

harman/kardon

# Model FL8350

5 Disc Compact Disc Changer

## SERVICE MANUAL



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## LASER BEAM SAFETY PRECAUTIONS

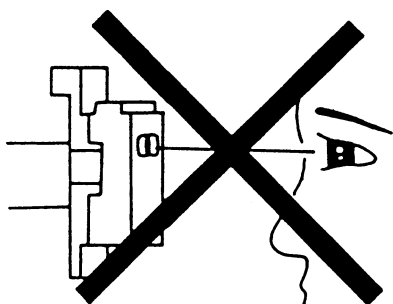
### CLASS 1 LASER PRODUCT



#### CAUTION

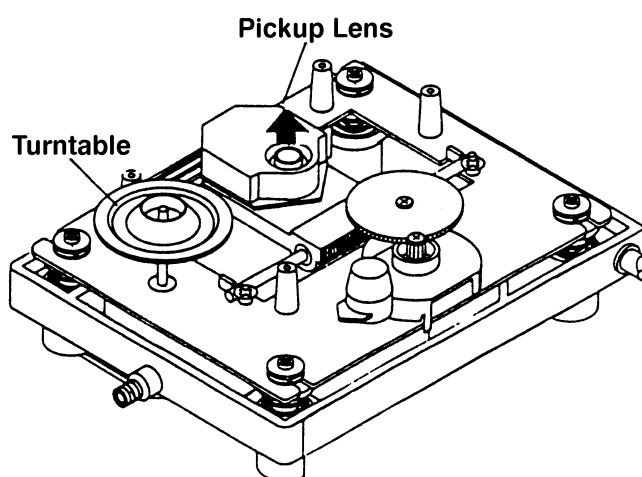
**Invisible laser radiation when the unit is open.  
Do not stare into beam.**

CAUTION: USE OF ANY CONTROLS, ADJUSTMENT, OR PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.



Do not look directly at the laser beam coming from the pickup or allow it to strike against your skin.

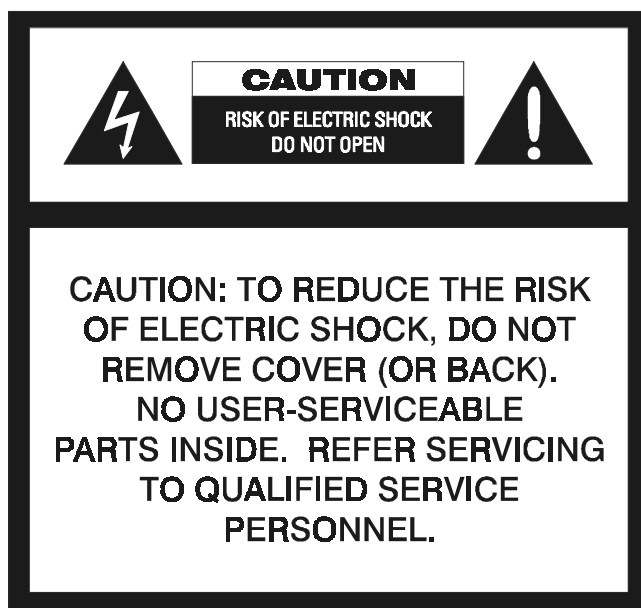
This compact disc player uses a pickup that emits a laser beam. The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 1 foot away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.



#### CAUTION:

Using controls and adjustment, or doing procedures other than those specified herein, may result in hazardous radiation exposure.

## SAFETY PRECAUTIONS



### WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

**Caution:** To prevent electric shock do not use this (polarized) plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted to prevent blade exposure.

**Attention:** Pour prévenir les chocs électriques ne pas utiliser cette fiche polarisée avec un prolongateur, une prise de courant ou une autre sortie de courant, sauf si les lames peuvent être insérées à fond sans en laisser aucune partie à découvert.

## HANDLING LASER PICKUP

The laser diode in the optical system of this player can be damaged by electrostatic discharge from your clothes or your body. Proper electrostatic grounding for service personal is required during servicing.

## BEFORE REPAIRING THE COMPACT DISC PLAYER

### Preparation

Human Body Grounding:

Many of the components used in this compact disc player, including the laser pickup, are sensitive to electrostatic discharge. Service personal should be grounded with an electrostatic armband (1 Mohm).

**Caution:**

Static charge on clothing does not escape through a body grounding wrist band.

Be careful not to contact the pickup or electrical components with your clothing.

Workbench and Tool Grounding:

A properly-grounded electroconductive plate (1Mohm) or metal sheet should be fitted to the workbench surface. Tools and instruments (such as soldering irons and scopes) should be grounded to prevent AC leakage.

Incorrect



Fig. 1

Correct

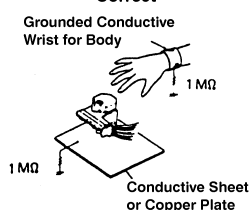


Fig. 2

**Note:** Laser diodes are so susceptible to damage from static electricity that, even if a static discharge does not ruin a diode, it can shorten its life or cause it to work improperly.

## Specification and Features

### Specifications

|                       |                                                    |
|-----------------------|----------------------------------------------------|
| Power Requirement     | AC 120V / 60Hz, 230V / 50Hz                        |
| AC Cord               | H05VVH2-F (CE Versions);<br>SPT-2 (NRTL/C Version) |
| AC Plug               | VDE (CE Version) ULp (NRTL/C Version)              |
| Power Consumption     | 20W (Rated)                                        |
| Dimension (H x W x D) | 5 1/8 x 17 5/16 x 15 3/16 (130 x 439 x 86mm)       |
| Weight                | 16.7 lbs (7.6kg)                                   |

### DATA SPECIFICATION OF FL8350

#### FL8350 Test Disc Playability

| Item                  | Test Disc | Typical    | Limits     |
|-----------------------|-----------|------------|------------|
| 1. Black Dot          | TCD725A   | 1000uM     | 800uM      |
| 2. Interruption       | TCD725A   | 1000uM     | 800uM      |
| 3. Finger Print       | TCD725A   | 75uM       | 65uM       |
| 4. Vertical Deviation | MCD151    | 1.0mm      | 0.92mm     |
| 5. Eccentricity       | TCD712    | 140uM      | 140uM      |
| 6. Long Access Time   | YEDS18    | 10SEC      | 15SEC      |
| 7. 8cm DISC           | TCD783    | LAST TRACK | LAST TRACK |

#### FL8350 Audio Specification

| Item                                               | Typical               | Limits              |
|----------------------------------------------------|-----------------------|---------------------|
| 1. Output Level                                    | 1.9V                  | 2V/1.75V            |
| 2. Level Balance                                   | 0dB                   | +/-0.5dB            |
| 3. THD(20Hz ,100Hz ,1Kz<br>20Kz)<br>(30KHz Filter) | 0.02%                 | 0.05%               |
| 4. THD (10Kz)<br>(30KHz Filter)                    | 0.04%                 | 0.07%               |
| 5. S/N Ratio(A weighting)                          | 98dB                  | 94dB                |
| 5. Dynamic Range(A<br>weighting)                   | 96dB                  | 92dB                |
| 6. Channel Separation<br>(1KHz)                    | 90dB                  | 85dB                |
| 7. Channel Separation<br>(10KHz)                   | 75dB                  | 70dB                |
| 8a. De-emphasis(5KHz)                              | -4.53dB               | -4.53dB +/-1dB      |
| 8b. De-Emphasis(16KHz)                             | -9.04dB               | -9.04dB +/-1dB      |
| 9. Phones Output Level                             | 1.5Vp-p               | 1Vp-p +/-1dB        |
| 10. Frequency Response                             | 20Hz-20KHz : 0/-0.5dB | 20Hz-20KHz : 0/-1dB |

## FL8350 Special Item

1. VFD : Samsung SVA-08MM11
2. DAC Type : Philips TDA1305T
3. Remote Code : Harman Kardon Remote Code
4. Compliance : EMC+LVD, FCC+NRTL/C, DHHS,
5. Input Voltage : 230V, 117/230V, 117V
6. AC on/off Power switch with dual colors LED.

## Features

|                   |                                                         |
|-------------------|---------------------------------------------------------|
| D/A converter     | DAC, single-bit / multi-bit dual converters             |
| Digital Output    | Coaxial digital output (SPDIF)                          |
| Remote Connection | Remote control jacks for connecting to other components |
| Optical pick up   | 3 beam laser                                            |
| Disc Capacity     | 5                                                       |

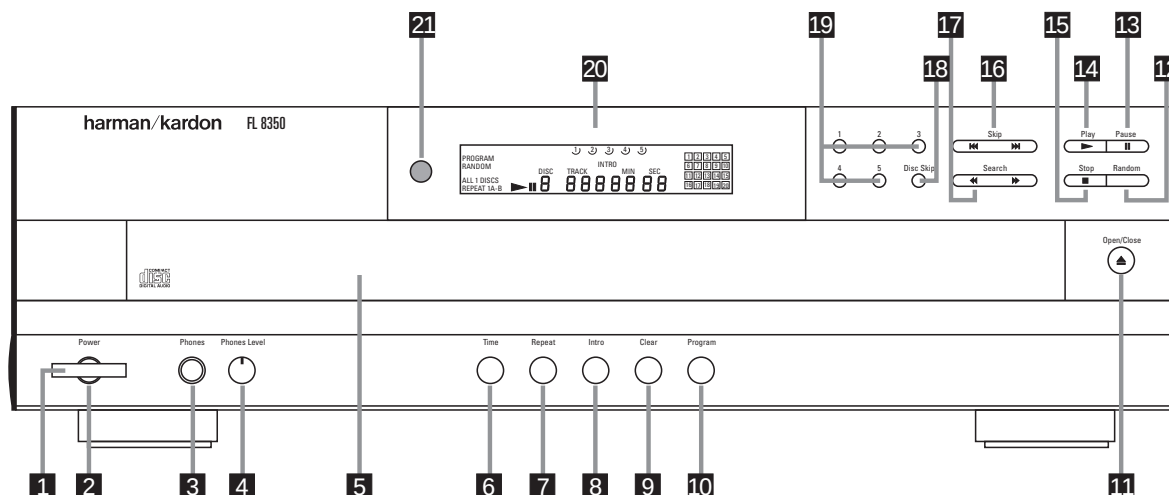
## Controls and Switches

|                  |          |
|------------------|----------|
| Power Standby    | Push     |
| Headphone Volume | Rotary   |
| Open / Close     | Tact     |
| Play             | Tact     |
| Pause            | Tact     |
| Stop             | Tact     |
| Skip +/-         | Tact x 2 |
| Search +/-       | Tact x 2 |
| Random           | Tact     |
| Time             | Tact     |
| Intro            | Tact     |
| Repeat           | Tact     |
| Program          | Tact     |
| Clear            | Tact     |
| Disc Skip        | Tact     |
| Disc Select 1~5  | Tact x 5 |

## Remote Control Feature

|           |                                                                                                                                              |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Batteries | AA (UM-3) x 2                                                                                                                                |
| Range     | Approx. 7m / 20 feet                                                                                                                         |
| Control   | Standby, Disc Skip, Disc Select 1~5, Numeric 1~10, +10, Search +/-, Skip +/-, Play, Pause, Stop, Repeat, Program, Clear, Time, Intro, Random |

## Front Panel Controls



**1 Power Switch:** Press this switch to change the FL8350 from STANDBY to ON. When the unit is first connected to AC power, the **Status Mode Indicator** **2** will turn Amber (STANDBY mode). Press this switch to turn the unit ON; indicator will turn Green and the **Information Display** **20** will illuminate. Press the switch again to turn the unit off, in STANDBY mode. When the FL8350 is connected to a switched AC outlet, such as those found on the back of many audio products, when power is applied it will return to whatever state it was left in previously, whether ON or STANDBY. In this case, when always left ON, further use of the power switch is not needed.

**2 Status Mode Indicator:** When the FL8350 is in the ON mode, this indicator will glow green. When the unit is off, the indicator will glow amber, indicating that the unit is still connected to the AC mains supply.

**3 Headphones Jack:** Connect a set of standard headphones to this jack for private listening.

**4 Headphones Level:** Turn this knob to increase or decrease the volume level for headphones connected to the FL8350's **Headphones Jack** **3**. Note that changing this level will not change the sound level for the unit's main output, as that remains constant.

**5 CD Drawer:** This drawer holds the discs that will be played. Press the **Open/ Close** button **11** **1** to open the drawer so that discs may be inserted.

**6 Time Button:** In normal operation, this display will show the running time of the track being played. Press the button once to check the time remaining for the track in play. Press

this button again to view the total play time remaining for the disc in play.

**7 Repeat Button:** Press this button once to constantly repeat the track currently being played. Press it a second time to repeat the entire disc.

**8 Intro Button:** Press this button to put the FL8350 in the Intro Scan mode. When you press the button, the unit will play the first 10 seconds of each track on the disc, and then move to the next track. Press the button again to defeat the function and continue full play of the current track.

**9 Clear Button:** Press this button to remove tracks from a programmed sequence. Each press of the button will remove one track, starting with the last track programmed to play.

**10 Program Button:** This button is used to program the playback of a disc in a particular order.

**11 Open/ Close:** Press this button to open or close the disc drawer. DO NOT push the drawer to close it, or damage to the transport mechanism may result.

**12 Random Button:** Press this button to put a disc into play, and to have all of the tracks played in a random order.

**13 Pause Button:** Press this button once to momentarily pause a disc. When the button is pressed again, the disc will resume play at the point it was paused.

**14 Play Button:** Press this button to start the playback of a CD. If the CD drawer is open, pressing this button will automatically close the drawer.

**15 Stop Button:** Press this button to stop the disc currently being played.

**16 Skip Button:** Press either side of this button to move to the next track ►►, or to move back to the previous track ◀◀ on the disc being played.

**17 Search Button:** Press either side of this button to search forward ►► or backwards ◀◀ through a disc to locate a particular portion of the selection of the disc being played.

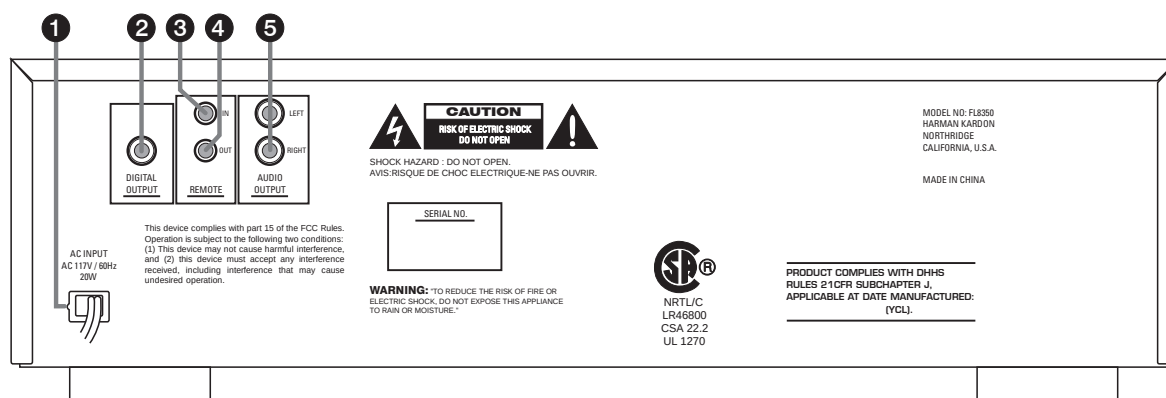
**18 Disc Skip Button:** Press this button to change to the next disc. If a disc position is empty, the FL8350 will automatically search for the next position that contains a disc.

**19 Disc Select Buttons:** Press one of these buttons to select the disc in a specific position in the CD drawer.

**20 Information Display:** This display provides details about the operation of the FL8350.

**21 Remote Sensor:** The sensor behind this window receives commands from the remote control. Keep this area clear if you wish to use the FL8350 with a remote control.

## Rear Panel Connections



### 1 AC Power Cord

Connect this plug to an AC outlet. If the outlet is switch is controlled, make certain that the switch is in the ON position.

### 2 Coaxial Digital Output

Connect this jack to the coaxial digital input of an external digital-to-analog converter for direct access to the digital signals of the FL8350. DO NOT connect this jack to the standard audio inputs of any device.

### 3 Remote Control Input

Connect the output of a remote infrared sensor or the remote control output of another compatible Harman Kardon product. This will enable the remote control system to operate even when the front panel **Remote Sensor** **21** is blocked. It will also allow use of the FL8350 with optional, external control systems.

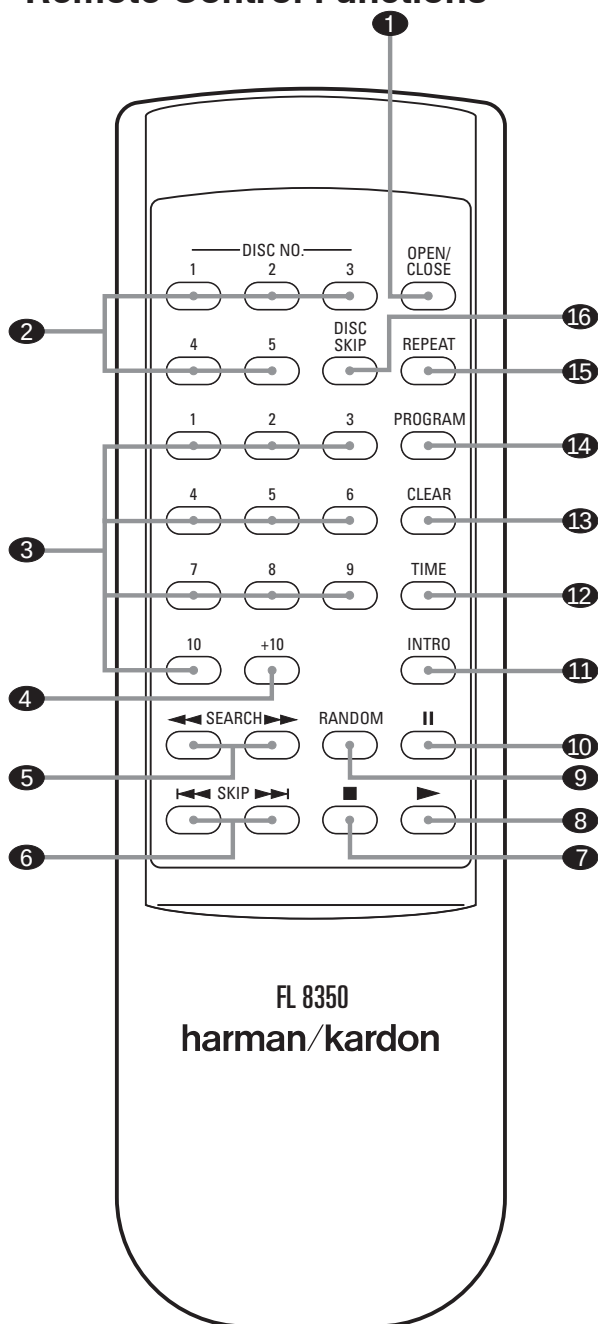
### 4 Remote Control Output

Connect this jack to the input of another compatible Harman Kardon remote controlled device to have the remote sensor on the FL8350 provide signals to other products.

### 5 Fixed Audio Outputs

Connect these jacks to the CD audio inputs of your receiver, surround processor or preamplifier.

## Remote Control Functions



- 1 Open/ Close Button:** Press this button to open or close the disc drawer. The drawer may also be closed by pressing the **Play** button **14** **8**. DO NOT push the drawer, as damage to the transport mechanism may result.
- 2 Disc Select Buttons:** Press one of these buttons to select the disc in a specific position in the CD drawer.
- 3 Numeric Buttons:** Press these buttons to select a specific track on a disc. The FL8350 will immediately search for the track and begin to play it. For tracks 1 through 10 on a disc, you need only press the desired number. For tracks 10 and above, press the **10+** button **4** to select the first digit of the track number, and then press the second digit from these numeric buttons. These buttons are also used to enter track numbers into the memory for pre-programmed play lists.
- 4 +10 Button:** Press this button to select the first digit of a track number above 10. Each press of the button increases the first digit one increment. Press it once to start accessing tracks 10 through 19 twice to start accessing tracks 20 through 29, and so forth. For example, to select track 22, press the **+10** button twice, and then press the **2** button **3**.
- 5 Search Buttons:** Press these buttons to search forward **▶▶** or backwards **◀◀** through a disc to locate a particular portion of the selection being played.
- 6 Skip Buttons:** Press one of these buttons to move to the next track **▶▶**, or to move back to the previous track **◀◀** on the disc being played.
- 7 Stop Button:** Press this button to stop the disc currently being played.
- 8 Play Button:** Press this button to start the playback of a CD. If the CD drawer is open, pressing this button will automatically close the drawer.
- 9 Random Button:** Press this button to put a disc into play, and to have all of the tracks played in a random order.
- 10 Pause Button:** Press this button once to momentarily stop a disc. When the button is pressed again, the disc will resume play at the point it was stopped.

- 11 Intro Button:** Press this button to put the FL8350 into the Intro Scan mode. When you press this button, the unit will play the first 15 seconds of each track on the disc, and then move to the next track. Press the button again to defeat the function and continue full play of the current track.
- 12 Time Button:** Press this button to select the time display. In normal operation, the display will show the running time of the track being played. Press the button once to check the time remaining for the track in play. Press the button a third time to view the total play time remaining for the disc in play.
- 13 Clear Button:** Press this button to remove tracks from a programmed sequence. Each press of the button will remove one track, starting with the last track programmed to play.
- 14 Program Button:** This button is used to program the playback of a disc in a particular order.
- 15 Repeat Button:** Press this button once to constantly repeat the track currently being played. Press it a second time to repeat the entire disc.
- 16 Disc Skip Button:** Press this button to change to the next disc. If a disc position is empty, the FL8350 will automatically search for the next position that contains a disc.



# Troubleshooting

FL8350

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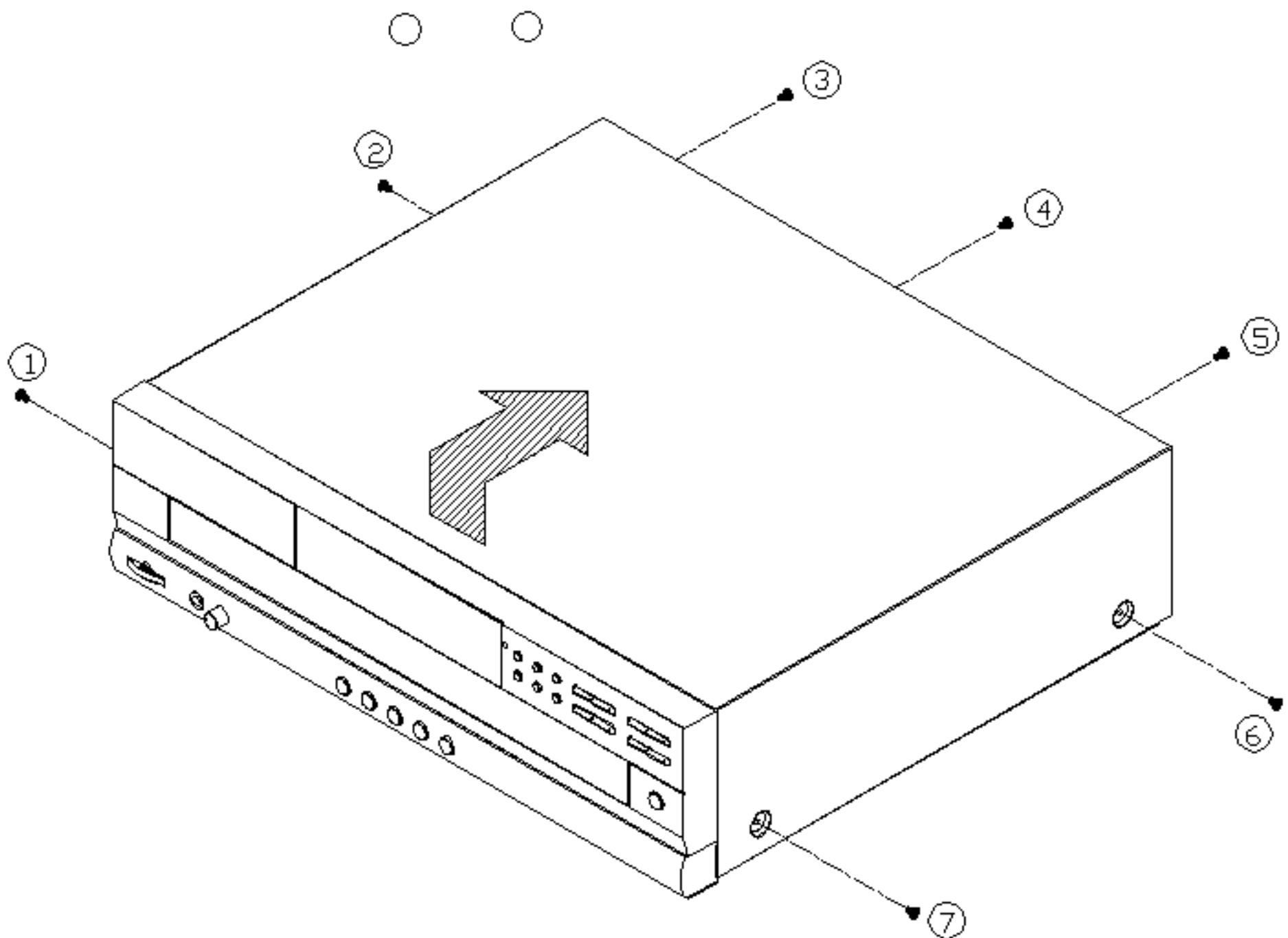
## Troubleshooting Guide

| <i>SYMPTOM</i>                               | <i>CAUSE</i>                                                                                                                     | <i>SOLUTION</i>                                                                                                                                                                                                                                                                      |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No lights on Front Panel                     | <ul style="list-style-type: none"><li>• No AC power</li></ul>                                                                    | <ul style="list-style-type: none"><li>• Make certain that the AC power cord is plugged into a live outlet.</li></ul>                                                                                                                                                                 |
| Remote does not appear to operate            | <ul style="list-style-type: none"><li>• Main Power Switch turned off</li><li>• Weak batteries</li><li>• Blocked sensor</li></ul> | <ul style="list-style-type: none"><li>• Turn on Main Power Switch.</li><li>• Install fresh batteries, observing polarity indications.</li><li>• Remove obstructions from the front panel sensor or connect a remote sensor to the <b>Remote In</b> jack on the rear panel.</li></ul> |
| Front panel lights, but CD does not play     | <ul style="list-style-type: none"><li>• Disc upside down</li><li>• Moisture inside unit</li></ul>                                | <ul style="list-style-type: none"><li>• Reload disc with label side facing up.</li><li>• Leave the unit turned ON for 30 minutes to allow moisture to evaporate.</li></ul>                                                                                                           |
| Play indicator lights, but no sound is heard | <ul style="list-style-type: none"><li>• Poor connections</li><li>• Wrong source selected</li></ul>                               | <ul style="list-style-type: none"><li>• Make certain connections are secure and made to the correct (e.g., <b>CD</b>) input.</li><li>• Select CD source on receiver or preamp.</li></ul>                                                                                             |
| Sound skips or stutters during play          | <ul style="list-style-type: none"><li>• Disc may be damaged</li><li>• Surface vibrations</li></ul>                               | <ul style="list-style-type: none"><li>• Try another disc.</li><li>• Isolate the unit from vibration by placing it on a firm surface or move it further away from speakers.</li></ul>                                                                                                 |
| Sound is continually distorted               | <ul style="list-style-type: none"><li>• Incorrect input</li></ul>                                                                | <ul style="list-style-type: none"><li>• Make certain that the FL8350 is connected to a line-level audio input, NOT a digital audio or phono input.</li></ul>                                                                                                                         |

# DISASSEMBLY INSTRUCTIONS

1. Removing the top cover.

1) Remove 7 screws ( 1 to 7 ) holding the top cover.

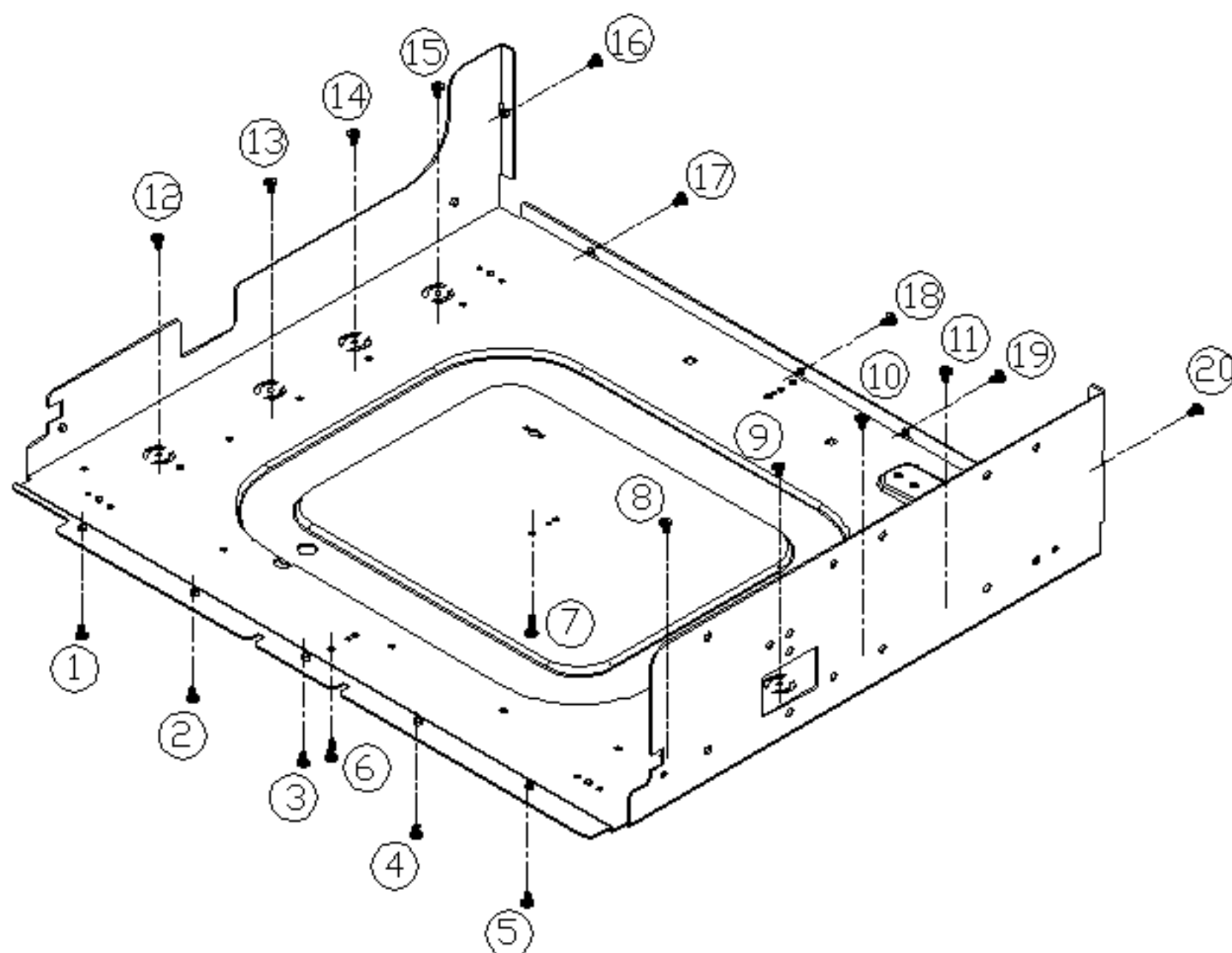


## 2. Removing the bottom cover.

1) Turn the set over.

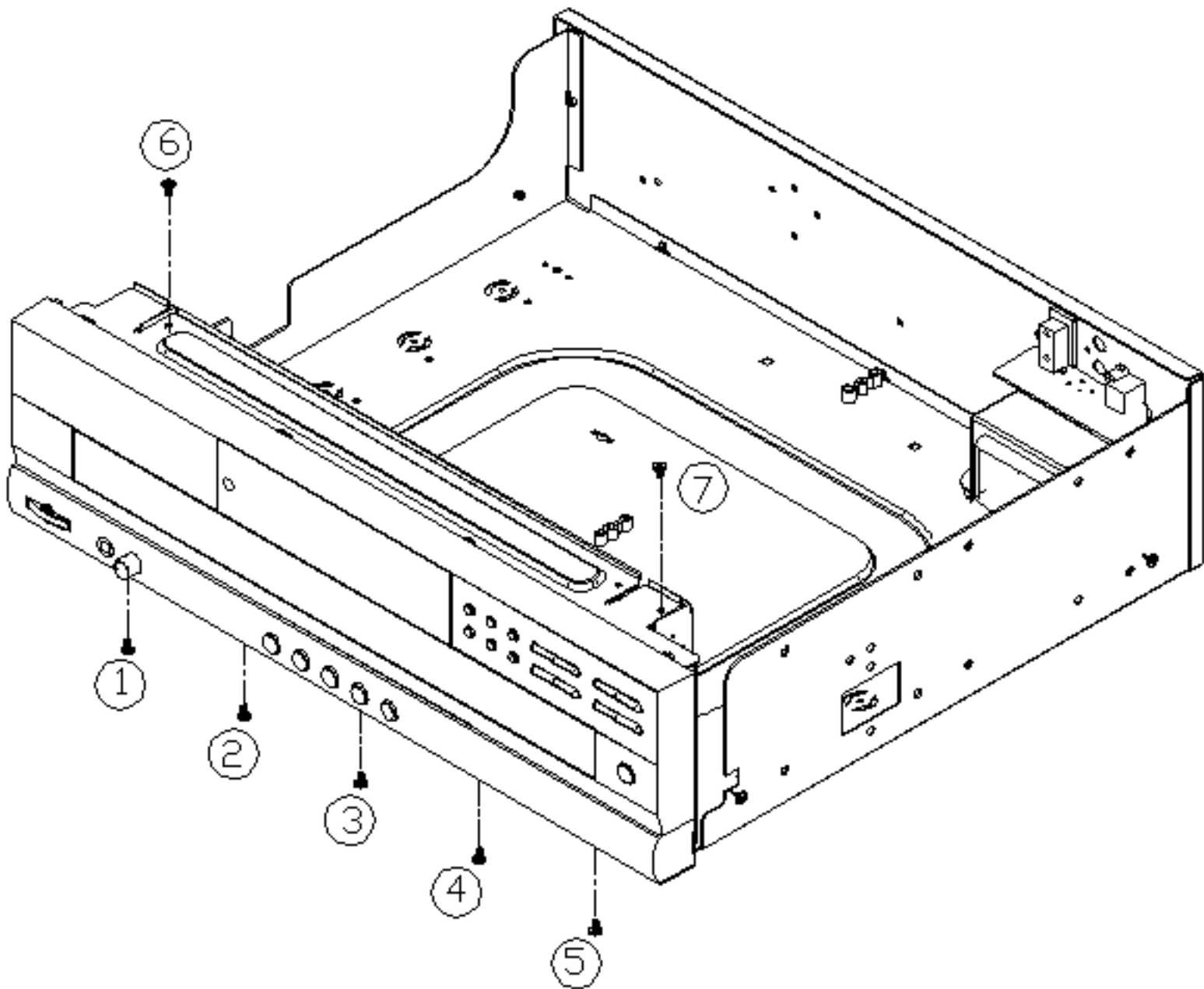
2) Remove 15 screws ( ① to ⑮ ) from the bottom chassis.

3) Remove 5 screws ( ⑯ to ⑳ ) from the back chassis.



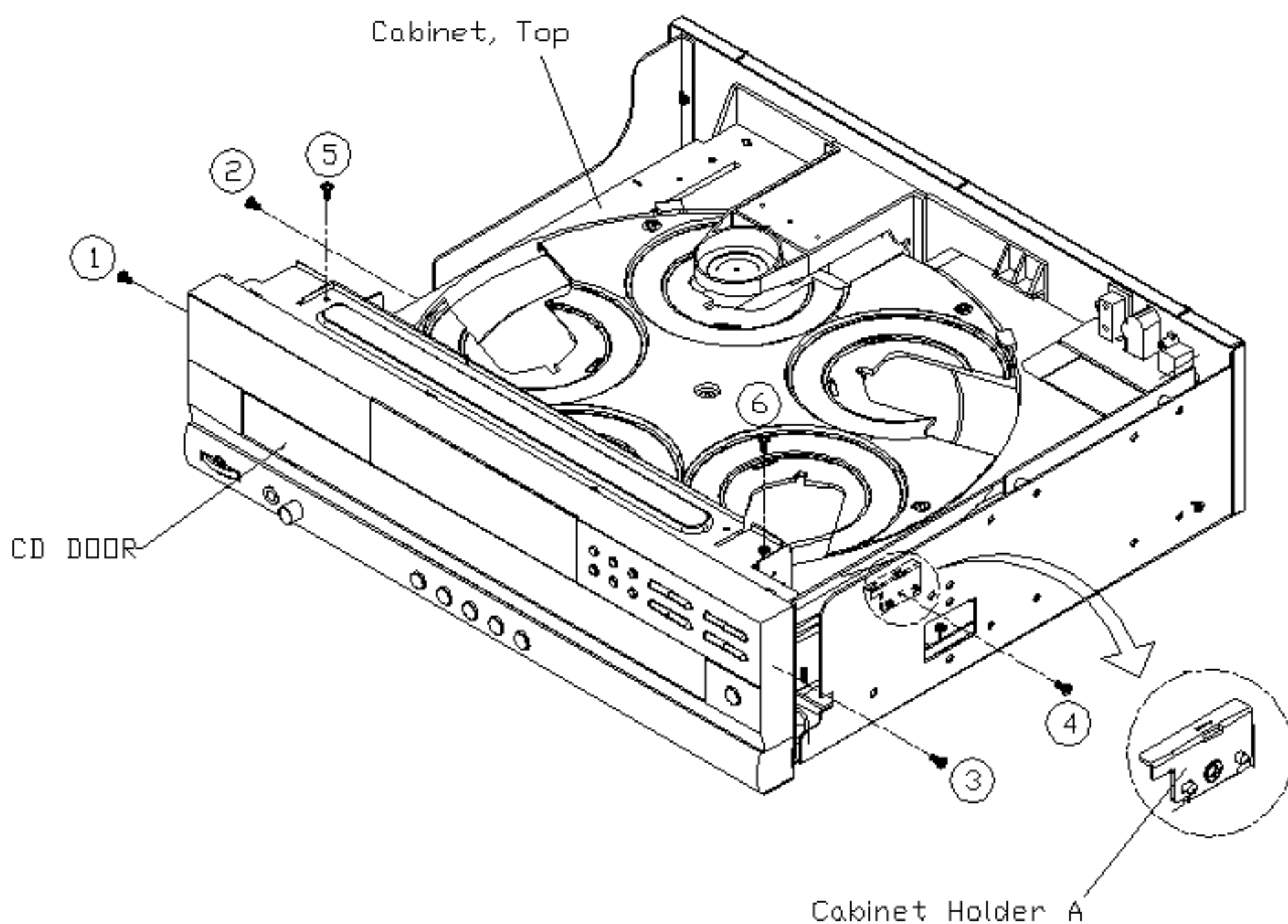
3. Removing the front panel.

