Section 5: Troubleshooting

INTRODUCTION

The CD-100B 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
40832201	Central Control Computer (CCC)
61030703	Mechanism Control and CD decoder
30933702	CD Player
40770607	Power Supply
40832303	Digital Display
61038904	OBA-2 Control Unit

TROUBLESHOOTING AIDS

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 *(figure 5-2)*.
- 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:

OBA RED STATUS lamps and error messages are presented in this section. The other OBA service procedures are described in *Section 4* of this manual.

REPLACING THE CCC EPROM

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

1. Turn phonograph power off at the SERVICE switch.
2. Press and hold the keyboard 0 and 1 switches down and place the SERVICE 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
- 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
- Mutes and unmutes the audio amplifier

Mechanism Control

- A slave controller
- Plays selections sent by the CCC
- Controls all mechanism functions
- Controls the CD player

OBA-2 Control Unit

- 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 OBA-2 control unit. Rowelink is a 2-wire communication channel that ties the system components together. The ROWELINK COMMAND (CCC), SYSTEM TRANSMIT/ROWELINK RESPONSE (mechanism control), and RS-485 STATUS (OBA control unit) 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	+8.2 to +9.4 VDC
115 VAC	9.5 VAC	8.75 to 10 VAC

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 OBA-2).

Mechanism Control

- +5 VDC LED lights
- BOARD ERROR LED flashes 3 times to indicate that ROM, RAM and other checks have tested OK.
- SYSTEM TRANSMIT (Rowelink response) LED flickers indicating that communication is occurring between the mechanism control (a slave) and CCC (the master). Each time it flickers, communication has successfully occurred.

OBA-2 Control Unit

- +5 VDC LED lights
- +24 VDC LED lights
- BA STATUS LED flashes 1 time
- RS-485 STATUS LED flashes 1 time
- RS-485 STATUS LED flickers indicating communication occurring between OBA-2 control unit (a slave) and CCC (the master). Each time it flickers, communication successfully occurred.

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
- OBA-2 control unit 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 (> <) and OUT (< >) switches.
- CCC sends out Strobes 1, 9 and 10 to the DIGITAL DISPLAY.
- • The motor driver in the DIGITAL DISPLAY 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 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-3 what track (i.e. selection) to play.
- CDM-3 tells the mechanism control that the track has been located.
- Selection plays
- • Mechanism control tells the CCC that the selection is playing.
- • CCC 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.

