THE COMPUTER MUSEUM

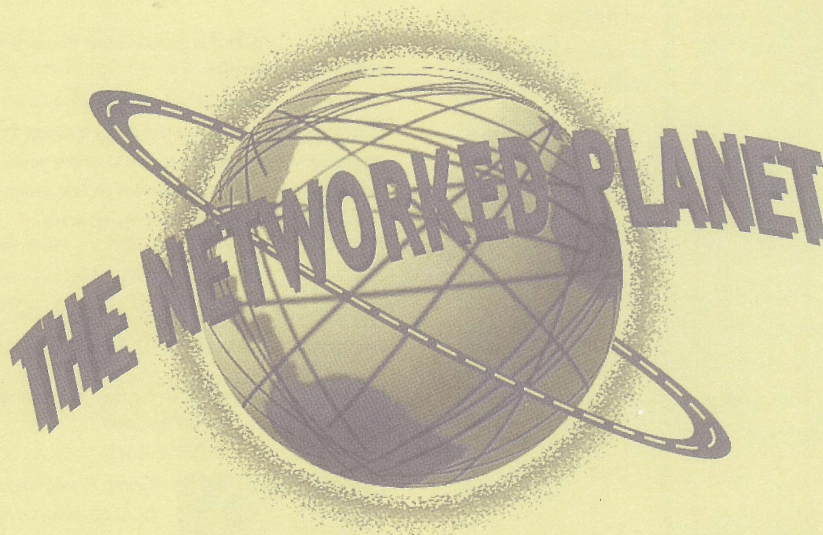THE NETWORKED PLANET OPENED NOVEMBER 1994

THE COMPUTER MUSEUM

Annual Report FY'95

THE NETWORKED PLANET

On November 12, 1994

— our tenth anniversary in downtown Boston — The Computer Museum opened *The Networked Planet,*™ a major 4000-square-foot exhibit on the applications, technology, history and impact of the growing computer network infrastructure that is increasingly becoming part of everyday life.

The exhibit shows how computers, and the networks that connect them, are almost as essential as electricity. Using a variety of hands-on, interactive experiences, visitors learn about all kinds of computer networks, from the telephone system to financial networks to the largest network of all, the Internet.

To achieve this, the Museum turned to leaders in the field of networking, bringing together a veritable "United Nations" of computer and networking technology: a high-speed T1 connection to the Internet provided by Sprint, over 30 Mac AV computers provided by Apple Computer, Novell's Netware 4 networking software to connect all the computers together, a Chipcom hub, routers from both Wellfleet and Cisco, high-end graphic workstations from Sun Microsystems and Hewlett-Packard, and a fault-tolerant Internet server from Stratus. Most of this cutting-edge technology resides in the Network Control Center, where visitors can see how networking technology works in real time and is juxtaposed to an additional piece of

hardware, no longer in operation: an original Interface Message Processor (IMP) that served to connect computers on ARPAnet, the precursor to the Internet.

The technology, of course, helped to put into action the many hours of planning, design and programming provided by staff and an army of dedicated volunteers. Our two advisory boards ensured that the content of the exhibit was correct and well-balanced. Experts from NYNEX, S.W.I.F.T. and the Harvard Community Health Plan helped collect and interpret the information that became part of the interactive exhibits.

The result is an exhibit with over 60 computers, high-speed access to the Internet, off-site representation in the form of a World Wide Web site, <http://www.tcm.org.>, and, based on summative evaluations, positive visitor response. Catching the wave of the public's fascination with the "Information Highway," *The Networked Planet* exhibit helped to break The Computer Museum's attendance record for FY '95.

A Trip along the Information Highway

The Networked Planet exhibit is designed as a trip along an information highway, with areas dedicated to applications and the impact of computer networks. But with an exhibition space of just under 4,000 square feet, the exhibit staff and advisors had to make tough decisions about which stops to feature along the highway.

