ROWE®

AMERICAN VENDING SALES, INC.
750 MORSE AVENUE
ELK GROVE VILLAGE, IL 60007

CD-100

LaserStar

Compact Disc Phonograph

Field Service Manual & Parts Catalog

PART NO. 21822611
SECOND EDITION

CD-100

LaserStar

Compact Disc Phonograph

Field Service Manual
And Parts Catalog

ROWE
ROWE INTERNATIONAL INC
1500 UNION AVE., S.E., GRAND RAPIDS, MI 49507
(616) 243-3633

Printed in USA

Part No. 21822611
Second Edition
First Printing December 1988

warranty

Rowe extends to the original operator of this equipment the following warranty:

All parts are guaranteed to be free of defects in material and workmanship for the specific periods which follow. Rowe agrees to repair without charge during such period any part which proves defective upon examination by Rowe. All costs of shipping an allegedly defective part to or from Rowe's offices shall be borne by the original operator.

Phono Mechanism Moving Parts	5 Years
Electronic Circuit Boards	2 Years
Electrical and Mechanical Parts	1 Year
Lamps and Styli	90 Days
CD Players, VCR's, Monitors, and CD Decks	1 Year

In the case of parts supplied to Rowe as components, Rowe extends the same warranty period as extended by the original manufacturer.

The above warranty applies provided that all parts of the machine have been serviced properly as directed in the service manual, and provided the alleged defective part, upon examination by Rowe, shall prove to be thus defective.

This warranty will not apply to any machine or any part which has been subjected to any accident, abuse, or misuse.

ROWE INTERNATIONAL, INC. EXTENDS NO WARRANTY, EXPRESSED OR IMPLIED, TO PURCHASERS OR USERS OF ITS PRODUCTS EXCEPT AS HEREIN SET FORTH, WHETHER BY OPERATION OF LAW OR OTHERWISE.

8-88

WARNING:

When servicing, do not approach the laser exit with the eye too closely. In case it is necessary to confirm laser beam emission, be sure to observe from a distance of more than 10 inches from the surface of the objective lens on the optical pick-up block.

Preface

The CD-100 is an entirely new phonograph. In keeping with the new phonograph design we have redesigned and reorganized this service manual, so please take time to read this page and review the *Table of Contents.*

We have used easy-to-read type, reorganized this manual, and added numerous examples to provide you with a single source for service information.

The *Troubleshooting* section has been expanded to include schematics, component lists, and board layouts for all serviceable modules.

This service manual is divided into eight sections:

- **Section 1** — **System Description** — Introduces you to the CD-100, its features, and its major components, principles of operation, and step-by-step unpacking instructions. After unpacking the CD-100, you should continue the installation process by following the title rack loading and programming instructions in *Section 2.*

- **Section 2** — **Programming** — Continues the installation process with disc and title rack loading instructions, programming references, and step-by-step programming and pricing instructions. Whether you are familiar with previous Rowe phonographs or not, pay special attention to the pricing and programming.

  Programming and pricing have been set at the factory, so you may not wish to change any of the CD-100 options. After you load the titles and the discs, the CD-100 is ready to play.

- **Section 3** — **Routine Service** — Provides routine service instructions for collecting money, doing cash and play audits, resetting phonograph totals, and doing preventive maintenance.

- **Section 4** — **OBA-2 Maintenance** — Contains all OBA-2 maintenance information, except for the OBA-2 replacement parts, which are in the *Parts Catalog.*

- **Section 5** — **Troubleshooting** — Provides troubleshooting charts, error code and disc condition descriptions, troubleshooting procedures, block diagrams, schematics, circuit board layouts, and component lists. This section also contains the sequence of operation.

- **Section 6** — **Mechanical Adjustments** — Details the mechanical checks and adjustment procedures for all of the CD-100's modules, except for the OBA-2 modules, which are described in *Section 4.*

- **Section 7** — **Miscellaneous** — Contains specifications, fuse and circuit breaker locations, and a resistor color code chart.

- **Section 8** — **The Parts Catalog** — Lists and illustrates all replaceable modules in the CD-100. The Accessory Equipment List is at the end of this section.

This manual is intended for owners, route operators, and technicians. This manual provides all field and shop related service and maintenance material. Accessories and their installation and service are discussed in the corresponding accessory instructions (or manuals).

Table of Contents

SECTION 1 — SYSTEM DESCRIPTION

SECTION 2 — PROGRAMMING

Section 2, Continued

SECTION 3 — ROUTINE SERVICE

SECTION 4 — OBA-2 MAINTENANCE

Section 4, Continued

SECTION 5 — TROUBLESHOOTING

Section 5, Continued

SECTION 6 — MECHANICAL ADJUSTMENTS

SECTION 7 — MISCELLANEOUS

SECTION 8 — PARTS CATALOG

FREQUENTLY USED FIGURES AND TABLES

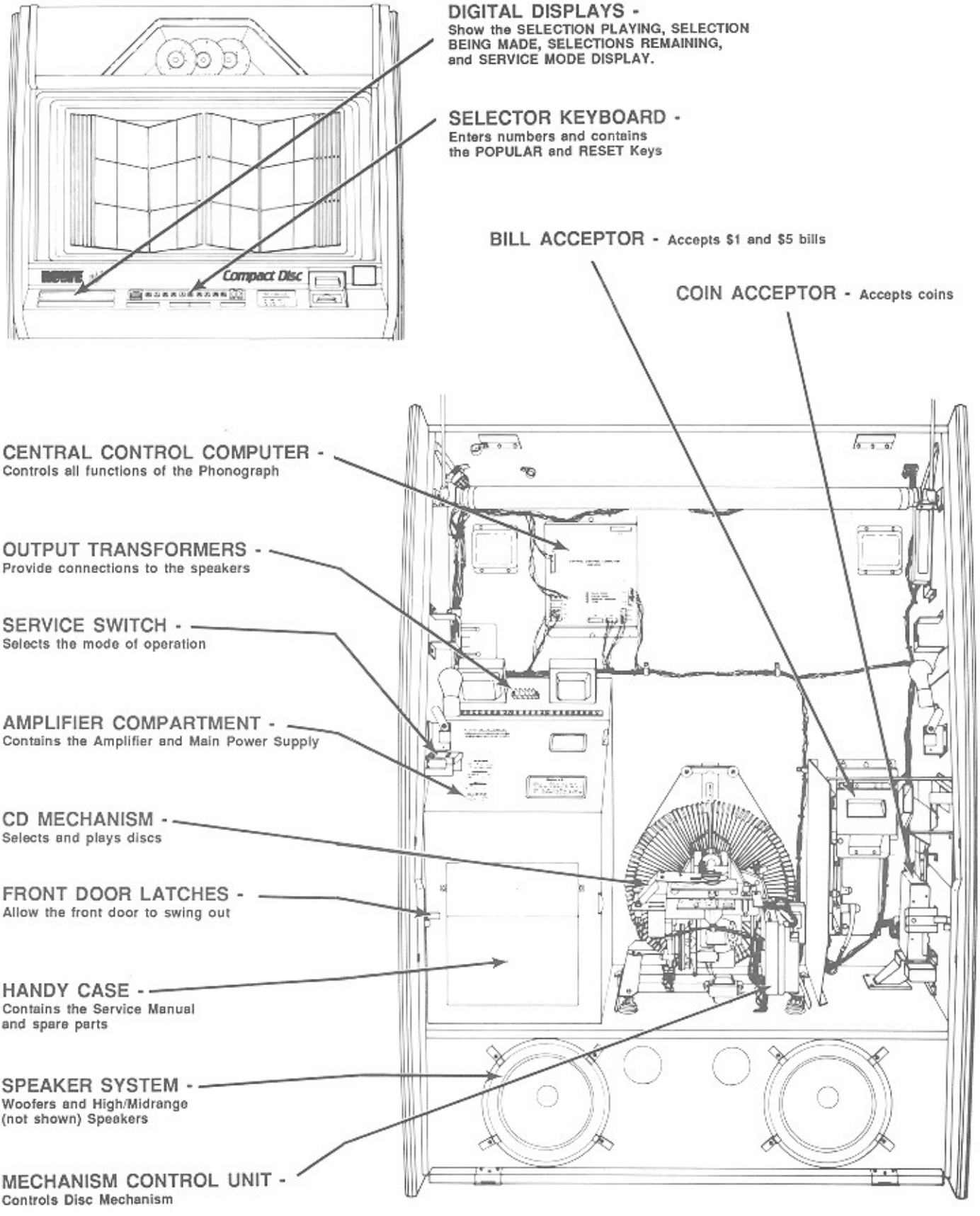


Figure 1-1. CD-100 Major Components

Section 1: Installation & System Description

INTRODUCTION

The CD-100 phonograph is the first Rowe phonograph to play compact discs exclusively. The outer appearance of the CD-100 is totally new, but many of the functional modules are very similar to previous 45 RPM record models. The reliable record mechanism has been modified to hold up to 100 compact discs. These discs are played through a 250 watt stereo sound system. Before you begin to unpack and use this phonograph, you need to pay special attention to the following:

Read This Carefully Before You Put Your New CD-100 In Service

- ***Mechanism***—Completely unpack the mechanism before you plug the 2-wire Yellow and White/Black cable into P10 on the CD mechanism.
- ***Title Pages***—If you wish to turn the title pages manually, use the handwheel on the back of the title rack.
- ***CD Player***—Read the CD player unpacking procedure and the static caution that accompanies the procedure.
- ***Title Rack***—Before you close the top door, make sure that you have returned the title rack and hinged title rack support bracket to their normal positions .

FEATURES

The CD-100 utilizes many of the standard Rowe phonograph service features and contains many new features. The major CD-100 features are:

General Features:

- Sturdy construction and reliable design
- Conveniently located customer, operator, and service controls
- New attention getting animation display and expanded Autoplay options
- Electrically operated title pages
- Entire albums can be selected
- A 250 watt amplifier with dual 7-band graphic equalizer
- Increased AVC range keeps CD volume constant over a wider range
- 100 disc capacity
- As selected (FIFO) playback or random playback
- 500 Bill capacity
- Attract mode to merchandise music or advertising
- Many new phonograph programing options
- Pricing is similar to the R-92 and R-93
- A total of 25 selections may be "locked out"
- A total of 10 selections may be "priorities"
- A total of 25 selections may be "premium"
- A real-time clock allows Autoplay and free play to be scheduled by time and day
- Accessory available to play background music and/or autoplay at different volume levels

Service Features:

- All servicing can be done from the front of the phonograph
- Modular component construction for easy removal and replacement
- Alpha/Numeric display gives you more comprehensive readouts
- Complete cash and play audit information
- Three levels of security access provide limited access to route operators if desired
- Disc condition logging feature to help find skipping selections and unplayable discs.
- Machine errors and disc conditions are logged by time and date
- Choice of 3 CD initialization procedures
- Optional RS-232 Interface allows you print audit data, Memorec data, pricing options, disc conditions, and error history.

UNPACKING INSTRUCTIONS

This section contains information for unpacking the CD-100 and installing it on location. The phonograph is shipped with all major components in place. Save all tie-down hardware in case the CD-100 must be moved to another location.

Exterior

1. Remove the shipping carton with care: Do not use shipping hooks or sharp tools that could damage the phonograph cabinet.

2. Remove the plastic bag that covers the phonograph.

3. Carefully inspect the interior and exterior of the phonograph to ensure that no damage occurred during transit.

   If damage is detected, the carrier who delivered the phonograph should be contacted immediately to examine it. Regardless of the exterior condition of the shipping cartons, the carrier should be called and notified of damage. Do not destroy the packing material or boxes until the carrier's agent has examined them. Damage claims are your responsibility. Do not return shipping damaged merchandise until after your claim has been established. Once your claim has been established, merchandise may be returned to your Rowe distributor for repair. The invoice amount for repair charges can then be collected from the carrier.

Doors

1. Locate the red bag on the top door. Remove the door key from the bag and unlock the top door. (Turn the key to the right)

2. Open the front door by pressing down on both front door latches *(see figure 1-1)*.

Shipping Bolts, Clips, And Tape

TITLE RACK

1. Remove the shipping tape from both ends of the lower title rack assembly support bar.

2. Remove the shipping tape from the front of the title rack pages.

CAUTION:

Do not attempt to turn the CD title pages by hand. Use the handwheel on the back of the title rack (*see figure 1-2*).

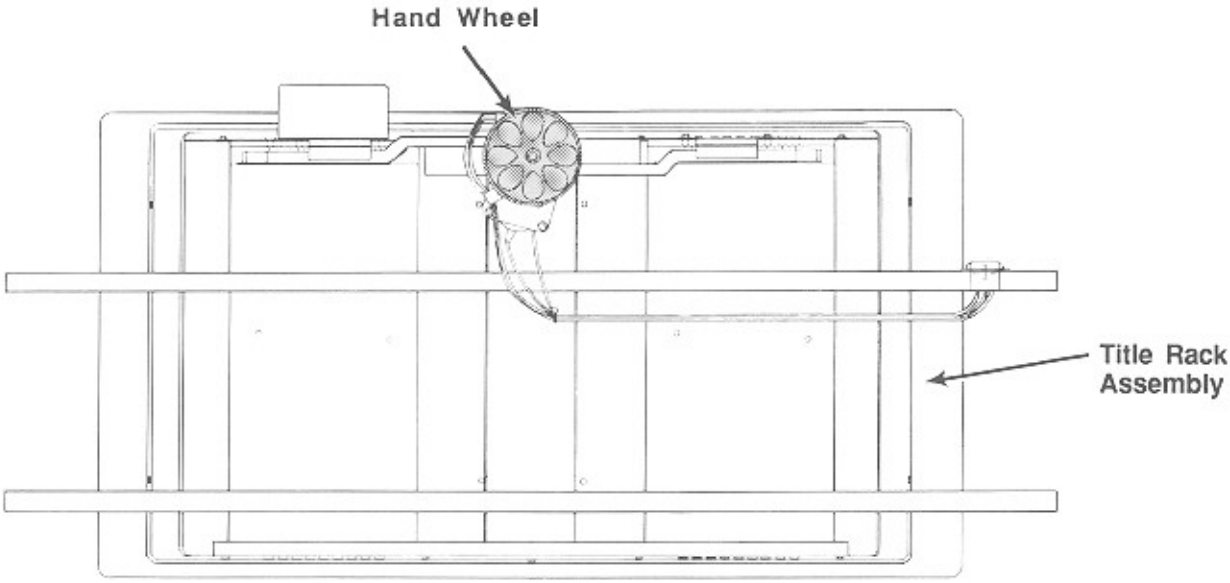


Figure 1-2. Title Rack Hand Wheel

Save all shipping hardware that you remove in the following six steps.

CD Unpacking

CAUTION:

The CD mechanism is extremely sensitive to static discharges. The photo diodes and the laser are more sensitive to discharges than MOS IC's. Careless handling may immediately destroy components within the player or cause undetectable damage that will lead to failure after several weeks or even months of use. Before you touch the player, discharge your hands and tools by touching a grounded metal part of the phonograph, such as the amplifier or power supply chassis. If you need to remove the CD player for servicing, place the CD player into the anti-static bag (shipped with the phonograph for this purpose) immediately after you remove it from the phonograph.

1. Remove the CD changer mechanism shipping bolt from the back of the phonograph cabinet (*see figure 1-3*).

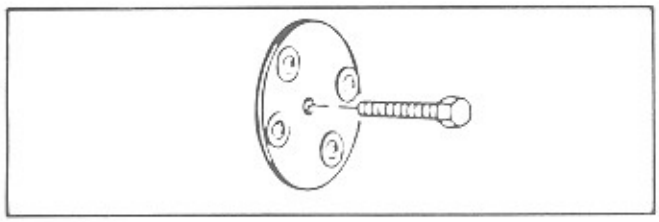


Figure 1-3. Shipping Bolt Removal

2. Remove the shipping tape from the front ends of the mechanism tie-down levers on the side of the mechanism frame (*refer to figure 1-4*).

3. Push the end of the lever down slightly, rotate the lever away from the frame until the latch tab clears the hole in the frame, rotate the lever up until the mechanism is free, and remove the levers.

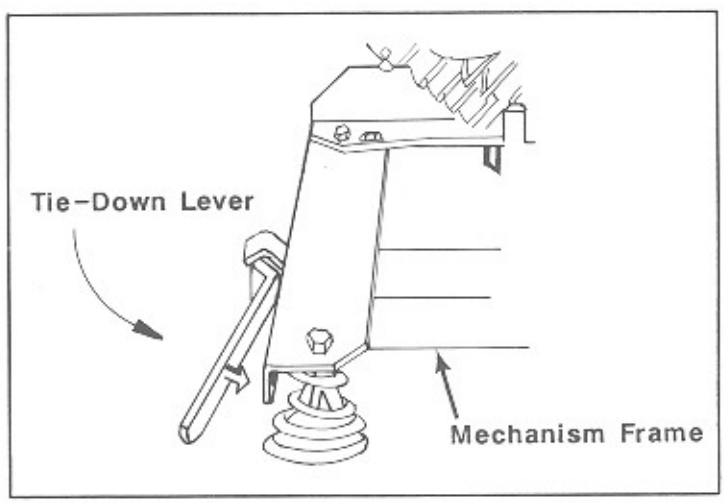


Figure 1-4. CD Changer
Tie-Down Levers

Do not proceed with unpacking until you read and understand the following caution:

CAUTION:

The CD mechanism is extremely sensitive to static discharges. The photo diodes and the laser are more sensitive to discharges than MOS IC's. Careless handling may immediately destroy components within the player or cause undetectable damage that will lead to failure after several weeks or even months of use. Before you touch the player, discharge your hands and tools by touching a grounded metal part of the phonograph, such as the amplifier or power supply chassis. If you need to remove the CD player for servicing, place the CD player into the anti-static bag (shipped with the phonograph for this purpose) immediately after you remove it from the phonograph.

4. Remove the rubber band on the hold-down plate, lift the hold-down plate up and remove the rubber back sheet and white foam block from the top of the CD mechanism.
5. Remove the rubber band, wire hook, and warning tag that hold the sprag lever out of the sprag wheel.
6. Remove all tape from the magazine belt and magazine pulley.
7. Plug the 2-wire, Yellow and White/Black mechanism cable into P10 of the CD mechanism control module.
8. Check to see that the title page assembly is plugged in.

VISUAL INSPECTION

Check to be sure that all electrical plugs are completely seated into their receptacles.

PHONOGRAPH LEVELING

To ensure proper coin acceptor operation (if used), level the phonograph cabinet from left-to-right and front-to-back by inserting spacers under the caster wheels.

HANDY CASE

The Handy Case is a blue plastic envelope located on the left hand side of the phonograph. The Handy Case contains a variety of items, including the phonograph service manual and parts catalog, spare parts, and fuses. Keep the Handy Case inside the phonograph so that the service manual and parts will be readily available when needed.

WARRANTY REGISTRATION CARD

A postage-paid Warranty Registration Card is included with the phonograph. This card should be returned to Rowe to register the phonograph for warranty.

MAJOR COMPONENTS OF THE CD-100

Figure 1-1 shows the major CD-100 Phonograph components. Take a minute to familiarize yourself with these components.

Table 7-1 lists the accessories that you may have in addition to the standard phonograph.

CD Selection System

CD selections are made by entering the four digit selection number on the selector keyboard (keyboard). (*See figure 1-5*)

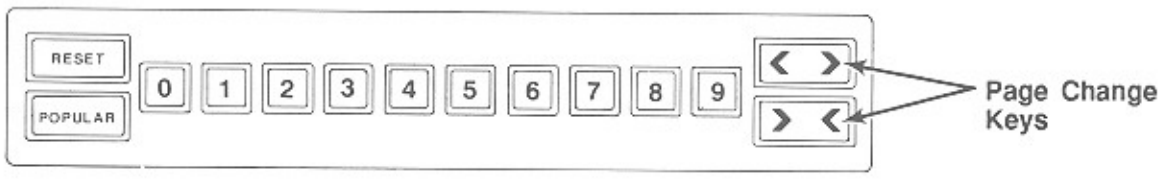


Figure 1-5. Keyboard

Keyboard

The keyboard consists of 14 keys, ten digit keys (0-9), and four special keys. The two PAGE CHANGE keys move the title pages electrically. The RESET button allows the customer to re-enter his selection, if he has changed his mind or made a mistake. The POPULAR key selects the selection that customers have selected the most number of times. Pressing the POPULAR key a second time will select the second most popular selection. Pressing the POPULAR key a third time will select the third most popular selection and so on.

Central Control Computer

The central control computer (CCC) keeps track of all of the phonograph's activities and determines what the various components are to do next. The CCC regulates the following functions:

- Calculating credit and making selections
- Keeping track of selections not yet played
- Calculating the most popular selection list
- Remembering the operator's programed values

Memorec

Memorec is the part of the CCC that remembers the:

- Number of times each selection was played
- The total amount of money deposited in the phonograph

Autoplay

When no selections have been made for a predetermined time, the Autoplay feature will play selections from a programed list or make random selections. The choice of which selections are chosen, the selection sequence, and the selection interval can be programed by the owner or service person.

PRINCIPLES OF OPERATION

Audio System

The audio system consists of the electronic components that transform the recorded sound into music. The major components of the audio system are the:

- CD player
- Stereo amplifier
- Output transformers
- Speaker system

CD PLAYER

This sub assembly translates digital pulses from the CD into a left and right channel audio signals.

STEREO AMPLIFIER

The amplifier assembly (*see figure 1-6*) contains two major sections, the preamplifier (preamp) and the power amplifier (amp).

Preamp

The preamp increases the signal from the CD player, corrects for varying recording levels (automatic volume control or AVC), allows the volume to be adjusted manually, and modifies the CD tone (Tone changes are made through a 7-band graphic equalizer).

Power Amplifier

The power amplifier converts the preamp signal to a signal that can be used by the phonograph speakers.

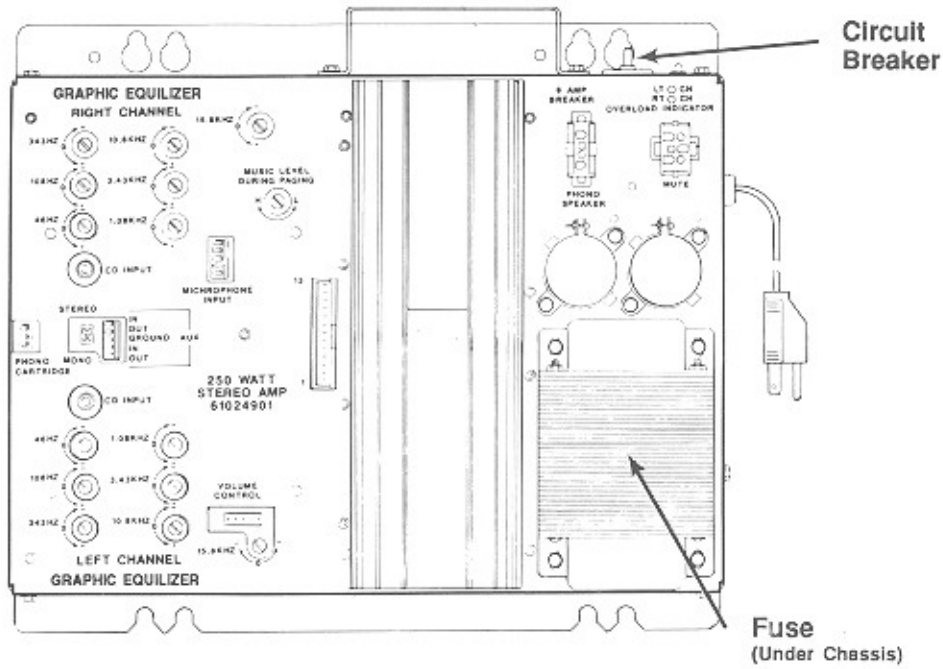


Figure 1-6. 250 Watt Stereo Amplifier Components

TWO-WIRE VOLUME CONTROL

A Rowe innovation, the two-wire volume control simplifies complex installations and reduces cost. A special preamplifier design permits volume control wiring using any unshielded two-wire cable.

OUTPUT TRANSFORMERS

The output transformers (*figure 1-7*) "step up" the power amplifier's output voltage so that remote speakers may be used efficiently. The output transformers, also, provide connections (taps) for selecting different power levels and impedances (loads) for the speakers.

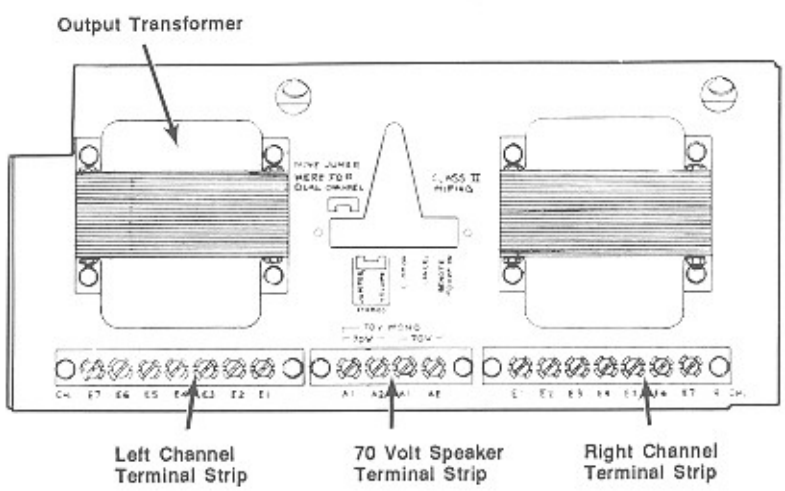


Figure 1-7. Output Transformer Package Components

THE SPEAKER SYSTEM

The speaker system consists of two specially designed speaker systems. Each channel consists of one 10-inch woofer, one mid/high range speaker, a tweeter, and a crossover network.

CD Changer Mechanism

The CD changer mechanism, also referred to as the "mechanism" or "mech", is located in the center of the cabinet's interior. It is the primary mechanical component of the phonograph. The mechanism holds 100 CD's and plays selections on command from the selection system (*refer to figure 1-8* for the location of each of the major magazine components).

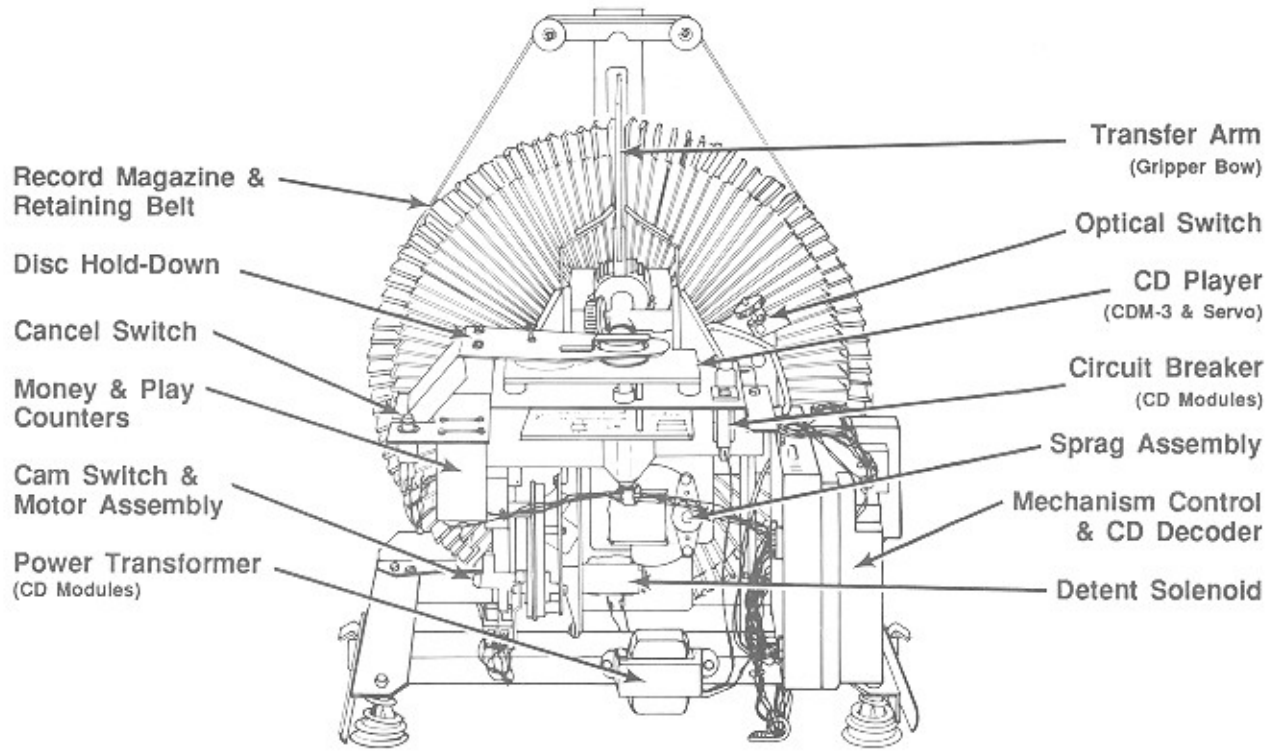


Figure 1-8. CD Changer Mechanism

MAGAZINE

The CD magazine stores 100 CD's in a circular cage.

PLAY COUNTER

The play counter accumulates the total number of plays on the mechanism.

MONEY COUNTER

The money counter registers the total money deposited in the phonograph.

OPTICAL SWITCH

The optical switch senses the CD magazine position so that the CCC can determine which CD is in gripping position.

CAM SWITCH AND MOTOR ASSEMBLY

The cam switch and motor assembly *(see figure 1-9)* consists of the transfer motor, cam, and two cam switches.

SPRAG ASSEMBLY

This assembly locks the CD magazine in position.

CD MODULES

The CD player and the CD decoder play CD's after they are positioned on the turntable by the disk transfer arm.

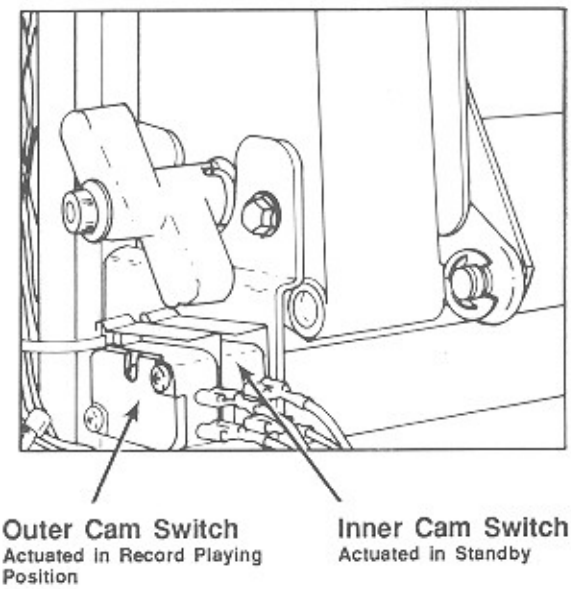


Figure 1-9. Cam Switch & Motor Assembly

Mechanism Control Unit

This solid state switching unit controls the scan and transfer.

Main Power Supply

The main power supply *(see figure 1-10)*, located inside the amplifier compartment, distributes unregulated +28 VDC, 28 VAC, and regulated +8 VDC to the phonograph. The 120 VAC line voltage to the main power supply is controlled by the power switch on the rear of the phonograph cabinet.

CAUTION:

The 120 VAC AMPLIFIER OUTLET on the main power supply does not shut off.

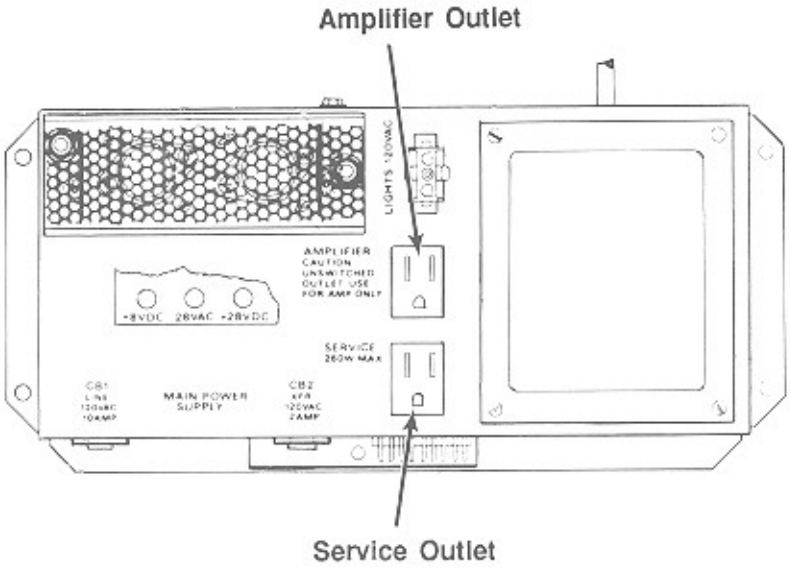


Figure 1-10. Main Power Supply

Section 2: Programming

INTRODUCTION

This section describes the installation and programming process. This information begins with a summary of what happens when the phonograph is powered up and continues with detailed instructions on how to modify the pricing and make other programming changes.

POWER ON

The following steps are a summary of the detailed *Power On Process* that is described in *Section 5* of this manual.

Step 1. Power turned on, main power supply +8 VDC, and 28 VDC LED's light, and all modules and components receive power.

Step 2. The +5 VDC LED's light on the CCC, mechanism control, OBA-2 control unit, and digital display, Board Error LED's on CCC and mechanism control flash 3 times, The OBA-2 Control Unit, BA Status and RS-485 Status LED's flash 1 time, CCC Rowelink Command, mechanism control Rowelink Response, and OBA-2 Control Unit RS-485 Status LED's continuously flicker.

Step 3. Phonograph is ready to operate.

LIFTING THE TITLE RACK

CAUTION:

Do not attempt to turn the CD title pages by hand. Use the handwheel on the back of the title rack *(see figure 1-2)*.

Before you begin changing discs, you may wish to lift the title rack to give yourself more room to work. Lift the title rack as follows:

1. Open the phonograph top door.
2. Rotate the two retaining latches on the ends of the title rack lower support bar *(see figure 2-1)* away from the support bar and lift the bottom of the title rack up and toward you with your left hand.
3. With your right hand, swing the title rack support brace out to hold the title rack in the raised position.

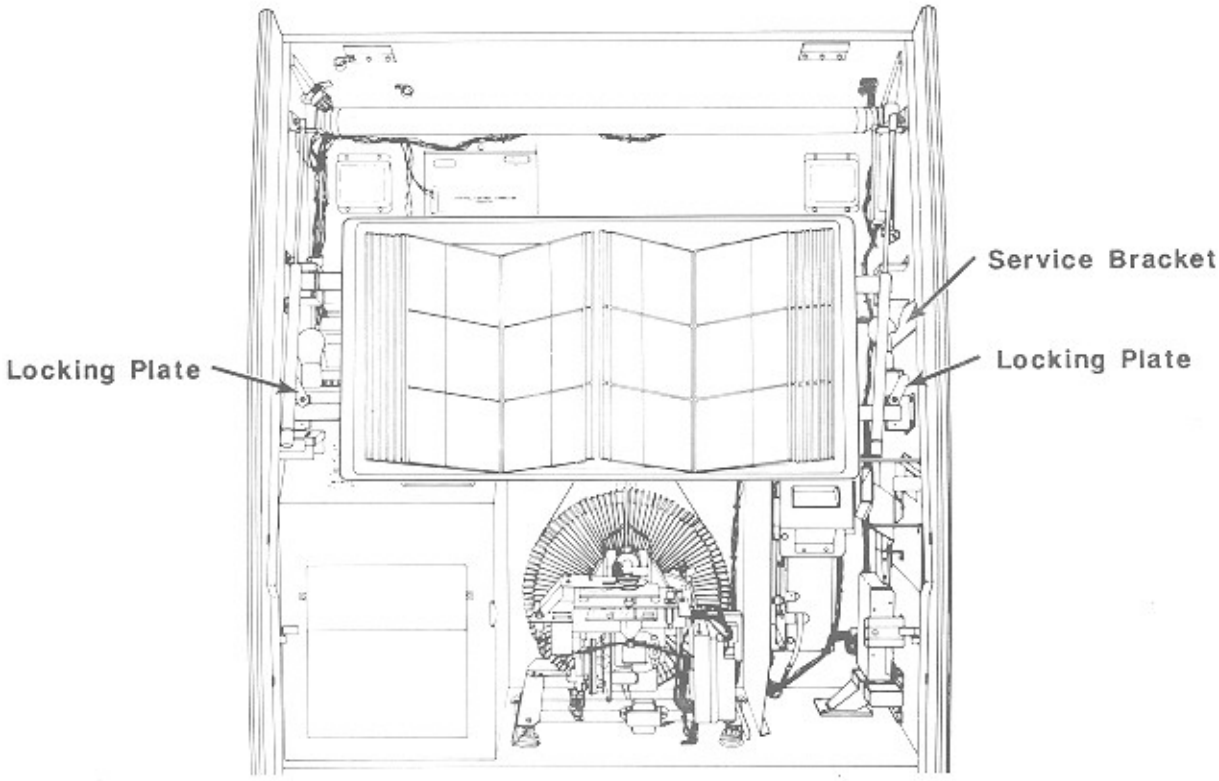


Figure 2-1. Raising The Title Rack

LOADING CD'S AND TITLES

> **CAUTION:**
>
> Do not attempt to turn the CD title pages by hand. Use the handwheel on the back of the title rack *(see figure 1-2)*.

The procedure for loading CD's and titles into an empty phonograph is different from the procedure to change CD's and titles. Please make sure that you are following the procedure that describes your situation.

Preparing Titles For The Title Rack

If your titles have not been shipped with the discs or pre-printed, you will need to prepare the title strips yourself.

Loading The Title Rack

All of the titles on the title strip sheet can be used for either right or the left-hand titles. If your title strips have not been pre-printed, you may want to type the titles before you tear the individual title strips off of the title strip sheet.

Refer to the sample, *Blank Title Sheet*, in *figure 2-2*. Refer to *figure 2-2* for examples of how to tear the title strips off of the title strip sheets.

These step-by-step instructions describe the procedure to load one CD album and one title strip. Repeat this procedure for each CD that is being loaded.

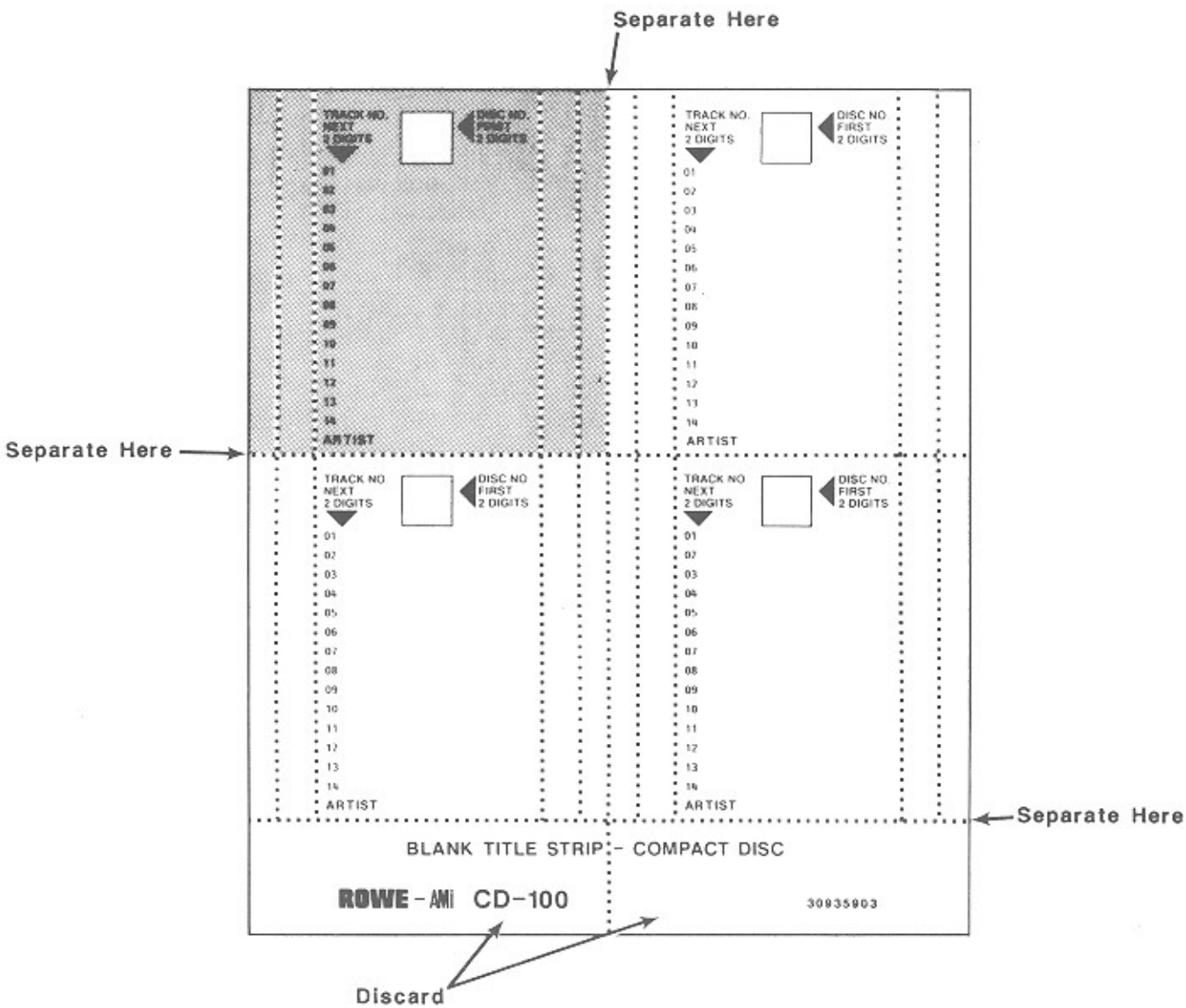


Figure 2-2. Blank Title Sheet

STEP-BY-STEP INSTRUCTIONS

1. Tear each title strip from the title sheet so that the two perforated columns appear on the side of the title strip (the shaded portion of the title strip in *figure 2-2* represents a title strip that has been removed from the title sheet).

2. Fold the title strip along the inner most perforated line on both sides of the title strip *(see figure 2-3).*

3. Locate the CD album booklet that matches the title strip that you have just made. If the CD booklet is more than two sheets thick, remove the inner sheets so that the booklet is no thicker than two title strips.

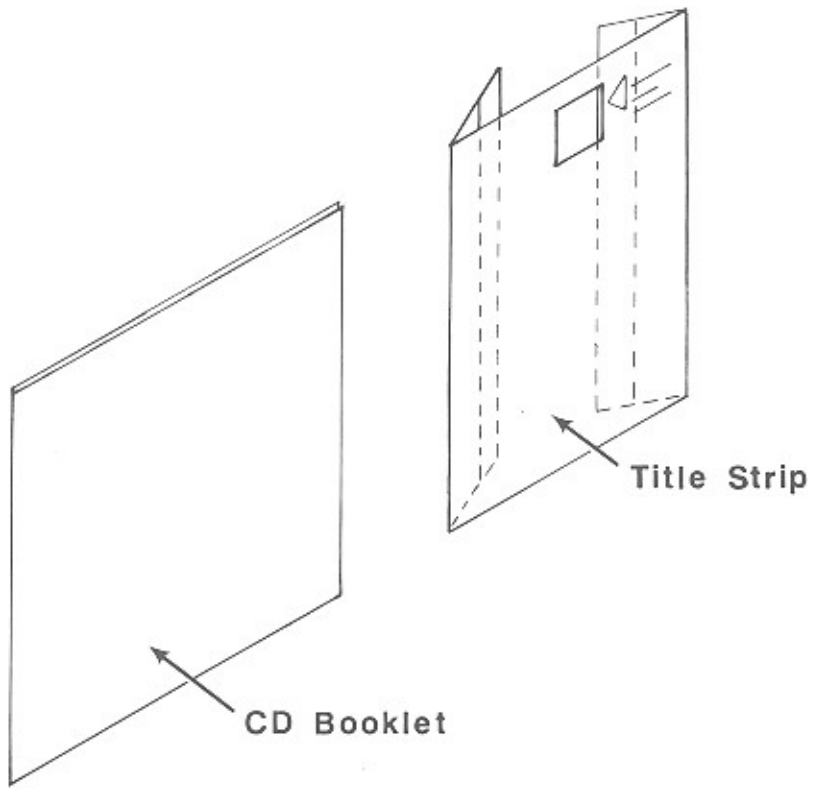


Figure 2-3. Folding The Title Strip

4. Insert the CD booklet under the top and bottom tabs of the title rack. Slide the CD booklet toward the pivot of the title rack until the booklet is trapped by the molded stops on the title page *(see figure 2-4, ref A).*

5. Insert the folded title strip under the top and bottom tabs of the title rack. Slide the title strip until the disc number shows in the opening of the title strip and the title strip is locked in place by the molded stops *(see figure 2-4, ref B).*

6. All of the tabs surrounding the CD booklet and title strip should be holding them in place. If you missed a tab, carefully tuck the loose paper under the tab as shown in *figure 2-4, ref C.*

7. Repeat steps 4 and 5 until all titles are installed. Use the CHANGE PAGE buttons to change title rack pages. Insert filler title strips (Part Number 30940601) to fill out any unused space

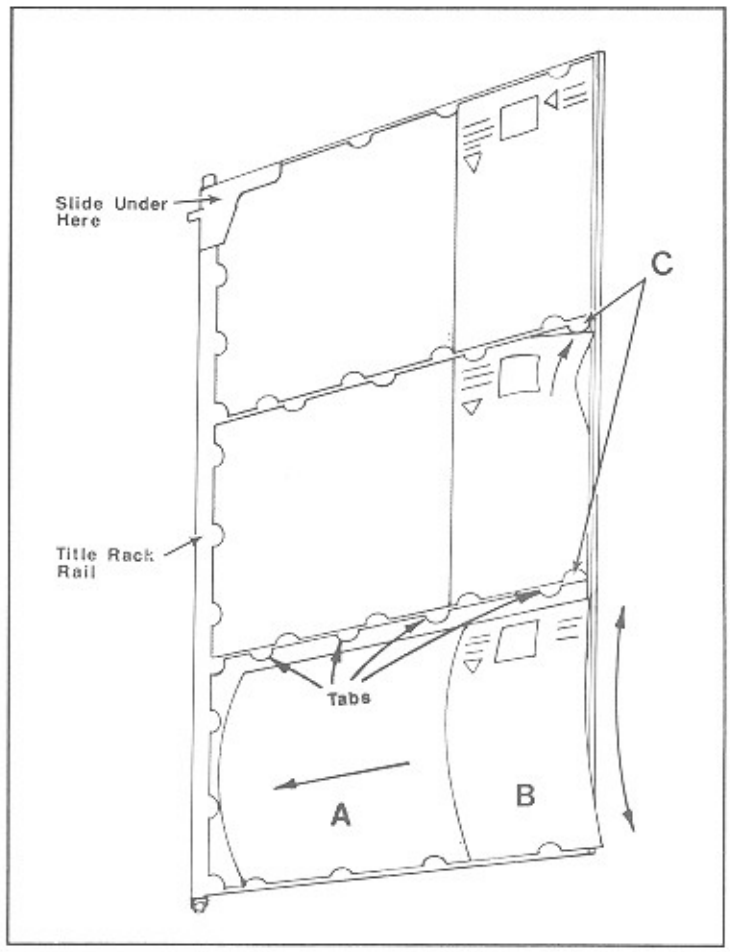


Figure 2-4. Loading The Title Rack

left on a page. Insert these in the same way that you installed the fill-in title strips.

LOADING DISCS

Load discs as follows:

1. Unlock and open the top door, if not already done.

2. Move the SERVICE switch to the SERVICE position, if not already done *(refer to figure 2-5)*.

3. Press the CANCEL/SCAN button to move the disc space to the left or right of the transfer arm.

4. Slide the CD into the slot with the label to the right *(figure 2-6)*. *See NOTE, next page.*

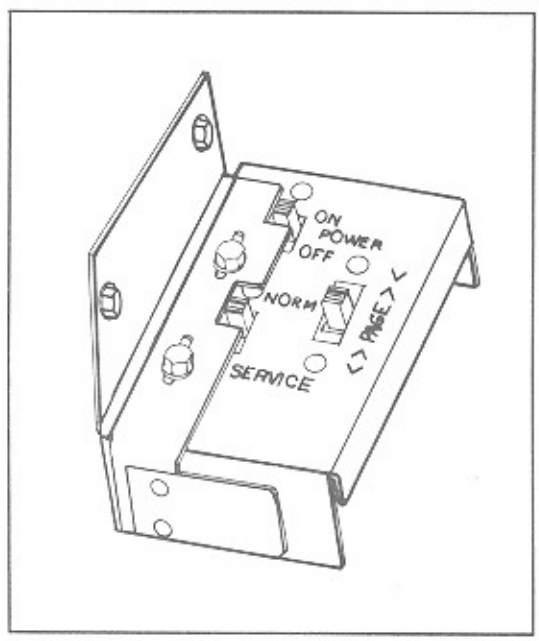


Figure 2-5 Service Switch

NOTE:

When loading discs, be sure to keep the magazine disc load approximately balanced. If the magazine is partially loaded with all discs on one side, The sprag wheel may lock and the magazine will not turn.

5. Check title strips and disc sequence to ensure that the titles and discs correspond.

6. After all titles and discs are in the proper places, perform a disc initialization. Initialization is performed in the following manner:

   A. Make sure that the phonograph is in the SERVICE mode and "SERVICE MODE" appears on the display.

   B. Type 3 to select the INITIALIZE sub menu and type 0. FULL INITIALIZE will appear on the display. Press POPULAR to start the initialization and close the top door or place the phonograph in the NORMAL mode.

   The initialization process will start and continue for approximately 30 minutes. During this time, the phonograph can be used *(see the notes that follow)*.

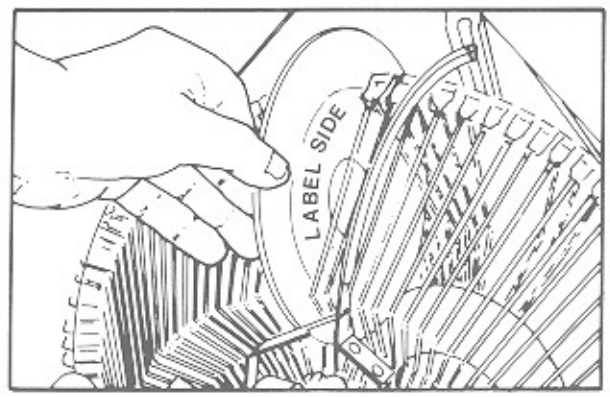


Figure 2-6. Loading A Disk

7. Check that all discs have initialized. To do this, re-enter the SERVICE mode and:

   A. Type 3 to select the INITIALIZE sub menu and then type 4 to view the number of discs that have been initialized. If this number does not match the number of discs that should have been initialized, do the following step. If the number matches the number of discs that you expected to be initialized, initialization is complete.

   B. If the number of discs initialized does not match the number of discs that you expected to be initialized, hold RESET and press 0 twice. This will place you in the DISC _ _ TRACK _ _ menu. Press POPULAR to display the first disc and its number of selections. Hold RESET and press 3 to see the next disc and its number of selections. Continue through the list by holding RESET and pressing 3 until you find a disc with the number of tracks equal to 0 (zero). Continue through the disc list until the list will not advance any more (this is the end of the list), noting all discs with track numbers equal to 0.

   C. Check that each disc on your list (ones with track numbers equal to 0) is in the proper slot, with the label facing to the right. If it is not, move it to the proper slot. If the disc is in the proper slot, it may be defective. Repair or replace it and do the individual disc initialization *(see Changing Discs in Section 3)*.

NOTE:

1. **The initialization process will stop whenever the phonograph is in the SERVICE mode, and will resume when the phonograph is returned to the NORMAL mode if the phonograph is in Standby (i.e. no selections are in memory).**

2. **During full initialization, all disc limits are initially set to 99. As each disc is scanned, the proper limits for that disc are stored in memory allowing only valid selections to be made.**

SETTING TITLE PAGE LIMITS FOR THE FIRST TIME

This procedure gives you specific instructions on how to set the page limits only. You should read the topic *Entering The Service Mode* for general operating instructions.

The phonograph is shipped with all pages accessible. Pages 1 through 9 can be "flipped" and viewed. When you install discs, you may not need all 9 pages. If you do not need all 9 pages, you should restrict page movement to just those pages that have titles. Set the title page limits as follows:

1. Unlock and open the top door, if not already done.

2. Move the SERVICE switch to the SERVICE position, if not already done *(refer to figure 2-5)*.

3. Make sure that * SERVICE MODE *. appears on the display.

4. Press 0 to select the SECURITY sub menu. Press 0 again to select the CODE ENTRY function. Enter four more zeros (0000, which is the factory setting) and press the POPULAR button. At this point, the display will show the current security level.

5. Press and hold RESET and then press POPULAR twice. This will return you to the main menu (the same display as step 3).

6. Type 2 to select the ATTRACT sub menu then type 4 to select the PAGE LIMIT function and you will see the display for entering the first page number to use and the last number to use. Type the first page number (page numbers are counted from the left to the right) and press POPULAR. Notice that the blinking number has moved to the right. Type the last page number to be used and press POPULAR.

USING THE POPULAR BUTTON ON A NEW, REPAIRED, OR CLEARED PHONOGRAPH

The POPULAR button selects the most popular selection played on the phonograph. On a new phonograph, a phonograph that has had a new central control computer, or a phonograph that has had its popularity cleared, no selections will have been made, so no selection number will appear until at least one selection is made.

ENTERING THE SERVICE MODE

To enter the SERVICE mode, open the top door and place the SERVICE switch (*figure* 2-5) in the SERVICE position. The phonograph display will say * SERVICE MODE *. At this point, the phonograph is in Security Level 1. To change any of the phonograph's stored information you must go to Security Level 2 or 3.

> **NOTE:**
>
> **The phonograph's display can display a maximum of 16 characters at a time. SERVICE mode commands and messages are abbreviated to fit the 16-character space.**

Security Level 1

All of the programming and pricing information can be viewed from the SERVICE mode without using a security code.

- Full and programmed initialization can be performed in Level 1.
- Credits may be added or subtracted and selections to be played may be cleared in Level 1.

Security Level 2 And Level 3

LEVEL 2

Security Level 2 allows route representative to:

View and clear CD play and popularity figures

View and clear current cash on hand figures

Security Level 2 will not allow any changes to any other areas. The security code for Level 2 must be changed in Level 3. Security Level 2 will also allow the operator to use any of the Security Level 1 commands.

LEVEL 3

Security Level 3 allows the operator to view and change any resettable value in the phonograph's memory. Security Level 3 will also allow the operator to use any of the Security Level 2 commands.

Accessing The Security Levels

The CD-100 security levels allow you to grant separate access for programming and routine service. This feature prevents accidental program changes and eliminates tampering. While this feature is desireable in some locations, you may not wish to restrict access to the programming. If you do not wish to have separate security codes, you can leave the security codes set to the factory default (0000) for all levels.

If you want your location to have a unique security code, but you do not want to restrict access to programming at your location, you can set Level 2 and Level 3 to the same unique access code.

Enter the SERVICE mode and press 0 to select the SECURITY sub menu. Press 0 again to select the CODE ENTRY function. Enter four more zeros (0000, which is the factory setting) and press the POPULAR button. At this point, the display will show the current security level.

CHANGING THE SECURITY LEVEL 2 CODE

To change the Security Level 2 code, follow the procedure in the previous paragraph, press and hold RESET, and then press 1. You will see the current security code (0000) for Level 2. Type all four of the new security digits and press POPULAR. Write the new security code down and keep it in a safe, but accessible place: No one will be able to access Level 2 if you loose the security code.

CHANGING THE SECURITY LEVEL 3 CODE

These steps assume that you have just finished changing the Level 2 Security Code.

To change the Security Level 3 code, Press and hold RESET, and then press 1. You will see the current security code (0000) for Level 3. Type all four of the new security digits and press POPULAR. Write the new security code down and keep it in a safe, but accessible place: No one will be able to change the Level 2 or Level 3 security code if you loose this security code.

CD-100 MENUS

Each menu contains a collection of similar CD-100 commands. These menus and their commands replace the older style Programming and Memorec commands.

Viewing Menu Options

To view a menu option, hold down the RESET button and press either the 0 digit or the 1 digit. The 1 digit will move you down one item and the 0 will move you up one item. This method of viewing menu options will allow you to view your options in any menu.

Making A Selection

When you have found the option that you want, press the POPULAR button. If the option that you have selected requires that you enter a value, press the appropriate digits on the selector keyboard and then press POPULAR to complete the transaction. If you make a mistake, press and hold the RESET button press "0", then press "1", then re-enter your selection. If you have not already reviewed the *CD-100 Service Mode Map, figure 2-7*, take a minute to read it.

Service Mode Menu

The SERVICE MODE menu (referred to as the "MAIN menu") is the starting point for all service, pricing, and programming functions. This menu contains the general title for each submenu. Some of the submenus contain commands only. Other submenus contain both commands and further submenu names. Refer to *figure 2-7*, the *CD-100 Service Mode Map*, for a illustration of the following menu descriptions:

Using The CD-100 Menus

Menus can only be used while the phonograph is in the SERVICE mode. When the phonograph is placed into the SERVICE mode, the message * SERVICE MODE * appears on the digital display *(see figure 1-1 if you are not familiar with the keyboard or display)*. This message forms the top of the main menu as shown in *figure 2-7*.

Occasionally, the message that first appears with say - ERRORS EXIST -. This is just an indication that an error has been logged. Pushing the POPULAR key will return the * SERVICE MODE * message.

IF YOU "GET LOST" IN THE MENUS

Since the menu mode of pricing and programming does not require you to use any reference material, you may (occasionally) find that you have ventured down the wrong menu and that you don't know what option is next. Don't panic . . . you can find your way:

1. Press and hold down RESET and then press 0 until you come to the top of current menu.
2. If this menu name doesn't help, Press and hold RESET and then press POPULAR. This will move you to the top of the previous menu. In most cases, this will return you to the main menu.
3. If you still cannot determine where you are, press and hold RESET and then press POPULAR again. This will return you to the main menu.

Using CD-100 Commands

CD-100 Commands are formed by combining the numbers that appear on the left side of the menus that appear in *figure 2-7*. To construct and use CD-100 commands, you need to refer to *figure 2-7* or *table 2-2*.

As An Example: You want to view the number of cycles that the CD mechanism has made. Using *figure 2-7*, you determine that you need to select AUDITS (1), on the main menu; NON-RESETTABLES (2), on the AUDIT menu; and MECH (7), on the NON-RESETTABLES menu. Use the digits to form a numeric command, which is 027. Type 027 and The number of mechanism cycles is displayed.

NOTE:

To use the command mode effectively, you should return to the main menu after each command is completed. Do this by holding RESET **down and pressing** POPULAR **until the words** *SERVICE MODE* **appear on the digital display.**

Combining Menu And Command Modes

The most efficient way to set pricing and change programming is to use a combination of the menu mode and the command mode to move through the menus. To do this, use the command mode to get you to the command you want to use, execute the command, and use the menu mode to go to your next selection.

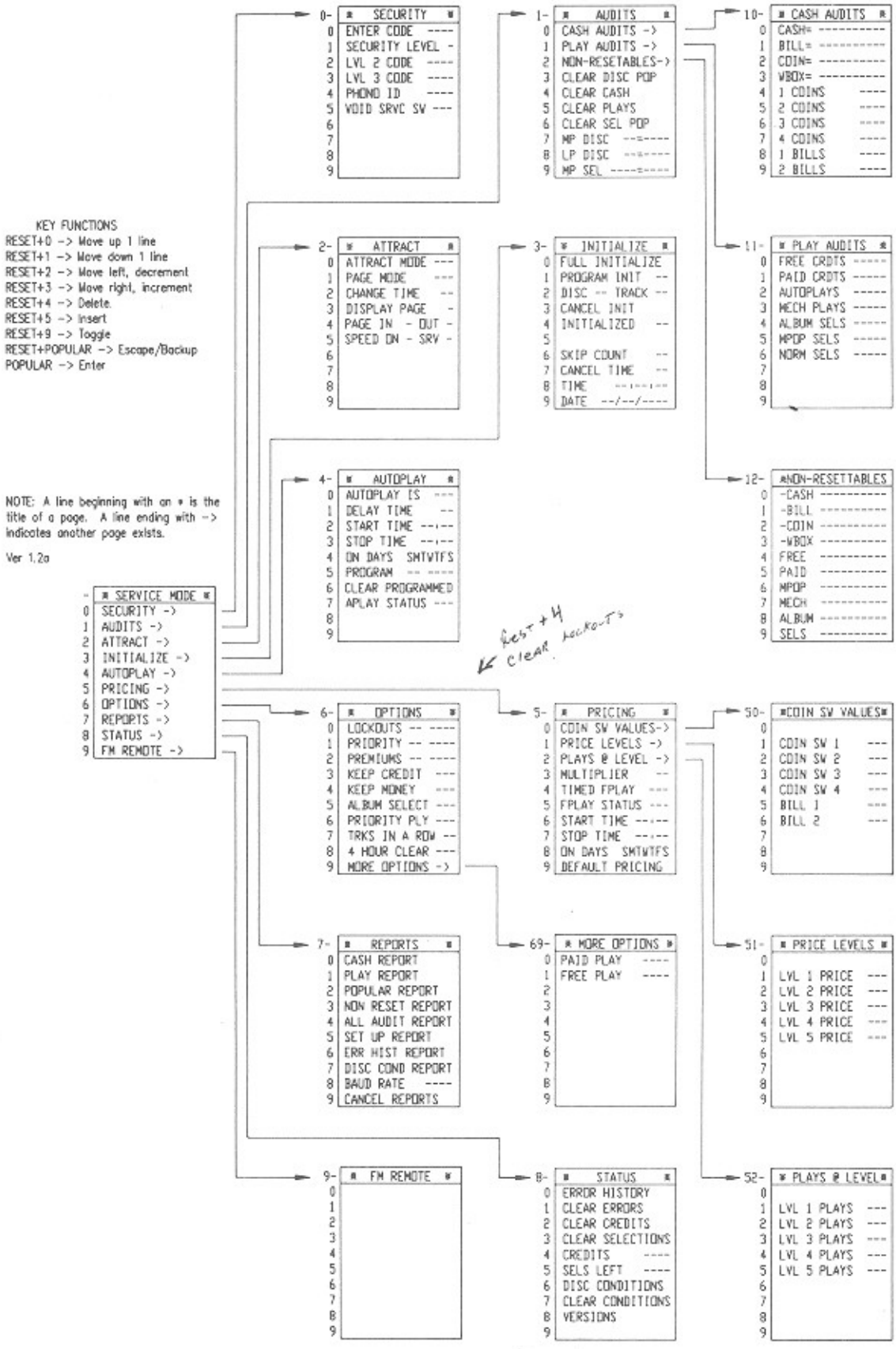


Figure 2-7. Service Mode Map

HOW TO MAKE PROGRAMMING AND PRICING CHANGES

The CD-100 Phonograph allows you to perform programming and pricing activities in two ways.

The primary or MENU mode uses menus to move through the choices until you find the desired function. This method of selecting the function that you want is more time consuming than the COMMAND mode, but does not require you to remember any commands.

The Command mode uses two and three digit commands to tell the phonograph what function you want to perform. The command mode requires you to know exactly what command you want because you will go straight to the function that you have requested: You will not receive any intermediate prompts (as you would in the menu mode).

Keyboard Controls

The POPULAR and RESET buttons on the selector keyboard *(see figure 1-1 if you are not familiar with the selector keyboard or digital display)* are used to tell the phonograph how to use the digits that you are about to enter. *Table 2-1* describes the results of using these buttons.

Table 2-1. Keyboard Controls

Keys Pressed	Results
POPULAR	Completes a transaction
RESET+0 (hold RESET down)	Moves you up one item in a menu
RESET+1 (hold RESET down)	Moves you down one item in a menu
RESET+2 (hold RESET down)	Moves the display "window" one position to the left
RESET+3 (hold RESET down)	Moves the display "window" one position to the right
RESET+4 (hold RESET down)	Remove an entry (such as a programmed Autoplay entry) from the list.
RESET+5 (hold RESET down)	Makes a space in a list (such as programmed Autoplay) so that new information can be inserted
RESET+9 (hold RESET down)	Toggles between two possible selections.
RESET+POPULAR (hold RESET down)	Cancels the current activity or moves you back to the previous menu title.

Security Menu

This menu contains all of the command options that must be executed to display or change a phonograph security code or enter a security level. This menu also contains a command to change the phonograph ID.

NOTE:

You must go to the SECURITY menu and enter the correct security code before you can change any phonograph information and you must access Security Level 3 to display or change a security code.

The last SECURITY option, the VOID SERVICE SWITCH option, allows you to completely close the phonograph door (which places the SERVICE switch in the NORMAL position) and remain in the SERVICE mode.

To enter this menu from the MAIN menu: Type 0.

Audits Menu

The AUDITS menu allows you to display and clear the various cash and play totals that are routinely reset when money is collected. Audit options 4, 5, and 6 are the only changes that can be made from security Level 2.

To enter this menu from the MAIN menu: Type 1.

Attract Mode Menu

Attract mode is designed to draw attention to customers by moving the selection pages and/or flashing messages on the keyboard display.

To enter this menu from the MAIN menu: Type 2.

Initialize Menu

This menu controls the type of CD initialization that is to be done whenever a disc is changed or moved to a new disc number. This menu must be used to identify empty CD mechanism slots.

This menu also contains options to change the phonograph's time and date.

See NOTE on the following page.

To enter this menu from the MAIN menu: Type 3.

NOTE:

The phonograph will automatically adjust the disc limits whenever a disc is played. This form of initialization is not recommended as a substitute for the selections in this menu.

Autoplay

Autoplay is the function that plays CD's when no customers have made selections. This feature can be scheduled and customized from the Autoplay menu.

To enter this menu from the MAIN menu: Type 4.

Pricing Menu

This menu allows you to change the pricing structure, select FREE PLAY, or return to the factory (default) pricing.

To enter this menu from the MAIN menu: Type 5.

Options Menu

This menu is a collection of disc selection options that allow you to:

- Prevent playing a track
- Give certain tracks priority play
- Charge a double price for certain selections
- Retain credits during a power failure
- Retain the current money total during a power failure
- Buy an entire album
- Limit the number of tracks that can be played from a disc before another disc is allowed to play.
- Select FIFO or random playback of selections

To enter this menu from the MAIN menu: Type 6.

Reports Menu (Optional)

The REPORTS options allow you to connect a printer or a personal computer to the RS-232 connector on the CCC. This information is the same information that can be displayed on the keyboard display, except that it has been arranged in a simple report format that can be printed or stored on a disk or diskette.

To enter this menu from the MAIN menu: Type 8.

Status Menu

This menu allows you to display and clear the various phonograph error messages, clear and set credits, clear selections, and display and clear disc condition messages.

To enter this menu from the MAIN menu: Type 7.

PRICING

The prices charged for CD selections may be changed as needed. When shipped from the factory the prices are set as follows:

Price of Selections

3 Selections for $1.00
7 Selections for $2.00
18 Selections for $5.00

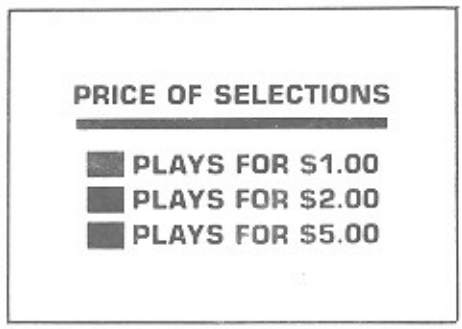


Figure 2-8A. Alternate Price Card

To set Alternate Disc prices:

The Handy Case has an Alternate Price Card *(see figure 2-8A)* that may be substituted for the Standard Price Card. The Handy Case also contains a Price Sheet with printed prices *(see figure 2-8B)*, which can be peeled off and placed at the appropriate spot on the Alternate Price Card.

Using the phonograph keyboard, the pricing structure of the phonograph may be adjusted to match the prices on the Alternate Price Card. The maximum amount that can be charged for a selection is $99.95. The maximum number of selections that can be entered is 999. The POPULAR key must be pressed to record the data entered on the display.

If you wish to use alternate pricing, follow the steps to complete the Alternate Price Card and enter the prices. Before making the actual pricing changes, step through the sample pricing that follows:

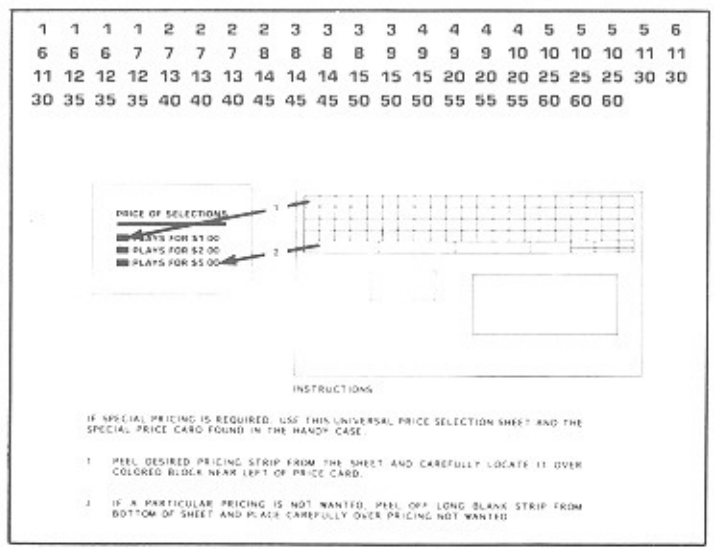


Figure 2-8B. Universal Price Sheet

How CD-100 Pricing Works

Pricing is determined by the numbers that are stored in the PRICE LEVELS and PLAYS @ LEVEL menus. The LEVEL 1 PRICE corresponds to the LEVEL 1 PLAYS in the following way: Enough money must be deposited to reach the first (#1) price level before any selections can be made. Once the amount of money matches this price, the number of selections in the LEVEL 1 PLAYS menu can be made.

To make pricing changes, set the LEVEL 1 PRICE and LEVEL 1 PLAYS to match the lowest price and number of plays on the Alternate Price Card. Then enter the remaining PRICE LEVELS and PLAYS @ LEVEL until you have set all five levels (if you do not have prices for all levels, enter 0's in all of the remaining PRICE and PLAYS positions.

SAMPLE PRICE CHANGES

1. Determine the prices that are to be charged for disc selections and place the price decals from the Price Sheet into the slots on the Alternate Price Card. The following is an example of a completed Alternate Price Card:

Price of Selections

4 for $1.00
9 for $2.00
20 for $5.00

2. Enter the SERVICE mode by setting the SERVICE switch to the SERVICE position.

3. Enter the SERVICE mode and press 0 to select the SECURITY sub menu. Press 0 again to select the function. Enter four more zeros (0000, which is the factory setting) and press the POPULAR button. At this point, the display will show the current security level. Security Level 3 is required to change pricing.

4. Press and hold RESET and then press POPULAR two times. Release the RESET button and the * SERVICE MODE * message (the main menu) will appear (*See Note:*).

NOTE:

This example will not give the correct dollar amounts for U.S. money unless PRICING OPTION 3 is set to 5 (this is the factory setting for U.S. phonographs and you should not have to change it).

Use the prices in the example that follows to help yourself understand the phonograph's pricing better.

Example CD Prices

4 for $1.00
9 for $2.00
20 for $5.00

5. Select the PRICE LEVELS menu, Option 1, from the main menu by pressing 511.

If You Have A Problem In A Menu

1. Press and hold down RESET and then press 0 until you come to the top of current menu.
2. If this menu name doesn't help, Press and hold RESET and then press POPULAR. This will move you to the top of the previous menu. In most cases, this will return you to the main menu.
3. If you still cannot determine where you are, press and hold RESET and then press POPULAR again. This will return you to the main menu.

6. Now enter the LEVEL 1 PRICE, which is the lowest disc selection price (enter 0100 and press POPULAR).
7. Move down to the next price (LEVEL 2 PRICE) by pressing and holding RESET and then pressing 1. Enter the next highest price (enter 0200 and press POPULAR).
8. Move down to the next price (LEVEL 3 PRICE) by pressing and holding RESET and then pressing 1. Enter the next highest price (enter 0500 and press POPULAR).
9. Move down to the next price (LEVEL 4 PRICE) by pressing and holding RESET and then pressing 1. Enter 0000 (because only three prices are being used) and press POPULAR.
10. Move down to the last price (LEVEL 5 PRICE) by pressing and holding RESET and then pressing 1. Enter 0000 and press POPULAR.
11. Press and hold RESET while pressing POPULAR 2 times. This will place you in the main menu. Select the PLAYS @ LEVEL menu, Option 1, from the main menu by pressing 521.
12. Enter the number of disc selections to be given for the lowest amount on the disc portion of the example price card into LEVEL 1 PLAYS (enter 004 and press POPULAR).
13. Move down to the next play option (LEVEL 2 PLAYS) by pressing and holding RESET and then pressing 1 (enter 009 and press POPULAR).
14. Move down to the next play option (LEVEL 3 PLAYS) by pressing and holding RESET and then pressing 1 (enter 020 and press POPULAR).
15. Move down to the next play option (LEVEL 4 PLAYS) by pressing and holding RESET and then pressing 1 (enter 000 and press POPULAR).
16. Move down to the last play option (LEVEL 5 PLAYS) by pressing and holding RESET and then pressing 1 (enter 000 and press POPULAR).

AUTOPLAY

The Autoplay feature stimulates customer interest in the phonograph by periodically playing selections. The Autoplay feature is factory preset to play one track after the phonograph has been idle for 20 minutes. This feature may be programmed for any length of time between 0 and 255 minutes. Selections may be played in a specific sequence.

TURNING AUTOPLAY ON AND OFF

CD-100 Phonographs are shipped from the factory with the AUTOPLAY function turned ON and set for a 20-minute delay. The AUTOPLAY mode must be set to OFF to turn Autoplay OFF. If AUTOPLAY mode is ON, Autoplay is turned ON.

To change the AUTOPLAY mode:

1. Enter the SERVICE mode by setting the SERVICE switch to the SERVICE position.
2. Type 0 to select the SECURITY menu. Type 0 again to select the CODE ENTRY function. Enter the 4-digit Level 3 security code and then press POPULAR.
3. Press and hold RESET while you press POPULAR twice (to get back to the MAIN menu).
4. Press 4 to select the AUTOPLAY menu. Press 0 to select the AUTOPLAY mode option.
5. Press and hold RESET then press 9. This will toggle the AUTOPLAY mode between ON and OFF. Press POPULAR to select the option when it is displayed the way you want it.

See the MENU and Command Descriptions for The AUTOPLAY menu, Programming Autoplay, Premiums, Priorities and Lockouts, and AUTOPLAY Programming modes for more information on Autoplay.

CONTINUOUS CREDIT

If continuous credit (FREE PLAY) of the phonograph is desired, the central control computer may be programmed to play selections entered from the keyboard without putting money into the phonograph. To use this feature:

1. Enter the SERVICE mode by setting the SERVICE switch to the SERVICE position.
2. Type 00, type the four digit Level 3 security code, and then press POPULAR.
3. Press and hold RESET and then press POPULAR two times.
4. 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.

TIMED FREE PLAY FEATURE

This feature lets you program specific days and time of day as free play time. The commands for this function are:

54 Timed Free Play ON/OFF - Enables or Disables the timed free play function

55 Free Play Status ON/OFF - Display and change the current free play status

56 Start Time 00:00 - The time of day that free play will begin

57 Stop Time 00:00 - Time of day that Free Play will no longer be allowed

58 Days ON SMTWTFS - Day(s) of the week that Free Play will be allowed

Free Play Example:

Assume that you want Free Play ON from 5:00 pm to 6:00 pm Monday, Wednesday, and Friday:

1. Set TIMED FREE PLAY to ON.
2. Set FREE PLAY STATUS to OFF.
3. Set START TIME to 17:00.
4. Set STOP TIME to 18:00.
5. Set ON DAYS to M W F.

NOTE:

See table 2-2 for details on using Commands 54-58.

If FREE PLAY STATUS is ON, the phonograph will be on Free Play. If FREE PLAY STATUS is OFF, the phonograph will not be on Free Play.

Free Play status will always be turned OFF when the STOP time matches the time on the "Real-Time Clock", and timed Free Play is set to ON.

Free Play status will only turn ON when the START time matches the real-time clock, the day of the week is turned ON, AND timed Free Play is set to ON.

When timed Free Play is set to OFF, the system will not turn Free Play status ON or OFF.

CHANGING THE NUMBER OF CREDITS REMAINING

Use these steps to increase or decrease the number of CREDITS REMAINING on the phonograph.

1. Enter the SERVICE mode by setting the SERVICE switch to the SERVICE position.
2. Type 84 and then type the number of CREDITS REMAINING. Press POPULAR to complete the change.

READING AND SETTING A PROGRAM WITH PHONOGRAPH DOORS CLOSED

The top door can be completely closed while using the keyboard in the SERVICE mode. This option is enabled in the SECURITY menu, Option 5 from any security level.

1. Enter the SERVICE mode by setting the SERVICE switch to the SERVICE position.

2. Press 0 to select the Security Sub menu. Press 5 to select the VOID SERVICE SWITCH function. Press and hold RESET then press 9 until the option is ON, then release RESET and press POPULAR.

NOTE:

This function will prevent the phonograph from returning to the NORMAL **mode until the** VOID SERVICE SWITCH **option is returned to** OFF.

Code	Description

* SERVICE MODE * - Is the title of the MAIN menu. This menu is the beginning menu for all the other menus. All of the options in this menu are names for other menus. The table that follows contains descriptions of all of the menu options. The MAIN menu options can be selected by a single digit (*i.e. Security is selected with a 0*).

0 **SECURITY** - Contains options to access and change the security levels and to change the phonograph I.D. All security code changes must be made from Security Level 3.

00 **Enter Code** - Allows you to enter a security code. If the security code that you enter matches either the Level 2 or Level 3 Security Code, the phonograph will go to that security level after you press POPULAR. If both Security Level 2 and Level 3 have the same code (the factory-set code for both levels is 0000), then Level 3 is allowed. When the new security level is attained, the phonograph will automatically go to Command 01, and display the new security level.

01 **Security Level** - Displays the current security level. This command can be used at any time to determine the security level. The phonograph automatically moves to this option and displays the new security level after you successfully enter a security code (see command 00).

02 **Level 2 Security Code** - Displays the Level 2 Security Code and allows the security code to be changed by entering new data, then pressing POPULAR. The phonograph must be in Security Level 3 for either of these selections to function.

This security level is intended to be used by the route man, so that he can read cash totals, reset cash totals, and initialize the phonograph without changing pricing or programming.

03 **Level 3 Security Code** - Displays the Level 3 Security Code and allows the security code to be changed by entering new data, then pressing POPULAR. The phonograph must be in Security Level 3 before this code can be displayed or changed.

04 **Phonograph I.D.** - Displays the current phonograph I.D. code and allows the I.D. to be changed by entering new data, then pressing POPULAR. The phonograph must be in Security Level 3 before the I.D. can be changed. It may be viewed in Security Level 1.

05 **Void Service Switch** - Allows the top door of the phonograph to be closed (which normally places the SERVICE switch back into the NORMAL mode) and still remain in the SERVICE mode. Press and hold RESET. Press 9 to toggle the option ON and OFF. Press POPULAR to save the change.

06-09 Are not used

1 **AUDITS** - Are the functions and menus that allow you to display and reset the various accumulated figures for money, popularity, number of plays, and credits.

10 **Cash Audits** - Is the menu that allows you to display, but not change, cash totals, number of coins through the coin switches, and the total number of bills. Press POPULAR to go to the CASH AUDITS menu.

11 **Play Audits** - Is the menu that allows you to display, but not change, credits, autoplays, mechanism plays, and album plays. Press POPULAR to go to the PLAY AUDITS menu.

Code	Description

12 **Non-resettables** - Is the menu that allows you to display the ongoing totals. These totals cannot be reset from any security level. Press POPULAR to go to the NON-RESETTABLE AUDITS menu.

13 **Clear Disc Popularity** - Clears the popularity for all discs. This option should only be used after the popularity figures (Selections 7, 8, and 9 in this menu) have been read and recorded. Press POPULAR to perform this function. The display will blink when the command is executed.

COMMANDS 14, 15, AND 16 ARE THE ONLY CHANGE COMMANDS THAT CAN BE EXECUTED FROM LEVEL 2

14 **Clear Cash** - Clears all current cash totals. This option should only be used after the figures for Cash Audits (Selection 0 in this menu) have been read and recorded. Press POPULAR to perform this function. The display will blink when the command is executed.

15 **Clear Plays** - Clears all current play totals. This option should only be used after the Play Audit figures in Play Audits (Selection 1 in this menu) have been read and recorded. Press POPULAR to perform this function. The display will blink when the command is executed.

16 **Clear Selection Popularity** - Clears all current selection popularity. This option should only be used after the Play Audit figures in PLAY AUDITS (Selection 1 in this menu) have been read and recorded. Press POPULAR to perform this function. The display will blink when the command is executed.

