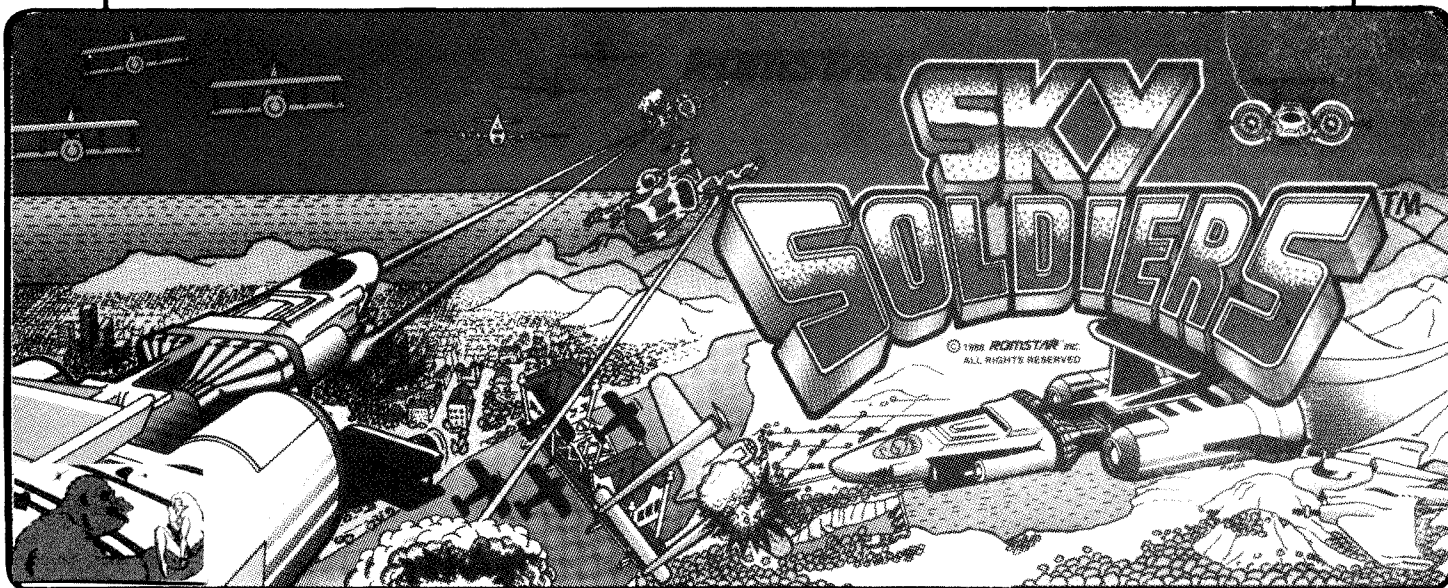


**ROMSTAR™ INC.**

# SKY SOLDIERS™

## INSTALLATION MANUAL



Romstar, Inc.  
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# WARRANTY, REPAIR AND RETURN POLICY

1. \*45 DAY FULL PARTS WARRANTY.
2. \*60 DAY FULL ELECTRONICS WARRANTY (SEE RMA BELOW).
3. MINIMUM \$40.00 SERVICE CHARGE FOR ALL NON-WARRANTY REPAIRS OR RETURNS. FOR ALL PCB SERVICING RETURN TO ROMSTAR AND ALL ROMSTAR DECALS MUST REMAIN ON PCB.
4. **ANY UNAUTHORIZED NON-FACTORY REPAIR OR ATTEMPTED REPAIR VOIDS WARRANTY.**
5. ALL REPAIR WORK **MUST** BE AUTHORIZED BY ROMSTAR FOR EACH PCB.

(\*ALL WARRANTY PERIODS BEGIN ON THE DATE OF PURCHASE FROM ROMSTAR)

