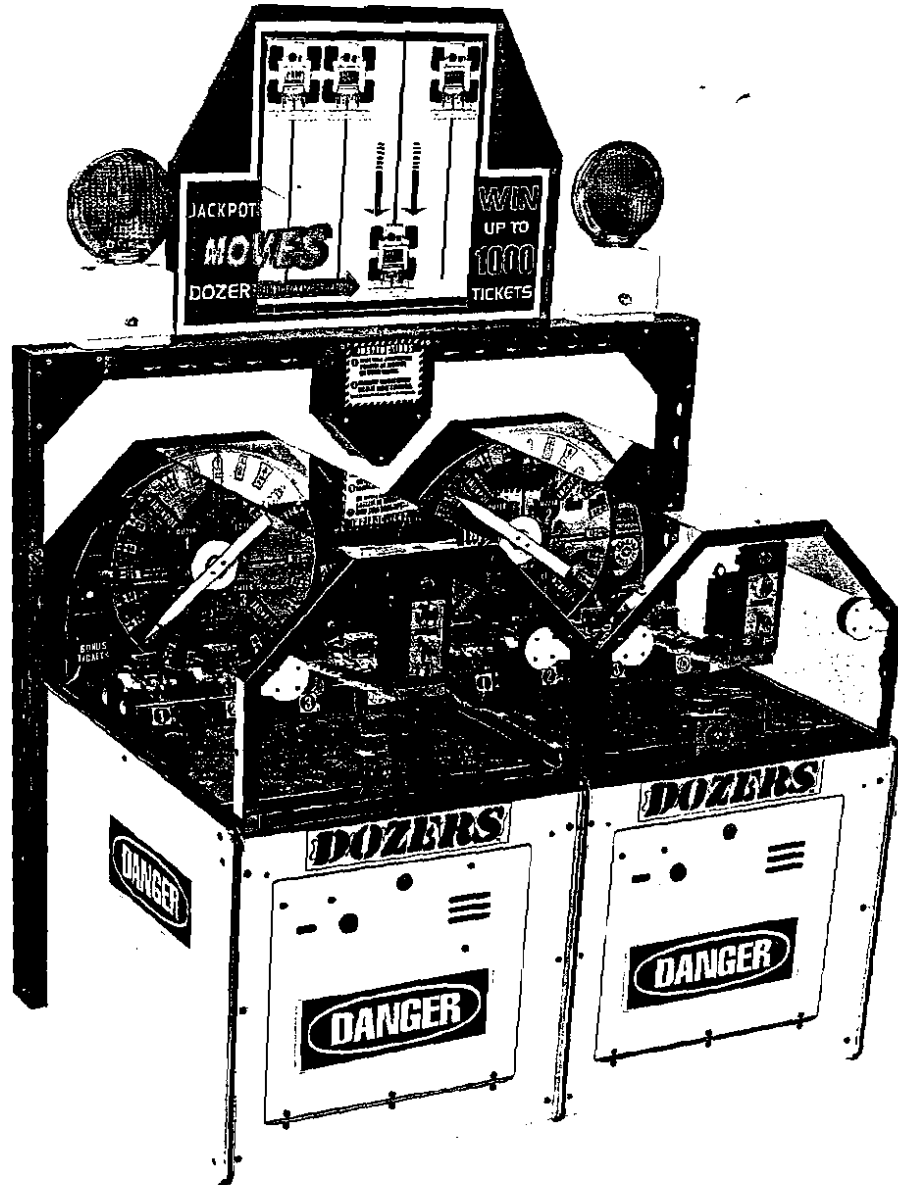


DOZERS

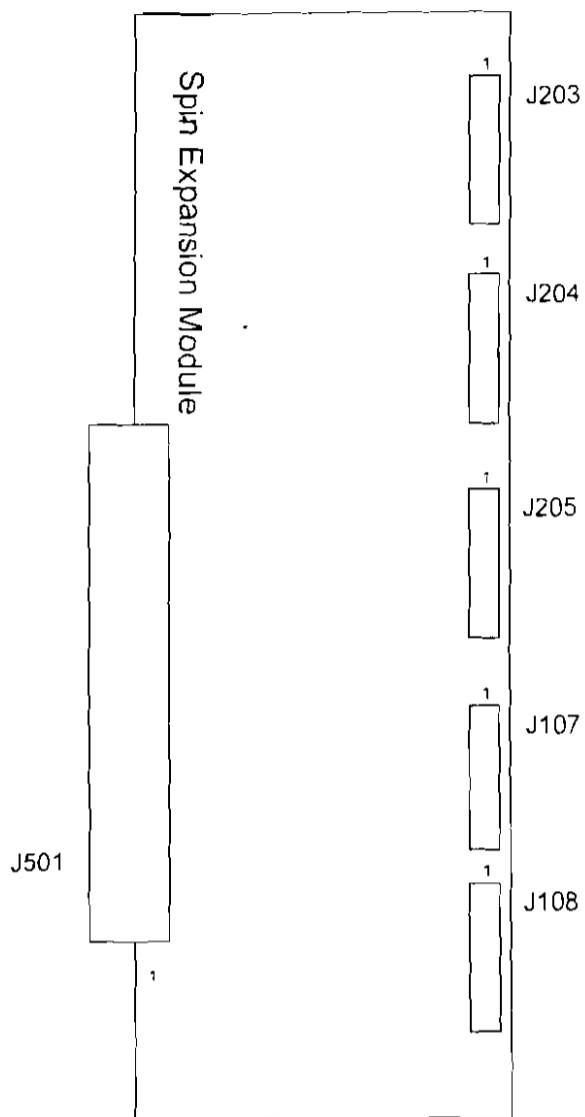


OPERATOR'S MANUAL



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Expansion Board Block Diagram:

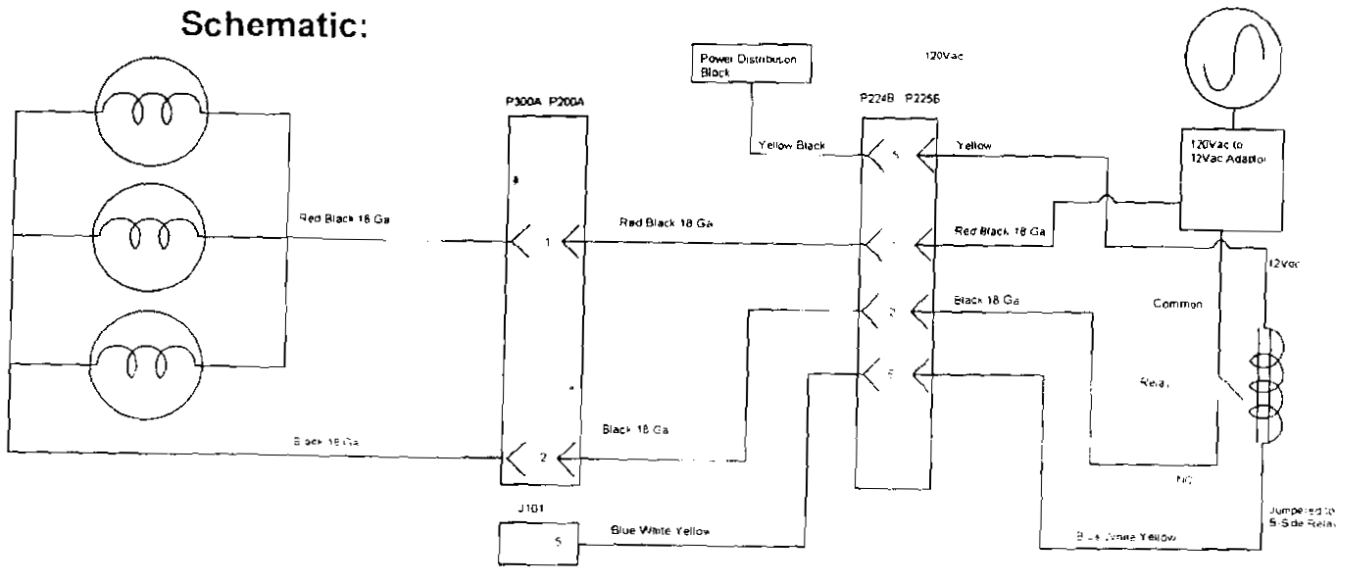


CPU - 2

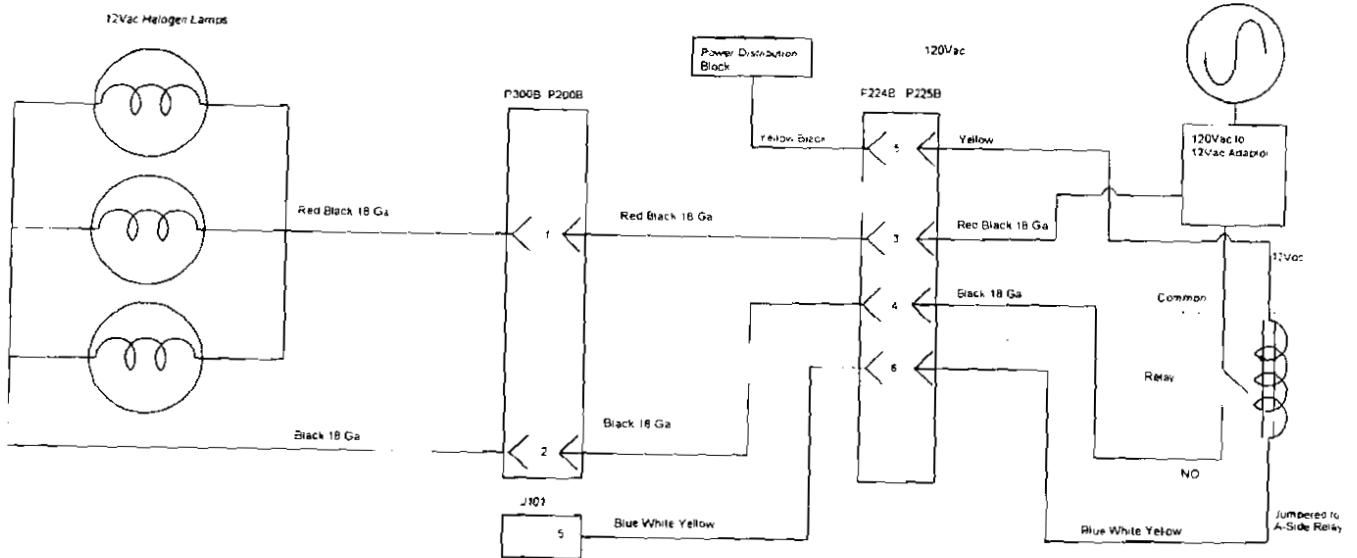
Schematic:

A-Side Halogen Lamps

Schematic:

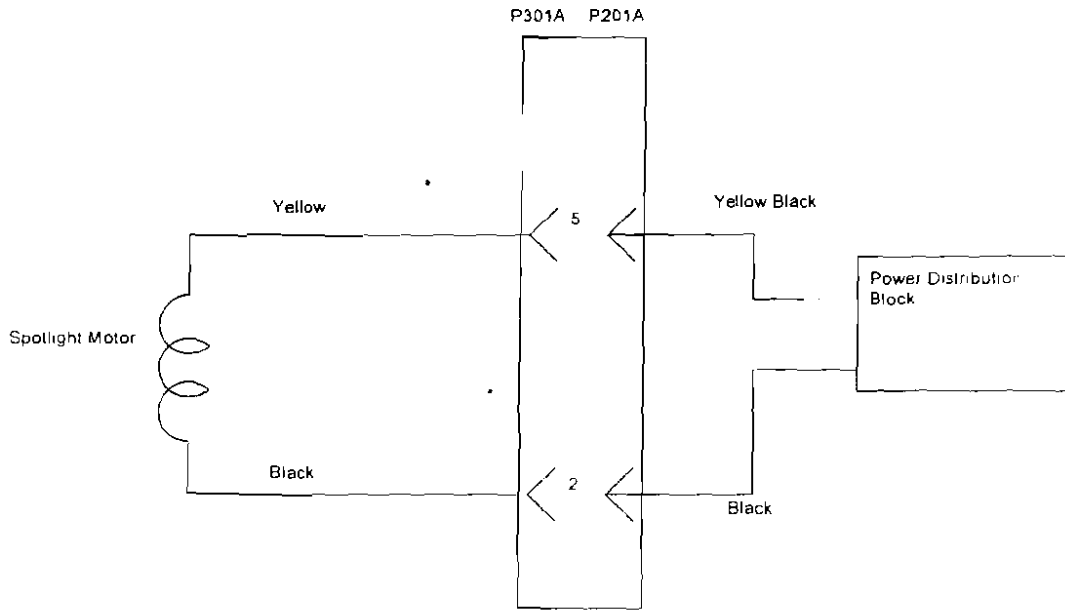


B-Side Halogen Lamps

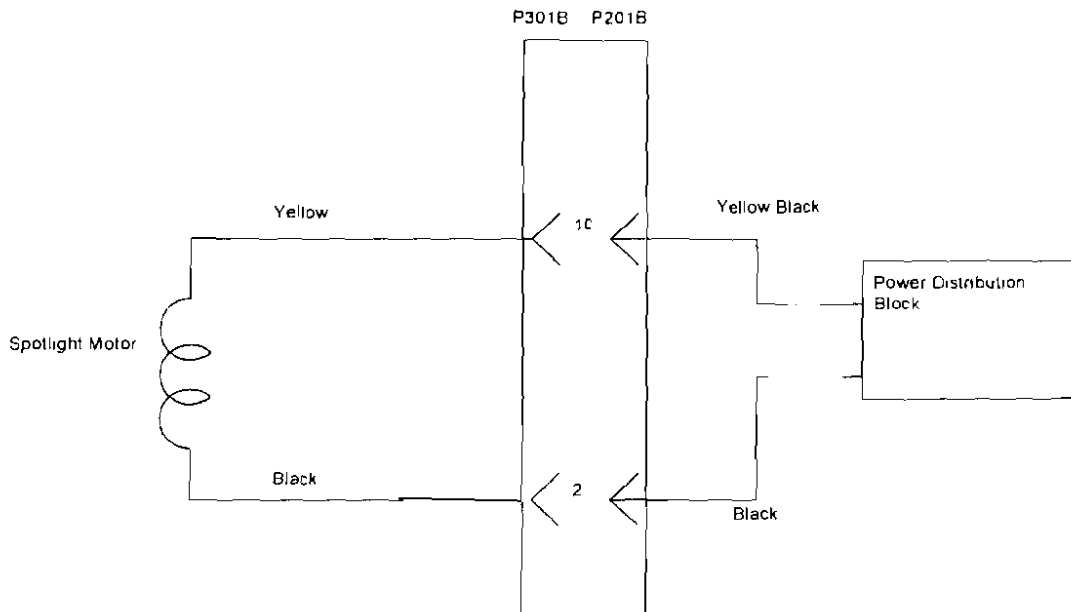


Schematic:

