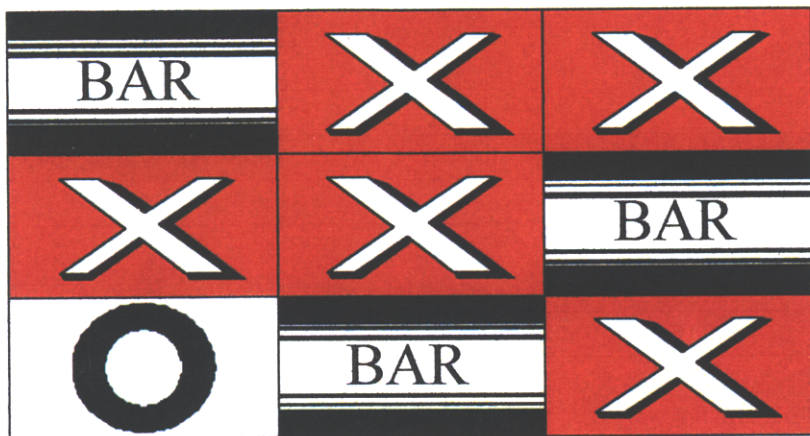


BAR-Y



THE PUSHER

Produced by:

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1. COMMISSIONING

1.1 Receipt Of Machine

Upon receipt of machine carefully remove all protective packaging and establish machine on a flat and level floor. Take care to protect the machine from sudden shocks etc. when lifting or manhandling.

The machine should only be situated indoors, and should not be subjected to any other environments. Ensure all ventilation grills have at least 4" (100mm) clearance from other surfaces to permit adequate cooling.

1.2 Electrical Connection

The Bar X should be connected to the mains supply via a suitable plug to suit your installation requirements. A competent trained person should always carry this out. If in any doubt, consult a qualified electrician.

Mains wiring:	Live	Brown
	Neutral	Blue
	Earth	Green/Yellow

THIS MACHINE MUST BE EARTHED

1.3 Electrical Supply Entry

This machine may have the electrical supply connected either at the base or at the very top, as best suits the location in which the machine is situated. The base feed entry socket is located in the base skirt of the machine below section 1 cash box door. The top feed entry socket is located in the top roof section of the machine.

The On/Off switch for the machine is located in section 1 lower compartment. The switch is a three-position switch, with the central position being 'Off'. Left and right of this position are 'On - Top Feed' and 'On - Bottom Feed' respectfully.

1.4 Initial Operation

Connect the mains supply and switch ON. The Top-Sign and Coin-Entry area fluorescent lamps will illuminate, as will the playfield dichroic lamps. The pusher boxes start moving.

A short time later the 'Attract' sound will operate depending on the switch settings on the Sound Board (see other section in this manual). The volume level may be adjusted if required by means of a volume control fitted on the Sound Board.

Insert a coin in any of the coin entry chutes, a tune will be heard as the coin is accepted. The corresponding section coin-in counter will increment and the diverter solenoid operate to access the paycup. The game is now initiated and will remain so for approximately 20 seconds.

The anti abuse 'slam-tilt' alarm feature may be tested by thumping on a lower cabinet door. The alarm should sound and the playfield lights go out. All diverter solenoids will release, diverting any coins falling off the playfield into the cashbox. The operation of the tilt or slam tilt alarm stops all games in progress and lasts approximately 10 seconds.

A safety feature is incorporated which will stop the pusher drive motor should a jam or restriction occur. Simply holding back an advancing pusher box may test this. The response of this feature is adjustable (see motor control section in this manual). This operation may be reset by pressing the reset switch located beneath the lower cabinet door of section two.

2.1 Access To Machine

WARNING - DANGEROUS VOLTAGES EXIST WITHIN THIS MACHINE

Playfield

Release the lock at the top of the glass and hinge backward far enough to get a firm handhold either side. Carefully lift clear of the machine and store safely.

Coin-Entry

Release the locks at the top of the door and hinge backwards.

Lower Cabinet

Each player section has an access door below the playfield which may be fully removed by releasing the locks, hinge outward and lift clear.

Cashbox

Each player section has an access door located below the lower cabinet, which can be fully removed by releasing the lock at the top, hinge outward, and lift clear. The cash box is located within.

Top-Sign

The artwork panels may be unscrewed and removed, permitting access to each top sign.

3. **GAME OPERATION**

3.1 **The Game**

Attract Mode

When not in active play, the machine lighting and pusher box mechanism operate continuously. The attract tune is played at intervals dependant on the settings made on the Sound Board

Active Play Mode

When coins of the correct type are inserted into a coin entry chute they are detected by flag opto sensors activating that particular player section and pass down the pin perspex to the playfield. Coins of the incorrect type fall through the chute and are collected in the reject trays, not activating the sensors.

When the player section is active, the diverter solenoid operates allowing coins over the edge to be directed to the pay cup. After coin entry, a player section remains enabled for approximately 20 seconds, allowing the player the full benefits from the effects of his coin.

Coins in and feature awards are recorded on separate electro-mechanical counters. It is recommended that readings of these counters be taken regularly, to establish a clear pattern of usage/profit and thus any significant deviations may highlight a fault condition requiring attention.

