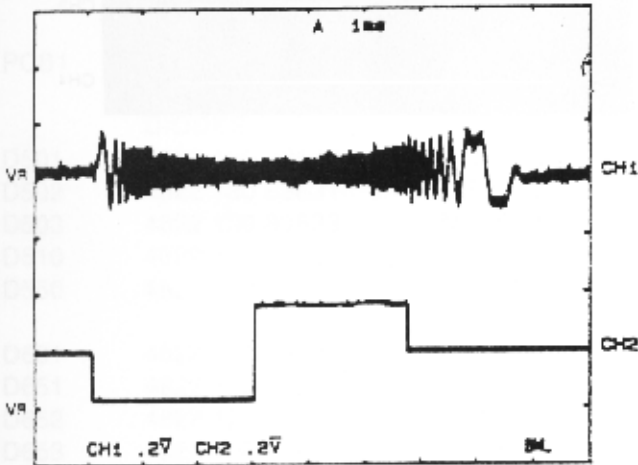
CH1:TE (TP, TE) 2V/div  
 CH2:JPO (Pin 19 of IC650) 2V/div  
 1ms/div

Mode: Backward Search (10 Track jump)



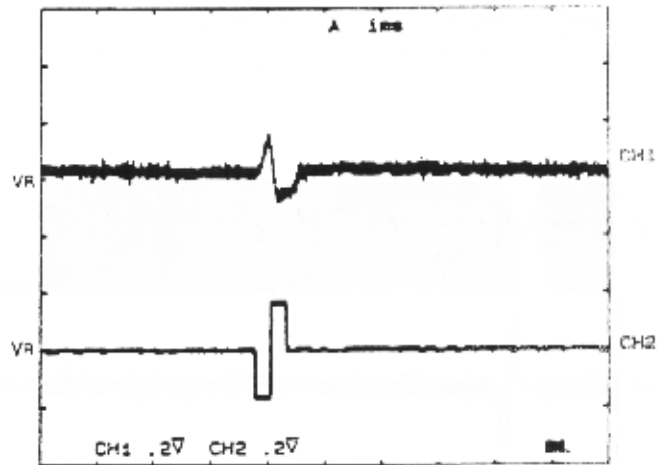
CH1:TE (TP, TE) 2V/div  
 CH2:JPO (Pin 19 of IC650) 2V/div  
 1ms/div

Mode: Backward Search (100 Track jump)



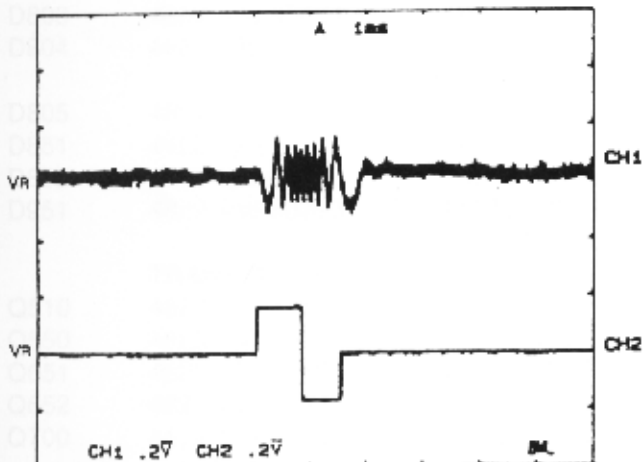
CH1:TE (TP, TE) 2V/div  
 CH2:JPO (Pin 19 of IC650) 2V/div  
 1ms/div

Mode: PAUSE



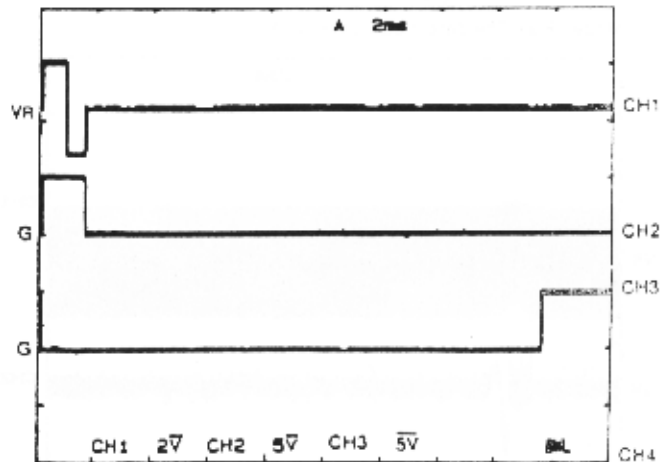
CH1:TE (TP, TE) 2V/div  
 CH2:JPO (Pin 19 of IC650) 2V/div  
 1ms/div

Mode: Forward Search (10 track jump)



CH1: JPO (pin 19 of IC650) 2V/div  
 CH2: TRHD (pin 80 of IC801) 5V/div  
 CH3: TRGL (pin 61 of IC801) 5V/div  
 2ms/div

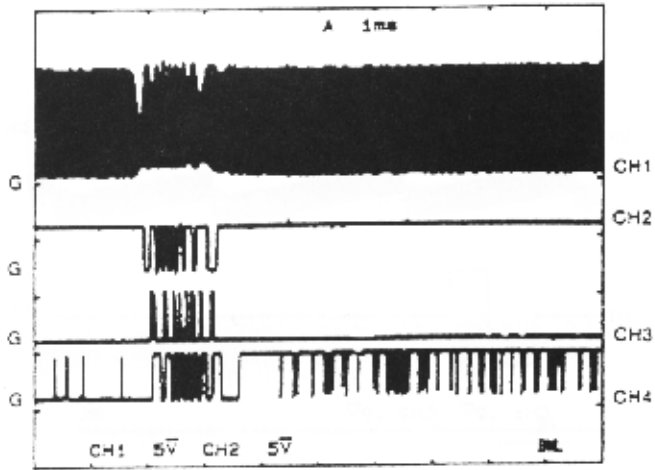
Mode: Track Search



## TROUBLE SHOOTING

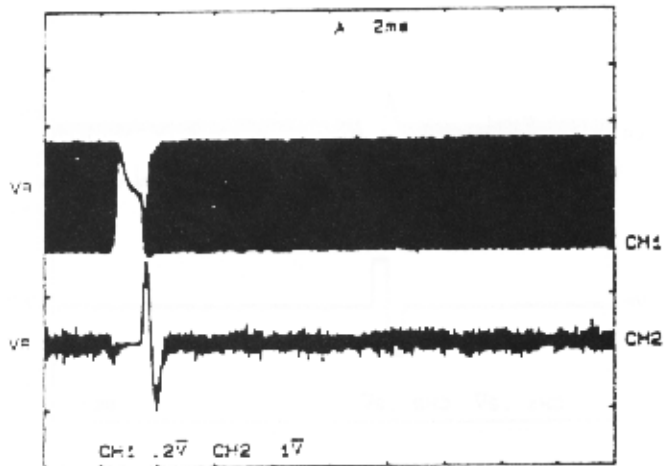
CH1: RF (TP, RF) 2V/div  
 CH2: FZC (pin 67 of IC601) 5V/div  
 CH3: HF (pin 55 of IC601) 5V/div  
 CH4: TE<sub>R</sub> (pin 56 of IC601) 5V/div  
 1ms/div