Examples were chosen to illustrate the use of live feeds of information, social and technical issues, the global character of the network, local applications, and subjects that would be of interest to family visitors. Major off-ramps take visitors to a telephone network, a financial network, airline and weather networks, telemedicine, and the Internet. Minor excursions via video kiosks look at other applications, such as retailing, transportation, telecommuting, employee monitoring, and computerized fingerprinting.

To provide perspective, an historical timeline lets visitors zoom from the era when the first telegraph message announced, *"What has God wrought?"* in 1844 to maps showing the evolution of the ARPAnet into the Internet in the 1980s.

The Visit

After a brief introductory film, visitors are issued key cards, which they use to join the exhibit's local area network. Visitors log on with their name, sex, age, and zip code, and are asked to choose whether they want to keep their information private or public. If they select the "public" setting, the system allows for a "Who's out there?" option, by which they can "spy" — that is, see the location of everyone in the exhibit who is logged on. If they choose "private," no one has access to their information, but they also have no access to other visitors' information.

When visitors log on, they also get to pick one of four "Network Guides," electronic tour guides who provide commentary on the exhibit. The guides, chosen to represent diverse perspectives, tell stories that illuminate technical and social questions. Each gives clues to his or her unique perspective and background so that a visitor can make a choice of the approach of his guide, as well as the option to have subtitles in Spanish. A capsule view of each guide follows.

ERICA, a wife and mother who runs her own business consulting firm from home:

"Computer networks let me run my business from my house, which is great because I'm here when my kids come home from school. But it's not always easy keeping my family life and business separate."

**JESSIE, a teenager who by day is a computer programmer, by night a creator of computer games:**

"Come fly with me through the computer networks. You can't make reservations, you don't need a passport, and there are no boundaries."

BEATRICE, a book editor in her fifties:

"At the publishing house where I'm an editor, we use computer networks throughout the publishing process. Computer networks have changed the way we make books, but I can't say they've made the books themselves any better."
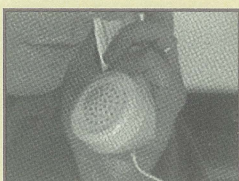
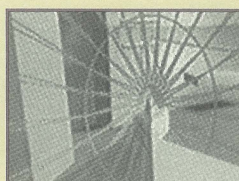**MAX, a social worker working with the homeless:**
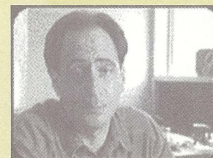
"A lot of people don't have access to technology. What I do is I use the technology — like computer networks — to help these people out, get them more connected."

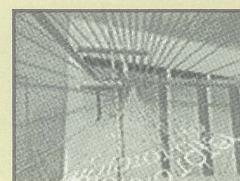## A Computer-Animated Ride Down a Phone Line
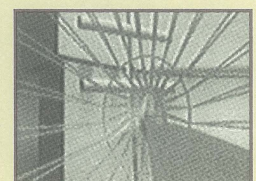
Analog lines leave an out-going call.

Lines switch at a switching station.

Digital lines are used for the long haul.

Lines switch again.

Analog lines go to a final destination.

Animations by Ed Hill

The Telephone Network

From the time of the Carterfone decision in 1968, when the FCC said that digital bits could be sent over phone lines, telephone lines have been used for digital network connections. But most people have no idea what happens after the wire leaves the wall. The exhibit fills this gap of knowledge by providing a computer animation, created by animator Ed Hill, that slows down the action and illustrates the various transformations that occur in any phone call.

While the exhibit reveals the almost miraculous technology of a telephone network, the commentary of the guides brings out some of the social issues. Max, for example, queries the visitor: "What about people without phones? The homeless people I work with don't have a number where a social service agency, a potential employer, or landlord can reach them. In this society, if you can't be reached by phone, you are invisible."

