Inter Office Memo

CORPORATE DIVISION
Corporate Research

To: Corporate Research

From: Eric A. Hulteen

Subject: The World Center Date: 8/17/82

While I was visiting the Architecture Machine during SIGGRAPH I picked up this paper. I thought that some of you might like to read it.

CENTRE MONDIAL

Informatique et Ressources Humaines

MISSIONS AND PROGRAMS

(1982-83)

By J.J. Servan-Schreiber and
Prof. Nicholas Negroponte

Computer science and microelectronics technology have developed at a rhythm which obsoletes all previous socio-economic predictions.

This rhythm will accelerate. In the short term, we must transform all our perspectives on : industrialization, investment, employment. One example : the world's computing capacity per capita will double in the next year.

The decline of industrial employment in all countries is, in part, a consequence of an irreversible automation. Only one response will permit the era of industrial robots to turn into something other than social chaos : reveal the other side of information sciences, that of personal computation, which applies itself to the intellectual development of Everyman. We must do this in concert with the development of new means for personal communications and telecommunications.

personal computation

This challenge was the cause for creation of the World Center, announced in September 1981 by the President of the French Republic, based on a report he commissioned over the summer.

The Center was officially created on November 20, 1981 at a public conference in the Elysée and confirmed by the Council of Ministers on January 27, 1982. The Center's General Assembly, and Board of Directors, are holding their first meeting in Paris, on March 15, 1982.

The primary objective of the Center is to unite the social sciences and computer technologies, at a rate of development which exceeds that of automation.

social science ↔ computer technology

In particular the Center must accelerate design concepts and the evolution of a truly personal computer with which any person can interact in a fashion no less familiar than human-to-human conversation and for purposes of personal development.

Such personal development will be multiplied by computing power, itself interconnected by advanced telecommunications. Far from being a fatality of social and mental isolation, we should see the emergence of a world society in which the density and diversity of intellectual exchanges will exceed anything we have known before.

These objectives are the subject of a science which is not computer science as we know it or its derivations like office automation, numerical control, or the hardware and software of large systems. It is the subject of a new "science of the artificial" which is at the roots of the Center.

Our task is to augment the intellectual universe of each individual not only to achieve full employment in the classical sense, but to achieve full employment of each person's faculties. The World Center intends to help the emergence of this immense and new potential.

The Center is a place for the most imminent scientists to find a computational environment of unmatched quality which will transform their work conditions and, so, their abilities to invent.

We anticipate a population of researchers that by mid-1983 will equal approximately 100 scientists. The work will include at least three pilot projects in Third World Countries and a larger number of social experiments in France.

In Paris, the World Center will be opened seven days a week and 24 hours a day. This is because it must be a way of life, a place to learn, and a public resource.

The World Center must be a laboratory which fosters the utmost creativity in part by its resources : the most advanced video technologies, a large network of microprocessors, and a central node for telecommunications throughout the world.

The Center will orient itself in three directions : 1) research programs, 2) social experiment in France, 3) pilot projects in the Third World.

In parallel, the Center will seek active collaboration with French electronic and telecommunications industries. These industries and the World Center are expected to have close ties, from the start, with the American and Japanese computer science communities.

What follows is a brief description of 8 programs of research and experimentation which will be more fully presented and discussed at the March 15 meeting.

1- Informatics, knowledge and cultures

a - Role of informatics in enhancing the appropriation of knowledge by individuals and by cultures.

b - New technologies of education and access to knowledge.

c - Expert computer systems particularly in the domains of self-explanatory computers, agriculture and medicine.

2- Cultural anthropology and ethnic economics

3- The Human Interface with computers

a - Speech recognition and synthesis, a polyglot program that embraces the phonetic and linguistic structures and variations.

b - Interactive graphics and low-cost image processing, deploying advanced memory architectures, flat pannel displays and touch sensitive television.

4- Programming and natural languages

Derivations of Logo and Prolog including the immediate transfer of Logo to at least one French-made personal computer.

5- Interactive and Personalized Media

a - Optical videodisc research. The full integration of optical disc technology with personal computers including the storage of computer programs on disc and the intermixing of video with computer generated graphics.

b - Direct broadcast satellite for high bandwidth interaction with remote users, including portable systems.

c - The night time feeding of personal computer by telephone including personalized news and program sharing.

6- Micro-computer architectures

a - The design of multi-processor and memory-plentiful personal computers.

b - The thorough investigation of portable systems.

7 - Social Experiments in France

Large scale experiments will be based in the Aix-Marseille region, closely affiliated with the University at Luminy.

8 - Pilot Projects and Third World countries

Following the document "Micro-informatics and Third World Development" presented at the OPEC meeting in November 1981 in Vienna, authorized by Professors: Negroponte, Papert and Reddy, five countries have expressed interest in hosting pilot projects, participating intimately in the evolution of the World Center. These include : Senegal, Kuwait, India, Saudi Arabia and the Philippines. Discussions are under way regarding these projects starting with Senegal and Kuwait.

Inter Office Memo

CORPORATE DIVISION
Corporate Research

To: Systems Research

From: Michael Naimark MN

Subject: Cinemagraphic Considerations for Interactive Movies Date: 11/19/82

I'm not convinced that movies evolved the same way here as they did on other intelligent planets. For one thing, we locked ourselves into a uniformity early on so that what we have now is not very different from what we started with. And what we started with was based largely on our culture, our technology, and chance.

The movie form, with very few exceptions, has always been flat, rectangular, passively viewed, and the same for every viewer. [How many images of yourself have you seen that were not?] Emerging computer technologies will soften presently fixed parameters. Little precedent exists; diversity is lacking. Cultural and ecological systems make good models.

I wish to explore alternative cinemagraphic forms. My interest is in evolution of style-- some call this "progress in art." It is complimentary but different from "progress in technology."

Two general bodies of research are proposed:

1. Field Cinematography
   [motion control and image stabilization, multiple cameras and anamorphic lenses, intelligent cameras (ie., with position sensors, etc.)]

2. Display Environments
   [reality rooms (null spaces: not site-specific), site-specific playback (extreme example is outdoors), portable intelligent displays (ie., with position sensors, etc.)]

Some initial areas of concern include:

-cataloging visual primitives (history of movie library);

-farfield imaging (where parallax equals zero and focus equals infinity);

-dilemmas of mixing real and abstracted images.

Read 11/29

Inter Office Memo

CORPORATE DIVISION
Corporate Research

To: W. Royse et al

From: R. Stein

Subject: EPCOT Date: 11/23/82

Favorites

- 3D Movie (great glasses, especially for someone with regular glasses)
- Dancing water Pellets (fountain)
- Acapella singing in Rotunda of American Adventure
- Audio-animatronics at American Adventure (only ones that seem more advanced (ie. more lifelike) than the basic Disneyland characters we've seen for 15 years. (I didn't see the Hall of the Presidents)
- Technology used in the Astuter Computer exhibit; the dancing figure seemed to be exist in 3D space (a good illusion)
- ambience of world showcase at night
- water slide at River Country

Bummers

- Snail-like pace of the transportation between Hotel, Magic Kingdom and Epcot
- generally shallow content of exhibits, vastly underestimating level of people's curiosity

General Comments

- I asked a lot of people their impressions (usually started off by asking what they liked best). I got very few raves. The typical response was The Land, or Motion, or Energy or Spaceship Earth. No one mentioned any of the interactive exhibits or the 3D movie.

- In general Epcot is oriented toward adults, virtually nothing for little kids (Murphy loved the water pellet fountain). Even Morgan was not especially turned on by anything at Epcot and preferred his time at the Magic Kingdom

- A lot of the "interactive" exhibits didn't work or didn't work well. The Image Works was overall a disappointment; in most cases the effects resulting from actions were trivial and uninteresting.

- The exhibit that I saw generate the strongest emotional response from the audience was the acapella singing at the American Adventure; second was the street theatre at the Italian exhibit. Frankly the technology might have seemed more interesting to people if it had been used to permit or enhance communication between people.

- Disney carries off the re-creation of the past quite well, but consistently muffs the view of the future, which keeps coming off as dreary, one-dimensional; in a word, Tron-like.

- Disneyland works very well as a "fantasyland" because the fantasies are carried out to a considerable depth. Pirates works because enough effort was expended to make the scenes believable; the richness of the tableaux makes the fantasy work and the experience enjoyable. That you don't learn very much about pirates and their world is not very important; you're there for the sense impression and that works. At Epcot however people are coming with the expectation (at least in part) that they are there to learn. The dinosaur scenes in the energy pavilion might have worked for me if they were at Disneyland. At Epcot they and others came off mainly as fluff. In general Epcot puts forward the pretense of dealing with weighty subjects (energy, motion, communication etc.) but no significant effort was made to supply much substance. (On top of all this most of the dioramas and scenes in the Epcot exhibits were not done with the same attention to detail that makes Pirates so effective.)

On behalf of Aleen, Morgan, and Murphy, it was a pleasure and a privelege to have shared this experience with all of you.

Inter Office Memo

CORPORATE DIVISION
Corporate Research

To: Ted Voss

From: Bob Stein

Subject: Halley's Comet Date: 11/29/82

Evidently the attached 10/28/82 memo was sent to you without including the 9/14/82 memo I sent to Alan Kay without which none of what I sent you on 10/28 makes any sense.

cc: A. Leonard
J. Soderstrom

Inter Office Memo

CORPORATE DIVISION
Corporate Research

To: Ted Voss

From: R. Stein

Subject: Halley's Comet Date: 10/28/82

Alan Kay suggested I send you a copy of the attached memo. Recent articles from the New York Times (also attached) only underscore the original point.

cc: A. Leonard
J. Soderstrom

Inter Office Memo

ATARI®

Corporate Headquarters

To: Alan Kay

From: R. Stein

Subject: Halley's Comet Date: 9/14/82

It's 1982 and I'm reading the 47th article of the year that mentions the 1986 rendevous with Halley's comet. Wow! I thought, given the incredible attention likely to be paid to the comet's visit (fly by missions by both the European Ariane group and the Soviets) it would be great if Atari could tie a major promotional campaign directly to Halley's appearance.

By the way, when do we stop naming our computers after numbers. I appreciate that in the early years you have to build manufacturer recognition - Ford Model T, Apple 2 & 3, Atari 400 & 800, but let's figure on when we can put some romance and fantasy into our names. "The Atari Comet takes you where man has never been before!"

Front Page
New York Times
October 21, 1982

Halley's Comet Appears, a Billion Miles Away

By JOHN NOBLE WILFORD

After searching the skies on and off for nearly five years, astronomers have sighted Halley's comet for the first time since its last visit to the vicinity of the Earth back in 1910. The astronomers were pleased, but not surprised, to see that the illustrious comet, as predictable as ever, was on course and on time for its next encounter with the Sun in early 1986.

Astronomers at the California Institute of Technology reported yesterday that using the 200-inch telescope at Mount Palomar, they detected the comet last Friday night as a faint speck in the region of the constellation Canis Minor.

G. Edward Danielson, a Caltech astronomer, said in a telephone interview, "The comet was moving to the southwest, as we expected. We know where it is now, and it's right on track."

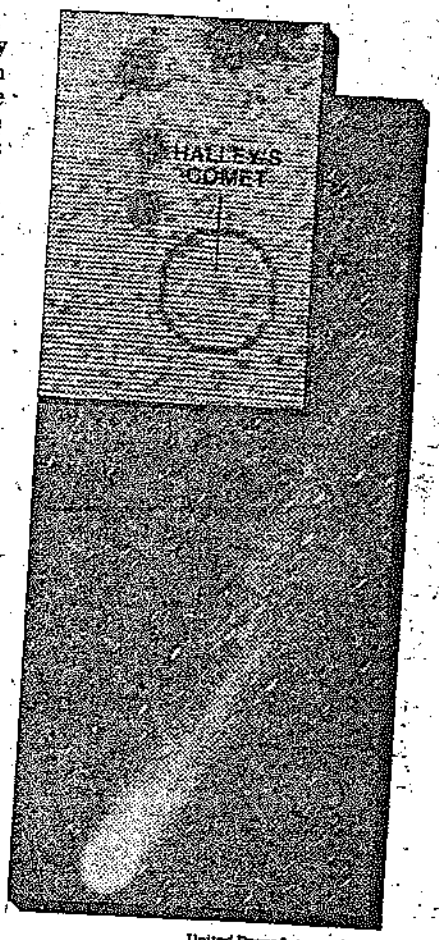
The comet, which reappears every 76 years, is now more than a billion miles away, beyond the orbit of the planet Saturn. Astronomers are preparing for detailed observations as it swings around the Sun in February, 1986. The comet should pass within 39 million miles of the Earth.

The Soviet Union, Japan and the European Space Agency, are planning space missions to gather data and photographs that could reveal the nature and composition of comets. The Reagan Administration rejected plans for a similar mission, but observations are scheduled with the space telescope that is to be put into an Earth orbit in 1985.

Mr. Danielson said that it would probably be at least two and a half years before amateur astronomers could see the comet.

The Caltech astronomers were successful, Mr. Danielson said, because they were using the nation's largest telescope combined with an imaging system built around an electronic sensor known as a charge-coupled device. The sensor uses a silicon chip that is more sensitive to light than any photographic film. Mr. Danielson made the sighting while testing it for use on the space telescope.

He said several exposures, of 480 seconds each, were taken. The stars remained fixed, but something else left a faint blur. He said that blur of light, the approaching comet, was 50 million times fainter than anything that can be seen with the unaided eye.



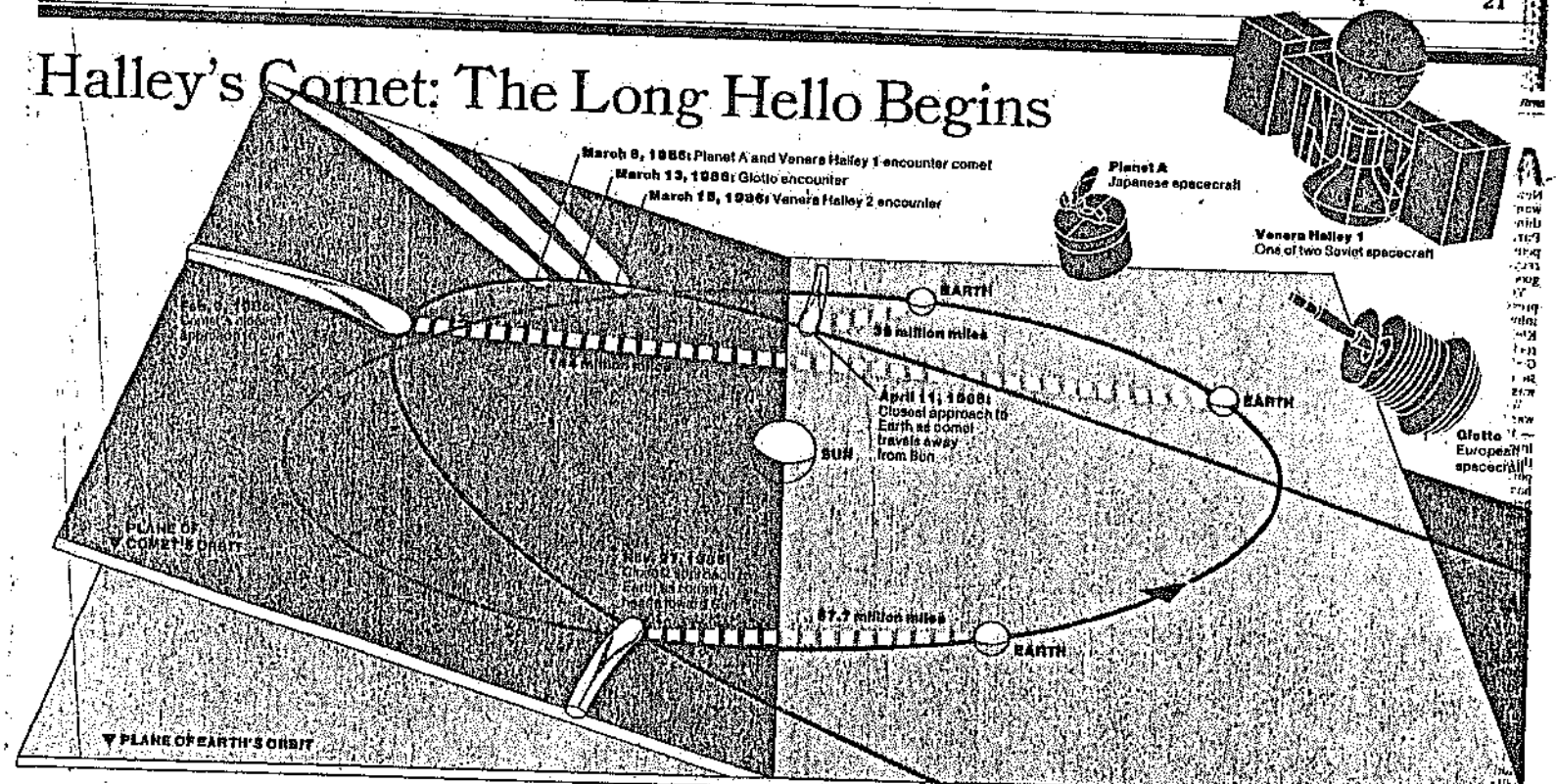
United Press International

Halley's comet on its appearance in 1910 and, inset, as scientists saw it last week — 72 years, four months and 10 days later.

