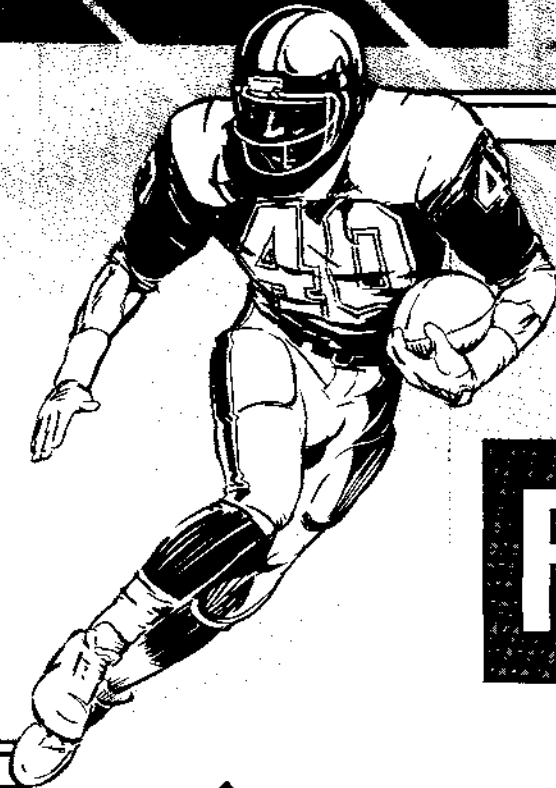


ALL AMERICAN



FOOTBALL

Service Manual

The Leland
CORPORATION

Your Responsibility For Maintenance

It is the owner's responsibility to make sure that the specified maintenance is performed. The Troubleshooting Section gives details of these maintenance requirements. Also included in the Troubleshooting Section is information regarding other requirements for games operated under severe playing conditions.

MACHINE INFORMATION	
Purchase Date:	____/____/____
Distributor:	_____
Serial Numbers	
Program:	_____ (See lower left corner of Bookkeeping Main Menu screen)
Main Board:	_____
Sub Board:	_____
Cabinet:	_____

Written and Illustrated by:
Team Leland

Part Number - 72-13606-24

Foreword

Welcome to the growing group of value conscious people who operate Leland Corporation products. We are proud of the advanced engineering and quality of each game we build.

We invite you to read through this Owner's Manual. It is designed to acquaint you with the features of your new "All-American Football" and to help you enjoy many quarters of earning pleasure.

When it comes to service, remember that your authorized Leland distributor knows your game best and is interested in your complete satisfaction. He will provide quality parts, service, and any other assistance you may require.

The Leland Corporation

Please leave the Owner's Manual in this game at the time of resale. The next owner will also need this information.

All information and specifications in this manual are current at the time of printing. However, because of The Leland Corporation's policy of continual product improvement, we reserve the right to make changes at any time without notice.

Non-Leland Replacement Parts Notice

The Leland Corporation recommends the use of only Leland Corporation parts when replacing any malfunctioning component or assembly in your video amusement machine. For safety and reliability, The Leland Corporation does not recommend or authorize any substitution parts or modifications of Leland equipment. Such alterations may adversely affect game play or cause serious injury, and will void your warranty. Unauthorized parts and/or modifications may also void FCC compliance.

FCC Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed in accordance with the Owner's Manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a class "A" computing device pursuant to subpart "J" of part 15 of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense will be responsible to correct the interference.

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"WHAT'S HOT..."

WHAT'S NEW"

- Fumbles, fake punts, pileups, and more challenging tackling
- Sideline shop
- Choice of college or pro teams
- Streamlined go-anywhere cabinet
- New scoreboard
- Improved graphics

Game Concept

"All-American Football" - the only thing that could top the number one hit Team Quarterback and the legendary Quarterback.

"All-American Football" has all the features of Team Quarterback and much more, all in a streamlined go-anywhere cabinet.

"All-American Football" plays even more like real football. Now with fumbles, fake punts, pileups, and more challenging tackling. An informative new scoreboard highlights new and improved graphics throughout. One to four players can now play as their favorite Pro or College Team.

The competition keeps getting tougher, and our computer team is no exception. Slip up on coverage and he'll burn you - try to sack him and you're in for a knock-down drag-out struggle.

We've added an innovative Sideline Shop to the Play Select where players can customize their team with a wide range of needed talents. For example, players can purchase a harder helmet for surer, more ball jarring tackles or SportKreem to get more range out of their arm. By trading credit clock time for added skills, players get more out of the game and you get more out of the cash box.

Leland's exclusive Stat Storage gives players an equity that keeps them coming back. Online statistics of over 15 categories show them what they're doing right and what they need to improve. Top Salaries, another Leland feature, sums up the statistics to a overall rating.

Add this to the passing, pitching, running, and kicking game strategy that players from coast to coast have mastered and your *"All-American Football"* has the guts for glory.

The Leland Corporation Warranty

The Leland Corporation warrants that whenever the video display (monitor) and/or the power supply and/or the printed circuit boards and/or all parts contained therein are furnished with its product, that such part or parts will be free from all defects in materials and workmanship for a period of sixty (60) days from the date of shipment. The Leland Corporation's warranty of above parts is subject to the normal use and service on its product. No other products or part thereof are warranted. If the products described in this manual fail to conform to this warranty, The Leland Corporation's sole liability shall be, as mutually agreed, to replace or repair such products which are returned to The Leland Corporation during the stated warranty period, provided:

- A. The Leland Corporation is notified *in writing* upon discovery by the buyer that said products are defective.
- B. The defective product or part is returned *pre-paid* to The Leland Corporation's plant with a Leland Corporation Returned Merchandise Authorization (RMA) number clearly visible on the outside of the package.
- C. The Leland Corporation's examination of the returned product(s) or part(s) determines, to our satisfaction, that the alleged defects existed and were not caused by accident, misuse, neglect, alteration, improper repair, installation or testing.

The Leland Corporation is not responsible for bent pins on ICs not installed by our employees. In no event shall The Leland Corporation be liable for loss of profits, loss of use, or incidental or consequential damages.

Except for this warranty, The Leland Corporation disclaims all other warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose, and all other obligations or liabilities on The Leland Corporation's behalf, and it neither assumes nor authorizes any other person to assume for The Leland Corporation any other liabilities in connection with the sale of products manufactured by The Leland Corporation.

Maintenance and Upkeep Procedure

The winning coach will always tell you offense wins games, but defense wins championships! To keep your "*All-American Football*" a fine-tuned machine, you must defend the game from dirty or improperly adjusted monitors, sticky coin mechs, or poorly adjusted player controls. With the proper defensive moves, you will enjoy the success of a championship season.

The following are recommended standard procedures when servicing your machines.

1. Every collection -
 - a. Make sure the cabinet and especially the control panel are clean and free of gum, grease, and dirt.
 - b. Play the game. Check the joysticks and buttons for proper adjustment and operation. (See the buttons and controls test in the Diagnostics section.) Note: Be sure to adjust, clean, or replace any marginal switches.
 - c. Clean and adjust the monitor to insure the picture is "rich" and inviting.
2. Once a month -
 - a. Check the inside of the cabinet for dirt and dust. Suggestion: Carry a portable "dustbuster" type vacuum.
 - b. See that all connectors are properly seated.
 - c. Be sure the power supply is up to snuff. (See "A Note About Power" for proper settings.)
 - d. Go through all diagnostic functions to insure proper operation and inspect game settings.

At first, these steps may seem cumbersome, however, when viewed with respect to the income generated by a clean, well-maintained machine, as opposed to the income lost by a dirty, "trashed" game, the benefit of spending those extra few minutes will be seen as a wise investment.

The Troubleshooting Section

A Note About Power

DC Power

The computer board on this machine operates most efficiently when the power supply is providing a steady 5.00 to 5.05VDC. When checking DC power always put your leads across the +5VDC test points on the top board (e.g. not at the power supply, DC input connector or any I.C.) and be sure that the +5 volt supply is between +5.00VDC and +5.05VDC. Also be sure that there is less than .005 volts AC riding on the +5 volt line. If you do find AC on the DC line, suspect the filter capacitor or the rectifier on the power supply. Low voltage or AC on the DC lines are the main causes of the following problems:

- "Garbage" on the screen
- Computer "Freeze"
- Coin or Coin Meter malfunction
- A variety of seemingly unrelated problems

AC Power

Connect this game only to a grounded three-wire outlet which provides between 108 and 132 volts AC. If you have only a two-wire outlet we recommend that you hire a licensed electrician to install a grounded outlet. The possibility exists that players may receive an electrical shock if this system is not properly grounded.

Our Service Department

For parts, service and technical information first contact your authorized Leland Corporation distributor. For additional technical aid feel free to contact the Leland Corporation Customer Service Department at *(619) 562-7000* Monday through Friday from *8:00 AM to 5:00 PM Pacific Standard Time*.

To provide you with the quickest possible response to your questions, please have the following information ready when you call:

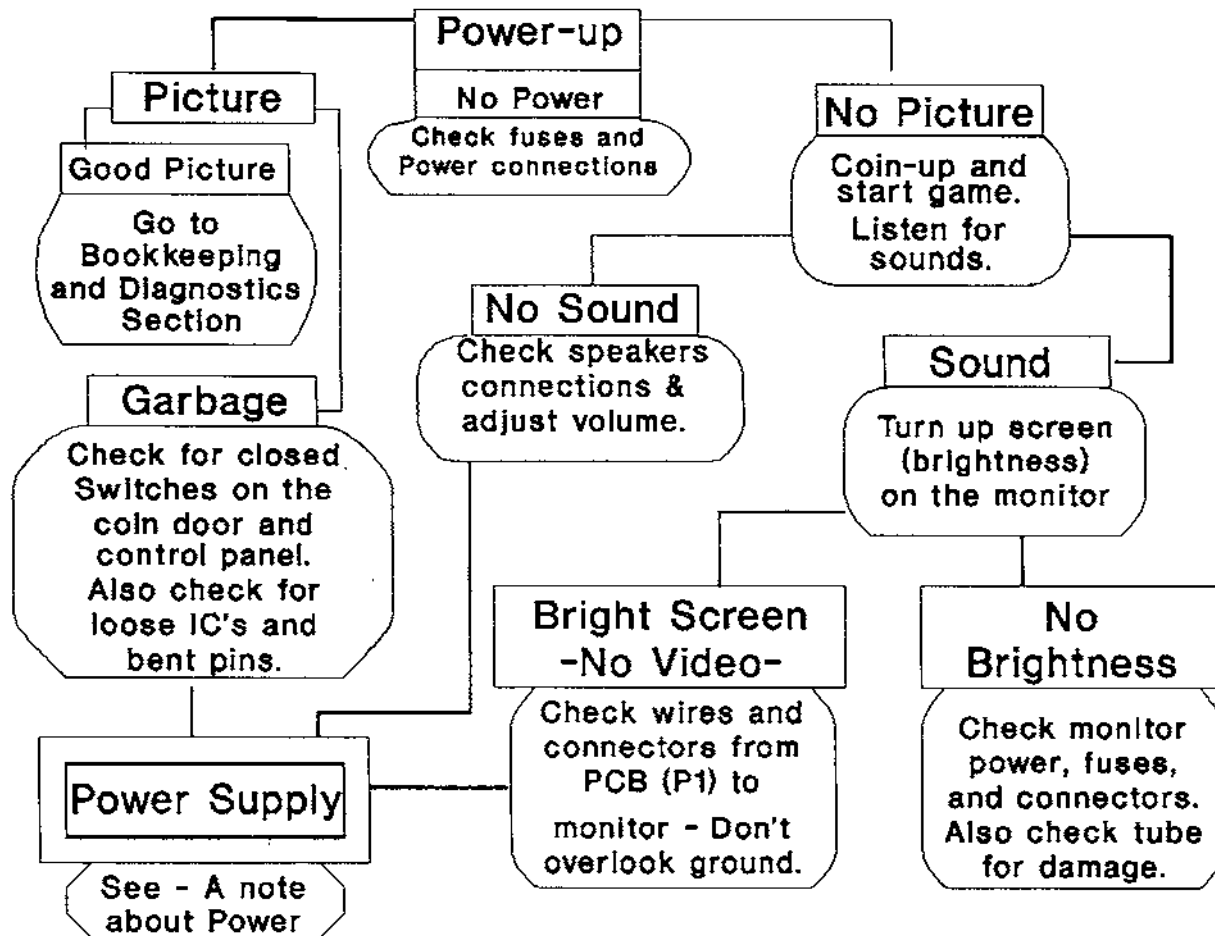
1. Your game name and serial number.
2. Any reference materials and a list of observations.

