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From: Andrea Dencker, Publications Dept. andrea Date: March 22, 1991

Subject: Internal Distribution of *Pit-Fighter Universal Kit Installation Instructions,* CO-357-05, 1st printing

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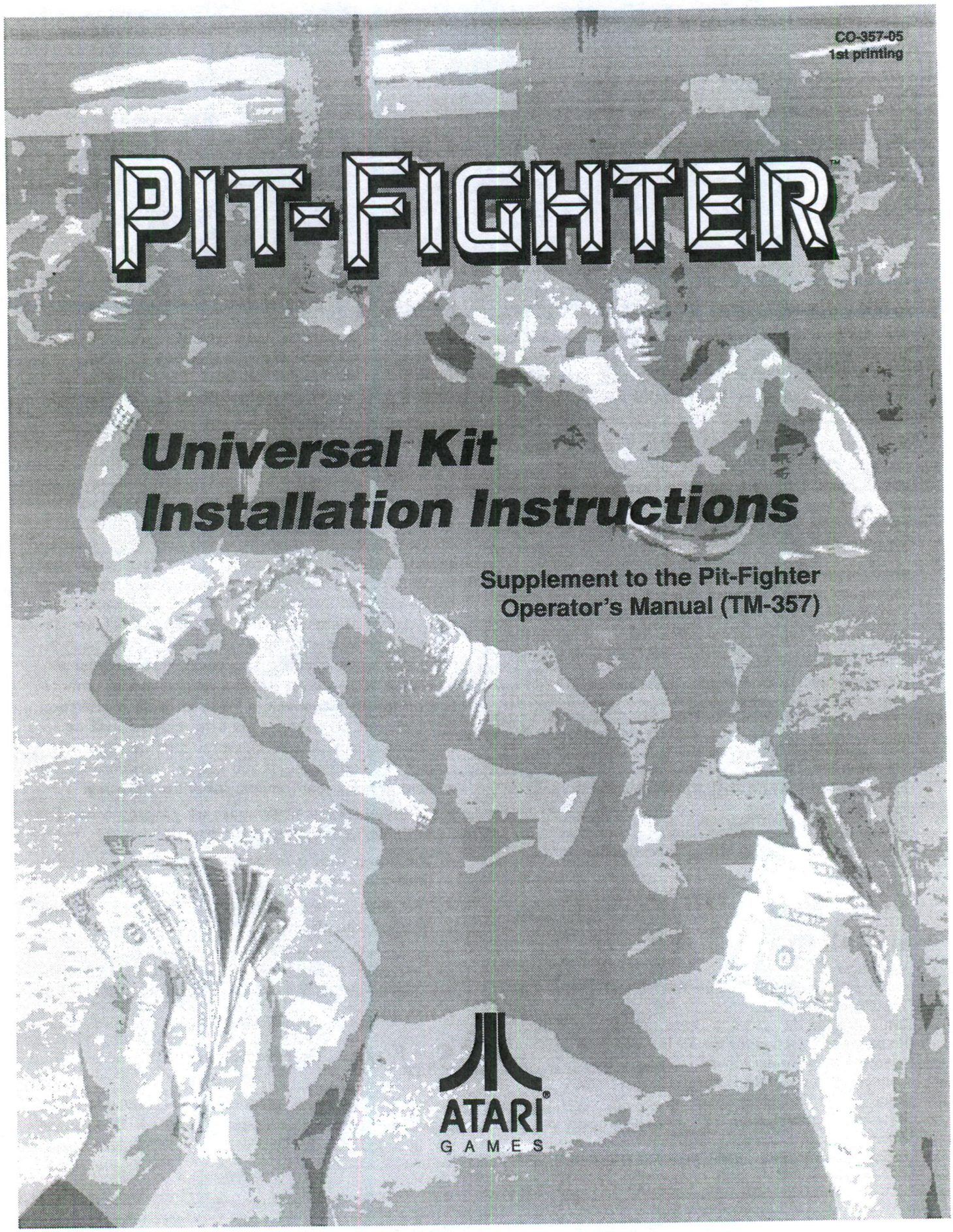
Attached is your copy of the first printing of the *Pit-Fighter Universal Kit Installation Instructions* (CO-357-05).

If any people were inadvertently left off of this distribution list and you think they should have copies of these publications, please let me know. For those of you who helped us on this project, we thank you very much!

