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February 21, 1984

Thomas A. Briody, Esquire
Corporate Patent Counsel
North American Philips Corporation
580 White Plains Road
Tarrytown, New York 10591

Re: Magnavox v. Activision

Dear Tom:

Following receipt of our letter of January 5 regarding assertion of infringement of the '507 patent by additional Activision games, you asked us to obtain samples of the Activision Frostbite, Plaque Attack, Crackpots, Pressure Cooker, Space Shuttle, and Robot Tank game cartridges and give you our opinion as to those games. We have obtained each of those cartridges for the Atari VCS console. A short description of each game is attached hereto along with a copy of the chart included with our January 5 letter but updated to include these additional games. Also enclosed are copies of the instruction manuals for each of the cartridges.

As you will see, the only one of these six new games which we believe may be asserted as covered by the '507 patent is Pressure Cooker. The general comments in our January 5 letter apply to these games also.

You also asked that we reconsider the Pitfall game, and
we have done so. Two possible aspects of the game have been
discussed in the past as forming the basis for an assertion of
infringement, first when Pitfall Harry encounters a scorpion and
second when Pitfall Harry catches a swinging vine to cross over an
obstacle. In both instances, Pitfall Harry is the symbol
controlled by the human player. Harry is caused to move to the
left or right by manipulating the joystick and he is caused to jump
by depressing the action button.

When Harry encounters a scorpion, the scorpion is
moving toward Harry. The object for the human player is to avoid
coincidence between the symbols representing Harry and the
scorpion by causing Harry to jump over the scorpion. When
coincidence does occur, the motion of both the scorpion and Harry
stops. When Harry is to use a vine, the vine is swinging over the
obstacle. Harry catches the vine when he is running toward it and
the action button is pressed at the proper time. When the symbols
representing Harry and the vine become coincident, Harry swings
with the vine until the human player pushes the joystick down
causing him to drop off the vine. It appears that Harry is
normally able to catch the vine only when it is near one extreme of
its swinging action, so that the vine swings in the reverse of its
previous direction after it is caught. However, either catching
or missing the vine does not appear to have any effect on its
motion. Indeed, if Harry catches the vine slightly before it
reaches the extreme of its swinging action, the vine continues to
travel in the same direction until the extreme is reached.

Claims 25 and 51

With respect to claims 25 and 51, Harry would normally
be the "hitting" symbol since he is the symbol under player

control. As to the scorpion, it would be the "hit" symbol. However, the motion of the scorpion is stopped when coincidence between the two symbols is achieved. It is thus difficult to say that a distinct motion is applied to the scorpion when coincidence occurs. Similarly, even if the hit and hitting symbols were reversed, there would be no "distinct" motion imparted to Harry since his motion is also stopped.

As to the vine, it would also normally be the "hit" symbol. While it is true that the direction of swing of the vine is reversed at approximately the location where the images representing Harry and the vine become coincident, the reversal of direction appears to happen regardless of whether coincidence is achieved. Thus, it cannot be argued that a "distinct motion" is imparted to the vine "upon coincidence" since the fact of coincidence has no effect whatever on the motion of the vine.

It has been suggested that perhaps the "hit and hitting" symbols could be interchanged, the vine being the "hitting" symbol and Harry the "hit" symbol. A distinct motion would then be imparted to Harry, the "hit" symbol, upon coincidence with the vine symbol as the motion of Harry is changed from the falling action of the last half of a jump to swinging with the vine.

As we mentioned in our letter of January 5 and our memorandum of August 17, 1983, we believe that attempting to interchange the hit and hitting symbols would run a substantial risk of the patent being held invalid. We will not repeat all the reasons previously stated. But, essentially, the terms "hit" and "hitting" symbols do not have any meaning without reference to the '507 specification and its prosecution history. The term "hitting" symbol is there consistently used to refer to the symbol under control of the player, and "hit symbol" is consistently used to refer to the symbol the human player attempts to intercept.

In our August 17 memorandum at pages 11-13 we discussed
how the definitions of "hit" and "hitting" symbols appearing in
the patent were used at trial to distinguish over the prior art and
at pages 14-17 how Judges Grady and Leighton relied on essentially
those definitions in their respective opinions.

Moreover, it appears to us that if the "hit" and
"hitting" symbols are interchanged, the claims would then come
substantially closer to the prior art. If the actions of the "hit"
and "hitting" symbols can be interchanged, this necessarily means
that the "hitting" symbol can be either under machine control or
control of the human player. If so, then the cue ball of either
the RCA or Michigan Pool games may be considered to be a "hitting"
symbol, and any of the object balls could be considered as the
"hit" symbol. Equally well, the cue ball could be considered as
the hit symbol and the object balls as "hitting" symbols. In
either case, a distinct motion is imparted to both the cue ball and
any object ball with which the cue ball achieves coincidence.
Thus, the principal argument by which we have distinguished over
the pool games in the past would be removed by this claim
interpretation.

Claim 60

Claim 60 does not use the terms "hit" and "hitting"
symbols but instead recites in the general environment of a raster
scan display a game playing apparatus including means for
generating a "first symbol...at a position which is directly
controlled by a player" and a "second symbol...which is movable,"
coincidence determining means, and means for "imparting a
distinct motion to said second symbol in response to said
coincidence." In the normal reading of the claim, Harry would be
the first symbol and the scorpion or the vine the second symbol.

As with claims 25 and 51, it is difficult to argue that a distinct motion is imparted to either the scorpion or the vine.

Moreover, it appears to us to be even more difficult to argue for a reversal of roles of the two symbols in claim 60 than it was in claims 25 and 51. Claim 60 explicitly states that it is the first symbol which is controlled by the player. An argument that the first and second symbols could be interchanged has as a necessary corollary the position that the first symbol may be player or machine controlled. If so, the recitations of the first and second symbols and the resultant coincidence and distinct motion would apply to the RCA and Michigan Pool games just as would the corresponding limitations of claims 25 and 51, with the same effect.

Thus, we continue to recommend that no assertion be made that Pitfall comes within the '507 patent claims.

Incidentally, you have probably noted that Activision has announced a loss of $8.1 million on sales of $10.2 million for its quarter ending December 31, 1983 compared with income of $4.7 million on sales of $50.1 million for the corresponding quarter of 1982.
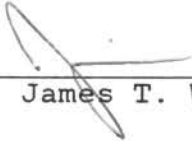
It is desirable to determine what games should be included in the supplemental responses to the Activision

interrogatories relatively soon as those responses will permit us to commence the necessary depositions of Activision.

Very truly yours,

NEUMAN, WILLIAMS, ANDERSON & OLSON

By_____
James T. Williams

JTW/sjm
Enc.

CC: R. T. Mayer, Esquire/with enc.
A. Tamoshunas, Esquire/with enc.
L. Etlinger, Esquire/with enc.

	DNI	CONSERVATIVE	LIBERAL	VERY LIBERAL	CLAIM 60 ONLY
Tennis		X			
Ice Hockey		X			
Boxing			X		
Fishing Derby				X	
Kaboom!	X				
Freeway	X				
Oink	X				
Dolphin			X		
Keystone Kapers					X
Dragster*					
Decathlon					X
Pitfall	X				
Bridge	X				
Checkers	X				
Stampede			X		
Skiing	X				
Grand Prix					X
Barnstorming					X
Sky Jinks					X
Enduro					X
Seaquest*					
Laser Blast	X				
Chopper Command	X				
Starmaster	X				
River Raid	X				
Megamania	X				
Spider Fighter	X				
Robot Tank	X				
Pressure Cooker			X		
Plaque Attack	X				
Crackpots	X				
Frostbite	X				
Space Shuttle	X				

*Further information should be obtained on game before
final decision is made; see the game description.

ROBOT TANK - shooting game with sight in center of screen.

PRESSURE COOKER - human player maneuvers Short-Order-Sam to catch or reject condiments coming toward him. When Sam catches a condiment, it travels with him and he places it on a hamburger moving on a conveyor belt. When Sam misses a condiment, it disintegrates. When Sam rejects a condiment by pushing the action button when it hits him, it bounces back.

PLAQUE ATTACK - shooting game.

CRACKPOTS - essentially a shooting type game. Human player maneuvers "Potsy" to drop flowerpots on bugs advancing across and up screen; when bugs are hit by a pot, the pot keeps going, and the bug goes white and keeps going but slowly fades away.

FROSTBITE - human player maneuvers "Frostbite Bailey" between different moving symbols representing ice flows while attempting to avoid moving symbols representing Killer Clams, Alaskan King Crabs, Snow Geese, and Polar Grizzly and attempting to catch moving fish symbols. When a fish is caught, the fish disappears. When Bailey is caught by a Snow Goose, Alaskan King Crab, or Killer Clam, Bailey is pushed off the ice flow and motion of all other symbols stops momentarily. When Bailey is caught by the Polar Grizzly, Frostbite Bailey moves off screen.

SPACE SHUTTLE - a simulation in which the human player attempts to pilot a Space Shuttle lifting off a launch pad, achieving orbit, docking with a satellite, leaving orbit, and landing from a perspective inside the space ship. We do not see any symbols which correspond to those of the claims. There is a central vertical line which appears to represent the central line of the shuttle windshield. A docking is achieved by maneuvering the shuttle to get proper readings on simulated gauges. When this occurs, the center line and the satellite are coincident, but rendezvous may be achieved long after coincidence with the center line occurs. After rendezvous, the satellite moves away from the center line.

WARNING...
OFFICIAL ORDERS
CODE NAME : ROBOT TANK™

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ACTIVISION.

Activision, Inc., Drawer No. 7287
Mountain View, CA 94039

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CONFIDENTIAL

FROM THE OFFICE OF THE PRESIDENT

Greetings. As you well know, sophisticated enemy Robot Tanks are quickly advancing cross country, firing at will and stopping at nothing. You must command your own Robot Tanks to stop their charge of chaos. Avoid being hit by enemy fire, or your Robot Tanks may be destroyed. The rebels are currently headed towards downtown Santa Clara. Only you can stop them.

Good luck!

1. Hook up your video game system. Follow manufacturer's instructions.

2. With power OFF, plug in the game cartridge.

3. Turn power ON. If no picture appears, check connection of your game system to TV, then repeat steps 1-3.

4. Plug Joystick into left controller port only. This is a solo mission.

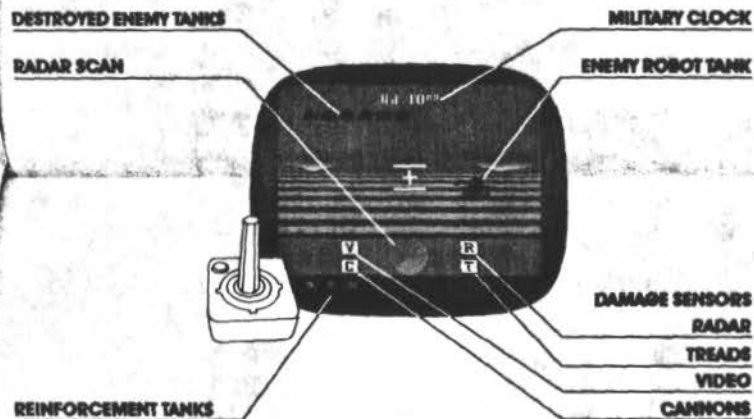5. The game select switch and difficulty switches are not used.

6. **Use of Joystick Controller.**

   *Hold Joystick Controller with the red fire button in the upper left position.

   *Move Joystick left to maneuver and/or aim your Robot Tank left.

   *Move Joystick right to maneuver and/or aim your Robot Tank right.

   *Push Joystick forward to roll your Robot Tank forward.

   *Pull Joystick back to retreat.

   *Press the red fire button to shoot your Robot Tank cannon at rampaging enemy Robot Tanks. Hold button down for continuous fire.

7. **To begin play.** Press game reset switch.

8. **Scoring.** A small tank appears at the top of your screen for each enemy Robot Tank you destroy. A square with the number 12 appears at the top of your screen each time a squadron of twelve enemy Robot Tanks are destroyed.

9. **Reinforcements.** You begin with one active Robot Tank and three reserves. Reserve Robot Tanks begin operation in perfect condition. You earn one bonus Robot Tank for every enemy squadron destroyed. The maximum number of bonus Robot Tanks allowed at any one time is 12.

10. **End of Game.** You may lose your Robot Tank when it is hit by enemy rocket fire. Your video scrambles with static interference when this happens. Some hits may only damage your tank. (See "Damage Sensors" in "Special Features"). Game ends when all of your Robot Tanks are destroyed or all 12 enemy squadrons are destroyed.

DESTROYED ENEMY TANKS   MILITARY CLOCK

RADAR SCAN   ENEMY ROBOT TANK

DAMAGE SENSORS

RADAR

TREADS

VIDEO

CANNONS

REINFORCEMENT TANKS

SPECIAL FEATURES OF ROBOT TANK™

Your Electronic Eye. Your Robot Tank's electronic eye lets you view the battlefield from a remote control station. Perspectives are real. The size of enemy Robot Tanks and their fire increase on your remote screen as they get dangerously close.