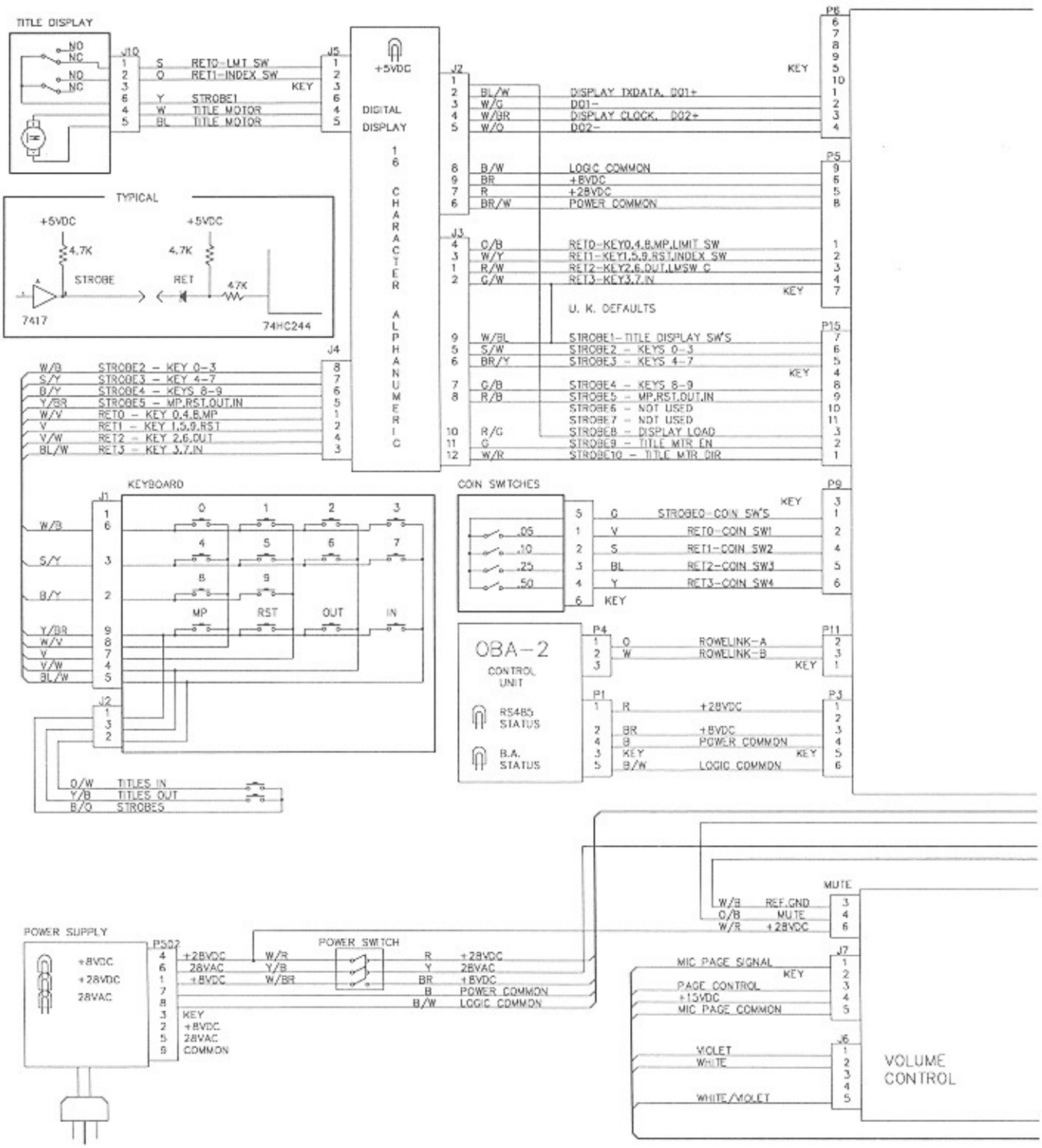
Step 6. Selection ends, the disc returns to magazine, the CCC searches selection memory.

- Mechanism control tells the CCC that the selection is over.
- CCC 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.

This page intentionally left blank.