17 **Display The Most Popular Disc** - Displays the most popular disc number (00-99), followed by the number of plays (9999 maximum) that disc had. To display the next "Most Popular" disc, press and hold RESET and then press 3. Press and hold RESET and then press 3 to display each successive most popular disc. Press and hold RESET and then press 2 to move up through the popularity display toward the most popular disc.

You can request the popularity for a particular disc by pressing the disc number.

18 **Display The Least Popular Disc** - Displays the least popular disc number (00-99) followed by the number of plays that the disc had. To display the next "Least Popular" disc, press and hold RESET and then press 2. Press and hold RESET and then press 2 to display each successive least popular disc. Press and hold RESET and then press 3 to move up through the popularity display toward the least popular disc.

You can request the popularity for a particular disc by pressing the disc number.

19 **Display The Most Popular Selection** - Displays the most popular selection number (Disc 00-99 followed by Selection 00-99, a total of four digits), followed by the number of plays (9999 maximum) that selection had. To display the next "Most Popular" selection, press and hold RESET and then press 3. Press and hold RESET and then press 3 to display each successive most popular selection. Press and hold RESET and then press 2 to move up through the popularity display toward the most popular selection. A total of 50 selection numbers may be contained in the MOST POPULAR list.

You can request the popularity for a particular selection by pressing the selection number (four digits).

Code	Description
10	**CASH AUDITS** - Allows you to display, but not change, cash totals, number of coins through the coin switches, and the total number of bills.
100	**Current Cash**[1] - Displays the total cash amount (in nickels) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
101	**Current Bill**[1] - Displays the total amount of bill money (in nickels) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
102	**Current Coin**[1] - Displays the total amount of coins (in nickels) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
103	**Current Wallbox**[1] - Displays the total amount of money (in nickels) collected by wallboxes since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
104	**Current Number Of Type 1 Coins** - Displays the total number of Type 1 coins (5¢) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
105	**Current Number Of Type 2 Coins** - Displays the total number of Type 2 coins (10¢) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
106	**Current Number Of Type 3 Coins** - Displays the total number of Type 3 coins (25¢) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
107	**Current Number Of Type 4 Coins** - Displays the total number of Type 4 coins (50¢) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
108	**Number Of Type 1 Bills** - Displays the total number of Type 1 bills ($1) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
109	**Number Of Type 2 Bills** - Displays the total number of Type 2 bills ($5) collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
11	**PLAY AUDITS** - Allows you to display, but not change, credits, autoplays, mechanism plays, and album plays.
110	**Free Credits** - Displays the number of free credits given since the last time the CLEAR PLAYS command (Selection 4 in the AUDITS menu) was used.
111	**Paid Credits** - Displays the number of paid credits given since the last time the CLEAR PLAYS command (Selection 4 in the AUDITS menu) was used.

[1] This information is displayed as the number of units in Version 1.0 and 1.1 (money=units x multiplier and the display says: CURNT CASH - - - -). In Version 1.2 and subsequent, this value is displayed as the actual cash value (the display says: -CASH = - - - - - - - -).

Table 2-2. Menu & Command Descriptions
Continued

Code	Description
112	**Autoplays** - Displays the number of Autoplays made since the last time the CLEAR PLAYS command (Selection 5 in the AUDITS menu) was used.
113	**Mechanism Plays** - Displays the number of times the mechanism has played CD's since the last time the CLEAR PLAY command (Selection 5 in the AUDITS menu) was used.
114	**Album Buys** - Displays the number of times albums have been bought since the last time the CLEAR PLAY command (Selection 5 in the AUDITS menu) was used.
115	**Most Popular plays** - Displays the number of times that the POPULAR button was used to select the most popular selection.
116	**Normal Selections** - Displays the number of selections made from the keyboard.
12	**NON-RESETTABLES** - These totals for cash, plays, and credits can be displayed from any security level, but they cannot be reset from any security level. These totals constitute the permanent phonograph history.
120	**Cash**[1] - Displays total cash received by the phonograph
121	**Bill**[1] - Displays total bill cash received by the bill acceptor
122	**Coin**[1] - Displays total coin cash received by the coin acceptor
123	**Wallbox**[1] - Displays total cash received by all wallboxes
124	**Free** - Displays total free credits
125	**Paid** - Displays total paid for credits
126	**Most Popular** - Displays the total number of Most Popular selections made with the POPULAR button
127	**Mechanism** - Displays the total number of mechanism cycles
128	**Album** - Display total album buys
129	**Selections** - Displays the total number of selections made using the keyboard.
2	**ATTRACT** - This menu sets ATTRACT MODE ON or OFF and defines the ATTRACT MODE's characteristics
20	**Attract Mode** - Displays and toggles the ATTRACT MODE. Hold RESET while pushing 9 to toggle ON or OFF. Press POPULAR to save the change.

[1] This information is displayed as the number of units in Version 1.0 and 1.1 (money=units x multiplier and the display says: CASH = - - - - - - - -). In Version 1.2 and subsequent, this value is displayed as the actual cash value (the display says: -CASH = - - - - - - - -).

Code	Description
21	**Page Mode** - Displays and toggles the automatic page selection mode. Hold RESET while pushing 9 to toggle ON or OFF. Press POPULAR to save the change.
22	**Change Time** - Displays and sets the time interval for page changes (1 minute minimum) in minutes. Type in the new time in minutes then press POPULAR.
23	**Display Page** - Page to be displayed in the AD mode. Type in the new page number then press POPULAR.
24	**Title Page Number Control** - Controls the first and last page that can be selected from the keyboard. Type the low page number for IN then press POPULAR. Type the high page number for OUT then press POPULAR Again.
25	**Title Page Speed Control** - Controls the speed that the title pages will change. The ON value is the speed that the pages will turn while the phonograph is in the NORMAL mode, and the SRV value is the speed that the pages will turn in the SERVICE mode. The allowable selections are 1-9, but only Selections 3 through 8 are true speed changes. Type the new speed number for ON then press POPULAR. Type the new speed number for SRV then press POPULAR again.
26	-----
27	**Edit Messages**[1] - Changes functions and edits display messages
28	**Clear Messages**[1] - Clears all 20 lines of message storage
29	**Load Default Message**[1] - Loads the factory set messages
3	**INITIALIZE** - This menu establishes the CD track numbers and saves them
30	**Full Initialize** - Starts full mechanism initialization. All disc limits are set to 99, then as each disc is scanned, new limits are automatically entered into memory. Initialization begins when the SERVICE switch is moved to the NORMAL position. Full initialization takes about 30 minutes. During this time, selections can be played, but initialization will not continue until the phonograph is scanned out.
31	**Program Initialize** - Initializes specific discs automatically. Type the disc number to be initialized then press POPULAR. Type disc numbers until all disc numbers that need initializing have been entered. Initialization will begin when the service switch is moved back to the NORMAL position.
32	**Disc Initialize and Track Limits** - Allows you to view and change disc limits manually. To view disc limits, type the disc number. Press and hold RESET then press 3 (next disc) or 2 (previous disc) to view the next or previous disc limits. To a change a disc's limits, display the limits then press POPULAR. Type the new limits, then press POPULAR.
33	**Cancel Initialization** - Cancels initializations that have been started with either of the previous options (30 or 31). Press POPULAR to perform this function. The display will blink when the command is executed.

[1] This feature is not available on 1988 model year phonographs.

Code	Description
34	**Initialized**[1] - Displays the number of discs that have been initialized.
35	----- -----
36	**Skip Count** - Determines the maximum number of times that a CD may skip while playing before it is automatically cancelled. Type the new number then press POPULAR. *See Disc Conditions* in *Section 5* for a detailed explanation of SKIP COUNT.
37	**Cancel Time** - Determines the maximum time that a CD may skip before it is automatically cancelled. Type the new number then press POPULAR. *See Disc Conditions* in *Section* 5 for a detailed explanation of CANCEL TIME.
38	**Time HH:MM:--** - Displays and sets the time-of-day. Hours and minutes can be entered, seconds will begin automatically at "00". Type the new hours and press POPULAR. Type the new minutes and then press POPULAR. Both the hours and minutes must be changed together.
39	**Date MM/DD/YYYY** - Displays and sets the date. Any date from the year 1980 to 2087 is allowed.
4	**AUTOPLAY** - This menu sets AUTOPLAY ON or OFF and defines the Autoplay characteristics
40	**Autoplay Is** - Displays and sets the AUTOPLAY style to either OFF or ON (Standard). Press and hold RESET and then press 9 to toggle between the two options and press POPULAR to select the option that you want.
41	**Delay Time** - Displays and sets the time between Autoplay selections. Type the number in minutes then press POPULAR.
42	**Start Time** - Sets the time-of-day that Autoplay is allowed to begin making Autoplay selections. Enter the time in 24-hour format (*see the table that follows Stop Time*). Type the hour then press POPULAR. Type the minute then press POPULAR. Both the hour and minute must be changed together.
43	**Stop Time** - Sets the time-of-day that Autoplay will no longer be allowed to make selections. If you are not familiar with 24-hour time keeping, use the following table to help you figure the 24-hour time.

24-Hour Clock times:

00:00 = Midnight (23:59 is 1 minute before midnight, 00:00 is 12-midnight)

12:00 = Noon (11:59 is one minute before noon, 12:00 is 12-noon)

00:00 to 12:59 (Midnight to 12:59 in the afternoon) is entered as you would normally enter time

Continued on next page

[1] Active in Version 1.2 and subsequent

Code	Description

Continued from previous page

1:00 pm — Is entered as 13:00, and all succeeding times are entered as 12 + the hour:

1:00 pm = 13:00	7:00 pm = 19:00
2:00 pm = 14:00	8:00 pm = 20:00
3:00 pm = 15:00	9:00 pm = 21:00
4:00 pm = 16:00	10:00 pm = 22:00
5:00 pm = 17:00	11:00 pm = 23:00
6:00 pm = 18:00	12:00 am = 00:00

44 **On Days SMTWTFS** - Allows you to select the days of the week that Autoplay can make selections. Press and hold RESET then press either 2 or 3 to move from day to day. The day currently selected will blink. Hold RESET and then press 9 to turn the day ON or OFF. Press POPULAR to save any changes.

45 **Programmed** - Displays and changes the individual selection numbers that will be played. This mode allows you have Autoplay play specific disc and track selections. A maximum of 100 selections can be programmed. On the menu, the two-digit number is the play sequence number and the four-digit number is the selection number.

If no programmed selections are made, the Autoplay function will select a random disc and a random track each time Autoplay makes a selection. If one or more selections are programmed, the programmed selections will be selected. A disc number followed by two zeros can be programmed. If you request disc 6300, for example, then Disc 63 will be programmed and a random track will be played from that disc (*see Programming Autoplay, Premiums, Priorities, and Lockouts*).

46 **Clear Programmed Mode** - Clears all programmed selections. Press POPULAR to perform this function. The display will blink when the command is executed.

47 **Autoplay Status** - Allows you to change the AUTOPLAY STATUS immediately, without waiting for the START or STOP time of day. Hold RESET then press 9 to toggle the status ON or OFF. Press POPULAR to save the changes.

5 **PRICING** - This menu allows the operator to change CD pricing, coin switch values, credit levels, credit values, credit multiplier, and Free Play value

50 **COIN SWITCH VALUES:** - Is a menu that displays and sets various coin switch values. Press POPULAR to go to the COIN SWITCH VALUES menu.

500 ----- -----

501 **Coin SW1 = XX** - Displays and sets the #1 COIN SWITCH VALUE. Type the new value and then press POPULAR.

502 **Coin SW2 = XX** - Displays and sets the #2 COIN SWITCH VALUE. Type the new value and then press POPULAR.

Code	Description
503	**Coin SW3 = XX** - Displays and sets the #3 COIN SWITCH VALUE. Type the new value and then press POPULAR.
504	**Coin SW4 = XX** - Displays and sets the #4 COIN SWITCH VALUE. Type the new value and then press POPULAR.
505	**Bill 1 = XX** - Displays and sets the #1 BILL VALUE. Type the new value and then press POPULAR.
506	**Bill 2 = XX** - Displays and sets the #2 BILL VALUE. Type the new value and then press POPULAR.
507	----- -----
508	----- -----
509	----- -----
51	**PRICE LEVELS:** - Is a menu that displays various credit levels. Press POPULAR to go to the PRICE LEVELS menu.
510	----- -----
511	**LVL1 Price = XX** - Displays and sets the price of the 1st credit level. Type the new value and then press POPULAR.
512	**LVL2 Price = XX** - Displays and sets the price of the 2nd credit level. Type the new value and then press POPULAR.
513	**LVL3 Price = XX** - Displays and sets the price of the 3rd credit level. Type the new value and then press POPULAR.
514	**LVL4 Price = XX** - Displays and sets the price of the 4th credit level. Type the new value and then press POPULAR.
515	**LVL5 Price = XX** - Displays and sets the price of the 5th credit level. Type the new value and then press POPULAR.
516	----- -----
517	----- -----
518	----- -----
519	----- -----
52	**PLAYS @ LEVEL:** - Is a menu that displays and edits credit values. Press POPULAR to go to the PLAYS @ LEVEL menu.
520	----- -----
521	**LVL1 Plays = xx** - Displays and sets the number of plays given for this credit level. Type the new value and then press POPULAR.
522	**LVL2 Plays = xx** - Displays and sets the number of plays given for this credit level
523	**LVL3 Plays = xx** - Displays and sets the number of plays given for this credit level. Type the new value and then press POPULAR.

Code	Description
524	**LVL4 Plays = xx** - Displays and sets the number of plays given for this credit level
525	**LVL5 Plays = xx** - Displays and sets the number of plays given for this credit level
526	----- -----
527	----- -----
528	----- -----
529	----- -----
53	**Multiplier** - Displays and sets the coin multiplier value. For the U.S., this value is 5 (nickel). Type the new number then press POPULAR.
54	**Timed Free Play** - Turns ON or turns OFF the timed free play schedule. Hold RESET then press 9 to toggle ON or OFF. Press POPULAR to save the change.
55	**Free Play Status** - Allows you to turn free play OFF immediately without waiting for the start or stop time. Hold RESET then press 9 to toggle ON or OFF. Press POPULAR to save the change.
56	**Start Time** - Sets the time of day that free play will be turned ON. Enter the time in 24 hour format (*see Command 43 for an explanation*).
57	**Stop Time**[1] - Sets the time of day that free play will be turned OFF. Enter the time in 24 hour format (*see Command 43 for an explanation*).
58	**ON Days SMTWTFS** - Allows you to select the days of the week that the free play feature will turn ON. Press and hold RESET then press either 2 or 3 to move from day to day. The day currently selected will blink. Hold RESET and then press 9 to turn the day ON or OFF. Press POPULAR to save any changes.
59	**Default Pricing** - Loads the factory (default) settings for all pricing. Press POPULAR to perform this function. The display will blink when the command is executed.
6	**OPTIONS** - Displays and allows you to change the phonograph's miscellaneous options
60	**Lockouts** - Displays and selects lockout selections (25 maximum). These selections are not allowed to be selected by the customer or AUTOPLAY (*see Programming, Autoplay, Premiums, Priorities, and Lockouts*). If a locked-out selection is made, the words "Not Allowed" will momentarily appear on the display.
61	**Priorities** - Displays and sets priority selections (10 maximum). When these selections are made by the customer, they will be inserted at the top of the play list and they will be played next (*see Programming, Autoplay, Premiums, Priorities, and Lockouts*).
62	**Premiums** - Displays and sets premium selections. These selections (25 maximum) will be priced at twice the regular price (*see Programming, Autoplay, Premiums, Priorities, and Lockouts*).

[1] When the stop time is encountered, Version 1.2 and subsequent will erase all selections that were made during Free Play.

Code	Description

63 **Keep Credit** - Displays and toggles the KEEP CREDIT option ON or OFF to allow retaining or cancelling credit upon Power up. Hold RESET and press 9 to toggle ON or OFF. Press POPULAR to save the changes.

64 **Keep Money** - Displays and toggles the KEEP MONEY option ON or OFF to allow retaining or cancelling money on power up. Hold RESET and press 9 to toggle ON or OFF. Press POPULAR to save the change.

65 **Album Buy** - Displays and toggles the ALBUM BUY option ON and OFF so that entire albums can be selected. Hold RESET and press 9 to toggle ON or OFF. Press POPULAR to save the change.

66 **Priority Play** - Displays and toggles PRIORITY PLAY from ON to OFF. When PRIORITY PLAY is ON, priority plays will be allowed. When PRIORITY PLAY is OFF, Priority Plays will not be allowed. Hold RESET and press 9 to toggle ON or OFF. Press POPULAR to save the change.

67 **Tracks In A Row** - Displays and sets the maximum number of tracks (sequential selections) that can be played from one disc. Type the new number then press POPULAR.

68 **4-Hour Clear**[1] - Displays and toggles the 4-Hour Clear option ON or OFF. When 4-Hour Clear is ON, all selections remaining to be played will be cleared (if the phonograph is turned OFF for more than 4 consecutive hours). When this option is OFF, selections to be played will remain in the phonograph's memory and they will play when the phonograph is turned back ON. Hold RESET and press 9 to toggle this option ON or OFF. Press POPULAR to save the change.

69 **MORE OPTIONS** - The MORE OPTIONS menu is a continuation of the OPTIONS menu.

690 **Paid Play** - Determines the play sequence for paid selections. This option toggles between random (RAND) and FIFO (First In First Out) sequences. Hold RESET and press 9 to toggle ON or OFF. Press POPULAR to save the change.

691 **Free Play** - Determines the play sequence for free selections. This option toggles between random (RAND) and FIFO (First In First Out) sequences. Hold RESET and press 9 to toggle ON or OFF. Press POPULAR to save the change.

7 **REPORTS** - The REPORTS menu provides an output to an RS-232 serial printer or computer with an RS-232 serial interface. To use this feature, the RS-232 Option must be installed in the phonograph.

To select and print the report, type the code for the report and press POPULAR. The display will blink when the command is executed.

70 **Cash Report** - Starts the Cash Report

71 **Play Report** - Starts the Play Report

72 **Popular Report** - Starts Popularity Report

---

[1] Active in Version 1.1 and subsequent

Table 2-2. Menu & Command Descriptions
Continued

Code	Description
73	**Non-Resettable Report** - Starts the report of all non-resettable numbers
74	**All Audit Report** - Starts all 4 audit reports
75	**Setup Report** - Starts the phonograph Setup Report
76	**Error History Report** - Starts the Accumulated Phonograph Errors Report
77	**Disc Condition Report** - Starts the Disc Condition Report
78	**Baud Rate**[1] - Selects either 2400 or 9600 baud for printing reports. Hold RESET and press 9 to toggle between 2400 and 9600 baud. Press POPULAR to save the change.
79	**Cancel Reports** - Stops all report printing
8	**STATUS** - The STATUS menu defines credit and displays figures, which indicate the condition of the phonograph
80	**Error History** - Displays the error history of the phonograph (*see Errors and Warnings in Section 5*)
81	**Clear Errors** - Clears all errors from the phonograph's error log. Press POPULAR to perform this function. The display will blink when this command is executed.
82	**Clear Credits** - Clears all current credit. Press POPULAR to perform this function. The display will blink when this command is executed.
83	**Clear Selections** - Clears all selections remaining to be played. Press POPULAR to perform this function. The display will blink when this command is executed.
84	**CREDITS** - Displays and changes the number of credits. Type the number of credits then press POPULAR.
85	**Selections Left** - Displays the current number of selections left to be played.
86	**Disc Conditions** - Displays the condition of discs played (see **Disc Conditions** under **Errors And Warnings** in Section 5)
87	**Clear Conditions** - Clears current conditions from the phonograph. Press POPULAR to perform this function. The display will blink when this command is executed.
88	**Display Software Versions** - Displays the current version number of phonograph modules. Hold RESET and press 3 to view the next device version number.
89	----- -----
9	**FM REMOTE**[2] - The FM REMOTE menu activates and defines FM REMOTE options.
90-99	These options are not available at the present time

[1] Active in Version 1.2 and subsequent

[2] This feature is not available on 1988 model year phonographs

PROGRAMMING AUTOPLAY, PREMIUMS, PRIORITIES AND LOCKOUTS:

Each of these four options will allow programming specific selection numbers into memory. The procedure is the same for all four options.

Place the phonograph into the SERVICE mode and get to the * SERVICE MODE * display (hold RESET and push POPULAR). Type 00 to get to the security function. Enter the level 3 security code and push POPULAR. Hold RESET and push POPULAR twice to get back to * SERVICE MODE *. Enter the command for the particular option to be programmed.

For Autoplay programming

Type	Display shows
4	*AUTOPLAY*
5	PROGRAM 00----

For Lockouts programming

Type	Display shows
6	*OPTIONS*
0	LOCKOUTS 00----

For Priorities programming

Type	Display
6	*OPTIONS*
1	PRIORITY 00 ----

For Premiums programming

Type	Display shows
6	*OPTIONS*
2	PREMIUMS 00 ----

Program sequence number

Selection number

If a selection is not programmed for the displayed sequence number, four dashes will appear. When first received from the factory, none of these options will have any selections programmed.

It is possible to program up to 100 autoplay selections, up to 25 premium selections, up to 25 lockout selections and up to 10 priority selections. The program sequence number will start at 00 and go to 1 less than the maximum possible programmed selections,. For example, the sequence numbers for lockouts will start at 00 and go to 24.

All selections must be in consecutive sequence locations. You may not have a "hole" in the sequence. For example, premiums 00 is programmed to Selection 1305. The next premium selection must be entered in sequence location 01. The phonograph will not allow a hole to be left in the sequence.

If you are at security level 3 and have one of the four programming options on the display, you will notice the 1's digit of the sequence number will be blinking. The blinking digit indicated it may be changed. Type the sequence number where the new selection is to be entered then push POPULAR. If the sequence number entered would create a hole, the display will change to show the next available sequence number. The 1's digit in the selection number will now blink. Type in a four digit selection number then push popular to save it. The 1's digit in the sequence number will now blink allowing another sequence number to be entered.

If you try to enter a selection from a disk that has limits of 0 (the disk is not installed in the machine or it has not yet been initialized), the four dashes will reappear when POPULAR is pushed.

By holding RESET and pushing 3, the next sequence number and selection will be displayed. Holding RESET and pushing 2 will display the previous sequence number.

EDITING AUTOPLAY, PREMIUMS, PRIORITIES AND LOCKOUTS

Security level 3 is needed to edit programmed sequence selection numbers.

To change a selection number, use RESET + 2 and RESET + 3 to scan the sequence looking for the selection to be changed. If the sequence number of the selection to be changed is known, simply type the sequence number. When the proper selection is displayed, push POPULAR to move the blinking digit to the 1's position of the selection number. Type in the new selection number then push POPULAR.

If you try to enter a selection from a disk that has limits of 0 (the disk is not installed or not yet initialized), the original selection will be automatically reinserted when POPULAR is pushed.

To delete a selection number, locate that selection as described above. Push and hold RESET then push 4 once. The selection will be deleted. The next selection will be moved down into this sequence number to fill the hole the deletion would have left.

To add a selection in the middle of a list, locate the selection previous to selection you want to enter. Hold RESET and push 5 once. This will open a hole in the list. Type the new selection number then push POPULAR. If you try to enter a selection from a disk that has limits of 0 (the disk is not installed in the machine or it has not yet been initialized), selection 0001 will be inserted automatically.

AUTOPLAY PROGRAMMING MODES

When the Autoplay program sequence does not have any selections in it, Autoplay will select a random disk and track to play whenever the Autoplay time has elapsed. By entering selections into the sequence program, Autoplay will follow that sequence and play only those selections entered. The order of play will follow the sequence.

When entering a selection number ending in 00 (this is not normally a valid selection) in to the Autoplay sequence, Autoplay will select a random selection from that particular disk. For example, sequence number 04 has Selection 5200 programmed in. When Autoplay gets to sequence number 04 (the 5th Autoplay selection to be played), it will play a random track from disk 52.

Specific selection numbers and random selections on specific disks may be entered together and in any order in an Autoplay sequenced program.

Table 2-3. CD-100 Command Index

Function	Menu	Command
Album		
maximum tracks in a row	OPTIONS	67
Select - on/off	OPTIONS	65
Attract mode		
change time between page changes	ATTRACT	22
select a specific "AD" page	ATTRACT	23
set speed that title pages turn	ATTRACT	25
set title page number limits	ATTRACT	24
turn attract on/off	ATTRACT	20
turn auto page changes on/off	ATTRACT	21
Audits		
all audit	REPORTS	74
cash	AUDITS	100-109
non-resettable Displays	AUDITS	120-129
play	AUDITS	110-116
Autoplay		
clear programmed Autoplay	AUTOPLAY	46
display or change		
start time	AUTOPLAY	42
stop time	AUTOPLAY	43
days of the week	AUTOPLAY	44
time	INITIALIZE	38
enable priority plays	OPTIONS	66
enhanced schedules	AUTOPLAY	49
priority play a disc	OPTIONS	61
select a specific disc and track	AUTOPLAY	45
status	AUTOPLAY	47
time between Autoplays	AUTOPLAY	41
turn Autoplay on/off	AUTOPLAY	40
week that Autoplay is enabled	AUTOPLAY	44
Baud Rate	REPORTS	78
Bill values	PRICING	505-506
Cash		
clear	AUDITS	14
keep credit after power failure	OPTIONS	63
keep money after power failure	OPTIONS	64
multiplier	PRICING	53
report	REPORTS	70
Clear		
conditions	STATUS	87
credits	STATUS	82
disc conditions	STATUS	86
errors	STATUS	81
phonograph if it is off 4 hours	OPTIONS	68
selection popularity	AUDITS	16
selections	STATUS	83
Coin switch values	PRICING	501-504

Table 2-3. CD-100 Command Index
Continued

Function	Menu	Command
Credit		
clear credits	STATUS	82
display or change credits	STATUS	84
display or clear		
free play - on/off	PRICING	55
keep credit after power failure	OPTIONS	63
levels	PRICING	511-515
multiplier	PRICING	53
remaining	STATUS	84
selections remaining	STATUS	85
values	PRICING	521-525
Date change	INITIALIZE	39
Default pricing	PRICING	59
Disc		
Autoplay	AUTOPLAY	40-47
clear conditions	STATUS	87
conditions	STATUS	86
initialize	INITIALIZE	30-33
Errors		
clear	STATUS	81
history		
report	REPORTS	76
status	STATUS	80
Factory pricing	PRICING	59
Free play		
on days	PRICING	58
on/off	PRICING	55
start	PRICING	56
status	PRICING	55
stop	PRICING	57
timed	PRICING	54
Initialize		
all discs (takes 30 minutes)	INITIALIZE	30
by disc number	INITIALIZE	31
cancel		
auto initialize	INITIALIZE	33
number of discs initialized	INITIALIZE	34
skip time (delay before cancel)	INITIALIZE	37
set track limit for a disc	INITIALIZE	32
skip count	INITIALIZE	36
Lockout (do not allow) a selection	OPTIONS	60

Table 2-3. CD-100 Command Index
Continued

Function	Menu	Command
Money		
keep	OPTIONS	64
clear	AUDITS	14
Plays		
audit	PLAY AUDITS	110-116
clear	AUDITS	15
sequential play	MORE OPTIONS	690,691
random play	MORE OPTIONS	690,691
Phonograph commands		
clear		
after 4-hours OFF	OPTIONS	68
credit	STATUS	82
errors	STATUS	81
display		
credit	STATUS	84
selections remaining	STATUS	85
error history report	REPORTS	76
ID change	SECURITY	04
Popularity		
disk		
clear	AUDITS	13
least popular	AUDITS	18
most popular	AUDITS	17
report	REPORTS	72
selection - most popular	AUDITS	19
Pricing		
bill values	PRICING	505-506
buy an album - on/off	OPTIONS	65
coin switch values	PRICING	501-504
price levels		
levels	PRICING	511-515
multiplier	PRICING	53
plays at price level	PRICING	521-525
premium plays (special pricing)	PRICING	66
use factory (default) pricing	PRICING	59
Priorities		
enable priority plays	OPTIONS	62
maximum tracks to play in a row	OPTIONS	67
play a specific selection	OPTIONS	61
Program with top door closed	SECURITY	05

Table 2-3. CD-100 Command Index
Continued

Function	Menu	Command
Reports		
all audit	REPORTS	73
cancel	REPORTS	79
cash	REPORTS	70
disc conditions	REPORTS	77
error history	REPORTS	75
non resettables	REPORTS	73
play	REPORTS	71
popular	REPORTS	72
set up	REPORTS	75
Security		
enter security code	SECURITY	00
level display	SECURITY	01
change level 2	SECURITY	02
change level 3	SECURITY	03
phono ID	SECURITY	04
Service switch enable - on/off	SECURITY	05
Software level	STATUS	88
Time change	INITIALIZE	38
Tracks in a row	OPTIONS	67
Versions	STATUS	88

SOUND SYSTEM

Acoustical Compensation (Equalizer Tone Controls)

The preamplifier contains seven tone controls on each channel to compensate for room acoustics in various locations. These controls are on the amplifier chassis. The sound level at which the phonograph will be operated and the room furnishings determine the settings of these controls.

A room with carpet and drapery is a soft or highly absorbent location. A crowded room is also highly absorbent. These locations require greater emphasis of high frequencies.

A room with paneled walls and a bare or tiled floor is a hard, non-absorbent location, which requires greater low frequency emphasis.

Regardless of the room acoustics, the high and low frequency characteristics of your speakers can influence the equalizer settings as much or more than the room acoustics.

What This Graphic Equalizer Does

This graphic equalizer controls the tone for seven specific tone ranges. The frequency for each range is printed next to each equalizer control.

Important:

- ☞ **Each of these controls can limit the maximum volume for its range by as much as 85%.**
- ☞ **This means that if a control is set to minimum, that the maximum power available for that range is only about 40 watts.**
- ☞ **If all of the graphic equalizer controls are set to minimum, then the phonograph will produce no more than approximately 40 watts of its 250 watt capacity.**

Equalizer Settings

These equalizers work equally well for stereo and mono sound and may be used with single and dual volume controls.

The settings that follow will give a good sound for a room with the matching acoustics (highly-absorbent, moderately absorbent, non-absorbent). Set the right and left channel equalizer controls to the positions that match the room described (or most closely described) in the three illustrations that follow this paragraph. These settings may be just right, or they may not sound 100% right to you. If the sound is not satisfactory, make small changes in the settings until the sound is just the way you want it.

If The Room Or Speaker System Requires A Trade-Off

Since the equalizer limits the volume of all of the audio frequencies, you may find that the best sound for a specific room or set of speakers requires that most of the graphic equalizer controls need to be turned down. In this situation, the overall phonograph volume may not be adequate. If you find that you have this situation, you will need to increase each qraphic equalizer control slightly until the phonograph can produce the required volume.

Step-By-Step Instructions

Select one of the Room Acoustics that most closely matches your room's acoustics and follow the instructions for that room type. If your room is an average or moderately absorbent room, or you like the phonograph's sound, you can use the factory settings just the way they are.

Soft And Highly Absorbent Rooms

Rooms with carpet and drapery are considered to be "soft and highly-absorbent."

1. Turn all seven right channel and seven left channel graphic equalizer controls fully counter-clockwise.

2. Turn the 46 and the 108 Hz controls all the way clockwise. Leave all of the other controls turned all the way counter-clockwise.

3. The graphic equalizer's controls should now be set as shown to the right.

4. Play a selection and turn the controls slightly (no more than 1/8 of a turn at a time) until the sound is acceptable. Be sure that the phonograph volume is adequate. If the volume is not adequate, you will need to turn each control up (counter-clockwise) slightly until the volume is satisfactory.

Remember: The maximum volume setting is obtained when all controls are turned fully counter-clockwise.

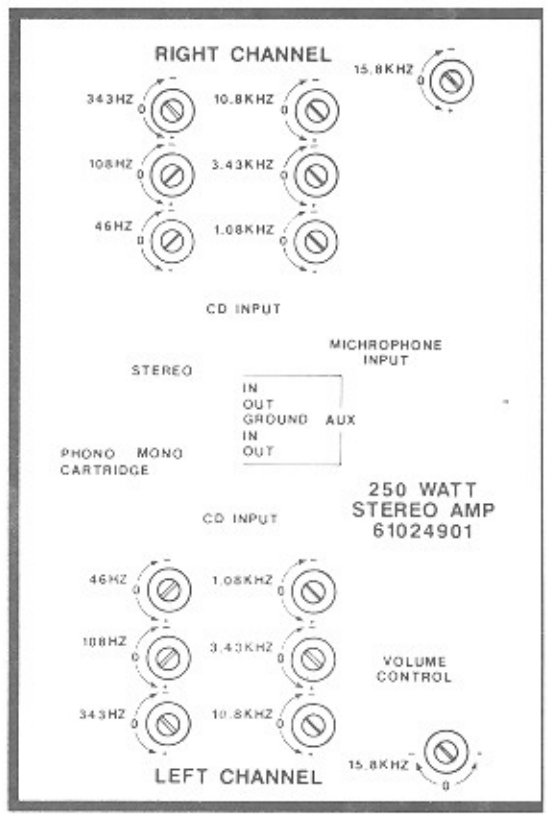


Figure 2-9A. "Soft" Rooms

Average Or Moderately-Absorbent Rooms

(These are the factory settings)

1. Turn all seven right channel and seven left channel graphic equalizer controls fully counter-clockwise.

2. Turn the 46 and the 108 Hz controls to the position midway between the maximum and the minimum position as shown to the right. Leave all other graphic equalizer controls turned all the way counter-clockwise.

3. The graphic equalizer's controls should now be set as shown to the right

4. Play a selection and turn the controls slightly (no more than 1/8 of a turn at a time) until the sound is acceptable. Be sure that the phonograph volume is adequate. If the volume is not adequate, you will need to turn each control up (counter-clockwise) slightly until the volume is satisfactory.

Remember: The maximum volume setting is obtained when all controls are turned fully counter-clockwise.

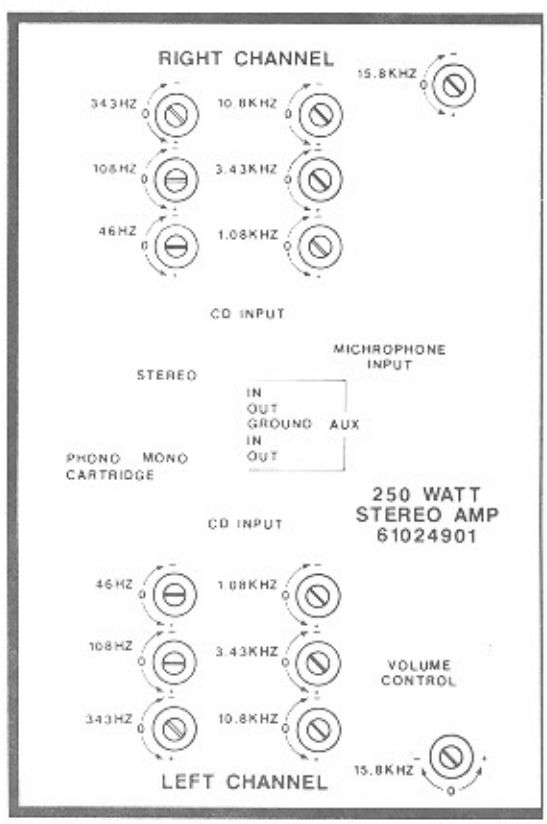


Figure 2-9B. "Average" Rooms

Hard And Non-Absorbent Rooms

Rooms that are paneled and have bare or tiled floors are considered to be "hard or non-absorbent."

1. Turn all seven right channel and seven left channel graphic equalizer controls fully counter-clockwise.
2. Turn the 15.8 KHz control all the way clockwise as shown to the right.
3. The graphic equalizer's controls should now be set as shown to the right.
4. Turn the 46 Hz, 108 Hz, and 10.8 KHz controls to the position midway between the maximum and minimum position as shown to the right. Leave the 343 Hz, 1.08 KHz, and 3.43 KHz controls turned all the way counter-clockwise.
5. Play a selection and turn the controls slightly (no more than 1/8 of a turn at a time) until the sound is acceptable. Be sure that the phonograph volume is adequate. If the volume is not adequate, you will need to turn each control up (counter-clockwise) slightly until the volume is satisfactory.

Remember: The maximum volume setting is obtained when all controls are turned fully counter-clockwise.

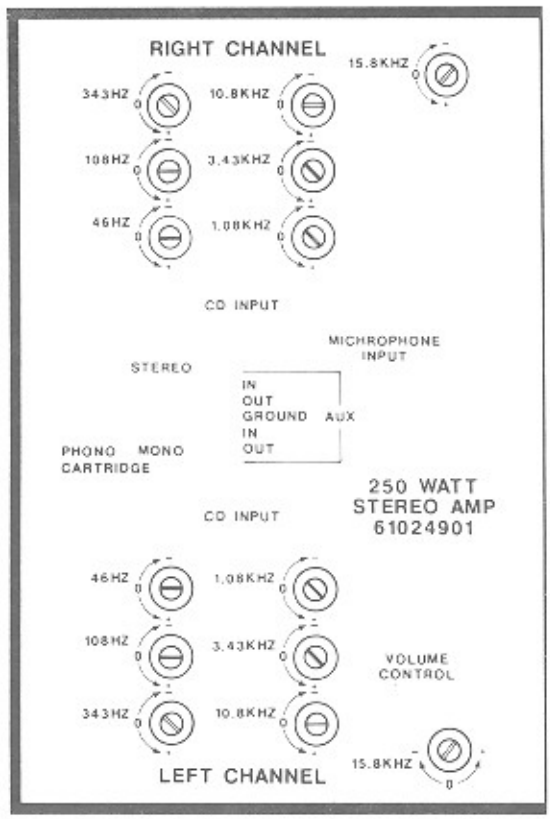


Figure 2-9C. "Non-Absorbant" Rooms

Paging

Paging circuitry is part of the 61023701 Preamplifier. The microphone cable plugs directly into the preamplifier.

Extension Speaker Operation

To avoid a poor sounding phonograph, care must be taken when adding extension speakers. Three requirements must be met:

1. Speakers must be wired so that the power consumed by the phonograph speakers and the extension speakers, including wallettes, does not exceed the amplifier power rating.
2. Extension speakers should produce the desired sound level relative to the sound level of the speakers on the phonograph.
3. All speakers must be connected with the correct polarity.

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.

Several charts have been included to assist you with connecting the extension speakers. *Figure 2-10* at the end of this section shows the entire sound system.

70-Volt Speakers

To avoid prohibitive cable losses on long speaker lines, 70-volt speakers should be used as much as possible.

The power level in the 70-volt speakers is set at each speaker.

Low Impedance Speakers

Low impedance speakers (8 ohms) can be used when the connecting cable is less than 100 feet.

4-OHM SPEAKERS

No more than one 4-ohm speaker should be connected to a speaker line. If several 4-ohm speakers are to be used, each speaker should have its own line.

8-OHM SPEAKERS

The loss in 100 feet of zipcord feeding one 8-ohm speaker is 15%. The loss for two 8-ohm speakers is 30%.

Do not connect a low impedance speaker to a speaker tap that exceeds the speaker's power rating.

CAUTION:

In any speaker installation, the total speaker load (the sum of all power ratings of all speakers) must not exceed 250 watts.

SELECTING SPEAKER POWER

General Instructions

This section will lead you through the power and speaker selection process. This process consists of three major steps and several smaller steps. The major steps are:

1. Identifying the extension speakers and computing the extension speaker power
2. Making the external speaker connections
3. Determining and selecting the phonograph power

Step-By-Step Instructions

1. Use a pencil (you may want to revise your figures) to fill in the work sheet on the following pages.

Table 2-4. Extension Speaker Work Sheet
Sheet 1

Extension speakers are available in three general categories: General purpose speakers (4 and 8 ohm speakers), wallbox speakers, and 70-volt speakers.

Use this work sheet to help you calculate the amount of power consumed by the extension speakers.

Use table 2-5 as a guide to help you select which power tap to use for each type of external speaker that you are using.

4-OHM SPEAKERS

Place the quantity of stereo speakers in the blank under QTY and multiply the quantity times the power consumption (show stereo speakers as 2 speakers). Place your results in the TOTAL blank.

4-Ohm Stereo Speakers

	QTY	Total	Connections
Speakers for the 1 watt taps:	___ at 1 watt each =	_____ watts	(E1 to E2)
Speakers for the 1.75 watt taps:	___ at 1.75 watts each =	_____ watts	(E4 to E5)
Speakers for the 4 watt taps:	___ at 4 watts each =	_____ watts	(E1 to E3)
Speakers for the 9 watt taps:	___ at 9 watts each =	_____ watts	(E2 to E4)
Speakers for the 16 watt taps:	___ at 16 watts each =	_____ watts	(E1 to E4)
Speakers for the 28 watt taps:	___ at 28 watts each =	_____ watts	(E1 to E5)
Speakers for the 64 watt taps:	___ at 64 watts each =	_____ watts	(E1 to E6)
Speakers for the 113 watt taps:	___ at 113 watts each =	_____ watts	(E1 to E7)

4-Ohm Mono Speakers

Speakers for the 4 watt taps:	___ at 4 watts each =	_____ watts	(E2 to E2)
Speakers for the 16 watt taps:	___ at 16 watts each =	_____ watts	(E3 to E3)
Speakers for the 64 watt taps:	___ at 64 watts each =	_____ watts	(E4 to E4)
Speakers for the 113 watt taps:	___ at 113 watts each =	_____ watts	(E5 to E5)

Table 2-4. Extension Speaker Work Sheet
Sheet 2

8-OHM SPEAKERS

Place the quantity of stereo speakers in the blank under QTY and multiply the quantity times the power consumption (show stereo speakers as 2 speakers). Place your results in the TOTAL blank.

8-Ohm Stereo Speakers

	QTY	Total	Connections
Speakers for the .5 watt taps:	___ at .5 watt each =	_____ watts	(E1 to E2)
Speakers for the .9 watt taps:	___ at .9 watts each =	_____ watts	(E4 to E5)
Speakers for the 2 watt taps:	___ at 2 watts each =	_____ watts	(E1 to E3)
Speakers for the 4.5 watt taps:	___ at 4.5 watts each =	_____ watts	(E2 to E4)
Speakers for the 8 watt taps:	___ at 8 watts each =	_____ watts	(E1 to E4)
Speakers for the 14 watt taps:	___ at 14 watts each =	_____ watts	(E1 to E5)
Speakers for the 24 watt taps:	___ at 24 watts each =	_____ watts	(E2 to E6)
Speakers for the 32 watt taps:	___ at 32 watts each =	_____ watts	(E1 to E6)
Speakers for the 57 watt taps:	___ at 57 watts each =	_____ watts	(E1 to E7)

8-Ohm Mono Speakers

Speakers for the 2 watt taps:	___ at 2 watts each =	_____ watts	(E2 to E2)
Speakers for the 8 watt taps:	___ at 8 watts each =	_____ watts	(E3 to E3)
Speakers for the 32 watt taps:	___ at 32 watts each =	_____ watts	(E4 to E4)
Speakers for the 57 watt taps:	___ at 57 watts each =	_____ watts	(E5 to E5)
Speakers for the 128 watt taps:	___ at 128 watts each =	_____ watts	(E6 to E6)

WALLBOXES

Place the number of wallbox units in the blank under QTY and multiply the quantity times the power consumption. Place your results in the TOTAL blank.

Wallboxes for the .35 watt taps:	___ at .35 watts each =	_____ watts	(E4 to E4)
Wallboxes for the 1.4 watt taps:	___ at 1.4 watts each =	_____ watts	(E5 to E5)
Speakers for the 5.0 watt taps:	___ at 5.0 watts each =	_____ watts	(E6 to E6)

70-VOLT SPEAKERS

70-Volt speakers have a power tap on them or on their associated transformer. Add together all of the 70-volt speaker tap settings and enter that value:

_____ watts (A1 to A2)

Table 2-4. Extension Speaker Work Sheet
Sheet 3

Combine all speaker's consumptions:

	Stereo	Mono
4-Ohm:	_____	_____
8-Ohm:	_____	_____
Wallboxes:	_____	_____
70-Volt:	_____	_____

	Stereo		Mono		Grand Total
Totals:	_____	+	_____	=	_____

Subtract the Grand Total from 250 and write the result

in the blank at the end of this line: **Power Available For The Phonograph** _____

The Grand Total is the amount of power that the phonograph will need to supply to the extension speakers. This amount must be less than 250 watts. If this amount is not less than 250 watts, you must reduce the power used by the extension speakers to reduce the total power consumed; then recalculate the total power consumed.

When you subtract the Grand Total from 250, you will get the "Power Available For The Phonograph" figure. Be sure to write this value down in the blank because you will not be using it until you have wired all of the extension speakers.

2. When you have reached a satisfactory combination of speakers and speaker power consumption, use the CONNECTION column (the connections are in parentheses) as a wiring guide to make the actual connections. *Refer to figure 1-1* for the location of the speaker terminal strips and *refer to figure 2-10* for typical examples of speaker connections.

NOTE:

1. **The amplifier may be connected to a load of 250 watts before distortion will begin to increase beyond specification.**
2. **The wallbox speakers have been treated as 45-ohm speakers.**
3. **Refer to *figure 2-11* for remote volume control connection diagrams.**

3. The phonograph wires to change are the Violet (left channel) and the Pink (right channel) on the output transformer assembly (*see table 2-5*).

   Use table 2-5 as a guide to select the power used by the phonograph. This power should roughly match the amount indicated in "Power Available For The Phonograph" on the previous page.

Table 2-5. Phonograph Speaker Power

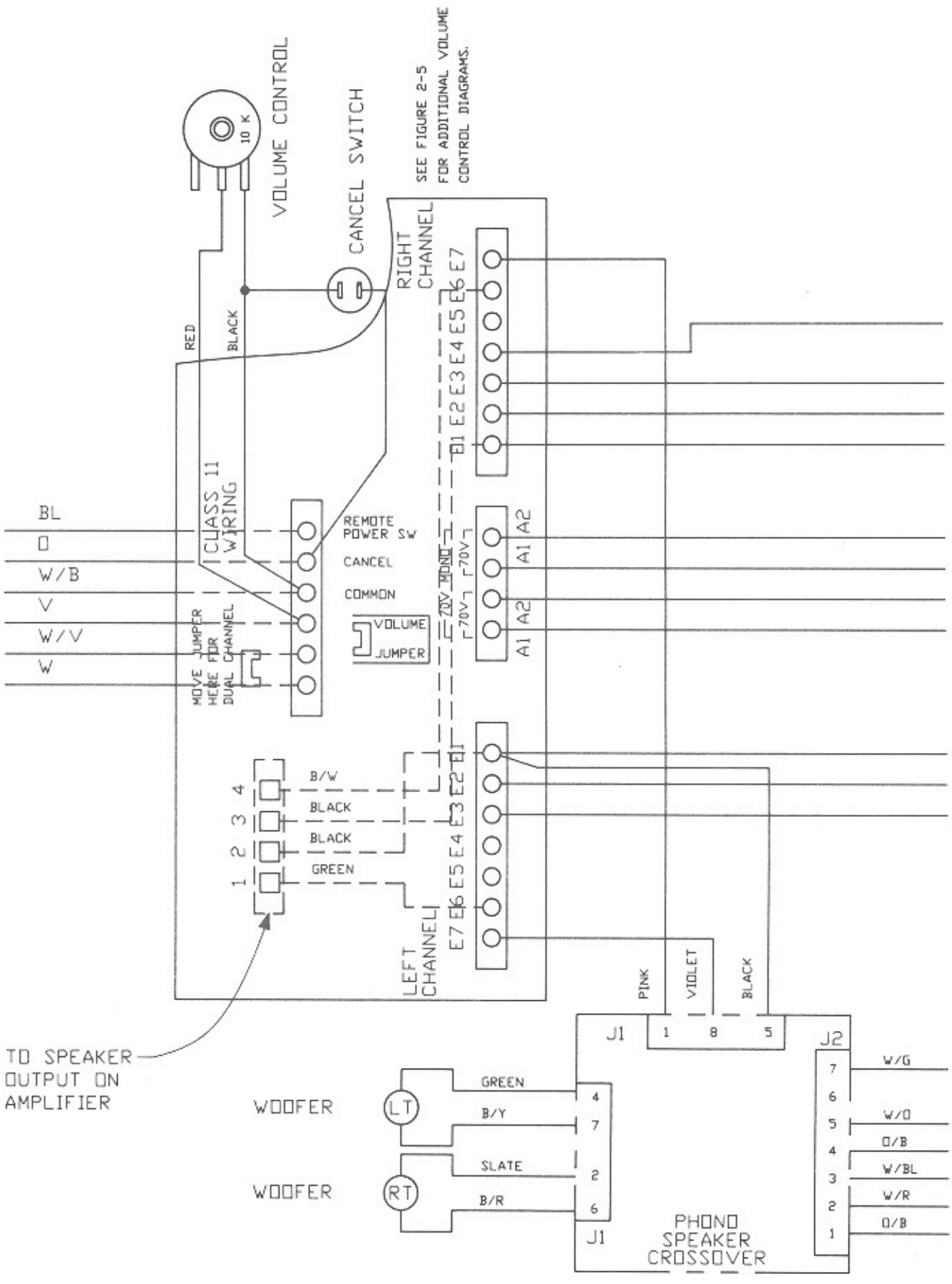
Select the speaker taps that will use up most of the "available Speaker Power".

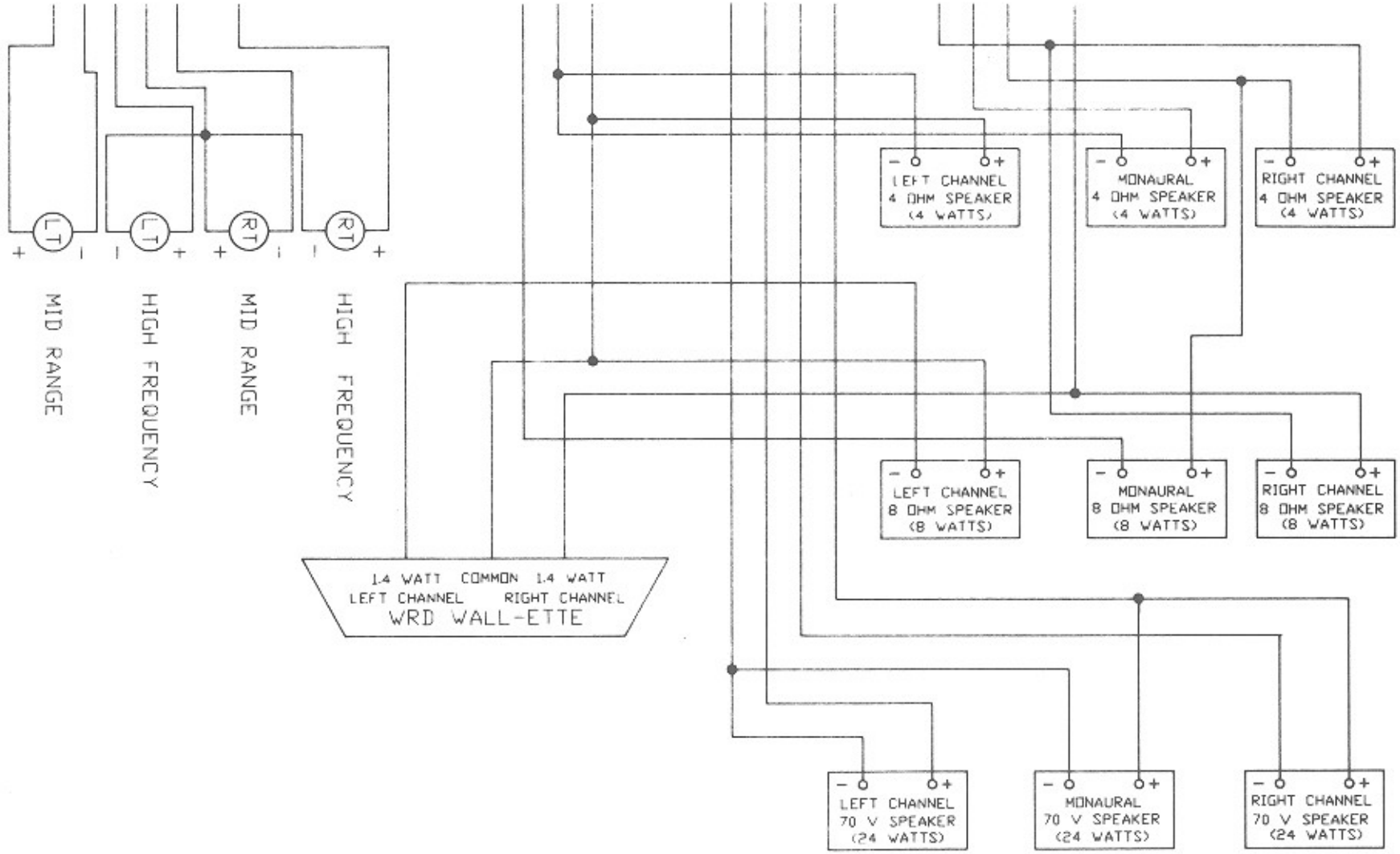
You may select more power or less phonograph power to suit you phonograph volume preference.

Phono Power[1]	Phono Speaker Connections
1	Violet connects to Left E2, Pink connects to Right E2
4	Violet connects to Left E3, Pink connects to Right E3
16	Violet connects to Left E4, Pink connects to Right E4
28	Violet connects to Left E5, Pink connects to Right E5
64	Violet connects to Left E6, Pink connects to Right E6
113	Violet connects to Left E7, Pink connects to Right E6

Do not move the Black wire; it should stay on either the Left or Right E1 terminal.

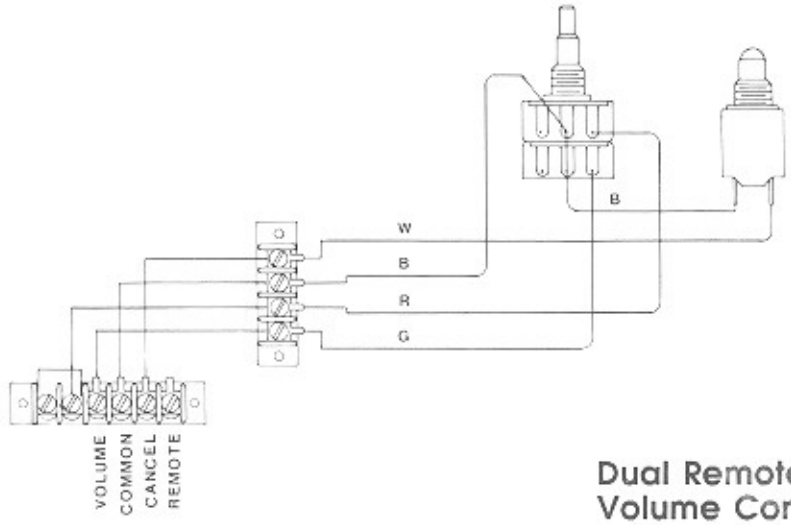
[1] This value is the total for both channels. The power consumption for each channel is one-half of this value.


VOLUME CONTROL
10 K
CANCEL SWITCH
SEE FIGURE 2-5 FOR ADDITIONAL VOLUME CONTROL DIAGRAMS.
RIGHT CHANNEL
E7 E6 E5 E4 E3 E2 E1
RED
BLACK
CLASS 11 WIRING
BL
O
W/B
V
W/V
W
REMOTE POWER SW
CANCEL
COMMON
VOLUME JUMPER
MOVE JUMPER HERE FOR DUAL CHANNEL
70V
PHONO
A1 A2
B/W
BLACK
BLACK
GREEN
1 2 3 4
LEFT CHANNEL
TO SPEAKER OUTPUT ON AMPLIFIER
PINK
VIOLET
BLACK
J1
1 8 5
J2
7 6 5 4 3 2 1
W/G
W/O
O/B
W/BL
W/R
O/B
WOOFER
LT
GREEN
B/Y
WOOFER
RT
SLATE
B/R
4 7 2 6
J1
PHONO SPEAKER CROSSOVER

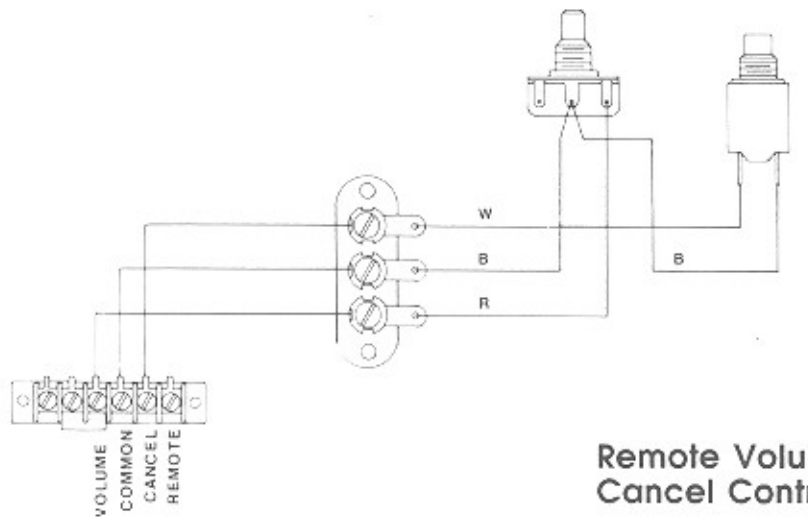


Note: See Section 5 for the crossover schematic and components list

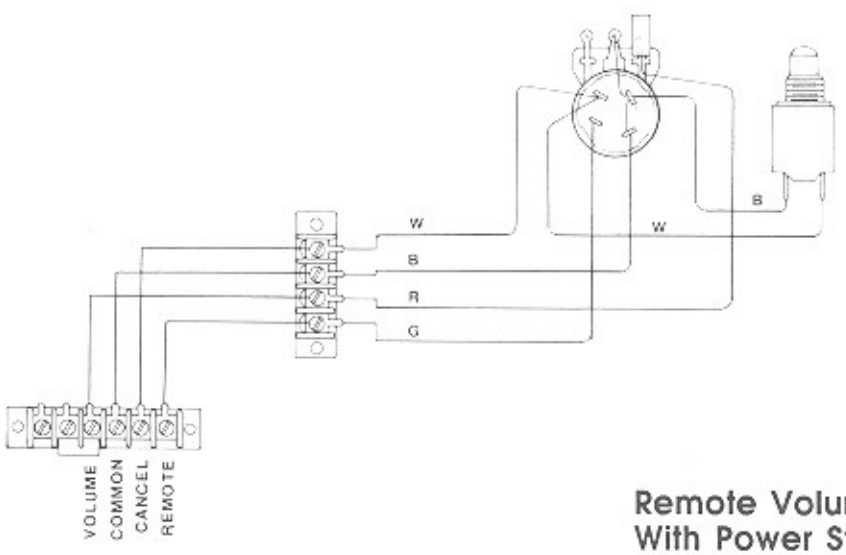
Figure 2-10. Speaker Connections



Dual Remote &
Volume Control 30632209



Remote Volume &
Cancel Control 30632201



Remote Volume & Cancel Control
With Power Switch 30632211

Figure 2-11. Remote Volume Control Diagrams

Section 3: Routine Service

INTRODUCTION

Routine and preventive maintenance are to be performed on your normal periodic service call. This section discusses how to change discs and titles, how to collect money, audit statistics, and preventive maintenance procedures.

LIFTING THE TITLE RACK

CAUTION:

Do not attempt to turn the CD title pages by hand. Use the handwheel on the back of the title rack *(see figure 1-2)*.

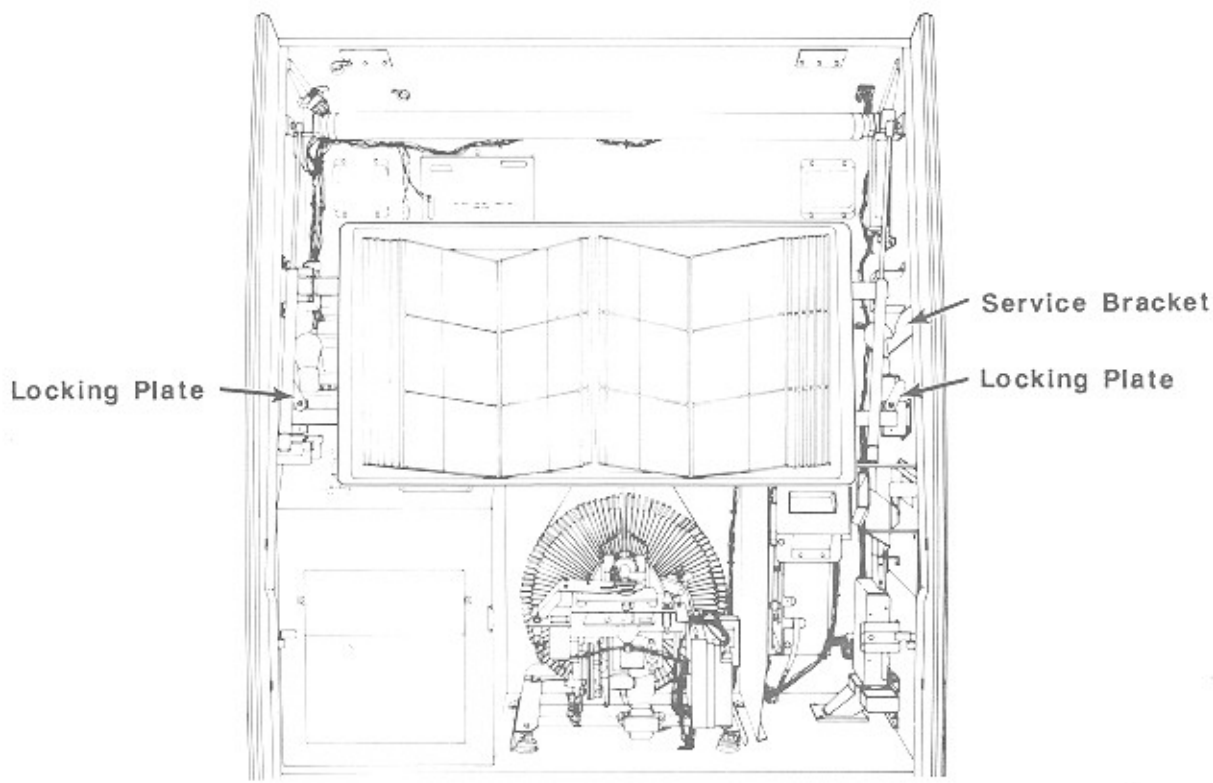


Figure 3-1. Lifting The Title Rack

Before you begin changing discs, you may wish to lift the title rack to give yourself more room to work. Lift the title rack as follows:

1. Open the phonograph top door.
2. Rotate the two locking plates (*see figure 3-1*) away from the title rack bar and lift the bottom of the title rack up and toward you with your left hand.
3. With your right hand, swing the title rack service bracket out to hold the title rack up.

DOING AN AUDIT

The following pages describe how to:

1. Access the phonograph's audit menus and extract audit figures
2. Change title strips and discs
3. Collect money

You can perform these three activities in any order that you wish.

COLLECTING AUDIT FIGURES

The pages that follow describe the major auditing activities that need to be done on a routine service call. If you wish to do additional auditing, you can obtain the additional commands from *table 3-1*, the AUDIT commands.

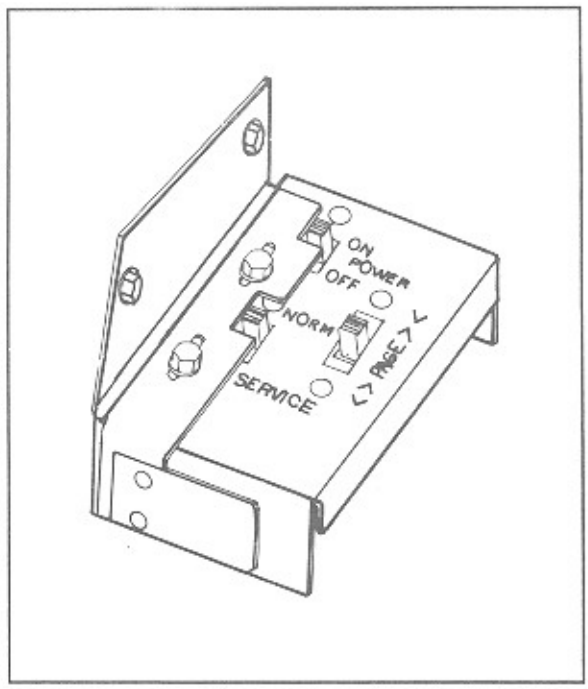


Figure 3-2. Service Switch

Entering The Service Mode

1. Open the top door and place the SERVICE switch (*figure 3-2*) in the SERVICE position. The phonograph display will say * SERVICE MODE *. At this point, the phonograph is in Security Level 1. You can only view audit information in this security level. In order to clear the cash, play, and popularity figures you must obtain and properly enter the security code for SECURITY LEVEL 2.

Entering A Security Level

1. Make sure that you have placed the SERVICE switch in the SERVICE mode and that * SERVICE MODE * is on the keyboard display.
2. Press 0 to select the Security submenu then type 0 to select CODE ENTRY. Type the security code, and then press POPULAR. The phonograph will automatically go to the security level that matches the code that you typed in. If the security code is set to the factory code (0000), or if the Level 2 and Level 3 codes are the same, you will see that the display says that you are on Level 3. If you are on Level 3 Security, be careful . . . any changes that you request will be made.
3. Press and hold RESET while you press POPULAR two times. This will take you back to the * SERVICE MODE * display, which is called the "MAIN menu".

NOTE:

If you find that you are not seeing the display that you expect, you can always: press and hold RESET and then press POPULAR three times. This will take you back to the main menu.

At this point you can begin doing the audits. *Refer to the CD-100 Service Mode Map (figure 2-7)* for a diagram of the audit menus and commands. Do audits for cash, play, non-resettables, clear disc popularity, clear cash, clear plays in the following manner:

Cash Audits

1. Type 100. This displays the CURRENT CASH value. Record the CURRENT CASH figure in your usual way and go to the next step.
2. Press and hold RESET and then press 1. This will move you down to the next display. Record the CASH VALUE in the usual way.
3. Repeat Step 2 until you do the last CASH audit, which is the #2 BILLS audit. Do this audit and then press and hold RESET while you press POPULAR three times.

Play Audits

1. Type 110. This displays the FREE CREDITS value. Record the FREE CREDITS figure in your usual way and go to the next step.
2. Press and hold RESET and then press 1. This will move you down to the next display. Record the credit value in the usual way.
3. Repeat Step 2 until you do the last PLAY audit, which is the MOST POPULAR PLAYS audit. Do this audit and then press and hold RESET while you press POPULAR three times.

Non-Resettable Audits

1. Type 120. This displays the NON-RESETTABLE CASH value. Record the NON-RESETTABLE CASH value in your usual way and go to the next step.
2. Press and hold RESET and then press 1. This will move you down to the next display. Record the value in the usual way.
3. Repeat Step 2 until you do the last NON-RESETTABLE audit, which is the ALBUMS PLAYED audit. Do this audit and then press and hold RESET while you press POPULAR three times. This returns you to the main menu.

Most Popular Disc

1. Type 17. The most popular disc number will be displayed.

2. If you wish to know the next-to-the-most popular, press and hold RESET and then press 3. Press and hold RESET and then press 3 to display each successive "Most Popular" disc. Press and hold RESET and then press 2 to move through the popularity display toward the most popular disc.

3. Press and hold RESET while you press POPULAR twice. This returns you to the main menu.

Least Popular Disc

1. Type 18. The least popular disc will be displayed.

2. To display the next "Least Popular" disc, press and hold RESET and then press 2. Press and hold RESET and then press 2 to display each successive least popular disc. Press and hold RESET and then press 3 to move through the popularity display toward the least popular disc.

3. Press and hold RESET while you press POPULAR twice. This returns you to the main menu.

Most Popular Selection

1. Type 19. The most popular selection number will be displayed.

2. To display the next most popular selection, press and hold RESET and then press 3. Press and hold RESET and then press 3 to display each successive most popular selection. Press and hold RESET and then press 2 to move through the popularity display toward the most popular selection.

   You can request the popularity for a particular selection by pressing the selection number (four digits).

Clearing The Audit Values

The three CLEAR options will not clear the corresponding audit value until the POPULAR button is pressed.

For example:

You can display the CLEAR CASH message and then move to CLEAR PLAYS and then move back to CLEAR CASH without actually clearing either set of values.

The following steps describe how to perform each of the three CLEAR commands as a separate activity. If you wish to use the "short cut" method, *follow the Using The CD-100 Commands instructions in Section 2.* Each of these commands may be executed from SECURITY LEVEL 2 or 3.

CLEAR CASH

1. Make sure that you are in the SERVICE mode and that * SERVICE MODE * is on the display.

2. Type 14. The message CLEAR CASH will appear on the display. Press POPULAR to clear the cash values. The display will blink when the command is executed.

3. Press and hold RESET while you press POPULAR twice.

CLEAR PLAYS

1. Make sure that you are in the SERVICE mode and that * SERVICE MODE * is on the display.
2. Type 15. The message CLEAR PLAYS will appear on the display. Press POPULAR to clear the play values. The display will blink when the command is executed.
3. Press and hold RESET while you press POPULAR twice.

CLEAR SELECTION POPULARITY

1. Make sure that you are in the SERVICE mode and that * SERVICE MODE * is on the display.
2. Type 16. The message CLEAR SEL POP will appear on the display. Press POPULAR to clear the popularity values. The display will blink when the command is executed.
3. Press and hold RESET while you press POPULAR twice.

CHANGING CD'S AND TITLES

CAUTION:

Do not attempt to turn the CD title pages by hand. Use the handwheel on the back of the title rack *(see figure 1-2).*

The procedure for loading CD's and titles into an empty phonograph is different from the procedure to change CD's and titles. Please make sure that you are following the procedure that describes your situation.

Preparing Titles For The Title Rack

1. If your titles have not been shipped with the discs or pre-printed, you will need to prepare the title strips yourself.
2. Tear each title strip from the title sheet so that the two perforated columns appear on the side of the title strip (the shaded portion of the title strip in *figure 3-3* represents a title strip that has been removed from the title sheet).
3. Fold the title strip along the inner most perforated line on both sides of the title strip *(see figure 3-4).*
4. Locate the CD album booklet that matches the title strip that you have just made. If the CD booklet is more than two sheets thick, remove the inner sheets so that the booklet is no thicker than two title strips.
5. Insert the CD booklet under the top and bottom tabs of the title rack. Slide the CD booklet toward the pivot of the title rack until the booklet is trapped by the molded stops on the title page *(see figure 3-5, ref A).*

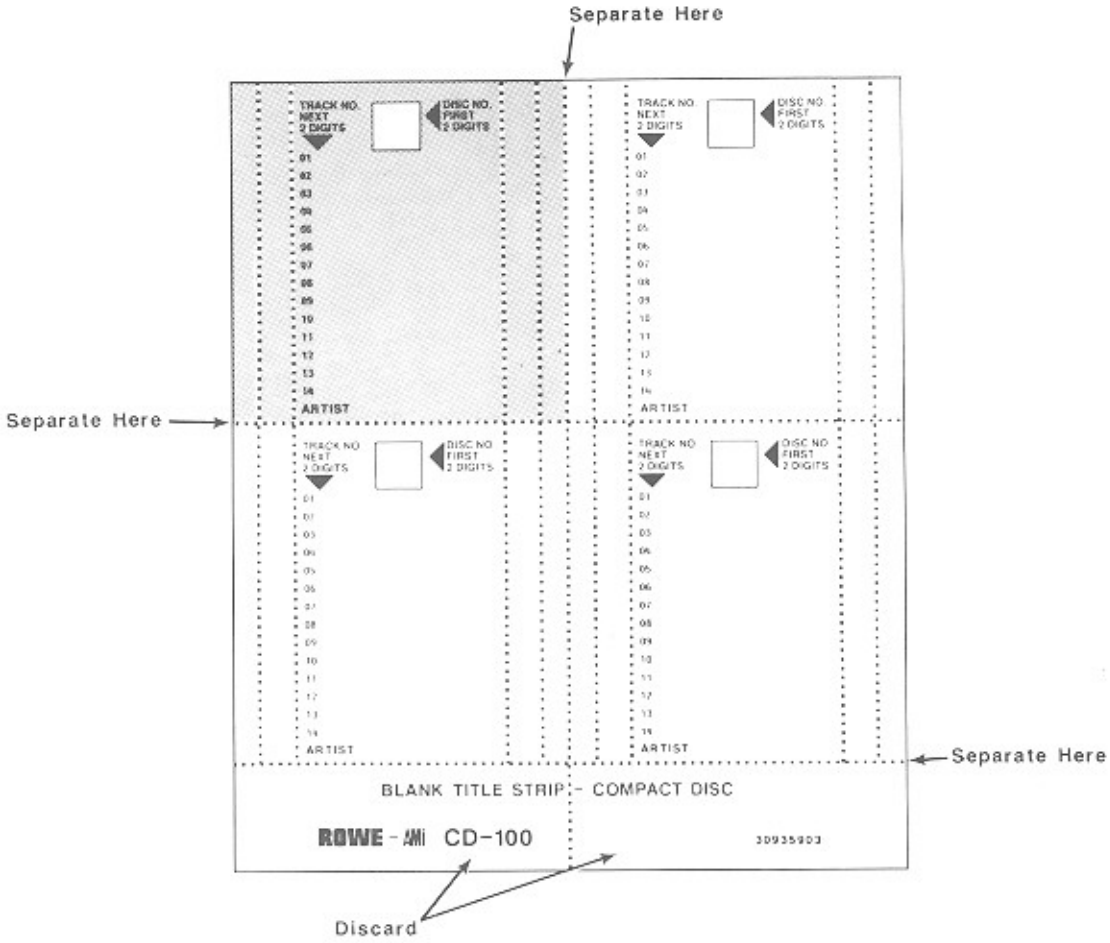


Figure 3-3. Blank Title Sheet

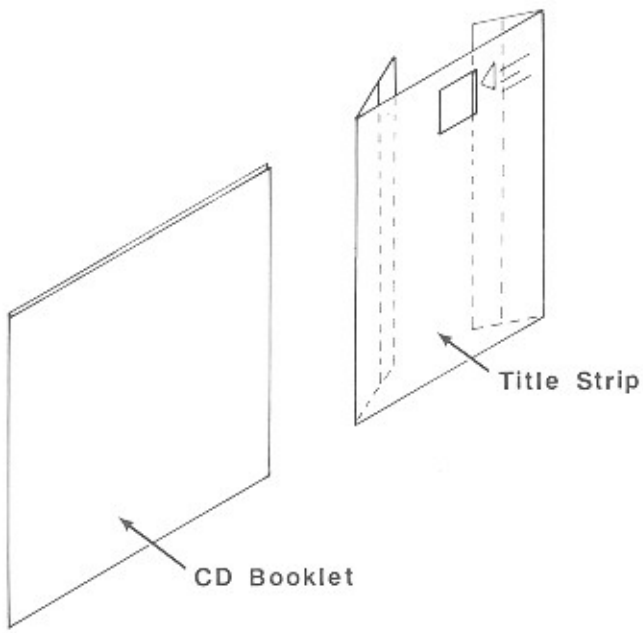


Figure 3-4. Folding The Title Strip

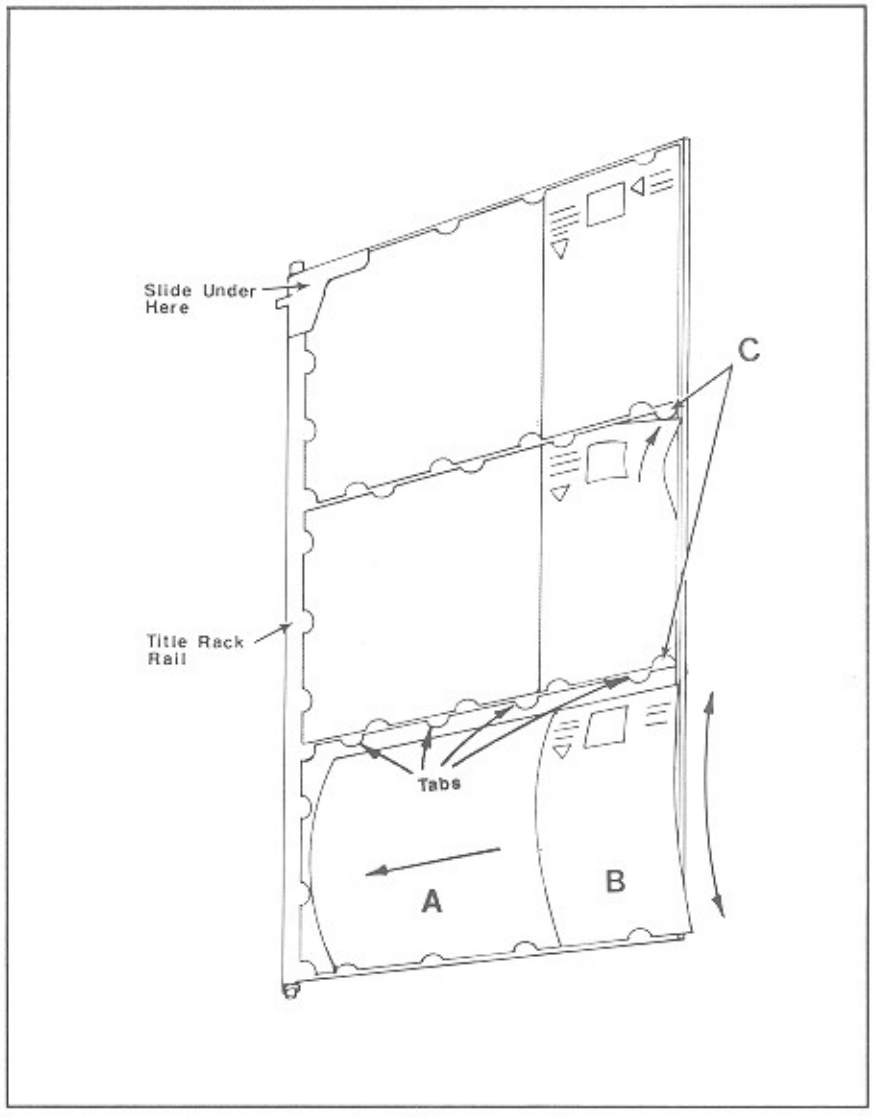


Figure 3-5. Loading the Title Rack
(Right-Hand Page)

6. Insert the folded title strip under the top and bottom tabs of the title rack. Slide the title strip until the disc number shows in the opening of the title strip and the title strip is locked in place by the molded stops *(see figure 3-5, ref B).*

7. All of the tabs surrounding the CD booklet and title strip should be holding them in place. If you missed a tab, carefully tuck the loose paper under the tab as shown in *figure 3-5, ref C.*

8. Repeat steps 4 through 7 until all titles are installed. Use the CHANGE PAGE buttons to change title rack pages. Insert filler title strips (Part Number 30940601) to fill out any unused space left on a page. Insert these in the same way that you installed the fill-in title strips.

Changing Title Page Limits On An Installed Phonograph

1. Unlock and open the top door, if you have not already.
2. Move the SERVICE switch to the SERVICE position, if not already done (*refer to figure 3-2*).
3. Make sure that * SERVICE MODE * appears on the display.
4. Type 00 and then type the security code to gain access to SECURITY LEVEL 3.
5. Press and hold RESET and then press POPULAR twice. This will return you to the main menu (the same display as step 3).
6. Type 24 and you will see the display for entering the first page number to use and the last number to use. Type the first page number (page numbers are counted from the left to the right) and press POPULAR. Notice that the blinking number has moved to the right. Type the last page number to be used and press POPULAR.

Changing Discs

You can (1) initialize each disc as you change it, or (2) you can write down all of the disc numbers and then type them all into the INITIALIZE command. The following steps describes the second method.

Change discs as follows:

1. Unlock and open the top door, if not already done.
2. Move the SERVICE switch to the SERVICE position, if not already done (*refer to figure 3-2*).
3. Press the SCAN button to move the disc space to the left or right of the transfer arm.

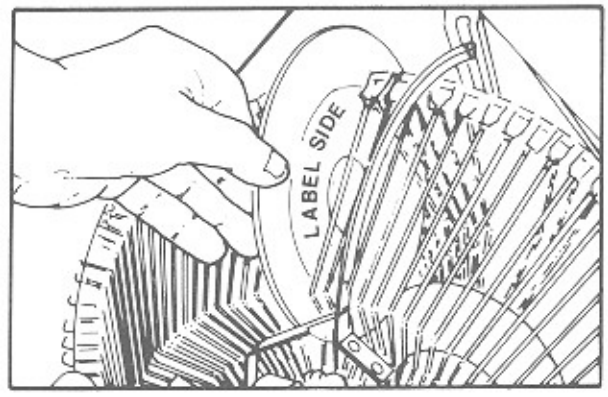


Figure 3-6. Changing a Disc

4. Slide the old CD out of the slot and slide the new CD into the slot (*see figure 3-6*) with the label to the right. Write the disc number on a note pad.
5. Repeat step 4 until all discs have been changed.
6. Make sure that you have placed the SERVICE switch in the SERVICE mode and that * SERVICE MODE * is on the keyboard display.
7. Type 31. Enter the CD numbers that you have changed and press POPULAR. After you have entered all of the disc numbers, place the phonograph into the NORMAL mode and the initialization process will start. Selections can be made while the new discs are being initialized.

