THE ATARI EXPLORER
CONCEPT PAPER

Where Do We Go From Here, and What Do We Do When We Get There?

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1.0 INTRODUCTION

The Atari Explorer is an expandable, high-performance, moderate-cost computer system for the home. It will offer immediate utility without the need for user programming. The sophisticated user however will find it easy to program and to make use of any system provided facilities for data management or user interaction.

The Atari Explorer will be divided into two main components. The Personal Component is more than a stand-alone portable information appliance. The Entertainment Component provides high-resolution graphics and animation, good quality sound,

and convenient mass storage.

2.0 FUNCTIONAL DESCRIPTION

The notebook motif will be used consistently throughout the product's software and documentation. Files, while physically consisting of a collection of characters, may be thought of as containing "pages." It will be easy for the user to "flip" to a different section of the Explorer than he is currently using to make an entry or check a reference. Ideally, he will be able to display parts of multiple pages simultaneously. In all cases possible, the user will be able to "jot things down," entering the information that might be necessary for an outline or an appointment or address book in as free a form as possible. Each user might be able to specify the overall form of such forms, and then later be able to enter the data in his own quick "shorthand." The components of the Explorer system could exist today, given adequate software development.

3.0 SOFTWARE DESCRIPTION

The software will be transparent to the user. The naive user should not be made aware that he is using "software." The sophisticated user should find it straightforward to add his own software that is consistent in interface with the standard Atari Noteware. The consistent user interface implies that there is a single set of user interface techniques that is maintained throughout the appliance. The user-developed software will have straight-forward access to system routines that perform these transactions. The Explorer software should prevent the user from having to guess at a proper response whenever possible. The software should present the available options and allow selection by pointing or the minimum amount of typing possible. Commands that produce drastic, irreversible results will require operator verification. Whenever possible, software will provide an UNDO feature for undoing the last significant operation (or series of operations if possible).

3.1 Noteware

The Explorer will contain internal extensible software that provides the user with immediate utility when the computer is turned on. The notebook motif will be followed consistently throughout all Atari applications software. The Noteware will be integrated so that the output of the outline can be fleshed out in the word processor, or the information maintained in the address book may be used to facilitate the terminal communications program.

3.1.1 Outline - Perhaps the most useful utility provided will be the ability to organize notes in an outline form. Notes may be entered in any order, and then sorted and moved about under operator control. Headings and words may be inserted, deleted, searched for, and replaced.

3.1.2 Writer - The Explorer will include some rudimentary word processing capabilites capable of dealing with a high-school or undergraduate term paper or a the letter writing demands of a typical American household. The level of sophistication in the standard Writer application will be approximately the same as that provided by the AtariWriter system for the current Atari home computers.

3.1.3 List - The Explorer will provide some list management capabilities.

3.1.3.1 Address Book - One application of the list manager that will be built in is a simple address book. It will include the ability for insertions, deletions, and searches. Additionally, the user may dial a telephone number by giving a person's name for example.

3.1.3.2 Appointment Calendar - Another built in application for the list manager is an simple appointment calendar. In conjunction with the time of day clock, it will be capable under user control of alerting the user to appointments or important dates.

3.1.4 NoteCalc - A simple spread-sheet like application will be included continuing the Explorer motif. It will be optimized to the sorts of operations that are normally performed with paper and pencil, or currently with paper, pencil, and calculator. It will be a recording calculator that just happens to permit multiple columns of data to be operated on at once, although this later feature will not be the primary mode of operation.

3.1.5 Term - A simple terminal emulator will be built in to permit the user to access remote computing power or databases. Additionally, the Term program will permit the transmission of files (or maintaining the Explorer motif, pages of outlines, calculations, or lists). Term will also be capable of receiving pages of data without operator intervention.

3.2 Internal High-Level Language Support

The Explorer will provide the sophisticated user with a powerful high-level language built-in, in addition to the available application software. There are significant arguments in favor of a user-extensible language such as Logo. Unfortunately, short of educating the proposed customer base, it may be necessary to (also) include the BASIC language.

