# BASEBALL

## Operation, Maintenance and Service Manual
Complete with Illustrated Parts Catalog

# BASEBALL™

## Operation, Maintenance and Service Manual

Complete with Illustrated Parts Catalog

ATARI®

A Warner Communications Company

# table of contents

# table of contents

## 4 details of electronic operation

## 5 illustrated parts catalog

# list of illustrations

# list of illustrations

# list of tables

# location setup

## a. introduction

Baseball™ is a new one- or two-player video game designed by Atari. The game rules, catching, pitching and batting are realistically displayed on the screen, accompanied by sounds of crowd cheers, noise, the crack of the bat, and a ball sound.

Player controls are mounted at either end of the game. The player controls consist of two multi-function LED pushbutton switches and Trak Ball™ controls. (The switches' functions are described in the graphics on the control panel.) The Trak Ball rolls smoothly with a shove from the palm of your hand: this moves either the batter or outfielders on the screen.

Baseball™

1
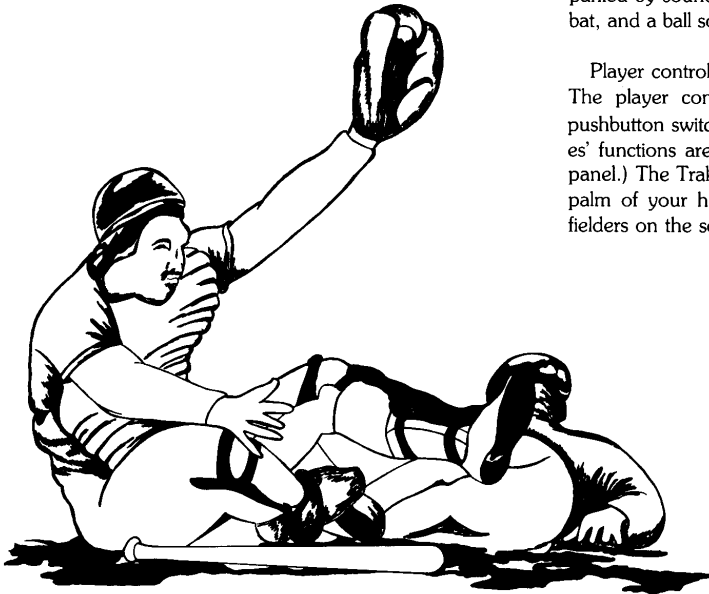
# b. game inspection

Your new Baseball game is manufactured ready to play immediately after removal from the shipping carton. Your cooperation is desired in order to supply the final touch of quality control to your game. Therefore, please follow the procedures below to ensure that your game is in good condition:

1. Examine all external parts of the game cabinet for dents, chips, or broken parts.

2. After determining that the game has been received in good condition, unlock and open the access panel. Carefully inspect the interior and verify the following:
   * All plug-in connectors are firmly seated.
   * All integrated circuit packages (chips, ICs) in sockets on the game printed circuit board are firmly seated.
   * No harness wires are disconnected.
   * No loose foreign objects are present, especially metal objects that could cause electrical problems.

Be sure that all major assemblies are checked. Check the game printed circuit board (PCB), the speakers, player controls and the TV monitor for secure mounting.

Note the location of the game's serial number—it is on a metallic label attached to the left side of the game cabinet (as you face the coin door). A serial number (not necessarily the same one) also appears in the corner of the PCB that's common to both edge connectors, inside the game cabinet. See the illustration on the inside front cover of this manual.

*Please mention this number(s) whenever calling your distributor for service.*

# c. voltage selection

Use one of the following four plugs to set the proper voltage for your game. If you have any problems with your game as described in either paragraph below, then change the voltage plug as required.

| Line Voltage Range | Voltage Selection Plug Color |
|---|---|
| 86-104 VAC | Black |
| 100-125 VAC | Orange (installed at factory) |
| 190-220 VAC | Green |
| 210-240 VAC | Red |

## 1. Low-Voltage Problems

If your game is set for 110 VAC (or 220 VAC) and your line voltage is usually below 110 VAC (or 200 VAC), you may experience a decrease in the size of the monitor picture and/or the game operation will be erratic (weird things will appear on the screen).

## 2. High-Voltage Problems

If your game is set for 95 VAC (or 210 VAC) and your line voltage is usually above 110 VAC (or 220 VAC), the monitor picture size may increase, the game will run hotter, and the game will be prone to an increased rate of failures.
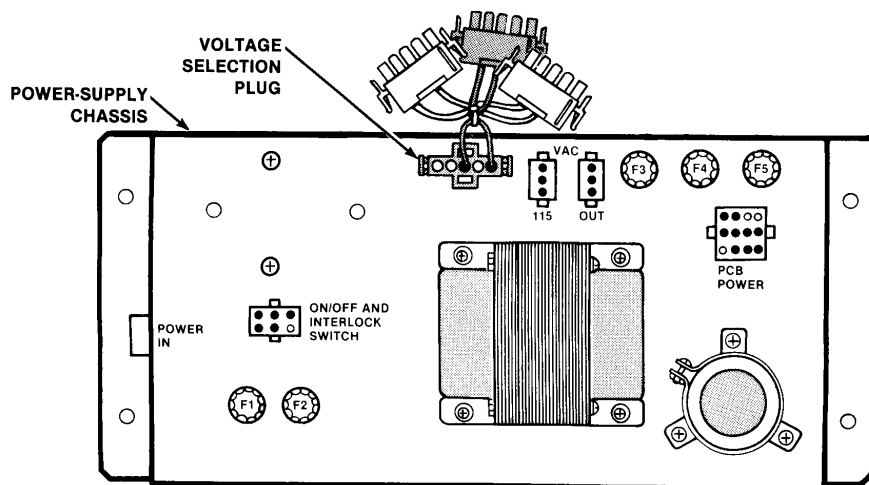


**Figure 1-1  Voltage Selection Plugs**

# d. interlock and power on/off switches

To minimize the hazard of electrical shock while you are working on the inside of the game cabinet, two interlock switches have been installed (see Figure 1-2). One is located behind the access panel and one behind the coin door. Any of these switches will disconnect all the AC line voltage from the game circuitry.

Check for proper operation of the interlock switches by performing the following steps:

1. Unlock and open the access panel and the coin door.
2. Plug the AC line power cord into your local AC outlet.
3. Set the power on/off switch to the *on* positon.

4. Close the access panel and coin door. Within approximately 30 seconds after closing the last door, the TV monitor should display a picture. (The game lighting should light immediately.)

5. Slowly open either door. The TV picture should disappear and the game lighting go off when either the access panel or coin door is opened approximately 2½ cm (one inch).

6. If the results of step 5 are satisfactory, the interlock switches are operating properly. If the picture and lights *stay on*, check to see if either interlock switch is broken from its mounting or stuck in the *on* position.

7. Close and lock the access panel.

NOTE:
WHEN TROUBLESHOOTING WITH THE DOOR(S) OPEN, YOU MAY DEFEAT THE INTERLOCK SWITCHES BY PULLING INTER-LOCK PLUNGER OUT AS INDICATED BY DIRECTION OF ARROW.



INTERLOCK SWITCHES
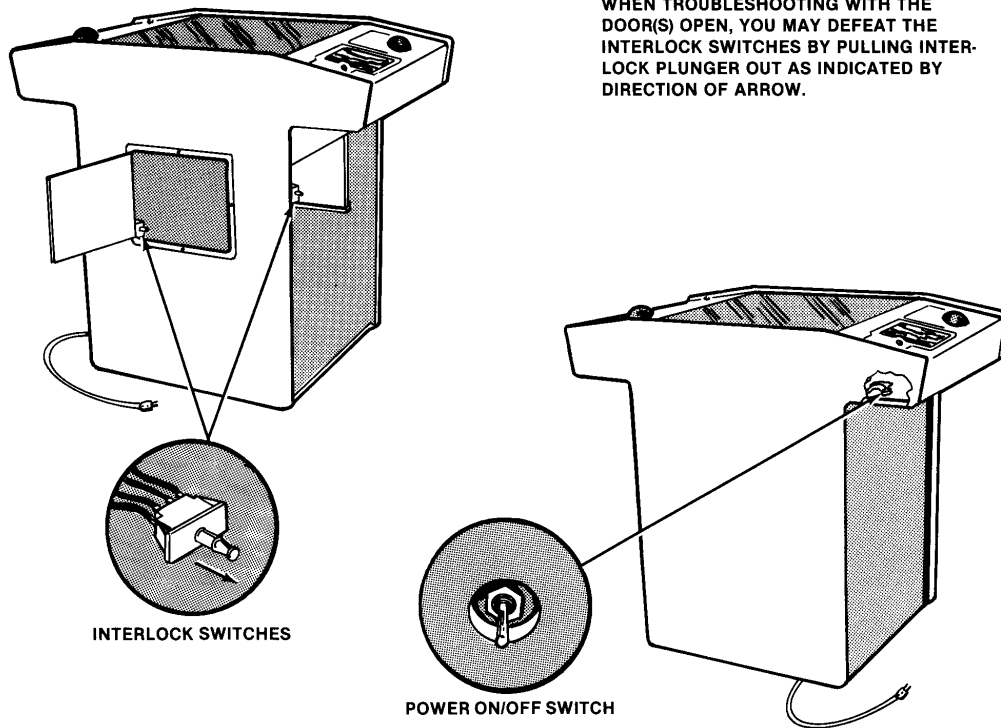
POWER ON/OFF SWITCH

Figure 1-2   Location of Interlock and Power On/Off Switches

# e. self-test procedure

This game will test itself and provide data on the TV monitor and speakers to demonstrate that its circuitry and controls are working properly. No additional equipment is required. See Figure 1-3 for location of the self-test switch. To start the procedure, slide this switch to *on* as indicated in the figure.

See Table 1-1 for further details and instructions on the self-test. We suggest that you perform the self-test each time the coin box is emptied.

# f. volume adjustment

If the volume is incorrect for your location, open the coin door and adjust the volume control as indicated in Figure 1-3.

VOLUME CONTROL:
TO DECREASE TURN
COUNTERCLOCKWISE
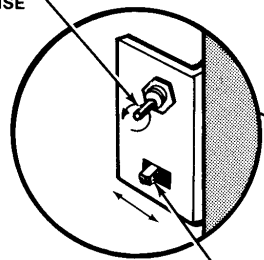
SELF-TEST
SWITCH
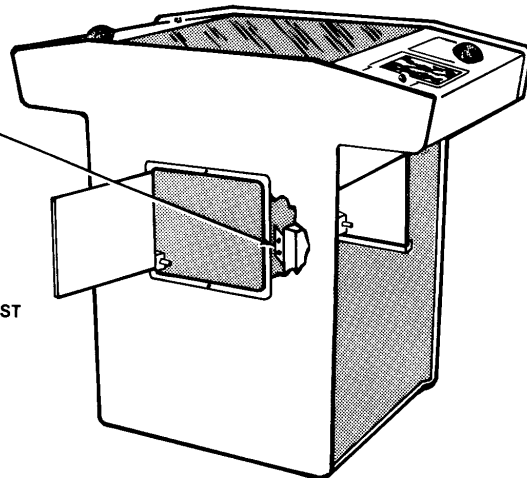
Figure 1-3  Location of Self-Test Switch and Volume Control

## Table 1-1   Self-Test Procedure

Open the coin door. Locate the self-test switch inside the cabinet on a metal bracket. It's to the right and slightly below the door opening. Slide the switch to *on*.

| Instruction | Result if Test Passes | Result if Test Fails |
|---|---|---|
| Preliminary Test | Crowd noise is turned on. | No crowd noise: Indicates a defective speaker, volume control set too low, or faulty crowd noise circuitry. |
| 1.   RAM/ROM Test | TV monitor displays<br>RAM OK          ROM OK | Monitor displays the message<br>BAD RAM<br>if the random-access memory is at fault.<br><br>Monitor displays the message<br>BAD ROM<br>if a read-only memory is at fault. |
| 2.   Trak Ball™ Test<br><br>Roll the Trak Ball in all directions. | Two white figures will appear on the monitor, one for each Trak Ball control. They will move exactly as the control is moved—up/down, right/left, and diagonally at both angles. | One or both white figures are not displayed, or one or more directions of movement will not respond, such as up/down. Suspect a bad steering PCB on the Trak Ball or bad steering circuitry on the game PCB. |
| 3.   Switch/Crowd Cheer<br>Audio Test<br>Move the Trak Ball and then press each of these switches:<br>• play/select switches<br>• coin door switches<br>• slam switch | For each pressed switch another white figure will be frozen onto the screen wherever the rolling Trak Ball last placed the moving white figure.<br>Switch pressure will also cause a crowd cheer to be heard simultaneously from both speakers. | No crowd cheer *and* no white figure frozen on screen indicates bad switch.<br><br>White figure frozen on screen but no crowd cheer indicates bad crowd cheer audio circuitry. |

Return the Self-Test Switch to its *off* position; then close the coin door.

# g. operator options

The operator options offer maximum player appeal for your game's location. These options are listed in Table 1-2. They are preset for a certain game set-up during production.

To change the toggle positions of the switch assembly and set the desired options, you do *not* have to remove the game PCB. Unplug the game, and open the access panel. Then locate the four-toggle switch assembly on the PCB near the edge connector (see Figure 1-4).

Set the toggles for the desired options as listed in Table 1-2. Close and lock the access panel. Plug the game in and verify attract mode.

Table 1-2   Option Switch Settings

| Switch Settings on 4-Toggle DIP Switch (located at position K10 on the game PCB) | | | | Result |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | |
| Off | Off | | | Most difficult setting: Infielders are excellent players and innings are shortest. |
| On | Off | Not | Used | Intermediate settings |
| Off | On | | | |
| On | On | | | Easiest setting: Infielders are poor players and innings are longest. |

Atari recommends, at least for initial location setup, using one of the two middle settings. Regardless of the setting, the infielders always get better as the inning progresses to provide challenge for the players.



GAME PCB
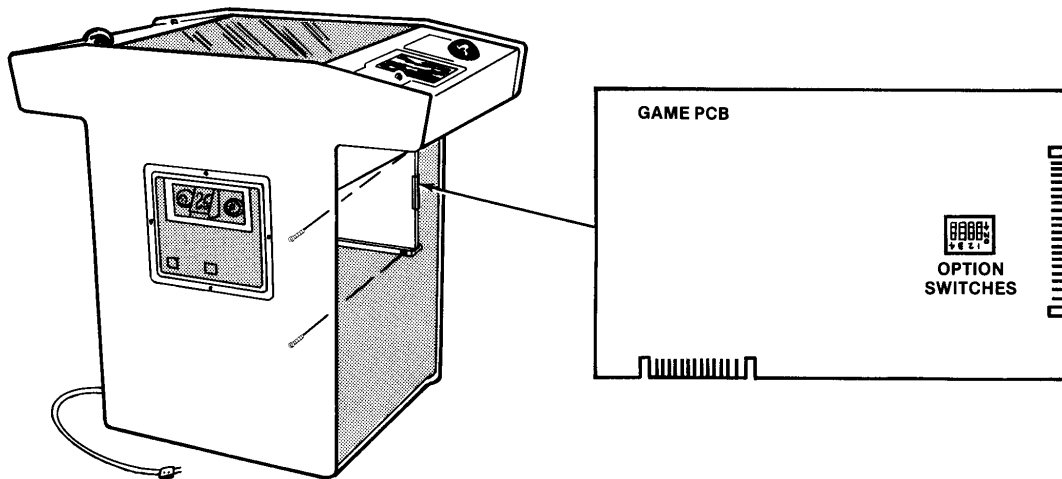
OPTION SWITCHES

Figure 1-4   Option-Setting Switches
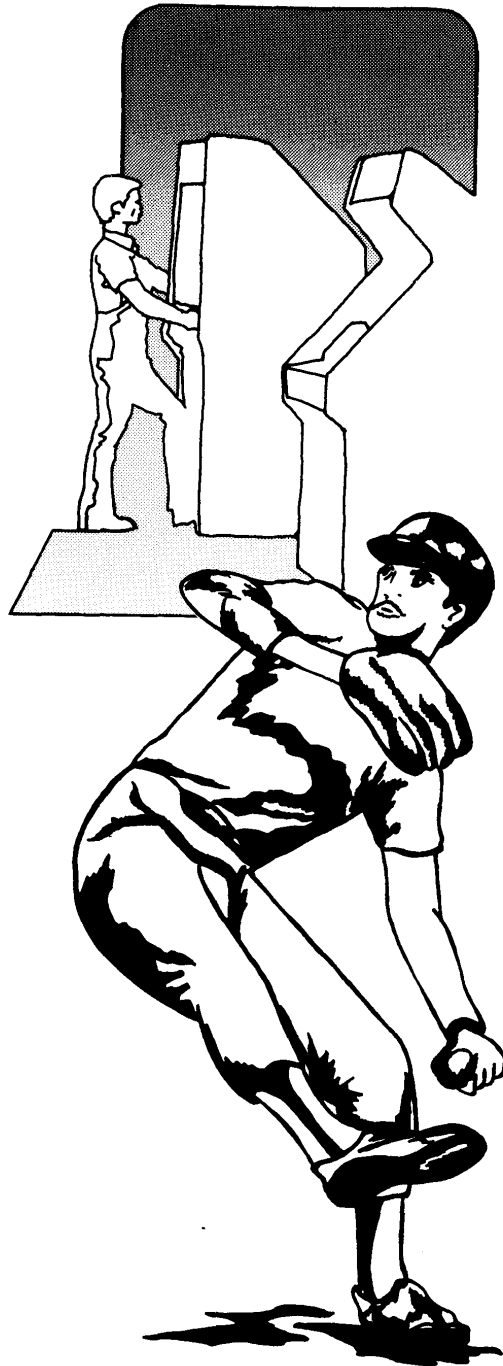
# game play

The Baseball™ game has four basic modes of operation: attract, ready-to-play, play and the self-test. The *attract mode* starts after the play mode or after power-up. It ends when a coin has been inserted into either coin slot. The *ready-to-play* mode begins after a coin has been inserted. It ends with the pressing of either LED switch.

The *play mode* starts whenever a player presses an LED switch. The game does not automatically start after a certain time has elapsed. The *self-test* is a special mode used for verifying proper game operation. It begins with the self-test switch set to on, and ends when the switch is set to off.

Baseball™

2

## a. attract mode

The attract mode is specifically programmed to attract potential players by displaying the basic sequence of game play. The fielders run out to their respective places on the playfield, pitches are made, batters run around all the bases, and three outs finally cause the diamond to invert by 180°. The game repeats this sequence, so that the opposing side of the cabinet is now "playing".

Scores for balls, strikes, and outs are totalled and displayed as the attract-mode sequence progresses. In addition, the *INSERT COINS* and appropriate coinage phrases are displayed at the ends of the screen. No sound is generated during this mode.

## b. ready-to-play mode

This mode starts when either coin switch is activated by a coin. Crowd noise begins at this point. Both sides of the TV monitor flash the message *PUSH START* until a player pushes either LED switch.

## c. play mode

Fielders run from the dugout to their proper places. The game will prompt the players to select one of the four types of hits or pitches by flashing *SELECT PITCH* or *SELECT HIT* on the ends of the screen. A player chooses a hit or pitch by pressing his or her play select switch until the indicator LED corresponding to the hit or pitch selected is lit. If the player does not do so, the game will automatically choose the hit or pitch randomly.

As a player successfully hits the ball, control of the runner is gained by rolling the Trak Ball™ in the proper diagonal direction toward first base, and so on around the diamond. The crowd noise increases with a triple, home run, score or out.

Scoring is exactly as in actual games, i.e., three strikes equals an out, four balls equals a walk, and three outs mean that side retires. Coinage of the Baseball game for the first inning is one coin per player. The second and subsequent innings each cost one coin, regardless of the number of players.

# maintenance
## and
## adjustments
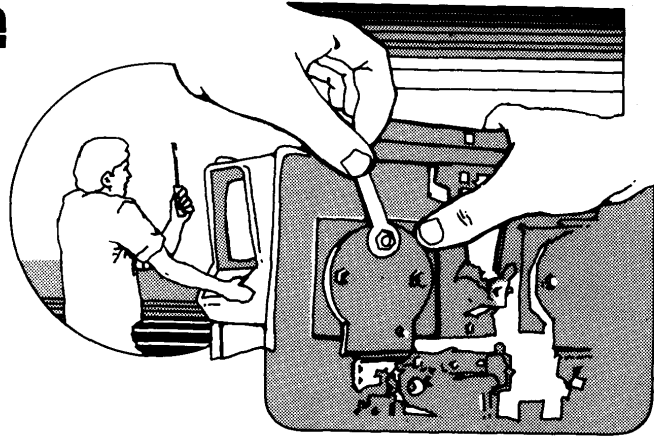
Due to its solid-state circuitry, this Atari unit should re-
quire very little maintenance and only occasional adjust-
ment. Information given in this chapter and elsewhere in
this manual is intended to cover most servicing situations
that may be encountered at the game site. The procedures
given are in sufficient detail to be understood by a person
with moderate technical background.

Baseball™

3
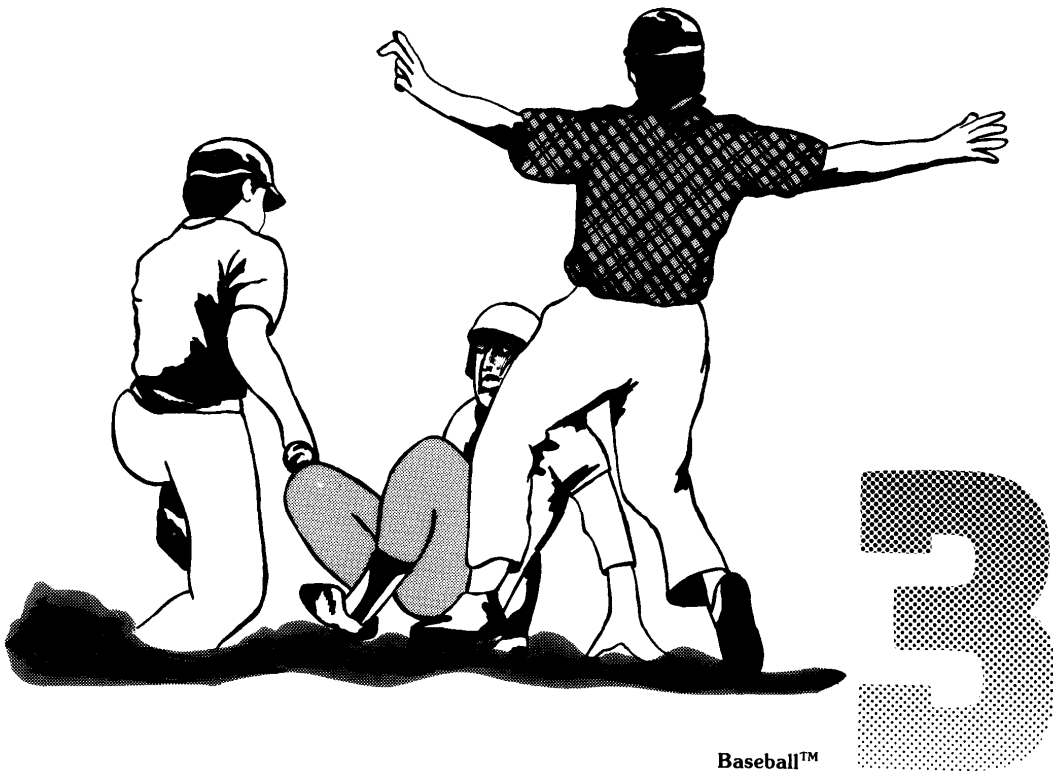
## a. cleaning

The exterior of the game cabinet and the glass and acrylic panels may be cleaned with any non-abrasive household cleaner. If desired, special coin machine cleaners that leave no residue can be obtained from your distributor. Do *not* dry-wipe the small acrylic play select panel, because any dust can scratch the surface and result in fogging the plastic. (The large monitor shield is made of tempered glass and should be scratch-resistant.)