NOTE:

When changing discs, be sure to keep the magazine disc load approximately balanced. If the magazine is partially loaded with all discs on one side, The sprag wheel may lock and the magazine will not turn.

COMPLETE AUDIT COMMAND LIST

Table 3-1 is a complete list of the Audit commands with an explanation of what each command does.

Table 3-1. Audit Commands

Command	Description

1 **AUDITS** - Are the functions and menus that allow you to display and reset the various accumulated figures for money, popularity, number of plays, and credits.

10 **Cash Audits** - Is the menu that allows you to display, but not change, cash totals, number of coins through the coin switches, and the total number of bills.

11 **Play Audits** - Is the menu that allows you to display, but not change, credits, autoplays, mechanism plays, and album plays.

12 **Non-Resettables** - Is the menu that allows you to display the ongoing totals. These totals cannot be reset from any security level.

13 **Clear Disc Popularity** - Clears the popularity for all discs. This option should only be used after the popularity figures (Selections 7, 8, and 9 in this menu) have been read and recorded. Press POPULAR to clear the popularity values. The display will blink when the command is executed.

COMMANDS 14, 15, AND 16 CAN BE EXECUTED FROM LEVEL 2

14 **Clear Cash** - Clears all current cash totals. This option should only be used after the figures for Cash Audits (selection 0 in this menu) have been read and recorded. Press POPULAR to clear the cash audit values. The display will blink when the command is executed.

15 **Clear Plays** - Clears all current play totals. This option should only be used after the PLAY AUDIT figures in PLAY AUDITS (selection 1 in this menu) have been and recorded. Press POPULAR to clear the play audit values. The display will blink when the command is executed.

16 **Clear Selection Popularity** - Clears all current selection popularity. This option should only be used after the PLAY AUDIT figures in PLAY AUDITS (selection 1 in this menu) have been and recorded. Press POPULAR to clear the selection popularity values. The display will blink when the command is executed.

17 **Display The Most Popular Disc** - Displays the most popular disc number (00-99), followed by the number of plays (9999 maximum) that disc had. To display the next most popular disc, press and hold RESET and then press 3. Press and hold RESET and then press 3 to display each successive most popular disc. Press and hold RESET and then press 2 to move up through the popularity display toward the most popular disc.

You can request the popularity for a particular disc by pressing the disc number.

Command	Description

18 **Display The Least Popular Disc** - Displays the least popular disc number (00-99) followed by the number of plays that the disc had. To display the next "least popular" disc, press and hold RESET and then press 2. Press and hold RESET and then press 2 to display each successive leastRESET and then press 3 to move up through the popularity display toward the least popular disc.

You can request the popularity for a particular disc by pressing the disc number.

19 **Display The Most Popular Selection** - Displays the most popular selection number (disc 00-99 followed by selection 00-99, a total of four digits), followed by the number of plays (9999 maximum) that selection had. To display the next "most popular" selection, press and hold RESET and then press 3. Press and hold RESET and then press 3 to display each successive most popular selection. Press and hold RESET and then press 2 to move up through the popularity display toward the most popular selection.

You can request the popularity for a particular selection by pressing the selection number (four digits).

10 **CASH AUDITS** - Allows you to display, but not change, cash totals, number of coins through the coin switches, and the total number of bills.

100 **Current Cash**[1] - Displays the total cash amount collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.

101 **Current Bill**[1] - Displays the total amount of bills collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.

102 **Current Coin**[1] - Displays the total amount of coins collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.

103 **Current Wallbox**[1] - Displays the total amount of money collected by wallboxes since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.

104 **Current Number Of Type 1 Coins** - Displays the total number of Type 1 coins collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.

105 **Current Number Of Type 2 Coins** - Displays the total number of Type 2 coins collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.

106 **Current Number Of Type 3 Coins** - Displays the total number of Type 3 coins collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.

---

[1] This information is displayed as the number of units in Version 1.0 and 1.1 (money=units x multiplier and the display says: CASH = - - - - - - - -). In Version 1.2 and subsequent, this value is displayed as the actual cash value (the display says: -CASH = - - - - - - - -).

Table 3-1. Audit Commands
Continued

Command	Description
107	**Current Number Of Type 4 Coins** - Displays the total number of Type 4 coins collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
108	**Number Of Type 1 Bills** - Displays the total number of Type 1 ($1) bills collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
109	**Number Of Type 2 Bills** - Displays the total number of Type 2 ($5) bills collected since the last time the CLEAR CASH command (Selection 4 in the AUDITS menu) was used.
11	**PLAY AUDITS** - Allows you to display, but not change, credits, autoplays, mechanism plays, and album plays.
110	**Free Credits** - Displays the number of free credits given since the last time the CLEAR PLAY command (Selection 4 in the AUDITS menu) was used.
111	**Paid Credits** - Displays the number of paid credits given since the last time the CLEAR PLAY command (Selection 4 in the AUDITS menu) was used.
112	**Autoplays** - Displays the number of Autoplays made since the last time the CLEAR PLAYS command (Selection 5 in the AUDITS menu) was used.
113	**Mechanism Plays** - Displays the number of times the mechanism has dispensed CD's since the last time the CLEAR PLAY command (Selection 5 in the AUDITS menu) was used.
114	**Album Buys** - Displays the number of times albums have been bought since the last time the CLEAR PLAY command (Selection 5 in the AUDITS menu) was used.
115	**Most Popular plays** - Displays the number of times that the POPULAR button was used to play the most popular selection.
116	**Normal Selections** - Displays the number of selections made from the keyboard.
12	**NON-RESETTABLES** - These totals for cash, plays, and credits can be displayed from any security level, but they cannot be reset from any security level. These totals constitute the permanent phonograph history.
120	**Cash**[1] - Displays total cash (displayed as the number of nickels) received by the phonograph
121	**Bill**[1] - Displays total bill cash received (displayed as the number of nickels) by the bill acceptor

[1] This information is displayed as the number of units in Version 1.0 and 1.1 (money=units x multiplier and the display says: CASH = - - - - - - - -). In Version 1.2 and subsequent, this value is displayed as the actual cash value (the display says: -CASH = - - - - - - - -).

Table 3-1. Audit Commands
Continued

Command	Description
122	**Coin**[1] - Displays total coin cash received (displayed as the number of nickels) by the coin acceptor
123	**Wallbox**[1] - Displays total cash received (displayed as the number of nickels) by all wallboxes
124	**Free** - Displays total free credits
125	**Paid** - Displays total paid for credits
126	**Most Popular** - Displays the total number of Most Popular selections
127	**Mechanism** - Displays the total number of mechanism cycles
128	**Album** - Display total number of times an entire album was selected.
129	Selections - Displays the total number of selections made using the keyboard.

[1] This information is displayed as the number of units in Version 1.0 and 1.1 (money=units x multiplier and the display says: CASH = - - - - - - - -). In Version 1.2 and subsequent, this value is displayed as the actual cash value (the display says: -CASH = - - - - - - - -).

Collecting Money

1. Open the top door (if it is not already open) and reach in, behind the bill acceptor, and unlock the bill acceptor bill box.
2. Remove the currency and close and lock the bill box.
3. Close the top door.

PREVENTIVE MAINTENANCE

Preventive maintenance should be performed at the regular intervals specified, while adjustments should be made only when necessary.

In addition to cleaning the cabinet each time the location is visited, clean the interior every three to six months, as required. Keeping the cabinet interior clean reduces dust, resulting in increased disc and component life (*see table 3-2 for details*).

- Use a vacuum cleaner to remove heavy dust deposits.
- Use a clean, lint free cloth saturated in denatured alcohol to clean mechanical parts.
- Clean electrical parts using a clean, dry cloth or camel hair brush.

WARNING:

Use solvents in a well ventilated area only. Do not use solvents on plastic parts.

Table 3-2. Cabinet Cleaning

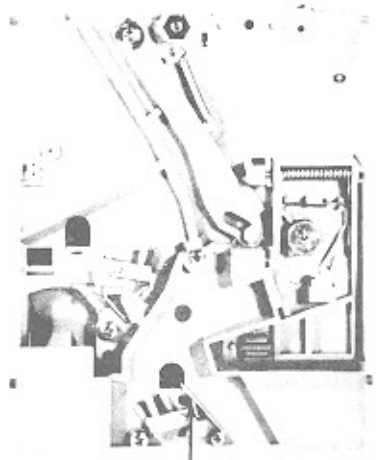
ACTION REQUIRED		PROCEDURE	
1.	**Clean Glass**	a.	Clean all glass with a paper towel and a non-abrasive glass cleaner such as Windex.
		b.	Dry with a clean, lint-free cloth.
2.	**Clean painted wood and metal surfaces**	a.	Clean all painted wood and metal surfaces with mild soap and water. **DO NOT USE SOLVENTS.**
		b.	Apply a good quality auto or furniture wax to protect the finish.
3.	**Clean chrome trim**	a.	Use a damp or dry cloth to remove any dust or dirt.
		b.	Use mild soap and water to remove stubborn deposits. Do not use strong detergents or abrasives of any kind.
4.	**Clean plastic trim**	a.	Wipe all plastic surfaces with a damp or dry cloth only. **DO NOT USE SOLVENTS.**
5.	**Clean electrical components**	a.	Clean all electrical components with a clean, dry, lint-free cloth or a soft bristled brush only.

COIN ACCEPTORS
3 COIN

FRONT VIEW

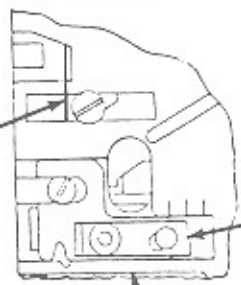
REMOVE COVER AND DRIVE
No. 6-32 SCREW INTO BOSS AS
SHOWN TO REJECT NICKELS

BACK VIEW



TO REJECT DIMES ADD COINCO
No. 903-915 BLOCK OUT WIRE

COIN ACCEPTORS
4 COIN

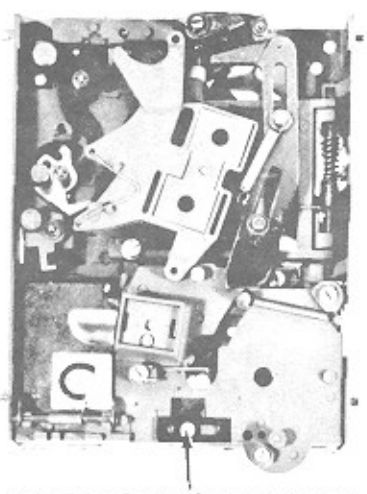


LINE UP EDGE OF
DEFLECTOR WITH
THIS LINE

TO IMPROVE $ SLUG REJECTION
ADJUST AS SHOWN

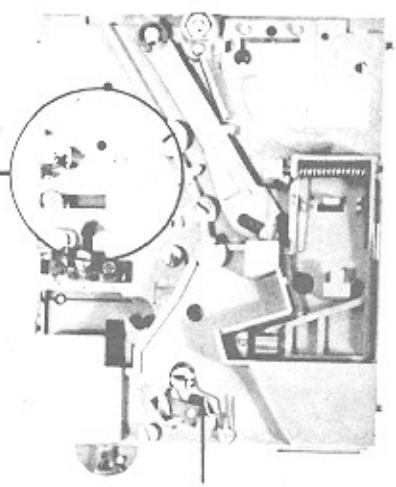
LINE SEPARATOR AS SHOWN

FRONT VIEW



MOVE THIS BRACKET TO RIGHT
TO REJECT NICKELS (OR JUST
FAR ENOUGH TO LEFT TO
ACCEPT NICKELS)

BACK VIEW



TO REJECT DIMES ADD COINCO
No. 903915 BLOCK OUT WIRE

Figure 3-7. Coin Acceptors

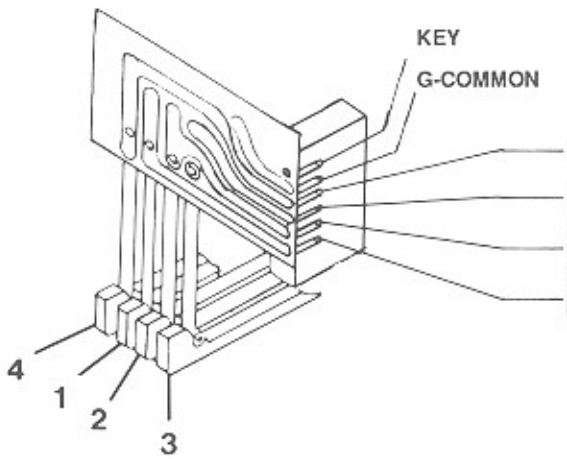
COIN ACCEPTORS (optional)

Coin Switch

Coin Switch Wiring Note:

Table 3-2 shows how to set the coin switch values for 3-coin and 4-coin acceptors. Programing The multiplier (PRICING SELECTION 3) should always be set to 5 for U.S. currency.

Table 3-3. Coin Switch Wiring



3 & 4 COIN WIRING	COIN SWITCH NUMBER	3 COIN VALUE	3 COIN PROGRAM	4 COIN VALUE	4 COIN PROGRAM
Y	4		504 = 10	5¢	504 = 1
BL	3	25¢	503 = 5	50¢	503 = 10
S	2	10¢	502 = 2	10¢	502 = 2
V	1	5¢	501 = 5	25¢	501 = 5

CHECKS AND ADJUSTMENTS

Coin Lever

Refer to figures 3-7 and 3-8 in the following steps:

1. Hold the plastic coin switch lever in the normal position and drop a coin through the slug rejector.
2. When the coin comes to rest on the lever, release the lever slowly.
3. Check that the weight of the coin operates the lever enough to close the coin switch and allow the coin to fall free.
4. Repeat Steps 1, 2, and 3 for the other three levers.

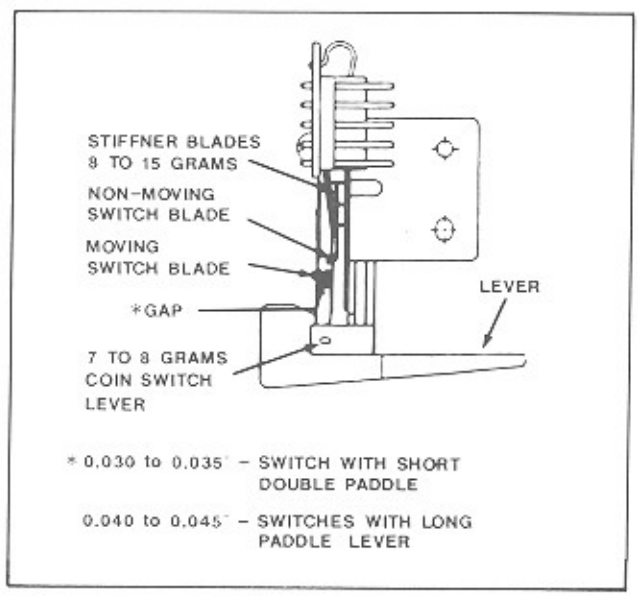


Figure 3-8. Contact Pressure & Gap Adjustment

Contact Pressure And Gap

1. Check that each moving switch blade pushes against its lever with 7 to 8 grams force to hold the lever against the cushion (*see figure 3-7*). To adjust the pressure, bend the blade near its mounting point.

2. Check that each non-moving blade pushes against its stiffener blade with 8 to 15 grams force. To adjust the pressure, bend the contact blade near its mounting point.

3. Check that contact gap at switch with short double paddle is 0.035 inch. Check that the contact gap for long paddle switches is 0.045 inch.

DOOR SPRING REPLACEMENT

1. Open the top door.

2. While another person keeps the door open, find the appropriate style spring end fitting in figure 3-9 and follow the example given.

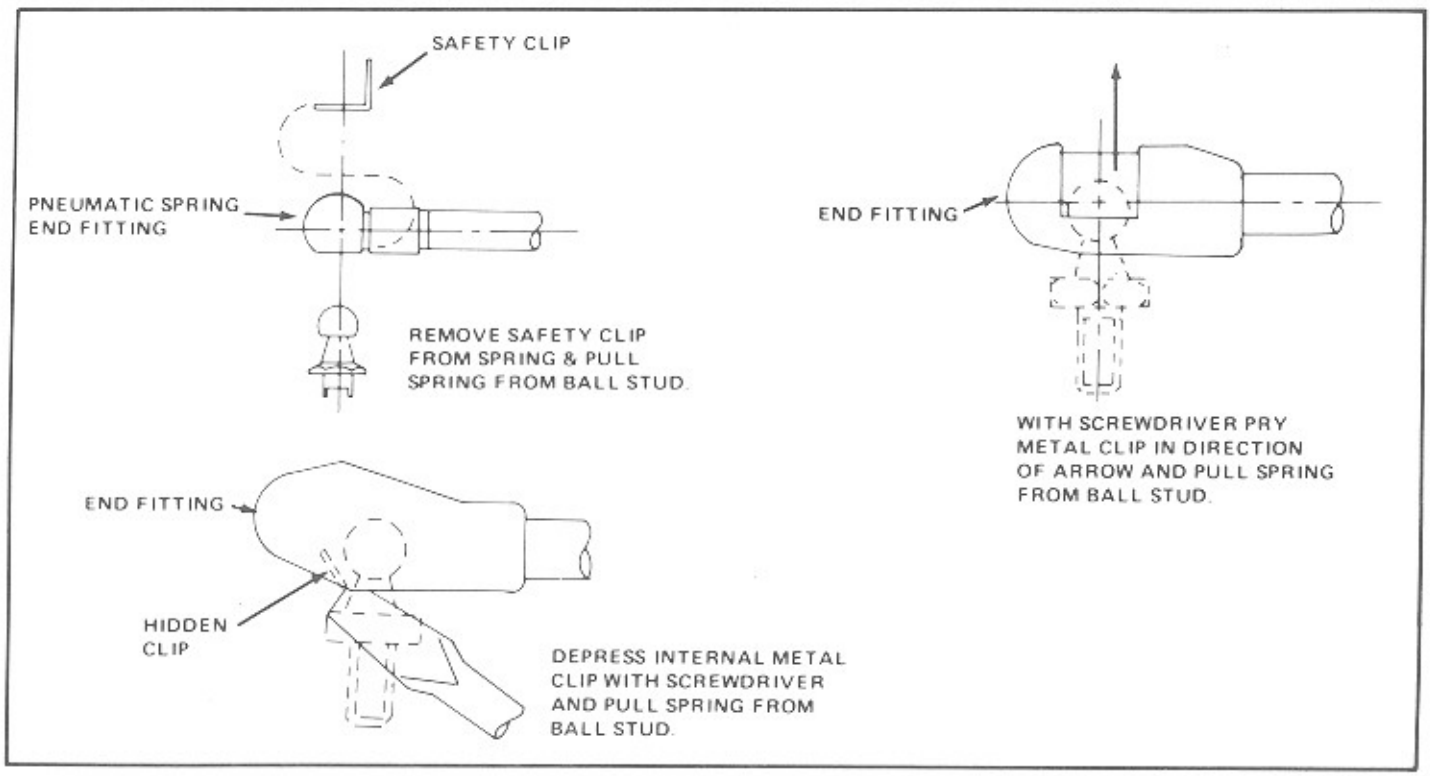


Figure 3-9. Door Spring Fittings

GLASS REPLACEMENT

WARNING:

The top door glass can break or fall on you if you do not follow the reccommended removal procedure.

For your safety, Rowe does not recommend that you replace the top door glass while the top door is on the phonograph. This procedure requires two people to remove the top door safely.

1. Unplug the power to the phonograph.

2. Open the cabinet door.

3. Unplug the 120 volt AC harness at the connector on the upper right side of the phonograph. Unplug the 3-pin connector from the central control computer and disengage the harness from the cable clamps.

4. Remove all of the top door hinge screws except for one screw and one nut at each end of the hinge.

5. With your helper still holding the top door open, disconnect the door springs (use the *Door Spring* procedure in this section if you are not familiar with the procedure for removing the door springs).

6. Remove the two remaining top door hinge screws while your helper continues to hold the top door open.

7. Again, using a helper, lift the top door off of the phonograph and set the door on a clean smooth working surface (lay the door so the outside is down).

8. Remove all of the shroud bracket screws from the four shroud brackets.

9. Lift out the brackets and the plastic shroud.

10. Be sure to protect your hands from broken glass with protective gloves before you remove the door glass. Remove the remaining glass with any available brush.

11. Set the new door glass in the door, re-install the door shroud, and brackets.

12. Lift the door back onto the phonograph and attach all screws and nuts through the hinge. Make sure that the door is centered before you tighten all of the screws.

13. While your helper holds the door, reconnect the door springs and make sure that the door will be supported by the springs.

14. Reconnect the 120 volt AC harness (on the right side of the phonograph) and the other harnesses on the left side of the phonograph and then push them into the cable clamps.

15. Plug-in the phonograph and play a selection and make sure that the title rack pages turn, all lights are on, and the animated discs turn.

16. Check the top door-to-OBA clearance and adjust the OBA if necessary *(see OBA To Top Door Clearance in Section 4 for this procedure).*

Section 4: OBA-2 Maintenance

INTRODUCTION

This section of the service manual provides a general description of the Rowe OBA-2 Bill Acceptor (OBA) including a physical description and a functional description.

The OBA-2 Bill Acceptor accepts valid U.S.returns unacceptable currency to the customer.

The bill acceptor interfaces with the central control computer, which sends and receives messages concerning the acceptance, rejection, and validation of currency.

PHYSICAL DESCRIPTION

The bill acceptor consists of three major components. These are: The bill transport mechanism, the bill stacker, and the OBA control unit *(see figure 4-1)*.

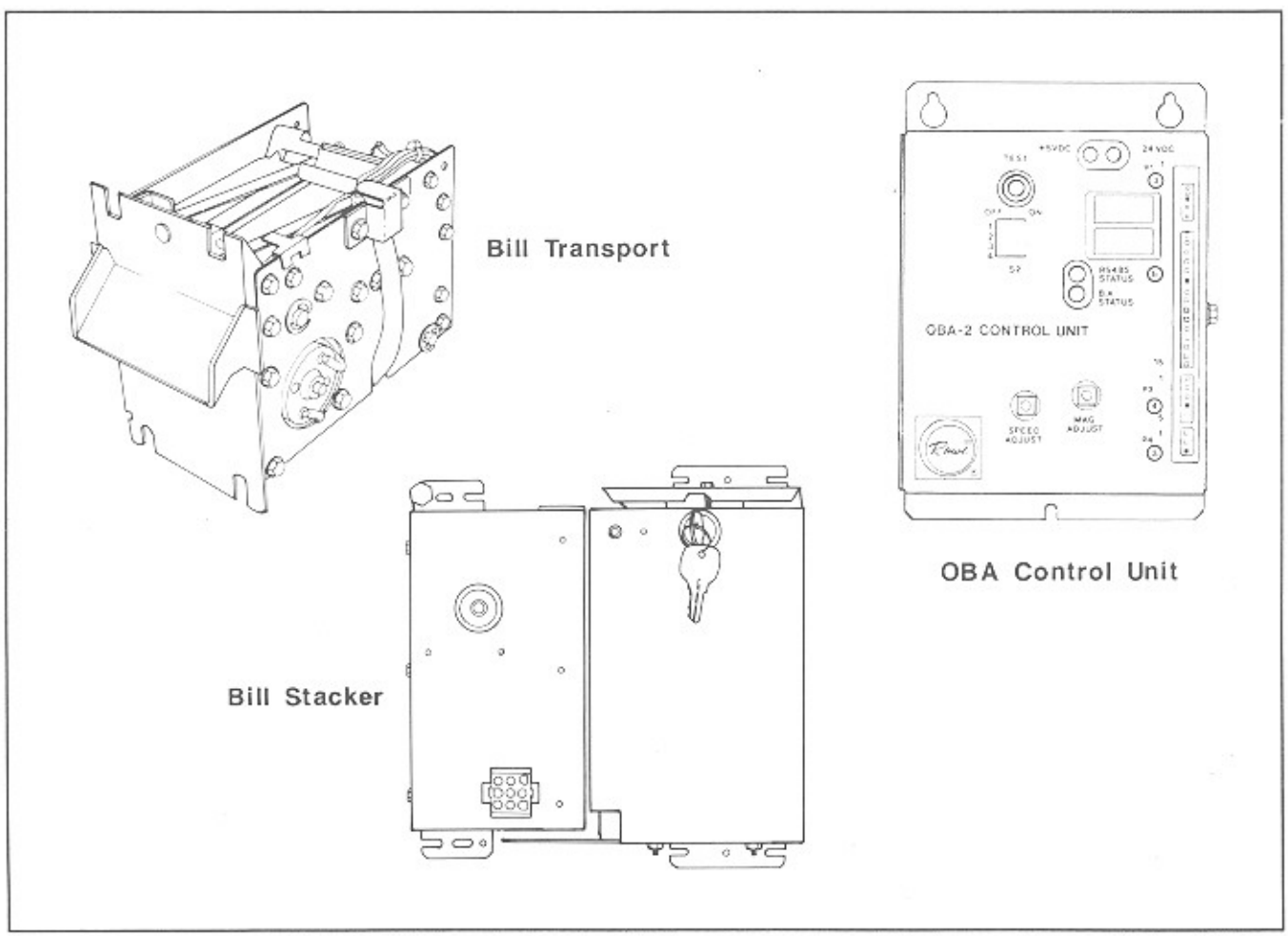


Figure 4-1. Bill Acceptor Components

Bill Transport Mechanism

This device mechanically transports the currency from the bill acceptor opening past various sensors. These sensors scan the bill for validation information and relay it to the OBA control board *(see figure 4-2 and 4-3)*.

DRIVE BELTS

A D.C. motor, a series of rollers, and pulleys and belts carry the bills from the bill inlet through the bill acceptor. The drive belts provide long life and reliable operation while requiring very little maintenance.

The main drive belt and lower bill transporting belts are cogged for more reliable operation, while adjustable idle pulleys are used to maintain correct tension. Upper transporting belts are of a stretch type, which require no adjustment. As the bill moves along the path from the opening to the stacker it is trapped between the upper and lower transporting belts. This provides a sure and non-slip movement through the transport mechanism.

OPTICAL SENSORS

Three optical sensors are used to communicate bill information to the OBA control unit while the

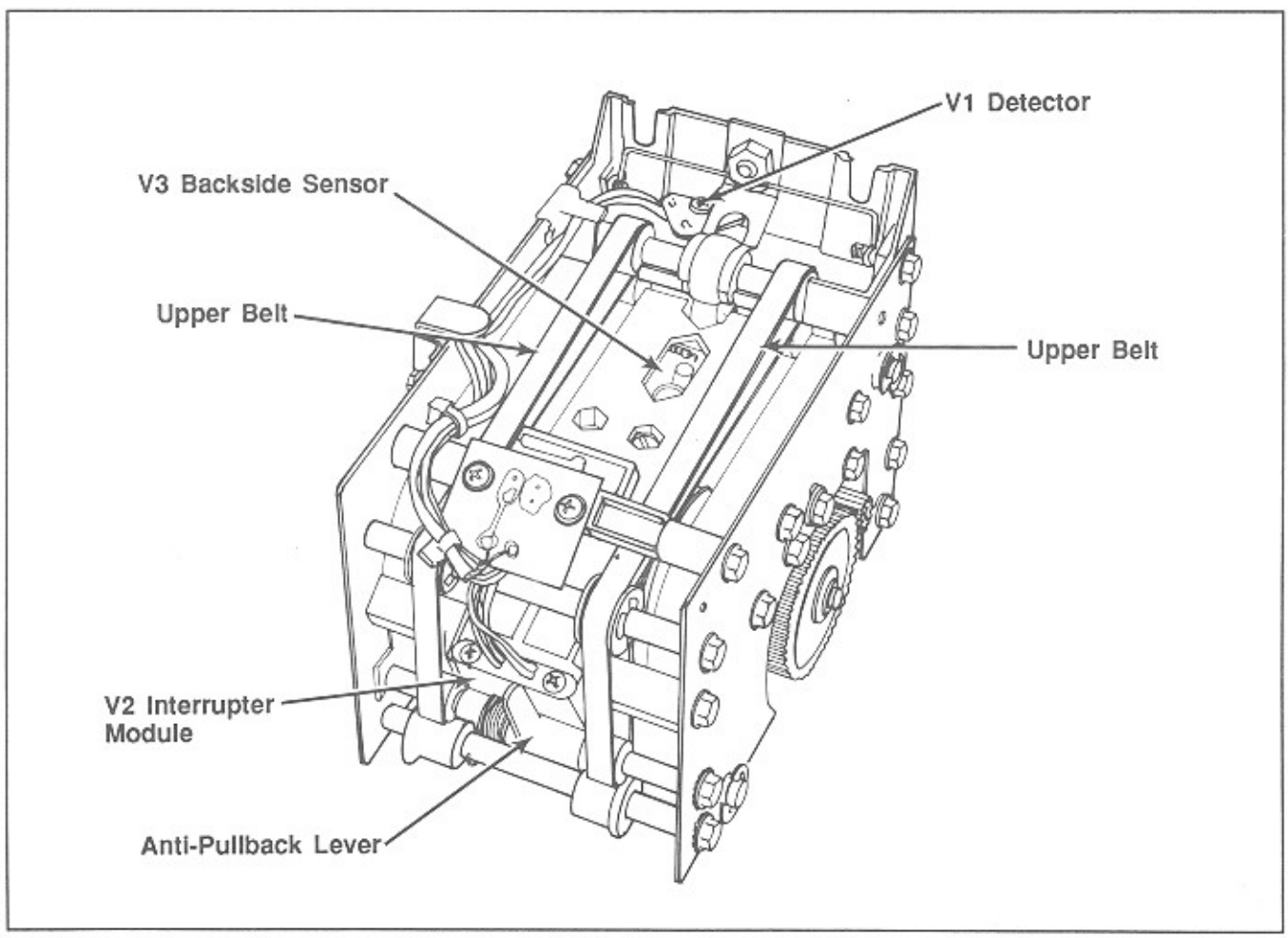


Figure 4-2. Bill Transport Unit
Top View

bill is in the transport mechanism. Two of the three sensors used in the bill acceptor are used for establishing bill position within the transport mechanism path. The third provides validation data from the bill as it passes through the transport. These sensors, referred to hereafter as V1, V2 and V4, are arranged so that, beginning from the bill acceptor opening, the numbers ascend as the bill moves farther away from the opening.

V1 is used to sense the presence of a bill in the transport opening. V2 is used for obtaining precise information from the underside of the bill. V4 is used to make a precise determination of the bill position. All three of the optical sensors are of the infrared type.

MAGNETIC HEAD

The magnetic head checks the magnetic properties of the incoming bill. A spring loaded pressure roller insures intimate contact between the bill and the magnetic head.

ANTI-PULL-BACK LEVER

This lever prevents the bill from being removed by the customer after the bill has been accepted as valid. It also works in conjunction with the V4 sensor to determine the bill's position.

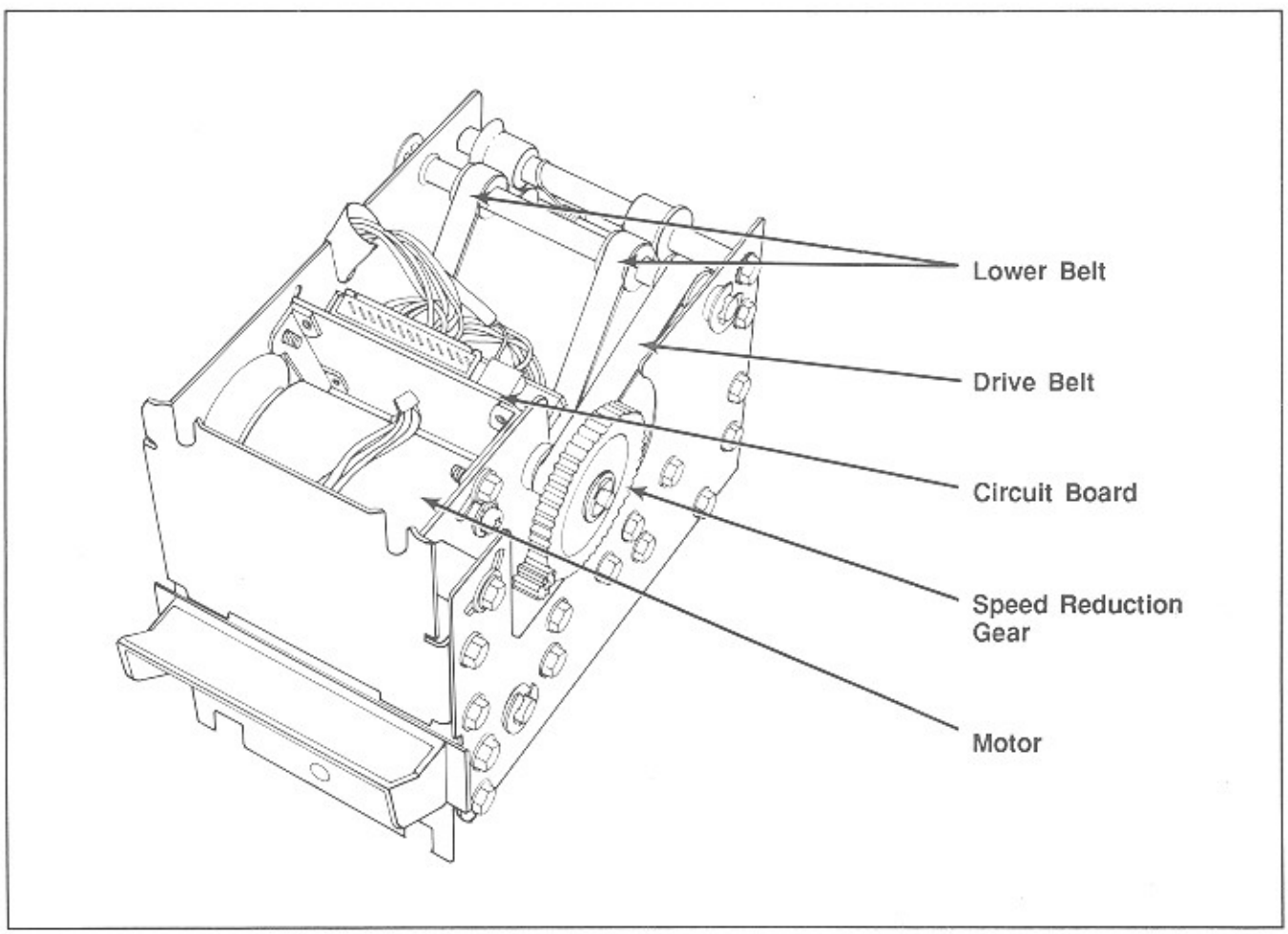


Figure 4-3. Bill Transport Unit
Bottom View

Bill Stacker

The stacker accepts bills from the transport mechanism and stacks them in a locked bill box. The stacker uses a D.C. motor to drive a metal platen, which via a mechanical linkage, pushes the bill into the bill box. A cam-actuated switch signals the OBA control unit as to the position of the platen. The platen may be in either the HOME or the OFF HOME position. An OFF HOME signal received by the control unit while it is in STANDBY, prompts it to reset the platen and return it to its HOME position (*See functional description in this section*).

OBA Control Unit

This module contains the electronic circuit board and micro-computer. It directs the operations of the various parts of the bill acceptor, but it in turn is directed by the central control computer. It also contains all the necessary circuitry for connecting the bill transport to the bill stacker *(see figure 4-4)*.

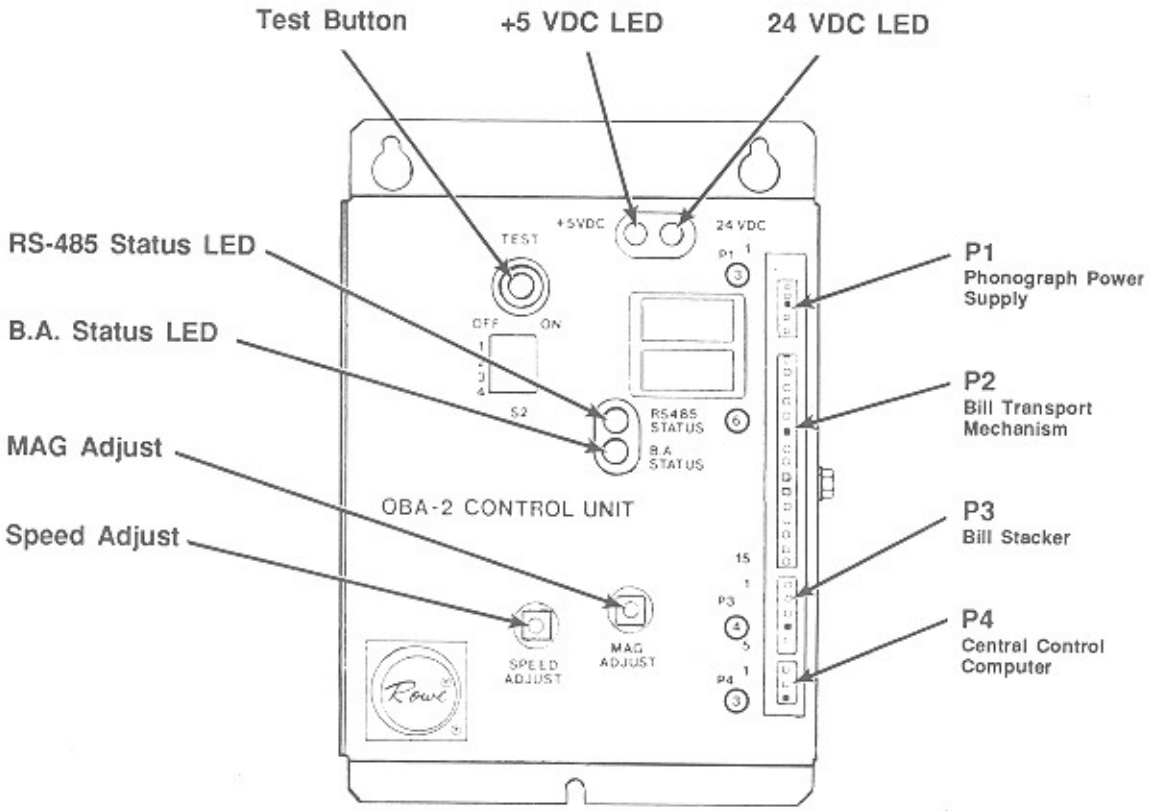


Figure 4-4. OBA Controller

CONNECTORS

Four connectors, labelled P1, P2, P3, and P4 connect the three major modules or components of the bill acceptor to each other and to the central control computer.

P1 connects the OBA control unit to the phonograph power supply.

P2 connects the bill transport mechanism to the OBA control unit.

P3 connects the bill stacker to the OBA control unit.

P4 connects the OBA control unit to the central control computer.

Adjustments on the OBA control unit *(see Electrical Adjustments for a detailed explanation of adjustment procedures).*

MAG ADJUST

Allows adjustment of the magnetic amplifier circuitry for optimum performance. The amplifier is used in conjunction with the magnetic head in the bill transport mechanism for checking specific properties of the bills *(see figure 4-4).*

TEST BUTTON

If this button *(see figure 4-4)* is depressed when the unit is in the idle (STANDBY) state it activates the motor speed adjustment mode. This allows the rate at which the bill is fed through the transport mechanism to be adjusted for optimum performance. If the bill acceptor is in the SHUTDOWN mode rather than the STANDBY mode, pushing the TEST button will reset it and put it back into STANDBY (*see Functional Description in this section*).

VISUAL INDICATORS

Refer to figure 4-4 for the location of these indicators.

RS-485 STATUS LED - This LED indicates the status of the communications link. If the LED is not on, the bill acceptor is in the RECEIVE mode, waiting for a command from the central control computer. When the LED is on, the bill acceptor is in the TRANSMIT mode and is sending information to the central control computer.

BA STATUS LED - This LED indicated whether the bill acceptor is in the SHUTDOWN state or is in operating condition. When not lit, the bill acceptor is in normal operating condition. When lit, the LED indicates that the unit is shutdown due to a fault. The STATUS LED is also used to indicate the correct motor speed when used in conjunction with the MOTOR SPEED ADJUST mode (TEST button depressed).

+5VDC AND +24 VDC LED'S - When lit, these indicate the norman presence of the system voltages.

FUNCTIONAL DESCRIPTION

The following is a sequential description of the operation of the bill acceptor. This description gives a basic understanding of how the bill acceptor normally operates and can be used as an aid in troubleshooting *(see figure 4-5, the OBA Block Diagram).*

Bill Acceptor In Standby Mode

When the power is first supplied to the bill acceptor, in normal operation, the bill acceptor immediately assumes a passive or idle state. It will not attempt to accept bills until it receives an ENABLE command from the central control computer. Though it is not able to accept bills it is not completely idle; it is continually checking the various sensors in the bill transport and bill stacker mechanisms. If it sees an incorrect signal it takes the appropriate actions, as described in the following paragraphs:

PROBLEMS THAT MAY ARISE IN THE STANDBY MODE:

V4 Sensor Is Active

The bill acceptor assumes that something is trapped in the bill transport path if this sensor is active while in the STANDBY mode. It then begins the reject sequence to remove the trapped object from the path (*see Reject Sequence in this section*).

Stacker Home Switch Not Activated

The bill acceptor turns on the stacker motor and attempts to return the stacker platen to its HOME position. If successful, the bill acceptor returns to the STANDBY mode. If unsuccessful, it shuts itself down *(see Shutdown Sequence in this section for additional information on this subject).*

ACTIONS TAKEN BY THE BILL ACCEPTOR TO CORRECT THESE PROBLEMS:

Reject Sequence

In order to clear the bill transport mechanism and purge any objects from the path, the bill acceptor turns on its transport motor in the reverse direction. If the bill acceptor is following a normal bill rejection sequence, it will reject the bill and return it the bill acceptor opening. It will place it so that it can be easily grasped by the customer. If the customer retrieves the bill within five seconds and all other sensors indicate that the transport path is clear, the bill acceptor returns to the STANDBY mode. A BILL REJECT message and a REJECT code is sent to the central control computer indicating the cause of the rejection (*see Troubleshooting in this section for an explanation of the REJECT codes*). If the track is not clear, the bill acceptor begins the self-clearing sequence.

Self-Clearing Sequence

Upon failing to clear the transport path as described, the bill acceptor begins a self-clearing sequence. This consists of a series of reverse-forward-reverse cycles to dislodge and object trapped in the transport. If this procedure is successful the bill acceptor returns to the STANDBY mode. If the track is not cleared after 10 cycles the unit will shutdown.

Shutdown Sequence

Several things may cause a shutdown of the bill acceptor. In the instance above an unsuccessful attempt by the bill acceptor to clear an object lodged in the transport path will initiate a SHUTDOWN sequence. In the event of a shutdown the bill acceptor turns everything off except the STATUS LED, which turns ON to indicate a fault condition. A SHUTDOWN message is sent to the central control computer along with an error code indication the cause of the fault (*see Troubleshooting in this section for a complete explanation of the FAULT codes*).

Bill Acceptance Mode

The following is a description of the operations that occur when the bill acceptor is in the BILL ACCEPTANCE mode. These are not the only operations that can occur in this mode however. The reject, self-clearing and shutdown sequences as previously described can occur as well.

An acceptance cycle starts when a bill is inserted into the transport. The transport motor starts in a forward direction and continues until the trailing edge of the bill passes the magnetic head. If the bill fails any of the required magnetic or optical checks it is immediately rejected and

returned to the customer. If the bill passes all of the checks the transport stops and the OBA then waits for a STATUS REQUEST from the central control computer and, upon receiving it, transmits a BILL IN ESCROW message containing the correct code for the bill validated. If a STATUS REQUEST is not received within two seconds, the bill is rejected. After sending the BILL IN ESCROW information, the bill acceptor waits for either the ACCEPT or REJECT command from the central control computer.

After receiving the ACCEPT command, the bill acceptor activates the transport motor and moves the bill from the transport mechanism to the bill stacker. The bill is monitored to ensure that the bill movement through the mechanism is correct. If the bill does not clear the transport mechanism within a specified time the bill is rejected and returned to the customer.

The stacker motor is now activated and the home switch monitored to ensure that the bill stacker platen leaves the home position, stacks the bill in the bill box and returns to the home position. If the stacker platen does not leave the home position within 750 milliseconds or if it does not return within 2.5 seconds, the bill acceptor begins its shutdown sequence.

Upon completion of the stacking process the bill acceptor sends a BILL ACCEPTED message to the central control computer and is then ready to begin another bill acceptance sequence.

PRICING

For overall pricing, see *Pricing in Section 2.*

Maintenance And Adjustments

ELECTRICAL ADJUSTMENTS

The electrical adjustments on the bill acceptor are factory set and should not be changed under normal operating conditions. However, replacing a bill transport or control unit requires a recalibration of the system as follows:

Motor Speed Adjustment

Refer to figure 4-4 for the locations of the electrical adjustments.

1. Depress the TEST button on the OBA control unit.
2. Turn the SPEED ADJUST control either clockwise or counterclockwise until the B.A. STATUS LED reaches its brightest and steadiest condition.

Mag Adjust

Refer to figure 4-4 for the locations of the electrical adjustments.

1. Set the MAG ADJUST control 1/8-turn back from the full clockwise position.
2. Depress the TEST button momentarily and release.
3. If the B.A. STATUS LED blinks rapidly several times after you release the TEST button, turn the MAG ADJUST control slightly counterclockwise and repeat step 2.
4. If the B.A. STATUS LED remains OFF after releasing the TEST button, the MAG ADJUST is correct.

ROUTINE MAINTENANCE

Cleaning

Since environmental conditions vary considerably, no prescribed maintenance schedule is set. Instead, the following items should be inspected periodically and cleaned as necessary:

BILL INLET AND TRACK

These surfaces should be wiped with a soft, clean, lint-free cloth.

V2 Sensor

The V2 backside sensor, which includes both an emitter and a detector, should be kept clean to ensure that all valid bills will be accepted. A soft cloth or cotton swab moistened with denatured alcohol can be used for this purpose.

Magnetic Head

Due to the abrasive nature of currency, the magnetic head does not normally require cleaning. If the magnetic head does collect dirt, the dirt may be removed with a cotton swab saturated with denatured alcohol.

Drive Belts

Drive belts can be cleaned by wiping them with a clean lint-free cloth moistened with denatured alcohol. Do not soak belts in a solvent.

Bill Stacker

Use a clean cloth to remove any excess dirt from the stacker, platen, and surrounding areas.

Lubrication

BILL STACKER

The bill stacker does not require lubrication.

BILL TRANSPORT MECHANISM

The bill transport mechanism does not require lubrication with normal use. If the transport mechanism is difficult to turn or if the transport mechanism is excessively noisy, apply one drop of light machine oil to each nyliner bearing and to any shaft location that supports a plastic roller.

Mechanical Adjustments

BILL STACKER

The bill stacker does not normally require adjustment. If the computer control unit indicates a problem involving the HOME switch while in SHUTDOWN mode (*see Troubleshooting in this section*), then the switch adjustment may be checked by performing the following procedures *(see figure 4-6)*:

1. Rotate the cam so that the switch actuator rest on the high point of the stacker motor cam.

2. Place a .040-inch gauge between the cam and the actuator. The bottom of the actuator should rest against the switch case. If the adjustment is incorrect, reposition the switch by loosening its two mounting screws.

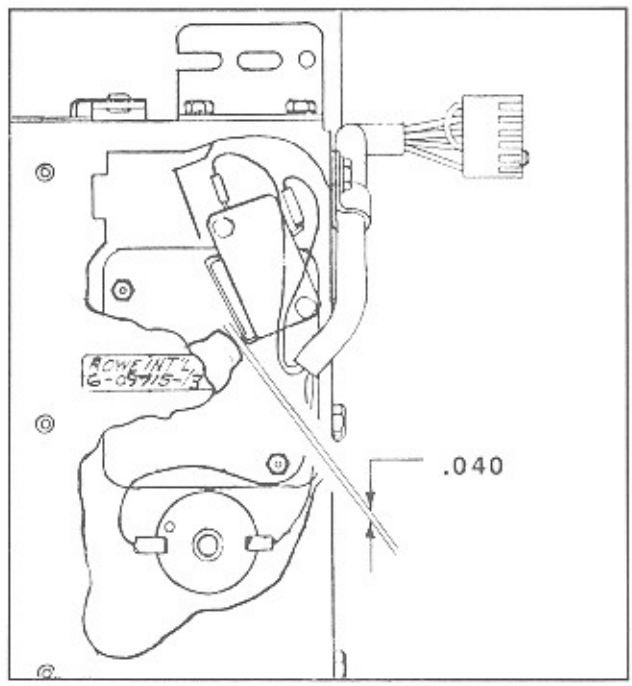


Figure 4-6. Stacker Home Switch Adjustment

BILL TRANSPORT MECHANISM

The transport mechanism does not require any initial set-up or routine adjustment. If any slipping or binding occurs in the mechanism, make the following adjustments:

DRIVE BELT TENSION ADJUSTMENT

Refer to figure 4-7 before doing this adjustment.

Adjust the drive belt tension as follows:
(For OBA transport units without an idler pulley)

1. Loosen machine screws A, B, and C to the point that the motor mounting assembly can rotate around machine screw B.

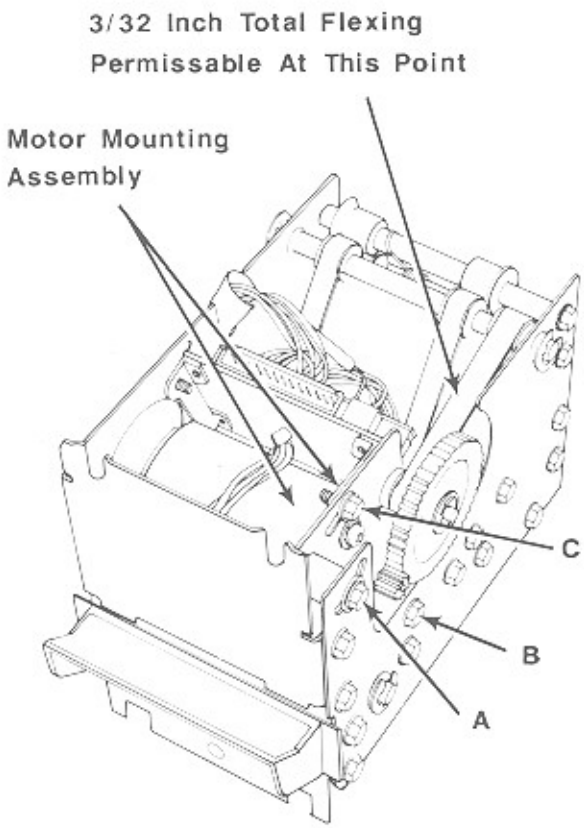


Figure 4-7. Drive Belt Tension

2. Rotate motor mounting assembly until the drive belt flexes a total of approximately 3/32-inch in mid span between the gear pulley and the drive shaft pulley.

3. Tighten the machine screws in the following order: A, B, then C. Recheck the belt tension.

4. If machine screw A is at the end of its slot and the drive belt is still too loose, the belt has stretched and must be replaced.

LOWER BELT TENSION ADJUSTMENT

Refer to figure 4-8 before doing this adjustment.

Adjust the lower belt tension as follows:

1. Loosen the four hex-head screws holding the ends of the idler pulley shaft and the take-up brackets.

2. Remove the circuit board by removing the three screws that hold the brackets and unplug the three connectors.

3. Push down on the idler pulleys until the belt flexes about 3/16 of an inch.

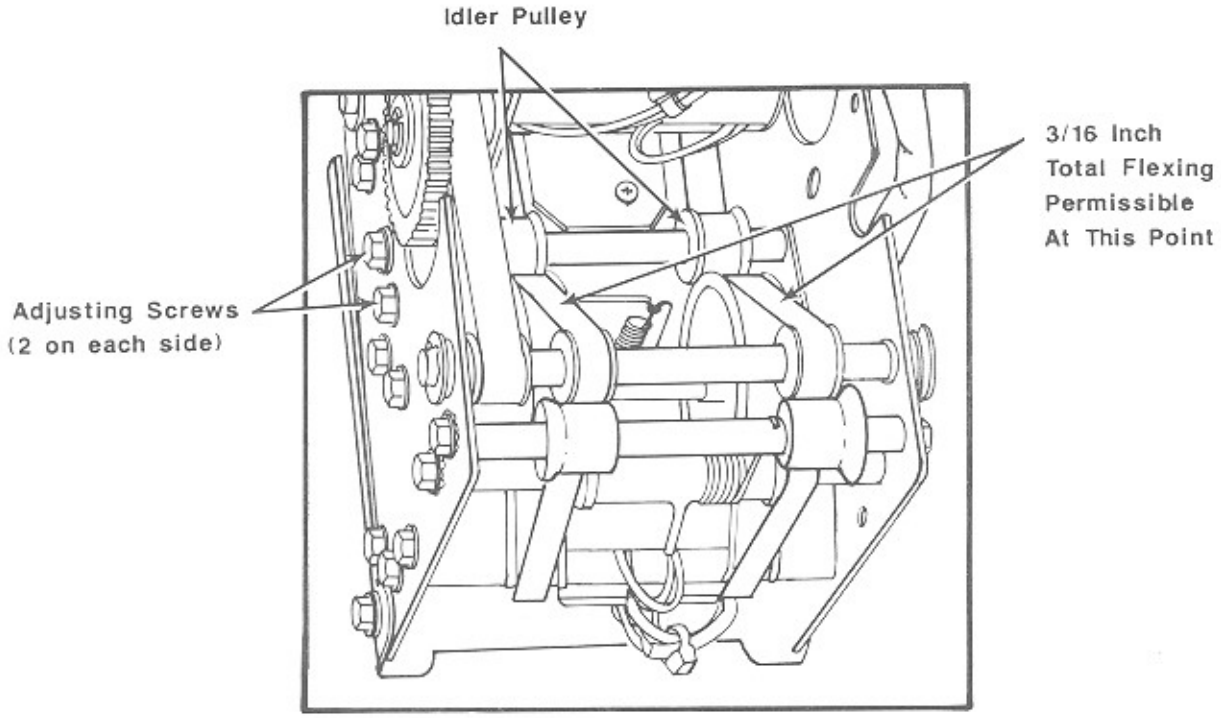


Figure 4-8. Lower Belt Tension Adjustment

4. Tighten all four screws and check the belt tension again. The tension must be equal on both belts.

5. Replace the circuit board and plug in the three connectors.

6. If the adjusting screws are against the ends of the slots and the timing belts are still loose, the transport should be returned to and authorized service center.

GEAR BACKLASH ADJUSTMENT

A degree of backlash should exist between the gears, as *shown in figure 4-9.*

To adjust the gear backlash:

1. Loosen the two Phillips-head screws holding the motor. Move the motor to give the correct backlash. This adjustment is not critical, but make sure that backlash is present at all points, as you rotate the gears.

2. Tighten the two screws and recheck the gear backlash.

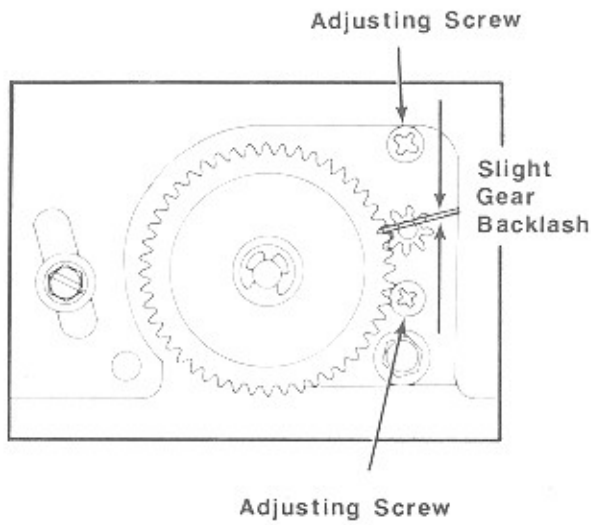


Figure 4-9. Gear Backlash Adjustment

MAGNETIC HEAD ALIGNMENT

The magnetic head is aligned with the harness and holder assembly at the factory. If a problem with the head develops, the harness and holder assembly must be replaced. Order the harness and holder assembly, part number 45059801.

To replace the harness and holder assembly:

1. Install the four screws loosely, and align the assembly with the lower track by pressing the V on the holder firmly against the V on the lower track (*figure 4-10*).
2. Tighten the two screws at the V's to hold the alignment.
3. Tighten the two remaining screws.

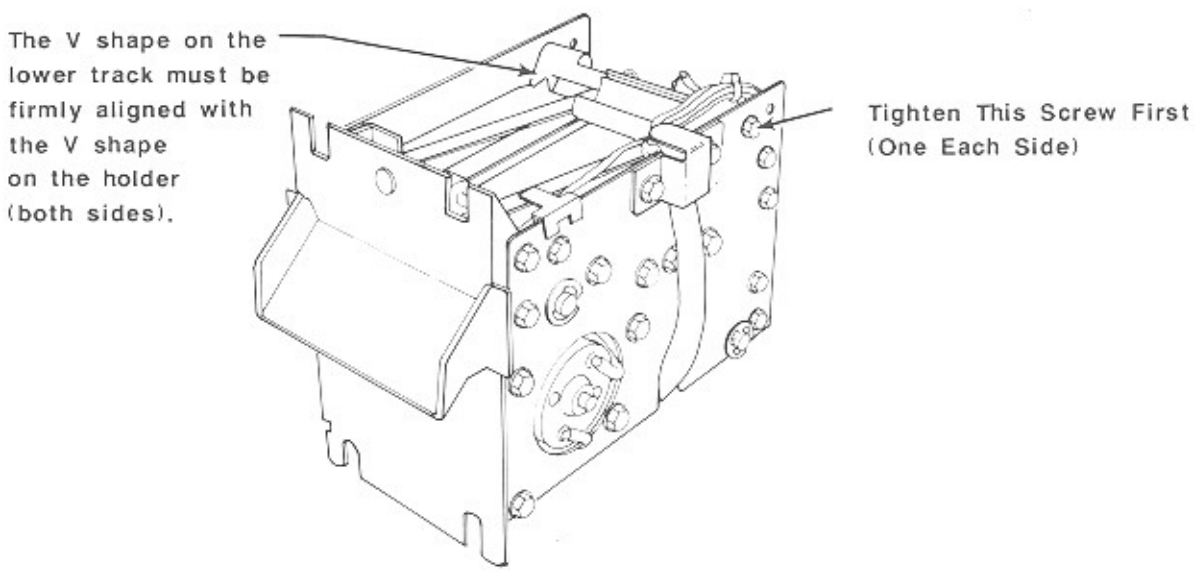


Figure 4-10. Magnetic Head Alignment

CREASING ROLLER POSITION

The creasing roller shaft should always be positioned so that the creasing rollers spin freely (*see figure 4-11*). They should not contact either lower timing belt. When making this adjustment, or when you are assembling the creasing roller shaft, hold the shaft away from the lower belts while tightening the two mounting screws. After tightening, always re-check to be sure that the creasing rollers spin freely.

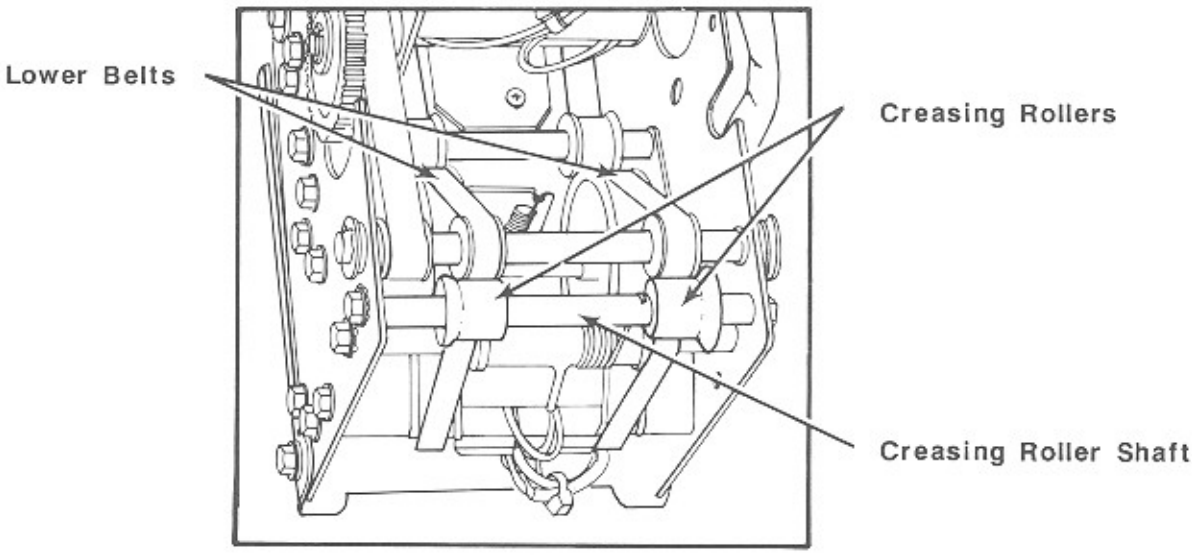


Figure 4-11. Creasing Roller Position

BILL ACCEPTOR HEIGHT AND FRONT TO BACK ADJUSTMENT

These two adjustments can affect each other. If you need to make one of these adjustments, be sure to read the entire procedure to determine whether you need to do any additional steps.

OBA-2 Height

Perform this procedure only if the OBA-2 height is incorrect.

1. Locate the hex-head screw in the vertical slot on the left side of the OBA-2 mounting plate and compartment divider. Tape a small piece of paper next to the slot and mark the position of the center of the screw on the paper (this will serve as a reference point).

2. Close the top door and estimate the vertical distance that the OBA-2 is high or low.

3. Loosen the hex-head screw and the three similar screws on the right side of the divider and, using the reference mark, slide the OBA-2 up or down by the amount that you estimated the OBA-2 height to be in error. Tighten one of the screws and recheck the OBA-2 height. If the height is acceptable, tighten the other three screws. If the height is not acceptable, repeat steps 2 and 3 until the height is acceptable.

4. Check the OBA-2 front-to-back clearance and make the following adjustment if necessary.

OBA-2/STACKER FRONT TO BACK CLEARANCE

1. Loosen the wing nut on the left side of the OBA-2 mounting bracket and slide the OBA-2 transport out approximately 1-1/2 inches.

2. Loosen the four stacker mounting screws on the right side of the divider plate and slide the stacker toward the rear of the phonograph as far as it will go.

3. Slowly close the top door so that it pushes the OBA–2 transport back into the phonograph. Open the top door and tighten the wing nut on the transport mounting bracket.

4. Slide the stacker toward the OBA–2 transport until the stacker engages the transport and tighten the four mounting screws.

5. Check the OBA–2 height and make the adjustment if necessary.

Refer to figure 4-12, the OBA Schematic Diagram, as you troubleshoot electrical problems on the OBA control unit.

Table 4-1. OBA Troubleshooting Chart

Trouble	Symptom	Probable Cause
Transport motor does not start when a bill is inserted.	The +5 V or +24 V LED on the OBA control unit is not lit.	1. A defective power supply 2. A defective harness to the OBA 3. A defective OBA control unit
	Transport does not start, but a clicking sound is heard in the OBA control unit	1. An object is jammed in the transport mechanism 2. A defective transport
	No sound or other indication that the transport is trying to run	1. A defective V1 cell in the transport 2. A defective OBA control unit 3. A defective CCC
	The BA STATUS LED is blinking	The OBA is not operational due to a FAULT condition: See the next problem
The OBA is in SHUTDOWN mode (er 80). In this state, the BA STATUS LED will alternate between STEADY ON and FLASHING (on for 1 second and then flash one or more time). The number of flashes indicates the cause of the shutdown. Also, a SHUTDOWN message with the indicated FAULT code will be sent to the CCC.	The BA STATUS LED flashes once. The FAULT code is 41.	1. An object is in the transport covering the V1 cell 2. A defective transport 3. A defective OBA control unit
	The BA STATUS LED flashes 4 times. The FAULT code is 44.	1. An object is in the transport activating the anti-pull-back lever 2. A defective transport 3. A defective OBA control unit
	The BA STATUS LED flashes 5 times. The FAULT code is 48 or 49.	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 control unit

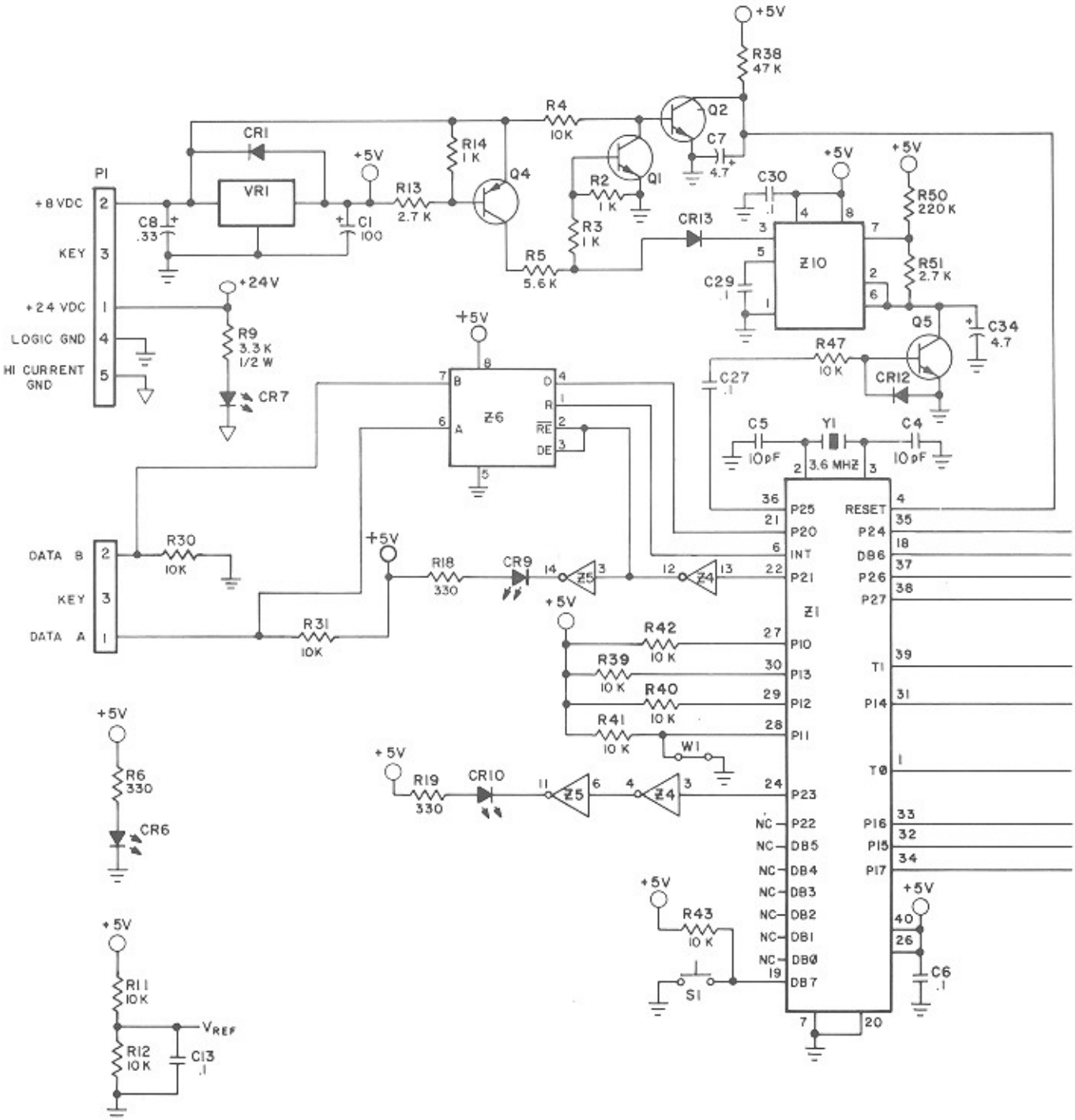
Table 4-1. OBA Troubleshooting Chart
Continued

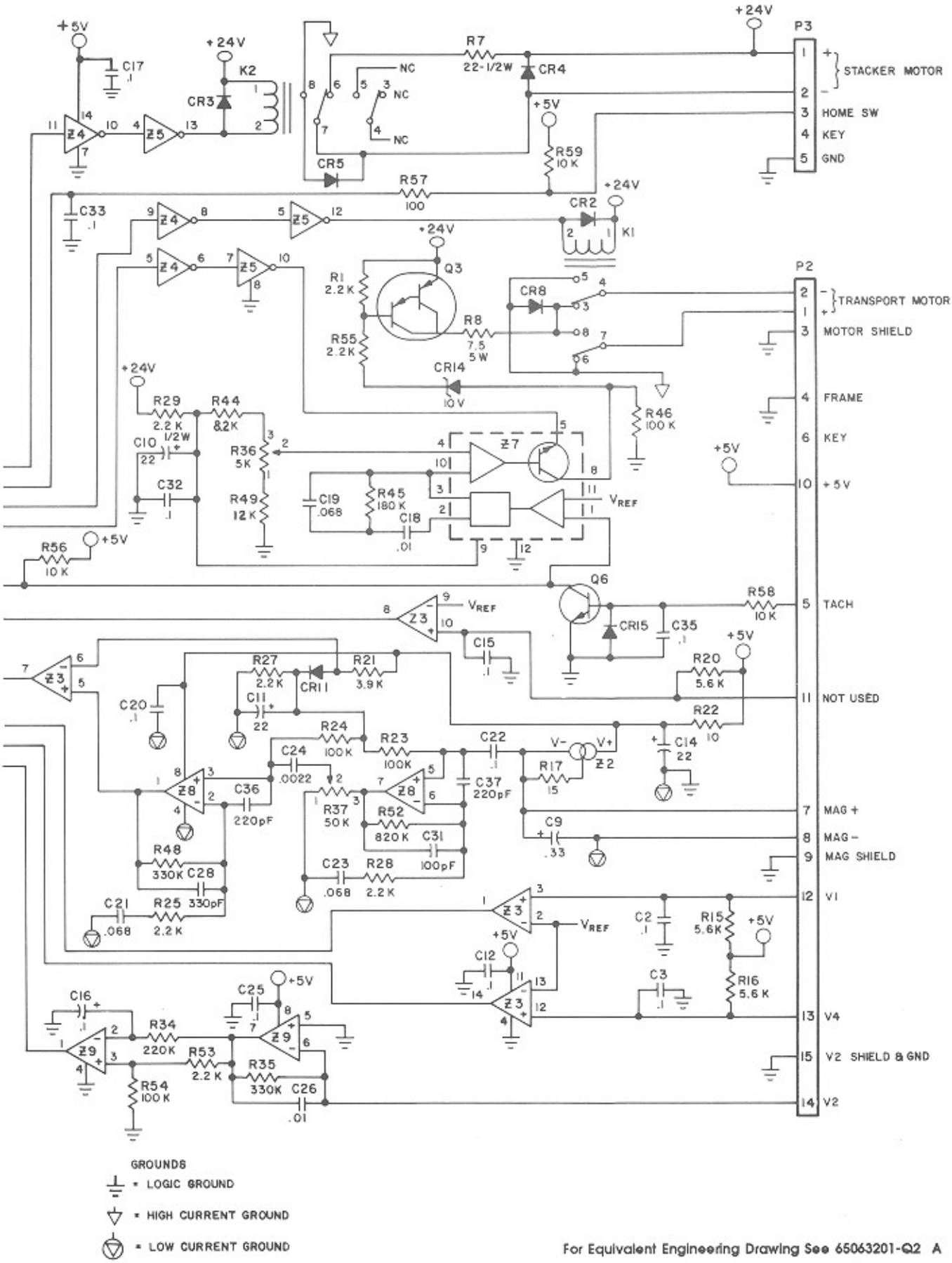
Trouble	Symptom	Probable Cause
The bill acceptor rejects a large number of valid bills. If the rejected bill is allowed to remain in the transport opening, the BA STATUS LED will flash one or more times to indicate the cause of the rejection.	BA STATUS LED flashes 1 time after rejecting the bill	1. A defective V1 or V4 cell in the transport 2. A defective OBA control unit
	BA STATUS LED flashes twice after rejecting the bill	1. A defective V2 cell in the transport 2. A defective control unit
	BA STATUS LED flashes 4 times after rejecting the bill	1. An object is lodged in the transport 2. A binding anti-pull-back lever 3. A defective V4 cell in the transport 4. A defective OBA control unit
	BA STATUS LED flashes 5 times after rejecting the bill	1. The MAG. ADJUST control is set too low 2. The motor speed is incorrectly adjusted 3. A defective magnetic head or transport 4. A defective OBA control unit
	BA STATUS LED flashes 6 times after rejecting the bill	1. MAG. ADJUST may be either too low or too high (*see the Mag. Adjust procedure*) 2. A defective harness connection at P1, Pins 3 or 4 3. A defective motor or magnetic head in the transport 4. A defective OBA control unit 5. A defective power supply (+24 VDC) from the CCC
	BA STATUS LED flashes 7 times after rejecting the bill	1. The motor speed is not correct 2. A defective transport 3. A defective OBA control unit

Table 4-1. OBA Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Bills jam frequently	Any bill transporting failure	1. The anti-pull-back lever is not operating freely 2. The bill pressure roller is binding 3. The transport inlet or track surfaces contain projections, rough spots, or dirt 4. The transport belts are out of adjustment or dirty 5. The transport belts are not centered on the rollers 6. The transport upper input roller does not move up and down freely 7. A defective power supply (+24 VDC) from the CCC

This page intentionally left blank.


P1
+8 VDC
KEY
+24 VDC
LOGIC GND
HI CURRENT GND
VR1
C8 .33
C1 100
R13 2.7 K
R14 1 K
Q4
R4 10K
Q2
Q1
R2 1 K
R3 1 K
R5 5.6 K
C7 4.7
R38 47 K
+5V
+24V
R9 3.3 K 1/2 W
CR7
CR1
CR13
Z10
C30 .1
C29 .1
R50 220 K
R51 2.7 K
Q5
C34 4.7
R47 10 K
CR12
C27 .1
C5 10pF
Y1 3.6 MHZ
C4 10pF
Z6
DATA B
KEY
DATA A
R30 10K
R31 10K
R18 330
CR9
Z5
Z4
R42 10 K
R39 10 K
R40 10 K
R41 10 K
W1
R19 330
CR10
R6 330
CR6
R11 10K
R12 10K
C13 .1
VREF
R43 10 K
S1
C6 .1
Z1
P25
P20
INT
P21
P10
P13
P12
P11
P23
P22
P16
P15
P17
RESET
P24
DB6
P26
P27
T1
P14
T0
DB5
DB4
DB3
DB2
DB1
DB0
DB7



For Equivalent Engineering Drawing See 65063201-Q2 A

Figure 5-12A. OBA-2 Circuit Board Schematic

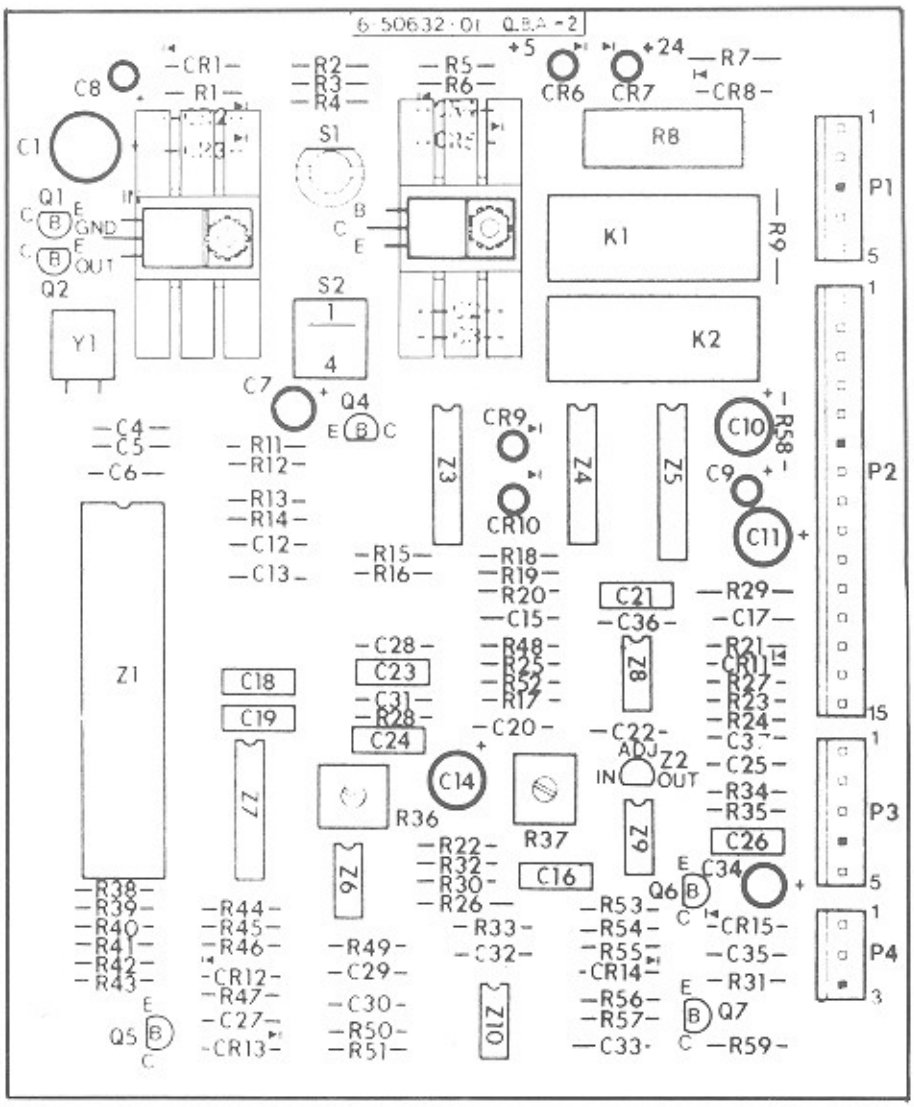


Figure 5-12B. OBA-2 Circuit Board Layout

COMPONENTS LIST FOR
OBA-2 CONTROLLER CIRCUIT BOARD 60935703

C1	Capacitor - Electrolytic	100 mf	70023814
C2	Capacitor - Monolithic	.1 mf	70028514
C3	Capacitor - Monolithic	.1 mf	70028514
C4	Capacitor - Monolithic	10 pf	70028701
C5	Capacitor - Monolithic	10 pf	70028701
C6	Capacitor - Monolithic	.1 mf	70028514
C7	Capacitor - Electrolytic	4.7 mf	70023806
C8	Capacitor - Tantalum	.33 mf	70025119
C9	Capacitor - Tantalum	.33 mf	70025119
10	Capacitor - Electrolytic	100 mf	70023814
C11	Capacitor - Electrolytic	22 mf	70023810
C12	Capacitor - Monolithic	.1 mf	70028514
C13	Capacitor - Monolithic	.1 mf	70028514
C14	Capacitor - Electrolytic	22 mf	70023810
C15	Capacitor - Monolithic	.1 mf	70028514
C16	Capacitor - Mylar	.1 mf	70021549
C17	Capacitor - Monolithic	.1 mf	70028514
C18	Capacitor - Mylar	.01 mf	70021525
C19	Capacitor - Mylar	.068 mf	70021545
C20	Capacitor - Monolithic	.1 mf	70028514
C21	Capacitor - Mylar	.068 mf	70021545
C22	Capacitor - Monolithic	.1 mf	70028649
C23	Capacitor - Mylar	.068 mf	70021545
C24	Capacitor - Mylar	.0022 mf	70021509
C25	Capacitor - Monolithic	.1 mf	70028514
C26	Capacitor - Mylar	.01 mf	70021525
C27	Capacitor - Monolithic	.1 mf	70028514
C28	Capacitor - Monolithic	330 pf	70028719
C29	Capacitor - Monolithic	.1 mf	70028514
C30	Capacitor - Monolithic	.1 mf	70028514
C31	Capacitor - Monolithic	100 pf	70028713
C32	Capacitor - Monolithic	.1 mf	70028514
C33	Capacitor - Monolithic	.1 mf	70028514
C34	Capacitor - Electrolytic	4.7 mf	70023806
C35	Capacitor - Monolithic	.1 mf	70028514
C36	Capacitor - Monolithic	220 pf	70028606
C37	Capacitor - Monolithic	220 pf	70028606

CR1	Diode - Silicon	70035005
CR2	Diode - Silicon	70035005
CR3	Diode - Silicon	70035005
CR4	Diode - Silicon	70035005
CR5	Diode - Silicon	70035005
CR6	Diode - LED	70035303
CR7	Diode - LED	70035303
CR8	Diode - Silicon	70035005
CR9	Diode - LED	70035305
CR10	Diode - LED	70035303
CR11	Diode - Silicon	70035012
CR12	Diode - Silicon	70035012
CR13	Diode - Silicon	70035012
CR14	Diode - Zener	70035514
CR15	Diode - Silicon	70035012

K1	Relay - DPDT	25191201
K2	Relay - DPDT	25191201

COMPONENTS LIST FOR
OBA-2 CONTROLLER CIRCUIT BOARD 60935703
(Continued)

P1	Polarizing Wafer	5 Circuit		70075005
P2	Polarizing Wafer	15 Circuit		70075015
P3	Polarizing Wafer	5 Circuit		70075005
P4	Polarizing Wafer	3 Circuit		70075003
Q1	Transistor - NPN Silicon			70030007
Q2	Transistor - NPN Silicon			70030007
Q3	Transistor - PNP Silicon			70030805
Q4	Transistor - PNP Silicon			70030104
Q5	Transistor - NPN Silicon			70030007
Q6	Transistor - PNP Silicon			70030007
Q7	NOT USED			

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	22 K		79901222
R2	Resistor - Carbon	1 K		79901102
R3	Resistor - Carbon	1 K		79901102
R4	Resistor - Carbon	10 K		79901103
R5	Resistor - Carbon	5.6 K		79901562
R6	Resistor - Carbon	330 Ohm		79901331
R7	Resistor - Carbon	22 Ohm	(½w, 10%)	70010724
R8	Resistor - Carbon	7.5 Ohm	(5w, 10%)	70011008
R9	Resistor - Carbon	3.3 K	(½w, 5%)	79904332
R10	NOT USED			
R11	Resistor - Carbon	10 K		79901103
R12	Resistor - Carbon	10 K		79901103
R13	Resistor - Carbon	2.7 K		79901272
R14	Resistor - Carbon	1 K		79901102
R15	Resistor - Carbon	5.6 K		79901562
R16	Resistor - Carbon	5.6 K		79901562
R17	Resistor - Carbon	15 Ohm		79901150
R18	Resistor - Carbon	330 Ohm		79901331
R19	Resistor - Carbon	330 Ohm		79901331
R20	Resistor - Carbon	5.6 K		79901562
R21	Resistor - Carbon	3.9 K		79901392
R22	Resistor - Carbon	10 Ohm		79901100
R23	Resistor - Carbon	10 K		79901103
R24	Resistor - Carbon	100 K		79901104
R25	Resistor - Carbon	2.2 K		79901222
R26	NOT USED			
R27	Resistor - Carbon	2.2 K		79901222
R28	Resistor - Carbon	2.2 K		79901222
R29	Resistor - Carbon	1.5 K	(½w, 10%)	70010405
R30	Resistor - Carbon	10 K		79901103
R31	Resistor - Carbon	10 K		79901103
R32	NOT USED			
R33	NOT USED			
R34	Resistor - Carbon	220 K		79901224
R35	Resistor - Carbon	330 K		79901334
R36	Potentiometer	5 K		21520706
R37	Potentiometer	50 K		21520702
R38	Resistor - Carbon	47 K		79901473
R39	Resistor - Carbon	10 K		79901103
R40	Resistor - Carbon	10 K		79901103
R41	Resistor - Carbon	10 K		79901103

R42	Resistor - Carbon	10 K	79901103
R43	Resistor - Carbon	10 K	79901103
R44	Resistor - Carbon	8.2 K	79901822
R45	Resistor - Carbon	180 K	79901184
R46	Resistor - Carbon	100 K	79901104
R47	Resistor - Carbon	10 K	79901103
R48	Resistor - Carbon	330 K	79901334
R49	Resistor - Carbon	12 K	79901123
R50	Resistor - Carbon	220 K	79901224
R51	Resistor - Carbon	2.7 K	79901272
R52	Resistor - Carbon	820 K	79901824
R53	Resistor - Carbon	2.2 K	79901222
R54	Resistor - Carbon	100 K	79901104
R55	Resistor - Carbon	2.2 K	79901222
R56	Resistor - Carbon	10 K	79901103
R57	Resistor - Carbon	100 Ohm	79901101
R58	Resistor - Carbon	10 K	79901103
R59	Resistor - Carbon	10 K	79901103
S1	Switch - Push Button		70043502
S2	NOT USED		
VR1	IC - +5 VDC Regulator		70036506
Y1	Crystal - 3.58 MHz		25167308
Z1	IC - Microcomputer - 8 Bit	8049	70039304
Z2	IC - Current Regulator	LM334Z	70037601
Z3	IC - Quad OP Amp	LM324	30800216
Z4	IC - TTL Hex Inverter	7404	70036304
Z5	IC - Darlington Array	ULN2003	70036901
Z6	IC - RS-485 Transceiver	SN75176	70037801
Z7	IC - F/V Converter	LM2917	30800218
Z8	IC - Dual OP Amp	LM358	30800214
Z9	IC - Dual OP Amp	LM358	30800214
Z10	IC - Timer	LM555	70033801

Section 5: Troubleshooting

INTRODUCTION

The CD-100 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)
61030701	Mechanism Control and CD decoder
30933701	CD Player
40770607	Power Supply
40832301	Digital Display
61038901	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.