3.3 Underlying Operating System

The underlying operating system in the Explorer will be a subset of that contained in the next generation of Atari computers. The operating system calls will be a subset of the UNIX system calls. All system functions will be performed by the operating system, and the applications writer and user will be discouraged from directly performing any system functions. The operating system will support multiple concurrent tasks in a very trivial manner. The "background" tasks will handle timekeeping, some communications, and other housekeeping functions. At no time can the performance of any of these tasks adversely affect the active user interface.

4.0 HARDWARE DESCRIPTION

The hardware used to implement the desired functions is definitely secondary to the applications software. The lowest-cost alternatives that adequately meet user interface criteria may be freely chosen, with due consideration to the development of the utility software within Atari. The principle mode of operation of the Explorer will be as a portable appliance of great utility. It is important that the Explorer be usable for long periods of time (5-8 hours) each day without changing the batteries or recharging. At night, when connected to the Atari Explorer home component or the optional AC supply, the Explorer should be

rechargable in 8 hours or less.

4.1 Processor

The processor used will have adequate speed to provide a convenient user interface. For power consumption reasons, it will need to be fabricated with CMOS technology. A 16 or 32 bit processor capable of adequately supporting code written in a higher level language and capable of addressing a large amount of memory in a non-segmented way is the best choice. The Motorola 68000 family (68000 / 68008 / 68010 / 68020 / Hitachi 63000) and the National 16000 family are currently the best commercially available choices.

Processor power may be augmented by the addition of graphics and I/O coprocessors.

4.2 Memory

The Explorer will contain a large amount of application software in ROM which will provide instant utility. The computer will provide enough RAM memory to support its own applications and some level of user programability and extensibility.

4.2.1 ROM - The Explorer will include enough low power ROM to contain the applications programs and a higher level language. A rough estimate might put the necessary amount of ROM for a 68000 family processor at 64K to 128K bytes.

4.2.2 RAM - The Explorer will contain adequate memory for user data storage and some limited programming. Most, if not all, of the RAM in the Explorer portable component will be non-volatile (battery backed-up). A quick estimate suggests that there should be at least 32K bytes of RAM, and more probably, 64K bytes or more. Some expansion capability might be provided, perhaps through a non-volatile SmartCard.

4.2.3 SmartCards - Additional applications programs may be sold to the user on cards only slightly thicker than normal printed circuit boards. Each SmartCard may contain one or more applications which could be selected by software or by the orientation of their insertion. The Explorer will have provisions for accepting at least two SmartCards simultaneously.

4.3 Display

The Explorer will have as large an LCD display as economically feasible to stay within the desired target price. The display must be at least 64 characters wide (using at least a 5x7 font) and should be 6 or more lines long. The preferable size would be capable of 80 characters in 8, or ideally, 16 lines.

4.4 Keyboard

The keyboard will be durable and damage resistant, being able to withstand pressure of several books being placed atop it or the directly entry of liquids spilled into it. The keyboard must provide the operator with good tactile feel. It must also operate as silently as possible so its use is not distracting.

4.4.1 Typewriter Keyboard - The keyboard will include 58 or more full-stroke keys in a standard typewriter keyboard layout.

4.4.2 Function Keys - The Explorer will have one function keys for each 8 characters of display width mounted directly below the LCD display panel. These keys need not be full-stroke "keyboard type" keys. Additionally, there will be four cursor control keys arranged in a "plus symbol" format.

4.5 Pointing Device(s)

The Explorer will have a common connector type located on its right edge that will permit the connection of the user's choice of pointing devices. It will accept a joystick, mouse, trackball, or touch pad. Additionally the port will support a bar-code reader.

