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Triple Hunt™

Operation, Maintenance and Service Manual

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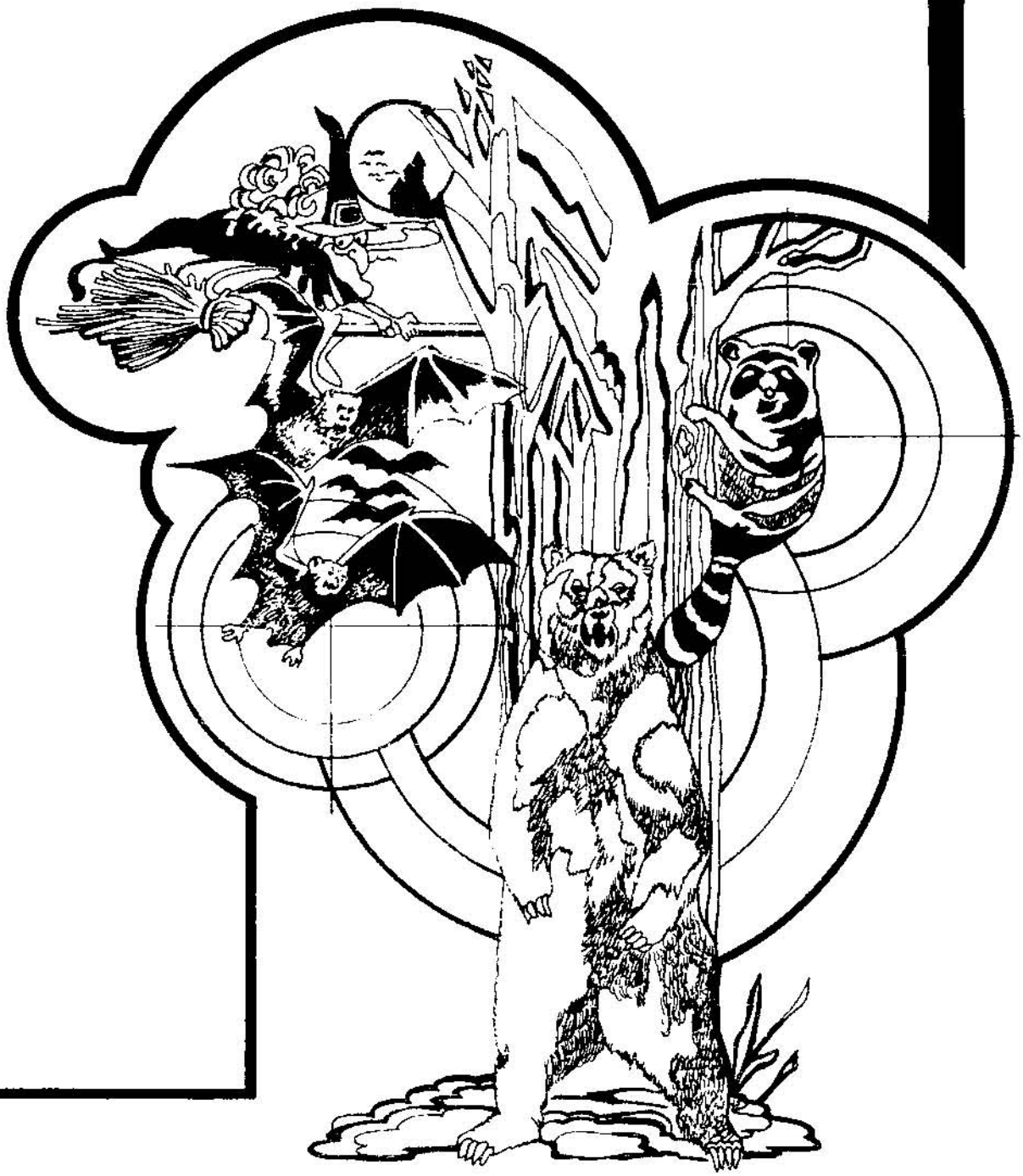

Triple Hunt™

Operation, Maintenance and Service Manual

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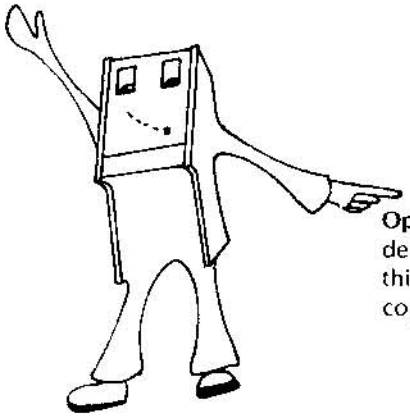

You may find it helpful to read **Atari's Video Game Operator's Handbook,** TM-043, as a prerequisite to understanding the theory of operation contained within this manual. Contact your distributor for a personal copy of the Video Game Operator's Handbook.

By the Publications Group, Engineering Department

ATARI®

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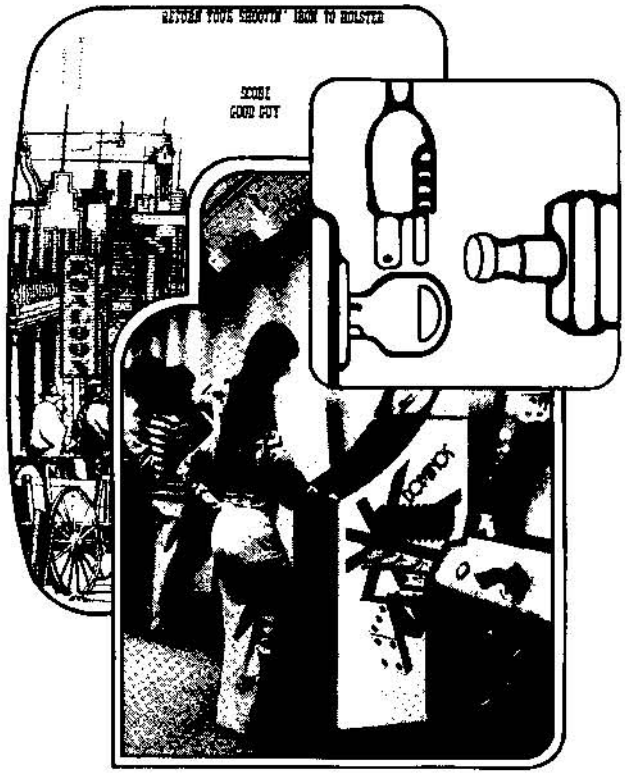


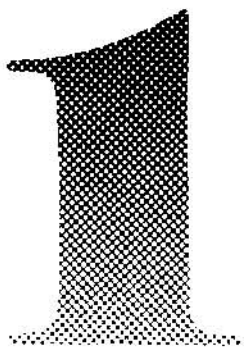
LOCATION SETUP

INTRODUCTION

Atari's Triple Hunt is a one-player gun game housed in two upright cabinets that rest directly on the floor. A rifle-type gun is mounted at the top of one cabinet, and a TV monitor, on whose screen the target objects appear, is mounted in the other cabinet. An adjustable-length support tube and plate assembly connects between the cabinets. Its adjustment feature allows the operator to easily change the separation distance between cabinets to any value between 5 ft. and 10 ft. Figure 1 shows the amount of floor space needed for the cabinets and lists their physical dimensions. The game does not require any bolt connections to the floor at the game site.

The game's only player-operated controls are a trigger on the gun and a backlighted Start pushbutton that is mounted on top of the cabinet with the gun. On the player side of this cabinet two identical coin mechanisms and two speakers are also mounted, below the gun. Either coin mechanism can initiate game play; the coin box is located behind a locked access door to the mechanisms. During play the speakers add to the game excitement by producing continuous background sounds, gunshots when the trigger is pulled, and other special "hit" sounds whenever a player's shot hits an object on the TV screen.

A unique feature of this Atari game is that at the game site the operator can easily change it back and forth between *three* different game play configurations. These configurations are named Hit the Bear, Racoon Hunt, and Witch Hunt; each has its own combinations of graphics panels, target objects and distinctive sounds produced during play. Chapter 2 of this manual describes each configuration in detail. All parts needed for changeovers from one play configuration to another are provided with the game and are stored inside the game cabinets when not in use. The changeover can be done in less than one hour, and no special tools or technical skills are required. Therefore, this feature in effect provides the operator with a 3-game capability from *1* cabinet set.



Another important game feature is a set of switch-selectable options that give the operator three choices for cost per game play, four choices for the length of game play, and a choice for allowing extended play or not. Table 2 in Section C of this Chapter describes these options in detail.

The special "High Score" display is a game feature that increases player incentive to try out the game, and also to play it over again as well. "High Score" is a numerical display that only appears on the TV screen between game plays. The game's microcomputer system begins remembering the highest number of score points earned by any player as soon as AC power is turned on. After each game play ends, the microcomputer puts this number on the screen and the words "HIGH SCORE" right below it. Persons looking at the screen are then challenged to beat the high score player, even long after that player has walked away!

The game also has a built-in self-test feature. The self-test will confirm correct game operation when all components are working properly, and will speed up the troubleshooting steps if a component has failed. The failure information is automatically displayed in letter codes directly on the TV screen, and the self-test can be performed by a person not having special technical training in electronics.

INSTALLATION INSTRUCTIONS

UNPACKING

Examination for Shipping Damages:

Before shipment from the factory, components and sub-assemblies of each game are carefully checked for proper operation. However, during shipment some adjustments may have changed or parts may have been damaged.

The game is packed in three shipping containers, with certain parts disassembled. One container has the gun mount container, less the gun itself. A second container has the CRT cabinet and the gun, and the third container has the support tube and plate assembly needed for interconnecting the cabinets. Upon initial removal of the game from the shipping containers, first examine the exterior of the cabinets. Then open the cabinet doors and also examine the interiors. Any shipping damage such as a dented, cracked or broken cabinets, sub-assemblies broken loose, etc., should be reported immediately to the shipper and to Atari, Inc.

Mechanical Inspection:

After determining that the game has been received in good condition, carefully inspect the interior parts and verify the following:

(a) All plug-in connectors are firmly seated.
(b) The fuses are all seated in their holders
(c) No loose foreign objects are present (especially metal objects which could cause electrical short circuits)
(d) No harness wires have become disconnected or pulled loose.

Be sure *all* major assemblies have been checked. In the gun mount cabinet check the bottom side of the gun mount assembly, the speakers, the coin door assembly, components on the tape deck shelf (including a small printed circuit board and two tape cartridges packed in the storage box alongside the tape deck itself), the coin box, the RF shield box (perforated metal box mounted on the cabinet door), and the power supply assembly mounted on the floor of the cabinet.

In the CRT cabinet, check the TV monitor, the two fluorescent lamp assemblies (one at the top front of the cabinet and one inside the cabinet at the front, about halfway down), the power cord, and the plex and cardboard panels stored in the shelves at the bottom of the cabinet. Also confirm that the half-silvered mirror (installed at a 45° angle in front of the TV tube) is firmly in place.

Do not go on to the remaining paragraphs in this section until the above mechanical inspection has been thoroughly performed.

SETUP

Table 1 lists the specifications for this game, including the electrical power and environmental requirements at the game site. The floor space requirement will partly depend upon the choice made for separation distance between the two game cabinets (from a minimum of 5 ft. to a maximum of 10 ft.).

After the game has been moved to the game site, the setup procedure consists of the following: bolting the gun onto the gun mount cabinet, attaching the support tube and plate assemblies that connect the two cabinets together, a preliminary electrical checkout, operating the game in the test mode and performing the gun alignment procedures (covered in Section C of this chapter), and finally structuring the game for one of the three possible game selections: Hit the Bear, Racoon Hunt or Witch Hunt (also covered in Section C).

Table 1 Game Specifications

GENERAL	
TV Monitor	Black and white, 23-inch screen, with composite video input.
Coin Mechanisms:	Two identical mechanisms; accept only quarters.
Cash Box:	Removable; located behind locked access door to coin mechanisms.
Power Cord:	Approximately 8 feet long, extending from rear of CRT cabinet (at a point approx. 39 inches up from floor), and having grounded three-prong plug for conventional wall outlets.
Self-Test Switch:	Located inside cabinet, behind locked access door to coin mechanisms and to the immediate left of the coin box.
Cabinet Dimensions:	Gun Mount Cabinet Width 25¼ in., Depth 26½ in., Height 54 in. (with gun mounted) and 43⅞ in. (with gun dismounted). CRT Cabinet Width 25¼ in., Depth 46 in., Height 66 in.
Power On/Off Switch:	Toggle switch in recessed position on surface of gun mount cabinet facing away from player; intended for operator use only.
Lighting:	Two 18-inch fluorescent "blacklamp" tubes inside CRT cabinet (one type F15T8/BL tube and one type F15T8/BLB tube); one GE #47 incandescent lamp inside gun mount cabinet for coin mechanism lighting.
Tape Deck:	Audio tape deck with 2 removable tape cartridges that have been pre-recorded with background sounds for playback during game play.
ELECTRICAL	
Power Requirement:	Uses conventional grounded wall outlet providing single phase, 60 Hz AC, normally at 110 volts. Voltage selection block on power supply assembly can be changed to permit game to operate at 95 VAC, 205 VAC, or 220 VAC, however.
Power Consumption:	Approximately 150 watts
Fusing:	Total of four fuses, two in each cabinet, accessible behind access doors. TV monitor has two 3AG 1-amp slow-blow, 250-volt fuses mounted on rear of chassis; remainder of game is protected by two 3AG 3-amp quick-blow, 250-volt fuses mounted on top of power supply assembly on floor inside gun mount cabinet.
Power Interrupt Switches:	Game has two safety interlock switches, one in each cabinet, located inside the access door. Either switch will cause removal of AC power to the game when its door is opened. In the case of the CRT cabinet, only the upper rear door needs an interlock switch, because no voltages are present in the lower portion of this cabinet.

Table 1 Game Specifications

ENVIRONMENTAL	
Operating and Storage Temperature Range:	From 32° Fahrenheit to 120° Fahrenheit (ambient temperature)
Relative Humidity:	Maximum of 80% without condensation
OPERATOR OPTIONS FOR STRUCTURING OF GAME PLAY	
Cost:	1 coin per play 1 coin per 2 plays 2 coins per play
Game Selection:	Hit the Bear, Racoon Hunt, or Witch Hunt
Play Time:	For Hit the Bear and Witch Hunt 30 sec., 60 sec., 90 sec., or 120 sec.; for Racoon Hunt 32, 48, 64 or 80 racoons
Extended Play:	Choice of no extended play, or 50% additional play time given if player earns pre-set high score by the end of normal play time.

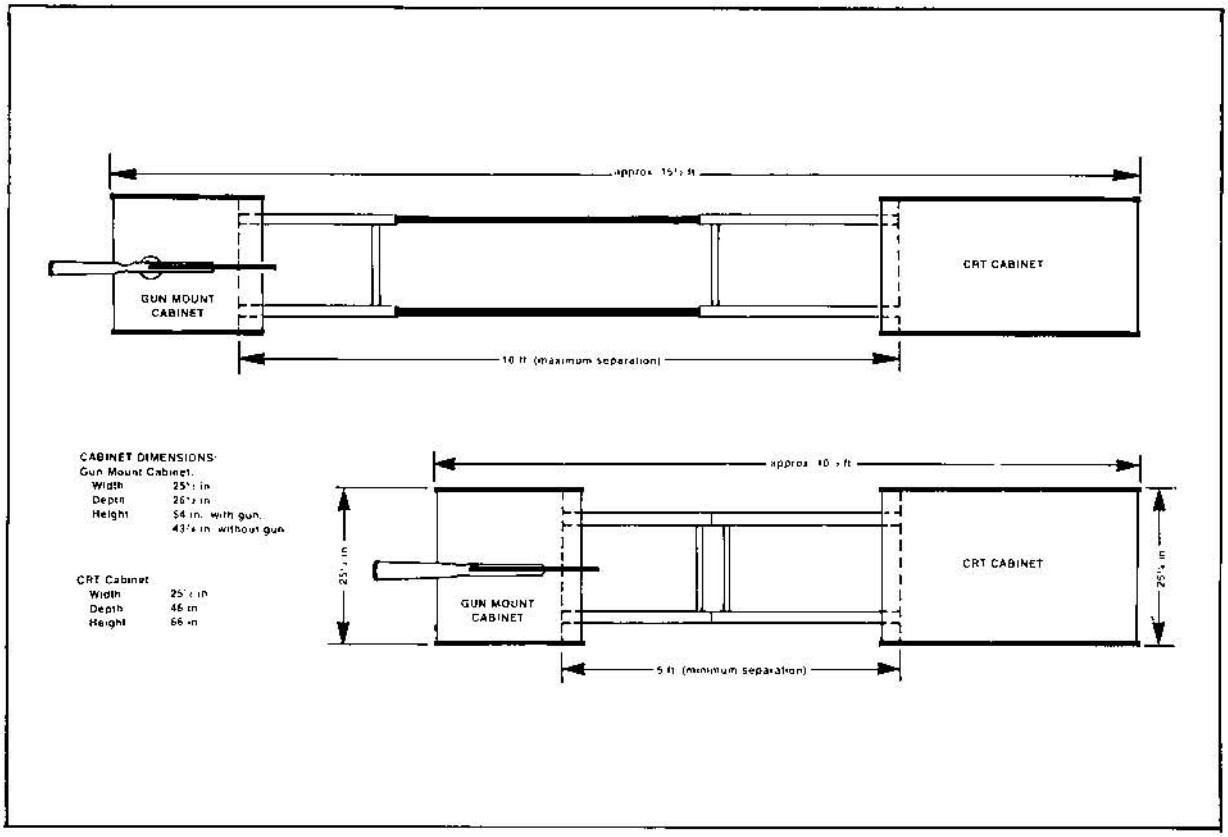


Figure 1 Physical Dimensions of Game

BOLTING GUN ONTO GUN MOUNT CABINET

PROCEDURE

1) Place the gun onto the gun mount and position it so that the holes for the three ¼-20 screws are allgned.