- 1) Remove 5 screws ( ① to ⑤ ).
- 2) Remove 2 screws ( ⑥ to ⑦ ) from the metal of front panel.
- 3) Hold the front panel and pull it up.
- 4) Remove 2 connectors ( CN501 , CN502 ) from the phones board.



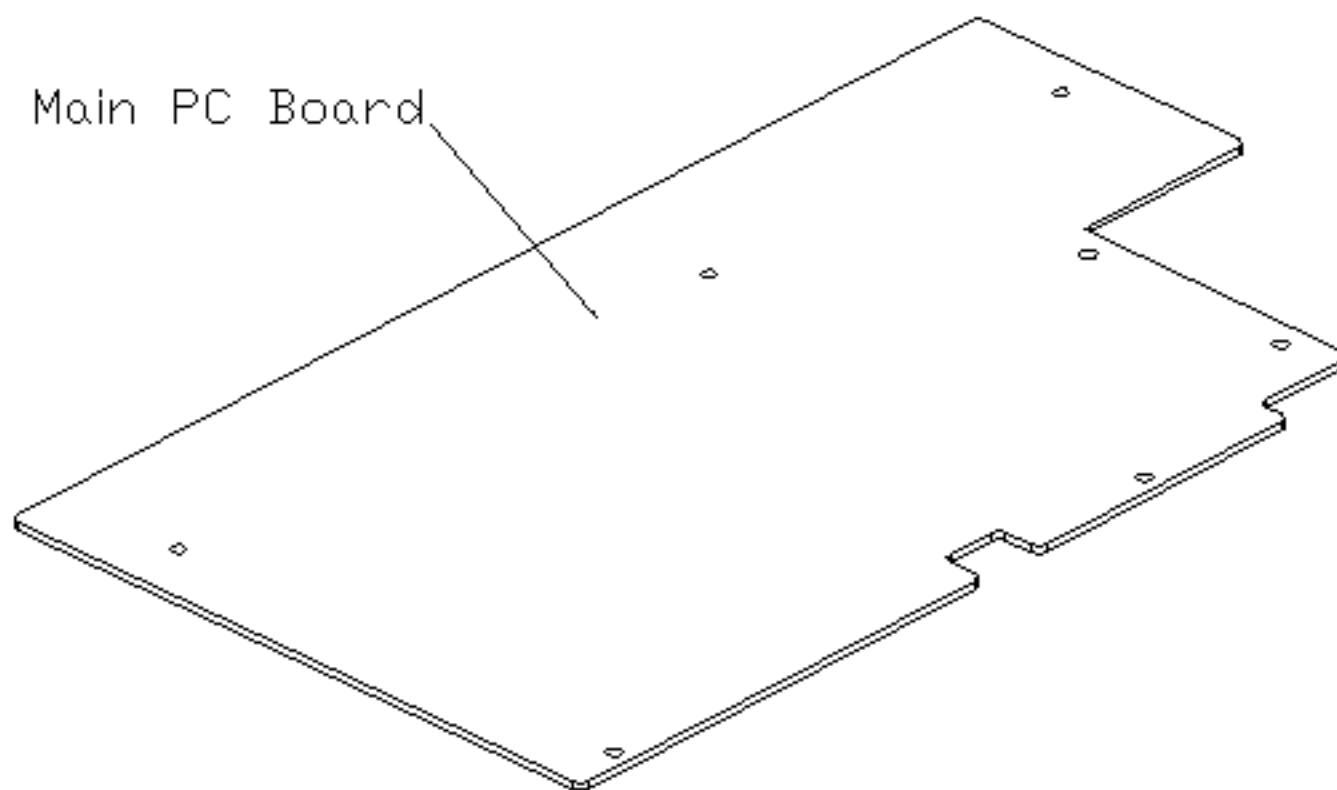
#### 4. Removing the loading table ( Cabinet,Top)

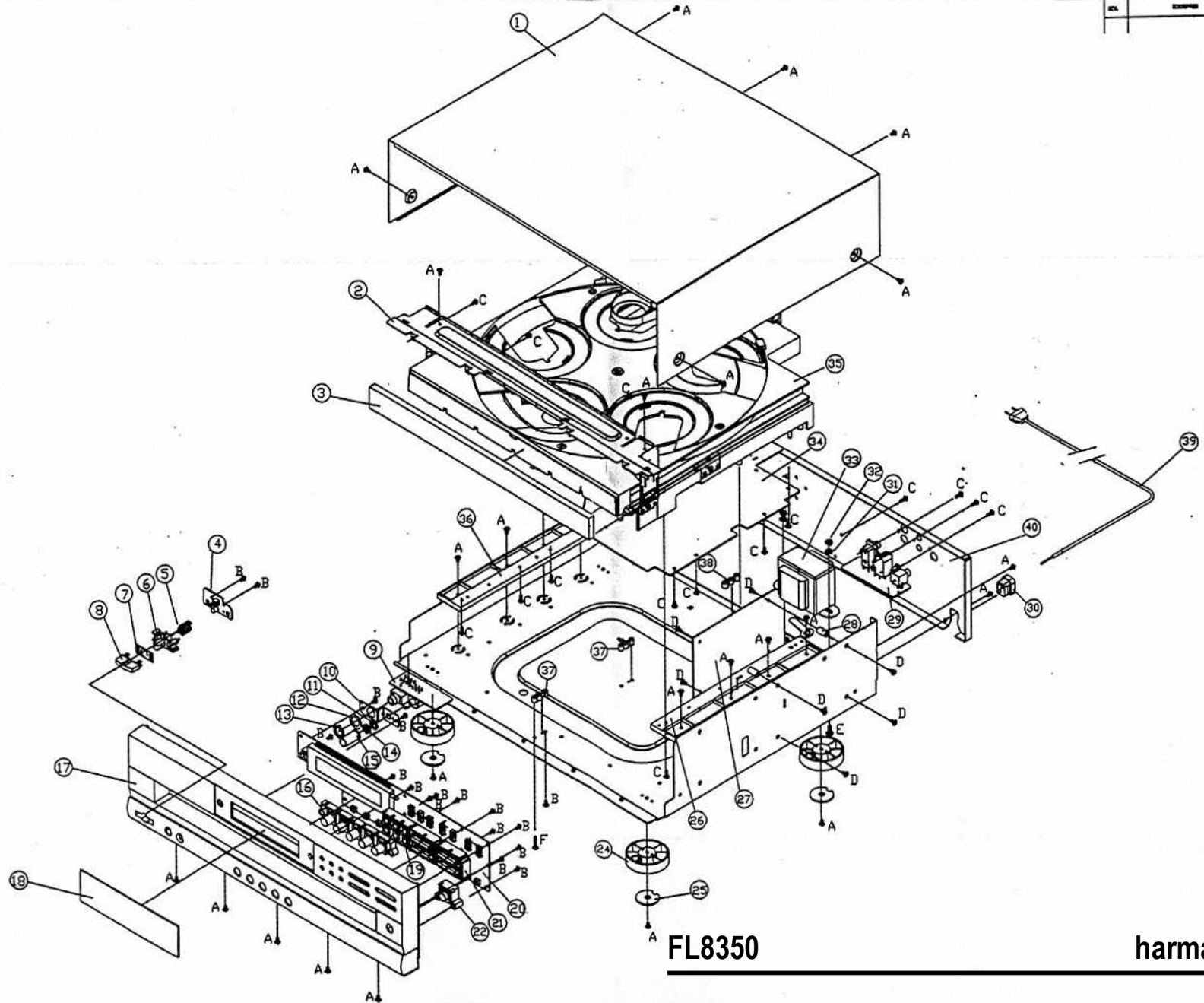
- 1) Remove 4 screws ( ① to ④ ) holding the Cabinet holder A & B.
- 2) Remove 2 screws ( ⑤ to ⑥ ) Holder the metal frame.
- 3) Remove the Cabinet Holder A and B.
- 4) Remove and hold the loading table up.
- 5) Disconnect the 6 pins wire connector from main PCB Assembly.



5. Removing the main board .

- 1) Remove all screws holding the main board from mechanism.
- 2) Disconnect all lead assembly.





FL8350

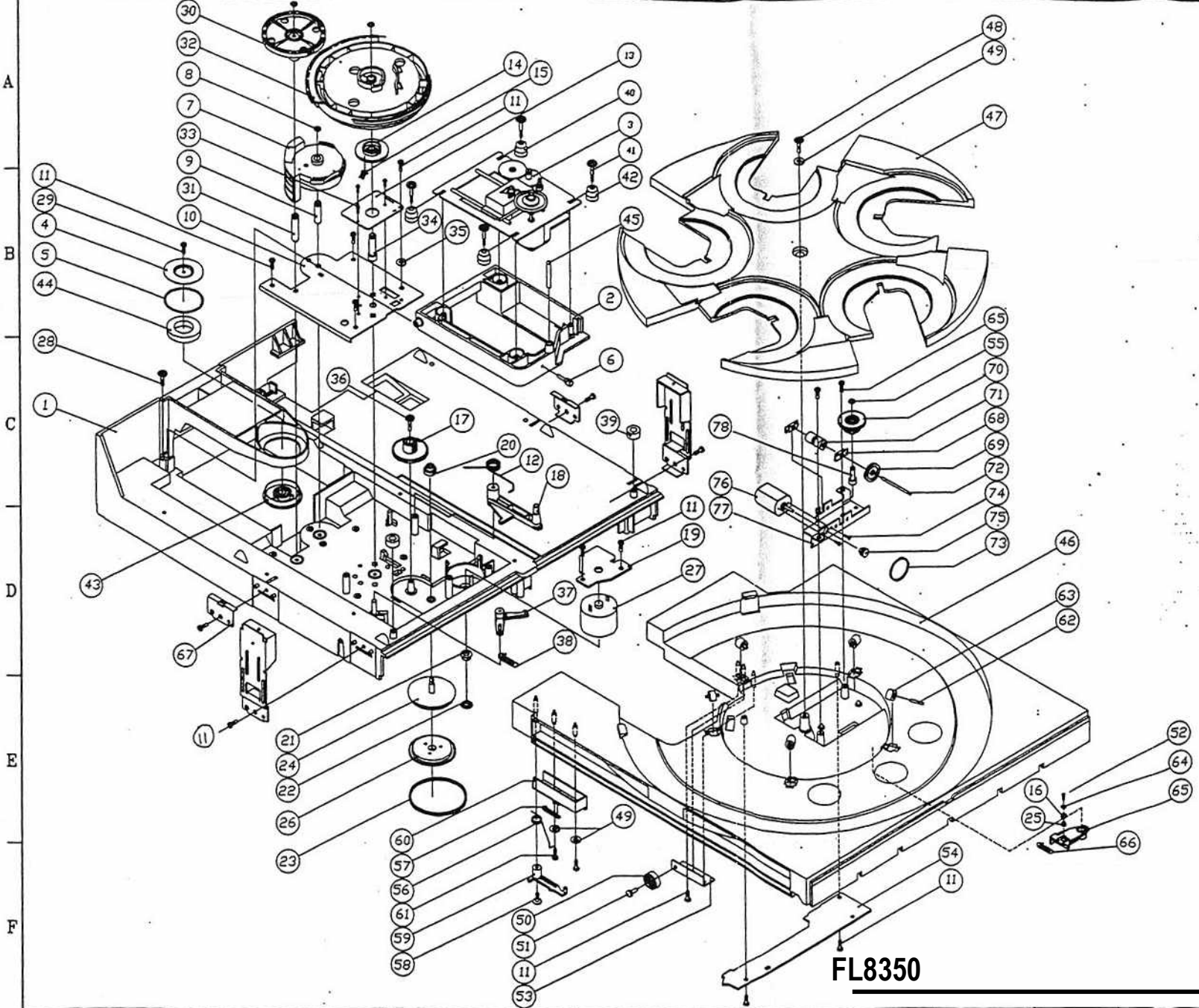
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# Model : FL8350 Exploded drawing List

Rev. A

| <u>Seq. No.</u> | <u>Parts No.</u>     | <u>Parts Name</u>               | <u>Material</u>      | <u>Qty.</u> |
|-----------------|----------------------|---------------------------------|----------------------|-------------|
| 1               | 6583-510002-000-XXXX | Top Cabinet, Painted            |                      | 1           |
| 2               | 6583-510004-000      | Bracket, Front Panel            | SECC 1.0t            | 1           |
| 3               | 6083-510002-000-XXXX | Door, CD, silkscreen            |                      | 1           |
| 4               |                      | PCB, Power, Assy                |                      | 1           |
| 5               | 6600-010293-000      | Spring, Power Switch            |                      | 1           |
| 6               | 6083-510008-000      | Lens, Power Knob                | Acrylic ,transparenc | 1           |
| 7               | 6083-510015-000      | Light Sheet, Black              |                      | 1           |
| 8               | 6083-510007-000-XXXX | Knob, Power , Painted           |                      | 1           |
| 10              | 6583-510006-000      | Bracket, Phones (MIC)           | SECC 0.8t            | 1           |
| 11              | 7107-212005-022      | Washer M7                       |                      | 1           |
| 12              | 7112-517506-022      | Washer M12                      |                      | 1           |
| 13              | 6600-120120-000      | Nuts M12                        |                      | 1           |
| 14              | 6600-120070-000      | Nuts M7                         |                      | 1           |
| 15              | 6083-510006-000-XXXX | Knob, VR , Painted              |                      | 1           |
| 16              | 6083-510005-000-XXXX | Knob, Program , Painted         |                      | 1           |
| 17              | 6083-510001-000-XXXX | FL8350 Front Panel silkscreened |                      | 1           |
| 18              | 6083-510003-000-XXXX | Lens, Diaplay , silkscreen      |                      | 1           |
| 19              | 6083-510004-000-XXXX | Knob, Disc, Painted             |                      | 1           |
| 20              |                      | Display PCB Assy                |                      | 1           |
| 21              | 6083-510010-000-XXXX | Knob, Play, Pianted             |                      | 1           |
| 22              | 6083-510009-000-XXXX | Knob, Open/Close, Painted       |                      | 1           |
| 23              | 6583-510001-000      | Bottom Cabinet                  | SECC 1.2t            | 1           |
| 24              | 6029-010012-000      | Foot                            |                      | 4           |
| 25              | 6600-070003-000      | Pad, Foot                       |                      | 4           |
| 26              | 6083-510014-000      | Bracket, 5CD-Side 2             | ABS, Black           | 1           |
| 27              |                      | CPU Broad Assy                  |                      | 1           |
| 28              | 6600-020010-000      | CD420L01 PCB Mount              |                      | 4           |
| 29              |                      | RCA PCB Assy                    |                      | 1           |
| 30              | 6600-180007-000      | Bush, AC 5RF-5B                 |                      | 1           |
| 31              | 6600-120040-000      | Nut M4                          |                      | 2           |
| 32              | 7104-010010-022      | Washer M4X10X1mm                |                      | 2           |
| 33              |                      | Transformer                     |                      | 1           |
| 34              |                      | Main PCB Assy                   |                      | 1           |
| 35              | 9600-505004-001      | 5CD Mechanism                   |                      | 1           |
| 36              | 6083-510013-000      | Bracket, 5CD-Side 1             | ABS, Black           | 1           |
| 37              | 6083-510011-000      | Stand, Front -5CD               | ABS, Black           | 2           |
| 38              | 6083-510012-000      | Stand, Rear -5CD                | ABS, Black           | 1           |
| 39              |                      | Power Cord                      |                      | 1           |
| 40              | 6583-510003-000-XXXX | Rear Cabinet, Silkscreen        |                      | 1           |
| A               | 7003-006001-111      | Screw M3X6 STP B/H (Black)      |                      | 22          |
| B               | 7003-006002-112      | Screw M3X6 PTP B/H              |                      | 23          |
| C               | 7003-008002-112      | Screw M3X8 PTP B/H              |                      | 16          |
| D               | 7002-606010-062      | Screw M2.6X6 W/H                |                      | 8           |
| E               | 7004-010010-112      | Screw M4X10 B/H                 |                      | 2           |
| F               | 7003-016002-112      | Screw M3X16 PTP B/H Zn          |                      | 3           |





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**Model : 5CD Exploded drawing List**

Rev. A

| <b><u>Seq. No.</u></b> | <b><u>Parts No.</u></b> | <b><u>Parts Name</u></b>       | <b><u>Qty.</u></b> |
|------------------------|-------------------------|--------------------------------|--------------------|
| 1                      | 6505-050050-000         | Base, 5CD                      | 1                  |
| 2                      | 6505-050010-003         | Bracket, CD Mecha              | 1                  |
| 3                      | 9691-005001-000         | Mechan Unit (PU91T-001)        | 1                  |
| 4                      | 6590-050001-000         | PU91 Idler Gear A              | 1                  |
| 5                      | 6600-140001-000         | Chucking Metal Plate Felt Ring | 1                  |
| 6                      | 6600-020200-002         | Pin, Round                     | 1                  |
| 7                      | 6005-050008-001         | Control Cam                    | 1                  |
| 8                      | 7105-010005-030         | Washer Lock 5X10X0.5           | 3                  |
| 9                      | 6600-020198-000         | Pin, Control Cam               | 1                  |
| 10                     | 6505-050001-001         | Bracket Gear                   | 1                  |
| 11                     | 7003-008002-112         | Screw M3X8 B Type B/H Zn       | 12                 |
| 12                     | 6600-010211-000         | Spring, Lever Lock, Outer      | 1                  |
| 13                     | 4841-010700-005         | Turntable PCB Rev. E           | 1                  |
| 14                     | 6005-050025-000         | Switch Cover                   | 1                  |
| 15                     | 6505-050007-000         | Contact Plate                  | 1                  |
| 16                     | 6600-170056-000         | Rubber Ring 3.2X5.2X2          | 1                  |
| 17                     | 6005-050009-000         | Intermediate Gear              | 1                  |
| 18                     | 6005-050014-004         | Lever Lock, Outer              | 1                  |
| 19                     | 4800-310210-001         | Loader Board Ver A             | 1                  |
| 20                     | 6005-050011-000         | Idler Gear                     | 1                  |
| 21                     | 6005-050023-001         | Pulley Motor                   | 1                  |
| 22                     | 6005-050024-000         | Pulley Disc                    | 1                  |
| 23                     | 6600-090053-000         | Belt Motor Loading             | 1                  |
| 24                     | 6005-050013-000         | Driven Pulley                  | 1                  |
| 25                     | 6005-050027-000         | Bush, Roller                   | 1                  |
| 26                     | 6005-050012-000         | Driven Pulley Plate            | 1                  |
| 27                     | RF-500TB-11415 D/V9     | Motor                          | 1                  |
| 28                     | 7003-012002-062         | Screw M3X12 PTP W/H            | 1                  |
| 29                     | 7002-605002-112         | Screw M2.6X5 PTP B/H Zn        | 1                  |
| 30                     | 6005-050007-000         | Gear, Cabinet Top              | 1                  |
| 31                     | 6600-020197-000         | Pin, Gear, Cabinet Top         | 1                  |
| 32                     | 6005-050006-001         | Cam Cabinet                    | 1                  |
| 33                     | 7002-006001-022         | Screw M2X6 STP P/H             | 2                  |
| 34                     | 6600-020196-002         | Pin , Cam Cabinet              | 1                  |
| 35                     | 7103-012010-022         | Washer M3X12X1mm               | 4                  |
| 36                     | 7003-008002-062         | Screw M3X8 P Type W/H Zn       | 1                  |
| 37                     | 6005-050015-000         | Lever Lock                     | 1                  |
| 38                     | 6600-010210-000         | Spring Lever Lock              | 1                  |
| 39                     | 6600-170021-000         | Cushion Ring                   | 2                  |
| 40                     | 6600-170019-000         | Cushion B                      | 2                  |
| 41                     | 6600-020181-000         | Screw, Special                 | 4                  |
| 42                     | 6600-170018-000         | Cushion A                      | 2                  |

|    |                        |                             |   |
|----|------------------------|-----------------------------|---|
| 43 | 6090-050002-003        | Chuckling Pulley            | 1 |
| 44 | 6600-150006-000        | Chuckling Magnet            | 1 |
| 45 | 6600-020199-001        | Pin, Lock                   | 1 |
| 46 | 6005-050002-005        | Cabinet Top                 | 1 |
| 47 | 6005-050001-005        | Turntable                   | 1 |
| 48 | 7003-012002-062        | Screw M3X12 PTP W/H         | 1 |
| 49 | 7103-209008-022        | Washer M3.2X9X0.8           | 3 |
| 50 | 6005-050017-000        | Roller                      | 1 |
| 51 | 6600-020202-000        | 5CD Pin, Roller             | 1 |
| 52 | 6600-020297-000        | Pin, Roller Lock            | 1 |
| 53 | 6505-050005-000        | Bracket, Roller             | 1 |
| 54 | 9400-501000-131        | Sensor Board Assy Rev.A     | 1 |
| 55 | 7103-006005-130        | Washer 3X6X0.5mm Cut        | 1 |
| 56 | 6600-010213-000        | Spring, Gear Block Arm      | 1 |
| 57 | 6600-010212-000        | Spring, Gear Block          | 1 |
| 58 | 7002-620002-062        | Screw M2.6X20 P Type W/H Zn | 1 |
| 59 | 6005-050005-001        | Gear Block Arm              | 1 |
| 60 | 6005-050004-003        | Gear Block                  | 1 |
| 61 | 7002-608002-062        | Screw M2.6X8 W/H P.T.P.     | 2 |
| 62 | 6600-020203-000        | Shaft, T.T. Roller          | 5 |
| 63 | 6600-080001-000        | YN21R 03/04 Pinch Roller    | 5 |
| 64 | <u>6005-050028-000</u> | Washer, Bush                | 1 |
| 65 | 6005-050026-000        | Lever Lock, T.T.            | 1 |
| 66 | 6600-010290-001        | Spring, Lever Lock          | 1 |
| 67 | 6505-050002-001        | Cabinet Holder A            | 2 |
| 68 | 6005-050019-000        | Shaft Bushing               | 2 |
| 69 | 6005-050020-000        | Pulley Rotary               | 1 |
| 70 | 6005-050021-000        | Gear Rotary                 | 1 |
| 71 | 6005-050022-000        | Gear Worm                   | 1 |
| 72 | 6600-020268-000        | Shaft Dia. 2X34mm           | 1 |
| 73 | 6600-090052-000        | Belt Rotary                 | 1 |
| 74 | 7002-003010-111        | Screw M2X3 B/H (Black)      | 2 |
| 75 | 6005-050018-000        | Motor Pulley                | 1 |
| 76 | FF-130SH-11340-2684A   | Motor FF-130SH-11340-2684A  | 1 |
| 77 | 6505-050004-004        | Motor Bracket               | 1 |
| 78 | 6600-020201-001        | Shaft, Gear Rotary          | 1 |
| 79 | 6505-050003-000        | Cabinet Holder B            | 2 |
| 80 |                        |                             |   |

Service bulletin # H/K9901 Rev1 November 2002

Warranty Labor Rate: Major Repair

To: All harman/kardon Service Centers

Models: FL8350/FL8550

Subject: "No disc" reading in display

When a CD is in the carousel at the play position, Infra red light emitted by IR LED D3 is reflected onto IR Photo sensor D2. D3 and D2 are on the PCB located underneath the carousel. When the amount of IR light received by D2 is insufficient, D2 will not saturate and the display will read "No disc".

**In the event you receive an FL8350 or FL8550 with the complaint: Display reads "No disc" but a disc is in the tray, perform the modification as listed below:**

- 1) Lay the unit on a padded surface.
  - 2) Remove the (7) Black Philips screws holding the Top Cover on; remove cover.
  - 3) Lay unit on its side and remove (5) Black screws on bottom which hold front panel to chassis.
  - 4) Lay unit upright, remove (2) Black screws at top front section holding front panel to the front tray retainer brackets.
  - 5) Pull front panel away, cut plastic cable ties if necessary, and lay the front panel face down on the table.
  - 6) Remove (4) tray retainer brackets, (1) Plated screw each. (Bracket on left side may have a ground terminal).
  - 7) Pull the carousel tray up and out of the unit; turn upside-down to expose the sensor board.
  - 8) Remove the (2) Plated screws holding the sensor board to tray.
  - 9) Lift the board and unplug either molex connector CN1 or CN2 to be able to turn board upside-down.
  - 10) Locate R1 and change from a 470 $\Omega$  to a 750 $\Omega$  resistor - h/k part# 1007-501316-000.
  - 11) Locate R2 and change from a 750 $\Omega$  to a 470 $\Omega$  resistor - h/k part# 1004-701316-000.
- Alternately, the two above parts may just be "swapped", as this will result in the correct values.
- 12) Locate D3 and replace with new infra-red LED - h/k part# 3100-204000-002.

## REASSEMBLY:

- 13) Replace sensor board, screws, and CN1 or CN2 connectors.
- 14) Turn the carousel tray over and replace back in the track; tray must be positioned all the way at the rear of the unit. When placed correctly, tray should *not* glide back & forth on the track.
- 15) Replace and attach the (4) tray retainer brackets with single screws - ground wire (if present) is re-attached to left front bracket.
- 16) Replace the front panel, both with the (5) bottom screws and the (2) screws at the top. Note: Make sure any washers that were present between the various brackets and the chassis are reinstalled. Replace cable ties as necessary.
- 17) Test the player by inserting one or more compact discs, assure unit reads discs in all slots.
- 18) Locate MCU board, which is mounted vertically on right side of unit. Connect DC Multimeter to Pin 8 (gray wire) of CN705 (10 pin plug, labeled 'DSNS'), and Pin 2 (red wire) of CN701 (2 pin plug). While playing a disc, DC Multimeter reading must be between 4.7 V and 5.0 V.
- 19) Replace top cover and screws.

| Model  | Serial number (120V)               | Serial number (230V)               | Status             | Action                                                         |
|--------|------------------------------------|------------------------------------|--------------------|----------------------------------------------------------------|
| FL8350 | YC0001-01001<br>to<br>YC0001-37014 | YC0002-01001<br>to<br>YC0002-16673 | Needs Modification | Replace:<br>R1 with 750 $\Omega$<br>R2 with 470 $\Omega$<br>D3 |
| FL8550 | YC0003-01001<br>to<br>YC0003-08666 | YC0004-01001<br>to<br>YC0004-04884 |                    |                                                                |
| FL8350 | YC0001-37015<br>and above          | YC0002-16674<br>and above          | Changed by factory | NONE REQUIRED                                                  |
| FL8550 | YC0003-08667<br>and above          | YC0004-04885<br>and above          |                    |                                                                |

Service bulletin # H/K2000-09 November 2000

This is considered a Minor Repair

To: All harman/kardon Service Centers

Models: FL8350/FL8550

Subject: Carousel does not stop

**In the event you receive an FL8350 or FL8550 with the complaint: "The carousel does not stop at a given disc position, ...or passes disc positions intermittently", perform the modification listed below:**

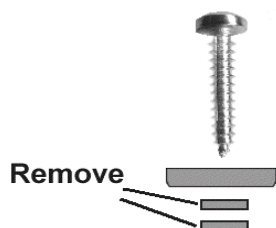
- 1) Lay the unit on a padded surface.
- 2) Remove the (7) Black Philips screws holding the Top Cover on; remove cover.
- 3) In the center of the carousel are a single screw and plated washer; remove these.
- 4) Underneath the larger plated washer are two smaller fiber washers. These are to be removed permanently.
- 5) Examine the larger plated washer carefully. Upon replacement of the larger plated washer and screw, make sure the slightly sharper, stamped edge of the washer is facing upwards.
- 6) Test the player by inserting one or more compact discs, assure the unit reads discs in all slots, and stops at all positions.

IF THIS MODIFICATION DOES NOT CORRECT THE PROBLEM

- 7) Lay unit on its side and remove (5) Black screws on the bottom, which hold the front panel to the chassis.
- 8) Lay unit upright, remove (2) Black screws at top front section holding front panel to the front tray retainer brackets.
- 9) Pull front panel away, cut plastic cable ties if necessary, and lay the front panel face down on the table.
- 10) In the center of the carousel, once again remove the single screw and plated washer.
- 11) Lift the carousel up and off the chassis, towards the front of the unit.
- 12) Turn the carousel upside-down; in the center is a hollow plastic post. Remove any excess lubricant with a clean dry cloth or paper towel, saving it for re-application. The end of this post must be filed down approximately 0.020" (0.5mm) with a file, Dremel tool, or similar tool. Be sure not to remove too much material and keep the surface even (flat). Remove any debris or shavings when finished.
- 13) Spread and replace the saved lubricant on the new surface of the center post.

REASSEMBLY:

- 14) Replace the carousel and mounting screw + washer.
- 15) Replace the front panel, both with the (5) bottom screws and the (2) screws at the top. Note: Make sure any washers that were present between the various brackets and the chassis are reinstalled. Replace cable ties as necessary. Replace the top cover.
- 16) Test the player by inserting one or more compact discs, assure unit reads discs in all slots, and stops at all positions.



Remove 0.020" from this surface



| Model            | Serial number (120V)        | Serial number (230V)        | Status                | Action                                                                                                    |
|------------------|-----------------------------|-----------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------|
| FL8350<br>FL8550 | All Serial numbers affected | All Serial numbers affected | May need modification | Remove small fiber washers in center screw of carousel; if necessary file center post down 0.020" (0.5mm) |

# ADJUSTMENT PROCEDURES

**Reference Disk for adjustments: Sony YEDS - 18**

**Mode: FL8350**

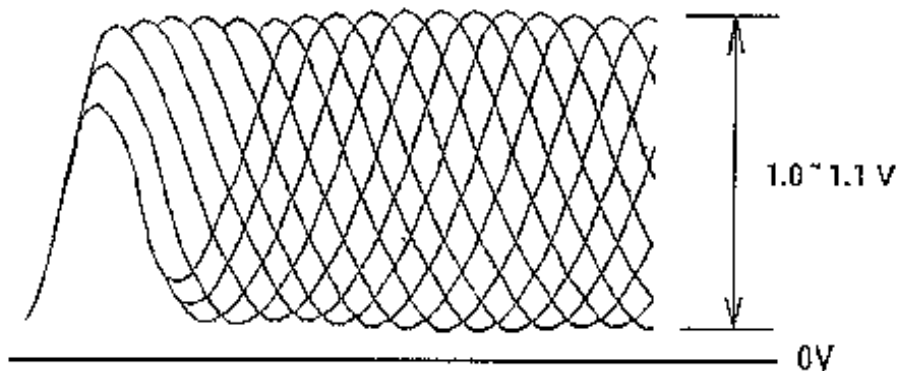
## Testng Equipment:

- i. 5020 Frequency Response Analyzer
- ii. Oscilloscope
- iii. Frequency Counter
- iv. Frequency Generator (Kenwood AG-203A or similar generator).

## **Adjustment Procedure**

### **(A) Focus Adjustment**

- i. Connect Jitter Meter between TP301(R301) and Vref(J11), then play the reference CD disc.
- ii. Adjust VR301 until the Jitter Meter achieves the minimum valuem.
- iii. Connect Oscilloscope to the same point as the last step. Waveform will appear as a  
diamond shape and voltage will be 1.1v opimally. (see figure 1)



**Fig. 1**

## (B) Tracking Adjustment

- i. Connect oscilloscope to the test point TP1 (KA9220C) and Vref(J11).
- ii. Press PLAY button and adjust VR304 to maximum and press SKIP BACK button to make it tracking off.
- iii. Adjust VR302 to get symmetrical waveform height. Then adjust VR304 to the center position.
- iv. The result should appear as shown in fig. 2

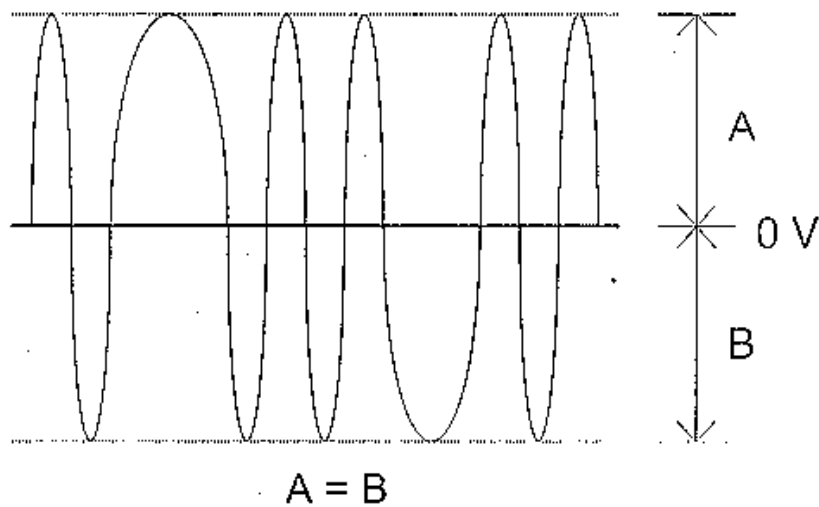
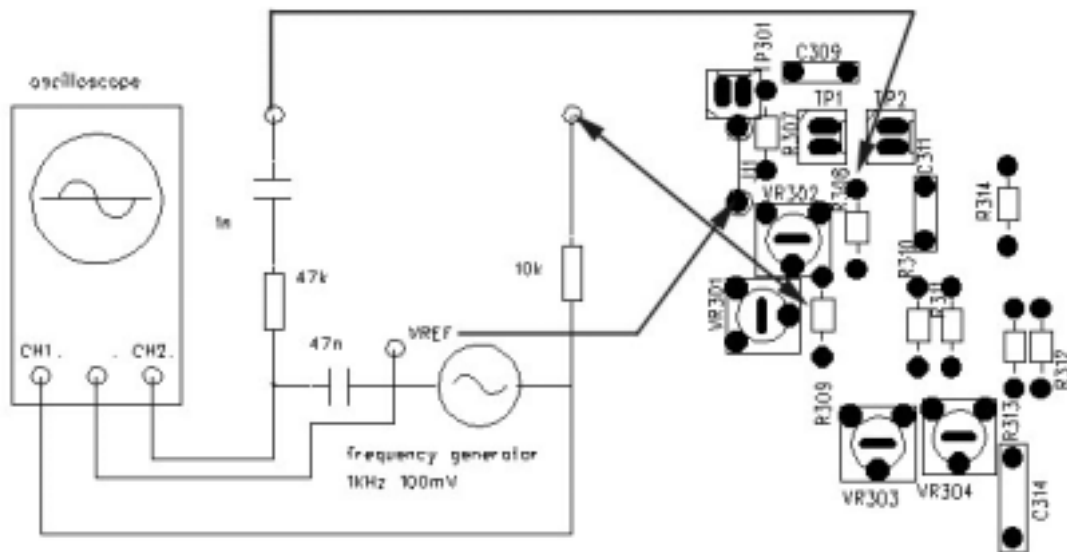


Fig. 2

### (C) Focus Servo Loop Gain Adjustment

| Connection point                                              | Setting                                                                                                                | State      | Adjustment Location |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|------------|---------------------|
| U308 (KA9220C)<br>Pin 57 (R308)<br>Pin 56 (R309)<br>See fig 3 | 1. Oscilloscope Probe: x 10<br>2. Oscilloscope setting<br>CH1: 20mV/division<br>CH2: 10mV/division<br>Remark: X-Y mode | Play State | Adjustment VR303    |

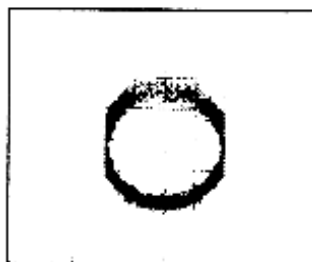
- Set the frequency generator output to 1KHz and 100mv.
- Press the play key and press skip key to move the pickup to halfway across the disk (R=35mm).
- Adjustment VR303 (focus gain) so that the Lissajous waveform is symmetrical above the X axis and the Y axis. See illustration below.



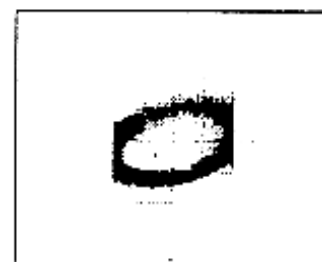
#### Focus Gain Adjustment



Higher gain



Optimum Gain



Lower Gain



## D) Tracking Servo Loop Gain Adjustment

| Connection point                                              | Setting                                                                                                               | state      | Adjustment location |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------|---------------------|
| U308 (KA9220C)<br>Pin 53 (R310)<br>Pin 52 (R311)<br>See fig.4 | 1. Oscilloscope probe: X10<br>3. Oscilloscope setting<br>CH1: 50mV/division<br>CH2: 20mV/division<br>Remark: X-Y mode | Play State | Adjustment VR304    |

- Set the frequency generator output to 1KHz and 100mV.
- Press the play key and press skip key to move the pickup to halfway across the disk (R=35mm).
- Adjustment VR304(track gain) so that the Lissajous waveform is symmetrical above the X axis Y axis. See illustration below.