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1. ALL RETURNED MERCHANDISE MUST HAVE AN RMA NUMBER CLEARLY VISIBLE ON THE OUTSIDE OF THE PACKAGE.
2. ALL RMA NUMBERS MUST BE OBTAINED FROM ROMSTAR BY AN AUTHORIZED ROMSTAR DISTRIBUTOR. (PLEASE HAVE ROMSTAR SERIAL NUMBER AVAILABLE WHEN CALLING FOR AN RMA #).
3. **ALL PC BOARDS RETURNED TO ROMSTAR WITHOUT AN RMA NUMBER WILL NOT BE ACCEPTED.**
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6. ALL REPAIRS AND/OR REPLACEMENTS WILL BE SHIPPED BY ROMSTAR WITHIN 24 HOURS OF RECEIPT OR REQUEST. (SUBJECT TO AVAILABILITY OF BOARDS).
7. FOR ANY ROMSTAR PRODUCT PURCHASED AFTER 3/1/86, A ROMSTAR WARRANTY CARD MUST BE ON FILE FOR EACH BOARD TO FACILITATE REPAIR & RETURN.
8. ROMSTAR WILL REPAIR OR REPLACE ROMSTAR PCB's FOR A MINIMAL CHARGE FOR A PERIOD OF 1 YEAR. (SUBJECT TO AVAILABILITY OF BOARDS OR TIME REQUIRED TO REPAIR PCB.)

\*NOTE: ATTEMPTED REPAIR USUALLY INCREASES THE TIME AND COST OF REPAIR.

## Installing Your

# SKY SOLDIERS

## New Game Package

### Table of Contents

New Game Package Contents .....	2
Power and Monitor Requirements .....	2
Factory Settings .....	3
Recommended Tools and Supplies .....	4
Installation Procedures .....	5
Coin Meter Diagram .....	10
Monitor Sync Tips .....	11
Control Panel Positioning .....	12
Dip SW Diagram .....	13
In Case Of Difficulty .....	14
Main Harness Connections .....	<b>16 &amp; 17</b>

### NEW GAME PACKAGE CONTENTS

DESCRIPTION	PART #	DESCRIPTION	PART #
1 Main Printed Circuit Board (PCB)	5501	2 White Player Button	0231
1 Monitor Bezel	5508	1 Marquee	5503
1 PCB Feet Assembly	0524	1 Control Panel Overlay	5507
1 Connecting Wire Harness (Jamma)	0215	1 Plex Control Cover	0271
2 Eight-Way Joystick	0210	1 Set Side Graphics	5506
6 Player Button Assemblies		1 Set Play Instructions & Function Labels	5504
2 Red Player Button	0229	1 Installation Manual	5502
2 Blue Player Button	0233		

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

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

# **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

TECH. DEPT.

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### **\* FACTORY SETTING PLEASE SET THE SKY SOLDIERS PCB AS FOLLOWS:**

DESCRIPTION	SETTING	ADJUSTMENT	POSITION	DIP BANK
COIN 1	1 COIN — 1 PLAY	OFF/OFF/OFF	4, 5, 6	2
COIN 2	1 COIN — 1 PLAY	OFF/OFF/OFF	4, 5, 6	2
TV-SCREEN	NORMAL	OFF	1	1
DIFFICULTY	3	OFF/OFF	2, 3	1
DEMO SOUND	NO SOUND	OFF	3	2
ALWAYS ON	ON	ON/ON	4, 5	1
# MEN	3	OFF/OFF	1, 2	2

# 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)
2. Control panel
3. Monitor plexiglass
4. Monitor Bezel
5. Marquee
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 +5, -5, +12 volts. 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 +5 or -5 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 all voltages 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?

### **Is the picture upside-down?**

Refer to your game manual or 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

## **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

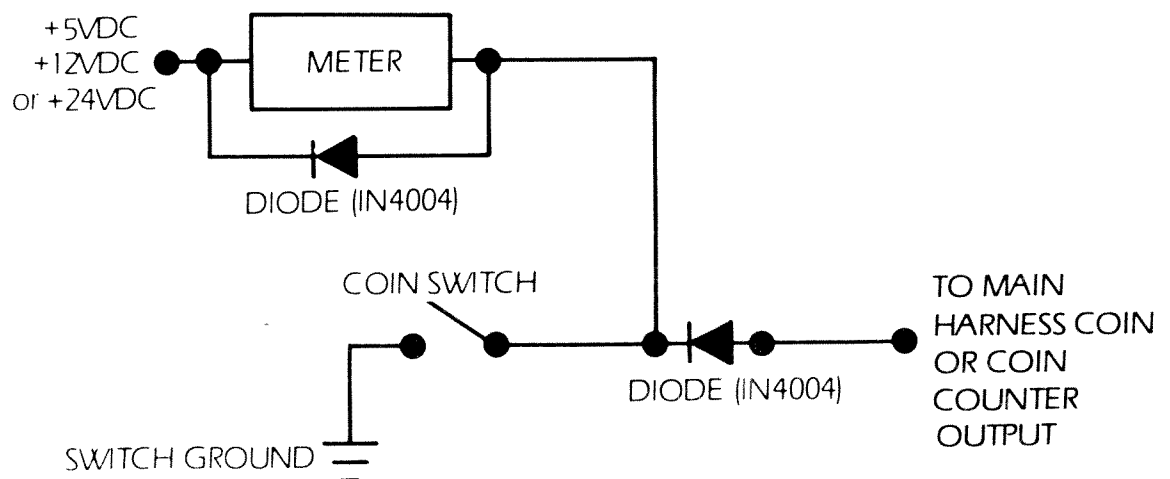
1. Check the game inside and out for any imperfections. Secure any loose wiring or fastening hardware.
2. Make sure the coin door is tight and the coin mechs are well adjusted. A game is no good to anybody if you can't get a coin into it.
3. Once again go over every step of this **new game** transformation 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.)