IDE

A similar article appeared on the front page of the LA Times on the same day.

Halley's Comet: The Long Hello Begins



By JOHN NOBLE WILFORD

SOME photons traversing more than a billion miles of space arrived at the earth 10 days ago, bearing a message long awaited. These particles of radiant energy, from sunlight reflected off a vagabond chunk of dirty ice, registered a faint impression on a silicon-chip sensor near the base of the great 200-inch telescope on Mount Palomar in California. Astronomers saw the speck of recorded light and recognized its meaning. The most celebrated comet is now back in view, Halley's comet.

The sighting set in motion plans long laid for one of the most intensive investigations of a heavenly object in the history of astronomy. Large telescopes around the world are being focused on the comet, now out beyond the orbit of Saturn. More and more telescopes will join the watch as the comet draws closer, and beginning in late 1984 a multinational fleet of spacecraft will be going forth to get an even better look. Sounding rockets, high-altitude aircraft and balloons are also be readied for deployment when the comet makes its closest approach to the Earth and the Sun, in the winter and spring of 1985-86.

Over the next five years, scientists thus expect to make enormous advances in their understanding of comets, those swift and sometimes dazzling wanderers of solar space that have long fascinated and mystified mankind. Perhaps, since comets are thought to be among the most primitive bodies in the solar system, scientists will gain from the visitation of Halley's comet a better understanding of the conditions of 4.6 billion years ago out of which the sun and its family of planets emerged.

Halley's comet is an irresistible object of attention. Its regular traveling habits and brilliant showmanship appeal to scientists. They can plan their investigations, particularly the greeting party of spacecraft, with a high degree of precision because the comet's course is well known after so many appearances recorded in the last 2,300 years. The comet was named for Edmond Halley, an English astronomer who in 1705 calculated cometary orbits and predicted that a comet seen in 1682 would reappear in 1758, which it did. It has been coming back every 76 years or so.

Scientists also count on Halley's comet, being large and active, to give a classic performance. When heated by sunlight, it should release a bright tail of gas and dust stretching millions of miles.

Such a sight reminded the ancients of a mighty sword hanging ominously over the human race. The Jewish historian Josephus believed that a comet in the year 66, probably Halley's, foretold the destruction of Jerusalem four years later. The comet in 1066, also Halley's, was taken as a warning to King Harold of England, killed later that year in the Battle of Hastings.

The comet's timing may account for much of the mystique. Dr. Donald K. Yeomans of the Jet Propulsion Laboratory in Pasadena, Calif., said that the comet's "periodic returns every 76 years act like a clock counting time in units of human lifetimes."

Mark Twain often remarked that he came into the world with Halley's comet, in 1835, and expected to depart the next time the comet came, in 1910. He was a man of his word.

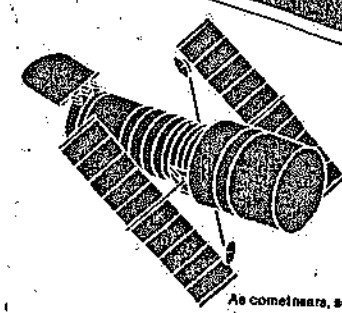
When last seen, a lifetime ago in May of 1911, Halley's comet was wandering back to the fringes of the solar system, to the relief of people who had feared, like the ancients, that the comet was a portent of disaster. An Oklahoma sheriff had to stop some superstitious people from sacrificing a virgin to the comet. An unwary public, yielding to hucksters' warnings that noxious gases from the tail would sweep the earth at the comet's closest approach on May 18, 1910, stocked up on cometproof inhalers and assorted comet pills.

In 1948, innocent of the intervening disasters that did befall mankind, the comet reached the outer limit of its elongated, cigar-shaped orbit of the sun. There, in the cold emptiness 3.2 billion miles away, the comet responded to the leash of solar gravity, swung about and began its return trip.

It was seen again for the first time on Friday night, Oct. 15, by observers from the California Institute of Technology, G. Edward Danielson and David C. Jewitt.

It will be a long time before the comet will be visible

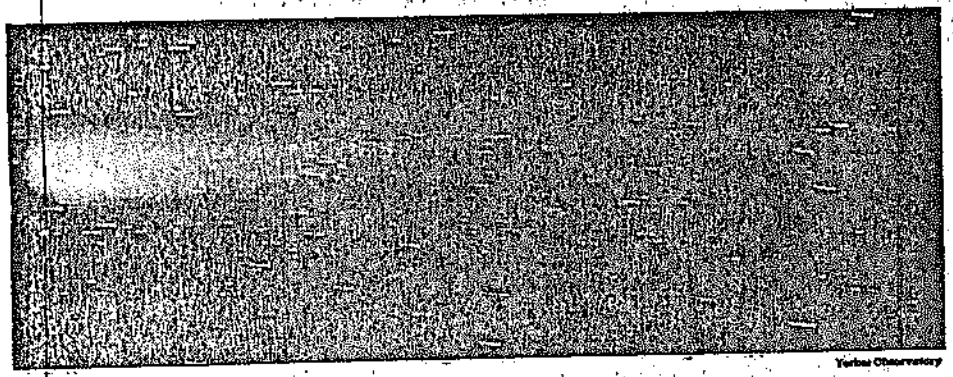
Continued on Page 22



U.S. Space Telescope
Launching: early 1985

As comet nears, scientists around the world are preparing projects to examine it.

Halley's Comet: A Long Hello Begins



Yerkes Observatory

Halley's comet as it appeared in 1910.

Continued From Page 11

to the unaided eye, or through less sensitive telescopes. Even then, astronomers say, the comet will not be as impressive a sight as in 1910.

Because the earth's position relative to the comet's path will be different this time, the comet will be on the other side of the sun when its tail reaches its maximum length of perhaps 50 million miles. The best times for ordinary viewers to get a glimpse will probably be in November and December of 1985 and again in March and early April of 1986.

Scientists are confident that recent technology will more than compensate for the inferior viewing circumstances. In 1910, the world's largest telescope had a 60-inch mirror. Now there are 16 optical telescopes 98 inches or larger, not to mention the many new telescopes for observations in the wavelengths from radio through the infrared to the ultraviolet.

This time, moreover, scientists intend to meet the comet more than halfway, so to speak, in an effort to learn more of its composition. They are sending out four spacecraft especially designed to study the comet.

Ambitious Russian Mission

The Soviet Union, in partnership with France, has the most ambitious plans. Two spacecraft, Vemera Halley 1 and 2, are to be launched in December 1984 and fly by Venus. This had been the mission's sole objective till a French scientist suggested redirecting it to encounter the comet.

The encounters are now scheduled for March 8 and 13 in 1986. The two craft should come within 6,000 miles of the comet's solid nucleus and spend several hours taking pictures and gathering other data.

According to American scientists, the Soviet craft will be equipped with two television cameras with new electronic sensors that should produce high-quality pictures. Other instruments include magnetometers for examining the comet's magnetic properties, if any; sensors for studying the electrically charged gases surrounding the comet, and several spectrometers for determining the nature of the dust particles in the tail.

This will be a key test of the "dirty snowball" model, proposed in 1951 by Dr. Fred L. Whipple of the Harvard-Smithsonian Center for Astrophysics. He pictured a comet as a frozen mass of gas and dust. There would likely be ices of ammonia, carbon dioxide, methane and water, believed to be the most abundant materials at the edge of the solar system where comets are thought to originate. And mixed with the ice could be carbon, magnetite and silicates, which are also found in those other ancient interplanetary travelers, the meteorites.

Dr. Whipple was drawn to this model by the observed behavior of comets. Jan Oort, a Dutch astronomer, had calculated that comets must come from beyond the planets. A swarm of the cometary material, the so-called Oort cloud, was the frozen leftovers from the formation of the solar system, according to the hypothesis. And on rare occasions the gravity from a star in the neighborhood might jostle some of the comets out of the cloud and into their own orbits, taking them in close to the sun.

As a comet moves in toward the sun and warms up, some of the ice melts and vaporizes to form a dusty, gaseous atmosphere around the nucleus. This is called the coma. From it extend the separate tails of gas and dust. Solar radiation breaks up the gas molecules, producing a stream of electrically charged particles. This tail carries millions of miles, pointed away from the sun, while the pressure of sunlight blows the dust away in a separate and more visible tail, which trails the comet in its orbital path.

Beside the two Soviet craft, European and Japanese vehicles will also inspect Halley's comet.

The European Space Agency, a consortium of 11 Western European nations, plans to launch its probe July 10, 1985. The spacecraft, named Giotto after the 14th century Florentine artist who depicted Halley's comet, will be flown to within 600 miles of the comet on March 13, 1986. It, too, will carry a camera and instruments for investigating the comet's dust, gases, charged particles, chemical processes and magnetic properties.

Japan's spacecraft, designated Planet A, will be launched Aug. 14, 1985, for a flyby of the comet on March 8, 1986 — the same day as the first Soviet encounter. A much smaller craft, it will carry only two instruments, an ultraviolet camera and a charged-particle analyzer, and may get no closer than 80,000 miles.

For several years, American researchers sought support for their own mission to rendezvous with Halley's comet, but to no avail. Each proposal, beginning in 1978, was turned down by the National Aeronautics and Space Administration or the White House because of the tight space budgets. The more ambitious plans called for no ordinary flyby but a station-keeping mission with the comet — cruising along close by the comet for several weeks, followed by a visit to another comet, Tempel-II, for comparative studies.

With the American record for success in interplanetary flight, the mission promised to be more rewarding than anything that will be conducted. Stephen J. Edberg, an astronomer at the Jet Propulsion Laboratory, lamented, "I'm still crying about not having an American mission."

American scientists will not be left out, however. They will be flying some instruments on the European spacecraft. Barring development delays, the 94-inch space telescope should be orbiting the earth by the summer of 1985 and observing the comet as it approaches the sun. An effort is being made to have the space shuttle carry aloft an ultraviolet telescope to study the comet as it passes close to the earth in November, 1985.

Even before the spacecraft leave the earth, hundreds of astronomers will be peering at the comet through a coordinated program known as the International Halley Watch. The operations will be directed from the Jet Propulsion Laboratory, with NASA financial support, and the Remeis Observatory in West Germany.

For the time being, there is nothing to the comet but its nucleus, which may be a mere three miles in diameter. It is now traveling in at 21,600 miles an hour. By early 1985, it will cross the orbit of Jupiter and begin warming up. In the summer of 1985, when it traverses the asteroid belt between Jupiter and Mars, the nucleus will probably become obscured by the glow of its widening coma.

A Checkup Every Month

By then, the Halley Watch will be conducting monthly observations by astronomers around the world, both professional and amateur. They will be recording the development of the tail, which will probably take shape as the comet passes the orbit of Mars in the early fall. They will measure the heat and other emissions that should show its composition.

According to calculations by Dr. Yeomans of the Jet Propulsion Laboratory, the comet will come within 57.7 million miles of Earth on Nov. 27, 1985 — the closest passage inbound. Then, gathering speed from the tug of solar gravity, the comet will swing around the sun, coming within 55.8 million miles of it on Feb. 9.

Emerging from behind the sun, the comet should still be quite bushy-tailed when the four spacecraft make their encounters in March. The comet's closest outbound approach to Earth, at a distance of 39 million miles, will come on April 11. For many on the ground that will be the best viewing opportunity.

Scientists of the Halley Watch plan to continue coordinated worldwide observations for about a year. Then, as Halley's comet passes far beyond the orbit of Jupiter, it should fade into the starry background, not to return again for another lifetime — in 2061.

To: Alan Kay January 10, 1983

From: Scott Fisher, Bob Stein

Re: Videodiscs

Our goal here is not to propose a grand Atari videodisc strategy. A lot more groundwork has to go on before that can be done well. Our purpose here is simply to offer some suggestions as to how Atari can tackle the complexity of issues that must be considered and get started.

Why is trying to understand the videodisc question like wrestling with a greased pig? They're both big and slippery. With that caveat in mind, let's go!

Part of the difficulty in understanding videodiscs is the broad range of potential applications and consequently the great number of markets the technology intersects with. Videodiscs are so many things to so many people.

-- To the movie industry videodiscs are a vehicle for delivering movies to individual homes in a hard-to-pirate medium.

-- To record publishers it is potentially the future of the record industry.

-- To game designers it may be a viable short-cut to high resolution graphics (at least for backgrounds).

-- For people in the knowledge game it is a transitional solution on the way to the dynamic multi-media book.

-- To computerists it's a medium on which to store vast amounts of digital data or equally impressive amounts of "visual" data in the form of pictures as well as sound.

Assumptions

1. This memo is predicated on the firm expectation that videodiscs constitute a viable consumer technology with wide-ranging entertainment and learning applications and therefore, are a key technology in Atari's future.*

2. What You See Is What You Get (at least for a few years)!

   Whatever may be in the labs, the technology has reached a plateau and short of minor improvements (more powerful motors, faster seek algorithms, sturdier mechanism, etc.) for the next two years or so the player base (both in terms of the consumer market and what might be available to Coin-Op) will consist of machines basically like today's. Multiple heads or full-frame buffers, sound over still, etc., are unlikely to appear at reasonable cost before 1985, if then. (We're considering the RCA "interactive" player in the "already seen" category.)

3. We're Very Early On The Learning Curve!

   The number of consumer videodiscs whose content was designed and produced originally for disc can be counted on one hand. The number designed to be controlled by a human through a microcomputer is nil. We don't even know of any in the planning stages. This is not said to create a sense of confidence at Atari that we can wait indefinitely to get into the market, but to emphasize the point that we (humanity, not Atari) have had precious little experience with the medium and many of its most interesting uses have not yet been imagined.

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* Lest there be too much skepticism about the viability of the consumer videodisc market (especially given early press accounts of supposedly dismal sales), it should be pointed out that videodiscs enjoyed the best first year sales of any big-ticket item. Consider the following statistics: In the first year RCA sold 12 times as many videodisc players as all manufacturers of black and white TV sets sold in the first year. When compared to color TV sets the number is even more impressive with 16 times as many videodisc players the first year. (We're talking units, not dollars.) In terms of dollars, the first year sales of RCA players and discs exceeded the combined first year sales of b&w TVs and color TVs, and VCRs by 90 million dollars. And all this with a minimum amount of software. The Milton Berle (credited with launching the mass TV market) or Visicalc (doing the same for micros) of videodiscs has yet to appear. One last point. Last year the average owner of an RCA player purchased 32 videodiscs.

Assumptions, Cont'd

4. Videodiscs are a subset of the broader video question

The advent of the videodisc occurs in a broader context. We are on the verge of significant developments in the field of video itself - high definition TV, 3D, and digital TV are all on the way within the next 10 years. Also, the courtship between computers and video is developing apace - computational video is the wave of the future. A correct videodisc strategy must be developed in this broader context. For example, while in one sense videodiscs are viewed as a kludgey, awkward technology, transitional in nature on the way to all-digital picture creation, videodiscs are the only way to fly if you want to get a headstart in the area of interactive video (both in terms of learning how to do decent programming and in terms of the marketplace).

Points And Recommendations

1. Applications should be the driving force behind hardware decisions.

A lot of the discussion at Atari re: videodiscs has centered on the question of hardware (wish lists of modifications, laser vs. capacitance, etc.). On the whole these discussions tend to be taking place in the abstract, without a clear idea of the applications the hardware addresses. We suggest that big hardware decisions be postponed until we have a major brainstorming effort on potential applications. Especially since different divisions, Coin-Op, CED, and HCD, may come up with quite different hardware requirements. Many exciting applications may also transcend the various divisions' products at this time.

