SEGA

AURAIL

KIT

Installation/Owners Manual

JAMMA COMPATIBLE

999-0055

AURAIL CONVERSION

by:

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A Kit for
Upright Cabinet with Horizontal Monitor

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

This SEGA product has the copyright notice as follows: SEGA 1990
This signifies that this product was disclosed in 1990 and is the property of SEGA Enterprises.

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Introduction

SEGA ENTERPRISES. LTD., supported by its high electronic technology of Large Scale Integration, microprocessors, etc. and a wealth of experience, has for more than 30 years been supplying various innovative and popular game machines to the world market. This OWNER'S AND KIT INSTALLATION manual is intended to provide detailed comments together with all the necessary information covering the operation and installation of electronic assemblies, electro-mechanical assemblies, control assemblies, and spare or replacement parts for coin operated games. This manual is intended for those who have knowledge of electricity and technical expertise in video games. Carefully read the enclosed information before starting the kit installation or troubleshooting procedures.

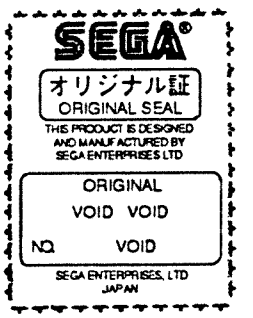
Handling and Installation Precautions

During Installation:

1. Be sure to remove power plug when working on the machine.
2. Be sure all connections and harness routing are secure.
3. Make sure all grounding connections are secure and properly affixed.
4. Do not use any fuse that does not meet the specified rating.

Prevention of Counterfeiting and Conversion Labeling

To prevent counterfeit and unauthorized conversions, the following label is supplied with all authorized SEGA kit products. When handling such goods, be sure to locate and confirm the label. It is used to prevent illegal acts such as the unauthorized copying of the products and the printed circuit boards.



F.C.C. REQUIREMENTS

The Federal Communications Commission requires that all Class A equipment be verified and labeled as follows:

This equipment complies with the requirements in part 15 of FCC Rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take what ever steps are necessary to correct the interference.

This label must be permanently attached in a conspicuous location and the text must be legible. If this label is removed or tampered with, such action is punishable under Section 503 of the Communications Act of 1934 (ACT), as amended.

Precautions Concerning the Place of Installation

The CONVERSION KIT is intended to be installed in an indoor game cabinet. Absolutely do not install it outdoors. When installed indoors the following places mentioned below should be avoided to ensure proper operation and usage:

- Places subject to rain or water leakage, or condensation due to humidity
- In the proximity of an indoor swimming pool and/or shower
- Places subject to direct sunlight
- Places subject to heat sources from heating units, hot air, etc.
- Vicinity of highly flammable/volatile chemicals or hazardous materials
- Sloped surfaces
- Vicinity of anti-disaster facilities such as fire exits and fire extinguishers
- Places subject to any type of violent impact
- Dusty environment

System Requirements

Power Supply:

- Input voltage 90 VAC to 135 VAC 60 Hz
- + 5 volts at 6 amps
- + 12 volts at 2 amps
- Over-voltage protected at + 5.8 volts
- Current limit set at 8 amps

RFI Line Filter:

1. If a switching power supply is used:
   - Current rating of 6 amps
   - Frequency attenuation of the following:

0.15 MHz	40db
0.5 MHz	65db
1.0 MHz	65db
5.0 MHz	55db
10.0 MHz	50db
30.0 MHz	50db

2. If a linear power supply is used:
   - Current rating of 5 amps
   - Frequency attenuation of the following:

0.15 MHz	6db
0.5 MHz	19db
1.0 MHz	28db
5 .0 MHz	42db
10.0 MHz	45db
30.0 MHz	50db

Miscellaneous:

Line Fuse:	4 amp 120 VAC
Speaker:	8 ohms 10 watt
On/Off Switch:	6 amp 120 VAC
Isolation Transformer:	115 VAC primary, 115 VAC secondary, 100 Watts

Coin Door:	Dual coin acceptors
Coin Meter:	+ 5 Volt DC
Power Cord:	Three conductor with ground

Color Monitor:

- Video input 1 volt to 5 volt peak-to-peak positive polarity
- Sync TTL negative polarity separate horizontal and vertical
- Horizontal frequency 15.7 50 KHz
- Vertical frequency 60 Hz
- Video bandwidth 12 MHz or greater
- Horizontal mounted
- Recommended size 19 inch

Tools Required

- Drill
- Hole cutter 1-3/16 "
- Phillips screw driver
- Flat blade screw driver
- Small flat blade screw driver
- Scissors
- Sand paper
- Paint
- Xacto knife
- Wood patch

Cabinet Preparation

1. Remove old PCB, and all unnecessary game harnesses.
2. Remove and disassemble the control panel.
3. Remove any side decals and marquee.
4. Using sandpaper and/or paint thinner, clean and smooth the cabinet for paint preparation. Use wood patch to fill any nicks or flaws in the cabinet.
5. Paint cabinet if required.
6. Wipe down and vacuum cabinet as necessary.