CO-357-05
1st printing

PIT-FIGHTER™



Universal Kit Installation Instructions

Supplement to the Pit-Fighter Operator's Manual (TM-357)

ATARI® GAMES

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Note

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area or modification to this equipment 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. If you suspect interference from an Atari game at your location, check the following:

- All ground wires in the game are properly connected as shown in the game wiring diagram.
- The power cord is properly plugged into a grounded three-wire outlet.
- The game printed-circuit boards (PCBs) are properly installed with **all** screws in place and tightened.

If you are still unable to solve the interference problem, please contact Customer Service at Atari Games Corporation. See the inside front cover of this manual for service in your area.

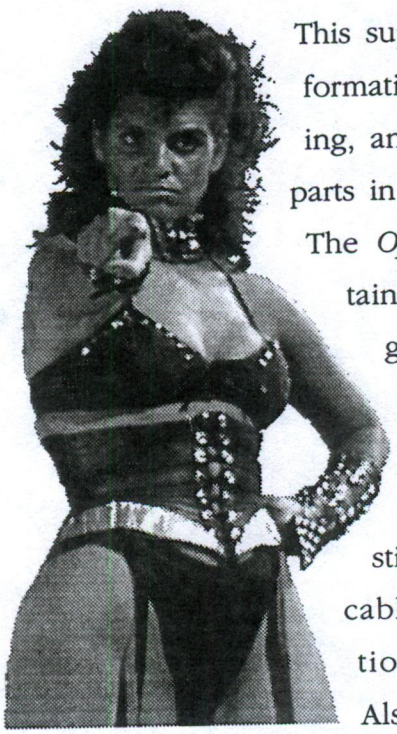
Safety Summary

Please refer to the complete safety summary printed on page iv in the *Pit-Fighter Operator's Manual*. That manual was included with this kit.

Installation

Introduction

The Pit-Fighter™ two-player conversion kit includes this supplement and the *Pit-Fighter Operator's Manual* (TM-357). ❖



This supplement provides information for installing, testing, and troubleshooting the parts in the conversion kit. ❖ The *Operator's Manual* contains a description of the game play and the self-test, troubleshooting and maintenance procedures for the joystick control, plus applicable parts lists, illustrations, and schematics. Also printed in the back of that manual is the statistics sheet.

WARNING

To avoid electrical shock, unplug the cabinet while installing the kit. After installation, plug the game only into a grounded 3-wire outlet.

Cabinet Equipment Requirements

Table 1 lists the equipment required in the cabinet into which you are installing the Pit-Fighter kit.

CAUTION

Do not unplug or plug in the Pit-Fighter game printed-circuit board (PCB) edge connector while the power is on. You could seriously damage the PCB.

Table 1 Equipment Requirements

Equipment	Specification
Video Display	Color RGB monitor Separate positive horizontal and vertical sync or negative composite sync Horizontal mounting Horizontal frequency: 15.750 KHz Vertical frequency: 60 Hz Video input: 1V to 3V peak-to-peak positive polarity
Control Panel	Metal only
Speaker	8 Ω, 10 W
Coin Counter	+5 VDC or +12 VDC
Power Cord	Three-conductor with ground
Power Supply	+5 VDC ± 0.25V @ 3.0 amps +12 VDC @ 1.0 amp -5 VDC @ 1.0 amp (optional)

Tools Required

- Drill with a 1/4-inch and 5/16-inch drill bits
- Phillips screwdriver
- Flat-blade screwdriver
- Socket wrench set and ratchet
- 1/4-20 hex wrench
- Wire cutters and strippers
- Straight edge
- Squeegee
- X-ACTO™ knife
- Insulated wire connectors (if you are installing a new JAMMA harness)
- Carbon paper
- Saber saw
- File

