

ROMSTAR[®] INC.

CHAMPIONSHIP BOWLING

ROMSTAR[™]

4
PLAYER
ALTERNATING

Available in Upright
and Cocktail Kits

UNIVERSAL JAMMA CONVERSION KIT
(Vertical 4 Player Alternating, 1 Trackball, 3 Button Game)

ROMSTAR[®] INC.

INSTRUCTION MANUAL

Installing Your

CHAMPIONSHIP BOWLING

New Game Package

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**CHAMPIONSHIP BOWLING
NEW GAME PACKAGE CONTENTS**

DESCRIPTION	PART #	DESCRIPTION	PART #
1 Main Printed Circuit Board (PCB)	6301	1 Marquee	6303
1 Monitor Bezel	6308	1 Control Panel Overlay	6307
1 PCB Feet Assemble	0524	1 Set Side Graphics	6306
1 Connecting Wire Harness (Jamma)	0215	1 Set Play Instructions & Function Labels	6304
1 3" Trackball	6309	1 Installation Manual	6302
4 Button Holders	0221	1 Metal Trackball Template Overlay	6309A
2 Red Player Button	0229	1 Molex 6 Pin Male Connector	6309M
1 Blue Player Button	0233	6 Molex 22 Gauge Female Pins	6309P
1 White Player Button	0235		

Note: Replacement accessories available through your exclusive **Romstar** distributor

POWER REQUIREMENTS		MONITOR REQUIREMENTS
+5 VDC	7 amp minimum	Vertical Mount Raster Scan
+12 VDC	1 amp minimum	Negative Composite Sync
-5 VDC	1 amp minimum	Required for Jamma Compatibility

ROMSTAR™ INC.

Invites You To Use

OUR PHONE OR FAX NUMBER FOR
SERVICE INFORMATION CONCERNING THIS GAME, OR ANY
OTHER ROMSTAR GAME YOU NOW HAVE ON LOCATION.

CALL US FOR PROMPT, COURTEOUS
ANSWERS TO YOUR PROBLEMS.

ROMSTAR, INC.

22857 LOCKNESS AVENUE • TORRANCE, CALIFORNIA 90501

TECHNICAL QUESTIONS — SENIOR TECHNICIAN DARRYL WILLIAMS EXT. 119

RMA'S / PARTS QUESTIONS — PARTS MANAGER AUDREY SMITH EXT. 112

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WARNING

Federal law provides severe civil and criminal penalties for the unauthorized reproduction, distribution, or exhibition of copyrighted audiovisual works and video games.

The Federal Bureau of Investigation investigates allegations of criminal copyright infringement.

Before You Get Started . . . Stop!

1. Does your **new game** package include all listed parts? (Is it complete?)
2. Is the game you have chosen to transform able to supply all the required voltages for the **new game**?
Note: Some games, (i.e. Ms. Pac Man, Galaxian, etc.) regulate their voltages on the main P.C.B. This makes the existing power supply inefficient. These games will require a change in power supply for your **new game**. Many game supply houses can offer you a switching regulated power supply for a relatively low cost.
3. Is the monitor configuration compatible? In most games it is rather difficult to change the monitor from a vertical mount to a horizontal mount. We recommend you choose a game cabinet with the same mount as your **new game** requires.
4. Do you have the necessary tools? (See the recommended tool list)

Caution

F.C.C. Regulation Compliance

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 take whatever measures may be required to correct the interference.

Recommended Tools and Supplies

ROMSTAR **new game** package.
Phillips and Slot Screwdrivers
Socket Set
Enthusiastic Attitude
Wire Cutters and Strippers
Pliers or Channel Locks
Planning and Careful Thought
Electric Drill
3/32" • 1/4" • 7/16" Drill Bits
1/4" Plex Bit
1-3/16" Chassis or Sheet Metal Punch
1 1/4" Plex Hole Saw
Glass of Water and a Snack
Small File
Razor Knife and Sharp Blades
Straight Edge
Patience
Common Sense

Painting Supplies (if you do your own painting)
Paint Brush and Paint (don't forget the primer)
Paint Roller and Pan
Sand Paper
Putty Knife and Wood Putty
A Good Night's Sleep
Staple Gun and Staples
Soldering Iron and 60/40 **ResIn Core**
Solder
Vacuum Cleaner
Assorted Fastening Hardware
Shrink Tubing: 3/32" • 1/8" • 3/16"
Masking Tape
3 1/2" OR 4" Wire Ties
Spray Window Cleaner and Rags
(baby diapers work GREAT!)

Dip Switch Tables

Optimize Your Profits

Thorough Research shows that two and a half minute games both satisfy players and also keep the quarters flowing.

If games aren't running about two and a half minutes long, then collections probably aren't at their peak. You'll want to tailor your game to your location. The trick is to adjust a few DIP switches. (See the chart in this book.) It's easy!

Installation Procedures

Something To Think About

Your final product will be a **new game**.

You have made a wise decision to transform a game that has seen better days in the all important cash box into a **new game**. This is by far the most cost effective alternative to maximize the return of your initial investment. All you provide is the cabinet with a power supply and a monitor. Oh yes, you will need a touch of elbow grease. And that's it! We provide the rest. The end result is . . . a **new game** at a very low cost.

Fact: Spend a little time on the cabinet's appearance (i.e. marquee, control panel and cabinet graphics). With a little paint, some wood putty and new lights, you will raise the profits of any game . . . especially with the introduction of a **new game** package.

The **new game** look should always apply to the inside of your game as well as the outside. A few wire ties and shrink tubing on your harness; some fastening hardware on your subassemblies and a sweep with the ol' vacuum cleaner will ensure that unnecessary *glitches* do not occur.

Remember: You are creating a **new game** .

If you have any questions or just need some advice on any of your **new game** transformations, don't hesitate in giving a member of our technical staff a call.

Let's Get Our Hands Dirty

Preparing the Original Game for the New Game

Remove the following:

- | | |
|------------------------|------------------|
| 1. Main logic board(s) | 4. Monitor Bezel |
| 2. Control panel | 5. Marquee |
| 3. Monitor plexiglass | 6. Graphics |

I would recommend painting your cabinet to give it a fresh new look. You may consider having an auto body shop take care of your painting needs.

If your cabinet has wood grain sides; remove old graphics and adhesive (adhesive may be removed with **lacquer** thinner.

If you intend to use your original plexiglass, be sure it is in mint condition or it should be replaced.

Thoroughly clean out your cabinet.

Time To Install Your New Goodies

**Before You Start . . . Remember DO NOT
Do This Work With The Power On!**

Logic P.C.B.

Mount the logic board securely (away from power supply).

- A Mark and drill pilot holes (3.32").
- B Install the P.C.B. into cabinet. Use feet and spacers supplied and adjust them so that the screws will go through the holes in the cabinet.