NOTE: You are building a new game, not just changing an old one. A nice, clean, and new looking conversion not only earns better, but lasts longer.

Kit Component Verification

Verify each component with the kit list provided to assure your kit is complete. If any part is missing after the inventory is taken, please contact your distributor and provide to them the following information:

1. Kit serial number
2. Part number and description of missing item/s
3. Date received

Kit List

Part Number	Quantity	Description
0002-0000	2	#6 x 3/8 P/H Phil Tek
0002-0001	4	#6 x 3/4 P/H Phil "AB" SMS
0312-0024	4	#10-24 x 1 3/4 Carr/Bolt Black
0502-0024	4	#10-24 Hexnut
0612-0024	4	#10 Split Lock Washer
0692-0024	4	#10 Flat Washer 1/2 OD
2112-0000	2	Wire Nut
999-0055	1	Aurail Manual
421-5801-115	1	Aurail License Seal
421-7783-01	1	Aurail Switch Setting Sheet
999-0008	2	SEGA Side Decal
999-0057	1	Aurail Control Panel Overlay
423-0008-01	1	Control Panel Clear Plex
999-0058	1	Aurail Marquee
999-0059	1	Aurail Label Sheet (See List) (2ea sets) Button Labels (1ea) Play Instr. AURAIL (1ea) Play Instr. 2D Scene (1ea) 1 Player Start (1ea) 2 Player Start
999-0047	1	FCC Plate
5091-0001-01	2	Joystick 8 Way (Spring Type)
5091-0004-01	2	PB Spst Control Panel (Red)
5091-0004-02	2	PB Spst Control Panel (White)
5091-0004-03	2	PB Spst Control Panel (Blue)
5091-0004-04	2	PB Spst Control Panel (Yellow)
5091-0015-01	8	Pal Nut
5091-0015-02	8	Leaf Switch
5091-0015-03	8	Universal Adaptor
JAM-0000	1	Jamma Harness
S25-0003	1	Interface Board
833-7001	1	System 16 PCB
834-7702-06	1	Rom Board, Aurail

Installation Procedure

License Seal

1. Locate the LICENSE SEAL and place seal as shown in figure 1. Note: Verify that the License Seal will be visible when installed on game cabinet on the existing Monitor Bezel.

Side Decal

2. Locate the SIDE DECALS and install on the left and right side panels of the (see figure 1). Note: A mixture of slightly soapy water can be used on the cabinet to position the artwork as desired. A squeegee may be used to remove any wrinkles in the artwork if soapy water is used.

Marquee Plex

3. Locate the MARQUEE PLEX and measure the size of existing marquee plex or required size to fit and trim the marquee plex to size. Install on cabinet. (see figure 1)

Control Panel

4. Locate the CONTROL PANEL OVERLAY and measure the size required and cut the control panel overlay to fit the existing control panel.

5. Define the location of the player push buttons and joystick(s) on the control panel. (see figure 2)

6. Cut holes in control panel to locate buttons and joystick(s). (see figure 2)

7. Install the "ONE PLAYER START" label and the "TWO PLAYER START" label on the control panel overlay if applicable. (see figure 2)

8. Install player control button labels on the control panel overlay. (see figure 2)

9. Locate the CONTROL PANEL CLEAR PLEX and cut holes into the plex to match the holes cut into the control panel. Then trim as required to protect the control panel overlay and labels.
   Note: This clear plex overlay can be used to protect unused holes in the control panel from player punctures. (see figure 2)

10. Install player pushbutton/s as required. (see figure 2)

NOTE: When buttons are securely placed and tightened in the control panel assembly, a small amount of clear RTV Silicone may be placed on two or three areas of the lock-nut to keep the switches from being unscrewed from the top of the panel. (see figure 3)

11. Install player/s JOYSTICK/S as required. (see figure 2)

Optional Service Switch

12. The service and test functions along with remote volume control may be connected if this option is to be used. Use figure 4 and figure 10 for proper connection.

Harness Installation

13. The Aurail PCB is not Jamma compatible. Sega has supplied an interface PCB which will connect between the Aurail PCB and the JAMMA harness. The output side of the PCB is JAMMA compatible. Modification of an existing Jamma harness inside the game cabinet should not be necessary if the interface PCB is used.

CAUTION SHOULD BE OBSERVED TO ASSURE THAT THE PIN OUTPUTS ARE CORRECT.

14. Connect the Player/s controls and buttons to the PCB as defined in figure 10.

15. Connect the T.V Monitor as shown in figure 6.

16. Connect the routed speaker wires to the speaker. Check the routing for security.

Cabinet 115 VAC System Grounding

17. Locate the GROUND lead (green) of the 115 volt input power Line (see figure 7). This must be connected to all components of the game system. This is a safety requirement for the players protection. This AC GROUND must be of # 18 AWG wire or larger. (see figure 7 for the proper routing of the wire)

Cabinet System Checkout

18. Apply power to cabinet system and check for the following voltages. If any voltage is incorrect, remove power and correct problem before proceeding any further.
    a. + 5 Volts on pins 3,4,C, and D of the 56 pin PCB connector. (Interface Connector)
    b. + 12 Volts on pins 6 and F of the 56 pin PCB connector.
    c. No voltage present on any other pins of the 56 pin PCB connector.