Spotlight Motor A-Side

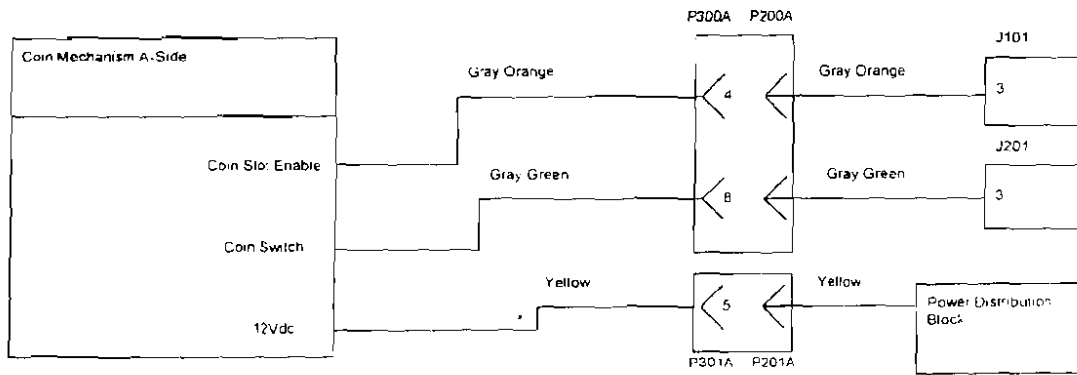


Spotlight Motor B-Side

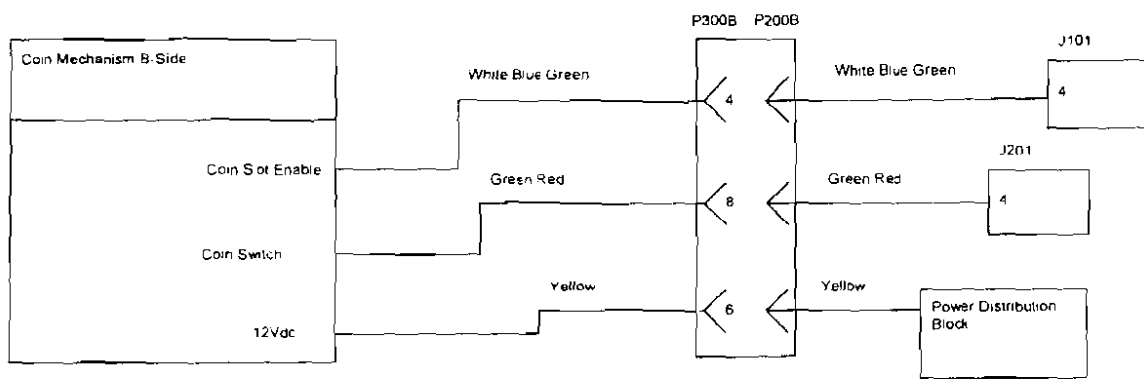


Schematic:

Coin Mechanism A-Side

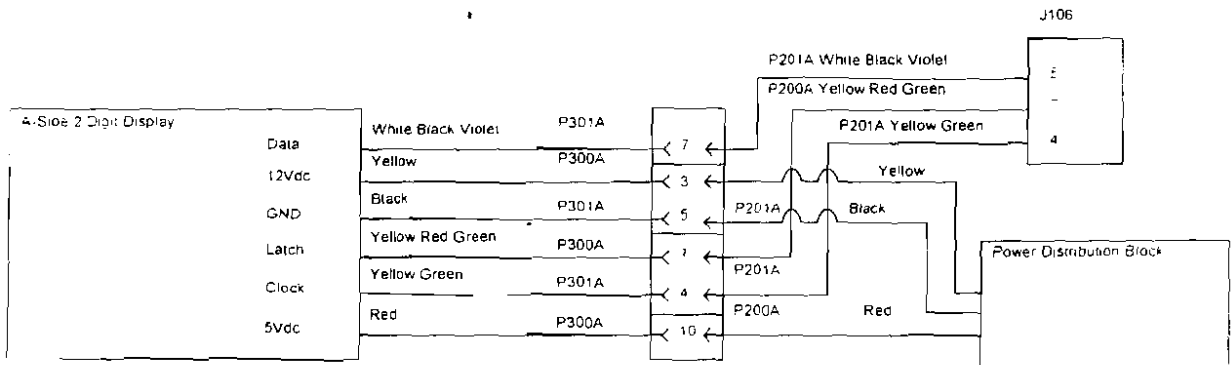


Coin Mechanism B-Side

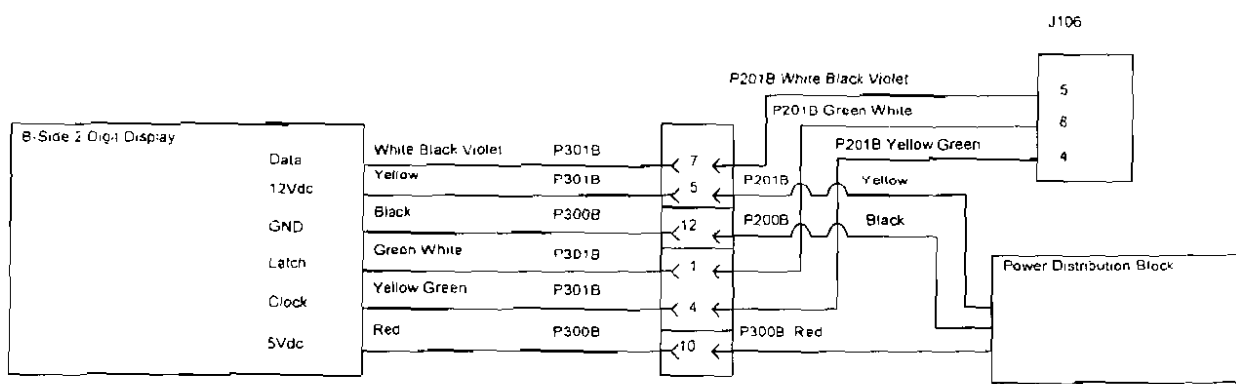


Schematic:

A-Side 2 Digit Display

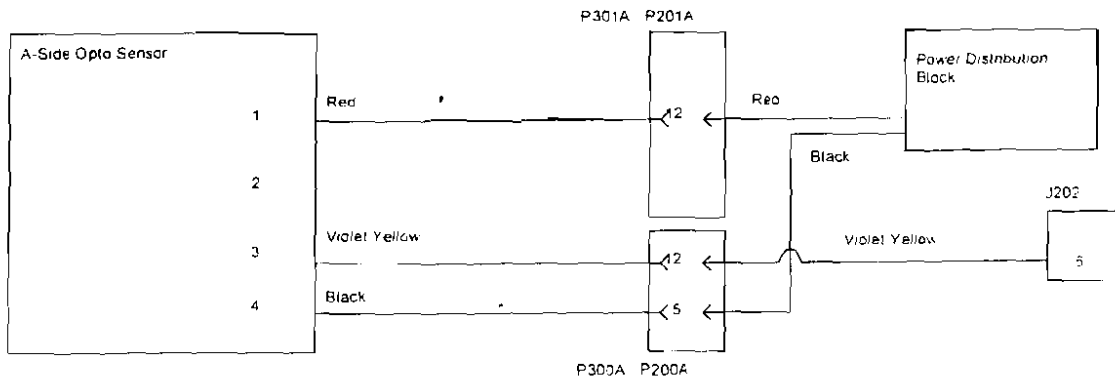


B-Side 2 Digit Display

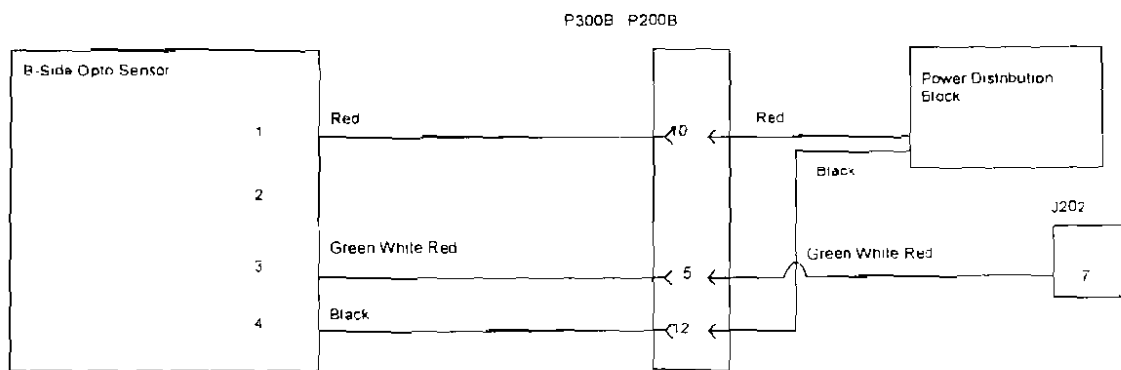


Schematic:

A-Side Opto Sensor

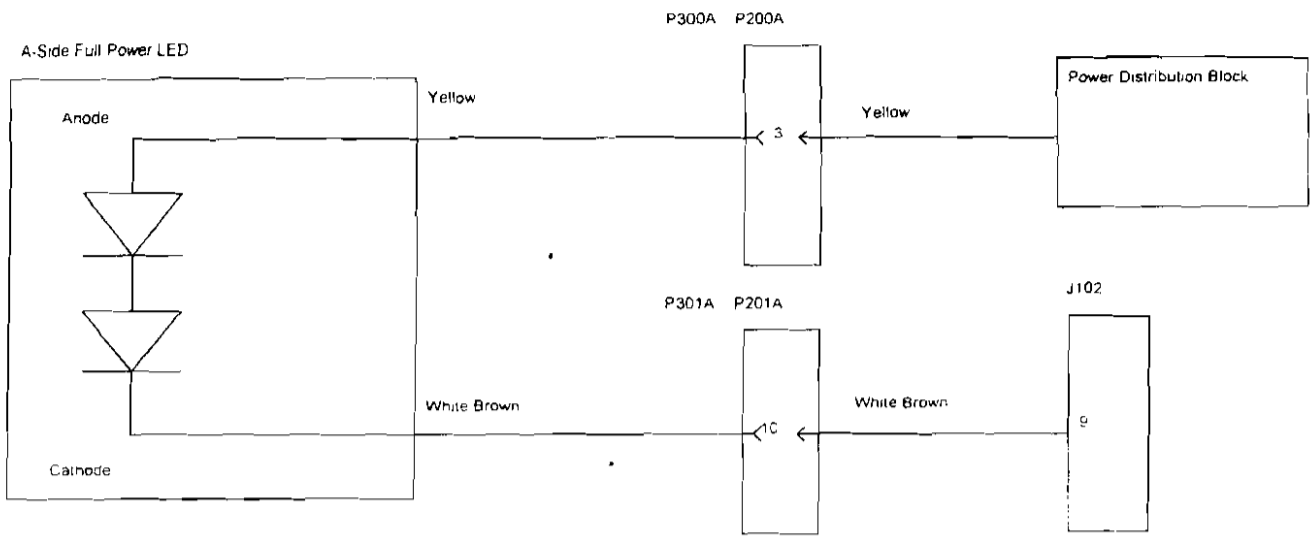


B-Side Opto Sensor

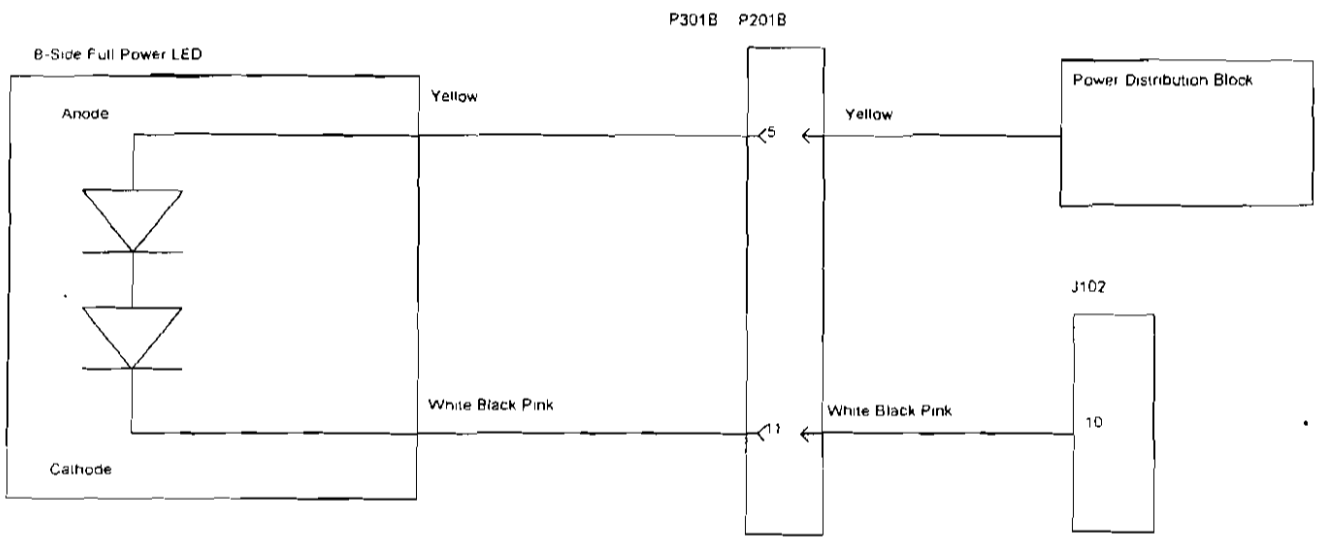


Schematic:

A-Side Full Power LED



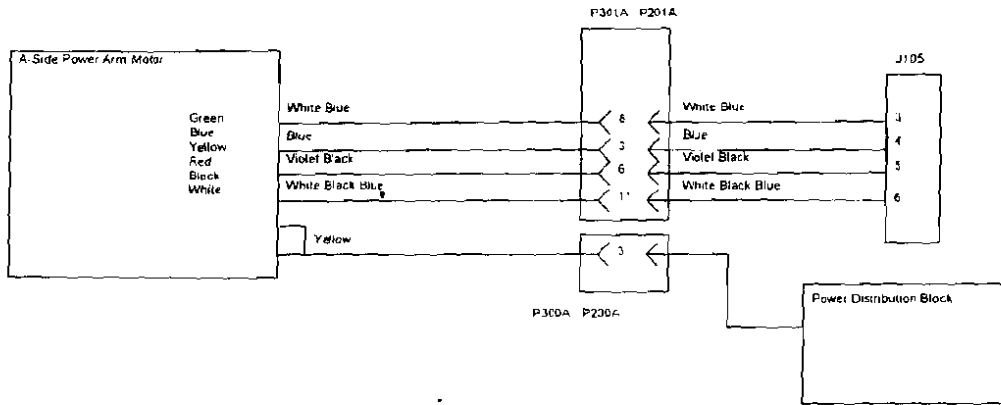
B-Side Full Power LED



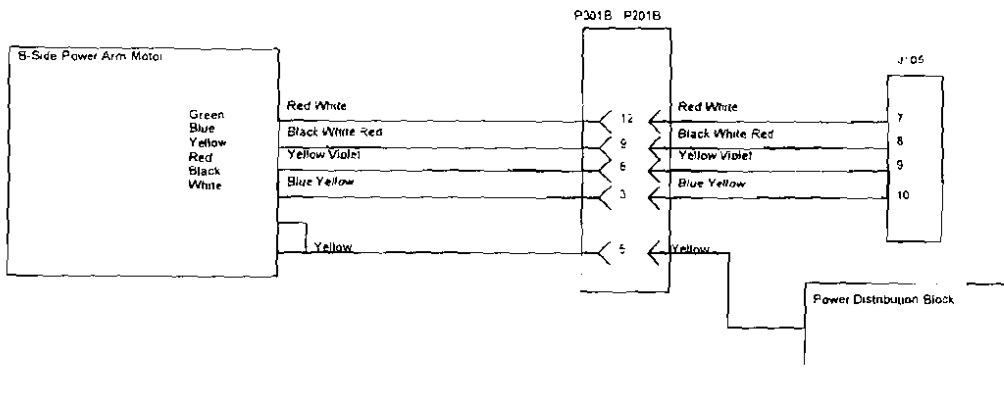
Schem - 6

Schematic:

A-Side Power Arm Motor

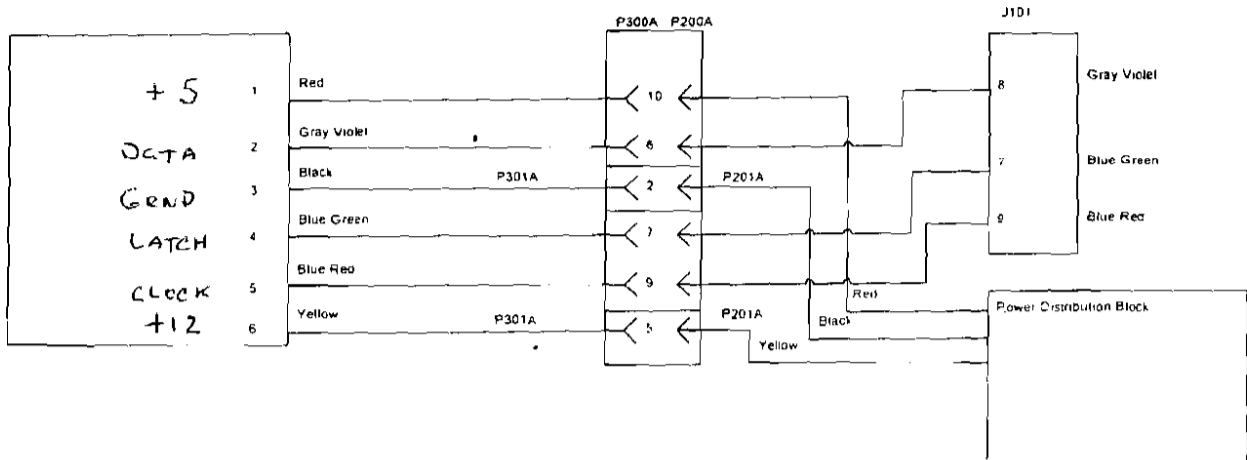


B-Side Power Arm Motor

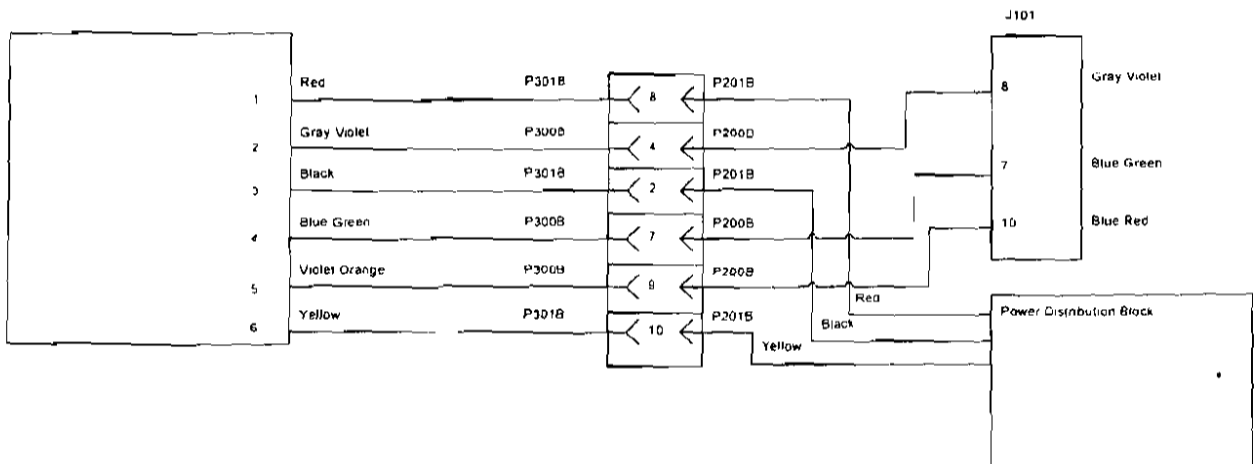


Schematic:

A-Side Power Button

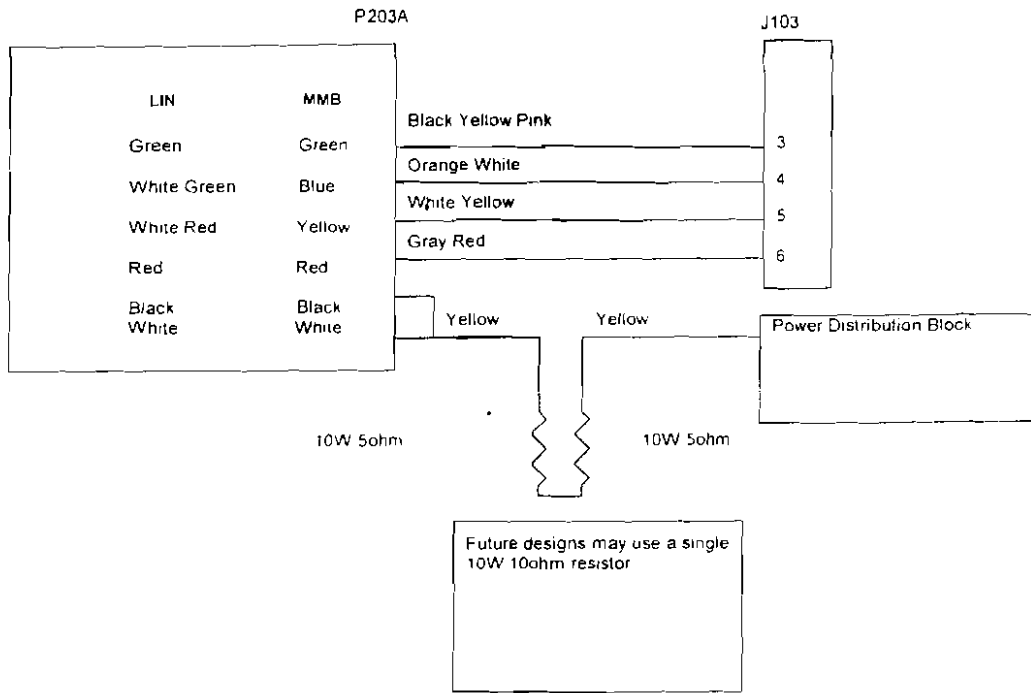


B-Side Power Button

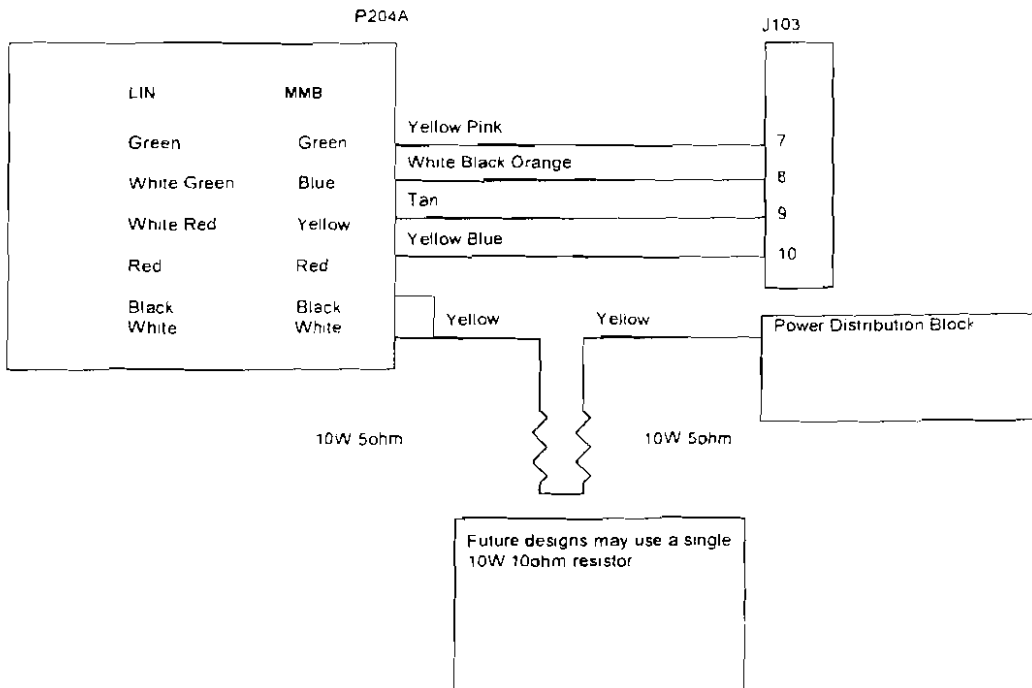


Schematic:

A-Side Tractor #1 Motor

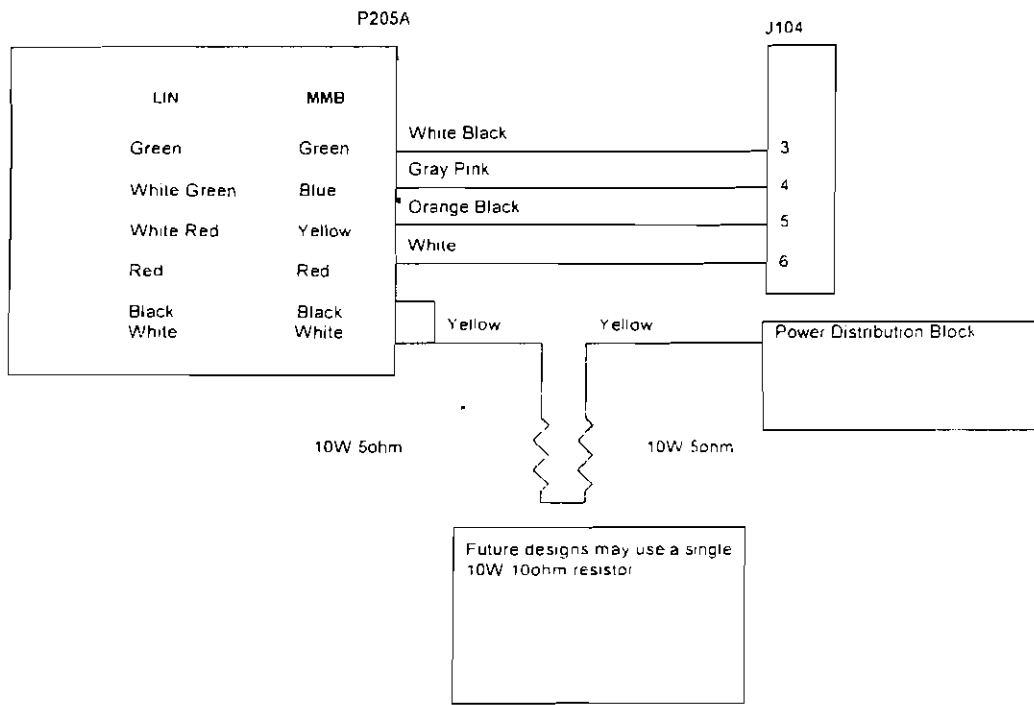


A-Side Tractor #2 Motor

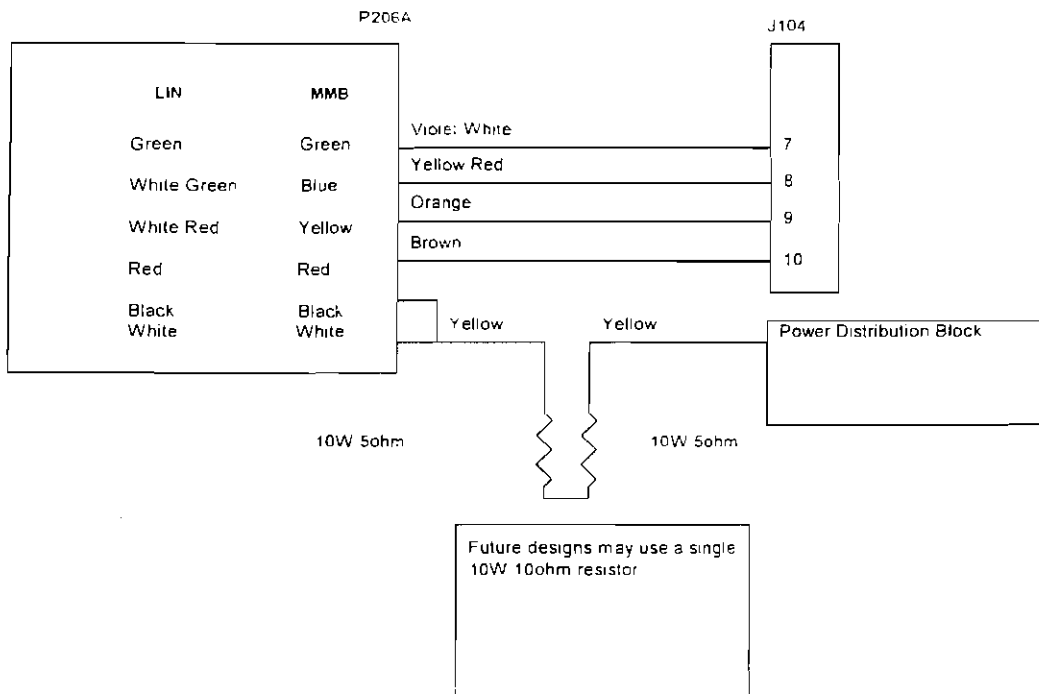


Schematic:

A-Side Tractor #3 Motor

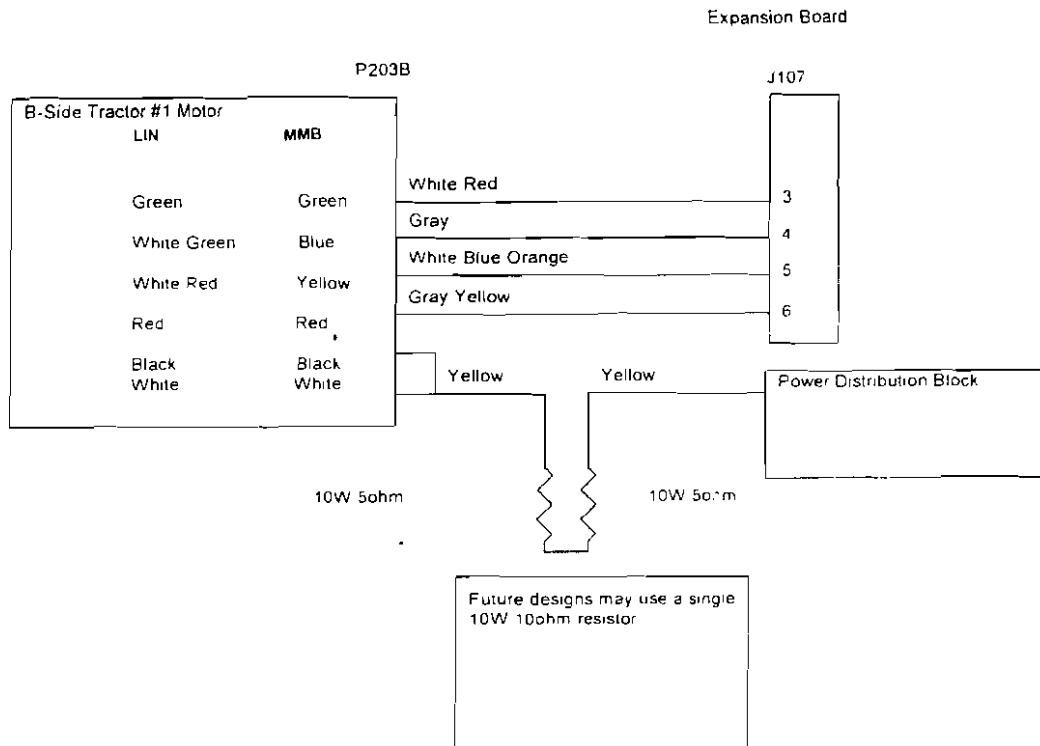


A-Side Tractor #4 Motor

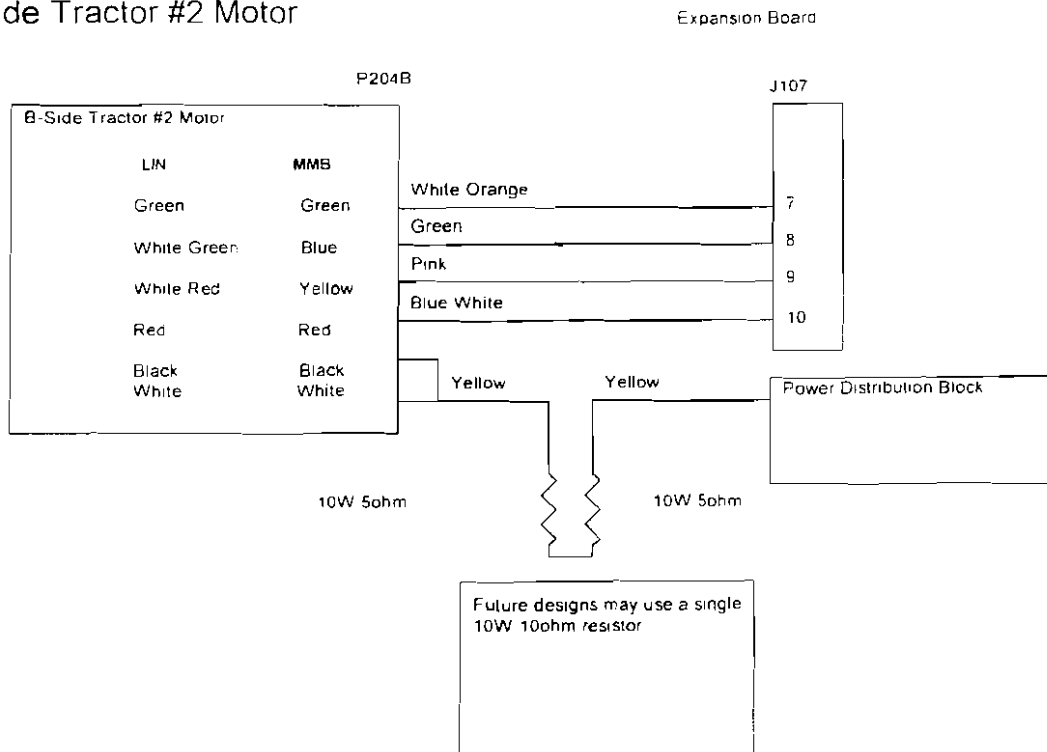


Schematic:

B-Side Tractor #1 Motor

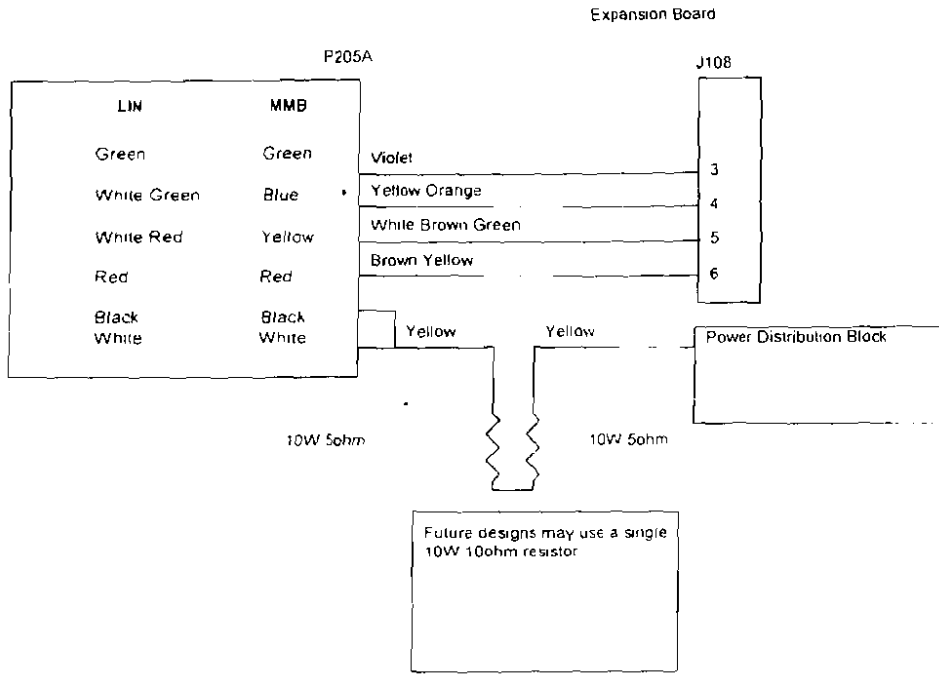


B-Side Tractor #2 Motor

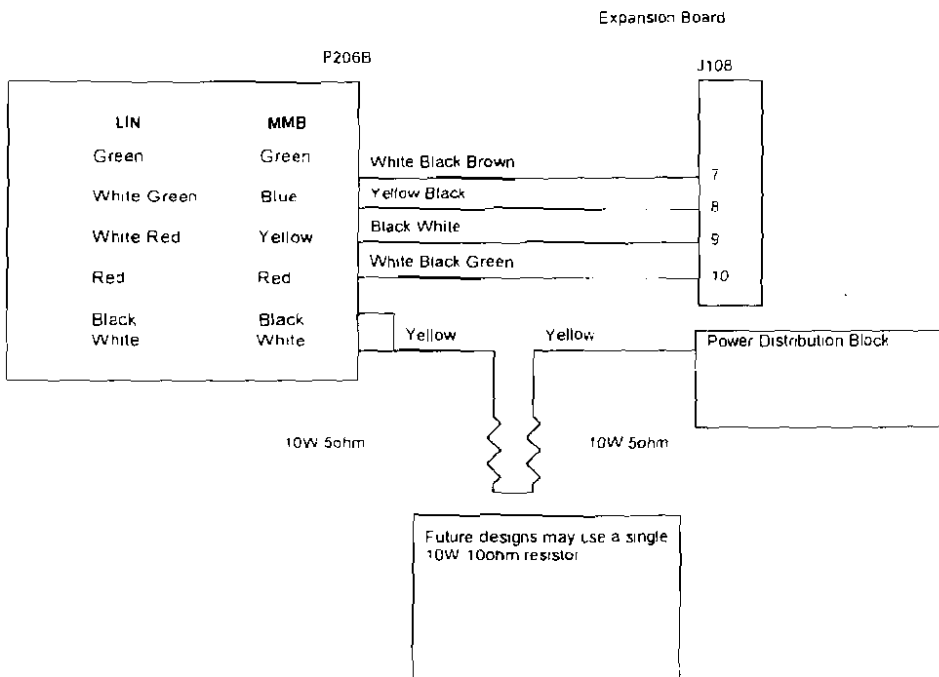


Schematic:

B-Side Tractor #3 Motor

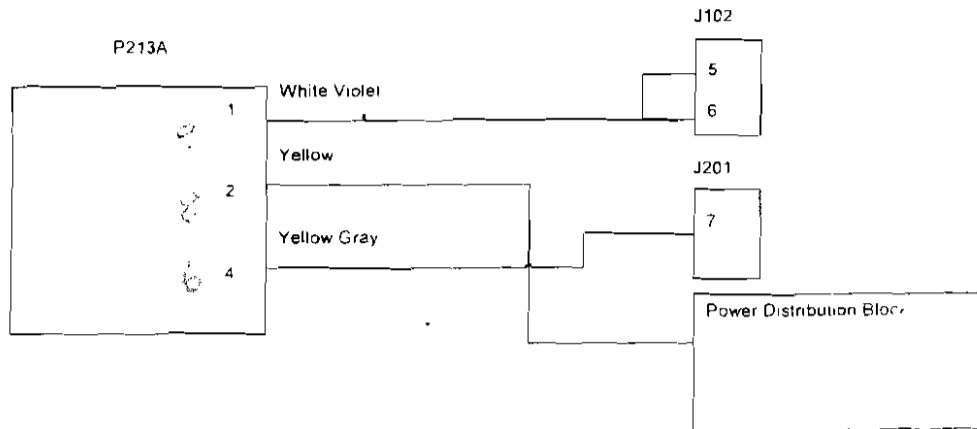


B-Side Tractor #4 Motor

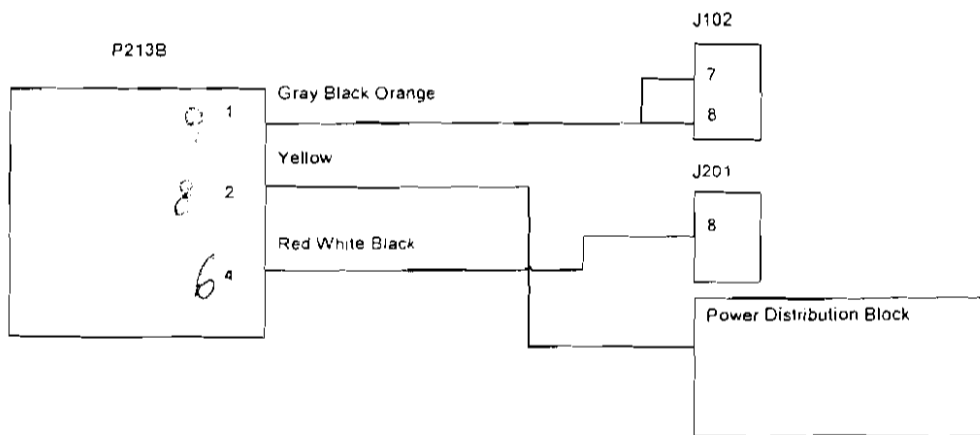


Schematic:

A-Side Hopper

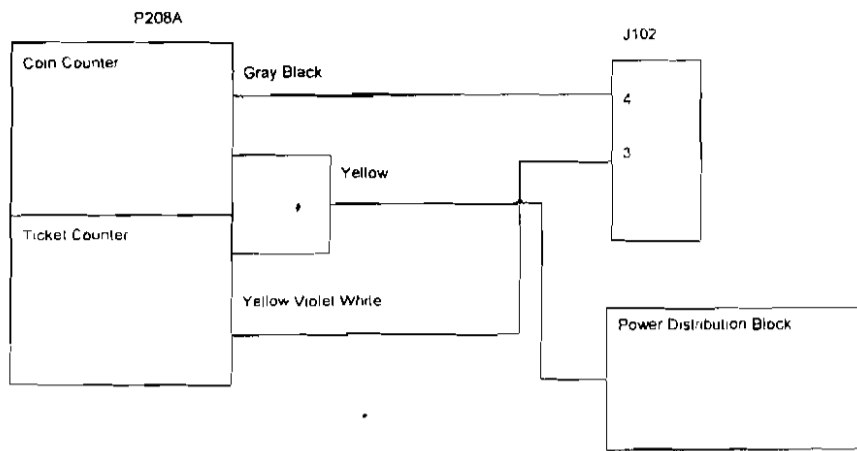


B-Side Hopper

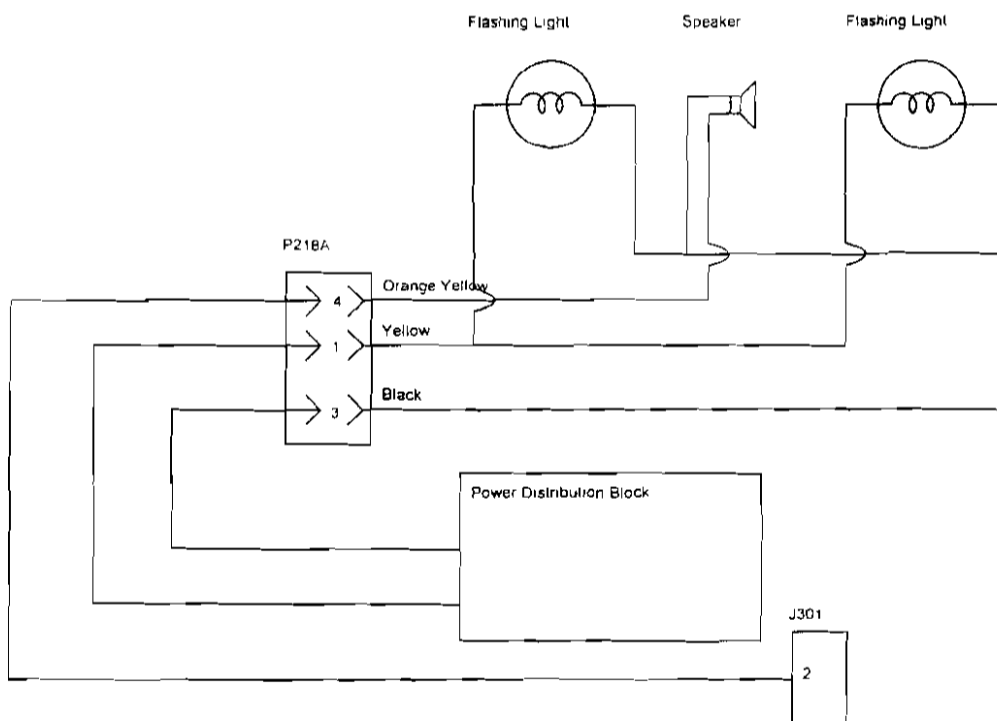


Schematic:

Counters



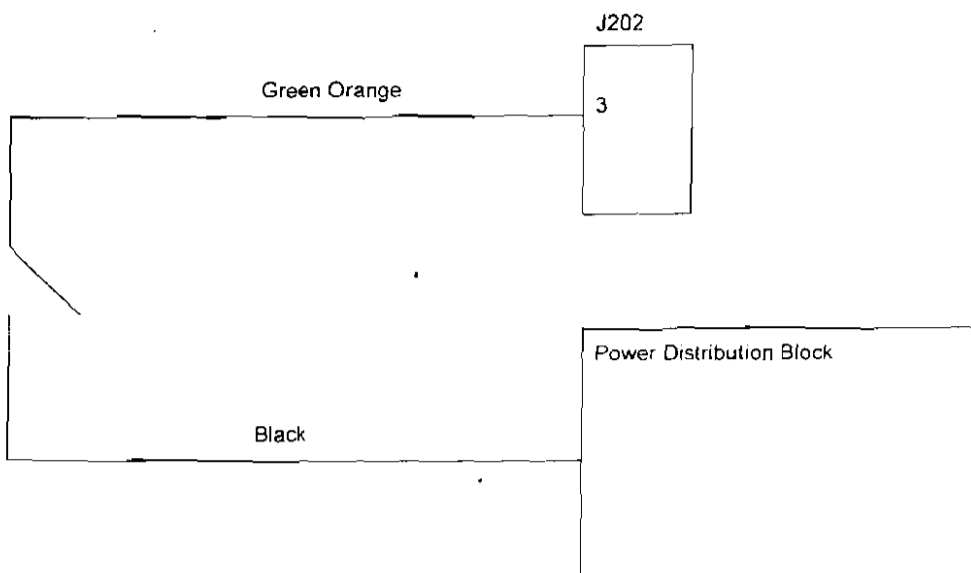
Barricade Harness



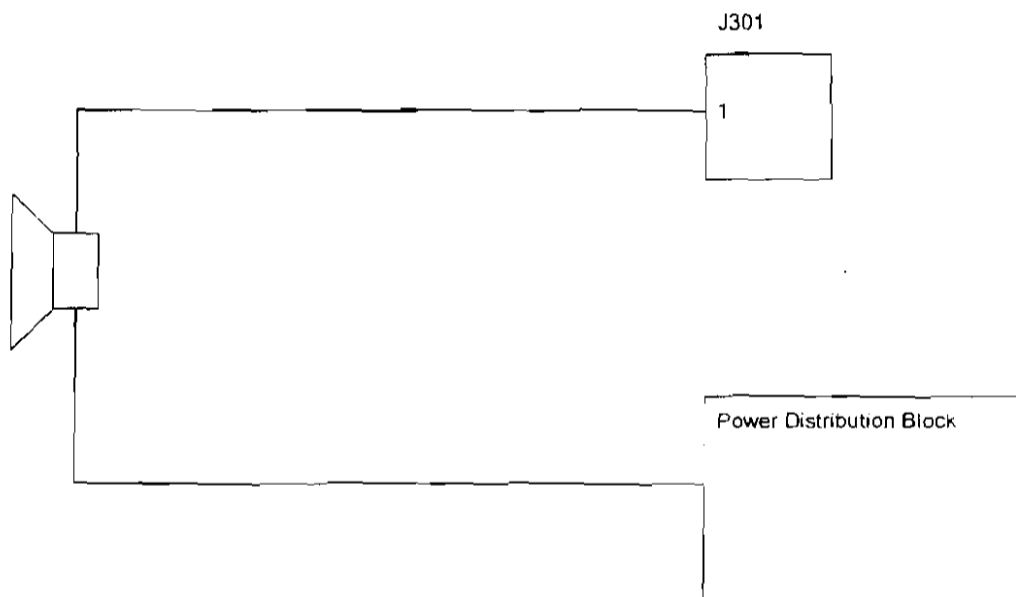
Schem - 14

Schematic:

Tilt Mechanism

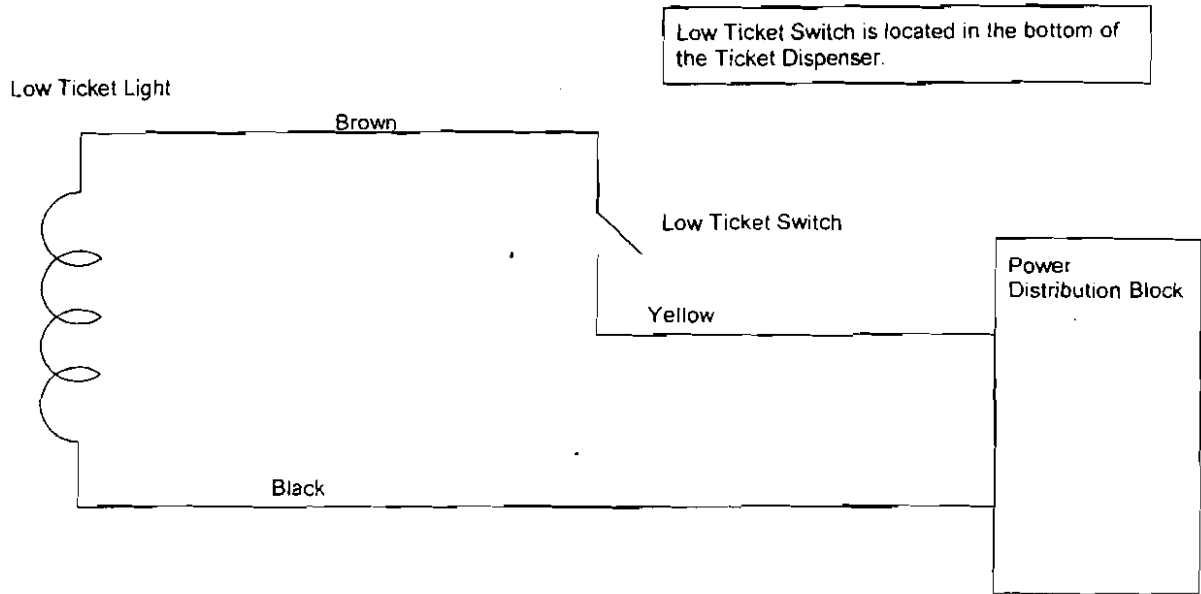


Speaker

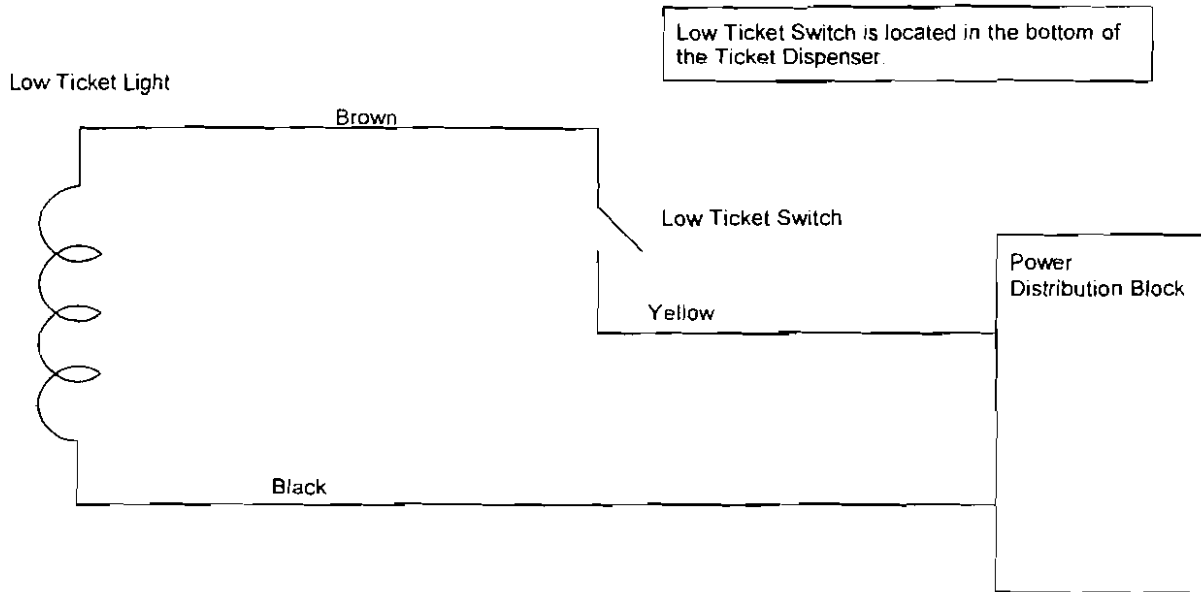


Schematic:

A-Side Low Ticket Light

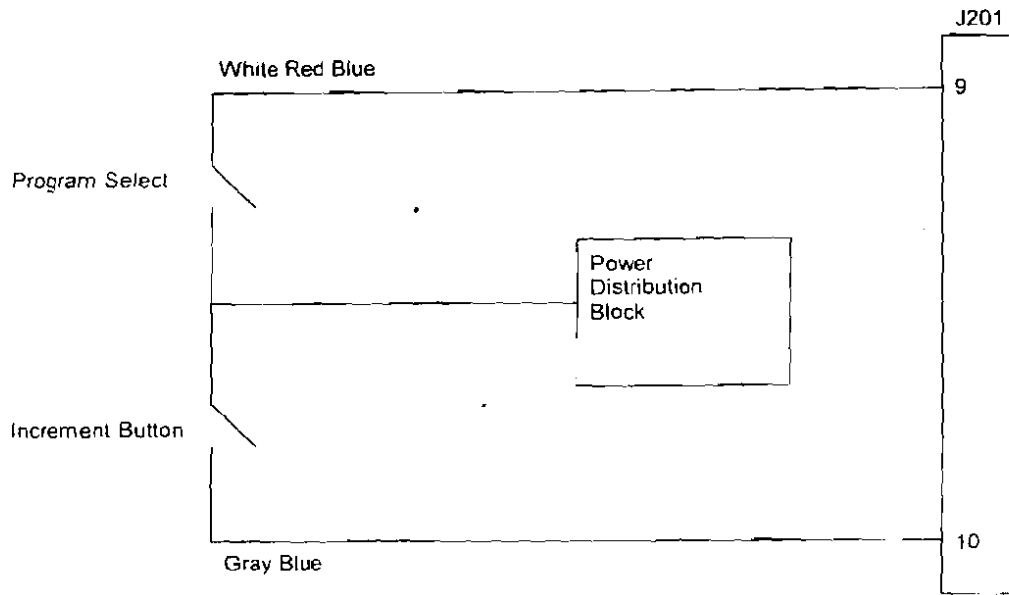


B-Side Low Ticket Light



Schematic:

Programming Switches



Warning:

DO NOT TURN GAME ON UNTIL THE FOLLOWING WARNINGS ARE READ AND UNDERSTOOD.

FAILURE TO ADHERE TO THE FOLLOWING INSTRUCTIONS WILL VOID ANY FACTORY WARRANTIES AND COULD RESULT IN DAMAGE TO THE GAME AND OR INJURY TO THE PLAYER OR TECHNICIAN.

THIS GAME SHOULD BE PLUGGED INTO A 3 WIRE GROUNDED OUTLET 115VAC 60HZ. UNLESS OTHERWISE SPECIFIED.

FCC PART 15 RULE

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J OF PART 15 OF FCC RULES.

ELECTRICAL SPECIFICATIONS

POWER CONSUMPTION	1.5 AMP 180W
LINE VOLTAGE	100-130VAC 60HZ.
CIRCUIT BREAKER	15 AMP

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Game Setup

Check shipping container for the following components prior to setup:

Barricade

Barricade sign

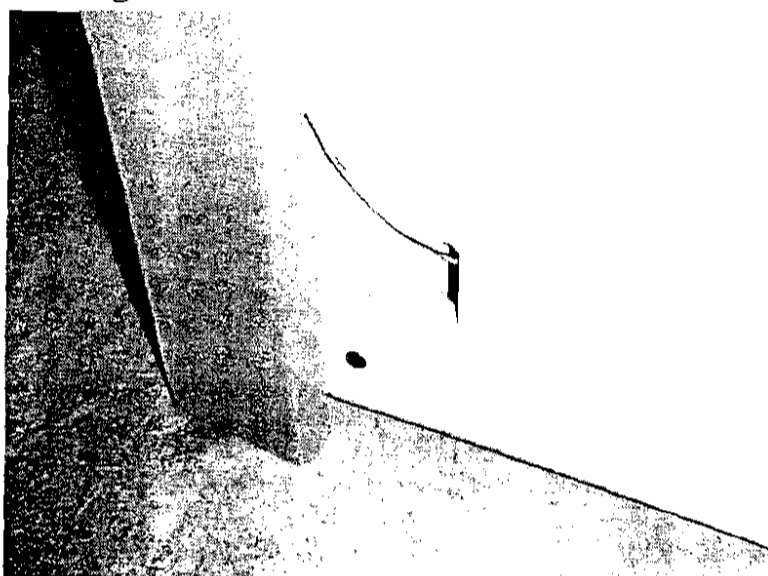
2) Barricade Lights with bolts

Barricade Installation (3 Steps)

Step 1:

Install barricade on to game

Remove screws from each side of game. The screws will be sticking out of side of game.



Screws will be pre-installed and will need to be removed prior to installation of barricade

Position barricade so that the 4 pin connector is on the side of the game with the slot for the connector.

Insert the connector through the slot. It is

not necessary to connect the connectors inside the game at this point, this will be done after the screws are installed.

Insert screws in the holes to the front of the barricade and align with holes in side of game. The upper and lower holes are the only two that need to be used. Perform this step for both sides.

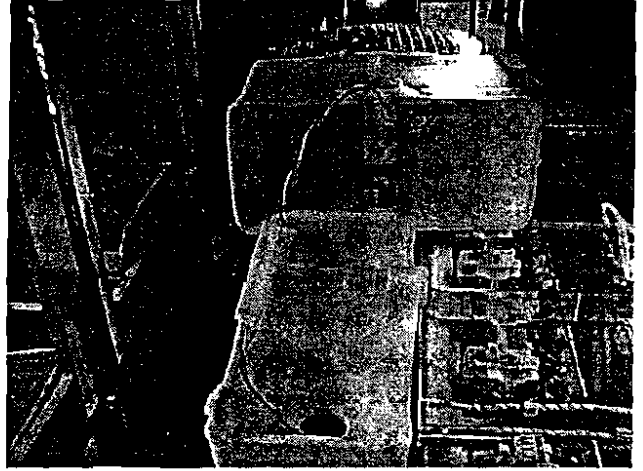
Tighten screws being careful not to overtighten.



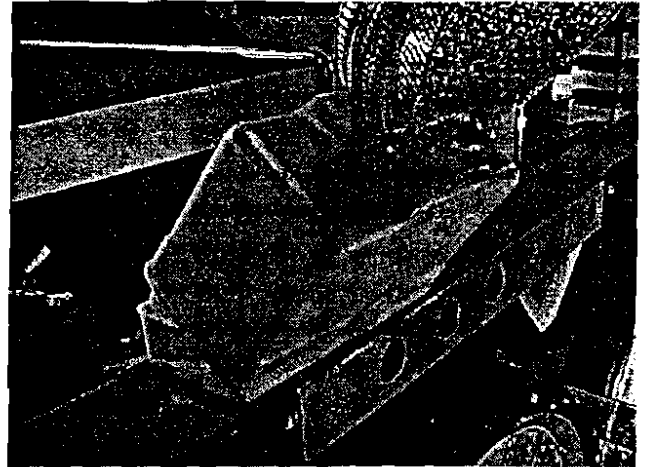
Step 2:

Install lights on barricade.

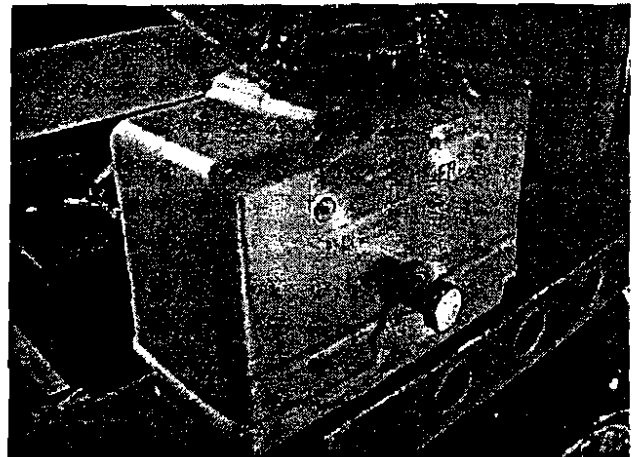
Connect the 2 pin male and female connectors. Make sure yellow is connecting to yellow and black is connecting to black.



Install light by hooking the hole in the front with the protruding boss on the front of the base then roll back so that the two catches in the back of the base catch with the holes on the light case.



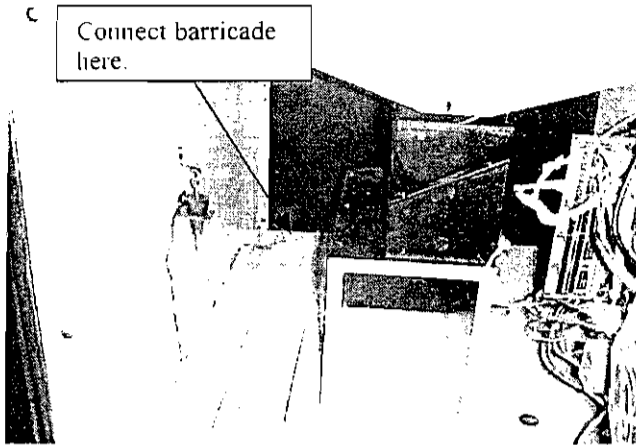
Install bolt provided.



Step 3:

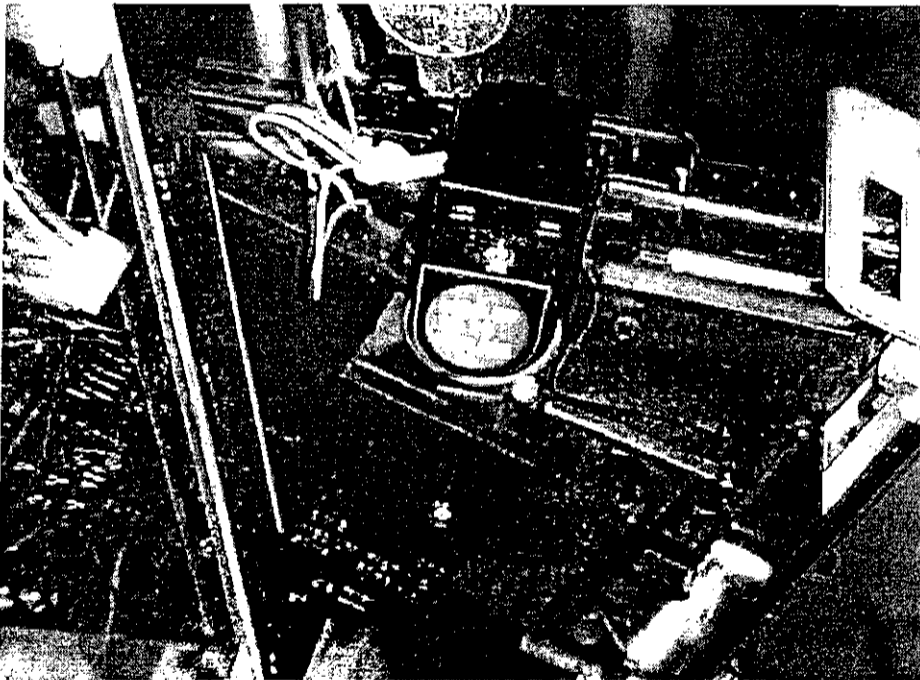
Install Dozer Sign.

