

WILLYBITE™

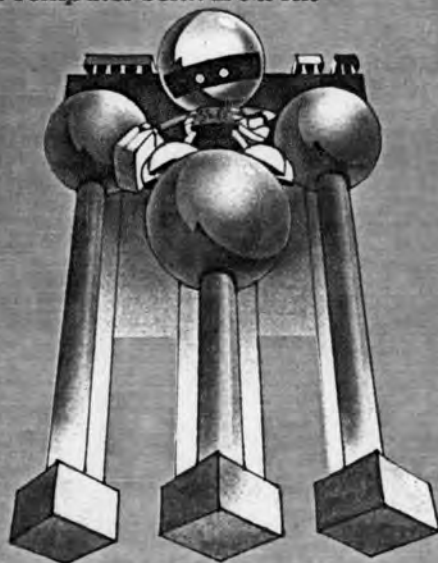
DIGITAL DIMENSION



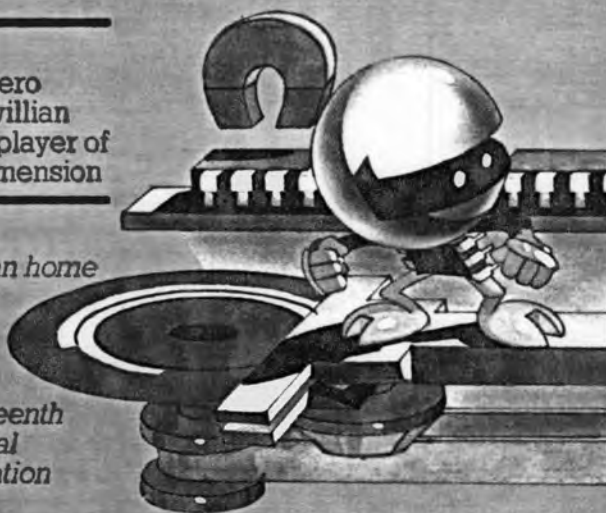
CHARACTERS

Willy Byte: electronic hero
Hex Luthor: digital archvillian
Cybil Nibble: 13 year-old player of Willy Byte in the Digital Dimension

Scene — A suburban home in the 1980's on a late Sunday evening. A teenager, Cybil Nibble, has been playing (for the umpteenth time) Willy Byte in the Digital Dimension, the newest creation in computer software from



Data Trek, Inc. She decides to go to bed and quickly enters into a deep sleep that plunges her into the Digital Dimension. She finds herself on the ground gazing at eight towering electronic circuit poles, each emitting a blue glow that consumes the entire sky. Fascinated and perplexed by the sudden change in environments, Cybil notices an animated object, high in the heavens, swinging from pole to pole.



Cybil (whispering to herself): The lightning speed, the energetic response, the total commitment, it must be Willy Byte!

(At that moment the game's charismatic electronic hero, Willy, sees Cybil and slides gracefully down the pole to meet his newest acquaintance.)

Willy Byte (cheerfully): Greetings, Cybil! Welcome to the Digital Dimension.

Cybil: The Digital what?

Willy: You know, my home, the inside of your computer. Watch this!

(Off he scampers about the Keyboard Room jumping and pushing on each bit while dodging the stinging sensations of static charges. As soon as Willy completes his task and the

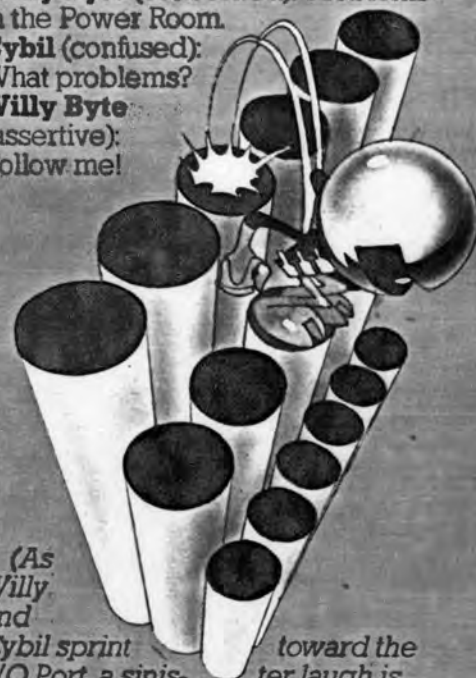
byte has safely left the keyboard room, a sudden uneasiness comes over Willy.)

Cybil: Are you alright?

Willy Byte (concerned): Problems in the Power Room.

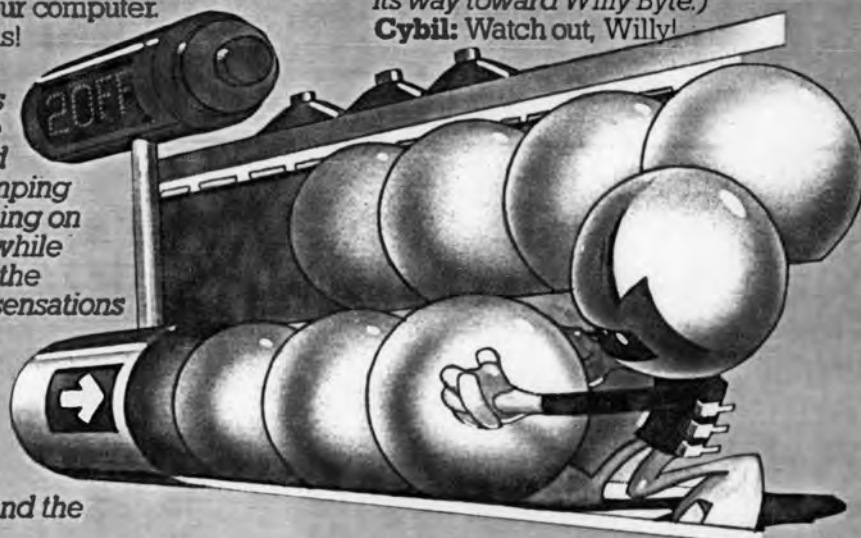
Cybil (confused): What problems?

Willy Byte (assertive): Follow me!