3.2 **Priming The Playfields With Coins.**

Each player section requires approximately 800 coins, of which the first 750 may be hand placed on the playfield. The final 50 for each section should be played in to the machine via the coin entry slots in order to achieve the best possible visual appearance of the playfield area. The feature hopper in each player section should be initially filled. This is then topped up during normal play by coins from the lose holes.

Remember to record the coin counter readings after priming for your records.

3.3 **Lose Hole Adjustment**

At the front side edges of the playfield lie the lose chutes, down which coins are routed back into the machine cashbox. These chutes are covered by a plastic cover and not visible to the player. The number of coins falling down the chutes may be controlled by the position of an adjustable plate; adjustment being effected by removing the plastic cover, slackening off the screws and moving the plate across the aperture as required. By adjustment of this control the operator may control the overall percentage payout of he machine.

3.4 **General Maintenance & Care**

The Bar-X is a robust and reliable machine, which looked after will give years of profitable service. Regular cleaning is the key to optimum condition and performance.

To maintain all visible surfaces in an 'as new condition':

3. Plastic and Glass Fibre - use a general purpose (non aggressive) water based detergent and finish with a quality furniture polish.
2. Laminated Cabinet trims - clean with an all purpose non-aggressive cleaner and finish to a high gloss using a furniture polish.
3. Glass and Chrome - clean with a quality window cleaning solution.

Do not use caustic or abrasive cleaners. Always use cleaning products in accordance with the manufacturers instructions.

The Bar-X utilises 'sealed for life' type bearings and a high quality mechanical components that do not require regular greasing or regular servicing.

It is recommended an initial inspection be carried out after approximately two months usage, to check for any signs of wear on the moving parts. Adjust as required, and thereafter inspect annually.

4 Electrical Systems

4.1 Circuit Breakers

Mains Supply Circuit Breaker

The Mains Supply is protected by a thermally operated circuit breaker, which can be manually reset. This circuit breaker is located in a metal enclosure together with the main supply switch, located in No1 section lower cabinet.

Should this device trip, firstly ascertain the cause of the fault and rectify. To reset the device, simply depress the yellow centre back in to the body of the circuit breaker.

Motor Fuse

The Motor fuse is located on the motor control PCB. This fuse is designed to protect the motor control circuitry and must only be replaced with an identical item. Failure of this fuse would normally indicate a motor fault.

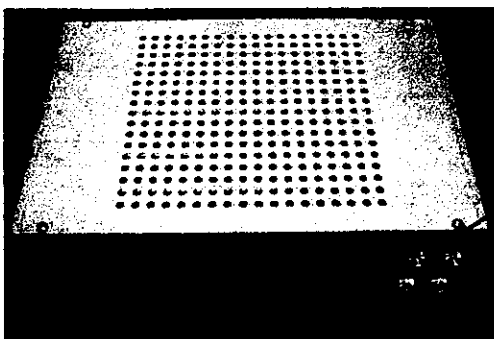
Motor fuse

2 Amp (T) 20mm
(T) = Time Delay/Anti-Surge

Power Supplies

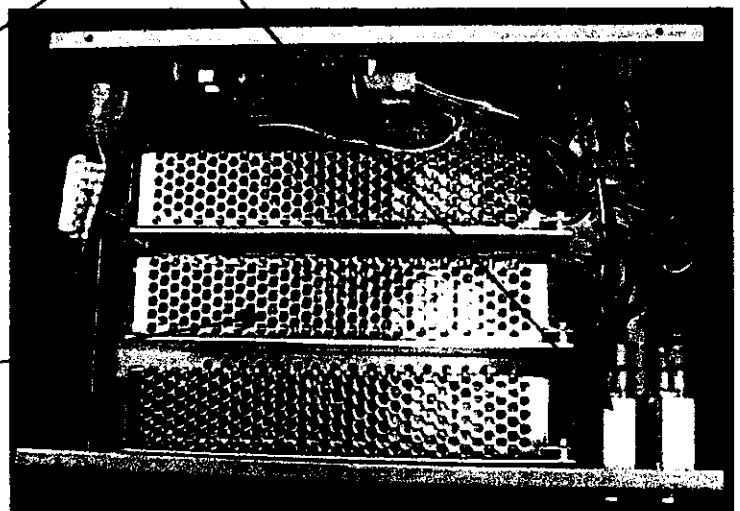
There are three power supply enclosures located in the base of the machine. The transformer enclosure for the dichroic lighting is located in the centre of the coin entry area. The machine power supply units and the dichroic transformer unit all have circuit breakers fitted in the low voltage sides of the circuits, accessible without opening the enclosures. Additionally, each diverter solenoid is protected by a separate circuit breaker, physically mounted along side each diverter assembly.

Resetting these devices, having identified and rectified the fault condition, is simply a case of pressing the white button back in to the body of the device. Since these are thermally operated devices, a small 'cooling down' time may be required after tripping before reset can be achieved.

