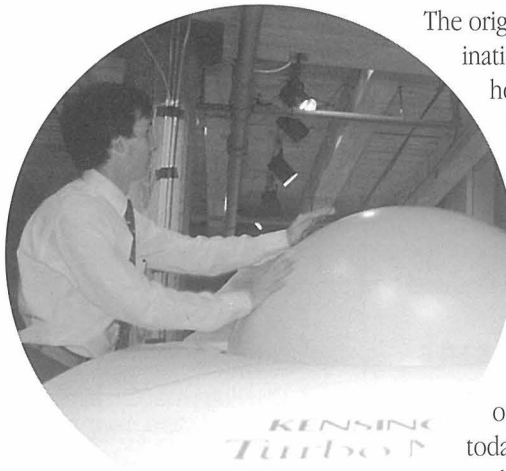


# The WALK-THROUGH COMPUTER 2000

**MAKING A GREAT EXHIBIT EVEN GREATER** On October 21, 1995, The Computer Museum opened *The Walk-Through Computer 2000*, the networked, multimedia upgrade of its colossal, 50-times-scale personal computer.



The original *Walk-Through*, unveiled in 1990, had captured the public's imagination, inspiring 750,000 Museum visitors from around the world to learn how computers work by entering and operating the huge PC. But over the next five years, rapid advances in technology had made *The Walk-Through Computer*™ obsolete. By 1995, PCs everywhere featured impressive multimedia, communications, and networking applications that were not available in 1990. They also sported faster microprocessors, more powerful hard drives, and lots more memory than the older models.

The Museum decided that it was time to upgrade its flagship exhibit. With the support of Cirrus Logic, Inc., Intel Corporation, and 12 other corporate sponsors—which all supply components used by today's PCs—the 1990 *Walk-Through Computer* was replaced by a totally new exhibit, packed with state-of-the-art technology.

FAYFOTO/John Rich  
The new machine is driven by a high-speed Pentium® processor, surrounded by multimedia boards, connected to a CD-ROM drive, and networked—at the same 50-times-scale as its predecessor. Over 100 people—sponsors, volunteers, the Museum exhibit and design team, and outside contractors—spent 18 months fabricating the \$1 million exhibit, designing it to captivate a diverse audience including seniors and small children.

## IMPROVING UPON THE ORIGINAL

To bring new life to its cornerstone exhibit, the Museum had to find innovative, exciting ways to explain how a computer works to an increasingly sophisticated audience. The upgrade provided a unique opportunity to improve upon the original model.

Ongoing evaluations of visitors' experiences had revealed specific instances where the old exhibit did not work for some people. At the same time, an advisory group of educators and marketing experts began to meet regularly and recommended that the new exhibit be more interactive, immersive, and fun.

## UPGRADE HIGHLIGHTS

The *Walk-Through Computer* is state-of-the-art inside and out:

### MULTIMEDIA

- The Philips Electronics CD-ROM player stores over 600 MB of data optically on a CD-ROM—enough for an entire encyclopedia set with graphics and sound.
- The audio/video board, loaded with Cirrus Logic processing chips, lets the computer process audio, video, graphics and text.
- The Adaptec SCSI adapter card allows the CD-ROM player to connect to the computer for rapid transfer of data.

### NETWORKING

- A Hayes modem allows people at computers to send electronic mail or hook onto global networks like the Internet.
- A Cirrus Logic infrared transceiver chip provides communication via infrared signals between the computer and a cellular phone or personal digital assistant.
- The 3COM Ethernet card enables people at computers on a local-area network (LAN) to share information and messages.

### MORE MEMORY

- The Quantum 4.2 GB hard drive (upgraded from 400 MB) is faster at reading and writing the vast amounts of information used in movies, animation, and sound.
- The 32 MB of random access memory (RAM) from Texas Instruments (upgraded from 4MB) enables the computer to have eight times as many files open at once as did the 1990 model. This means more multimedia applications can be used in real time.

### MORE SPEED AND POWER

- The Intel Pentium® Processor is three times faster than the 1990 exhibit's 486 microprocessor, and handles the vast amounts of data needed for full-motion video and rich CD-quality sound.
- The Texas Instruments digital signal processing chip (DSP) speeds up the modem so that multimedia data travel over the phone lines faster.
- The American Power Conversion Uninterruptible Power Supply provides battery-backup power, and prevents electrical surges from entering the computer via an outlet, phone line, or network cable.



