2400 GROUP GAMES

WATER GAMES•ROLL A BALL•RACERS EDGE
WHAC A MOLE•SPEED SHIFTER

MODULAR ELECTRONICS

OWNER'S MANUAL

427 15th STREET · DAYTONA BEACH · FLORIDA · 32117

PHONE 386·677·0761 FAX 386·677·0794

WWW.BOBSSPACERACERS.COM

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.

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 386-677-0795

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 8:30 am - 5:00 pm, 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 8:30 am - 5:00 pm, 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®, Inc. by calling (386) 677-0794, 24 hours a day.

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. 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.

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APPENDICES

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.

* * *

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.

OPERATIONS

INTRODUCTION

The most important thing to remember about the job you are about to begin is to be yourself! Your personality is what keeps you from sounding like a computer. As you are taught the basic procedures, you'll also learn how to adapt them to your own style. Working in the game can be a lot of fun, once you have mastered the proper technique.

ALWAYS REMEMBER THAT THE CUSTOMER IS THE MOST IMPORTANT PART OF THIS

BUSINESS!

SMILE! A smile will do more for your business than anything else. It shows the customer that you are happy and they will have some fun.

LOOK PEOPLE IN THE EYE! Making eye contact with people lets them know that you are talking to them, and not just 'rambling on'. A simple "Hello, how are you?" or, "Hi there! Are y'all having fun today?" will let them know you are talking to them. Follow up with, "Come over here and I'll show you how to play this game!"

USE YOUR FREE HAND to motion the people you're addressing to come over to your game.

ONCE THE CUSTOMER IS AT THE COUNTER,

Just be polite and explain the game in a simple manner**.**

WHEN THE GAME IS OVER, be certain to:

1. Acknowledge the winner.
2. Encourage the non-winners to play again, before they start to walk away.
3. Encourage the winner to play again and show him/her the next prize they could trade-up for if they won again.

If you keep these basic procedures in mind, everything else should come together.

GETTING STARTED

No matter what part of the world you may be operating your equipment in; customers are the most important part of making your operation successful. By keeping the customer happy, you will enjoy increased profits. When a customer leaves your game one of two things will have occurred: either you have a satisfied customer who will play that great new game the next time he goes by and will tell his/her friends about it; or, he/she will leave vowing that is the last time that game will ever get his/her money! Of course we all agree that a happy customer is what success is all about.

It is the operator's job to ensure that the customer can easily understand the game and what the prizes are for each win level. This task can only be achieved by the person who will actually be in the game working with the people. There are important features to look for when hiring a game attendant. Always look for a friendly, outgoing personality, someone who is honest, dependable, and is used to working with money. The attendant is the one who will be dealing with the customers on a one-on-one and day-to-day basis.

Although working with the public can be extremely trying at times, by insuring proper breaks for your employees you will eliminate most problems. It is recommended to give the attendant a 30 to 60 minute break every two (2) hours, this way you will always have a fast, outgoing, upbeat attendant running your game. If the attendant is polite and friendly, the public will respond the same way.

WHY BREAKS ARE SO IMPORTANT

Operating a game is physically and mentally demanding. We found it is best to have two (2) attendants for each game, or, three (3) attendants to rotate between two (2) games. This will keep them always at their peak performance and alertness levels. We also suggest you have a part-time employee who can work during the busy/peak times. This person is commonly referred to as the 'second' attendant. It's also important for higher profits. Having two (2) people collecting money can save time and allows the game operation to run much more quickly and efficiently.

GETTING READY FOR EACH DAY

We suggest you begin each day by checking the power. This procedure is done to insure that proper power is being supplied to the game to avoid electrical damage, and/or malfunctions. To check the power going into your trailer, look for the power checker with a toggle switch on it. This is mounted near the breaker panel. Toggle the switch to the left to test one leg of the power, then right for the other leg of the power. The needle should read approximately 120V AC on each leg.

If either leg does not read 120V AC you will need to locate the supply generator or the city power connections and check the voltage source there. This needs to be done every day because your trailer may have been hooked to a different circuit by a show electrician, from one day to the next, without your knowledge.

If both legs do read 120V AC you can start the game up and check your sound level for both the microphone and the sound track. We find it helpful to label the knobs on the amp so the operator/attendant can easily distinguish between each knob.

It is important to be aware of your merchandise inventory throughout the day, especially during peak times. This will ensure that your game doesn't run out of prizes.

PUSH BUTTON STATION

1. FORWARD: Pressing the “Forward” button will start the game and turn on the Forward I.D. Light.

2. CB OFF: Pressing the “CB OFF” Button will reset the game and return the Toys to the Home position.

3. STOP: Pressing the “Stop” button wile pause the game.

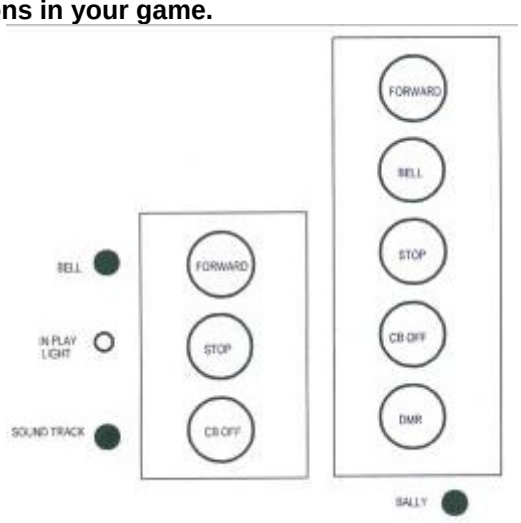
4. BELL PUSH BUTTON: Pressing the “Bell” Push Button will right the bell.

5. DMR PUSH BUTTON: Pressing the “DMR” Push Button will activate the Sound Unit.

6. PRACTICE BUTTON: Some models have a practice button. When pressed, any units kicked up, will deliver the ball to the player so they can practice while waiting on the race to begin. Pressing Stop Button disables this feature so you can have everyone roll up their ball and have it held beginning the race (so no one has a head).

7. BALLY BUTTON: Some Models have a Bally Button. When the button pressed, the toys will rise up and down in a wave like motion drawing attention to your game. Hitting any foot switch will take the game out of Bally Mode ready to play.

NOTE: This is an example – some features shown here are optional and do not necessarily reflect the number of buttons in your game.



GAME OPERATIONS

1. Collect money.

2. Activate the Player position be kicking the foot-switch, pressing Push Button or activate the I-Button on games at each unit. Notice that the small ID light turns on and stays on, if it doesn't stay on; see (Trouble Shooting Section).

3. Repeat Steps 1 and 2 for each participant.

4. To turn unit off hold foot switch, Push Button or I Button in for two to three seconds until lights go off.

5. Start game when all players are ready by pushing the "Forward Button". Everything will start in sequence from that point, i.e. Sound Track, Bell, Pump, and Game Start. This is done with "Auto Start" option 1. See page 5 for other start options.

6. The first Toy to reach either the top of a vertical game, or the finish line of a horizontal game, will be the Winner. The globes will stop flashing and only the winner's globe will light up. If you have beacons instead of win globes, the winner's beacon will light up indicating that unit has won. The bell will ring for two seconds and, after a predetermined time, the game will automatically go into reverse to bring all the Toys back to their original position. *Can be set with game options.

GAME OPERATIONS

Okay, it's time to begin! As each customer passes by they need to be acknowledged with a simple greeting. Such as:

"Hello!"
"Hi, there!"

Followed by:

"How are you?"
"Have you seen this game?"
"Would you like to try it?"
"Are you ready to try this one?"
"Let me show you how to play!"

Remember; make eye contact with the person you are speaking to when you are trying to persuade them to come over to play the game.

Getting the customer to the playing counter is half the battle. Once they are at the counter, quickly give a brief explanation of how to play the game. Then try to get a few more players to begin the race. Note: It's not necessary to have a group of players to begin a skill type game (i.e. Sidewinder®, Roll-A-Ball®, Whac-A-Mole®, etc). However, you do need at least two (2) players to start the game. After you have your desired amount of players, be certain that each player is at the correct player station and you have collected all of the money. Also, know which prize you will be giving out.

GAME OPERATIONS

Next, go over to the push button station and begin the race. Putting labels on the push buttons during training will make it easier for the training operator to get started. During the race quickly check that all players are playing the game properly, and that they are at their correct play stations. Also, note how many players you have. If possible, note the bystanders and point out any empty positions for them to join in on the next race.

Once the race has ended, announce the winner, encourage non-winners to play again before giving the winner's prize out. Also, get at least one (1) player to pay for the next game before you give the winner his/her prize. For example:

> Player at station #5 won and players at #7 and #12 were a very close second and third. You might say;
>
> Hey! #7, you were right there that time! #12 – you should've had it! You better try again! This could be your lucky chance! How about another try?" remember your winner, "Player #5, you were our lucky winner this time! Look at what you've won!" At this point you hand him/her the prize and continue by pointing to the next larger prize, "When you win again, you can trade this in for a larger prize!"

We've found that by showing the winner the next prize they are easily tempted to play again. Always encourage a few more players with each new race. People are the key to attracting more people to the game.

However, there will be times when only a few customers will be in the playing area.

WHAT TO DO WHEN IT IS SLOW

How fast or slow the operator runs the game is referred to as the 'pace'. The operator should try to get at least three (3) or four (4) players for the next game, before beginning a game. This is commonly referred to as 'grinding'. Simply pay more attention to the players you have already, take more time to explain the rules of the game, explain the prize levels – remember the more people you have at your game the more people will come to your game. It's not uncommon to wait as long as five (5) minutes or more for players. There is no reason to run a race as soon as you have two (2) players, unless there is no one else in the playing area. If the operator runs the races too quickly when it is slow they will end up with no players. If the operator works the crowd as suggested they will find that two (2) players can easily turn into three (3) or four (4), or many more players.

WHAT TO DO WHEN IT IS BUSY

At some point, while grinding, the operator will become 'steady'. This simply means that there are at least five (5) or more players at each and every race. When players are steady, the operator should pick up the pace. The races should be running every three to five (3-5) minutes. (If the operator is really good he/she can try to run a race every one to two (1-2 minutes.) At the same time the operator should be trying to get at least ten or more players for each race – this would be considered busy.

It is important to make every step count. We recommend the operator go down the counter collecting money from each player while checking to see if there are enough players to begin the race. If there aren't enough players, then quickly make one more sweep up the counter for more before beginning the race. However, if you have enough players there is no need to go all the way back to station #1 to start the race. That is why we have two (2) push button stations in each game.

WHAT TO GIVE AWAY

We found in our operations that 28 to 30 cents on the dollar for give-away has proven the most profitable for us, and the customer. This works out to be 28 to 30 percent of the cost of play. This is achieved by dividing your cost of merchandise by your revenue for that race.

CHANGING ATTENDANTS/OPERATORS

1. The new operator puts on his/her change apron.

2. The new operator obtains enough one (1) dollar bills from the current/old operator in order to be able to make change for fifty dollars.

3. During a race the old operator hands over the microphone system to the new operator. The new operator continues on with that same race. The old operator checks the amount of stock in the game to ensure there will be enough to last until he/she returns from break.

4. The old operator cleans up any stray trash in or around the game area, and makes certain the game area is orderly.

INSTALLATION AND SET-UP

TRAILER INSTALLATION, SET-UP AND HOOK-UP

Power Requirement: 220V, 60 Cycles, Single Phase

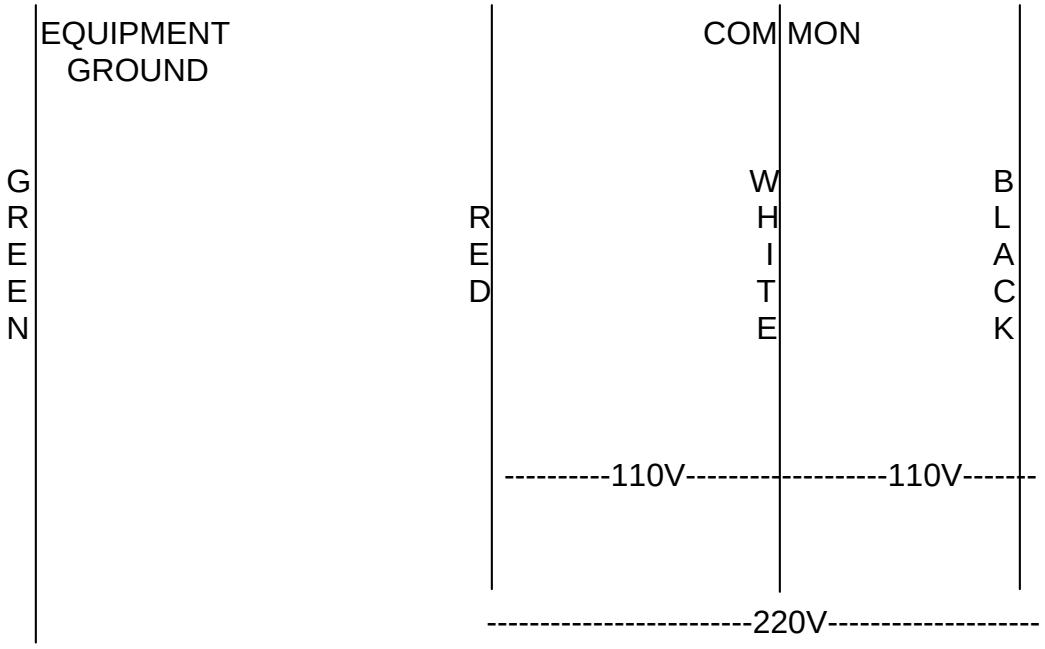
1. Locate trailer and drop Leveler Jacks. Level the trailer, front to back and right to left. Unwind lead line from hitch. Remove hitch and store out of the way.

2. Unlock awning doors. Raise the doors by use of key switch at the corner of the trailer.

3. Put pins in awning prop rods; release pressure from Hydraulic Pump by turning the key the other direction. Remove key.

4. Hook-up White wire to the Neutral (Common). The Red and Black hook to opposite 110 volt phases. Green is Earth Ground. NOTE: Use power checker to check for 110 volts on both hot lines. CAUTION! Be sure of correct voltage: 220V, 60 Cycle, **Single Phase. NO MORE!**

BLACK WIRE: 110V AC
GREEN WIRE Equipment Ground
WHITE WIRE: Common/Neutral
RED WIRE: 110-V AC



TRAILER INSTALLATION, SET-UP AND HOOK-UP

Power Requirement: 220V, 60 Cycles, Single Phase

5. Raise marquee top and secure with prop rods. Unload ends of marquee from inside game and attach to marquee sides. The ends plug into the sides with a Black Amp plug. Check for bad or broken bulbs. NOTE: Make sure Safety Cables are used when raising the Marquee. Install bally curtains.

6. Check operation of game; check for any bad or broken lights and flash game.

INSTALLATION OF PARK AND BUILDING MODELS

Bob's Space Racers® installs all Park and Building Model Games 95% of the time. If you desire to install your game by yourself, we can send separate instructions on how to do so.

ELECTRONIC FEATURES

ELECTRONIC FEATURES

ELECTRONIC MODULE COMPONENT

BSR exclusive module electronics are as easy to change and repair as our old style relays systems. Modules pop out and pop in if problems arise, no boards or cables to change. Modules can be swapped between the units and/or the master module. One spare module can repair problems or update your game features. See below instructions in trouble shooting for information on changing modules.

SELF DIAGNOSTICS

2400 Electronics are equipped with easy to use self diagnostic LED's. These LED's are easily read to sort out most problems that can occur in operation. If problems occur out Tech Services can easily identify problems by noting which of these LED's are on or off.

NO ERROR FEATURES

Nothing is worse in a group game than having switches stick that cause unfair advantages or disrupt the game. In 2400 electronics if this happens we simply won't let the unit turn on or we turn it off when the game starts. See the activated switches in troubleshooting for details on this important feature.

AUTOMATIC FEATURES

New for 2400 is the 1 button Auto Start, the Timed Auto Start, and the Manual Start feature.

Manual Start - Setting 0 – The operator pushes each start button for sound, game and bell manually at the time sequence desired.

1 Button Start – Setting 1 - This is your 1 button start feature for all sound, game and bell. This is for new and untrained operators. By depressing #1, everything sequences in proper order to start the game, the same way every time.

Timed Auto Start – Set at Time Desired - This feature is for the serious operations, "Time is Money". Set your time desired and get ready -hat you set is when we start.

CB OFF/RESET

All 2400 Electronics have "CB OFF" or "RESET" button. This button is used to reset the preset game. If units were inadvertently turned on, press and hold the "CB OFF" button. In about two seconds, the game will reset and be ready for play. This will sometimes cure your odd problems. If CB OFF doesn't work, simply turn off game power at main breaker panel, wait 16 seconds and turn the game power breaker back on. Just remember "RESET To Repair".

COMPUTER CONTROLLED GAME OPTIONS

In all 2400 Electronics **All** game features and controls can be set and changed using the keyed BSR MULTI-LINE LCD display panel. These option registers are preset by years of testing and operating experience by our company. These setting can be changed by the end user depending on operational needs. If you have any questions on these setting please contact our Tech Services. See Game Option Overview.

OPTIONS SETTINGS

GAME OPTIONS OVERVIEW
Versions 2400

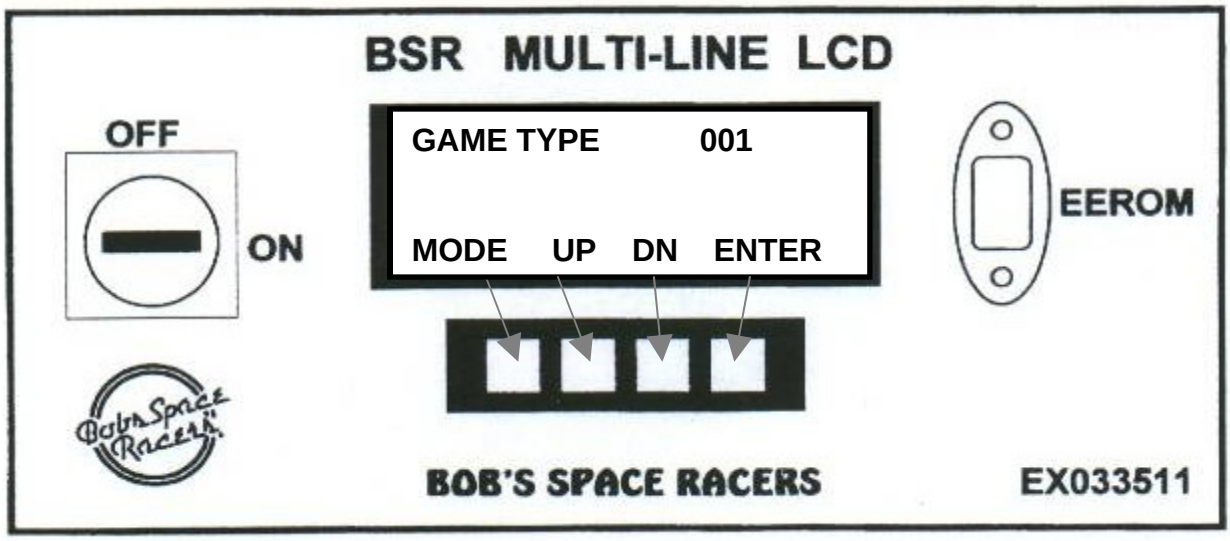
Enter Options by turning the keyed switch to “on” and waiting until the following message comes up:

“GAME TYPE 001”

The ### will be replaced by a number Game Type for you particular game type. This means the system is ready to accept changes for the option registers. The second line of the display reads ‘**MODE’, ‘UP’, ‘DN’, ‘ENTER’**. The **‘DN’** stands for down**.** The **MODE** button sequences through each option displaying the value in that option register. The **UP** and **DOWN** buttons increase or decrease the value of the current register**.** The change is **NOT** made permanent until the **ENTER** button is pressed**.** The ENTER button also advances the screen to the next option register. **Pressing the MODE button before pressing ENTER leaves the register unchanged.**

NOTE: <u>The Registers CANNOT be changed in the middle of a race and if GAME TYPE is changed, the game MUST be powered down.</u>

MULTI-LINE LIQUID CRYSTAL
DISPLAY BOX



OPTION REGISTERS
WATER GAME

Option/Game	Vertical Water	Ramp Water	Rising Water	TopGlo/Top Spin	Top Glo2	Description	Min	Max	Default
Game Type	1	1	4	1	1	1:Water, 2:RAB, 3:Shifter, 4:Rinsing, 5:Whac, 6:Driving	1	6	1
Game Mode	0	1	0	0	0	0: Start @Bottom/Right, 1:Start @Top/Left	0	1	0
# Players	#Units	#Units	#Units	#Units	#Units	Enter The Number of Units in the Game	2	22	14
Bell Time	20	20	20	20	20	Time the Bell Rings for in 1/10 seconds	20	40	20
Win Lite Time	60	60	100	100	100	Time the Winner Indicator stays on for in 1/10 seconds	50	100	60
Forward Speed	24	24	24	24	24	The Fastest Forward Speed for a Motor, the Higher the number, the faster it goes	10	60	24
Reverse Speed	35	25	35	35	35	The Speed for a Motor goes Home at, the Higher the number, the faster it goes.	25	50	35
Oper Beacon	60	60	60	60	60	The Time in seconds until the Operator Beacon turns on out front	0	90	60
Bally Delay	28	28	28	28	20	The time from the start of one unit to the start of the next unit in 1/10 seconds for Bally Mode	15	100	28
Chase Speed	10	10	10	10	10	How Many 100ths of a second each Channel of the Chase Lights are on	7	25	10
Short Time 1	28	28	28	28	28	Walk Time RAB	16	28	28
Med Time 1	34	34	34	34	34	Trot Time RAB	30	35	34
Long Time 1	34	34	34	34	34	Run Time RAB	30	35	34
Zone Length	95	95	95	95	95	Time that Toy moves before using the 2' Timing Values RAB	80	100	95
Short Time 2	12	12	12	12	12	Walk Time After Zone RAB	10	16	12
Med Time 2	16	16	16	16	16	Trot Time After Zone RAB	14	16	16
Long Time 2	16	16	16	16	16	Run Time After Zone RAB	14	16	16
Mole Up Time	53	53	63	53	53	Time that the Mole Heads Stay Up for in 100ths seconds WAC	48	63	53
Mole Dwn Time	15	15	15	15	15	Time between Moles in 100ths Sec WAC	10	15	15
Win Score X 10	60	65	0	60	0	Score to Win All #x10 WAC	10	15	15
Reverse Time	50	50	50	50	50	Time From a Win until Toys Back Up	40	100	50
Min Speed	20	20	20	20	20	Off the Track Speed RACE	1	40	20
Slow Speed	35	35	35	35	35	Slow Speed RACE	30	50	35
Medium Speed	45	45	45	45	45	Medium Speed RACE	30	55	45
Fast Offset	30	30	30	30	30	Width of Run RACE	10	45	30
Med Offset	70	70	70	70	70	Width of Med Past Run RACE	20	80	70
Slow Offset	120	120	120	120	120	Width of Slow Past Med RACE	30	120	120
Track Speed	70	70	70	70	70	Speed Table Spins at on Race Game	50	70	70
Lo Money Val	1	1	1	1	1	Amount to add per player for Lo Money	1	9	1
Hi Money Val	2	2	2	2	2	Amount to add per player for Hi Money	0	9	2
Auto Start TM	* 1	* 1	* 1	* 1	* 1	Auto Start: 0 = Man, 1 = Auto, 2 = Message Start, >2 = Timed	0	255	1
Track Sub Value	8	8	8	8	8	Value To Subtract From Track Speed	5	12	8

* NOTE : Any Games without DMR Jumper & Update Programs use 0 for Auto Start TM

** ***Racers Edge: These settings are for MultiSpeed Games ONLY! If your game is not MultiSpeed c***

OPTION REGISTERS

WHAC-A-MOLE, ROLL-A-BALL, RACERS EDGE, SPEED SHIFTER

Option/Game	Whac-A-Mole	Roll-A-Ball 12'	Roll-A-Ball 15'	Vertical Roll-A-Ball	**Racers Edge	Speed Shifter	Description	Min	Max	Default
Game Type	5	2	2	2	6	3	1 Waler, 2 RAB, 3 Shifter, 4 Rinning, 5 Whac, 6 Driving	1	6	1
Game Mode	0	0	0	1	1	0	0 Start @ Bottom Right, 1 Start @ Top Left	0	1	0
# Players	#Units	#Units	#Units	#Units	#Units	#Units	Enter The Number of Units in the Game	2	22	14
Bell Time	20	20	20	20	20	20	Time the Bell Rings for in 1/10 seconds	20	40	20
Win Life Time	60	60	60	60	60	60	Time the Winner Indicator stays on for in 1/10 seconds	50	100	60
Forward Speed	24	35	40	12	50	24	The Fastest Forward Speed for a Motor, the Higher the number, the faster it goes.	10	60	24
Reverse Speed	35	47	47	25	50	35	The Speed for a Motor goes Home at, the Higher the number, the faster it goes.	25	50	35
Oper Beacon	60	60	60	60	60	60	The Time in seconds until the Operator Beacon turns on out Ford	0	60	60
Bally Delay	28	50	50	50	50	28	The time from the start of one unit to the start of the next unit in 1/10 seconds for Bally Mode	15	100	28
Chase Speed	10	10	10	10	10	10	How Many 1000ths of a second each Channel of the Chase Lights are on	7	25	10
Short Time 1	28	28	28	18	28	28	Walk Time RAB	18	28	28
Med Time 1	34	34	34	30	34	34	Trot Time RAB	30	35	34
Long Time 1	34	34	34	30	34	34	Run Time RAB	30	35	34
Zone Length	95	80	95	80	95	95	Time the Toy moves before using the "2" Timing Values RAB	80	100	95
Short Time 2	12	12	12	12	12	12	Walk Time After Zone RAB	10	18	12
Med Time 2	16	16	16	16	16	16	Trot Time After Zone RAB	14	16	16
Long Time 2	16	16	16	16	16	16	Run Time After Zone RAB	14	16	16
Mole Up Time	53	53	53	53	53	53	Time that the Mole Heads Stay Up for in 100ths seconds WAC	48	53	53
Mole Down Time	15	15	15	15	15	15	Time between Moles in 100ths Sec WAC	10	15	15
Win Score X 10	15	0	0	50	0	0	Score to Win At 8x10 WAC	10	15	15
Reverse Time	50	50	50	50	50	50	Time From a Win until Toys Back Up	40	100	50
Min Speed	20	20	20	20	20	20	Off the Track Speed RACE	1	40	20
Slow Speed	35	35	35	35	35	35	Slow Speed RACE	30	50	35
Medium Speed	45	45	45	45	45	44	Medium Speed RACE	30	55	45
Fast Offset	30	30	30	30	25	30	Width of Run RACE	10	45	30
Med Offset	70	70	70	70	60	70	Width of Med Fast Run RACE	20	80	70
Slow Offset	120	120	120	120	120	120	Width of Slow Fast Med RACE	30	120	120
Track Speed	70	70	70	70	70	70	Speed Table Spins at on Race Game	50	70	70
Lo Money Val	1	1	1	1	1	1	Amount to add per player for Lo Money	1	9	1
Hi Money Val	2	2	2	2	2	2	Amount to add per player for Hi Money	0	9	2
Auto Start TM	* 1	* 1	* 1	* 1	* 1	* 1	Auto Start, 0 = Man, 1 = Auto, 2 = Message Start, >2 = Timed	0	255	1
Track Sub Value	8	8	8	8	10	8	Value To Subtract From Track Speed	5	12	8

* NOTE : Any Games without DMR Jumper & Update Programs use 0 for Auto

MAINTENANCE

SCHEDULED MAINTENANCE INFORMATION

GENERAL MAINTENANCE: The Float Switches will get caught up on occasion; tap the affected tube to knock the float loose in order to free up the game. Sometimes it will stop the entire game from working if only one unit has a stuck float. (If that unit didn't win, it will only affect that one unit.) If the game appears locked up; look for a single footswitch light on. That is probably the unit with a stuck switch. A stuck float switch is a sign that the tubes need to be cleaned in the near future.

After the tube is empty, if the unit drains too slowly, then the drain valve needs to be cleaned. Unplug the Molex plug, remove the four 5/16 bolts, and clean the diaphragm on the valve. Be certain there isn't any trash inside the brass fitting where it bolts up. Coat the diaphragm with a thin coat of heatproof grease before re-assembling. (See the Detailed Pressurized System Layout Diagram.) Many times taking the valve apart allows the trash to fall out. Don't worry if you don't see the trash.

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®;	Stainless Steel; other metals
Old English® Oil; Baby Oil	Formica; Stainless Steel; other metals

TO LUBRICATE:

Dynarods: wipe heat proof grease on them once every three (3) months; spray CRC® or WD-40® (or equivalent) on them every six (6) months.

WATER PUMP MAINTENANCE

Daily: change out water; clean out trash and other debris.
Weekly: change filter; switch pumps.

WATER MAINTENANCE SCHEDULE

Daily

- Clean all Formica.
- Run game in Bally Mode.
- Check all Footswitches.
- Check all ID Lights.
- Check that water rises properly in each tube.
- Check all Winning Lights.
- Check Accounting System
- Check Target Switch for activation.
- Check water level. Water should be to the bottom of the screens (approximately 4").
- Remove all debris from the screens and filter. (Check over pump intake – inside the tank – and over top of the tank).
- Remove the screen on the end and check the suction and the tank pick-up screen.

Every 3 or 4 Days

- Clean the gun tank filter.

Weekly

- Drain all water.
- Clean tank and all screens.
- Switch pumps (for both pressurized and unpressurized systems) and clean pump filter.
- Wipe the interior of the tank and Dynarod.
- Fill tank with clean water and add two ounces of factory recommended water conditioner.

Every 2 Weeks

- Change the Blue Water that fills the tubes.

Monthly

- Clean Dynarod(s) in each tank with a 3M pad (Scotch Brite green). Wipe dry and re-submerse in tank.

Every Six Months

- Clean pre-filter screen in Watts Valve (for both systems). Make certain the pressurized system has no pressure when checking post filter screen in the Watts Valve.
- Lemon oil all Formica.

WATER MAINTENANCE PROCEDURES

Flush System as Needed

If system is extremely dirty or won't run clean after the normal weekly drain and clean:

- Hook hose to the bottom of the pump filter and partially open the valve on the bottom of the filter.

- Turn on all units, put clean water hose in tank and run game until water out of taps is clear. Refill water tank according to weekly procedure.

NOTE: *Only* add Bob's Space Racers® recommended products.
***Never* add Lime-Away, bleach, or any other corrosive products.**

To prevent metal stains (made from iron, copper, manganese, or rust), scale or calcium deposits, and/or rusty clouds or discolored/green water from occurring in your water game. You will need to add one of the following recommended products to the water in your game.

USE ANY OF THE FOLLOWING PRODUCTS:

- SpaTime® Stain and Scale Control
- Proteam® Spa Metal Magic
- Jack's Magic® The Pink Stuff™
- Aqua Chem® Stain & Scale Inhibitor

Where to get the above products?

All of the above named products can be found at any Lowe's®, Home Depot®, or any pool supply store in your area.

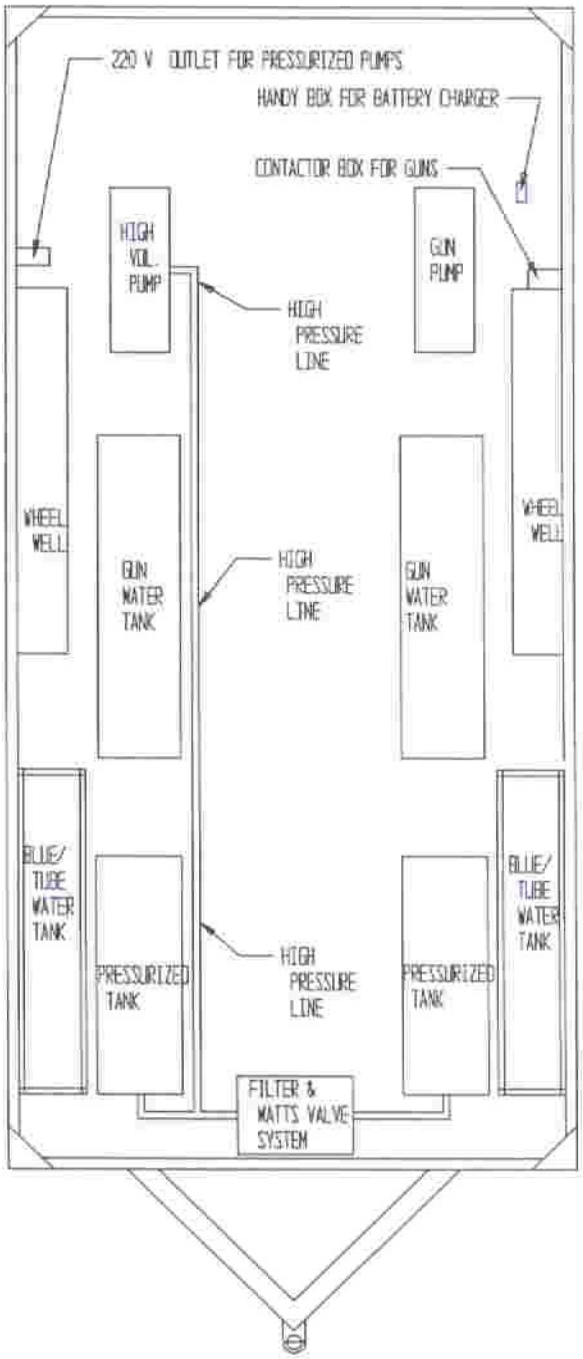
When to apply to your water game:

1. Always add the product to your new water when you are changing out the old water in your game.
2. Always add a fresh supply of the product once each week to your game's water.

How much to add each time?

Add two (2) to three (3) ounces, or 30% more than what the directions on the bottle say, each time you add the product to your game water.

TRAILER LAYOUT



WATER PUMP SYSTEMS

This game has a water pump system for the tubes (with blue water) and a separate system for the water guns (tap water). And there is a separate pump system for the air pump. Each system has a backup system. See diagram on previous page.

DEIONIZED DISTILLED WATER

The use of Deionized distilled water in Bob's Space Racers® Water games, has been determined by the Sta-rite Corporation to be highly detrimental to their pump's life and performance.

Since Deionized distilled water is ion deficient, it attacks metal surfaces by pulling free ions from the surfaces that come in direct contact with it. The electro-chemical reaction that takes place results in rapid oxidation of the metal. This type of aggressive oxidation (rusting) will result in premature pump failure.

The game needs to have all of its holding tank water drained and the filter cartridge replaced weekly. Any time you drain the water system and put new water in, (**we recommend using plain tap water**) you need to put in a new water filter. Any sediment, or anything, that is in that filter at the time the water is changed would be re-circulated into the new water – if you do not change the filter.

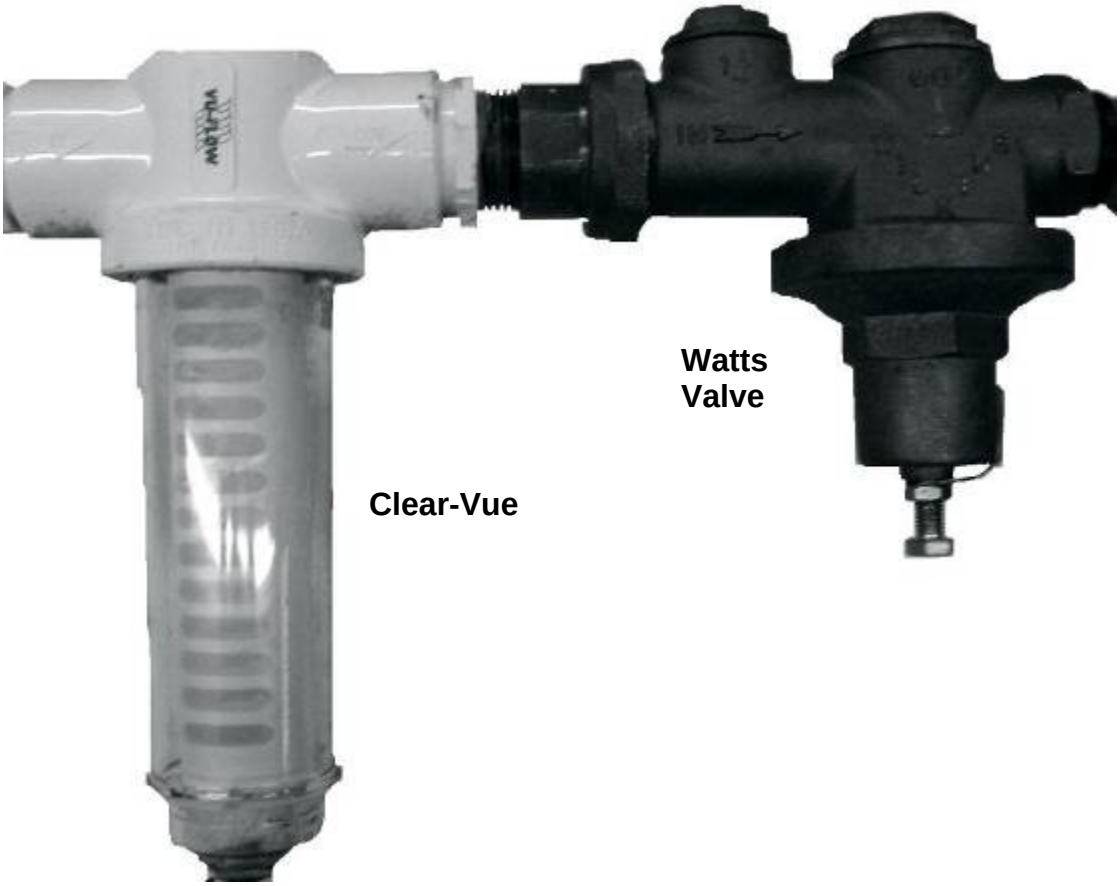
CLEAR VUE FILTERS

GUN TANK: This filter is re-useable. Remove this filter every 3 or 4 days by unscrewing the bowl. Take out the filter and clean it, then replace in original location. Keep the tank free of trash.

> **NOTE:** The gun tank may have a different filter in it. The different filter is tan with a dark brown top. This filter contains a disposable sediment filter cartridge. That cartridge needs to be replaced every time you change the water (for any reason).

BLUE FLUID TANK: The filters used for the blue colored water (in the tubes) are reuseable. Once every 2 weeks, while changing the blue fluid, take the filter out. Clean it and return it to original location. Do this while the system is draining and there is <u>no pressure</u> on the system.

> **NOTE:** If the Water Pump System is clogged, water will not drain from the crossover tube, thus creating a flood.



CLEANING THE TUBES

1. Turn game power and pumps to 'Off'.
2. Read all of the instructions before going any further.
3. Determine the type to Plexiglas you have:
    a. Pre 1995: This is the old style tube. Look at the base of the Plexiglas when it comes off, if it has hex screws holding the base in place, then it is the old style. (See Figure 1 in this section).
    b. Post 1995: This is the new style tube. Look at the base of the Plexiglas when it comes off, if it has an aluminum piece on the bottom, then it is the new style. (See Figure 2 in this section).
4. Go into the stock chute and remove the screws that hold the cover in place, over the top of the tubes.
5. Unplug the 3-pin Molex plug that is plugged into the switch at the top of each tube.
6. Remove back panels from each side of the game (These are the ones just below the top counter surface, on the lower part of the game, that the tubes go in. See the Pressurized Unit Layout Graphic, the Detail of the same Layout, the Detailed Pressurized Wiring Layout Graphic, and the Detailed Pressurized System Relay Board Wiring Graphic).
7. Locate the two hoses leading to the Plexiglas cylinder and loosen the hose clamp closest to the tube on each hose.
8. Slide off the Plexiglas tube fitting. (Slide the tube up until the fittings clears the base of the counter, tipping the base of the tube toward the center of the game – toward the walkway. Then lower the tube down from the top.
9. Check float switches are clear and not tangled up. Do NOT rip the float switches out of the tube.
10. Place each tube that needs to be cleaned in a clean common work space to begin disassembly.
11. Remove Inner Tube:
    a. Loosen the float switch from tube by using a 1/8" Allen wrench on the 2 machine bolts located at the top of the tube, near the float switch assembly.
    b. Remove the 2 bolts.
    c. Slide float switch out of the top of the tube.
    d. Remove the inner tube from the Plexiglas cylinder.
12. Determine the year your game was built.
    a. Pre 1995: There are 3 machine screws holding the bottoms of the inner tube and the outer tube. Remove these machine screws. Slide the inside tube downward from the outside tube.
    b. Post 1995: Turn the base of the inside tube counter-clockwise and unthread if from the outside tube.
13. Keep the inner and outer tubes together for reassembly.
14. Locate the high pressure water tank; this is the tank that does not have the pick up to the pumps.
15. Plug the lower fitting in the front end of the tank (for the crossover tube which joins the two high pressure tanks).
16. Partially fill the plugged tank with water and a half gallon of vinegar. This tank is large enough to completely submerge the disassembled tubes.
17. Submerge the disassembled tubes.
18. Wash the inside of the tubes with the supplied brush by inserting it into either end.
19. Clean the outside of inner tube with a soft rag.
20. Rinse cleaned tubes with fresh water.
21. Re-assemble tubes (from step 12 backwards).
22. Install float assembly in the top of the tube.
23. Insert tube back into game by placing the top of the tube up through the stock bin (that the float switch wires go through) first, so you don't trap the float switches between the tube and the stock bin. Then lower the bottom end of the tube back down through the counter.
24. Slide the hoses back onto the corresponding fittings and tighten.
25. Plug float switches in and fasten down the wooden covers.
26. Drain the vinegar water from the tank.

27. Unplug the crossover tube.
28. Fill tank as you would normally and test each unit before replacing the inside covers over the plumbing of the game.
29. Run game and test for leakage (at the lower fittings).

If you experience any problems or have any questions, feel free to call the Technical Department.

UNPRESSURIZED WATER SYSTEM (FOR TAPS/GUNS)

On either side of the game, there is a tank that collects the water that runs out of the tap. The tanks are tied together with a crossover tube so that both tanks have the same amount of water in them. These tanks contain the main supply of water for the taps. The water is fed via gravity down to the intake of the water pump. (See Water Pump Diagram, next page). The water pump then sends the water through the water filter cartridge, which removes any sediment from the water.

The filter is specifically to keep large mineral deposits, etc., from making their way out to the tips of the water guns where there is a very small hole. A mineral deposit could greatly restrict the amount of water passing through the guns. This is a sediment filter; we are only trying to get out the large particles and not to filter for drinking water. If a higher quality filter is used, i.e. a .02 Micron Filter, or any filter that would remove 99.9% of contaminants, that would take away from the water pressure needed to push the water through the guns, regardless of where the pressure regulator is set up.

From the water filter cartridge the water passes through to the Watts Valve, also called a pressure regulator. (Your game may not have a Watts Valve.) This allows for regulation of the water pressure to the front counter. On top of the Watts Valve there are two large bolt-looking caps, which are actually hollow bolts. The one closest to the water filter is the smallest. Upon removal of the cap, there is a cylindrical tube made out of a screen/mesh material. This is a free filter that keeps any large particles from going through the pressure regulator, as they would damage the diaphragm (a rubber disk that causes the pressure regulator to operate).

a. One important thing to note about the screen (the pre-filter screen) on the Watts Valve (the Pressure Regulator). Often, if there is not enough water pressure, the reason could be that the pre-filter screen has a build-up of algae or other debris on it, and the screen needs to be removed and cleaned. Make certain the pump is NOT running when you do this, as the bolt will be under pressure.

b. Do not remove the larger cap, which is directly above the adjustment screw. The reason for this is because it holds the spring that operates the diaphragm and if that cap is loosened, there is a chance the diaphragm could be damaged. Below that cap is the pressure adjustment screw. This allows for pressure adjustment if the Watts Valve is not putting out enough pressure.

c. There is a jam nut up near the casing of the pressure regulator. After that nut is loosened, adjust to the desired pressure and tighten the nut (closest to the body) tight up against the body, so that the adjustment screw cannot vibrate loose.

The water passes from the Watts Valve into a red rubber hose and out to the front counter. The hose is then attached to a check valve that allows water to go out to the front counter. The check valve will not allow the water to drain from the front counter back to the water pump when it is turned off. From the check valve the water goes up into a manifold where all of the valves are mounted for each of the individual unit stations.

These valves, when operated, allow water to pass from the manifold into the water tap where water runs out into the pitcher. Any water from the manifold that is not used passes through the manifold into a reducer coupling and comes back to the holding tank via a 1/2" return line, which is a piece of 1/2" copper tubing. It is important that this line is not clogged up or restricted in any way, as it will damage the seals in the pump.

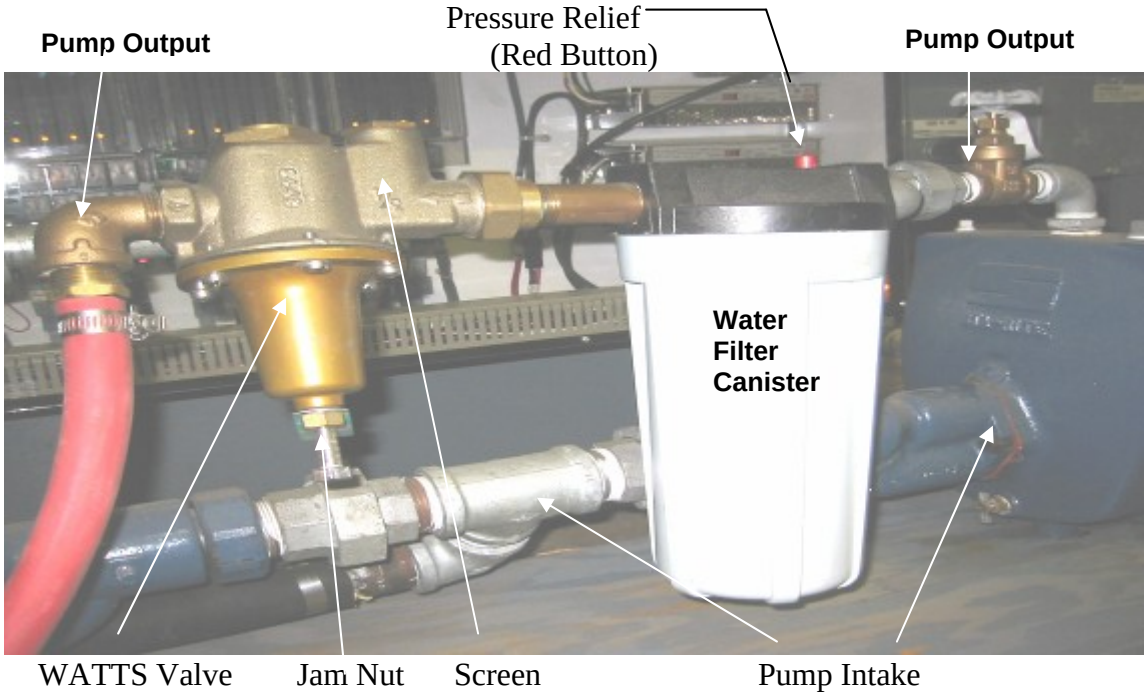
There is a stainless steel mesh screen in the holding tank in the bottom of the pan near the center. The screen is made out of stainless steel because it needs to be rigid enough so it cannot be

compressed down into the water intake line. The reason for the screen is to prevent foreign objects thrown into the water tank from getting sucked up into the water pump where they could damage the impeller or any of the seals. This screen must be cleaned daily.

