

Section 5: Troubleshooting

INTRODUCTION

The CD-100F Phonograph incorporates several modules which plug in for rapid service. The most likely causes of phonograph problems are:

1. Continuous or intermittent opens in a harness. The cause can be wiring, a terminal, or a bad terminal crimp.
 - Check that all plugs are firmly seated.
 - Check that connector pins are not bent, broken or pushed through the back of connectors when mated.
 - Check for bad solder joints, especially at connector pins.
2. A defective module (See Table 5-1). Troubleshooting procedures are directed at module replacement, not repair.

Table 5-1. Replaceable Modules

| Part No. | Description |
|----------|--|
| 40832220 | Central Control Computer (CCC) |
| 61086201 | Mechanism Control |
| 30995302 | CDM-12 CD Player with Centering Hub |
| 61086501 | Power Supply Circuit Board Assembly |
| 40855001 | Digital Display |
| 40856101 | Title Rack-Keyboard Interface Assembly |

TROUBLESHOOTING TOPICS

The troubleshooting topics presented in this section are:

- A summary of the functions for each of the phonograph's replaceable modules
- A sequence of operation explanation and a Block Diagram (Figure 5-1) to help you isolate the problem to a harness or a module.
- The RED LED STATUS lamps (Figures 5-2 through 5-6).
- Instructions on how to use the ERROR and WARNING messages
- Modular Troubleshooting Charts that list the *Trouble*, *Symptom*, and *Probable Cause*
- A Sound System Quick Check

**NOTE:**

The CBA-2 service procedures are described in *Section 4* of this manual.

REPLACING THE CCC EPROM / FACTORY DEFAULT

If you have changed the CCC EPROM, use the following procedure to reset the CCC:

1. Put the NORM/SERVICE switch to SERVICE and the ON/OFF Power switch to OFF.
2. Press and hold keyboard 0 and 1 switches down and place the ON/OFF POWER switch power to ON; hold the 0 and 1 buttons down until the display shows LOADING DEFAULTS. Do not be concerned when the 14-04 WARNING appears, because it is just a status message indicating that the defaults were loaded. For a fresh start, clear out this warning (CODE 81).

FREE PLAY

1. Enter the SERVICE mode by setting the SERVICE switch to the SERVICE position.
2. Enter 55. This will place you in the PRICING menu, OPTION 5. Press and hold RESET and press 9. The display will change from FPLAY STATUS OFF to FPLAY STATUS ON. Press POPULAR to complete the change.

CD MODULE FUNCTIONS

Digital Display Module

- A “dumb” controller (i.e. cannot make any decisions)
- Displays information sent by CCC

Title Page Assembly-Keyboard Interface Module

- Contains the TITLE DISPLAY motor driver IC. The IC is controlled by the CCC.

CCC

- The master controller
- Has battery backed up RAM
- Controls all credit functions
- Stores all selections
- Controls all programming functions
- Makes all system decisions

Mechanism Control

- A slave controller
- Plays selections sent by the CCC
- Controls all mechanism functions
- Controls the CD player
- Mutes and unmutes the audio amplifier

CBA-2 Logic Board

- A slave controller
- Tells CCC when a valid bill is accepted.

Rowelink and the Power Bus (voltages, Commons & System Reset) are the only connections between CCC, mechanism control and CBA-2. Rowelink is a 2-wire communication channel that ties the system components together. The ROWELINK COMMAND (CCC), and ROWELINK TX (mechanism control), LED's should always be flickering.

SEQUENCE OF OPERATION

This sequence of operation describes the phonograph cycle and jobs performed by each module shown in the Block Diagram (*Figure 5-1*).

In the Block Diagram, the TITLE DISPLAY switches are shown in the PAGE 1 position. The mechanism OUTER CAM and INNER CAM switches are shown in the MAGAZINE ROTATE position.

Step 1. Power is turned on, voltages and commons are applied to modules and components.

| At Line Voltage | Voltages Labeled | Should Measure |
|-----------------|------------------|------------------|
| 115 VAC | 28 VAC | 26 to 30 VAC |
| 115 VAC | +28 VDC | +23 to +30 VDC |
| 95 to 135 VAC | +8 VDC | +8.5 to +9.9 VDC |

Step 2. The modules sense power turn on, no selections or credit in memory, and the SERVICE switch is in the NORMAL position.

CCC

- +5 VDC LED lights
- BOARD ERROR LED flashes 3 times to indicate that ROM, RAM and real time calendar clock have tested OK.
- ROWELINK COMMAND LED flickers, indicating that serial communication commands are being sent from the master (CCC) to the slaves (mechanism control and CBA-2).

Mechanism Control

- +5V LED lights.
- BOARD ERROR LED flashes 3 times to indicate that ROM, RAM and CD Player Communication (CDM COMM) have tested OK.
- CDM COMM flashes once.
- ROWELINK TX (Rowelink response) LED flickers, indicating that communication is occurring between the mech control (a slave) and CCC (the master). Each time it flickers, communication has successfully occurred.

CBA-2

- PWR LED lights
- STATUS LED flashes 1 time

Digital Display

- +5 VDC LED lights
- CCC serially sends information (via TX data, clock) and display shows:
- Checksum = XXXX
- RAM test passed
- 0 (selections remaining)
- After 10 seconds, the moving messages **ROWE**, **CD PHONOGRAPH** and **PLAY THE MUSIC** appear.

Step 3. Customer deposits money. Play credit is established.

- Money is deposited
- CBA-2 tells CCC if a bill was validated and stacked.
- • CCC senses coins from the closed coin switches.
- • CCC uses pricing information (COIN SWITCH VALUES, PRICE LEVELS, PLAYS @ LEVEL and MULTIPLIER) stored in it, to convert money deposited into play credits.
- CCC sends (via TX data, clock) credits to digital display and they appear above the SELECTIONS REMAINING legend.
- • CCC tells the mechanism control the money's value and the mechanism control increments the money counter.

Step 4. Customer makes a selection.

- CCC determines that a switch is closed or open by sending out strobes and sensing returns.
- Customer finds the selection that he wants to make by using the keyboard IN (Λ) and OUT (v) title page switches.
- CCC sends out Strobes 1, 9 and 10 to the TITLE RACK-KEYBOARD INTERFACE.
- • The motor driver in the TITLE RACK-KEYBOARD INTERFACE uses Strobe 9 to control speed and Strobe 10 to control direction.
- • CCC determines when to stop the motor (i.e., a page has flipped) by sensing the state of the INDEX switch on return RET 1.
- • CCC determines when to change directions by sensing the state of the LIMIT switch on return RET 0, or by using PAGE IN, OUT data in the ATTRACT menu.
- • Customer enters 4 digits (a 2-digit disc number and a 2-digit track number).
- • CCC senses the pushed keys by sending out Strobes 2, 3, 4, 5 and sensing returns RET 0, 1, 2 and 3.
- • Digital display shows digits as they are entered above the SELECTION BEING MADE.
- • Selection stored in the CCC's memory.
- • Credit is cancelled.
- • Selection is displayed for approximately 4 seconds after it is made.

Step 5. Selection is located and played.

- CCC sends the selection to the mechanism control.
- Mechanism Control searches for the disc.
- • Detent coil is energized and the magazine unlocks.
- • Magazine motor rotates the magazine.
- • Mechanism control SCAN/TRANSFER LED lights.
- • Digital display shows the selection playing as - - - -.
- • Mechanism control locates the disc by counting gear teeth interruptions of the INDEX optical switch light beam.
- Disc located and transferred to the play position.
- • Magazine motor stops and the magazine locks (detented).
- • Transfer motor runs and the disc is placed in the play position.
- • Outer cam Common connected to the N.O. contact.
- Mechanism control SCAN/TRANSFER LED goes OFF.
- Mechanism control tells the CDM-12 what track (i.e., selection) to play.
- CDM-12 tells the mechanism control that the track has been located. Play counter advances.
- Selection plays
- • Mechanism control tells the CCC that the selection is playing.
- • Mechanism control unmutes the audio amplifier.
- • Selection is erased from CCC's memory.
- • Digital display shows that the selection is playing.
- • Mechanism control monitors the disc condition and tells the CCC if disc problems occur.