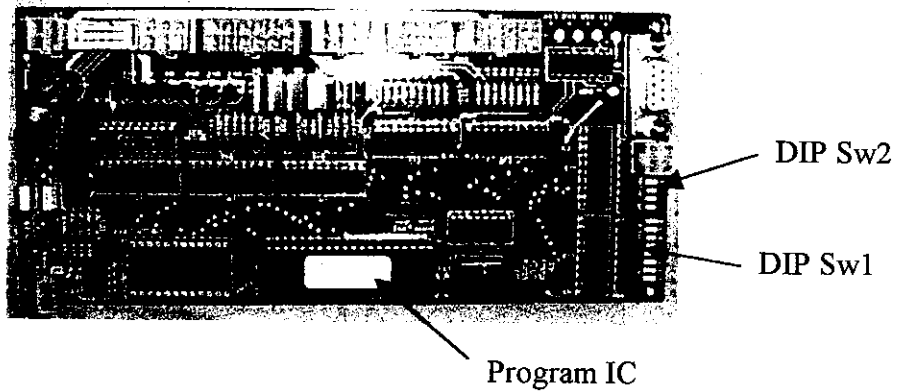


Single rail
Power supply units

Circuit Breakers



4.2 Logic Board



There is a logic board for each section, located in the coin entry area on the LHS web. There are two banks of DIP switches, on which the parameters detailed below may be set. Only one section is set as the 'MASTER', controlling the attract sound interval. The other five boards must be set to 'SLAVE MODE'.

Program: BARX03 V1.0

SW1 Attract sound timer

<u>Poles</u>				<u>Mode/Time</u>
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	
off	off	off	off	Slave mode
on	off	off	off	Master mode – 30 secs
off	on	off	off	Master mode – 60 secs
on	on	off	off	Master mode – 90 secs
off	off	on	off	Master mode – 120 secs
on	off	on	off	Master mode – 150 secs
off	on	on	off	Master mode – 180 secs
on	on	on	off	Master mode – 210 secs
off	off	off	on	Master mode – 240 secs
on	off	off	on	Master mode – 270 secs
off	on	off	on	Master mode – 300 secs
on	on	off	on	Master mode – 330 secs
off	off	on	on	Master mode – 360 secs
on	off	on	on	Master mode – 390 secs
off	on	on	on	Master mode – 420 secs
on	on	on	on	Master mode – 450 secs

SW1 Spin in attract

Pole 5

off	No spin in attract
on	Spin every 30 seconds in attract

Continued...

SW1 Re-spin feature (after 0/0/0 result)

Pole 6

off	Re-spin disabled
on	Re-spin enabled

SW1 Payout quantities

Poles

Pole 7

off	x/x/x win = 5 coins, Bar/Bar/Bar win = 10 coins
on	x/x/x win = 10 coins, Bar/Bar/Bar win = 25 coins

SW2 Percentage control

<u>1</u>	<u>2</u>	<u>3</u>	<u>Percentage aimed for (feature only)</u>
off	off	off	10
on	off	off	13
off	on	off	15
on	on	off	18
off	off	on	20
on	off	on	24
off	on	on	28
on	on	on	32

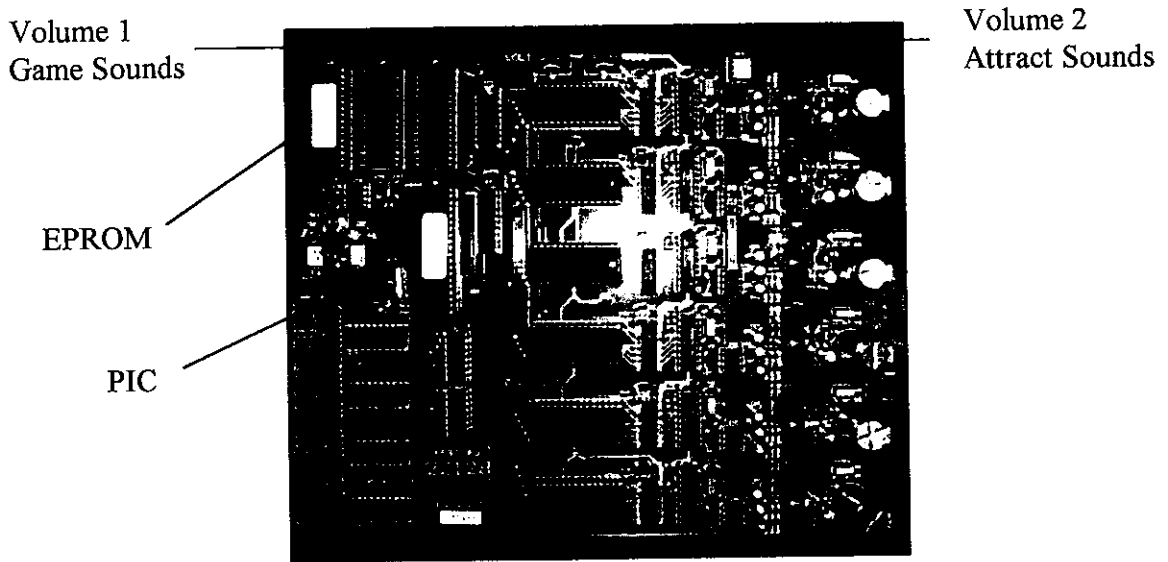
SW2 Percentage control reset

Pole 4

Power machine up with pole 4 switched ON, then switch pole 4 OFF (sound should indicate successful reset to theoretical ideal percentage)

4.3 Sound Board

There is a 6 channel soundboard located on the roof panel of the coin entry area, between sections 5&6. This sound board produces all of the sounds generated within the machine. There are two volume controls, one for the attract music/messages and the other for the game operation sounds, such as coin in, feature operate, reel stop etc.



