IBM-055

IBM-PC	256K RAM

COSMI

SUPER HUEY

by
Paul Norman
Conversion by
Ron Paludan

Authentic HELICOPTER FLIGHT SIMULATOR, that not only teaches you how to fly rotary wing aircraft, but also sends you on four separate and exciting missions.

Tomorrow's Reality ... Today

SUPER HUEY
UH-IX

Programming by Ron Paludan

Based on the Commodore-64 version by Paul Norman

OVERVIEW

The UH-1X is a new experimental high-performance helicopter utilizing the latest in electronic control systems and stabilization.

Features include a state-of-the-art electronic instrument console; an on-board computer that regulates and monitors the ship's systems as well as providing pilot commands for special functions; automatic pitch control/engine power linkage for RPM equilibrium, including synchronization of anti-torque pitch unless directly controlled by pilot.

Also employed is a new VLW (very light weight) piston engine molded with a super-strength, super-light-weight material, still "Classified" by the military, which rivals the weight/thrust ratio of most turboshaft engines. Mounted vertically, the engine is coupled to the main rotor shaft through a custom/direct drive transmission system with a 10 to 1 reduction ratio.

The rotor assembly consists of semi-rigid blades and a hub articulation system that is electronically adjustable through varying flight conditions. The effect of this system is to reduce drag by 40 to 60 percent and increase forward speed substantially.

Structurally based on Bell Helicopters' UH-1 series, The UH-1X fuselage is made of a carbon-fiber material and molded for optimum aero-dynamic characteristics and low weight.

The UH-1X represents a step in a new direction in helicopter flight design and control. See your Huey dealer and test-fly one soon. In the meantime, prepare yourself with the Super Huey Flight Simulator, from Cosmi.

LOADING THE PROGRAM

1. Insert your DOS disk in Drive A, close drive door and turn on computer. After DOS is loaded, remove DOS disk.

2. Insert Super Huey disk in drive A with label facing up. Close drive door.

3. At the A > prompt type:
SH and press ENTER key.

4. You will be asked if you have a joystick. Answer "Y" for yes or "N" for no.

5. Select graphics mode that your computer uses.

6. Select mission from menu.

CHANGING MISSIONS, QUITTING, AND PAUSING

To quit playing and exit to DOS, press the ESC key. You will be asked if you are sure. Answer "Y" for yes or "N" for no.

To quit a mission, press the "Q" key. You will be asked if you are sure. Answer "Y" for yes or "N" for no. If you answer "Y" the mission will end and the SELECT MISSION menu will appear.

To pause the program during a mission, press the ALT key and while holding it down, press the "P" key. The game will freeze until you press another key.

A BRIEF SUMMARY OF CONVENTIONAL HELICOPTER CONTROLS

This is not intended as a tutorial on helicopters but rather a general description of the traditional and well-understood characteristics of rotary wing aircraft.

The physics of flight are the same for fixed and rotary wing aircraft, but the helicopter introduces some complex problems over airplanes. In the first place, airplanes are inherently stable, whereas helicopters are inherently unstable. As a result, planes require less constant controlling than do helicopters. Both the wing of the aircraft and the rotor blade of a helicopter are "airfoils" and interact with the air in the same way through the "Bernoulli effect." Briefly, this describes the effect of the curvature of a wing causing a high-pressure area below the wing and a low-pressure area above. This produces lift as the wing moves through the air. A fixed-wing aircraft requires forward thrust to produce lift. A helicopter blade achieves forward thrust only in a direction parallel to the axis, or vertical thrust. The amount of lift depends on the "angle of attack" of the airfoil, the angle of the blade to the relative wind. This "angle of attack" is proportional to the pitch of the rotor blade which is controlled by the pilot, with greater pitch producing more lift. At the same time, as the pitch increases, so does drag, since more blade surface is presented to the airflow, and, consequently, more power is required to maintain the rotor RPM.

The relationship between pitch and RPM is perhaps the most important consideration in operating a helicopter. Another factor in a rotary-wing system is the torque reaction of the spinning rotor on the fuselage. The torque of the turning rotor exerts an equal and opposite force on the body of the craft, causing it to turn opposite to the blades unless counteracted by another force, in this case the tail, or anti-torque, rotor blades. The tail rotor provides thrust in a direction opposite the torque reaction, thus equalizing the force and stabilizing the heading of the craft. Further, the thrust of the tail rotor is controllable by the pilot, providing directional control. This is possible because over compensation of the torque effect will turn the fuselage in the direction of the spinning blades, and thrust less than the force of the torque will allow the fuselage to turn against the rotor direction.