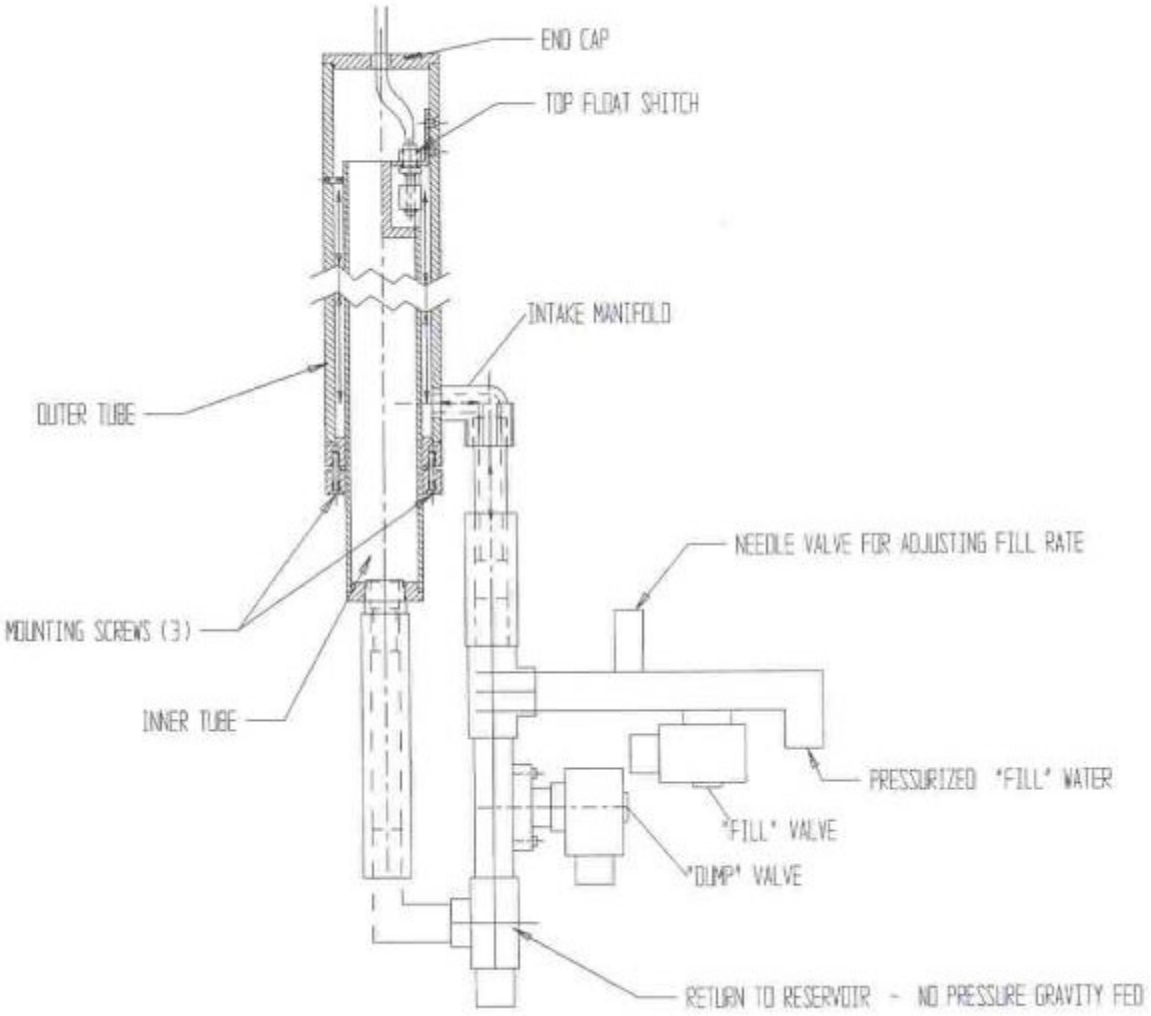
The water pump has an intake, which is the larger size fitting on the pump. The smaller fitting is the output of the water pump. The water pump we use is a 1Hp well pump that operates off of 220V through a contactor that is turned on when the game goes into RACE MODE. The output of the water pump goes up into a water filter canister. On top of the water filter there is a red button that is used to allow air to bleed out of the water pump system whenever the pump is trying to 'prime'. Many times this is not needed, because gravity is feeding the water pump. If difficulties should occur in getting the pump to prime, just press the red button and it will allow air to escape out of the lines, thus reducing the pressure the pump is fighting against to push the water through. This action will bleed off any air pockets in the system between the pump and the fill side.

Priming water system: If you experience difficulties priming the gun water system, look for the following:

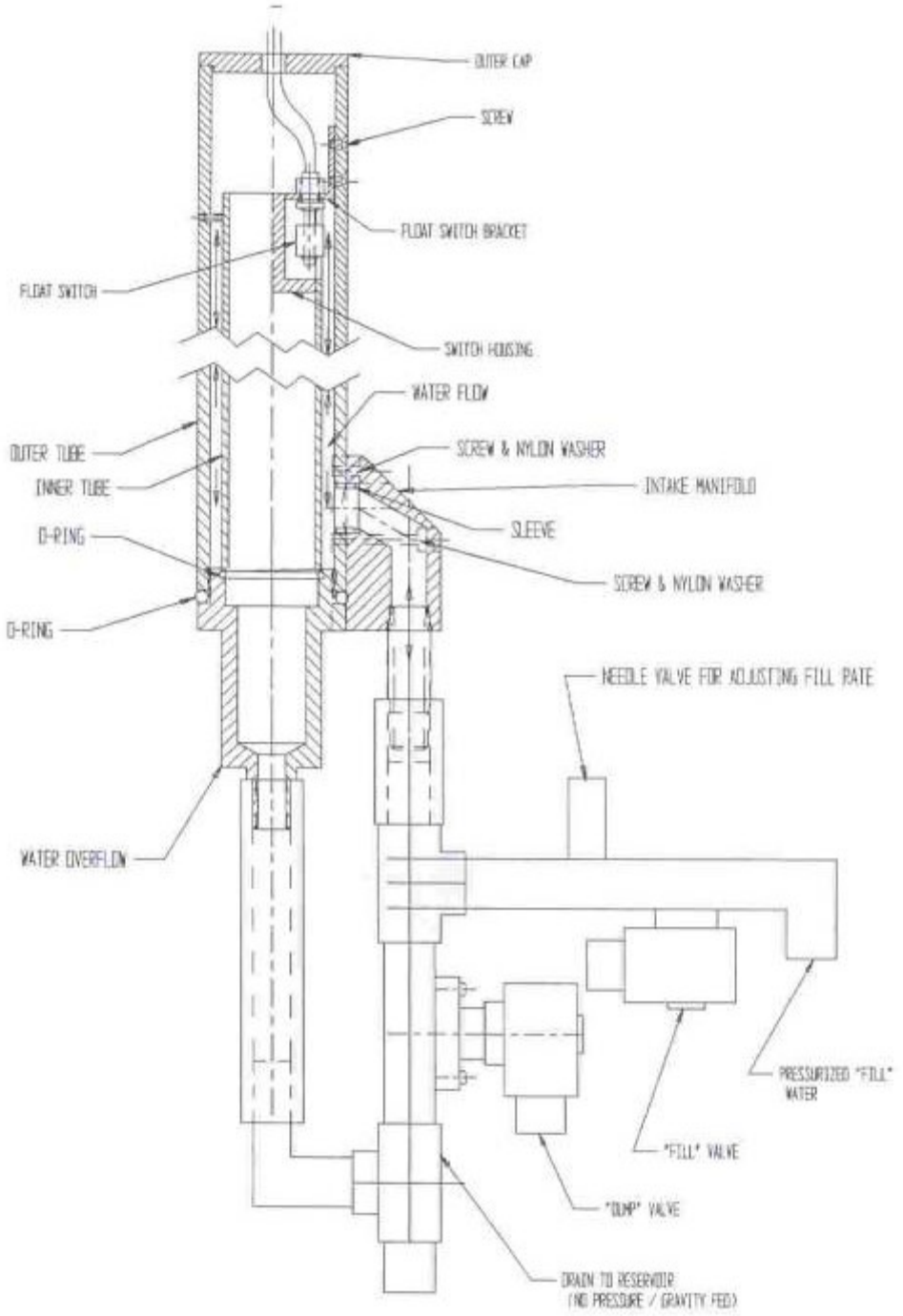
1. Check tank screen for debris.
2. Check gun filter to see if it is clean.
3. Make certain the valve is open on the pump you are running.
4. Open ball valve on bottom of filter with pump running.
5. When all of the above has been checked, try sticking a water hose into the pick-up hole to force water into the pump.
6. If the above does not work, you will need to remove a plug from the top of the pump, and fill the pump with water.
7. If the above hasn't worked, then re-check everything a second time. Pump may need to be sent in for repair.



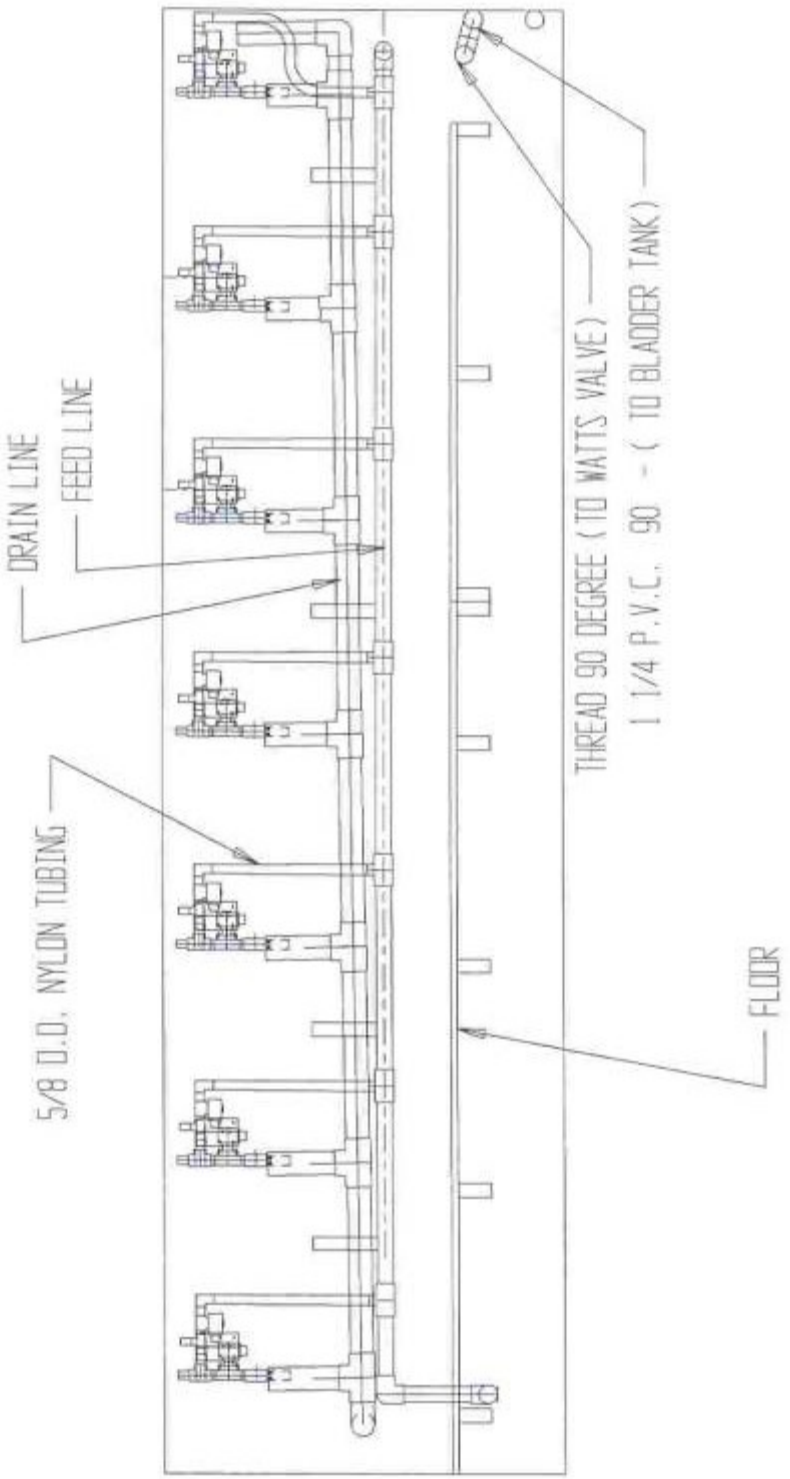
TUBE ASSEMBLY PRE 1995 (FIGURE #1)



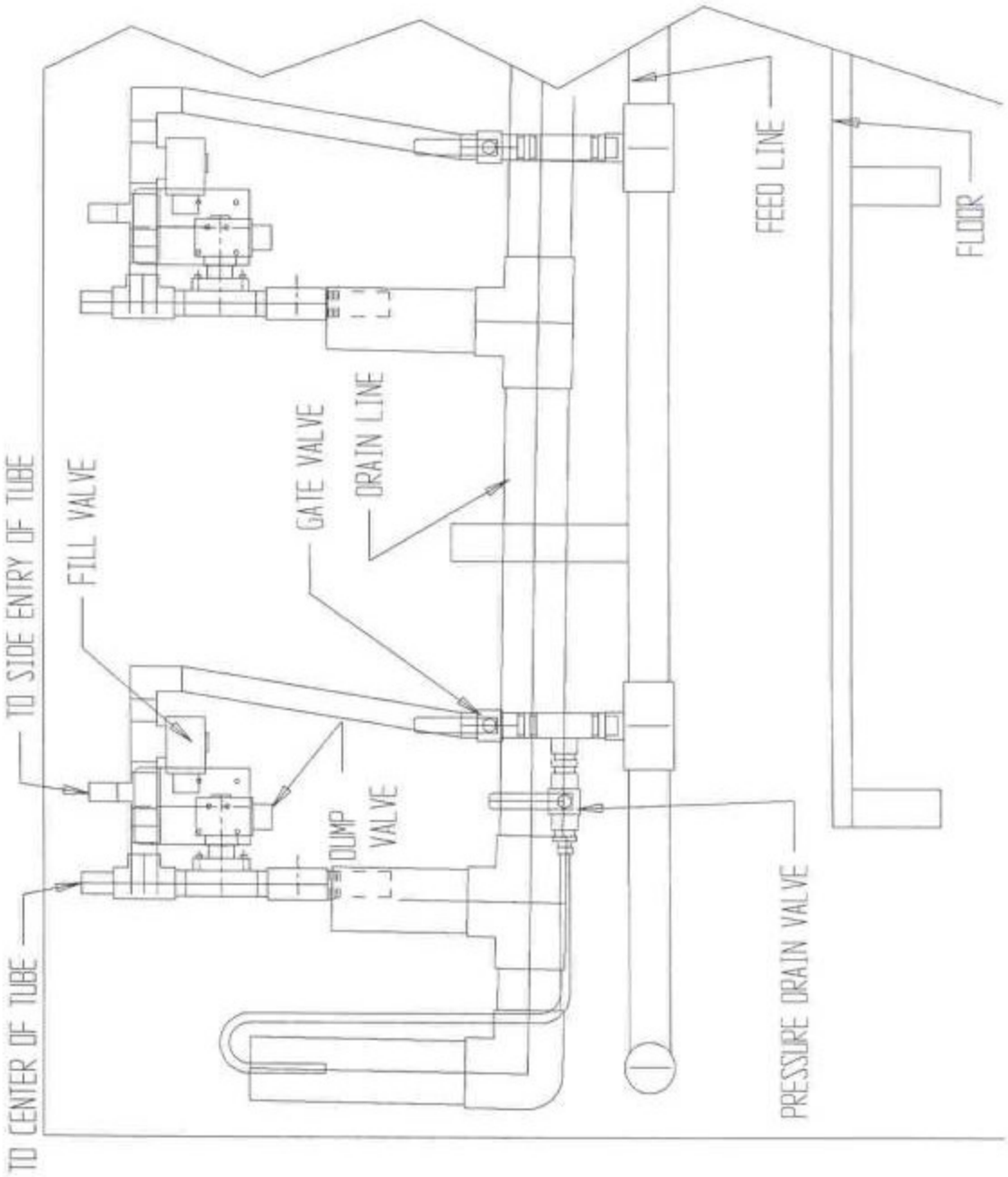
TUBE ASSEMBLY POST 1995 (FIGURE #2)



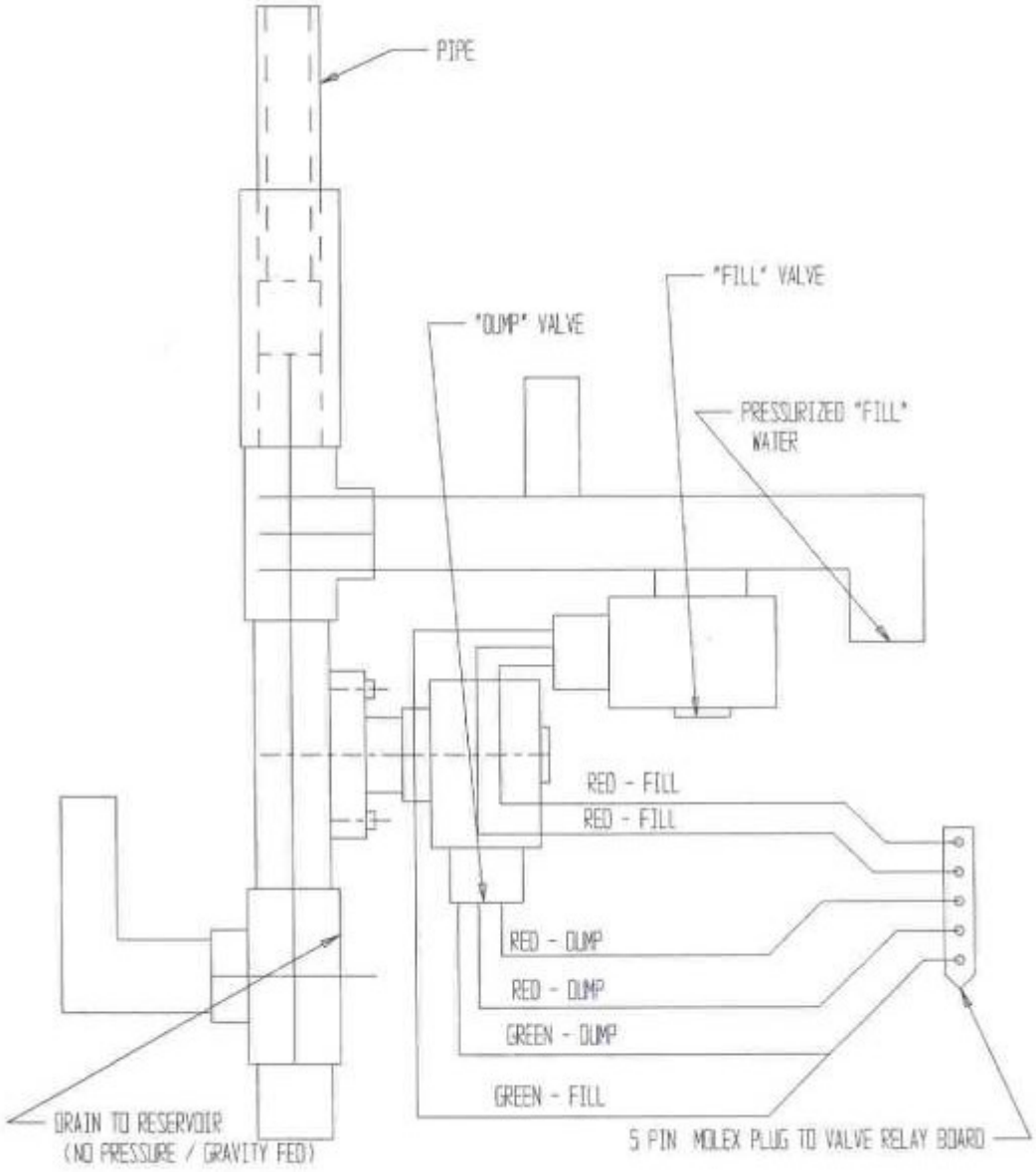
PRESSURIZED UNIT LAYOUT GRAPHIC



DETAILED PRESSURIZED UNIT LAYOUT GRAPHIC



DETAILED PRESSURIZED SYSTEM
WIRING LAYOUT GRAPHIC



BACK-UP WATER SYSTEMS

Most water games produced by **BOB'S SPACE RACERS®**, **Inc,** include the Back-up Systems Option. This system consists of an extra power supply and an extra water pump.

TO CHANGE QUICKLY FROM ONE POWER SUPPLY TO ANOTHER:

1. Turn off **ALL** Game Power.

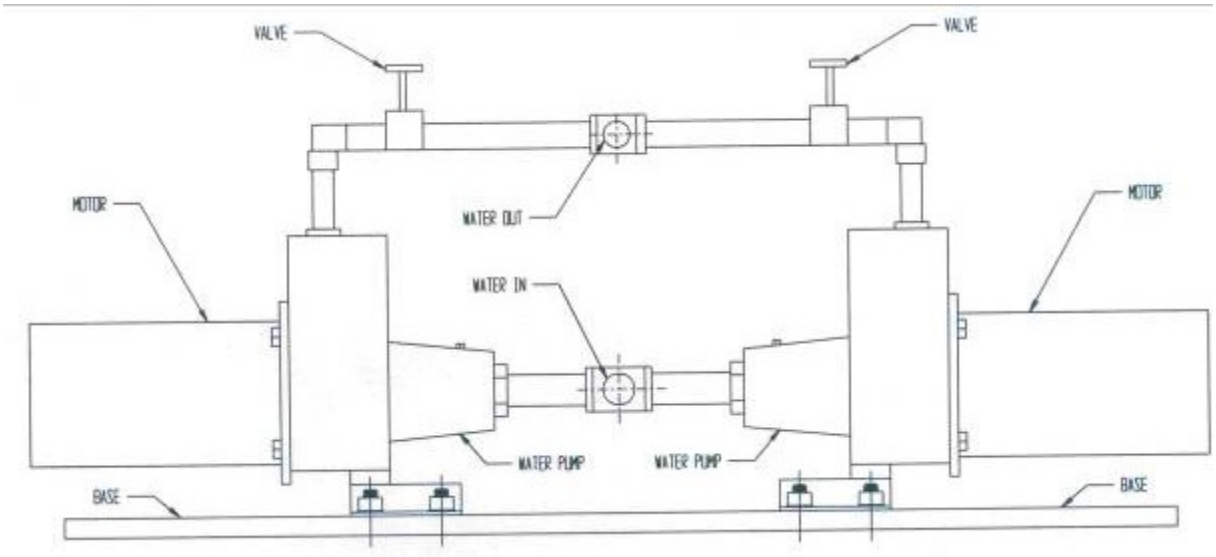
2. Disconnect the power supply wire harness for the AC and DC side; reconnect them to the spare power supply. Make certain there is a secure fit for both the AC side and DC side of the spare power supply.

3. Turn the game power back on. Game should be ready to play.

TO CHANGE FROM ONE WATER PUMP TO THE OTHER:

1. Unplug first pump; plug in second pump.

2. Close valve on output of first pump and open valve on output of second. **NOTE:** It is **critical** that the valves be switched so as not to damage the Water Pumps. If uncertain about what needs to be done, please call **BOB'S SPACE RACERS®** and ask to speak to a Technician.



WINTERIZING A WATER GAME

When water freezes it expands, thus causing anything that is holding it to crack. This means your frozen tubing, the water pumps, the filter casings, and the manifolds – anything that the frozen water is in where there is no room for expansion. All of this adds up to very expensive repairs and replacements during the spring thaw. To prevent such a costly project we at Bob's Space Racers® recommend that every game with water in it be 'winterized'.

Winterizing is an easy and relatively inexpensive process to go through to protect your money-making games. You will need at least six to ten (6 – 10) gallons of propylene glycol based antifreeze, one (1) hydrometer, and containers large enough to hold all of the fluid. The hydrometer is used to test the freeze point of antifreeze after it has been put into your game. You can obtain the proper type of antifreeze and hydrometer from a recreation vehicle (RV) supplier.

CAUTION: WHEN USING PROPYLENE GLYCOL ANTIFREEZE YOU MUST FOLLOW ALL INSTRUCTIONS ON THE LABEL OF THE CONTAINER THAT IT CAME IN!

When you are closing the game for the winter season, and you have the above supplies, follow the below procedures: READ ALL DIRECTIONS BEFORE STARTING!

1. Empty water tanks of all water to within (1") one inch above the top of the drain. Remember to clean out all of the debris just like you would normally do during regular maintenance on the water system. Repeat this process for the back-up pump.
   Note: These are the water tanks for the guns and/or taps, not the holding and bladder tanks for the Rising Water® tubes.
2. Close water drain.
3. Add approximately six (6) gallons of the propylene glycol based antifreeze to the water tanks. If this is not enough antifreeze to thoroughly circulate through the entire system and both pumps, then you will need to add more.
4. Turn game on and play each player-unit until you see the antifreeze come out of the gun, this will look foamy. If your game has target pans, **do not shoot the antifreeze at the target pan;** aim the guns to the side.
5. If this process has taken less than five (5) minutes, then allow the pump to run for a total of five minutes.
6. Use the hydrometer to check the freeze point of the antifreeze; it should read between -42^{o} and -26^{o}. If the temperature is not between -42^{o} and -26^{o}, then you need to add more antifreeze and repeat step four. If the temperature is between -42^{o} and -26^{o}, then continue on to step seven (7).
7. Switch pumps.
8. Let pump run for five (5) minutes.
9. Turn power off.
10. Place the containers under the drain plugs at the front of the trailer and remove the plugs. Or, if you have a park model, place the container at the open end of the drain tube and open the drain valve. Remember this drain system is gravity-fed and you will want to catch as much of the propylene glycol antifreeze as possible in order to re-use it on the Rising Water® tubes.
11. Remove the filter cartridge housing, wash it and store near the filter unit. Discard the old filter.
12. Remove the guns from the hoses and store the guns inside. Let the hoses hang into the containers and allow for all of the antifreeze to drip out.
13. Remove all drain plugs, and use compressed air to blow out all of the lines and housings.

14. After all of the antifreeze is drained, you will need to wipe the entire game dry. This insures all water and antifreeze that can be removed from the game has been removed.
15. Block all open holes to prevent rodents from moving in during the winter.
16. If your game has relay electronics, you will need to wrap up the master control box to prevent it from being damaged during the cold weather.
17. Remove all batteries and store them inside. (Batteries may be used for the awning of a trailer).

Winterizing Rising Water® Tubes: READ ALL DIRECTIONS BEFORE STARTING!

1. Drain all of the water from the holding tanks and the bladder tanks for the Rising Water® tubes and close drain.
2. Add the used (saved from the above procedure) propylene glycol antifreeze to the holding tanks.
3. The antifreeze will need to be filled to two inches (2") above the intake line. You will most likely need to add more fresh antifreeze.
4. Pressurize the system. *Immediately shut off pump* as soon as antifreeze level reaches the intake line!
5. Put game into "TEST" mode.
6. Push the "FORWARD" button – for about ten (10) seconds – and "STOP" button (both found on the push-station). The "FORWARD" button is to fill the tube and the "STOP" button is to drain the tube. You will need enough antifreeze to **fill each tube up one to two inches (1" – 2") at the bottom**. DO NOT ALLOW THE ANTIFREEZE TO GO ALL THE WAY UP INTO THE TUBES! IT WILL LEAVE A RESIDUE ON THE TUBES THAT DOES NOT COME OFF.
7. Repeat steps three through six (3 – 6) until you see antifreeze foaming in the bottom (2") two inches of each tube.
8. Drain tubes.
9. Use the hydrometer to check the freeze point of the antifreeze; it should read between -42° F and -26° F. If the temperature is not between -42° F and -26° F, then you need to add more antifreeze and repeat steps three through six (3 – 6) until you see antifreeze foaming in the bottom (2") two inches of each tube. If the temperature is between -42°F and -26°F, then continue to step ten (10).
10. Switch pump tanks.
11. Repeat steps three through six (3 - 6), to ensure the entire system has antifreeze run through it.
12. Turn off pumps. The air pressure will automatically go down.
13. Drain the antifreeze into your containers for proper disposal. Try to obtain as much of the antifreeze as possible.

CAUTION: WHEN USING PROPYLENE GLYCOL ANTIFREEZE YOU MUST FOLLOW ALL INSTRUCTIONS ON THE LABEL OF THE CONTAINER THAT IT CAME IN!

OPERATING A WATER GAME IN BELOW FREEZING TEMPERATURES

To operate your game in below freezing temperatures you must first winterize the game using the above procedures (Winterizing a Water Game and Winterizing Rising Waters® Tubes).

Note: you must circulate the water/antifreeze solution throughout the system and make certain the pump turns on and off at least twice. Switch pumps and circulate the solution throughout, with this pump turning on and off at least twice.

Using the hydrometer, measure the solution for the correct freeze temperatures (see step #9 above). You may not operate the game below these freeze temperatures because it will damage the game.

-WHEN THE GAME IS DOWN LONGER THAN 30 DAYS

In order to prevent malfunction of the bladder operation during prolonged periods of inactivity, along with draining the blue water from the high pressure system, you must release the air pressure from the bladders!

Remove the protective cap from the valve stem and press the Schraeder Valve until all of the air is removed from the bladders. Using the appropriate tool remove the Schraeder Valve completely and replace the protective cap.

Remember: You must fill the bladder tanks to the recommended 22psi before filling any water into the high pressure water system. To do this you must replace the Schraeder Valve and the protective cap.

If you operate the game and the blue water pumps turn on and off every time blue water is being used then you have the problem we are trying to prevent. If operating correctly, the blue water pumps will operate once every 1½ races, or less. The problem we are fixing is the air bag in the bladder tank is stuck to the walls of the bladder tank. Turn off the blue water pump breaker. Drain the air off of the bladder tanks. Remove the Schrader Valves. Turn the pressurized water pump breaker on, allowing pressure to build. This is to 'squeeze' the air bag off of the tank wall. As the air bag is compressed, the water in the holding tank of the blue water system will be used up and more water will need to be added. When the pump builds to pressure and shuts off, allow the system to sit for 10 minutes. If the pump turns on, wait another 10 minutes after it quits again (you may need to add water to the holding tanks again). Turn the breaker off for the pressure pumps and open the bottom valve on the Clear Vue Filter to drain the pressurized system. Fill all bladder tanks to 22 psi, wait 1 minute. Check the pressure (the drain on the Clear Vue Filter needs to remain open). If the pressure is less than 22 psi, then fill again and repeat the process of waiting 1 minute and check the tank pressure (repeat until you get 22 psi). This will take a while as all of the water in the bladder tanks needs to be squeezed out. Once the tanks are at a stable 22 psi, proceed filling the blue water system as normal.

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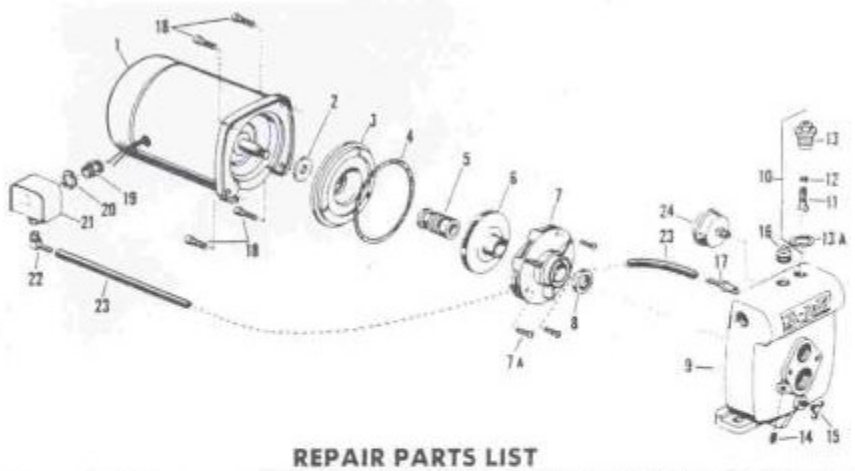
PUMP INFORMATION



REPAIR PARTS LIST

Key No.	Part Description	No. Used	ALB-30 1/3 H.P.	ALC-30 1/2 H.P.	ALD-30 3/4 H.P.	ALE-30 1 H.P.	ALF-30 1½ H.P.
1*	Motor - 115V - 60 Cycle	1	AS1008H	—	—	—	—
1*	Motor -115/230V - 60 Cycle	1	—	A100CL	A100DL	A100EL	A100FL
# † 2	Water Slinger	1	C69-2	C69-2	C69-2	C69-2	C69-2
3	Seal Plate	1	N3-9	N3-9	N3-9	N3-10	N3-10
# † 4	Gasket - Seal Plate	1	N20-35	N20-35	N20-35	C20-21	C20-21
# † 5	Shaft Seal	1	U109-6A	U109-6A	U109-6A	U109-6A	U109-6A
# 6	Impeller	1	J105-40P	J105-40P	J105-86P	J105-85P	J105-22PA
7	Volute Diffuser	1	L1-25P	L1-25P	L1-48P	L1-47P	L1-23P
# 7A	Screw	3	—	—	—	U30-489SS	U30-489SS
# † 8	Gasket - Diffuser	1	L21-1	L21-1	L21-1	L21-1	L21-1
9	Pump Body	1	L76-19	L76-19	L76-19	L176-20	L176-20
10	Control Valve Assembly - Complete	1	L262-4PS	L262-4PS	L262-4PS	L262-5PS	L262-5PS
11	Valve Plate and Stem Assembly	(1)	L62-8P	L62-8P	L62-8P	L62-9P	L62-9P
12	"O" Ring	(1)	U9-26	U9-26	U9-26	U9-26	U9-26
13	Valve Bushing	(1)	L23-3P	L23-3P	L23-3P	L23-4P	L23-4P
13A	Gasket	(1)	L20-39	L20-39	L20-39	L20-40	L20-40
14	Pipe Plug - ⅛" NPT	1	U78-56CT	U78-56CT	U78-56CT	U78-56CT	U78-56CT
15	Draincock - ¼" NPT	1	U212-68T	U212-68T	U212-68T	U212-68T	U212-68T
16	Pipe Plug - Priming	1	U78-60CT	U78-60CT	U78-60CT	U78-61GPT	U78-61GPT
17	Compression Fitting - ¼" NPT	1	U111-85T	U111-85T	U111-85T	U111-85T	U111-85T
18	Capscrew - ⅜" - 16 x 1¼" Lg.	4	U30-75C	U30-75C	U30-75C	—	—
•18	Nut - ⅜" x 16	4	—	—	—	U36-38C	U36-38C
19	Connector	1	L43-5C	L43-5C	L43-5C	L43-5C	L43-5C
20	Locknut - ½"	1	U36-112C	U36-112C	U36-112C	U36-112C	U36-112C
x 21	Pressure Switch	1	U217-2E	U217-2E	U217-2E	U217-2E	U217-204E
22	Compression Elbow - ¼" NPT	1	U111-86T	U111-86T	U111-86T	U111-86T	U111-86T
23	Switch Tube	1	U37-192P	U37-192P	U37-192P	U37-192P	U37-192P
★ 24	Pressure Gauge	1	U239-3	U239-3	U239-3	U239-3	U239-3

• Not Illustrated.

SERVICE KITS

	Seal and Gasket Kit	1	PP1550	PP1550	PP1550	PP1551	PP1551
	Overhaul Kit	1	PP1560	PP1560	PP1565	PP1566	PP1564
	Pressure Gauge Kit	1	PP2102	PP2102	PP2102	PP2102	PP2102
	Pressure Switch Kit	1	PP2151	PP2151	PP2151	PP2151	PP2151

NOTE: † Included in Seal and Gasket Kit. ★ Included in Pressure Gauge Kit.
Included in Overhaul Kit x Included in Pressure Switch Kit.

* For repair or service to motors, always give the Motor Model Number and any other data found on the Motor Model Plate.

TROUBLESHOOTING – WATER PUMP SYSTEM

PROBLEMS/CAUSES	SUGGESTED FIX
Low Pressure/No Pressure	
Lost Prime	Run Pump, Press Red Button on Top of Water Filter to relieve trapped air.
Clogged Filter, Clogged Watts Valve Screen	Clean Watts Filter, Replace paper filter.
Clear-vue Filter Clogged	Remove inner screen wash with soap and water. Rinse and Replace.
Broken Impeller	Replace Impeller.
Trash in Pump	Open Pump and clean inside.
Lint on Tank Screen	Located in the bottom of the tank or on the side of the tank near the bottom – remove and clean it off.
Water Supply hoses to Front Counter kinked under counter. (Center Joint Games)	Lift counter and place hose in its proper position
Motor Does Not Run	Check Circuit Breaker.
No Power	If Motor is hot, allow to cool.
Thermal Circuit Breaker	Check Contacts for free movement (do this with Pump unplugged from Power).
Bad Pressure Switch on Pump	
No Water Shooting Out of Guns	
(Check all of the PROBLEMS listed above)	
Solenoid Valve not Operating	Check Relay Board. Is Relay operating? Is LED on Board Operating when you shoot the Gun? If LED comes on, it is probably a bad Relay.

TROUBLESHOOTING – WATER PUMP SYSTEM

(CONTINUED)

PROBLEMS/CAUSES	SUGGESTED FIX
Guns Shoot Over or Around The Counter	
Gun Not at Correct Height	Loosen Set Screws and adjust to correct height (when gun tips back, the lower part of Gun Handle should be one (1) inch above the Countertop).
Y Yoke Loose	Loosen Set Screw or bolts. Position on Gun aimed at center of Target. Tighten Set Screws (Bolt).
Pump Runs Continuously	
Bad Contactors	Check Contactors to see if they have welded shut or just stuck. If they are welded shut, they need to be replaced.
Bad Solid State Relay	Check Input and Output voltages. The relay may need replacing. If you have Input voltage and no Output voltage, it's bad. If there is Output voltage, but no Input voltage, the Output is shorted and needs to be replaced.
Bad Board	Check the LED Outputs for proper operation.
Bad Pressure Switch (Pressurized System)	Incorrect cut-off pressure; adjust switch
Motor Runs Hot	
Something in the Pump	Take pump apart to see what the problem is.
Tank Drain Knob in Wrong Position	Check valve to make sure it is in game position. Rotate knob to check position.

TROUBLESHOOTING – WATER PUMP SYSTEM

PROBLEM/CAUSE	SUGGESTED FIX
Motor Does Not Run	
Bad Solid State Relay	Check input and output voltages. If there is input voltage, but no Output, it is bad. Replace it.
Insufficient voltage at Pump Motors (motors hum and/or Run very hot). 110VAC at Pump instead of 220VAC	Make sure lead lines are connected to opposite phases.
High pressure reading on Pressure relieve valve at pump.	Gate valve for that pump closed open valve, close the valve for the Pump that is not being used.
Pump runs while Blue Water Fills and shuts off when Blue Water is not filling.	See “When the Game is down Longer than 30 Days” in the MAINTENANCE Section of the Manual.
Pump Runs Continuously	
Pressure Plate in Pressure Switch jammed.	Remove the Cover of the Pressure witch (with the Power off). Examine the movement of the Contact Plate that moves to Open And Close the Contacts. Look for Anything that it might rub against that may prevent it from moving (a screw for example). Correct the problem.

TROUBLESHOOTING – WATER PUMP SYSTEM

PROBLEM/CAUSE	SUGGESTED FIX
No Water Shooting Out of Guns	
Check all of the **PROBLEMS** listed Above	
Solenoid Valve not Operating	Check Relay Board. Is Relay Operating? Is LED on Board perating when you shoot the Gun? If LED comes on, probably a bad Relay.
Gun Tip Clogged	Clean Gun Tip with #57 Drill Bit by hand. **DO NOT USE ELECTRIC DRILL – USING THE DRILL BIT IN AN LECTRIC DRILL WILL AMAGE GUN TIPS!** Shoot Gun With Brass Tip removed.
No Pressure On One Unit	
Clogged Tip	Remove Tip and see if Gun operates.
Bad Relay	Does Relay operate? Does LED on the board operate when gun shoots? If LED comes on, it's probably a bad Relay.
Guns Shoot Over or Around the Counter	
Gun Not at Correct Height	Loosen Set Screws and adjust to correct height (when gun tips back, the lower part of gun handle should be one (1) inch above the Counter top).

PARTS LIST

PART #	DESCRIPTION
CX000090	Tube Assembly
E0003800	Relay 12VDC KHAU-17D12
E0012400	Footswitch Assembly
E0012900	Switch Pushbutton N/O
E0013600	Switch, Micro, Water Game YZ
E0022680	Power Supply 12V, 9 Amp Phi-hong
E0023375	Transformer, Neon Alanson
E0023600	Fuse 2 Amp
E0023625	Fuse 2 Amps SB. MDL-2
E0024000	Fuse 7 ½ Amp, AGC
E0028500	Bulb, 40W for Top Globe 120V
E0028600	Bulb, 25W RS for Target 120V
E0029105	Bulb Blue Beacon 14V-27W-1A
E0029800	I.D. Light 14V Amber
EX012770	Switch, Liquid Level N/C M3326
EX033100	Footswitch Assembly
EX033446	Board Assemble – Relay BSR9010
EX033442	Board Assembly – Relay BSR9020
EX033420	2400 Module
EX033490	Display Assembly
EX033609	3 Digit LED Display
EX033611	2 Digit LED Display
EX033631	Small Relay Board
EX033658	2400 Processor Board
M0002200	Decal SHOOT HERE w/Clear
M0005300	CRC Spray, @0-Ounce Can
M0006101	Springs, BSR551, 57-112
M0006102	Spring B121-3B, 57-114
M0006103	Brass Tip Nozzle
M0006104	Water Gun Tip Cleaner w/#57 Drill
M0006200	Water Gun O Rings 57-158
M0006300	Retainer 58-3
M0006302	Stem 57-113
M0006500	Heat Proof Grease
M0010900	Screwlox, Driver #2
MX010200	Water Hose Complete Assembly
MX010300	Water Gun Complete Assembly
MX010360	Water Gun Rebuild Kit

PARTS LIST

PART #	DESCRIPTION
MX010200	Water Hose Complete Assembly
MX010300	Water Gun Complete Assembly
MX010360	Water Gun Rebuild Kit
MX010380	Gun Barrel Old Style (For Binks Guns)
MX010390	Gun Barrel New Style (Arcade Style Guns)
MX010750	Thru-Hull Assembly
P0007700	Electric Valve, 120/60, 110/50
P0007705	Valve Electric 12VDC 1/8" RW
P0007708	Valve Electric 12VDC RW FILL
P0007720	Valve Electric 12VDC RW DRAIN
P0007825	Pressurized System Watts Valve 1 ¼"
P0008050	Valve, Needle 3/8"
P0008700	Water Filter
P0008750	Filter O Ring
P0008800	Water Filter Cartridge
P0009985	Dynarod 18"
WX040000	Arcade Water Gun Assembly

TROUBLESHOOTING

TROUBLE SHOOTING

K.I.S.S. - KEEP IT SIMPLE & SIMPLER

Look for the simple things first. Most problems, about 90%, occur with BSR equipment are simple things that are overlooked.

- Loose wires
- Bad Connections
- Loose modules or relays
- Something has been changed around bye someone else's action

Example: Someone plugs a wire connector into a wrong plug or someone disconnects something.

ELECTRONIC RESET PRECEDURES

There are 2 ways to reset your game. One is "CB OFF" (Computer Board Off) button and 2nd is game power breaker. First try the "CB OFF" (Computer Board Off) button
Located at each end of the game where start and stow push buttons are. Second turn the game power breaker off at the power panel, wait 16 seconds and turn breaker back on. Something to remember – 2400 electronics is a computer, if it gets "lost" it must be reset to start over properly.

ACTIVATED TARGET SWITCH

Hung or struck Water Game target switches ("SHOOT HERE"), Roll A Ball™ target switches or Mole switches can cause an unfair and revenue losing problem. To cure this, our 2400 Electronics senses this problem before it is too late. If one of the three above symptoms arises the foot-switch for the problem unit simply will not turn on. If you have a foot-switch that lights when turned on and goes out when foot-switch is released you must fix the stuck target switch before this unit will turn on.

ACTIVATED WIN SWITCH

Hung or stuck win switches can cause confusion, when you push "Forward" button the game or unit automatically wins immediately without reaching the end of the track. To eliminate this problem in 2400 Electronics we simply turn the problem unit off when the game is started. If you have a unit that turns off when a race is started, check the win switch for problems. All other units will continue to operate normally so not to confuse the whole game.

FUSE PROTECTION

Your game has fuses located and for the following:

Power supply/bridge rectifier protection; – located beside power supplies in power supply box (See Power Supply Layout). The ID light beside the fuse post represents a fuse in proper working order when lit.

Relay board fuses – Mounted on Master Relay and Unit Relay Boards.

Surge protectors – mounted on breaker panels.

Depending on game there are numerous fuses located throughout the game. Be familiar with these locations and check these first when problems arise.