Wire Harness

Attach the wire harness connector to the main logic board. **CAUTION:** Sometimes the connector is not keyed and it is very easy to install it reversed on the logic board. Even if it is keyed, always **triple check** to be sure the wire inputs were connected correctly to the connector and the connector to the logic board.

Connecting the Wire Harness to the Existing Wires

When you hook up the control panel, power supply, monitor or other subassemblies that remain in the game cabinet to your new wire harness, try and use their existing secondary connectors.

- 1. Cut the original wire approximately three inches from the original connector. Strip off about one half inch of insulation.
- 2. Solder the new wire designated for that position to the original wire you just stripped.

Warning: DO NOT JUST TIE THE WIRES TOGETHER. THIS CAN CAUSE NAGGING INTERMITTENT PROBLEMS THROUGH LOOSE CONNECTIONS OR OXIDATION OR BOTH. **Always take the time to do it right.**

- 3. Melt shrink tubing around all your in-line wire connections. Do not use electrical tape. Tape could unravel over a period of time due to the cabinet heat and cause you a great deal of trouble.
- 4. Use wire tie wraps, and secure the cable to the cabinet whenever it seems necessary. Remember this is a **new game**, not a sloppy conversion.

Power Wires

- 1. Connect the wires that are designated for your power supply. You will need a supply of +5V, +12V & ground. Your **new game** package may not require all of the voltages that were used in the original game. Tie off any unused wires.
- 2. You will notice that you probably have more than one wire for each voltage. It is a good idea to use all wires supplied (double up if it is necessary). This will help to ensure that you don't overload the edge connector pins and cause them to "burn".

Monitor Wires

You will be connecting the wires designated for the RED, GREEN & BLUE video guns along with the SYNC & GROUND wires.

NOTE . . . CONCERNING SYNC:

Your **new game** only calls for one sync wire connection, this is called **composite sync** (horizontal and vertical tied together). This composite sync is also **negative**. Most monitors have supply positions for both negative and positive sync. You can check your monitor manual or call our technical department for assistance.

Speaker Wires

Find the two wires that are designated for the speaker and hook 'em on up.

Coin Door Wires

1. Connect the designated wires to the coin switches and meter. (See tech tips)
2. You can connect your door lamps to the unused -5V power supply. Some games have separate power outputs for the coin door lamps.
3. Be sure to clean and lubricate your old coin mechanisms. Keep the money coming in.

GUESS WHAT?

You are almost done with the electrical connections of your **new game**. All you have left is the control panel wiring. But we are going to hold off on that for right now. We have a few other things we need to do first. So why don't you go ahead and get yourself a drink of water and stretch your legs. When you return, we can take a fresh look at your progress and then move forward.

Smoke Test

What Test?

Don't worry. All this means is that you are ready to apply power to the system for the first time and you pray that there will be no smoke from a simple oversight.

You are just about ready to power up the logic board. But first we need to recheck your work.

1. Carefully inspect the game for loose power wires, exposed connections and extra fastening hardware.
2. Make sure the logic board, monitor and power supply are securely fastened in place.
3. **Double check** the connectors to be sure they are wired and connected properly.
4. Set the dip switches on the logic board to the factory recommendations. (Refer to page 5.) Also, be sure you set the dip switches for "DEMO WITH SOUND". This will enable you to hear as well as see that your new P.C.B. is functional.

Time to Apply Power:

1. Look and smell for smoke. (TURN OFF IMMEDIATELY IF ANY IS NOTICED)
2. Listen for game sounds.
If after one minute you have not heard any sounds:
 - A) Check for proper dip switch settings.
 - B) Adjust volume control and check speaker connections.
 - C) Check the +12V power supply to the logic board.**NOTE:** If you do get sounds, but they are a little fuzzy, switch the wires around on the speaker.
3. How is the monitor image?
 - A) **Is the picture in sync?**
If your picture has the top and bottom halves of the screen reversed and it will not stop rolling, change your sync polarity on the monitor. (Positive to negative (see tech tips section).

NOTES:

B) Now how's your picture?

- Is it centered?
- Is it too bright or dim?
- Is it in focus?

Check your monitor manual for these adjustments. If your screen looks "off", then your **new game** transformation may have been in vain. So let's take the time to make the monitor look great.

C) Is the picture upside-down?

Refer to your monitor manual - switch two horizontal yoke wires and then switch two vertical wires. (Pull the pins in the connector on the monitor P.C.B. to switch them.) or check **Dip Switch Tables**

Control Panel Assembly

1. Remove the buttons, joysticks and wire harness and put them aside for now. Do not remove the original panel overlay until the new holes have been drilled.
2. Mark positions on the panel for the new holes.
ROMSTAR supplies a clear 1/8" thick piece of plexiglass with every **new game** package to cover the control panel. We feel that your **new game** investment is well worth protecting . . . and the control panel is the first place to show wear and tear.
 - You will need to cut this piece to size. Use the control panel as a template.
 - Use a razor knife to score the plexiglass **deeply**. Then use a pair of pliers to break away the extra plexiglass.
3. Now drill the holes in your panel that you have marked off for the *buttons, joystick and bolts*.
Hint: For best results, use a chassis or sheet metal punch for button holes.
4. Drill the same holes on your plexiglass panel protector. Once again use your panel as a template.
Hint: To avoid chipping while you are drilling the holes, place the plexiglass securely on a soft wood surface and use a plexiglass drill bit and hole cutter.
5. The holes are now all cut. Smooth them out on your panel and plexiglass with a fine toothed file.
6. Remove the original graphics overlay from the panel. Clean up the panel and install your **ROMSTAR** graphics.
Make It Easier: Peel the top half of the protective backing off of your graphics. Start from the center and smooth out your overlay. Make sure you have about an inch extra coming off the top. *No bubbles please*. Now peel off the bottom half and do the same as you did for the top.
7. Adhere the instruction and function labels.
8. Install the Plex Control Cover over your completed **new game** panel.
Note: Be sure to bolt the plexiglass securely to the panel.
9. Mount the joystick and the buttons to the panel and wire them up. (Use the existing Panel wiring if possible)

Marquee Installation

Using the original marquee as a template, Center your **new game** marquee graphics and score the new marquee deeply to fit the cabinet. Break off the excess with pliers.

Note: when cutting marquee to size, check to make sure that you are cutting as little of the necessary art as possible (name, manufacturer, etc.)

Be sure the light behind the marquee works. Everything should **always work** on a new game.
Take your time ... Don't forget this is going to be a **new game**.

Side Graphic Installation

1. Be sure sides of game are clean and free of old adhesive, dust, etc.
2. Mark position of decal with erasable pen or pencil (centered on upper half of cabinet).
3. Peel off top 1/4 of decal backing and apply to cabinet with a smoothing motion (use a soft rag). Continue peeling off backing and smoothing.
4. Remove any small bubbles with a pin or razor blade (pop them!)