Troubleshooting Flow Chart

Don't Touch that Switch!!!

Before you reach for the power switch take a good look at the game. Open it and check for loose wires, bad connections, or burned spots. Look for spilled drinks and signs of vandalism. Those quick checks will save you a lot of time.

After you've eliminated the obvious, start digging.



Never take anything for granted. This is easy to do if you are in a hurry -- You'll kick yourself every time for missing a broken wire or loose connector after spending hours looking in the wrong place - I have.

Troubleshooting

General Shooting

Garbage

Check: Power supply voltages
Closed switches on the control panel or coin door
Loose connections, loose ICs, or bent pins on the board
Pins 3 through 7 on connector P-4. If less than +5VDC suspect U114 or U119.

No Sound

Check: Loose connections
Low +12VDC supply
Bad speaker or volume pot

No control or function switches (includes coin switches)

Check: All connections (especially ground)
Wire continuity between board and switch
Closed or broken switches
Input buffers (see buffers)

Monitor Shooting

No Picture

Check: Power connection
Monitor fuses
Video connections (check continuity)

Sync Problems

Check: Sync and ground connections (see Wiring Diagram)
Sync polarity
Video output buffer

Buffers

An input or output (I/O) buffer is the component that connects the actual game computer to the outside world and, as such, is the part most likely to fail. Check the following list when attempting to isolate possible problems. First and second choices are given. (M = Main Board, I/O = Multi-Function Board).

Note: Any unauthorized board repair or attempted repair will void your warranty.

Troubleshooting

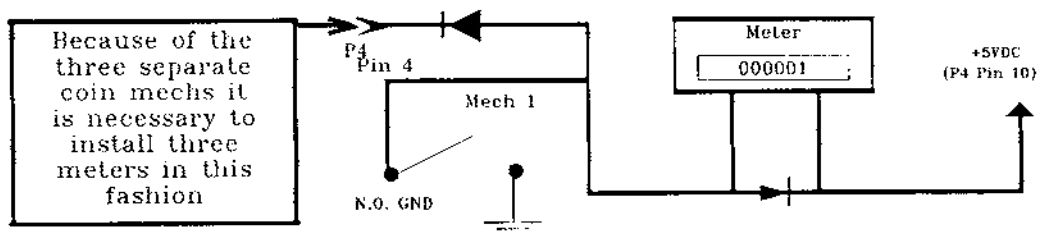
<i>Problem Area</i>	<i>Component</i>	<i>PCB Location</i>
Video (Colors or Sync)	1st 7405 or 74S05	M-U24
Player Controls and/or Coin Controls	1st 150 ohm resistor pack. 2nd 74LS257	See Wiring Diagram for specific switch.
Audio (Bad channel)	1st 7524 2nd 7533	I/O-U35 (ch5) through U40 (ch0) I/O-U31
	TDA 2002	M122

About Mechanical Coin Counters

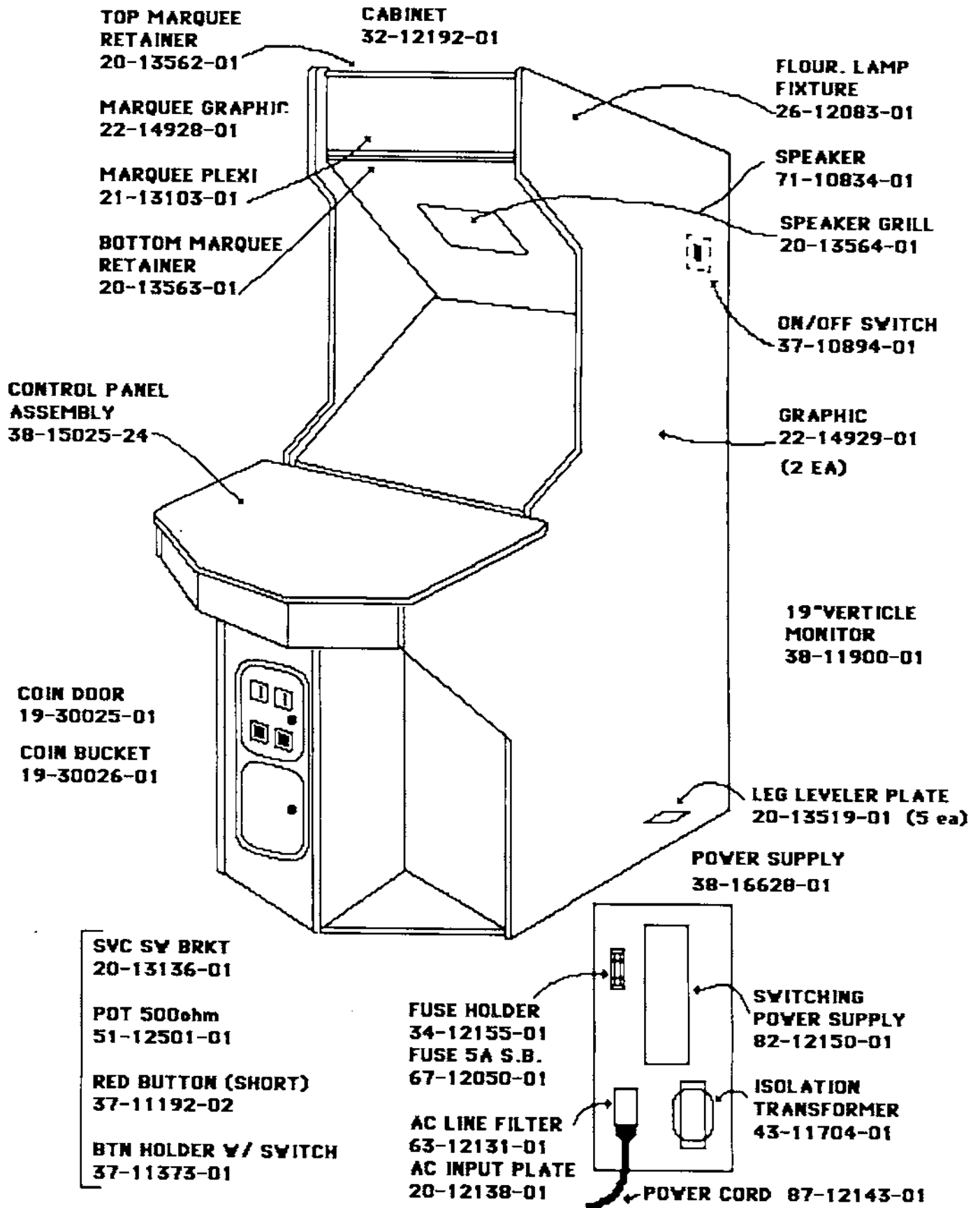
We have not installed mechanical coin counters on this game for two reasons:

1. The bookkeeping program is extremely accurate and includes not only number of coins dropped and dollars earned, but also the number of tests and coins in a given period. (See Bookkeeping in the Diagnostics Section).
2. These mechanical coin counters produce an inductive "kick" that will damage components on the circuit board. Checkerboard video is the most common problem - take a look at the "NMI not" signal on the master Z80 (pin 17). If a low input is observed, try replacing U114 (74LS08) and/or U119 (74LS157).

Note: If you must install a mechanical coin counter, please use the following diagram. (Diodes may be 1N4001 to 1N4004).



ILLUSTRATED PARTS SECTION



CONTROL PANEL ILLUSTRATED PARTS LIST

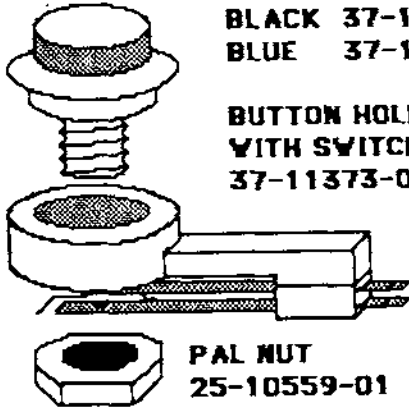
BUTTONS (SHORT)

