

GROUP GAME
WHAC-A-MOLE®
OWNERS MANUAL



Bob's Space Racers Incorporated.

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* * *

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

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

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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[®] by calling (386) 677-0794, 24 hours a day or e-mailing us at tech@bobsspaceracers.com

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Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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

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

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

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

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

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

ADVANCED REPLACEMENT POLICY

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

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

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

OR

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

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

ADVANCED REPLACEMENT ITEM(S) SHIPPING RULES

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

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

Thank you for your cooperation.

OWNER'S MANUAL

CONGRATULATIONS!

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

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

MANUAL INTRODUCTION

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

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

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REVISED: February 2008

INTRODUCTION

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, "Hi! 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. A person 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 coming 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.

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.

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!”

GAME OPERATIONS

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'. Try to get at least three (3) or four (4) players 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 DO WHEN IT IS BUSY

When the game has ended the operator will follow the same steps as outlined above: acknowledge the winner, encourage the non-winners to play the next race, give the winner his/her prize while showing the trade-up prize if he/she wins the next race, and then get other players to the game. If you find the operator is not able to do all of this in a minute or so, then we suggest having another person in the game to help 'kick-change'. This is a slang term that means basically what it says. Another person is there to kick, or step on the foot pedals to re-set the individual games, and assist in taking money from the players. We normally have our second operator assist a game during peak times.

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

When changing attendants/operators, it is important to do so with as few disruptions as possible. We at BSR have found that this can be done by following a few simple steps.

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.
4. 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.
5. 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

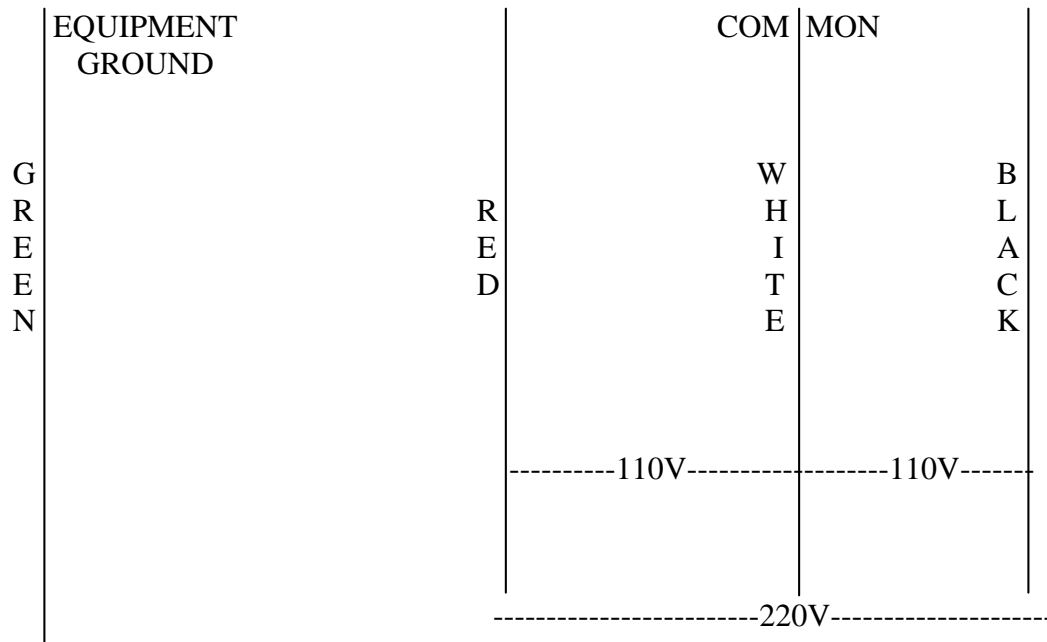
TRAILER INSTALLATION, SET-UP AND HOOK-UP

Power Requirement: 220V, 60 Cycles, Single Phase

1. Locate trailer and drop Leveler Jacks. Level 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!

GREEN WIRE: Equipment Ground
BLACK WIRE: 110V AC

RED WIRE: 110V AC
WHITE WIRE: Common/Neutral



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 of the 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.

WHAC-A-MOLE® TRAILER MODEL



WHAC-A-MOLE® PARK MODEL



WHAC-A-MOLE® BUILDING MODEL



OPERATIONS

GAME OPERATION

1. Collect money.
2. Activate the Player position by kicking the foot switch at the base of the unit. Notice that the small ID Light turns on and stays on.
3. Repeat Steps 1 and 2 for each participant.
4. Start the game by first activating the Sound System (if applicable) by pressing the bottom (plain) pushbutton on either end of the game. As soon as the sound starts, push the ON and the Bell buttons at the same time. The Moles will start popping up and down.
5. The first Player to reach the pre-determined winning score will be the Winner. The Bell and Beacon will ring for two seconds and the game will automatically reset.
6. Repeat entire procedure. (Also see Appendix section, "OPERATORS GUIDE".)

PUSH BUTTON STATIONS

1. ON: Pressing the "ON" button will start the Moles "popping" up and down.
2. BELL: Pressing the "BELL" button rings the bell.
2. STOP: Pressing the "STOP" button will stop the Moles from raising and lowering, but the score recorded will not be lost.
4. CB-OFF: Pressing the "CB-OFF" button resets all game scores and deactivates them.
5. PLAIN BUTTON: Starts the Sound Unit.
6. MINIATURE TOGGLE SWITCH: One Push Button Station in the game will have a Miniature Toggle Switch mounted in it. This allows the Operator to switch between having the heads either pop up at a continuous steady pace, or continually increase the pace at which the heads pop up.

GAME OPTIONS

Over the years, the game Options for the Whac-A-Mole Group games have increased to ensure the game's continued profitability and excitement. These Options will depend upon which model of electronics and/or Sequencer in the game. First, determine which model of electronics and/or Sequencer are in the game and then refer to the corresponding data sheets. Basically, for pre 1985 games, the only Options available were setting the Winning Score and how fast the heads popped up. Setting the Winning Score was done by setting the Dip Switches on the face of each Control Box (on each unit). The rate at which the heads pop up was done on the Sequencer Unit (determine which model you have and see the corresponding data sheets). For games manufactured between 1985 and 1995, all the Options were set through the Sequencer Unit. These Options consist of setting the Winning Score, Total Game Speed, Progressive and Non-Progressive games. See Sequencer Technical Data sheets (for games made between 1985 and 1995). For games made after 1996, options were set from a LC Display Box (that has a key on it). See Option Registers on following pages for Controls/Options on the game.

2400 ELECTRONICS OPTION REGISTER SETTING INSTRUCTIONS

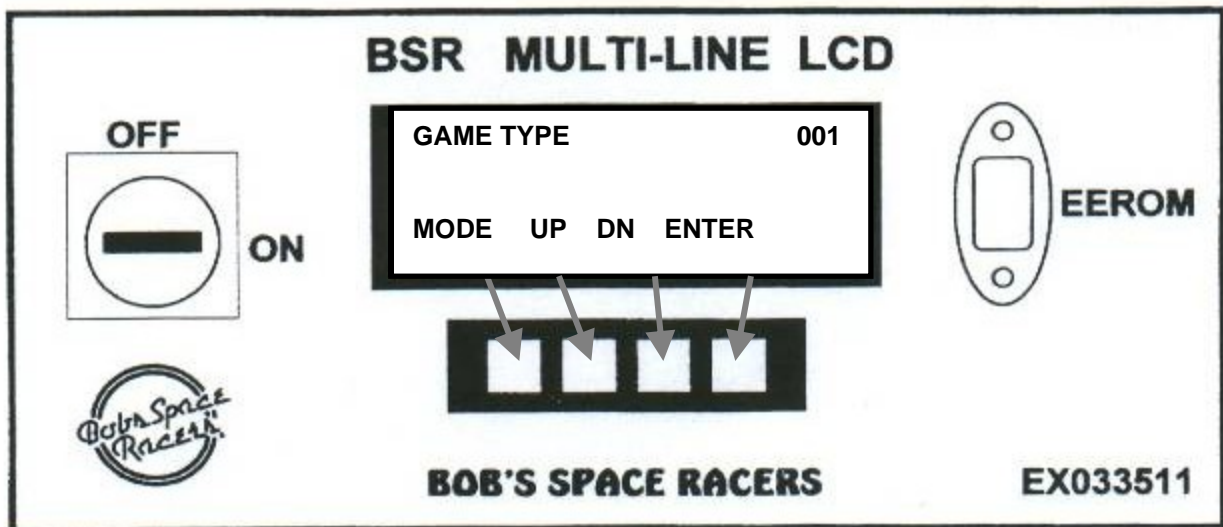
Enter Options by turning the keyed switch to "on" and waiting until the following message comes up:

"GAME TYPE 001"

This means the system is ready to accept changes for the option registers. The MODE button sequences through each register setting 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: The Registers CANNOT be changed in the middle of a race and if GAME TYPE is changed, the game MUST be powered down.

MULTI-LINE LIQUID CRYSTAL DISPLAY BOX



WHAC-A-MOLE OPTION REGISTER SETTINGS

Option/Game	Whac-A-Mole	Description	Min	Max	Default
<i>Game Type</i>	5	1:Water, 2:RAB, 3:Shifter, 4:Rising, 5:Whac, 6:Driving	1	6	1
<i>Game Mode</i>	0	0:Start @Bottom/Right, 1:Start @Top/Left	0	1	0
<i># Players</i>	#Units	Enter The Number of Units in the Game	2	22	14
<i>Bell Time</i>	20	Time the Bell Rings for in 1/10 seconds	20	40	20
<i>Win Lite Time</i>	60	Time the Winner Indicator stays on for in 1/10 seconds	50	100	60
<i>Forward Speed</i>	24	The Fastest Forward Speed for a Motor, the Higher the number, the faster it goes.	10	60	24
<i>Reverse Speed</i>	35	The Speed for a Motor goes Home at, the Higher the number, the faster it goes.	25	50	35
<i>Oper Beacon</i>	60	The Time in seconds until the Operator Beacon turns on out front	0	90	60
<i>Bally Delay</i>	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
<i>Chase Speed</i>	10	How Many 100ths of a second each Channel of the Chase Lights are on	7	25	10
<i>Short Time 1</i>	28	Walk Time RAB	18	28	28
<i>Med Time 1</i>	34	Trot Time RAB	30	35	34
<i>Long Time 1</i>	34	Run Time RAB	30	35	34
<i>Zone Length</i>	95	Time the Toy moves before using the "2" Timing Values RAB	80	100	95
<i>Short Time 2</i>	12	Walk Time After Zone RAB	10	16	12
<i>Med Time 2</i>	16	Trot Time After Zone RAB	14	16	16
<i>Long Time 2</i>	16	Run Time After Zone RAB	14	16	16
<i>Mole Up Time</i>	53	Time that the Mole Heads Stay Up for in 100ths seconds WAC	48	53	53
<i>Mole Dwn Time</i>	15	Time between Moles in 100ths Sec WAC	10	15	15
<i>Win Score X 10</i>	15	Score to Win At #x10 WAC	10	15	15
<i>Reverse Time</i>	50	Time From a Win until Toys Back Up	40	100	50
<i>Min Speed</i>	20	Off the Track Speed RACE	1	40	20
<i>Slow Speed</i>	35	Slow Speed RACE	30	50	35
<i>Medium Speed</i>	45	Medium Speed RACE	30	55	45
<i>Fast Offset</i>	30	Width of Run RACE	10	45	30
<i>Med Offset</i>	70	Width of Med Past Run RACE	20	80	70
<i>Slow Offset</i>	120	Width of Slow Past Med RACE	30	120	120
<i>Track Speed</i>	70	Speed Table Spins at on Race Game	50	70	70
<i>Lo Money Val</i>	1	Amount to add per player for Lo Money	1	9	1
<i>Hi Money Val</i>	2	Amount to add per player for Hi Money	0	9	2
<i>Auto Start TM</i>	* 1	0 = Man, 1 = Auto, 2 = Intro, & 3 or Greater is Timed	0	255	1
<i>Track Sub Value</i>	8	Value To Subtract From Track Speed	5	12	8

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

MAINTENANCE

GENERAL MAINTENANCE INFORMATION

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.

