ARCADE GAME

FROG SONG®

OWNER'S MANUAL

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate 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.

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W A R N I N G :

ALL OF BOB'S SPACE RACERS® GAMES ARE SHIPPED WITH THE SAME KEY AND LOCK SETS.

IT IS IN YOUR BEST INTEREST TO CHANGE THE KEYS AND LOCKS ON YOUR GAMES WHEN YOU RECEIVE THEM.

SERVICE POLICY

At BOB'S SPACE RACERS®, INC., our strength lies in the high quality, long lasting equipment we manufacture.

Should the need arise, we maintain both Technical Support and Customer Service staff.

Technical Support is available whenever you should need it. The direct technical 'hot line' is (386) 677-0761. This line is manned 8:30am - 5:00pm, EST, Monday through Friday, excluding holidays. During all other times an operator will be available to relay your problem to the technician on call. Technical Support will assist you in troubleshooting a service problem or setting equipment options.

Customer Service telephone lines are manned 8:30am - 5:00pm, EST, Monday through Friday, excluding holidays. Customer Service staff can be reached at (386) 677-0761 they will also take parts orders and research the status of previous orders.

As always, you can call (386) 677-0761 to reach all other departments, or you can FAX anyone at BOB'S SPACE RACERS® by calling (386) 677-0794, 24 hours a day. You can, also, e-mail us at tech@bobsspaceracers.com, 24 hours a day.

BOB'S SPACE RACERS®, INC.'S
ONE-YEAR NEW EQUIPMENT WARRANTY

1. INCLUDED IN THIS WARRANTY Bob's Space Racers®, Inc. warrants to the original purchaser only that the equipment that is the subject of this sale conforms to its specifications, and is free from defects under normal service for a one-year period from the original date of delivery. This warranty does not include any damages resulting from occurrences listed in Paragraph 2 below. This Warranty is not transferable under any circumstance. Any claims under this warranty must be received in writing by Bob's Space Racers®, Inc. within 13 months from the date of delivery. Within a reasonable time of such written notification Bob's Space Racers®, Inc. will replace or repair any defective component of the equipment or part thereof which fails for reasons other than normal services, use, or wear. Light bulbs are specifically excluded from this warranty and shall be the sole responsibility of the purchaser. Bob's Space Racers®, Inc., within its sole discretion, makes the final determination as to whether to repair or replace any component and whether any such repair or replacement shall be performed where the equipment is located or at its home facility in Volusia County, Florida, or another facility of its sole choice. Any and all freight charges for the purposes of repair or replacement shall be paid by the original purchaser. All defective parts shall be returned to Bob's Space Racers®, Inc. if requested. Bob's Space Racers®, Inc. does not warrant that the equipment will meet any original purchaser's specific requirements or that the operation of the equipment will be uninterrupted. These remedies are the original purchaser's exclusive remedies for breach of warranty.

2. EXCLUDED BY THIS WARRANTY. Bob's Space Racers®, Inc. does not warrant (a) any product, components or parts not manufactured by Bob's Space Racers®, Inc.; (b) damage caused by use of the equipment for purposes other than those for which it was designed; (c) defects caused by failure to provide a suitable installation environment for the equipment; (d) damage caused by unauthorized attachments, modification, or service; (e) damage caused by normal wear and tear or improper power supply; (f) damage caused by accident or disaster such as fire, flood, lighting and wind; (g) any other abuse or misuse of the equipment.

3. EXCLUSIVE WARRANTY. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OR REMEDIES, WHETHER WRITTEN, ORAL OR IMPLIED. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, COURSE OF DEALING OR USAGE OF TRADE ARE HEREBY EXPRESSLY DISCLAIMED AND EXCLUDED.

BOB'S SPACE RACERS®, INC.'S
ONE-YEAR NEW EQUIPMENT WARRANTY

4. REMEDIES LIMITED. UNDER NO CIRCUMSTANCES, EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, SHALL BOB'S SPACE RACERS®, INC. BE LIABLE FOR ANY LOSS OR DAMAGE, DIRECT OR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL ARISING OUT OF THE USE OR INABILITY TO USE THIS EQUIPMENT INCLUDING BUT NOT LIMITED TO ANY CLAIM FOR LOSS OR PROFITS, LOSS OF SAVINGS OR REVENUE, LOSS OF USE OF THE EQUIPMENT, OR ANY ASSOCIATED EQUIPMENT, FACILITIES OR SERVICE, DOWNTIME, THE CLAIMS OR COST(S) OF THIRD PARTIES INCLUDING CUSTOMERS, AND INJURY TO PROPERTY. Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

5. NO OTHER WARRANTIES. Unless modified in writing and signed by both parties, this agreement is understood to be the complete and exclusive agreement between the parties, superseding all prior agreements, oral or written, and all other communications between the parties relating to the subject matter of this agreement. No employee or representative of Bob's Space Racers®, Inc. or any other party is authorized to make any other warranty or to assume any other liability in connection with the sale of its equipment.

6. TIME LIMIT FOR CLAIMS. Any claim for breach of warranty or claims under this warranty must be received in writing by Bob's Space Racers®, Inc. within 13 months following delivery of the equipment.

7. FUTURE CHANGES. Bob's Space Racers®, Inc. reserves the right to reserve, change or modify the construction and design of its equipment or any component part or parts thereof without incurring the obligations to make such changes or modifications in present equipment.

8. ALLOCATION OF RISKS. This agreement allocates the risks of equipment failure between Bob's Space Racers®, Inc. and the original purchaser. This allocation is recognized by both parties and is reflected in the price of the goods. THE PURCHASER ACKNOWLEDGES THAT IT HAS READ THIS AGREEMENT, UNDERSTANDS IT, AND IS BOUND BY ITS TERMS.

9. TO OBTAIN WARRANTY SERVICE. The original purchaser must, at his own expense, bring or ship the equipment to an authorized location for service. Additionally, the original purchaser must pay all freight, shipping or transportation charges for the return of the equipment from Bob's Space Racers®, Inc. to the original purchaser. Telephone or write:

Bob's Space Racers®, Inc.
427 15th Street
Daytona Beach, Florida 32117
Telephone number 386-677-0761
FAX 386-677-0794

ADVANCED REPLACEMENT POLICY

After speaking with our Technical Department it may be necessary for Bob's Space Racers®, Inc. to ship an assembly item or part to repair your game. We will ship the item(s) according to your preference via United Parcel Service, Federal Express, US Postal Service, etceteras. Note: we will not ship anything to P.O. Boxes via the US Postal Service. You will be billed, per your account status, for the total cost of the shipment (which includes shipping charges).

Upon shipment of the new item(s) a Return Merchandise Authorization Number (RMA #) will be issued for you to use when returning the defective item(s) to Bob's Space Racers®, Inc., or you may use the order number. After the defective item(s) is received by Bob's Space Racers®, Inc. your account will be issued either a:

1. Warranty credit: if your game is under warranty. (See the Warranty Policy page.) Note: this credit does not include return shipping charges.

OR

2. Credit for the item(s). Note: this credit does not include return shipping charges, nor does it include the repair charges for the item(s).

If the item(s) cannot be repaired to the point where it could be shipped to another customer as an Advanced Replacement item (i.e. cosmetic damage), we will ship your original item(s) back to you. You will be required to return the Advanced Replacement item(s) or pay for it. You will be responsible for all shipping charges, should you decide to not keep, and pay for, the Advanced Replacement item(s).

ADVANCED REPLACEMENT ITEM(S) SHIPPING RULES

When you request an Advanced Replacement item from us, we have a few rules for you to follow:

1. **DO NOT** try to repair the defective item(s) on your own; **DO NOT** disassemble the defective item(s) prior to returning it to Bob's Space Racers®, Inc. – this could cause further damage and the possibility of you not receiving any credit at all on the item(s). There are not any user serviceable parts inside, and our vendors may void their warranty on disassembled parts. (Please review the last paragraph of the Advanced Replacement Policy.)
2. Wait for the Advanced Replacement item(s) to arrive prior to returning the defective item(s).
3. When the new item(s) arrive, verify that it is the correct part. If it is not, please note what the differences are and contact Bob's Space Racers®, Inc.
4. Return the defective item(s) in the exact same packaging the Advanced Replacement item(s) came in. This insures no more damage will be done to the item(s) during the return shipping.

Thank you for your cooperation.

OWNER'S MANUAL

CONGRATULATIONS!