International Financing and Banks

The exhibit needed to show that while the old saying, "money makes the world go 'round,'" may be true, computer networks are what make money go around the world. No longer does someone need to be on the floor of the stock exchange to see the latest transaction. A variety of services brings these transactions right to the desktops of people around the world. Our live ILX feed, provided by Thomson Financial Services, allows visitors to view stock exchange transactions as they happen. Visitors can stand and watch as a stock symbol changes from green (while it is going up) to red on a down-turn, and they can also track the monthly progress of any stock they choose.

To enforce the extremely fast pace of making financial transactions, a simulated situation was created where each visitor gets a million "cyber-bucks" to invest in four constantly changing global markets, with visitors competing against each other to see who can make the most profitable investments. The closing times of foreign markets emphasize the global quality of the financial networks, as do other simulated purchasing opportunities, from African kenta cloth to New Zealand kiwi fruit.

Since the 1970s when Marshall McLuhan said that "cash is a poor man's credit card," money has become an increasing abstraction. Network Guide Erica expresses a common kind of problem: "The other day when I was out shopping with my son, he asked me to buy him an overpriced stuffed animal. I told him it cost too much. He said, 'Momma, just get some money out of the machine.' He thinks cash machines give you money any time you want it. It's hard teaching my son about the value of money when he thinks you can get all the money you want, anytime you want, out of a machine."

Probing the Privacy Issue

When Congressman Ed Markey visited *The Networked Planet* and was faced with the choice of keeping his information private or public, he aptly noted that in the real world you have no choice about who has access to your information. The exhibit tries not merely to present the technology involved in global networks, but also to increase visitors' awareness about attendant social implications. Here, for example, two Network Guides discuss both sides of the privacy issue:

Jessie

"On the networked planet there's a lot of information about you, spread out over many different networks. Where you shop, what you buy, your birth date, your shoe size, and even how many parking tickets you haven't paid. I never give anyone my social security number. There's a lot of information tied to that number — your driving record, school and medical records. People who get your social security number and understand networks can find out almost anything they want to know about you."
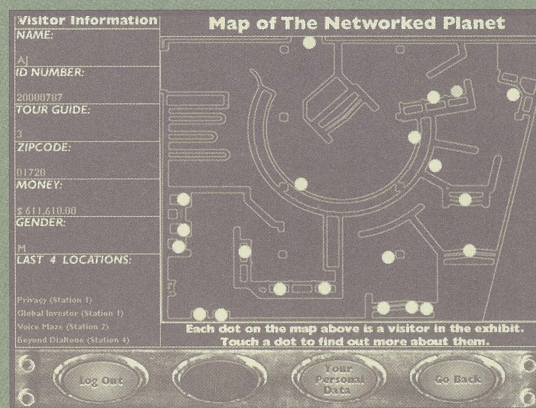

This screen image shows the location of the visitors logged on at various stations in *The Networked Planet* exhibit.

Beatrice

"I know a lot of people think computer networks intrude on their privacy — that too many people know too much about them. But sometimes I want to share information about myself. When I applied for a mortgage to buy a house, it was approved partly because my credit rating is very good. The bank knew that I am a low risk. Now, I don't know those people at the bank, and they don't know me. Without a credit report how could they have known I'm someone they can safely lend money to?"