2) For each of the three screws, insert the screw in place and then use a ⅛-inch Allen wrench to tighten the screw down.

(For removal of the gun, perform the above steps in reverse.)

Figure 2 Bolting Gun Onto Gun Mount Cabinet

ATTACHING SUPORT TUBE AND PLATE ASSEMBLIES TO CABINETS

1) Move the gun mount cabinet and CRT cabinet to their final positions at the game site, and make sure that they are lined up with one another and separated by the desired distance (no closer than 5 ft. and no farther than 10 ft.). Refer to Figure 3 for a view of a final location with the maximum 10 ft. separation.

2) Remove the Support Tube and Plate Assemblies from their shipping container and lay them out in their approximate positions, as shown in Figure 2. It may be necessary to use a ⅛-inch Allen wrench to loosen the two clamping screws on the ends of each support tube, so that the plate portions of the assemblies will be free to move over the tubes.

3) A cable is permanently installed inside the left tube, and connectors are wired to each end of the cable. Insert each cable connector into its corresponding hole provided near the bottom corner of each cabinet.

4) On the gun mount cabinet unlock and open the rear door. Then reach inside the cabinet and mate the cable's connector to the connector from the cabinet's wiring harness. Also coil up any excess length of cable inside on the cabinet floor, but make sure that the coil is not touching against any cabinet components.

5) On the CRT cabinet, unlock and remove the lower rear door. Then crawl inside the cabinet and mate the cable's connector to the connector from the cabinet's wiring harness. Also coil up any excess length of cable inside on the cabinet floor. (For this step and the following step, it may be necessary to temporarily remove the graphics panel from their storage shelves in order to gain full access to the cabinet floor area.

6) On each cabinet, push the plate end of the support tube assembly up against the edge of the cabinet so that the holes in the plates line up with the holes in the cabinets. Then insert the four ¼-20 carriage bolts into the holes on each plate, so that the bolts pass all the way through the cabinet walls and the bolt heads are flush against the plates.

7) Reach inside the cabinets. Onto the threaded end of each carriage bolt protruding inside the cabinet, place a flat washer, a split-ring lock washer, and a wing nut. Alternately tighten down the eight wing nuts until both plates are fully attached to each cabinet.

8) Use a ⅛-inch Allen wrench to tighten down the four clamping screws on the support tubes, so that the distances between the cabinets will be held constant.

9) On the CRT cabinet replace and lock the lower rear door. *Do not* plug in the power cord yet.

PRELIMINARY ELECTRICAL CHECK-OUT

1) Look inside the gun mount cabinet and locate the power supply assembly that rests on the floor of the cabinet. Examine the voltage selection block that mounts on top of the assembly, as shown in Figure 4. Confirm that a voltage selection block is in place, and that it corresponds with the voltage present at the AC power wall outlet at the game site. (Normally an orange color-coded block will be in place, to correspond with a 110 VAC outlet. However, three other types of blocks are available to enable use with outlets providing 95 VAC, 205 VAC or 220 VAC, all single-phase.)

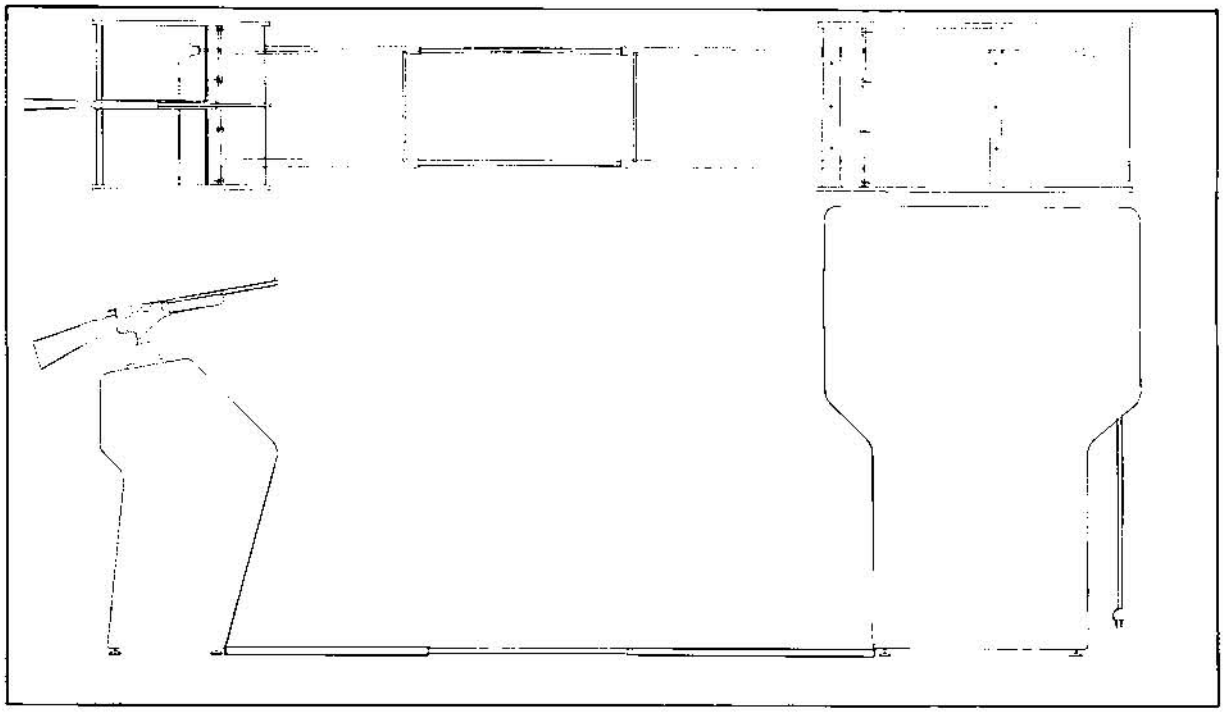


Figure 3 Final Location Setup

2) Inside the cabinet, also find the three size AA batteries mounted in a battery holder on the back side of the rear door. Figure 5 shows the location of the batteries. Confirm that the batteries are fully seated, with the correct orientations for polarity, and that the lead clip to the battery holder is connected securely. Figure 6 shows a detailed view of the holder, including battery polarities. (The lead clip may have been disconnected at the factory, in order to avoid battery drain during shipment. If the game is to be stored for longer than a few weeks, it is a good idea to disconnect the lead clip for this same reason.) The gun alignment portion of the test mode has to be done over again after any removal of a battery.

3) Examine the cabinet interior to make sure that no tools or other foreign objects are present. Then close and lock the cabinet rear door.

4) A hole has been provided in the back of the CRT cabinet, about halfway up from the floor on the left side (when viewing the cabinet from the rear), for the power cord to exit from the cabinet. Find the cord and plug it into the AC wall outlet. The doors to both cabinets should be closed and locked at this time.

5) On the forward surface of the gun cabinet, below and to one side of the gun barrel, a two-position Power On/Off toggle switch is mounted in a recessed position. If this switch is in its *ON* position, withing approximately 30 seconds a raster display will appear on the screen of the TV monitor. If the switch was in the *OFF* position, then it has to be changed to *ON* before the raster will appear. If the raster still does not appear, unplug the power cord and check the game fuses before initiating any other troubleshooting steps. Refer to Chapter 3, Section C, for fuse replacement.

FINAL STEPS IN SETUP PROCEDURE

Refer to Section C of this Chapter for operating the game in the test mode and performing the gun alignment procedure, and then for structuring the game for one of the three possible game selections.

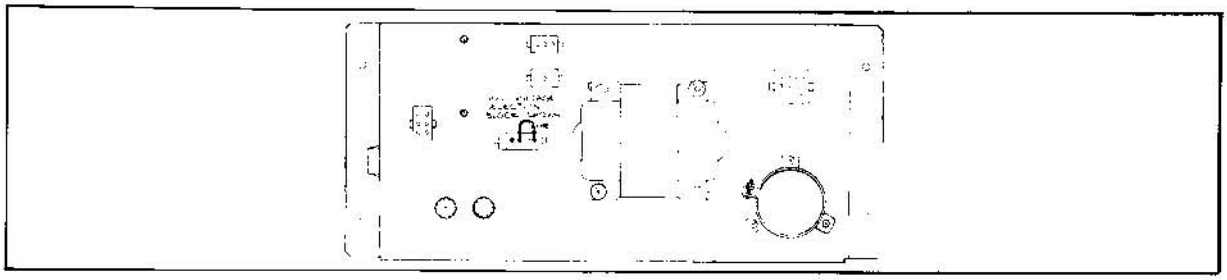


Figure 4 Voltage Selection Block

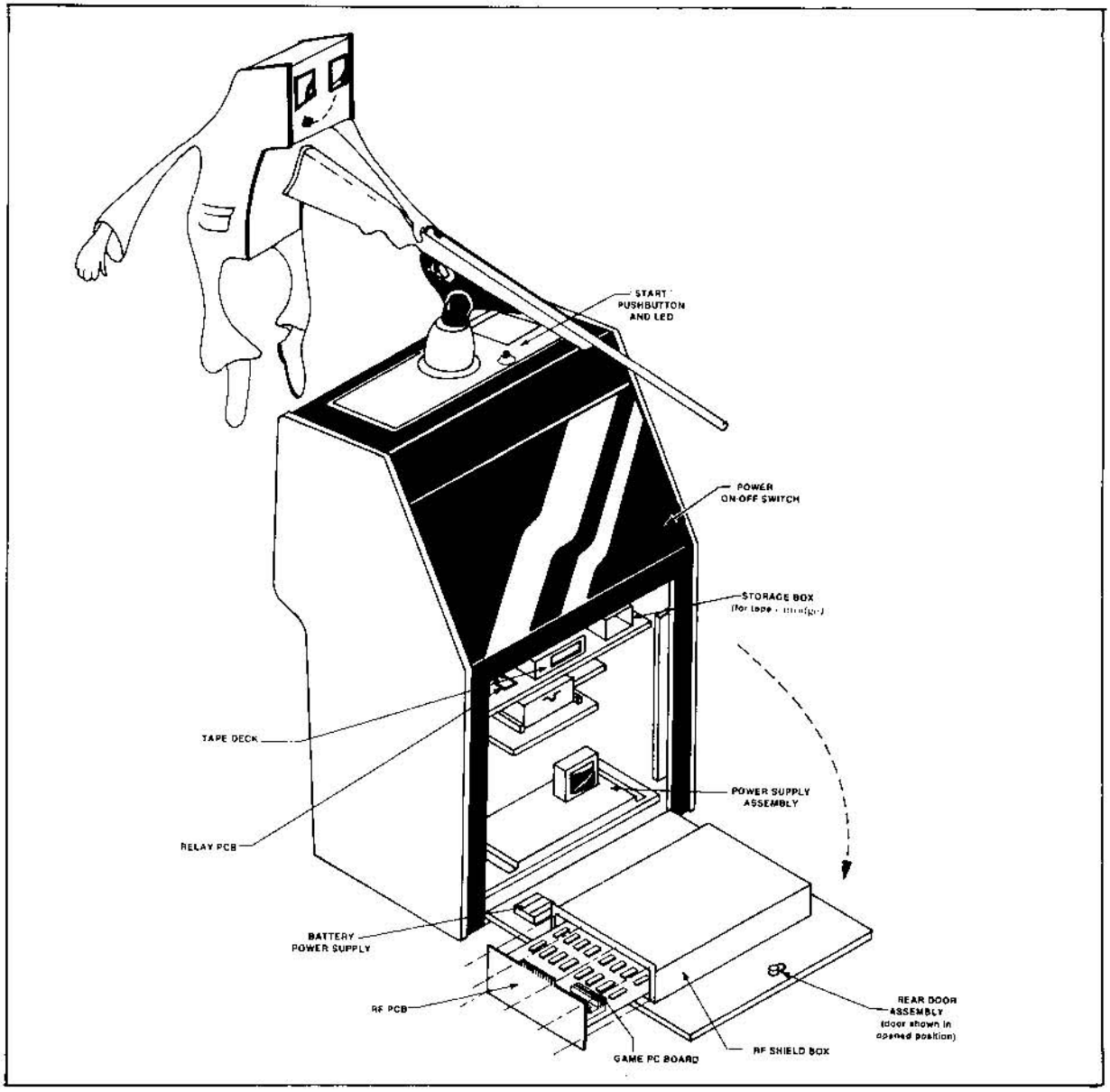


Figure 5 Exploded Diagram, Front View of Gun Mount Cabinet

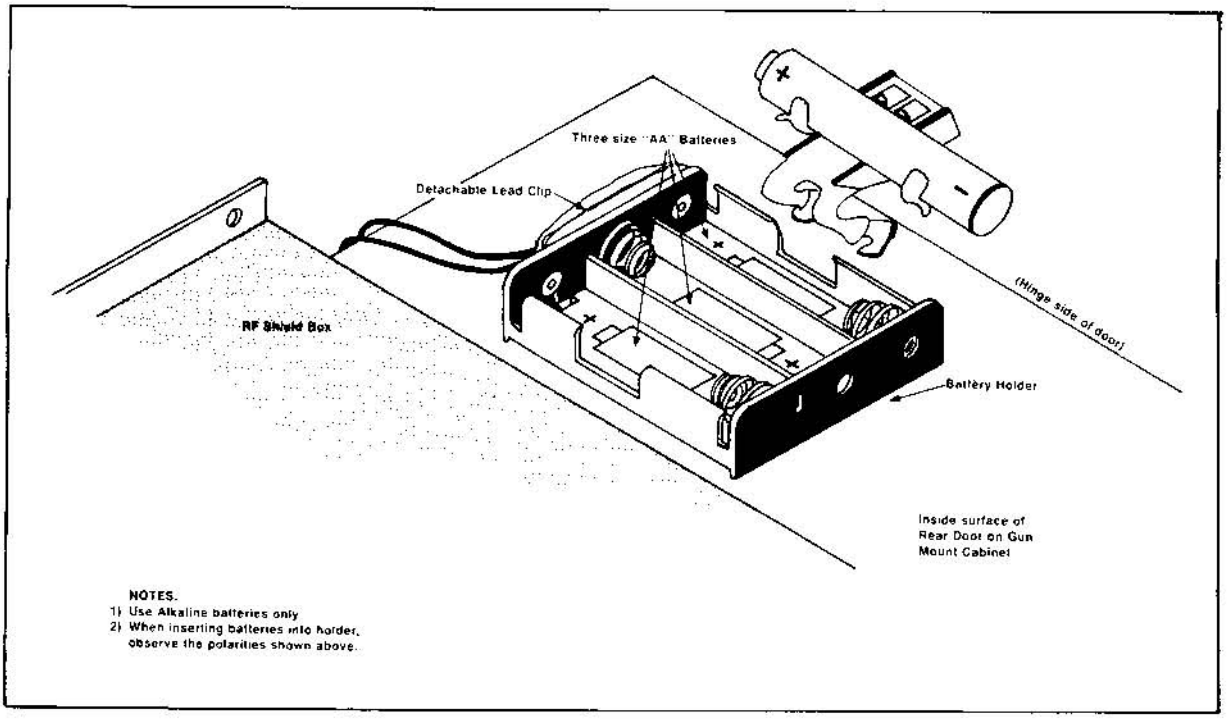


Figure 6 Detail View of Battery Power Supply

ADJUSTING OPERATOR OPTIONS FOR GAME SELECTION

CHECK ON INTERLOCK SWITCHES

Two interlock switches have been provided, one in each cabinet. They have been put there to prevent accidental shock of anyone who has reason to stick a hand inside the cabinet. The function of each switch is to remove all power to the game when a cabinet door is opened. These switches are mechanically aligned prior to shipment of the game from the factory, but it is important that they be checked to insure proper operation after shipping.

