

SERVICE & INSTALLATION MANUAL

PART NO. 22-13603-01

FCC WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed in accordance with the instructions 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 required to correct the interference.

NON-LELAND REPLACEMENT PARTS NOTICE

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

THE "HAPPY CAMPER" OUTLOOK

Research shows that a two and a half minute quarter both satisfies the player and keeps the cash flowing. Time a couple of games and adjust a few dip switches periodically to keep both the players and the cash box happy.

MACHINE INFORMATION: PURCHASE DATE: _____/_____/_____

DISTRIBUTOR: _____

GAME NAME: _____

SERIAL NUMBER: _____

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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 defects in materials and workmanship for a period of sixty (60) days from date of shipment. The Leland Corporation's warranty of above parts is subject to the normal use and service of its product. No other products or parts 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 Corp. during stated warranty period, provided:

- a. The Leland Corp. is notified in writing upon discovery by buyer that said products are defective.
- b. The defective product or part is returned *pre-paid* to The Leland Corp. plant with a Leland Corp. *Returned Merchandise Authorization (RMA)* number clearly visible on the outside of the package.
- c. An Operator Service Card is on file at The Leland Corp. plant or is included in the package for all returned printed circuit boards.
- d. The Leland Corporations' examination of returned products 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 Corp. is not responsible for bent pins on ICs not installed by our employees. In no event shall The Leland Corp. be liable for loss of profits, loss of use, incidental or consequential damages.

EXCEPT FOR THIS WARRANTY, THE LELAND CORP. 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 CORP. ANY OTHER LIABILITIES IN CONNECTION WITH THE SALE OF PRODUCTS MANUFACTURED BY THE LELAND CORP.

KIT CONTENTS

1 Main Printed Circuit Board Assy.	1 Marquee Lexan
1 Wire Harness	1 Control Panel Overlay
1 Hardware Set	1 Control Panel Plex
2 8-Way Joystick	1 Monitor Bezel
6 Player Button Assemblies	1 Service & Installation Manual
1 Set Side Graphics	1 Set Play Instruction & Function Labels
1 Marquee Plex	

NOTE: Replacement parts available through your exclusive LELAND CORP. distributor.

POWER REQUIREMENTS	MONITOR REQUIREMENTS
+5VDC - 8 amp minimum +12VDC - 2 amp minimum -5VDC - 1 amp minimum	Horizontal Mount Raster Scan Negative Composit Sync

RECOMMENDED TOOLS AND SUPPLIES

Phillips and Slot Screwdrivers
 Socket Set
 Wire Cutters and Strippers
 A Cool Head
 Pliers or Channel Locks
 An Eye To The Future
 Electric Drill
 3/32" 1/4" 7/16" Drill Bits
 5/16" Plex Drill Bit
 1-3/16" "Greenlee" Hole Punch
 Occasional Breaks
 Small File and Medium Rasp
 Razor Knife and *Sharp* Blades
 Straight Edge
 Adjustable Square
 Center Punch

OPTIONAL - Table Saw and 60 or 80 Tooth Carbide Tip Blade for Plex

Painting Supplies
 2" Paint brush
 Paint Roller and Pan
 Paint and Primer
 Sand Paper
 Wood Putty and Putty Knife
 Staple Gun and Staples
 Soldering Pen and 60/40
RESIN CORE Solder
 Vacuum Cleaner
 Shrink Tube
 3/32" 1/8" 3/16"
 Masking Tape
 Cleaner and Rags
 "Craftsman" Circle Cutter
 A *NEW GAME* Attitude

*****WOW*****

As with any new piece of equipment, the anticipation and excitement of seeing and playing the game is hard to control, but control you must. The people at the Leland Corporation have gone to great lengths to supply you with everything you will need to make that "used" game into a *NEW GAME* that you can be proud of.

*****IT'S A NEW GAME*****

That's right, a *NEW GAME*. The cabinet is used and the monitor and power supply might be out of an old game, but with your new Leland Corp. kit, some paint, wood putty, and a little elbow grease there is no reason that this game won't look and earn like any "dedicated" game on the market.

