

harman/kardon

Model FL8380

5 Disc Compact Disc Changer

SERVICE MANUAL



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LASER BEAM SAFETY PRECAUTIONS

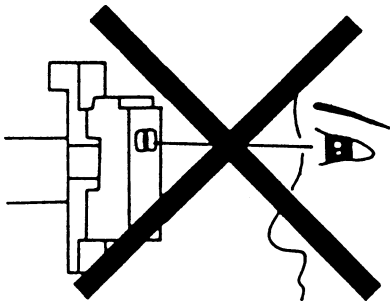
CLASS 1 LASER PRODUCT



CAUTION

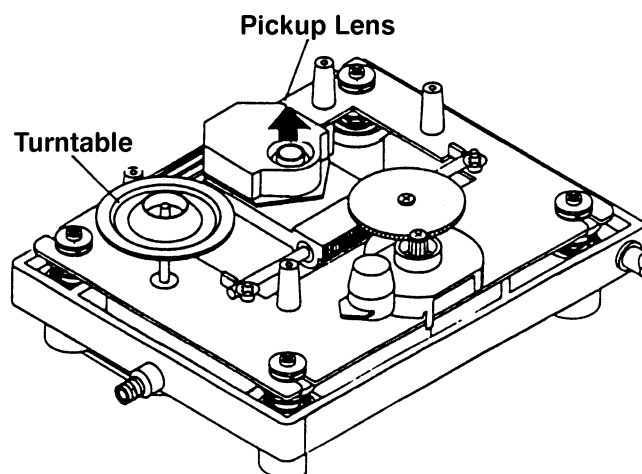
**Invisible laser radiation when the unit is open.
Do not stare into beam.**

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.

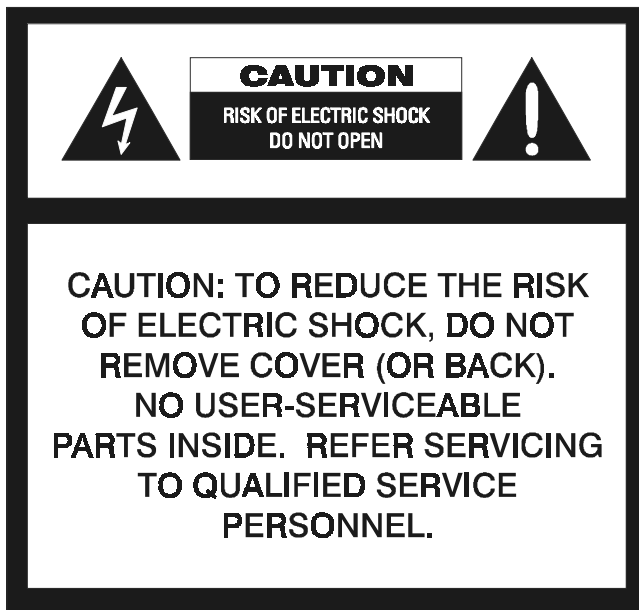
This compact disc player uses a pickup that emits a laser beam. The laser beam is emitted from the location shown in the figure. When checking the laser diode, be sure to keep your eyes at least 1 foot away from the pickup lens when the diode is turned on. Do not look directly at the laser beam.



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

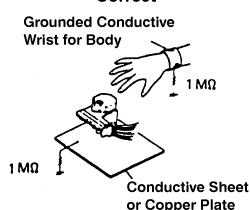


Fig. 2

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.

Technical Specifications

Signal Format

Sampling Frequency	44.1kHz
HD/CD Processing	Burr-Brown PCM1732
D/A Conversion	Dual 18-Bit
Oversampling	8 Times

Discrete Analog Output Section

Error Correction	CIRC System
Frequency Response	20Hz – 20kHz +0, –1dB
Total Harmonic Distortion (THD)	<0.02% @1kHz
Dynamic Range	>97dB
Signal-to-Noise Ratio	>97dB
Channel Separation	80dB
Line-Level Output	1.0V RMS
Digital Output	Coax

General

Power Requirement	120V/60Hz
Power Consumption	20 Watts
Dimensions	
Height	5.1" (129mm)
Width	17.3" (440mm)
Depth	15.2" (386mm)
Weight	16.7 lbs (7.6kg)

Depth measurement includes knobs and buttons.

Height measurement includes feet and chassis.

All features and specifications are subject to change without notice.

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 , HD/CD®, High Definition Compatible Digital® and Pacific Microsonics™ are either registered trademarks or trademarks of Pacific Microsonics, Inc., in the United States and/or other countries. HD/CD system manufactured under license from Pacific Microsonics, Inc. This product is covered by one or more of the following: In the USA: 5,479,168; 5,638,074; 5,640,161; 5,808,574; 5,838,274; 5,854,600; 5,864,311; 5,872,531; and in Australia: 669114. Other patents pending.

GENERAL INFORMATION

1. Power Consumption	Operating <18W; Standby <5W
2. Power Super	230V AC 50Hz or 120V AC60Hz
3. Dimensions	440 x 130 x 386mm
4. Product Outlook	Refer to attached diagram
5. Remote Unit	harman/kardon remote code
6. Compliance Requirement	i EMC EN55013, EN61000-3-2, EN61000-3-3, EN55022 ii. CE (LVD EN60065) iii. NRTL/C iv. HDCD
7. Disc Changer Mechanism	5 disc carousel; Play 1 change 4
8. Sound Processor	HDCD
9. CD Servo System	Digital Servo, Auto Alignment

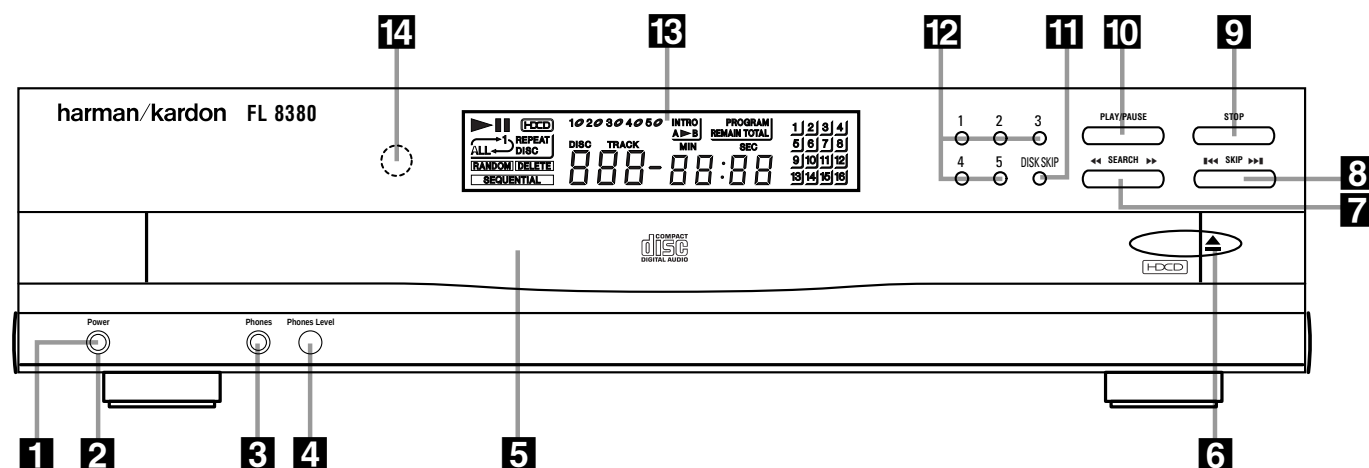
AUDIO SPECIFICATION

	Typical	Limit
Output Level 1KHz 0dB (no HDCD)	1.0 Vrms	+/-1dB
Output Level 1KHz 0dB (HDCD output)	2.0Vrms	+/- 2dB
Frequency Response 20Hz~20KHz reference	+0-1dB	+0.5-1.5dB
THD 1KHz 0dB (30KHz Filter)	0.01%	0.05%
THD 1KHz 0dB (no any filter)	0.03%	0.08%
THD 20Hz~20KHz 0dB (30KHz Filter)	0.04%	0.05%
S/N 1KHz 0dB A-weighted (A Filter)	97dB	93dB
Dynamic Range	95dB	90dB
Channel Separation 1KHz 0dB(30KHz Filter)	85dB	80dB
Channel Balance	+/-0.5dB	+/-1.5dB
De-emphasis (5KHz,16KHz)	+/-0.5dB	+/-1.5dB

Headphone output specification under 32 ohm load

Maximum Headphone Output Level 1KHz 0dB	1.5Vp-p	+/-0.2V
Frequency Response (20~20KHz)	+/-1dB	+/-1.5dB
THD 20~20KHz 0dB (30KHz Filter)	0.1%	0.2%

Front Panel Controls



- 1** Power Switch
- 2** Status Mode Indicator
- 3** Headphones Jack
- 4** Headphones Level Control
- 5** CD Drawer

- 6** Open/Close Button
- 7** Search Button
- 8** Skip Button
- 9** Stop Button
- 10** Play/Pause Button

- 11** Disc Skip Button
- 12** Disc Select Button
- 13** Information Display
- 14** Remote Sensor

1 Power Switch: Press this switch to apply power to the FL 8380. When the FL 8380 is first turned on by pressing this switch, the **Status Mode Indicator 2** will turn green, and the **Information Display 13** will light. Press the switch again to turn the unit off; the **Status Mode Indicator 2** will turn amber, indicating that the unit is in a Standby mode. When the FL 8380 is connected to a switched AC outlet, such as those found on the back of many audio products, it will return to the Standby mode when power is applied to the switched outlet without any further press of the switch.

2 Status Mode Indicator: When the FL 8380 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 main supply.

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

4 Headphones Level Control: Turn this knob to increase or decrease the volume level for headphones connected to the FL 8380'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 6** to open the drawer so that discs may be inserted.

6 Open/Close Button: 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.

7 Search Button: Press one side of this button to search forward ►► or the other side of the button to search backwards ◀◀ through a disc to locate a particular portion of the disc being played.

8 Skip Button: Press one side of this button to move to the next track ►► or the other side of the button to move back to the previous track ◀◀ on the disc being played.

9 Stop Button: Press this button to stop the disc currently being played. (See page 11 for more information.)

10 Play/Pause 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. Press this button once during play to momentarily pause a disc. When the button is pressed again, the disc will resume play at the point it was paused.

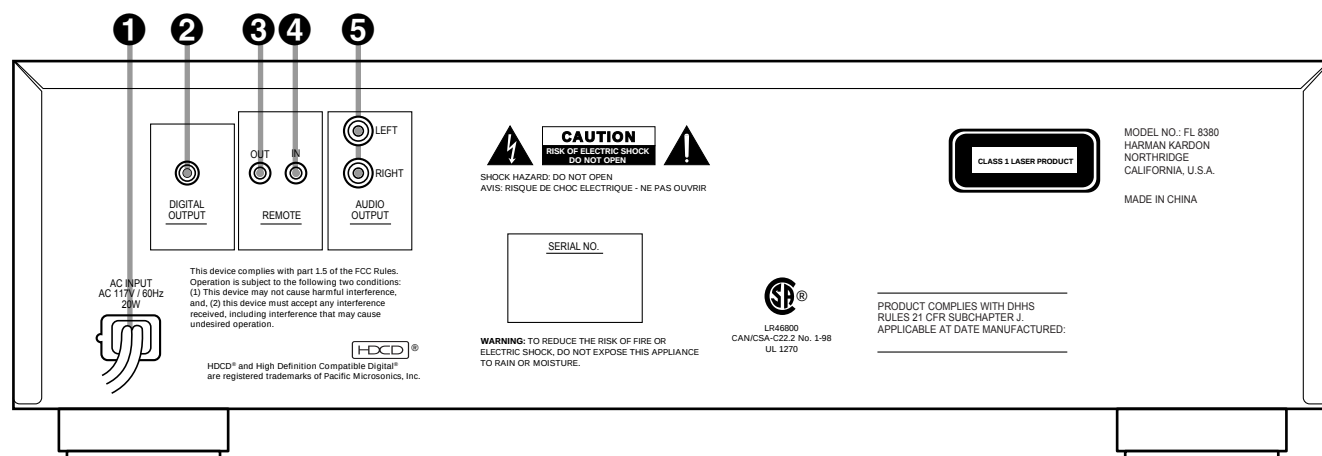
11 Disc Skip Button: Press this button to change to the next disc. If a disc position is empty, the FL 8380 will automatically search for the next position that contains a disc.

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

13 Information Display: This display provides details about the operation of the FL 8380.

14 Remote Sensor: The sensor behind this window receives commands from the remote control. Keep this area clear if you wish to use the FL 8380 with a remote control.

Rear Panel Connections



- ❶ AC Power Cord
- ❷ Coaxial Digital Output
- ❸ Remote Control Output

- ❹ Remote Control Input
- ❺ Analog Audio Outputs

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

❷ Coaxial Digital Output: Connect this jack to the coaxial-digital input of a digital audio/video receiver or an external digital-to-analog converter for direct access to the digital signals of the FL 8380. DO NOT connect this jack to the standard audio inputs of any device.

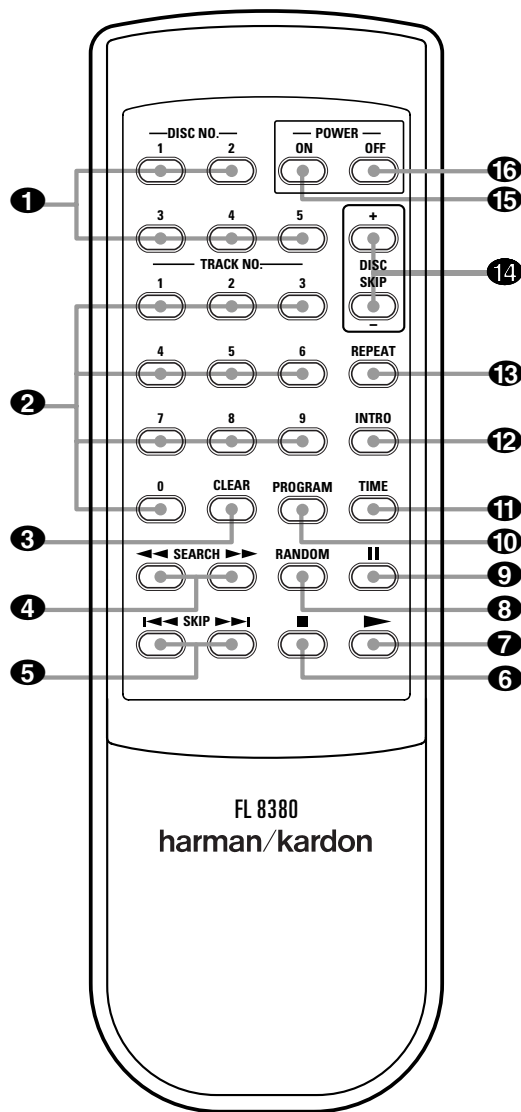
❸ Remote Control Output: Connect this jack to the input of another compatible Harman Kardon remote controlled device to have the remote sensor on the FL 8380 provide signals to other products.

❹ 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 14** is blocked. It will also allow use of the FL 8380 with optional, external control systems.

❺ Analog Audio Outputs: Connect these jacks to the analog CD audio inputs of your receiver, surround processor or preamplifier.

Remote Control Functions

- ❶ Disc-Select Buttons
- ❷ Numeric Buttons
- ❸ Clear Button
- ❹ Search Buttons
- ❺ Skip Buttons
- ❻ Stop Button
- ❼ Play Button
- ❽ Random Button
- ❾ Pause Button
- ❿ Program Button
- ⓫ Time Button
- ⓬ Intro Button
- ⓭ Repeat Button
- ⓮ Disc Skip Buttons
- ⓯ Power On Button
- ⓰ Power Off Button



Remote Control Functions

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

2 Numeric Buttons: Press these buttons to select a specific track on a disc. The FL 8380 will immediately go to the track and begin to play it. These buttons are also used to enter track numbers into the memory for preprogrammed-play lists. (See page 13 for complete information on programming the FL 8380.)

3 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. (See page 13 for complete information on programming the FL 8380.)

4 Search Buttons: Press these buttons to search forward ►► or backwards ◄◄ through a disc to locate a particular portion of the selection being played.

5 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.

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

7 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.

8 Random Button: Press this button to play all of the tracks on a disc in a random order. (See page 11 for more information.)

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

10 Program Button: This button is used to program the playback of a disc in a particular order. (See page 13 for complete instructions on programming the FL 8380.)

11 Time Button: 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 again to view the total play time remaining for the disc in play.

12 Intro Button: Press this button to put the FL 8380 into the Intro Scan mode. When you press this 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. (See page 12 for more information.)

13 Repeat Button: Press this button once to continuously repeat the track currently being played. Press it a second time to repeat the entire disc. (See page 13 for more information.)

14 Disc Skip Buttons: Press these buttons to change to the next disc. If a disc position is empty, the FL 8380 will automatically search for the next position that contains a disc.

15 Power On Button: When the FL 8380 is plugged into an active AC outlet, press this button to turn the unit on. The **Status Mode Indicator 2** will turn green. If the unit is plugged into a switched outlet, power must be applied to the switched outlet in order for the **Power On** button **15** to be effective.

16 Power Off Button: Press this button to turn the unit off; the **Status Mode Indicator 2** will turn amber, indicating that the unit is in a Standby mode.

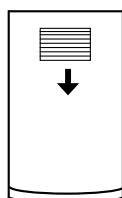
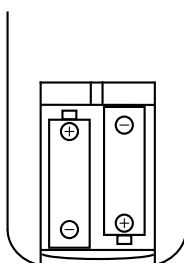
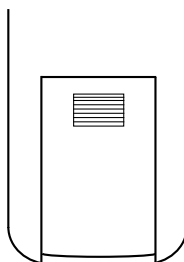
Installation and Connections

To prevent possible damage to your speakers and other components in your audio system, it is important that ALL components, including the FL 8380 and your receiver or preamp and amplifiers, are turned off and unplugged from their AC power source when installing any new component.

Connecting the FL 8380 to your audio system is simple. Using standard RCA-to-RCA interconnect cords, connect the left and right **Audio Output** jacks ⑤ on the rear panel to the CD input jacks on your receiver, surround processor or preamplifier.

If your system includes an optional external digital-to-analog converter, or if you are using a receiver or other processor that has the capability to decode PCM digital input signals, connect the **Coaxial Digital Output** jack ② to the Coaxial Digital input on the decoder. Make certain to use a coaxial-style interconnect cable, as standard audio cables will not perform as well.

Install the two AA batteries supplied with the FL 8380's remote by turning the remote over so that you are holding the bottom side up. Press lightly on the embossed arrow on the cover and gently slide the cover towards you in the direction of the arrow. Insert the batteries inside the compartment, being careful to follow the + and - polarity indications at the bottom of the compartment. Replace the cover by placing it on the remote and sliding it back towards the top of the remote.



NOTE: When replacing batteries, it is always a good idea to replace both at the same time. When the unit will not be used for an extended period of time, it is also a good idea to remove the batteries so that the potential for corrosion or damage is avoided.

If the FL 8380 is installed behind a cabinet or other obstruction that may block the path between the front panel **Remote Sensor** ⑭ and the location of the remote, an optional external IR sensor may be used. Connect the sensor to the remote IR-In jack ④ on the rear panel. This jack may also be connected to the IR-Output jack of another compatible Harman Kardon component or a compatible IR-system-remote product.

You may also use the IR Sensor in the FL 8380 to send commands to other compatible remote controlled products. Connect the remote IR-Out jack ③ to the input of the other product or system.

Connect the power to a nonswitched AC wall outlet or to the accessory outlet on the rear of another audio device in your system and you are ready to go!

NOTE: When using the accessory outlet on another product to power the FL 8380, make certain that it has the compatibility to power a device that draws at least 20 watts of current in addition to being able to handle the requirements of the other devices that may be plugged into the accessory outlets. If you use a "switched" outlet, it is important to remember that the host product must be turned on in order for the FL 8380 to operate.

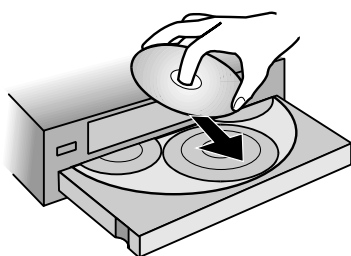
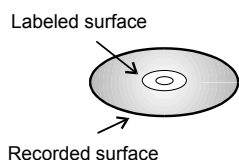
Operation

Loading Discs

To load a disc, first turn the FL 8380 on, using the **Power Switch 1** or the **Power On 15** button on the remote. Note that the **Status Mode Indicator 2** will turn green and the **Information Display 13** will light. The word **disc** will flash in the Information Display, and the disc tray will automatically turn clockwise so that the FL 8380 can sense which, if any, of the disc positions already have a disc.

To load a disc, first press the **Open/Close** button **6**, taking care that the space in front of the drawer is not obstructed. Note that if the drawer is blocked when you attempt to open it, it will automatically close within five seconds to protect the mechanism.

Load discs in the tray with the printed (label) side facing up toward you. Make certain that the disc is centered in the tray. Either 5" (12cm) or 3" (8cm) discs may be used. When a 3" (8cm) disc is played, it should be carefully centered within the smaller ridges on the tray. Only one CD can be placed in any position at a time. When a 3" (8cm) disc is played, DO NOT place a standard 5" (12cm) disc over the smaller disc.



Note that each disc position has a number embossed in the plastic tray. This corresponds to the position this disc will occupy for playback and programming. To make it easier to identify each disc's position, the disc position number for the holder space that is in the center of the disc tray will also appear in the Information Display when the disc drawer is open.

To rotate the disc tray to another position, press the **Disc Skip** button **11 14**. The tray will revolve to the next slot and the Information Display will indicate the position number for the slot in the middle of the tray.

To close the disc drawer, press the **Open/Close** button **6**. When the drawer closes, the disc that was last in the center position on the tray will be readied for play. Its number will appear in the Information Display and a red icon will flash to the right of the disc number. The icons for all other tray positions that have a disc will be a blue line. If the center disc position is empty when the drawer is closed, the unit will search for the next position with a loaded disc and place it in the Ready mode.

The drawer may also be closed and the FL 8380 put into play by pressing the **Play/Pause** button **10 7**. This will put the disc in the center position into the Play mode.

To close the drawer and play a specific disc, press the **Disc Select** button **12 1** corresponding to the tray position number for the disc you wish to play.

When the disc drawer closes, the Information Display will briefly display the disc number, the total number of tracks on the disc and the disc's total running time. After five seconds, the display will indicate the disc number that is in the play position, both by a flashing red icon to the right of the disc number and the wording in the display, such as **disc 5**. The total number

of tracks on the disc will light at the far right side of the display.



To remove a disc from the player, press the **Open/Close** button **6**. The drawer will open, allowing the disc to be removed. Press the **Disc Skip** button **11 14** to rotate the disc carousel tray to reach discs that may be covered. When a disc does not occupy a numbered tray, and the sensor detects no disc present, the disc number will drop from the display.

Upon placing a disc in the unoccupied tray, the disc number will reappear when detected by the sensor mechanism.

Disc-Handling Notes

When loading or unloading discs, it is best to hold them by the edges.

While compact discs are very reliable, rough handling may damage them. Avoid scratching the bottom (nonprinted) side of discs, and any handling that will leave fingerprints.

To avoid damage to the disc and player, always seat discs so that they are centered in the tray.

Do not lift the player while the disc tray is opening or closing, as this may cause the discs to unseat from the tray and possibly jam.

Note: Always remember to remove all discs from the player before moving or repacking it.

Operation

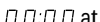
Normal Play

The FL 8380 provides a variety of ways to select discs for playback.

To play all of the tracks on each disc in order, starting with the first track on the disc currently in the play position, and proceeding through each disc that has been loaded, press the **Play/Pause** button **10** on the front panel, or the **Play** **7** button on the remote.

To start play on a specific disc, press the **Disc Select** button **12** **1** that corresponds to the desired disc's position in the disc tray. If no disc is found in the selected position, the unit will search for the next disc.

When a disc is in play, the Information Display will show a play indicator . The track being played will show both as a large number in the middle of the display, and as a smaller, flashing number at the right side of the display. The elapsed time of the track being played will appear in the display.

As the disc plays, the track numbers will change, and the time will reset to  at the start of each new track. To momentarily pause the play of a disc, press the **Play/Pause** button **10** on the front panel, or the **Pause** **9** button on the remote. Note that a Pause indication **II** will appear in the display to remind you that the disc is paused. Press either the **Play** button (**Play/Pause** on front panel) **10** **7** or the **Pause** button **9** to resume normal play.

You may also select a track on any disc in play by entering the desired track number directly using the **Numeric** buttons **2**. Note that two buttons must always be pressed when entering a track number. Thus, when entering track numbers 1 through 9, press the "0" button first and then the number for the desired track. In all cases, the two buttons must be entered within three seconds of each other.

To stop the disc, press the **Stop** button **9** **6**. When the stop button is pressed, the display will again show the total number of tracks and total running time of the last disc played.

Random Play

The FL 8380 includes three Random Play modes that enable you to let the machine select the tracks to be played in a random order. The Random modes may be started at any time by pressing the **Random** button **8** on the remote when the unit is already in Play mode.

Random 1: To play all the tracks on a disc in random order, press the **Random** button **8** ONCE so that the **RANDOM** indicator lights. The FL 8380 will play the tracks on the disc in an order selected by the unit's microprocessor and stop play when all of the tracks have been played once.

Random, All, Sequential: When the **Random** button **8** is pressed TWICE, the **RANDOM** and **SEQUENTIAL** indicators will light. In this mode, all tracks on the current disc will be played in random order, and then the unit will advance to the next disc in order and play all tracks on that disc randomly. When each disc is finished, the next disc will play its tracks in random order until all discs have been played. After the last disc plays, the unit will stop.

Random, All Tracks/Discs: When the **Random** button **8** is pressed THREE times, the **RANDOM**, **ALL** and **DISC** indicators will light. In this mode, the FL 8380 will select two tracks from the disc in use and play them randomly. After these two tracks play, another disc will be randomly selected and two tracks will play from that disc. This pattern of a randomly selected disc, and the play of two random tracks from each disc, will continue until all tracks on all discs have been played. At that point the unit will stop.

HDCD

HDCD, which stands for High Definition Compatible Digital®, is a sophisticated process that enables the FL 8380 to deliver outstanding digital-to-analog decoding, no matter what type of CD is played.

When a disc with the HDCD logo is played, the FL 8380 is able to take advantage of the special recording process that is used in the creation of HDCD discs. Although HDCD discs are playable on any CD player, when they are used in a unit such as the FL 8380, the special circuitry delivers audio with extraordinary fidelity, stunning resolution and the highest possible overall quality. The HDCD process effectively cancels the additive and subtractive distortions that are present in other recordings.

No special adjustment is required to play an HDCD disc. Simply play the disc as you would any other CD, and the FL 8380 will automatically sense that it is an HDCD recording. The  indicator will light in the **Information Display** **13** on the front panel to remind you that an HDCD disc is playing.

It is important to note that the HDCD process is completely compatible with standard recordings.

Its high-quality digital-to-analog circuitry provides enhanced playback from all standard CD audio discs.

Play Exchange

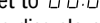
The FL 8380's Play Exchange feature allows you to change discs while the machine is playing. Using this feature, you can have uninterrupted play of an unlimited number of discs, since the drawer may be opened and discs changed while another disc is playing.

To use the Play Exchange function, simply press the **Open/Close** button **6** at any time while the unit is in the Play mode. The disc drawer will open and two discs will be available for change. Replace either disc, or both, as desired. To reach the other two discs, press the **Disc Skip** button **11** **4**. You may now remove and change either of these two discs.

When you have finished making any disc changes, press the **Open/Close** button **6**. The drawer will close and play will continue with normal functions.

Time Display

The FL 8380's time display is capable of showing a wide range of information about a CD.

In normal operation, the display will show the total running time of the CD that is currently being played. Each time the track changes, the time display will reset to  and begin to increase again as the disc plays.

To view the time remaining on an individual track, press the **Time** button **11** on the remote control ONCE. The display will now show the time left in the track currently playing.

To view the total playing time remaining on a disc, press the **Time** button **11** on the remote control TWICE. In this Time Display mode the **TRACK** indicator will show the tracks remaining, differing from the usual display of the track being played.

Headphone Listening

You may listen to the output of the FL 8380 through headphones by plugging any headphones with a 1/4" headphone plug or adapter into the front-panel **Headphones Jack** **3**. The volume of the headphone output can be adjusted with the **Headphones Level Control** **4**. Note that changing the headphone level will not change the volume for the main audio output. This is a fixed output and it is changed using the volume control on your receiver, preamplifier or surround processor.