Twenty-four hours a day. From the first glimmer of sunrise, beyond the grey dusk and into darkened night, the enemy attacks relentlessly. For you, sleep becomes a distant memory. The military clock counts the hours and days and can be used as a tool for strategy (see "Tips from Alan Miller"). How long can you go on?

Weather Alert. Fog, rain and snow are reported to you through pre-dawn computer updates. In the snow, your tank will slip and slide. Rain significantly impedes your tank's mobility. In blanketing fog, enemy Robot Tanks are only visible when they are right in front of you. So, take advantage of bright sunshine while it lasts.

Radar Scan. The circular radar scan at the bottom of your screen is your window on the entire battlefield. Your tank is at the center of the scan, and the moving dot describes location, distance and directional movement of the enemy Robot Tank. Enemy tanks only fire rockets when they are in front of your tank. Your tank is safe when the enemy tank is behind you—when the moving dot is **below** the center of the the scan.

Damage Sensors. Video, cannons, radar and treads can be damaged by an enemy hit. Sensors report the damage by flashing on your control panel:

V: Video, your view on the battlefield, blacks out periodically.

C: Cannons will never go completely out, but when damaged, don't count on them firing all the time.

R: Radar scan inoperative. You must depend on your video to fix enemy position.

T: Treads damaged. Mobility is brought to a crawl. Movement is almost entirely frozen in the snow.

Be forewarned! Damaged tanks can NEVER be repaired.

Guiding your cannon fire. Your tank's cannon fire is continuously targetable while it's in-flight. It will follow the direction of your cross hairs. Also, enemy rocket fire can be prematurely detonated by intercepting it with your own cannon fire. Destroying an enemy Robot Tank automatically explodes its in-flight rockets.

GETTING A READING ON YOUR ROBOT TANK™

To successfully stop the rampage of enemy Robot Tanks, you must first become completely at ease with your own machine. There will be enough tension in the throes of battle.

Start out by practicing simple maneuvers. Roll your tank in all directions—forward, back, left and right. Pay strict attention to your tank's speed. It is important to know how quickly it can advance on enemy Robot Tanks or retreat from them.

Dodging enemy fire is a vital defensive move. Find out how close you can get to an enemy Robot Tank and still have time to avoid on-coming rocket fire.

The radar scanner is a very important monitoring device. It is the only **consistent** way to know where the enemy is located at night or in unforgiving fog. Practice using the scanner by firing your cannon when an enemy tank is directly above the center. It's the only time you can make a hit.

HOW TO JOIN ACTIVISION'S TANK CORPS

For service beyond the call of duty, you are eligible to join Activision's Tank Corps. If you destroy at least 48 enemy Robot Tanks (4 squadrons), then you've earned the Medal of Merit patch. Succeed in destroying 60 enemy Robot Tanks (5 squadrons), and you proudly deserve the Cross of Excellence patch. Distinguish yourself by destroying 72 enemy Robot Tanks (6 squadrons), and your meritorious achievement decorates you with the Star of Honor patch.

Please send us a picture of your tour-de-force (TV screen), and we'll issue you the appropriate Tank Corps patch, along with our salute and congratulations.

Be sure to write "ROBOT TANK" and the number of enemy Robot Tanks you destroyed on the bottom left-hand corner of the envelope.
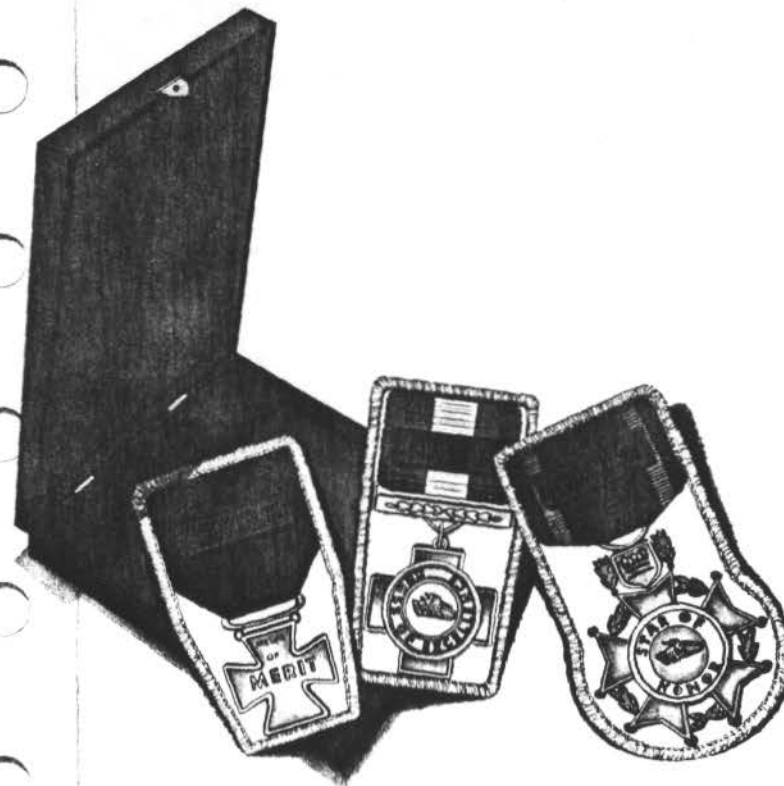
SPOTTING NEEDLES IN A HAYSTACK... 5000 MILES AWAY

The United States has the most complex, exact and efficient defense surveillance system of any country on earth. This is due, in part, to an elaborate use of computers.

Deep inside hollowed-out Cheyenne Mountain, directly west of Colorado Springs, Colorado, is an expansive bank of computers and security surveillance screens. These computers receive information from strategically positioned radar stations located all over the earth. The name of this Defense Command Center is NORAD, which stands for North American Air Defense Command.

NORAD's high-powered radar antennas continually scan the skies to detect all aerial movement and transmit relevant data to the computer center in Colorado. Many of the antennas have a 3000 mile scanning range capability, and some of the biggest antennas can detect an object as small as a bouncing basketball 5000 miles away, just about the distance from New York to Honolulu.

The computers evaluate the data to determine the size, shape, direction and speed of the moving objects. The data transmitted by the antennas is so detailed that the computers can even describe such physical features as what material the moving object is made of.
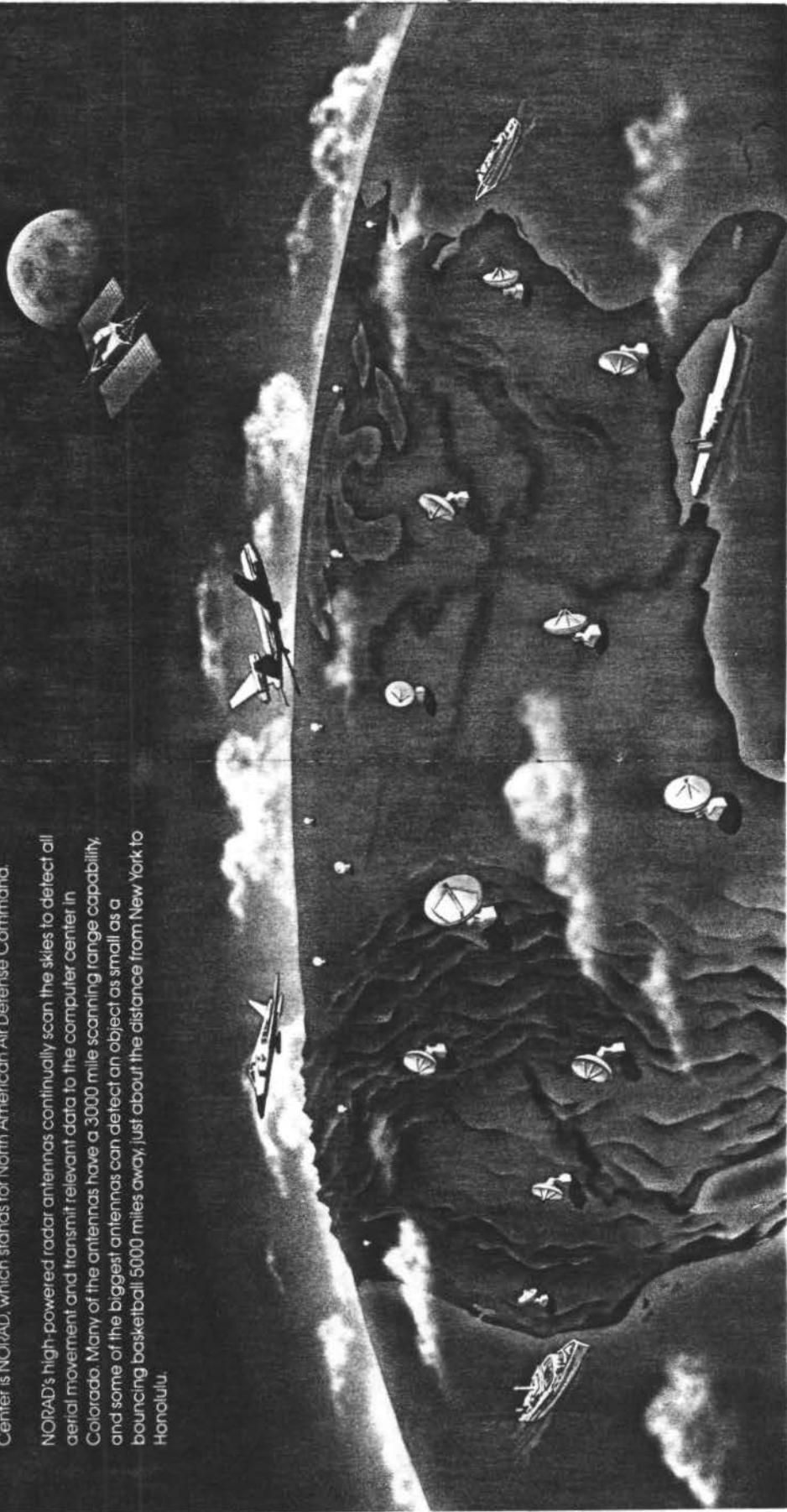
BECOME A HIGHLY DECORATED VETERAN OF ROBOT TANK™
Tips from Alan Miller, designer of Robot Tank™.

Alan Miller is an award-winning senior designer at Activision®. One of the 'giants' in the field, he's created Checkers, Tennis, Ice Hockey, StarMaster™ and now, Robot Tank™.

"Once you're locked in electronic battle, there's only one thing you can be sure of – nothing ever stays the same.

"Enemy Robot Tanks continually sneak up on you. You'll frequently end up losing visibility for one reason or another. So, practice aiming at enemy tanks using **only** the radar scan. If you can master this, then you will have better battling success at night or in fog.

"When there's no visibility, I suggest constantly maneuvering your Robot Tank to keep the enemy behind you, so that the vulnerable front of your tank is safe. Then, you can wait until conditions improve.

"If your tank is damaged, and it's night, keep track of the time using the military clock. If it's close to 0500 hours, then you may decide to wait for the weather alert. Conditions may improve from the previous day, and your next offensive may prove more successful.

"Remember that you can neutralize enemy fire by shooting into it. But, it's a risky tactic. Your miss could backfire and become a hit for your attacker."

alan miller

"P.S. When you've put plenty of distance between your Robot Tanks and the enemy, and all robotic communication has normalized, issue me a battle report. I'd love to know how you and your machines are doing."

MISSION ACCOMPLISHED

SHORT-ORDER SAM'S FAMOUS FAST-FOOD COOKBOOK

Let us get to know you! If you have questions or comments about our games or clubs, or want to be added to our mailing list, drop us a note or call the "Game Hotline" toll-free at (800) 633-GAME. In California please call (415) 940-6044/5.

ACTIVISION.

ACTIVISION.

COOKING BASICS

Business is booming at "The Grille". Hamburger orders are just pouring in. But back in the Assembly Room, the Food Dispenser is pouring out condiments everywhere. Help Short-Order Sam fill each order with the proper combination of tomatoes, onions, lettuce and cheese. And don't forget the bun! Then, rush the completed orders to the Wrapping Room fast. Alright cooks, grab your spatulas!