TITLE DISPLAY
NO
NC
NO
NC
J10
S RET0-LMT SW
O RET1-INDEX SW
KEY
Y STROBE1
W TITLE MOTOR
BL TITLE MOTOR
J5
TYPICAL
+5VDC
4.7K
STROBE
RET
7417
74HC244
+5VDC
DIGITAL DISPLAY
16 CHARACTER ALPHANUMERIC
J2
BL/W DISPLAY TXDATA, DO1+
W/G DO1-
W/BR DISPLAY CLOCK, DO2+
W/O DO2-
B/W LOGIC COMMON
BR +8VDC
R +28VDC
BR/W POWER COMMON
J3
O/B RET0-KEY0,4,8,MP,LIMIT SW
W/Y RET1-KEY1,5,9,RST,INDEX SW
R/W RET2-KEY2,6,OUT,LMSW C
G/W RET3-KEY3,7,IN
KEY
U. K. DEFAULTS
W/BL STROBE1-TITLE DISPLAY SW'S
S/W STROBE2 - KEYS 0-3
BR/Y STROBE3 - KEYS 4-7
KEY
G/B STROBE4 - KEYS 8-9
R/B STROBE5 - MP,RST,OUT,IN
STROBE6 - NOT USED
STROBE7 - NOT USED
R/G STROBE8 - DISPLAY LOAD
G STROBE9 - TITLE MTR EN
W/R STROBE10 - TITLE MTR DIR
P8
P5
P15
J4
W/B STROBE2 - KEY 0-3
S/Y STROBE3 - KEY 4-7
B/Y STROBE4 - KEYS 8-9
Y/BR STROBE5 - MP,RST,OUT,IN
W/V RET0 - KEY 0,4,8,MP
V RET1 - KEY 1,5,9,RST
Y/W RET2 - KEY 2,6,OUT
BL/W RET3 - KEY 3,7,IN
KEYBOARD
J1
W/B 0 1 2 3
S/Y 4 5 6 7
B/Y 8 9
Y/BR MP RST OUT IN
W/V
V
Y/W
BL/W
J2
O/W TITLES IN
Y/B TITLES OUT
B/O STROBES
COIN SWITCHES
.05
.10
.25
.50
KEY
O STROBE0-COIN SW'S
V RET0-COIN SW1
S RET1-COIN SW2
BL RET2-COIN SW3
Y RET3-COIN SW4
KEY
P9
0BA-2
CONTROL UNIT
RS485 STATUS
B.A. STATUS
P4
O ROWELINK-A
W ROWELINK-B
KEY
P11
P1
R +28VDC
BR +8VDC
B POWER COMMON
KEY
B/W LOGIC COMMON
P3
MUTE
W/B REF.GND
O/B MUTE
W/R +28VDC
POWER SUPPLY
+8VDC
+28VDC
28VAC
P502
+28VDC W/R
28VAC Y/B
+8VDC W/BR
KEY
+8VDC
28VAC
COMMON
POWER SWITCH
R +28VDC
Y 28VAC
BR +8VDC
B POWER COMMON
B/W LOGIC COMMON
MIC PAGE SIGNAL
KEY
PAGE CONTROL
+15VDC
MIC PAGE COMMON
J7
VIOLET
WHITE
WHITE/VIOLET
J6
VOLUME CONTROL