(As Willy and Cybil sprint toward the I/O Port, a sinister laugh is heard from above — the laughter of Hex Luthor. Suddenly a bolt of static charge is seen thundering its way toward Willy Byte.)

Cybil: Watch out, Willy!



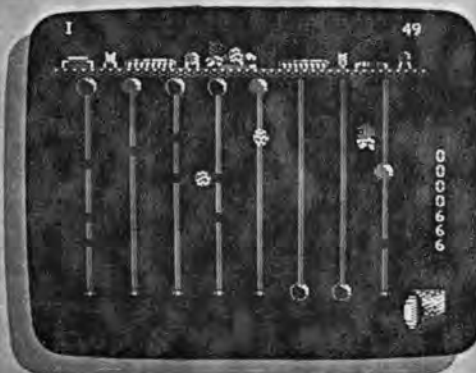
CPU

This is it. Grand Central Station. The smarts of your computer. And now you've got control of it. Really. See all those buttons down there with words under them? Good. Those are your options. Just get down there and make a choice. Don't worry, Willy's here to help you. Let's see... Disk? RAM? Ah, Keyboard. That looks good. So, now what? Well, you could sit here and look at the pretty picture, or you could get moving and go to the room you chose.



KEYBOARD

Looks like you made a good choice—everything's still working. Good. Now that you're here, why don't you climb up to the top? Might get a better view that way. There you go. You're now standing on the main circuit board for the keyboard. There should be a keyswitch around here somewhere... ah yes, there's one, smack in the middle. Go ahead and jump on it. Congratulations, you've just typed in the first character of your secret code. That's it, up there in the left-hand corner. It's also over there on the right in its hexadecimal



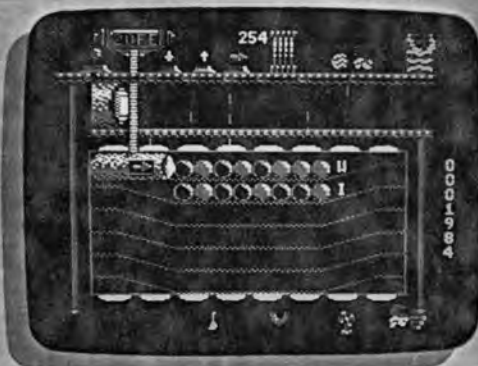
form. And those black and blue globes that just appeared below your feet represent the binary form of your character. Pretty exciting, huh? Now get busy and push those eight bits (having nothing to do with the value of the dollar) down the circuit lines so that they'll go zipping out through the I/O (input/output) tube to the RAM Room.

RAM

Welcome to RAM (Random Access Memory). This is where you'll store that byte (eight bits) that you just sent from the Keyboard. It's here, you just can't see it yet. The controls for this gizmo are up there in the left-hand corner. Unless you'd like to give your computer a case of instant amnesia, don't touch that first button. It's the power switch. The next two buttons control the tube that's hanging below on that chain. That last one with the blue arrow over it is the one you want now. Jump on it and then get on down to that narrow tube and see what you find. Lo and behold, there's a bit there! And not just one, but the whole byte you just saw in the Keyboard. Will miracles never cease?

What's this? Oh no! See the guy that just appeared up there? Yeah,

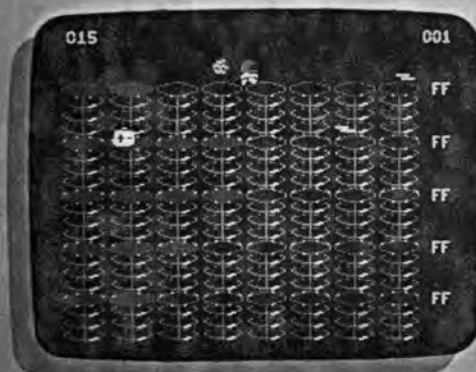
the one who looks like a punk rocker. Well, he doesn't like you or your computer very much. His name is Hex Luthor. He's the guy responsible for all those things that go wrong with computers that no one can explain (like the problem happening right now in the Power Room—you'd better go there next). You might say that Hex is a... nuisance. Those tools down at the bottom will help you defend against his little tricks. In the meantime, try to finish pulling that byte into position. And, by the way, Hex is no slow poke. So hurry up!



POWER

Now, this is neat! Look at all those springs. Hey, it's a little dark in here. Why don't you start turning these things on? That's better. Look out! You just about got nailed by that bolt. You really should be more careful. Oh, no. There's one of those orange beasts again, and it's following you! Here's your chance. See that white tool box floating down? It's yours. Hurry up and grab it. Oops! A little slow, aren't you? Don't worry, you'll get the hang of it.

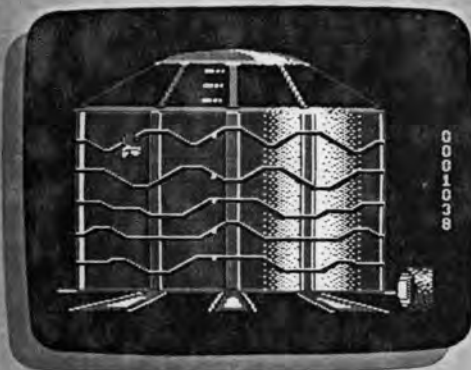
You know, if you ever get tired of looking at the pattern you're



working on, you can change it. You just change those hexadecimal numbers over at the right, and voila! . . . the pattern is different. It's your very own Power Room construction set. By the way, once you get those things all turned on, you can leave. And if you were watching while you zipped through the CPU last time, you would have noticed that the Clock is also on theritz. You'd be wise to check it out before something nasty happens.

CLOCK

Yup, you're right. It's huge. Well, let's see. There's got to be some way to get you up there. Hmmm. Okay, here's the plan. See those weird black lines with the electric pulses running through them? Good. Start jumping. Only be



careful not to . . . Oooh! . . . oh well. Now you know what happens when a pulse touches you. A shocking experience. Try, try again. There you go. Very good. Now that you're up there, don't you feel a sense of accomplishment? Sure you do. Now just get up on the very top and jump on that big blue button. Feels like sponge rubber, doesn't it?