1. **Insert game cartridge** into your video game console with power OFF. Then, turn power ON.
2. **Plug in Joystick Controller(s).** Solo player uses left Joystick.
3. **Select game variation** by pressing the game select switch. You have less time to complete each order in the higher game variations.
   - Games 1, 3, 5, 7—One player.
   - Games 2, 4, 6, 8—Two players taking turns.
4. **Difficulty switches**
   - Left Difficulty Switch
     A: Plays music only between waves.
     B: Plays music continuously.
   - Right Difficulty Switch is not used.
5. **The Joystick Controller** is held with the red button in the upper left position.
   - To move Sam up, down, left and right, move the Joystick in that direction.
   - Press and hold the red button down to reject unwanted condiments.
   - Press the red button to drop completed hamburgers into the wrapping chute.
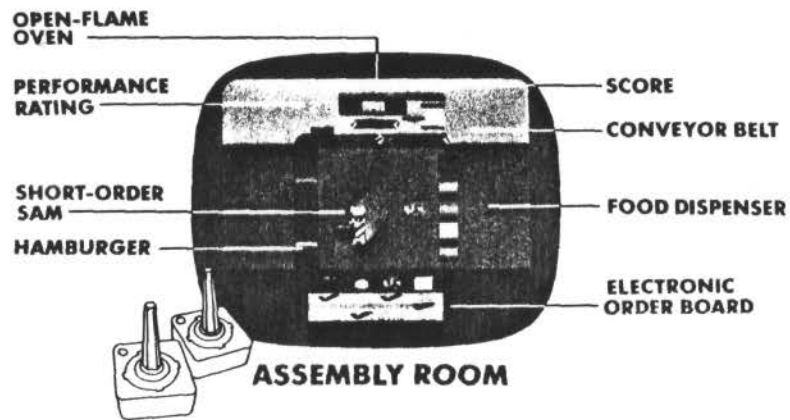
6. **To begin the game,** press the game reset switch.
7. **Performance Rating.** You begin with 50 performance points. You can add or lose performance points depending on your efficiency as a cook.
   You earn 10 performance points each time:
   - Your score increases 10,000 points. The maximum performance rating is 99 points.
   You lose 1 performance point each time:
   - Any condiment is wasted, smashing against Short-Order Sam or the conveyor belt.
   - You place the same type of condiment on any hamburger more than once.
   You lose 5 performance points each time:
   - You drop a hamburger into the wrong wrapping chute.
   - You miss the wrapping chute when you drop the hamburger.
   You lose 10 performance points each time:
   - A hamburger falls off the end of the conveyor belt.
8. **Scoring.** Each time you catch a condiment you score 5 points. You score 10 points for placing any type of condiment on any hamburger for the first time. 100 points are awarded each time you drop a completed hamburger into the correct wrapping chute. Efficiency Bonus Points and Burger Bonus Points reward you and boost your score at the end of each wave.
9. **End of Game.** The game ends when your Performance Rating drops to zero.

Note to owners of Sears Tele-Games® Video Arcade™. Difficulty is called skill, and **A** is **expert**, **B** is **novice**.

ASSEMBLY ROOM

WRAPPING ROOM

The Automated Food Services Silver Kitchen occupies two rooms in the back of "The Grille". Hamburgers are cooked and orders are filled in the Assembly Room. Completed hamburgers are wrapped and sacked in the Wrapping Room.

ASSEMBLY ROOM

Open-flame oven and conveyor belt.
Hamburger patties charbroil over the open-flame oven and topple onto the bottom half of a bun. The hamburgers continue along the conveyor belt.

Food Dispenser.
Big juicy tomatoes, eight-pound onions, crisp heads of lettuce and squares of cheese fly out of the Food Dispenser one at a time, but hardly ever in the right order. The dispenser throws out the top half of the bun when the proper combination of condiments are placed on a hamburger.

Electronic Order Board.
A maximum of three orders appear on the Electronic Order Board at any one time. Each order is color-coded: red, green or blue. A check (✓) registers under the condiments needed to fill each order.
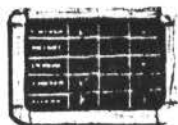
WRAPPING ROOM

Wrapping and Sacking Machine.
Wrapping and Sacking Machine is equipped with three separate color-coded automatic wrappers. The colors are red, green and blue, corresponding to those on the Electronic Order Board. Completed orders are wrapped and sacked one at a time.

Catching Ingredients. Flying condiments must collide with Sam's rather rotund stomach—head-on, left or right sides—to be caught. When they hit him anywhere else, splat!

Rejecting ingredients. When you don't want a condiment, press the red button and the condiment will bounce off Sam's stomach. None of the orders ever require any condiment more than once.

Building burgers. Condiments are placed one at a time on the burgers. Touch the burger with the ingredient to place the ingredient on it. When every ingredient needed has been placed on a burger, the color bar on the Electronic Order Board corresponding to that order flashes.

Wrapping burgers. To complete the order, rush Sam to the bottom of the Assembly Room and enter the Wrapping Room. Drop the hamburger into the wrapping chute that is the same color as the flashing bar on the Electronic Order Board.

JOIN ACTIVISION'S "SHORT-ORDER SQUAD"

Filling orders can really run you ragged, especially at "The Grille". But if you score 45,000 points or more, then we think the cook deserves a round of applause. Stand up and become a bona-fide member of the Activision "Short-Order Squad".

Just sandwich a snapshot of your savory score in an envelope, along with your name and address, and send it to us. We'll be delighted to send you the "Short-Order Squad" emblem shown below.

Be sure to write the name "PRESSURE COOKER" and your score on the bottom corner of the envelope.

HAMBURGER HERITAGE

Most Americans eat many, many hamburgers each year. But did you know that the name "hamburger" comes from "Hamburg steak" which was a marinated meat dish served in 1801 England? Scholars that study the origins and evolution of food are called Food Historians. Let's see how much you know about the history of the hamburger.

Q. The first hamburger was served in America in what year?

A. In 1900, in New Haven, Connecticut, Louis Lassen served the first hamburger between two slices of toast at his lunch wagon.

Q. When was the first hamburger served between a bun?

A. In 1904, at the Louisiana Purchase Exposition held in St. Louis.

Q. When was the first cheeseburger served in America?

A. In Los Angeles in 1929.

Q. Was the Hamburg steak ever prescribed as medicine?

A. The answer is yes. An English doctor named J.H. Salisbury prescribed the "Salisbury Steak" to his patients.

Q. Were hamburgers ever inflated in an attempt to raise the Titanic?

A. The answer is no.

COOKING UNDER PRESSURE

Tips from Garry Kitchen, designer of Pressure Cooker.™

Garry Kitchen is a Senior Designer at Activision. In addition to Pressure Cooker™, Garry designed the best-selling hit, Keystone Kapers™. Garry is a dynamite ping-ponger and, of course, loves to eat hamburgers.

"The Automated Food Services Silver Kitchen waits for no cook. Of course, neither do customers. Here are some tips I use to keep the customers happy and take some pressure off myself.

"First of all, keep moving. The open-flame oven never stops cooking, so you never have time to just stand around. Run to the conveyor belt and place the condiment on the hamburger. After dropping a hamburger into a wrapping chute, hurry back to the Assembly Room. Don't waste time watching the order fall into the sack.

"Also, it is important to remember that the Food Dispenser only throws out one condiment at a time. So, if there is one in particular that you need, then move closer to the dispenser and reject the ones that you don't need. It'll really speed things up, and you'll get the condiment that you do need sooner.

"Lastly, there will be times when you catch a condiment that you don't want. When that happens, place it on the hamburger at the top of the conveyor belt and hope the next order will need it. But more importantly, try not to catch any useless condiments.

"When it's closing time at 'The Grille', and all the customers have gone home, drop me a line. I'd love to know how your shift went."

Garry Kitchen

Let us get to know you! If you have questions or comments about our games or clubs, or want to be added to our mailing list, drop us a note or call the "Game Hotline" toll-free at (800) 633-GAME.

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Mountain View, CA 94039

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Flash! Across America, awful jawfuls of junk food are causing deadly dental decay. Plaque is spreading its invisible film, turning teeth yellow as they decompose before our very eyes. Blast this junk with toothpaste before it gets to your teeth! And don't let up. This is the Plaque Attack™, by cuspid, the last stop before gum city!

1. Hook up your video game system. Follow manufacturer's instructions.

2. With power OFF, plug in game cartridge.

3. Turn power ON. If no picture appears, check connection of your game system to your TV; then repeat steps 1-3.

4. Plug in Joystick Controller(s). Solo player uses left Joystick.

5. Set both difficulty switches to **b** to begin. Switches in this position will cause fast continuous fire from your tube when the red button is depressed. Set switches in position **a** for slower continuous fire.

6. Select the game with the game select switch.

   Game 1: One player. Advanced. Difficulty and points increase rapidly as your score rises.

   Game 2: Two players. Same as above.

   Game 3: One player. Beginner. Less rapid increase in difficulty, less rapid increase in points.

   Game 4: Two players. Same as above.

7. **To start**, press game reset.

SCORE
BONUS TEETH
TEETH
DECAYING TOOTH
TOOTHPASTE TUBE
ICE CREAM CONES
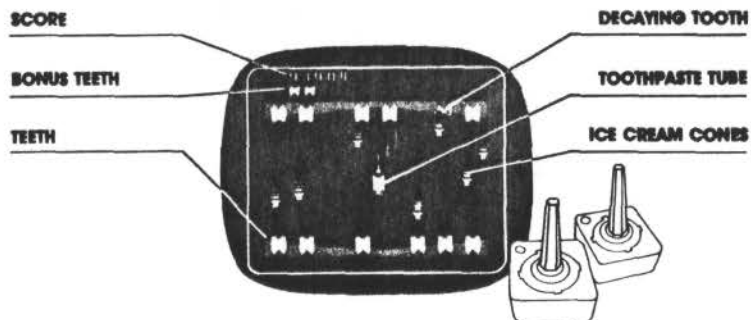
Note to owners of Sears Tele-Games® Video Arcade™.
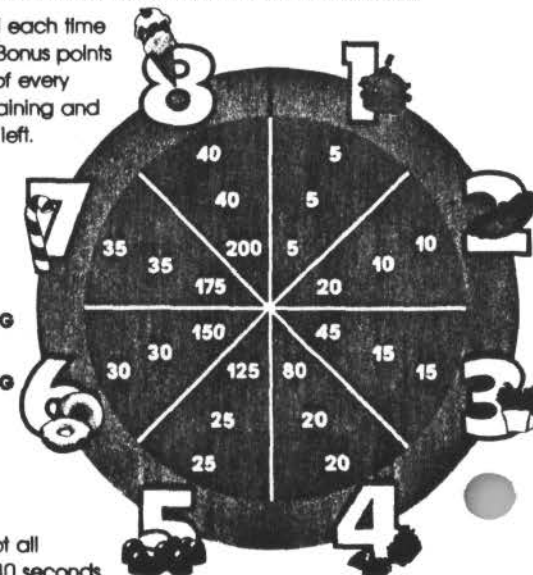**Difficulty is called skill: _a_ is _expert_ and _b_ is _novice_.**

8. **The Joystick Controller** is held with the red button in the upper left position. Push Joystick left or right and you'll move to the left or right. Pull Joystick back and you'll aim toward the lower mouth. Push Joystick forward and you'll aim toward the upper mouth. Press the red button to squirt the toothpaste.

9. Time is a factor. As soon as you press game reset, you'll have 35 seconds to wipe out each wave of food. Your tube will shrink as time runs out.

10. **Scoring.** Points are scored each time you shoot a food article. Bonus points are received at the end of every wave for each tooth remaining and for each second of time left.

WAVE	1	2	3	4	5	6	7	8
POINTS PER HIT	5	10	15	20	25	30	35	40
POINTS FOR EACH REMAINING SECOND	5	10	15	20	25	30	35	40
POINTS FOR EACH REMAINING TOOTH	20	45	80	125	175	200		

For example, if you've shot all the food in wave 2, with 10 seconds remaining (100 bonus points) and 8 teeth remaining (160 bonus points), you'll receive a total of 260 bonus points (see chart).

After the eighth wave, the scoring peaks, and the food cycle repeats.

11. **Bonus teeth.** You begin with eight teeth in your mouth. With each increase of 2000 points, a bonus tooth will appear beneath your score. Bonus teeth are automatically placed in your mouth at the beginning of the next wave.

12. **The game ends** when you've lost all your teeth _and_ have used up all your toothpaste.

Junk Food Cycles When you've blasted all of the food in all eight of the waves, brace yourself for a super Plaque Attack! All eight waves will return in ferocious retaliation. And the harder **you** work, the harder **they** work, taking on hectic motion patterns and evading your moves with each new cycle.

Limited time, unlimited shots There's no limit to the number of shots you can fire. However, your toothpaste tube will shrink as time runs out, and eventually disappear. Careful! Without a tube in your mouth, your teeth are defenseless against the food remaining in that wave.

Dental restoration Once plaque attacks a tooth, it turns yellow. But, it can still be saved if you act quickly! An immediate blast of toothpaste at the food invader will wipe out the food and plaque and restore your tooth's health and whiteness.

If you lose all your teeth at first, don't get too down in the mouth. All you need is practice. You'll soon develop a sense of rhythm and timing. Notice that the food waves alternately attack the top and bottom teeth. So, begin to anticipate their movement.

Be generous in your shots of toothpaste. That is, blast away! You've got nothing to lose, since shots are unlimited and time is of the essence.

JOIN THE ACTIVISION® "NO PLAQUE PACK"

Can you reach a score of 35,000 points or more? If so, you can become a "No Plaque Packer", a leader in the bitter war against tooth decay. Just send us a photo of the TV screen showing your score, along with your name and address, and we'll send you the official No Plaque Pack emblem.