Congratulations on your purchase of a Bob's Space Racers® Game! Bob's Space Racers® continues to lead the amusement industry in the manufacturing and the operation of amusement games and has operated these games at several of North America's largest expositions for the last 30 plus years. Some of these expositions include: <u>The Canadian National Exhibition</u>, Toronto, Ontario, Canada; <u>The Calgary Stampede</u>, Calgary, Alberta, Canada; <u>The Minnesota State Fair</u>, St. Paul, Minnesota, USA; <u>The Ohio State Fair</u>, Columbus, Ohio, USA; <u>The Big E</u>, Springfield, Massachusetts, USA; <u>The South Carolina State Fair</u>, Columbia, South Carolina, USA; and, <u>The Dade County Youth Fair</u>, Miami, Florida, USA. This experience has allowed us the opportunity to field test each piece of equipment that we manufacture, and helps us to stay in tune with the amusement industry with its ever-changing trends.

What you are about to read may appear a little overwhelming at first, but it will help you reach the high profits you seek. Keep in mind we are offering this only as a guide for you to get started. These tips have proved time and again to work successfully in our own operations over the last thirty years.

MANUAL INTRODUCTION

This owner's manual is divided into several sections beginning with Operator's Guide, Introduction and Set-up, and so on. We have provided direction on every aspect of the game from running and maintaining it to pertinent technical information and troubleshooting problems. We, also, cover coin mechanisms, ticket dispersion, and prize redemption in the appendix section.

Each section has troubleshooting guides that contain enough information so that the game can be repaired with little difficulty. If this information is not sufficient, a call to Bob's Space Racers will provide additional assistance. Between the manual and the personal assistance, downtime of your game will be minimal. (When you call, we assume that you have read this manual and have tried the suggested repairs).

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Revised February 2006

INSTALLATION
AND SET-UP

INSTALLATION

1. Choose a suitable indoor location for the game and set it in place.
2. Make certain there is adequate power for the game according to the Power Requirement Label(s) on the back of the game.
3. Remove all of the spare parts that were shipped with the game, from inside the back door <u>before</u> the game is plugged in. After this is done, no one other than a qualified service technician should have access to the game inside the back door.
4. There are (5) five balls that come with the game. Only <u>three</u> balls should be used at a time. The other two balls are spares and should not be used.

OBJECT OF THE GAME

A player tries to shoot the balls into the frog's mouth before it closes. Each time the ball goes through the mouth it is counted (scored). The number scored determines the number of ticket(s).
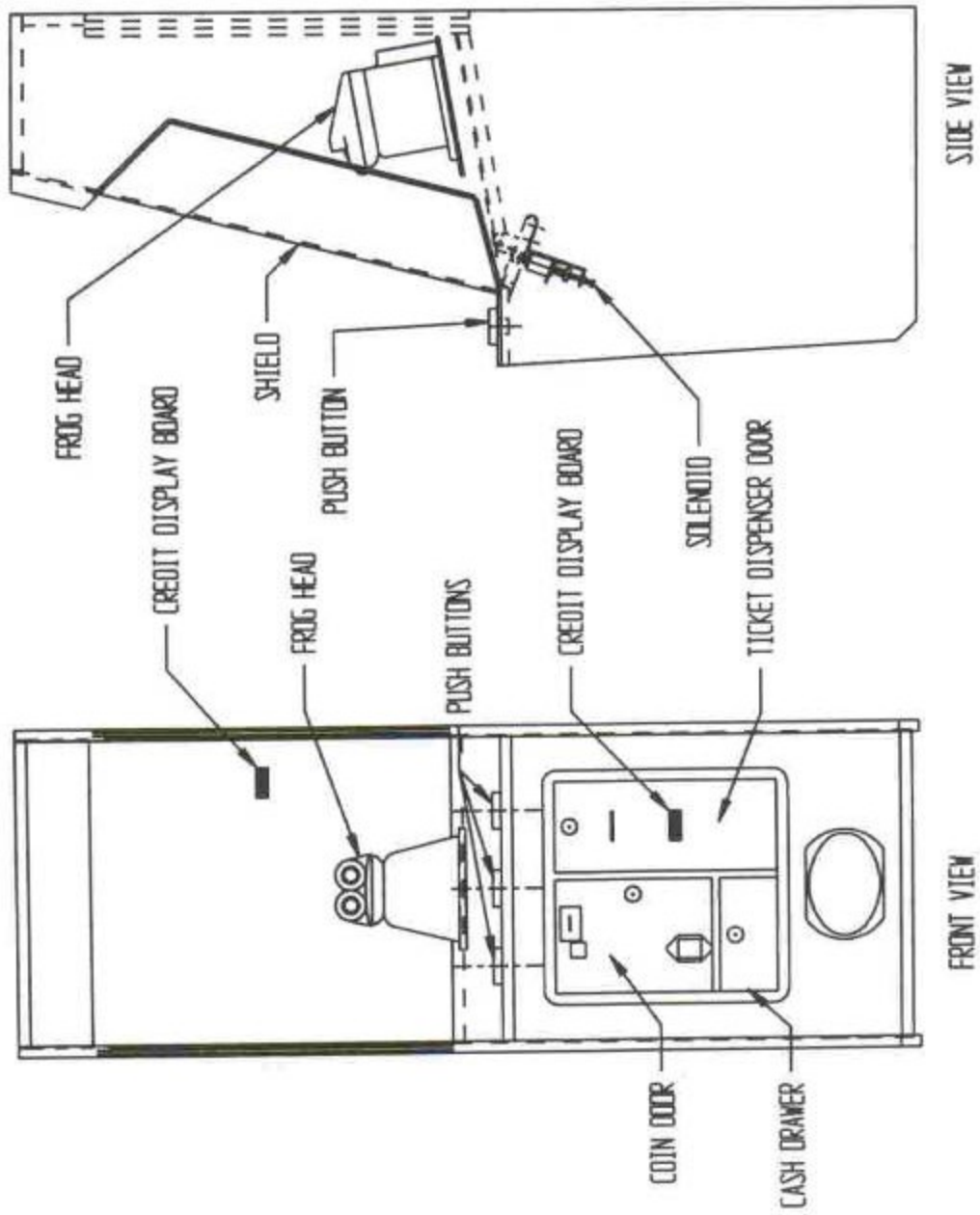
ELECTRICAL REQUIREMENTS
Single Unit

Voltage (V)	Hertz (Hz)	Amps
100-125	60	0.7 (start up)
		1.5 (operating)
		1.7 (maximum operating)

SEQUENCE OF PLAY

1. Insert coin(s) required for a credit.
2. At this point, the sound will start, the push button switches will light and the frog's mouth will open and close. Also, the timer display board will start at 20 seconds (selectable) and start counting down.
3. The player pushes the lighted switches when the frog's mouth is open, which will propel the balls into the frog's mouth.
4. When the player shoots a ball into the frog's mouth, a new score sound will play.
5. The number of balls shot into the frog's mouth is counted via a micro switch and displayed on the far right two digits of the timer display board, on the background. The left two digits are for time remaining.
6. At the end of the game, a winning score sound will play and tickets will be dispensed

COMPLETE ASSEMBLY DIAGRAM

FROG HEAD

CREDIT DISPLAY BOARD

SHIELD

PUSH BUTTON

CREDIT DISPLAY BOARD

SOLENOID

TICKET DISPENSER DOOR

SIDE VIEW

FROG HEAD

PUSH BUTTONS

FRONT VIEW

COIN DOOR

CASH DRAWER

HEAD ASSEMBLY

The operation of the frog's head is fairly simple. The frog motor is supplied with power which then starts turning the motor shaft. Attached to the motor shaft is an eccentric with a push rod connected to it – to raise and lower the frog's head. Below the eccentric is a dynamic breaking switch. This switch is used to engage the dynamic breaking at the top of the push rod's travel, when the switch is open the ball is fired into the frog's mouth, which is funneled past a count switch which counts each ball, and the count is displayed on the right (2) two digits of the timer display board. The ball then falls through to the play field and can be used again.