Sound Board

Program:	PIC:	BXSND1	V1.0
	EPROMS:	BXSND1	V1.0

Loudspeaker

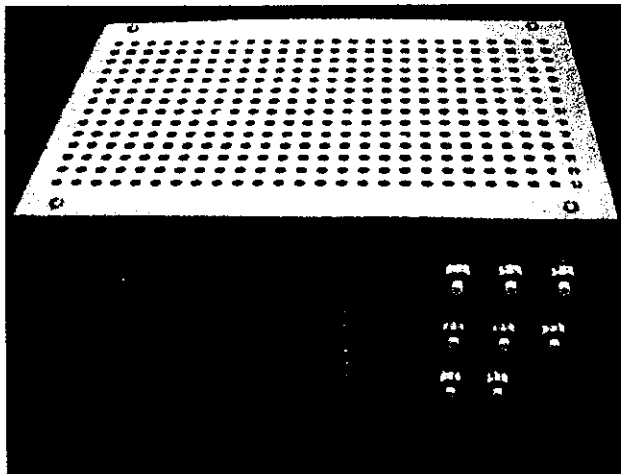
There are 6 loud speakers, one per section. Each speaker is located in the top of the coin entry area, to the rear of the section top sign. Each is rated at 8 Ohms 20 watts.

4.4 Power Supplies

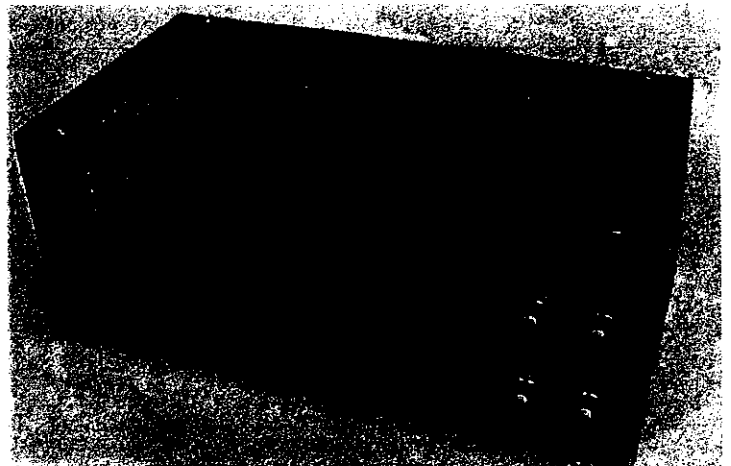
WARNING - Dangerous voltages (230 V) - Disconnect from the mains supply!

There are three power supplies within the machine base. These provide the DC supplies for the electronics and reel band mechanism drives. The forth (taller) enclosure houses the transformer that provides the AC supply for the dichroic lighting, and is located centrally in the coin entry area of the machine. All power supply enclosures also house circuit breakers for the respective circuits (see 'Fuses' section in this manual)

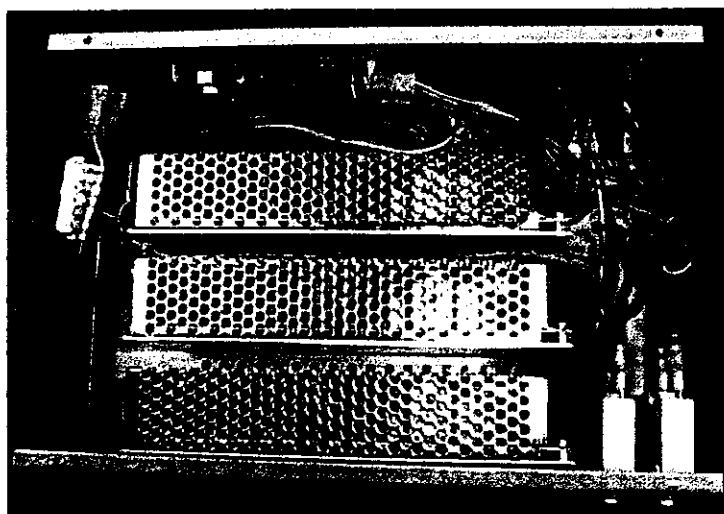
Two of the three enclosures that house the DC supplies also each contain a circuit board. These boards are the 'Motor Control' and 'Tilt' board respectively. These boards are housed in these enclosures to comply with safety regulations, as they have dangerous (Mains) voltages present on them.



