

MIRCO

VOL. I

1012-9000

1012-9900

**VIDEO GAMES
SERVICE MANUAL**



MIRCO GAMES, INC.

Manufacturers of Coin and Non-Coin
Operated Amusement Games

1960 WEST NORTH LANE, PHOENIX, ARIZONA 85021

TELEPHONE (602) 944-5578

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VIDEO GAMES

SERVICE MANUAL

A Publication of Mirco Games, Inc.

Congratulations on your purchase. We at Mirco Games, Inc. take great pride in producing the finest in coin and non-coin operated amusement games on the market. Well maintained equipment will provide greater pleasure for your customers and increased profits for you. A thorough reading of this manual will clarify our Warranty and provide product knowledge and maintenance procedures.

This manual supercedes all other manuals and warranties expressed or implied therein.
(4-28-75)

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Some illustrations in this booklet are made possible by the use of the Motorola Service Manual 68P65130A70.

*To order additional copies, see your
local distributor, or write:*

MIRCO GAMES, INC.
1960 W. North Lane
Phoenix, Arizona 85021

WARRANTY

MIRCO warrants the Goods to be free from defects in material and workmanship under normal use and service for a period of twelve (12) months from the date of delivery on all parts except potentiometers and monitor, for which the warranty period is of ninety (90) days from the date of delivery. MIRCO MAKES NO REPRESENTATIONS OR WARRANTIES CONCERNING THE EQUIPMENT WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING THOSE OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE, OR WITH RESPECT TO PATENT INFRINGEMENT, EXCEPT AS MAY BE SPECIFICALLY MADE HEREIN. MIRCO's obligation under its warranty herein is limited to the repair or replacement of such parts which have been returned to MIRCO's plant at Purchaser's expense and which examination shall disclose to MIRCO's satisfaction to have been so defective and to the shipment of such repaired or replacement parts to the Purchaser f.o.b. the shipping point. This warranty does not apply to any of MIRCO's products which have been repaired or altered by unauthorized personnel or service facilities in any way or which have had the unit serial number altered or removed.

Upon acceptance of the Goods, the Purchaser agrees to assume all liability for any damages, and bodily injury which may result from the use or the misuse of the equipment by the Purchaser, his employees or others, and to hold MIRCO GAMES, INC., harmless from liability and claims arising out of the use of the Goods by any person.

Parts returned for warranty service must be packaged to insure no damage is incurred during the shipment and shipped to 1960 West North Lane, Phoenix, Arizona, 85021. The original shipping carton is recommended.

INSPECTION

INSTALLATION:

- 1) **IMPORTANT:** Do not plug unit into wall power receptacle until inspection of game is completed.
- 2) Upon receipt of unit, check out immediately for damage. Mirco Games are shipped in a carefully designed package intended to prevent shipping damage. However, if damage should occur a claim must be made with the carrier upon delivery of the game. Storage of packing material is recommended in the event reshipment of the game or a game part is desired.

CLEANING:

IMPORTANT: UNPLUG GAME FROM POWER RECEPTACLE DURING CLEANING, INSPECTION, OR WHENEVER REPLACING A PART, TO PREVENT POSSIBLE ELECTRICAL SHOCK.

Top

Description: The top is of a one piece laminated formica. The surface is resistant to scratches. To help maintain the luster, occasional waxing will help. On walnut finished units, deep scratches may be filled or covered using 'Putty Stick', shade #130, available at most hardware stores; for leather finished games use 'Old English' furniture polish.

Cleaning: The surface may be cleaned with any standard cleaner designed for this type of finish.

INSPECTION (Continued)

Outside Window

Description: The window used in the top is made of break resistant 3/16" flow tempered glass. The top surface is highly resistant to scratches and chips. Although scratching may result, shattering from a sharp blow is not likely.

Cleaning: Daily cleaning of the window may be accomplished using clear water and paper towels. Window cleaners may be used; however, overspray from these products will also remove wax or protective finish from the top. It is highly recommended that anti-static cleaner and a non-abrasive cloth be used.

Inside Window

Description: The tinted display window is made of break resistant acrylic plexiglas which is 16 to 20 times stronger than glass. Although scratching may result, shattering from a sharp blow is not likely.

Cleaning: Cleaning of window may be accomplished by using any anti-static cleaner (such as Kleenmaster Brilliamize, made by Chemical Products Co., Omaha, Nebraska) and soft non-abrasive cloth. If anti-static cleaners are not available, a mixture of Joy and water may be used. Window should be waxed with car wax (paste) after 15 to 20 cleanings. Hairline scratches or spider webbing can be removed using Vestal Plus Polish (Vestal Laboratories, St. Louis, Missouri, 63110).
CAUTION: Window or other ammonia cleaners must not be used.

INSPECTION (Continued)

Cabinet

Description: The outside surfaces of the cabinet are covered with a mar-resistant wood grained vinyl to insure long life and durability.

Cleaning: Walnut finished cabinet surfaces may be cleaned with any standard cleaners designed for this type of finish. Deep scratches may be taken out using 'Putty Stick', shade #130, available at most hardware stores; for leather finished cabinets, use 'Old English' furniture polish.

Legs or Base

Cleaning: The legs may be touched up by using flat black paint. The base may be touched up using brown enamel paint.

Picture Display Tube

Cleaning: May be accomplished with a damp (damp only) lintless towel. Do not apply liquid to tube - apply liquid to towel first, making sure it is only damp, before attempting to clean tube.

OPERATION

- 1) Open front door with the key.
- 2) To change end of game score point from 11 to 15:
 - A) While you have the front door open, push the metal tab (hanging down from the middle upper inside of the door jamb) to the back; this will release the lid lock.
 - B) While holding the tab back, push the lid open and lock into place with the lock-arm located at the rear-right hand side of the game.
 - C) Select game point of either "11" or "15" by moving switch on the large circuit board on your left (switch left for "11", right for "15"). Switch is normally pre-set at factory for "11" count.
 - D) Unlock the lock-arm and carefully shut the lid, giving it a little downward push. Listen for a latching sound - it should now be locked in the down position. Give the lid a sharp pull upward to make sure it is locked before shutting the front door to the cabinet. Place game in final location and adjust leveling feet.
 - E) To start game:
 - 1) Close and lock the front door. Connect to 110V 3-wire outlet only. Operation of unit not guaranteed if ungrounded 2-wire adapters are used. NOTE: For those games placed in locations where 220V AC at 50 HZ is required, the following is applicable. SW1 located on the monitor chassis must be placed in the 220V position. The power input cord must be converted for same voltage and applicable power source plug.

IMPORTANT: All games are equipped with a safety interlock switch for your protection. The interlock switch allows AC power to the unit only when the door is closed and locked.