<u>Cleaner</u>	<u>Material</u>
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
Brilliance™	Plexi-glass; regular glass
Windex®	Regular glass
3812S Enamel Reducer	Plexi-glass
Soft Scrub®; CLR®;	Stainless Steel; other metals
Old English® Oil; Baby Oil	Formica; Stainless Steel; other metals

AIR COMPRESSOR MAINTENANCE

Daily: check for proper oil level (use SAE-30 non-detergent); drain and condensate from receiver and traps; listen for any unusual noises and check for vibrations.

Weekly: visually check air filter for debris and dust; clean all external parts of compressor and driver; test safety valve manually to be certain it does not stick.

Monthly: inspect entire system for leaks; inspect oil for contamination and change if necessary; check belt tension and wear.

Three (3) Months: make a complete oil change; inspect valve assemblies.

WHAC-A-MOLE® SCHEDULED MAINTENANCE

DAILY

1. Check oil (compressor = 30 weight non-detergent; lubricator = 10 weight non-detergent).
2. Check dryers; drain if necessary.
3. Visual inspection of game.
4. Check bulbs.
5. Clean all Formica.
6. Start all units; check for score on each figure head.
7. Check Win Lights (Beacons). Make sure each unit can win.

WEEKLY

1. Drain air tank.
2. Clean cooling surfaces of compressor.
3. Remove counter tops; inspect micro switches or air switches and attached wires or hoses.
4. Remove countertops; check wires at TB strips.
5. Remove countertops; check tightness of all bolts and nuts in Mole assembly.
6. Lemon oil all Formica.
7. Check hammers and adjust ropes (adjust hammer so it does not touch mirror).
8. Lubricate Mole Shafts and Guide Pins with grease, i.e., Lubriplate (see page 50). Lubricate rope where it comes out of the cabinet with same.

MONTHLY

1. Operate safety valves on compressor or tank.
2. Replace or clean air filter.
3. Check belt tensions 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.
5. Lubricate electric motor.

AIR COMPRESSOR AND AIR PRESSURE ADJUSTMENT

All Whac-A-Mole games require compressed air to activate the Moles. This is either supplied by the customer or by an on-board compressor supplied by Bob's Space Racers. There are two sizes of Compressors used in Whac-A-Mole Group games, depending upon the number of units in the game.

Air pressure adjustment is very important. Too much pressure can cause Moles to score by themselves, broken micro switches, broken Mole brackets, broken air cylinders, and hammers to wear out much too quickly. The recommended procedure for air pressure adjustment is as follows:

1. Turn all units on so that all moles are working.
2. Decrease the regulator pressure by turning the screw on the bottom of the pressure regulator counter-clockwise until the Moles are no longer popping up.
3. Slowly increase the pressure and stop as soon as the cylinders are getting a full extension. Do not increase pressure any further when you hear a banging noise when the moles come up.

If you follow this procedure, the reading on the regulator gauge should be somewhere between 16 and 20 P.S.I.

*** * IMPORTANT * ***

There is important safety information on the Compressor, as well as proper grounding instructions, in the Appendix Section on COMPRESSORS. Read this information carefully before operating the compressor.

BACK-UP SYSTEMS

Most Whac-A-Mole games produced by Bob's Space Racers®, Inc. include the Back-Up System Option. This System consists of an extra power supply.

TO CHANGE FROM ONE POWER SUPPLY TO ANOTHER

1. Locate and unplug power supply now being used.
2. Follow the thick red wire and the thick black wire to a terminal block.
3. With a screwdriver, disconnect the red and the black wires from the terminal block.
4. Reconnect the red and black wires to terminal block of back-up power supply.
4. Plug in back-up power supply.

WARNING: Before plugging in the back-up power supply, make sure that the thick black wire is connected to the (DC) of the back-up power supply. Do not connect it to the black AC wire. Make sure that the red wire is connected to (DC+) of back-up power supply.

TECHNICAL DATA

2400 SERIES ELECTRONICS

2400 BOARD ELECTRONICS OVERVIEW

In 1999 Bob's Space Racers® introduced the 2400 Series Electronics Board. It is very similar to the 2300 Series Electronics Board but with several major improvements. With the 2400 Board Electronics it is easier to program. Also, the failure of one board will not take the entire game down as it would if one board failed in the 2300 Board Electronics.

2400 MICROPROCESSOR BOARD OVERVIEW

The basic operation of the processor board is as follows.

The inputs on this board are on J9. The J9 connector inputs are ground-seeking. The row of pins closest to the edge of the board is at ground and the row in towards the board are the actual input pins. To check an input, simply ground the input's corresponding pins and the corresponding LED should light up – if good. These LED's are tied to opto-couplers which convert the 12 volt circuit to TTL for the board.

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

The 4-pin Molex connector is the +12V (pin 4) and ground (pins 2 and 3) power input to the board.

The two (2), RJ-45 connectors at the upper left corner of the board, are communication ports to other boards and systems, and are wired in parallel.

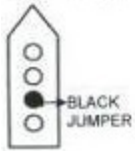
There is a row of serial expansion connectors that are used to communicate with serial devices, such as the front panel board, credit display, etc. There is a total of four (4) connectors, only three (3) of these ports are being used at this point. The other two (2) are for future use.

There is an 18-position SIP header connector. This is an 8-bit, clocked parallel TTL port. It is set up to be used for a sound board to plug 'piggyback' on top of this board.

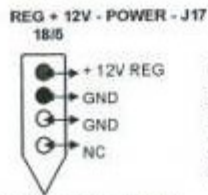
WHAC-A-MOLE[®] 2400 MASTER BOARD

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

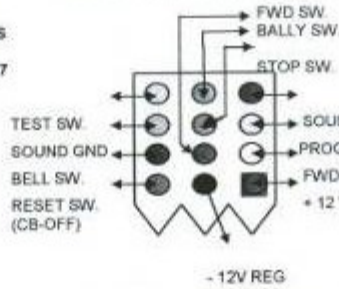
FEMALE PLUG - MALE PINS UPPER SHIFTER MAS TREE - J8



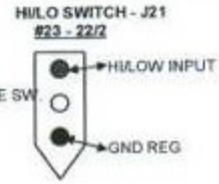
MALE PLUG - MALE PINS REG + 12V - POWER - J17



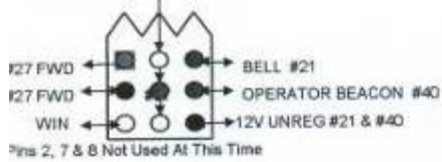
Pins 1 & 2 Not Used At This Time



MALE PLUG - FEMALE PINS HI/LO SWITCH - J21



FEMALE PLUG - MALE PINS REG + 12 V - J22

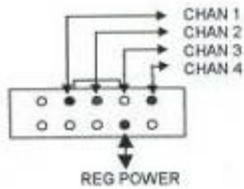


Pins 2, 7 & 8 Not Used At This Time

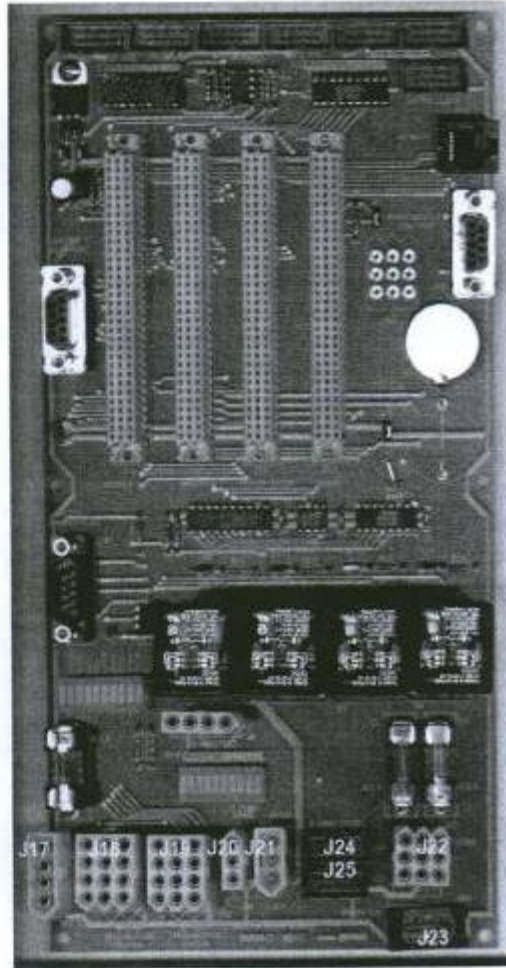
UNREG + 12V - POWER - J23



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

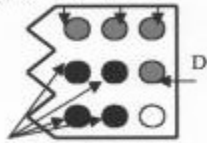


LED SWITCH ARRAY BLOCK

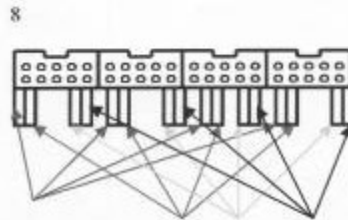
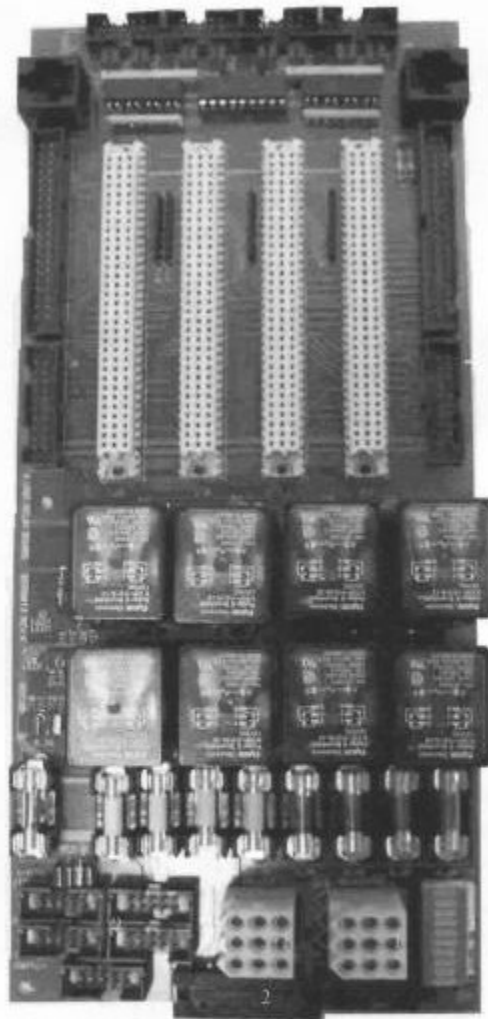
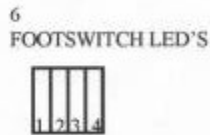
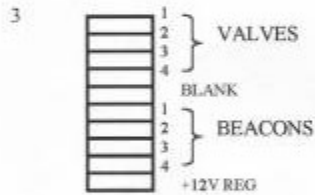
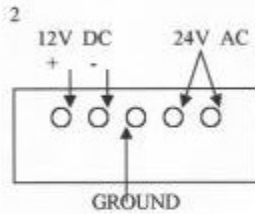