Let us get to know you! If you have questions
or comments about our games or clubs, or want
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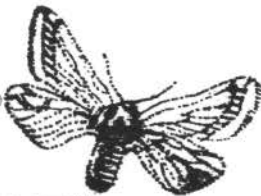
ACTIVISION®

ACTIVISION®

CRACKPOTS™

·PEST·
CONTROL
HANDBOOK

APPROVED BY BROOKLYN
BLOCK ASSOCIATION
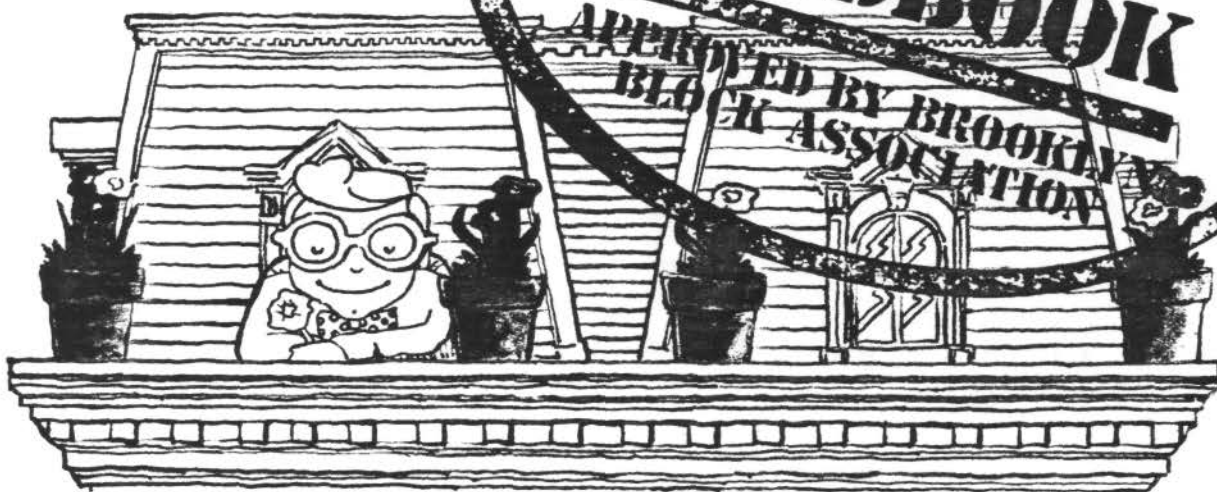
We're infested! A bug barrage is swarming out of the sewer, chomping away at every building in town. Entire neighborhoods are now crumb piles! Over in Brooklyn, Potsy, the rooftop gardener, is defending his beloved building with his only weapon—potted petunias. Be a good neighbor. Help him take potshots at the insect invaders...Quick! When too many bugs crawl into the windows, they'll start eating you out of house and home!

BASIC BUG BASHING

1. **Insert game cartridge** into your video game console with power OFF. Then turn power ON.

2. Plug in **Joystick Controller/s.** Solo player uses left Joystick.

3. The **difficulty switches** are not used.

4. Select game with **game select switch.**

Game 1	**Game 2**
One Player	Two players taking turns

5. The **Joystick Controller** is held with the red button in the upper left position. To move Potsy left or right, push the Joystick left or right. To push a pot over the ledge, press the red button when Potsy is standing behind it.

6. **To begin** a new game, press the game reset. You'll hear the pitter-patter of tiny bug feet rising up through the sewer. Take a breath and get ready...here they come!!

7. **Bugs** come in waves. The first wave is black, then colors progress to blue, red and green. There are twelve bugs in each wave. When you make it through the green wave, the cycle will repeat. However, you'll then be at the next level and all the bugs will move faster.

8. **Six Bonus Bugs** are displayed below the sewer at the beginning of each wave. Whenever a bug slithers into a window, a Bonus Bug will disappear from this display. When six bugs have crawled into the windows, all six Bonus Bugs will be gone and your Joystick's red button won't release any more flowerpots. Then, one of the crawlers will chew up a layer of your building, and you'll repeat the wave at a slower level.

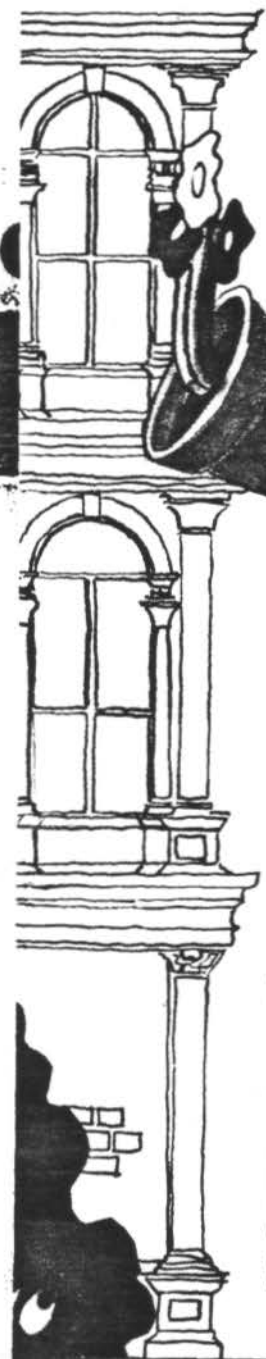9. The **game ends** when the creepy crawlers have gobbled up six layers of the building.

POTSY — SCORE

WINDOWS — POTTED PETUNIAS

SEWER — BUGS
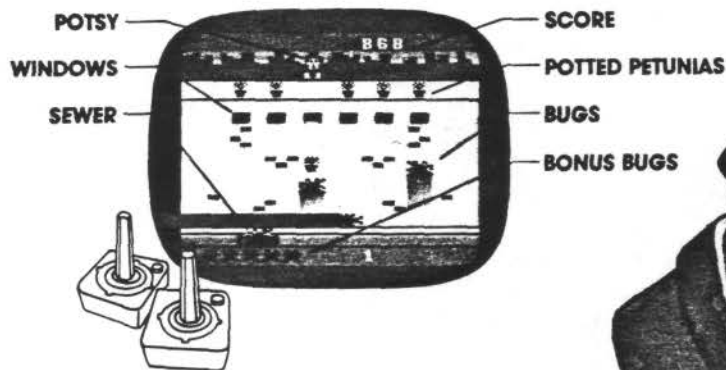
BONUS BUGS

SCORING

VEL		BLACK	BLUE	RED	GREEN
	1	10	20	30	40
	2	20	40	60	80
	3	30	60	90	120
	4	40	80	120	160

COLOR OF BUGS

5	50	100	150	200
6	60	120	180	240
7	70	140	210	280
8	80	160	240	320

Bonus Bugs. 200 points are awarded for each bug print remaining at the end of every wave.

BUGS OF MANY COLORS

The bugs crawl up the wall in four different directions, depending on their color.

Black bugs crawl straight up.

Blue bugs wiggle side to side.

Red bugs crawl diagonally.

Green bugs zig-zag between two windows.
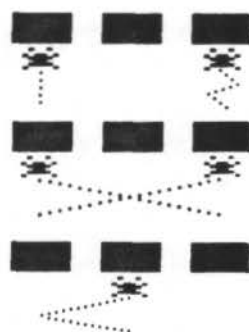
GETTING THE FEEL OF CRACKPOTS

Becoming a seasoned Crackpot doesn't just happen after one day in the big city. You need to stick around for a while and practice. For starters, hang out with Potsy. Check out his speed and style. Develop a sense of timing based on the speed and direction of the bugs and the time it takes for a petunia to fall. This will vastly improve your accuracy at pitching a plant at just the right time.

JOIN THE ACTIVISION, "CRACKPOTS"

If you help Potsy pitch pots at pests for points totaling 75,000 or more, you've been more than a good neighbor. Consider yourself an official Activision Crackpot. Send us a photo of the TV screen showing your qualifying score, along with your name and address, and we'll send you the official Crackpot emblem. Be sure to write the name 'Crackpots' and your score on the bottom corner of the envelope.
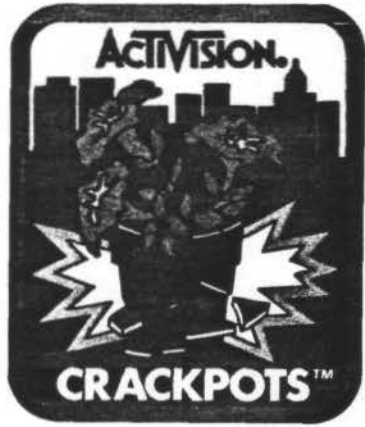
THERE'S A BUG IN THE HOUSE!!!

Most people aren't too disturbed by insects crawling in the woods and wilds. Let one appear in the parlor, however, and a frenzy sets in.

Yet, like us, these tiny creatures are nature's handiwork and, as co-inhabitants of planet Earth, perhaps we should all get to know each other.

Roaches are old-timers. Human existence began one million years ago, while roaches have been around for 300 million years! If you're wondering what to serve a roach for dinner, they'll eat most foods, in the pantry or in the garbage. But did you know they also like glue, watercolor paints and stale beer?

Fleas are the high jumpers of the planet. They can leap up to 50 times their height. We'd have to jump up to 300 feet to compete with that!

Clothes moths love wool. But did you know that they eat your sweaters *before* they become moths? The mother moth leaves her eggs on your clothes and rugs and, when they hatch, baby caterpillars emerge. *That's* who does the eating! In their winged state, they are unable to eat.

Spiders are not insects, they're Arachnids. Insects have six legs, spiders have eight. A spider in the house is a friend indeed! If you can tolerate their presence, and don't rub them the wrong way, they will do you no harm. Allow them to spin their gentle webs and rid your house of many insect pests.
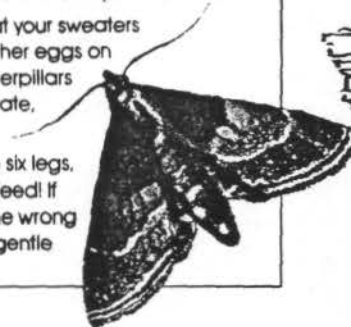
HOW TO BECOME THE NEIGHBORHOOD CRACKPOT
Tips from Dan Kitchen, designer of Crackpots™

Dan Kitchen grew up in a family of game designers and computer pros (Garry and Steve are his brother designers). It's no wonder that he was designing games right out of high school—in 1979! In his spare time, he plays folk guitar, tinkers with electronics and jogs.

"Crackpots is a game that requires balance, advanced planning, good aim and the ability to remain calm when things appear hopeless. Follow these tips and you'll soon be a smashing success.

"Play the sidewalk—that is, try to hit the bugs while they're crawling along the sidewalk or when they're just coming out of the sewer. The closer they get to the windows, the less time you'll have to react.

"When you're up in the higher levels, the bugs will crawl too fast for you to get them all. You're better off playing, say, three selected windows in the middle. It's OK if a few crawlers get in on the extreme right or left. You only have to get seven out of twelve bugs to go to the next level.

"Notice that the red bugs end up 2 windows away from where they began their diagonal climb. And, while the building is still pretty high, the green bugs will end up at the window over the spot they started from below. Keep this in mind and you'll soon be dropping the right pot at the right time.

"Then, if you *still* can't stamp out bugs, you can always buy the original, inner-city bug killer—a pair of shoes with pointed toes. Know what I mean? Drop me a line if you do. God bless!"

Dan Kitchen
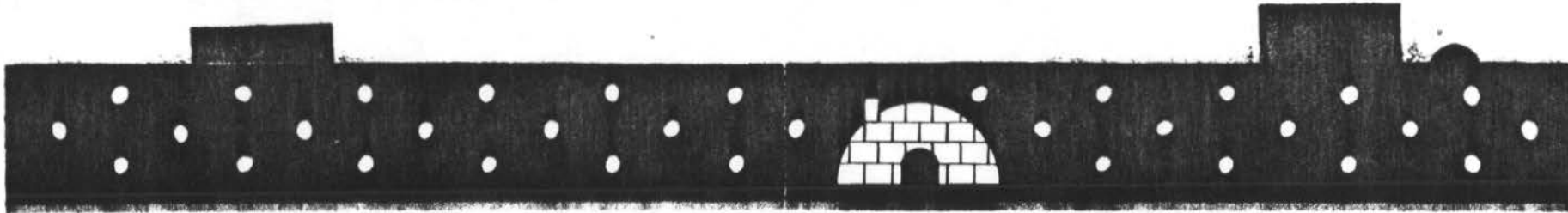
Let us get to know you! If you have questions or comments about our games or clubs, or want to be added to our mailing list, drop us a note or call the "Game Hotline" toll-free at (800) 633-GAME. In California, please call (415) 940-6044/5.

# ARCTIC ARCHITECT'S HANDBOOK

ACTIVISION®

The object of the game is to help Frostbite Bailey™ build igloos by jumping on floating blocks of ice. Be careful to avoid these deadly hazards: killer clams, snowgeese, Alaskan king crab, grizzly polar bears and the rapidly dropping temperature.

FROSTBITE™ BASICS

1. **Insert game cartridge** into your video game console with power OFF. Then, turn power ON.

2. **Plug in Joystick Controller/s.** Solo player uses left Joystick.

3. **The difficulty switches are not used.**

4. **Select game** with game select switch.
   Game 1 — Regular   **Game 2** — Regular, two players
   Game 3 — Advanced   **Game 4** — Advanced, two players
   Regular games start at level 1.
   Advanced games start at level 5.