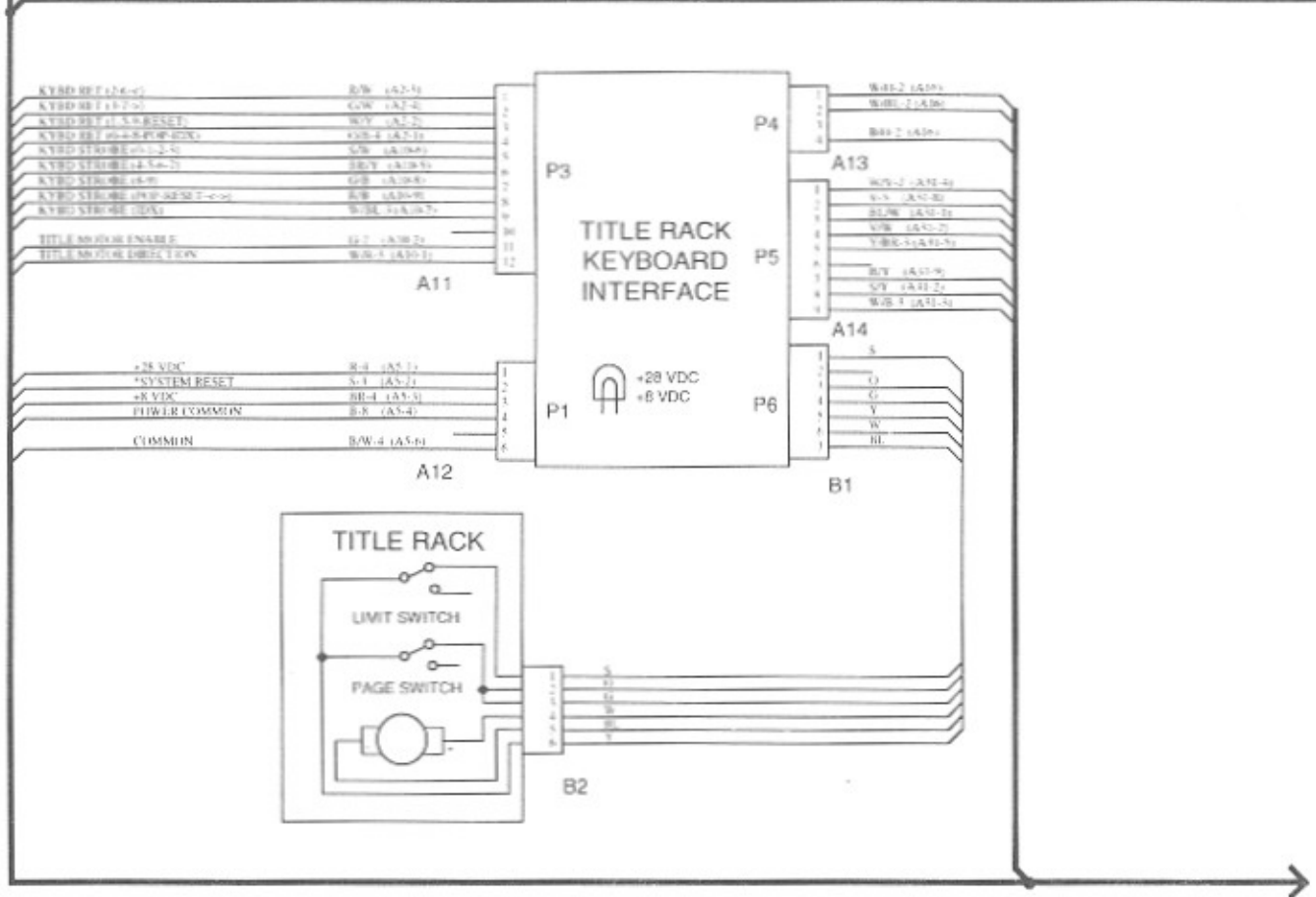
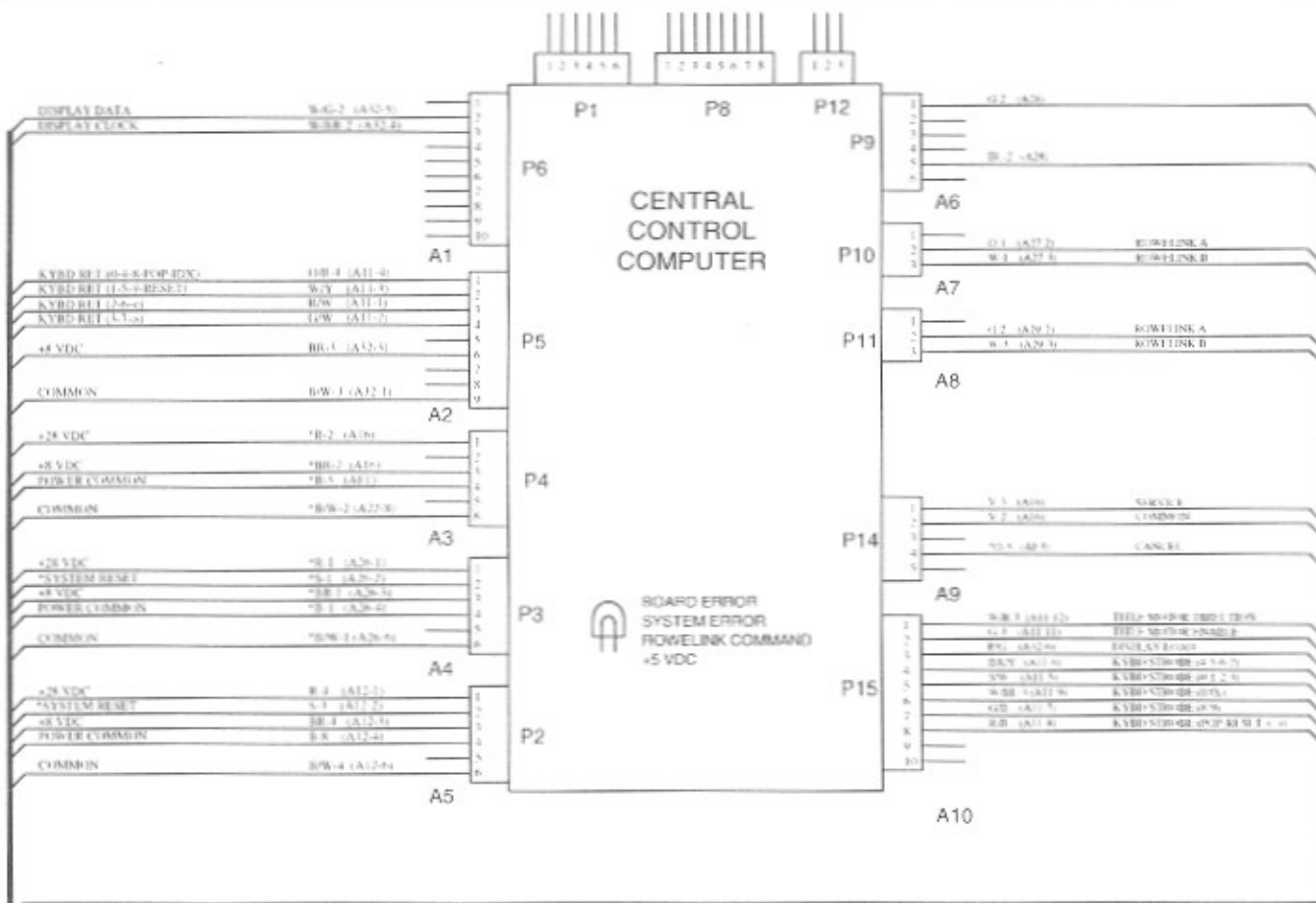
Step 6. Selection ends, the disc returns to the magazine, the CCC searches selection memory.

- Mechanism control tells the CCC that the selection is over.
- Mechanism control mutes the audio amplifier.

- Transfer motor runs and the disc is returned to the magazine.
- Inner cam Common connects to the N.O. contact when the disc is in the magazine.
- CCC searches its selection memory. If it contains one or more selections, steps 5 and 6 are repeated.

Step 7. Phono returns to STANDBY and AUTOPLAY timing begins.

- All selections have played.
- Digital display shows moving messages: ROWE, CD PHONOGRAPH, and PLAY THE MUSIC.



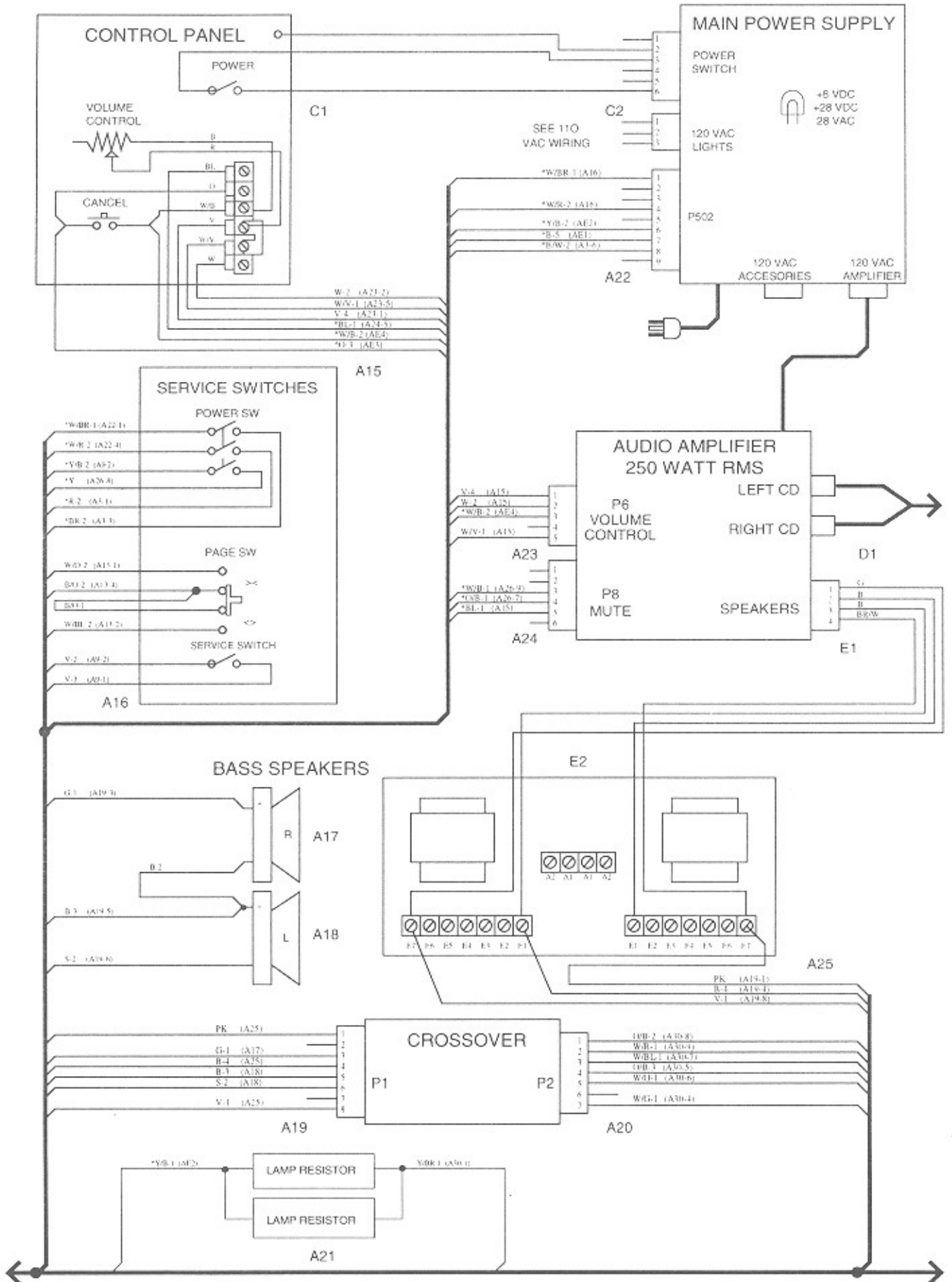
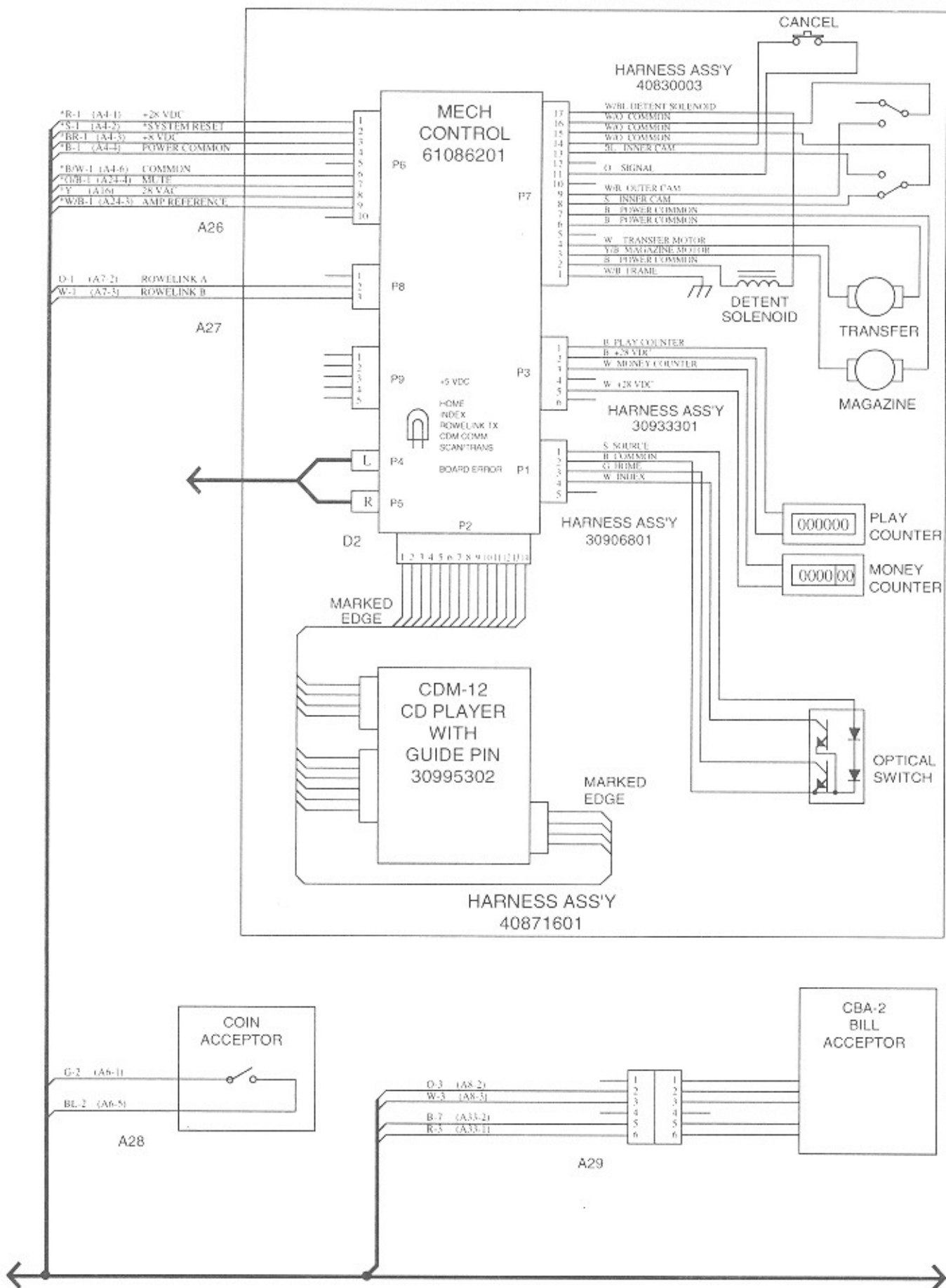