19. Check that the monitor has power. This can be accomplished by observing the glow of the filament inside the neck of the picture tube.

20. Check that the Marquee lamp has power.

21. Check that the system ON/OFF switch functions properly.

WARNING: PROCEED ONLY IF THE ABOVE CHECKS ARE CORRECT

PCB Installation

22. Install the logic PCB and interface PCB inside the cabinet (see figure 5). Use wood screws to secure the PCB through its' mounting feet.

23. Locate the Switch Setting Sheet (See Figure 9). Place this sheet on the inside of the game so hat it is visible when the back door is removed or opened. This will allow the DIP SWITCH OPTIONS to be handy when service or changes in options are required.

24. Connect the 56 pin Jamma connector to the interface PCB.

NOTE: The proper orientation of the connector (see figure 8). If not connected properly, the system will not function and damage can occur to the PCB.

Logic Board and Complete System Checkout

25. Apply power to the system and observe that the logic PCB functions. If a video picture is not present proceed to "IN CASE OF DIFFICULTY" portion of this manual. When corrected, return to this point and continue.

Note: If the Test and Service Option is installed...

26. Press the TEST BUTTON to enter the test menu. Individual tests can be entered by following the instructions on the Test screen.

27. Set up game options as shown in figure 9.
    a. DIP SWITCH 1 on PCB sets up the number of coins per credit
    b. DIP SWITCH 2 on PCB sets up specific game options

28. Functionally test the game by:
    a. VERIFY that coin drops register proper credit/s and the COIN METER OPERATES
    b. VERIFY that the proper number of lives is given for each CREDIT
    c. VERIFY that all player controls operate properly

29. Locate the Kit SERIAL NUMBER STICKER and FCC PLATE. Install these on the rear of the game cabinet. (see figure 1)

In Case of Difficulty

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 56 pin 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

Incorrect 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

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

No Sound
- -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 ohm meter 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.