2. Good videodisc programs will be a synthesis of the visual storytelling skills of the filmaker and the interactive branching knowhow of Atari software designers. To get to this synthesis, the filmakers and software designers will have to learn each others' vocabularies and perspectives. Lucas, Spielberg, and other filmakers should be brought into brainstorming sessions and project planning from the beginning.

3. Many parallel efforts - czar, no; ombudsman, yes

Given that we are early on the learning curve it makes sense to consider supporting several videodisc projects at Atari, within divisions, and across divisions. The theory being that we plant a number of seeds to see which ones grow - better a lot of smaller projects than one or two BIG projects.

There shouldn't be any one person empowered to put thumbs up or down on every project because there isn't one person today who could hope to recognize all the valid applications people will come up with. Expert is a relative term and while there are people a little further along the learning curve (and thus are 'experts'), we wouldn't want to invest them with the power of a czar.

On the other hand, we definitely want to capitalize on Atari's size and diversity. A videodisc ombudsman should be appointed to ensure lessons learned on one project are transferred to others and to have an overall sense of all videodisc resources - machines and people - inside and outside the company.

On the business side, we suggest that all videodisc 'deals', hardware and software, be funnelled through one person. This is the only way to maximize Atari's clout effectively.

4. The FIRST important hardware issue for Atari to address IS NOT player modification, but the design and development of an INTERFACE between the videodisc and Atari products that would allow program designers to fully utilize the technology that will be in the marketplace over the next few years.

First efforts should be:

a) A cartridge (and connecting wire) that would turn the VCS and/or 5200 into a low-level videodisc controller.

b) An interface for the 800, 1200, etc., which can at least transfer feedback from player to computer about what track is being read and at best permit you to overlay computer graphics on the videodisc signal.

c) Modify Antic chip to ensure compatability of Atari computer graphics with NTSC video. Work in this area could easily be expanded from work already done for the ERIC system. ERIC constitutes a head-start. Let's not squander it!

5. Publishing A Range Of Discs

While the videodisc market is evolving rapidly, Atari should aim to produce programs for all hardware configurations with a minimum market penetration.

--Stand alone players - Atari should definitely do game discs on the order of but better than, the "Kidisc."

--Videodisc player plus computer (or VCS) - where the computer is used to control the sequencing of images from the videodisc player. This configuration will probably lend itself better to non-skill and action adventure type games. For example, popular movies may be transformed into home computer games.

--Videodisc player plus computer with computer graphics overlay - working toward full integration of videodisc images, computer graphics, and computer sound.

[Note on videodiscs and games: The charge from video games comes from the control the player is able to exert over the graphic images. They do what you make them do! This sense of control is the key and in no way will the startlingly real backgrounds from the videodisc permit us to slack off on the "playability" quotient. In fact, heightened realism will require even more skill on the part of the game designer since greater realism will evoke a desire for even greater control on the player's part. For example, in a racing game with real backgrounds from a videodisc, the player will expect comparatively greater realism in the steering wheel response.]

Spinoffs: We need to be constantly aware of major possibilities which arise in the course of videodisc work. For instance, Coin-Op's manufacturing capabilities might support a business which offers point-of-purchase video display units ala ERIC.

6. Publishing Model

If a careful strategy is worked out, Atari could become the Atari or Warner Records of the videodisc industry. Key to this is accepting the fact that we can't hope to hire all the creative people required to produce as many good videodisc programs as Atari is capable of distri-

buting. (This has as much to do with the sensibilities of artists and the geographical location of Atari - Sunnyvale isn't NY, LA, SF, or Boston - as anything else.)

Therefore, in addition to their own in-house productions, each division should expect to function like a book or record company which publishes the work of independent artists.

Presumably, Atari could solicit ideas and proposals for projects from a broad cross-section of independent artists and products. Atari would then select projects for development with Atari functioning as executive producer/editor - working with these outside production companies to refine concepts and monitor the production itself.

7. Videodisc Facility

We distinguish between a production facility capable of producing the 1" tape required by the disc manufacturers for mastering and a development facility where people can play around with and experiment with ideas to be used in actual productions. We recommend against setting up a production facility at this time for two reasons:

a) It's extremely expensive if done right, probably between four and eight million dollars. Given that Atari probably couldn't use the full capacity of such a facility at this time, this is an unnecessary expense. Also, many established production houses, some right in our Sunnyvale backyard, could supply this capability for us now at expensive but reasonable costs.

b) It's too early to decide exactly what configuration we might want in a production facility; we probably need to engage in actual videodisc production for a few years before we could be sure that we are building a facility that would serve our needs.

On the other hand, we definitely recommend setting up a development facility to serve the work in the divisions (including outside artists they are working with). Such a facility should cost one-half to one million dollars.

8. Hardware Wars

RCA and Pioneer, the major players representing the two videodisc formats have visited us recently. (VHD, the third format, is on indefinite hold.) Each technology has its advantages and disadvantages depending on the application. For now, given technical and market realities, we will have to work with both formats. Both companies expressed an interest in working with (companies like) Atari on custom hardware. For discplayer features requiring major research & development efforts, both companies suggested Atari might co-fund such work (which says something about how enthusiastic they are about sinking much more money into the technology on their own).

We should speak to the other manufacturers - Sony, Phillips, and Matsushita - so that once we have established our hardware and software requirements and priorities we are in a position to strike the best possible deal/deals.

Immediate Steps

1. Hold a major brainstorming meeting, the central purpose of which is to explore the range of applications that Atari should address. We want to emerge from the meeting with a much clearer idea of what videodisc programming is appropriate to Atari - the Atari look, style, niche, etc. Clearly this will be an evolutionary process, but we need to start the ascent from a higher plateau than we're at now.

   This meeting whould allow us to set hardware priorities - both what is needed in an interface and what sorts of features we need built into future machines.

   We may want to invite a few key people from outside Atari, including other WCI people actively considering videodiscs, and some independent producers we may want to work with who have demonstrated imaginative work with videodiscs.

2. Appoint an ombudsman to facilitate projects throughout the company.

3. To strenghthen Atari's position vis-a-vis the video/computer marriage, a company-wide group should be created to consider hardware-related issues and help

define longer-term research directions for both hardware and software.

Some of the issues that the group should explore are:

a) Specs of an interface between Atari hardware and various videodisc players.

b) The potential of OEMing an Atari videodisc peripheral.

c) Mass storage of digital data along with images on videodisc.

d) Erasable, writable, optical disc players.

e) Sound over still image.

f) Multiple-head players and/or frame buffers.

g) Non-NTSC video: high definition TV, vector scan; Atari's postion vis-a-vis international standard setting.

4. The Warner Connection

Videodisc design, production, and manufacturing is very expensive, especially for a consumer media product. All possible leverage must be brought to bear if innovative programming is to be produced and marketed successfully. For this reason, we suggest that Atari take the lead in considering and urging WCI to consider how WCI's varied entities might contribute to a major effort. Some questions include:

a) The use of Warner production facilities.

b) Distribution through existing WB and Warner Records channels.

c) Tie-ins with Warner Publishing entities, e.g., DC Comics.

d) Mastering and replication deals with disc manufacturers which would include Warner Records, Atari, and WB.

e) Should WCI go into the mastering and replication business?

f) The use of existing (and future) Warner TV and movie footage in Atari videodisc products.

5. Marketing and Testing

We suggest that Conrad Jutson's group begin a significant marketing study of videodiscs, both the key markets for Atari to address and the likely channels of distribution (e.g., will Atari videodiscs be sold in record stores, video stores, computer, or toy stores?). General market testing, i.e., asking the public at large what sorts of videodisc programs they want isn't useful since people who have not been exposed to the technology won't be able to offer imaginative enough answers. On the other hand, users of the technology, particularly where children are in the household, may be a rich source of information as to what market Atari should attack.

6. Securing Rights

In anticipation of videodisc games developments, Atari should secure rights and/or arrange for joint ventures with DC Comics, Disney, Sesame Street, Henson's Muppets, etc. Their characters are naturals for videodisc productions.

7. Lucasfilm

Discussions should be held with Lucasfilm to explore ways in which the connection between the two companies can be exploited in the videodisc market. They have had people working with the technology for some time and undoubtedly have a lot of technical and creative insight to offer.

8. For Those Who Have To Get Started Immediately

If any group is driven by the need to get something to market as soon as possible, the following may be helpful:

1. Get someone on staff who has made a disc. The first project is invariably a killer and it will save lots of time and money if you have someone who has been through it before. This person <u>does not</u> have to be in charge of the project.

2. Pick doable projects. Avoid complex projects requiring lots of trial and error experimentation.

3. Aim for your first disc to be a learning and design tool. Something always needs to be redone on a first disc so they rarely make it to market. Since the handiest medium to have material on for design purposes is a disc (as opposed to tape) we suggest you plan to use the first disc as a design tool. Then your second disc, designed with the aid of the first, is the one you bring to market.

Inter Office Memo

CORPORATE DIVISION
Corporate Research

To: Keith Schaefer

From: Brenda Laurel

Subject: "Voyage of the Mimi" Date: 1/19/83

This is to follow up on our whirlwind meeting last Friday regarding Atari sponsorship of the planned television series, "Voyage of the Mimi," to be produced by Bank Street College under the direction of Sam Gibbon. Gibbon, as you may recall, was the Emmy-award-winning producer of "Sesame Street" and "The Electric Company" for CTW. We have every reason to believe that the "Mimi" series will represent another such milestone in quality television for children.

Rick Glossman's memo summarizes the proposed business deal for Atari sponsorship of the television series. I want to remind you of the additional developments that may make the deal even more attractive to us:

> Bank Street has obtained permission from PBS and DOE to use an Atari computer in the show so that it is recognizable, and
>
> PBS will allow its local affiliates to offer purchase of Atari products at the end of each broadcast, so that the local station acts as a dealer at a 20% margin.

Our sponsorship would assure that related software will be developed for our machines, since an Atari, and not an Apple, would be used in the series in the many scenes where the kids and scientists are using the computer.

I also want to remind you of the scope of visibility that this project offers us. In addition to the PBS broadcast, there are other broadcast opportunities, both with the networks and in syndication. The entire project, including videotapes, software, and videodisk products, will be marketed to schools--hence our name and products can appear in every classroom in which the materials are used. Finally, the magnitude of the DOE grant and the multi-media nature of the project have already attracted the attention of the educational community and will also be of interest to the press.

We hope that you will express your support of the proejct to the other powers that be. Please call if you have any questions, or if you would like me to arrange another screening of the pilot episodes.

Many thanks for your consideration.

xc: Sueann Ambron
Chris Bowman
Jim Dunion
Rick Glossman
Bob Hon
Kristina Hooper
Ted Kahn
Alan Kay
Brian Moreno
Jan Soderstrom
Bob Stein

Sent to S. Bonnie 1-25-85

CORPORATE DIVISION
Corporate Research

Atari Incorporated
1196 Borregas Avenue
PO Box 427
Sunnyvale California 94086
408 745 0510

Attendees at the Atari/Warner Records meeting 1/18-19.

From Atari Research - available at the above address and phone

Susan Brennan
Scott Fisher
Ann Marion
Alan Kay

From Atari Design Research - available at 1171 Borregas Ave.
Sunnyvale, CA. 94086
(408) 745-1310

Michael McKay

From Atari - available at 292 Gibraltar Ave.
Sunnyvale, CA.
(408) 745-2570

Pat Cole

From Atari Research: Consultants

Bob Stein - available at Atari Research or 2139 Manning Ave.
Los Angeles, CA. 90025
(213) 475-3524

Mike Naimark - available at Atari Research or 216 Filbert St.
San Francisco, CA.
94133

Others:

Bonnie MacBird - available at 12212 Octagon St.
Los Angeles, CA. 90049

Aleen Stein - same as Bob Stein

Rebecca Allen - available at NYIT Computer Graphics Lab
Wheatly Rd.
Old Westbury, NY 11568

Joe Medjuk - available at The Burbank Studios
Producers Building 1, Room 109
Burbank, CA.
(213) 954-1771

Corporate Division

Atari Incorporated
1196 Borregas Avenue
PO Box 427
Sunnyvale California 94086

February 15, 1983

Mr. Ted Kahn
Atari Institute for
Education Action Research
1196 Borregas Ave.
Sunnyvale, CA. 94086

Dear Ted,

Thank you for inviting me to participate in the Institute's recent program in Dallas. Taken together, the accounts of the projects being funded by the Institute make a strong statement about the power of the computer as an amplifier of human potential and a facilitator of human communication. In the research environment, we tend to discount the potential of existing technology. As someone concerned with the tools of tomorrow, it was humbling to see the richly creative ways people are using current Atari hardware and software. It sets a high standard for our work at Atari Research.

Popularizing its success is one of the most important things the Institute can do. Judging from the excellent audience reaction, the presentations made a very convincing statement about the social value of computers in general, and Atari's unique role, in particular. I strongly suggest that you arrange for similar programs at appropriate events, especially some of the major national education-related conferences. Atari's image should soar.

The videotapes that were shown were quite good. I urge you to continue the practice of requiring these video reports and to consider compiling an "Atari Institute Greatest Hits" program which could be shown widely. This tape should also be shown throughout Atari itself. People will be proud to learn of the influence Atari has in the community at large.

Please feel free to call on me. I would be very pleased to help in any way I can.

Sincerely,

Bob Stein

cc: R. Kassar, A. Kay, S. Williams
E. Gerrard J. Cavalier

Inter Office Memo

Corporate Research Group

To: ASR, Research Engineering, Games Research, Design Research

From: R. Stein

Subject: Steve Gibson Date: 2/17/83

Steve Gibson, inventor of the incredible Gibson Light Pen (see atttched), will be here with his associate Steve DeWitt to make a presentation to the Research Group at 10am, Tuesday, March 8th. This pen is so nifty (it's the software rather than the hardware that makes it so special) that Apple actually modified the 2e to make sure it would be compatible with the pen.

While Gibson and DeWitt will be making a presentation appropriate to a research group, they would be happy to meet afterwards with marketing people etc., who would like to discuss the possibility of developing an Atari version, etc.

cc: Conrad Jutson
Chris Horseman
Bob Fournier

RS:jck

VOLUME 1 OCTOBER 1982 $3.00

Woz Cranks It for US

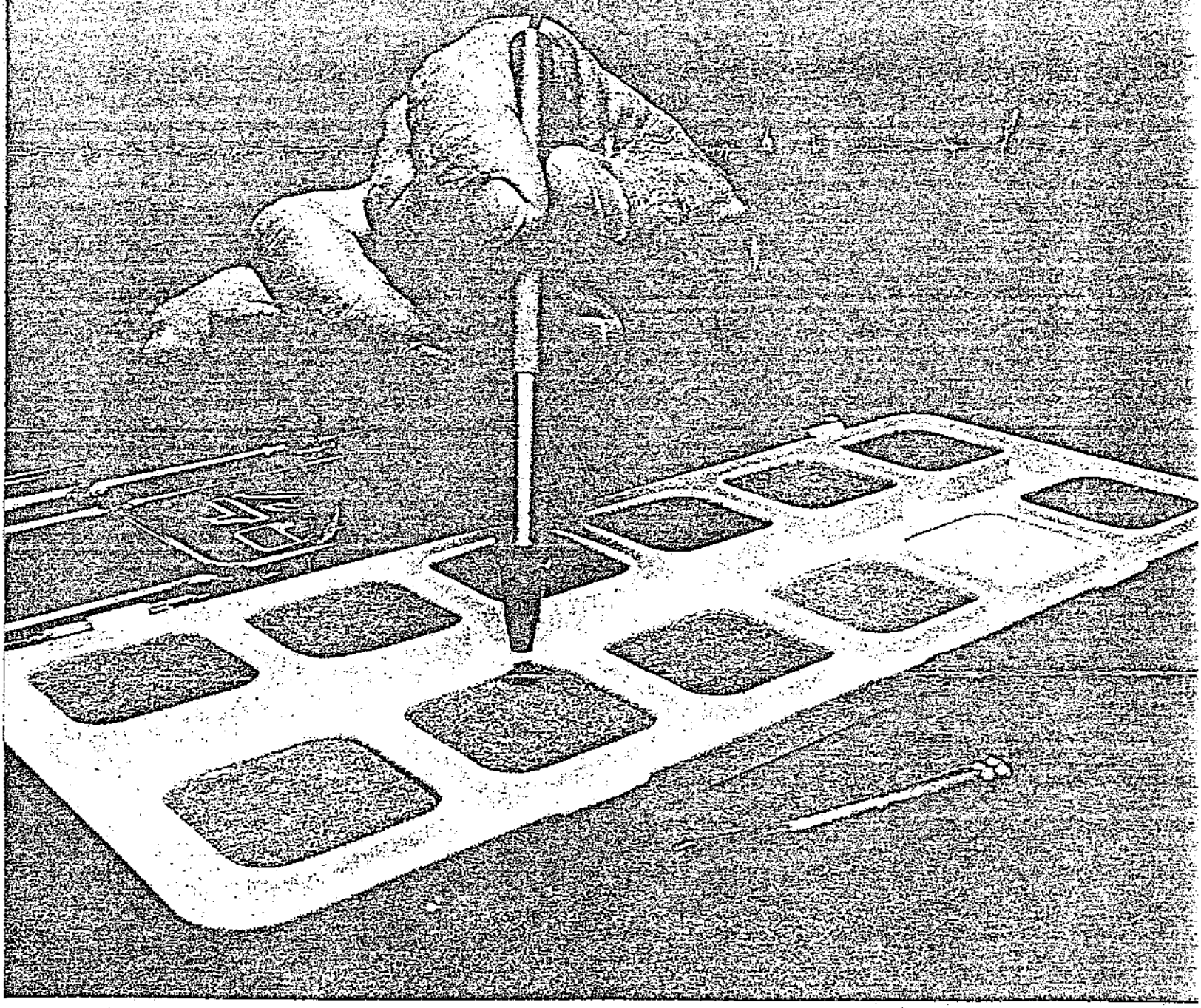
Exec Infocom

Apples of the Sun

Bob Bishop's Hi-Lo Soft

A GRAPHICS TOOL FOR THE DISCERNING PALETTE

BY DAVID DURKEE



It has been said that any sufficiently advanced technology will be indistinguishable from magic. If you think that this principle applies only to isolated aboriginal tribes, like the ones in New Guinea who thought they were seeing the gods incarnate when airplanes first flew over their lands, think again.