Mode: Track Search



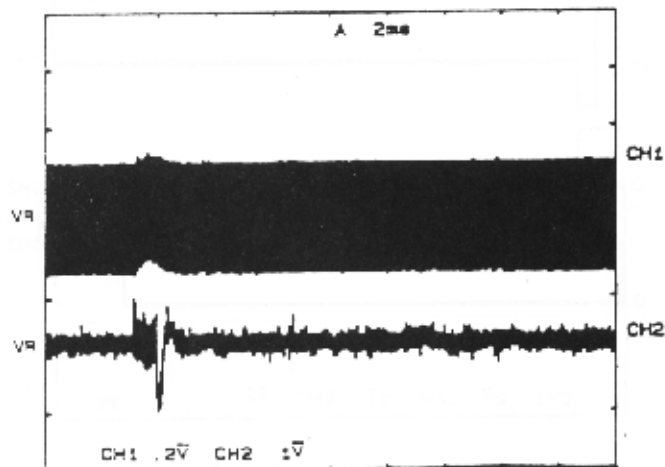
CH1: RF (TP, RF) 2V/div  
 CH2: TE (TP, TE) 1V/div  
 2ms/div

Mode: Play (The Black dot part passes 1mm)



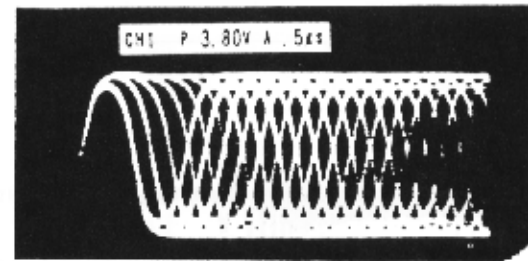
CH1: RF (TP, RF) 2V/div  
 CH2: TE (TP, TE) 1V/div  
 2ms/div

Mode: Play (The defect part passes 1mm)



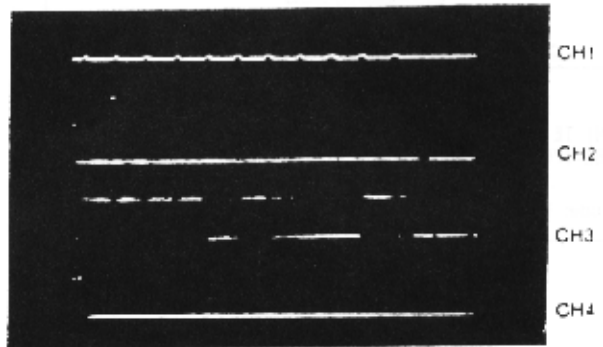
CH1: RF (TP, RF) 1V/div  
 0.5μs/div

Mode: Play



CH1: SCK (pin 46 of IC601) 5V/div  
 CH2: R/W (pin 47 of IC601) 5V/div  
 CH3: Dout (pin 49 of IC601) 5V/div  
 CH4: WQ (pin 50 of IC601) 5V/div

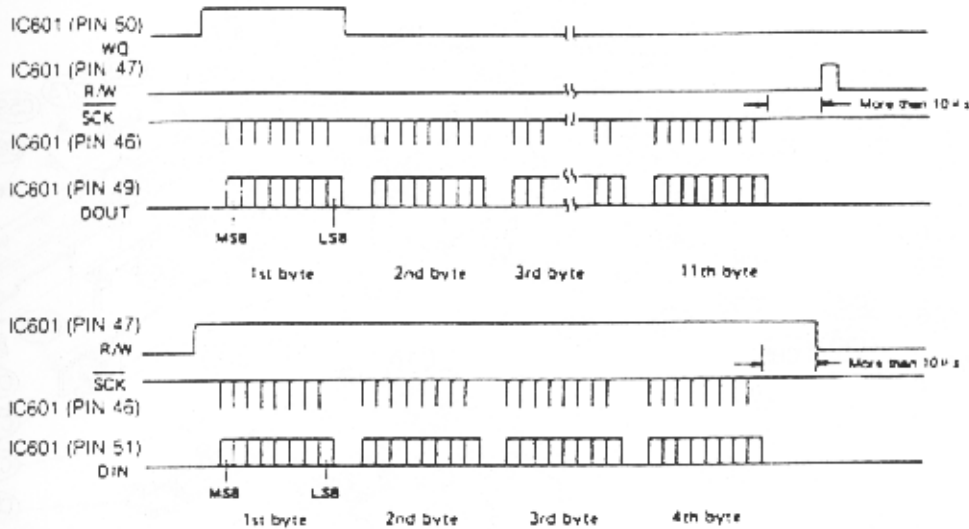
Mode: Play





## TROUBLE SHOOTING

### CD MODE WAVEFORMS



### LIST OF ELECTRICAL PARTS

| MAIN PCB    |                |               |
|-------------|----------------|---------------|
| PCB1        | 4822 214 52217 | MAIN PCB ASSY |
| DIODES      |                |               |
| D501        | 4822 130 82557 | DCC010        |
| D502        | 4822 130 83631 | DSB010        |
| D503        | 4822 130 83633 | MA704A        |
| D510        | 4822 130 83765 | DZD5.6Y       |
| D550        | 4822 130 83023 | SC802-04      |
| D601        | 4822 130 83631 | DSB010        |
| D651        | 4822 130 83637 | DCB010        |
| D652        | 4822 130 83637 | DCB010        |
| D653        | 4822 130 83637 | DCB010        |
| D654        | 4822 130 83637 | DCB010        |
| D700        | 4822 130 80273 | MTZJ8.2C      |
| D801        | 4822 130 83632 | DZD5.1Y       |
| D802        | 4822 130 83631 | DSB010        |
| D803        | 4822 130 83631 | DSB010        |
| D804        | 4822 130 83631 | DSB010        |
| D805        | 4822 130 83637 | DCB010        |
| D851        | 4822 130 83765 | DZD5.6Y       |
| D852        | 4822 130 83765 | DZD5.6Y       |
| D951        | 4822 130 80273 | MTZJ8.2C      |
| TRANSISTORS |                |               |
| Q510        | 4822 130 63549 | 2SD1621S      |
| Q550        | 4822 130 63547 | 2SB1203ST     |
| Q651        | 4822 130 63654 | 2SB1119ST     |
| Q652        | 4822 130 90323 | DTC114TK      |
| Q700        | 4822 130 60753 | 2SC2812L6     |