Troubleshooting Guide

SYMPTOM	POSSIBLE CAUSE	SOLUTION
No lights on front panel	No AC power	Make certain that the AC power cord is plugged into a live outlet
Remote does not appear to operate	- Main Power Switch turned off - Weak batteries - Blocked sensor	- Turn on Main Power Switch - Install fresh batteries, observing polarity indications - Remove obstructions from the front panel sensor, or connect a remote sensor to the Remote-In jack on the rear panel
Front panel lights but CD does not play	- Disc upside down - Moisture inside unit	- Turn CD over so that label side faces up - Leave the unit turned ON for 30 minutes to allow moisture to evaporate
Play indicator lights but no sound is heard	- Receiver or preamp and amp not turned on - Poor connections - Wrong source selected	- Turn on all necessary equipment - Make certain connections are secure and made to the correct (e.g., CD) input - Select CD source on receiver or preamp
Sound skips or stutters during play	- Disc may be damaged - Surface vibrations	- Try another disc - Isolate the unit from vibration by placing it on a firm surface or move it further away from speakers
Sound is continually distorted	Incorrect input	Make certain that the FL 8380 is connected to a line-level audio input, NOT a digital audio or phono input

Audio Characteristics Test Procedure

Test Equipment

1. 3346 CD Player Evaluating Filter x 2 (NF Electronic Instrument)
2. VP7722 Panasonic Audio Analyzer
3. Sony YEDS18 Test CD disc

Procedure

Equipment Setup

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

Check the output Voltage

1. Set the mode of the filter to 'THRU'
2. Set the mode of Audio Analyzer to 'LEVEL' mode
3. Select track 2 of the test disc and play the CD disc
4. 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

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

Total Harmonic Distortion

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

Signal to Noise Ratio

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

Dynamic Range

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

Channel Separation

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

De-emphasis

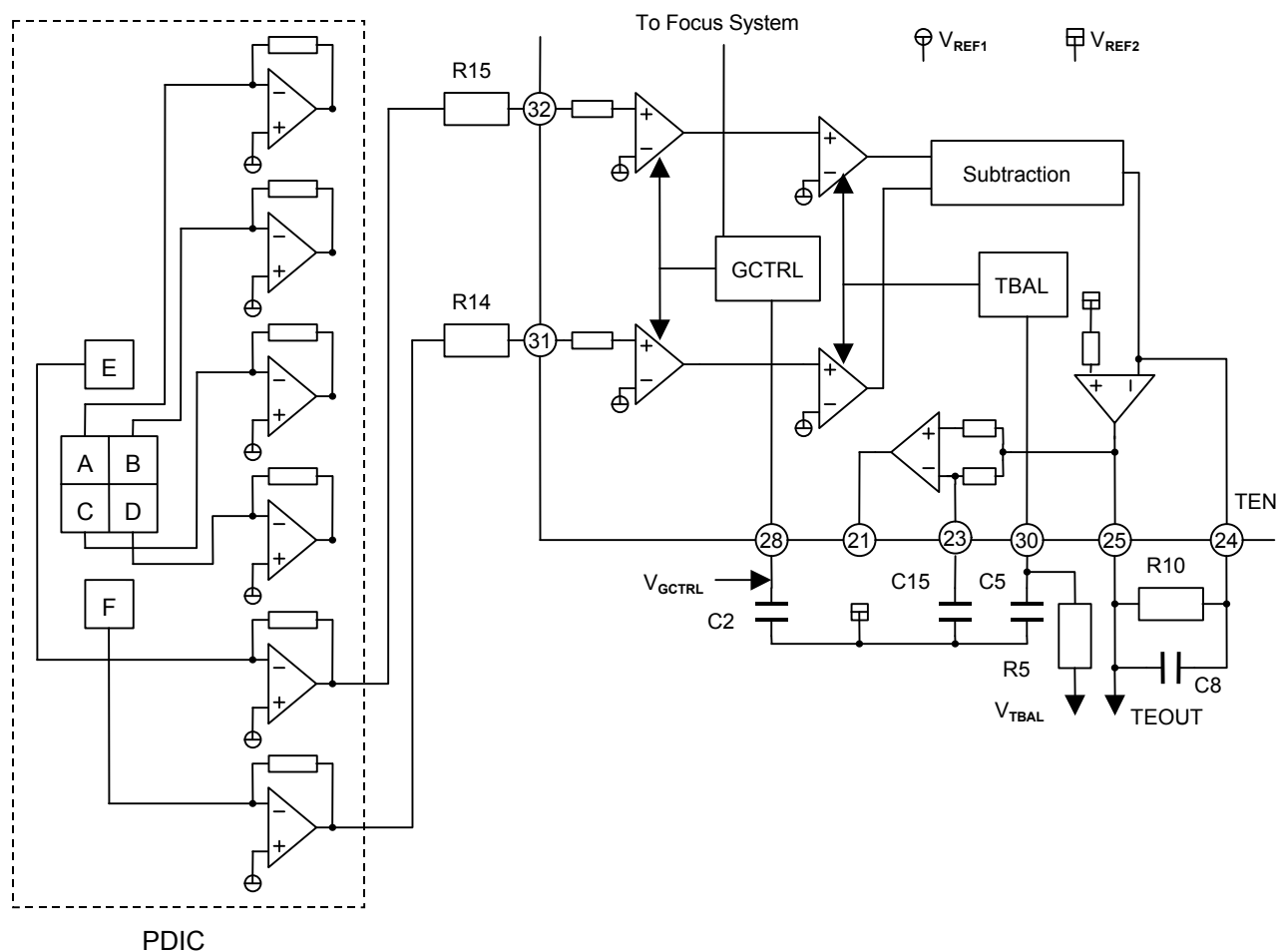
1. Press the 'THRU' button of the CD filter
2. Play the track 2 of the test disc
3. Press the 'Relative Level' and make it 'ON'
4. Select the track 12 and 13 and measure the L & R channels value

Test Disc Specification

	Typical	Limit
Black Dot TCD 725B	1000um	600um
Interruption MCD-131	900um	600um
Finger print	75um	65um
Vertical Deviation MCD-151	0.92mm	0.92mm
Eccentricity TCD 712	140um	140um
8cm test disc TCD 783	Last Track	Last Track
Access Time 1 st to last track YEDS18	4 sec	10 sec

FUNCTION DESCRIPTION

Tracking System

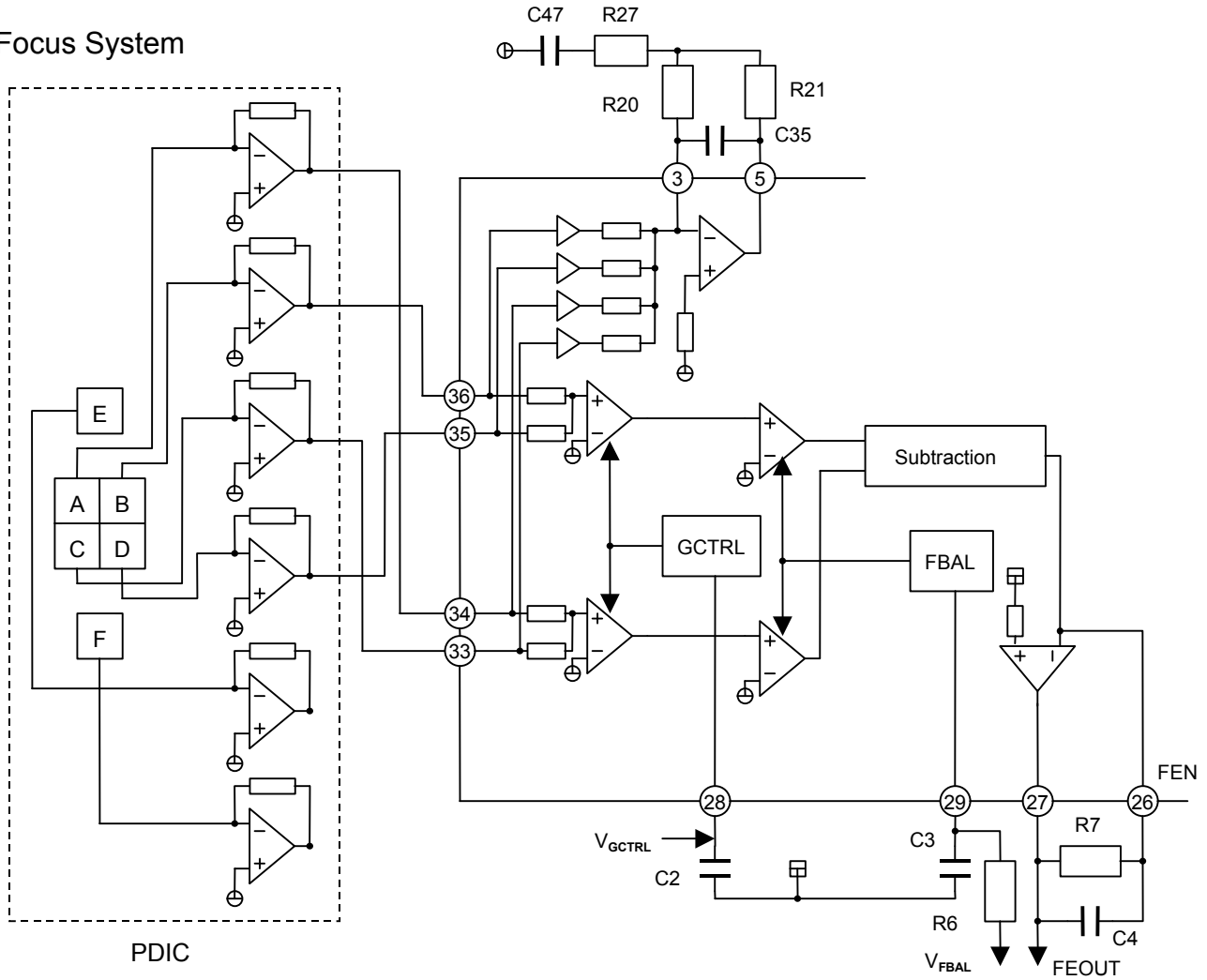


The tracking error output of E and F is given to Pin 25 (TEOUT). C8 is required for oscillation-proof. R10 is chosen such that TEOUT of Pin 25 become 1.4Vp-p.

During alignment procedure, the DSP IC (MN662790) will adjust the tracking balance voltage V_{TBAL} from Pin 31. V_{TBAL} varies with reference to the center voltage V_{REF2} ($=1.65$ V) within ± 0.5 V.

The tracking gain will change according to the type of disc. For normal disc or CDR disc, V_{GCTRL} is set to V_{REF2} ; for CDRW disc V_{GCTRL} is set to $V_{\text{REF2}} - 0.75 \text{ V}$. At the same time, the focus gain is changed too.

Focus System

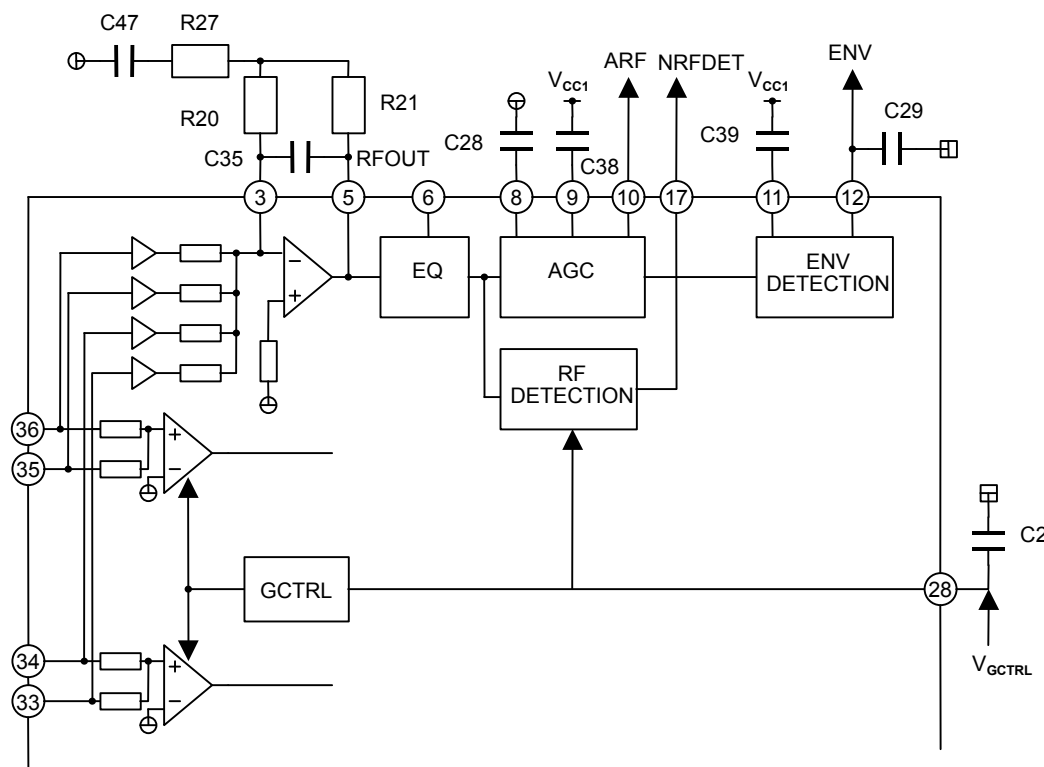


The focus error output of A, B, C and D are given to Pin 27. C4 is required for oscillation-proof. R7 is set such that FEOUT of Pin 27 becomes 1.46 Vp-p.

During alignment procedure, the DSP IC (MN662790) will adjust the focus balance voltage V_{FBAL} from Pin 30. V_{FBAL} varies with reference to the center voltage V_{REF2} (≈ 1.65 V) within ± 0.5 V.

The focus gain will change according to the type of disc. For normal disc or CDR disc, V_{GCTRL} is set to V_{REF2} ; for CDRW disc V_{GCTRL} is set to $V_{REF2} - 0.75$ V. At the same time, the tracking gain is changed too.

RF, EQ, AGC



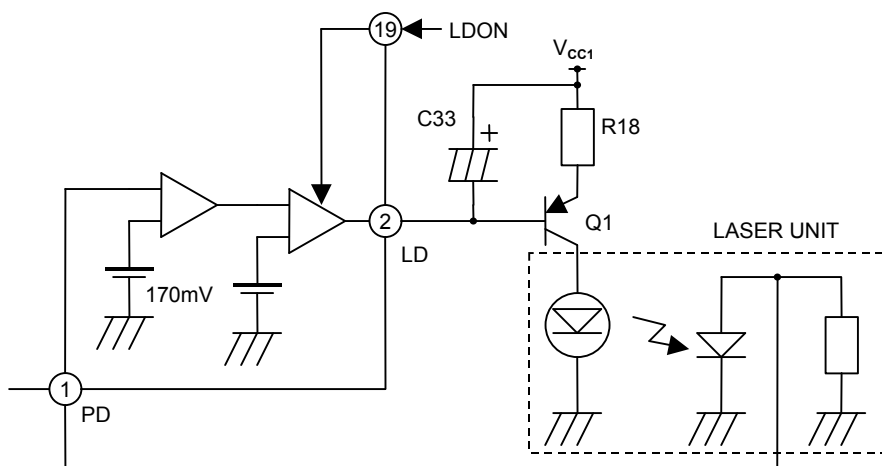
The signals A, B, C and D input from PDIC are composed into the RF signal by the RF Addition Amp, then output from RFOUT of Pin 5. This Amp is designed so that RFOUT is about 0.5 Vp-p for normal CD disc (about 0.4 Vp-p for CDR and 0.12 Vp-p for CDRW).

RF signal from Pin 5 is then input to the AGC block through the EQ block (the EQ characteristic is fixed for single speed operation in this design). It is then gain-controlled and output to Pin 10 ARF. The AGC block maintains the output level of ARF to about 1.0Vp-p for all types of disc. C38 connected to Pin 9 is for the AGC loop filter.

The RF Detection block detects the amplitude of the RF signal inputted from the EQ block. Inputted RF signal is detected after passing through a high-pass filter. Detection level is changed in accordance with the voltage of GCTRL Pin 28.

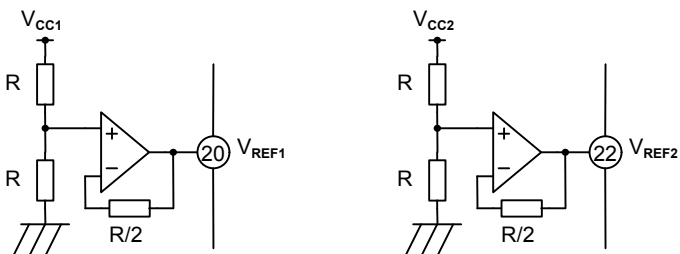
The ENV detection block detects the fluctuation of the 3T-composition in the RF signal which is needed for focus balance adjustment. C39 connected to Pin 11 forms a filter for detecting the signal fluctuation. The ENV output signal from Pin 12 is filtered by C29.

APC



The laser diode has large negative temperature characteristic in its optical output when driven with a constant current on laser diode. Therefore, the output on processing monitor photo diode, must be a controlled current for getting regular output power, thus the APC (Auto Power Control) circuit is composed.

Reference Power Supply



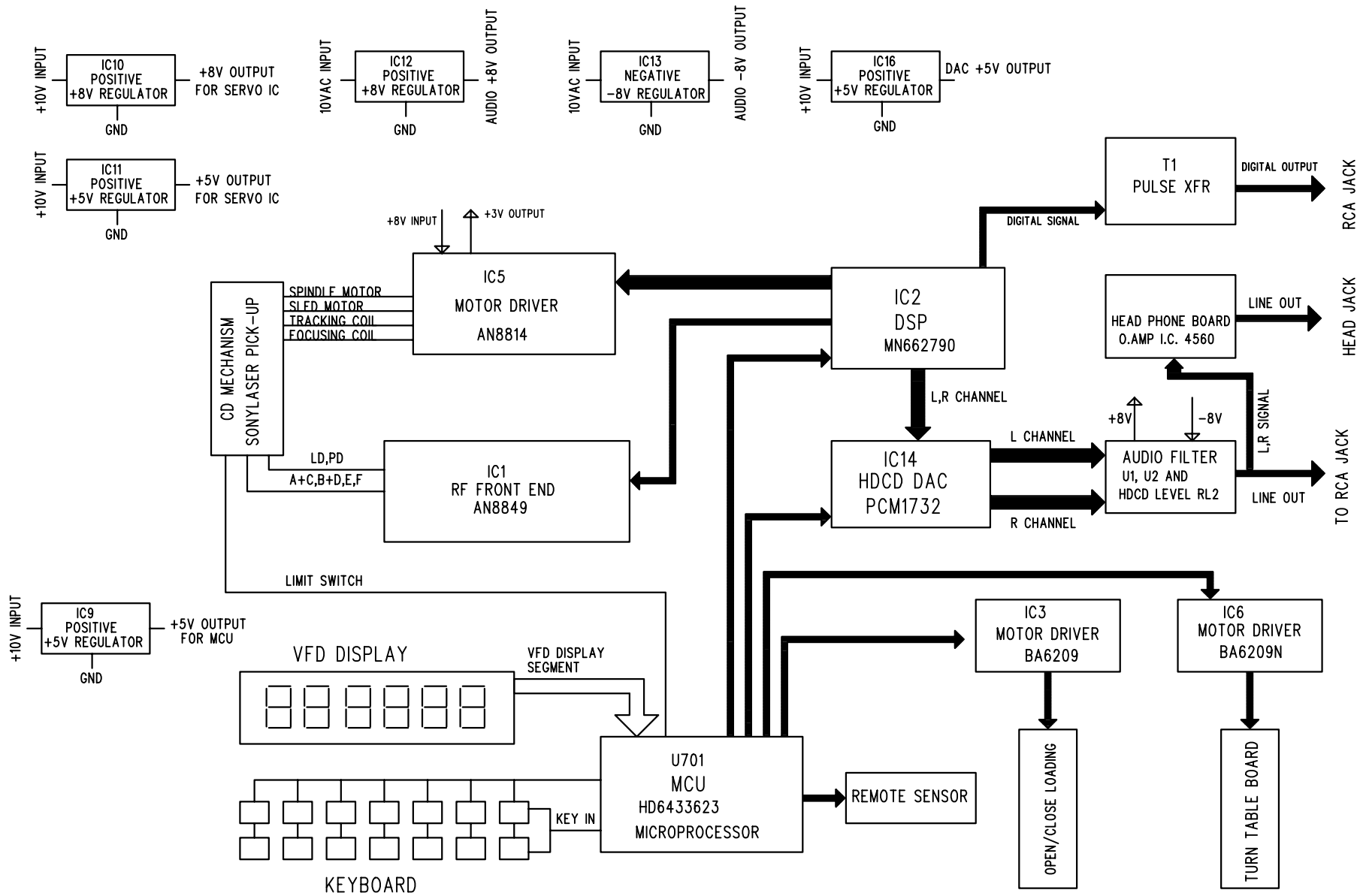
A reference power supply for servo is built-in. The current capacity of the reference supply is about 3 mA.

$$V_{REF1} = 1/2 V_{CC1} = 2.5 \text{ V}$$

$$V_{REF2} = 1/2 V_{CC2} = 1.65 \text{ V}$$

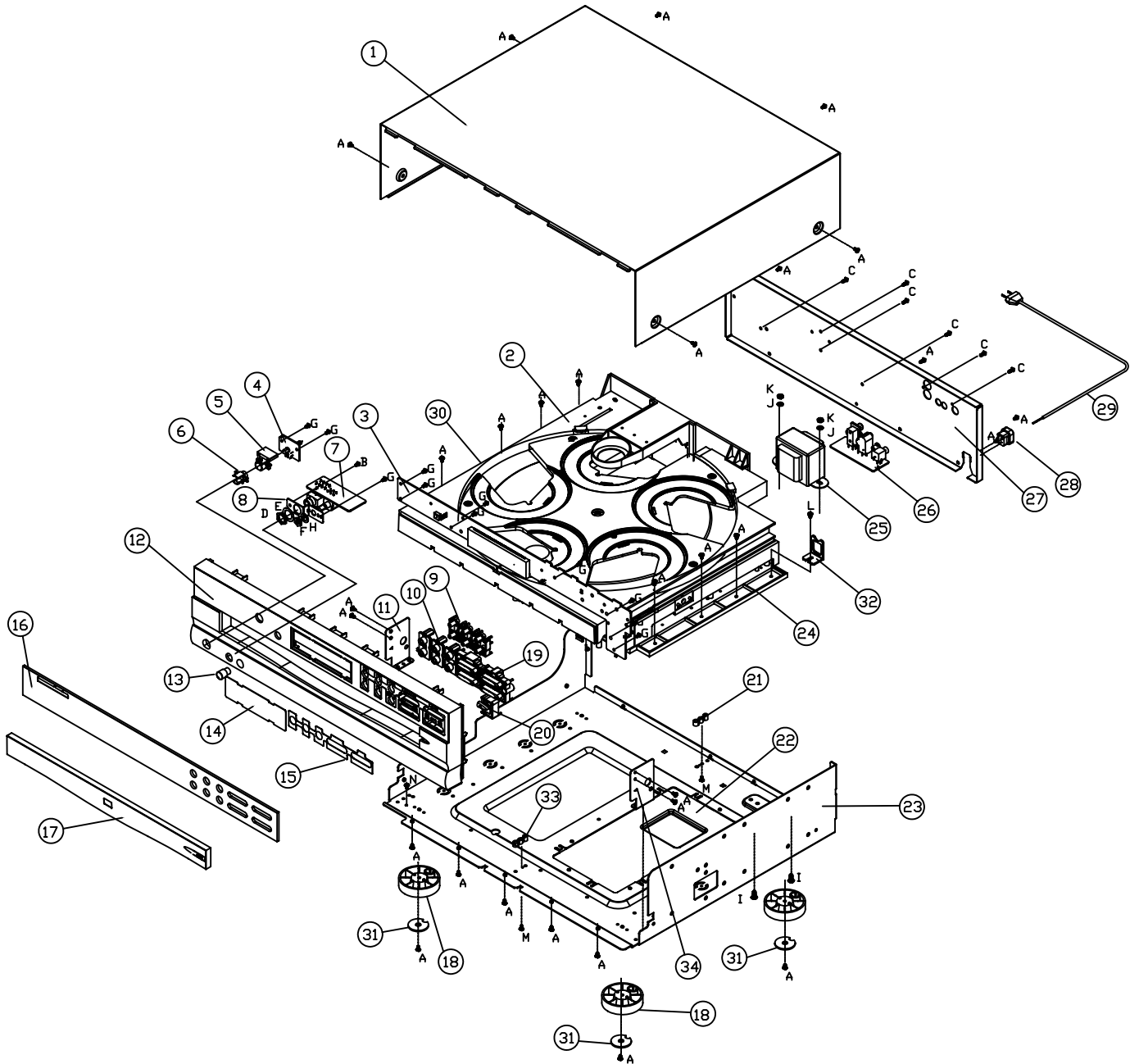
where $V_{CC1} = 5\text{ V}$ and $V_{CC2} = 3.3\text{ V}$

FL8380 BLOCK DIAGRAM



REV.	DESCRIPTION	PROJECT ENGR./DATE	APPROVAL /DATE

FL8380



N	7003-006001-112	SCREW M3X6 STP B/H (Zn)	1
M	7003-016002-112	SCREW M3X16 PTP B/H(Zn)	2
L	7003-008001-111	SCREW M3X8 STP B/H(BLACK)	1
K	6600-120040-000	HEX NUT M4	2
J	7104-010010-022	WASHER M4	2
I	7004-010010-112	SCREW M4X10 B/H	2
H	7107-212004-022	WASHER M7	1
G	7003-008002-112	SCREW M3X8 PTP B/H	24
F	6600-120070-000	HEX NUT M7	1
E	7112-018006-022	WASHER M12	1
D	6600-120120-000	HEXNUT M12	1
C	7003-008002-111	SCREW M3X8 PTP B/H(BLACK)	6
B	7003-006002-112	SCREW M3X6 PTP B/H(Zn)	3
A	7003-006001-111	SCREW M3X6 STP B/H(BLACK)	39
34	6583-810003-000	BRACKET FP RIGHT	1
33	6083-510011-000	STAND FRONT-5CD	1
32	6083-510016-000	BRACKET WIRE	1
31	6600-070003-000	PAD FOOT	4
30	6083-510013-001	BRACKET 5CD-SIDE1	1
29	2610-218300-002	POWER CORD	1
28	6600-180007-000	BUSH ACSRF-5B	1
27	6583-510003-003-05	REAR CABINET SILKSCREEN	1
26	9483-801000-291	OUTPUT BOARD ASSY	1
25	3200-480150-400	TRANSFORMER	1
24	6083-510014-000	BRACKET 5CD-SIDE2	1
23	6583-510001-006	BOTTOM CABINET	1
22	6583-510010-000	COVER PLATE	1
21	6083-510012-000	STAND REAR-5CD	1
20	6083-810006-000-01	BUTTON OPEN/CLOSE PAINTED	1
19	6083-810007-000-01	BUTTON PLAY PAINTED	1
18	6092-010012-001-01	FOOT	4
17	6083-810002-000-01	CD DOOR PAINTED	1
16	6083-810003-001-01	WINDOWS DISPLAY	1
15	6083-810010-000	DIFFUSER	1
14	6083-810011-000	FILTER FL	1
13	6085-810013-000-01	KNOB VR PAINTED	1
12	6083-810001-000-01	FRONT PANEL	1
11	6583-810002-000	BRACKET FP LEFT	1
10	6083-810009-000-01	CAP BUTTON DISC	1
9	6083-810004-000-01	BUTTON DISC	1
8	6583-510006-000	BRACKET PHONES	1
7	9483-801000-021	ASSY PCB PHONES	1
6	6083-810015-000	INDICATOR STANDBY	1
5	6083-810014-000-01	BUTTON STANDBY	1
4	9483-801000-111	ASSY PCB STANDBY	1
3	9483-801000-261	ASSY PCB FL	1
2	9600-505007-001	5CD MECHANISM	1
1	6583-810001-002-01	TOP CABINET PAINTED	1
No	PARTS No	PARTS NAME	QTY

NOTE:
1. UNLESS OTHERWISE SPECIFIED:
A. TOLERANCE: ± 0.1 mm
B. ALL DIMENSIONS ARE IN mm
C. BREAK ALL SHARP CORNERS
D. FOR SHEET METAL PARTS, BUREL < 0.4
E. < 0.4 mm AT FINAL CUT OFF POSITION