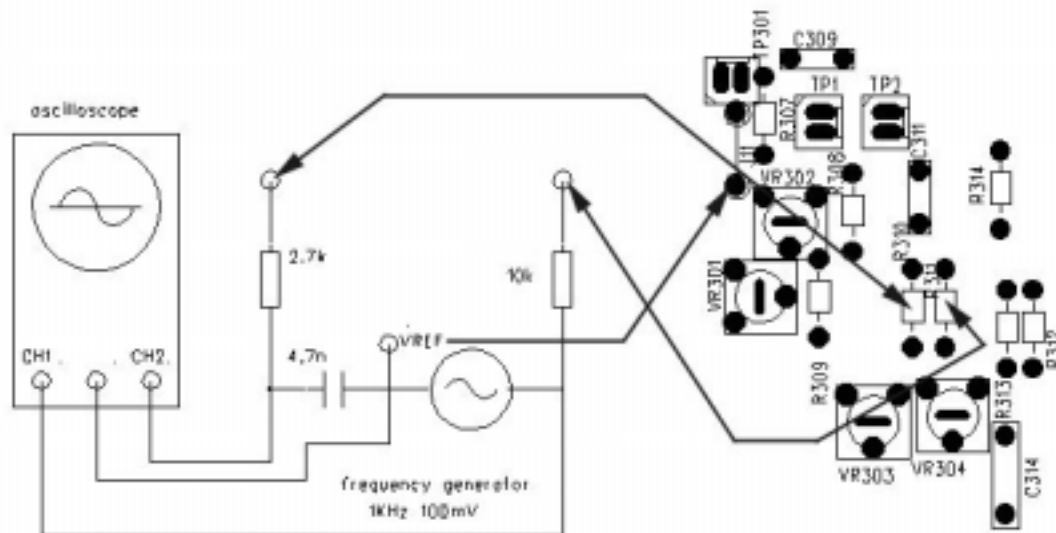
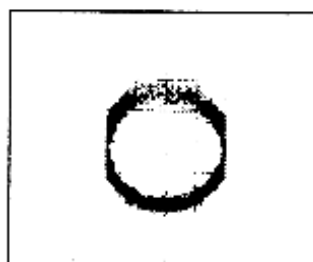


Fig.4

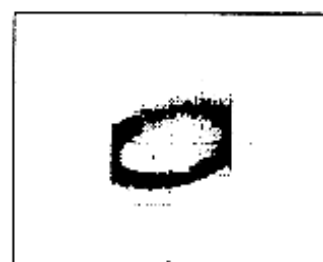
### Tracking Gain Adjustment



Higher Gain



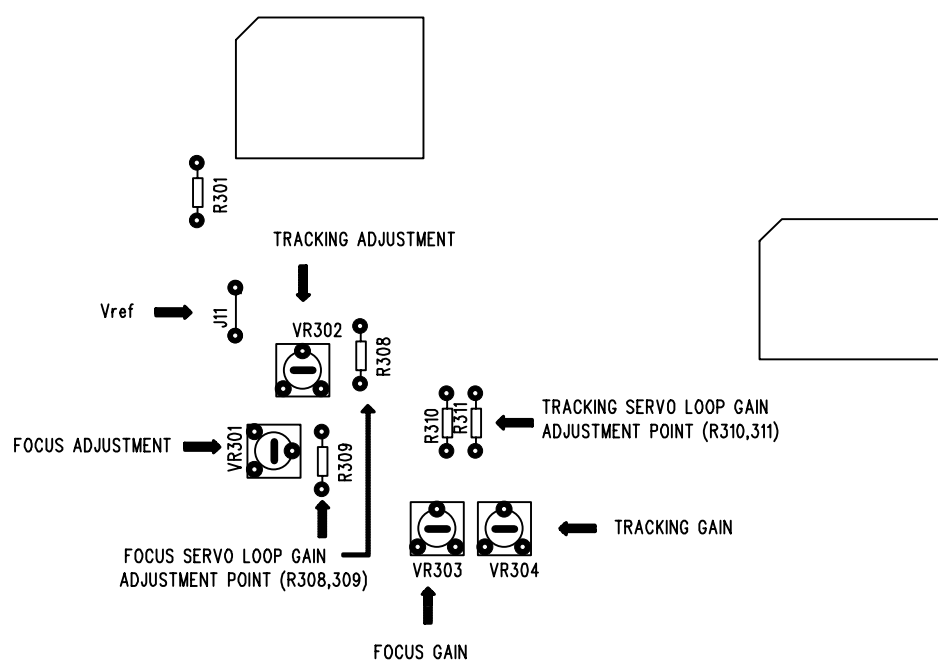
Optimum Gain



Lower Gain

4883-500010-004

FL8350 REV(D)



## Audio Characteristics Test Procedure

### Test Equipment

- 3346 CD Player Evaluating Filter x 2 (NF Electronic Instrument)
- VP7722 Panasonic Audio Analyzer
- Sony YEDS18 Test CD disc

### Procedure

#### Equipment Setup

- The audio output of the CD player under test is connected to the CD filter L & R inputs.
- The outputs from the filter are connected to the Audio Analyzer.

#### Check the output Voltage

- Set the mode of the filter to 'THRU'
- Set the mode of Audio Analyzer to 'LEVEL' mode
- Select track 2 of the test disc and play the CD disc
- The output voltage and gain of the R & L channels are taken by pressing the respective buttons on the control board of Audio Analyzer.

#### Frequency Response

- Set the mode of the filter to reference level mode.
- Select the track 3, 4, 5, and 6 of the test disc and run it under 'Play' mode.
- Check the output of the R & L Channels

#### Total Harmonic Distortion

- Set the mode of the filter to 'DIST/CH-SP' mode
- Set the audio analyzer to 'DIST' mode.
- Set the unit of the audio analyzer to '%' mode
- Select the track 2, 4, and 5 on the test disc and run them under 'PLAY' mode
- Check the % of each R & L channels

### Signal to Noise Ratio

- Set the mode of the filter to 'S/N' mode
- Play track 2 of the test disc
- The unit of the audio analyzer is set to dB mode
- Press the S/N key on the control panel of the audio analyzer
- Play track 7
- Measure the data of S/N ratio

### Dynamic Range

- Set the mode of the filter to 'D-Range' mode
- Set the audio analyzer to 'DIST' Mode
- Set the unit of the audio analyzer to 'dB' mode
- Play track 17 of the test disc
- The dynamic range should be  $|A| + 60\text{dB}$

### Channel Separation

- Set the mode of the filter to 'DIST/CH-SP' mode
- Set the audio analyzer to 'LEVEL' mode
- Play the tracks 8, 9, 10 & 11
- The measured results is the difference between L & R channel

### De-emphasis

- Press the 'THRU' button of the CD filter
- Play the track 2 of the test disc
- Press the 'Relative Level' and make it 'ON'
- Select the track 12 and 13 and measure the L & R channels value



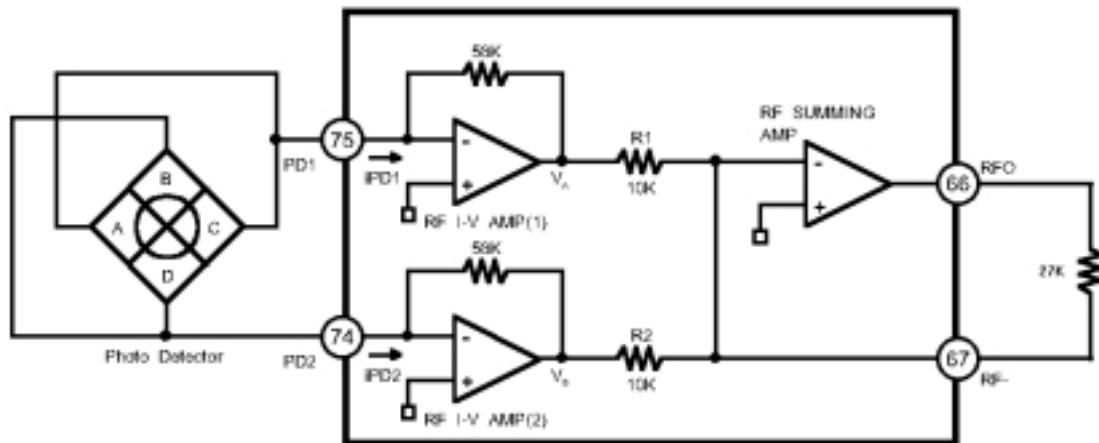
## Circuit Description

### RF Amp Block

#### A) Description

The KA9220B is designed for 3-sport type optical pick-up assembly. The photo detector is composed of 6 light sensor (A through F). The photo detector A, B, C, and D detect audio modulation signal on the disc generate focus error signal. The E and F photo detector generate tracking error signal.

#### B) RF Amplifier



RF1-V AMP (1) and RF 1-V (2) convert current of PD 1(A+B) and PD2 (B+C) through the 58 kohm internal resistor into voltage.

Furthermore, it is added to RF summing amplifier.

This signal (A+B)+(C+D) is outputted form RFO (pin66).

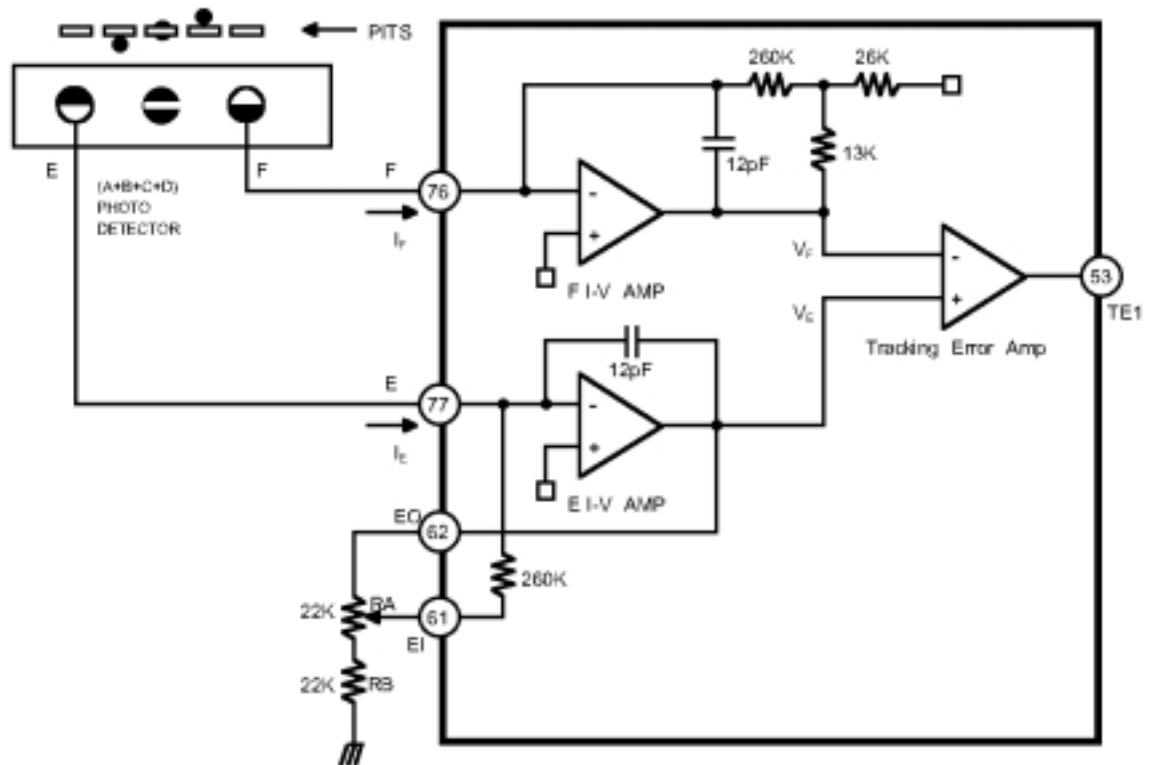
The output voltage is as follow.

$$V_{RFO} = -22K/10K \times (V_A + V_B)$$

$$= -2.2 \times 58K (i_{PD1} + i_{PD2})$$

$$= 127.6k (i_{PD1} + i_{PD2})$$

### C) Tracking Error Amplifier



The output of photo detector F is transmitted to the (-) input of FI-V AMP and the output of photo detector E is directed to the (-) input of E I-V AMP.

These input signals are current.

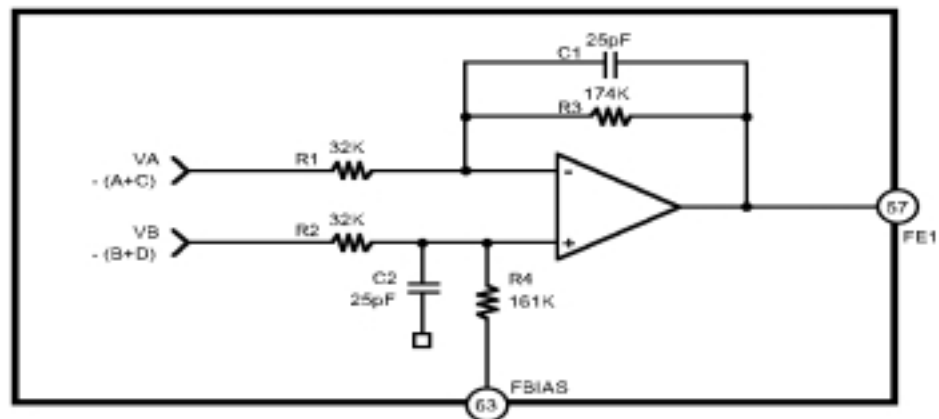
E I-V AMP and F I –V AMP convert current signal to voltage signal. When correct tracking, two input ( $V_F$ ,  $V_E$ ) signal are equal. The occurrence of tracking error is due to difference between FI-V AMP output and EI-V AMP output.

$$V_F = I_F \times 403k\Omega$$

$$V_E = I_E \times 260k\Omega$$

$$\begin{aligned} V_{TEI} &= (V_E - V_F) \times 3.2 \\ &= (I_E - I_F) \times 1290k\Omega \end{aligned}$$

## D) Focus Error Amplifier



The focus error signal is generated by the difference between RF-I-V AMP (1) output  $V_A$  and RF I-V AMP (2) output  $V_B$ .

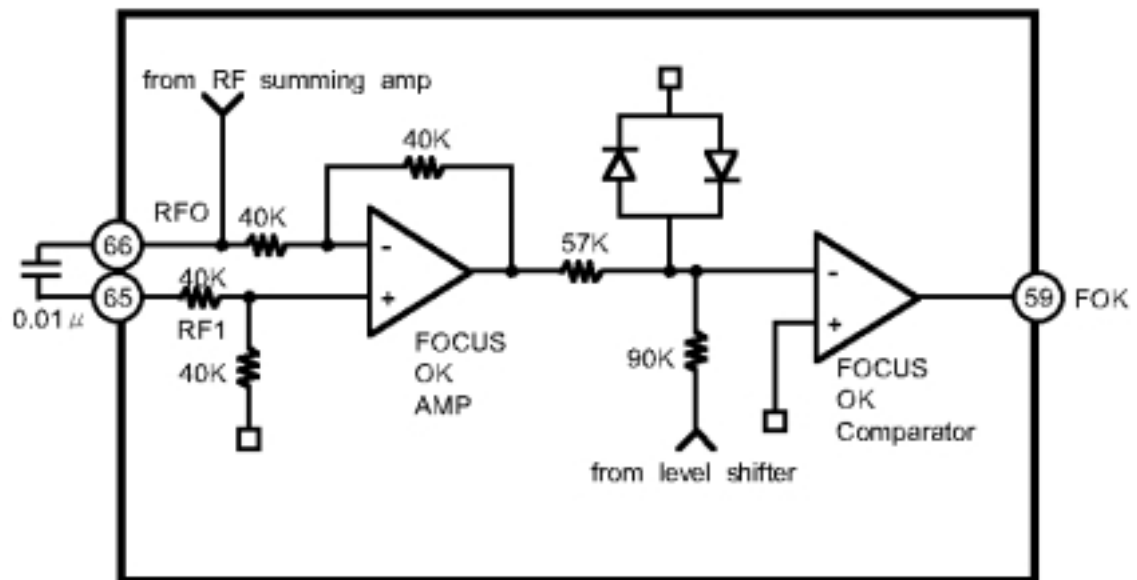
This two ( $V_A$ ,  $V_B$ ) Signals are each applied to the (-) and (+) input of focus error amp.

As the result of differential voltage, focus error signal appears at FEI pin (pin 57)

This FEI output voltage (low frequency) becomes  $(A + C) - (B + D)$ , and

$V_{fe1} = R1/R3 \times (V_B - V_A)$  the focus error voltage is directed to the focus servo block, to maintain an optimum level at all times.

## E) Focus OK Circuit



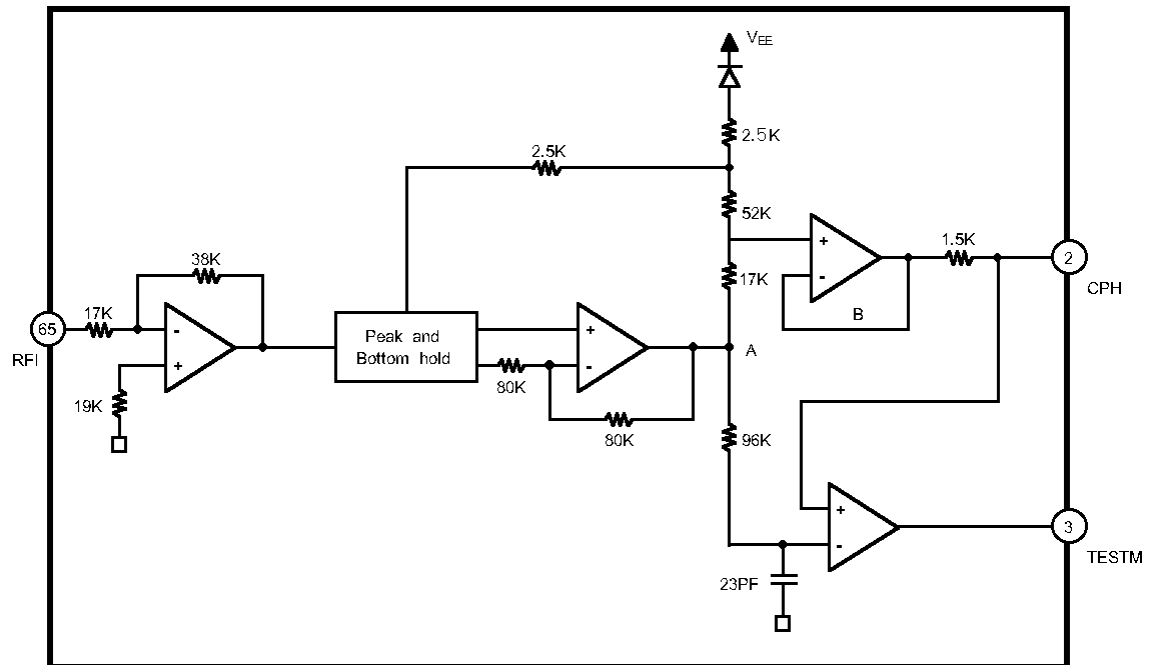
The focus OK circuit generates a timing window to monitor focus search status of focus servo.

When RFO (pin 66) voltage is more than  $-0.37\text{V}$ , the focus OK circuit is inverted.

Time constant of HPF in EFM comparator and mirror circuit and that of LPF in focus ok circuit are determined by capacitor (c301) between RFI and RFO.



## F) Mirror Circuit

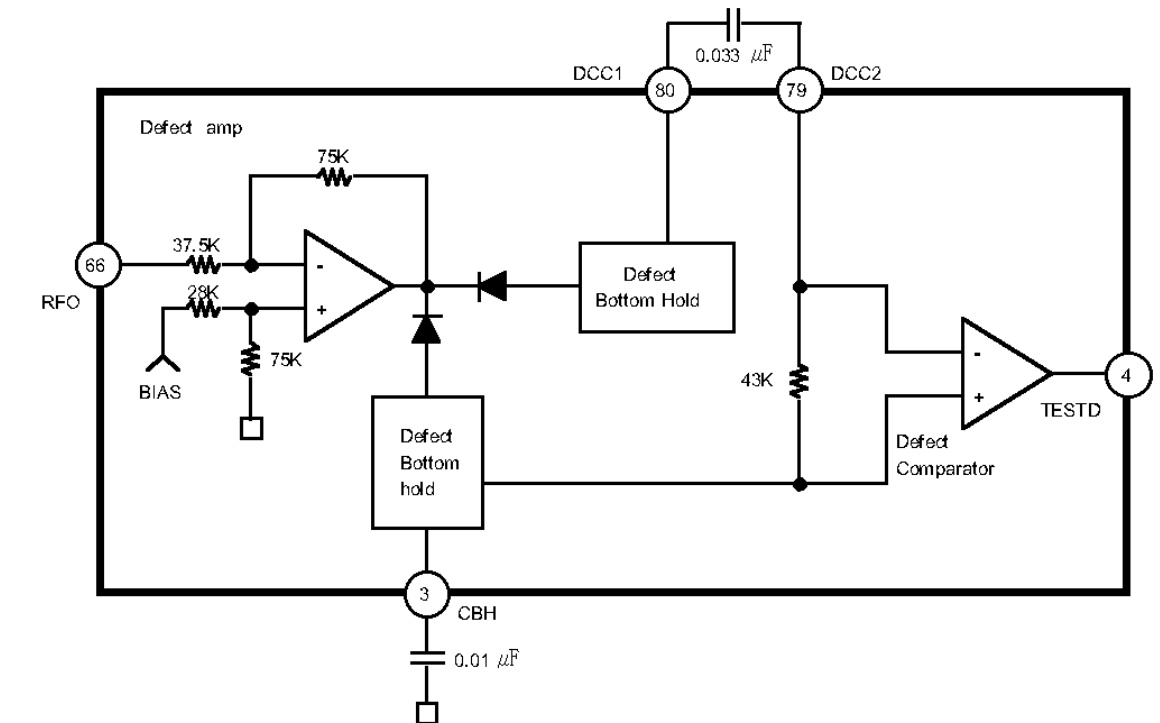


After RF input signal is amplified by mirror amp, it is held in bottom and peak hold circuit.

Such a holding is determined by the time constant. Envelope signal a (demodulated to DC) is two-thirds of the peak value of this signal. The value of A signal is held when it is larger than that of B signal.

Therefore, mirror output is low at track on disc, high at between tracks on disc and during detection.

## G) Defect Circuit



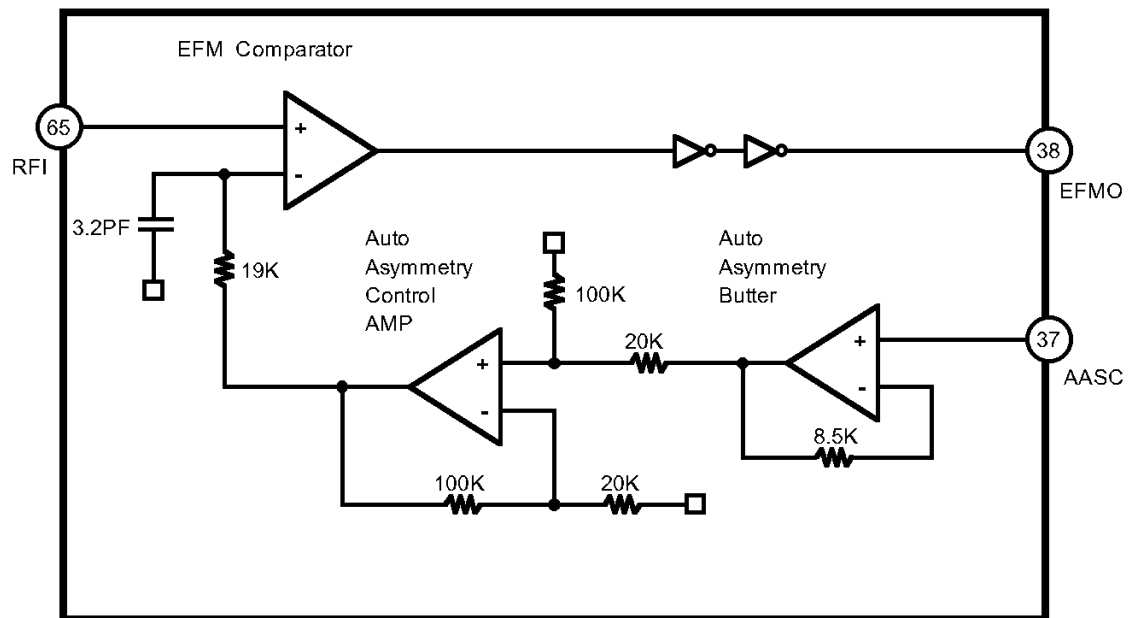
When a defect exists on the disc, drop-out at the upper part of RF signal occurs: At this time, defect signal is generated at defect circuit and shifted into servo part.

The signal shifted into servo part is available for preventing focus and tracking servo from abnormal operation.

The bottom hold has two time constant of long and short, after that the RF signal inverts.

The short time constant of bottom hold is generated shorter than 0.1 msec of disc mirror defect and long time constant is generated by previous mirror level. Mirror defect detection signals are generated by difference on coupling capacitor and transfer level.

## H) EFM Comparator

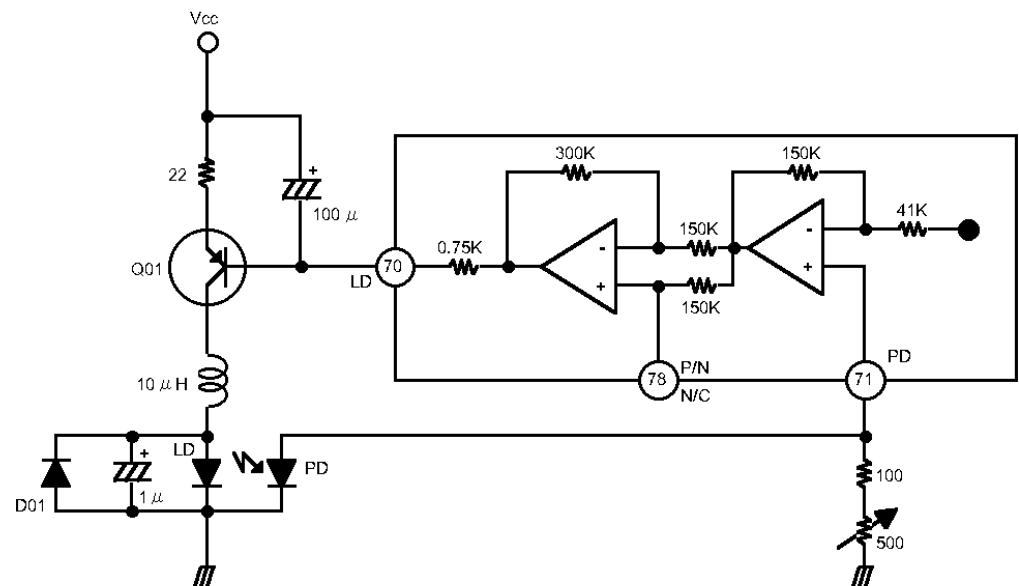


The EFM comparator converts a RF signal into a binary signal. The asymmetry generated for variations on disc manufacturing cannot be eliminated by the ac coupling alone.

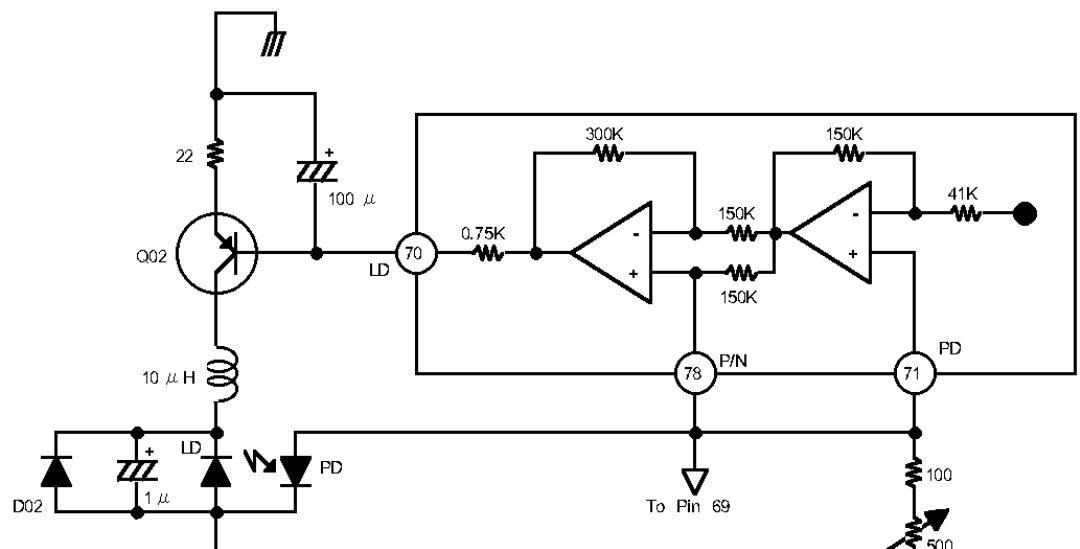
That reference voltage of EFM comparator is controlled utilizing the fact that generation-probability of 1 and 0 is 50% (duty) in the binary EFM signal.

## I)APC (Automatic Power Control) Circuit

(1)  $\pm 5V$  Signal Power Supply P-sub Laser



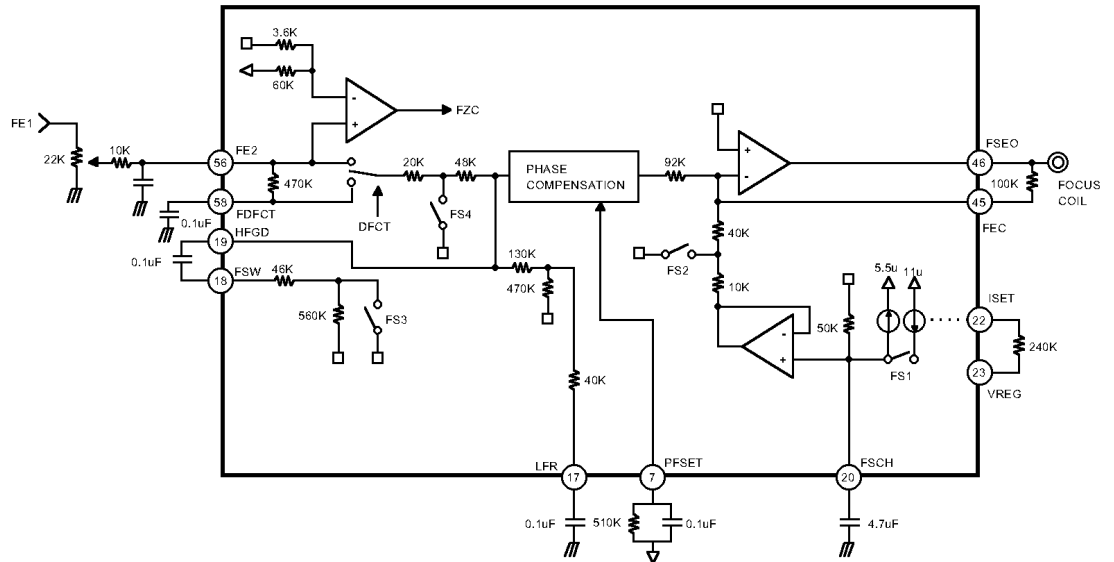
(2)  $+ 5V$  Signal Power Supply N-sub Laser



As a laser diode has large negative temperature characteristics when active and fed by a normal supply current, Therefore, the output current during processing monitor photo diode must be controlled for getting constant output power. Thus APC circuit using p-sub and n-sub of laser diode is for signal power supply operation.

## 1) Servo Block

### A) Focus Servo



When the defect signal is detected, the focus servo loop is isolated.

At this time, the focus servo error output is achieved through low pass filter connected to a capacitor (0.1uF) between the built-in 470KΩ resistor and FDFCT pin (pin 58).

Accordingly, the focus error output is held just before error value is detected.

The peak frequency of the focus phase compensation is about 1.2kHz when the resistor connected to PFSET (pin7) has a value of 430 KΩ.

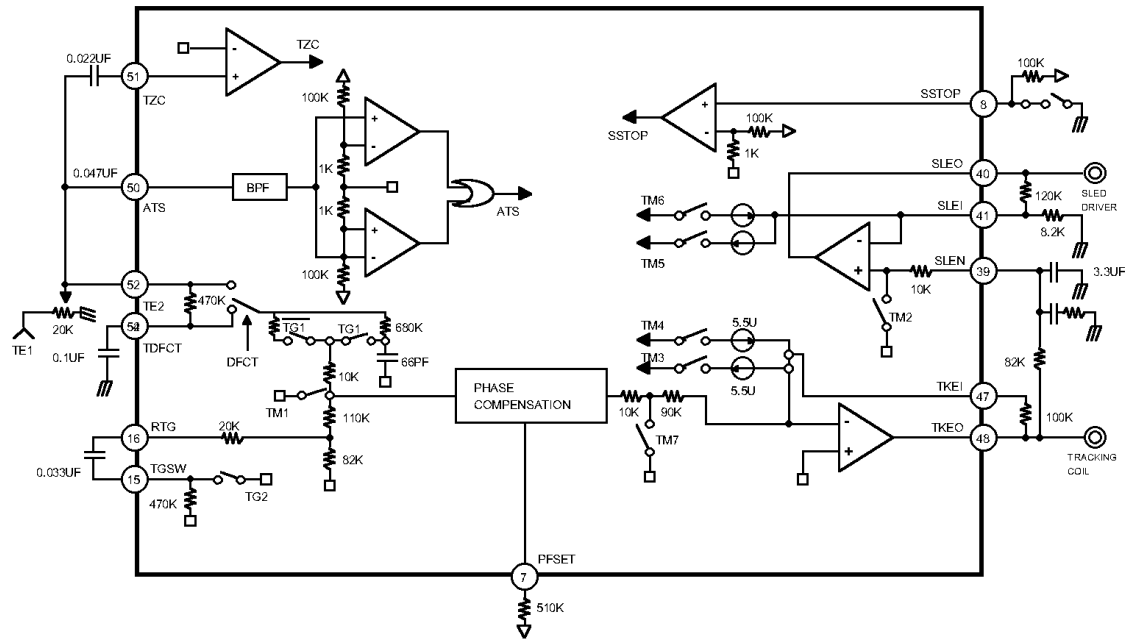
It is reversely proportional to the resistor connected to the pin 7.

While the focus search is operating, the FS4 switch is ON and then focus error signal is isolated, consequently the output comes through FSEO pin (pin 46).

When the FS2 switch is on the focus servo loop is on and focus error output comes through the focus servo loop.

The value of ISEG resistor connected to pin 22 is based on the focus search voltage in reverse proportion.

## B) Tracking and Sled Servo Loop



The capacitor between RTG (pin16) and TGSW (pin15) reduces high frequency gains when the TG2 switch is OFF. The peak frequency of the tracking phase compensation is at about 1.2 KHZ when the value of resistor connected to PFSET (pin7) is 430KΩ.

It is inversely proportional to the resistor connected to the pin 7. The tracking error signal is switched into low pass filter route connected to a capacitor between the built-in resistor of DFCT (479KΩ) and pin 54 (TDFCT) for tracking error signal.

The built-in tracking gain-up circuitry is available for optimum operation right before the tracking jump.

The value of ISET resistor is in reverse proportion to voltage value of track jump and sled kick.

ATS (Anit-Shock) circuitry is for preventing abnormal operation of tracking block when the shock is detected.

## 2)DSP BLOCK

### A) Description

#### (1) Operating theory

After CD data detected by pick-up is amplified by RF AMP it is shifted into DSP (KS9282B).

In KS9282B after EFM signal (8→14 bit conversion) shifted from RF Amp of KA9220B is changed into the original signal of (14→ 8 bit conversion), the signal is finally changed into digital audio signal by means of error correction and De-interleave operation.

This digital audio is changed at 16 bit data converter into analog signal after its high frequency element is cut off.

And the analog signal output is out through pin 19 and pin 20 (digital signal output is out through pin 7).

Double speed mode of pin 79 is possible by means of H/L selection.

#### (2) Features

- EFM Data Demodulation
- Built-in frame sync detection, protection and insertion circuit
- Error correction of C1, C2
- Interpolation
- 8fs oversampling Digital filter (51 th +13 th + 9 th)
- Subcode data serial output
- CLV Servo Controller
- Tracking Counter
- Micom interface
- Built-in 16K SRAM
- Digital Audio out
- Double speed available
- Built-in Digital PLL
- Built-in ,16-bit D/A converter
- Single power supply : + 5V

# IC BLOCK DIAGRAMS

## U315 KA9258D

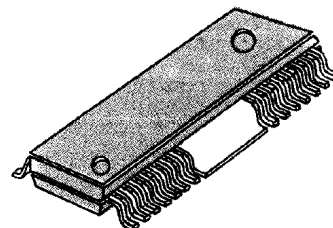
### INTRODUCTION

The KA9258D is a quad power operational amplifier to drive spindle motor, sled motor, focus actuator and tracking actuator.