RED 37-11192-02

BLACK 37-11192-03

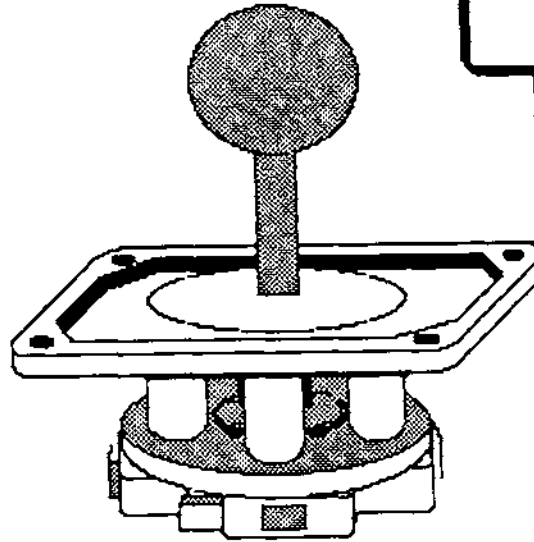
BLUE 37-11192-06

BUTTON HOLDER
WITH SWITCH
37-11373-01

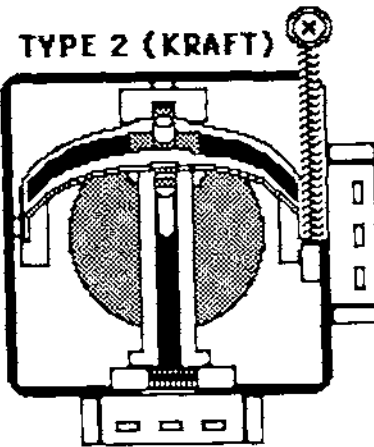


PAL NUT
25-10559-01

JOYSTICK, MICRO
38-11401-01



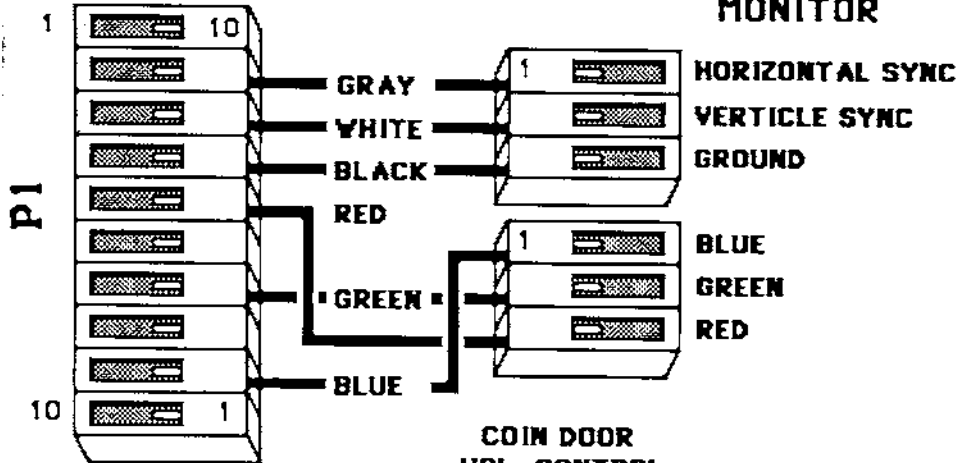
ANALOG (SPRING)
JOYSTICK
37-13055-01



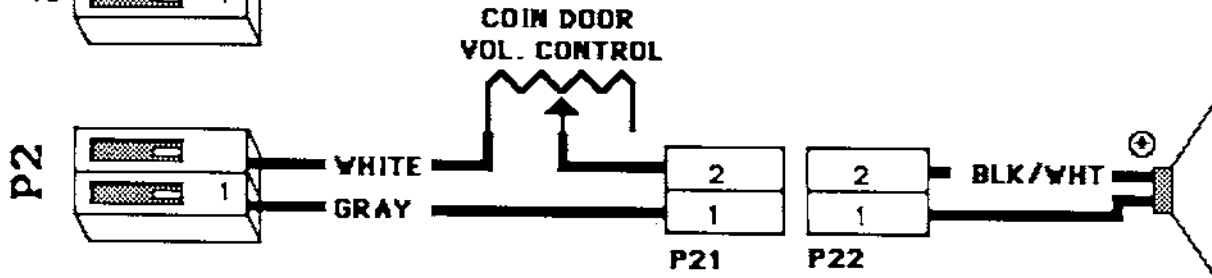
TYPE 2 (KRAFT)

NOT SHOWN
SPRINGSTICK
ADAPTER PLATE
20-15102-00
SPRINGSTICK
RUBBER GASKET
23-10401-01

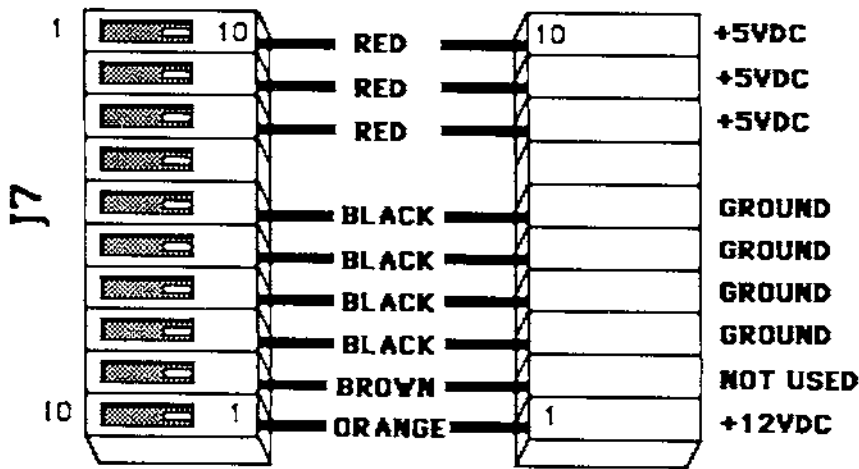
TO
MONITOR



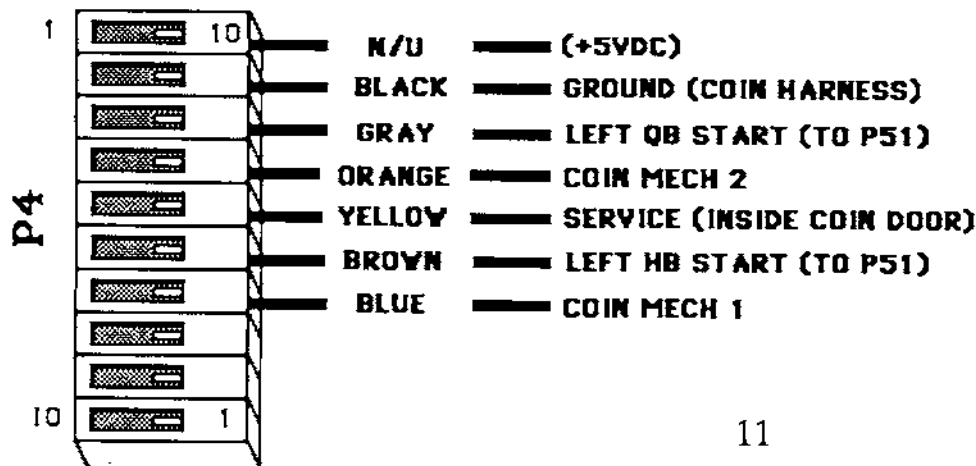
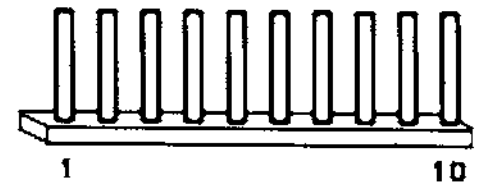
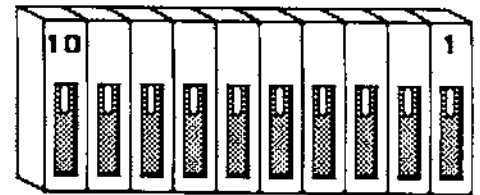
MAIN WIRING DIAGRAM (MAIN BOARD)



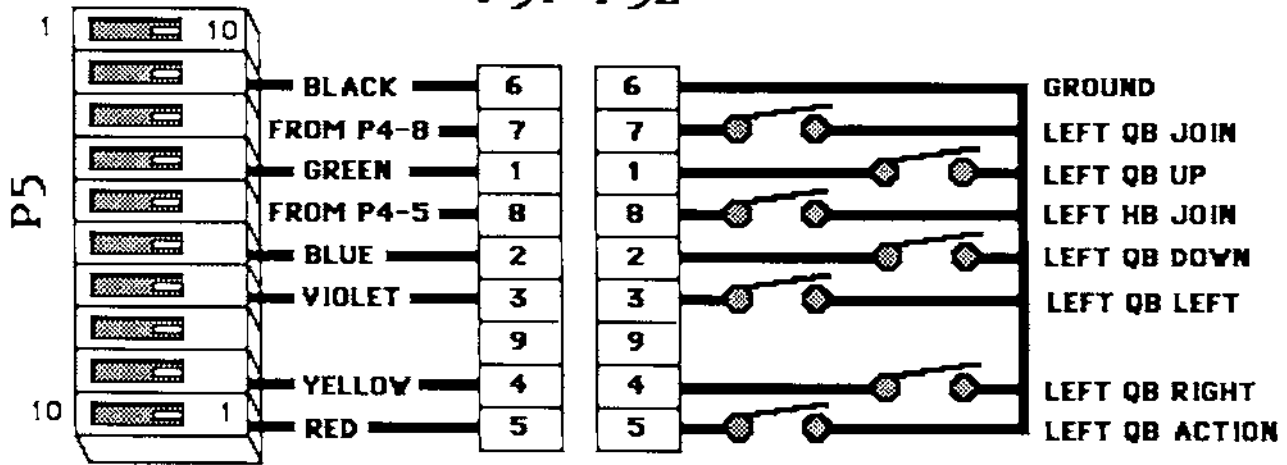
TOP (MULTI-FUNCTION) PCB



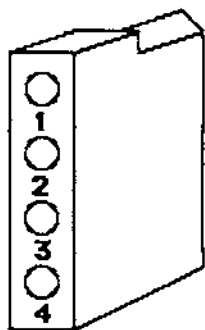
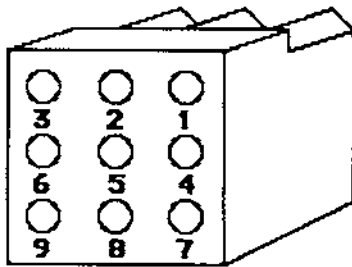
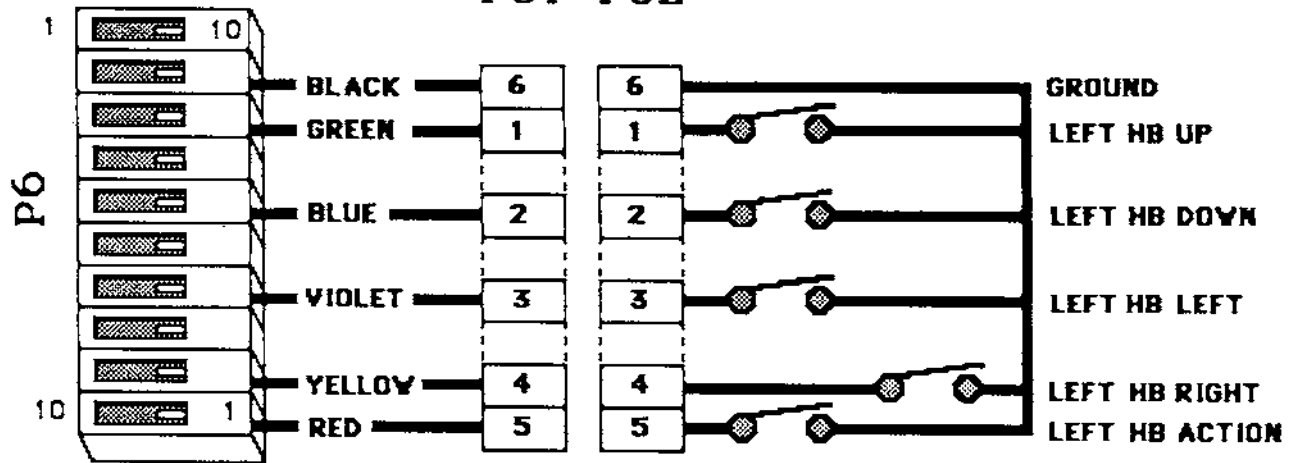
*NOTE: SYSTEM PIN-OUT
OPPOSITE OF PIN-OUT
MOLDED IN HARNESS
CONNECTORS.*