Four main control systems are found on conventional helicopters. These are the cyclic stick, the collective pitch control, the throttle and the anti-torque (or rudder) pedals. The collective pitch control, or simply, collective, increases or decreases the pitch of all blades equally. The collective is the primary vertical thrust control. Normally, pulling up on the collective stick will produce lift, and lowering it will decrease lift. As mentioned above, as pitch increases, so does drag, requiring an increase in engine power to maintain RPM. In many helicopters, this synchronization is provided automatically by a link between the collective and the throttle.

The throttle controls the engine power and RPM directly. It is usually located on the collective stick to aid in the coordination of pitch and RPM.

The anti-torque pedals control the pitch of the rotor tail blades, providing torque compensation and directional control. Normally, these are conventional rudder pedals. Finally, the cyclic control is the main direction control which determines the attitude of the rotor system. Basically, when the plane of the rotor disc is horizontal, all the thrust is directed upward, perpendicular to the plane and parallel to the rotor shaft. By moving the cyclic stick in any direction away from the center (or neutral), the plane of the rotor tilts in the same direction, thereby providing the thrust between the vertical and the direction of tilt. For example, moving the cyclic forward will cause forward thrust to a degree which is equal to the amount of rotor deviation from the horizontal. At the same time, the attitude of the fuselage will change to the same degree (in forward flight, a nose-down condition). Also, a cyclic change will change the "angle of attack" set by the collective pitch control, which will affect RPM, and, thereby, torque reaction.

This illustrates an essential characteristic of helicopter controls. Any change in one of the controls will, in most cases, require some adjustment in the other controls. This is why helicopters must be "flown" at all times.

THE UH-1X CONTROL SYSTEM

Start the engine and turn on the electrical systems with the backslash key "F1." Accelerate the engine with the F8 key to between 1500 and 1700 RPM. If necessary, decelerate with the F10 key. Engage rotor clutch with the "F4" key. RPM will slowly rise to match the engine speed (at a 1 to 10 ratio).

Accelerate engine (F8) to around 3000 RPM and let the rotor catch up. Make sure that collective pitch is at FULL LOW before increasing throttle.

do take off, raise the pitch (F7) and monitor the level on the LCD (27). At a point above equilibrium, which is determined by the rotor RPM, the helicopter will lift at a rate based on the level of pitch: the higher the pitch level, the faster it will lift. Monitor the altitude at the altimeter (31). Now lower pitch (F9) and the rate of lift will slow until it stops at a hover. This is the point of equilibrium. If the pitch level falls below this point, the craft will begin to descend at a rate that increases as pitch level is lowered. The actual rate of lift or descent is displayed on the VSI readout (26), in positive (lift) or negative (descent) values. To move the helicopter horizontally, push the joystick forward a slight amount. The speedometer (32) will start to increment, the altitude indicator (25) will rise above the horizon line and, if the altitude was steady, it will begin to fall. This is because as the joystick (which is the cyclic control) is moved forward, it tilts the rotor in the same direction. This transfers some of the lifting power to forward acceleration. Therefore, it affects the system in the same way as if the pitch was lowered proportionately.

If you are not using a joystick, the arrow (cursor) keys on the numeric keypad may be used instead. The left and right arrow keys roll the helicopter left and right respectively. The up and down arrows pitch the helicopter forward and backward.

To return to level flight at the established speed, increase pitch (F7). The more speed required, the greater the pitch level will need to be. However, at any pitch level, the cyclic control will transfer that power to forward motion. So, at full forward stick, the craft will always descend. To achieve the fastest level flight, raise pitch (F7) to full (27) and push the stick forward until the helicopter starts rising, and pull back a bit if it starts to fail. The forward speed will also depend on the engine RPM. Therefore, an increase in acceleration (F8) will increase both speed and lift and the pitch and cyclic controls will need to be adjusted.