- 2) A play field should appear within moments on the display screen. Brightness, contrast and volume are pre-set at the factory. However, location, lighting and accoustics may vary requiring readjustment of these controls (Ref. Figure 1-1) It is recommended that adjustments other than the ones indicated be performed by a qualified technician.
- 3) Select type of mode (i.e., player vs player or player vs game):

Player vs Player

Deposit one coin into the coin mechanism. This will display one (1) paddle for each player. Deposit a second coin for one additional paddle per player (for doubles). The first coin will cause the score to reset to 0-0. Push "To Start" button - game will commence immediately with a beginning serve tone.

Player vs Game

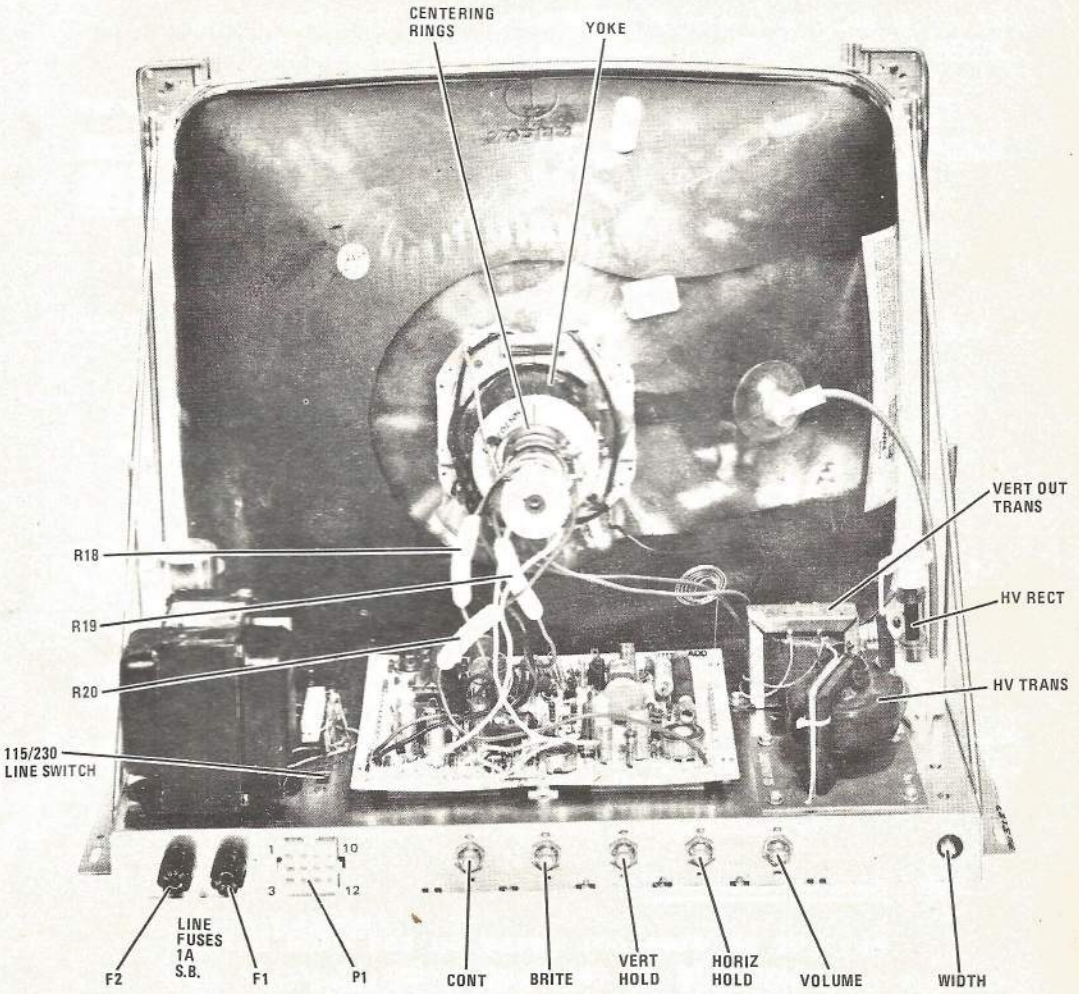
Deposit one coin for one (1) paddle for the challenger. Deposit a second coin for an additional paddle. The first coin will cause the score to reset to 0-0. Push "To Start" button - game will commence immediately with a beginning serve tone.

- 4) Free Game:

A free game is available only in the player vs game mode. Upon the challenger winning, the free game light will come on.

- a) Select mode
- b) Push the "To Start" button for the second game. The free game light should remain on during the free game.
- c) You cannot win a consecutive free game on top of the first free game. Only one free game is available per original game.

NOTE: If game does not operate properly, refer to the Troubleshooting Guide to determine reason for failure and steps that must be taken to correct operation.



Chassis Component Location Rear View

FIGURE 1-1

TROUBLESHOOTING GUIDE

IMPORTANT: UNPLUG GAME FROM POWER RECEPTACLE DURING CLEANING, INSPECTION, OR WHENEVER REPLACING A PART, TO PREVENT POSSIBLE ELECTRICAL SHOCK.

Normal Conditions

- 1) Partial numbers may be displayed prior to new game. Game should reset 0-0 upon insertion of a coin.
- 2) A tone will sound at pushing the "To Start" button after the insertion of a coin into the coin mechanism.
- 3) A tone should be sounded at every bounce and score of the ball.
- 4) There are two (2) speedups of the ball during a play: on both the second and sixth bounce after the initial serve.

Adjustments to be made, if needed, concerning:

1) Game points

- A) On main printed circuit board, there is a switch. In one position it will let the game continue to 11 points before ending; in the other it will go to 15 (as expressed on Page V).

2) Paddle movement

- A) For paddles not going to the side of the playfield or stopping short of wall: on main printed circuit board there is an adjustment potentiometer. See Removal of Main Printed Circuit Board and Figure 2-2.

3) Picture

- A) Fuzziness can be adjusted on monitor from the brightness, contrast or focus controls.
- B) Vertical and horizontal holds are also adjusted on monitor chassis. (See Figure 1-1)

THE FOLLOWING MALFUNCTIONS WILL REQUIRE THE MAIN COMPUTER BOARD TO BE REPLACED (See 'Removal of Main Printed Circuit Board', Page 6)

1) Score Related

- A) No reset to zero at beginning of game (either side or both)
- B) Partial and odd numbers (either side or both)
- C) Score does not display (either side or both)
- D) Score displayed continuously (either side or both)
- E) Score erratic (either side or both)

2) Paddle Related

- A) Four paddles for one coin
- B) Partial or odd paddles (either side or both)
- C) No paddles (either side or both) upon insertion of a coin (score of 0-0 may or may not appear)
- D) Two paddles for two coins (See Miscellaneous Problems: Coin Mechanism Related)

3) Tone Related

- A) An unusually long scoring tone (either side or both)
- B) An unusually short scoring tone (either side or both)
- C) No scoring tone (either side or both)

NOTE: Slight differences in length of score tone (up to 50%) do not indicate a board malfunction.