Young visitors to the exhibit discover how the FAA uses computer networks to manage air traffic.
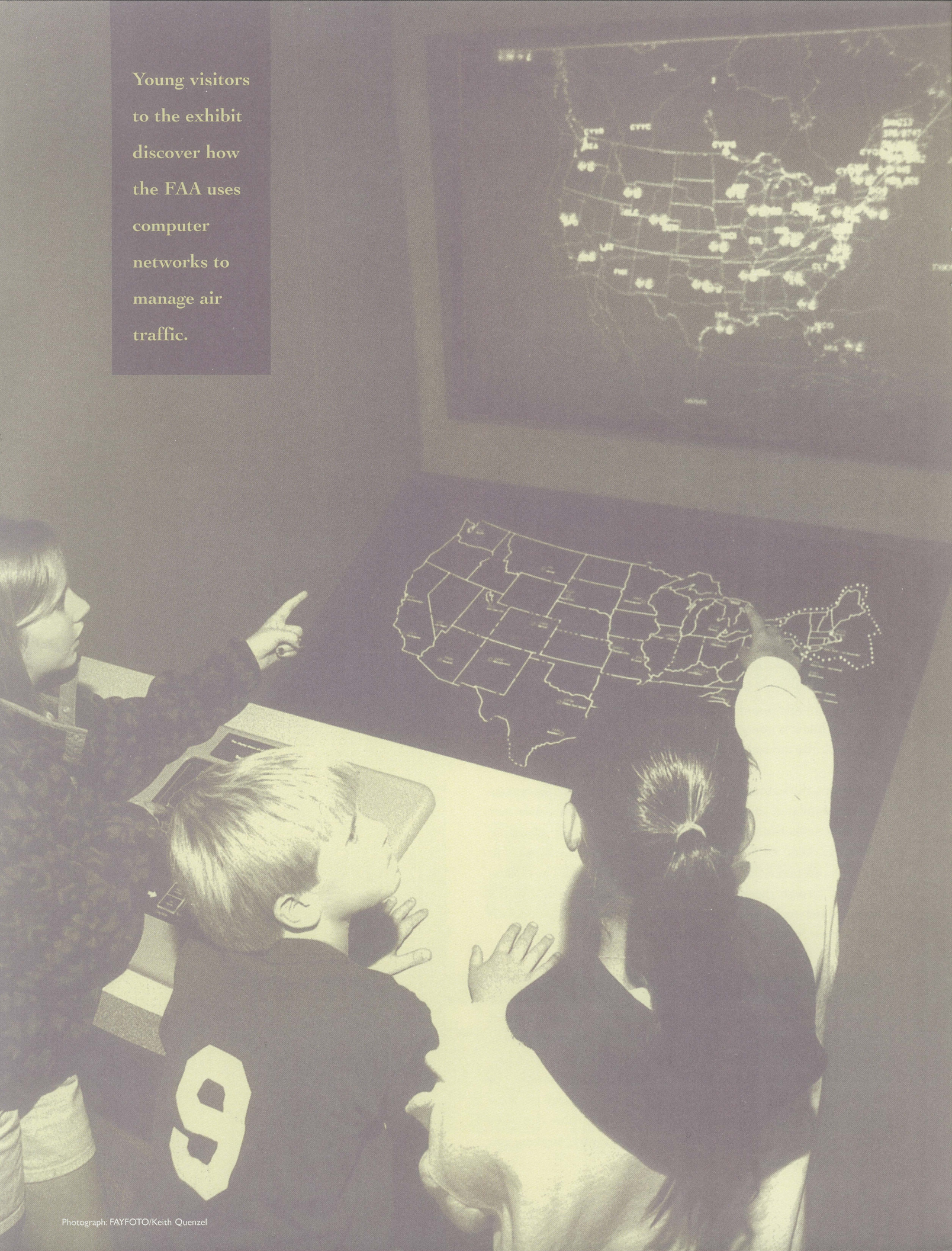
Air Traffic Control

A direct link to the Air Traffic Control program used by the FAA provides a highly dramatic view of all the commercial planes in the air in the United States at any given minute. The networks let the air traffic controllers see the big picture by collecting information from multiple locations and sending it to one central source.

The system was designed to allow regional air traffic control managers to monitor the flow of aircraft across the country. It helps them to anticipate potential delays before they happen and to orchestrate a more manageable traffic flow for air traffic controllers.

Here's how it works:

1 Flight location information is collected. Twenty air traffic control centers across the United States track air traffic in their area using radar. Every three minutes, each center sends its latest radar information by phone or satellite to the John A. Volpe Transportation Center in Cambridge, Mass.

2 Flight location information is processed. Computers at the Volpe Center collect the air traffic control centers' radar information and organize it into a "big picture" of all the airplanes' locations.