|      |                |           |
|------|----------------|-----------|
| Q701 | 4822 111 90813 | UN2113    |
| Q702 | 4822 130 90323 | DC114TK   |
| Q703 | 4822 130 90323 | DTC114TK  |
| Q801 | 4822 130 63551 | DTC124XK  |
| Q802 | 4822 130 62912 | 2SB1202ST |

**IC-S**

|       |                |             |
|-------|----------------|-------------|
| IC501 | 4822 209 33241 | MC147805AUT |
| IC502 | 4822 209 33094 | L78M05T     |
| IC550 | 4822 209 33239 | M5291FP     |
| IC601 | 4822 209 33762 | YDC103-F    |
| IC650 | 4822 209 31678 | LA9210M     |

|       |                |            |
|-------|----------------|------------|
| IC651 | 4822 209 33761 | AN8388SR   |
| IC653 | 4822 209 32984 | TC7SU04F   |
| IC701 | 4822 209 71451 | NJM4558M   |
| IC702 | 4822 209 71451 | NJM4558M   |
| IC801 | 4822 209 31687 | UPD75116GF |

|       |                |              |
|-------|----------------|--------------|
| IC802 | 4822 209 63631 | S-8054HN-CB  |
| IC803 | 4822 209 33759 | S-80732AN-DW |
| IC851 | 4822 209 32743 | MSM6307GS    |
| IC901 | 4822 209 32442 | TC7WU04F     |
| IC950 | 4822 209 33758 | LB1644       |

**MISCELLANEOUS**

|        |                |                      |
|--------|----------------|----------------------|
| L550   | 4822 157 71081 | CHOKE 680UH          |
| SVR651 | 4822 101 30857 | 10K PRES.            |
| SW801  | 4822 276 13546 | SWITCH 1P-1T EJECT   |
| SW802  | 4822 276 13548 | SWITCH TACT, RESET   |
| X601   | 4822 242 81702 | XTAL RES. 16.9344MHZ |
| X801   | 4822 242 81703 | CERAM.RES. 4.19MHZ   |
| X851   | 4822 242 81847 | CERAM.RES. 6.00MHZ   |

**CONNECT PCB**

|       |                |                  |
|-------|----------------|------------------|
| PCB2  | 4822 214 52218 | CONNECT PCB ASSY |
| CS505 | 4822 267 31758 | DIN SOCKET       |

**CD PCB**

|       |                |                      |
|-------|----------------|----------------------|
| PCB3  | 4822 214 52219 | CD PCB ASSY          |
| TH901 | 4822 111 92201 | THERM.NTH4G42B104E01 |
| D901  | 4822 130 83764 | LED SLR-989A         |

**SENSOR PCB**

|      |                |                 |
|------|----------------|-----------------|
| PCB4 | 4822 214 52221 | SENSOR PCB ASSY |
| Q901 | 4822 130 63655 | PHOTOD. PT4850F |

**PHOTO COUPLER PCB**

|      |                |                   |
|------|----------------|-------------------|
| PCB5 | 4822 214 52222 | PHOTO C. PCB ASSY |
| D910 | 4822 130 83766 | PHOTOC. GP1S51V   |

**SWITCH1 PCB**

|      |                |                  |
|------|----------------|------------------|
| PCB6 | 4822 214 52223 | SWITCH1 PCB ASSY |
| U.SW | 4822 276 13547 | SWITCH, PUSH     |
| L.SW | 4822 276 13547 | SWITCH, PUSH     |

**SWITCH2 PCB**

|      |                |                  |
|------|----------------|------------------|
| PCB7 | 4822 214 52224 | SWITCH2 PCB ASSY |
|------|----------------|------------------|

**CABIN**  
(Note:

136)

1  
2  
3  
7

**LIST C**  
(Note:

C3  
C4  
C5  
C6  
C8  
  
C16  
C23  
C30  
C31  
C41  
  
C46  
C48  
C49  
C50  
C51  
  
C53  
C62  
C65  
C66  
C67  
  
C69  
C71  
C73  
C92  
C99  
  
C101  
C103  
C109  
C110  
C116  
  
C121  
C124  
C125  
CS80V  
CS80V  
  
CS904  
CS90V

PCS74434

## CABINET PARTS AND ACCESSORIES

(Note: all parts not mentioned here are no service parts)

|   |                |                     |
|---|----------------|---------------------|
|   | 4822 736 22191 | INSTRUCT. MANUAL    |
|   | 4822 402 61551 | ACC. PART ASSY      |
|   | 4822 466 93439 | ACC. PART ASSY      |
|   | 4822 310 32197 | ACC. PART ASSY      |
|   | 4822 691 10426 | CD MAGAZINE         |
|   | 4822 502 21556 | SPECIAL SCREW, FIX  |
| 1 | 4822 444 40788 | ASSY FRONT PANEL    |
| 2 | 4822 444 40787 | ASSY CABINET        |
|   | 4822 502 21553 | SCREW FOR CAB.      |
| 3 | 4822 444 40791 | ASSY BOTTOM LID     |
|   | 4822 529 10308 | DAMPER              |
| 7 | 4822 321 62671 | DIN INTERFACE CABLE |