DISK

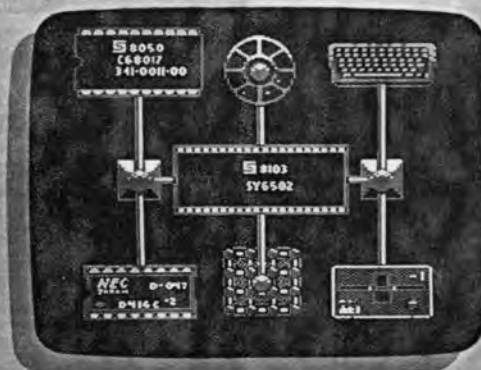
At least this thing should look vaguely familiar. No, it's not a turntable. It's the Disk Drive, and you're about to ensure that all of your hard(?) work up to now will be safe. First, get the thing going by



jumping on that button to your left. Good. Now climb up there and jump on what you thought was the phonograph needle (it's actually the Disk Drive's read/write head). Here's the fun part. You get to keep your balance while trying to maintain position on top of the head. It's somewhat like trying to run on top of a rolling ball. Oh, and try not to fall off onto the disk. You might not like the ride you get and besides, it'll cost you valuable time. Once you see an orange circle appear on the disk, you'll know

you've saved one byte onto the disk.

MAP



The Map is essentially a schematic diagram of the Digital Dimension. You'll want to use it throughout the game to spot problem areas before they cause the system serious damage.

FLOWCHART

After playing through the game several times on your own, you may want to organize your gameplay into a more structured pattern. The FLOWCHART mode in the CPU allows you to do just that. After choosing the "PROG" option, not only are all of your options sent to the FLOWCHART grid, but also you gain two new options to use: the "IF" statement, and the "LOOP" command. Planning out your mission with the FLOWCHART not only streamlines your gameplay, but also helps you earn a higher rating status at the end.

Computer programming (especially in concentrated doses) can do funny things to people. Take, for example, 17 year old Murray Krehbiel. He led a fairly normal life—playing basketball, watching girls at Mission Beach, doing his homework—until the day an Apple™ computer dropped into his life. Since then, he's only had time for one of those three activities. (We won't say which one.) Now things are even worse. In fact, we overheard the following conversation between Murray and his computer late one night:

Murray: Hey, Willy!

Willy: Oh, hi boss! What's up?

M: Just here to see how everything's going.

W: Everything's as smooth as can be. I haven't even seen Hex lately.

M: Uh, I think you spoke too soon, Willy. Look over there.

W: Oh, no! I knew it was too good to last.

Hex Luthor: Greetings, computer nerds.

W: Why don't you get lost!

M: Pipe down, you characters!

H: That reminds me. There's something I've been meaning to ask you, Furry...

M: It's Murray!!!

H: Well, excuuuse me, Muuurray! Anyway, when you created me, why did

you have to create that monster as well?

W: I think you've got your logic circuits in backwards, bud.

M: Actually, Willy was here first. The whole reason you're here is to give Willy a more challenging existence (sorry, Willy).

You also stand for those little glitches that computer users hate. And we know the best way to fix glitches don't we, Willy?

W: Yeah. I was feeling a bit sleepy anyway. Go ahead and turn it off.

H: Hey! What are you doing?!

M: Good night, Will.

W: Good night, boss.

H: Hey! Stop!
(click)

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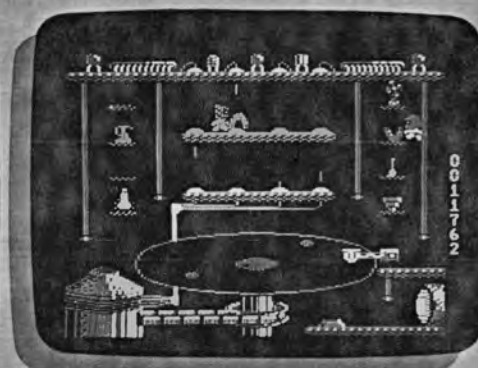
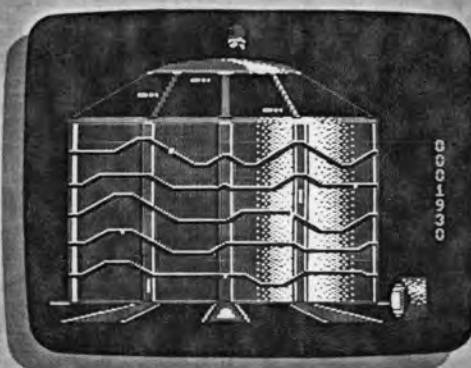
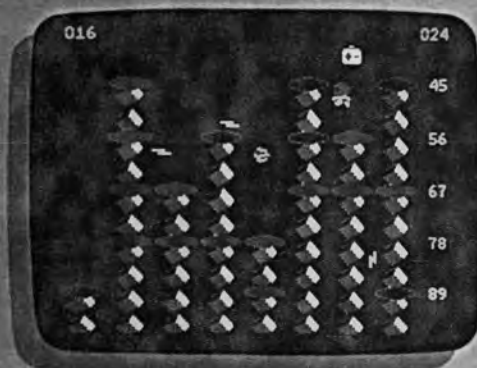
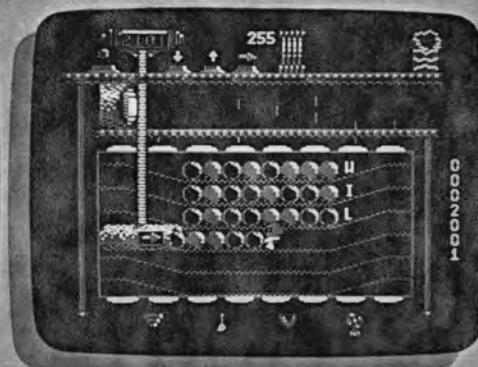
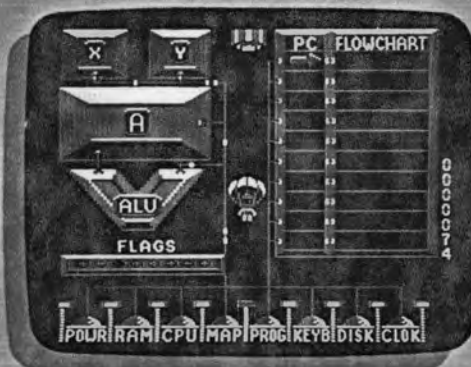
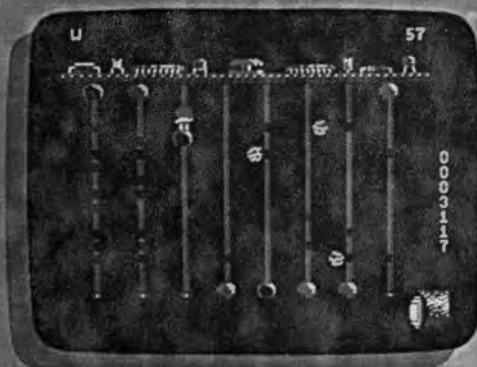
Data Trek, Inc. is dedicated to developing educational, entertainment, and business software that is valuable to society. Let Willy Byte in the Digital Dimension be your springboard to a new breed of computer software, combining the best elements of educational and entertainment software into an intriguing, challenging, and learning experience within the world of your personal computer.