TO ERR IS HUMAN TO DOUBLE-CHECK SAVES YOU TIME

Before you get started, sit down, take a breath, and go through your kit.

1. Does your package include all of the listed parts? (Is it complete? Check the Kit Contents section.)
2. Is the power supply you have chosen able to supply all of the required voltages and current requirements?
NOTE: Some games, (i.e. Ms. Pac Man, Galaxian, etc.) regulate their voltages on the main P.C.B., and in other cases the existing power supply may not support the current requirements of your new game board. In these cases it will be necessary to find or buy a new power supply.
3. Is the monitor configuration compatible? In some cabinets it is rather difficult to change the orientation of the monitor from vertical to horizontal or vice versa.
4. Do you have the necessary tools? (See the recommended tools list.)

IN THE BEGINNING . . .

Now that you've checked your kit, selected your cabinet, and put yourself in that *NEW GAME* state of mind, let's get started.

The cabinet itself is your first task. Remove the following items:

1. All old logic boards.
2. Control panel.
3. Monitor glass or plex.
4. Marquee.
5. All Graphics. (The side graphic adhesive may be removed with *lacquer* thinner.)

Thoroughly clean (vacuum) the old cabinet and monitor.

Check the outside of the cabinet for dings, gouges, and cracks. Fill and sand any imperfections, mask and prime the cabinet and let dry. (You know what? Now might be a good time to start on the control panel.)

When dry, lightly sand the primed areas and paint. Use a small brush to get the edges and hard-to-reach places and the roller and pan to do the large areas. You might be surprised at how much difference a little paint and elbow grease will make in that all-important cash box.

NOTE: Be sure to remove the cabinet edge molding before painting.

NOW FOR THE GOOD STUFF . . .

NO POWER YET PLEASE!

LOGIC

Before you can install the wiring harness, the logic board must be mounted. After all, the wiring begins at the edge connector which is attached to the logic board.

Remove the board from its packing and inspect it for loose chips, jumpers, etc. and install it in a well-ventilated area away from the power supply and monitor using the supplied hardware.

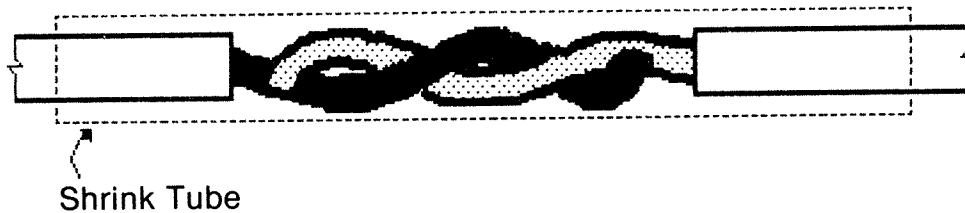
THE HARNESS

CAUTION: Always **TRIPLE CHECK** your connections. A little oversight, such as installing the edge connector backwards or hooking the + 12 volt supply to the + 5 volt input, can put your board out of commission for good.

A *HARNESSE HINT* - Either use existing connectors or buy new ones. Don't attach anything to the main harness without installing a secondary connector. If you don't already know why, you will discover the reason the first time you try to troubleshoot a malfunction in the field.

When splicing wires always use solder and shrink tube. I have found that the old Western Union splice works well and helps give your game that quality look.

Strip 1/2" Insulation, Twist and *Solder* Wires



Use wire ties and secure the harness to the cabinet wherever necessary. Remember, this will be a *NEW GAME*.

FIRST - POWER

You will need +5, +12, -5, and Ground connections from your power supply (see the harness wiring diagram on the back cover of this manual). It is a good idea to attach *all* power wires supplied on the harness to the power supply (double up where necessary). This will insure that you don't overload the edge connector pins and cause them to "burn".