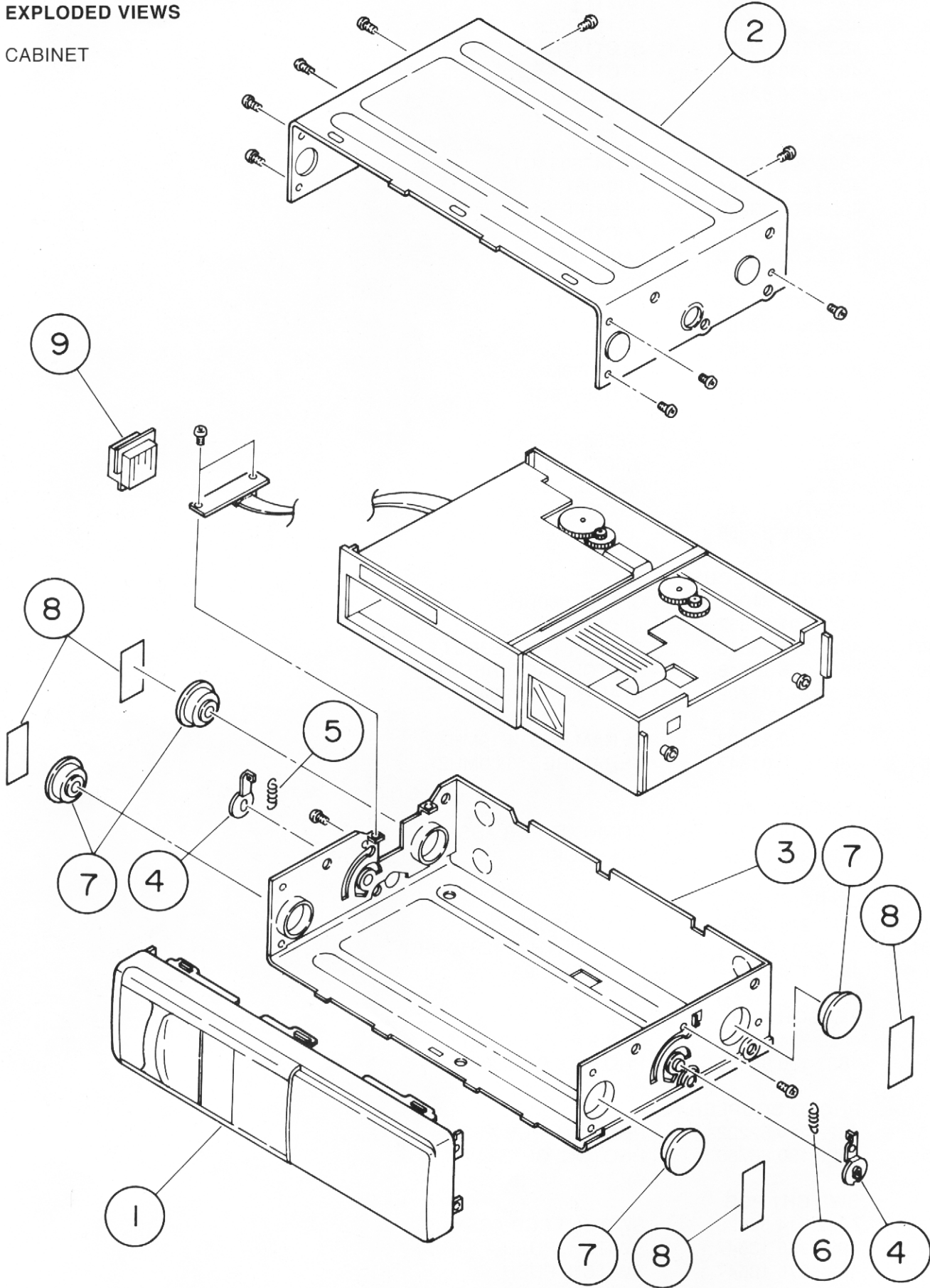
## LIST OF MECHANICAL PARTS

(Note: all parts not mentioned here are no service parts)

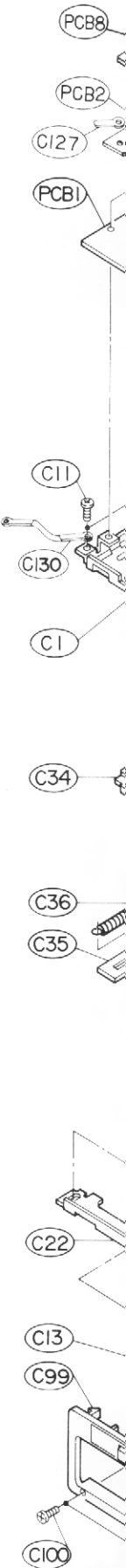
|       |                |                      |
|-------|----------------|----------------------|
| C3    | 4822 522 33508 | GEAR, A              |
| C4    | 4822 522 33509 | GEAR, B              |
| C5    | 4822 522 33511 | GEAR, C              |
| C6    | 4822 532 12294 | MOUNT-M, SPEC.WASHER |
| C8    | 4822 361 30441 | ASSY, DC ELEV. MOTOR |
| C16   | 4822 502 21554 | SPECIAL SCREW        |
| C23   | 4822 532 12293 | SPECIAL WASHER       |
| C30   | 4822 532 12293 | SPECIAL WASHER       |
| C31   | 4822 522 33512 | GEAR, D              |
| C41   | 4822 276 13547 | SWITCH, PUSH         |
| C46   | 4822 361 30441 | ASSY, DC MOTOR LOAD  |
| C48   | 4822 522 33508 | GEAR, A              |
| C49   | 4822 522 33513 | GEAR, F              |
| C50   | 4822 522 33514 | GEAR, G              |
| C51   | 4822 532 12294 | MOUNT-M, SPEC.WASHER |
| C53   | 4822 502 21555 | SPECIAL SCREW        |
| C62   | 4822 276 13547 | SWITCH, PUSH         |
| C65   | 4822 466 83144 | PLATE ASSY, ELEV.    |
| C66   | 4822 522 33515 | GEAR, H              |
| C67   | 4822 532 12294 | MOUNT-M, SPEC.WASHER |
| C69   | 4822 402 61548 | LEVER, SWITCH        |
| C71   | 4822 402 61549 | ASSY, SLIDE LEVER    |
| C73   | 4822 532 12293 | SPECIAL WASHER       |
| C92   | 4822 276 13547 | SWITCH, PUSH         |
| C99   | 4822 444 40789 | PANEL ASSY           |
| C101  | 4822 691 30348 | ASSY, CH.DISC MOTOR  |
| C103  | 4822 361 30439 | ASSY, DC MOTOR FEED  |
| C109  | 4822 358 31311 | BELT                 |
| C110  | 4822 691 30349 | PICKUP, LASER        |
| C116  | 4822 276 13547 | SWITCH, PUSH         |
| C121  | 4822 532 12295 | MOUNT-M, SPEC.WASHER |
| C124  | 4822 532 12294 | MOUNT-M, SPEC.WASHER |
| C125  | 4822 532 12295 | MOUNT-M, SPEC.WASHER |
| CS801 | 4822 321 62668 | CABLE ASSY 2-P       |
| CS802 | 4822 321 62669 | CABLE ASSY 5-P       |
| CS904 | 4822 321 62667 | CABLE ASSY 4-P       |
| CS905 | 4822 321 62667 | CABLE ASSY 4-P       |