FORM	W/XG	DESIGNED BY	APPROVED BY
FL8380	W/XG		
EXPLODE	EXPLODE		
EXPLODE	EXPLODE		

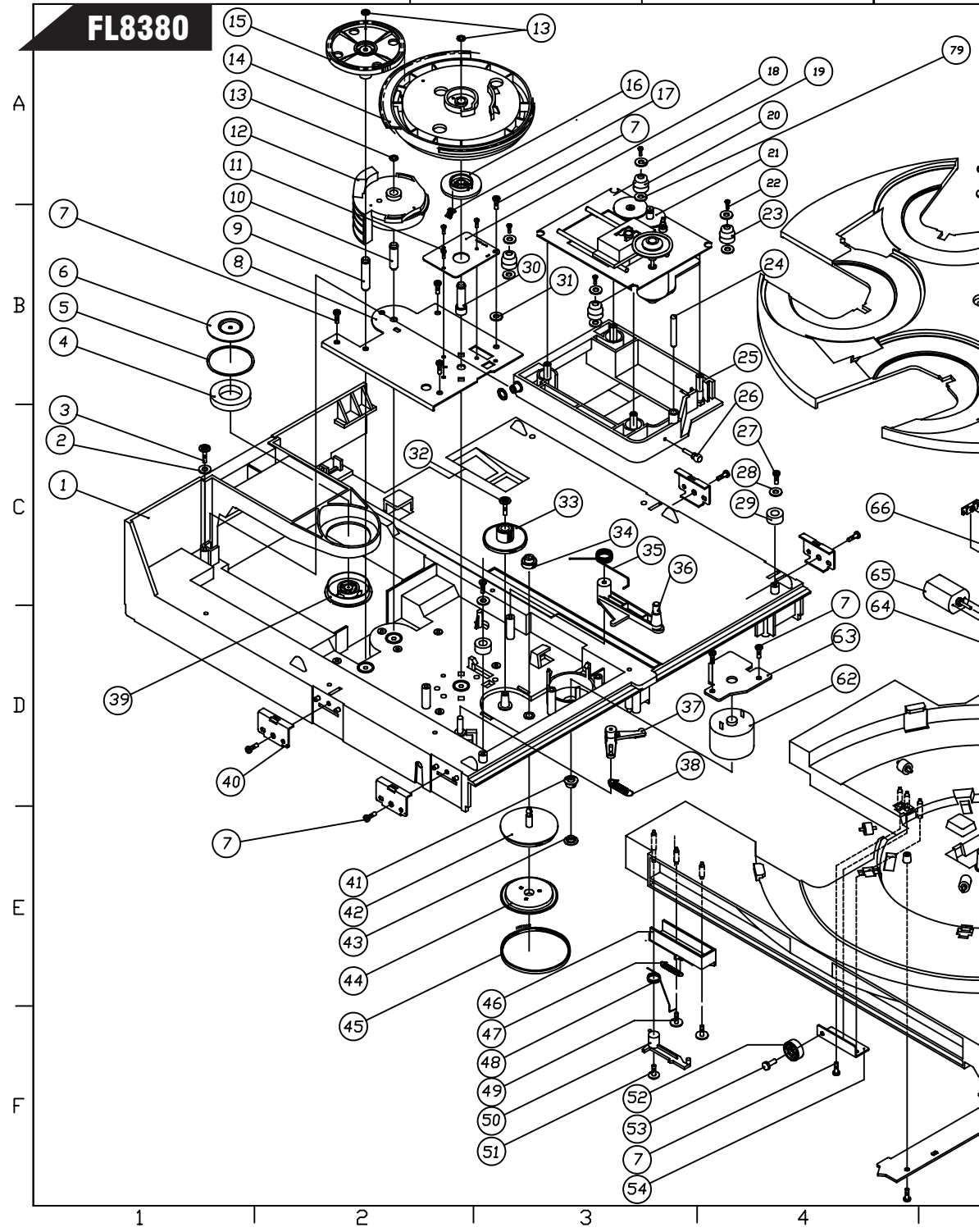
FL8380

No.	Parts No.	Parts Name	Qty.
1	6005-050050-007	Base, SCD	1
2	7103-314010-022	washer M3.3w14w1	1
3	7003-012002-062	Screw M3X12 P.T.P. W/H	1
4	6600-150006-001	Chucking Magnet	1
5	6600-140001-000	Felt Ring	1
6	6591-060007-000	chucking metal plate	1
7	7003-008002-112	Screw M3X8 P.T.P. B/H	13
8	6505-050008-001	Bracket, Gear	1
9	6600-020197-001	Pin, Cabinet Top	1
10	6600-020198-000	Pin, Control Can	1
11	7002-006001-022	Screw M2X6 S.T.P. P/H	2
12	6005-050008-001	Control Can	1
13	7103-010002-030	Washer Lock 5X10X0.5	3
14	6005-050006-004	Can Cabinet	1
15	6005-050007-000	Gear, Cabinet Top	1
16	6005-050025-002	Switch Cover	1
17	6505-050007-001	Contact Plate	1
18	4841-010700-006	PCB, Switch	1
19	7102-712706-022	washer M2.7w12.7w0.6	5
20	6600-1700176-000	CushionScd 30 deg	2
21	3009-213000-000	sony CD MECHA 213ccm	1
22	7002-608002-022	Screw M2.6w8 ptp P/H	4
23	6600-170077-000	Cushion Scd 40 deg	2
24	6600-020199-001	Pin Lock	1
25	6505-050030-001	Bracket CD Mecha	1
26	6600-020200-002	Pin, Round	1
27	7003-006002-112	Screw M3w6 P.T.P. B/H	2
28	7103-209008-022	washer M3.2w9w0.8	2
29	6600-170021-000	Cushion Ring	2
30	6600-020196-002	Pin, Can Cabinet	1
31	7103-012001-022	Washer M3X12X1mm	3
32	7003-008002-062	Screw M3X8 P.T.P. W/H ZN	1
33	6005-050009-000	Intermediate Gear	1
34	6005-050011-000	Idler, Gear	1
35	6600-010211-000	Spring, Lever Lock, Duter	1
36	6005-050014-004	Lever Lock, Duter	1
37	6005-050015-000	Lever Lock	1
38	6600-010120-001	Spring Lever Lock	1
39	6091-060006-000	Chucking Pulley	1
40	6505-050002-001	Cabinet Holder A	4
41	6005-050023-001	Pulley, Motor	1
42	6005-050034-001	Driven Pulley	1
43	6005-050024-000	Pulley Disc	1
44	6005-050035-000	Driven Pulley Plate	1
45	6600-090062-000	Timing Belt,S2M180 90T	1
46	6005-050004-003	Gear Block	1
47	6600-010212-002	Spring, Gear Block	1
48	6600-010213-000	Spring, Gear Block Arm	1
49	7002-608002-062	Screw M2.6w8 ptp W/H	2
50	6005-050005-001	Gear Block Arm	1
51	7002-620002-062	Screw M2.6X20 P.T.P. W/H ZN	1
52	6005-050017-000	Roller	1
53	6600-020202-000	Pin, Roller	1
54	6505-050005-001	Bracket, Roller	1
55	9400-501000-134	Sensor Board Assy Rev A	1
56	6600-010290-001	Spring, lever lock	1
57	6005-050026-002	lever lock	1
58	7002-010002-032	Screw M2w10 ptp 1/p	1
59	6600-020203-000	Shaft, T.T. Roller	5
60	6600-080001-000	Pinch Roller	5
61	6005-050002-011	Cabinet Top	1
62	8F-3007B-1445 B/V9	Motor	1
63	4800-310210-001	Loader Board	1
64	6505-050004-004	Motor Bracket	1
65	7F-285H-1244-0644	Motor QWABUCHD	1
66	6600-020201-001	SCD Shaft, Gear Rotary	1
67	6600-090052-000	SCD Belt Rotary	1
68	6005-050018-000	Motor Pulley	1
69	7002-003010-111	Screw M2x3 B/H (Black)	2
70	6600-020268-000	Shaft Dia. 2x34mm	1
71	6005-050020-000	Pulley Rotary	1
72	6005-050019-000	Shaft Bushing	2
73	6005-050022-000	Gear Worm	1
74	6005-050021-000	Gear rotary	1
75	7103-006005-130	Washer 3x6x0.5mm CUT	1
76	6005-050051-000	Turntable	1
77	7103-012010-022	Washer M3w12w1	1
78	7003-012002-062	Screw M3X12 P.T.P. B/H	1
79	7106-212505-022	plan washer 6.2w12.5w0.5	6

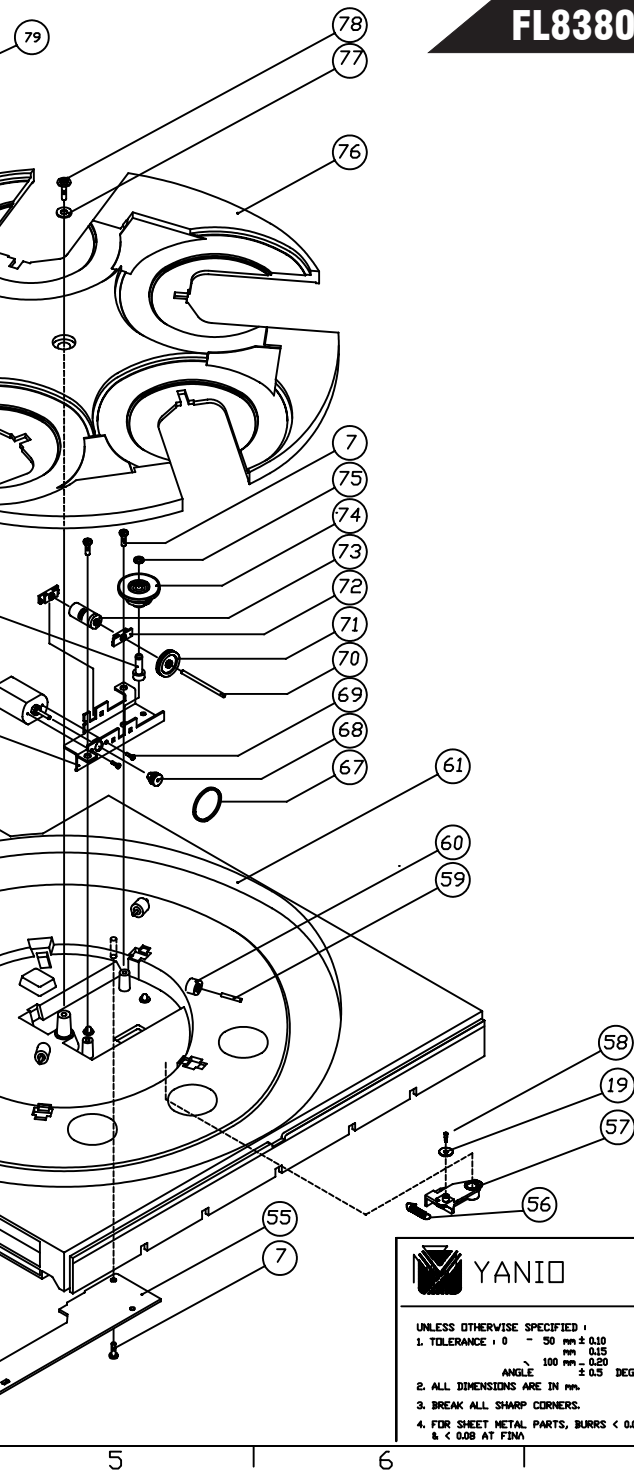


UNLESS OTHERWISE SPECIFIED :
1. TOLERANCE : 0 - 50 mm ± 0.10
mm 0.15
100 mm ± 0.20
± 0.5 DEG.
ANGLE
2. ALL DIMENSIONS ARE IN mm.
3. BREAK ALL SHARP CORNERS.
4. FOR SHEET METAL PARTS, BURRS < 0.04
& < 0.08 AT FINI.

FRESH	DRAWN BY WXG	CHECKED BY	APPROVED BY
MODEL SCD	SCALE	SHEET 1 OF 1	
MAT'L ref. to BDM	1 MECVHA ASSY FOR FL9		
SIZE A2			

FL8380

FL8380



No.	Parts No.	Parts Name	Qty.
1	6005-050050-007	Base, SCD	1
2	7103-314010-022	washer M3.3w14w1	1
3	7003-012002-062	Screw M3X12 P.T.P. V/H	1
4	6600-150006-001	Chuckling Magnet	1
5	6600-140001-000	Felt Ring	1
6	6591-060007-000	chuckling metal plate	1
7	7003-008002-112	Screw M3XB P.T.P. B/H	13
8	6505-050008-001	Bracket, Gear	1
9	6600-020197-001	Pin, Cabinet Top	1
10	6600-020198-000	Pin, Control Can	1
11	7002-006001-022	Screw M2X6 S.T.P. P/H	2
12	6005-050008-001	Control Can	1
13	7105-010005-030	Washer Lock 5X10X0.5	3
14	6005-050006-004	Can Cabinet	1
15	6005-050007-000	Gear, Cabinet Top	1
16	6005-050025-002	Switch Cover	1
17	6505-050007-001	Contact Plate	1
18	4841-010700-006	PCB, Switch	1
19	7102-712706-022	washer M2.7w12.7w0.6	5
20	6600-170076-000	Cushion SCD 30 deg	2
21	3009-213000-000	assy CD MECHA 213ccm	1
22	7002-608002-022	Screw M2.6w8 ptp P/H	4
23	6600-170077-000	Cushion SCD 40 deg	2
24	6600-020199-001	Pin Lock	1
25	6505-050030-001	Bracket CD Mecha	1
26	6600-020200-002	Pin, Round	1
27	7003-006002-112	Screw M3w6 P.T.P. B/H	2
28	7103-209008-022	washer M3.2w9w0.8	2
29	6600-170021-000	Cushion Ring	2
30	6600-020196-002	Pin, Can Cabinet	1
31	7103-018001-022	Washer M3X12x0mm	3
32	7003-008002-062	Screw M3XB P.T.P. V/H ZN	1
33	6005-050009-000	Intermediate Gear	1
34	6005-050011-000	Idler, Gear	1
35	6600-010211-000	Spring, Lever Lock, Outer	1
36	6005-050014-004	Lever Lock, Outer	1
37	6005-050015-000	Lever Lock	1
38	6600-010120-001	Spring Lever Lock	1
39	6091-060006-000	Chuckling Pulley	1
40	6505-050002-001	Cabinet Holder A	4
41	6005-050023-001	Pulley, Motor	1
42	6005-050034-001	Driven Pulley	1
43	6005-050024-000	Pulley Disc	1
44	6005-050035-000	Driven Pulley Plate	1
45	6600-090062-000	Timing Belt S2M180 90T	1
46	6005-050004-003	Gear Block	1
47	6600-010212-002	Spring, Gear Block	1
48	6000-010213-000	Spring, Gear Block Arm	1
49	7002-608002-062	Screw M2.6w8 ptp V/H	2
50	6005-050005-001	Gear Block Arm	1
51	7002-620002-062	Screw M2X20 P.T.P. V/H ZN	1
52	6005-050017-000	Roller	1
53	6600-020202-000	Pin, Roller	1
54	6005-050002-001	Bracket, Roller	1
55	9400-501000-134	Sensor Board Assy Rev A	1
56	6600-010290-001	Spring, lever lock	1
57	6005-050026-002	lever lock	1
58	7002-010002-032	Screw M2w10 ptp 1/p	1
59	6600-020203-000	Shaft, T.I. Roller	5
60	6600-080001-000	Pinch Roller	5
61	6005-050002-011	Cabinet Top	1
62	1W-3007B-14415 B/V9	Motor	1
63	4800-310210-001	Loader Board	1
64	6505-050004-004	Motor Bracket	1
65	FF-1009H-1340-266AA	Motor (MABUCHI)	1
66	6600-020201-001	SCD Shaft, Gear Rotary	1
67	6600-090052-000	SCD Belt Rotary	1
68	6005-050018-000	Motor Pulley	1
69	7002-003010-111	Screw M2x3 B/H (Black)	2
70	6600-020268-000	Shaft Dia. 2x34mm	1
71	6005-050020-000	Pulley Rotary	1
72	6005-050019-000	Shaft Bushing	2
73	6005-050022-000	Gear Vorn	1
74	6005-050021-000	Gear, rotary	1
75	7103-006005-130	Washer 3x6x0.5mm CUT	1
76	6005-050051-000	Turntable	1
77	7103-012010-022	Washer M3w12w1	1
78	7003-012002-062	Screw M3X12 P.T.P. B/H	1
79	7106-212505-022	plan washer 6.2w12.5w0.5	6



YANIO

UNLESS OTHERWISE SPECIFIED :

1. TOLERANCE : 0 - 50 mm ± 0.15 mm ± 0.20 mm ± 0.5 DEG.
2. ALL DIMENSIONS ARE IN mm.
3. BREAK ALL SHARP CORNERS.
4. FOR SHEET METAL PARTS, BURRS < 0.04 & < 0.08 AT FIMA

FRESH

MODEL SCD

MTRL ref. to BOM

SIZE A2



DRAWN BY WXG

CHECKED BY

APPROVED BY

SCALE SHEET 1 OF 1

1 MECVHA ASSY FOR FL9

SIZE PART

A

Troubleshooting tips and solutions to common service problems

For models: FL8350/FL8550/FL8380

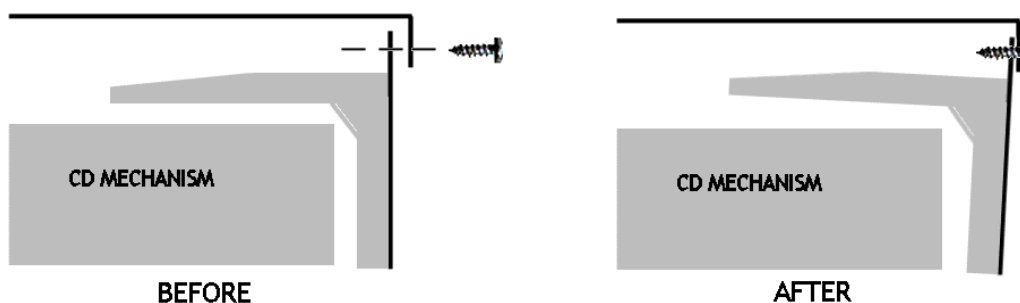
TIP# HKTT2003-06

Complaint: Unit Will Not Play or Recognize a Disc, “Skipping”.

Possible Problem: Misalignment of the top cover and rear panel.

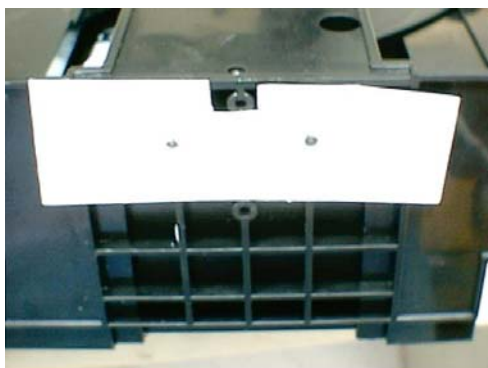
To test, attempt to play the unit with the top cover OFF. If symptoms persist, troubleshoot further. If the unit will play with the cover OFF, the problem is caused by a misalignment of the top cover and the rear panel. When the screws are tightened on the top cover, at the rear of the unit, the CD mechanism may “warp” upward in the area of the clamper arm, which causes a “Will not Play” symptom, which shows up as an unusual delay, with the word “Disc” in the display, after the “Play” button is pressed.

(SIDE VIEWS)

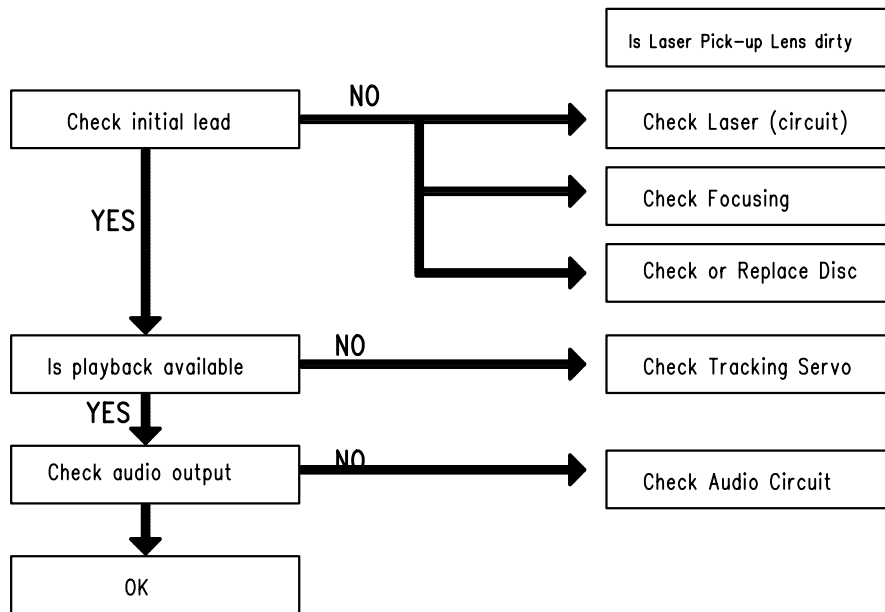


Solutions:

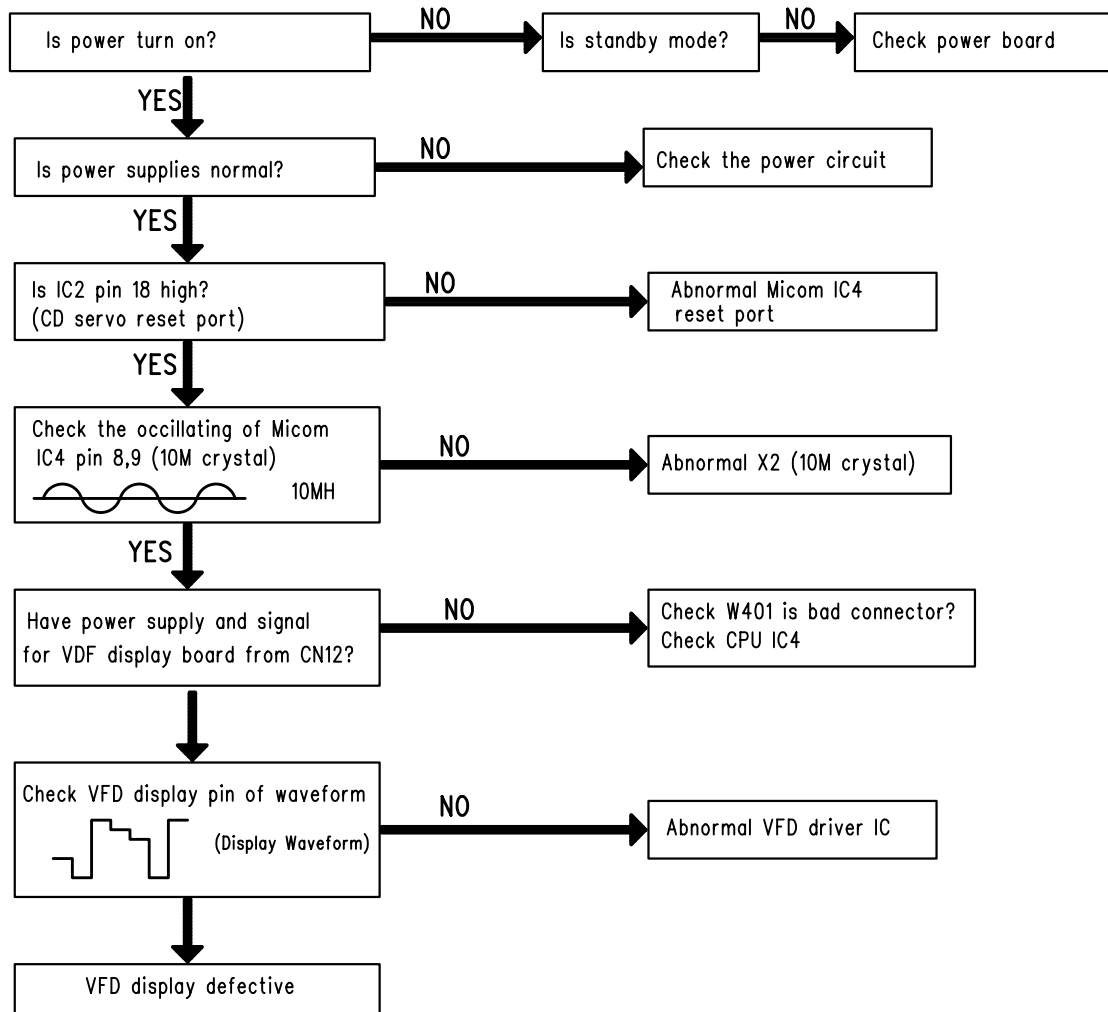
Washers can be added to the top rear screws to fill the gap between the top cover “lip” and rear panel. Alternately, a spacer can be constructed of fish paper, plastic sheet, or similar material, that will fit between the Disc Clamper and the inside of the rear panel. Choose thickness as necessary.



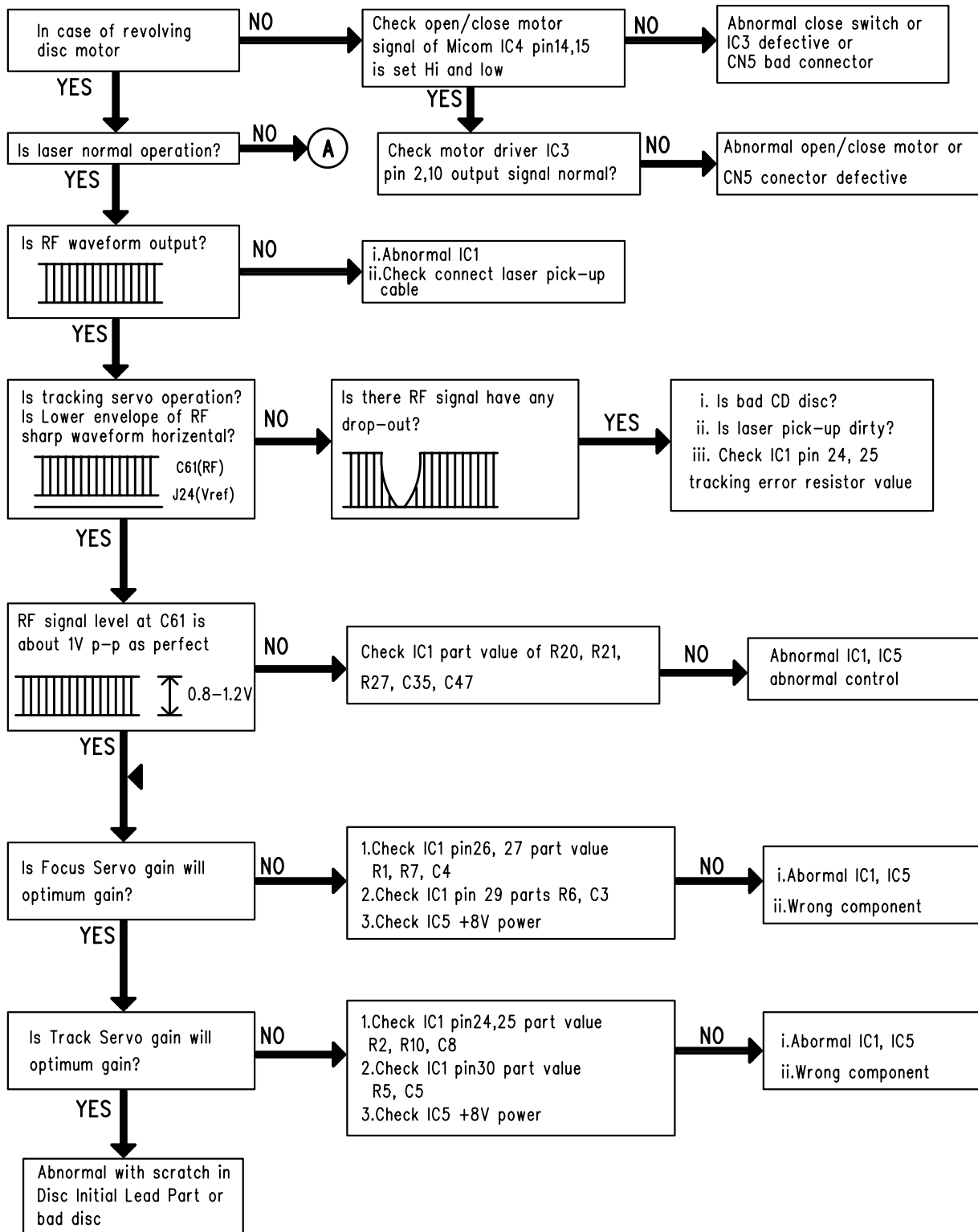
Check CD Player Is Normal Operational?