FAYFOTO/John Rich

The plan that emerged from both the advisors and visitor evaluations called for these changes:

- interactive activities built inside the oversized components that would bring each part to life and help visitors learn, as they move through the exhibit, what each part does and how it relates to the whole computer;
- a fanciful, oversized desktop environment that would immerse visitors as they explore the giant machine and its new, more life-like, 3-D components. It was decided that the desktop would belong to an imaginary teenager named C.J.;
- a new, more realistic application for the big monitor that would resemble the operating environment of computers people actually use nowadays for work and play.

Visitors enter the new exhibit through a colossal simulation of a bubble-jet printer and find themselves shrunk to crayon-size next to an eight-foot-long CD-ROM. Clicking and rolling a car-sized trackball on C.J.'s vast desktop, they answer e-mail from C.J.'s friends and explore full-motion video on a 12-foot-tall color monitor.

Once inside the giant machine, visitors discover ceiling-high printed circuit boards loaded with suitcase-sized chips accurate down to the number of pins on each.

Bright flashing lights in the motherboard floor lead to a powerful seven-foot-square Pentium® processor, opened to reveal a photo of the actual silicon die.

### THE INTERACTIVES

The new *Walk-Through* presents and explains each of the components by its role in the operation of the computer: Input, Processing, Storage, Communication, and Output. Most of the components feature interactive activities that enable visitors to experience firsthand how the parts work.

### PROCESSING

At the heart of the new PC sits the table-sized microprocessor, with a cut-away view revealing how the levels of the chip are soldered to wires connected to pins plugged into the motherboard. The interactive program embedded in the processor shows how it converts instructions from English to programming and assembly languages, and finally to ones and zeroes. By operating a control panel, visitors take charge of the computer, fetching an instruction from one of three programs—sending e-mail, playing a sound, or making a picture. Each is designed to highlight the microprocessor's interaction with the computer's components. As visitors execute each instruction, it jumps off the screen into a fantastic display of lights and sounds racing from the microprocessor through buslines in the motherboard floor to each component.

A periscope-type device reveals an actual electron-microscope view of real transistor gates switching. For a simulated view into the heart of the microprocessor, the Museum used edited IMAX footage of a microprocessor fly-through, provided by Intel. A stunning, enlarged colorized image of a Pentium processor covers the processor's surface.

The audio/video board, loaded with Cirrus Logic processing chips, enables the computer to process audio, video, graphics, and text. To tell the story of the other chips inside the PC, a customized A/V board uses larger-than-life-sized replicas of audio and

video processing chips, supplied by Cirrus Logic. An exploded hole in the middle of the card allows entry. The interactive program embedded in the board's audio section lets visitors record their voice as an analog audio signal, convert it to a digital signal that the computer understands, and manipulate the numbers to hear how their voice changes. An interactive in the video section lets visitors capture a digital image of their face and discover how a computer mixes red, green, and blue to create a full-color image accurately on a screen.

## STORAGE

At the hard drive, visitors use a giant read/write arm to flip magnets and write messages by setting eight bits of code. As the mammoth disk platters spin, visitors then see the bits read magnetically and decoded, with the results displayed on a monitor.

The interactive program embedded in the 8-foot-by-10-foot CD-ROM player reveals how a CD stores and retrieves vast amounts of data optically. By manipulating individual bits of information on a table-sized CD, visitors "write" a code, then see the giant mirrored disk spin past a laser that reads the code. A monitor displays the results. The CD-ROM player actually shoots a laser at pits and lands on the surface of the disk.

Creating these interactives was a challenge, since they had to work on spinning platters. The Museum worked with the New Curiosity Shop in California to develop the concepts for writing bits with magnets and laser light. Mystic Scenic Studios of Dedham, Mass., the exhibit's primary fabricator, developed the mechanics—a series of 96 bits that could be manipulated—while programmer Eban Gay created the software offering visitors feedback during the activity.

A magnified display inside the huge RAM modules lets visitors take "files" from a bin and "load" them into RAM. If visitors switch off the power, the files drop and the RAM "forgets" everything. Another display lets visitors discover how RAM stores information at the microscopic level by setting eight individual bits to form a single byte of information.