SECOND - VIDEO and SYNC

The RED, GREEN, BLUE, GROUND, AND SYNC wires are to be connected to the monitor. In this case, the SYNC output is *composite - negative*, which means that you should attach the sync wire to negative horizontal *and* negative vertical sync inputs on the monitor. For more information on monitor hook-ups see the troubleshooting section of this manual.

THIRD - AUDIO

There are two speaker wires in the harness. The white wire (pin 10) should be attached to the speaker lug with a "+" mark or a red dot and the gray wire (pin L) to the other lug. See the harness wiring diagram on the back of this manual for auxiliary volume pot wiring procedures.

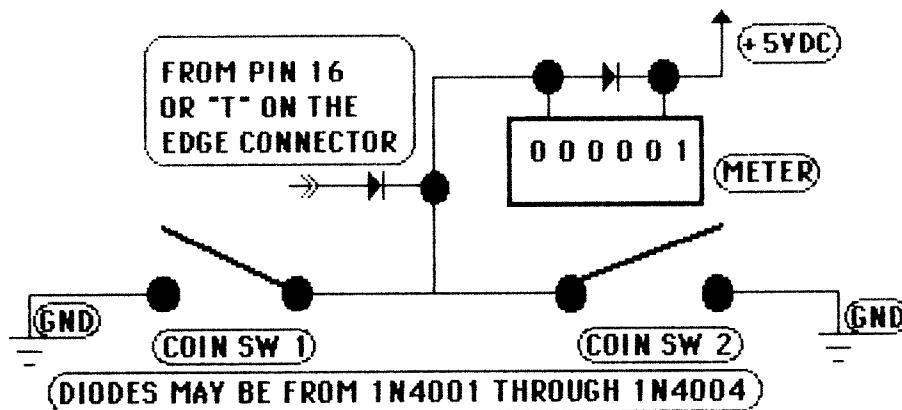
FOURTH - COIN DOOR

Connect the Coin 1, Coin 2, and Ground wires to your coin door (remember the secondary connector). The ground wire should be attached to the common (COM) lug of both coin switches and the coin wires to the normally open (NO) lugs.

To wire coin door lights, attach the ground wire to one lug of each light and one of the - 5VDC wires from the edge connector to the other.

MECHANICAL COIN COUNTER WIRING TIPS

Use the following diagram to facilitate installation of a mechanical coin counter:



BREAK TIME

You're just about ready to power this thing up, so go over every step again and make sure it is secure. Double check all of your connections. Inspect the game for loose wires and loose hardware and *take a break*. While you're taking this break, go over the installation in your mind and check for "glitches".

SMOKE TEST

Don't worry, its just a term (we hope). After you have gone over any possible problems that you may have come up with while on break, make sure that your dip switch is set for attract sound "on". This will help you hear as well as see that your new game is functional.

POWER-UP

Plug the game into a grounded AC outlet (110 volts please) and turn it on. Look and smell for smoke and listen for any "wierd" noises. **TURN THE GAME OFF IMMEDIATELY IF ANY ARE NOTICED!!!**

Coin the game up and listen for sounds. Refer to the troubleshooting section to remedy any problems that may arise.