To turn the helicopter, there are two general methods. The most direct and quickest is to push the joystick (cyclic) in the direction of the turn. The second method is to change the pitch of the tail rotor using the anti-torque controls the "<" and ">" keys. The LCD (28) shows a line across the center when the torque caused by the main rotor is compensated for by the pitch of the tail rotor. Normally, this control is internally automatic, keeping steady with any rotor RPM changes. When the pitch is manually altered, the LCD (28) will indicate the change in under-or-over compensation which will result in turning the craft left or right at a rate determined by the degree of change. Any manual change will need to be manually corrected to stop the turning by taking the opposite action.

Given this control system, the suggested method of operation is to bring the helicopter to the desired altitude (31) and speed (32) and then fly the craft with the stick almost exclusively. Changes in altitude can be accomplished by moving the stick forward or back and turns done with the other directions.

The console displays dedicated to aircraft control are the engine (22) and rotor (23) RPM gauges, the altimeter (31), the speedometer (32), the compass (24), the altitude indicator (25), the pitch (27), tail-rotor (28), LCD indicators and the VSI (26). The RPM and AVI (altitude/velocity indicator) systems have both slide gauge and digital readouts. All have a warning light on each side to indicate excessively low or high levels. The digital compass shows in degrees (000-360), the actual geographic heading of the helicopter with 000 being true north.

The altitude indicator (25), or artificial horizon, displays the deviation of the craft from the horizontal, or level flight. For example, when moving forward, the nose dips down and the A.1. rises. When slowing, the nose comes up and the A.1. moves down. The helicopter should be level when landing. The four lights to the right of the A.1. are a graphic representation of horizontal displacement.

Differences between a real cyclic control and joysticks should be noted. To reach a level of change with a cyclic, one would push it in a direction and hold it at the desired angle. Since the joystick is merely an on and off switch, to hold it "on" is to continue to change. Therefore, when using the joystick as a cyclic, hold it in the desired direction until the desired change has been achieved and then release it.

CAPABILITIES

The UH-1X is equipped with three types of weapons which are activated by pressing the proper function key (F1, F3 or F5) and launched by pressing the joystick fire button or the space key. Only one weapon system can be active at a time. The ammunition supply is counted down while firing on the digital display (3). Two lights on the left of each weapon's display indicate problems: either a low ammo supply (1) or a firing malfunction (2). Weapons can be reloaded only at a base. To load weapons, activate it with its function key and press the 'L' key.

The Air-to-Air Missiles (ATA) are activated by F1 key and launched with the fire button. The UH1X carries a maximum of 8 Air-to-Air missiles. ATA missiles can be used against ground targets.

'RKT' is a 2.75 inch rocket launcher which is activated by F3 key and fired with the fire button. These are unguided folding fin rockets (FFAR). The UH-1X can carry two 19-shot rocket pods for a total of 38 rockets.

The UH-1X carries two 9MM machine guns that hold 2000 rounds each. The guns are activated by the F5 function key and fired by fire button.

Below the computer screen is a digital clock (20) that runs in real time.

NAVIGATION

The area available for flight is 3600 square miles (60 miles to a side). Pressing the "P" key displays the current position in mileage coordinates such as 10 miles north/25 miles east. The base is at the exact center (Plot 00,000) and is equipped for refueling, reloading and repair.

To refuel, land at the base and decrease engine RPM to zero. The fuel gauge will slowly rise.

The navigation system can be tuned to three types of incoming signals with the tuning buttons "=" and "-". The current frequency is displayed on the FRQ readout. All three signals can be transmitted simultaneously, but only one can be tuned to.

On initial start-up, the days' VOR frequency is established and is transmitted from the base. If the radio frequency is the same as the base VOR frequency, the indicator light next to the BASE digital readout (4) will light up, and the BASE readout will display the compass heading to the base.

Each time the "H" key is pressed, a homing device is dropped, and the homing frequency, the indicator light next to the HOME digital readout (5) will light up, and the HOME readout will display the compass heading to the homing device.

The rescue frequency is established by the sender. When the radio frequency is the same as the homig frequency, the indicator light next to the RESC digital readout (6) will light up, and the RESC readout will display the compass heading to the sender.

MALFUNCTION CHARACTERISTICS

1. Oil Line breaks will increase temperature until engine shut-down.

2. Transmission problems will affect rotor operation.

3. Rotor wear can occur with excessive power or large differences in engine and rotor RPM as well as combat damage will increase manifold pressure.