CONTINUOUS CREDIT

1. Enter the SERVICE mode by setting the SERVICE switch to the SERVICE position.
2. Type 00, type the four digit security code, and then press POPULAR.
3. Press and hold RESET and then press POPULAR two times.
4. 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 DISC HOLD DOWN, 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.
- SCAN/TRANSFER LED is lit while the magazine locates HOME.
- 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.
  - Disc hold-down Common is connected to the N.O. contact.
  - Outer cam Common connected to the N.O. contact.

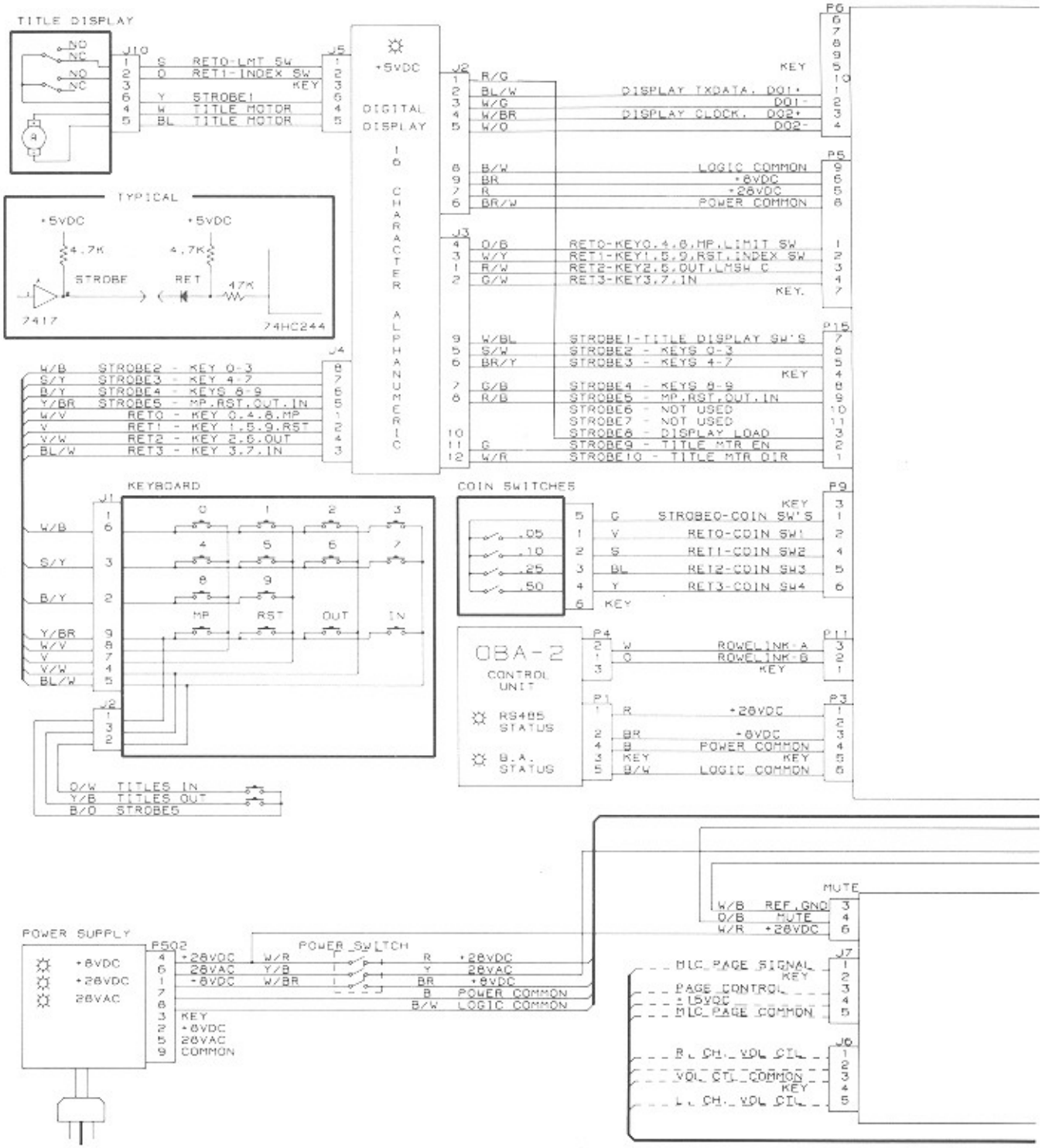
- Mechanism control SCAN/TRANSFER LED goes OFF.
- Mechanism control tells the CDM-3 what track (i.e. selection) to play.
- CDM-3 tells the mechanism control that the track has been located.
- Selection plays
  - Mechanism control tells the CCC that the selection is playing.
  - CCC unmutes the audio 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.


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
+5VDC
DIGITAL
DISPLAY
16 CHARACTER ALPHANUMERIC
J2
R/G
BL/W DISPLAY TXDATA, DO1+
W/G DO1-
W/BR DISPLAY CLOCK, DO2+
W/O DO2-
KEY
P6
B/W LOGIC COMMON
BR +8VDC
R +28VDC
BR/W POWER COMMON
P5
TYPICAL
+5VDC
+5VDC
4.7K
4.7K
STROBE
RET
47K
7417
74HC244
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,LMSH C
O/W RET3-KEY3,7,IN
KEY
P15
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
STROBE8 - DISPLAY LOAD
G STROBE9 - TITLE MTR EN
W/R STROBE10 - TITLE MTR DIR
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
V/W RET2 - KEY 2,6,OUT
BL/W RET3 - KEY 3,7,IN
KEYBOARD
J1
0 1 2 3
4 5 6 7
8 9
MP RST OUT IN
W/B
S/Y
B/Y
Y/BR
W/V
V
V/W
BL/W
J2
O/W TITLES IN
Y/B TITLES OUT
B/O STROBE5
COIN SWITCHES
.05
.10
.25
.50
G STROBE0-COIN SW'S
V RET0-COIN SW1
S RET1-COIN SW2
BL RET2-COIN SW3
Y RET3-COIN SW4
KEY
P9
OBA-2
CONTROL UNIT
RS485 STATUS
B.A. STATUS
P4
W ROWE_LINK-A
O ROWE_LINK-B
KEY
P11
P1
R +28VDC
BR +8VDC
B POWER COMMON
KEY KEY
B/W LOGIC COMMON
P3
MUTE
W/B REF_GND
O/B MUTE
W/R +28VDC
J7
MIC_PAGE SIGNAL
KEY
PAGE CONTROL
+15VDC
MIC_PAGE COMMON
J6
R CH. VOL CTL
VOL CTL COMMON
KEY
L CH. VOL CTL
POWER SUPPLY
+8VDC
+28VDC
28VAC
P502
+28VDC
28VAC
+8VDC
KEY
+8VDC
28VAC
COMMON
POWER SWITCH
W/R
Y/B
W/BR
R +28VDC
Y 28VAC
BR +8VDC
B POWER COMMON
B/W LOGIC COMMON

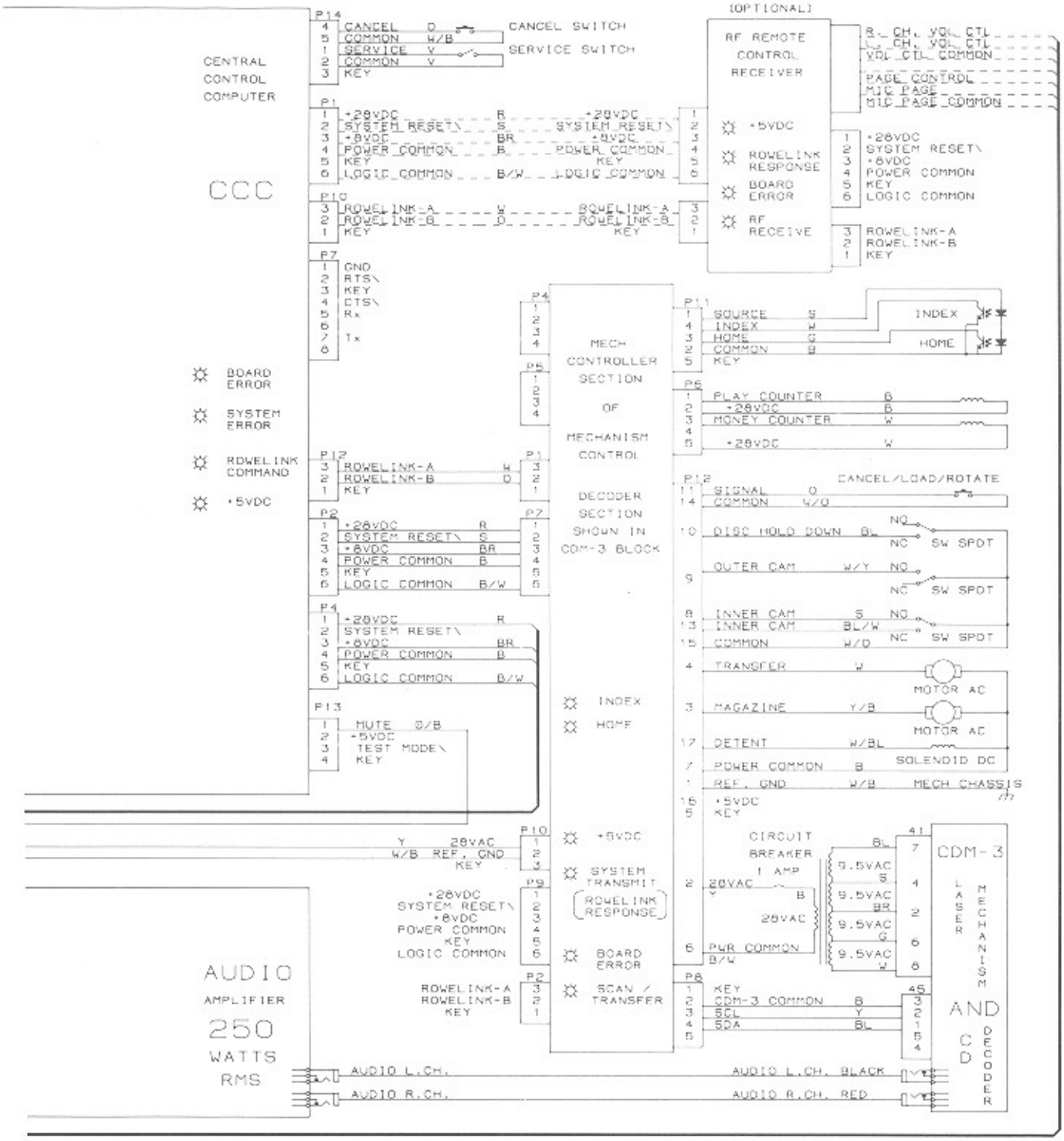


Figure 5-1. CD-100 Block Diagram

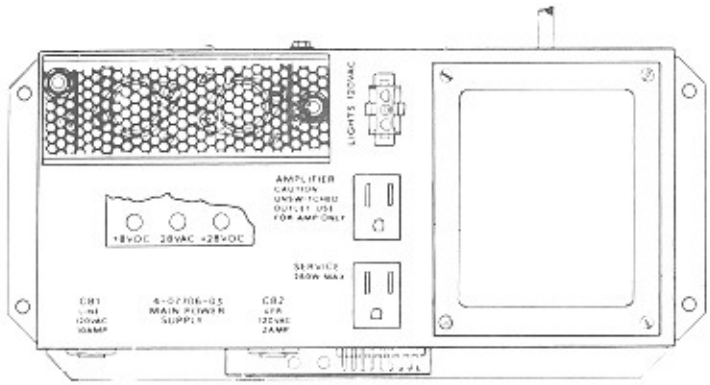
STATUS LAMPS

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

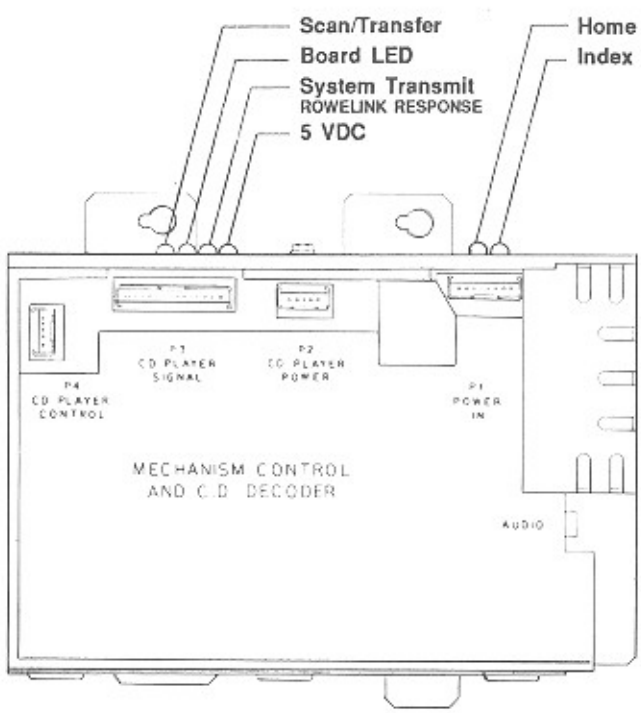
Mechanism Control And CD Decoder

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.

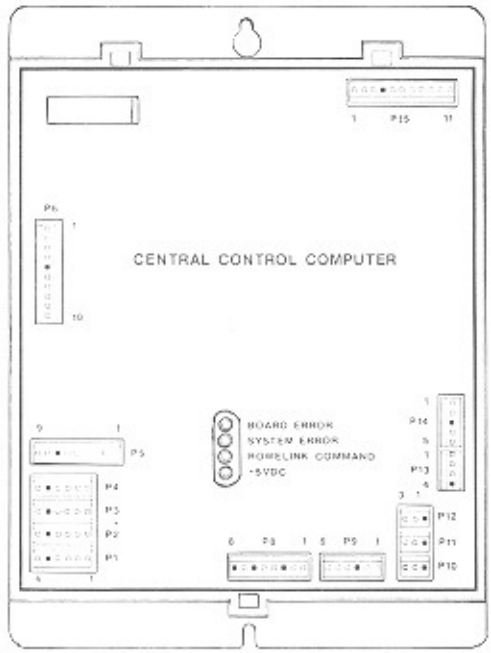
Central Control Computer

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).

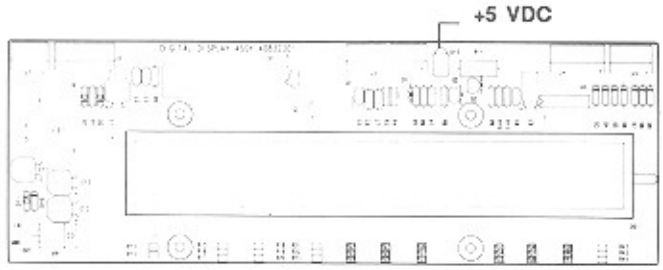
+5 VDC — +5 VDC is present.



Central Control Computer

Digital Display

+5 VDC — +5 VDC is present.



Digital Display

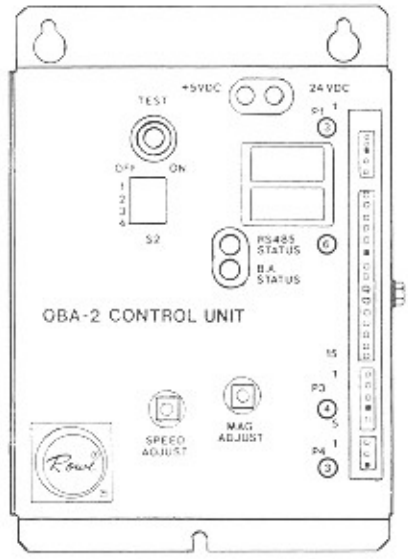
OBA-2 Control Unit

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.

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 — 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 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 05-60 03
START 09:10 07/13
END 00:00 00/00

Message means

- Mechanism control failed its EPROM test 3 times.
- 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.

Description Of Errors And Probable Causes

ERROR SOURCE 01 (COIN SWITCH ERRORS)

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 ½ second.

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)

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 1 minute.

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 04 (ROWELINK ERRORS)

WARN 04-01

Message Means:

Rowelink communication error. If active, phonograph will not work.

Probable cause:

1. A defective CCC
2. A defective OBA-2 control unit
3. A defective mechanism control
4. A wiring short or open between units 1,2,3.

ERROR SOURCE 05 (MECHANISM ERRORS)

WARN 05-02

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

WARN 05-05

Message Means:

Mechanism control senses that the Index and Home signals are changing, but in an improper sequence.

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 05-50	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
05-54	Disc Hold Down always closed
05-55	Disc Hold Down 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 signal always ON
05-57 Index signal always OFF
05-58 Home signal always ON
05-59 Home signal always OFF

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 05-60 EPROM checksum error

Message Means:

Checksum error

Probable cause:

1. A failed EPROM
2. The mech has failed

ERR 05-61 RAM test failed

Message Means:

RAM test failure

Probable cause:

Mech failure

ERR 05-62 CDM communication failure

Message Means:

A communications failure with the decoder board has occurred

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:

Mechanism communications failure

Probable cause:

1. Rowelink harness failure in the CCC harness
2. The mech control has failed

ERR 05-64

Message Means:

Mechanism control senses that the cam switch is changing, but in an improper sequence.

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)

WARN 06-01

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.

WARN 06-02

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

WARN 06-03

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

WARN 06-04

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

Continued on next page

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

ERROR SOURCES 11-13 ARE NOT DEFINED

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. Type 0	* SECURITY *
3. Type 0	ENTER CODE ----
4. Enter four digit security code for LEVEL 2 or LEVEL 3 SECURITY (factory default is 0000) and press POPULAR	SECURITY LEVEL 3
5. Hold RESET and press POPULAR twice.	* SERVICE MODE *

6. Press 8.	* STATUS *
7. Press 1.	* CLEAR ERRORS *
8. 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 devices but sometimes they develop problems similar to vinyl records. Skips and dropouts are not uncommon CD faults. Sometimes the CD player may not be able to read the disc at all.

The CD-100 has a built-in disc condition "watch dog" feature that reports the condition of any disc that shows signs of deterioration. If a disc has been reported, it should be cleaned and visually inspected, then placed back into the CD-100 or replaced with a good disc.

VIEWING THE DISC CONDITIONS

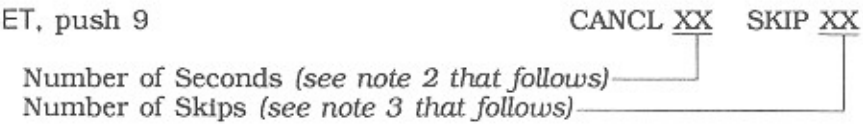
Steps	Display Shows
1. Enter SERVICE mode	* SERVICE MODE *
2. Type 8	* SERVICE MODE *
3. Type 6	DISC CONDITIONS
4. Press POPULAR	-NO CONDITIONS-

-OR-

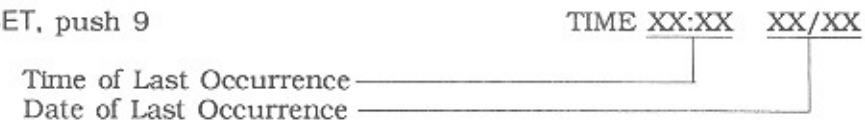
SEL XX XX OCC XX

Disc number
Track number *(see note 1 that follows)*
Number of occurrences

5. Hold RESET, push 9



6. Hold RESET, push 9



7. Hold RESET, push 3 to view next disc condition

8. Hold RESET, push 2 to view previous disc condition

9. Repeat steps 5, 6, 7, and 8 as often as necessary.

Note 1: Selections ending in 00 do not actually exist. If the selection number ends in 00, the CD player could not correctly read the Disc's table of contents. The disc may be: installed backwards, dirty, a bad disc, not initialized, or absent.

Note 2: This number will represent the total amount of time the selection was off by when it was cancelled. For example, if a 12 is reported in this field, the selection indicated skipped ahead (or back) 12 seconds. The cancel time is factory set at 10 seconds. Cancel time may be changed in the INITIALIZE menu. If a disc condition is reported because of cancel time, the number here will always be equal to or greater than the set cancel time limit.

Note 3: This number represents the number of times the disc skipped by more than 1 second. The skip limit may be set in the initialize menu. The factory setting is 5. If a condition is reported because of this parameter, this number will always be the same as the programmed limit.

Example 1:

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

Message means

- The CD player could not read Disc 15 on five occasions when it was selected.
- The last time it was selected and could not be read was 12:15 pm on 7/19.

Probable cause

- Disc installed backward, the disc is cracked, dirty, the disc is bad, or the disc is absent and the disc is not initialized to zero tracks.

Remedy

- Remove and inspect disc. If disc was installed backward, re-install it correctly.
- Clean the disc and try a selection from it. If the disc still cannot be read, replace it with a new disc.
- If a disc is not present at the indicated position and the disc limits were not initialized to zero; initialize the disc to zero.

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.	Type 0	* SECURITY *
3.	Type 0	ENTER CODE ----
4.	Enter four digit security code for LEVEL 2 or LEVEL 3 SECURITY (factory default is 0000) and press POPULAR	SECURITY LEVEL 3
5.	Hold RESET and press POPULAR twice.	* SERVICE MODE *
6.	Press 8.	* STATUS *
7.	Push 7.	* CLEAR CONDITIONS *
8.	Press POPULAR.	CLEAR CONDITIONS will blink and then reappear.

This page intentionally left blank.

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.

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.

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Phonograph fails to operate when power is turned ON *(Continued)*	CCC ROWELINK COMMAND LED is always OFF or always ON (not flickering)	1. 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
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

NOTE:

The CCC sends OUT OF ORDER to the display and logs the A ERR 05-63 Error 1-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 P11, but it could be P10, P11, or P12.**

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Magazine does not rotate when a selection is made *(Continued)*	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
	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	1. Mech control board
Magazine stops at wrong disc	Stops at random record 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 records (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 records (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
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

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
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 5. DISC HOLD-DOWN switch N.C. 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
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

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
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
Some CD's Skip		1. Defective discs (check disc conditions) 2. Mechanism control 3. CD player
All CD's skip		1. CD player 2. Mechanism control
No credit	No credit given by coins and dollar bills	1. 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	1. Insufficient credit
	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

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
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 4*. 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.
	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 4*. 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.

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Title pages do not operate normally *(Continued)*	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.
	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 through 5-6 as needed.*

CAUTION:

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 Pins 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 1-3*), then disconnect the extension speakers from the transformer package receptacle (*figure 1-3 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.

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.

BALANCE CONTROL

Adjust control for equal sound from each channel. Leave in mid position if adjustment is not possible. With a selection playing, reverse tone arm cable connections to the amplifier. If the sound switches channels, check player connections against *figure 5-1, System Block Diagram.* Replace the player if connections are good.

EXTENSION SPEAKERS

Check the OVERLOAD indicators (*see figure 1-3*), then disconnect the extension speakers from the transformer package receptacle (*figure 1-3 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.

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.

PREAMP

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.

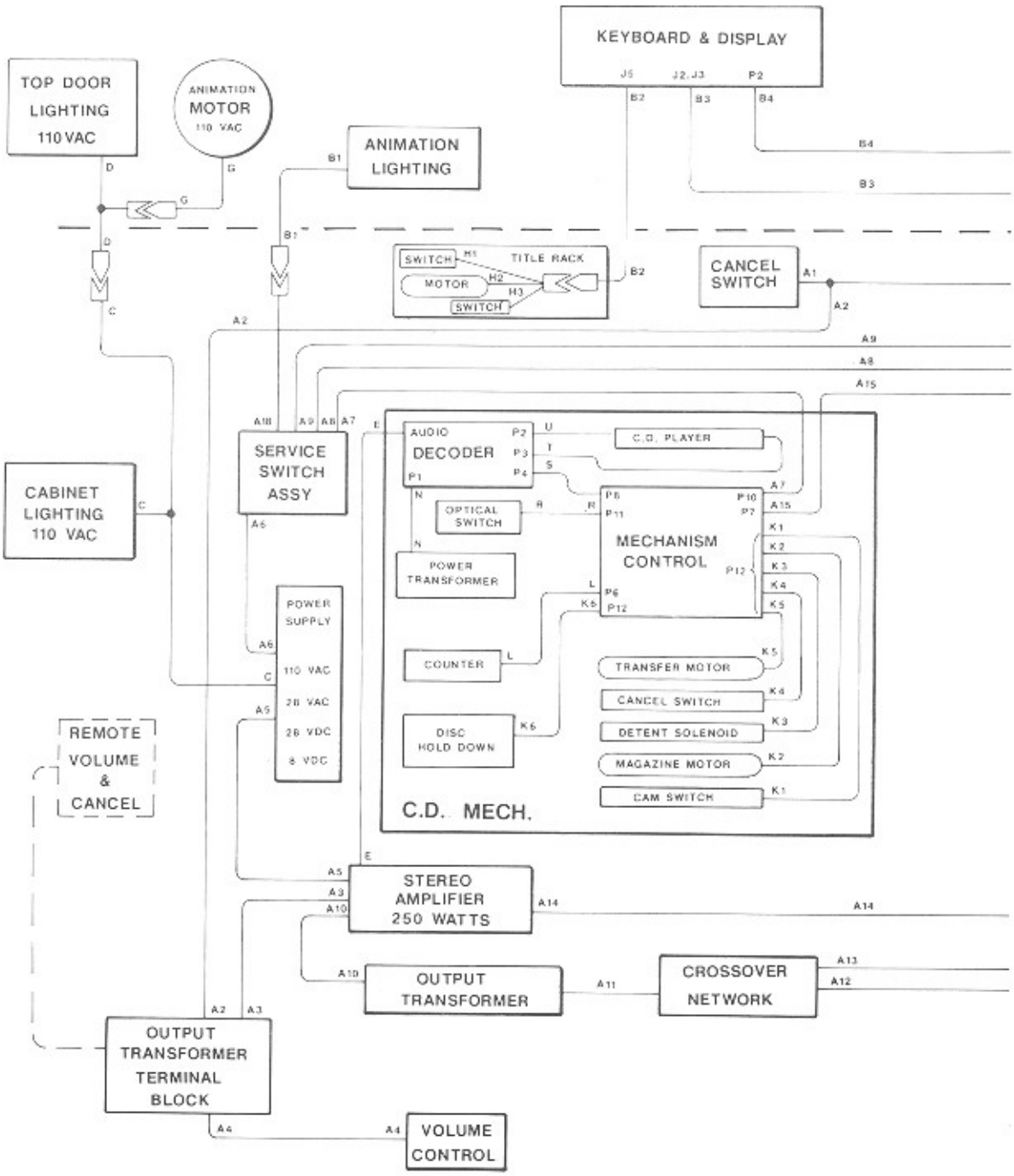
Excessive Hum

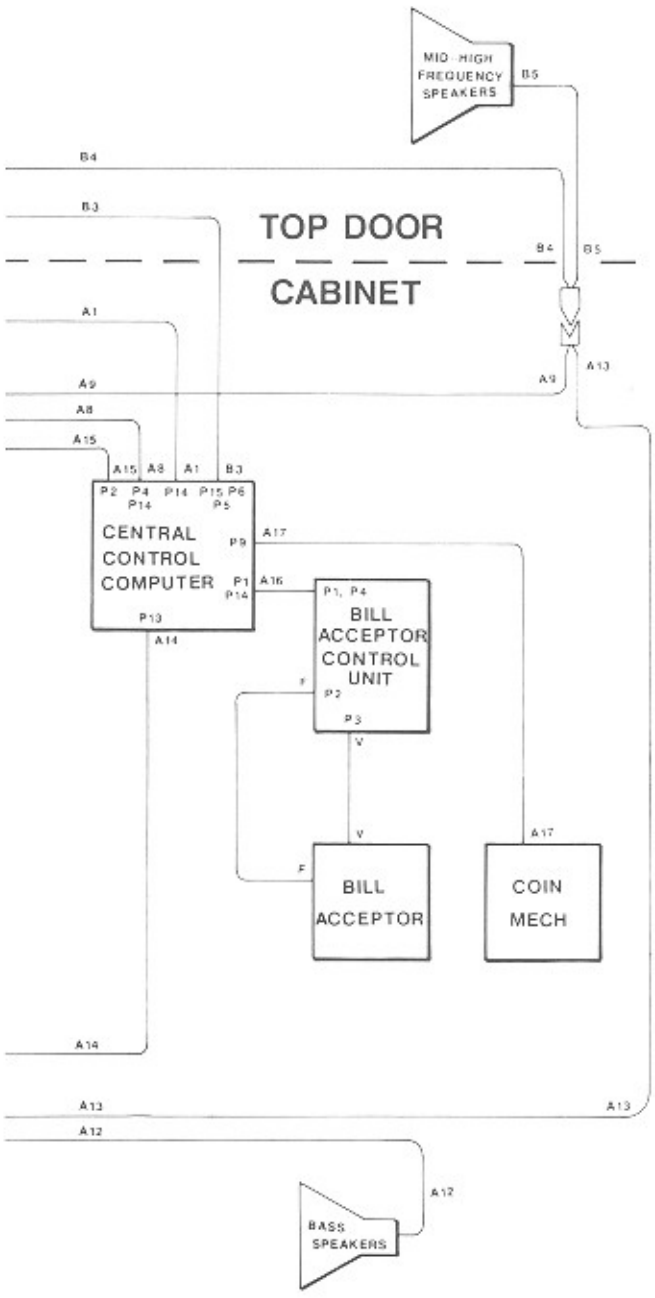
OPEN SHIELD

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.


KEYBOARD & DISPLAY
J5
J2, J3
P2
B2
B3
B4
TOP DOOR LIGHTING 110 VAC
ANIMATION MOTOR 110 VAC
ANIMATION LIGHTING
B1
SWITCH
H1
TITLE RACK
MOTOR
H2
H3
SWITCH
CANCEL SWITCH
A1
A2
A9
A8
A15
A10
A9
A8
A7
SERVICE SWITCH ASSY
CABINET LIGHTING 110 VAC
AUDIO DECODER
P2
P3
P4
P1
C.D. PLAYER
OPTICAL SWITCH
POWER TRANSFORMER
MECHANISM CONTROL
P5
P11
P10
P7
P12
K1
K2
K3
K4
K5
K6
POWER SUPPLY
110 VAC
28 VAC
28 VDC
8 VDC
COUNTER
TRANSFER MOTOR
CANCEL SWITCH
DETENT SOLENOID
MAGAZINE MOTOR
CAM SWITCH
DISC HOLD DOWN
C.D. MECH.
REMOTE VOLUME & CANCEL
STEREO AMPLIFIER 250 WATTS
A14
OUTPUT TRANSFORMER
A11
CROSSOVER NETWORK
A13
A12
OUTPUT TRANSFORMER TERMINAL BLOCK
A4
VOLUME CONTROL



A > HARNESS & SWITCH ASSY _____ 61035501
1. CANCEL TO COMPUTER
2. CANCEL LINE TO TERMINAL BLOCK
3. REMOTE VOLUME & VOLUME CONTROL FROM AMPLIFIER.
4. VOLUME CONTROL
5. 110 VAC TO AMPLIFIER
6. LOW VOLTAGE POWER TO SWITCH
7. 28 VAC TO C. D. PLAYER
8. LOW VOLTAGE POWER TO COMPUTER
9. PAGE CONTROL
10. AMPLIFIER OUTPUT (AUDIO)
11. AUDIO OUTPUT TO CROSSOVER
12. AUDIO OUTPUT TO BASS SPEAKERS
13. AUDIO OUTPUT TO MID-HIGH FREQUENCY SPEAKERS
14. MUTE
15. SIGNAL & VDC POWER TO C.D. PLAYER
16. SIGNAL & VDC POWER TO CONTROL UNIT
17. SIGNAL-COIN MECHANISM
18. 28 VAC POWER TO ANIMATION LIGHTING

B > HARNESS ASSY - DISPLAY _____ 40833401
1. 28 VAC POWER TO ANIMATION LIGHTING
2. SIGNAL AND VDC POWER TO TITLE RACK
3. SIGNAL AND VDC POWER TO KEYBOARD - DISPLAY
4. PAGE CONTROL
5. AUDIO INPUT TO MID-HIGH FREQUENCY SPEAKERS

C > HARNESS ASSY -110VAC 60/50 HZ _____ 40832901,02

D > HARNESS ASSY-TOP DOOR LIGHTING _____ 40834501

E > CABLE ASSY - AUDIO _____ 30934201

F > HARNESS ASSY-INTERCONNECT_____ 45070203

G > MOTOR & HARNESS ASSY _____ 40824302

H > HARNESS ASSY-INTERCONNECT_____ 30938501
1. SWITCH-SIGNAL TO DISPLAY
2. SWITCH-SIGNAL TO DISPLAY
3. VDC POWER FROM DISPLAY

K > HARNESS ASSY - C. D. MECH. _____ 40830001
1. CAM SWITCH------ TO MECH CONTROL
2. MAGAZINE MOTOR - TO MECH CONTROL
3. DETENT SOLENOID - TO MECH CONTROL
4. CANCEL SWITCH - TO MECH CONTROL
5. TRANSFER MOTOR-- TO MECH CONTROL
6. DISC HOLD DOWN - TO MECH CONTROL

L > COUNTER & PLUG ASSY _____ 30933301

N > TRANSFORMER ASSY-POWER _____ 40830401

R > OPTICAL SWITCH ASSY _____ 30906801

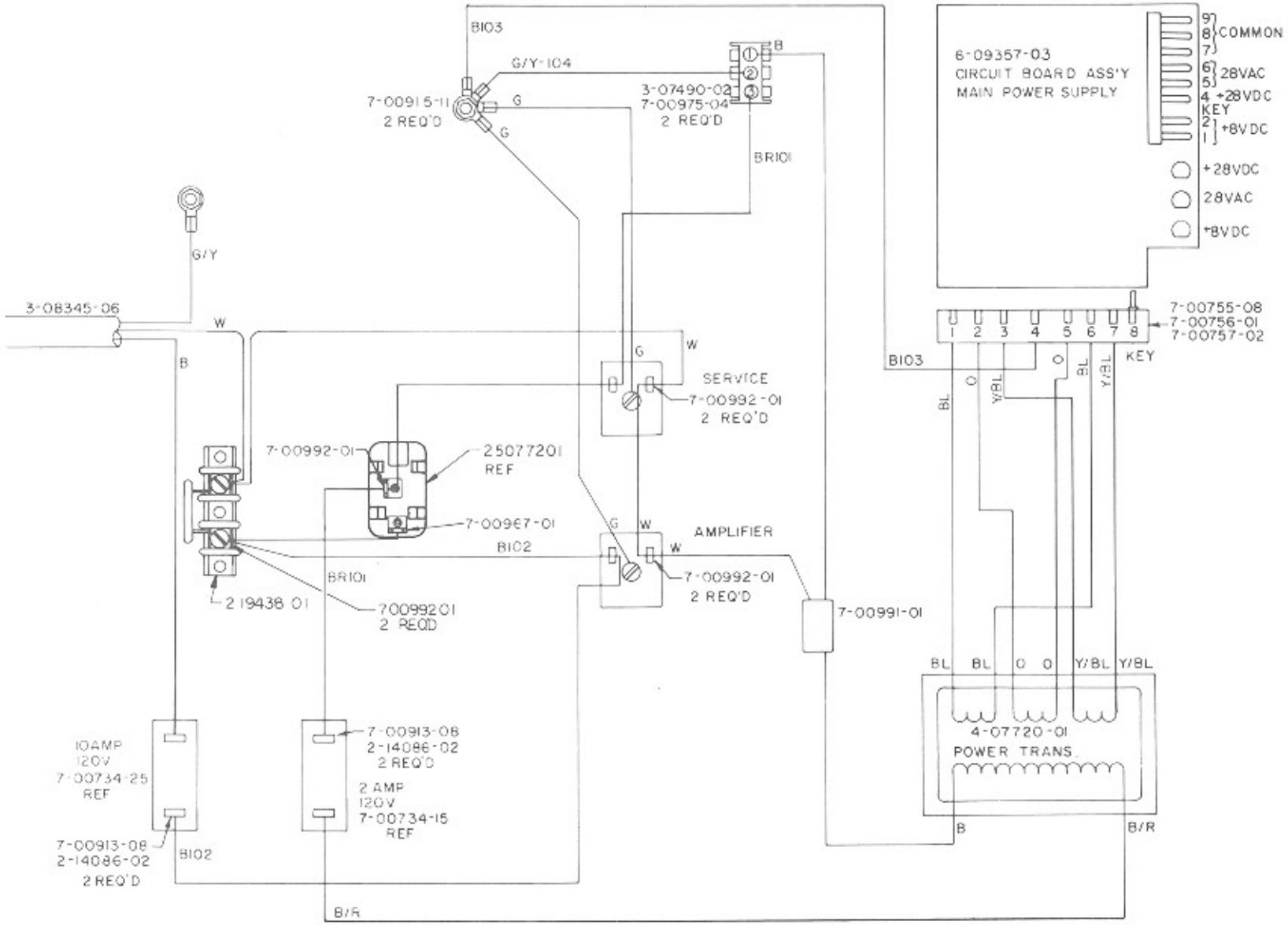
S > HARNESS ASSY- PLAYER CONTROL _____ 30930501

T > HARNESS ASSY-C.D. MECH (SIGNAL) _____ 30930701

U > HARNESS ASSY- C.D. MECH (POWER) _____ 30930601

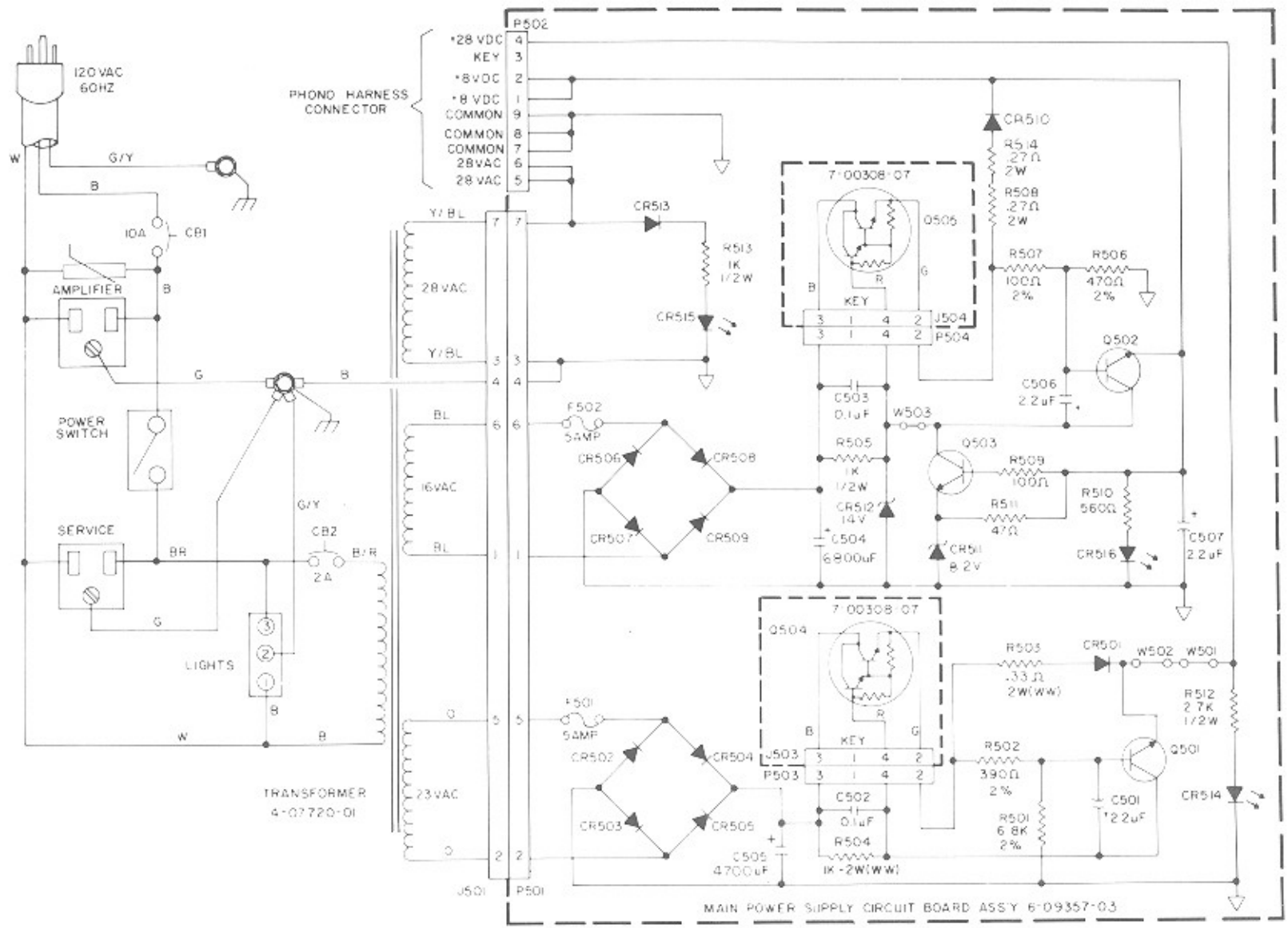
V > HARNESS ASSY- D.C. BILL STACKER _____ 45062308

Figure 5-4. CD-100 Harness Diagram



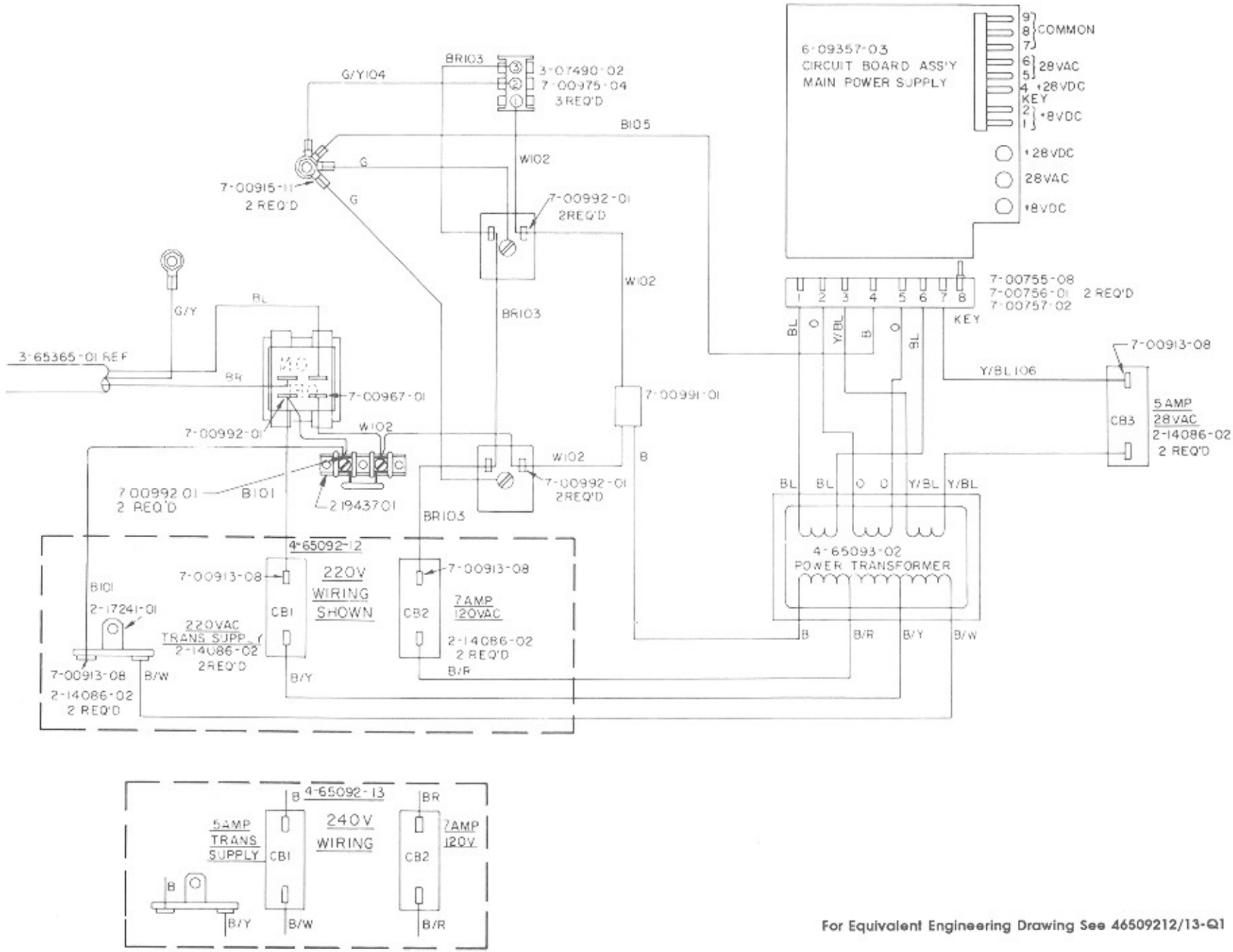
For Equivalent Engineering Drawing See 40770608-Q1 A

Figure 5-5A. Main Power Supply Wiring Diagram - Domestic



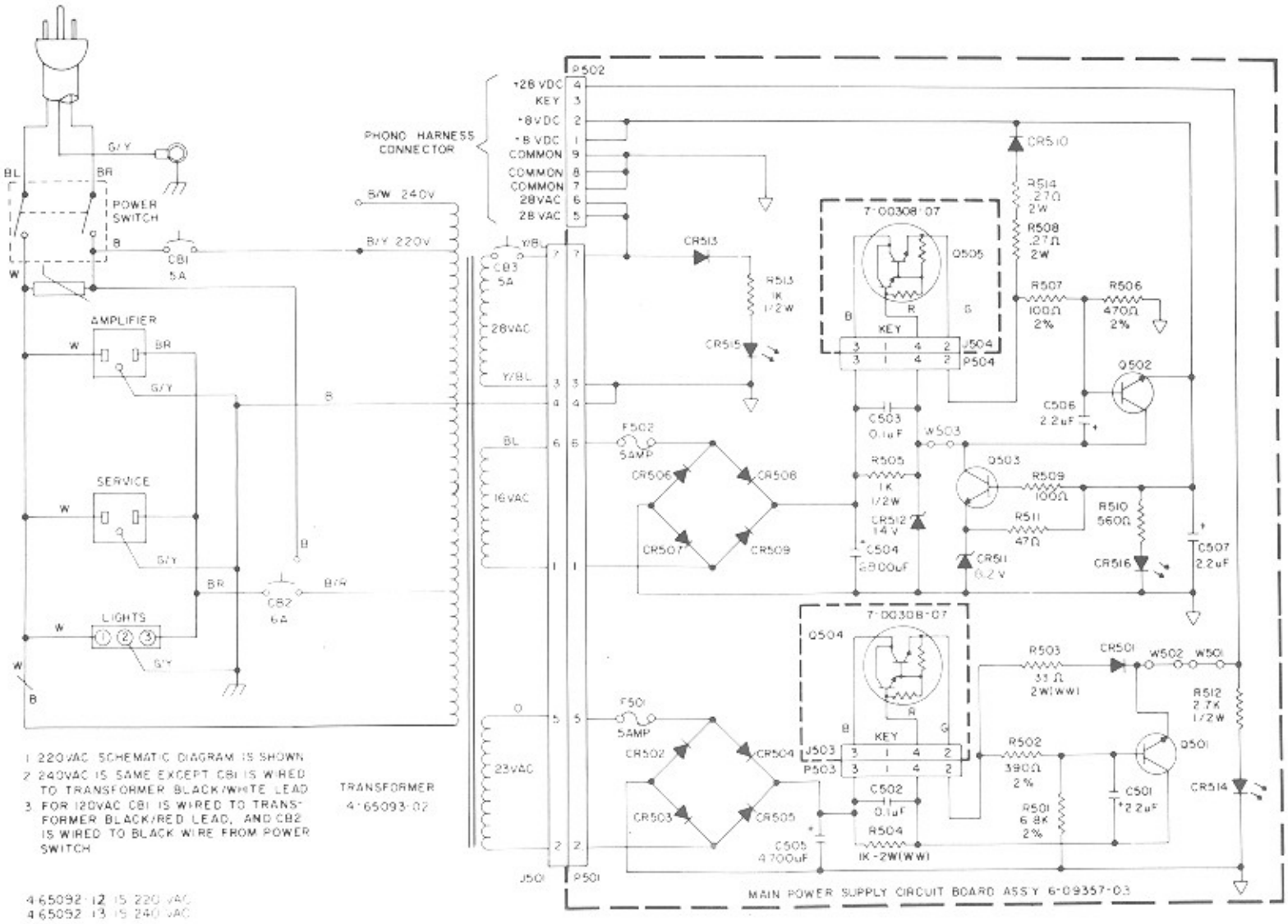
For Equivalent Engineering Drawing See 40770608-Q2 A

Figure 5-5B. Main Power Supply Schematic - Domestic



For Equivalent Engineering Drawing See 46509212/13-Q1 A

Figure 5-6A. Main Power Supply Wiring Diagram - Export



1. 220VAC SCHEMATIC DIAGRAM IS SHOWN
2. 240VAC IS SAME EXCEPT CB1 IS WIRED TO TRANSFORMER BLACK/WHITE LEAD
3. FOR 120VAC CB1 IS WIRED TO TRANSFORMER BLACK/RED LEAD, AND CB2 IS WIRED TO BLACK WIRE FROM POWER SWITCH

46509212 IS 220 VAC
46509213 IS 240 VAC

For Equivalent Engineering Drawing See 46509212/13-Q2 A

Figure 5-6B. Main Power Supply Schematic - Export

COMPONENTS LIST FOR
MAIN POWER SUPPLY CIRCUIT BOARD 60935703

C501	Capacitor - Electrolytic	2.2 mf @ 50V	70023805
C502	Capacitor - Monolithic Ceramic	0.1 mf @ 50V	70028511
C503	Capacitor - Monolithic Ceramic	0.1 mf @ 50V	70028511
C504	Capacitor - Electrolytic	6800 mf @ 35V	70023601
C505	Capacitor - Electrolytic	4700 mf @ 50V	70023604
C506	Capacitor - Electrolytic	2.2 mf @ 50V	70023805
C507	Capacitor - Electrolytic	2.2 mf @ 50V	70023805

CR501-CR510	Diode - Silicon	70035004
CR511	Diode - Zener (8.2 V, 5%)	70035528
CR512	Diode - Zener (14 V, 5%)	70035529
CR513	Diode - Silicon	70035005
CR514-CR516	Diode - Light Emitting	70035303

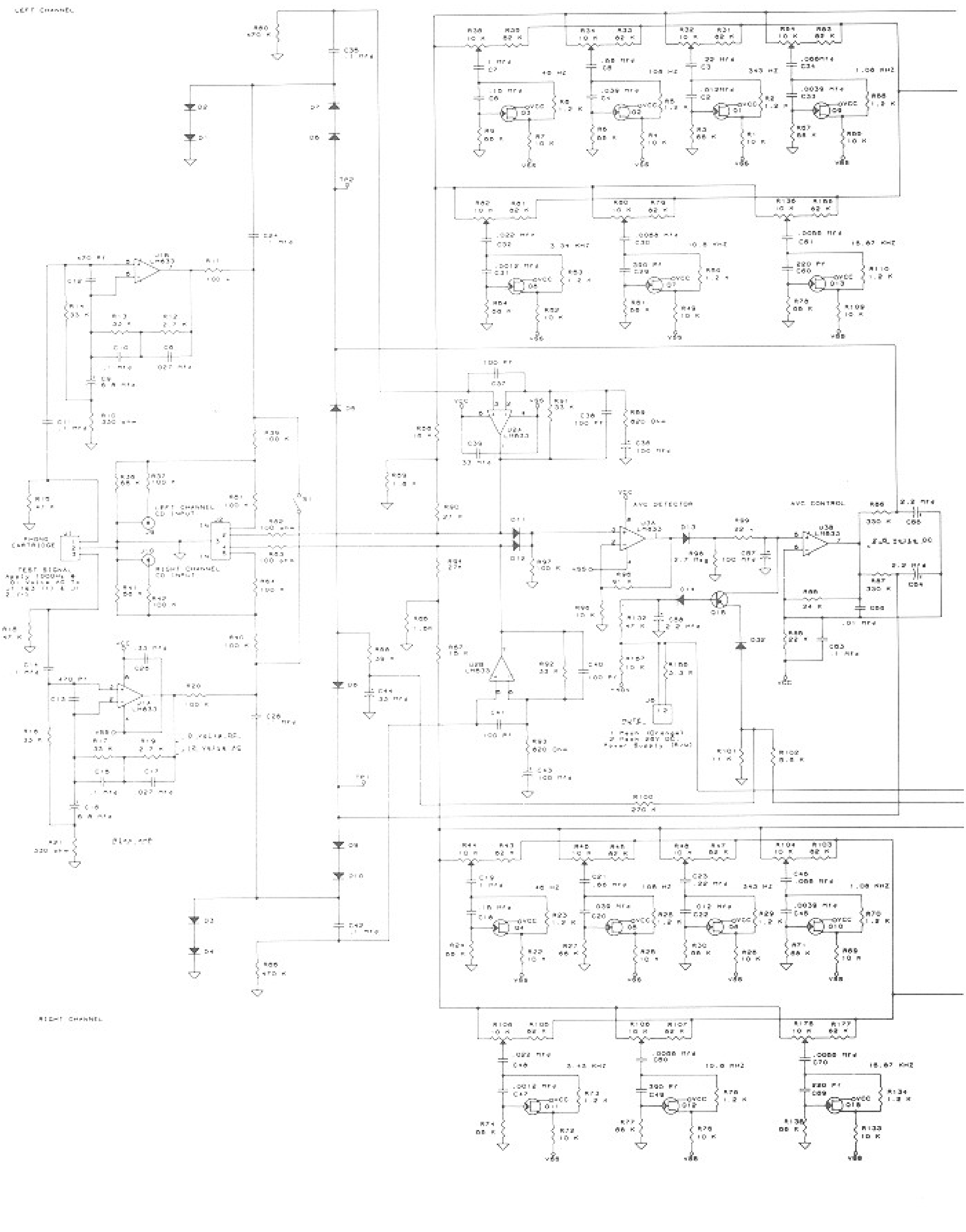
F501-F502	Fuse - 5 Amp	70072106

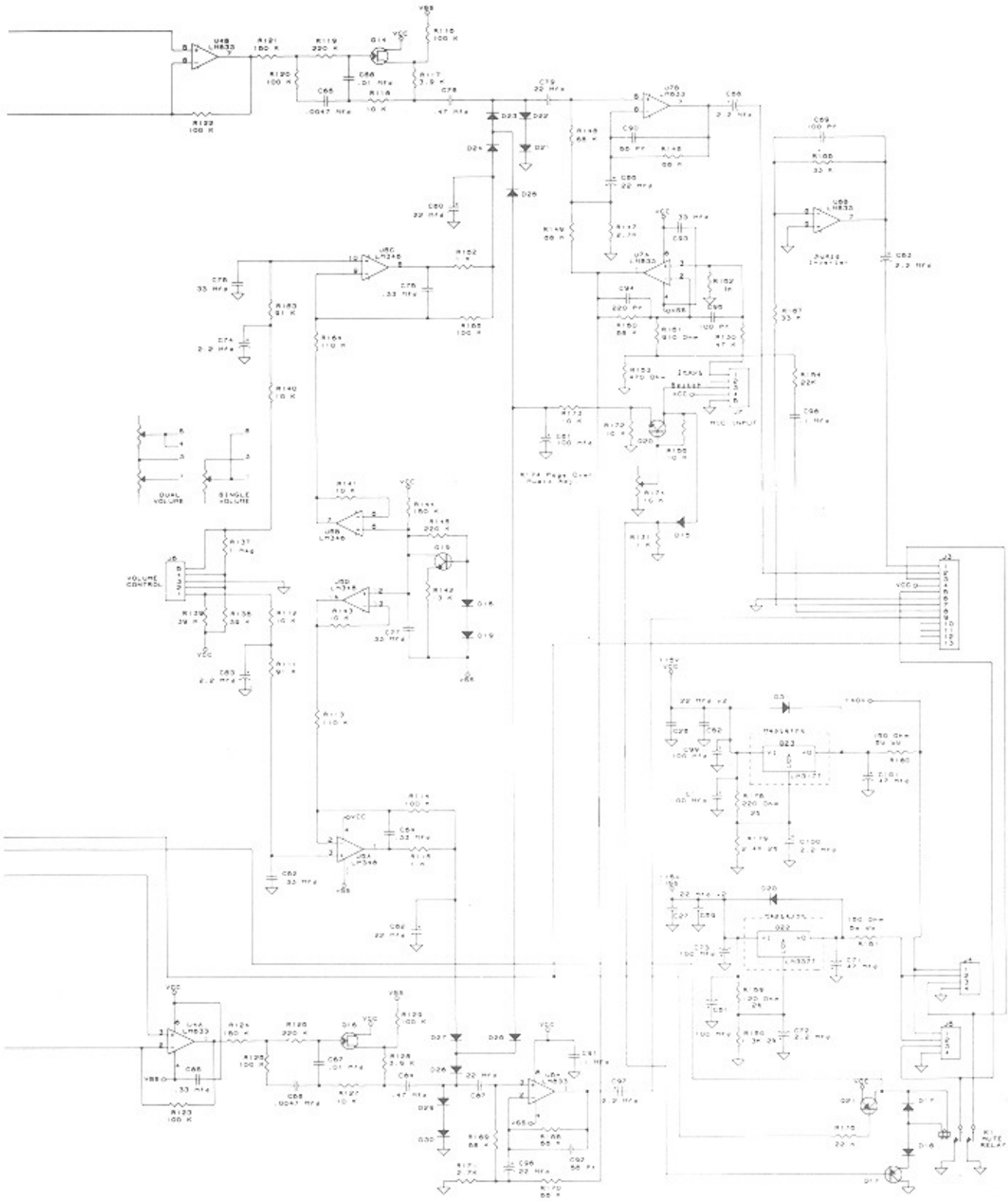
P501	Polarizing Wafer Assembly	70075007
P502	Polarizing Wafer Assembly - Right-angle mount	70076009
P503-P504	Polarizing Wafer Assembly	70075003

Q501-Q502	Transistor - Silicon	(NPN)	70033005
Q503	Transistor - Silicon	(NPN)	70030008

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R501	Resistor - Carbon	6.8 K	(¼w, 2%)	79902682
R502	Resistor - Carbon	390 Ohm	(¼w, 2%)	79902391
R503	Resistor - Wire Wound	0.33 Ohm	(2w, 10%)	79920338
R504	Resistor - Wire Wound	1 K	(2w, 10%)	79920102
R505	Resistor - Carbon	1 K	(½w, 10%)	70010619
R506	Resistor - Carbon	470 Ohm	(¼w, 2%)	79902471
R507	Resistor - Carbon	100 Ohm	(¼w, 2%)	79902101
R508	Resistor - Wire Wound	0.27 Ohm	(2w, 10%)	79920278
R509	Resistor - Carbon	100 Ohm		79901101
R510	Resistor - Carbon	560 Ohm		79901561
R511	Resistor - Carbon	47 Ohm		79901470
R512	Resistor - Carbon	2.7 K	(½w, 5%)	70012007
R513	Resistor - Carbon	1 K	(½w, 10%)	70010619
R514	Resistor - Carbon	.27	(2w, 5%)	79920278


LEFT CHANNEL
RIGHT CHANNEL
AVC DETECTOR
AVC CONTROL
PHONO CARTRIDGE
LEFT CHANNEL CD INPUT
RIGHT CHANNEL CD INPUT



For Equivalent Engineering Drawing See 61023701 B

Figure 5-7. Schematic Diagram - Stereo Preamp Assembly

COMPONENT LIST FOR PREAMPLIFIER BOARD (61023701)

C1	Capacitor - Electrolytic	100 mf	70023814
C2	Capacitor - Monolithic Ceramic	012 mf	70028638
C3	Capacitor - Monolithic Ceramic	.22 mf	70028510
C4	Capacitor - Monolithic Ceramic	.039 mf	70028644
C5	Capacitor - Monolithic Ceramic	.68 mf	70028522
C6	Capacitor - Monolithic Ceramic	.15 mf	70028512
C7	Capacitor - Monolithic Ceramic	1 mf	70028521
C8	Capacitor - Monolithic Ceramic	.027 mf	70028642
C9	Capacitor - Electrolytic	6.8 mf	70023807
C10	Capacitor - Monolithic Ceramic	.1 mf	70028649
C11	Capacitor - Monolithic Ceramic	.1 mf	70028649
C12	Capacitor - Monolithic Ceramic	470 pf	70028612
C13	Capacitor - Monolithic Ceramic	470 pf	70028612
C14	Capacitor - Monolithic Ceramic	.1 mf	70028649
C15	Capacitor - Monolithic Ceramic	.1 mf	70028649
C16	Capacitor - Electrolytic	6.8 mf	70023807
C17	Capacitor - Monolithic Ceramic	.027 mf	70028642
C18	Capacitor - Monolithic Ceramic	.15 mf	70028512
C19	Capacitor - Monolithic Ceramic	1 mf	70028521
C20	Capacitor - Monolithic Ceramic	.039 mf	70028644
C21	Capacitor - Monolithic Ceramic	.68 mf	70028522
C22	Capacitor - Monolithic Ceramic	.012 mf	70028638
C23	Capacitor - Monolithic Ceramic	.22 mf	70028510
C24	Capacitor - Monolithic Ceramic	.1 mf	70028649
C25	Capacitor - Monolithic Ceramic	.33 mf	70028515
C26	Capacitor - Monolithic Ceramic	.1 mf	70028649
C27	Capacitor - Monolithic Ceramic	.22 mf	70028510
C28	Capacitor - Monolithic Ceramic	.22 mf	70028510
C29	Capacitor - Monolithic Ceramic	390 pf	70028611
C30	Capacitor - Monolithic Ceramic	.0068 mf	70028633
C31	Capacitor - Monolithic Ceramic	.0012 mf	70028620
C32	Capacitor - Monolithic Ceramic	.022 mf	70028641
C33	Capacitor - Monolithic Ceramic	.0039 mf	70028629
C34	Capacitor - Monolithic Ceramic	.068 mf	70028647
C35	Capacitor - Monolithic Ceramic	.1 mf	70028649
C36	Capacitor - Electrolytic	100 mf	70023814
C37	Capacitor - Monolithic Ceramic	100 pf	70028601
C38	Capacitor - Monolithic Ceramic	100 pf	70028601
C39	Capacitor - Monolithic Ceramic	.33 mf	70028515
C40	Capacitor - Monolithic Ceramic	100 pf	70028601
C41	Capacitor - Monolithic Ceramic	100 pf	70028601
C42	Capacitor - Monolithic Ceramic	.1 mf	70028649
C43	Capacitor - Electrolytic	100 mf	70023814
C44	Capacitor - Electrolytic	33 mf	70023811
C45	Capacitor - Monolithic Ceramic	.0039 mf	70028629
C46	Capacitor - Monolithic Ceramic	.068 mf	70028647
C47	Capacitor - Monolithic Ceramic	.0012 mf	70028620
C48	Capacitor - Monolithic Ceramic	.022 mf	70028641
C49	Capacitor - Monolithic Ceramic	390 pf	70028611
C50	Capacitor - Monolithic Ceramic	.0056 mf	70028632
C51	Capacitor - Electrolytic	100 mf	70023814

C52	Capacitor - Monolithic Ceramic	.22 mf	70028510
C53	Capacitor - Monolithic Ceramic	.1 mf	70028649
C54	Capacitor - Electrolytic	2.2 mf	70023805
C55	Capacitor - Electrolytic	2.2 mf	70023805
C56	Capacitor - Monolithic Ceramic	.01 mf	70028636
C57	Capacitor - Electrolytic	100 mf	70023814
C58	Capacitor - Electrolytic	2.2 mf	70023805
C59	Capacitor - Monolithic Ceramic	.22 mf	70028510
C60	Capacitor - Monolithic Ceramic	220 pf	70028606
C61	Capacitor - Monolithic Ceramic	.0056 mf	70028632
C62	Capacitor - Monolithic Ceramic	.33 mf	70028515
C63	Capacitor - Electrolytic	2.2 mf	70023805
C64	Capacitor - Monolithic Ceramic	.33 mf	70028515
C65	Capacitor - Monolithic Ceramic	.0047 mf	70028630
C66	Capacitor - Monolithic Ceramic	.01 mf	70028636
C67	Capacitor - Monolithic Ceramic	.01 mf	70028636
C68	Capacitor - Monolithic Ceramic	.0047 mf	70028630
C69	Capacitor - Monolithic Ceramic	220 pf	70028606
C70	Capacitor - Monolithic Ceramic	.0056 mf	70028632
C71	Capacitor - Electrolytic	47 mf	70023812
C72	Capacitor - Electrolytic	2.2 mf	70023805
C73	Capacitor - Electrolytic	100 mf	70023814
C74	Capacitor - Electrolytic	2.2 mf	70023805
C75	Capacitor - Monolithic Ceramic	.33 mf	70028515
C76	Capacitor - Monolithic Ceramic	.33 mf	70028515
C77	Capacitor - Monolithic Ceramic	.33 mf	70028515
C78	Capacitor - Monolithic Ceramic	.47 mf	70028516
C79	Capacitor - Monolithic Ceramic	.22 mf	70028510
C80	Capacitor - Electrolytic	22 mf	70023810
C81	Capacitor - Electrolytic	100 mf	70023814
C82	Capacitor - Electrolytic	22 mf	70023810
C83	Capacitor - Electrolytic	2.2 mf	70023805
C84	Capacitor - Monolithic Ceramic	.47 mf	70028516
C85	Capacitor - Electrolytic	22 mf	70023810
C86	Capacitor - Monolithic Ceramic	.33 mf	70028515
C87	Capacitor - Monolithic Ceramic	.22 mf	70028510
C88	Capacitor - Electrolytic	2.2 mf	70023805
C89	Capacitor - Monolithic Ceramic	100 pf	70028601
C90	Capacitor - Monolithic Ceramic	56 pf	70028710
C91	Capacitor - Monolithic Ceramic	.1 mf	70028649
C92	Capacitor - Monolithic Ceramic	56 pf	70028710
C93	Capacitor - Monolithic Ceramic	.33 mf	70028515
C94	Capacitor - Monolithic Ceramic	220 pf	70028606
C95	Capacitor - Monolithic Ceramic	100 pf	70028601
C96	Capacitor - Electrolytic	22 mf	70023810
C97	Capacitor - Electrolytic	2.2 mf	70023805
C98	Capacitor - Monolithic Ceramic	.1 mf	70028649
C99	Capacitor - Electrolytic	100 mf	70023814
C100	Capacitor - Electrolytic	2.2 mf	70023805
C101	Capacitor - Electrolytic	47 mf	70023812

COMPONENT LIST FOR PREAMPLIFIER BOARD (61023701)
(Continued)

D1	Diode - Silicon	1N4148	70035012
D2	Diode - Silicon	1N4148	70035012
D3	Diode - Silicon	1N4148	70035012
D4	Diode - Silicon	1N4148	70035012
D5	Diode - Silicon	1N4148	70035012
D6	Diode - Silicon	1N4148	70035012
D7	Diode - Silicon	1N4148	70035012
D8	Diode - Silicon	1N4148	70035012
D9	Diode - Silicon	1N4148	70035012
D10	Diode - Silicon	1N4148	70035012
D11	Diode - Silicon	1N4148	70035012
D12	Diode - Silicon	1N4148	70035012
D13	Diode - Silicon	1N4148	70035012
D14	Diode - Silicon	1N4148	70035012
D15	Diode - Silicon	1N4148	70035012
D16	Diode - Silicon	1N4148	70035012
D17	Diode - Silicon	1N4148	70035012
D18	Diode - Silicon	1N4148	70035012
D19	Diode - Silicon	1N4148	70035012
D20	Diode - Silicon	1N4148	70035012
D21	Diode - Silicon	1N4148	70035012
D22	Diode - Silicon	1N4148	70035012
D23	Diode - Silicon	1N4148	70035012
D24	Diode - Silicon	1N4148	70035012
D25	Diode - Silicon	1N4148	70035012
D26	Diode - Silicon	1N4148	70035012
D27	Diode - Silicon	1N4148	70035012
D28	Diode - Silicon	1N4148	70035012
D29	Diode - Silicon	1N4148	70035012
D30	Diode - Silicon	1N4148	70035012
D31	Diode - Silicon	1N4148	70035012
D32	Diode - Silicon	1N4148	70035012
HS1	Heatsink - Vertical Mount		21541405
HS2	Heatsink - Vertical Mount		21541405
J1	Header - Non-Polarizing (3 CKT)		70074921
J2	Header - Non-Polarizing (5 CKT)		70074923
J3	Header - Non-Polarizing (13 CKT)		70074931
J4	Connector - Top Entry (4 CKT)		70074802
J5	Connector - Top Entry (4 CKT)		70074802
J6	Header - Non-Polarizing (5 CKT)		70074923
J7	Header - Non-Polarizing (5 CKT)		70074923
J8	Header - Polarizing (2 CKT)		70075002
J9	Receptacle - Phono Jack		21540902
J10	Receptacle - Phono Jack		21540902
K1	Relay - Reed		70042208

Q1	Transistor - J-FET (N-channel)	70030901
Q2	Transistor - J-FET (N-Channel)	70030901
Q3	Transistor - J-FET (N-Channel)	70030901
Q4	Transistor - J-FET (N-Channel)	70030901
Q5	Transistor - J-FET (N-Channel)	70030901
Q6	Transistor - J-FET (N-Channel)	70030901
Q7	Transistor - J-FET (N-Channel)	70030901
Q8	Transistor - J-FET (N-Channel)	70030901
Q9	Transistor - J-FET (N-Channel)	70030901
Q10	Transistor - J-FET (N-Channel)	70030901
Q11	Transistor - J-FET (N-Channel)	70030901
Q12	Transistor - J-FET (N-Channel)	70030901
Q13	Transistor - J-FET (N-Channel)	70030901
Q14	Transistor - J-FET (N-Channel)	70030901
Q15	Transistor - Silicon (PNP)	70030104
Q16	Transistor - J-FET (N-Channel)	70030901
Q17	Transistor - Silicon (PNP)	70030104
Q18	Transistor - J-FET (N-Channel)	70030901
Q19	Transistor - Silicon (NPN)	70030008
Q20	Transistor - Silicon (NPN)	70030008
Q21	Transistor - Silicon (PNP)	70030104
Q22	Regulator - Voltage (ADJ NEG)	70036508
Q23	Regulator - Voltage (ADJ POS)	70036507

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	10 K	79901103
R2	Resistor - Carbon	1.2 K	79901122
R3	Resistor - Carbon	68 K	79901683
R4	Resistor - Carbon	10 K	79901103
R5	Resistor - Carbon	1.2 K	79901122
R6	Resistor - Carbon	68 K	79901683
R7	Resistor - Carbon	10 K	79901103
R8	Resistor - Carbon	1.2 K	79901122
R9	Resistor - Carbon	68 K	79901683
R10	Resistor - Carbon	330 Ohm	79901331
R11	Resistor - Carbon	100 K	79901104
R12	Resistor - Carbon	2.7 K	79901272
R13	Resistor - Carbon	33 K	79901333
R14	Resistor - Carbon	33 K	79901333
R15	Resistor - Carbon	47 K	79901473
R16	Resistor - Carbon	47 K	79901473
R17	Resistor - Carbon	33 K	79901333
R18	Resistor - Carbon	33 K	79901333
R19	Resistor - Carbon	2.7 K	79901272
R20	Resistor - Carbon	100 K	79901104
R21	Resistor - Carbon	330 Ohm	79901331
R22	Resistor - Carbon	10 K	79901103
R23	Resistor - Carbon	1.2 K	79901122
R24	Resistor - Carbon	68 K	79901683
R25	Resistor - Carbon	10 K	79901103

COMPONENT LIST FOR PREAMPLIFIER BOARD (61023701)
(Continued)

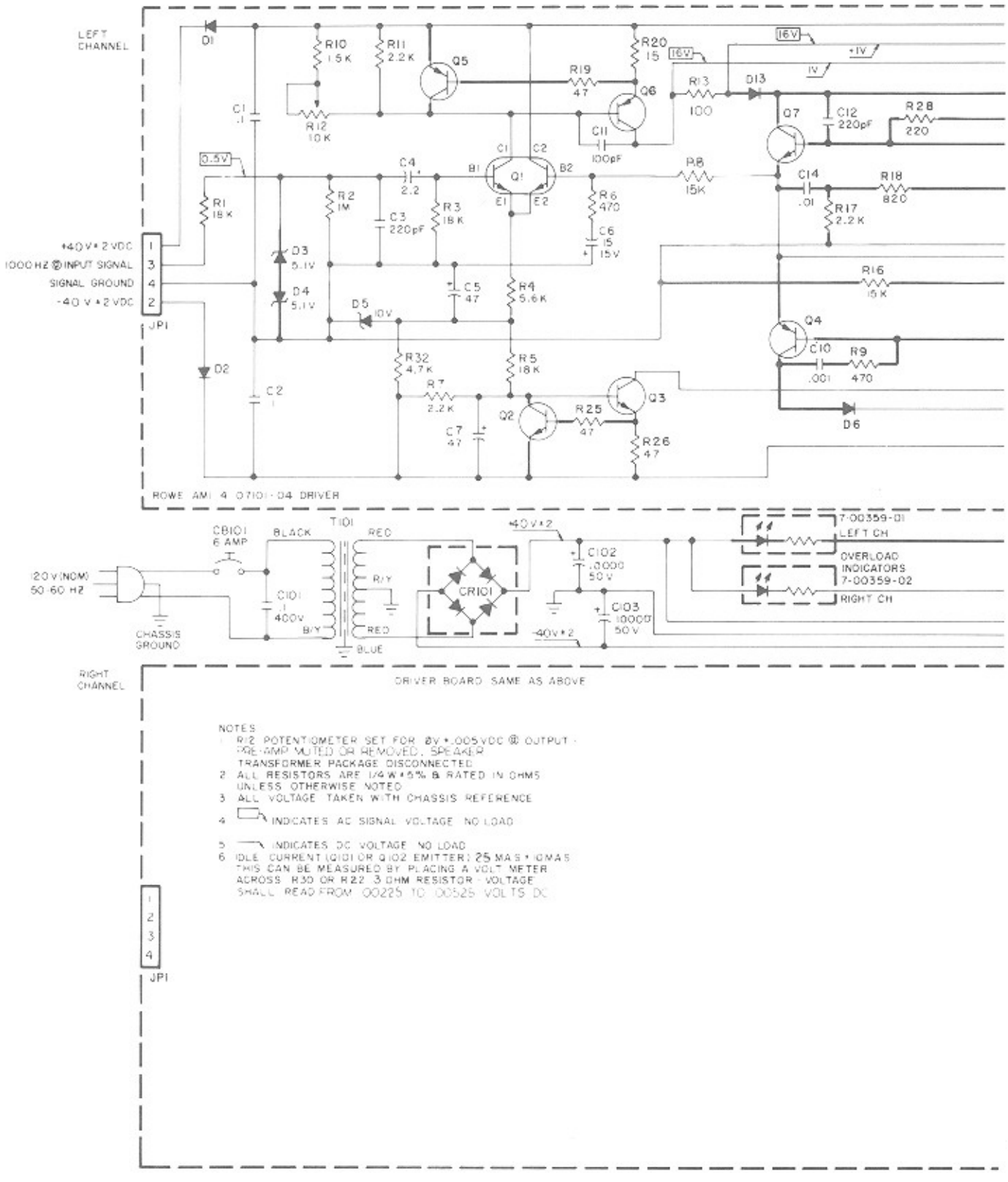
R26	Resistor - Carbon	1.2 K	79901122
R27	Resistor - Carbon	68 K	79901683
R28	Resistor - Carbon	10 K	79901103
R29	Resistor - Carbon	1.2 K	79901122
R30	Resistor - Carbon	68 K	79901683
R31	Resistor - Carbon	82 K	79901823
R32	Potentiometer - Special	10 K	70040018
R33	Resistor - Carbon	82 K	79901823
R34	Potentiometer - Special	10 K	70040018
R35	Resistor - Carbon	82 K	79901823
R36	Potentiometer - Special	10 K	70040018
R37	Resistor - Carbon	100 K	79901104
R38	Resistor - Carbon	68 K	79901683
R39	Resistor - Carbon	100 K	79901104
R40	Resistor - Carbon	100 K	79901104
R41	Resistor - Carbon	68 K	79901683
R42	Resistor - Carbon	100 K	79901104
R43	Resistor - Carbon	82 K	79901823
R44	Potentiometer - Special	10 K	70040018
R45	Resistor - Carbon	82 K	79901823
R46	Potentiometer - Special	10 K	70040018
R47	Resistor - Carbon	82 K	79901823
R48	Potentiometer - Special	10 K	70040018
R49	Resistor - Carbon	10 K	79901103
R50	Resistor - Carbon	1.2 K	79901122
R51	Resistor - Carbon	68 K	79901683
R52	Resistor - Carbon	10 K	79901103
R53	Resistor - Carbon	1.2 K	79901122
R54	Resistor - Carbon	68 K	79901683
R55	Resistor - Carbon	10 K	79901103
R56	Resistor - Carbon	1.2 K	79901122
R57	Resistor - Carbon	68 K	79901683
R58	Resistor - Carbon	15 K	79901153
R59	Resistor - Carbon	1.8 K	79901182
R60	Resistor - Carbon	470 K	79901474
R61	Resistor - Carbon	100 K	79901104
R62	Resistor - Carbon	100 Ohm	79901101
R63	Resistor - Carbon	100 Ohm	79901101
R64	Resistor - Carbon	100 K	79901104
R65	Resistor - Carbon	470 K	79901474
R66	Resistor - Carbon	1.8 K	79901182
R67	Resistor - Carbon	15 K	79901153
R68	Resistor - Carbon	39 K	79901393
R69	Resistor - Carbon	10 K	79901103
R70	Resistor - Carbon	1.2 K	79901122
R71	Resistor - Carbon	68 K	79901683
R72	Resistor - Carbon	10 K	79901103
R73	Resistor - Carbon	1.2 K	79901122
R74	Resistor - Carbon	68 K	79901683
R75	Resistor - Carbon	10 K	79901103
R76	Resistor - Carbon	1.2 K	79901122

