The Walk-Through Computer™ CDROM

Request for Proposals

The Computer Museum
Boston, MA 02210

December 18, 1995

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The Computer Museum
Boston, Massachusetts
12/18/95

DRAFT ver 3.1

Request for Proposal

Re: The Walk-Through Computer™ CD-ROM

Request

The Computer Museum requests proposals for the production of The Computer Museum's "Walk-Through Computer™ CD-ROM". The concept for this project is based on the Museum's cornerstone exhibit, The Walk-Through Computer™. The CDROM will contain links to the upcoming on-line project, The Computer Museum Network™, and thus allow online users to take advantage of the rich materials contained on the CDROM as well as the opportunity for interactivity and communication allowed by the Museum's Website.

Our plan is to release a Gold CDROM version of the environment by the first quarter in 1997, with an ongoing beta "sampler" (a small portion of the product) available on-line beginning in the second quarter of 1996.

Proposals should include detail of the following:

- a description of the creative approach you would take in developing the CD-ROM, based on the descriptions in this RFP;

- an example of the look and feel of your approach;

- an example of the type of activity you would develop, (while we have been specific about the content and activities, we welcome new thoughts about both, as well as the way the CD-ROM is organized);

- an outline of the software development tools you would use;

- a production process and timeline, including the process you envision for interfacing with staff at The Computer Museum who developed the actual Walk-Through Computer exhibit.

- specification of a production team (with resumes and work samples) and available resources;

- a detailed production budget.

Please give us your commitment to submit a proposal or schedule a in-person presentation by December 22, 1995. Complete proposals are due by the first week in January, 1996.

Overview

In collaboration with Microsoft, The Computer Museum will develop an activity-filled, exploratory environment based on the Museum's cornerstone exhibit, The Walk-Through Computer™ . The educational approach of the CD-ROM will be based on the informal learning method found within the Museum where users learn what a computer is and how it works by engaging in active explorations that reveal the basic principles of computing, rather than being told *about* the principles.

In addition, just as a large part of the museum experience is the socialization among groups of visitors, the CD will have the option to give users, with a connection to the Internet, the opportunity to share and explore portions of the CD with other remote users.

The project will have four basic areas:

1. A central, 3-D Walk-Through Computer™ space – a navigable model of a personal computer with all the major components – which users can explore at their own will.

- Each component has one or more activity that, through solving a problem, explains what the component is, how it works, and how it works with other components.
- For about 60% of the components, there is a next step into a laboratory where they participate in more detailed activities that builds on the skills developed in the initial activities.
- For a more structured experience there are tours that lead the user through the model.
- If linked to the Internet, users can pick a computer-related avatar to represent themselves (a chip, a CD-ROM) and "meet" other users and ask questions/share ideas about the different components.

2. A series of "applications" run from the 3-D monitor that give uses access to computer-related topics, such as an introduction to basic software (word processing, games), a computer glossary, and activities such as "what is in MY computer?" where users can find out the specifics of the computer system they are using.

3. Five hands-on *labs* where users can explore the ideas behind chips, storage, add-in cards and communication technology in more detail. Here a user will be able to manipulate components and adjust their performance, size and look. Users can then save these newly-created components for placement with other components in the fifth lab, the Computer Assembly lab, where users get to build their own computer.

4. A *Trading Post* where users will be able to share the components they have built with other remote users. This space will also act as a meeting place for users looking for more detailed information about computers; they will be able to chat with other remote users, and access links to other computer-learning sites on the Internet.

Overall, the product is designed for users who knows little-to-nothing about how a computer works. This includes a range of user profiles, from computer novices to those who have had a computer for years but have never learned the fundamentals of its inner workings. The target age groups are 10 -16 year olds and the over 35 year olds.

Project Goals

The goal of the Walk-Through Computer™ CD-ROM is to give each user a better sense about how their computer works and expand the range of what they think they can do with it.

Specifically, The Walk-Through Computer™ CD-ROM will provide:

- an understanding of the basic anatomy of a desktop computer and what each component does,

- an understanding of how each component works, how components work together, and how operating systems and application software works with the hardware,

- a social perspective on human-computer interaction,

Equally important to the three content objectives listed above is a fourth design objective:

- a fun, enjoyable experience that is designed for longevity, looks, and learning

Detailed Project Description

The Walk-Through Computer™ CD-ROM will have four major areas. The first two, the 3-D model of a personal computer, and a series of "applications" run from the 3-D monitor, are designed for first-time users of the project, providing them with activities that illustrate the basic principles of computing. The other two areas, the component-building labs and the trading post, are designed for more detailed learning and provide steps for further exploration beyond the scope of the CD.

There are two areas where users can interact with other remote users via an Internet connection: in the 3-D model of the computer, and at the trading post.

For a diagrammatic overview of this project, see appendix A.

Area 1. The Walk-Through Computer™ 3-D Model

The Walk-Through Computer CD-ROM begins by placing users into a 3-D model of The Computer Museum's Walk-Through Computer. They are told there is a problem with the computer – it seems that all the components are not working. It is their job to get the computer running again by engaging in activities they will find at each component. The activities will let them know how each component works, and with this knowledge, they'll be able to fix them.

The 3-D model will allow users to navigate through the computer at their own will. As they come across a component, they are offered a range of things to do, from reading text that describes the component's basic function, to activities that illustrates how the component works, to a tour that links the component's function to other components. All are designed around the goal of getting the component working again.

It is worth the user's effort to get the computer running again: there are a range of applications just waiting to be played on the 3-D monitor, including games...

Users with Internet access will also be able to "meet" other remote visitors in the 3-D model by picking a computer-related avatar (a chip, a capacitor) to represent themselves. They will be able to communicate with other users by clicking on their avatar and typing messages to them. The goal is to encourage users to work together to solve the problem of fixing each component.

There are two different levels of components, each with different types of interactions. For the more simple components (trackball, keyboard, UPS, others), activities will center on how the device works by giving visitors cross-sections into the device with animation that illustrate their functions. Visitors can manipulate the functions and, discovering where something is not working correctly (for example, a broken lead on a keyboard), can fix it using a virtual tool (a solder iron). These "simple" components and their activities are as follows:

Trackball: Users get a cross-section of how a trackball works and, by moving the large ball, see how it sends signals – via black and white strips on the rotating wheels that support the ball – to encoders. The activity centers on one of the wheels having lost its black and white strips. Users need to repaint the wheel using the right sequence of black and white lines.

Motherboard: Here users learn about the different layers of connections that make up a motherboard by taking a trip around the busses. The activity centers on finding places where the busses have lost their connection and can be fixed using a virtual soldering tool.

Power Supply: Users encounter a cross-section of this component showing how it converts the power from an outside source to a level acceptable for the computer. The activity will center on adjusting the signal so that it is correctly tuned for the computer.

Uninterruptable Power Supply: Here users find that the plug to the socket has been unplugged for over a day, and that the universal power supply has run out of juice. They need to plug in the plug to get a cross-section of the UPS and see the battery slowly filling up. Once the battery has enough juice, they can experiment with the UPS functions by unplugging the plug from its socket.

Cables and Ports: Users find a dissection of a cable and see that it is made up of a number of wires. One is broken apart, and needs to be fixed with the virtual soldering tool.

Keyboard: Users type a key but find it is displaying the wrong letter on the monitor. They get a cross-section of the keyboard and find that due to a broken lead, keys are being mapped incorrectly. Using the soldering iron, they fix the keyboard and it types correctly. The keyboard also has a tour option that users can access called "Journey of a Keypress." This tour leads users through the steps of what happens when a keyboard key is pressed. They follow the keypress through the keyboard, to the ROM, and ultimately to the screen where the key they pressed is displayed.

A second group of more complex components provide for more detailed explorations. Here visitors will become involved in activities that illustrate the workings of the component, while also touching on basic principles of computing, such as binary code and the difference between optical and magnetic storage. These components also have links to one of five labs where users will get to build their own components.

Chips:
ROM: Getting Things Started
An ordering activity where users have to place the steps the ROM takes to boot up the computer in the right order.

RAM: Storing a Character using ASCII
An interactive tool that offers 8 bits to store a byte of information in RAM. Users can "edit" a word processing document character by character by changing the 8-bit ASCII code stored at each address.

CPU: How all the components work together
A simulation of the operation of the CPU as it fetches, decodes, and executes instructions from a software program. Users fetch lines of code from a software program, decode them into the language a computer understands, and execute those instructions, seeing their effect.

Storage:
CD-ROM: Optical Storage Activity

An interactive tool to discover pits, lands, and storing information with light. Users set pits and lands to form an 8-bit ASCII code which is read back using a laser light.

Hard Disk & Floppy Disk: Magnetic Storage Activity
An interactive tool for exploration of storage of information using magnetism. Users change polarity of magnetic particles on the disk to read and write an 8-bit ASCII code.