### FEATURES

- 4-channel BTL driver
- Built in 5V regulator
- Built-in thermal shut down circuit
- Operating supply voltage: 6 ~ 13V

28-SSOPH-375



### ORDERING INFORMATION

| Device  | Package      | Operating Temperature |
|---------|--------------|-----------------------|
| KA9258D | 28-SSOPH-375 | -25°C ~ +75°C         |

### BLOCK DIAGRAM

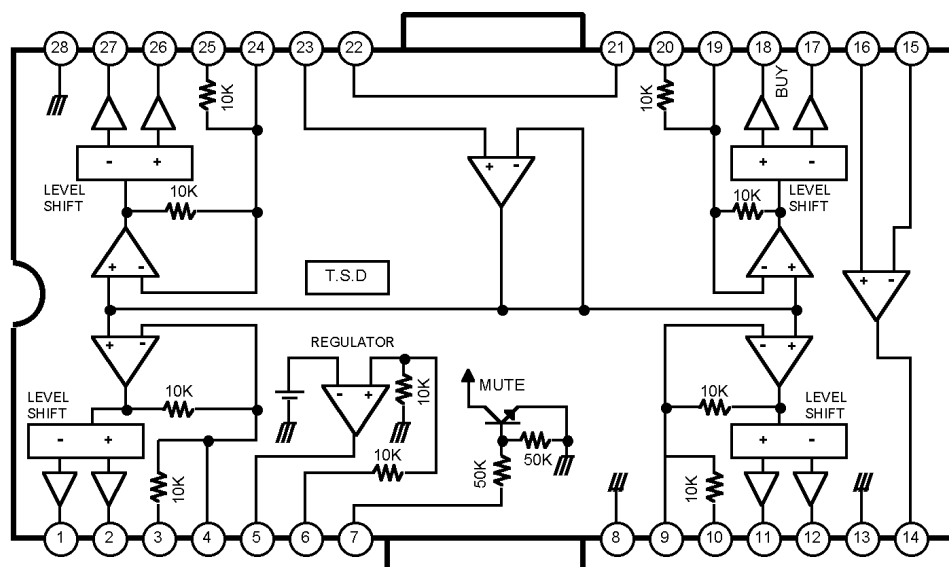


Fig. 1

## KA9258D



## PIN DESCRIPTION

| Pin No. | Symbol   | I/O | Description       |
|---------|----------|-----|-------------------|
| 1       | DO1.1    | O   | DRIVE OUTPUT      |
| 2       | DO1.2    | O   | DRIVE OUTPUT      |
| 3       | DI1.1    | I   | DRIVE INPUT       |
| 4       | DI1.2    | I   | DRIVE INPUT       |
| 5       | REG      |     | REGULATOR         |
| 6       | REO      | O   | REGULATOR OUTPUT  |
| 7       | MUTE     | I   | MUTE              |
| 8       | GND1     | -   | GROUND            |
| 9       | DI2.1    | I   | DRIVE INPUT       |
| 10      | DI2.2    | I   | DRIVE INPUT       |
| 11      | DO2.1    | O   | DRIVE OUTPUT      |
| 12      | DO2.2    | O   | DRIVE OUTPUT      |
| 13      | GND2     | -   | GROUND            |
| 14      | OPOUT    | O   | OPAMP OUTPUT      |
| 15      | OPIN (-) | I   | OPAMP INPUT (-)   |
| 16      | OPIN (+) | I   | OPAMP INPUT (+)   |
| 17      | DO3.1    | O   | DRIVE OUTPUT      |
| 18      | DO3.2    | O   | DRIVE OUTPUT      |
| 19      | DI3.1    | I   | DRIVE INPUT       |
| 20      | DI3.2    | I   | DRIVE INPUT       |
| 21      | VCC1     | -   | SUPPLY VOLTAGE    |
| 22      | VCC2     | -   | SUPPLY VOLTAGE    |
| 23      | VREF     | I   | 2.5V BIAS VOLTAGE |
| 24      | DI4.1    | I   | DRIVE INPUT       |
| 25      | DI4.2    | I   | DRIVE INPUT       |
| 26      | DO4.1    | O   | DRIVE OUTPUT      |
| 27      | DO4.2    | O   | DRIVE OUTPUT      |
| 28      | GND3     | -   | GROUND            |

# U308 KA9220C

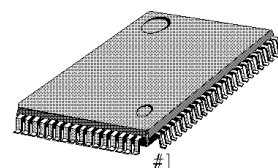
## INTRODUCTION

The KA9220C is an 1-Chip BICMOS integrated circuit to perform the function of RF AMP and SSP (Servo Signal Processor) for Compact disc player applications. It consists of RF signal processing, focus servo, tracking servo, sled servo control, EFM detecting and automatic power control circuits.

## FEATURES

- RF Amplifier
- Focus Error Amplifier
- Tracking Error Amplifier
- Mirror Detector
- Focus OK detector
- EFM Comparator and Auto-Asymmetry control Amplifier
- Defect Detector for improvement to playability
- Built-in APC (Automatic power control) Amplifier (Focus, Tracking, sled, spindle servo control)
- Built-in Autosequencer
- Anti-shock function
- The function of preventing sled run away
- Double speed operation available
- Operating supply Voltage range: 3.4 ~ 5.5V

80 - QFP - 1420C

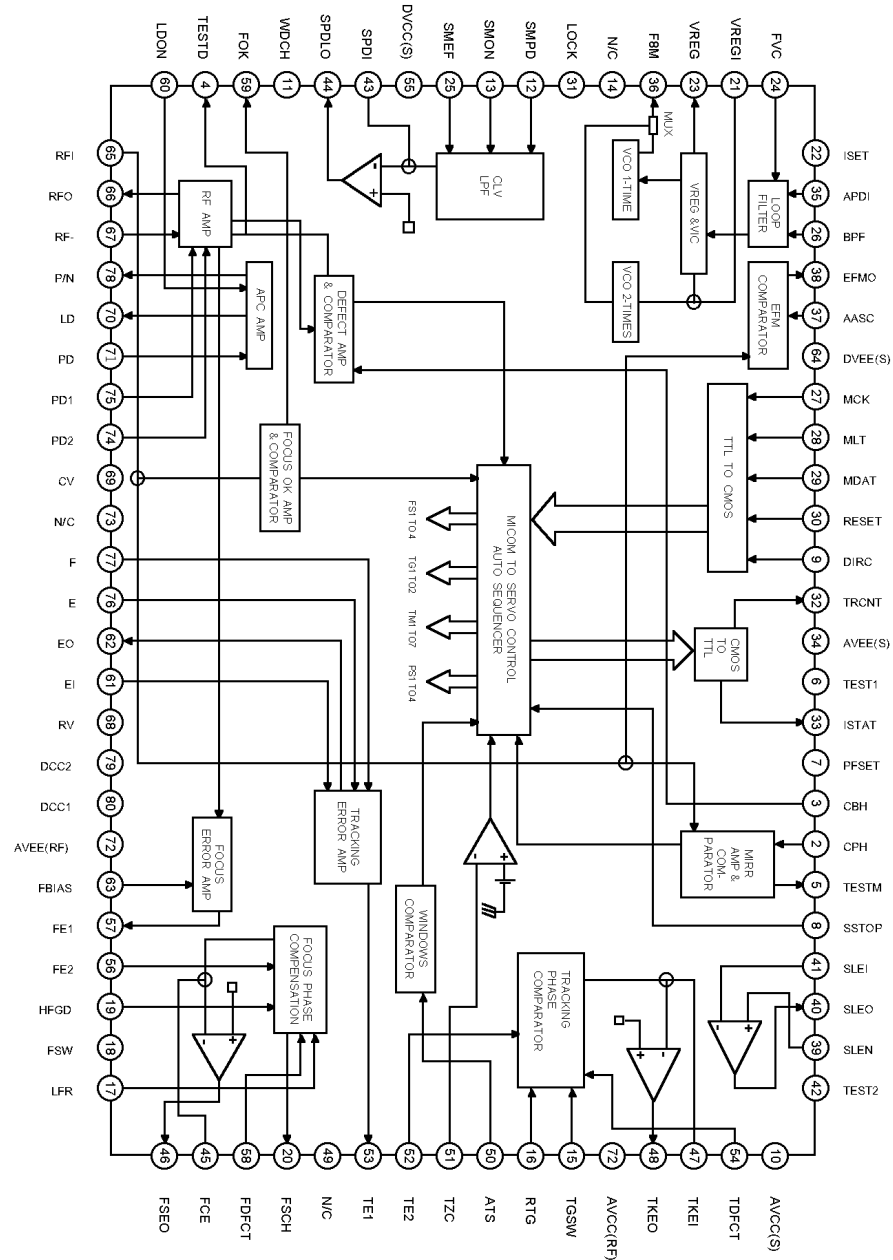


## ORDERING INFORMATION

| Device  | Package      | Operating Temperature |
|---------|--------------|-----------------------|
| KA9220C | 80-QFP-1420C | -20°C ~ +75°C         |

**KA9220C**

### BLOCK DIAGRAM



**Fig. 1**

## KA9220 C

## PIN DESCRIPTION

| Pin No | Symbol   | Description                                                                                        |
|--------|----------|----------------------------------------------------------------------------------------------------|
| 1      | AVEE (R) | Analog negative power supply input pin for RF part                                                 |
| 2      | CPH      | Capacitor connection pin of mirror hold.                                                           |
| 3      | CBH      | Capacitor connection pin of defect bottom-hold                                                     |
| 4      | TESTD    | Defect test pin                                                                                    |
| 5      | TESTM    | Mirror test pin                                                                                    |
| 6      | Test1    | Input pin for test                                                                                 |
| 7      | PPSET    | Peak frequency setting pin for focus, tracking compensation and fc (cut off frequency) of CLV LPF. |
| 8      | SSTOP    | Check the position pin of pick-up whether inside or not.                                           |
| 9      | DIRC     | Direct 1 Track Jump Control Pin                                                                    |
| 10     | AVCC (S) | Analog positive power supply input pin for SERVO part.                                             |
| 11     | WDCH     | Auto-sequencer clock-input pin<br>(Normal speed = 88.2KHz, Double speed = 176.4KHz)                |
| 12     | SMPD     | Connection pin of DSP SMPD                                                                         |
| 13     | SMON     | Connection pin of DSP SMON, spindle servo ON at "H"                                                |
| 14     | N/C      | No connection pin                                                                                  |
| 15     | TGSW     | Providing time constant to change the high frequency tracking gain                                 |
| 16     | RTG      | Capacitor connection pin to switch the tracking gain of high frequency                             |
| 17     | LFR      | Capacitor connection pin to perform rising low bandwidth of focus servo loop                       |
| 18     | FSW      | High frequency gain of focus servo loop can be changed by FS3 switch ON or OFF                     |
| 19     | HFGD     | Reducing high frequency gain with capacitor connected between pini18 and pin19                     |
| 20     | FSCH     | Time constant external pin to generate focus search waveform                                       |
| 21     | VREGI    | External regulator voltage input pin for VCO                                                       |
| 22     | ISET     | Determining the peak value of focus search, track jump and SLED kick                               |

## PIN DESCRIPTION (CONTINUED)

| Pin No | System   | Description                                                                   |
|--------|----------|-------------------------------------------------------------------------------|
| 23     | VREG     | 3.5V Regulator output pin                                                     |
| 24     | N/C      | No connection pin                                                             |
| 25     | SMEF     | Providing an external LPF time constant of CLV SERVO Loop                     |
| 26     | N/C      | No connection Pin                                                             |
| 27     | MCK      | Clock input pin from micom                                                    |
| 28     | MLT      | Latch input pin from micom                                                    |
| 29     | MDAT     | Data input pin from micom                                                     |
| 30     | RESET    | Reset input pin from micom, reset at "L"                                      |
| 31     | LOCK     | Pin for operation of the sled runaway prevention function at "L"              |
| 32     | TRCNT    | Track count output pin                                                        |
| 33     | ISTAT    | Internal status output pin                                                    |
| 34     | AVEE (S) | Analog negative power supply input pin for SERVO part                         |
| 35     | N/C      | No connection                                                                 |
| 36     | N/C      | No connection                                                                 |
| 37     | AASC     | Auto-Asymmetry control input pin                                              |
| 38     | EFMO     | EFM comparator output pin                                                     |
| 39     | SLEN     | Non-inverting input pin of SLED SERVO amplifier                               |
| 40     | SLEO     | Output pin of SLED SERVO amplifier                                            |
| 41     | SLEI     | Inverting input pin of SLED SERVO amplifier                                   |
| 42     | TEST2    | Test input pin to change speed mode<br>Normal speed = "H", Double speed = "L" |
| 43     | SPDI     | Inverting input pin of spindle servo amplifier                                |
| 44     | SPDLO    | Spindle servo amplifier output pin                                            |
| 45     | FCE      | Inverting input pin of focus servo amplifier.                                 |

## PIN DESCRIPTION (Continued)

| Pin No | System   | Description                                                         |
|--------|----------|---------------------------------------------------------------------|
| 46     | FSEO     | Output pin of focus servo amplifier                                 |
| 47     | TKEI     | Non-inverting input pin of tracking servo amplifier                 |
| 48     | TKEO     | Output pin of tracking servo amplifier                              |
| 49     | N/C      | No connection                                                       |
| 50     | ATS      | Anti-shock input pin                                                |
| 51     | TZC      | Tracking Zero Crossing input pin                                    |
| 52     | TE2      | Tracking Error Servo input pin                                      |
| 53     | TE1      | Output pin of tracking Error Amplifier                              |
| 54     | TDFCT    | Capacitor Connection pin for Defect Compensation of tracking servo  |
| 55     | DVCC (S) | Digital positive power supply input pin for servo part              |
| 56     | FE2      | Focus error servo input pin                                         |
| 57     | FE1      | Output pin of focus error Amplifier                                 |
| 58     | FDFCT    | Capacitor connection pin for defect compensation of focus servo     |
| 59     | FOK      | Output pin of Focus OK comparator.                                  |
| 60     | LDON     | Laser diode ON/OFF control pin                                      |
| 61     | EI       | Feedback input pin of E I-V amplifier                               |
| 62     | EO       | Output pin of E I-V Amplifier                                       |
| 63     | FBIAS    | Bias pin of non-inverting input of focus error amplifier            |
| 64     | DVEE (S) | Digital negative power supply input pin for servo part              |
| 65     | RFI      | Output Signal of RF summing amplifier is inputted through capacitor |
| 66     | RFO      | Output pin of RF summing amplifier                                  |
| 67     | RF-      | Inverting input pin of RF summing amplifier                         |
| 68     | RV       | Output pin of $(AVCC + AVEE)/2$ Voltage                             |
| 69     | CV       | Bias input pin of Center Voltage buffer                             |

## PIN DESCRIPTION (CONTINUED)

| Pin No | System   | Description                                               |
|--------|----------|-----------------------------------------------------------|
| 70     | LD       | Output pin of APC amplifier                               |
| 71     | PD       | Input pin of APC amplifier                                |
| 72     | AVEE (R) | Analog positive power supply input pin for RF part        |
| 73     | N/C      | No connection                                             |
| 74     | PD2      | Inverting input pin of RF I-V AMP2                        |
| 75     | PD1      | Inverting input pin of RF I-V AMP1                        |
| 76     | F        | Inverting input pin of F I-V AMP                          |
| 77     | E        | Inverting input pin of E I-V AMP                          |
| 78     | P/N      | Selecting P - sub/N - sub of Laser diode                  |
| 79     | DCC2     | Defect bottom - hold output is inputted through capacitor |
| 80     | DCC1     | Output pin of defect bottom - hold                        |

## U310      KS9284

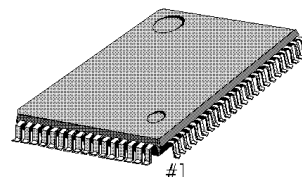
### INTRODUCTION

The KS9284 is a CMOS integrated circuit designed for the digital audio signal processor.

It is a monolithic IC that builds in 16K SRAM and DPLL.

It is similar to KS9284 IC but has advanced error correction ability.

80-QFP-1420C



### FEATURES

- EFM data demodulation
- Built-in frame sync detection, protection and insertion circuit
- C1:2 - Error correction, C2:4 - Erasure correction
- Interpolation
- Subcode data serial output
- CLV servo controller
- Tracking counter
- Micom interface
- Built-in 16K SRAM
- Digital audio output (TX)
- Built-In digital PLL and analog PLL
- Double speed function
- Single power supply: +5V

### ORDERING INFORMATION

| Device | Package      | Operating Temperature |
|--------|--------------|-----------------------|
| KS9284 | 80-QFP-1420C | - 20°C ~ + 75°C       |

## KS9284

## BLOCK DIAGRAM

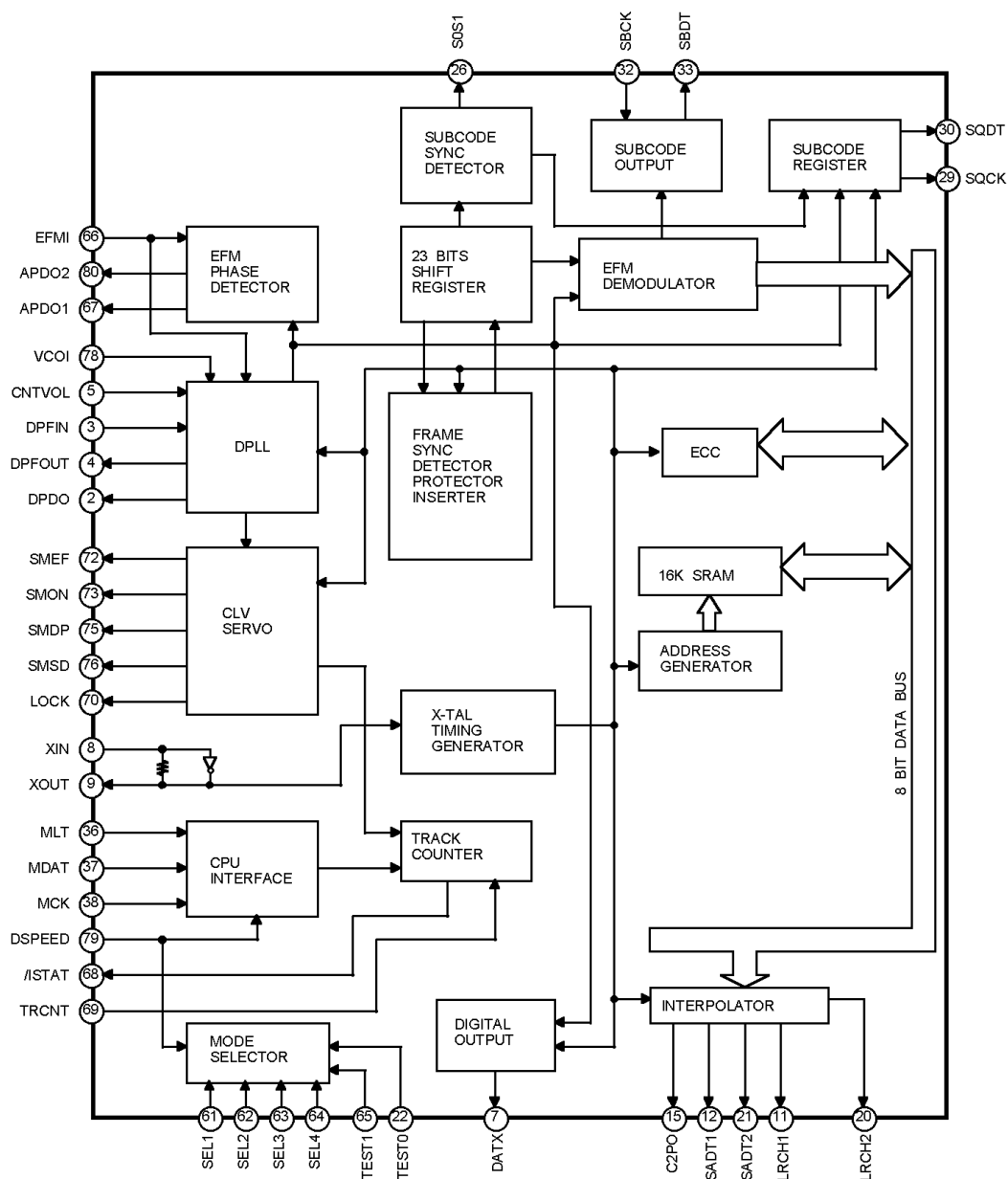


Fig. 1



## PIN CONFIGURATION

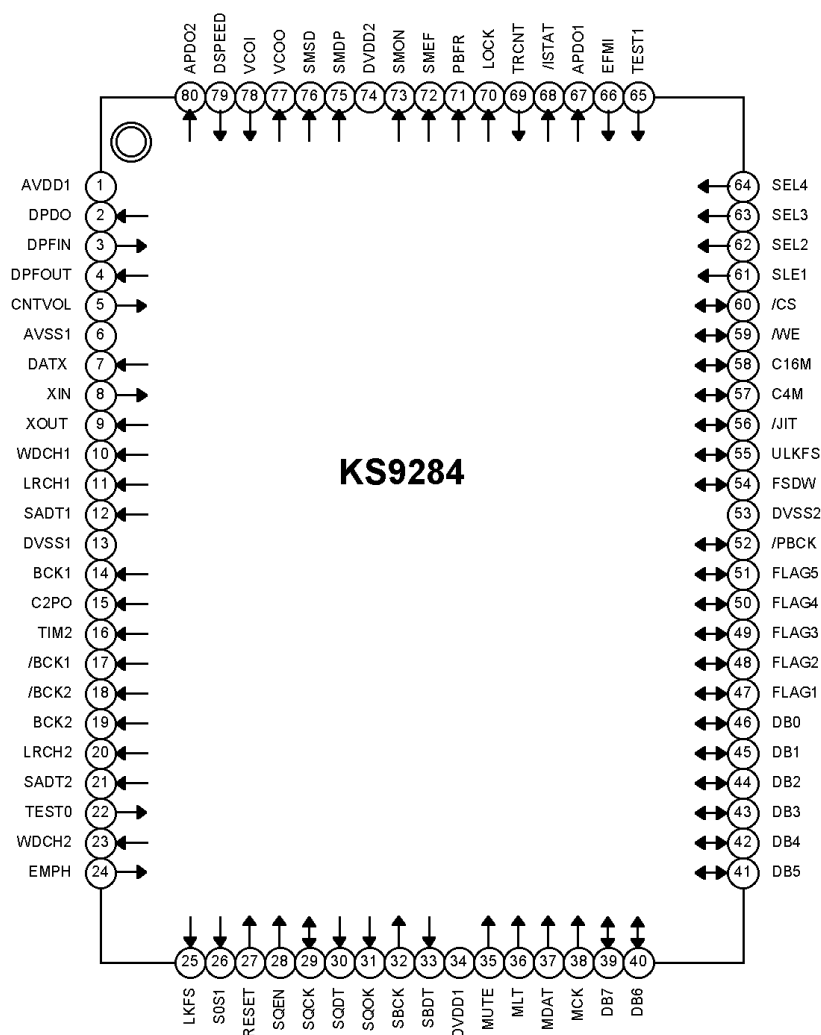


Fig. 2

## KS9284

## PIN DESCRIPTION

| Pin No. | Symbol             | I/O | Description                                                   |
|---------|--------------------|-----|---------------------------------------------------------------|
| 1       | AV <sub>DD</sub> 1 | -   | Analog supply voltage 1                                       |
| 2       | DPDO               | O   | Charge pump output for master PLL                             |
| 3       | DPFIN              | I   | Filter input for master PLL                                   |
| 4       | DPFOUT             | O   | Filter output for master PLL                                  |
| 5       | CNTVOL             | I   | VCO control voltage for master PLL                            |
| 6       | AV <sub>SS</sub> 1 | -   | Analog ground 1                                               |
| 7       | DATX               | O   | Digital audio output                                          |
| 8       | XIN                | I   | X-tal oscillator input (16.9344MHz / 33.8688MHz)              |
| 9       | XOUT               | O   | X-tal oscillator output                                       |
| 10      | WDCH1              | O   | Word clock of 48 bits/slot                                    |
| 11      | LRCH1              | O   | Channel clock of 48 bits/slot                                 |
| 12      | SADT1              | O   | Serial audio data output with 48 bits/slot                    |
| 13      | DV <sub>SS</sub> 1 | -   | Digital ground 1                                              |
| 14      | BCK1               | O   | Serial audio data bit clock for 48 bits/slot                  |
| 15      | C2PO               | O   | C2 pointer for serial audio data                              |
| 16      | TIM2               | O   | Normal or double speed control output pin                     |
| 17      | /BCK1              | O   | Inverted clock of BCK1                                        |
| 18      | /BCK2              | O   | Inverted clock of BCK2                                        |
| 19      | BCK2               | O   | Serial audio data bit clock for 64 bits/slot                  |
| 20      | LRCH2              | O   | Channel clock for 64 bits/slot                                |
| 21      | SADT2              | O   | Serial audio data output with 64 bits/slot                    |
| 22      | TEST0              | I   | Test input pin ("L": normal, "H": test)                       |
| 23      | WDCH2              | O   | Word clock of 64 bit/slot                                     |
| 24      | EMPH               | O   | Emphasis/Non-emphasis output ("H" : Emphasis)                 |
| 25      | LKFS               | O   | The lock status output of frame sync                          |
| 26      | S0S1               | O   | Output of subcode sync signal (S0 + S1)                       |
| 27      | RESET              | I   | System reset at "L"                                           |
| 28      | SQEN               | I   | SQCK control input ("L": internal clock, "H": external clock) |
| 29      | SQCK               | I/O | Subcode-Q data bit clock                                      |
| 30      | SQDT               | O   | Subcode-Q data serial output                                  |

## PIN DESCRIPTION (continued)

| Pin No. | Symbol            | I/O | Description                                                                             |
|---------|-------------------|-----|-----------------------------------------------------------------------------------------|
| 31      | SQOK              | O   | The CRC check result signal output of subcode-Q                                         |
| 32      | SBCK              | I   | Subcode data bit clock                                                                  |
| 33      | SBDT              | O   | Subcode serial data output                                                              |
| 34      | DV <sub>DD1</sub> | -   | Digital supply voltage 1                                                                |
| 35      | MUTE              | I   | Mute control input ("H": Mute ON)                                                       |
| 36      | MLT               | I   | Latch signal input from micom                                                           |
| 37      | MDAT              | I   | Serial data input from micom                                                            |
| 38      | MCK               | I   | Serial data transferring clock input from micom                                         |
| 39      | DB7               | I/O | Data port 7 for external SRAM (MSB)                                                     |
| 40      | DB6               | I/O | Data port 6 for external SRAM                                                           |
| 41      | DB5               | I/O | Data port 5 for external SRAM                                                           |
| 42      | DB4               | I/O | Data port 4 for external SRAM                                                           |
| 43      | DB3               | I/O | Data port 3 for external SRAM                                                           |
| 44      | DB2               | I/O | Data port 2 for external SRAM                                                           |
| 45      | DB1               | I/O | Data port 1 for external SRAM                                                           |
| 46      | DB0               | I/O | Data port 0 for external SRAM (LSB)                                                     |
| 47      | FLAG1             | I/O | Monitoring output for C1 error correction (RA0)                                         |
| 48      | FLAG2             | I/O | Monitoring output for C1 error correction (RA1)                                         |
| 49      | FLAG3             | I/O | Monitoring output for C2 error correction (RA2)                                         |
| 50      | FLAG4             | I/O | Monitoring output for C2 error correction (RA3)                                         |
| 51      | FLAG5             | I/O | C2 decoder flag ("H": when the processing C2 code is impossible correction status /RA4) |
| 52      | /PBCK             | I/O | VCOI/2 clock (4.3218/8.6436MHz) ; when locked in with EFMI (RA5)                        |
| 53      | DV <sub>SS2</sub> | -   | Digital ground 2                                                                        |
| 54      | FSDW              | I/O | Unprotected frame sync (RA6)                                                            |
| 55      | ULKFS             | I/O | Frame sync protection status (RA7)                                                      |
| 56      | /JIT              | I/O | RAM overflow and underflow status (RA8)                                                 |
| 57      | C4M               | I/O | 4.2336MHz clock output (RA9)                                                            |
| 58      | C16M              | I/O | 16.9344MHz clock output (RA10)                                                          |
| 59      | /WE               | I/O | Write enable output to external SRAM                                                    |
| 60      | /CS               | I/O | Chip select output to external SRAM                                                     |

## PIN DESCRIPTION (continued)

| Pin No. | Symbol            | I/O | Description                                                                                                                                            |
|---------|-------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 61      | SEL1              | I   | X-tal selection terminal ("L":16.9344MHz; "H" : 33.8688MHz)                                                                                            |
| 62      | SEL2              | I   | DPLL selection terminal ("L": DPLL, "H" : APLL)                                                                                                        |
| 63      | SEL3              | I   | CD-ROM selection terminal ("L": CDP, "H" : CD-ROM)                                                                                                     |
| 64      | SEL4              | I   | SRAM selection terminal ("L": internal SRAM, "H" : external SRAM)                                                                                      |
| 65      | TEST1             | I   | Test terminal ("L": normal, "H": test)                                                                                                                 |
| 66      | EFMI              | I   | EFM data input                                                                                                                                         |
| 67      | APDO1             | O   | Charge pump output for analog PLL                                                                                                                      |
| 68      | /ISTAT            | O   | The internal status output                                                                                                                             |
| 69      | TRCNT             | I   | Tracking clock input signal                                                                                                                            |
| 70      | LOCK              | O   | Output signal of LKFS conditions sampled PBFR/16<br>(If LKFS is "H", lock is "H". If the LKFS is sampled "L" at least 8 times by PBFR/16, lock is "L") |
| 71      | PBFR              | O   | Write frame clock (Lock : 7.35KHz)                                                                                                                     |
| 72      | SMEF              | O   | LPF time constant control of the spindle servo error signal                                                                                            |
| 73      | SMON              | O   | ON/OFF control signal for spindle servo                                                                                                                |
| 74      | DV <sub>DD2</sub> | -   | Digital supply voltage 2                                                                                                                               |
| 75      | SMDP              | O   | Spindle motor driving output (rough control in the speed mode, phase control in the phase mode)                                                        |
| 76      | SMSD              | O   | Spindle motor (Velocity control in the phase mode)                                                                                                     |
| 77      | VCOO              | O   | VCO output                                                                                                                                             |
| 78      | VCOI              | I   | VCO input (when the state is lock by means of PBFR, it is 8.6436MHz)                                                                                   |
| 79      | DSPEED            | I   | Double speed mode control ("H": normal speed, "L": 2-times speed )                                                                                     |
| 80      | APDO2             | O   | Analog PLL charge pump output for double speed mode                                                                                                    |

## (NOTE)

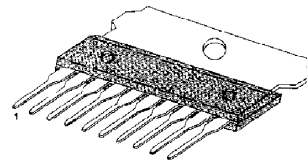
1. PBFR: 7.35KHz Write frame clock produced by data which being reproduced.
2. /PBCK : Channel bit clock of data which being reproduced.
3. /JIT : Display signal of either RAM overflow or underflow for  $\pm 4$  frame jitter margin.

## U305/306 KA8301

### BI-DIRECTIONAL DC MOTOR DRIVER

The KA8301 is a monolithic integrated circuit designed for driving bi-directional DC motor with braking and speed control, and suitable for the loading motor driver of VCR systems. The speed control can be achieved by adjusting the external voltage of the speed control pin.

10-SIPH-B



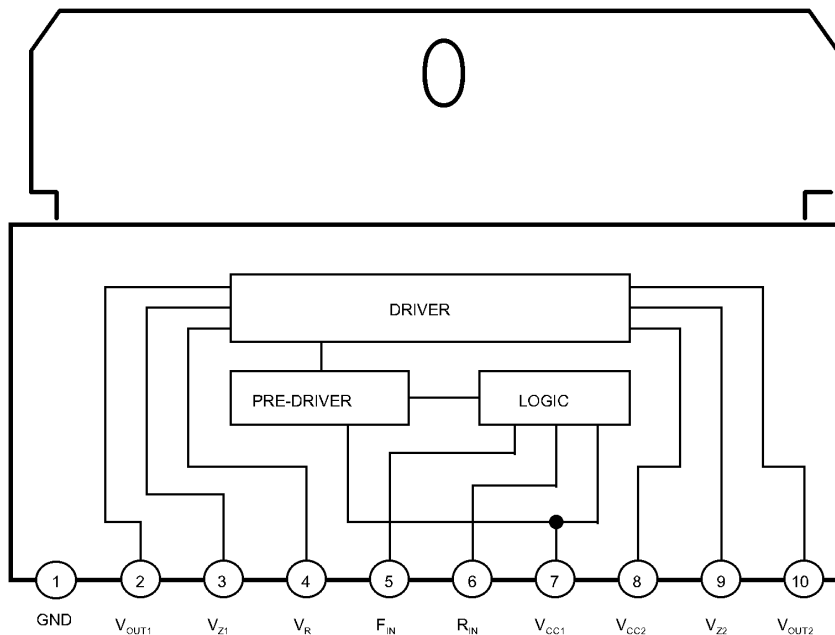
### FEATURES

- Built-in brake function for stable brake characteristics.
- Built-in element to absorb a dash current derived from changing motor direction and braking motor drive.
- External motor speed control pin
- Stable motor direction change.
- Interfaces with CMOS devices.

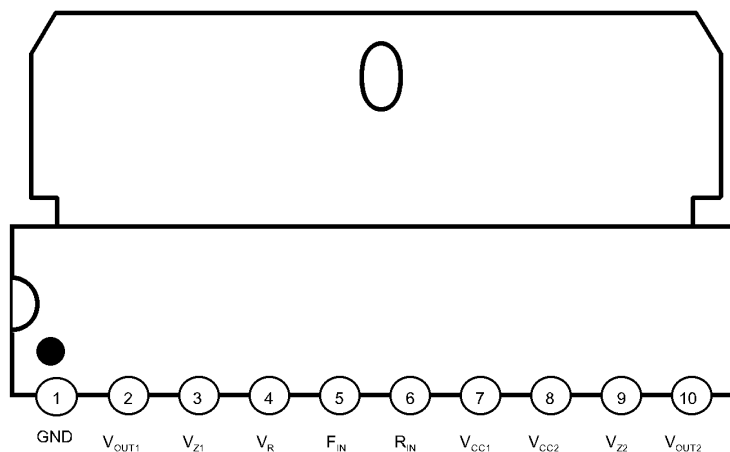
### ORDERING INFORMATION

| Device | Package   | Operating Temperature |
|--------|-----------|-----------------------|
| KA8301 | 10-SIPH-B | - 25°C ~ + 75°C       |

### BLOCK DIAGRAM



## PIN CONFIGURATIONS



## PIN DESCRIPTIONS

| Pin no. | Symbol     | I/O | Description                 | Pin no. | Symbol     | I/O | Description             |
|---------|------------|-----|-----------------------------|---------|------------|-----|-------------------------|
| 1       | GND        | -   | Ground                      | 6       | $R_{IN}$   | I   | Input 2                 |
| 2       | $V_{OUT1}$ | O   | Output 1                    | 7       | $V_{CC1}$  | -   | Supply Voltage (Signal) |
| 3       | $V_{Z1}$   | -   | Power Transistor Protection | 8       | $V_{CC2}$  | -   | Supply Voltage (Power)  |
| 4       | $V_R$      | I   | Motor speed control         | 9       | $V_{Z2}$   | -   | Phase compensation      |
| 5       | $F_{IN}$   | I   | Input 1                     | 10      | $V_{OUT2}$ | O   | Output 1                |

## U307 TDA1305T

Philips Semiconductors

Preliminary specification

Stereo 1fs data input up-sampling filter with  
bitstream continuous dual DAC (BCC-DAC2)

TDA1305T

## FEATURES

Easy application

16f<sub>s</sub> Finite-duration Impulse-Response (FIR) filter incorporated

Selectable system clock (f<sub>sys</sub>) 256f<sub>s</sub> or 384f<sub>s</sub>

I<sup>2</sup>S-bus serial input format (at f<sub>sys</sub> = 256f<sub>s</sub>) or LSB fixed 16, 18 or 20 bits serial input mode (at f<sub>sys</sub> = 384f<sub>s</sub>)

Slave-mode clock system

Cascaded 4-stage digital filter incorporating 2-stage FIR filter, linear interpolator and sample-and-hold

Smoothed transitions before and after muting (soft mute)

Digital de-emphasis filter for three sampling rates of 32 kHz, 44.1 kHz and 48 kHz

12 dB attenuation via the attenuation input control

Double speed mode

2nd order noise shaper

96 (f<sub>sys</sub> = 384f<sub>s</sub>) or 128 (f<sub>sys</sub> = 256f<sub>s</sub>) times oversampling in normal speed mode

48 (f<sub>sys</sub> = 384f<sub>s</sub>) or 64 (f<sub>sys</sub> = 256f<sub>s</sub>) times oversampling in double speed mode

Bitstream continuous calibration concept

Small outline SO28 package

Voltage output 1.5 V (RMS) at line drive level

Low total harmonic distortion

No zero crossing distortion

Inherently monotonic

No analog post filtering required

Superior signal-to-noise ratio

Wide dynamic range (18-bit)

Single rail supply (3.4 to 5.5 V).

## GENERAL DESCRIPTION

The TDA1305T is a new generation of filter-DAC which features a unique combination of bitstream and continuous calibration techniques. The converter functions as a



bitstream converter for low signals while large signals are generated using the dynamic continuous calibration technique, thus resulting in low power consumption, small chip size and easy application.

The TDA1305T is a dual CMOS DAC with up-sampling filter and noise shaper. The combination of high oversampling up to 16f<sub>s</sub>, 2nd order noise shaping and continuous calibration conversion ensures that only simple 1st order analog post filtering is required.

The TDA1305T supports the I<sup>2</sup>S-bus data input mode with word lengths of up to 20 bits (at f<sub>sys</sub> = 256f<sub>s</sub>) and the LSB fixed serial data input format with word lengths of 16, 18 and 20 bits (at f<sub>sys</sub> = 384f<sub>s</sub>). Four cascaded FIR filters increase the oversampling rate to 16 times. A sample-and-hold function increases the oversampling rate to 96 times (f<sub>sys</sub> = 384f<sub>s</sub>) or 128 times (f<sub>sys</sub> = 256f<sub>s</sub>). A 2nd order noise shaper converts this oversampled data to a bitstream for the 5-bit DACs.

