CARRIER AIRWING™

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KIT INSTRUCTION MANUAL

CAPCOM U.S.A.

Installing Your New

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New Game Package

Table of Contents

CARRIER AIRWING

POWER REQUIREMENTS		MONITOR REQUIREMENTS
FCC Approved power supply		Horizontal Mount Raster Scan
+5 VDC	7 amp	Negative Composite Sync
+12 VDC	1 amp	

NEW GAME PACKAGE CONTENTS

1 Main Printed Circuit Board (PCB)	1 Control Panel Overlay
1 Set Legs, Bolts, & Spacers	1 Plex Control Cover
1 Connecting Wire Harness	1 Set Side Graphics
2 Eight-Way Joystick	1 Monitor Card
6 Player Button Assemblies	1 Service and Installation Manual
1 Marquee	

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

Recommended Tools and Supplies

CAPCOM new game package.

Phillips and Slot Screwdrivers
Socket Set
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
$13/16''$ Chassis or Sheet Metal Punch
$11/4''$ Plex Hole Saw
Glass of Water and a Snack
Small File
Razor Knife and Sharp Blades
Straight Edge

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
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
$31/2''$ 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!

DIP SW (A)

ITEM	DESCRIPTION	1	2	3	4	5	6	7	8
COIN 1	1 COIN 1 CREDIT	**OFF**	**OFF**	**OFF**					
	1 COIN 2 CREDITS	ON	OFF	OFF					
	1 COIN 3 CREDITS	OFF	ON	OFF					
	1 COIN 4 CREDITS	ON	ON	OFF					
	1 COIN 6 CREDITS	OFF	OFF	ON					
	2 COINS 1 CREDIT	ON	OFF	ON					
	3 COINS 1 CREDIT	OFF	ON	ON					
	4 COINS 1 CREDIT	ON	ON	ON					
COIN 2	1 COIN 1 CREDIT				**OFF**	**OFF**	**OFF**		
	1 COIN 2 CREDITS				ON	OFF	OFF		
	1 COIN 3 CREDITS				OFF	ON	OFF		
	1 COIN 4 CREDITS				ON	ON	OFF		
	1 COIN 6 CREDITS				OFF	OFF	ON		
	2 COINS 1 CREDIT				ON	OFF	ON		
	3 COINS 1 CREDIT				OFF	ON	ON		
	4 COINS 1 CREDIT				ON	ON	ON		
CONTINUE COIN	NORMAL							**OFF**	
	CONTINUE COIN							ON	

When CONTINUE COIN is ON, game starts with 2 COINS and continues with 1 COIN. In this case, settings of COIN 1 & COIN 2 are meaningless.

DIP SW (B)

ITEM	DESCRIPTION	1	2	3	4	5	6	7	8
DIFFICULTY 1 (Adjust strength of enemies)	EASY ↑	OFF	OFF	OFF					
		ON	OFF	OFF					
		OFF	ON	OFF					
	NORMAL	**ON**	**ON**	**OFF**					
		OFF	OFF	ON					
		ON	OFF	ON					
	↓	OFF	ON	ON					
	DIFFICULT	ON	ON	ON					
DIFFICULTY 2 (Adjust strength of player)	EASY ↑				OFF	ON			
	NORMAL ↓				**OFF**	**OFF**			
					ON	OFF			
	DIFFICULT				ON	ON			

Difficulty level is set at normal when shipped. When adjusting DIFFICULTY LEVEL, please refer to ABOUT DIFFICULTY LEVEL (written at bottom of page).

DIP SW (C)

ITEM	DESCRIPTION	1	2	3	4	5	6	7	8
FREE PLAY	NOT FREE PLAY			**OFF**					
	FREE PLAY			ON					
SCREEN STOP	NORMAL				**OFF**				
	PAUSE				ON				
SCREEN FLIP	NORMAL					**OFF**			
	FLIP					ON			
SOUND DURING DEMONSTRATION MODE	OFF						**OFF**		
	ON						ON		
CONTINUE MODE	OFF							**OFF**	
	ON							ON	
TEST MODE	GAME MODE								**OFF**
	TEST MODE								ON

Whenever DIP SWITCH is changed, make sure the power is OFF.

*BOLDFACE INDICATES FACTORY SETTING.
*POWER DOWN AFTER CHANGING DIP SWITCHES.

• ABOUT DIFFICULTY LEVEL
Please follow our suggestions in the following case.
1) Increase DIFFICULTY LEVEL 1, when average play time becomes longer.
2) Increase DIFFICULTY LEVEL 2, when average play time is longer since last change.
3) Decrease DIFFICULTY LEVEL 1, when game becomes unpopular since setting up.
4) Decrease DIFFICULTY LEVEL 2, when game becomes unpopular after a while.