Figure 5-1. CD-100F Block Diagram Sheet 1



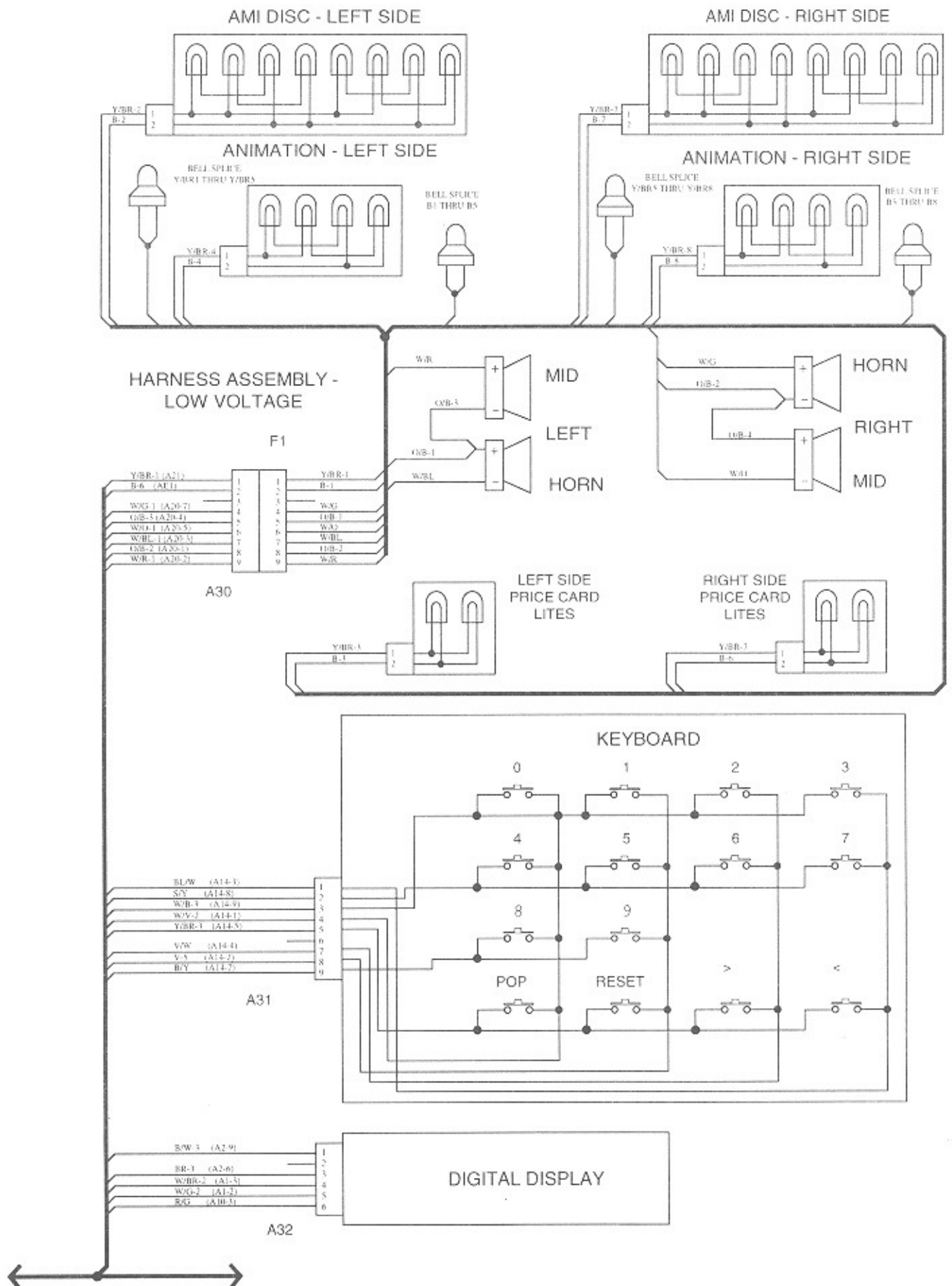
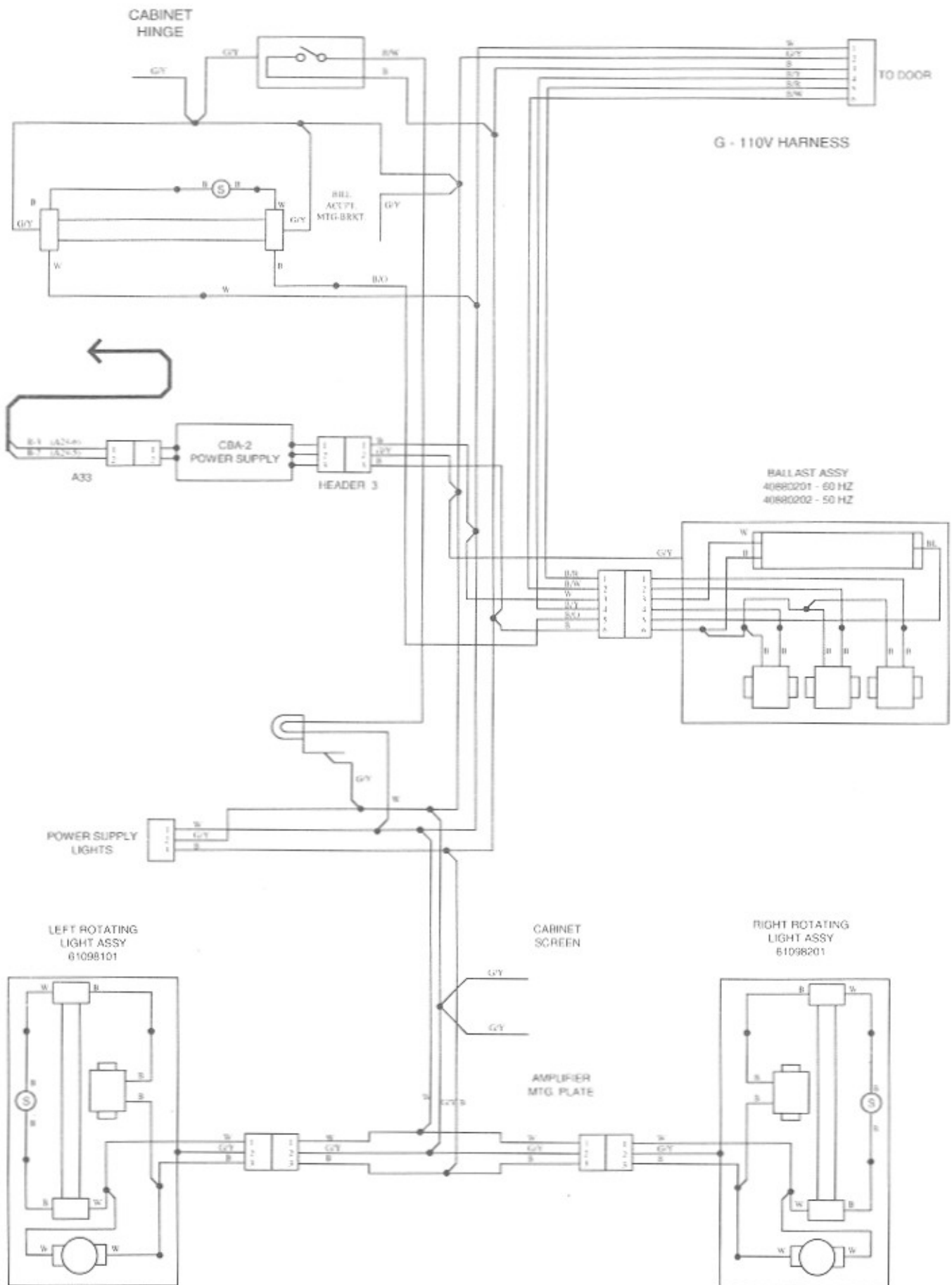
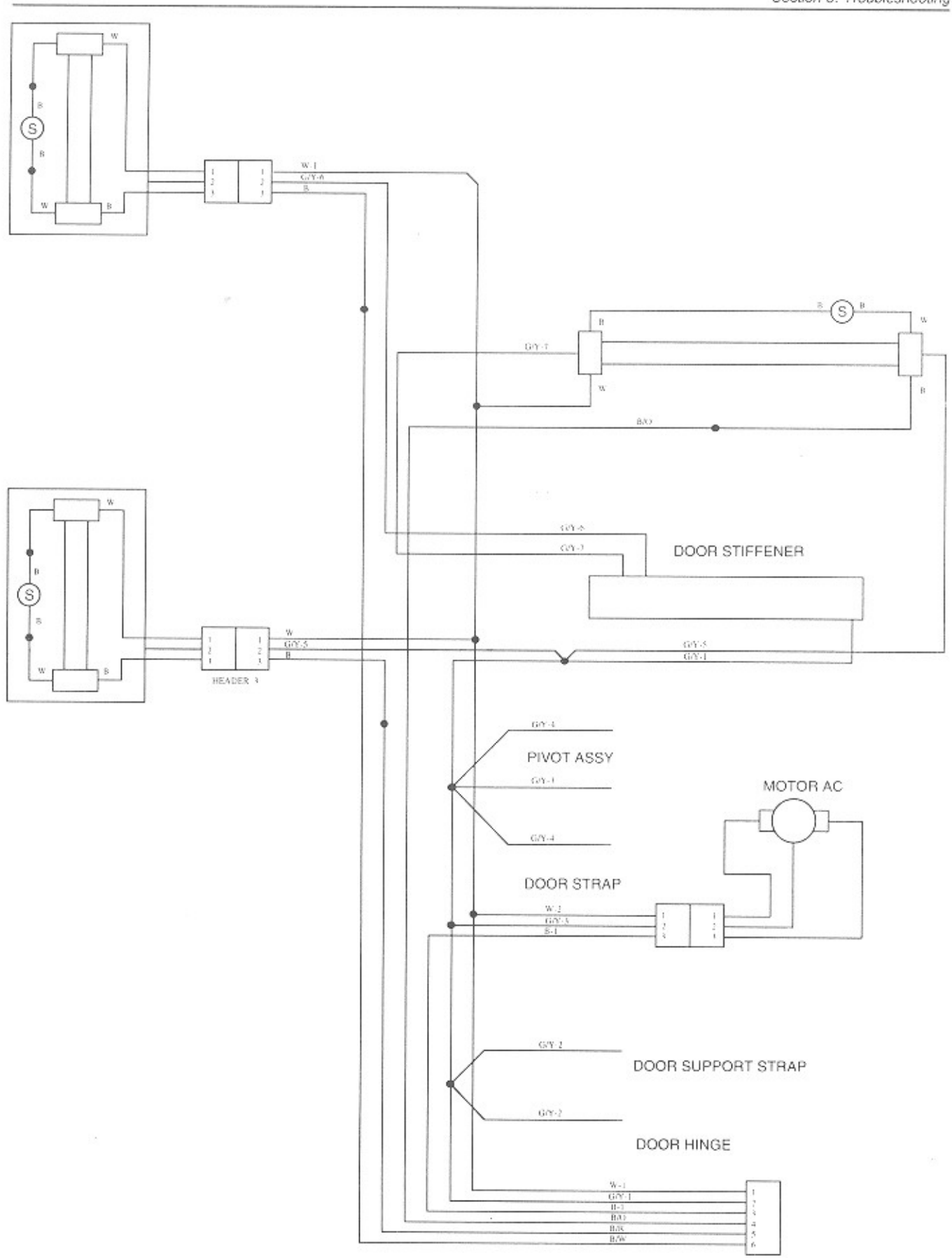