HEAD DIAGRAM
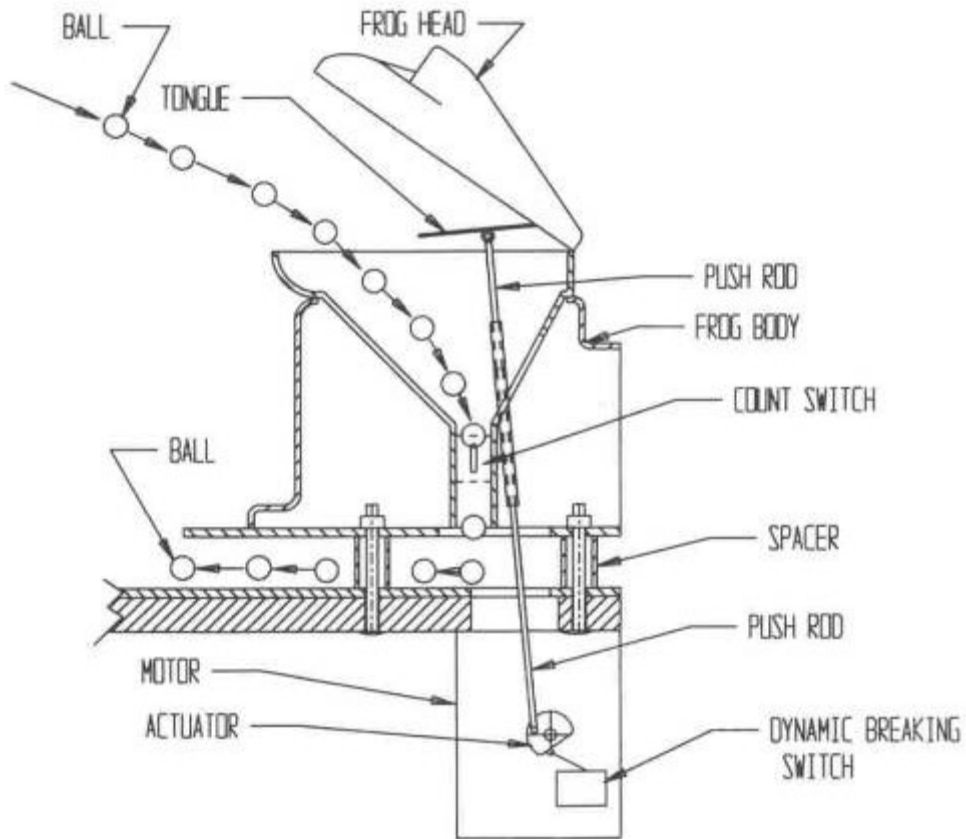
OPERATION

SETTING THE OPTION REGISTERS
FRONT PANEL BOARDS

In order to set the Option Registers, first locate the Front Panel Board and Credit Display. The Front Panel Board (also called the Register Select Board) is located inside the game, behind the Coin Door, and on top of the Coin Box. The Credit Display is on the Ticket Dispenser door and is part of the Coin/Ticket Box. They will be used in conjunction with one another to set the Registers. Turn the game power **ON**.

The two digits to the left on the Credit Display represent the number of coins required to play the game; the two digits to the right on the Credit Display represent the number of credits. To set the Registers and enter the desired Options, locate the four white pushbuttons on the Front Panel Board labeled **"MODE"**, **"UP"**, **"DOWN"**, and **"ENTER"** (see diagram below). To enter the Options, press the two buttons on the right (**"DOWN"** and **"ENTER"**) simultaneously. On the Credit Display, the first two digits indicate the Register you are in; the two digits on the right show the value in that Register. The system is now ready to accept changes in the Options. The value can be set from 00 to 255. If there is a decimal point after the last digit, this means there is a value of 100 plus that value; if there is a decimal point after the third and fourth digit, it means there is a value of 200 plus that value. Once the system has reached the 255 value, the counter will default back to 00.

MODE	**UP**	**DOWN**	**ENTER**
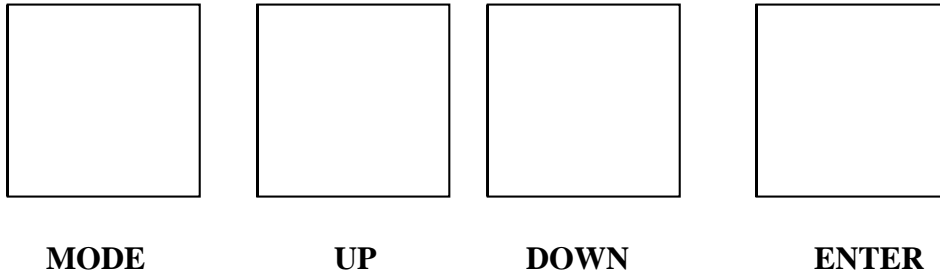
The **"MODE"** button sequences through each Register displaying the value in that Option Register. The **"UP"** and **"DOWN"** buttons increase or decrease the value of the current register. The change is <u>NOT</u> made permanent until the "**ENTER**" button is pressed. Doing this also advances to the next Register. Pressing the "**MODE**" button before pressing "**ENTER**" leaves the register unchanged. Once all changes have been made, press the **"MODE"** and **"UP"** buttons simultaneously. This will cause the Credit Display to return to its normal operation.

> **NOTE: The registers <u>cannot</u> be accessed when game is being played, has credits or is loading balls into the Shooter Mech.**

FROG SONG ARCADE GAME
2300 BOARDS; FS 2303

Reg#	BSR	Actual	Description
01	1	_____	Coins Per Game
02	4	_____	Coins for Bonus 1
03	20	_____	Coins for Bonus 2
04	0	_____	Value of Bonus 1 in Extra Coins
05	0	_____	Value of Bonus 2 in Extra Coins
06	1	_____	Number of Plays Per Game
07	1	_____	Number of Free Tickets Every Game
08	0	_____	Minimum Number of Tickets Per Game
09	99	_____	Maximum Number of Tickets Per Game
10	2	_____	Number of Tickets given per ball scored
11	15	_____	Bell Time in 0.1 Seconds
12	30	_____	Beacon Time in 0.1 Seconds
13	10	_____	Game Delay Time in 0.1 Seconds
14	0	_____	Time Between Bally Messages
15	35	_____	Game Time in Seconds
16	1	_____	Time Between Game Start and Theme Song
17	30	_____	Time from Theme to Play
18	70	_____	Solenoid Fire Delay
19	5	_____	Solenoid on Time
20	10	_____	Target Debounce Time
21-31	0	_____	Reserved For Future Use
32	68	_____	Bally ON
33	64	_____	Bally OFF
34	64	_____	Start ON
35	64	_____	Start OFF
36	132	_____	Theme ON
37	00	_____	Theme OFF
38	64	_____	System Parameter: Do Not Change
39	64	_____	System Parameter: Do Not Change
40	64	_____	System Parameter: Do Not Change
41	64	_____	System Parameter: Do Not Change
42	40	_____	High Score Sound
43	32	_____	System Parameter: Do Not Change
44	37	_____	Game Over Sound
45	32	_____	System Parameter: Do Not Change
46	226	_____	Ticket Sound ON
47	96	_____	Ticket Sound OFF
48	39	_____	Shoot Sound
49	32	_____	System Parameter: Do Not Change
50	74	_____	Hit Sound # 1
51	76	_____	Hit Sound # 2
52	75	_____	Hit Sound # 3
53	77	_____	Hit Sound # 4
54	73	_____	Open Mouth Sound # 1

FROG SONG ARCADE GAME
2300 BOARDS; FS 2303

55	70	_____	Open Mouth Sound # 2
56	73	_____	Open Mouth Sound # 3
57	70	_____	Open Mouth Sound # 4
58-63	64	_____	System Parameter: Do Not Change
00	0	_____	Game Type: Frog Song

NOTE: The Registers <u>cannot</u> be changed in the middle of a game.

NOTE: We recommend you write your settings in the "Actual" column for future reference. Your settings can be different depending on coins per game, number of tickets, etc.

A NOTE ON BONUS COINS:

To be compatible with multi-coin systems and dollar bill acceptors around, this game is equipped with bonus levels for additional coins. If you want customers to put in a dollars worth of coins (or a dollar bill) instead of just a 25 cent piece, set bonus level to 4 (4-25 cent coins = 1 dollar). Then set the bonus coins to a number greater than zero. If it was set on 1, then 4 coins would be the same as putting in 5 coins, one after each game. To get the bonus, all coins need to be put in <u>before a game is played.</u> Once a game is played, the bonus level starts from zero.

MAINTENANCE

GENERAL MAINTENANCE INFORMATION

Your pride is reflected by the cleanliness and flash. A good game with good flash will make money. The very best game, if not clean or properly flashed, will be easily passed by. Remember, no one can enjoy the game until they have played it. Proper maintenance is extremely important for good game operation and profitable stock averages.

Clean all laminated surfaces **daily** (see chart below).

TO CLEAN GAMES

You may use soapy water on Formica, Plexi-glass, regular glass, Stainless Steel, and other metals without causing any damage. The following list of cleaners can only be used on the materials they are listed with. If a cleaner is used on a material that it is not listed with it will cause damage to that material and Bob's Space Racers® will not be held responsible for repair and/or replacement of that damaged material.

Cleaner	**Material**
Lacquer Thinner	Formica; regular glass
Mineral Spirits	Formica; Plexi-glass; Stainless Steel; other metals
Clean-On-The-Go Glass	Formica; regular glass; Stainless Steel; other metals and Hard Surface Cleaner™
De-Solve-It®	Formica; Plexi-glass
Brillianize™	Plexi-glass; regular glass
Windex®	Regular glass
3812S Enamel Reducer	Plexi-glass
Soft Scrub®; CLR®;	Stainless Steel; other metals
Old English® Oil; Baby Oil	Formica; Stainless Steel; other metals

Daily
- Clean all Formica
- Check game for proper operation (win/lose and update score display correctly)
- Remove Plexi-glass cover and clean out trash and dirt, if necessary

Weekly
- Lemon oil Formica
- Check solenoid for correct firing angle, correct if necessary.

