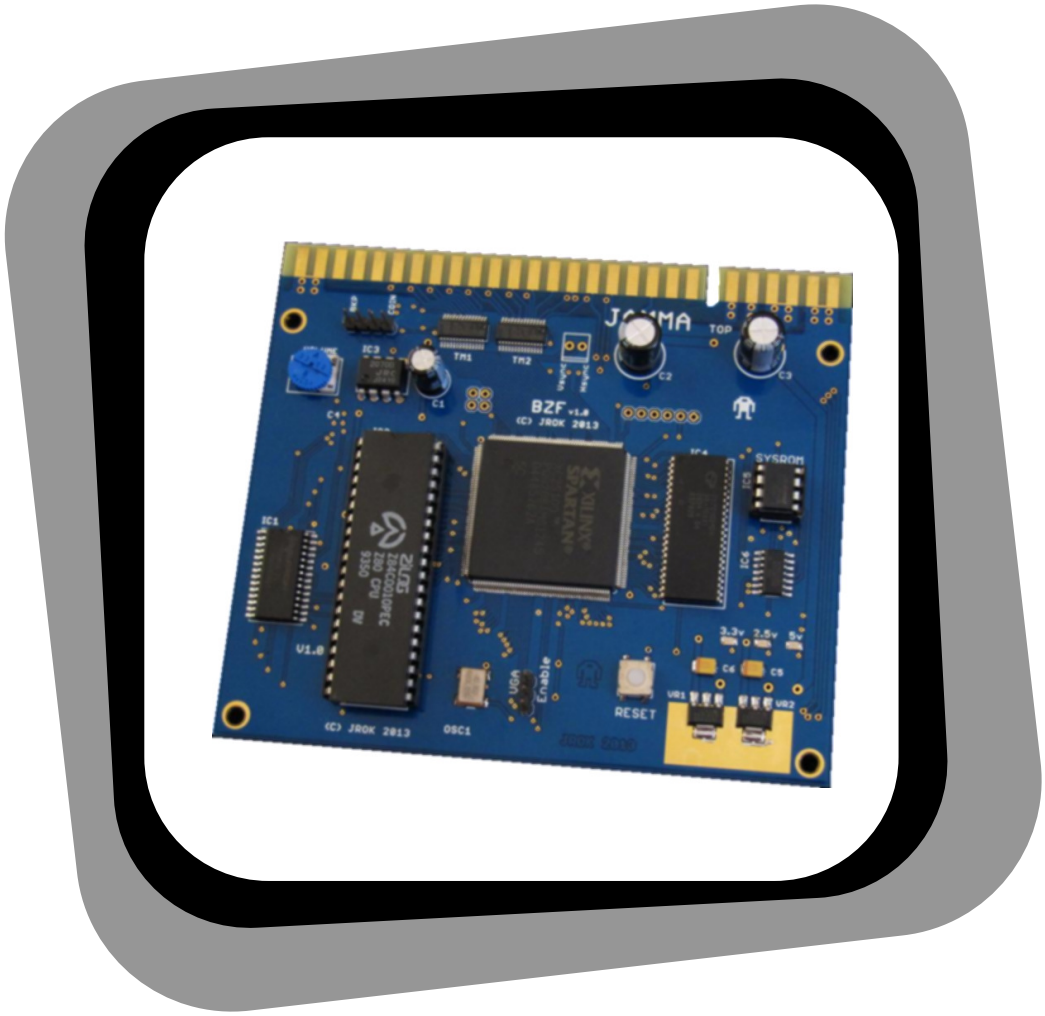
BZFPGA



BZF – Berzerk Frenzy FPGA

Setup Guide revision 1
For v1.0 board hardware

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Hardware Requirements

Connectors

The board uses a standard JAMMA connector, in an upright cabinet only player 1 joystick and 1 button are required.

The four pin header on the board is used for two optional additional inputs. See the section “Board Layout & Additional Button Header” for pin connections.

Mating connector types are:
4 position = molex kk 0.1” 22-01-3047 or TE Connectivity/AMP CST-100 0.1” 770602-4

Voltage & Current

The board requires **only** 5v regulated DC power. Maximum current draw is 400mA when using a 4ohm speaker at maximum volume. A minimum of 500mA power supply should be used to ensure stable operation.

If long runs of cabling are used significant voltage drop may occur, ensure the power supply is adjusted to provide a reliable 5v at the edge connector of the board.

A voltage at the edge connector of the board under 4.75v will cause the board to suspend and remain in reset mode.

Power Requirements

5v DC regulated
400mA

Select & Play Menu

After power on tests have completed and the “BOOT TO” option is set to “menu” the game select screen will be displayed.

Use the player 1 joystick up and down to select the game or the setup menu. Press player 1 fire button to choose the option selected.

If the “BUTTON TIMER” option has been set to 1, 2 or 4 seconds, when a game is playing pressing and holding both “player 1 start” and “player 2 start” buttons together at the same time the system will restart back to the game menu.

Setup Menu

The option setup menu can be accessed from the Main Menu if “SETUP” is enabled.

If the SETUP menu is **disabled** or “BOOT TO” is set to a game use the following method to get to setup menu.

- Press and hold 1P button 1 (fire button) and press RESET on the board, or power the machine on.

Setup Options

The setup menu allows the board options shown to be changed:

BOOT TO

Select the game the machine should boot to when powered on. Default is the Menu.