3 A "big picture" of airplanes' locations is sent to over 50 centers. The data of all the airplanes' locations is sent via a network to computers in over 50 FAA installations (and *The Networked Planet* exhibit). This includes the 20 air traffic control centers and major airports, where flight control managers use the information to manage air traffic controllers. Standing at the exhibit, a visitor can see the locations of all the planes in the air change every three minutes and can select any city and get a close-up of their incoming flights.

The Internet Sampler
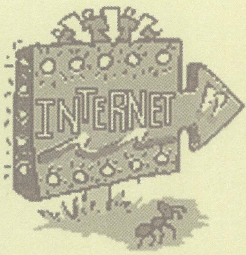
The idea of the Internet can be difficult to understand without experiencing it firsthand. For many visitors, the exhibit's Internet Samplers provide their first ride on this most publicly hyped segment of the "Information Highway." The Samplers offer an easy on-ramp to the Internet, either by using Gopher or via the World Wide Web. Visitors can choose Internet sites to visit from the "hot lists" compiled by Museum staff and arranged in subject categories, or enter their own favorite Uniform Resource Locator (URL), or search the Net for their own interests using search engines and Net indexes.

This highlight of *The Networked Planet* exhibit is enhanced by the incredibly fast T1 connection service provided by the exhibit's principal sponsor, Sprint. The T1 line allows visitors to view graphic images and download audio and video clips relatively quickly. Here visitors can see for themselves the global nature of the Internet as they "surf" Web sites that include an online art museum in France, Sarajevo Alive On Line, a listing of events for Jerusalem's 3000th anniversary, the Australian Triathlon page, and the site of the African National Congress.

The Sampler's Main Menu also offers information on how the Internet works, the history and culture of the Internet, and how to join the Internet.
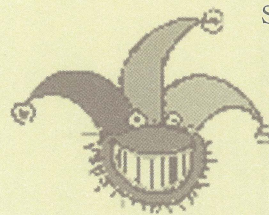
Since July, visitors have learned more about the Internet from hands-on demonstrations that are included with the price of admission. These are the first of many programs planned for *The Networked Planet*, as the Museum continues to educate the community about the Internet and other cutting-edge applications of network technology. Future programs include more advanced fee-based Internet training classes designed for the general public, for businesses, and for educators, and a video-conferencing system that will send The Computer Museum to remote sites and bring remote programs to the Museum.

The most far-reaching network project is The Online Computer Museum, which will be launched in March 1996. More than just an online version of The Computer Museum, this Web site will offer a unique online destination with online exhibits, forums, and research opportunities. Visitors can preview our ideas for The Online Computer Museum and read learn about our existing exhibits and facilities at our Web site, located at: <http://www.tcm.org/>.

THE NETWORKED PLANET

7/94-6/95

Principal Sponsor

Sprint

Major Underwriters

National Science Foundation
National Endowment
  for the Humanities

Major Sponsors

Apple Computer
Hewlett-Packard Company
Novell
NYNEX Corporation
Stratus Computer
S.W.I.F.T.

Supporting Sponsors

Banyan Systems
Chipcom Corporation
Cisco Systems
Fannie Cox Foundation
Harvard Community Health
  Plan Foundation
Morgridge Family Foundation
Pisces Productions
Paul and Kathleen Severino
Sun Microsystems
Thomson Financial Services
Wellfleet Communications

Contributors of Equipment and Services

Adaptec
Addison Wesley Publishing Company
America Online
Apple Computer
Asanté Technologies
Bear Rock Technologies Corporation
Burle Industries
Cabletron Systems
Chipcom Corporation
Cisco Systems
CompuServe
Debco Office Safety
  Products, Retrofitting Products
Digital Equipment Corporation
Double Diamond Interactive
Harvard Community Health
  Plan Foundation
Herman Miller
Hewlett-Packard Company
ILX Systems
KAO Infosystems Company
The LAN Support Group
Lotus Development Corporation
Macromedia
Microcom
NEC Technologies
Network General
Novell
NYNEX Corporation
Office Pavilion
The Open Software Foundation
Pisces Production
Quantum Corporation