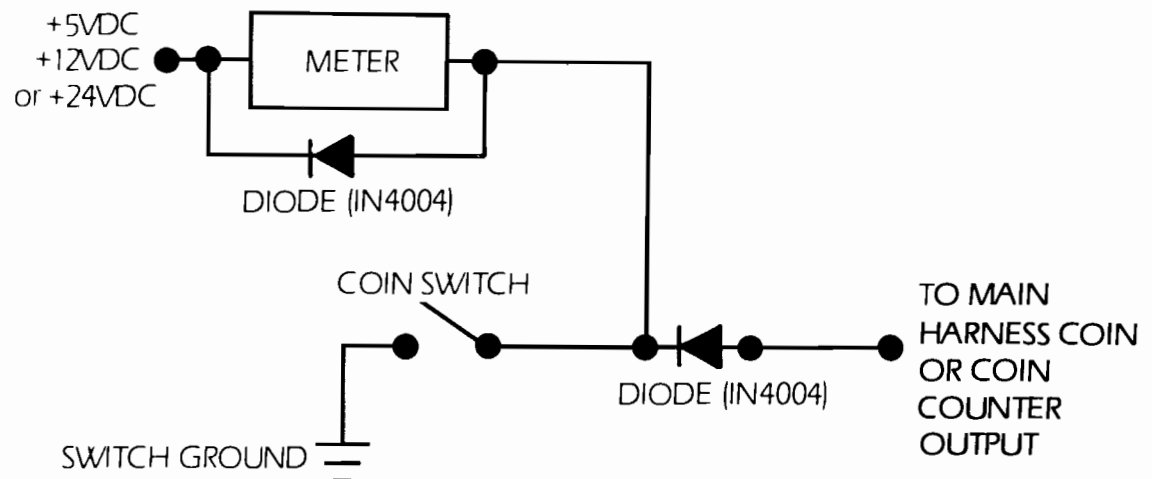
Finishing Touches

1. Check the game inside and out for any imperfections. Secure any loose wiring or fastening hardware.
2. Make sure the coin door is tight and the coin mechs are well adjusted. A game is no good to anybody if you can't get a coin into it.
3. Once again go over every step of this **new game** transformation in your mind. Be sure everything is correct and to your liking.
4. Power up the game.
 - A. Check all the coin switches. (Does the coin meter work?)
 - B. Play your **new game**.
 - Are all the player controls working?
 - Are the game sounds present?
 - Is the volume level proper?
 - Are the dip switches set properly?

Well, that's about it. Good Luck.

Coin Meter Diagram

To attach a coin meter, use following diagram:



Star Tech Tips

We are grateful to Star Tech Journal™ for allowing us to publish the following excerpts from their journal.

1. Monitor Sync

If your monitor does not have dual polarity positions for sync, you may use one of the following methods to get your game going.

CURE 1: Install a simple one I.C. Circuit on your logic board. This I.C. may be "piggy backed" on to another 7404 series chip for power by bending up all but the two power pins so that they are parallel to the top surface of the new I.C. and then connecting the power pins only to the existing chip. (See Fig. 1) Next connect the sync wires as shown in Fig. 2. (Note: Figure 2 shows a hookup for either **composite** or **separate** syncs.)

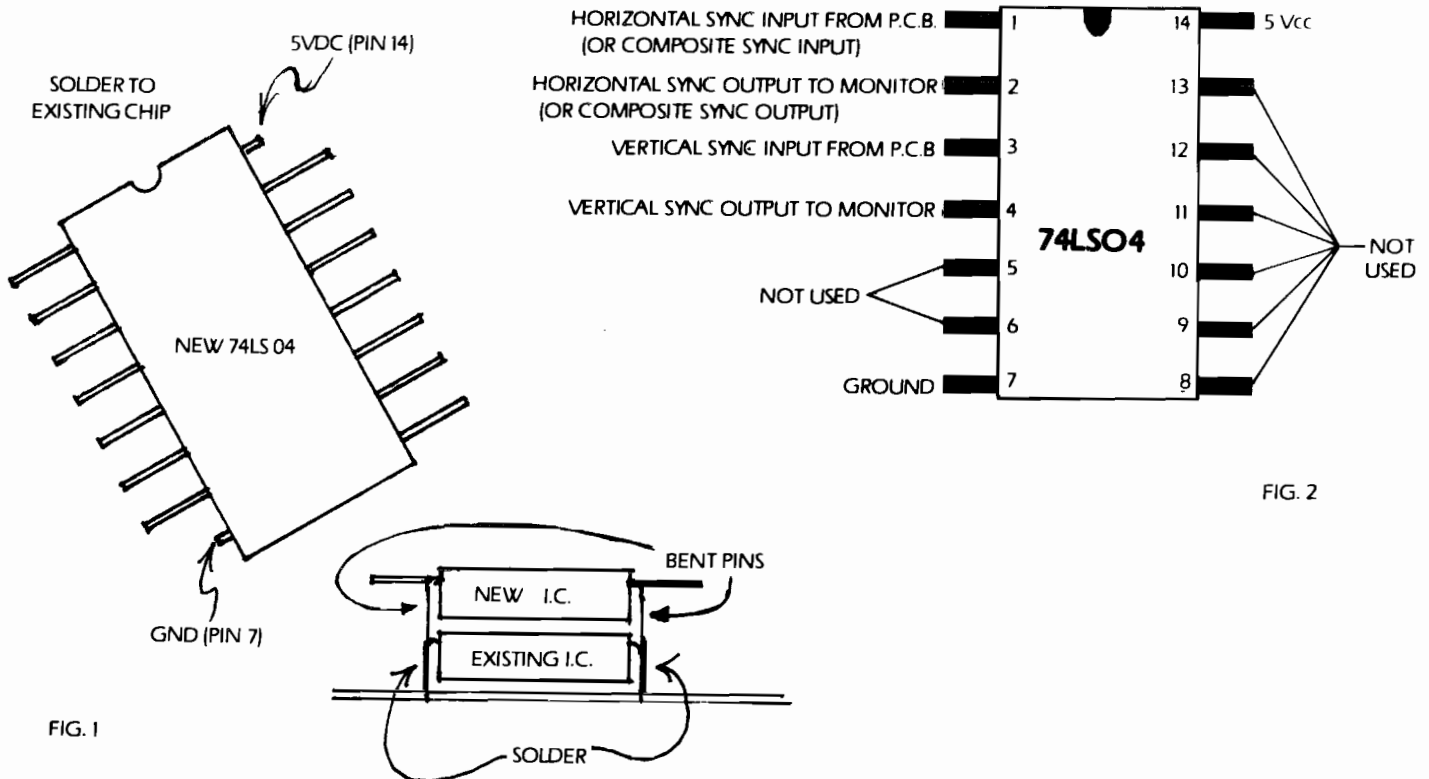


FIG. 2

CURE 2: Used for Wells-Gardner Video-Sync boards with positive sync connections only. (Vertical mount board 85x140B.