Add-in Boards:
SCSI card: Parallel to Serial Conversion
This activity takes users inside a chip to see parallel information be converted to serial information. They learn the advantages and disadvantages of each method of information travel.

Audio card: Analog vs. Digital sound
An interactive tool that shows analog to digital conversion of users voice. Users pick from a sample of sounds or record a sample of their own voice (if they have a mike), see it graphically as an analog waveform, then convert it to a series of digits. Once digitized, the sample can be altered and users can see how the digits have changed.

Video card: RGB Pixel Activity
An interactive tool for users to explore how computer images are made using R, G, and B pixels of different sizes. Users experiment with the R, G, and B channels that make up a computer image on a monitor, seeing how the image changes when information is added or subtracted. Users can also alter the image using fun digital video effects.

Communication:
Ethernet card: How Networks Work
A network simulation that allows the user to send and receive Ethernet network messages. Users watch as their messages are sent to other computers and can see clearly how computers know which messages to accept or reject.

Modem: Sending ASCII remotely
An interactive tool for exploration of modulation and demodulation that demonstrates how computers use audio tones to send binary information. Users set an 8-bit ASCII code, choose a rate of transmission, and hear as their code is sent to another computer with a modem as a series of audio tones.

A final note on the 3-D computer: We would like all components to have exterior and interior views, and realistic in detail. Substantial sub-components (e.g. significant chips on boards) will also have interior views.

Area 2. "Applications" viewed from the 3-D Monitor

Once visitors get the computer running by completing all the activities that are part of the computer's main components, they can boot up and run the computer to view different applications on the 3-D monitor. These applications consist of more activities, games, samples of PC software, and a glossary of computer terms. They are as follows:

Tours:

1. What's In My Computer?
This interactive tool runs a system check on the user's computer and provides easy-to-understand information about what is connected and how it is configured. This is a "get-to-know-your-own-computer" activity.

2. What Happens When I Turn On the Computer? (ROM BIOS)
An interactive tool that follows the power-up sequence that the computer goes through. This may include reading the ROM BIOS, looking for the boot up disk, and registering the additional components.

3. Journey of a Keyboard Press
An interactive tool to explore what happens when a key is pressed. Users follow the keypress through the keyboard, to the ROM, and ultimately to the screen where the key they pressed is displayed.

Games and Reference:

Where's (the Computer) Chip?
This game is similar to the popular "Where's Waldo?" series. Users will be given images of "everyday" scenes and will be asked to find all of the computers in the picture. Images include rooms in a house, an office, a classroom, a store, a restaurant, and other familiar places. Computer chips in appliances, jewelry, notepads, cars, etc. will be featured in an effort to show the far-reaching effects of computers in our lives.

Computer People
This section provides a place to learn about the people who make computers work. This is basic guide to computer careers, including Chip designers, chip manufacturers, component designers and manufacturers, computer users, computer teachers, tech people, sales people, software designers, hardware engineers, interactive designers, non-linear writers, multimedia specialists, and more.

This activity is structured like a game: users must put people in their proper roles to get a computer designed, built, marketed, sold, installed, and used. Care will be taken to show a diverse range of people in these positions.

Software
This section demonstrates the importance of software to the operation of a computer. Explanations are provided of the roles that are played by the operating systems, applications, utilities, BIOS, freeware/shareware, applets, etc. Users can try run simulated software on the computer model.

Compare and Contrast Mac and PC
The definitive guide to the similarities and differences in Mac's and PC's design. This area will address the different design approaches (history) of desktop computers by highlighting the key differences in a Mac and a PC. Users can find out how each evolved the way it has, and will be able to graphically compare and contrast the two designs. This is designed to be "evergreen", stressing the basic, underlying design differences rather than the latest features and advancements.

Glossary and Reference
A glossary and other reference materials (digital movies, bibliography, etc.) will be provided for the most common computer term and questions. Information about choosing a new computer, ("Where do I begin?"), or just upgrading, ("Do I really need 32 MB RAM?"), is provided so users can make informed decisions.

Basic Principle Activities: These are interactive, hands-on activities that teach basic principles of computing.

Binary Counter
An interactive tool for counting in binary, with lots of easy-to-understand examples. Users get an audiovisual representation of base 10 counting (1, 2, 3) to compare and contrast with binary counting (1, 10, 11) They can use this tool to count to 999.

Bits and Bytes Activity
An interactive tool that demonstrates the importance of the bit and byte by using lots of real world examples. Users will learn that the bit is the smallest unit of information that a computer recognizes, that combining 8 bits creates a byte of information, and that many bytes can be strung together to make words, pictures, programs, etc.

Memory Sizes Activity
An activity to teach the relative sizes of a bit, byte, K, MB, GB, TB with interactive examples of each. Users learn how much memory is needed to store a character, a letter, a book, a song, and a movie.

Area 3 "Laboratories" for Component Building

As described earlier, about 60% of the components also offer users the option of jumping into one of five labs where they can explore the function of the component in more detail by building their own version of the component. There are four component-building labs – storage, communications, add-in boards, and chips – that all link to the Computer Assembly lab where users can bring their components together to build their own computer.

The Chip Lab
An interactive area that lets users design and build a variety of chips and test them. Included is a circuit building activity where users can build simple circuits and test them.

The Storage Lab
Here visitors can build different storage devices, drawing on the lessons they have learned about optical and magnetic storage.

The Add-In board Lab
An interactive area that lets users design and build custom add-in boards, such as audio and video boards, and test them. This is an exercise in identifying a need, and then providing a solution.

The Communication Lab
This area allows users to design different devices for communicating with other computers. This is an opportunity for exploring networking in more details, as well as learning about the different characteristics of modems (baud rates, etc.).

The Computer Assembly Lab
The lab that all other labs connect to, this lab lets users import the components they have built in other labs so that they can build a custom computer and test it. This is a lesson in how the components work together. The Computer Assembly Lab is also connected to an on-line area, the Trading Post, where users can share their custom computers with other remote users.

Area 4. The Trading Post

The Trading Post is an on-line gathering point where users can explore their interest in computers in greater detail and meet people with similar interests. It is accessible at any point through a menu item. There is also a natural connection made at the Computer Assembly Lab, since users can take their custom components and offer them to other users at the Trading Post.

This area serves a number of functions:
1) an area where users can access other user-built components to import into their custom computers
2) an area where users can "post" the components they have built
3) an area where users can research computers in more detail by accessing links on the Internet and FAQ's related to computers.
4) a chat area where users can talk in more detail about computers with other users. Like in the 3-D computer, users can be physically represented with avatars.

Other Related Issues

Operating Modes: We anticipate the product will be used a number of different modes, depending on the venue in which it is presented. The product should contain provisions for operation within the following different modes:

Open Exploration- This is the mode used by the majority of users and follows the pattern of use as described above, with navigation through a 3-D space and provisions for guided tours.

On-line Connected- A mode for multi-user interactions and explorations when the user connects with other remote users via the Internet (using The Computer Museum Network as the connecting site). This mode also allows for pieces of the CD-ROM will be updated.

Media Show- A mode that is designed for students writing reports or presentations, it allows the user to gather and assemble information into a presentation. Users can mark pages and create tours for project presentations. This is useful for school environments.

Self-running "Store" kiosk mode that can only be quit out of with a password, and returns to a starting position after 90 seconds of no activity.

Suggested Minimum Systems Configurations

For Windows:

- A Multimedia PC or compatible with a 486SX or higher microprocessor, 25MHz (33 MHz recommended), at least 5MB of available hard-disk space, double speed CDROM drive, 8-bit audio board (16-bit suggested), and SVGA display capable of 256 colors.
- MS-DOS operating system version 5.0 o later.
- Microsoft Windows™ operating system version 3.1 or Win95.