In Case of Abnormal Indication

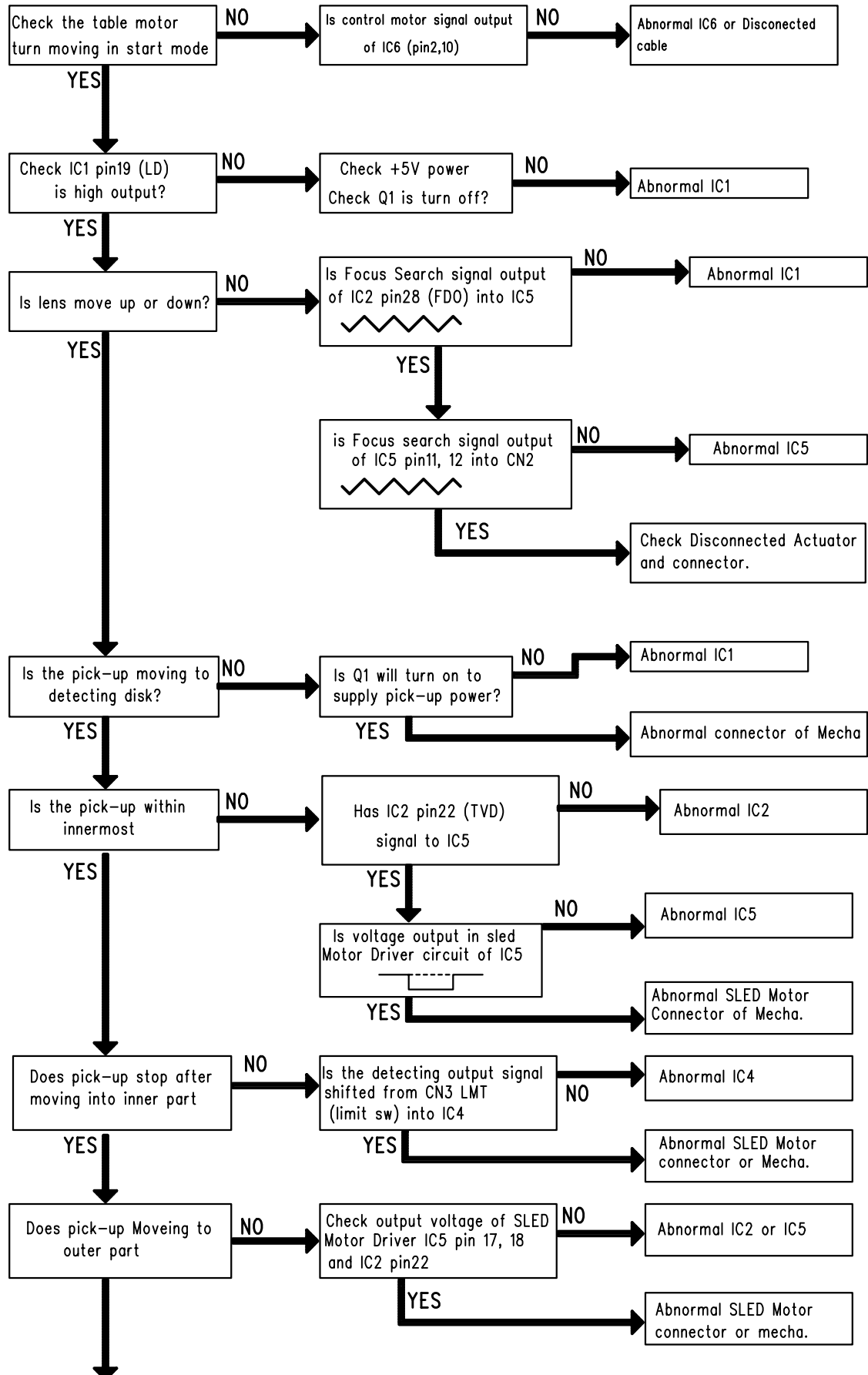


When Initial Lead-In Is Not Operational

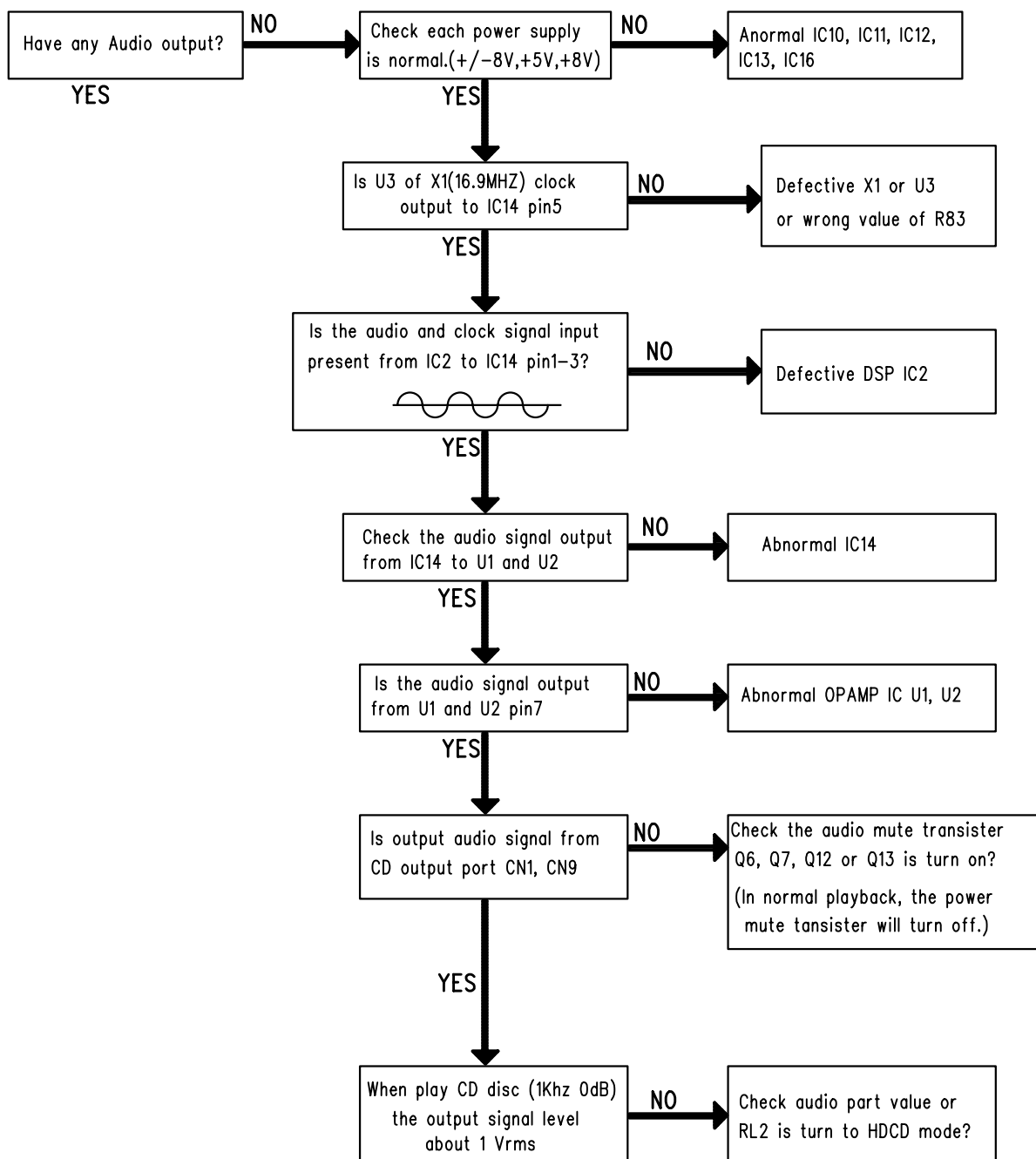


Remark: (A) is next page

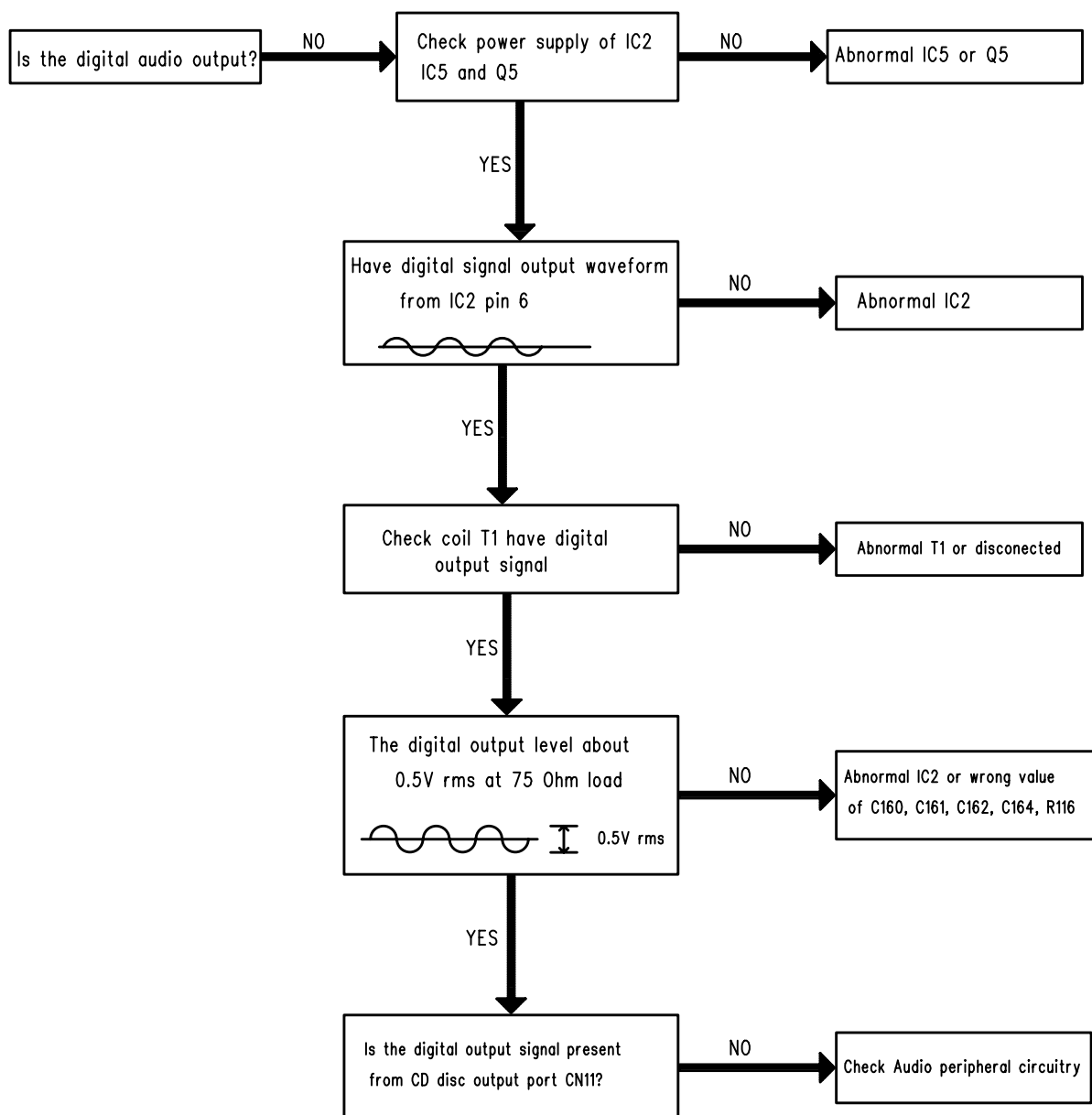
A: When Laser is NOT Operation



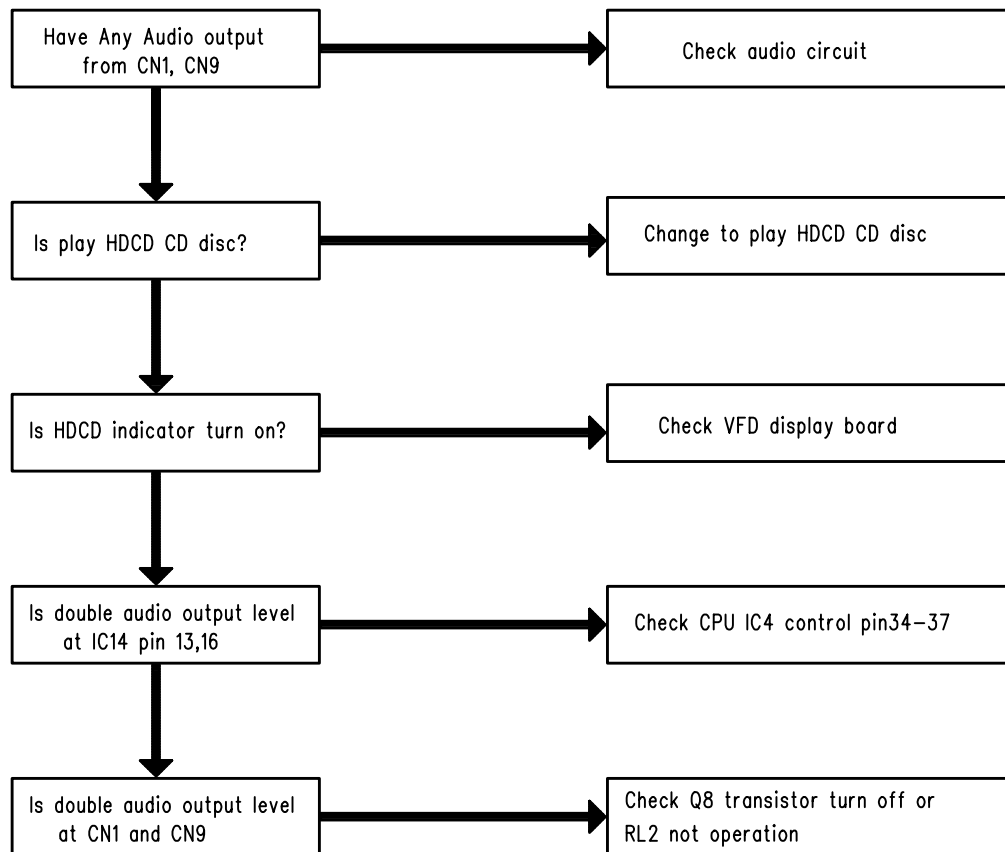
2) Audio Circuit Checking



3) Check Digital Audio Circuit



4) Check HDCD Circuit



MN662790RSA1

Signal Processing LSI for CD Players

■ Overview

The MN662790RSA is a CD signal processing LSI that, on a single chip, combines optics servos for the CD player (focus, tracking, and traverse servos), digital signal processing (EFM demodulation and error correction), digital servo processing for the spindle motor, digital filter, and D/A converter, so thus covers all signal processing functions from the head's RF amplifier onward.

■ Features

(Optics servo)

- Focus, tracking, and traverse servos
- Automatic adjustment functions for FO/TR gain, FO/TR offset, and FO/TR balance
- Built-in D/A converter for drive voltage output
- Built-in dropout countermeasures
- Anti-shock functions
- Built-in track cross counter
- Traverse speed detection function

(Digital Signal Processing)

- Built-in DSL and PLL
- Frame synchronization detection, holding, and insertion
- Subcode data processing
 - Subcode Q data CRC check
 - Built-in subcode Q data register
- CIRC error detection and correction
 - C1 decoder: duplex error correction
 - C2 decoder: triplex error correction
 - Built-in 16-K bits of RAM for use in de-interleaving
- Audio data interpolation
 - Averaging or retention of previous values
 - Digital attenuation (−12 dB)
- Audio data peak level detection function
- Digital audio interface (EIAJ format)
- Audio data serial interface for input and output

(Spindle Motor Servo)

- CLV digital servo
- Switchable servo gain

(Audio circuits)

- Digital filter using 8-fold oversampling
- Built-in D/A converter (1-bit D/A converter)
- Built-in differential operational amplifier (secondary low pass filter)

(Other)

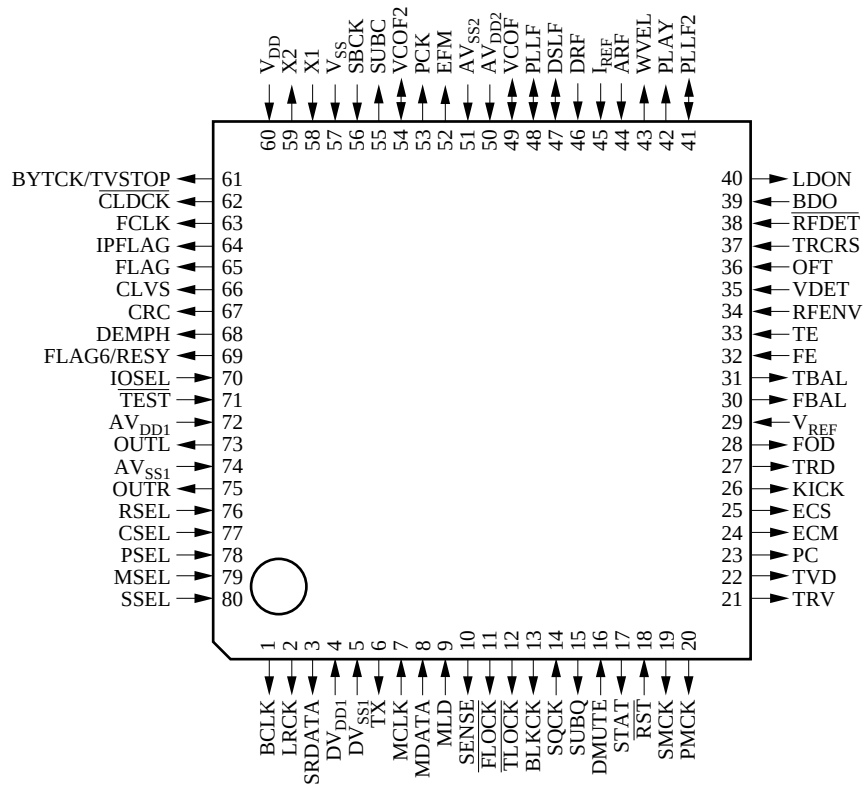
- Built-in playback pitch control function (normal speed only) ($\pm 13\%$)
- Support for quadruple-speed playback (digital servo and signal processing block only)
- Built-in support for jitter-free disc rotation synchronization playback
- Oscillator shutdown mode
- Power management mode
- Operating voltage 3.3 V for internal circuit; 5 V for Digital input pins

■ Applications

-

MN662790RAS1

■ Pin Assignment

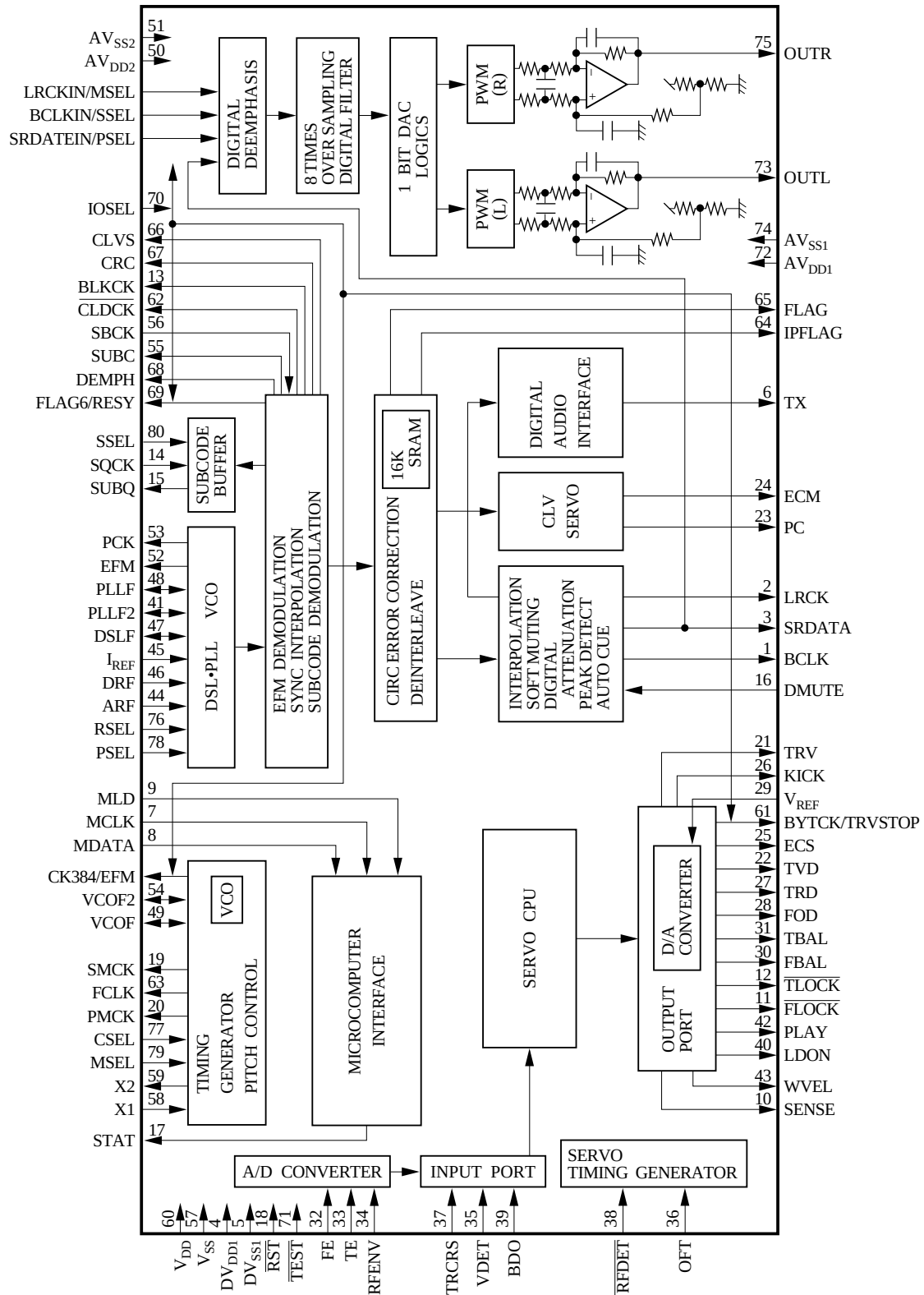


(TOP VIEW)

QFS080-P-1414

MN662790RAS1

■ Block Diagram



MN662790RAS1

■ Pin Descriptions

Pin No.	Symbol	I/O	Function Description
1	BCLK	O	SRDATA bit clock output.
2	LRCK	O	Left/right channel discrimination signal output.
3	SRDATA	O	Serial data output.
4	DV _{DD1}	I	Power supply for digital circuits.
5	DV _{SS1}	I	Ground for digital circuits.
6	TX	O	Digital audio interface output signal.
7	MCLK	I	Microcomputer command clock input. (Data is latched at rising edge.)
8	MDATA	I	Microcomputer command data input.
9	MLD	I	Microcomputer command load signal input. "L" level: load.
10	SENSE	O	Sense signal output. (OFT, FESL, NACEND, NAJEND, SFG, and NWTEND)
11	$\overline{\text{FLOCK}}$	O	During default operation, focus servo convergence signal. "L" level: convergence. During command execution, direction detection output for external track counter.
12	$\overline{\text{TLOCK}}$	O	During default operation, tracking servo convergence signal. "L" level: convergence. During command execution, traverse speed control output.
13	BLKCK	O	Subcode block clock signal ($f_{\text{BLKCK}}=75 \text{ Hz}$)
14	SQCK	I	External clock input for subcode Q register
15	SUBQ	O	Subcode Q data output
16	DMUTE	I	Muting input. (Effective only for an output bit rate of 64 f _s) "H" level: muting.
17	STAT	O	Status signal. (CRC, CLVS, TTSTOP, JCLVS, SQOK, FLAG6, SENSE, $\overline{\text{FLOCK}}$, $\overline{\text{TLOCK}}$, rpm data, and FCLV)
18	$\overline{\text{RST}}$	I	Reset input. "L" level: reset.
19	SMCK	O	If MSEL is "H" level, 8.4672 MHz clock signal output. If MSEL is "L" level, 4.2336 MHz clock signal output
20	CSEL	O	Oscillation frequency selection: "H" is 33.8688MHz; "L" is 16.9344MHz.
21	TRV	O	Traverse forced feed output. (tristate)
22	TVD	O	Traverse drive output.
23	PC	O	Spindle motor ON signal. "L" level: ON (default).
24	ECM	O	Spindle motor drive signal (forced mode output). (tristate)
25	ECS	O	Spindle motor drive signal (servo error signal output). (tristate)
26	KICK	O	Kick pulse output. (tristate)
27	TRD	O	Tracking drive output.
28	FOD	O	Focus drive output.
29	V _{REF}	I	Reference voltage for DA output (TVD, ECS, TRD, FOD, FBAL, and TBAL).
30	FBAL	O	Focus balance adjustment output.
31	TBAL	O	Tracking balance adjustment output.
32	FE	I	Focus error signal input. (analog input)

MN662790RAS1

■ Pin Descriptions (continued)

Pin No.	Symbol	I/O	Function Description
33	TE	I	Tracking error signal input. (analog input)
34	RFENV	I	RF envelope signal input. (analog input)
35	VDET	I	Vibration detection signal input. "H" level: vibration detected.
36	OFT	I	Offtrack signal input. "H" level: offtrack.
37	TRCRS	I	Track cross signal input. (analog input)
38	RFDET	I	RF detection signal input. "L" level: detected.
39	BDO	I	Dropout signal input. "H" level: dropout.
40	LDON	O	Laser ON signal output. "H" level: ON.
41	PLL2	I/O	PLL loop filter characteristic selection pin.
42	TOFS	O	Tracking offset adjustment or DSL balance output(D/A output).
43	WVEL	O	Double-speed status signal output. "H" level: double-speed.
44	ARF	I	RF signal input.
45	I _{REF}	I	Reference current input pin.
46	DRF	I	DSL bias pin.
47	DSL2	I/O	DSL loop filter pin.
48	PLL2	I/O	PLL loop filter pin.
49	VCO2	I/O	VCO loop filter pin.
50	AV _{DD2}	I	Power supply for analog circuits (DSL, PLL, D/A converter output, and A/D converter).
51	AV _{SS2}	I	Ground for analog circuits (DSL, PLL, D/A converter output, and A/D converter).
52	EFM or CK384	O	EFM signal output. EFM output when IOSEL is "H" level. •Crystal oscillator 16.9344-MHz clock output when I •IOSEL is "L" level. •384 f_s output from signal processing block. (During variable-pitch operation, this is the VCO clock.) Commands permit switching among the above three outputs.
53	PCK	O or DSLB	PLL derived clock or DSL balance output. f _{PCK} = 4.3218 MHz.
54	VCO2	I/O	VCO loop filter pin.
55	SUBC	O	Subcode serial output.
56	SBCK	I	Serial clock input for subcode serial output.
57	V _{SS}	I	Ground for oscillator circuit.
58	X1	I	Crystal oscillator circuit input/output pins. f=16.9344 MHz, 33.8688 MHz.
59	X2	O	Crystal oscillator circuit output/output pins. f=16.9344 MHz, 33.8688 MHz.
60	V _{DD}	I	Oscillator circuit power supply.
61	BYTCK or TRVSTOP	O	When IOSEL is "H" level, byte clock signal output. When IOSEL is "L" level, traverse stop signal output. "H" level: stop mode.
62	CLDCK	O	Subcode frame clock signal output pin. (f _{CLDCK} =7.35 kHz)
63	FCLK	O	Crystal frame clock signal output. (f _{FCLK} =7.35 kHz)
64	IPFLAG	O	Interpolation flag signal output. "H" level: interpolation.
65	FLAG	O	Flag signal output.