The options are :

- Menu
- Berzerk (RC31 fast bullets)
- Berzerk SB (RC28 slow bullets)
- Frenzy

When setting the board to boot to a specific game (the “boot to” option is NOT set to “Menu”) then powering on the board or pressing reset the board will boot only to that game.

Holding the 1P & 2P Start to restart, will **ALWAYS** cause a restart to the game select menu.

It is recommended that when using “Boot To” then the “Button Timer” should be set to “OFF” if the game select menu should be disabled and never displayed.

Note: Even when “boot to” is set to a game, powering or resetting the board when holding the 1P fire button will always jump to the Setup Menu.

SETUP MENU

Enable or disable the setup menu on the game menu list.

ON Setup will be the last option
OFF Setup is not displayed

Note:
Setup is always available by holding player 1 button 1 (fire button) down when powering on or resetting the board.

CABINET

COCKTAIL Enables the 2 player inputs and screen flipping for cocktail tables.
UPRIGHT Standard Machine

FAST BOOT

Enable fast startup of games.

ON The self test of each game is disabled. There will be no ‘beeps’ during the game startup
OFF Standard power on self test is run when a game is selected.

SCREEN SAVER

ON/OFF
If no buttons are pressed on the game select screen for approximately 10 minutes the screen saver will automatically kick in. When in screen saver mode any button press will restart the menu.

The screen save does not start when in the setup or game enabled menu.

BUTTON TIMER

1/2/4 Number of seconds that holding down 1P & 2P start buttons together will reset the board and jump back to the game main menu IF the menu is set in “BOOT TO”.
OFF Disable the option to jump to then main menu when holding 1P & 2P start buttons.

VGA SCAN LINES

Adds blank lines in the display to simulate a standard resolution monitor. This option is only available in VGA mode.

ON Blanks every other video line
OFF All video lines are displayed

Note: in standard resolution mode this option has no effect

COLOR RGB DRIVE

Controls Red, Green, Blue color output drive levels. This option makes all colors brighter or darker depending on the setting.

This setting will normally be set to **HIGH** with an original monitor or **LOW** with a VGA display.

LOW Low RGB level video outputs (approximately 75% of high setting)
HIGH High level RGB video output

START BUTTON MODE

ON PRESS The player start button are passed directly to the game as soon as they are pressed.

ON RELEASE The player start buttons are passed to the game for ½ a second AFTER the start button is released.

This option can be used to stop a game from starting when holding 1P & 2P start to return to the main menu.

AUTOCOIN FREEPLAY

Simulates the adding of coins when the player 1 or player 2 start buttons are pressed allowing a game to start without having to add credits.

ON Pressing the 1 player start button automatically adds 1 credit and then sets the start button to pressed. The 2 player button will add 2 credits and set the 2 player start button to pressed.

OFF No action

Note:
Selecting this option will reset the coins/credit options for ALL games to 1 coin/1 credit.

SPEECH CLICK

ON Adds an audible ‘click’ to the start of speech effects to mimic the stock speech board.
OFF No click at the start of speech.

SIMULATE LED

ON When the game code would turn on the LED during self test, the screen display turns RED.
OFF No action.

MENU NAMES

Allows for the alternate ordering of the games and the names displayed in the main menu, also the names used in the setup screen.

STANDARD Menu names are shown as

- Berzerk
- Berzerk SB
- Frenzy

RC NAMES Uses the ‘Release Candidate’ RC names for the games in the order,

- Berzerk (RC28)
  with ‘slow bullet’ under the title logo
- Berzerk (RC31)
  with ‘fast bullet’ under the title logo
- Frenzy

MENU ZERO CREDITS

When enabled any credits in the any of the games are set to zero when the board returns to the main menu.
This also includes when the board is powered off.

ON Returning to the menu will set all games credits to zero.
OFF No action.

BERZERK DIPS / BERZERK RC31 DIPS

Allows for the setting of the game options for Berzerk (fast bullets) version.

Additionally enables “TRAINER” mode for the game.

BERZERK SB DIPS / BERZERK RC28 DIPS

Allows for the setting of the game options for Berzerk (slow bullets) version.

Additionally enables “TRAINER” mode for the game.

FRENZY DIPS

Allows for the setting of the game options for Berzerk (slow bullets) version.

Additionally enables “TRAINER” mode for the game.

SWITCH TEST

Allows testing of the JAMMA control inputs for both cocktail and upright inputs.

COLOR TEST

Displays color bars on screen, and allows for cycling through Red, Green, Blue and all combinations.
This screen can display a crosshatch for monitor convergence.

In the color test mode the following buttons can be used:

Player 1 Start Cycle though each color combination and display color bars

Player 1 Fire Displays the convergence screen (press fire button to exit screen)

Player 2 Start End the test

Trainer Mode

Under the “DIPS” section for each game there is an option for “TRAINER SCORE” for each Berzerk version and “TRAINER LEVEL” for Frenzy. Both trainer modes give the player unlimited lives.

Berzerk – “TRAINER SCORE”

This sets the starting score for the game and the difficulty level, it also enables the infinite lives feature and allows for practice at more difficult levels of play.

The high-scores table in trainer mode is saved to a different area of memory so that the scores on the standard “non-trainer” game are not affected.