## b. fuse replacement

Baseball contains six fuses, five on the power supply assembly, and one on the floor of the cabinet (not including TV monitor). Replace fuses only with the same type as shown in Figure 3-1. See the manual on the TV monitor for additional monitor fuse data.
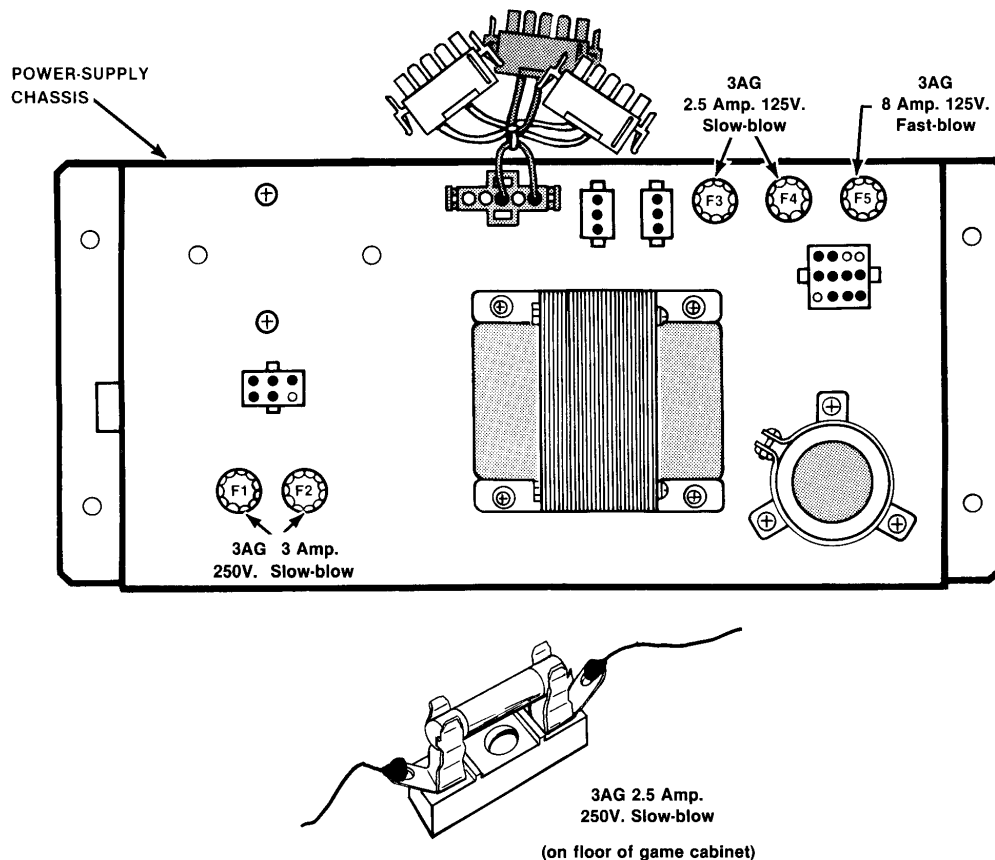


Figure 3-1   Fuse Replacement

# c. control panel access

Prior to replacing any removable component from the control panel or prior to removing the TV monitor, unplug the game and follow the steps outlined in Figure 3-2.
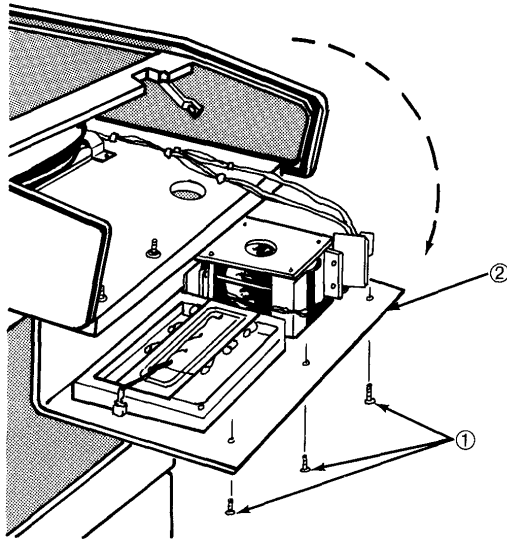


1. Unfasten and remove three allen-head screws from control panel.
2. Carefully swing the control panel open.

Figure 3-2   Control Panel Access

## 1.   LED Switch Replacement

The light-emitting diode (LED) switch on top of the control panel has a very low failure rate. In case the switch should ever be suspect, first test it. To test or replace the switch, refer to Figure 3-3.

## 2.   Play Select PCB Repairs

Two problems could occur with this PCB. A light-emitting diode could burn out, or one of the six incandescent lamps could burn out. To replace any LED or lamp, open the control panel and remove this small PCB as described in Figure 3-4.
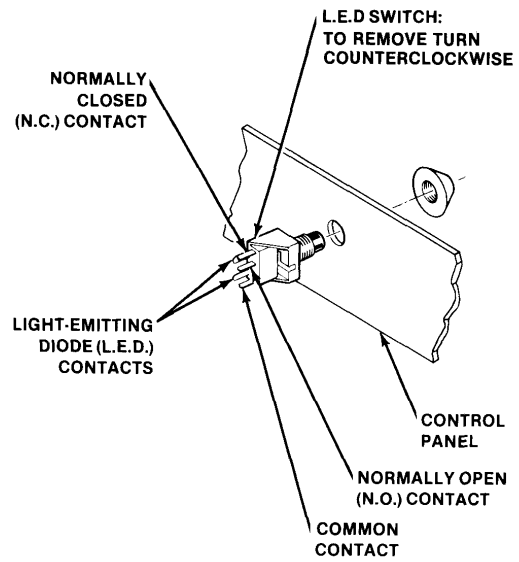


- Remove all wires from the faulty switch.
- Turn the switch counterclockwise while holding the cone-shaped nut on the outside of the control panel.
- Install a new switch using the reverse procedure.
- Reconnect the harness wires.
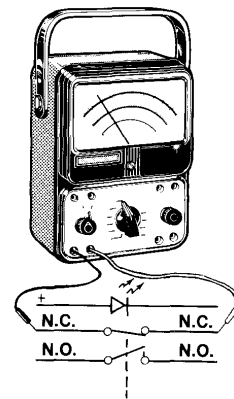


DOUBLE-POLE SINGLE-THROW (DPST) SWITCH WITH INTERNAL LED

Figure 3-3   L.E.D. Switch Replacement

1. **Open control panel as illustrated in Figure 3-2.**
2. **Remove the two washers and nuts.**
3. **Unplug the white connector.**
4. **Remove the play select PCB.**
5. **Replace lamp or light-emitting diode, as needed. The lamps are NEMA type no. 47 (Atari part no. 70-11-47).**
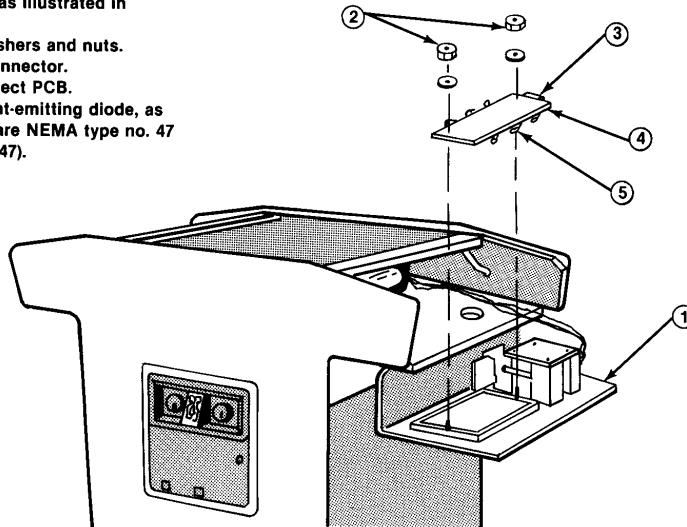


Figure 3-4  Play Select PCB Removal

### 3. Trak Ball™ Maintenance and Repair

To maintain this control, you will only have to lubricate the bearings approximately every 4,000 innings or $1,000 in income earned. The number of innings can be read off the coin counter, located on the coin door. Use *only two drops* of 3-in-One® oil in each of the ball bearings. (Each Trak Ball control has five bearings.)

For further instructions on how to replace the trak ball or either steering PCB, see Figure 3-5.

### 4. TV Monitor Removal

If you should need to service or replace the 23-inch TV monitor, you must first remove it from the game cabinet. Follow the instructions in Figure 3-6.
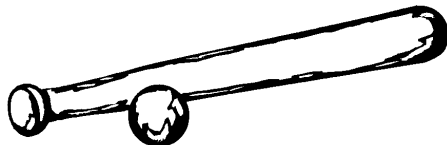


# d.  game pcb removal

You may wish to remove the game PCB for service or inspection. To do this, proceed as follows:

- Open the access panel.
- Locate the two screws that secure the game PCB in its slots, and remove them.
- Unplug the edge connector; then carefully slide the PCB straight out of its slots. Be careful not to twist the board, as this may loosen connections or components.
- Replace or repair as required.
- Reinstall the PCB, making sure that the edge connector is properly plugged in. Note it is keyed to fit on only one way, so if it doesn't slip on easily, don't force it! A reversed edge connector may damage the game!
- Replace the securing screws through the holes in the PCB.
- Close and lock the access panel.
- Check that the operation of the game is correct by performing the self-test.
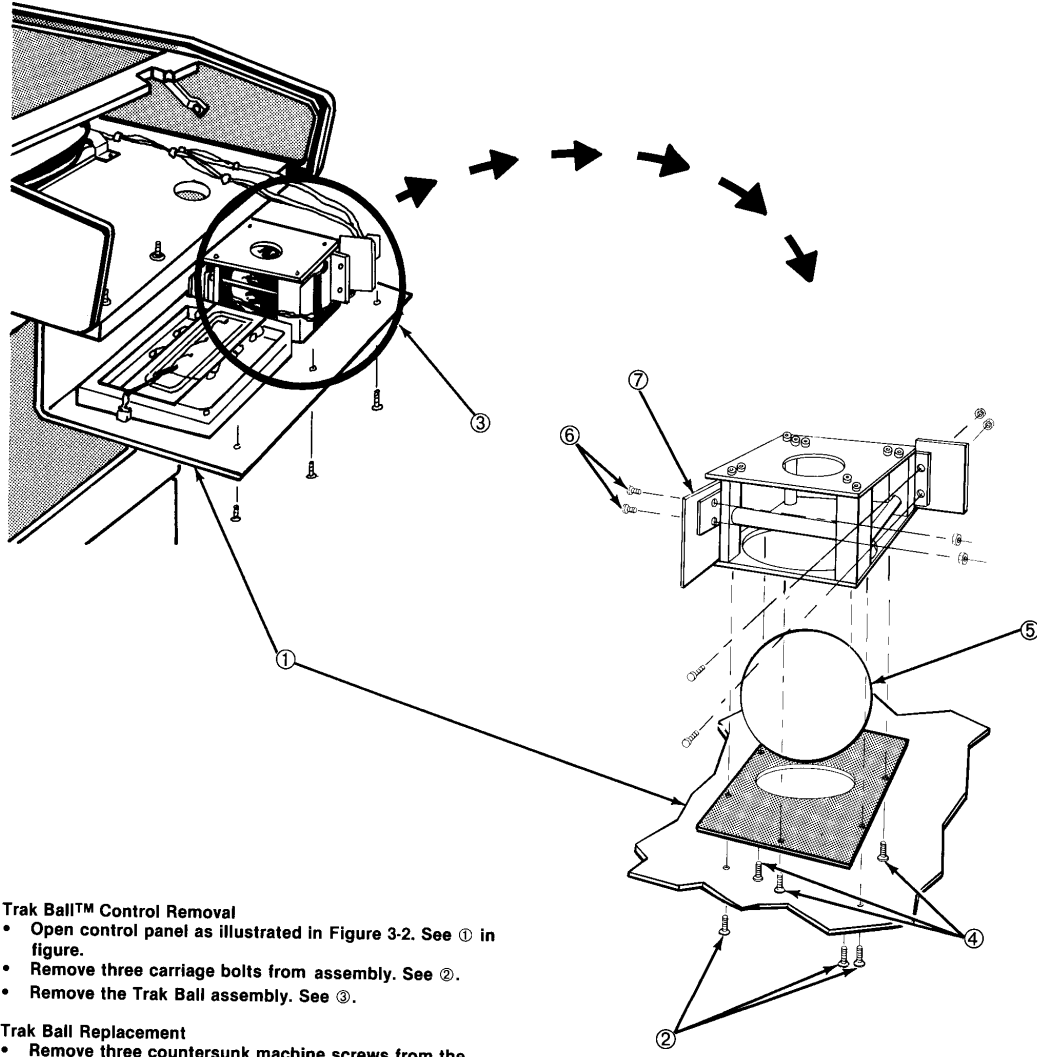
**Trak Ball™ Control Removal**
- Open control panel as illustrated in Figure 3-2. See ① in figure.
- Remove three carriage bolts from assembly. See ②.
- Remove the Trak Ball assembly. See ③.

**Trak Ball Replacement**
- Remove three countersunk machine screws from the Trak Ball assembly's acrylic top plate. (When the assembly is installed, these three screws are right underneath the control panel.) See ④.
- Remove and replace the ball. See ⑤.

**Steering PCB**
- Unplug connector on steering PCB. Remove two cross-recessed machine screws, associated washers and hex nuts from the steering PCB. See ⑥.
- Remove the steering PCB. See ⑦.
- When replacing this PCB assembly, be certain that the black toothed wheel turns freely between the two halves of the red photo sensor device.

Figure 3-5   Trak Ball™ Control Repair

1. Open control panel above and to the right of the coin
   door as shown in Figure 3-2. Open the coin door.
2. Carefully loosen tape at exposed end of cardboard
   bezel. Do not remove the bezel.
3. Open access panel.
4. Unplug control panel connector for opened player
   control panel.
5. Remove the four TV monitor carriage bolts and
   associated hardware.
6. Unplug TV monitor chassis connector.
7. Slide out TV monitor shelf assembly along with the
   bezel; the opened control panel is attached to the
   assembly.
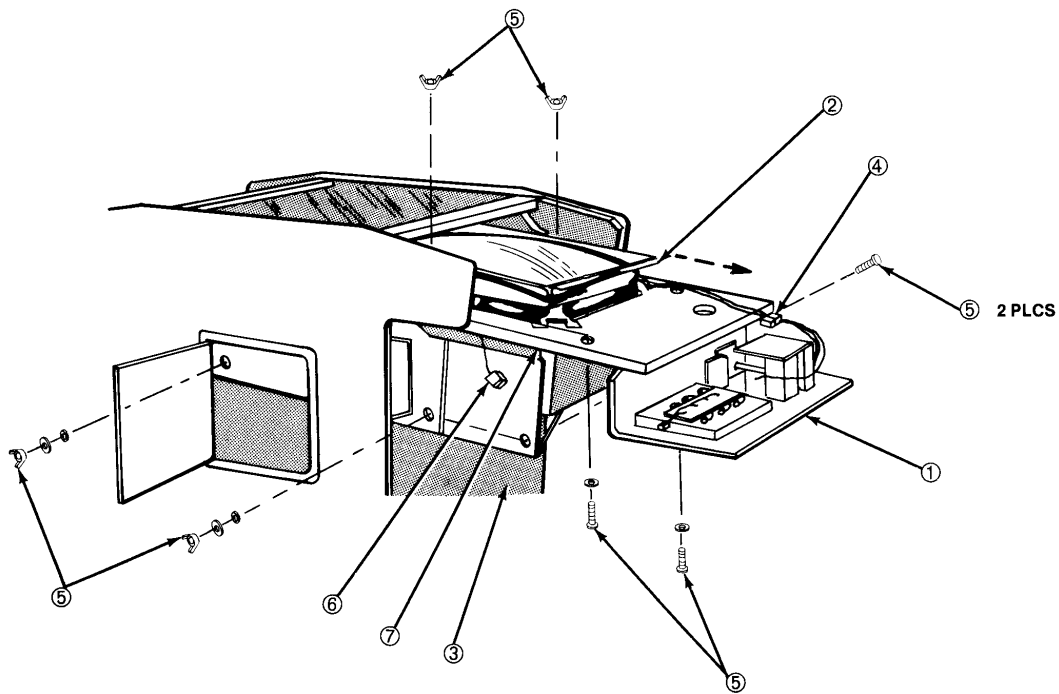


Figure 3-6   TV Monitor Removal

# details of electronic operation
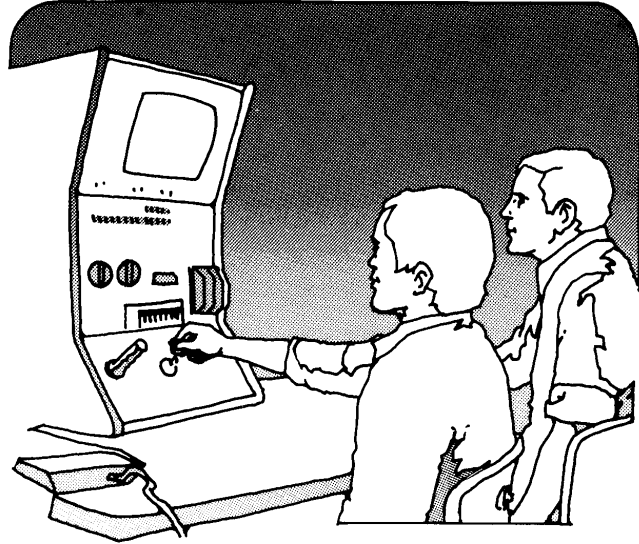
This chapter provides a general overview of the operation of the circuitry contained on the game printed circuit board (PCB). This information has been organized with an emphasis placed on troubleshooting the game PCB circuit by circuit.

The Baseball game block diagram of Figure 4-1 illustrates the major components, including all controls remote to the game PCB. The function and direction of the information to and from these various controls is also shown.

The game PCB block diagram in Figure 4-2 illustrates the division and function of the various circuits located on the game PCB and how they are controlled by the microprocessor. Refer to Figure 4-2 as you go through the following circuit descriptions.

Baseball™
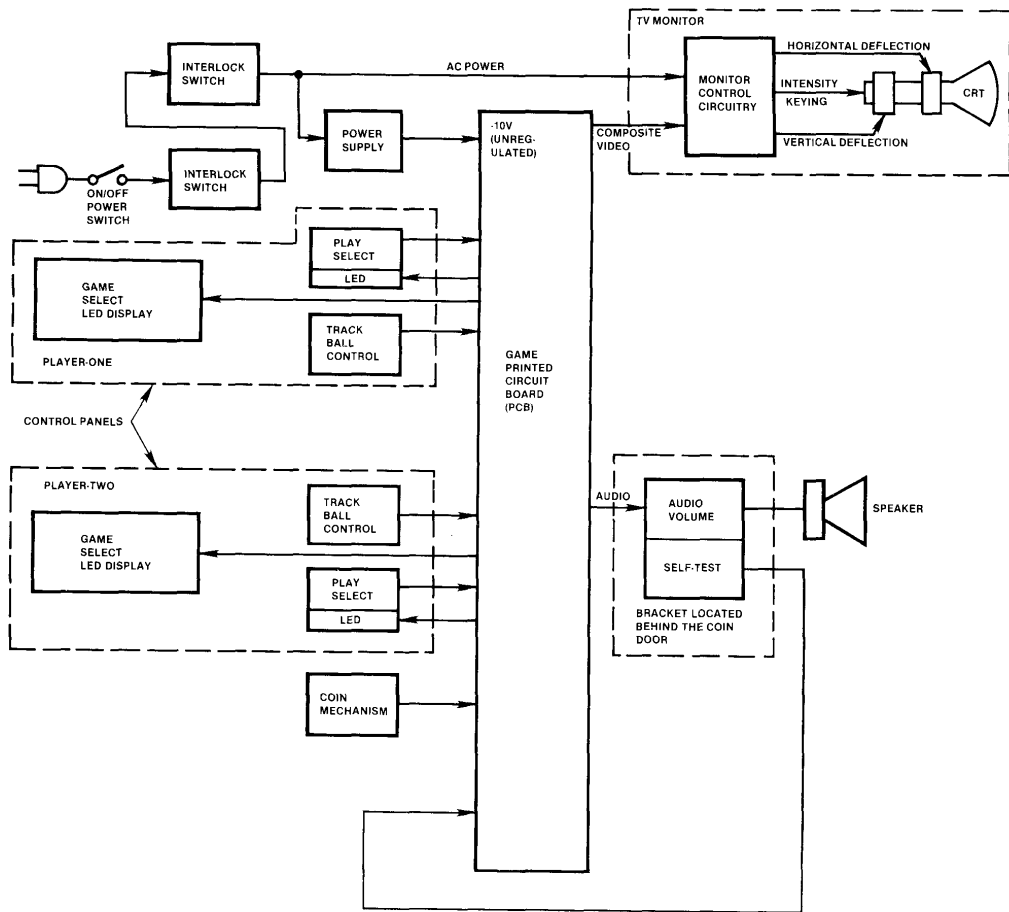
Figure 4-1 Game Block Diagram

**MICROPROCESSOR CIRCUITRY**

SYNC

SYNC
BUFFER

ABUS0, ABUS1, ABUS11-ABUS15

ADDRESS
DECODING
CIRCUITRY

ENABLE
OUTPUTS

ABUS0-ABUS7

ABUS0-ABUS7

ABUS0-ABUS7

RESET
INPUT

MPU

A0-A15

ADDRESS
BUFFERS

ABUS0-
ABUS15

RAM

RAMD0-RAMD7

BI-DIRECTIONAL
DATA
BUFFER

D0-D7

ABUS0-ABUS9

DATA
BUFFERS

D0-D7

DBUS0-DBUS7

DBUS0-DBUS7

ROM
MEMORY

D0-D7

D0-D7

D0-D7

SWITCH AND
TRACK BALL
INPUTS

D0-D7

Figure 4-2   Game PCB Block Diagram

SYNC →

ALPHANUMERICS
GENERATOR

RAMD0-RAMD7

DISD16-DISD23

MOTION
OBJECT
RAM

RAWVID →

SYNC →

DISPLAY
RAM

SYNC →

GRAPHICS
GENERATOR

DISD8-DISD15

ABUS0-ABUS9

PIC0-PIC7

DBUS0-DBUS7

D0-D7

PLAYFIELD
GATE

SYNC →

MVID

PLFOVID

VIDEO
SUMMING
CIRCUIT

→ VIDEO OUT

D0-D7

DBUS0-DBUS7

AUDIO
CIRCUITRY

→ AUDIO

SYNC →

DISPLAY PCB
AND
COIN COUNTER
OUTPUTS

DBUS0-DBUS7

ANODE OUTPUTS

CATHODE OUTPUTS

COIN CNTR

} TO LEDS

# a. power supply

(See Figure 4-3)

The power supply (located on the bottom) produces all the necessary game power as shown in Figure 4-3.