We Apple users like to think of ourselves as too technologically aware to be more than just impressed by something as mundane as a new peripheral. It's a good thing when something comes along to challenge our complacency. If you left your sense of wonder behind you with other childish things, you may be surprised to find out that magic has returned to the world.

Saint Nick Deals a Gibson. Imagine that you're a kid again, and it's Christmas morning. There are presents under the tree, there's a fire in the fireplace, and there's a foot of fresh snow on the ground from the night

before. Now imagine that one of the presents is so neat that for the rest of Christmas vacation you forget about snow forts, snowmen, snowballs, and the Flexible Flyer in the garage and just play with this one present. If you close your eyes and think about that for a second, you'll begin to feel the way that we feel about the *LPS II* from Gibson Laboratories.

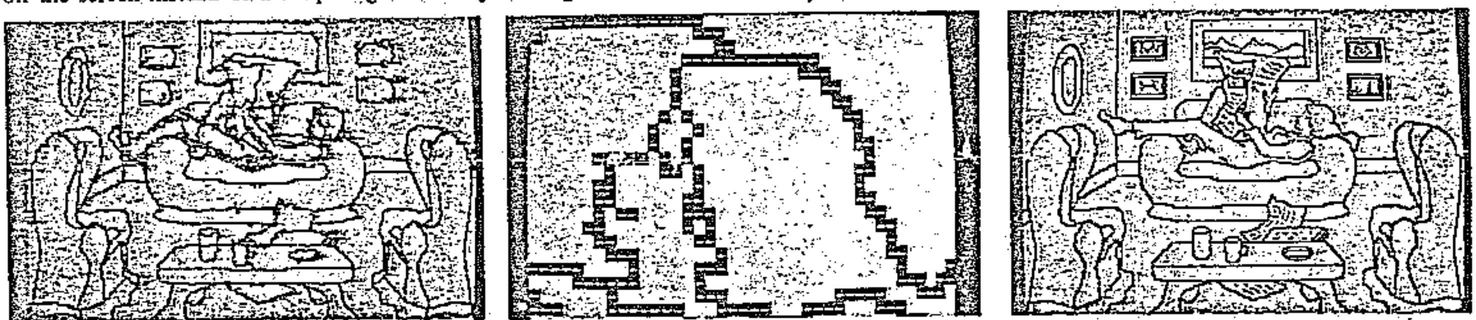
The *LPS II* is a light pen that's turned into a revolutionary graphics system. Originally intended as demonstration software, the disk in this package contains the most exciting hi-res art system since Bill Budge first chose to share the secrets of 3-D. The pen becomes a tool to the software—but a very special tool.

This pen is not to be confused with other instruments called light pens. It's similar in appearance—a penlike object attached to a wire that runs to the back of the Apple—but in execution it is a quantum leap beyond other light pens. It actually gives the Apple a coordinate location on the screen instead of a simple light-intensity reading.

trol functions, such as turning the pen on and off, selecting a color, and loading or saving a picture, are handled with single keypress commands instead of with a pen-based submenu. If you forget the commands, they're as close as the help screen. Just hit H.

Assisted Triple Play. Some of the other programs support and add to the capabilities of *Sketch*. *EasyEdit* allows you to clean up your picture. *Geomed II* lets you put perfect geometric forms in your hi-res drawings. *Penpainter* is an innovation in color-fill programs that makes the most hardened adult yearn for a disk-based coloring book to play with.

Even with the most precision equipment, the human hand is not completely steady, so anything you create with *Sketch* is likely to contain small glitches—lines that don't quite come together or details that don't look quite right. With *EasyEdit*, you point the pen at an area on the hi-res display and you instantly zoom in on the image in that area. That is, a forty by twenty-four pixel section of the hi-res image will be instantly translated to the text screen. Each pixel that's *on* (white) is repre-



Left: This cozy domestic scene was created using *Sketch*. *Sketch*, *Geomed II*, and the *Penpainter* sketch mode all include a powerful mirroring function that can be set for two-way horizontal, two-way vertical, or four-way mirroring. The symmetry of the furniture was accomplished with two-way vertical mirroring. Center: Using *EasyEdit*, the rough lines of the picture on the left are smoothed out point by point. *EasyEdit* was also used to create the face and other detail work. Individual pixels from the hi-res display are blown up to the size of Apple text characters in *EasyEdit*'s zoom mode. Right: The domestic scene after *EasyEdit*: The line drawing is clean and was relatively easy to create. It is now ready to go on the *Penpainter* to pick up some color.

Steven Gibson, the creator of the *LPS II*, originally intended the device and its machine language driver program, *Pentrak*, as a graphics aid for programmers, but light pens had such a bad reputation that computer retailers wouldn't even look at it. Undaunted, he set out to create demonstration programs. He soon got so caught up in the wonder of his own product that the demos grew to a full graphics system.

No graphics system on the market makes a fair comparison with the *LPS II*. The paddle and keyboard based systems are all somewhat difficult to use. Keyboard input just doesn't lend itself to easy graphics application. Paddles' problem lies in their duality: you need both members of a pair to control horizontal and vertical cursor movement, and paddles aren't designed for one person to operate both dials at the same time. Joysticks aren't much better; although simpler to manipulate than paddles, they don't give as fine a degree of control.

The Apple Graphics Tablet comes the closest to the *LPS II*, but having to point to the tablet and watch the CRT just isn't the same as pointing the pen directly at the screen and seeing the image appear right beneath the pen tip.

"Don't Point That Thing at Me!" The system is operated from a central menu program that comes up when you boot the *Pentrak* master disk or whenever you exit one of the system's programs. The menu is the first inkling an unsuspecting user has of the actual capabilities of the pen. You merely point the pen at the program you want. Many of the programs in the system use similar submenus, making the whole package as friendly as you could ask for.

For each of the programs, there's a help listing accessible from the keyboard. The programs are so interactive and easy to use that the one-page help listings are all it takes to make the programs completely self-explanatory.

After running *Introduction* (which gives an overview of the system) and *Calibrate* (which ensures that the pen is honed in to your individual screen), the logical place to go is *Sketch*. This is a drawing program that's as easy to use as pen and paper but more versatile. The pen has six colors, and the whole image can be erased or switched to a reversed display (black on white instead of white on black) at any time.

Because *Sketch* uses the whole screen as its drawing pad, all the con-

sented by an inverse space (which appears as a white block the same size as the Apple's flashing cursor), and each pixel that's *off* (black) is represented by a normal (white-on-black) dash. You then use the pen to change the image point by point. The result is a picture with clean lines, well defined angles, and fine curves.

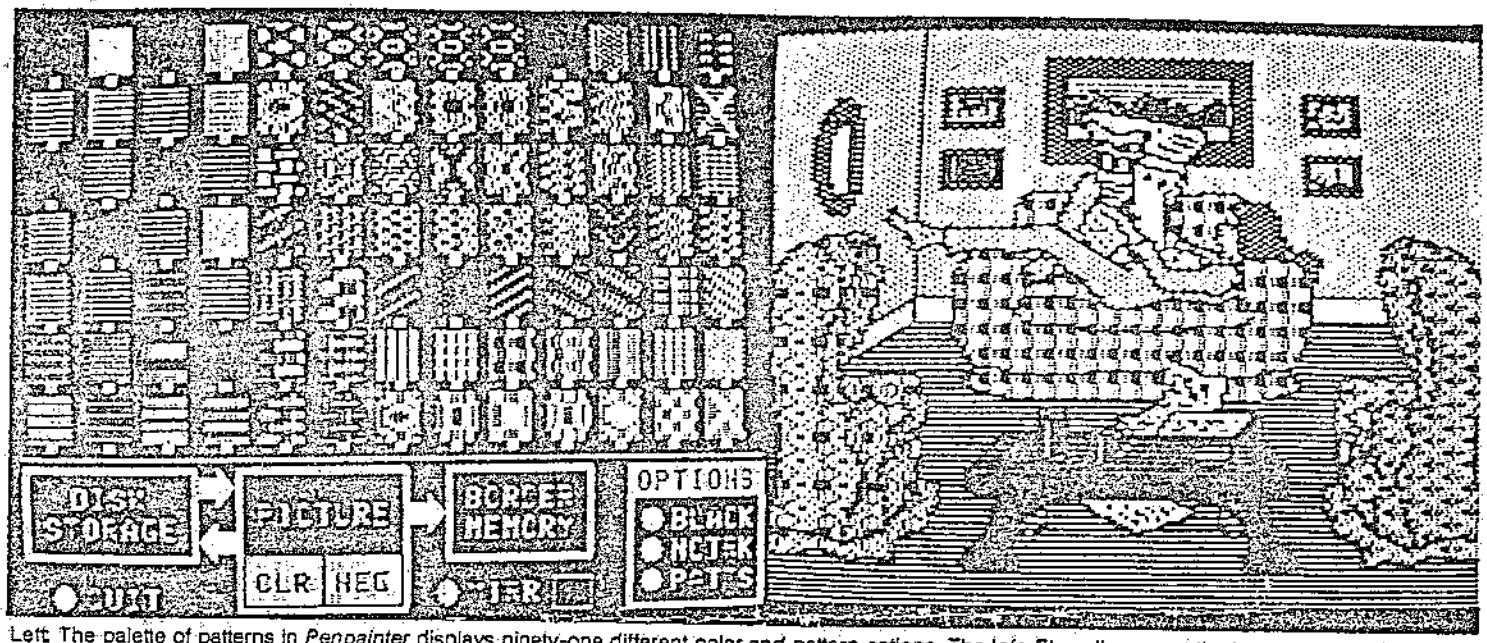
Penpainter is perhaps the most powerful and exciting program on the *Pentrak* disk. *Penpainter* is a fill program that doesn't have to be told twice. Where most fill routines may miss a section of the area they're supposed to cover and require the user to try again to get the missed areas, *Penpainter*'s fill algorithm never misses. It actually seems to find and fill its "missed" areas itself, so filling even the most complexly shaped area is always a one-step process.

The first thing you do when you enter *Penpainter* is load the picture into what Gibson has called "border memory." The picture you start with must be a black-on-white line drawing created with *Sketch*, *Penpainter*'s mini-sketch routine, the other programs, or any other graphics system. If your outline drawing is white-on-black, *Penpainter* can reverse it with a single pen stroke. Selecting the border memory option makes the black lines thicker and copies the screen to a separate location.

South of the Border. The purpose of the separate storage location is to allow you to change your mind. When you fill an area, *Penpainter* determines the area to fill by looking at border memory, not at the actual picture. It performs the action of filling on the displayed screen but leaves border memory as it is. If you don't like the pattern you first selected, you can replace it with another with no hassle—even if your first choice was black.

You may have noticed the word *pattern* where you might have expected *color*. This is another unique feature of *Penpainter*: it fills with patterns. The disk comes with a file containing ninety-one different patterns. Some are solid colors, some are mixed colors such as other graphics programs offer, and some are repeated patterns.

The beauty of this approach is that you can create your own patterns using another of the programs on the disk: *Pattern Editor*. You can easily create any conceivable pattern from wallpaper to herringbone, from water to brick wall.



Left: The palette of patterns in *Penpainter* displays ninety-one different color and pattern options. The Info-Flow diagram at the bottom not only shows the options available, but suggests the logical order of the painting process as well. Right: The domestic scene in color. Some of the patterns used came with the Patterns file on the disk; others were custom made with the *Pattern Editor*. Any of the patterns in the picture can be changed by selecting a new pattern and pointing the pen.

The outstanding system is not without problems. One minor annoyance is that these programs have no protection from ordinary disk errors, like file locked, file not found, and disk full. These problems won't occur if you do everything right, but to err is human. The only other problem with the current implementation of the graphics system is that you have to save the picture before you can pass control from one program to another. Gibson will release a unified graphics system that eliminates these problems by the end of November, but even in its present form *LPS II* is easier to use than any other graphics system extant. The update will be free to all *LPS II* owners.

Two programs are included that don't tie in with the others in the graphics system but are interesting in their own right. *Music* allows you to use the pen to compose short musical pieces that it plays with the *Pentrak* sound routines. *Animate* lets you make a twenty-frame graphic cartoon frame by frame and point by point. The graphics in the cartoon can be as complicated as your patience allows. While both of these are really only demo programs and have the limitations that that implies, Gibson plans to expand on them if there is sufficient user interest.

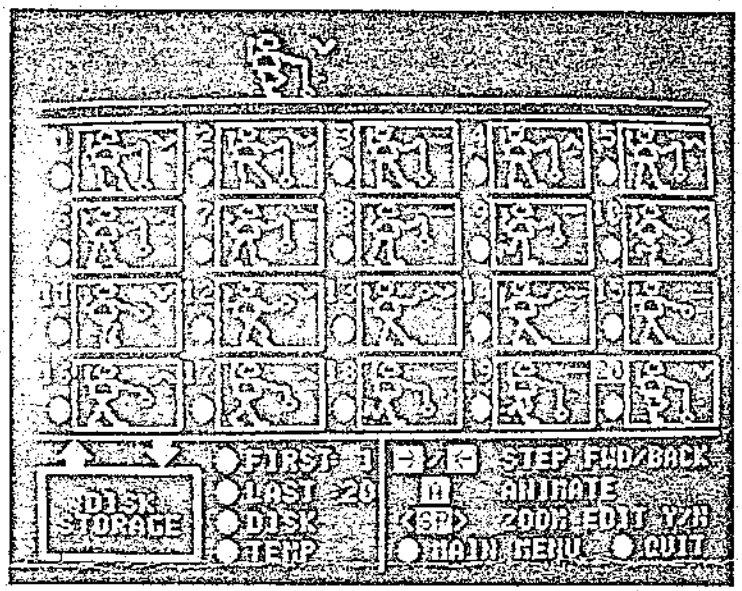
Happy Hour. All the programs are written in unprotected Applesoft Basic, so they're open for intrepid programmers to build on and modify. In fact, Gibson has deliberately left them uncopyrighted. He figures that if people take routines from his programs and put them into their own, even for commercial purposes, it won't hurt his business. It will just sell more pens.