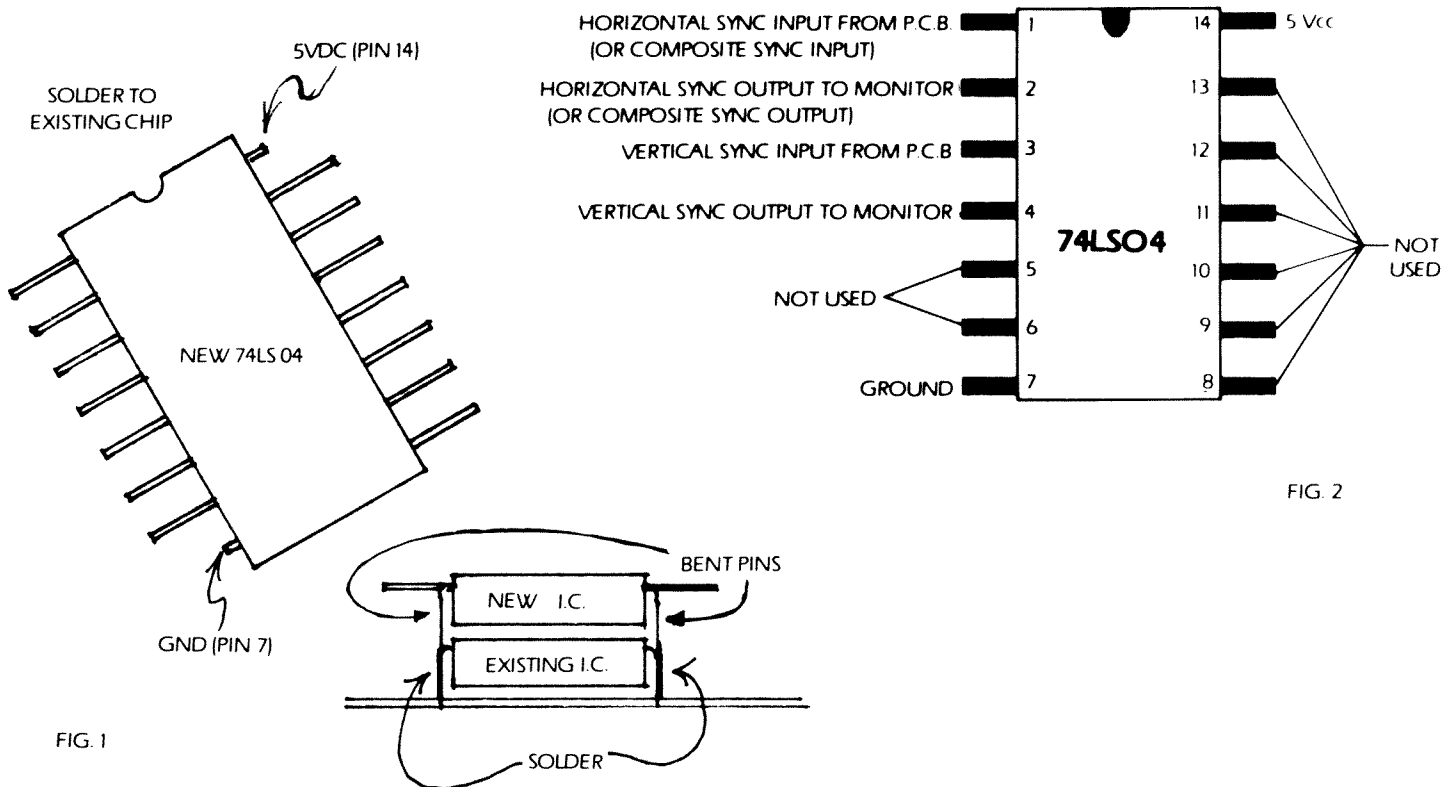


FIG. 1

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)