EXPLODED VIEWS

CABINET

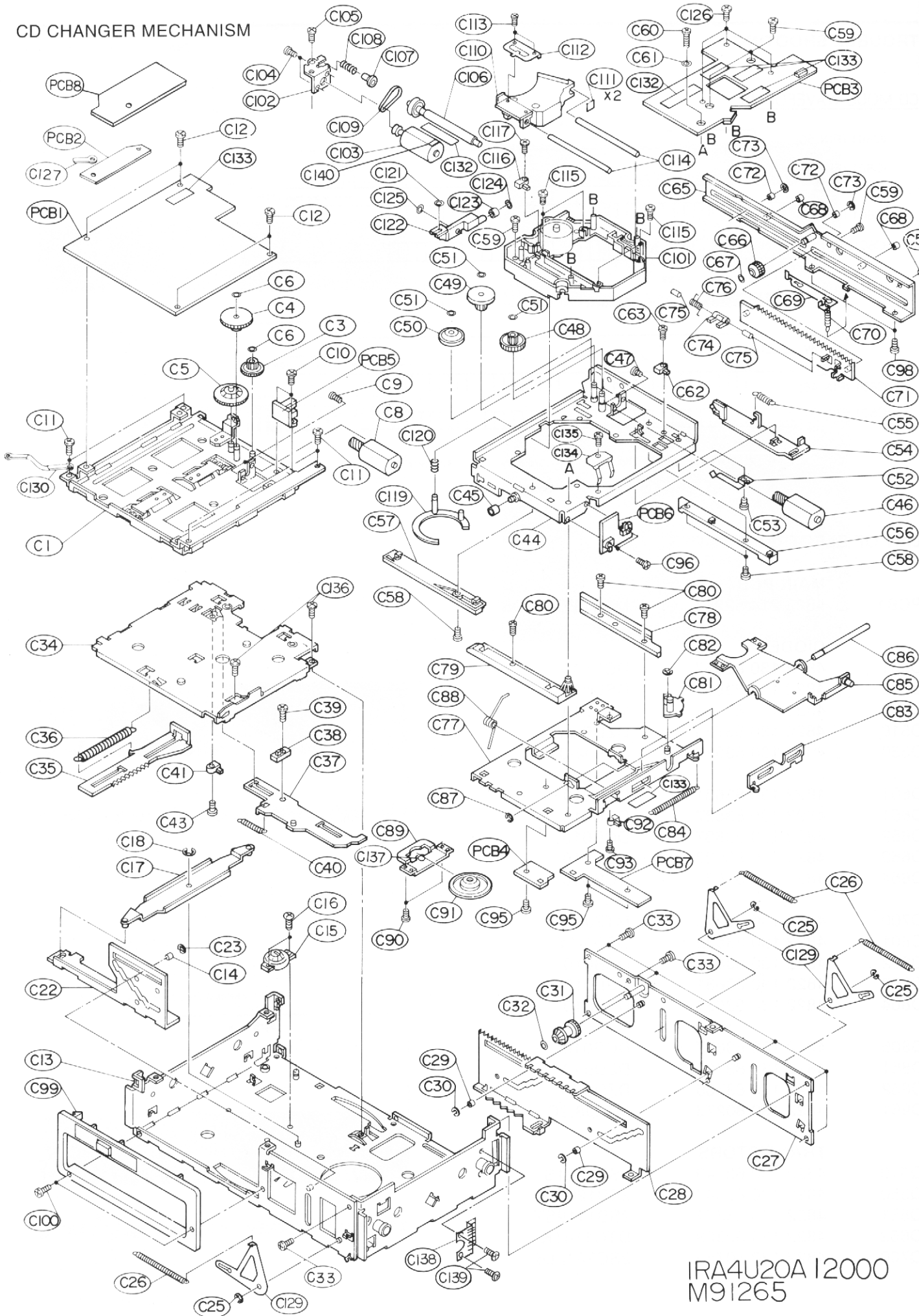


CD CHAN



IRA4U29A19200  
DC022

CD CHANGER MECHANISM



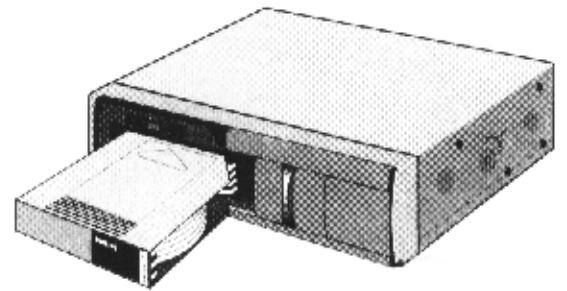
8

4

AI9200

IRA4U20A I2000  
M91265

Service  
Service  
**Service**



# Repair Manual

## PREFACE

This manual is a supplement to the service manual of the DC022. It gives practical hints for demounting, disassembling and trouble shooting. Also general warnings and additional servicing hints concerning the CD changer are included.

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4822 725 24649



# 1 DEMOUNTING/MOUNTING of CABINET

## DEMOUNTING CABINET

1. Removal of top cover:-
  - . unscrew 9 screws (note: 4 screws fixing front are longer)
  - . lift top cover starting at left side and push front panel to disengage the front cams.
  - . remove top cover (watch out for connector)
2. Removal of front panel
  - . release front panel by pushing sides of bottom cover inwards.
3. Removal of bottom cover
  - . loosen connector PCB by unscrewing 2 screws
  - . remove tape together with shock dampers (4x)
  - . detach suspension springs

## MOUNTING CABINET

1. Place bottom cover and:-
  - . fix suspension springs
  - . place dampers (use some alcohol for easy fixation to spindles), take care that tape does not cover screw holes for mounting top cover
  - . mount DIN socket PCB, position wires between PCB and bracket (not in magazine room)
2. Mount front panel by:-
  - . positioning bottom
  - . pushing bottom cover at top side
  - . pushing front over bottom cover
3. Mount top cover from left to right (be careful for DIN socket) and fix screws (start with front side, than rear side)

## 2 DISASSEMBLY HINTS (when Cabinet is removed)

### 2.1 Replacing Elevator motor

1. Loosen main PCB (4 screws) and disconnect CP801 (Mag. switch)  
(no need to disconnect CP802 and FCP602)
2. Unscrew loading motor

NOTE: When fixing motor again use loctite to secure screws.