The game PCB receives an unregulated +10 volts DC at pins B and 2 of the PCB edge connector. The +10 volts DC is rectified in the power supply assembly and regulated to a stable +5 volts DC by the LM323 on the game PCB. The regulated +5 volts DC is distributed throughout the PCB to power all logic circuits (see Figure 4-4).

The 25 volts AC is received by the game PCB on pins W, 19, X, and 20 and rectified by diodes CR1 and CR2, then filtered by capacitor C62. Zener diode CR3 regulates the +18 volts DC to +12 volts DC. This voltage powers the LM324 IC in the audio circuitry.

The unregulated +18 volts DC is used to supply the TDA2002 audio amplifier in the audio circuitry.

**Power Supply**

**Coin Door**

Figure 4-3 Game Power Distribution and Wiring Diagram

**Figure 4-3** (Continued) Game Power Distribution and Wiring Diagram

(034562-01 B)

# b. sync generator

(See Figure 4-5)

The basic frequency of the sync generator is a 12.096-MHz clock, generated by a crystal-controlled oscillator consisting of crystal Y1, inverter N4 and several discrete components. The output of the oscillator is 12 MHz. Examination of this signal with an oscilloscope (at pin 2 of N4) should show a period (or one cycle) of approximately 83 nanoseconds (.083 microseconds).

This base frequency is then divided down by binary counters P5, P6 and N6. These provide the various horizontal synchronization frequencies (1H thru 256H). The final output of this horizontal counter chain is 256H (at pin 13 of N6). This signal is, in effect, a division of the base frequency by 768, or 15,750 Hz. The period of 256H is about 63.5 microseconds. The 256H signal, as well as other horizontal signals, are used to generate the HBLANK and HSYNC timing pulses at flip-flop N5. See Figure 4-9 for the relative timing of these waveforms.

The HSYNC signal is used to clock two stages of vertical sync counters M5 and M6. The HSYNC signal is divided down by these counters to form the various vertical synchronization frequencies (1V thru 128V). These two stages are used, in effect, to do a divide by 262 of the HSYNC signal. This results in the final output of these counters (128V at pin 11 of M6) to be at a frequency of 60Hz (the period is approximately 16.6 milliseconds). The various vertical frequencies address a sync PROM (L5) whose data is latched at the output of L6. The outputs of this latch are the various polarities and phases of the vertical timing frequencies used to synchronize the TV monitor display. See Figure 4-9 for the relative timing of these waveforms.

The end result of the horizontal and vertical timing waveforms is to synchronize the TV monitor display. This display consists of 262 horizontal lines per frame, with each line being the equivalent of 768 (12 MHz) clock pulses. Each frame is repeated 60 times per second, providing the necessary frequency of display refresh to provide a stable, non-flickering display.
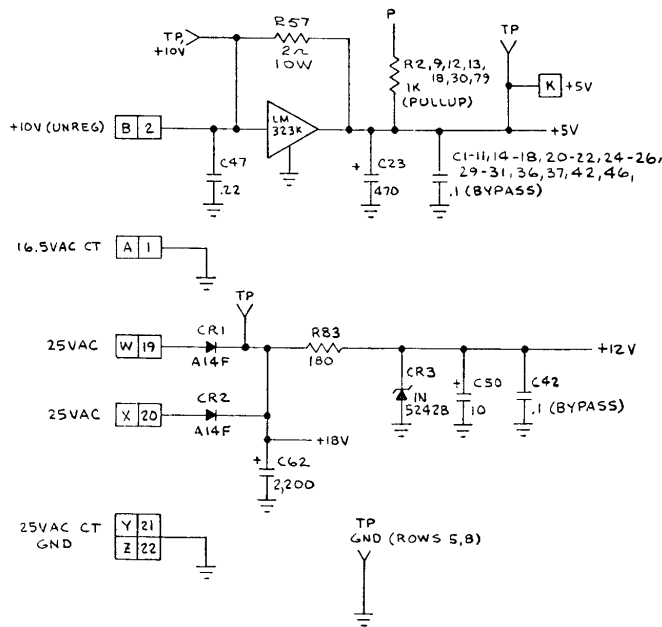


Figure 4-4  Game PCB Power Distribution
(Part of 034634-XX  B)
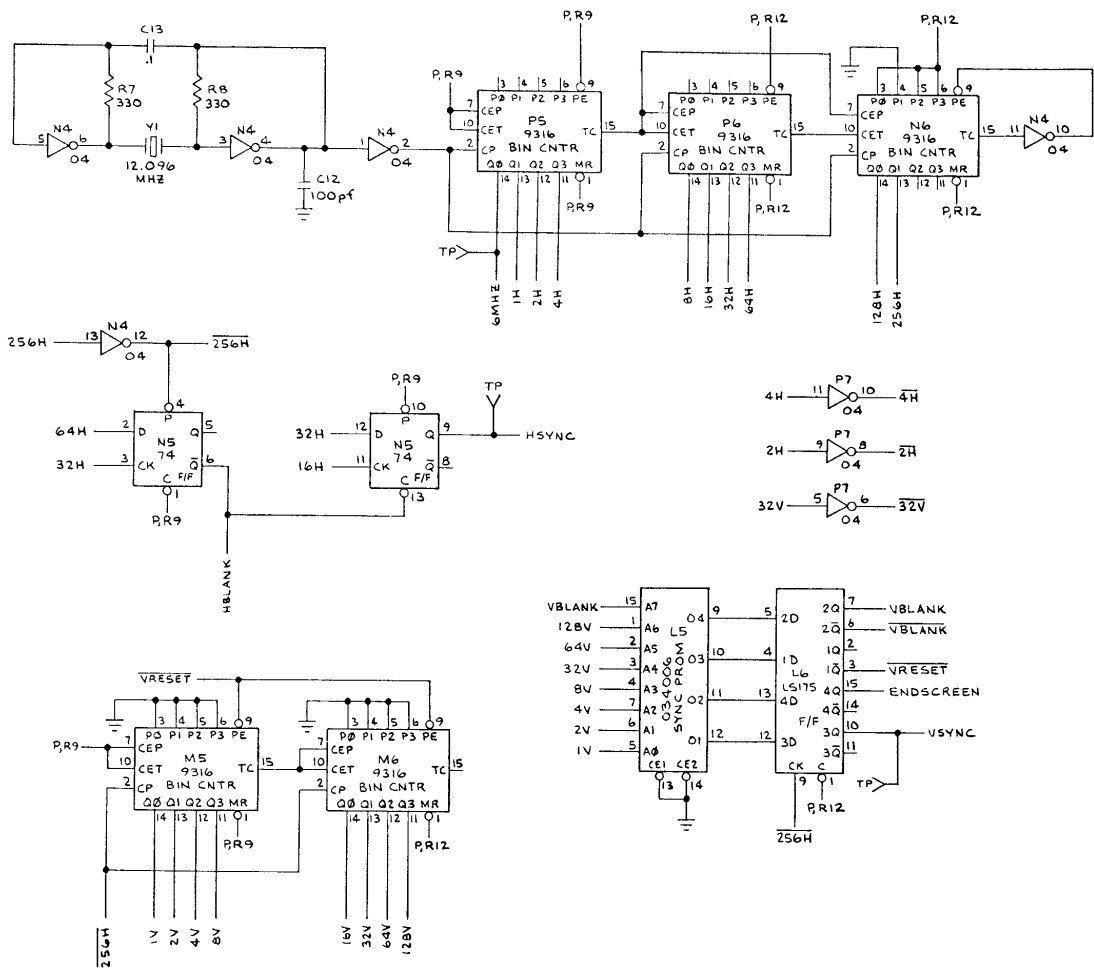
Figure 4-5  Sync Circuitry
(Part of 034634-XX  B)

# c. microcomputer circuitry

The heart of the game PCB is the microcomputer circuitry. A brief description of the major components and their functions is provided in the following paragraphs. Note that the microcomputer components include the following:

1. MPU at location C2, address buffers at B1 and C1, and data buffers at location E2 (see Figure 4-6).

2. ROM memory at locations M1, N0, N1 and P1 for the -02 version, or PROM memory at B0, C0, D0, D1, E0, E1, F0, F1, H0, H1, J0, J1, K0, K1 and M0 for the -01 version (see Figure 4-7).

3. RAM memory at locations N2 and M2 (see Figure 4-8).

4. Address decoding circuitry B3, C7 and associated gates (see Figure 4-9).
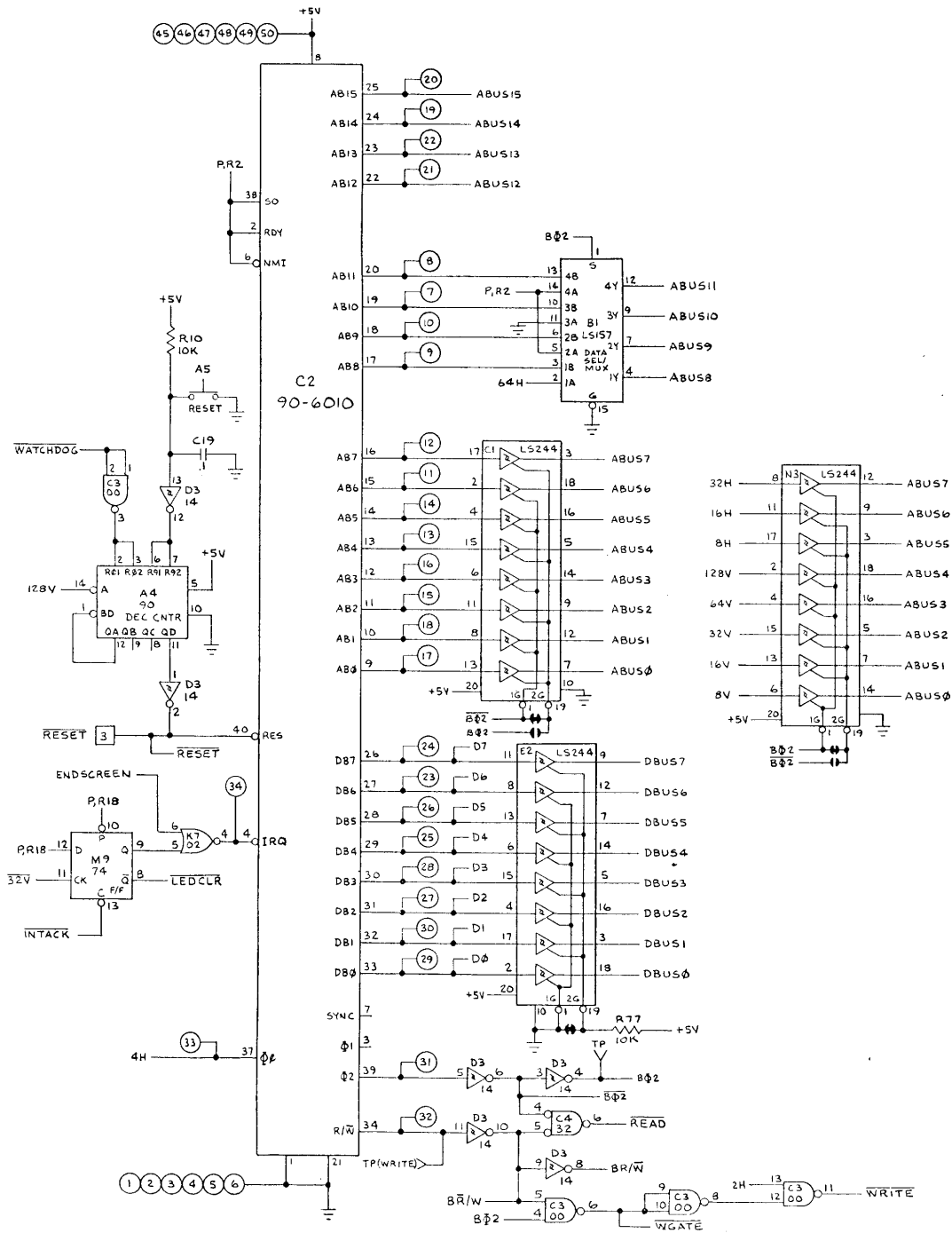
**Figure 4-6   Microprocessor Circuitry**
(Part of 034634-XX   B)
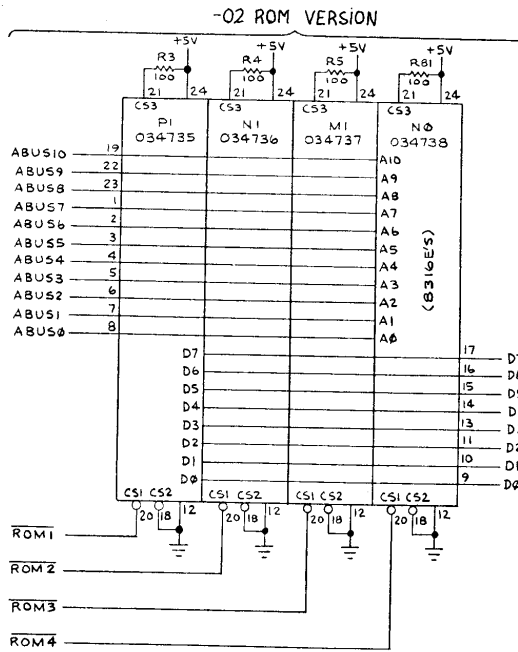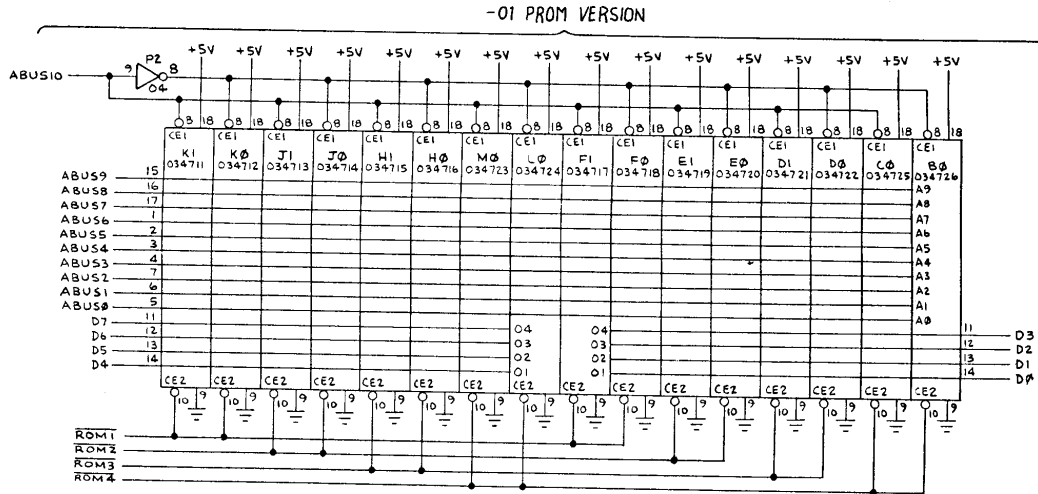
Figure 4-7  Program Memory
(Part of 034634-XX  B)

5. Watchdog reset counter A4 and associated circuitry (see Figure 4-6).

## MPU, ROM, and RAM

(See Figure 4-6, 4-7 and 4-8)

The microprocessor (MPU) is the "master controller" of all action that takes place in the game circuitry. Upon initialization, the MPU (via ABUS0 thru ABUS15) addresses data locations in the program ROMs or PROMs. The data in the addressed locations is then read by the MPU via the 8-bit data bus (D0 thru D7). The MPU decodes this data to determine what action it is to perform next (i.e., "read coin switch 1", "HIT", etc.). The MPU uses RAM memory to temporarily store information which it will later recall. The MPU is capable of writing (or putting data into) the RAM and then later reading (pulling data out of the RAM, via address bus ABUS0 thru ABUS15 and bi-directional data bus D0 thru D7).

## Address Decoding Circuitry

(See Figure 4-9)

The MPU address decoding circuitry performs the critical function of turning on or enabling the appropriate game circuitry (i.e., RAM, ROM, latches, etc.) at the correct time, so that information can be transferred back and forth between the game circuitry and the MPU. Table 4-1 is the memory map for this game.

## Φ 0 Clock Driver

(See Figure 4-6)

The basic operating frequency of the MPU is established by its Φ 0 input (on pin 37 of the MPU). The MPU runs at an operating frequency of 750 KHz. Examination of the MPU Φ 2 output waveform (pin 39) with an oscilloscope should show a signal with a period of 1.33 microseconds.
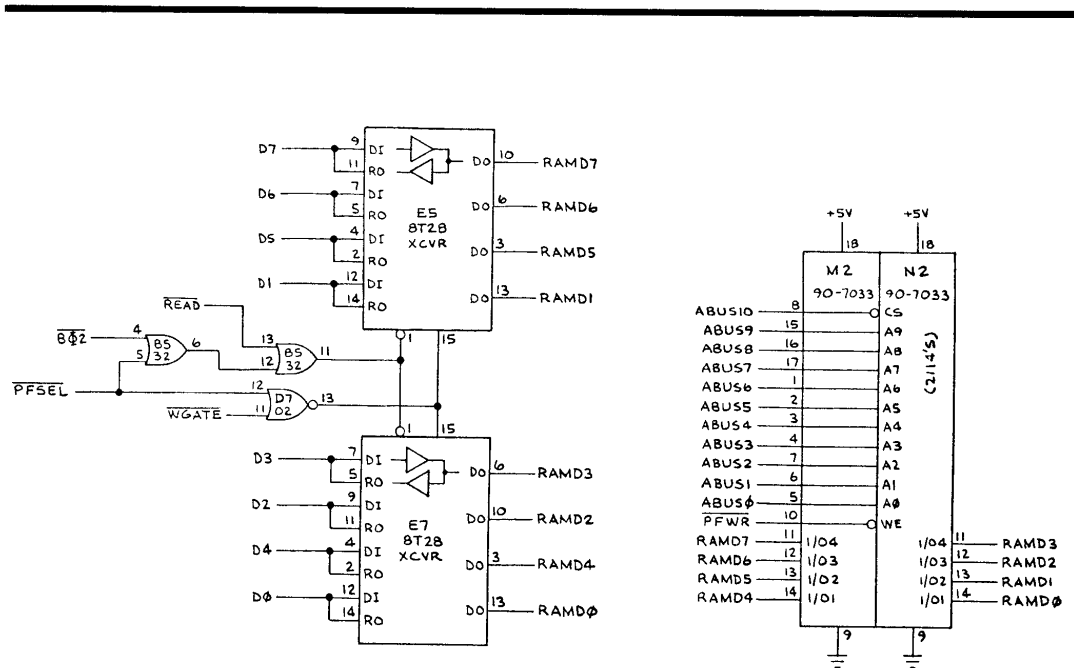


**Figure 4-8  MPU RAM**
**(Part of 034634-XX  B)**
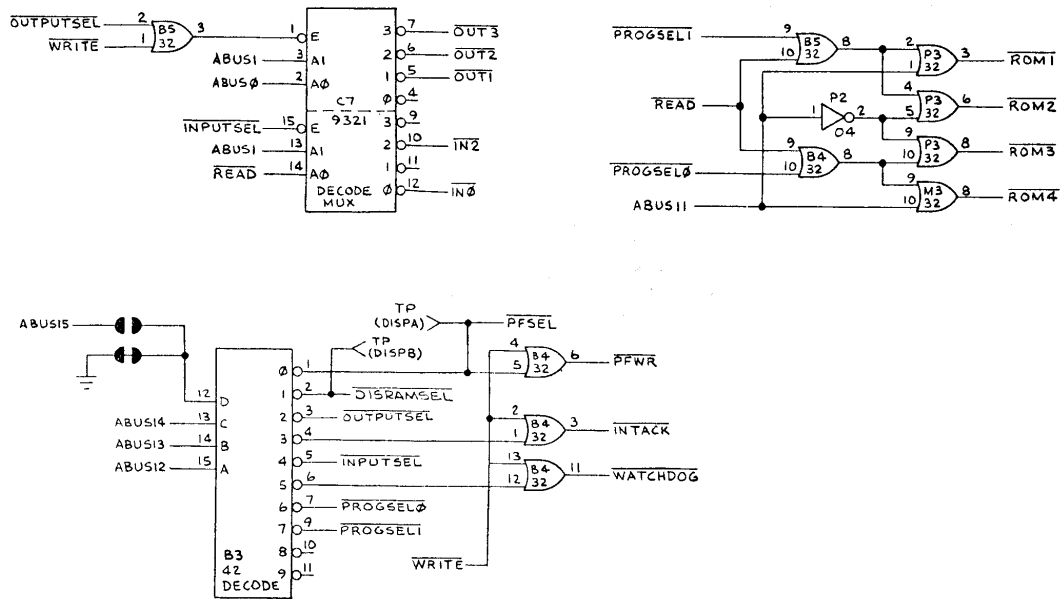
**Figure 4-9  Address Decoding Circuitry**
**(Part of 034634-XX   B)**

(The period of any periodic waveform is the measurement of the time it takes to complete one full cycle.) The 750 KHz clock outputs are generated by the 4H signal. This 4H frequency is generated by the horizontal sync counter R4 to produce the Φ 0 clock input.

## Watchdog RESET

(See Figure 4-6)

The reset counter in the MPU control circuitry is a 4-bit decade counter, A4. The $Q_D$ output of this counter is the RESET signal to the MPU. Counter A4 counts the times the 128V signal changes states. On every high-to-low transition of 128V, the counter advances to the next count in its sequence. Meanwhile, the WATCHDOG signal, generated by the MPU at various times during its normal instruction sequence, is resetting the counter back to zero. If for some reason, the MPU program has strayed from its intended instruction sequence and the WATCHDOG signal does not occur before this counter counts up to a point where the $Q_D$ output goes high, a RESET signal is received by the MPU. The RESET signal causes the MPU to restart its instruction sequence from the beginning of the program.