MN662790RAS1

■ Pin Descriptions (continued)

Pin No.	Symbol	I/O	Function Description
66	CLVS	O	Spindle servo phase synchronization signal output. "H" level: CLV. "L" level: rough servo.
67	CRC	O	During default operation, subcode CRC check result output. "H" level: OK. "L" level: no good. During command execution, pulse output for external track counter.
68	DEMPH	O	De-emphasis detection signal output. "H" level: ON.
69	FLAG6 or RESY	O	When IOSEL is "L" level, FLAG6 output, signal for resetting address of RAM for error correction de-interleave. "L" level: address reset. When IOSEL is "H" level, RESY output, frame resynchronization signal. "H" level: synchronized. "L" level: out of sync.
70	$\overline{\text{IOSEL}}$	I	Mode selection pin
71	TEST	I	Test pin. Keep this at "H" level.
72	AV _{DD1}	I	Power supply for analog circuits. (common use for left and right channel audio outputs.)
73	OUTL	O	Left channel audio output.
74	AV _{SS1}	I	Ground for analog circuits. (common use for left and right channel audio outputs.)
75	OUTR	O	Right channel audio output.
76	RSEL	I	RF signal polarity selection pin. "H" level: bright level is "H." "L" level: bright level is "L."
77	V _{CC5V}	I	5-V power supply applied to pins for 5-V input.
78	PSEL	I	When IOSEL is "H" level, test pin. Keep this at "L" level. When IOSEL is "L" level, SRDATA input.
79	MSEL	I	When IOSEL is "H" level, frequency selection pin for SMCK pin output. "H" level: SMCK=8.4672 MHz When IOSEL is "L" level, LRCK input. "H" level: left channel data. "L" level: right channel data. SMCK output fixed at 4.2336 MHz.
80	SSEL	I	When IOSEL is "H" level, SUBQ pin output mode selection pin. "H" level: buffered subcode Q mode. "L" level: CLDCK synchronization mode. When IOSEL is "L" level, BCKL input. Buffered subcode Q mode.

AN8849SB

Head amplifier IC for CD-ROM drive (for 24 times speed or more)

■ Overview

The AN8849SB is a head amplifier IC for digital servo. It can configure an efficient CD-ROM system in combination with the MN662752, and allows a full-automatic adjustment of tracking balance-gain-offset and focus balance-gain-offset with fewer external parts.

Built-in functions are a variable equalizer, wide band RF amp. and AGC which meet CAV playback with 24 times speed or more.

■ Features

- Variable equalizer which meets CAV playback with 24 times speed or more CAV playback.
- Wide band RF amp. and AGC ($f_c = 20$ MHz or more (-3 dB))
- Balance adjustment function built-in
Focus error amp./tracking error amp.
- CD-RW playback compatible.

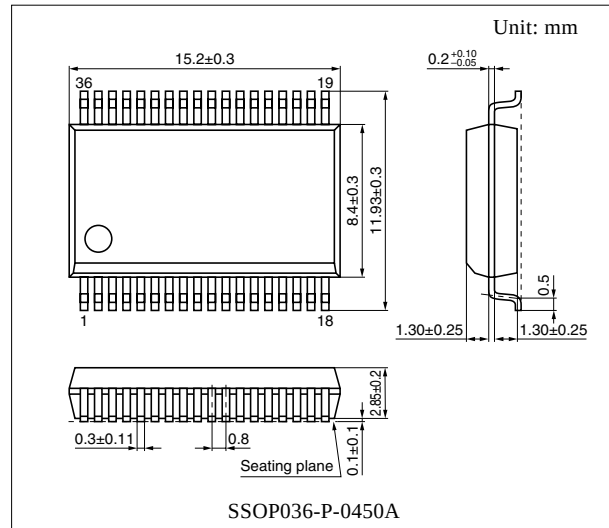
Variable gain

Focus error amp./tracking error amp.
(to $+16.9$ dB)

- OFTR/BDO detection
- APC amp.

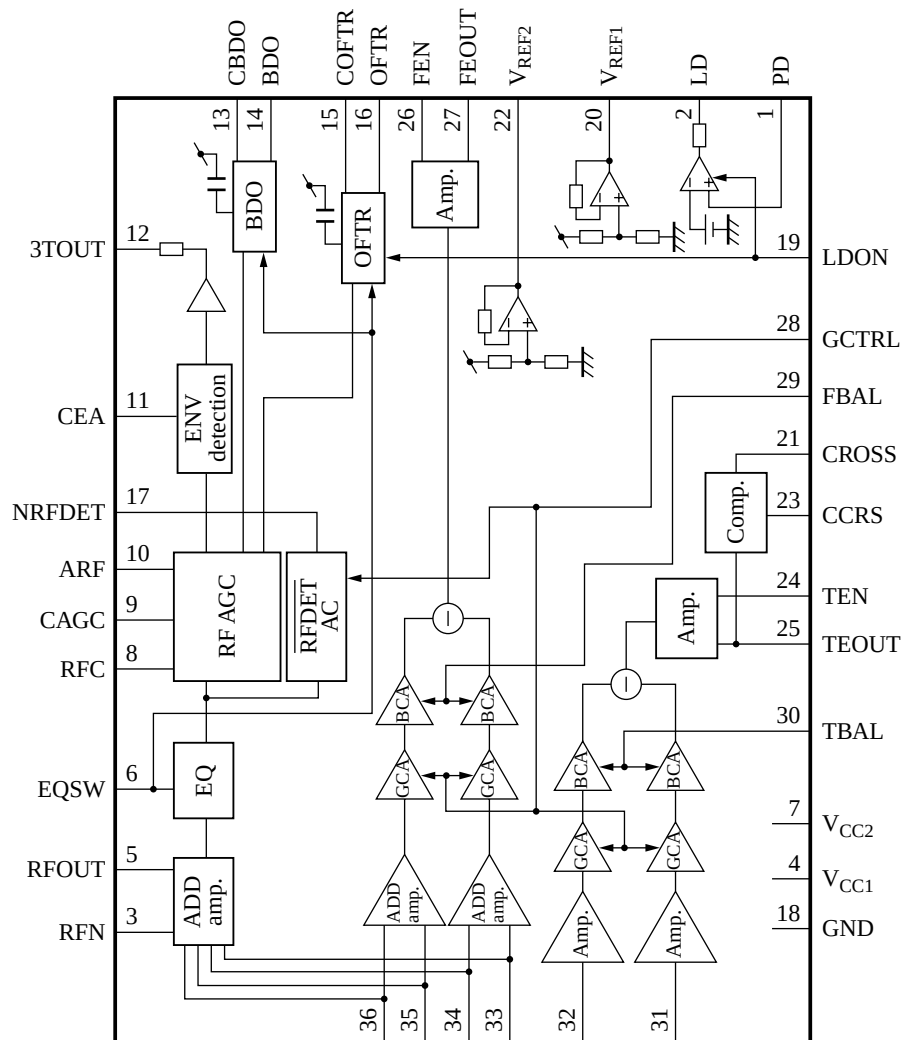
■ Applications

- CD/CD-ROM drive



AN8849SB

■ Block Diagram



AN8849SB

■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	APC amp. input pin	18	GND pin
2	APC amp. output pin	19	APC & masking control pin
3	RF addition amp. inverted input pin	20	V _{REF1} output pin
4	Power supply pin 1	21	CROSS output pin
5	RF addition amp. output pin	22	V _{REF2} output pin
6	EQ characteristics control pin	23	Capacitor connection pin for CROSS
7	Power supply pin 2	24	TE amp. inverted input pin
8	Capacitor connection pin for HPF of AGC input	25	TE amp. output pin
9	AGC loop filter connection pin	26	FE amp. inverted input pin
10	AGC output pin	27	FE amp. output pin
11	Capacitor connection pin for HPF amp.	28	GCTRL pin
12	3TENV output pin	29	FBAL control pin
13	Capacitor connection pin for RF dark-side envelope detection	30	TBAL control pin
14	BDO output pin	31	Tracking signal input pin 1
15	Capacitor connection pin for RF right-side envelope detection	32	Tracking signal input pin 2
16	OFTR output pin	33	Focus signal input pin 4
17	NRFDET output pin	34	Focus signal input pin 2
		35	Focus signal input pin 3
		36	Focus signal input pin 1

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage 1 *1	V _{CC1}	5.8	V
Supply voltage 2 *1	V _{CC2}	5.8	V
Supply current 1 *1	I _{CC1}	55	mA
Supply current 2 *1	I _{CC2}	2.5	mA
Power dissipation *1, *2	P _D	333.5	mW
Operating ambient temperature *1	T _{opr}	−20 to +75	°C
Storage temperature *1	T _{stg}	−55 to +125	°C

Note) *1: Except for the power dissipation, operating ambient temperature and storage temperature, all ratings are for T_a = 25°C.

$$*2: P_D = V_{CC1} \cdot I_{CC1} + V_{CC2} \cdot I_{CC2}$$

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage 1	V _{CC1}	4.5 to 5.5	V
Supply voltage 2	V _{CC2}	3.0 to 5.5	V

Note) Apply voltage to satisfy $V_{CC2} - V_{CC1} < 0.3 \text{ V}$.

AN8849SB

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Current consumption with no load 1	I_{TOTAL1}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{EQSW}} = V_{\text{REF2}} + 0.75\text{ V}$	28.4	40.6	52.8	mA
Current consumption with no load 2	I_{TOTAL2}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$	1.20	1.72	2.24	mA
V_{REF1} output voltage	V_{REF1}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$	2.27	2.50	2.73	V
V_{REF2} output voltage	V_{REF2}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$	1.50	1.65	1.80	V
Focus error amp.						
Focus error amp. output offset voltage	$V_{\text{FO-OF}}$	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$	-90	0	90	mV
Focus error offset balance crosstalk amount	$V_{\text{FO-OFB}}$	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{FB}} = V_{\text{REF2}} \pm 0.5\text{ V}$	-150	0	150	mV
Focus error amp. V-V conversion gain	G_{FO}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{GC}} = V_{\text{REF2}} - 0.75\text{ V}$	12.3	14.4	16.5	dB
Focus error amp. V-V conversion relative gain	ΔG_{FO}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{GC}} = V_{\text{REF2}} - 0.75\text{ V}$	-1.5	0	1.5	dB
Focus error amp. balance output 1-H	$B_{\text{FO1-H}}$	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{FB}} = V_{\text{REF2}} + 0.5\text{ V}$	1.08	1.35	1.62	—
Focus error amp. balance output 1-L	$B_{\text{FO1-L}}$	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{FB}} = V_{\text{REF2}} - 0.5\text{ V}$	0.45	0.65	0.85	—
Focus error amp. balance relative output 2-H	B_{FOH}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{FB}} = V_{\text{REF2}} + 0.5\text{ V}$	4.35	6.35	8.35	dB
Focus error amp. balance relative output 2-L	B_{FOL}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{FB}} = V_{\text{REF2}} - 0.5\text{ V}$	-8.35	-6.35	-4.35	dB
Focus error amp. frequency characteristics	G_{FOF}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $f = 3\text{ kHz}$, 60 kHz	-4.5	-3.0	-1.5	dB
Focus error amp. GCTRL gain ratio $\times 4$	B_{FO4}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{GC}} = V_{\text{REF2}}$	3.3	4.3	5.3	—
Tracking error amp.						
Tracking error amp. output offset voltage	$V_{\text{TR-OF}}$	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$	-60	0	60	mV
Tracking error offset balance crosstalk amount	$V_{\text{TR-OFB}}$	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{TB}} = V_{\text{REF2}} \pm 0.5\text{ V}$	-200	0	200	mV
Tracking error amp. V-V conversion gain	G_{TR}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{GC}} = V_{\text{REF2}} - 0.75\text{ V}$	12.2	14.3	16.4	dB
Tracking error amp. V-V conversion relative gain	ΔG_{TR}	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{GC}} = V_{\text{REF2}} - 0.75\text{ V}$	-1.5	0	1.5	dB
Tracking error amp. balance output 1-H	$B_{\text{TR1-H}}$	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{TB}} = V_{\text{REF2}} + 0.5\text{ V}$	0.45	0.65	0.85	—
Tracking error amp. balance output 1-L	$B_{\text{TR1-L}}$	$V_{\text{CC1}} = 5\text{ V}$, $V_{\text{CC2}} = 3.3\text{ V}$ $V_{\text{TB}} = V_{\text{REF2}} - 0.5\text{ V}$	1.08	1.35	1.62	—

AN8849SB

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$ (continue)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Tracking error amp. (continued)						
Tracking error amp. balance relative output 2–H	B_{TRH}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$ $V_{TB} = V_{REF2} + 0.5\text{ V}$	–8.35	–6.35	–4.35	dB
Tracking error amp. balance relative output 2–L	B_{TRL}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$ $V_{TB} = V_{REF2} - 0.5\text{ V}$	4.35	6.35	8.35	dB
Tracking error amp. frequency characteristics	G_{TRF}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$ $f = 30\text{ kHz}$, 500 kHz	–4.5	—	0	dB
Tracking error amp. GCTRL gain ratio $\times 4$	B_{TR4}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$ $V_{GC} = V_{REF2}$	3.3	4.3	5.3	—
CROSS detection						
CROSS high-level output	V_{CR-H}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$, $f = 10\text{ kHz}$	4.2	—	—	V
CROSS low-level output	V_{CR-L}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$, $f = 10\text{ kHz}$	—	—	0.8	V
RF addition amp.						
RF addition amp. output offset voltage	V_{RAOF}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$	–200	0	200	mV
RF addition amp. addition gain	G_{RAD}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$	–2.1	0	2.1	dB
RF addition amp. addition relative gain 1	ΔG_{RAD1}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$	–1.0	0	1.0	dB
RF addition amp. addition relative gain 2	ΔG_{RAD2}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$	–1.0	0	1.0	dB
RF addition amp. addition relative gain 3	ΔG_{RAD3}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$	–1.0	0	1.0	dB
RF addition amp. full-addition gain	G_{RADA}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$	9.9	12.0	14.1	dB
RF addition amp. full-addition frequency characteristics *	G_{RADDF}	$V_{CC1} = 5\text{ V}$, $V_{CC2} = 3.3\text{ V}$ $f = 500\text{ kHz}$, 30 MHz	–3.1	–1.6	1.4	dB
Variable EQ characteristics						
EQ characteristics $\times 1-1$ *	G_{EQ1-1}	$f = 100\text{ kHz}$ $EQSW = V_{REF2} - 0.5\text{ V}$	–1.5	0	1.5	dB
EQ characteristics $\times 1-3$ *	G_{EQ1-3}	$f = 500\text{ kHz}$ $EQSW = V_{REF2} - 0.5\text{ V}$	0.5	2.0	3.5	dB
EQ characteristics $\times 20-1$ *	G_{EQ20-1}	$EQSW = V_{REF2} + 0.5\text{ V}$ $f = 2\text{ MHz}$	–1.5	0	1.5	dB
EQ characteristics $\times 20-3$ *	G_{EQ20-3}	$EQSW = V_{REF2} + 0.5\text{ V}$ $f = 13\text{ MHz}$	–1.3	0.2	1.7	dB
AGC						
AGC max. gain	G_{MAGC}	$f = 500\text{ kHz}$, $V_{IN} = 20\text{ mV[p-p]}$	20.3	23.3	26.3	dB
AGC operating gain	G_{AGC}	$f = 500\text{ kHz}$, $V_{IN} = 500\text{ mV[p-p]}$	3.0	6.0	9.0	dB
AGC compression factor	ΔG_{AGC}	$f = 500\text{ kHz}$, $V_{IN} = 125\text{ mV[p-p]}$	–1.20	1.30	3.80	dB
AGC frequency characteristics	G_{FAGC}	$f = 30\text{ MHz}$, $V_{IN} = 20\text{ mV[p-p]}$	–4.5	–3.0	0	dB

Note) *: The values mentioned above are subject to change according to the state of a printed circuit board, a socket, etc.

AN8849SB

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$ (continued)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
NRF detection						
NRF det. detection level	V_{RDA1}	$f = 500 \text{ kHz}, V_{\text{GC}} = V_{\text{REF2}} - 0.75 \text{ V}$	73	105	137	mV[p-p]
NRF det. high-level output voltage	V_{RDAH}	$f = 500 \text{ kHz}, V_{\text{GC}} = V_{\text{REF2}} - 0.75 \text{ V}$	4.2	—	—	V
NRF det. low-level output voltage	V_{RDAL}	$f = 500 \text{ kHz}, V_{\text{GC}} = V_{\text{REF2}} - 0.75 \text{ V}$	—	—	0.8	V
NRF det. detection level ratio	B_{RDA}	$f = 500 \text{ kHz}, V_{\text{GC}} = V_{\text{REF2}}$	2.9	3.9	4.9	—
BDO						
CBDO detection current	I_{BDO}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $\text{EQSW} = V_{\text{REF2}} - 0.5 \text{ V}$	0.98	1.40	1.82	μA
CBDO detection current ratio	B_{IBD4}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $\text{EQSW} = V_{\text{REF2}}$	3.0	3.8	4.6	—
BDO high-level output voltage	V_{BDOH}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $f = 5 \text{ kHz}, \text{rectangular wave}$	4.2	—	—	V
BDO low-level output voltage	V_{BDOL}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $f = 5 \text{ kHz}, \text{rectangular wave}$	—	—	0.8	V
OFTR						
COFTR detection current	I_{OFTR}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $\text{EQSW} = V_{\text{REF2}} - 0.5 \text{ V}$	0.98	1.40	1.82	μA
COFTR detection current ratio	B_{IOFTR4}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $\text{EQSW} = V_{\text{REF2}}$	3.0	3.8	4.6	—
OFTR high-level output voltage	V_{OFTRH}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $f = 5 \text{ kHz}, \text{rectangular wave}$	4.2	—	—	V
OFTR low-level output voltage	V_{OFTRL}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $f = 5 \text{ kHz}, \text{rectangular wave}$	—	—	0.8	V
Masking operating voltage 1	V_{MASK1}	$f = 40 \text{ kHz}, V_{\text{IN}} = 100 \text{ mV[p-p]}$	—	—	0.35	V
Masking operating voltage 2	V_{MASK2}	$f = 40 \text{ kHz}, V_{\text{IN}} = 100 \text{ mV[p-p]}$	0.65	—	—	V
3TENV						
CEA to ENV transfer characteristics	$G_{\text{CEA-ENV}}$	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$	20.0	23.0	26.0	dB
CEA input impedance	Z_{CEA}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$	6.8	8.8	10.8	$\text{k}\Omega$
ENV amp. output impedance	Z_{ENV}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$	6.4	8.4	10.4	$\text{k}\Omega$
ENV amp. offset voltage	V_{ENVOF}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$	−100	0	100	mV
ENV amp. operation	V_{ENV}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$ $f = 800 \text{ kHz}, \text{AM modulation}$	270	540	810	mV[p-p]
LD APC						
LD operating reference voltage	V_{LD}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$	135	170	205	mV
LDON operating voltage	V_{LDON}	$V_{\text{CC1}} = 5 \text{ V}, V_{\text{CC2}} = 3.3 \text{ V}$	—	—	−0.35	V

AN8814SB

4-channel driver IC for optical disk drive

■ Overview

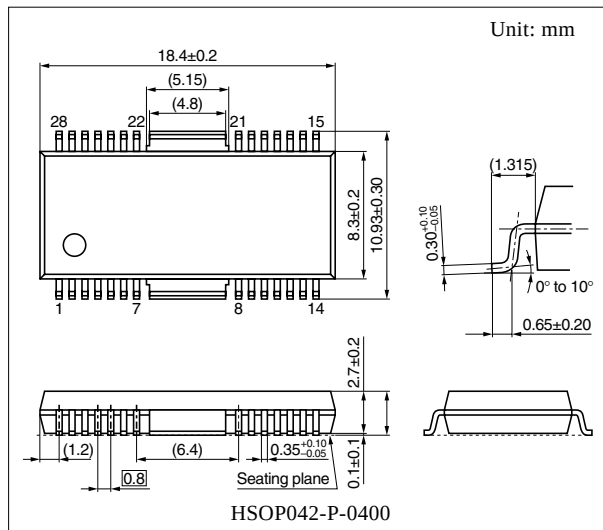
The AN8814SB is a BTL system 4-channel driver and is encapsulated in the SMD package which excels in heat radiation characteristic.

■ Features

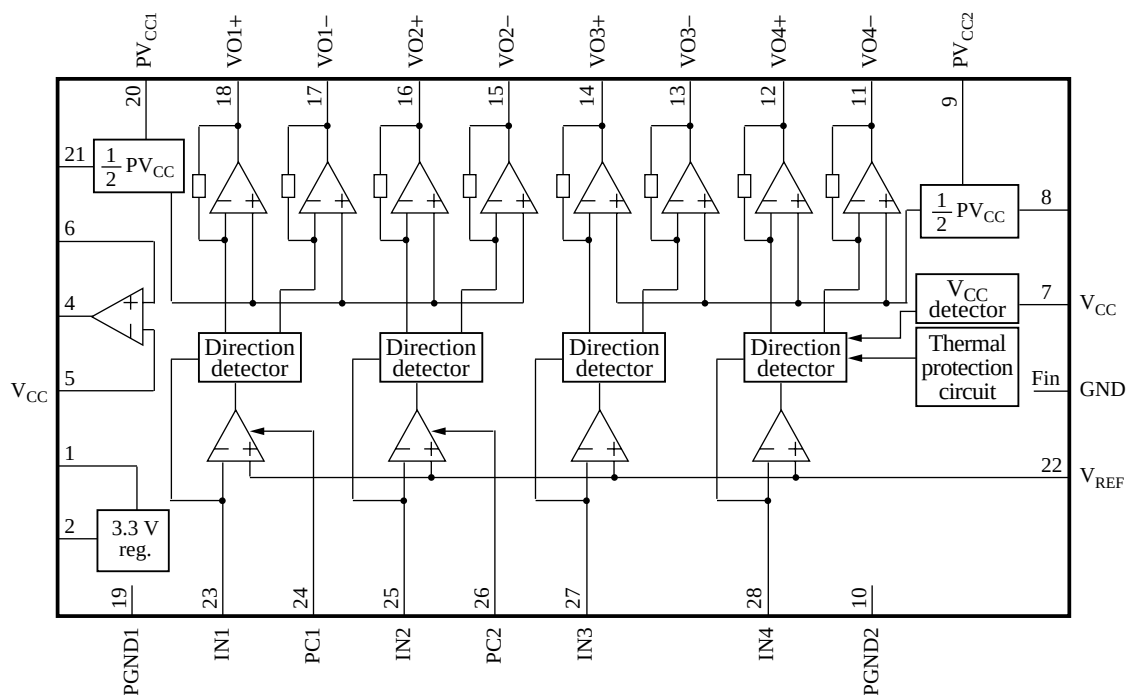
- Wide output dynamic range regardless of reference voltage of the system
- Driver I/O gain setting is possible with an additional external resistor
- 3.3 V supply voltage is available due to an external PNP-tr.
- Additional OP-amp. built-in

■ Applications

- MD, CD/CD-ROM drive
- DVD/DVD-ROM drive



■ Block Diagram



AN8814SB

■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Base control pin for an external transistor of 3.3 V regulator	15	Motor driver-2 reverse rotation output pin
2	3.3 V regulator output monitor pin	16	Motor driver-2 forward rotation output pin
3	N.C. pin	17	Motor driver-1 reverse rotation output pin
4	Op-amp. output pin	18	Motor driver-1 forward rotation output pin
5	Op-amp. inverted input pin	19	Driver GND pin 1
6	Op-amp. non-inverted input pin	20	Driver power supply pin 1
7	Power supply pin	21	1/2 PV _{CC} output pin 1
8	1/2 PV _{CC} output pin 2	22	V _{REF} input pin
9	Driver power supply pin 2	23	Motor driver-1 input pin
10	Driver GND pin 2	24	PC (power cut) input pin 1
11	Motor driver-4 reverse rotation output pin	25	Motor driver-2 input pin
12	Motor driver-4 forward rotation output pin	26	PC (power cut) input pin 2
13	Motor driver-3 reverse rotation output pin	27	Motor driver-3 input pin
14	Motor driver-3 forward rotation output pin	28	Motor driver-4 input pin
		Fin	GND pin

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	SV _{CC}	17	V
Supply current	I _{CC}	—	mA
Power dissipation *2	P _D	542	mW
Operating ambient temperature *1	T _{opr}	−30 to +85	°C
Storage temperature *1	T _{stg}	−55 to +150	°C

Note) *1: Except for the operating ambient temperature and storage temperature, all ratings are for T_a = 25°C.

*2: T_a = 85°C.

Referring to "■ Application Circuit Example", following the allowable power dissipation characteristic curve of "■ Application Notes".

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	SV _{CC} , PV _{CC1} , PV _{CC2}	4.0 to 14	V

AN8814SB

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Current consumption with no load	I_{TOT}	$V_{\text{CC}} = 5\text{ V}$	5	10	15	mA
Motor driver 1 to motor driver 4						
Input offset voltage	V_{IOF}	$V_{\text{CC}} = 5\text{ V}$, $V_{\text{PC1}} = V_{\text{PC2}} = 0\text{ V}$, R_{L1} to $R_{\text{L4}} = 8\text{ k}\Omega$, R_1 to $R_4 = 10\text{ k}\Omega$	-10	0	10	mV
Output offset voltage	V_{OOF}	$V_{\text{CC}} = 5\text{ V}$, $V_{\text{PC1}} = V_{\text{PC2}} = 0\text{ V}$, R_{L1} to $R_{\text{L4}} = 8\text{ k}\Omega$, R_1 to $R_4 = 10\text{ k}\Omega$	-50	0	50	mV
Gain	G	$V_{\text{CC}} = 5\text{ V}$, $V_{\text{PC1}} = V_{\text{PC2}} = 0\text{ V}$, R_{L1} to $R_{\text{L4}} = 8\text{ k}\Omega$, R_1 to $R_4 = 10\text{ k}\Omega$	18.0	20.0	22.0	dB
Maximum output amplitude (+)	$V_{\text{L+}}$	$V_{\text{CC}} = 5\text{ V}$, $V_{\text{PC1}} = V_{\text{PC2}} = 0\text{ V}$, R_{L1} to $R_{\text{L4}} = 8\text{ k}\Omega$, R_1 to $R_4 = 10\text{ k}\Omega$	2.4	2.7	—	V
Maximum output amplitude (-)	$V_{\text{L-}}$	$V_{\text{CC}} = 5\text{ V}$, $V_{\text{PC1}} = V_{\text{PC2}} = 0\text{ V}$, R_{L1} to $R_{\text{L4}} = 8\text{ k}\Omega$, R_1 to $R_4 = 10\text{ k}\Omega$	—	-2.7	-2.4	V
Motor driver 1						
High-level threshold voltage	V_{PCH1}	$V_{\text{CC}} = 5\text{ V}$, $R_{\text{L1}} = 8\text{ }\Omega$, $R_1 = 10\text{ k}\Omega$	2.0	—	—	V
Low-level threshold voltage	V_{PCL1}	$V_{\text{CC}} = 5\text{ V}$, $R_{\text{L1}} = 8\text{ }\Omega$, $R_1 = 10\text{ k}\Omega$	—	—	0.5	V
Motor driver 2						
High-level threshold voltage	V_{PCH2}	$V_{\text{CC}} = 5\text{ V}$, $R_{\text{L2}} = 8\text{ }\Omega$, $R_2 = 10\text{ k}\Omega$	2.0	—	—	V
Low-level threshold voltage	V_{PCL2}	$V_{\text{CC}} = 5\text{ V}$, $R_{\text{L2}} = 8\text{ }\Omega$, $R_2 = 10\text{ k}\Omega$	—	—	0.5	V
Reset circuit						
Reset operation release supply voltage	V_{RST}	$I_{\text{IN}} = 10\text{ }\mu\text{A}$, R_1 to $R_4 = 10\text{ k}\Omega$	2.1	2.3	2.5	V
3.3 V regulator						
Output voltage	V_{REG}	$V_{\text{CC}} = 5\text{ V}$	3.1	3.3	3.5	V
Output load fluctuation	ΔV_{R}	$V_{\text{CC}} = 5\text{ V}$	-50	0	50	mV
Supply voltage fluctuation	ΔV_{V}	$V_{\text{CC}} = 5\text{ V}/12\text{ V}$	-5	0	5	mV
Op-amp.						
Input offset voltage	V_{OF}	$V_{\text{CC}} = 5\text{ V}$	-10	0	10	mV
Input bias current	I_{BOP}	$V_{\text{CC}} = 5\text{ V}$	—	150	500	nA
High-level output voltage	V_{OH}	$V_{\text{CC}} = 5\text{ V}$	4.0	—	—	V
Low-level output voltage	V_{OL}	$V_{\text{CC}} = 5\text{ V}$	—	—	1.5	V
Output driving current sink	I_{SIN}	$V_{\text{CC}} = 5\text{ V}$	2.0	—	—	mA
Output driving current source	I_{SOU}	$V_{\text{CC}} = 5\text{ V}$	2.0	—	—	mA

AN8814SB

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$ (continued)

• Design reference data

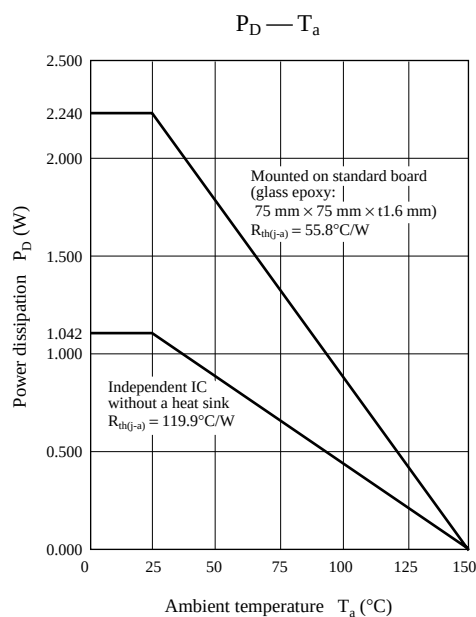
Note) The characteristics listed below are theoretical values based on the IC design and are not guaranteed.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Thermal protection circuit						
Operating temperature equilibrium value	T_{THD}		—	180	—	$^\circ\text{C}$
Operating temperature hysteresis width	ΔT_{THD}		—	45	—	$^\circ\text{C}$

■ Usage Notes

1. Avoid the short-circuits between output and V_{CC} , and between output pin and GND. Otherwise, the IC is likely to break down or emit smoke.
2. An appropriate prior study should be done for use of dip soldering.