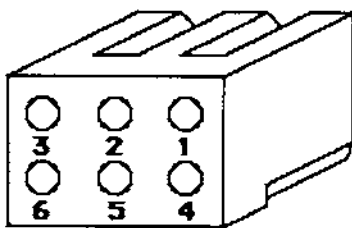
P51 P52



P61 P62

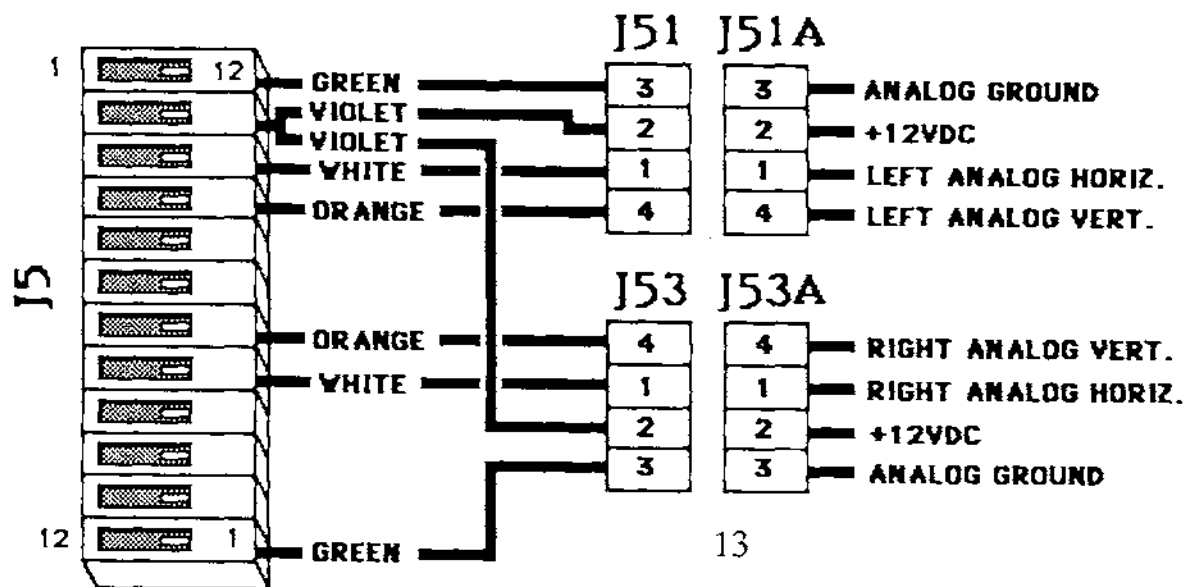
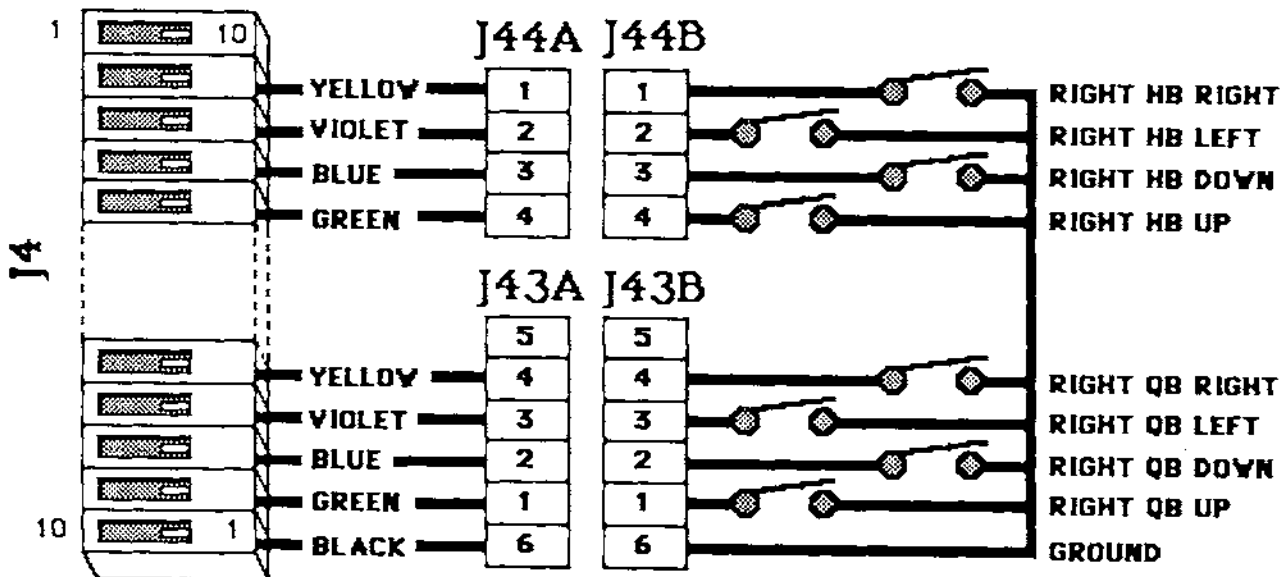
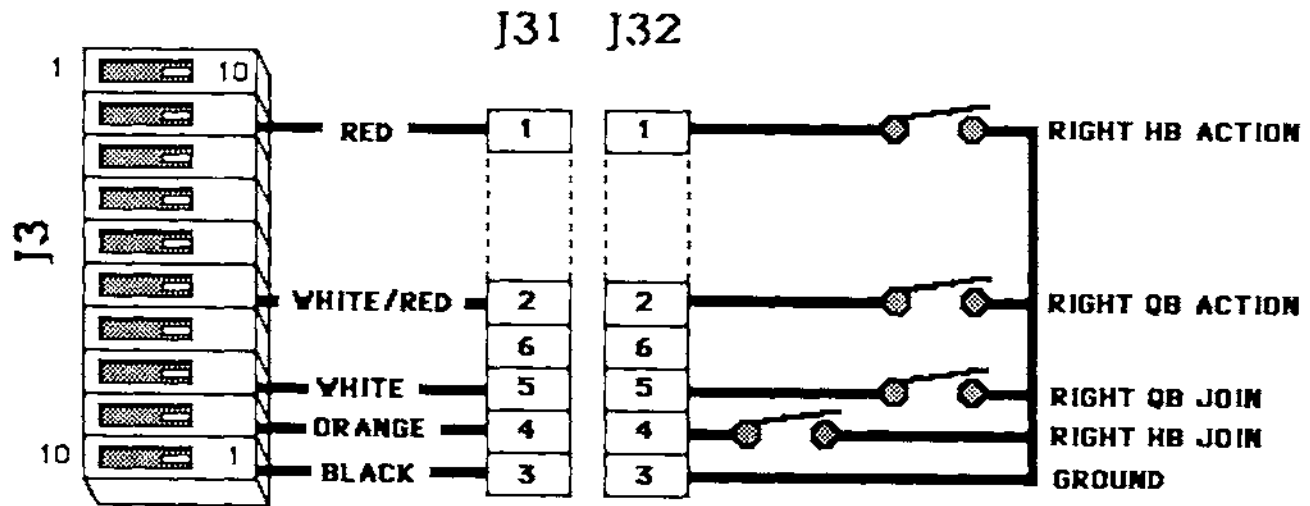


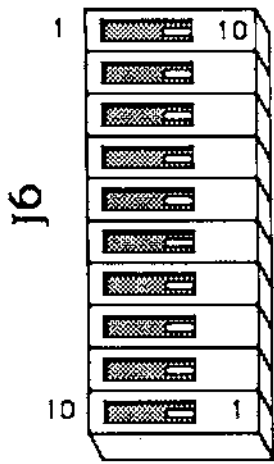
*MALE MOLEX CONNECTORS
TYPICAL PIN-OUT*



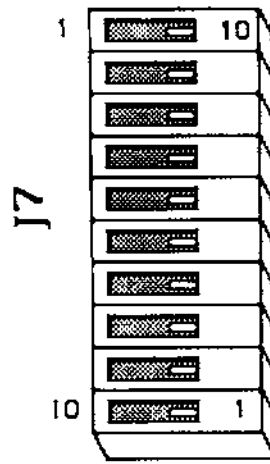
*SEE MAIN BOARD LAYOUT
FOR BOARD CONNECTOR
LOCATIONS.*

MAIN WIRING DIAGRAM (MULTI-FUNCTION BOARD)

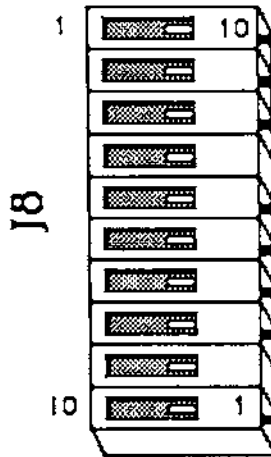




NOT
USED



SEE P7 ON MAIN BOARD
WIRING DIAGRAM



RED — +5VDC

RED — +5VDC

RED — +5VDC

BLACK — GROUND

BLACK — GROUND

BLACK — GROUND

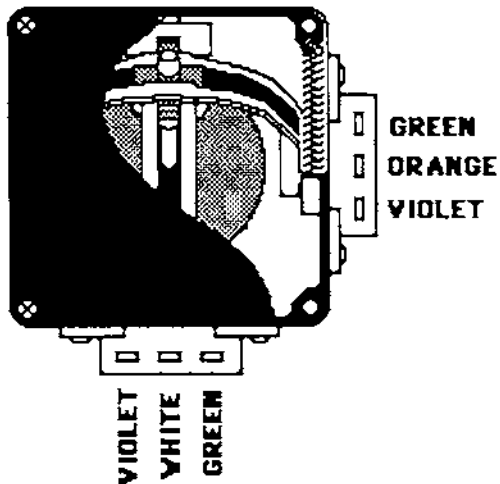
BLACK — GROUND

ORANGE — +12VDC

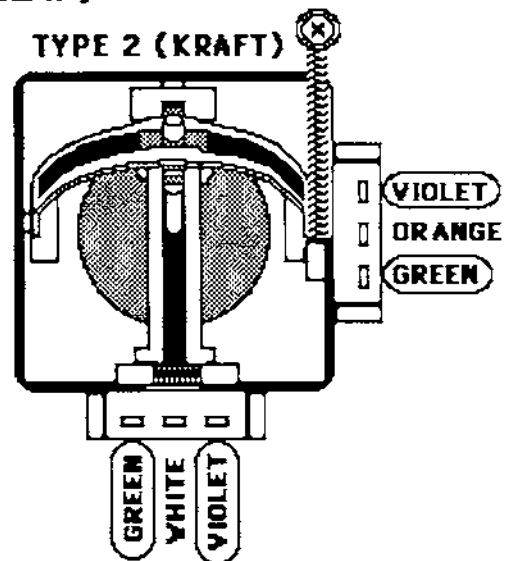
FROM SWITCHING
POWER SUPPLY

TYPICAL ANALOG
SPRINGSTICK ASSY.
(BOTTOM VIEW)