Table 2 Contents of the Pit-Fighter Kit

Part No.	Description	Qty.
A047955-05	Pit-Fighter Kit PCB Assy. (2-Player Version)	1
A046501-01	JAMMA Harness Assy.	1
048421-01	Control Panel Decal	1
048422-01	Side Panel Decals	2
048423-02	Attraction Panel Film	1
048425-02	Monitor Bezel with Graphics	1
178237-005	Blue Button Assemblies	3
178237-001	Red Button Assemblies	3
171097-001	8-Position Black Wico Joystick Assy.	2
178283-005	Start/Jump Indicator Plates	2
178283-006	Punch Indicator Plates	2
178283-007	Kick Indicator Plates	2
160044-001	Snap-Action Switches	6
177026-0040	#10-24 Nut/Washer Assemblies	12
038158-01	Product I.D. Label	1
039450-01	FCC Compliance Label	1
TM-357	Pit-Fighter Operator's Manual	1
CO-357-05	Pit-Fighter Universal Kit Installation Instructions (with control panel template)	1
141026-001	.50"-Inside Diameter Ferrite Split Beads	2
178032-002	#10-24 Wire & Cable Tie	1
75-5112B	#10-24 x 3/4"-Long Black Carriage Bolts	12
175014-1040	#10 Flat Washers	12
178265-001	L-Style Nylon Standoffs	4
72-6608S	#6 x 1/2"-Long, Type AB, Pan-Head, Cross-Recessed Screws	4

Packaging materials are not listed. Note: An attraction shield and control panel cover are not included in this kit.