Figure 5-1. CD-100F Block Diagram Sheet 2





H - TOP DOOR LITES

Figure 5-1. CD-100F Block Diagram Sheet 3

CD-100F HARNESS ASSEMBLIES

| <u>PART NO.</u> | <u>HARNESS NAME</u> |
|------------------------|--|
| A. 61099101 | Harness & Switch Assembly |
| B. 40883801 | Harness Assembly - Title Rack |
| C. 40883701 | Harness Assembly - Power Switch |
| *C1. 40883702 | Harness Assembly - Power Switch (Export) |
| D. 30934204 | Harness Assembly - Audio |
| E. 30985302 | Harness Assembly - Output Transformer |
| F. 61101401 | Harness Assembly - Low Voltage |
| G. 40880101 | 110V Harness Assembly |
| H. 40881601 | Harness Assembly - Top Door Lights |

* Denotes Harness Not Shown in Block Diagram

STATUS LAMPS

The red LED indicators are connected to various strategic points in the phonograph's circuits to indicate the status of power and signal circuits.

Main Power Supply LED's

+8 Volts DC
+28 Volts DC
28 Volts AC

These indicators light when their corresponding voltages are present and no wiring shorts are present.

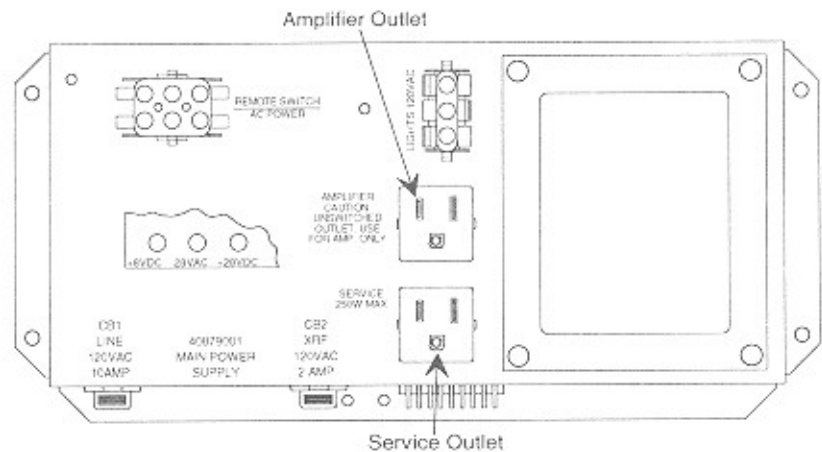


Figure 5-2. Main Power Supply LED's

Mechanism Control

| | |
|-----------------------|--|
| 5VDC | Lights as long as 5 VDC is present from the main power supply. |
| OPT. SW. HOME | Lights when the HOME section of the optical switch sees the hole in the magazine drive gear. Flickers when the magazine CD Position 99 passes the transfer position. |
| OPT. SW. INDEX | Lights when the index section of the optical switch sees a tooth space of the magazine drive gear. Flickers when the magazine rotates. |
| ROWELINK TX | Flashes when the CD mechanism is transmitting to the CCC. |
| CDM COMM | Flashes when the CDM-12 is transmitting to the mech control. |
| SCAN/TRANSFER | Lights when either the scan or the transfer motor is activated. |
| BOARD ERROR | Blinks on and off three times on power up. Any other time, this LED indicates that a fatal mechanism error (phonograph out of service) has occurred. |

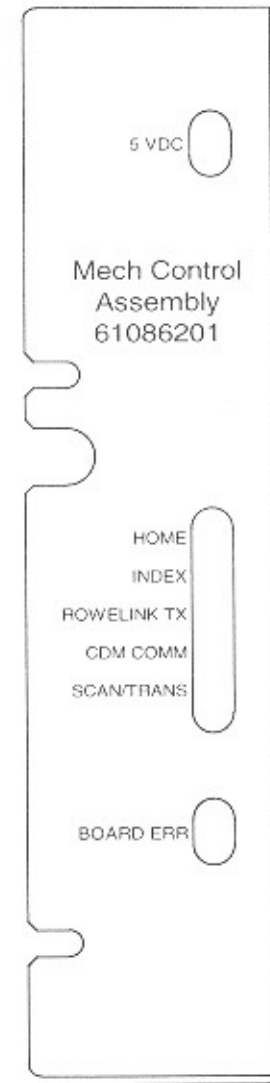


Figure 5-3. Mechanism Control LED's

Central Control Computer

- BOARD ERROR** Flashes 3 times on power up. If it stays on, an error has been detected.

- SYSTEM ERROR** Lit only when the phonograph is out of order. The type of error that caused the shutdown can be examined from the SERVICE mode.

- ROWELINK COMMAND** Flashes when the CCC is transmitting messages to slave devices (i.e. mechanism, CBA-2)

- +5 VDC** +5 VDC is present.