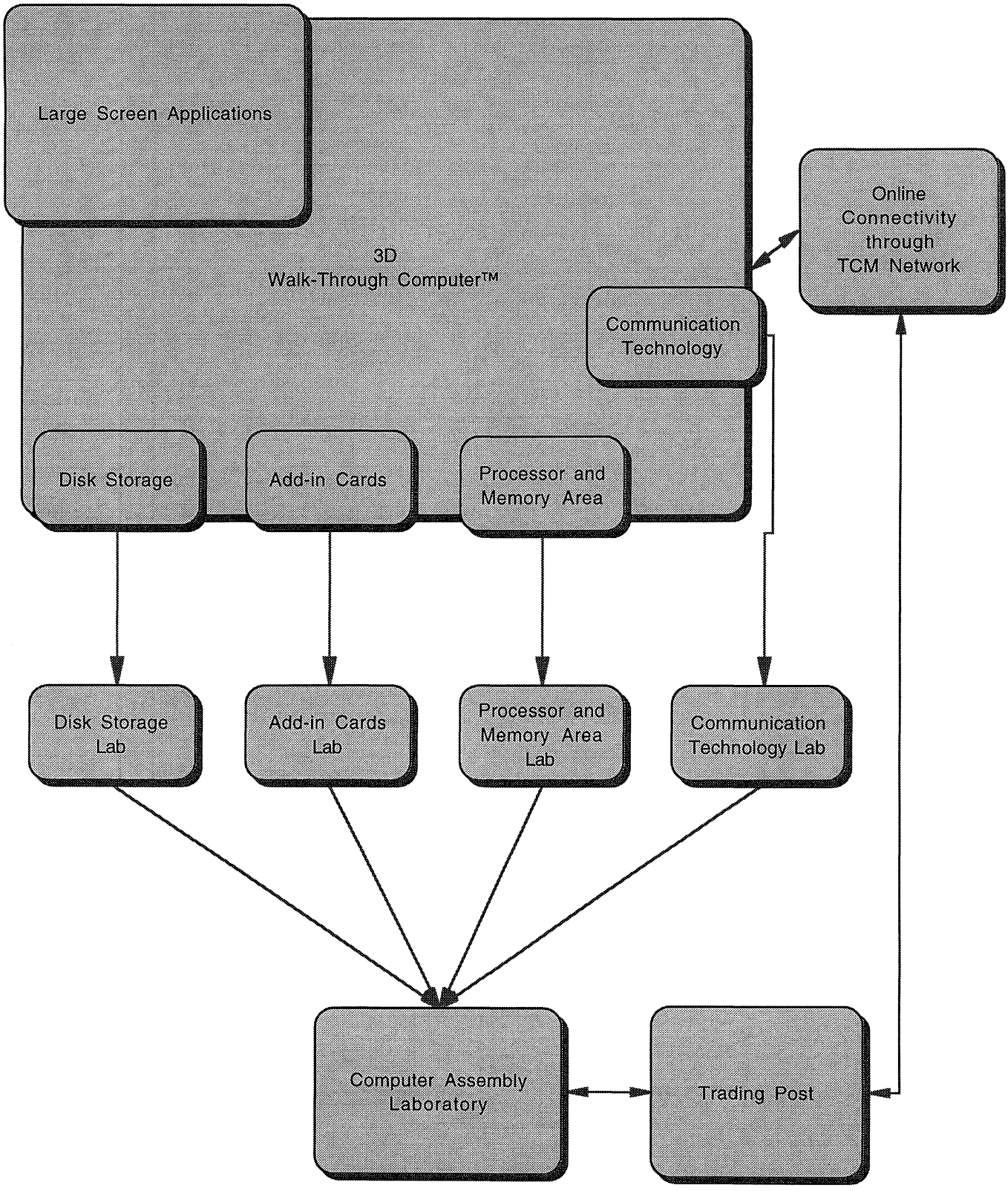
For Macintosh

- Any Apple Macintosh® using System 7™ or later, an 030 or PowerPC chip, a 13- inch or larger color monitor displaying 8-bit color or better, a double speed CDROM drive, headphones or speakers.
- Quicktime™ 1.5 or later.

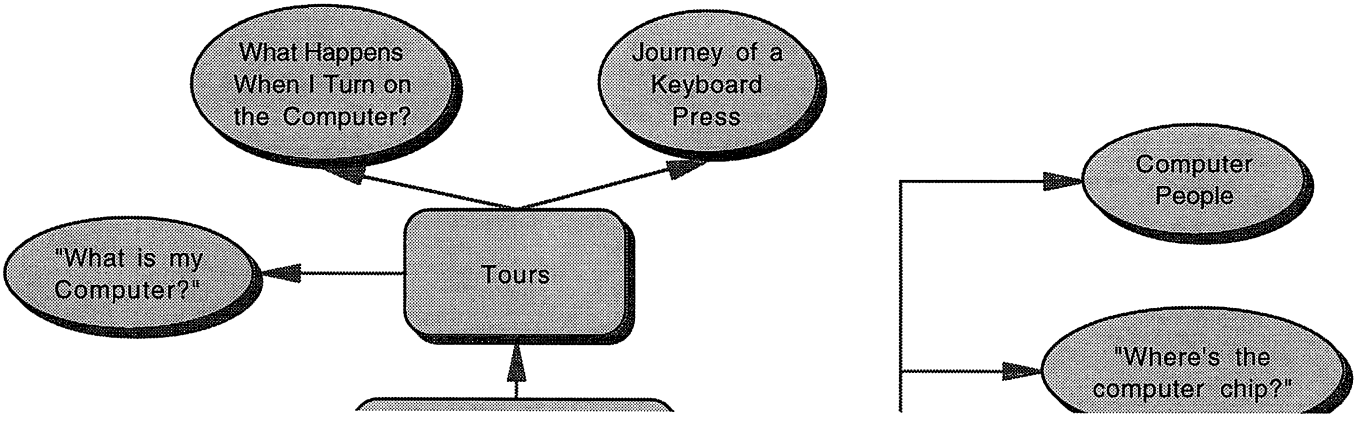
On-line Connectivity for all systems

- A 14.4 MBS or faster modem with a TCP/IP Internet connection.