SOLENOID ADJUSTMENT

The solenoid position should not require adjustment once it is set and mounted on the game at Bob's Space Racers®. However, the firing of the solenoid may need adjustment periodically. Notice at the bottom of the solenoid bracket there is a white plastic screw/bolt with a nut and star lock washer attached. This screw adjusts the firing height of the ball. If the ball is firing way beyond the frog's mouth, the screw needs to be screwed into the bracket and the nut/washer assembly needs to be retightened against the solenoid bracket. If the ball isn't firing hard enough to reach the mouth of the frog, the screw needs to be backed off of the bracket assembly and retighten the nut/washer assembly. Also, notice the rubber pad between the bracket and solenoid shaft. This is a very important part of the assembly. It is used to cushion the firing pin from hitting metal to metal and eliminate the solenoid from becoming magnetized. This in turn causes the solenoid to stick. If this piece of rubber becomes torn or missing it is important that it be replaced. If you require further assistance, call us at (386) 677-0761 and ask to speak to a technician.

SOLENOID DIAGRAM
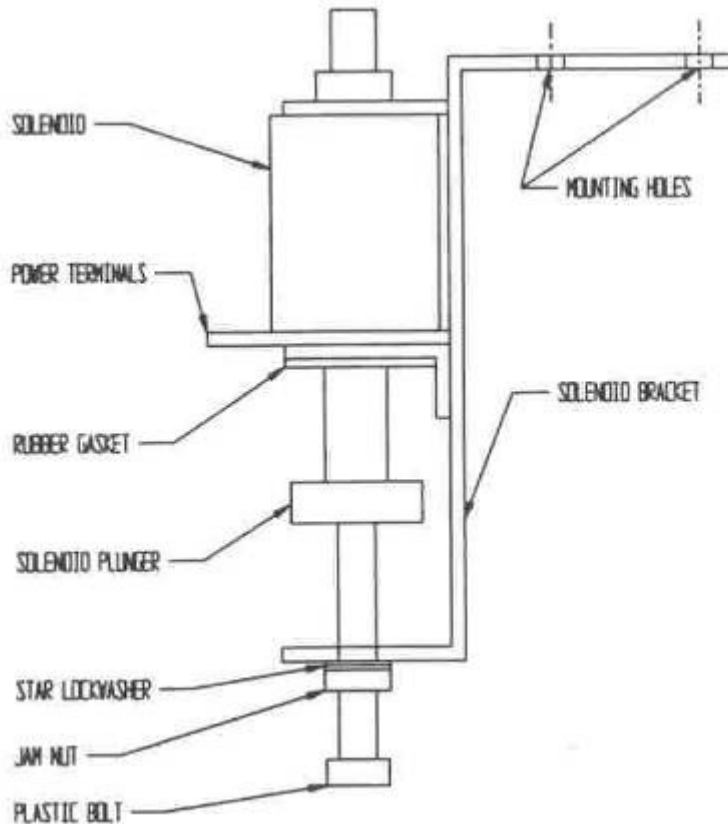
TECHNICAL DATA

2300 SERIES ELECTRONICS

2300 SERIES ELECTRONICS

We use our 2300 Series of Electronics for this game incorporating it's many features and capabilities. It is based on one main board and several peripheral circuit boards.

2300 MICROPROCESSOR BOARD OVERVIEW

The basic operation of the Processor Board is as follows.

The Inputs on this Board are on connector J9. The Inputs are ground seeking which means to check an input, simply ground the Inputs corresponding pins and the corresponding LED should light up, if good. These LED's are tied to Opto-couplers which convert the 12 volt circuit to TTL for the Board.

The output connectors, J10 through J13, are open collector to ground. If the LED is on, the output is working because they are tied directly to the output pin. DO NOT ever short a front and back row pin on the Output Connector together. If the Output was good, it isn't any more!

The 4-Pin Molex Connector supplies +12V (Pin 4) and Ground (Pins 2 & 3) to the Board.

The two, 10-Pin Connectors labeled Network In and Network Out are communication ports to other boards and displays.

There is a row of Serial Expansion Connectors that are used to communicate with Serial Devices, such as the Front Panel Board, Credit Display, etc. There is a total of five (5) connectors, only three (3) of these ports are being used at this point. The other two (2) ports are for future use.

There is an 18-position SIP Header connector. This is an 8-bit, clocked Parallel TTL Port. It is set up to be used for a Sound Board to plug 'piggyback' on top of this Board.

2300 MICROPROCESSOR BOARD
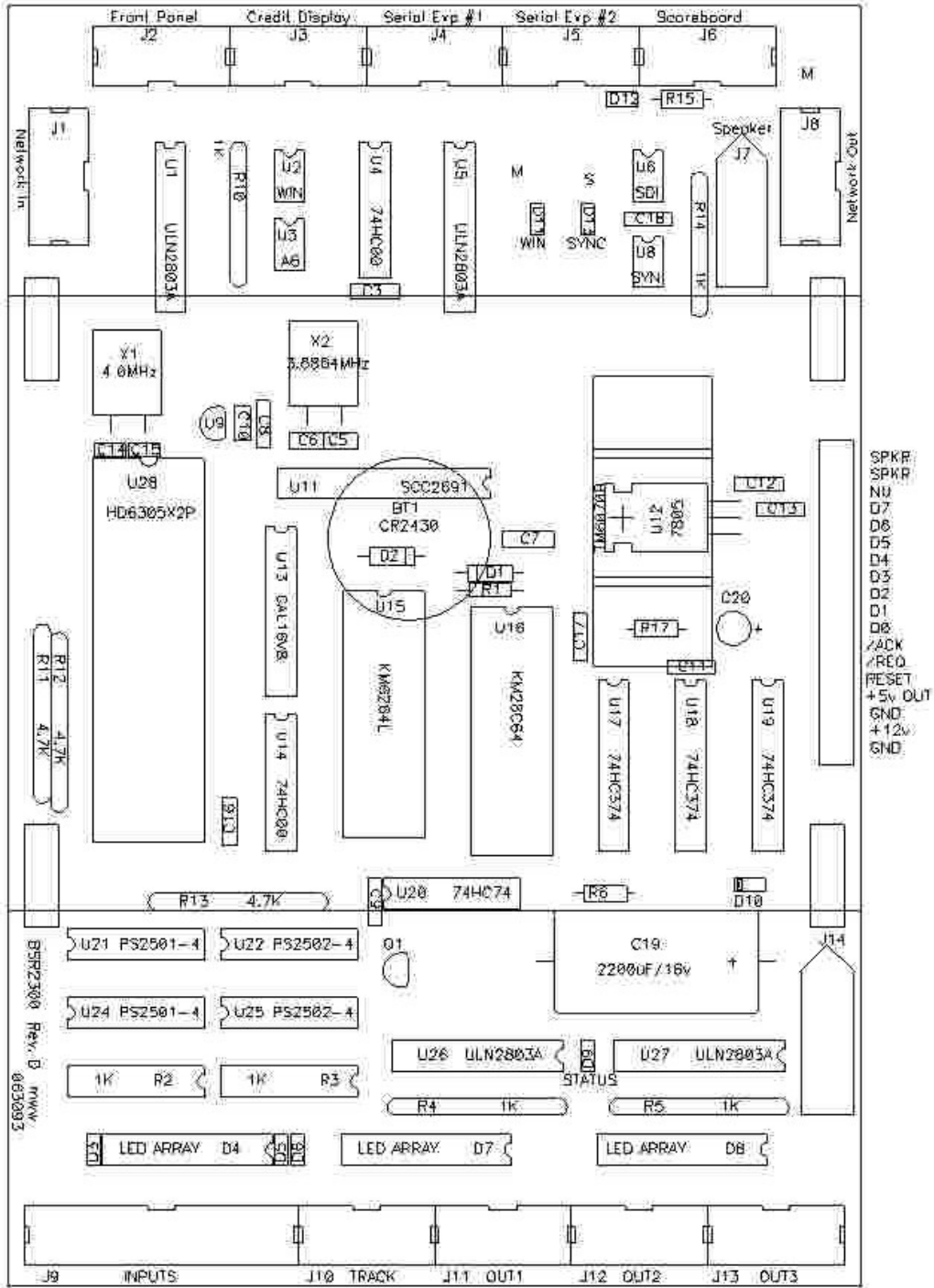
2300 ELECTRONICS PIN-OUT
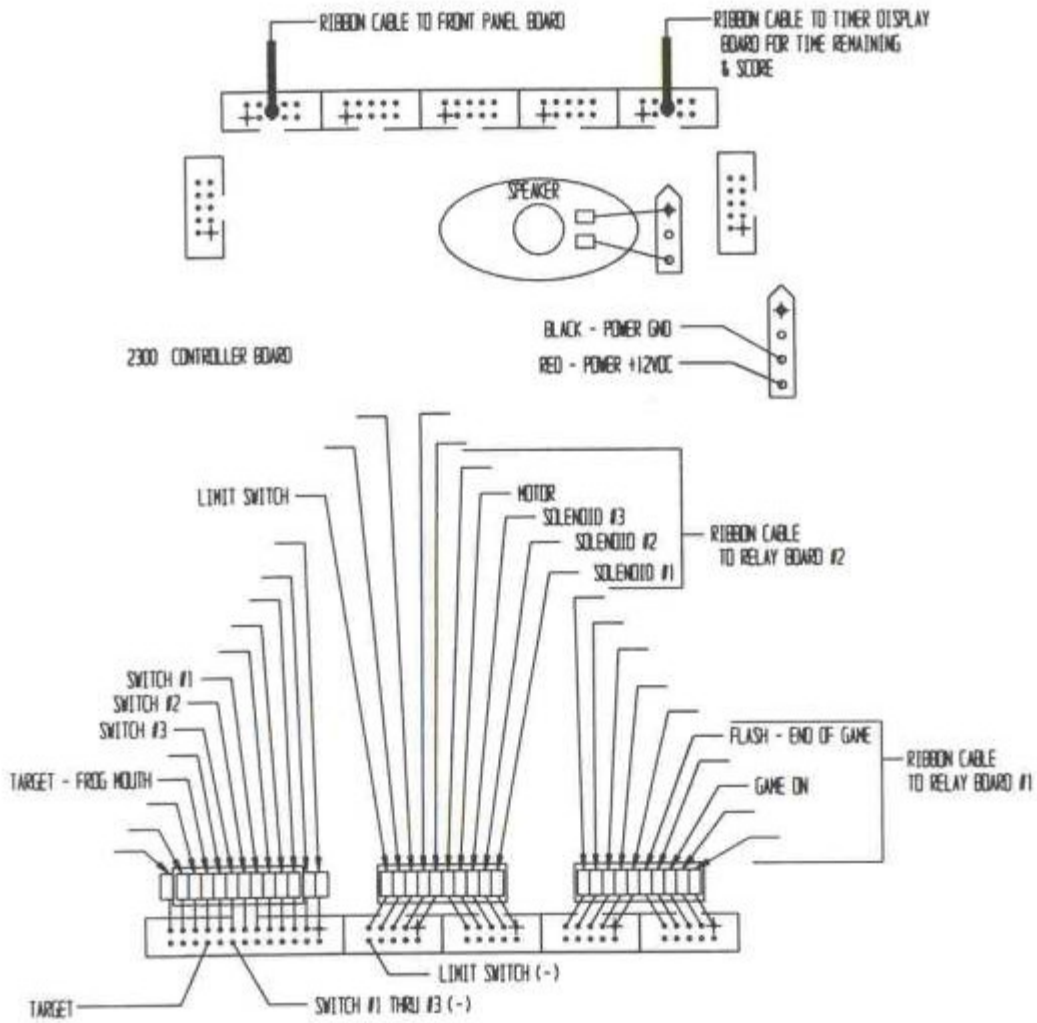
FRONT PANEL BOARD OVERVIEW