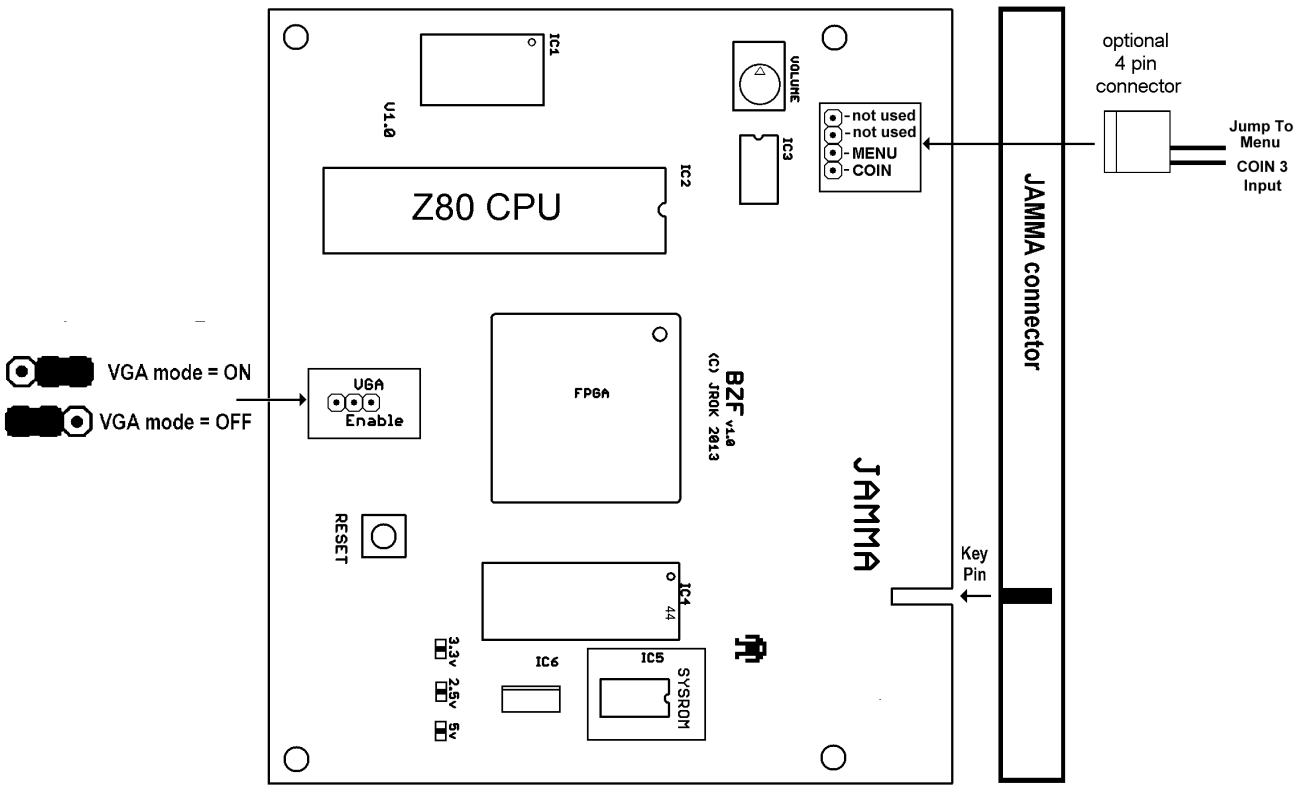
Frenzy – “TRAINER LEVEL”

This sets the starting level for the game and the difficulty, it also enables the infinite lives feature and allows for practice at more difficult levels of play.

The high-scores table in trainer mode is saved to a different area of memory so that the scores on the standard “non-trainer” game are not affected.

Board Layout & Additional Button Header

A four pin headers is provided on the board for Coin input 3 & Jump to Menu Button.
The remaining two pins are unused and should remain unconnected.



NOTE: Ensure the VGA enable is OFF when used in a standard resolution monitor !

WARNING

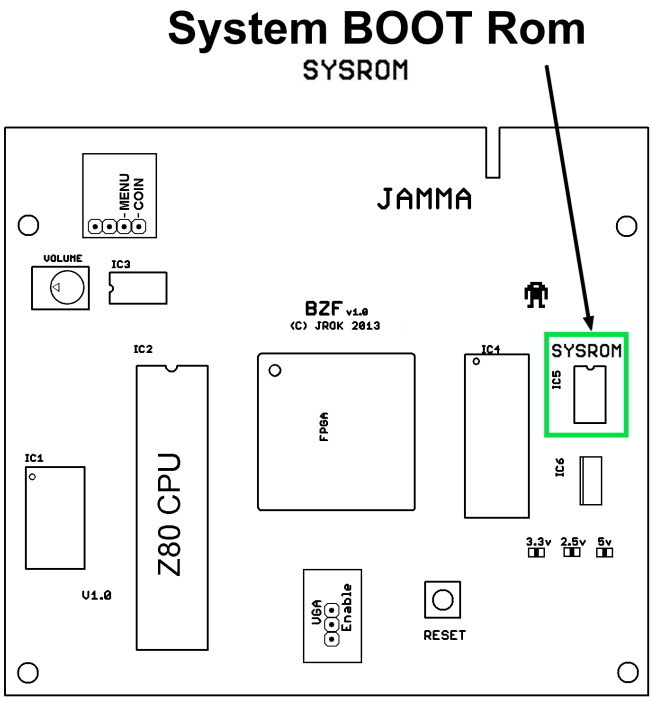
Plugging in an un-keyed JAMMA adapter the wrong way around could damage or DESTROY the board !

SYSROM Boot Memory

The system boot memory is a 1Meg x 8 SPI serial Flash memory, part number Winbond W25X80VDAIZ.

It is socketed and can be removed then reflashed, using an appropriate programmer, with upgraded firmware if needed.