Cut the traces on the solder side of the board between input pins 5 & 6 to the unbanded (anode) ends of diodes X201 & X202.

Add MPSA56 transistor as follows:

Collector to anode leads of diodes X201 & X202. Base to pins 5 & 6 of the video input connector.

Emitter to cathode (banded) lead of zener diode ZD201.

Insert a 1N4148 diode - cathode to the emitter of the MPSA56 and anode to the base. (See Fig. 3)

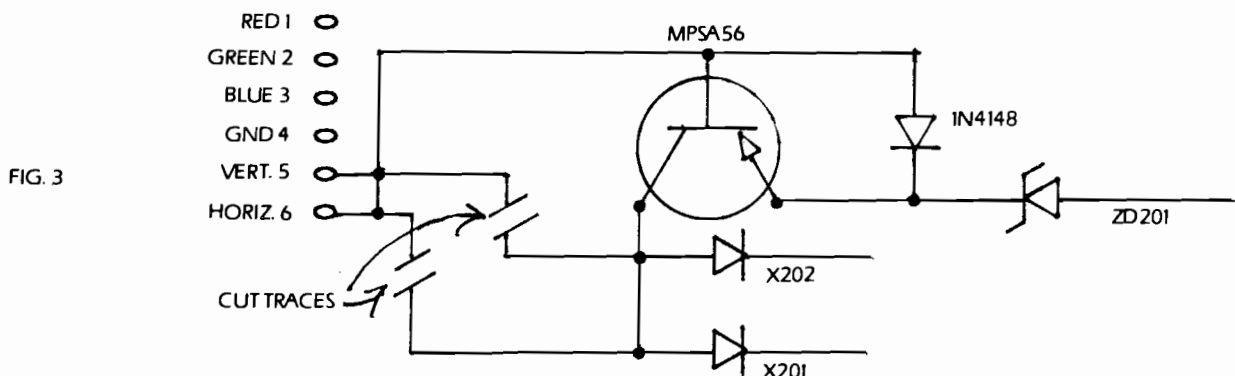


FIG. 3

2. Horizontal Tearing

CAUSE: The negative sync signal of most logic sets are slightly different than the GO7-CBO monitor negative sync inputs. The result of this mismatch is a horizontal "wave" or "curl".

CURE 1: On the monitor deflection board, replace C303 with a 10uF 25V radial lead capacitor with the positive lead towards the collector of X305. (CAUTION: be sure to check this step as the original cap is not polarized.) Then replace C501 with the cap removed from the C303 location.

CURE 2: Connect 1N4148 fast-switching diodes across both the positive and negative sync inputs to the monitor. (See Fig. 4) **NOTE:** Both diodes must be installed or you will not have vertical stability.

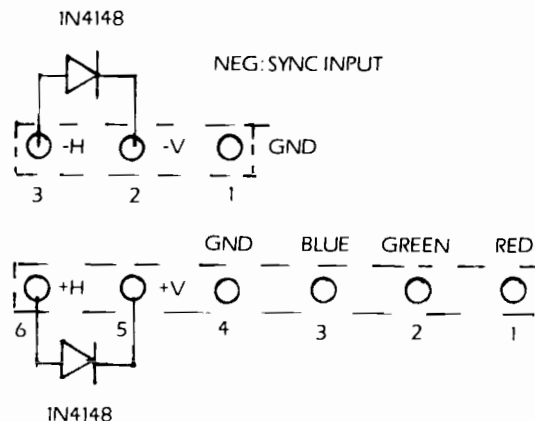


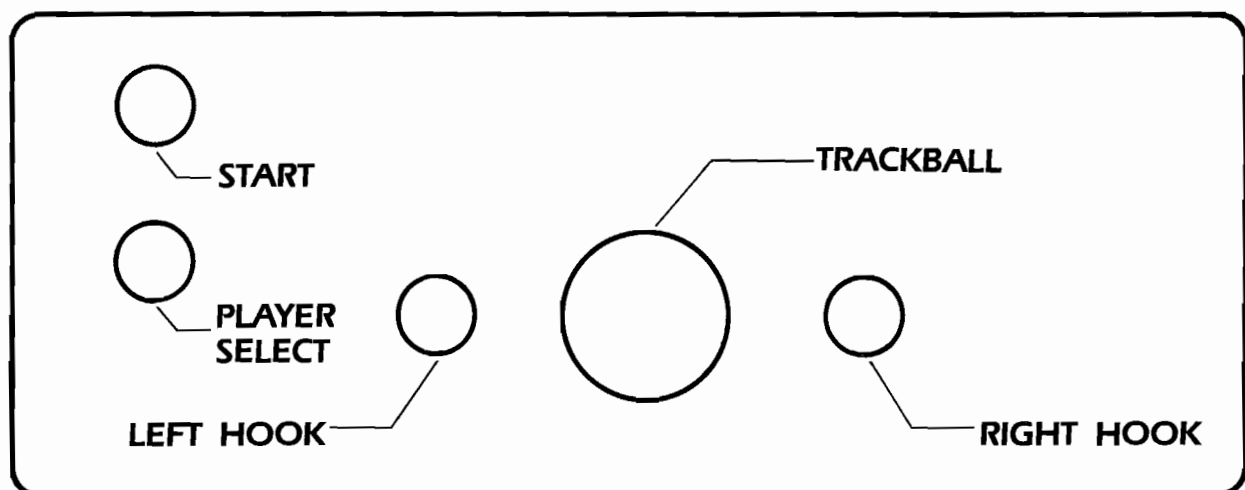
FIG. 4

CURE 3: Join negative sync inputs J2 and J3 together with a jumper. Locate W102 and install a jumper from W102 to either J2 or J3.