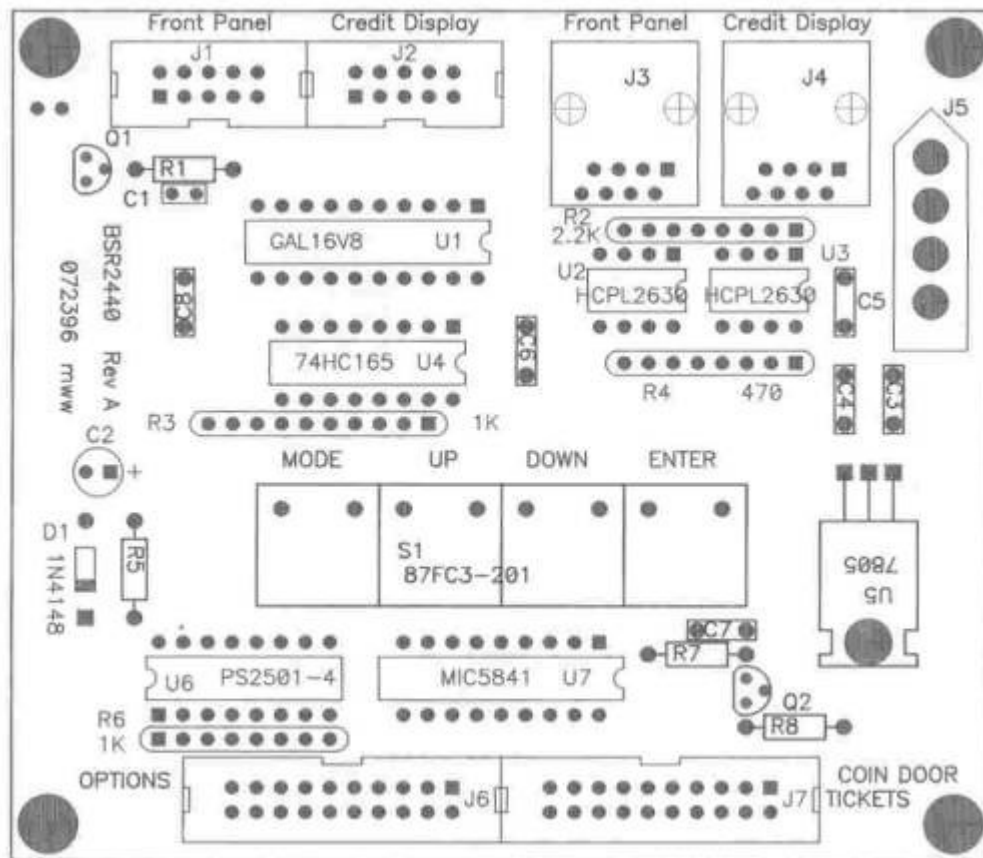The basic operation of the Front Panel Board is as follows.

The Front Panel Board is used as a distribution point for the Credit Display Board and gives the customer the ability to change the Option Registers via the four (4) pushbutton switches.

The two 20-Pin Connectors (J6 and J7) are Expansion Inputs and Outputs via the Main Processor. One of the 20-Pin Connectors is the Coin Door and Ticket Dispenser Connections.   The other 20-Pin Connector is labeled 'options' and will be used at a later date.
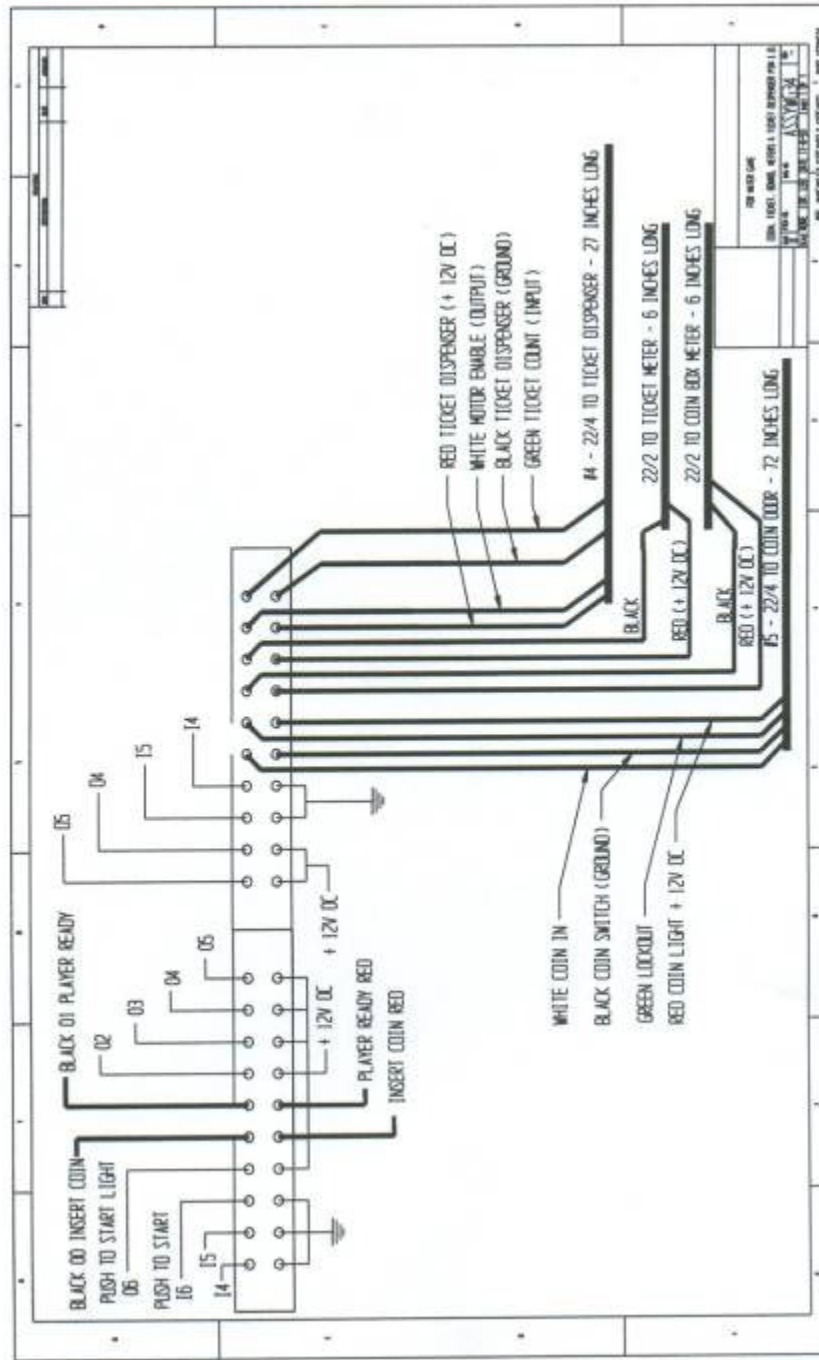
The 4-Pin Molex Connector (J5) supplies +12VDC (Pin 4) and Ground (Pins 2 & 3) to the Board.