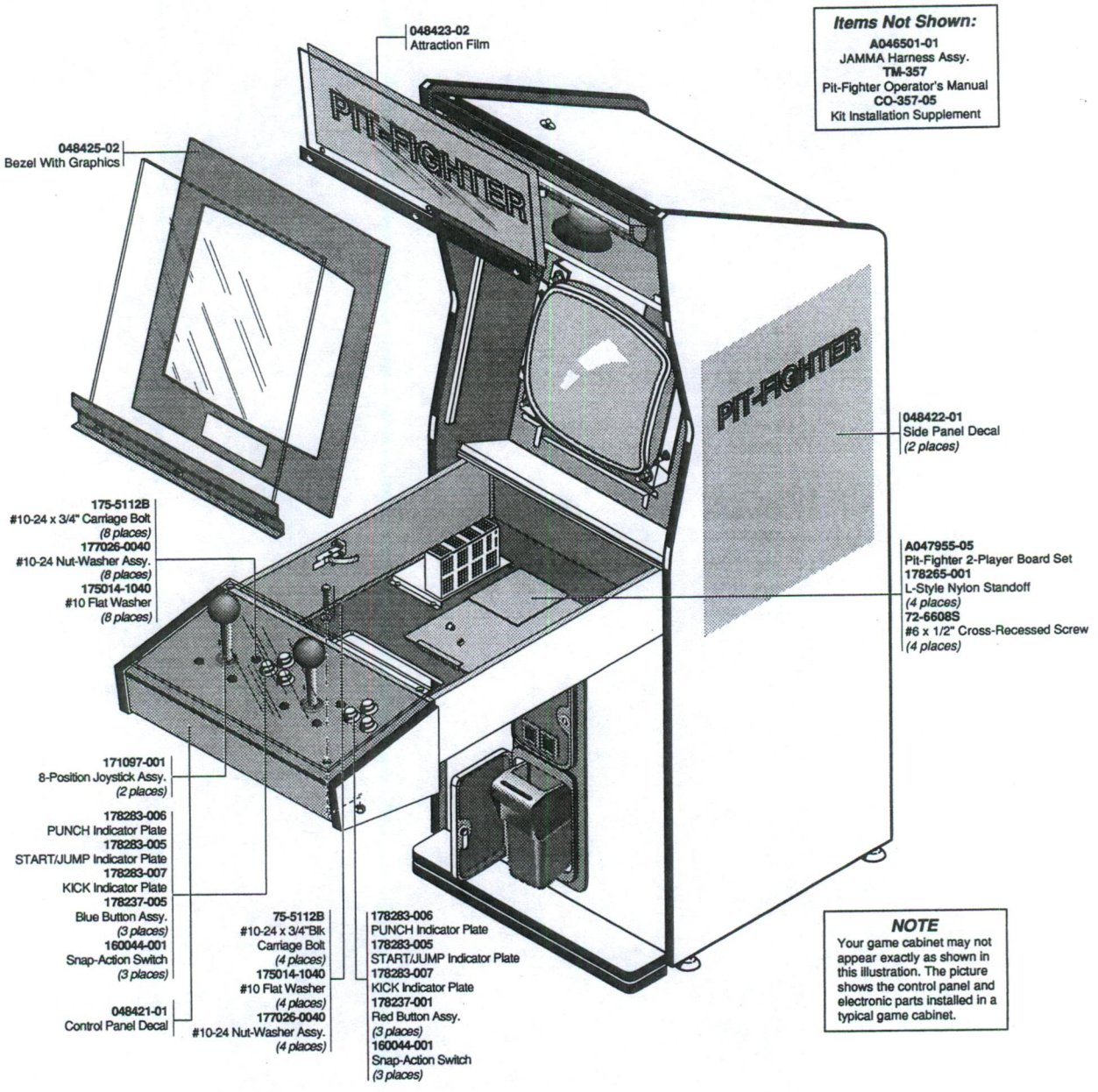


Figure 1 Installed Kit Parts

- Bandsaw
- Tape or glue

Inspecting the Kit

Check to see that you have all the parts listed in the kit parts list in Table 2. If any part is missing or damaged, contact your distributor with the Pit-Fighter kit serial number, part number, and description of the missing or damaged parts, and date received.

Preparing the Cabinet for the Kit Installation

WARNING

To avoid electrical shock, unplug the cabinet while installing the kit. After installation, plug the game only into a grounded 3-wire outlet.

Table 3 JAMMA Pin and Wire Connections

Pin	Wire Color	Signal	Instructions
Component Side			
1	BN	GND	Connect to the 5V RTN (GND) terminal on the power supply. However, if you have 12V RTN, connect *one* of the BN wires at pin 1, 2, A, or B to the 12V RTN terminal.
2	BN	GND	Same as pin **1**.
3	R	+5V	Connect to the +5V terminal on the power supply. However, if your power supply has a +SENSE terminal, connect *one* of the R wires at pin 3, 4, or C to +SENSE instead of +5V.
4	R	+5V	Same as pin **3**.
5	OR	–5V	Connect to the –5V terminal of the power supply. If –5V is not available, connect to the 12V RTN or the 5V RTN (GND) or leave it unconnected. *NOTE: If you do not have (or use) –5V, the maximum power to the speaker will be reduced by half.*
6	Y	+12V	Connect to the +12V terminal of the power supply. If your coin counter(s) require 12V, also connect to the + side of the coin counter(s).
7		**Key**	
8	BU/W	COIN CTR 1	Connect this wire to the – side of the coin counter. *Note: Do not use 24V counters.* Connect the + side to +5V or +12V on the power supply, as appropriate.
9		Not used	
10	BN	SPKR +	Connect to the + terminal on the speaker. (This wire is part of a twisted pair.)
11		Not used	
12	R	RED	Attach to the video display.
13	BU	BLUE	Attach to the video display.
14	BK	VIDEO GND	Attach to the video display.
15	W	SELF-TEST	Use this wire if you want an external self-test switch. However, the kit already has a self-test switch on the PCB. *(If you connect an external self-test switch, switch off the switch on the PCB. Connect the wire to the N.O. terminal on the external self-test switch. Connect the common terminal of the switch to a BK/W wire [GND].)*
16	Y	LT COIN	Connect to the N.O. terminal of the left coin switch. Connect the common terminal of the switch to a BK/W wire.
17	W/BK	Not used	
18	W/BN	LT JOYST UP	Connect to the N.O. terminal of the switch. Connect the common terminal of the switch to one of the BK/W wires.
19	W/R	LT JOYST DN	Same as pin **18.**
20	W/OR	LT JOYST LT	Same as pin **18.**
21	W/Y	LT JOYST RT	Same as pin **18.**
22	W/GN	LT PUNCH BTN	Connect this wire to the N.O. terminal of the left Punch switch. Connect the common terminals of the switches to one of the BK/W wires.
23	W/BU	LT KICK BTN	Connect this wire to the N.O. terminal of the left Kick switch. Connect the common terminals of the switches to one of the BK/W wires.
24	W/V	LT JUMP BTN	Connect this wire to the N.O. terminal of the left Jump switch. Connect the common terminals of the switches to one of the BK/W wires.
25	W/GY	Not used	
26	V	Not used	
27	BK/W	GND	Connect one of the BK/W wires at pin 27, 28, e, and f to the negative sense terminal of the power supply (if it exists) and one to the common terminals of the coin switches. Connect two of these wires to the common terminals of the control switches on the control panel.
28	BK/W	GND	Same as pin **27**.