**Table 4-1 Memory Map**

**MEMORY MAP**

| Address | Description |
|---|---|
| 6000-7FFF | PROGRAM |
| 5000 | WATCHDOG |
| 4000-4003 | INPUT PORTS |
| 3000 | INTERRUPT ACKNOWLEDGE |
| 2000-2003 | OUTPUT PORTS |
| 1000-13BF | PLAYFIELD |
| **MOTION OBJECT PARAMETERS** | |
| 13C0 | MOTION OBJECT 1 PICTURE # |
| 13C1 | MOTION OBJECT 1 VERTICAL POSITION |
| 13E0 | MOTION OBJECT 1 HORIZONTAL POSITION |
| 13E1 | SPARE |
| 13C2 | MOTION OBJECT 2 PICTURE # |
| 13C3 | MOTION OBJECT 2 VERTICAL POSITION |
| 13E2 | MOTION OBJECT 2 HORIZONTAL POSITION |
| 13E3 | SPARE |
| | |
| 13DE | MOTION OBJECT 16 PICTURE # |
| 13DF | MOTION OBJECT 16 VERTICAL POSITION |
| 13FE | MOTION OBJECT 16 HORIZONTAL POSITION |
| 13FF | SPARE |
| 03A0-03FF | PLAYER 2 ALPHANUMERICS |
| 0200-025F | PLAYER 1 ALPHANUMERICS |
| 0000-01FF | WORKING RAM |

| INPUT/OUTPUT PORTS | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|---|
| 2001 ($\overline{\text{OUT1}}$) | VIDEO INVERT | SPARE | $\overline{\text{CRTLD}}$ | SPARE | | NOISEN | HIT | WHISTLE |
| 2002 ($\overline{\text{OUT2}}$) | | | ATTRACT | COIN CNTR | NOISE AMPLITUDE | | | |
| 2003 ($\overline{\text{OUT3}}$) | | | SPARE | | LED CATHODES (4 BITS) | | | |
| 4000 ($\overline{\text{CTRLD}}$)=0 | COIN 1 | END-SCREEN | SLAM | SELECT 1 | PL1HD | PL1VD | PL2HD | PL2VD |
| ($\overline{\text{IN0}}$) ($\overline{\text{CTRLD}}$)=1 | TRACK-BALL VERT. 1 | | | | TRACK-BALL HORIZ. 1 | | | |
| 4002 ($\overline{\text{CTRLD}}$)=0 | COIN 2 | TEST | SPARE | SELECT 2 | OPTION SW: 4 | 3 | 2 | 1 |
| ($\overline{\text{IN2}}$) ($\overline{\text{CTRLD}}$)=1 | TRACK-BALL VERT. 2 | | | | TRACK-BALL HORIZ. 2 | | | |

# d. alphanumerics generator

(See Figure 4-10)

All score board information at the top and bottom of the TV monitor is generated by the alphanumerics generator. The information is actually generated by alphanumerics PROM N7. This PROM is addressed by latched MPU RAM data signals RAMD0 thru RAMD7.

The scoreboard picture components are each displayed as two side-by-side 8-line-by-4-bit blocks of video on the TV monitor screen. The MPU writes alphanumerics "picture select" data into the MPU RAM during Φ2. During Φ2, the MPU RAM is accessed by horizontal and vertical sync signals, a process referred to as direct memory access (DMA). The data output from the MPU RAM (RAMD0 thru RAMD5, RAMD7) is latched and applied to the input of the alphanumerics PROM N7. This address information selects one of the 64 possible alphanumeric characters to be displayed. The actual line of the alphanumeric character to be displayed is defined by vertical sync signals 1V, 2V and 4V and horizontal sync signal 4H. These four signals address the graphics PROM and cause it to either output a normal alphanumeric character or an "upside-down"

alphanumerics character. This is done so that the two players' scoreboards (on opposite sides of the screen) appear in the proper orientation. This inversion is controlled by HREFCNTL, which is generated by RAMD6 latched at the output of latch M7.

The data output of the alphanumerics PROM is applied to data selector/multiplexer N8. If horizontal reflect control signal HREFCNTL is low, the data is loaded into shift register P8 in the same order as output from the alphanumerics PROM. However, if HREFCNTL is high, the data input to shift register P8 is reversed. Therefore, HREFCNTL not only causes the TV monitor character to be inverted vertically, but it is also inverted horizontally.

Shift register P8 is loaded only during the period when HBLANK* and 256H* are both low. (This is the narrow strip at the top and bottom of the screen where the players' scoreboard and other miscellaneous messages are displayed.) This results in a high ALPHASCAN signal that enables a load signal output from NAND gate N9 when both 1H and 2H are high. When 1H goes low P8 shifts four bits of the alphanumeric character out at a 6-MHz rate.
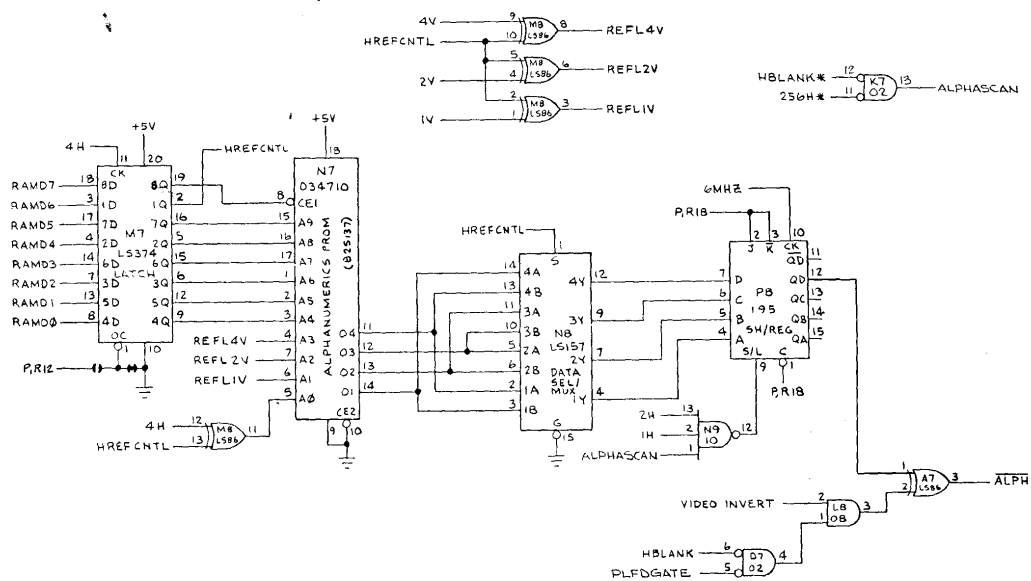


**Figure 4-10   Alphanumerics Generator**
**(Part of 034634-XX   B)**
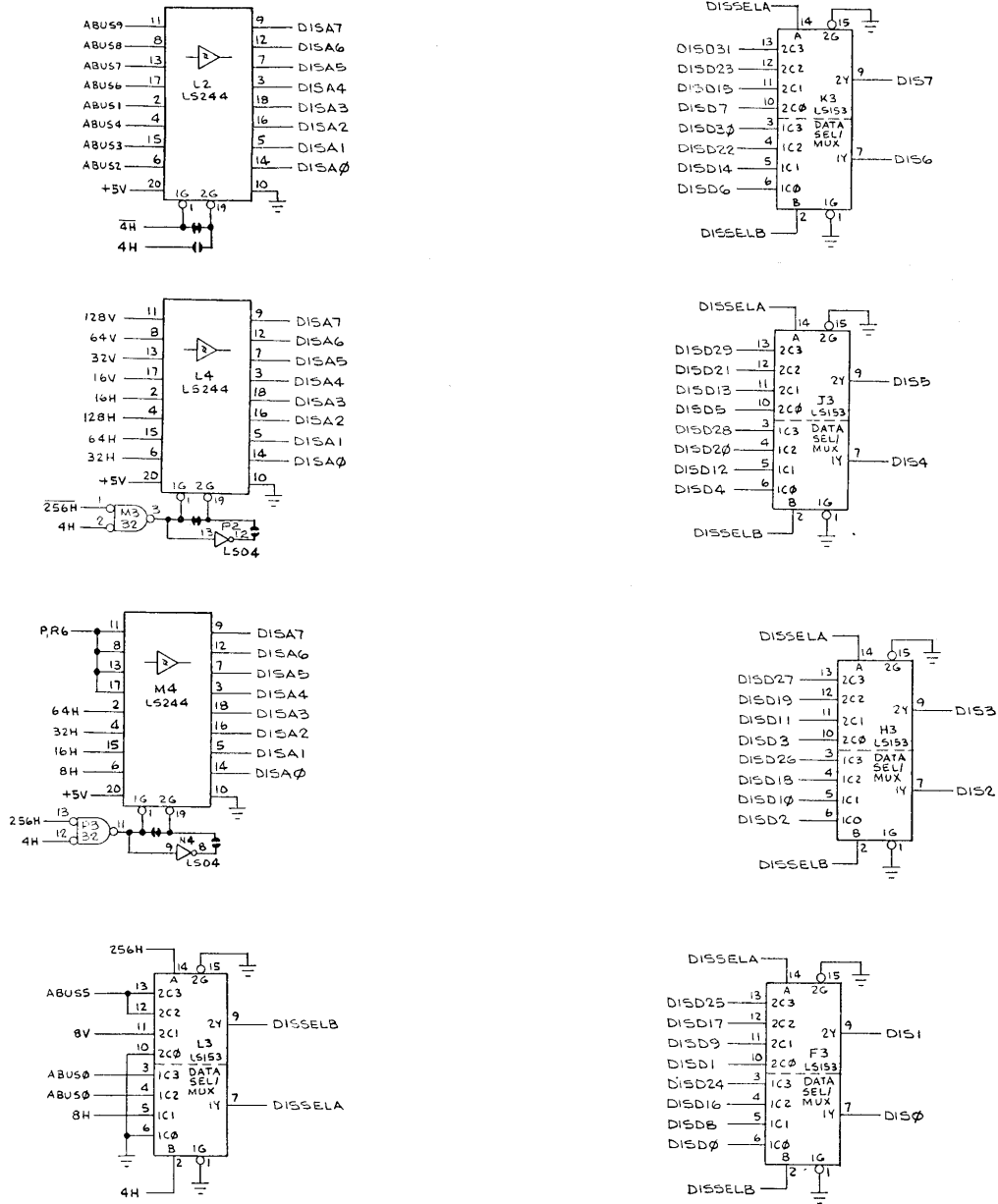
Figure 4-11   Display RAM
(Part of 034634-XX   B)

DISA7 7
DISA6 6
DISA5 5
DISA4 21
DISA3 1
DISA2 2
DISA1 3
DISA0 4
DBUS7 15
DBUS6 13
DBUS5 11
DBUS4 9

K2 90-7031  J2 90-7031  H2 90-7031  F2 90-7031  K4 90-7031  J4 90-7031  H4 90-7031  F4 90-7031

(2101A-4)

A7
A6
A5
A4
A3
A2
A1
A0

DI4 / DI3 / DI2 / DI1

15 DBUS3
13 DBUS2
11 DBUS1
9 DBUS0

DO4 DO3 DO2 DO1 R/W

DISD31 DISD30 DISD29 DISD28 DRAM3
DISD23 DISD22 DISD21 DISD20 DRAM2
DISD15 DISD14 DISD13 DISD12 DRAM1
DISD7 DISD6 DISD5 DISD4 DRAM0
DISD27 DISD26 DISD25 DISD24 DRAM3
DISD19 DISD18 DISD17 DISD16 DRAM2
DISD11 DISD10 DISD9 DISD8 DRAM1
DISD3 DISD2 DISD1 DISD0 DRAM0

BR/W
DISRAMSEL ── C4 32 ── DRAMRD
BR/W ── C4 32 ── B∅2 ── C4 32 ── DRAMWR

4H +5V
DIS7 3D 3Q PIC7
DIS6 2D 2Q PIC6
DIS5 7D 7Q PIC5
DIS4 6D D4 6Q PIC4
DIS3 8D LS374 8Q PIC3
DIS2 1D LATCH 1Q PIC2
DIS1 4D 4Q PIC1
DIS0 5D 5Q PIC0
OC
+5V R78 1K

2H D ∅ DRAM0
DRAMWR C 1 DRAM1
ABUS5 B 2 DRAM2
ABUS0 A 3 DRAM3
4
5
6
7
8
9
E3 42 DECODE

1H +5V
DIS7 6D 6Q D7
DIS6 7D 7Q D6
DIS5 2D 2Q D5
DIS4 3D E4 3Q D4
DIS3 1D LS374 1Q D3
DIS2 8D LATCH 8Q D2
DIS1 5D 5Q D1
DIS0 4D 4Q D0
OC
DRAMRD

# e. display ram

(See Figure 4-11)

The display RAM stores information from the MPU that defines the horizontal location, vertical location and picture of both the playfield objects (baseball diamond) and motion objects (players, ball and bat). The display RAM consists of four pairs of RAM devices, F2 and F4 (DRAM0), H2 and H4 (DRAM1), J2 and J4 (DRAM2) and K2 and K4 (DRAM3). Each pair contains 256 8-bit bytes of information.

The MPU addresses the display RAM during the Φ2 period (4H is low) through tri-state buffers L2 on address lines ABUS1 thru ABUS4 and ABUS6 thru ABUS9. The MPU selects the display RAM pair to be written to with address lines ABUS0 and ABUS5, when DRAMWR goes low at the input of decoder E3. At this time data is written into the display RAM via data bus lines DBUS0 thru DBUS7.

During the Φ1 period (4H is low), the display RAM receives its address from either of two different sources. When the TV monitor is actually scanning a horizontal line (256H is low), the display RAM outputs playfield data to the graphics generator. The graphics generator receives its data for playfield pictures when display RAM memory is directly accessed (DMA process) by horizontal and vertical sync signals through tri-state buffers L4. When the monitor is in horizontal blanking (256H is low), the display RAM outputs

motion object data to the graphics generator. The graphics generator receives its data from motion object pictures when the display RAM memory is directly accessed (DMA process) by horizontal sync signals through tri-state buffers M4.

The outputs of the display RAM are selected by data selector multiplexers F3, H3, J3 and K3. These data selector multiplexers are controlled by the data selector multiplexer L3. During horizontal blanking (256H is low) and when 4H is low, display data (DISD0 thru DISD7) is output to the graphics generator (for motion objects). During horizontal scan time (256H is high) and when 4H is low, horizontal sync 8H and vertical sync 8V select the data byte which is output to the graphics generator (for playfield objects).

When 4H goes high, the MPU selects the display RAM data byte (via address lines ABUS0 and ABUS5) which is output from the MPU. The display RAM is read by the MPU on data lines D0 thru D7. Selected display RAM data is latched into tri-state latch E4 with each rising edge of 1H. When display RAM read DRAMRD goes low, the latched information appears at the D0 thru D7 output of latch E4.

The multiplexed data byte output D1S0 thru D1S7 is latched at the output of latch D4 (PIC0 thru PIC7). This data byte of information contains the following: PIC0 thru PIC5 defines the actual playfield picture to be generated by the graphics generator. PIC6 (when high) reverses the generated picture horizontally. PIC7 (when high) reverses the picture vertically.

# f.  graphics generator

(See Figure 4-12)

The graphics generator generates the video for the playfield (baseball diamond) during horizontal scan time. During horizontal blanking, the graphics generator generates the motion object signals (players, ball and bat) that are written into the motion object RAM.

For motion objects, display data DISD8 thru DISD15 from the display RAM defines the vertical scan line where there is a motion object to be displayed. When sync signals 8V thru 128V are equal to this number, at the next rising edge of 4H and $\overline{\text{MATCH}}$ signal is latched at the output of latch F6. At this time latch F6 outputs LINE0, LINE1 and LINE2. The binary count of LINE0 thru LINE2 indicates which vertical line of the motion object picture is to be scanned.

The actual graphics pictures are stored in graphics ROMs C5 and D5. Address inputs PIC0 thru PIC5 from the display RAM define the actual picture to be output by the ROMs. The vertical line of the picture is defined by address inputs GA6 thru GA8. These signals originate from vertical sync signals 1V thru 4V for the playfield pictures. For the motion object pictures, these signals originate from the compared output of adder F5.

If PIC7 is low, the output of Exclusive OR gates D6 counts from 0 to 7. If PIC7 is high, the outputs of D6 count from 7 to 0. Therefore, PIC7 reverses the vertical order of the output graphics ROMs C5 and D5.

The data output from the graphics ROMs is applied to two data selector multiplexers B6 and C6. If the output is a motion object, B6 and C6 are enabled by $\overline{\text{MATCH}}$ at the input of OR gate K7. For a playfield object, B6 and C6 are enabled by 256H* (horizontal scan time). The inputs of B6 and C6 are arranged so that if PIC6 is low, the outputs are loaded into shift register A6 with graphics data GD0 shifted out first and GD7 out last. If PIC6 is high, GD7 is shifted out first and GD0 last. Therefore, PIC6 reverses the horizontal order of the graphics data output.

Shift register A6 is loaded every 8H and shifted out at a 6-MHz rate. The output of A6 is inverted by B7 and applied to the motion object RAM data input. It is also gated with the playfield gate (PLFDGATE) signal at the input of AND gate K8. If PLFDGATE is high, it means that the horizontal scan is out of the area reserved for the alphanumerics generator and in the playfield area. Playfield video $\overline{\text{PLFDVID}}$ is applied to the video summing circuitry. Motion object signals are applied to the input of the motion object RAM as $\overline{\text{RAWVID}}$.

# g.  motion object ram

(See Figure 4-13)

The motion object RAM stores the video for sixteen 8-bit-wide motion objects, then outputs the object video bits in their proper locations during the time of scanning that horizontal line.

During the horizontal blanking period, display RAM data DISD16 thru DISD23 presets binary counters J6 and K5 when $\overline{\text{HLD}}$ goes low. When $\overline{\text{HLD}}$ goes high, the counters increment their count output one count for each rising edge of 6 MHz. The count output is received by RAM K6 as its address input. For each count, one bit of motion data from the graphics generator is written into RAM K6. The counters increment their output seven counts, then $\overline{\text{HLD}}$ again goes low, presetting the counters with a new horizontal location number. This process is repeated seven times.

Shortly after the beginning of the horizontal scan period (256H is high), counters J6 and K5 receive a $\overline{\text{HCLR}}$ pulse that sets the count output to zero. When $\overline{\text{HCLR}}$ goes high, the counters begin counting from 0 to 255, again at a 6-MHz rate. At each address count, motion object data is output from the RAM to the video summing circuit.
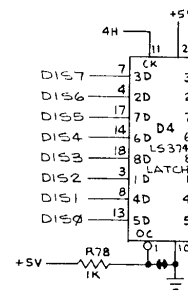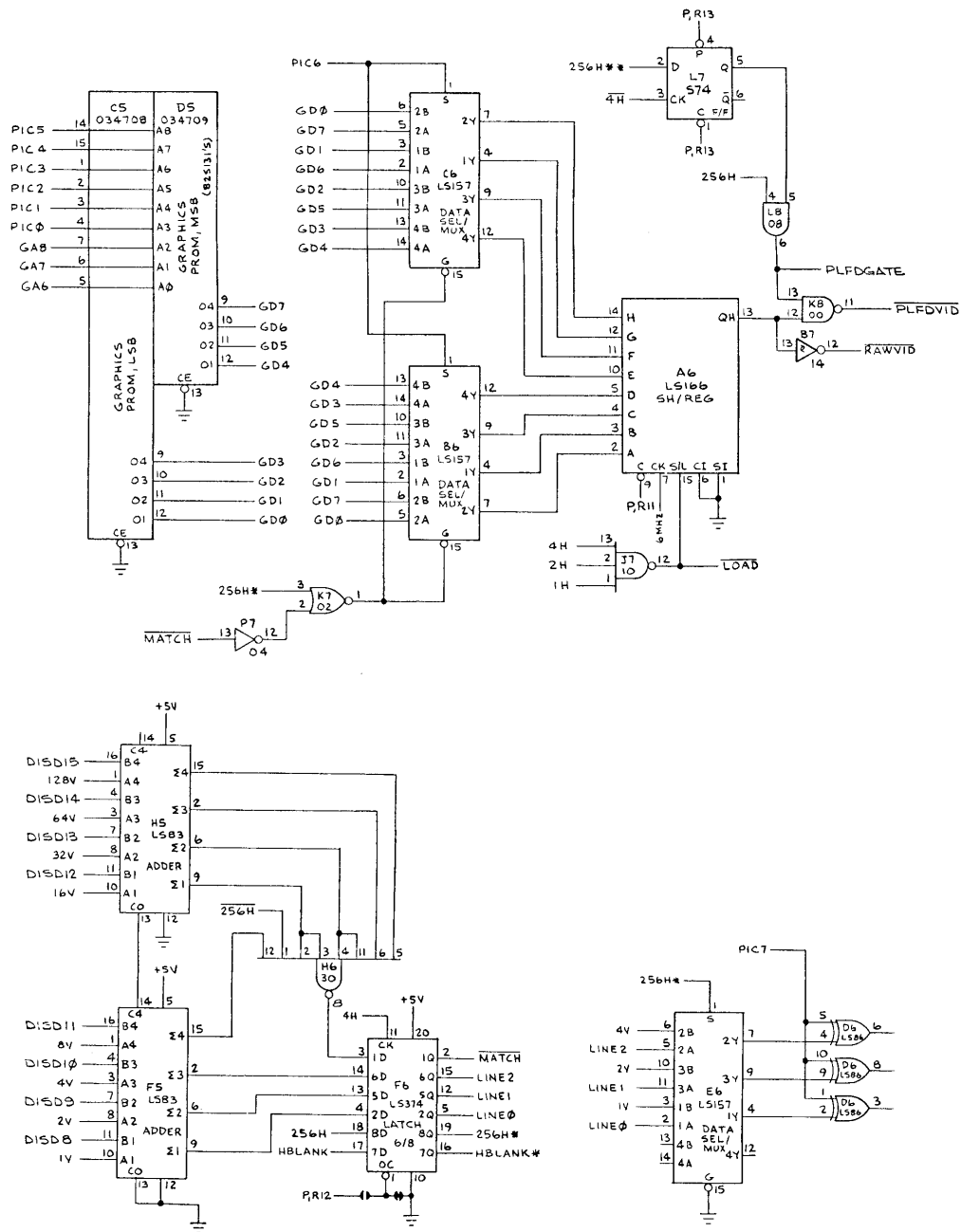
Figure 4-12   Graphics Generator
(Part of 034634-XX   B)
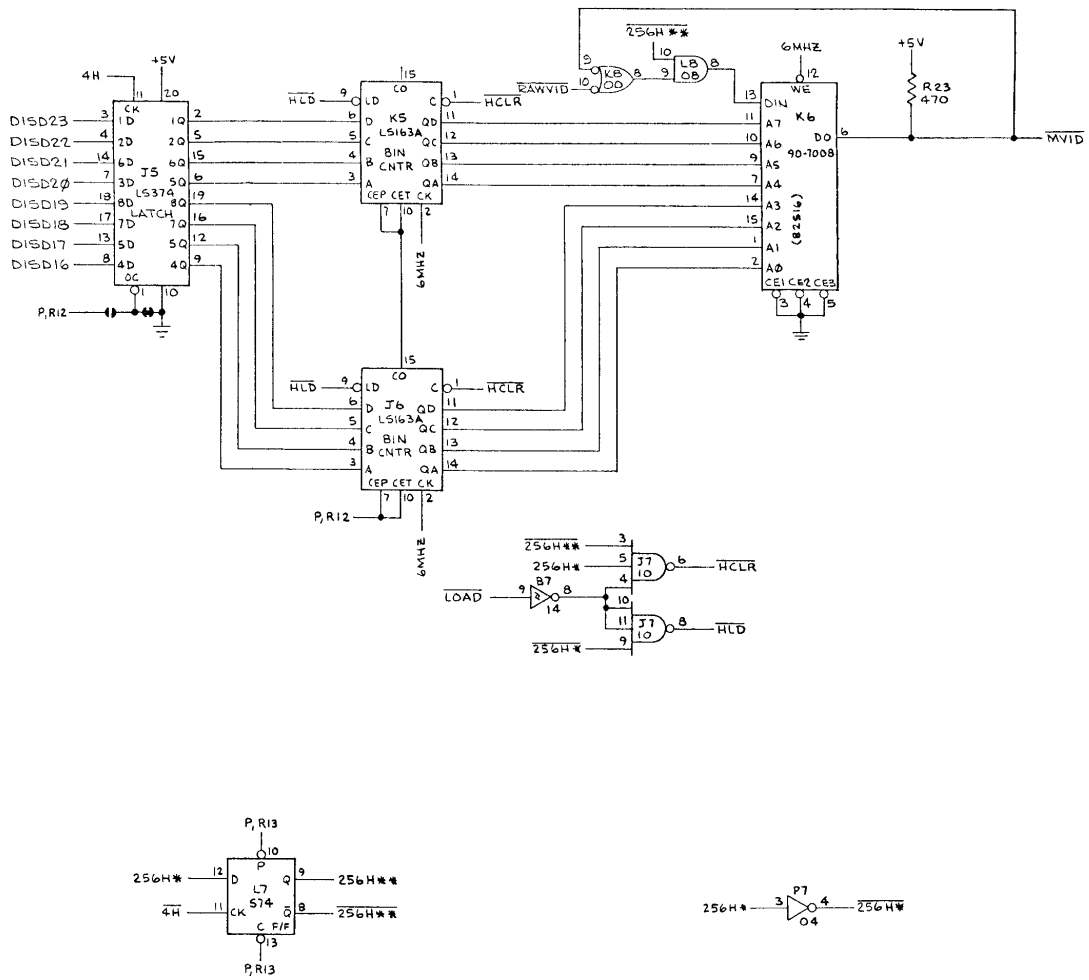
**Figure 4-13 Motion Object RAM Circuitry**
**(Part of 034634-XX B)**