The DACs are of the continuous calibration type and incorporate a special data coding. This ensures an extremely high signal-to-noise ratio, superior dynamic range and immunity to process variation and component ageing.

Two on-board operational amplifiers convert the digital-to-analog current to an output voltage. Externally connected capacitors perform the required 1st order filtering so that no further post filtering is required.

The unique combination of bitstream and continuous calibration techniques, together with a high degree of analog and digital integration, results in a single filter-DAC with 18-bit dynamic range, high linearity and simple low cost application.

## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE |                                                            |          |
|-------------|---------|------------------------------------------------------------|----------|
|             | NAME    | DESCRIPTION                                                | VERSION  |
| TDA1305T    | SO28    | plastic small outline package; 28 leads; body width 7.5 mm | SOT136-1 |

1995 Dec 08

2

Stereo 1fs data input up-sampling filter with  
bitstream continuous dual DAC (BCC-DAC2)

TDA1305T

QUICK REFERENCE DATA

| SYMBOL        | PARAMETER                                                          | CONDITIONS                                 | MIN.  | TYP.          | MAX.   | UNIT  |
|---------------|--------------------------------------------------------------------|--------------------------------------------|-------|---------------|--------|-------|
| $V_{DDD}$     | digital supply voltage                                             | note 1                                     | 3.4   | 5.0           | 5.5    | V     |
| $V_{DDA}$     | analog supply voltage                                              | note 1                                     | 3.4   | 5.0           | 5.5    | V     |
| $V_{DDO}$     | operational amplifier supply voltage                               | note 1                                     | 3.4   | 5.0           | 5.5    | V     |
| $I_{DDD}$     | digital supply current                                             | $V_{DDD} = 5\text{ V}$ ;<br>at code 00000H | —     | 30            | —      | mA    |
| $I_{DDA}$     | analog supply current                                              | $V_{DDA} = 5\text{ V}$ ;<br>at code 00000H | —     | 5.5           | 8      | mA    |
| $I_{DDO}$     | operating amplifier supply current                                 | $V_{DDO} = 5\text{ V}$ ;<br>at code 00000H | —     | 6.5           | 9      | mA    |
| $V_{FS(rms)}$ | full-scale output voltage (RMS value)                              | $V_{DDD} = V_{DDA} = V_{DDO} = 5\text{ V}$ | 1.425 | 1.5           | 1.575  | V     |
| (THD + N)/S   | total harmonic distortion plus noise-to-signal ratio               | at 0 dB signal level                       | —     | —             | 90     | dB    |
|               |                                                                    |                                            | —     | 0.003         | 0.009  | %     |
|               |                                                                    | at -60 dB signal level                     | —     | —             | 44     | dB    |
|               |                                                                    |                                            | —     | 0.63          | 0.1    | %     |
|               |                                                                    | at -60 dB signal level;<br>A-weighted      | —     | —             | 46     | dB    |
|               |                                                                    |                                            | —     | 0.5           | —      | %     |
| S/N           | signal-to-noise ratio at bipolar zero                              | A-weighting;<br>at code 00000H             | 100   | 108           | —      | dB    |
| $BR_{ns}$     | input bit rate at data input                                       | $f_s = 48\text{ kHz}$ ; normal speed       | —     | —             | 3.072  | Mbits |
| $BR_{ds}$     | input bit rate at data input                                       | $f_s = 48\text{ kHz}$ ; double speed       | —     | —             | 6.144  | Mbits |
| $f_{sys}$     | system clock frequency                                             |                                            | 6.4   | —             | 18.432 | MHz   |
| $TC_{FS}$     | full scale temperature coefficient at analog outputs (VOL and VOR) |                                            |       | 100 $10^{-6}$ | —      |       |
| $T_{amb}$     | operating ambient temperature                                      |                                            | -30   | —             | +85    | C     |

Note

1. All  $V_{DD}$  and  $V_{SS}$  pins must be connected to the same supply.



# Stereo 1fs data input up-sampling filter with bitstream continuous dual DAC (BCC-DAC2)

TDA1305T

## BLOCK DIAGRAM

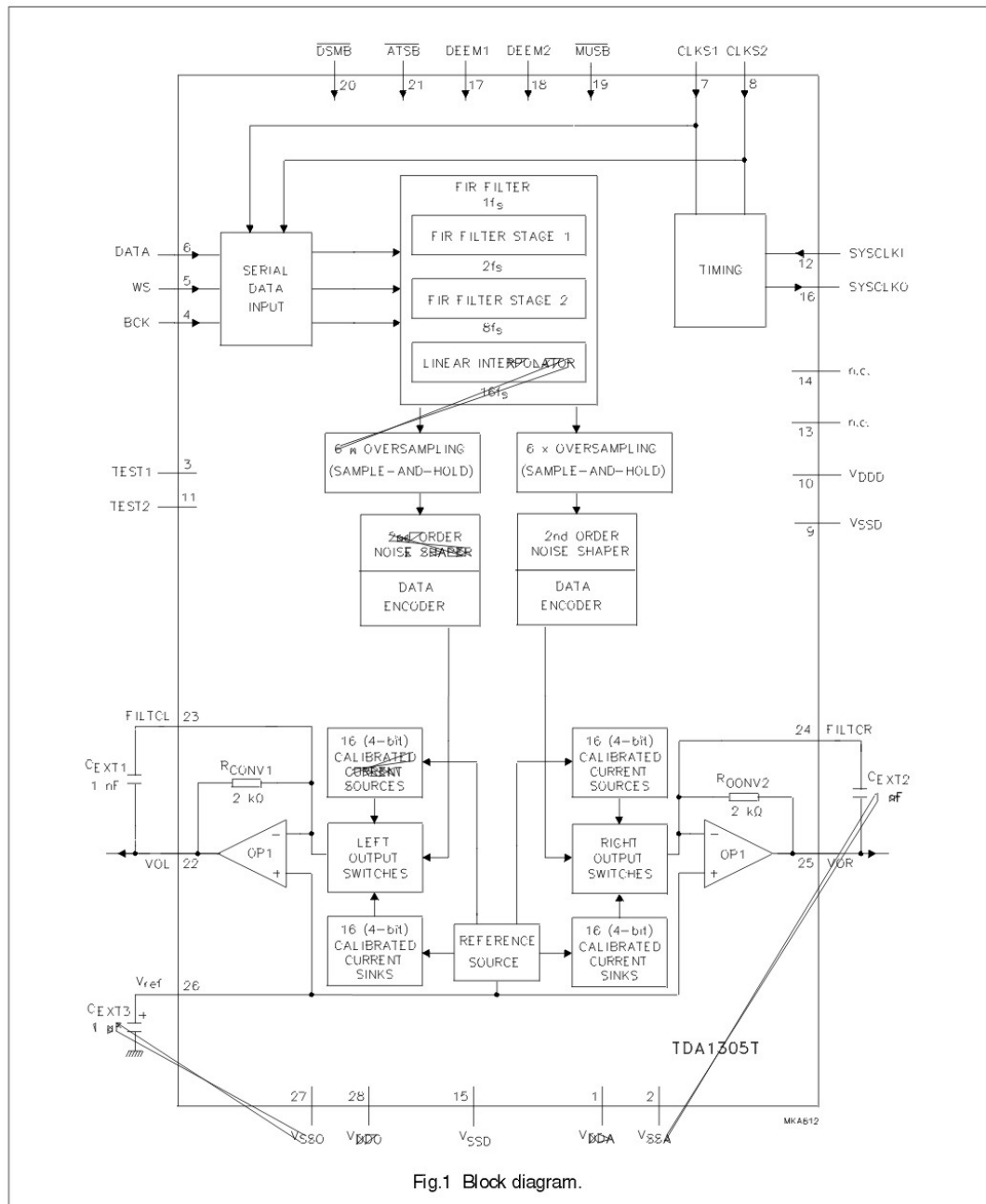


Fig.1 Block diagram.

# Stereo 1fs data input up-sampling filter with bitstream continuous dual DAC (BCC-DAC2)

TDA1305T

## PINNING

| SYMBOL           | PIN | DESCRIPTION                                                                                      |
|------------------|-----|--------------------------------------------------------------------------------------------------|
| V <sub>DDA</sub> | 1   | analog supply voltage                                                                            |
| V <sub>SSA</sub> | 2   | analog ground                                                                                    |
| TEST1            | 3   | test input; pin should be connected to ground (internal pull-down resistor)                      |
| BCK              | 4   | bit clock input                                                                                  |
| WS               | 5   | word select input                                                                                |
| DATA             | 6   | data input                                                                                       |
| CLKS1            | 7   | clock selection 1 input                                                                          |
| CLKS2            | 8   | clock selection 2 input                                                                          |
| V <sub>SSD</sub> | 9   | digital ground                                                                                   |
| V <sub>DDD</sub> | 10  | digital supply voltage                                                                           |
| TEST2            | 11  | test input; pin should be connected to ground (internal pull-down resistor)                      |
| SYSCCLKI         | 12  | system clock input                                                                               |
| n.c.             | 13  | not connected (this pin should be left open-circuit)                                             |
| n.c.             | 14  | not connected (this pin should be left open-circuit)                                             |
| V <sub>SSD</sub> | 15  | digital ground                                                                                   |
| SYSCCLKO         | 16  | system clock output                                                                              |
| DEEM1            | 17  | de-emphasis on/of f; f <sub>DEEM</sub> 32 kHz, 44 kHz and 48 kHz                                 |
| DEEM2            | 18  | de-emphasis on/of f; f <sub>DEEM</sub> 32 kHz, 44 kHz and 48 kHz                                 |
| MUSB             | 19  | mute input (active LOW)                                                                          |
| DSMB             | 20  | double-speed mode input (active LOW)                                                             |
| ATSB             | 21  | 12 dB attenuation input (active LOW)                                                             |
| VOL              | 22  | left channel output                                                                              |
| FILTCL           | 23  | capacitor for left channel 1st order filter function should be connected between pins 22 and 23  |
| FILTCR           | 24  | capacitor for right channel 1st order filter function should be connected between pins 25 and 24 |
| VOR              | 25  | right channel output                                                                             |
| V <sub>ref</sub> | 26  | internal reference voltage for output channels (0.5V <sub>DD</sub> )                             |
| V <sub>SSO</sub> | 27  | operational amplifier ground                                                                     |
| V <sub>DDO</sub> | 28  | operational amplifier supply voltage                                                             |

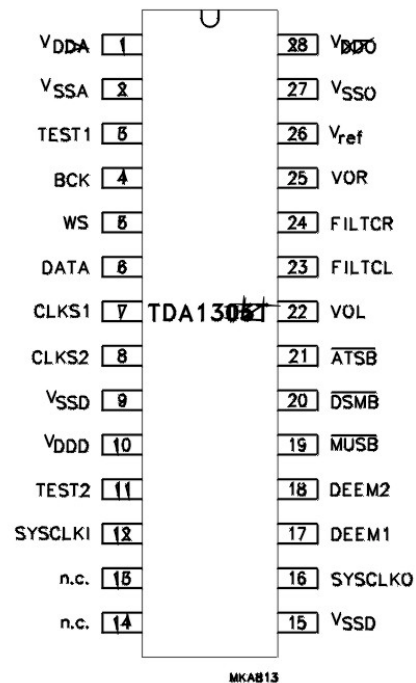


Fig.2 Pin configuration.

## Section 1 Overview

### 1.1 Overview U701 HD6433724E393F MICROPROCESSOR

The H8/300L Series is a single-chip microcomputer (MCU: microcomputer unit), built around the high-speed H8/300L CPU and equipped with peripheral system functions on chip.

The H8/3724 Series is a single-chip microcomputer in the H8/300L Series equipped with high-voltage pins. Its on-chip peripheral functions include a vacuum fluorescent display (VFD)

controller/driver, timers, a 14-bit PWM (pulse width modulator), two serial communication interface channels, and an analog-to-digital converter. Together these functions make this chip ideally suited to use as a microcontroller in embedded systems requiring a VFD display.

The H8/3724 Series comes in the following memory configurations for various system scale needs.

H8/3723: 24-kbyte ROM, 384-byte RAM

H8/3724: 32-kbyte ROM, 512-byte RAM

H8/3725: 40-kbyte ROM, 640-byte RAM

H8/3726: 48-kbyte ROM, 1,024-byte RAM

In addition to masked ROM versions available for the H8/3724 Series, H8/3724 and H8/3726 are also available in ZTAT?versions which allow the user to freely program the on-chip PROM.

Table 1-1 summarizes the main features of the H8/3724 Series.

Note: \* ZTAT (zero turn around time) is a trademark of Hitachi, Ltd.

## Appendix D Port States in Each Processing State

**Table D-1 Port States**

**mode**

**Port Pins Reset Sleep Standby Watch Subactive Active**

P0 7 to P0 0 Hi-z Hi-z Hi-z Hi-z Hi-z Standard

input port

P1 7 Hi-z Hi-z Hi-z Hi-z Hi-z High-voltage

input port

P1 6 Hi-z or pull-up Hi-z or Hi-z Hi-z Hi-z Standard

pull-up input port

P1 5 to P1 0 Hi-z or pull-up prev. state Hi-z Hi-z Hi-z Standard I/O

port

P3 3 to P3 0 Hi-z or prev. state Hi-z or Hi-z or Hi-z or High-voltage

pull-down pull-down pull-down pull-down I/O port

P4 7 to P4 0 Hi-z or prev. state Hi-z or Hi-z or Hi-z or High-voltage

pull-down pull-down pull-down pull-down I/O port

P5 7 to P5 0 Hi-z or prev. state Hi-z or Hi-z or Hi-z or High-voltage

pull-down pull-down pull-down pull-down I/O port

P6 7 to P6 0 Hi-z or prev. state Hi-z or Hi-z or Hi-z or High-voltage

pull-down pull-down pull-down pull-down I/O port

P7 7 to P7 0 Hi-z or prev. state Hi-z or Hi-z or Hi-z or High-voltage

pull-down pull-down pull-down pull-down I/O port

P8 7 to P8 0 Hi-z or pull-up prev. state Hi-z Hi-z Hi-z Standard I/O

port

P9 7 to P9 0 Hi-z or pull-up prev. state Hi-z Hi-z Hi-z Standard I/O

port

PA 1 , PA 0 Hi-z or pull-up prev. state Hi-z Hi-z Hi-z Standard I/O

port

Notation:

Hi-z: High-impedance state

Prev. state: Input pins are in high-impedance state. Output pins hold their previous output.

Hi-z or pull-up: Standard ports for which the pull-up MOS mask option is chosen are in pull-up state; ports without the pull-up MOS option are in high-impedance state.

Hi-z or pull-down: High-voltage ports for which the pull-down MOS mask option is chosen are in pull-down state; ports without the pull-down MOS option are in high-impedance state.

| REF. NO.                                                      | PART NO.        | DESCRIPTION                              | QTY |
|---------------------------------------------------------------|-----------------|------------------------------------------|-----|
| <b>FL8350 MAIN BOARD RESISTORS</b>                            |                 |                                          |     |
| R338/388/390                                                  | 1001-001316-000 | CARBON FILM RESISTOR 100 OHM 1/6 W +-5%  | 3   |
| R303/308/310/324/334-336/346                                  | 1001-002316-000 | CARBON FILM RESISTOR 1K OHM 1/6 W +-5%   | 8   |
| R322/353/355/342/344/358/399                                  | 1001-003316-000 | CARBON FILM RESISTOR 10K OHM 1/6 W +-5%  | 7   |
| R312/317/323/352/377/379/387/389                              | 1001-004316-000 | CARBON FILM RESISTOR 100K OHM 1/6 W +-5% | 8   |
| R320                                                          | 1001-005316-000 | CARBON FILM RESISTOR 1M OHM 1/6 W +-5%   | 1   |
| R311/316                                                      | 1001-504316-000 | CARBON FILM RESISTOR 150K OHM 1/6 W +-5% | 2   |
| R305/306                                                      | 1001-803316-000 | CARBON FILM RESISTOR 18k OHM 1/6 W +-5%  | 2   |
| R319/328                                                      | 1001-804316-000 | CARBON FILM RESISTOR 180k OHM 1/6W +-5%  | 2   |
| R302                                                          | 1002-200316-000 | CARBON FILM RESISTOR 22 OHM 1/6 W +-5%   | 1   |
| R391/393/394/395/605                                          | 1002-202316-000 | CARBON FILM RESISTOR 2.2K OHM 1/6 W +-5% | 5   |
| R307/309                                                      | 1002-203316-000 | CARBON FILM RESISTOR 22K OHM 1/6 W +-5%  | 2   |
| R301/325                                                      | 1002-703316-000 | CARBON FILM RESISTOR 27K OHM 1/6 W +-5%  | 2   |
| R330                                                          | 1002-704316-000 | CARBON FILM RESISTOR 270K OHM 1/6 W +-5% | 1   |
| 326/327/345/347                                               | 1003-302316-000 | CARBON FILM RESISTOR 3.3K OHM 1/6 W +-5% | 4   |
| R313                                                          | 1003-303316-000 | CARBON FILM RESISTOR 33K OHM 1/6 W +-5%  | 1   |
| R304                                                          | 1004-700316-000 | CARBON FILM RESISTOR 47 OHM 1/6W +-5%    | 1   |
| R337                                                          | 1004-701316-000 | CARBON FILM RESISTOR 470 OHM 1/6 W +-5%  | 1   |
| R603                                                          | 1004-702316-000 | CARBON FILM RESISTOR 4.7K OHM 1/6 W +-5% | 1   |
| R392.                                                         | 1004-703316-000 | CARBON FILM RESISTOR 47K OHM 1/6 W +-5%  | 1   |
| R318                                                          | 1005-104316-000 | CARBON FILM RESISTOR 510K OHM 1/6 W +-5% | 1   |
| R329.                                                         | 1005-602316-000 | CARBON FILM RESISTOR 5.6K OHM 1/6 W +-5% | 1   |
| R315                                                          | 1005-603316-000 | CARBON FILM RESISTOR 56K OHM 1/6 W +-5%  | 1   |
| R314.                                                         | 1006-803316-000 | CARBON FILM RESISTOR 68K OHM 1/6 W +-5%  | 1   |
| R396/398/397.                                                 | 1007-501316-000 | CARBON FILM RESISTOR 750 OHM 1/6W +-5%   | 3   |
| R321                                                          | 1008-202316-000 | CARBON FILM RESISTOR 8.2K OHM 1/6 W +-5% | 1   |
| R375/383                                                      | 1011-004016-000 | METAL FILM RESISTOR 100K 1/6W + -1%      | 2   |
| R370/374/376/384/385/386                                      | 1011-502016-000 | METAL FILM RESISTOR 1.5K OHM 1/6W +-1%   | 6   |
| R369/378                                                      | 1011-803016-000 | METAL FILM RESISTOR 18K 1/6W + -1%       | 2   |
| R372/380                                                      | 1012-202016-000 | METAL FILM RESISTOR 2.2K 1/6W + -1%      | 2   |
| R373/381                                                      | 1012-403016-000 | METAL FILM RESISTOR 24K OHM 1/6W +-1%    | 2   |
| R371/382                                                      | 1015-101016-000 | METAL FILM RESISTOR 510 OHM 1/6W + -1%   | 2   |
| VR301                                                         | 1051-003500-001 | SEMI-FIXED RESISTOR 10K OHM +-30%        | 1   |
| VR302/303/304                                                 | 1052-003600-110 | SEMI-FIXED RESISTOR 20K OHM +-30%        | 3   |
| <b>CAPACITORS</b>                                             |                 |                                          |     |
| 1/392/3 C318/3999                                             | 1100-103044-000 | CERAMIC CAP. 0.01UF/50V +-20%            | 4   |
| C342/343/347/345/350/352/357/359/372/<br>366/368/370/371/389/ | 1100-104044-000 | CERAMIC CAP. 0.1uF/50V +-20%             | 24  |
| C338/339                                                      | 1100-220043-000 | CERAMIC CAP. 22pF/50V +- 10%             | 2   |
| C321                                                          | 1100-332043-000 | CERAMIC CAP. 3300PF/50V +-10%            | 1   |
| C302/324/327                                                  | 1100-333043-000 | CERAMIC CAP. 0.033UF/50V +-10%           | 3   |
| C308/336                                                      | 1100-473044-000 | CERAMIC CAP. 0.047UF/50V +-20%           | 2   |

|                                  |                 |                                           |    |
|----------------------------------|-----------------|-------------------------------------------|----|
| C 303/ 363/364                   | 1101-102062-000 | POLYESTER/MYLAR CAP. 0.001UF/100V +-5%    | 3  |
| C322/331/333                     | 1101-103063-000 | POLYESTER/MYLAR CAP. 0.01UF/100V +-10%    | 3  |
| C309/310/314/315/323/325/326     | 1101-104063-000 | POLYESTER/MYLAR CAP. 0.1UF/100V +-10%     | 7  |
| C337                             | 1101-152063-000 | POLYESTER/MYLAR CAP. 0.0015UF/100V +-10%  | 1  |
| C377/378/380/382/383/390         | 1101-222062-000 | POLYESTER/MYLAR CAP. 2200PF/100V +-5%     | 6  |
| C307/311/320/335/360/361         | 1101-223063-000 | POLYESTER/MYLAR CAP. 0.022UF/100V +-10%   | 6  |
| C313                             | 1101-682063-000 | POLYESTER/MYLAR CAP. 0.0068UF/100V +-10%  | 1  |
| C312                             | 1101-683063-000 | POLYESTER/MYLAR CAP. 0.068UF/100V +-10%   | 1  |
| C379/362/365/367/375/376/356/398 | 1102-100044-000 | ELECT. CAP. 10UF/50V +-20%                | 8  |
| C304/306/319/334/384-387/381/388 | 1102-101014-000 | ELECT. CAP. 100uF/16V +-20%               | 10 |
| C316/355                         | 1102-220024-000 | ELECT. CAP. 22UF/25V +-20%                | 2  |
| C317/340/395                     | 1102-221014-000 | ELECT. CAP. 220UF/16V +-20%               | 3  |
| C341/349/351                     | 1102-222014-000 | ELECT. CAP. 2200uF/16V +-20%              | 3  |
| C354                             | 1102-331014-000 | ELECT. CAP. 330uF/16V +-20%               | 1  |
| C300/305/329/369                 | 1102-470014-000 | ELECT. CAP. 47uF/16V +-20%                | 4  |
| C344/346/348/353/924             | 1102-471014-000 | ELECT. CAP. 470uF/16V +-20%               | 6  |
| C328                             | 1102-477024-000 | ELECT. CAP. 4.7UF/25V +-20%               | 1  |
| C330/332                         | 1102-478044-000 | ELECT. CAP. 0.47uF/50V +-20%              | 2  |
| <b>TRANSISTORS</b>               |                 |                                           |    |
| Q302/303/305/306                 | 1300-945000-100 | TRANSISTOR NPN KSC945-Y (SAMSUNG)         | 4  |
| Q304                             | 1301-200300-100 | TRANSISTOR PNP KSR2003 (SAMSUNG)          | 1  |
| Q301                             | 1301-733000-100 | PNP TRANSISTOR A733                       | 1  |
| Q307                             | 1301-928000-100 | TRANSISTOR PNP KSA928A TO-92 SAMSUNG      | 1  |
| <b>DIODES</b>                    |                 |                                           |    |
| D302-307/309-312                 | 1401-140040-000 | DIODE RECTIFIER 1N4004                    | 10 |
| D308                             | 1401-141480-000 | DIODE 1N4148                              | 1  |
| ZD301/303                        | 1402-560000-000 | ZENER DIODE 5.6V 0.5W                     | 2  |
| ZD302                            | 1402-620001-200 | ZENER DIODE 6.2V 1/2W                     | 1  |
|                                  | 1503-161280-100 | FERRITE COIL T16128 SIZE: 16X12X8         | 1  |
| L301/302                         | 1503-353400-100 | FERRITE COILS B3534                       | 2  |
| <b>MISCELLANEOUS</b>             |                 |                                           |    |
| X301                             | 1600-169343-000 | CRYSTAL 16.9344 +- 30 PPM 49U3H TYPE      | 1  |
| CN313/314/311                    | 2300-002000-001 | STRAIGHT CONN WAFER 2PIN 2MMP JST         | 3  |
| CN312                            | 2300-003000-001 | STRAIGHT CONN WAFER 3PIN 2MMP JST         | 1  |
| CN308                            | 2300-004000-000 | STRAIGHT CONN. WAFER 4 PINS 2mmP          | 1  |
| CN303/304/307/315/316            | 2300-006000-000 | STRAIGHT CONN. WAFER 6 PINS 2mmP          | 5  |
| CN302                            | 2300-008000-000 | STRAIGHT CONN. WAFER 8 PINS 2mmP          | 1  |
| CN306                            | 2300-010000-000 | STRAIGHT CONN. WAFER 10 PINS 2mmP         | 1  |
| CN305                            | 2300-012000-000 | STARIGH CONN. WAFER 12PIN 2MMP            | 1  |
| CN310                            | 2500-022201-050 | 2PIN 220MM 1CONN CABLE AWG#28 2MMP        | 1  |
| CN318 TO HEADPHONE BD. CN502     | 2500-037001-050 | 3PIN 700MM 1 CONN CABLE AWG#28 2MMP       | 1  |
| CN303                            | 2501-062801-150 | 6PIN 280MM 2CONN RIBBON CABLE AWG#28 2MMP | 1  |
| CN302                            | 2501-084001-150 | 8PIN 400MM 2CONN CABLE AWG#28 2MMP        | 1  |
| CN316 TO CN307                   | 2506-062201-150 | 6PIN 220MM 2CONN RIBBON CABLE AWG#28 2MMP | 1  |

|                               |                 |                                                    |   |
|-------------------------------|-----------------|----------------------------------------------------|---|
| CN317 TO CN752                | 2510-033001-060 | 3PIN 300MM 1CONN SHIELD CABLE AWG#30 2MMP          | 1 |
| CN319                         | 2510-036501-050 | 3PINS 650MM 1 CONN SHIELD CABLE AWG#28 2MMP        | 1 |
| CN301                         | 2510-052501-060 | 5PIN 250MM 1CONN SHIELD CABLE AWG#30 2MMP          | 1 |
| CN313 TO CN314                | 2511-022001-160 | 2PIN 200MM 2CONN SHIELD CABLE AWG#30 2MMP (1-GND)  | 1 |
| CN309 TO CN753                | 2511-023001-160 | 2PIN 300MM 2CONN SHIELD CABLE AWG#30 2MM           | 1 |
| P22/23                        | 2600-100654-200 | 65MM JUMPER WIRE AWG#26 UL1007 RED                 | 1 |
| P36/37                        | 2600-100804-200 | 80MM JUMPER WIRE AWG#26 RED                        | 1 |
| <b>FUSE</b>                   |                 |                                                    |   |
| F301                          | 4030-100000-000 | MICRO FUSE 1A                                      | 1 |
| <b>INTEGRATED CIRCUITS</b>    |                 |                                                    |   |
| U307                          | 4113-050102-100 | I.C. TDA1305TN2 28PINS SMD (PHILIPS)               | 1 |
| U311-314                      | 4155-320052-100 | I.C. NE5532N 8P DIP PHILIPS                        | 4 |
| U309                          | 4174-740052-100 | I.C. 74HC74 DIP (PHILIPS)                          | 1 |
| U304                          | 4178-050311-600 | I.C. NJM78L05 3 PINS TO-92 (NEW JAPAN)             | 1 |
| U301                          | 4178-080301-400 | I.C. MC7808AC 3PIN TO-220 (MOTOROLA)               | 1 |
| U303                          | 4178-080310-000 | I.C. 78L08 TO92 (MIRCO)                            | 1 |
| U302                          | 4179-080311-600 | I.C. 79L08 TO92 (NJRC)                             | 1 |
| U305/306                      | 4183-010002-400 | I.C. KA8301 10PIN SIL                              | 2 |
| U308                          | 4192-200122-400 | I.C. KA9220C QFP SAMSUNG SSP                       | 1 |
| U315                          | 4192-580122-400 | I.C. KA9258D SMT SAMSUNG MOTOR DRIVE               | 1 |
| U310                          | 4192-840122-400 | I.C.KS9284 QFP SAMSUNG DSP                         | 1 |
| <b>PCB</b>                    |                 |                                                    |   |
|                               | 4883-500010-004 | FL8350 CD MAIN BOARD REV D                         | 1 |
| <b>FL8350 HEADPHONE BOARD</b> |                 |                                                    |   |
| <b>RESISTORS</b>              |                 |                                                    |   |
| R511-514                      | 1001-003316-000 | CARBON FILM RESISTOR 10K OHM 1/6 W +-5%            | 4 |
| R507-510                      | 1001-004316-000 | CARBON FILM RESISTOR 100K OHM 1/6 W +-5%           | 4 |
| R503-504                      | 1001-503316-000 | CARBON FILM RESISTOR 15K OHM 1/6 W +-5%            | 2 |
| R501-502                      | 1004-701316-000 | CARBON FILM RESISTOR 470 OHM 1/6 W +-5%            | 2 |
| R515-516                      | 1005-600314-000 | CARBON FILM RESISTOR 56 OHM 1/4W +-5%              | 2 |
| R505                          | 1065-003500-130 | VAR. RESISTOR 50k 1/4W +-20% ROTARY B-TYPE         | 1 |
|                               | 1065-003500-131 | VAR. RESISTOR 50K 1/4W +-20% ROTARY B-TYPE W/O NUT | 1 |
| <b>CAPACTIORS</b>             |                 |                                                    |   |
| C509-510                      | 1100-102044-000 | CERAMIC CAP. 1000PF/50V +-20%                      | 2 |
| C511                          | 1100-103044-000 | CERAMIC CAP. 0.01UF/50V +-20%                      | 1 |
| C503/504/511                  | 1100-104044-000 | CERAMIC CAP. 0.1uF/50V +-20%                       | 3 |
| C505-508                      | 1102-100044-000 | ELECT. CAP. 10UF/50V +-20%                         | 4 |
| C501-502                      | 1102-101044-000 | ELECT. CAP. 100UF/50V +-20%                        | 2 |
| <b>MISCELLANEOUS</b>          |                 |                                                    |   |
| CN501-502                     | 2300-003000-001 | STRAIGHT CONN WAFER 3PIN 2MMP JST                  | 2 |
| U502                          | 2320-009911-003 | 6.4MM HEADPHONE JACK (JY-6303-02-030)GOLD PLATED   | 1 |
|                               | 2320-009911-002 | 6.4MM HPHONE JACK W/O NUT (JY-6303-01-010) GD      | 1 |

|                                   |                 |                                                   |   |
|-----------------------------------|-----------------|---------------------------------------------------|---|
|                                   |                 | PLT                                               |   |
|                                   | 2605-100902-000 | 90MM GND WIRE 1RING (M3) AWG#22 BLK               | 1 |
| <b>INTEGRATED CIRCUITS</b>        |                 |                                                   |   |
| U501                              | 4145-580051-600 | IC NJM 4558L                                      | 1 |
| <b>PCB</b>                        |                 |                                                   |   |
|                                   | 4883-500020-003 | FL8350 HEADPHONE BOARD REV C                      | 1 |
| <b>FL8350 CONTROL BOARD</b>       |                 |                                                   |   |
| <b>RESISTORS</b>                  |                 |                                                   |   |
| R831-832                          | 1001-201316-000 | CARBON FILM RESISTOR 120 OHM 1/6 W +-5%           | 2 |
| R833                              | 1001-801316-000 | CARBON FILM RESISTOR 180 OHM 1/6W +-5%            | 1 |
| R834                              | 1002-201316-000 | CARBON FILM RESISTOR 220 OHM 1/6 W +-5%           | 1 |
| R835                              | 1003-301316-000 | CARBON FILM RESISTOR 330 OHM 1/6W +-5%            | 1 |
| <b>MISCELLANEOUS</b>              |                 |                                                   |   |
| S831-835                          | 2400-020200-000 | TACT SW 2P2T KPT-1105A (5MM)                      | 5 |
| CN831                             | 2500-022001-040 | 2 PIN 200MM 1 CONN CABLE AWG#26 2MMP              | 1 |
| <b>PCB</b>                        |                 |                                                   |   |
|                                   | 4883-500040-001 | FL8350 CONTROL BOARD REV A                        | 1 |
| <b>FL8350 POWER BOARD</b>         |                 |                                                   |   |
| <b>MISCELLANEOUS</b>              |                 |                                                   |   |
|                                   | 2610-221000-000 | 2100MM POWER CORD W/POLARZED PLUG UL SPT-2 AWG#18 | 1 |
|                                   | 3200-480140-401 | TRANSFORMER EI48 117V CUL #4801Y44T-1 (WINBOND)   | 1 |
|                                   | 4002-311975-000 | TOROID COILS "T31X19X7.5MM"                       | 1 |
| <b>FL8350 POWER CONTROL BOARD</b> |                 |                                                   |   |
| <b>RESISTORS</b>                  |                 |                                                   |   |
| R841                              | 1001-501316-000 | CARBON FILM RESISTOR 150 OHM 1/6 W +-5%           | 1 |
| <b>MISCELLANEOUS</b>              |                 |                                                   |   |
| S841                              | 2402-020200-003 | PUSH SWITCH 2P2T ESB64801 MATSUSHITA              | 1 |
| CN841                             | 2500-032201-050 | 3PIN 220MM 1CONN CABLE AWG#28 UL1571 2mmP         | 1 |
| D841                              | 3100-204000-001 | LED 5MM BI- COLOR A/G #BL-BAG204                  | 1 |
| <b>PCB</b>                        |                 |                                                   |   |
|                                   | 4883-500110-002 | FL8350 POWER CONTROL BOARD REV B                  | 1 |
| <b>FL8350 MCU BOARD</b>           |                 |                                                   |   |
| <b>RESISTORS</b>                  |                 |                                                   |   |
| R701                              | 1001-000320-000 | CARBON FILM RESISTOR 10 OHM 2W +-5%               | 1 |
| R704-705                          | 1001-001314-000 | CARBON FILM RESISTOR 100 OHM 1/4 W +-5%           | 2 |
| R703/722-725                      | 1001-002316-000 | CARBON FILM RESISTOR 1K OHM 1/6 W +-5%            | 5 |
| R731                              | 1001-004316-000 | CARBON FILM RESISTOR 100K OHM 1/6 W +-5%          | 1 |
| R708                              | 1001-005316-000 | CARBON FILM RESISTOR 1M OHM 1/6 W +-5%            | 1 |
| R706                              | 1002-203316-000 | CARBON FILM RESISTOR 22K OHM 1/6 W +-5%           | 1 |
| R730                              | 1002-403316-000 | CARBON FILM RESISTOR 24K OHM 1/6W +-5%            | 1 |
| C704                              | 1003-302314-000 | CARBON FILM RESISTOR 3.3K 1/4W +-5%               | 1 |
| R702                              | 1008-202316-000 | CARBON FILM RESISTOR 8.2K OHM 1/6 W +-5%          | 1 |



|                             |                 |                                                   |   |
|-----------------------------|-----------------|---------------------------------------------------|---|
| R733                        | 1041-003318-331 | RESISTOR ARRAY 10KX4 1/8W TYPE A                  | 1 |
| <b>CAPACITORS</b>           |                 |                                                   |   |
| C701                        | 1100-103044-000 | CERAMIC CAP. 0.01UF/50V +-20%                     | 1 |
| C703                        | 1100-104044-000 | CERAMIC CAP. 0.1uF/50V +-20%                      | 1 |
| C710/711                    | 1100-220042-001 | CERAMIC CAP. 22PF +-5% 'NPO'                      | 2 |
| C707                        | 1102-100004-000 | ELECT. CAP. 10uF/10V +- 20%                       | 1 |
| C705                        | 1102-100044-000 | ELECT. CAP. 10UF/50V +-20%                        | 1 |
| C706                        | 1102-101014-000 | ELECT. CAP. 100uF/16V +-20%                       | 1 |
| C704                        | 1102-221034-000 | ELECT. CAP. 220UF/35V +-20%                       | 1 |
| C702                        | 1102-330014-000 | ELECT. CAP. 33uF/16V +-20%                        | 1 |
| <b>TRANSISTORS</b>          |                 |                                                   |   |
| Q702                        | 1300-100300-100 | TRANSISTOR NPN KSR1003 (SAMSUNG)                  | 1 |
| Q701                        | 1300-805000-100 | TRANSISTOR NPN 8050D TO92 SAMSUNG                 | 1 |
| <b>DIODES</b>               |                 |                                                   |   |
| D701-704                    | 1401-140020-000 | DIODE RECTIFIER 1N4002                            | 4 |
| D706/707                    | 1401-141480-000 | DIODE 1N4148                                      | 2 |
| Z701                        | 1402-240001-200 | ZENER DIODE DZ24V                                 | 1 |
| Z702                        | 1402-620001-200 | ZENER DIODE 6.2V 1/2W                             | 1 |
| <b>MISCELLANEOUS</b>        |                 |                                                   |   |
| X701                        | 1602-800002-000 | REASONATOR 8.0MHZ                                 | 1 |
| CN701                       | 2300-002000-001 | STRAIGHT CONN WAFER 2PIN 2MMP JST                 | 1 |
| CN710                       | 2300-003000-001 | STRAIGHT CONN WAFER 3PIN 2MMP JST                 | 1 |
| CN704                       | 2300-004000-000 | STRAIGHT CONN. WAFER 4 PINS 2mmP                  | 1 |
| CN707                       | 2300-007000-000 | STRAIGHT CONN. WAFER 7 PINS 2mmP                  | 1 |
| CN705                       | 2300-010000-000 | STRAIGHT CONN. WAFER 10 PINS 2mmP                 | 1 |
| CN706                       | 2300-012000-000 | STARIGH CONN. WAFER 12PIN 2MMP                    | 1 |
| CN709                       | 2370-014100-000 | STRAIGH HEADER 14PIN 2.5MMP                       | 1 |
| CN711                       | 2370-020100-000 | STRAIGHT HEADER 20PINS 2.5MMP                     | 1 |
| CN705                       | 2501-103001-151 | 10PIN 300MM 2CONN CABLE AWG#28 UL1751 2MMP (GRAY) | 1 |
| CN706                       | 2501-123001-151 | 12PIN 300mm 2CONN CABLE AWG#28 2mmP. (GRAY)       | 1 |
| <b>INTEGRATED CIRCUITS</b>  |                 |                                                   |   |
| U701                        | 4201-835000-601 | I.C. 5 DISC VFD MCU 5FL15 HD6433 724E93F          | 1 |
| <b>PCB</b>                  |                 |                                                   |   |
|                             | 4805-010230-005 | 5CD MCU BOARD (VFD) REV A                         | 1 |
| <b>FL8350 DISPLAY BOARD</b> |                 |                                                   |   |
| <b>RESISTORS</b>            |                 |                                                   |   |
| R811                        | 1001-201316-000 | CARBON FILM RESISTOR 120 OHM 1/6 W +-5%           | 1 |
| R805/817                    | 1001-802316-000 | CARBON FILM RESISTOR 1.8K OHM 1/6 W +-5%          | 2 |
| R813                        | 1002-201316-000 | CARBON FILM RESISTOR 220 OHM 1/6 W +-5%           | 1 |
| R812                        | 1003-001316-000 | CARBON FILM RESISTOR 300 OHM 1/6W +-5%            | 1 |
| R802/814                    | 1003-301316-000 | CARBON FILM RESISTOR 330 OHM 1/6W +-5%            | 2 |
| R803/815                    | 1005-601316-000 | CARBON FILM RESISTOR 560 OHM 1/6 W +-5%           | 2 |
| R806/818                    | 1005-602316-000 | CARBON FILM RESISTOR 5.6K OHM 1/6 W +-5%          | 2 |