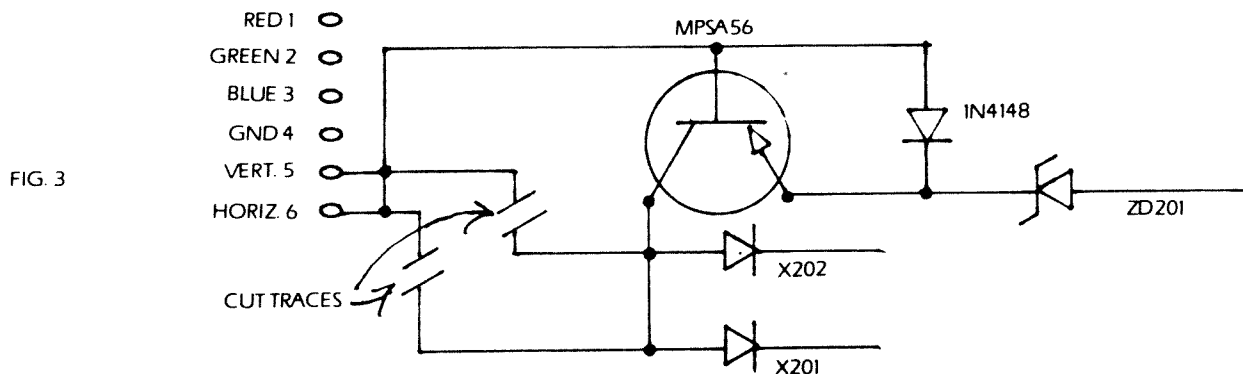


FIG. 3

## 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 C 303 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 C 303 location.