The switches operate independently of one another, so each has to be checked separately. The switch in the CRT cabinet is mounted behind the upper rear door, near the TV monitor. (No switch is needed behind the lower rear door of the CRT cabinet because no electrical components have been placed in the lower half of this cabinet.)

Verify operation of the interlock switch as follows. Unlock and slowly open the door. The switch is operating correctly if, by the time the edge of the door has moved about 2 to 3 inches away from the cabinet, the display on the TV monitor goes dark. While opening the door do not insert fingers inside the cabinet and do not allow foreign objects to fall inside. If the raster display continues to appear on the TV monitor even after the door has been opened, immediately close and lock the door and unplug the power cord from the wall outlet. Then adjust and/or replace the interlock switch, and perform the check over again.

CHANGES REQUIRED FOR GAME SELECTION

Table 2 summarizes the changes required when making a new game selection. When setting the game up at a game site for the first time, all the items in the table (panels, tape cartridge, settings on SW1, and instruction card) may have to be changed from what they were when the game was received.

CHANGING THE SETTINGS ON SW1

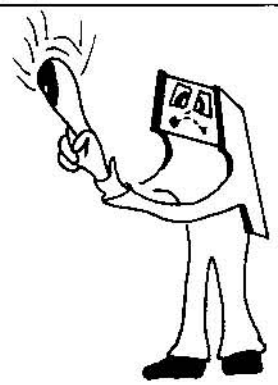
SW1 is a miniature switch assembly on the game printed circuit board inside the gun mount cabinet.

Table 2 Changes Required When Making New Game Selection

Present Game Selection	*New Game Selection*	*Changes Required*
Hit the Bear	Racoon Hunt	Front Plex Silkscreen Panel, part number 8362-01, settings on SW1, and new instruction card.
Hit the Bear	Witch Hunt	Front Plex Silkscreen Panel, part number 7957-01, Main Display Silkscreen Panel, part number 8374-01, Card Board Graphics Panel, part number 8454-01, Witch Hunt Tape Cartridge, and remove Mask Silkscreem Panel. Change settings on SW1 and new instruction card.
Racoon Hunt	Hit the Bear	Front Plex Silkscreen Panel, part number 8361-01, settings on SW1, and new instruction card.
Racoon Hunt	Witch Hunt	Front Silkscreen Panel, part number 7957-01, Main Display Silkscreen Panel, part number 8374-01, Card Board Graphics Panel, part number 8454-01, Witch Hunt Tape Cartridge and remove Mask Silkscreen Panel. Change settings on SW1 and new instruction card.
Witch Hunt	Hit the Bear	Front Plex Silkscreen Panel, part number 8361-01, Main Display Silkscreen Panel, part number 8373-01, Card Board Graphics Panel, part number 8453-01, Mask Silkscreen Panel, part number 8377-01, Bear/Racoon Tape Cartridge, settings on SW1 and new instruction card.
Witch Hunt	Racoon Hunt	Front Plex Silkscreen Panel, part number 8362-01, Main Display Silkscreen Panel, part number 8373-01, Card Board Graphics Panel, part number 8453-01, Mask Silkscreen Panel, part number 8377-01, Bear/Racoon Tape Cartridge, settings on SW1, and new instruction card.
		NOTE: If the Extended Play operator option is chosen, then the instruction card also has to show the number of score points needed to earn extended play.

CAUTION:

The game PCB operates at a temperature of about 200 degrees Fahrenheit. Exercise caution to prevent burning parts of the body touching the PCB.



1) On the Gun Mount Cabinet place the Power On/Off Switch in its *off* position.

2) On the Gun Mount Cabinet unlock and fully open the Rear Door.

3) Locate the R.F. Shield Box (a large, perforated aluminum box attached to the door), and the R.F. printed circuit board (attached to one end of the box). Refer to Figure 6 for an exploded diagram view of the interior of the Gun Mount Cabinet.

4) Use a Phillips-head screwdriver to loosen and remove the 10 screws that hold down the R.F. printed circuit board.

5) Carefully unplug the R.F. printed circuit board from the Game PCB (that rests inside the box), and then place the R.F. printed circuit board on top of the box.

6) Slide the Game PCB about half way out of the box. It will *not* be necessary to completely remove the Game PCB from the box. Locate Switch Assembly SW1 on the surface of the Game PCB. (Refer to Figure 7).

7) Set the positions of the miniature switches on SW1 so that they will correspond to the game selection and other operator options desired, as listed in Table 3. Any adjustments of speaker volume or of the pitch (bass or treble sound), or the bear growl can also be made at this time, by manually moving the studs on the potentiometers shown in Figure 7.

Table 3 Switch Settings for Game Selections and other Operator Options

Option	*Message on TV Screen During Attract Mode*	*Toggle Positions on Switch Assembly SW1*								*Description of Structuring*
		1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	
Game Cost	1 COIN/ 1 GAME	off				off				One game play given for deposit of one coin.
		on				on				One game play given for deposit of one coin.
	1 COIN/ 2 GAMES	on				off				Two game plays given for deposit of one coin.
	2 COINS/ 1 GAME	off				on				One game play given for deposit of two coins.
Game Selection	Racoons climb up tree.		off				off			Racoon Hunt is selected.
			on				off			Racoon Hunt is selected.
	Witches fly across screen at random		off				on			Witch Hunt is selected.
	Bears walk across screen		on				on			Hit the Bear is selected.
Play Time				on				on		In Hit the Bear & Witch Hunt 30 sec.; in Racoon Hunt 32 racoons.
				off				on		In Hit the Bear & Witch Hunt 60 sec.; in Racoon Hunt 48 racoons.
				on				off		In Hit the Bear & Witch Hunt 90 sec.; in Racoon Hunt 64 racoons.
				off				off		In Hit the Bear & Witch Hunt 120 sec.; in Racoon Hunt 80 racoons.

Table 3 Switch Settings for Game Selections and other Operator Options

Option	Message on TV Screen During Attract Mode	Toggle Positions on Switch Assembly SW1								Description of Structuring
		1	2	3	4	5	6	7	8	
Extended Play					off					No extended play allowed, regardless of player's score level.
					on					When normal play time elapses, if the player's score is equal to or higher than the extended play scoring level, then the player is given additional play time. In Racoon Hunt the extended play will be 50% more racoons, and in Hit the Bear and Witch Hunt the extended play will be 50% more time. The value for the extended play scoring level depends on both the game selected and on the choice made for normal play time. One value will apply to each of the game selection/normal play time combinations, as shown below.

Game	Normal Play Time	Score Required to get Extended Play	Extended Play
Witch Hunt	30 sec.	1400 points	15 sec. add
	60 sec.	3000 points	30 sec. add
	90 sec.	4000 points	45 sec. add
	120 sec.	5000 points	60 sec. add
Hit the Bear	30 sec.	8000 points	15 sec. add
	60 sec.	1200 points	30 sec. add
	90 sec.	1500 points	45 sec. add
	120 sec.	1800 points	60 sec. add
Racoon Hunt	32 racoons	900 points	16 racoons add
	48 racoons	1200 points	24 racoons add
	64 racoons	1500 points	32 racoons add
	80 racoons	1800 points	40 racoons add

8) Check to make sure that no foreign objects have been dropped onto the Game PCB, and that the board has not been damaged.

9) Carefully plug the R.F. printed circuit board back onto the Game PCB, and then slide the Game PCB back into the box. DO NOT FORCE OR BEND THE PRINTED CIRCUIT BOARDS.

10) Replace the 10 screws that attach the R.F. printed circuit board to the R.F. Shield Box, and tighten them down.

CHANGING THE TAPE CARTRIDGE

1) If the tape cartridge is to be changed, grasp the end of the cartridge presently in the Tape Deck and remove it by pulling straight out. Figure 4 shows the location of the Tape Deck inside the Gun Mount Cabinet.

2) Place this cartridge in the Tape Cartridge Storage Box, and remove the new cartridge from this box. Each cartridge is labeled with the name of the game in which it is to be used.

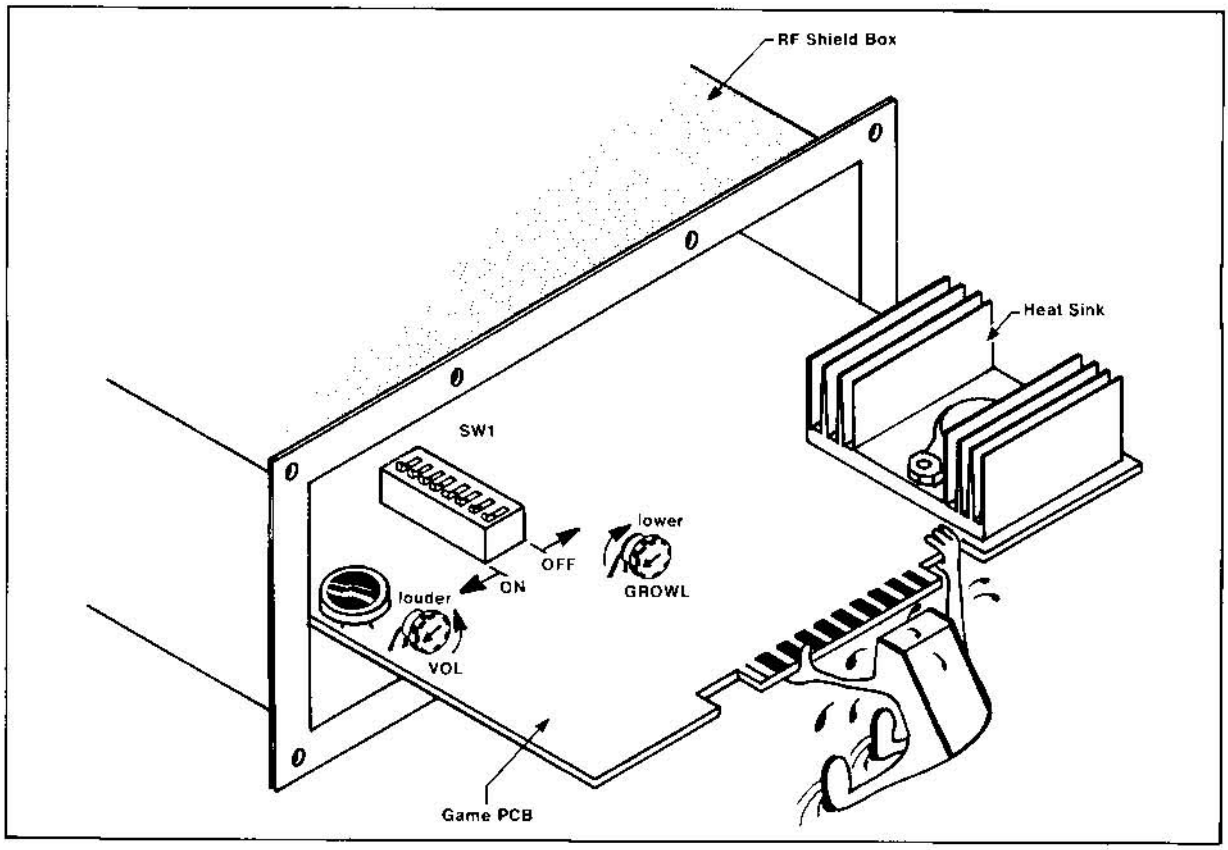


Figure 7 Locations of Switch Assembly SW1 and Potentiometer Adjustments

3) Insert the new cartridge into the front of the Tape Deck, and then push it all the way in as far as it will go.

CHANGING THE INSTRUCTION PLATE

The instruction plate is located on top of the gun mount cabinet, next to the Start pushbutton. Three plates are provided with the game, one to go with each of the game selections. Plates not being used are kept along with unused tape cartridges in a storage box inside the gun mount cabinet. The instruction plate being used must correspond to the game options selected on Switch Assembly SW1, and the plate must call out the number of points needed for extended play when that option has been selected. For this purpose, number strips have also been provided that can be affixed to the underside of the instruction plate, so that a number will be included as part of the instructions. The last entry in Table 3 lists all the values possible for the score level required for extended play.

The instruction plate is held in place by four flathead screws that screw down into the gun mount control panel from the top. To change the plate, use a ⅛-inch Allen wrench to loosen and remove the screws, then lift out the present plate and replace it with the new card. Afterwards replace the four screws.

Place the unused instruction plate in the storage box, and then also check to make sure that no foreign objects have fallen inside the cabinet. After this is done, close and lock the gun cabinet rear door.

CHANGING GRAPHICS PANELS

The plex and graphics panels, in place inside the CRT cabinet, have to correspond to the game selected. Table 2 lists the panels that must be changed to select a different game. Refer to Figures 8 through 11 for procedures and illustrations telling how to change each type of panel. After all the required panels have been changed and unused panels have been placed in the panel storage shelves, replace and lock the lower rear door.

VERIFICATION OF CHANGES MADE

As the last step, place the Power On/Off Switch on the gun mount cabinet in its *ON* position, and then look at the TV picture. Verify that the game cost message is the one desired, that the objects in the picture go with the game selected, and that the proper panels have been used and installed correctly (with graphics side facing up). Chapter 2 give a detailed description of game play.

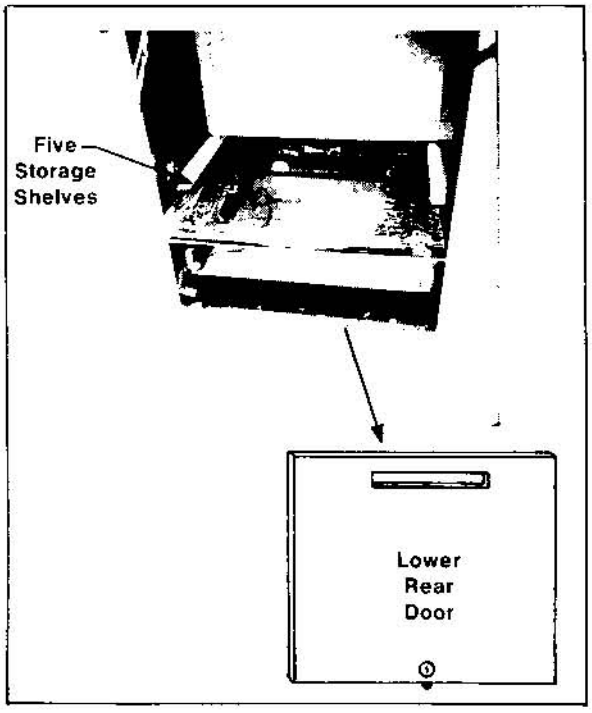


Figure 8 Location of Storage Area in CRT Cabinet for Plex and Graphics Panels

PERFORMING SELF-TEST

DESCRIPTION OF TEST MODE

This self-test feature of the game can speed up troubleshooting steps by quickly isolating many types of component troubles. Tests are done automatically and include checks on RAM and ROM devices on the Game PCB. Also incorporated into the test mode is a simple gun alignment procedure that has to be performed when the game is initially set up at the game site. The alignment has to be done over again if the separation distance between the cabinets is changed, after batteries are changed, or if the previously done alignment has gone out of adjustment (as evidenced during game play when gun shot sounds are produced but no "impact" pictures appear on the TV screen). Generally the life of the alkaline batteries and stability of the gun position sensing circuitry will permit an alignment to last for at least one year.