For the system to boot and display a picture the SYSROM **must** be installed.



Memory Map

For customizing, the code can be re-flashed with modified ROMs to change the games. The area of Flash memory is specific to game.

The FPGA code and boot menu areas should not be modified.

Address (HEX)	Function
00000 – 1FFFF	FPGA firmware
20000 – 23FFF	Boot Menu
24000 – 25000	speech ROMs
30000 – 32FFF	Berzerk (RC31) fast bullet ROM area
33000 – 36000	Berzerk (RC28) slow bullet ROM area
36000 – 3AFFF	Frenzy ROM area

Revision History

FPGA Revisions

0.xx BETA release
1.00 Initial Release

BOOT ROM Revisions

0.xx BETA release
1.00 Initial Release
1.01 Berzerk RC31 trainer mode bugfix
1.02 Clear coins/credit to return to menu option added

JAMMA Wiring Examples

The following guide is for using a wiring harness for an original cabinet or cocktail table.
It is not required when using a standard JAMMA harness wired cabinet.

This example wiring is based on the final connectors being to the PS-1000 and RCR-1000 boards.

Connector Types & Part Numbers

Connector types are all Molex KK 0.156" (3.96mm) part numbers are for Molex connectors.

Connectors for all cabinet styles

PS-1000, J4 15 pin = 09-50-7151 (alternate 09-50-3151)

RCR-1000, J1, 10 pin = 09-50-7101 (alternate 09-50-3101)
RCR-1000, J3, 12 pin = 09-50-7121 (alternate 09-50-3121)
RCR-1000, J4, 10 pin = 09-50-7101 (alternate 09-50-3101)

Keying pin = 15-04-0219

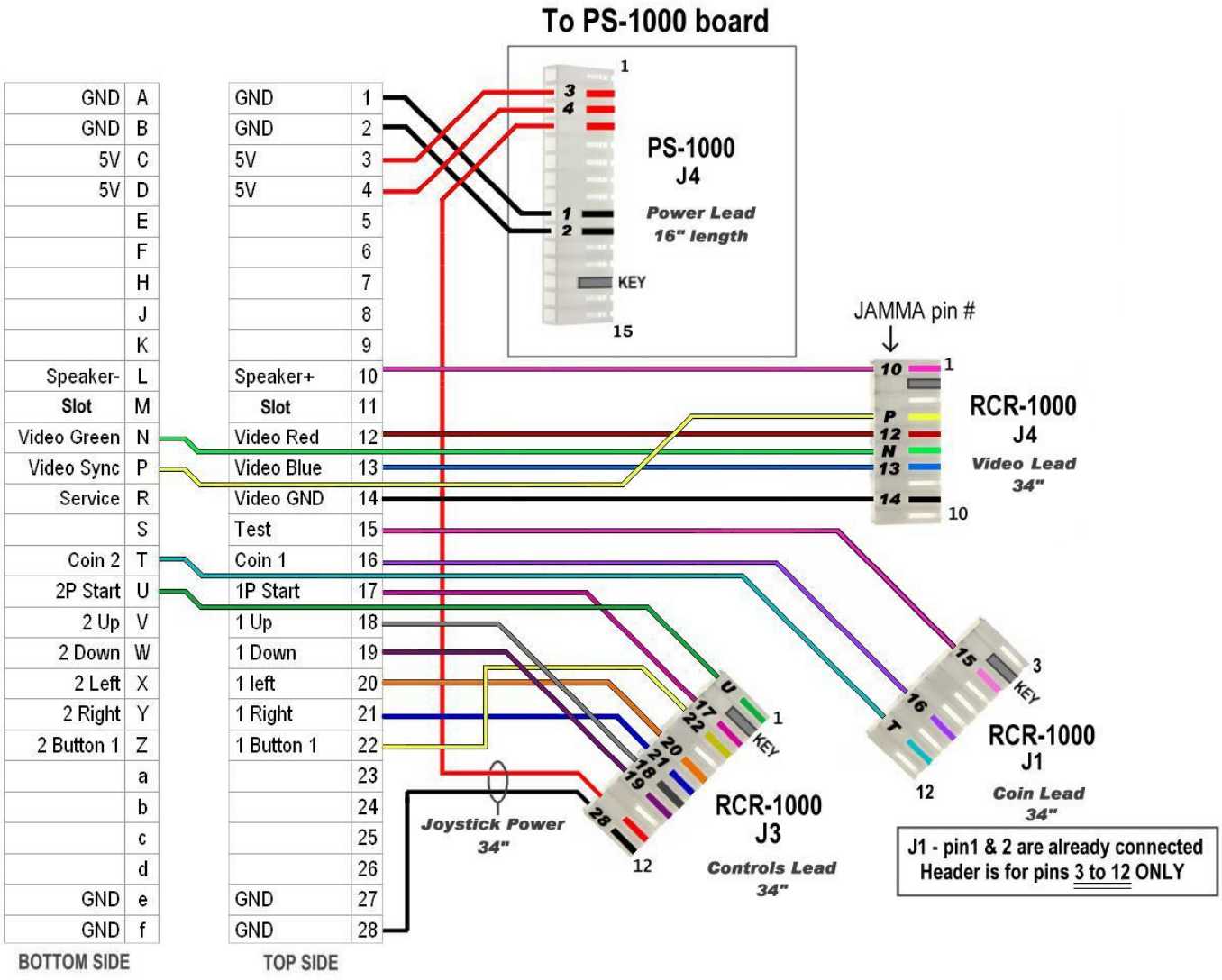
Crimp Pins = 08-50-0189 (20 to 18 AWG wire) trifurcon pins recommended for power & ground connections
08-03-0304 (24 to18 AWG) for all other connectors