R77	Resistor - Carbon	68 K	79901683
R78	Resistor - Carbon	68 K	79901683
R79	Resistor - Carbon	82 K	79901823
R80	Potentiometer - Special	10 K	70040018
R81	Resistor - Carbon	82 K	79901823
R82	Potentiometer - Special	10 K	70040018
R83	Resistor - Carbon	82 K	79901823
R84	Potentiometer - Special	10 K	70040018
R85	Resistor - Carbon	22 K	79901223
R86	Resistor - Carbon	330 K	79901334
R87	Resistor - Carbon	330 K	79901334
R88	Resistor - Carbon	24 K	79901243
R89	Resistor - Carbon	820 Ohm	79901821
R90	Resistor - Carbon	27 K	79901273
R91	Resistor - Carbon	33 K	79901333
R92	Resistor - Carbon	33 K	79901333
R93	Resistor - Carbon	820 Ohm	79901821
R94	Resistor - Carbon	27 K	79901273
R95	Resistor - Carbon	91 K	79901913
R96	Resistor - Carbon	10 K	79901103
R97	Resistor - Carbon	100 K	79901104
R98	Resistor - Carbon	2.7 M	79901275
R99	Resistor - Carbon	22 K	79901223
R100	Resistor - Carbon	270 K	79901274
R101	Resistor - Carbon	11 K	79901113
R102	Resistor - Carbon5.6 K		79901562
R103	Resistor - Carbon	82 K	79901823
R104	Potentiometer - Special	10 K	70040018
R105	Resistor - Carbon	82 K	79901823
R106	Potentiometer - Special	10 K	70040018
R107	Resistor - Carbon	82 K	79901823
R108	Potentiometer - Special	10 K	70040018
R109	Resistor - Carbon	10 K	79901103
R110	Resistor - Carbon	1.2 K	79901122
R111	Resistor - Carbon	91 K	79901913
R112	Resistor - Carbon	10 K	79901103
R113	Resistor - Carbon	110 K	79901114
R114	Resistor - Carbon	100 K	79901104
R115	Resistor - Carbon	1 K	79901102
R116	Resistor - Carbon	100 K	79901104
R117	Resistor - Carbon	3.9 K	79901392
R118	Resistor - Carbon	10 K	79901103
R119	Resistor - Carbon	220 K	79901224
R120	Resistor - Carbon	100 K	79901104
R121	Resistor - Carbon	150 K	79901154
R122	Resistor - Carbon	100 K	79901104
R123	Resistor - Carbon	100 K	79901104
R124	Resistor - Carbon	150 K	79901154
R125	Resistor - Carbon	100 K	79901104
R126	Resistor - Carbon	220 K	79901224
R127	Resistor - Carbon	10 K	79901103

COMPONENT LIST FOR PREAMPLIFIER BOARD (61023701)
(Continued)

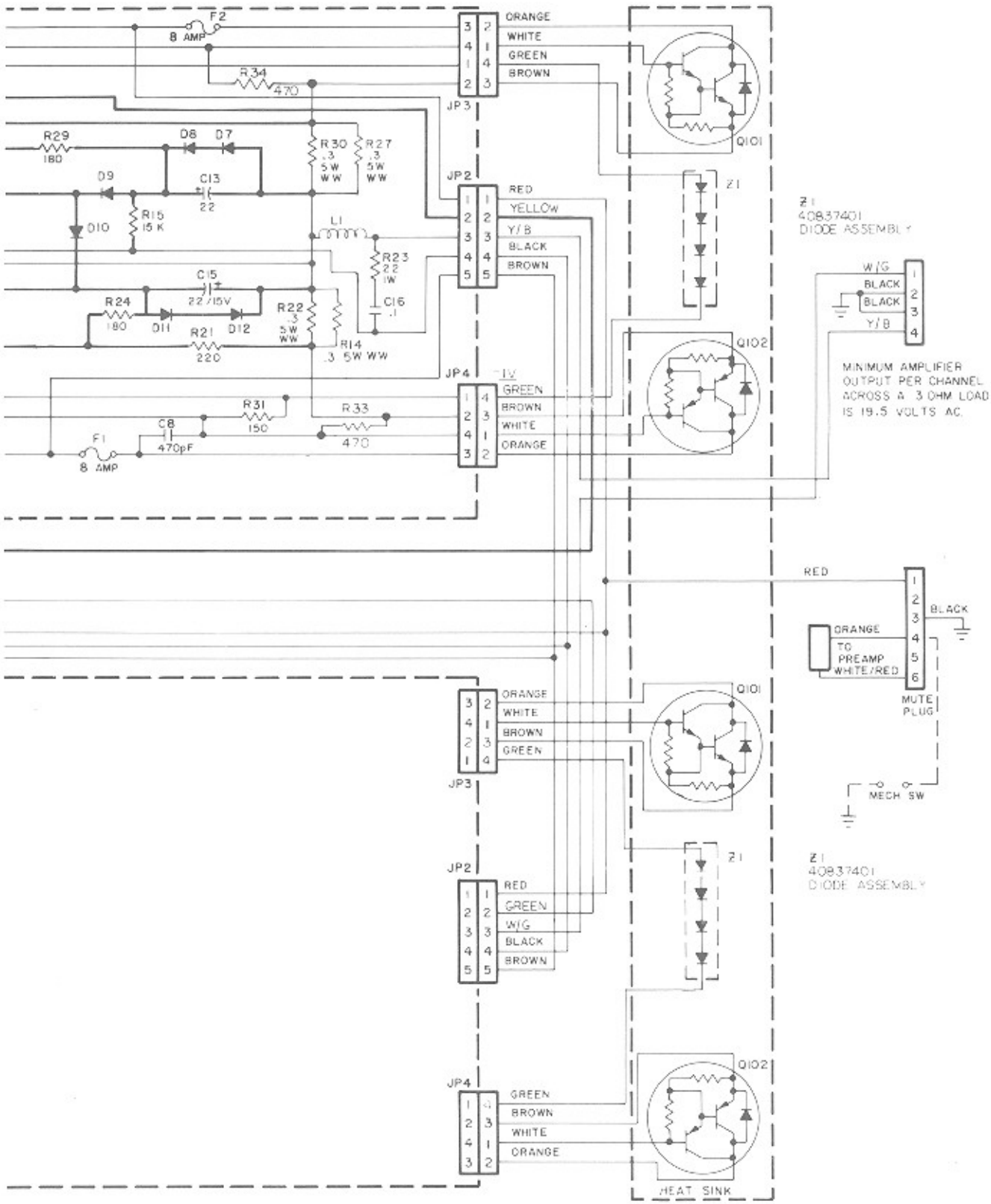
R128	Resistor - Carbon	3.9 K	79901392
R129	Resistor - Carbon	100 K	79901104
R130	Resistor - Carbon	47 K	79901473
R131	Resistor - Carbon	1 K	79901102
R132	Resistor - Carbon	47 K	79901473
R133	Resistor - Carbon	10 K	79901103
R134	Resistor - Carbon	1.2 K	79901122
R135	Resistor - Carbon	68 K	79901683
R136	Potentiometer - Special	10 K	70040018
R137	Resistor - Carbon	1 M	79901105
R138	Resistor - Carbon	39 K	79901393
R139	Resistor - Carbon	39 K	79901393
R140	Resistor - Carbon	10 K	79901103
R141	Resistor - Carbon	10 K	79901103
R142	Resistor - Carbon	13 K	79901133
R143	Resistor - Carbon	10 K	79901103
R144	Resistor - Carbon	150 K	79901154
R145	Resistor - Carbon	220 K	79901224
R146	Resistor - Carbon	68 K	79901683
R147	Resistor - Carbon	2.7 K	79901272
R148	Resistor - Carbon	68 K	79901683
R149	Resistor - Carbon	68 K	79901683
R150	Resistor - Carbon	68 K	79901683
R151	Resistor - Carbon	910 Ohm	79901911
R152	Resistor - Carbon	1 K	79901102
R153	Resistor - Carbon	470 Ohm	79901471
R154	Resistor - Carbon	22 K	79901223
R155	Resistor - Carbon	10 K	79901103
R156	Resistor - Carbon	3.3 K	79901332
R157	Resistor - Carbon	10 K	79901103
R158	Resistor - Carbon	82 K	79901823
R159	Resistor - Carbon	1.3 K	79902132
R160	Resistor - Carbon	120 Ohm	79902121
R161	Resistor - Wirewound	150 Ohm	70011804
R162	Resistor - Carbon	1 K	79901102
R163	Resistor - Carbon	91 K	79901913
R164	Resistor - Carbon	110 K	79901114
R165	Resistor - Carbon	100 K	79901104
R166	Resistor - Carbon	33 K	79901333
R167	Resistor - Carbon	33 K	79901333
R168	Resistor - Carbon	68 K	79901683
R169	Resistor - Carbon	68 K	79901683
R170	Resistor - Carbon	68 K	79901683
R171	Resistor - Carbon	2.7 K	79901272
R172	Resistor - Carbon	10 K	79901103
R173	Resistor - Carbon	10 K	79901103
R174	Potentiometer	10 K	70040014
R175	Resistor - Carbon	22 K	79901223
R176	Potentiometer - Special	10 K	70040018
R177	Resistor - Carbon	82 K	79901823
R178	Resistor - Carbon	2.4 K	79902242

R179	Resistor - Carbon	220 Ohm	79902221
R180	Resistor - Wirewound	150 Ohm	70011804
S1	Switch - DIP		70043301
U1	IC - Dual OP Amp.		30800238
U2	IC - Dual OP Amp.		30800238
U3	IC - Dual OP Amp.		30800238
U4	IC - Dual OP Amp.		30800238
U5	IC - Dual OP Amp.		30800238
U6	IC - Dual OP Amp.		30800238
U7	IC - Dual OP Amp.		30800238



NOTES

1. R12 POTENTIOMETER SET FOR 8V ±.005VDC @ OUTPUT - PRE-AMP MUTED OR REMOVED, SPEAKER TRANSFORMER PACKAGE DISCONNECTED
2. ALL RESISTORS ARE 1/4 W ±5% & RATED IN OHMS UNLESS OTHERWISE NOTED
3. ALL VOLTAGE TAKEN WITH CHASSIS REFERENCE
4. ⊏\ INDICATES AC SIGNAL VOLTAGE NO LOAD
5. —\ INDICATES DC VOLTAGE NO LOAD
6. IDLE CURRENT (Q101 OR Q102 EMITTER) 25 MA ± 10MA S THIS CAN BE MEASURED BY PLACING A VOLT METER ACROSS R30 OR R22 3 OHM RESISTOR - VOLTAGE SHALL READ FROM .00225 TO .00525 VOLTS DC



(See Figure 8-15 for the pictorial view of the heat sink)

For Equivalent Engineering Drawing See 61024901-Q2 B

Figure 5-8A. Schematic Diagram - 250 Watt Power Amp

COMPONENT LIST FOR AMPLIFIER DRIVER BOARD 40710104

C1	Capacitor - Mylar	.1 mf	70021549
C2	Capacitor - Mylar	.1 mf	70021549
C3	Capacitor - Monolithic Ceramic	220 pf	70028606
C4	Capacitor - Electrolytic	2.2 mf	70023805
C5	Capacitor - Electrolytic	47 mf	70023812
C6	Capacitor - Electrolytic	33 mf	70023811
C7	Capacitor - Electrolytic	47 mf	70023812
C8	Capacitor - Monolithic Ceramic	470 pf	70028612
C9	NOT USED		
C10	Capacitor - Monolithic Ceramic	.001 mf	70028618
C11	Capacitor - Monolithic Ceramic	100 pf	70028601
C12	Capacitor - Monolithic Ceramic	220 pf	70028606
C13	Capacitor - Electrolytic	22 mf	70023810
C14	Capacitor - Monolithic Ceramic	.01 mf	70028636
C15	Capacitor - Electrolytic	22 mf	70023810
C16	Capacitor - Mylar	.1 mf	70021549
CR1	Diode - Silicon		70035005
CR2	Diode - Silicon		70035005
CR3	Diode - Zener	(5.1 V)	70035527
CR4	Diode - Zener	(5.1 V)	70035527
CR5	Diode - Zener	(10 V)	70035514
CR6	Diode - Silicon		70035005
CR7	Diode - Silicon		70035005
CR8	Diode - Silicon		70035005
CR9	Diode - Silicon		70035005
CR10	Diode - Silicon		70035005
CR11	Diode - Silicon		70035005
CR12	Diode - Silicon		70035005
CR13	Diode - Silicon		70035005
F1	Fuse (8 Amp)		70072002
F2	Fuse (8 Amp)		70072002
L1	Inductor - Coil		21940701
P1	Wafer - Non-Polarizing	(4 CKT)	70074904
P2	Wafer - Polarizing	(5 CKT)	70075005
P3	Wafer - Polarizing	(4 CKT)	70075004
P4	Wafer - Polarizing	(4 CKT)	70075004
Q1	Transistor - Silicon (Dual)	(NPN)	70030301
Q2	Transistor - Silicon	(NPN)	70030008
Q3	Transistor - Silicon	(NPN)	70033006
Q4	Transistor - Silicon	(PNP)	70030104
Q5	Transistor - Silicon	(NPN)	70030104
Q6	Transistor - Silicon	(PNP)	70030403
Q7	Transistor - Silicon	(NPN)	70030008

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	18 K	79901183
R2	Resistor - Carbon	1 MEG	79901105
R3	Resistor - Carbon	18 K	79901183
R4	Resistor - Carbon	5.6 K	79901562
R5	Resistor - Carbon	18 K	79901183
R6	Resistor - Carbon	470 Ohm	79901471
R7	Resistor - Carbon	2.2 K	79901222
R8	Resistor - Carbon	15 K	79901153
R9	Resistor - Carbon	470 Ohm	79901471
R10	Resistor - Carbon	1.5 K	79901152
R11	Resistor - Carbon	2.2 K	79901222
R12	Resistor - Potentiometer	10 K	70040014
R13	Resistor - Carbon	100 Ohm	79901101
R14	Resistor - Wire Wound	.3 Ohm	70011805
R15	Resistor - Carbon	15 K	79901153
R16	Resistor - Carbon	15 K	79901153
R17	Resistor - Carbon	2.2 K	79901222
R18	Resistor - Carbon	820 Ohm	79901821
R19	Resistor - Carbon	47 Ohm	79901470
R20	Resistor - Carbon	15 Ohm	79901150
R21	Resistor - Carbon	180 Ohm	79901181
R22	Resistor - Wire Wound	.3 Ohm	70011805
R23	Resistor - Carbon	22 Ohm	79920220
R24	Resistor - Carbon	180 Ohm	79901181
R25	Resistor - Carbon	47 Ohm	79901470
R26	Resistor - Carbon	47 Ohm	79901470
R27	Resistor - Wire Wound	.3 Ohm (5w, 10%)	70011805
R28	Resistor - Carbon	180 Ohm	79901181
R29	Resistor - Carbon	180 Ohm	79901181
R30	Resistor - WIRE WOUND	.3 Ohm (5w, 10%)	70011805
R31	Resistor - Carbon	220 Ohm	79901221
R32	Resistor - Carbon	4.7 K	79901472

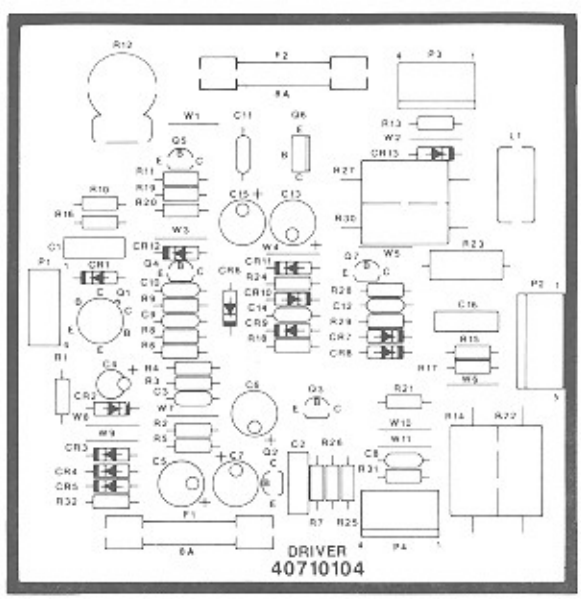
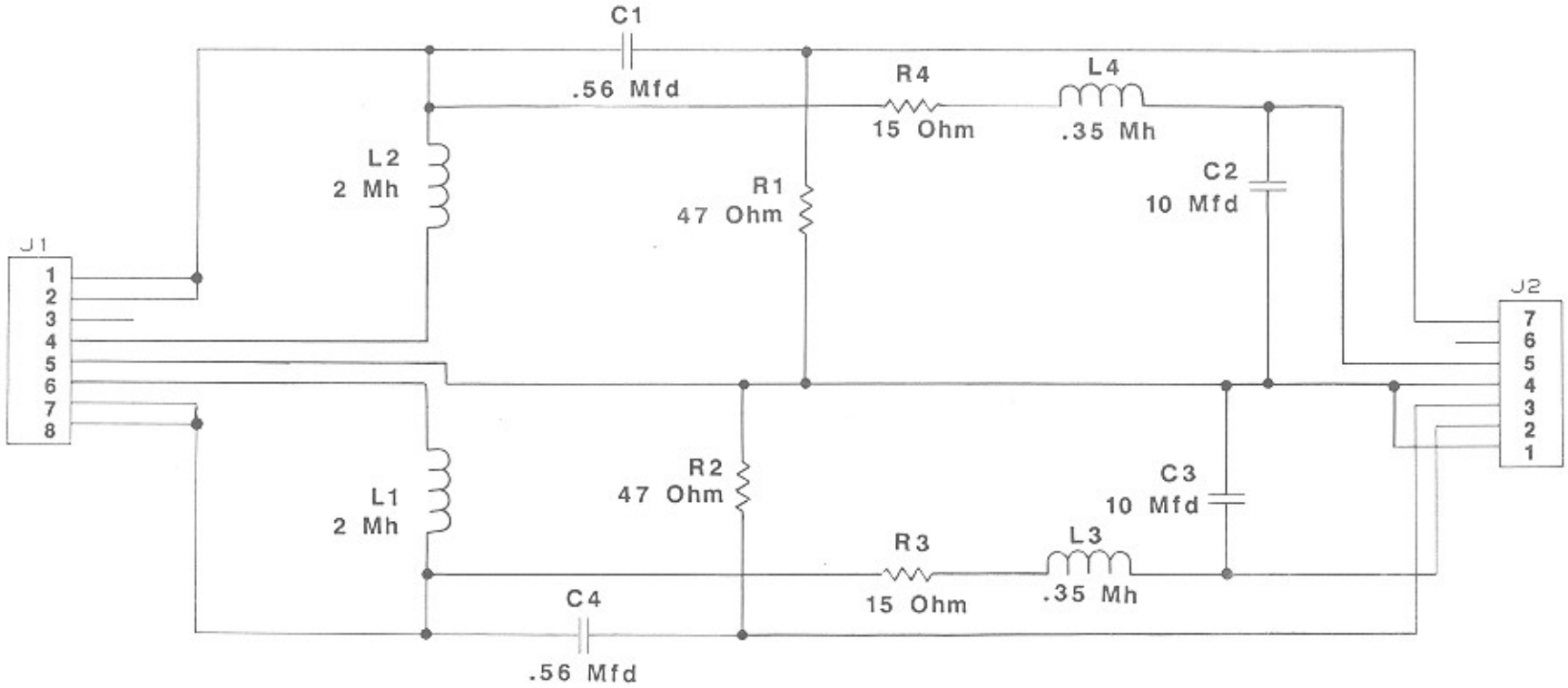


Figure 5-8B. Amplifier Driver Board Layout



For Equivalent Engineering Drawing See 61038801-Q1 B

Figure 5-8C. Schematic Diagram - Crossover Network

COMPONENTS LIST FOR CROSSOVER NETWORK (61038801)

C1	Capacitor	.56 mf	70021309
C2	Capacitor - Bl—Polar Electrolytic	10 mf	70022905
C3	Capacitor - Bl—Polar Electrolytic	10 mf	70022905
C4	Capacitor	.56 mf	70021309
J1	Wafer - Polarizing	8 CKT	70075008
J2	Wafer - Polarizing	7 CKT	70075007
L1	Inductor - Air Core	2 mh	70041401
L2	Inductor - Air Core	2 mh	70041401
L1	Inductor - Air Core	.35 mh	70041402
L1	Inductor - Air Core	.35 mh	70041402
R1	Resistor	47 Ohm (2 w)	79920470
R2	Resistor	47 Ohm (2 w)	79920470
R3	Resistor	15 Ohm (2 w)	79920150
R4	Resistor	15 Ohm (2 w)	79920150

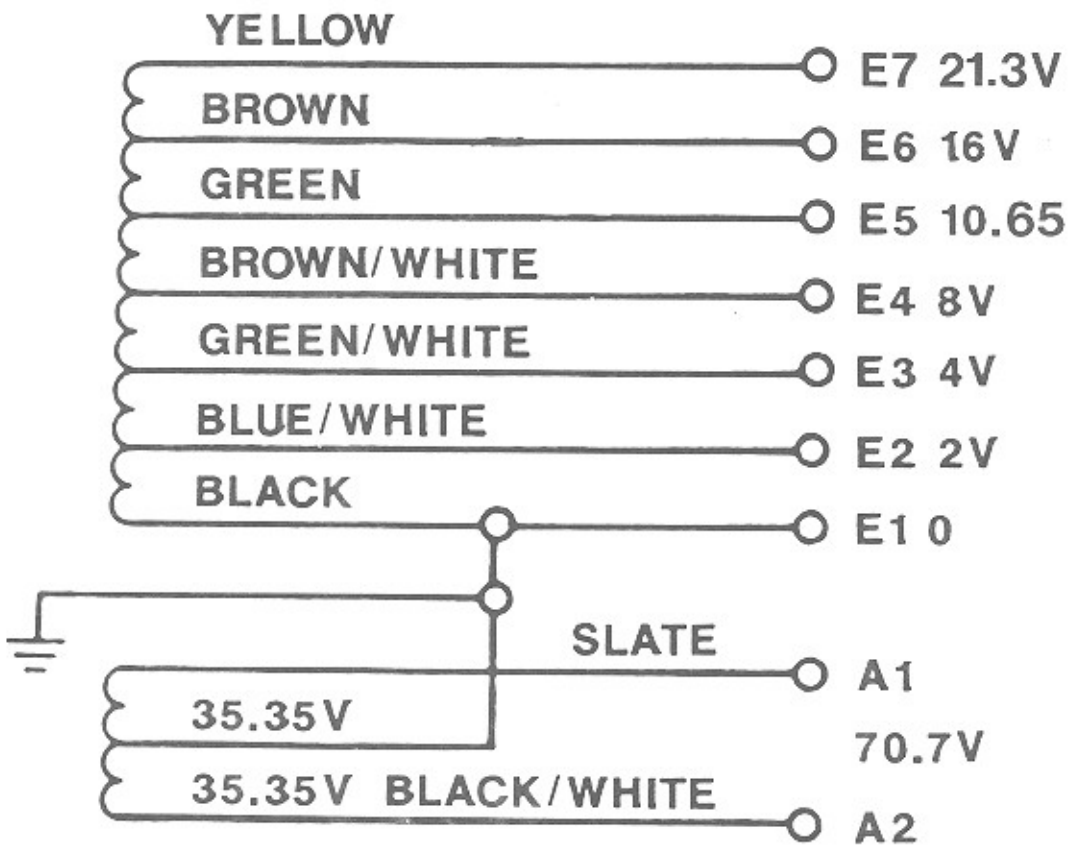
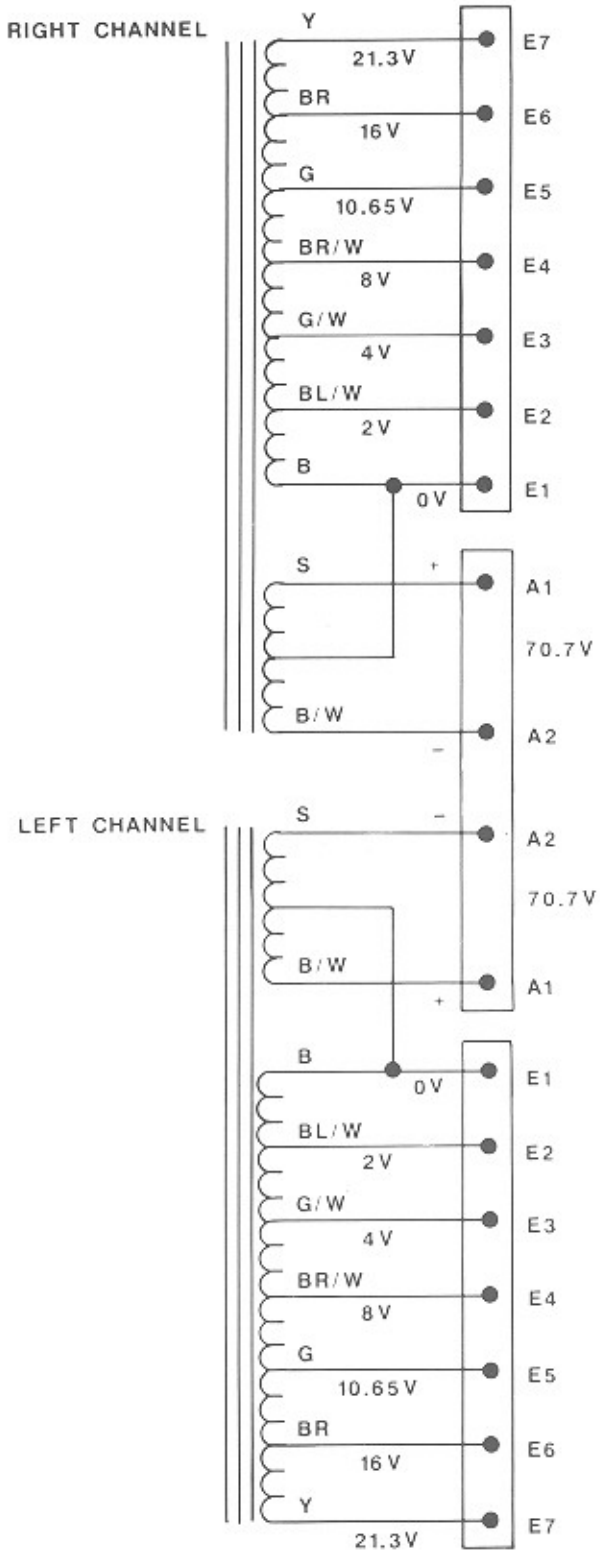
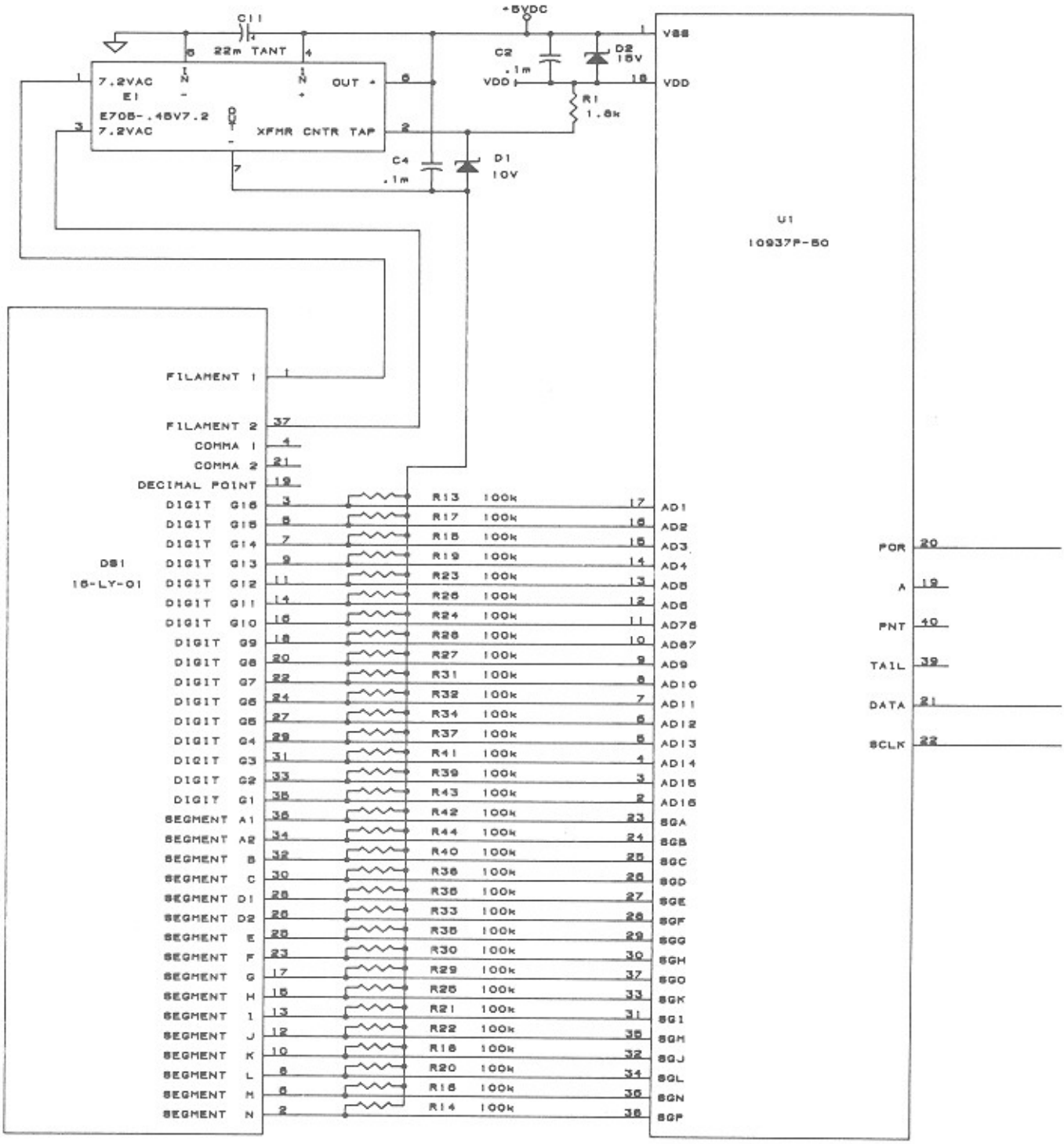


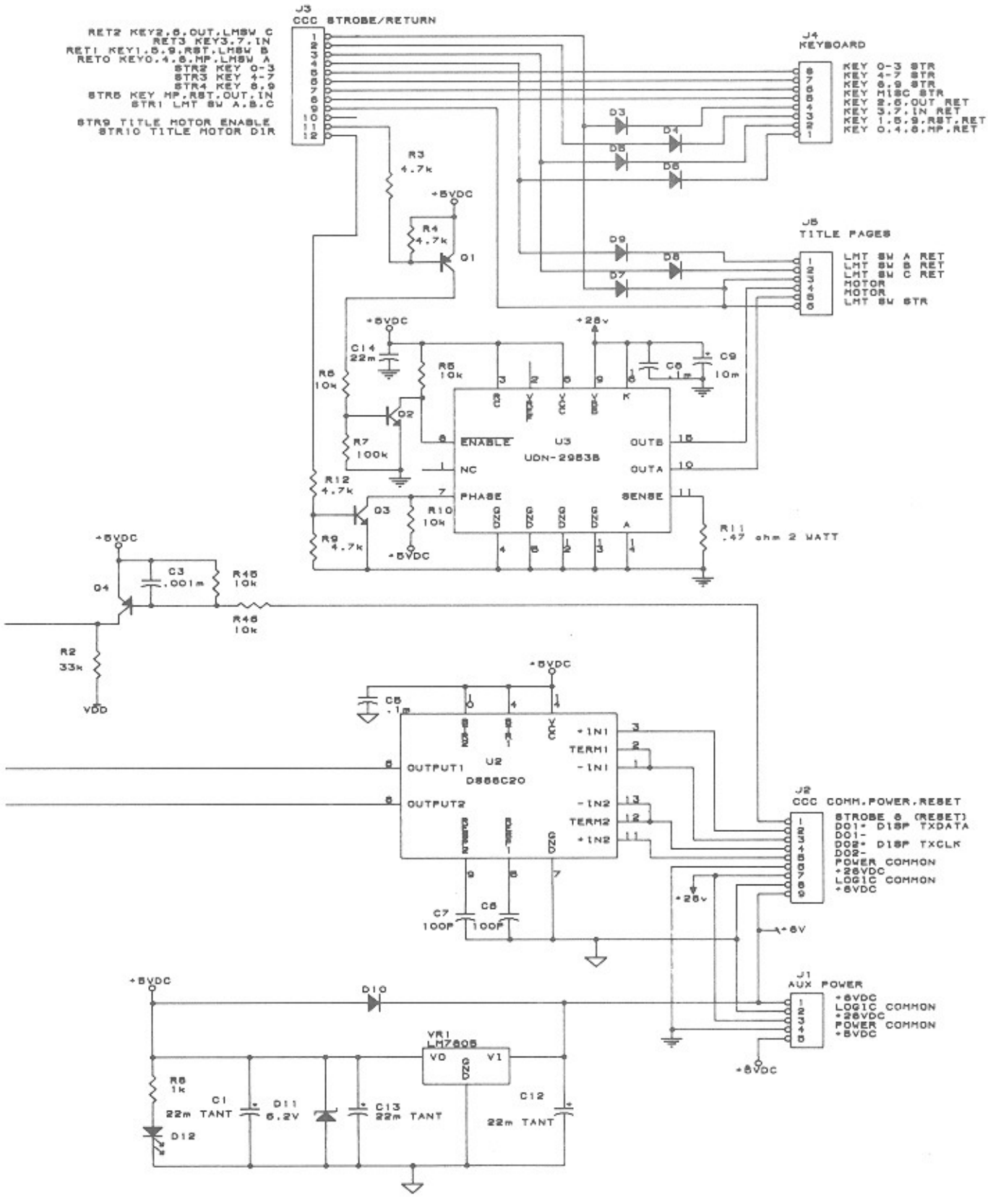
Figure 5-9. Transformer Output Voltages



For Equivalent Engineering Drawing See 40832101-Q2 A

Figure 5-10. Transformer Wiring Diagram


C11
22m TANT
+5VDC
C2
.1m
D2
15V
VSS
VDD
R1
1.8k
7.2VAC
E1
E705-.48V7.2
7.2VAC
OUT +
XFMR CNTR TAP
C4
.1m
D1
10V
U1
10937P-50
FILAMENT 1
FILAMENT 2
COMMA 1
COMMA 2
DECIMAL POINT
DS1
16-LY-01
DIGIT G16
DIGIT G15
DIGIT G14
DIGIT G13
DIGIT G12
DIGIT G11
DIGIT G10
DIGIT G9
DIGIT G8
DIGIT G7
DIGIT G6
DIGIT G5
DIGIT G4
DIGIT G3
DIGIT G2
DIGIT G1
SEGMENT A1
SEGMENT A2
SEGMENT B
SEGMENT C
SEGMENT D1
SEGMENT D2
SEGMENT E
SEGMENT F
SEGMENT G
SEGMENT H
SEGMENT I
SEGMENT J
SEGMENT K
SEGMENT L
SEGMENT M
SEGMENT N
R13 100k
R17 100k
R15 100k
R19 100k
R23 100k
R25 100k
R24 100k
R26 100k
R27 100k
R31 100k
R32 100k
R34 100k
R37 100k
R41 100k
R39 100k
R43 100k
R42 100k
R44 100k
R40 100k
R36 100k
R35 100k
R33 100k
R38 100k
R30 100k
R29 100k
R28 100k
R21 100k
R22 100k
R18 100k
R20 100k
R16 100k
R14 100k
AD1
AD2
AD3
AD4
AD5
AD6
AD78
AD67
AD9
AD10
AD11
AD12
AD13
AD14
AD15
AD16
SGA
SGB
SGC
SGD
SGE
SGF
SGG
SGH
SGI
SGK
SGL
SGM
SGJ
SGN
SGP
POR
A
PNT
TAIL
DATA
SCLK



For Equivalent Engineering Drawing See 40832301-Q2 D

Figure 5-11. Display Assembly

COMPONENT LIST FOR THE DISPLAY ASSEMBLY (40832301)

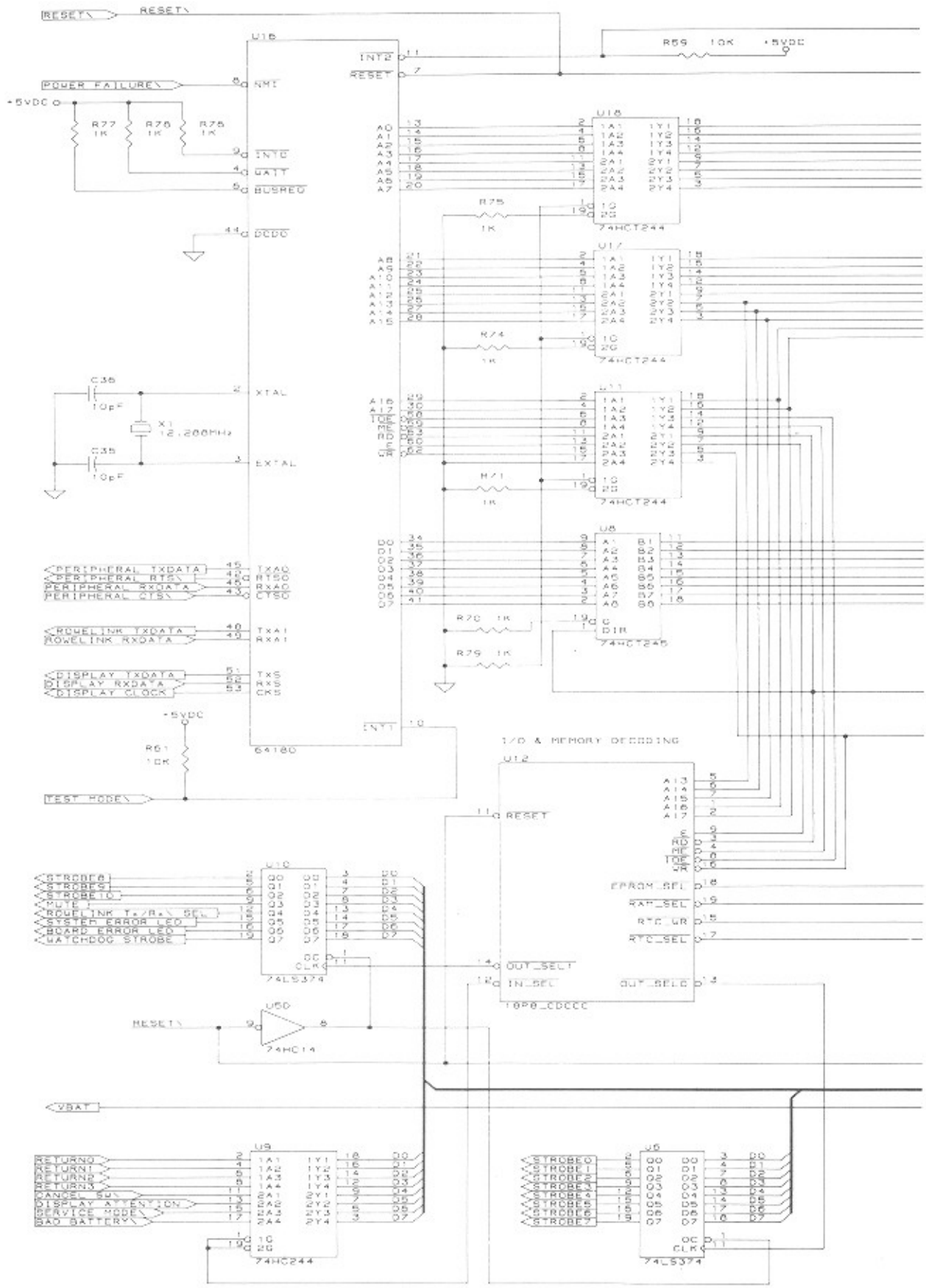
C1	Capacitor-Tantalum	22 mf	70025104
C2	Capacitor-Monolithic Ceramic	.1 mf	70028511
C3	Capacitor-Monolithic Ceramic	.001 mf	70028518
C4	Capacitor-Monolithic Ceramic	.1 mf	70028511
C5	Capacitor-Monolithic Ceramic	.1 mf	70028511
C6	Capacitor-Monolithic Ceramic	100 pf	70028601
C7	Capacitor-Monolithic Ceramic	100 pf	70028601
C8	Capacitor-Monolithic Ceramic	.1 mf	70028511
C9	Capacitor-Electrolytic	10 mf	70023808
C10	Capacitor-Tantalum	22 mf	70025104
C11	Capacitor-Tantalum	22 mf	70025104
C12	Capacitor-Tantalum	22 mf	70025104
C13	Capacitor-Tantalum	22 mf	70025104
C14	Capacitor-Tantalum	22 mf	70025104
D1	Diode-Zener (10 V)		70035514
D2	Diode-Zener (15 V)		70035522
D3	Diode-Silicon		70035005
D4	Diode-Silicon		70035005
D5	Diode-Silicon		70035005
D6	Diode-Silicon		70035005
D7	Diode-Silicon		70035005
D8	Diode-Silicon		70035005
D9	Diode-Silicon		70035005
D10	Diode-Silicon		70035005
D11	Diode-Zener (6.2 V)		70035508
D12	LED-Block (90)		70035201
DS1	Display-VAC FLU (16 Character)		30933201
E1	Converter, DC-DC/AC		30932501
J1	Wafer-Polarizing 90 (5 CKT)		70074405
J2	Wafer-Polarizing 90 (9 CKT)		70074409
J3	Wafer-Polarizing 90 (12 CKT)		70074412
J4	Wafer-Polarizing 90 (8 CKT)		70074408
J5	Wafer-Polarizing 90 (6 CKT)		70074406
Q1	Transistor-Silicon (PNP)		70030104
Q2	Transistor-Silicon (NPN)		70030008
Q3	Transistor-Silicon (NPN)		70030008

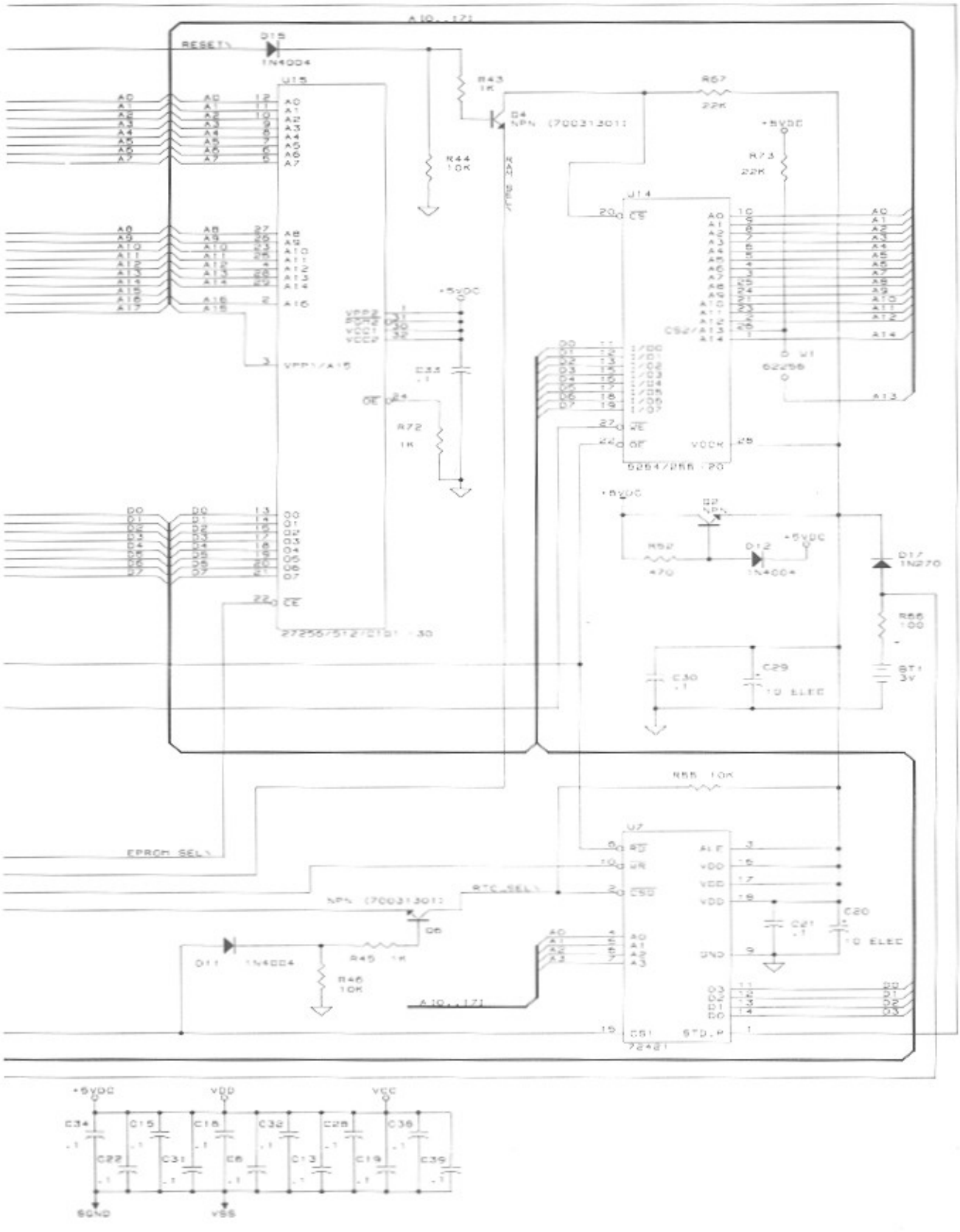
Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor-Carbon	1.8 K	79901182
R2	Resistor-Carbon	33 K	79901333
R3	Resistor-Carbon	4.7 K	79901472
R4	Resistor-Carbon	4.7 K	79901472
R5	Resistor-Carbon	10 K	79901103
R6	Resistor-Carbon	10 K	79901103
R7	Resistor-Carbon	100 K (1/8 w)	79905104
R8	Resistor-Carbon	1 K	79901102
R9	Resistor-Carbon	4.7 K	79901472
R10	Resistor-Carbon	10 K	79901103
R11	Resistor-Carbon	.47 Ohm	79920478
R12	Resistor-Carbon	4.7 K	79901472
R13 Through R44	Resistor-Carbon	100 K (1/8 w)	79905104

U1	Driver-Display (VAC FLU) (10937)	30800237
U2	Receiver-Dual (RS-422)	30800228
U3	Driver-Motor (Full Bridge)	30800229

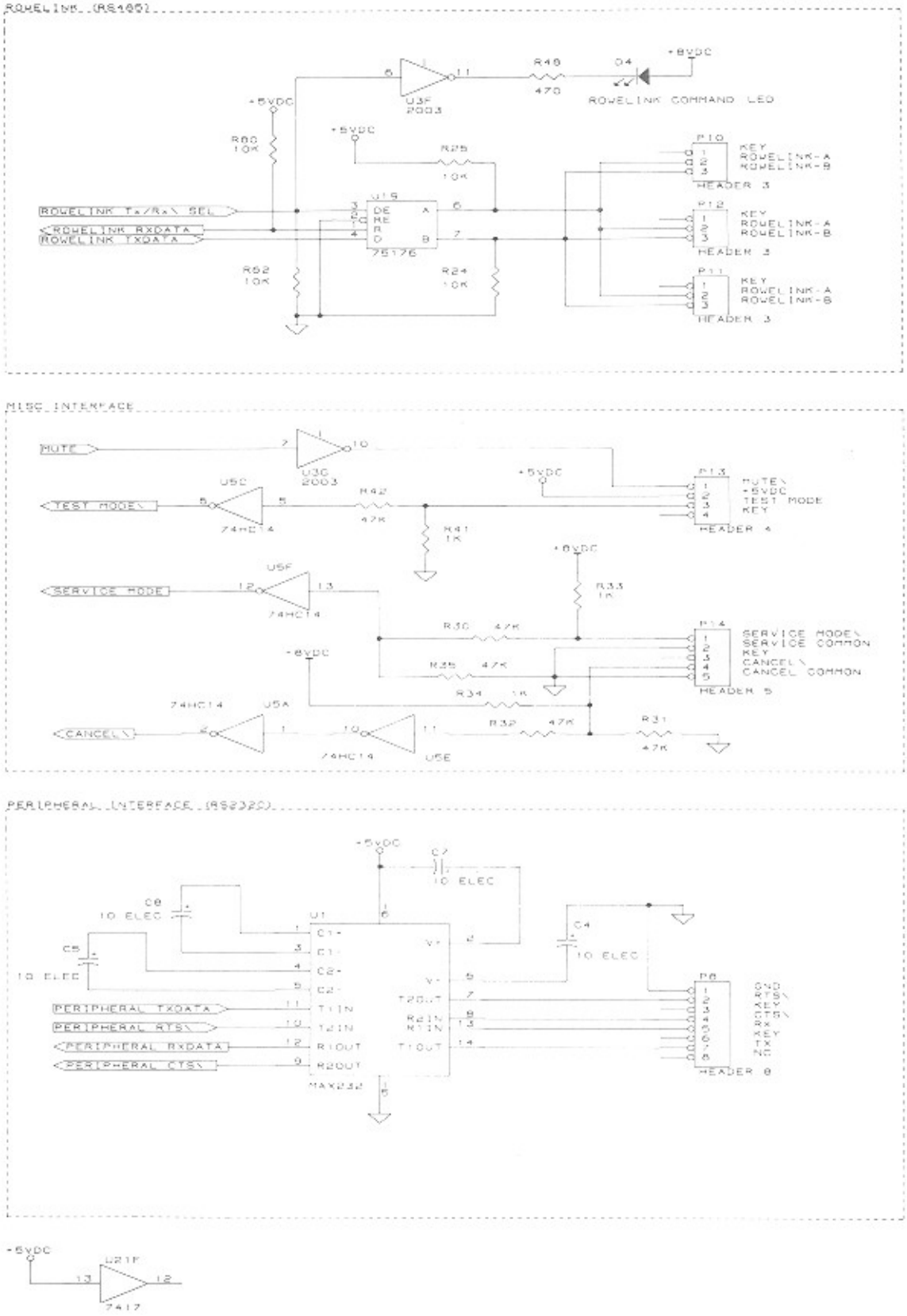
VR1	Regulator-Voltage (Linear IC)	70036506

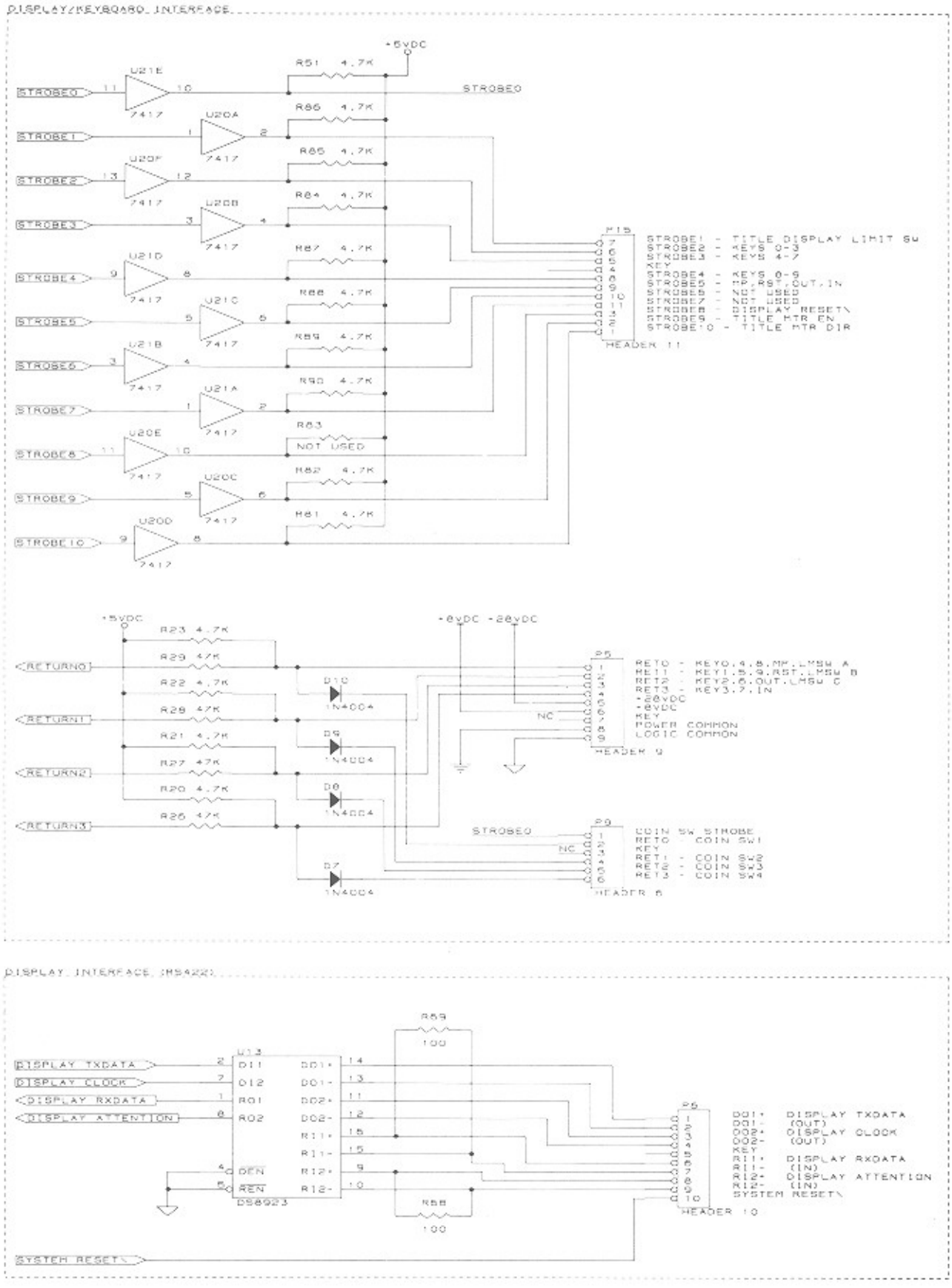

RESET\
U16
INT2
RESET
R59 10K +5VDC
POWER FAILURE\
NMI
+5VDC
R77 1K
R76 1K
R75 1K
INTC
GATT
BUSREQ
DCDC
74HCT244
R75 1K
U17
R74 1K
C36 10pF
X1 12.288MHz
XTAL
EXTAL
U11
R71 1K
U8
74HCT245
R70 1K
R79 1K
PERIPHERAL TXDATA
PERIPHERAL RTS\
PERIPHERAL RXDATA
PERIPHERAL CTS\
TXA0
RTS0
RXA0
CTS0
ROWELINK TXDATA
ROWELINK RXDATA
TXA1
RXA1
DISPLAY TXDATA
DISPLAY RXDATA
DISPLAY CLOCK
TXS
RXS
CKS
INT1
64180
R61 10K
TEST MODE\
I/O & MEMORY DECODING
U12
RESET
EPROM_SEL
RAM_SEL
RTC_WR
RTC_SEL
OUT_SELC
IN_SEL
OUT_SELC
10P8_CDCCC
U10
STROBE8
STROBE9
STROBE10
MUTE
ROWELINK T/R\ SEL
STEP ERROR LED
BOARD ERROR LED
WATCHDOG STROBE
74LS374
U50
74HC14
RESET\
VBAT
U9
RETURN0
RETURN1
RETURN2
RETURN3
RANGE SW\
DISPLAY ATTENTION
SERVICE MODE
BAD BATTERY\
74HC244
U6
STROBE0
STROBE1
STROBE2
STROBE3
STROBE4
STROBE5
STROBE6
STROBE7
74LS374



For Equivalent Engineering Drawing See 61031101-Q2 B

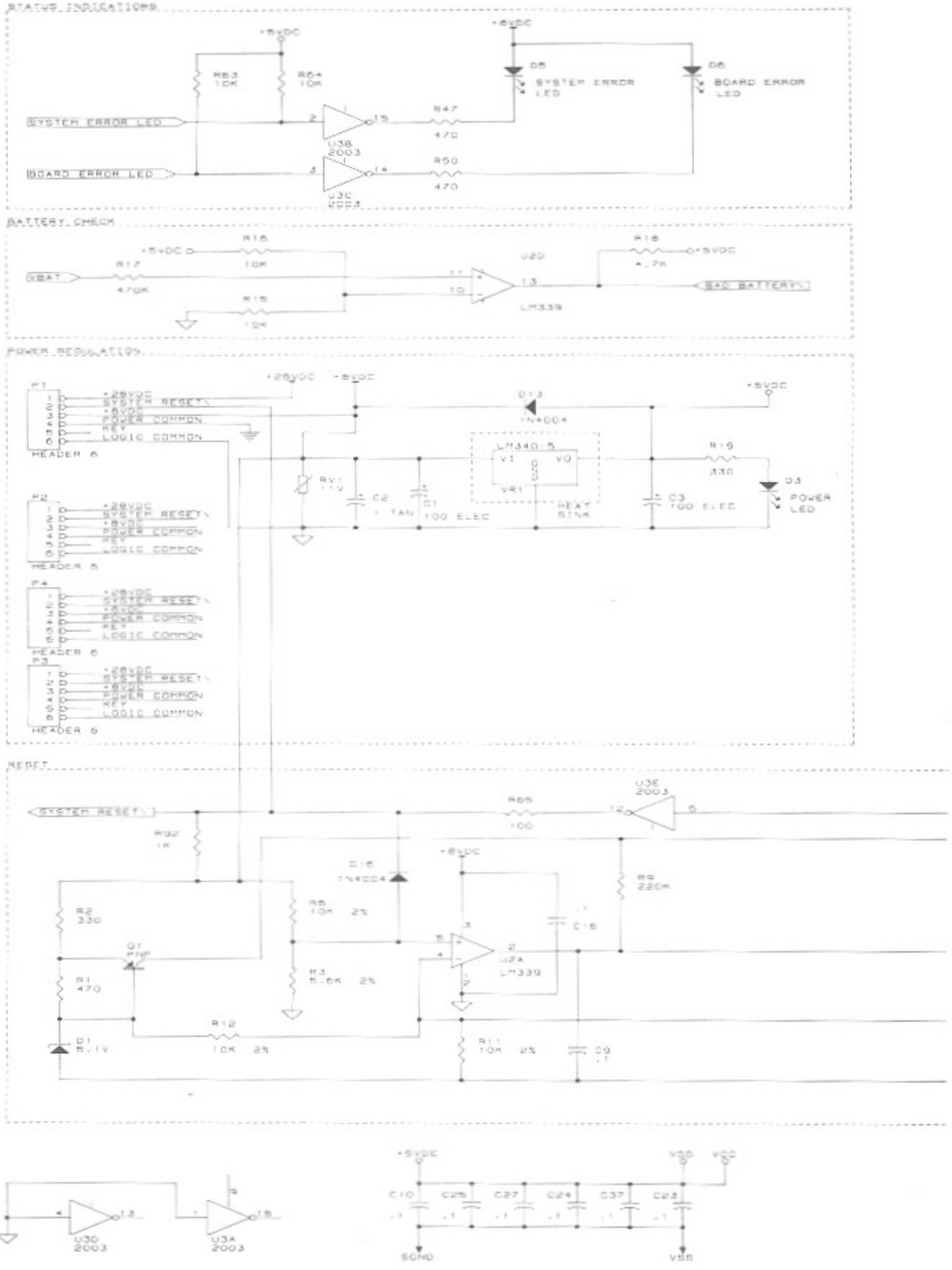
Figure 5-12A. Central Control Computer Schematic, Sheet 1

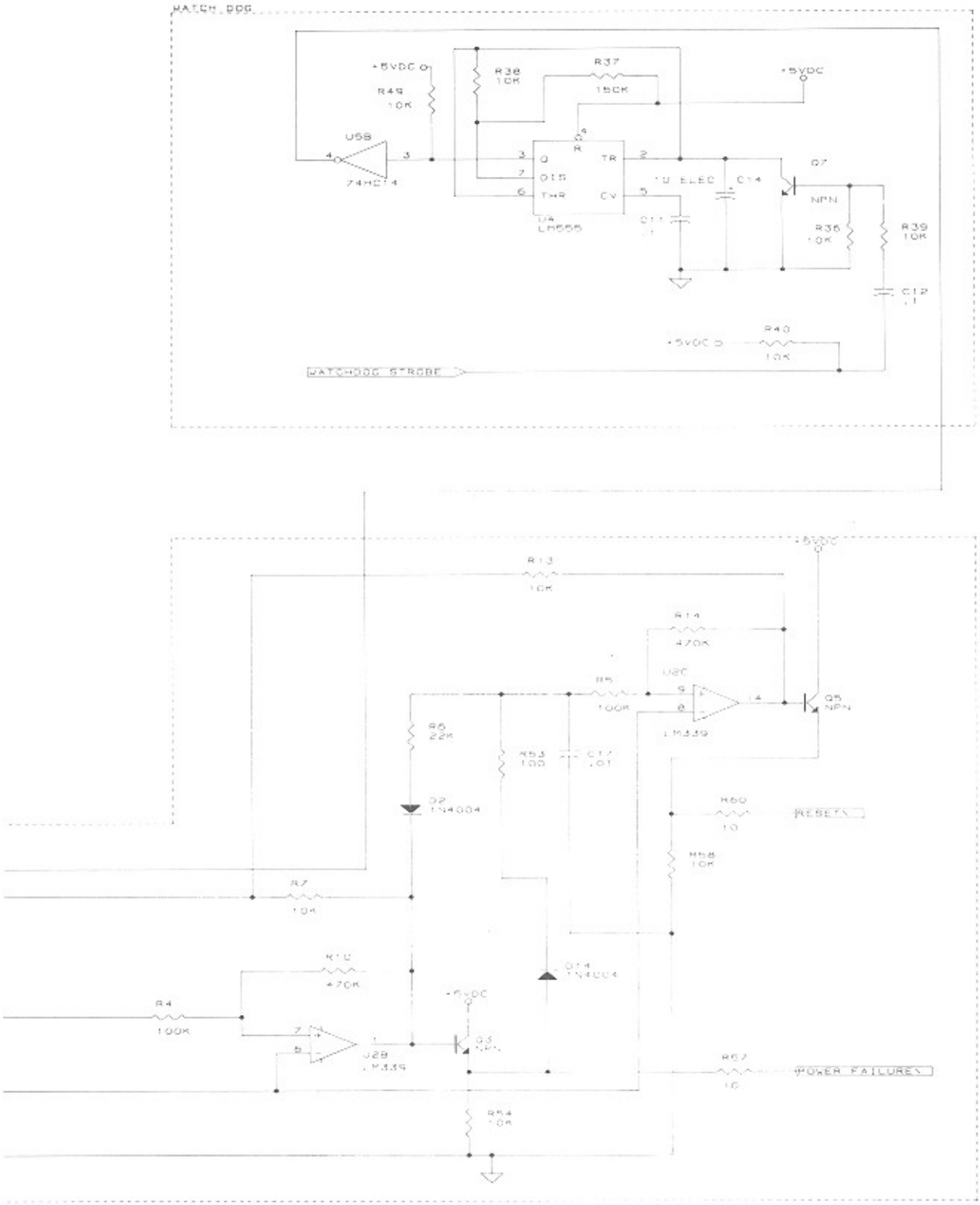

ROWELINK (RS485)
+5VDC
U3F
2003
R48
470
D4
+8VDC
ROWELINK COMMAND LED
R60
10K
R25
10K
U19
75176
ROWELINK Tx/Rx\ SEL
ROWELINK RXDATA
ROWELINK TXDATA
R62
10K
R24
10K
P10
KEY
ROWELINK-A
ROWELINK-B
HEADER 3
P12
KEY
ROWELINK-A
ROWELINK-B
HEADER 3
P11
KEY
ROWELINK-A
ROWELINK-B
HEADER 3
MISC INTERFACE
MUTE
U3C
2003
TEST MODE\
U5C
74HC14
R42
47K
R41
1K
+5VDC
P13
MUTE\
+5VDC
TEST MODE
KEY
HEADER 4
SERVICE MODE
U5F
74HC14
R33
1K
+8VDC
R30 47K
R35 47K
R34 1K
P14
SERVICE MODE\
SERVICE COMMON
KEY
CANCEL\
CANCEL COMMON
HEADER 5
CANCEL\
74HC14
U5A
74HC14
U5E
R32 47K
R31
47K
PERIPHERAL INTERFACE (RS232C)
+5VDC
C7
10 ELEC
C8
10 ELEC
C5
10 ELEC
U1
MAX232
C1+
C1-
C2+
C2-
V+
V-
T2OUT
R2IN
R1IN
T1OUT
T1IN
T2IN
R1OUT
R2OUT
C4
10 ELEC
PERIPHERAL TXDATA
PERIPHERAL RTS\
PERIPHERAL RXDATA
PERIPHERAL CTS\
P8
GND
RTS\
CTS\
RX
TX
NC
HEADER 8
+5VDC
U21F
7417



For Equivalent Engineering Drawing See 61031101-Q2 B

Figure 5-12A. Central Control Computer Schematic, Sheet 2


STATUS INDICATORS
+5VDC
+5VDC
R63
10K
R64
10K
D5
SYSTEM ERROR LED
D6
BOARD ERROR LED
SYSTEM ERROR LED
BOARD ERROR LED
U3B
2003
U3C
2003
R47
470
R50
470
BATTERY CHECK
+5VDC
R16
10K
R17
470K
VBAT
R15
10K
U2D
LM339
R18
4.7K
+5VDC
BAD BATTERY\
POWER REGULATION
P1
P2
P4
P3
HEADER 6
+28VDC
SYSTEM RESET\
+5VDC
POWER COMMON
KEY
LOGIC COMMON
+28VDC
-5VDC
D13
1N4004
+5VDC
LM340-5
VI
VO
VR1
HEAT SINK
RV1
1.1K
C2
1 TAN
C1
100 ELEC
R19
330
C3
100 ELEC
D3
POWER LED
RESET
SYSTEM RESET\
U3E
2003
R65
100
R92
1K
D16
1N4004
+5VDC
R2
330
R5
10K 2%
R3
5.6K 2%
Q1
PNP
R1
470
D1
5.1V
R12
10K 2%
U2A
LM339
C16
.1
R9
220K
R11
10K 2%
C9
.1
U3D
2003
U3A
2003
+5VDC
VSS
VCC
C10
C25
C27
C24
C37
C23
.1
SGND
VSS



For Equivalent Engineering Drawing See 61031101-Q2 B

Figure 5-12A. Central Control Computer Schematic, Sheet 3

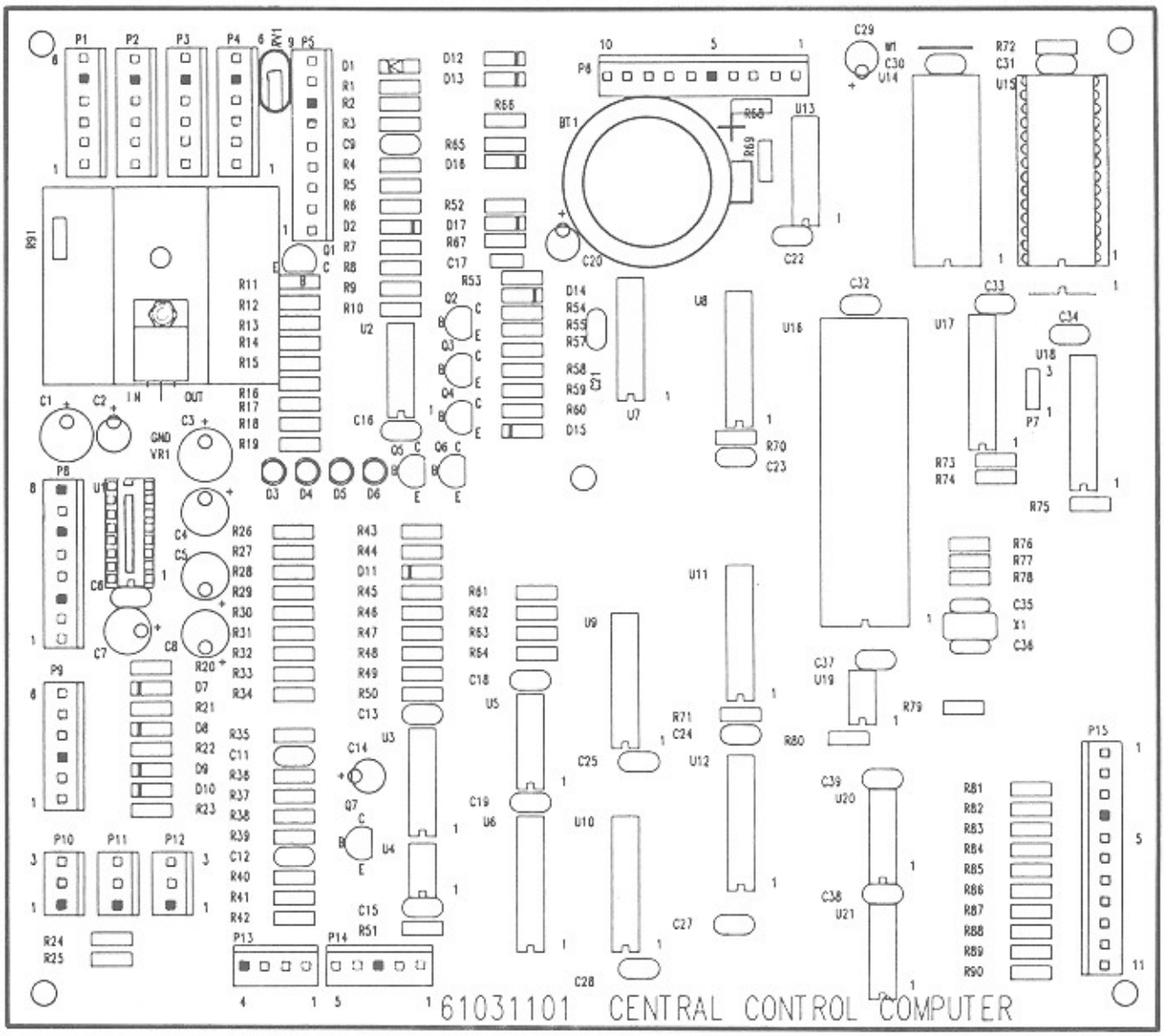


Figure 5-12B. Central Control Computer Circuit Board Layout

COMPONENT LIST FOR CENTRAL CONTROL COMPUTER (61031101)

BT1	Battery - Lithium	750 mah 3V	40788901
C1	Capacitor - Electrolytic	100 mf	70023814
C2	Capacitor - Tantalum	1 mf	70025121
C3	Capacitor - Electrolytic	100 mf	70023814
C4	Capacitor - Electrolytic	10 mf	70023808
C5	Capacitor - Electrolytic	10 mf	70023808
C6	Capacitor - Monolithic Ceramic	.1 mf	70028511
C7	Capacitor - Electrolytic	10 mf	70023808
C8	Capacitor - Electrolytic	10 mf	70023808
C9	Capacitor - Monolithic Ceramic	.1 mf	70028511
C10	NOT USED		
C11	Capacitor - Monolithic Ceramic	.1 mf	70028511
C12	Capacitor - Monolithic Ceramic	.1 mf	70028511
C13	Capacitor - Monolithic Ceramic	.1 mf	70028511
C14	Capacitor - Electrolytic	10 mf	70023808
C15	Capacitor - Monolithic Ceramic	.1 mf	70028511
C16	Capacitor - Monolithic Ceramic	.1 mf	70028511
C17	Capacitor - Monolithic Ceramic	.1 mf	70028511
C18	Capacitor - Monolithic Ceramic	.1 mf	70028511
C19	Capacitor - Monolithic Ceramic	.1 mf	70028511
C20	Capacitor - Electrolytic	10 mf	70023808
C21	Capacitor - Monolithic Ceramic	.1 mf	70028511
C22	Capacitor - Monolithic Ceramic	.1 mf	70028511
C23	Capacitor - Monolithic Ceramic	.1 mf	70028511
C24	Capacitor - Monolithic Ceramic	.1 mf	70028511
C25	Capacitor - Monolithic Ceramic	.1 mf	70028511
C27	Capacitor - Monolithic Ceramic	.1 mf	70028511
C28	Capacitor - Monolithic Ceramic	.1 mf	70028511
C29	Capacitor - Electrolytic	10 mf	70023808
C30	Capacitor - Monolithic Ceramic	.1 mf	70028511
C31	Capacitor - Monolithic Ceramic	.1 mf	70028511
C32	Capacitor - Monolithic Ceramic	.1 mf	70028511
C33	Capacitor - Monolithic Ceramic	.1 mf	70028511
C34	Capacitor - Monolithic Ceramic	.1 mf	70028511
C35	Capacitor - Monolithic Ceramic	10 pf	70028701
C36	Capacitor - Monolithic Ceramic	10 pf	70028701
C37	Capacitor - Monolithic Ceramic	.1 mf	70028511
C38	Capacitor - Monolithic Ceramic	.1 mf	70028511
C39	Capacitor - Monolithic Ceramic	.1 mf	70028511
D1	Diode - Zener (5.1 V)		70035526
D2	Diode - Silicon	IN4004	70035005
D3	Diode - Light Emitting		70035305
D4	Diode - Light Emitting		70035305
D5	Diode - Light Emitting		70035305
D6	Diode - Light Emitting		70035305
D7	Diode - Silicon	IN4004	70035005
D8	Diode - Silicon	IN4004	70035005
D9	Diode - Silicon	IN4004	70035005
D10	Diode - Silicon	IN4004	70035005
D11	Diode - Silicon	IN4004	70035005
D12	Diode - Silicon	IN4004	70035005
D13	Diode - Silicon	IN4004	70035005
D14	Diode - Silicon	IN4004	70035005
D15	Diode - Silicon	IN4004	70035005
D16	Diode - Silicon	IN4004	70035005
D17	Diode - Germanium	IN270	70035101

COMPONENT LIST FOR CENTRAL CONTROL COMPUTER (61031101)
(Continued)

P1	Wafer - Polarizing	6 CKT	70075006
P2	Wafer - Polarizing	6 CKT	70075006
P3	Wafer - Polarizing	6 CKT	70075006
P4	Wafer - Polarizing	6 CKT	70075006
P5	Wafer - Polarizing	9 CKT	70075009
P6	Wafer - Polarizing	10 CKT	70075010
P7	NOT USED		
P8	Wafer - Polarizing	8 CKT	70075008
P9	Wafer - Polarizing	6 CKT	70075006
P10	Wafer - Polarizing	3 CKT	70075003
P11	Wafer - Polarizing	3 CKT	70075003
P12	Wafer - Polarizing	3 CKT	70075003
P13	Wafer - Polarizing	4 CKT	70075004
P14	Wafer - Polarizing	5 CKT	70075005
P15	Wafer - Polarizing	11 CKT	70075011

Q1	Transistor - Silicon (PNP)		70030104
Q2	Transistor - Silicon (NPN)		70030008
Q3	Transistor - Silicon (NPN)		70030008
Q4	Transistor - Silicon (NPN)		70031301
Q5	Transistor - Silicon (NPN)		70030008
Q6	Transistor - Silicon (NPN)		70031301
Q7	Transistor - Silicon (NPN)		70030008

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	470 Ohm	79901471
R2	Resistor - Carbon	330 Ohm	79901331
R3	Resistor - Carbon	5.6 K (1/4w, 2%)	79902562
R4	Resistor - Carbon	100 K	79901104
R5	Resistor - Carbon	100 K	79901104
R6	Resistor - Carbon	22 K	79901223
R7	Resistor - Carbon	10 K	79901103
R8	Resistor - Carbon Film	10 K (1/4w, 2%)	79902103
R9	Resistor - Carbon	220 K	79901224
R10	Resistor - Carbon	470 K	79901474
R11	Resistor - Carbon Film	10 K (1/4w, 2%)	79902103
R12	Resistor - Carbon Film	10 K (1/4w, 2%)	79902103
R13	Resistor - Carbon	10 K	79901103
R14	Resistor - Carbon	470 K	79901474
R15	Resistor - Carbon	10 K	79901103
R16	Resistor - Carbon	10 K	79901103
R17	Resistor - Carbon	470 K	79901474
R18	Resistor - Carbon	4.7 K	79901472
R19	Resistor - Carbon	330 Ohm	79901331
R20	Resistor - Carbon	4.7 K	79901472
R21	Resistor - Carbon	4.7 K	79901472
R22	Resistor - Carbon	4.7 K	79901472
R23	Resistor - Carbon	4.7 K	79901472
R24	Resistor - Carbon	10 K	79901103

R25	Resistor - Carbon	10 K	79901103
R26	Resistor - Carbon	47 K	79901473
R27	Resistor - Carbon	47 K	79901473
R28	Resistor - Carbon	47 K	79901473
R29	Resistor - Carbon	47 K	79901473
R30	Resistor - Carbon	47 K	79901473
R31	Resistor - Carbon	47 K	79901473
R32	Resistor - Carbon	47 K	79901473
R33	Resistor - Carbon	1 K	79901102
R34	Resistor - Carbon	1 K	79901102
R35	Resistor - Carbon	47 K	79901473
R36	Resistor - Carbon	10 K	79901103
R37	Resistor - Carbon	150 K	79901154
R38	Resistor - Carbon	10 K	79901103
R39	Resistor - Carbon	10 K	79901103
R40	Resistor - Carbon	10 K	79901103
R41	Resistor - Carbon	1 K	79901102
R42	Resistor - Carbon	47 K	79901473
R43	Resistor - Carbon	1 K	79901102
R44	Resistor - Carbon	10 K	79901103
R45	Resistor - Carbon	1 K	79901102
R46	Resistor - Carbon	10 K	79901103
R47	Resistor - Carbon	470 Ohm	79901471
R48	Resistor - Carbon	470 Ohm	79901471
R49	Resistor - Carbon	10 K	79901103
R50	Resistor - Carbon	470 Ohm	79901471
R51	Resistor - Carbon	4.7 K	79901472
R52	Resistor - Carbon	470 Ohm	79901471
R53	Resistor - Carbon	100 Ohm	79901101
R54	Resistor - Carbon	10 K	79901103
R55	Resistor - Carbon	10 K	79901103
R57	Resistor - Carbon	10 Ohm	79901100
R58	Resistor - Carbon	10 K	79901103
R59	Resistor - Carbon	10 K	79901103
R60	Resistor - Carbon	10 Ohm	79901100
R61	Resistor - Carbon	10 K	79901103
R62	Resistor - Carbon	10 K	79901103
R63	Resistor - Carbon	10 K	79901103
R64	Resistor - Carbon	10 K	79901103
R65	Resistor - Carbon	100 Ohm	79901101
R66	Resistor - Carbon	100 Ohm	79901101
R67	Resistor - Carbon	22 K	79901223
R68	Resistor - Carbon	100 Ohm	79901101
R69	Resistor - Carbon	100 Ohm	79901101
R70	Resistor - Carbon	1 K	79901102
R71	Resistor - Carbon	1 K	79901102
R72	Resistor - Carbon	1 K	79901102
R73	Resistor - Carbon	22 K	79901223
R74	Resistor - Carbon	1 K	79901102
R75	Resistor - Carbon	1 K	79901102
R76	Resistor - Carbon	1 K	79901102

COMPONENT LIST FOR CENTRAL CONTROL COMPUTER (61031101)
(Continued)

R77	Resistor - Carbon	1 K	79901102
R78	Resistor - Carbon	1 K	79901102
R79	Resistor - Carbon	1 K	79901102
R80	Resistor - Carbon	10 K	79901103
R81	Resistor - Carbon	4.7 K	79901472
R82	Resistor - Carbon	4.7 K	79901472
R83	Resistor - Carbon	1 K	79901102
R84	Resistor - Carbon	4.7 K	79901472
R85	Resistor - Carbon	4.7 K	79901472
R86	Resistor - Carbon	4.7 K	79901472
R87	Resistor - Carbon	4.7 K	79901472
R88	Resistor - Carbon	4.7 K	79901472
R89	Resistor - Carbon	4.7 K	79901472
R90	Resistor - Carbon	4.7 K	79901472
R91	Resistor - Carbon	1 K	79901102
RV1	Metal Oxide Varistor	11 V	70037505
U1	NOT USED		
U2	I.C. - Quad Comparator (LM339)	(3302)	70036801
U3	I.C. - Darlington Array	(2003)	70036901
U4	I.C. - Timer	(LM555)	70033801
U5	I.C. - HCT (Hex Schmitt Trigger)	74HC14	79940014
U6	I.C. - Octal Edge Triggered F/F	74LS374	70037111
U7	I.C. - Calendar Clock	72421	30800236
U8	I.C. - HCT (Octal Bus Transceiver)	74HCT245	79930245
U9	I.C. - HC-Tristate Octal Buffer	74HC244	79940244
U10	I.C. - Octal Edge Triggered F/F	74LS374	70037111
U11	I.C. - HCT (Octal Buffer/Line Driver)	74HCT244	79930244
U12	I.C. - PAL 18P8-CDCCC		30800232
U13	I.C. - RS-422 Dual Driver/Rcvr	DS8923	30800230
U14	I.C. - CMOS RAM 8K X 8	6264	70036604
U15	I.C. - 64K X 8 EPROM	27512	70039902
U16	I.C. - Microprocessor	64180	70039126
U17	I.C. - HCT (Octal Buffer/Line DRIVER)	74HCT244	79930244
U18	I.C. - HCT (octal Buffer/Line Driver)	74HCT244	79930244
U19	I.C. - Transceiver (RS-485)	75176	70037801
U20	I.C. - TTL Buffer (Open Collector)	7417	70036305
U21	I.C. - TTL Buffer (Open Collector)	7417	70036305
VR1	Regulator - Voltage (Linear I.C.)	LM340-5	70036505
W1	Not Used		
X1	Crystal - Quartz (12.288 Mhz)		25167314

The chart below shows the various combinations of strobes (outputs from the CCC) and returns (inputs to the CCC) and their corresponding functions.