PUTTING THE GAME INTO TEST MODE

Before the game can be changed over to the test mode, it must first be operating in the attract mode. When in attract, proceed as follows. Unlock and fully open the coin mechanism access door. Then find the Test Switch; it is mounted near the door's hinge, about in the middle of the door opening. Placing this switch in its *on* position will change the game over to the test mode.

To change game operation back to the other modes, place the Test Switch in its *off* position.

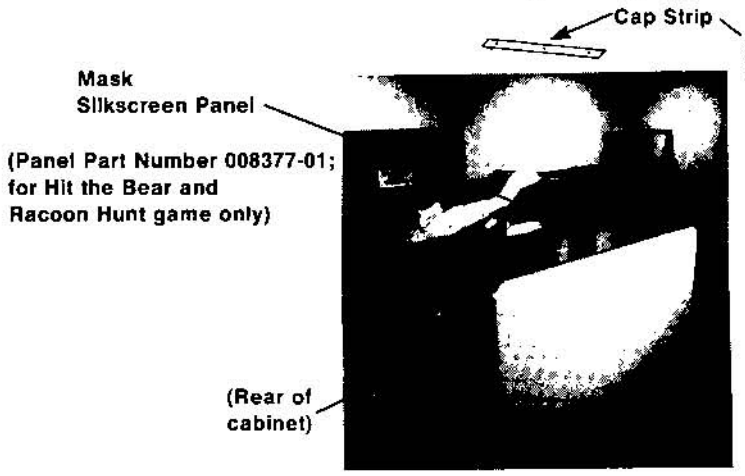
INITIAL ROM AND RAM CHECKS

Immediately after being put into the test mode, the game automatically goes through the ROM checks and all but one RAM check. If one or more devices fail a check, the work "TEST" followed by one or more of the letters A through F will appear on the TV screen. Table 4 shows how to interpret the letter codes to determine which devices on the Game PCB may be bad. This message will remain on the screen; the game will not go on to the gun alignment if any check has failed. But if all ROM and RAM checks pass, the game will automatically show a gun alignment picture on the TV screen.

REPLACING ICs ON THE GAME PCB

To remove the Game PCB use the same procedure as that given under "Changing the Settings on SW1," discussed earlier in this Section. Extreme care should be exercised when removing integrated circuit devices and discrete components. Use a 40-watt maximum soldering iron with a small tip designed expecially for IC work. To remove an IC device, follow this procedure:

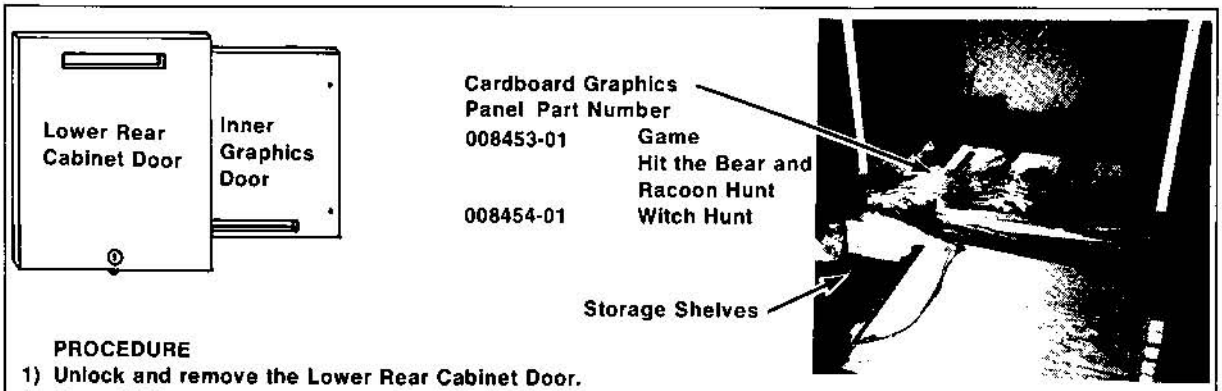
> Clip all leads and lift the IC package out, leaving two rows of leads. Then remove leads individually with a soldering iron and needle-nose pliers. Finally, evacuate the holes with a solder sucker. Afterwards clean the area thoroughly, using an approved PCB cleaning solution to remove any traces



PROCEDURE

1) Use a ⅛-inch Allen wrench to remove the three Button-Head screws located on top of the cabinet, about halfway from each end.
2) If the Cap Strip is in place, remove it and then insert the desired Mask Silkscreen Panel down all the way through the slot and into the cabinet top (Witch Hunt does not use this panel). If the Mask Silkscreen Panel is in place, withdraw it completely and place the Cap Strip over the slot.
3) Insert and tighten the three Button-Head screws.
4) If the Mask Silkscreen Panel was removed in Step 2, put it on a shelf in the panel storage are in the rear of the cabinet. If the Cap Strip had been removed, then put it on a shelf instead.

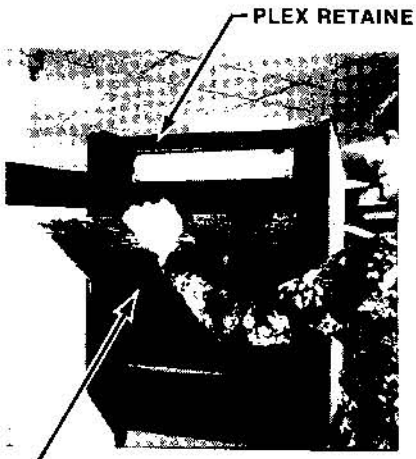
Figure 9 Changing Mask Silkscreen Panel

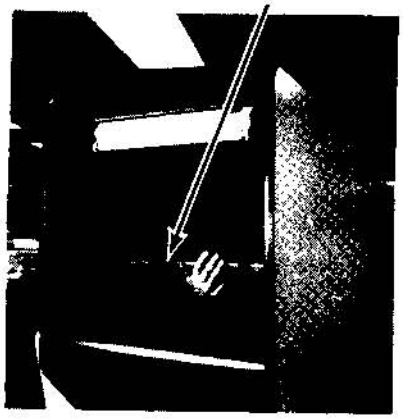


PROCEDURE

1) Unlock and remove the Lower Rear Cabinet Door.
2) Use a Phillips-head screwdriver to remove the four #8 flat-head wood screws that hold the Inner Graphics Door in place, then remove the door.
3) Grasp the edge of the present Cardboard Graphics Panel and slide it back and all the way out of the cabinet.
4) Place the new Cardboard Graphics Panel in position where the other panel had been.
5) Place the removed panel in its shelf in the panel storage area.
6) Replace the Inner Graphics Door and insert and tighten the four screws in the Inner Graphics Door.
7) Replace the Lower Rear Cabinet Door and lock it.

Figure 10 Changing the Cardboard Graphics Panel





Panel Part Number	Game
008361-01	Hit the Bear
008362-01	Racoon Hunt
007957-01	Witch Hunt

Panel Part Number	Game
008373-01	Hit the Bear and Racoon Hunt
008374-01	Witch Hunt

PROCEDURE

1) Use a 1/8-inch Allen hex wrench to remove the three Button-Head screws that hold down the Plex Retainer Bracket and remove the bracket.
2) Remove the Plex Retainer Bracket. Pull up on the present Front Plex Silkscreen Panel, then life it completely our of the cabinet.
   NOTE: If the Main Display Silkscreen Panel is to be changed also, next perform steps 3 and 4. But if Main Display is not to be changed, skip over these steps and next perform step 6.
3) Reach inside the cabinet and remove both #6 x 5/8 wood screws that hold down the Main Display Panel. Lift it up and remove it by pushing up from underneath.
4) Place the new Main Display Silkscreen Panel down inside the cabinet, and screw it into place.
5) Insert the bottom end of the new Front Plex Silkscreen Panel into the slot inside the cabinet, then slide the panel into place.
6) Replace the Plex Retainer Bracket and insert and tighten the three button-head screws.
7) Place the panel or panels just removed onto shelves in the panel storage area in the rear of the cabinet.

Figure 11 Changing the Front Plex and Main Display Silkscreen Panels

of flux and dirt. Alcohol will do in a pinch, if necessary.

Insert the new IC device using an IC insertion tool, making sure that the reference notch is oriented correctly and that the device's leads are not bent during insertion into the board. Afterwards, be sure to solder each lead on *both* sides of the PCB, using as little solder as possible. After soldering, clean the area thoroughly to remove the flux.

Observe the same removal and insertion procedures when replacing discrete components. Trim the leads as close as possible and be sure to orient diodes and capacitors correctly.

The microprocessor, read-only memories, and random-access memories are removed by simply pulling them out of their sockets. When placing them into their sockets, make certain they are placed in the correct socket.

Table 4 Letter Codes for RAM/ROM Tests

Letter Displayed on Screen During Test	Device That May Be Bad
A	B1
B	A1
C	F1 and F2
D	E1 and E2
E	D1 and D2
F	C/D1 and C/D2
G	J5

GUN ALIGNMENT

Two types of pictures will appear on the TV screen, as shown in Figure 12. As soon as the first picture appears, the person performing the alignment must carefully aim the gun at the exact cross point of the X, and then pull the trigger once. The game will respond by changing to the second picture. Once again the person must aim at the cross point of the X and pull the trigger. After this has been done the game's microcomputer will immediately store the new alignment data in the gun alignment data memory (the RAM device in location J5 on the Game PCB). Then the microcomputer will check this RAM's operation by reading the data back and comparing the results with the data originally sent. If this check fails, then the words "TEST G" will be added below the words "END OF TEST START GAME" on the TV screen. If the check passes, only the words "END OF TEST START GAME" will appear. Any subsequent pulling ot the trigger merely causes impact pictures to appear on the screen and gunshot sounds to be produced, but the gun alignment data will not be altered.

SWITCH CHECK

After gun alignment has been performed, the operation of certain switches can also be confirmed, if desired. A person manually activating the switches, one at a time, will cause the microcomputer to produce a speaker sound if that switch and its sensing circuit are operating properly. The following switches can be checked: on top of the gun mount cabinet the trigger switch and the "START" pushbutton (whose LED will light whenever a switch is activated), and on the backside of the coin mechanism access door the slam switch and the two coin switches.

FINAL STEPS

When the Test Switch is placed in its OFF position, the game will respond by automatically changing over to the attract mode (regardless of whether *any* ROM or RAM checks failed or not). If the gun alignment had not been performed, the microcomputer system will retain the previous gun alignment data.

After the Test Switch has been put into its OFF position, close and lock the coin mechanisms access door.

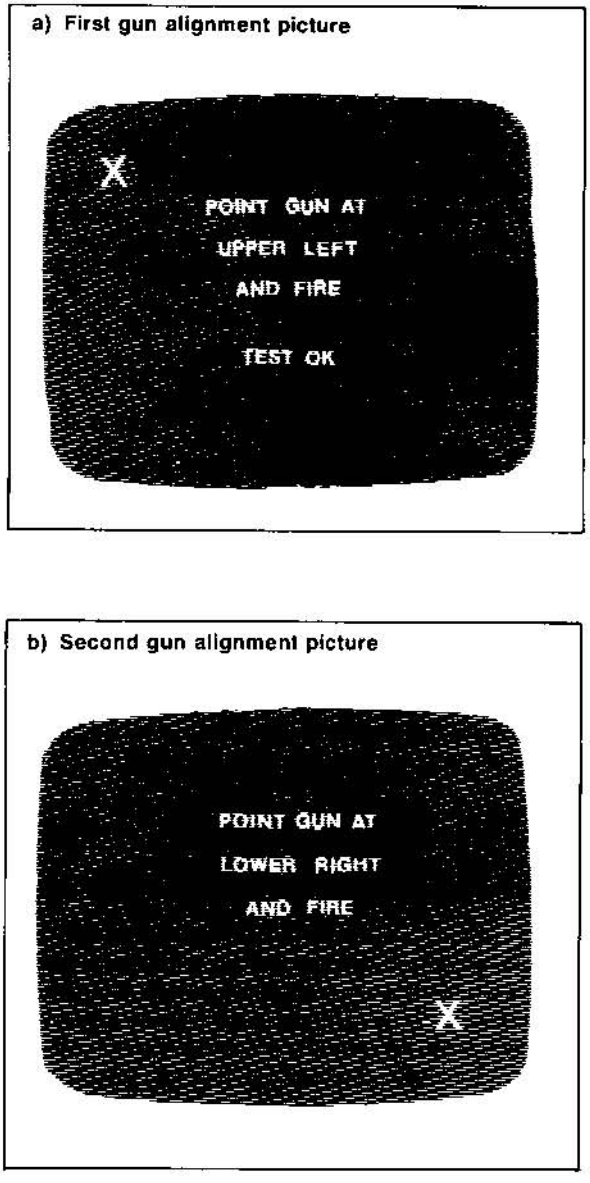
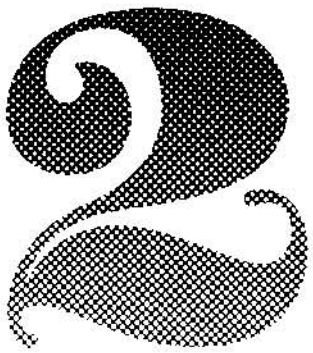


Figure 12 Pictures During Test Mode

GAME PLAY

OPERATING MODES

During use this Atari game can be described as operating in one of four modes: attract, ready-to-play, play or test mode. Just after AC power is turned on the game starts out in the attract mode. It remains in this mode until players deposit coins and these coins clear the coin mechanisms, after which time the game changes over to ready-to-play mode. But a player must depress the lighted START pushbutton in order to cause the game to change over to the play mode. The game remains in the play mode until the play time runs out, after which time the game normally changes back to the attract mode. The only exception to this is the case when the game cost option has been set for "1 COIN, 2 PLAYS" and the player has only just completed the first play. The game will then change from play mode to ready-to-play mode, but after the second play is completed will change from play to attract mode. The speakers do not produce sounds during attract or ready-to-play modes. The game ignores the player pulling the trigger during both attract and ready-to-play modes, and ignores the player depressing the START pushbutton if the button is not lighted.



The game is operated in the test mode for installation, maintenance and troubleshooting purposes only, and players do not have access to the Test Switch that puts the game into this mode. For more information about test mode, refer to Section C of Chapter 1.

The next paragraphs point out the elements of game operation that are common to all three game selections (Hit the Bear, Racoon Hunt, and Witch Hunt). Then the remaining parts of this chapter cover the operating modes of each game selection separately, including such details as point scoring, target objects used and their motion, and the various sounds produced during the play mode.

A lock-out coil has been included with the game's coin mechanisms. When AC power to the game is turned off the coil is de-energized and it causes coins to be blocked from entering the coin slots. When AC power is turned on, during attract mode the game's microcomputer energizes the lock-out coil and players are able to deposit coins in the slots. During the play mode it is de-energized by the game's microcomputer and it blocks the deposit of any coins at that time. The lock-out coil is also de-energized during ready-to-play mode, except in the situation where the "2 COINS, 1 PLAY" game cost option has been selected. Then it is de-energized only after the second coin has been accepted by the game.

The overall objective in all three game selections is to earn the highest possible number of score points before the play time runs out. There is no limit on the number of shots that a player can fire, but only one gunshot can appear on the screen at any one time. During play mode, a two-digit numerical display appears in the upper left corner of the screen and counts down. This display continuously lets the player know how much play time is remaining. Normally game play ends when this display reaches "00." However, in the case where the operator has set the option switch to allow extended play, if the player's score at this time has reached or exceeds the extended play score level, then the player is given 50% more play time and the numerical display starts counting down again (starting from a reset value equal to 50% of its initial value). Also the words "EXTENDED PLAY" appear across the bottom of the screen and remain there until the extended play time runs out, at which time that play mode cycle ends.

Two other situations when choice of game cost option can affect operating modes need to be mentioned. As pointed out already, if the "1 COIN, 2 PLAYS" choice has been made, then after the first of these plays has been completed the game changes from play mode over to ready-to-play mode. But in this situation the "HIGHEST SCORE" display and the player's score display can remain showing for only approximately two minutes in ready-to-play mode. (This is the only situation when this can happen, and players will never be aware of it unless they wait longer than two minutes before depressing the lighted START pushbutton.)

A second situation in which operating modes are slightly altered occurs when the "2 COINS, 1 GAME" game cost option has been chosen. After deposit of the first coin the game changes over to ready-to-play mode, but the message "INSERT COIN" immediately appears at the top of the screen (instead of the message "PUSH START" that would be the case had either of the other two cost options been chosen). The player must next deposit a second coin in order to cause the "PUSH START" message to appear and the START pushbutton to light up.