Sign is installed in same screw holes used for the center speaker housing on the back of the barricade. Remove the screws from the back side of speaker housing only. Put sign in place and replace screws.

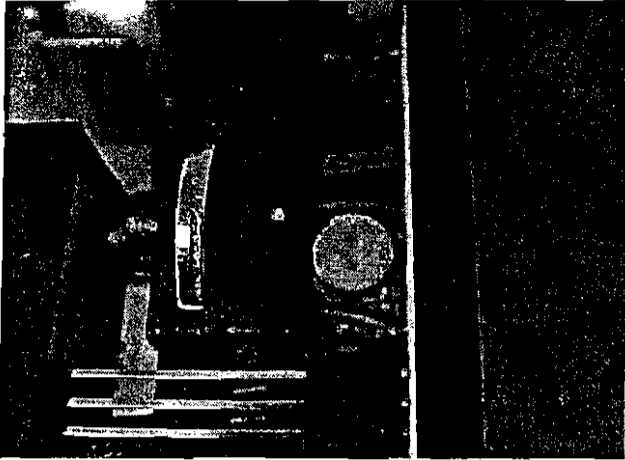


Finish by connecting wire from barricade to main harness.

Coin Mechanism (One step)



Lift up the holder for the coin comparator and insert the type token used in your establishment.



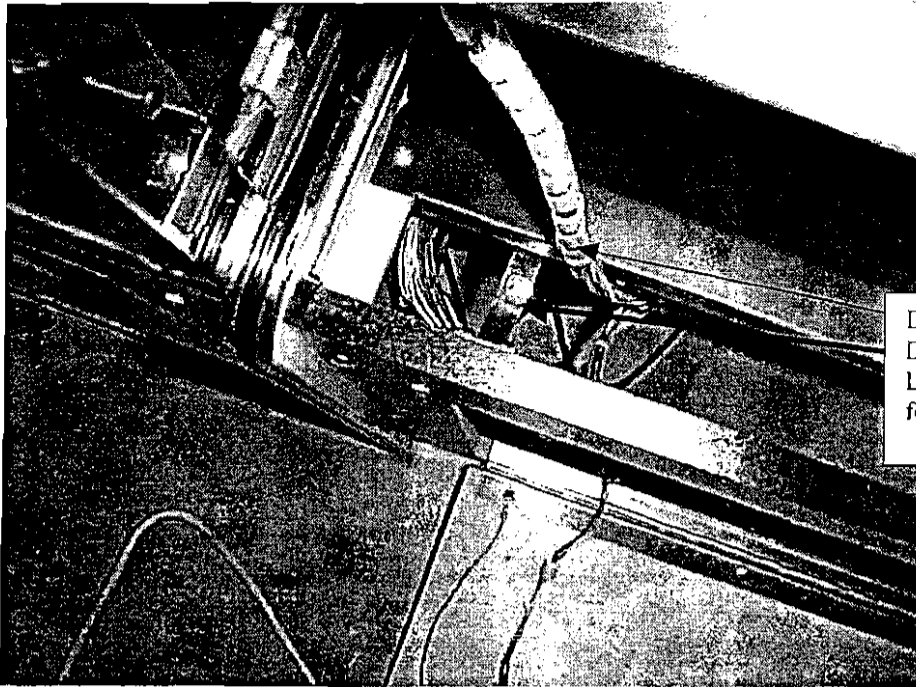
Locate tuning pot on back of coin mech. Adjust pot clockwise to slacken sensitivity or counterclockwise for strict sensitivity.

Replace coin mech and lock into place.

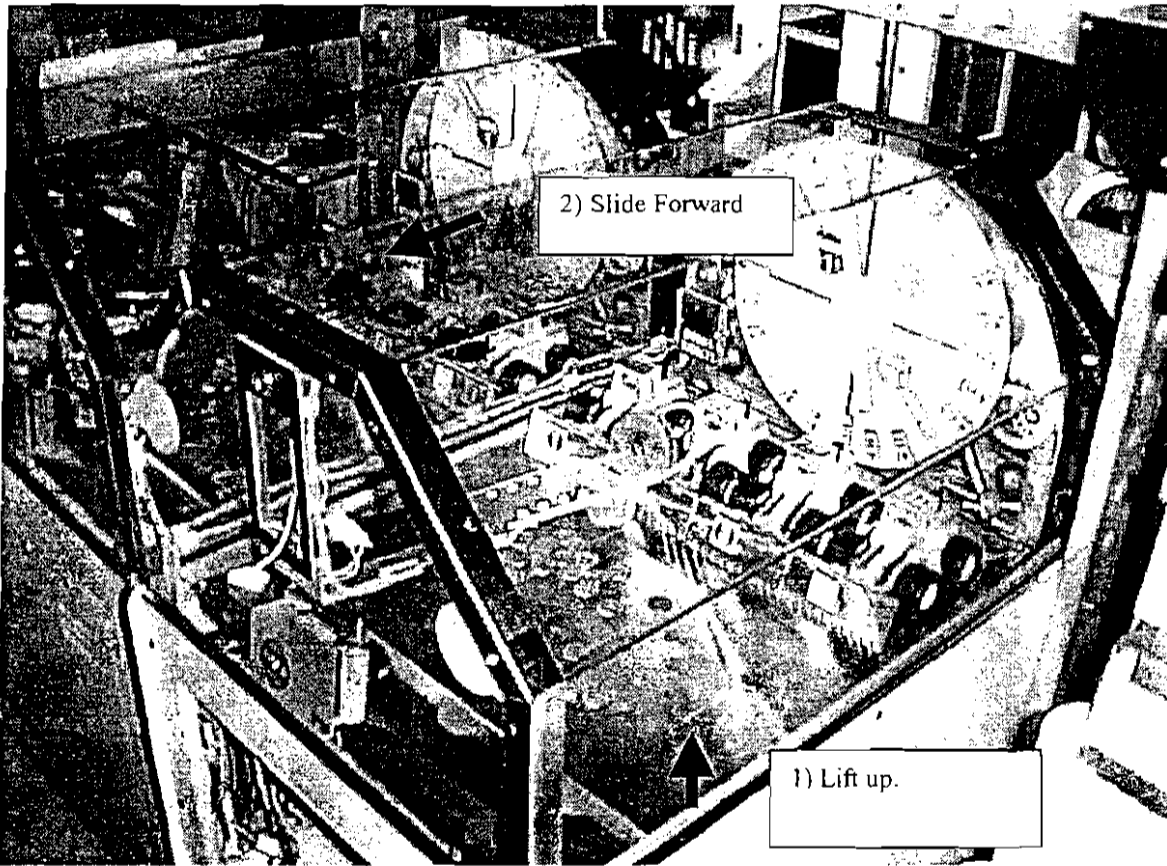
Seeding the game:

Each side should be seeded with at least 500 coins. A good guage to use would be to play a couple of coins to see the stop point of the dozers and seed to that point on the table.

To seed the game locate the latches that lock the tops down and unlatch. Disconnect the top harness from the main harness. Lift the top up and then forward to disengage the rear latch. Lift straight up to remove. It is not necessary to completely remove the top to seed the game but do not lift the front of the top to high in order to avoid bending the back latch.



Disconnect harness.
Disengage latches
Lift and pull top
forward

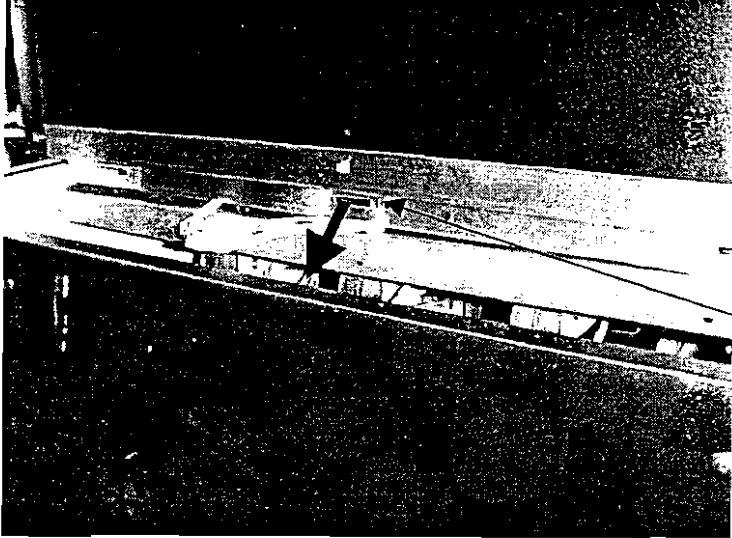


2) Slide Forward

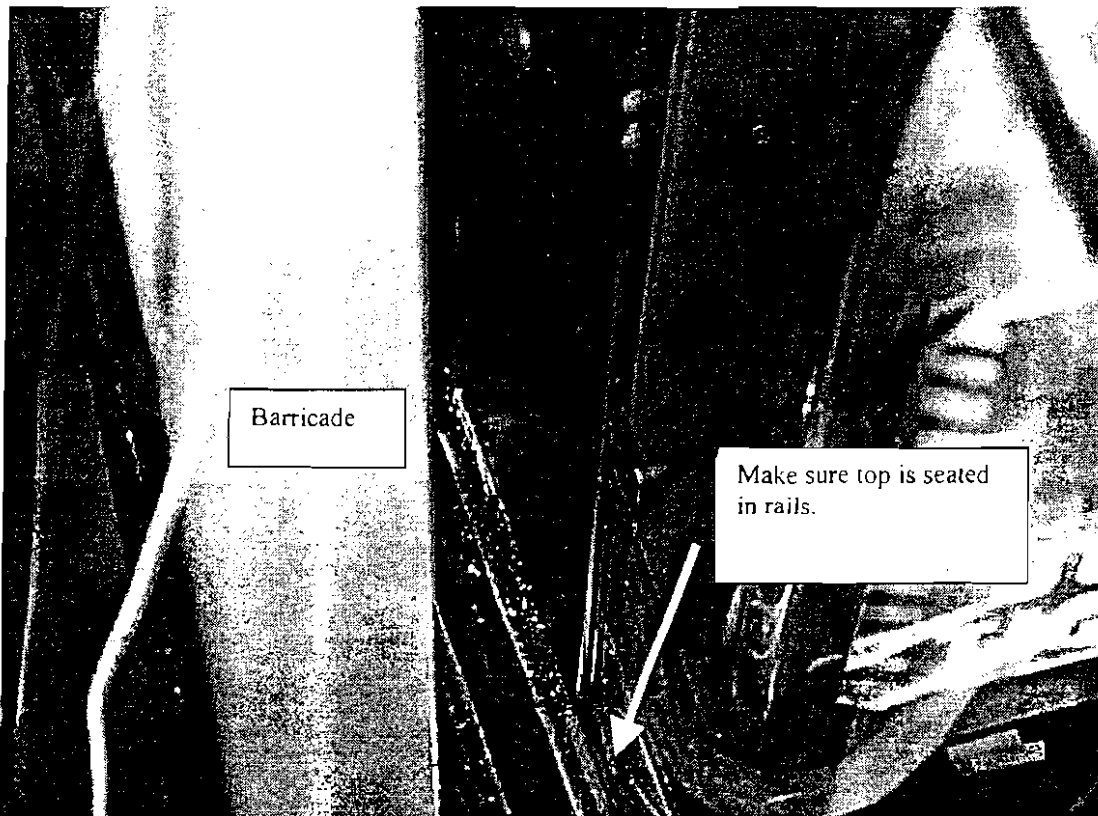
1) Lift up.

Replacing Top:

Hold front of top up at a slight angle.



Align hole with bracket on dozer back panel. Slide top back until it stops and lower the front. Latch top and lock door.



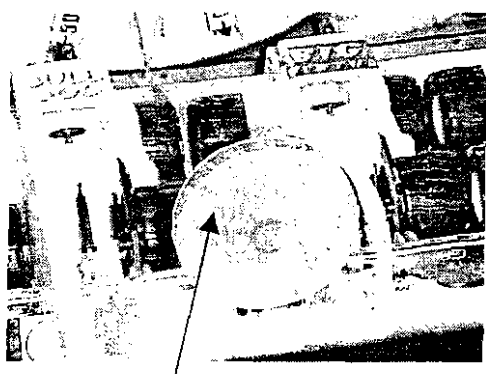
Barricade

Make sure top is seated in rails.

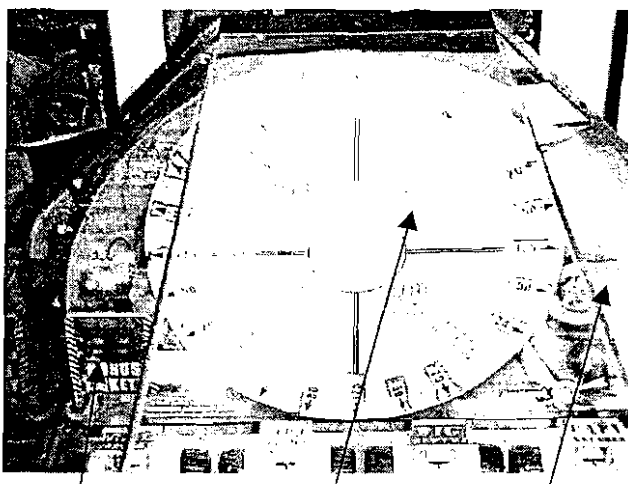
Power up:

The power cord is located in the right cabinet as you face the game. There is a square hole notched out in the bottom of the game at the back right corner. Pull the power cord through this notch and plug into a suitable 3 wire grounded 110VAC outlet.

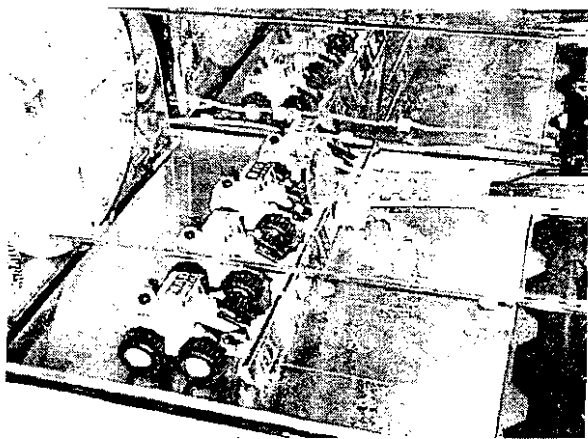
The On/Off switch is located to the front of the dozer on the lower right side through a round hole. Turn the switch on and the game should initialize.



Power button will begin to flash after a few seconds.



Pointer will begin to spin.
Display will display the Software version and begin to flash.
Jackpot LED will flash every time the pointer passes a Jackpot area.



Dozers will move back. If dozers are already in the back position there will be a noise as the motors attempt to move the dozers back. This noise is normal and should cause no concern. It should last no longer than 5 seconds or so.

Playing the Game:

The object of the game is to win tickets. There are two ways this can be accomplished. 1) Push coins off of the table. 2) Hit a ticket area on the back board.