Additional connectors for Cocktail

RCR-1000, J2, 10 pin = 09-50-7101 (alternate 09-50-3101)

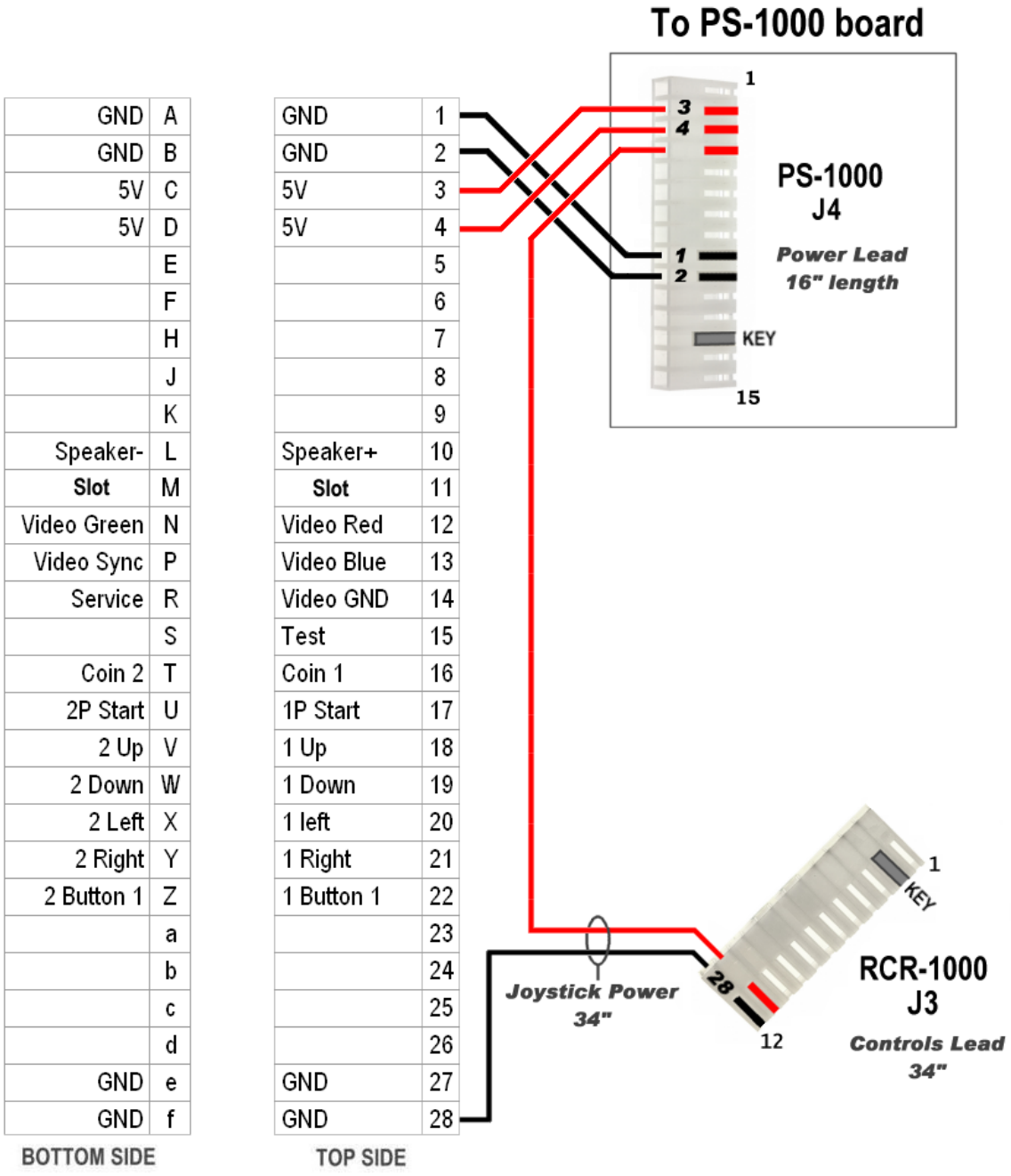
Wiring Complete Diagram

The individual connectors on this diagram are each detailed separately.



Power Connector Wiring

Standard upright cabinet



GND	A	GND	1
GND	B	GND	2
5V	C	5V	3
5V	D	5V	4
	E		5
	F		6
	H		7
	J		8
	K		9
Speaker-	L	Speaker+	10
Slot	M	**Slot**	11
Video Green	N	Video Red	12
Video Sync	P	Video Blue	13
Service	R	Video GND	14
	S	Test	15
Coin 2	T	Coin 1	16
2P Start	U	1P Start	17
2 Up	V	1 Up	18
2 Down	W	1 Down	19
2 Left	X	1 left	20
2 Right	Y	1 Right	21
2 Button 1	Z	1 Button 1	22
	a		23
	b		24
	c		25
	d		26
GND	e	GND	27
GND	f	GND	28
BOTTOM SIDE		TOP SIDE	