Table 3 JAMMA Wire Connections, Continued

Pin	Wire Color	Signal	Instructions
Solder Side			
A	BN	GND	Connect to the 5V RTN (GND) terminal on the power supply. However, if you have 12V RTN, connect *one* of the BN wires at pin 1, 2, A, or B to the 12V RTN terminal.
B	BN	GND	Same as pin **A**.
C	R	+5V	Connect to the +5V terminal on the power supply. However, if your power supply has a +SENSE terminal, connect *one* of the R wires at pin 3, 4, or C to +SENSE instead of +5V.
D	R	+5V	Connect to the +5V terminal on the power supply. However, if your power supply has a +SENSE terminal, connect *one* of the R wires at pin 3, 4, or C to +SENSE instead of +5V.
E	OR	–5V	Connect to the –5V terminal of the power supply. If –5V is not available, connect to the 12V RTN or the 5V RTN (GND) or leave it unconnected. *NOTE: If you do not have (or use) –5V, the maximum power to the speaker will be reduced by half.*
F	Y	+12V	Connect to the +12V terminal of the power supply.
H		**Key**	
J	V/W	COIN CTR 2	Connect this wire to one side of the second 12V coin counter. Clip R13 on the game PCB if you use a second coin counter. *Note: Do not use 24V counters.* If your counter requires 5V, connect a wire from the +5V terminal on the power supply.
K		Not used	
L	W	SPKR–	Connect to the – terminal on the speaker. (This wire is one of a twisted pair.)
M		Not used	
N	GN	GREEN	Attach to the video display.
P	BN	$\overline{\text{COMPSYNC}}$	Attach to the video display.
R	GY	Service	
S		Not used	
T	OR	RT COIN	Connect to the N.O. terminal of the right coin switch. Connect the common terminal of the switch to a BK/W wire.
U	Y/BK	Not used	
V	Y/BN	RT JOYST UP	Connect to the N.O. terminal of the switch. Connect the common terminal of the switch to one of the BK/W wires.
W	Y/R	RT JOYST DN	Same as pin **V**.
X	Y/OR	RT JOYST LT	Same as pin **V**.
Y	Y/W	RT JOYST RT	Same as pin **V**.
Z	Y/GN	RT PUNCH BTN	Connect this wire to the N.O. terminal of the right Punch switch. Connect the common terminals of the switches to one of the BK/W wires.
a	Y/BU	RT KICK BTN	Connect this wire to the N.O. terminal of the right Kick switch. Connect the common terminals of the switches to one of the BK/W wires.
b	Y/V	RT JUMP BTN	Connect this wire to the N.O. terminal of the right Jump switch. Connect the common terminals of the switches to one of the BK/W wires.
c	Y/GY	Not used	
d	GY/W	Not used	
e	BK/W	GND	Connect one of the BK/W wires at pin 27, 28, e, or f to the negative sense terminal of the power supply (if it exists) and one to the common terminals of the coin switches. Connect two of these wires to the common terminals of the control switches on the control panel.
f	BK/W	GND	Same as pin **e**.

Figure 1 shows almost all kit parts installed in a typical cabinet. Use this illustration as a guide while you install the parts.

1. Turn off power to the game, and unplug the power cord.
2. Remove the following from the cabinet:
   - Existing PCBs
   - Game harness, if it is not Japan Amusement Machinery Manufacturers Association (JAMMA)–compatible
   - Control panel decals, labels, and controls
   - Side decals, graphics, and adhesive. If the cabinet sides are damaged, repair them before putting on the new decals.
   - Video display (monitor) shield, display bezel, attraction shield, and marquee, if any.
3. Wipe down and vacuum the cabinet. Paint the cabinet, if required.