THE CONTROL PANEL

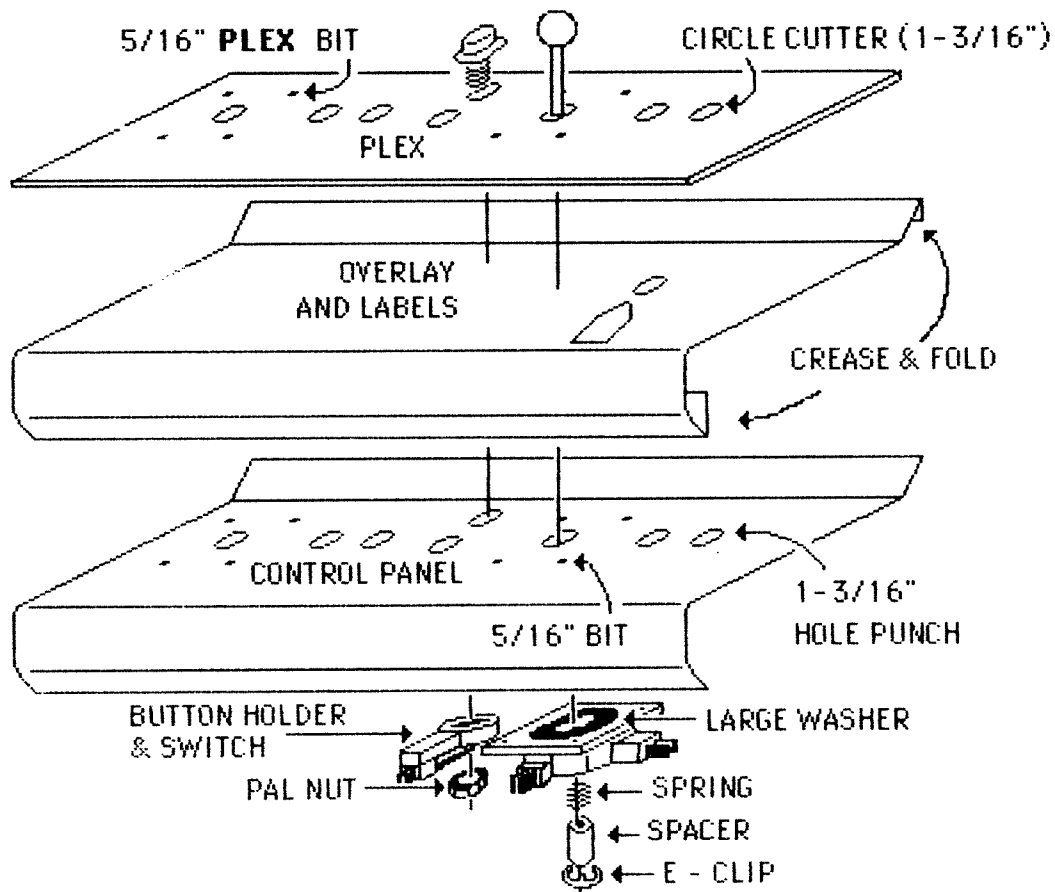
Actually, assembly of the control panel would be a nice diversion to occupy your time during the "drying" phase of the cabinet preparation period.

Many people consider the control panel to be the hardest part of any kit installation but with the proper tools (i.e. plex drill bits, a circle cutter, and a "Greenlee" hole punch) and a little practice, your control panel will be a "piece of cake". Just refer to the following illustration for placement of the control panel hardware.

TAKE YOUR TIME

After you *mark* the hole positions be sure to double check them to make sure that the switch holders, bolts, and joystick mounts aren't going to obstruct each other.

If you've never used the plex tools, practice on a scrap piece of plex first.



FIRST - DISASSEMBLY

Remove all old hardware. This includes buttons, joystick, bolts, etc.. *Do Not* remove the original control panel overlay until any new holes have been marked and drilled.

NEXT - HOLES AND STUFF

Mark the hole positions for all new hardware. Check alignment and start holes with a center punch. Pilot all holes with a 1/4" drill. *Don't drill the holes to size yet!*

HINT: An adjustable square works wonders when positioning button and joystick holes on the panel.

CONTROL PANEL PLEX

Use one of the two sheets of plex supplied with your kit as a control panel cover (the other sheet is for the marquee).

This plex must be cut to size for your control panel. Using the control panel as a template, mark the plex for size and core DEEPLY with a razor knife (use a straight edge). Clamp the plex between two pieces of wood and break off the excess with pliers. Use a rasp to smooth the edges

HINT: A table saw with a fine tooth blade (60 to 80 teeth) will leave a clean edge. You can even bevel the front edge for that "quality" look but BE CAREFUL!

Again using the control panel as a template, mark all hole positions on the plex (don't forget the bolt holes). Drill bolt holes with a 5/16" plex bit and use the circle cutter for the large holes.