■ Application Notes

• $P_D - T_a$ curves of HSOP042-P-0400

BURR - BROWN®



For most current data sheet and other product information, visit www.burr-brown.com



PCM1732

SoundPLUS™ 24-Bit, 96kHz, Stereo Audio DIGITAL-TO-ANALOG CONVERTER With HDCD® Decoder

FEATURES

- ENHANCED MULTI-LEVEL $\Delta\Sigma$ DAC
- INPUT AUDIO DATA WORD: 16-, 20-, 24-Bit
- SAMPLING FREQUENCY (f_s): 16kHz - 96kHz
- SYSTEM CLOCK: 256, 384, 512, 768 f_s
- HIGH PERFORMANCE:
 - THD+N: -96dB
 - Dynamic Range: 104dB
 - SNR: 104dB
- AUDIO OUTPUT LEVEL: $0.57 \times V_{cc}$ (Vp-p)
- 8x OVERSAMPLING DIGITAL FILTER WITH HDCD DECODER:
 - Stopband Attenuation: -120dB
 - Passband Ripple: ± 0.00001 dB
 - HDCD Filter Optimized for 44.1kHz to 48kHz and 88.2kHz to 96kHz
- MULTI-FUNCTIONS:
 - Digital De-emphasis
 - Soft Mute
 - Digital Attenuation
 - Zero Detect
 - Digital Gain Scaling
 - Reversible Output Phase
- +5V SINGLE-SUPPLY OPERATION
- SMALL SO-28 PACKAGE

NOTE: An HDCD license from Pacific Microsonics, Inc. is required to purchase the PCM1732.

HDCD® is a registered trademark of Pacific Microsonics, Inc.

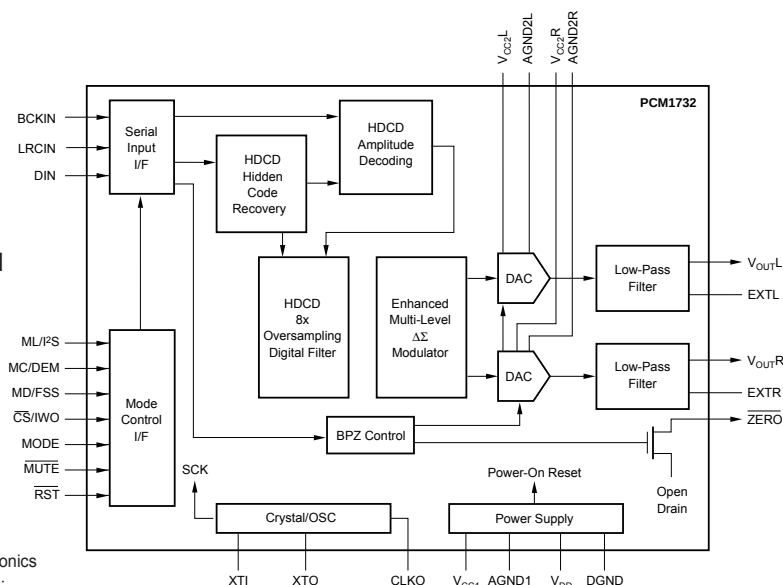
HDCD® technology is provided under license from Pacific Microsonics Inc. The PCM1732's design is covered by the following patents:
 In the USA: 4,579,168, 5,638,074, 5,640,161, 5,808,574, 5,838,274, 5,854,600, 5,864,311, 5,872,531.
 In Australia: 669,114.
 Other patents pending.

DESCRIPTION

The PCM1732 is designed for mid- to high-grade digital audio applications which achieve 96kHz sampling rates with 24-bit audio data, such as High Definition Compatible Digital (HDCD) CD players, DVD players, mini-disc players and AV receivers.

PCM1732 uses a newly-developed "enhanced, multi-level delta-sigma modulator" architecture that improves audio dynamic performance and reduces jitter sensitivity.

The internal digital filter operates at 8x oversampling at a 96kHz sampling rate, with -120dB stopband attenuation.



SPECIFICATIONS

24-Bit Data Performance

All specifications at +25°C, +V_{CC} = +V_{DD} = +5V, f_S = 44.1kHz, and SYSCLK = 384f_S, unless otherwise noted.

PARAMETER	CONDITIONS	PCM1732			UNITS
		MIN	TYP	MAX	
RESOLUTION		24		Bits	
DATA FORMAT Audio Data Interface Format Data Bit Length Audio Data Format Sampling Frequency (f _S) System Clock Frequency ⁽¹⁾ System Clock Duty Cycle			Standard/I ² S 16/20/24 Selectable MSB-First, Binary Two's Complement		
		16		96	kHz
		40	256/384/512/768f _S	60	%
DIGITAL INPUT/OUTPUT LOGIC LEVEL Input Logic Level (except XTI): V _{IH} V _{IL} Output Logic Level (CLKO): V _{OH} V _{OL}	I _{OH} = 2mA I _{OL} = 4mA	2.0 4.5		0.8 0.5	V V V V
CLKO PERFORMANCE⁽²⁾ Output Rise Time Output Fall Time Output Duty Cycle	20 ~ 80% V _{DD} , 10pF 80 ~ 20% V _{DD} , 10pF 10pF Load		5.5 4 30		ns ns %
DYNAMIC PERFORMANCE^(3, 4) THD+N V _O = 0dB V _O = -60dB Dynamic Range Signal-to-Noise Ratio ⁽⁵⁾ Channel Separation	f _S = 44.1kHz f _S = 96kHz f _S = 44.1kHz f _S = 44.1kHz, EIAJ A-weighted f _S = 96kHz, A-weighted f _S = 44.1kHz, EIAJ A-weighted f _S = 96kHz, A-weighted f _S = 44.1kHz f _S = 96kHz		-96 -94 -42 104 103 104 103 104 101	-90	dB dB dB dB dB dB dB dB dB
DC ACCURACY Gain Error Gain Mismatch Channel-to-Channel Bipolar Zero Error	V _O = 0.5V _{CC} at Bipolar Zero		±1.0 ±1.0 ±30	±3.0 ±3.0 ±60	% of FSR % of FSR mV
ANALOG OUTPUT Output Voltage ⁽⁶⁾ Center Voltage Load Impedance	Full Scale (0dB) AC Load		0.57 V _{CC} 0.5 V _{CC}		Vp-p V kΩ
DIGITAL FILTER PERFORMANCE Filter Characteristics 1 (f _S = 44.1kHz/48kHz optimal) Passband Stopband Passband Ripple Stopband Attenuation Delay Time Filter Characteristics 2 (f _S = 88.2kHz/96kHz optimal) Passband Stopband Passband Ripple Stopband Attenuation Delay Time De-Emphasis Error	±0.002dB -3dB < 0.453f _S Stopband = 0.515f _S Stopband = 0.520f _S ±0.005dB -3dB < 0.341f _S Stopband = 0.538f _S	0.515f _S -109 -123 0.538f _S -132	0.471f _S 0.487f _S ±0.0001 81/f _S 0.395f _S 0.441f _S ±0.0001 31/f _S ±0.1		dB dB dB sec dB dB dB dB dB
INTERNAL ANALOG FILTER -3dB Bandwidth Passband Response	f = 20kHz		100 -0.16		kHz dB
POWER SUPPLY REQUIREMENTS Voltage Range Supply Current: I _{CC} + I _{DD} Power Dissipation	V _{DD} , V _{CC} f _S = 44.1kHz f _S = 96kHz f _S = 44.1kHz f _S = 96kHz	4.5	5 35 93 425 465	5.5 105	VDC mA mA mW mW
TEMPERATURE RANGE Operating Storage Thermal Resistance, θ _{JA}		-25 -55		+70 +100	°C °C °C/W

NOTES: (1) Refer to the System Clock section of this data sheet. (2) An external buffer is recommended. (3) Dynamic performance specifications are tested with 20kHz low-pass filter and THD+N specifications are tested with 30kHz LPF, 400Hz HPF, Average Mode. (4) Dynamic performance specifications are tested with HDCD gain scaling set to analog gain scaling. (5) SNR is tested with infinite zero detection off. (6) Output level is for sine wave. DAC outputs 0.64 V_{CC} (peak-to-peak) due to filter response as transient.

SPECIFICATIONS

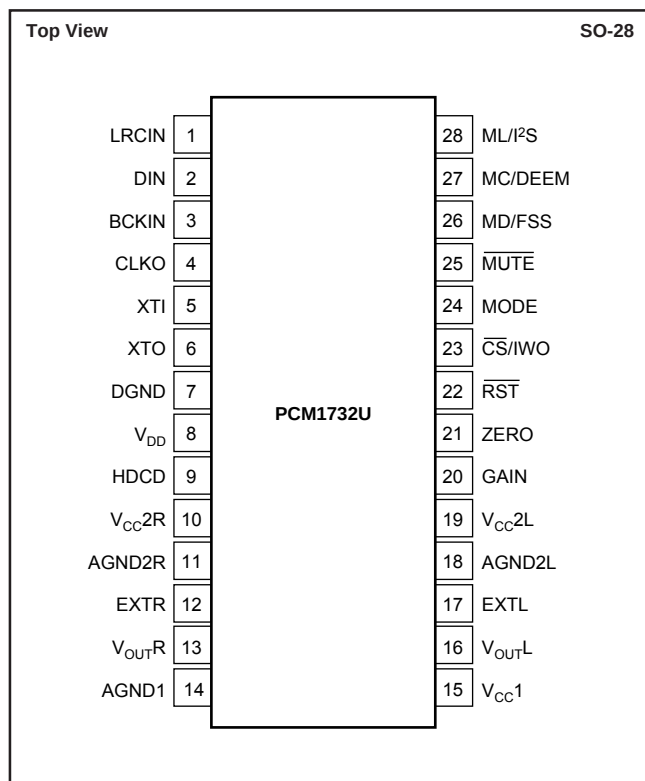
16-Bit Data Performance

All specifications at +25°C, +V_{DD} = +V_{CC} = +5V, f_S = 44.1kHz, and SYSCLK = 384f_S, unless otherwise noted. For discussion of HDCD scaling options, see the Applications Considerations section of this data sheet.

PARAMETER	CONDITIONS	PCM1732U			UNITS
		MIN	TYP	MAX	
DYNAMIC ANALOG PERFORMANCE, STANDARD CD, ANALOG HDCD SCALING⁽¹⁾ Total Harmonic Distortion + Noise V _O = 0dB V _O = -60dB Dynamic Range Output Voltage, Sine Wave	0dBFS EIAJ A-Weighted 0dBFS ⁽²⁾		-95 -37 99 0.57V _{CC}		dB dB dB Vp-p
DYNAMIC ANALOG PERFORMANCE, HDCD CD, ANALOG HDCD SCALING⁽³⁾ Total Harmonic Distortion + Noise V _O = 0dB V _O = -60dB Dynamic Range Output Voltage, Sine Wave	0dBFS EIAJ A-Weighted ⁽⁴⁾ 0dBFS, Without Peak Extend ⁽²⁾ 0dBFS, With Peak Extend ⁽⁵⁾ +6dBFS ^(5, 6)		-94 -38 104 0.57V _{CC} 0.285V _{CC} 0.57V _{CC}		dB dB dB Vp-p Vp-p Vp-p
DYNAMIC ANALOG PERFORMANCE, Standard CD, Digital HDCD SCALING⁽¹⁾ Total Harmonic Distortion + Noise V _O = 0dB V _O = -60dB Dynamic Range Output Voltage, Sine Wave	0dBFS EIAJ A-Weighted 0dBFS		-92 -33 96 0.285V _{CC}		dB dB dB Vp-p
DYNAMIC ANALOG PERFORMANCE, HDCD CD, Digital HDCD SCALING⁽²⁾ Total Harmonic Distortion + Noise V _O = 0dB V _O = -60dB Dynamic Range Output Voltage, Sine Wave	0dBFS EIAJ A-Weighted ⁽⁴⁾ 0dBFS +6dBFS ⁽⁵⁾		-91 -34 104 0.285V _{CC} 0.57V _{CC}		dB dB dB Vp-p Vp-p

NOTES: (1) Without dither. (2) Gain pin is LOW. (3) With the rectangular PDF dither. (4) Including Peak Extend to +6dBFS. (5) Gain pin is HIGH. (6) +6dBFS is the full Peak Extend, while dynamic range numbers are with Peak Extend.

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

Power Supply Voltage	+6.5V
+V _{CC} to +V _{DD} Difference	±0.1V
Input Logic Voltage	−0.3V to (V _{DD} + 0.3V)
Input Current (except power supply)	±10mA
Power Dissipation	750mW
Operating Temperature Range	−25°C to +70°C
Storage Temperature	−55°C to +125°C
Lead Temperature (soldering, 5s)	+260°C
Lead Temperature (reflow, 10s)	+235°C

PIN ASSIGNMENTS

PIN	NAME	I/O	DESCRIPTION
1	LRCIN	IN	Left and Right Clock Input. This clock is equal to the sampling rate, f _s . ⁽¹⁾
2	DIN	IN	Serial Audio Data Input ⁽¹⁾
3	BCKIN	IN	Bit Clock Input for Serial Audio Data ⁽¹⁾
4	CLKO	OUT	Buffered System Clock Output.
5	XTI	IN	Oscillator Input/External Clock Input ⁽²⁾
6	XTO	OUT	Oscillator Output
7	DGND	—	Digital Ground
8	V _{DD}	—	Digital Power +5V
9	HDCD	OUT	HDCD Encoded Data Detect
10	V _{CC2R}	—	Analog Power +5V, Rch
11	AGND2R	—	Analog Ground, Rch
12	EXTR	—	Common Mode Voltage for Analog Output Amp, Rch
13	V _{OUTR}	OUT	Analog Voltage Output, Rch
14	AGND1	—	Analog Ground
15	V _{CC1}	—	Analog Power +5V
16	V _{OUTL}	OUT	Analog Voltage Output, Lch
17	EXTL	—	Common Mode Voltage for Analog Output Amp, Lch
18	AGND2L	OUT	Analog Ground, Lch
19	V _{CC2L}	—	Analog Power +5V, Lch
20	GAIN	OUT	External (analog) Gain Scaling
21	ZERO	OUT	Zero Data Flag
22	RST	IN	Reset. When this pin is LOW, the digital filter and modulators are held in reset. ⁽³⁾
23	CS/IWO	IN	Chip Select/Input Format Selection. When this pin is LOW, the Mode Control interface is enabled. ⁽⁴⁾
24	MODE	IN	Mode Control Select: H = Software; L = Hardware ⁽³⁾
25	MUTE	IN	Mute Control ⁽³⁾
26	MD/FSS	IN	Mode Data/Sampling Rate Range Select ⁽³⁾
27	MC/DEM	IN	Mode Clock/De-Emphasis Select ⁽³⁾
28	ML/I ² S	IN	Mode Latch/Input Format Select ⁽³⁾

NOTES: (1) Schmitt Trigger input. (2) CMOS logic level input. (3) Schmitt Trigger input with pull-up resistor. (4) Schmitt Trigger input with pull-down resistor.

PACKAGE/ORDERING INFORMATION

PRODUCT	PACKAGE	PACKAGE DRAWING NUMBER ⁽¹⁾	SPECIFIED TEMPERATURE RANGE	PACKAGE MARKING	ORDERING NUMBER ⁽²⁾	TRANSPORT MEDIA
PCM1732U	SO-28	217	−25°C to +70°C	PCM1732U	PCM1732U	Rails
"	"	"	"	"	PCM1732U/1K	Tape and Reel

NOTES: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix C of Burr-Brown IC Data Book. (2) Models with a slash (/) are available only in Tape and Reel in the quantities indicated (e.g., /1K indicates 1000 devices per reel). Ordering 1000 pieces of "PCM1732U/1K" will get a single 1000-piece Tape and Reel. For detailed Tape and Reel mechanical information, refer to Appendix B of Burr-Brown IC Data Book.



ELECTROSTATIC DISCHARGE SENSITIVITY

This integrated circuit can be damaged by ESD. Burr-Brown recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

Reversible motor driver

BA6209 / BA6209N

The BA6209 and BA6209N are reversible-motor drivers suitable for brush motors. Two logic inputs allow three output modes : forward, reverse, and braking. The motor revolving speed can be set arbitrarily by controlling the voltage applied to the motor with the control pin voltage V_R .

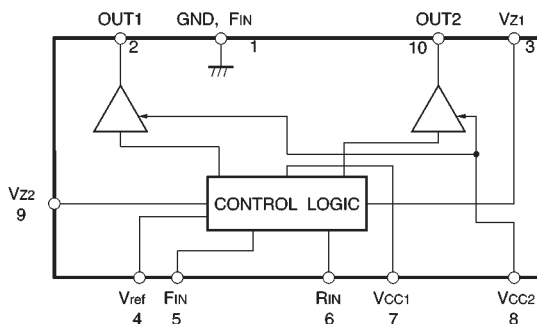
●Applications

VCRs and cassette tape recorders

●Features

- 1) Power transistors can handle a large current (1.6A maximally).
- 2) Brake is applied when stopping the motor.
- 3) Built-in function to absorb rush currents generated by reversing and braking.
- 4) Motor speed controlling pin.
- 5) Small standby current.
($V_{CC} = 12V$, $I_o = 5.5mA$ typically)
- 6) Stable operation during mode changes either from forward to reverse or vice versa.
- 7) Interface with CMOS devices.

●Block diagram



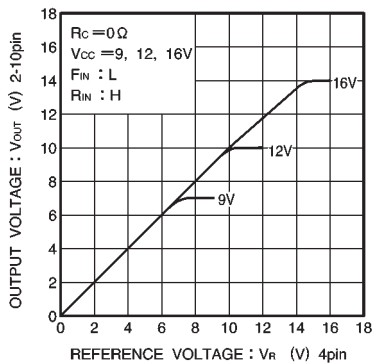


Fig.13 Output voltage vs. reference voltage (II)

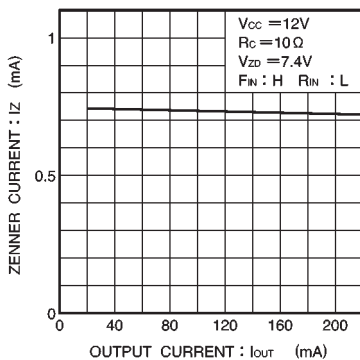


Fig.14 Zener current vs. output current

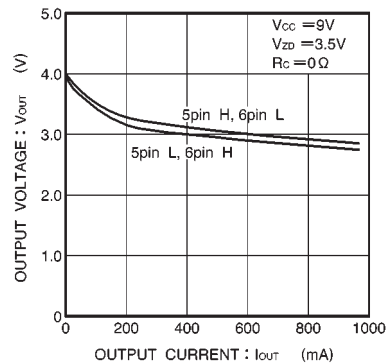


Fig.15 Output voltage vs. output current

● Measurement circuit

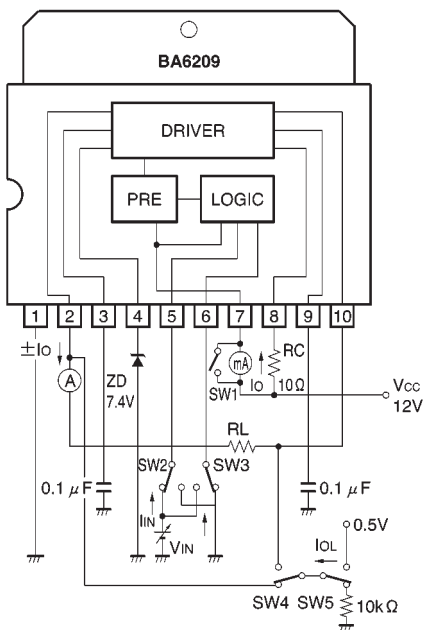


Fig.16

MCU Pin Arrangement and Functions

Pin Arrangement

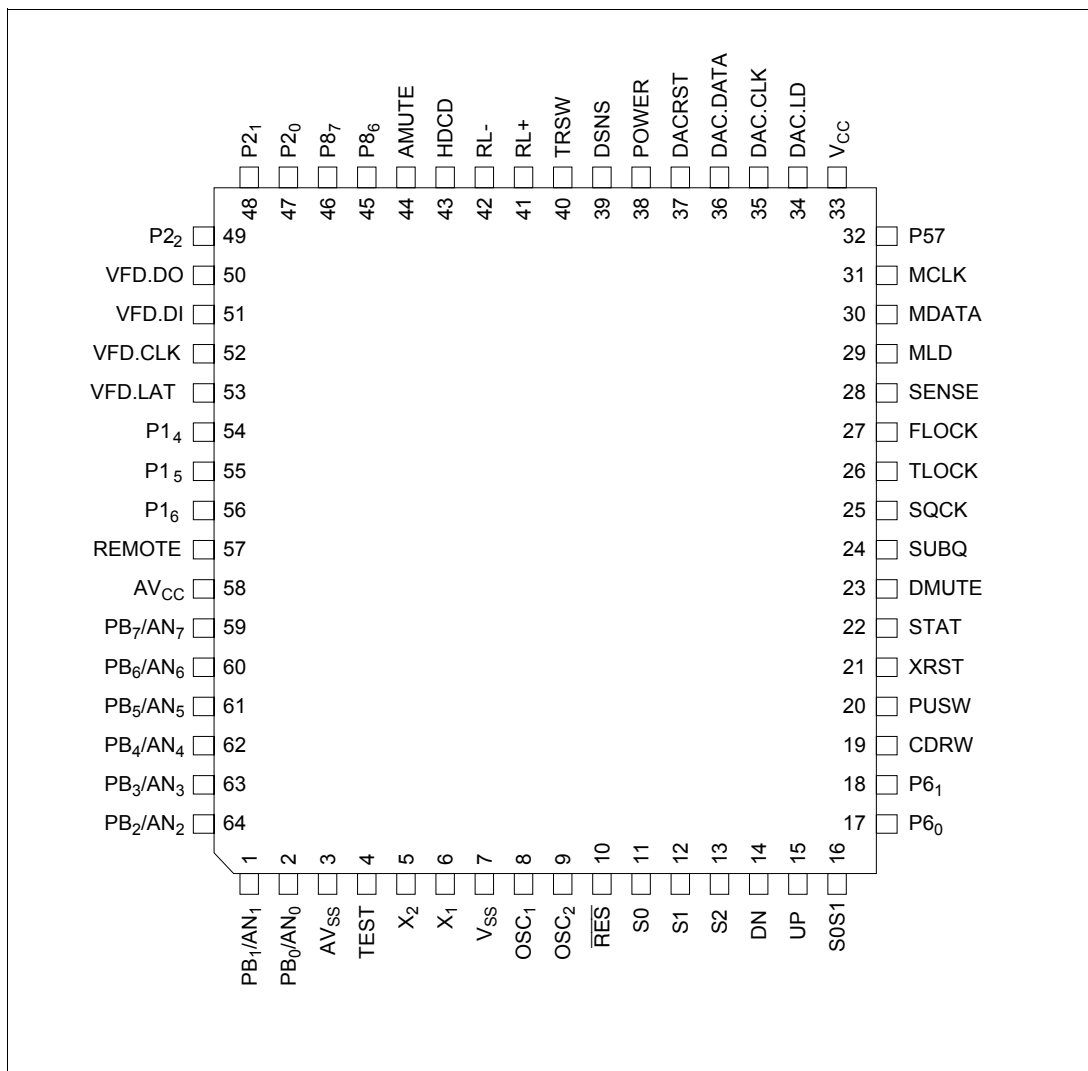


Figure 1.2 Pin Arrangement

Internal Block Diagram

Figure 1.1 shows a block diagram.