5. **The Joystick Controller** is held with the red button in the upper left position.

   * To move Frostbite Bailey left or right, move Joystick left or right.
   * He'll move up when you push the Joystick forward, and move down when you pull it back.
   * To reverse the direction of the ice floe you are standing on, press the red button. But remember, each time you do, your igloo will lose a block, unless it is completely built.

6. **To begin a new game,** press the game reset. The ice will start to move and Frostbite can start jumping.

7. **Reserves.** You begin the game with one active Frostbite Bailey™ and three on reserve. With each increase of 5,000 points, a bonus Frostbite is added to your reserves (up to a maximum of nine).

8. **Frostbite gets lost** each time he falls into the Arctic Sea, gets chased away by a Polar Grizzly or gets caught outside when the temperature drops to zero.

9. **The game ends** when your reserves have been exhausted and Frostbite is 'retired' from the construction business.
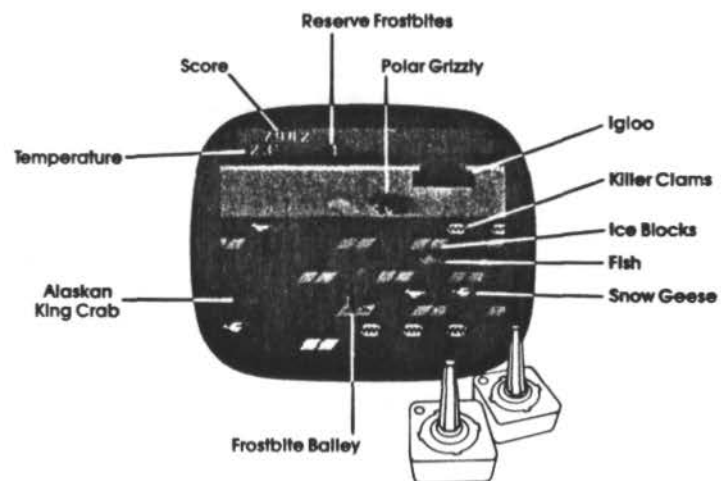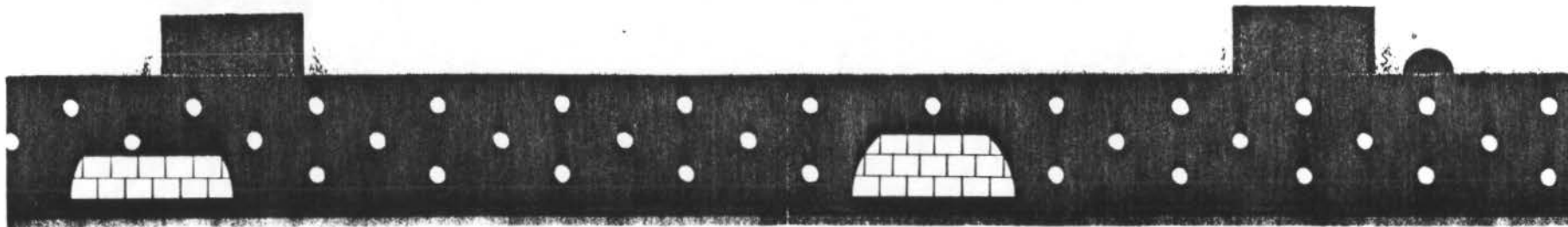
IGLOO CONSTRUCTION

Building Codes. Each time Frostbite Bailey™ jumps onto a white ice floe, a "block" is added to the igloo. Once jumped upon, the white ice turns blue. It can still be jumped on, but it won't add points to your score or blocks to your igloo. When all four rows are blue, they will turn white again. The igloo is complete when a door appears. Frostbite may then jump into it.

Work Hazards. Avoid contact with Alaskan King Crabs, snow geese and killer clams, as they will push Frostbite Bailey into the fatal Arctic Sea. The Polar Grizzlies come out of hibernation at level 4 and, upon contact, will chase Frostbite right off-screen.

No Overtime Allowed. Frostbite always starts working when it's 45° outside. You'll notice this steadily falling temperature at the upper left corner of the screen. Frostbite must build and enter the igloo before the temperature drops to 0°, or else he'll turn into blue ice!

SPECIAL FEATURES OF FROSTBITE™

Fresh Fish swim by regularly. They are Frostbite Bailey's only food and, as such, are also additives to your score. Catch 'em if you can.

Night and Day. Frostbite works the day shift and the night shift. He must build four igloos per shift.

A Magic Fish will appear near your score when you've racked up a certain high number of points. Watch for it!

SCORING

Level	Points per Iceblock	Points for Entering Igloo
1	10	160
2	20	320
3	30	480
4	40	640
5	50	800
6	60	960
7	70	1120
8	80	1280
9	90	1440

Scoring remains constant after the ninth level.

* Fish are worth 200 points each.

* Also, each degree remaining when Frostbite Bailey™ enters his igloo will add points to your score as follows:

$$10 \times Degree \times Level \#$$

JOIN THE "ARCTIC ARCHITECTS"

Getting into any builder's association requires paying your dues. Score 40,000 points or more, and we'll figure you've paid yours. If you find the magic fish, we'll really be impressed! Send us a photo of the TV screen showing your qualifying score, along with your name and address, and we'll send you the official Arctic Architects emblem. Be sure to write the name "Frostbite" and your score on the bottom corner of the envelope.

LIFE AT THE TOP OF THE WORLD

The Arctic probably ranks as the area least chosen by homebuyers, and most of us know little, if anything, about this amazing land. Yet, the Arctic has been home to some of the happiest and healthiest members of humankind for thousands of years — the Eskimos!

Traditional Eskimos believe that nature's gifts belong to everyone. There is no private property except for tools and clothes. Everything else is shared — not only with community members, but with any stranger that travels by!

It is only while traveling that Eskimos live in their famous snow houses. All houses are called "igloos" whether they're made of wood, fur, mud or snow. The snow variety can be built in about one hour. Here's how:

A knife with a long, wide blade is used to cut snow into blocks measuring 36" × 18" × 6". These are piled in a continuous spiral.

The entrance is a tunnel under the snow or, when the ground is frozen, a long hall, above-ground. This keeps out the cold wind, and keeps the warm air inside. A hole is made in the roof for ventilation.

There are fascinating things to learn from our Arctic sisters and brothers. Find out more at your library.

HOW TO BECOME AN ARCTIC ARCHITECT

Tips from Steve Cartwright, designer of Frostbite™

Steve Cartwright is an Activision senior designer. His prolific talents have already brought you Barnstorming,™ Megamania,™ Seaquest,™ and Plaque Attack.™ Aside from video games, Steve enjoys motorcycle touring and photography.

"Here are my favorite tips for high scoring:

"Learn to use the red button sparingly. The best time to use it is to 'fake out' the bear by drawing him to the middle of the screen and then quickly changing direction.

"Don't be greedy with the fish. Get them if they happen to come by. However, going out of your way often uses too much time.
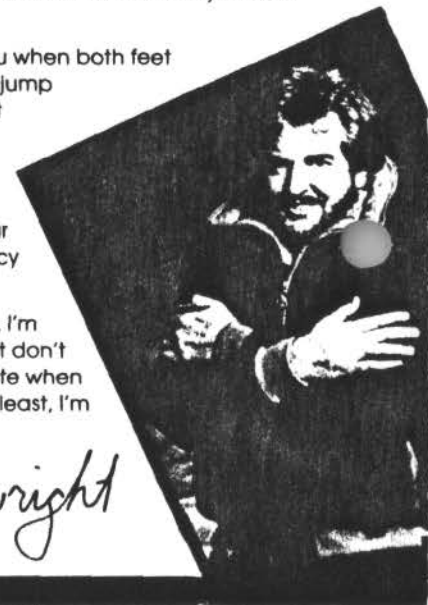
"Another thing: You can move Frostbite Bailey in mid-air and, at the higher levels, you can really hook him around. Check out just how far he'll go.

"Notice that hazards can only get you when both feet are planted. Therefore, it's possible to jump 'around' hazards since they can't hurt you in mid-air.

"Now here's a secret tip I've decided to share: If you jump up onto the extreme left side of the shore, the bear can't get you. It's Frostbite's emergency hide-out.

"Now that you know the inside scoop, I'm expecting some really high scores. But don't stay on the ice too long: You can't write when your hands are cold. And, at the very least, I'm expecting a postcard."

Steve Cartwright

The terminology in this instruction manual corresponds to that of the Flight Deck Console overlay provided. The overlay should be used when operating Space Shuttle. However, if the overlay cannot be used with your particular game system, the following list should be used as a guide:

TERMINOLOGY

GAME SYSTEM	FLIGHT DECK CONSOLE
Power On/Off	Internal Power
Color/B&W	Primary Engines
Left Difficulty	Backup Engines
Right Difficulty	Cargo Doors/Landing Gear
Game Select	Status
Game Reset	Activate Countdown

If the Color/B&W Switch (Primary Engines) on your game system is inaccessible, the Left Difficulty Switch (Backup Engines) should be used.

Also, on the Atari® 2800™ and Sears Video Arcade II™, put the Color/B&W Switch in the B&W mode, then use the Left Difficulty Switch.

Otherwise, shutdown Backup Engines (Left Difficulty) and **do not touch!**

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Sears Video Arcade II™ game systems:
Difficulty is called skill, and A is Expert, B is novice.
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Space Shuttle—A Journey Into Space™
is dedicated to the men and women of the National Aeronautics and Space Administration (NASA), without whose kind assistance this cartridge would not have been possible.

MISSION PROFILE

It is the 101st Shuttle mission of the Space Transportation System. You are at the helm of the Space Shuttle Discovery. Approximately 210 nautical miles above the Earth is your target: an orbiting satellite with intentionally programmed gyroscope problems.

Your mission is to launch, rendezvous, and dock with the satellite as many times as you can, using the minimum of fuel, then return safely to Earth. A word of caution: Each time you successfully dock, the satellite has been programmed to become even more erratic.

This is a total test of your piloting capabilities. You will be evaluated at the end of your flight.

EQUIPMENT CHECK

Status Switch Your Flight Indicator. Hold it down to make your Flight Selection and to check the following important information: speed, altitude, fuel, MET (mission elapsed time) and stats (see "Stat Messages" for descriptions). Also, hold down for two seconds during flight to re-start flight.

Primary Engines Your access switch to all Shuttle engines: Main Engines, Orbital Maneuvering System, and Reaction Control System.

Backup Engines Used only on game systems where Primary Engines (Color/B&W Switch) is inaccessible. Otherwise *always* keep in shutdown mode.

Cargo Doors/Landing Gear A dual function switch used to open and close your Cargo Bay Doors, and to lower your Landing Gear. More on this in later sections.

Joystick Controller A realistic directional hand controller. Forward and back moves Shuttle forward or back (X axis). Left and right controls your "plane" (left/right) movement (Y axis). With red button depressed, forward or back stick movement moves shuttle up or down (Z axis). See "Maneuvering in Space" for further explanation. Also, the red button has other uses in launch, orbit, and entry phases as described in those sections.

FLIGHT SELECTION

There are three separate flight modes. Spend time with training flights #1 and #2 before taking on all the challenge of a real, unassisted Shuttle mission (flt. #3). Flight mode can only be selected before countdown is activated.

Flight #1 Autosimulator Flight mode #1 is a combination demonstration flight and autosimulator. The Shuttle flies an abbreviated mission. You do not use any of the console controls. In this flight mode, most aborts (see "Abort indicator") are ignored. Whenever you touch your Joystick, you take control from that point on. However, you will only need to use your Joystick Controller to correct your Y axis, and land.

Flight #2 Simulator All astronauts spend thousands of hours practicing in ground-based simulators before flying an actual Shuttle mission. In this mode, experience the challenge and demands of a real mission with a couple of important exceptions: You will never use any fuel units, so take your time to complete a mission. Also, your onboard computers will greatly assist you during flight by compensating for less than perfect piloting skills. Most aborts are overriden, but your flight indicator (stat message) will alert you when you've erred.

Flight #3 STS 101 A full-fledged Shuttle Flight. All aborts are operative and flight conditions are quite realistic. Good luck!

FLIGHT EVALUATION

Abort Indicator If critical problems occur anytime during a flight, you may receive a "Launch Scrub" or "Mission Abort" signal. If this happens, your flight has ended, and you must check your Status to find out what went wrong.

Ranking If you safely land your Shuttle at Edwards Air Force Base, in flight #3, your performance will be computer-evaluated. Your ranking will be determined by the number of successful dockings and the exact number of fuel units you have remaining at the end of your flight:

RANKING	DESCRIPTION	QUALIFICATIONS	
		(Dockings)	(Minimum fuel units)
Commander	Responsible for overall crew safety and flight execution	6 or greater	7500
Pilot	Second in command, assists in all flight functions.	4.5	4500
Mission Specialist	Qualified to coordinate mission scientific objectives.	2.3	3500
Payload Specialist	Qualified to operate specific payloads and coordinate Shuttle housekeeping	1	1

See "Earning Your Wings" for important club information.