**CURE 2:** Connect IN4148 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.

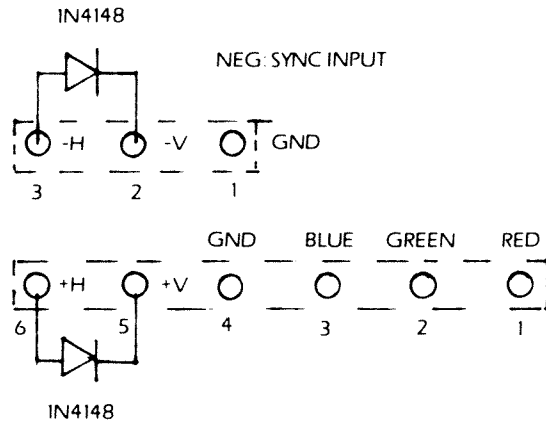


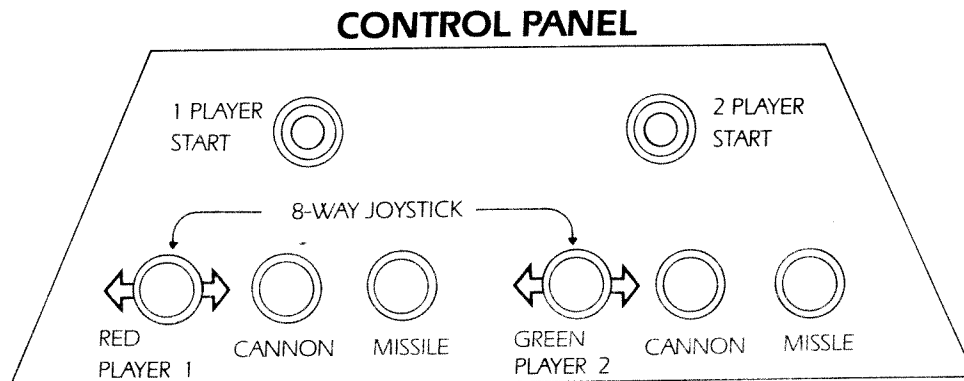
FIG. 4

**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 C 356 (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



# DIP sw 1

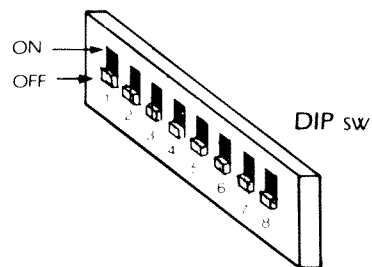
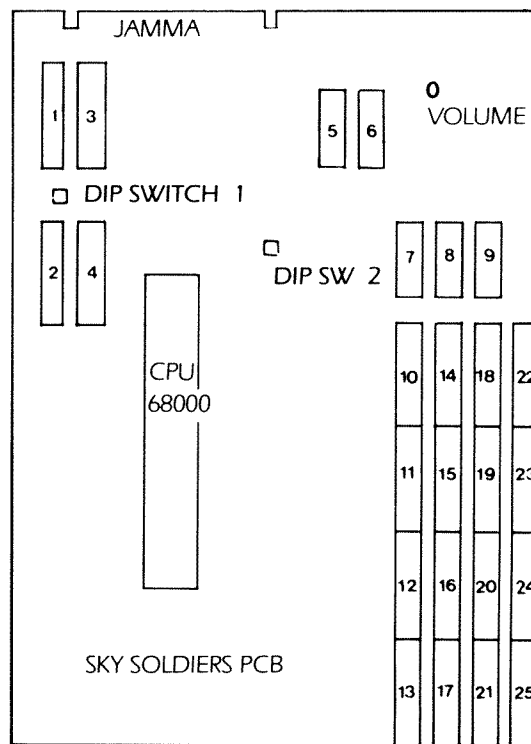
# SKY SOLDIER

ITEM	CONTENTS	1	2	3	4	5	6	7	8			
DISPLAY	NORMAL *	OFF			ALWAYS	ALWAYS	ON	ON				
	INVERSE	ON										
(EASY)	1		OFF	ON								
DIFFICULTY ↑ LEVEL (DIFFICULT) ↓	2		ON	OFF								
	3 *		OFF	OFF								
	4		ON	ON								
NO DEATH	NORMAL *								OFF			
MODE									ON			

## DIP SWITCH 2

ITEM		1	2	3	4	5	6
NO. OF SOLDIERS	3 *	OFF	OFF				
	4	OFF	ON				
	5	ON	OFF				
	6	ON	ON				
ATTRACTION SOUND	WITHOUT SOUND *			OFF			
	WITH SOUND			ON			
PLAY	1 Coin — 1 Play *				OFF	OFF	OFF
	1 Coin — 2 Plays				OFF	OFF	ON
PRICING	1 Coin — 3 Plays				OFF	ON	OFF
	1 Coin — 4 Plays				OFF	ON	ON
COIN 1	1 Coin — 5 Plays				ON	OFF	OFF
	1 Coin — 6 Plays				ON	OFF	ON
	2 Coins — 3 Play				ON	ON	OFF
	3 Coins — 2 Play				ON	ON	ON
PLAY	1 Coin — 1 Play *				OFF	OFF	OFF
	2 Coins — 1 Play				OFF	OFF	ON
	3 Coins — 1 Play				OFF	ON	OFF
PRICING	4 Coins — 1 Play				OFF	ON	ON
	5 Coins — 1 Play				ON	OFF	OFF
COIN 2	6 Coins — 1 Play				ON	OFF	ON
	7 Coins — 1 Play				ON	ON	OFF
	8 Coins — 1 Play				ON	ON	ON