UNIT MODULE RELAY BOARD

1
 J18 - VALVES
 J19 - BEACONS
 MALE PINS - FEMALE PLUG
 UNITS: A B C

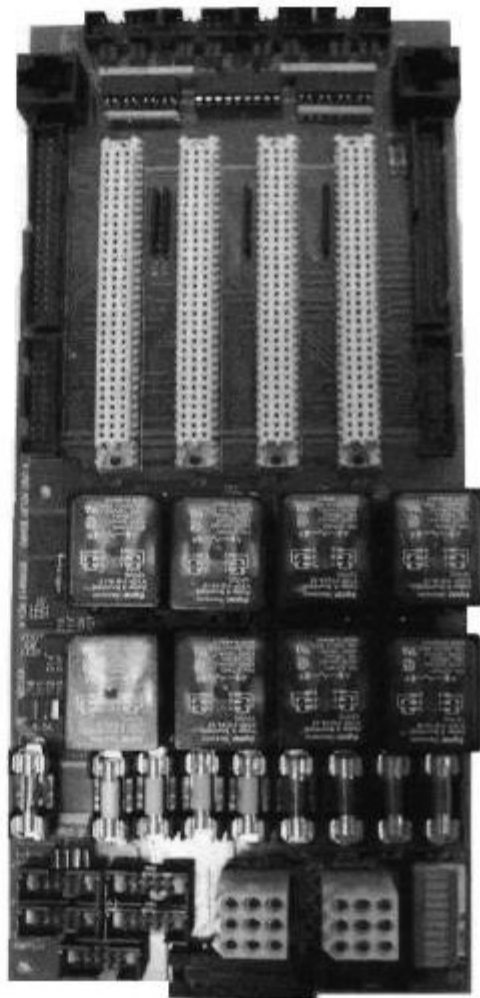
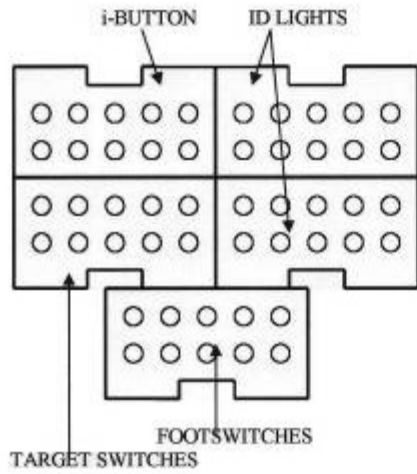


-12V UNREG
 PIN 7 IS NOT USED
 AT THIS TIME.

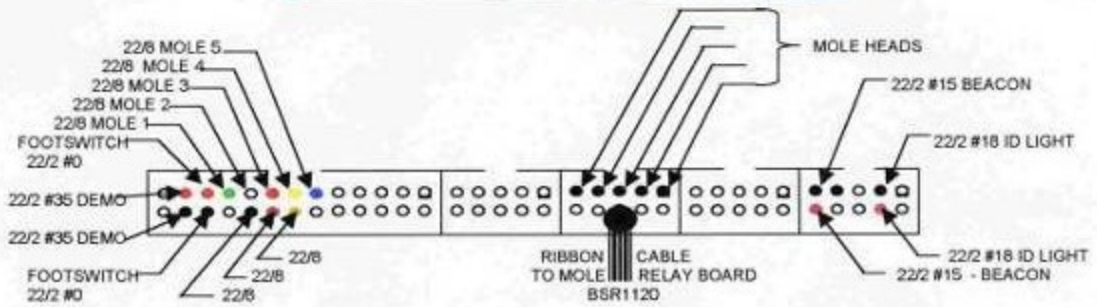
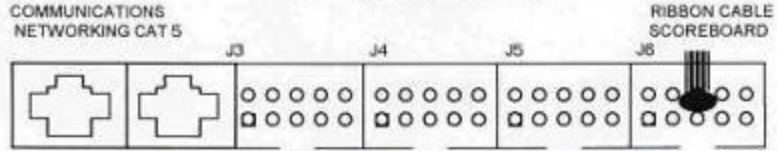


9 IS ON PAGE 2

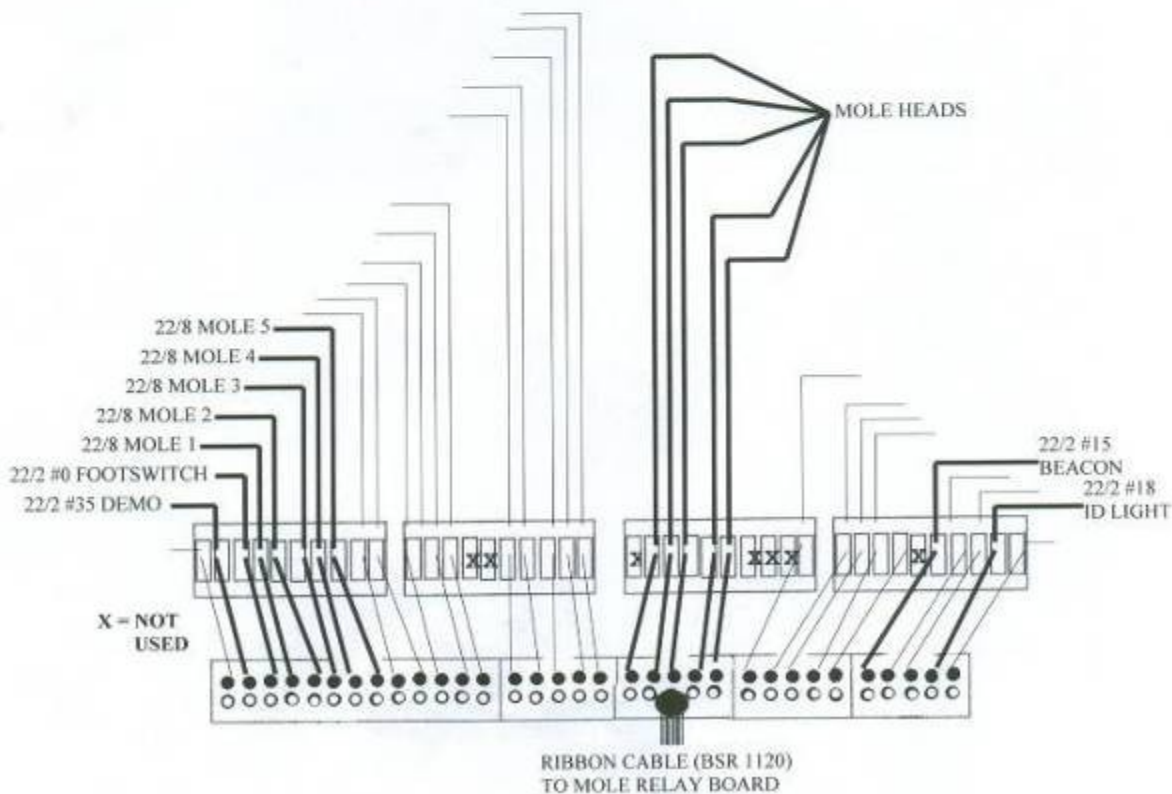
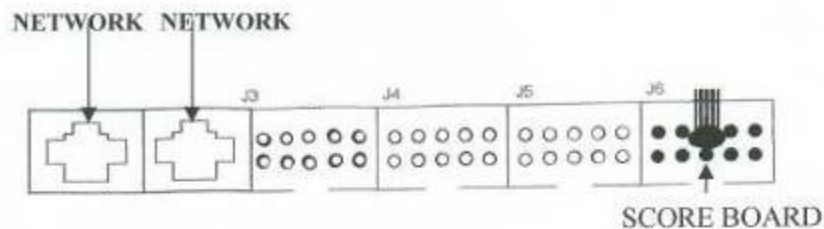
UNIT MODULE RELAY BOARD



WHAC-A-MOL® 2400 UNIT BOARD

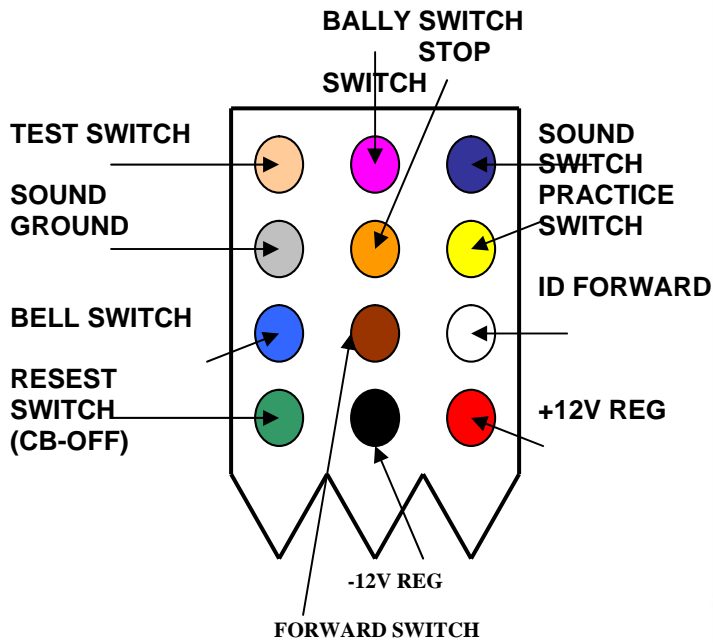


WHAC-A-MOLE [®] 2400 UNIT BOARD PIN-OUT



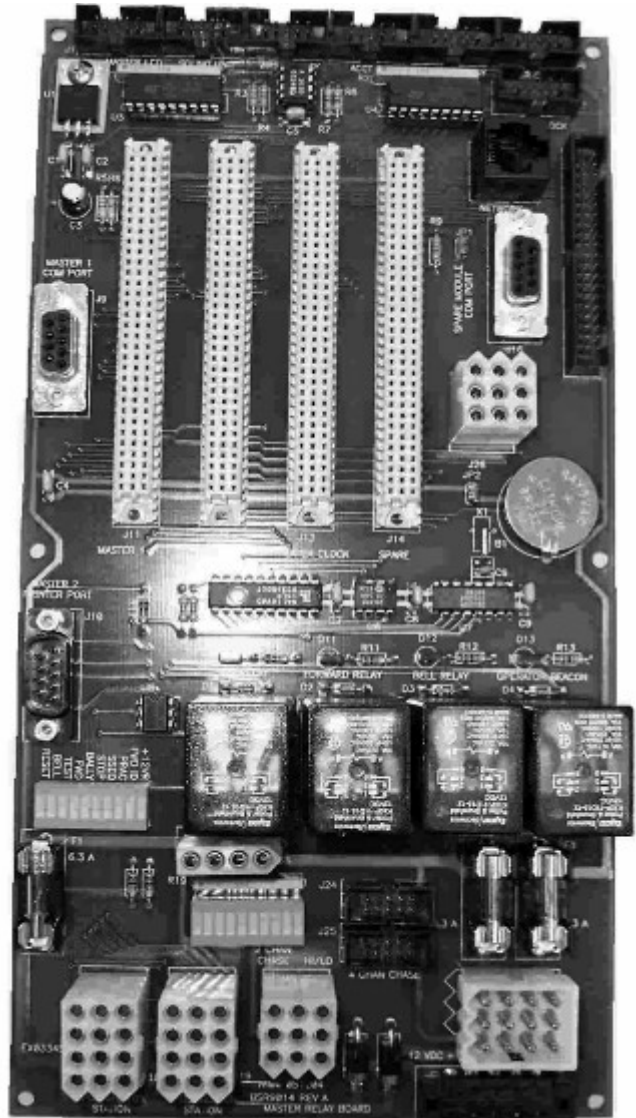
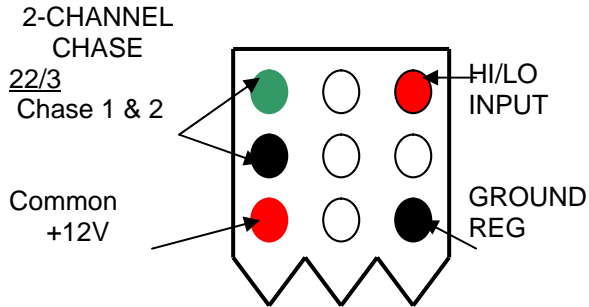
WHAC-A-MOLE MASTER RELAY BOARD