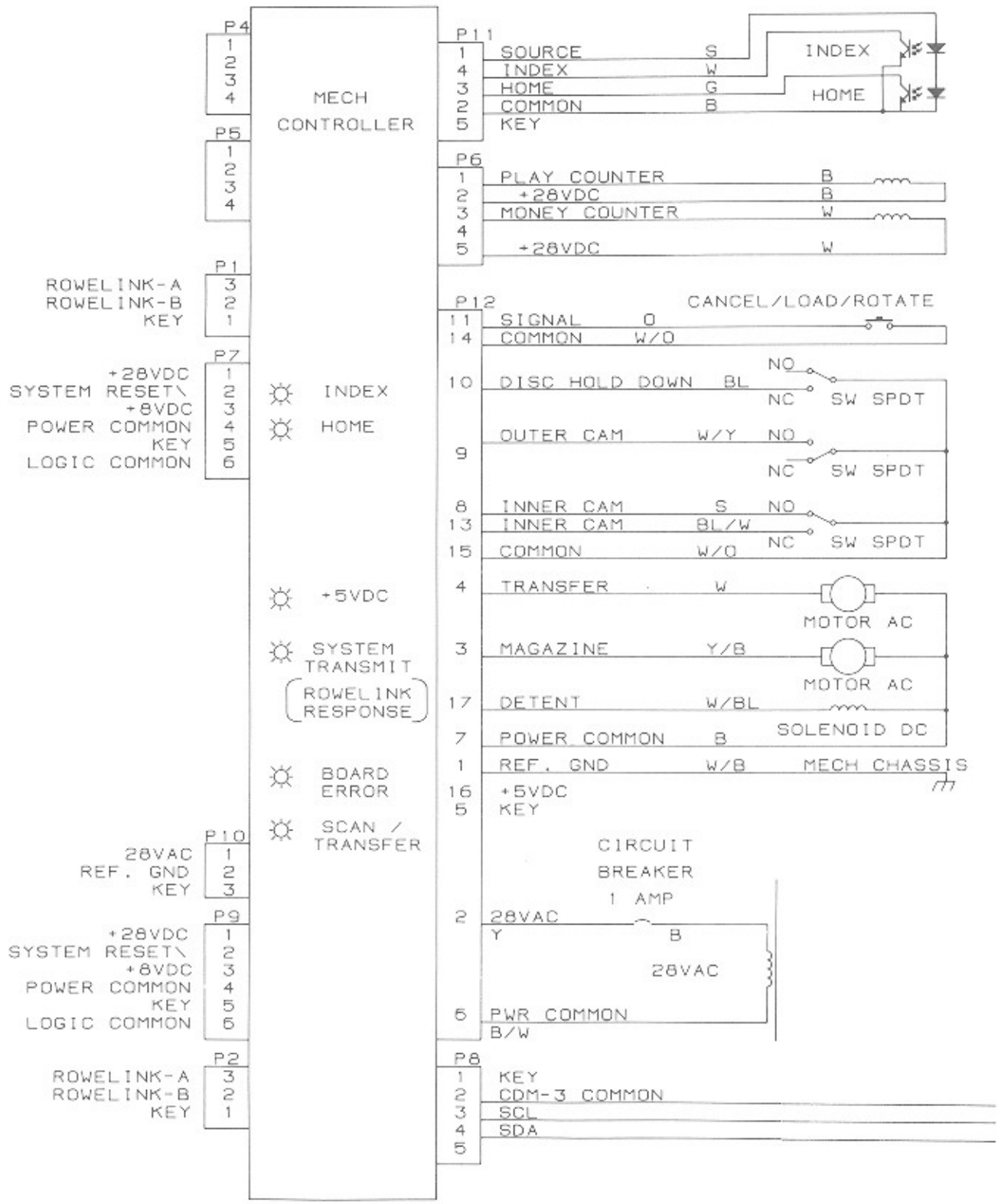
Strobes 0 through 5 appear on Returns 0 through 3 when the indicated switches are activated.

For Example: If you need to be sure that Key 5 is working, find Key 5 in table 5-3. This matrix entry indicates that, when Strobe 3 is active and Key 5 is pressed, Return 1 becomes active.

Not all of the strobes and returns operate in this matrix mode; Returns 4 through 7 and Strobes 7 through 15 have unique functions, which are listed in the table.

Table 5-3. CD-100 CCC I/O Matrix

OUTPUTS		INPUTS							
		RETURNS				DEDICATED			
		0	1	2	3	4	5	6	7
STROBES	0	5¢ Coin Switch	10¢ Coin Switch	25¢ Coin Switch	50¢ Coin Switch	CANCEL SWITCH	DISPLAY ATTENTION	SERVICE SWITCH	LOW BATTERY DET
	1	Title Disp Limit	Title Disp Index						
	2	Key 0	Key 1	Key 2	Key 3				
	3	Key 4	Key 5	Key 6	Key 7				
	4	Key 8	Key 9		Audit Report Start Button				
	5	POPULAR	RESET	OUT	IN				
DEDICATED	6	Not Used							
	7	Background Music Active							
	8	Display Reset - Controls hardware reset on the display driver chip							
	9	Sends speed info to motor chip							
	10	Sends direction info to motor chip							
	11	Mute							
	12	ROWELINK Tx/$\overline{Rx}$ Select							
	13	SYSTEM ERROR LED							
	14	BOARD ERROR LED							
	15	Watchdog Strobe							


P4
1
2
3
4
P5
1
2
3
4
MECH
CONTROLLER
P1
ROWELINK-A 3
ROWELINK-B 2
KEY 1
P7
+28VDC 1
SYSTEM RESET\ 2
+8VDC 3
POWER COMMON 4
KEY 5
LOGIC COMMON 6
INDEX
HOME
+5VDC
SYSTEM TRANSMIT
ROWELINK RESPONSE
BOARD ERROR
SCAN / TRANSFER
P10
28VAC 1
REF. GND 2
KEY 3
P9
+28VDC 1
SYSTEM RESET\ 2
+8VDC 3
POWER COMMON 4
KEY 5
LOGIC COMMON 6
P2
ROWELINK-A 3
ROWELINK-B 2
KEY 1
P11
1 SOURCE S
4 INDEX W
3 HOME G
2 COMMON B
5 KEY
INDEX
HOME
P6
1 PLAY COUNTER B
2 +28VDC B
3 MONEY COUNTER W
4
5 +28VDC W
P12
CANCEL/LOAD/ROTATE
11 SIGNAL O
14 COMMON W/O
10 DISC HOLD DOWN BL
NO
NC
SW SPDT
9 OUTER CAM W/Y
NO
NC
SW SPDT
8 INNER CAM S
13 INNER CAM BL/W
15 COMMON W/O
NO
NC
SW SPDT
4 TRANSFER W
MOTOR AC
3 MAGAZINE Y/B
MOTOR AC
17 DETENT W/BL
SOLENOID DC
7 POWER COMMON B
1 REF. GND W/B
MECH CHASSIS
16 +5VDC
5 KEY
CIRCUIT
BREAKER
1 AMP
2 28VAC
Y
B
28VAC
6 PWR COMMON
B/W
P8
1 KEY
2 CDM-3 COMMON
3 SCL
4 SDA
5

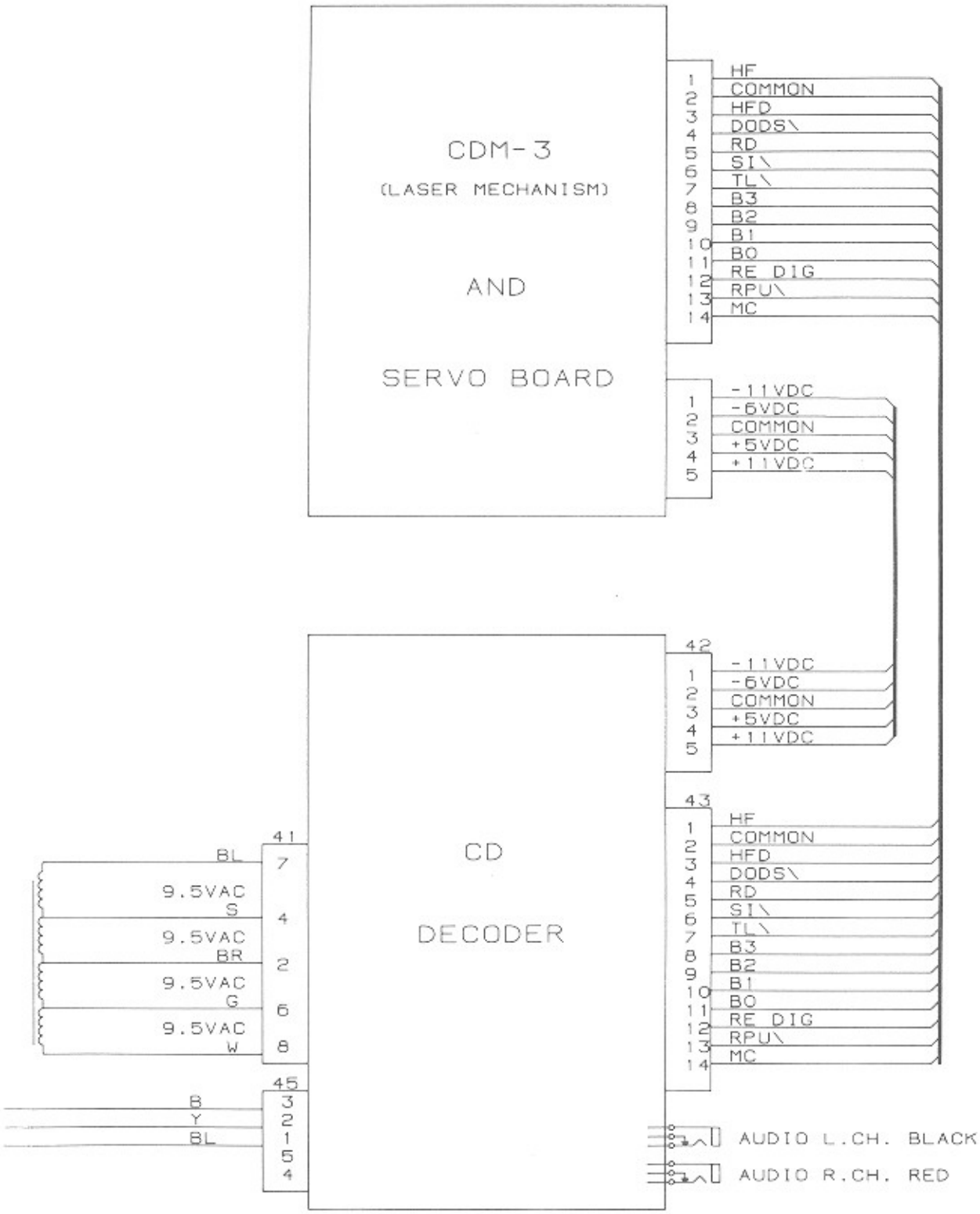
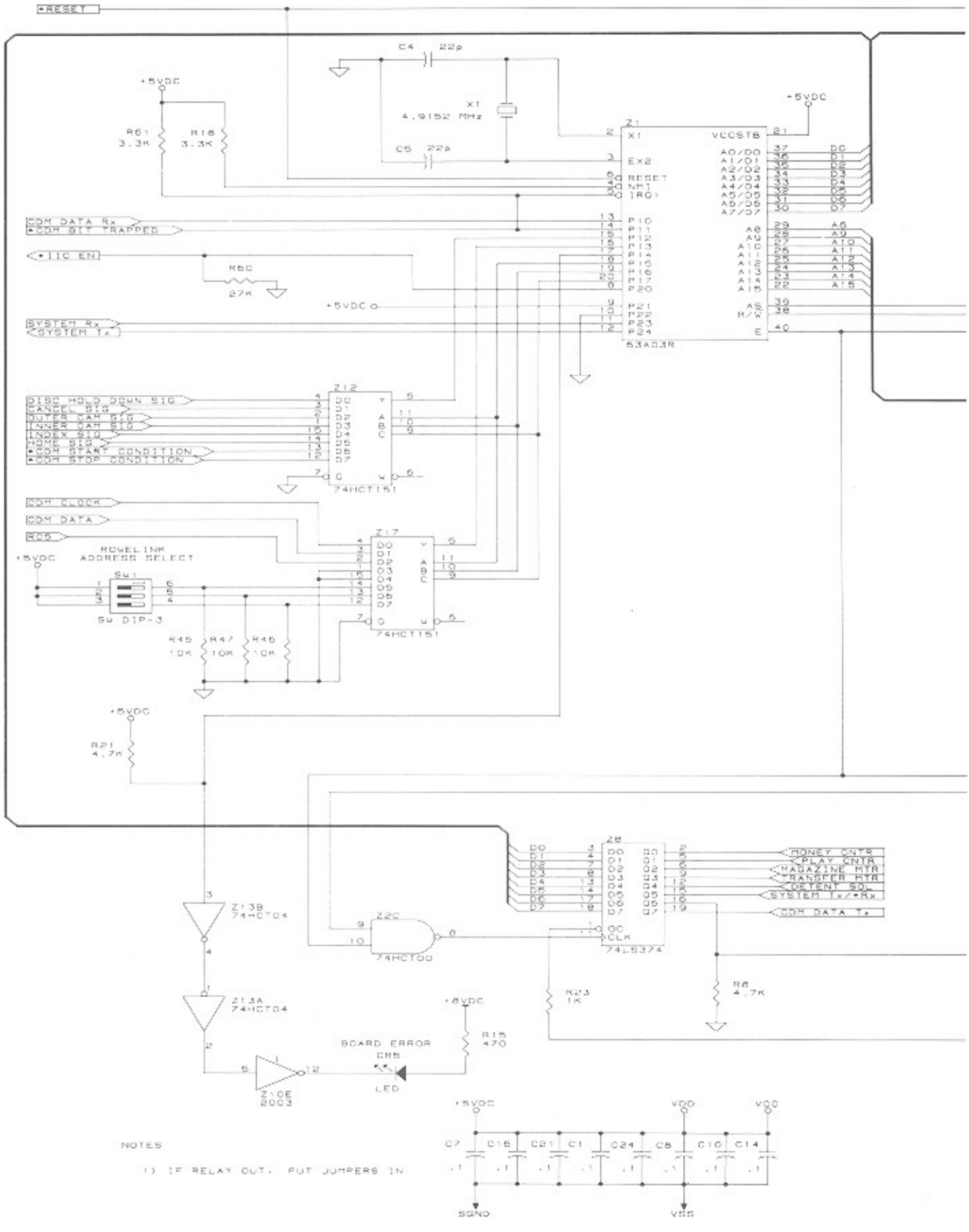
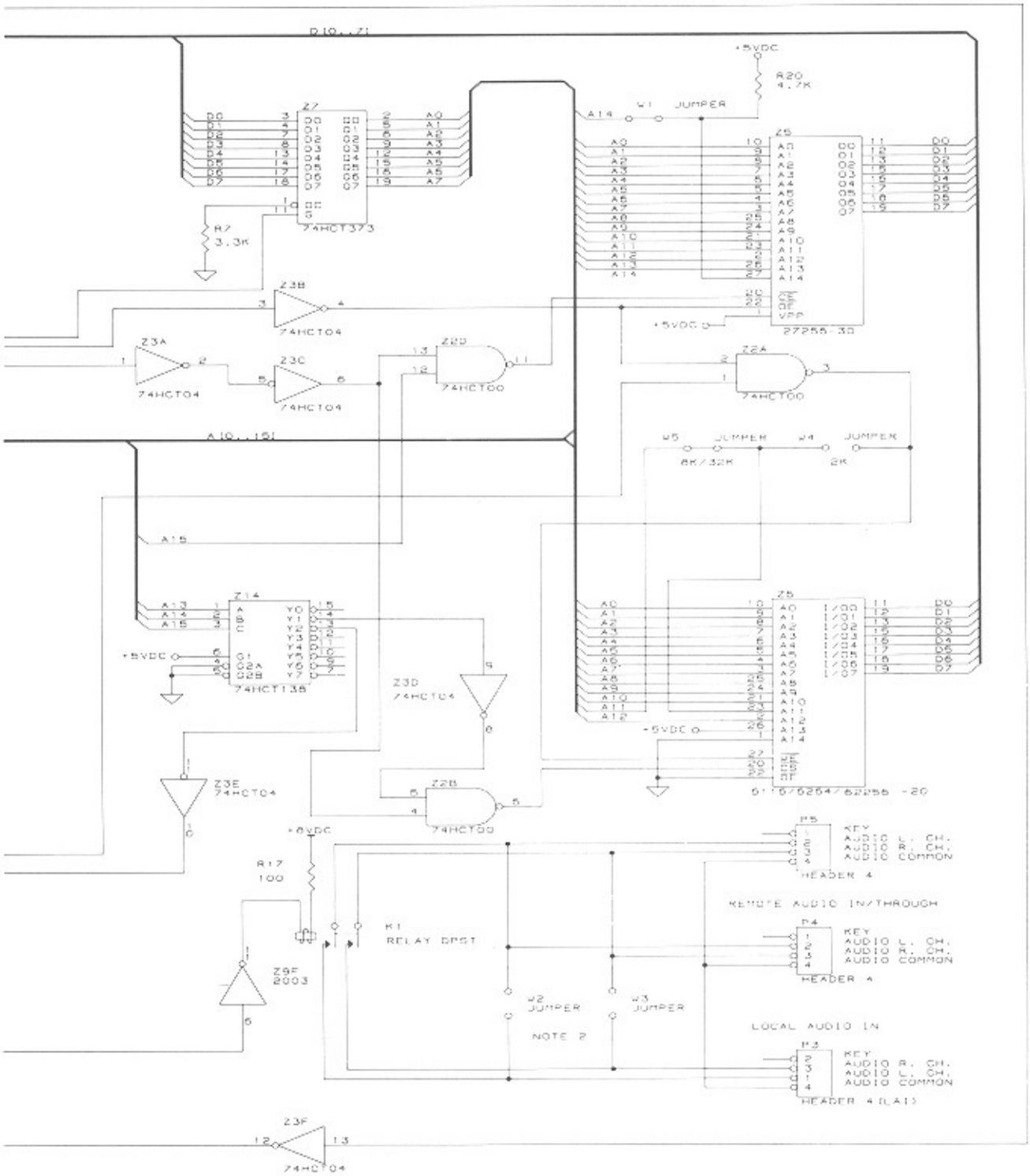


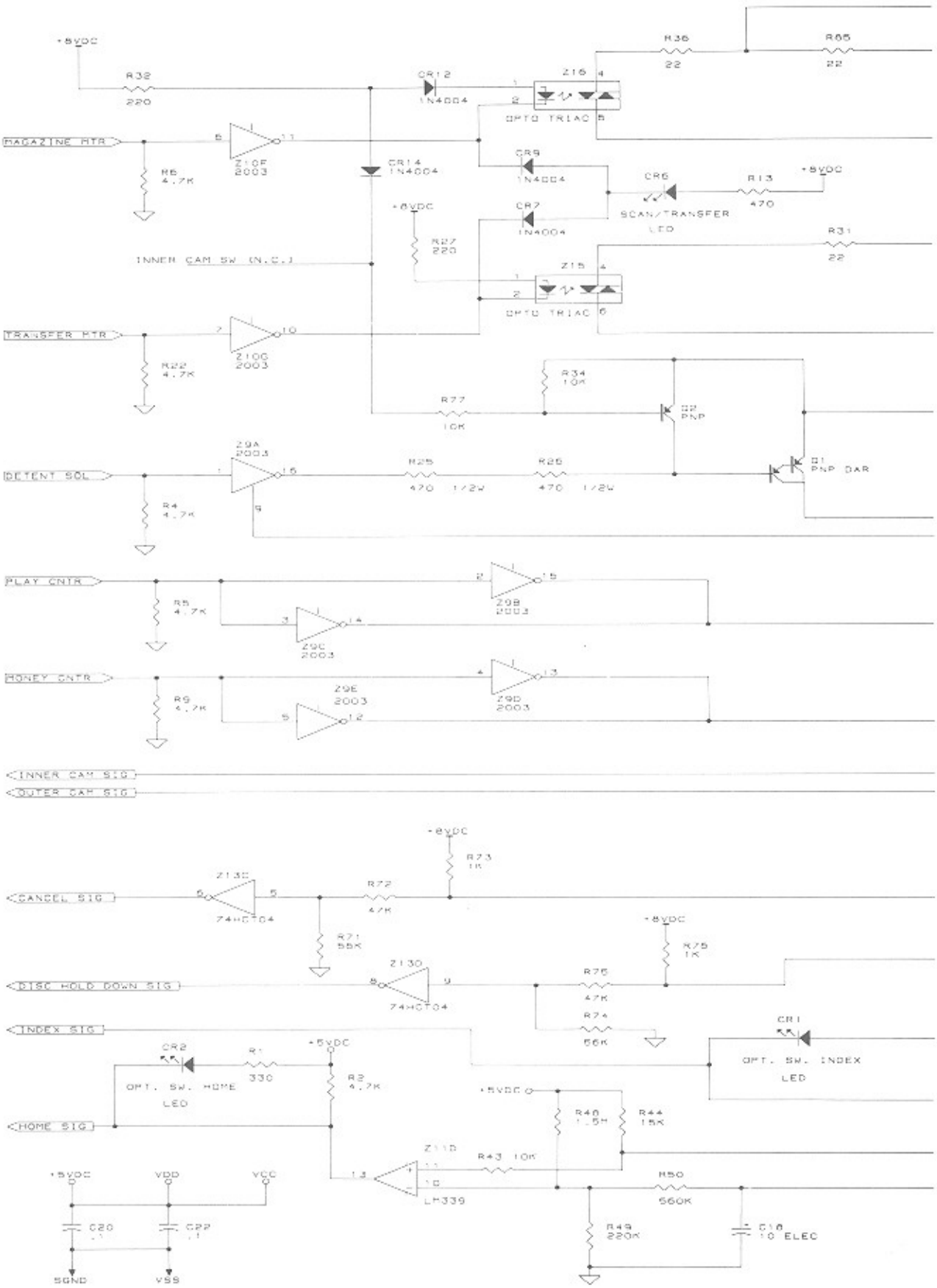
Figure 5-13A. Mechanism Control Assembly Block Diagram

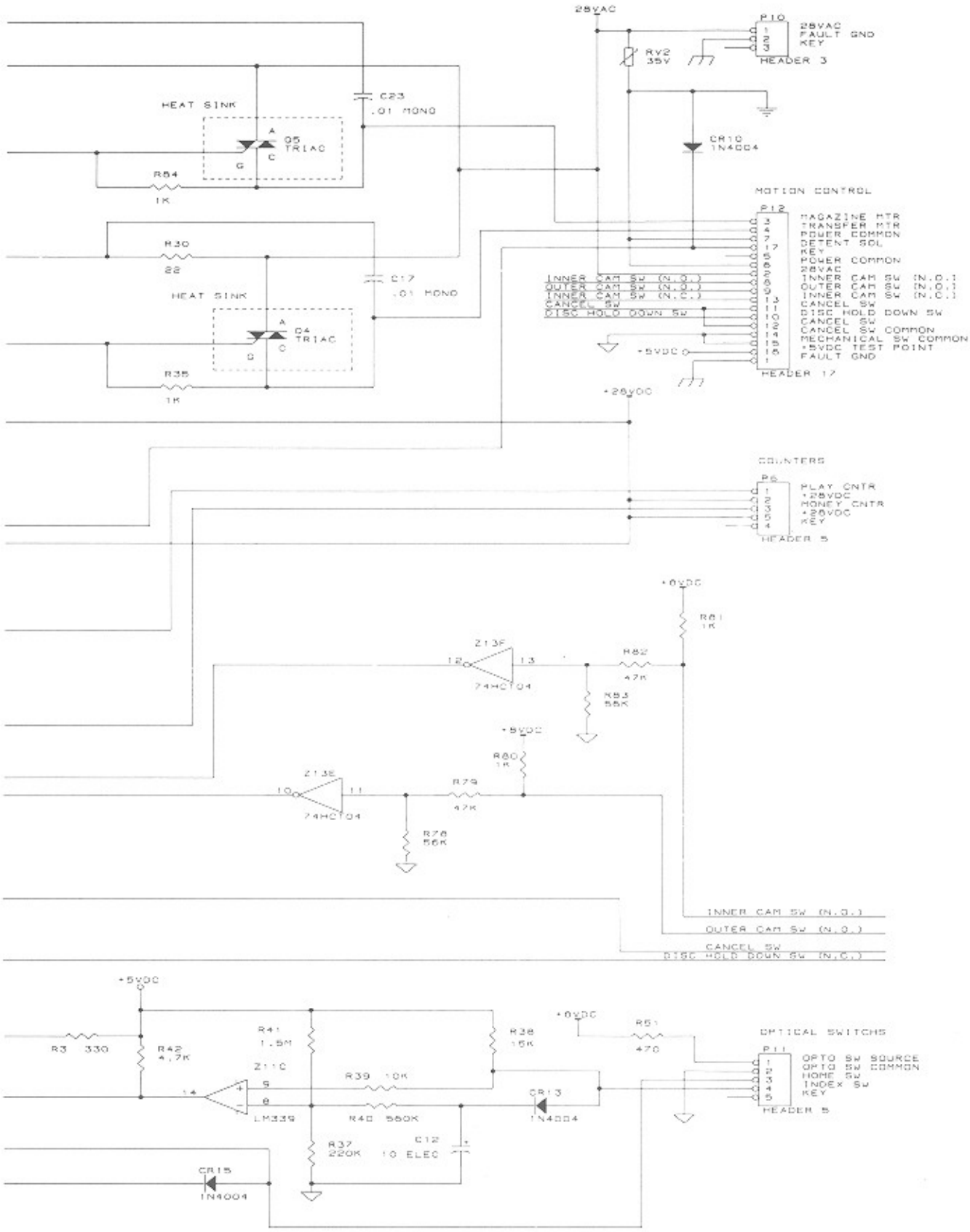

*RESET
C4 22p
X1
4.9152 MHz
C5 22p
+5VDC
R61 3.3K
R18 3.3K
Z1
53A03R
COM DATA Rx
*COM BIT TRAPPED
*IIC EN
R60 27K
SYSTEM Rx
*SYSTEM Tx
DISC HOLD DOWN SIG
CANCEL SIG
OUTER CAM SIG
INNER CAM SIG
INDEX SIG
HOME SIG
*COM START CONDITION
*COM STOP CONDITION
Z12
74HCT151
COM CLOCK
COM DATA
R05
ROWELINK ADDRESS SELECT
SW1
SW DIP-3
Z17
74HCT151
R45 10K
R47 10K
R46 10K
R21 4.7K
Z13B 74HCT04
Z13A 74HCT04
Z10E 2003
BOARD ERROR
CR5
LED
R15 470
Z8
74LS374
MONEY CNTR
PLAY CNTR
MAGAZINE MTR
TRANSFER MTR
DETENT SOL
SYSTEM Tx/*Rx
COM DATA Tx
R23 1K
R6 4.7K
NOTES
1) IF RELAY OUT, PUT JUMPERS IN
VDD
VSS
SGND



For Equivalent Engineering Drawing See 61030601-Q2 B

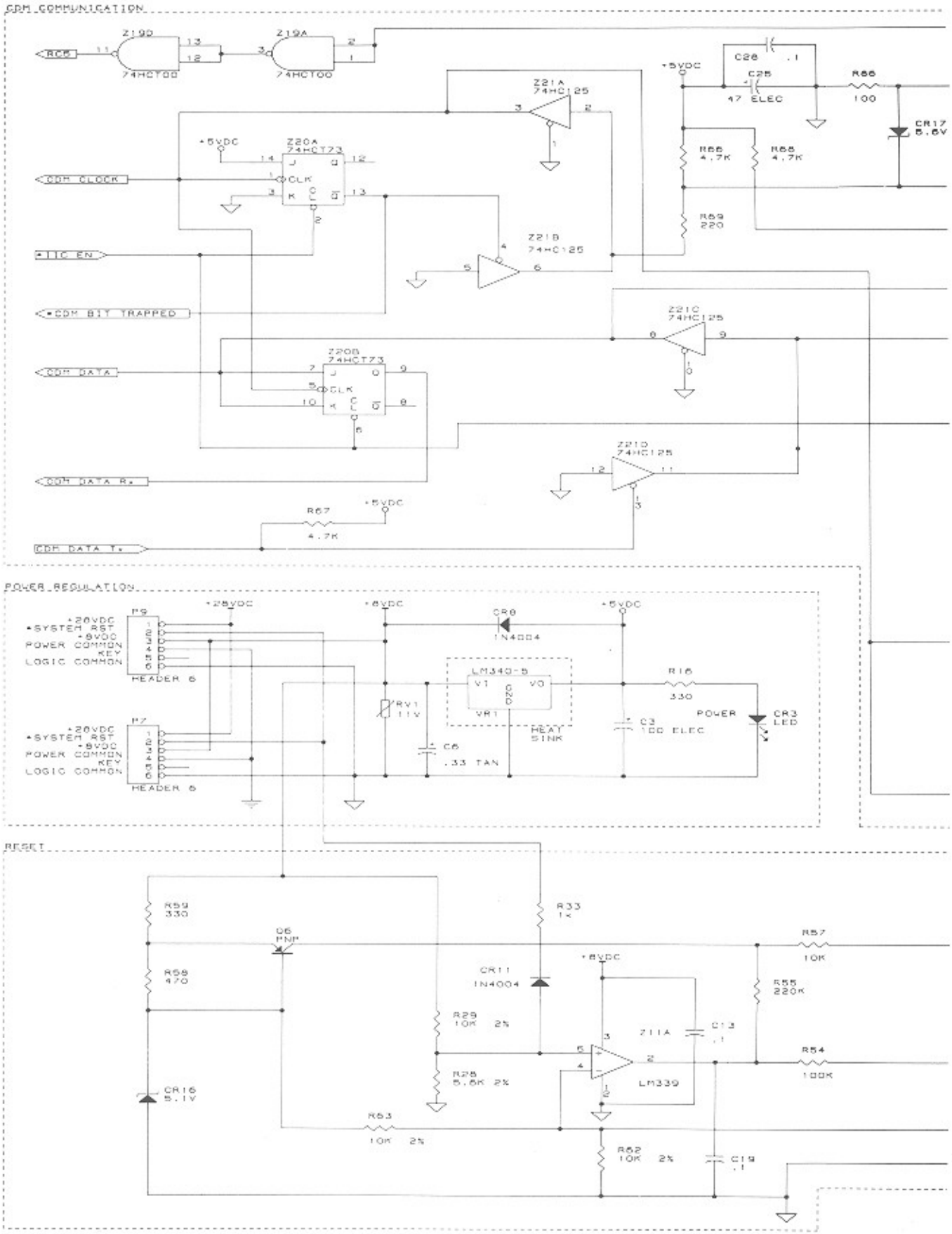
Figure 5-13B. Mechanism Control Assembly Schematic, Sheet 1

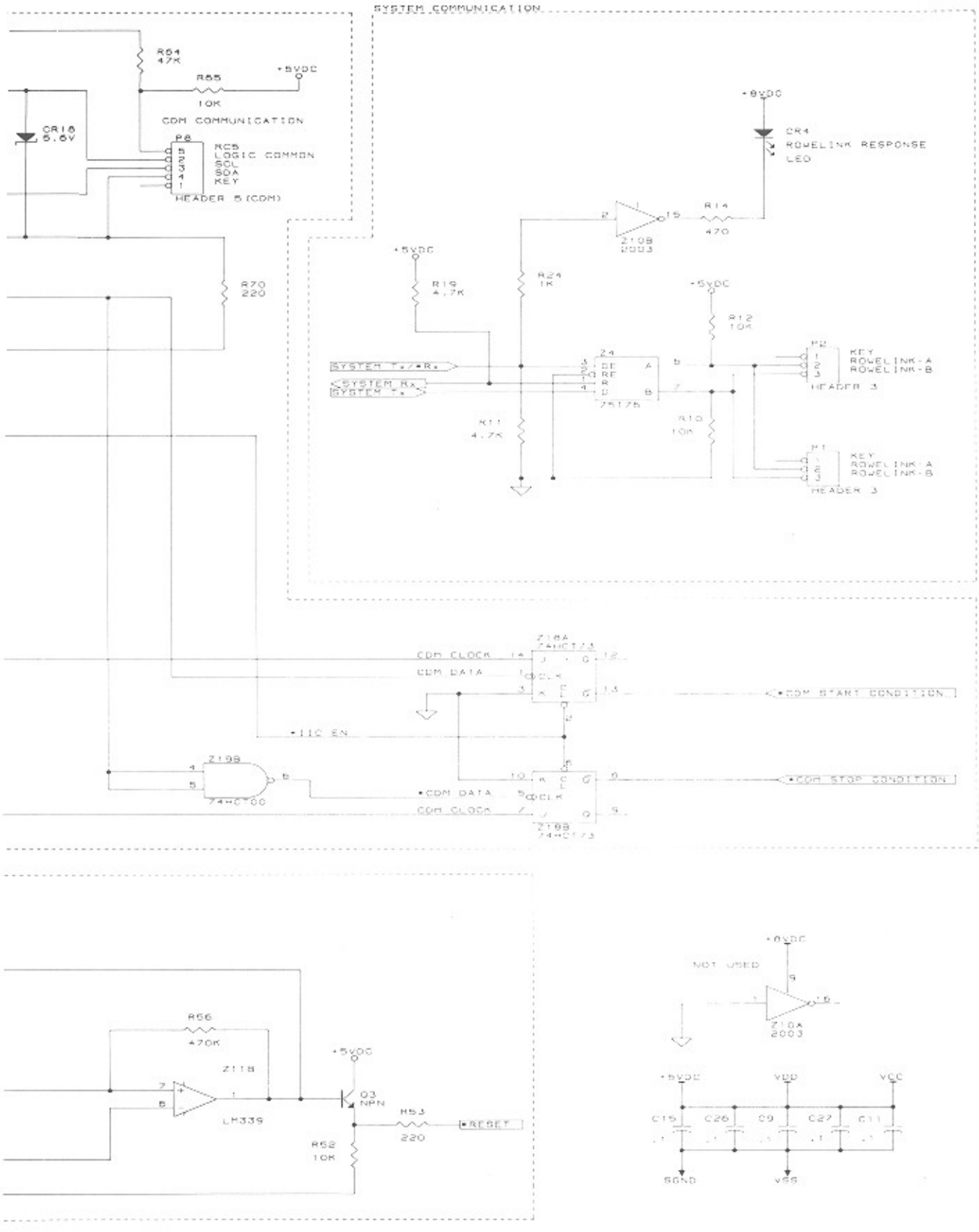

+5VDC
R32
220
CR12
1N4004
Z1A
OPTO TRIAC
R36
22
R65
22
MAGAZINE MTR
Z10F
2003
R6
4.7K
CR14
1N4004
CR9
1N4004
CR6
SCAN/TRANSFER
LED
R13
470
+5VDC
+8VDC
CR7
1N4004
R27
220
R31
22
INNER CAM SW (N.C.)
Z1B
OPTO TRIAC
TRANSFER MTR
Z10G
2003
R22
4.7K
R34
10K
R77
10K
Q2
PNP
Z9A
2003
DETENT SOL
R25
470 1/2W
R26
470 1/2W
Q1
PNP DAR
R4
4.7K
PLAY CNTR
R5
4.7K
Z9B
2003
Z9C
2003
MONEY CNTR
R9
4.7K
Z9E
2003
Z9D
2003
INNER CAM SIG
OUTER CAM SIG
+8VDC
R73
1K
CANCEL SIG
Z13C
74HCT04
R72
47K
R71
56K
+8VDC
R75
1K
DISC HOLD DOWN SIG
Z13D
74HCT04
R76
47K
R74
56K
INDEX SIG
CR1
OPT. SW. INDEX
LED
CR2
OPT. SW. HOME
LED
R1
330
+5VDC
R3
4.7K
HOME SIG
+5VDC
R40
1.5M
R44
15K
Z11D
R43 10K
LM339
R50
560K
R49
220K
C18
10 ELEC
+5VDC
VDD
VCC
C20
.1
C22
.1
SGND
VSS



For Equivalent Engineering Drawing See 61030601-Q2 B

Figure 5-13B. Mechanism Control Assembly Schematic, Sheet 2


COM COMMUNICATION
Z19D
RCS
74HCT00
Z19A
74HCT00
Z21A
74HC125
+5VDC
C28 .1
C25
47 ELEC
R66
100
CR17
5.6V
R65
4.7K
R68
4.7K
R69
220
Z20A
74HCT73
COM CLOCK
CLK
Z21B
74HC125
*I C EN
*COM BIT TRAPPED
Z21C
74HC125
Z20B
74HCT73
COM DATA
CLK
Z21D
74HC125
COM DATA R*
R67
4.7K
+5VDC
COM DATA T*
POWER REGULATION
P9
+28VDC
*SYSTEM RST
+8VDC
POWER COMMON
KEY
LOGIC COMMON
HEADER 6
+28VDC
P7
+28VDC
*SYSTEM RST
+8VDC
POWER COMMON
KEY
LOGIC COMMON
HEADER 6
+28VDC
+8VDC
CR8
1N4004
+5VDC
LM340-5
VI
VO
GND
VR1
HEAT SINK
RV1
11V
C6
.33 TAN
R16
330
C3
100 ELEC
POWER
CR3
LED
RESET
R59
330
Q6
PNP
R58
470
CR16
5.1V
R33
1K
CR11
1N4004
+8VDC
R29
10K 2%
R28
5.6K 2%
Z11A
LM339
C13
.1
R57
10K
R55
220K
R54
100K
R63
10K 2%
R62
10K 2%
C19
.1



For Equivalent Engineering Drawing See 61030601-Q2 B

Figure 5-13B. Mechanism Control Assembly Schematic, Sheet 3

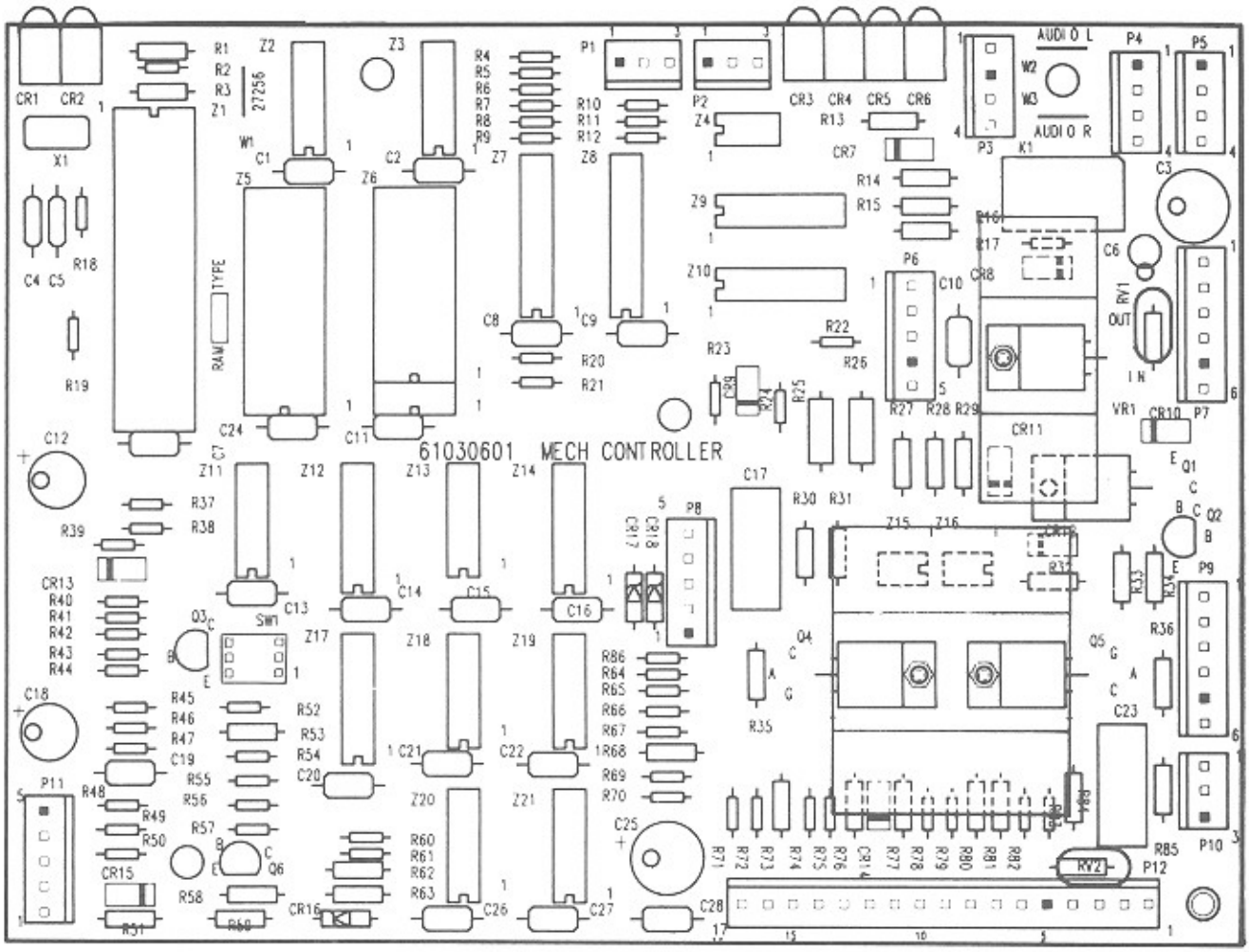


Figure 5-13C. Mechanism Control Assembly Circuit Board Layout

COMPONENT LIST FOR MECHANISM CONTROL BOARD (61030601)

C1	Capacitor - Monolithic Ceramic	.1 mf	70028511
C2	Capacitor - Monolithic Ceramic	.1 mf	70028511
C3	Capacitor - Electrolytic	100 mf	70023814
C4	Capacitor - Monolithic Ceramic	22 pf	70028705
C5	Capacitor - Monolithic Ceramic	22 pf	70028705
C6	Capacitor - Tantalum	.33 mf	70025119
C7	Capacitor - Monolithic Ceramic	.1 mf	70028511
C8	Capacitor - Monolithic Ceramic	.1 mf	70028511
C9	Capacitor - Monolithic Ceramic	.1 mf	70028511
C10	Capacitor - Monolithic Ceramic	.1 mf	70028511
C11	Capacitor - Monolithic Ceramic	.1 mf	70028511
C12	Capacitor - Electrolytic	10 mf	70023808
C13	Capacitor - Monolithic Ceramic	.1 mf	70028511
C14	Capacitor - Monolithic Ceramic	.1 mf	70028511
C15	Capacitor - Monolithic Ceramic	.1 mf	70028511
C16	Capacitor - Monolithic Ceramic	.1 mf	70028511
C17	Capacitor - FILM FOIL	.01 mf	70024013
C18	Capacitor - Electrolytic	10 mf	70023808
C19	Capacitor - Monolithic Ceramic	.1 mf	70028511
C20	Capacitor - Monolithic Ceramic	.1 mf	70028511
C21	Capacitor - Monolithic Ceramic	.1 mf	70028511
C22	Capacitor - Monolithic Ceramic	.1 mf	70028511
C23	Capacitor - FILM FOIL	.01 mf	70024013
C24	Capacitor - Monolithic Ceramic	.1 mf	70028511
C25	Capacitor - Electrolytic	47 mf	70023812
C26	Capacitor - Monolithic Ceramic	.1 mf	70028511
C27	Capacitor - Monolithic Ceramic	.1 mf	70028511
C28	Capacitor - Monolithic Ceramic	.1 mf	70028511

CR1	LED - Block		70035201
CR2	LED - Block		70035201
CR3	LED - Block		70035204
CR4	LED - Block		70035204
CR5	LED - Block		70035204
CR6	LED - Block		70035204
CR7	Diode - Silicon		70035005
CR8	Diode - Silicon		70035005
CR9	Diode - Silicon		70035005
CR10	Diode - Silicon		70035005
CR11	Diode - Silicon		70035005
CR12	Diode - Silicon		70035005
CR13	Diode - Silicon		70035005
CR14	Diode - Silicon		70035005
CR15	Diode - Silicon		70035005
CR16	Diode - Zener	5.1 V	70035526
CR17	Diode - Zener	5.6 V	70035507
CR18	Diode - Zener	5.6 V	70035507

K1	NOT USED

COMPONENT LIST FOR MECHANISM CONTROL BOARD (61030601)
(Continued)

P1	NOT USED		
P2	Wafer - Polarizing	3 CKT	70075003
P3	NOT USED		
P4	NOT USED		
P5	NOT USED		
P6	Wafer - Polarizing	5 CKT	70075005
P7	Wafer - Polarizing	6 CKT	70075006
P8	Wafer - Polarizing	5 CKT	70075005
P9	NOT USED		
P10	Wafer - Polarizing	3 CKT	70075003
P11	Wafer - Polarizing	5 CKT	70075005
P12	Wafer - Polarizing	17 CKT	70075017
Q1	Transistor - Darlington	(PNP)	70030805
Q2	Transistor - Silicon	(PNP)	70030104
Q3	Transistor - Silicon	(NPN)	70030008
Q4	THYRISTOR - Triac		70038102
Q5	THYRISTOR - Triac		70038102
Q6	Transistor - Silicon	(PNP)	70030104

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	330 Ohm	79901331
R2	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R3	Resistor - Carbon	330 Ohm	79901331
R4	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R5	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R6	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R7	Resistor - Carbon (1/8w,5%)	3.3 K	79905332
R8	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R9	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R10	Resistor - Carbon (1/8w,5%)	10 K	79905103
R11	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R12	Resistor - Carbon (1/8w,5%)	10 K	79905103
R13	Resistor - Carbon	470 Ohm	79901471
R14	Resistor - Carbon	470 Ohm	79901471
R15	Resistor - Carbon	470 Ohm	79901471
R16	Resistor - Carbon	330 Ohm	79901331
R17	Resistor - Carbon (1/8w,5%)	100 Ohm	79905101
R18	Resistor - Carbon (1/8w,5%)	3.3 K	79905332
R19	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R20	NOT USED		
R21	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R22	Resistor - Carbon (1/8w,5%)	4.7 K	79905472
R23	Resistor - Carbon (1/8w,5%)	1 K	79905102
R24	Resistor - Carbon (1/8w,5%)	1 K	79905102
R25	Resistor - Metal Film (1/2w,5%)	470 Ohm	79904471
R26	Resistor - Metal Film (1/2w,5%)	470 Ohm	79904471
R27	Resistor - Carbon	220 Ohm	79901221

R28	Resistor - Carbon	(1/4w,2%)	5.6 K	79902562
R29	Resistor - Carbon	(1/4w,2%)	10 K	79902103
R30	Resistor - Carbon		22 Ohm	79901220
R31	Resistor - Carbon		22 Ohm	79901220
R32	Resistor - Carbon		220 Ohm	79901221
R33	Resistor - Carbon		1 K	79901102
R34	Resistor - Carbon		10 K	79901103
R35	Resistor - Carbon		1 K	79901102
R36	Resistor - Carbon		22 Ohm	79901220
R37	Resistor - Carbon	(1/8w,5%)	220 K	79905224
R38	Resistor - Carbon	(1/8w,5%)	15 K	79905153
R39	Resistor - Carbon	(1/8w,5%)	10 K	79905103
R40	Resistor - Carbon	(1/8w,5%)	560 K	79905564
R41	Resistor - Carbon	(1/8w,5%)	1.5 Meg	79905155
R42	Resistor - Carbon	(1/8w,5%)	4.7 K	79905472
R43	Resistor - Carbon	(1/8w,5%)	10 K	79905103
R44	Resistor - Carbon	(1/8w,5%)	15 K	79905153
R45	Resistor - Carbon	(1/8w,5%)	10 K	79905103
R46	Resistor - Carbon	(1/8w,5%)	10 K	79905103
R47	Resistor - Carbon	(1/8w,5%)	10 K	79905103
R48	Resistor - Carbon	(1/8w,5%)	1.5 Meg	79905155
R49	Resistor - Carbon	(1/8w,5%)	220 K	79905224
R50	Resistor - Carbon	(1/8w,5%)	560 K	79905564
R51	Resistor - Carbon		470 Ohm	79901471
R52	Resistor - Carbon	(1/8w,5%)	10 K	79905103
R53	Resistor - Carbon		220 Ohm	79901221
R54	Resistor - Carbon	(1/8w,5%)	100 K	79905104
R55	Resistor - Carbon	(1/8w,5%)	220 K	79905224
R56	Resistor - Carbon	(1/8w,5%)	470 K	79905474
R57	Resistor - Carbon	(1/8w,5%)	10 K	79905103
R58	Resistor - Carbon		470 Ohm	79901471
R59	Resistor - Carbon		330 Ohm	79901331
R60	Resistor - Carbon	(1/8w,5%)	27 K	79905273
R61	Resistor - Carbon	(1/8w,5%)	3.3 K	79905332
R62	Resistor - Carbon		10 K	79902103
R63	Resistor - Carbon		10 K	79902103
R64	Resistor - Carbon	(1/8w,5%)	47 K	79905473
R65	Resistor - Carbon	(1/8w,5%)	10 K	79905103
R66	Resistor - Carbon	(1/8w,5%)	4.7 K	79905472
R67	Resistor - Carbon	(1/8w,5%)	4.7 K	79905472
R68	Resistor - Carbon		4.7 K	79901472
R69	Resistor - Carbon	(1/8w,5%)	220 Ohm	79905221
R70	Resistor - Carbon	(1/8w,5%)	220 Ohm	79905221
R71	Resistor - Carbon	(1/8w,5%)	56 K	79905563
R72	Resistor - Carbon	(1/8w,5%)	47 K	79905473
R73	Resistor - Carbon		1 K	79901102
R74	Resistor - Carbon	(1/8w,5%)	56 K	79905563
R75	Resistor - Carbon	(1/8w,5%)	47 K	79905473
R76	Resistor - Carbon		1 K	79901102
R77	Resistor - Carbon		10 K	79901103
R78	Resistor - Carbon	(1/8w,5%)	56 K	79905563

COMPONENT LIST FOR MECHANISM CONTROL BOARD (61030601)
(Continued)

R79	Resistor - Carbon (1/8w,5%)	47 K	79905473
R80	Resistor - Carbon	1 K	79901102
R81	Resistor - Carbon	1 K	79901102
R82	Resistor - Carbon (1/8w,5%)	47 K	79905473
R83	Resistor - Carbon (1/8w,5%)	56 K	79905563
R84	Resistor - Carbon	1 K	79901102
R85	Resistor - Carbon	22 Ohm	79901220
R86	Resistor - Carbon 1/4w,5%)	100 Ohm	79901101
RV1	Varistor - Metal Oxide	11 V	70037505
RV2	Varistor - Metal Oxide	35 V	70037506
VR1	Regulator - Voltage		70036505
X1	Crystal - Quartz (4.9152 MHZ)		25167313
Z1	IC - Microprocessor (63A03R)		70039125
Z2	IC - HCT (QUAD 2 Input NAND)		79930000
Z3	IC - HCT (HEX Inverter)		79930004
Z4	IC - Transceiver (RS-485)		70037801
Z5	IC - 32K X 8 EPROM (27256-20)		70038220
Z6	IC - CMOS RAM (8K X 8)		70036604
Z7	IC - HCT (Octal D-Type)		79930373
Z8	IC - LS (Octal Edge Triggered FF)		70037111
Z9	IC - Darlington Array		70036901
Z10	IC - Darlington Array		70036901
Z11	IC - QUAD Comparator		70036801
Z12	IC - HCT (8 Input Data SEL)		79930151
Z13	IC - HCT (HEX Inverter)		79930004
Z14	IC - HCT (3-To-8 Line Decoder)		79930138
Z15	IC - OPTO Triac		70033703
Z16	IC - OPTO Triac		70033703
Z17	IC - HCT (8 Input Data SEL)		79930151
Z18	IC - HCT (DUAL JK Flip-Flop)		79930073
Z19	IC - HCT (QUAD 2 INPUT NAND)		79930000
Z20	IC - HCT (DUAL JK Flip-Flop)		79930073
Z21	IC - HC (Quad Buffer)		79940125

Section 6: Mechanical Adjustments

LUBRICATION

Your phonograph requires no lubrication.

UNSCHEDULED MAINTENANCE

This section contains adjustments, removal, and replacement procedures that are to be followed whenever a malfunction has occurred.

MECHANISM MAINTENANCE AND ADJUSTMENTS

CAUTION:

The CD mechanism is extremely sensitive to static discharges. The photo diodes and the laser are more sensitive to discharges than MOS IC's. Careless handling may immediately destroy components within the player or cause undetectable damage that will lead to failure after several weeks or even months of use. Before you touch the player, discharge your hands and tools by touching a grounded metal part of the phonograph, such as the amplifier or power supply chassis. If you need to remove the CD player for servicing, place the CD player into the anti-static bag (shipped with the phonograph for this purpose) immediately after you remove it from the phonograph.

CD Player Mechanism

The only maintenance required on the CD player is an occasional cleaning of the lens. This cleaning should be done with a camel's hair brush or a blow brush (these items can be purchased at most camera supply stores).

Take care not to snag the brush bristles under the lens. The lens is mounted on a delicate suspension spring that may be damaged even with a soft brush.

CD Player Maintenance

The CD player does not contain any field adjustments or field replaceable parts. Individual parts and components are not available for distributor or field repairs. All CD players that require repair must be sent to Rowe for service.

Removing The CD Player And Mechanism Control Unit

If you have followed the troubleshooting procedure in *Section 5*, and you have found that the CD player and the mechanism control unit needs to be removed for factory service, follow this procedure:

1. Turn the POWER switch (on the back of the phonograph) OFF, or place the POWER switch (on the left side of the phonograph) in the OFF position.

2. Remove all connectors from the mechanism control unit , loosen the two top screws *(figure 6-1, ref. A)*, and remove the mechanism control unit.

3. Read the following Caution before you remove the CD player:

CAUTION:

The CD mechanism is extremely sensitive to static discharges. The photo diodes and the laser are more sensitive to discharges than MOS IC's. Careless handling may immediately destroy components within the player or cause undetectable damage that will lead to failure after several weeks or even months of use. Before you touch the player, discharge your hands and tools by touching a grounded metal part of the phonograph, such as the amplifier or power supply chassis. If you need to remove the CD player for servicing, place the CD player into the anti-static bag (shipped with the phonograph for this purpose) immediately after you remove it from the phonograph.

Loosen the two front mounting screws (These screws remain part of the phonograph. *See figure 6-1, ref. B* on the underside of the CD player mounting plate.

4. Slide the player approximately 1 inch toward the front of the phonograph and lift the front of the CD player up slightly and so that you can unplug the two connectors on the back side of the CD player. Remove the connectors by depressing the latches on each connector and separating the connectors from their sockets.

5. Lift the CD player up and out of its mounting bracket.

6. Remove the two rear mounting screws and grommets from the player assembly and install them on the replacement CD player.

7. Immediately place the CD player into the anti-static bag (supplied with the phonograph) and return the CD player to your distributor.

To replace the CD player, reverse the previous steps. *Refer to figure 6-2* for the mechanism control connecting diagram.

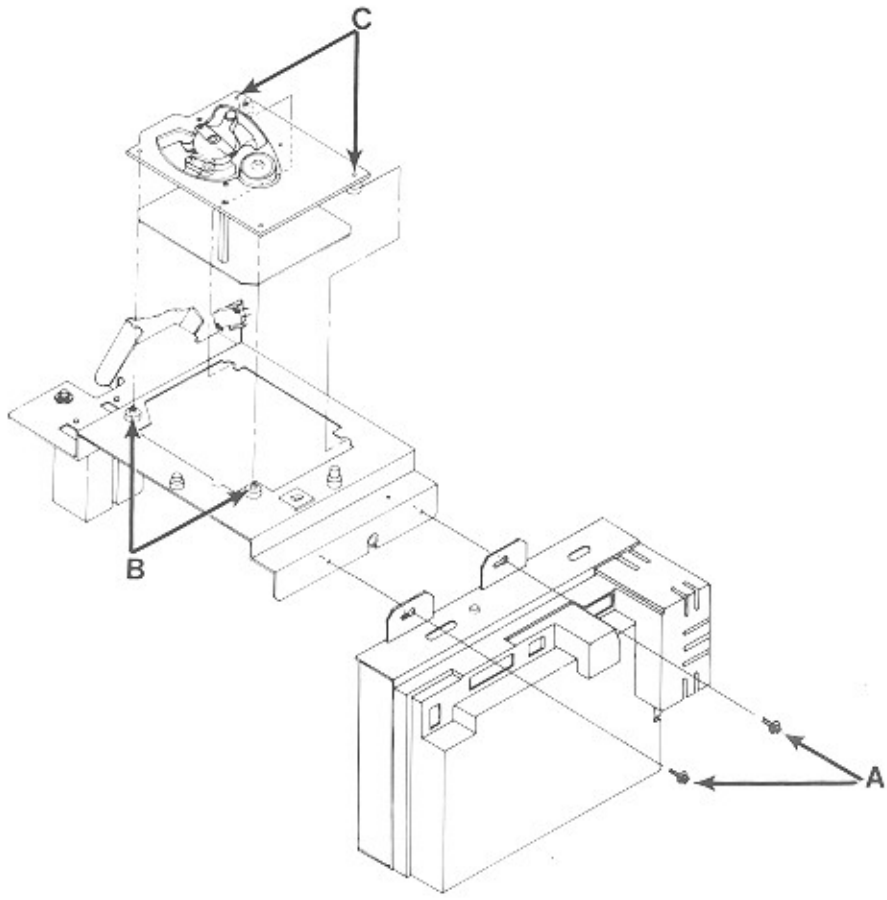


Figure 6-1. Removing the CD Player

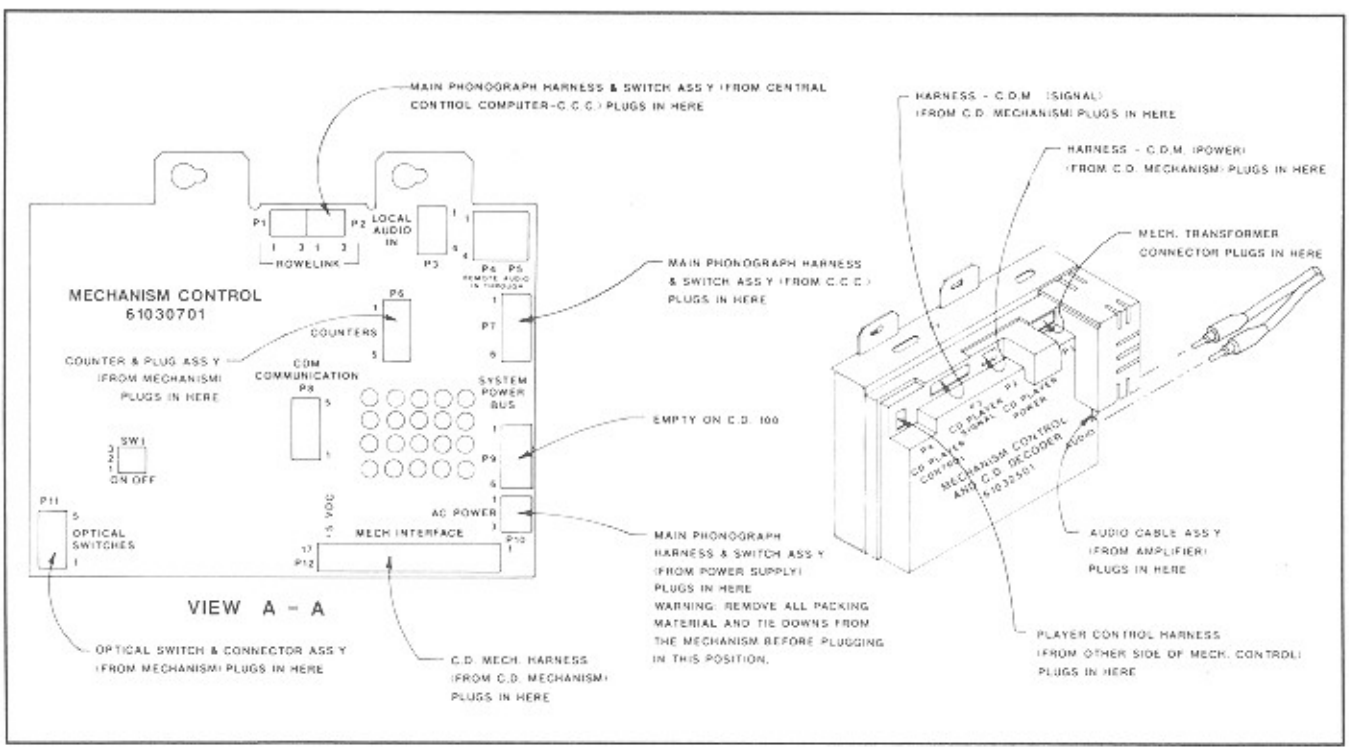


Figure 6-2. Mechanism Connecting Diagram

Hold Down Assembly And Hold Down Plate Height

SERVICE CHECK

With the gripper bow in the play position and the disc on the turntable (the outer cam switch is actuated), the aluminum hold down plate *(figure 6-3)* should be 3/32 to 5/32 inch (1/8 ± 1/32) under the flange of the magnetic hold down hub.

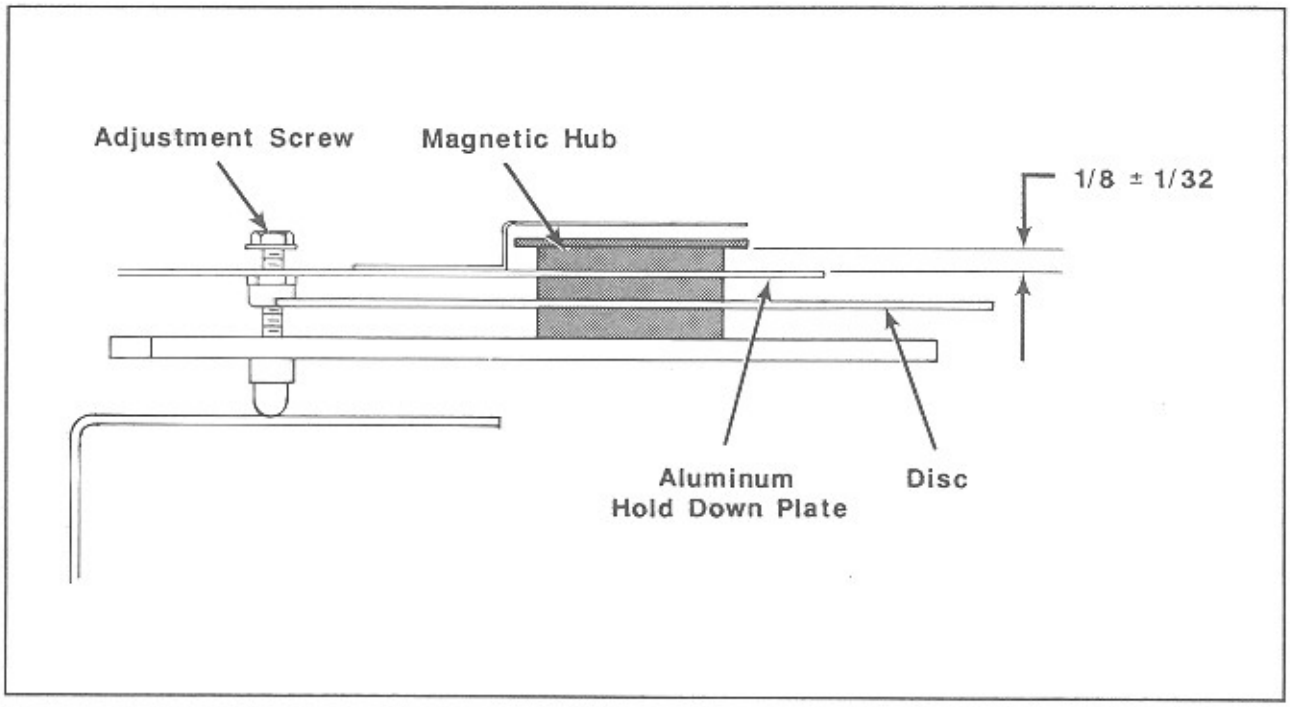


Figure 6-3. Hold Down Plate

ADJUSTMENT

If the hold down plate height is not correct, turn the adjustment screw (figure 4-3) until the 3/32 to 5/32 (1/8 ± 1/32) height is attained.

HOLD DOWN LIFTING CAM ADJUSTMENT

Refer to figure 6-4 as you make this adjustment.

1. With the gripper bow in the SCAN position over the magazine (transfer motor crank in the maximum down position), loosen one Allen-head screw in the collar.

2. Use a 5/32 Allen Wrench in the end of the transfer motor shaft to turn the

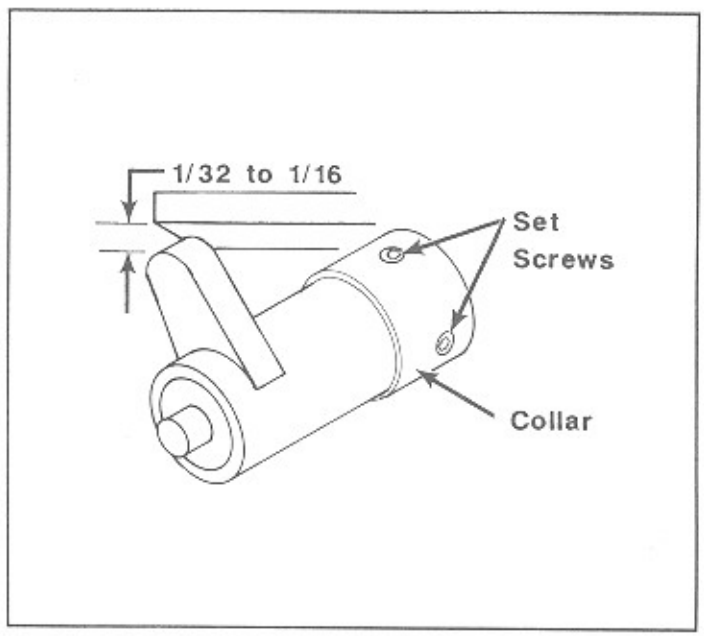


Figure 6-4. Hold Down Lifting Cam Adjustment

motor shaft clock-wise until the gripper bow is in the playing position (transfer motor crank in the up position).

4. Loosen the other Allen-head set screw in the collar.
5. Position the cam to clear the lifting surface by 1/32 to 1/16 inch.
6. Tighten the Allen-head set screws.

HOLD DOWN PLATE CENTERING

Refer to figure 6-5 for this adjustment.

1. With the gripper bow in the PLAY position and the disc on the turntable, loosen the two centering adjustment screws slightly.
2. Look straight down on the turntable hub and shift the hold down plate until the scribed "witness" line appears to be centered around the magnetic hold down hub. Rotate the disc and turntable hub (notice that the hold down hub will not run perfectly true).
3. Shift the hold down plate until it appears to be in the best compromise position with the slightly off-center position of the hold down hub. Look for equal clearance as it rotates.
4. Tighten the two centering adjustment screws and recheck the previous adjustments.

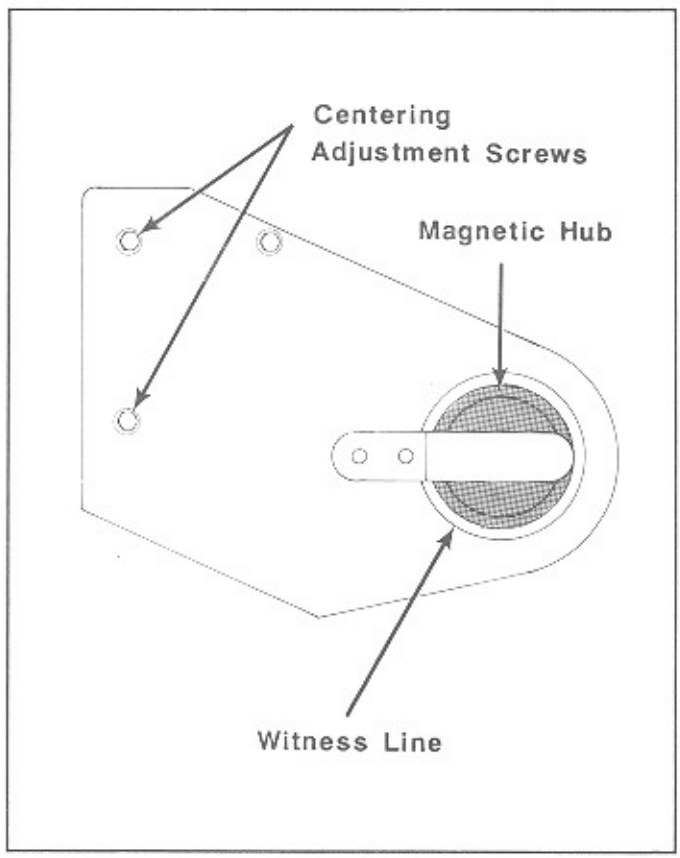


Figure 6-5. Hold Down Centering

Interlock Switch Adjustment

Refer to figure 6-6 to make this adjustment.

Before you make this adjustment, make sure that you have made the *Hold Down Plate Height Adjustment.*

SERVICE CHECK

1. While the gripper bow is in the PLAY position, make sure that the interlock switch is actuated by the hold down assembly as shown.

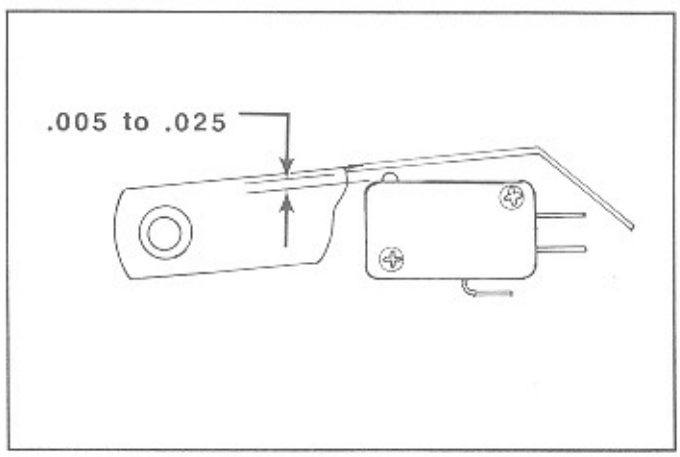


Figure 6-6. Interlock Switch

ADJUSTMENT

Loosen the interlock mounting screws and rotate the interlock switch until the clearance is .005 to .025 inch.

Optical Switch Adjustment

1. Pull out the detent plunger, so that the magazine can be rotated to Position 99. Engage the detent plunger.

2. Loosen the optical switch bracket mounting screw, turn the adjustment knob counter clockwise to top of its travel, and move the bracket down to the bottom of its travel *(refer to figure 6-7)*. Snug the optical switch mounting screw, so that the bracket can move with resistance.

3. With the detent plunger engaged, rotate the magazine counter-clockwise to remove gear backlash and maintain pressure for steps 4 and 5.

4. Turn the adjustment knob clockwise until both the INDEX and HOME LED's are ON.

5. Continue turning the adjustment knob clockwise until the INDEX LED goes OFF then turn the knob one additional turn clockwise. The HOME LED must remain ON. Tighten the mounting screw.

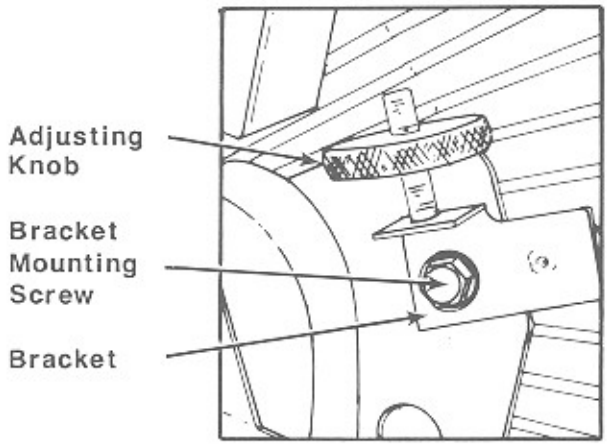


Figure 6-7. Optical Switch Adjustment

6. Pull out the detent plunger and rotate the magazine to Position 06.

7. With the detent plunger engaged, rotate the magazine in both directions as far as you can by hand (taking up the gear backlash in both directions). The INDEX and HOME LED's will remain OFF when properly adjusted.

8. Pull out the detent plunger and rotate the magazine to Positions 56, 07, and 57. Repeat step 7 at each position.

Sprag Assembly

ADJUSTMENTS

The following steps must be used to make sprag assembly adjustments.

WARNING:

Turn the power OFF before servicing the sprag assembly.

1. *Refer to figure 6-8.* Depress solenoid plunger until the roll pin bottoms on the plunger stop (actuate by pressing on plunger).

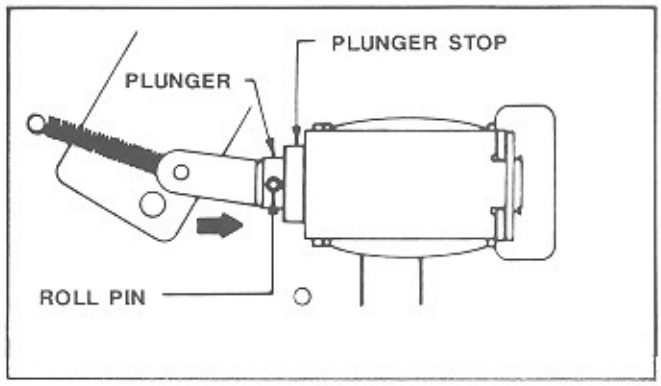


Figure 6-8. Sprag Assembly (Plunger)

2. Rotate the disc magazine and note the clearance between the sprag lever and the sprag wheel located on the backside of the sprag plate assembly.

   The sprag lever must not touch the sprag wheel and the clearance must be .015 to .025 inches *(see figure 6-9)*. It will be necessary to remove the sprag assembly if corrections are required.

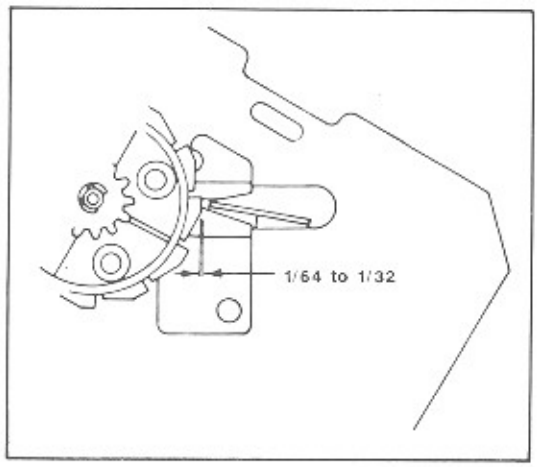


Figure 6-9. Sprag Wheel

SPRAG ASSEMBLY REMOVAL

1. To remove sprag assembly, disconnect wires to the solenoid and motor, remove the three mounting screws and slide the assembly out of the right side of the mechanism *(see figure 6-10)*.

2. Loosen the solenoid mounting screws and with the roll pin against the plunger, position the solenoid so that there is a .015 to .025-inch gap between the sprag lever and the highest point on the sprag wheel *(see figure 6-11)*.

3. Tighten solenoid mounting screws.

4. Replace sprag assembly in mechanism with three mounting screws and replace the Black and White/Blue wires to the solenoid and the Yellow and Yellow/Black wires to the magazine motor.

Instructions for aligning the disc magazine are in this section under *Aligning Magazine Stopping Position With Transfer Arm.*

To readjust the optical switch, *refer to Optical Switch* in this section.

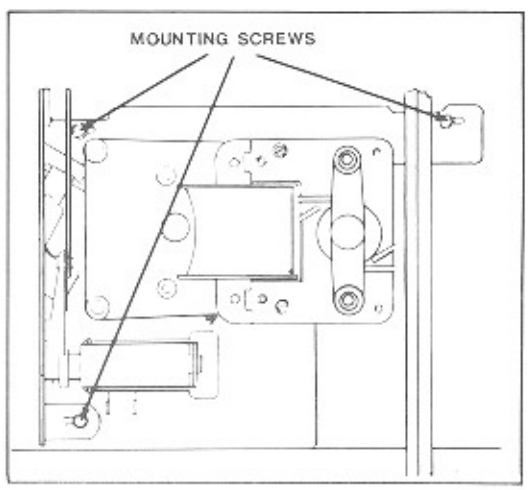


Figure 6-10. Sprag Assembly Removal

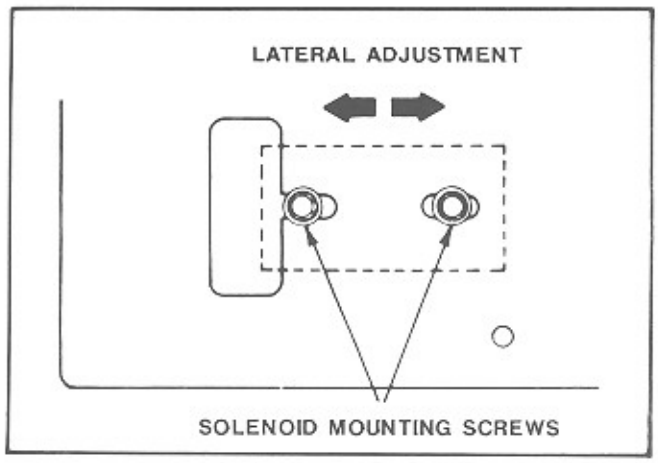


Figure 6-11. Lateral Adjustment

Disc Magazine Transfer Arm And Support

ADJUSTMENT

To eliminate magazine end play and center transfer arm support:

1. Loosen the set screws in rear magazine shaft collar. Push the collar on to magazine shaft to eliminate end play and tighten the screws.
2. Loosen the screw that holds the transfer arm support to the mechanism frame.
3. Adjust the transfer arm support so that the transfer arm is centered in the opening.
4. Tighten the mechanism frame to the transfer arm support screw.

Cam Switch

ADJUSTMENTS

If you need to remove the switch cam from the transfer motor, the following procedure must be followed to ensure that the cam is properly located and not 180 degrees out of position.

Locate the inner lobe so that it is pointing in the same direction as the crank. Turn cam so that neither cam lobe is on a switch before removing or installing the cam *(see figure 6-12)*.

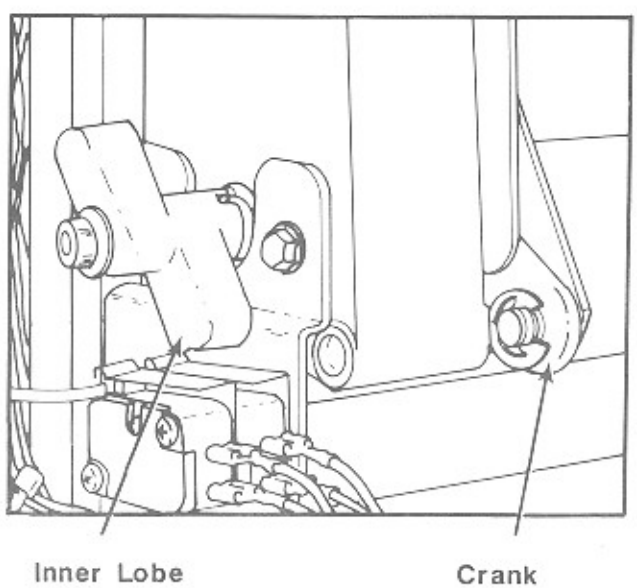


Figure 6-12. Cam Switch

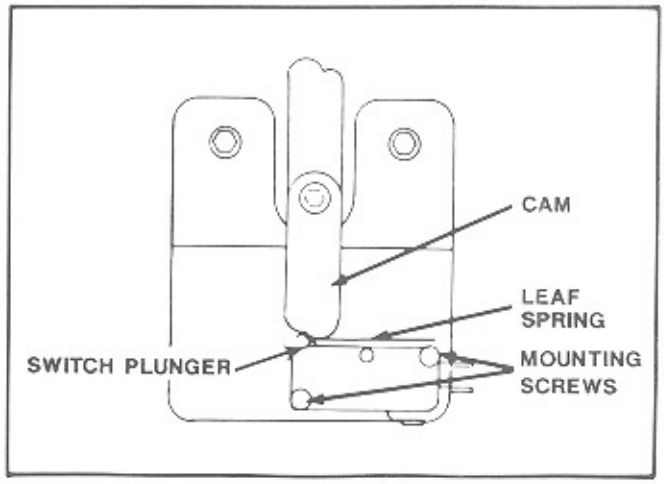


Figure 6-13. Cam Switch Adjustment

CAM SWITCH CHECK AND ADJUSTMENT

1. Check that the plastic cam leaf spring and switch plunger just touch as shown above.
2. To adjust switches, loosen mounting screw under plunger end and move the switch housing as required *(see figure 6-13)*.
3. Tighten mounting screw and recheck operation.