# h. video summing circuitry

(See Figure 4-14)

The video summing circuitry receives $\overline{\text{ALPHA}}$ from the alphanumerics generator $\overline{\text{PLFDVID}}$ (playfield video), from the graphics generator and $\overline{\text{MVID}}$ (motion object video) from the motion object RAM. These three signals are summed through various gates into flip-flops P9. The actual video to be displayed on the TV monitor is determined by the combination of the two signals at the outputs of flip-flops P9. These outputs (P9, pins 5 and 9) are mixed with HSYNC and VSYNC for a composite VIDEO OUT signal.
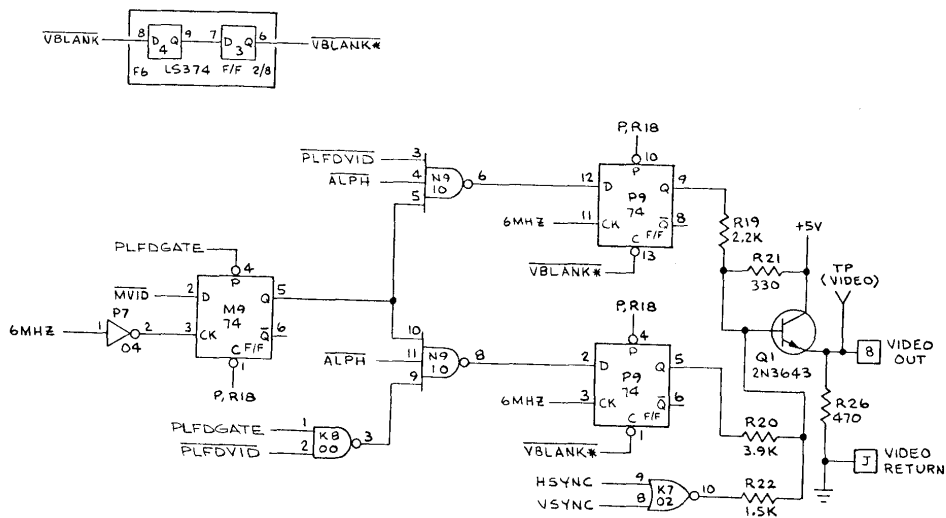


Figure 4-14   Video Summing Circuitry
(Part of 034634-XX   B)

## i. switch and trak ball™ input circuitry

(See Figure 4-15)

Player Trak Ball information, player switch inputs and the game option switches are read by the MPU on data lines D0 thru D7. The three timing signals that control which inputs are read on which data lines, and when, are $\overline{IN0}$ and $\overline{IN2}$ from the address decoding circuitry and $\overline{CTRLD}$ from latch F8 that is shown on Figure 4-17.

When $\overline{IN0}$ and $\overline{CTRLD}$ are both low, horizontal and vertical direction of both Trak Balls are read by the MPU on data lines D0 thru D3 and player 1 switches are read on lines D4 thru D7. When $\overline{IN0}$ is low and $\overline{CTRLD}$ is high, the horizontal rate of player 1's Trak Ball is read by the MPU on data lines D0 thru D3. The vertical rate of player 1's Trak Ball is read on lines D4 thru D7.

When $\overline{IN2}$ and $\overline{CTRLD}$ are low, the game option switches are read by the MPU on data lines D0 thru D3 and the switches for player 2 are read on lines D4 thru D7. When $\overline{IN2}$ is low and $\overline{CTRLD}$ is high, the horizontal rate of player 2's Trak Ball is read on data lines D0 thru D3. The vertical rate of player 2's Trak Ball is read on lines D4 thru D7.

## j. display pcb and coin counter outputs

(See Figure 4-16)

For a diagram of the display PCB, see Figure 4-3, Game Wiring Diagram.

The anode of all the game LEDs are strobed at the rate of 64V. The MPU lights an LED by first outputting data on bus lines DBUS0 thru DBUS3. With the proper address from the MPU, $\overline{OUT3}$ goes low and latches the data at the output of latch F9. A high on any output causes its transistor to conduct.

The coin counter is tripped when the address decoding circuitry outputs a COIN CNTR signal. The high COIN CNTR signal causes Q2 to conduct.
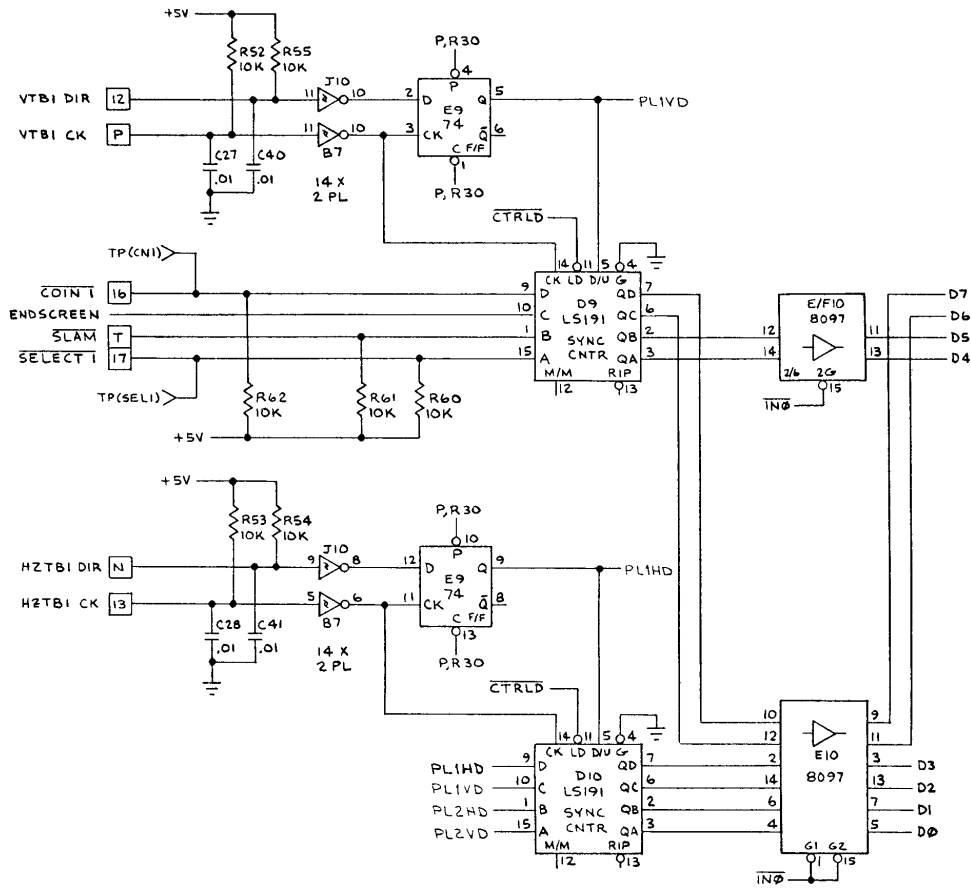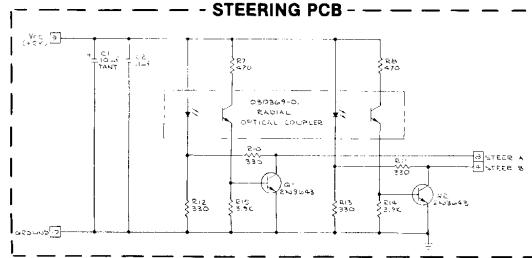
Figure 4-15   Switch and Trak Ball Inputs
(Part of 034634-XX   B)
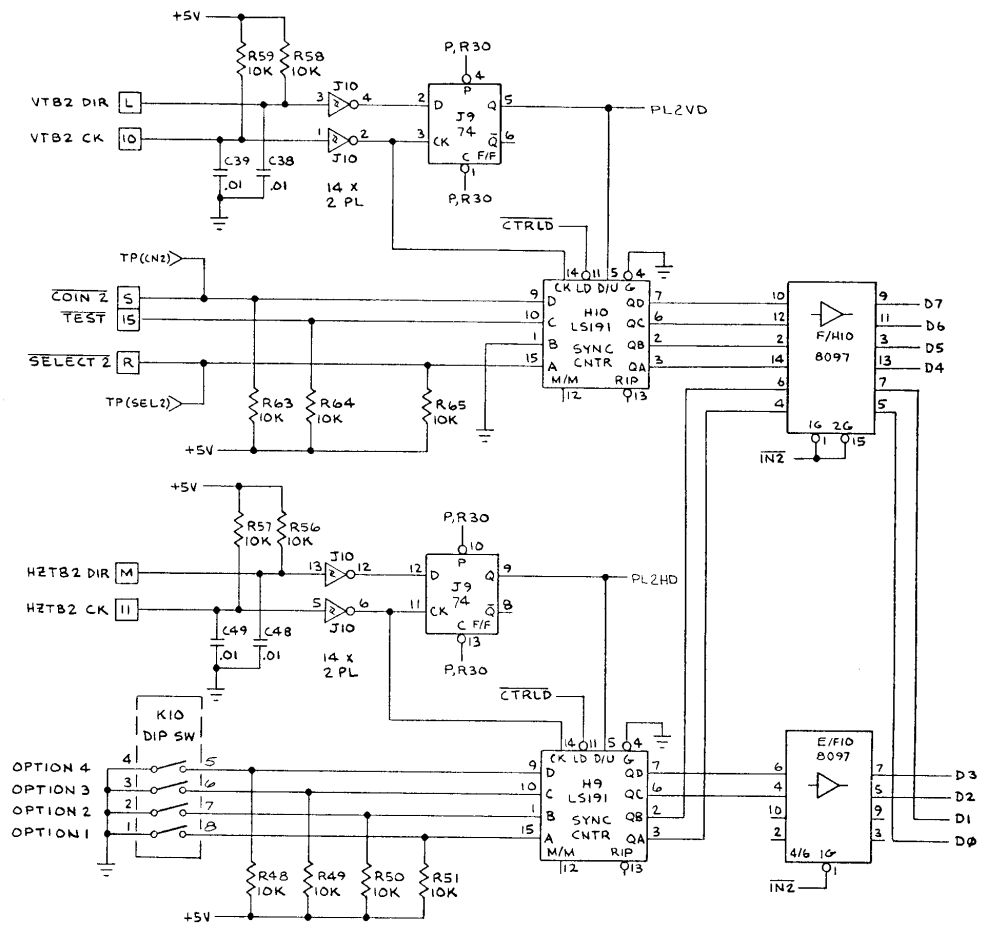
Figure 4-15   (Continued) Switch and Trak Ball Inputs
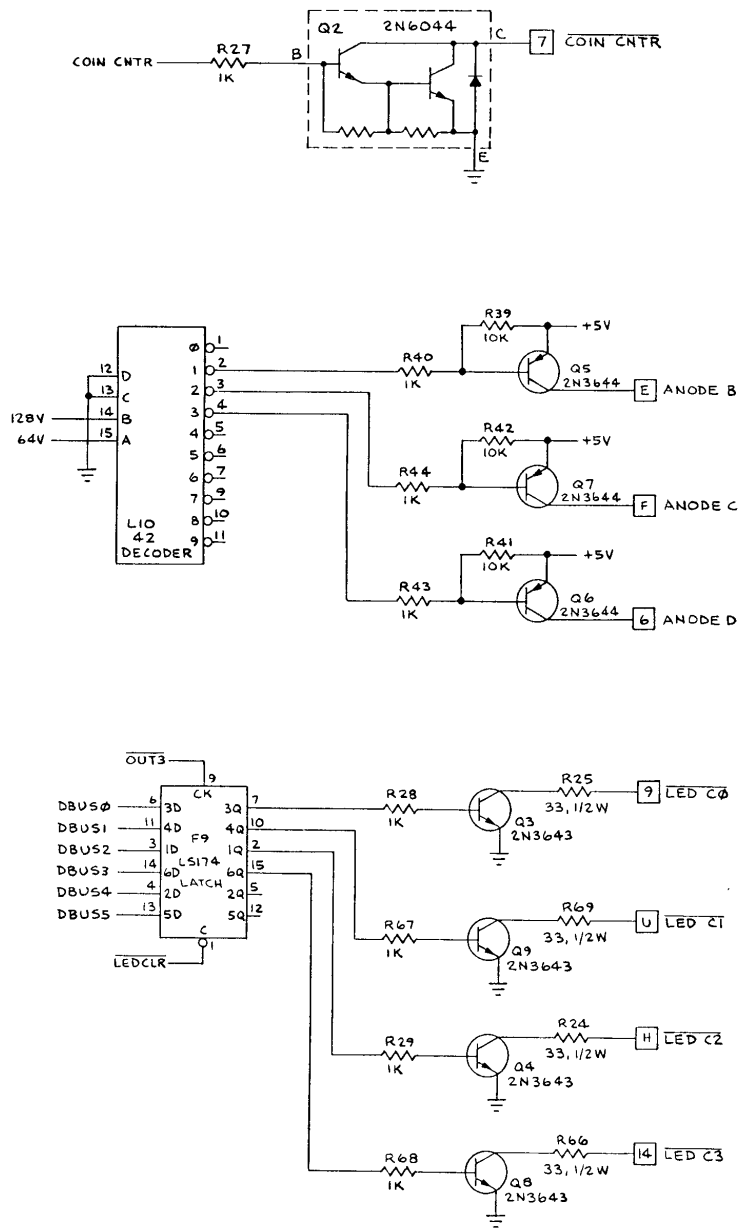
Figure 4-16   Display PCB and Coin Counter Outputs
(Part of 034634-XX   B)

# k. audio circuitry

(See Figure 4-17)

The audio circuitry produces crowd noise, HIT and WHISTLE audio. The crowd sound is the result of the gated random noise generator composed of shift registers A8 and B8. The crowd sound volume is selected by the MPU through data bits DBUS0 thru DBUS3. The noise (unfiltered crowd sound) is filtered by the active bandpass filter circuit comprised of one quarter of op-amp A9 (LM324).

The HIT audio is generated from latched data signal DBUS1 from the MPU.

The WHISTLE sound is generated by timer C9 when DBUS0 is latched high.

The three sounds are summed at the input of op-amp A9 (one quarter of LM324) and fed to the volume control. The signal is then fed to the TDA2002 amplification circuit.

The ATTRACT signal is generated from the MPU via DBUS5 input to latch E8. When ATTRACT is high, the audio signal is grounded by conducting transistor Q11.
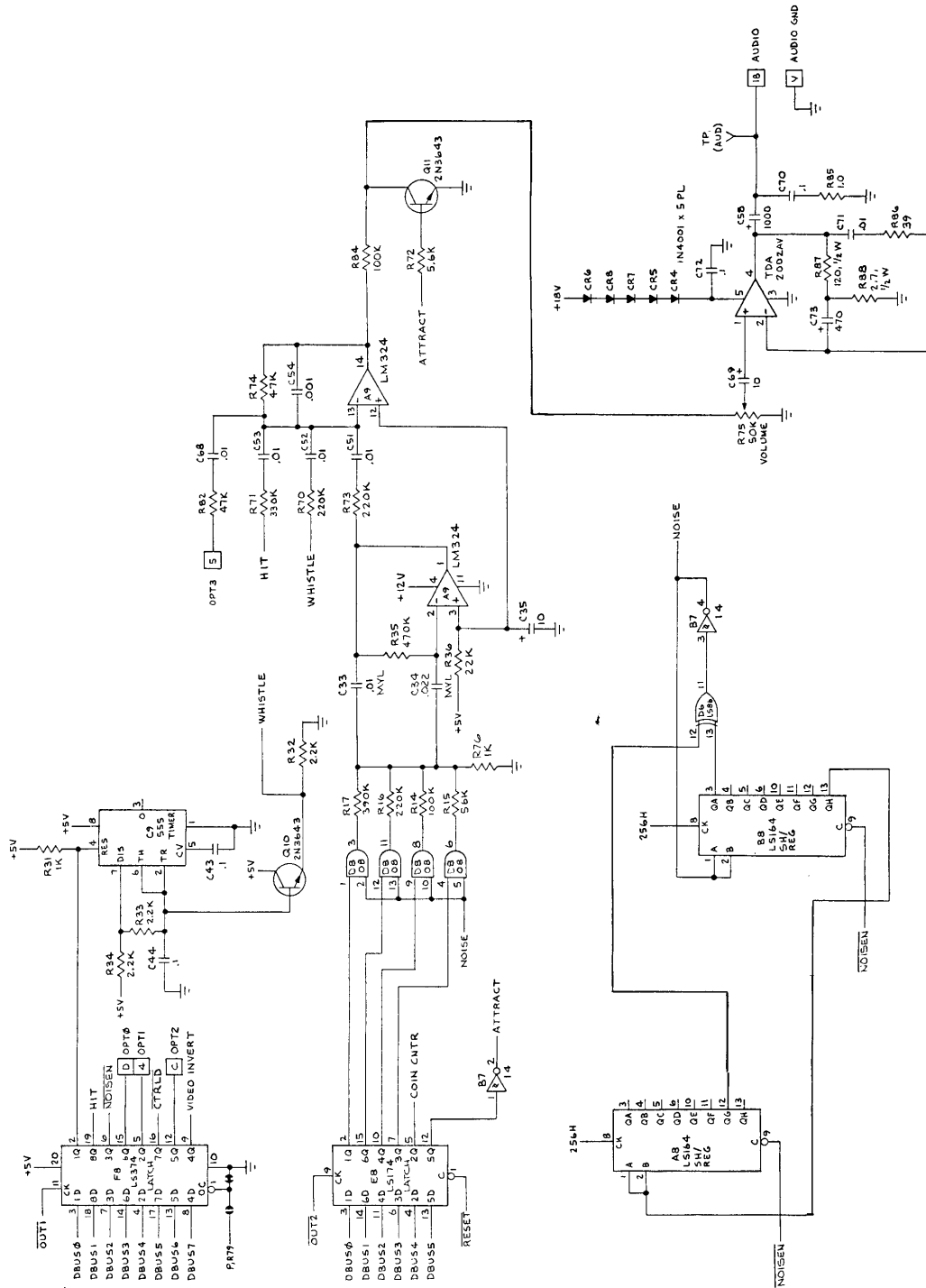
Figure 4-17 Audio Circuitry
(Part of 034634-XX B)

# illustrated
# parts catalog
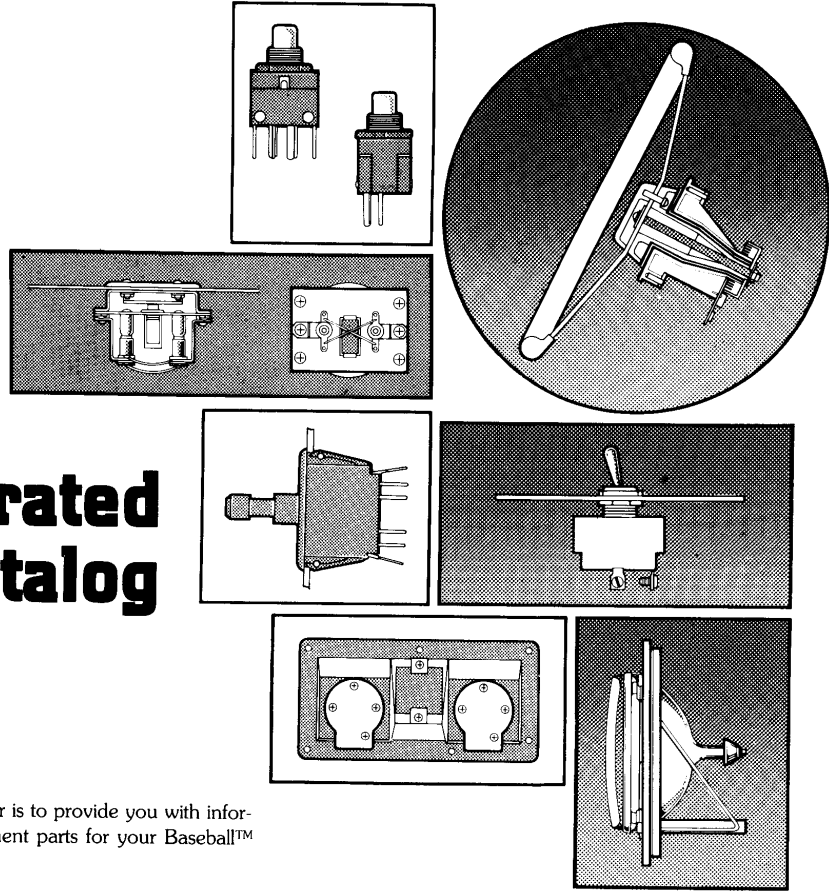
The purpose of this chapter is to provide you with information for ordering replacement parts for your Baseball™ game.

When ordering parts from your distributor, give the part number, part name, applicable figure number of this catalog, and serial number of your game. This will help to avoid confusion and mistakes in your order. We hope the results will be less downtime and more profit from your game.

Baseball™

5

NOTES:

1. SECURE USING STAPLES (MIN. 8 PLACES).
2. APPLY R.T.V SILICON RUBBER (G.E. 108 OR EQUIV.) AS SHOWN.
3. TAPE FULL LENGTH OF BEZEL. FLAP TO FULL LENGTH OF SHIELD SUPPORT.
4. 3M SEALANT (ITEM 34) IS TO BE APPLIED TO WOOD SURFACE ONLY. FILL ENTIRE RECESSED AREA. INSTALL GLASS & CHECK FOR SEAL ON ALL 4 SIDES.