BRIDGE RECTIFIERS

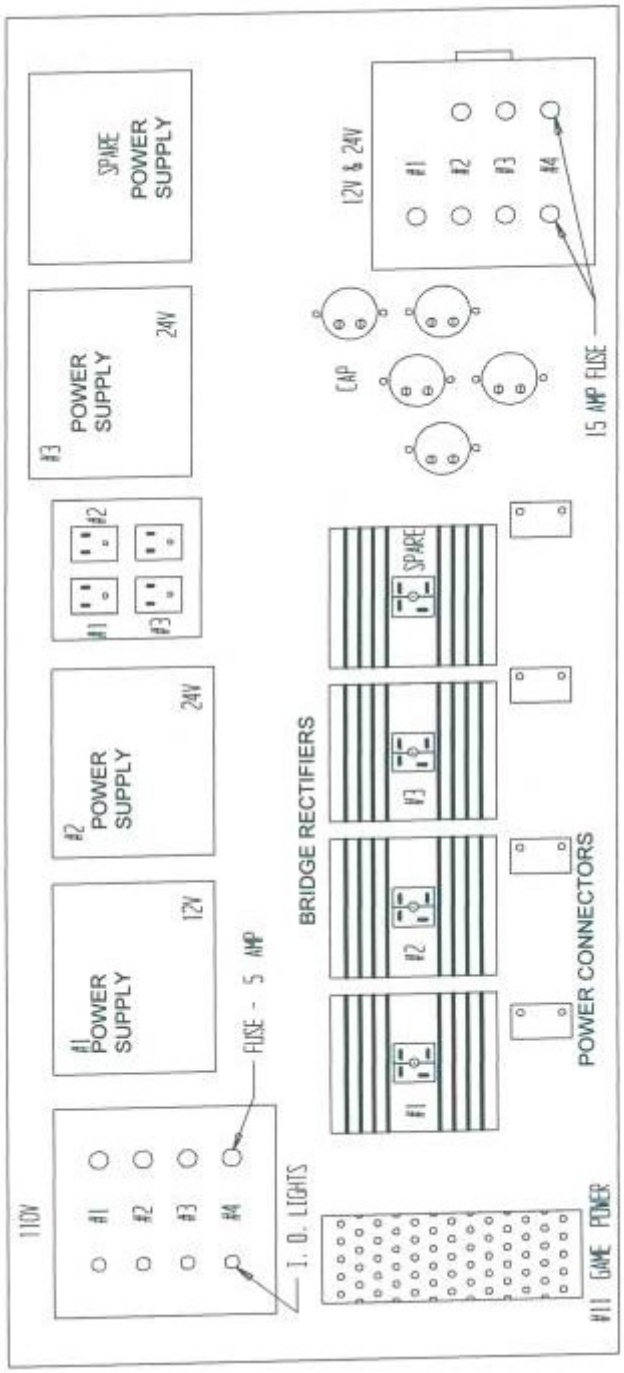
Your game also has bridge rectifiers. If fuses in the power supply box blow immediately when replaced the bridge rectifier for that fuse must be replaced. If your game has a certain number of units not working, i.e.: four in a row on one side of game. The cause would be a blown bridge rectifier and fuse. In this condition both fuse and bridge rectifier will be blown.

INTERMITTENT & ERRATIC PROBLEMS

If the game is demonstrating erratic behavior that doesn't affect multiple units it's best to power down the game then power the game back up. If the problem continues, write down the symptoms and/or behaviors, and call Bob's Space Racers Tech Service for help in repairing the problem.

Intermittent problems are the hardest to find and cure. If you have an intermittent problem please keep details on the problem, symptoms and details on when the problem occurs. Note how it is fixed or when it stops having problems. Contact Bob's Space Racers Tech Services with the problem details.

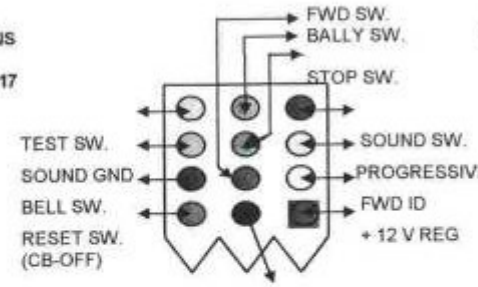
POWER SUPPLY LAYOUT



2400 SERIES ELECTRONICS

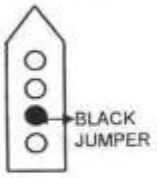
2400 MASTER BOARD

FEMALE PLUG - MALE PINS
PUSH BUTTON STATION - J18 & J19



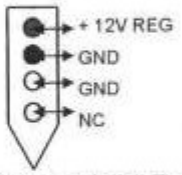
EMALE PLUG - MALE PINS

UPER SHIFTER
MAS TREE - J8



MALE PLUG - MALE PINS

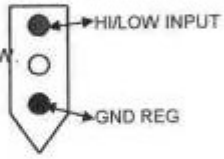
REG + 12V - POWER - J17
18/5



Pins 1 & 2 Not Used At This Time

MALE PLUG - FEMALE PINS

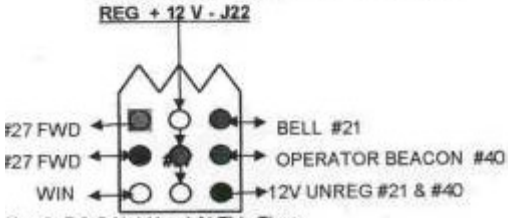
HI/LO SWITCH - J21
#23 - 22/2



- 12V REG

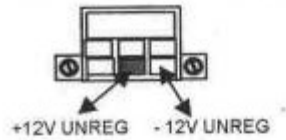
FEMALE PLUG - MALE PINS

REG + 12 V - J22

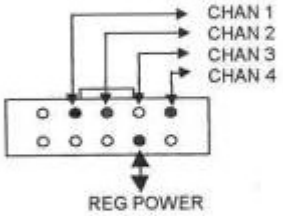


Pins 2, 7 & 8 Not Used At This Time

UNREG + 12V - POWER - J23

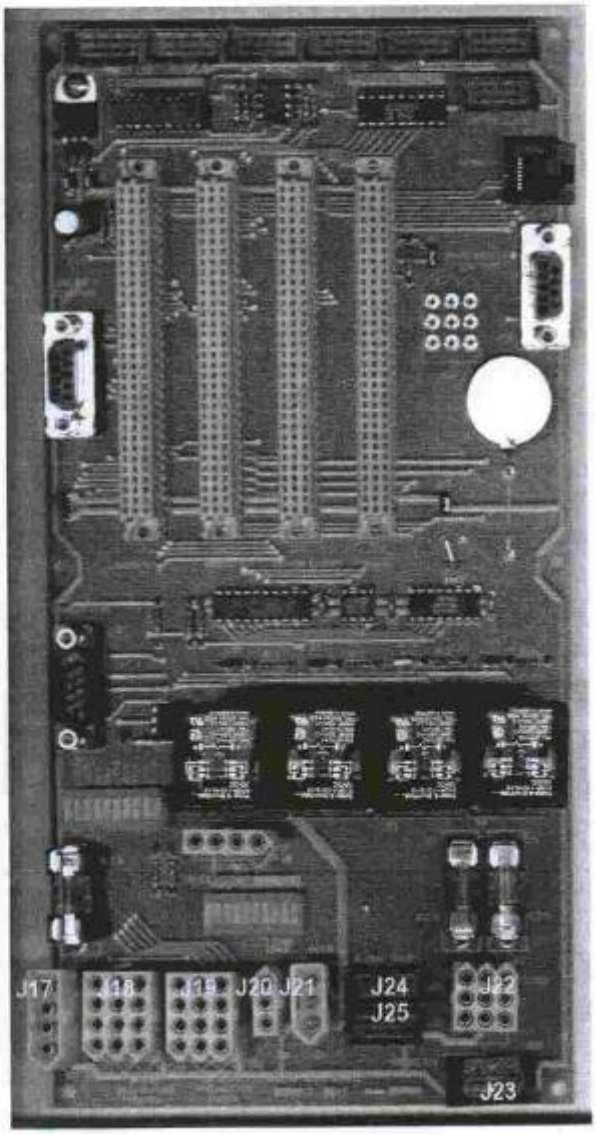


4 CHANNEL CHASE - J24 & J25
22/5 - #36

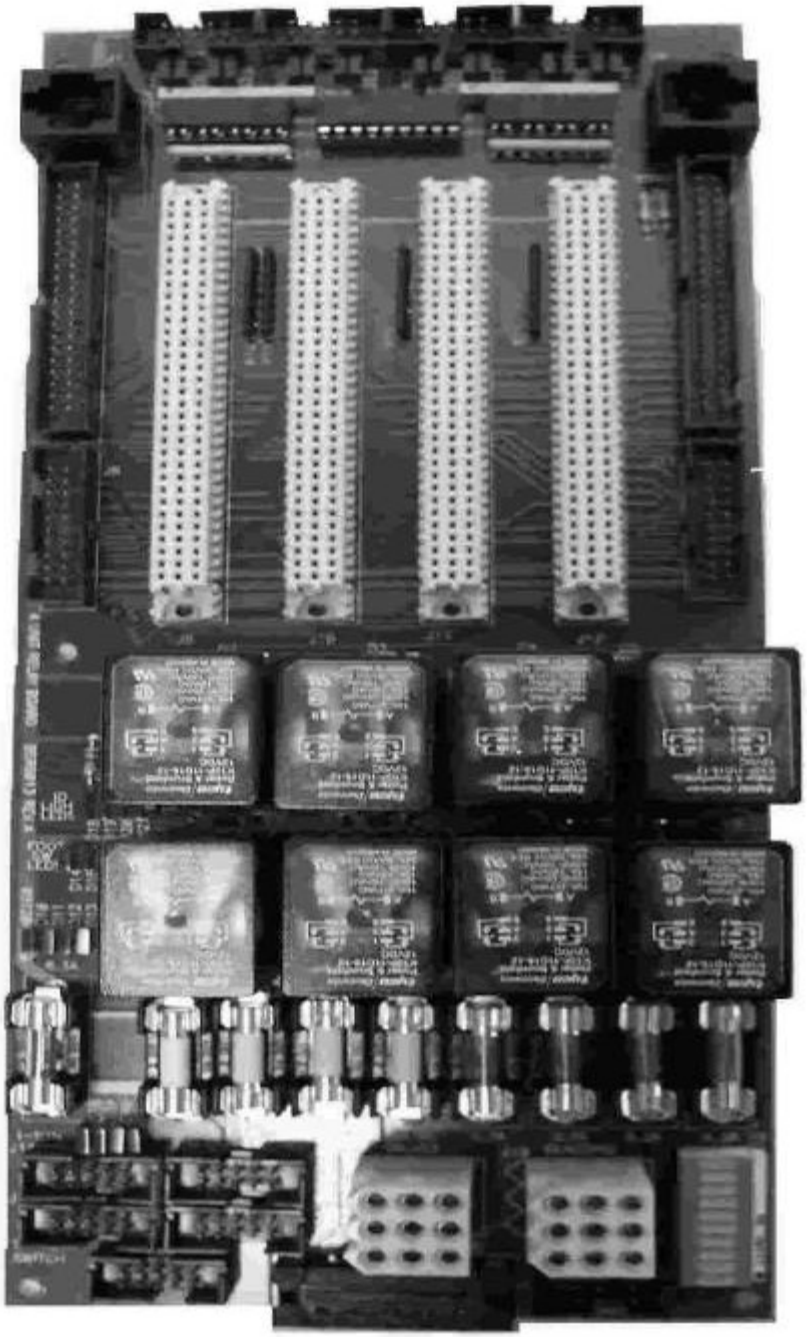


LED SWITCH ARRAY BLOCK

1	+12VR
2	FWD ID
3	PRAC
4	SSEQ
5	STOP
6	BALLY
7	FWD
8	TEST
9	BELL
10	RESET



2400 UNIT MODULAR BOARD



MODULES

The Modules serve as the units' individual controller board, while containing our latest innovative electronics. This electronic set-up is designed with the customers' best interest in mind. The modules provide an easy maintenance tool and prevent the entire game from crashing when only one unit is down or inoperative.

When a unit is down and all practical trouble shooting solutions have been exhausted, the problem may exist on an electronic level. Ensure all modules and boards have their LED's ON to indicate regulated 12V DC power exists.

There are several possibilities to be considered:

a. Is the entire game inoperative or down?
b. Is there one or two units that are inoperative?
c. Do both inoperative units have anything in common?
    i. Do the bad units share the same Module Relay Board?
    ii. Do the bad units have a fuse or wiring harness in common?

Module LED definitions:

- Red (or red with yellow, typically red without green): This means a critical area of failure.
- Red alone means a network fault.
- Red with irregularly flashing green means incorrect addressing.
- Yellow means invariable win line (shuts off when there is a WIN at the end of the race and comes back on).
- Flashing green indicates module is working correctly and there is normal traffic on the network.
- Red with solid green indicates an error but not necessarily an error that will cause shutdown.

In the event a module is plugged into the wrong spot, there are three distinctive LED's flashes on the module:

One flash indicates correct networking sequence
Two flashes and one long pause indicates the module for slot two (accounting module) is in the wrong port (or spot).
Three flashes and one long pause indicates the module for slot three (player clock module) is in the wrong port (or spot).

Visually look for proper illumination of all module LED's and for irregular symptoms. If all of the module LED's are correctly lit, then take note of the LED's for: footswitches, I.D. lights, valves, etc. These LED's are for you, the customer, to visually look at and determine what area is at fault or activated improperly.

Troubleshooting is easiest done by a process of elimination. It would help to determine which half of the game the problem exists in. For example: Activating the footswitch does nothing, – no I.D. light. Does the unit go into forward (in the event that the I.D. light is bad), you can easily determine, by looking at the Module Relay Board, if the footswitch I.D. light illuminates. If it does, then you know that footswitch and its wiring to the board are good. If the light doesn't illuminate, you can be pretty certain that either the footswitch or its wiring (prior to the board) is bad.

Lastly, determine whether all visual inspections have been exhausted. If so, then you will need to ensure that all the boards and electronics are receiving the correct voltages to operate correctly. The electronics are supplied with three types of voltages: 12V DC regulated 12V DC unregulated, and 24V DC unregulated.

ELECTRONIC SELF DIAGNOSTICS – MODULES

MASTER RELAY BOARD

"Green is Go – Red is Stop" Green LED's mean everything is connected in proper slots and in proper communication with other components. Red shows an error in your module or module location. Master 1 and units are interchangeable. Master 2 must be in Master 2 slot only. Player clock must be in player clock location only. Your spare Unit or Master 1 module is located in spare slot. (See Board Layout)

UNIT RELAY BOARD

Green LED's mean everything is connected in their proper slots. A blinking red LED means the module is plugged into a wrong location. If the module flashes at constant rate it means it belongs in either a Master or Unit location (they don't care which) and it's in the wrong location. If a module flashes twice and goes out for a period of time and flashes twice again. That means it belongs in the Master 2 position of the Master Relay Board. If the module flashes three times on the red LED and goes out for a period of time, then flashes three times again. That indicates it belongs in the number 3 position or the Player Clock location of the Master Relay Board.

MODULE CHANGES & UPDATES

When you receive an update or replacement module it can go into one of several sockets on your Master Relay Board. If the module does not have a label on it, you can put it in any of the positions other than "Master 2" or "Player Clock". These specific sockets are labeled on the Master Relay Board. The Master Relay Board is mounted to the far left side of your Control Electronics Box. The Master Relay board has four sockets; they are labeled from left to right, "Master 1", "Master 2", "Player Clock", and "Spare".

All the modules have the same features other than Player Clock and Master 2. If you receive a Player Clock or Master 2 module they will be labeled as such. Generally if a module is received it is labeled Master 1, which means it has a problem updating for the game. The Master 1 location has the ability to update the program to the rest of the game. In order to insert any of the modules you must make sure your game electronics is "OFF". You will notice that the three LED's on the edge of the module are out completely. At that point insert the module into the correct position, removing the old module if one is in that position. The module should be inserted so the LED's (small yellow, red and green light) are toward the bottom. It should plug securely into place. That module should be at the same height as the other modules in place and not at any angle. Now you can apply game power - turn on the circuit breaker or plug it into the wall power, all the modules should light up at least the green lights.

When a Master 2 module (which keeps track of what time it is) is inserted into a game; the time must be set for your time zone. To do this, go to the display with the accounting features (picture page 14). Hold down the two middle buttons on the display. Then turn the key, it should display "YEAR = "and a "DOWN" buttons PRESS the "ENTER" key. The four buttons have the following features; the left hand button is "MODE" as is says in the bottom of the display. When you press his button it advances to the next option without modifying any settings. The next two buttons are "UP" and "DOWN"; to change the value of the given setting. When you change the value in the display the setting does not 'take' until you press the "ENTER" button which is the far right button. If you press the MODE button instead of the ENTER button, you advance to the next location without changing the option; even though you saw the value change. You must press ENTER for the change to be made in the register. The year value is a two digit number from 00 to 99 (this program takes into account the year 2000) and is accurate to the year 2099.

Now set the month; which is from 01 for January to 12 for December. Press ENTER after that value is set correctly. Next set the time; there is no AM or PM value we use a 24 hour format. If you want 8PM, the setting would be 8 + 12 or 20 for the value the press “ENTER”. The next setting is for minute; set the correct number of minutes and press ENTER. Turn the key back off and it will return to the accounting function.

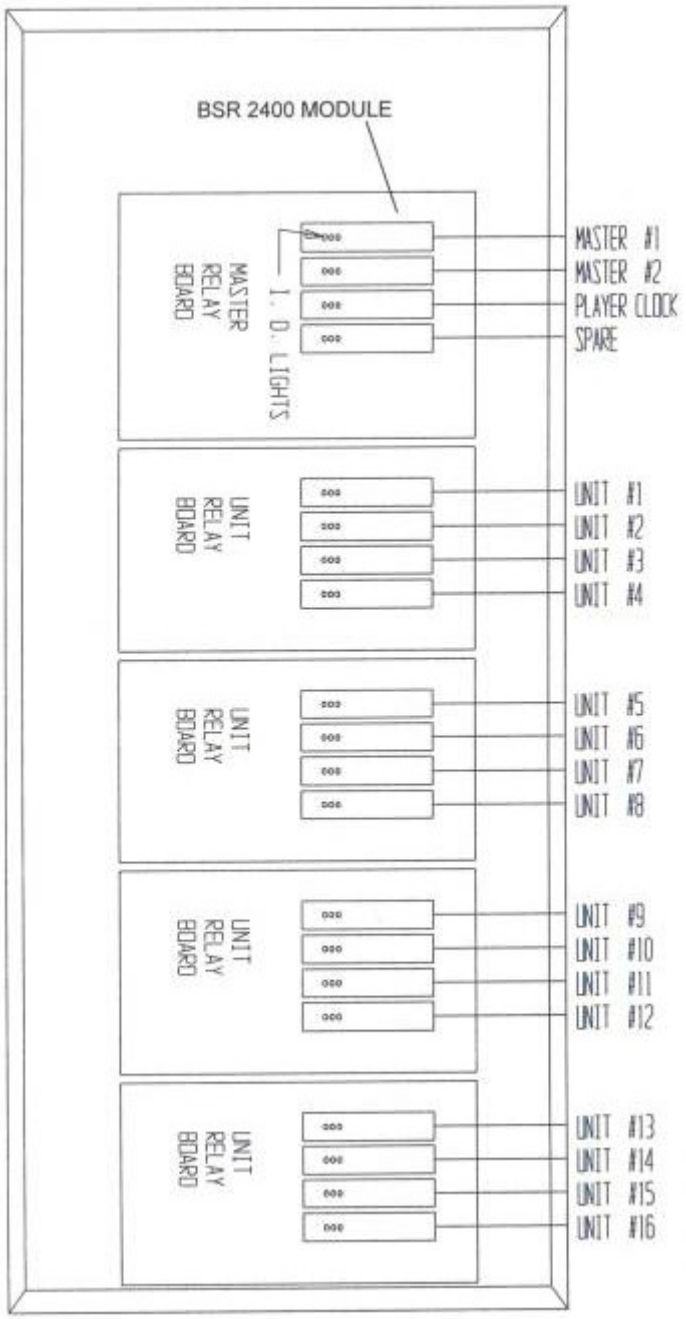
If you receive an updated Player Clock module there are not settings for it, when plugged it will just do its job.

If you receive a module and it has no label and it is a replacement for example unit #3 module the following procedure must be implements. After the module is inserted into the correct location, you will need to do a systems download to get your games current program into the replacement module. If you have received an update Master 1 or program, the module belongs in the Master 1 location and a download needs to take place in order for the rest of the game to have all the updates. To download the program for the rest of the game, if a Master 1 has been changed, or if one of the unit modules has been changed, with the game power on locate the game MULTI-LINE LCD units. Turn the key to the on position. The display should read “GAME TYPE” and a value (refer to your game options sheet). Depress the left “MODE” button, this will advance through the options, with the left button still being held down, press the far right button for at least one second. “After 2 seconds the display will say ‘DOWNLOADING UNIT”. At that point, you can let go of the buttons and turn the key off; it will download the program to the rest of the modules and will ensure no conflicts between any of the modules. During the time they are downloading the yellow and red LED’s on the modules are taking in new program values. When this is complete, the red LED will go out, and the yellow and green LED’s will come on, bright.

If you insert a module and after power up you see a red LED flashing, it indicates a module is plugged into a wrong location. If the module flashes in a constant rate it means it belongs in either a Master or Unit location (they don’t care which) and it’s in the wrong location. If a module flashes twice and goes out for a period of time and flashes twice again. That means it belongs in the Master 2 position of the Master Relay Board. If the module flashes three times on the red LED and goes out for a period of time, then flashes three times again. That indicates it belongs in the number 3 position or the Player Clock socket of the Master Relay board.

If you have any problems during the downloading process or it the game is not working correctly after download, please call BOB’S SPACE RACERS® for further technical support help. Try to identify which LED’s are “ON”, which module. Generally speaking, you should see that most of the modules have the same lights on, in the same pattern. There may be one or two that are different. Make note which locations are different, to aid in troubleshooting with a technician.

2400 RELAY BOARD LAYOUT
(MODULE LAYOUT)



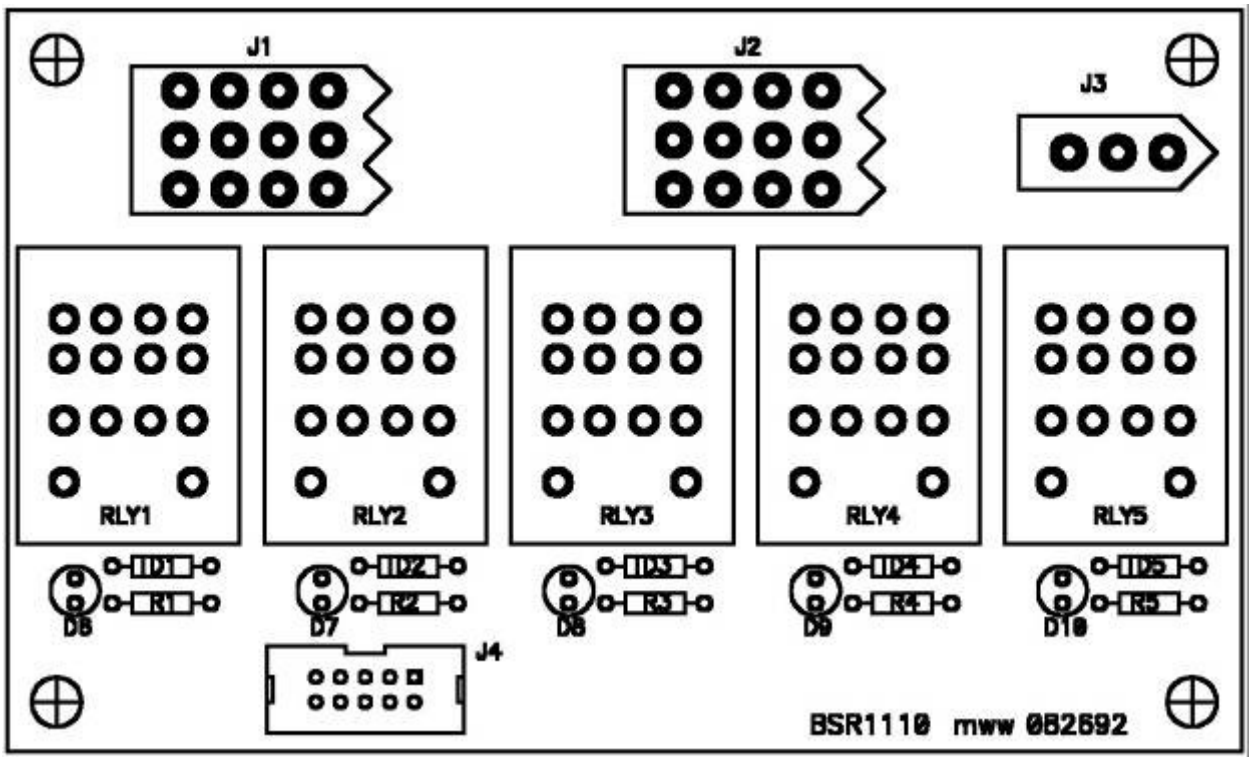
RELAY BOARD
Overview and Diagram

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 only.

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.

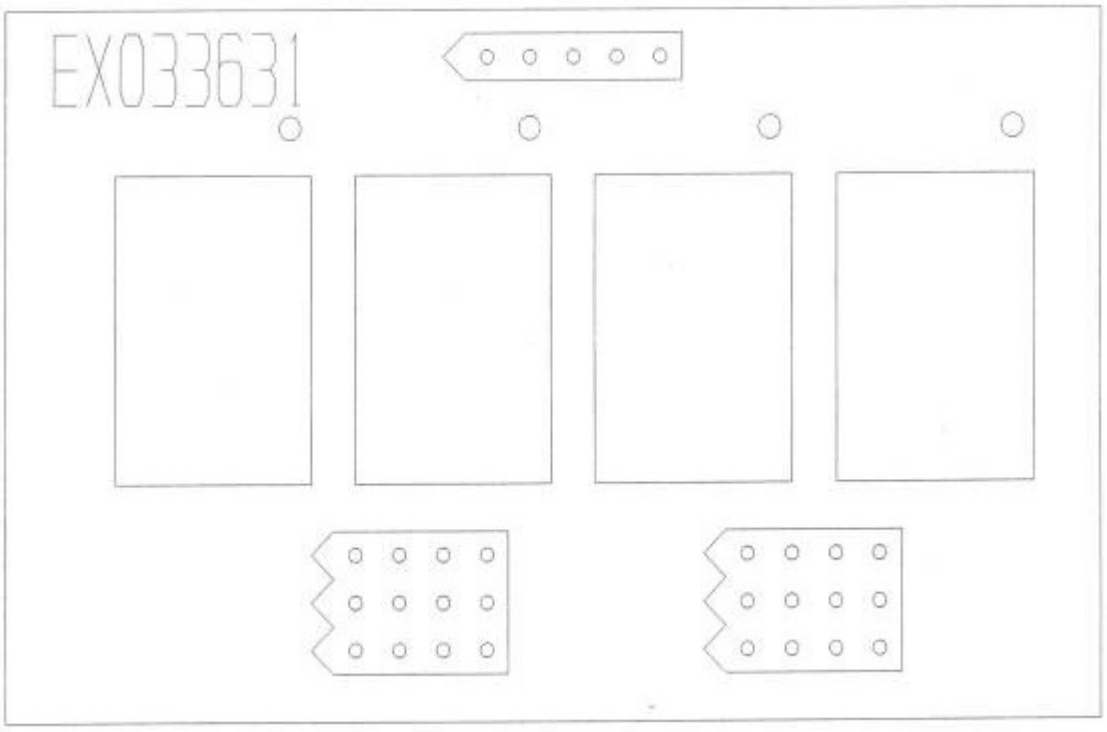


MODULE RELAY BOARD OVERVIEW

The Module Relay board controls the Stepper motor. The module relay board is thoroughly labeled and has indicator LED's for instantaneous indication of game activity.

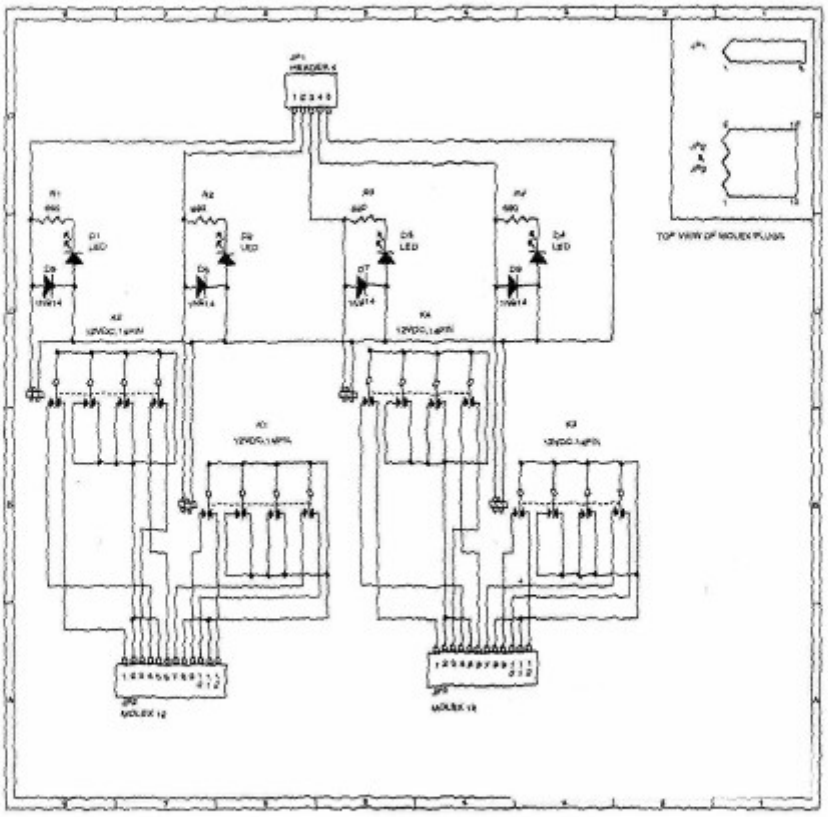
There are CAT5 (RJ45) connectors for networking multiple units and for the Master board. The master board controls overall function of the entire game (i.e. start, stop, winner determination, etc).

Master board and the On Tap module relay board contain both regulated 12V DC and unregulated 12VDC with the addition of 24V DC unregulated power.



MODULE RELAY BOARD SCHEMATIC

4 RELAYS



STEPPER MOTOR CONTROLLER BOARD OVERVIEW

The Stepper Motor requires a Controller Board to operate.

The operation of the Board is as follows:

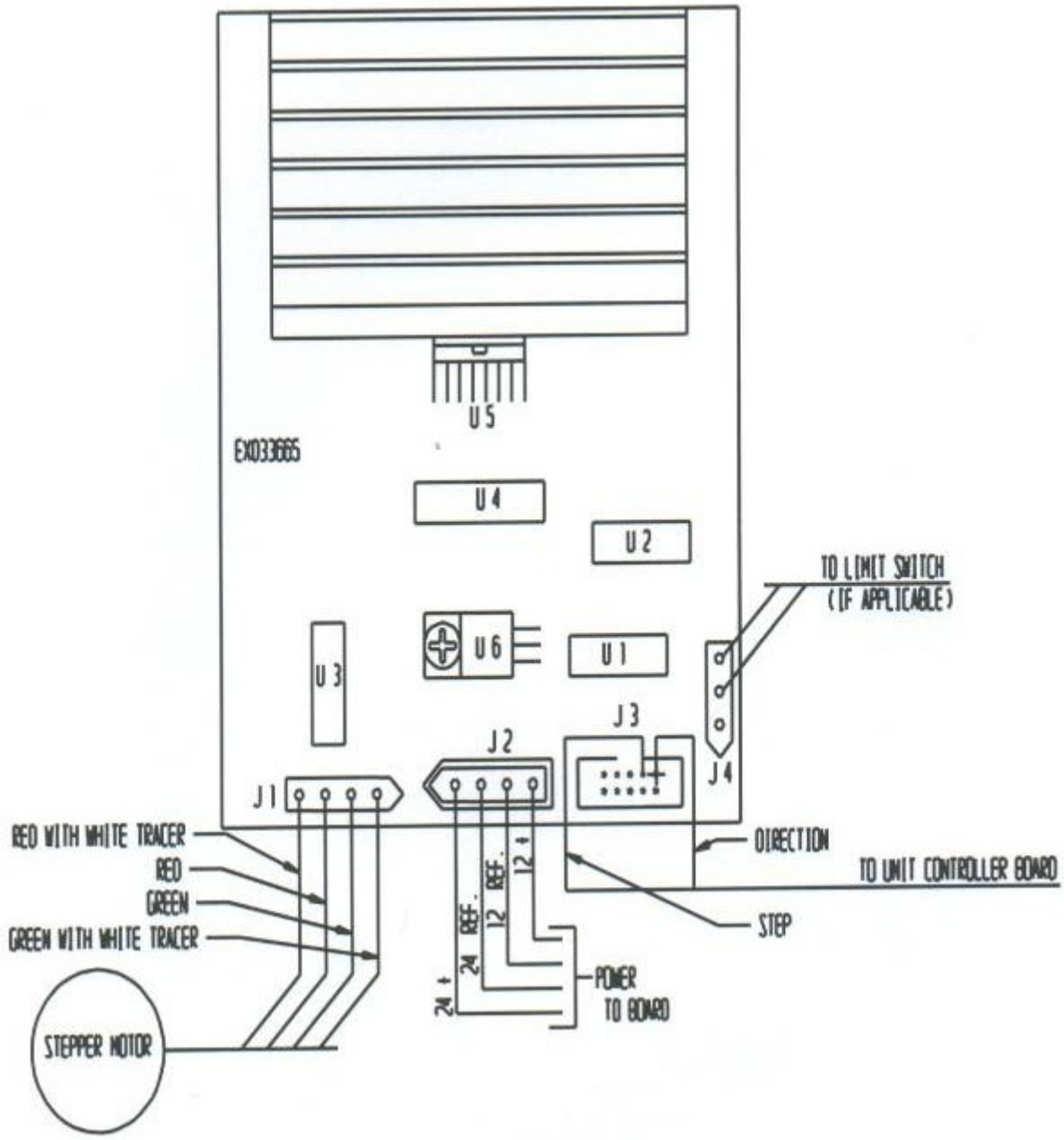
The Input signals, step and direction, on connector J3, are opto-coupled through the Opto-coupler (PC817-4). The voltage for the motors is supplied via connector J1. That signal is a 'chopped' H-bridge bipolar output. J2 is the +12VDC and +24VDC for the Control Board and Motor. As part of the operation of the Board, we use a Timer IC, SN74123N. After two seconds, if the Board doesn't sense the step signal, it will go to reduced power mode. The input signals from the Controller Board (step and direction) come in on connector J3.

Bob's Space Racers® has four versions of Stepper Motor Boards, Rev. A/B, and Rev. C/D. Each board has three jumper locations; Rev. A/B has JP1, JP2, JP3, Rev C/D has JP2, JP3, and JP4. JP1 should be jumpered on Rev. A. boards and was eliminated on Rev. C. JP1 is to select between 1.2 Amp Output and 1 Amp Output. When the jumper is inserted, the board is in 1.2 Amp Mode. **DO NOT** remove this jumper unless you are instructed to do so by a **Bob's Space Racer®** Technician. JP2 forces the Board into Full Step Mode (fast spinning). Usually, this jumper is removed, causing the Board to be in half Step Mode (slow spinning). With no jumper present, the half/full step signal can be controlled by grounding Pin 5 on J3. JP3 will provide 12VDC to the opto-couplers from the board. With JP3 out, the step, direction, and half/full step signals will be required to supply +12VDC for the Opto-couplers (this Option allowed the inputs to be twisted pairs for higher signal to noise ratio, if required). JP4 is available for an auxiliary fan, although one should not be required. **Never remove or add any jumpers unless you are instructed to be Bob's Space Racers Technician.**

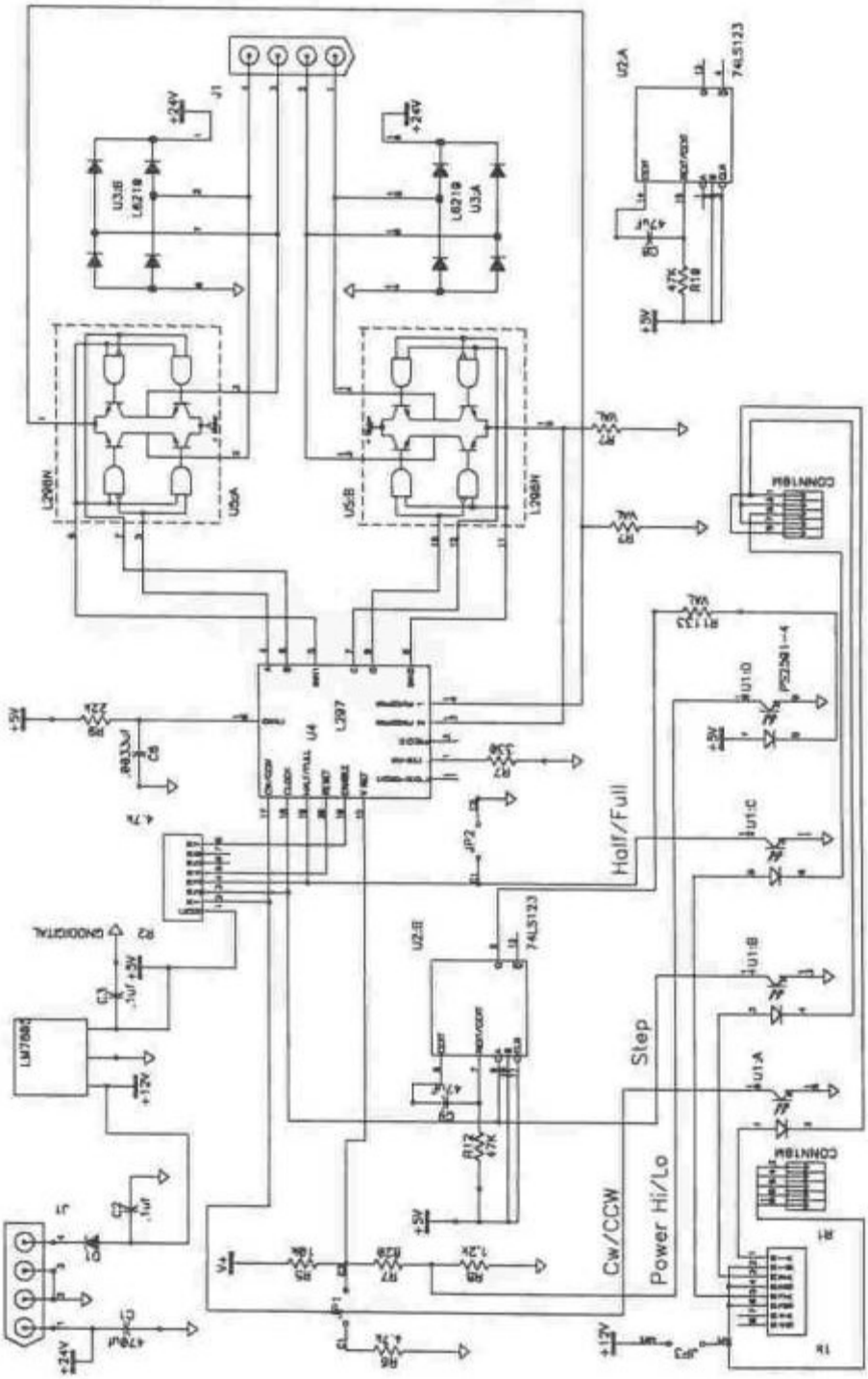
The inputs are opto-coupled by U1 (PC817-4), sent to U4, a translator/generator (L297) and then final output driver (L298N). A L6210 diode bridge is attached to the outputs for protection from back EMF.

To increase motor life, and decrease heat, we use a timing circuit that detects motor "steps", after about 2 seconds, if U2 (SN74123N) does not sense a signal the board will go into reduced power mode. JP2 on both boards, changes whether the motor is in full or half step mode. Normally, JP2 is not jumpered and the motor is in half step mode. JP3 is almost always jumpered and supplies 12VDC to the opto-couplers. JP4 is available for an auxiliary fan, although one should not be required. Never remove or add any jumpers unless you are instructed by a technician from Bob's Space Racers® to do so.

STEPPER MOTOR CONTROLLER BOARD LAYOUT



STEPPER MOTOR CONTROLLER BOARD SCHEMATIC



TROUBLESHOOTING – 2400 SERIES ELECTRONICS

PROBLEMS/CAUSES	SUGGESTED FIX
Game Will Not Coin Up	
Bad Coin Switch	Check coin switch using an Ohm meter. If it's bad, then replace.
Bad Front Panel (Register Select)	Check the 20-pin connector on the Front Panel Board for a good connection. If you have a 2-player game, swap boards between units to see if the problem follows the board. Check for 12V DC power.
Game Coins Up Automatically	
Bad Coin Switch	If it's stuck, then replace.
Wrong Option Register Setting	Check option settings for both 'number of coins' and 'autostart' to be certain that they have been set to the correct settings.
Game Speed Too Slow Or Too Fast	
Wrong Option Register Setting	Check **all** option settings to be certain they have been set to the correct settings.

NOTE: The 2400 Module Electronics have been designed to assist you (the customer) in troubleshooting without any doubts in mind. Each and every sequence of events in the game is verified by an LED. You should be able to see a corresponding LED activate for each switch, button, or game activity that happens.

MISCELLANEOUS

GAME PARTS LIST

PART #	DESCRIPTION
E0022680	Phi-Hong Power Supply 12V, 9 Amps
M0006104	Water Gun Tip Cleaner w/Drill #57
M0010900	Screwlox, Driver #2
E0020600	***Contactor (only) for Pump***
PX011600-LS	Pump Assy Water ½ hp 60 Hz
PX011130	Screen Water Tank
P0008800	Cartridge Water Filter
WX040002	Gun Assembly Toddler Arcade Style
P0009980	Dynarod 9" Cell Arc Water Games
E0025100	Meter 12V DC Eaton-Durant
M0009256	Coin Mech Ticket Dr w/Sbz Lock No Display
EX000325	Filter EMI Assy w/Brkt Arc Games
E0027390	***Speaker 4" JC5FD Round***
EX033665	Board Assy Stepping Motor
E0028500	Bulb 40W/130V Top Globe 374660
EX030900	Light Target Assm complete w/Brkt
EX007681	Motor Stepping and Bracket Assy Vert
E0027145	Cord 10' SJTO w/Plug and F225 Socket U/L
EX013600	Target Switch YZ Wired
EX033420	Board Assy Module
EX004035-SBZ	Coin Box Assy Arc –SBZ- Free Fall/LIL Sqrt
E0003400	Relay 24V DC 20Q3CD024
H0013200	Chain #3 Hi-Sheen Double Loop
MX007206	Target Pan Complete SBZ LIL Squirt Fire

APPENDICES

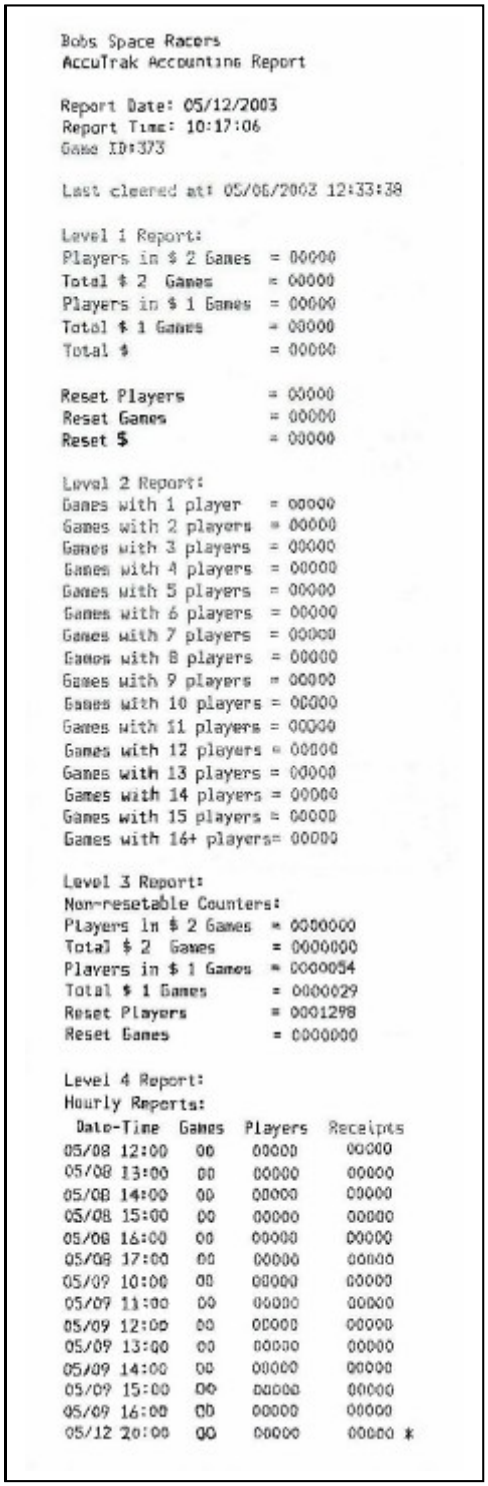
ACCOUNTING

ACCOUNTING SYSTEM

On the 2400 Electronics the Accounting Systems is integrated in with the game electronics. There is no wiring harness to connect it to the rest of the game or individual units. The external wiring for the Accounting System includes 2 cables plugged into the Master Relay Board. There is a connector marked 'MASTER 2 PRINTER PORT' ON THE Master Relay Board, which has a cable that runs down to the printer in the game, and a Ribbon Cable above the Spare Module that is labeled 'ACCOUNTING LCD". Even with the printer or the LCD cable not plugged in, the accounting system continues to accumulate information. Whenever a good LCD or printer is plugged in, all the tallied information will be available.

To locate the BSR MULTI-LINE LCD for the accounting system simply read the display. The message on the display will read out "ACCT2400", on the bottom left side of the display. When you turn the key on, it will display 'PRINT REPORT?' across the top. On the bottom line it will say 'NEXT' above the far left button and above the far right button it will read 'yes". If you press the button below the word "NEXT", it will sequence through a number of settings from 'PRINT REPORT' to 'HI PLAYERS' to 'HI GAMES' to 'LO PLAYERS' to 'LO GAMES', then to 'erase data'. If you then press button below the word 'YES' when the display reads 'ERASE DATA' it will clear the data and default back to 'PRINT REPORT' display.