S.H. Pierce & Company
Shiva Corporation
Sprint
Stratus Computer
Sun Microsystems
Thomson Financial Services
Unisys Corporation
Video Express
The Virtual Hospital
WBZ-TV
Wellfleet Communications
X10, USA

Video Contributors

American Airlines Television
Amtech Corporation
AT/Comm
Cable News Network
Chronicle, WCVB-TV
Chiat/Day
e-Shop
FedEx
The Food Marketing Institute
Instromedix
Main Street
M.I.T. Media Lab
The National Geographic Society
The National Library of Medicine
NBC News
Novell
Pacific Bell
Peapod
Stock Video
Stop & Shop
The Texas Telemedicine Project
Universal Pictures
Wall Street Journal Television

National Endowment for the Humanities Advisory Committee

Robert Baum,
  University of Florida, Gainesville
Paul Edwards, Stanford University
Diane Forsythe, Stanford University
Thomas Hughes, University
  of Pennsylvania
Robert Kling, University of
  California, Irvine
John Ladd, Brown University
Lee Sproull, Boston University

The Computer Museum Board Advisory Committee

Edward Belove
Gardner Hendrie
David Mahoney
James McKenney
David Nelson
Howard Salwen
Paul Severino

Marketing and Public Relations Committee

Steve Coit
DRK
Clif Gerring
Joseph Grillo
Pat Kreger, WBZ-TV
The Weber Group

EXHIBIT & GENERAL SUPPORT

7/94-6/95

$100,000 and above

Cirrus Logic
Intel Corporation

$50,000 and above

3Com Corporation
Adaptec
Gordon and Gwen Bell
Hayes Microcomputer Products
Massachusetts Cultural Council
Philips Electronics
Phoenix Technologies
Quantum Corporation
Texas Instruments

$25,000 and above

American Power Conversion

IN-KIND GIFTS

Aetna Life and Casualty
American Airlines
American Power Conversion
Avid Technology
Claris Corporation
DRK
Microsoft Corporation
NEC Corporation
Silicon Graphics

$10,000 and above

AT&T Foundation
The Bodman Foundation
Compaq Computer Foundation
Kensington Microware
James and Mary McKenney

$5,000 and above

American Association
  for Artificial Intelligence
New York Hall of Science

$1,000 and above

Boston Globe Foundation
Chroma Copy
Coopers & Lybrand
Allan and Nadine Wallack

Photograph: FAYFOTO

Scott Ford of Novell, Inc., explains how *The Networked Planet*'s own network enables the Network Guides to track visitors.

THE COMPUTER CLUBHOUSE

Supporters

Anonymous (3)
Boston Globe Foundation
Cabot Corporation Foundation
Fleet Bank of Massachusetts
Intel Foundation
Arthur D. Little Foundation
Massachusetts Cultural Council
Millipore Foundation
Oracle Education Foundation
State Street Foundation
Toshiba America Foundation

In-Kind Contributors

Adobe Systems
Advanced Gravis
Apple Computers
Broderbund
Davidson & Associates
ION
KOA
LEGO Systems
Macsyma
MAXIS
Microsoft Corporation

T

o educate and inspire people of all ages and backgrounds from around the world through dynamic exhibitions and programs on the technology, application, and impact of computers

To preserve and celebrate the history and promote the understanding of computers worldwide

To be an international resource for research into the history of computing

MUSEUM HOURS

Winter: Tuesday-Sunday, 10am-5pm
Summer: daily, 10am-6pm

ADMISSIONS

$7.00 adults; $5.00 students, children five and up, seniors.
Free for Museum Members and children four and under.
Half price Sundays 3-5pm. Group rates by arrangement.

THE NETWORKED PLANET

THE COMPUTER MUSEUM

300 Congress Street · Boston, Massachusetts 02210 · 617 426 2800 · Fax: 617 426 2943 · World Wide Web: <http://www.tcm.org/>