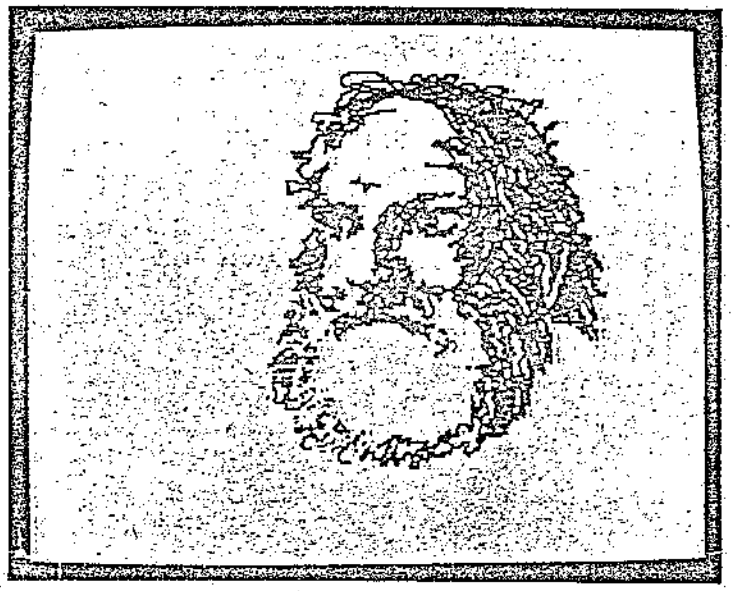
For the Applesoft programmer, the programs that come with the *LPS II* are just the beginning. The *Pentrak* driver is the software heart of the graphics programs, but more than that, it was designed for easy access from Basic. The machine language routines that allow the pen to work its magic are available to the ordinary programmer.

Pentrak uses the ampersand hook, which may be somewhat familiar to those who have used the *Renumber* program from the DOS System Master. Simply, Applesoft's ampersand command (&) calls a machine language routine at a specific location. The routine is then able to read the characters following the ampersand in the Basic program and interpret them as further commands.

So loading the *Pentrak* driver adds a whole new set of commands to Applesoft. A *Pentrak* command that demonstrates the typical command syntax is *&PEN(X,Y,KEY,ZV60)*. This tells the computer to follow the pen's position on the screen and put the values for its location into the variables X and Y when an escape condition is met. Two escape conditions are given in this example. *Key*, the third parameter in the parentheses, says to escape when a key is pressed and put the ASCII value of that key into the variable *key*. *ZV* in the fourth parameter stands for zero velocity. *ZV60* says to escape when the pen has been aimed at the same point on the screen for sixty machine cycles, or one second. While *key* and *ZV* are the only escape conditions available, the variable parameter on *ZV* and the possibility of using the conditions alone or in combination make the commands that use escape conditions extremely flexible.

DocuDramas. The *Pentrak* system includes other commands and options to draw a black or white rectangle anywhere on the hi-res screen, produce sounds, write in various character sets on hi-res, negate a screen, switch to hi-res without clearing the screen, and perform many other





Left: The main screen from *Animate* displays the menu at the bottom and the twenty frames of the animation in the middle. When the animate command is given, the figure moves across the top of the screen. Right: Even without the assistance of color filling, *Sketch* is capable of creating some striking artistic effects.

functions. The manual sections covering these commands are at times a little hard to follow, but by examining the demo programs and experimenting you can learn the new commands fairly quickly. Gibson offers documentation updates at no extra charge as they become available.

Gibson Laboratories's plans and policies for customer support are exemplary. Gibson offers a six-month warranty on hardware and software defects. Although more than five hundred pens have been sold, none have been returned defective. He also offers software and documentation updates free to anyone who returns the registration card.

There are some exciting programs soon to be released which will use the *LPS II*. The first game for the pen is called *LPS II Madness* by John Besnard. Stoneware is updating its *Graphics Processing System* to use the pen, and Island Graphics is releasing a hi-res drawing program, *Illustrator II*, with complete *LPS II* compatibility. Gibson Laboratories is working on *Pastrak*, a version of the *Pentrak* driver that will be compatible with Pascal, Fortran, and Pilot.

The Method behind the Magic. Here are some technical goodies for the electronics buffs. If you believe in magic, you may find the realities behind it a bit disillusioning, but if you believe in hardware, we will now answer the burning question, "How does it all work?"

Anyone who has seen a light pen before has probably been profoundly unimpressed. The typical device of that name is a passive light receptor that returns a value from 0 to 255 to the Apple through the game I/O port. This value represents an analog to digital conversion of the light intensity where the pen is pointed. It can't even tell if the light source is on the Apple screen or not. The only resemblance it bears to a pen is its shape.

The *LPS II* is in a class well beyond its unsophisticated predecessors. Its plastic-encased interface card looks like an audio cassette case with teeth. It plugs into a peripheral slot rather than the game port. Instead of reading light intensity, its hardware actually synchronizes with the computer's video signal. The pen's receptor is sensitive enough to determine when the monitor's scan line passes the tip. Because the *Pentrak* driver has been tracking the scan's horizontal and vertical positions, it can return a pair of numbers for the hi-res X, Y coordinates. Applesoft can read these numbers, and the magic begins.

At the moment, only about five hundred of Gibson's pens have been sold. That's less than two-tenths of a percent of the Apple user base. And yet, when professional programmers see this device they seem instantly to want to write software for it. To experience the wonder is to know that the *LPS II* will become a significant factor in the Apple marketplace. Now people are writing software that will help sell the pen, but in another year, it will be the pen that is selling their software.

Note: *The LPS II currently works with any monitor or television except for the Apple green monitor III and the green Amdek monitor. Gibson is testing wider spectrum diodes to eliminate this limitation. The Pentrak driver requires an Apple II with 48K and DOS 3.3.*

Gibson Laboratories, 23192-D Verdugo Drive, Laguna Hills, CA 92653; (714) 770-3088.

InfoWorld
The Newsweekly for Microcomputer Users

August 9, 1982

Light-pen system enhances Apple II graphics

By David Needle, IW Staff

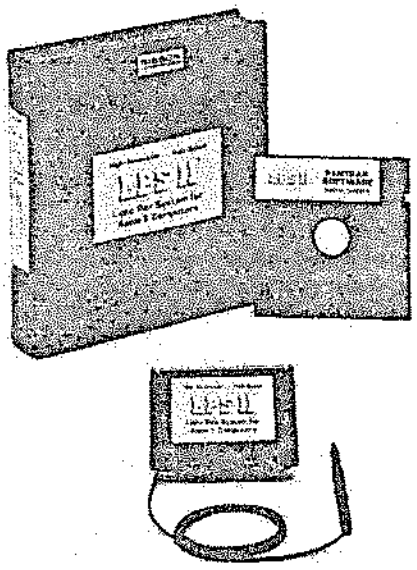
What's been billed as the first high-resolution, high-speed light-pen system for the Apple II computer is starting to pick up many enthusiastic adherents after its somewhat inauspicious debut at this year's West Coast Computer Faire.

"We couldn't get away from our booth at the Faire long enough to talk to the press," recalled Steven Gibson, developer of the LPS II light-pen system. In terms of exposure the recent Boston Applefest was a far more successful show, according to Gibson, who founded Gibson Laboratories in Laguna Hills, California, which manufactures the product.

"*What's so great about the LPS II?*" asks a flyer for the product. (There was no LPS I; the "II" refers to the Apple II.)

"The thing about our pen is that it works," claimed inventor Gibson.

It's doubtful that any of the 20 or so people who crowded around Gibson's booth at the Applefest would disagree with his seemingly modest claim. Gibson kept their attention on the high-resolution color monitor he'd attached to an Apple II. He used the pen to draw a variety of multicolored sketches, geometric patterns and animated sequences, and he even composed music with it. Within minutes after he had asked for a volunteer from the assembled onlookers, Gibson had a recruit, someone who was not familiar with either computer graphics or the use of a light pen, performing the same artistic feats.



LPS II package for the Apple II

Gibson preferred to compare his light pen to more expensive graphics tablets than to other light pens on the market, which he claimed don't operate as quickly and interactively as his does.

The LPS II's electronics determine the pen's position 60 times each second; this means you receive a virtually instantaneous response from the system when you start to "draw," as if you were in fact drawing with a pen.

LPS II comes with 30 different application programs, all of which are unprotected and written in Applesoft BASIC.

"You can change anything or move a program onto another diskette or onto a hard disk. Our hardware is the key: That's what we want to sell," noted Gibson.

The LPS II package retails for $349 and includes the diskette of programs, the light pen itself and a cartridge that fits into slot number 7 inside the Apple.

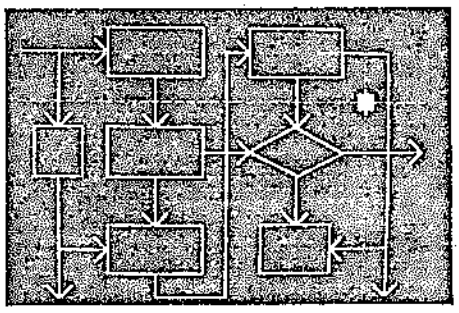
Representatives from CPU Corporation, a Massachusetts-based firm that owns 12 Computer City computer retail stores in the New England area, first saw the LPS II at the Boston Applefest and soon after placed an order for 200 of them.

"They've come up with something that's an excellent tool and beautifully designed. Anyone can use it," commented Jay Weiss, who evaluates new products for CPU Corporation.

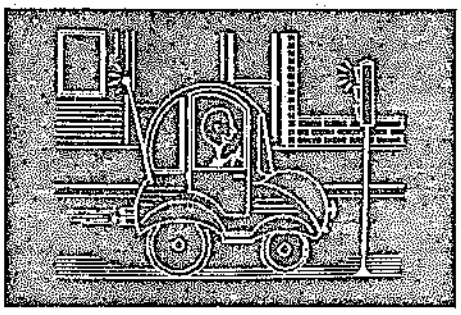
One aspect of the system that caught the attention of many onlookers at Applefest was a "screen lifter" feature that is named for what it does. By moving the pen to a right-margin area on the display screen and moving it upward, you can actually lift up (as if you were raising a window shade) what's being displayed so you can see underneath it.

What's "underneath" is any one of a series of stored displays. The series includes lists of graphics commands and previously "drawn" works that

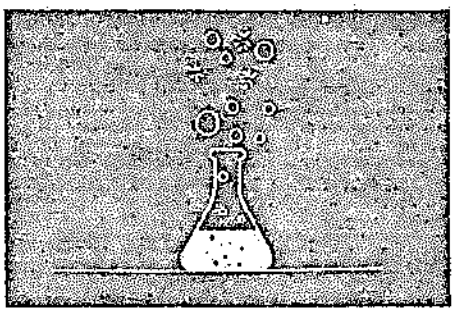
GRID DRAW's "graph paper" surface makes it easy to draw flowcharts.



Picture of man in car, drawn with the geometric editor, GEOMED II



Bubbling beaker, drawn with GEOMED II and use of mirror option



GIBSON LABORATORIES
23192-D Verdugo Drive
Laguna Hills, CA 92653

drawn with SKETCH

drawn with SKETCH

drawn with GEOMED II

drawn with GEOMED II

drawn with GRIDRAW

LPS II® Light Pen System for Apple II™ Computers

zoomed-in with GEOMED II

The LPS II is the only true High Resolution Light Pen System with full software support for the Apple II Computer. High Resolution pictures, diagrams and other graphics can be easily drawn directly on the screen of the Apple II. The pictures shown here were created with the LPS II and easy-to-use Applesoft programs which are included on the DOS 3.3 diskette. PENTRAK,® the Light Pen driver, lets you easily create your own Applesoft programs for Light Pen graphics. PENPAINTER® is a color sketching system which allows the user to create an infinite variety of patterns to be used for filling-in the sketched areas. Area refilling allows various combinations of patterns to be tried and changed. Hi-Res Text generation is a standard feature of the PENTRAK driver, allowing simultaneous use of multiple user-defined character sets. The complete user's manual includes instructions for installation and checkout as well as basic and advanced Applesoft light pen programming.

PEN MUSIC display

drawn with DRAW

Menu from GEOMED II

Menu Selection example

Possible Applications:
- Computer Aided Design
- Computer Aided Drafting
- Logic Design/Simulation
- Animation and Game Playing
- Graphic Arts
- Menu Selection
- Process Control
- Business Graphics
- Circuit Analysis
- Interactive Education
- Text Editing

LPS II Features Include:
- True Hi-Res Resolution
- PENTRAK Machine Language Software
- PENPAINTER Software System with area fill/refill
- Four Complete Hi-Res Drawing Systems
- Menu Selection Programs
- Hi-Res Text Generator
- Installation/Operation/Programming Manual • Many Complete Application & Sample Programs
- Operates in All Screen Modes
- Installs Easily into I/O Slot 7
- Installation/Checkout/Diagnostics
- 90-Day Limited Warranty

LPS II and PENTRAK are trademarks of Gibson Laboratories, Irvine, CA
Apple II and Applesoft are trademarks of Apple Computer, Inc.

drawn with SKETCH

Menu from GEOMED II

Full-Screen Animation

drawn with GEOMED II

2/28/83

Memo to file

Re: Luncheon with ATARI representatives to discuss possible applications and collaborative ventures involving computers and videodiscs

Attending:	NGS		ATARI
	Robert Breeden	David Beacom	Bob Stein
	Phil Silcott	Annmarie Manzi	Michael Naimark
	Will Gray	Andy van Duym	
	George Peterson	Barry Bishop	
	Jim Caffrey		

Bob Stein and Michael Naimark (who consulted NGS on videodisc in 1981) are associated with a research group of twenty scientists at ATARI. The long-term purpose of the group is to develop new modes of interfacing visual and verbal information with human audiences through the use of computers and interactive visual media. ATARI believes that this area of man--information interfacing will develop into a highly lucrative market over the next twenty years. ATARI has therefore decided to invest in an extensive basic research program to expand the frontiers in this area both conceptually and technologically: They believe that current examples of interactivity fail to realize the potential of the concept, and that videodiscs, while the best medium now available, do not necessarily represent the ultimate interactive format.

ATARI is also developing a business plan through which they hope to eventually capitalize on the fruits of the basic research program. They believe their success in this venture will involve further alignment with the publishing, educational, entertainment, and data communications industries. Their purpose in this meeting was to establish a dialogue with NGS concerning possible future collaboration: ATARI sees NGS as a leader in the publishing and educational fields, as well as the repository of the best color imagery in the world. ATARI sees itself as a leader in the consumer electronics and entertainment fields. They feel that a collaboration between the two organizations could put the unique resources of both organizations to work, with mutually beneficial results.

In the near-term, ATARI has two relevant projects in mind:

1. A videodisc/computer encyclopedia. This project will attempt to create a visual/verbal information reference source that can respond more precisely to the needs of individuals (with different levels of sophistication, patterns of thinking, areas of interest, etc.) than conventional media.
2. A set of "classic" interactive videodiscs for use with personal computers. Focusing on such themes as the Grand Canyon, the life and music of Mozart, etc., these videodiscs will spare no cost in the quest to create more effectively interactive presentations of visual and verbal materials.

Mr. Breeden outlined the difficulty NGS would have collaborating with a profit-making organization, also noting that there might be ways to get around the problem. Mr. Stein explained that ATARI does have a non-profit arm as well through which some arrangement might be made. The WHALES videodisc was discussed, as well as progress towards electronic storage and retrieval of the Society's illustrations collection. Mr. Breeden indicated that further discussion and a future meeting with Mr. Grosvenor was in order. The ATARI representatives invited us to visit their group in California.

Andy van Duym

Assumptions, Cont'd

4. Videodiscs are a subset of the broader video question

The advent of the videodisc occurs in a broader context. We are on the verge of significant developments in the field of video itself - high definition TV, 3D, and digital TV are all on the way within the next 10 years. Also, the courtship between computers and video is developing apace - computational video is the wave of the future. A correct videodisc strategy must be developed in this broader context. For example, while in one sense videodiscs are viewed as a kludgey, awkward technology, transitional in nature on the way to all-digital picture creation, videodiscs are the only way to fly if you want to get a headstart in the area of interactive video (both in terms of learning how to do decent programming and in terms of the marketplace).

Points And Recommendations

1. Applications should be the driving force behind hardware decisions.

A lot of the discussion at Atari re: videodiscs has centered on the question of hardware (wish lists of modifications, laser vs. capacitance, etc.). On the whole these discussions tend to be taking place in the abstract, without a clear idea of the applications the hardware addresses. We suggest that big hardware decisions be postponed until we have a major brainstorming effort on potential applications. Especially since different divisions, Coin-Op, CED, and HCD, may come up with quite different hardware requirements. Many exciting applications may also transcend the various divisions' products at this time.

2. Good videodisc programs will be a synthesis of the visual storytelling skills of the filmaker and the interactive branching knowhow of Atari software designers. To get to this synthesis, the filmakers and software designers will have to learn each others' vocabularies and perspectives. Lucas, Spielberg, and other filmakers should be brought into brainstorming sessions and project planning from the beginning.