2400 G MODULE ELECTRONICS' ACCOUNTING SYSTEM
OVERVIEW



```
Bobs Space Racers
AccuTrak Accounting Report

Report Date: 05/12/2003
Report Time: 10:17:06
Game ID:373

Last cleared at: 05/06/2003 12:33:38

Level 1 Report:
Players in $ 2 Games  = 00000
Total $ 2  Games      = 00000
Players in $ 1 Games  = 00000
Total $ 1 Games       = 00000
Total $               = 00000

Reset Players         = 00000
Reset Games           = 00000
Reset $               = 00000

Level 2 Report:
Games with 1 player   = 00000
Games with 2 players  = 00000
Games with 3 players  = 00000
Games with 4 players  = 00000
Games with 5 players  = 00000
Games with 6 players  = 00000
Games with 7 players  = 00000
Games with 8 players  = 00000
Games with 9 players  = 00000
Games with 10 players = 00000
Games with 11 players = 00000
Games with 12 players = 00000
Games with 13 players = 00000
Games with 14 players = 00000
Games with 15 players = 00000
Games with 16+ players= 00000

Level 3 Report:
Non-resetable Counters:
Players In $ 2 Games  = 0000000
Total $ 2  Games      = 0000000
Players in $ 1 Games  = 0000054
Total $ 1 Games       = 0000029
Reset Players         = 0001298
Reset Games           = 0000000

Level 4 Report:
Hourly Reports:
  Date-Time  Games  Players  Receipts
05/08 12:00   00     00000     00000
05/08 13:00   00     00000     00000
05/08 14:00   00     00000     00000
05/08 15:00   00     00000     00000
05/08 16:00   00     00000     00000
05/08 17:00   00     00000     00000
05/09 10:00   00     00000     00000
05/09 11:00   00     00000     00000
05/09 12:00   00     00000     00000
05/09 13:00   00     00000     00000
05/09 14:00   00     00000     00000
05/09 15:00   00     00000     00000
05/09 16:00   00     00000     00000
05/12 20:00   00     00000     00000 *
```

When the display reads "PRINT REPORT" and you press the right hand button below the "YES", as shown on the previous page, a report will be printed, similar to the one shown on the left of this page. (See example at left). If no report is printed then you will need to make certain the printer is turned on. A green light on the face of the printer unit will come on when the printer has power to it. Also, check the paper supply to the printer; the paper is found inside the unit. If these items are fine and you still have no printing capabilities, then you will need to check the connection on the Master Relay Board. Examine the "MASTER 2 PRINTER PORT" on the Master Relay Board and make certain it is securely plugged in.

A printed report will have a heading that includes: 1) the Current Time and Date; 2) the Game Identification Number; and, 3) the Last Time and Date the Information was cleared from the Accounting System. Note: You should recognize it as the last time you cleared your meters! The report will then print a LEVEL 1 report providing you with the totals since the last time the system was cleared.

This Accounting System will also keep track of the total dollars for you. If you have the price sign option and if the price sign reads correctly, then this system will accumulate how many dollars the game was supposed to bring in since the last time it was cleared.

After Level 1, the report prints Level 2 which provides you with the number of races that were 1-player games, 2-player games, 3-player games, et cetera, up through 16-player games. If you have more than 16 units, then all of the games played with 16 or more players or more will be tallied on the "16+ players" line on the printed report.

Below Level 2 is Level 3, this consists of a set of total races that have ever been played. These values do not get cleared when you "ERASE DATA" and are considered non-resetable. (This part replaces the Mechanical Meters you may have in some of your older games).

2400 G MODULE ELECTRONICS' ACCOUNTING SYSTEM OVERVIEW

The last part to be printed is Level 4, which is an hourly report. This informs you of how many games were played each hour the machine was powered up (turned on). If the machine was not powered up there will be no report for that time frame.

When you are done using the BSR MULTI-LINE LCD, you need to turn the key to the "off" position. This key needs to be in the "off" position during game operation as well as when the game itself is powered down – it will not affect the operation of the game. If the key is left in the "on" position during the game operation it will not affect the game, nor will it affect the function of the BSR MULTI-LINE LCD. However, if the key is left in the "on" position it will affect your security! It will allow anyone to have access to your game's financial information and they will be able to erase it before you have a chance to record it in your books! It is very important that you do not leave the key in the "on" position for safety and security reasons!

For Games Using BSR I-Button Systems

1. At the Beginning of each day each BSR I-Button Operator is issued an I-Button with their starting bank.

2. At the end of their shift or when they turn in their starting bank, they must also turn in their I-Button.

3. The Cash Office Employee is to immediately print 2 copies of the operator's I-Button report (one for Cash Office and one for Cash Control).

4. The Group Game Operator must then write their name, badge ID and signature the 'I-Button' printout.

5. The Cash Office employee should record bag tag receipt numbers on duplicate I-Button printout.

6. The Cash Office employee should then staple the operators bag tags to the I-Button report and drop in drop box to cash control.

7. If there is a discrepancy the following day with the dollar amount on the game meters and the dollar amount reported by Cash Control for an I-Button Game, then the I-Button reports can be used to find the discrepancy.

BSR SUGGESTED Cash Office Procedures
For Games Using BSR I-Button Systems

Wearing the I-Button

1. The I-Button should be wrapped around the wrist or clipped to you belt loop.

Using the I-Button

1. Your I-Button is used to activate the Units (turn player on) in a game. After you take the money from a customer, you should immediately use your I-Button to activate the unit.

2. The 'I-Button' activates the unit by touching both the side and the top of the module. The quickest and easiest way to use the I-Button is to slide it in at an angle. This assures that the side and the top is touched. **Do Not Push Hard On the I-Button.**

3. You must leave the I-Button on the module until the red lights flash in a circular motion. This indicates that the unit is activated.

4. To deactivate a unit, the **Same** I-Button that activated it must be placed back on the module and held there until the unit is turned off, **DO NOT REMOVE THE I- BUTTON UNTIL THE MODULE IS DE-ACTIVATED.** (Lights turn off).

5. If the I-Button is pulled away from the module to fast an error will occur. The module will have three flashing lights on it. If this happens the **Same** operator who activated the module must go back and hold their I-Button to the module. This will clear the error and activate the unit. **(The unit will not activate if error lights are flashing).**

6. Employees are accountable and responsible for all money receipts using I-Buttons. **Do not let anyone have access to or use your I-Button.**

BSR SUGGESTED Cash Office Procedures
For Games Using BSR I-Button Systems

Before an operator leaves a game using a BSR 'I-Button' system, they must drop the money they have made in that game in a drop box. This is done by the following steps:

1. Take all the money out of your apron; make sure you check all the pockets.

2. Count out your original starting bank and place it back in the apron.

3. Fill out a Drop Slip with you name, time, date, game number, and badge number.

4. Place all the remaining money and the Drip Slip in the sealable tamper proof bag. (TPB)

5. Rip the top numbered receipt off top of TPB and keep it to be turned in at the end of the night with your I-Button.

6. Seal the bag and write your name, game number and game name on the outside of the bag.

7. Drop the bag in the drop box at the game.

8. You are now ready to take your apron with your starting bank inside and leave the game.

9. When you turn in your starting bank at the end of the day, you also need to turn in your 'I-Button' and bag receipts.

OPERATOR ACCOUNTING SYSTEM OVERVIEW

The OAS keeps track of individual operators regardless of how many different games they work. This will ensure the money in the operator's apron will always match the amount on the I-Button. By tracking the

operator and not just the game, you make it almost impossible for someone to try to beat the system, one apron, one I-Button, and unlimited games.

Data no longer needs to be collected from the actual game. All the information needed will be brought to the appropriate area (cash control) in the I-Button. There are various ways to collect the money. The operator can count the money, print the report, and drop it all off at cash control with the I-Button. The operator can also bring the I-Button and money to cash control, where it will be counted and sorted. Any other methods which suit the location or cash procedures can also be used.

Re-printed reports will be marked “REPRINT” to avoid confusion.

All I-Buttons will have an incrementing collection number counting the number of prints; therefore, a missing printout will be noticed immediately.

There is no need to collect an operator’s money or get a printout every time they leave a game. An operator can work every game in the park without affecting the count.

Game numbers can be programmed to match existing customer locations.

By keeping track of the operator, you are keeping track of the money. Working hand in hand with the existing BSR Accounting System, your organization can now audit all aspects of the money collecting process. Game owners and loss prevention are given a check against operators and cash control.

Since the Operators printout can be separated from the individual game printouts, cash control does not need to have the totals of each game, only the total earning of each operator. The game earnings and operator earnings can then be compared at a higher level to see if everything balances, bringing cash control under the microscope.

OPERATOR ACCOUNTING SYSTEM OVERVIEW

I-Button

An ‘I-Button’ is a durable memory device which transfers information quickly and easily. Each I-Button has a unique serial number, making it possible to track individual operators. The information on an

Operator I-Button can be printer at any time, showing what games the operator worked, what times they worked, and how much money they made.

I-Button

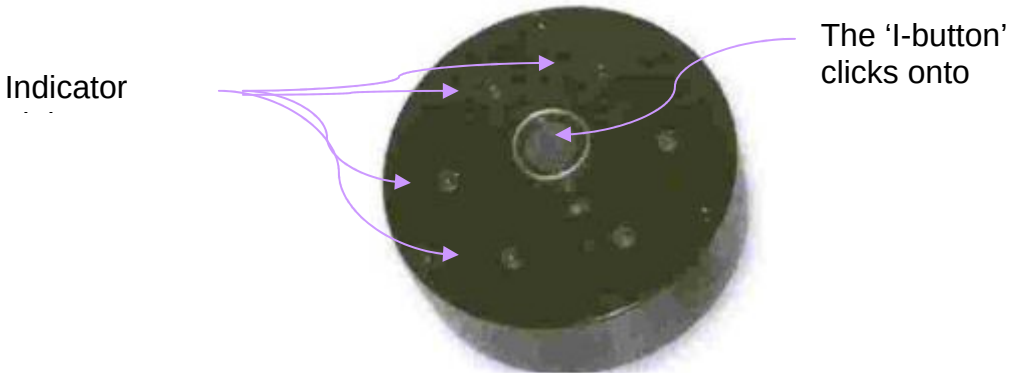
The head of the I-button is actually about the size of a nickel.

I-Button MODULE

Resembling a large watch battery, each I-Button has a unique serial number, which is programmed into the I-Button's memory making it possible to track individual operators. The 'I-Button' is used to activate a unit by touching it to an I-Button module. A special Master I-Button (RED) is used to program the Game Number and Price Point for the Game.

I-Button Module

I-Button MODULE



The OAS uses I-Button Modules, which read operator buttons (BLUE) and activate the units much like a traditional kick switch. Each I-Button Module has six indicator lights, which show the status of the unit.

The modules are mounted in front of each game unit, and easily accessible to the game operator. Only when an operator touches their I-Button to this module will the unit be activated.

Getting Started

Thank you for purchasing a BSR Operator Accounting System (OAS).

The OAS is an advanced accounting system; however, BSR developers took measures to ensure it is easy to operate.

The heart of the system is the I-Button. An 'I-Button' is a durable memory device, which transfers information, quickly and easily. Each I-Button has a unique serial number, making it possible to track individual operators.

The information on an Operator I-Button can be printed at any time, showing what games the operator worked, what times they worked, and how much money they made.

A special Master 'I-Button' (RED) is used to program the Game Number and Price Point for the game.

When the OAS is first installed, three lights may flash on the I-Button modules, this is because they need to be setup. Please follow the next few steps in order to get your OAS working for you.

Before you use the OAS, you must

Assign a unique Game Number to each game
Assign a Price Point to each game
Set the Time and Date on the printer
Please refer to Section 1 – Section 1 – Setting up the Printer and Section 2 – Setting Up The Game, for instructions on how to set these options

TROUBLESHOOTING: BSR-OAS

PROBLEMS/CAUSES	THE GAME
Lights on the unit flash in a triangle configuration.	Unit will not de-activate.
Unit activates for a few seconds, and then goes into error mode.	The unit takes a long time to turn on.

thoroughly. The probe on the printer should also be cleaned in a similar matter periodically.

THE PRINTER

Display shows “PRINTING...” but nothing is being printed.

Make sure printer is on and has paper. Make sure all connections are secure.

Display is too dark or too light.

Remove the four (4) screws on the front panel, which houses the display. Look on the back of the circuit board. Using a small flat head screwdriver adjust the contrast dial to the desired setting.

SUGGESTED FIX

The ‘I-button’ was removed too soon while activating or deactivating a unit. Touch the I-button to the unit until the lights turn off. Make sure the same I-button that caused the error is used.

This problem is the same as a "kick switch" that will not stay activated, and should be dealt with in the same manner. This is usually caused by a switch that is stuck (i.e. trigger switch, home switch).

This is caused when an ‘I-button’ other then the one which turned on the unit is used to deactivate the unit. Use the same I-button that activated the unit.

The probe on the module, or the ‘I-button’ itself may be dirty. Use rubbing alcohol or contact cleaner to clean both the I-button and the probe. Make sure you clean both the face and the sides

BEFORE USING YOU MUST –

OPERATOR ACCOUNTING SYSTEM

Section 1 – Setting Up The Printer

A Master-Button is needed to get into the printers Setup Menu. Hold a Master I-Button to the printer probe and the Setup Menu will appear as follows:

SET MENU
NEXT *EXIT*

Press *NEXT* to scroll through the menu options. To exit the Setup Menu press *EXIT.* To get back to this screen, cycle trough the setup menu options by pressing *NEXT* until this screen appears again.

Setting Time and Date

While in the Setup Menu press *NEXT* until you arrive at the following:

DATE *TIME*

NEXT *SET*

Press *SET* AND THE TIME AND DATE WILL APPEAR. Use the left button to choose what you want to change. Use the right button to increment the underlined selection.

NOTE: The time and date is stored in each individual Operator I-Button. Changes will not take effect in the I-Button until it is held to the printer.

Setting Number of Copies

This sets the number of copies that will be printed for each new printout; this allows you to customize the system to your cash control procedures.

While in the Setup Menu press *NEXT* **until you arrive at the following:**

COPIES = 1

NEXT *INC*

Press *INC* until the desired number of copies you want printed is selected.

Setting Auto Logout

This option allows you to automatically create a new block on the printout if the I-Button has been idle for the set amount of time. We recommend setting the Auto Logout. Time to the length of an operator's break, this way the system will automatically start a new block on the printout once their break is over. Setting this option will ensure you know when an operator's I-Button is not used for longer than the set amount of time.

While in the Setup Menu press *NEXT* until you arrive at the following:

AUTOLOGOUT = OFF
NEXT *INC*

Press *INC* until the desired amount of minutes for the auto ragout is selected.

NOTE: The Auto logout setting is stored in each individual Operator I-Button. Changes will not take effect in the I-Button until it is held to the printer.

Section 2 – Setting up the Game

The Game Number and Price Point of each game are set using a Master 'I-Button'; these options are programmed into the Master I-Button using the printer's set up menu.

NOTE: When a Master I-Button is held up to the printer probe, the Price Point and Game Number currently stored on that I-Button will be cleared.

Setting Price Point

While in the Setup Menu, press *NEXT* until you arrive at the following:

GAME $ = SAME
NEXT INC

Press *INC* until the desired price point is selected. When you have the desired price point press *SET*, the following message will appear:

HOLD I-BUTTON
TO PROBE

When this message appears hold the Master I-Button to the probe.

NOTE: If a Master I-Button is not held t o the probe within 10 seconds you will be exited from the Setup Menu.

After you have touched the I-Button to the probe and the display returns to the Setup Menu, programming is complete, this process is very fast. Multiple games can new be programmed at this price point without affecting their game numbers, **as long as the Game Number in the I-Button has not been set.** If you also want to change the Game Number do not exit the Setup Menu refer to *Setting Game Number.* Now that the price is programmed into the Master I-Button, refer to *Programming Price Point* and *Game Number.*

Setting Game Number

While in the Setup Menu press *NEXT* until you arrive at the following:

GAME # = SAME
NEXT INC

OPERATOR ACCOUNTING SYSTEM

Press *INC* until the desired Game Number is selected. Holding down *INC* will increment the number in tens. Any number between 1 and 254 can be selected. When you have the desired game number press *SET*, the following message will appear:

HOLD 'I-BUTTON'
TO PROB

When this message appears hold the Master I-Button to the probe. **NOTE**: If a Master I-Button is not held to the probe within 10 seconds you will be exited from the Setup Menu.

After you have touched the I-Button to the probe and the display returns to the Setup Menu, programming is complete, this process is very fast.

If you also want to change the Price Point, do so before exiting the Setup Menu.

NOTE: Any game you touch with this Master I-Button will be set to this Game Number. Only use it on the game it has been programmed for.

Now that the game number is programmed into the Master I-Button, refer to Programming Price Point and Game Number.

Programming Price Point and Game Number

Once the Master I-Button is programmed to the desired Price Point and/or Game Number, the actual game itself has to be programmed. This is done as follows:

Hold the Master I-Button to the Module until all the lights turn on. When this happens you can take the I-Button away from the probe. Do this to every module in the game, **it is very important that you program every module in the game.** When every module in the game has been programmed, turn the power to the modules off for a few seconds. When the modules turn back on, the changes will have been made.

Activating a Unit

To activate a player unit, touch the I-Button to the unit's module. Two lights will rotate, indicating the unit is on.

De-activating a Unit

To de-activate a unit, hold the I-Button to the module for 2 seconds. When the lights turn off the unit has been de-activated and the I-Button can be removed.

NOTE: Only the I-Button that activated the unit can de-activate the unit.

Error Mode

If the lights on the unit flash in a triangle configuration there is an error. This is the result of removing the I-Button too early, while activating or de-activating a unit. To correct the error, simply hold the ***SAME*** I-Button to the unit until the lights turn off.

OPERATOR ACCOUNTING SYSTEM

Section 4 - Printout

Printing Report

To print the information stored on an Operator I-Button, hold the I-Button to the printer probe. The display will show *DOWNLOADING…,* and will automatically start printing when all the information from the I-Button has been downloaded.

When the screen says *PRINTING* the I-Button can be removed from the probe.

Reprinting reports

To reprint reports hold the I-Button to the printer probe. The screen will show *DOWNLOADING*…, and then the following menu will appear:

REPRINT?
NO YES

The 'I-Button' can be removed from the probe when this menu appears.

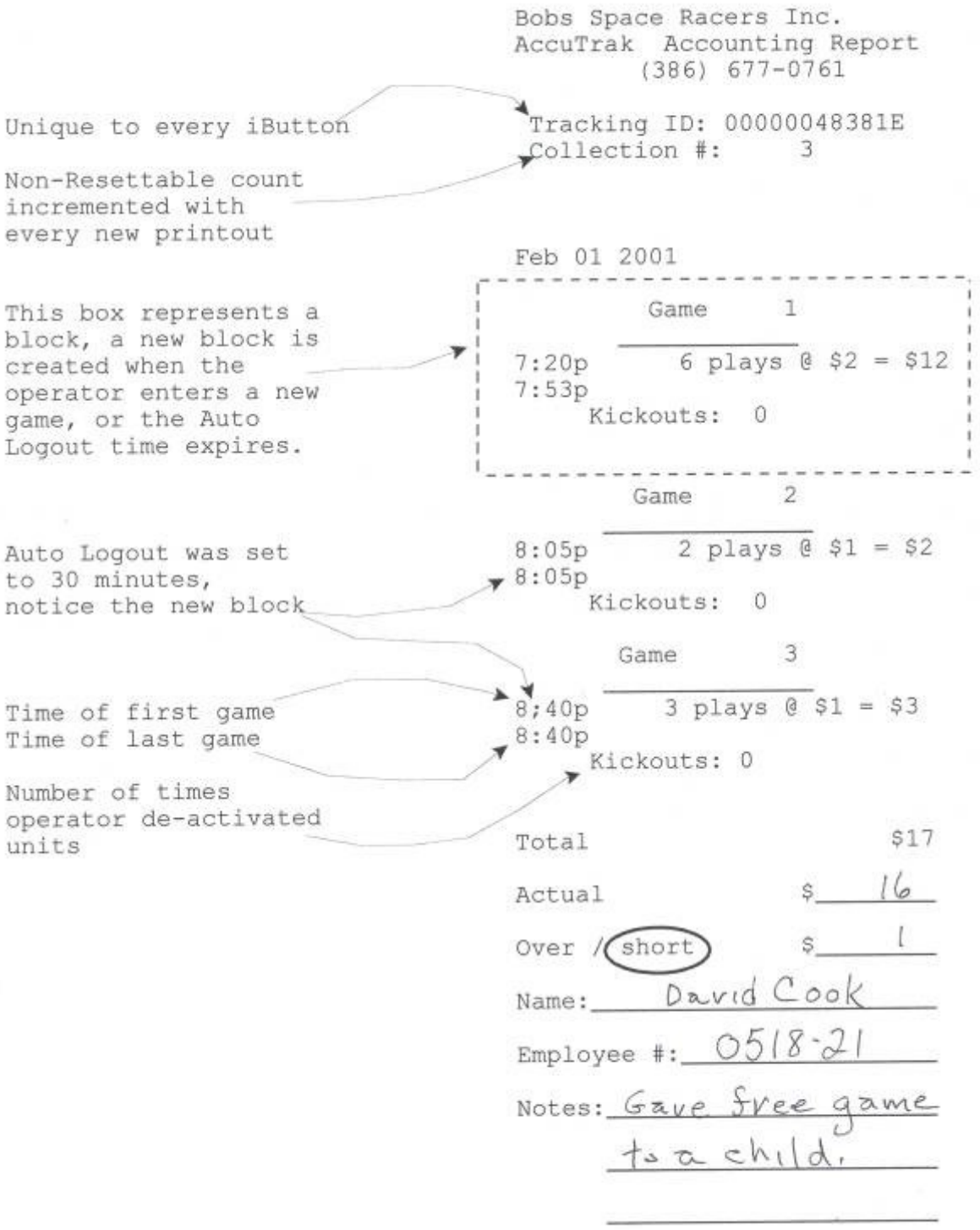
Press *YES* and the most recent printout will be reprinted. When the reprint is complete the following menu may appear:

REPRINT- NEXT?
NO YES

You can choose to reprint up to 31 blocks starting from the most recent.

OPERATOR ACCOUNTING SYSTEM

Printout Description



OPERATOR ACCOUNTING SYSTEM

Section 5 - Troubleshooting

Printer

Problem: Display show PRINTING . . . but nothing is being printer.

Make sure printer is on and has paper. Make sure all connections are secure.

Problem: Display is too dark or too light.

Remove the 4 screws on the front panel, which houses the display. Look on the back of the circuit board. Using small flat head screwdriver, adjust the contrast dial to the desired setting.

Game

Problem: Lights on the unit flash in a triangle configuration.

The 'I-Button' was removed too soon while activating or de-activating a unit. Touch the I-Button to the unit until the lights turn off. Make sure the same I-Button that caused the error is used.

Problem: Unit activates for a few seconds, and then goes into error mode.

This problem is the same as a "Kick Switch" that will not stay activated, and should be dealt with in the same manner. Usually caused by a switch that is stuck, i.e. trigger switch, home switch.

Problem: Unit will not de-activate.

This is caused when an 'I-Button' other then the one which turned on the unit is used to de-activate the unit. Use the same I-Button that activated the unit.

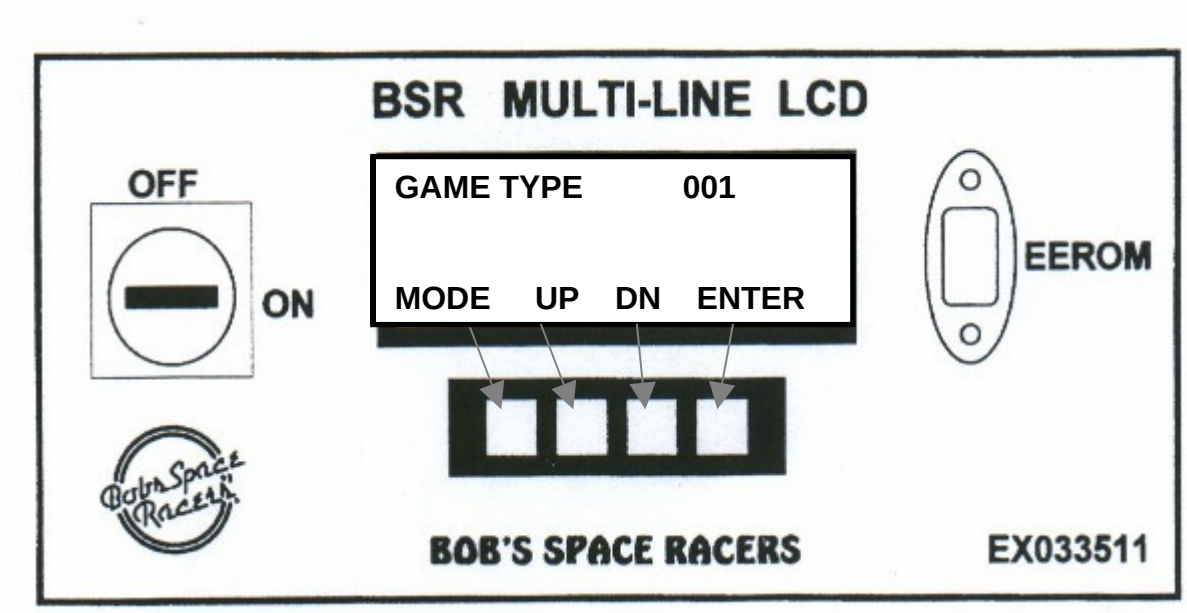
Problem: The unit takes a long time to turn on.

The Probe on the Module, or the 'I-Button' itself may be dirty. Use rubbing alcohol or contact cleaner to clean both the I-Button and the Probe. Make sure you clean both the face and the sides thoroughly. The probe on the printer should also be cleaned in a similar matter periodically.

LIQUID CRYSTAL DISPLAY MODULE OVERVIEW

The Liquid Crystal Display (LC display or LCD) is permanently mounted inside the electronics enclosure. The LCD enables the operator to view the number of games run and how many players there have been. Also, it is used to monitor the number of high/low players, the number of high/low games, and the operator time (in minutes) – for up to two (2) operators – in your game. To read the contents of the LCD, turn the key to the 'on' position (this key is used for safety precautions so that unauthorized personnel cannot clear it). The LCD will reveal the data. Press 'mode' to sequence through the data; once completed, it will read 'erase data'. Press 'enter' to clear the contents, and turn the key to the 'off' position. Compare this information with the mechanical meters. (For other options available on the LCD, see the 2400 G Module Electronics' Accounting System Overview.) The circuitry inside the LCD module is a BSR serial-to-parallel interface for the actual LCD, which is an "intelligent" module (meaning it has its own microprocessor).

MULTI-LINE LCD GRAPHIC



HORIZONTAL TRACK

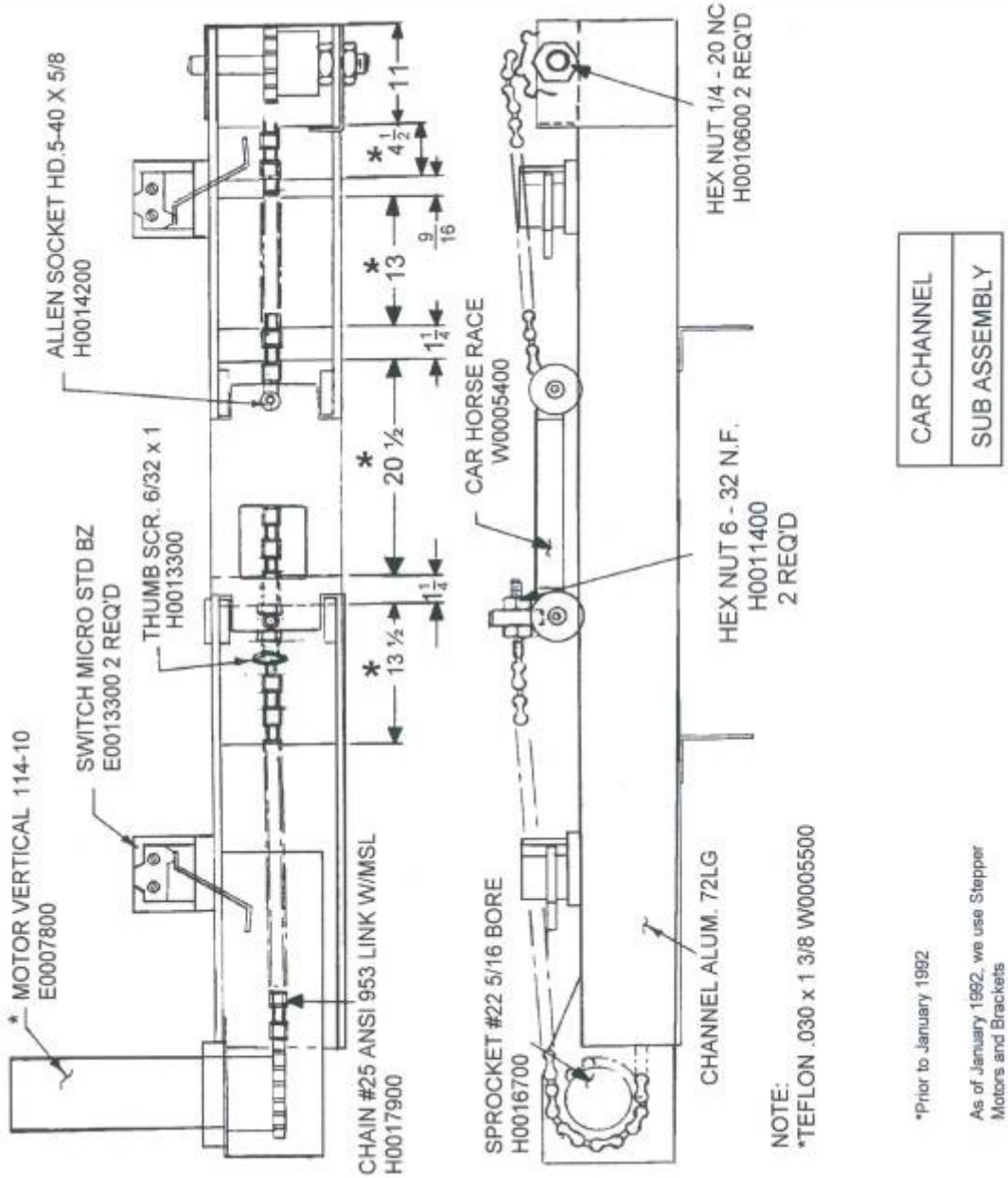
The channel is made of U-shaped aluminum and the Car runs on the edges of the channel. The only adjustment on the Horizontal Track is for chain adjustment. There is a thumb screw on the Car that is used for “fine tuning” chain length.

With the car at one end or the other, the chain should have less than ¼ inch gap between the top chain and the bottom chain at the smallest gap. There should be some gap so that if the top chain is moved side to side, it doesn’t hit the bottom chain.

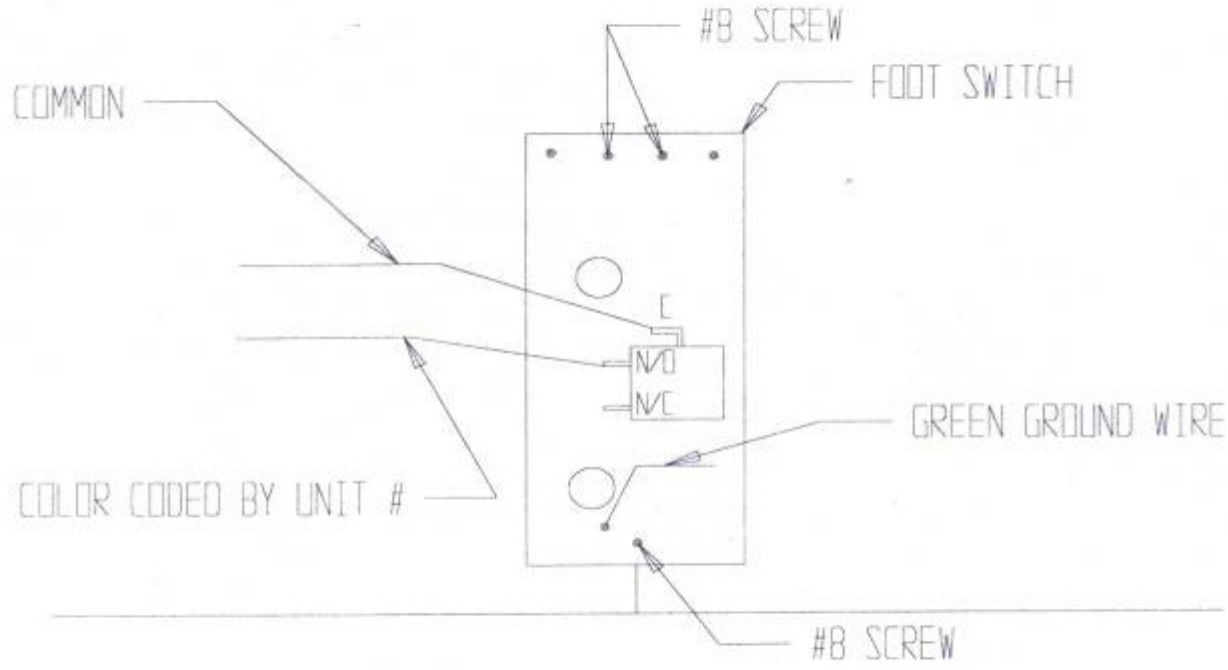
If adjustment is needed, slacken the two (2) jam nuts and, depending on whether the chain needs to be loosened or tightened, use one of the nuts to move the thumb screw either in or out.

When chain adjustment is complete, tighten the other jam nut to prevent the thumb screw from loosening.

HORIZONTAL TRACK



FOOT SWITCH WIRING



NOTE:

C = Common
N/O = Normally Open
N/C = Normally Closed

ROLL-A-BALL™- LANES

Each player has a lane to play. In each lane there are four micro switches, one relay, two indicating lamps, and a Ball Stop Solenoid.

The two indicating lamps are located on the outside of the lane in the back. This is for the operator to view. The yellow lamp comes on when that Player's footswitch is pressed. This is the player "Game On" indicator. This comes on when the game is not in the forward mode and the Ball is missing from in front of the Ball Stop Arm. Watching this lamp when the game is over can help you stop people from stealing Balls.

Inside the lane, at the top, is the run area. When Balls land in this area, they are funneled down to hit the run microswitch, and then they hit the trot microswitch, then finally the walk microswitch. Although the Toys start moving when the Run or Trot micro switches are hit, the timer that turns them off doesn't start until the Walk microswitch is hit (on units before 1989).

As the Ball continues down the "trough" it hits the "Ball missing" microswitch which has no effect during game play.

The Ball continues down past the Ball Stop Arm to the Ball Return Area.

The process the Ball goes through continues until there is a Winner. When there is a Winner, the Ball Stop Solenoid turns off. The Ball Stop Arm drops out and catches the Ball instead of letting it go by. When the Ball Stop Solenoid turns off, the Ball missing indicator comes on if the Ball is not resting against the Ball Stop Arm (thus closing the Ball Missing microswitch).

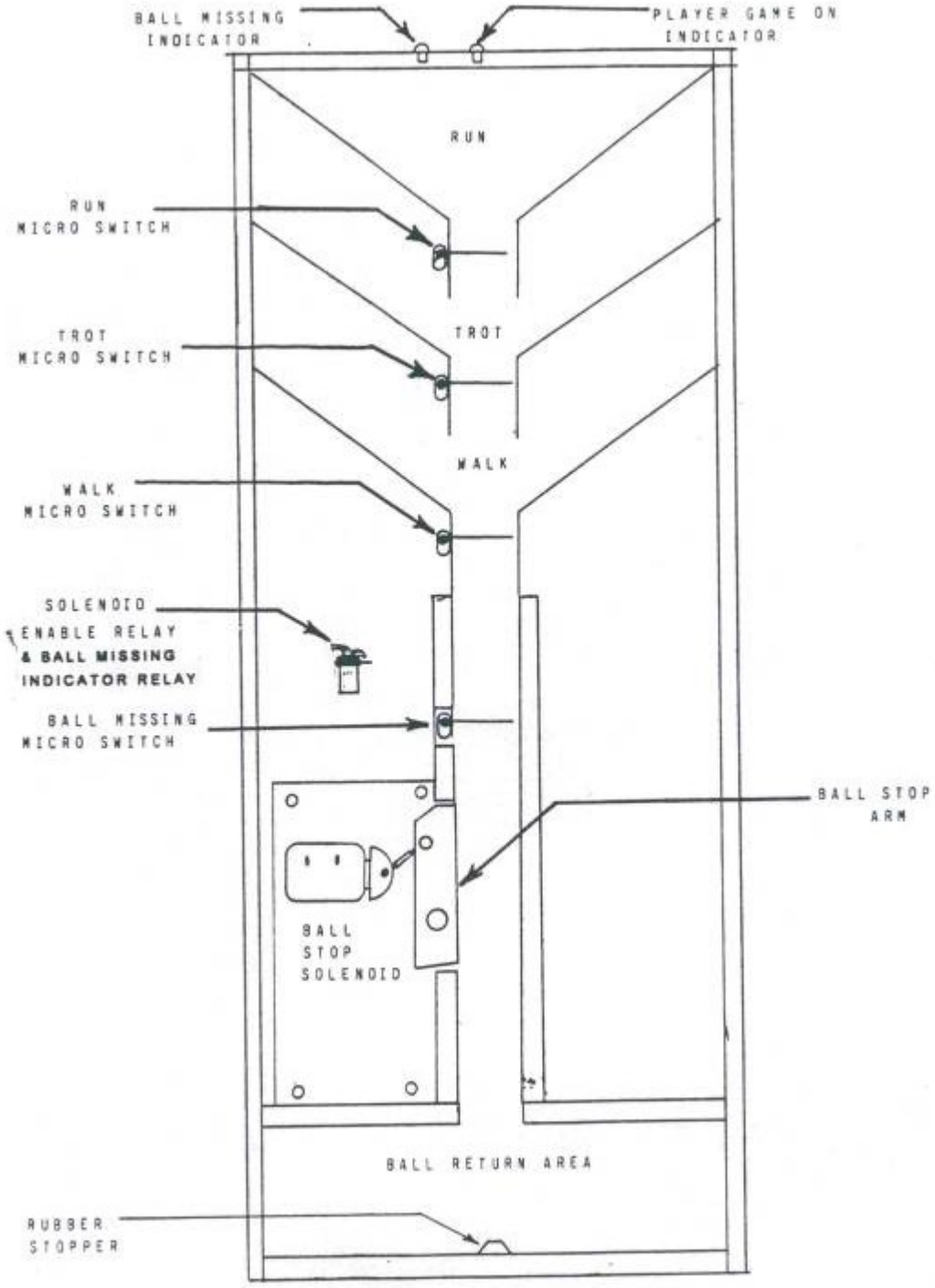
In the lane above the Ball Stop Solenoid is the Solenoid Enable Relay. The relay energizes when the forward button is pressed. The Ball Stop Solenoid is energized pulling in the Ball Stop Arm. If the Ball Stop doesn't pull in all the way, the Solenoid will vibrate badly causing a humming or vibrating noise. Do not let this happen. It will make the solenoid burn out or become magnetized over a period of time.

-Should the vibration occur, turn the game power 'off', and then remove the Plexiglas cover and the alley cover. Examine the Ball Stop Arm for free movement.

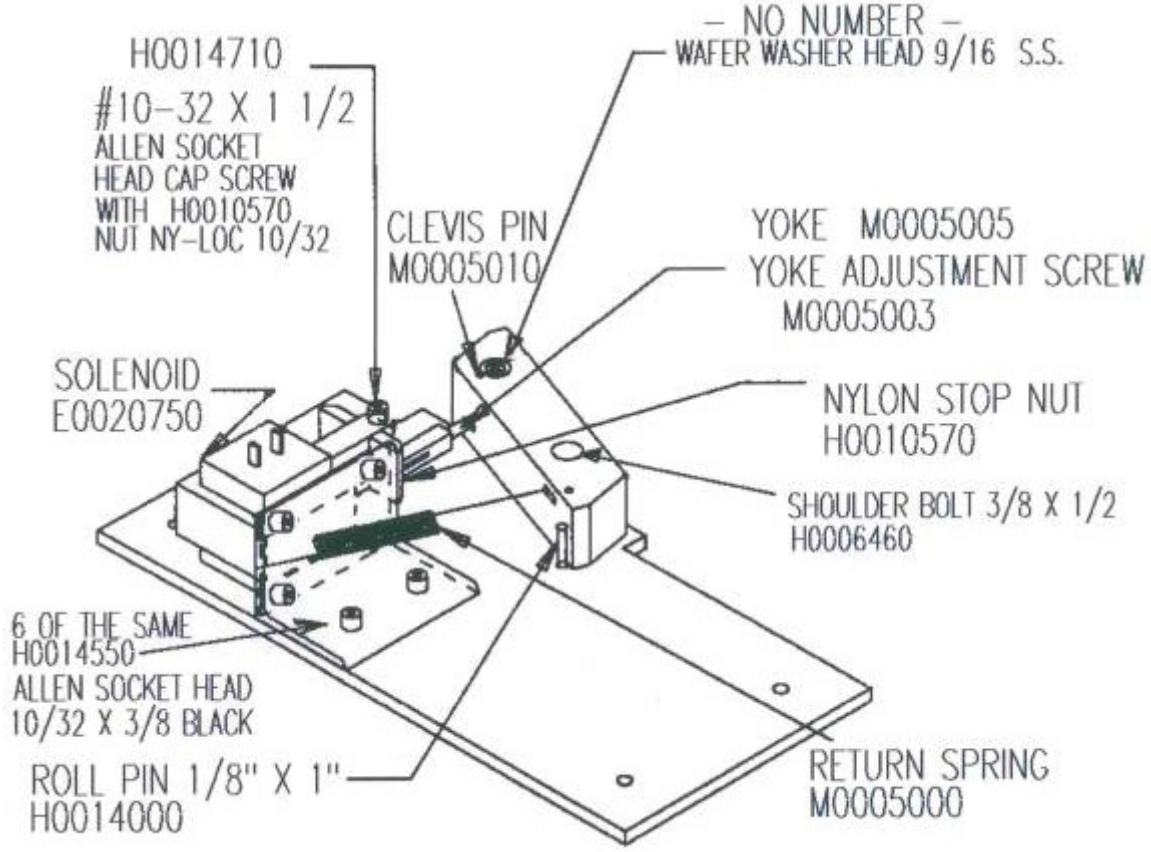
Remove any trash that would block any free movement. Check for binding at the connecting arm between the solenoid and the Ball Stop Arm. Lubricate the pivot point*. Check to see if solenoid is magnetized by manually moving the arm (and solenoid arm) in and out and see if it "sticks" at any point. After repairs are made, test unit while lane is apart. If it works, reassemble lane.

***NOTE:** ONLY lubricate the Pivot Point where 2 metal surfaces touch each other. Do NOT lubricate the solenoid, the solenoid throw, the Nylon Ball Stop Arm, or any of the Ball Stop Arm pivot points. This will cause the Ball Stop mechanism to stick.

INDICATOR POSITIONS FOR ROLL-A-BALL



AUTO BALL STOP ASSEMBLY



W0010040

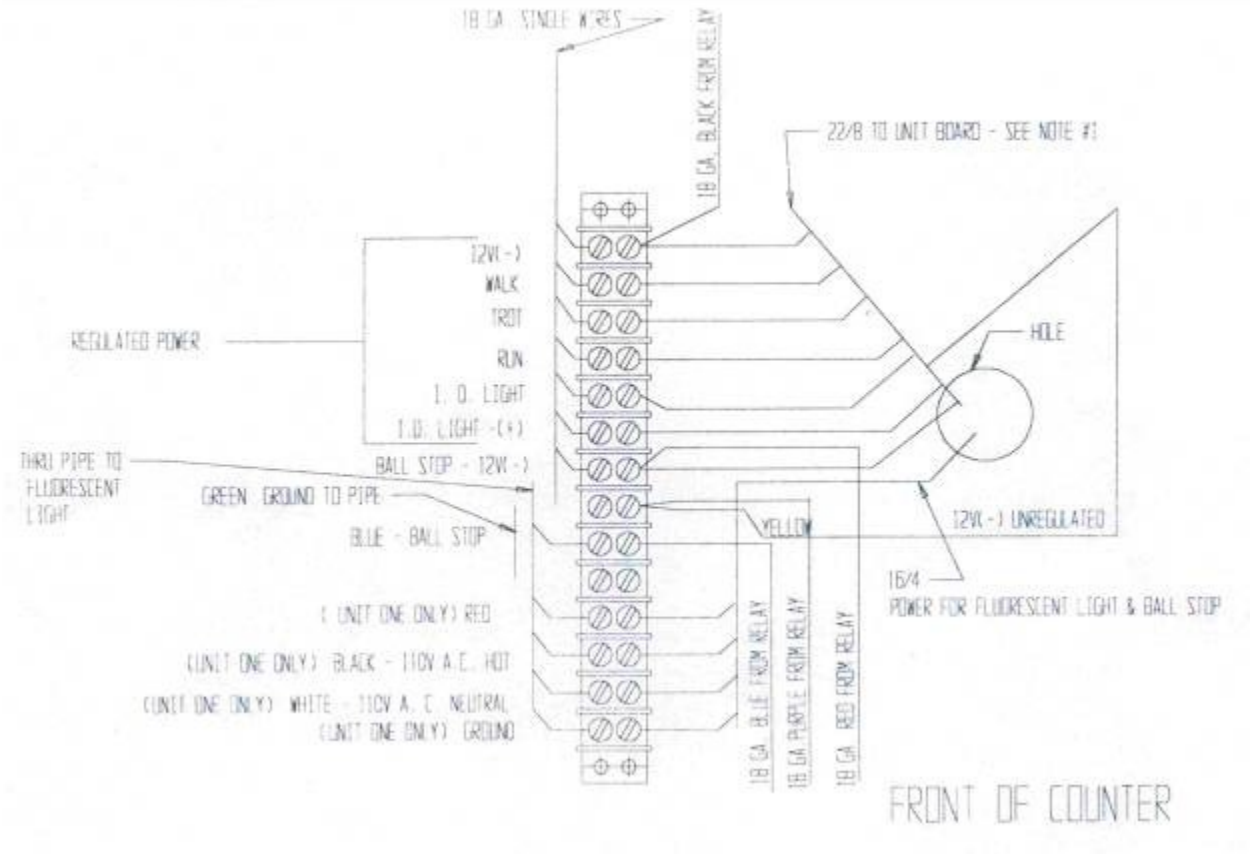
FRONT COUNTER MICROSWITCH ADJUSTMENT

There are four micro switches (including Ball Missing) under the Front Counter. If any of the micro switches need replacing, you will have to bend the activation wire to fit the Lane.

Remove the old switch and replace with a new switch while the game power is OFF. Connect the wires in the same order as they are on the old switch. The Activation wire slides through a hole or slot in the shaft that protrudes from the side of the switch case. A spring clip slides over the top of the shaft to hold the Activation wire in place. With the switch mounted and Activation wire in place, you must now bend the wire so that it is perpendicular to the lane, (Activation wire is across the lane). About 11, from the far side of the lane, you must now bend the wire down at a 45 degree angle. If the wire touches the bottom of the lane, you will need to cut the end of the wire off.