SECTION A-A

ITEMS NOT SHOWN
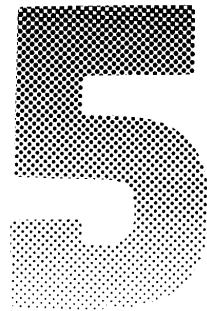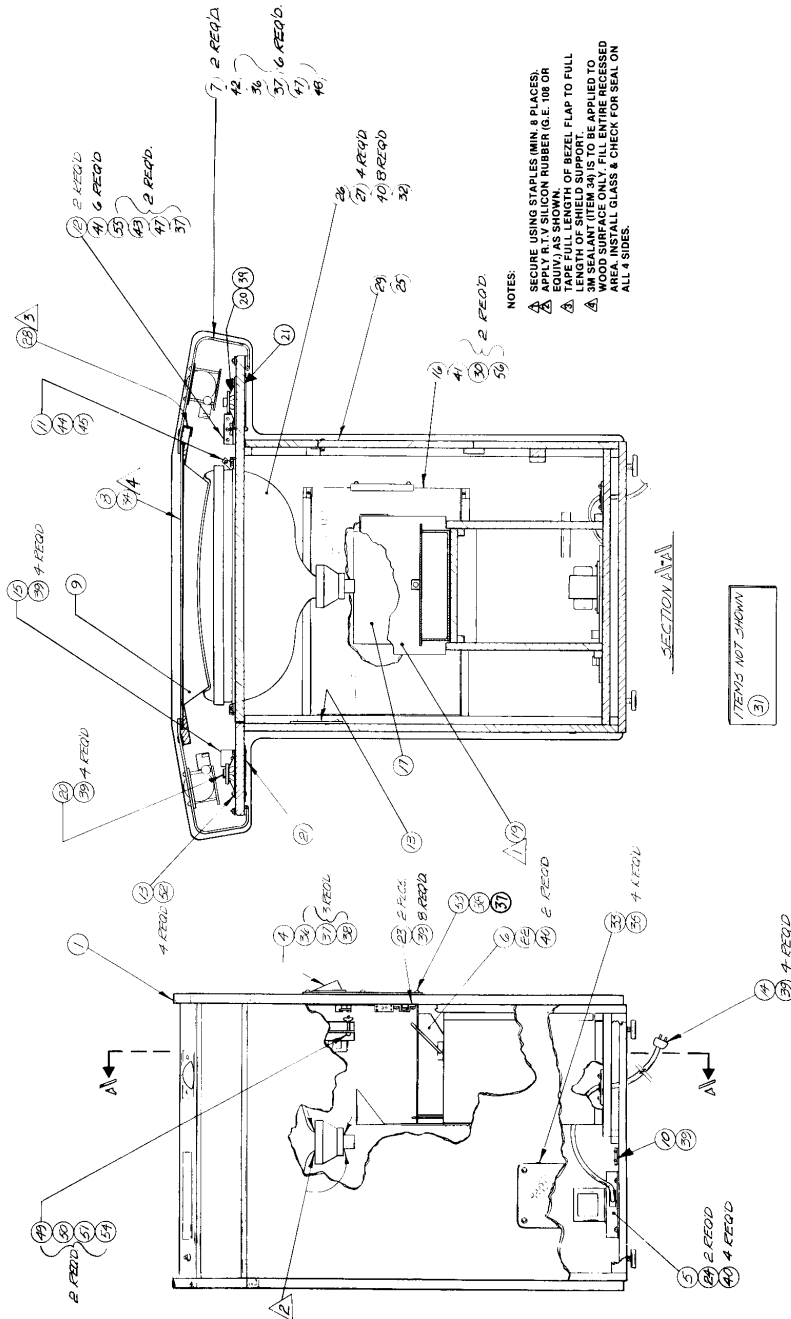
Figure 5-1   Final Assembly
A034526-01   B

Figure 5-1  Final Assembly, continued
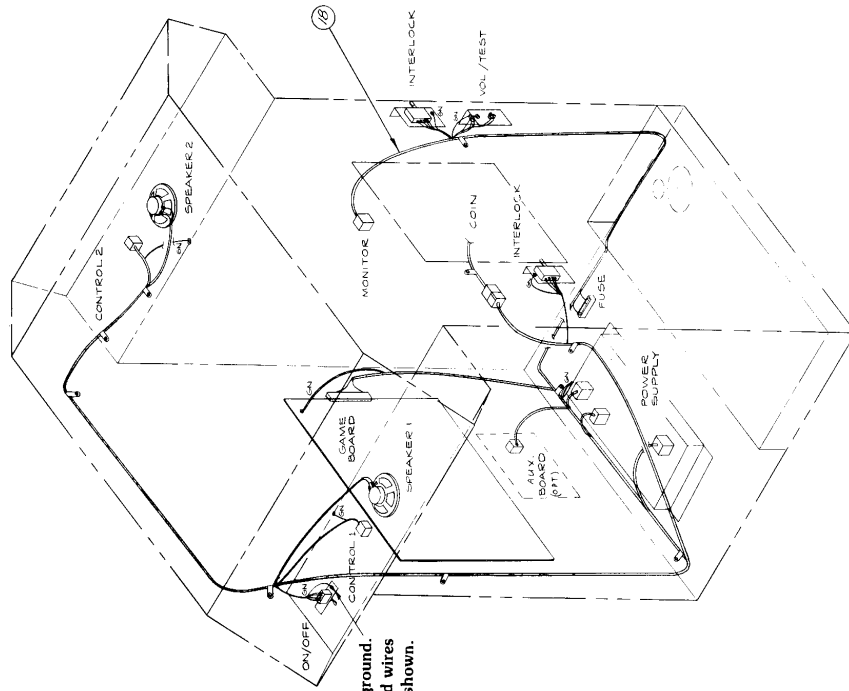
8 places, typical ground.
Attach green ground wires
as shown.

INTERLOCK
VOL/TEST
SPEAKER 2
CONTROL 2
MONITOR
COIN
INTERLOCK
FUSE
GAME BOARD
SPEAKER 1
AUX BOARD (OPT)
POWER SUPPLY
CONTROL 1
ON/OFF

**Figure 5-1 Final Assembly**
**Parts List**

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 1 | A034504-01 | 1 | Cabinet Assembly |
| 4 | A009083-16 | 1 | Coin Door Final Assembly. Consists of A006794-XX Coin Door Assy. and A006921-01 Harness Assy. For breakdown of Coin Door Assy. see Figure 5-2. |
| 5 | A007197-01 | 1 | Power Supply Assembly—see Figure 5-4 |
| 6 | A007902-01 | 1 | Cash Box Assembly, consisting of the following 3 items: |
|  | 030244-01 | 1 | Cash Drawer |
|  | 006317-01 | 1 | Cash Box Lid |
|  | 006445-01 | 1 | Cash Box Handle |
| 7 | A034533-01 | 2 | Control Panel Assembly—see Figure 5-5 |
| 8 | 033494-01 | 1 | Glass Shield with Graphics |
| 9 | 033493-01 | 1 | Cardboard Bezel with Graphics |
| 10 | 46-2012502 | 1 | 3AG 2½-Amp. 250-Volt Slow-Blow Cartridge-Type Fuse |
| 11 | 033098-01 | 1 | Stop |
| 12 | 002728-01 | 2 | Panel Mounting Bracket |
| 13 | 004131-02 | 2 | Mesh Ventilation Grille |
| 14 | A033016-03 | 1 | Power Cord Assembly |
| 15 | 007103-01 | 1 | On/Off Switch Cover |
| 16 | A034634-01 | 1 | Baseball PCB Assembly—see Figure 5-8 |
| 17 | 034536-01 | 1 | Foam Vibration Damper |
| 18 | A034564-01 | 1 | Harness/Switch Assembly—see Figure 5-9 |
| 19 | 034497-01 | 1 | Monitor/Cash Box Guard |
| 20 | 48-004 | 2 | 5-Inch 8-Ohm 5-Watt Speaker |
| 21 | 000869-01 | 2 | Speaker Grille |
| 22 | 006870-01 | 1 | Cash Box Bracket |
| 23 | 007882-02 | 2 | Interlock Switch Cover |
| 24 | 46-2023002 | 2 | 3AB 3-Amp. 250-Volt Slow-Blow Cartridge-Type Fuse |
| 25 | 005233-01 | 1 | Rear Door Seal |
| 26 | 92-030 | 1 | 23-Inch Diagonal Measure Black-and-White TV Monitor |
| 27 | 005594-01 | 4 | Monitor Tie-Down Bracket |
| 28 | 78-67032 | A/R | 2" Wide Black Adhesive Paper Tape |
| 29 | A034534-01 | 1 | Service Door Assembly |
| 30 | 030868-01 | 2 | Connector Mount |
| 31 | TM-123 | A/R | TEC Videoelectronics Monitor Service Manaul |
|  | TM-124 |  | Motorola Monitor Service Manual |
|  | TM-125 |  | Wells-Gardner Monitor Service Manual |
| 32 | 006319-03 | 1 | Copyright Decal |
| 33 | 034537-01 | 1 | Mesh Ventilation Grille |
| 34 | 78-13025 | A/R | 3M Brand Sealant, 1/8" × 3/8" (3M Part No. EC-5354) |
| 36 | 75-5520B | 9 | #¼-20 × 1¼" Round-Head Square-Neck Black Oxide Steel Carriage Bolt |
| 37 | 75-015S | 12 | #¼ Flat Plain SAE-Standard Regular-Pattern Steel Washer |
| 38 | 75-990505S | 4 | #¼-20 Self-Locking Prevailing-Torque Shallow-Pattern Steel Hex Nut |

**ATARI®**

**Figure 5-1   Final Assembly, continued**
**Parts List**

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 39 | 72-6610S | 25 | #6 × 5/8" Cross-Recessed Pan-Head Type AB Zinc-Plated Steel Thread-Forming Screw |
| 40 | 72-6812S | 14 | #8 × ¾" Cross-Recessed Pan-Head Type AB Zinc-Plated Steel Thread-Forming Screw |
| 41 | 72-6810S | 8 | #8 × 5/8" Cross-Recessed Pan-Head Type AB Zinc-Plated Steel Thread-Forming Screw |
| 42 | 034509-16 | 6 | #¼-20 × 1" Socket Cap Countersunk Flat-Head Black Oxide Screw with Key Size of 0.156" Square. Thread-Locking Compound applied before Assembly. |
| 43 | 75-935 | 2 | #¼-20 Steel Wing Nut |
| 44 | 72-6012S | 1 | #10 × ¾" Cross-Recessed Pan-Head Type AB Zinc-Plated Steel Thread-Forming Screw |
| 45 | 75-010S | 1 | #10 Flat Plain SAE-Standard Regular-Pattern Steel Washer |
| 47 | 75-045S | 8 | #¼ Corrosion-Resistant Steel Split Lock Washer |
| 48 | 75-915S | 6 | #¼-20 Standard Hex Pattern Cadmium-Plated Steel Machine Nut |
| 49 | 75-931 | 2 | #10-24 Steel Wing Nut |
| 50 | 75-5124B | 2 | #10-24 × 1½" Round-Head Square-Neck Black Oxide Steel Carriage Bolt |
| 51 | 75-040S | 2 | #10 Corrosion-Resistant Steel Split Lock Washer |
| 52 | 72-6608S | 4 | #6 × ½" Cross-Recessed Pan-Head Type AB Zinc-Plated Steel Thread-Forming Screw |
| 53 | 75-5516B | 1 | #¼-20 × 1" Round-Head Square-Neck Black Oxide Steel Carriage Bolt |
| 54 | 75-030S | 2 | #10 Flat Plain SAE-Standard Wide-Pattern Steel Washer |
| 55 | 75-5524B | 2 | #¼-20 × 1½" Round-Head Square-Neck Black Oxide Steel Carriage Bolt |
| 56 | 72-1406S | 2 | #4-40 × 3/8" Cross-Recessed Pan-Head Type AB Zinc-Plated Steel Thread-Forming Screw |

**ATARI**®
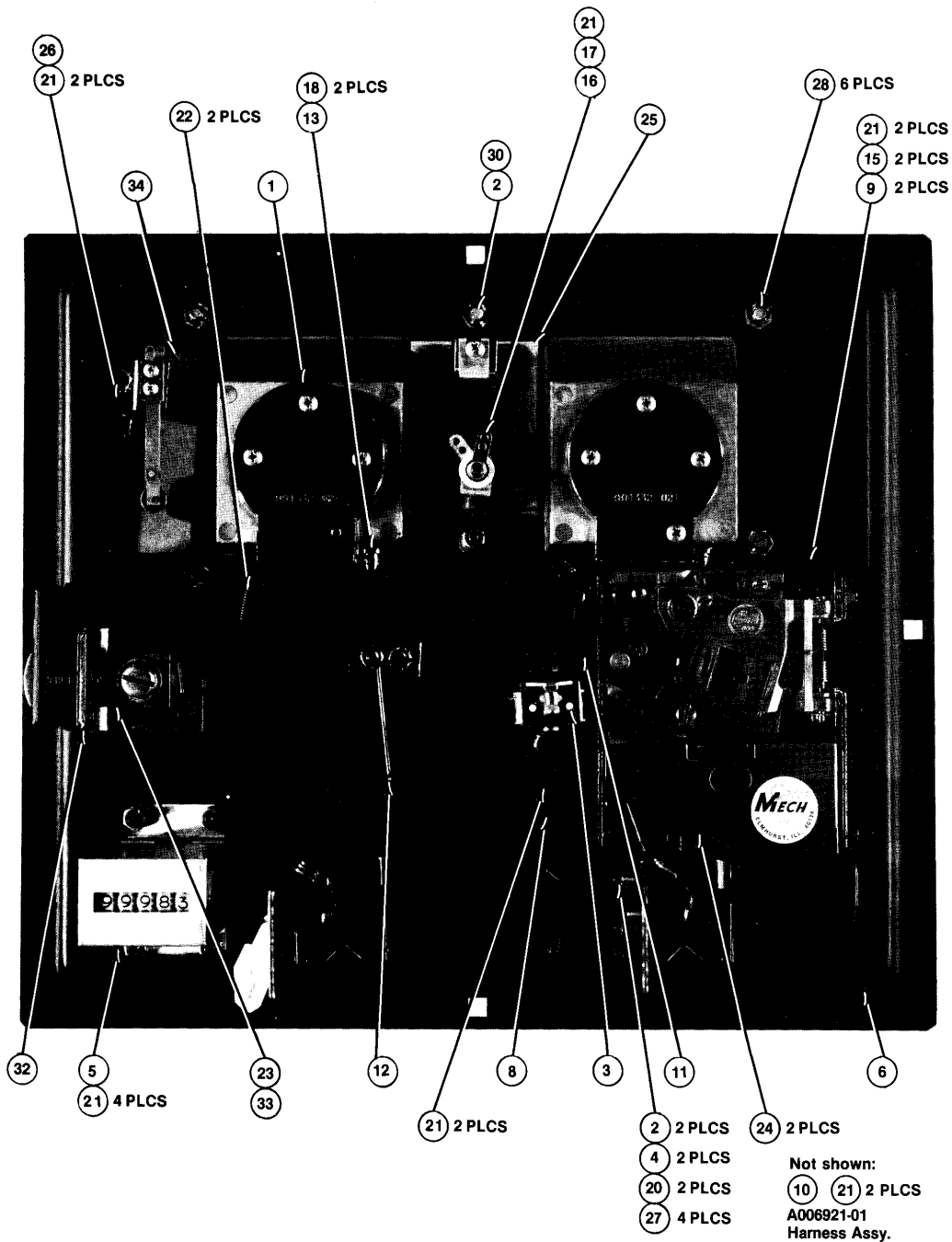
Figure 5-2   Coin Door Assembly
A006794-16 thru -27   J

**Figure 5-2 Coin Door Assembly**
**Parts List**

| Item | Part No. | Qty. | Description |
|---|---|---|---|
| 1 | A007637-16 | ↑ | Front Bezel Assy.—Used only on -16 Coin Door Assy. (25¢ ) |
| | A007637-17 | | Front Bezel Assy.—Used only on -17 Coin Door Assy. (5 Fr) |
| | A007637-18 | | Front Bezel Assy.—Used only on -18 Coin Door Assy. (1 DM) |
| | A007637-19 | One of these used per coin door | Front Bezel Assy.—Used only on -19 Coin Door Assy. (1 Kr) |
| | A007637-20 | | Front Bezel Assy.—Used only on -20 Coin. Door Assy. (100 Y) |
| | A007637-21 | | Front Bezel Assy.—Used only on -21 Coin Door Assy. (10 pence) |
| | A007637-22 | | Front Bezel Assy.—Used only on -22 Coin Door Assy. (20¢ Australian) |
| | A007637-23 | | Front Bezel Assy.—Used only on -23 Coin Door Assy. (1 DM/2 DM) |
| | A007637-24 | | Front Bezel Assy.—Used only on -24 Coin Door Assy. (1 Fr) |
| | A007637-25 | | Front Bezel Assy.—Used only on -25 Coin Door Assy. (1 Baht) |
| | A007637-26 | | Front Bezel Assy.—Used only on -26 Coin Door Assy. (1 DM/5 DM) |
| | A007637-27 | ↓ | Front Bezel Assy.—Used only on -27 Coin Door Assy. (100 Lire) |
| | | | *For breakdown of Front Bezel Assy., see Figure 5-3* |
| 2 | 72-HA4608C | 3 | #6-32 × ½" Cross-Recessed Pan-Head Cadmium-Plated Steel Tri-Fluted Thread-Forming Screw |
| 3 | A030362-01 | 1 | Coin Lockout Assembly |
| 4 | A030250-01 | 2 | Coin Switch Assembly |
| 5 | A002465-01 | 1 | Coin Counter Assembly |
| 6 | 004320-01 | 1 | Coin Door Weldment |
| 8 | 004344-01 | 1 | Key Loop |
| 9 | 004340-01 | 2 | Spring Return (used only on German DM coin doors) |
| 10 | 004337-01 | 2 | Bracket for Lock-Out Wires |
| 11 | 004338-01 | 1 | Right-Hand Lock-Out Wire |
| 12 | 004336-01 | 1 | Left-Hand Lock-Out Wire |
| 13 | 004326-01 | 2 | Scavenger Button |
| 15 | 006904-01 | 2 | Spacer (used only on German DM coin doors) |
| 16 | 030257-01 | 1 | Lamp Socket |
| 17 | 70-11-47 | 1 | NEMA #47 Incandescent Miniature Bayonet-Base Lamp |
| 18 | 73-3008 | 2 | Carbon Spring Steel External Retaining Ring, for ¼" Diameter Shaft |
| 20 | 72-HA4604C | 2 | #6-32 × ¼" Cross-Recessed Pan-Head Cadmium-Plated Steel Tri-Fluted Thread-Forming Screw |
| 21 | 75-99516 | 13* | #6-32 Steel Nut and Spring Washer Assembly |
| | | | *Quantity of 15 is used on the German DM coin doors |
| 22 | 008629-01 | 2 | Spring |
| 23 | 71-2118 | 1 | Cam Lock, Hudson #CR73A045S |
| 24 | 71-1225CU | ↑ | Coin Mechanism for American Quarter |
| | 71-1205FF | | Coin Mechanism for French 5-Francs Coin |
| | 71-1201MG | | Coin Mechanism for German 1-Mark Coin |
| | 71-1201KS | 2 of any of these used per coin door, as required | Coin Mechanism for Swedish 1-Krona Coin |
| | 71-12100YJ | | Coin Mechanism for Japanese 100-Yen Coin |
| | 71-1210PE | | Coin Mechanism for English 10-Pence Coin |
| | 71-1220CA | | Coin Mechanism for Australian 20-Cent Coin |
| | 71-1202MG | | Coin Mechanism for German 2-Mark Coin |
| | 71-1201FF | | Coin Mechanism for French 1-Franc Coin |
| | 71-1201BT | | Coin Mechanism for Thai 1-Baht Coin |
| | 71-1205MG | | Coin Mechanism for German 5-Mark Coin |
| | 71-120100LI | ↓ | Coin Mechanism for Italian 100-Lire Coin |

Figure 5-2   Coin Door Assembly, continued
Parts List

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 25 | 007753-01 | 1 | Anti-Probe Plate |
| 26 | A007638-01 | 1 | Slam Switch Assembly |
| 27 | 75-036S | 4 | #6 Flat Plain Wide-Pattern SAE-Standard Steel Washer |
| 28 | 73-3025 | 6 | Carbon Spring Steel External Retaining Ring, for 0.184" Diameter Shaft |
| 30 | 75-056 | 1 | #6 Internal-Tooth Steel Lock Washer |
| 32 | 033368-01 | 1 | Lock Bracket |
| 33 | 033369-01 | 1 | Lock Arm |
| 34 | 033371-01 | 1 | Slam Switch Insulator |

ATARI®
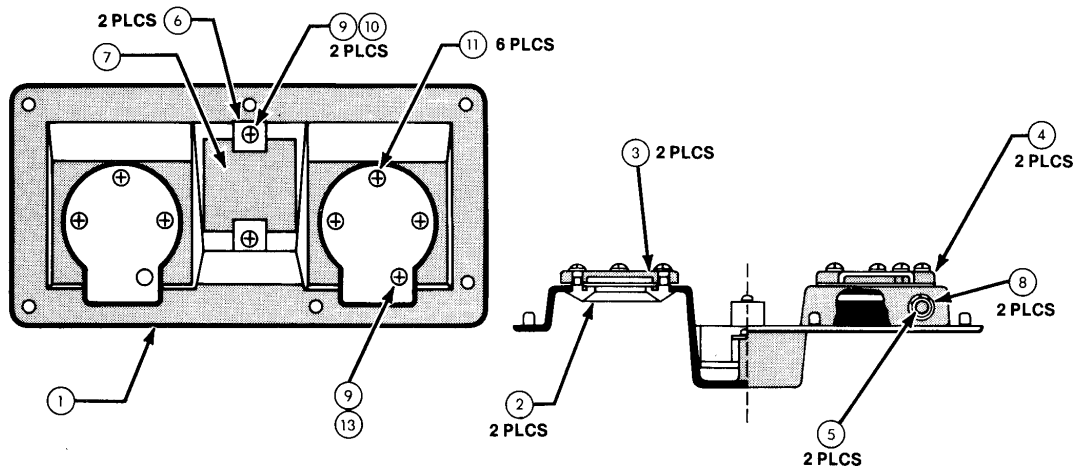


Figure 5-3   Front Bezel Assembly
A007637-16 thru -27   G

**Figure 5-3  Front Bezel Assembly**
**Parts List**

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 1 | 004328-02 | 1 | Bezel |
| 2 | 004330-02 | ↑ | Ring for American Quarter |
|   | 004330-02 |   | Ring for French 5-Franc Coin |
|   | 009153-02 | Two of these used per coin door | Ring for German 1-Deutschmark Coin |
|   | 004330-02 |   | Ring for Swedish 1-Krona Coin |
|   | 009153-02 |   | Ring for Japanese 100-Yen Coin |
|   | 007752-02 |   | Ring for English 10-Pence Coin |
|   | 007752-02 |   | Ring for Australian 20¢ Coin |
|   | 030677-02 |   | Ring for German 2-Deutschmark Coin |
|   | 009153-02 |   | Ring for French 1-Franc Coin |
|   | 030677-02 |   | Ring for Thai 1-Baht Coin |
|   | 007752-02 |   | Ring for German 5-Deutschmark Coin |
|   | 030677-02 | ↓ | Ring for Italian 100-Lire Coin |
| 3 | 004331-02 | 2 | Coin Shield |
| 4 | 004332-02 | 2 | Primary Coin Chute |
| 5 | 004327-01 | 2 | Scavenger Button Bearing |
| 6 | 004328-01 | 2 | Price Plate Clamp |
| 7 | 004343-01 | ↑ | Price Plate— *25* |
|   | 004343-06 |   | Price Plate—*5 FR* |
|   | 004343-04 | One of these used per coin door | Price Plate—*1 DM* |
|   | 004343-03 |   | Price Plate—*1 KR* |
|   | 004343-05 |   | Price Plate—*¥ 100* |
|   | 004343-02 |   | Price Plate— *10 P* |
|   | 004343-07 |   | Price Plate—*20¢ Australian* |
|   | 004343-08 |   | Price Plate—*Einwurf 1 DM/2 DM* |
|   | 004343-09 |   | Price Plate—*1 FR* |
|   | 004343-10 |   | Price Plate—*1 Baht* |
|   | 004343-11 | ↓ | Price Plate—*Einwurf 1 DM/5 DM* |
|   | 004343-12 |   | Price Plate—*100 Lire* |
| 8 | 73-3009 | 2 | Carbon Spring Steel External Retaining Ring, for 3/8" Shaft Diameter |
| 9 | 72-1604S | 3 | #6-32 × ¼" Cross-Recessed Pan-Head Cadmium-Plated Steel Machine Screw |
| 10 | 75-046 | 2 | #6 Corrosion-Resistant Steel Split Lock Washer |
| 11 | 72-CL606 | 6 | #6-32 × 3/8" Phillips Pan-Head Steel "Rolok" Self-Threading, Thread-Rolling Machine Screw |
| 13 | 75-046 | 1 | #6 Internal-Tooth Steel Lock Washer |