3. Many parallel efforts - czar, no; ombudsman, yes

Given that we are early on the learning curve it makes sense to consider supporting several videodisc projects at Atari, within divisions, and across divisions. The theory being that we plant a number of seeds to see which ones grow - better a lot of smaller projects than one or two BIG projects.

There shouldn't be any one person empowered to put thumbs up or down on every project because there isn't one person today who could hope to recognize all the valid applications people will come up with. Expert is a relative term and while there are people a little further along the learning curve (and thus are 'experts'), we wouldn't want to invest them with the power of a czar.

On the other hand, we definitely want to capitalize on Atari's size and diversity. A videodisc ombudsman should be appointed to ensure lessons learned on one project are transferred to others and to have an overall sense of all videodisc resources - machines and people - inside and outside the company.

On the business side, we suggest that all videodisc 'deals', hardware and software, be funnelled through one person. This is the only way to maximize Atari's clout effectively.

4. The FIRST important hardware issue for Atari to address IS NOT player modification, but the design and development of an INTERFACE between the videodisc and Atari products that would allow program designers to fully utilize the technology that will be in the marketplace over the next few years.

First efforts should be:

a) A cartridge (and connecting wire) that would turn the VCS and/or 5200 into a low-level videodisc controller.

b) An interface for the 800, 1200, etc., which can at least transfer feedback from player to computer about what track is being read and at best permit you to overlay computer graphics on the videodisc signal.

c) Modify Antic chip to ensure compatability of Atari computer graphics with NTSC video. Work in this area could easily be expanded from work already done for the ERIC system. ERIC constitutes a head-start. Let's not squander it!

5. Publishing A Range Of Discs

While the videodisc market is evolving rapidly, Atari should aim to produce programs for all hardware configurations with a minimum market penetration.

--Stand alone players - Atari should definitely do game discs on the order of but better than, the "Kidisc."

--Videodisc player plus computer (or VCS) - where the computer is used to control the sequencing of images from the videodisc player. This configuration will probably lend itself better to non-skill and action adventure type games. For example, popular movies may be transformed into home computer games.

--Videodisc player plus computer with computer graphics overlay - working toward full integration of videodisc images, computer graphics, and computer sound.

[Note on videodiscs and games: The charge from video games comes from the control the player is able to exert over the graphic images. They do what you make them do! This sense of control is the key and in no way will the startlingly real backgrounds from the videodisc permit us to slack off on the "playability" quotient. In fact, heightened realism will require even more skill on the part of the game designer since greater realism will evoke a desire for even greater control on the player's part. For example, in a racing game with real backgrounds from a videodisc, the player will expect comparatively greater realism in the steering wheel response.]

Spinoffs: We need to be constantly aware of major possibilities which arise in the course of videodisc work. For instance, Coin-Op's manufacturing capabilities might support a business which offers point-of-purchase video display units ala ERIC.

6. Publishing Model

If a careful strategy is worked out, Atari could become the Atari or Warner Records of the videodisc industry. Key to this is accepting the fact that we can't hope to hire all the creative people required to produce as many good videodisc programs as Atari is capable of distri-

buting. (This has as much to do with the sensibilities of artists and the geographical location of Atari - Sunnyvale isn't NY, LA, SF, or Boston - as anything else.)

Therefore, in addition to their own in-house productions, each division should expect to function like a book or record company which publishes the work of independent artists.

Presumably, Atari could solicit ideas and proposals for projects from a broad cross-section of independent artists and products. Atari would then select projects for development with Atari functioning as executive producer/ editor - working with these outside production companies to refine concepts and monitor the production itself.

7. Videodisc Facility

We distinguish between a production facility capable of producing the 1" tape required by the disc manufacturers for mastering and a development facility where people can play around with and experiment with ideas to be used in actual productions. We recommend against setting up a production facility at this time for two reasons:

a) It's extremely expensive if done right, probably between four and eight million dollars. Given that Atari probably couldn't use the full capacity of such a facility at this time, this is an unnecessary expense. Also, many established production houses, some right in our Sunnyvale backyard, could supply this capability for us now at expensive but reasonable costs.

b) It's too early to decide exactly what configuration we might want in a production facility; we probably need to engage in actual videodisc production for a few years before we could be sure that we are building a facility that would serve our needs.

On the other hand, we definitely recommend setting up a development facility to serve the work in the divisions (including outside artists they are working with). Such a facility should cost one-half to one million dollars.

8. Hardware Wars

RCA and Pioneer, the major players representing the two videodisc formats have visited us recently. (VHD, the third format, is on indefinite hold.) Each technology has its advantages and disadvantages depending on the application. For now, given technical and market realities, we will have to work with both formats. Both companies expressed an interest in working with (companies like) Atari on custom hardware. For discplayer features requiring major research & development efforts, both companies suggested Atari might co-fund such work (which says something about how enthusiastic they are about sinking much more money into the technology on their own).

We should speak to the other manufacturers - Sony, Phillips, and Matsushita - so that once we have established our hardware and software requirements and priorities we are in a position to strike the best possible deal/deals.

Immediate Steps

1. Hold a major brainstorming meeting, the central purpose of which is to explore the range of applications that Atari should address. We want to emerge from the meeting with a much clearer idea of what videodisc programming is appropriate to Atari - the Atari look, style, niche, etc. Clearly this will be an evolutionary process, but we need to start the ascent from a higher plateau than we're at now.

   This meeting whould allow us to set hardware priorities - both what is needed in an interface and what sorts of features we need built into future machines.

   We may want to invite a few key people from outside Atari, including other WCI people actively considering videodiscs, and some independent producers we may want to work with who have demonstrated imaginative work with videodiscs.

2. Appoint an ombudsman to facilitate projects throughout the company.

3. To strenghthen Atari's position vis-a-vis the video/computer marriage, a company-wide group should be created to consider hardware-related issues and help

define longer-term research directions for both hardware and software.

Some of the issues that the group should explore are:

a) Specs of an interface between Atari hardware and various videodisc players.

b) The potential of OEMing an Atari videodisc peripheral.

c) Mass storage of digital data along with images on videodisc.

d) Erasable, writable, optical disc players.

e) Sound over still image.

f) Multiple-head players and/or frame buffers.

g) Non-NTSC video: high definition TV, vector scan; Atari's postion vis-a-vis international standard setting.

4. The Warner Connection

Videodisc design, production, and manufacturing is very expensive, especially for a consumer media product. All possible leverage must be brought to bear if innovative programming is to be produced and marketed successfully. For this reason, we suggest that Atari take the lead in considering and urging WCI to consider how WCI's varied entities might contribute to a major effort. Some questions include:

a) The use of Warner production facilities.

b) Distribution through existing WB and Warner Records channels.

c) Tie-ins with Warner Publishing entities, e.g., DC Comics.

d) Mastering and replication deals with disc manufacturers which would include Warner Records, Atari, and WB.

e) Should WCI go into the mastering and replication business?

f) The use of existing (and future) Warner TV and movie footage in Atari videodisc products.

5. Marketing and Testing

We suggest that Conrad Jutson's group begin a significant marketing study of videodiscs, both the key markets for Atari to address and the likely channels of distribution (e.g., will Atari videodiscs be sold in record stores, video stores, computer, or toy stores?). General market testing, i.e., asking the public at large what sorts of videodisc programs they want isn't useful since people who have not been exposed to the technology won't be able to offer imaginative enough answers. On the other hand, users of the technology, particularly where children are in the household, may be a rich source of information as to what market Atari should attack.

6. Securing Rights

In anticipation of videodisc games developments, Atari should secure rights and/or arrange for joint ventures with DC Comics, Disney, Sesame Street, Henson's Muppets, etc. Their characters are naturals for videodisc productions.

7. Lucasfilm

Discussions should be held with Lucasfilm to explore ways in which the connection between the two companies can be exploited in the videodisc market. They have had people working with the technology for some time and undoubtedly have a lot of technical and creative insight to offer.

8. For Those Who Have To Get Started Immediately

If any group is driven by the need to get something to market as soon as possible, the following may be helpful:

1. Get someone on staff who has made a disc. The first project is invariably a killer and it will save lots of time and money if you have someone who has been through it before. This person does not have to be in charge of the project.

2. Pick doable projects. Avoid complex projects requiring lots of trial and error experimentation.

3. Aim for your first disc to be a learning and design tool. Something always needs to be redone on a first disc so they rarely make it to market. Since the handiest medium to have material on for design purposes is a disc (as opposed to tape) we suggest you plan to use the first disc as a design tool. Then your second disc, designed with the aid of the first, is the one you bring to market.

Inter Office Memo

CORPORATE DIVISION
Corporate Research

To: Keith Schaefer

From: Brenda Laurel

Subject: "Voyage of the Mimi" Date: 1/19/83

This is to follow up on our whirlwind meeting last Friday regarding Atari sponsorship of the planned television series, "Voyage of the Mimi," to be produced by Bank Street College under the direction of Sam Gibbon. Gibbon, as you may recall, was the Emmy-award-winning producer of "Sesame Street" and "The Electric Company" for CTW. We have every reason to believe that the "Mimi" series will represent another such milestone in quality television for children.

Rick Glossman's memo summarizes the proposed business deal for Atari sponsorship of the television series. I want to remind you of the additional developments that may make the deal even more attractive to us:

> Bank Street has obtained permission from PBS and DOE to use an Atari computer in the show so that it is recognizable, and
>
> PBS will allow its local affiliates to offer purchase of Atari products at the end of each broadcast, so that the local station acts as a dealer at a 20% margin.

Our sponsorship would assure that related software will be developed for our machines, since an Atari, and not an Apple, would be used in the series in the many scenes where the kids and scientists are using the computer.

I also want to remind you of the scope of visibility that this project offers us. In addition to the PBS broadcast, there are other broadcast opportunities, both with the networks and in syndication. The entire project, including videotapes, software, and videodisk products, will be marketed to schools--hence our name and products can appear in every classroom in which the materials are used. Finally, the magnitude of the DOE grant and the multi-media nature of the project have already attracted the attention of the educational community and will also be of interest to the press.

We hope that you will express your support of the proejct to the other powers that be. Please call if you have any questions, or if you would like me to arrange another screening of the pilot episodes.

Many thanks for your consideration.

xc: Sueann Ambron
Chris Bowman
Jim Dunion
Rick Glossman
Bob Hon
Kristina Hooper
Ted Kahn
Alan Kay
Brian Moreno
Jan Soderstrom
Bob Stein

sent to S. Springer 1-25-85

CORPORATE DIVISION
Corporate Research

Atari Incorporated
1196 Borregas Avenue
PO Box 427
Sunnyvale California 94086
408 745 0510

Attendees at the Atari/Warner Records meeting 1/18-19.

From Atari Research - available at the above address and phone

Susan Brennan
Scott Fisher
Ann Marion
Alan Kay

From Atari Design Research - available at 1171 Borregas Ave.
Sunnyvale, CA. 94086
Michael McKay (408) 745-1310

From Atari - available at 292 Gibraltar Ave.
Sunnyvale, CA.
Pat Cole (408) 745-2570

From Atari Research: Consultants

Bob Stein - available at Atari Research or 2139 Manning Ave.
Los Angeles, CA. 90025
(213) 475-3524

Mike Naimark - available at Atari Research or 216 Filbert St.
San Francisco, CA.
94133

Others:

Bonnie MacBird - available at 12212 Octagon St.
Los Angeles, CA. 90049

Aleen Stein - same as Bob Stein

Rebecca Allen - available at NYIT Computer Graphics Lab
Wheatly Rd.
Old Westbury, NY 11568

Joe Medjuk - available at The Burbank Studios
Producers Building 1, Room 109
Burbank, CA.
(213) 954-1771

Corporate Division

Atari Incorporated
1196 Borregas Avenue
PO Box 427
Sunnyvale California 94086

February 15, 1983

Mr. Ted Kahn
Atari Institute for
Education Action Research
1196 Borregas Ave.
Sunnyvale, CA. 94086

Dear Ted,

Thank you for inviting me to participate in the Institute's recent program in Dallas. Taken together, the accounts of the projects being funded by the Institute make a strong statement about the power of the computer as an amplifier of human potential and a facilitator of human communication. In the research environment, we tend to discount the potential of existing technology. As someone concerned with the tools of tomorrow, it was humbling to see the richly creative ways people are using current Atari hardware and software. It sets a high standard for our work at Atari Research.

Popularizing its success is one of the most important things the Institute can do. Judging from the excellent audience reaction, the presentations made a very convincing statement about the social value of computers in general, and Atari's unique role, in particular. I strongly suggest that you arrange for similar programs at appropriate events, especially some of the major national education-related conferences. Atari's image should soar.

The videotapes that were shown were quite good. I urge you to continue the practice of requiring these video reports and to consider compiling an "Atari Institute Greatest Hits" program which could be shown widely. This tape should also be shown throughout Atari itself. People will be proud to learn of the influence Atari has in the community at large.

Please feel free to call on me. I would be very pleased to help in any way I can.

Sincerely,

Bob Stein

cc: R. Kassar, A. Kay, S. Williams
E. Gerrard J. Cavalier

Inter Office Memo

Corporate Research Group

To: ASR, Research Engineering, Games Research, Design Research

From: R. Stein

Subject: Steve Gibson Date: 2/17/83

Steve Gibson, inventor of the incredible Gibson Light Pen (see atttched), will be here with his associate Steve DeWitt to make a presentation to the Research Group at 10am, Tuesday, March 8th. This pen is so nifty (it's the software rather than the hardware that makes it so special) that Apple actually modified the 2e to make sure it would be compatible with the pen.

While Gibson and DeWitt will be making a presentation appropriate to a research group, they would be happy to meet afterwards with marketing people etc., who would like to discuss the possibility of developing an Atari version, etc.

cc: Conrad Jutson
Chris Horseman
Bob Fournier

RS:jck

VOLUME 3 OCTOBER 1982 $3.00

Woz Cranks It for Us

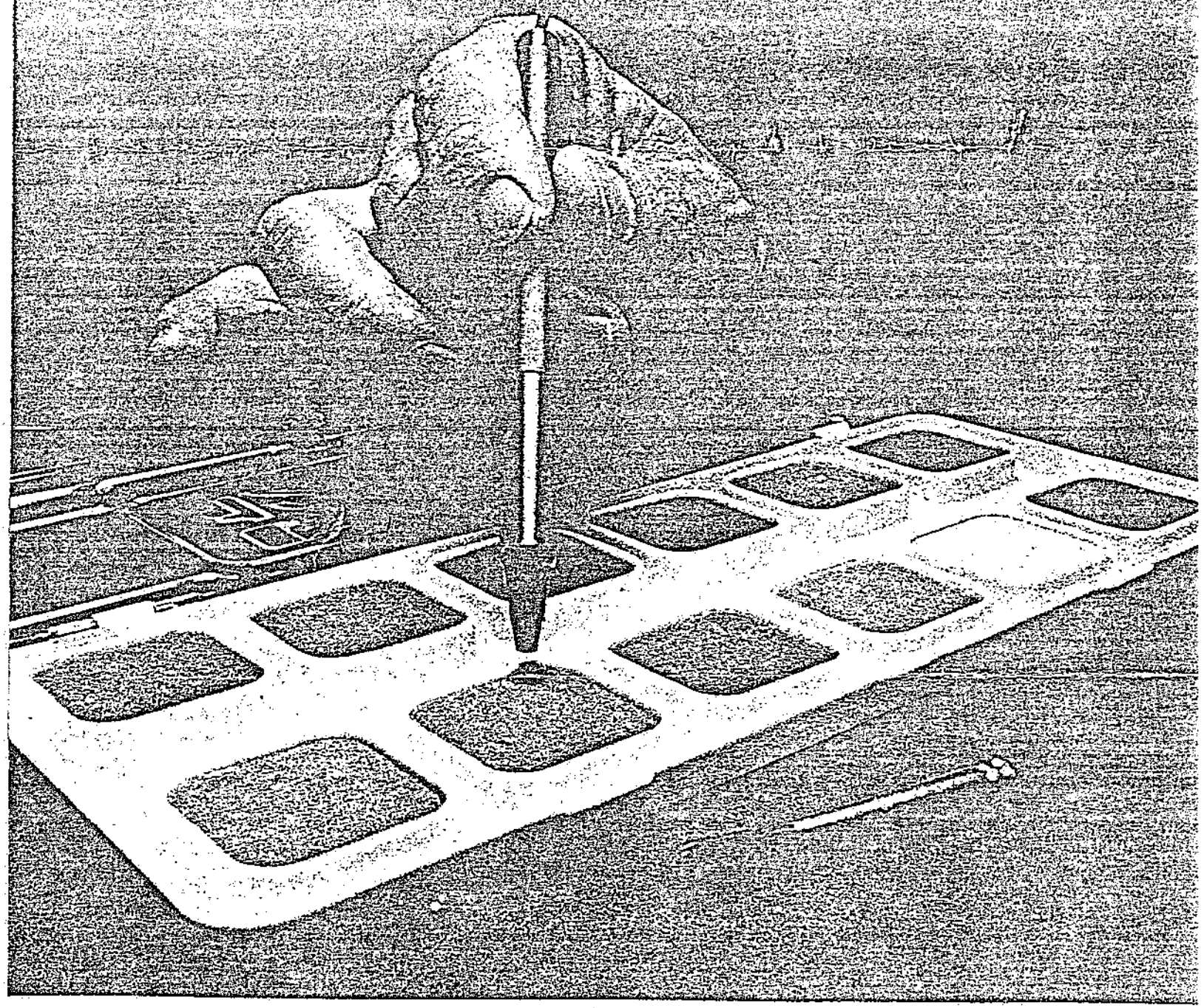
Exec Infocom

Apples of the Sun

Bob Bishop's HiRes Solid

A GRAPHICS TOOL FOR THE DISCERNING PALETTE

BY DAVID DURKEE



It has been said that any sufficiently advanced technology will be indistinguishable from magic. If you think that this principle applies only to isolated aboriginal tribes, like the ones in New Guinea who thought they were seeing the gods incarnate when airplanes first flew over their lands, think again.