Now drill the holes on the control panel to size and make button and joystick holes with the hole punch.

The holes are done - smooth them with a fine tooth half-round file.

Remove old graphics (keep it clean) and install the new overlay.

HINT: Remove about 3 inches of backing from the top of the overlay and, using a light *behind* your work, align the top of the overlay with the top of the panel leaving a 1" overlap. Crease the top of the overlay with a piece of rounded metal (i.e. screw driver shaft) and fold it over. Remove the rest of the backing, smooth the overlay top to bottom and center to edges, using that screw driver shaft for any corners, and trim the excess.

Cut out holes with a *sharp* razor knife, adhere button and instruction labels, and install your new hardware.

FINALLY - THE WIRING

Start by hooking a Ground wire to *every* switch in a “daisy-chain” fashion. Next, attach each Function wire to its respective switch. Remember to make the wire colors on the control panel match the wires coming from the PCB. Use wire ties to bundle the wires together making sure to allow about 1” of slack at each switch connection. Last, but not least, leave yourself a 3” to 4” pig-tail coming off the control panel and attach the control panel connector.

THE MARQUEE

Using the original marquee as a template, mark and cut the marquee plex to size. Peel the backing from the marquee graphic and apply to the face of the new marquee plex making sure to center the artwork on the plex.

Be sure that the marquee light works!

SIDE GRAPHICS

Be sure the sides of the game are clean and free of dust, old adhesive, etc.. Hold one side graphic up to the cabinet and mark the approximate position with an erasable pen or pencil (centered on the upper half of the cabinet). Using that adjustable square, measure from the top and back of the cabinet and make alignment lines (top and back) on both sides of the cabinet.

Spray one side at a time with a mild soap and water solution (don't be stingy and don't forget the soap). Peel the top half of the backing from one decal, align the top and back of the decal with the lines on the side of the cabinet, and smooth it on with a piece of cardboard (or squeegee) top to bottom and center to sides. Reach under the decal and remove the rest of the backing while smoothing the decal onto the side. Smooth any bubbles to the edges. Some bubbles just won't budge, but these may be popped with a pin or a knife. Repeat this process on the other side.

WELL THAT'S IT - RIGHT?

Wrong. Go over the game from top to bottom and make sure it looks good. Drop a couple of coins in and see if they credit. (The game won't make anything if it won't take money.) Does the meter work?

Now *PLAY THE GAME!* Do all of the controls work properly? Does the game sound good? Are the dip switches set to your liking? Is the monitor adjusted properly? If the picture doesn't look good, all the time you've spent on this conversion might as well have been spent fishing.

YES?

WELL THEN, NOW YOU'RE DONE - GOOD LUCK AND HAVE A GREAT TIME WITH YOUR NEW GAME!

THE TROUBLESHOOTIST'S SECTION

A NOTE ABOUT POWER

DC POWER

The computer board in this machine operates most efficiently when the power supply is providing a steady +5VDC (± 0.1 VDC). When checking DC power always put your leads across the power inputs on the main board and be sure that the +5 volt supply is between +4.9VDC and +5.1VDC. 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 is the main cause 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 Corp. 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.