Cocktail Table Power Connector Wiring

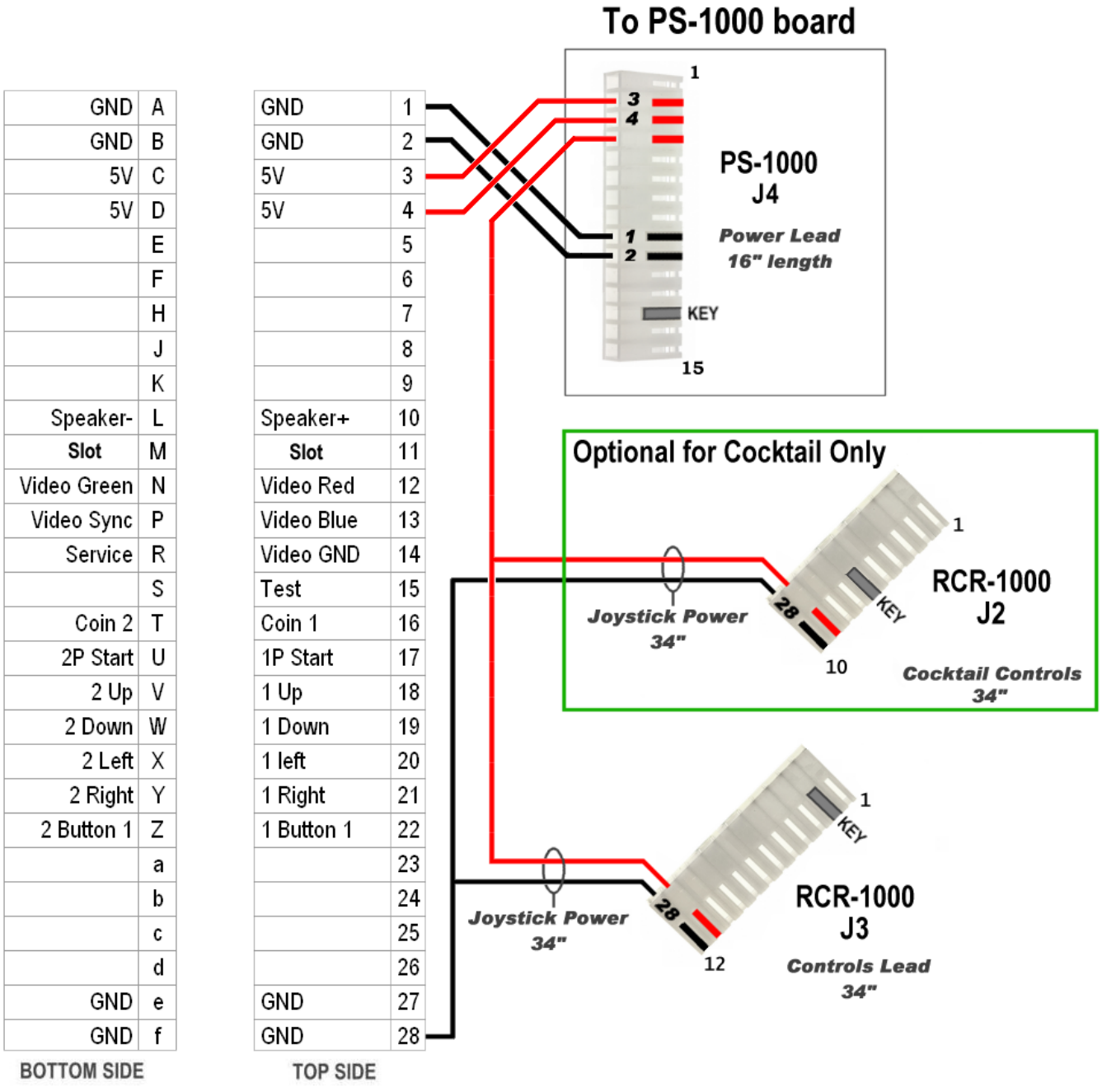
When wiring for a cocktail table harness an power needs to also be supplied to the RCR-1000 connector J2.

GND	A
GND	B
5V	C
5V	D
	E
	F
	H
	J
	K
Speaker-	L
Slot	M
Video Green	N
Video Sync	P
Service	R
	S
Coin 2	T
2P Start	U
2 Up	V
2 Down	W
2 Left	X
2 Right	Y
2 Button 1	Z
	a
	b
	c
	d
GND	e
GND	f

BOTTOM SIDE

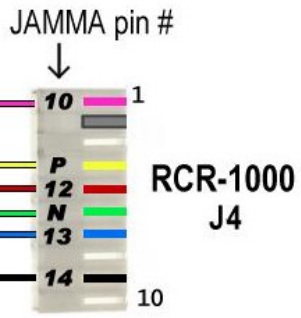
GND	1
GND	2
5V	3
5V	4
	5
	6
	7
	8
	9
Speaker+	10
Slot	11
Video Red	12
Video Blue	13
Video GND	14
Test	15
Coin 1	16
1P Start	17
1 Up	18
1 Down	19
1 left	20
1 Right	21
1 Button 1	22
	23
	24
	25
	26
GND	27
GND	28

TOP SIDE



Sound and Video

GND	A	GND	1	
GND	B	GND	2	
5V	C	5V	3	
5V	D	5V	4	
	E		5	
	F		6	
	H		7	
	J		8	
	K		9	
Speaker-	L	Speaker+	10	
Slot	M	**Slot**	11	
Video Green	N	Video Red	12	
Video Sync	P	Video Blue	13	
Service	R	Video GND	14	
	S	Test	15	
Coin 2	T	Coin 1	16	
2P Start	U	1P Start	17	
2 Up	V	1 Up	18	
2 Down	W	1 Down	19	
2 Left	X	1 left	20	
2 Right	Y	1 Right	21	
2 Button 1	Z	1 Button 1	22	
	a		23	
	b		24	
	c		25	
	d		26	
GND	e	GND	27	
GND	f	GND	28	
BOTTOM SIDE		TOP SIDE		