We Apple users like to think of ourselves as too technologically aware to be more than just impressed by something as mundane as a new peripheral. It's a good thing when something comes along to challenge our complacency. If you left your sense of wonder behind you with other childish things, you may be surprised to find out that magic has returned to the world.

Saint Nick Deals a Gibson. Imagine that you're a kid again, and it's Christmas morning. There are presents under the tree, there's a fire in the fireplace, and there's a foot of fresh snow on the ground from the night

before. Now imagine that one of the presents is so neat that for the rest of Christmas vacation you forget about snow forts, snowmen, snowballs, and the Flexible Flyer in the garage and just play with this one present. If you close your eyes and think about that for a second, you'll begin to feel the way that we feel about the *LPS II* from Gibson Laboratories.

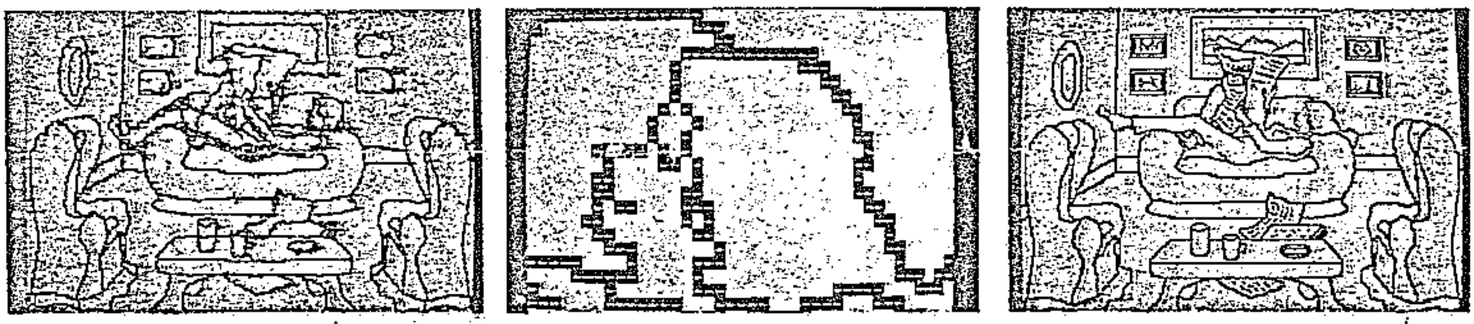
The *LPS II* is a light pen that's turned into a revolutionary graphics system. Originally intended as demonstration software, the disk in this package contains the most exciting hi-res art system since Bill Budge first chose to share the secrets of 3-D. The pen becomes a tool to the software—but a very special tool.

This pen is not to be confused with other instruments called light pens. It's similar in appearance—a penlike object attached to a wire that runs to the back of the Apple—but in execution it is a quantum leap beyond other light pens. It actually gives the Apple a coordinate location on the screen instead of a simple light-intensity reading.

trol functions, such as turning the pen on and off, selecting a color, and loading or saving a picture, are handled with single keypress commands instead of with a pen-based submenu. If you forget the commands, they're as close as the help screen. Just hit H.

Assisted Triple Play. Some of the other programs support and add to the capabilities of *Sketch*. *EasyEdit* allows you to clean up your picture. *Geomed II* lets you put perfect geometric forms in your hi-res drawings. *Penpainter* is an innovation in color-fill programs that makes the most hardened adult yearn for a disk-based coloring book to play with.

Even with the most precision equipment, the human hand is not completely steady, so anything you create with *Sketch* is likely to contain small glitches—lines that don't quite come together or details that don't look quite right. With *EasyEdit*, you point the pen at an area on the hi-res display and you instantly zoom in on the image in that area. That is, a forty by twenty-four pixel section of the hi-res image will be instantly translated to the text screen. Each pixel that's *on* (white) is repre-



Left: This cozy domestic scene was created using *Sketch*. *Sketch*, *Geomed II*, and the *Penpainter* sketch mode all include a powerful mirroring function that can be set for two-way horizontal, two-way vertical, or four-way mirroring. The symmetry of the furniture was accomplished with two-way vertical mirroring. Center: Using *EasyEdit*, the rough lines of the picture on the left are smoothed out point by point. *EasyEdit* was also used to create the face and other detail work. Individual pixels from the hi-res display are blown up to the size of Apple text characters in *EasyEdit*'s zoom mode. Right: The domestic scene after *EasyEdit*. The line drawing is clean and was relatively easy to create. It is now ready to go on the *Penpainter* to pick up some color.

Steven Gibson, the creator of the *LPS II*, originally intended the device and its machine language driver program, *Pentrak*, as a graphics aid for programmers, but light pens had such a bad reputation that computer retailers wouldn't even look at it. Undaunted, he set out to create demonstration programs. He soon got so caught up in the wonder of his own product that the demos grew to a full graphics system.

No graphics system on the market makes a fair comparison with the *LPS II*. The paddle and keyboard based systems are all somewhat difficult to use. Keyboard input just doesn't lend itself to easy graphics application. Paddles' problem lies in their duality: you need both members of a pair to control horizontal and vertical cursor movement, and paddles aren't designed for one person to operate both dials at the same time. Joysticks aren't much better; although simpler to manipulate than paddles, they don't give as fine a degree of control.

The Apple Graphics Tablet comes the closest to the *LPS II*, but having to point to the tablet and watch the CRT just isn't the same as pointing the pen directly at the screen and seeing the image appear right beneath the pen tip.

"Don't Point That Thing at Me!" The system is operated from a central menu program that comes up when you boot the *Pentrak* master disk or whenever you exit one of the system's programs. The menu is the first inkling an unsuspecting user has of the actual capabilities of the pen. You merely point the pen at the program you want. Many of the programs in the system use similar submenus, making the whole package as friendly as you could ask for.

For each of the programs, there's a help listing accessible from the keyboard. The programs are so interactive and easy to use that the one-page help listings are all it takes to make the programs completely self-explanatory.

After running *Introduction* (which gives an overview of the system) and *Calibrate* (which ensures that the pen is honed in to your individual screen), the logical place to go is *Sketch*. This is a drawing program that's as easy to use as pen and paper but more versatile. The pen has six colors, and the whole image can be erased or switched to a reversed display (black on white instead of white on black) at any time.

Because *Sketch* uses the whole screen as its drawing pad, all the con-

sented by an inverse space (which appears as a white block the same size as the Apple's flashing cursor), and each pixel that's *off* (black) is represented by a normal (white-on-black) dash. You then use the pen to change the image point by point. The result is a picture with clean lines, well defined angles, and fine curves.

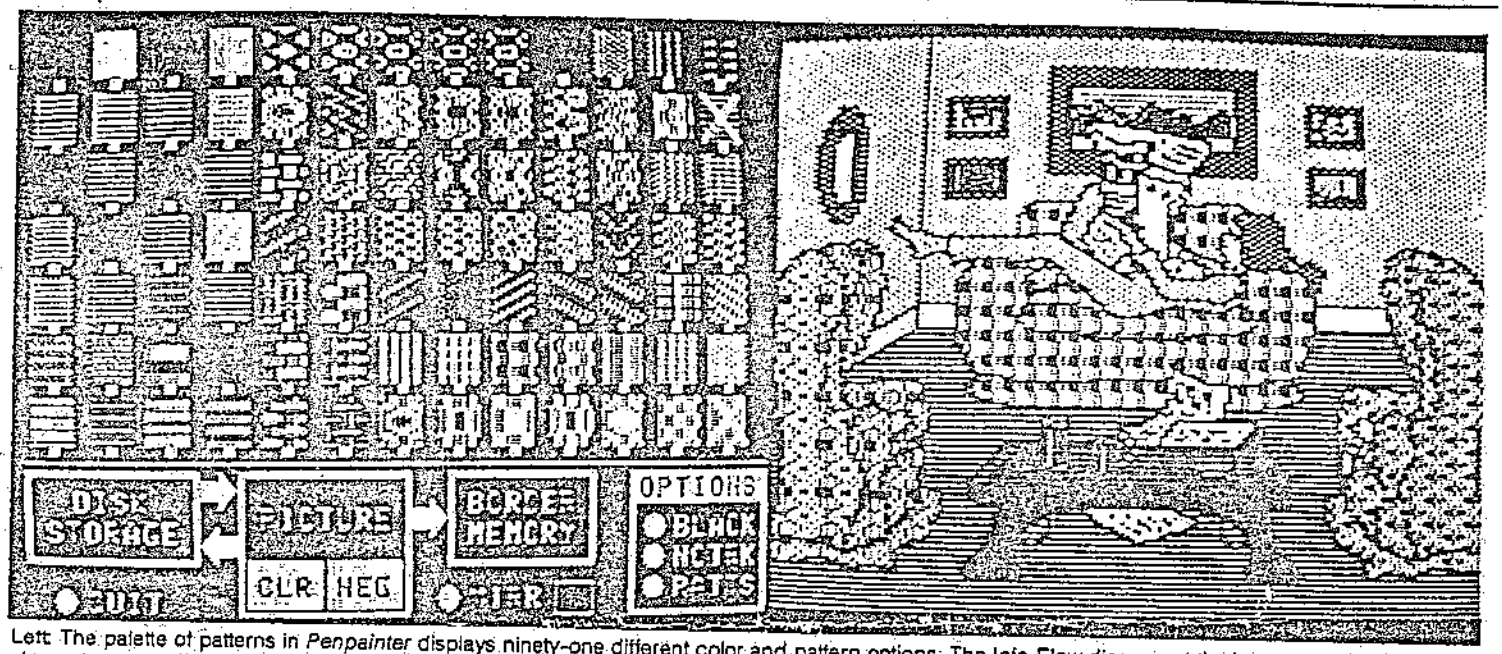
Penpainter is perhaps the most powerful and exciting program on the *Pentrak* disk. *Penpainter* is a fill program that doesn't have to be told twice. Where most fill routines may miss a section of the area they're supposed to cover and require the user to try again to get the missed areas, *Penpainter*'s fill algorithm never misses. It actually seems to find and fill its "missed" areas itself, so filling even the most complexly shaped area is always a one-step process.

The first thing you do when you enter *Penpainter* is load the picture into what Gibson has called "border memory." The picture you start with must be a black-on-white line drawing created with *Sketch*, *Penpainter*'s mini-sketch routine, the other programs, or any other graphics system. If your outline drawing is white-on-black, *Penpainter* can reverse it with a single pen stroke. Selecting the border memory option makes the black lines thicker and copies the screen to a separate location.

South of the Border. The purpose of the separate storage location is to allow you to change your mind. When you fill an area, *Penpainter* determines the area to fill by looking at border memory, not at the actual picture. It performs the action of filling on the displayed screen but leaves border memory as it is. If you don't like the pattern you first selected, you can replace it with another with no hassle—even if your first choice was black.

You may have noticed the word *pattern* where you might have expected *color*. This is another unique feature of *Penpainter*: it fills with patterns. The disk comes with a file containing ninety-one different patterns. Some are solid colors, some are mixed colors such as other graphics programs offer, and some are repeated patterns.

The beauty of this approach is that you can create your own patterns using another of the programs on the disk: *Pattern Editor*. You can easily create any conceivable pattern from wallpaper to herringbone, from water to brick wall.



Left: The palette of patterns in *Penpainter* displays ninety-one different color and pattern options. The Info-Flow diagram at the bottom not only shows the options available, but suggests the logical order of the painting process as well. Right: The domestic scene in color. Some of the patterns used came with the Patterns file on the disk; others were custom made with the *Pattern Editor*. Any of the patterns in the picture can be changed by selecting a new pattern and pointing the pen.

The outstanding system is not without problems. One minor annoyance is that these programs have no protection from ordinary disk errors, like file locked, file not found, and disk full. These problems won't occur if you do everything right, but to err is human. The only other problem with the current implementation of the graphics system is that you have to save the picture before you can pass control from one program to another. Gibson will release a unified graphics system that eliminates these problems by the end of November, but even in its present form *LPS II* is easier to use than any other graphics system extant. The update will be free to all *LPS II* owners.

Two programs are included that don't tie in with the others in the graphics system but are interesting in their own right. *Muric* allows you to use the pen to compose short musical pieces that it plays with the *Pentrak* sound routines. *Animate* lets you make a twenty-frame graphic cartoon frame by frame and point by point. The graphics in the cartoon can be as complicated as your patience allows. While both of these are really only demo programs and have the limitations that that implies, Gibson plans to expand on them if there is sufficient user interest.

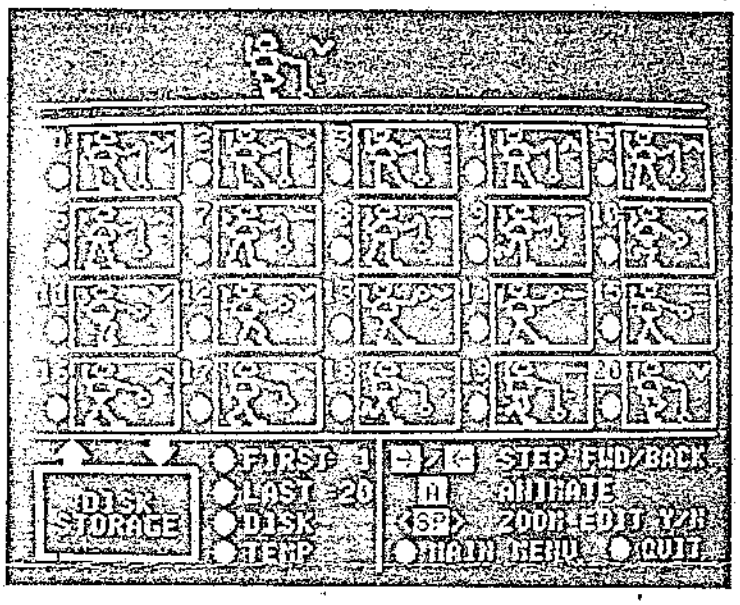
Happy Hour. All the programs are written in unprotected Applesoft Basic, so they're open for intrepid programmers to build on and modify. In fact, Gibson has deliberately left them uncopyrighted. He figures that if people take routines from his programs and put them into their own, even for commercial purposes, it won't hurt his business. It will just sell more pens.