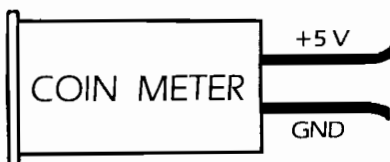
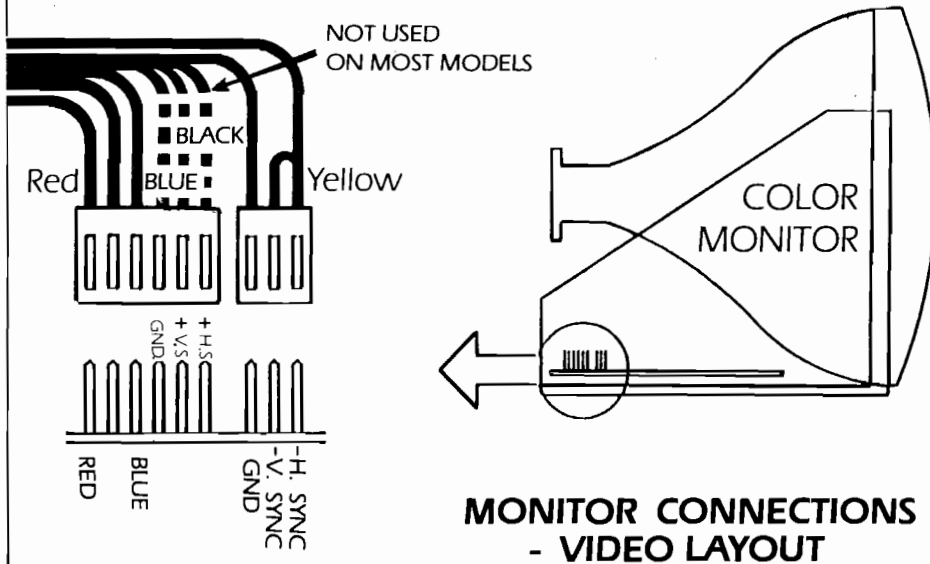
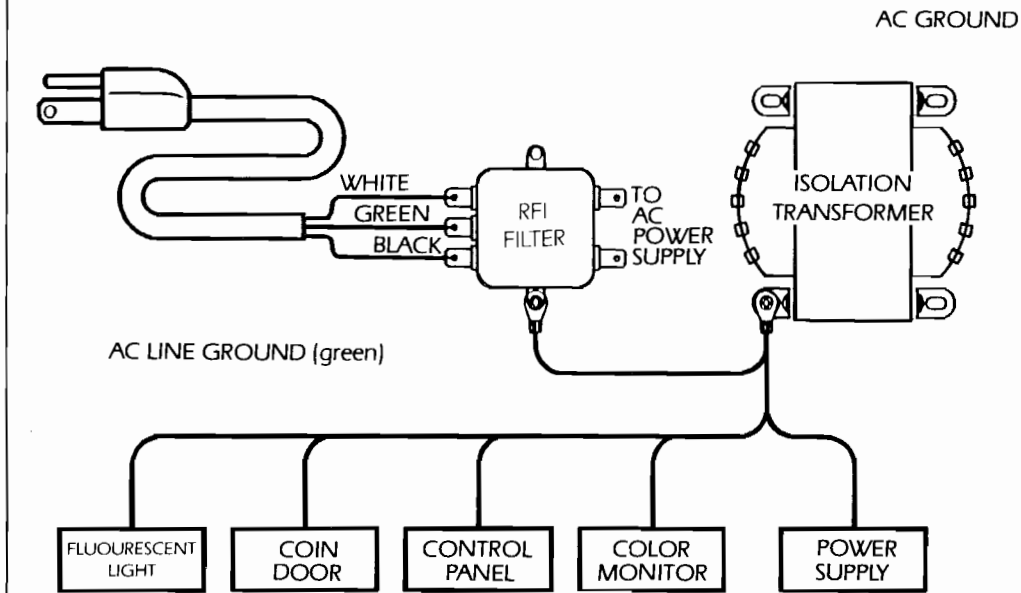
CURE 3: For Wells-Gardner K4600 series monitors

Replace C356 (4.7uF 25V) on the Horizontal/vertical board (vertically mounted board nearest the flyback transformer) and center the horizontal hold pot. Turn L351 for the best horizontal stability and fine-tune with the horizontal width pot.

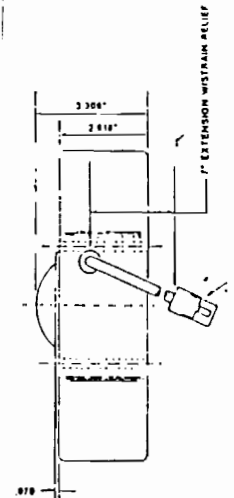
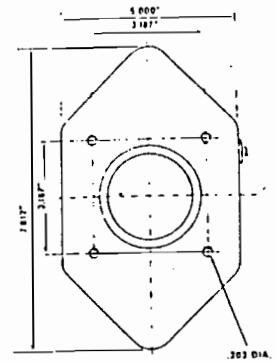
Control Panel Positioning



ILLUSTRATED PARTS LISTS

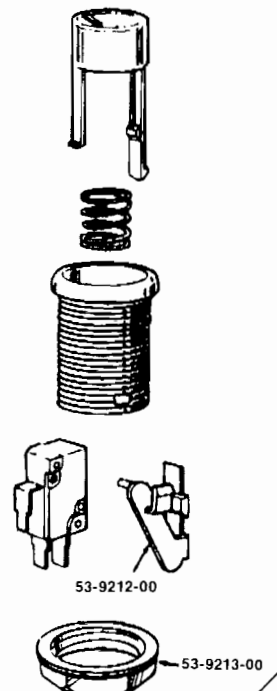


COIN METER LAYOUT



95-4115-00
MICROSWITCH WITH
GOLD CONTACTS

Exploded View

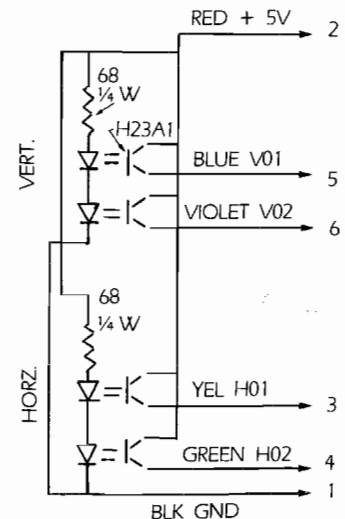


56 PIN EDGE CONN. PIN-OUT CHART (JAMMA COMPATIBLE)

WIRE COLOR	SOLDER SIDE		PARTS SIDE		WIRE COLOR
BLACK	GND	A	1	GND	BLACK
BLACK	GND	B	2	GND	BLACK
RED	+5V	C	3	+5V	RED
RED	+5V	D	4	+5V	RED
WHITE	-5V	E	5	-5V	WHITE
YELLOW	+12V	F	6	+12V	YELLOW
	KEY	H	7	KEY	
	COIN COUNTER 2	J	8	COIN COUNTER 1	BROWN
	COIN LOCK OUT 2	K	9	COIN LOCK OUT 1	RED
WHITE/BLACK	SPK (-)	L	10	SPK (-)	WHITE
OP.-BLU/BLACK	N.C.	M	11	N.C.	BLUE-OPTION
GREEN	VIDEO GREEN	N	12	VIDEO RED	RED
GRAY	VIDEO SYNC	P	13	VIDEO BLUE	BLUE
RED/BLACK	SERVICE SWITCH	R	14	VIDEO GND	BLACK
OP.-BRN/BLACK	TILT SW.	S	15	TEST SW.	BROWN
	COIN SW. 2	T	16	COIN SW. 1	WHITE
WHITE/GRAY	START SW. 2	U	17	START SW. 1	GRAY
WHITE/VIOLET	2P XDIR	V	18	1P XDIR	VIOLET
WHITE/BLUE	2P YDIR	W	19	1P YDIR	BLUE
WHITE/GREEN	2P XCLK	X	20	1P XCLK	GREEN
WHITE/YELLOW	2P YCLK	Y	21	1P YCLK	YELLOW
WHITE/ORANGE	2P HOOK R	Z	22	1P HOOK R	ORANGE
WHITE/RED	2P HOOK L	a	23	1P HOOK L	RED
WHITE/BROWN		b	24	PLAYER SELECT	BROWN
GREEN/WHITE	N.C.	c	25	N.C.	BLUE/WHITE
YELLOW/WHITE	N.C.	d	26	N.C.	RED/WHITE
BLACK	GND	e	27	GND	BLACK
OPTION-BLACK	GND	f	28	GND	BLACK-OPTION