The top two 10-Pin Ribbon Cable Connectors (J1 and J2) are Input/Output Connectors--one from the 2400 Board and one from the Credit Display.

FRONT PANEL BOARD DIAGRAM

FRONT PANEL BOARD SCHEMATIC

RED TICKET DISPENSER (+ 12V DC)
WHITE MOTOR ENABLE (OUTPUT)
BLACK TICKET DISPENSER (GROUND)
GREEN TICKET COUNT (INPUT)

#4 - 22/4 TO TICKET DISPENSER - 27 INCHES LONG

22/2 TO TICKET METER - 6 INCHES LONG
22/2 TO COIN BOX METER - 6 INCHES LONG

BLACK
RED (+ 12V DC)
BLACK
RED (+ 12V DC)

#5 - 22/4 TO COIN DOOR - 72 INCHES LONG

WHITE COIN IN
BLACK COIN SWITCH (GROUND)
GREEN LOCKOUT
RED COIN LIGHT + 12V DC

I4
I5
D4
D5

BLACK D1 PLAYER READY
D2
D3
D4
D5

+ 12V DC
+ 12V DC
PLAYER READY RED
INSERT COIN RED

BLACK D0 INSERT COIN
PUSH TO START LIGHT
D6
PUSH TO START
I6
I4
I5

CREDIT DISPLAY BOARD OVERVIEW

The basic operation of the Credit Display Board is as follows.

The Credit Display Board is used to show the Player how many coins or tokens are required for a play and how many credits are remaining. The Credit Display Board, when used in conjunction with the Front Panel Board, will display the Option Registers and the contents of that register, when needed.

The only connector on the Board is a 10-Pin Ribbon Cable Connector that connects the Credit Display to the Front Panel Board or directly to the 2400 Microprocessor Board.

> *The Credit Display Board is __not__ used to set Options on multi-player games. See OPTION REGISTERS - 2400 SERIES on how to change Registers and the contents thereof.

CREDIT DISPLAY DIAGRAM
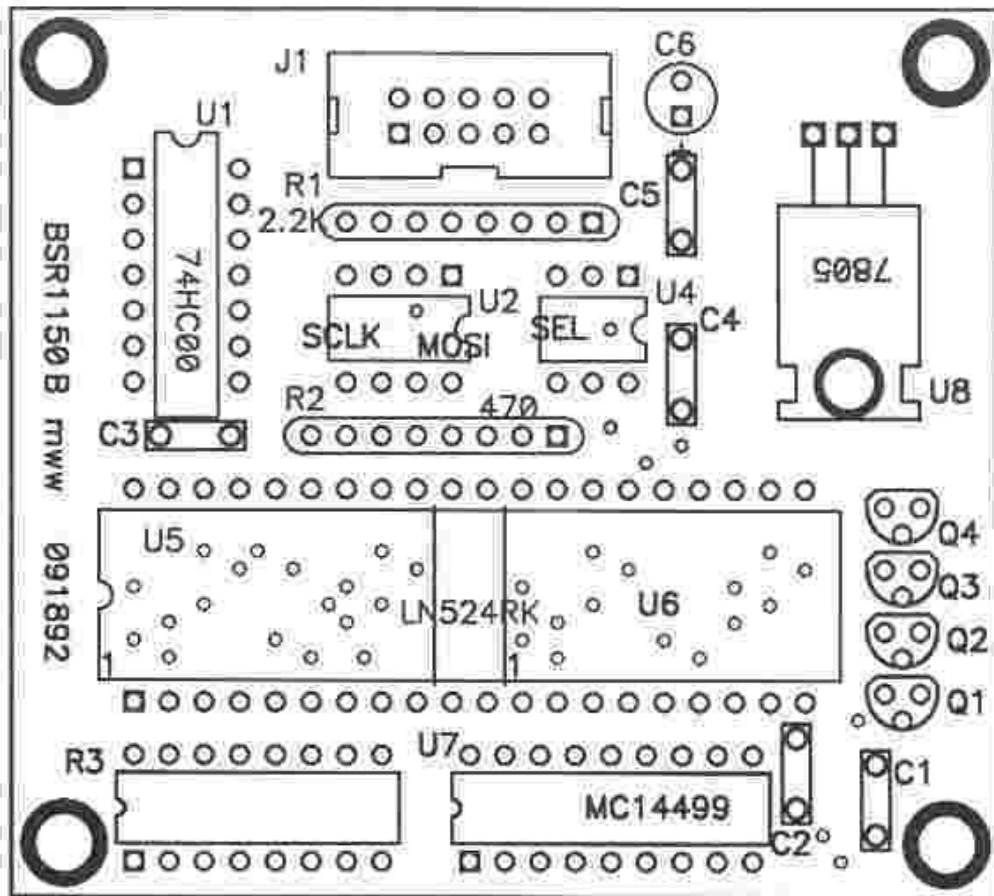
RELAY BOARDS
Overview and Diagrams