Assembling the Control Panel

Parts Needed

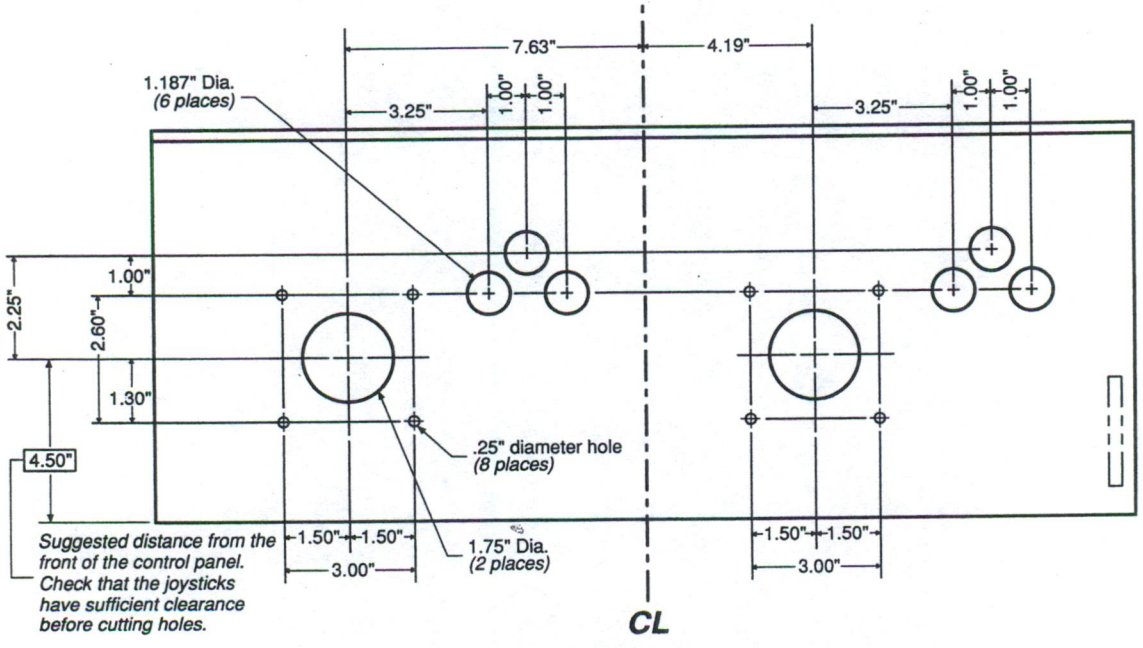
To assemble the control panel, you need the control panel hole-cutting template, which is printed at the end of this supplement. Cut out the template sheet.

You will need to obtain a clear acrylic cover for the control panel: it must be 3/16" thick and larger than the dimensions of your game's control panel. Gather together the following parts from the kit:

- Control panel decal
- Three red and three blue button assemblies
- Six snap-action switches
- Two each of the Start/Jump, Punch, and Kick indicator plates
- Two joystick controls
- Twelve #10 x 3/4"-long black carriage bolts, flat washers, and nut/washer assemblies

Installing the Parts

1. Using carbon paper, transfer the joystick mounting pattern from the template to the control panel. Save the template, since you will need it for the second player station. Also refer to Figure 2 for the exact locations of all holes.
2. Drill four 1/4" holes in the metal control panel for each joystick's mounting bolts.
3. Using a saber saw, carefully cut out the large holes for the joysticks. Deburr the sharp edges with a file.
4. Lay the acrylic cover over the top of the control panel and mark the outside shape of the panel on the plastic. Also mark the six button holes as close as possible to the locations shown on the template. Lastly, mark the positions of the four holes that will be used for securing the cover to the control panel. These four holes



NOTE

The four holes in the corners are not shown in this illustration. Drill these holes wherever space permits.

Figure 2 Locations of Control Panel Holes to be Drilled

can be placed anywhere near the corners — wherever space permits.

5. Using a bandsaw, cut the control panel cover to its correct outside shape.

WARNING

Wear safety glasses when drilling the plastic control panel cover. Use care to avoid shattering or chipping the plastic.

6. Tape or glue the template to the acrylic cover. To start the saber saw cut, drill a 1/2" hole inside the large and smaller holes.
7. Saw out the large and smaller holes.
8. Drill the four 5/16" holes that will be used to mount the cover to the control panel and the eight 1/4" holes to mount the joysticks.
9. To prevent injury, carefully deburr all the edges of the acrylic cover.
10. Install the control panel decal on the control panel. Use a sharp X-ACTO knife to trim the outside edge and to cut out the holes for the controls.
11. Install the cover on the control panel with the four 3/4"-long carriage bolts, flat washers, and nut/washer assemblies.
12. Install the joystick assemblies using the eight 3/4"-long carriage bolts. Install the six button assemblies and the six indicator plates as shown in Figure 1.

NOTE

The orientation of the joysticks is critical. Refer to the template for a picture of the correct position.

For maintenance and servicing information on the joystick controls, refer to Chapter 3 of this manual.

Connecting the JAMMA Harness

1. If your game cabinet does not already have a JAMMA harness, install the JAMMA harness in the cabinet.
2. Install the split beads on the harness as close to the PCB edge connector as possible. Hold the beads on the harness with the tie wrap included in the kit.