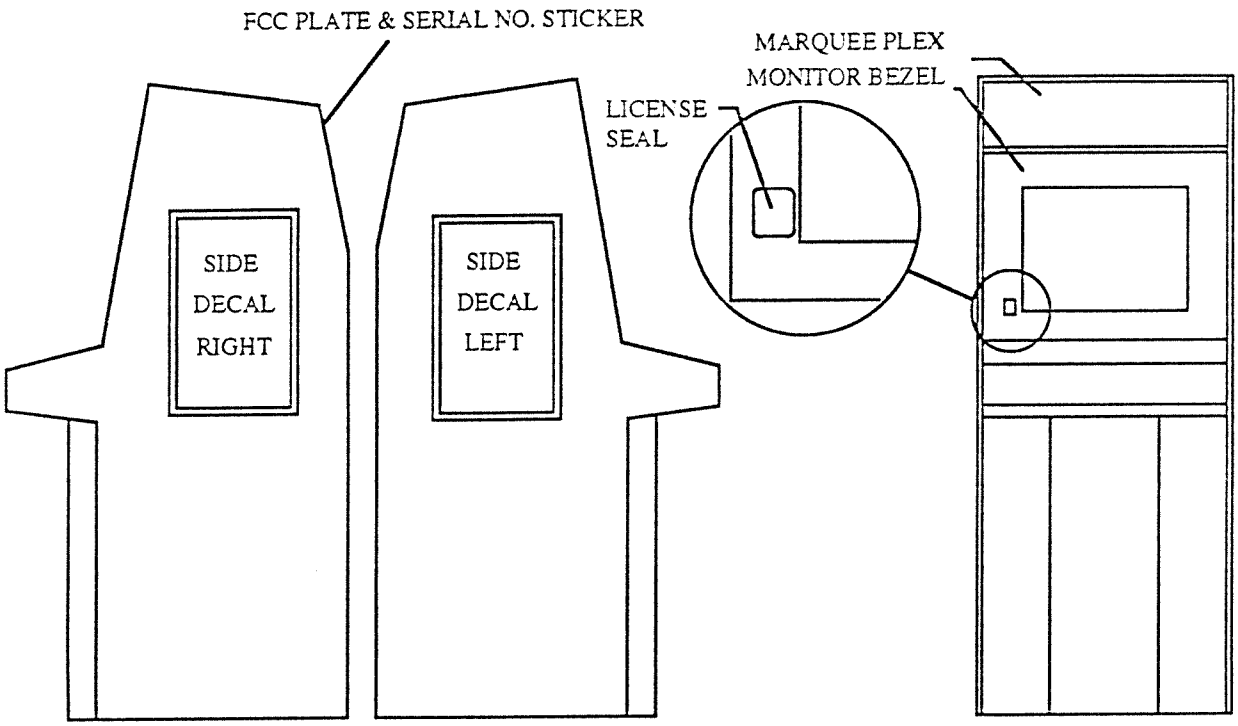


Figure 1

CONTROL PANEL TOP VIEW

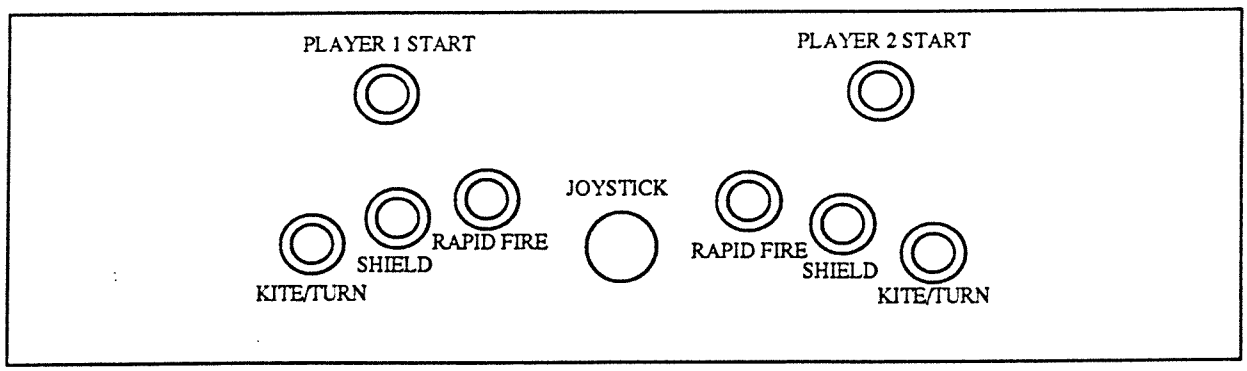