Coin and Test

GND	A	GND	1
GND	B	GND	2
5V	C	5V	3
5V	D	5V	4
	E		5
	F		6
	H		7
	J		8
	K		9
Speaker-	L	Speaker+	10
Slot	M	**Slot**	11
Video Green	N	Video Red	12
Video Sync	P	Video Blue	13
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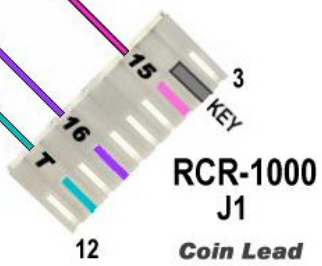
2 Up	V	1 Up	18
2 Down	W	1 Down	19
2 Left	X	1 left	20
2 Right	Y	1 Right	21
2 Button 1	Z	1 Button 1	22
	a		23
	b		24
	c		25
	d		26
GND	e	GND	27
GND	f	GND	28
BOTTOM SIDE		TOP SIDE	

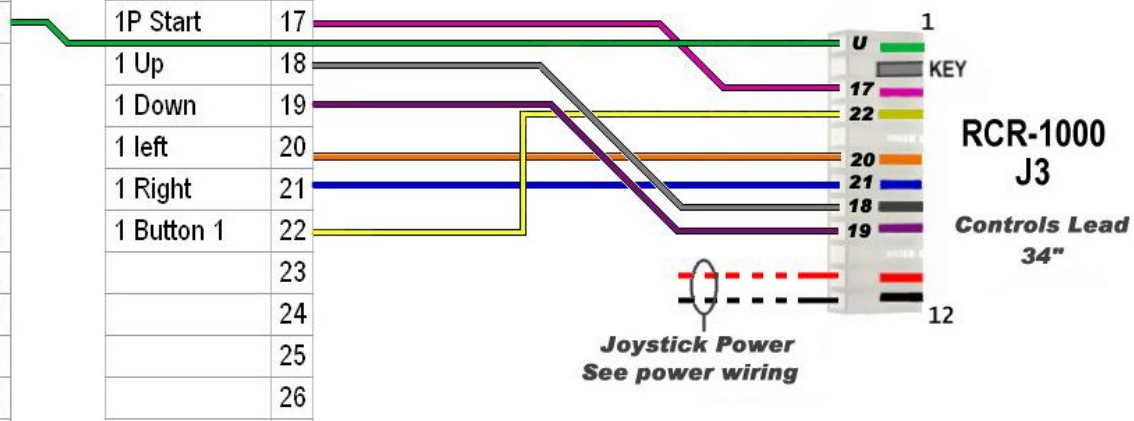


J1 - pin1 & 2 are already connected
Header is for pins 3 to 12 ONLY

NOTE: The first two pins of J1 on the RCR-1000 board will already be populated with a connector. The connector shown above will plug into pin 3 through 12 of RCR-1000 J1 **ONLY**

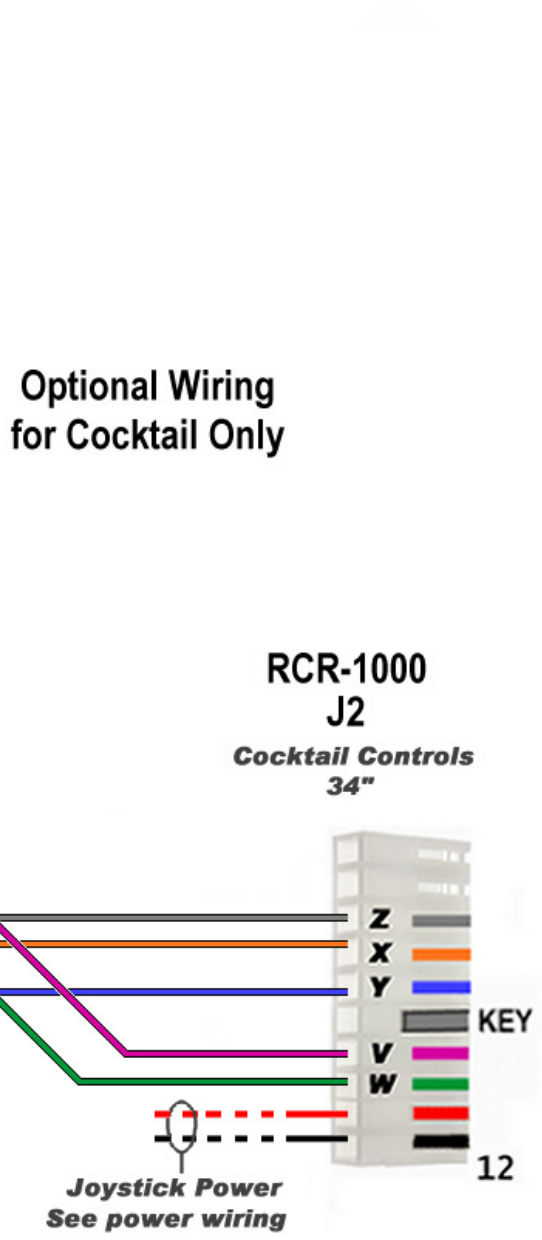
Controls (upright cabinet)