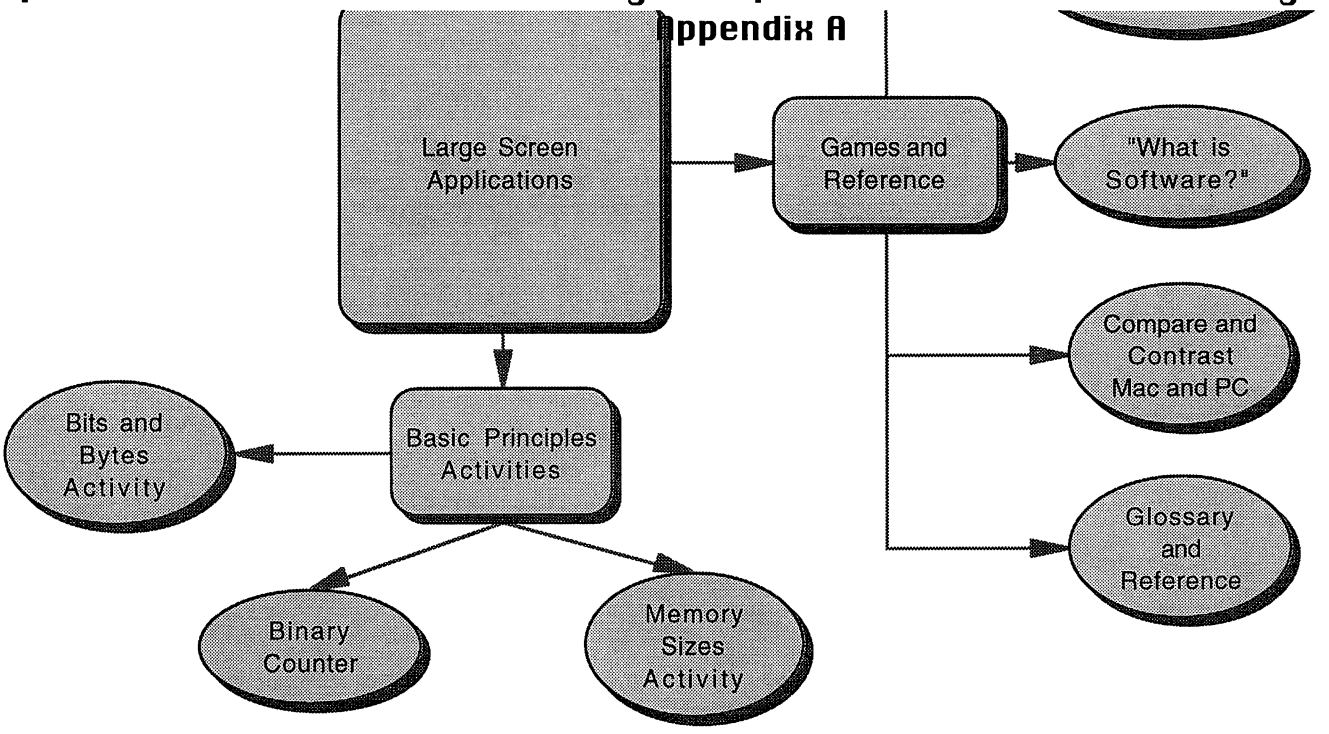
Main Information Flow



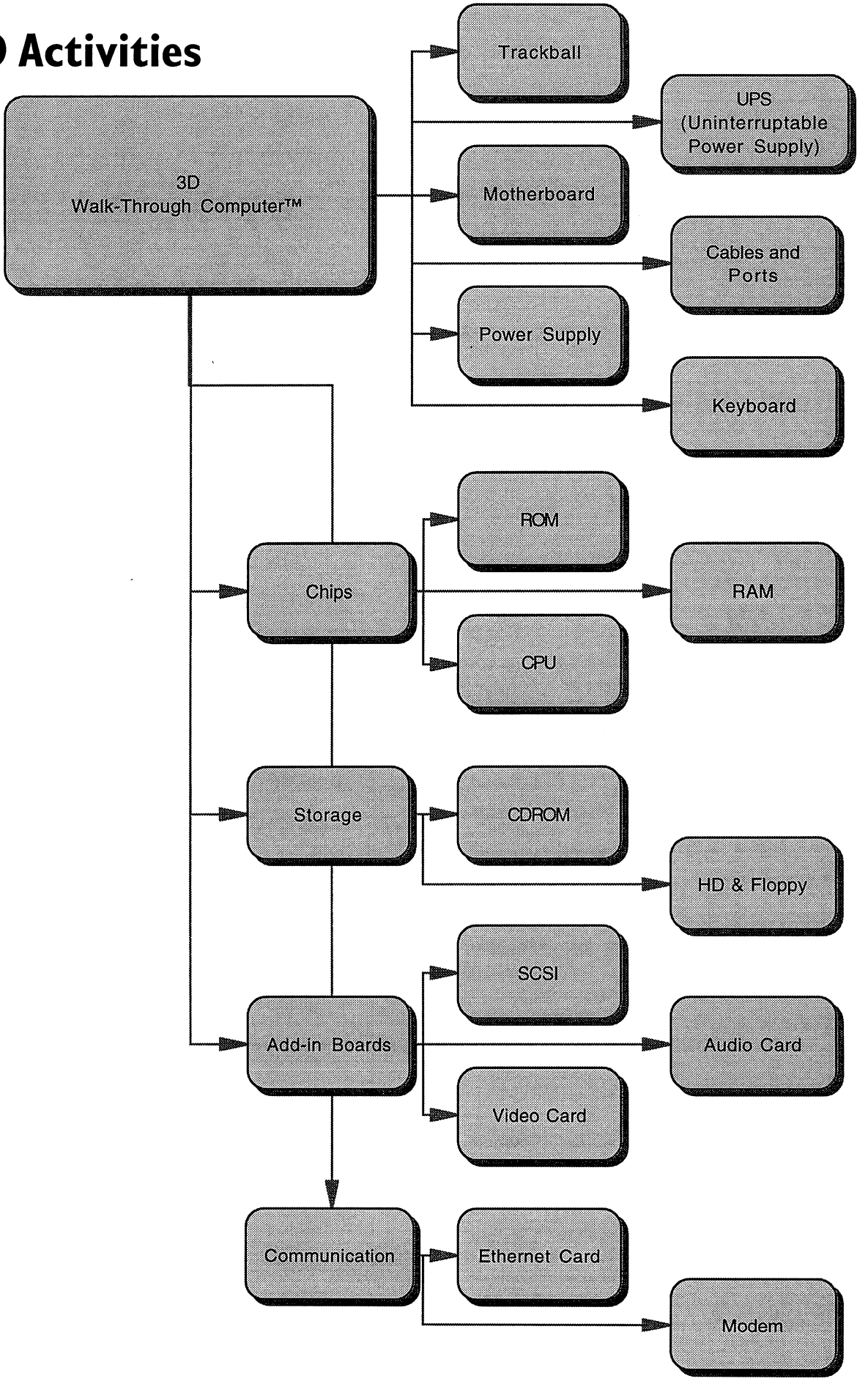
Large Screen Applications



Appendix A


Large Screen Applications
Games and Reference
"What is Software?"
Compare and Contrast Mac and PC
Glossary and Reference
Basic Principles Activities
Bits and Bytes Activity
Binary Counter
Memory Sizes Activity

3D Activities



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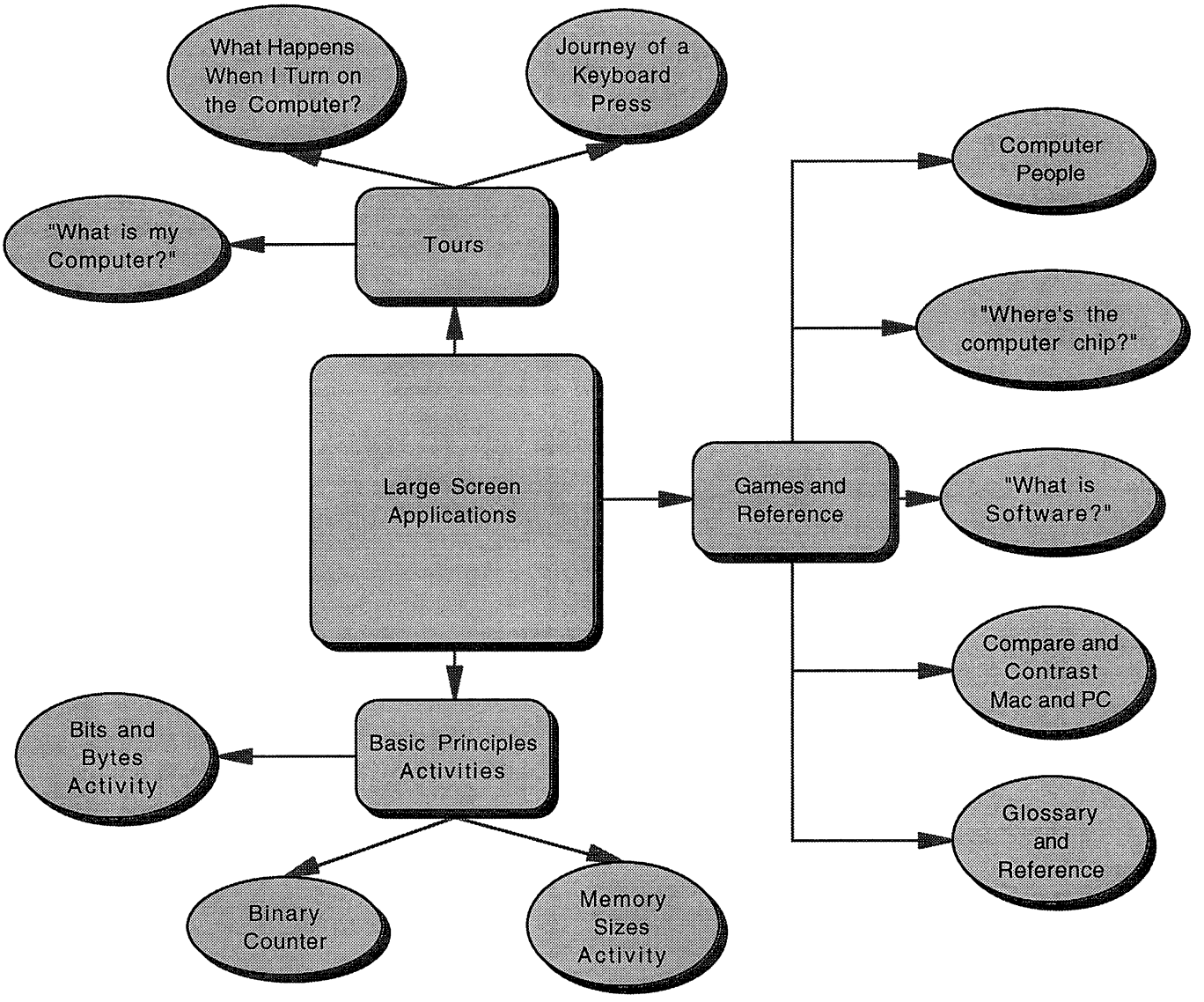

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Request for Proposal

Re: The Walk-Through Computer™ CDROM

Request

The Computer Museum requests proposals for the production of the Computer Museum's "Walk-Through Computer™ CDROM". The concept for this project is based on the museum's cornerstone exhibit, The Walk-Through Computer™ and will link to the upcoming online project, The Computer Museum Network™.

Our plan is to release a Gold CDROM version of the project by the Third or Fourth Quarter in 1996.

Proposals should include detail on the following:

- an understanding of the product and an outline of your creative approach,
- a proposed production process and timeline,
- a proposed production team and resources available,
- a proposed production budget.

A commitment to propose and presentations are to be scheduled by -

December 22, 1995

Overview

In collaboration with Microsoft, The Computer Museum will develop an interactive, exploratory environment based on the Museum's cornerstone exhibit- The Walk-Through Computer™. The project will have three components:

1. The virtual Walk-Through Computer™ which is the main 3D environment for the CDROM. Users can explore the different areas of the computer either on their own, or take a guided tour. Each component will be explained and there will be large applications on the screen that will introduce the basic concepts and animate the computer components.

2. There will be several hands-on *laboratories* where users can explore the main system subsets of processing and memory chips, disk storage, add-in cards and communication technology. Here a user will be able to see the workings of the component and adjust it's performance. Users will then be able to save their new settings.

3. The *trading post* is the place where users will be able to store their projects and reference information which will be stored in FAQ (Frequently Asked Questions) documents. This is also where the link to the larger online library will give the user a place to post their work and exchange information with others.