dti data trek

The documentation is located inside the front cover of this package.



In Willy Byte in the Digital Dimension, your mission is to guide your coded message from the Keyboard Room to the RAM (Random Access Memory) Room and then successfully save the data in the Disk Drive Room. Meanwhile, you've also got to keep your eye on the power supply and the system clock. To accomplish this mission, you'll be risking Willy's life and limb (aren't you glad it's him in there, and not you?) And, although your efforts will be timed, the clock is not your worst enemy. You'll also have to contend with Willy's archvillain, Hex Luthor. Hex is the kind of guy who'd love to ruin your day. Don't give him the satisfaction.



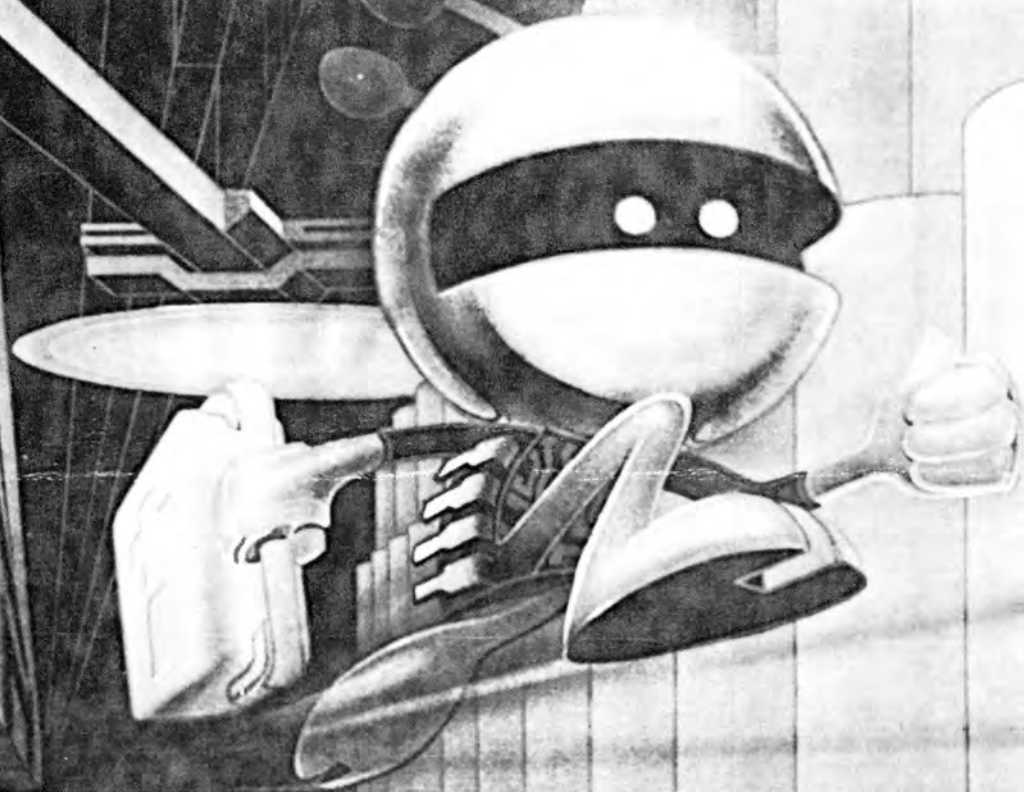
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WILLYBYTE™

DIGITAL DIMENSION



P L A Y E R ' S G U I D E

WELCOME TO THE DIGITAL DIMENSION

In this, the era of Big Brother, many of us are feeling the effect of future shock. Personal computers, automated tellers, and yes, even robotic supermarkets have been invented to help make our lives better. But then, when was the last time you were on intimate terms with your "personal" computer?

With these thoughts in mind, we designed **Willy Byte in the Digital Dimension**. What better way to acquaint people with their computers than to give them an inside view? And quite a view it is at that. Willy Byte will take you on a grand tour through the various parts of your computer, everywhere from the keyboard to the disk drive.

This manual has been designed to provide you with both gameplay guidelines as well as informative notes on your computer itself. We hope that through playing the game and reading this guide, you'll have a better feeling about your computer and its basic functions. We also hope that, because of **Willy Byte in the Digital Dimension**, your computer will seem more "personal" to you than it was before.

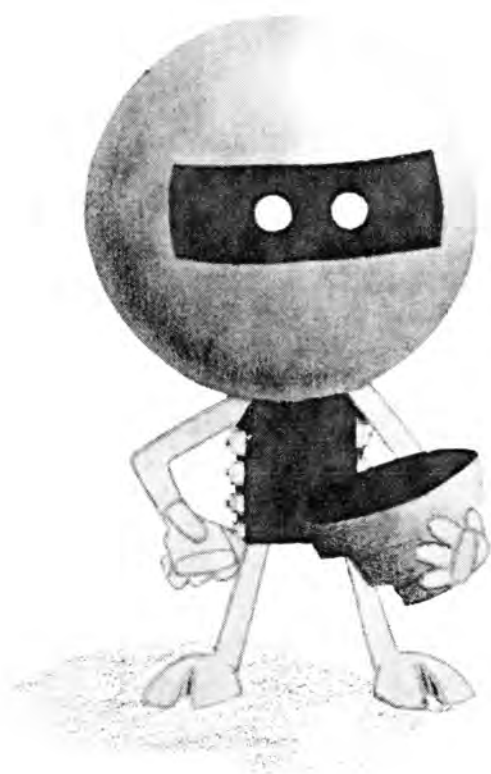
YOUR MISSION

Your mission, which by now you have chosen to accept, is to guide bytes of information through the computer. By starting in the Keyboard room, you'll symbolically type in one or more characters. From there, you'll move through the CPU to Random Access Memory (RAM) to store those bytes in memory. The final step in this process is to save the information contained in RAM to disk in the Disk Drive room.