CAUTION

You must install the split beads included in the kit on the JAMMA harness to meet FCC requirements.

3. Using Table 2 for wiring information, connect the JAMMA harness to existing component harnesses. Use crimp splices or butt soldering.

WARNING

Do not simply tie the wires together. If you do, you could cause intermittent problems, loose connections, oxidation, or a fire.

Connecting Power Wires

1. Connect the wires on the JAMMA harness to the wires for the power supply, as shown in Table 3. The Pit-Fighter kit requires +5V and +12V. If -5V is available, it should be used too. Tie off any other voltage wires on the power supply besides +5V, –5V, and +12V.

   There is more than one wire for each voltage in the JAMMA harness. Use more than one wire for each voltage (connecting them as described in Table 3) so that the edge connector does not overload and burn.

Connecting Video Display Wires

NOTE

The JAMMA harness provides only negative composite sync. If your video display requires separate positive sync, this kit has a standard Atari Games video connector (located near the JAMMA connector) that provides separate positive sync. Refer to Table 4 and make the appropriate connections for your video display.

Connect the wires designated for the red, green and blue video guns along with the sync and ground wires, according to Table 3.

Table 4 Atari Games Video Connector Pin Assignments

Pin	Signal	Pin	Signal
1	Red	7	GND
2	GND	8	GND
3	Key	9	Negative composite sync
4	Green		
5	GND	10	Positive V sync
6	Blue	11	Positive H sync

Connecting Coin Door Wires

1. Connect the wires on the JAMMA harness to the coin switches and meter according to Table 3.
2. Connect one terminal of the door lamps to one of the BK/W wires. Connect the other terminal of the door lamps to the R wire supplying +5V.

NOTE

Do not use –5V for the coin door lamps. –5V is required for audio.

Some games have separate power supply outputs for the coin door lamps. If you choose to use these outputs, make sure you connect both terminals of each lamp to the terminals on the power supply.

Connecting the Control Wires

Connect the JAMMA harness to the joystick and button switches, following the information in Table 3.

Grounding the Cabinet

Find the ground lead (green) of the 115V input power line. Connect this lead in daisy-chain fashion to a bare metal part of the coin door, the control panel, the video display, and the power supply. This AC ground must be of #18 AWG wire or larger.

WARNING

For the safety of players, you must connect the green ground wire as indicated above.

Checking the JAMMA Connections

Before plugging in the game PCB, turn on the power to the game, and check +5 Volts on pins 3, 4, C, and D of the JAMMA connector; +12 Volts on pins F and 6; and –5 Volts on pins E and 5.

Check that the video display and the attraction lamp have power. Now turn off the power to the game.

Installing the Pit-Fighter Board Set

1. After you have checked the power on the JAMMA connector (above), install the Pit-Fighter game board set in the cabinet. Use the nylon standoffs and four #6 screws in the kit.
2. Connect the JAMMA connector to the PCB.
3. Secure the JAMMA harness away from the PCB with cable ties.
4. Turn on the power to the game. Check that the game PCB functions. If a video picture is not present, see Chapter 3.

Installing the Bezel, Labels, Decals, and Attraction Assembly

These kit parts are shown assembled in a game in Figure 1.

Installing the Display Bezel

Find the cardboard display bezel in the kit. This bezel can only accommodate a 25-inch video display. For 19-inch displays, cut out the Pit-Fighter instructions area from the bezel in this kit, and adhere it to a black 19-inch bezel.

Installing the Product ID and FCC Label

Place the product ID label and FCC compliance label on the back of the cabinet.

Installing the Side Panel Decals

Find the side panel decals in the kit. Wet the left and right side panels of the cabinet with slightly soapy water. Then position the decals as shown in Figure 1. Remove any wrinkles in the artwork using a squeegee. Allow the sides to dry.

Installing the Attraction Assembly

Find the Pit-Fighter attraction film in the kit. Clean the existing attraction shield that was in your cabinet. If that shield is damaged or scratched, obtain a new piece of acrylic that is 1/8" thick. Using this shield as a template, cut the film to size, if necessary. Install them on the cabinet as shown in Figure 1.

Setting the Coin and Game Options

Set the coin and game options in the self-test. See Chapter 2 of the *Pit-Fighter Operator's Manual* for information about the option settings.