### 2.2 Replacing Loading motor

1. Remove mecha panel C99 (front with eject)
2. Loosen top chassis C1 (5 screws) and disconnect CP801 (Magazine switch)

NOTE: Elevator must be in top position

3. Remove plastic rings on gears (use new rings when mounting back again)
4. Remove gears
5. Remove loading motor (2 screws)

NOTE: When fixing motor again use loctite to secure screws.  
When placing top chassis be careful for disc count sensor.

### 2.3 Replacing Pick-up

1. Loosen CD PCB (to make pick-up accessible):-
  - . Unsolder CP906 (switch PCB connector)
  - . Disconnect CS904, FPC603, CS902, CS901 and CS905
  - . Remove 3 screws (one screw is placed beneath flex foil)
2. Remove slide plate C112 (2 screws)
3. Remove 2 right side screws from shafts C114
4. Loosen pick-up flex foils from C101 (drive housing part)
5. Replace pick-up unit

NOTE: When placing new pick-up take care for proper routing of the flex foils.

### 2.4 Replacing Feed motor

1. Loosen CD PCB (see removing pick-up)
2. Remove slide plate C112 (2 screws)
3. Remove screw fastening feed motor bracket
4. Remove belt and screw shaft assy
5. Remove feed motor (loosen 2 screws)



## 2.5 Replacing Disc motor assembly

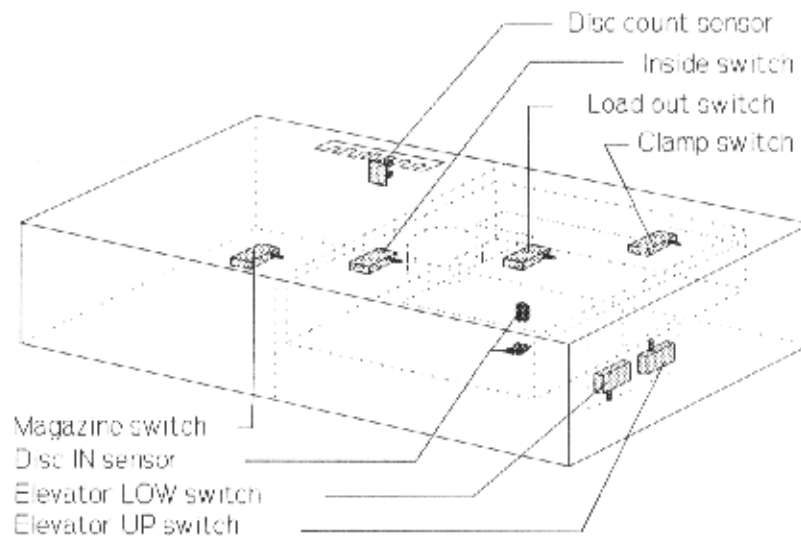
1. Close solder bridge of pick-up on flex foil to protect pick-up
2. Remove CD PCB (see removing pick-up) and desolder disc motor
3. Remove complete CDM (3 screws)
4. Remove from CDM the pick-up assy + shafts (4 screws)
5. Remove feed motor + shaft screw assy + belt and inside switch
6. Remove disc brake plate (C119) and lever for disc brake plate

**NOTE:** When mounting CDM back again:-

- . take care locking pins are engaging correct holes.
- . disc brake bracket must be mounted beneath bracket.
- . take care for proper routing of pick-up flex foils
- . do not forget to remove short circuit of laser

## 2.6 Accessibility of Sensors

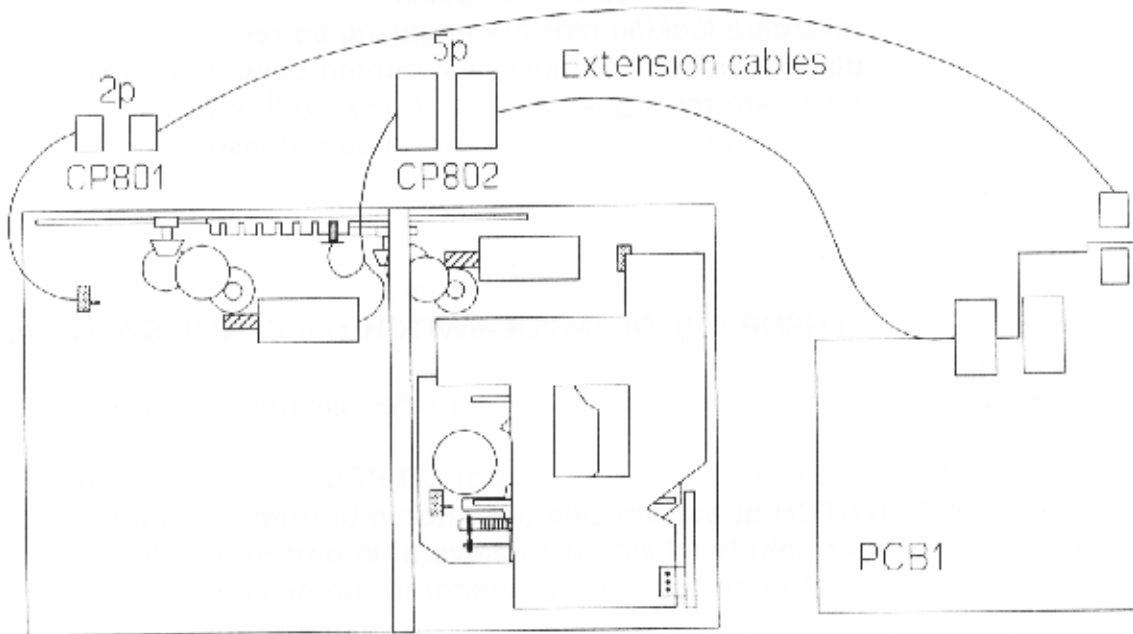
- . DISC COUNT SENSOR (D910), INSIDE SWITCH and CLAMP SWITCH at top side;
- . DISC IN Phototransistor (Q901) at bottom side (elevator in bottom position);
- . DISC IN Led (D901) at component side of CD PCB (loosen CD PCB);
- . LOAD OUT SWITCH at bottom side (elevator in bottom position);
- . LOW SWITCH at right-hand side with elevator in bottom position;
- . UP SWITCH at right-hand side with elevator in top position;
- . MAGAZINE SWITCH at bottom side.