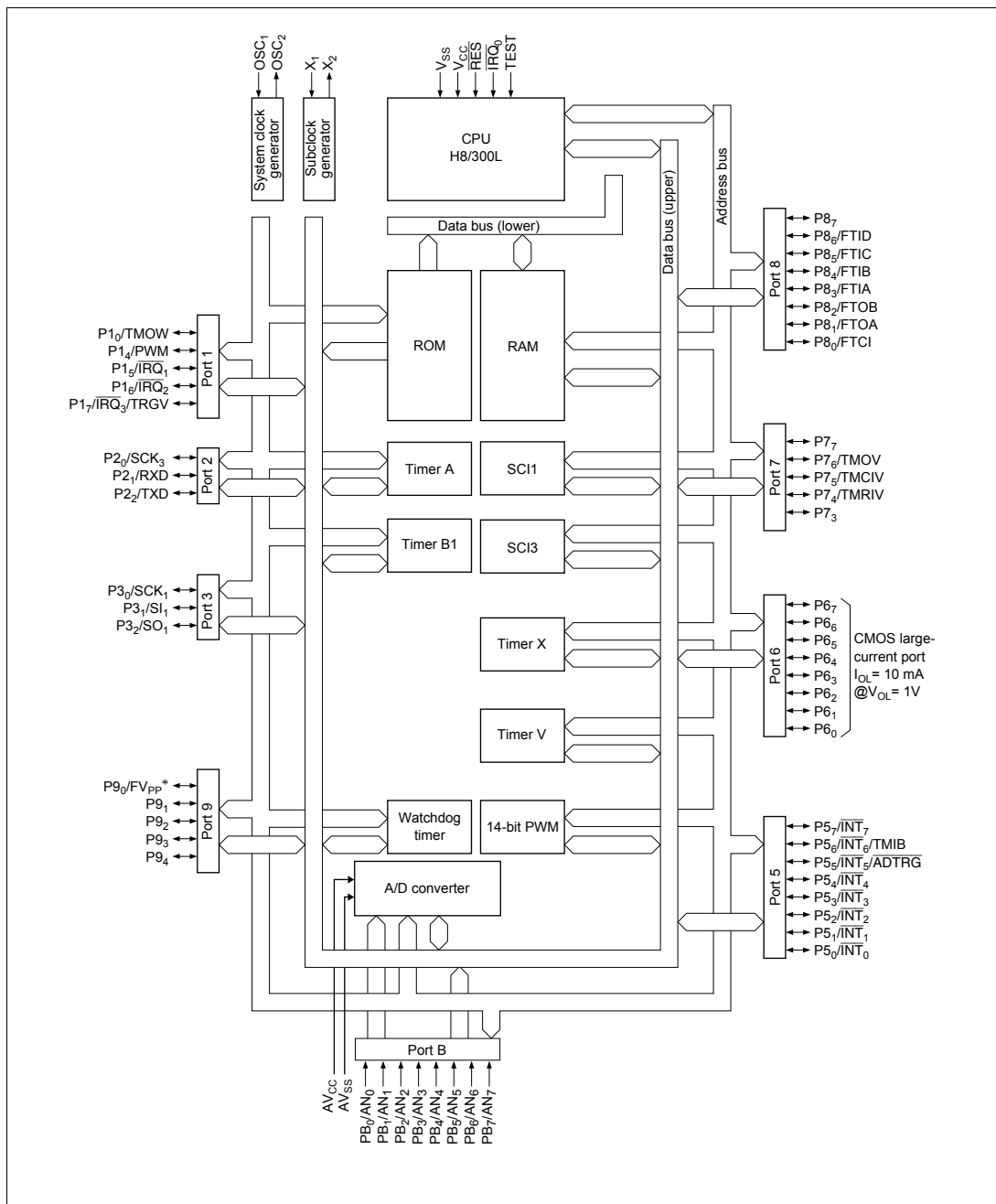
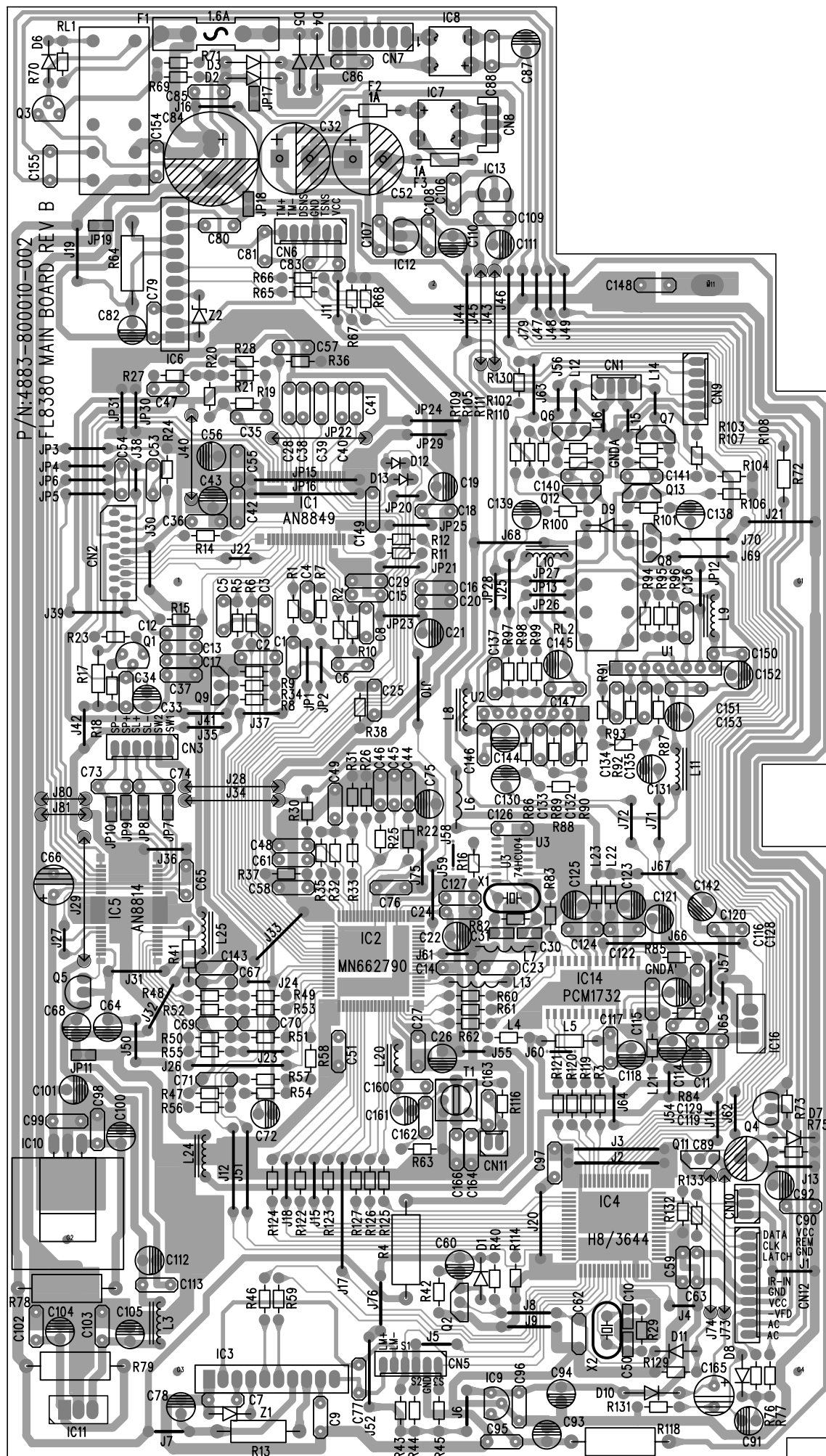


Figure 1.1 Block Diagram

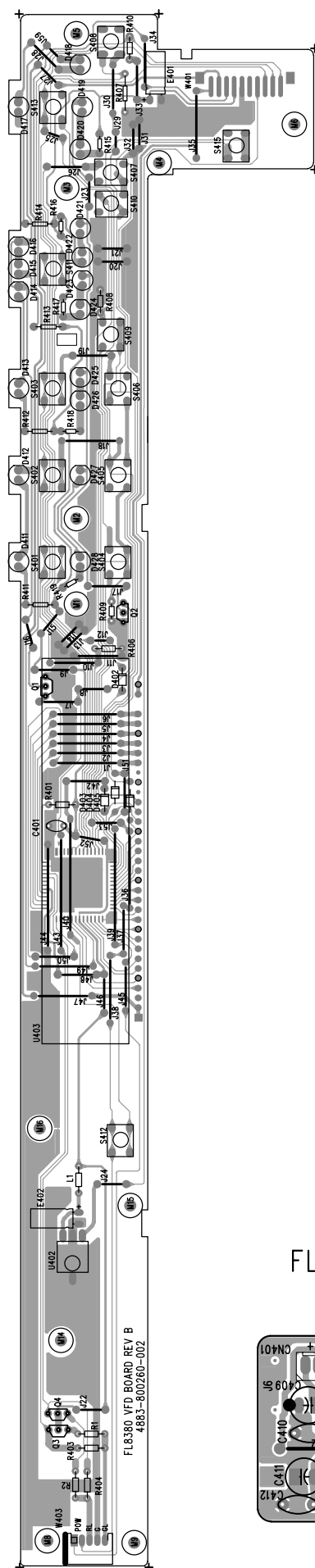
Pin Functions

Pin	Name	Description
1	PB1	No connection
2	PB0	No connection
3	AVSS	Connected 0V
4	TEST	Connected 0V
5	X2	No connection
6	X1	Connected 5V
7	VSS	MCU ground line; connected to 0V
8	OSC1	10MHz crystal input
9	OSC2	10MHz crystal input
10	RES	MCU reset line; 0V = reset; 5V = normal operation
11	S0	CD Changer Mechanism door position switch
12	S1	CD Changer Mechanism door position switch
13	S2	CD Changer Mechanism door position switch
14	DN	CD Changer Mechanism door motor control line
15	UP	CD Changer Mechanism door motor control line
16	S0S1	CD DSP SUBQ ready input; high pulse for SUBQ ready
17	P60	No connection
18	P61	No connection
19	CDRW	CDRW RF gain control; 0V=CDRW
20	PUSW	Laser pickup inner switch; 5V=pickup at inner position
21	XRST	CD DSP reset line; 0V = DSP reset
22	STAT	CD DSP internal status output
23	DMUTE	CD DSP mute control; 5V = mute on
24	SUBQ	SUBQ output
25	SQCK	SUBQ output serial clock
26	TLOCK	No connection
27	FLOCK	No connection
28	SENSE	No connection
29	MLD	CD DSP command latch
30	MDATA	CD DSP serial command data
31	MCLK	CD DSP serial command clock
32	P57	No connection
33	VCC	MCU power supply; connected to 5V
34	DAC.LD	PCM1732 serial command latch
35	DAC.CLK	PCM1732 serial command clock
36	DAC.DATA	PCM1732 serial command data
37	DACRST	PCM1732 reset pin; 0V = reset
38	POWER	Servo power on/off control; 5V = power on
39	DSNS	Disc detection optical sensor output; 0V = disc present
40	TRSW	Carousel position detection optical sensor output
41	RL+	Carousel motor line
42	RL-	Carousel motor line
43	HDCD	HDCD decoding status from PCM1732; 5V = HDCD
44	AMUTE	System mute control; 0V = mute
45	P86	No connection

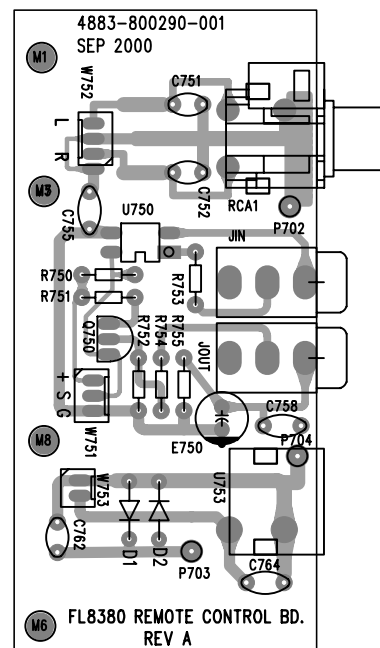
46	P87	No connection
47	P20	No connection
48	P21	No connection
49	P22	No connection
50	VFD.DO	Display driver status serial data
51	VFD.DI	Display driver command serial data
52	VFD.CLK	Display driver command serial clock
53	VFD.LAT	Display driver command serial latch
54	P14	No connection
55	P15	No connection
56	P16	CD DSP internal status for auto-adjustment
57	REMOTE	IR remote signal input
58	AVCC	Connected to 5V
59	PB7	No connection
60	PB6	No connection
61	PB5	No connection
62	PB4	No connection
63	PB3	No connection
64	PB2	No connection



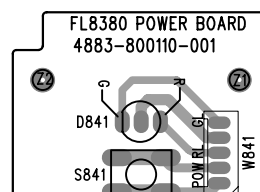
FL8380 VFD DISPLAY BOARD



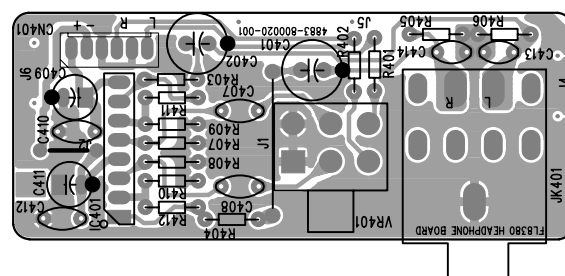
FL8380 REMOTE BOARD



L8380 POWER BOARD



FL8380 HEADPHONE BOARD



MAIN BOARD ASSY

Reference	Part number		
RESISTOR			
R13, R64	1001-000312-000	CARBON FILM RESISTOR 10 OHM 1/2W +-5%	2
R72	1001-000314-020	CARBON FILM RESISTOR 10 OHM 1/4W +-5% AXIAL TAPE	1
R18	1001-000316-020	CARBON FILM RESISTOR 10 OHM 1/6W +-5% AXIAL TAPE	1
R4, R79, R118	1001-000320-000	CARBON FILM RESISTOR 10 OHM 2W +-5%	3
R41, R60, R61, R62, R76, R77	1001-001316-020	CARBON FILM RESISTOR 100 OHM 1/6W +-5% AXIAL TAPE	6
R1, R2, R3, R20, R21, R27, R46, R59, R65, R66, R119, R120, R121, R122, R123, R124, R125, R126, R127, R133	1001-002316-020	CARBON FILM RESISTOR 1K OHM 1/6W +-5% TP52	20
R28, R42, R43, R44, R45, R69, R71, R75, R114, R132	1001-003316-020	CARBON FILM RESISTOR 10K OHM 1/6W +-5% TP52	10
R6, R29, R68, R82	1001-004316-020	CARBON FILM RESISTOR 100K OHM 1/6W +-5% TP52	4
R130	1001-005316-020	CARBON FILM RESISTOR 1M OHM 1/6W +-5% TP52	1
R31	1001-006316-020	CARBON FILM RESISTOR 10M OHM 1/6W +-5% AXIAL TAPE	1
R23	1001-200316-020	CARBON FILM RESISTOR 12 OHM 1/6W +-5% AXIAL TAPE	1
R17	1001-201316-020	CARBON FILM RESISTOR 120 OHM 1/6 W +-5% AXIAL TAPE	1
R48	1001-502316-020	CARBON FILM RESISTOR 1.5K OHM 1/6W +-5% AXIAL TAPE	1
R8, R53	1001-803316-020	CARBON FILM RESISTOR 18K OHM 1/6W +-5% TP52	2
R9	1002-003316-020	CARBON FILM RESISTOR 20K OHM 1/6W +-5% AXIAL TAPE	1
R25	1002-201316-020	CARBON FILM RESISTOR 220 OHM 1/6 W +-5% AXIAL TAPE	1
R40, R52	1002-202316-020	CARBON FILM RESISTOR 2.2K OHM 1/6W +-5% TP52	2
R55	1002-203316-020	CARBON FILM RESISTOR 22K OHM 1/6W +-5% TP52	1
R35	1002-204316-020	CARBON FILM RESISTOR 220K OHM 1/6W +-5% AXIAL TAPE	1
R14, R15, R50, R104, R105, R106, R109	1002-702316-020	CARBON FILM RESISTOR 2.7K OHM 1/6W +-5% AXIAL TAPE	7
R7	1003-003316-020	CARBON FILM RESISTOR 30K OHM 1/6W +-5% AXIAL TAPE	1
R51	1003-302316-020	CARBON FILM RESISTOR 3.3K OHM 1/6W +-5% TP52	1
R5	1003-304316-020	CARBON FILM RESISTOR 330K OHM 1/6W +-5% AXIAL TAPE	1
R10	1003-903316-020	CARBON FILM RESISTOR 39K OHM 1/6W +-5% AXIAL TAPE	1
R107, R110	1004-700316-020	CARBON FILM RESISTOR 47 OHM 1/6W +-5% TP52	2
R22	1004-701316-020	CARBON FILM RESISTOR 470 OHM 1/6 W +-5% AXIAL TAPE	1
R11, R12, R129	1004-702316-020	CARBON FILM RESISTOR 4.7K OHM 1/6W +-5% TP52	3
R32, R33, R38	1004-703316-020	CARBON FILM RESISTOR 47K OHM 1/6W +-5% TP52	3
R116	1005-100316-020	CARBON FILM RESISTOR 51 OHM 1/6W +-5% AXIAL TAPE	1
R36	1005-102316-020	CARBON FILM RESISTOR 5.1K OHM 1/6W +-5% AXIAL TAPE	1
R56, R57	1005-602316-020	CARBON FILM RESISTOR 5.6K OHM 1/6W +-5% TP52	2
R67	1005-603316-020	CARBON FILM RESISTOR 56K OHM 1/6W +-5% TP52	1
R73	1006-802316-020	CARBON FILM RESISTOR 6.8K OHM 1/6W +-5% AXIAL TAPE	1
R83	1007-501316-020	CARBON FILM RESISTOR 750 OHM 1/6W +-5% AXIAL TAPE	1
R34	1007-502316-020	CARBON FILM RESISTOR 7.5K OHM 1/6W +-5% AXIAL TAPE	1
R24, R70, R131	1009-100316-020	CARBON FILM RESISTOR 91 OHM 1/6W +-5% AXIAL TAPE	3
R16	1009-101316-020	CARBON FILM RESISTOR 910 OHM 1/6W AXIAL TAPE	1
R49	1009-102316-020	CARBON FILM RESISTOR 9.1K OHM 1/6W +-5% AXIAL TAPE	1
R100, R101	1011-001018-020	METAL FILM RESISTOR 100 OHM 1/8W +-1% AXIAL TAPE	2
R84, R85, R88, R93, R94, R95, R96, R97, R98, R99	1011-002018-020	METAL FILM RESISTOR 1K OHM 1/8W +-1% AXIAL TAPE	10
R30	1011-204018-020	METAL FILM RESISTOR 120K OHM 1/8W +-1% AXIAL TYPE	1
R90, R91	1012-202018-020	METAL FILM RESISTOR 2.2K OHM 1/8W +-1% AXIAL TAPE	2
R102, R103	1012-203018-020	METAL FILM RESISTOR 22K OHM 1/8W +-1% AXIAL TAPE	2
R108, R111	1013-902018-020	METAL FILM RESISTOR 3.9K OHM 1/8W +-1% AXIAL TAPE	2
R89, R92	1016-802018-020	METAL FILM RESISTOR 6.8K 1/8W +-1% AXIAL TAPE	2
CAPACITOR			
C136, C137, C140, C141	1100-101042-001	CERAMIC CAP. 100PF/50V +-5% NPO	4
C51, C61	1100-102043-000	CERAMIC CAP. 1000PF/50V +-10%	2
C62, C154	1100-103043-000	CERAMIC CAP. 0.01uF/50V +-10%	2
C2, C3, C5, C7, C9, C14, C15, C18, C20, C23, C24, C27, C28, C34, C42, C48, C53, C54, C55, C57, C59, C63, C65, C73, C74, C76, C77, C79, C80, C81, C83, C85, C86, C88, C90, C95, C96, C97, C98, C99, C102, C103, C106, C107, C108, C109, C113, C115, C117, C119, C120, C122, C124, C126, C127, C143, C146, C147, C150, C151, C160, C164, C166	1100-104044-000	CERAMIC CAP. 0.1uF/50V +-20%	63
C35	1100-150043-000	CERAMIC CAP. 15PF +-10%	1
C10, C30, C31, C50	1100-220043-000	CERAMIC CAP. 22pF/50V +- 10%	4
C25	1100-331043-000	CERAMIC CAP. 330PF/50V +-10%	1
C49	1100-333043-000	CERAMIC CAP. 0.033UF/50V +-10%	1
C8, C58	1100-471043-000	CERAMIC CAP. 470PF/50V +-10%	2
C16, C17, C36, C37	1100-473043-000	CERAMIC CAP. 0.047uF/50V +-10%	4
C12, C13	1100-680043-000	CERAMIC CAP. 68pF/50V +-10%	2

C67, C70	1101-102062-000	POLYESTER/MYLAR CAP. 0.001UF/100V +-5%	2
C71	1101-103062-000	POLYESTER/MYLAR CAP. 0.01UF/100V +-5%	1
C40, C133, C135	1101-222062-000	POLYESTER/MYLAR CAP. 2200PF/100V +-5%	3
C29, C39	1101-273062-000	POLYSTER CAP. 0.027UF/100V +-5%	2
C128, C129	1101-332062-000	POLYESTER/MYLAR CAP. 0.0033UF/100V +-5%	2
C41	1101-562062-000	POLYESTER/MYLAR CAP. 5600PF/100V +-5%	1
C114, C116, C118, C121, C123, C125, C144, C145, C152, C153	1102-100024-000	ELECT. CAP. 10UF/25V +-20%	10
C43, C56, C64, C78, C82, C91, C161	1102-101014-000	ELECT. CAP. 100uF/16V +-20%	7
C92, C93, C100, C104	1102-101024-000	ELECT. CAP. 100UF/25V +-20%	4
C89	1102-101034-000	ELECT. CAP. 100UF/35V +-20%	1
C32, C52	1102-102024-000	ELECT. CAP. 1000UF/25V +-20%	2
C21, C60, C68	1102-220014-000	ELECT. CAP. 22uF/16V +-20%	3
C112	1102-221014-000	ELECT. CAP. 220UF/16V +-20%	1
C19, C22, C26, C66, C75, C165	1102-221014-000	ELECT. CAP. 220UF/16V +-20%	6
C87	1102-221034-000	ELECT. CAP. 220UF/35V +-20%	1
C84	1102-222024-000	ELECT. CAP. 2200UF/25V +-20%	1
C33, C130, C131	1102-470014-000	ELECT. CAP. 47uF/16V +-20%	3
C138, C139	1102-470024-000	ELECT. CAP. 47UF/25V +-20%	2
C94, C101, C105, C110, C111, C142	1102-471014-000	ELECT. CAP. 470uF/16V +-20% 8X12MM	6
C149	1106-105044-000	MONO CAP. 1UF/50V +-20%	1
C38	1106-155043-000	MONO CAP. 1.5UF/50V +-10%	1
C69	1106-224043-000	MONO. CAP. 0.22uF/50V +-10%	1
C46	1106-334043-000	MONO CAP. 0.33UF/50V +-10%	1
C44	1106-474043-000	MONO CAP. 0.47UF/50V +-10%	1
C47	1181-121042-000	CERAMIC CAP. 120PF/50V +-5% NPO	1
C4, C132, C134	1181-221042-000	CERAMIC CAP. 220PF/50V +-5% NPO	3
TRANSISTOR			
Q2, Q8, Q9	1300-114000-100	XTOR DTC114E/S NPN TO-92	3
Q3, Q6, Q7, Q12, Q13	1300-174000-101	TRANSISTOR 2SC1740Q NPN TO-92	5
Q11	1301-124000-400	TRANSISTOR DTA124ESA PNP SC-72 ROHM	1
Q1	1301-564000-100	TRANSISTOR PNP KSB564A-Y (SAMSUNG)	1
Q4	1301-855000-100	TRANSISTOR PNP SS8550C TO-92 (SAMSUNG)	1
Q5	1301-928000-100	TRANSISTOR PNP KSA928A TO-92 SAMSUNG	1
DIODE, ZENER, BRIDGE			
IC7, IC8	1401-101000-000	BRIDGE RECTIFIER DB101 50V 1A UL	2
D10, D11	1401-113300-000	DIODE 1SS133, ROHM	2
D2, D3, D4, D5	1401-140040-000	DIODE RECTIFIER 1N4004	4
D1, D6, D9, D12, D13	1401-141480-000	DIODE 1N4148	5
D7	1402-240001-200	ZENER DIODE DZ24V	1
D8	1402-471201-200	ZENER DIODE 4.7V 1/2W	1
Z1	1402-620001-200	ZENER DIODE 6.2V 1/2W	1
Z2	1402-620001-200	ZENER DIODE 6.2V 1/2W	1
INDUCTOR, COIL			
L6, L13, L22	1500-650400-000	INDUCTOR COIL 65UH +-20%	3
L20	1503-353400-100	FERRITE COILS B3534	1
L3, L4, L5, L8, L9, L10, L11, L21, L23, L24, L25	1504-100300-100	AXIAL INDUCTOR 10UH +-10%	11
T1	3299-838000-000	DIGITAL OUTPUT COIL FOR FL8380	1
CRYSTAL			
X2	1600-100003-000	CRYSTAL 10MHz +-30PPM 49U TYPE	1
X1	1600-169343-000	CRYSTAL 16.9344 +- 30 PPM 49U3H TYPE	1
CONNECTOR, CABLE			
CN10	2300-003000-001	STRAIGHT CONN WAFER 3PIN 2MMP JST	1
CN8	2300-003100-000	STRAIGHT CONN. WAFER 3 PINS 2.5mmP	1
CN3, CN5, CN6	2300-006000-000	STRAIGHT CONN. WAFER 6 PINS 2mmP	3
CN7	2300-006100-000	STRAIGHT CONN. WAFER 6PINS 2.5mmP	1
CN2	2301-016901-000	16PIN FILM TYPE CABLE STRAIGHT CONN	1
CN12	2501-103601-140	10PIN 360MM 2CONN CABLE #26 2MMP JST (1 BOARD IN)	1
CN2	2503-162509-090	16PIN 250MM FLAT FLEXIBLE CABLE	1
CN11	2510-026001-060	2PIN 600MM 1CONN SHIELD CABLE AWG#30 2MMP	1
CN1	2510-043501-060	4PIN 350MM 1CONN SHIELD CABLEX2 AWG#30 2MMP	1
CN10	2511-034701-160	3PIN 470MM 2CONN SHIELD CABLE JST #30 2MMP (SHS)	1
CN9	2511-066501-150	6PIN 650MM 2CONN 3WIRE S CABLEX2 #28 2MMP(1 BD IN)	1
GND A	2600-101254-200	125MM JUMPER WIRE AWG#26 UL1007 RED	1
FUSE			
F2	4030-100000-001	SLOW BLOW MICRO FUSE 1A	1
F3	4030-100000-001	SLOW BLOW MICRO FUSE 1A	1
F1	4030-160000-512	FUSE 1.6A 250V GLASS TUBE SLOW BLOW (BELL 5TT1.6)	1
F1	4031-004000-000	FUSE CLIP FOR 5X20MM HF-004/P	2
RELAY			
RL2	4050-000005-002	RELAY ME-2-5 DC 5V GS-SH-205T	1
RL1	4050-212000-003	RELAY 12V 5A MI-SH-212L(GOOD SKY)	1
IC			
IC14	4117-320104-600	PCM1732 VOLTAGE OUTPUT DELTA-SIGMA DAC BURR-BROWN	1
U1, U2	4145-600001-600	I.C. NJM4560L 8PINS SIL (NJRC)	2

IC3	4162-090002-300	I.C. BA6209 SIL MOTOR DRIVER (ROHM)	1
IC6	4162-090002-301	IC BA6209N SIL MOTOR DRIVER WITHOUT HEAT SINK ROHM	1
IC2	4166-279122-000	I.C. MN662790RSA1 QFP TYPE 80PIN DSP (PANASONIC)	1
U3	4174-040102-910	I.C. SN74HCU04 SOP (T.I.)	1
IC9	4178-050310-000	I.C. LM78L05 TO92	1
IC11, IC16	4178-050334-700	I.C. L7805CV TO220 THOMSON	2
IC10	4178-080302-600	I.C. L7808CV TO-220 (SGS-THOMSON)	1
IC12	4178-080310-000	I.C. 78L08 TO92 (MIRCO)	1
IC13	4179-080311-600	I.C. 79L08 TO92 (NJRC)	1
IC5	4188-140102-000	I.C. AN8814SB SMT 28PIN MOTOR DRIVER (PANASONIC)	1
IC1	4188-490102-000	I.C. AN8849SB SMT TYPE 36PIN ASP (PANASONIC)	1
IC4	4201-838000-600	I.C. 5 DISC MCU 8380-2 HD6433643RB63H HITACHI	1

PCB, HEATSINK, MISC

IC10, IC11, IC16	6501-010001-000	HEAT SINK	3
	6600-070003-000	CD90R05 RUBBER PAD,LEG	1
	6600-120030-001	NUT M3 HEX M3X5.5X2.4MM	3
	7003-008010-111	SCREW M3X8 B/H BLACK	3
	7103-207004-000	FIBRE WASHER M3.2X7X0.4MM	1

HEADPHONE BOARD ASSY

Reference	Part number		
R403, R404	1001-001316-000	CARBON FILM RESISTOR 100 OHM 1/6 W +-5%	2
R409, R410	1001-002316-000	CARBON FILM RESISTOR 1K OHM 1/6 W +-5%	2
R405, R406	1001-004316-000	CARBON FILM RESISTOR 100K OHM 1/6 W +-5%	2
R411, R412	1001-202316-000	CARBON FILM RESISTOR 1.2K OHM 1/6 W +-5%	2
R407, R408	1004-704316-000	CARBON FILM RESISTOR 470K OHM 1/6 W +-5%	2
VR401	1065-003500-130	VAR. RESISTOR 50k 1/4W +-20% ROTARY B-TYPE	1
CAPACITOR			
C413, C414	1100-102044-000	CERAMIC CAP. 1000PF/50V +-20%	2
C410, C412	1100-103044-000	CERAMIC CAP. 0.01UF/50V +-20%	2
C407, C408	1101-473062-000	POLYESTER/MYLAR CAP. 0.047UF/100V +-5%	2
C409, C411	1102-101024-000	ELECT. CAP. 100UF/25V +-20%	2
C401	1102-471014-000	ELECT. CAP. 470uF/16V +-20% 8X12MM	1
CONNECTOR			
CN401	2300-006000-000	STRAIGHT CONN. WAFER 6 PINS 2mmP	1
JK401	2320-009911-003	6.4MM HEADPHONE JACK (JY-6303-02-030)GOLD PLATED	1
IC			
IC401	4145-600001-600	I.C. NJM4560L 8PINS SIL (NJRC)	1
	6600-070003-000	CD90R05 RUBBER PAD,LEG	2

VFD BOARD ASSY

Reference	Part number		
R411, R412, R413, R414, R415, R416, R417, R418, R419	1001-001316-000	CARBON FILM RESISTOR 100 OHM 1/6 W +-5%	9
R406, R407, R408, R409, R410	1001-003316-000	CARBON FILM RESISTOR 10K OHM 1/6 W +-5%	5
R403, R404	1003-301316-000	CARBON FILM RESISTOR 330 OHM 1/6W +-5%	2
R401	1005-103316-000	CARBON FILM RESISTOR 51K OHM 1/6W +-5%	1
L1	1007-500316-000	CARBON FILM RESISTOR 75 OHM 1/6W +-5%	1
CAPACITOR			
C401	1100-104044-000	CERAMIC CAP. 0.1uF/50V +-20%	1
E401, E402	1102-100014-000	ELECT. CAP. 10UF/16V +-20%	2
TRANSISTOR			
Q1, Q2	1300-114000-100	XTOR DTC114E/S NPN TO-92	2
DIODE			
D402, D403, D404, D405	1401-141480-000	DIODE 1N4148	4
CONNECTOR, SWITCH			
W403	2300-005010-000	RIGHT ANGLE CONN WAFER 5PIN 2mmP	1
W401	2300-010001-900	10PIN STRAIGHT CONN WAFER 2MMP SMT SM-TYPE	1
S401, S402, S403, S404, S405, S406, S407, S408, S409, S410, S411, S413, S415	2400-020200-000	TACT SW 2P2T KPT-1105A (5MM)	13
IR, LED, VFD			
U402	3001-120430-001	INFRARED SENSOR PIC-12043TM	1
D411, D412, D413, D414, D415, D416, D417, D418, D419, D420, D421, D422, D423, D424, D425, D426, D427, D428	3100-000330-003	LED 3MM GREEN COLOUR	18
U403	3105-630900-000	VFD 6-BT-309GNK FUTABA	1
IC			
U401	4116-311121-500	IC PTC PIC16311 QFP (VFP DRIVER)	1