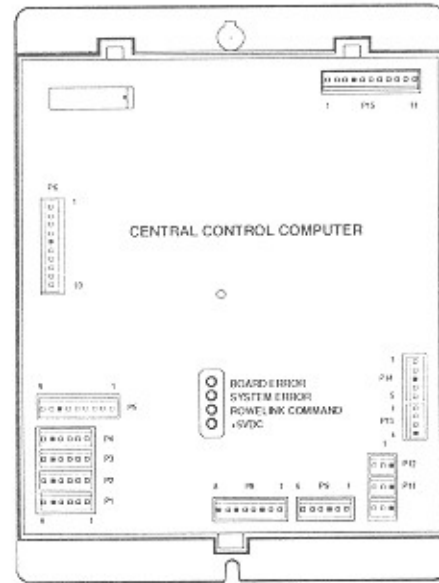


Figure 5-4. Central Control Computer LED's

Digital Display

- +5 VDC** +5 VDC is present.



Figure 5-5. Digital Display LED's

CBA-2

- BA STATUS** Flashes one time at power up then stays off. See Section 4 Troubleshooting if always lit or flashing.

- PWR** Voltage is present.

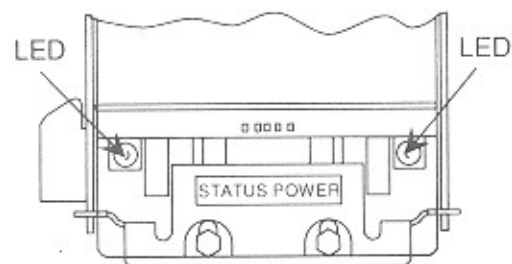


Figure 5-6. CBA-2 LED's

ERRORS AND WARNINGS

Basic Concepts

When you switch to SERVICE mode, you will see one of two displays:

- If the phonograph has not encountered any errors or warnings, *SERVICE MODE* will be displayed.
- If the phonograph has encountered errors or warnings, --ERRORS EXIST-- will be displayed. This message will only appear as you enter SERVICE mode, and it will not change menu or command operation.

ERRORS (ERR)

- Cause phonograph shutdown and show the OUT OF ORDER message.
- Usually require a service call, component replacement, adjustment, or harness repair.
- Are always shown as active (A), even if they cleared up.

If you turn power OFF and ON, the phonograph will operate if error cleared up. If error is still present, the phonograph will shut down. Errors that clear up do not require service unless the phonograph is malfunctioning.

WARNINGS (WARN)

- Do not cause phonograph shutdown.
- Phonograph may or may not operate.
- Service personnel are made aware by the --ERRORS EXIST-- message appearing upon entering the service mode.
- Shown as active (A) until the problem clears up.
- Not active (N) warnings do not require service unless the phonograph is malfunctioning.

VIEWING THE ERRORS AND WARNINGS



NOTE:

1. If the CCC thinks that a key other than RESET is closed, it will not accept other keys. This problem will not allow you to view the error/warnings. The probable cause is a short in the keyboard, a short in RET 0, 1, 2 or 3 wiring, defective CCC, or a short in (^) or (v) page switch or wiring.
2. The viewing procedure can be started over by holding RESET and repeatedly pushing POPULAR until the display shows *SERVICE MODE*. Then start at step 2.

| Steps | Display Shows |
|---|---|
| 1. Enter SERVICE mode | --Errors Exist-- |
| 2. Type 8 | * STATUS * |
| 3. Type 0 (<i>See Note 1</i>) | Error History |
| 4. Push POPULAR | X WARN XX-XX XX |
| | A = Active N = Not Active Source of warning Type of warning Number of occurrences |
| | OR |
| | X ERR XX-XX XX |
| | A = Active Source of error Type of error Number of occurrences |
| 5. Hold RESET, push 9 | START XX:XX XX/XX |
| | Time of first occurrence Month/day of first occurrence |
| 6. Hold RESET, push 9 | END XX:XX XX/XX |
| | Time it last cleared up (not active) Month/day it last cleared up (not active) 00:00 00/00 if first occurrence and still active, or ERR message |
| 7. Hold RESET, push 3 | Next ERR or WARN if a different one exists. Otherwise stays the same. |
| 8. Repeat steps 5, 6, and 7 as often as necessary (<i>See the Notes that follow</i>). | |

**NOTE:**

3. You can review the WARN or ERR, START or END by holding RESET and pushing 9 as often as desired.
4. Steps 4 and 5 can be skipped.
5. Hold RESET, push 2 to search backwards through errors.

EXAMPLE 1:

```
N WARN 06-02 15
START 14:30 06/01
END 15:00 06/01
```

Message means

- CBA-2 thinks bill transport V1 cell was blocked 15 times.
- First occurrence was 2:30 p.m. on June 1.
- Last occurrence cleared up 3:00 p.m. on June 1.

Probable cause

- Someone tried to obtain free credit by inserting a foreign object.

EXAMPLE 2:

```
A ERR 05-63 03
START 09:10 07/13
END 00:00 00/00
```

Message means

- The CCC has sent messages (via the ROWELINK) to the mechanism control, but the CCC has not received any response for 1 minute.
- First occurrence was 9:10 a.m. on July 13.

**NOTE:**

6. A (Active symbol) always proceeds ERR, even if the problem is not active now.
7. An ERR message always shows 00:00 and 00/00 for the END time and date.

ERROR AND WARNING SUMMARY

The following list summarizes all possible errors and warnings that can be displayed. For details of causes and corrective action, see *Description Of Errors/Warnings And Probable Causes* that follows this summary.

Coin Switches (01)

| | | | |
|-------|------------------------|-------|-----------------------------------|
| 01-17 | #1 coin switch | 05-56 | Index LED |
| 01-18 | #2 coin switch | 05-57 | Index LED |
| 01-19 | #3 coin switch | 05-58 | Home LED |
| 01-20 | #4 coin switch | 05-59 | Home LED |
| 01-31 | Multiple coin switches | 05-62 | CDM-to-CCC communication lost |
| | | 05-63 | Mech-to-CCC communication lost |
| | | 05-64 | Gripper bow position undetermined |

Keyboard Switches (02)

| | |
|-------|------------------|
| 02-16 | Key 0 |
| 02-17 | Key 1 |
| 02-18 | Key 2 |
| 02-19 | Key 3 |
| 02-20 | Key 4 |
| 02-21 | Key 5 |
| 02-22 | Key 6 |
| 02-23 | Key 7 |
| 02-24 | Key 8 |
| 02-25 | Key 9 |
| 02-26 | Most Popular key |
| 02-27 | Reset key |
| 02-28 | ^ key |
| 02-29 | v key |
| 02-31 | Multiple keys |
| 02-32 | Cancel button |

Mechanism Controller (05)

| | |
|-------|--|
| 05-05 | Mech. cannot determine magazine position |
| 05-08 | EPROM checksum error |
| 05-09 | RAM test failed. |
| 05-10 | CDM communication invalid |
| 05-25 | Cause undetermined |

Mechanism Fatal Errors

The error codes below will cause a system reset and after five errors, the phonograph will go out of order.

| | |
|-------|------------------|
| 05-50 | Inner cam switch |
| 05-51 | Inner cam switch |
| 05-52 | Outer cam switch |
| 05-53 | Outer cam switch |

CBA-2 (06)

| | |
|-------|--|
| 06-01 | Communication to the CBA-2 has been lost |
| 06-02 | V1 cell or inlet cell |
| 06-03 | Jammed bill (V3 Cell) |
| 06-04 | Bill stacker is full |
| 06-05 | Cause undetermined |
| 06-06 | Jammed bill (V4 Cell) |
| 06-07 | Motor speed error |

Wallbox Controller (07-10)

| | |
|-------|---|
| 07-01 | Communication to wallbox #1 has been lost |
| 08-01 | Communication to wallbox #2 has been lost |
| 09-01 | Communication to wallbox #3 has been lost |
| 10-01 | Communication to wallbox #4 has been lost |

IR Remote (11)

| | |
|-------|---|
| 11-01 | Communication to the IR remote has been lost. |
|-------|---|

Central Control Computer (14)

| | |
|-------|-----------------------------------|
| 14-01 | EPROM checksum error |
| 14-02 | RAM failed |
| 14-03 | Real time clock error |
| 14-04 | Factory defaults have been loaded |
| 14-05 | RAM checksum error |
| 14-06 | Low battery |

Description Of Errors/Warnings And Probable Causes

SOURCE 01 COIN SWITCH WARNINGS

| | | |
|------|-------|------------------------|
| WARN | 01-17 | #1 coin switch |
| | 01-18 | #2 coin switch |
| | 01-19 | #3 coin switch |
| | 01-20 | #4 coin switch |
| | 01-31 | Multiple coin switches |

Message Means:

CCC thinks one or more coin switches are closed for more than 5 seconds.

Probable cause:

1. A manual operation of coin switches.
2. A jammed coin or switch.
3. A short in wiring.
4. A defective CCC.

SOURCE 02 KEYBOARD WARNINGS

| | | |
|------|-------|------------------------|
| WARN | 02-16 | Key 0 |
| | 02-17 | Key 1 |
| | 02-18 | Key 2 |
| | 02-19 | Key 3 |
| | 02-20 | Key 4 |
| | 02-21 | Key 5 |
| | 02-22 | Key 6 |
| | 02-23 | Key 7 |
| | 02-24 | Key 8 |
| | 02-25 | Key 9 |
| | 02-26 | MOST POPULAR key |
| | 02-27 | RESET key |
| | 02-28 | < > key |
| | 02-29 | > < key |
| | 02-30 | ----- |
| | 02-31 | Multiple keys |
| | 02-32 | External CANCEL button |

Message Means:

CCC thinks one or more switches were closed for more than 10 minutes.

Probable cause:

1. Someone held it closed. Nothing needs repairing or replacing.
2. A short in associated wiring (*See the Block Diagram in this section*).
3. A defective CCC.

SOURCE 03-04 NOT DESIGNATED

SOURCE 05 MECHANISM ERRORS/WARNINGS

WARN 05-05

Message Means:

Both the Index and Home signals are changing, but the mechanism is unable to determine the magazine position.