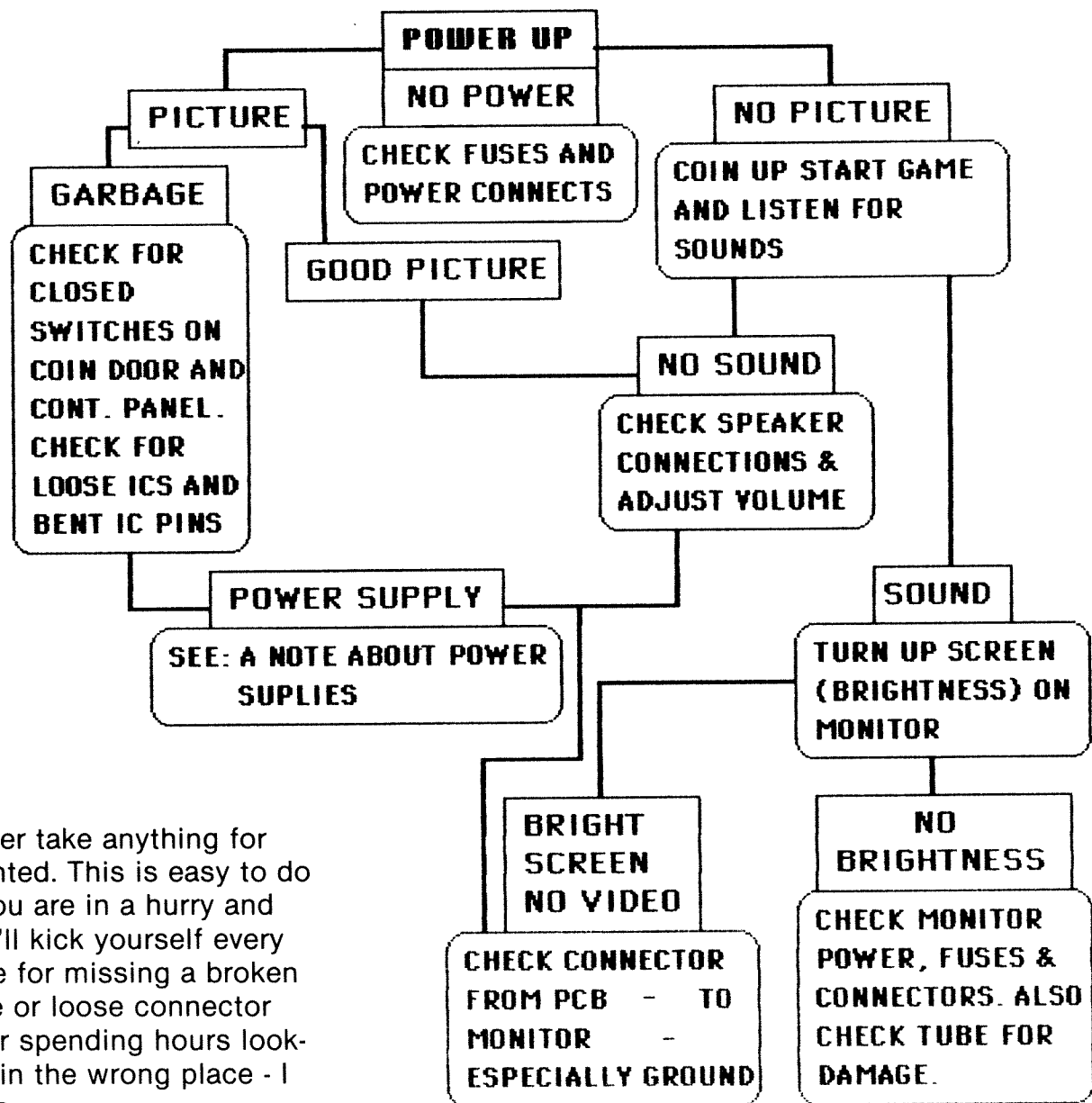
TROUBLESHOOTING FLOW CHART

The following chart may help you in your search for those annoying bugs.

DON'T TOUCH THAT SWITCH!!!

Before you reach for the power switch take a good look at the game. Open it up and check for loose wires, bad connections, or burned smells or spots. Look for spills and signs of vandalism. These quick checks will save you time and energy.

After you've eliminated the obvious, start digging.



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

GENERAL SHOOTING

GARBAGE

Check:

- Power supply voltages.
- Closed switches to control panel or coin door.
- Loose connections or loose chips on board.

NO SOUND

Check:

- Loose Connections.
- Low + 12 volt supply.
- Bad speaker or pot.

NO CONTROL OR FUNCTION SWITCHES (Including coin switches)

Check:

- Loose connections or broken wires. (Be sure to check ground connections and wires.)
- Closed switch.
- Input Buffer. (Follow edge connector trace to the first chip on the board.)