**ATARI®**

TOP VIEW

(See Figure 5-1 for fuse values for F1 and F2)

BOTTOM VIEW
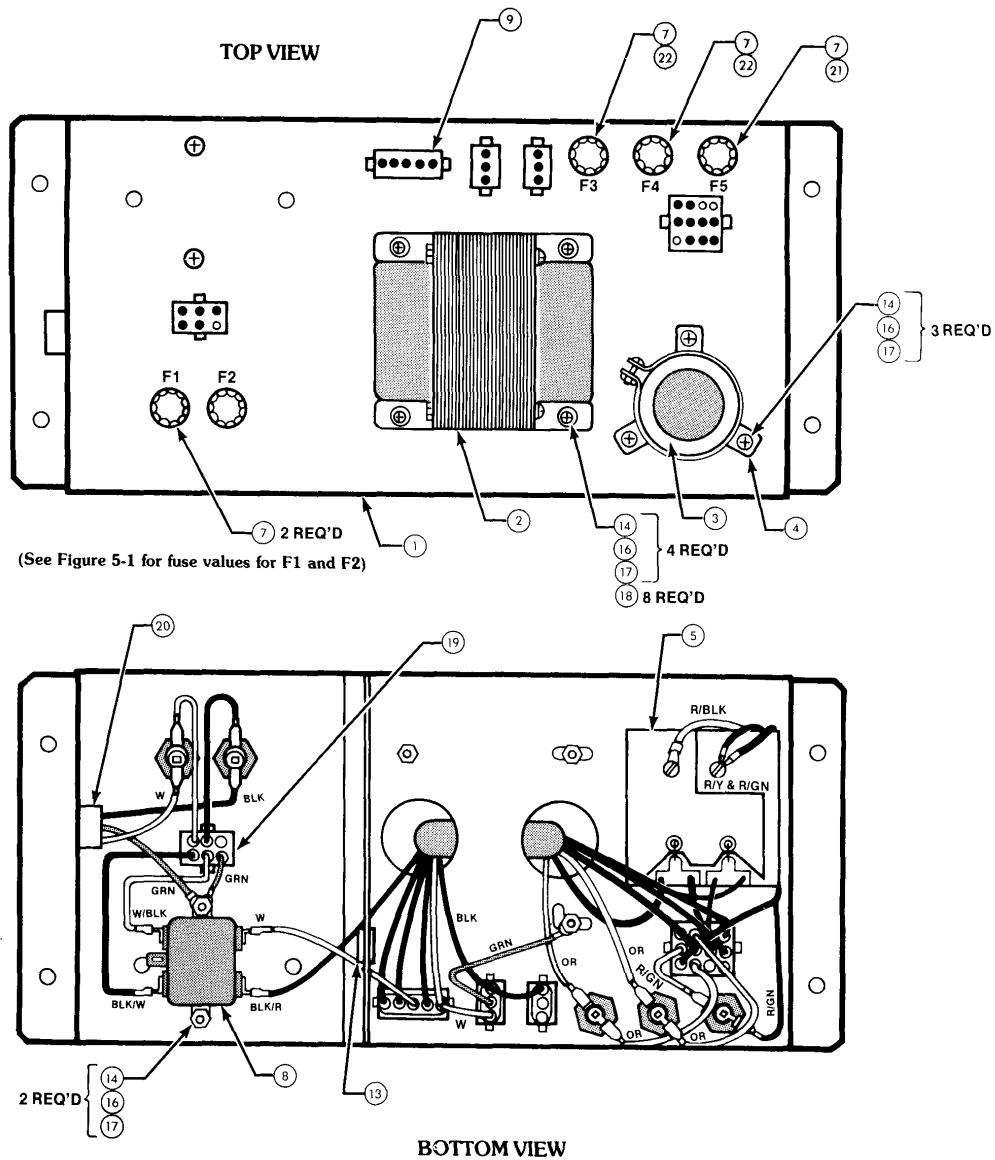
Figure 5-4   Type B Power Supply Assembly
A007197-01   J

**Figure 5-4  Type B Power Supply Assembly**
**Parts List**

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 1 | A009266-01 | 1 | Power Supply Base Weldment Assembly |
| 2 | A006886-01 | 1 | Type B Transformer Termination Assembly |
| 3 | 29-053 | 1 | 26,000 µf 15V Electrolytic Capacitor |
| 4 | 78-70501SC | 1 | 2" Diameter Cadmium-Plated Steel Component Mounting Bracket |
| 5 | A006555-01 | 1 | P.C. Board Rectifier |
| 7 | 79-4411004 | 5 | Panel-Mounting Non-Indicating 3AG Fuse Post |
| 8 | 41-2003 | 1 | 115/250 VAC 5-amp 5-400 Hz AC Line Filter |
| 9 | A006958-01 | 1 | 95V Voltage Selection Block (Black Wires) |
| 10 | A006958-02 | 1 | 110V Voltage Selection Block (Orange Wires) |
| 11 | A006958-03 | 1 | 205V Voltage Selection Block (Green Wires) |
| 12 | A006958-04 | 1 | 220V Voltage Selection Block (Red Wires) |
| 13 | 78-2708 | 1 | Nylon Tape 6/6 Hole Bushing, 5/8" Inside Diameter × 55/64" Outside Diameter × ¼" Thick |
| 14 | 72-1810S | 9 | #8-32 × 5/8" Pan-Head Cross-Recessed Cadmium-Plated Steel Machine Screw |
| 16 | 75-048 | 9 | #8 Corrosion-Resistant Steel Split Lock Washer |
| 17 | 75-918S | 9 | #8-32 Standard Hex-Pattern Cadmium-Plated Steel Nut |
| 18 | 75-018S | 8 | #8 Flat Plain SAE-Standard Regular-Pattern Steel Washer |
| 19 | A007192-01 | 1 | Power Switch Termination |
| 20 | A007444-01 | 1 | Power In Harness |
| 21 | 46-2038001 | 1 | 8-amp 125V 3AG Normal-Acting Fuse |
| 22 | 46-2012501 | 2 | 2½-amp 125V 3AG Slow-Acting Fuse |
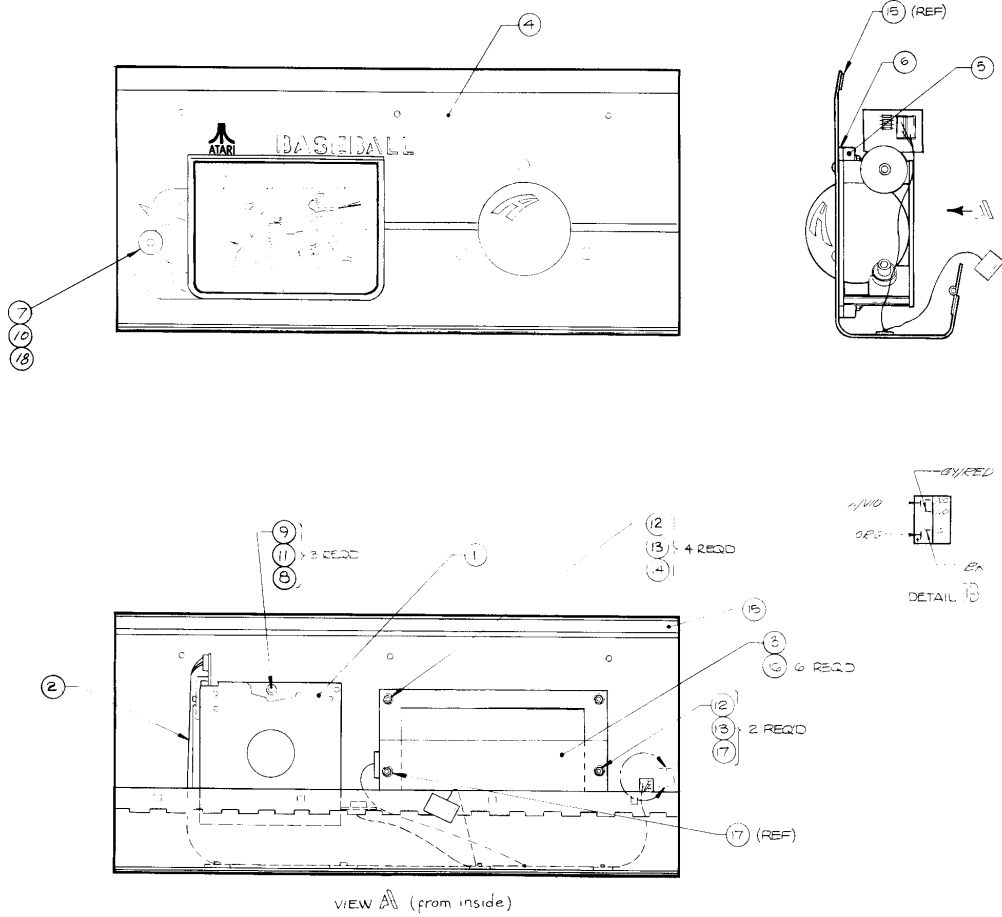
Figure 5-5   Control Panel Assembly
A034533-01   B

**5-12   Baseball™**

**Figure 5-5   Control Panel Assembly**
Parts List

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 1 | A033360-01 | 1 | Trak Ball™ Assembly — see Figure 5-6 |
| 2 | A034565-01 | 1 | Control Harness Assembly |
| 3 | A033729-01 | 1 | Play Select PCB Assembly — see Figure 5-7 |
| 4 | 034491-01 | 1 | Metal Control Panel with Graphics |
| 5 | 033097-01 | 1 | Play Select Panel Support |
| 6 | 034492-01 | 1 | Acrylic Play Select Panel with Graphics |
| 7 | 001856-01 | 1 | Aluminum Bushing |
| 8 | 75-990505S | 3 | #1/4-20 Self-Locking Prevailing-Torque Shallow-Pattern Steel Hex Nut |
| 9 | 75-5512N | 3 | #1/4-20 × 3/4" Round-Head Square-Neck Nickel-Plated Steel Carriage Bolt |
| 10 | 62-039 | 1 | SPDT Momentary Pushbutton Switch, with Red Cap and Light-Emitting Diode |
| 11 | 75-015S | 3 | #1/4 Flat Plain SAE-Standard Regular-Pattern Steel Washer |
| 12 | 75-040S | 6 | #10 Corrosion-Resistant Steel Split Lock Washer |
| 13 | 75-910S | 6 | #10-32 Standard Hex-Pattern Cadmium-Plated Steel Nut |
| 14 | 75-010S | 6 | #10 Plain Flat Regular-Pattern Steel Washer |
| 15 | 78-6900402 | A/R | Black Single-Coated Adhesive Foam Tape, 1/4" wide × 1/8" thick |
| 16 | 70-11-47 | 6 | NEMA #47 Incandescent Miniature Bayonet-Base Lamp |
| 17 | 75-07053 | 2 | #10 Fiber Washer |
| 18 | 75-07054 | 1 | Flat Nylon Washer, 0.470" inside diameter × 0.968" outside diameter × 0.075" thick |

ATARI®
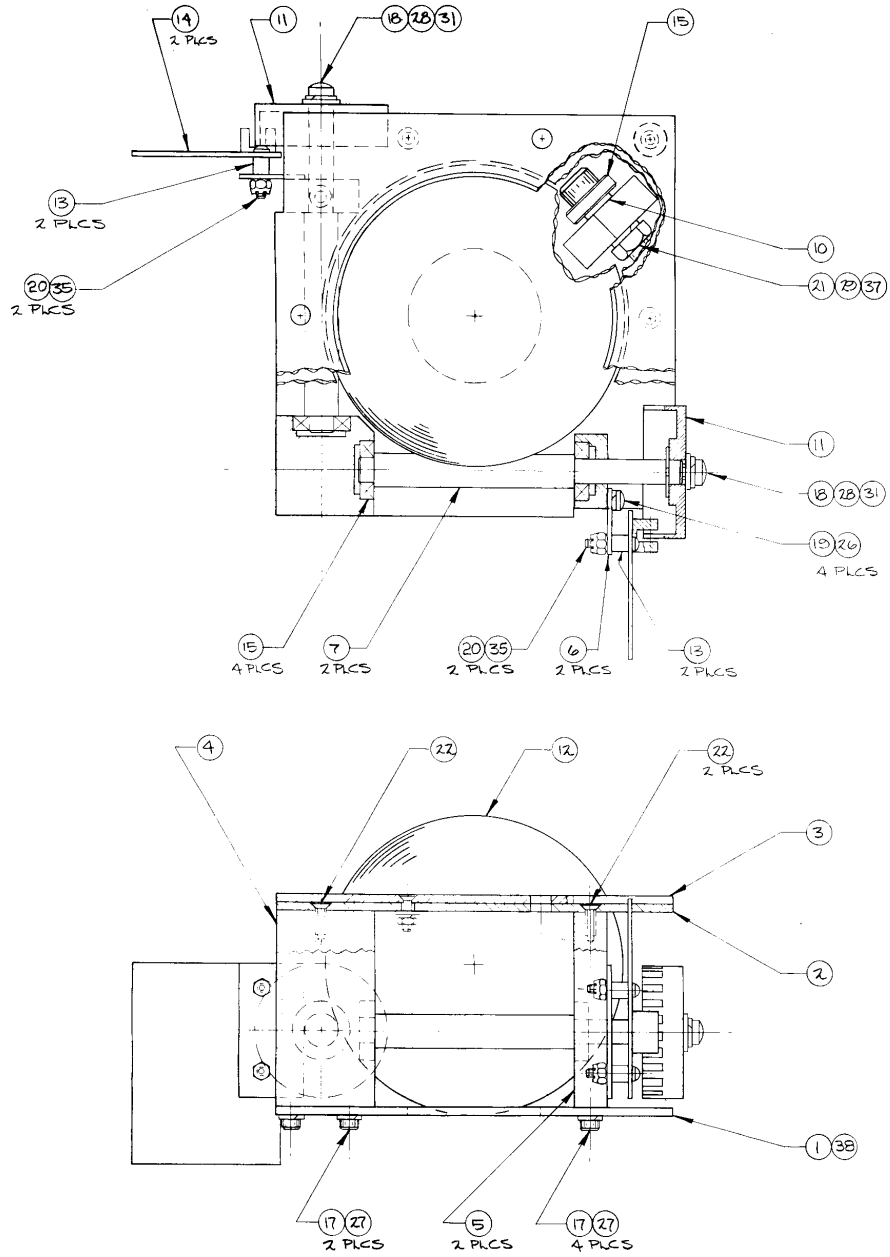
Figure 5-6   Trak Ball™ Assembly
A033360-01   F
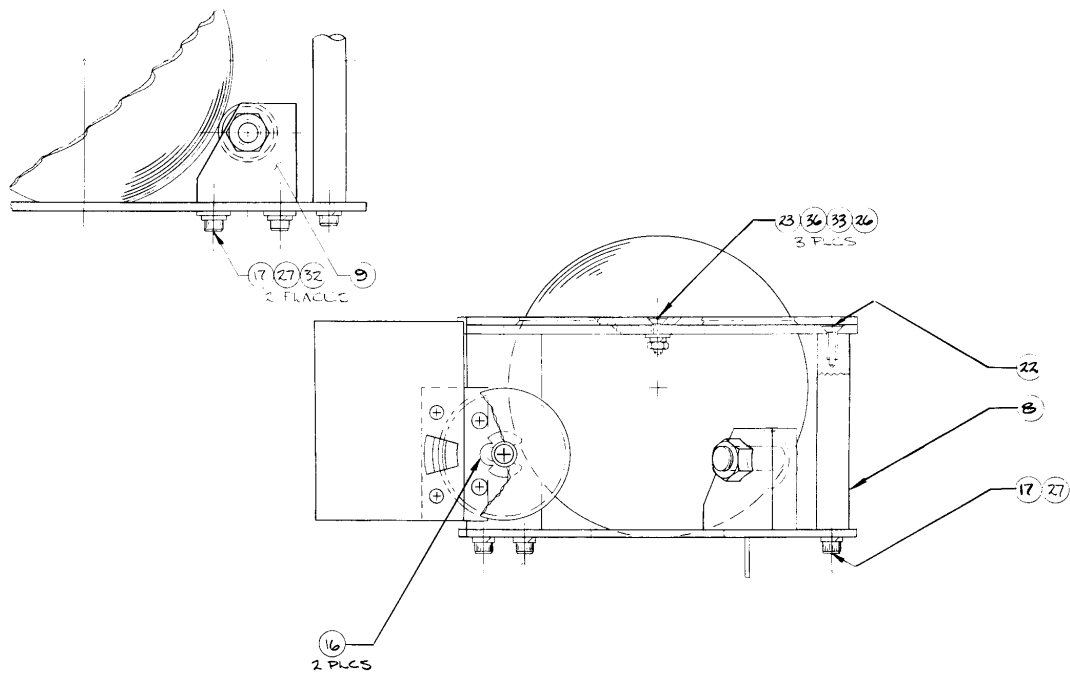
**Figure 5-6   Trak Ball™ Assembly**
**Parts List**

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 1 | 033355-01 | 1 | Base Plate |
| 2 | 033356-01 | 1 | Top Plate |
| 3 | 033357-01 | 1 | Cover Plate (Acrylic) |
| 4 | 033358-01 | 1 | Corner Post |
| 5 | 033359-01 | 2 | End Post |
| 6 | 033361-01 | 2 | Steering PCB Bracket |
| 7 | 033362-01 | 2 | Roller Shaft |
| 8 | 033363-01 | 1 | Stand-Off |
| 9 | 033364-01 | 1 | Adjustable Post |
| 10 | 033365-01 | 1 | Spacer |
| 11 | 000616-01 | 2 | Light Hub |
| 12 | 033366-01 | 1 | Trak Ball™ |

ATARI®

Figure 5-6   Trak Ball™ Assembly, continued
Parts List

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 13 | 74-A00011 | 4 | Phenolic Spacer, 1/8" inside diameter × ¼" outside diameter × ¼" long |
| 14 | A009060-02 | 2 | Printed Circuit Board Assembly |
| 15 | 033367-01 | 5 | Bearing |
| 16 | 73-3006 | 2 | Carbon Spring Steel External Retaining Ring, for 3/8" shaft diameter |
| 17 | 72-8808 | 9 | #8-32 × ½" Hex Socket-Head Cap Steel Alloy Machine Screw |
| 18 | 72-1006S | 2 | #10-32 × 3/8" Cross-Recessed Pan-Head Cadmium-Plated Steel Machine Screw |
| 19 | 72-1606S | 4 | #6-32 × 3/8" Cross-Recessed Pan-Head Cadmium-Plated Steel Machine Screw |
| 20 | 72-1408S | 4 | #4-40 × ½" Cross-Recessed Pan-Head Cadmium-Plated Steel Machine Screw |
| 21 | 72-8920S | 1 | #3/8-16 × 1¼" Hex Socket-Head Cap Steel Alloy Machine Screw |
| 22 | 85-1808B | 4 | #8-32 × ½" Socket Cap Flat Countersunk Head Black Oxide Steel Screw |
| 23 | 75-3608S | 3 | #6-32 × ½" Cross-Recessed Flat-Head Cadmium-Plated Steel Machine Screw |
| 26 | 75-046S | 4 | #6 Corrosion-Resistant Steel Split Lock Washer |
| 27 | 75-048S | 9 | #8 Corrosion-Resistant Steel Split Lock Washer |
| 28 | 75-040S | 2 | #10 Corrosion-Resistant Steel Split Lock Washer |
| 29 | 75-041S | 1 | #3/8 Corrosion-Resistant Steel Split Lock Washer |
| 31 | 75-010S | 2 | #10 Flat Plain SAE-Standard Regular-Pattern Steel Washer |
| 32 | 75-018S | 2 | #8 Flat Plain SAE-Standard Regular-Pattern Steel Washer |
| 33 | 75-016S | 3 | #6 Flat Plain SAE-Standard Regular-Pattern Steel Washer |
| 35 | 75-990504C | 4 | #4-40 Hex Shallow-Pattern Self-Locking Prevailing-Torque Corrosion-Resistant Steel Nut |
| 36 | 75-916S | 3 | #6-32 Standard Hex-Pattern Cadmium-Plated Steel Machine Nut |
| 37 | 75-919S | 1 | #3/8-16 Standard Hex-Pattern Cadmium-Plated Steel Machine Nut |
| 38 | 034168-01 | 1 | Label with Lubrication Instructions |

ATARI®
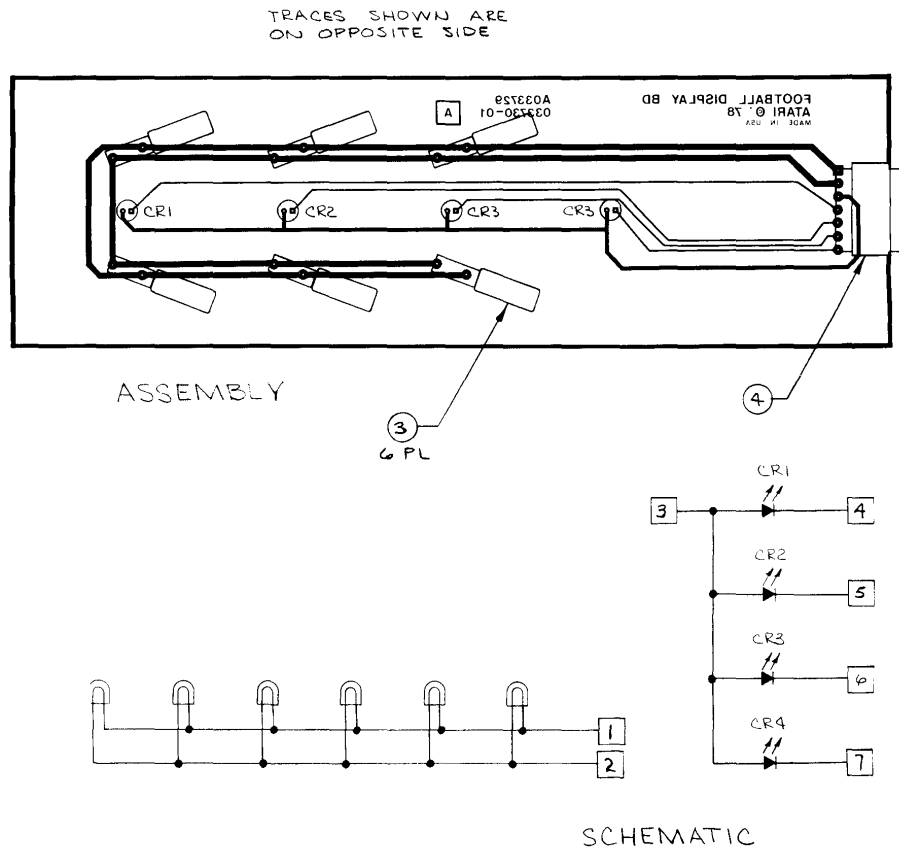
Figure 5-7 Play Select PCB Assembly
A033729-01 A