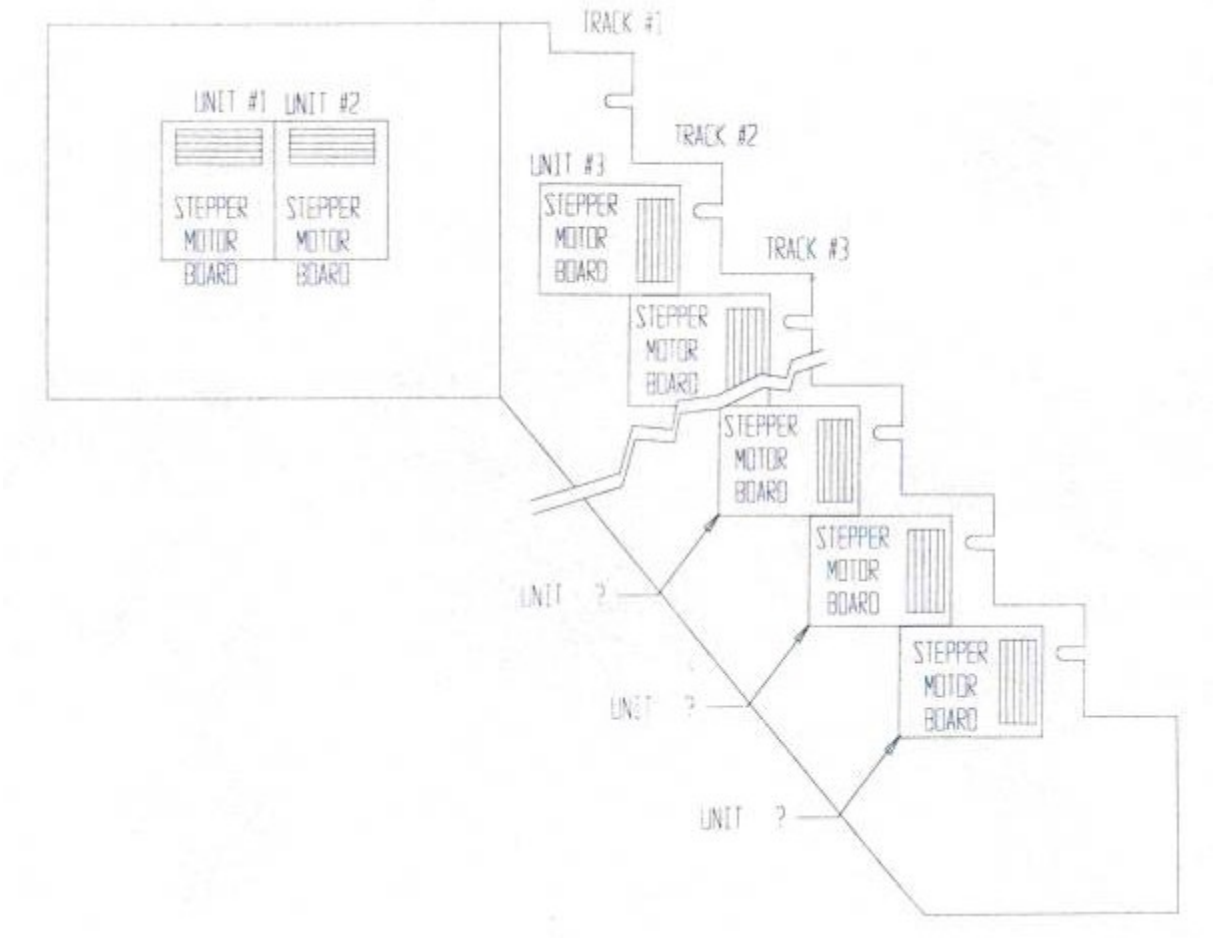
Place the ball in the lane and hold it as far away from the switch as possible. Move the ball down the lane to ensure the switch activates and does not stick. If it doesn't activate, bend the wire up a small amount. (See ROLL-A-BALL LANE DIAGRAM, PREVIOUS TWO PAGES).

FRONT COUNTER WIRING
PARK/TRAILER



NOTE: ***For a Park Model Game*** – this cable goes to a 9 pin Amp Plug then to a Unit Board. For a Trailer Model Game – this cable goes straight to the Unit Board.

-RAMP STEPPER MOTOR BOARD LAYOUT



NOTE: This configuration is for the Ramp Games and the number of boards used will depend on the number of units in your game. For the Vertical Games, - the stepper motor boards are located on the tank back, above the unit boards.

TROUBLESHOOTING

PROBLEMS	SUGGESTED FIX
PROBLEMS WITH THE GAME	
Game Will Not Turn On	
Bad Footswitch	Check continuity on foot. If bad, replace.
PROPBLEMS WITH THE BEACON	
Beacon light works but The Disk Doesn't Revolve	
Reflector is Slipping	Check the Motor to see if it is slipping. There is a O-ring around the disk; also There is a tension wheel that pushes The O-ring tight to the Motors' shaft. It is Probably not pushing down hard enough On the O-ring, - adjust if necessary.
Beacon Light Does Not Work, But the Disk is Revolving	
Bad Bulb	Check the Bulb and/or replace it with a #1195 bulb.
Beacon Does Not Work At All	
No Power	The Bell probably isn't working either Which means it is a Board problem. Check voltage to Relay Board; should be 12VDC
Bad Wire Connection (s)	If the Bell is working check all wiring to and from the Beacon.
Bad Relay	Check Relay on Relay Board for proper operation.
Bell Does Not Work At All	
No Power	Check for 12VDC at the Relay Board. Check wiring.
Bad Relay	Swap Relay with another one; Replace, if necessary.
Bad Bell	Check Bell by plugging into the end of an extension cord. (The Bell Has a standard wall plug jack on it.)

PARTS LIST

PART #	DESCRIPTION
E0003800	Relay, 12VDC 14 Pin
E0007680	Stepper Motor
E0013300	Switch, Micro, Standard BZ
E0013900	Microswitch Cherry
E0013907	Actuator Wire
E0013910	Retaining Washer
E0023600	Fuse, 2 Amps
E0024000	Fuse, 7 ½ Amp
E0028060	Amplifier
E0028500	Bulb for Top Globe 40W @ 120V
E0029105	Bulb Blue Beacon 14V @ 27W, 1A
E0029800	I.D. Light 12V
EX033100	Footswitch Assembly
EX033600	Auto Ball Stop Assembly
EX033420	2400 Module
EX033490	Display Assembly
EX033609	3 Digit LED Display
EX033611	2 Digit LED Display
EX033658	2400 Processor Board
M0004575	Cue Ball
M0005300	CRC Spray, 20-ounce Can
M0006500	Heat Proof Grease
M0010900	Screwlox Driver #2

WATER GAME™ GROUP

WATER GAMES

WATER MAINTENANCE PROCEDURES

Daily

- Run game in Test Mode.
- Check that all guns work properly.
- Check water level. Water should be to the bottom of the screens (approximately 4").
- Remove all debris from the screens and filter.
- Remove the screen on the end and check the suction and the tank pick-up screen.
- Clean tank suction screens
- Check for any water leaks
- Check target light bulbs

Weekly

- Drain all water.
- Clean tank and all screens.
- Clean pump filter.
- Wipe the interior of the tank and Dynarod.
- Fill tank with clean water and add two ounces of factory recommended water conditioner.
- Test that each unit turns on and wins when played by shooting each gun.
- Check all light bulbs.
- Drain water tanks and refill (clean tanks before you refill).
- Change or clean all water filters.
- Rotate water pumps.
- Adjust guns alignment or hose length on Binks guns.
- Check all microphone and sound equipment (working & physical condition).
- Check all neon.

Flush System as Needed

If system is extremely dirty or won't run, clean after the normal weekly drain and clean:

- Hook hose to the bottom of the pump filter and partially open the valve on the bottom of the filter.

- Turn on all units, put clean water hose in tank and run game until water out of the guns is clear. Refill water tank according to weekly procedure.

NOTE: *Only* add Bob's Space Racers® recommended products.
***Never* add Lime-Away, bleach, or any other corrosives.**

THE DYNAROD

Bob's Space Racers® offers the Dynarod Water Treatment System. The Dynarod is a metal electrode (rod) that helps minimize corrosion. Your game already has one with it when you receive it. If you wish to purchase more Dynarods for your arcade game, the part number is P0009980.

Benefits of the Dynarod are:

- Controls scaling and corrosion
- Softens existing scale
- Extends life of the equipment
- Reduces maintenance time
- Reduces equipment down time
- Environmentally safe
- Eliminates the use of chemicals

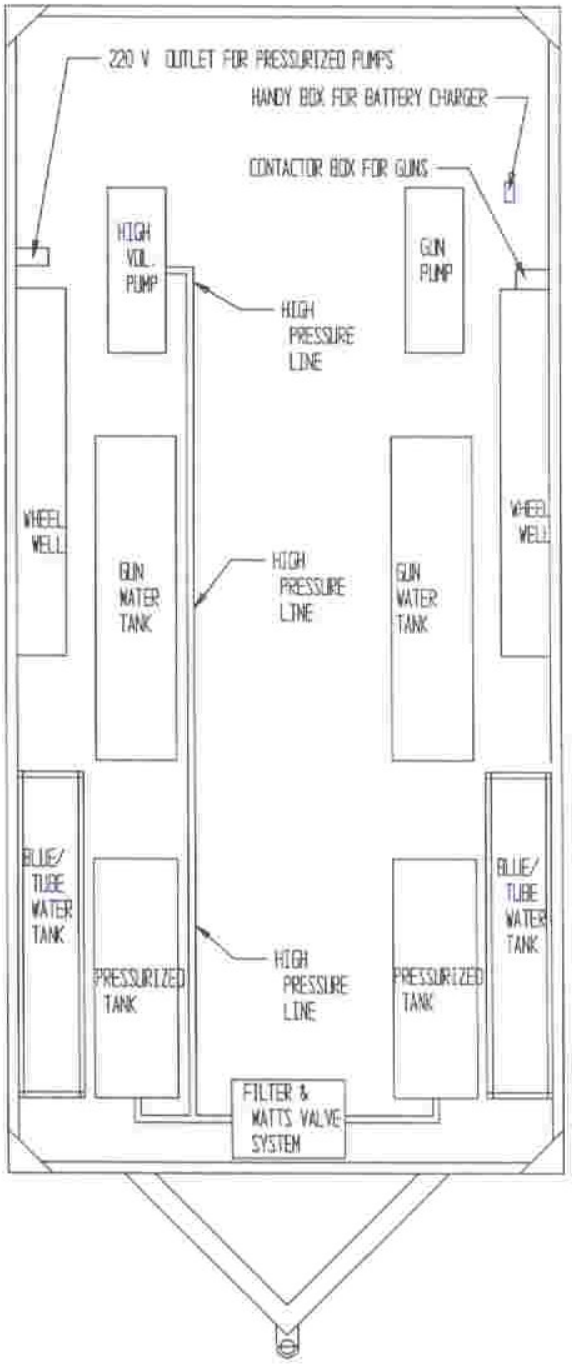
Dynarods are placed in the water tanks and left in 24 hours a day. The only maintenance required is to clean the Dynarods every 30 days or so with a green 3M type pad, Wipe dry and submerse in the tank. Be sure to re-install the rubber end caps if removed. The cells should not touch the metal tank! If they do, it will short out the process.

PRESSURIZED WATER SYSTEM-BLUE WATER

The pumps for the rising water tubes are completely different than the ones used by the guns. A 1-1/2 HP high-pressure well pump is used for the tubes. On either side of the game there is a holding tank, and a large bladder tank. The holding tanks, which are not pressurized, hold the main supply of water for the pressurized system. This is where the blue fluid is added for the tubes. The water is fed via gravity down to the intake of the water pumps. The pumps then send the water to the bladder tanks.

Bladders: The bladders maintain a certain pressure in the system so that the pump does not run all of the time during the race, and maintains equal pressure on all tube valves, regardless of which unit or number of units are being used. A crossover tube connects the two bladders. This pressure is maintained through an air bag (or bladder) inside the round tanks. There is a valve stem on one end of the bladder tank. This stem is under a black cap that just pulls off. The air pressure inside the tank should be 22psi. To check the air pressure, first remove all of the water pressure in the system. Then remove the black cap, and check the PSI of the air bladder using a tire gauge.

WATER PUMP SYSTEMS OVERVIEW



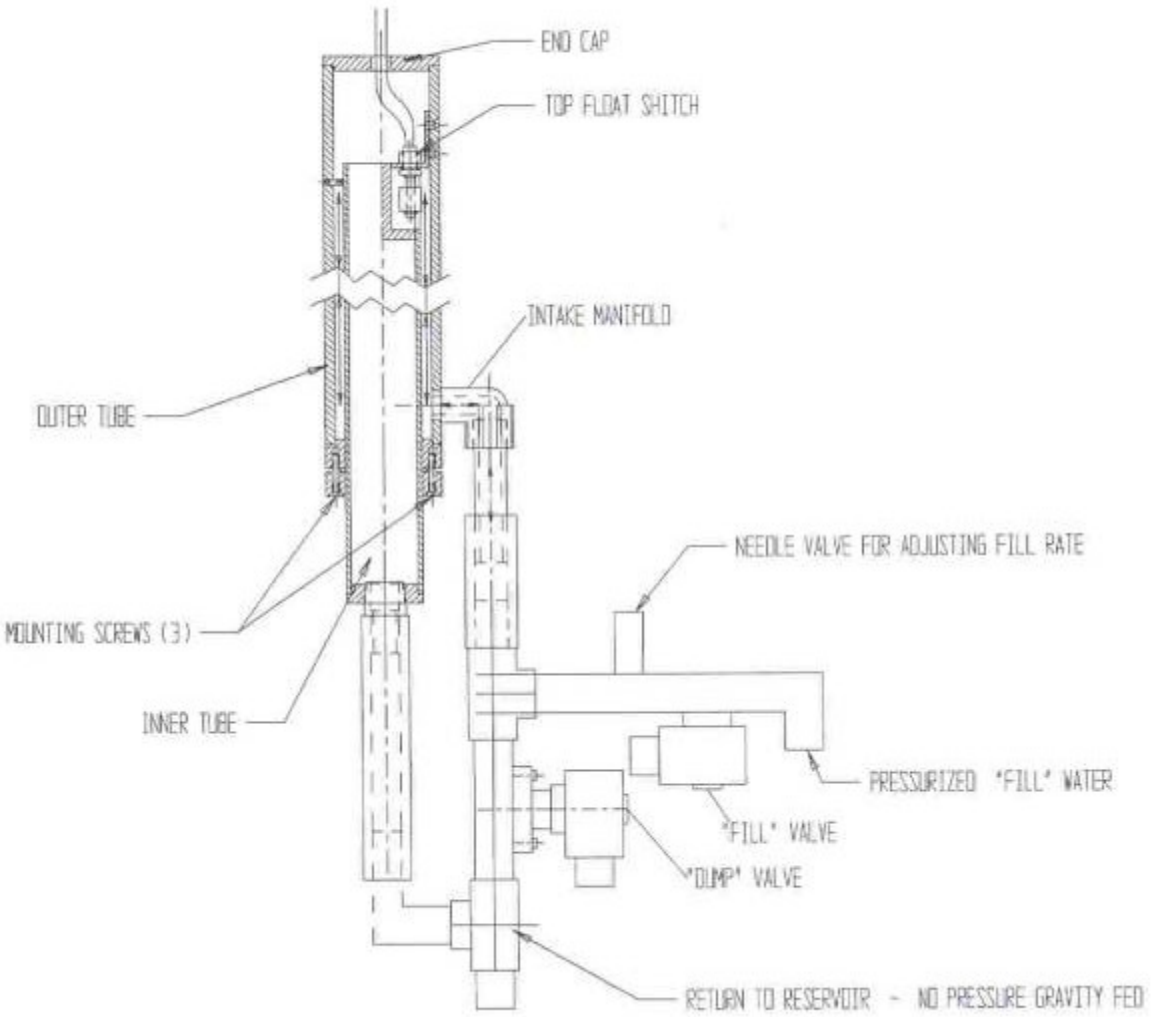
CLEANING THE TUBES

1. Turn game power and pumps to 'Off'.
2. Read all of the instructions before going any further.
3. Determine the type to Plexiglas you have:
    a. Pre 1995: This is the old style tube. Look at the base of the Plexiglas when it comes off, if it has hex screws holding the base in place, then it is the old style. (See Figure 1 in this section).
    b. Post 1995: This is the new style tube. Look at the base of the Plexiglas when it comes off, if it has an aluminum piece on the bottom, then it is the new style. (See Figure 2 in this section).
4. Go into the stock chute and remove the screws that hold the cover in place, over the top of the tubes.
5. Unplug the 3-pin Molex plug that is plugged into the switch at the top of each tube.
6. Remove back panels from each side of the game (These are the ones just below the top counter surface, on the lower part of the game, that the tubes go in. See the Pressurized Unit Layout Graphic, the Detail of the same Layout, the Detailed Pressurized Wiring Layout Graphic, and the Detailed Pressurized System Relay Board Wiring Graphic).
7. Locate the two hoses leading to the Plexiglas cylinder and loosen the hose clamp closest to the tube on each hose.
8. Slide off the Plexiglas tube fitting. (Slide the tube up until the fittings clears the base of the counter, tipping the base of the tube toward the center of the game – toward the walkway. Then lower the tube down from the top.
9. Check float switches are clear and not tangled up. Do NOT rip the float switches out of the tube.
10. Place each tube that needs to be cleaned in a clean common work space to begin disassembly.
11. Remove Inner Tube:
    a. Loosen the float switch from tube by using a 1/8" Allen wrench on the 2 machine bolts located at the top of the tube, near the float switch assembly.
    b. Remove the 2 bolts.
    c. Slide float switch out of the top of the tube.
    d. Remove the inner tube from the Plexiglas cylinder.
12. Determine the year your game was built.
    a. Pre 1995: There are 3 machine screws holding the bottoms of the inner tube and the outer tube. Remove these machine screws. Slide the inside tube downward from the outside tube.
    b. Post 1995: Turn the base of the inside tube counter-clockwise and unthread if from the outside tube.
13. Keep the inner and outer tubes together for reassembly.
14. Locate the high pressure water tank; this is the tank that does not have the pick up to the pumps.
15. Plug the lower fitting in the front end of the tank (for the crossover tube which joins the two high pressure tanks).
16. Partially fill the plugged tank with water and a half gallon of vinegar. This tank is large enough to completely submerge the disassembled tubes.
17. Submerge the disassembled tubes.
18. Wash the inside of the tubes with the supplied brush by inserting it into either end.
19. Clean the outside of inner tube with a soft rag.
20. Rinse cleaned tubes with fresh water.
21. Re-assemble tubes (from step 12 backwards).
22. Install float assembly in the top of the tube.
23. Insert tube back into game by placing the top of the tube up through the stock bin (that the float switch wires go through) first, so you don't trap the float switches between the tube and the stock bin. Then lower the bottom end of the tube back down through the counter.
24. Slide the hoses back onto the corresponding fittings and tighten.
25. Plug float switches in and fasten down the wooden covers.

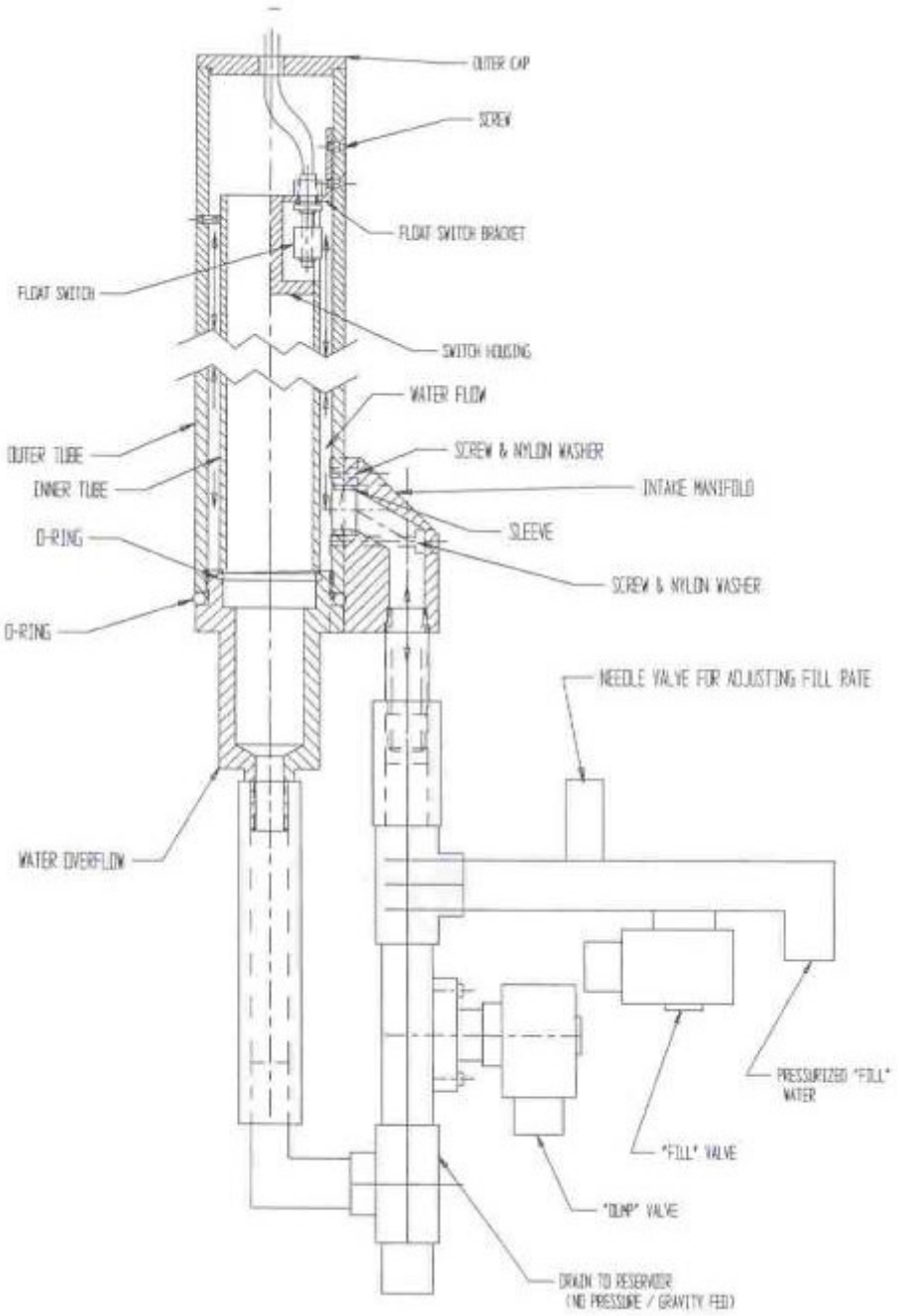
26. Drain the vinegar water from the tank.
27. Unplug the crossover tube.
28. Fill tank as you would normally and test each unit before replacing the inside covers over the plumbing of the game.
29. Run game and test for leakage (at the lower fittings).

If you experience any problems or have any questions, feel free to call the Technical Department.

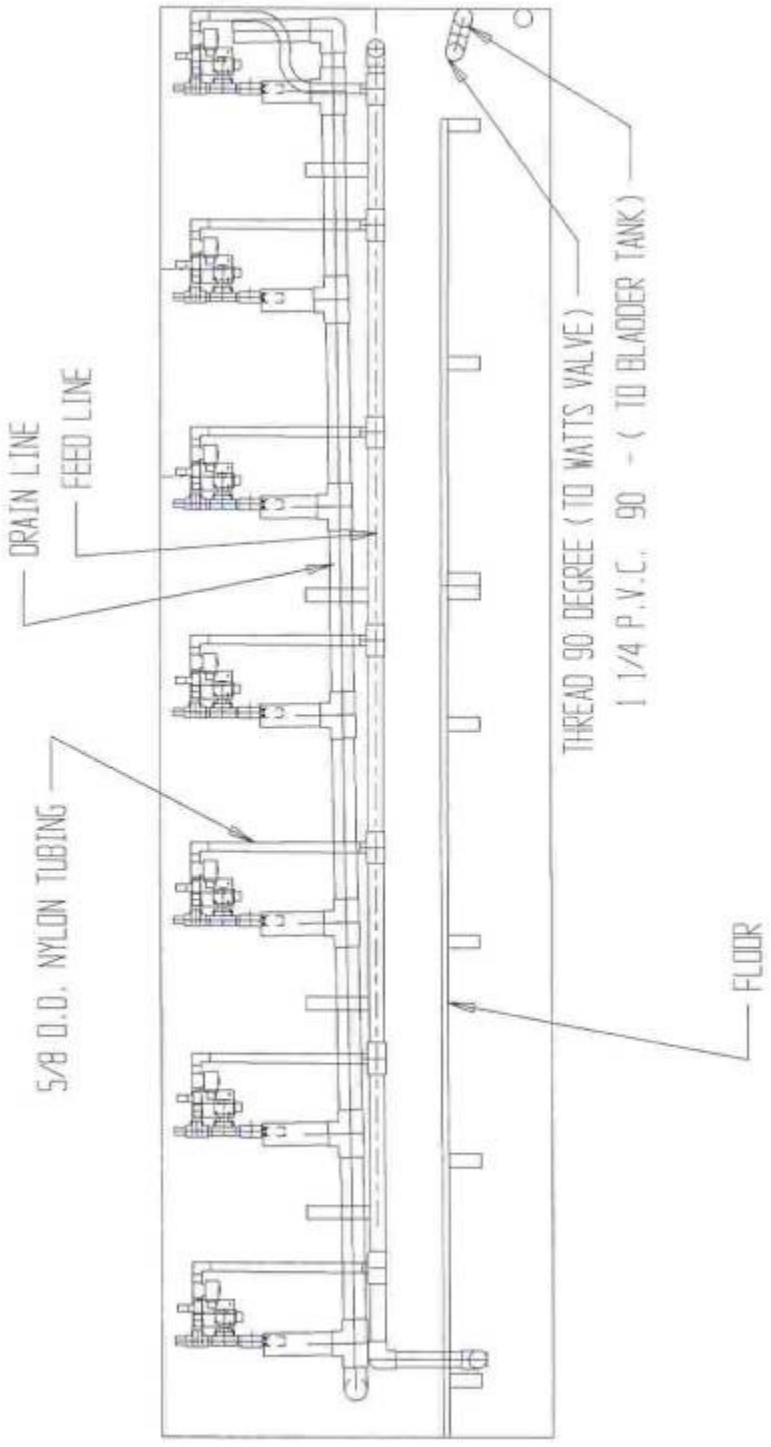
TUBE ASSEMBLY PRE 1995 (FIGURE #1)
Rising Waters



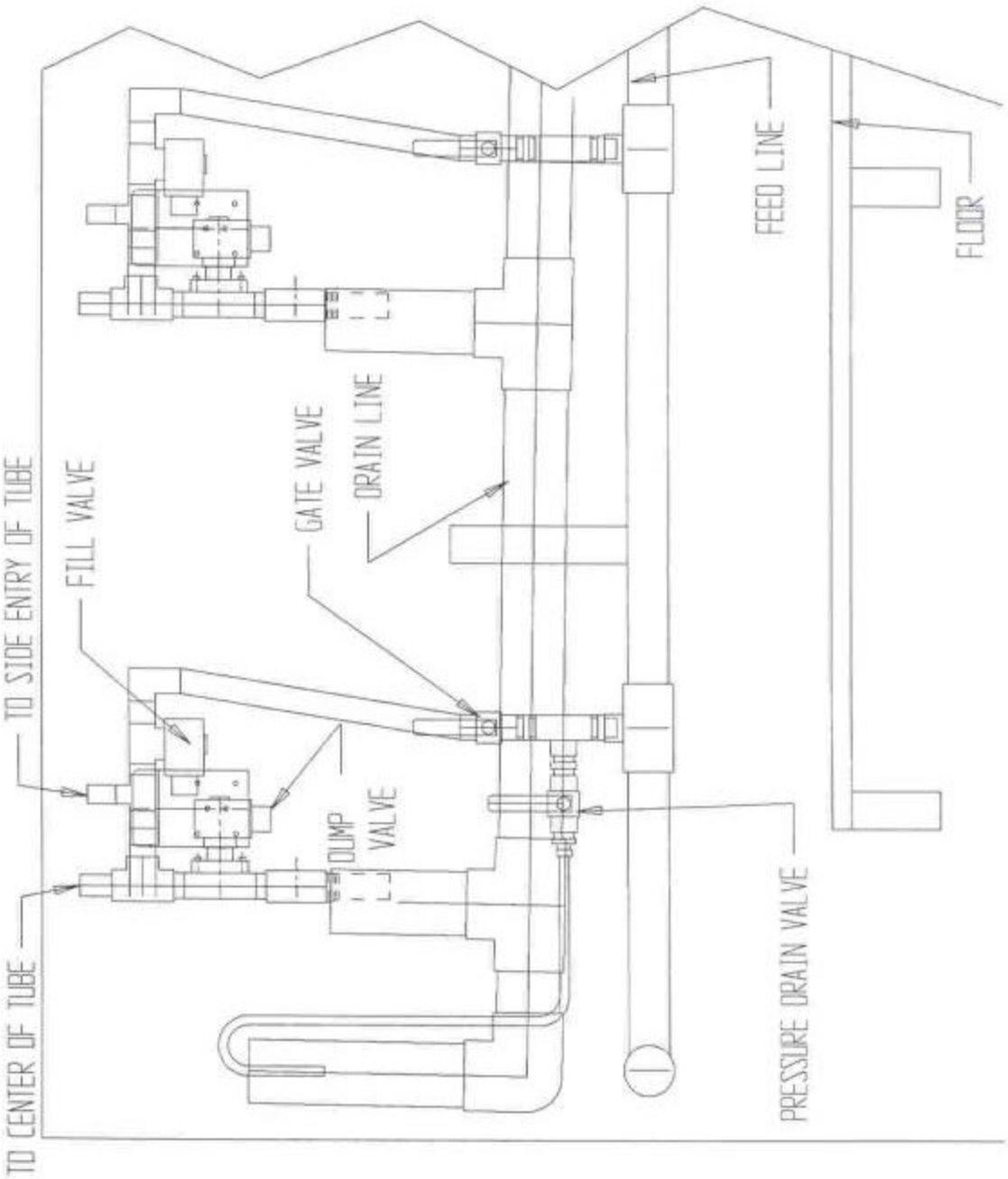
-TUBE ASSEMBLY POST 1995 (FIGURE #2)



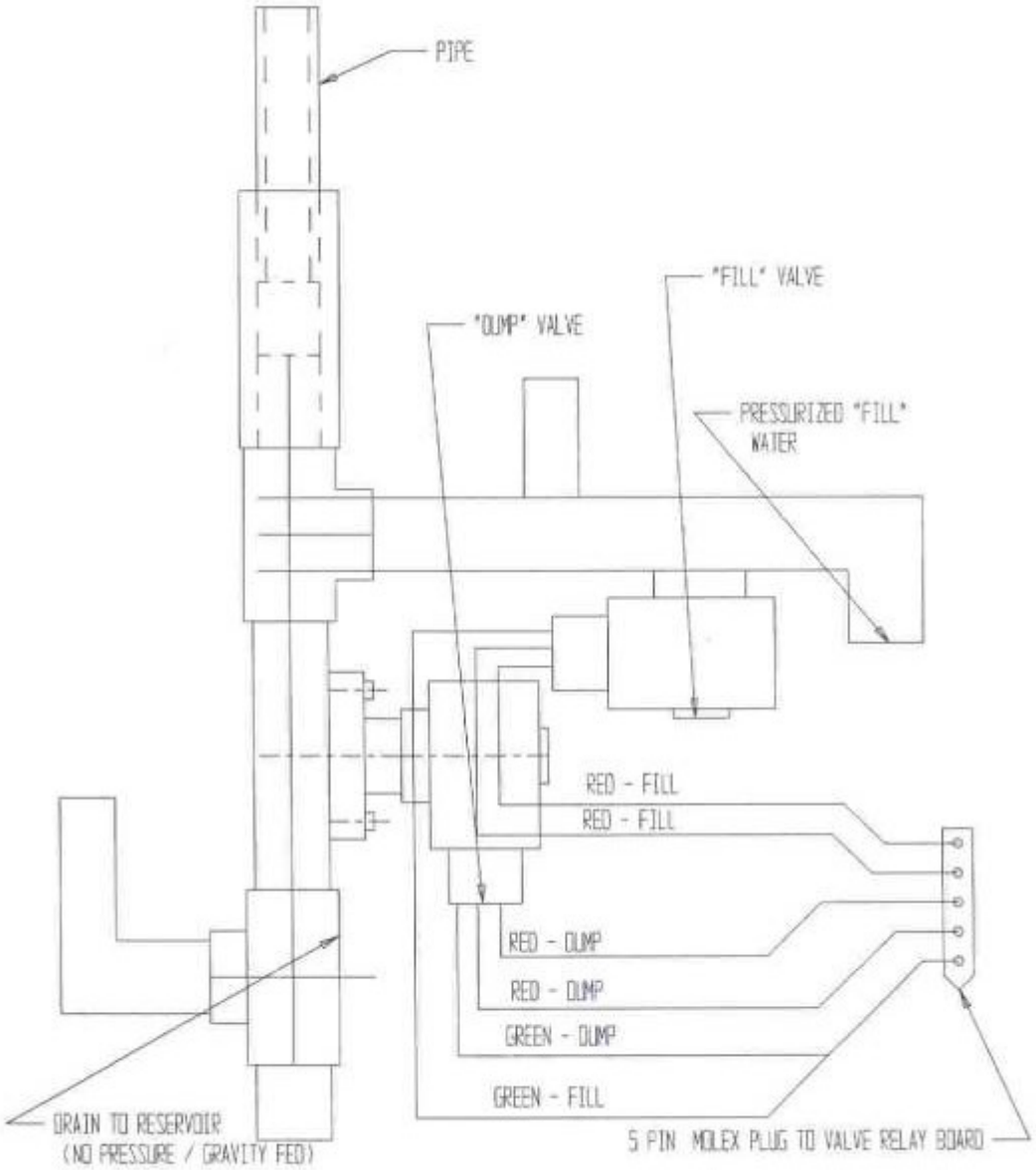
PRESSURIZED UNIT LAYOUT GRAPHIC



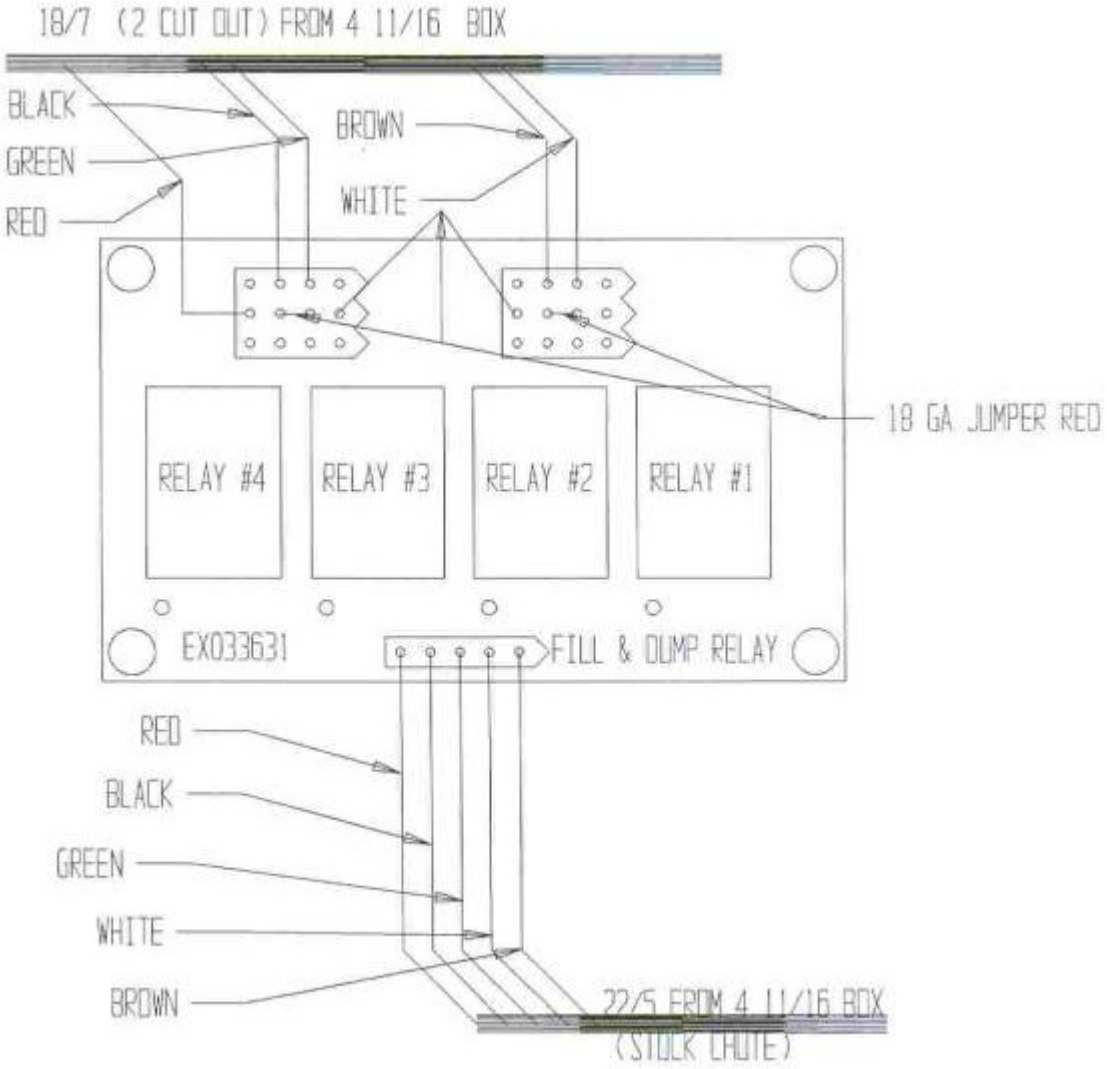
DETAILED PRESSURIZED UNIT LAYOUT GRAPHIC



DETAILED PRESSURIZED SYSTEM WIRING LAYOUT GRAPHIC



DETAILED PRESSURIZED SYSTEM
RELAY BOARD WIRING GRAPHIC
(VALVE ASSEMBLY)



UNPRESSURIZED WATER SYSTEM

The tanks are tied together with a crossover tube so that both tanks have the same amount of water in them. These tanks contain the main supply of water for the taps. The water is fed via gravity down to the intake of the water pump. The water pump then sends the water through the water filter cartridge, which removes any sediment from the water.

The filter is specifically to keep large mineral deposits, etc., from making their way into the system. A mineral deposit could greatly restrict the amount of water passing through the taps. This is a sediment filter; we are only trying to get out the large particles and not to filter for drinking water. If a higher quality filter is used, i.e. a .02 Micron Filter, or any filter that would remove 99.9% of contaminants, that would take away from the water pressure needed to push the water through the taps, regardless of where the pressure regulator is set up.

From the water filter cartridge the water passes through to the Watts Valve, also called a pressure regulator in generic terms. (Your game may not have a Watts Valve.) This allows for regulation of the water pressure to the front counter. On top of the Watts Valve there are two large bolts that look like caps, which are actually hollow bolts. The one closest to the water filter is the smallest. Upon removal of the cap, there is a cylindrical tube made out of a screen/mesh material. This is a free filter that keeps any large particles from going through the pressure regulator, as they would damage the diaphragm (a rubber disk that causes the pressure regulator to operate).

Do not remove the larger cap, which is directly above the adjustment screw. The reason for this is because it holds the spring that operates the diaphragm and if that cap is loosened, there is a chance the diaphragm could be damaged. Below that cap is the pressure adjustment screw. This allows for pressure adjustment if the Watts Valve is not putting out enough pressure.

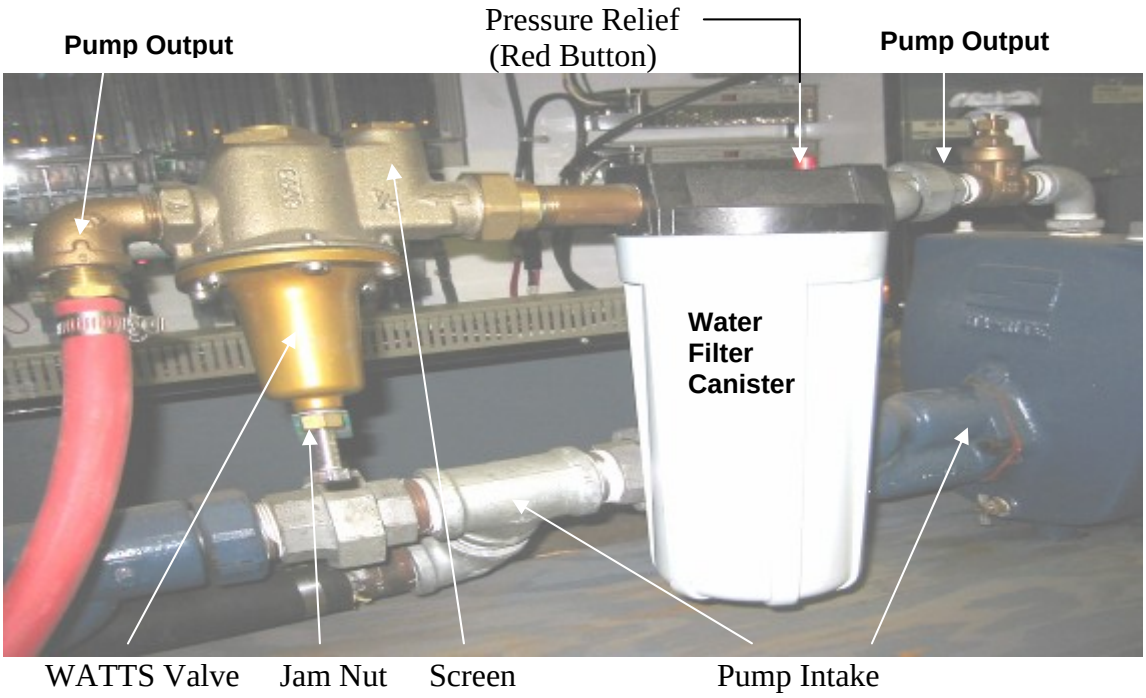
There is a jam nut up near the casing of the pressure regulator. After that nut is loosened, adjust to the desired pressure and tighten the nut (closest to the body) tight up against the body, so that the adjustment screw cannot vibrate loose. The water passes from the Watts Valve into a red rubber hose and out to the front counter. The hose is then attached to a check valve that allows water to go out to the front counter. The check valve will not allow the water to drain from the front counter back to the water pump when it is turned off. From the check valve the water goes up into a manifold where all the valves are mounted for each of the individual unit stations. These valves, when operated, allow water to pass from the manifold into the Water Gun where water is shot out the bras tips towards the target. Any water coming from the manifold, that is not used, passes through the manifold into a reducer coupling and comes back to the holding tank via a ½" return line which is apiece of ½" copper tubing. It is important what this line is not stopped up or restricted in any way, as it will damage the seals in the Pump

There is a brass screen in the holding tank in the bottom of the pan near the center. The screen is made out of brass because if it were made out of fiberglass or aluminum it would bet sucked down the intake and into the Water Pump. The brass is a rigid material where it cannot be compressed down into the water intake line. The reason for the screen is to prevent any foreign objects that are thrown into the Water Tank from getting sucked up into the Water Pump where it could damage the impeller or any of the seals.

The Water Pump has an intake which is the larger size fitting on the pump. The smaller fitting is the output of the Water Pump. The Water Pump we use is a 1 Hp Well Pump that operates off of 220 volts through a contactor that is turned on when the game goes into RACE MODE. The output of the Water Pump goes up into a Water Filter Canister. On top of the Water Filter there is a Red Button that is used to allow air to bleed out of the Water Pump system whenever the pump is trying to 'prime'. Many times this is not needed because gravity is feeding the Water pump, but if difficulties should occur in getting the

pump to prime, just press the Red Button and it will allow air to escape out of the lines, reducing the pressure the pump is fighting against to push the water through. This action will bleed off any air pockets in the system between the pump and the fill side.

The Water Valve for each unit is 12VDC. There are 12VDC relays turning on the valves in order to have a safe voltage for the 12VDC relays are always tied on one side to +12VDC; the other side is seeking a ground. Any units that are "coined up" and ready to play will have a ground provided by the 2100 Board up to the push button switch on the gun. Not only does the unit have to be "READY' but also one of the push buttons on the gun must be pressed in, in order to complete the path to ground for that really so that the valve won't end up being energized to allow water to pass through.



WHEN THE GAME IS DOWN LONGER THAN 30 DAYS

In order to prevent malfunction of the bladder operation during prolonged periods of inactivity, along with draining the blue water from the high pressure system, you must release the air pressure from the bladders!

Remove the protective cap from the valve stem and press the Schrader Valve until all of the air is removed from the bladders. Using the appropriate tool remove the Schrader Valve completely and replace the protective cap.

Remember: You must fill the bladder tanks to the recommended 22 psi before filling any water into the high pressure water system. To do this you must replace the Schrader Valve and the protective cap.

If you operate the game and the blue water pumps turn on and off every time blue water is being used then you have the problem we are trying to prevent. If operating correctly, the blue water pumps will operate once every 1½ races, or less. The problem we are fixing is the air bag in the bladder tank is stuck to the walls of the bladder tank. Turn off the blue water pump breaker. Drain the air off of the bladder tanks. Remove the Schrader Valves. Turn the pressurized water pump breaker on, allowing pressure to build. This is to 'squeeze' the air bag off of the tank wall. As the air bag is compressed, the water in the holding tank of the blue water system will be used up and more water will need to be added. When the pump builds to pressure and shuts off, allow the system to sit for 10 minutes. If the pump turns on, wait another 10 minutes after it quits again (you may need to add water to the holding tanks again). Turn the breaker off for the pressure pumps and open the bottom valve on the Clear Vue Filter to drain the pressurized system. Fill all bladder tanks to 22 psi, wait 1 minute. Check the pressure (the drain on the Clear Vue Filter needs to remain open). If the pressure is less than 22 psi, then fill again and repeat the process of waiting 1 minute and check the tank pressure (repeat until you get 22 psi). This will take a while as all of the water in the bladder tanks needs to be squeezed out. Once the tanks are at a stable 22 psi, proceed filling the blue water system as normal.

It is not recommended that any adjustments be made unless absolutely necessary. However, from time to time, it may be noticeable that the water pump contactor is 'chattering'. This can cause the adjustment screws inside the pressure switch to move. The pressure should not waiver more than +/- 5% from the recommended setting. An accurate pressure gauge will be needed to make any adjustments.

When starting the system from scratch, and with all of the water pressure out of the tanks, the air pressure in the pressurized bladder tanks should be 22 psi. The cut-in pressure at the pump should be 50 psi. The cut-out pressure on the pumps should be 85 psi. The output side of the Watts Valve should be 30 psi. **Important: It will not be possible to check the air pressure in the pressurized bladder tanks unless the system is completely drained of water, and the drain valve on the bottom of the sediment filter is open.** If the pressure in the tanks is checked before draining the pressurized system, it would be completely inaccurate and would be of no benefit.