WICO 3" TRACKBALL WIRE COLOR TABLE

WIRE NAME	POSITION	WICO COLOR	JAMMA COLOR	TECH. NAME
1 PL. UP	PIN 18	BLUE	VIOLET	X DIRECTION
1 PL. DOWN	PIN 19	GREEN	BLUE	Y DIRECTION
1 PL. LEFT	PIN 20	VIOLET	GREEN	X CLOCK
1 PL. RIGHT	PIN 21	YELLOW	YELLOW	Y CLOCK
+5 volts	pin 3	RED	RED	5 VOLTS
ground	pin 1	BLACK	BLACK	GND



Test Mode Procedure:

To enter Test Mode, turn Dipswitch #1 ON on the PCB. Turn power off then on, or press the small reset button beside the volume control (SW 2 LOC. M-13).

Test mode screen 1 is a video color/crosshatch screen. To go to the next Test Mode screen, use Start button.

Screen 2 will have dipswitch setting and some ROM information. The trackball test is the letter in the gray box. Move the trackball to move the letter (this part of the test is useful when building the kit, for checking proper operation of the trackball). Press start for the next screen.

Screen 3 is a music, sound, voice and animation test. Move the trackball to move the bowling ball pointer to the category you wish to work with. Use the left hook and right hook button to control the category advance and activate mode. Press start to continue.

Screen 4 is a game adjustment screen. Use the trackball once again to move the bowling ball pointer to the category, then use the right hook and left hook to change the setting. More details on this category below.

Screen 4 is a highly critical screen, as it controls the actions of the game. The trackball speed setting is to adjust trackball responsiveness to the player. Move the ball to this setting and use left and right hook to change the value. We recommend a setting of 10.

The timer setting will disable the time. We recommend using the timer.

The throw mode affects the little animation of the player throwing the ball. If set to quick mode, the animation will occur in less than a second. In full mode, the animation of the ball throw will be a natural speed (1-3 seconds). We recommend quick mode.

Game Difficulty is used to adjust the hardness of the game to the custom needs of your location. We recommend a setting of two (2).

The INIT backup AREA is used to clear the bookkeeping RAM. If the RAM gets bad data in it, the machine may display weird symptoms. You should also erase High Scores when you INIT backup RAM. Some possible symptoms are: screen garbage during the high score display, a "Bad ROM version" error, or very strange game settings. If the problems persist, check your battery voltage, make sure the switch by the battery is set "ON", or your RAM may be bad. Call the ROMSTAR service department in that event.

Screen 5 is various game bookkeeping data. It shows game coins, scores, and other various bookkeeping data.

OPTION SWITCH SETTINGS

The following option switch settings were designed to allow the customizing of various game features to suit different environments. If used wisely, the flexibility they offer can maximize game performance and increase potential earnings.

DIP SW (1)

Item	Condition	1	2	3	4	5	6	7	8
Test Mode	Game *	OFF							
	Test	ON							
Type	Upright *		OFF						
	Table Top		ON						
Freeplay	OFF *			OFF					
	ON			ON					
Demo Sound	OFF *				OFF				
	ON				ON				
Screen	NORMAL *					OFF			
	REVERSE					ON			
Don't Touch	N/A					OFF	OFF	OFF	
	N/A					ON	ON	ON	

*Rec. Setting

TEST MODE

TO ENTER: ADJUST DIP SWITCH 1 POSTION 1 ON / TURN ON POWER

TO EXIT: PRESS START OR READJUST DIP SW AND RESET POWER

SCREEN 1: VIDEO COLOR AND CROSSHATCH TEST

SCREEN 2: DIP SW, 4-16MEG ROM, COIN, PLAYER CONTROL, AND TRACKBALL TEST

SCREEN 3: MUSIC, SOUND, VOICE, AND ANIMATION TEST
RIGHT HOOK = + # INCREASE, LEFT HOOK = — # DECREASE

SCREEN 4: GAME ADJUSTMENTS;
TRACKBALL SPEED (1 FAST — 19 SLOW)
TIMER (ON / OFF)
THROW MODE DISPLAY (FULL - QUICK)
GAME LEVEL (1 EASY - 5 HARD)
RESET SCORES AND REPLAY / SCORE ADJUSTMENTS