1 FEMALE PLUG, MALE PINS
MASTER (J18)& SATELLITE (J19)
PUSHBUTTON STATIONS



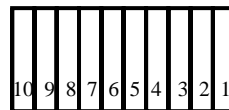
2

MALE PLUG – FEMALE PINS
HI/LO SWITCH (J20)
#23 – 22/2



4

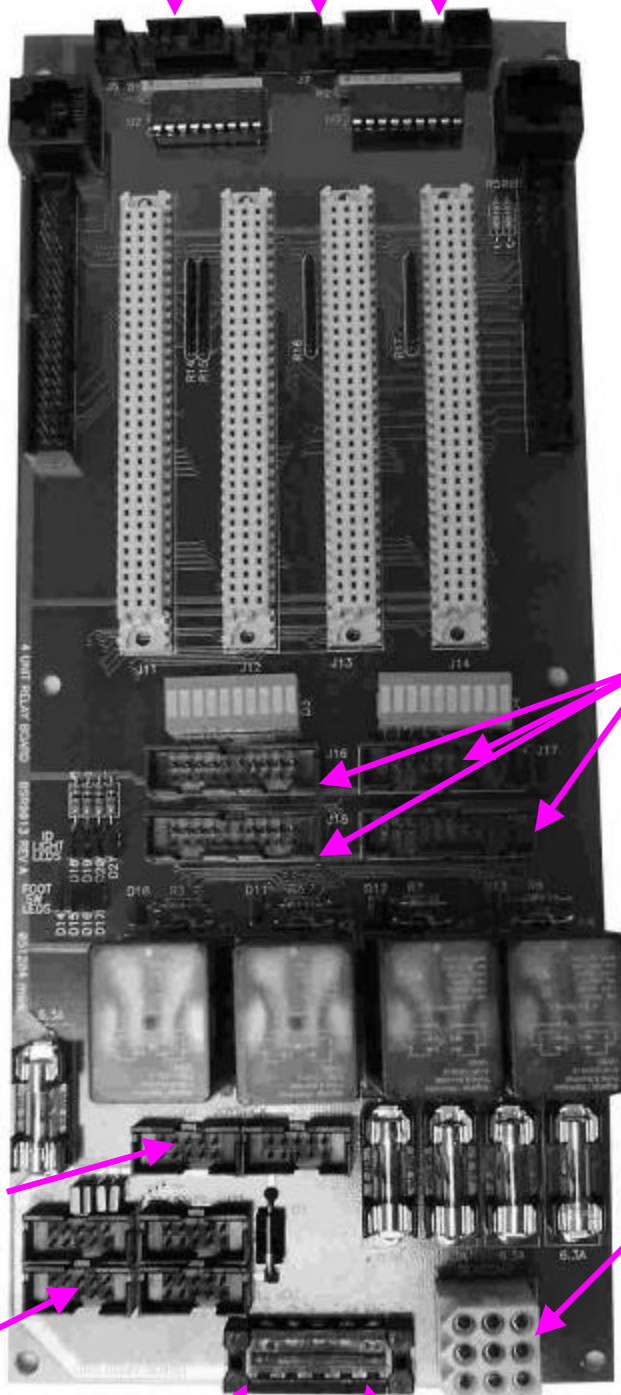
LED SWITCH ARRAY
BLOCK (D5)



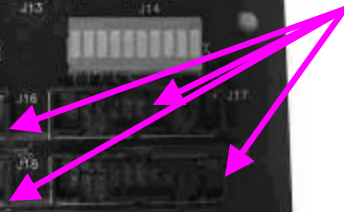
- 1) +12V REG
- 2) FORWARD ID
- 3) PRACTICE
- 4) SSEQ
- 5) STOP
- 6) BALLY
- 7) FORWARD
- 8) TEST
- 9) BELL
- 10) RESET

WHAC-A-MOLE UNIT RELAY BOARD

Mole Boxes

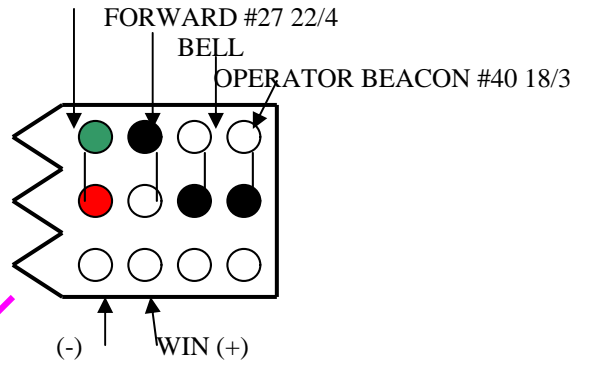


Mole Boxes



3
FEMALE PLUG – MALE PINS

(J22) FORWARD #27 22/4



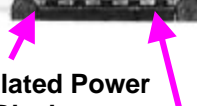
Joystick



Footswitch



Regulated Power
Red/Black
Unregulated Power
White/Black



TROUBLESHOOTING

2400 SERIES ELECTRONICS

PROBLEMS/CAUSES

PROBLEMS WITH THE GAME

Game Will Not Turn On

Bad Footswitch

SUGGESTED FIX

Check continuity on foot. If bad, replace.

PROBLEMS 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 an O-ring around the disk; also, there is a tension wheel that pushes the O-ring tight to the Motor shaft. It probably isn't 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.

PROBLEMS WITH THE BEACON

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

Bell Does Not Work At All

No Power

Check Relay on Relay Board for proper operation.

Bad Relay

Check for 12VDC at the Relay Board. Check wiring.

Bad Bell

Swap Relay with another one; replace, if necessary.

Check Bell by plugging into the end of an extension cord. (The Bell has a standard wall plug jack on it.)

Unit may be automatically wining - Check Pitcher Float Switch.

Check Limit Switch for Bad Crimp or Broken Wire.

MOLE HEAD BOXES

MOLE HEAD BOXES

Overview

Over the years there have been improvements made to the Mole Head Box and related parts in order to improve its reliability and longevity. The original versions used two switches wired in series, one under the mole (a normally open switch) which would close when the mole was hit, and a switch under the guide pin (a normally closed switch) which would open when the air cylinder was down. The circuit for the two switches was fairly simple. The only time a player could score was when the air had filled the cylinder (the bottom microswitch is now closed) and the player hit the raised mole head (closing the top microswitch, which completed the circuit through both switches).

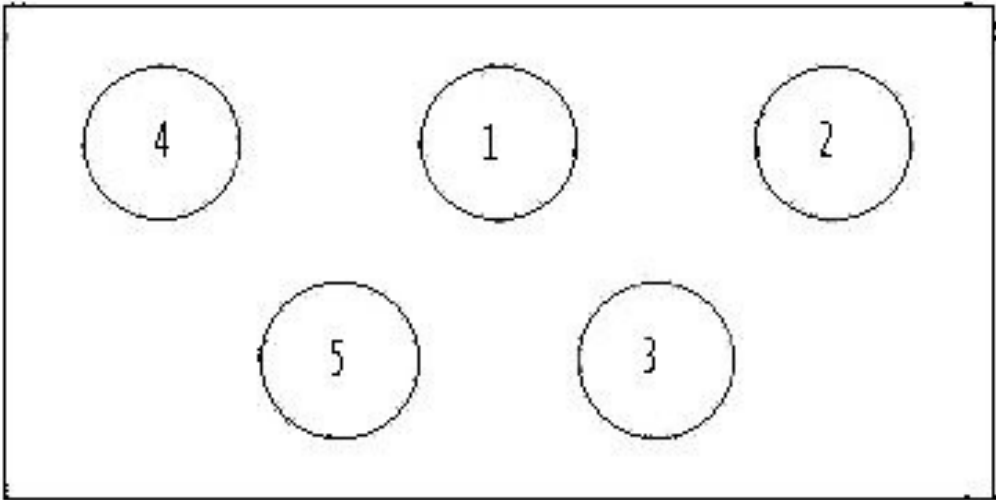
The main problem with this design was there were many parts associated with mounting a switch and often, when a repair was done, parts were left off. The wires going to the switches had a tendency to break, which caused the mole head to score all of the time or to not score at all. The parts that prevent this are crimp terminals with a strain-relief on the wire and a clamp that fastens the wire to the switch housing so it is strain-relieved.

The current version looks very similar, but the operation is quite different. Instead of two micro switches, an air switch is now used under the mole heads and an air pressure sensing switch that senses a mole head hit. Originally the system used the air that fills the air cylinder and it is plumbed into an air switch that is located under the mole head body. With the cylinder in the 'up' position, there is air pressure on one side of the switch. When the mole head is hit, the switch will open and allow air to pass through the switch and down to a manifold. All of the switches are connected to this manifold which, in turn, is connected to the air pressure sensing switch. The air pressure pulse will pass down from the manifold to the sensing switch. The switch, once it has an air pressure pulse, will make an internal switch closure and will cause an input to activate on the processor board.

With the 2400 Electronics, the air switch under the mole head always has pressure going to it. Each air switch is hooked to an air electric switch which hooks into the controller board. The controller board only counts a mole head hit if it is supposed to be "popped" up.

With all set-ups, there is a rubber gasket on both sides of the switch under the mole head and these parts are sandwiched between a metal plate on the outside and the mole bracket on the other side. The fastening nuts are 6/32 shake-proof nuts. This allows you to only snug the nuts instead of tightening the nuts and this will provide a shock mount for the switch.