## COMMUNICATIONS

In an Ethernet board, a lighthearted 3-D animation tells the story of networks. Created by computer animator Ed Hill, the interactive program reveals how messages are sent to all the computers on a local area network, but are delivered only to those with proper addresses.

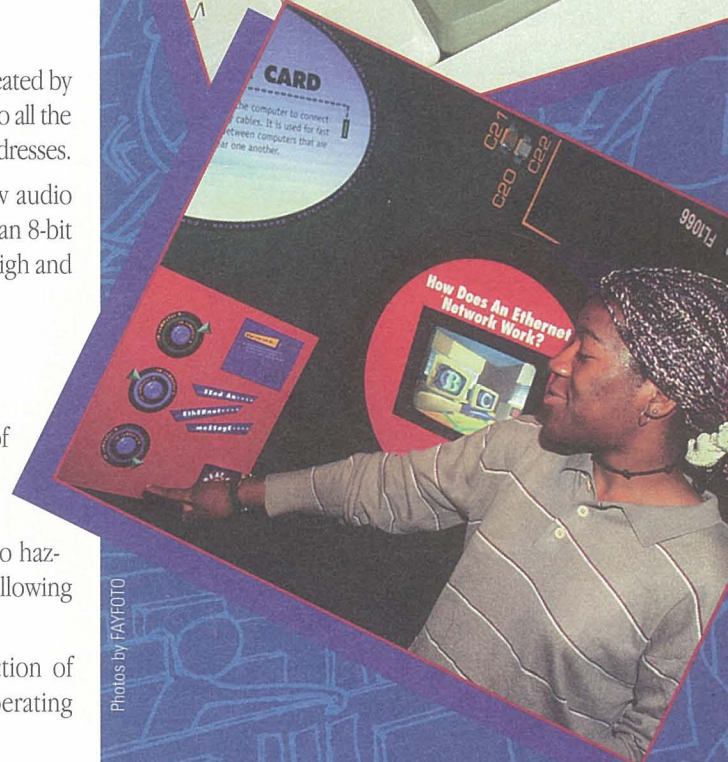
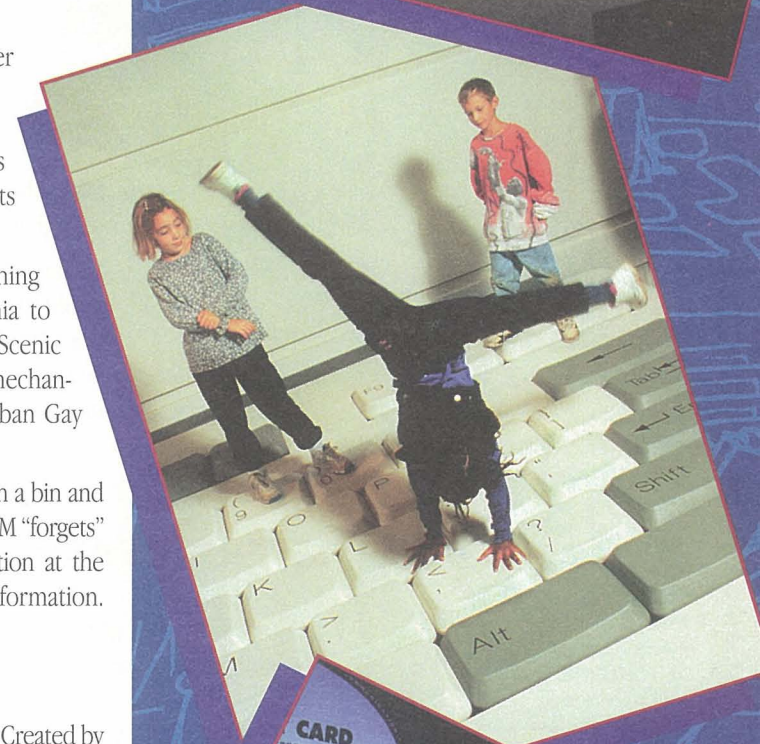
Behind and outside the PC chassis, the huge modem's interactive shows how audio tones are used to send and receive digital messages over phone lines. Setting an 8-bit ASCII code (one byte) using audio tones turns into a series of corresponding high and low tones as it is sent to a receiving unit to be read, decoded, and displayed.