There are three (3) styles of relay boards, and the style of relay board used depends on the application. The coil voltage comes in on a 10-pin ribbon cable connection to turn the relay(s) ON or OFF. The LED's on the board signal when a relay is ON or OFF. The different styles of relay boards are as follows.
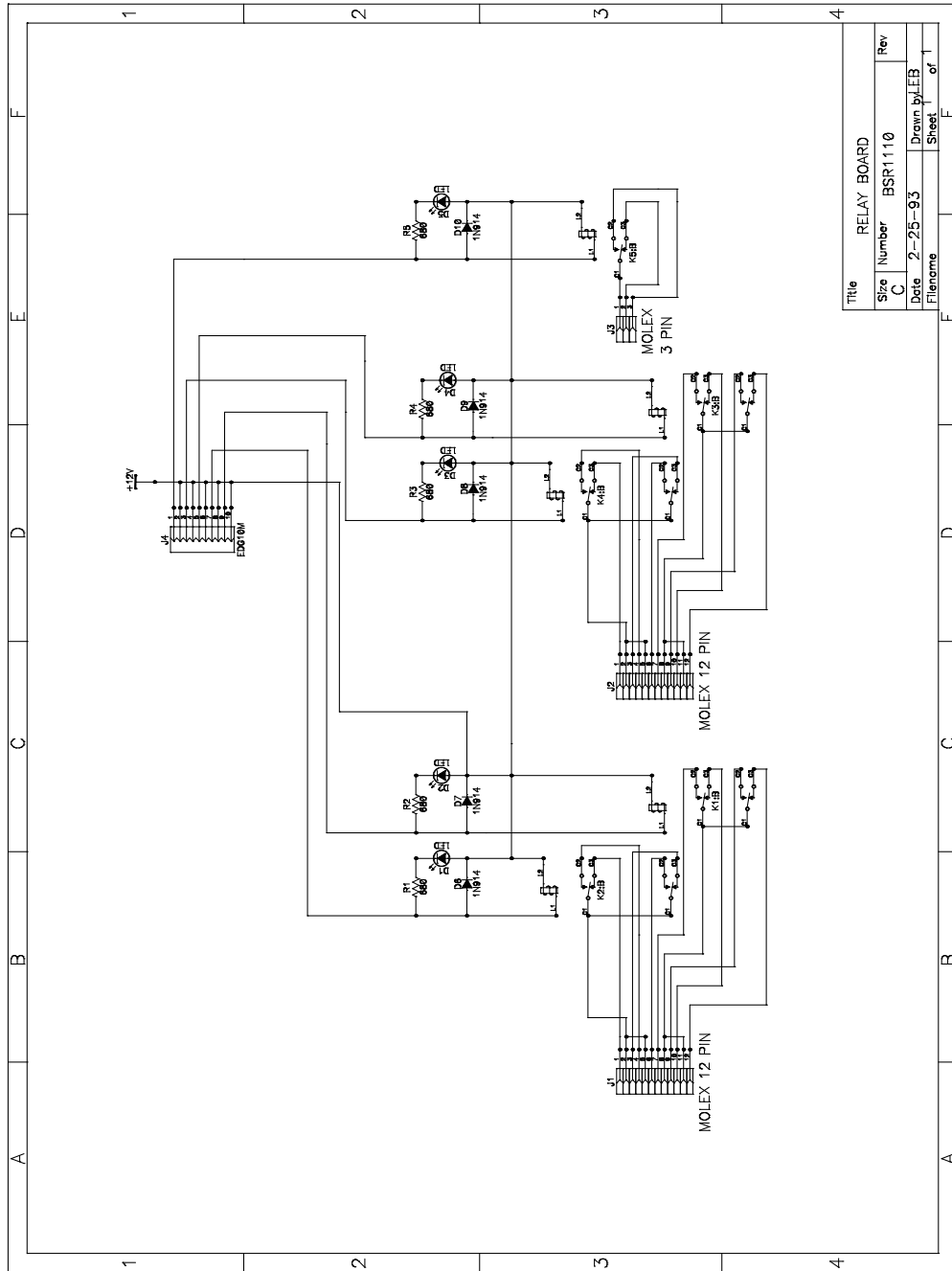
This game uses the following style(s):

Style 1 -   BSR1110

On this relay board there are two (2) 12-pin Molex plugs and one (1) 3-Pin Molex plug. The Molex plugs bring out the contacts of the relay(s), (common, N/O, and N/C). These are used for any voltage level or general application.
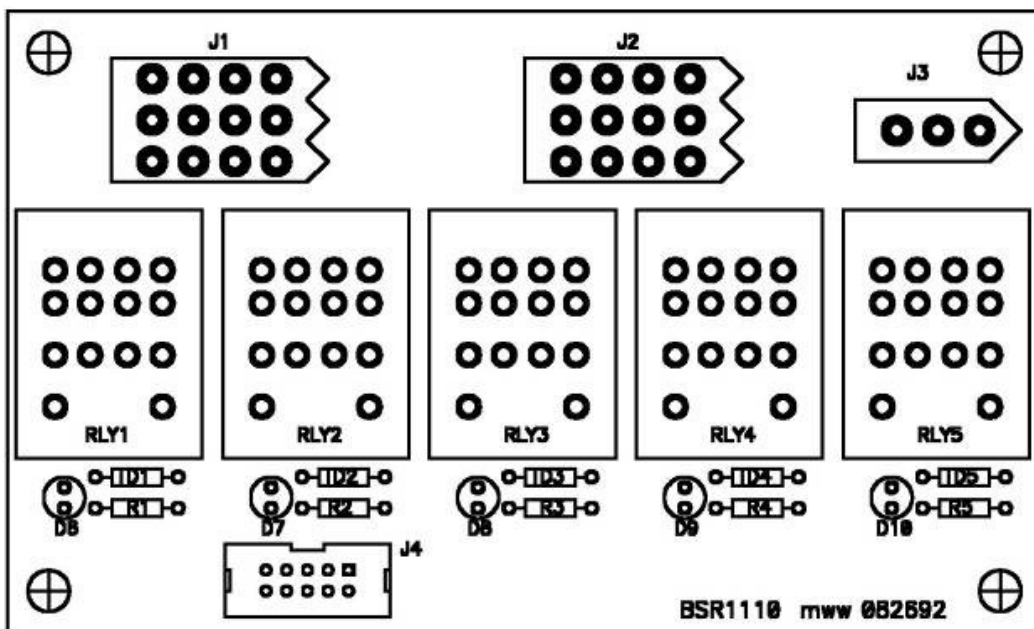
RELAY BOARD SCHEMATIC – BSR 1110

RELAY BOARD DEFINITIONS

Relay Board #1:

Relay #1 – Flash
Relay #2 – Not Used
Relay #3 – Game On
Relay #4 – Not Used
Relay #5 – Not Used

Relay Board #2:

Relay #1 - Not Used
Relay #2 – Motor
Relay #3 – Solenoid #3
Relay #4 – Solenoid #2
Relay #5 – Solenoid #1

TROUBLESHOOTING

PROBLEMS/CAUSES

SUGGESTED FIX

Game Will Not Coin Up
Bad Coin Switch

Disconnect one wire from the coin switch and ohm the coin switch. If bad, replace.

Loose Connection

Check wiring for solid connections.

Bad Front Panel Board

Check the 20-pin connector on front panel board for good connection. Replace the 4N26 on the board.

Bad Relay

Check relay board for proper operation.

Game Coins Up On Its Own
Bad Coin Switch

Stuck coin switch, check switch operation. Check game for extra credits. Turn game off and on to reset the electronics.

Wrong Register Setting

Check option registers for correct setting.

Bad Relay or Shorted Relay Board

Check relays and relay board for correct operation. Try swapping relays.

Credit Display Not On
No Power

Check ribbon cable connection back to the front panel board and/or controller board.

No Game Power
Bad Fuse

Ohm out fuse with an ohm meter. Replace if necessary with correct value fuse (7.5amp).

Bad Power Supply

Check the +12V output from the power supply. Make sure the game power is on. If no +12V output, check the 5amp fuse with a meter. Replace if necessary with correct value fuse. Check 120V AC going into the power supply. If you have 110V AC coming in, but no voltage going out, then replace power supply.

TROUBLESHOOTING

PROBLEMS/CAUSES	SUGGESTED FIX
No Sound	
No Connection	Check wiring from the speaker back to the 2300 controller board.
Volume POT Too Low	Adjust the POT on the sound board (located in the upper right-hand corner).
Bad Sound Board	Swap sound board, if applicable. Or send it in to Bob's Space Racers for repair.
Game Will Not Enter The Register Select Mode	
Bad Connection	Check ribbon cable from credit display board back to the front panel board and then back to the 2300 controller board.
Game In Progress	You can only enter the register mode when no game is being played (between games).
Bad IC On 2300 Controller Board	Swap/Replace the 2803 IC next to the 10-pin front panel board connector on the 2300 board with another one on the board or another known good one.
Register #01 Has Wrong Setting	Power down the game, hold in the two push buttons on the far right and power up the game, simultaneously. This will allow you access to the registers and change if necessary.
No Power To Front Panel Board	Check the 4-pin Molex plug for +12V DC.
No Connection	Check ribbon cable connection on the left side of the board, back to the 2300 controller board for a good solid connection.
Bad Board	Swap front panel board and credit display board with known good one from another BSR game.

TROUBLESHOOTING

PROBLEMS/CAUSES	SUGGESTED FIX
Balls Going Into Frog's Mouth Not Scoring	
Bad Micro-switch	Check micro-switch for correct operation. When activated does a LED on the 2300 board come on? Ohm out with a meter, replace if necessary.
Bent/Broken Micro-switch Arm	Adjust/replace if necessary.
Push Button Switches Not Activating the Solenoid	
Wrong Register Settings	Check option register for correct settings.
No Power	Check voltage across the solenoid (should be approximately +12V DC).
Bad Switch	Check micro-switch for correct operation.
Solenoids Are Not Firing Hard Enough or Are Firing Too Hard To Go Into The Frog's Mouth	
Out of Adjustment	See 'Solenoid Adjustment' in maintenance section.

MISCELLANEOUS

PARTS LIST

Part #	Description
E0007905	Motor 12V DC 50 RPM Frog Song®
E0003800	Relay 12V DC KHAU-17D12
E0013290	Mirco-switch
E0013970	Switch Cherry Brake E33-00K
E0020300	Ticket Dispenser
E0022680	Power Supply 12V at 9amp
	Phi-hong Raw
M0004470	Frog Song® Ball
	(.750 diameter polypropylene)
E0025100	Meter Eaton Durant +12V DC
E0013950 (specify color)	Switch – Pattie Cake
EX003360	Coil Plunger Assy 12V (Straight)
EX003365	Coil Plunger Assy 12V (Bent)

APPENDIX

COIN MECHANISM

OVERVIEW

In all of our arcade games we use the Coin Mechanisms, Inc. brand of coin mechanism, unless the customer requests a different brand.