Figure 2

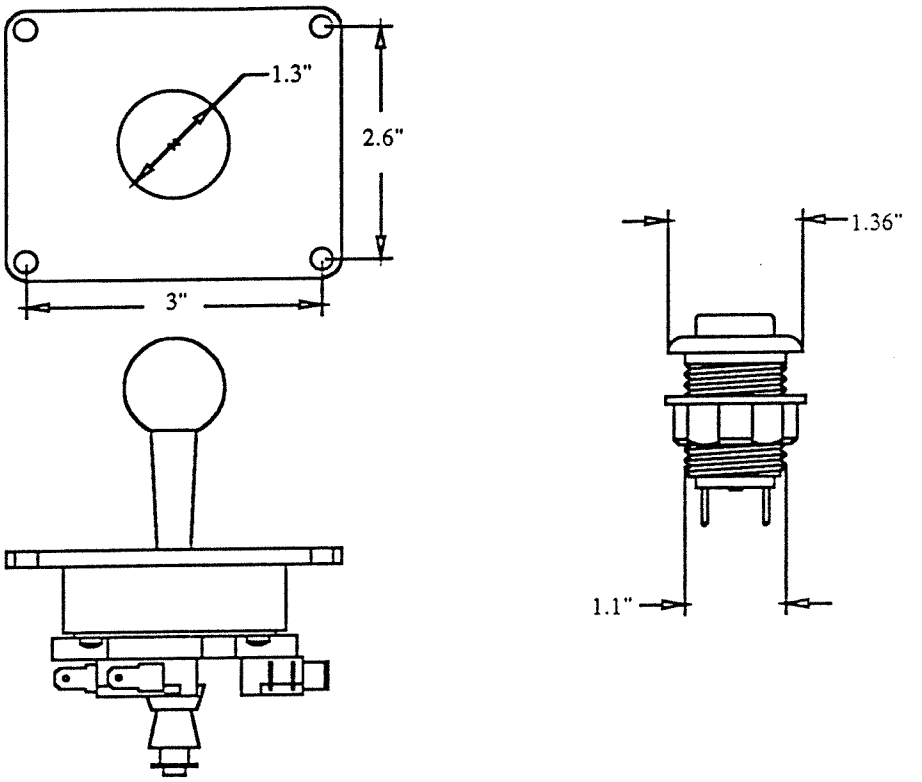
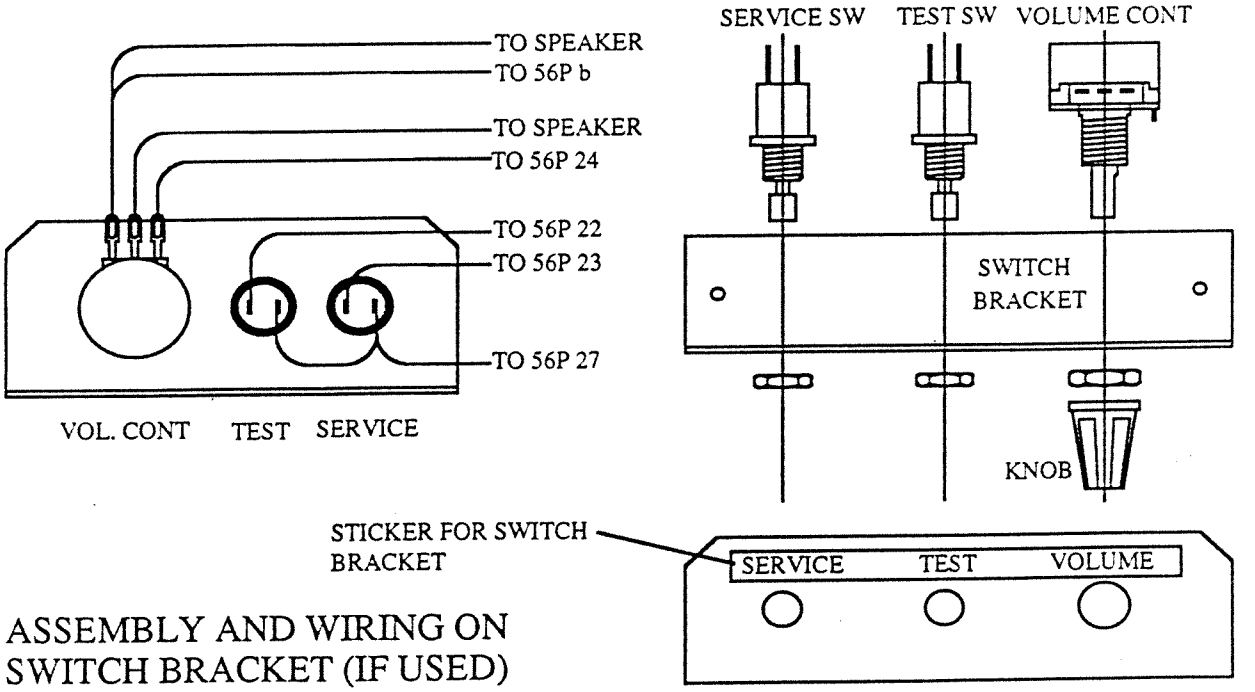