\* FACTORY



## 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

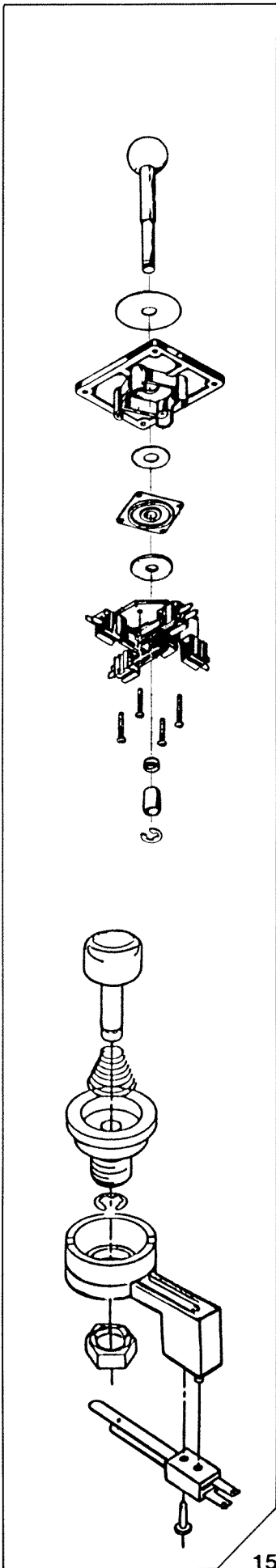
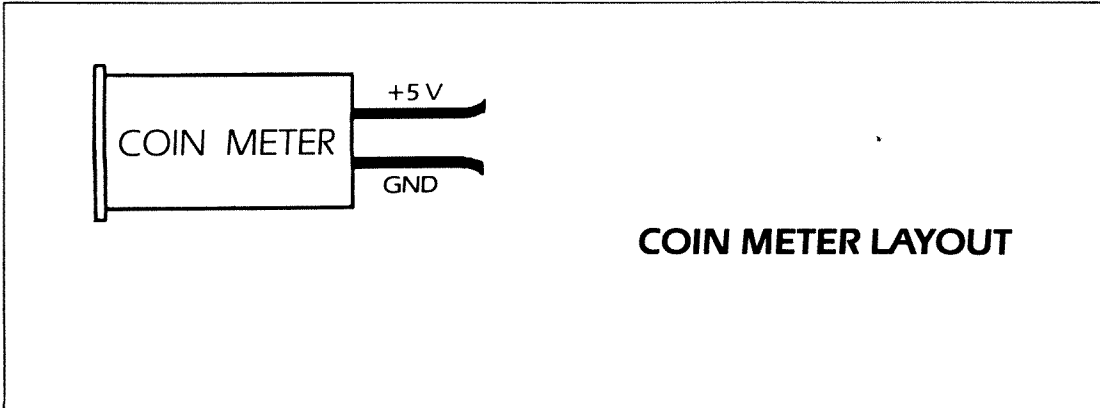
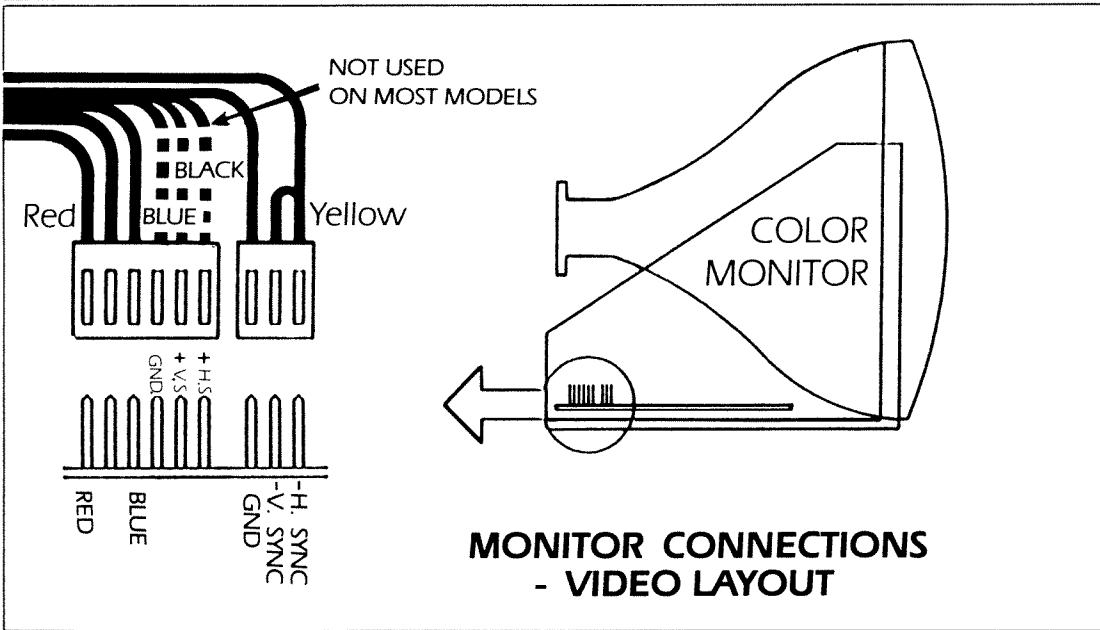
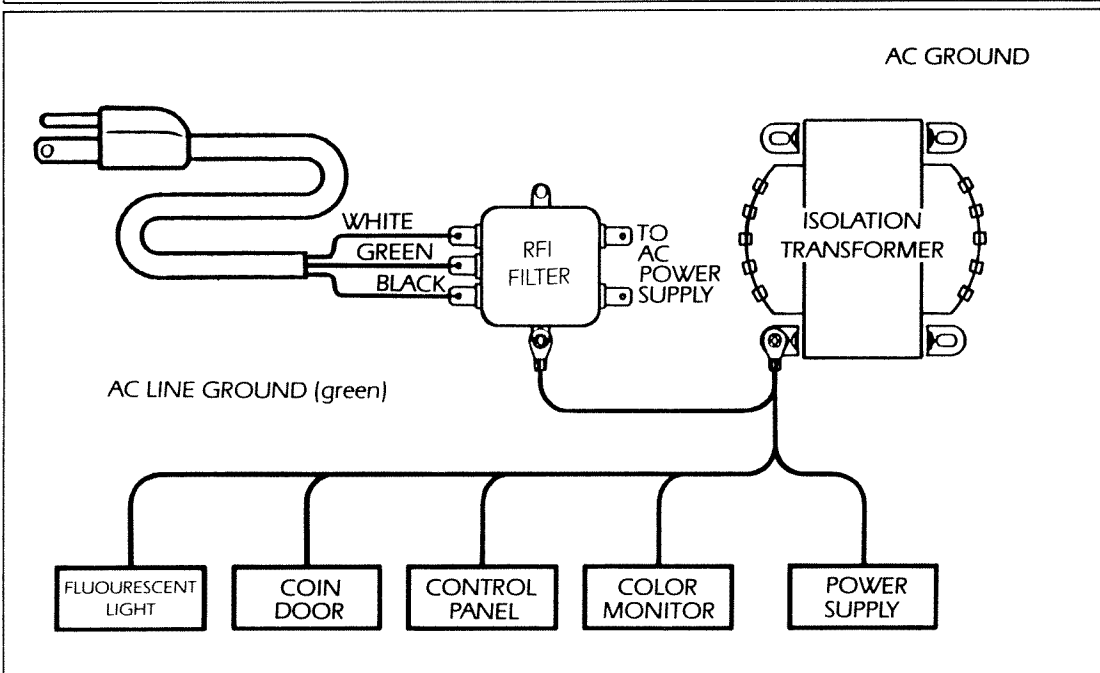
- Check wiring to coin meter
- Check that +5 volts is on "+" side of meter
- Verify a +5 volt meter is used