4. Compression problems will reduce engine power, lift and speed.

5. Tail rotor wear or damage will result in control problems.

6. Coolant leaks will raise temperature.

7. Torque stabilizer damage will cause control problems.

8. Pitch controls and linkage damage will seriously disable flight controls.

9. Engine turbine problems will affect power and could cause failure.

10. Manifold ruptures will seriously affect power and performance and could cause the engine to explode.

11. Electrical problems an disable various console displays, navigation and the computer.

Malfunctions can occur in many ways and cause various problems from disabled displays to complete destruction. If in combat, for example, being hit may not destroy the UH-1X but will cause some damage. This can accumulate to a point of destructionor inability to control the aircraft.

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MISSIONS

1. FLIGHT INSTRUCTION

The computer display (29) will be your flight instructor. It will provide instructions for engine and rotor start, takeoff, and maintaining altitude. After you have flown 15 miles from the base, the computer will provide instructions for return and landing. You are in full charge of aircraft performance, and you should have a satisfactory understanding of the instruments and controls before attempting this test fight. Unlike the other missions, you cannot crash or damage the helicopter.

2. RESCUE

An aircraft has crash-landed in a violent thunderstorm. You must fly through the same treacherous weather, land and evacuate the injured crew and passengers. Tune the navigational radio until the rescue frequency indicator light goes on. The rescue dispay (6) will show the heading to the downed aircraft. You may have to turn off course, however, to avoid violent weather. After landing, the computer will display ALL CLEAR, to indicate that the survivors have been loaded. Time is critical on this mission, because the survivors may be badly injured and need to be returned to base for medical treatment. The number of survivor is reported by pressing the mission status key (F6).

3. EXPLORE

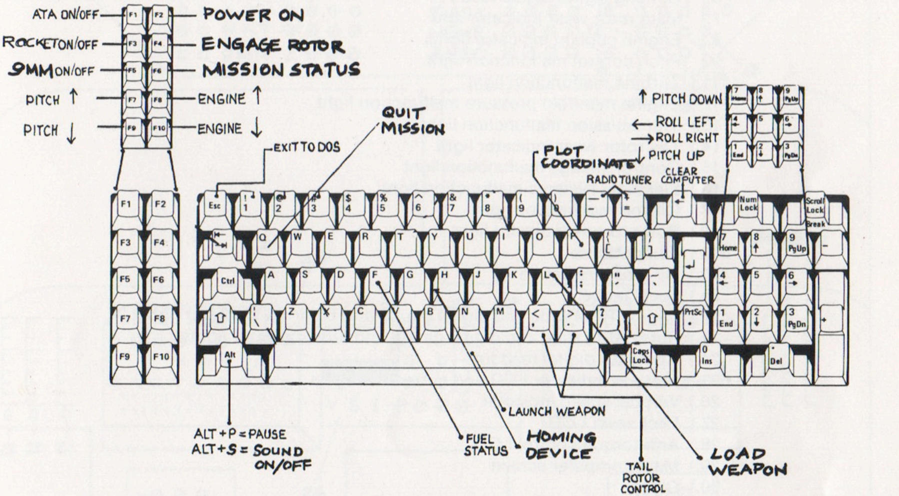
Your mission is to explore the terrain around the base. Map out the major geological features (mountains, lakes, fields) and small villages. You should plan a search pattern and use the UH-1X computer's plotting command (the 'P' key) to determine the coordinates of any features that you fly over. When you complete your map, send COSMI a copy and we will send you the actual map so you can see how they compare (Indicate IBM version).

4. COMBAT

A secret desert installation to which you are assigned is under possibe attack by unknown hostile forces. Your mission is to seek out and destroy any potential threat. To survive, you must learn to attack while dodging enemy anti-aircraft guns and surface-to-air missiles. the number of probable enemy installations is reported by pressing the mission status key (F6). When the threat of attack is eliminated, you will receive an "ALL CLEAR" message.