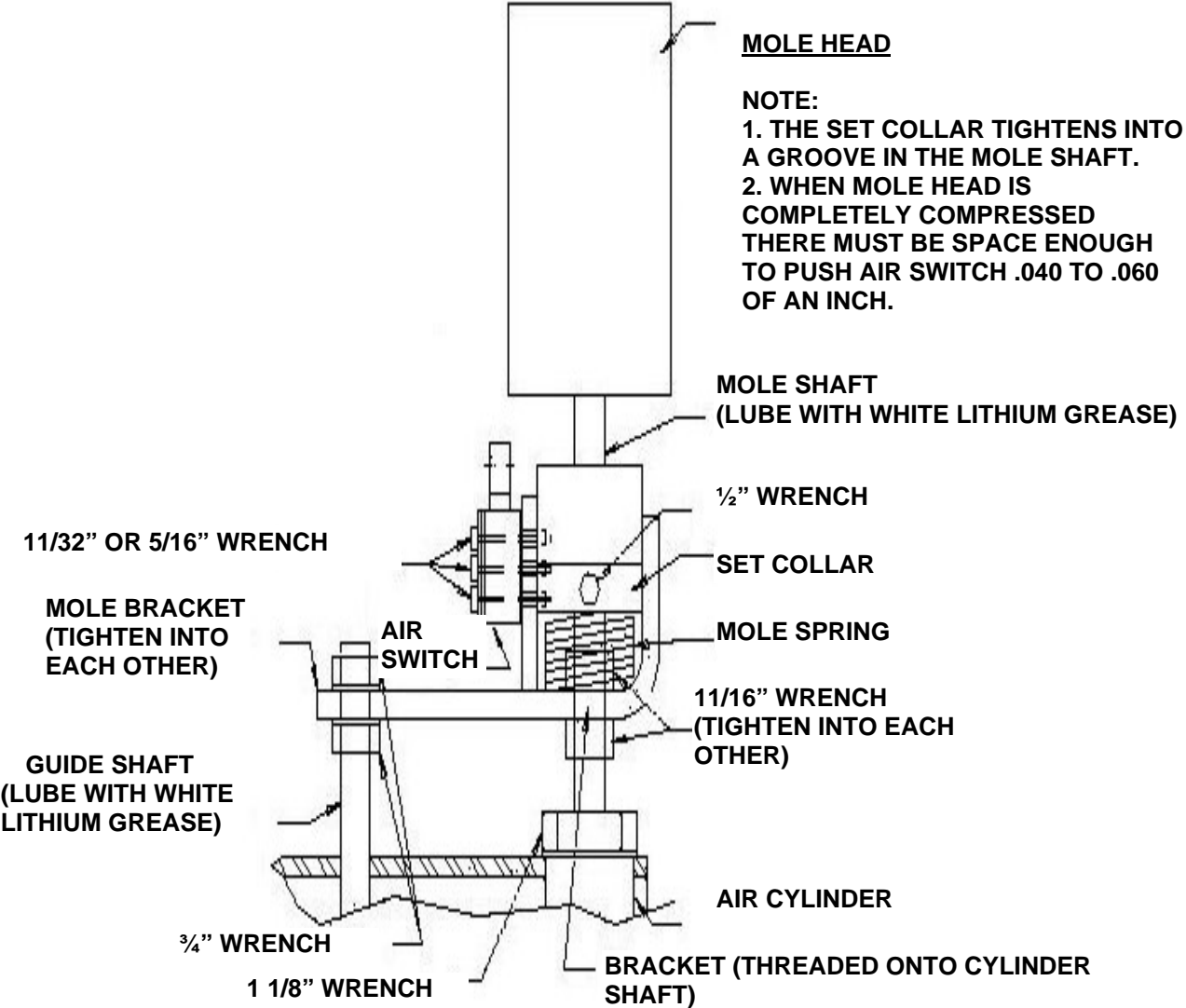
MOLE HEAD NUMBER REFERENCE



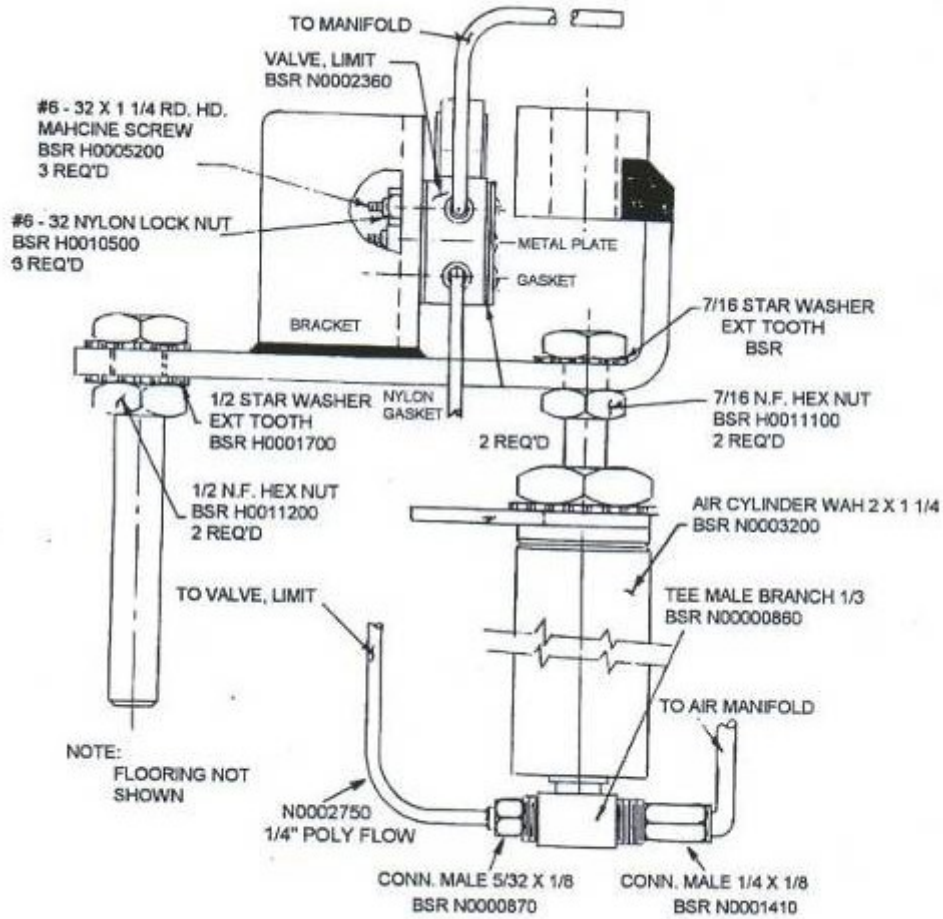
FRONT OF GAME

View is from the top as you look down.

MOLE HEAD UNDER-HEAD ASSEMBLY

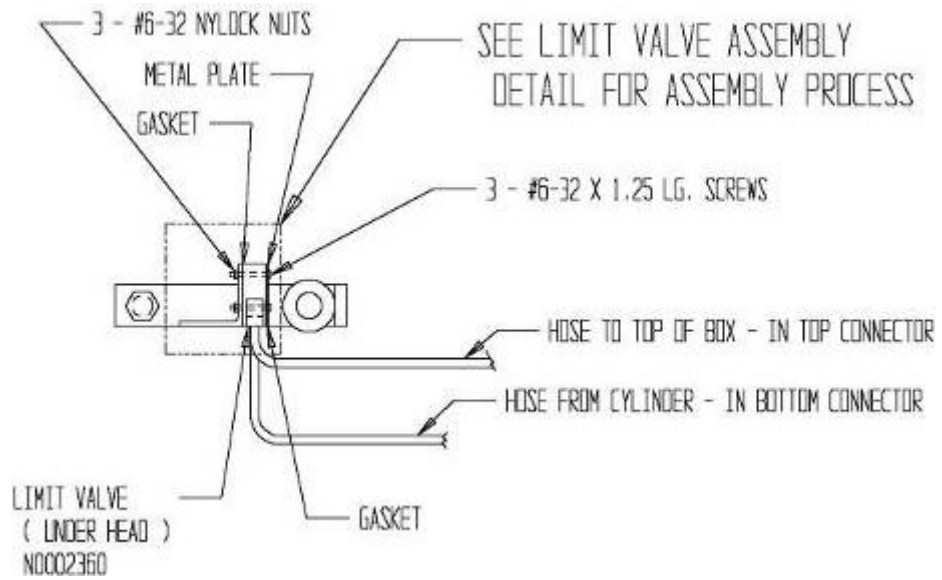


MOLE HEAD BRACKET ASSEMBLY

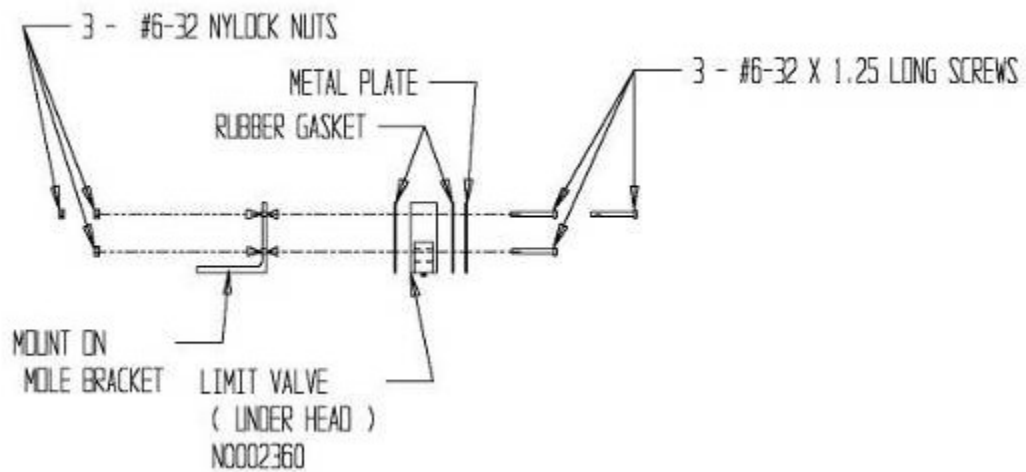


Mounting Instructions for Valve Limit: Insert three (3) # 6-32 X 1 ¼ RD. HD. machine screws through the galvanized spacers and neoprene gaskets then place a second gasket opposite of the valves. Place screws in the valves through holes in brackets and secure with three (3) elastic stop nuts.