Overall, the product is designed for "any user who knows little-to-nothing" about how a computer works. The desired audience is 10 years old and up with basic navigational skills in graphically interfaced computers. This can include any users, from computer novices to those who have had a computer for years but never learned the fundamentals of the inner workings.

Project Goal - What do we want the user to do after using this CDROM?

The goal of the Walk-Thru Computer™ CDROM and Online Network is teach users about computers, what you can do with computers, and how they impact our lives.

The Walk-Through Computer™ CD-ROM and Online Network will provide:

- an understanding of the basic anatomy of a desktop computer and what each component does,

- an understanding of how a computer works, how components work together, and how system and application software works with the hardware,

- a social perspective on human-computer interaction,

Equally important to the three content objectives listed above is a fourth design objective:

- a fun, enjoyable experience that is designed for longevity, looks, and learning.

Operating Modes

There are multiple modes available for exploration of the product:

Open Exploration- free exploration of the product with little or no assistance.

Guided Tours- structured tours of the PC, from a select number of "specialists" that offer different perspectives (a "how it is connected" tour, a "what are the parts" tour, etc.)

Online Connected- a mode for multi player interactions and explorations when the user connects with The Computer Museum Network. This mode uses applications which are based on the CDROM but that access application modules on The Computer Museum Network. The user then shares the 3D space of the computer with others. The online modules will be updated so that users will always be able to get the latest versions.

Media Show- a mode that is designed for students writing reports or presentations, allowing the user to gather and assemble information into a presentation. Users can mark pages and create tours for project presentations. This is useful for school environments.

Self-running "Store" kiosk mode that can link to touch screens for simple navigation and only be quit out of with a password.

Project Components

I. The Walk-Through Computer™

The Walk-Through Computer™ is a giant 3D computer that you can travel through. You can watch it as it operates, choose to engage in activities that are linked to each component, or explore components in detail by accessing text, graphics, and sounds. The large screen is your main interface with the computer. Smaller screens will offer topic related information as you travel through the 3D space.

From here you can also enter the different systems labs to examine and adjust the Walk-Through Computer.

Large Screen Activities

Interactive Tour
On the big screen are large applications where a user can pick a guide and go on a tour of the computer. There is Help info for beginners. This area also contains additional information about the product, such as user configuration settings (sound on/off, etc.)

Tours include:
"Teach Me The Parts"
"Journey of a Keypress"
"What Happens When I Turn On The Computer?" (ROM BIOS)

Components covered in the tours include:

Mouse/Trackball	Keyboard
Floppy Disk and Drive	CD ROM Disk and Drive
Hard Drive	SCSI card
Audio card	Video card
Motherboard/Sockets	ROM BIOS
CPU	RAM
Power Supply	Modem
Ethernet card	? UPS
Chassis	Cables and Ports
Application	

Component Details
All components will have exterior and interior views
All components will be realistic in detail
Substantial sub-components (eg. chips on boards) will also have interior views.

-What's In *My* Computer?
This interactive tool runs a system check on the user's computer and provides easy-to-understand information about what is connected and how it is configured. This is a "get-to-know-your-own-computer" activity.

-Where's (the computer) Chip?
This game is similar to the popular "Where's Waldo?" series. Users will be given images of "everyday" scenes and will be asked to find all of the computers in the picture. Images include rooms in a house, an office, a classroom, a store, a restaurant, and other familiar places. Computer chips in appliances, jewelry, notepads, cars, etc. will be featured in an effort to show the far-reaching effects of computers in our lives.

-Computer People
This section provides a place to explore the people that make computers work. This is basic guide to computer careers, including: Chip designers, chip manufacturers, component designers and manufacturers, computer users, computer teachers, tech people, sales people, software designers, hardware engineers, interactive designers, non-linear writers, multimedia specialists, and more.

This is structured like a game: user must put people in their proper roles to get a computer designed, built, marketed, sold, installed, and used.

Care will be taken to show a diverse range of people in these positions.

-Software
This section demonstrates the importance of software to the operation of a computer. Explanations of the roles that OS's, applications, utilities, BIOS, freeware/shareware, applets, etc. are provided. Users can try run simulated software on the computer model and see how it works with each of the components.

-Glossary and Reference
An "online" glossary and other reference materials (digital movies, bibliography, etc.) will be provided for easy reference.

Information about choosing a new computer ("Where do I begin?"), or just upgrading ("Do I really need 32 MB RAM?"), is provided in a helpful way so users can make informed decisions.

This has a trivia game, and fun facts associated with it to liven it up.

-Binary Counter
An interactive tool for counting in binary, with lots of easy-to-understand examples. Users get an audiovisual representation of base 10 counting (1, 2, 3) to compare and contrast with binary counting (1, 10, 11), and can use this tool to count to 999.

-Bits and Bytes Activity
An interactive tool that demonstrates the importance of the bit and byte by using lots of real world examples. Users will learn that the bit is the smallest unit of information that a computer recognizes, that combining 8 bits creates a byte of information, and that many bytes can be strung together to make words, pictures, programs, etc.

Basic Principle Activities in the 3D Environment

These are interactive, hands-on activities that teach basic principles of computing. They can be accessed from the 3-D model as well as from the Tour and Help Desk.

1. Processor and Memory

-ASCII Activity-Storing a Character in RAM RAM
An interactive tool that offers 8 bits to store a byte of information in RAM. Users can "edit" a word processing document character by character by changing the 8-bit ASCII code stored at each address.

-CPU Activity Microprocessor
A simulation of the operation of the CPU as it fetches, decodes, and executes instructions from a software program. Users fetch lines of code from a software program, decode them into the language a computer understands, and execute those instructions, seeing their effect.

2. Disk Storage

-Memory Sizes Activity CD-ROM disk, Floppy Disk
An activity to teach the relative sizes of a bit, byte, K, MB, GB, TB with interactive examples of each. Users learn how much memory is needed to store a character, a letter, a book, a song, and a movie.

-Optical Storage Activity CD-ROM
An interactive tool to discover pits, lands, and storing information with light. Users set pits and lands to form an 8-bit ASCII code which is read back using a laser light.

-Magnetic Storage Activity Hard Disk, Floppy Disk
An interactive tool for exploration of storage of information using magnetism. Users change polarity of magnetic particles on the disk to read and write an 8-bit ASCII code.

3. Ad-in Cards

-Journey of a Keypress Activity Keyboard
An interactive tool to explore what happens when a key is pressed. Users follow the keypress through the keyboard, to the ROM, and ultimately to the screen where the key they pressed is displayed.

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This activity takes users inside a chip to see parallel information be converted to serial information. They will learn the advantages and disadvantages of each method of information travel.

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An interactive tool that shows analog to digital conversion of users voice. Users record a sample of their voice, see it graphically as an analog waveform, then convert it to a series of digits. Once digitized, the sample can be altered and users can see how the digits have changed.

-RGB Pixel Activity Video card, Monitor
An interactive tool for users to explore how computer images are made using R, G, and B pixels of different sizes. Users experiment with the R, G, and B channels that make up a computer image on a monitor, seeing how the image changes when information is added or subtracted.

Users can also alter the image using fun digital video effects.

4. Communication Technology

-How Networks Work Activity Ethernet card
A network simulation that allows the user to send and receive Ethernet network messages. Users watch as their messages are sent to other computers and can see clearly how computers know which messages to accept or reject.

-Modem Activity Modem
An interactive tool for exploration of modulation and demodulation that demonstrates how computers use audio tones to send binary information. Users set an 8-bit ASCII code, choose a rate of transmission, and hear as their code is sent to another computer as a series of audio tones.

-Compare and Contrast Mac and PC
The definitive guide to the similarities and differences in Mac's and PC's design. This area will address the different design approaches (history) of desktop computers by highlighting the key differences in a Mac and a PC. Users can find out how each evolved the way it has, and will be able to graphically compare and contrast the two designs.

This is designed to be "evergreen", stressing the basic, underlying design differences rather than the latest features and advancements.

II. The TCM Systems Laboratories

The laboratories are the places where you can interact with the components of the Walk-Through Computer™. You can make the computer faster and more powerful by using the interactive tools found in each lab.

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1. Memory and Processor Chip Lab
This lab allows you to disassemble and examine the CPU, The Memory Chips and ROM BIOS chips. The user can make the chips faster by adding transisitors and ...

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The Storage device lab is where you examine the technology for Hard Drives and CDROM Drives. You can increase the storage capability of the Walk-Through Computer™ by changing the drives' parameters.

3. Add-in Card Lab
This lab is where you can choose the add-in cards for the Walk-Through Computer™. You use the tools in the lab to evaluate each card's performance and compatability with the other cards in order to give power to the computer.

4. Communication Technology Lab
The Communication Technology Lab is where the links to the outside world have to be maintained. Ethernet Cards and Modems through the serials ports are cosen and adjusted for the best possible connection.