|                                              |                 |                                           |    |
|----------------------------------------------|-----------------|-------------------------------------------|----|
| R801                                         | 1006-201316-000 | CARBON FILM RESISTOR 620 OHM 1/6W +-5%    | 1  |
| R804/816                                     | 1009-101316-000 | CARBON FILM RESISTOR 910 OHM 1/6W         | 2  |
| <b>CAPACITORS</b>                            |                 |                                           |    |
| C801                                         | 1102-221014-000 | ELECT. CAP. 220UF/16V +-20%               | 1  |
| <b>MISCELLANEOUS</b>                         |                 |                                           |    |
| CN805                                        | 2300-002000-001 | STRAIGHT CONN WAFER 2PIN 2MMP JST         | 1  |
| CN804                                        | 2300-003000-001 | STRAIGHT CONN WAFER 3PIN 2MMP JST         | 1  |
| CN801                                        | 2370-014110-000 | RIGHT ANGLE HEADER 14PIN 2.5MMP           | 1  |
| CN802                                        | 2370-020110-000 | RIGHT ANGLE HEADER 20PIN 2.5MMP           | 1  |
| S801-806/811-819                             | 2400-020200-000 | TACT SW 2P2T KPT-1105A (5MM)              | 15 |
| CN803                                        | 2500-072601-040 | 7PIN 260MM 1CONN CABLE AWG#26 2MMP        | 1  |
|                                              | 2507-145002-240 | D-ROW CABLE 14PIN 500MM 2.54MMP           | 1  |
|                                              | 2507-205002-240 | D-ROW CABLE 20PIN 500MM 2.54MMP           | 1  |
| U801                                         | 3001-120430-001 | INFRARED SENSOR PIC-12043TM               | 1  |
| VFD1                                         | 3106-081100-000 | VFD DISPLAY SVA-08MM11                    | 1  |
| <b>PCB</b>                                   |                 |                                           |    |
|                                              | 4883-500260-002 | FL8350 DISPLAY BOARD (VFD) REV B          | 1  |
| <b>FL8350 DIGITAL OUTPUT BOARD RESISTORS</b> |                 |                                           |    |
| R751                                         | 1001-001316-000 | CARBON FILM RESISTOR 100 OHM 1/6 W +-5%   | 1  |
| R753                                         | 1002-701316-000 | CARBON FILM RESISTOR 270 OHM 1/6W +-5%    | 1  |
| R750                                         | 1003-902316-000 | CARBON FILM RESISTOR 3.9K OHM 1/6 W +-5%  | 1  |
| R754/755                                     | 1004-700316-000 | CARBON FILM RESISTOR 47 OHM 1/6W +-5%     | 2  |
| R752                                         | 1004-703316-000 | CARBON FILM RESISTOR 47K OHM 1/6 W +-5%   | 1  |
| <b>CAPACITORS</b>                            |                 |                                           |    |
| C761-763                                     | 1100-103044-000 | CERAMIC CAP. 0.01UF/50V +-20%             | 3  |
| C7654/755                                    | 1100-104044-000 | CERAMIC CAP. 0.1uF/50V +-20%              | 2  |
| C751-752                                     | 1100-151045-000 | CERAMIC CAP. 150PF/50V +80% -20%          | 2  |
| C750                                         | 1102-101014-000 | ELECT. CAP. 100uF/16V +-20%               | 1  |
| <b>TRANSISTORS</b>                           |                 |                                           |    |
| Q750                                         | 1301-200300-100 | TRANSISTOR PNP KSR2003 (SAMSUNG)          | 1  |
| <b>MISCELLANEOUS</b>                         |                 |                                           |    |
| CN753                                        | 2300-002000-001 | STRAIGHT CONN WAFER 2PIN 2MMP JST         | 1  |
| CN752                                        | 2300-003000-001 | STRAIGHT CONN WAFER 3PIN 2MMP JST         | 1  |
| U751                                         | 2320-004911-002 | 3.5MM EARPHONE JACK (JY3552-31-230)MONO   | 1  |
| U753                                         | 2330-002901-000 | RCA JACK RJ-1081-020-000                  | 1  |
| U752                                         | 2330-003911-003 | RCA JACK AV-2-8.4-9                       | 1  |
| CN752 TO CN711                               | 2500-031501-050 | 3PIN 150MM 1CONN CABLE AWG#28 UL1571 2mmP | 1  |
|                                              | 2605-100502-000 | 50MM GND WIRE 1RING (M3) AWG#22 BLK       | 2  |
| <b>INTEGRATED CRICUITS</b>                   |                 |                                           |    |
| U750                                         | 4181-700010-000 | I.C. LTV817B LITON                        | 1  |
| <b>PCB</b>                                   |                 |                                           |    |
|                                              | 4883-500290-003 | FL8350 DIGITAL OUTPUT BOARD REV C         | 1  |

**FL8350 SENSOR BOARD**
**RESISTORS**

|    |                 |                                         |   |
|----|-----------------|-----------------------------------------|---|
| R2 | 1004-701316-000 | CARBON FILM RESISTOR 470 OHM 1/6 W +-5% | 1 |
| R1 | 1007-501316-000 | CARBON FILM RESISTOR 750 OHM 1/6W +-5%  | 1 |

**MISCELLANEOUS**

|     |                 |                                           |   |
|-----|-----------------|-------------------------------------------|---|
| CN1 | 2300-002010-000 | RIGHT ANGLE CONN WAFER 2PIN 2MMP          | 1 |
| CN2 | 2300-006010-000 | HORIZONTAL CONN. WAFER 6 PINS 2mmP        | 1 |
|     | 2500-021201-050 | 2PIN 120MM 1CONN CABLE AWG#26 2MMP        | 1 |
|     | 2506-062501-150 | 6PIN 250MM 2CONN RIBBON CABLE AWG#28 2MMP | 1 |
| D2  | 3001-820000-000 | INFARED SENSOR ST-8LR2 OPTO-SENSOR        | 1 |
| D1  | 3004-206000-000 | PHOTO COUPLER SG206 OPTO-SENSOR           | 1 |
| D3  | 3100-800000-000 | EMITTING FIODE EL-8L OPTO-SENSOR          | 1 |

**PCB**

|                 |                     |   |
|-----------------|---------------------|---|
| 4841-010130-003 | 5CD SENSOR BD REV C | 1 |
|-----------------|---------------------|---|

**FL8350 SWITCH BOARD**
**MISCELLANEOUS**

|    |                 |                                   |   |
|----|-----------------|-----------------------------------|---|
| J1 | 2300-003000-001 | STRAIGHT CONN WAFER 3PIN 2MMP JST | 1 |
|----|-----------------|-----------------------------------|---|

**FL8350 LOADER BOARD**
**MISCELLANEOUS**

|    |                 |                                            |   |
|----|-----------------|--------------------------------------------|---|
| J1 | 2300-003000-001 | STRAIGHT CONN WAFER 3PIN 2MMP JST          | 1 |
|    | 2300-006010-000 | HORIZONTAL CONN. WAFER 6 PINS 2mmP         | 1 |
|    | 2411-010120-012 | PU91 E04 LEAF SWITCH (SANYO 1EA4S13A00800) | 1 |
|    | 3002-000000-000 | SANYO OPICAL PICK UP                       | 1 |

**OPTICAL PICK-UP**

|                      |                 |                                         |   |
|----------------------|-----------------|-----------------------------------------|---|
|                      | 4800-310210-001 | 5CD LOADER BOARD REVA                   | 1 |
|                      | 4891-000060-002 | PCB,SPINDLE MOTOR CD-PCB-06UL REV B     | 1 |
|                      | 6091-050001-000 | PU91 IDLER GEAR A (DIA. 25X10MM)        | 1 |
|                      | 6091-050002-001 | PU91 IDLER GEAR B (DIA. 23.3X10.5MM)    | 1 |
|                      | 6091-050003-000 | PU91 MOTOR GEAR (DIA. 6X6.7MM)          | 1 |
|                      | 6091-050004-000 | PU91 FEEDING GEAR (43X12)               | 1 |
|                      | 6091-050005-001 | PU91 TURNTABLE ASS'Y                    | 1 |
|                      | 6600-020006-000 | PU91L02 GUIDE PIN B (DIA. 3X80MM)       | 1 |
|                      | 6600-020007-000 | PU91L01 GUIDE PIN A (DIA. 3X68MM)       | 1 |
|                      | 7002-003010-022 | SCREW M2X3 P/H                          | 5 |
|                      | 7002-005010-042 | SCREW M2X5 NO.1 FLAT (1/K) COUNTER HEAD | 2 |
|                      | 7002-606004-032 | SCREW M2.6X6 1/P C.T.P.                 | 4 |
| DGMEWD980120/98-6-10 | 9101-633700-000 | SOLDER WIRE 63/37                       | 0 |
|                      | 9113-000000-000 | SCREW GLUE SL-118, RED                  | 0 |
|                      | 9115-000020-000 | GREASE DIAMOND #2                       | 0 |
|                      | 9115-000501-000 | SILICON GREASE SHINETSE #G501           | 0 |

|                 |                      |                               |   |
|-----------------|----------------------|-------------------------------|---|
|                 | 9291-050000-010      | PU91 BASE ASSY                | 1 |
|                 | 6591-050001-003      | PU91T BASE                    | 1 |
|                 | 6600-020008-001      | PU91L03a IDLER GEAR SHAFT     | 2 |
| ALT PART 4A0200 | RF-310T-11400-04917A | MOTOR RF-310T-11400 (19.7)    | 1 |
| ALT PART 4A210  | RF-310T-11400-04918A | MOTOR RF-310T-11400 (10.9)    | 1 |
|                 | 9115-000501-000      | SILICON GREASE SHINETSE #G501 | 1 |

## FL8350 TURN TABLE

|                 |                                           |   |
|-----------------|-------------------------------------------|---|
| 2300-006000-000 | STRAIGHT CONN. WAFER 6 PINS 2mmP          | 1 |
| 2501-062801-150 | 6PIN 280MM 2CONN RIBBON CABLE AWG#28 2MMP | 1 |
| 4841-010700-005 | 5CD TURN TABLE PCB REV E                  | 1 |

## FL8350 FCC

|                                   |                 |                                   |   |
|-----------------------------------|-----------------|-----------------------------------|---|
| J7,C366/CN2                       | 1100-103044-000 | CERAMIC CAP. 0.01UF/50V +-20%     | 4 |
| C334(+),CN318(GND)/C368,C359(GND) | 1100-104044-000 | CERAMIC CAP. 0.1uF/50V +-20%      | 2 |
| CN313,CN314                       | 1503-161280-100 | FERRITE COIL T16128 SIZE: 16X12X8 | 1 |
| CN752/753                         | 4002-311975-000 | TOROID COILS "T31X19X7.5MM"       | 2 |

## FL8350 PACKING

|                      |                                                   |   |
|----------------------|---------------------------------------------------|---|
| 2611-310009-000      | 1M AUDIO CABLE (ㇿ 岐工 白)                           | 1 |
| 2617-210009-000      | MIC INTERCONNECTION CABLE 1M                      | 1 |
| 5000-835001-000      | POLYFOAM, FL8350                                  | 2 |
| 5013-835001-000-0001 | HARMAN/KARDON FL8350 C/B (W 120V)                 | 1 |
| 5013-835001-000      | CARTON BOX FOR FL8350                             | 1 |
| 5100-835000-100      | OPERATION GUIDE (FL8350 120V)                     | 1 |
| 5103-835000-100      | LIMITED WARRANTY SHEET HARMAN V/E KARDON BLK      | 1 |
| 5103-835000-200      | WRRANTY SERVICE SHEET HARMAN KARDON 16.5X43CM V/E | 1 |
| 5113-000000-000-0001 | SERIAL NO LABEL (PRODUCT) FL8350 (120V)           | 1 |
| 5113-000000-000      | SERIAL NUMBER LABEL, BLANK (6.5X35.5MM)           | 1 |
| 5113-000000-000-0005 | MANUFACTURE DATE CODE LABEL (PRODUCT) FL8350 120V | 1 |
| 5113-000000-000      | SERIAL NUMBER LABEL, BLANK (6.5X35.5MM)           | 1 |
| 5113-835100-100-0001 | BAR CODE SERIAL NUMBER LABEL (YC0001-01001)       | 2 |
| 5113-835100-100      | SERIAL NUMBER LABEL, BLANK 70X17MM (WHITE)        | 1 |
| 5199-835000-100      | SAFETY PRECAUTIONS SHEET HARMAN KARDON V/E BLK    | 1 |
| 5200-230321-030-0001 | POLYBAG FOR ACCESSORIES (FL8350/FL8550)           | 1 |
| 5200-230321-030      | POLYBAG 230X321X3C MM (PE)                        | 1 |
| 5200-600600-040-0003 | POLYBAG FOR UNIT (FL8350/FL8550)                  | 1 |
| 5200-600600-040      | POLYBAG 600X600X4C MM                             | 1 |
| 5206-500160-050      | E.P.E. SHEET P-EP500160-05                        | 1 |

## FL8350 REMOTE UNIT

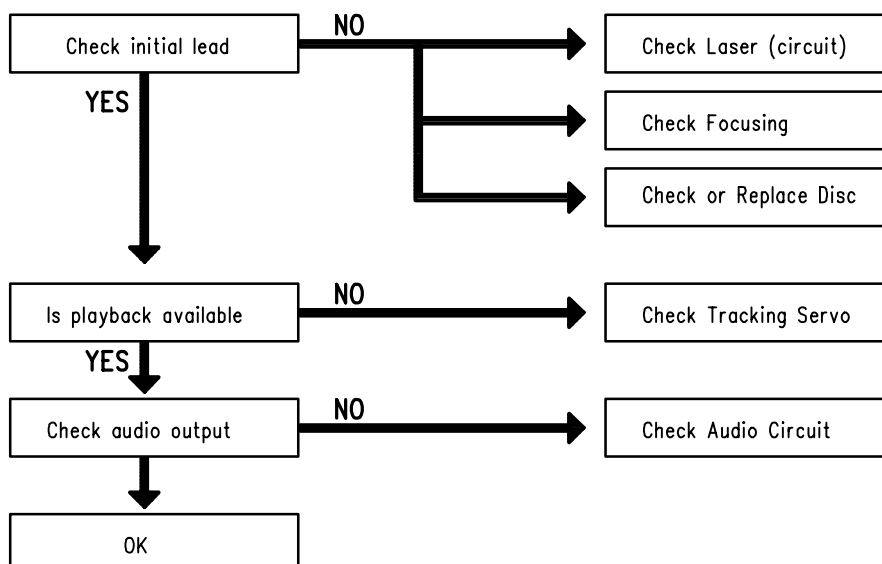
|                 |                      |   |
|-----------------|----------------------|---|
| 5200-080250-030 | POLYBAG 80X250X3C MM | 1 |
|-----------------|----------------------|---|

|                                    |                                             |                                            |
|------------------------------------|---------------------------------------------|--------------------------------------------|
| 6002-000001-000-0010               | HARMAN/KARDON FL8350 TOP CASE (W/G PRINTED) | 1                                          |
| 6002-000001-000                    | RT02-P001 CASE TOP                          | 1                                          |
| 6002-000002-000                    | RT02-P002 CASE BOTTOM                       | 1                                          |
| 6002-000003-000                    | RT02-P003 COVER BATTERY                     | 1                                          |
| 6003-000012-000-0001               | HARMAN/KARDON FL8350&8550 R/C INLAY         | 1                                          |
| 6003-000012-000                    | INLAY 31 KEYS FOR RT03                      | 1                                          |
| 6600-010156-001                    | CONTACT BATTERY COMMON                      | 1                                          |
| 6600-010157-000                    | RT02-S002 CONTACT BATTERY POS               | 1                                          |
| 6600-010158-000                    | RT02-S003 CONTACT BATTERY NEG               | 1                                          |
| 6600-070088-000                    | KEY PAD 31 KEYS FOR RT03                    | 1                                          |
| FOR REAR PANEL                     |                                             |                                            |
| 7002-008002-021                    | SCREW M2X8 P TYPE P/H BLK                   | 1                                          |
| <b>FL8350 REMOTE CONTROL BOARD</b> |                                             |                                            |
| <b>RESISTORS</b>                   |                                             |                                            |
| R2-5                               | 1001-004316-000                             | CARBON FILM RESISTOR 100K OHM 1/6 W +-5% 4 |
| R1                                 | 1001-507314-000                             | CARBON FILM RESISTOR 1.5 OHM 1/4W +-5% 1   |
| <b>CAPACITOR</b>                   |                                             |                                            |
| C2-3                               | 1100-221043-000                             | CERAMIC CAP. 220pF/50V +- 10% 2            |
| C1                                 | 1102-470114-000                             | ELECT. CAP. 47uF/6.3V +-20% MINI SIZE 1    |
| <b>TRANSISTORS</b>                 |                                             |                                            |
| Q1                                 | 1300-246800-103                             | TRANSISTOR NPN 2SD468C 1                   |
| <b>DIODE</b>                       |                                             |                                            |
| D1                                 | 1401-113300-000                             | DIODE 1SS133, ROHM 1                       |
| <b>MISCELLANEOUS</b>               |                                             |                                            |
| Y1                                 | 1600-455001-990                             | CERAMIC RESONATOR KBR455BTLR22 "KYOCE" 1   |
| LED1                               | 3100-120000-001                             | INFRARED LED EL-1L2 1                      |
| <b>INTEGRATED CRICUIT</b>          |                                             |                                            |
| U1                                 | 4122-220103-800                             | I.C. PT2222 1                              |
| <b>PCB</b>                         |                                             |                                            |
| 4883-500080-001                    | FL8350 REMOTE CONTROL BOARD REV A           | 1                                          |

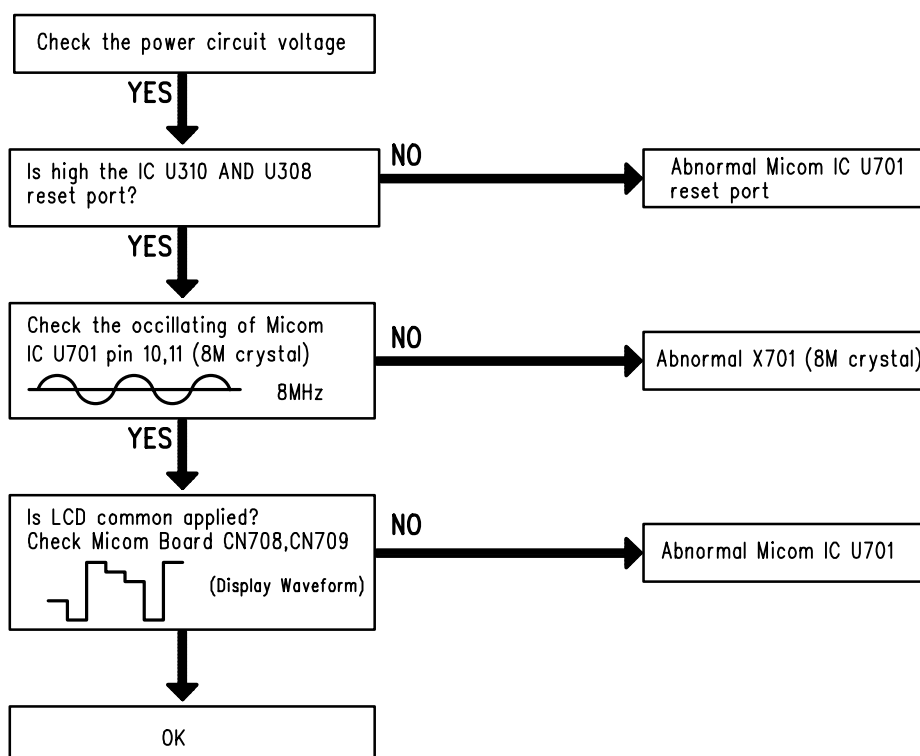
# MECHANICAL PARTS LIST

| REF. NO. | PART NO.             | DESCRIPTION                                         | QTY |
|----------|----------------------|-----------------------------------------------------|-----|
| 1        | 9801-835000-001      | FL8350 120V CUL (HARMAN) REV A                      | 1   |
| 2        | 9683-501000-002      | FL8350 MECHAN ASSY 120V CUL REV B                   | 1   |
| 3        | 6029-010012-000-XXXX | PLASTICS FOOT, HOT STAMP                            | 4   |
| 4        | 6029-010012-000      | PLASTICS FOOT                                       | 1   |
| 5        | 6083-510001-000-0001 | HARMAN/KARDON FL8350 FRONT PANEL (W SILKSCREEN&P)   | 1   |
| 6        | 6083-510001-000      | FL8350 FRONT PANEL                                  | 1   |
| 7        | 6083-510002-000-0001 | HARMAN/KARDON FL8350&FL8550 TRAY DOOR(W SILKSCREEN) | 1   |
| 8        | 6083-510002-000      | DOOR, CD                                            | 1   |
| 9        | 6083-510003-000-0002 | HARMAN/KARDON FL8350 DISPLAY LENS (W SILKSCREEN)    | 1   |
| 10       | 6083-510003-000      | LENS, DISPLAY                                       | 1   |
| 11       | 6083-510004-000-XXXX | KNOB, DISC, PAINTED                                 | 1   |
| 12       | 6083-510004-000      | KNOB, DISC                                          | 1   |
| 13       | 6083-510005-000-XXXX | KNOB, PROGRAM, PAINTED                              | 1   |
| 14       | 6083-510005-000      | KNOB, PROGRAM                                       | 1   |
| 15       | 6083-510006-000-XXXX | KNOB, VR, PAINTED                                   | 1   |
| 16       | 6083-510006-000      | KNOB, VR                                            | 1   |
| 17       | 6083-510007-000-XXXX | KNOB, POWER, PAINTED                                | 1   |
| 18       | 6083-510007-000      | KNOB, POWER                                         | 1   |
| 19       | 6083-510008-000      | LENS, POWER KNOB                                    | 1   |
| 20       | 6083-510009-000-0001 | HARMAN/KARDON "EJECT" KNOB (W SILKSCREEN&PAINTED)   | 1   |
| 21       | 6083-510009-000      | KNOB, OPEN/CLOSE                                    | 1   |
| 22       | 6083-510010-000-0001 | HARMAN/KARDON FUNCTION KNOB (W SILKSCREEN&PAINTED)  | 1   |
| 23       | 6083-510010-000      | KNOB, PLAY                                          | 1   |
| 24       | 6083-510011-000      | STAND, FRONT-5CD                                    | 2   |
| 25       | 6083-510012-000      | STAND, REAR-5CD                                     | 1   |
| 26       | 6083-510013-000      | BRACKET, 5CD-SIDE 1                                 | 1   |
| 27       | 6083-510014-000      | BRACKET, 5CD-SIDE 2                                 | 1   |
| 28       | 6083-510015-000      | LIGHT SHEET, BLACK                                  | 1   |
| 29       | 6083-510016-000      | BRACKET, WIRE                                       | 1   |
| 30       | 6505-050003-001      | 5CD CABINET HOLDER B                                | 2   |
| 31       | 6583-510001-001      | BOTTOM CABINET                                      | 1   |
| 32       | 6583-510002-000-XXXX | TOP CABINET, PAINTED                                | 1   |
| 33       | 6583-510002-000      | TOP CABINET                                         | 1   |
| 34       | 6583-510003-001-0002 | HARMAN/KARDON FL8350 R/P (W 117V FCC&CSA            | 1   |

|    |                 |                               |    |
|----|-----------------|-------------------------------|----|
|    |                 | VR)                           |    |
| 35 | 6583-510003-001 | REAR CABINET                  | 1  |
| 36 | 6583-510004-000 | BRACKET, FRONT PANEL          | 1  |
| 37 | 6583-510006-000 | BRACKET, PHONES (MIC)         | 1  |
| 38 | 6600-010293-000 | SPRING, POWER SWITCH          | 1  |
| 39 | 6600-020010-000 | CD420L01 PCB MOUNT.           | 4  |
| 40 | 6600-070003-000 | CD90R05 RUBBER PAD,LEG        | 4  |
| 41 | 6600-120030-001 | NUT M3 HEX M3X5.5X2.4MM       | 1  |
| 42 | 6600-120040-000 | SCREW NUT M4X7X3              | 2  |
| 43 | 6600-210035-000 | PADCOCK 10X10X7MM             | 1  |
| 44 | 6600-210036-000 | PADCOCK FL 70X12X2.5MM        | 1  |
| 45 | 6600-260001-000 | LUG CS-1 BLK                  | 2  |
| 46 | 7002-606010-062 | SCREW M2.6X6 W/H              | 8  |
| 47 | 7003-006001-111 | SCREW M3X6 S.T.P. B/H (BLACK) | 32 |
| 48 | 7003-006002-112 | SCREW M3X6 P.T.P. B/H         | 10 |
| 49 | 7003-008001-111 | SCREW M3X8 S.T.P. B/H BLK     | 1  |
| 50 | 7003-008002-111 | SCREW M3X8 P.T.P. B/H (BLACK) | 7  |
| 51 | 7003-008002-112 | SCREW M3X8 P.T.P. B/H         | 28 |
| 52 | 7003-008003-112 | SCREW M3X8 B TYPE B/H ZN      | 2  |
| 53 | 7003-008010-111 | SCREW M3X8 B/H BLACK          | 1  |
| 54 | 7003-016002-112 | SCREW M3X16 PTP B/H ZN        | 3  |
| 55 | 7004-010010-112 | SCREW M4X10 B/H               | 2  |
| 56 | 7103-206005-022 | METAL WASHER M3.2X6X0.5MM     | 1  |
| 57 | 7104-010010-022 | WASHER M4X10X1MM              | 2  |
| 58 | 9110-120000-000 | CABLE TIE L=120MM             | 7  |