## INPUT AND OUTPUT

A spruced-up, car-sized Kensington Turbo Mouse 4.0 controls the action of the cursor on the 108-square-foot NEC color monitor. Since the new ball sits on a cushion of air, not on ball bearings, it is much easier to manipulate.

In the first version of the *Walk-Through*, the keyboard's steep keys proved too hazardous for little feet. The new streamlined keyboard is ergonomically safe, allowing kids (of all ages) to climb on the keys to their hearts' content.

The new application being output to the big monitor is a realistic collection of work-and-play-related *faux* programs, games, and files that simulate the operating



Some members of *The Walk-Through 2000* exhibit team. From left: (back row) Don Greene, Jennifer Brackett, Owen Mysliwy, Dennis Shea, Josh Hooten; (front row) Patrick Liddy, Ann Fraioli, Sari Boren, and Christopher Grotke.

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## EXHIBIT ADVISORS & SPONSORS

The upgrade would not have been possible without the support of its sponsors.

### PRINCIPAL SPONSORS

- Cirrus Logic, Inc.
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- Avid Technology, Inc.
- Bose Corporation
- Digital Equipment Corporation

### EXHIBIT ADVISORS

The following individuals offered valuable insights throughout the planning and implementation of the upgrade:

- Daniel Dennett
- Clif Gerring
- Jan Liziak
- Christopher Morgan
- Mitchel Resnick
- Lee Sproull

environment of a typical multimedia computer. Programmer Dan Griscom and graphics designer Patrick Liddy worked with the Museum to create the interactive activities, which include e-mail, songs, movies, letters, and games—all relating to C.J., the computer's imaginary teen-age owner, and the upcoming visit of a pen pal.

## R.I.P. WALK-THROUGH 1.0

On Sunday evening, August 13, the giant computer's lights dimmed for the last time. In the following weeks, the old *Walk-Through's* insides were razed. As the opening date approached, Mystic Scenic Studios worked round the clock, as the Museum's carpentry and design shop prepared the exhibit space and completed a mammoth replica of a bubble-jet printer. At the crack of dawn and after dusk, the PC's huge components arrived

(in 10 truckloads) from Mystic Scenic. Six-man crews carefully unloaded the oversized parts in sections and placed them in the exhibit. Meanwhile, local muralists finished painting the huge books and other details on C.J.'s desk that accentuated the big computer's scale.

Finally, on Saturday, October 21, *The Walk-Through Computer 2000* opened to the public. Jim Blessing, 9, of Concord, Mass., was the first person to operate the upgrade. The last to use the old exhibit in August, Jim returned in the fall, eager to try out the new version. (He gave it a big thumbs up.) As of July 31, more than 100,000 visitors had explored the new PC.

## THE PRESS AND THE CELEBRITY PC

**N**ews of the original *Walk-Through Computer* traveled quickly around the world, generating media coverage in 63 countries, including spots on the *Today* show and *Sesame Street*.

Not to be outdone, the new *Walk-Through* has already prompted interest worldwide. The exhibit turned into a mini-United Nations last summer, as film crews from Japan's NHK-TV, the BBC, and Germany's ZDF-TV arrived to shoot the giant computer for educational programs—all within the same week! A long feature in the German news magazine *Stern* prompted *The Times* of London to fly a photographer across the Atlantic to capture the giant PC for a cover.

On the home front, Bill Nye, PBS's "Science Guy," was filmed using the keyboard as a giant teaching tool. *Weekly Reader* put the exhibit on its cover to help teachers excite young children about computers. *Washington Post* writer John Schwartz was inspired to reflect on the nature of obsolescence for *Wired*. For a page-one story on Sherry Turkle, *USA Today*

photographed the MIT psychologist-sociologist

on the giant keyboard. In April, *The Boston Globe* followed suit, assembling 11 owners of successful computer companies—all women—for a "power" pose on the keyboard that ran on the front page of the *Living/Arts* section.

The big PC has also proven popular with corporations and event planners. In May, Microsoft Chairman and CEO Bill Gates introduced his company's Internet Discovery Kiosk program nationally at the Museum, simulcasting images and sound to the *Walk-Through's* screen. And on a lighter note, the giant PC made a guest appearance as "Boston's Favorite Byte" in a Papa Gino's television commercial highlighting local attractions.