TYPE 1 (CH)



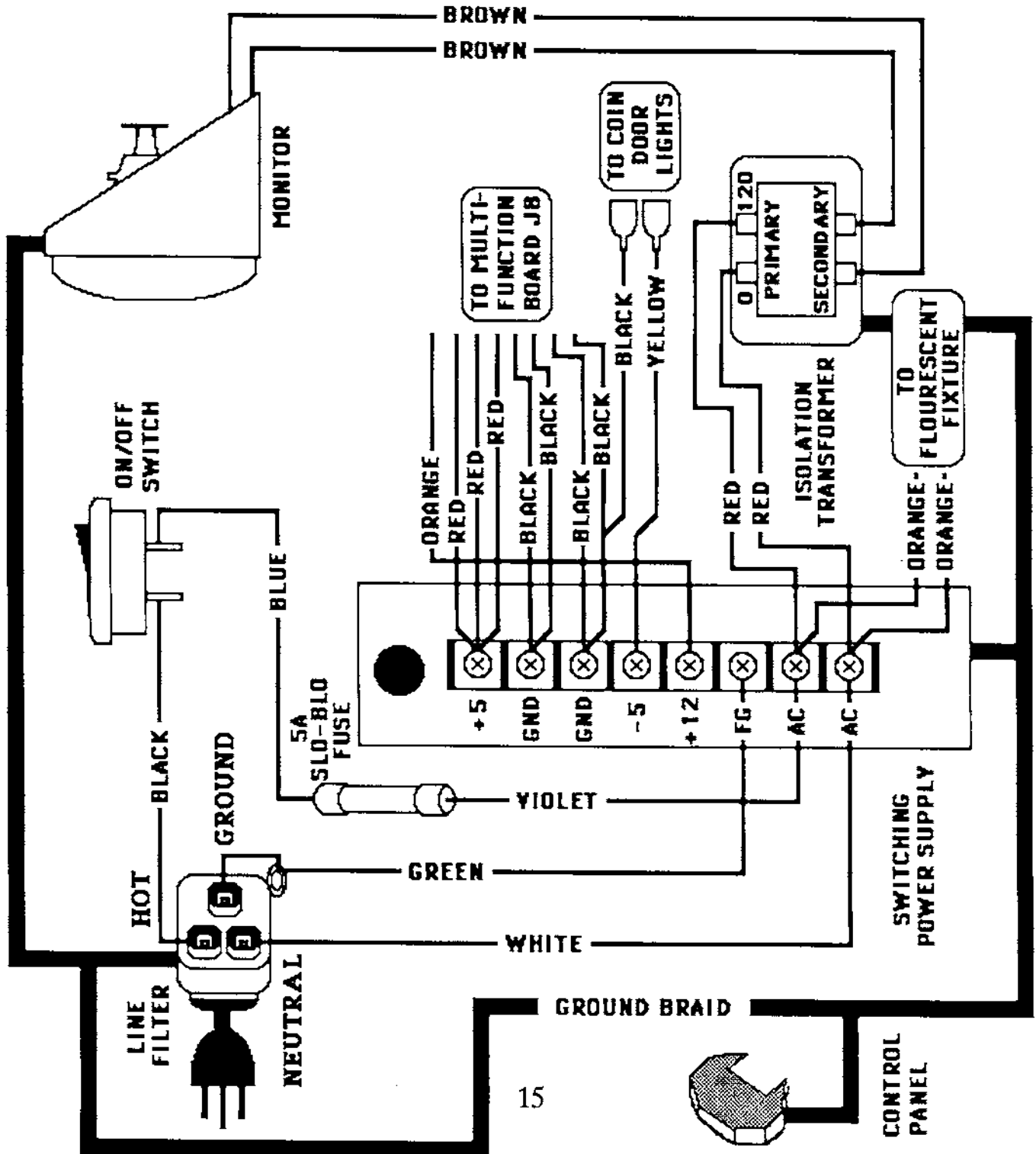
TYPE 2 (KRAFT)



CABINET WIRING DIAGRAM

AC POWER
 108 - 132 VAC
 2.5A MAX

DC POWER
 +5VDC @ 11A
 +12VDC @ 2A
 -5VDC @ 1A

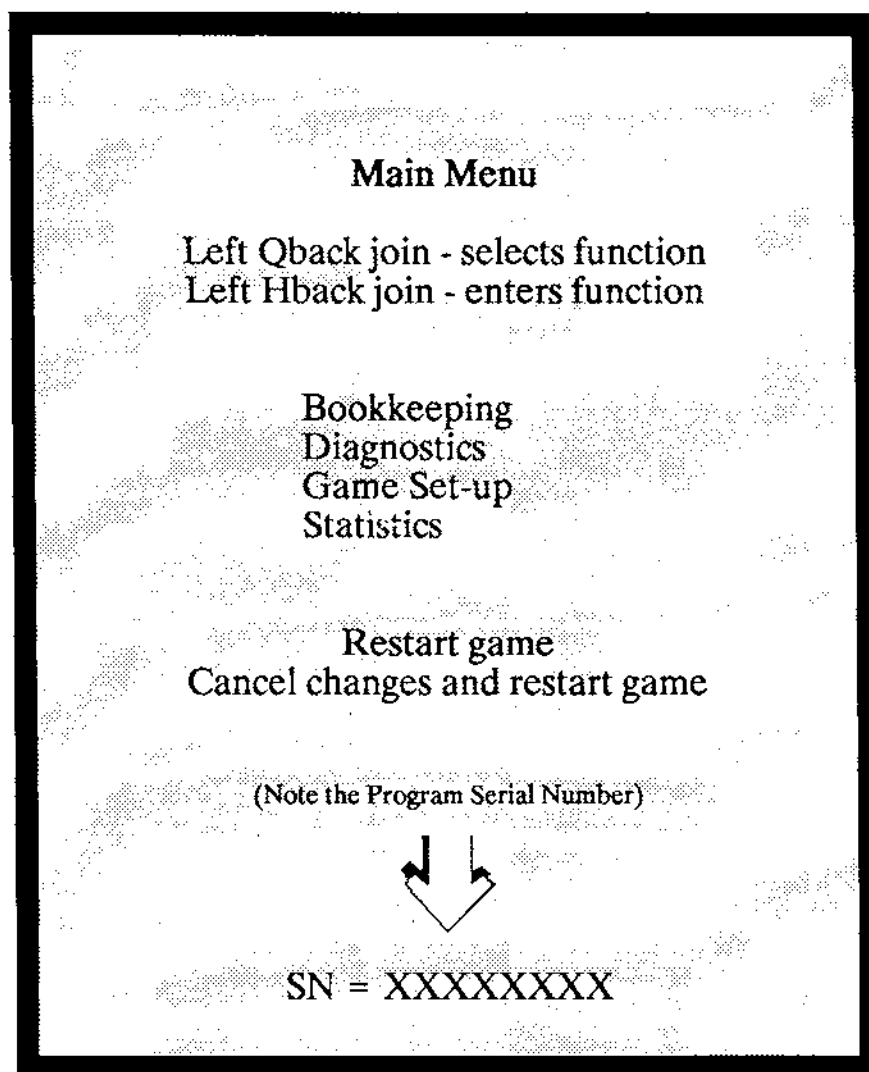


Bookkeeping and Diagnostics Section

To enter the Bookkeeping and Diagnostics Section:

- * Press and hold the left Quarterback Join button
- * Press the test button (located inside the front door)
- * Release both buttons

Upon entering the program the Main Menu will appear. Follow the instructions on this menu to select and enter the desired function.

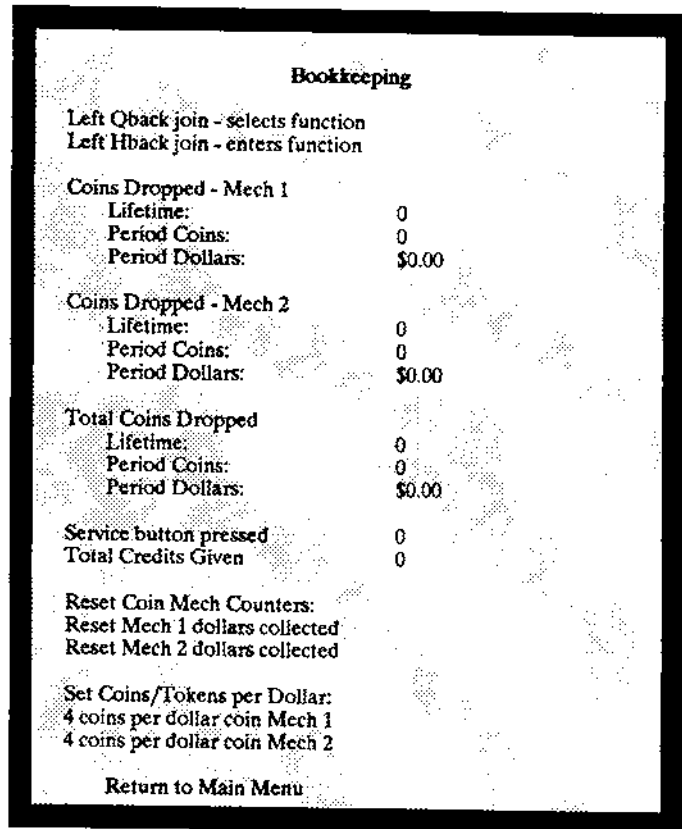


Bookkeeping

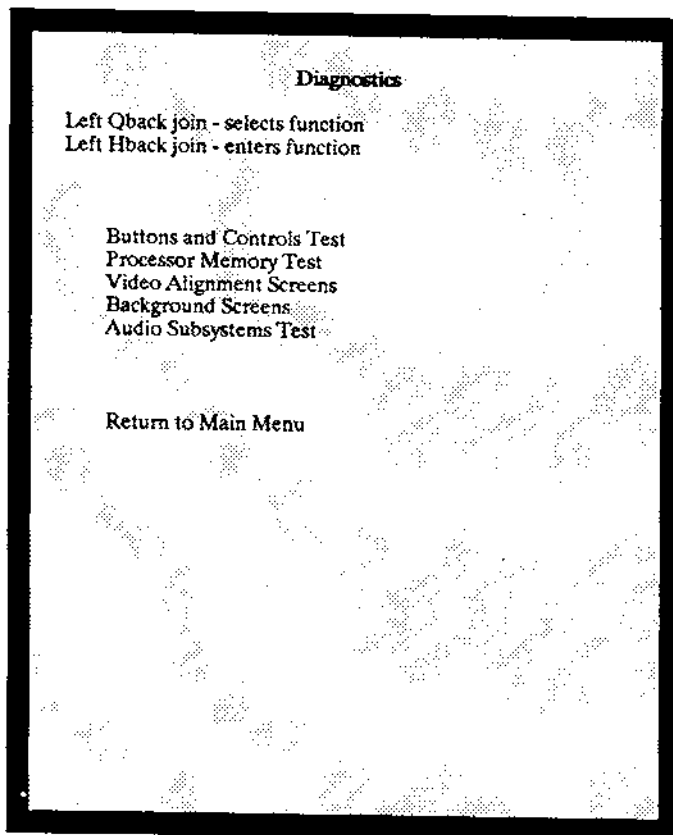
The Bookkeeping function is your game accountant. It records the lifetime earnings of your game and allows you, through the use of resettable "Period" totals, to keep track of weekly, monthly, or location earnings.