Build Your Own...
Each lab also allows you build your own fun, interactive modules designed to lead you from the

simplest levels of computer design (circuits) through the assembling of an entire desktop computer. The network component of this product allows you to share tips and tricks as well as trade custom built circuits, chips, cards, and computers.

...Circuit
An interactive tool that lets users design and build a few simple circuits, and test them. This is a lesson in binary logic.

...Chip
An interactive tool that lets users design and build a variety of chips and test them. This is an advanced circuit design activity.

...Add-In Board
An interactive tool that lets users design and build custom Add-In boards, and test them. This is a creative exercise in identifying a need, then providing a solution.

...Computer
An interactive tool that lets users design and build a custom computer, and test it. This is a lesson in how the components work together, and is puzzle-like in approach.

III. The Library/Lounge/

Once the computer is adjusted or even built from scratch, to whatever level you want, you can go to The Computer Museum Network. Your presense is represented by the Walk-Through Computer™ as an avatar, or virtual person, in an online space. The more powerful you have made the Walk-Through Computer™ the more you can do in this space. Communication with others in this space is also possible.

Suggested Minimum Systems Configurations

Windows
•A Multimedia PC or compatible with a 486SX or higher microprocessor, 25MHz (33 MHz recommended), at least 5MB of available hard-disk space, double speed CDROM drive, 8-bit audio board (16-bit suggested), and SVGA display capable of 256 colors.

• MS-DOS operating system version 5.0 o later.

• Microsoft Windows™ operating system version 3.1 or Win95.

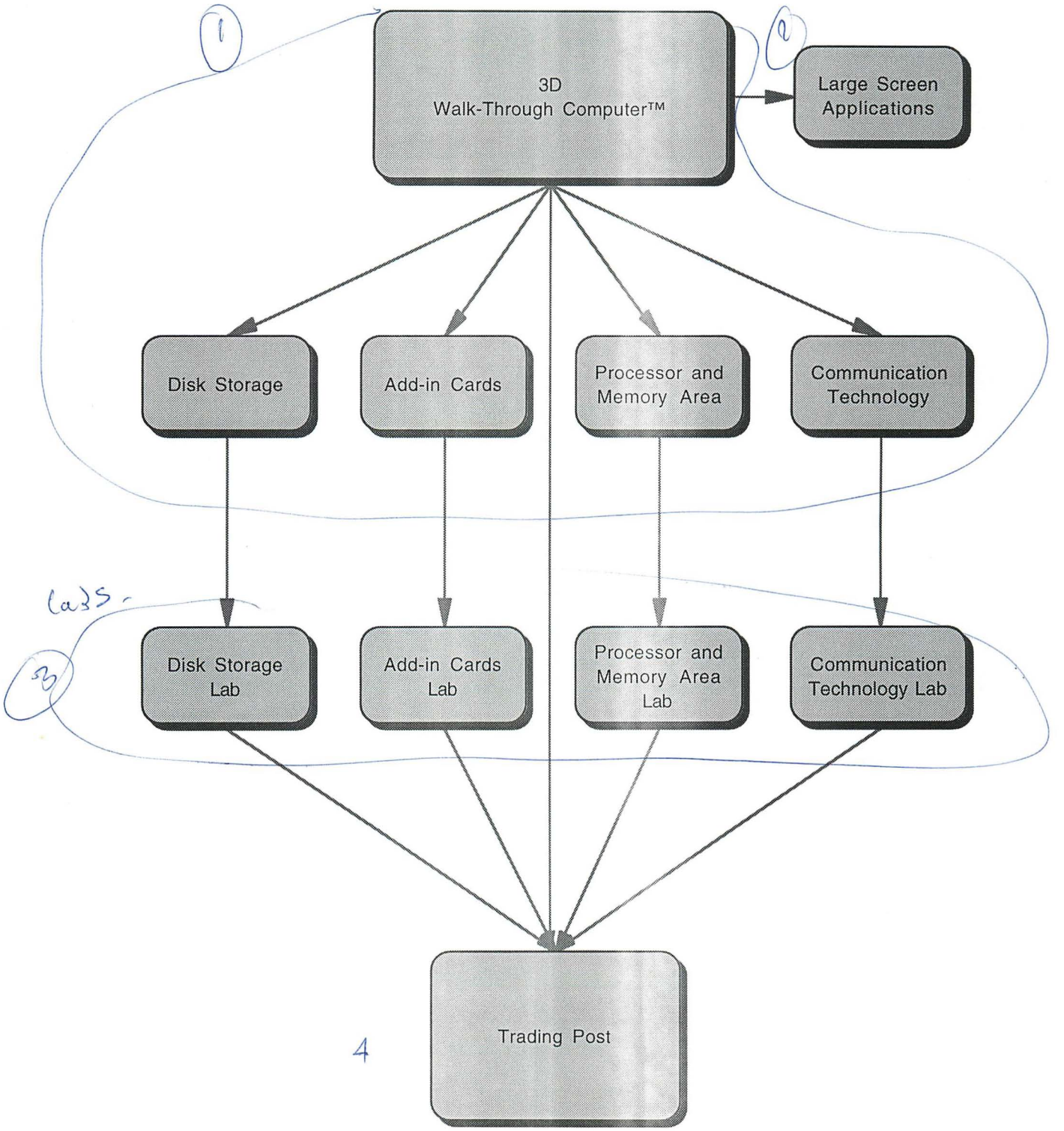
Macintosh
•Any Apple Macintosh® using System 7™ or later, a 13- inch or larger color monitor displaying 8-bit color or better, a double speed CDROM drive, headphones or speakers.

• Quicktime™ 1.5 or later.

Online Connectivity for all systems
• A 14.4 MBS or faster modem with a TCP/IP internet connection.

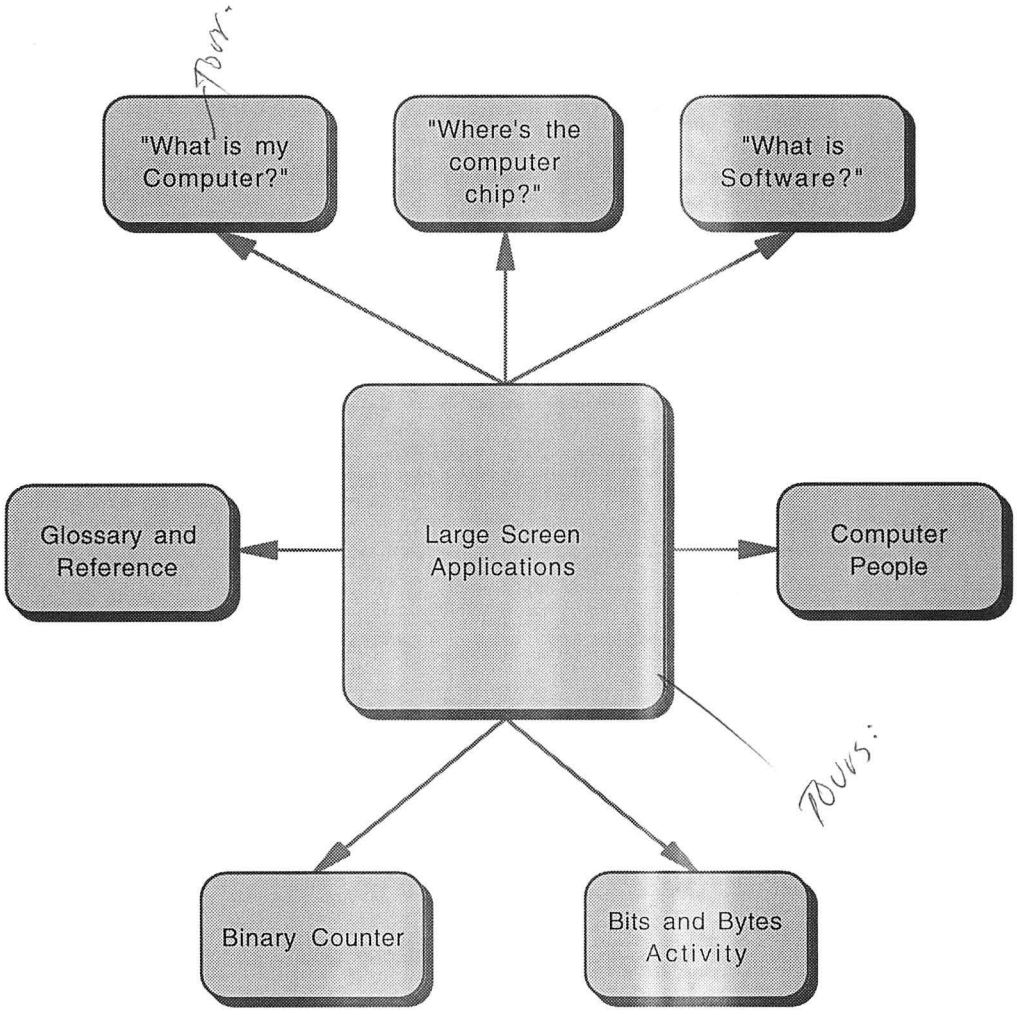
The Computer Museum
Walk-Through Computer™ CDROM

Main Information Flow : Four major Areas



The Computer Museum
"Walk-Through Comuter™ CDROM"

Large Screen Applications



The Computer Museum
Boston, Massachusetts
12/14/95

DRAFT ver2..0

Request for Proposal

Re: The Walk-Through Computer™ CDROM

Request

The Computer Museum requests proposals for the production of the Computer Museum's "Walk-Through Computer™ CDROM". The concept for this project is based on the museum's cornerstone exhibit, The Walk-Through Computer™ and will link to the upcoming online project, The Computer Museum Network™.