OBJECTIVE

Launch your Space Shuttle and attain an altitude and orbit as close to the satellite's orbit as possible.

LAUNCH CHECKLIST

Launch Phases As you fire your enormous main engines and liftoff from the pad, you'll be going through 3 separate phases. The numbers 1, 2, 3 on your initial computer screen refer to: (1), firing of the SRB's (solid rocket boosters), which really shakes the shuttle, (2), maximum acceleration, and (3), approaching engine shut down. The X indicates MECO, (Main Engine Cut-Off).

Thrust Notice the two, long horizontal bars on the control panel on your screen. "T" stands for thrust. "C" stands for computer. The "C" arrow represents a signal from the onboard computer indicating the proper thrust needed during each phase of liftoff. You control "T" (thrust) using the red button on your Joystick. Always keep both "T" and "C" arrows aligned. Whenever the "T" arrow flashes, you are wasting fuel and should immediately increase or decrease thrust.

Hold Down Bolts Though your engines are firing, you won't leave the ground until MET + 3. The "Hold Down Bolts" will keep your Shuttle on the ground until MET + 3 to compensate for the mechanical strain on the Shuttle from firing your engines.

Trajectory/Plane In addition to regulating thrust, you'll need to also follow the proper trajectory (forward-back on Joystick), and constantly correct your "plane" (left-right on Joystick).

Line Horn If you stray from the correct launch trajectory, you will waste fuel. To alert you when this is happening, a warning horn will sound. You'll find this feature helpful in avoiding an abort situation.

Separation A yellow flash at about 26 nautical miles will indicate Solid Rocket Booster separation (SRB SEP). Another flash shortly after MECO, (Main Engine Cut-Off), will alert you that the main External Tank has fallen away into the Indian Ocean (ET SEP).

LAUNCH SEQUENCE

1. Internal Power On.
2. Primary and Backup Engines Shutdown.
3. Cargo Door closed/Landing Gear Up.
4. Activate Countdown.
5. At MET-015 activate Primary Engines.
6. At MET-004 ignite Engines by pressing red button on Joystick. Match "T" arrow with "C" arrow during launch.
7. As Shuttle rises, watch both dots on the computer screen. You must follow the indicated launch trajectory and continually correct your "plane" by keeping your Shuttle centered in the small box at right:
   - Move Joystick forward to move dot left, backward to move dot right.
   - Move Joystick left or right to correct plane.
8. At about 205 nautical miles, quickly shutdown engines. The closer you come to the 210 altitude, the closer you'll be to the satellite's orbit.

Launch & Ascent Summary Flying the Shuttle into orbit is an extremely challenging task. Following a roller coaster path, you must match your thrust with the computer indicator, stay on the proper trajectory as plotted on the altitude display, and correct your plane as indicated in the small green box. Each area is critical. Incorrect trajectory will cost precious fuel and may abort your mission. A great elevation in the plane setting at MECO will make satellite docking difficult.
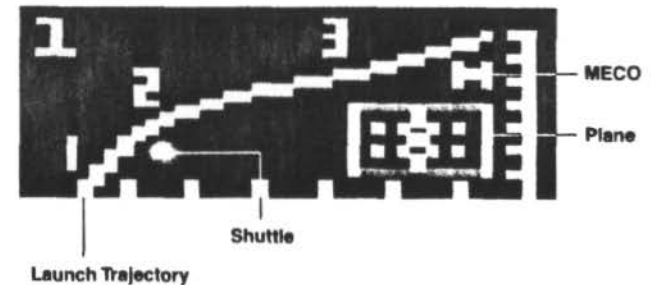
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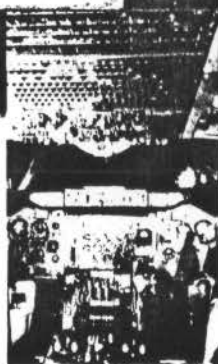
OBJECTIVE

Establish a stable orbit by adjusting Shuttle pitch to enable visual contact, and by opening Cargo Bay Doors for heat release.

STABLE ORBIT CHECKLIST

Nose Down Maneuver When the Shuttle first achieves orbit, the nose of the craft is pointed up out of the line of sight of the satellite. In order to dock, you must see the satellite. So it's necessary to bring the nose down, which is done by adjusting pitch (the up-down movement of the nose of the Shuttle).

Cargo Bay Doors One of your first tasks in orbit will be to open the Cargo Bay Doors. This is vital and must be accomplished within first orbit. The radiators that shed excess heat generated by the Shuttle are on the inner surfaces of these doors. If the doors remain closed, heat builds up within the vehicle, and a warning horn will sound. (You then have 30 seconds left to open Cargo Bay Doors.) If the doors aren't quickly opened, the mission will have to be aborted.

SEQUENCE TO STABILIZE ORBIT
1. Activate Primary Engines.
2. Push Joystick forward to set-28 pitch.
3. Shutdown Primary Engines.
4. Open Cargo Bay doors.

STABLE ORBIT SUMMARY
Nose pitch down and Cargo Bay Door events must be performed on the first orbit revolution before any on-orbit operations can be attempted.

OBJECTIVE

Properly correct the speed and position (Z, Y, X axes) of your Shuttle to successfully rendezvous with the satellite.

DOCKING CHECKLIST

Maneuvering in Space There are two separate ways to maneuver your Shuttle in space. For major maneuvers (30 nautical miles or more) the Orbital Maneuvering System (OMS) can be used. This system (explained in a later section) takes a good deal of understanding and experience to use effectively. So, when first starting out, use the Reaction Control System (RCS). These clusters of rocket engines in the Shuttle's nose and tail can move the Shuttle about its three major axes X, Y, Z (called transitional) or about its yaw or pitch (rotational).

Shuttle Speed and Position Speed is just as important as position. Never allow your speed to drop below mach 17.0, or your altitude to fall below 195 nautical miles, or you'll burn up in the atmosphere! Your X motion to satellite is dependent upon your speed, not the RCS engines. To move toward satellite you must increase speed to greater than mach 23.9 (the satellite's speed). When you make your final approach to satellite, keep your speed close to mach 23.9.

Drifting As you move closer to the satellite, constantly go back and forth to check all axes. Settings continually shift, and the satellite movement is erratic.

"S" Curve On computer screen #2, the "S" line indicates both the Shuttle's and the satellite's ground track around the Earth. The flashing dot is your Shuttle, the solid dot is the satellite. Notice as you track the satellite, your X axis will suddenly change significantly as the satellite "wraps around" the tracking line. This is because the orbital tracking line wraps around the display as a real orbit would wrap around the Earth.

"S" Curve

Shuttle ——
Equator ——
Satellite ——

One full Earth rotation

GROUND TRACK SCREEN
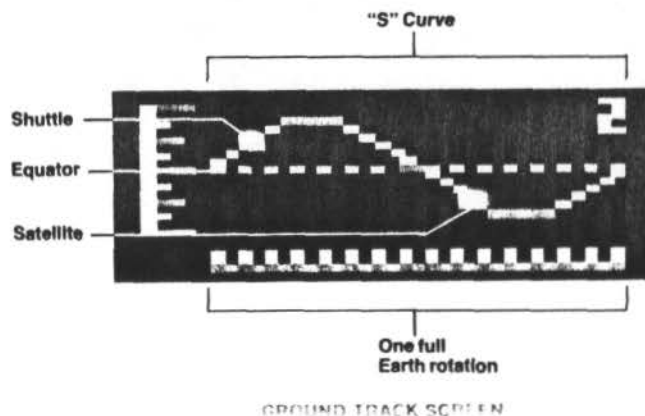
Docking Screen You'll use the "S" curve screen until you get fairly close to the satellite. Then, two smaller radar screens will appear. The left screen shows your Z axis, (up-down), and a wide view of your Y axis, (left-right). The right screen, which you'll use more, shows the X axis (left-right), and micro (close in) Y axis (up-down).

Multiple Dockings Every time you dock, you receive a "Rendevous" sign and a certain number of fuel units. However, each docking becomes more and more difficult. So, for each successive docking, you receive more fuel. After each docking, the satellite has been programmed to sail a good distance away from your Shuttle. Wait until it settles (x = + 128 or − 128) before beginning another docking procedure.
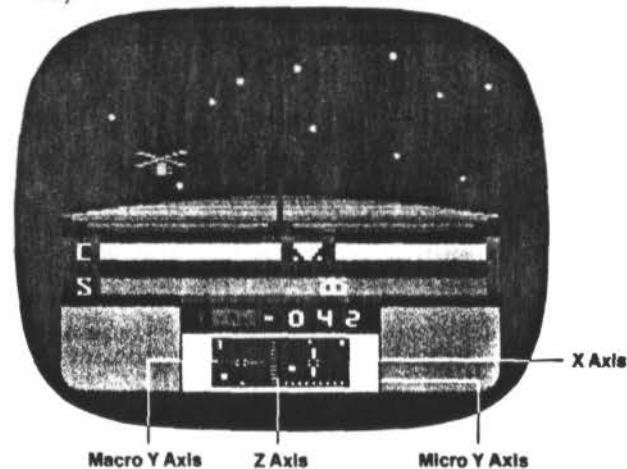
DOCKING
PROCEDURE

Match the position of your Shuttle with that of the satellite's by correcting your Z, Y and X axes preferably *in that order*.

1. Correct Z axis to 0: Hold down red button and tap Joystick forward. A negative number means the satellite is below you, so push the Joystick forward to dive. A positive number means the satellite is above you, so pull the Joystick back to climb.
2. Correct Y axis to 0: Tap the Joystick to the right. A positive number means the satellite is right of you, so push your stick right to line up with it. A negative number means it is left of you. Push Joystick left to line up with satellite.
3. Correct X axis: Tap the Joystick back. A positive number means the Satellite is ahead of you. A negative number means it is behind you. To increase Shuttle speed, push Joystick forward. To decrease speed, pull Joystick back. Use Status switch to check Shuttle speed.
4. Dock: All axes must be adjusted to 0, and stabilized for 2 seconds, then you will receive a "Rendevous" signal, indicating you've docked.

DOCKING
SUMMARY

You are attempting to dock with a satellite that is travelling at Mach 23.9 and 210 nautical miles above the Earth. You will either need to slow down or speed up to rendezvous (X axis). Also, you will need to be at the same altitude (Z axis), and position (Y axis). All of these maneuvers are interrelated—changing one can affect the others. And, in flight #3, the longer you take to dock, the more fuel you'll use! It is also better to tap the Joystick than hold it down (saves fuel).

—— X Axis

Macro Y Axis   **Z Axis**   **Micro Y Axis**

DOCKING SCREEN

OBJECTIVE

To turn the Shuttle around, fire the engines, and decelerate to the proper speed.

DEORBIT

Deorbit Burn Maneuver You must first turn the Shuttle around so that it is traveling tail-first. Then, in order to maintain the proper altitude, set your Z axis and pitch. Once completed, fire the engines to decelerate. (If the Z axis and pitch are not set properly, firing the engines will make your Shuttle climb or dive.) After the deorbit burn, the Shuttle must then be reoriented nose-forward to the proper attitude for reentry. Entering the atmosphere backwards will cause the Shuttle to burn-up.

Yaw Left-right rotation of the nose of the craft.

Satellite Interference Before attempting a deorbit burn, you *must* allow the satellite to pull a safe 128 nautical miles away from the shuttle. If you don't, your deorbit burn will be unsuccessful, and you'll never leave orbit!

SEQUENCE
FOR DEORBIT
BURN

1. Check x axis by tapping Joystick back. Wait until x = 128 miles before proceeding (x = + 128 or − 128).
2. Using Status switch, check your speed. Pull Joystick back or push Joystick forward to set speed at Mach 23.9.
3. Correct Z axis to 0.
4. Activate Primary Engines.
5. Turn Shuttle around by pushing Joystick left to set yaw at − 128.
6. Pull back or push Joystick forward to set pitch at − 004.
7. Display speed (SP/m), speed in Mach, using Status switch.
8. Ignite engines by pressing red fire button. Hold down button until speed = 19.0.
9. Reset yaw to exactly 0.

DEORBIT
RECAP

Deorbit is one of the most critical phases of your flight.

Following completion of orbital operations, the Shuttle is oriented to a tail-first attitude, then decelerated to a necessary speed for reentry.

The orientation of the Shuttle is established by the RCS engines, and deceleration is provided by the larger OMS engines.

You begin to lose altitude once you've slowed the Shuttle down below the actual velocity needed to sustain your 210 mile orbit.

OBJECTIVE

To establish and maintain the correct pitch, yaw and speed; follow the correct trajectory; and properly manage heat build-up during reentry.

REENTRY CHECKLIST

Entry Interface This is the point in your flight where atmospheric entry officially begins. As the Shuttle descends, atmospheric drag dissipates tremendous energy, generating a great deal of heat. This heat quickly builds up (portions of the vehicle's exterior reach 1,540°C). Pitch and speed must be correct to properly utilize the Shuttle's Thermal Protection System.