Again, the bladder tank pressure is checked with the system completely drained. There is a Schrader Valve (valve stem on a tire) on the bladder tank on the opposite side from the plumbing. Use an accurate tire gauge to check the pressure inside the tanks (before any water is added, or after the water is drained – see Pressurized Water System). The pressure should be 48 psi +/- 1 or 2. The closer you are to 48 psi, the more accurate the pressure to the tubes will be.

To check the cut-in pressure, with the power ON, drain the pressure by running the tubes up and down until the pump comes on. Verify the pressure on the gauge by the pump that the cut-in pressure is 50 psi. The pump should run until the cut-out pressure is 85 psi. If this is not correct, it can be adjusted. The pressure switch requires very small adjustments. On systems before 1996 each pump of the pressurized

system has its own pressure switch at the pump, which will require checking and adjustment. On systems from 1996 and beyond, a single pressure switch located near the Watts Valve (in the access below the circuit breaker panel in a trailer). Be very careful to adjust it properly, according to the instructions on the inside of the pressure switch cover.

CHARCOAL FILTER REJUVENATION
(ONLY ON GAMES MADE PRIOR TO 1997)

A water softening system, for softening the water that goes into the tubes, is supplied on all Rising Waters® Trailers and Park Model games made prior to 1997. The reason for this is that if the water is hard water, it will eventually leave deposits on the inside of the tubes and will look unsightly. Deposits in the water lines will also make the game more difficult to 'balance' and will increase maintenance. We recommend that the water be changed every 2 weeks. The water softening system will need to be rejuvenated after every 3rd use.

Along with the game is a cart with 1 or 2 tanks on it (depending on the year of manufacture of your game). A common manifold joins the 2 tanks together. Attached to one end is a hose, and the other end of has a connection for a garden hose. Also, included is a large salt/brine tank (referred to as a 'trash can'), and a timer unit. To rejuvenate the tanks, they must be removed one at a time. Unscrew the top of the tank and install the timer (see the Charcoal Filter Rejuvenation Plumbing Diagram on the next page).

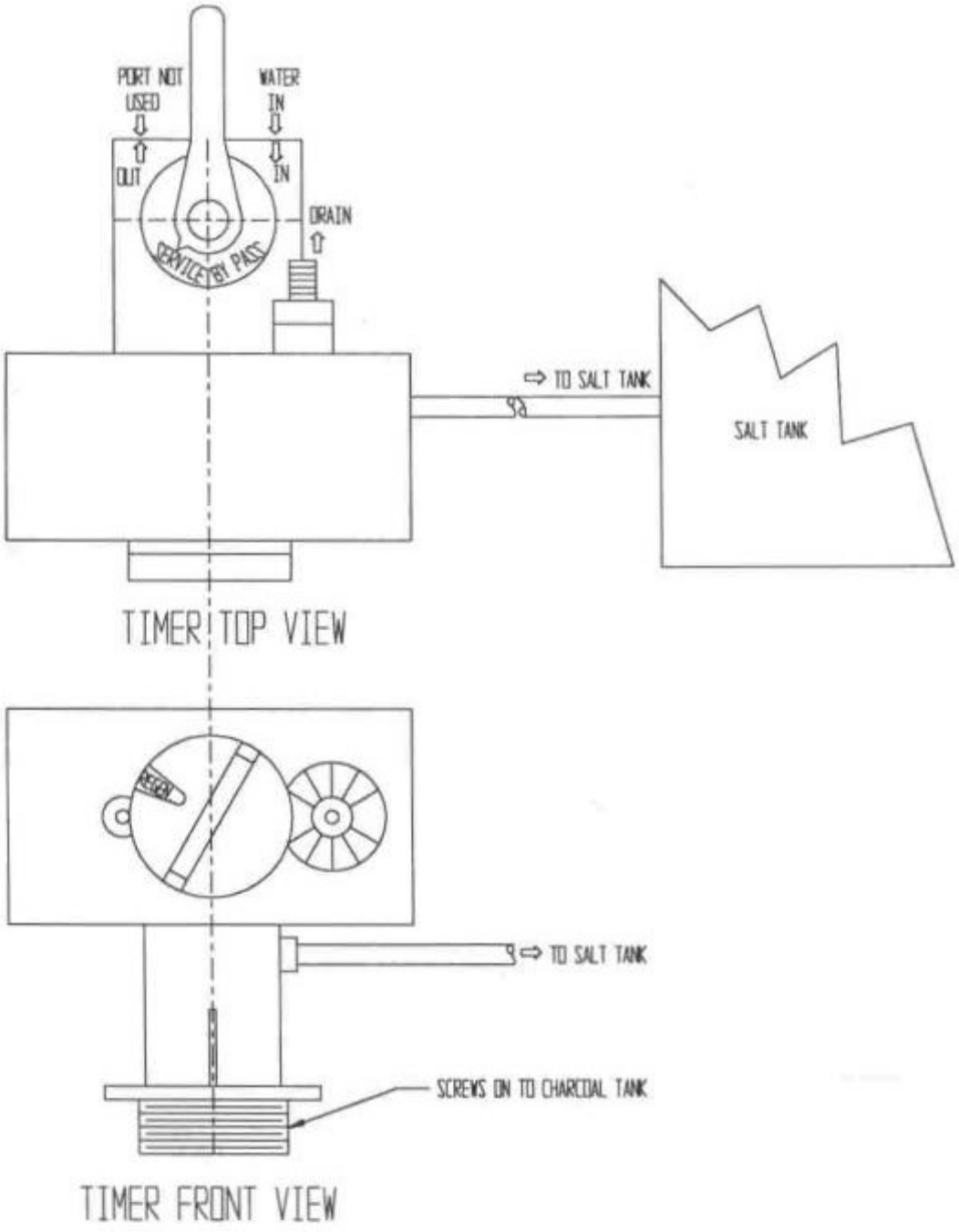
Fill the 'trash can' (Brine Tank) with a 20 lb bag of water softening system salt pellets, approximately 2-3" covering the bottom. Connect a garden hose to the timer (see Diagram on next page) and connect the pipe from the salt water solution to the timer. On the right hand side of the timer run the discharge hose over to a drain. Turn the water supply to the garden hose 'ON' and fill the 'trash can' with water, until the float inside the 'trash can' is activated. Also, plug the timer into an 110V power outlet. Turn the selector handle to the 'service' position; close the ball valve on the outgoing system (yellow handle in the 'up' position).

Turn the knob on the front of the timer to the 'REGEN' position. The timer is set for one cycle of 'clean and rinse', and lasts for about 2-3 hours. The unit may be left unattended after the cycle has started.

Once the cycle has finished, turn off the water supply. Remove the timer and replace the top of the tank.

Repeat this procedure for the other tank.

CHARCOAL FILTER REJUVENATION PLUMBING DIAGRAM



TROUBLESHOOTING – CLEAR WATER (GUN) SYSTEM

PROBLEMS/CAUSES	SUGGESTED FIX
Low Pressure/No Pressure	
Lost Prime	Run pump; press the RED button on the top of the water filter to relieve trapped air.
Clogged Filter Cartridge/Watts Valve Screen	Replace paper filter/ clean Watts Filter.
Clear Vue Filter Clogged	Remove inner screen, wash with soap and water, rinse, and replace.
Broken Impeller	Replace.
Trash in Pump	Open pump and clean inside.
Lint on Tank Screen	The tank screen is located in the bottom of the tank or on the side of the tank near the bottom. Remove and clean off lint, replace.
Water Supply Hoses to Front Counter Kinked Under Counter (Center Joint Games)	Lift counter and place hose in proper position.
Check the Valves at Front Counter to See if They Are Stuck Shut or Partially Closed	Tap the valve with a wrench handle to jar it loose; replace valve.
Motor Does Not Run	
No Power	Check circuit breaker.
Thermal Circuit Breaker	If motor is hot, let it cool.
Bad Pressure Switch on Pump	Check contacts for free movement (do this with pump unplugged from power).
Bad Solid State Relay	Check input and output voltages. If there is input voltage but no output voltage, then the solid state relay is bad. Replace it.
Insufficient input Voltage at Pump Motor (Motors Hum and/or Run Very Hot). There is 110V AC at Pump Instead of 220V AC.	Be certain lead lines are connected to opposite phases.

TROUBLESHOOTING – CLEAR WATER (GUN) SYSTEM

(CONTINUED)

PROBLEMS/CAUSES	SUGGESTED FIX
Motor Does Not Run (continued)	
High Pressure Reading On Pressure Valve at Pump	Gate valve for that pump is closed – open valve, and close the valve for the pump that is not being used.
Pump Runs While Blue Water Fills and Shuts off When Blue Water is Not Filling	See WHEN THE GAME IS DOWN LONGER THAN 30 DAYS section (above).
Pump Runs Continuously	
Bad Contactors	Check contactors to see if they have welded shut or are just stuck. If they are welded shut, they need to be replaced.
Bad Board	Check the LED outputs for proper operation.
Bad Pressure Switch (Pressurized System)	Incorrect cut-off pressure; adjust switch.
Pressure Plate in Pressure Switch Jammed	Remove the cover of the pressure switch (with the power OFF). Examine the movement of the contact plate (that moves to open and close the contacts). Look for anything that might rub against the contact plate that may prevent it from moving (i.e. a mounting screw). Correct the problem.
No Water Shooting Out of Guns	
Check all of the above listed problems first.	
Solenoid Valve Not Operating	Check relay board. Is relay operating? Is LED on the board operating when you shoot the gun? If LED comes on, there is probably a bad relay.
Gun Tip Clogged	Clean gun tip with a #57 drill bit by hand. DO NOT USE AN ACTUAL DRILL – USING THE DRILL BIT IN A DRILL WILL DAMAGE THE TIPS! Shoot gun with brass tip removed.

TROUBLESHOOTING – CLEAR WATER (GUN) SYSTEM

(CONTINUED)

PROBLEMS/CAUSES	SUGGESTED FIX
No Pressure On One Unit	
Clogged Tip	Remove tip and see if gun operates.
Bad Relay	Is relay operating? Is LED on the board operating when you shoot the gun? If LED comes on, probably have a bad relay.
Guns Shoot Over or Around the Counter	
Gun Not at Correct Height	Loosen set screws and adjust to correct height (when gun tips back, the lower part of the gun handle should be 1" above the counter top).
Y Yoke Loose	Loosen set screw or bolts. Position on gun aimed at center of target. Tighten set screws or bolts.

WINTERIZING A WATER GAME

When water freezes it expands, thus causing anything that is holding it to crack. This means your frozen tubing, the water pumps, the filter casings, and the manifolds – anything that the frozen water is in where there is no room for expansion. All of this adds up to very expensive repairs and replacements during the spring thaw. To prevent such a costly project we at Bob's Space Racers® recommend that every game with water in it be 'winterized'.

Winterizing is an easy and relatively inexpensive process to go through to protect your money-making games. You will need at least six to ten (6 – 10) gallons of propylene glycol based antifreeze, one (1) hydrometer, and containers large enough to hold all of the fluid. The hydrometer is used to test the freeze point of antifreeze after it has been put into your game. You can obtain the proper type of antifreeze and hydrometer from a recreation vehicle (RV) supplier.

CAUTION: WHEN USING PROPYLENE GLYCOL ANTIFREEZE YOU MUST FOLLOW ALL INSTRUCTIONS ON THE LABEL OF THE CONTAINER THAT IT CAME IN!

When you are closing the game for the winter season, and you have the above supplies, follow the below procedure: READ ALL DIRECTIONS BEFORE STARTING!

1. Empty water tanks of all water to within (1") one inch above the top of the drain. Remember to clean out all of the debris just like you would normally do during regular maintenance on the water system. Repeat this process for the back-up pump.
2. Close water drain.
3. Add approximately six (6) gallons of the propylene glycol based antifreeze to the water tanks. If this is not enough antifreeze to thoroughly circulate through the entire system and both pumps, then you will need to add more.
4. Turn game on and play each player-unit until you see the antifreeze come out of the gun, this will look foamy. If your game has target pans, **do not shoot the antifreeze at the target pan;** aim the guns to the side.
5. If this process has taken less than five (5) minutes, then allow the pump to run for a total of five minutes.
6. Use the hydrometer to check the freeze point of the antifreeze; it should read between, -42^{o} F and -26^{o} F. If the temperature is not between -42^{o} F and -26^{o} F, then you need to add more antifreeze and repeat step four. If the temperature is between -42^{o} F and -26^{o} F, then continue on to step seven (7).
7. Switch pumps.
8. Let pump run for five (5) minutes.
9. Turn power off.
10. Place the containers under the drain plugs at the front of the trailer and remove the plugs. Or, if you have a park model, place the container at the open end of the drain tube and open the drain valve. Remember this drain system is gravity-fed and you will want to catch as much of the propylene glycol antifreeze as possible in order to properly dispose of it.
11. Remove the filter cartridge housing, wash it and store near the filter unit. Discard the old filter.
12. Let the hoses hang into the containers and allow for all of the antifreeze to drip out.
13. Remove all drain plugs, and use compressed air to blow out all of the lines and housings.
14. After all of the antifreeze is drained, you will need to wipe the entire game dry. This insures all water and antifreeze that can be removed from the game has been removed.
15. Block all open holes to prevent rodents from moving in during the winter.
16. Remove all batteries and store them inside. (Batteries may be used for the awning of a trailer).

OPERATING A WATER GAME
IN BELOW FREEZING TEMPERATURES

This is to establish the amount of anti-freeze required to protect a Water Game while operating below freezing.

FOR ALL TYPES OF WATER GAMES

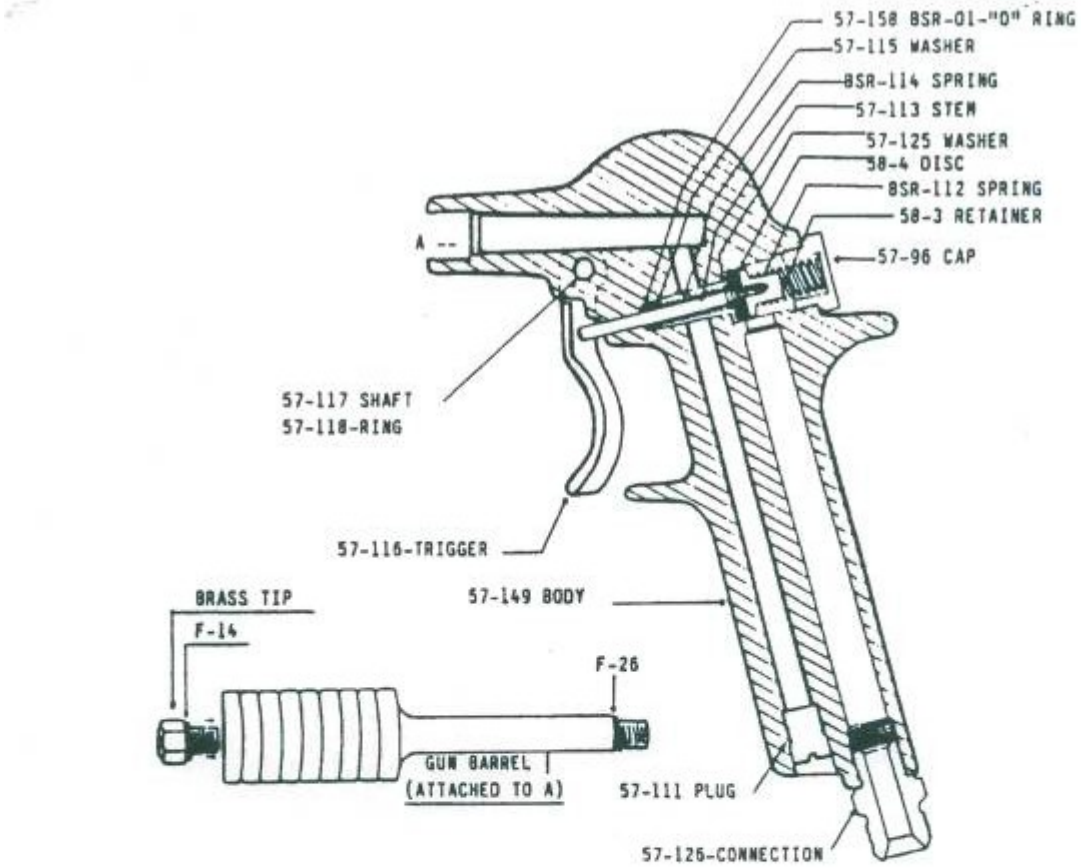
The volume of water required for the tap system will vary with size of game. Tank must be filled one (1) inch above the pump inlet screen. We recommend that you use *Recreational Vehicle Anti-freeze. The instructions on the anti-freeze tell you how much to mix based on what temperature you want protection too. We recommend the use of a Hydrometer (for that Manufactures Anti-freeze) to tell you what temperature you are protected too.

Add the appropriate amount of Anti-freeze for the amount of protection you want. Run the system to thoroughly circulate the water. Run each gun until you can see a little milkiness or foam to the water in each pitcher. This is to ensure that anti-freeze is throughout the system. Next, swap pumps (See Back up System of your Manual). Run the pump for about five (5) minutes and run taps until you fill each pitcher. If the anti-freeze is not correctly circulated, and allowed to even its distribution in the water, the water is protected at different temperatures in different parts of the system. It is important to thoroughly circulate the water! Next, check the anti-freeze protection by use of the hydrometer. If you have to add anti-freeze, repeat this process from the beginning of the paragraph. **Hint**: use the hydrometer while you are running the first pump and after the pitchers have been filled. Get the protection a little better than you want. That way when the anti-freeze mixes with the water in the lines and unused pump the protection may be reduced some but hopefully it will still be where you want it so you don't have to repeat the process to often.

Note: This Guideline is to be used as an Approximate Reference. To further Insure you're Game from Freezing, Test the Anti-Freeze according to Anti-Freeze Manufacturers Instructions.

* This can be bought at RV Supply Stores. They use it in the Holding Tanks for the drinking water. Read the Safety Instructions on the Anti-freeze you buy.

WATER GUN HANDLE ASSEMBLY



PARTS LIST

PART NO.	DESCRIPTION	BSR PART NUMBER	PART NO.	DESCRIPTION	BSR PART NUMBER
57-96	Air Valve Cap	M0006311	57-125	Air Valve Stem Washer	M0006306
57-111	Gun Body Plug	M0006301	57-126	Air Connection	M0006313
57-112	Air Valve Spring	M0006101	57-149	Gun Body	M0006100
57-113	Air Valve Stem	M0006302	57-158	O-Ring	M0006200
57-114	Air Valve Packing Spring	M0006102	58-3	Retainer	M0006300
57-115	Air Valve Packing Washer	M0006303	58-4	Disc	M0006307
57-116	Trigger	M0006304	F-14	Tip Washer	M0006308
57-117	Trigger Shaft	M0006305	F-26	Gun Barrel Washer	M0006309
57-118	Trigger Shaft Snap Ring	M0006314		Gun Barrel	MX010380
				Brass Tip	M0006103

VERTICAL TRACK

Changing Damaged Or Broken Screws for Toy Holder Brackets

The Vertical Track is very different from the Horizontal Track in its design; electrically, it operates the same.

The Channel is made of aluminum. Observed fro the front of the game, are two #5 – 40 x 2" screws with nuts which are attached to the chain inside the channel via a Vertical Toy Holder Bracket. These screws are used to hold the Toys in place. If the screws become worn, breaks, etc., they may need to be replaced. Replacing them is a difficult and time-consuming job, so great care should be taken to ensure that they don't get damaged or broken. Please read all instructions and locate components before beginning this task.

The chain needs to be removed from the motor (just up on Motor Mount Bracket and slide it off). In order to get to the Vertical to Holder Bracket to change the #5 – 40 x 2" screws, the following steps need to be done **carefully.**

Remove the outside screw to the top microswitch and spin the microswitch out away from the channel; this will allow the Micro Activator Bracket enough room so you can change the screws. The next step is to remove the ¼" x 2" bolt at the top of the track, which is held to the channel, via an acorn nut. The bolt is used to keep the Micro Activator Bracket from moving beyond the switches (and causing possible damage).

Once these steps have been done, you can remove the #5 – 40 x 2" nut and washer from the #5 – 40 x 2" screws on the face of the channel. (There is a washer on the screw inside of the channel: be careful not to lose this washer). This will allow the screws and Vertical Toy Holder Bracket in and away from the slot, so you can pull the chain up to you and replace the #5 – 40 x 2" screws.

CAUTION: Only remove one (1) screw at a time. The new screw needs to be replaced in the **exact same** slot in the chain where the old screw was removed from in order for the unit to remain balanced.

The order of the parts is as follows:

Chain/Screw/Bracket/Nut/PlasticWasher/Channel/Washer/Nut/Space/Nut/Toy Bracket/Nut

Once the #5 – 40 x 2" screws have been replaced, you can feed the screws through the slot on the channel and slide the chain down the channel. After the screws are in place, replace the washer/nut on the outside of the channel. **DO NOT TIGHTEN** the nut/washer against the channel. There should be approximately a 1/8" gap when you pull on the screw. Replace the ¼" x 2" bolt, along with the acorn nut and the microswitch.

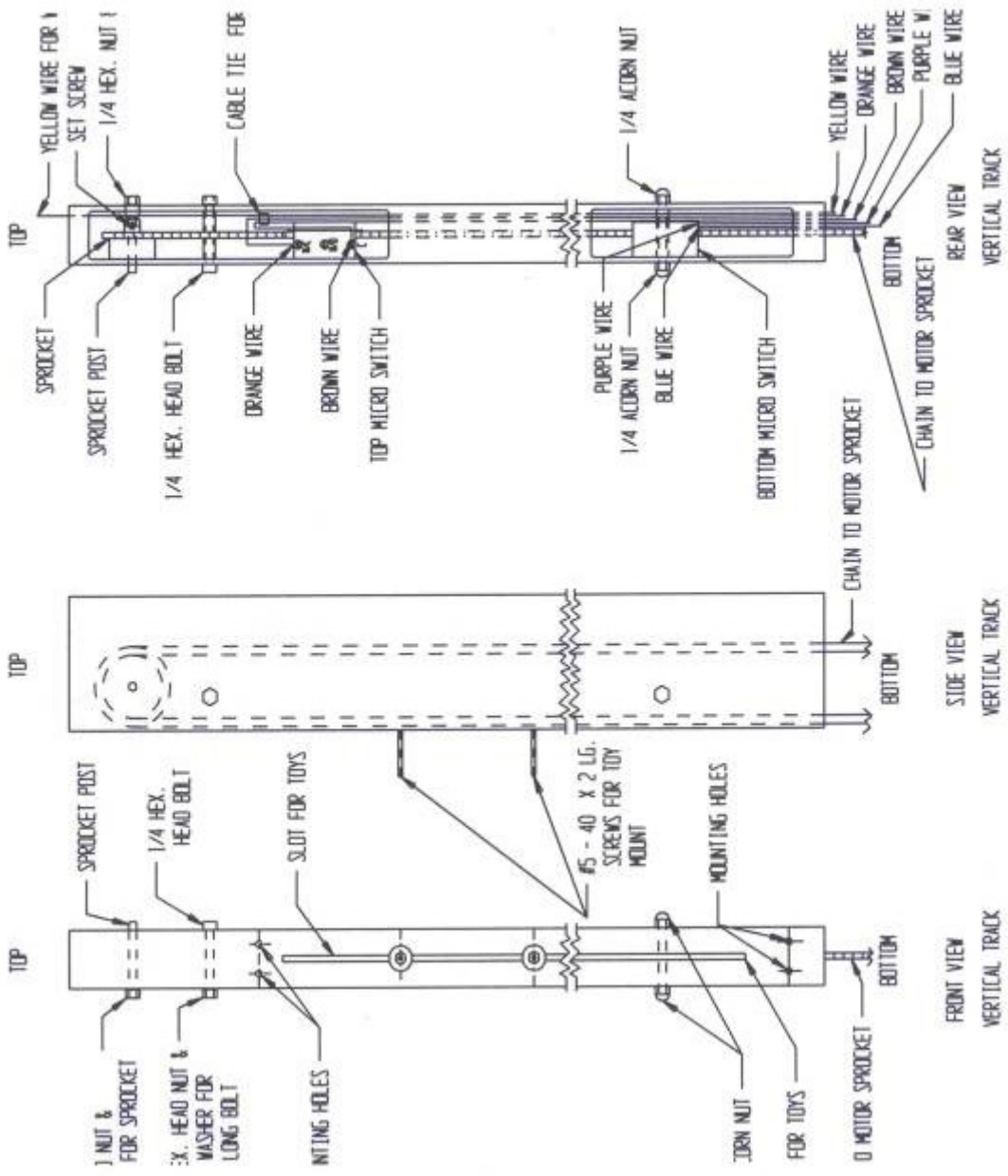
Observe the chain and its position while doing these procedures, so as not to twist the chain. There are two brackets further down on the chain, which are used to activate the Hole Limit Switch and/or Win Switch, which are the Micro Activator Brackets. If the chain gets twisted in any way, these brackets will become entangled and not activate the Limit Switches. Even it if doesn't tangle, the chain will keep coming off the Motor.

For the 1994 Model tracks, the bottom microswitch wiring has been changed to accommodate both Arcade and Park a Model games. The Switch, for a Park model, was wired N/O (Normally Open) with a Purple and Blue wire. The Switch, for an Arcade Model, was wired N/C (Normally Closed) with a Purple

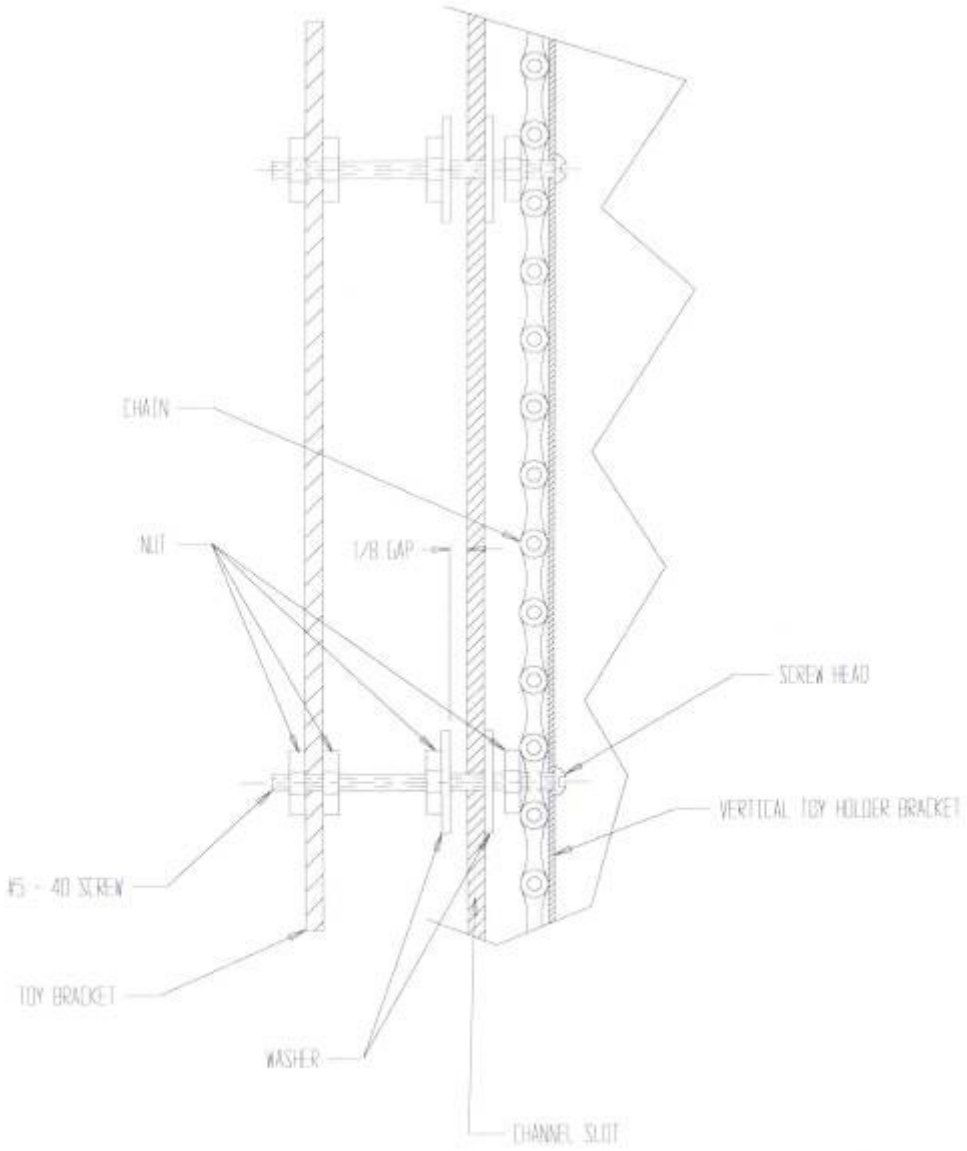
and a Blue wire. Currently, we use three wires: Purple, Blue, and Red, for all three positions on the Switch. If you have a Park Model game, the Switch will be wired N/O, only using the Purple and Blue wires. If you have an Arcade Model game, the Switch game, the Switch will be wired N/C, only using the Purple and Red wires. We have also added a green with yellow stripe wire on t the top of each track, for a ground. This wire will ground the entire track channel.

When the above steps have been completed, and the game returned to its original appearance, you can replace the Toy (s) and power up the game to ensure that everything is working properly. If you need further assistance, please call **BOB'S SPACE RACERS®** and ask to speak with a Technician: (386-677-0761).

VERTICAL TRACK – (PARK)



VERTICAL TRACK
#5 – 40 x 2” SCREW REPLACEMENT



LARGE
AIR COMPRESSOR

LARGE AIR COMPRESSOR OVERVIEW

For Large Group Games and Trailers

The air compressor currently in use is a “continuous run” compressor that is directly wired to a circuit breaker or plugged into an outlet. The compressor will run continuously, once started, until it is manually turned off.

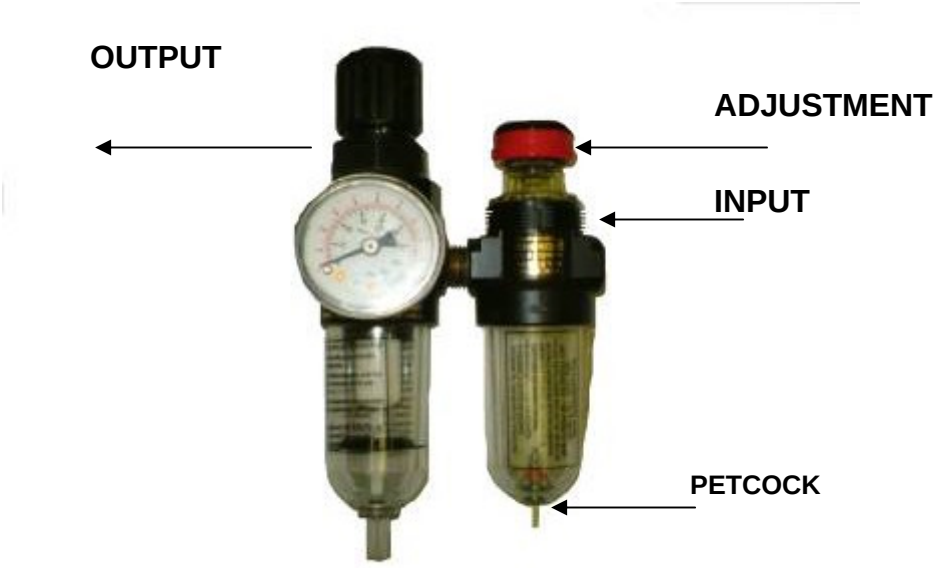
When there is a demand for compressed air the pilot valve closes, causing the unloader tower to actuate the unloader. Now the compressor begins to make compressed air. As soon as the demand for compressed air is met, the pilot valve opens, allowing air pressure to deactuate in the unloader tower. (The compressor still runs, but doesn’t compress air).

The pilot valve is preset at the factory, so you should not need to make any adjustments. There are two (2) adjustment options for the pilot valve:

1. The top brass hex nut can be adjusted in, or out, to set the top (unload) pressure.
2. A large brass hex nut that can be screwed in, or out, of the pilot valve assembly to alter the differential pressure between the start pressure and the unload pressure (cut-in and cut-out) settings.

Once these pressures have been set, use the lock nuts to lock the settings.

The compressed air moves from the compressor (or house supply) to the Filter, Regulator, Lubricator (F.R.L.) and manifold assembly. The filter collects any water that is in the compressed air and deposits it in the first glass bowl. This should be drained routinely by means of a petcock at the bottom of the bowl. The regulator then allows only a preset amount of air into the manifold. The lubricator automatically puts oil into the air to keep all valves and cylinders in good working condition. The lubricator bowl should always be kept full with 10w
Non-detergent oil.



GENERAL INFORMATION

The BSR Medium Air Compressor is a basic, but very important, piece of equipment. Be certain to understand this information before any adjustments are made on this machine.

After the BSR Medium Air Compressor is plugged into the electrical outlet it will run continuously until the air pressure inside the holding tank reaches the preset pressure. When the pressure switch notes the proper air pressure inside the holding tank, it will automatically turn off the motor.

When the motor turns off, the excess pressurized air that is trapped between the compressor head, and the check valve needs to be released. This is done automatically when the pressure switch shuts off, via the needle valve, which is bolted to the side of it. The needle valve is pushed open by a small lever mounted on the side of the pressure switch. The holding tank should not empty through the needle valve. The check valve prevents this from happening when the needle valve is open; it allows air to go into, but not out of the holding tank. The needle valve lets air out of the compressor head so the when the motor turns back on; there will not be any pressure on the compressor head. This prevents the motor from spinning around. When the motor starts up again then the small lever comes off of the needle valve, thus allowing pressure to develop in the compressor head again.

On the side of the holding tank is a pipefitting. On this fitting is a pressure gauge, safety valve, and drain valve. The pressure gauge shows you how much pressure is inside the holding tank. The safety valve has a small metal ring on it. If the pressure gauge shows too much pressure inside the holding tank, then you will need to pull the metal ring on the safety valve to release the air. **Caution! An excess amount of pressure in the holding tank can cause an explosion! NEVER REPLACE THE SAFETY VALVE WITH A PLUG!** The drain valve is for draining the holding tank and removing water from it. Water develops in the tank due to condensation. For your compressor to function properly, the holding tank needs to be drained on a weekly basis.

There is a pushbutton on the back of the compressor motor. This button resets the motor should it overheat. Newer models don't have a reset button; they have auto-reset when the temperature of the motor cools down to the appropriate level.

The air then goes from the compressor (or house supply) to the Filter, Regulator, Lubricator (F.R.L.) and manifold assembly. The filter collects any water that is in the air and deposits it in the first glass bowl. This should be drained routinely by means of the petcock on the bottom of the bowl. The regulator then allows only a preset amount of air pressure into the manifold. The lubricator automatically puts oil into the air to keep all valves and cylinders in good working condition. The lubricator bowl should always be kept full with 10w non-detergent oil.

GROUNDING INSTRUCTIONS

1. The BSR Air Compressor should always be grounded. In the event of an electrical short circuit, grounding reduces the risk of electrical shock by providing an escape route for the electric current. This air compressor is equipped with a cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances. **NOTE: Do not use a rounding adapter.**

*** DANGER ***

INPROPER USE OF GROUNDING PLUG CAN RESULT IN ELECTRICAL SHOCK!

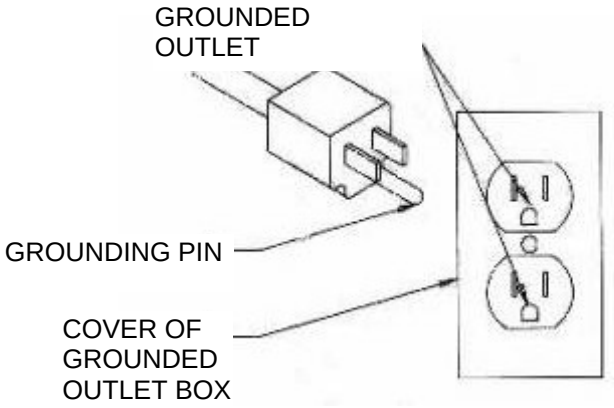
2. If repair or replacement of cord or plug is necessary, do not connect grounding wire to either flat blade terminal. The wire with insulation, having an outlet surface that is green, with or without yellow stripes, is the grounding wire.

3. Check with a qualified electrician or serviceperson if grounding instructions are not completely understood, or if you are in doubt about product being properly grounded. Do not modify plug provided; if it will not fit your outlet, have the proper outlet installed by a qualified electrician.

*** WARNING ***

NEVER CONNECT THE GREEN (OR GREEN AND YELLOW) WIRE TO A LIVE TERMINAL!

GROUNDING METHOD



BSR AIR COMPRESSOR SAFETY INFORMATION

* WARNING *

ALL ELECTRICAL WORK SHOULD BE DONE BY A LICENSED, OR CERTIFIED, ELECTRICIAN. ON A PROPERLY WIRED CIRCUIT, THE BLACK WIRES CARRY THE ELECTRICAL CURRENT.

1. Carefully read the instruction manual for each component prior to attempting to assemble, disassemble, or operate your system.

2. Do not exceed the pressure rating of any component in this system.

3. Protect material lines and air lines from damage or puncture. Keep hose and power cable away from sharp objects, chemicals, oil, and other solvent spills, and wet floors.

4. Never point a spray gun at yourself, or anyone else. Accidental discharge may result in serious injury.

5. Check hoses for weak or worn areas before each use; make certain all connections are secure; do not use is deficiency is found.

6. Release all pressures within system slowly; dust and debris expelled at high speeds may be harmful.

*** WARNING ***

DISCONNECT POWER AND DEPRESSURIZE SYSTEM BEFORE SERVICING AIR COMPRESSOR! TURN THE PRESSURE REGULATOR KNOB FULLY CLOCKWISE BEFORE SHUTTING OFF THE COMPRESSOR!!

7. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).

8. Wiring and fuses should follow electrical codes, current capacity, and be properly grounded.

9. Electrical motors must be securely and adequately grounded.
   (See Grounding Instructions in this manual).

10. Always disconnect power source (or its connected load) prior to working on, or near, a motor.

11. Guard all moving parts; keep visitors away. Never allow children in work areas.

12. Use only a properly grounded outlet that will accept a three (3) pronged plug, and wear shoes to prevent shock hazards.

13. Be careful when touching exterior, or operating motor; it may be hot enough to cause injury.

14. Protect power cables from coming in contact with sharp objects.

15. Clean electrical/electronic equipment with an approved cleaning agent (such as a dry, non-flammable cleaning solvent).

16. To avoid spontaneous combustion, discard waste rags into approved metal waste cans.

17. Never store flammable liquids, or gasses, in the vicinity of the BSR Air Compressor.

18. When spraying with solvent of toxic chemicals, follow the instructions provided by the chemical's manufacturer.

19. NEVER reset the safety valve or pressure switch. Keep the safety valve free from paint and other accumulations. (This provides safety against over-pressure).

20. Do regular maintenance; keep all nuts, bolts, and screws tight; be certain equipment is in safe working condition.

LARGE AIR COMPRESSOR MAINTENANCE

Daily

- Check oil level: it should be between the high and low level marks.
- Drain water from main tank.
- Check oil pressure: it should be between 18-20 PSIG.

Weekly

- Operate the pressure relief valves to be certain they are in working order.
- Clean or replace the air intake filter.

Monthly

- Check belt tension.

Quarterly

- Change oil and filter: it should be done more frequently in harsh environments.

TROUBLESHOOTING – LARGE AIR COMPRESSOR

PROBLEMS/CAUSES	SUGGESTED FIX
Low Discharge Output	
Restricted inlet	Clean or replace filter.
Defective compressor valves or valve unloading mechanism	Check valves for correct operation.
Leaks in the compressed air distribution system; at fittings, connections, etc.	Check for air leaks, etc.
Pressure switch defective or set wrong	Check pressure settings on Pressure Switch.
Drive belt slipping	Check/tighten belt.
Low oil pressure	Check oil pressure/level.
Drain valve open	Drain tank, then close valve.
Low Oil Pressure	
Oil pump direction reversed	Check power. The flywheel has a direction of rotation marking; check that fly turns correct direction.
Low oil level	Check oil level; add oil, if necessary.
Compressor Loads and Unloads Excessively	
Excessive system leakage	Check for air leaks.
Unloader pilot differential set too close	Check Start and Stop pressures; adjust, if necessary.
Pressure Switch defective	Check switch for operation; clean, if necessary.

TROUBLESHOOTING – LARGE AIR COMPRESSOR

(CONTINUED)

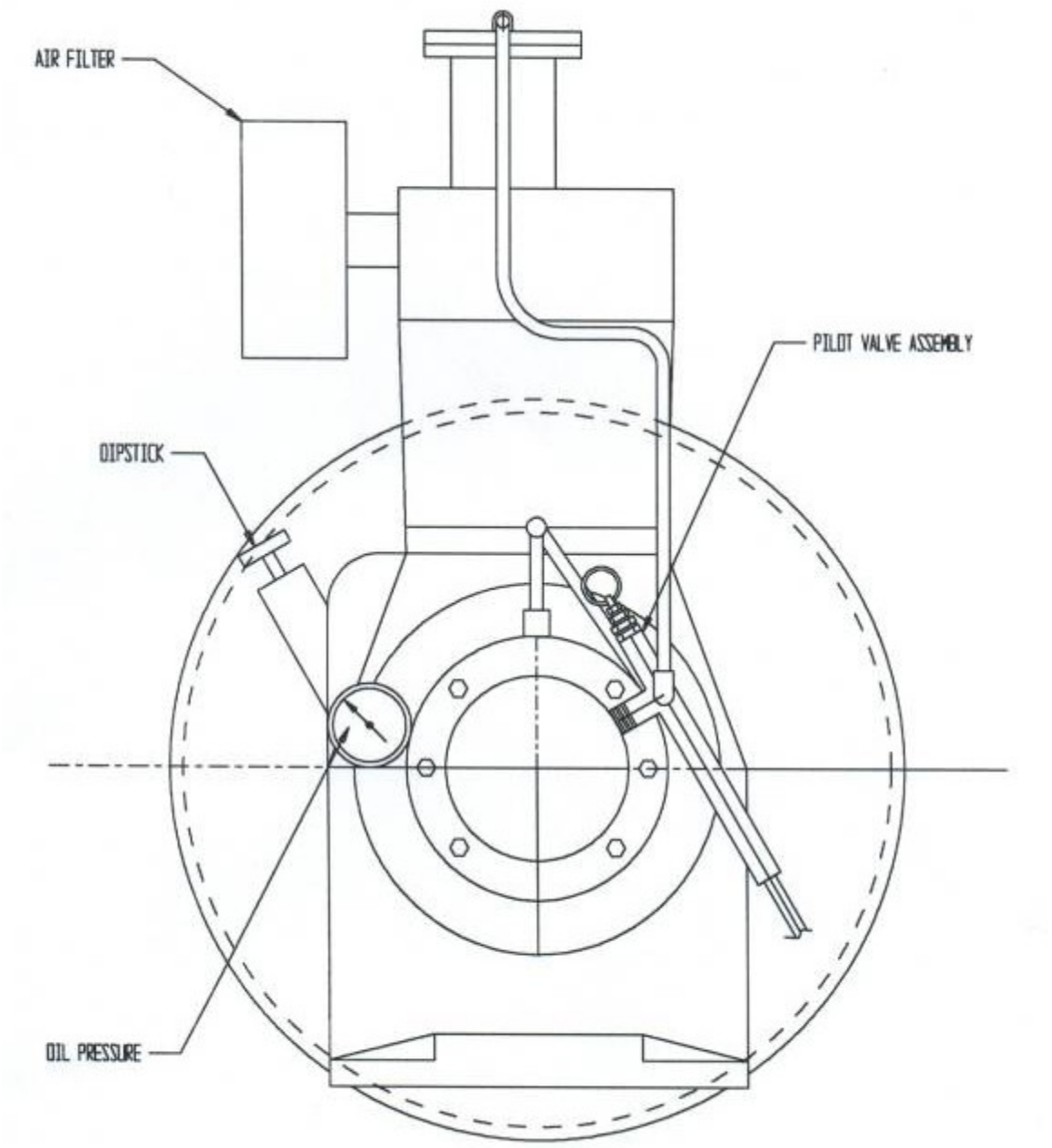
PROBLEMS/CAUSES	SUGGESTED FIX
Defective Pressure Switch Moisture and/or oil buildup on the pressure switch diaphragm	Clean switch, if still doesn't work – replace.
Ruptured diaphragm	Replace switch.
Burned contact points	Replace switch.
Excessive Current Draw **CAUTION! Motor surface temperature normally exceeds 170^0 F!** To determine maximum amperage allowed, multiply the F.L.A. on the motor nameplate by the Service Factor.	
Low voltage (must be within 10% of nameplate voltage)	Check power to compressor.
Loose electrical connection	Tighten connections; Check wire for kinks.
Motor defective	Remove belt and check motor; replace, if motor doesn't work.
Drive belts too tight	Slacken belt to see if that cures the problem.
Failure to Start Power not on	Check power to motor.
Blown circuit fuse	Check fuse or circuit breaker.
Low voltage	Check power to motor.
Faulty start switch	Clean or replace switch.
Pressure switch incorrectly adjusted or faulty	Adjust switch or replace.