Our plan is to release a Gold CDROM version of the project by the middle of the Third Quarter in 1996.

Proposals should include detail on the following:

- an understanding of the product and an outline of your creative approach,
- a proposed production process and timeline,
- a proposed production team and resources available,
- a proposed production budget.

Proposals are requested to be submitted and/or presentations to be scheduled by -

December 22, 1995

Overview

In collaboration with Microsoft, The Computer Museum will develop an interactive, exploratory environment based on the Museum's cornerstone exhibit- The Walk-Through Computer™. The project will have three components:

1. The virtual Walk-Through Computer™ which is the main 3D environment for the CDROM. Users can explore the different areas of the computer either on their own, or take a guided tour. Each component will be explained and there will be large applications on the screen that will introduce the basic concepts and animate the computer components.

2. There will be several hands-on *laboratories* where users can explore the main system subsets of processing and memory chips, disk storage, add-in cards and communication technology. Here a user will be able to see the workings of the component and adjust it's performance. Users will then be able to save their new settings.

3. The *library* is the place where users will be able to store their projects and reference information which will be stored in FAQ (Frequently Asked Questions) documents. This is also where the link to the larger online library will give the user a place to post their work and exchange information with others.

Overall, the product is designed for "any user who knows little-to-nothing" about how a computer works. The desired audience is 10 years old and up with basic navigational skills in graphically interfaced computers. This can include any users, from computer novices to those who have had a computer for years but never learned the fundamentals of the inner workings.

Project Goal - What do we want the user to do after using this CDROM?

The goal of the Walk-Thru Computer™ CDROM and Online Network is teach users about computers, what you can do with computers, and how they impact our lives.

The Walk-Through Computer™ CD-ROM and Online Network will provide:

- an understanding of the basic anatomy of a desktop computer and what each component does,

- an understanding of how a computer works, how components work together, and how system and application software works with the hardware,

- a social perspective on human-computer interaction,

Equally important to the three content objectives listed above is a fourth design objective:

- a fun, enjoyable experience that is designed for longevity, looks, and learning.

Operating Modes

There are multiple modes available for exploration of the product:

Open Exploration- free exploration of the product with little or no assistance.

Guided Tours- structured tours of the PC, from a select number of "specialists" that offer different perspectives (a "how it is connected" tour, a "what are the parts" tour, etc.)

Online Connected- a mode for multi player interactions and explorations when the user connects with other remote sites. This mode uses applications which are based on the CDROM but that access application modules on the Computer Museum Network. The online modules will be updated so that users will always be able to get the latest versions.

Media Show- a mode that is designed for students writing reports or presentations, allowing the user to gather and assemble information into a presentation. Users can mark pages and create tours for project presentations. This is useful for school environments.

Self-running "Store" kiosk mode that can link to touch screens for simple navigation and only be quit out of with a password.

Project Components

I. The Walk-Through Computer™

The Walk-Through Computer™ is a giant 3D computer that you can travel through. You can watch it as it operates, choose to engage in activities that are linked to each component, or explore components in detail by accessing text, graphics, and sounds. The large screen is your main interface with the computer. Smaller screens will offer topic related information as you travel through the 3D space.

From here you can also enter the different systems labs to examine and adjust the Walk-Through Computer.

Large Screen Interaction
On the big screen are large applications where a user can pick a guide and go on a tour of the computer. There is Help info for beginners. This area also contains additional information about the product, such as user configuration settings (sound on/off, etc.)

Tours include:
- "Teach Me The Parts"
- "Journey of a Keypress"
- "What Happens When I Turn On The Computer?" (ROM BIOS)

Components covered in the tours include:
- Mouse/Trackball
- Keyboard
- Floppy Disk and Drive
- CD ROM Disk and Drive
- Hard Drive
- SCSI card
- Audio card
- Video card
- Motherboard/Sockets
- ROM BIOS
- CPU
- RAM
- Power Supply
- Modem
- Ethernet card
- ? UPS
- ? Chassis
- Cables and Ports
- Application

Component Details
- All components will have exterior and interior views
- All components will be realistic in detail
- Substantial sub-components (eg. chips on boards) will also have interior views.

Basic Principle Activities in the 3D Environment

These are interactive, hands-on activities that teach basic principles of computing. They can be accessed from the 3-D model as well as from the Tour and Help Desk.

-What's In *My* Computer?
This interactive tool runs a system check on the user's computer and provides easy-to-understand information about what is connected and how it is configured. This is a "get-to-know-your-own-computer" activity.

-Where's (the computer) Chip??
This game is similar to the popular "Where's Waldo?" series. Users will be given images of "everyday" scenes and will be asked to find all of the computers in the picture. Images include rooms in a house, an office, a classroom, a store, a restaurant, and other familiar places. Computer chips in appliances, jewelry, notepads, cars, etc. will be featured in an effort to show the far-reaching effects of computers in our lives.

-Computer People
This section provides a place to explore the people that make computers work. This is basic guide to computer careers, including: chip designers, chip manufacturers, component designers and manufacturers, computer users, computer teachers, tech people, sales people, software designers, hardware engineers, interactive designers, non-linear writers, multimedia specialists, and more.

This is structured like a game: user must put people in their proper roles to get a computer designed, built, marketed, sold, installed, and used.

Care will be taken to show a diverse range of people in these positions.

-Software
This section demonstrates the importance of software to the operation of a computer. Explanations of the roles that OS's, applications, utilities, BIOS, freeware/shareware, applets, ~~etc. are provided.~~ Users can try run simulated software on the computer model and see how it works with each of the components.

-Glossary and Reference
An "online" glossary and other reference materials (digital movies, bibliography, etc.) will be provided for easy reference.

Information about choosing a new computer ("Where do I begin?"), or just upgrading "Do I really need 32 MB RAM?") is provided in a helpful way so users can make informed decisions.

~~This has a trivia game, and fun facts associated with it to liven it up.~~

-Binary Counter Reference
An interactive tool for counting in binary, with lots of easy-to-understand examples. Users get an audiovisual representation of base 10 counting (1, 2, 3) to compare and contrast with binary counting (1, 10, 11), and can use this tool to count to 999.

-Bits and Bytes Activity Reference
An interactive tool that demonstrates the importance of the bit and byte by using lots of real world examples. Users will learn that the bit is the smallest unit of information that a computer recognizes, that combining 8 bits creates a byte of information, and that many bytes

can be strung together to make words, pictures, programs, etc.

-Memory Sizes Activity CD-ROM disk, Floppy Disk
An activity to teach the relative sizes of a bit, byte, K, MB, GB, TB with interactive examples of each. Users learn how much memory is needed to store a character, a letter, a book, a song, and a movie.

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image on a monitor, seeing how the image changes when information is added or subtracted. Users can also alter the image using fun digital video effects.

-Compare and Contrast Mac and PC
The definitive guide to the similarities and differences in Mac's and PC's design. This area will address the different design approaches (history) of desktop computers by highlighting the key differences in a Mac and a PC. Users can find out how each evolved the way it has and will be able to graphically compare and contrast the two designs.

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Each lab also allows you build your own fun, interactive modules designed to lead you from the simplest levels of computer design (circuits) through the assembling of an entire desktop computer. The network component of this product allows you to share tips and tricks as well as trade custom built circuits, chips, cards, and computers.

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An interactive tool that lets users design and build a few simple circuits, and test them. This is a lesson in binary logic.

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This is an advanced circuit design activity.

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III. The Library/Lounge

Once the computer is adjusted or even built from scratch, to whatever level you want, you can go to The Computer Museum Network. Your presense is represented by the Walk-Through Computer™ as an avatar, or virtual person, in an online space. The more powerful you have made the Walk-Through Computer™ the more you can do in this space. Communication with others in this space is also possible.

Suggested Minimum Systems Configurations

Windows
• A Multimedia PC or compatible with a 486SX or higher microprocessor, 25MHz (33 MHz recommended), at least 5MB of available hard-disk space, double speed CDROM drive, 8-bit audio board (16-bit suggested), and SVGA display capable of 256 colors.

• MS-DOS operating system version 5.0 or later.