Maximizing Earnings

For maximum earnings, regularly maintain your Pit-Fighter game. If you have problems, follow the instructions in Chapter 3 of the *Pit-Fighter Operator's Manual.*

When you set up the game and when you collect money, perform the automated self-test and check the controls with the Switch Test and Sound Test in the self-test.

Game Play

Refer to the *Pit-Fighter Operator's Manual* for a complete description of the Pit-Fighter game play.

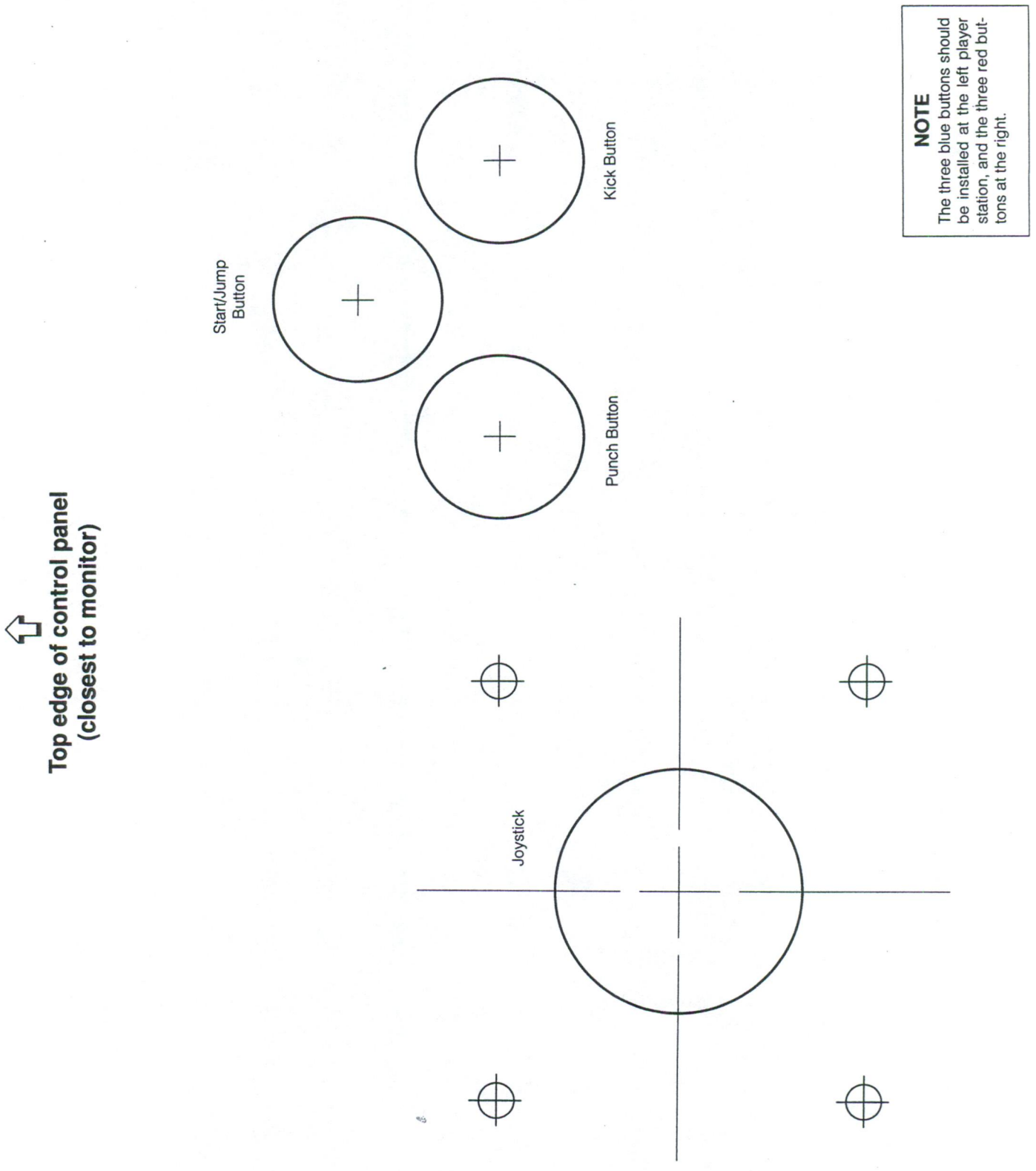


Figure 3 Template for One Player Station

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