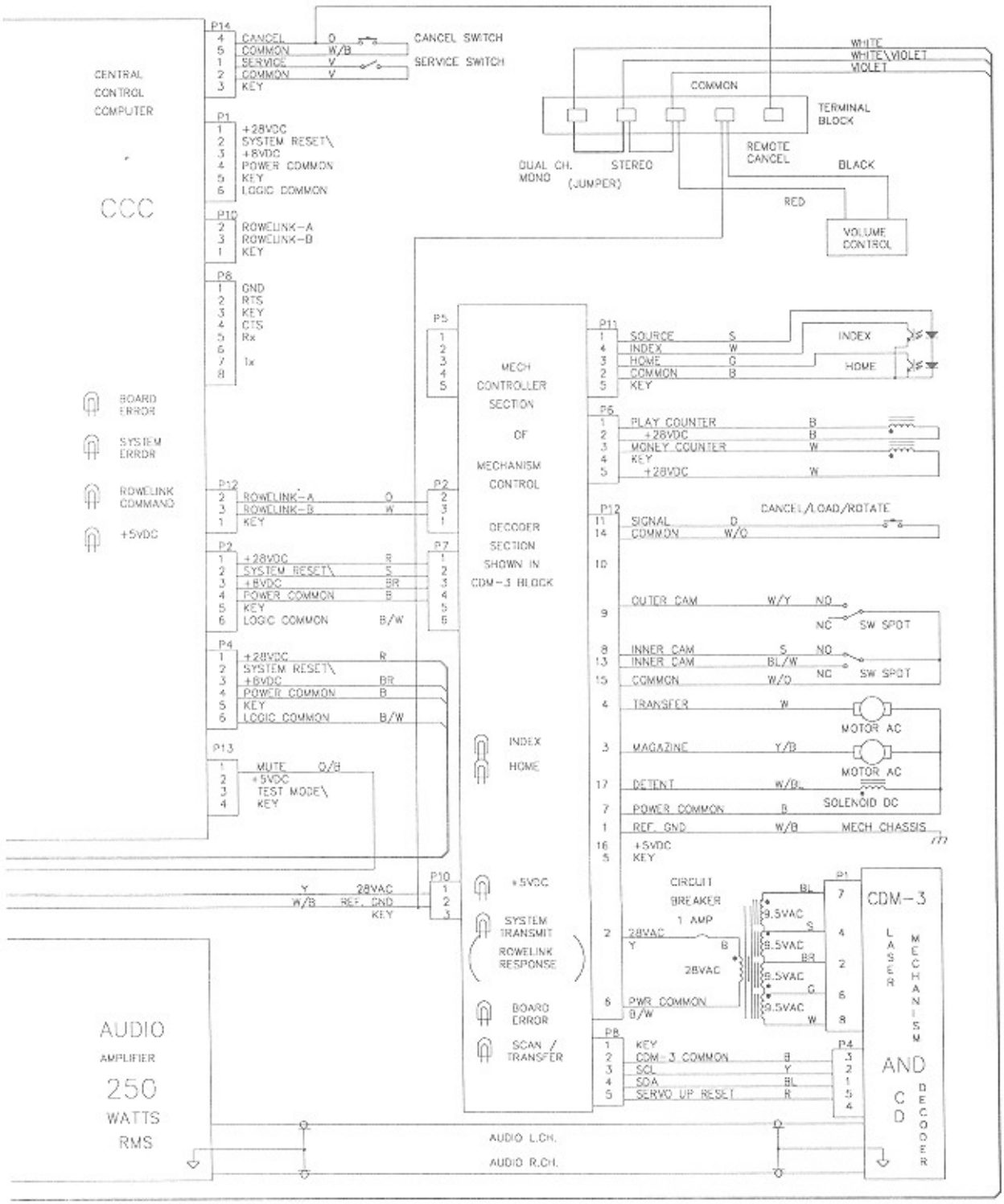


Figure 5-1. CD-100B Block Diagram

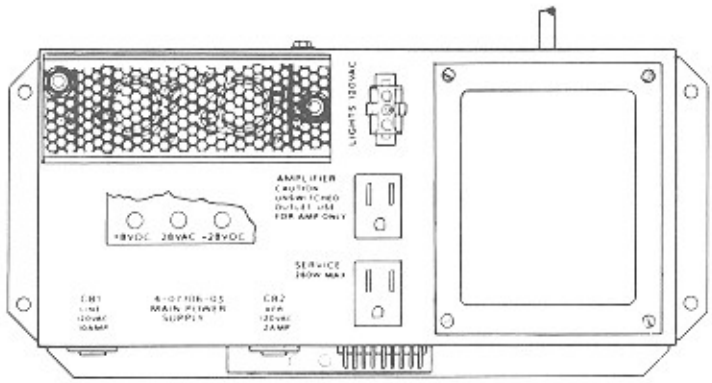
STATUS LAMPS

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.



Main Power Supply

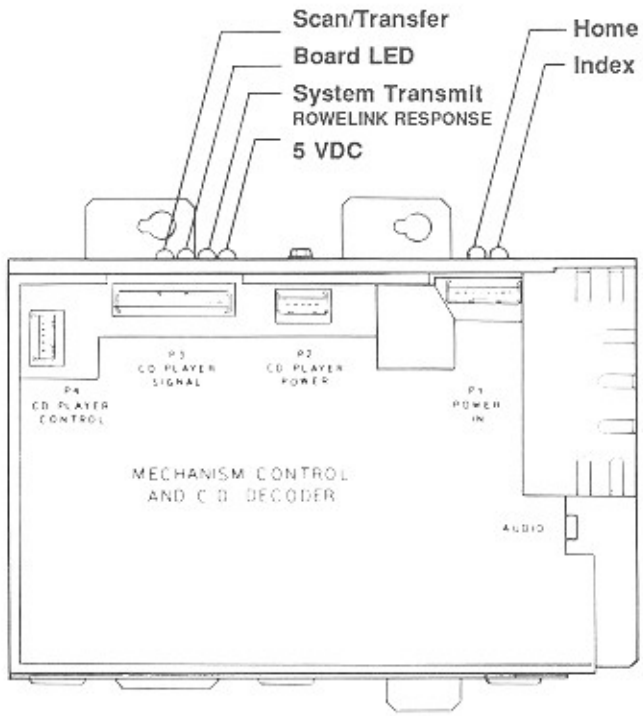
Mechanism Control And CD Decoder

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.