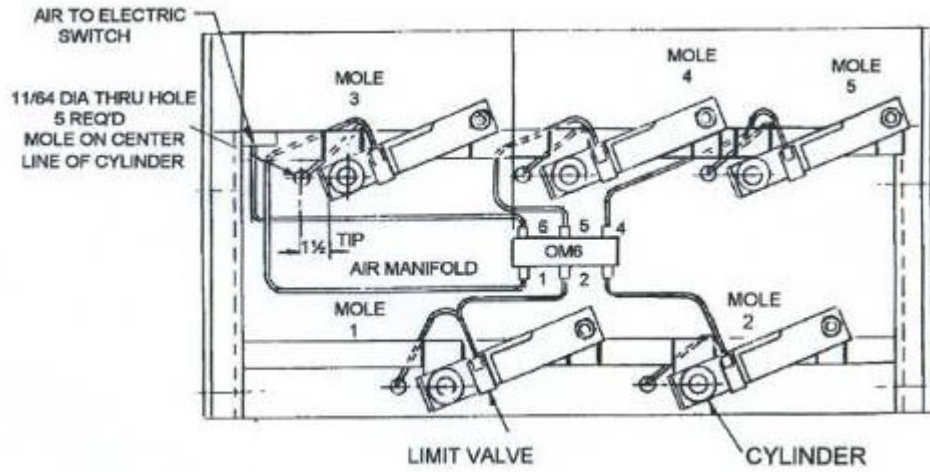
TOP LIMIT VALVE ASSEMBLY



LIMIT VALVE ASSEMBLY DETAIL

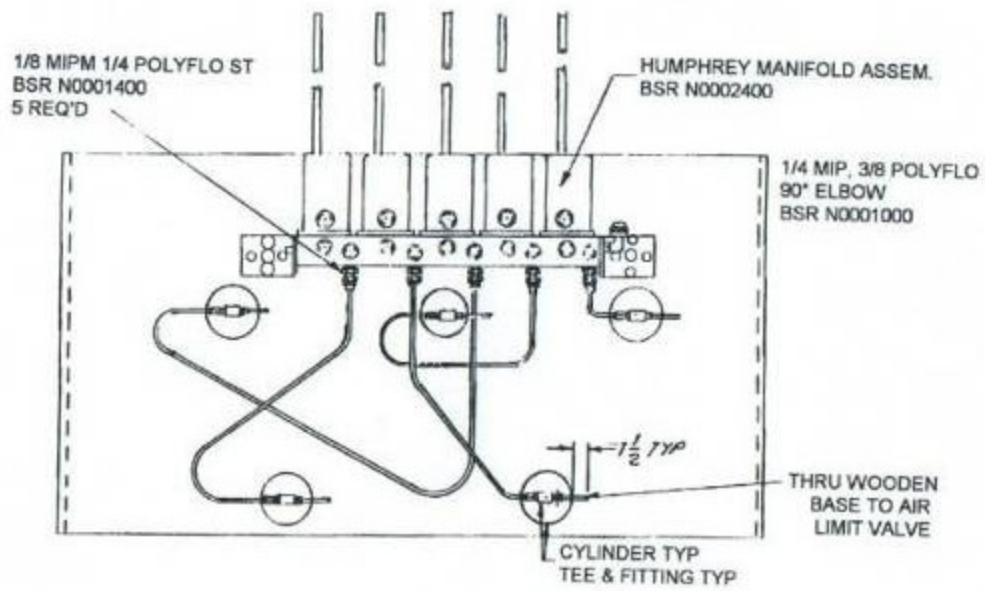


HOUSING ASSEMBLY – PLAN VIEW

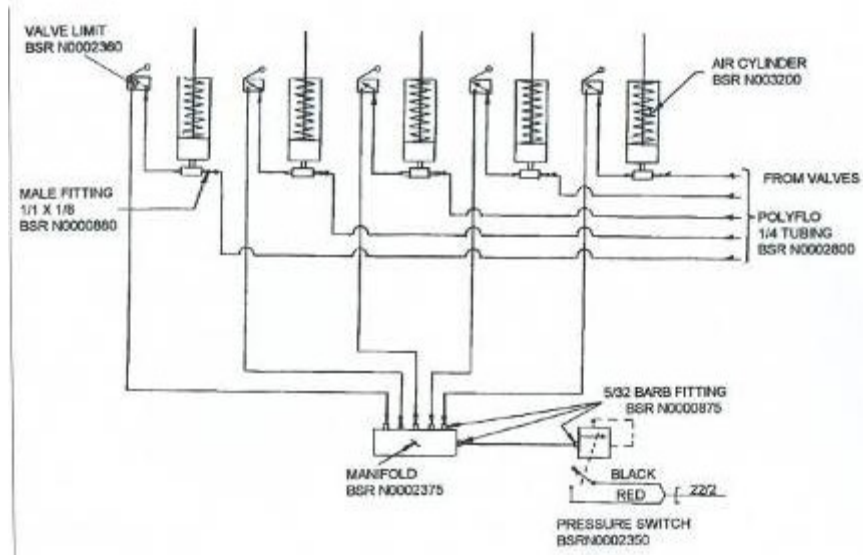


Note: All Tubing is 5/32"

HOUSING ASSEMBLY – BOTTOM VIEW

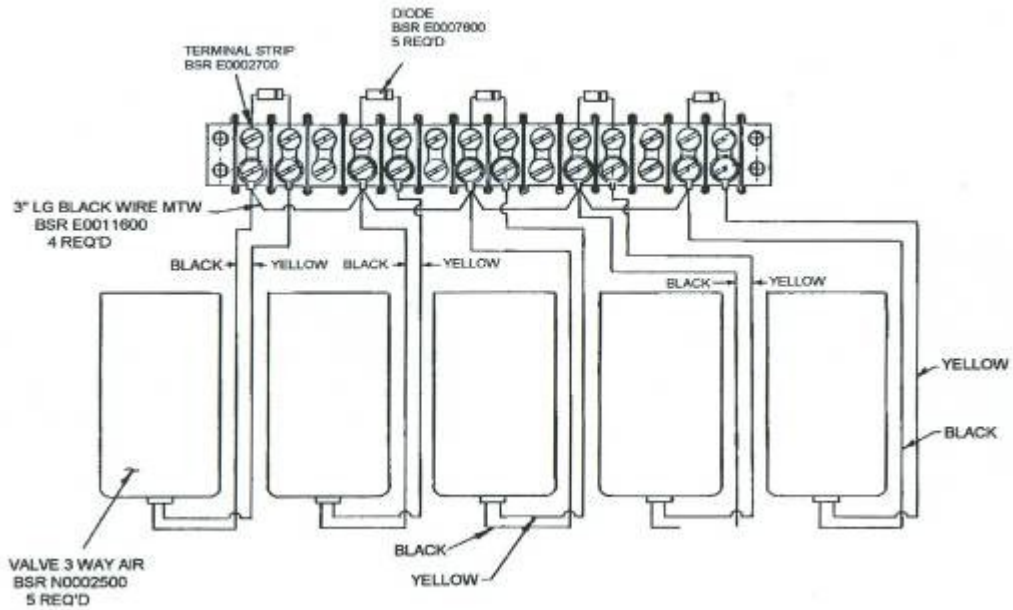


MOLE HEAD PNEUMATIC SCHEMATIC



NOTE: All tubing is 5/32" Nylon (BSR N0002750), unless otherwise noted.

WIRING DIAGRAM



TROUBLESHOOTING MOLE HEAD BOXES

PROBLEMS/CAUSES

Wires on Score Switches Breaking.
No strain relief.

Head Doesn't Remain Up Long Enough.
Bad valve or cylinder.

One Head Will Not Score.
Bad switch or kinked air line.

Game Scores On it's Own.
Shorted wire or bad switch.

Pressure set too high.

One Head Stays Up continuously.
Valve stuck open.

Only One Head Pops Up.
Bad diodes.

Air Switches Breaking.
Screws that hold the switches in place are too tight; no rubber gasket.

SUGGESTED FIX

Use terminals with strain relief and secure wire to side of switch.

Switch air hoses between good valve/head and the bad head/valve to determine if either the valve or cylinder is bad.

Check for air out of head switch when it's depressed.

Check for short on score wire or terminal strip; if it's a bad switch, replace.

Adjust pressure to 20 psi.

Check for short circuit in one of the valves that makes the heads pop up.

Shorted or "blown" diode(s) between terminal blocks where valves hook up.

Adjust switch so when mole head is down there is still a little movement left in the switch. Make certain you use rubber gaskets.

TROUBLESHOOTING MOLE HEAD BOXES

PROBLEMS/CAUSES

One Head Won't Come Up.

No voltage on terminal block.

Blown diode.

Bad connection(s).

Bad relay.

Bad valve or cylinder.

Bad cylinder.

SUGGESTED FIX

Check terminal block for proper voltage (approximately 12V).

If you have voltage on the terminal block, check diode, replace if necessary. Otherwise, see Bad valve or cylinder.

Check wire connections to and from sequencer.

Check relay for proper operation and replace if necessary.

Disconnect the air line from valve – Is there any air? If yes, put line on another valve; could be a crimp in line or bad cylinder. If no, it's a bad valve that needs to be replaced.

Pull up on the cylinder – does it stick? If yes, then the guide pin could be misaligned. Otherwise, it's a bad cylinder that needs to be replaced.

MISCELLANEOUS

GAME PARTS LIST

<u>PART #</u>	<u>DESCRIPTION</u>
E0003800	Relay, 12VDC, KHAU-17D12
E0013400	Switch, Micro, Whac-A-Mole 516 N/O
E0022670	Power Supply, 12VDC, 7.5A Open Frame (Per Unit) Requires Power Supply Cover
E0022671	Power Supply Cover (Use with E0022670)
E0022700	Power Supply, 12V/15 Amp (for Sequencer)
E0022800	Power Supply, 12VDC, 42 Amps (Adult)
E0022820	Power Supply, 12V @ 80 Amps
E0025100	Meter 12VDC, Eaton-Durant
EM068800	Microprocessor Chip Group Processor
EX033100	Foot switch Assembly
EX033475	Display, BSR Assembly, Small Digits
EX033500	Display, BSR Assembly, Large Digits
EX033515	Sequencer, Microprocessor
EX033615	Board, Group Game Processor
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, Assembly
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

RECOMMENDED TOOL LIST

TOTE BOX
CUP HOOKS
CUP CHAIN
CUP BANDS
2 TEE HANDLES FOR TOPS (LARGE TYPE)
WHISK BROOM
BROOMS
6 ROLLS TOWELS (12 RED & 12 CLEAR - FOR UNDER AWNING)
1 TOOL BOX
1 SCREWLOCK DRIVER
1 MULTI TIP SCREWDRIVER
1 REGULAR PLIERS
1 NEEDLE NOSE PLIERS
1 SMALL ADJUSTABLE WRENCH
1 (1/4) DRIVER RATCHET WITH 11/32" SOCKET
1 (11/32") WRENCH
1 (3/8") WRENCH
1 («") END WRENCH WITH BOX END
1 (9/16") END WRENCH
2 (11/16") WRENCHES
2 (3/4") WRENCHES
1 (1 1/8") WRENCH
2 (5/32") T-HANDLE ALLEN WRENCHES
1 SLOTTED, STUBBY SCREWDRIVER
1 LOCTITE (RED)
1 LUBERPLATE
1 RAZOR KNIFE

APPENDIX

ACCOUNTING SYSTEM

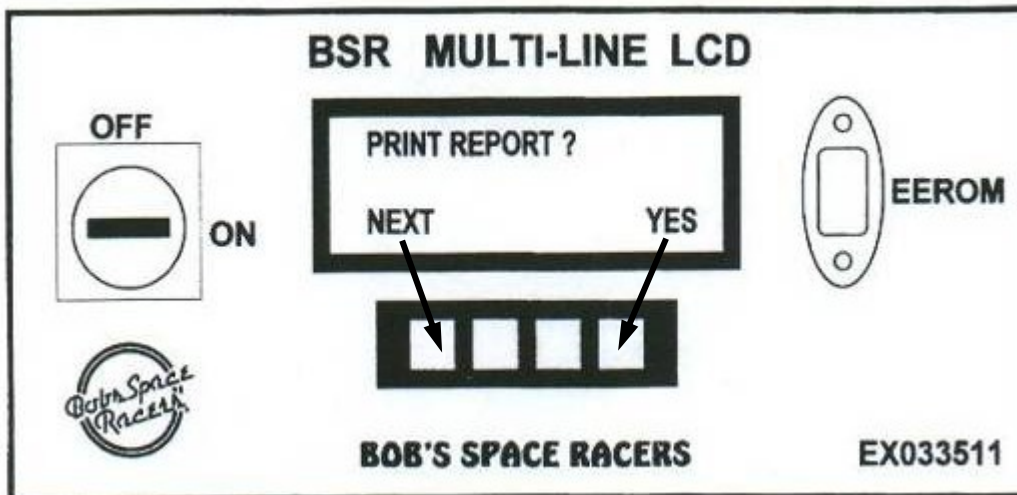
2400 G MODULE ELECTRONICS' ACCOUNTING SYSTEM OVERVIEW

The 2400 G Module Electronics' Accounting System is integrated into the game's own electronics. This means there is no wiring harness to connect it to the rest of the game or to individual units.

The external wiring for this accounting system includes two (2) cables that are 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 left button and above the far right 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, and then, to "ERASE DATA". If you press the button below the word "YES" when the display reads "ERASE DATA" it will clear the data and default back to "PRINT REPORT" display.