SCREEN 5: BOOKKEEPING DATA:
COIN, REPLAY, GAMEPLAY, AND SCORE DATA

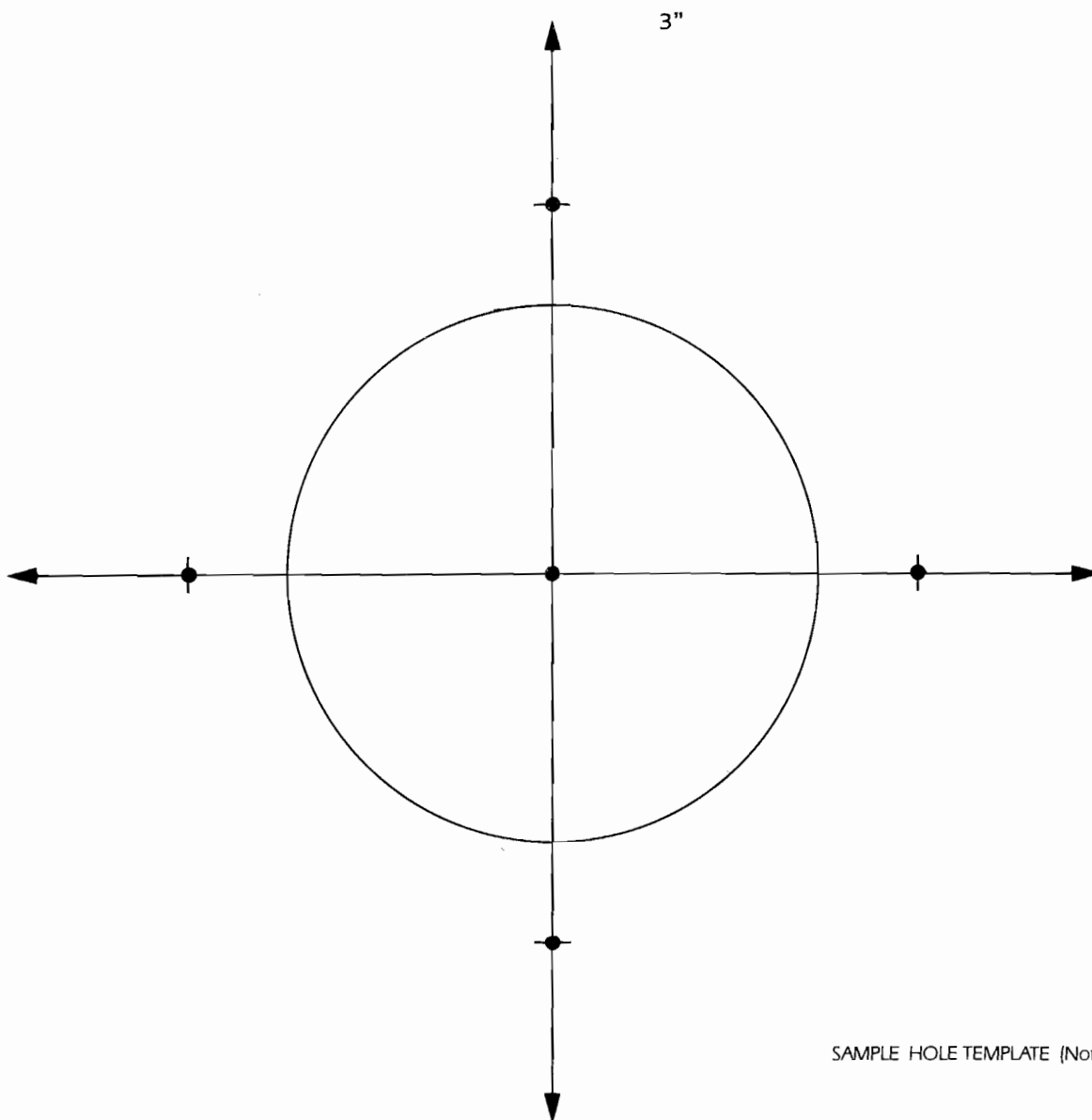
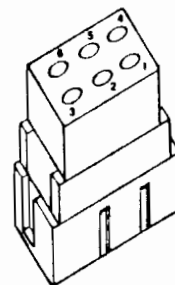
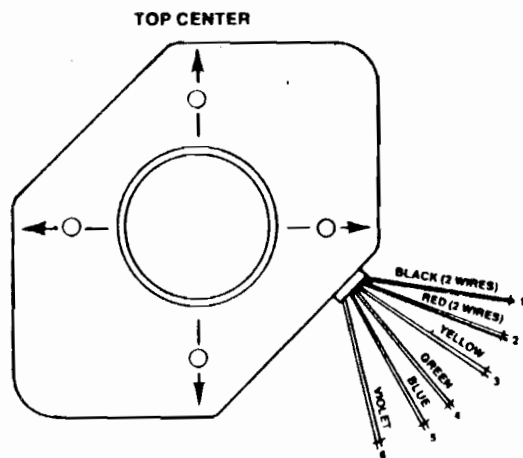
TO CONTINUE: DEPRESS START BUTTON

NOTE: Use hook buttons to adjust the selected values

* FACTORY SETTING PLEASE SET PCB AS FOLLOWS:

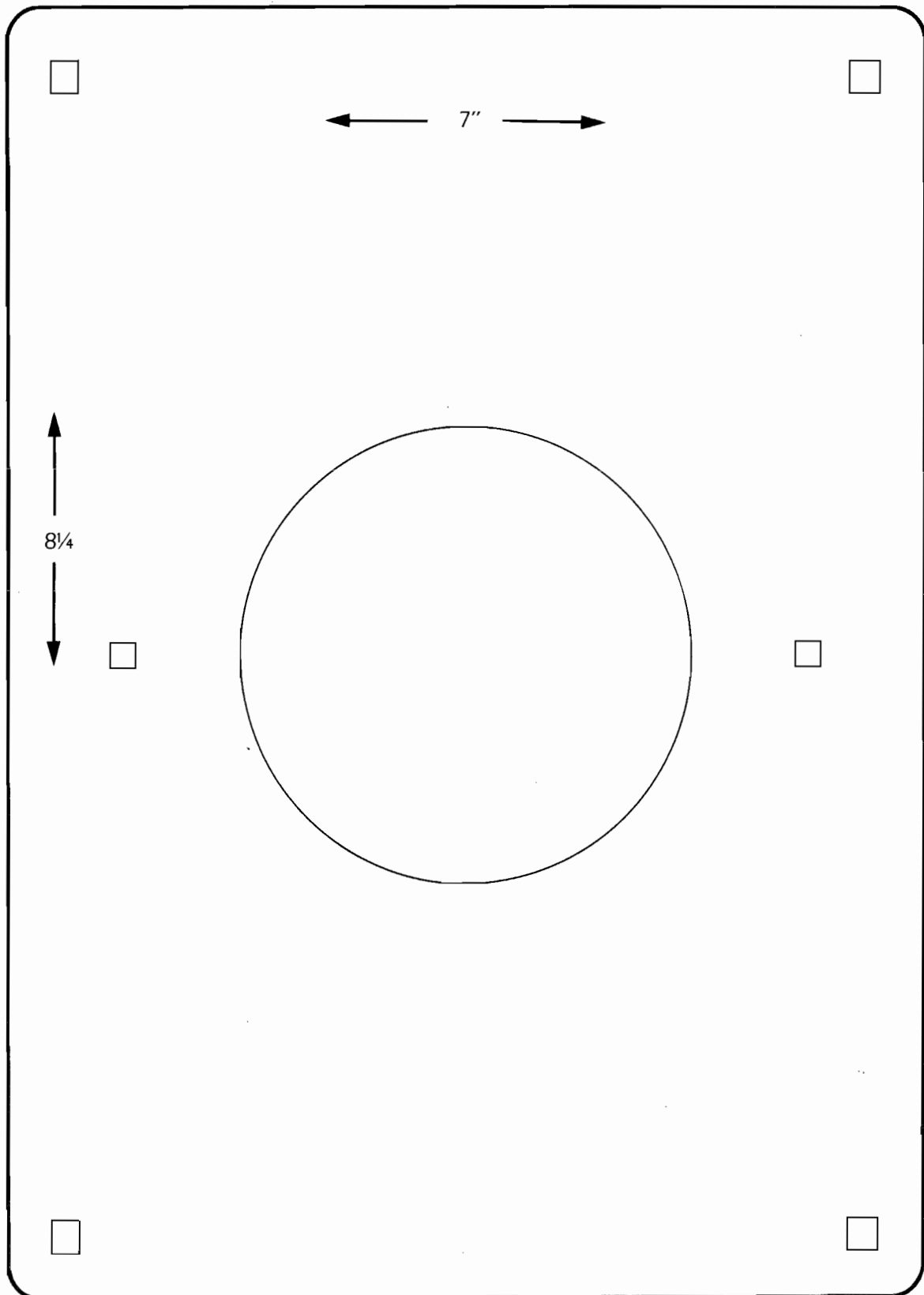
DESCRIPTION	SETTING	ADJUSTMENT	POSITION	DIP BANK
TRACKBALL	10 NORMAL	10	TEST MODE	SCREEN 4
TIMER	ON	ON	TEST MODE	SCREEN 4
THROW/ DISPLAY	QUICK	QUICK	TEST MODE	SCREEN 4
GAME LEVEL	2 NORMAL	2	TEST MODE	SCREEN 4
DEMO SOUND	OFF	OFF	4	1
UNUSED POSITIONS	OFF	OFF/OFF/OFF	6,7,8	1