*In other cases, adjust DIFFICULTY LEVEL 1 first and next adjust DIFFICULTY LEVEL 2 when it seems required.
When adjust LEVEL 2, Dip Switch of LEVEL 1 should be settled at NORMAL POINT.

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 Plexiglas
4. Monitor Bezel
5. Marquee
6. Graphics

I would recommend painting your cabinet to give it a fresh new look. (If it is geographically inconvenient to make use of our facilities, 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 Plexiglas, 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. Cage

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

A   Mark and drill pilot holes ($^3/_{32}$").
B   Place the logic cage (bottom) over the holes and secure it with the supplied wood screws.
C   Install the P.C.B. into the logic cage. Use feet and spacers supplied and adjust them so that the screws will go through the slots in the cage bottom.

    Note: Leave the cage cover off until you have attached the entire wire harness and have tested the game for proper operation.

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.
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, board cage, 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.

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.

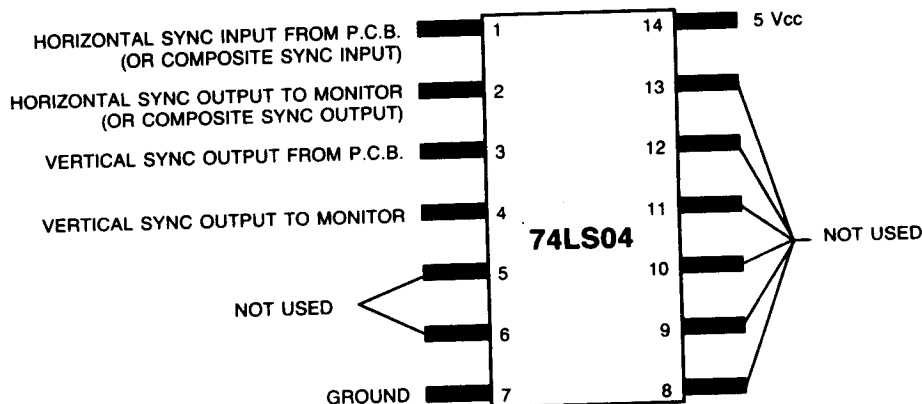   C) Check the +12V power supply to the logic board.

   NOTE: If you do get sounds, but they are a little fuzzy, switch the wires around on the speaker. See page 12 for more helpful hints.

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).

      If your monitor does not have dual polarity positions for sync, then you will need to reverse the sync yourself by installing a simple one I.C. circuit between the logic board and the monitor. (The following illustration shows a hookup for both **composite** and **separate** syncs.


```
HORIZONTAL SYNC INPUT FROM P.C.B.  ▬┌────────┐▬  5 Vcc
      (OR COMPOSITE SYNC INPUT)      │ 1    14 │
HORIZONTAL SYNC OUTPUT TO MONITOR  ▬│ 2    13 │▬
      (OR COMPOSITE SYNC OUTPUT)     │         │
VERTICAL SYNC OUTPUT FROM P.C.B.   ▬│ 3    12 │▬
                                     │         │
VERTICAL SYNC OUTPUT TO MONITOR    ▬│ 4    11 │▬      NOT USED
                                     │ 74LS04  │
                                   ▬│ 5    10 │▬
                        NOT USED     │         │
                                   ▬│ 6     9 │▬
                                     │         │
              GROUND                ▬│ 7     8 │▬
                                     └─────────┘
```

G07 MONITOR SYNC MODE

1. Replace R314 from 390Ω to 1.8KΩ resistor

2. Replace C303 from .1μf 35V cap, locate "+" side of cap to collector of X305

3. Replace C501 with .1μf (old C303)

   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?**

      Dip switch 5 on switch bank "C" should solve your problems.

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.
    CAPCOM supplies a clear 1/8" thick of Plexiglas with every **new game** package to convert 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 Plexiglas **deeply.** Then use a pair of pliers to break away the extra Plexiglas.
3. Now drill the holes in your panel that you have marked off for the *buttons, joystick* and *bolts.*
4. Drill the same holes on your Plexiglas panel protector. Once again use your panel as a template.
    Hint: To avoid chipping while you are drilling the holes, place the Plexiglas securely on a soft wood surface and use a Plexiglas drill bit and hole cutter.
5. The holes are now all cut. Smooth them out on your panel and Plexiglas with a fine toothed file.
6. Remove the original graphics overlay from the panel. Clean up the panel and install your **CAPCOM** 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 Plexiglas 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.

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 eraseable pen or pencil (centered on upper half of cabinet).
3. Peel off top ¼" 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?
   • Is the test switch set up properly?

Well, that's about it. Good Luck.