TROUBLESHOOTING – LARGE AIR COMPRESSOR

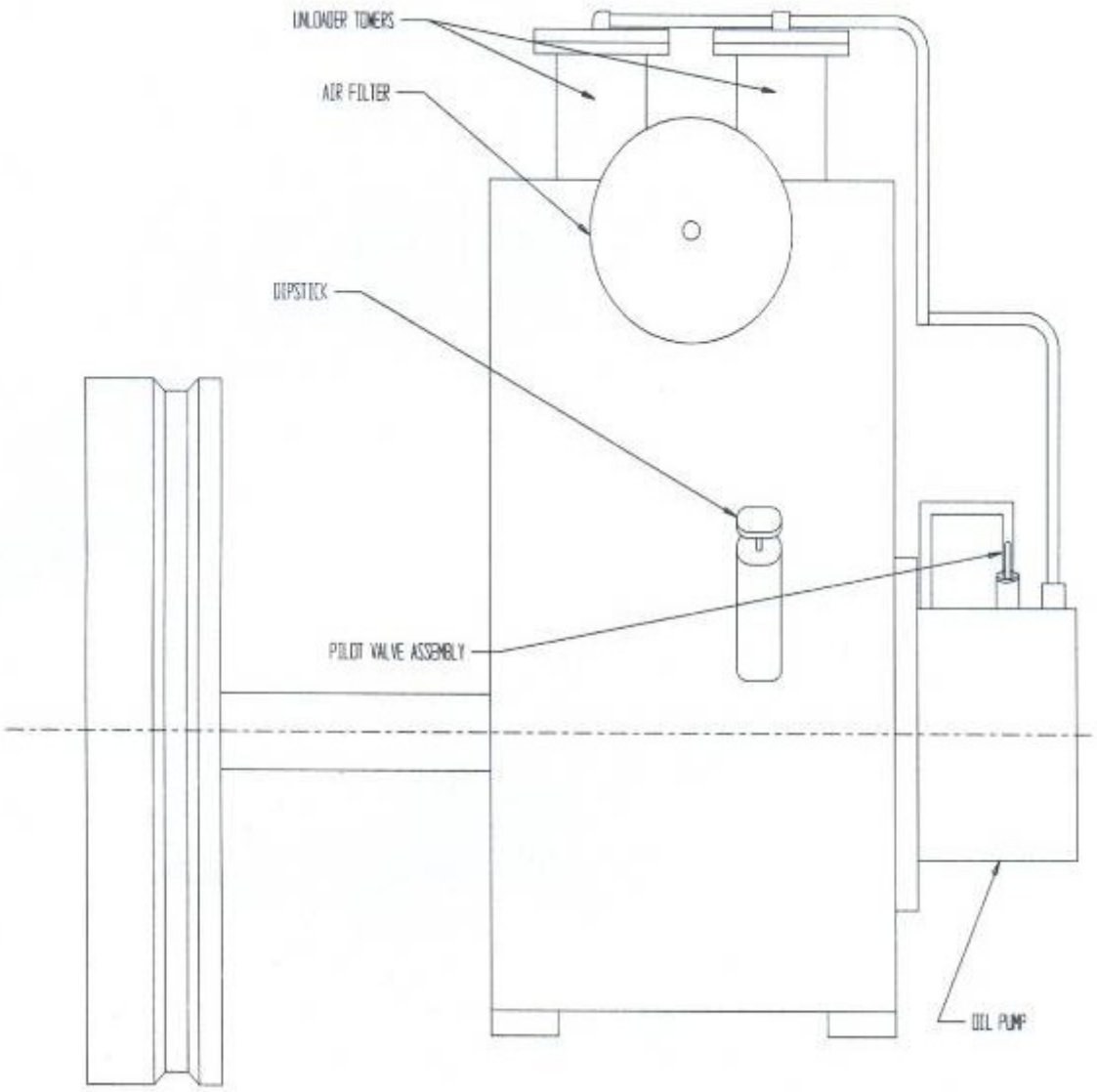
(CONTINUED)

PROBLEMS/CAUSES	SUGGESTED FIX
Failure to Start (continued)	
Loose or broken wire	Check wire connections; check power to motor.
Motor defective	Remove belt and check motor; replace if motor doesn't work.
Motor Stalls	
Motor overloaded	Refer to Excessive Current Draw (above)
Excessive Drive Belt Wear	
Pulley/sheave out of adjustment	Check pulleys for alignment; adjust, if necessary.
Belt too loose or too tight	Adjust belt.
Belt slipping	Tighten belt.

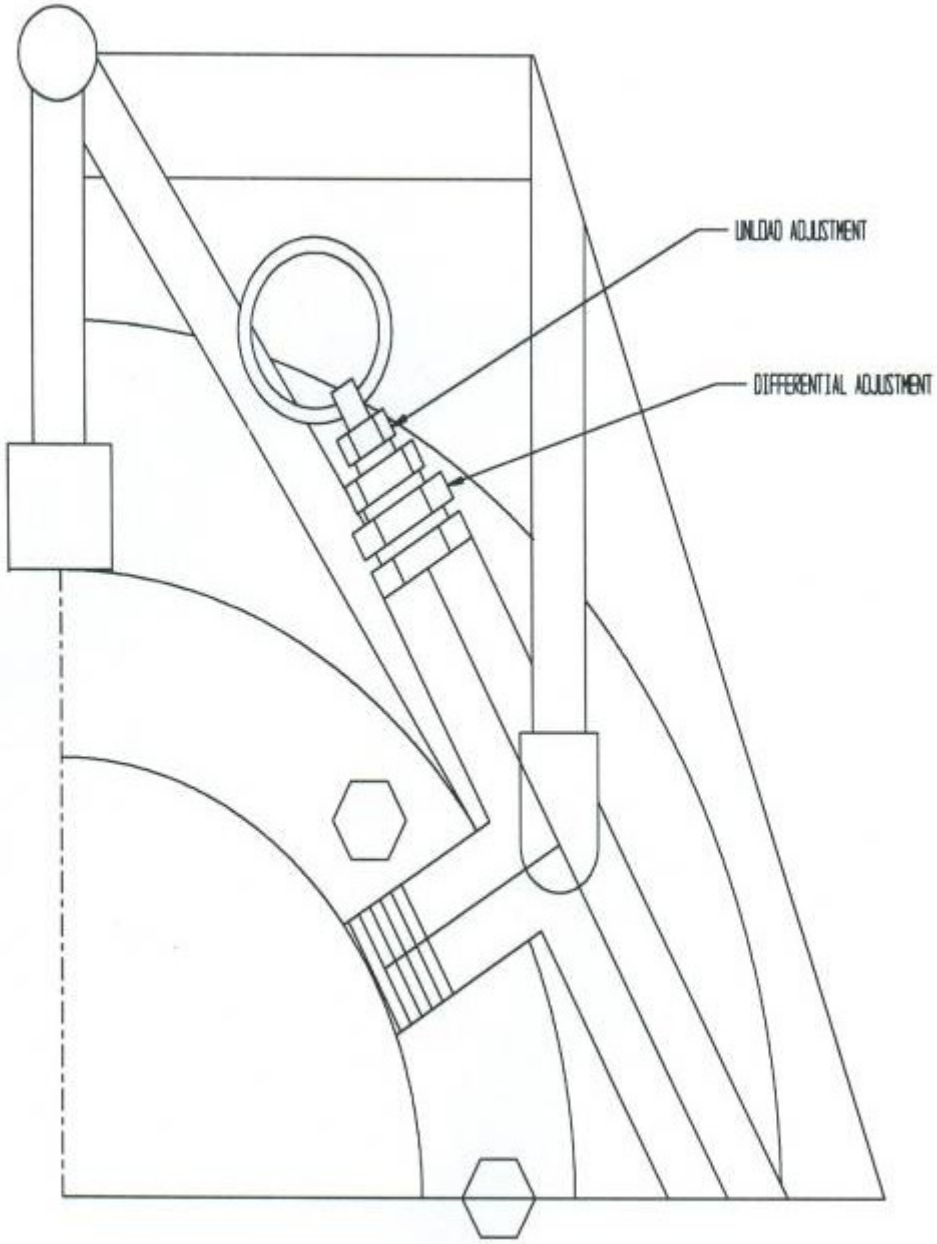
LARGE AIR COMPRESSOR – PUMP FRONT VIEW



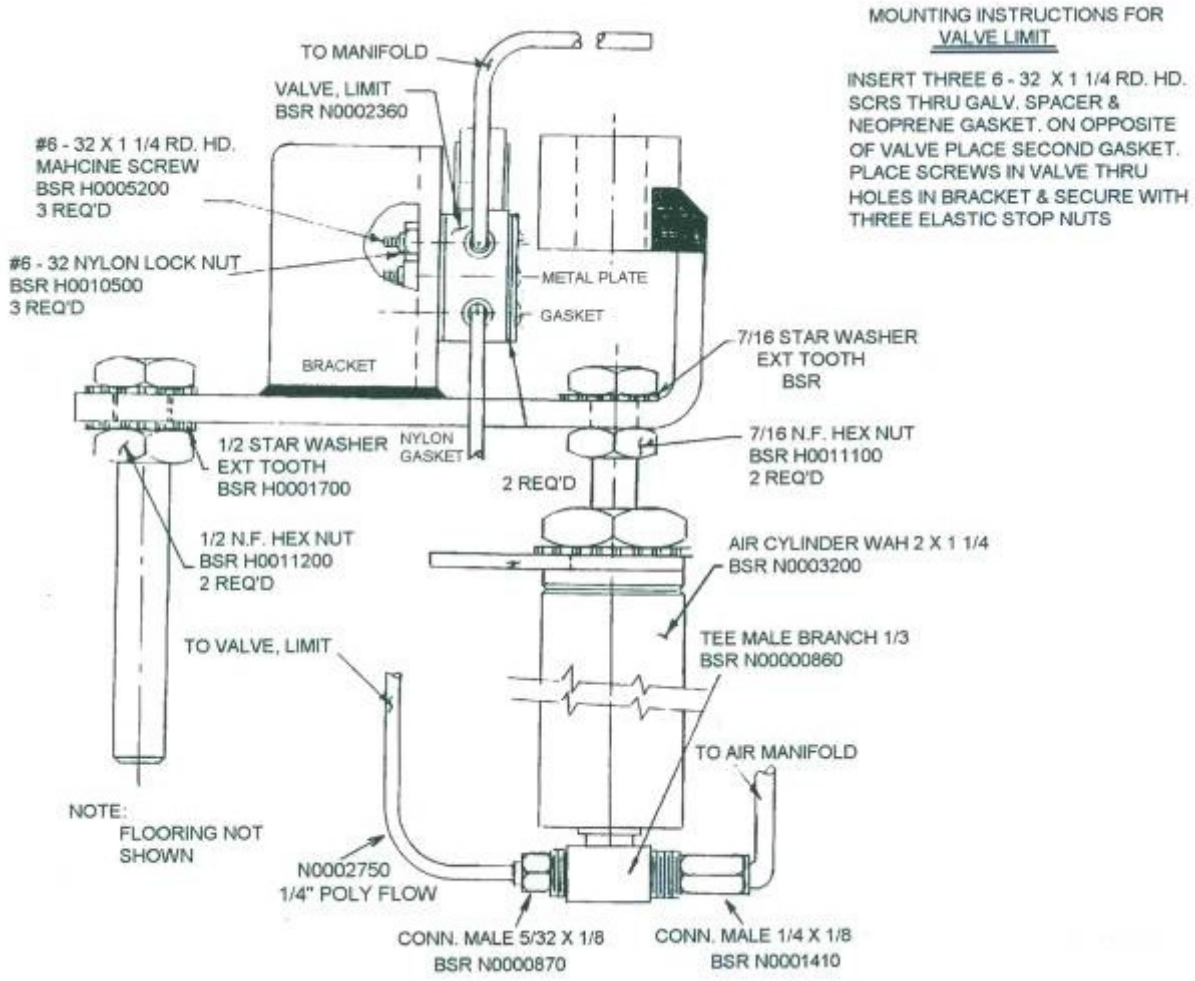
LARGE AIR COMPRESSOR – PUMP SIDE VIEW



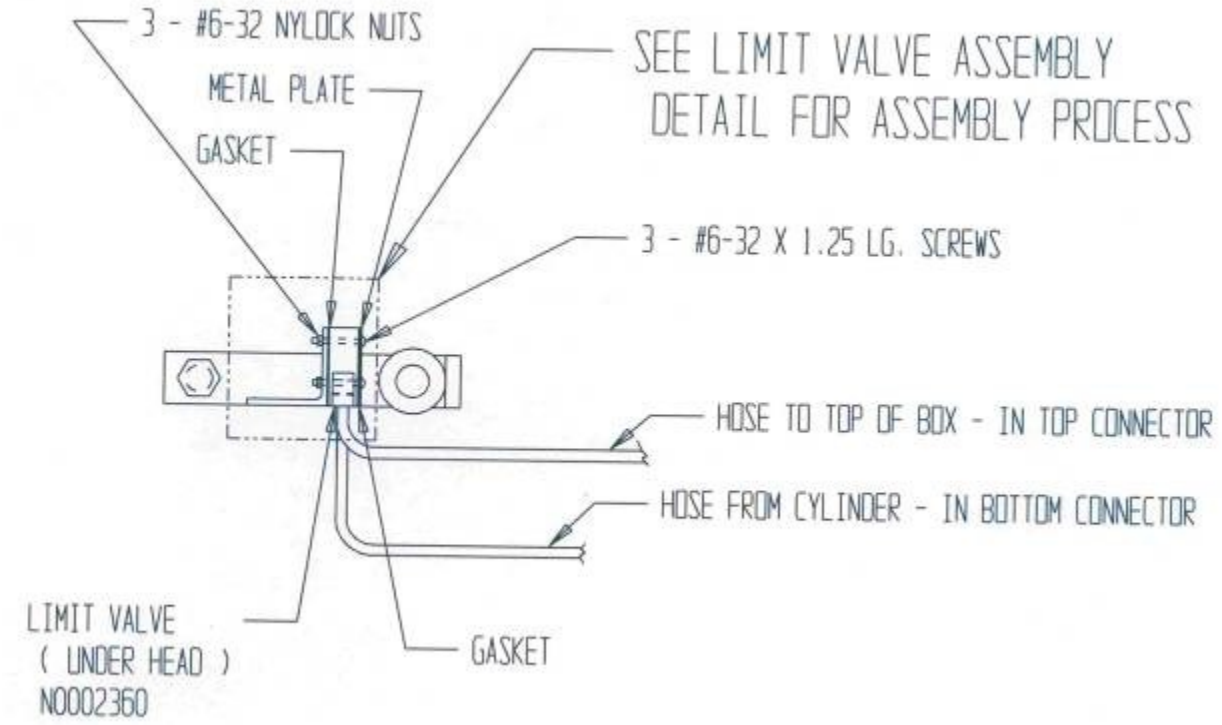
LARGE AIR COMPRESSOR – PILOT VALVE ASSEMBLY



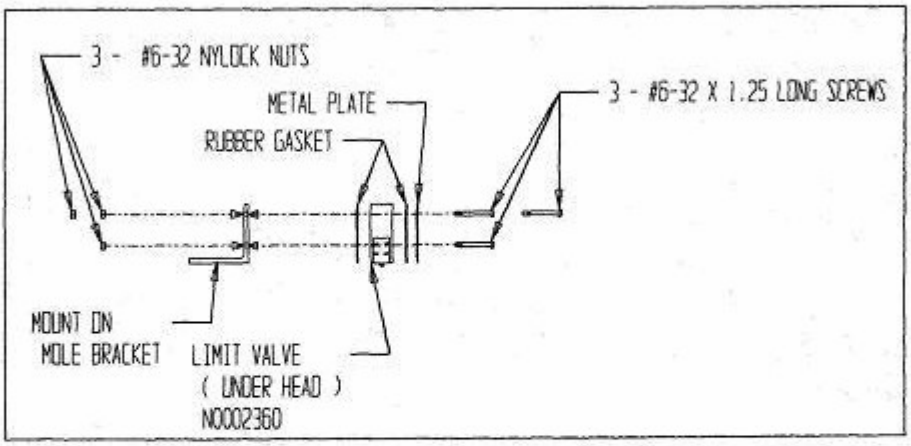
BSR COMPRESSOR BRACKET ASSEMBLY



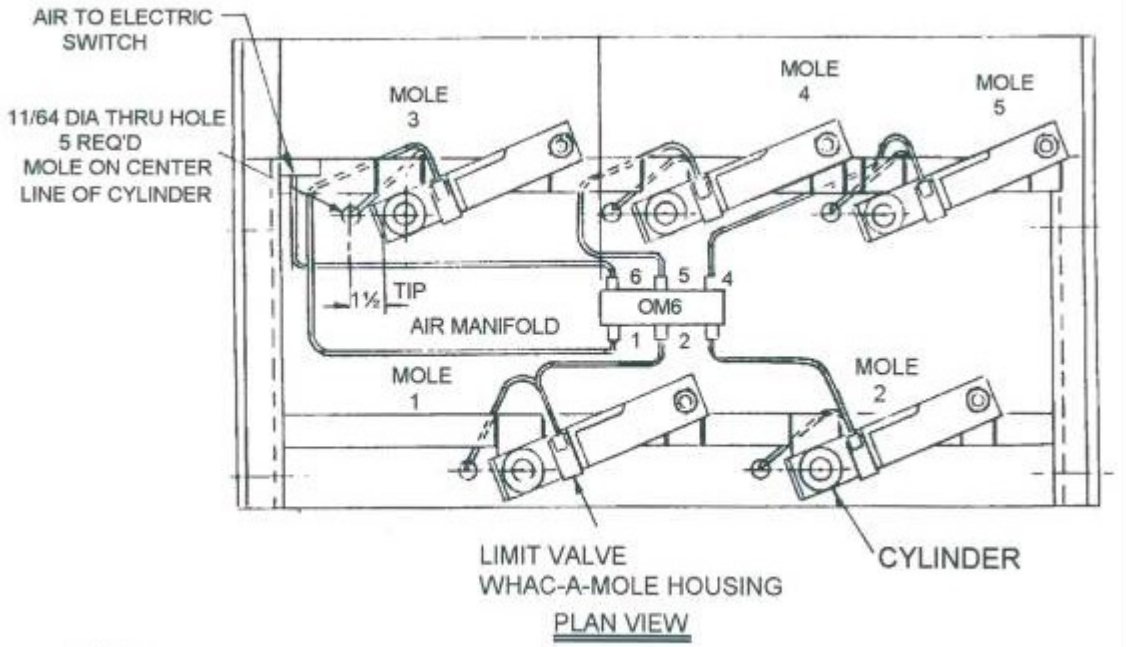
TOP LIMIT VALVE ASSEMBLY



BSR LIMIT VALVE ASSEMBLY DETAIL



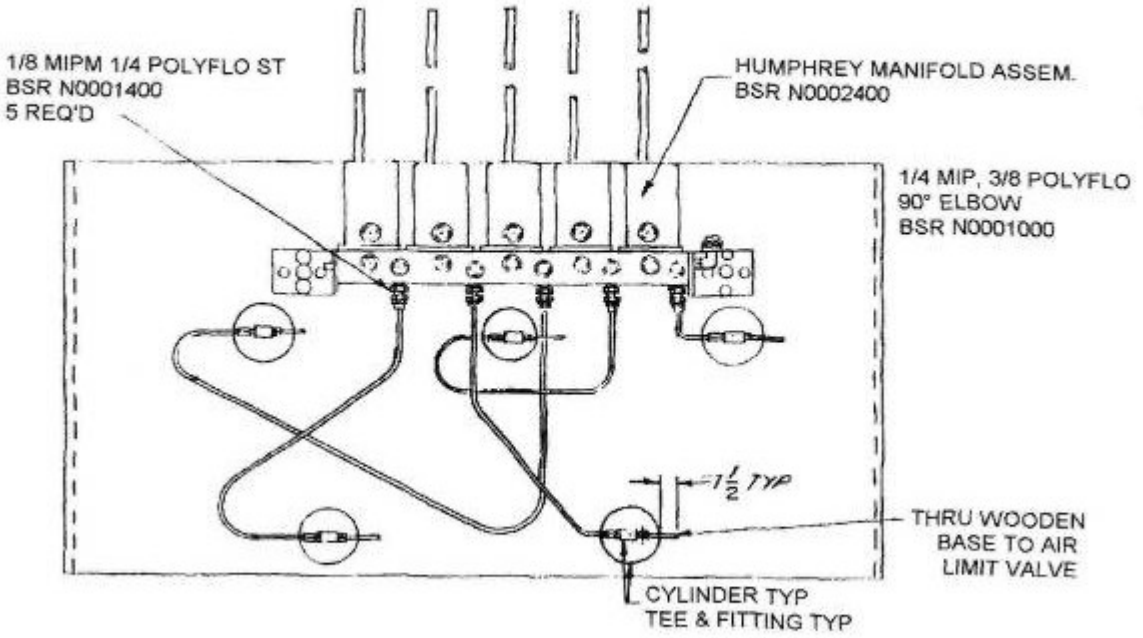
2400 VALUE HOUSING ASSEMBLY
(WHAC-A-MOLE)



PLAN VIEW

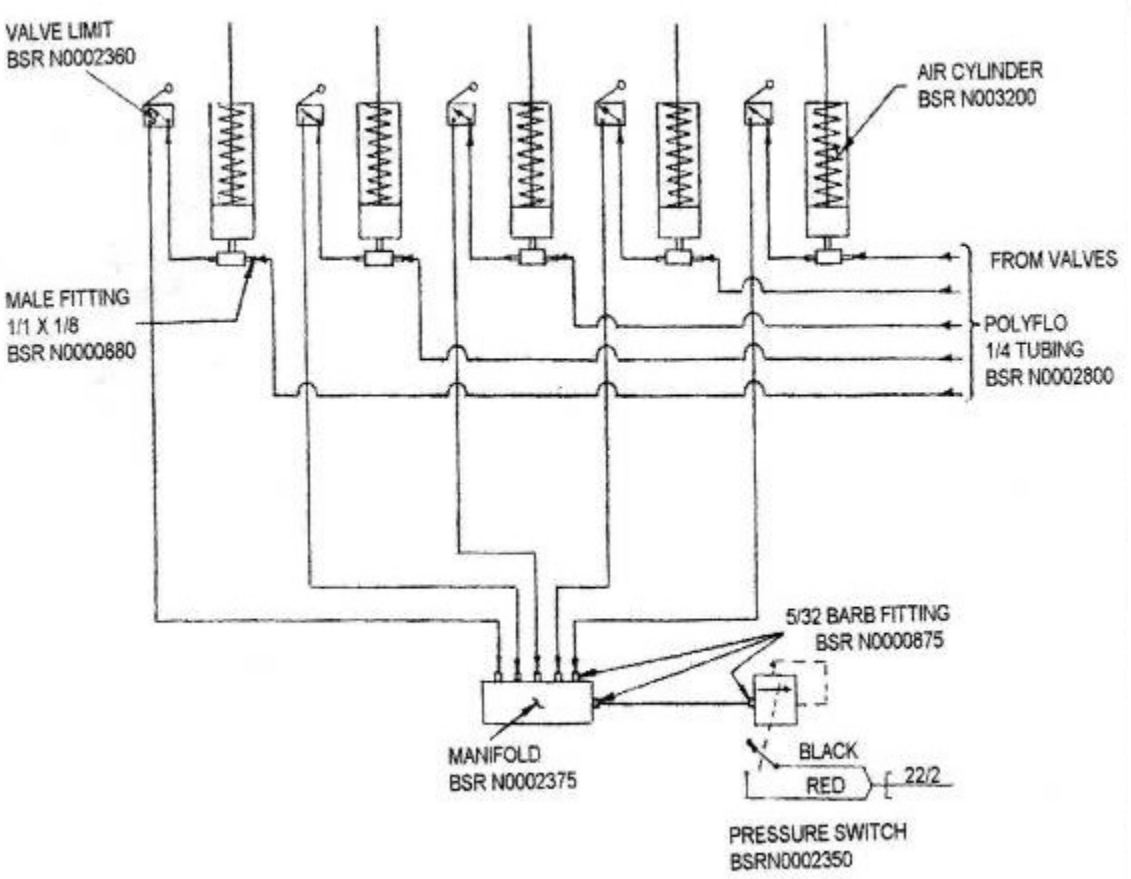
NOTE:
ALL TUBING 5/32

BSR MANIFOLD ASSEMBLY
(WHAC-A-MOLE)



WHAC A MOLE HOUSING ASSEMBLY
BOTTOM VIEW

2400 PNEUMATIC SCHEMATIC
(WHAC-A-MOLE)



NOTE:

ALL TUBING 5/32 NYLON BSR N0002750
UNLESS OTHERWISE SPECIFIED

TROUBLESHOOTING

PROBLEM/CAUSE	FIX
One Head Will Not Score	
Bad Switch or Kinked Air Line	Check for air out of Head Switch when it is depressed
Air Switches Breaking	
Screws that hold the Switch in place are too Tight; No rubber gasket	Adjust switch so when mole head is down there still is a little movement left in the Switch. Make sure you use Rubber gaskets.
One Head Won't Come Up	
Bad Valve or Cylinder	Disconnect the Air line from Valve; is there any air? Yes – Put line on another valve; Could be a crimp in line or Bad cylinder. No – Bad Valve; Replace, if necessary.
Bad Limit Valve under Head	
Bad Cylinder	Pull up on the cylinder. Does It stick? Yes – could be just A misaligned Guide Pin. Otherwise, it's a bad Cylinder.

PARTS LISTS

PARTS #	DESCRIPTION
E0003800	Relay, 12VDC, KHAU-17D12
E0013400	Switch, Micro, Whac-A-Mole 516 N/O
E0022670	Power Supply 12VDC, 7.4A Open Frame (Per Unit) Requires power supply cover
E0022671	Power Supply Cover (Use with E0022670)
EX033100	Footswitch Assembly
EX033420	2400 Module
EX033490	Display Assembly
EX033609	3 Digit LED Display
EX033611	2 Digit LED Display
EX033658	2400 Processor Board
H0018600	Set Collar 5/8” with 5/16” set Screw
M0005300	CRC Spray, 20 ounce can
M0010500	Lubriplate Tube
M0010900	Screwlox, Driver #2
M0010910	Allen T-Handle Wrench 5/32
MX010000	Mole w/shaft assembly
MX010100	Hammer, Adult Whac-A-Mole, assembly
MX010150	Hammer, Kiddie Whac-A-Mole
N0002360	Air Switch
N0002500	Valve, 3-Way Air WAM
N0003200	Air Cylinder WAM 2 x 1-1/4
WX006600	Whac-A-Mole Bracket Assembly, New style

BSR MEDIUM
AIR COMPRESSOR

BOB'S SPACE RACERS® MEDIUM AIR COMPRESSOR

IMPORTANT NOTICE

Read carefully before attempting to assemble, install, operate, or maintain the BSR Air Compressor. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage!

When unpacking the unit, inspect carefully for any damage that may have occurred during transit. Make certain any loose fittings, bolts, et cetera, are tightened prior to putting unit into service.

BSR MEDIUM AIR COMPRESSOR
GENERAL INFORMATION

The BSR Medium Air Compressor is a basic, but very important, piece of equipment. Be certain to understand this information before any adjustments are made on this machine.

After the BSR Medium Air Compressor is plugged into the electrical outlet it will run continuously until the air pressure inside the holding tank reaches the preset pressure. When the pressure switch notes the proper air pressure inside the holding tank, it will automatically turn off the motor.

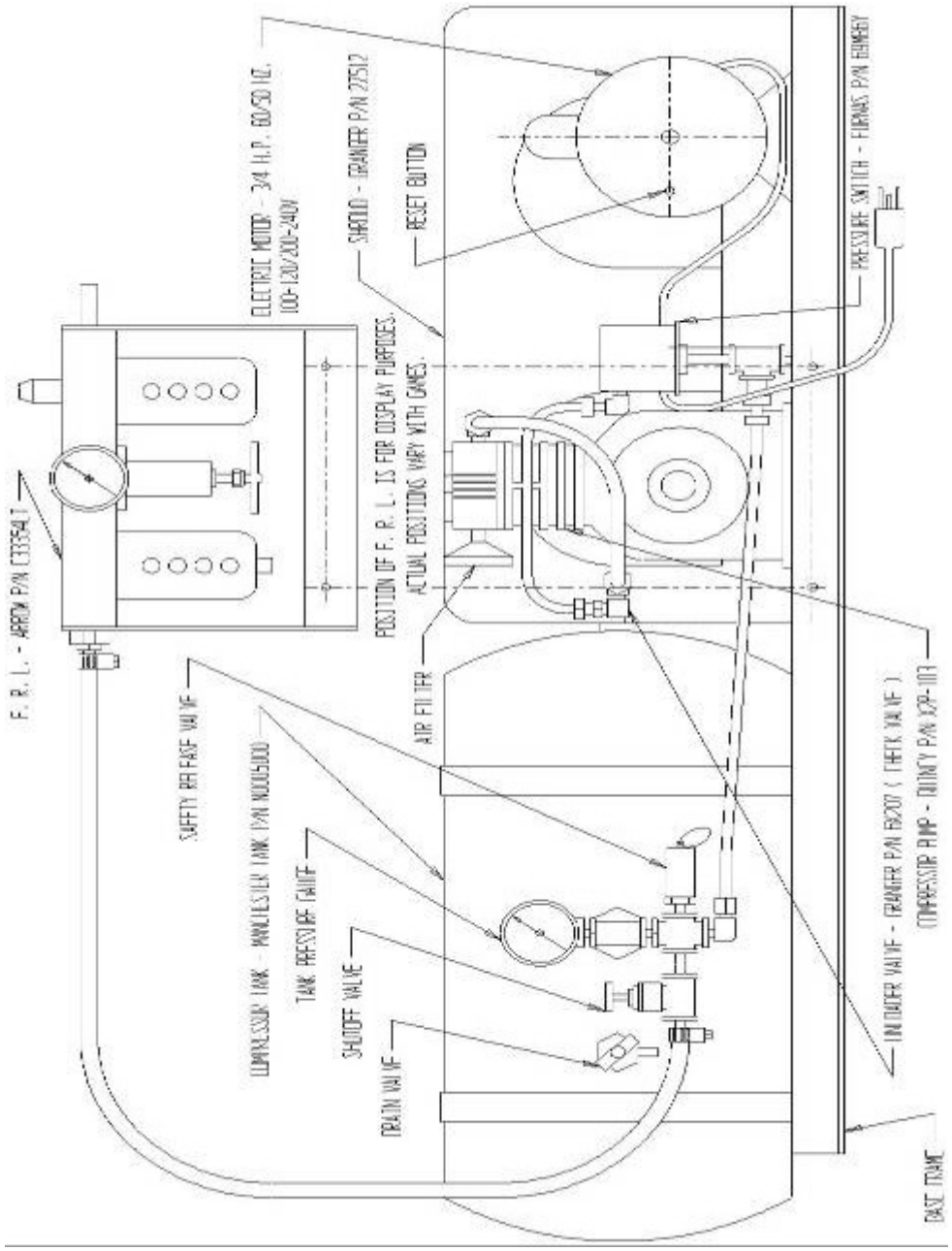
When the motor turns off, the excess pressurized air that is trapped between the compressor head and the check valve needs to be released. This is done automatically, when the pressure switch shuts off, via the needle valve, which is bolted to the side of it. The needle valve is pushed open by a small lever mounted on the side of the pressure switch. The holding tank shouldn't empty through the needle valve. The check valve prevents this from happening when the needle valve is open; it allows air to go into, but not out of the holding tank. The needle valve lets air out of the compressor head so that when the motor turns back on; there will not be any pressure on the compressor head. This prevents the motor from spinning around. When the motor starts up again then the small lever comes off of the needle valve, thus allowing pressure to develop in the compressor head again. This pressure will go through the check valve and into the holding tank.

On the side of the holding tank is a pipefitting. On this fitting is a pressure gauge, safety valve, and drain valve. The pressure gauge shows you how much pressure is inside the holding tank. The safety valve has a small metal ring on it. If the pressure gauge shows too much pressure inside the holding tank, then you will need to pull the metal ring on the safety valve to release the air. **Caution! An excess amount of pressure in the holding tank can cause an explosion! NEVER REPLACE THE SAFETY VALVE WITH A PLUG!** The drain valve is for draining the holding tank and removing water from it. Water develops in the tank due to condensation. For your compressor to function properly, the holding tank needs to be drained on a weekly basis.

There is a pushbutton on the back of the compressor motor. This button resets the motor should it overheat. Newer models don't have a reset button; they have auto-reset when the temperature of the motor cools down to the appropriate level.

The air then goes from the compressor (or house supply) to the Filter, Regulator, Lubricator (F.R.L.) and manifold assembly. The filter collects any water that is in the air and deposits it in the first glass bowl. This should be drained routinely by means of the petcock on the bottom of the bowl. The regulator then allows only a preset amount of air pressure into the manifold. The lubricator automatically puts oil into the air to keep all valves and cylinders in good working condition. The lubricator bowl should always be kept full with 10w non-detergent oil.

BSR AIR COMPRESSOR – DIAGRAM



GROUNDING INSTRUCTIONS

1. The BSR Air Compressor should always be grounded. In the event of an electrical short circuit, grounding reduces the risk of electrical shock by providing an escape route for the electric current. This air compressor is equipped with a cord having a grounding wire with an appropriate grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances. **NOTE: Do not use a grounding adapter.**

* DANGER *

IMPROPER USE OF GROUNDING PLUG CAN RESULT IN ELECTRICAL SHOCK!

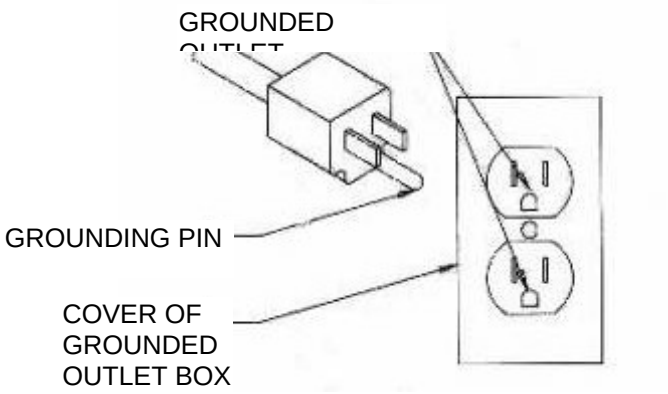
2. If repair or replacement of cord or plug is necessary, do not connect grounding wire to either flat blade terminal. The wire with insulation, having an outlet surface that is green, with or without yellow stripes, is the grounding wire.

3. Check with a qualified electrician or serviceperson if grounding instructions are not completely understood, or if you are in doubt about product being properly grounded. Do not modify plug provided; if it will not fit your outlet, have the proper outlet installed by a qualified electrician.

* WARNING *

NEVER CONNECT THE GREEN (OR GREEN AND YELLOW) WIRE TO A LIVE TERMINAL!

GROUNDING METHOD



BSR MEDIUM AIR COMPRESSOR MAINTENANCE

Daily

1. Check oil
   - Air Compressor: 30w non-detergent
   - Lubricator (if supplied): 10w non-detergent
2. Check dryer and drain, if necessary.

Weekly

1. Drain air tank.
2. Clean cooling surfaces of BSR Air Compressor.

Monthly

1. Operate safety valves on compressor or tank.
2. Replace or clean air filter.
3. Check belt tension on compressor.
4. Check pulley clamp bolt and set screws.
5. Inspect air lines, rubber, and PVC.

Semi-Annually (Twice Each Year)

1. Inspect valve assemblies.
2. Check pressure hoses from compressor to tank.
3. Check discharge line for carbon build-up.
4. Check contact points in pressure switch.

BSR AIR COMPRESSOR WIRING

1. Local electrical wiring codes differ in each area. The source wiring, plug, and protector must be rated for the amperage and voltage indicated on the motor nameplate. They must, also, meet all electrical codes for your area and meet the minimum indicated on the motor nameplate.

2. Use a Type "T" fuse (slow-blow), or a circuit breaker.

   CAUTION: Overheating, short circuits, and fire damage will result from inadequate wiring, etc.

   Note: 115V 15amp units can be operated on a 115V 15amp circuit under the conditions:

   i. No other electrical appliances, or lights, are connected to the same branch circuit.
   ii. Voltage supply is normal.
   iii. Extension cords are of the minimum gauge specified in this instruction manual.
   iv. The circuit is equipped with a 15 amp circuit breaker or a 15 amp slow-blow fuse.

3. If the above conditions cannot be met, or if nuisance tripping of current protection device occurs, it may be necessary to operate the BSR Air Compressor from a 115V 20 amp circuit.

TROUBLESHOOTING – BSR AIR COMPRESSOR

PROBLEMS/CAUSES	SUGGESTED FIX
Air Leaking	
Loose fittings	Check fittings for leaks. If leaks are at fittings: drain tank; disconnect fitting; and reconnect it properly.
Needle valve (while running)	Check needle valve for leak. If needle valve is leaking while game is running: unplug the Air Compressor, remove needle valve using a wrench; clean out needle valve (with hot, ns for your controller board.
Needle valve (while shut off) (AKA: check valve)	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).
Compressor Runs Continuously	
Pressure switch	Locate the pull-up resistor (1K ¼ W); make certain the leads are not shorted. Replace if necessary.
No Air Pressure	
Line kinked; compressor not on	

REMOTE START

PROGRAMMING THE REMOTE START

1. **LOCATE** the Receiver Learn Code Button

2. **PRESS** and **RELEASE** the Learn Code Button and the Radio Signal Indicator will blink.

3. **PRESS** the remote control button once and the Radio Signal Inculcator will light continuously
4. **PRESS** the remote control button again and the Radio Signal Indicator will go out.

NOTE: You must perform Steps 2 and 3 within 30 seconds. If the Radio Signal Indicator begins to blink rapidly; (about 4 times per second) – you must repeat Steps 2 and 3.

NOTE: If the Radio Signal Indicator does not respond correctly during any part of the programming processes, check wiring from Receiver to Transformer.

5. **TEST** the remote control by pressing the remote control button once to start the garage door opener and second time to stop the garage door opener.

NOTE: If garage door opener does not work, check wiring from Receiver to garage door opener.

You must perform Steps 2 through 4 for each remote control, wireless keypad or other access device. The Intellicode Universal Receiver can be programmed to accept a maximum of 7 Intellicode remote controls, wireless keypad or other access devices at a time.

6. **REPLACE** receiver cover.

BATTERY REPLACEMENT

REPLACING THE BATTERY

1. **Battery replacement** (your Remote Control is battery powered).

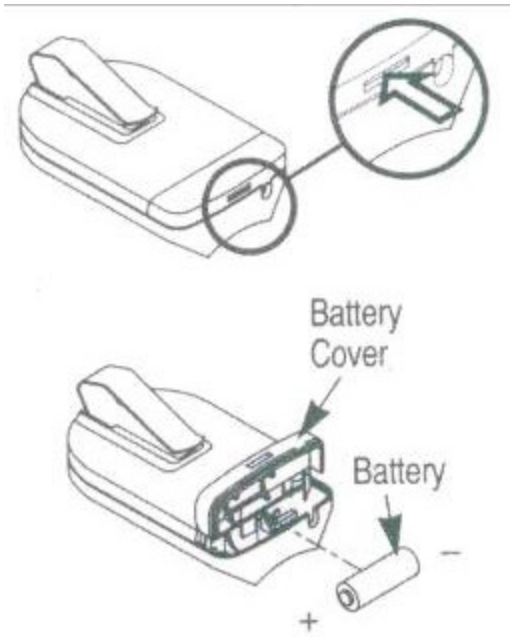
2. Gently **PUSH** straight **IN** on Tab as shown.

3. Use ball point pen, coin or small screwdriver.

4. Battery cover snaps open.

5. Install new battery in same position; use Eveready, A23, 12 Volt (lighter type).

6. Press on battery cover until it snaps closed.



LIGHTING

LIGHTING OVERVIEW

Flashers

MECHANICAL FLASHERS:

Overhead lighting is an option on many BSR games, and standard on BSR trailers. Each game has multiple light tracks, a flasher unit, and overhead mounting braces. In the past we have used a three (3) terminal flasher unit, 33-C3 (66-C3 for high amperage use); now a four (4) terminal flasher unit, 33-C4 (66-C4 for high amperage use), is being used.

Trailer model games require three (3) flasher units: One (1) for the marquee, and two (2) for the awnings. The awnings are separated into two sections: one long and one short for each of the flasher units. See Figures #1 and #2.

Each of the four terminals on the flasher unit attaches to a certain number of sockets on the light bars. As the motor turns, the cam that is attached to the motor shaft will open and close the contacts, turning the lights on and off.

*** CAUTION: Turn OFF all lighting power when troubleshooting either type of flasher box (120V AC or 220V AC)! ***

During the life of the flasher unit, the contact posts may need to be cleaned, use only contact cleaner to do this! Do not use abrasive cleaners, brushes, filing, or any other non-approved cleaning product or technique to clean the contact posts (as that will damage them)!

You may need to adjust the contact posts at some point. To do this, simply turn the cam so the middle of the gear is under the contact wheel. (The teeth of the gear should be on either side of the contact wheel.) Using a screwdriver, loosen the nut on the contactor post and lower the contactor by tightening the screw adjustment. The contact pads should be approximately 1/16” to 3/16” apart. If they touch, the light will be on all of the time. When the contactor pads have the correct gap distance from each other replace the nut, and tighten it. NOTE: Flashers should be mounted on three (3) corners, not four (4), to prevent binding.

Each flasher unit has a model number, which is located on a decal on the flasher unit itself. This model number enables you to order parts for the particular flasher unit you have. If you can’t find the model number on your flasher unit, then count the number of contact posts on your flasher unit; there is either three (3) or four (4) contact posts, and they are either in a single row (Figure #1) or a circle (Figure #2).

ELECTRONIC FLASHERS:

Electronic Solid State Flasher Unit(s) are based on a 2300 Microprocessor and have been placed in some games as early as 1996. They consist of a 2300 Series Microcontroller that drives either four (4) or eight (8) 25 amp solid state relays, depending on the lighting application. Each unit, also, has a self-contained 12V DC power supply. See Figure #3.

FLUORESCENT LIGHTING

Fluorescent lighting is used on all trailer models, and on some park models, to light up parts of the game. We use standard light fixtures that can be sourced from a local hardware or building supply store. Most of the fixtures use replaceable ballasts that can be obtained from local home repair stores or sourced from Bob's Space Racers, Inc. ®

Figure #1

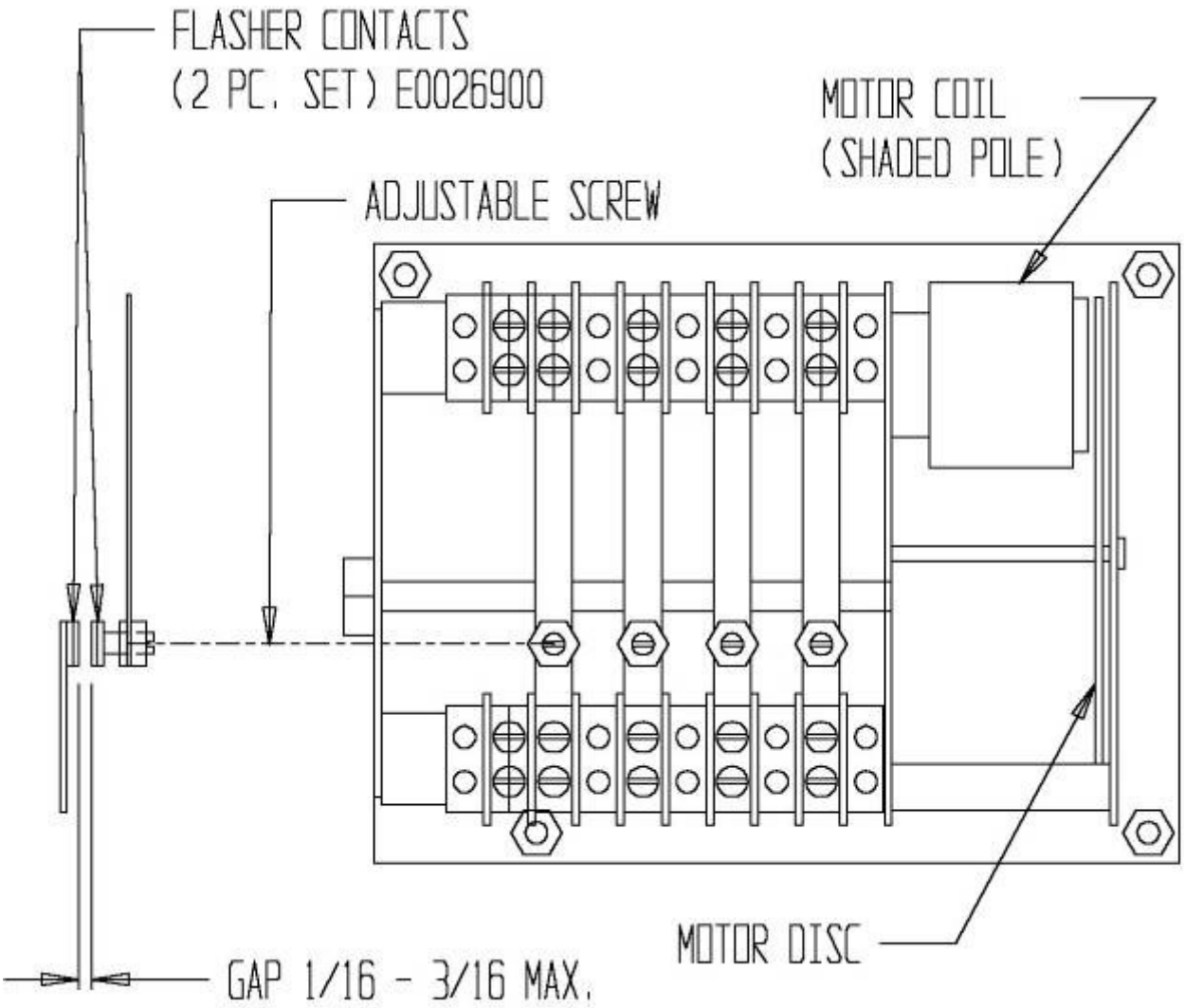
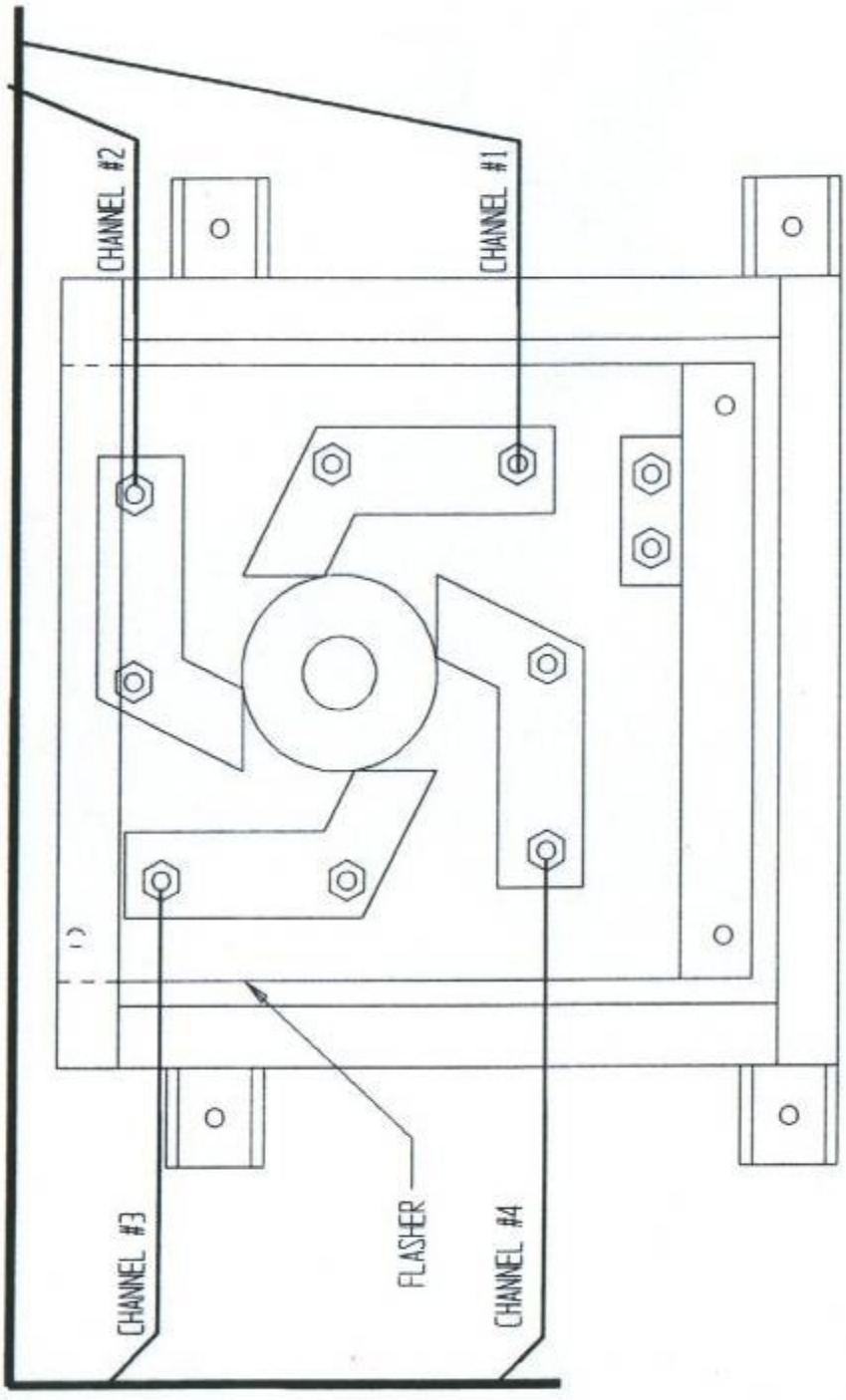

FLASHER CONTACTS
(2 PC. SET) E0026900
MOTOR COIL
(SHADED POLE)
ADJUSTABLE SCREW
MOTOR DISC
GAP 1/16 - 3/16 MAX.