Note: The "Set Coins/Tokens per dollar" category must be set to the location standard to maintain accurate accounting data. (i.e. 6 coins/tokens per dollar)

This function does not affect the number of coins per credit. (See in "Game Set-Up" section for this information).



Bookkeeping	
Left Qback join - selects function	
Left Hback join - enters function	
Coins Dropped - Mech 1	
Lifetime:	0
Period Coins:	0
Period Dollars:	\$0.00
Coins Dropped - Mech 2	
Lifetime:	0
Period Coins:	0
Period Dollars:	\$0.00
Total Coins Dropped	
Lifetime:	0
Period Coins:	0
Period Dollars:	\$0.00
Service button pressed	0
Total Credits Given	0
Reset Coin Mech Counters:	
Reset Mech 1 dollars collected	
Reset Mech 2 dollars collected	
Set Coins/Tokens per Dollar:	
4 coins per dollar coin Mech 1	
4 coins per dollar coin Mech 2	
Return to Main Menu	



Diagnostics
Left Qback join - selects function
Left Hback join - enters function
Buttons and Controls Test
Processor Memory Test
Video Alignment Screens
Background Screens
Audio Subsystems Test
Return to Main Menu

Diagnostics Menu

Invoking the Diagnostics function will open a very complete and easy to use set of tests designed to take the grumbling and hair pulling out of adjusting, troubleshooting, and servicing your machine.

You will notice that the diagnostics section has a sub-menu of its own.

Buttons and Controls Test

This test provides a quick examination of the state of all buttons and controls as well as an easy range setting format for the analog inputs (springsticks).

Minimum and maximum settings are shown in italics on the screen to the left. To reset the pots, break melt points or loosen screws (depending on joystick type), align each pot using this screen, and reseal the pot to the mounting assembly with a hot soldering pencil or retighten screws.

Press the following Buttons:

Quarterback 1 join	Closed		
Halfback 1 join	Open		
Quarterback 2 join	Open		
Halfback 2 join	Open		
Coin Mech 1	Open		
Coin Mech 2	Open		
Service Switch	Open		
Quarterback 1 Action	Open		
Halfback 1 Action	Open		
Quarterback 2 Action	Open		
Halfback 2 Action	Open		
Quarterback 1 Joystick			
Up	Left	Down	Right
Halfback 1 Joystick			
Up	Left	Down	Right
Quarterback 2 Joystick			
Up	Left	Down	Right
Halfback 2 Joystick			
Up	Left	Down	Right
Left Springstick Horizontal:	80H (+-02)		
01H	FFH		
Left Springstick Vertical:	01H (+-02)		
01H	FFH		
Right Springstick Horizontal:	80H (+-02)		
01H	FFH		
Right Springstick Vertical:	01H (+-02)		
01H	FFH		

Press Halfback 1 Join button or service button twice to exit.

Processor Memory test

Master ROM Tested	<i>If a tested part does not pass, the part will be displayed by its board location number - i.e. "Master ROM tested chip U49T suspect"</i>
Master ROM Good	
Master RAM Tested	<i>Press test button to hurry through color RAM test.</i>
Master RAM Good	
Color RAM Tested	<i>Press test button to hurry through color RAM test.</i>
Color RAM Good	
Slave Memory Tested	
Slave RAM Good	
Slave ROM Good	
Left halfback join exits test	

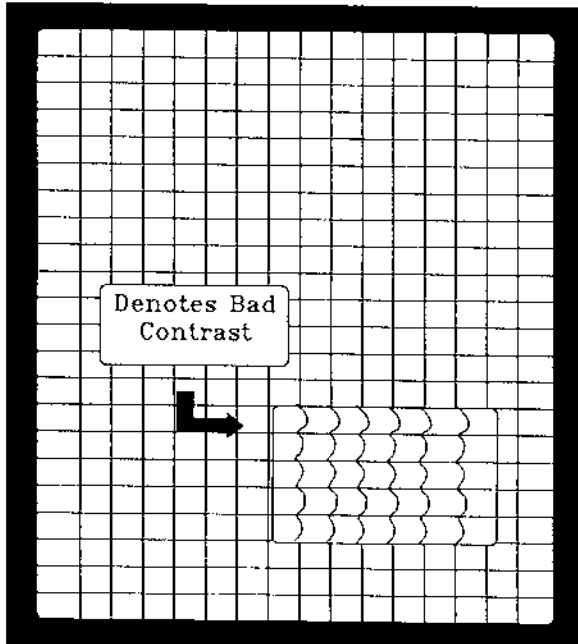
Processor Memory Test

The Erasable Programmable Read Only Memory (EPROM) and Random Access Memory (RAM) IC's are storage areas for the actual game guidelines and are accessed by the Microprocessor section. The percentage of field failures in these areas is very low, but when problems do arise they can be a bear to track down. This test samples the action of the processor section and notes any incongruities.

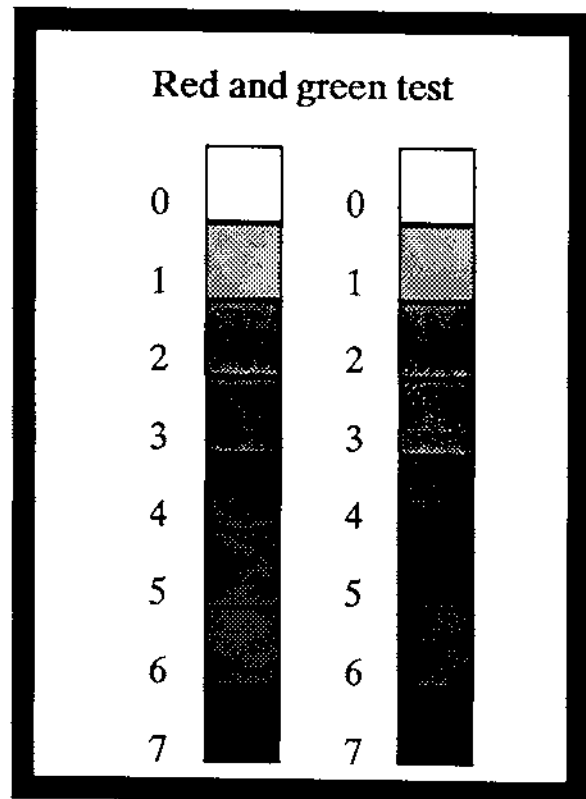
Warning: Read your warranty before attempting any printed circuit board repairs.

Video Alignment Screens

The picture on the screen is the most important and most neglected part of the game. It is a proven fact that a dirty, misaligned, or unfocused screen will cause a player to walk away even if the game is his/her favorite piece. A little elbow grease and a couple of minutes taken to go through these adjustment screens will make a difference in the cashbox. Use all three screens to adjust your picture and then go to the Background Screens section to make the game look "rich".

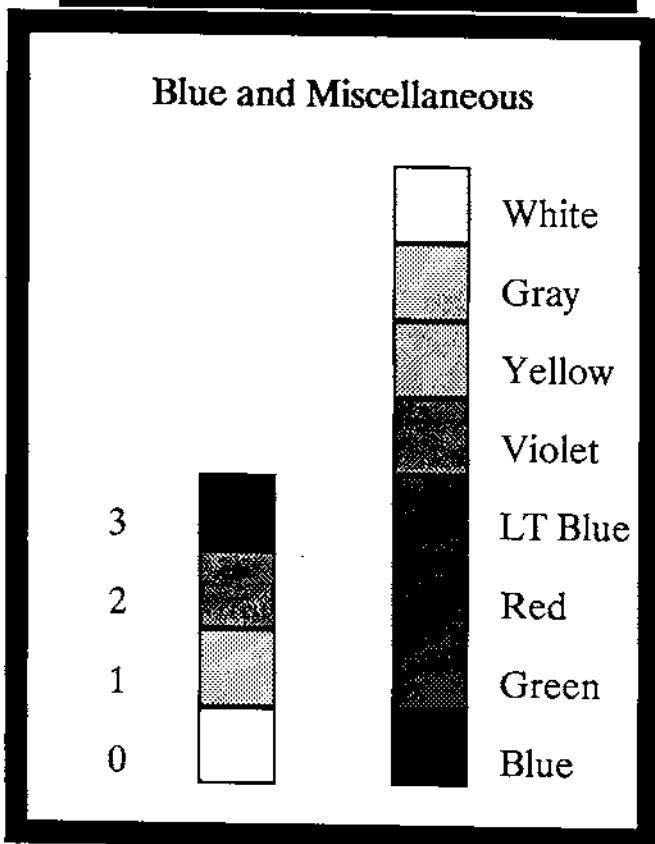


Use the cross hatch screen to adjust focus, alignment, size, and contrast. Wavy horizontal lines denote bad contrast. The background should be black and the lines solid white.



Red and Green Screen

Adjust screen control so green color bar shows faintly on the 1 level and use red cutoff control to adjust red to the same intensity.