### 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 IN4004 can be used across the meter.  
Cathode to "+" side of meter and anode to "-" side of meter



# ILLUSTRATED PARTS LISTS



ROMSTAR JAMMA HARNESSES  
VERSIONS 1 - 4

PLEASE REFER TO MAIN HARNESSES  
PIN-OUT FOR PINS Z, a, b, 22, 23, & 24.

JAMMA GE.BK

Wire Color	Solder Side	Parts Side	Wire Color
Black	Ground	Ground	Black
Black	Ground	Ground	Black
Red	+5VDC	+5VDC	Red
Red	+5VDC	+5VDC	Red
Yellow	+12VDC	+12VDC	Yellow
	Post	Post	
Red	Coin Counter 2	Coin Counter 1	Violet
	Coin Lockout	Coin Lockout	
Black	Speaker (-)	Speaker (+)	Gray
	N/A	N/A	
Green	Video Green	Video Red	Red
White	Video Sync (comp./neg)	Video Blue	Blue
Pink	Service Switch	Video Ground	Black
Yellow	Tilt Switch	Test Switch	Blue
Orange	Coin 2	Coin 1	Tan
Gray	2P Start	1P Start	Brown
Green	2P Up	1P Up	Green
Blue	2P Down	1P Down	Blue
Violet	2P Left	1P Left	Violet
Yellow	2P Right	1P Right	Yellow
Red			Red
Orange			Orange
	N/A	N/A	
	N/A	N/A	
Black	Ground	Ground	Black
Black	Ground	Ground	Black