FL8380 Electrical/Mechanical Parts List (Cont'd)

POWER CONTROL BOARD ASSY

<u>Reference</u>	<u>Part number</u>		
S841	2400-020200-000	TACT SW 2P2T KPT-1105A (5MM)	1
W841	2500-051201-050	5PIN 120MM 1CONN CABLE AWG#28 UL1571 2MMP	1
LED			
D841	3100-204000-001	LED 5MM BI- COLOR A/G #BL-BAG204	1

OUTPUT BOARD ASSY

<u>Reference</u>	<u>Part number</u>		
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, R755	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
CAPACITOR			
C755, C762	1100-102043-000	CERAMIC CAP. 1000PF/50V +-10%	2
C751, C752	1100-151044-000	CERAMIC CAP. 150PF/50V +-20%	2
E750	1102-101014-000	ELECT. CAP. 100uF/16V +-20%	1
TRANSISTOR			
Q750	1301-200300-100	TRANSISTOR PNP KSR2003 (SAMSUNG)	1
DIODE			
D1, D2	1401-141480-000	DIODE 1N4148	2
CONNECTOR			
W753	2300-002000-001	STRAIGHT CONN WAFER 2PIN 2MMP JST	1
W751	2300-003000-001	STRAIGHT CONN WAFER 3PIN 2MMP JST	1
W752	2300-004000-002	STRAIGHT CONN WAFER 4PINS 2MMP JST	1
U754, U755	2321-003911-002	MIC JACK 3.5MM JY-3510-01-010	2
U753	2330-002901-000	RCA JACK RJ-1081-020-000	1
RCA 1	2330-003901-304	RCA JACK WITH SHIELD PLATE RCA-213D	1
IC			
U750	4181-700010-000	I.C. LTV817B LITON	1

FL8380 MAIN UNIT MECHANICAL PART LIST

5110-362000-000	LASER PICK UP LABEL	1
6029-010012-001-01	PLASTIC FOOT (HOT STAMPING)	4
6083-510011-000	STAND, FRONT-5CD	1
6083-510012-000	STAND, REAR-5CD	1
6083-510013-001	BRACKET, 5CD-SIDE 1	1
6083-510014-001	BRACKET, 5CD-SIDE 2	1
6083-510016-000	BRACKET, WIRE	1
6083-810002-000-01	HARMAN/KARDON FL8380 CD TRAY DOOR (W SILKSCREEN)	1
6083-810003-001-01	HARMAN/KARDON FL8380 DISPLAY LENS W SILKSCREEN	1
6083-810010-000	DIFFUSER	1
6583-510001-006	BOTTOM CABINET	1
6583-510003-003-05	HARMAN/KARDON FL8380 (117V)REAR PANEL W SILKSCREEN	1
6583-510010-000	COVER PLATE	1
6583-810001-002-01	TOP CABINET W/BLACK PAINTED	1
6583-810002-000	BRACL CET, FP LEFT (1.0 SECC)	1
6583-810003-000	BRACL CET, FP RIGHT (1.0 SECC)	1
6583-810004-000	HARMAN KARDON LOGO BADGE	1
6600-070003-000	CD90R05 RUBBER PAD,LEG	4
6600-120040-000	SCREW NUT M4X7X3	2
7003-006001-001	SCREW M3x6 S.T.P BW/H (BLACK)	4
7003-006001-111	SCREW M3X6 S.T.P. B/H (BLACK)	39
7003-006001-112	SCREW M3X6 S.T.P. B/H	1
7003-006002-112	SCREW M3X6 P.T.P. B/H	3
7003-008001-111	SCREW M3X8 S.T.P. B/H BLK	2
7003-008002-111	SCREW M3X8 P.T.P. B/H (BLACK)	2
7003-008002-111	SCREW M3X8 P.T.P. B/H (BLACK)	4
7003-008002-112	SCREW M3X8 P.T.P. B/H	12
7003-016002-112	SCREW M3X16 PTP B/H ZN	2
7004-010010-112	SCREW M4X10 B/H	2
7104-010010-022	WASHER M4X10X1MM	1
7104-010010-022	WASHER M4X10X1MM	1
7104-010010-022	WASHER M4X10X1MM	2

8583-801010-301

6083-810001-000-01	FL8380 FRONT PANEL (HARMAN KARDON FL8380) REV A HARMAN KARDON FL8380 FRONT PANEL (W SILKSCREEN)	1
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6083-810004-000-01	BUTTON DISC W PAINTED	1
6083-810006-000-01	OPEN/CLOSE KNOB W/PAINTED	1
6083-810007-000-01	BUTTON PLAY, PAINTED	1
6083-810009-000-01	HK-FP105.1 PAINTED CAP BUTTON DIMMER FOR FL8380	1
6083-810011-000	FILTER, FL (PVC 0.5t)	1
6083-810013-000-01	KNOB, VR, PAINTED	1
6083-810014-000-01	BUTTON STANDBY, PAINTED	1
6083-810015-000	INDICATOR, STANDBY SAN(MILKY)	1
6583-510006-000	BRACKET, PHONES (MIC)	1
6600-210035-000	PADCOCK 10X10X7MM	1
6600-210060-000	PADCOCK 70X12X6t	1
7003-006002-112	SCREW M3X6 P.T.P. B/H	1
7003-008002-112	SCREW M3X8 P.T.P. B/H	12
2610-218300-002	AC POWER CORD NON-INTEGRAL SPT-2 UL/CSA	1
3200-480150-400	TRANSFORMER EI48 117V UL #4801Y52T	1
6600-180007-000	AC CORD BUSHING (PG5RF-5B)	1
6600-240003-001	CLOSE END CONNECTOR (CE-1)	2

5 DISC CHANGER MECHANISM

5CD SENSOR BOARD ASSY		9400-501001-131
<u>Reference</u>	<u>Part number</u>	
R2	1004-701316-000	CARBON FILM RESISTOR 470 OHM 1/6 W +-5%
R1	1007-501316-000	CARBON FILM RESISTOR 750 OHM 1/6W +-5%
CONNECTOR, CABLE		
CN1	2300-002010-000	RIGHT ANGLE CONN WAFER 2PIN 2MMP
CN2	2300-006010-000	HORIZONTAL CONN. WAFER 6 PINS 2mmP
CN1	2500-021201-050	2PIN 120MM 1CONN CABLE AWG#28 2MMP
CN2	2506-062501-150	6PIN 250MM 2CONN RIBBON CABLE AWG#28 2MMP
OPTICAL DEVICE		
D2	3001-820000-000	INFRARED SENSOR ST-8LR2 OPTO-SENSOR
D1	3004-206000-000	PHOTO COUPLER SG206 OPTO-SENSOR
D3	3100-800000-000	EMITTING DIODE EL-8L OPTO-SENSOR
PCB, MISC		
	4841-010130-003	5CD SENSOR BD REV C
	6005-050029-001	HOLDER SENSOR
	6005-050032-000	COVER, HOLDER, SENSOR

5CD CHANGER MECHANICAL ASSY	
2501-062801-150	6PIN 280MM 2CONN RIBBON CABLE AWG#28 2MMP
6505-050002-001	CABINET HOLDER A
7003-008002-112	SCREW M3X8 P.T.P. B/H

8500-055080-300	CABINET TOP ASSY	
6005-050002-011	CABINET TOP	1
6005-050004-003	GEAR BLOCK	1
6005-050005-001	GEAR BLOCK ARM	1
6005-050026-002	LEVER LOCK, T.T.	1
6005-050027-000	BUSH, ROLLER	1
6005-050028-000	WASHER, BUSH	1
6005-050051-000	TRUNTABLE	1
6600-010212-002	5CD SPRING, GEAR BLOCK	1
6600-010213-000	5CD SPRING, GEAR BLOCK ARM	1
6600-010290-001	SPRING LEVER LOCK	1
6600-020203-000	5CD SHAFT, T.T. ROLLER	5
6600-020297-000	PIN, ROLLER LOCK	1
6600-080001-000	YN21R D03/04 PINCH ROLLER	5
6600-170056-000	RUBBER RING 3.2X5.2X2	1
7002-608002-002	SCREW M2.6X8 P.T.P W/H D6.5	2
7002-620002-062	SCREW M2.6X20 P TYPE W/H ZN	1
7003-008002-112	SCREW M3X8 P.T.P. B/H	5
7003-012002-062	SCREW M3X12 P.T.P. W/H	1
7103-012010-022	WASHER M3X12X1MM	1
7103-207004-000	FIBRE WASHER M3.2X7X0.4MM	5

8500-055040-301	MOTOR BRACKET ASSY	
6005-050019-000	SHAFT BUSHING	2
6005-050020-000	PULLEY ROTARY	1
6005-050021-000	GEAR ROTARY	1
6005-050022-000	GEAR WORM	1
6600-020268-000	SHAFT DIA. 2X34MM	1
6600-090052-000	5CD BELT ROTARY	1
7002-003010-111	SCREW M2X3 B/H (BLACK)	2
7103-006005-130	WASHER 3X6X0.5MM CUT	1

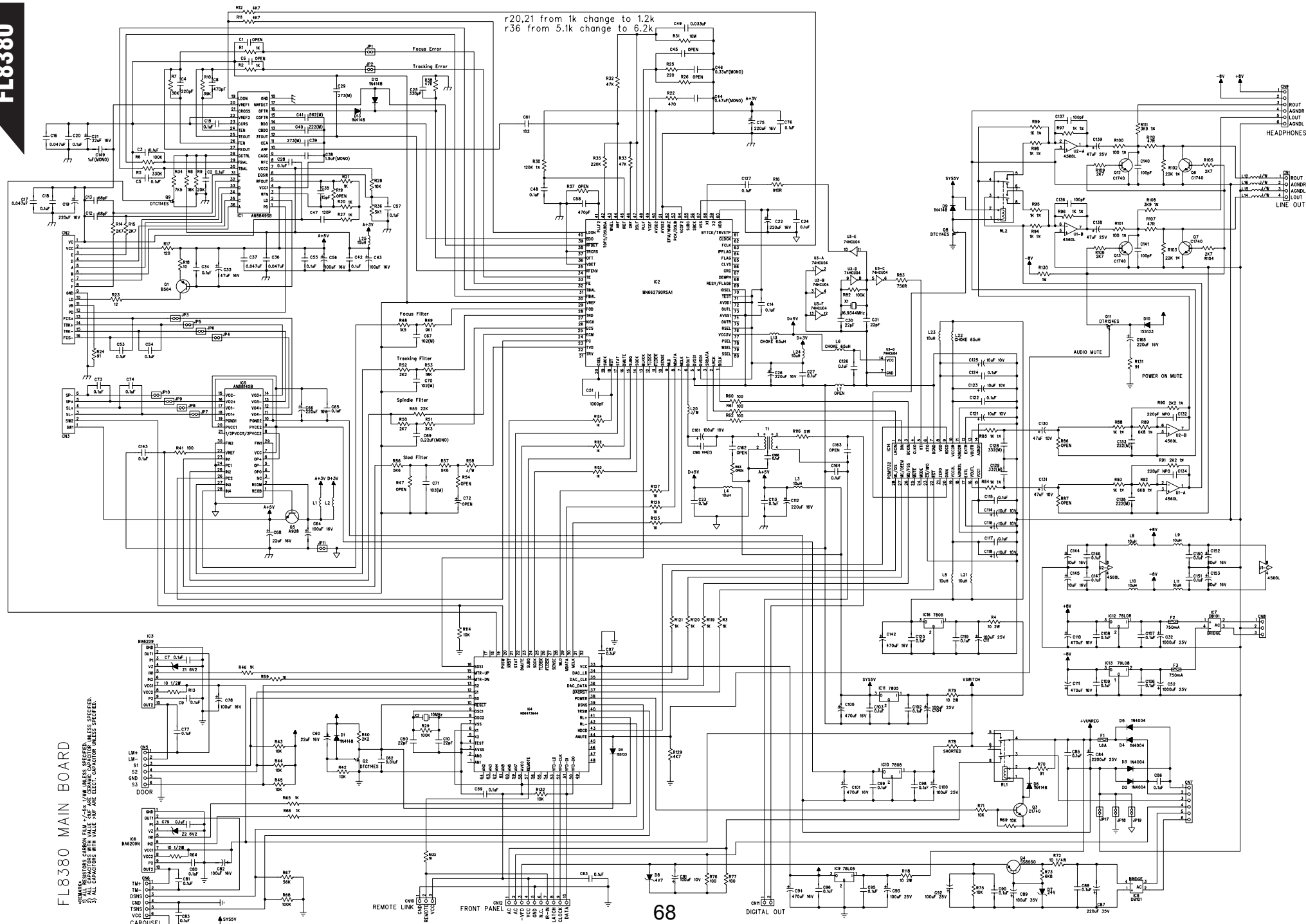
8500-055010-300	MOTOR ASSY
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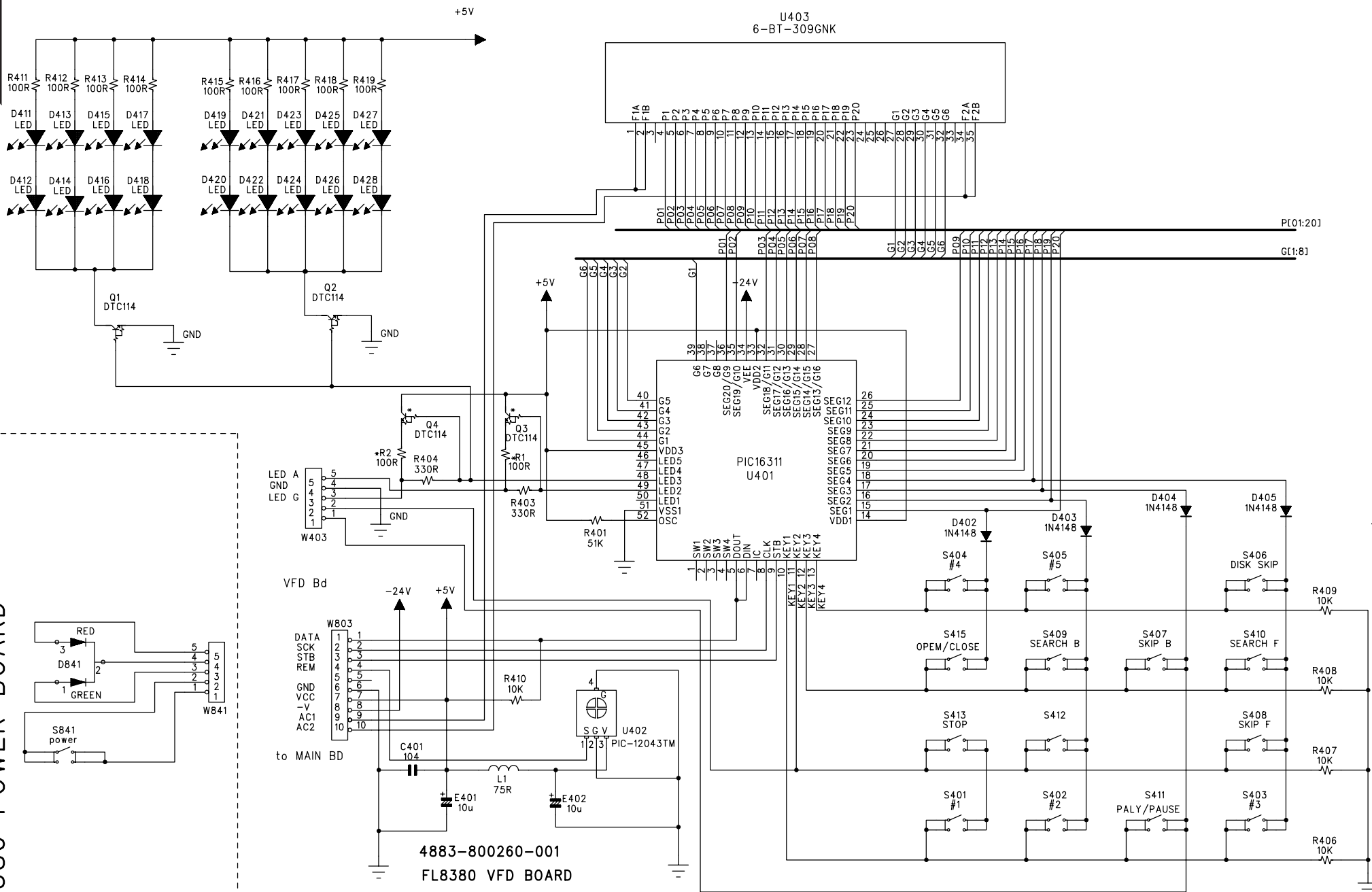
2500-021301-050	2PIN 130MM 1CONN CABLE AWG#28 UL1571 2mmP	1
6005-050018-000	MOTOR PULLEY	1
FF130SH11340-2684A	MOTOR FF-130SH-11340-02684A (MABUCHI)	1
8500-055040-100	MOTOR BRACKET SUB-ASSY	
6505-050004-004	MOTOR BRACKET	1
6600-020201-001	5CD SHAFT, GEAR ROTARY	1
8500-055050-100	BRACKET ROLLER ASSY	
6005-050017-000	ROLLER	1
6505-050005-001	BRACKET ROLLER	1
6600-020202-000	5CD PIN, ROLLER	1
8500-055230-101	BASE 5CD ASSY REV A	
6005-050006-004	CONTROL CAM	1
6005-050007-000	GEAR, CABINET TOP	1
6005-050008-001	CONTROL CAM	1
6005-050009-000	INTERMEDIATE GEAR	1
6005-050011-000	IDLER GEAR	1
6005-050014-004	LEVER LOCK, OUTER	1
6005-050015-000	LEVER LOCK	1
6005-050033-000	SUPPORT BRACKET	1
6005-050034-001	DRIVEN PULLEY 80T	1
6005-050035-000	DRIVEN PULLEY PLATE 80T	1
6005-050050-007	BASE, 5CD	1
6091-060006-000	CHUCKING PULLEY	1
6591-060007-000	CHUCKING METAL PLATE	1
6600-010210-001	SPRING LEVER LOCK	1
6600-010211-000	5CD SPRING, LEVER LOCK, OUTER	1
6600-090062-000	TIMING BELT, S2M180 90T	1
6600-140001-000	CD90F01 CHUCKING METAL PLATE FELT RING	1
6600-150006-001	CHUCKING MAGNET	1
6600-170021-000	5CD CUSHION RING	2
7002-006001-022	SCREW M2*6 S.T.P. P/H	2
7003-006002-112	SCREW M3X6 P.T.P. B/H	2
7003-008002-062	SCREWM3X8 P TYPE W/H ZN	1
7003-008002-112	SCREW M3X8 P.T.P. B/H	8
7003-008003-112	SCREW M3X8 B TYPE B/H ZN	1
7003-012002-062	SCREW M3X12 P.T.P. W/H	1
7103-207004-000	FIBRE WASHER M3.2X7X0.4MM	1
7103-209008-022	WASHER M3.2X9X0.8	3
7103-210012-022	PLAN WASHER 3.2X10X1.2t ZN	2
7103-314010-022	WASHER M3.3X14X1MM ST/ZN	1
7105-010005-030	WASHER LOCK 5X10X0.5MM	3
7106-212505-022	PLAN WASHER 6.2X12.5X0.5t	3
8500-055010-100	BRACKET GEAR ASSY	
6505-050008-001	BRACKET, GEAR, SUB	1
6600-020196-002	PIN, CAM CABINET	1
6600-020197-001	PIN CABINET TOP	1
6600-020198-000	5CD PIN, CONTROL CAM	1
8500-055030-301	MOTOR ASSY	
6005-050023-001	PULLEY MOTOR	1
6005-050024-000	PULLEY DISC	1
9400-501000-171	5CD SWITCH BOARD ASSY REV A	
2300-003000-001	STRAIGHT CONN WAFER 3PIN 2MMP JST	1
6005-050025-002	SWITCH COVER	1
6505-050007-001	CONTACT PLATE	1
6600-020270-004	BUSH, SWITCH COVER	1
9400-501000-211	5CD LOADER BOARD ASSY REV A	
2300-003000-001	STRAIGHT CONN WAFER 3PIN 2MMP JST	1
4800-310210-001	5CD LOADER BOARD REVA	1
RF-500TB-14415	DC MOTOR MABUCHI RF-500TB-14415 (DC002VT00003)	1
8500-055220-100	BRACKET, CD MECHA ASSY	
3009-213000-000	CD MECHANISM 213CCM	1
6005-050030-001	BRACKET, CD MECHA	1
6600-020199-001	PIN, LOCK	1
6600-020200-002	PIN, ROUND	1
6600-170076-000	CUSHION 5CD, 30 DEG. BLACK IIR	2
6600-170077-000	CUSHION 5CD 40 DEG. GREY IIR	2
7002-608002-022	SCREW M2.6X8 P.T.P. P/H	4
7102-712706-022	WASHER DIA2.7XDIA12.7X0.6mm ST/ZN	4
7106-212505-022	PLAN WASHER 6.2X12.5X0.5t	4

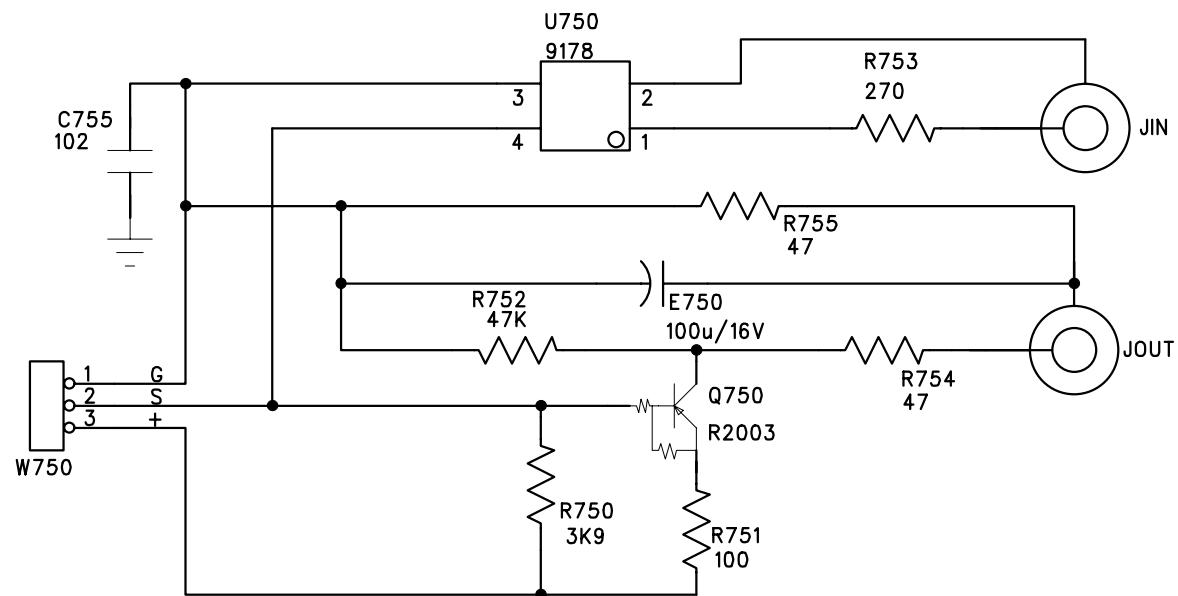
9400-501000-701	5CD TURN TABLE BOARD ASSY REV A	
2300-002000-001	STRAIGHT CONN WAFER 2PIN 2MMP JST	1
2300-006000-000	STRAIGHT CONN. WAFER 6 PINS 2mmP	1
2501-062801-150	6PIN 280MM 2CONN RIBBON CABLE AWG#28 2MMP	1
4841-010700-006	5CD TURN TABLE REV F	1

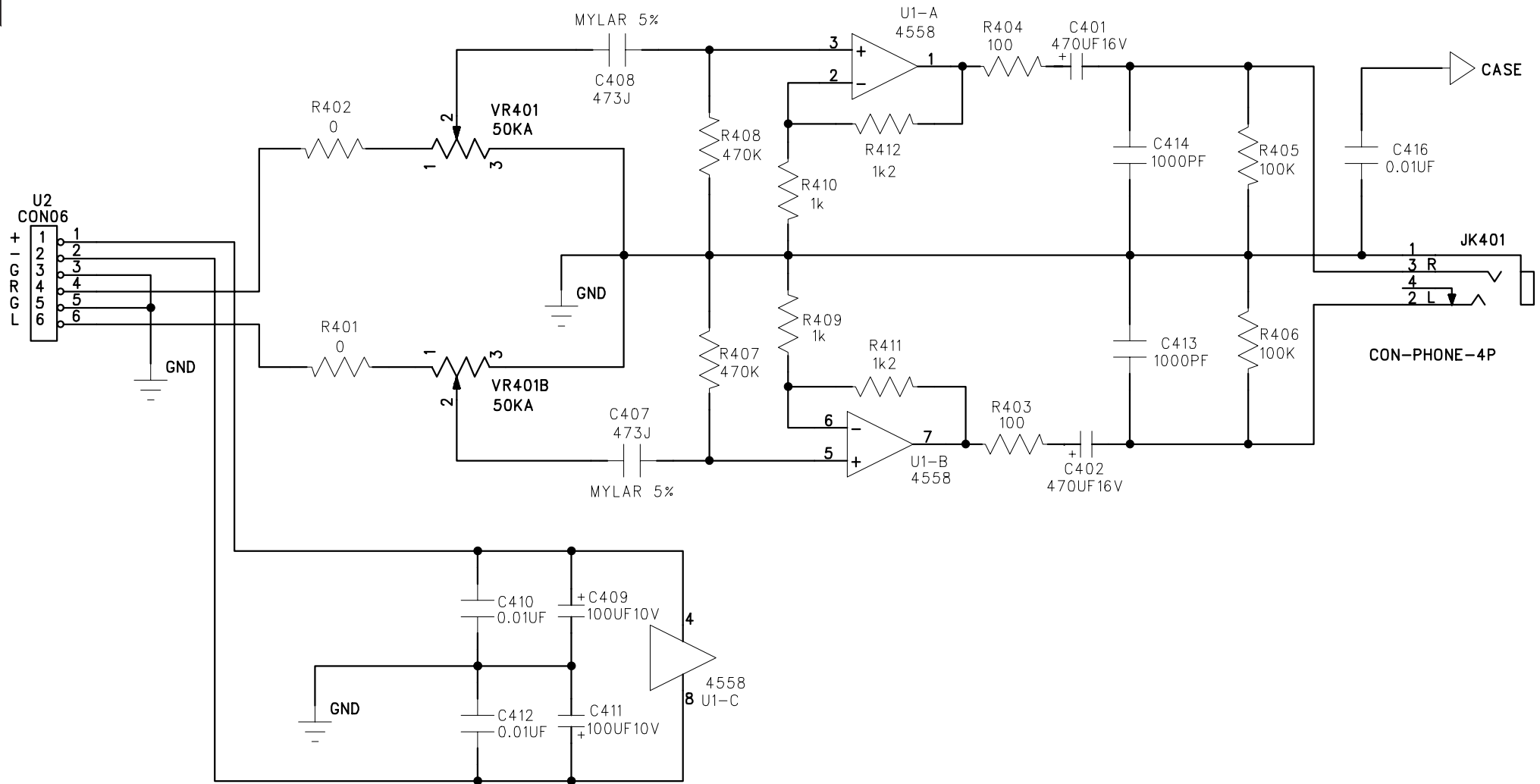
FL8380 MAIN BOARD

REMARK











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NOTE:
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SERIAL .380		DATE FTH	MONT	D Y M
REF.		PACKING ASSY		
SERIAL NO. PACKING ASSY		DATE A0	REF ID 9783-801000-001	REV A