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.

5 VDC — Lights as long as 5 VDC is present from the main power supply.

SYSTEM TRANSMIT (ROWELINK RESPONSE) — Flashes when the CD mechanism is transmitting to the CCC.



Mechanism Control And CD Decoder

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.

SCAN/TRANSFER — Lights when either the scan or the transfer motor is activated.

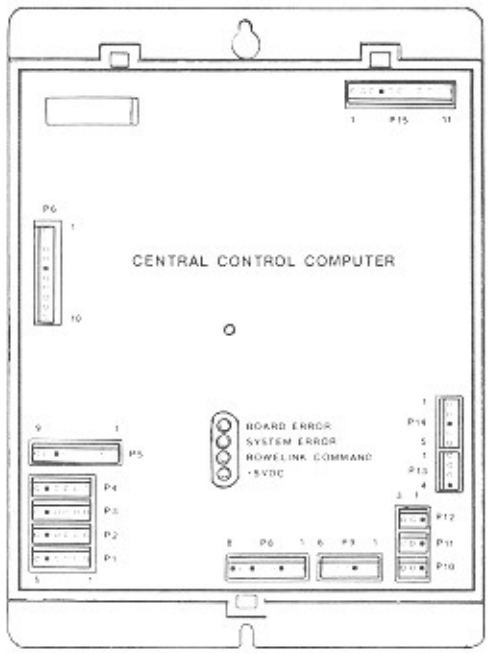
Central Control Computer

BOARD ERROR — Blinks 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, OBA control).

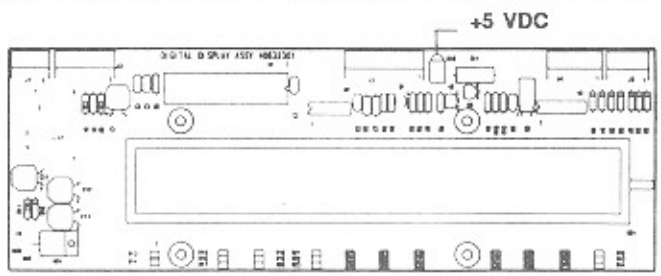
+5 VDC — +5 VDC is present.



Central Control Computer

Digital Display

+5 VDC — +5 VDC is present.



Digital Display

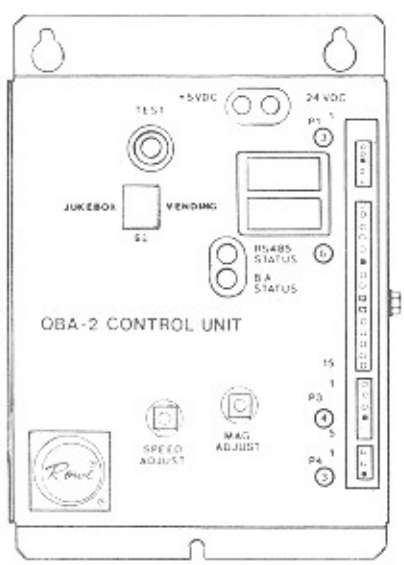
OBA-2 Control Unit

RS-485 STATUS — Flashes when the OBA– 2 is transmitting to the CCC.

BA STATUS — Indicates faults and aids in adjusting the magnetic gain and motor speed.

+5 VDC — +5 VDC is present.

+24 VDC — +24 VDC is present.



OBA-2 Control Unit

Figure 5-2. Status Indicators

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 the error is still present, the phonograph will shutdown. Errors that clear up usually do not require service unless the location says that 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 usually do not require service unless the location says that the phonograph is malfunctioning.