MULTI-LINE DISPLAY DIAGRAM



2400 G MODULE ELECTRONICS' ACCOUNTING SYSTEM OVERVIEW

```

Bob's 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-resettable 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. (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-resettable. (This part replaces the Mechanical Meters you may have in some of your older games).

2400 G MODULE ELECTRONICS' ACCOUNTING SYSTEM OVERVIEW

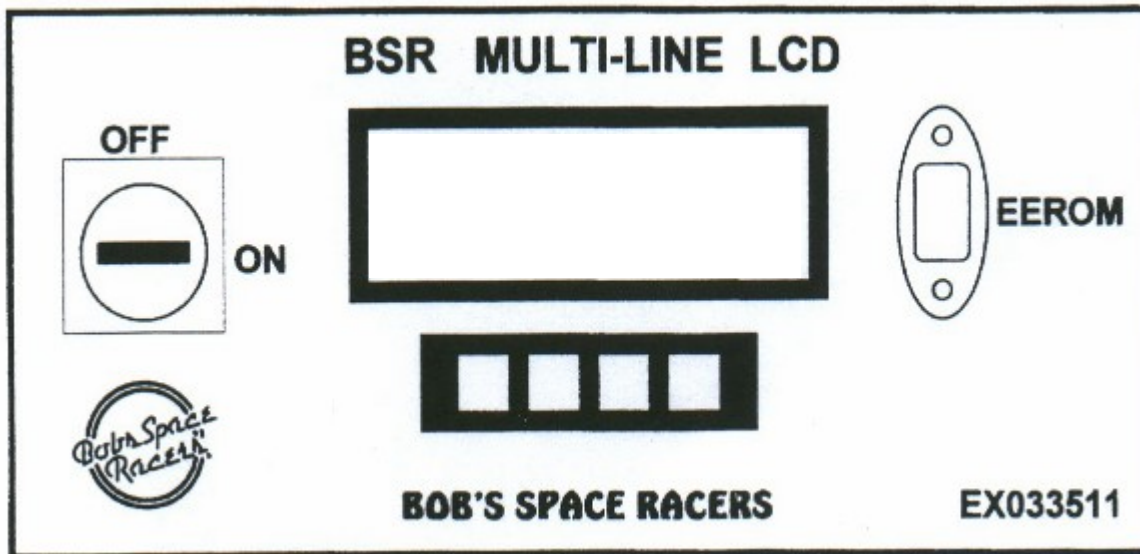
The last part to be printed is Level 4, which is an hourly report. This informs you of how many games were played each hour the machine was powered up (turned on). If the machine was not powered up there will be no report for that time frame.

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!

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 DIAGRAM



COMPRESSORS

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 deactivate 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.

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

Low Discharge Output

Restricted inlet

Defective compressor valves or valve unloading mechanism

Leaks in the compressed air distribution system at fittings, connections, etc.

Pressure switch defective or set wrong

Drive belt slipping

Low oil pressure

Drain valve open

Low Oil Pressure

Oil pump direction reversed

Low oil level

Compressor Loads and Unloads

Excessively

Excessive system leakage

Unloader pilot differential set too close

Pressure Switch defective

Defective Pressure Switch

Moisture and/or oil buildup on the pressure switch diaphragm

Ruptured diaphragm

Burned contact points

SUGGESTED FIX

Clean or replace filter.

Check valves for correct operation.

Check for air leaks, etc.

Check pressure settings on Pressure Switch.

Check/tighten belt.

Check oil pressure/level.

Drain tank, then close valve.

Check power. The flywheel has a direction of rotation marking; check that fly turns correct direction.

Check oil level; add oil, if necessary.

Check for air leaks.

Check Start and Stop pressures; adjust, if necessary.

Check switch for operation; clean, if necessary.

Clean switch, if still doesn't work – replace.

Replace switch.

Replace switch.

TROUBLESHOOTING LARGE AIR COMPRESSOR

PROBLEMS/CAUSES

Excessive Current Draw

CAUTION! Motor surface temperature normally exceeds 170° 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)

Loose electrical connection

Motor defective

Drive belts too tight

Failure to Start

Power not on

Blown circuit fuse

Low voltage

Faulty start switch

Pressure switch incorrectly adjusted or faulty

Failure to Start (continued)

Loose or broken wire

Motor defective

Motor Stalls

Motor overloaded

Excessive Drive Belt Wear

Pulley/sheave out of adjustment

Belt too loose or too tight

Belt slipping

SUGGESTED FIX

Check power to compressor.

Tighten connections; Check wire for kinks.

Remove belt and check motor; replace, if motor doesn't work.

Slacken belt to see if that cures the problem.

Check power to motor.

Check fuse or circuit breaker.

Check power to motor.

Clean or replace switch.

Adjust switch or replace.

Check wire connections; check power to motor.