Probable cause:

1. A defective optical switch.
 2. A loose connection wire/terminal at OPTICAL switch connector on the mechanism controller.
 3. A defective mechanism control.
-

WARN 05-08 EPROM checksum warning

Message Means:

Checksum test failed

Probable cause:

1. A failed EPROM.
 2. A defective mechanism control.
-

WARN 05-09 RAM test failed

Message Means:

RAM test failure

Probable cause:

A defective RAM or mechanism control.

WARN 05-10 CDM communication invalid

Message Means:

The mechanism control is receiving invalid communications from the servo-processor on the decoder board.

Probable cause:

1. Neon signs
 2. RF signals from radio station(s), CB radio(s), arcing wires, etc.
-

| | | |
|------|-------|---------------------|
| WARN | 05-25 | Unspecified Warning |
|------|-------|---------------------|

| | | |
|-----|-------|--------------------------------|
| ERR | 05-50 | Inner Cam switch always closed |
| | 05-51 | Inner Cam switch always open |
| | 05-52 | Outer Cam switch always closed |
| | 05-53 | Outer Cam switch always open |

Message Means:

Mechanism control thinks a switch is not working.

Probable cause:

1. A switch.
 2. A wiring short or open.
 3. The mechanism control.
-

| | | |
|-----|-------|----------------------|
| ERR | 05-56 | Index LED always OFF |
| | 05-57 | Index LED always ON |
| | 05-58 | Home LED always OFF |
| | 05-59 | Home LED always ON |

Message Means:

Mechanism control thinks that the optical switch is defective.

Probable cause:

1. The optical switch.
 2. A wiring short or open.
 3. The mechanism control.
-

| | | |
|-----|-------|---------------------------|
| ERR | 05-62 | CDM communication failure |
|-----|-------|---------------------------|

Message Means:

The servo processor, on the decoder board, has stopped all communications with the mechanism control for 20 seconds.

Probable cause:

1. The decoder board is not getting power.
 2. A failure in the mech controller.
 3. A failure in the decoder board.
-

| | | |
|-----|-------|----------------------------|
| ERR | 05-63 | Mech communication failure |
|-----|-------|----------------------------|

Message Means:

The CCC has sent messages (via the Rowelink) to the mechanism controller, but the CCC has not received any response for one minute.

Probable cause:

1. Rowelink harness failure in the CCC harness.
 2. The mech control has failed.
 3. CCC (or a module that uses ROWELINK) has failed.
-

ERR 05-64

Message Means:

Both the inner and outer cam switches are operating, but the gripper bow position is uncertain.

Probable cause:

1. A defective cam switch.
 2. A loose connection in wire/terminal at cam switch.
 3. A defective mechanism control.
-

SOURCE 06 CBA-2 WARNINGS

WARN 06-01

Message Means:

CBA-2 Communication failure.

Probable Cause:

1. A loose connection in wire/terminal at the Rowelink communication line.
 2. A defective CBA-2.
-

WARN 06-02

Message Means:

CBA-2 control unit thinks that the transport V1 cell is blocked.

Probable cause:

1. An object in transport covering V1 cell.
 2. A defective harness.
 3. A defective CBA-2 logic board.
-

WARN 06-03

Message Means:

CBA-2 control unit thinks that the V3 cell is blocked.

Probable cause:

1. An object is or was in transport covering the V3 cell.
 2. A defective harness.
 3. A defective CBA-2 logic board.
-

WARN 06-04

Message Means:

The CBA-2 thinks that the bill stacker is full.

Probable cause:

1. The bill stacker is full.
 2. The bill stacker is jammed in the OFF HOME position.
 3. The bill stacker HOME switch is out of adjustment.
 4. A defective bill stacker.
 5. A defective CBA-2 logic board.
-

WARN 06-05 Unspecified Warning

WARN 06-06

Message Means:

The CBA-2 thinks that the V4 cell (pullback flipper) is blocked.

Probable cause:

1. An object is or was in the transport, activating the pullback flipper.
 2. A defective harness.
 3. A defective CBA-2 logic board.
-

WARN 06-07

Message Means:

The CBA-2 control unit could not set the proper motor speed.

Probable cause:

1. Incorrect belt tension.
2. A defective motor.
3. A defective harness.
4. A defective CBA-2 logic board.

SOURCE 07 WALLBOX ADDRESS 70

WARN 07-01 CCC lost communication with wallbox or concentrator for more than 1 minute.

SOURCE 08 WALLBOX ADDRESS 71

WARN 08-01 CCC lost communication with wallbox for more than 1 minute.

SOURCE 09 WALLBOX ADDRESS 72

WARN 09-01 CCC lost communication with wallbox for more than 1 minute.

SOURCE 10 WALLBOX ADDRESS 73

WARN 10-01 CCC lost communication with wallbox for more than 1 minute.

Message Means:

Rowelink communications was established with this wallbox or concentrator then it was lost for more than 1 minute.

Probable Cause:

1. The Rowelink wiring to the concentrator (or wallbox).
 2. A wallbox power supply.
 3. A wallbox or concentrator.
-

SOURCE 11 IR REMOTE WARNING

WARN 11-01 IR Remote communication failure

Message Means:

Rowelink communication was established with the IR remote, then was lost for more than 1 minute.

Probable Cause:

1. Defective Rowelink harness between the P10 of the CCC and P6 of the IR Remote.
 2. Defective power harness between P1 of the CCC and P4 of the IR Remote.
 3. Defective IR Remote assembly.
-

SOURCE 12-13 NOT DESIGNATED

SOURCE 14 INTERNAL CCC WARNINGS

- 14-01 CCC EPROM checksum test failed.
- 14-02 CCC RAM test failed.
- 14-03 CCC real-time clock failure.
- 14-04 CCC factory defaults requested and loaded.
- 14-05 CCC programmed RAM checksum test failed.
- 14-06 CCC battery voltage is low.

Message Means:

All except 04 indicate a CCC internal fault. The 04 indicates that factory defaults were loaded into programmed RAM because someone used the factory load procedure (see replacing the EPROM).

Probable cause:

1. A defective CCC for all except 04
2. A defective CCC if 04 occurs frequently
3. Someone loaded factory defaults, causing 04 warning.

Clearing Error/Warnings from Memory

Error/warnings stored in the phonograph's memory can be cleared by:

| STEPS | DISPLAY SHOWS |
|-----------------------|--------------------------------|
| 1. Enter SERVICE mode | -- ERRORS EXIST -- |
| 2. Press 8. | * STATUS * |
| 3. Press 1. | * CLEAR ERRORS * |
| 4. Press POPULAR. | CLEAR ERRORS |
| | (Will blink and then reappear) |

**NOTE:**

If already in SERVICE mode, or you want to start over, hold RESET and repeatedly press POPULAR until display shows * SERVICE MODE *. Then start at step 2.

DISC CONDITIONS

Basic Concepts

Compact Discs are very rugged, but sometimes they develop problems similar to vinyl records. Skips and dropouts are not uncommon CD faults and may be caused by: a dirty disc, dirty CD player lens, or CD manufacturing defects. On rare occasions, the CD player may be unable to play any tracks on a disc. This failure to play any tracks may have the same cause as skips and dropouts.

Programmable Disc Condition Logging

The CD-100F has a built-in disc condition logging feature that records disc play problems found on a disc or track. Three programmable options determine when these conditions are placed into the Disc Condition Log:

CONDITION LOG (SERVICE CODE 35)

The number of skips over one second or the time difference in seconds between disc time and running time, to occur before recording the error in the condition log. The recommended setting is 3.

SKIP CANCEL (SERVICE CODE 36)

The number of skips, greater than one second, to occur before recording the error in the condition log and canceling the selection. The recommended setting is 5.

TIME CANCEL (SERVICE CODE 37)

The absolute time difference, in seconds, between the current playing position, coming off the CD, and the running time. The recommended setting is 10.

Factory Settings

The factory setting for the CONDITION LOG is 5, and 99 for SKIP CANCEL and TIME CANCEL. The reason for the difference between defaults and recommended settings is that we want the CD-100F, when shipped, to play discs of practically any condition without early canceling.

Non-Programmable Disc Condition Logging

Four non-programmable disc condition events are also recorded in the condition log. These events are:

LOGGED TRACK NUMBER EQUALS 00

This entry in the log means that the CD player was unable to read the CD Table Of Contents (TOC).



NOTE:

The TOC is read every time the disc is placed on the turntable. The TOC contains the location of each track on the disc, so without it the player is unable to play any track.

LOGGED CANCL AND SKIP EQUALS 99

This entry means that the CD player was able to read the TOC, but was unable to locate the track.

LOGGED CANCL EQUALS 99 AND SKIP EQUALS 88

This means the disc stopped spinning while playing.

LOGGED CANCL EQUALS 99 AND SKIP EQUALS 77

This means tracking was lost when the disc was playing.

The CD-100F has an automatic method to lock out selections that have logged too many errors. You can set this number of condition occurrences from 1 to 99. Once the LOCKOUT COUNT, Code 693, has exceeded the number of occurrences on a selection, that selection is automatically placed into LOCKOUTS list, Code 60. To remove a condition-generated lockout, refer to *Section 2* on editing the Lockout List or re-initializing the disc when using menu command 31.

Viewing Disc Conditions**STEPS**

1. Enter SERVICE mode.
2. Type 8.
3. Type 6.
4. Press POPULAR

DISPLAY SHOWS

* SERVICE MODE *

* STATUS *

DISC CONDITIONS

- NO CONDITIONS

-OR-

SEL ditr OCC oo

The small letters mean:

di - Disc number

tr - Track number

oo - Number of occurrences

5. Hold RESET, press 9

CANCL tt SKIP ss

tt- Absolute time difference, in seconds, when the condition was logged.

ss-Number of skips, greater than one second in duration, when the condition was logged.

6. Hold RESET, press 9

TIME hh:mi mo/dd

hh- Hour when last condition occurred.

mi- Minute when last condition occurred.

mo- Month when last condition occurred.

dd- Day when last condition occurred.

7. Hold RESET, Press 3 to view next disc condition.
8. Hold RESET, Press 2 to view previous disc condition.
9. Repeat steps 5, 6, 7, and 8 as often as necessary.