Main Dichroic Transformer Enclosure



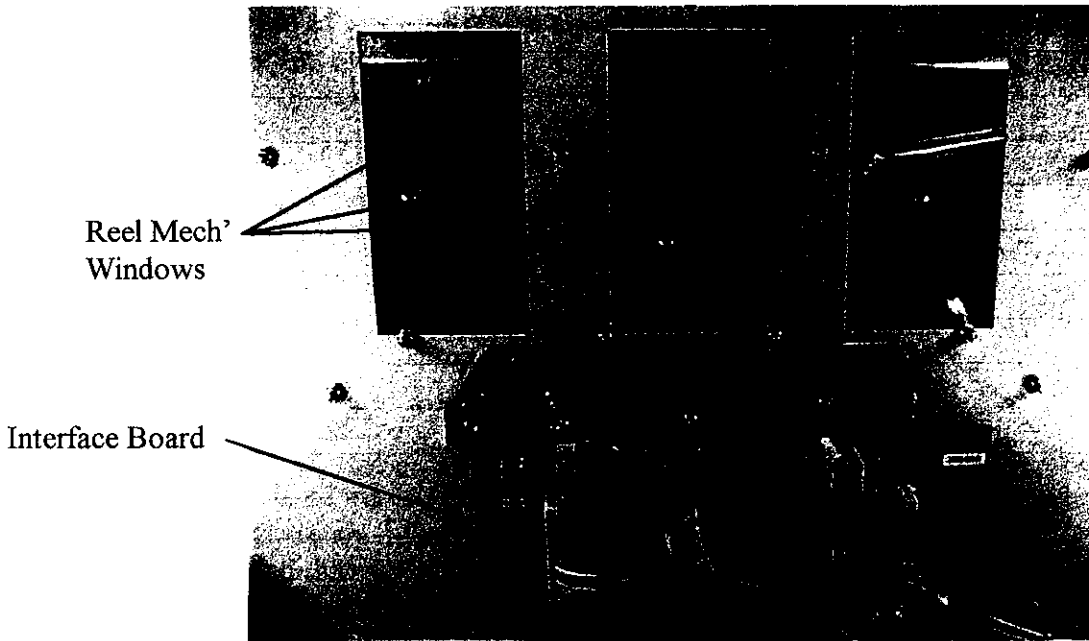
One Of Three PSU Enclosures



Of The Three PSUs, Two Of Them Also House Circuit Boards

Motor Control / Tilt Board Also Located In Two Of The PSU Enclosures

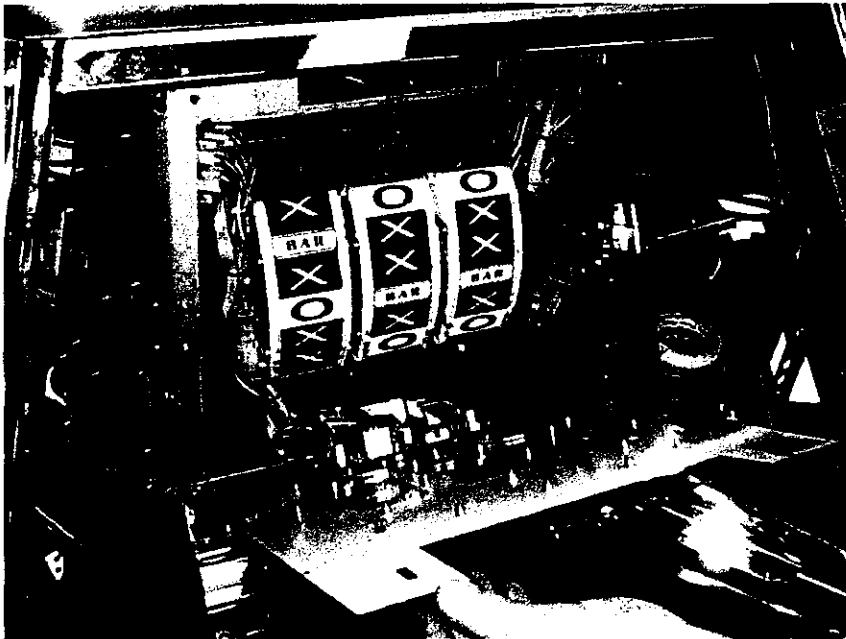
4.5 Interface Board



Rear View Of Pin Perspex

The interface board provides the drive control electronics of the three reel band mechanisms of each section. This board is located on the rear of each section pin Perspex, immediately below the reel band mechs'.

4.6 Reel Band Mechanisms

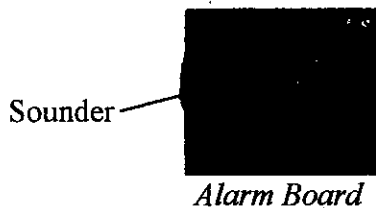


Reel Band Mechanisms Behind Pin Perspex

Each reel band is a self contained unit, and may be replaced separately should this ever be required. They are located behind each section pin perspex, mounted in a metal work 'cradle' assembly. The illumination lamps are mounted in holders on the circuit board of each unit. Replacement is simply a case of 'unlatching' the cradle arms from the mech', and carefully lifting forward to access the circuit board. Reel band replacement can be achieved by pressing in the end roller supported on small springs, releasing the band tension. Release these sprung latches on refit.

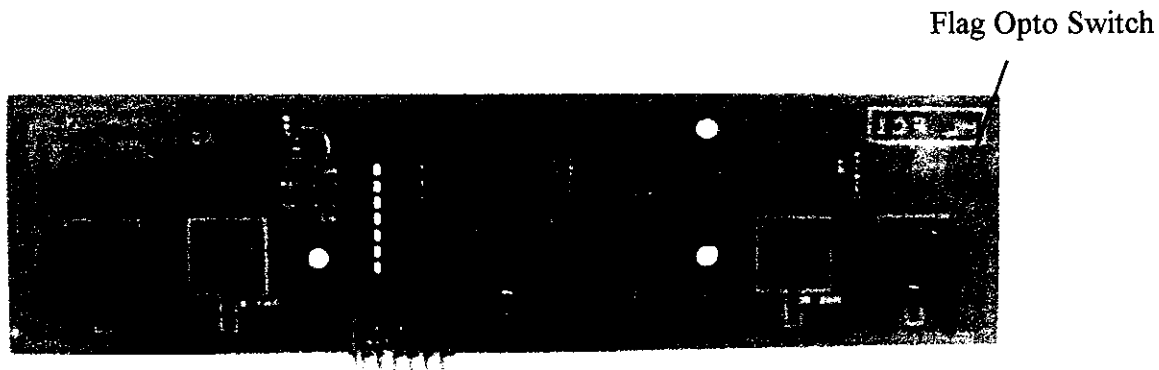
4.7 Alarm Board (7819)

Located on the roof of section 1 coin entry compartment , this board drives a sounder to produce the alarm tone for tilt, motor jam etc.