4) Free Game Related

- A) Gives intermittant free games during a regular game
- B) Gives free game, but no free game light (See 'Replacement of Free Game Light')
- C) Gives free game light, but no free game
- D) Gives no free games
- E) Free game light does not stay on during free game
- F) Paddles are removed after winning first game preventing play of free game
- G) Game will not end at score point during free game

5) Game Related

In Player vs Machine mode:

- A) Backboard and guard appear but no right paddle
- B) Backboard, guard and right paddle appear but right inside paddle does not appear with insertion of second quarter
- C) Backboard does not appear
- D) Guard does not appear
- E) No goal in back wall
- F) Paddles disappear after winning free game

In Player vs Player mode:

- A) First quarter does not give paddle on right side
- B) First quarter does not give paddle on left side
- C) Second quarter does not give right inside paddle
- D) Second quarter does not give left inside paddle
- E) Half or only part of any paddle displayed
- F) Top boundary missing all or in part
- G) Net missing

5) Game Related (Continued)

End of game:

- A) Game ends on 1 or 5
- B) Game ends immediately after start
- C) Score reaches 11 or 15, then goes back to 10
- D) Game does not end when score on right reaches 11 or 15
- E) Game does not end when score on left reaches 11 or 15
- F) Game continues beyond 11 or 15

6) Play Field Related

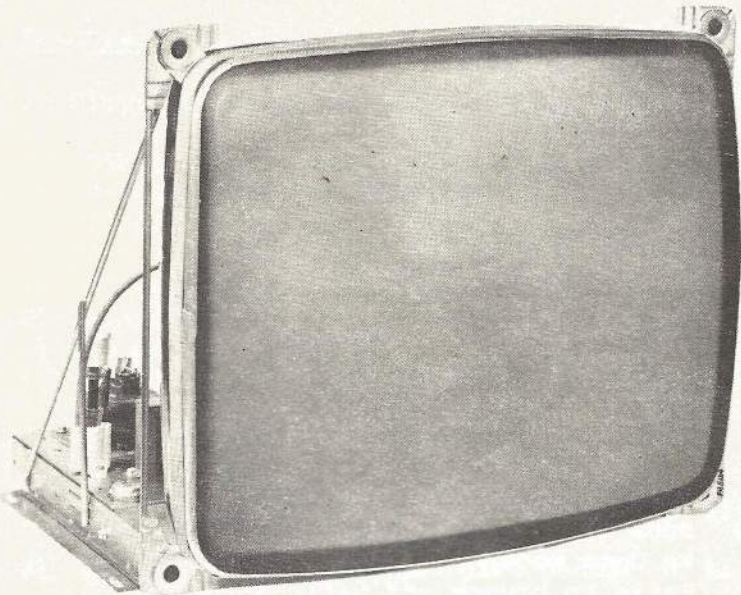
- A) Multiple fields
- B) No net or partial net
- C) No video, but ball
- D) Fuzziness
(See Figure 3-5 for focus control)
- E) Play field light with black borders

7) Ball Related

- A) No balls
- B) Multiple balls
- C) Erratic balls, jerky balls
- D) Unusually high or low travel speeds
- E) No angle to rebound off a paddle
- F) Score doesn't change at time of win
- G) Does not go through goal (during Player vs Game mode)
- H) Fails to bounce off walls or paddles

8) Video Related

- A) No picture or just a flash on screen at time of plugging in or unplugging from wall socket
- B) White screen
- C) Ball and/or play field in bad contrast
- D) Tube lights up, but no play field
- E) Vertical or horizontal hold or contract unadjustable from monitor chassis. (See Miscellaneous Parts To Be Replaced: Monitor)



Removal of Main Printed Circuit Board

CAUTION: Unplug the game first!

- A) Open game door
- B) Unlatch lid and lock in the full open position

Located on your left is the Main Printed Circuit Board. Carefully take the two (2) upper corners and pull the board straight up and out, lay board on Display Tube (using a soft cloth covering the tube to prevent scratches from the Printed Circuit Board), with the component side facing upward (See Figure 2-2).

Pull each of the four plugs out by depressing both release tabs and pulling straight up.

Fill out red repair tag and mail broken board and repair tag to MIRCO.

Replacement of Main Printed Circuit Board

Upon re-installation of Main Printed Circuit Board, make sure you slide it into the slots provided on either side of the game box interior. Also be sure that components A, B and C (See Figure 2-2) are not sticking out so far to the left that when you push the board down into the box the wooden lip breaks off one of these three components:

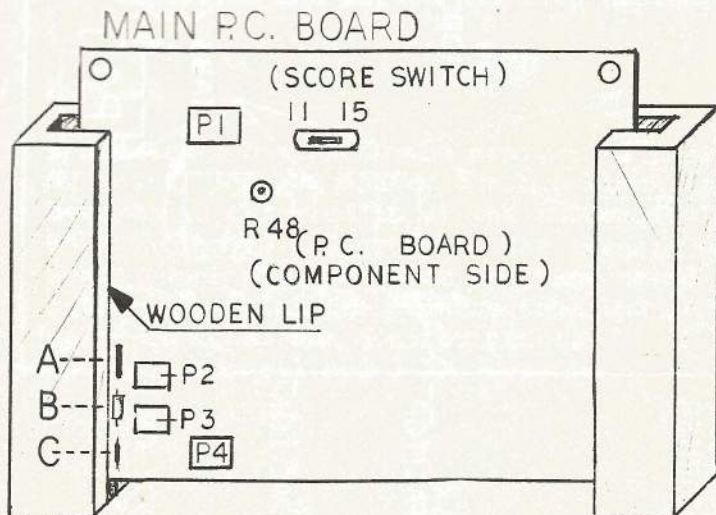
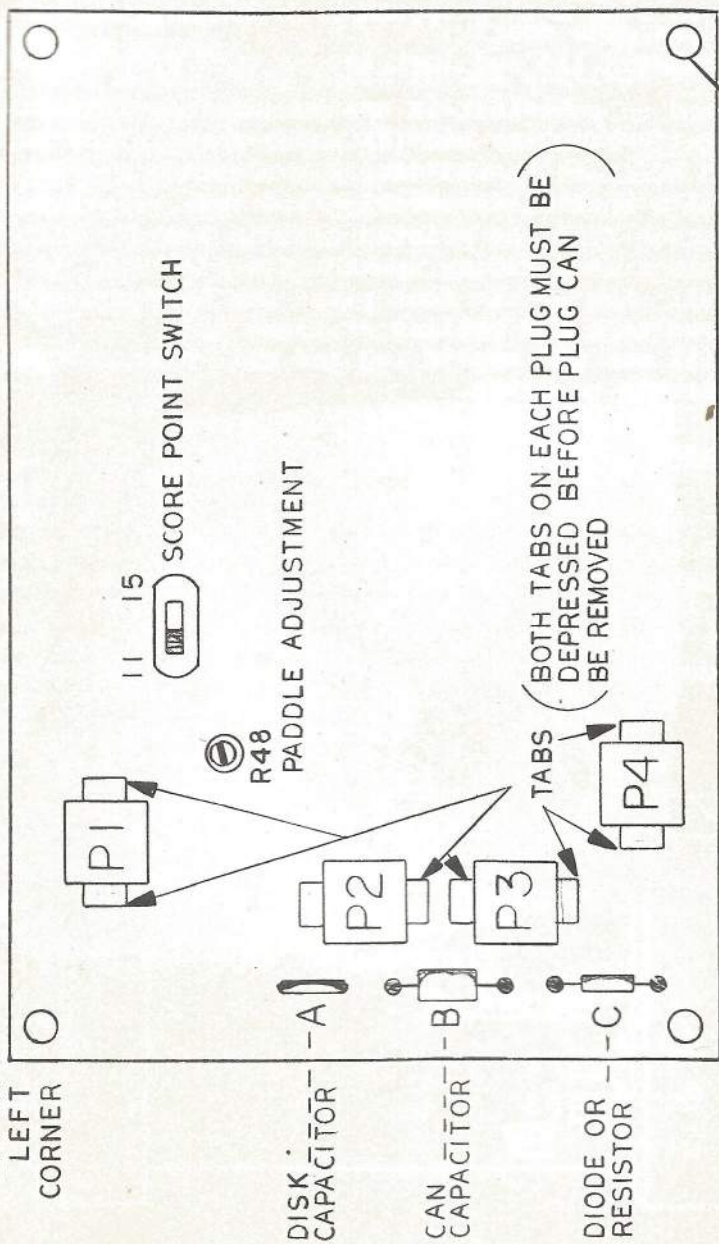


FIGURE 2-1

UPPER
RIGHT
CORNER

RC. BOARD — COMPONENT SIDE

UPPER
LEFT
CORNER



UNUSED MOUNTING HOLES (4)

FIGURE 2-2

MISCELLANEOUS PARTS TO BE REPLACED if the following problems exist:

- 1) Player Mode Switch, if wires are not loose or shorting, and:
 - A) Player vs Player is unobtainable
 - B) Player vs Game is unobtainable
 - C) Neither position will allow a game after money has been deposited

- 2) Control Potentiometers, if wires are not loose or shorting, and:
 - A) Paddles don't move in accordance to rotation of knobs
 - B) Paddle jumps or quivers slightly at rotation of knob

- 3) Start Button, if wires are not loose or shorting, and:
 - A) Fails to start game after money has been deposited and switch has been depressed

- 4) Monitor

There are 2 boards in the monitor, a small plug-in 5V board, located behind the big black transformer, henceforth referred to as the audio panel; and an 8" x 5½" board plugged into the chassis with a small bunch of wires from the same board plugged into the yoke of the picture tube, henceforth referred to as the monitor panel.
(See Figures 3-1 and 3-2)

A) Monitor Chassis (See Figures 3-1 and 3-2)

- 1) A low 73V on monitor power supply will give you a reduced Play Field (in size) or ripples throughout the Play Field, or bars in Play Field.
- 2) No Picture - Check Q16
- 3) Contrast, brightness, verticle or horizontal holds, or volume, is unadjustable or partly adjustable.

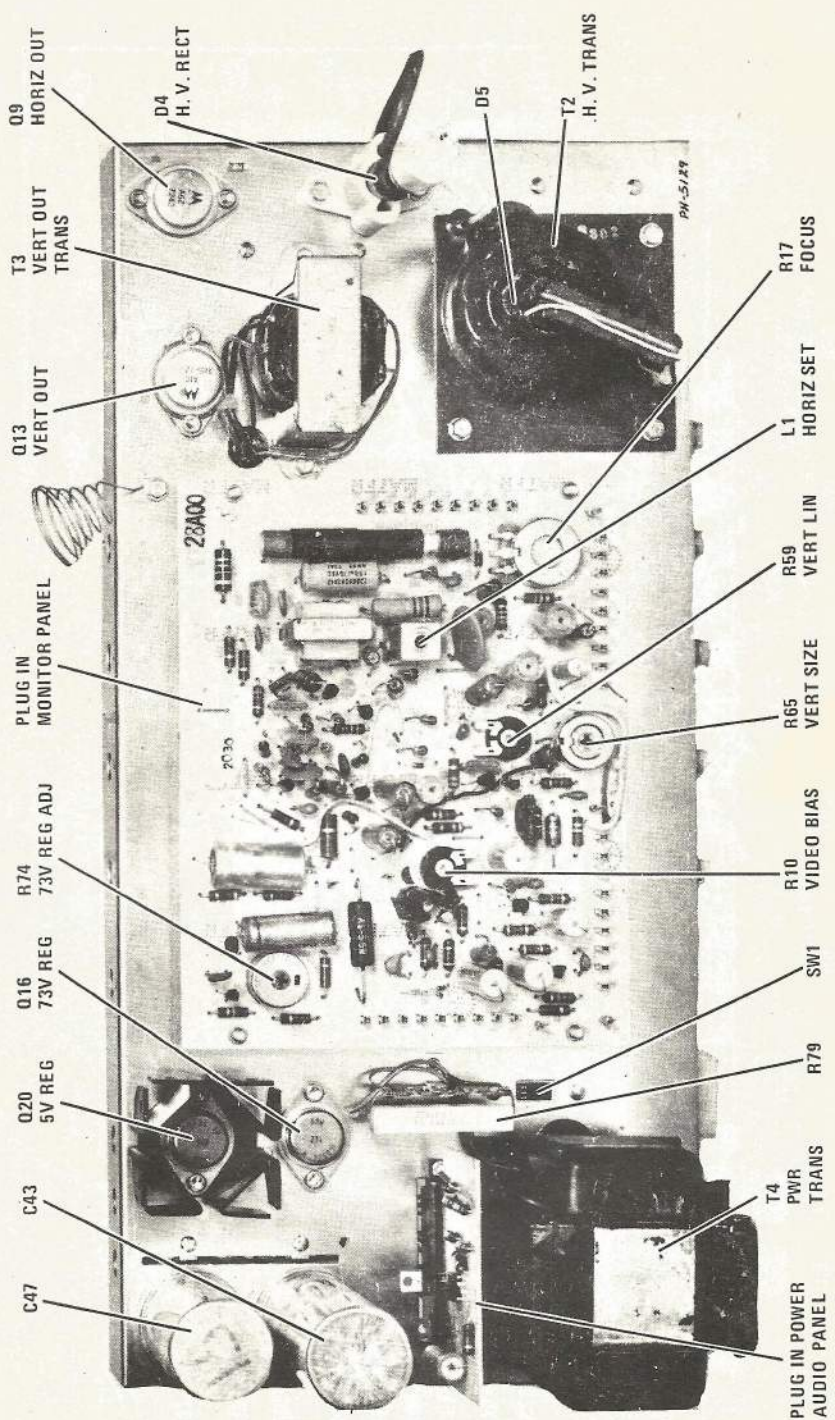
B) Audio Panel (See Figure 3-3)