FIGURE 3



ASSEMBLY AND WIRING ON SWITCH BRACKET (IF USED)

FIGURE 4

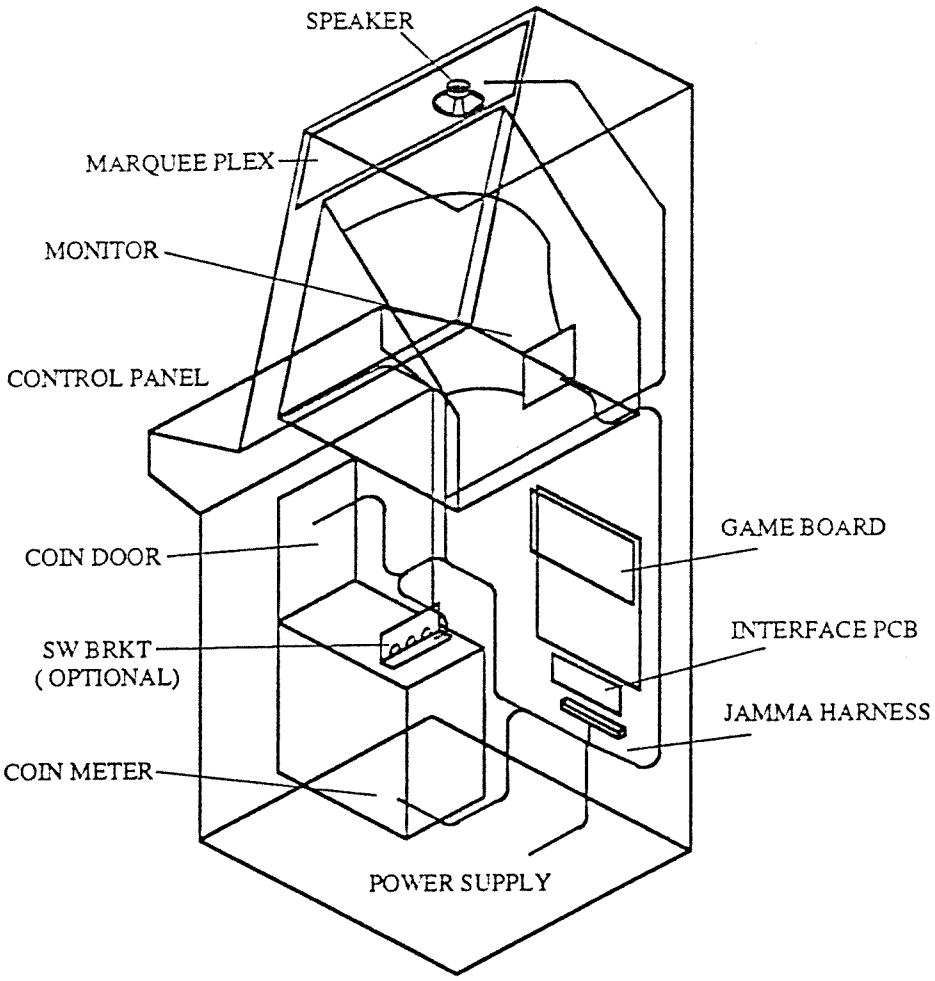


FIGURE 5

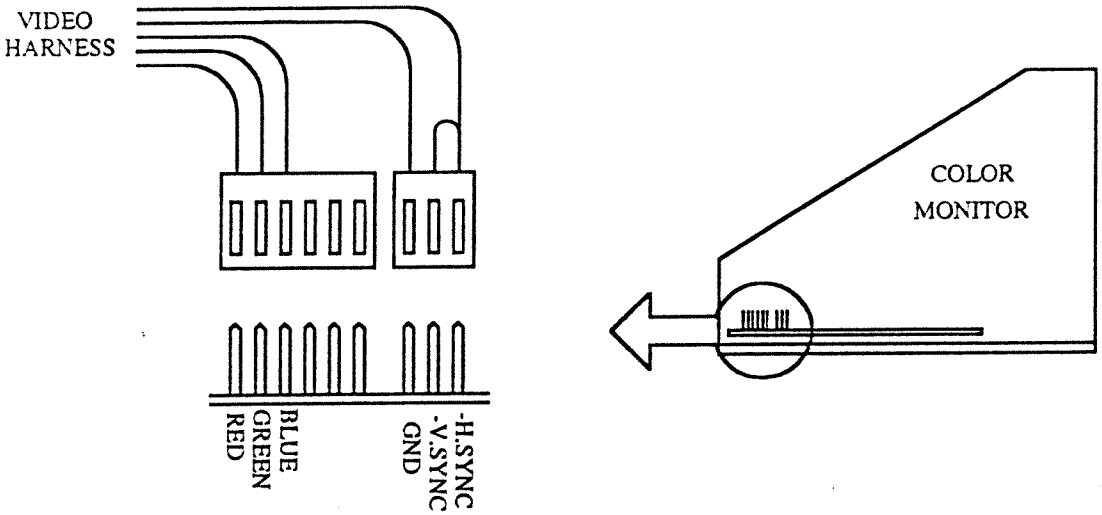


FIGURE 6

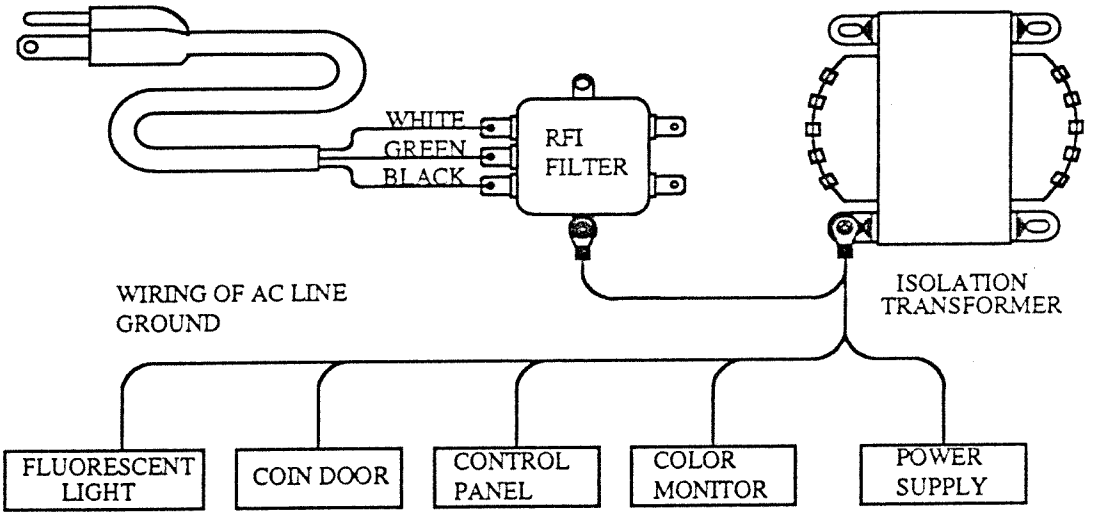


Figure 7

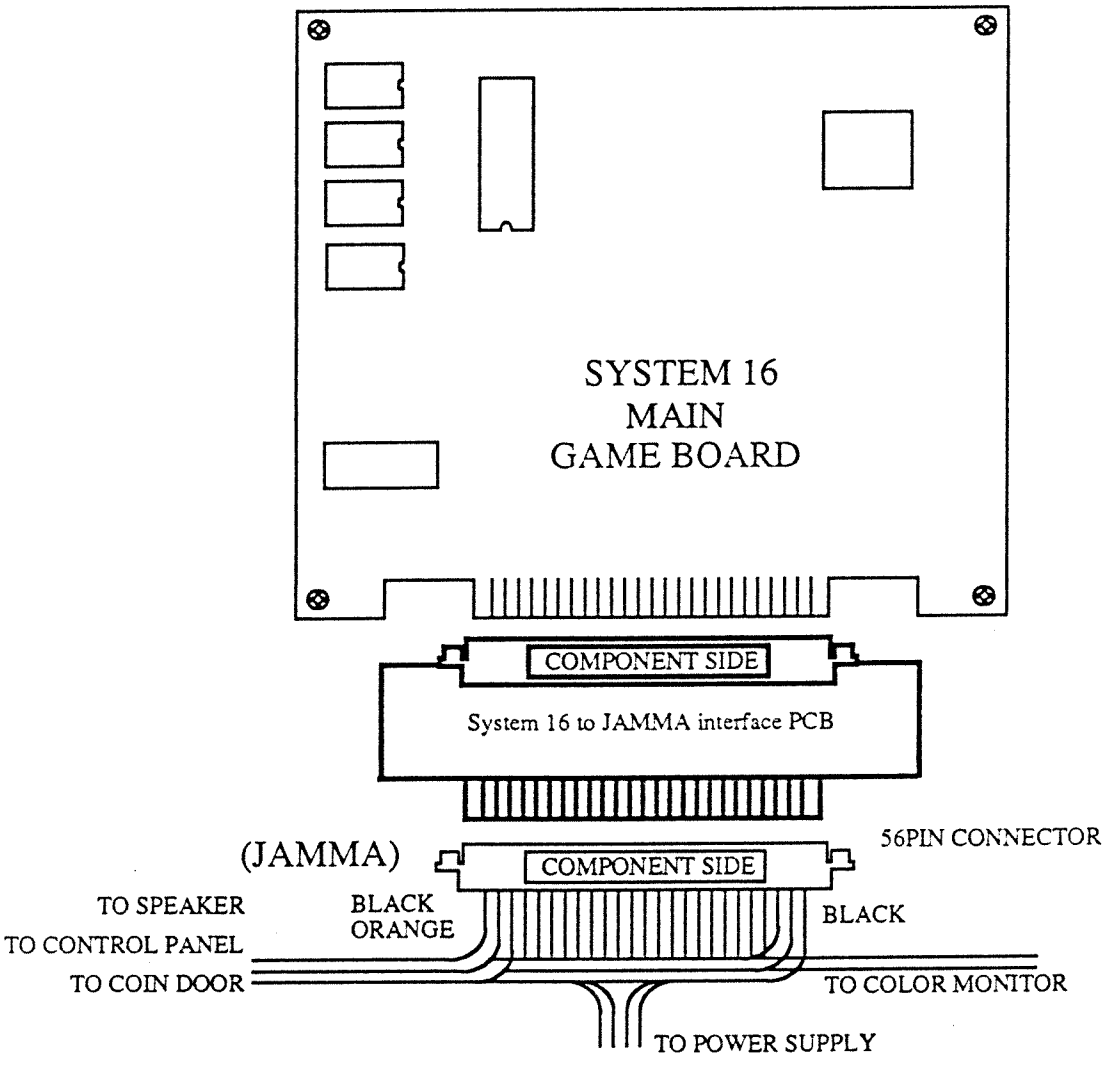


FIGURE 8

AURAIL

SWITCH SETTINGS

COIN / CREDIT OPTION SWITCH SETTING

OPTION		DIP SW #1 1	2	3	4	5	6	7	8
1 COIN	1 CREDIT	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1 COIN	2 CREDITS	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
1 COIN	3 CREDITS	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
1 COIN	4 CREDITS	ON	ON	OFF	OFF	ON	ON	OFF	OFF
1 COIN	5 CREDITS	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