The play mode for all three game selections can be summarized as follows. One or more target objects appear on the TV screen and begin to move, and various background sounds are produced continuously by the speakers. These background sounds come from a tape deck that uses a continuous-loop tape cartridge. One cartridge has been pre-recorded with forest sounds (chirping of birds, animal howls, etc.) and goes with both Hit the Bear and Racoon Hunt. The second cartridge has haunted-house sounds and goes with Witch Hunt.

As soon as a player hits a target object, that object either disappears or, in the case of the bears, the object changes its motion. Also a "hit" sound, unique to the object hit, is momentarily added to the other sounds being produced by the speakers. And finally, the player's score is increased by the number of score points assigned for hitting that type of object.

HIT THE BEAR GAME PLAY

Figure 13 shows a typical picture that would appear on the TV screen during attract mode, and Figure 14 shows one for ready-to-play mode. Either of two bear target objects, a large bear and a small bear, can appear (but only one at a time). The bears move horizontally across the screen, in either direction. After a bear reaches the edge of the screen and moves off, the other bear appears and begins to move in an opposite direction across the screen.

Figure 13 Typical Picture in Attract Mode—Hit the Bear Game Selection

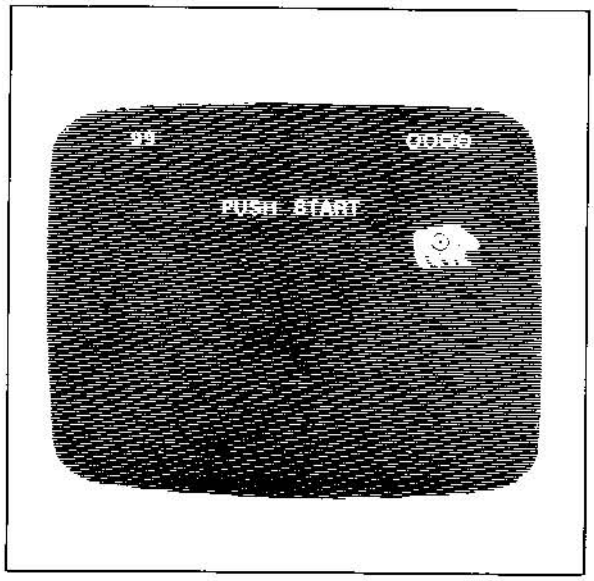


Figure 14 Typical Picture in Ready-to-Play Mode—Hit the Bear Game Selection

As soon as the game changes over to the ready-to-play mode the bear motion immediately freezes. Also the player score display is reset to "0000" and the "HIGH SCORE" display is changed to a two-digit number that indicates the amount of play time remaining. As soon as play mode begins the numbers in this display count down, starting from "99" and ending at "00," (for a total of 100 counts). This is the case—regardless of which choice the operator has set up on the Play Time option. Therefore during play mode each count in this arbitrary scale represents 1/100th of the total play time, and would thus correspond to 0.6 actual seconds when play time was set for 60 sec., to 0.9 sec. when set for 90 sec., and so forth.

Figure 15 shows a typical picture during play mode. A close examination of a bear will reveal that the center part of the body is covered by a solid circle of intense white (whiter than the surrounding parts of the body). This circle represents a bullseye, and the player's shot must touch this circle in order to be scored as a hit. When the player hits a bear the game responds by causing the bear to stand up and by adding a growl to the sounds being produced by the speakers, (see Figure 16). However, the game will ignore any player shots that subsequently hit while the bear is still standing up. After a few moments the

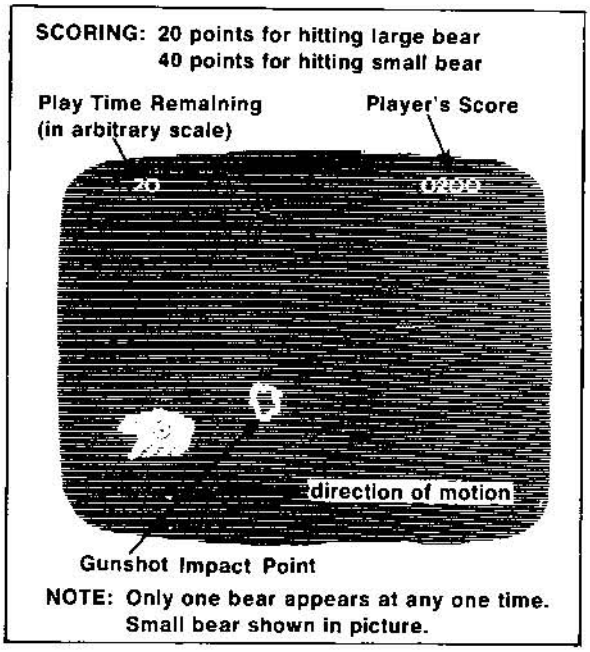


Figure 15 Typical Picture in Play Mode—Hit the Bear Game Selection, with Moving Bear

growl ceases and that same bear resumes a walking motion again, except that the direction will be opposite to what it was before the hit. A potentiometer adjustment on the Game PCB allows the operator to adjust the pitch (bass or treble sound) of the bear growl.

Figure 16 Typical Picture in Play Mode—Hit the Bear Game Selection, with Standing Bear

To provide added challenge for the players, as the score increases the speed of the bear's motion also increases. The game cycles through three levels of speed, and when the fastest speed is reached it continues for the remainder of that play-mode cycle.

RACOON HUNT GAME PLAY

Figures 17 and 18 show typical TV pictures during the attract and ready-to-play modes. The four racoons move upwards along four parallel vertical lines. The front plex graphics panel for this game has four trees placed in these positions, so that to players the racoons seem to be climbing up four trees. The two-digit number appearing in the upper left corner during ready-to-play mode is the total number of racoons that will appear during the course of the normal play time in play mode. Each racoon "wags" its tail as it climbs, thereby enhancing the animation of their movement.

Figure 19 shows a typical picture during the play mode. No more than four racoons can appear on the screen at any one time. However, the racoons no longer have to be moving together, because when a racoon is hit (anywhere along its climb up a tree) it disappears, after which time a new racoon will appear at the *bottom* of that tree. Also, immediately after a racoon is hit a howling sound is added to the sounds being produced by the speakers.

The number appearing at the upper left corner of the screen decreases by one each time a racoon disappears, either because it was hit or because it had

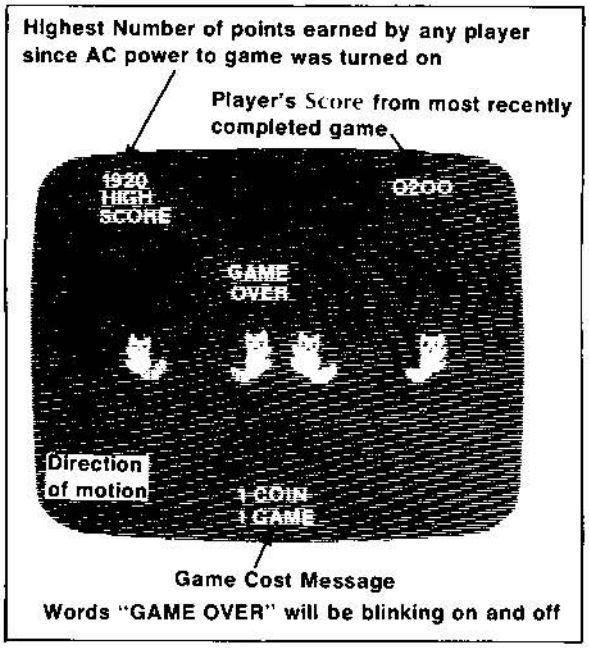


Figure 17 Typical Picture in Attract Mode—Racoon Hunt Game Selection

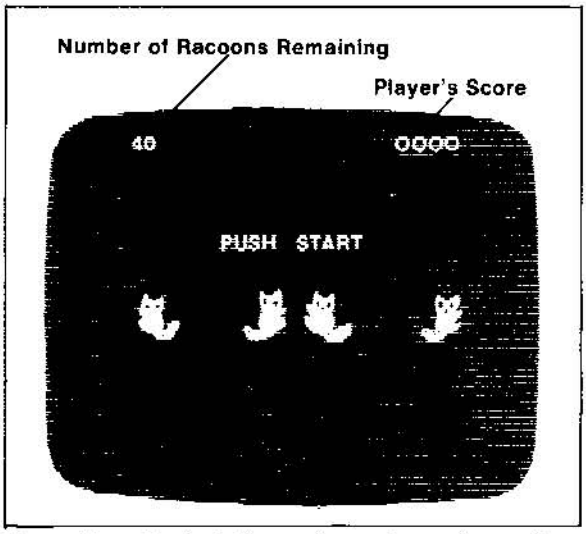


Figure 18 Typical Picture in Ready-to-Play Mode—Racoon Hunt Game Selection

traveled off the screen. Normal play time ends when this number has decreased all the way to "00."

To provide added challenge for the players, as the score increases the speed of the racoon motion also increases. The games cycles through four levels of speed, and when the fastest speed is reached it continues for the remainder of that play mode cycle.

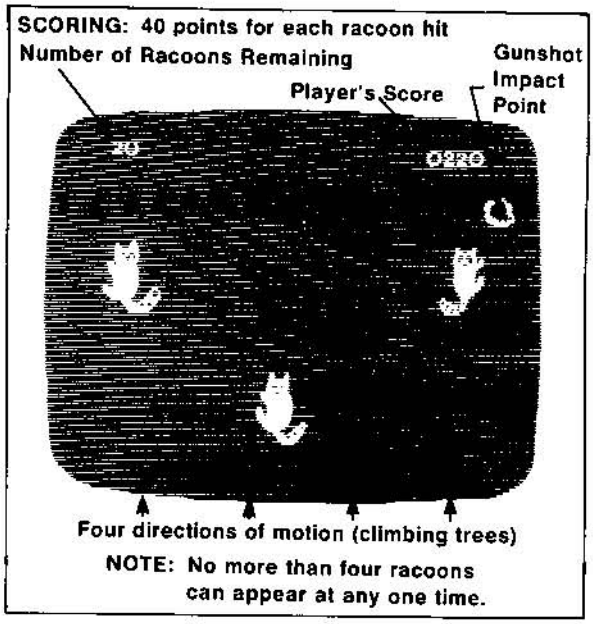


Figure 19 Typical Picture in Play Mode—Racoon Hunt Game Selection

WITCH HUNT GAME PLAY

Figures 20 and 21 show typical TV pictures during the attract and ready-to-play modes. The ghost target objects appear and disappear randomly in fixed positions on the screen, but do not move away from these

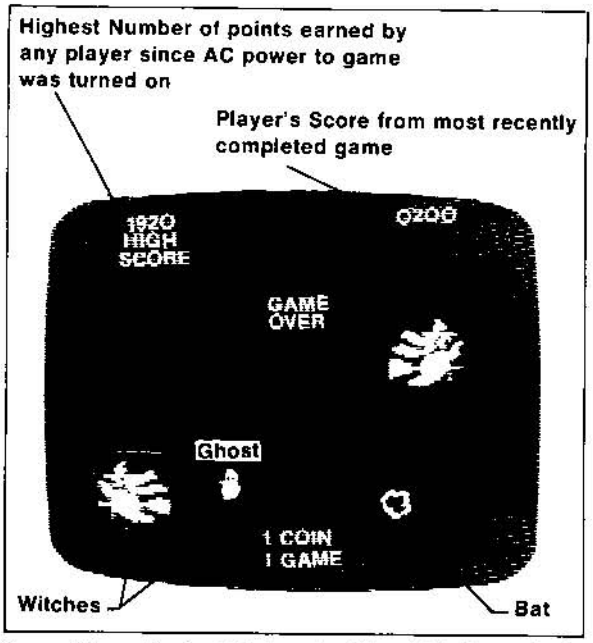


Figure 20 Typical Picture in Attract Mode—Witch Hunt Game Selection

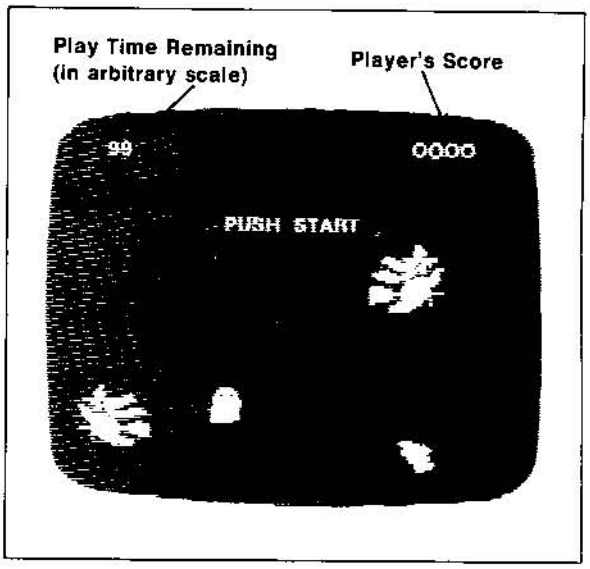


Figure 21 Typical Picture in Ready-to-Play Mode—Witch Hunt Game Selection

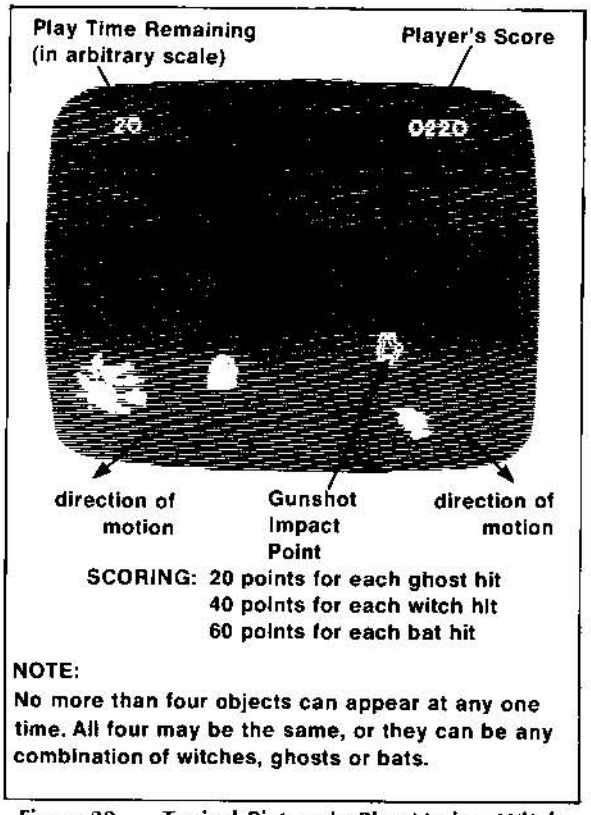


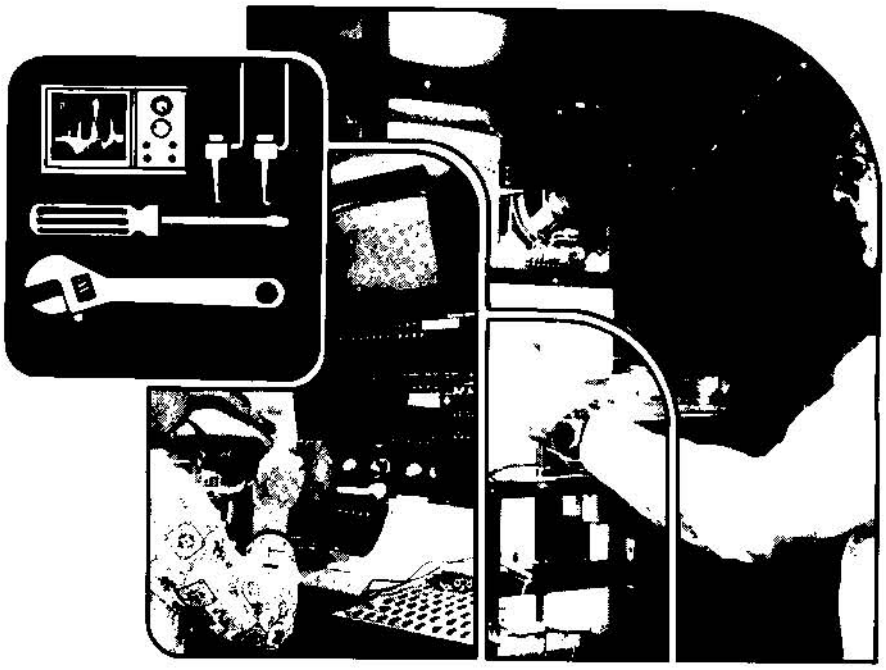
Figure 22 Typical Picture in Play Mode—Witch Hunt Game Selection

positions. (The positions correspond to open windows in a haunted house included on the graphics panels for this game selection.) The two other types of target objects move along straight lines radiated outwards from their appearance at the center of the screen. The bats appear to flap their wings during flight, thereby enhancing the animation of their movement. After a bat or witch reaches the edge of the screen, it disappears. Afterwards a new object—any of the three types—will appear near the center of the screen, but no more than *four* can ever appear at any one time.