VIEWING THE ERRORS (ERR OR WARN)

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 errors. 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** < > page > < **switch or wiring.**
2. **This 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 *(see note 1)*	Error History
4. Push POPULAR	X WARN XX-XX XX A = Active N = Not Active Source of error Type of error 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 (not active)	END XX:XX XX/XX Time it last cleared up (not active) Month/day it last cleared up 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 error exists. Otherwise stays the same.

8. Repeat steps 5, 6, and 7 as often as necessary (*See the Notes that follow*).

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

- OBA-2 control unit 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

- Mechanism control failed to communicate with the CCC through the Rowelink.
- 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 SUMMARY

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

Coin Switches (01)

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

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	>< key
02-31	Multiple keys
02-32	Cancel button

Mechanism Controller (05)

05-02	Cancel button
05-05	Mech. cannot determine magazine position
05-08	EPROM checksum error
05-09	RAM test failed.

Fatal Errors

These error codes (05-50 through 05-64) 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
05-56	Index LED
05-57	Index LED
05-58	Home LED
05-59	Home LED
05-62	CDM-to-CCC communication lost
05-63	Mech-to-CCC communication lost
05-64	Gripper bow position undetermined

OBA Controller (06)

06-01	Communication to the OBA has been lost
06-02	V1 cell or inlet cell
06-03	Jammed bill
06-04	Bill stacker is full

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

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 And Probable Causes

ERROR SOURCE 01 (COIN SWITCH ERRORS)

WARN01-17	#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

ERROR SOURCE 02 (KEYBOARD ERRORS)

WARN02-16	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.

ERROR SOURCE 03--NOT DESIGNATED

ERROR SOURCE 05 (MECHANISM ERRORS)

WARN05-02

Message Means:

Mechanism control thinks that the CANCEL/LOAD/ROTATE switch is always closed.

Probable cause:

1. A short in wiring
2. A defective switch
3. A defective mechanism control

WARN05-05

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 P11 on the mechanism controller.
3. A defective mechanism control

ERR 05-08 EPROM checksum error

Message Means:

Checksum error

Probable cause:

1. A failed EPROM
2. The mech has failed

ERR 05-09 RAM test failed

Message Means:

RAM test failure

Probable cause:

Mech failure

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 (via the I^2C Bus) with the mech. 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 mech., 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

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

ERROR SOURCE 06 (OBA ERRORS)

WARN06-01

Message Means:

OBA communication failure

Probable Cause:

1. A loose connection in wire/terminal a the Rowelink communication line.
2. A defective OBA—2 control unit.

WARN06-02

Message Means:

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

Probable cause:

1. An object in transport covering V1 cell
2. A defective transport
3. A defective OBA-2 control unit

WARN06-03

Message Means:

OBA-2 control unit thinks that a bill is jammed in the transport.

Probable cause:

1. An object is or was in transport activating anti-pullback lever.
2. A defective transport
3. A defective OBA-2 control unit

WARN06-04

Message Means:

OBA-2 control unit 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 OBA-2 control unit

Wallbox Errors

ERROR SOURCE 07 (WALLBOX ADDRESS 70)

07-01 Wallbox lost communication for more than 1 minute

ERROR SOURCE 08 (WALLBOX ADDRESS 71)

08-01 Wallbox lost communication for more than 1 minute

ERROR SOURCE 09 (WALLBOX ADDRESS 72)

09-01 Wallbox lost communication for more than 1 minute

ERROR SOURCE 10 (WALLBOX ADDRESS 73)

10-01 Wallbox lost communication for more than 1 minute

Message Means:

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

Probable Cause:

1. The Rowelink wiring to the wallbox or wallbox interface
2. A wallbox power supply
3. A wallbox or wallbox interface

IR Remote Errors

IR REMOTE (11)

11-01 IR Remote communication failure

Probable Cause:

1. Defective Rowelink harness between the P1O 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 14 (INTERNAL CCC ERRORS)

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

Message Means:

All except 04 indicate a CCC internal fault. The 04 indicates factory defaults were loaded into programmed RAM because:

1. An 14-05 error occurred
2. Someone used the factory load procedure

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 error.