- 1) A low 5V output will produce snow or haze. Check Q18, Q19 and IC1 (or Q20 on chassis)
- 2) No picture or sound

C) Monitor Panel (See Figures 3-4 and 3-5)

- 1) Adjustments to this panel should be done only by a qualified serviceman.

VP12



Chassis Component Location Top View

FIGURE 3-1

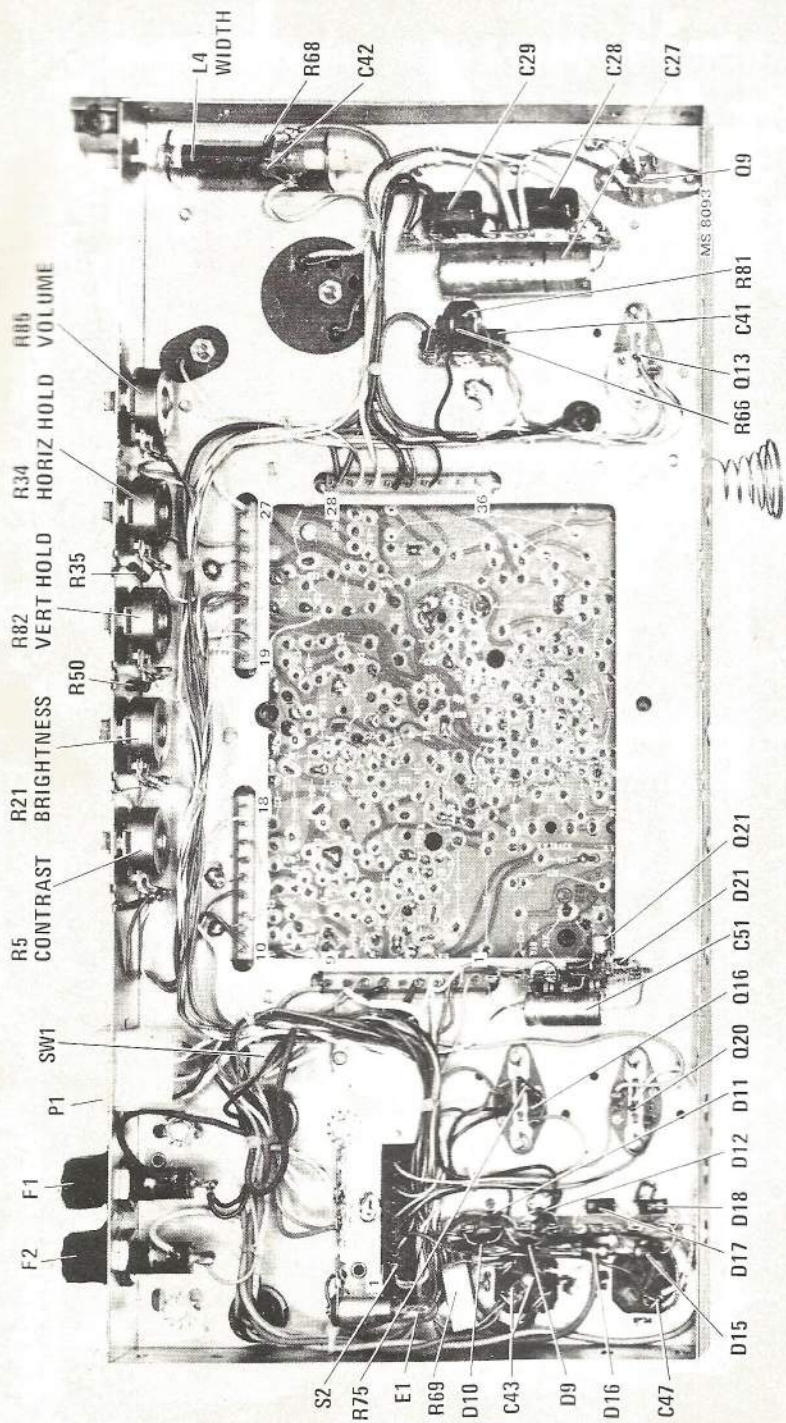
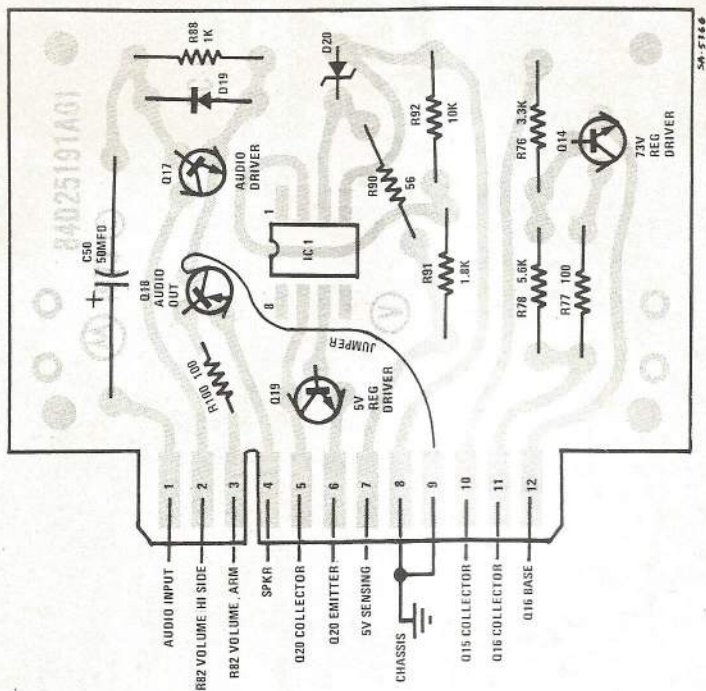