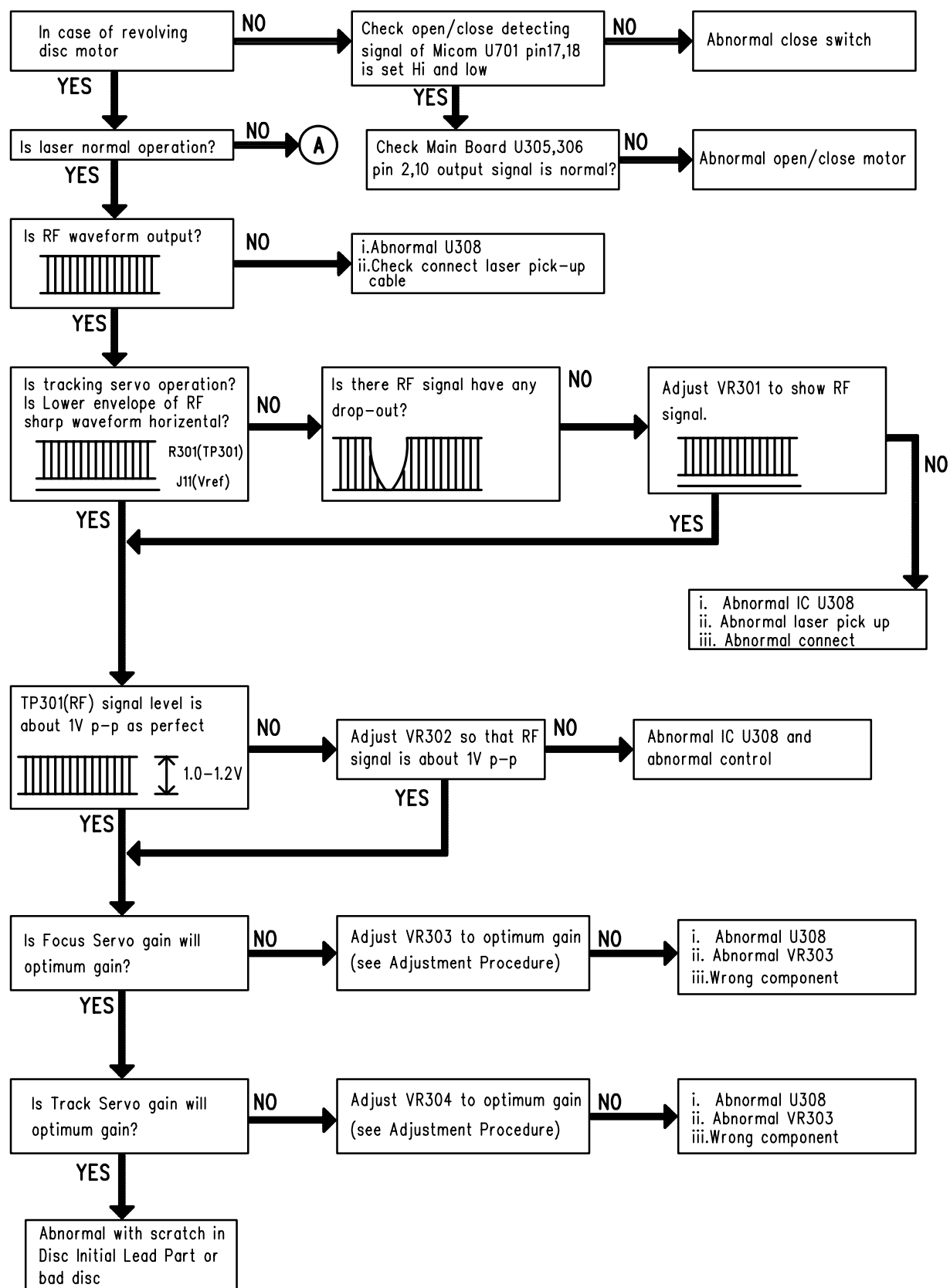


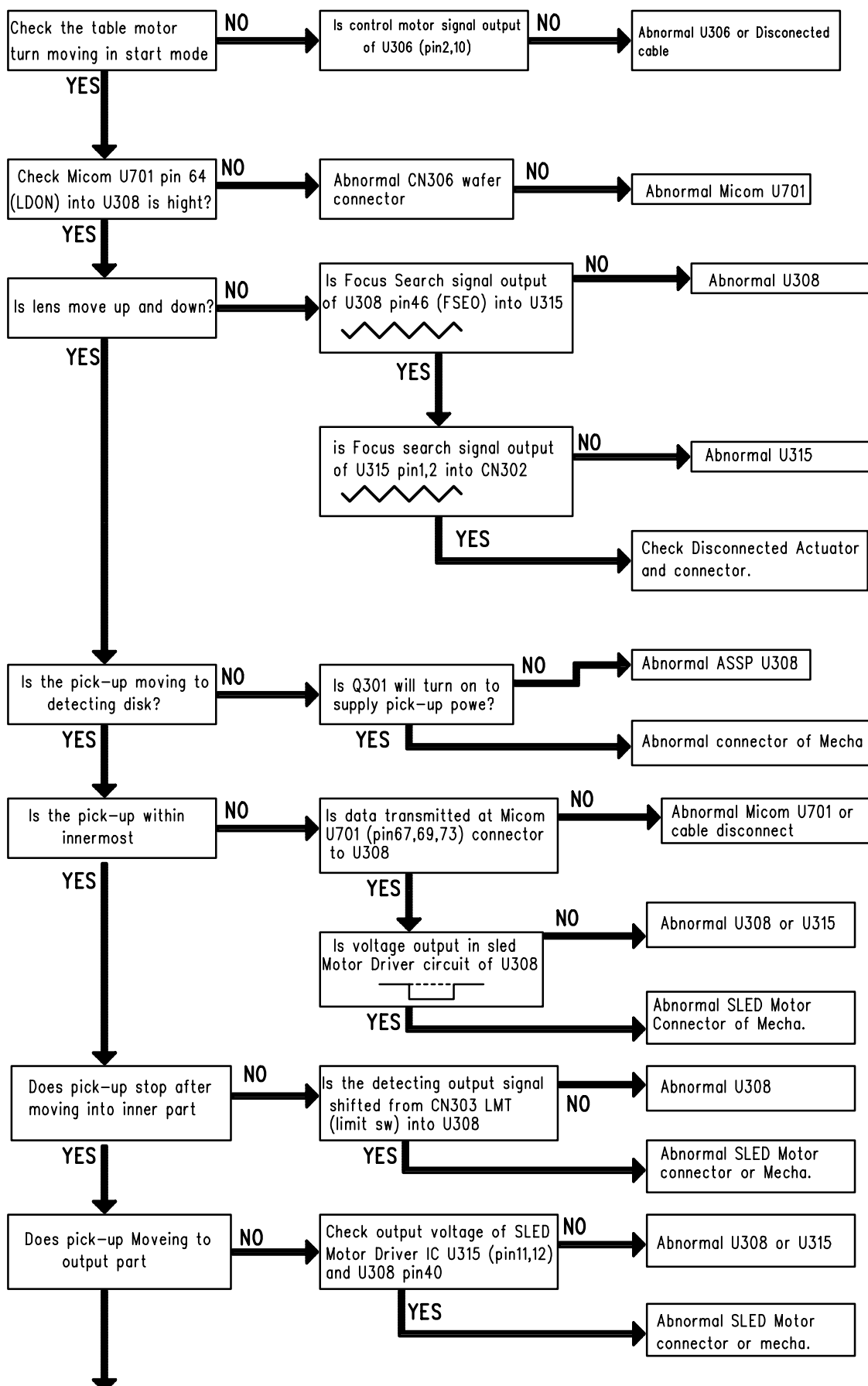
### In Case of Abnormal Indication



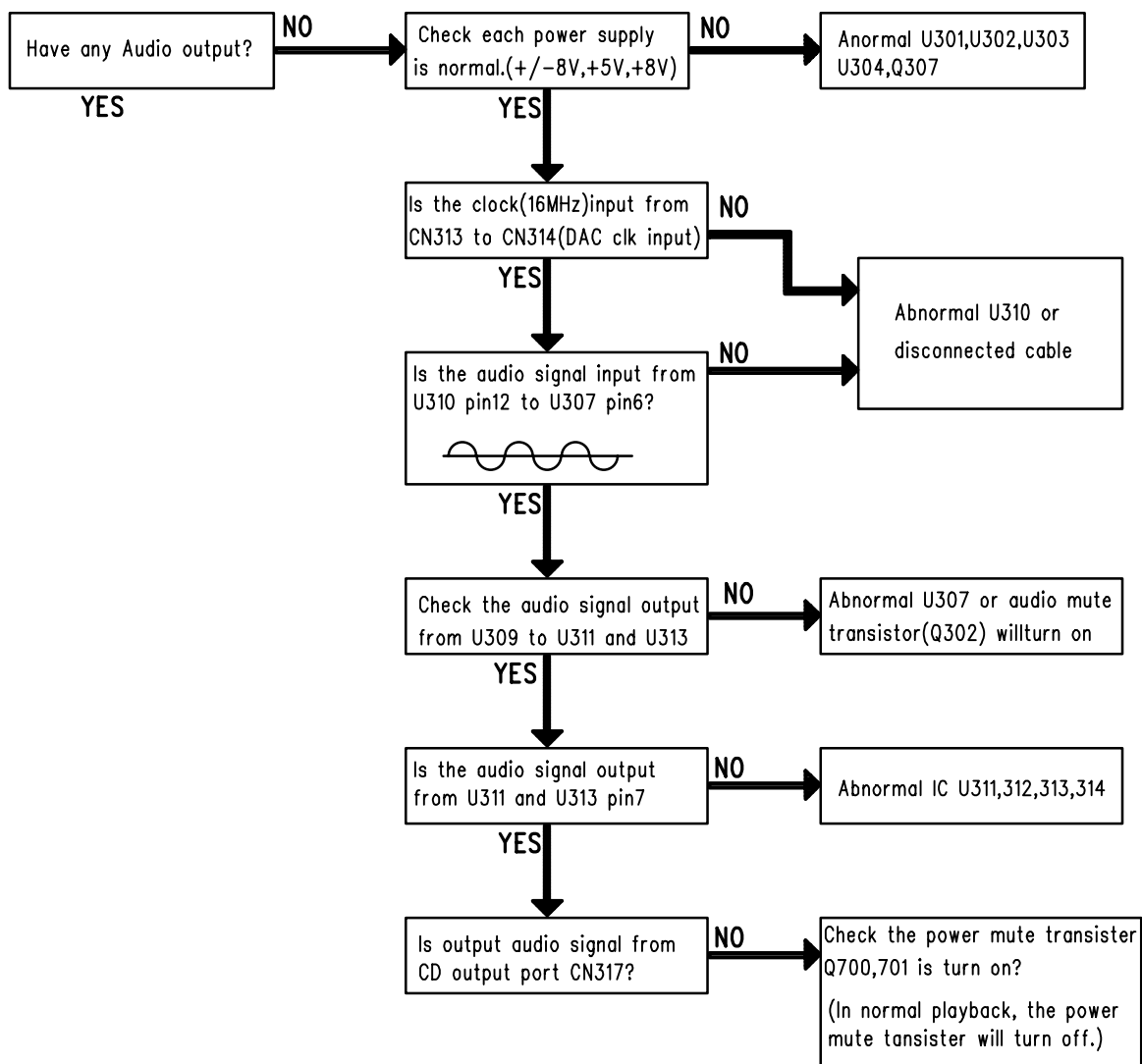


## When Initial Lead-In Is Not Operational

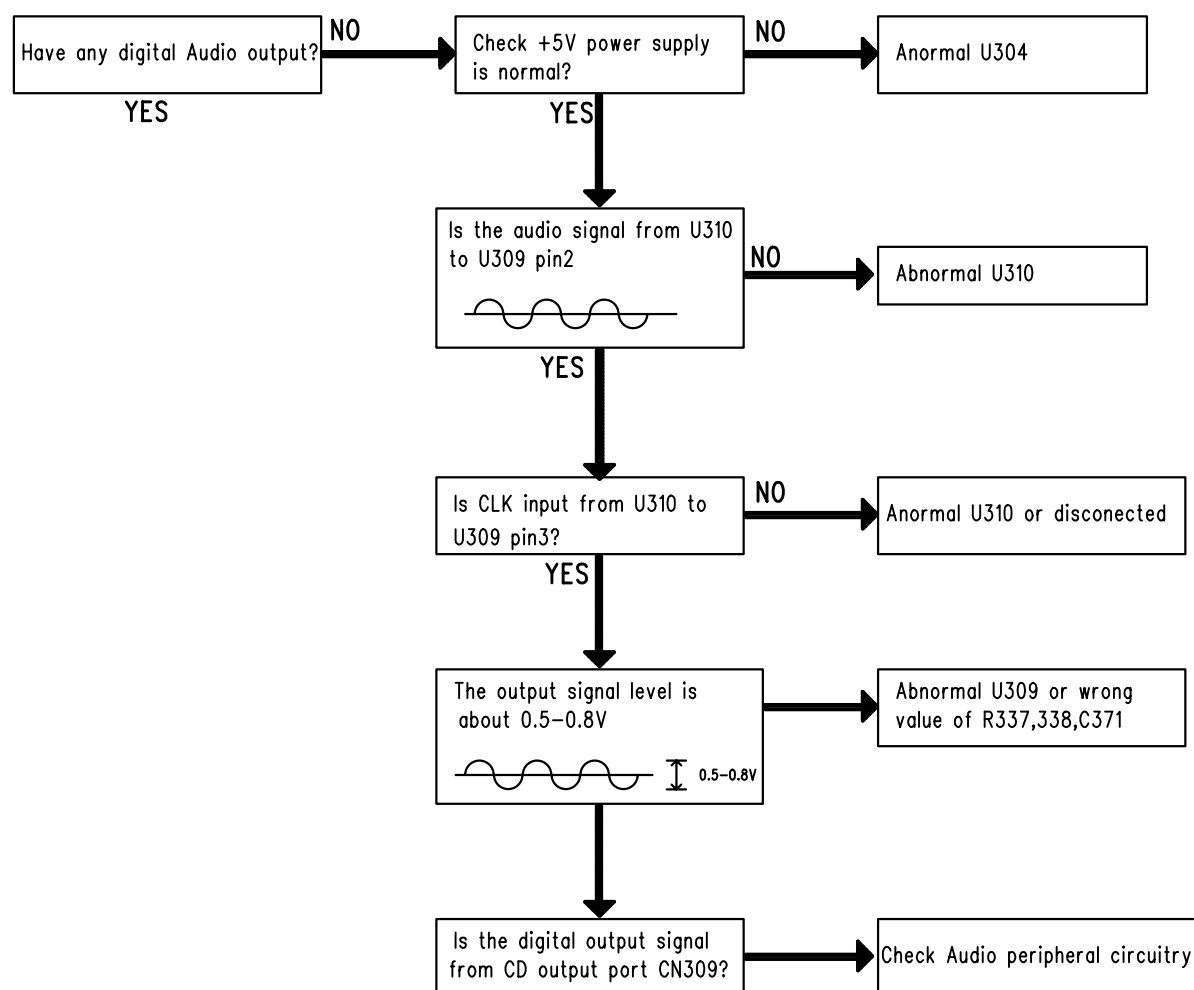




## 2) Audio Circuit Checking

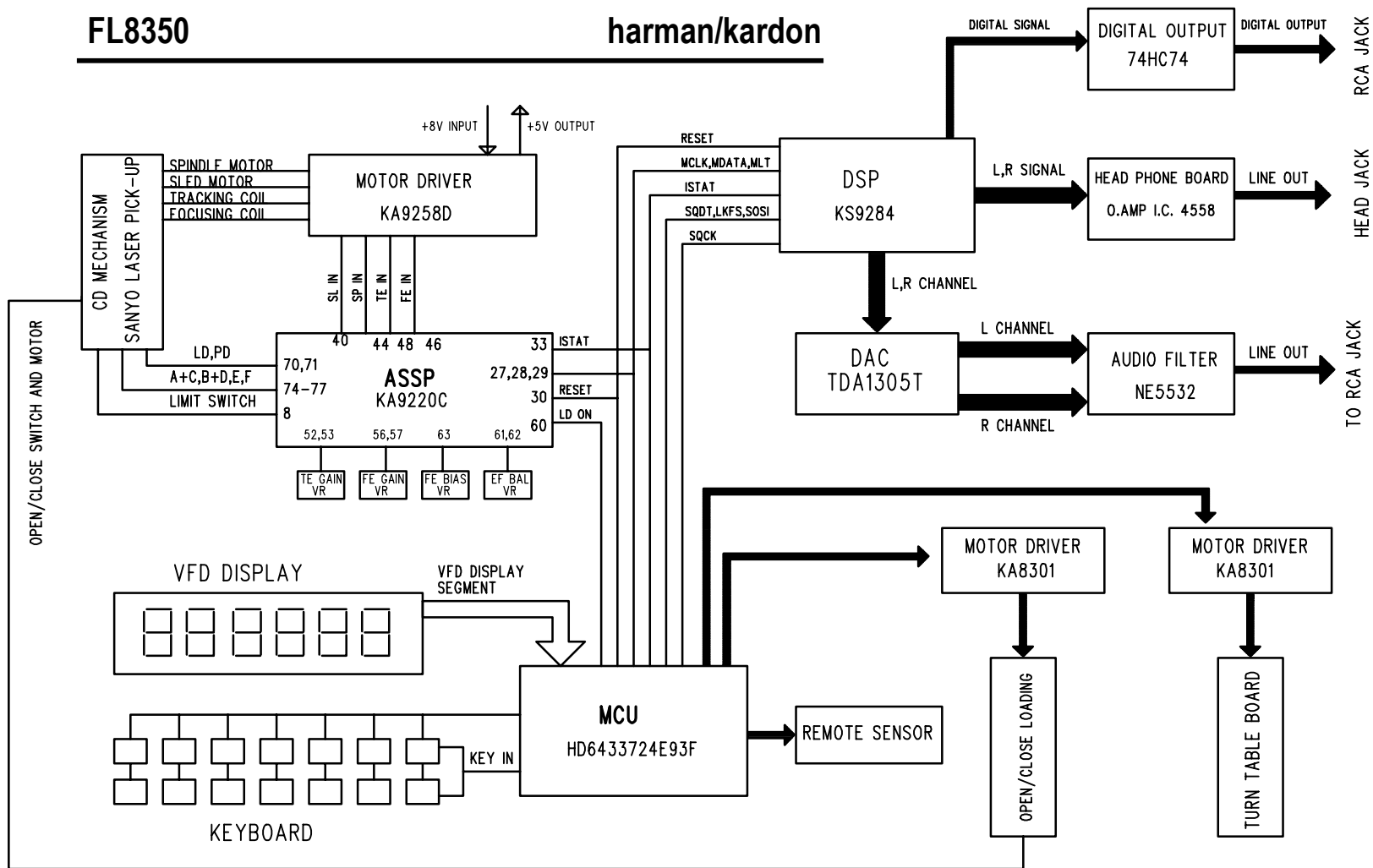


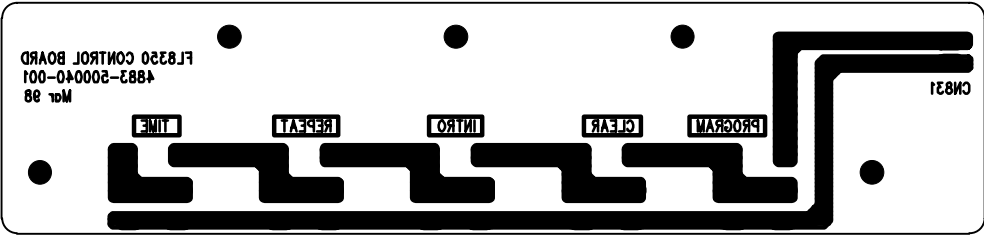
### 3) Digital Audio Circuit Checking



FL8350

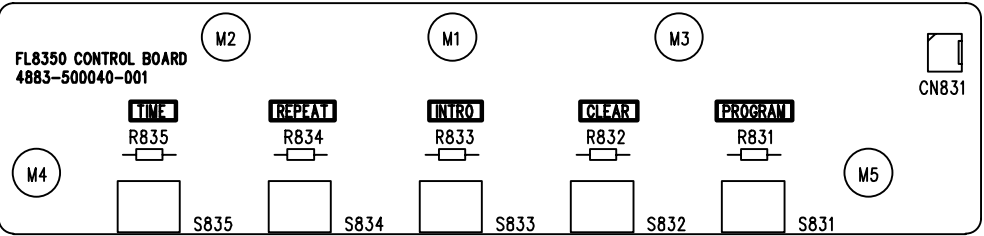
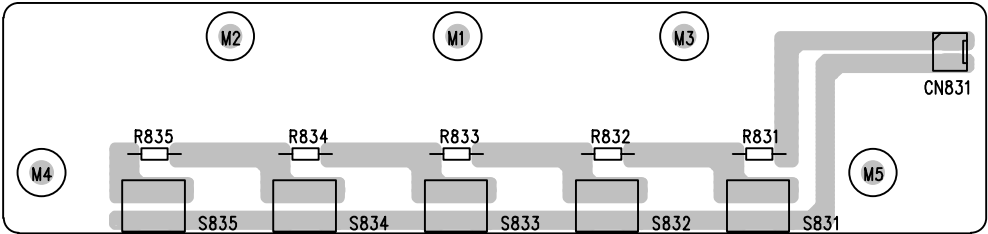
harman/kardon





PROJECT : FL8350  
CONTROL BOARD  
P/N : 4883-500040-001

3012 R3D102



PROJECT : FL8350  
CONTROL BOARD  
P/N : 4883-500040-001

SILK SCREEN

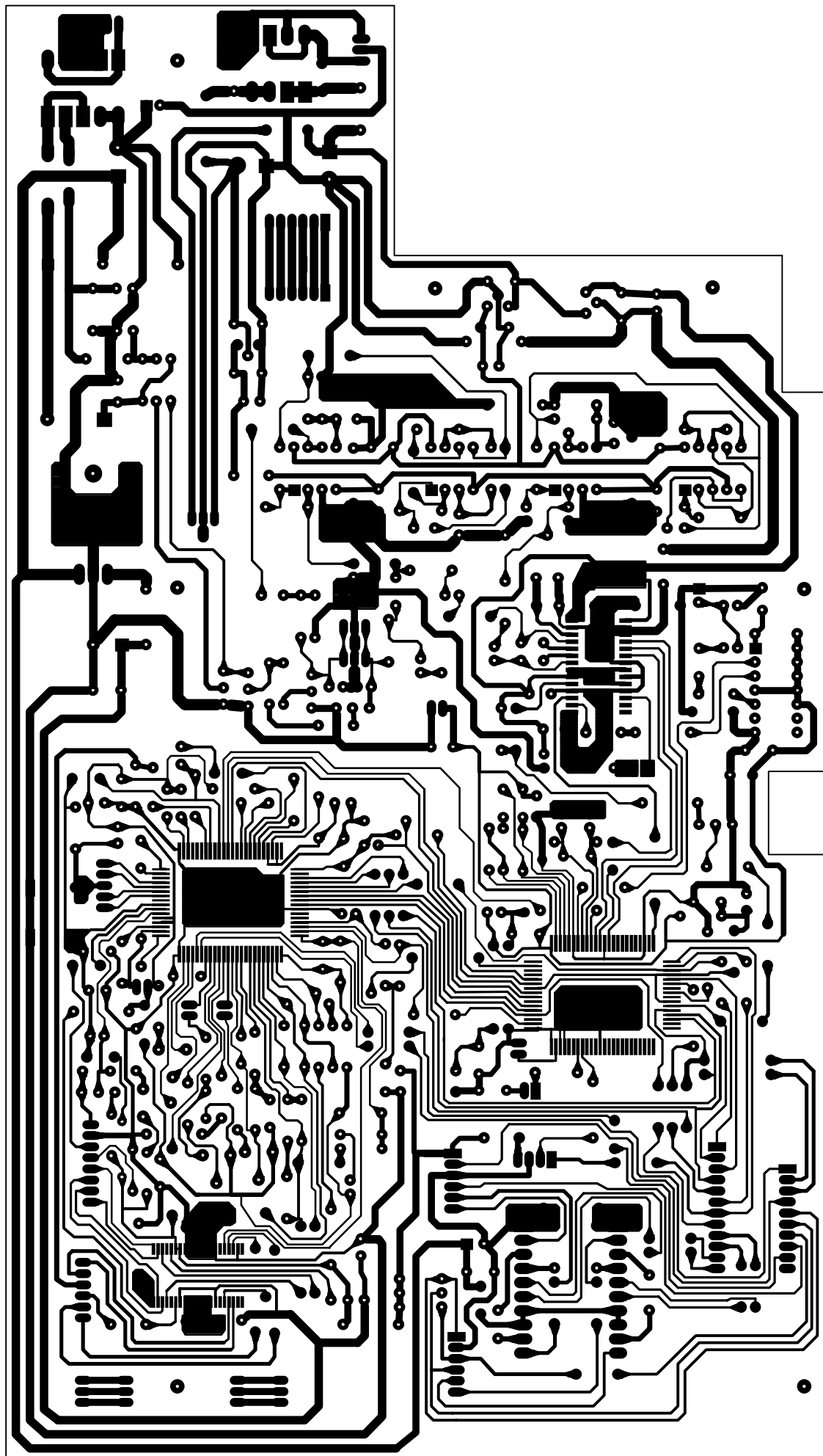


5CD-MD4.JOB  
01-06-1998

FL8350 MAIN BOARD

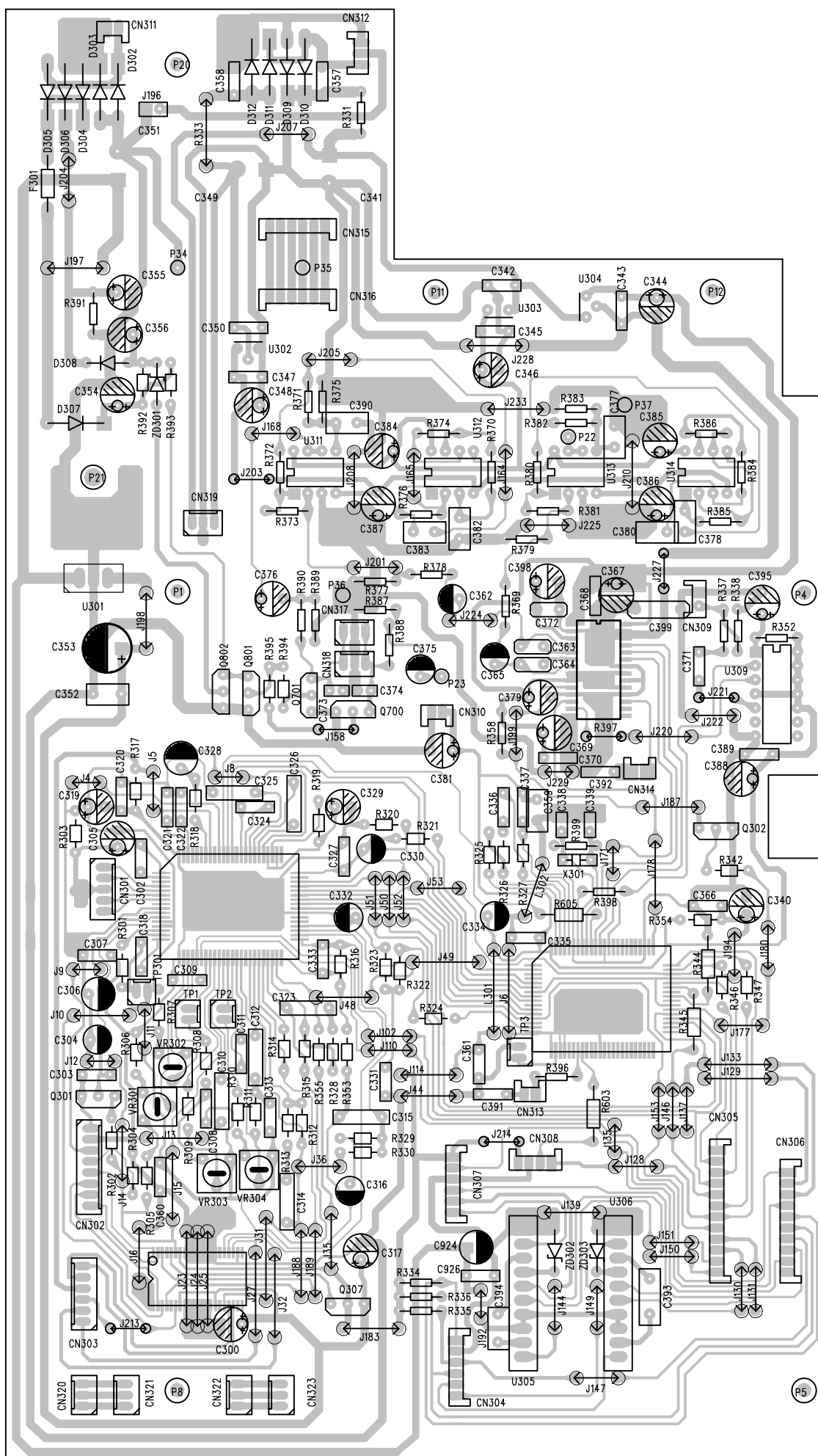
4883-500010-004

FL8350



20TDER SIDE

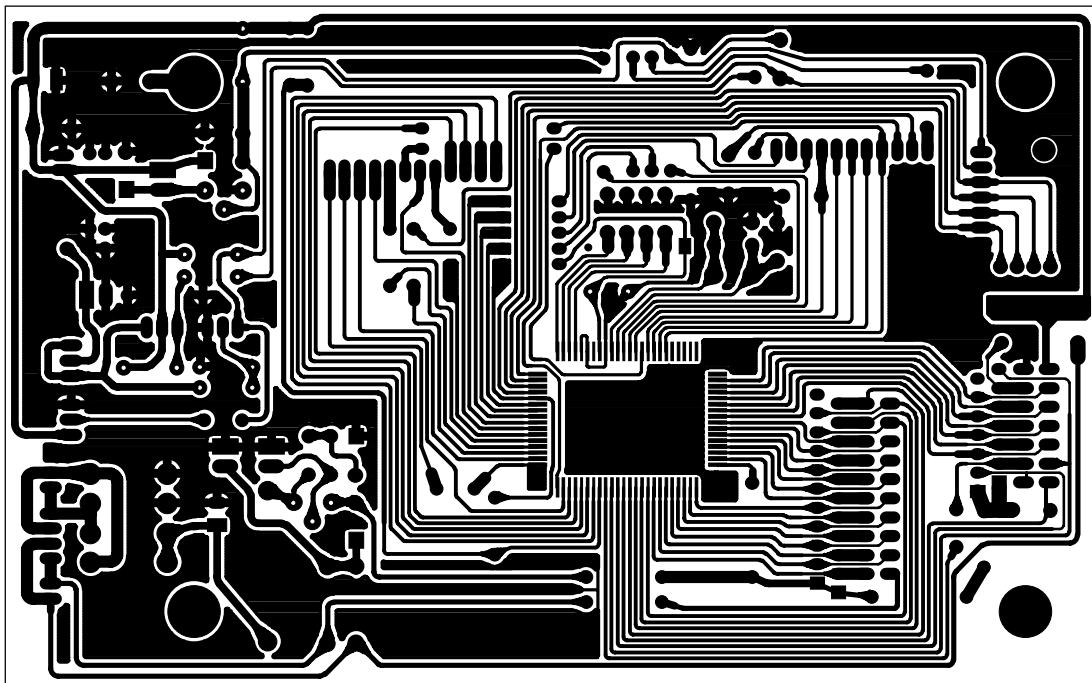






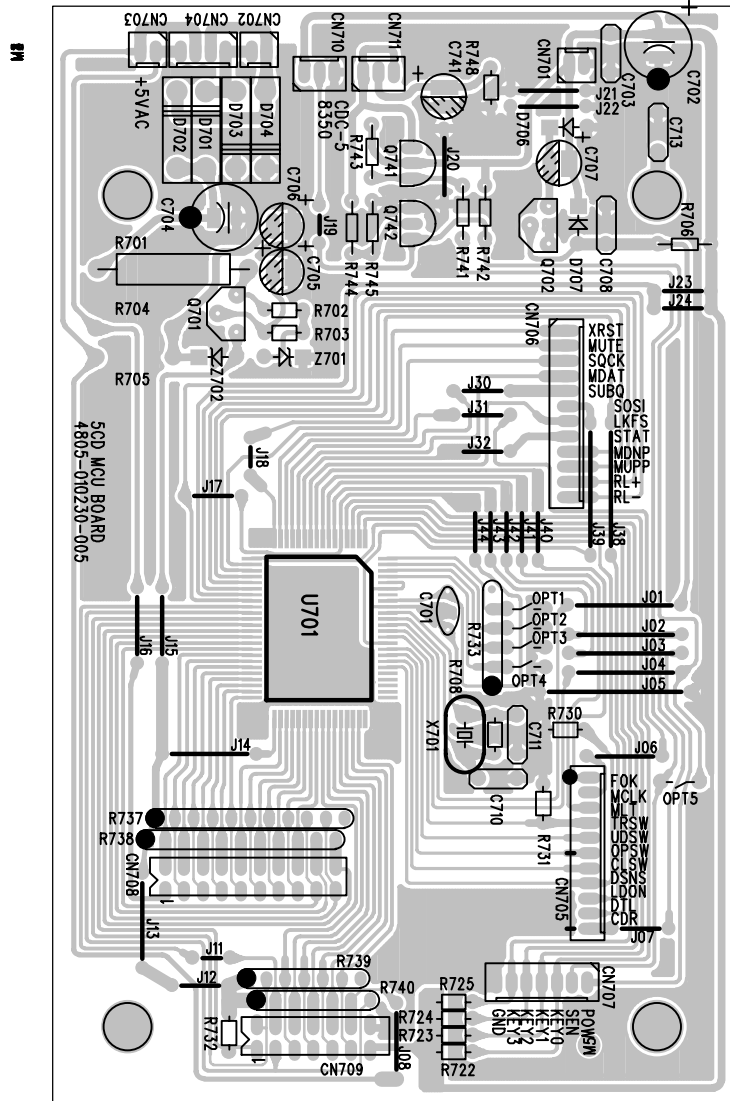
SILK SCREEN

**P/N:4805-010230-005**



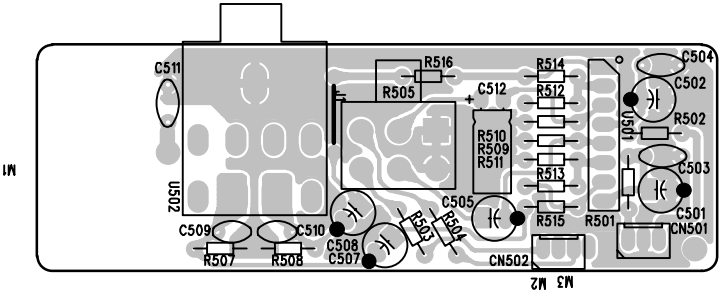
SOLDER SIDE

**P/N:4805-010230-005**

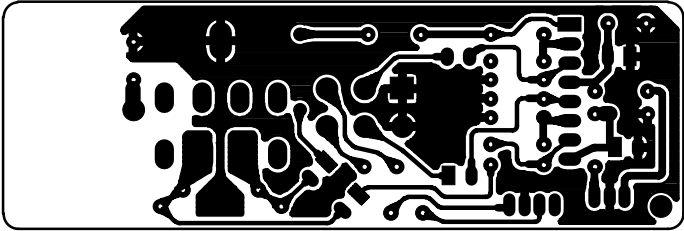
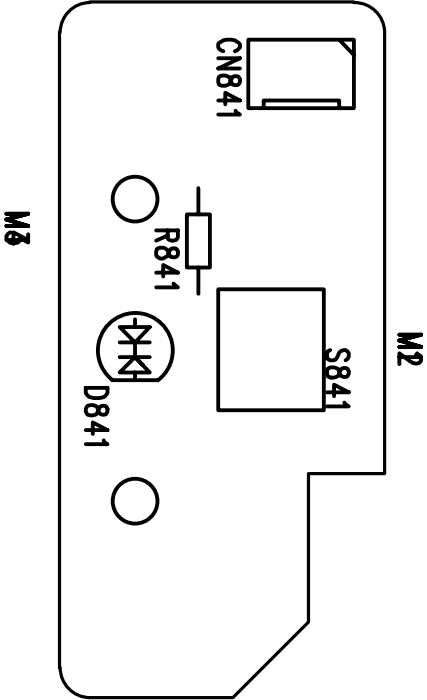


PROJECT : FL8350  
 SUB-PROJECT : MCU BOARD (VFD)  
 P/N:4805-010230-005

SILK SCREEN

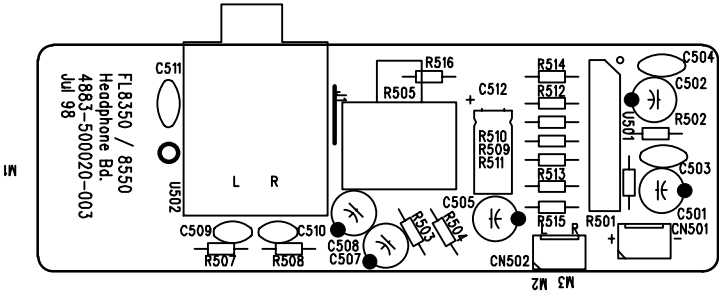


PROJECT : FL8350 HEADPHONE BOARD  
P/N : 4883-500020-003



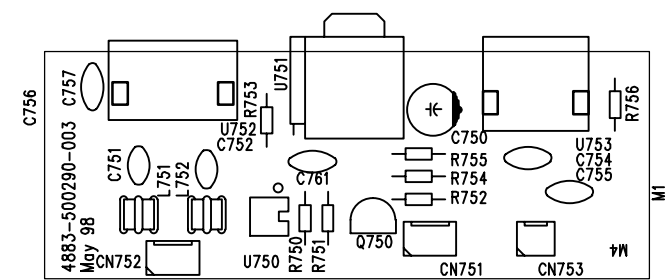
PROJECT : FL8350 HEADPHONE BOARD  
P/N : 4883-500020-003

2012 030102



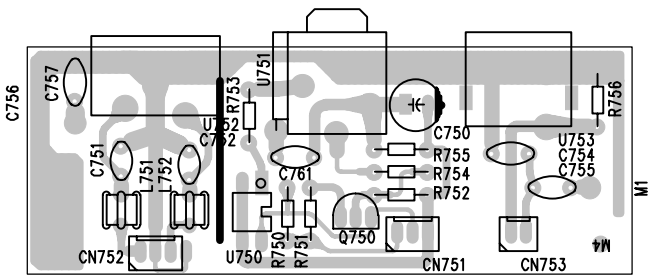
PROJECT : FL8350 HEADPHONE BOARD  
P/N : 4883-500020-003

SILK SCREEN



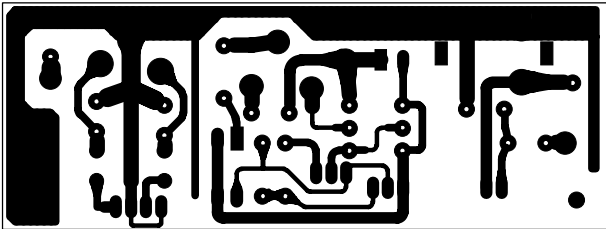
PROJECT : FL8350  
Remote Connection Board  
P/N : 4883-500290-003

Silk Screen



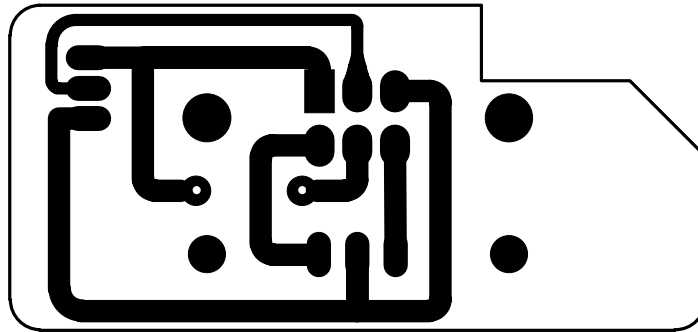
PROJECT : FL8350  
Remote Connection Board  
P/N : 4883-500290-003

2018 10 12



PROJECT : FL8350  
Remote Connection Board  
P/N : 4883-500290-003

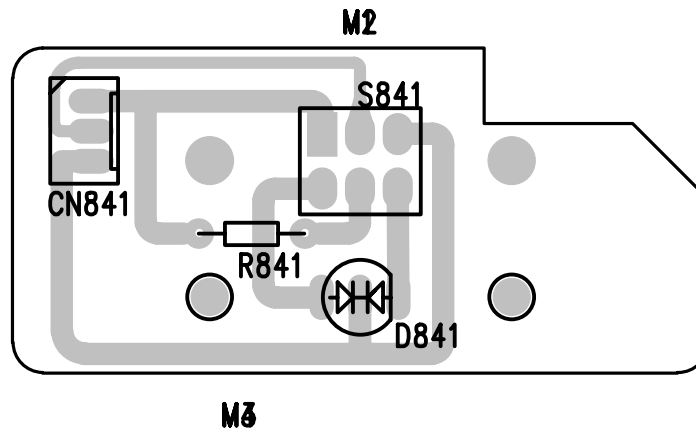
2018 10 12



PROJECT : FL8350

POWER CONTROL BD. 20D12 93D102

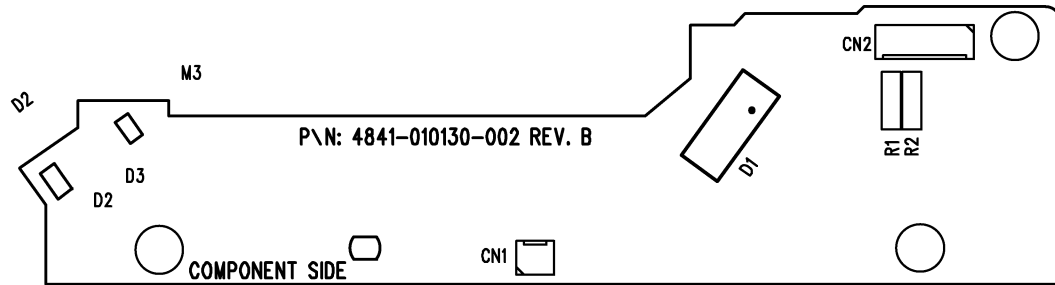
P/N : 4883-500110-002



PROJECT : FL8350

POWER CONTROL BD. 20D12 93D102

P/N : 4883-500110-002



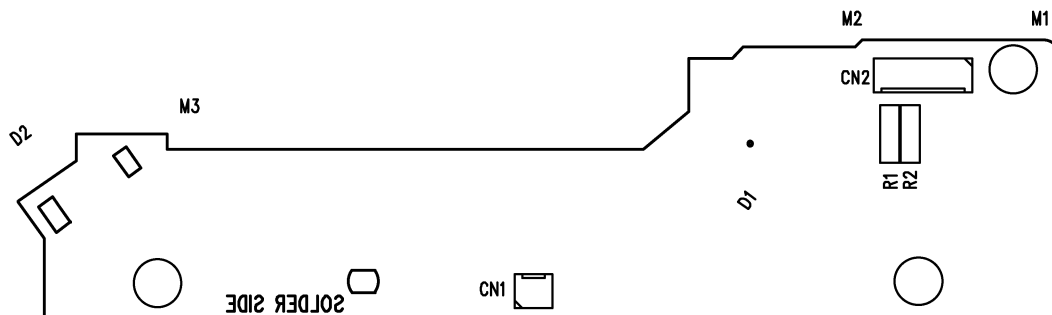
PROJECT: 5CD

SUBPROJECT:SENSOR BOARD

P\N: 4841-010130-002 REV.B

MATERIAL : 94V0, SINGLE SIDE, 1.6MM

SILK SCREEN



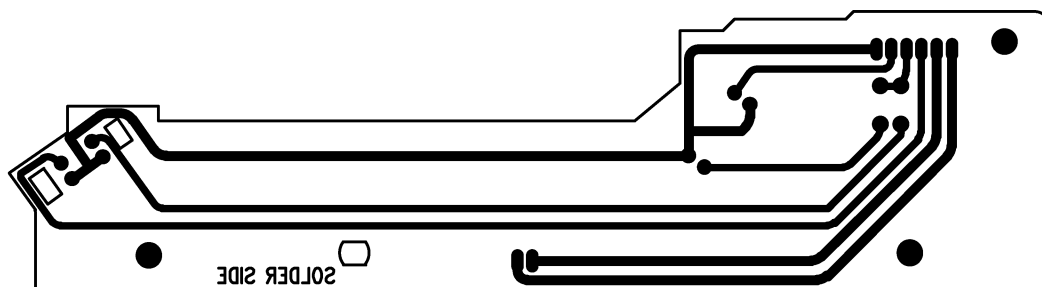
PROJECT: 5CD

SUBPROJECT:SENSOR BOARD

P\N: 4841-010130-002 REV.B

MATERIAL : 94V0, SINGLE SIDE, 1.6MM

20TH SIDE



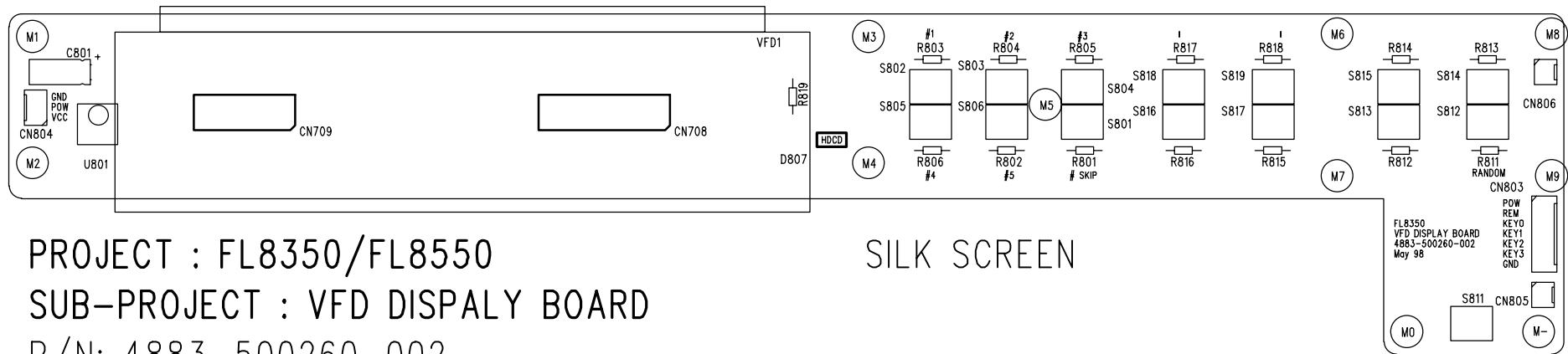
PROJECT: 5CD

SUBPROJECT:SENSOR BOARD

P\N: 4841-010130-002 REV.B

MATERIAL : 94V0, SINGLE SIDE, 1.6MM

20TH SIDE

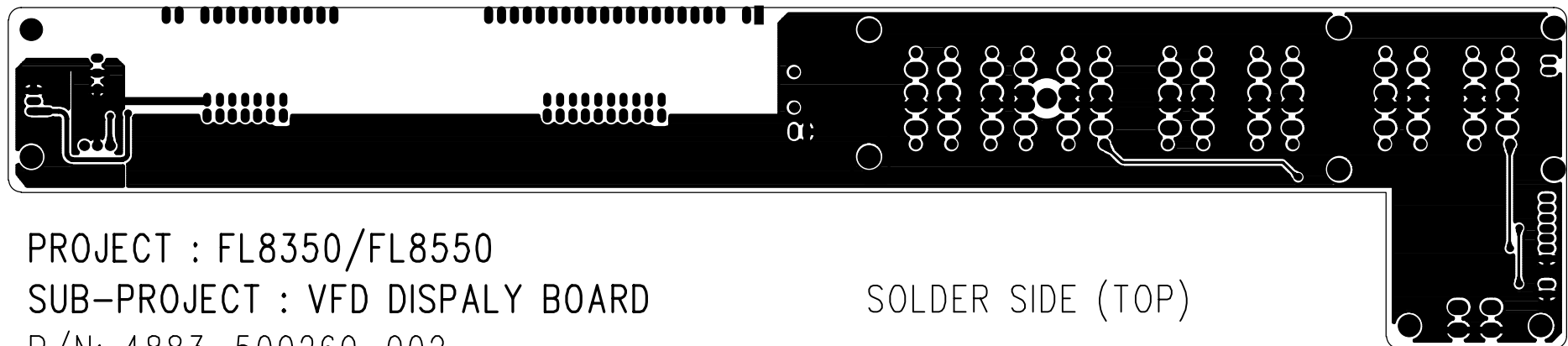


PROJECT : FL8350/FL8550

SUB-PROJECT : VFD DISPALY BOARD

P/N: 4883-500260-002

SILK SCREEN



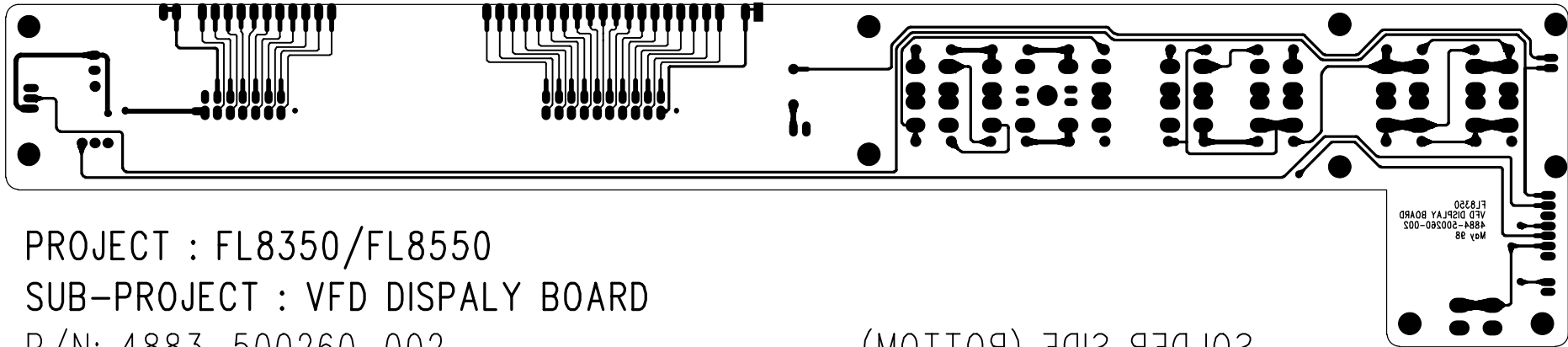
PROJECT : FL8350/FL8550

SUB-PROJECT : VFD DISPALY BOARD

P/N: 4883-500260-002

SOLDER SIDE (TOP)