CLEARING ERRORS FROM MEMORY

Errors 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-100B 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:

SKIP LOG (SERVICE CODE 35)

The number of skips, over one second, to occur before recording the error in the condition log. The recommended setting is 3.

SKIP CANCEL (SERVICE CODE 36)

The number of skips, over 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 calculated position. The recommended setting is 10.

Factory Settings

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

Non-Programmable Disc Condition Logging

Two 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.

The CD-100B has an automatic method to lock out selections that have logged too many errors. You can set this number of condition occurrences to any number 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 the Section 2* on editing the Lockout List.

Viewing Disc Conditions

Steps	Display Shows
1. Enter SERVICE mode.	* SERVICE MODE *
2. Type 8.	* STATUS *
3. Type 6.	DISC CONDITIONS
4. Press POPULAR	- 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 resent 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. See disc cleaning section.
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 occasions. The most resent 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 inner most 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 occasions. The most resent 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 some where 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.

Refer to figure 5-1 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 power supply and fluorescent lights fail to light	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 power supply fail to light but fluorescent lamps are ON	1. 2 amp circuit breaker tripped 2. Power supply 3. 28 VAC overload from magazine, transfer or T.T. motor
	The +8 VDC or +28 VDC LED on power supply fails to light but lights when phono harness at power supply is unplugged	1. Central control computer 2. Mechanism control 3. Digital display 4. OBA-2 control unit 5. Power Supply 6. Service switch 7. Short circuit in wiring 8. Detent coil 9. Money or play counter

NOTE:

To locate the problem, reconnect the phono harness and unplug the connectors in the order shown in the following 10 steps. If the LED lights, replace the last module unplugged or repair the short in the harness.

Table 5-2. Modular Troubleshooting Chart

Trouble	Symptom	Probable Cause
		1. Digital display module (J2) 2. Harness at the CCC (P5) 3. OBA-2 control unit module (P1) 4. Harness at CCC (P3) 5. Harness at mechanism control (P12 and P6). Check harnesses, detent coil, and counters. 6. Mechanism control module (P7) 7. Harness at CCC (P2) 8. CCC module (P4) 9. Check power switch and wiring between it, the power supply, and CCC (P4). 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 flickering 4 times a second and the display shows OUT OF ORDER, and Error A ERR 05-63 is logged in	1. If the OBA-2 control unit RS-485 STATUS LED is flickering, the cause is: a. mech control b. open wiring in mechanism 2. If the mechanism SYSTEM TRANSMIT LED is not flickering, the cause is: a. mechanism control b. OBA-2 control c. a short in the Rowelink wiring

Table 5-2. Modular Troubleshooting Chart

Trouble	Symptom	Probable Cause
NOTE: 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). 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 SYSTEM 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. 1. Unplug P4 at the OBA control unit. 2. Unplug the other end of the harness at the CCC (the Block diagram indicates that this connector is P12, but it could be P10, P11, or P12.		
Magazine does not rotate when a selection is made	SCAN/TRANSFER LED ON, detent is actuated	1. Power supply 2. Wiring to mag. motor 3. Magazine motor 4. Mech control board
	SCAN/TRANSFER LED OFF	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	1. Wiring to magazine motor 2. Mech control board