This would be a fairly simple task if you didn't also have to worry about the Power failing or the Clock going haywire. But you do. And then there's Hex Luthor. He's a wonderful character, akin to the gremlins that eat airplane wings. Aside from these little annoyances, there's nothing standing between you and the top rating. But then, life's little challenges are what make living fun, right?

THE OPTIONS MENU

After choosing to play with the keyboard or the joystick, you'll be prompted either to enter your own message or to allow the program to choose a message for you. You'll be attempting to send this message through the computer by playing the game. Your skill level will be determined by the number of characters in your message, e.g. the more characters, the higher the skill level.



WILLY BYTE
the protagonist

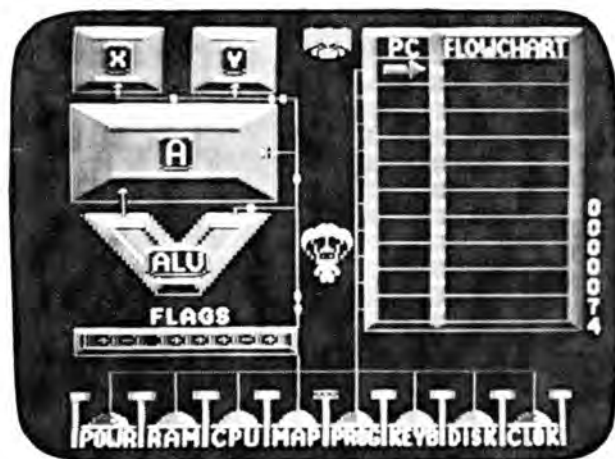


HEX LUTHOR
the antagonist

CPU

In **Willy Byte in the Digital Dimension**, the CPU serves as the options menu for the whole system. After landing, jump across the platforms at the bottom until Willy is next to the option button you want. To choose that option, simply walk off the platform onto the button. The title below the button will inverse indicating that you have chosen that option. If you change your mind, just hit another button. Once you have the option you want, go back to the center platform and jump straight up to leave the CPU.

(NOTE: if you hit **PROG** by mistake, press CTRL F to correct your goof.)



The Central Processing Unit (CPU) can be considered the "brain" of the computer. However, unlike a human brain, the CPU cannot reason or think independently. The CPU serves two primary roles: as an arithmetic/logic unit (ALU) and as a control unit. The arithmetic/logic function allows the CPU to complete arithmetic calculations and compare and sort information. The control function of the CPU can be likened to a busy police officer directing the flow of traffic during the peak rush hour.

As bytes of information enter the computer, the CPU must direct the flow of information between the input device (keyboard), the memory, the CPU, the ALU, and the output device (disk drive). Though this process may seem extremely time consuming, the actual time it takes for a byte to enter the CPU from the keyboard would be approximately one billionth of a second!

The CPU also contains two storage registers (X and Y). The X and Y registers allow the CPU to temporarily store one byte of instructions that is used to perform a particular operation.

In the animated CPU room the player is able to identify the V-shaped Arithmetic Logic Unit and the X and Y registers located at the upper left-hand portion of the screen. The elongated rectangle located below the ALU represents the flags. The flags enable the CPU to check the status of certain operations that are performed in the CPU. The Program Counter (PC) tells the CPU which instruction is to be executed next.

Inside an actual computer, the set of instructions appearing as the flowchart are normally stored in the computer's memory. When the Program Counter (PC) is ready for the next instruction, the CPU subsequently fetches the instruction from memory. However, in **Willy Byte in the Digital Dimension** these instructions have intentionally been placed in the CPU room in order for the player to visualize the relationship between the Program Counter and the set of instructions guiding the CPU.

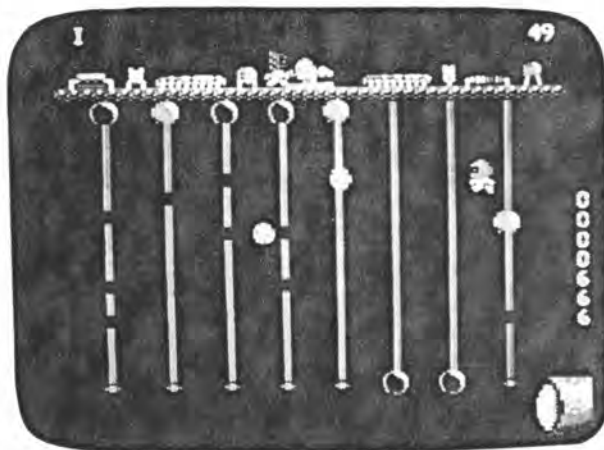
The concept of flowcharting has been introduced in order to acquaint the player with a basic skill necessary for computer programming. Normally, a flowchart is simply a tool used by programmers to organize the set of instructions guiding the CPU. A flowchart identifies the decision points and processing steps necessary for a particular set of instructions to be executed.

In **Willy Byte in the Digital Dimension**, the player is able to streamline gameplay by flowcharting Willy's itinerary. This function not only allows the player to understand the basic concept of flowcharting, but also helps his rating at the end.

(Please see FLOWCHARTING, page 17).

KEYBOARD

This is where your mission begins. To enter the first character of your secret code, climb up one of the lines and jump on the keyswitch in the middle of the circuit board. Push the eight bits (one byte) that appear below the circuit board to the bottom. Beware, contact with the static charges will be a shocking experience. Also, keep an eye out for Hex Luthor. Once you get the whole byte to the bottom it will leave. So should you. Just jump out through the tube.



The keyboard is an input device for the computer. Information is "put in" the computer using a combination of the 26 letters of the alphabet, the 10 numeric symbols (0-9), and the 20 special symbols printed on the keyboard. These are referred to as characters.