CONSOLE CONTROLS

KEY(s)	FUNCTION
F1	ATA missile on/off switch
F2	Power on
F3	FFAR rockets on/off switch
F4	Engage rotor clutch
F5	9MM machine guns on/off switch
F6	Report mission status
F7	Pitch level UP control
F9	Pitch level down control
F8	Engine Accelerator
F10	Engine Decelerator
P	Dispay current position in mileage coordinates, such as 10 miles north/25 miles east.
F	Reports exact fuel supply
H	Set a homing device. This establishes a new frequency and cancels transmission of any previous homing signals.
L	Reload active weapon. Only at Base.
SPACE	Fire Weapon
– =	Radio frequency tuner
	Tail rotor control
BKSPC	Clear computer screen button
ESC	Exit to DOS
Q	Quit mission
alt + P	Program pause control
alt + S	Toggle sound on/off

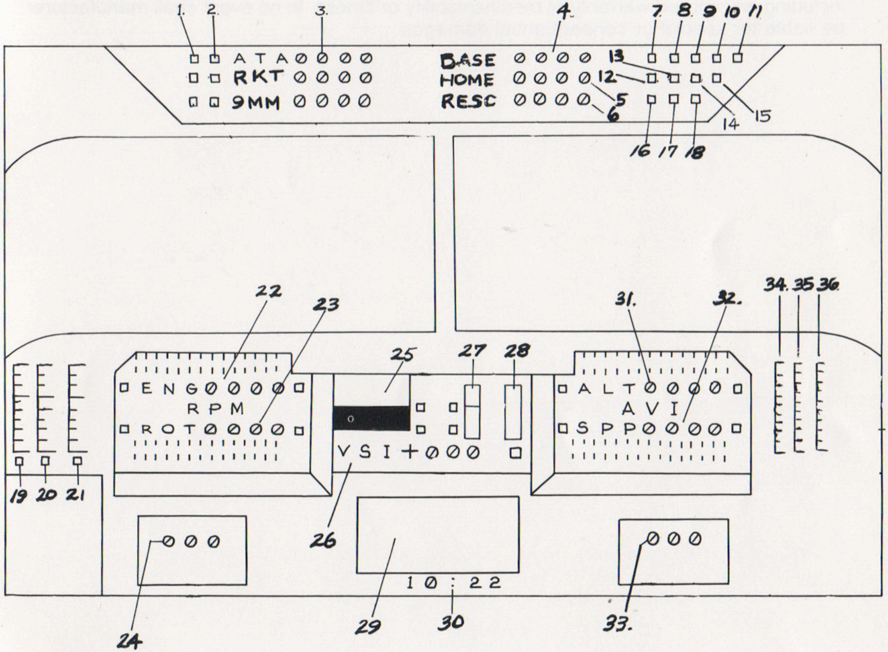


IBM SUPER HUEY KEYBOARD CONTROLS

CONSOLE DISPLAYS

1.) Weapon low supply indicator lights
2.) Weapon malfunction lights
3.) Weapon suppy digital readouts
4.) Base VOR digital readout
5.) Rescue signal digital readout
6.) Homing signal digital readout
7.) Main rotor wear indicator ight
8.) Engine coolant indicator lights
9.) Pitch control malfunction light
11.) Turbine malfunction light
12.) Engine manifold pressure malfunction light
13.) Transmission malfunction light
14.) Tail rotor wear indicator light
15.) Control linkage malfunction light
16.) Electrical systems malfunction light
17.) Oil line malfunction light
18.) Rotor torque indicator light
19.) Temperature
20.) Oil pressure gauge
21.) Fuel Gauge
22.) Engine RPM slide and digital gauge and high/low indicator lights
23.) Rotor RPM slide and digital gauge and hi/lo indicator lights
24.) Compass digital readout
25.) Attitude indicator LCD and correction lights
26.) Vertical speed indicator
27.) Pitch level LCD
28.) Anti-torque control LCD
29.) Main computer screen
30.) Clock
31.) Altimeter slide and digital gauge and hi/lo lights
32.) Speedometer slide and digital gauge and hi/lo ights
33.) Navigation radio frequency digital readout
34.) Generator gauge
35.) Carburetor gauge
36.) Exhaust temperature gauge

Paul Norman / Ron Paludan



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WARRANTY

This article will be replaced if found to be defective in material and/or workmanship within 90 days of purchase. This shall constitute the sole remedy of purchaser and the sole liability of manufacturer. To the extent permitted by law, the foregoing is exclusive and in lieu of all other warranties or representations whether expressed or implied, including any implied warranty of merchantability or fitness. In no event shall manufacturer be liable for special or consequential damages.

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431 N. Figueroa St., Wilmington, CA 90744 • (213) 835-9687