Magazine Belt Adjustment

1. Loosen the two adjustment screws *shown in figure 6-14*.
2. Raise the bracket to tighten the belt around the magazine.
3. Check that belt rides evenly in the center of the belt guides, all the way around the magazine.
4. Tighten the two adjustment screws.

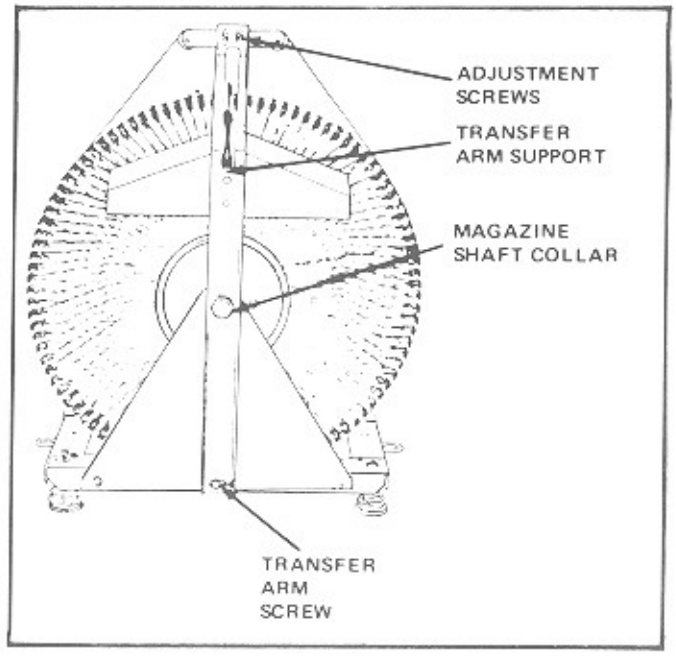


Figure 6-14. Magazine Belt Adjustment

Aligning Magazine Stopping Position With Transfer Arm

1. For this adjustment use a disc in good condition without warp or dish. Place this disc in any position in the disc magazine and rotate the magazine until this disc is in the top position. Allow the magazine sprag lever to engage and lock the magazine in this position.

2. Using a 5/32-inch Allen wrench in the end of transfer motor shaft, turn motor shaft clockwise until the gripper bow lifts the disc out of the magazine, and the outer shoe is approximately 3 inches from its rest position on the back support *(see figure 6-15)*.

   In this position, a center line from the inner shoe through the center of the outer shoe will pass through the back of the plastic disc guide on the magazine.

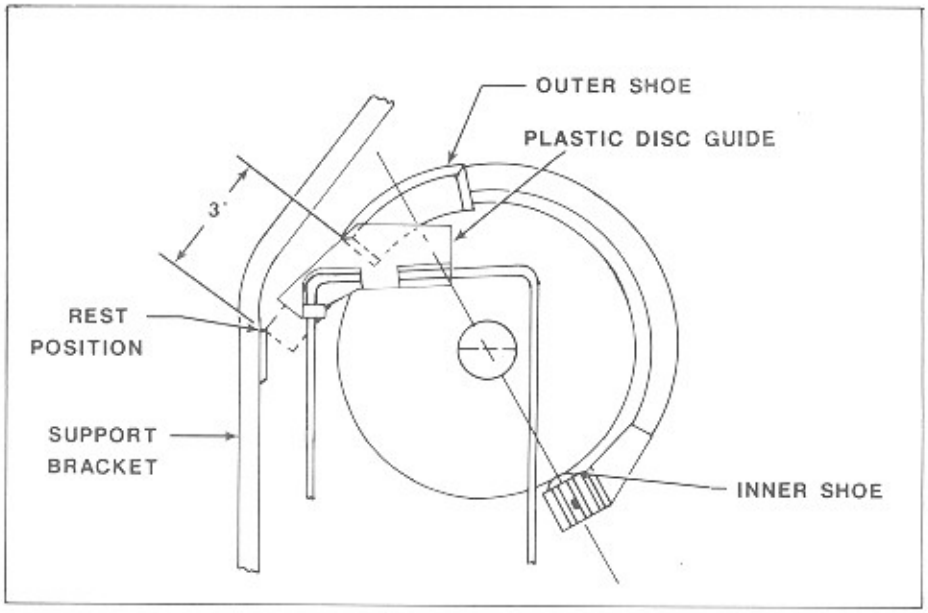


Figure 6-15. Magazine and Transfer Arm Position

3. With the disc and gripper bow in this lifted position, rock the magazine to the left and right and make sure the plastic magazine disc guides do not come in contact with the disc on either side.

   If the guide makes contact with the disc on one side or magazine space does not center with the disc, the following adjustment to the magazine will be necessary:

4. Loosen three screws in the magazine motor mounting plate.

5. With sprag wheel locked, move the magazine until the disc is centered between belt guides (The adjustment screws will be approximately centered in the slots, *see figure 6-16)*.

6. Tighten the three screws in the magazine motor mounting plate securely.

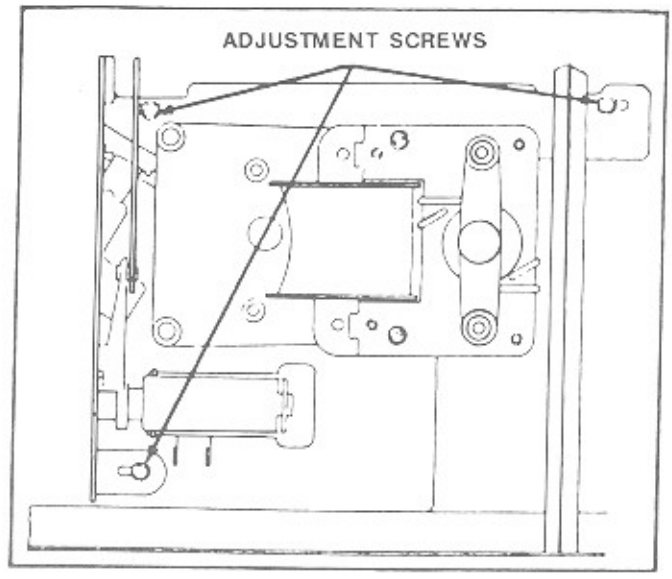


Figure 6-16. Magazine Adjustment

Title Rack Switch Adjustment

> **CAUTION:**
>
> **Do not attempt to turn the CD title pages by hand unless you use the handwheel on the back of the title rack (see figure 1-2).**

Refer to figure 6-17 for illustration of the title rack adjustment.

1. Open the top door, unplug the title rack from the phonograph, and remove the title rack from the phonograph.
2. Loosen the switch mounting screw and the adjusting screw so that the switch can be rotated.
3. Use the handwheel to move the rack and pinion (and the title rack pages) so that the switch roller is directly over the top of one of the rack lobes. This will cause two of the title rack pages to point approximately straight out.
4. Insert a 0.040-inch feeler gauge between the switch body and the switch actuator arm.
5. Slowly rotate the switch downward until all clearance between the switch and the switch body is removed.
6. Tighten the switch mounting screw and the switch adjustment screw.

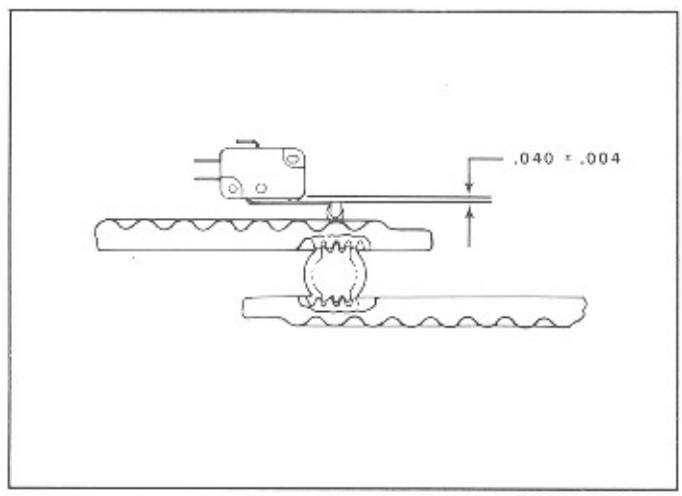


Figure 6-17. Title Rack Switch Adjustment

7. Turn the handwheel in both directions and verify that the switch clicks before the roller reaches the bottom of the rack (as it rolls "down hill") and before it reaches the top of the rack (as it rolls "up hill"). This distance should be approximately halfway between the peaks and the valleys of the lobes.
9. Re-install the title rack.
10. Perform *Title Page Re-Synchronizing* that follows this step.

Title Page Re-Synchronizing

Title page re-synchronizing is necessary whenever power to the phonograph is interrupted or after the title pages have been changed with the handwheel.

1. Press either CHANGE PAGE button repeatedly until the pages no longer change (The pages may not advance as far as you expect them to. This is normal when the pages are being re-synchronized).
2. Press the other CHANGE PAGE button repeatedly until the pages no longer change.

Section 7: Miscellaneous

CD-100 SPECIFICATIONS

General

Depth	26-1/2 in. (67.3 cm.)
Width	41-1/2 in. (105.4 cm.)
Height	59-7/8 in. (151.9 cm.)

Power Requirements

120 VAC 60 Hz.,
530 watts 5.3 amps.

220 VAC 50 Hz.,
560 watts 3.3 amps.

240 VAC 50 Hz.,
560 watts 3.0 amps.

CD Player And Changer

Capacity	100 Digital discs
Disc Size	5-inch or 3-inch

Credit And Pricing System

Accumulator Type Credit System — $1 & $5 bills; $1 & half-dollar coins are optional

Coins Accepted — Nickels, Dimes, Quarters

TOTAL CREDIT ACCUMULATIONS — 65535

PRICING — See Pricing, Section 2

Sound System

CD PLAYER

Type	Philips CDM-3
Frequency Response	20 to 20,000 Hz.
Channel Separation	25 db @ 1,000 Hz.
Output	1 V (approx. depending on the disc)

POWER AMPLIFIER

250 Watt Stereo

FTC Rating, 4 Ohm Loads @ 1% THD	250 watts RMS
FTC Rating, 70 V Lines @ 1% THD	126 watts RMS

PREAMPLIFIER

AVC Control Range . . . . . 40 db

Tone control is accomplished through a 7 band equalizer (10 db/filter band)

SELECTION SYSTEM CAPACITY . . . . . 100 discs with a 99 max. selections per disc

TRANSFORMER PACKAGE

Power Levels For Phonograph Speakers . . . . . 1, 4, 16, 64 watts
(Provides 70-volt line for extension speakers)

SPEAKER SYSTEM

	Woofer	Midrange	High Freq.
Speaker Diameter	10 in.	6 in.	3 in.
Voice Coil Diameter	1-1/2 in.	1 in.	NA
Impedance	8 Ohms	8 Ohms	NA

SYSTEM FREQUENCY RESPONSE . . . . . 20 to 20,000 ±4 db

Door Lighting . . . . . Fluorescent
30 watt, 36 in.
11 watt incandescent

14 volt incandescent

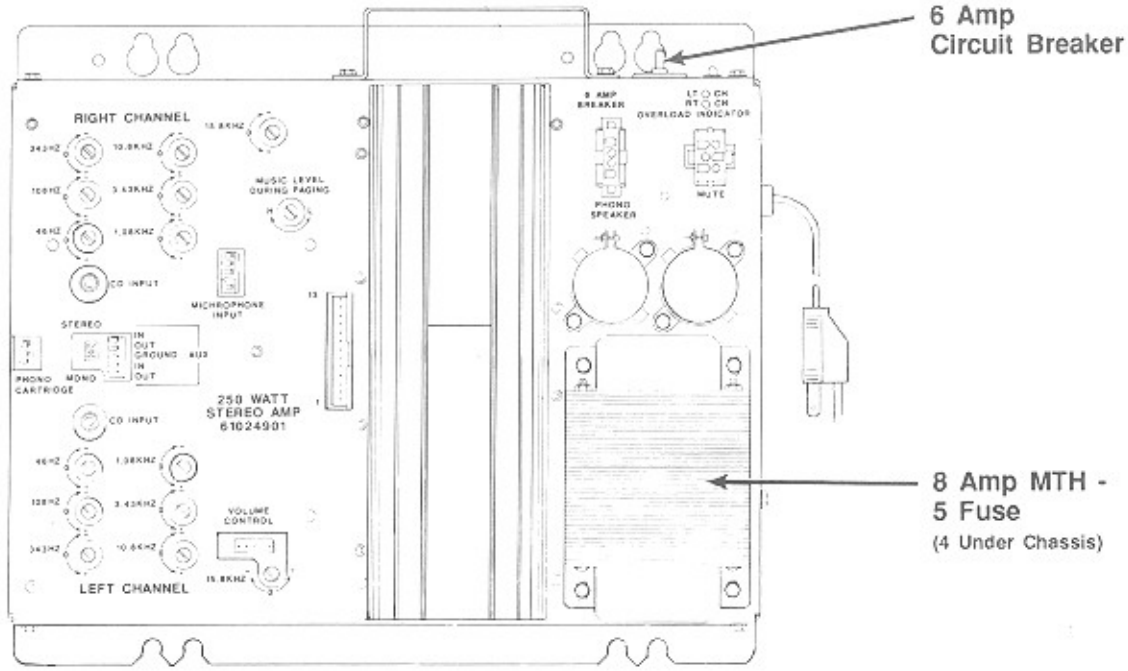
FUSES AND CIRCUIT BREAKERS

Main Power Supply

120 VAC (Transformer Primary Only)	2 amp. circuit breaker
120 VAC	10 amp. circuit breaker
+28 VDC	5 amp. Slo-Blo fuse
+8 VDC	5 amp. Slo-Blo fuse

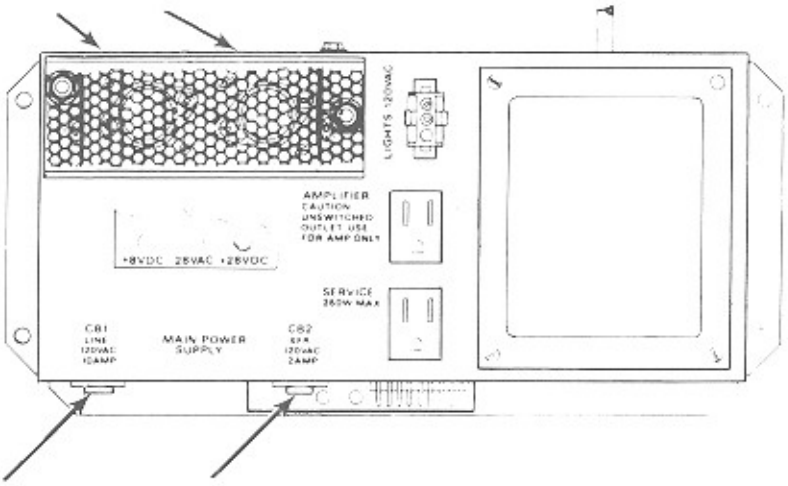
Amplifier

120 VAC	6 amp. circuit breaker
32 VDC	8 amp. fuse (4)



250 WATT AMPLIFIER

Two 5 Amp AGC Fuses
(Mounted on Power Supply Circuit Board)



10 Amp Circuit Breaker

2 Amp Circuit Breaker

MAIN POWER SUPPLY

Figure 7-1. Fuse and Circuit Breaker Locations

First Band 1st Digit	
Color	Digit
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

Second Band 2nd Digit	
Color	Digit
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Gray	8
White	9

Third Band Multiplier	
Color	Multiplier
Black	1
Brown	10
Red	100
Orange	1,000
Yellow	10,000
Green	100,000
Blue	1,000,000
Silver	0.01
Gold	0.1

Fourth Band Resistance Tolerance	
Color	Tolerance
Silver	±10%
Gold	± 5%
No Band	±20%

Figure 7-2. Resistor Color Code

Example: You have a resistor with the colors Yellow, Violet, Red, and Gold on it. Place the resistor in front of you so that the end of the resistor with no colored bands is on your right. Now, use the color code chart to decode the colors: the Yellow band=4, the Violet band=7, the Red band means multiply by 100. So the resistor value is 47X100, or 4700 ohms. The Gold band indicates that the resistor can be 5% over or 5% under the 4700 value and still be considered to be the proper value.

NOTE:

Testing a resistor while both ends of the resistor are connected to the circuit can give a false LOW reading. If the resistor value is critical, disconnect one end of the resistor from the circuit and use an accurate digital VOM.

Section 8: Parts Catalog

COUNTRY 1st & 2nd DIGIT

01 = US	= 6-10301-01	
02 = Arg	= "	-02
03 = Australia	= "	-03
04 = Aus	= "	-04
05 = Bah	= "	-05
06 = Belg	= "	-06
07 = Canada	= "	-07
08 = Chile	= "	-08
09 = Col	= "	-09
10 = Costa R	= "	-10
11 = Neut. Stk	= "	-11
12 = Denmark	= "	-12
13 = Ecuador	= "	-13
14 = El Salv	= "	-14
15 = England	= "	-15
16 = Finland	= "	-16
17 = France,	= "	-17
18 = Germany	= "	-18
19 =		
20 = Guat	= "	-20
21 = Holland	= "	-21
22 = Hon	= "	-22
23 = Italy	= "	-23
24 = Belize	= "	-24
25 = Japan	= "	-25
26 =		
27 = Nic	= "	-27
28 = Norway	= "	-28
29 = Aruba	= "	-29
30 = Panama	= "	-30
31 = Curaco	= "	-31
32 = Spain	= "	-32
33 = Sweden	= "	-33
34 = Swiss Fr	= "	-34
35 = Swiss Ge	= "	-35
36 = Swiss It	= "	-36
37 = Trinidad	= "	-37
38 = Eng Video	= "	-38
39 = Venez	= "	-39
40 = Zambia	= "	-40
41 = Puerto R	= "	-41
42 = Guyana	= "	-42
43 = Brazil	= "	-43
44 = Barbados	= "	-44
45 = Surinam	= "	-45
46 = Yugo	= "	-46
47 = S. Africa	= "	-47
48 = US (220V)	= "	-48
49 = US (240V)	= "	-49

PACK 3rd DIGIT

1 = DomPack 2-19410-01

CD-100 SUB-ASSEMBLY 4th & 5th & 6th DIGIT

050 = Black (60HZ) = 6-10300-01
051 = Black (50HZ) = 6-10300-02

*Requires:

(1) 3-09214-01 Blockout Assy
(1) 3-09254-01 Retainer - BA Blockout
(2) 89293010 #8 x 5/8 Hex WRHS (Hi-Lo)

AMPLIFIER 7th DIGIT

0 = None
1 =
2 =
3 = 3-06322-09 Remote Volume Cont. Assy
4 =
5 =
6 = 250W Amp. 6-10249-01
7 =

BILL ACCEPTOR 8th DIGIT

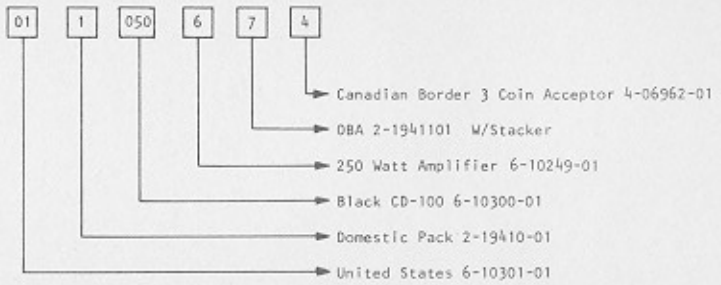
0 = None*
1 =
2 =
3 =
4 =
5 =
6 =
7 = OBA 2-19411-01 W/Stacker

COIN ACCEPTOR 9th DIGIT

0 = None
1 = 3 Coin Acc. = 4-06961-01
2 = 4 Coin Acc. = 4-07156-01
3 = Export Rej. (Special) = 7-09519-XX
4 = 3 Coin Canada Bdr. = 4-06962-01
5 = 4 Coin Canada Bdr. (5,10,25,50) = 4-07159-01
6 = Kit - Mars Slug Rej. = 2-18851-05
7 = 4 Coin $ Acc. ($,10,15,$) = 4-07156-02
8 = 2 Coin Acc. (25, $) = 4-07156-03
9 = Canada Bdr. $ ($,10,25,$) = 4-07159-02

SUB-ASSEMBLY CATEGORY
001-049 R-93 050-099 CD-100

SAMPLE:



CD-100 Codes

Revision E

INTRODUCTION

This parts catalog lists procurable replacement parts for the phonograph. The purpose of this parts catalog is to locate and identify replaceable components and supply information on how to order them.

Catalog Description

This catalog is divided into major sections labeled figures, which correspond to the illustrations used. Some assemblies require more than one illustration to identify the parts. Each page has a sheet number to identify the sheet as part of that assembly's parts list.

Since replacing parts that are welded or riveted onto an assembly is normally impractical, replacement parts are not listed for these items. The assembly that contains the welded part should be replaced.

Parts List Description

The parts list contains four columns:

- **Figure, Sheet, and Index Number** — The first entry in this column is the figure number of the corresponding illustration. An index number, when listed, corresponds to the index number appearing on the illustration. Index numbers are not used when items are listed for reference purposes only or when the item listed is an alternate part.
- **Rowe Part Number** — This column lists the part number to use when ordering replacement parts or making inquiries.
- **Description** — This column gives a word description of each part or assembly. Each item is indented to show its relationship to the next higher assembly.
- **Qty** — This column contains the part quantity used in the assembly. When a figure describes more than one model of an assembly, the "Qty" column is divided to show each model.

Ordering Replacement Parts

All replacement parts must be ordered directly from an authorized Rowe Distributor.

Once the replacement item has been determined, complete a Standard Parts Order Form. (available from your Rowe Distributor at no charge) Very often parts orders are delayed because of inadequate or incompletely filled out parts order forms. To enable prompt delivery, always specify the following information:

- Part Number and Description (indicate color, if applicable)
- Quantity required
- Machine Model and Serial Number
- Complete shipping address, including the ZIP code
- Shipping Instructions must be supplied. If the shipping method is Parcel Post, Air Parcel Post, United Parcel Service, or Air UPS, and the packages may exceed the size and weight limits of these services, indicate an alternate shipping method.

If the shipment must be delivered as fast as possible, specify "Fastest Way". Rowe will select the carrier for orders that justify shipment by truck.

Figure 8-1. CD-100 Phonograph External View

Sheet 1

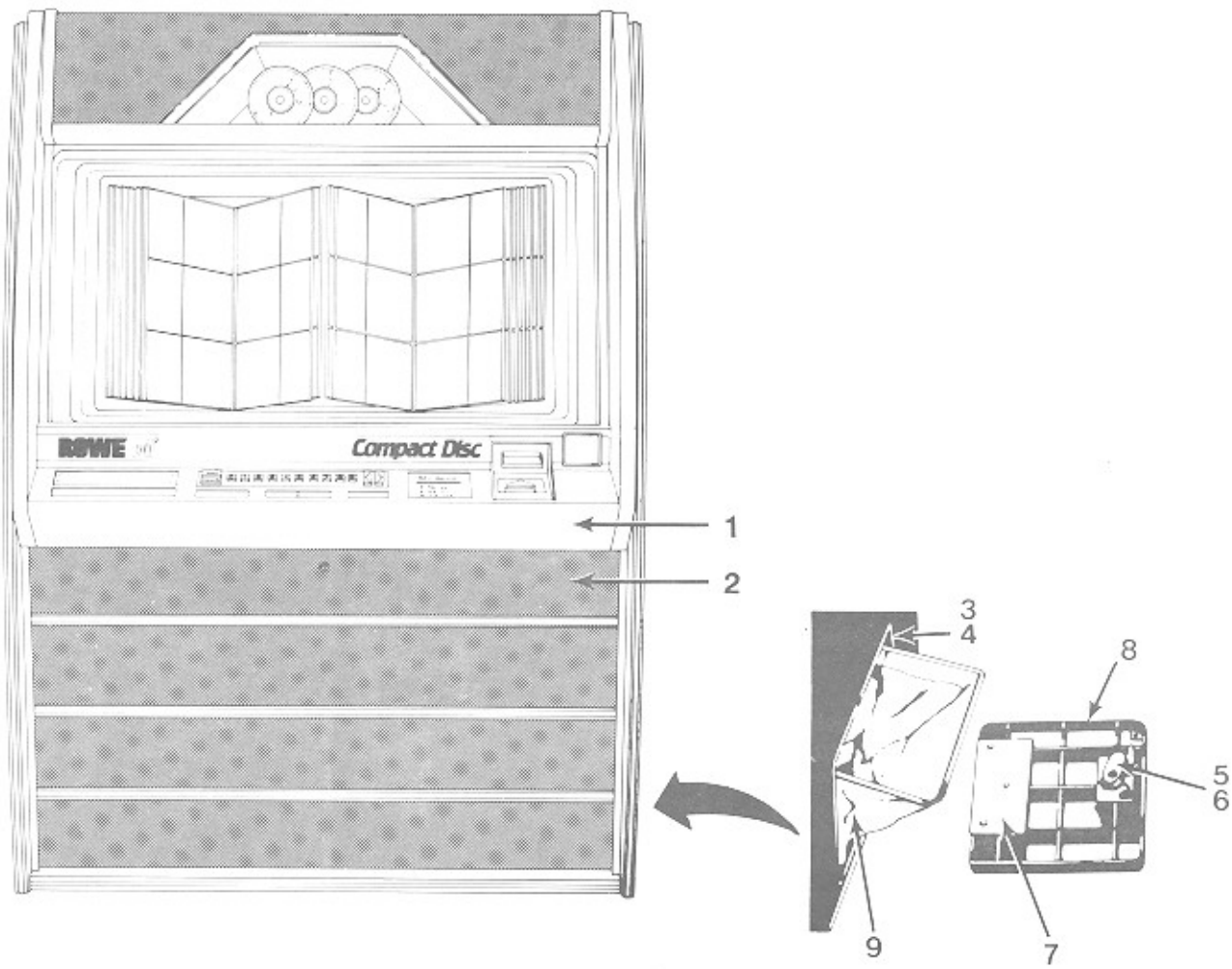


Figure 8-1 CD-100 Phonograph External View (Sheet 1)

Ref.	Part No.	Description	Qty
1	61034001	Top Door Assembly (Black) *(see figure 8-2)*	1
2	61034501	Front Door Assembly (Black) *(see figure 8-3)*	1
3	40527605	• Cash Box Door Frame	1
4	21776005	• "U" Type Speed Clip	1
	21186605	• Cash Box Door Assembly	1
5	70162004	• Cylinder Lock	1
6	20669501	• Lock Support	1
7	20770301	• Catch Bracket	1
8	60326705	• Cash Box Door	1
9	30702601	• Cash Bag	1
	70212507	• Felt Adhesive Tape	1

Figure 8-1. CD-100 Phonograph External View

Sheet 2

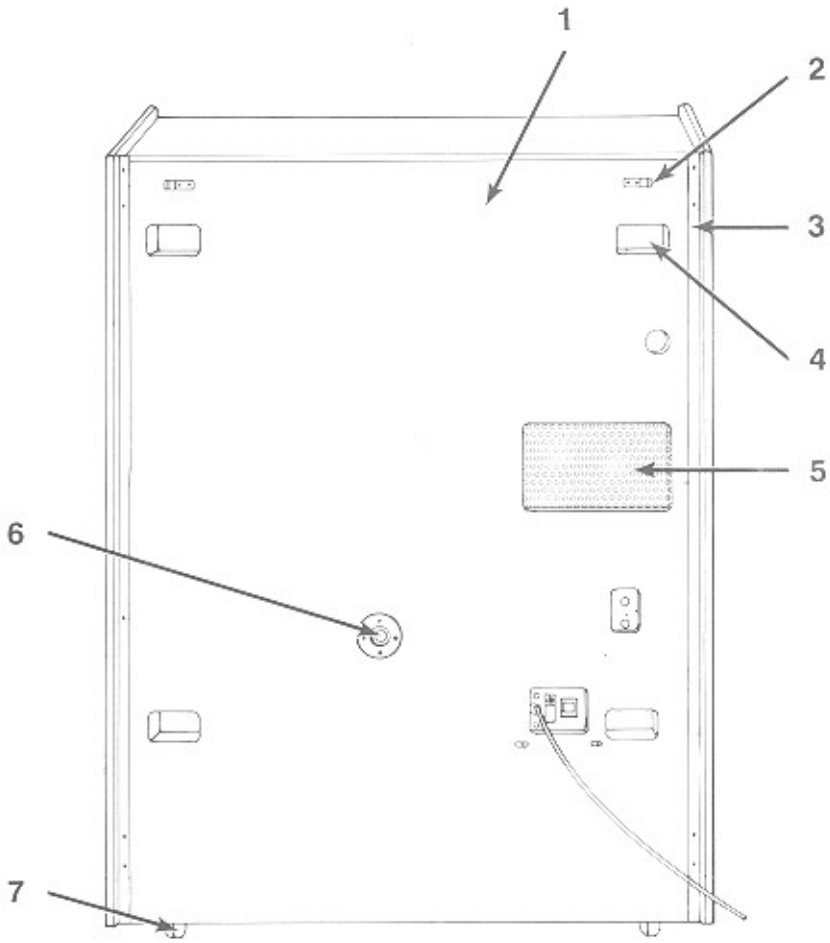
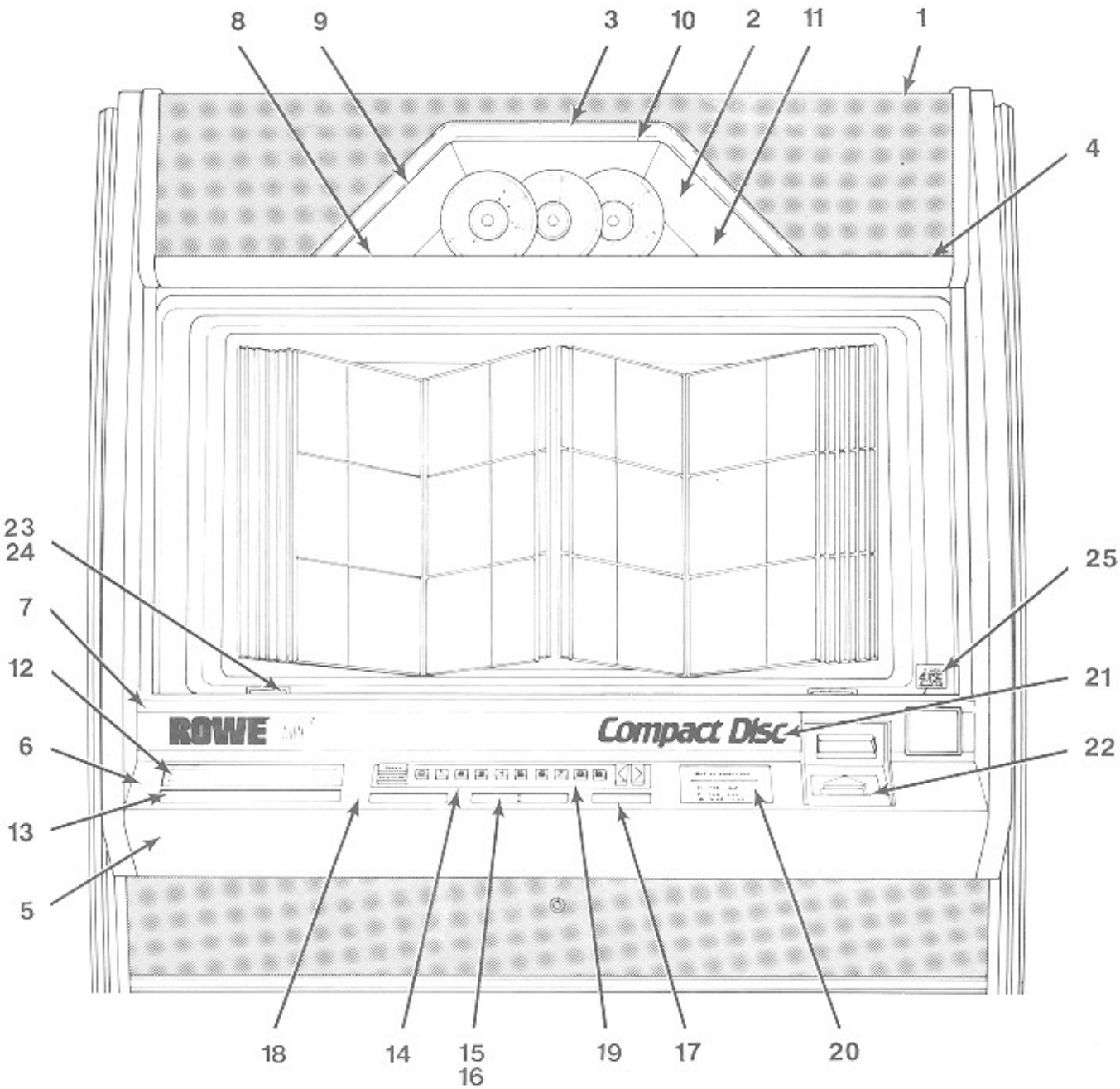


Figure 8-1 CD-100 Phonograph External View (Sheet 2)

Ref.	Part No.	Description	Qty
1	61035001	• Shell Assembly (Black)	1
2	20879501	• • Power Cord Holder	2
3	40702808	• • Skid Rail	2
4	30625701	• • Hand Hold Cover	4
5	30868402	• • Enclosure Screen	1
6	21265203	• • Tie Down Plate Assembly	1
7	30634001	• • Caster and Cup Assembly	4

Figure 8-2. CD-100 Phonograph Top Door Assembly

Sheet 1



Ref.	Part No.	Description	Qty
1	61034101	• Grille - Upper	1
2	61036001	• Animation Assy	1
	61037001	• • Housing - Animation	1
	61037101	• • Housing - Side (LH)	1
	61037201	• • Housing - Side (RH)	1
	30936901	• • Plate Assy - Animation Drive	1
	30937201	• • Brkt - Animation Mtg (Upper)	2
	30937301	• • Brkt - Animation Mtg (Lower)	2
	40824302	• • Motor & Harness Assy	1
	30936701	• • Shaft	2
	70143001	• • Ring - External Retaining	4
	21110001	• • Washer - Thrust	2
	40834901	• • Gear	3
	21532801	• • Speednut - Push On	3
	61037402	• • PWB - C.D. Animation	1
	21862201	• • Lamp & Socket Assy	8
	30866501	• • Lens - Brown	4
	30866504	• • Lens - Magenta	2
	30866503	• • Lens - Clear	2
	40834801	• • Support - Disc	3
	21922201	• • Ring - Compression	3
	30926902	• • Disc - Animation	3
	21922602	• Label - Copyright	1
3	61033401	• Trim - Animation Box	1
4	61033501	• Trim - Speaker Panel	1
5	40837101	• Trim & Strike Assy	1
6	61033201	• Trim - Control Panel	1
7	61033101	• Trim - Control Panel (Upper)	1
8	70212213	• Sponge Rubber - Closed Cell 1	
9	70212214	• Sponge Rubber - Closed Cell 2	
10	70212215	• Sponge Rubber - Closed Cell 1	
11	40834101	• Window - Animation	1
12	21845610	• Window - Digital Display	1
13	30934801	• Card - Readout	1
14	61033801	• Trim - Keyboard	1
15	30934901	• Card - Selector Graphics	1
16	21845611	• Window - Selector	1
17	70212412	• Cork Composition Strip	2
18	70212413	• Cork Composition Strip	6
19	40833501	• Keyboard Assy	1
20	21845612	• Window - Price Card	1
21	61036201	• Decal - Compact Disc	1
22	30935101	• Decal - B.A. Inlet	1
23	30921502	• Frame - License (White)	2
24	21921001	• Retainer - License	2
25	21922001	• Sticker - CD	1

Figure 8-2. CD-100 Phonograph Top Door Assembly

Sheet 2

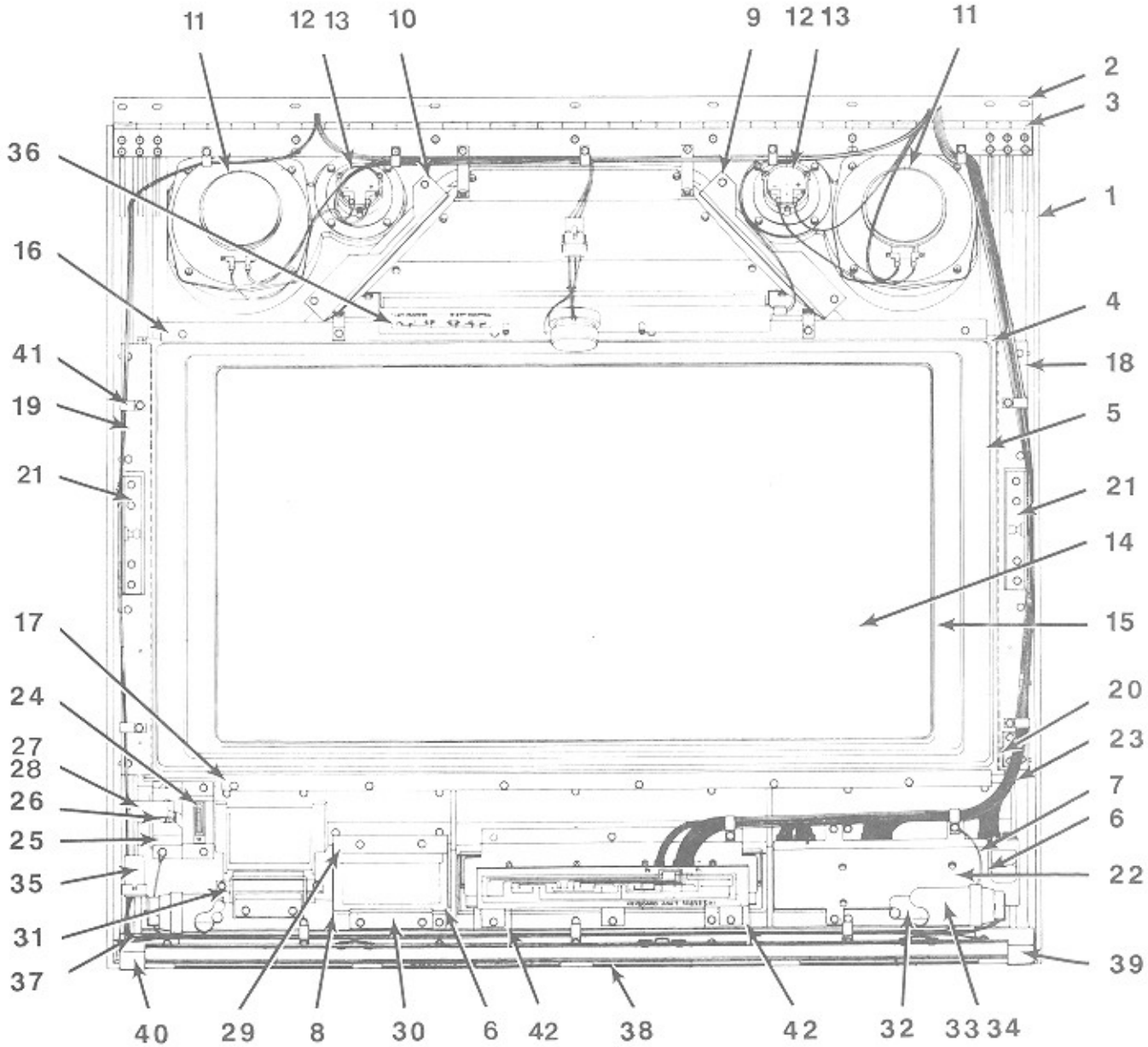


Figure 8-2. CD-100 Top Door Assembly, Sheet 2

Ref.	Part No.	Description	Qty.
1	61033601	• Frame - Top Door (CD-100)	1
2	61035801	• Hinge - Top Door	1
3	70220485	• Foamed Tape	1
4	70212211	• Sponge Rubber - Closed Cell	2
5	70212212	• Sponge Rubber - Closed Cell	2
6	70212216	• Sponge Rubber - Closed Cell	4
7	70212217	• Sponge Rubber - Closed Cell	2
8	70212218	• Sponge Rubber - Closed Cell	2
9	30934301	• Brkt - Mtg (Animation Window) LH	1
10	30934401	• Brkt - Mtg (Animation Window) RH	1
11	40830801	• Speaker - Mid Range (6")	2
12	40830901	• Speaker - Tweeter (3")	2
13	21944401	• Spacer - Speaker	8
14	21845609	• Window - Top Door	1
15	61036101	• Housing - Title Rack	1
16	30934501	• Bracket - Mtg (Window - Upper)	1
17	30934601	• Bracket - Mtg (Window - Lower)	1
18	40834301	• Bracket - Mtg (Window LH)	1
19	40834401	• Bracket - Mtg (Window RH)	1
20	21941901	• Actuator - Reset	1
21	30934701	• Pivot Assy - Gas Spring	2
22	40832301	• Digital Display Assy	1
23	40833401	• Harness Assy - Digital Display	1
24	40831801	• Inlet - Coin	1
25	30931601	• Bracket - Guide (Reject)	1
26	21834801	• Channel	2
27	21822901	• Spring - Compression	1
28	21942301	• Button & Shaft Assy - Reject	1
29	40831701	• Holder - Price Card	1
30	21942401	• Brkt - Holder (Price Card)	1
31	30931401	• Insert - B.A. Inlet	1
32	70060112	• Lamp - Fluorescent (30W T-8)	1
33	61036501	• Tube - Color	1
34	61037601	• Filter - Color	1
35	70080004	• Starter - Fluorescent (FS-4)	1
36	30935301	• Label - Speaker Harness	1
37	40834501	• Harness Assy - Top Door Light	1
38	30935601	• Diffuser - Light	1
39	30939701	• Bracket - Light Block (LH)	1
40	30939801	• Bracket - Light Block (RH)	1
41	70093401	• Clamp - Cable (17/32)	14
42	30941401	• Bracket - Hold Down (Graphics)	2

Figure 8-3 CD-100 Front Door Assembly

Sheet 1

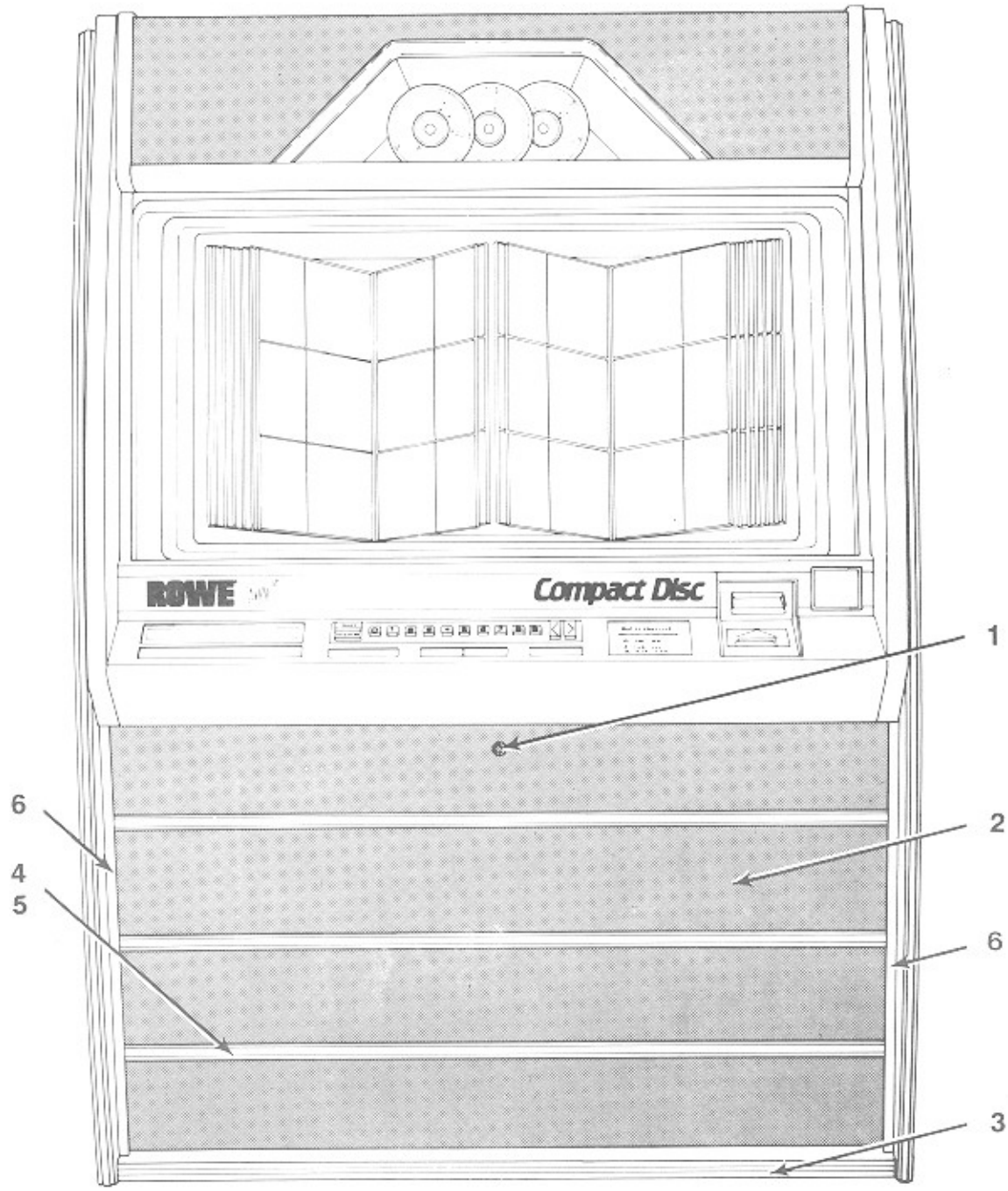


Figure 8-3 CD-100 Front Door Assembly (Sheet 1)

Ref.	Part No.	Description	Qty
1	70163211	• Cylinder - Lock (Common Key)	1
2	61034301	• Grille - Lower	1
3	61033701	• Trim - Bottom	1
4	40831101	• Trim - Grille	3
5	30934001	• Retainer Assy	3
6	40831301	• Trim - Side	2

Figure 8-3 CD-100 Front Door Assembly

Sheet 2

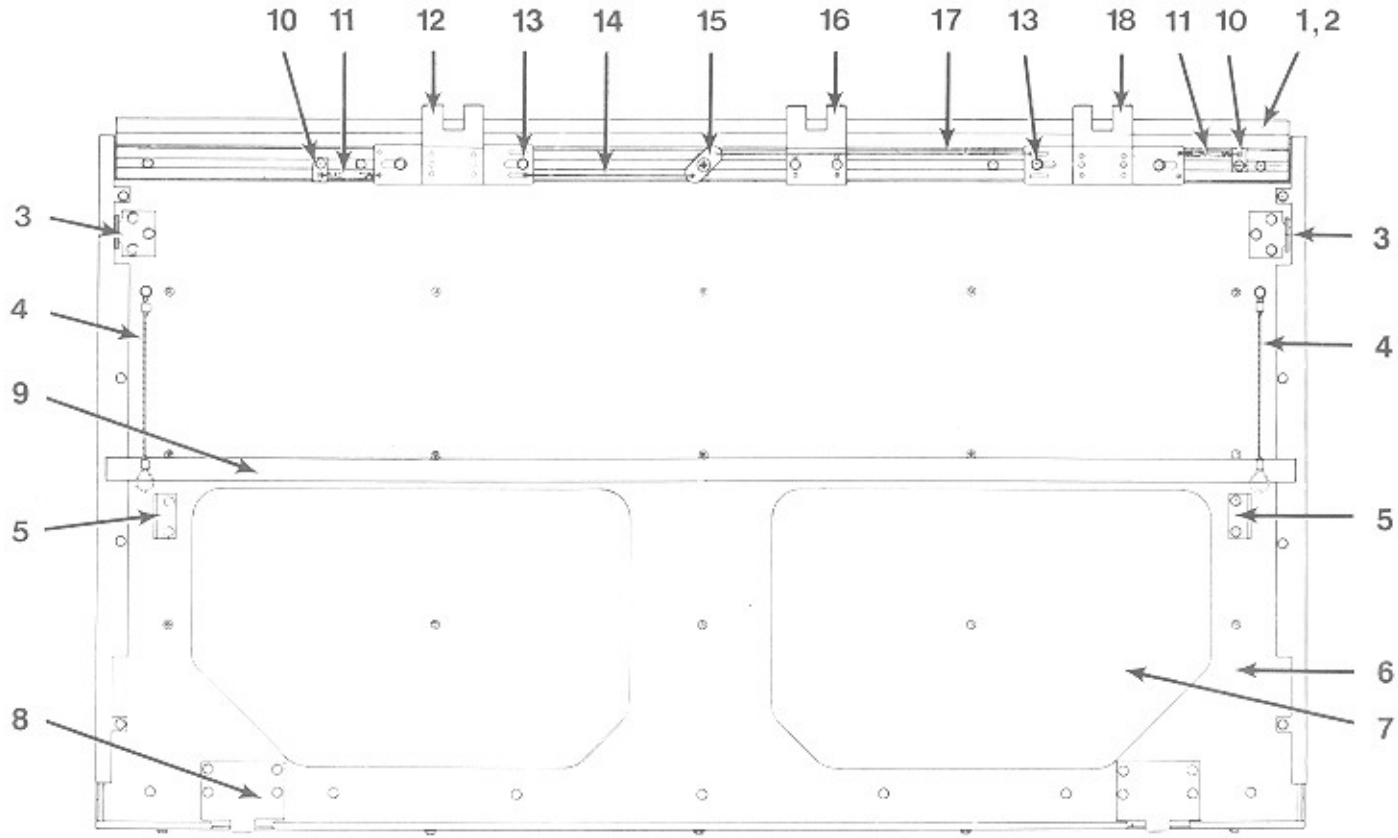
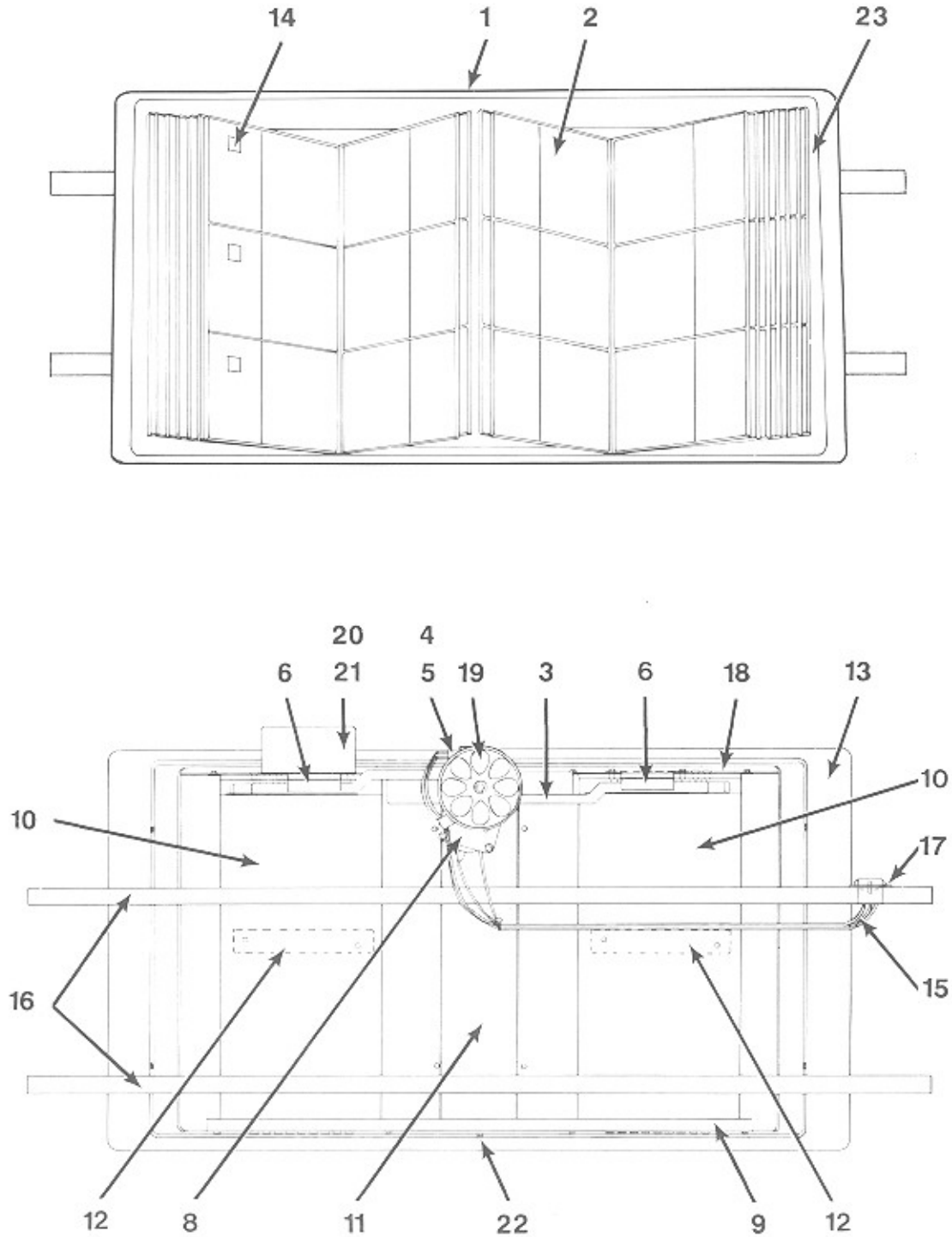


Figure 8-3 CD-100 Front Door Assembly (Sheet 2)

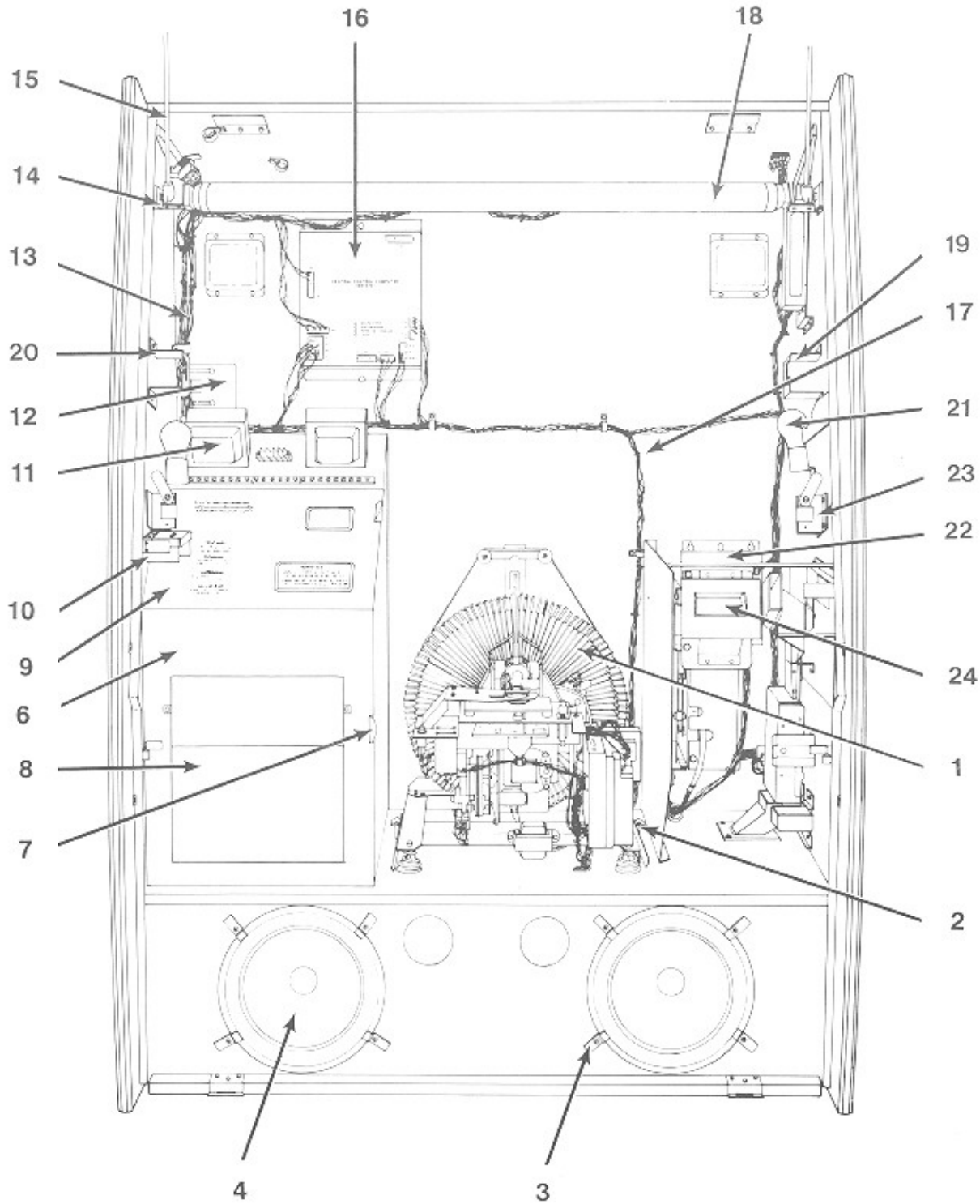
Ref.	Part No.	Description	Qty.
1	61034401	• Lockbar	1
2	70220488	• Foamed Tape	1
3	21883504	• Strike	2
4	21572601	• Cable - Fall Stop	2
5	21920101	• Bracket - Upstop	2
6	61034201	• Panel - Door (Lower)	1
7	40833601	• Scrim - Front Door	1
8	21940801	• Strap - Hinge	2
9	70220486	• Foamed Tape (3/4 x 1/2 x 39)	1
10	21567401	• Retainer - Spring	2
11	21256201	• Spring - Tension	2
12	21941801	• Lockbar Assy (RH)	1
13	20922502	• Spacer	4
14	21724905	• Link - Lockbar	1
15	21425601	• Bolt - Lock	1
16	21941301	• Catch	1
17	21724902	• Link - Lockbar	1
18	21941701	• Lockbar Assy (LH)	1

Figure 8-4 Title Rack Assembly



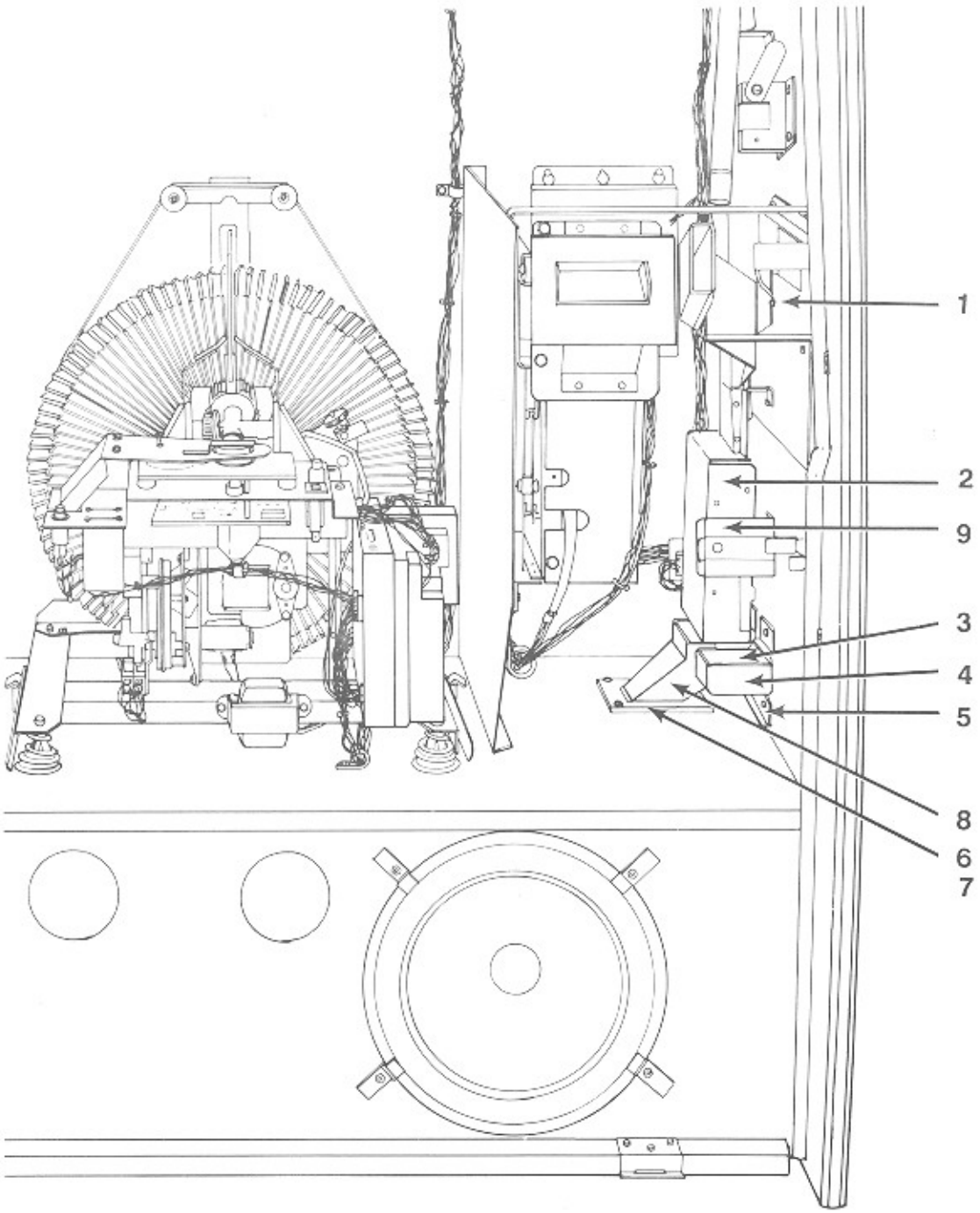
Ref.	Part No.	Description	Qty
1	61035701	• Title Rack Assy	1
2	30933901	• • Page & Clip Assy	18
3	40833901	• • Rack & Clip Assy	2
4	21942201	• • Switch - Micro	2
5	21083001	• • Nut - Twin	1
6	30935501	• • Guide - Side (CD Page Assy)	2
7	30935001	• • Guide - Center, CD Page Assy (Not Shown)	1
8	30936301	• • Motor & Gear Assy	1
9	61036801	• • Plate - Bottom (CD Page Assy)	1
10	61036901	• • Support - Vertical (CD Page Assy)	2
11	40834601	• • Plate - Nose (CD Page Assy)	1
12	40834701	• • Guide - Center (CD Page)	2
13	61036601	• • Shroud	1
14	40835401	• • Strip - Numbers (Page)	1
15	30938501	• • Harness Assy - Interconnect	1
16	40835301	• • Brace - Mounting	2
17	30938301	• • Plate - Connector	1
18	61036701	• • Plate - Top (CD Page Assy)	1
19	40836201	• • Knob	1
20	30940101	• • Bracket - Label	1
21	30940001	• • Label - Warning	1
22	30940701	• • Label - Warning	1
23	30940801	• • Bumper - Page	4

Figure 8-5. CD-100 Phonograph Internal View



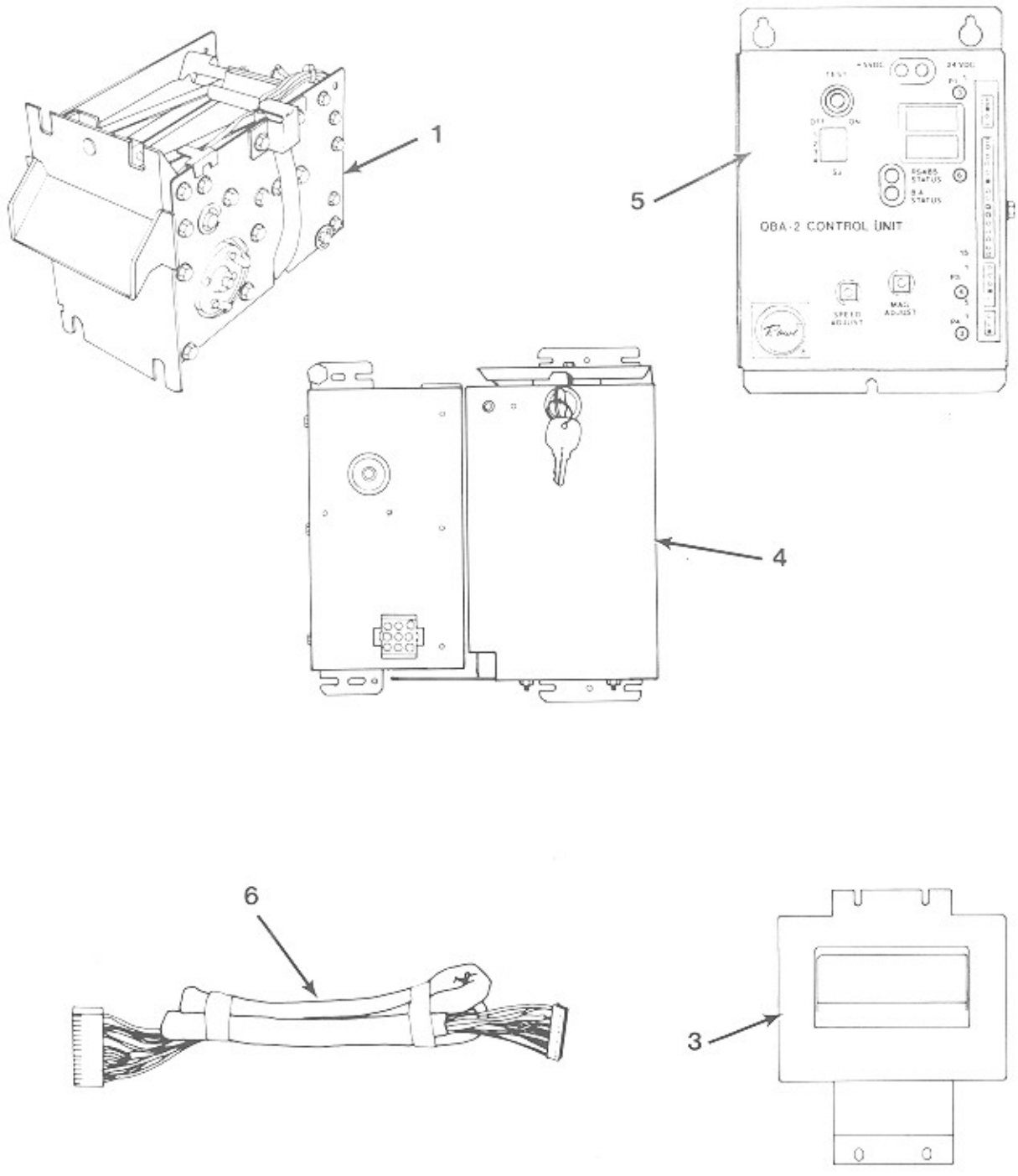
Ref.	Part No.	Description	Qty
1	61033001	• Mechanism Assy - CD *(see figure 8-19)*	1
2	30932101	• Bracket - Mech Tie Down	2
3	21780701	• Bracket - Retainer, Speaker	8
4	40830701	• Speaker - Woofer	2
5	21780607	• Pad - Acoustical (Not Shown)	2
6	30934101	• Panel Assy - Amplifier	1
7	21751804	• Spring Catch	1
8	30869801	• Handy Case	1
	21730516	• • Accessories Bag Assy	1
	21198801	• • • Bag - Accessories	1
	70097501	• • • • Contact - Univ Conn (Pin)	6
	70097502	• • • • Contact - Univ Conn (Socket)	6
	70075601	• • • • Contact - Post	10
	70091012	• • • • Terminal Lug - Spade	10
	70072002	• • • • Fuse Cartridge (8 amp.)	2
	70072106	• • • • Fuse Cartridge (5 amp.)	2
	26676801	• • • • Quality Card - Phonograph	1
	21822611	• • • • Manual - Service (CD-100)	1
	21888604	• • • • Programming Reference Guide	1
9	40836101	• Panel Assy - Amp (Top)	1
10	40835601	• Switch Assy - Service	1
11	40832101	• Output Transformer Assembly *(see figure 8-16)*	1
12	21759301	• Cover - Cord Hole	2
13	61035501	• Harness & Switch Assy	1
14	21941601	• Plate Assy - Pivot	2
	30936501	• • Bracket - Ball Stud	2
	21797601	• • Stud - Ball	2
15	40714908	• Spring - Pneumatic	2
16	40832201	• Central Control Computer	1
17	40832901	• Harness, 110 Volt, 50/60 Hz	1
18	70060112	• Fluorescent Lamp (30 watt, T-8)	1
	70080004	• Starter - Fluorescent Lamp	1
19	30938201	• Mounting Bracket - Title Rack Upper (RH)	1
20	30938101	• Mounting Bracket - Title Rack Upper (LH)	1
21	70060410	• Lamp - Incandescent	2
22	61038901	• Control Unit - OBA	1
23	21751804	• Catch - Title Rack	2
24	65056511	• Bill Acceptor transport	1

Figure 8-6. Coin Chute Assembly



Ref.	Part No.	Description	Qty
1	40832701	• Support & Coin Chute Assy	1
	40831201	• • Support - Coin Chute & Rej Mech	1
	40833701	• • Chute Assy - Coin (Upper)	1
	30930901	• • Pivot - Scavenge	1
	30931101	• • Link - Scavenge	1
	30931901	• • Actuator - Slug Rejector	1
	21940601	• • Link - Scavenge (Pivot)	1
	21256201	• • Spring - Tension	1
	21765601	• • Spring - Compression	1
	25156904	• • Washer - Shoulder	1
	20922502	• • Spacer	6
	70120010	• • Washer	1
	25155901	• • Bumper - Split Stem	1
2	40703811	• Mtg Brkt & Coin Switch Assy	1
	40579303	• • Mtg Bracket Assy	1
	30578702	• • Switch Assy - Coin	1
	21790201	• • Hinge - Rejector	1
3	21792901	• Door - Slug Cup	1
4	30781702	• Cup - Slug - (Black)	1
5	21793001	• Bracket - Slug Cup	2
6	30743701	• Collar - Coin Chute	1
7	21754401	• Gasket - Coin Chute	1
8	61034701	Chute - Lower (Coin)	1
9	21429501	Rejector Catch Assembly	1

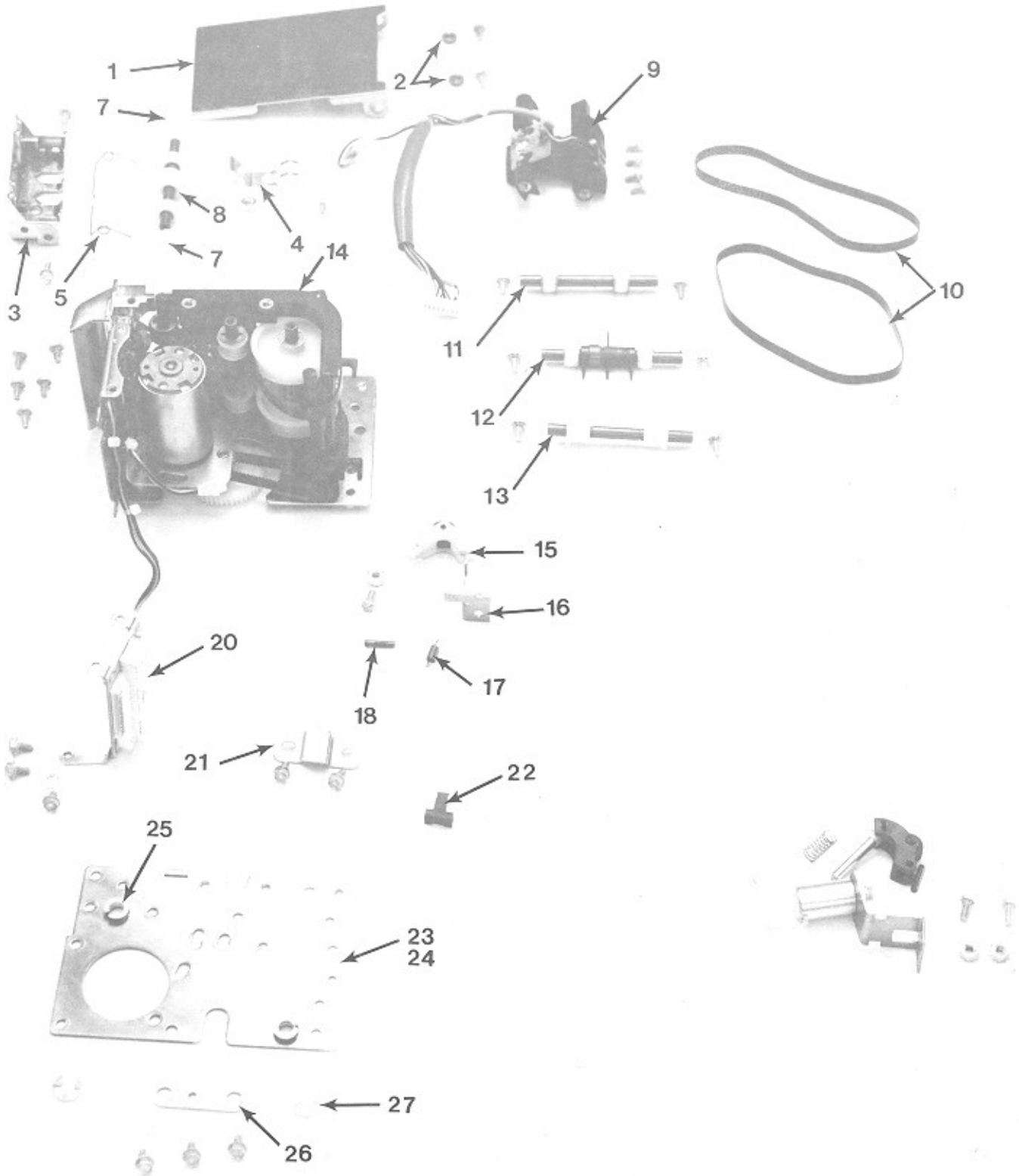
Figure 8-7. OBA–2 Bill Acceptor Assembly



Ref.	Part No.	Description	Qty
1	65056511	• OBA–2 Transport Assembly (1&5)BC-1	1
	30858005	• • Front Plate Support Assembly	1
	30857901	• • Adjustment Bracket	1
	30858402	• • Side Assembly Support	1
	21875001	• • Rear Spacer (OBA)	1
	70093402	• • Cable Clamp (13/16)	6
	30858801	• • Slide Bar Assembly	1
	21875201	• • Slide Spacer	2
	21828201	• • Roller Spacer	1
	61034801	• • Mounting Plate (BA)	1
	61035601	• • Mounting Panel (BA)	1
	30932001	• • Support Brace	1
2	20554502	• • Clip-Cable (Not Shown)	1
3	61033901	• • Bill Acceptor Trim	1
4	60971516	• Bill Stacker Assembly	1
5	61038901	• OBA–2 Control Unit	1
6	45070203	• Interconnect Harness Assembly	1

Figure 8-8. OBA–2 Transport Assembly

Sheet 1



Ref.	Part No.	Description	Qty
	65056511	• Standard OBA Transport Assembly	1
1	35083801	• Light Block	1
2	20922503	• Spacer	2
3	35082904	• Inlet and Stud Assembly	1
4	35082601	• Pressure Roller Spring	1
5	25213601	• Spring	1
6	25213501	• Long Sleeve Spacer	1
7	25213502	• Short Sleeve Spacer	1
8	35097801	• Pressure and Crowned Roller Shaft Assembly *(see figure 8-9, E)*	1
9	45059801	• Harness and Holder Assembly *(see figure 8-11)*	1
10	35110001	• Drive Belt	2
11	35097501	• Crowned Roller Shaft Assembly *(see figure 8-10, C)*	1
12	35097402	• Anti Cheat Lever Shaft Assembly *(see figure 8-10, B)*	1
13	35097601	• Creasing Roller Shaft Assembly *(see figure 8-10, D)*	1
14	35099403	• Track and Pressure Roller Assembly	1
15	35080603	• • Pressure Roller Assembly	1
16	25224601	• • Pressure Roller Spring Bracket	1
17	25225003	• • Tension Spring	1
18	25191701	• • Pivot Pin	1
19	45058404	• Motor Assembly (With Shield)	1
20	35080701	• Circuit Board and Bracket Assembly	1
21	35083701	• Wire Holding Bracket	1
22	21776009	• U-Type Speed Clip Fastener	1
23	35098001	• Side Plate Assembly (RH	1
24	45057801	• • Side Plate (RH	1
25	70146004	• • Nyliner Bearing	4
26	25194101	• • Take-up Shaft Bracket	2
27	70143004	• • External Retaining Ring	2

Figure 8-8. Transport Assembly

Sheet 2

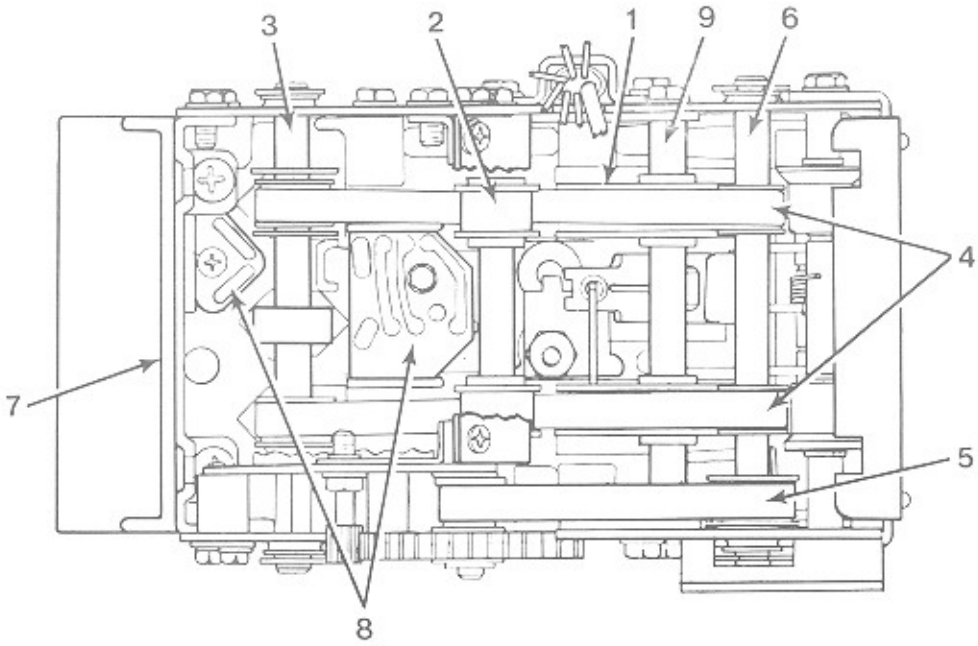


Figure 8-8. OBA-2 Transport Assembly,Sheet 2

Ref.	Part No.	Description	Qty
1	35080101	• Drum Pulley	2
2	35098101	• Take-up Roller Shaft Assembly *(see figure 8-9, F)*	2
3	35080501	• Lower Input Roller Assembly *(see figure 8-9, A)*	1
4	35082003	• Timing Belt (140 Tooth)	1
5	35082001	• Timing Belt (70 Tooth)	1
6	35080801	• Drive Shaft Assembly *(see figure 8-9, G)*	1
7	35090604	• Casting, Plate and Harness Assembly	1
	45064201	• • Front Plate	1
8	45058203	• • Harness Assembly - Lower *(see figure 8-10)*	1
9	35097701	• Ring Shaft Assembly	2
	35080001	• • Drum Pulley Shaft	1
	70143004	• • External Retaining Ring	2

Figure 8-8. Transport Assembly

Sheet 3

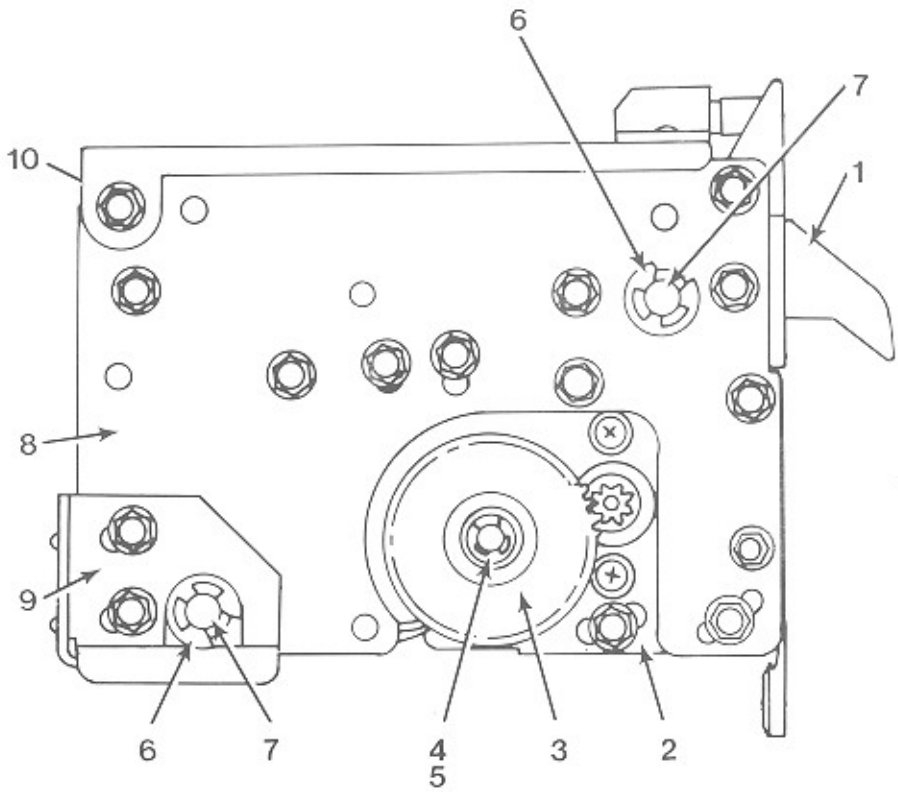


Figure 8--8. OBA-2 Transport Assembly, Sheet 3

Ref.	Part No.	Description	Qty
1	65056801	• Inlet Track Ref.	
2	35090701	• Bracket & Reduction Gear Assembly	1
	35090501	• • Bracket, Spacer And Pin Assembly	1
3	45058501	• • Reduction Gear	1
4	70120501	• • Washer	1
5	70143003	• • External Retaining Ring (3/16)	1
6	70143004	• External Retaining Ring	2
7	70146004	• Bearing (Nyliner)	2
8	35097901	• Side Plate Assembly - LH	1
	45057702	• • Side Plate - LH	1
	70146004	• • Nyliner Bearing	4
	25194101	• • Take-up Shaft Bracket	2
9	35112301	• Mag Head Holder Retainer (Not Shown)	2

Figure 8-9. OBA–2 Transport Roller and Shaft Assemblies

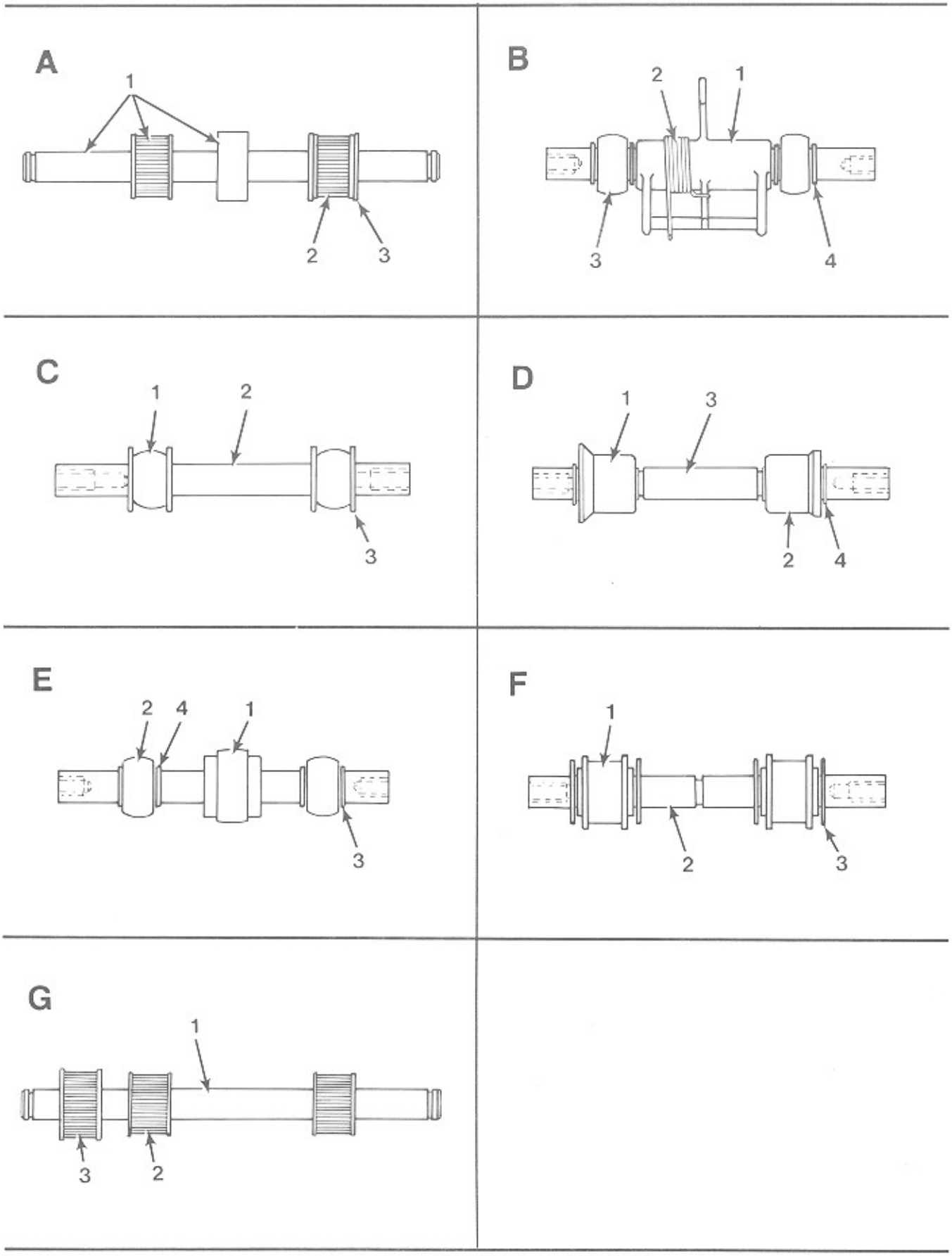


Figure 8-9 OBA—4 Transport Roller And Shaft Assemblies

Ref.	Part No.	Description	Qty
A	35080501	**Lower Input Roller Assembly**	
1	25227601	• Lower Input Shaft Assembly	1
2	26192901	• 22 Tooth Pulley	1
3	70143004	• External Retaining Ring	2
B	35097402	**Anti-Cheat Lever Shaft Assembly**	
1	35096402	• Anti-Cheat Lever	1
2	35081601	• Spring	1
3	25193301	• Crowned Roller	2
4	70143301	• External Retaining Ring	4
C	35097501	**Crowned Roller Shaft Assembly**	
1	25193301	• Crowned Roller	2
2	25193401	• Crowned Roller Shaft	1
3	70143004	• External Retaining Ring	4
D	35097601	**Creasing Roller Shaft Assembly**	
1	25193601	• Creasing Roller	1
2	25193602	• Small Creasing Roller	1
3	35080001	• Drum Pulley Shaft	1
4	70143301	• External Retaining Ring	2
E	35097801	**Pressure and Crowned Roller Shaft Assembly**	
1	25193901	• Pressure Roller (Upper)	1
2	25193301	• Crowned Roller	2
3	35082301	• Top Shaft	1
4	70143301	• External Retaining Ring	4
F	35098101	**Take-up Roller Shaft Assembly**	
1	35080301	• Take-up Roller	2
2	35080002	• Take-up Shaft	1
3	70143004	• External Retaining Ring	4
G	35080801	**Drive Shaft Assembly**	
1	25192801	• Drive Shaft	1
2	25192401	• 20 Tooth Pulley (Drive Belt)	2
3	25192901	• 22 Tooth Pulley	1

Figure 8-10. Lower Harness Assembly

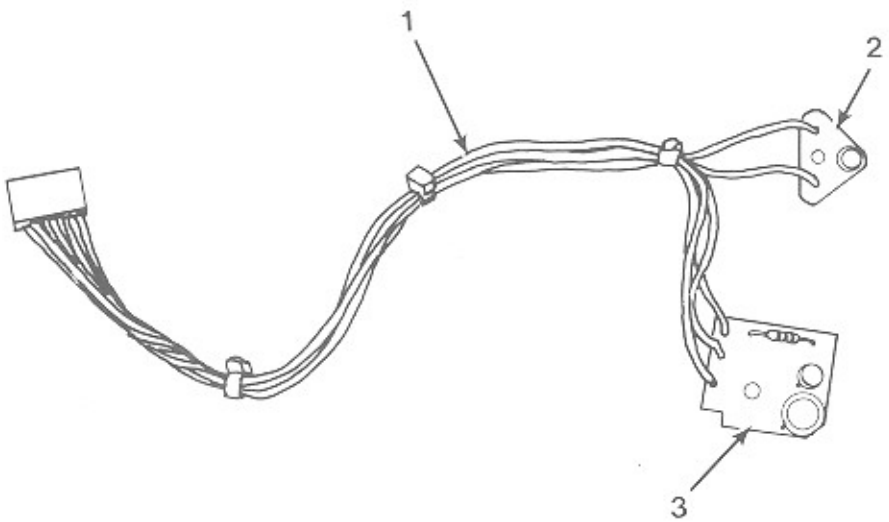


Figure 8-10. Lower Harness Assembly

Ref.	Part No.	Description	Qty
	45058202	Lower Harness Assembly *(see figure 8-8, sheet 2, item 8)*	
1	45060301	• Harness Assembly	1
2	21313002	• Terminal Board - V1 Emitter	1
	70035308	• • Light Emitting Diode	1
	45063301	• • Diode Spacer	1
3	35079903	• Reflective Sensor Assembly - V2	1
	21339701	• • Photovoltaic Cell	1
	79901820	• • Resistor - Carbon (1/4 W 5%) 150 Ohm	1
	70035308	• • Light Emitting Diode	1

Figure 8-11. Harness & Holder Assembly

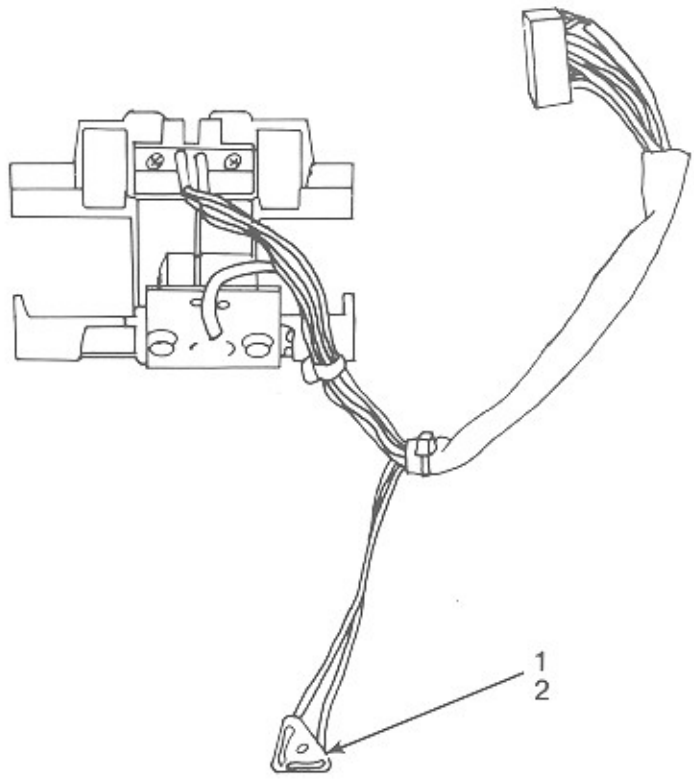


Figure 8-11. Harness & Holder Assembly

Ref.	Part No.	Description	Qty
	45059801	Harness And Holder Assembly *(see figure 8-8, sheet 1, item 9)*[1]	
1	21313002	• Light Sensor Assembly (V1)	1
2	70033204	• • Phototransistor	1

[1]The magnetic head must be factory aligned to holder and insert assembly. If a new head is needed, order the harness and holder assembly (Part Number 45059801).