Example 1:

```
SEL 1500 OCC 05  
CANCL 00 SKIP 00  
TIME 12:15 7/19
```

Condition Means

The CD player could not read the TOC (track number equals 00) of disc 15 on 5 selected occasions. The most recent condition was logged on July 19th at 12:15 (24 hour time).

Probable Cause

1. Disc installed backward.
2. Absent disc. This disc location may not have been initialized, allowing it to be accidentally selected.
3. Dirty disc. For this type of a condition the dirt would be located around the inner most diameter of the disc. This is where the TOC information is located.
4. Dirty CD player LASER lens. Expect to see various conditions logged on many of the discs selected (*see CD Player Lens in Section 3 for details*).

Remedy

1. Check to see if the disc was inserted backward. If inserted backward, re-install it correctly and initialize that disc.
2. Check to see if the disc is present. If not present, initialize that disc location.
3. Remove the disc from the magazine, then inspect the inner diameter, TOC area, for dirt or damage. If you find dirt or damage clean it up. See disc cleaning section. Clear out the conditions and select a track on this disc to see if the CD player is able to read the TOC. If the CD player is still unable to read the TOC, try further cleaning or replace the disc.
4. Clean the CD player LASER lens (*see CD Player Lens in Section 3 for details*).

Example 2:

```
SEL 1505 OCC 01  
CANCL 99 SKIP 99  
TIME 12:30 7/12
```

Condition Means

The CD player read the TOC successfully, but was unable to start playing the track (no music would have been heard) on 1 occasion. The most recent condition was logged on July 12th at 12:30 (24 hour time).

Probable Cause

1. The disc is dirty. For this type of a condition the dirt would be located some where between the innermost diameter of the disc and the track selected. See disc cleaning section.
2. Dirty CD player LASER lens. Expect to see various conditions logged on many of the discs selected (*see CD Player Lens in Section 3 for details*).

Remedy

1. Remove the disc from the magazine, then inspect it for dirt or damage. If you find dirt or damage clean it up. See disc cleaning section. Clear out the conditions and select 1505 again to see if the CD player is able to play it. If the CD player is still unable to play it, try further cleaning, lock out tracks 5 and greater on disc 15, or replace the disc.
2. Clean the CD player LASER lens (*see CD Player Lens in Section 3 for details*).

Example 3:

```
SEL 2302 OCC 01
CANCL 10 SKIP 3
TIME 23:30 5/20
```

Condition Means

1. The CD player was playing selection 2302, but while it was playing 3 skips occurred, skips over 1 second, with an overall time loss of 10 seconds on 1 occasion. The most recent condition was logged on May 20th at 23:30 (24 hour time).

Probable Cause

1. Dirty disc. For this type of a condition the dirt would be located somewhere within track 2.
2. Dirty CD player LASER lens. Expect to see various conditions logged on many of the discs selected (*see CD Player Lens in Section 3 for details*).
3. An outside jarring of the jukebox.

Remedy

1. Remove the disc from the magazine, then inspect it for dirt or damage. If you find dirt or damage clean it up. See disc cleaning section. Clear out the conditions and select 2302 again to see if the CD player is able to play it. If the CD player is still unable to play it, try further cleaning, lock out track 2 on disc 23, or replace the disc.
2. Clean the CD player LASER lens (*see CD Player Lens in Section 3 for details*).

Clearing Disc Conditions From Memory

Disc condition messages stay in memory until you perform the following steps:



NOTE:

If already in SERVICE mode, or you want to start over, hold RESET and repeatedly press POPULAR until display shows * SERVICE MODE *. Then start at step 2.

| STEPS | DISPLAY SHOWS |
|-----------------------|--|
| 1. Enter SERVICE mode | * SERVICE MODE * or -- ERRORS EXIST -- |
| 2. Press 8. | * STATUS * |
| 3. Push 7. | * CLEAR CONDITIONS * |
| 4. Press POPULAR. | CLEAR CONDITIONS (will blink and then reappear) |

TROUBLESHOOTING CHARTS

One of the best ways to isolate a problem is to determine the exact state of the phonograph when the failure occurs. This means recording the condition of digital display, STATUS LED's, gripper bow, detent pawl, magazine, cam switches, etc.

This information can help you identify the cause of intermittent or continuous failures.

See *Figures 5-2 through 5-6* for descriptions and locations of the LED's referred to in *the Modular Troubleshooting Chart* that follows in *Table 5-2*.

The chart has the following three columns:

- The trouble column lists different types of failures.
- The symptom column shows the state of the phonograph when the failure occurs.
- The last column shows the probable cause.

Refer to Figure 5-1, the Block Diagram, for harnessing information.

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|--|--|--|
| Phonograph fails to operate when power is turned ON. | LED's on the power supply and the fluorescent lights fail to light. | <ol style="list-style-type: none"> 1. Rear power switch OFF. 2. Plug not in wall. 3. Wall circuit is dead. 4. 10-amp circuit breaker tripped. 5. Wiring to rear power switch. 6. Rear power switch. |
| | LED's on the power supply fail to light but fluorescent lamps are ON. | <ol style="list-style-type: none"> 1. 2-amp circuit breaker tripped. 2. Power supply. 3. 28 VAC overload from magazine, transfer motor. |
| | The +8 VDC or +28 VDC LED on the power supply fails to light but lights when the phono harness is unplugged at the power supply. | <ol style="list-style-type: none"> 1. Central control computer. 2. Mechanism control. 3. Digital display. 4. Title Rack/Keyboard Interface. 5. Power supply. 6. Service switch. 7. Short circuit in wiring. 8. Detent coil. 9. Money or play counter. |

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|---|--|--|
| Phonograph fails to operate when power is turned ON | The +8 VDC or +28 VDC LED on the power supply fails to light but lights when the phono harness is unplugged at the power supply. | <ol style="list-style-type: none"> 1. Digital display module (P1). 2. Harness at the CCC (P5). 3. Title Rack/Keyboard Interface Module (P1). 4. Harness at CCC (P1). 5. Harness at mechanism control (P6). Check harnesses, detent coil, and counters. 6. Mechanism control module (P7). 7. Harness at CCC (P2). 8. CCC module (P3). 9. Check the power switch and the wiring between it, the power supply, and the CCC (P3). 10. Replace the power supply or the circuit board inside it. |
| | CCC ROWELINK COMMAND LED is always OFF or always ON (not flickering). | Central control computer. |
| | CCC ROWELINK COMMAND LED is flickering 4 times a second and the display shows OUT OF ORDER, and Error A ERR 05-63 is logged in. | <ol style="list-style-type: none"> 1. If the mechanism ROWELINK TX LED is flickering, the cause is: <ol style="list-style-type: none"> a. Mechanism control b. Open wiring in mechanism 2. If the mechanism ROWELINK TX LED is not flickering, the cause is: <ol style="list-style-type: none"> a. Mechanism control b. CBA-2 c. A short in the ROWELINK wiring |

Table 5-2. Modular Troubleshooting Chart


| Trouble | Symptom | Probable Cause |
|---|---|--|
| <p> NOTE:</p> <p>The CCC sends OUT OF ORDER to the display and logs the A ERR 05-63 Error one minute after power up if it cannot establish Rowelink communication with the mechanism control and the phonograph is in the NORMAL mode (i.e., not SERVICE).</p> <p>To isolate the problem to a module or its associated Rowelink wiring, put the SERVICE switch in the SERVICE position and unplug the connectors in the following order. If the mechanism ROWELINK TX (TRANSMIT) LED starts flickering, replace the last module unplugged or repair the short in the harness. If the LED never starts flickering, the cause is a defective mechanism control, CCC, or a short in the Rowelink harness between them.</p> <p>1. Unplug the CBA-2.</p> | | |
| Magazine does not rotate when a selection is made. | SCAN/TRANSFER LED ON, detent is actuated. | <ol style="list-style-type: none"> 1. Power supply. 2. Wiring to magazine motor. 3. Magazine motor. 4. Mech control board. |
| | SCAN/TRANSFER LED OFF. | <ol style="list-style-type: none"> 1. Mech control board. 2. Central control computer. 3. Wiring from central control computer to mech control board. |
| Magazine rotates continuously. | SCAN/TRANSFER LED OFF. | <ol style="list-style-type: none"> 1. Wiring to magazine motor. 2. Mech control board. |

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|--------------------------------|---|--|
| Magazine rotates continuously. | SCAN/TRANSFER LED is ON, OPT. SW. INDEX LED is not flashing, and/or OPT. SW. HOME LED does not flash at Disc Number 99. | <ol style="list-style-type: none"> 1. Optical switch. 2. Wiring to optical switch. 3. Mech control board. |
| | SCAN/TRANSFER LED ON and both optical switch LED's normal. | Mech control board. |
| Magazine stops at wrong disc. | Stops at random CD anywhere in magazine. | <ol style="list-style-type: none"> 1. Faulty optical switch. 2. Wiring to optical switch. 3. Heavy dirt buildup in optical switch. |
| | Stops one or two discs before disc selected. | <ol style="list-style-type: none"> 1. Optical switch adjustment. 2. Magazine not full of CD's (out of balance). 3. Broken sprag lever guide. |
| | Stops one or two discs after disc selected. | <ol style="list-style-type: none"> 1. Faulty optical switch. 2. Optical switch adjustment. 3. Magazine not full of CD's (out of balance). 4. Broken sprag gear. 5. Sprag linkage binding. |
| | Stops one-half to one disc position before or after disc selected. | <ol style="list-style-type: none"> 1. Broken sprag gear. 2. Broken sprag guide. 3. Sprag linkage binding or needs adjustment. |

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|--|---|---|
| All discs cancel without playing. | Disc spins but will not play. | 1. Short in cancel switch wiring. 2. Cancel switch. 3. Mech control board. 4. CD player. 5. Bad/upside down disc. |
| | Disc will not spin. | 1. Mech control board. 2. CD player. 3. Wiring between the CD player and the mech control. |
| Some discs cancel without playing. | | 1. Defective discs (check disc conditions). 2. Mechanism control. 3. CD player. |
| Money counter or play counter fails to count. | Fails to count. | 1. Wiring to counter. 2. Counter. 3. Mech control board. |
| Phonograph is always in SERVICE mode of operation. | *SERVICE MODE* is always displayed after power up. | 1. SERVICE switch. 2. SERVICE switch wiring. 3. Central control computer. 4. Central control computer set for programming with the front door closed (the VOID SERVICE SWITCH option is ON). |
| Phonograph will not go into SERVICE mode. | Display will not show *SERVICE MODE* or ERRORS EXIST when SERVICE switch is in SERVICE. | 1. Central control computer. 2. SERVICE switch wiring. 3. SERVICE switch. |