Terminal Area Energy Management After entry interface, you must closely follow the proper descent trajectory in order to maintain enough altitude and speed to reach the final touchdown point. This process of conserving your energy by maintaining the correct position, altitude, velocity and heading is called Terminal Area Energy Management (TAEM).

Loss of Signal During reentry, the Shuttle superheats the gas of the upper atmosphere, creating flashes of color outside your window. Heat strips electrons from the air around the Shuttle, enveloping it in a sheath of ionized air that blocks all communication with the ground. So, at 160 miles, you will experience a temporary partial loss of signal (LOS). Keep a close eye on your radar at this point. You will receive intermittent signals which you need to use to correct your course and plane.

Descent Screens On your reentry screen, "X" indicates cut-off of your OMS engines (deorbit burn). "T" indicates the Terminal Area Energy Management Phase. "L" indicates your transition to final landing approach. The small box at left is your plane indicator.
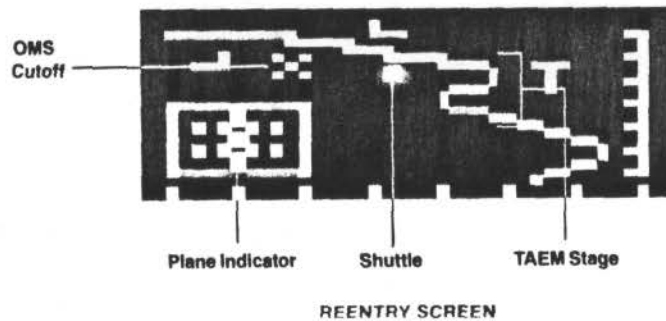
**REENTRY
SEQUENCE**

1. Pull back Joystick to set +24 pitch for proper reentry attitude.
2. Close Cargo Bay Doors.
3. Follow reentry course on computer screen. Pull stick back to go right; push forward to go left. Left and right on stick centers plane.

**REENTRY
SUMMARY**

There are three important stages to Reentry: Entry Interface, TAEM and LOS. Position, altitude, velocity and heading must all be exact to both properly manage the tremendous heat buildup and correctly position your shuttle for the Final Approach.

OMS
Cutoff

Plane Indicator   Shuttle   TAEM Stage

REENTRY SCREEN

DEORBIT BURN
TO SLOW SPEED

BEGIN DESCENT

MAXIMUM
HEATING

FOLLOW
GLIDEPATH

TERMINAL
AREA ENERGY
MANAGEMENT

TURN TO BEGIN
FINAL APPROACH

BEGIN TO PULL
NOSE UP

PREPARE TO
DROP GEAR

WHEELS DOWN

TOUCHDOWN
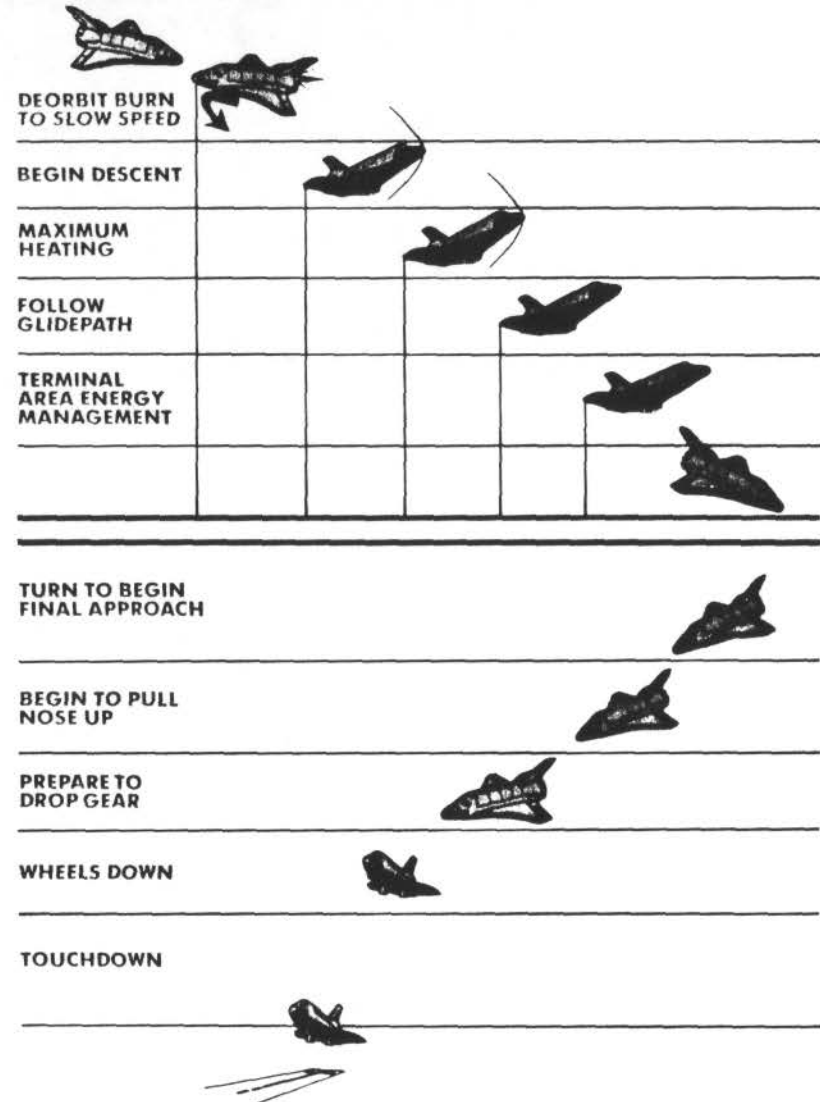
OBJECTIVE

Properly following the final approach course, maintain the correct pitch and descent rate to safely land.

LANDING CHECKLIST

Final Approach As you leave the reentry phase and enter your final approach, the first thing you'll see are the mountains around Edwards Air Force Base. You'll hear two sonic booms caused by your craft and the chase planes. At this point, your Shuttle is a glider.

In order to maintain enough altitude and speed to reach the touchdown point, you'll need to make an extreme right turn which will leave you lined up with the runway entry point.

Landing Screens Now, closely watch all your flight instruments on the front control panel. At this point events happen quickly. You will need to keep your nose pulled up to slow descent while constantly watching altitude and range. Lines on the left screen box, (Altitude Direction Indicator) indicate the ideal trajectory or path and your upper and lower safe limits. The right box is your Horizontal Situation Indicator. It shows your position relative to the runway.

Range Range is the distance from the edge of the runway to your shuttle. So, when range is negative you're above the runway.

Surface Conditions Since you're in the desert, crosswinds can become a real problem. Compensate by constantly moving Joystick left-right and forward-back to maintain the proper trajectory and descent rate until touchdown. Just because you're close to home—don't let up on your concentration.

LANDING SEQUENCE

1. As soon as you see the mountains, make a right turn. Line up Shuttle on runway using radar screen.
2. Follow final approach course on both computer screens. Left screen: Keep dot centered between the two arched lines. Right screen: Keep dot centered on straight runway approach line. Push Joystick forward to lower nose (quicken descent). Pull Joystick back to raise nose (slow descent). Push Joystick left or right to keep dot centered.
3. Press red button to display altitude. Release button to display range.
4. When range goes negative, you're over the runway, just seconds from touchdown, so drop landing gear *now*.
5. Push Joystick forward to lower nose.
6. When Shuttle hits runway, your nose will pop up, so keep Joystick pushed forward to keep nose down until you hear the thud of the front landing gear.

LANDING SUMMARY

During the final approach, descent speed is critical. You will be conducting a series of "flares" (nose-up maneuvers) that reduce speed which is necessary for landing. So, not only will you need to center the Shuttle on the runway, but also you must maintain the proper pitch at the same time. Sounds are important during this phase. Use them to monitor your progress. In addition to the sonic boom as you break through the atmosphere, you'll hear a constant beeping effect which will increase in speed the closer you get to the runway, a high-pitched warning horn after you've passed over the runway (a signal to put your landing gear down), landing gear lowered, and (main gear) tires screech when you've touched down.
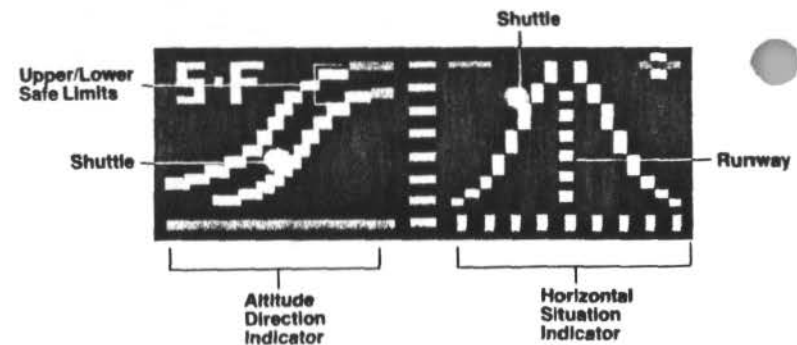
FINAL APPROACH SCREEN

You've successfully launched your Shuttle into orbit. Now, it's time to dock with the satellite. Whether you're making position corrections using the OMS or RCS engines, remember that every action you take may affect your axis (X, Y, Z) or altitude. For example, if your pitch is – 028 (nose-down) and you perform an OMS burn to correct your X axis, your altitude will drop because you're actually pointed towards Earth.

Try and picture the position of the Shuttle in your mind as you're orbiting. Use the diagram below (also on your Flight Deck Console) to help you visualize Shuttle positioning. And remember: minimum speed is Mach 17.0 and minimum altitude is 195 nautical miles, or your orbit will destabilize and the vehicle will burn up in the atmosphere.
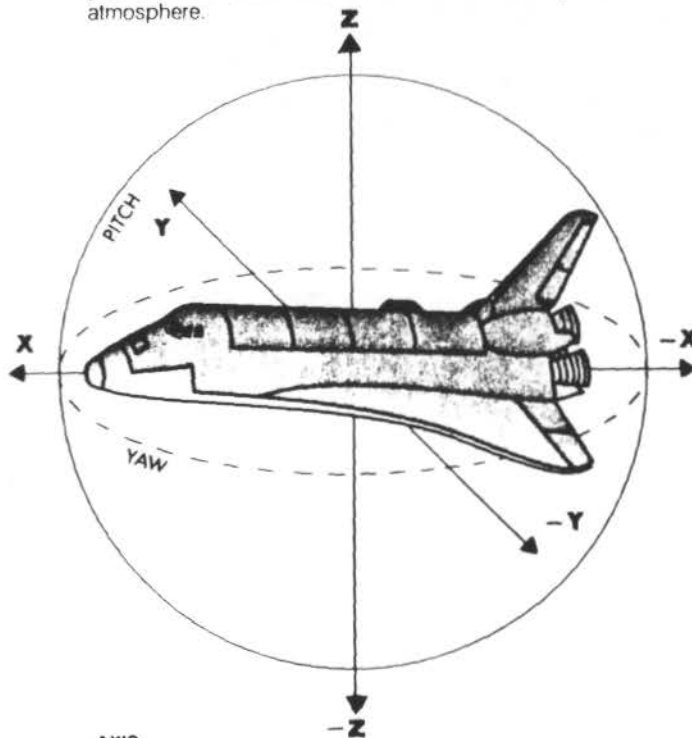
AXIS
Z = Vertical distance to earth
Y = Left and right distance to satellite
X = Forward and back distance to satellite
PITCH = Up-down of the nose of the craft
YAW = Left-right rotation of the nose of the craft

For smaller, precise adjustments, you'll want to achieve orbital maneuvers with your Reaction Control System (RCS) engines. They're easier to use. However, time means fuel. Housekeeping fuel—used to keep the various electrical equipment and life support systems of the Shuttle operating—is constantly being expended. So, it's imperative you make your orbital corrections as efficiently and quickly as possible. This is where your OMS engines can be a great aid. When making major maneuvers (30 nautical miles or more) use your 12,000-pound-thrust OMS engines. However, since using the powerful OMS engines can dramatically affect altitude, *read the following instructions carefully.*

X AXIS CORRECTIONS USING OMS ENGINES

When flying forward on X (0 Yaw) using your OMS engines, your altitude will drop faster if your pitch is zero or negative. When flying backwards on X (– 128 Yaw) using your OMS engines, your altitude will rise if your pitch is positive or zero, and your altitude will not be affected by the OMS burn if your pitch is negative.

Sequence
■ Set pitch to correct value.
■ Set display to "X" axis, speed, or altitude
■ Set yaw to – or + 128.
■ Push red button to fire engines.
■ Restore yaw and pitch to correct values.

Y AXIS CORRECTIONS USING OMS ENGINES

As you perform a Y OMS burn, you'll see your Y indicator change. If you forgot to change your pitch to 0, your altitude will change. A positive pitch will make you fall. A negative pitch will force you to rise. A non-zero pitch also burns extra fuel.

Sequence
■ Set pitch to correct value.
■ Set yaw to – or + 64.
■ Push red button to fire engines.
■ Restore yaw and pitch to correct value.