1. To switch VERTICAL direction (↑), exchange the BLUE & VIOLET wires
2. To switch HORIZONTAL direction (→), exchange the YELLOW & GREEN wires.



SAMPLE HOLE TEMPLATE (Not To Size)

MEDAL TEMPLATE HOLE LAYOUT
(To Size)



CHECKPOINTS IN CASE OF DIFFICULTY

PROBLEM / CAUSE-CURE

No Raster/No Video

- Check A.C. line cord
- Check line fuse
- Check monitor brightness
- Check power switch and/or interlock switch
- Check all solder connections on line filter and transformer
- Check for proper orientation of the PCB connector

Raster/No Video

- Check all PCB to monitor connections
- Check power supply voltage on PCB

No Video/Game sounds can be heard

- Check monitor brightness
- Check all PCB to monitor connections

Wrong colors

- Monitor needs degaussing
- Check for proper wiring between PCB and monitor
- Check monitor adjustment and adjust if necessary

Wavy picture

- Check monitor ground is properly connected to monitor
- Be certain sync inputs are properly connected to monitor
- Check horizontal hold adjustment

Horizontal/Vertical Roll

- Check horizontal and/or vertical hold adjustments
- Check for proper wiring of sync from PCB to monitor

No sound

- Check for -5 volts on edge connector of PCB
- Check volume control potentiometer adjustment
- Check for +12 volts on edge connector of PCB
- Check wiring from PCB to speaker
- Check speaker for low resistance between the "+" and "-" tabs

Bad sound

- Check wiring to speaker for bad solder connections
- Check sound with another speaker

No switch input

- Check ground connection to switch/es
- Check wiring between PCB and switch/es for proper connection
- Check switch/es with an ohmmeter to verify proper operation

Switch operates incorrect function

- Check wiring between PCB and switches for proper orientation
- Check wiring for shorts between switch inputs

No coin meter

- Check wiring to coin meter
- Check that +5 volts is on "+" side of meter
- Verify a +5 volt meter is used

When coin switch is made and meter pulses, the screen blanks out and/or game resets

- Verify that a meter with a diode is used
- If no diode is built in meter a 1N4004 can be used across the meter.
Cathode to "+" side of meter and anode to "-" side of meter

Trackball not working

- Check 5 volts, check gnd, check direction and clock connections

Trackball position bad

- Check trackball mounting and x or y direction and clock.

JAMMA DA.BK

Wire Color	Solder Side	Parts Side	Wire Color
Black	Ground	1 Ground	Black
Black	Ground	2 Ground	Black
Red	+5VDC	3 +5VDC	Red
Red	+5VDC	4 +5VDC	Red
White	-5VDC	5 -5VDC	White
Yellow	+12VDC	6 +12VDC	Yellow
	Post	7 Post	
Brown/White	Coin Counter 2	8 Coin Counter 1	Bm/Wht
Red/Black	Coin Lockout	9 Coin Lockout	Red/Blk
White/Black	Speaker (-)	10 Speaker (+)	White
		11	
Green	Video Green	12 Video Red	Red
Gray	Video Sync (comp/Neq)	13 Video Blue	Blue
Red/Blk	Service Switch	14 Video Ground	Black
	Tilt Switch	15 Test Switch	Brown
Wht/Blk	Coin 2	16 Coin 1	White
Wht/Grn	2P Start	17 IP Start	Gray
Wht/Vio	2P Up	18 IP Up	Violet
Wht/Blu	2P Down	19 IP Down	Blue
Wht/Grn	2P Left	20 IP Left	Violet
Wht/Yel	2P Right	21 IP Right	Yellow
Wht/Ora		22	Orange
Wht/Red		23	Red
Wht/Bm		24	Brown
Gm/Wht		25	Blu/Wht
Yel/Wht		26	Red/Wht
Black	Ground	27 Ground	Black
Black	Ground	28 Ground	Black

Wire color / Stripe color

NOTE: Please refer to manual harness pinout for pins

JAMMA SK.GR

Wire Color	Solder Side	Parts Side	Wire Color
Black	Ground	A 1 Ground	Black
Black	Ground	B 2 Ground	Black
Red	+5VDC	C 3 +5VDC	Red
Red	+5VDC	D 4 +5VDC	Red
Green	-5VDC	E 5 -5VDC	Green
Yellow	+12VDC	F 6 +12VDC	Yellow
	Post	H 7 Post	
	Coin Counter 2	J 8 Coin Counter 1	Brown
	Coin Lockout	K 9 Coin Lockout	
White	Speaker (-)	L 10 Speaker (+)	White
	Ground	M 11 Audio	
Light Green	Video Green	N 12 Video Red	Pink
Gray/Wht	Video Sync (comp/Neq)	P 13 Video Blue	Sky Blue
Violet	Service Switch	R 14 Video Ground	Black
Gray	N/A	S 15 N/A	Orange
	Coin 2	T 16 Coin	Violet/White
Wht/Blk	2P Start	U 17 IP Start	Black/White
Brown/Black	2P Up	V 18 IP Up	Brown/White
Red/Blk	2P Down	W 19 IP Down	Red/White
Orange/Black	2P Left	X 20 IP Left	Orange/White
Yellow/Black	2P Right	Y 21 IP Right	Yellow/White
Green/Black		Z 22	Green/White
Blue/Black		a 23	Blue/White
		b 24	
	N/A	c 25 N/A	
	N/A	d 26 N/A	
Black	Ground	e 27 Ground	Black
Black	Ground	f 28 Ground	Black

Wire color /Stripe color

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