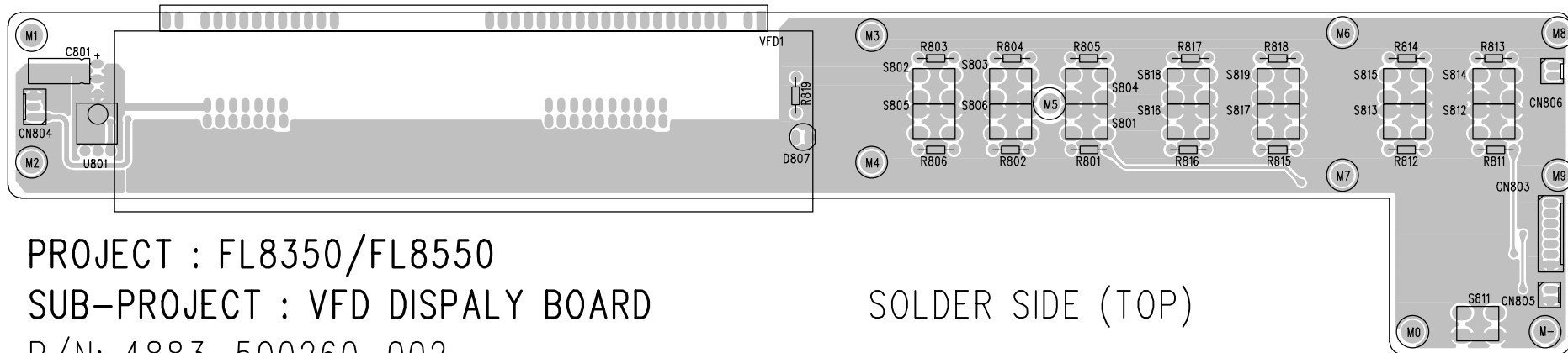


PROJECT : FL8350/FL8550

SUB-PROJECT : VFD DISPLAY BOARD

P/N: 4883-500260-002

(BOTTOM) SOLDER SIDE

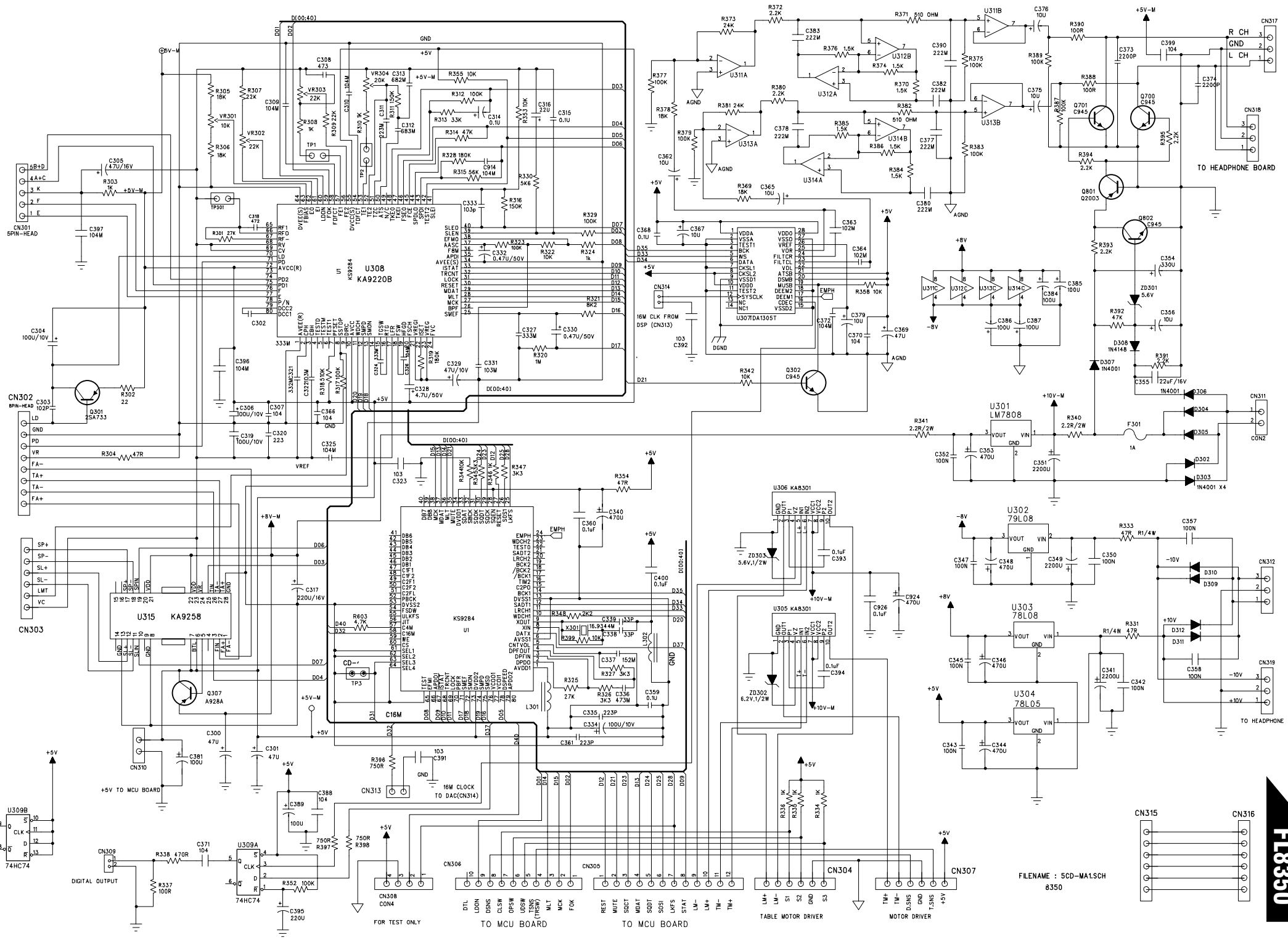


PROJECT : FL8350/FL8550

SUB-PROJECT : VFD DISPLAY BOARD

P/N: 4883-500260-002

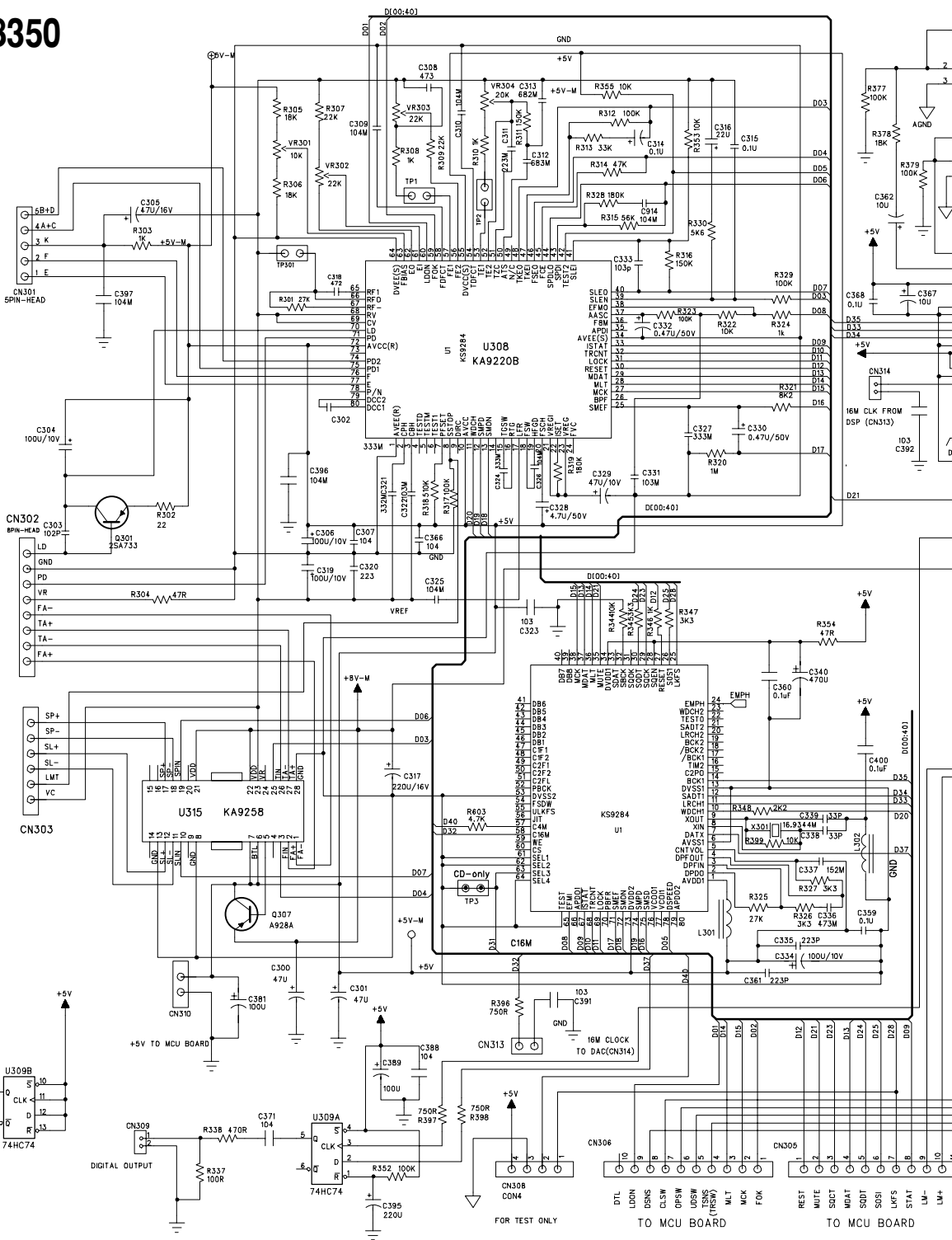
(TOP) SOLDER SIDE

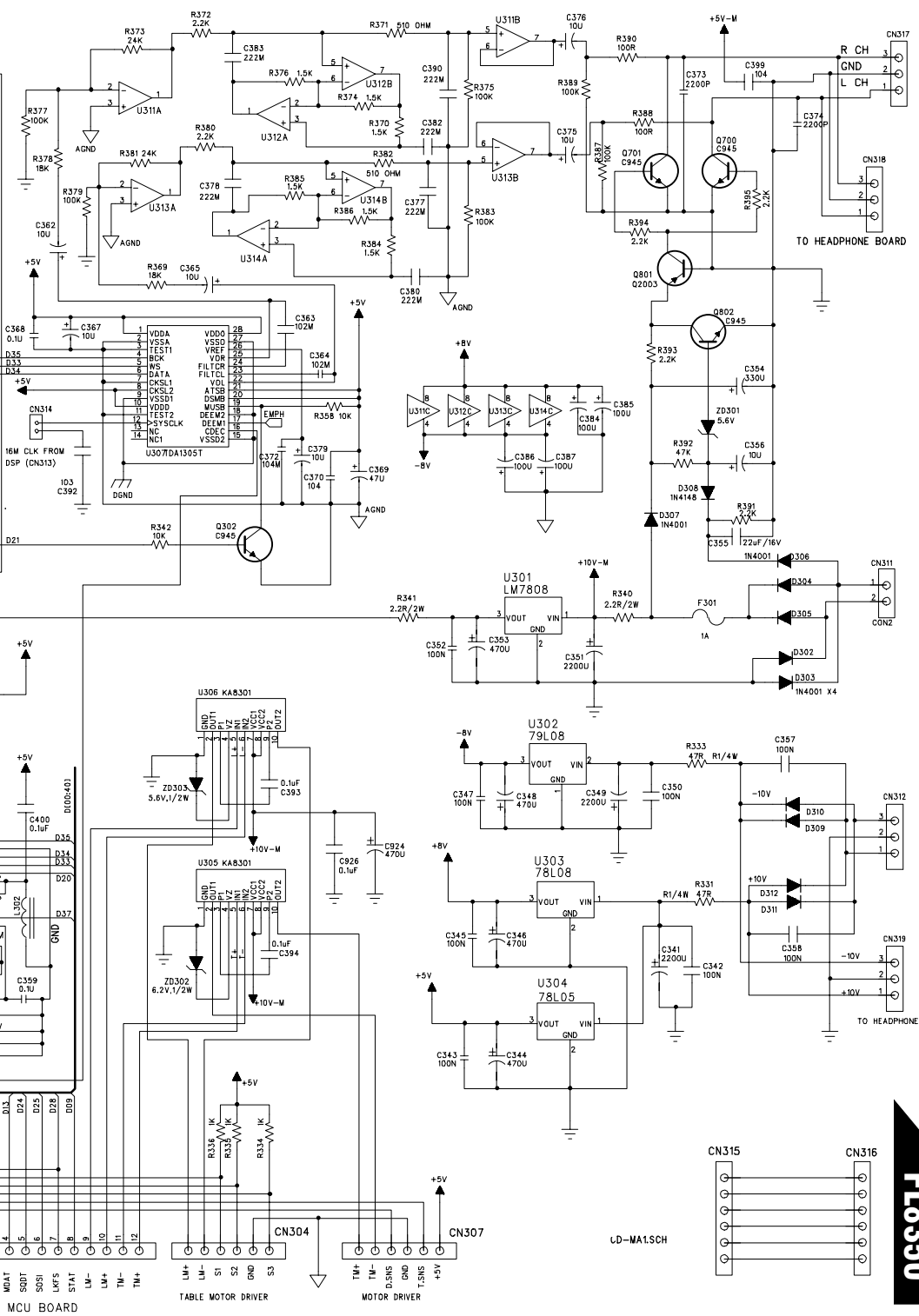


FILENAME : 5CD-MA1.SCH  
8350

# FL8350

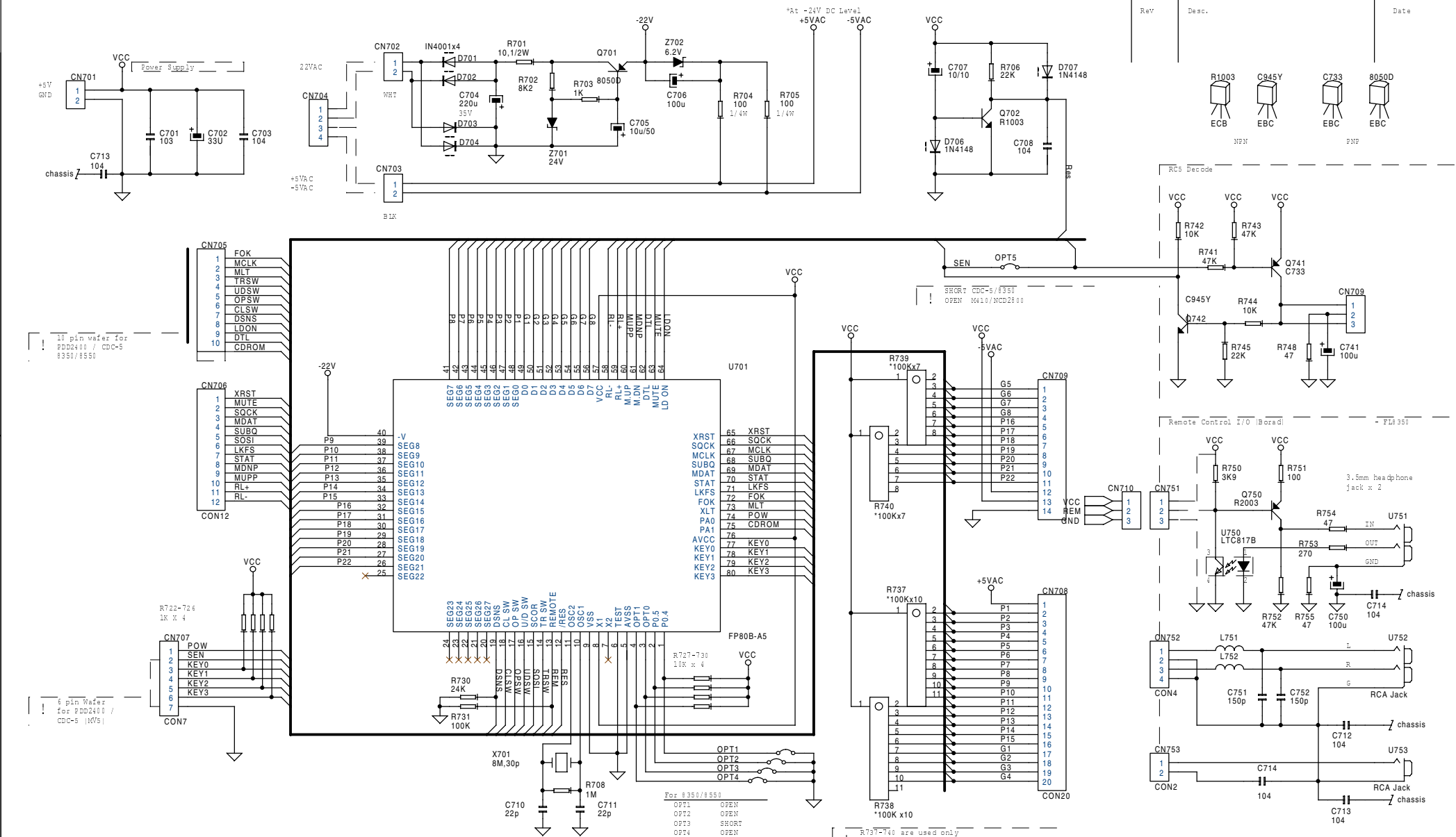
94





|           |            |               |
|-----------|------------|---------------|
| FILE NAME | 835MCU1.5  | <b>FL8350</b> |
| DATE :    | 1998-05-23 |               |

| Rev | Desc. | Date |
|-----|-------|------|
|-----|-------|------|



|               |       |
|---------------|-------|
| For 8350/8550 |       |
| OPT1          | OPEN  |
| OPT2          | OPEN  |
| OPT3          | SHORT |
| OPT4          | OPEN  |

```

R737-740 are used only
! when U7071 is OPT version

```

Ref: 8350\835MCU0 LOGO

|                                              |              |               |        |
|----------------------------------------------|--------------|---------------|--------|
| PURPOSE : SAMPLE MAKING [ X ] PRODUCTION [ ] |              | SHEET OF 1 1  | VER. B |
| PREPARED BY :<br><br>AMAS NG                 | CHECKED BY : | APPROVED BY : |        |

## SCHEMATIC DRAWING

FILE NAME : 835VFD1.SCH  
DATE : 1998-05-23

MODEL NO. : FL8350/8550

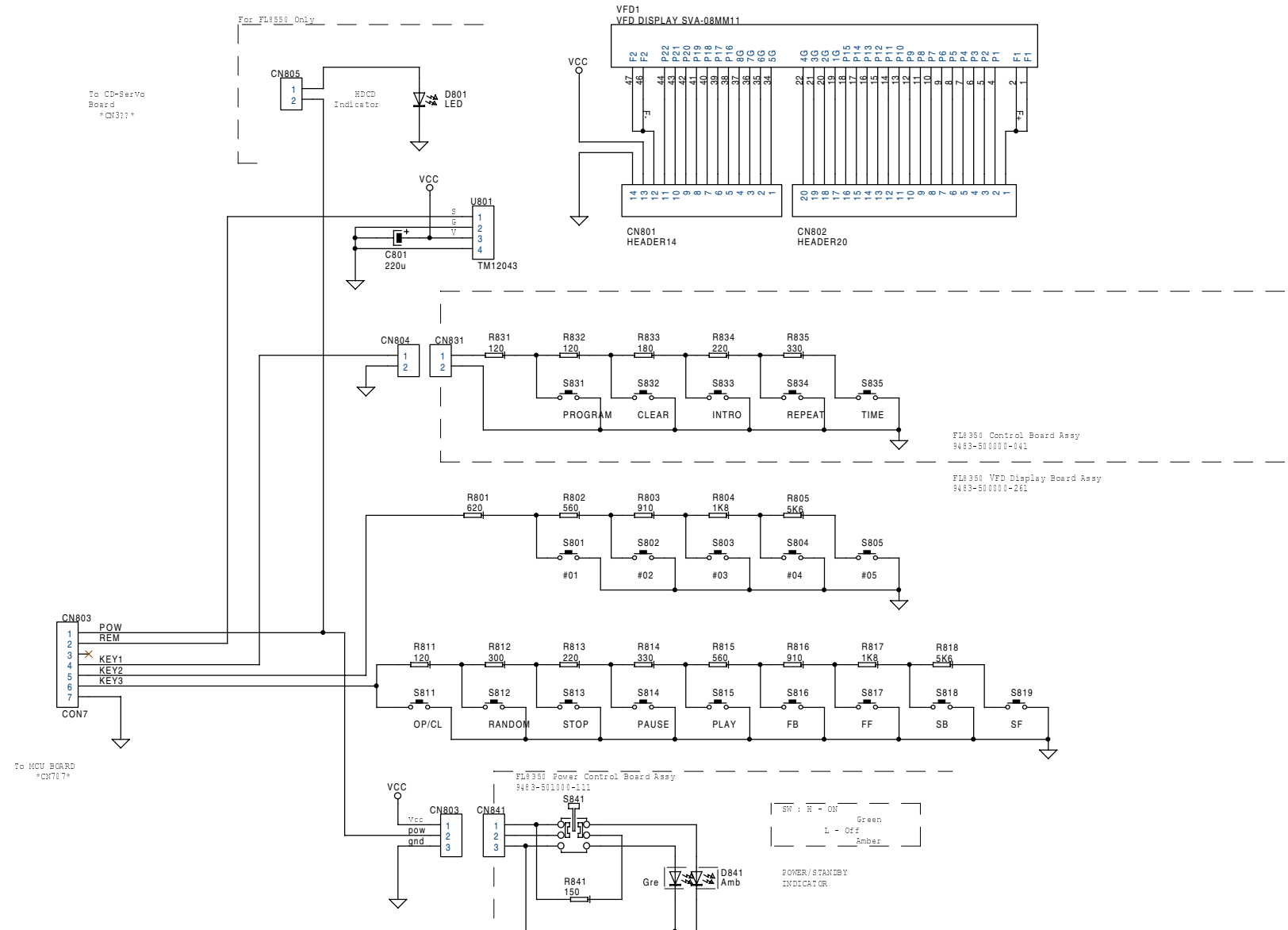
PART NO. : 9483-501000-071  
9483-501000-261 / 9485-501000-261

REV. B

PART NAME : FL8350 Control Board Assy  
FL8350 Display Board (VFD) Assy / FL8550 Display Board (VFD) Assy

FL8350 Power Control Board Assy

FL8350



Ref: 8350\835VFD1.SCH

PURPOSE : SAMPLE MAKING [ X ] PRODUCTION [ ]

PREPARED BY :

AMAS NG

CHECKED BY :

SHEET OF 1 1

APPROVED BY :

VER. B

## SCHEMATIC DRAWING

FILE NAME : 835PH01.SCH

DATE : 1998-05-23

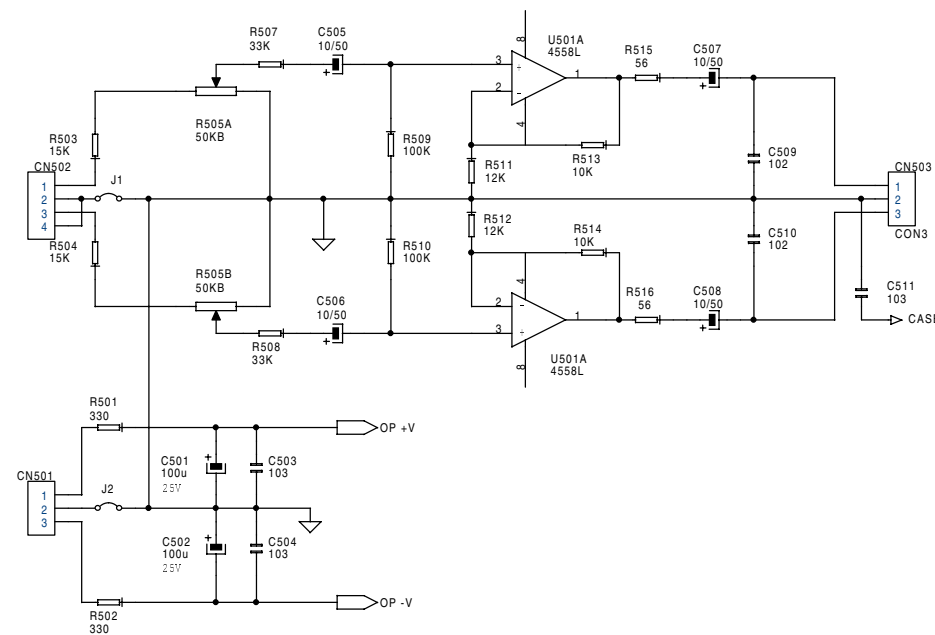
MODEL NO. : FL8350/8550

PART NO. : 8483-501000-021

REV. A

PART NAME : FL8350 Headphone Board Assy

FL8350



\* J1 and J2 are used to select to GND path

Ref: 8350/835VFD1.SCH

PURPOSE : SAMPLE MAKING [ ] PRODUCTION [X]

PREPARED BY :

AMAS NG

CHECKED BY :

SHEET OF 1 1

APPROVED BY :

VER. B

MODEL NO. : FL8350

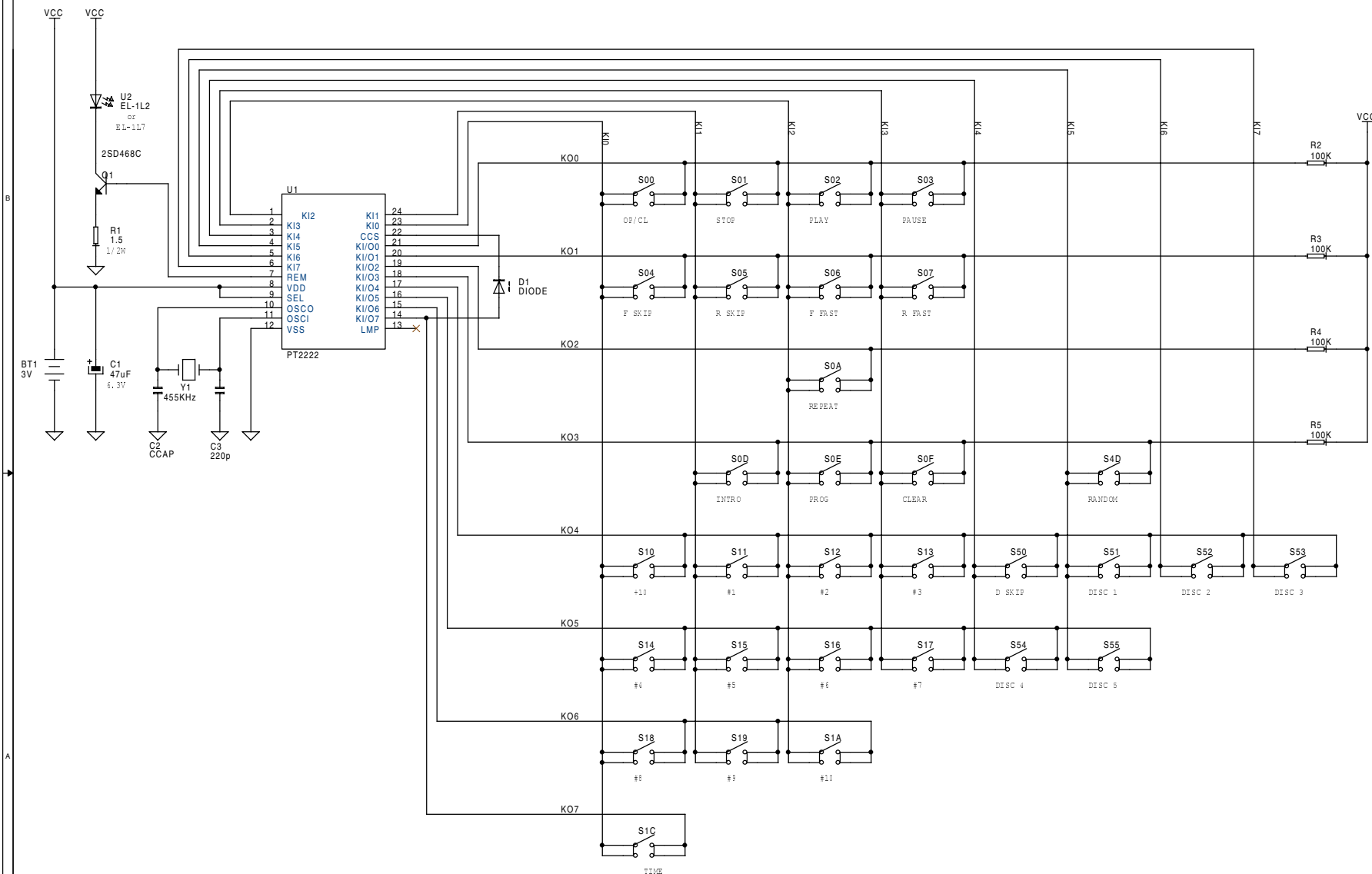
PART NO. : 9483-500000-081

REV.

PART NAME :

FL8350 Remote Control Bd

FL8350

FL8350 Remote Control  
Layout

|                |     |      |        |       |
|----------------|-----|------|--------|-------|
| -- Disc No --  | 1   | 2    | 3      | OP/CL |
| 4              | 5   | SKIP | Repeat |       |
| -- Track No -- | 1   | 2    | 3      | Prog  |
| 4              | 5   | 6    | Clear  |       |
| 7              | 8   | 9    | Time   |       |
| 10             | +10 |      | Intro  |       |
| <<             | >>  | Ran  |        |       |
| <              | >   |      | >      |       |

Customer Code : #6070h

REMARK: 1) ALL RESISTORS ARE CARBON FILM  $\pm 5\%$  1/6W UNLESS SPECIFIED.  
2) ALL CAPACITORS WITH VALUE  $<1\mu\text{F}$  ARE CERAMIC  $\pm 50\%$   $\sim 20\%$  UNLESS SPECIFIED.  
3) ALL CAPACITORS WITH VALUE  $\geq 1\mu\text{F}$  ARE ELEC-CAP  $\pm 20\%$  16V UNLESS SPECIFIED.  
4) ALL DCAP ARE 0.1uF CERAMIC CAP  $\pm 50\%$   $\sim 20\%$   
\* SUBJECT CHANGE WITHOUT NOTICE \*

Ref: 8350/835MCU

LOGO

VER. A

PURPOSE : SAMPLE MAKING [ X ] PRODUCTION [ ]

PREPARED BY :

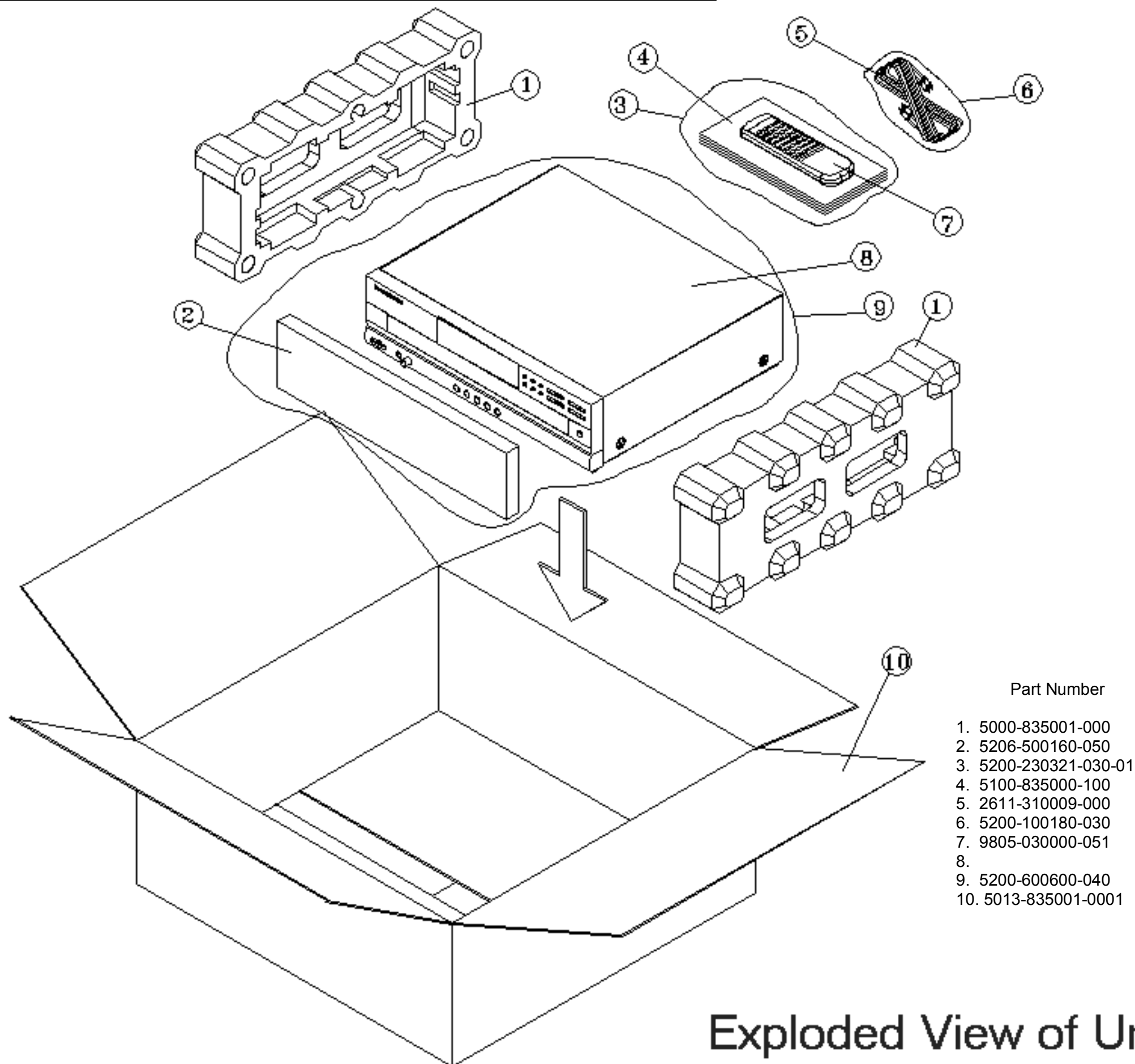
CHECKED BY :

SHEET OF 1 1

APPROVED BY :

AUG 98





| Part Number           | Description            | Qty |
|-----------------------|------------------------|-----|
| 1. 5000-835001-000    | Polyfoam, FL8350       | 2   |
| 2. 5206-500160-050    | E.P.E. Sheet           | 1   |
| 3. 5200-230321-030-01 | Polybag For Manual     | 1   |
| 4. 5100-835000-100    | Owner's Manual         | 1   |
| 5. 2611-310009-000    | IM Audio Cable         | 1   |
| 6. 5200-100180-030    | Polybag For Audio Cord | 1   |
| 7. 9805-030000-051    | FL8350 Remote Control  | 1   |
| 8.                    | FL8350 Main Unit       | 1   |
| 9. 5200-600600-040    | Polybag 600x600x40 mm  | 1   |
| 10. 5013-835001-0001  | FL8350 Outer Carton    | 1   |

# Exploded View of Unit packaged