4.8 Coin-In Sensor

When a coin is entered via one of the coin chutes it triggers a flag opto switch which initiates that player section. There are 3 flag opto switches, all mounted on the one board. The board itself is directly mounted to the rear of a metal coin guide, located at the top of each Perspex..



Coin-in sensor PCB.

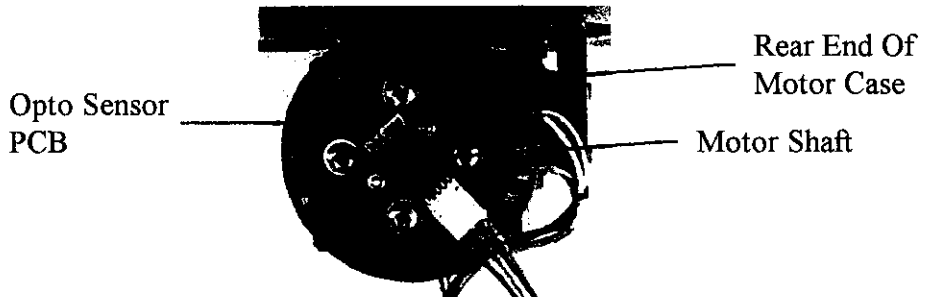
4.9 Counters

Electro-mechanical counters are provided in each player section, located in the coin entry compartment. These counters record the number of coins in and the number of feature/bonus coins issued. Taking readings of these counters regularly will obviously facilitate the monitoring of the machine performance and assist in cash accounting.

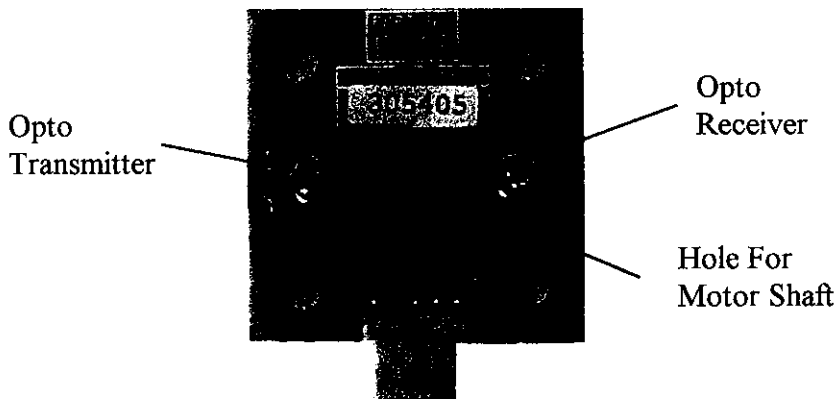
4.10 Pusher Box Motor Control

This system utilises an opto-electronic method to monitor the motor load, and stop the motor in the event of a restriction/jam.

The motor drive shaft extends some 35mm out of the rear end of the motor case. It is here that the opto sensor PCB is located, secured to the motor case. The motor shaft has a hole drilled in it, through which the infrared beam may pass when correctly aligned. With the rotation of the motor shaft, this results in the beam being continually interrupted, and a resultant string of pulses produced by the opto receiver.



Opto Sensor PCB Mounted To Motor



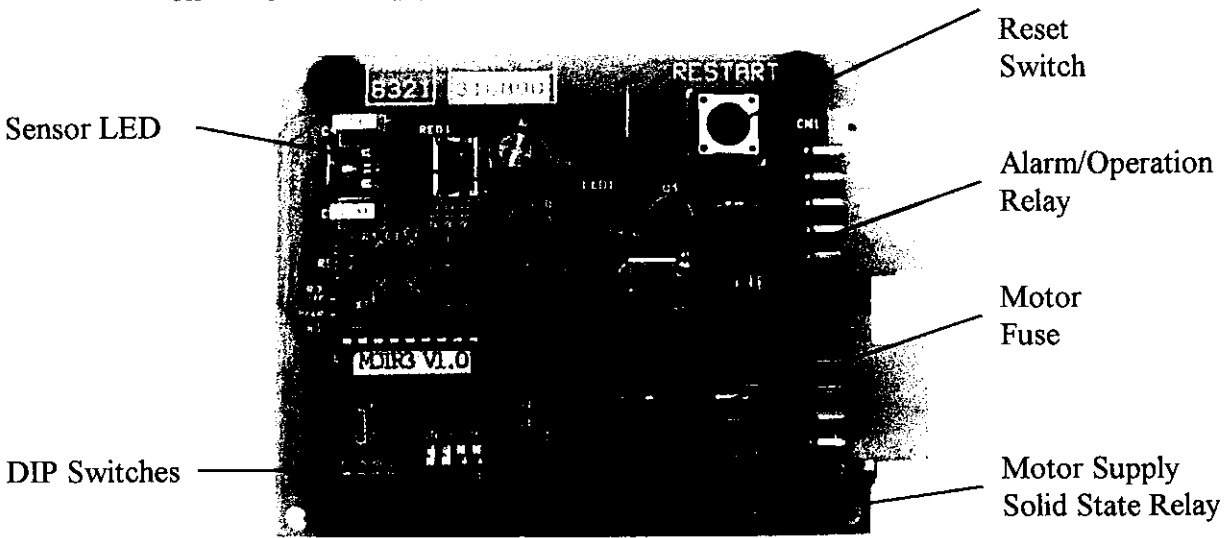
Close Up Of Opto Sensor PCB

The pulses produced by the opto receiver are monitored by the circuitry of the motor control PCB. This control circuit basically monitors for a given number of pulses within a set time frame. Should this number of pulses decrease beyond the tolerated amount, the supply to the motor is immediately switched off via a solid-state relay.