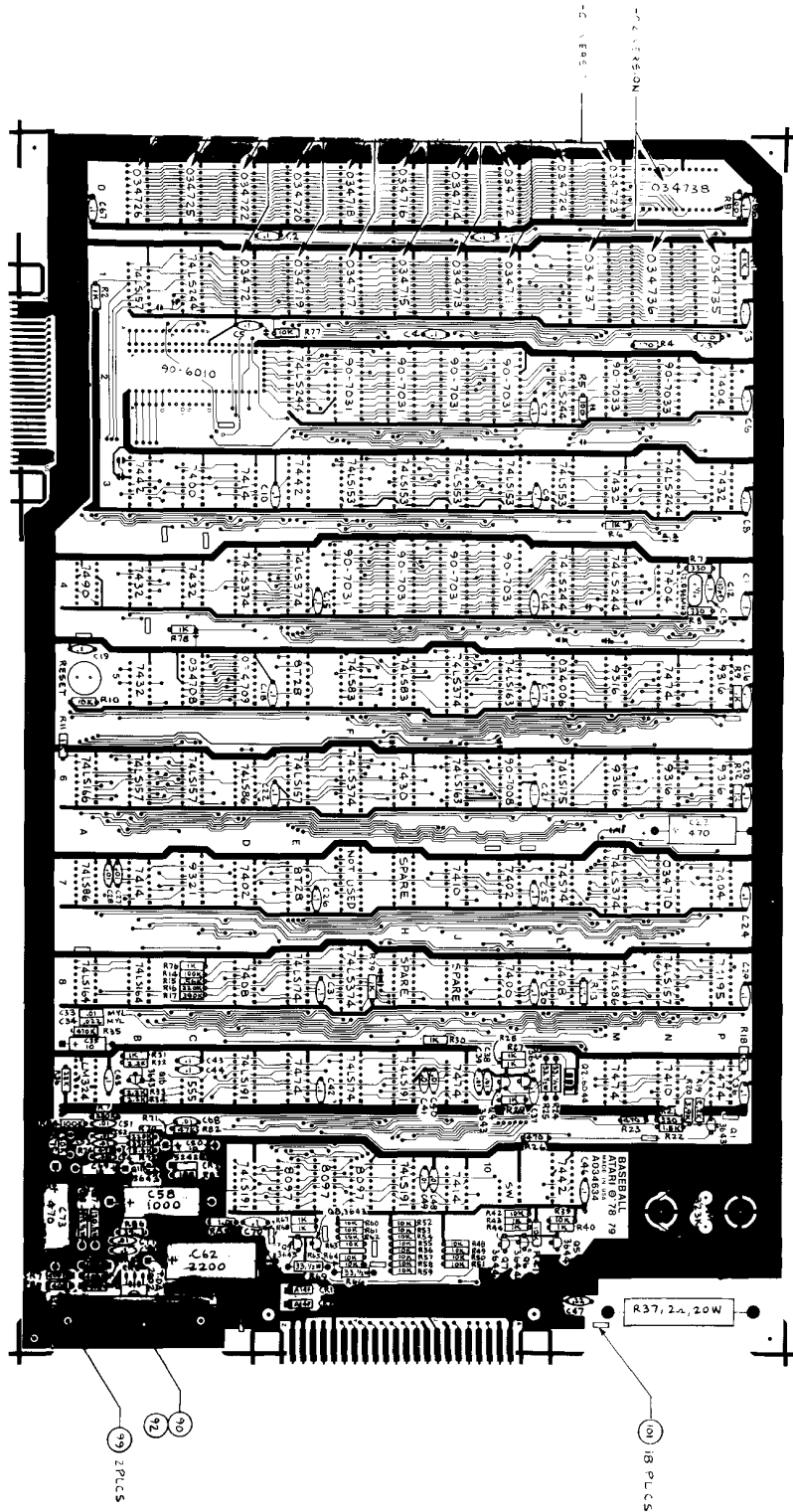| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 2 | 38-MV5053 | 4 | Light-Emitting Diode with Red Diffused Cap: 1.6 mcd, 20 mA, 1.7 Volts (MV5053)                    CR1-4 |
| 3 | 79-4312 | 6 | NEMA T-3¼ Right-Angle PCB Mounting Miniature Bayonet-Base Lamp Socket |
| 4 | 79-58281 | 1 | Right-Angle Header with 7 Contacts |

Figure 5-8   Baseball PCB Assembly
A034634-01 and -02   A

**Figure 5-8   Baseball PCB Assembly**
**Parts List**

| Item | Part No. | Qty. | Description | Ref. Design./ Location |
|------|----------|------|-------------|------------------------|
| 2 | 10-5101 | 4 | 100 Ohm, ±5%, ¼W Carbon Composition Resistor | R3-5, 81 |
| 3 | 10-5331 | 3 | 330 Ohm, ±5%, ¼W Carbon Composition Resistor | R7, 8, 21 |
| 4 | 10-5471 | 2 | 470 Ohm, ±5%, ¼W Carbon Composition Resistor | R23, 26 |
| 5 | 10-5102 | 21 | 1K Ohm, ±5%, ¼W Carbon Composition Resistor | R1, 2, 6, 9, 11-13, 18, 27-31, 40, 43, 44, 67, 68, 76, 78, 79 |
| 6 | 10-5152 | 1 | 1.5K Ohm, ±5%, ¼W Carbon Composition Resistor | R22 |
| 7 | 10-5222 | 5 | 2.2K Ohm, ±5%, ¼W Carbon Composition Resistor | R19, 32-34, 84 |
| 8 | 10-5392 | 1 | 3.9K Ohm, ±5%, ¼W Carbon Composition Resistor | R20 |
| 9 | 10-5562 | 1 | 5.6K Ohm, ±5%, ¼W Carbon Composition Resistor | R72 |
| 10 | 10-5103 | 23 | 10K Ohm, ±5%, ¼W Carbon Composition Resistor | R10, 39, 41, 42, 48-65, 77 |
| 11 | 10-5223 | 1 | 22K Ohm, ±5%, ¼W Carbon Composition Resistor | R36 |
| 12 | 10-5473 | 1 | 47K Ohm, ±5%, ¼W Carbon Composition Resistor | R74 |
| 13 | 10-5563 | 1 | 56K Ohm, ±5%, ¼W Carbon Composition Resistor | R15 |
| 14 | 10-5104 | 2 | 100K Ohm, ±5%, ¼W Carbon Composition Resistor | R14, 82 |
| 15 | 10-5224 | 3 | 220K Ohm, ±5%, ¼W Carbon Composition Resistor | R16, 70, 73 |
| 16 | 10-5334 | 1 | 330K Ohm, ±5%, ¼W Carbon Composition Resistor | R71 |
| 17 | 10-5394 | 1 | 390K Ohm, ±5%, ¼W Carbon Composition Resistor | R17 |
| 19 | 11-5330 | 4 | 33 Ohm, ±5%, ½W Carbon Composition Resistor | R24, 25, 66, 69 |
| 20 | 10-5390 | 1 | 39 Ohm, ±5%, ¼W Carbon Composition Resistor | R86 |
| 21 | 10-51P0 | 1 | 1 Ohm, ±5%, ¼W Carbon Composition Resistor | R85 |
| 22 | 19-315503 | 1 | 50K Ohm Vertical PCB-Mounting Cermet Trimpot (Bournes Series 3352V-1-50K) | R75 |
| 23 | 19-10020001 | 1 | 2 Ohm, ±10%, 20W Wirewound Resistor | R37 |
| 25 | 24-250106 | 3 | 10μf Electrolytic Radial-Lead Capacitor | C35, 50, 69 |
| 26 | 24-250108 | 1 | 1000μf Electrolytic 25V Radial-Lead Capacitor | C58 |
| 27 | 24-250477 | 2 | 470μf Electrolytic 25V Radial-Lead Capacitor | C23, 73 |
| 28 | 24-250228 | 1 | 2200μf Electrolytic 25V Radial-Lead Capacitor | C62 |
| 29 | 10-5181 | 1 | 180 Ohm, ±5%, ¼W Carbon Composition Resistor | R83 |
| 30 | 10-5474 | 1 | 470K Ohm, ±5%, ¼W Carbon Composition Resistor | R35 |
| 31 | 27-250102 | 1 | 0.001μf Ceramic-Disc 25V Radial-Lead Capacitor | C54 |
| 32 | 27-250103 | 13 | 0.01μf Ceramic-Disc 25V Radial-Lead Capacitor | C27, 28, 38-41, 48, 49, 51-53, 68, 71 |
| 33 | 27-250104 | 38 | 0.1μf Ceramic-Disc 25V Radial-Lead Capacitor | C1-11, 13-22, 24-26, 29-31, 36, 37, 42-46, 66, 67, 70, 72 |

**ATARI**®

**Figure 5-8  Baseball PCB Assembly**
**Parts List**

| Item | Part No. | Qty. | Description | Ref. Design./ Location |
|------|----------|------|-------------|------------------------|
| 34 | 27-250224 | 1 | 0.22µf Ceramic-Disc 25V Radial-Lead Capacitor | C47 |
| 36 | 28-101101 | 1 | 100pf Radial-Lead Epoxy-Dipped 100V Mica Capacitor | C12 |
| 38 | 21-101103 | 1 | 0.01µf Radial-Lead Epoxy-Dipped 100V Mylar Capacitor | C33 |
| 39 | 21-101223 | 1 | 0.022µf Radial-Lead Epoxy-Dipped 100V Mylar Capacitor | C34 |
| 40 | 31-1N4001 | 5 | 50V Silicon Rectifier 1N4001 Diode | CR4-8 |
| 41 | 31-A14F | 2 | 50V 2.5A Miniature Axial-Lead High-Current Rectifier | CR1, 2 |
| 42 | 32-1N5242B | 1 | 12V, ±5%, 500mw Zener Diode, Type 1N5242B | CR3 |
| 44 | 33-2N3644 | 3 | PNP Silicon Transistor, Type 2N3644 | Q5-7 |
| 46 | 34-2N3643 | 7 | NPN Silicon Transistor, Tykpe 2N3643 | Q1, 3, 4, 8-11 |
| 47 | 34-2N6044 | 1 | Darlington NPN Transistor, Type 2N6044 | Q2 |
| 49 | 37-7400 | 2 | Type 7400 TTL Quad 2-Input NAND Gate Integrated Circuit | C3, K8 |
| 50 | 37-7402 | 2 | Type 7402 TTL Quad 2-Input NOR Gate Integrated Circuit | D7, K7 |
| 51 | 37-7404 | 3 | Type 7404 TTL Hex Inverter Integrated Circuit | P2, N4, P7 |
| 52 | 37-7408 | 2 | Type 7408 TTL 2-Input AND Gate Integrated Circuit | D8, L8 |
| 53 | 37-7410 | 2 | Type 7410 TTL Triple 3-Input NAND Gate Integrated Circuit | J7, N9 |
| 54 | 37-7414 | 3 | Type 7414 TTL Hex Schmitt Trigger Inverter Integrated Circuit | D3, B7, J10 |
| 55 | 37-7430 | 1 | Type 7430 TTL 8-Input NAND Gate Integrated Circuit | H6 |
| 56 | 37-7432 | 5 | Type 7432 TTL Quad 2-Input OR Gate Integrated Circuit | M3, P3, B4, C4, B5 |
| 57 | 37-7442 | 3 | Type 7442 TTL 4-to-10 BCD-to-Decimal Integrated Circuit | B3, E3, L10 |
| 58 | 37-7474 | 5 | Type 7474 TTL Dual-D Edge Trigger Flip-Flop Integrated Circuit | N5, E9, J9, M9, P9 |
| 59 | 37-74S74 | 1 | Type 74S74 TTL Dual-D Edge Trigger Flip-Flop Integrated Circiut | L7 |
| 60 | 37-74LS83 | 2 | Type 74LS83 TTL 4-Bit Binary Full Adder Integrated Circuit | F5, H5 |
| 61 | 37-74LS86 | 3 | Type 74LS86 TTL Quad 2-Input Exclusive OR Gate Integrated Circuit | D6, A7, M8 |
| 62 | 37-7490 | 1 | Type 7490 TTL Decade Counter Integrated Circuit | A4 |
| 64 | 37-74LS153 | 5 | Type 74LS153 TTL Dual 4-line-to-1-line Data Selector/ Multiplexer Integrated Circuit | F3, H3, J3, K3 L3 |
| 65 | 37-74LS157 | 5 | Type 74LS157 TTL Quad 2-line-to-1-line Data Selector/ Multiplexer Integrated Circuit | B6, C6, E6, N8, B1 |
| 66 | 37-74LS163A | 2 | Type 74LS163A TTL Synchronous 4-Bit Counter Sync Clear Integrated Circuit | K5, J6 |
| 67 | 37-74LS164 | 2 | Type 74LS164 TTL 8-Bit Serial-In/Parallel-Out Shift Register Integrated Circuit | A8, B8 |

ATARI®

Figure 5-8   Baseball PCB Assembly, continued
Parts List

| Item | Part No. | Qty. | Description | Ref. Design./ Location |
|------|----------|------|-------------|------------------------|
| 68 | 37-74LS166 | 1 | Type 74LS166 TTL 8-Bit Shift Register Integrated Circuit | A6 |
| 69 | 37-74LS174 | 2 | Type 74LS174 TTL Hexadecimal D-Type Flip-Flop Integrated Circuit | E8, F9 |
| 70 | 37-74LS175 | 1 | Type 74LS175 TTL Quad D Flip-Flop Integrated Circuit | L6 |
| 71 | 37-74LS191 | 4 | Type 74LS191 TTL Synchronous Binary Up/Down Counter Integrated Circuit | D9, H9, D10, H10 |
| 72 | 37-74195 | 1 | Type 74195 TTL 4-Bit Parallel-Access Shift Register Integrated Circuit | P8 |
| 73 | 37-74LS244 | 6 | Type 74LS244 TTL Octal Buffers and Line Drivers Integrated Circuit | C1, E2, L2, N3, L4, M4 |
| 74 | 37-74LS374 | 6 | Type 74LS374 TTL Octal D Flip-Flop Tri-State Integrated Circuit | D4, E4, J5, F6, M7, F8 |
| 76 | 37-LM323K | 1 | 3-Amp. 5V Positive Voltage Regulator | |
| 77 | 37-LM324 | 1 | Type LM324 Linear Quad Operational Amplifier Integrated Circuit | A9 |
| 78 | 37-555 | 1 | Type NE555 Timer Integrated Circuit | C9 |
| 79 | 37-TDA2002AV | 1 | Type TDA2002AV 8W Linear Audio Amplifier Integrated Circuit | |
| 81 | 37-8T28 | 2 | Type 8T28 TTL Non-Inverting Out Tri-State Quad Bus Receiver Integrated Circuit | E5, E7 |
| 82 | 37-9316 | 5 | Type 9316 TTL 4-Bit Binary Counter Integrated Circuit | M5, P5, M6, N6, P6 |
| 83 | 37-9321 | 1 | Type 9321 TTL Dual 1-of-4 Decoder/Demultiplexer Integrated Circuit | C7 |
| 84 | 37-8097 | 3 | Type DM8097N TTL Tri-State Hex Buffer Integrated Circuit | E10, E/F10, F/H10 |
| 86 | 62-001 | 1 | SPST Pushbutton Switch | A5 |
| 87 | 66-114P1T | 1 | 4-Station Single-Throw Dual-Inline-Package Bit Switch | K10 |
| 88 | 72-1608C | 2 | #6-32 × ½" Cross-Recessed Pan-Head Corrosion-Resistant Steel Machine Screw | |
| 89 | 75-016C | 2 | #6 Flat Plain SAE-Standard Regular-Pattern Corrosion-Resistant Steel Washer | |
| 90 | 75-056C | 3 | #6 Internal-Tooth Stainless Steel Lock Washer | |
| 91 | 75-916C | 2 | #6-32 Standard Hex-Pattern Corrosion-Resistant Steel Nut | |
| 92 | 72-1604C | 1 | #6-32 × ¼" Cross-Recessed Pan-Head Corrosion-Resistant Steel Machine Screw | |
| 93 | 78-16005 | 1 | Thermal Conductive Compound, Berquist #7403-10-04 | |
| 94 | 78-06001 | 1 | Flat Black Anodized Aluminum Heat Sink | |
| 95 | 009470-01 | 1 | Heat Sink | |
| 97 | 034815-01 | 1 | Heat Sink | |

ATARI®

**Figure 5-8  Baseball PCB Assembly, continued**
**Parts List**

| Item | Part No. | Qty. | Description | Ref. Design./ Location |
|------|----------|------|-------------|------------------------|
| 98 | 79-42C40 | 1 | 40-Contact Medium-Insertion-Force IC Socket | C2 |
| 99 | 73-7A0509C | 2 | Oval-Head Semi-Tubular Corrosion-Resistant Stainless Steel Rivet, 5/32" Shank Diameter × 9/32" Shank Length | |
| 100 | 90-102 | 1 | 12.096 MHz, ± .005%, Crystal | Y1 |
| 101 | 020670-01 | 18 | Test Points | |
| 102 | 90-6010 | 1 | Microprocessor | C2 |
| 103 | 90-7008 | 1 | Type 82S16 256 × 1 Bipolar Random-Access Memory Integrated Circuit | K6 |
| 104 | 90-7031 | 8 | Type 2101A-4 MOS 256 × 4 Static Random-Access Memory Integrated Circuit (450 ns) | F2, H2, J2, K2, F4, H4, J4, K4 |
| 105 | 90-7033 | 2 | Type 2114 MOS 1024 × 4 Static Random-Access Memory Integrated Circuit (450 ns) | M2, N2 |
| 107 | 034006-01 | 1 | Programmable Read-Only Memory (Sync) | L5 |
| 108 | 034710-01 | 1 | Programmable Read-Only Memory (Alphanumerics) | N7 |
| 109 | 034708-01 | 1 | Programmable Read-Only Memory (Graphics/LSB) | C5 |
| 110 | 034709-01 | 1 | Programmable Read-Only Memory (Graphics/MSB) | D5 |

*For remaining memory components and their part numbers,*
*see next page.*

Figure 5-8   Baseball PCB Assembly, continued

| -01 P.C. Boards (PROMs) | Alternate -01 P.C. Boards (PROMs) | -02 P.C. Boards (ROMs) |
|---|---|---|
| 034711-01  K1 | 034727-01  K1 | 034735-01  P1 |
| 034712-01  K0 | | |
| 034717-01  F1 | 034730-01  F1 | |
| 034718-01  F0 | | |
| 034713-01  J1 | 034728-01  J1 | 034736-01  N1 |
| 034714-01  J0 | | |
| 034719-01  E1 | 034731-01  E1 | |
| 034720-01  E0 | | |
| 034715-01  H1 | 034729-01  H1 | 034737-01  M1 |
| 034716-01  H0 | | |
| 034721-01  D1 | 034732-01  D1 | |
| 034722-01  D0 | | |
| 034723-01  M0 | 034733-01  M0 | 034738-01  N0 |
| 034724-01  L0 | | |
| 034725-01  C0 | 034734-01  C0 | |
| 034726-01  B0 | | |

ATARI®
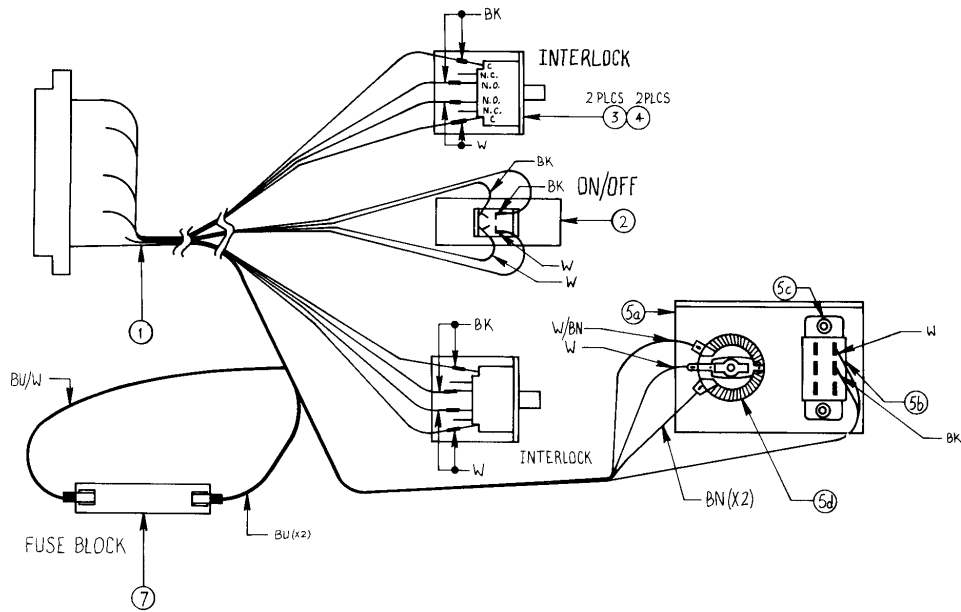
**Figure 5-9  Harness/Switch Assembly**
**A034564-01**

| Item | Part No. | Qty. | Description |
|------|----------|------|-------------|
| 1 | A034563-01 | 1 | Main Harness |
| 2 | A034631-01 | 1 | On/Off Switch Assembly |
| 3 | 68-002 | 2 | DPDT Interlock Switch, Cherry #E79-30A |
| 4 | 000268-02 | 2 | Interlock Switch Mounting Bracket |
| 5 | A030169-01 | 1 | Audio Control/Test Switch Assembly (Rev. G), consisting of the following four items: |
| 5a | 030168-01 | 1 | Mounting Bracket |
| 5b | 69-001 | 1 | DPDT Slide Switch, Switchcraft #46206LR |
| 5c | 72-6008S | 2 | #10 × ½" Cross-Recessed Pan-Head Type AB Zinc-Plated Steel Thread-Forming Screw |
| 5d | 19-9032 | 1 | Wirewound Panel-Mounting Variable Resistor, Ohmite Model E, #0110 Rheostat |
| 7 | 79-3210 | 1 | Single-Pole .25" Quick-Disconnect Tab Fuse Block |