Table 5-2. Modular Troubleshooting Chart

Trouble	Symptom	Probable Cause
	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.	1. Optical switch 2. Wiring to optical switch 3. Mech control board
	SCAN/TRANS LED ON and both optical switch LED's normal	Mech control board
Magazine stops at wrong disc	Stops at random CD anywhere in magazine	1. Faulty optical switch 2. Wiring to optical switch 3. Heavy dirt buildup in optical switch
	Stops one or two discs before disc selected	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	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	1. Faulty optical switch 2. Optical switch adjustment 3. Broken sprag gear 4. Sprag linkage binding
	Stops one-Half to one disc position off before or after disc selected	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
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
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
Some CD's Skip		1. Dirty discs or dirty lens on CD player (see *table 3-3* for lens cleaning procedure) 2. Defective discs (check disc conditions) 3. Mechanism control 4. CD player
All CD's skip		1. Dirty lens on CD player (see *table 3-3* 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	1. Coin switch Common wiring 2. Central control computer
	One value of coin will not give credit	1. Coin rejected 2. Wiring to coin switch 3. Coin switch 4. Central control computer
	Dollar bill will not give credit	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	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
	Credits remain, but entire keyboard does not work	1. Shorted keyboard switch 2. Central control computer 3. Short in keyboard wiring
	Credits remain, but certain keys do not work	1. Wiring from keyboard to display board 2. Keyboard 3. Digital display board 4. Central control computer
Digital display does not work	Display lights, but shows wrong information	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	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 switches are not adjusted properly—Adjust according to the procedure in *Section 6*. 4. The title page harness is not plugged in.
	Two pages on a side try to turn at the same time	The metal fingers on the back of the top of the page are bent because the pages were forced. Remove the racks from the back side of the assembly—Inspect the metal fingers and straighten any bent fingers.

Table 5-2. Modular Troubleshooting Chart

Trouble	Symptom	Probable Cause
	Pages continue to flip past the next page	1. Index switch on the title display is defective or out of adjustment. 2. Harness between title display and J5 of the digital display. 3. Harness between J3 of the digital display and P5 or P15 of the central control computer. 4. Defective digital display module. 5. Defective central control computer.
	Cannot get the desired page	1. PAGE IN/OUT limits are not set correctly—*See Section 2.* 2. Limit switch on the title display is defective or out of adjustment. 3. Harness between the title display and J5 of the digital display. 4. Harness between J3 of the digital display and P5 or P15 of the central control computer. 5. Defective digital display module. 6. Defective central control computer.
Title pages do not operate normally	Pages do not operate from keyboard OUT/IN switches or from the titles OUT/IN switch	1. Defective title motor. 2. Defective digital display module. 3. Defective central control computer. 4. Harness between title display and J5 of the digital display. 5. Harness between J3 of the digital display 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.

Table 5-2. Modular Troubleshooting Chart

Trouble	Symptom	Probable Cause
	Pages do not operate from the keyboard OUT/IN switches, but do operate from the titles OUT/IN switch	Defective keyboard
	Pages do not operate from the titles OUT/IN switch, but do operate from the keyboard OUT/IN switches	1. Defective titles OUT/IN switch 2. Harness between titles OUT/IN switch and J2 of the keyboard. 3. Defective keyboard.
Miscellaneous problems	Any malfunction not described above	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 and 5-4 as needed.*

WARNING:

Do not plug in or unplug circuit boards with power ON. Checks should be made with the changer in the record 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 the 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.

EXTENSION SPEAKERS

Check the OVERLOAD indicators (*see figure 1-6*), then disconnect the extension speakers from the transformer package receptacle (*figure 1-7 also*) 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 that 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 counter-clockwise.

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 INDICATORS(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.*

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.

PREAMP OUTPUT

Short all five of the volume control pins located on amp. Press your finger against Pins 1 or 3 (outside pins) labeled PHONO CARTRIDGE INPUT, and check for approximately 1 VAC at preamp output (Pins 3 or 5 of 13 pin connector to chassis Common). Replace the preamp board if voltage is not present. If voltage is present check the center pin of the output driver board for approximately 16 VAC. If voltage is not present, make sure your finger is pressed against the same outside pin with respect to the channel that is being checked with the voltmeter.

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 (*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 four steps:

1. Make sure that the phonograph and extension speakers are connected to the proper speaker taps.

2. Set the volume control fully clockwise (maximum volume) and make a selection.

3. While the music is playing, an acceptable load will allow the OVERLOAD INDICATORS(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 D.*

4. 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 or too many speakers on line) and repeat *Step 3.*

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 volume control plug from amplifier chassis. No sound indicates a short in the volume control line.

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