The control of the motor cut off point may be set by way of a 4 way DIP switch mounted on the motor control board thus (located in the power supply unit):

<u>Pole</u>	<u>1</u>	<u>2</u>	<u>Response</u>
	off	off	Fastest
	on	off	2nd Fastest
	off	on	2nd Slowest
	on	on	Slowest

<u>Pole</u>	<u>3</u>	<u>4</u>	<u>Stop Resistance</u>
	off	off	Weakest
	on	off	2nd Weakest
	off	on	2nd Hardest
	on	on	Hardest



When the system operates and stops the motor, the supply to the motor remains off until manual reset is initiated. This creates the opportunity to ensure the machine is in a safe state to re-start; a visual check by the attendant ensuring that there is no longer any item causing the obstruction. Reset of the system is done by depressing the 'Restart' switch on the Motor Control PCB or by way of the remotely located reset switch (mounted on a T-board in the rear of section one).

There is an LED on the Motor Control PCB, which indicates the output of the opto-sensor. In normal operation this will appear to be continuously ON, due to the high repetition rate of the pulses. This facility may be used to check the operation of the sensors, by manually rotating the motor shaft and observing the LED. The LED should turn on then off as the hole in the shaft passes between the sensors.

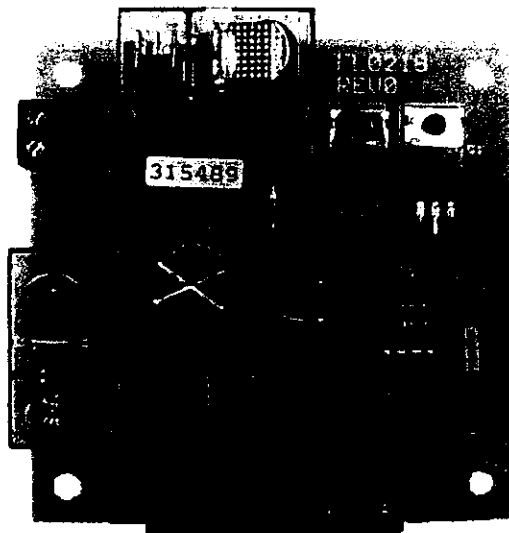
The 20mm fuse on this PCB is to provide over current protection to the solid-state relay/motor combination (Refer to specific machine manuals for type and rating).

The other relay (RL1) is used to provide a switching function upon system operation, which is used for signalling to other circuits for alarm operation etc.

4.11 Tilt Board

The Tilt Board provides the machine security feature. The inputs to this board are the slam tilt switches located on the lower cabinet doors/walls and the pendulum tilt device located in the top of the Coin entry area. The tilt board itself is located in one of the two power supply enclosures located in the base of the machine. This board drives the alarm board and switches the top sign lighting off in the event of a tilt/tamper condition.

Caution – this board has dangerous voltages (Mains) present on it



Tilt Board

4.12 Hoppers

Each player section has one hopper in it. This is mounted on the removable pay cup board, located in the lower compartment of each section.

This hopper is used solely to issue the coins won by the operation of the feature/bonus. The hopper needs to be initially filled, but should thereafter be topped up by coins from the playfield lose holes. In the event of overfill, coins simply spill out and are directed in to the cashbox. Award issues from the hopper are recorded on the feature counter, located in the coin entry compartment of each player section.

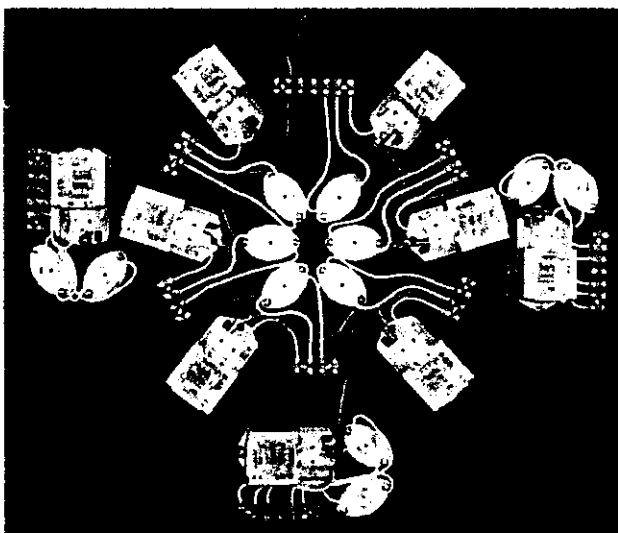
5.1 Cabinet Lighting

Fluorescent Lighting

WARNING – Dangerous Voltages (230v) - switch OFF prior to replacing!