Figure 8-12. 500 Bill Stacker Assembly

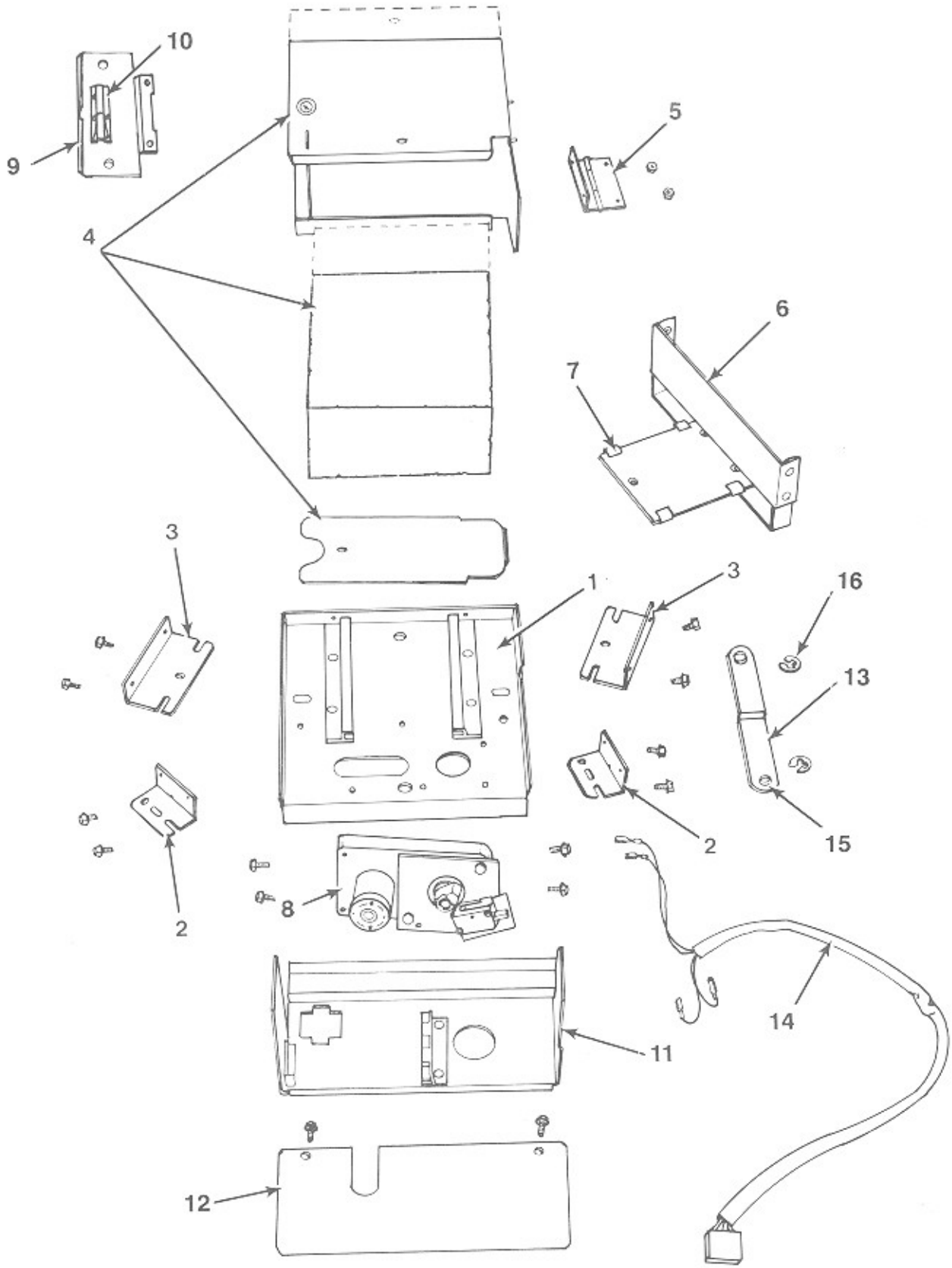


Figure 8-12. 500 Bill Stacker Assembly

Ref.	Part No.	Description	Qty
1	40712402	• Mounting Plate Assembly	1
	30783101	• • Side Chute	1
	30745002	• • Carriage Guide	2
2	21874603	• Bill Stacker Support	2
3	35084201	• Stacker Rear Support	2
4	40777008	• Cash Box Assembly (RH 500 Bill)	
	35039204	• • Pressure Plate	1
	21757901	• • Foam Block	1
	70162008	• • Cylinder Lock	1
	70166011	• • Lock Bolt	1
5	30783202	• Hinge - Cashbox	1
6	40712604	• Carriage Assembly	1
7	21757701	• Guide	4
8	35087801	• Motor & Switch Assembly	1
9	30785602	• Bill Box Cover	1
10	35084301	• Lock Bracket	1
11	40712702	• Rear Cover Assembly	1
	40711801	• • Rear Cover	1
	30783101	• • Side Chute	1
12	30859002	• Cover Plate	1
13	21792403	• Carriage Link	1
14	20922502	• Spacer	2
15	45062308	• DC Bill Stacker Harness Assembly	1
16	70146006	• Nyliner Bearing	2
17	70143004	• External Retaining Ring	2
18	70093104	• Cable Clamp (5/16)	1
	21572605	• Fall Stop Cable (not shown)	1

Figure 8-13. CD-100 Amplifier Compartment

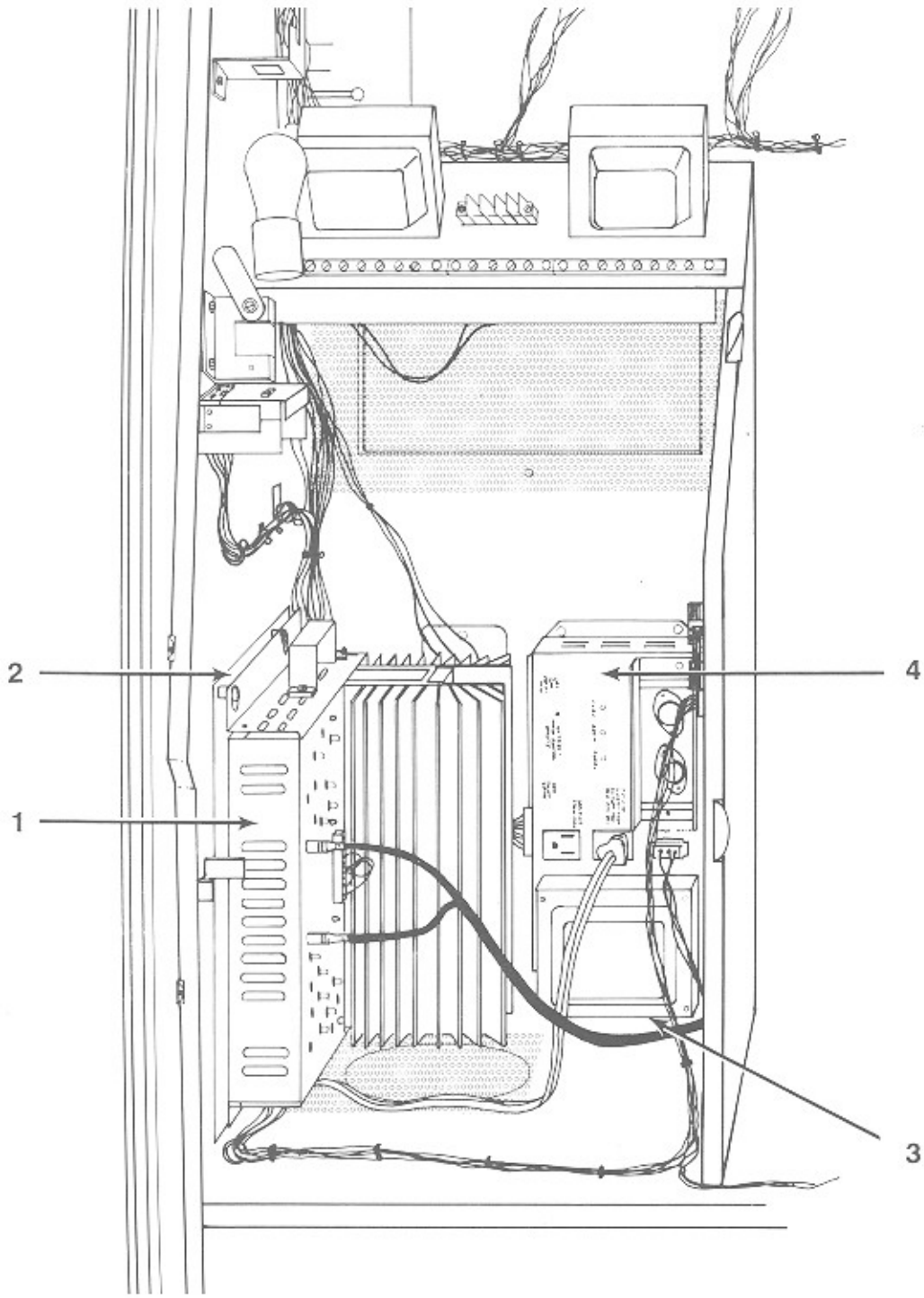
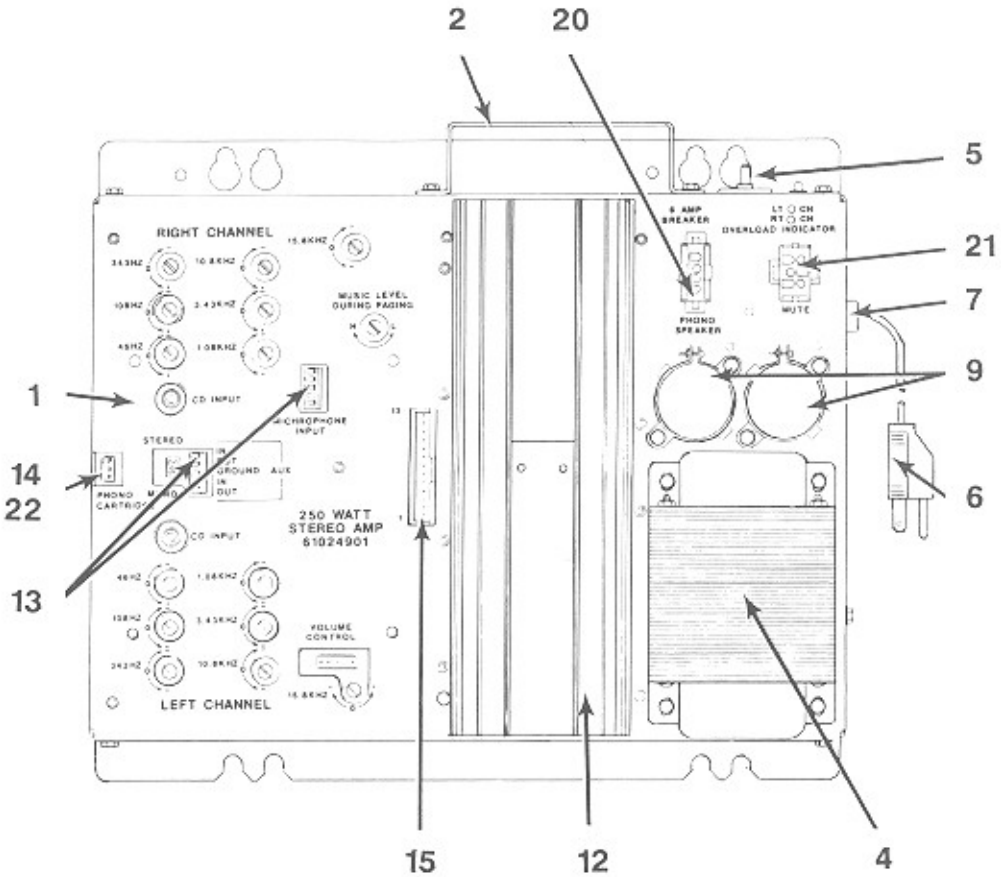
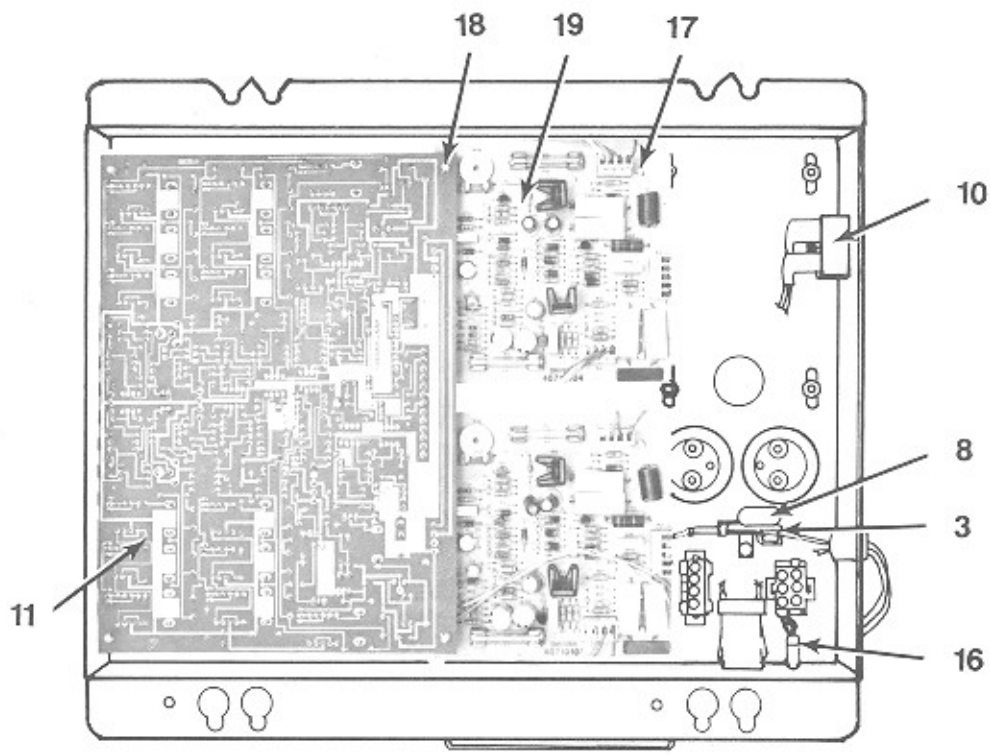


Figure 8-13 CD-100 Amplifier Compartment

Ref.	Part No.	Description	Qty
1	61024901	• 250 Watt Stereo Amplifier *(see figure 8-14)*	1
2	40242601	• Amplifier Mounting Bracket Assembly	1
3	20925601	• Main Power Supply Mounting Bracket	1
4	40770607	• Main Power Supply *(see figure 8-17)*	1

Figure 8-14. Stereo Amplifier Assembly





Ref.	Part No.	Description	Qty
	61024901	Stereo Amplifier Assembly *(see figure 8-13, item 1)*	
1	61024601	• Chassis Assembly	1
2	21488101	• Handle	1
3	21724102	• Terminal Strip	1
4	40737805	• Power Transformer	1
5	70078956	• Circuit Breaker	1
6	25218603	• 3 Conductor Cord and Plug	1
7	70232205	• Strain Relief	1
8	70021305	• Mylar Capacitor (.1 Mfd)	1
9	21823102	• Electrolytic Capacitor (10,000 Mfd)	2
10	21822501	• Bridge Rectifier	1
11	61023701	• Stereo Preamp. Assembly *(see schematic for parts list)*	1
12	40710303	• Heat Sink Assembly *(see figure 8-15)*	1
13	70075505	• Connector Housing (5 Circuit)	2
14	70075503	• Connector Housing (3 Circuit)	1
15	21620703	• Amplifier Jumper Plug Assembly	1
16	21893401	• Speaker Overload Indicator (Left Channel)	1
	21893402	• Speaker Overload Indicator (Right Channel)	1
17	70500006	• Circuit Board Support	8
18	70500018	• Circuit Board Support	5
19	40710104	• Driver Circuit Board Assembly *(see power amplifier schematic for components list)*	2
20	30749003	• Cap Housing	1
21	30749004	• Cap Housing	1
	70097502	• • Contacts	8
22	21620704	• Shorting Plug	1

Figure 8-15. Heat Sink Assembly

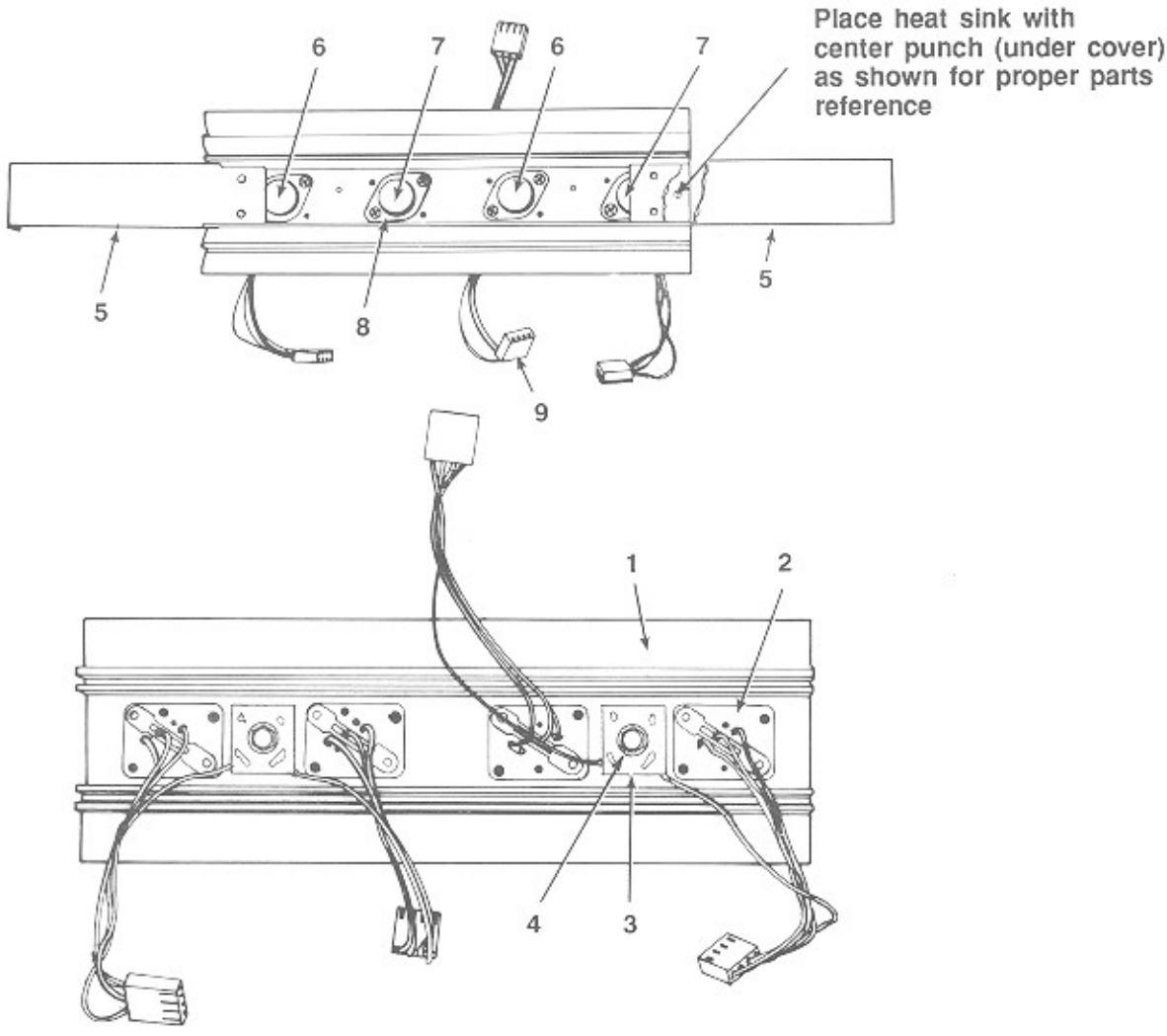


Figure 8-15. Heat Sink Assembly

Ref.	Part No.	Description	Qty
	61024901	Heat Sink Assembly *(see figure 8-14, item 12)*	
1	40710303	• Heat Sink	1
2	21547301	• Power Transistor Socket	4
3	40837401	• Circuit Board Assembly	2
4	21840201	• Compression Spring	2
	80443020	• #8-32 X 1/4 WRHMS (SF)	2
5	21798001	• Cover	2
6	70030206	• Transistor (Darlington Amp, RCA-2N6284) (NPN, Q101, 2 places)	2
7	70030207	• Transistor (Darlington Amp, RCA-2N6287) (PNP, Q102, 2 places)	2
8	21318902	• Precoated-Insulator	4
9	70075504	• Connector Housing	4
	21620702	• Amplifier Jumper Plug Assembly	1
	21620711	• Amplifier Jumper Plug Assembly	1

Figure 8-16. Output Transformer Assembly

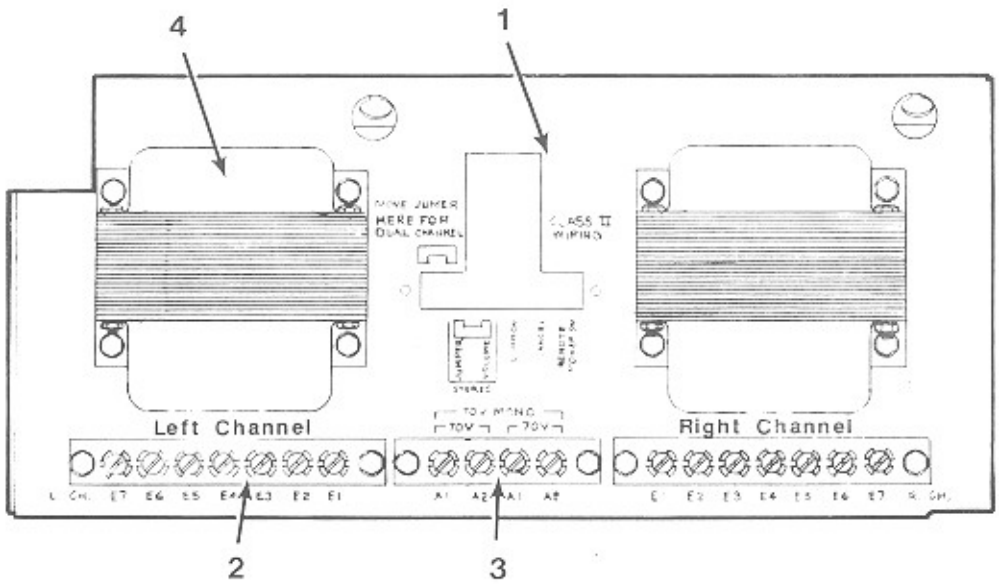
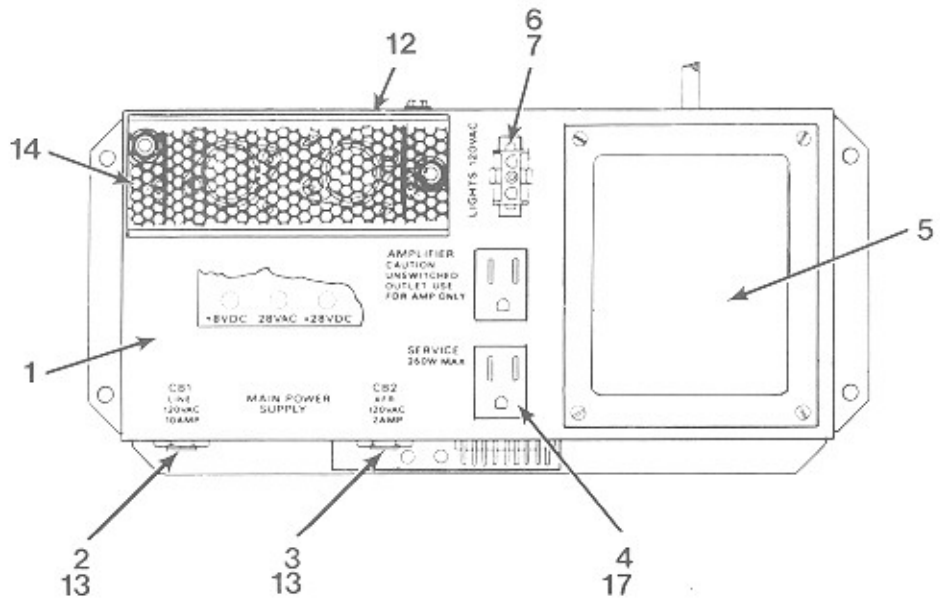


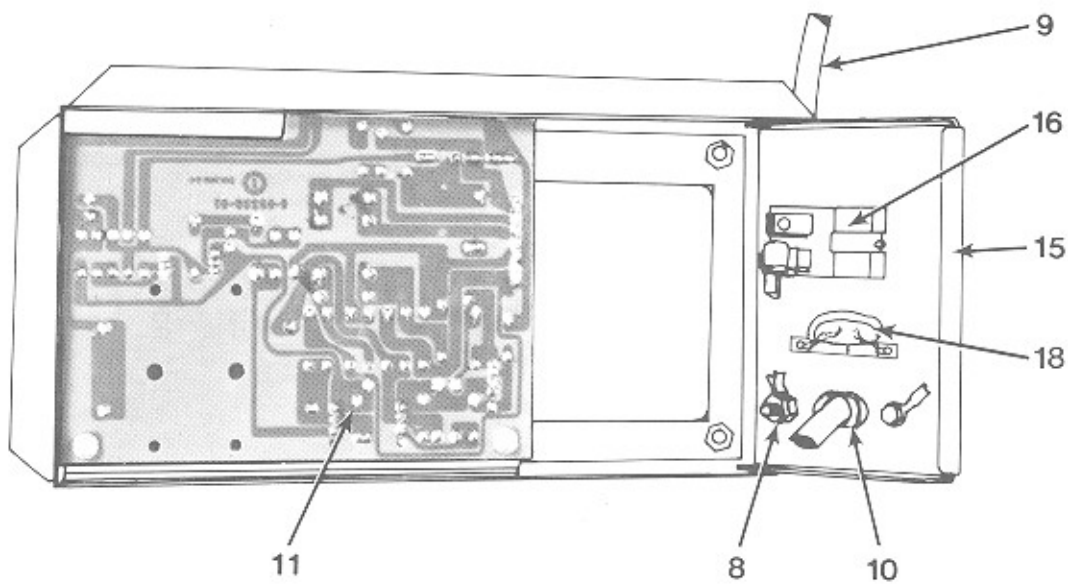
Figure 8-16. Output Transformer Assembly

Ref.	Part No.	Description	Qty
	40832101	Output Transformer Assembly (see figure 8-5, item 11) *(See also figure 5-10, the Wiring Diagram)*	
1	40832001	• Chassis With Lettering	1
2	30426707	• Terminal Strip	2
3	30426706	• Terminal Strip	1
4	40633502	• Output Transformer	2

Figure 8-17. Main Power Supply

(120 Volt, 60 Hz Model)





Ref.	Part No.	Description	Qty
	40770607	Main Power Supply (120 V) *(see figure 8-13, item 4)*	
	46509212	Main Power Supply (220 V)	
	46509213	Main Power Supply (240 V)	
1	40771904	• Chassis Assembly	1
2	70073613	• 10 Amp Circuit Breaker	1
3	70073605	• 2 Amp Circuit Breaker	1
4	21375901	• 3 Wire Convenience Outlet	2
5	40772001	• Transformer and Harness Assembly (120 V)	1
	46509302	• • Transformer Harness Assembly (220/240 V)	REF
	70075601	• • Post Contact	6
	70075601	• • Post Contact (220/240 V)	5
	70097504	• • Contact	1
	70091308	• • Terminal Lug	1
	70091308	• • Terminal Lug (220/240 V)	4
6	30749002	• Cap Housing	1
	70097504	• • Contact (220/240 V)	3
7	70097504	• Contact (120 V)	2
	70091308	• • Terminal Lug (120 V)	2
	70091308	• • Terminal Lug (220/240 V)	4
8	70091511	• Ring Terminal	2
9	30834506	• Power Cord Assembly (120 V)	1
	36536501	• Power Cord Assembly (220 V/240 V)	1
10	70232104	• Strain Relief	1
11	60935703	• Circuit Board Assembly	1
12	40733102	• Heat Sink and Power Transistor Assembly	1
	30834301	• • Power Supply Heat Sink	1
	70030807	• • Transistor (Darlington) (2N6055) (Motorola, RCA)	2
	21318901	• • Insulator	2
	21834201	• • Power Transistor Socket	2
	70075504	• • Connector Housing	2
	70075601	• • Post Contact	6
	70075702	• • Keying Post	2
13	21408602	• Straight Receptacle (120 V)	4
	21408602	• Straight Receptacle (220/240 V)	8
	70073608	• Breaker 220/240 V (5A) (Not Shown)	2
	70073610	• Breaker 220/240 V (7A) (Not Shown)	1
14	21828101	• Heat Sink Cover	1
15	30867301	• Switch Panel	1
16	30785701	• Rocker Switch (120 V)	1
	30785702	• Rocker Switch (220/240 V)	1
17	70096701	• Insulated Faston (120 V)	4
	70096701	• Insulated (220/240 V)	3
	70099201	• Self Stripping Terminal	5
	70099101	• Self Stripping Terminal	1
	70075508	• Connector Housing	1
	70075702	• Keying Plug	1
	70075601	• Post Contact (120 V)	1
	70075601	• Post Contact (220/240 V)	2
18	21943801	• MOV Assembly (120 V)	1
	21943701	• MOV Assembly (220/240 V)	1

Figure 8-18. Central Control Computer

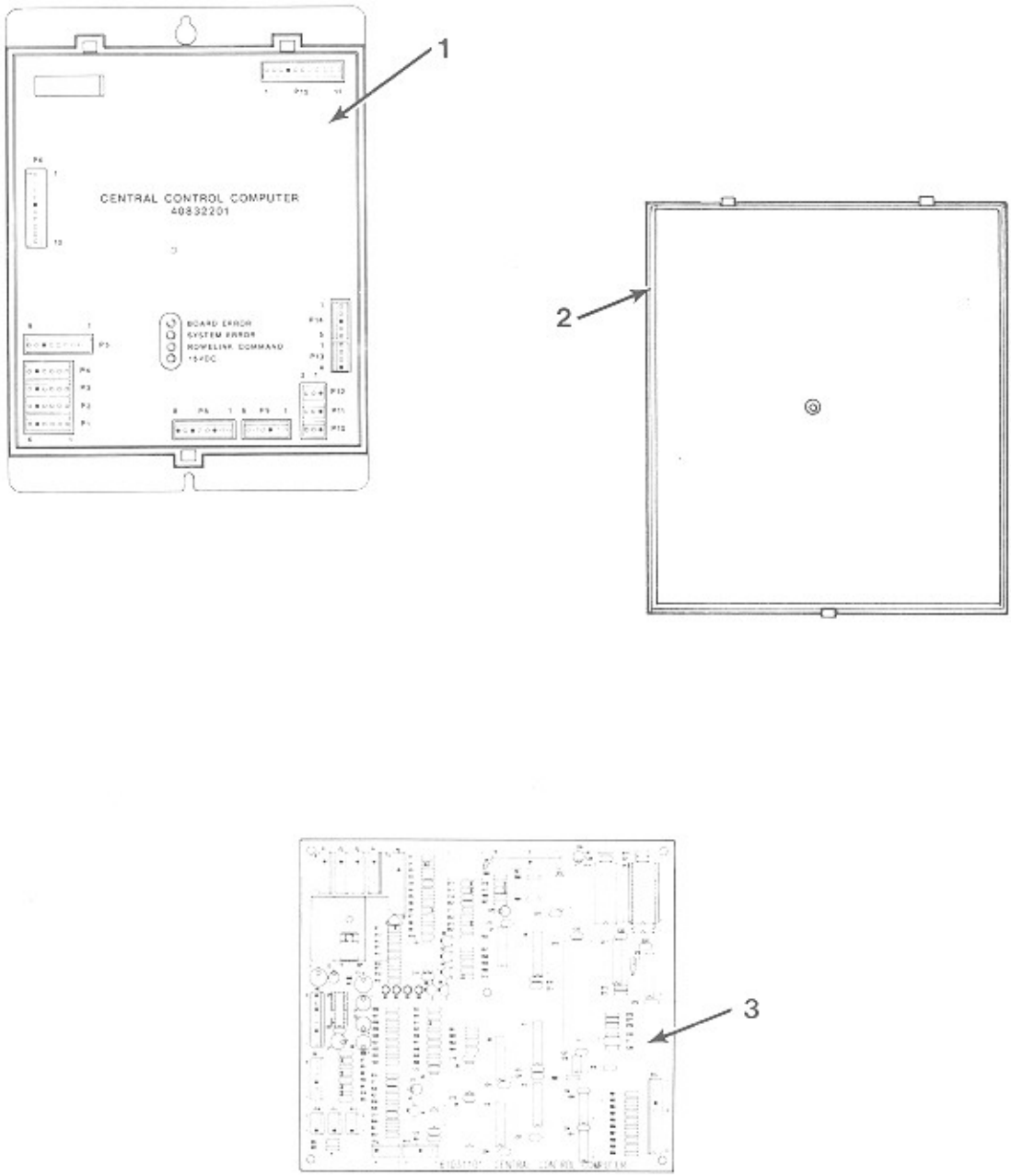
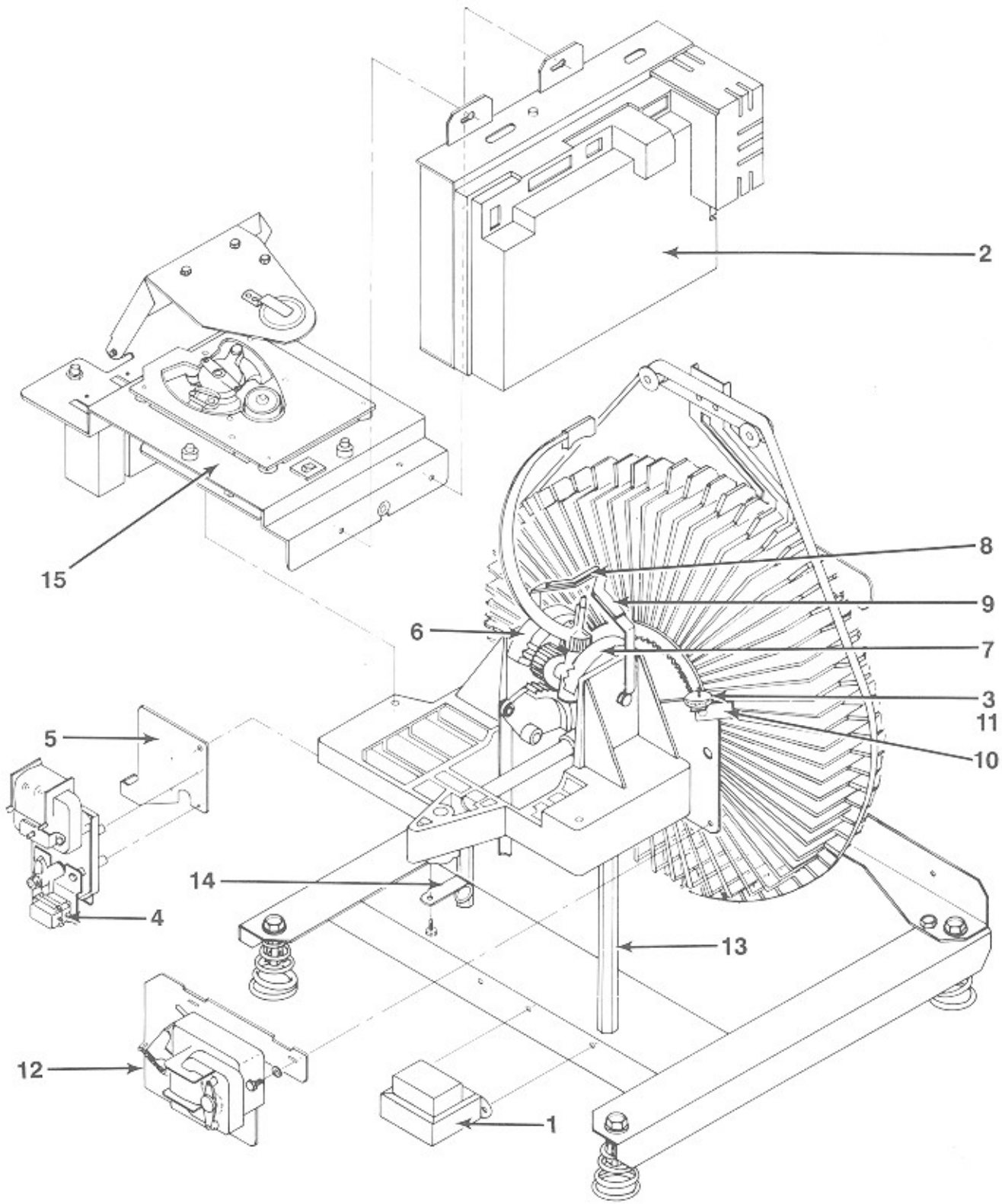


Figure 8-18. Central Control Computer Assembly

Ref.	Part No.	Description	Qty
	40832201	Central Control Computer Assembly (see figure 8-5, item 16)	
1	61031201	• Central Control Computer Cover	1
2	61031301	• Central Control Computer Base	1
3	61031101	• Central Computer Circuit Board Assembly *(see figure 5-12 for the schematic and components list)*	1

Figure 8-19. Mechanism Assembly

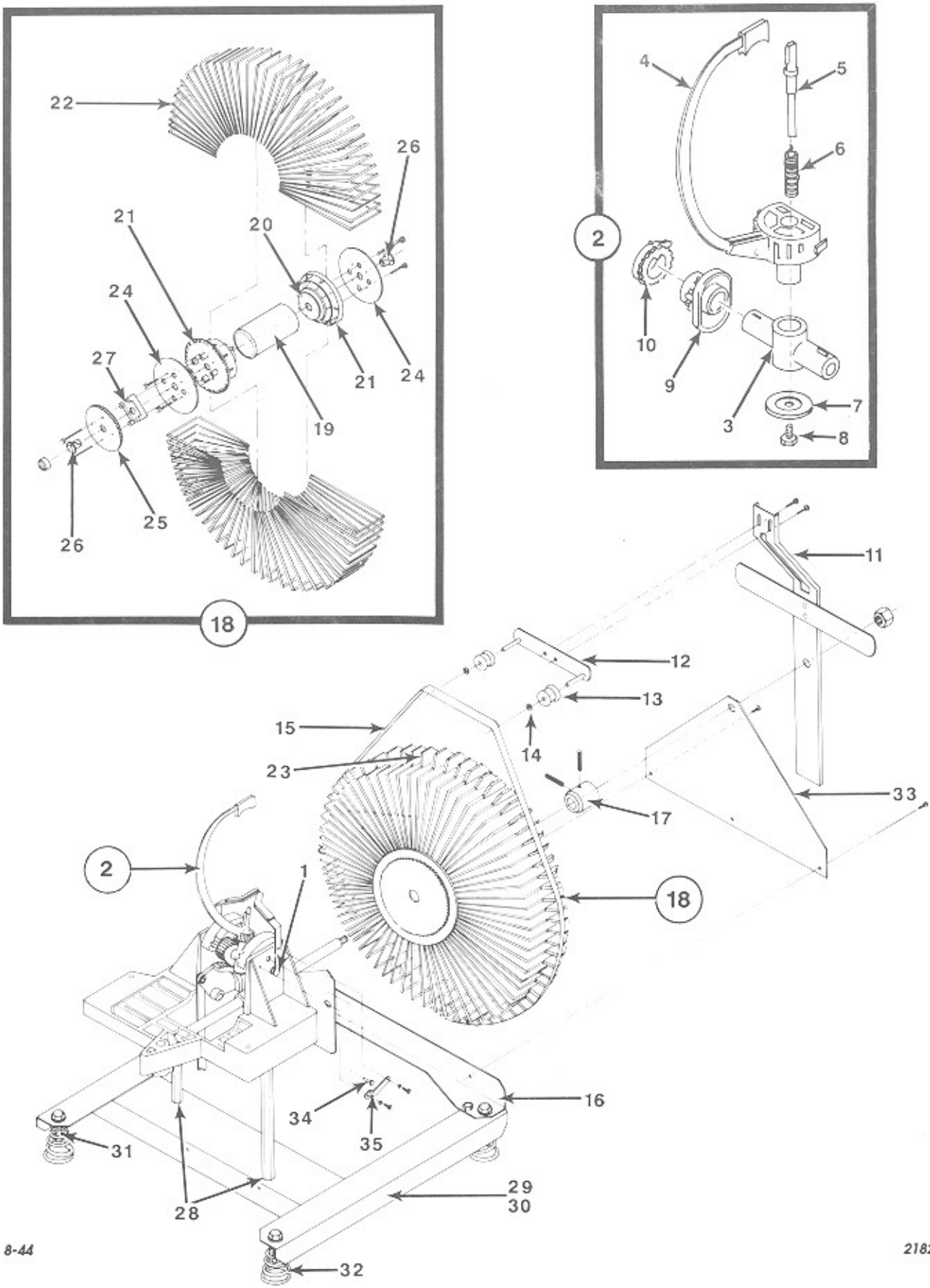
Sheet 1



Ref.	Part No.	Description	Qty
	61033001	Mechanism Assembly *(see figure 8-5, item 1)* (60 Hz)	
1	40830401	• CD Player Transformer	1
2	61030701	• Mechanism Control & Decoder Assembly *(see figure 8-19, sheet 3)*	1
3	30906801	• Optical Switch Assembly	1
	30794501	• • Mounting Bracket	1
	30905901	• • Optical Switch and Connector Assembly	1
	40803701	• • Optical Switch	1
	70075565	• • Connector Housing (Red)	1
	70075702	• • Keying Plug	1
	70075601	• • Contact Post	4
	70800101	• • Cable Tie	2
4	40720801	• Cam Switch & Motor Assembly *(see figure 8-21)*	1
5	30790701	• Motor Mounting Plate	1
6	30790501	• Rotator Assembly (LH)	1
7	30790601	• Rotator Assembly (RH)	1
8	21811801	• Record Guide Assembly (LH)	1
9	21811901	• Record Guide Assembly (RH)	1
10	21818601	• Adjusting Bracket Assembly	1
11	21818401	• Adjusting Knob	1
12	40721901	• Sprag Assmbly *(see figure 8-21)*	1
13	21812502	• Mech Support	2
14	70093401	• Cable Clamp (17/32)	1
15		• Base and CD Player *(see figure 8-19, sheet 5)*	1

Figure 8-19. Mechanism Assembly

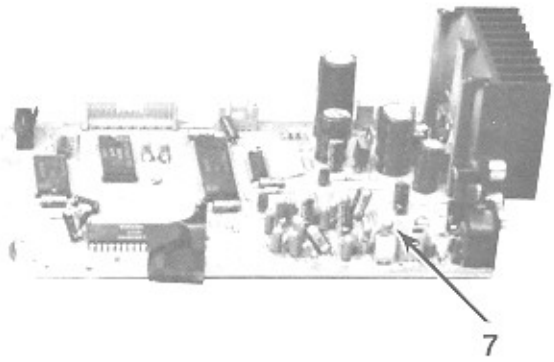
Sheet 2

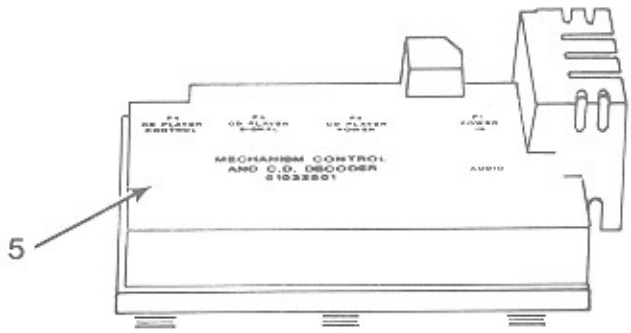


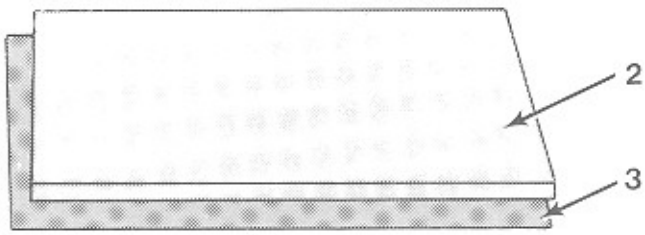
Ref.	Part No.	Description	Qty
1	21079202	• Trunnion Pin	2
2	40720702	• • Gripper Bow and Trunnion Assembly	1
3	30791001	• • Trunnion	1
4	30519703	• • Gripper Bow and Hub Assembly	1
5	21080804	• • Inner Shoe Assembly	1
6	21081101	• • Compression Spring	1
7	21811501	• • Cam Follower	1
8	21811701	• • Lock Screw	1
9	40720401	• • Cam Gear	1
10	40720601	• • Trunnion Gear	1
11	40721302	• Gripper Bow Guide Assembly	1
12	21089401	• • Roller Bracket Assembly	1
13	20384301	• • Belt Roller	2
14	70143003	• • Retaining Ring	2
15	21813802	• • Belt	1
16	30792501	• • Support Frame Rear Angle	1
17	21812601	• • Collar	1
18	60870303	• Magazine Assembly	1
19	40720002	• • Hub Spacer	1
20	30790201	• • Hub Anchor Plate	2
21	60870201	• • Magazine Hub	2
22	40720102	• • Record Magazine Separator	100
23	40720202	• • Belt Guide	100
24	30790301	• • Cover Plate	2
25	30790401	• • Magazine Gear	1
26	70146001	• • Nyliner Bearing	2
27	30930801	• • Gear Spacer	2
28	21101301	• Lock Nut	1
29	30791402	• Mechanism Support and Spring Assembly	1
30	30791502	• • Mech Support Assembly	1
31	20627202	• • Spring Support (Upper)	4
32	20612803	• • Mech Mounting Spring	4
33	40723202	• Magazine Support	1
34	21940301	• Rotator Pin	1
35	21940401	• Pin Bracket	1

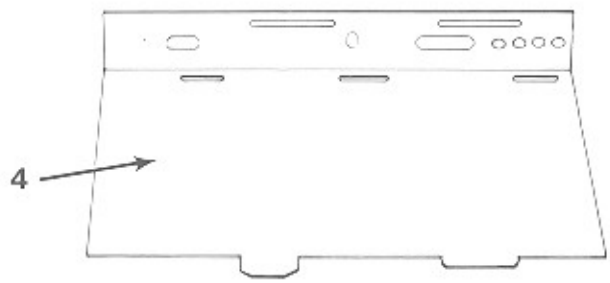
Figure 8-19. Mechanism Assembly

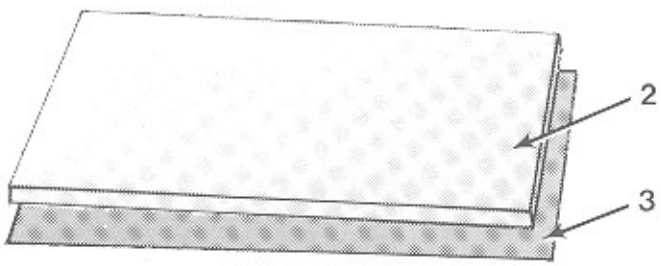
Sheet 3











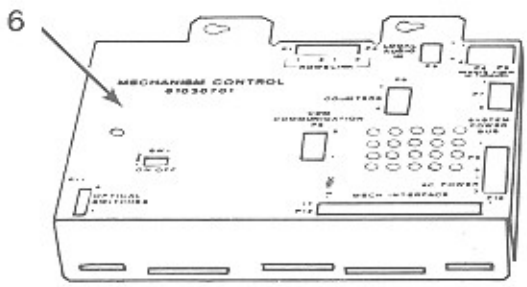


Figure 8-19. Mechanism Assembly, Sheet 3

Ref.	Part No.	Description	Qty
	61030701	Mechanism Control and Decoder Assembly *(see figure 8-19, sheet 1)*	1
1	61030601	• Mechanism Control Circuit Board Assembly *(see schematic for parts list)*	1
2	21771016	• Insulating Pad	2
3	21771113	• Insulating Base	2
4	40830201	• Decoder Base	1
5	61032701	• Decoder Cover	1
6	40830301	• Mechanism Control Cover	1
7	61032601	• Decoder Circuit Board Assembly *(no parts list or schematic available)*	1

Figure 8-19. Mechanism Assembly

Sheet 4

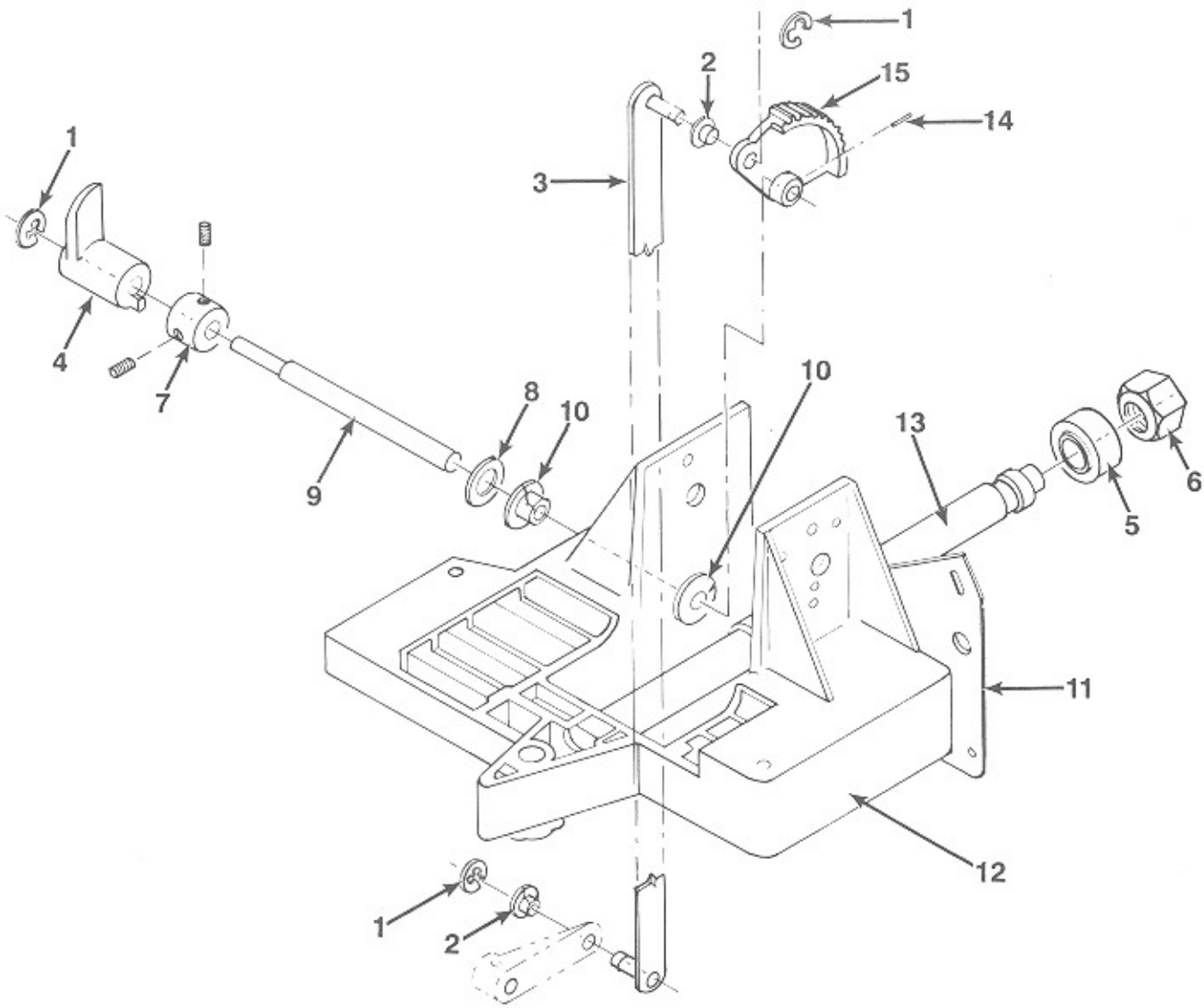


Figure 8-19. Mechanism Assembly, Sheet 4

Ref.	Part No.	Description	Qty
1	70143004	• Retaining Ring	3
2	70146004	• Bearing	2
3	21810201	• Transfer Link Assembly	1
4	30930001	• Hold Down Cam	1
5	25156906	• Shoulder Washer	1
6	70130109	• 9/16 x 18 Jam Nut	1
7	21813302	• Cam Collar	1
8	70122533	• Bowed Washer	1
9	21813201	• Cam Drive Shaft	1
10	70146005	• Bearing	2
11	40721801	• Intermediate Mounting Plate	1
12	60870702	• • Mechanism Base	1
13	30791302	• • Magazine Support Shaft	1
14	70113019	• Roll Pin	1
15	40720501	• Sector Gear	1

Figure 8-19. Mechanism Assembly

Sheet 5

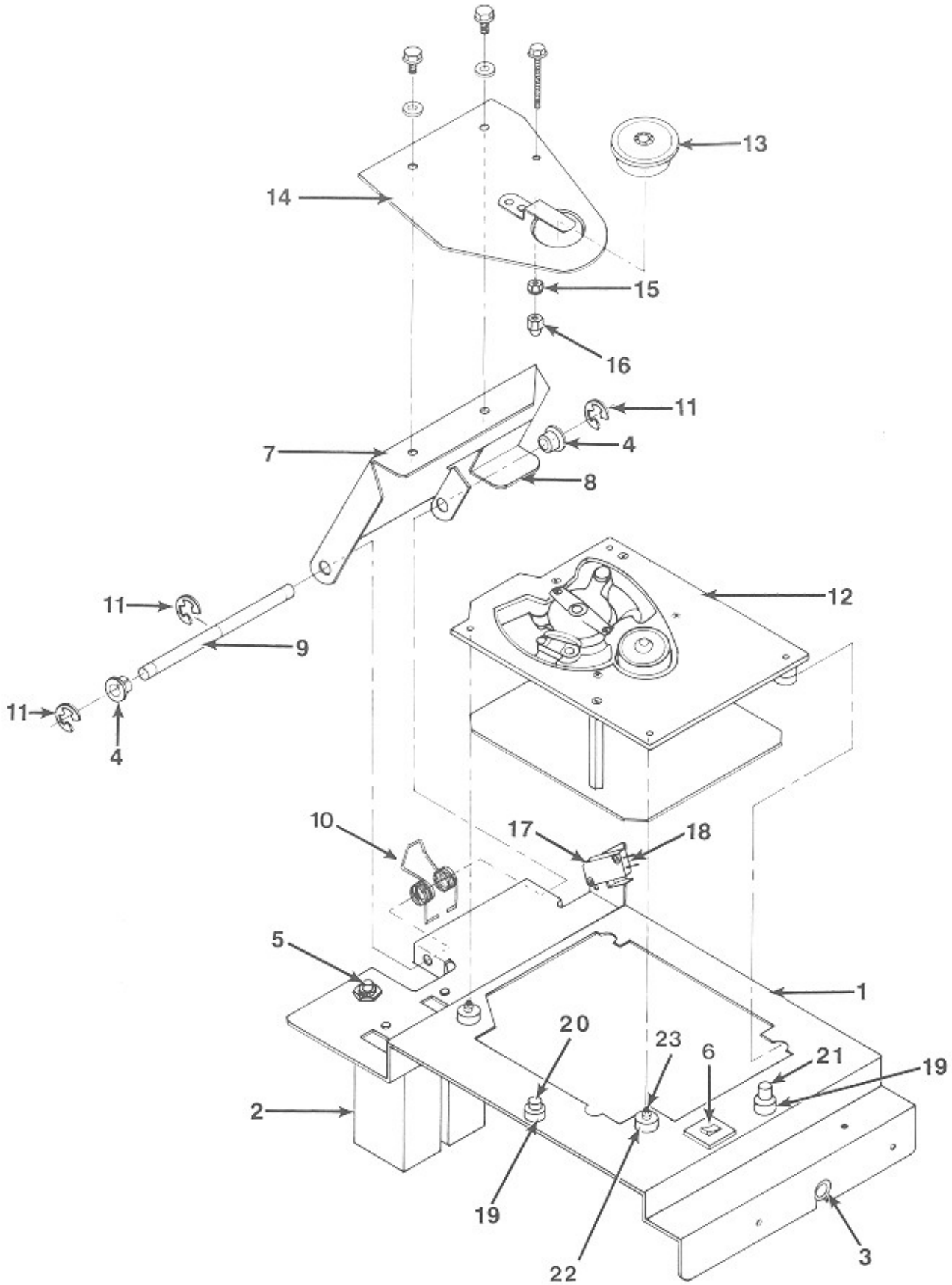


Figure 8-19. Mechanism Assembly, Sheet 5

Ref.	Part No.	Description	Qty
1	61032901	• Mounting Plate	1
2	30933301	• Counter & Plug Assembly	1
	21813701	• • Counter Assembly	1
	21538302	• • • Counter	1
	21441802	• • • Electric Counter	1
	70075505	• • • Connector Housing (5 Pin)	1
	70075601	• • • Post Contact	4
	70075701	• • • Keying Plug	1
3	70233202	• Snap Bushing (Split)	1
4	70146008	• Nyliner Bearing	2
5	21581801	• Pushbutton Switch (Momentary)	1
6	70073604	• Circuit Breaker (1 Amp)	1
7	40830101	• Hold Down Bracket	1
8	21942101	• Cam Bracket	1
9	21534709	• Pivot Pin	1
10	30941001	• Hold Down Spring	1
11	70143004	• External Retaining Ring	3
12	30933701	• Player - CDM-3	1
13	21943201	• Hub	1
14	30930201	• Hold Down Assembly	1
	30930301	• • Hold Down Plate	1
	21940001	• • Hold Down Spring	1
15	21814001	• Hex Lock Nut (#4-40)	1
16	21357808	• Elastic Stop Nut	1
17	21073101	• Switch	1
18	21083001	• Twin Nut	1
19	21813901	• Grommet	2
20	21941401	• Rest Rivet	1
21	21941202	• Rest Rivet	1
22	21940101	• Grommet	4
23	21940201	• Spacer	4

Figure 8-20. Sprag Assembly

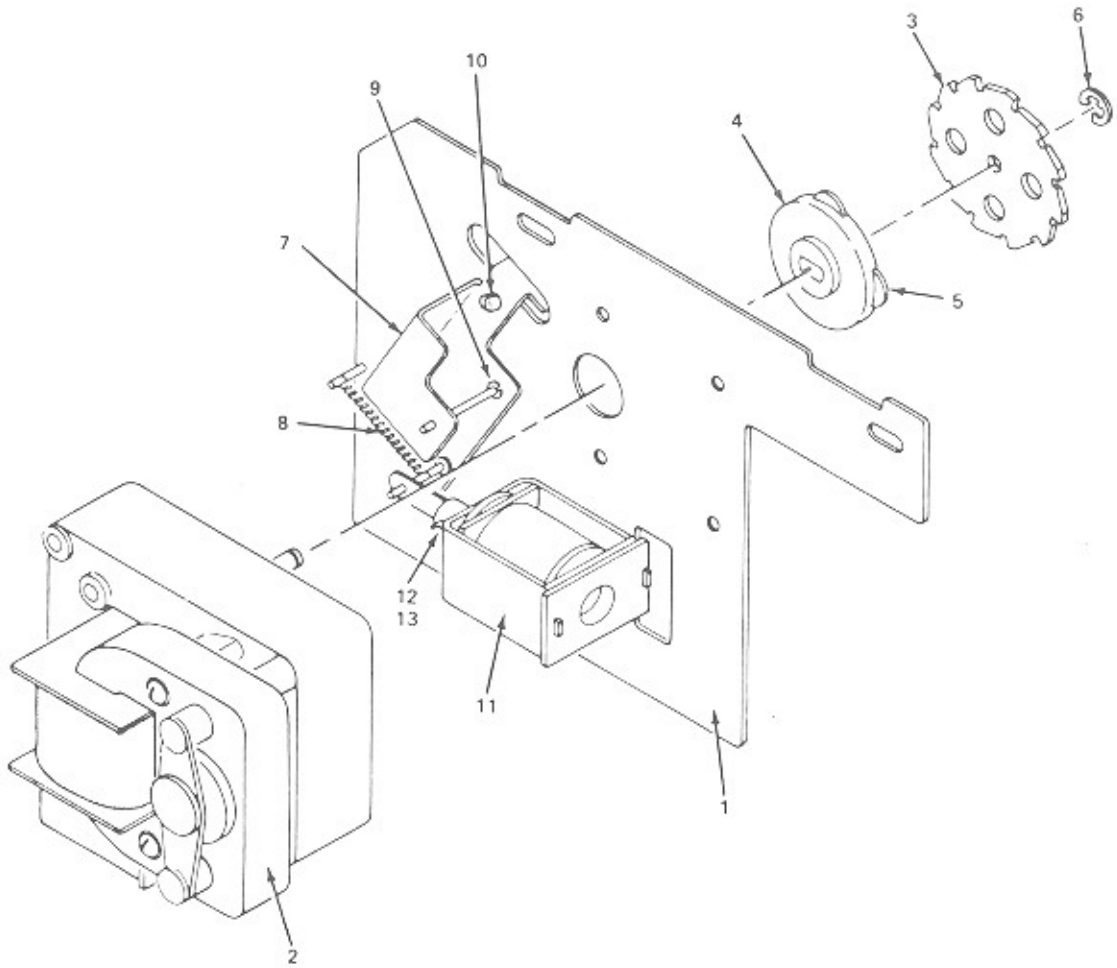


Figure 8-20. Sprag Assembly

Ref.	Part No.	Description	Qty
	40721901	Sprag Assembly (see figure 8-19, sheet 2, item 12)	
1	30793901	• Sprag Plate Assembly	1
2	40722701	• Magazine Motor	1
3	40722301	• Sprag Wheel	1
4	30793301	• Sprag Wheel Hub	1
5	21816103	• Stem Bushing	4
6	70143003	• Retaining Ring	1
7	21816001	• Sprag Lever Assembly	1
8	21256201	• Tension Spring	1
9	70143005	• Retaining Ring	1
10	25155901	• Split Stem Bumper	2
11	21150510	• Solenoid Assembly	1
12	21085701	• Plunger Assembly	1
13	21084902	• Plunger Stop	1

Figure 8-21. Cam Switch and Motor Assembly

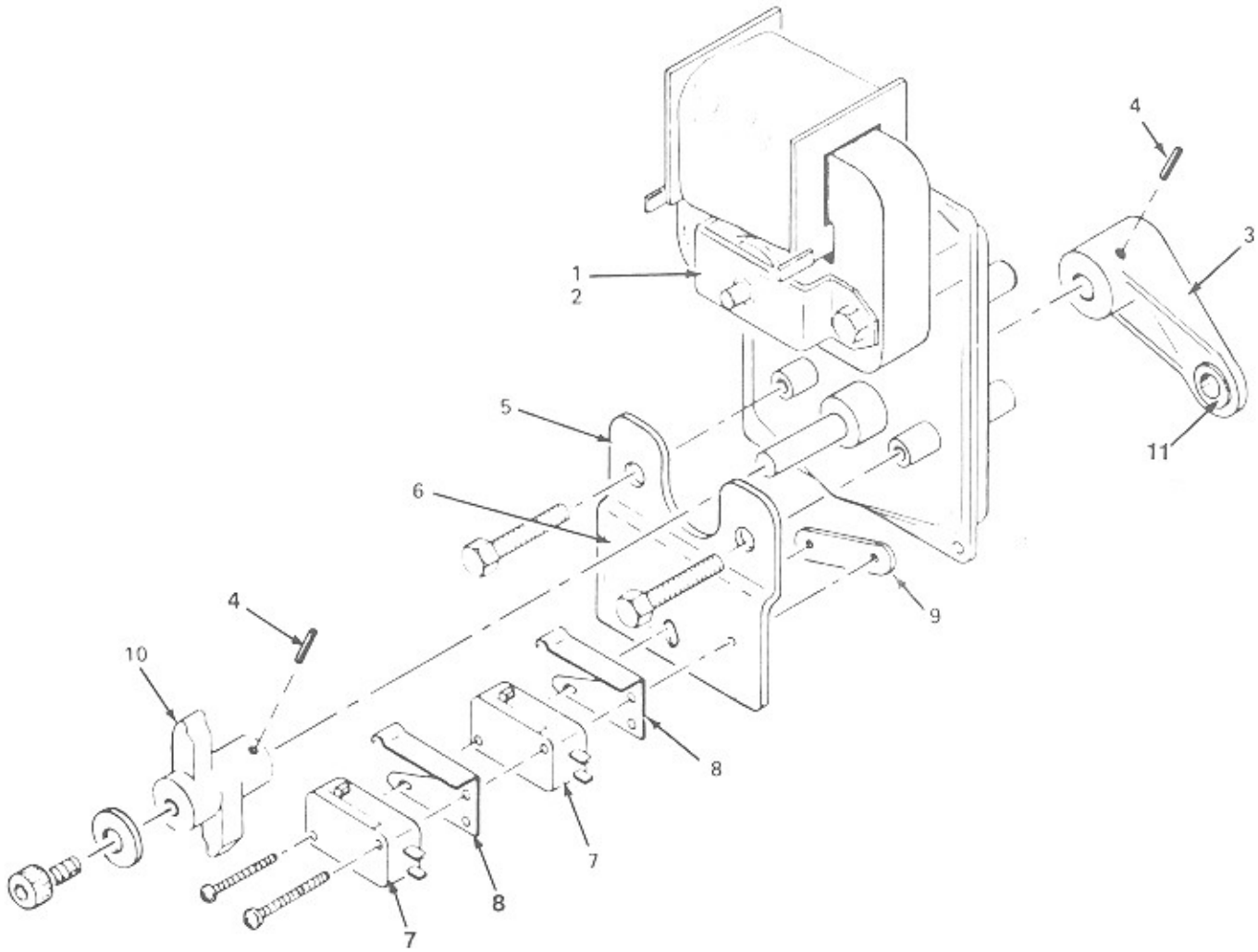


Figure 8-21. Cam Switch and Motor Assembly

Ref.	Part No.	Description	Qty
	40720801	Cam Switch and Motor Assembly (see figure 8-19, sheet 1, item 4)	
1	30790801	• Motor and Crank Assembly	1
2	40720901	• Cam Motor	1
3	21810401	• Trunnion Crank	1
4	70113116	• Roll Pin	2
5	30790901	• Switch Plate	1
6	21816901	• Cam Switch Label	1
7	21073101	• Switch	2
8	21082901	• Switch Actuator	2
9	21083001	• Twin Nut	1
10	30793401	• Switch Cam	1
11	70146004	• Bearing	1

Table 8-1. Accessory Equipment

Part No.	Description	Function
26704401	Phono paging system With tabletop microphone	Paging system not affected by A.V.C. All plug-in unit, complete with microphone and 50 foot microphone cable.
26704402	Phonograph Paging System With handheld microphone	Paging system not affected by A.V.C. All plug-in unit, complete with microphone and 50 foot microphone cable.
26694703	Amplifier Accessory Kit **(Note: This kit will work with all 607925XX and 610237XX preamplifiers)**	Provides access to auxiliary inputs and outputs of the preamplifier. Inputs will accept signals from most background music sources, such as tape players and AM/FM radios. Outputs are available to drive slave amplifiers before or after volume control.
21639701	Background Music Kit (Available March 1988)	Allows the phonograph to play Autoplay and customer selected music at different levels. Music can be played at different volumes in two different rooms or music can be switched to different rooms during either Autoplay or customer selections.
30632201	Remote volume and cancel control	The remote stereo volume control includes a cancel button. This kit does not include cable. A 3-conductor cable is required.
60898004	Remote volume power switch and cancel control	In addition to volume and cancel functions, the phonograph can be turned OFF and ON from a remote position. The record currently playing is automatically canceled when the phonograph is turned OFF. The amplifier remains ON so that paging is possible. For domestic 120 volt phonographs only. Cable is not included. A four conductor cable is required.
30632209	Dual remote volume control	Controls volume of each channel separately. Does not include cable. A 4-conductor cable is required.
20819907	Remote volume and cancel control cable	This 3-conductor 50 foot cable connects a remote volume control to a phonograph.
20819908	Remote volume and cancel control cable	This 4-conductor 50 foot cable connects a remote volume control to a phonograph.

Table 8-1. Accessory Equipment
Continued

Part No.	Description	Function
66505901	Service Kit	Includes central computer, digital display, power supply board, optical switch, power supply heat sink, blank titles, micro switches, peanut lamps, and fuses.
66505902	Service Kit	This kit includes: Mechanism controller and decoder assembly, CD player with mounting accessories.
26711401	Amplifier Adapter Harness	Allows a 130 watt amplifier to be connected to a CD-100 as a replacement amplifier (the total amplifier output will be limited to 130 watts in this configuration).
21633101	Extension Speaker	50 Watt RMS, three way speaker system incorporates 10" woofer, 5" mid-range and 3" tweeter, 4 or 8 ohms. Speaker dimensions: 24 x 15"W x 10"D (Mounting bracket not included).
26699503	Security Bar Kit	Heavy steel bar locks in place over cash box door. A padlock is required (not supplied by Rowe).
26711201	Pewter Touch-Up Paint	