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|---|--|--|
| Disc does not transfer. | SCAN/TRANSFER LED is ON. | 1. Wiring to transfer motor. 2. Mech control board. 3. Transfer motor. |
| | SCAN/TRANSFER LED is OFF. | 1. Mech control board. 2. Central control computer. 3. Wiring from central control computer to mech control board. |
| Transfer starts when power is applied and runs continuously. | SCAN/TRANSFER LED is OFF. | 1. Mech control board. 2. Wiring to motor. |
| | SCAN/TRANSFER LED is ON. | 1. Mech control board. 2. Open circuit at inner cam switch N.O. contact. 3. Open circuit at inner cam switch Common. 4. Outer cam switch N.O. shorted to Common. |
| Transfer starts and runs continuously after selection is located. | SCAN/TRANSFER LED comes ON when motor starts and stays ON. | 1. Wiring to outer cam switch. 2. Outer cam switch. 3. Mech control board. 4. Inner cam switch N.O. contact shorted to Common. 5. Open circuit in outer cam switch Common. |
| No sound. | Always muted. | 1. Central control computer. 2. Amplifier. |
| Motor noise in speakers. | Never muted. | 1. Central control computer. 2. Wiring between CCC and amplifier. 3. Amplifier. |

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|--------------------------------------|---|---|
| Some CD's skip. | | <ol style="list-style-type: none"> 1. Dirty discs or dirty lens on CD player (See Section 3 for lens cleaning procedure). 2. Defective discs (check disc conditions). 3. Mechanism control. 4. CD player. |
| All CD's skip. | | <ol style="list-style-type: none"> 1. Dirty lens on CD player (See Section 3 for lens cleaning procedure). 2. CD player. 3. Mechanism control. |
| No credit. | No credit given by coins and dollar bills. | Central control computer. |
| | No credit given by coins but dollar bill gives credit. | <ol style="list-style-type: none"> 1. Coin switch Common wiring. 2. Central control computer. |
| | One value of coin will not give credit. | <ol style="list-style-type: none"> 1. Coin rejected. 2. Wiring to coin switch. 3. Coin switch. 4. Central control computer. |
| | Dollar bill will not give credit. | <ol style="list-style-type: none"> 1. Bill acceptor. 2. Wiring to bill acceptor. 3. Central control computer. |
| Wrong credit. | Credit for amount deposited does not agree with price card setting. | <ol style="list-style-type: none"> 1. One or more coins or bills did not register (See No Credit). 2. Central control computer programmed incorrectly. 3. Central control computer. |
| System does not respond to keyboard. | 0 Credits on SELECTION REMAINING display. | Insufficient credit. |

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|--------------------------------------|--|---|
| System does not respond to keyboard. | Credits remain, but entire keyboard does not work. | <ol style="list-style-type: none"> 1. Shorted keyboard switch. 2. Central control computer. 3. Short in keyboard wiring. |
| | Credits remain, but certain keys do not work. | <ol style="list-style-type: none"> 1. Wiring from keyboard to title rack/keyboard interface. 2. Keyboard. 3. Title rack/keyboard interface. 4. Central control computer. |
| Digital display does not work. | Display lights, but shows wrong information. | <ol style="list-style-type: none"> 1. Digital display. 2. Central control computer. |
| Title pages do not operate normally. | Title pages do not move at all or movement is very slight. | <ol style="list-style-type: none"> 1. Mechanical jam in the mechanism - Try to rotate the motor by hand - Disassemble to locate the jam. 2. The motor will not run - faulty motor - test for voltage at the motor - Try rotating the motor by hand. Remove the motor and test it. 3. The title rack harness is not plugged in. |

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|--------------------------------------|--|---|
| Title pages do not operate normally. | Pages continue to flip past the next page. | <ol style="list-style-type: none"> 1. Index switch on the title display is defective or out of adjustment. 2. Harness between title display and P6 of the title rack/keyboard interface. 3. Harness between P3 of the title page/keyboard interface and P5 or P15 of the central control computer. 4. Defective title rack/keyboard interface module. 5. Defective central control computer. |
| | Cannot get the desired page. | <ol style="list-style-type: none"> 1. PAGE IN/OUT limits are not set correctly - See Section 2. 2. Limit switch on the title display is defective or out adjustment. 3. Harness between the title display and J5 of the digital display. 4. Defective title rack/keyboard interface module. 5. Defective central control computer. |

Table 5-2. Modular Troubleshooting Chart

| Trouble | Symptom | Probable Cause |
|--------------------------------------|---|---|
| Title pages do not operate normally. | Pages do not operate from keyboard OUT/IN switches or from the titles OUT/IN switch. | <ol style="list-style-type: none"> 1. Defective title motor. 2. Defective digital display module. 3. Defective central control computer. 4. Harness between title display and P6 of the title rack/keyboard interface. 5. Harness between P3 of the title rack/keyboard interface and P5 or P15 of the central control computer. 6. Defective keyboard. 7. Harness between J1 of the keyboard and J4 of the digital display. |
| | Pages do not operate from the keyboard OUT/IN switches, but do operate from the titles OUT/IN switch. | Defective keyboard. |
| Miscellaneous problems. | Any malfunction not described above. | <ol style="list-style-type: none"> 1. Main power supply. 2. Central control computer. |

SOUND SYSTEM QUICK CHECK

Rowe solid state sound systems are service designed for fast, easy repair. The following check list will enable you to locate troubles with basic tools. Refer to Figures 5-1, 5-5, and 5-6 as needed.



WARNING:

Do not plug in or unplug circuit boards with power ON. Checks should be made with the changer in the disc playing position. Perform all service checks in the order listed.

No Sound — Both Channels

POWER - SECOND LEVEL

1. Check that the amplifier is plugged-in and is receiving power from the power supply.
2. Disconnect the mute plug.
3. Press the circuit breaker reset pushbutton on the amplifier chassis to make sure that it is not tripped. The amplifier should cause an audible “thump” in the speakers when its power is turned ON.

VOLUME CONTROL

Disconnect the volume control plug from the amplifier chassis and short out Pin 3 (Common) to Pins 1, 2 and 4, 5. Full volume indicates an open volume control or line. If full volume at all times is the problem and disconnecting the volume control plug does not kill the sound, replace the preamp board.

No Sound, Low Sound, Or Distorted Sound—Right Or Left Channel Only

EXTENSION SPEAKERS

Check the OVERLOAD indicators (See Figure 1-6), then disconnect the extension speakers from the transformer package receptacle (See Figure 1-7) and look at the OVERLOAD indicators again. If either or both OVERLOAD indicators were ON, but are now OFF, the overload is in the extension speakers.

Check that the phonograph is not overloaded by performing the following five steps:

1. Make sure the phonograph and extension speakers are connected to the proper speaker taps.
2. On the amplifier, set all seven RIGHT CHANNEL and all seven LEFT CHANNEL graphic equalizer controls fully counterclockwise.
3. Set the volume control fully clockwise (maximum volume) and make a selection.
4. While the music is playing, an acceptable load will allow the OVERLOAD INDICATOR(S) to be off or occasionally flicker in a random manner. If the OVERLOAD INDICATOR(S) are always lit or flicker continuously, the amplifier is overloaded and you must perform Step 5.

5. Do this step only if the OVERLOAD INDICATOR(S) came on as described in the previous step. Find the source of the overload (shorted speaker wires, too many speakers connected, or speaker power taps too high). After you fix the short, disconnect a few speakers, or lower the speaker power tap selection; repeat *Step 4*.

**NOTE:**

The left channel output phase is reversed with respect to the right channel. This reversal is necessary to extend monaural sound in a stereo phonograph system. Because of this reversal, speaker connections to the left channel must be reversed when compared to the right channel, except for 70-volt speaker connections. The 70-volt phasing is reversed inside the output transformers. See *Figure 2-7* for correct polarity hookup of extension speakers. If the (+) and (-) terminals are not wired properly, the speakers will be out of phase, causing a reduction in low frequencies (bass).

OUTPUT DEVICES

Visually inspect the driver board for blown fuses. If a fuse is blown, replace the associated output device. The two devices used in each channel are not interchangeable. Check the part number on the case and install an identical or equivalent replacement. Before mounting the device onto the heat sink, be sure that the heat sink surface is flat and no burrs are around the mounting holes to cause a short. Be sure that one, and only one, mica insulator is between the device and the heat sink and heat transfer compound (*Rowe Specification 0-00053-00*) is on both sides of insulator.

FILTER CAPACITORS

Check for plus and minus 40 VDC in the amplifier power supply. Connect the negative meter lead to ground and check the voltage at the terminals of the large electrolytic filter capacitors located on the amplifier chassis next to the power transformer. When taking readings on the capacitor with the outer shell isolated from chassis to one of the shell tabs, check that the voltage on each capacitor terminal is the same. A lowered voltage at one of the capacitor pins indicates that the capacitor may be defective and should be replaced, or that the bridge rectifier is defective. Another indication of defective filter capacitors is excessive hum in the sound output.

DRIVER BOARDS

If one driver board is defective, switch the input to “Mono” and use the good channel temporarily.

Constant High Volume — Cannot Adjust**VOLUME CONTROL**

Disconnect the volume control plug from amplifier chassis. No sound indicates a short in the volume control line or the volume control connector is plugged in backwards. The white/violet wire should be closest to the heatsink.

PREAMP

If full volume is heard with control plug disconnected, replace the preamplifier board.

Excessive Hum

OPEN SHIELD

Be sure that shield or wires are not broken between CD player and the amplifier input plug.

FILTER CAPACITORS

Check the filter capacitor and parallel an extra 500 Mfd. 50V capacitor in the chassis. If the hum drops, replace the capacitor. If external inputs are used, the equipment driving those inputs must not be tied to earth ground.