MONITOR SHOOTING

NO PICTURE

Check:

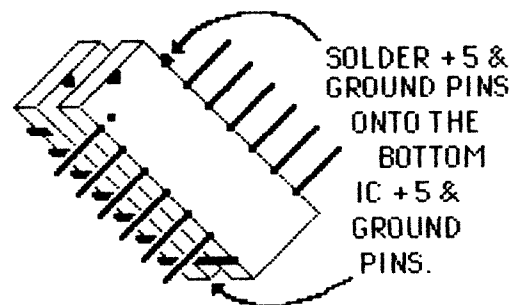
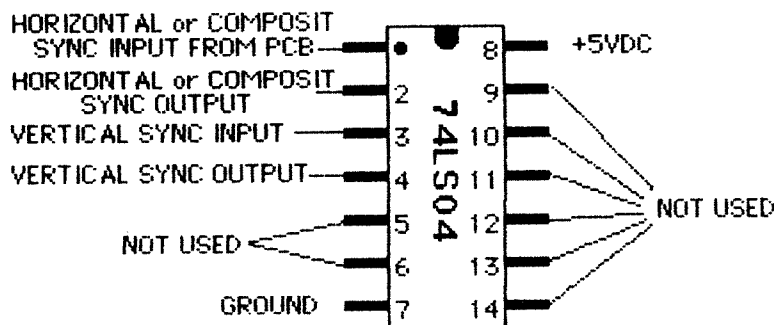
- Power connection.
- Blown monitor fuse.
- Video connection. (Check for continuity.)
- Turn up screen control and check for brightness.
- Broken tube or neck board.

BAD OR NO SYNC

Check:

- Sync and ground connections.
- Sync polarity.

If your monitor will not handle negative sync you may have to install the following inverter circuit.



“PIGGYBACK” ONTO A 14 PIN 7400 SERIES IC ON THE BOARD AND RUN JUMPER WIRE TO AN UNUSED EDGE CONNECTOR PIN

**SUPER
DODGE BALL
DIP SWITCH TABLES**

Dip Switch 1

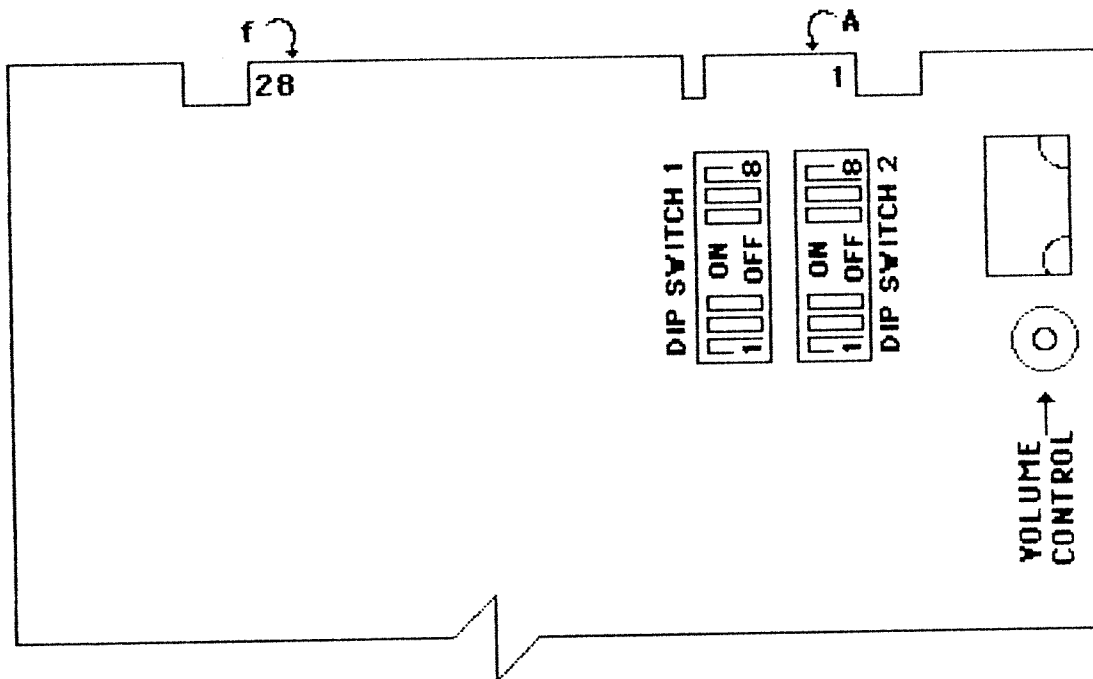
ITEM	1	2	3	4	5	6	7	8
DIFFICULTY								
Easy	ON	OFF						
Normal *	OFF	OFF						
Difficult	OFF	ON						
Very Diff.	ON	ON						