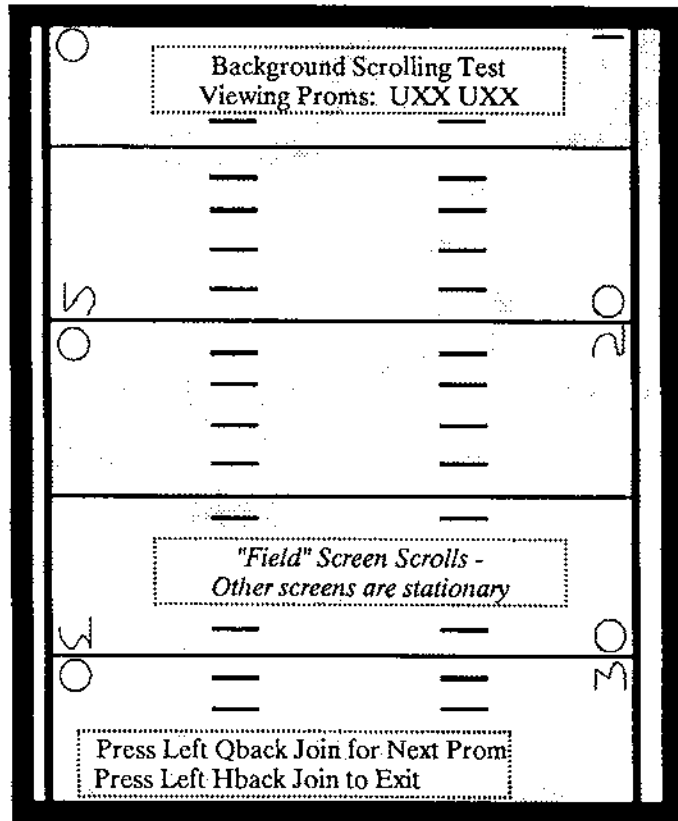


Blue and Miscellaneous Screen

Use blue cutoff control to make gray color bar look gray. Adjust red and green drive controls slightly, if necessary to make the white color bar white.

Background Screens

In this test the background screens are shown while the EPROMS which contain the information for these screens are displayed at the top of the screen. The test is not only helpful when looking for those "glitches" one sometimes encounters, but may also be viewed as a visual test of the colors and picture clarity after the Video Alignment test has been completed.



Audio Subsystems Test Press left halfback join to end

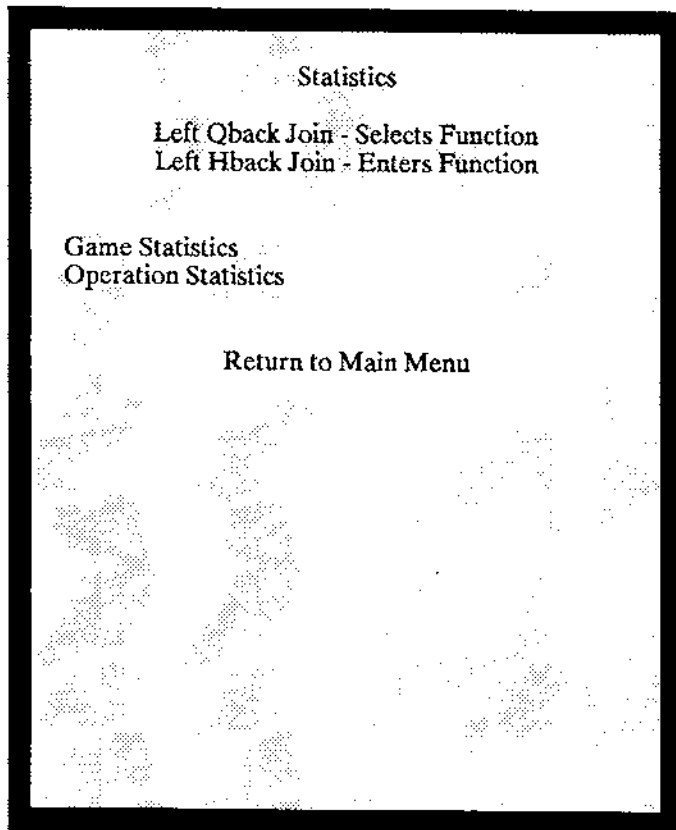
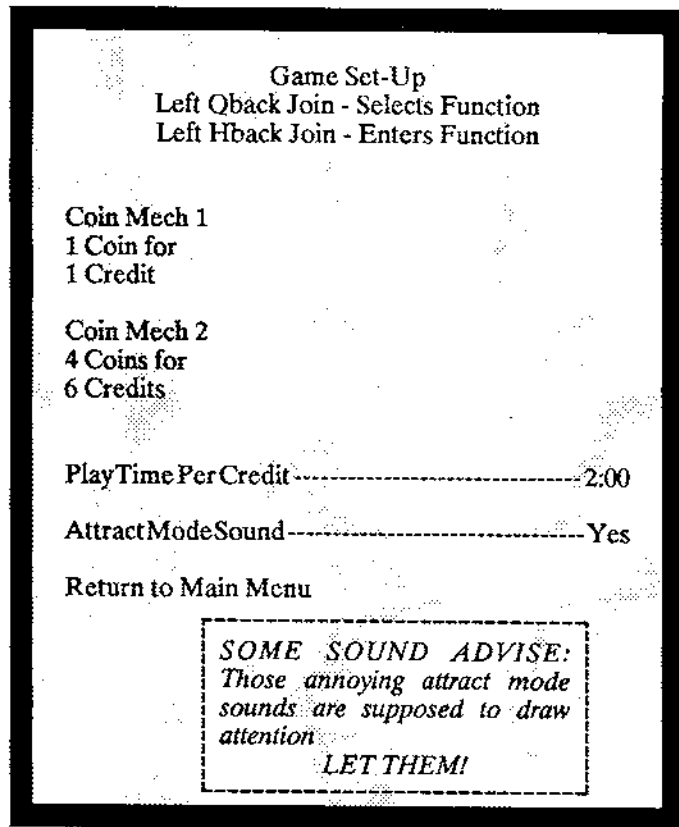
Audio PROMS OK	Audio RAM OK
Communications Test passes	
8 Bit DAC Test	(Fading tones)
Complete (Channels 0 through 5)	
10 Bit DAC Test	(Ready!)
DAC Interaction Test	(6 Tone pulses)
Complete (Channels 0 through 5)	
Music Test	(Charge Tune)

Audio Subsystems Test

The sounds are the second most important feature of any game and in a game like "All-American Football"™ are essential to the feel of the game. The volume of sound is, for the most part, dictated by the location and thus a "given", but the quality of sound is a function of the program. This test will be of help in your quest to find those "odd" sounds or to remedy the lack of certain sounds.

Game Set-Up

This section is vital to the condition of your cashbox. When used in conjunction with the Bookkeeping section of the diagnostics package, the Game Set-up function will keep your game on your list of top earners for many seasons. The coins per credit settings range from 1 coin/1 credit to 20 coins/20 credits. You might even set the two mechs differently, i.e. 1 coin/ 1 credit and 4 coins/5 credits. Sometimes a little tinkering pays off. The Play Time per credit function sets the time in 30 second increments.



Statistics

The statistics menu is the gateway to other game accounting information. It contains two choices, Game Statistics and Operation Statistics. Game Statistics contains information on multiplayer play and Operation Statistics contains information on game Operation and Play times.

Game Statistics

This section is your "Report Card". It lets you know how well you've done in setting your game for maximum earning power. You will notice that no where in this booklet is the word difficulty mentioned. The reason for this is that the game is set up to sense the ability of the player and respond accordingly. The way it works is - the player's salary increases as his percentages increase (i.e. passing percentage) and the computer knows it must play harder - simple huh?

Game Statistics				
Left Qback - Selects Function				
Left Hback - Enters Function				
	1PL	2PL	3LP	4PL
Games	0	0	0	0
	Started	Joined	Cont'd	Comp'd
Left QB	0	0	0	0
Left HB	0	0	0	0
Right QB	0	0	0	0
Left HB	0	0	0	0
Erase Hall of Fame on Exit - No				
Clear Game Statistics				
Return to Main Menu				

Operation Statistics

Left Qback Join - Selects Function
Left Hback Join - Enters Function

Lifetime Operation
xx Days, xx Hours, xx Minutes

Lifetime Play
xx Days, xx Hours, xx Minutes

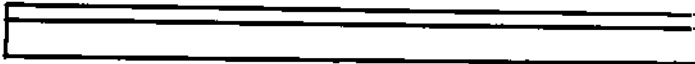
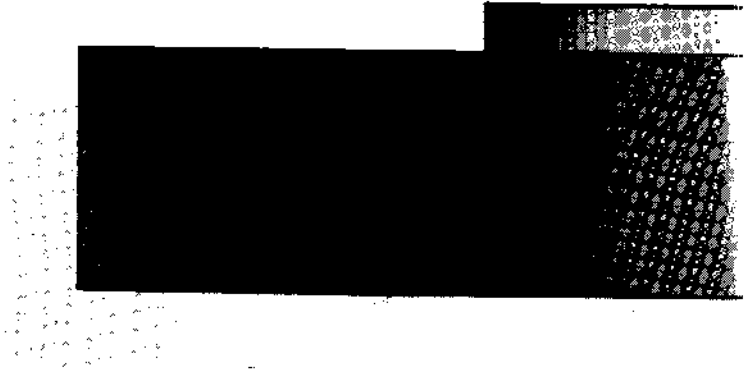
Period Operation
xx Days, xx Hours, xx Minutes

Period Play
xx Days, xx Hours, xx Minutes

Reset Period Timers on Exit - No/Yes
Return to Statistics Menu

Operation Statistics

This section reports the real-time duration counters. They are used at the factory to time burn-in, but can also be of use in the field. Play duration is the time that any number of players were playing. Operation duration is the time that the game was operating. Please reset the period counters when you reset period collections and you can find the following statistics: earnings per hour ((days *24)+hours+rounded minutes) /period collections. You can find out the efficiency of the game with the formula: lifetime operation / lifetime play or period operation / period play. Period timers are reset by pushing Select then Enter. Lifetime timers will reset if battery ram circuit fails.



W. Leland
C O R P O R A T I O N

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Instructions for Conversion .
of most video games
to
The Leland Corporation
All American Football

1. Parts for the All American Football conversion kit are as follows. Please inspect and check off:

Quantity	Description	Part Number
1	Decal, Control Panel Black	22-20006-01
1	Plexi, Marquee	21-13000-01
1	Decal, Marquee	22-14928-01
10	Ty-Wrap w/eyelet	25-10580-01
1	Control Panel Assembly All American Football	38-17000-26
1	Circuit Board Assembly All American Football	38-11695-26
1	Manual, All American Football w/Kit Instructions	72-13606-26
1	Harness, Video	87-14118-01
1	Harness, Main	87-14117-01
2	Decals, Side All American Football	22-14929-01
1	Harness, DC Power	87-14119-01
1	Decal, Monitor Wrap Around	21-13168-01

2. Remove existing game control panel, and all buttons or joystick controls associated with it. Install the black control panel decal over the existing metal control panel. We suggest you move the existing decal. Position the universal control panel above the control panel intended for conversion. Feed the harness through a convenient hole large enough for the harness connectors. Refer to Figure 1.
3. Securely mount the universal control panel with a bolt screw not easily removed from the exterior of the cabinet. Avoid pinching the wires. Secure using the ty-wraps included with your kit.
4. When routing the harness, leave enough slack so that servicing of the control panel and circuit board assembly can be accomplished with relative ease. Place a wire ty-wrap as close to the circuit board connectors as possible to relieve strain on the connector pins.
5. Mount the circuit board in an area of the cabinet that receives ample ventilation. Make sure the circuit board can be removed easily for service.