Figure #2



TROUBLESHOOTING - LIGHTING

PROBLEMS/CAUSES	SUGGESTED FIX
Overhead Lights Don't Work At All	
No connection	Check amp connector and all Molex plugs for each track of lights for a secure fit.
No 110V AC supply	Check voltage at the motor. If no voltage, follow wiring back to 4X4 box and check the fuse and/or wiring inside. If you have 110V AC at the motor and it still doesn't work, it's probably a bad motor.
Bad motor	Replace flasher unit if necessary.
Some Lights Don't Work	Check bulbs to make certain there is a secure fit into the socket.
Bad connection	
Contacts misaligned or dirty	Check flasher contacts inside the flasher unit. **CAUTION**: 110V AC – unplug the game power. Carefully clean each contact with contact cleaner and realign contact posts, if necessary, to its mating contact. **** DO NOT sand contacts! Check gap between contacts, MAX = 3/16", MIN = 1/16" ****
Bad bulb	Swap bulb with a known good one and replace if necessary.
Bad socket	Re-twist light socket connection and replace socket if necessary.

TROUBLESHOOTING – LIGHTING

(CONTINUED)

PROBLEMS/CAUSES	SUGGESTED FIX
Fluorescent Lights Will Not Light Up	
Bad light	Change light bulb.
Bad ground	Make certain fixture has an earth ground properly connected. Very important
Bad ballast	Replace ballast.
Fluorescent Lights Will Not Light Until Someone is Standing Next to Them	
Bad ground	Make certain fixture is properly grounded and check the ground on the game.

LIGHTING PARTS LIST

Part Number	Description
E0026400	33C3 FLASHER UNIT
E0026500	33C4 FLASHER UNIT
E0026600	66C3 FLASHER UNIT
E0026700	66C4 FLASHER UNIT
E0026800	66C FLASHER CONTACTS/PAIR
E0026900	33C FLASHER CONTACTS/PAIR
E0028500	40 WATT BULB 120V AC
E0028600	25 WATT RS BULB 120V AC
E0029390	18” FIXTURE, 15 WATT
E0029130	15 WATT FLUORESCENT TUBE
E0028140	15T6/145V GE BULB
E0028200	150 WATT WHITE FLOODLIGHT BULB

Interior/Exterior – USA

E0028700	11S14 CLEAR BULB (PHILLIPS)
E0028700-TR	11S14 RED BULB (GE)
E0028700-TB	11S14 BLUE BULB (GE)
E0028700-TY	11S14 YELLOW BULB (GE)
E0028700-TG	11S14 GREEN BULB (GE)
E0028700-TO	11S14 ORANGE BULB (GE)

Indoor Only – Imported

E0028710-TG	GREEN BULB (SIVAL)
E0028710-TB	BLUE BULB (SIVAL)
E0028710-TR	RED BULB (SIVAL)
E0028710-TY	YELLOW BULB (SIVAL)
E0028710-TO	ORANGE BULB (SIVAL)

Small Bulbs – USA

E0028800	10S11N CLEAR BULB (PHILLIPS)

Small Bulbs – Imported

E0028810-TB	10S11N BLUE BULB (SOBYCO)
E0028810-TR	10S11N RED BULB (SOBYCO)
E0028810-TY	10S11N YELLOW BULB (SOBYCO)

SOUND UNIT

SOUND SYSTEMS

SOUND SYSTEM OVERVIEW

Over the years, Bob's Space Racers® has updated the sound systems to accommodate the needs of our customers. The original sound system was a MacKenzie Cartridge, which was a small silver tape cartridge. Next was a Leer Cartridge, which was an 8-track tape. Then a DMR Mackenzie Sound, which was in a gold case with a slide-in cartridge. We also use either the DMR-PX Mackenzie Player or the Clever Device Sound Sequencer. The DMR-PX Mackenzie Player can play only a single sound. The Clever Device Sound Sequencer has the capacity to play from two to eight (2-8) sounds. We presently have a new innovative sound unit, the BSR Sound Unit, which plays up to 50 songs.

AMPLIFIERS

The amplifiers we have used over the years have, also, changed. Originally we used a Bogen Amplifier which had a 70V speaker system. The Yorkville Sound 4200 and KMD 4200 Amplifiers were the next ones used beginning in the early 1980's. They are similar in operations with only a cosmetic difference on their face units. The Yorkville Sound 6400 Amplifier was used after that. This was used in some Whac-A-Mole® trailers because they have more speakers than other games. Presently we use a Yorkville Sound MM4, or MP4, Amplifier System. This unit has more power and is more user-friendly. The hook-up of all of the above amplifiers is pretty much the same: power, speaker, etc.

The current sound system comes equipped with overhead microphone cables and includes a hand-held microphone and wireless microphone system. These kits are designed to operate at different frequencies for the various games Bob's Space Racers® manufactures. The transmitter and receiver are set for the same frequency of operation. We have selected different channels for each of the games to minimize interference of signals from other sound systems.

We also have CD Players available. We originally used a Pioneer 6-disk player, but have switched to a Sony single-disk player. This switch was done to reduce the maintenance and to simplify the operation.

If you are interested in updating your sound system to one of the newer systems available, please call us at 386-677-0761 and ask to speak with a technician. The technician will help you determine exactly what is needed for your system to be updated.

BSR SOUND UNIT

Pressing the "#" key on the keypad allows a person to increment through the five sections. Any person may now flip through the various sections while a sound is playing without interrupting the sound. A sound that is playing will only be interrupted if the operator chooses to play another sound or a game is started.

After accessing the desired section, press keys "*0"* through "9" to hear the corresponding sounds.

Press the "*" key from any section, at anytime, and the system will play a song from the *Game Music* section. Press the "*" key x times, and the system will play x songs with a ten second pause between songs. This cycle will be interrupted if any other key is pressed.

The system also has an automatic mode. While in automatic mode, the system will automatically activate if left idle for two minutes. The system can be set to play any sequence of songs, gimmicks, and operator commands in ten (10) second intervals, until a button is pressed or a game is raced.

The system can be set to the automatic mode by holding the "#" key for ten (10) seconds while in the *Game Music* section. After ten seconds, the *Game Music* light will blink off and on in two-second intervals. Depending on when the key is released, the system will be enabled or disabled. If the key is released while the light is on, the system will be set in automatic mode. If the key is released while the light is off, it will not be in automatic mode.

Starting a game will cancel any sound that may be playing, and will play the g*ame music* for the race. For each race, the system will play the next song in the *Game Music* section.

FACEPLATE DIAGRAM

-REPLACING THE MUSIC CARD

1. Unplug the system.

2. Remove the four screws on the face of the sound unit.

3. Carefully remove the faceplate (diagram above) and lay it face down. The green circuit board should be facing you.

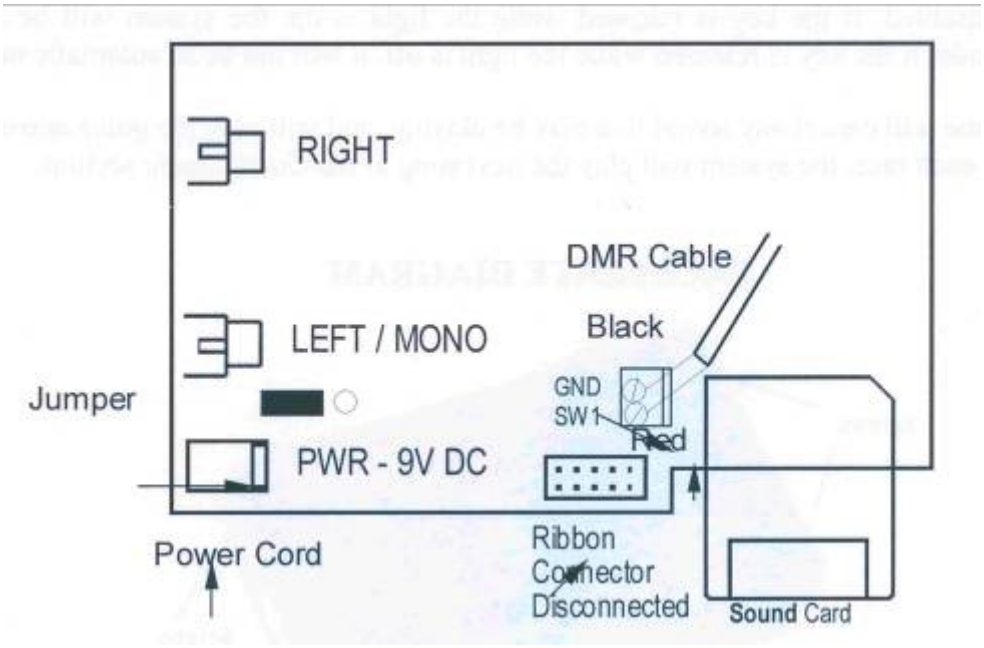
4. Refer to the circuit board diagram below, and gently pull out the **sound** card.

5. Insert the other card in the same manner, (refer to the same diagram below). The shiny gold section of the sound card should be facing you. Insert gently until it will go in no further.

6. If you insert the sound card upside down, the card socket will not allow you to insert it fully. **DO NOT FORCE THE CARD IN**. **IT SHOULD SLIDE IN EASILY**.

7. Replace the faceplate and screws, and plug in the system.

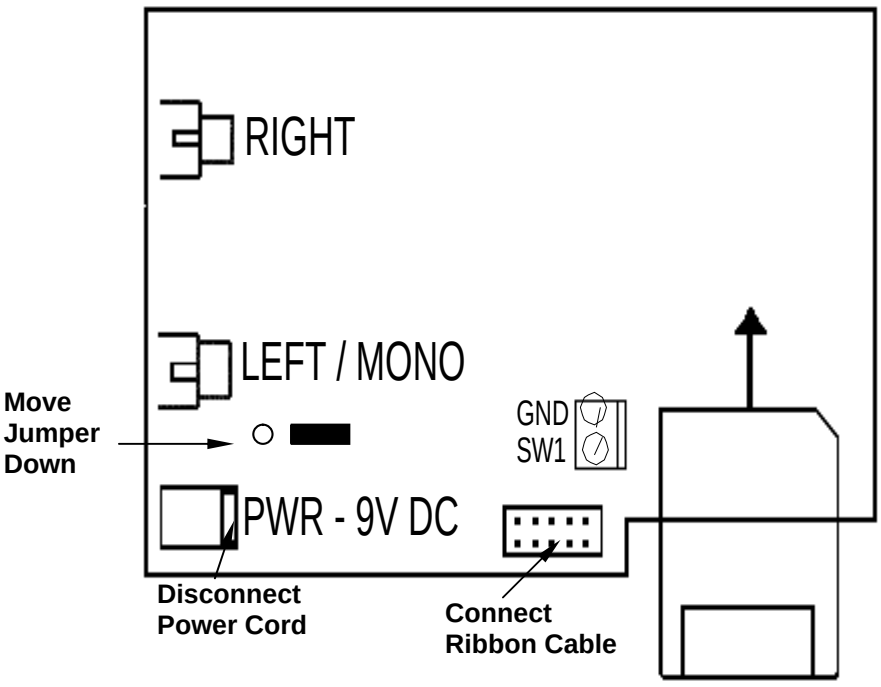
CIRCUIT BOARD DIAGRAM



SWITCHING FROM MANUAL MODE TO AUTOMATIC MODE

1. Remove the faceplate from the BSR Sound Unit.
2. Detach the DMR cable, as it is no longer needed. Remember to tape the ends.
3. Remove the power cord from the box, as the unit will get its power through the ribbon cable. Do not leave the power cord inside the box. If it accidentally touches the circuit board it may burn out the unit.
4. Move the black jumper down towards the ribbon connector.
5. Connect the ribbon cable.
6. Replace the faceplate on the BSR Sound Unit.

AUTOMATIC MODE DIAGRAM



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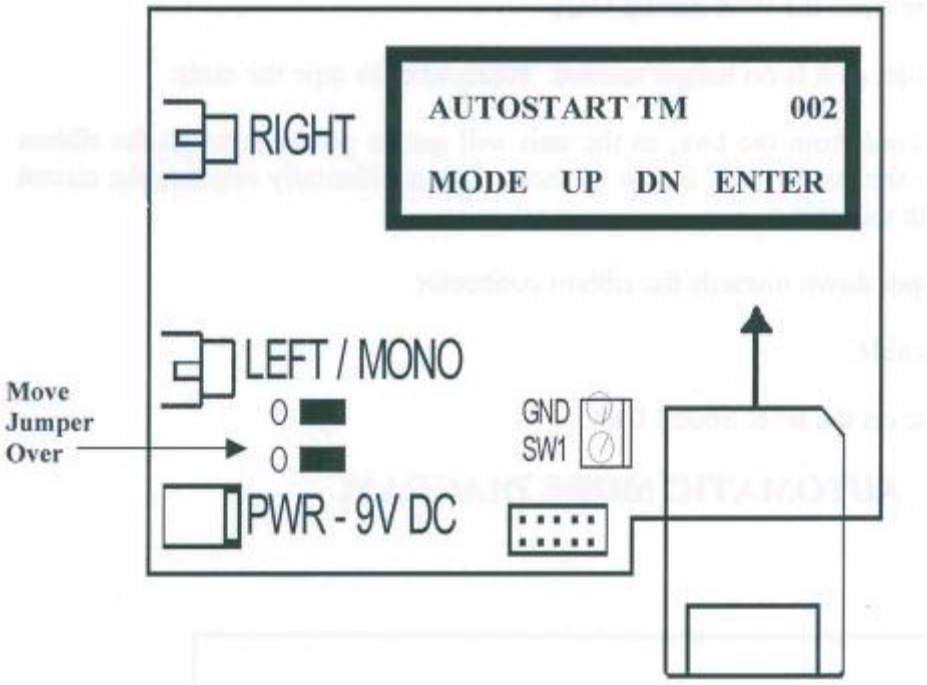
SOUND UNIT WITHOUT THE RIBBON CABLE

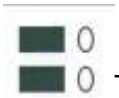


In the event your ribbon cable becomes damaged, broken or shorted, disconnect or unplug the ribbon cable. Ensure that the 22 gauge red and black wires are properly connected to “GND” and “SW1”. Plug in the 9V DC – 12V DC power supply and ensure that the phono/RCA cable is plugged into either “RIGHT” or “LEFT” female phone jack.

Do not use both the ribbon cable and the 9VDC power supply together. (Use one or the other).

Once the correct power supply and jacks have been properly installed, the final adjustment will be to move the black jumpers over.

This configuration supplies power through the ribbon cable.

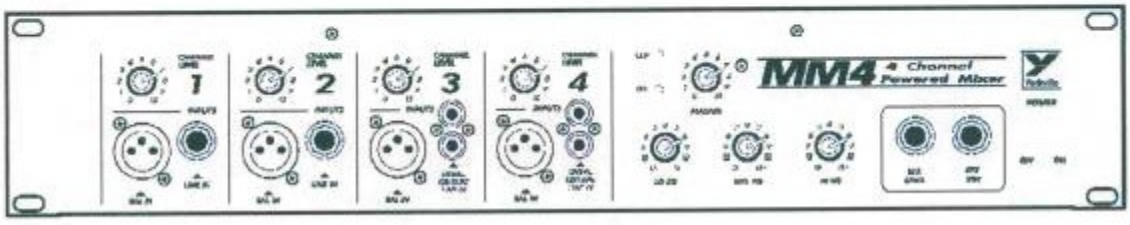


This configuration has power supplied by the 90V DC – 12V dc power supply.

FF

OWNERS MANUAL
MANUEL de L'UTILISATEUR

Yorkville **MM4** 4 Channel Powered Mixer



IMPORTANT SAFETY INSTRUCTIONS

INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS.

CAUTION:

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK).
NO USER SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Read Instructions:

The ***Owner's Manual*** should be read and understood before operation of your unit. Please, save these instructions for future reference.

Packaging:

Keep the box and packaging materials, in case the unit needs to be returned for service.

Warning:

When using electric products, basic precautions should always be followed, including the following:

Power Sources:

Your unit should be connected to a power source only of the voltage specified in the owners manual or as marked on the unit. This unit has a polarized plug. Do not use with an extension cord or receptacle unless the plug can be fully inserted. Precautions should be taken so that the grounding scheme on the unit is not defeated.

Hazards:

Do not place this product on an unstable cart, stand, tripod, bracket or table. The product may fall, causing serious personal injury and serious damage to the product. Use only with cart, stand, tripod, bracket, or table recommended by the manufacturer or sold with the product. Follow the manufacturer's instructions when installing the product and use mounting accessories recommended by the manufacturer.

The apparatus should not be exposed to dripping or splashing water; no objects filled with liquids should be placed on the apparatus.

Terminals marked with the "lightning bolt" are hazardous live; the external wiring connected to these terminals require installation by an instructed person or the use of ready made leads or cords.

No naked flame sources, such as lighted candles, should be placed on the apparatus.

Power Cord:

The AC supply cord should be routed so that it is unlikely that it will be damaged. If the AC supply cord is damaged **DO NOT OPERATE THE UNIT**.

Service:

The unit should be serviced only by qualified service personnel.

INSTRUCTIONS RELATIVES AU RISQUE DE FEU, CHOC ÉLECTRIQUE, OU BLESSURES AUX PERSONNES.

AVIS:

AFIN DE REDUIRE LES RISQUE DE CHOC ELECTRIQUE, N'ENLEVEZ PAS LE COUVERT (OU LE PANNEAU ARRIERE). NE CONTIENT AUCUNE PIECE REPARABLE PAR L'UTILISATEUR.

CONSULTEZ UN TECHNICIEN QUALIFIE POUR L'ENTRETIENT.

Veuillez lire le manuel:

Il contient des informations qui devraient êtres comprises avant l'opération de votre appareil. Conservez S.V.P. ces instructions pour consultations ultérieures

Emballage:

Conservez la boite au cas ou l'appareil devait être retourner pour réparation.

Warning:

Attention: Lors de l'utilisation de produits électrique, assurez-vous d'adhérer à des précautions de bases incluant celle qui suivent:

Alimentation:

L'appareil ne doit être branché qu'à une source d'alimentation correspondant au voltage spécifié dans le manuel ou tel qu'indiqué sur l'appareil. Cet appareil est équipé d'une prise d'alimentation polarisée. Ne pas utiliser cet appareil avec un cordon de raccordement à moins qu'il soit possible d'insérer complètement les trois lames. Des précautions doivent êtres prises afin d'eviter que le système de mise à la terre de l'appareil ne soit désengagé.

Hazard:

Ne pas placer cet appareil sur un chariot, un support, un trépied ou une table instables. L'appareil pourrait tomber et blesser quelqu'un ou subir des dommages importants. Utiliser seulement un chariot, un support, un trépied ou une table recommandés par le fabricant ou vendus avec le produit. Suivre les instructions du fabricant pour installer l'appareil et utiliser les accessoires recommandés par le fabricant.

Il convient de ne pas placer sur l'appareil de sources de flammes nues, telles que des bougies allumées.

L'appeil ne doit pas être exposé à des égouttements d'eau ou des éclaboussures et qu'aucun objet rempli de liquide tel que des vases ne doit être placé sur l'appareil.

Les dispositifs marqués d'une symbole "d'éclair" sont des parties dangereuses au toucher et que les câblages extérieurs connectés à ces dispositifs de connection extérieure doivent être effectivés par un opérateur formé ou en utilisant des cordons déjà préparés.

Cordon d'alimentation:

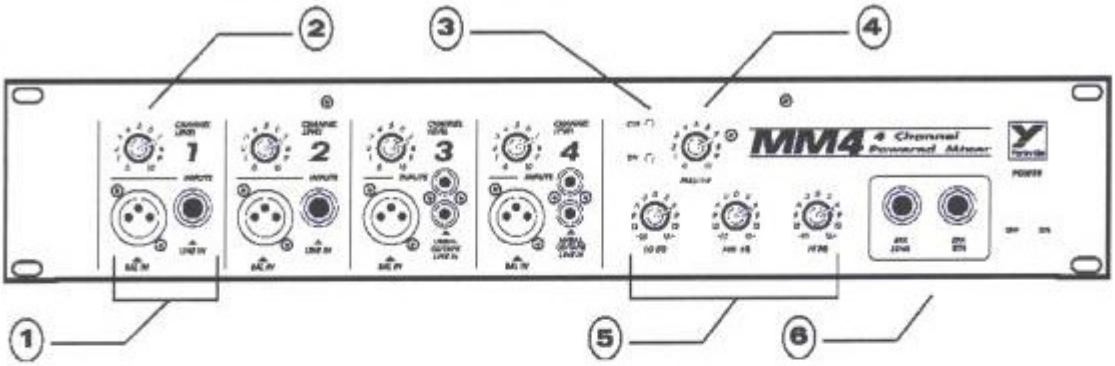
Évitez d'endommager le cordon d'alimentation. **N'UTILISEZ PAS L'APPAREIL** si le cordon d'alimentation est endommagé.

Service:

Consultez un technicien qualifié pour l'entretien de votre appareil.

INTRODUCTION

Your new Micromix model mm-4 is the latest addition to our growing Micromix line of powered mixers. We at Yorkville Sound are confident that you will find your new MM-4 to be an efficient and versatile solution to your sound reinforcement needs. This manual contains information to help you get the maximum performance from your Micromix. We hope you will take the time to read it over.



1. MICROPHONE & LINE INPUTS

The MM-4 features both balanced microphone and unbalanced line inputs on channels 1 through 3. The standard XLR type microphone inputs are electronicallt balanced for maximum noise supression. The input characteristics match those of professional low impedence dynamic microphones such as the Shure SM-58 and the Image IM-400.

The LINE inputs are standard 1/4-inch phone jacks which accept single-ended signals from guitars, synthesizers, electric pianos, tape recorders, unbalance high-impedence microphones, and the like.

- ***Do not*** connect signals to both types of inputs on any one channel. Use either the unbalanced or the balanced input on any one channel, but not both. Connecting to both inputs on one channel will cause improper operation of the input circuit.

Channel 4 is a special channel, in which the LINE input (1/4-inch phone jack) has been replaced by two RCA jacks. The XLR balanced input functions identically to the other XLR inputs, but the RCA inputs are specifically intended to receive stereo signals from compact disk players or tape players. Within the MM-4, these stereo signals are electronically summed to a monophonic signal.

2. CHANNEL LEVEL CONTROLS

Each channel has a separate level control. Advancing this control increases the contribution of the associated channel's signal to the overall mix.

3. CLIP LED

The Clip LEDis located next to the master control. It will light when any signal anywhere within the mixer section gets to within 3dB of clipping. Under normal use, it is expected that this LED will flash for brief instants during the loudest musical peaks. If the Clip LED is off, you can be sure that the mixer section of the MM-4 is not clipping.

The LED circuitry is intended to indicate clipping *only* in the mixer section of the MM-4. It is not implemented as an indicator of clippeg in the power-amp section. Remember also that the Clip LED can't indicate clipping in any external amplifier connected to the MM-4.

4. MASTER CONTROL

The signals from the four channels are internally routed to the Master section, where they are combined into a monophonic signal. This signal is then routed to the EQ and then to the power amplifier within the MM-4. The Master control varies the level of this combined signal. The signal level sent to the EFFECTS LOOP SEND jack is also governed by the Master Control.

5. EQ SECTION

The tone conttrols provided by the MM-4 consist of a three band active shelving equalizer. The signal arriving from the Master Control passes through this on its way to the power amplifier. Within the EQ section, the signal is temporarily split into three components. The lowest frequency (bass) components may be adusted with to LO control, the middle (midrange) frequencies are varied by the Mid Control, and the HI control adjusts the high (treble) frequencies.

The numbers around the LO, MID, and HI dials indicate the amount of boost ot cut applied to the signal, in the decibels. The center or "0" positions correspond to a "flat" response where the signal level remains unchanged as it passes through the EQ. Rotating the LO control clockwise from this position will increase the BASS frequency components, while a counterclockwise rotation will decrease the BASS sounds.

When adjusting the EQ controls, it is best to begin by setting all three controls to their center "0" positions. From there you can experiment until you get the sound you like.

6.EFFECTS LOOP

An external effect such as a digital delay, echo, phaser, flanger, or parametric equalizer can be easily interfaced to th MM-4. Any effect device designed to operate at 0dB line levels will properly interface to your MM-4. As a rule, any device which is not foot operated will work just fine; "foot pedal" devices which are designed to accept a guitar directly can often be overloaded by standard line level signals.

Connect the input of the effect device to the SEND jackof thr MM-4 EFFECTS LOOP. Connect the output of the effect device to the RTN jack of the MM-4 EFFECTS LOOP. Now the MM-4's signal is routed through the effect device on its way to the MM-4's power amplifier.

The EFFECTS LOOP SEND jack may also be used as a line output jack. You can augment the MM-4's internal amplifier by connecting an external power amplifier's input to this jack.

Plugging into the EFFECTS LOOP RTN (Return) jack will disconnect the MM-4's direct internal signal path from the MM-4's power amplifier and substitute the signal present at the RTN jack. This means that you can use the EFFECTS LOOP to send the signal from the MM-4's mixer to an external power amplifier while using the MM-4's built-in power amplifier for some other purpose.

6.POWER AMPLIFIER

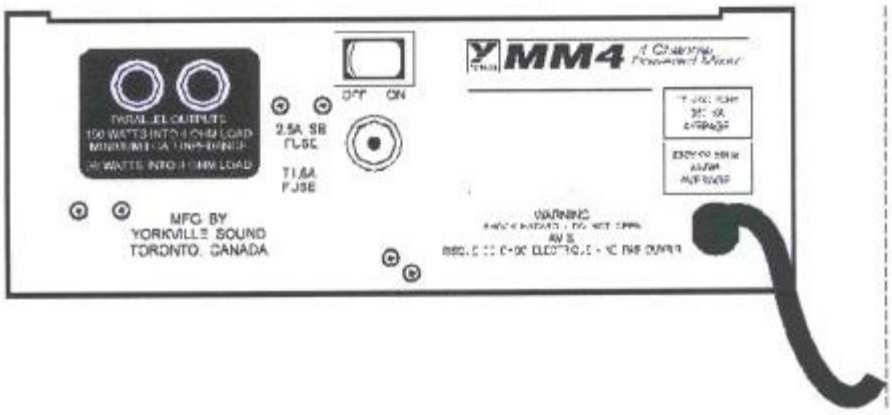
The MM-4 power amplifier delivers approximately 150 watts into a 4-Ohm load. There are two speaker output jacks on the rear panel of the MM-4. You may connect an 8-Ohm speaker to each jack, or you may connect one 4-Ohm speaker.

The MM-4's power amplifier is fully protected from all abnormal load conditions. Shorting the outputs of the MM-4 will not harm the unit. The power amplifier will "shut down" if it senses an improper load condition. Such a condition can result from connecting too many speakers, (too low a load-impedence), to the MM-4. In this case, the sound will be intermitent as the power amplifier repeatedly tests the load to determine if it can resume operation. The solution is, of course, to reduce the number of speakers you have connected

MM4 4 Channel Powered Mixer

SPECIFICATIONS

Power Output	140 Watts RMS @ 4-Ohms 90 Watts RMS @ 8-Ohms
Harmonic Distortion	< 1.0% at Full Power
Input sensitivity	1.0 Volt RMS
Output Load	4-Ohm minimum
Power Requirements	117 VAC 60 Hz 360 VA
(In Europe)	220 VAC 50 Hz 360 VA



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CAUTION:

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NO USER SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Read Instructions:
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Packaging:
Keep the box and packaging materials, in case the unit needs to be returned for service.

Warning:
When using electric products, basic precautions should always be followed, including the following:

Power Sources:
Your unit should be connected to a power source only of the voltage specified in the owners manual or as marked on the unit. This unit has a polarized plug. Do not use with an extension cord or receptacle unless all three blades can be fully inserted to prevent blade exposure. Precautions should be taken so that the grounding scheme on the unit is not defeated.

Power Cord:
The AC supply cord should be routed so that it is unlikely that it will be damaged. If the AC supply cord is damaged **DO NOT OPERATE THE UNIT**.

Service:
The unit should be serviced only by qualified service personnel.

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Service:
Consultez un technicien qualifié pour l'entretien de votre appareil.

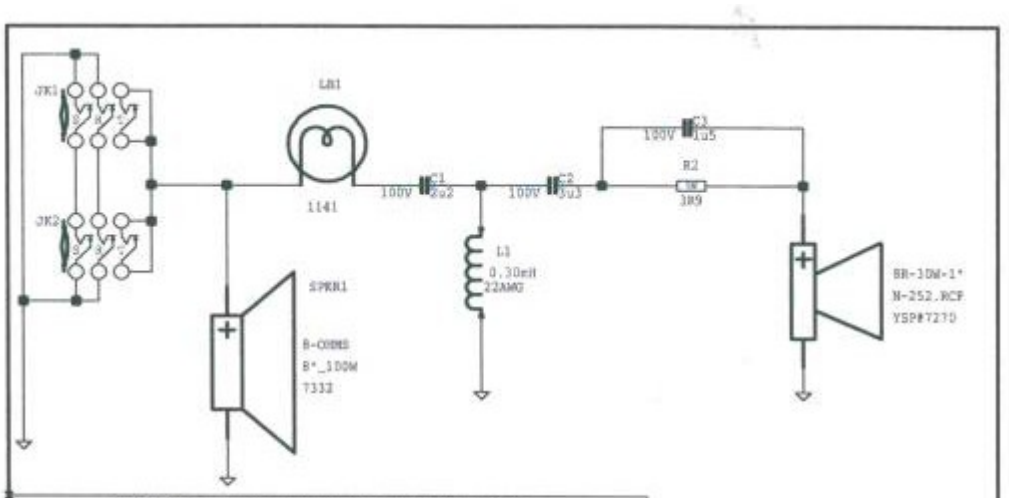
PRO STAR
by TELEX®

Operating Manual

UHF

Wireless Microphone System

FF



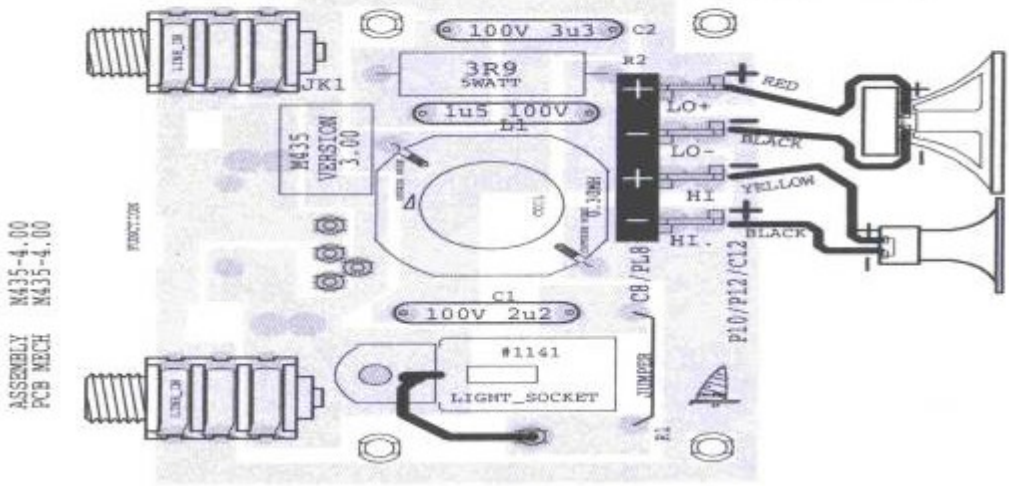
M435C.SCH_DATABASE_HISTORY

MODEL(S):- PL8

#	DATE	VER#	DESCRIPTION OF CHANGE
1	NOV/06/97	1.00	FIRST_PROTOTYPE
2	D	V	N
3	D	V	N
4	D	V	N
5	D	V	N
6	D	V	N
7	D	V	N
8	D	V	N
9	D	V	N
10	D	V	N

YORKVILLE	DATE: NOV/06/97
	NAME: PL8
MODELS:	PULSE PL8
TITLE: PL8	SCH ISSUE: 1.00

PL8 MODEL	M435C PCB#	4.00 ISSUE#



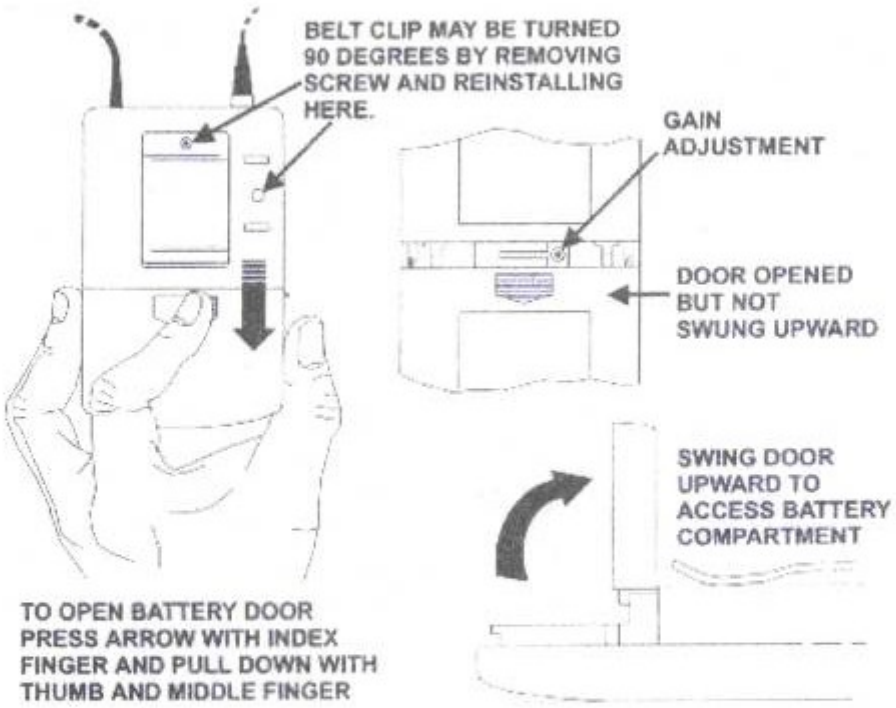
M435.PCB_DATABASE_HISTORY

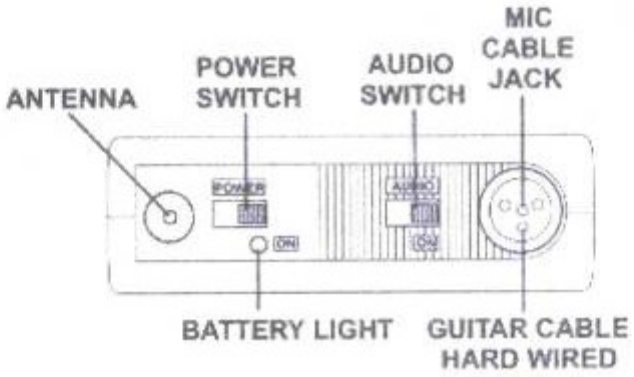
MODEL(S):- PL10/1070V/PM10/PL12/PM12/C12/C8

#	DATE	VER#	DESCRIPTION OF CHANGE
1	JAN/97	1.00P	FIRST_PROTOTYPE
2	JAN/28/97	1.00	ADD_R2
3	JUN/12/97	3.00	REDONE_FOR_C8/C12
4	OCT/15/97	3.00	REDONE_FOR_3_UP_SPREAD_FOR_TABS
5	DEC/08/97	4.00	TABS_ADDED_FOR_PL1070V
6	D	V	N
7	D	V	N
8	D	V	N
9	D	V	N
10	D	V	N
11	D	V	N

Belt Pack Set Up

Open the battery door and install a fresh 9 volt alkaline battery. Plug in your microphone. Clip or place the transmitter and microphone where desired and turn on the power switch. The battery light should flash once and go out. The "CARRIER" light at the receiver should be on at this time. Turn on the "AUDIO" switch. You are now ready to use the microphone.





SPECIFICATIONS

U1311 2, UH1 2, UGB11 2 Transmitter:

RF Power Output . . . . . 10 to 15 mW typical
Battery . . . . . 9.OVDC Alkaline
Battery Life . . . . . 8 to 12 hours typical
FCC . . . . . Type Accepted to FCC Part 74H

UR12, UGR12 Receiver:

RF Sensitivity . . . . . Less than 0.8 uV for 12 dB SINAD
Diversity . . . . . Full True Diversity
Audio Output Level, 1/4" in. jack . . . 0.775V RMS/1 00k load
Audio Output Level, XLR jack . . . . . 20 dBV, 600 Ohm load
Audio Frequency Response . . . . . 20 Hz to 15KHz ± 2dB
Audio Frequency Distortion . . . . . Less than 0.5%
Power . . . . . 12 VDC from supplied wall transformer
12 VDC from external battery or filtered power supply.
Part . . . . . 15 Notification

FCC REGULATIONS

The Telex Models UB12, UGB12, and UH12 are Type Accepted under United States Federal Communications Commission Part 74H. The UR1 2 and UGR1 2 Receivers are accepted under the Part 15 Notification Procedure of the Federal Communications, Commission. Licensing of Telex equipment is the user's responsibility and license ability depends upon the users classification, and frequency selected. Telex urges the user to contact the appropriate telecommunications authority before ordering and choosing frequencies.

CAUTION: Changes or modifications made by the user could void the user's authority to operate the equipment.

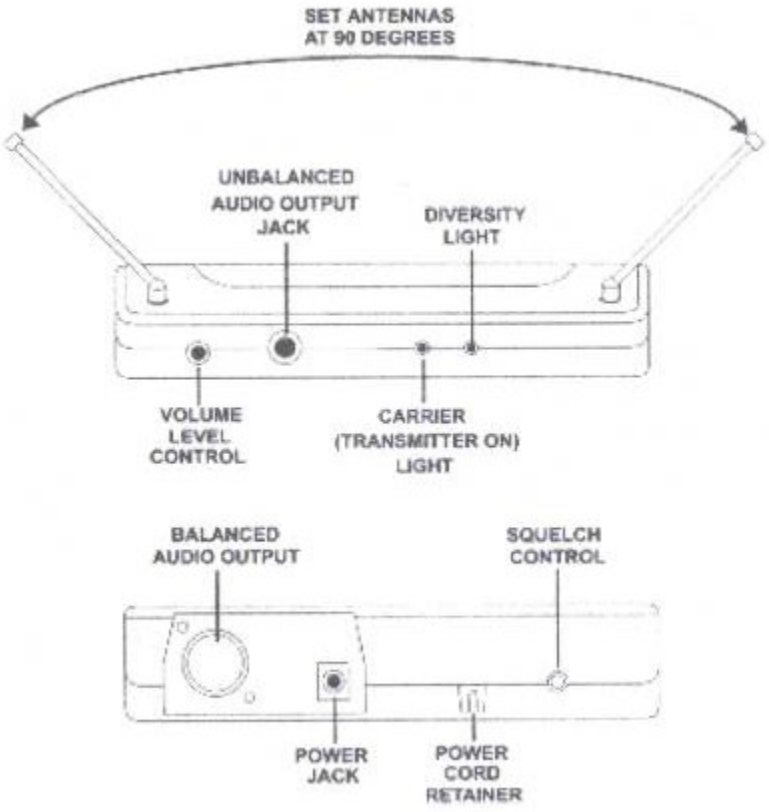
Receiver Set Up

Place the receiver in a location that is in direct line of sight to the transmitter. Unfold the antennas. Set them in a "rabbit ears" position as shown in the illustration. Plug the power supply into any convenient outlet. Plug the cable end of the supply into the power jack and route the cord through the retainer to prevent pull out. The "Diversity" light should come on at this time.

Connect an audio cable to either the 1/4 inch jack on the front or to the balanced output on the rear of the receiver. Connect the other end to your audio equipment. Set the output level control on the front of the receiver to the " 12 o'clock" position if you are using the 1/4 inch jack.

Diversity Light

The diversity light is a bi-color LED (orange/green) that is illuminated any time the receiver has power. When it changes color this indicates that the diversity circuit is activated to optimize reception.



Model PH-21 Microphone

General Description

The Telex Model PH-21 Headworn Microphone consists of a microphone assembly mounted on the pivot arm of an adjustable headband. This high-quality, lightweight headset is specifically designed to provide excellent performance as a vocal microphone for drummers and keyboard players. This is also designed for use in special event remote broadcasting, auctions and other handsfree broadcast applications.

The microphone assembly is attached by a spring clip to a pivot arm which rotates 360 degrees allowing the boom microphone to be properly positioned. The spring clip also allows the assembly to be worn with a variety of eyeglasses. An adjustable, field-replaceable clothing clip removes the cord weight from the head of the user for long-term comfort.

Microphone

The miniature close-talking electret microphone element is boom-mounted in a high-impact-resistant plastic housing. The boom can be swiveled over 180 degrees side-to-side to allow for precise positioning of the microphone. A foam windscreen is supplied with each microphone.

Headband

The split piece headband consists of two stainless steel springs sheathed in black nylon webbing. The two stainless steel springs are adjustable to 180 degrees. Head pads are conected to the headband by stainless steel sliders that permit over two inches (50 mm) of adjustment. The headband should be placed over the crown of the user's head for stable operation. The head pad cushions are adhesive-back polyester urethane foam and are field-replaceable.

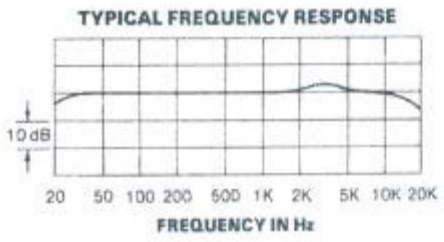
Model PH-21

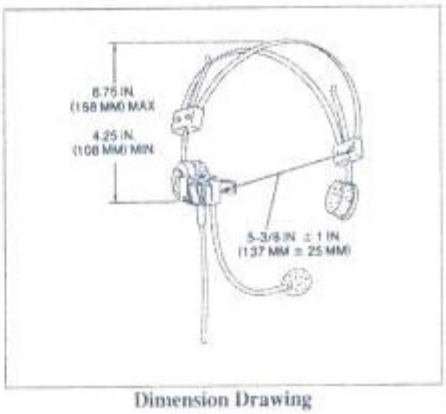
The Model PH-21 is terminated with a TA4F 4-pin plug that allows the microphone to be interfaced with the Telex PS10 Power Module and the Telex WT-50 Wireless Transmitter (see wiring diagram).

Specifications

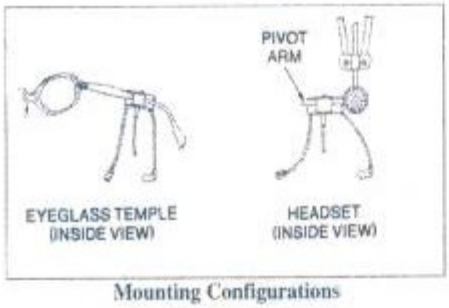
Element: Electret. Close-talking
Frequency Response: 20 to 20,000 Hz
Impedance: 3,000 Ohms
Output Level at 1 kHz: -60 dB (0 dB = I V/ %bar)
Maximum Sound Pressure: 130 dB
Supply Voltage: + 1.5 to 20 Vdc at pin 3 of headset connector
Cord: 3 ft (0.9 m)
Microphone Plug: TA4F Weight: 8 oz (227 grams)
Color: Black

Model PH-21 Head-Worn Microphone	64327-001
Replacement Windscreen	59747-001
Replacement Spring Clip	52878-000
Replacement Clothing Clip	63097-002
Replacement Head Cushions	63575-000
Replacement Carrying Pouch	57893-000

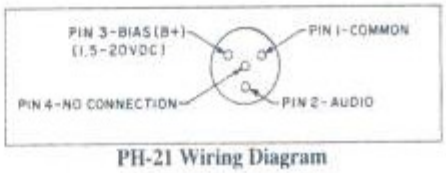




Dimension Drawing



Mounting Configurations



PH-21 Wiring Diagram

System Set Up

Talk or sing into the microphone at your normal volume and monitor the sound system. If the sound is distorted, try turning down the audio amplifier input control. You may also need to turn down the output level on the front of the receiver (if you are using the 1/4" jack) and/or the "GAIN" control on the transmitter.

If the sound is low or weak, you may have to increase one or more of the controls.

The squelch control on the back of the receiver may be adjusted to increase range or reduce interference. Turn the control counter-clockwise to increase range. **CAUTION! DOING SO WILL MAKE YOUR SYSTEM MORE SUSCEPTIBLE TO OUTSIDE INTERFERENCE!** Turn the control clockwise to reduce interference from noise and out side radio signals. It is usually best to set the squelch with the transmitter turned off. Turn the control counter-clockwise until you hear noise or interference over your sound system. Then turn it clockwise until the noise is squelched off. This setting will give you your best interference free range.

Battery and Battery Light

Use fresh 9 volt alkaline batteries from a quality manufacturer (8.4 volt ni-cad batteries may be used but will yield much shorter "on" time). When the power switch is turned on, the battery light will flash one time if the battery is good. If the light does not flash or stays lit continuously, the battery is weak or dead. If the light comes on during use, the battery is weakening and should be replaced as soon as possible.