Figure 22 shows a typical TV picture during the play mode. The number appearing in the upper left corner represents the amount of play time remaining, as expressed in an arbitrary scale starting from "99" and counting down to "00." The amount of actual time (in seconds) represented by this number is the same as described previously for Hit the Bear.

When a player hits a target object, it disappears and a screech-type sound is added to the sounds being produced by the speakers. Then the number of score points assigned for that type of object are added to the player's score. Although witches are the largest of the objects, a close examination reveals that only certain parts of the witch are white, while the remaining parts (foot, hand, face) are greyer in color. To qualify as a hit, a player's shot must hit somewhere in the white portion of the witch.

There is *no* speed-up of object motion during the play mode in the Witch Hunt game selection.



MAINTENANCE AND ADJUSTMENTS

Due to its solid-state electronic circuitry, this Atari game should require very little maintenance and only occasional adjustment. Information given in this chapter and elsewhere in the manual is intended to cover most servicing situations that may be encountered at the game site. The procedures given are in sufficient detail to be understood by a person with moderate technical ability.

NOTE

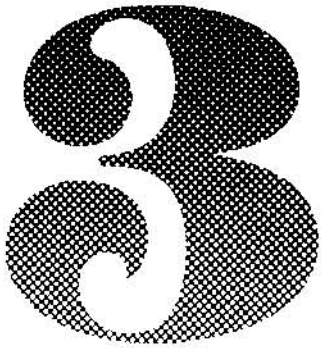
If reading through the manual does not lead to solving the specific maintenance problem, you can reach Atari's Customer Service Department by telephone (open Monday through Friday, 7:30 am to 4:30 pm Pacific Standard Time):

from **outside** *California (800) 538-6892*

(toll-free)

from **inside** *California (408) 984-1900*

For those interested in gaining more information on video game technology, especially the electronics, we recommend reading the **Video Game Operator's Handbook,** *manual no. TM-043. This book is available from Atari, Inc., attn. Customer Service Dept., 2175 Martin Avenue, Santa Clara, CA 95050 for $5.00 each, or from your distributor.*



CLEANING

The exteriors of game cabinets and plex panels may be cleaned with any non-abrasive household cleaner. If desired, special coin machine cleaners that leave no residue can be obtained from distributors. Do *not* dry-wipe the plex panels because any dust on the surface can scratch the surface and fog the plastic.

For periodic cleaning of tape heads on the tape deck, refer to Section F of this chapter.

ADJUSTMENTS ON TV MONITOR

> **NOTE**
>
> *The TV monitor is accessible only from inside the game cabinet and these adjustments have to be done while the game is energized. Therefore only persons familiar with safety measures and repair procedures on electrical equipment should perform them.*

The TV monitor need be adjusted *only* when the picture is distorted, or if the contrast or brightness seem out of adjustment.

The monitor's adjustments function like those of a conventional commercial television set, except that the volume adjustment has no effect. Instead the game produces its sound in a speaker separate from the TV monitor. Figure 23 shows the location of the adjustments on the rear of the chassis. When making the adjustments follow these general guidelines:

BRITE (Brightness)—Perform this adjustment before the contrast. Adjust so that the white lines covering the screen just barely disappear, when the brightness is turned up.

CONT (Contrast)—Adjust so that the images are as bright as possible against the dark background without being blurred.

HORIZ HOLD (Horizontal Hold)—Adjust if the picture is slightly off-center horizontally, if the images appear warped, or if the picture is broken up into a series of diagonal lines. Adjust for a stable, centered picture.

VERT HOLD (Vertical Hold)—This needs adjustment only if the picture appears to be rolling up or down the screen. Adjust for a stable, centered picture.

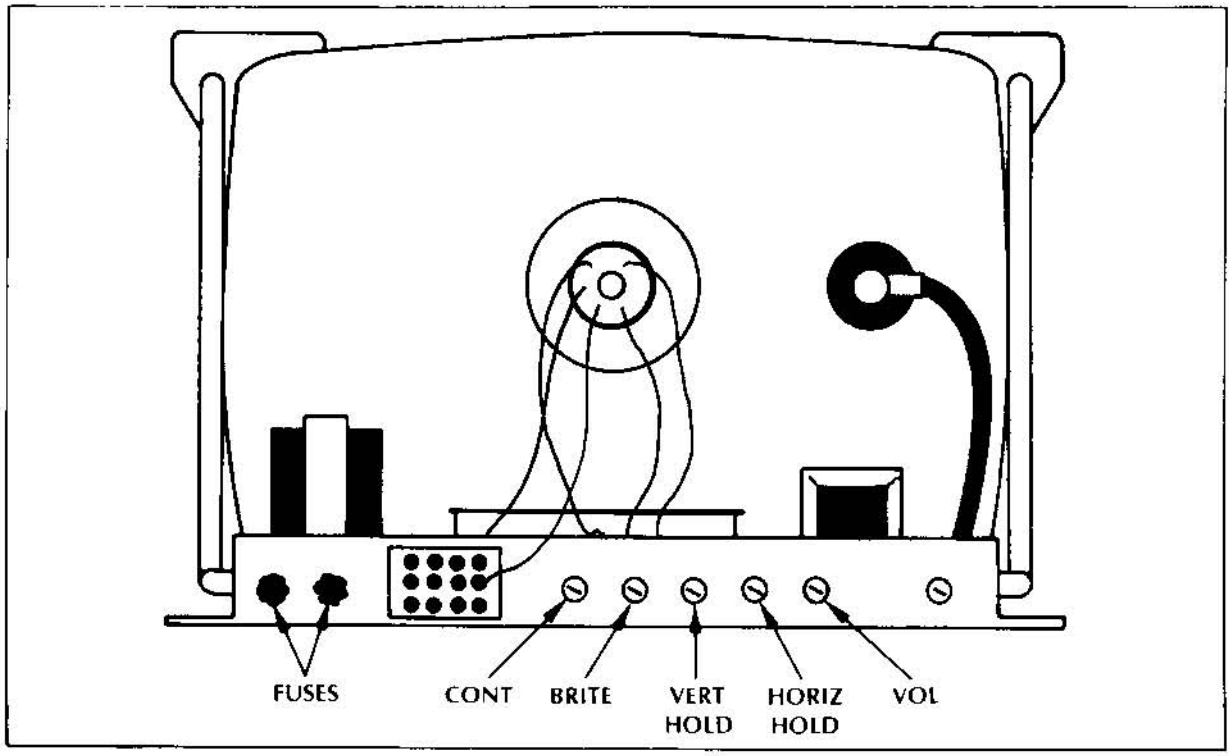
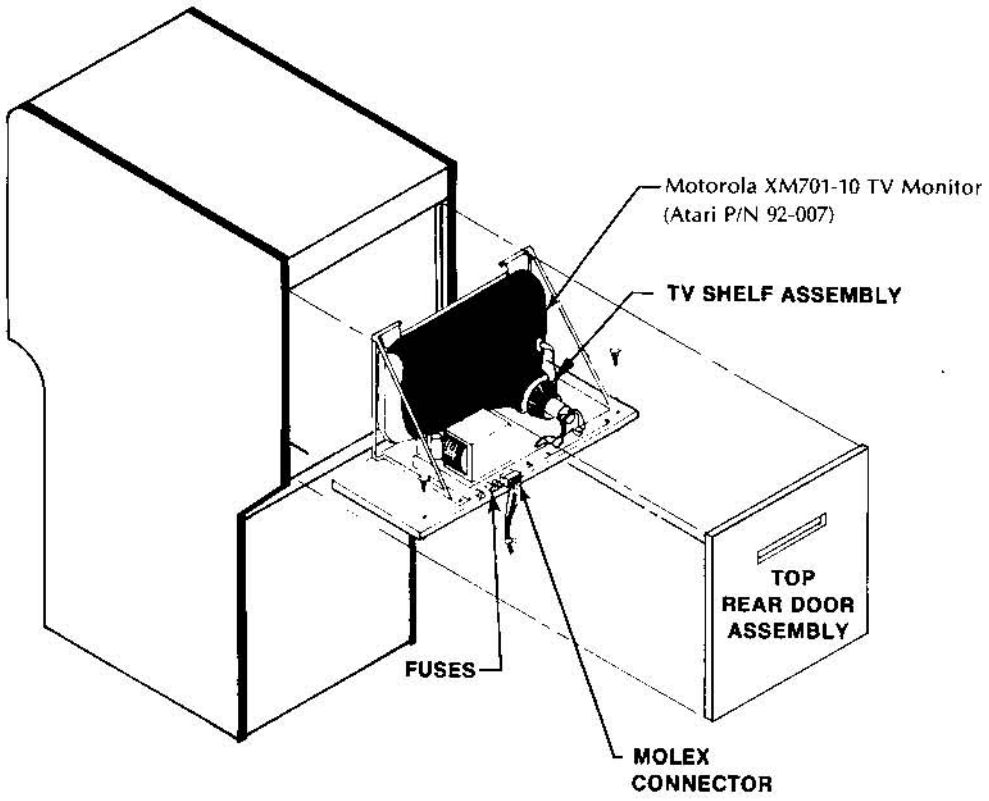


Figure 23 Locations of Adjustments on TV Chassis



REMOVAL:

1) Unlock the top rear door.
2) Unplug the Molex connector from the TV monitor chassis.
3) Use a box-end wrench to loosen and remove the two hex nuts (with flat and lock washers) on the underside of the wood TV shelf assembly, near the inside edge of the shelf.
4) Using both hands, firmly take hold of the bottom side of the shelf, then slide the entire TV Shelf Assembly back and remove it from the cabinet.

REPLACEMENT: Perform the above steps in reverse.

Figure 24 Removal of TV Monitor CRT Cabinet

NOTE

Before starting to work inside a cabinet, first always check to make sure that the interlock switch is not in the defeat position or stuck in the on *position.*

FUSE REPLACEMENT

The game has four fuses, two inside the gun mount cabinet and two more inside the CRT cabinet. The fuses in the gun mount cabinet are connected in series with the AC power cable; the fuses in the CRT cabinet are connected in the AC power circuit of the

TV monitor only. Fuses are accessible only by unlocking and opening a door on the respective cabinet.

PROCEDURE FOR FUSES IN GUN MOUNT CABINET

1) Unlock and fully open the rear door. Then look inside and find the power supply assembly that is bolted to the floor of the cabinet. Figure 3 shows a top view of the power supply assembly, and in this drawing the two fuse holders are identified. They are located on top of the assembly, in the lower left corner.

2) To replace a fuse merely unscrew the cap on the holder, remove the present fuse, insert the new fuse, and then replace the cap. Both fuses are type 3AG 3-amp quick-blow, 250-volt.

3) After replacing one or both fuses, close and lock the cabinet door.

PROCEDURE FOR FUSES IN CRT CABINET

1) Unlock and remove the upper rear door.

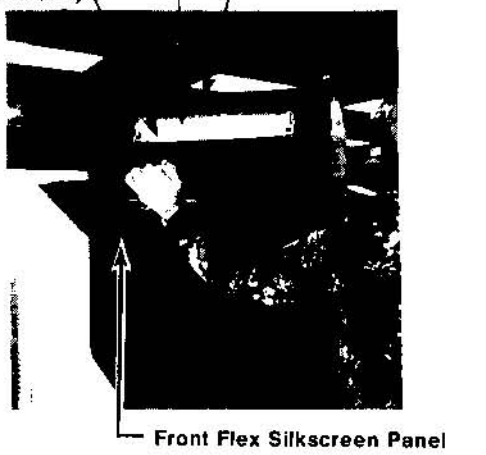
2) On the back side of the TV chassis, near the bottom left corner, find the two fuse holders. Refer to Figure 23 for a view of the TV chassis showing their exact locations.

3) To replace a fuse merely unscrew the cap on the holder, remove the present fuse, insert the new fuse, and then replace the cap. Both fuses are type 3AG 1-amp slow-blow, 250-volt.

4) After replacing one or both fuses, replace and lock the upper rear door.

LAMP REPLACEMENT

Two "blacklight" fluorescent lamps are mounted inside the CRT cabinet, one near the top of the cabinet at the front, and the other behind the front, about halfway up from the floor. Refer to Figures 25 and 26 for illustrations and procedures for replacing these lamps.



(Front of cabinet shown)

PROCEDURE

1) **Use a ⅛-inch Allen wrench to remove the three Button-Head screws that hold down the Plex Retainer Bracket and remove the bracket.**
2) **Pull up on the Front Plex Silkscreen Panel, then lift it completely out of the cabinet.**
3) **Using both hands, grasp the lamp tube, twist and remove the lamp from its socket.**
4) **Install the replacement lamp in the fixture socket.**
5) **Insert the bottom end of the Front Plex Silkscreen Panel back into the slot inside the cabinet, and then slide the panel into place.**
6) **Replace the Plex Retainer Bracket and insert and tighten the three Button-Head screws.**

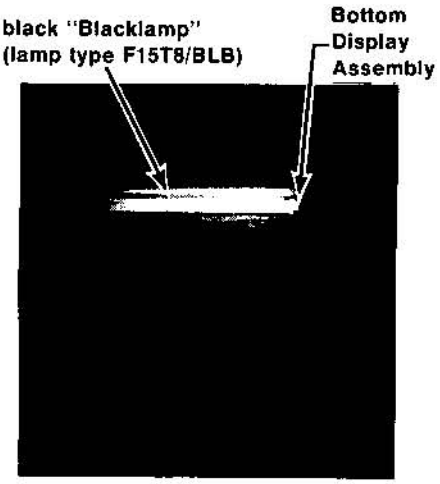
Figure 25 Replacing the Top Display Fluorescent Lamp

COIN MECHANISM

COMPONENTS ON COIN DOOR

Figure 27 shows the back side of the coin door assembly where the game's two coin mechanisms are mounted. Included is the lock-out coil assembly; the lock-out wires are connected to this assembly but are hidden behind the coin mechs. During the attract mode the microcomputer energizes the lock-out coil, causing the lock-out wires to retract far enough to allow genuine coins to reach the coin box. But during the ready-to-play mode when the LED is lighted and during the play mode (and also when AC power to the game has been turned off) the lock-out coil is de-energized, causing the lock-out wires to move out far enough to divert coins over to the return chute.

Directly below each coin mechanism is a secondary coin chute and a coin switch with a trip wire extending out to the front edge of the chute. When the trip wire is positioned correctly, a coin passing down the secondary chute and into the coin box will



(Rear of cabinet shown)

PROCEDURE

1) Unlock and remove the Lower Rear Cabinet Door.
2) Use a Phillips-head screwdriver to remove the four #8 flathead wood screws that hold the Inner Graphics Door in place, then remove the door.
3) Crawl inside the cabinet and locate the fluorescent lamp assembly that is mounted in a recessed area on the inside surface of the cabinet front side, about halfway up from the floor.
4) Using both hands, grasp the lamp tube and remove the lamp from its socket.
5) Install the replacement lamp in the fixture socket.
6) Replace the Inner Graphics Door and insert and tighten the four screws in the door.
7) Replace the Lower Rear Cabinet Door and lock it.

Figure 26 Replacing Bottom Display Fluorescent Lamp

momentarily push the trip wire down and cause the switch contacts to close.

Also shown in the photograph is a slam switch assembly. It has been included to defeat any players who might try to obtain free game plays by violently pounding on the coin door to momentarily close the contacts on a coin switch. The slam switch contacts connect to the microcomputer system, which will ignore coin switch signals whenever the slam switch contacts are closed.