OMS Summary In other words, when correcting either X or Y axis using your OMS engines, *altitude may be affected.* Taking this into account, it is possible to make both Z (vertical) *and* X or Y corrections, all in the same maneuver—if very skillfully done.

LAUNCH: PROBLEMS

PROBLEM: MET-15 does not appear. Screen only comes up STAT.

SOLUTION: Check switches. Primary and Backup Engines must be shut down. Cargo Doors must be closed. Try again.

PROBLEM: "Launch Scrub."

SOLUTION: You're igniting your engines prior to or too long after MET-004. Wait for launch systems to recycle and concentrate on firing as close to (but not before) MET-004 as possible.

PROBLEM: Line horn continually sounds during launch.

SOLUTION: Keep dot (your Shuttle) slightly on the low side of the trajectory line to maintain proper course.

STABILIZING ORBIT: PROBLEMS

PROBLEM: Initial orbit position too low, or speed too slow.

SOLUTION: You're shutting off your engines before proper altitude is achieved. Cut-off your main engines as close to 205 miles as possible.

PROBLEM: "Mission Abort" signal as soon as you shut down engines.

SOLUTION: Dependent upon your Abort number, either: speed/altitude were too low to sustain orbit; you were far off the trajectory line at MECO; you shut down your engines too early, or your orbit insertion angle was incorrect. Either you were very far off the trajectory line or your plane (right-left position) was incorrect.

PROBLEM: Once in orbit, Y axis is off badly.

SOLUTION: Plane (right-left) was not centered at MECO.

PROBLEM: Once in orbit, Z is off badly.

SOLUTION: You shut down your engines too early. Remember, your Z axis is directly related to your altitude. The lower your altitude, the more negative your Z axis. A Z-15 axis equals an altitude of 196.0 miles. When Z axis equals 0, altitude is 210 nautical miles, the altitude of the orbiting satellite.

PROBLEM: Once in orbit, X is badly off.

SOLUTION: Cargo Bay Doors were closed too long and Shut overheated. You have approximately 30 seconds open Doors after you achieved orbit.

DOCKING: PROBLEMS

PROBLEM: Although axes are adjusted, satellite is never sighted and docking screens never appear.

SOLUTION: Check your pitch and Yaw. If pitch is not −28 (Shuttle nose-down), you'll never be in line of sight of satellite. If Yaw is + or − 17 or greater, you'll also be out of line of sight (Shuttle line of sight will be too far left or right). With Z and Y axes adjusted to 0, docking screens should appear when the satellite is at X + or − 16, assuming pitch is −28 and yaw = 0.

PROBLEM: Conducting OMS burn sends Shuttle into dramatically high or low altitudes.

SOLUTION: Check your pitch. Always make sure your pitch is 0 before conducting an OMS burn unless you intentionally wish to adjust your altitude during burn.

PROBLEM: Axes all adjusted. Satellite spotted. But, you can't dock.

SOLUTION: Check your speed. The satellite always travels at Mach 23.9. So, if you're having trouble docking, adjust Shuttle speed + or − 1 Mach.

REENTRY: PROBLEMS

PROBLEM: After conducting a successful Deorbit Burn, you still aren't losing altitude for reentry.

SOLUTION: The Satellite may be interfering. Wait until it is at least 128 miles (x axis) away before conducting a deorbit burn. Also, make sure your altitude is 210 (z axis 0) and, speed mach 23.9 before attempting burn.

PROBLEM: Burn up during reentry.

SOLUTION: If your pitch is greater than + 24, your Shuttle cannot be protected by its special insulation. If pitch is less than + 24, you'll skip into space. If yaw does not equal 0, you'll spin out. And if your Cargo Bay Doors are left open, your Shuttle will also burn up.

LANDING: PROBLEMS

PROBLEM: Mission Abort as soon as you break through the cloud covering.

SOLUTION: You *cannot* be off course (Klaxon horn is on) during the last few seconds of your reentry (screen). This will place you in the wrong position for Final Approach—altitude and speed will be adversely affected! So, stay right on course at the end of reentry—don't let up.

PROBLEM: You crash into the desert floor.

SOLUTION: This is probably a result of improper use of your Altitude Direction Indicator (ADI). The ADI is your left computer screen during landing. It tracks your altitude and descent. Always keep the Shuttle above the lower of its two lines.

Moving the Joystick forward or back helps do this by raising or lowering the nose of the Shuttle (quickens or slows descent).

Importantly, as soon as you drop landing gear, drag will cause the nose to flare up. So, when landing gear is dropped, push and hold Joystick forward to bring and keep nose down.

Pilots are a skilled and hearty breed indeed. If you're able to successfully dock your Shuttle five times and land with at least 4,500 units of fuel, you're worthy of Pilot status and an official Pilot patch.

If, after hours of hard training, study and preparation, you make that sixth and final satellite docking with at least 7,500 fuel units in your tanks, you'll be one of the few, the proud, the elite—Space Shuttle Commanders! Anyone achieving this magnificent ranking will be rewarded with a distinguished on-screen display! Snap a photo of the TV screen, and we'll send you the appropriate patch shown below.

Be sure to write "Space Shuttle" on the bottom left hand corner of the envelope.
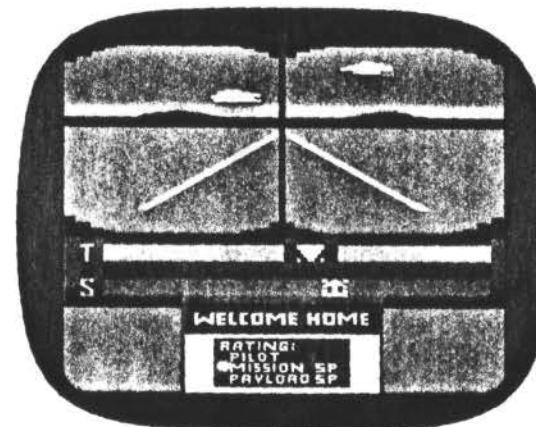
LANDING SCREEN EVALUATION

"Ever since I can remember, the Space Program has meant something very special to me. Every time a mission took off, so did my imagination.

"That's why designing a home video version patterned after the real Space Shuttle seemed so appealing—yet challenging. It was quite a task to achieve maximum accuracy in my work.

"In the photo on this page, I'm sitting in an actual NASA Space Shuttle simulator. It gave me a firsthand look at what our astronauts really go through. And I can assure you the Space Shuttle cartridge you now have is quite true to real life.

"So, don't be discouraged if you don't achieve Commander on your first flight. There are plenty of skills and a whole lot of knowledge you need to master first. I strongly suggest you fly Space Shuttle with a friend as co-pilot—functioning as navigator and assistant.

"Learn and understand this manual. The knowledge you gain will not only help with my program but, who knows, may get you a seat on the next real trip into orbit."

Steve Kitchen

Steve Kitchen is a master software designer, engineer and inventor. He was involved in the development of digital watches, the first handheld electronic games and electronic calculators. Steve welcomes and encourages your letters, comments and questions regarding his first work for Activision.

AX:	Axis
ALT:	Altitude
FLT:	Flight
MET:	Mission-Elapsed Time
MECO:	Main Engine Cut-Off
OMS:	Orbital Maneuvering Systems
RCS:	Reaction Control System
RNG:	Range
SRB:	Solid Rocket Booster
SP/M:	Speed in Mach
SSME:	Space Shuttle Main Engine
STS:	Space Transportation System
TAEM:	Terminal Area Energy Management
DAP:	Digital Auto Pilot

If you're encountering a problem, or just want to check your status, hold your Status Switch down until "STAT" appears. Then, use the following guide. Operational messages are prelaunch alerts. However, Mission Abort messages mean you've made a catastrophic mistake (Flights #2, #3 only) and must relaunch. For further explanations for some of these messages, see "Problems & Solutions."

MESSAGE NUMBER	MESSAGE OR ACTION NEEDED
(Prelaunch-Non Abort)	
0	All clear
4	Shutdown Primary Engines
24	Shutdown Primary and Back-up Engines
44	Shutdown Primary Engines and close Cargo Bay Doors.
64	Shutdown all Engines and close Cargo Bay Doors.
20	Shutdown Backup Engines.
40	Close Cargo Bay Doors.
60	Shutdown Backup Engines and close Cargo Bay Doors.

MESSAGE NUMBER	MESSAGE OR ACTION NEEDED
(Inflight-Mission Abort)	
0	All clear
1000	Not lined up with runway on touchdown
7000	Altitude too low to sustain orbit (below 195)
7500	Altitude too high (255 miles maximum)
9500	Speed/altitude too low to attain orbit at MECO
1500	Touchdown too early (hit desert)
2000	Touchdown too late (run off runway)

MESSAGE NUMBER	MESSAGE OR ACTION NEEDED
(Inflight-Mission Abort)	
3000	Nose gear not down at end of runway
3500	Not on course at beginning of banking turn (Klaxon horn is on)
4000	Landing gear not down at touchdown
8500	Cargo bay doors not open during orbit (overheat)
5000	Cargo bay doors not closed at ascent or entry interface
8000	Speed too low to sustain orbit (below M 17)
5500	Pitch greater than 24 on reentry into atmosphere (skip into space)
6000	Pitch greater than 24 on entry interface (burn up)
6500	Yaw not 0 on entry interface
9000	Orbit insertion angle incorrect at MECO
9900	Out of fuel

MESSAGE NUMBER	MESSAGE OR ACTION NEEDED
(After safely landing)	
1-99	Number of dockings. Also may appear as the last digit of a Mission Abort stat.

APOGEE: The highest point of an earth ORBIT.

ALTITUDE: Vertical height from Earth's mean surface (sea level).

ATITUDE: The position of the vehicle; for example, flying tail-first with cargo bay toward the earth.

AXIS: A line through a body about which it rotates.

CONFIGURE: To set equipment to certain specifications.

DEORBIT BURN: The firing of a RETRO-ROCKET to slow the spacecraft to a speed lower than that required to maintain ORBIT. On the Orbiter, this is accomplished with the orbiter maneuvering system (OMS) engines.

GLIDESCOPE: The angle at which you descend in the Orbiter or other glider with respect to the ground.

KILOMETER: 1000 meters, or 0.621 of a mile.

MACH: The term used to describe the speed of objects relative to the speed of sound (about 690 mph). For example, Mach 2 is twice the speed of sound. The shuttle travels through space (in orbit) at approx. 22 mach or 17,000 mph.

ORBIT: A balance between a body's inertia, or tendency to fly off into space, and the gravitational attraction of a central object.

PITCH: Up-down rotation of the nose of the craft (see Roll and Yaw).

RANGE: Distance to edge of runway.

RETRO-FIRE: To fire engines in the direction of motion in order to reduce forward velocity. In orbit, this permits gravity to pull you downward.
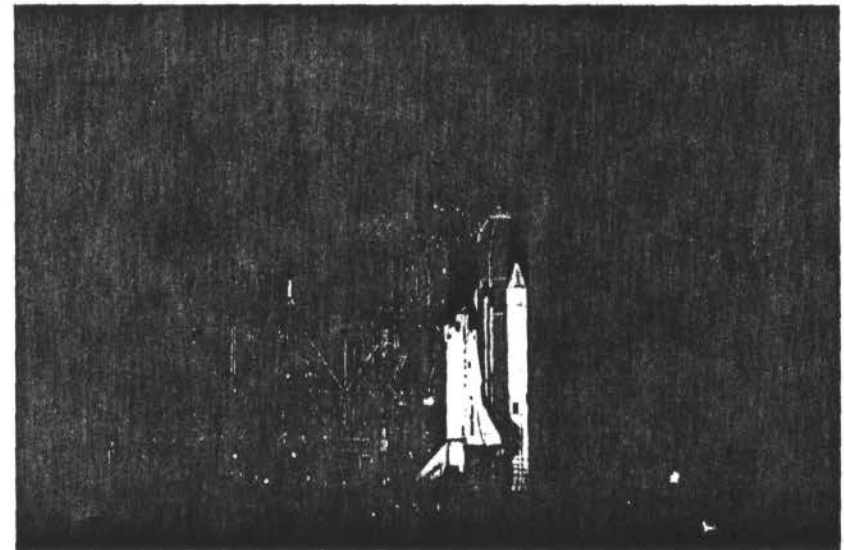
ROLL: To rotate about an axis from front to back (nose to tail) of the Orbiter. To the pilot, a roll is like a cartwheel (see Pitch and Yaw).

RENDEZVOUS: To meet in space and orbit together.

ROTATION: Movement of the Orbiter around its three principal axes producing Pitch, Yaw, or Roll.

TRAJECTORY Flight Path.

YAW: Left-Right rotation of the nose of the craft (see Pitch and Roll).

SPACE SHUTTLE EXTERIOR
THRUSTER, ENGINES, PENETRATIONS

Launch Umbilical Panel

Cargo Bay Door

S-Band Antenna

Star Tracker Door

Electrical Access Panel
RCS Primary Thruster
RCS Vernier
Thruster

Crew Hatch

Rudder/Speed Brake Power

OMS/AFT RCS Access

RCS Vernier Thruster

RCS Primary Thruster

Ground Maintenance Access Door