6. Refer to the DC power wiring diagram, making all the power connections as shown. Be sure to hook up the ground braid. Also, observe proper polarity. Careful with this one!
8. Set the regulated +5 volts at the test points on the circuit boards. Set the level per Page 5 of the All American Football manual.
9. The conversion process is now complete. It is recommended at this point, to go into diagnostics to test the performance of the new kit.

HINTS FOR SUCCESSFUL GAME INSTALLATION

Take some advice from the game masters. Successful game installations can be simple if you take a minute and read the following hints. It is worth it's weight in aspirin!

1. Inspect your kit

Inspect all received parts for shipping damage and to familiarize yourself with the parts. Inspect all integrated circuits (hereafter called "IC") for bent pins (being careful not to bend the pins).

2. The Old Case of the Bent IC Pin

The number one killer of a successful game installation, or for that matter, any other electronic device's proper operations, is bent pins. Avoid this plague and take the time (and patience) to make sure that all pins are in each hole and not bent.

Also installing ICs with bent pins runs the risk of bending the pins even further and eventually breaking them.

If pins are bent: First, grip the group of pins lengthwise with long needle-nose pliers. This gripping action will straighten them in this direction. Next, if any pins are bent in the other direction, straighten each one individually with needle-nose pliers being careful not to over-compensate. This overcompensation may break the pin.

3. Attach the Ground

Make sure to attach the ground braid to the control panel. Players risk an electric shock if the control panel is not properly grounded.

4. Which pole is which (observing polarity)?

Electronic circuits are quite sensitive to polarity and can easily lose their sense of humor when the polarity is reversed. A fuse may not be all they blow! Experienced electronic engineers check the polarity two times before applying power! You should probably check it three times.

Refer to figure 2 for proper 115 VAC and DC power connections.

5. Marquee blues (Marquee Installation)

Your game is a money-making investment! Why compromise by installing a crooked marquee? Avoid this and follow these instructions for installing:

First, place the plexiglass on the table. Next, center the decal on the plexiglass, getting an idea of the general location (before peeling off the back). Now, carefully peel off the back and place the far edge (lengthwise) on the plexiglass first, centering the remaining un-stuck (important) decal. Finally, "roll" down the rest of the decal, slowly, squeezing the air bubbles out with your hand.

Refer to figure 3 for Marquee Installation

6. Run Diagnostics (or Game Installation Success or Failure)

Five minutes of diagnostics may save an hour of frustration wondering why a feature does not work. Our software department is the best in the business. They have labored long and hard to write diagnostics to thoroughly check out your game. Take the time to follow the diagnostics section and prove to yourself that the entire game is working properly.

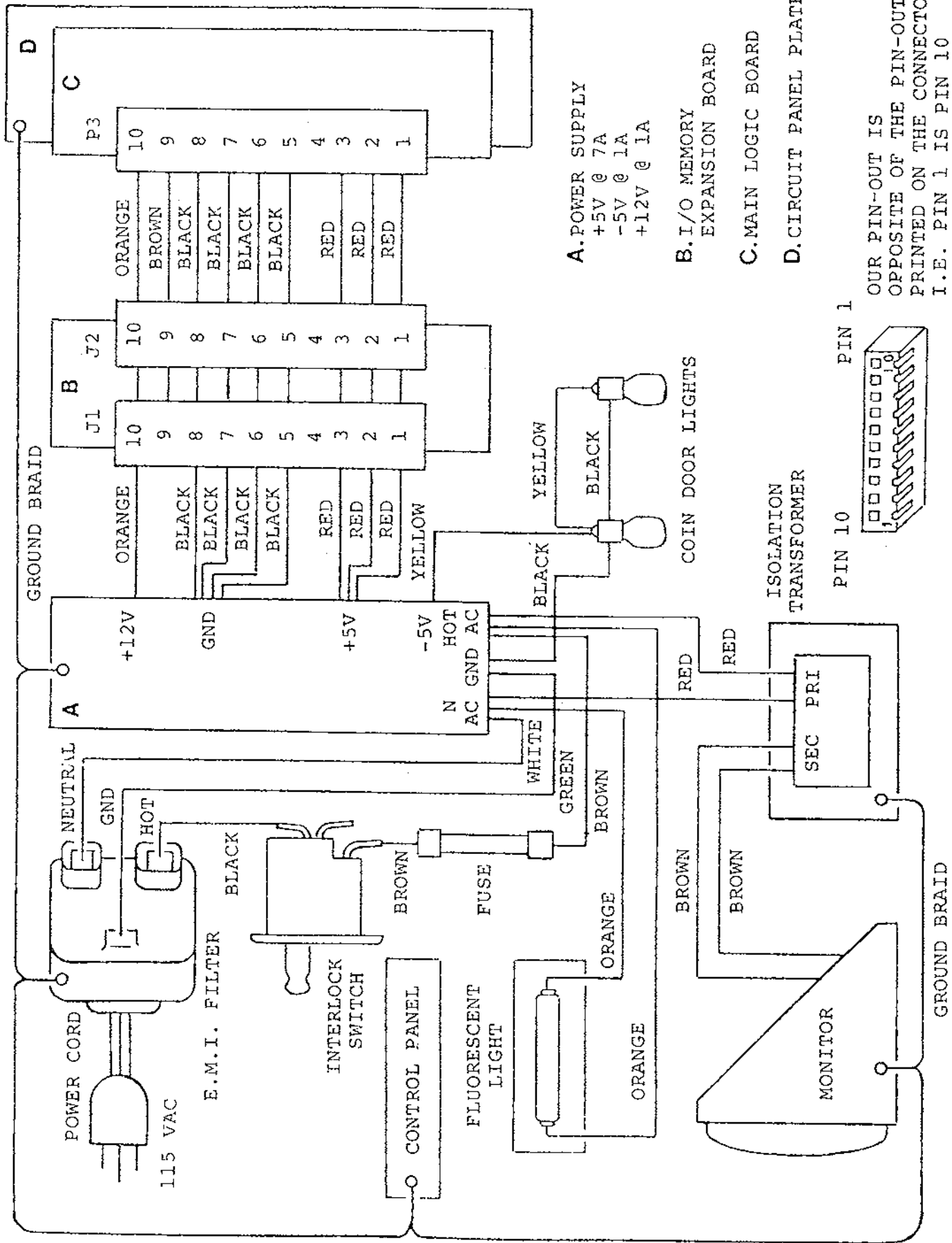
Next, play the game a couple of times to verify that all is well.

7. Monitor Outputs

The outputs from our system to the monitor are red, green and blue with negative horizontal and negative vertical sync.

8. How do I turn up the Sound?

Volume adjustment is easy. Locate VR1 (on main circuit board). Now look at the main board (largest board). Clockwise rotation increases the volume. Set this volume adjustment at full volume (fully clockwise). An additional volume adjustment is located on the service switch bracket just inside of the upper coin mechanism door.

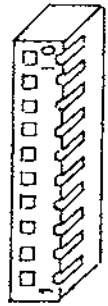


A. POWER SUPPLY
 +5V @ 7A
 -5V @ 1A
 +12V @ 1A

B. I/O MEMORY EXPANSION BOARD

C. MAIN LOGIC BOARD

D. CIRCUIT PANEL PLATE

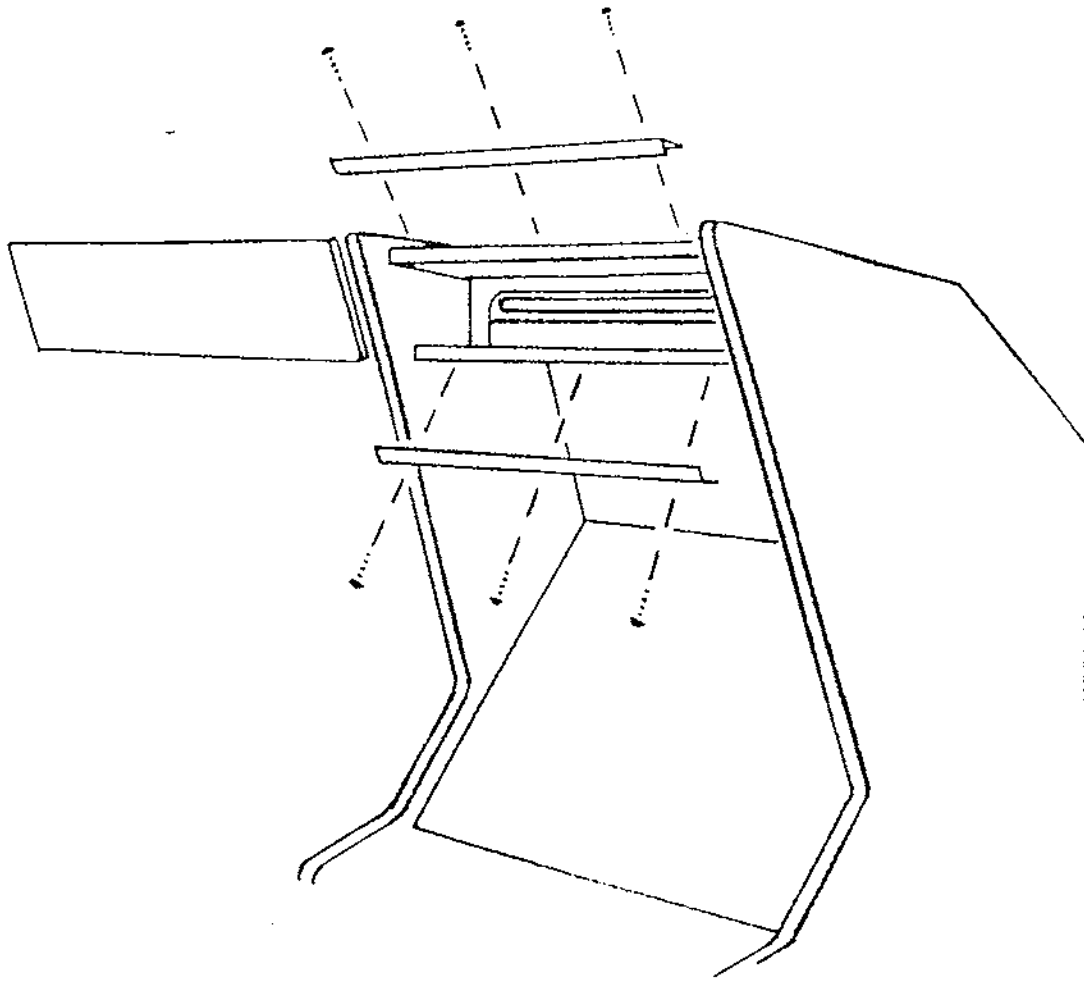


PIN 10 PIN 1

OUR PIN-OUT IS OPPOSITE OF THE PIN-OUT PRINTED ON THE CONNECTOR I.E. PIN 1 IS PIN 10 FOR A 10 PIN CONNECTOR

AC/DC POWER CONNECTION

FIG. 2



MARQUEE INSTALLATION

FIG. 3