Similar to using a translator in communicating with a visitor from a foreign country, the computer must translate every character it receives from the keyboard using the **binary number system**. Each character has its own binary code. The binary number system is comprised of only two numbers, 0 and 1. Every character can thus be translated by the computer into a combination of zero and one digits. These digits are called bits, taken from the words **binary digit**.

Information in the form of bits travels through the computer in circuits using electric current signals. An instruction translated as 0 instructs the computer to turn off a circuit while an instruction translated as 1 instructs the computer to turn on a circuit. In **Willy Byte in the Digital Dimension**, the off circuits are represented by the unlighted bits while the on circuits are represented by the lighted bits. The combination of eight off and on bits representing the character entered into the computer by the player is referred to as a **byte**. Provided below are a few illustrations.

CHARACTER	BYTE	CIRCUITS							
		8	7	6	5	4	3	2	1
B	01000010	off	on	off	off	off	off	on	off
O	01001111	off	on	off	off	on	on	on	on
O	01001111	off	on	off	off	on	on	on	on
T	01010100	off	on	off	on	off	on	off	off

Whereas most computer users communicate with the computer using the standard symbolic codes identified on the keyboard (A, B, C, etc./ 1, 2, 3, etc.), many computer programmers tend to favor the use of the hexadecimal coding system. In the hexadecimal system, a series of four bits (representing one half of a byte or a "nibble"—no kidding!) can be translated as a single hexadecimal digit. These digits are represented by the numbers 0-9 and the letters A, B, C, D, E, F. Using the hexadecimal system provides the programmer with a quicker process for entering information directly into the computer. The computer then needs only to translate the two-digit hexadecimal code into the appropriate binary code.

In **Willy Byte in the Digital Dimension**, the ASCII* character in conjunction with its hexadecimal representation and eight off and on bits (one byte) are graphically displayed in the Keyboard room on the adjacent page. As Willy depresses the keyboard switch, the ASCII character and its hexadecimal code appear in the upper left and right hand corners of the screen respectively while the byte corresponding to the letter or number selected by the player materializes below the keyboard switch. In this way the player is able to understand the relationship between the ASCII character, its hexadecimal code, and its binary representation.

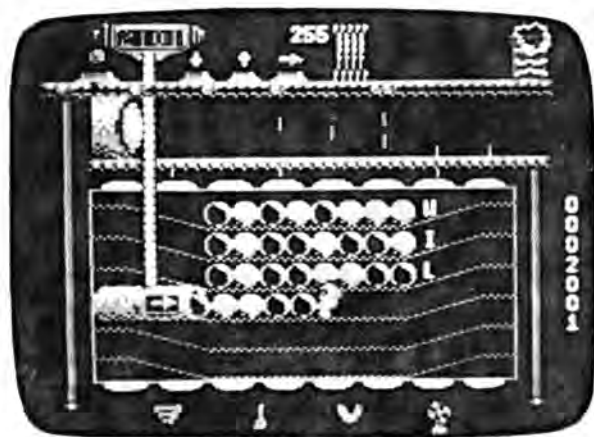
The enclosed **PLAY COMMANDS** card provides a conversion table for comparing ASCII characters with their corresponding hexadecimal and binary values.

*ASCII stands for "American Standard Code for Information Interchange"

RAM

The byte(s) that you just sent from the Keyboard is now ready to be stored in RAM (Random Access Memory). But first, you must be sure that the byte will be stored at the correct location. Run along the level where Willy appears—avoiding the pulses falling to the chip—and then double back through the chip below. Jump to the rope at the far left and climb up to the top level where the controls are located. Don't touch that large orange button—it's the power switch. Use the **↓** and **↑** arrow buttons to move the smaller tube to the first available memory location. (If this is your first byte, don't move the tube.) Then hit the button under the blue arrow to begin loading the byte into RAM. As soon as you do, you'll see the end of the byte emerge from the tube—get down there and pull it out. (This is where Willy gets to show off his muscles.) By the way, if Hex Luthor gives you any problems, just get down and grab one of those tools. Cool down the heatsink with the fan (when Hex puts his heatlamp on the other side). Demagnetize Hex's magnet with Willy's anti-magnet. Mop up the water that drips from Hex's water can. And catch the static with the blue static trap. **WARNING:** failing to stop any of Hex's tools can and will result in disastrous consequences. If the heatlamp melts through the heatsink, Hex will run through and tamper with the controls. If he hits the power switch, turn it back on in a hurry before the memory chip loses power. Failure to stop the other tools will result in the loss of one or more bytes. Once you've dropped your tool into position, both tools will return to their origin after about five seconds. After pulling the byte all the way out, its character will appear. You can then proceed with your next byte or leave by jumping into the large tube.

NOTE: Any tools on the same level as the byte currently being loaded into memory will block that byte's movement. You must move all tools out of the way in order to finish loading the byte.



The computer contains two primary sets of memory, Random Access Memory (RAM) and Read Only Memory (ROM). Both sources of memory play a vital role in the operation of the computer.

Random Access Memory (RAM) is essentially a storage area for bytes of information that enter RAM from the CPU. Each byte that enters RAM is assigned a temporary address location in order for the CPU to fetch that particular byte from RAM at a future time. The amount of storage space in RAM is measured in bytes. For instance, RAM's capacity might be 16,000 bytes. This means that up to 16,000 bytes of information can be stored temporarily in RAM. The most often used terminology for identifying storage space in RAM is the Latin word, kilo, meaning one thousand. Thus 16,000 bytes would equate to 16 kilobytes, or 16K. In **Willy Byte in the Digital Dimension**, the amount of storage space equals six bytes or .006K.