**Figure 1** Position of sensors and switches

### 3 MAIN PCB CHECK

To check and measure component side of Main PCB (PCB1) extension cables should be used to extend connections of magazine switch and disc counter/elevator motor to the main PCB.



**NOTE:-**

When mounting PCB1 again route flex foil FPC602 underneath bracket C11

## 4 WARNINGS

- When connecting CD PCB to Main PCB check flat cable is beneath bracket
- To prevent damage to pick-up close solder bridge on CD PCB when working on CD drive (Laser is short circuited).

### NOTE:-

- Do not forget to remove solder bridge after repair.
- Pick-ups are supplied with closed solder bridge on Flexible foil.
- Changer operates without cover. However do not expose to bright light. CDs will not start and play (cover CDM part with sheet of paper).
- Always deliver the (repaired) set with mounted transport screws. Service code for transport screw is 4822 502 21556.

## 5 SERVICE HINTS

### 5.1 Before replacing Pick-up

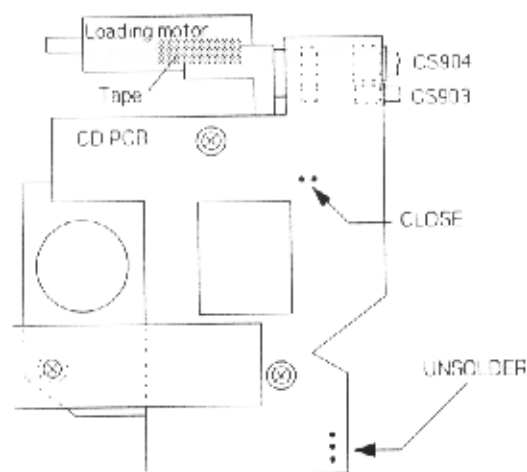
Before replacing PICK-UP:-

- . check disc on damages and dirt
- . check EYE pattern  
In normal condition eye pattern (on RF testpin) should be clear and 3.8 volts peak-to-peak.  
NOTE:- do not touch pick-up and flex cable (very susceptible to touching, this influences the measurements)
- . check laser output  
In normal operating condition current through R652 = 47mA  
(= 0.705 volts across R652)
- . check E-F balance
- . clean lens, check EYE pattern again

### 5.2 Cleaning Lens

To clean lens demount CDM + CD pcb:-

1. Close solder bridge of Pick-up
2. Unsolder switch PCB
3. Loosen flex foil on loading motor
4. Remove 3 screws
5. Loosen connectors CS904 and CS903 (flex)



- NOTE:-
- When mounting CDM + CD PCB again:-
    - . Remove SHORT Circuit of pick-up
    - . Disc brake must be placed below bracket

### 5.3 Skipping Magazine check

When inserting magazine the duration of the magazine check is approx. 40 secs.

This magazine check can be skipped by inserting magazine and immediately pressing eject. The head unit must be switched OFF. In this condition the first available disc is loaded.

### 5.4 Checking Elevator Mechanism

- . connect power supply
- . press EJECT

If CDM goes DOWN and UP elevator mechanism functions properly!

### 5.5 Emergency Eject

When the mechanism is defective and magazine is stucked in the set, this magazine can be released by the emergency eject, accessible at the bottom side.

NOTE: Check whether a CD is left in the mechanism and perform disc unloading by hand when necessary.

## 6 TROUBLE SHOOTING

### 6.1 General

| <u>Possible Symptom</u>      | <u>Possible cause</u>   |
|------------------------------|---|
| • Does not play CDs          | . Dirty lens  |
| • ERROR on display           | . CDs wrongly inserted  |
| • Shock sensitive            | . Wrong shock absorption position (position of suspension springs), check angle of mounting<br>. Transport screws not removed |
| • Intermittent play          | . Scratched or dirty disc   |
| • No power supply to changer | . Blown fuse in head unit<br>. Improper connections   |

### 6.2 Electronic Circuits

|                     |   |
|---------------------|---|
| • Power Supply      | . check B.up (+14V)<br>. check IC801 pins 57, 58, 30<br>. check IC801 pin 61 (power)<br>. check IC801 pin 7 (reset)<br>. check Q801, Q802<br>. check Q550 and IC550<br>. check IC502 pin 3    |
| • Mechanism control |   |
| <i>Elevator</i>     | . check magazine switch<br>. check up / low switch<br>. check disc count sensor<br>. check elevator motor<br>. check power supply<br>. check IC801 pins 3, 24, 25<br>. check IC950 pins 3, 14 |
| <i>Loading</i>      | . check loading motor<br>. check clamp switch<br>. check load out switch<br>. check disc in sensor<br>. check IC801 pins 1, 22, 23<br>. check IC950 pins 6, 11                                |

- **Laser Supply**

  - . check voltage IC650 pin 74, 75
  - . check Q651 (laser driver)
  - . check Q652 (laser switch)
  - . check voltage Q801 pin 59
  - . check pick-up
  
- **Focus Search**

  - . check voltage IC601 pin 15, 67, 68, 69
  - . check voltage IC650 pin 22
  - . check voltage IC651 pin 3, 4
  - . check CS602 pins 16, 19
  - . check pick-up
  
- **Disc Motor**

  - . check IC601 pins 53, 54
  - . check IC650 pin 31
  - . check IC651 pins 7, 8
  - . check CS602 pins 20, 21
  - . check disc motor
  
- **Tracking servo**

  - . check voltage of testpin TE
  - . check EF balance SVR651
  - . check IC650 voltage pin 21
  - . check IC651 voltage pins 5, 6
  - . check CS602 pins 17, 18
  - . check pick-up
  
- **Track Search**

  - . check IC601 pins 63, 64
  - . check IC650 pins 18, 19
  - . check IC601 pins 46..51  
(communication lines with IC801)
  
- **Feed Motor**

  - . check inside switch
  - . check CS602 pin 25
  - . check IC601 pins 57, 58
  - . check IC650 pin 33
  - . check IC651 pins 9, 10
  - . check CS602 pins 22, 23
  - . check feed motor and feed mechanism
  
- **Audio circuit**

  - . check eye pattern testpin RF
  - . check voltage Q700
  - . check IC701 pin 1 and IC702 pin 7
  - . check Q701, 702, 703 (mute)
  - . check CP501 pins 6, 7, 8
  
- **Head Unit control**

  - . check head unit
  - . check voltage CP501 pin 3, 4
  - . check Q510
  - . check IC851 pin 8, 9