1 COIN	6 CREDITS	ON	OFF	ON	OFF	ON	OFF	ON	OFF
2 COINS	1 CREDIT	OFF	ON	ON	OFF	OFF	ON	ON	OFF
3 COINS	1 CREDIT	ON	ON	ON	OFF	ON	ON	ON	OFF
4 COINS	1 CREDIT	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
2 COINS	3 CREDITS	ON	OFF	OFF	ON	ON	OFF	OFF	ON
2 COINS 4 COINS 5 COINS 6 COINS	1 CREDIT 2 CREDITS 3 CREDITS 4 CREDITS	OFF	ON	OFF	ON	OFF	ON	OFF	ON
2 COINS 4 COINS	1 CREDIT 3 CREDITS	ON	ON	OFF	ON	ON	ON	OFF	ON
1 COIN 2 COINS 3 COINS 4 COINS 5 COINS	1 CREDIT 2 CREDITS 3 CREDITS 4 CREDITS 6 CREDITS	OFF	OFF	ON	ON	OFF	OFF	ON	ON
1 COIN 2 COIN 3 COINS 4 COINS	1 CREDIT 2 CREDITS 3 CREDITS 5 CREDITS	ON	OFF	ON	ON	ON	OFF	ON	ON
1 COIN 2 COINS	1 CREDIT 3 CREDITS	OFF	ON	ON	ON	OFF	ON	ON	ON
FREE PLAY		ON	ON	ON	ON	ON	ON	ON	ON
		COIN SW #1				COIN SW #2			