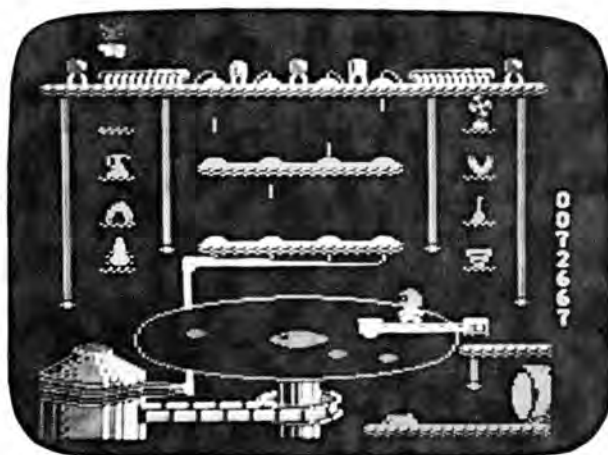
Since RAM represents temporary memory, a person programming the computer may add, delete, or modify the data contained in RAM. Information stored in RAM will remain in place as long as the computer remains turned on. However, if the computer is accidentally turned off, any information entered into RAM will be automatically erased. This is why computers have output devices such as a disk drive which enable the user to save the data to the diskette before the computer is turned off.

Read Only Memory (ROM), on the other hand, is permanent information contained in the computer. The ROM features are placed in the computer during the manufacturing phase and cannot be erased. Some typical ROM features include the computer's ability to translate a programming language code to its own language of binary numbers, to use specialized messages on the screen (Out of Memory, Syntax Error) and to provide specific symbols to guide the programmer. Unlike RAM, ROM cannot be modified or changed by the programmer.

The RAM room in **Willy Byte in the Digital Dimension** enables the player to understand both the concept of storing bytes (information) to their proper location and the consequences of having the bytes of information erased if the computer's power supply to RAM is shut off.

DISK DRIVE

After loading at least one byte into RAM, you may opt to save the contents of RAM to disk. To start the drive motor, jump on the button at the bottom. Then jump up on the read/write head (it's hanging over the disk) and step on top of the white part of the head. In order to save information to the disk, you must keep your balance on top of the head while it moves over the disk. Eventually, the same number of bytes that you just stored in RAM will appear on the disk (in the form of small orange disks). Once again, Hex Luthor is here to annoy you. This time, if he puts his heatlamp over the drive motor, it will eventually stop the mechanism if you don't cool it down with your fan. The other tools work the same way they did in RAM, erasing entire bytes when they strike.



The disk drive is considered to be an input/output device since information can either be saved to the disk (output) or entered into the computer as a program (input). The disk itself is similar in surface texture and material to the tape in a cassette tape. When reading the disk, the read/write head moves across the disk gathering magnetic impulses. These magnetic impulses are then loaded into RAM via the CPU. When writing to the disk, the magnetic impulses are deposited onto the disk from the computer through the read/write head.

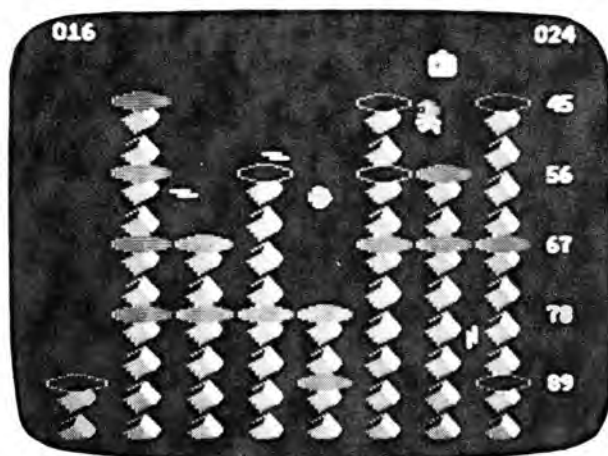
Reading information from the disk indicates an input function because information represented by the magnetic impulses is being loaded into the computer. Conversely, writing to the disk implies an output function since information is being stored to the disk. In **Willy Byte in the Digital Dimension**, the player is able to witness and, more importantly, participate in the process of saving information to the disk in the animated Disk Drive.

Though animated for game play, the Disk Drive room includes many of the critical features of an actual disk drive. The screen shows a sideview of the disk drive, equipped with the floppy disk, read/write head, circuit boards, and motor. The player's interaction with the disk drive also promotes a keen awareness of the disk itself. A floppy disk is vulnerable to environmental abuse caused by heat, static, liquids, and/or magnetic charges. Any of these elements could seriously damage the contents of the disk, as well as the disk itself.

NOTE: Whereas in **Willy Byte in the Digital Dimension** bytes appear on the disk as small orange disks, on a real disk the recorded information is invisible.

POWER

Your mission here is to restore the power supply to full capacity by turning all the cylinder tops to orange. The bolts of electricity are to be avoided at all cost. Also keep tabs on where the static is. If it hits you in mid-flight, you'll be stunned. However, if static catches you standing around, it'll knock you into next week. Help comes in the form of Willy's toolbox which, if grabbed, makes you invincible for about 5 seconds.



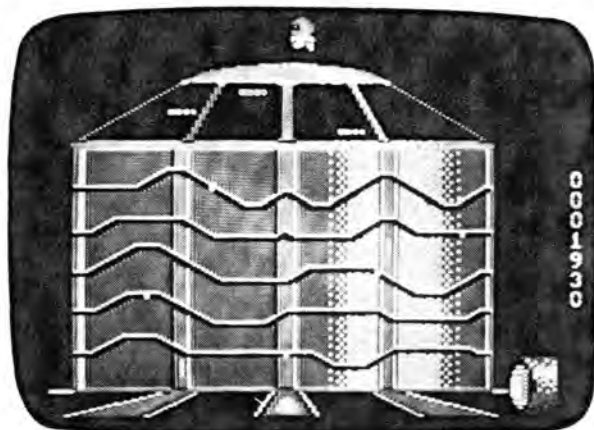
The concept of power as a critical feature of the computer was included within **Willy Byte in the Digital Dimension** because of its obvious influence on the smooth operation of the computer. For most personal computers, the power supply utilizes 12 volts of electricity.

As mentioned before, a power failure could completely erase all bytes of information stored in RAM. A sudden power surge entering the computer could also seriously impair or alter the flow of electricity throughout the system—a fundamental element of the computer's binary code. Prolonged use of the computer could possibly cause a power failure; however, many personal computers are equipped with a fan attached to the outside wall in order to prevent the problems associated with heat build-up.

By interacting with the Power room in **Willy Byte in the Digital Dimension**, the player is able to understand that without a continuous power supply the computer is functionally disabled.