• Microsoft Windows™ operating system version 3.1 or Win95.

Macintosh
• Any Apple Macintosh® using System 7™ or later, a 13- inch or larger color monitor displaying 8-bit color or better, a double speed CDROM drive, headphones or speakers.

• Quicktime™ 1.5 or later.

Online Connectivity for all systems
• A 14.4 MBS or faster modem with a TCP/IP Internet connection.

The Walk-Through Computer™ CDROM

WTC CDROM

TCM Network

Walk-Through Computer™ — **Computer Laboratories** — **Online Lounge/Library**

Trading Post
Libraries of User Generated Materials
Reference Works
Communication ability

Large Monitor
- Tutorial
- Guided Tour
- Basics Applications on ?

Fly-Through
- Hands-on exploration
- Component Tutorials

Activities
Build Your Own...

~~**Component Examination**~~
- ~~Viewer~~
- ~~Adjusters~~ ?

~~**Avatars**~~

~~**Enhanced Avatars**~~
- ~~Communication~~

The Computer Museum
Boston, Massachusetts
December 8, 1995

DRAFT ver1.0

Request for Proposal

Re: The Walk-Through Computer™ CDROM and Online Network

Request

The Computer Museum requests that a select group of new media application producers, that can provide high level programming of interactive and 3D environments, internet connectivity and online group environments, and design, submit proposals that outline a production scenario where the producer will collaborate with the Computer Museum on a creative level to produce the "Walk-Through Computer™ CDROM and Online Network". The concept for this project is based on the museum's cornerstone exhibit, The Walk-Through Computer™ and will link to the upcoming online project, The Computer Museum Network™.

Overview

In collaboration with Microsoft, The Computer Museum will develop an interactive, exploratory environment based on the Museum's cornerstone exhibit- The Walk-Through Computer™. The project will have two components; a hybrid CDROM with the basic application module that makes up the tour through a virtual computer with connectivity that links to the second part of an online group environment where participants can communicate and collaborate on projects.

The base module will be delivered on CDROM which offers the capability to store large amounts of image and application information. The main environment will be a virtual computer, users will be able to explore the virtual computer and engage in educational "games" or activities. The activities will be based on furthering the understanding of computer technologies.

An Internet gateway application located on the CDROM will link the user to the Computer Museum Network™. The online component will offer a group conversational environment for information exchanging and collaboration. Users will be able to meet others online and take a programming class together, and learn and explore the technology in group labs. The online component will also be an evolving curriculum of activities and updated as application modules. It will be TCP/IP based and though accessible solely through the World Wide Web, enhanced by the Gateway application on the CDROM.

The market for the Walk-Through Computer™ CDROM and Online Network is the "early majority of users" which makes up approximately 35% of the market. This group is interested in technology but wants products that work without any problems and are interesting, engaging and or fun. The whole environment will be geared towards the 10 year old and up.

Project Goal - What do we want the user to do after using this CDROM?

The goal of the Walk-Thru Computer™ CDROM and Online Network is to help users understand how computers work and how computers fit into people's everyday life by getting them to use the tools. Participation in the environment will promote the educational process by aligning a person's research and exploration methods to utilize computers as powerful tools which furthers a person's inquisitive reach.

After using the Walk-Through Computer™ CDROM and Online Network environment a user would want to seek out new realms of information and understanding through the tools of processing power and connectivity, computers and the internet.

The Walk-Through Computer™ CD-ROM and Online Network will provide:

- an understanding of the basic anatomy of a desktop computer and what each component does,
- an understanding of how a computer works, how components work together, and how system and application software works with the hardware,
- a social perspective on human-computer interaction, including careers one can pursue in the computer industry,

~~Equally important to the three content objectives listed above is a fourth design objective:~~

- a fun, enjoyable experience that is designed for longevity, looks, and learning.

This is an exploratory environment where people can come to be inspired by basic "hands-on" interaction and also explore items of interest in great detail. There are activities focusing on basic principles (binary, bits and bytes, how a microprocessor works), as well as activities that allow users to apply the knowledge they have gained to solve engaging problems (build your own circuit, build your own computer).

Audience

The desired audience is 10 years old and up with basic navigational skills in GUI interfaced computers. ***(we need museum info on the profile of visitors and how that would relate to the potential market)* The layers of knowledge available in the environment are limited only by a user's interest.

Overall, the product is designed for "any user who knows little-to-nothing" about how a computer works. This can include any users, from computer novices to those who have had one for years but never learned the fundamentals of the inner workings.

Marketing

The Walk-Through Computer™ CDROM and Online Network will be marketed for personal use in the home, school, and home electronic stores (for use when buying a new computer.)
***(needs Nicole's info)*

Suggested Minimum Systems Configurations

Windows

•A Multimedia PC or compatible with a 486SX or higher microprocessor, 25MHz (33 MHz recommended), at least 5MB of available hard-disk space, double speed CDROM drive, 8-bit audio board (16-bit suggested), and SVGA display capable of 256 colors.

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Online Connected- a mode for multi-player interactions and explorations when the user connects with other remote sites. This mode uses applications which are based on the CDROM but that access application modules on the Computer Museum Network. The online modules will be updated so that users will always be able to get the latest versions.

* A *light* version of the online application modules may be implemented for new users to try out the experience.

Media Show- a mode that is designed for students writing reports or presentations, allowing the user to gather and assemble information into a presentation. Users can mark pages

and create tours for project presentations. This is useful for school environments.

Self-running "Store" kiosk mode that can link to touch screens for simple navigation and only be quit out of with a password.

Project Components

Tour and Help Desk

An area to pick a guide and go on a tour of the computer. Contains Help info for beginners. This area also contains additional information about the product, such as user configuration settings (sound on/off, etc.)

Tours include:

"Teach Me The Parts"
"Journey of a Keypress"
"What Happens When I Turn On The Computer?" (ROM BIOS)

3-D Exploration of a Desktop Computer

Here people can navigate around a 3-D model of a computer. They can watch it as it operates, choose to engage in activities that are linked to each component, or explore components in detail by accessing text, graphics, and sounds.

Components include:

Mouse/Trackball
Keyboard
Chassis
Motherboard/Sockets
Floppy Disk and Drive
CD ROM Disk and Drive
ROM BIOS
SCSI card
Audio card
Video card
Ethernet card
CPU
Hard Drive
RAM
Power Supply
Modem
UPS
Cables and Ports
Application

Component Details

All components will have exterior and interior views
All components will be realistic in detail
Substantial sub-components (eg. chips on boards) will also have interior views.

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This is designed to be "evergreen", stressing the basic, underlying design differences rather than the latest features and advancements.

Build Your Own...

Fun, interactive modules designed to lead users from the simplest levels of computer design (circuits) through the assembling of an entire desktop computer. The network component of this product allows users to share tips and tricks as well as trade custom built circuits, chips, cards, and computers.

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An interactive tool that lets users design and build a few simple circuits, and test them. This is a lesson in binary logic.

...Chip
An interactive tool that lets users design and build a variety of chips and test them. This is an advanced circuit design activity.

...Add-In Board
An interactive tool that lets users design and build custom Add-In boards, and test them. This is a creative exercise in identifying a need, then providing a solution.

...Computer
An interactive tool that lets users design and build a custom computer, and test it. This is a lesson in how the components work together, and is puzzle-like in approach.

What's In *My* Computer?
This interactive tool runs a system check on the user's computer and provides easy-to-understand information about what is connected and how it is configured. This is a "get-to-know-your-own-computer" activity.

Where's (the computer) Chip??
This game is similar to the popular "Where's Waldo?" series. Users will be given images of "everyday" scenes and will be asked to find all of the computers in the picture. Images include rooms in a house, an office, a classroom, a store, a restaurant, and other familiar places. Computer chips in appliances, jewelry, notepads, cars, etc. will be featured in an effort to show the far-reaching effects of computers in our lives.

Computer People
This section provides a place to explore the people that make computers work. This is basic guide to computer careers, including: Chip designers, chip manufacturers, component designers and manufacturers, computer users, computer teachers, tech people, sales people, software designers, hardware engineers, interactive designers, non-linear writers, multimedia specialists, and more.

This is structured like a game: user must put people in their proper roles to get a computer designed, built, marketed, sold, installed, and used.

Care will be taken to show a diverse range of people in these positions.

Software
This section demonstrates the importance of software to the operation of a computer. Explanations of the roles that OS's, applications, utilities, BIOS, freeware/shareware, applets, etc. are provided. Users can try run simulated software on the computer model and see how it works with each of the components.

Glossary and Reference
An "online" glossary and other reference materials (digital movies, bibliography, etc.) will be provided for easy reference.

Information about choosing a new computer ("Where do I begin?"), or just upgrading "Do I really need 32 MB RAM?"), is provided in a helpful way so users can make informed decisions.

This has a trivia game, and fun facts associated with it to liven it up.