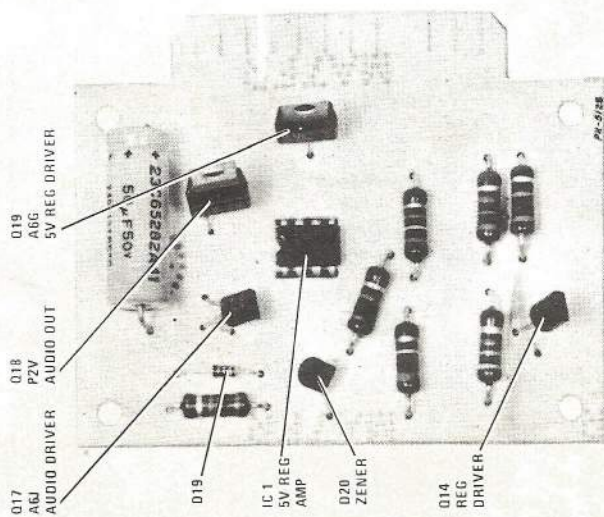
FIGURE 3-2

Chassis Component Location Bottom View



Circuit Side

Power, Audio Panel Component Location

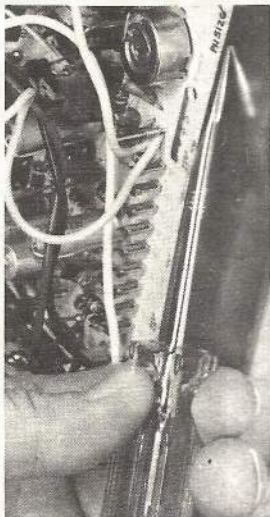


Top View

FIGURE 3-3

SERVICE NOTES

PANEL REMOVAL/INSTALLATION



To prevent damage to the board or foil when removing the circuit panel it may be necessary to pry up slowly, IN STAGES around the edges as shown. Start at one corner and move all around the board keeping the screw driver tip against the chassis. When installing, apply pressure at the edges near the pins. Do not force down on the components.

FIGURE 3-4

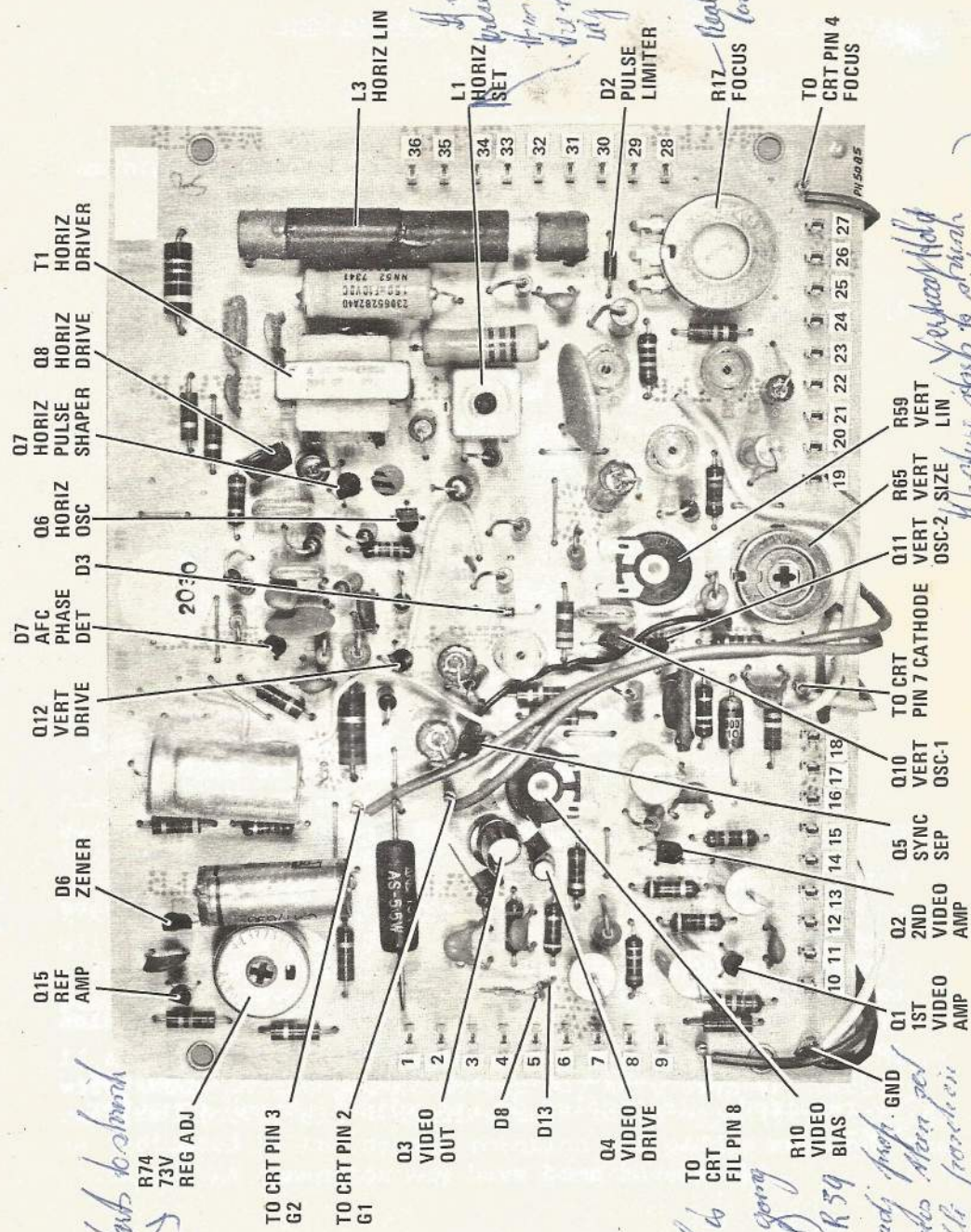


FIGURE 3-5

If picture starts to streak way for one way

*If vertical hold horizontal search to low (line holder going around standard) then adj L1 or R59
If you cannot adj prop. GND on outside screws then get screw in middle position and adj R59 or L1*

If you can't find the middle of the board

Really thick lead on screen

*Perfect hold
If there is a screw in the middle of the board*

Monitor Panel - Component Side

Miscellaneous Problems and Possible Solutions

1) Coin Mechanism Related

- A) Paddles don't appear, coins may be stuck in coin mechanism; or black wire on coin mechanism is loose
- B) Two paddles for two coins - check for loose wire on coin mechanism switch (blue or orange)