Fluorescent tube lighting is situated in each top sign, coin entry areas and behind each lower section artwork panel. The lighting in the coin entry area and the lower compartment has double insulated fittings in accordance with current regulations. The control gear is mounted on light boards located in the area behind the pin perspex panels and behind a protective cover on the RHS of each lower compartment. The light boards contain the chokes (ballast's) and starters required to drive the fluorescent lights. Lighting trays are also located in each top sign for these lamps.

If replacement of any part is required, ensure identically rated items are used.



Light Board Located centrally behind Pin Perspex

Dichroic Lighting

Low voltage dichroic spot lamp lighting is situated at the top of each playfield. These lamps are easily replaced by simply pulling the old bulb free from the fitting, and pushing the replacement bulb back in place.

WARNING - These lamps become very hot in operation - allow to cool before handling!

6.0 Mechanical Systems

6.1 Coin Entry

Each player section has three coin entry chutes. The chutes are designed to reject fraud coins into a reject tray just inside the door. This is not a high level of discrimination, but serves well and reliably in this application. Other than keeping the chutes clear and clean no specific maintenance is required. On exiting the coin entry chute, the coin passes through a mechanical flag sensor to initiate that player section

6.2 Pusher boxes

The pusher boxes are mounted on two Accuride slide bearings. An annual check to remove any build up of dust, and a light coat of grease will ensure many years of reliable service.

Ensure that the coin scraper system is fully intact and working smoothly and freely, replace any suspect parts.

7 Fault Finding

7.1 Methodology

It is of mutual interest that your pusher is kept in excellent working condition, therefore when required please order original replacement parts from your distributor or Harry Levy Amusement Contractor Ltd.

If a fault occurs with any electrical system **SWITCH THE MACHINE OFF**. Check that:-

- a) There is a suitable mains supply.
- b) All circuit breakers are set.
- c) All plugs and sockets are correctly mated.
- d) No wires are trapped, damaged or broken.
- e) All wires are properly secured to their terminals and pins.

Wiring check.

A visual inspection will reveal the general condition of the wiring. A more thorough test using a continuity tester will be needed to check apparently intact wires, however once a machine has been playing successfully for some time wiring is not usually at fault.

Device testing.

Disconnect the machine from the mains supply then check the physical condition and operation of the suspect device (remove from the machine if necessary). Bench test if possible using a suitable power supply.

In general PCB's are not user serviceable. Should a problem develop indicating a board fault it is recommended that the board be returned to your distributor/Harry Levy for repair.

7.2 Systems Checking

When a fault occurs that affects the whole of the machine, the power supply system should be investigated first.

Check the supply input connection, and main supply circuit breaker is set.

If the fault is not visual, or easily measurable it is often helpful to disconnect the outputs from the PSU, check that the PSU is functioning then connect the loads one at a time.

It is easy to identify the faulty system, then use a similar technique within that system (such as disconnecting all hoppers) to identify the faulty component.

7.3 Basic Checks

<u>Symptom</u>	<u>Possible Fault</u>	<u>Remedy</u>
Will not start	Internal switch OFF Circuit Breaker tripped	Check internal switch is ON Check plug fuse then circuit breakers.
No sound	Volume Speaker Sound board	Adjust volume Check wiring. Replace if faulty Check power supply & connectors, replace board if faulty.
Light failed	Tube failed Starter failed Choke (ballast) failed	Check end caps & wiring Replace tube. Replace with same type. Replace with same rating.
Pusher boxes not moving	Power to motor Mechanical jam	Check for coins or swag causing jam. Clear & reset control system.
Tilt alarm not working	Pendulum stuck Door bump sensor Sounder Tilt P.C.B	Check pendulum & adjust. Check & adjust. Test connections & power Check connections & power.
Counter not working	Wiring Counter Opto sensor	Check connectors & loom Bench test / replace. Check every opto sensor.
Hopper not working	Hopper motor. Power. Jammed.	Bench test with power supply. Check supply & connections. Check for obstruction.

Spare Parts List

This spares list is by no means fully comprehensive; since to provide the full listing would require another volume! The following are some of the more commonly required items that you may need. If the item you require is not listed, please contact either your distributor or Harry Levy Amusements and we will be pleased to assist you.

<u>Description</u>	<u>Harry Levy Stock Number</u>
201 lock & keys	6278
301 lock & keys	6087
Accuride pusher box slide	6081
Circuit Breaker 5A (mains)	8713
Circuit Breaker 1.5A	8878
Circuit Breaker 5A	8878
Circuit Breaker 4A	8880
Circuit Breaker 10A	8883
Coin entry Opto board	8739
Counter – feature/changer	8710
Counter	6029
Electronic alarm board	7819
Fan 12 VDC	8624
Hopper - 10p Asahi	8668
Interface board – feature	22127
Logic board	22126
Motor 230V 50 Hz	8309
Motor control board	8321
Motor Opto board	8318
Power supply 12V 100W	8859
Power supply 24V 100W	8860
Reel Band Mech'	22071
Sound board	22128
Speaker (small)	22134
Switch - ON / OFF / ON	8712
Switch - reset	6127
Switch - pendulum tilt	CC004
Switch – slam tilt	6149
Tilt board	7917
Transformer Dichroic 600VA	8708

Other items may be available on request.