HELPFUL HINTS 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
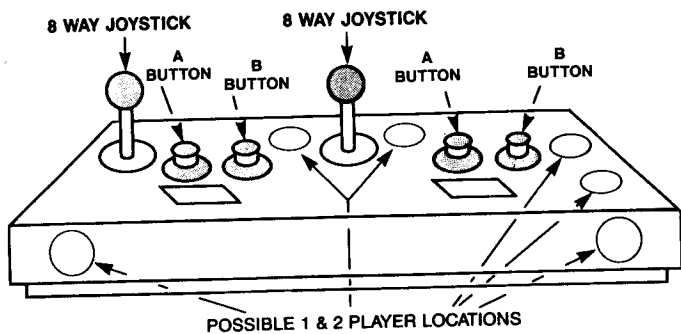- -Check wiring for shorts between switch inputs

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

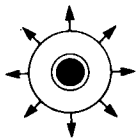Also see CAUTIONS under section "Before You Get Started"

CONTROL PANEL POSITIONS

8 WAY JOYSTICK 8 WAY JOYSTICK
A BUTTON B BUTTON A BUTTON B BUTTON

POSSIBLE 1 & 2 PLAYER LOCATIONS

- **PCB CONNECTOR**

  JAMMA STANDARD

- **CRT MONITOR**

  HORIZONTAL SCREEN

- **CONTROL PANEL**
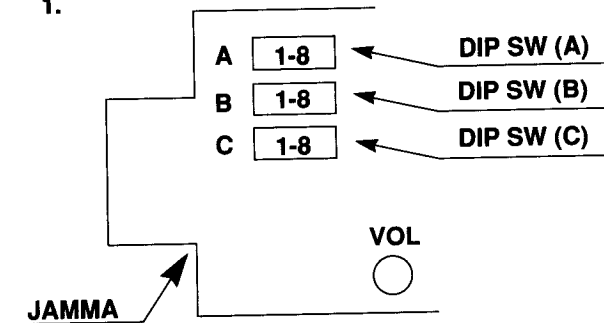

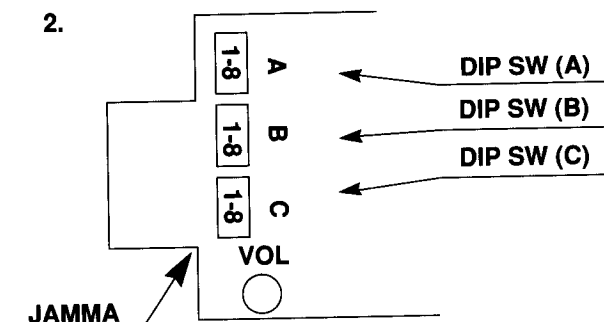8 WAY-JOYSTICK   FIRE   SPECIAL WEAPON

2-PLAYER SIMULTANEOUS

- **8-WAY JOYSTICK**
  MOVE PLAYER/CURSOR FOR SELECTION OF PLAYERS
- **BUTTON A**
  NORMAL SHOT AND SHOT FROM AUXILIARY ROCKET LAUNCHER
- **BUTTON B**
  SUPER WEAPON
- **MAXIMUM CREDITS: 9**
- **POSITIONS OF DIP SW (There are 2 types of PCB)**

1.

A [1-8] ← DIP SW (A)
B [1-8] ← DIP SW (B)
C [1-8] ← DIP SW (C)

VOL

JAMMA

2.

A [1-8] ← DIP SW (A)
B [1-8] ← DIP SW (B)
C [1-8] ← DIP SW (C)

VOL

JAMMA

JAMMA STANDARD

SOLDER SIDE			COMPONENTS SIDE
GND	A	1	GND
GND	B	2	GND
+5V	C	3	+5V
+5V	D	4	+5V
N.C.	E	5	N.C.
+12V	F	6	+12V
	H	7	
COIN COUNTER 2	J	8	COIN COUNTER 1
(COIN LOCK OUT 2)	K	9	(COIN LOCK OUT 1)
SP (−)	L	10	SP (+)
N.C.	M	11	N.C.
VIDEO GREEN	N	12	VIDEO RED
VIDEO SYNC	P	13	VIDEO BLUE
SERVICE SW	R	14	VIDEO GND
N.C.	S	15	TEST SW
COIN SW 2	T	16	COIN SW 1
START SW 2	U	17	START SW 1
2P UP	V	18	1P UP
2P DOWN	W	19	1P DOWN
2P LEFT	X	20	1P LEFT
2P RIGHT	Y	21	1P RIGHT
2P PUSH 1	Z	22	1P PUSH 1
2P PUSH 2	a	23	1P PUSH 2
N.C.	b	24	N.C.
N.C.	c	25	N.C.
N.C.	d	26	N.C.
GND	e	27	GND
GND	f	28	GND

- **PARTS NAME**

  CR7E-56DA-3.96E: (HIROSE)

  OR

  1168-056-009   :(KEL)