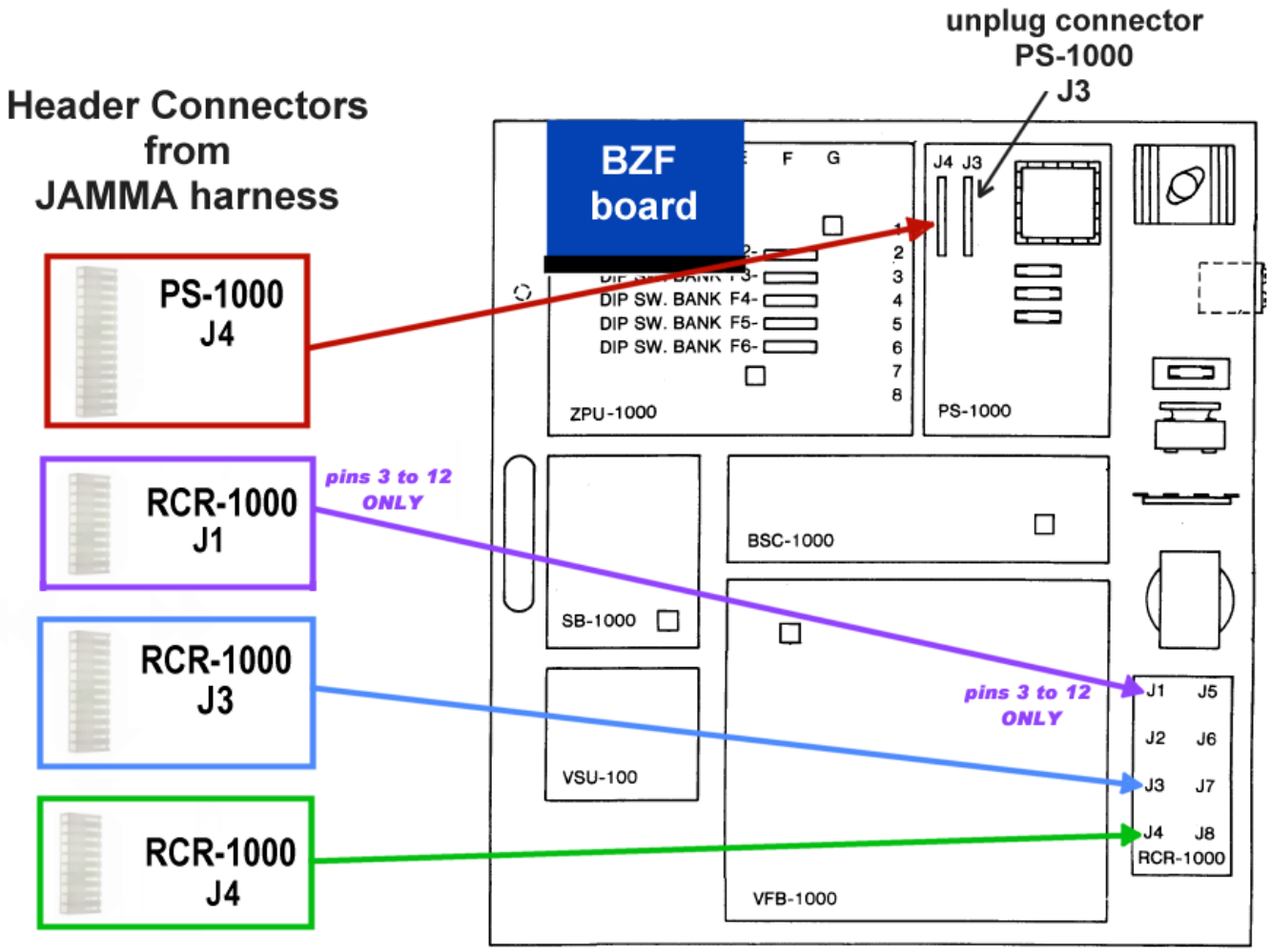
GND	A		GND	1
GND	B		GND	2
5V	C		5V	3
5V	D		5V	4
	E			5
	F			6
	H			7
	J			8
	K			9
Speaker-	L		Speaker+	10
Slot	M		**Slot**	11
Video Green	N		Video Red	12
Video Sync	P		Video Blue	13
Service	R		Video GND	14
	S		Test	15
Coin 2	T		Coin 1	16
2P Start	U		1P Start	17
2 Up	V		1 Up	18
2 Down	W		1 Down	19
2 Left	X		1 left	20
2 Right	Y		1 Right	21
2 Button 1	Z		1 Button 1	22
	a			23
	b			24
	c			25
	d			26
GND	e		GND	27
GND	f		GND	28
BOTTOM SIDE			TOP SIDE	



Controls (Cocktail Table)

GND	A	GND	1
GND	B	GND	2
5V	C	5V	3
5V	D	5V	4
	E		5
	F		6
	H		7
	J		8
	K		9
Speaker-	L	Speaker+	10
Slot	M	**Slot**	11
Video Green	N	Video Red	12
Video Sync	P	Video Blue	13
Service	R	Video GND	14
	S	Test	15
Coin 2	T	Coin 1	16
2P Start	U	1P Start	17
2 Up	V	1 Up	18
2 Down	W	1 Down	19
2 Left	X	1 left	20
2 Right	Y	1 Right	21
2 Button 1	Z	1 Button 1	22
	a		23
	b		24
	c		25
	d		26
GND	e	GND	27
GND	f	GND	28
BOTTOM SIDE		TOP SIDE	



Connection to RCR-1000 & PS-1000 Boards

The optional mounting of the BZF board is shown on the top left.