2) Audio Related

- A) Score tone is fuzzy - may need speaker replacement
- B) Audio Panel may be failing
- C) Tone too loud or low - adjust on monitor chassis

3) Free Game Related

- A) No free game light - L.E.D. may be burned out

light comes on by itself \$ 1.50

4) Control Knob Related

- A) Rotation of knob causes 2 or more paddles to move: Potentiometer leads are probably shorted
- B) No movement - bad potentiometer

NOTE: Proper Rotation and Paddle Movement

With full rotation of control knobs to the bottom, the paddles must touch the lower boundary. If a gap appears between the paddle and boundary with control knobs turned to stop, adjust potentiometer, R48, on computer board until the paddles just touch the lower boundary. Full reverse rotation of control knob will cause paddles to touch top boundary. If paddles do not touch top boundary recheck adjustment to lower boundary. Adjust as required. If paddles do not adjust change computer board.

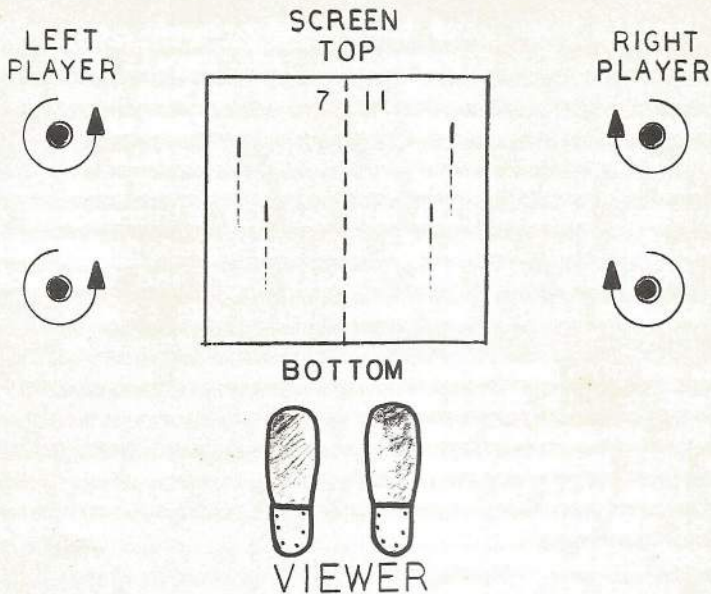


FIGURE 4-1

Looking down at the game field, stand between the two (2) players. The score should appear at the middle top of the screen facing to the viewer. A clockwise rotation of the left hand side paddle control knob(s) will cause the paddle(s) to move towards the bottom of the screen. A like rotation of the right hand side paddle control knob(s) will cause the paddle(s) to move towards the top of the screen. Now, a reverse rotation of any of the knobs should produce a reverse motion of the paddle.

If any paddle fails to move as indicated, the red and black wire leads on the potentiometer may have been erroneously reversed (or if all 4 paddles move in an opposite direction as indicated by the proper rotation and paddle movement the leads at the connector may have been reversed).

Replacement of Any Item in the Game

For any item in your game that needs repair, we request you fill out one (1) fluorescent red 'repair tag' per item with all the pertinent information and send us the 'repair tag(s)' along with the broken item(s).

If you plan to use a spare part in place of the item you are returning, please fill out one (1) fluorescent green 'item transfer tag' with all the pertinent information and mail it along with the 'repair tag' and the broken item.

All items in any particular game (boards, monitors, etc.) are to remain with the game in which they were originally installed - except in times of repair. All items sent to MIRCO will be repaired and returned with the assumption that the item will be replaced into the original game. This is of the utmost importance, as any deviation from this method will adversely affect the warranty.

Replacement of Parts

IMPORTANT: UNPLUG GAME FROM POWER RECEPTACLE DURING CLEANING, INSPECTION, OR WHENEVER REPLACING A PART, TO PREVENT POSSIBLE ELECTRICAL SHOCK.

- 1) Prior to the removal of the top, open up and remove. potentiometer controls, cables, and free game and illumination lamps and cables.
- 2) Unscrew 2 screws holding lid lock-arm to top. Unscrew the 10 screws holding the 2 hinges to the top.

A) Speaker

Using small Phillips head screwdriver, remove 2 screws diagonally placed on speaker frame. Pull out.

Replacement of Parts (Continued)

B) Free Game Light

Remove from retainer, 2 screws. Pull sideways, parallel to glass to remove. To replace, wood is slotted: slide retainer sideways, parallel to glass and install 2 screws.

C) Monitor

Remove MP4 wire connector - pull monitor straight up and out.

NOTE: Connector will come out only by depressing both release tabs. Also, it can be replaced back into the monitor in only one way because of connector mold.

D) Paddle Control Potentiometers

- 1) Release both Allen screws in knob; pull off
- 2) Open lid, remove 2 wood plate screws located directly under control knobs
- 3) Remove nut from top of potentiometer
- 4) Push potentiometer down through panel or top and remove from inside cabinet or top
- 5) Change wires from potentiometer to be replaced to new potentiometers one for one. If new potentiometers are not available at this time mark proper location of wires for re-installation
- 6) Connect wires to new potentiometers and place into control panel or top from bottom side. Tab on side of potentiometer must be positioned in small hole.
- 7) Place lock washer over shaft of potentiometer and tighten nut
- 8) Install knob
- 9) Check operation of potentiometers
- 10) See proper rotation on Pages 15-16 to insure potentiometers are hooked up correctly

Replacement of Parts (Continued)

E) Illumination Lamps

For coin mechanism and mode and start switches: remove plate inside of lid held on by 2 wood screws.

F) Game Mode Toggle Switch

- 1) Loosen nut holding switch to panel or door
- 2) Push switch down or in and remove from inside
- 3) Separate switch from ground braid
- 4) Exchange wires from old switch to new switch one for one. If new switch is not available mark location for re-installation
- 5) Insert switch through ground braid, and place in panel.
- 6) Install lock washer over switch and tighten nut (Do not allow body of switch to rotate as nut is turned)

G) Start Switch

- 1) Loosen nut and push switch through door
- 2) Remove wires from switch terminals and connect to new switch one for one
- 3) Position switch in door
- 4) Tighten in place (Do not allow switch to rotate as nut is turned)

H) Coin Mechanism

- 1) Remove ground braid from rear of frame
- 2) Remove mounting screws
- 3) Pull harness through front of door and change wires one for one to new mechanism
- 4) Connect wires to switch and position mechanism in door
- 5) Bolt in place and connect ground braid to rear of frame
- 6) Turn power on and check operation

Additional Information

- 1) A coin counter can be installed by connecting two purple wires lying by speaker with butt-connectors on them, to either lead of the optional coin counter. Secure coin counter in an upright position on the floor left of the white push-button interlock switch.