Dip Switch 2

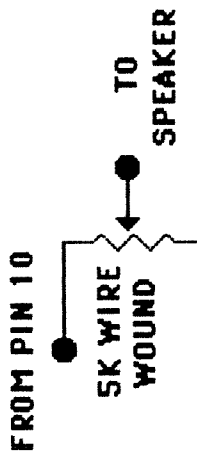
ITEM	1	2	3	4	5	6	7	8
COIN/CREDIT								
1 - 1 *	OFF	OFF	OFF					
1 - 2	ON	OFF	OFF					
1 - 3	OFF	ON	OFF					
1 - 4	ON	ON	OFF					
1 - 5	OFF	OFF	ON					
2 - 1	ON	OFF	ON					
3 - 1	OFF	ON	ON					
4 - 1	ON	ON	ON					
COIN SW 2 SAME AS COIN SW 1 USE DIP SWITCHES 4, 5, & 6								
PICTURE								
NORMAL *							OFF	
INVERT							ON	
ATTRACT SOUND								
SOUND *								OFF
NO SOUND								ON

*Denotes Factory Recommended Setting

SUPER
DODGE BALL
PC BOARD LAYOUT



**SUPER
DODGE BALL
WIRE HARNESS**



**AUXILIARY
VOLUME CONTROL**

WIRE COLOR	SOLDER SIDE	PIN #		PARTS SIDE	WIRE COLOR
BLACK	GROUND	A	1	GROUND	BLACK
BLACK	GROUND	B	2	GROUND	BLACK
RED	+5 YDC	C	3	+5 YDC	RED
RED	+5 YDC	D	4	+5 YDC	RED
BLUE	-5 YDC	E	5	-5 YDC	BLUE
ORANGE	+12 YDC	F	6	+12 YDC	ORANGE
	POST	H	7	POST	
	N/U	J	8	N/U	
	N/U	K	9	N/U	
GRAY	SPEAKER -	L	10	SPEAKER +	WHITE
	N/U	M	11	N/U	
GREEN	VIDEO GREEN	N	12	VIDEO RED	RED
GRAY	VIDEO SYNC	P	13	VIDEO BLUE	BLUE
YELLOW	TEST	R	14	VIDEO GROUND	BLACK
	N/U	S	15	N/U	
RED	COIN 2	T	16	COIN 1	WHITE
GRAY	PLAYER 2 START	U	17	PLAYER 1 START	BROWN
GREEN	PL 2 UP	V	18	PL 1 UP	GREEN
BLUE	PL 2 DOWN	W	19	PL 1 DOWN	BLUE
VIOLET	PL 2 LEFT	X	20	PL 1 LEFT	VIOLET
YELLOW	PL 2 RIGHT	Y	21	PL 1 RIGHT	YELLOW
RED	PL 2 THROW	Z	22	PL 1 THROW	RED
ORANGE	PL 2 PASS	a	23	PL 1 PASS	ORANGE
	N/U	b	24	N/U	
	N/U	c	25	N/U	
	N/U	d	26	N/U	
BLACK	GROUND	e	27	COIN GROUND	BLACK
BLACK	GROUND	f	28	SWITCH GROUND	BLACK