The coin drop should be timed so that when the coin hits the power button the pointer stops on a Jackpot or ticket value.

Pusher:

As stated above the game can either be played as a pusher or the player can choose to shoot for tickets. Either way it is up to the player.

The backboard is separated into 4 quadrants. Each quadrant is associated with a dozer on the playfield. When the pointer stops in a given quadrant all four dozers will move forward and the dozer associated with the quadrant that was hit will move a little further increasing the chance that that dozer will push coins off the table.

The player should determine which dozer stands a better chance of pushing coins off and try to get the pointer to stop in that quadrant. Ultimately if a Jackpot is hit, 50 bonus tickets are payed out, all dozers move forward as before, the dozer associated with quadrant whose jackpot was hit move to the end of the table pushing most of the coins off, and each coin pushed will pay 5 tickets each.

In order for a player to hit the Jackpot, the pointer must land on the Jackpot area while the Jackpot LED is lit. The LED lights each time the pointer passes through a jackpot area.

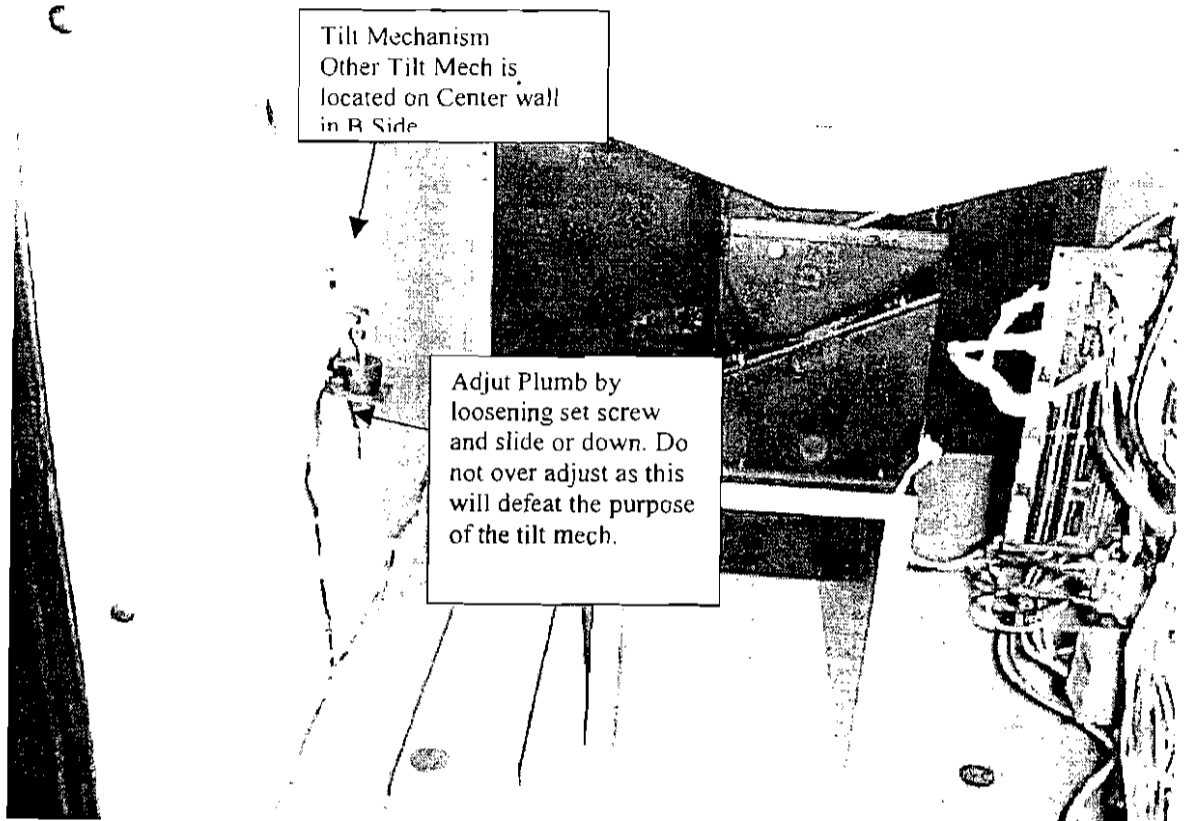
Tickets:

If several Jackpots have been hit and the playfield is bare the player should play for tickets. This will build the playfield back up so it can be played as a pusher again. To play for the tickets the coin drop should be timed to hit any of the many tick areas marked on the backboard. If the 125 ticket value is hit the display will display "12" since it is only a two digit display. If any of the other ticket values, including the Jackpot, is hit the ticket value will be displayed in the 2 Digit Display.

Tilt:

If the machine is bumped or tipped during play the tilt mechanism will be activated and both the A and B side will tilt simultaneously causing the hoppers to empty without giving tickets.

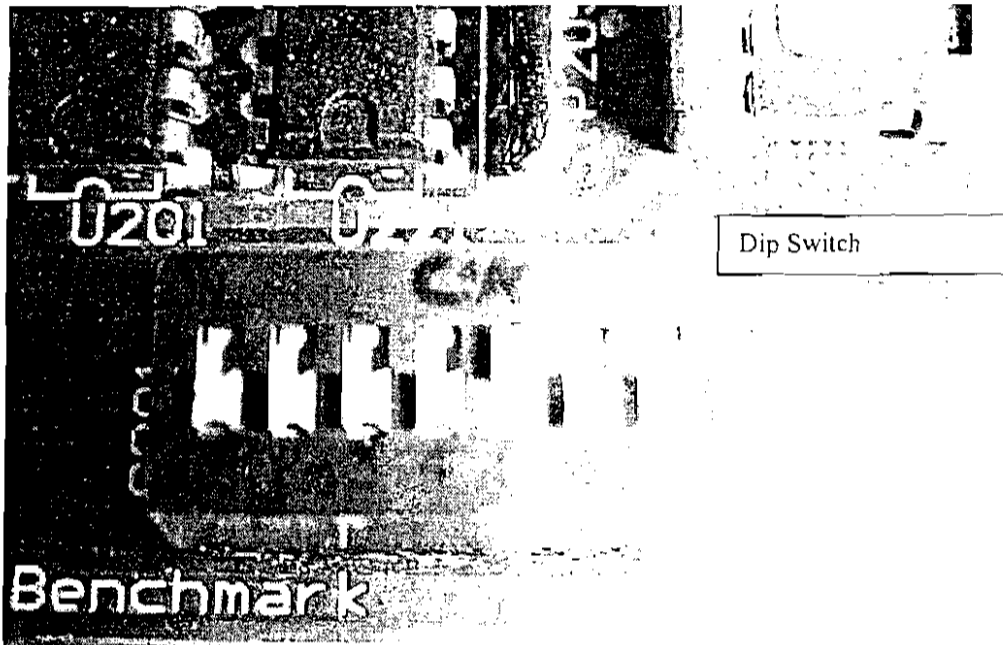
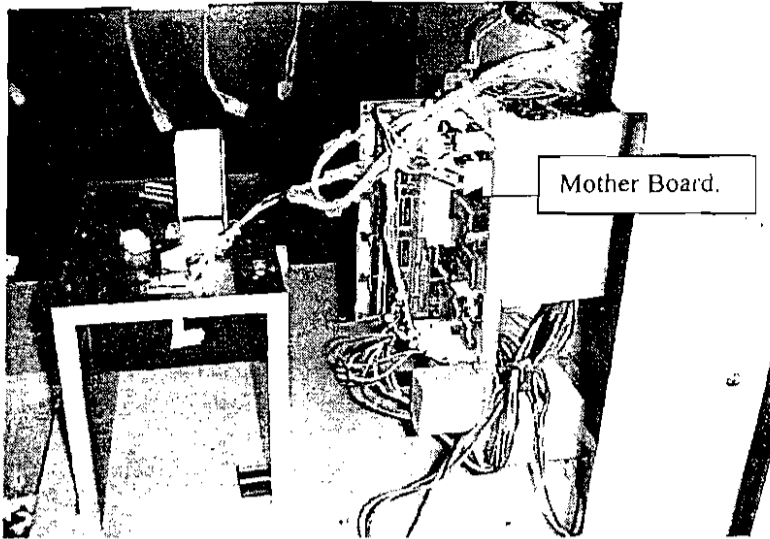
The tilt mechanism sensitivity is adjustable by moving the plumb up or down.



Game Programming:

Dip Switch:

The Dip Switch is located on the Mother Board.



At the time of the writing of this manual the only available option is switch number 6. In the on position the attract mode is on. In the Off position the attract mode is off. All other switches are in the Off position.

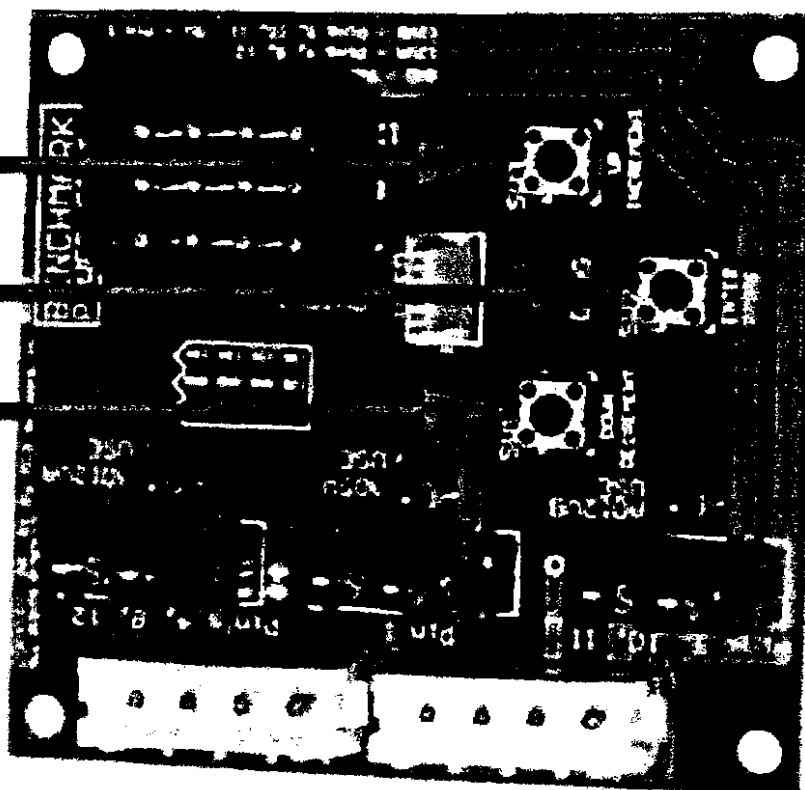
Programming Buttons:

Programming Buttons are located just beneath the Motherboard next to the power distribution block.

Programming Increment Button

Programming Mode Button

NOT USED



The upper button is the Programming Increment button and the lower button is the Programming Mode button. The displays on the Backboards display the Mode and Increment data. The Left Display will display the Mode Number and the Right Display will display the Increment Number.

Mode	Increment	Default Standard	Default MI-MO*
00 Set Default	1-2	1	1
01 Tickets Per Coin	1-10	5	N/A
02 Power Arm Speed	50 to 80	60	60
03 Coin Drop Delay	1 to 20	12	4
04 Full Power Steps	1 to 4	3	0
05 Exit Programming	Save and Exit		

Metal In - Metal Out

Mode 00 (Clear - Values; Set Default)

Pressing the Mode Button will cause the Left Display to show *di* and the Right Display to show *A9*.

Press the Increment button so the Left Display shows *00* and the Right Display shows *01*. If you want to reset game settings to the factory default, press the

increment button again so the right display shows 02 and press the mode button. Factory defaults will be entered. If you do not want to set factory defaults press the Mode Button while the right display is displaying 00 or 01 (Pressing the Increment Button while the left display is reading 00 will cause the right display to cycle through 00, 01, and 02).

Mode 01 (Tickets Per Coin)

Press the Mode Button until the left display displays "01". Press the Increment Button until the right display displays the number between 1 and 10, representing the number of tickets you want the game to pay out for each coin pushed off of the playfield.

Mode 02 (Power Arm Speed)

This mode controls the speed of the pointer spinning on the backboard. The higher the number the slower the arm spins, the lower the number the faster the arm spins. Press the mode button until "02" is displayed in the left display. Press the increment button until the desired speed is reached and press the Mode Button.

Mode 03 (Coin Drop Delay)

This mode controls where the pointer stops after a defined amount of time. The lower the number the less random the timing. The higher the number the more random the delay. Press the increment button until the left display displays "03". Press the increment switch until the desired number is displayed on the right display. Press the Mode Button.

Mode 04 (Full Power Steps)

Controls the number of steps the game will see as Jackpots. The higher the number the wider the jackpot area will be.

Mode 05 (Exit and save)

Press the Mode Button until 05 is displayed on the left display. Press the increment switch to exit programming. Game will re-initialize and the motors will activate. In some cases the pointer will stop spinning. If this happens, shut the game off and then turn it back on. This will reset the game and the game should work.

Bill of Materials:

Part Number	Description	Used	Revision
01-CAB-01A	Cabinet Center Piece	1	E
01-CAB-01B	Cabinet Left End	1	E
01-CAB-01D	Cabinet Right End	1	E
01CAB-02	Cabinet Front	2	E
01-CAB-04	Cabinet Bottom	1	E
01-CAB-05	Cabinet Door	2	B
01-CAB-06	Cabinet Coin Chute Panel	2	B
01-CAB-09	Top Glass	2	A
01-CAB-10	Cabinet Back (Top)	2	B
01-CAB-11	Cabinet Art Panel	2	F
01-CAB-26	Playfield Wood Support	2	B
01-OEM-01	Spotlight Pivot Cam Gear	2	
01-OEM-02	Toy Dozer	8	
01-OEM-03	1.5" Aluminum Stand Off	4	
01-OEM-04	3/8" Aluminum Stand Off	4	
01-SCM-03	Spotlight Pivot Arm Bushing	4	A
01-SHM-01	Dozer Motor Mount Bracket	8	B
01-SHM-02-L	Playfield Bracket Left	2	C
01-SHM-02-R	Playfield Bracket Right	2	C
01-SHM-03	Top Glass Front Trim	2	B
01-SHM-04	Top Glass Latch Bar	4	B
01-SHM-08	Playfield Stainless Cover	2	B
01-SHM-09	Coin Funnel	2	C
01-SHM-11	Playfield Coin Deverter	2	B
01-SHM-12	Coin Bounce Lens	2	A
01-SHM-13	Coin Ramp	2	A
01-SHM-14	Dozer Blade	8	B
01-SHM-15	Rear Top Latch	2	A
01-SHM-16	Front Door Latch Bracket	2	B
01-SHM-17	Spotlight Mount Bracket	2	B
01-SHM-18	Spotlight Lamp Bracket	2	A
01-SHM-19	Spotlight Pivot Bracket	2	A
01-SHM-20	Hopper Coin Guide	2	B
01-SHM-21	Corner Bracket	4	A
01-SHM-22	Spotlight Link	2	A
01-SHM-23	Top Glass Rear Trim	2	A
01-SHM-24	Power/CPU Mount	1	A
01-SHM-27	Cash Box Door	2	A
01-SHM-28	Throttle Marker	2	B
01-SHM-30	Coin Ramp Mounting Bracket	2	C
01-SHM-30-L	Barricade Left Vertical	1	A
01-SHM-30-R	Barricade Right Vertical	1	A
01-SHM-31	Barricade Horizontal Bar	1	A
01-SHM-32	Speaker Cover	2	A
01-SHM-33-L	Coin Ramp Guide	2	C
01SHM-33-R	Coin Ramp Guide	2	C