CLOCK

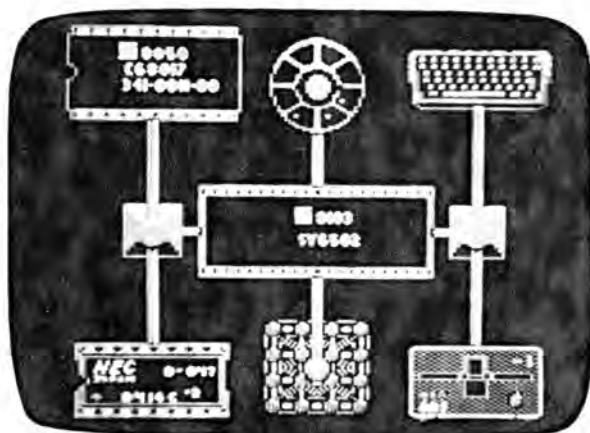
When the clock goes haywire, you've got to reset it. To do this, jump up from level to level, avoiding the pulses running through the lines. Once you get to the top, run up one of the spokes at either end of the clock and jump on the huge blue button. To leave, jump back down the levels and out the tube.



Just as power is seldom discussed but is of paramount importance to the computer, the clock is also vaguely noticed yet crucial to the operation of the computer system. Whereas the CPU is classified as the "brain" of the computer, the clock would be designated as the "heart" of the computer. Within the computer, the clock insures a steady flow of electricity to control the flow of bytes throughout the system. If the clock pulses erratically as a result of a power surge or static electricity, the entire computer system would be impaired. Since the CPU executes only one instruction at a time (no matter how fast), an erratic pulse could produce possible program bugs, loss of data (bytes) and/or a system lock-up. In **Willy Byte in the Digital Dimension**, the Clock room offers the player an opportunity to understand the significance of the clock as providing the "heartbeat" of the personal computer.

MAP/PERSONAL COMPUTER

Use the map as a reference while playing in manual mode. If there are any problem areas, those areas will be seen in inverse video on the screen.



The personal computer is a man-made creation designed to extend our ability to think systematically, logically and more efficiently in our highly complex and rapidly changing world. The computer accomplishes this task through its ability to accept, store, process, and disseminate information.

In accepting information, the computer uses input devices to enter data into the computer. The widely used input devices include the keyboard, floppy disk, cassette tape, and ROM cartridge. The processing phase of the computer includes its ability to calculate arithmetic solutions and compare and sort data. The disseminating function of the computer involves distributing the data that has been processed by the computer. Disk drives, video monitors, plotters, and printers are typical output devices used to "put out" information.

The personal computer thus contains four major elements: an input device (keyboard), a processing unit (CPU), a storage area (RAM), and an output device (disk drive).

In **Willy Byte In the Digital Dimension**, a map illustrating each of these major components provides the player with a basic conceptual model of the inside of the computer.

FLOWCHARTING

While in the CPU, you may choose to flowchart your mission in order to streamline your gameplay. Flowcharting also has a positive effect on your **EFFICIENCY RATING** at the end of the game. To flowchart, choose the **PROG** option button. From that point on, all options chosen in the CPU will be listed in the section marked **FLOWCHART**. Also, the **CPU** option will be replaced with the word **LOOP** and the **PROG** option will be replaced with the word **IF**. The **LOOP** option allows you to conveniently repeat a number of rooms as many times as necessary, e.g., **LOOP**, **KEYB**, **RAM**, **LOOP**. To end the loop, hit the **LOOP** option a second time. You will then be prompted below the **FLOWCHART** grid to enter (via keyboard) the number of loops desired.

In **Willy Byte in the Digital Dimension**, the **IF** option is an abbreviation of the flowcharting statement, "If problem, then go to problem." Strategic placement of the **IF** option within the **FLOWCHART** allows you to keep tabs on the system as you play the game. Every time the Program Counter (PC) indicates that an "IF" statement is being executed, the **FLAGS** will flash a "--" (minus sign) for any areas that are malfunctioning. (The eight **FLAGS** correspond to the eight option buttons at the bottom of the screen.) You'll see the CPU between each room in order to watch the Program Counter increment and to utilize any current **IF** statements.

NOTE: CONTROL D will delete options in the **FLOWCHART** grid if you goof or just change your mind. Some examples of possible flowchart strategies are presented below to help you.

For a 1 character word:

KEYBOARD
RAM
IF-THEN
DISK

This example only deals with a one character word and is therefore very straightforward.

For a 3 character word:

LOOP
KEYBOARD
RAM
IF-THEN
LOOPEND 3
DISK

This example works well except for the fact that you end up spending a long time in the Disk Drive to save all three bytes at one time.

For a 6 character word:

LOOP
KEYBOARD
IF-THEN
RAM
DISK
IF-THEN
LOOPEND 6

This example is good because it provides enough IF-THEN statements to fix any problems that might occur.

EFFICIENCY RATING

Your **EFFICIENCY RATING** at the end of the game is based on four different factors. Your **OVERALL TIME**, your **EFFICIENCY OF MOVEMENT**, the **INTEGRITY OF the DATA**, and the **POWER and CLOCK STATUS** at the end are all cross-matrixed together to give you your **FINAL RATING**. Your **OVERALL TIME** is the total time it takes you to play the game (taken from the running timer that appears at the right of each screen). The **EFFICIENCY OF MOVEMENT** factor is based on how many times you fall or are stunned (both of which deduct from your final rating). The **INTEGRITY OF DATA** factor is based on how much of the original message remained in RAM and was saved on Disk at the end of the game. The **POWER and CLOCK STATUS** factor is based on the condition of the **POWER** and the **CLOCK** at the end of the game, as well as your attention to their condition during the game. The **FINAL RATING** you receive is chosen from a scale of 1 to 64. If you rate in the top 8 players of all time, you will have the opportunity to enter your name which will be saved to disk.

NOTE: In **POWER**, instead of being timed, you'll be rated according to how many jumps you take as compared to the total number of pads in the pattern.

In addition to this manual, you'll also find a card entitled COMMAND SUMMARY behind the disk. It contains the play commands for the game, a convenient ASCII/hexadecimal/binary conversion table, and warranty information.

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