### 6.3 Relation between Errors and Sensors/Switches

| $\mu$ C (IC801)<br>Pin nbr.-name | Sensor<br>Status  | ERROR Status   |
|----------------------------------|---|--|
| 1-DISC IN                        | <i>Detect sensor for presence/absence disc (L = presence)</i> |  |
|                                  | not on (L)  | Disc unload → load → unload → load → stop  |
|                                  | not off (H)   | 'No disc' display  |
| 2-CLAMP                          | <i>Detect switch for Loading complete</i>                     |  |
|                                  | not on (H)  | Next disc load → unload → load → unload → stop   |
|                                  | not off (L)   | Disc unload → ELV down → ELV up → ELV down → stop at no. 6 position (ex. disc change 1 → 2)  |
| 3-DISC COUNT                     | <i>Detect sensor for Elevator position</i>                    |  |
|                                  | not on  | Disc select up:-<br>ELV down → mag. eject → ELV up → ELV down → stop   |
|                                  | not off   | Disc select down:-<br>ELV up → ELV down → ELV up → stop  |
| 6-MAG. SW.                       | <i>Detect switch for Magazine in</i>                          |  |
|                                  | not on (H)  | Not loading when magazine inserted   |
|                                  | not off (L)   | Magazine eject → ELV up → ELV down → stop (only eject mode);<br>No magazine, but disc check starts and 'no disc' condition occurs. |
| 13-LOAD OUT                      | <i>Detect switch for Unloading complete</i>                   |  |
|                                  | not on (H)  | Disc unload → load → unload → load → stop  |
|                                  | not off (L)   | Stop at loading complete position  |
| 62-INSIDE SW.                    | <i>Detect switch for Inner track position</i>                 |  |
|                                  | not on (H)  | Error detection at disc change   |
|                                  | not off (L)   |  |
| 63-LOW SW.                       | <i>Detect switch for Elevator down position</i>               |  |
|                                  | not on (H)  | ELV down → mag. eject → ELV up → ELV down → stop   |
|                                  | not off (L)   | ELV down → mag. eject → ELV up → ELV down → stop (ex. disc change 1 → 2)<br>Disc no. 2 plays; if disc select, ELV up → stop        |
| 64-UP SW.                        | <i>Detect switch for Elevator up position</i>                 |  |
|                                  | not on (H)  | Mag. eject → ELV up → ELV down → ELV up → stop   |
|                                  | not off (L)   | Disc unload → ELV up → ELV down → ELV up → stop<br>Magazine eject → stop (eject mode)  |

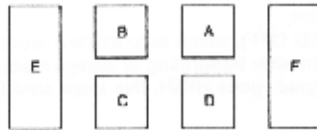


## 6.4 Functional Principle and Description

\*Pin No. is for IC650.

### 1. RF Amplifier (Eye pattern output)

This inputs Photodiode output current of light pickup (A+C) on 78pin, and (B+D) on 79pin. Photodiode output current is current-to-voltage converted, and then output on RFSUM Amplifier output 72pin. A filter is constituted in RFSUM Amplifier, and the output generates RF signal (eye pattern).



A, B, C, D : 4 divided photo diode  
E, F : tracking error photo diode

Fig. 1 PHOTO DIODE

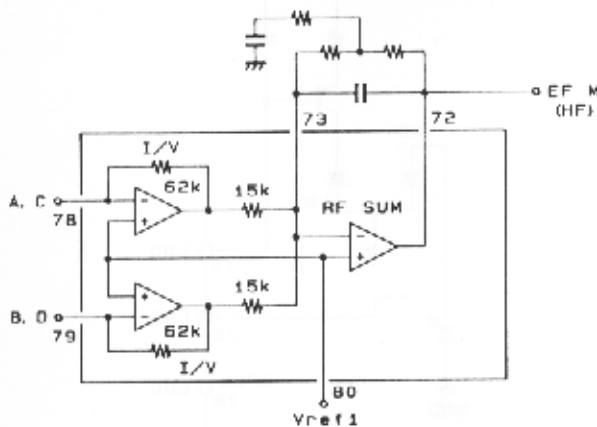


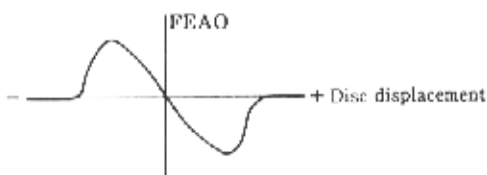
Fig. 2 AMP

### 2. Focus Servocontroller

Focus distance can be judged by detecting luminance difference between (A+C) and (B+D) by FE Amplifier, and the focus lens can be always kept in-focus by driving focus coil.

#### 2 - 1 FE Amplifier

This inputs Light pickup output (A+C) on 78pin, (B+D) on 79pin. Difference between current-to-voltage converted (A+C) and (B+D), which is (B+D)-(A+C), is output on 26pin



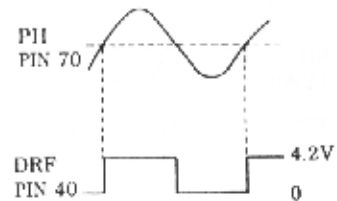
#### 2 - 2 DRF, FZD, FOCUS, FD-

DRF, FZD, FOCUS are the circuits for focus detection.

#### 2 - 2 - 1 DRF

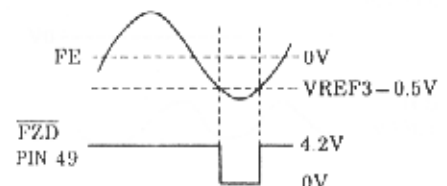
When the lens is in-focus, this goes HIGH.

When +5V power supply PH(70pin)VREF1 1.04V, this goes HIGH.



#### 2 - 2 - 2 FZD

This is the circuit for detecting S-curve, which is focus deviation signal (FE Amplifier output). When FE Amplifier output is below -0.6V, this goes LOW.



#### 2 - 2 - 3 FOCUS

When 50pin goes HIGH, Focus Servocontroller turns OFF. This is used, for example, in case of focus introduction.

#### 2 - 2 - 4 FOCUS INTRODUCTION

First DSP FST goes LOW, and the objective lens is lowered, and then as charged by FOCUS, the lens is gradually raised. When the lens reaches the in-focus position, S-curve, which is focus error signal, appears on FE Amplifier output, and when this output goes below -0.6V, FZD goes LOW. At the same time the output goes LOW, FOCUS is reset, and FOCUS Servocontroller turns ON, and then, if DRF is HIGH, Focus Servocontroller operation continues.

#### FOCUS INTRODUCTION TIMING