GAME OPTION SWITCH SETTINGS DIP SW #2

DIP SWITCH #2		1	2	3	4	5	6	7	8
CABINET TYPE	UPRIGHT TABLE	OFF ON							
ADVERTISE SOUND	OFF ON		OFF ON						
NUMBER OF LIVES	3 4 5 2			OFF ON OFF ON	OFF OFF ON ON				
EXTRA PLAYER	EXT PL1 EXT PL2					OFF ON			
GAME DIFFICULTY	NORMAL HARD						OFF ON		
CONTROLLER SELECT	1P SIDE 2P SIDE							OFF ON	
SPECIAL FUNCTION MODE	OFF ON								OFF ON

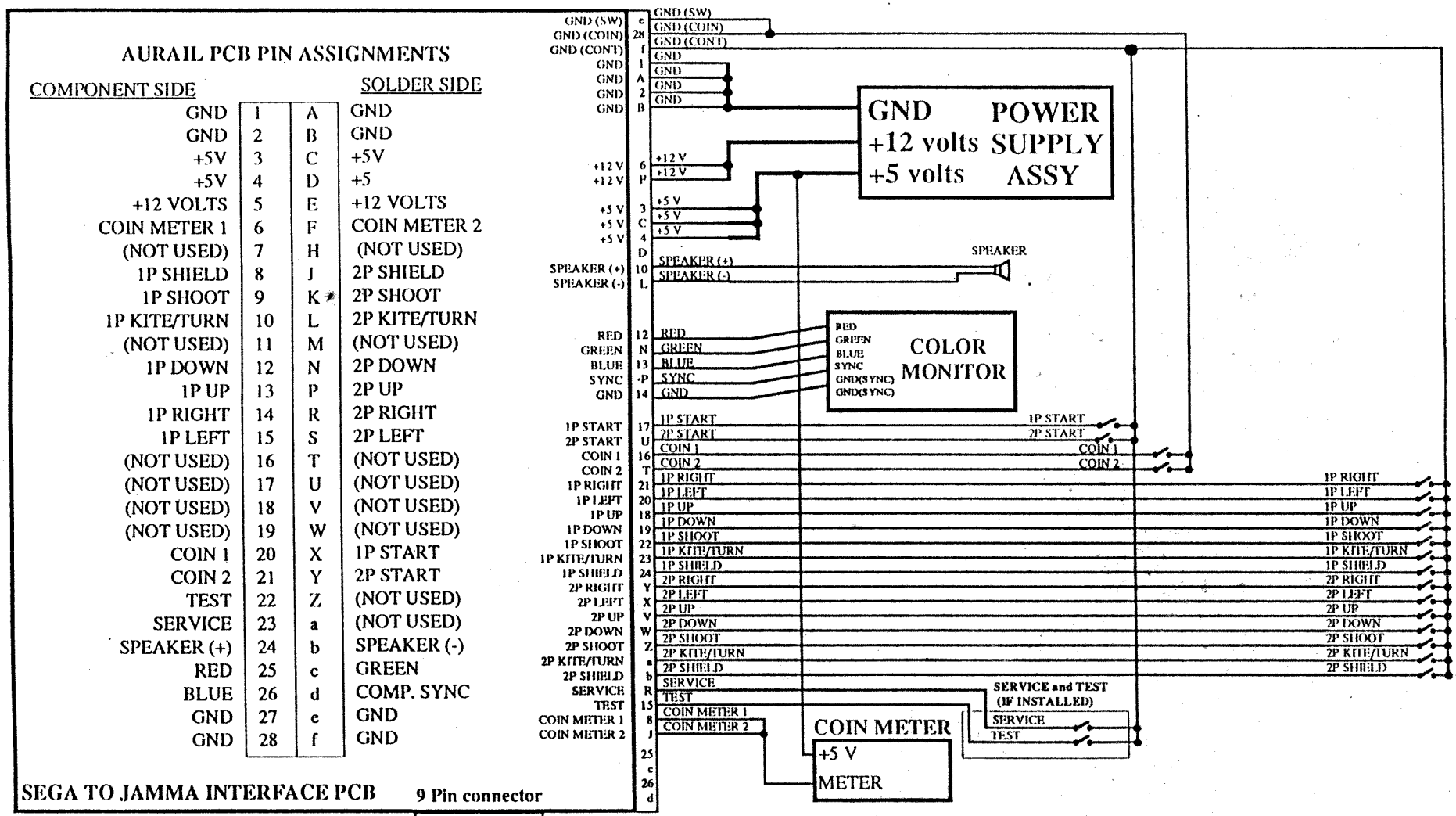
EXT PL1 - 1st LIFE 80000 POINTS
2nd LIFE 200000 POINTS
3rd LIFE 500000 POINTS
4th LIFE 1000000 POINTS

EXT PL2 - 1st LIFE 100000 POINTS
2nd LIFE 300000 POINTS
3rd LIFE 700000 POINTS
4th LIFE 1000000 POINTS

FIGURE 9

AURAIL PCB - SYSTEM 16
AND INTERFACE PCB

INTERFACE PCB OUTPUT
56 PIN CONNECTOR
JAMMA COMPATIBLE



NOTE:

For Audio Output connect:
Pin 1 of the 9 pin connector to Pin 3
Pin 2 of the 9 pin connector to Pin 4

FIGURE 10