Standard (Mechanical) Coin Mechanisms

When a player inserts a coin or token, it travels through a chute to the coin mechanism. The coin travels down onto a weighted lever that slows the coin and flips it over in front of a magnet. If the coin used is too light, it will get stuck on that weighted lever. If it is too heavy, the coin will be shot straight past the magnet and out the coin return slot. As the coin passes the magnet, the magnetic field slows the coin down enough to change its path and pass the coin by the coin switch. The coin mechanisms are replaceable and are available for a variety of coin sizes and tokens.

Coin Comparator (Electrical) Mechanisms

Also available is an electronic coin comparator that is used if you need high security, or have an unusual token or coin size. The coin comparator uses a good coin to compare to the coin being inserted. A coin must first pass the comparing circuit and register as a good coin, then travel past both optical sensors, in the correct direction, within a pre-determined time. If a coin is passed by the optical sensor backwards, as if on a string, the comparator will detect it and cause an "inhibit." This inhibit will cause a complete rejection of any coin, good or bad, for 16 seconds. After that time, the unit resets itself.

TICKET DISPENSER

TICKET DISPENSER

ELECTRONIC OPERATION

When the control unit calls for a ticket to be issued, 12V DC is applied to the ticket enable wire causing the motor to turn on. When a ticket is dispensed, the sensor senses a notch in a ticket and sends back a signal to the control unit. If no more tickets are called for, the enable voltage is turned off and the motor stops.

MECHANICAL OPERATION

The tickets are moved through the ticket chute by means of a power driven roller, which is spring loaded against an idler roller. The power driven roller has two Neoprene o-rings installed, and under normal operating conditions, are the only things in contact with the tickets.

The power driven roller is mounted on the output shaft of the motor gear train assembly. The motor assembly is mounted to the pivot bracket assembly in two Oilite bearings. The motor assembly has a limited free swing, limited by a single pin engaged in the brake sprag. The brake sprag engages the power assembly. The direction of torque, when electric power is applied is in a direction so as to release the brake sprag. When an attempt is made to pull tickets from the machine with the power off, the torque is reversed and the brake sprag is engaged. Also, the pulling of tickets will cause the pivot bracket assembly to apply a pressure to the power driven roller against the ticket and idler roller greater than the pre-set spring load. This causes the o-rings to depress and the coarse knurled surface of the roller will grip the tickets. One ounce of pull on the tickets will apply 20lbs of pressure on the rollers.

During 1992 Deltronic Labs made enhancements to their ticket dispensers. These included a push-to-feed ticket button on the main ticket dispenser board for ease of feeding tickets and the removable top on the ticket guide to allow ease of access to removing jammed tickets

TROUBLESHOOTING – TICKET DISPENSER

PROBLEMS/CAUSES

SUGGESTED FIX

Dispenses Tickets Continuously
(Not the same as Too Many Tickets)
Bad driver IC

Replace the IC that has the ticket enable line – see the output definitions for your controller board.

Bad Darlington on ticket dispenser board

Put a jumper between the white wire and black wire on ticket dispenser plug. If motor stops, the problem is in the game. If the problem continues: it's a bad ticket dispenser board. (Replace the driver transistor or ticket dispenser board.)

Shorted pull-up resistor

Locate the pull-up resistor (1K ¼ W); make certain the leads are not shorted. Replace if necessary.

White and red wire shorted

Examine the wire terminations from the game to the ticket dispenser. The wire may have been closed in the ticket dispenser door causing a short.

Dispenses No Tickets
No power to ticket board

Check the voltage between the red and black wires on the ticket dispenser Molex plug; it should be 12V DC.

Bad Darlington transistor(s)

Replace Darlington transistor(s) or ticket dispenser board.

Bad motor

Swap the ticket dispenser with another unit.

Wrong option setting(s)

Check the option setting(s) for this game (see information on your controller board).

Bad IC driver

Replace the IC that has the ticket enable line (see the output definitions for your controller board).

TROUBLESHOOTING – TICKET DISPENSER

PROBLEMS/CAUSES	SUGGESTED FIX
Dispenses No Tickets (CONTINUED)	
Bad ticket dispenser	When tickets are to be dispensed, check between the white (enable) wire and the black wire; should be 12V DC. If voltage is okay, ticket dispenser may be bad.
Doesn't Dispense Enough Tickets (OR) **Dispenses Too Many Tickets**	
Wrong option settings(s)	Check the options setting(s) for this game (see information on your controller board).
Ticket guide spring missing/needs adjustment	Read the ticket dispenser manual under "Ticket Guide Spring".
Bad/dirty optic sensor	Blow paper dust out of the optic sensor. If that doesn't solve the problem then swap ticket board with another unit.
Bad ticket count input on controller board	Check ticket count LED on your controller board (see info on the <u>controller board</u>).
Bad ticket notch output transistor on the ticket dispenser board	Swap board with another unit to verify this, then replace the bad board or ticket notch output transistor (see Ticket Dispenser Manual). The blue wire goes to ground when no tickets are under the sensor eye.
Bad board	Check connections between front panel board and ticket dispenser.
Bad front panel board	Check voltage between the green wire (ticket sensor) and the black wires: should be pulsing 12V DC for each ticket. If that is okay, then the front panel board may be bad.

REDEMPTION

REDEMPTION

INTRODUCTION

This explanation of redemption procedures is not meant to be an all inclusive document or a 'cast-in-stone' rule book. It is designed to outline basic concepts of what redemption is, how it works, and why it is both popular and profitable. For further discussion on planning, design, game selection, and operation of Redemption Centers, please contact our sales office.

WHAT IS REDEMPTION?

The concept of redemption is to give players an incentive to play the game other than just for the entertainment value. The way this is usually done is to give some type of reward based on the player's score or performance.

Redemption games are any games in which a player has an opportunity to win tickets, tokens, prizes, bubble gum cards, baseball cards, or any other type of award for playing the game. Usually the amount of the prize is based upon the performance of the player - it may be based on how many players the person beats in a game, or how many points are scored.

WHAT IS A PERCENTAGE?

A percentage is how many cents, on average, you are giving back for every dollar taken in. (When you see the % from here on it means cents on the dollar awarded.)

FIXED PAYOUT

Standard Bob's Space Racers® games give tickets as the reward. You will need to determine what percentage you want to use. The most successful percentage of payout is thirty percent (30%).

WHY DOES REDEMPTION WORK?

One reason that redemption works is because Family Fun Centers are becoming more popular and families can spend quality time together. The video game industry was pretty much reliant upon teenagers as their main clientele. With the advent of the Family Fun Center, video games are still there for the teenagers, although they have lost some of their popularity (possibly due to the home game industry). Redemption games are usually targeted for general audiences. With the addition of "kiddie" models that target now extends to the whole family. Redemption is popular in this family group due to the fact that the parents are usually paying for the entertainment and, generally, they like to see that they are getting something for their money.

With a payout of tickets, parents are more willing to let their children play the various games when the kids are going to actually receive some type of reward for what they have done.

WHY DOES REDEMPTION WORK?

For example: If a younger child has a small prize (i.e. a novelty pencil eraser) they would like to win, the parents will probably allow him/her to continue to play the game until they have won enough tickets to exchange for that prize. Whereas older children, such as teenagers, may want to save up their tickets to redeem them for a larger prize (i.e. a portable radio) that will encourage them to visit the establishment more frequently.

It is important to note that the most successful redemption operations do have some video games. They are a good means of entertainment, but the redemption allows a draw from a larger variety of patrons for your market. Also, because redemption games are played for the ticket payout as much as they are for the entertainment value, they typically do well as the years go by versus the video game only lasting for several months before a significant drop-off in game play is experienced.

MERCHANDISING

Redemption is yet another method of selling merchandise. Your customer is the family that comes into your Fun Center. Your merchandise selection should include items of interest to all age groups. It is very difficult to entice people to play the games if there is no merchandise they wish to win. A well stocked, properly displayed, and brightly-lit redemption counter is essential. Your pricing should also be competitive. Your customers are aware of retail pricing on most items you will have in stock; if they see items marked at exorbitant prices, they will not play our games.

A good rule of thumb is to mark your merchandise up only ten percent (10%). Thus, an item you bought for $1.00 should sell for $1.10 (110 tickets). You have already made a fair profit on the play of the game, so mark the merchandise up enough to handle freight (shipping) and handling – which in most instances is ten percent (10%) of the cost you pay for the merchandise. It might seem as though you are losing an opportunity to increase your profits, however the word-of-mouth comments on your operation will pay off much more in the long run.