ACCESS TO COIN MECHANISMS

To remove jammed coins, and for maintenance cleaning, each magnet gate assembly can be hinged open without removing it from the door, as shown in Figure 28. Or, if necessary, each coin mechanism can be entirely removed from the door merely by pulling

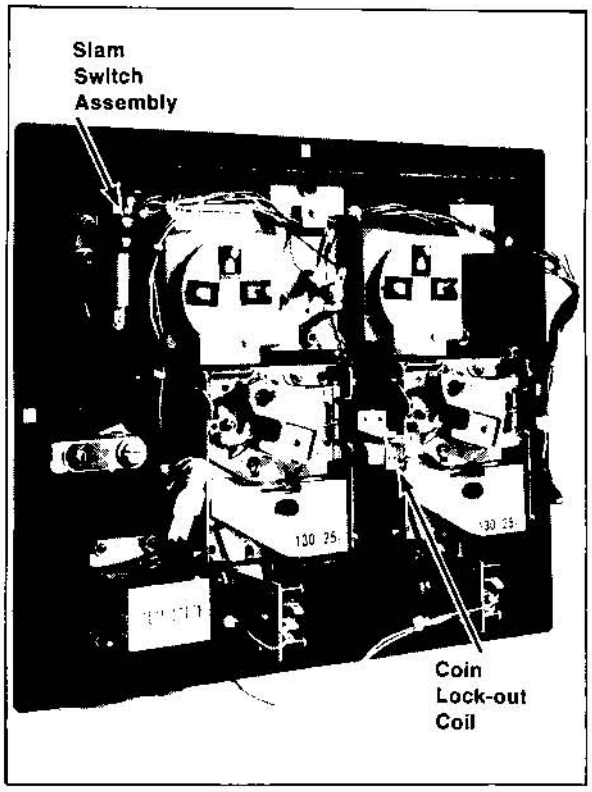


Figure 27 Coin Door Assembly

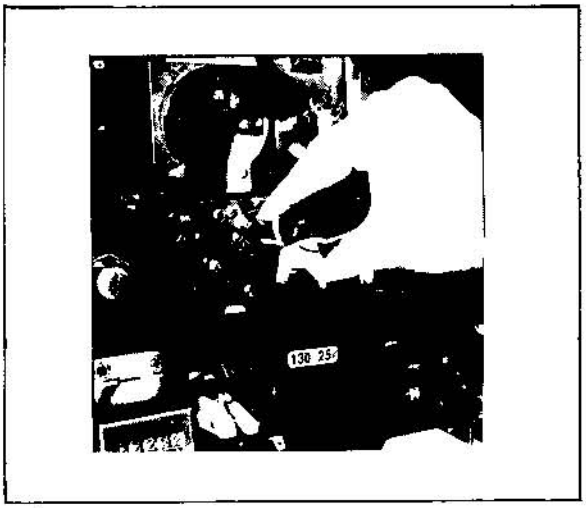


Figure 28 Hinging Open the Magnet Gate Assembly

back on a release lever and simultaneously tilting the mechanism back, then lifting it up and out. This is shown in Figure 29.

Figure 29 Removal of Coin Mechanism

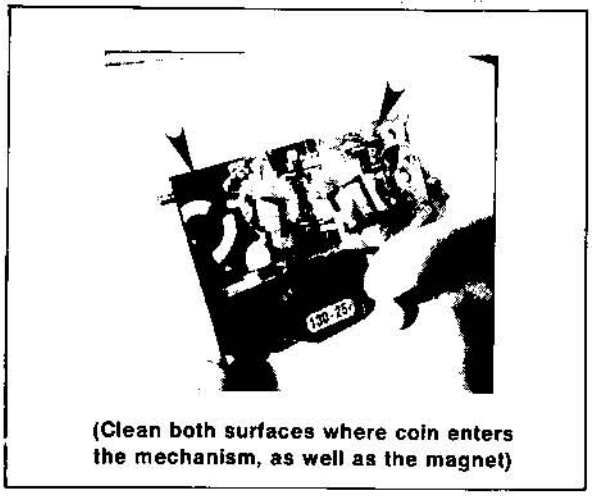
CLEANING OF COIN PATHS

CAUTION:

The use of an abrasive (such as steel wool or a wire brush) or a lubrication on a coin mechanism will result in a rapid build-up of residue.

By talking to many operators, we have found that the best method of cleaning a coin mechanism is by using hot or boiling water and a mild detergent. A toothbrush may be used for those stubborn buildups of residue. After cleaning, flush thoroughly with hot or boiling water, then blow out all water with compressed air.

Figure 30 shows the surfaces to clean inside the coin mechanism. These include the inside surface of the mainplate, and the corresponding surface of the gate assembly. There may also be metal particles clinging to the magnet itself. To remove these you can guide the point of a screwdriver or similar tool along the edge of the magnet.



(Clean both surfaces where coin enters the mechanism, as well as the magnet)

Figure 30 Surfaces to Clean Inside the Coin Mechanism

If coins are not traveling as far as the coin mechanisms, you will need to clean the channel beneath the coin slot. To gain access to this channel, turn each black clip about 180° to face out over the edge of the plate. Then pull gently towards you and remove each clip (refer to Figure 31). Removing the plate will provide access to the entire channel.

Figure 31 Removal of Plate Covering Rear of Coin Slot

Also clean the inside surfaces of the secondary coin chutes, but when doing this be careful not to damage or bend the trip wires on the coin switches.

ADJUSTMENT OF COIN SWITCH TRIP WIRE

In order for a coin switch to operate reliably when a coin travels down the secondary coin chute, the rest position of its trip wire should be as shown in Figure 32. Use extreme care when handling or touching these wires.

MECHANICAL ADJUSTMENTS ON COIN MECHANISM

Coin mechanisms are adjusted prior to shipment from the factory and normally will retain these adjustments for many months. If, due to wear or other causes, it becomes necessary to make new adjustments, remove the coin mechanism from the coin door. Then take it to a clean, well lighted area where it can be placed in a vertical position on a level surface (such as a bench top). Besides a screwdriver,

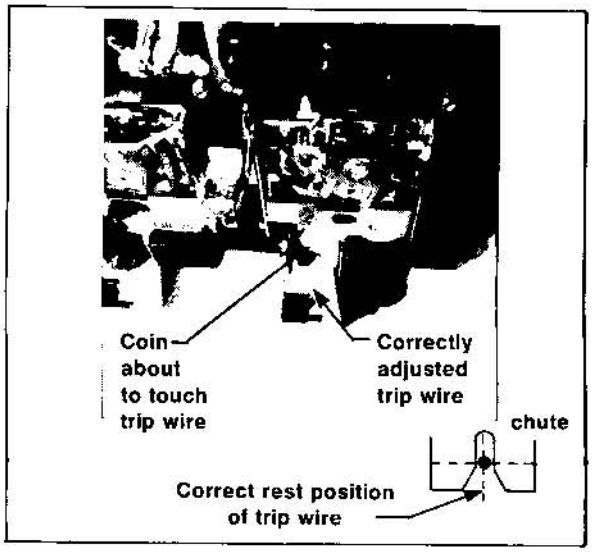


Figure 32 Detail View of Coin Switch and Trip Wire

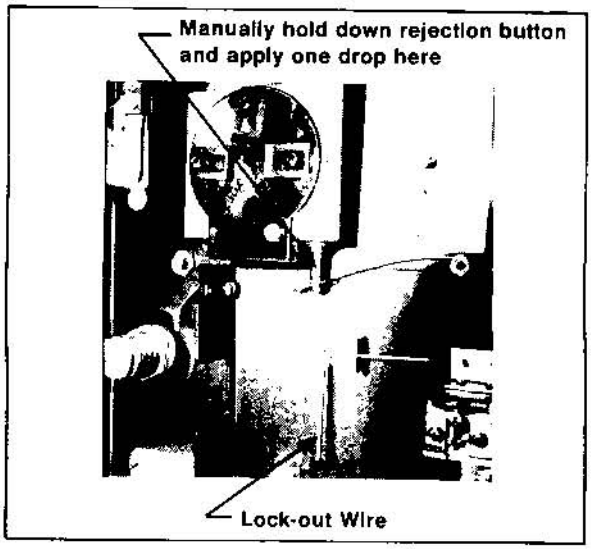


Figure 34 Close-up View of Lubrication Point

you will need a set of several coins, including both new and old, worn ones. Figure 33 shows an exploded view of the mechanism and gives procedures for adjusting the kicker, separator, and the magnet gate. These adjustments should only be done by someone who has experience in servicing coin mechanisms and who understands their operation.

LUBRICATION

Do *not* apply lubrication to the coin mechanisms. The only points that may need lubrication (and only rarely) are the shafts of the scavenger buttons (coin rejection buttons) where they pass through the coin door. Apply only one drop of light machine oil, and be positive that no oil drops down onto a coin mechanism. Figure 34 shows this lubrication point.

GENERAL TROUBLESHOOTING HINTS

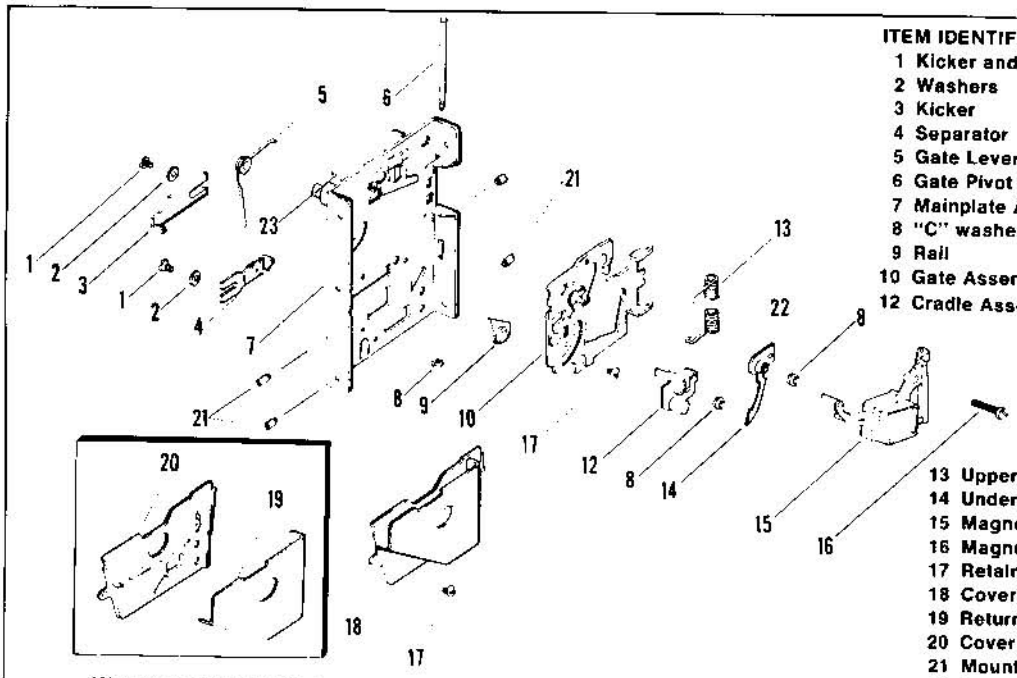
The first action is to look for jammed coins. After these have been removed, examine the coin path for presence of foreign material or loose objects (such as chewing gum, small metallic objects, paper wads, etc.). In cases where game usage is heavy, it may be necessary to clean the entire coin path periodically, in order to prevent build-up of contaminants that can hinder the movement of coins through the mechanisms. Also confirm that the trip wire on each coin switch is intact, and is properly adjusted. If troubles still persist, check the conditions and positions of the lock-out wires, and the mechanical adjustments on the coin mechanisms, before suspecting the electronics. If a coin mechanism rejects genuine coins, try to readjust it. If this is not successful, then replace it with a working mechanism.

Correct operation of the slam switch can be verified by putting the game into the test mode and performing the switch test (refer to Chapter 1, Section C). Correct operation of the other switches and of the lock-out coil can also be checked by the switch test, or else merely by manually operating them and watching game responses as it changes from the attract mode to ready-to-play and play modes, and then back to attract mode again.

GAME CONTROLS

The controls operated by the player are all found on top of the gun mount cabinet. They consist of the "START" pushbutton with its LED indicator, two gun position potentiometers (one for right/left motion and one for up/down motion), and the trigger switch.

Refer to Figure 35 for locations of these controls, and for removal and replacement procedures.



ITEM IDENTIFICATIONS

1 Kicker and Separator Screws
2 Washers
3 Kicker
4 Separator
5 Gate Lever Spring
6 Gate Pivot Pin
7 Mainplate Assembly
8 "C" washer
9 Rail
10 Gate Assembly
12 Cradle Assembly
13 Upper Gate Pivot Spring
14 Undersize Lever Assembly
15 Magnet Gate Assembly
16 Magnet Gate Adjuster
17 Retaining Screws
18 Coverplate Assembly
19 Return Coverplate
20 Coverplate
21 Mounting Studs
22 Lower Gate Pivot Spring
23 Coin Release Lever

Kicker and separator

1. Set the acceptor with the back of the unit facing you in the test position.
2. Loosen the kicker and separator screws (1) and move the kicker (3) and the separator (4) as far to the right as they will go. Lightly tighten the screws.
3. Insert several test coins (both old and new) and note that some are returned by striking the separator.
4. Loosen the separator screw and move the separator a slight amount to the left. Lightly retighten the screw.
5. Insert the test coins again and, if some are still returned, repeat Step 4 until all the coins are accepted.
6. Loosen the kicker screw and move the kicker as far to the left as it will go. Lightly retighten the screw.
7. Insert the test coins and note that some are returned.
8. Loosen the kicker screw and move the kicker a slight amount to the right. Lightly retighten the screw.
9. Insert the test coins again and, if some are still returned, repeat Step 8 until all the coins are accepted.
10. Be sure that both screws are tight after the adjustments have been made.

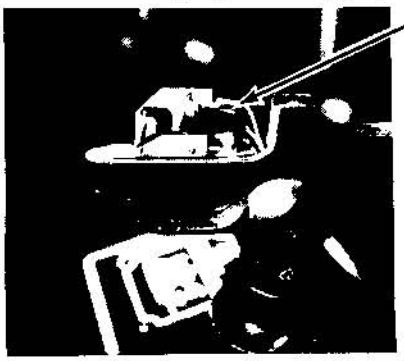
Magnet gate

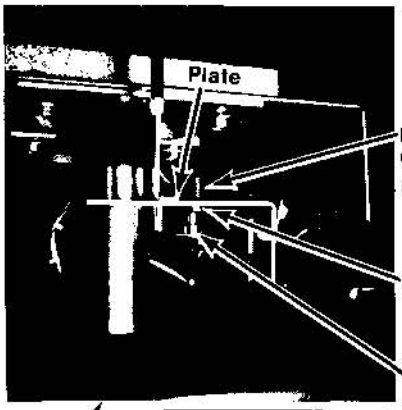
1. Set the acceptor with the front of the unit facing you in the test position.
2. Turn the magnet gate adjusting screw (16) out or counterclockwise until none of the coins will fit through.
3. With a coin resting in the acceptor entrance, turn the adjuster in or clockwise until the coin barely passes through the magnet gate.
4. Test this adjustment using several other coins (both old and new) and, if any fail to pass through the magnet gate, repeat Step 3 until all the coins are accepted.
5. Fix the magnet gate adjusting screw in this position with a drop of glue.

Additional Cleaning

1) Remove the transfer cradle (12) and the undersize lever (14).
2) Use a pipe cleaner or similar effective cleaning tool to clean the bushings and pivot pins.
3) Replace the transfer cradle and the undersize lever.
4) To be certain the coin mechanism is completely free of any residue, place the mechanism in boiling water for several minutes. Carefully remove it and let it air-dry completely before reinstalling in the door.

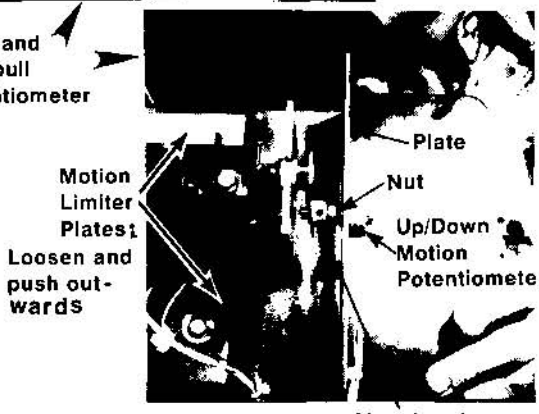
Figure 33 Adjustments on Coin Mechanism





Procedure for Trigger Switch:

1) Use a 1/8-inch Allen wrench to loosen and remove the three 1/4-20 screws that hold the gun down onto the gun mount. (Refer to Figure A for exact locations of these screws.)
2) Remove the gun by grasping the gunstock with both hands and lifting straight up. The trigger switch will now be visible just above the trigger.
3) Disconnect the wires to the switch, while noting which wires go to each terminal on the switch.
4) Use a screwdriver to loosen and remove the screws that hold the switch in position. Then lift out the switch.
5) Install the new switch. Then perform the preceding steps in reverse order.