01-SHM-40	Dozer Bottom Bracket	8 A
01-SHM-41	Dozer Front Bracket	8 A
01-SHM-42	Coin Deflector Mount	2 A
01-SHM-43	Header Corner Mount	4 A
01-SHM-44	Speaker Enclosure (A)	1 A
01-SHM-45	Speaker Enclosure (B)	1 A
01-SHM-50	Dozer Belt Coupler	8 A
01-SHM-51	Dozer Coupler	8 B
01-SHM-52	Barricade and Corner Bracket	2 A
01-SHM-53	Coin Deflector	2 A
01-SHM-55	Opto Mount	2 A
01-SHM-63	Ticket Display Cover	2 A
01-WIR-01	Wiring Harness Lower	1 A
01-WIR-02	Wiring Harness Upper A Side	1 A
01-WIR-03	Wiring Harness Upper B Side	1 A
07-OEM-02	xl 330 (165 grooves) 3/8 w. neop.	8
07-OEM-15	Coin Mech	2
07-OEM-19	Power Supply	1
07-OEM-20	CPU	1
07-OEM-22	Display PCB	2
07-OEM-25	16 Gear Pully	2
07-OEM-28	14 Gear Pully	8
07-OEM-30	30 Gear Pully	8
07-OEM-31	Opto Sensor	2
07-OEM-37	5/8" T-Molding	
07-OEM-38	Ticket Dispenser	2
07-OEM-48	Speaker	2
07-OEM-50	Counters	4
07-OEM-52	Low Ticket Switch	2
07-OEM-54	Tilt Plumb Bob	2
07-OEM-55	Power Strip	1
07-OEM-55	Tilt Top Bracket	2
07-OEM-56	Tilt Bottom Bracket	2
07-OEM-58	Low Ticket Light Assembly	2
07-OEM-59	Push Button Switch	2
07-SCM-03	Bushing for 30 Gear Pully	8 A
07-SCM-03	Y-Direction Pully Bearing	2 A
07-SHM-33	Ticket Holder	2
09-SHM-110	Coin Chute Lock Bottom	2 C
09-SHM-112	Coin Chute Lock Top	2 B
09-SHM-113	Coin Chute Back Plate	2 C
09-SHM-114	Coin Chute Front	2 D
01-TRC 003v	3 Volt Stepper Motors	10
	Barricade Sign Metal	1
	Bracket Keylock for Door	2
	Cabinet Back	1
	Cash Box	2
	Cash Box Housing	2
	Door Hinge	2

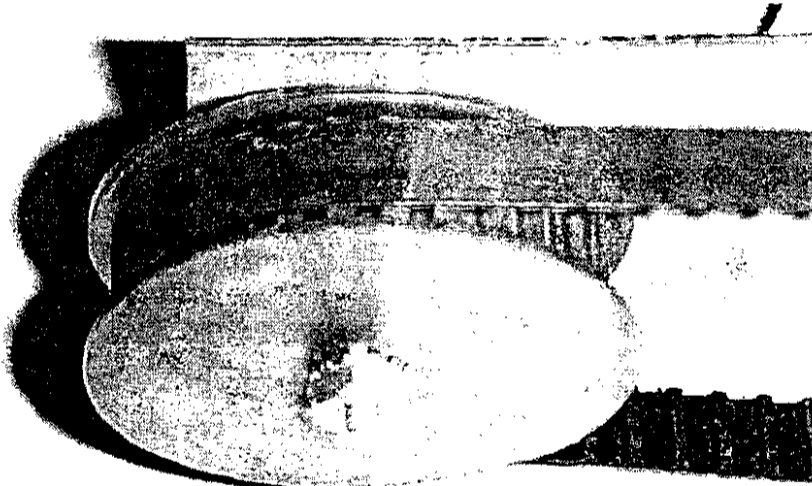
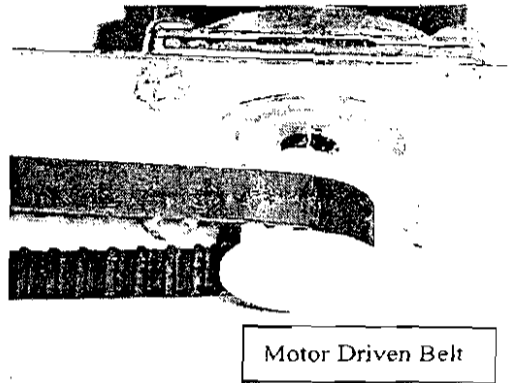
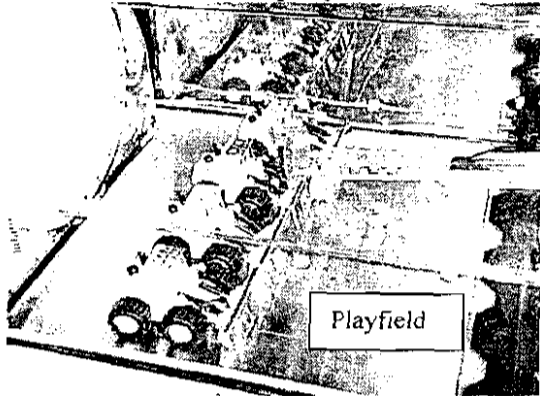
Dozer Belt Clamp	8
Keylock	2
LED 2 Pack	2
LED 2 Pack Plug	2
Power Button PCB	2

Maintenance:

The Dozer is practically maintenance free. The only user adjustments that may be required are; 1) Belt adjustment on the Dozer. 2) Opto adjustment on the backboard. 3) Bulb replacement.

1) Belt Adjustment on the Dozer:

Underneath each playfield are 4 belts driven by 4 motors.

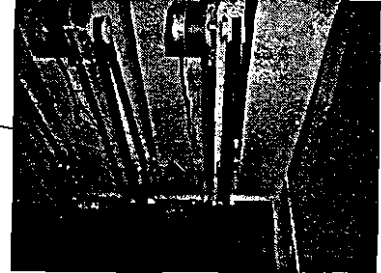


To adjust belt loosen nut on large gear (gear not mounted on motor), slide gear back and forth until desired tension is achieved. Belt should be adjusted so that when the belt is pinched together in the middle there is approx. 1/4" gap.

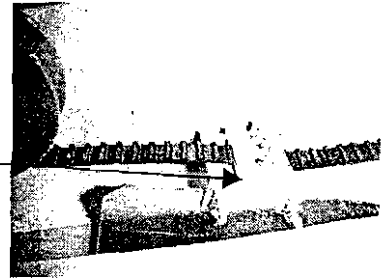
The first step to adjust the belts is to remove the four screws on the playfield.



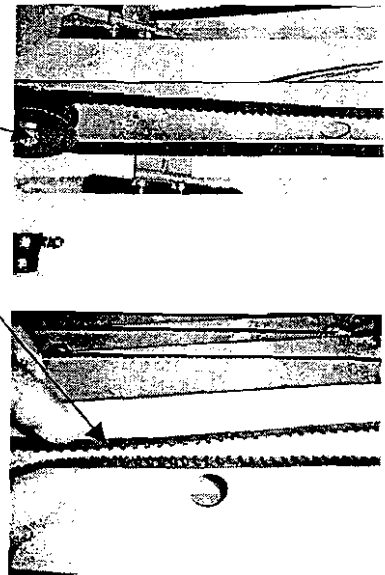
The next step is to raise the playfield from the front and disconnect the wiring harness from the playfield. All four motors must be disconnected.



Remove the belt clamp from the belt you wish to adjust.

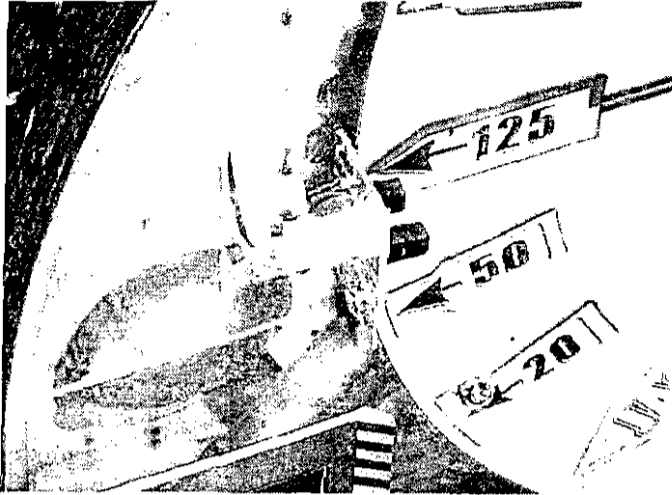


Loosen screw on large pulley and move back and forth until belt is adjusted properly. Belt should have approx. 1/4" when pinched together.



Opto Adjustment:

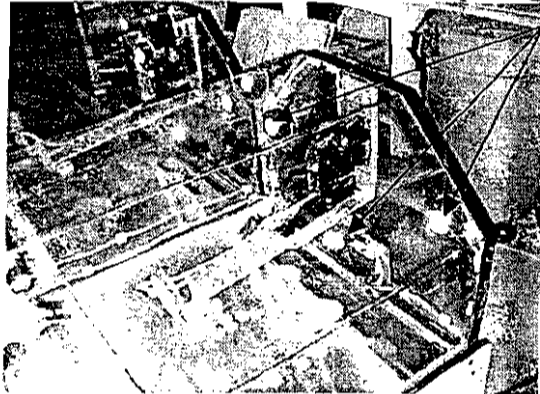
Opto sensor is located on the backboard.



The Opto Sensor is adjusted by loosening the two screws that are screwed into the backboard. After loosening screws the sensor can be moved up or down. Care should be taken and the technician should be sure that adjustment is required because if the sensor is mis-aligned the game will not play properly. If the pointer appears to be landing to the top or bottom of a payout area and is paying out then the sensor may need adjustment.

Bulb Replacement:

The light bulbs in the Dozer spotlights are 12 V Halogen bulbs.



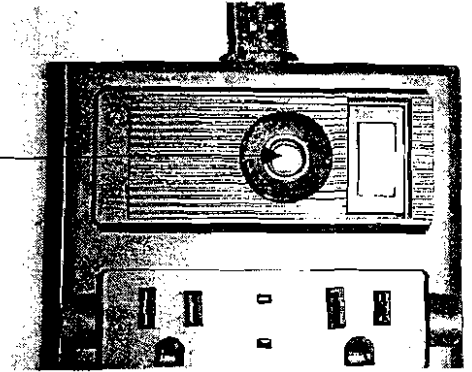
These bulbs are hot and should not be touched while lit.

When installing a new bulb use a cloth or paper towel while handling and inserting the new bulb. Contaminants on the bulb will cause the bulb to fail prematurely.

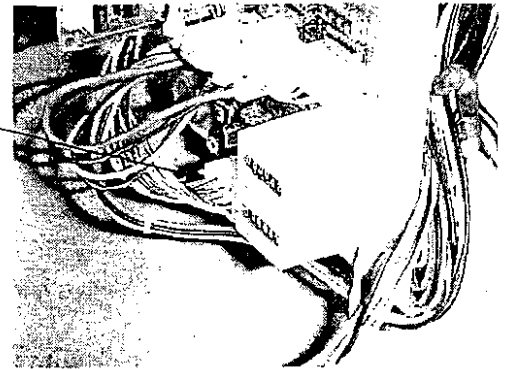
Trouble Shooting:

Nothing happens when game is turned on:

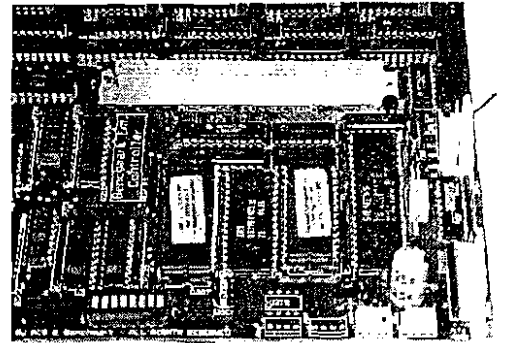
Make sure outlet you are plugged into has power.
 Make sure power supply inside game is plugged into power strip.
 Make sure reset on power strip is reset.



Check 12V on power supply. Measure 12 Volts on power distribution block. Power Supply Voltage can be checked by probing the red wire out of power supply for 5Vdc and probing yellow wire out of power supply for 12 Vdc.

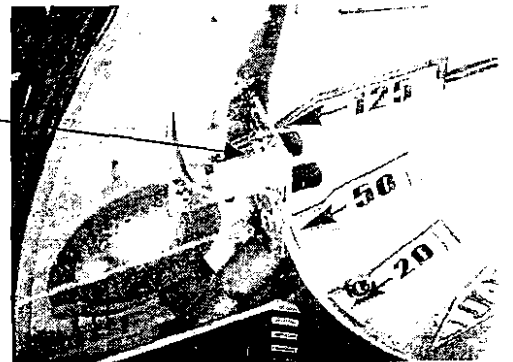


Check to make sure EPROM is seated in socket.



Game initializes but pointer stops spinning after a few seconds:

Turn game off. While watching the LED on the opto sensor turn the game back on. When the Pointer passes through the opto sensor an LED on the sensor should flash.



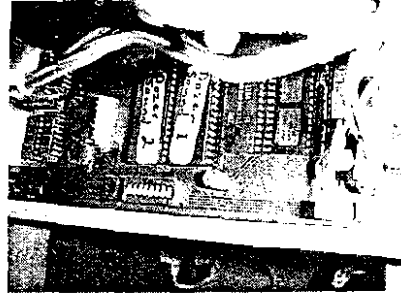
If LED is not flashing, check red wire for 5Vdc. If voltage is present, replace opto. If voltage is not present trace back through the harness until break is found.

If opto is flashing, trace the multi colored wire back to mother board and check all connections along the way.

No Sound when playing game.

Turn volume up. Turn knobs clockwise to increase volume and counter-clockwise to decrease volume.

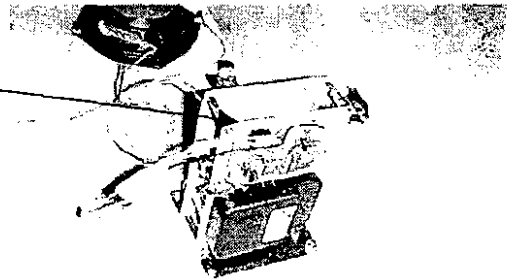
Check Speaker connection. In door and on Barricade.



Pointer Lands on ticket value and displays ticket amount but does not payout.

Check ticket dispenser for proper operation. Monitor ticket counters to make sure counters are counting the tickets.

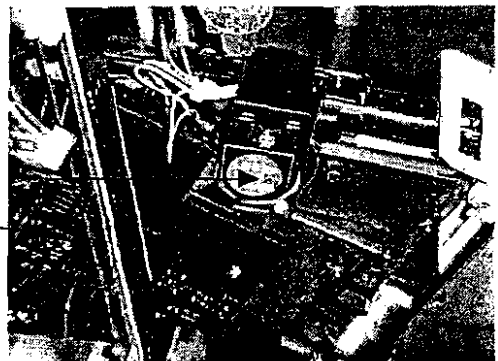
The ticket opto LED on the ticket counter should be flashing when tickets are being dispensed. If the opto is not flashing there is a problem with the ticket dispenser. If the opto LED is flashing check wires back to mother board.



Make sure ticket dispenser motor is functional by pressing the yellow button on side of ticket dispenser and motor should turn.

Coin Mech does not accept coins.

Make sure the coin comparator has coin — inserted. Try adjusting the sensitivity.



Dozer does not move back to home position after moving forward.

Check connector at wire harness. If the dozer moves a little but appears to be getting stuck try cleaning the slot in the playfield. It may be helpful to get some coarse sandpaper and fold it so it will fit in the grooves of the playfield and gently sand back and forth to remove any rough edges. Check belts for proper adjustments.

Service:

Should you require service, call Benchmark Games, Inc. at 1-888-538-1000.

Benchmark Games, Inc.
51 Hypoluxo Road
Hypoluxo, Florida 33462

www.benchmarkgames.com

CPU Board Block Diagram