Remove belt and check motor; replace if motor doesn't work.

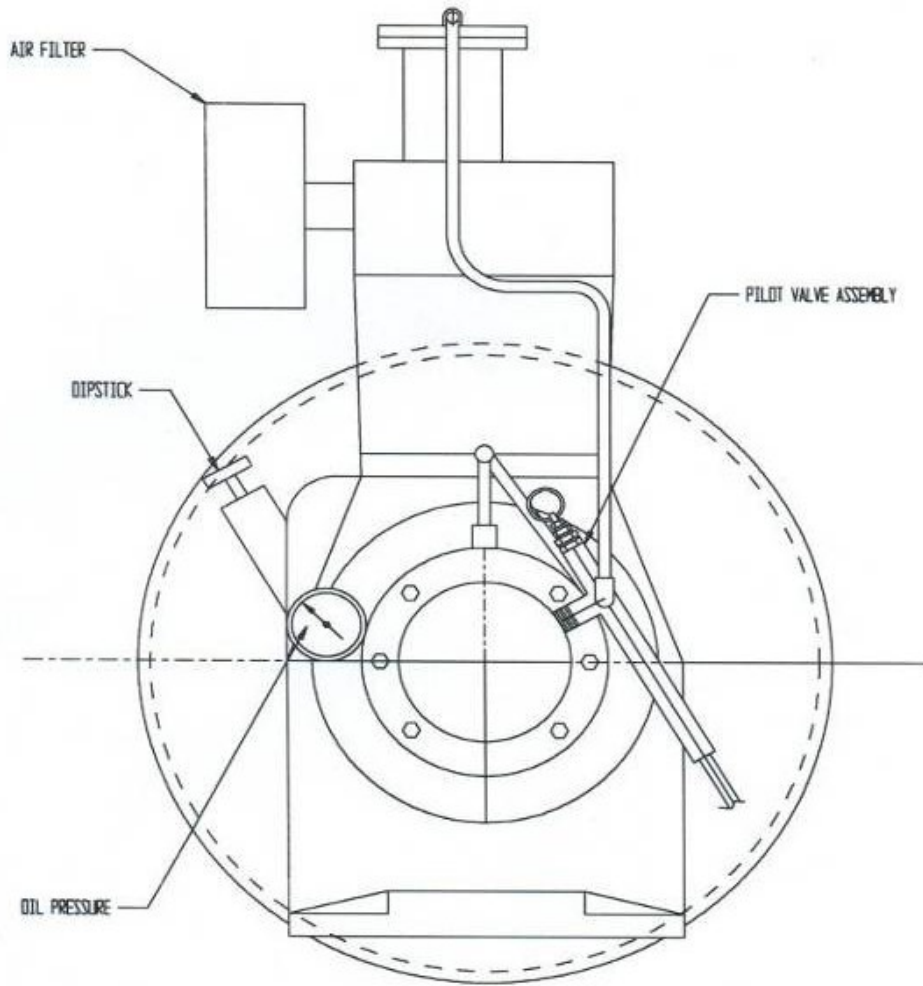
Refer to Excessive Current Draw (above)

Check pulleys for alignment; adjust, if necessary.

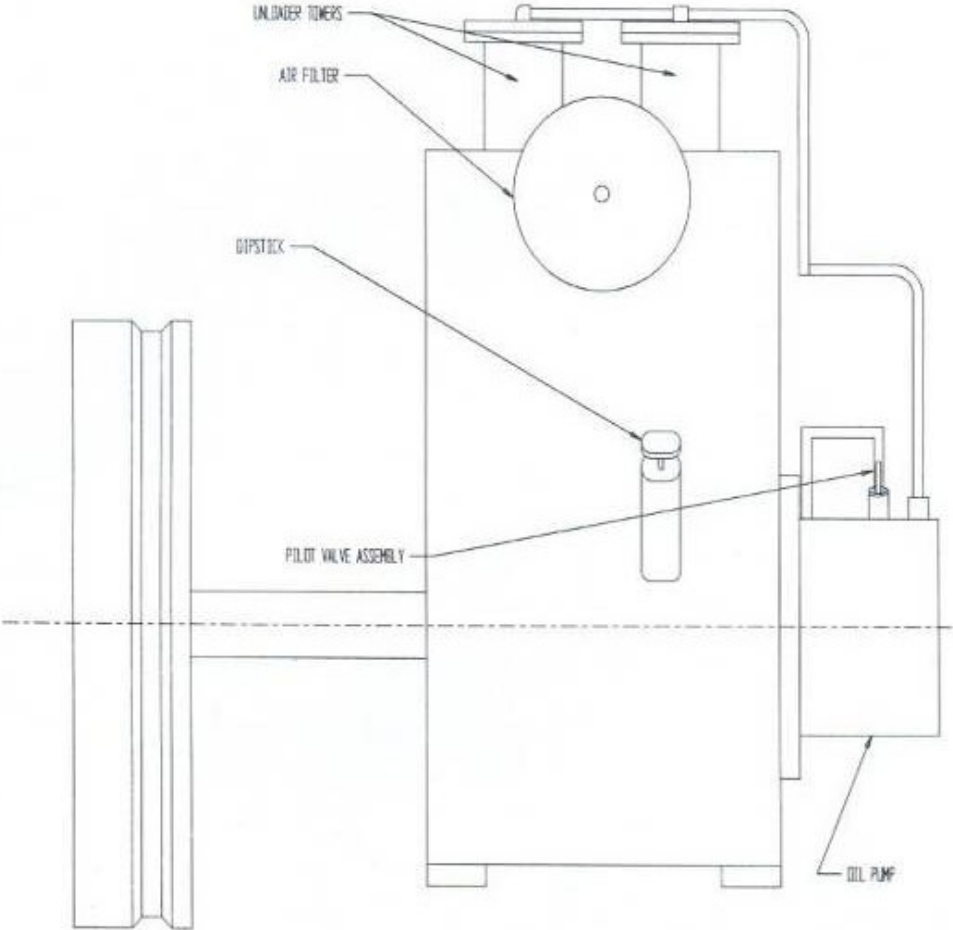
Adjust belt.

Tighten belt.

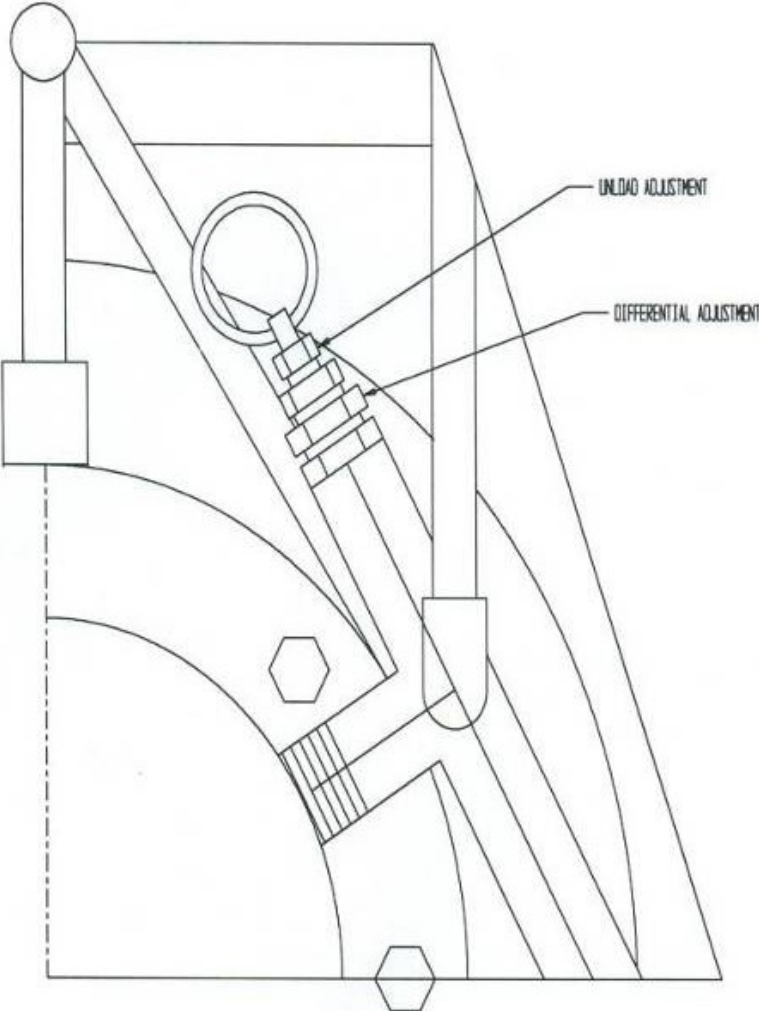
LARGE AIR COMPRESSOR – PUMP FRONT VIEW



LARGE AIR COMPRESSOR – PUMP SIDE VIEW



LARGE AIR COMPRESSOR – PILOT VALVE ASSEMBLY



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 amount 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.

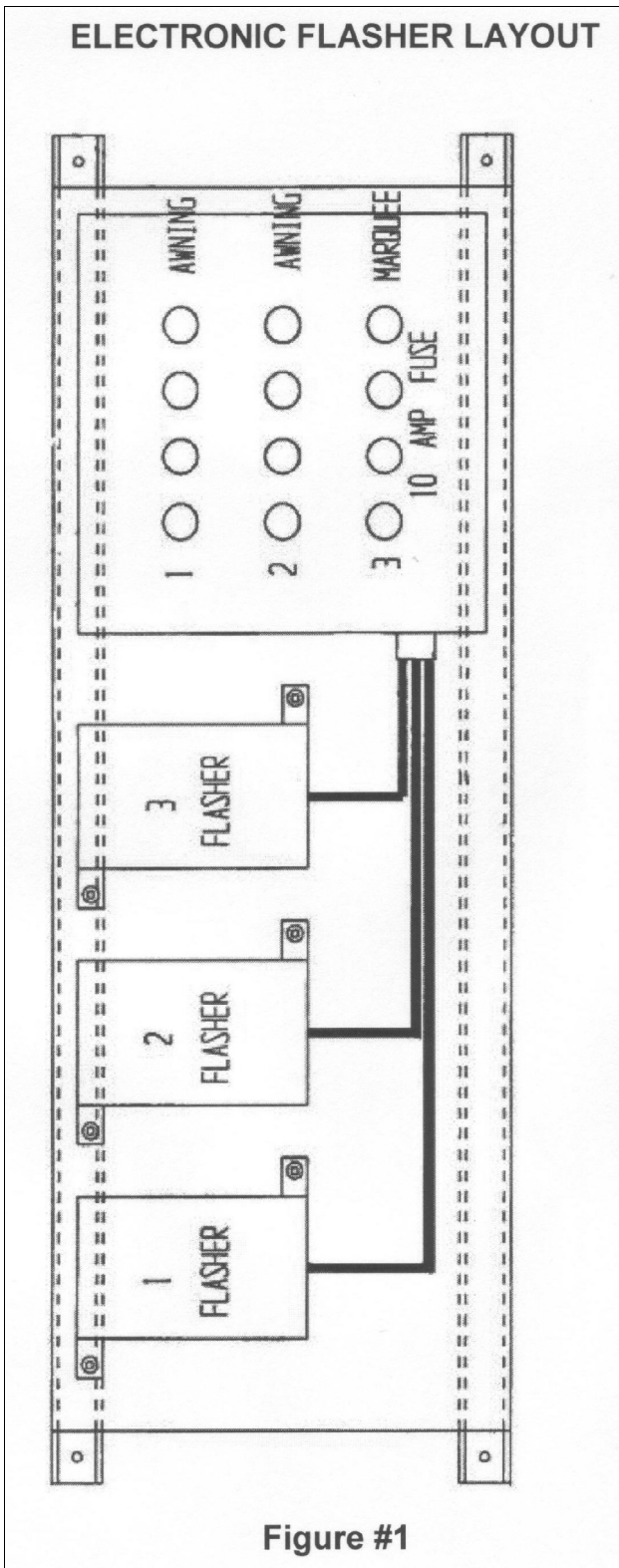
Each flasher unit has a model number, which is located on a decal on the flasher unit itself. This model number enables you to order parts for the particular flasher unit you have. If you can't find the model number on your flasher unit, then count the number of contact posts on your flasher unit; there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

LIGHTING OVERVIEW

Flashers

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.



OTHER

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®

TROUBLESHOOTING LIGHTING

PROBLEMS/CAUSES

Overhead Lights Don't Work At All

No connection

No 110V AC supply

Bad motor

Some Lights Don't Work

Bad connection

Contacts misaligned or dirty

Bad bulb

Bad socket

Fluorescent Lights Will Not Light Up

Bad light

Bad ground

Bad ballast

Fluorescent Lights Will Not Light Until

Someone is Standing Next to Them

Bad ground

SUGGESTED FIX

Check amp connector and all Molex plugs for each track of lights for a secure fit.

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.

Replace flasher unit if necessary.

Check bulbs to make certain there is a secure fit into the socket.

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" ****

Swap bulb with a known good one and replace if necessary.

Retwist light socket connection and replace socket if necessary.

Change light bulb.

Make certain fixture has an earth ground properly connected. (Very important!)

Replace ballast.

Make certain fixture is properly grounded and check the ground on the game.

LIGHTING PARTS LIST

<u>Part Number</u>	<u>Description</u>
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)
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Small Bulbs – Imported

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

SOUND SYSTEMS

BSR SOUND UNIT OVERVIEW

Pressing the “#” key on the keypad increments through the five sections. One can flip through the 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 *game music* for the race. For each race, the system will play the next song in the *Game Music* section.

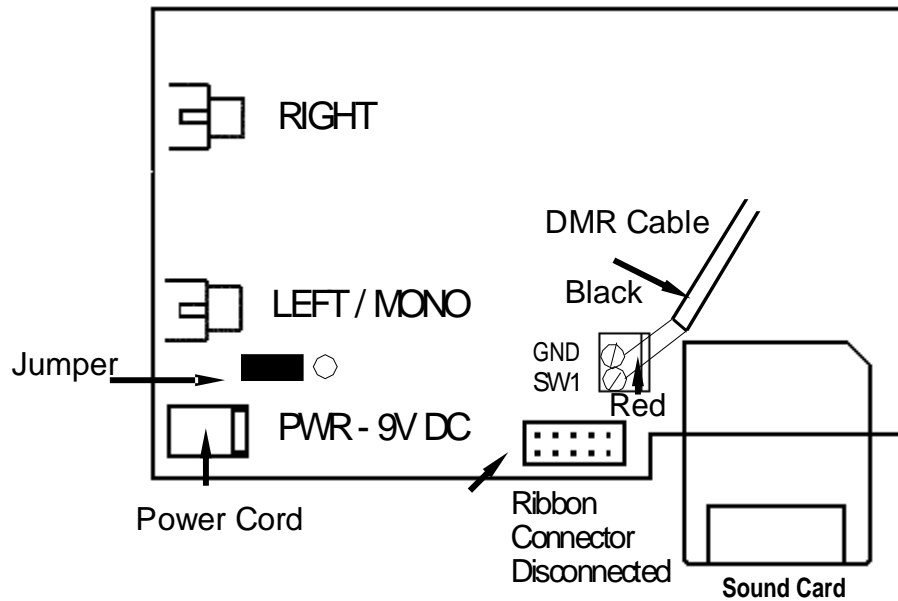
FACEPLATE DIAGRAM



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

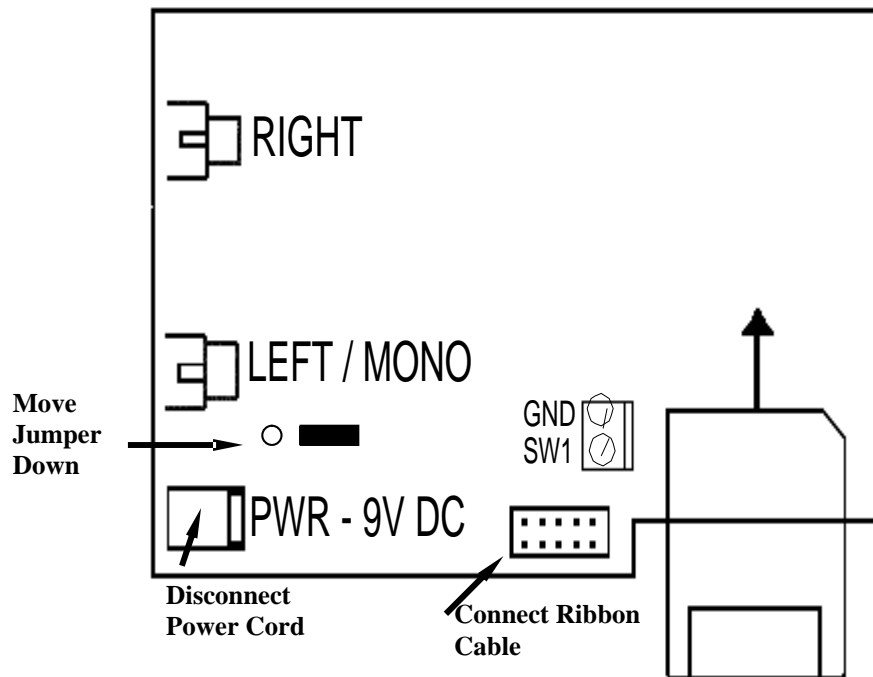
CIRCUIT BOARD DIAGRAM



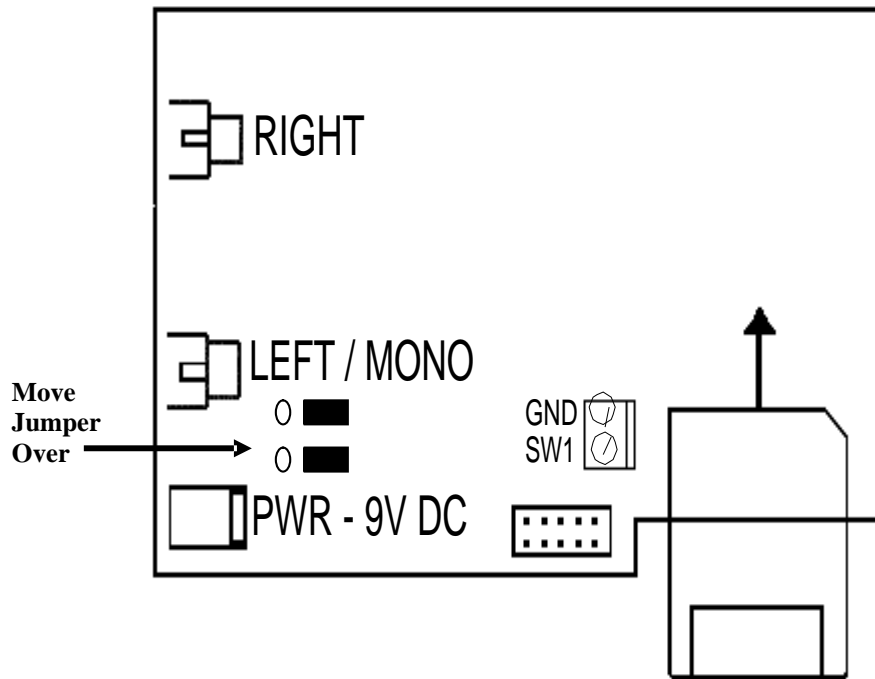
SWITCHING FROM MANUAL MODE TO AUTOMATIC MODE

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



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 phono jack.

Do not use both the ribbon cable and the 9V DC 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 9V DC – 12V DC power supply.