Procedure for other components:

1) Unlock and open the cabinet's rear door.
2) Reach inside the cabinet and use a box-end wrench to loosen and remove the four 1/4-20 hex nuts (each with a flat washer and a split head washer) that hold the gun assembly control panel down on the top of the cabinet.
3) Grasp the gun assembly with both hands and carefully lift it up until the four permanently-affixed panel bolts have just cleared the cabinet top. As soon as this happens, gently tilt the gun forward so that the front edge of the panel rests on the cabinet top and the gun muzzle is resting against the forward side of the cabinet. Be especially careful not to damage any wiring while lifting and handling the gun.

Note:

Up/down and right/left potentiometers must be disconnected from the harness wires before calibrating the potentiometers.

4) Examine the bottom side of the panel and locate the up/down and left/right potentiometers. Remove the defective potentiometer. Install the replacement potentiometer but at this time do not solder the harness wires to the potentiometer. Rotate the gun on its mounts so that it is at its maximum right and down position. Connect an ohmmeter between contacts 2 and 3 of potentiometer. Adjust potentiometer for 4k ohms. Place lever arm on potentiometer and tighten the two set screws. Solder harness wires onto potentiometer.
5) After components have been replaced, perform steps 1 through 3 in reverse order. Be sure that no wires are pinched when the control panel is placed back into the cabinet. If one or both potentiometers have been replaced, then the gun alignment procedure in Test Mode has to be done over again before the game is ready to be put back into operation.

Figure 35 Replacing Trigger Switch, Start Pushbutton, and Gun Position Potentiometers

TAPE DECK

CLEANING TAPE HEADS ON TAPE DECK: The tape heads inside the tape deck should be cleaned each time that coins are collected from the cash box. A tape-head cleaning cartridge, available in retail stores selling consumer hi-fi equipment, is required. To clean the heads proceed as follows.

Unlock and open the rear door on the gun mount cabinet. (Doing this should de-energize the game.) Remove the present sound tape cartridge and insert the head-cleaning cartridge in its place. Then close and lock the panel. Put the game into the play mode by depositing a coin and depressing the lighted *START* pushbutton. As soon as the game changes over to the play mode the tape deck motor will begin running and will be exercising the head-cleaning cartridge. Wait for approximately 10 to 20 seconds, and then place the Power On/Off Switch in its *off* position.

CAUTION:

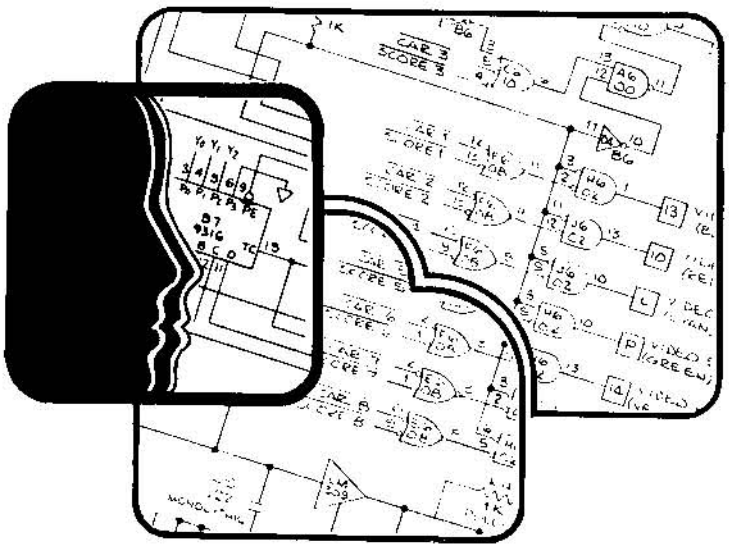
Allowing the game to exercise the head cleaning cartridge for longer than 10 to 20 seconds can lead to premature head wear.

Then unlock and open the coin door. Remove the head-cleaning cartridge and plug the game sound cartridge back in again. Close and lock the rear door, and place the Power On/Off switch in its *on* position. This completes the head cleaning procedure.

DE-MAGNETIZING TAPE HEADS ON TAPE DECK: About every 4 to 6 weeks the tape heads should be de-magnetized. A head de-magnetizing accessory, available in retail stores selling consumer hi-fi equipment, is required. Perform the following procedure when using this accessory.

Unlock and open the rear door on the gun mount cabinet. (Doing this should de-energize the game.) Remove the game tape cartridge from the tape deck. To de-energize the heads, perform the following;

1. With de-magnetizing cartridge outside of cabinet, plug the de-magnetizing cartridge into an AC source.
2. Insert the de-magnetizing cartridge into the tape deck. After approximately thirty seconds, remove de-magnetizing cartridge from tape deck and completely from cabinet, then unplug de-magnetizing cartridge from AC source.
3. Insert game tape cartridge in the tape deck, then close and lock the rear door. This completes the procedure.



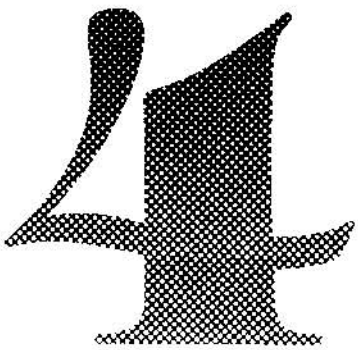
THEORY OF OPERATION

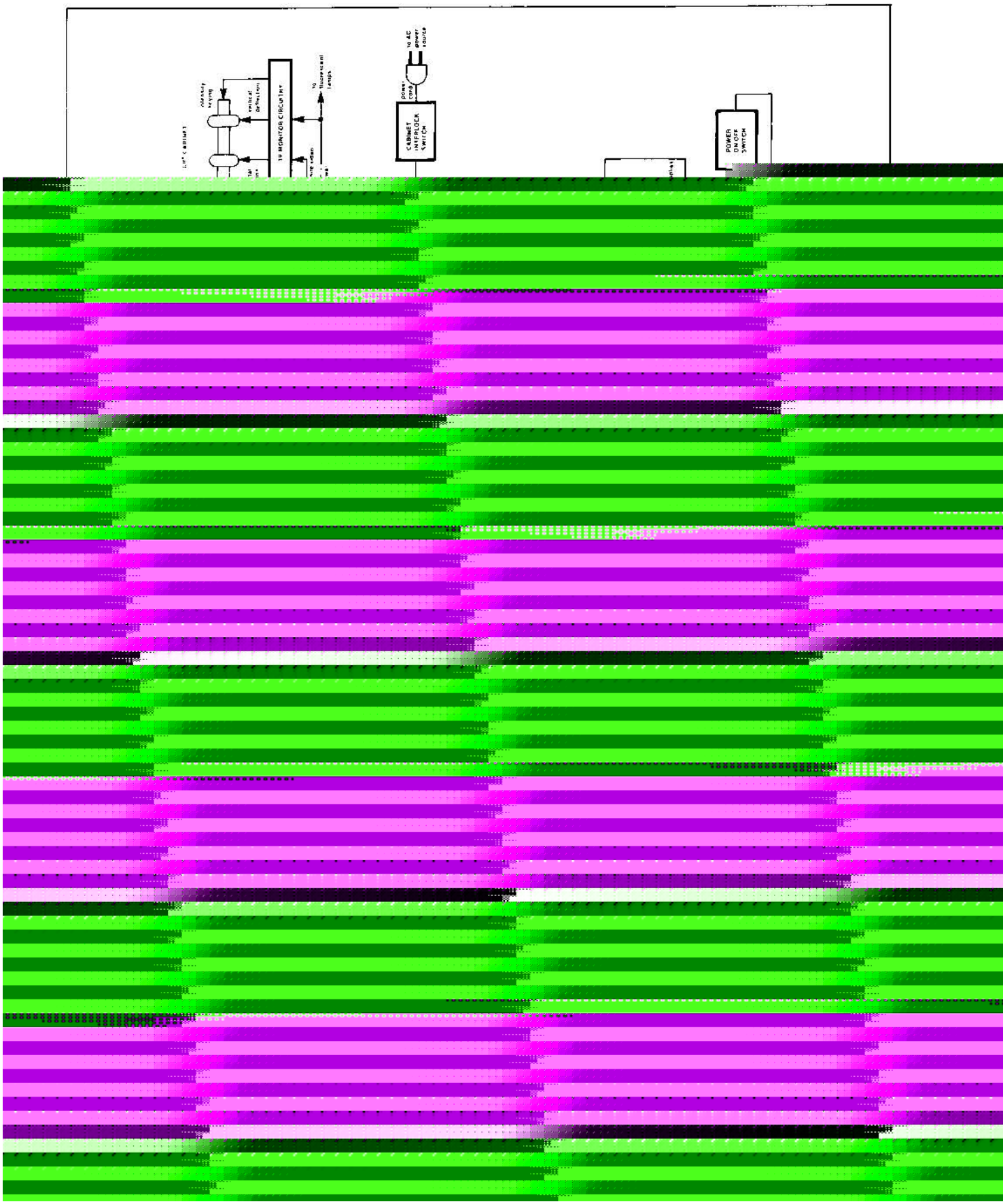
FUNCTIONAL DESCRIPTION OF GAME

The block diagram in Figure 36 shows the major functional parts of the Hit the Bear game and how the parts are interconnected. Note that a composite video signal is sent from the Game Printed Circuit Board (hereafter referred as Game PCB) to the TV monitor, and that a separate audio signal is sent to the speakers.

Unlike some previous Atari gun games which had an optical link between the gun and the light emitted from the TV screen, in the Hit the Bear game two potentiometers inside the gun mount assembly provide the gun position data. There is no light sensing electronic circuitry.

When players use the game (deposit coins, depress the lighted "START" pushbutton, move the gun, pull the trigger) they provide control switch and gun position data for the microcomputer system. And, in turn, the microcomputer system produces picture data and sound data that cause the game circuitry to respond with the proper video and audio outputs. In attract mode the microcomputer system produces picture data automatically, but does not produce sound data.




TV MONITOR CIRCUITRY
CABINET INTERLOCK SWITCH
POWER ON/OFF SWITCH

The latch outputs drive gates connected to another weighted resistor network, and the signal SHOT appears at the common point of the resistors.

The shift registers A7 and B7 form a white noise generator. They are driven by the 256H timing signal, and during play mode are turned entirely off and on by the LAMP 1 signal. The output of the noise generator is further gated with the SCREECH ENABLE signal to produce SCREECH at gate E7 pin 3.

AUDIO MIXING CIRCUIT AND AUDIO DRIVER

(lower left corner of sheet 5, Figure 41):

The junctions of resistors R59 through R62 form the sound summing point for the four separate contributions to the game's sounds. Potentiometer R105 provides the on-board manual adjustment for speaker volume.

The TDA 1004 device in location B12 serves as an audio driver whose outputs drive the two speakers in parallel.

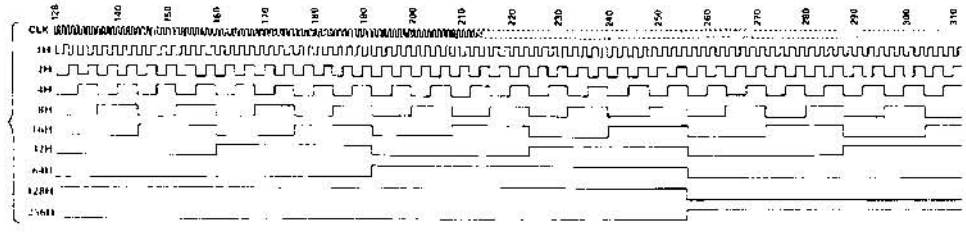
HORIZONTAL SYNCHRONIZATION NOTES

9-Bit Binary Counter K10, K9, and J9 counts from 128 to 512, then resets to 128. Results in the following:

6.0487 MHz
512 128

15.750 Hz 256H

Pulse 128H high portion longer than low portion. Pulse 256 high portion longer than low portion

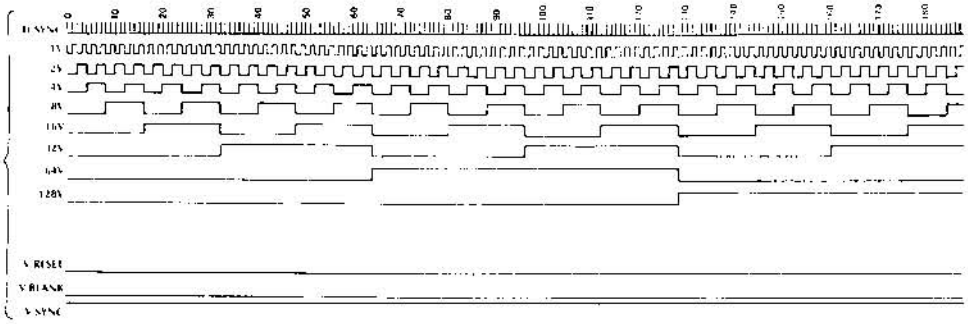


VERTICAL SYNCHRONIZAITON NOTES

9-Bit Binary Counter F8, J8, and H8 counts from 0 to 262, then resets to 0. Results in the following

15,750 Hz
262

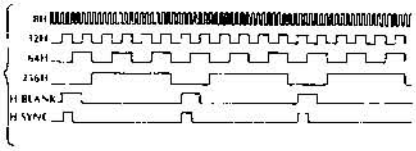
60 Hz V SYNC

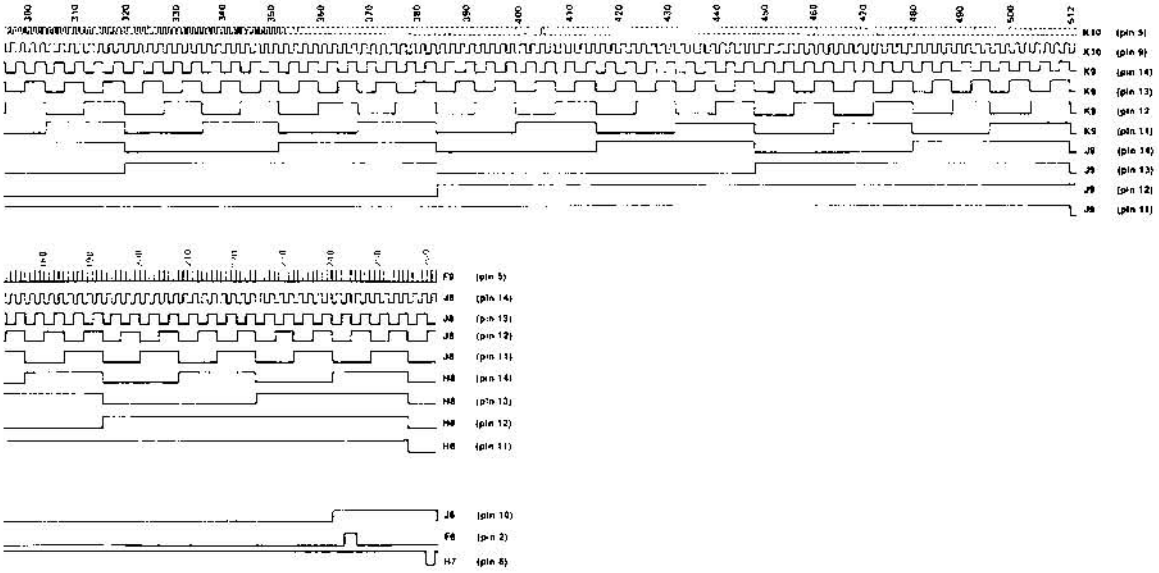


H BLANK AND H SYNC NOTES

Inputs to D-Type Flip-Flop F9 results in BLANK signal at pin 9 as illustrated.

Inputs to D-Type Flip-Flop F9 results in H SYNC signal at pin 5 as illustrated.





INSERT 1. HIT THE BEAR TV TIMING SIGNALS

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