4.6 Communications

4.6.1 Modem - The Explorer will contain a Bell 103 compatible direct connect modem. Additionally the user may purchase an optional adapter that will permit the accoustic connection of the modem to a telephone that does not have the standard modular connection (such as a pay telephone). The modem will be capable of detecting ring and will be able to operate in either answer or originate modes. The Explorer MODEM will be capable of detecting DIAL TONE, RING, BUSY (both fast and slow) and providing a software pollable result code. The modem must be capable of dialing in a standard rotary (pulse) phone system. DTMF dialing would be a desireable option.

4.6.2 AtariNet - The Explorer will permit communications over a high speed network to other Atari consumer electronic products. The software will be able to use peripherals attached to either of the two larger host computers for such functions as mass storage and printing. AtariNet will be a software and hardware superset of the AppleBus.

4.7 Mass Storage

Non-volatile memory SmartCards will be available so that the user may quickly and noiselessly free up some of the operating RAM in his Explorer. The Explorer will contain an internal interface that will permit the user to store programs and data on an audio cassette recorder. Since the recorder is user provided, he may choose to use either a standard audio cassette recorder, or a micro dictation recorder. The Explorer will transparently use the mass storage devices connected to other AtariNet computers.

4.8 Clock

The Explorer will contain a time of day clock. This may be implemented in either hardware or software as long as it continues to function when the computer is turned "off." The clock may be used to turn "off" the computer after a user specified number of minutes of inactivity. (The On/Off switch is a momentary push button that is physically protected so that setting a book atop the Explorer does not turn it on.) The clock may also be used to signal alarms based on a simple built-in appointment book utility.

4.9 Sound And Speech Synthesis

The Explorer will contain rudimentary sound signalling capablility. This may be as simple as a single bit under processor control that is connected to a transducer. The sound capability should allow software control of at least a single voice of programmable pitch.

4.10 Video Displays

4.10.1 Atari Video Engine - The base component of the Explorer will include a video engine consisting of a bit-map display maintained and manipulated by a general purpose co-processor. This processor will be responsible for implementing the functions of terminal emulation, line and arc drawing, filling, and motion object updating.

The video engine will be capable of operating in two modes. The first mode will use a combination of hardware and software to achieve a readable display of 64 characters per line on a home television receiver.

The video engine will also be capable of displaying 256 pixels x 200 rows. Each pixel can be one of 16 colors, chosen from a pallette of 4096 colors/intensities.

4.10.2 Other Internal Video Sources - The base component of the Explorer will be capable of accepting an optional, later-designed high-performance graphics chipset. Video from this source can be synchronized and superimposed on existing video sources.

4.10.3 External Video Sources - The base component of the Explorer must be capable of synchronizing its video signal to an external video source. Software will be able to superimpose portions of the external video and the Explorer video display. Control of external video disk players will be provided.

5.0 MECHANICAL DESIGN / APPEARANCE

The Explorer portable component will be small, easy-to-carry, and durable. It should be less than 3/4" tall at the front and less than 1 1/2" tall at the back.

There will be connectors for pointing devices on the right side. Slots will be provided for two SmartCards, both of

which should be on the same side of the unit. The optional LCD panel will be hinged at the rear of the unit to swing up during use to provide (1) a better viewing angle, (2) more available space in the unit, and (3) better durability during transport.

The rear panel of the Explorer portable component serves as a mounting place for the remaining connectors. Mounted here are the miniature D-type connectors for AtariNet and an RS-232C port (using a DB-25S), as well as two telephone type connectors, one an RJ-11C for direct connection to modular type telephones, the other a different size connector to link to an accoustic/inductive telephone coupler. The rear panel also contains a jack for connection to an external power source.

No component of the Explorer should contain a fan. The Explorer will include a built-in power supply module. The module will be selected at manufacturing time according to the power sources of the country of destination.

6.0 PROJECT DEVELOPMENT

All of the concepts presented here are within the current industry state-of-the art. The single largest task is defining a consistent, friendly user interface. The greatest hardware uncertainties concern the pricing for large LCD displays and low power memories. A reliable battery source must also be found.