Wire color / Stripe color

NOTE: Please refer to manual harness pinout for pins

JAMMA CA.BLU

Wire Color	Solder Side	Parts Side	Wire Color
Black	Ground	Ground	Black
Black	Ground	Ground	Black
Red	+5VDC	+5VDC	Red
Red	+5VDC	+5VDC	Red
White			White
Yellow	+12VDC	+12VDC	Yellow
	Post	Post	
Brown	Coin Counter 2	Coin Counter 1	Brown
Red	Coin Lockout	Coin Lockout	Red
Black	Speaker (-)	Speaker (+)	White
Blue	N/A	N/A	Blue
Green	Video Green	Video Red	Red
Gray	Video Sync (comp./neg)	Video Blue	Blue
Red	N/A	Video Ground	Black
Brown	N/A	N/A	Brown
White	SRVC Switch	Coin	White
Gray	2P Start	1P Start	Gray
Violet	2P Up	1P Up	Violet
Blue	2P Down	1P Down	Blue
Green	2P Left	1P Left	Green
Yellow	2P Right	1P Right	Yellow
Orange			Orange
Red			Red
Brown			Brown
Blue	N/A	N/A	Blue
Blue	N/A	N/A	Blue
Black	Ground	Ground	Black
Black	Ground	Ground	Black

Wire color / Stripe color

JAMIMA DA.BK

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

Wire color / Stripe color

NOTE: Please refer to manual harness pinout for pins

JAMIMA SK.GR

Wire Color	Solder Side		Parts Side		Wire Color
	A	1	Ground	Ground	
Black	Ground	1	Ground	Ground	Black
Black	Ground	2	Ground	Ground	Black
Red	+5VDC	3	+5VDC	+5VDC	Red
Red	+5VDC	4	+5VDC	+5VDC	Red
Green	-5VDC	5	-5VDC	-5VDC	Green
Yellow	+12VDC	6	+12VDC	+12VDC	Yellow
	Post	7	Post	Post	
	Coin Counter 2	8	Coin Counter 1	Coin Counter 1	Brown
	Coin Lockout	9	Coin Lockout	Coin Lockout	
White	Speaker (-)	10	Speaker (+)	Speaker (+)	White
	Ground	11	Audio	Audio	
Light Green	Video Green	12	Video Red	Video Red	Pink
Gray/White	Video Sync (comp/req)	13	Video Blue	Video Blue	Sky Blue
Violet	Service Switch	14	Video Ground	Video Ground	Black
Gray	N/A	15	N/A	N/A	Orange
	Coin 2	16	Coin	Coin	Violet/White
Wht/Blk	2P Start	17	1P Start	1P Start	Black/White
Brown/Black	2P Up	18	1P Up	1P Up	Brown/White
Red/Blk	2P Down	19	1P Down	1P Down	Red/White
Orange/Black	2P Left	20	1P Left	1P Left	Orange/White
Yellow/Black	2P Right	21	1P Right	1P Right	Yellow/White
Green/Black		22			Green/White
Blue/Black		23			Blue/White
		24			
	N/A	25	N/A	N/A	
	N/A	26	N/A	N/A	
Black	Ground	27	Ground	Ground	Black
Black	Ground	28	Ground	Ground	Black

Wire color / Stripe color

## SKY SOLDIERS

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
		E	5		
YELLOW	+ 12V	F	6	+ 12V	YELLOW
	POST	H	7	POST	
		J	8	COIN COUNTER 1	BROWN
		K	9		
WHITE	SPEAKER (-)	L	10	SPEAKER (+)	WHITE
		M	11		
LIGHT GREEN	VIDEO GREEN	N	12	VIDEO RED	PINK
GREY/WHITE	VIDEO SYNC	P	13	VIDEO BLUE	LIGHT BLUE
PURPLE	SERVICE SWITCH	R	14	VIDEO GND	BLACK
		S	15	TEST SWITCH	ORANGE
		T	16	COIN SWITCH 1	PURPLE/WHITE
WHITE/BLACK	2P START	U	17	1P START	BLACK/WHITE
BROWN/BLACK	2P 1 UP	V	18	1P 1 UP	BROWN/WHITE
RED/BLACK	2P 2 DOWN	W	19	1P 2 DOWN	RED/WHITE
ORANGE/BLK	2P 3 LEFT	X	20	1P 3 LEFT	ORANGE/WHT
YELLOW/BLACK	2P 4 RIGHT	Y	21	1P 4 RIGHT	YELLOW/WHITE
GREEN/BLACK	2P 5 CANNON	Z	22	1P 5 CANNON	GREEN/WHITE
BLUE/BLACK	2 P 6 MISSILE	a	23	1P 6 MISSILE	BLUE/WHITE
		b	24		
		c	25		
		d	26		
BLACK	GND	e	27	GND	BLACK
BLACK	GND	f	28	GND	BLACK