**STANDARD REPAIR PRICES
FOR OUT OF WARRANTY GAMES
(Less Parts)**

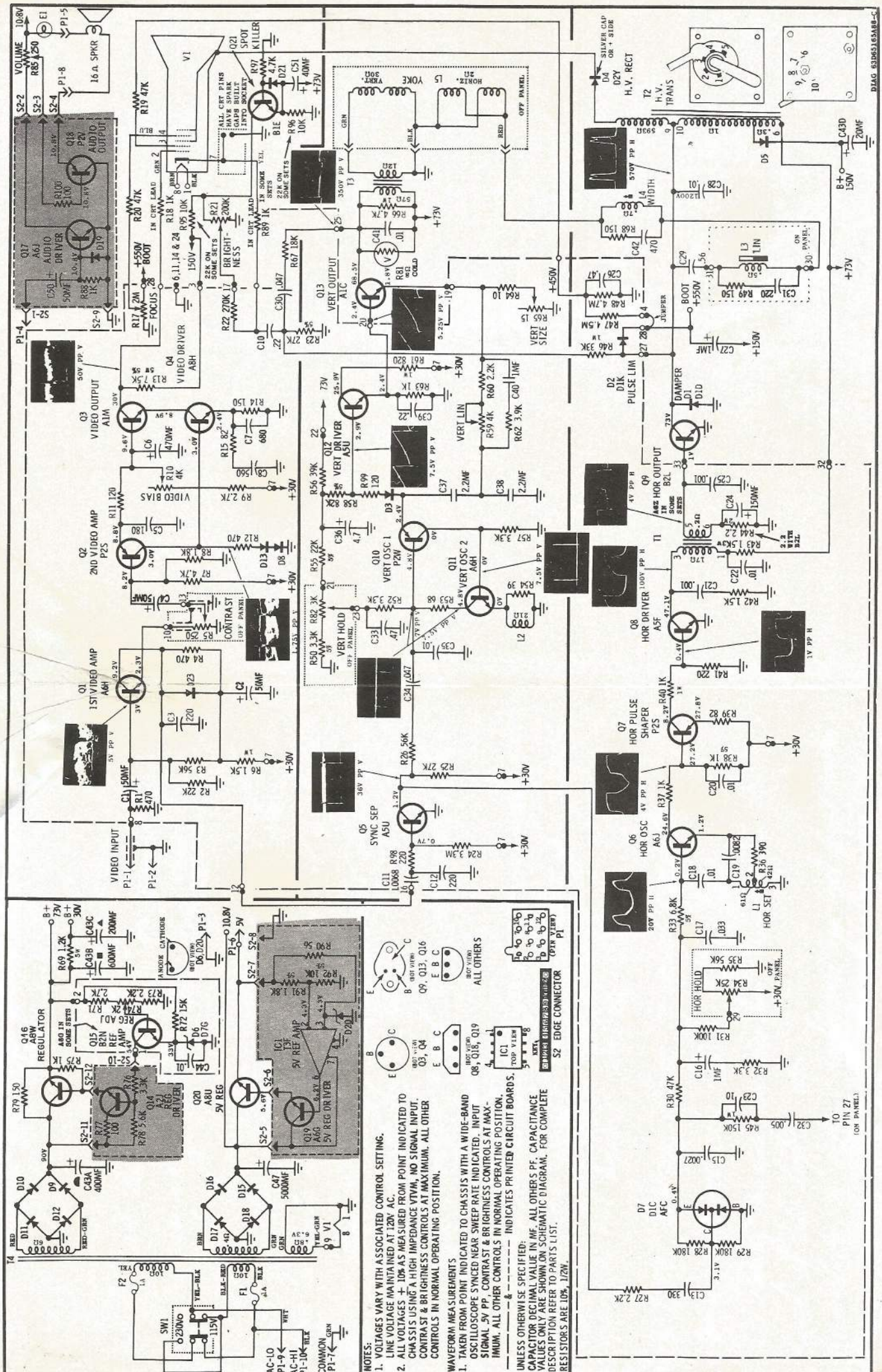
ITEM	DESCRIPTION	COST
3700	2 Player-Logic P.C. Board	\$25.00
3701	11 Grid-Logic P.C. Board	25.00
3702	12 Grid-Logic P.C. Board	25.00
3500	Free Game P.C. Board	20.00
32A02	Monitor Panel P.C. Board	25.00
VS102	5 Volt Monitor P.C. Board	15.00
Monitor	XM501-10	45.00

SHIPPING IS TO BE PREPAID,
BOTH WAYS, BY THE CUSTOMER.

This list of items and repair costs, is
subject to change without prior notification
by Mirco Games, Inc.

Carballo If a sixth ball comes out which happens
cannot play then "game over" relay will not come on.
Game over relay is generally towards the front - Ball
court (reel) is also towards front. 5th ball on return
should operate game over relay. I must check the above
and also the ball chute switch on L.H.S. at front.

MONITOR



NOTES:

- VOLTAGES VARY WITH ASSOCIATED CONTROL SETTING.
- LINE VOLTAGE MAINTAINED AT 120V AC.
- ALL VOLTAGES $\pm 10\%$ AS MEASURED FROM POINT INDICATED TO CHASSIS USING A HIGH IMPEDANCE VTVM. NO SIGNAL INPUT. CONTRAST & BRIGHTNESS CONTROLS AT MAXIMUM. ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.

WAVEFORM MEASUREMENTS

- TAKEN FROM POINT INDICATED TO CHASSIS WITH A WIDE-BAND OSCILLOSCOPE SYNCED NEAR SWEEP RATE INDICATED. INPUT SIGNAL 5V PP. CONTRAST & BRIGHTNESS CONTROLS AT MAXIMUM. ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.

— INDICATES PRINTED CIRCUIT BOARD S.

UNLESS OTHERWISE SPECIFIED: CAPACITOR DECIMAL VALUE IN MF. ALL OTHERS PF. CAPACITANCE VALUES ONLY ARE SHOWN ON SCHEMATIC DIAGRAM. FOR COMPLETE DESCRIPTION REFER TO PARTS LIST.

RESISTORS ARE 10% , $1/2W$.

Schematic Diagram

DIAG 93385165A8-C

1518 James St
1516 Wall Nbr Kings

177.00
1.00
178.00
16.92
194.92
67.68

Not in King's The Field James St
James St " 5 1/2
James St West Hill