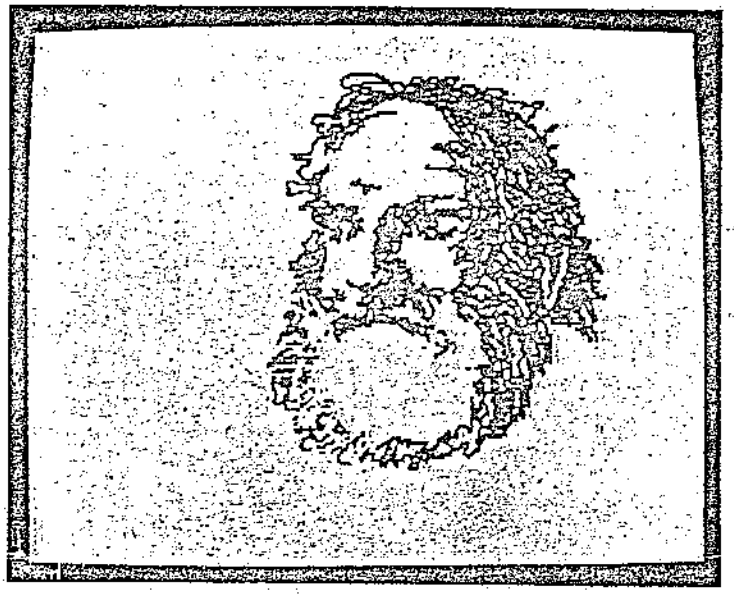
For the Applesoft programmer, the programs that come with the *LPS II* are just the beginning. The *Pentrak* driver is the software heart of the graphics programs, but more than that, it was designed for easy access from Basic. The machine language routines that allow the pen to work its magic are available to the ordinary programmer.

Pentrak uses the ampersand hook, which may be somewhat familiar to those who have used the *Renumber* program from the DOS System Master. Simply, Applesoft's ampersand command (&) calls a machine language routine at a specific location. The routine is then able to read the characters following the ampersand in the Basic program and interpret them as further commands.

So loading the *Pentrak* driver adds a whole new set of commands to Applesoft. A *Pentrak* command that demonstrates the typical command syntax is *&PEN(X,Y,KEY,ZV60)*. This tells the computer to follow the pen's position on the screen and put the values for its location into the variables X and Y when an escape condition is met. Two escape conditions are given in this example. *Key*, the third parameter in the parentheses, says to escape when a key is pressed and put the ASCII value of that key into the variable *key*. *ZV* in the fourth parameter stands for zero velocity. *ZV60* says to escape when the pen has been aimed at the same point on the screen for sixty machine cycles, or one second. While *key* and *ZV* are the only escape conditions available, the variable parameter on *ZV* and the possibility of using the conditions alone or in combination make the commands that use escape conditions extremely flexible.

DocuDramas. The *Pentrak* system includes other commands and options to draw a black or white rectangle anywhere on the hi-res screen, produce sounds, write in various character sets on hi-res, negate a screen, switch to hi-res without clearing the screen, and perform many other





Left: The main screen from *Animate* displays the menu at the bottom and the twenty frames of the animation in the middle. When the animate command is given, the figure moves across the top of the screen. Right: Even without the assistance of color filling, *Sketch* is capable of creating some striking artistic effects.

functions. The manual sections covering these commands are at times a little hard to follow, but by examining the demo programs and experimenting you can learn the new commands fairly quickly. Gibson offers documentation updates at no extra charge as they become available.

Gibson Laboratories's plans and policies for customer support are exemplary. Gibson offers a six-month warranty on hardware and software defects. Although more than five hundred pens have been sold, none have been returned defective. He also offers software and documentation updates free to anyone who returns the registration card.

There are some exciting programs soon to be released which will use the *LPS II*. The first game for the pen is called *LPS II Madness* by John Besnard, Stoneware is updating its *Graphics Processing System* to use the pen, and Island Graphics is releasing a hi-res drawing program, *Illustrator II*, with complete *LPS II* compatibility. Gibson Laboratories is working on *Pastrak*, a version of the *Pentrak* driver that will be compatible with Pascal, Fortran, and Pilot.

The Method behind the Magic. Here are some technical goodies for the electronics buffs. If you believe in magic, you may find the realities behind it a bit disillusioning, but if you believe in hardware, we will now answer the burning question, "How does it all work?"

Anyone who has seen a light pen before has probably been profoundly unimpressed. The typical device of that name is a passive light receptor that returns a value from 0 to 255 to the Apple through the game I/O port. This value represents an analog to digital conversion of the light intensity where the pen is pointed. It can't even tell if the light source is on the Apple screen or not. The only resemblance it bears to a pen is its shape.

The *LPS II* is in a class well beyond its unsophisticated predecessors. Its plastic-encased interface card looks like an audio cassette case with teeth. It plugs into a peripheral slot rather than the game port. Instead of reading light intensity, its hardware actually synchronizes with the computer's video signal. The pen's receptor is sensitive enough to determine when the monitor's scan line passes the tip. Because the *Pentrak* driver has been tracking the scan's horizontal and vertical positions, it can return a pair of numbers for the hi-res X, Y coordinates. Applesoft can read these numbers, and the magic begins.

At the moment, only about five hundred of Gibson's pens have been sold. That's less than two-tenths of a percent of the Apple user base. And yet, when professional programmers see this device they seem instantly to want to write software for it. To experience the wonder is to know that the *LPS II* will become a significant factor in the Apple marketplace. Now people are writing software that will help sell the pen, but in another year, it will be the pen that is selling their software.

Note: The LPS II currently works with any monitor or television except for the Apple green monitor III and the green Amdek monitor. Gibson is testing wider spectrum diodes to eliminate this limitation. The Pentrak driver requires an Apple II with 48K and DOS 3.3.

Gibson Laboratories, 23192-D Verdugo Drive, Laguna Hills, CA 92653; (714) 770-3088.

InfoWorld
The Newsweekly for Microcomputer Users

August 9, 1982

Light-pen system enhances Apple II graphics

By David Needle, IW Staff

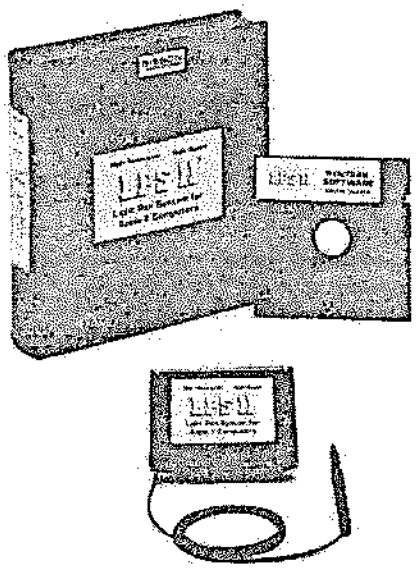
What's been billed as the first high-resolution, high-speed light-pen system for the Apple II computer is starting to pick up many enthusiastic adherents after its somewhat inauspicious debut at this year's West Coast Computer Faire.

"We couldn't get away from our booth at the Faire long enough to talk to the press," recalled Steven Gibson, developer of the LPS II light-pen system. In terms of exposure the recent Boston Applefest was a far more successful show, according to Gibson, who founded Gibson Laboratories in Laguna Hills, California, which manufactures the product.

"*What's so great about the LPS II?*" asks a flyer for the product. (There was no LPS I; the "II" refers to the Apple II.)

"The thing about our pen is that it works," claimed inventor Gibson.

It's doubtful that any of the 20 or so people who crowded around Gibson's booth at the Applefest would disagree with his seemingly modest claim. Gibson kept their attention on the high-resolution color monitor he'd attached to an Apple II. He used the pen to draw a variety of multicolored sketches, geometric patterns and animated sequences, and he even composed music with it. Within minutes after he had asked for a volunteer from the assembled onlookers, Gibson had a recruit, someone who was not familiar with either computer graphics or the use of a light pen, performing the same artistic feats.



LPS II package for the Apple II

Gibson preferred to compare his light pen to more expensive graphics tablets than to other light pens on the market, which he claimed don't operate as quickly and interactively as his does.

The LPS II's electronics determine the pen's position 60 times each second; this means you receive a virtually instantaneous response from the system when you start to "draw," as if you were in fact drawing with a pen.

LPS II comes with 30 different application programs, all of which are unprotected and written in Applesoft BASIC.

"You can change anything or move a program onto another diskette or onto a hard disk. Our hardware is the key. That's what we want to sell," noted Gibson.

The LPS II package retails for $349 and includes the diskette of programs, the light pen itself and a cartridge that fits into slot number 7 inside the Apple.

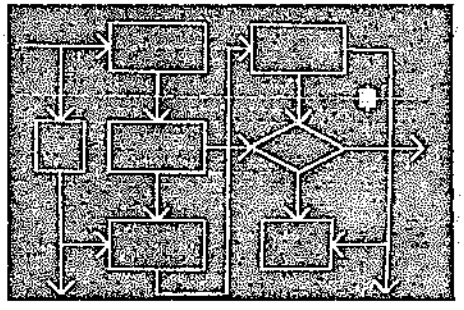
Representatives from CPU Corporation, a Massachusetts-based firm that owns 12 Computer City computer retail stores in the New England area, first saw the LPS II at the Boston Applefest and soon after placed an order for 200 of them.

"They've come up with something that's an excellent tool and beautifully designed. Anyone can use it," commented Jay Weiss, who evaluates new products for CPU Corporation.

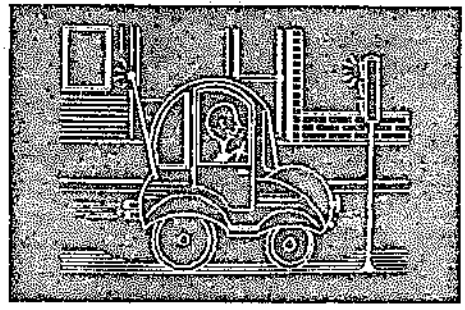
One aspect of the system that caught the attention of many onlookers at Applefest was a "screen lifter" feature that is named for what it does. By moving the pen to a right-margin area on the display screen and moving it upward, you can actually lift up (as if you were raising a window shade) what's being displayed so you can see underneath it.

What's "underneath" is any one of a series of stored displays. The series includes lists of graphics commands and previously "drawn" works that

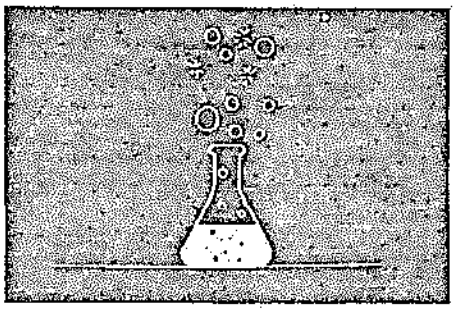
GRID DRAW's "graph paper" surface makes it easy to draw flowcharts.



Picture of man in car, drawn with the geometric editor, GEOMED II



Bubbling beaker, drawn with GEOMED II and use of mirror option



GIBSON LABORATORIES
23192-D Verdugo Drive
Laguna Hills, CA 92653

drawn with SKETCH

drawn with SKETCH

drawn with GEOMED II

drawn with GEOMED II

drawn with GRIDRAW

LPS II® Light Pen System for Apple II™ Computers

The LPS II is the only true High Resolution Light Pen System with full software support for the Apple II Computer. High Resolution pictures, diagrams and other graphics can be easily drawn directly on the screen of the Apple II. The pictures shown here were created with the LPS II and easy-to-use Applesoft programs which are included on the DOS 3.3 diskette. PENTRAK,® the Light Pen driver, lets you easily create your own Applesoft programs for Light Pen graphics. PENPAINTER® is a color sketching system which allows the user to create an infinite variety of patterns to be used for filling-in the sketched areas. Area refilling allows various combinations of patterns to be tried and changed. Hi-Res Text generation is a standard feature of the PENTRAK driver, allowing simultaneous use of multiple user-defined character sets. The complete user's manual includes instructions for installation and check-out as well as basic and advanced Applesoft light pen programming.

Possible Applications:
- Computer Aided Design
- Computer Aided Drafting
- Logic Design/Simulation
- Animation and Game Playing
- Graphic Arts
- Menu Selection
- Process Control
- Business Graphics
- Circuit Analysis
- Interactive Education
- Text Editing

LPS II Features Include:
- True Hi-Res Resolution
- PENTRAK Machine Language Software
- PENPAINTER Software System with area fill/refill
- Four Complete Hi-Res Drawing Systems
- Menu Selection Programs
- Hi-Res Text Generator
- Installation/Operation/Programming Manual
- Many Complete Application & Sample Programs
- Operates in All Screen Modes
- Installs Easily into I/O Slot 7
- Installation/Checkout/Diagnostics
- 90-Day Limited Warranty

zoomed-in with GEOMED II

PEN MUSIC display

drawn with DRAW

Menu from GEOMED II

Menu Selection example

LPS II and PENTRAK are trademarks of Gibson Laboratories, Irvine, CA
Apple II and Applesoft are trademarks of Apple Computer, Inc.

drawn with SKETCH

Menu from GEOMED II

Full-Screen Animation

drawn with GEOMED II

2/28/83

Memo to file

Re: Luncheon with ATARI representatives to discuss possible applications and collaborative ventures involving computers and videodiscs

Attending:	NGS		ATARI
	Robert Breeden	David Beacom	Bob Stein
	Phil Silcott	Annmarie Manzi	Michael Naimark
	Will Gray	Andy van Duym	
	George Peterson	Barry Bishop	
	Jim Caffrey		

Bob Stein and Michael Naimark (who consulted NGS on videodisc in 1981) are associated with a research group of twenty scientists at ATARI. The long-term purpose of the group is to develop new modes of interfacing visual and verbal information with human audiences through the use of computers and interactive visual media. ATARI believes that this area of man--information interfacing will develop into a highly lucrative market over the next twenty years. ATARI has therefore decided to invest in an extensive basic research program to expand the frontiers in this area both conceptually and technologically: They believe that current examples of interactivity fail to realize the potential of the concept, and that videodiscs, while the best medium now available, do not necessarily represent the ultimate interactive format.

ATARI is also developing a business plan through which they hope to eventually capitalize on the fruits of the basic research program. They believe their success in this venture will involve further alignment with the publishing, educational, entertainment, and data communications industries. Their purpose in this meeting was to establish a dialogue with NGS concerning possible future collaboration: ATARI sees NGS as a leader in the publishing and educational fields, as well as the repository of the best color imagery in the world. ATARI sees itself as a leader in the consumer electronics and entertainment fields. They feel that a collaboration between the two organizations could put the unique resources of both organizations to work, with mutually beneficial results.

In the near-term, ATARI has two relevant projects in mind:

1. A videodisc/computer encyclopedia. This project will attempt to create a visual/verbal information reference source that can respond more precisely to the needs of individuals (with different levels of sophistication, patterns of thinking, areas of interest, etc.) than conventional media.
2. A set of "classic" interactive videodiscs for use with personal computers. Focusing on such themes as the Grand Canyon, the life and music of Mozart, etc., these videodiscs will spare no cost in the quest to create more effectively interactive presentations of visual and verbal materials.

Mr. Breeden outlined the difficulty NGS would have collaborating with a profit-making organization, also noting that there might be ways to get around the problem. Mr. Stein explained that ATARI does have a non-profit arm as well through which some arrangement might be made. The WHALES videodisc was discussed, as well as progress towards electronic storage and retrieval of the Society's illustrations collection. Mr. Breeden indicated that further discussion and a future meeting with Mr. Grosvenor was in order. The ATARI representatives invited us to visit their group in California.

Andy van Duym

There are three main objectives of the computerization project in the Illustrations Library.

I. The primary objective is to automate the record-keeping procedures for all visual materials obtained from freelance or staff assignment coverages. The current manual system keeps track of many (89) data elements surrounding each submitter for each coverage. (See attached xerox.) The most important of these elements include:

a. the name of the photographer/artist (submitter)
b. the title of the coverage (project)
c. the published location(s) of the picture (e.g., Filmstrip Christmas in Many Lands Frame 9)
d. the series number of the project
e. the ID number of a picture
f. the indexed number of a picture (unique series number plus consecutive number assigned to each picture within a project)

There are two logical organizations of this data (and all the other data elements associated with them).

1. By Submission Record - A submission record keeps track in detail of the film/art of one submitter for one coverage. The record will show the arrival of the rolls by shipment and date, the publication of the pictures in the project they were submitted for, the subsequent re-publication of the pictures in other projects, the selection of unpublished pictures for the library files, the publication of these "file selects," the filing location of the film, and much more. To view this record there are four different ways to search it in the data base:

a) submitter and project
b) published location of a picture
c) indexed number of a picture
d) submitter and abbreviated title (project title stamped on the film mount)

2. By Project Record - A project record is condensed information regarding all of the submitters for one coverage. The record primarily lists the submitters and the quantities of published pictures and file selects for each submitter, along with other information concerning the entire coverage. To view this record there are three different ways to search it in the data base:

a) project title
b) series number
c) abbreviated title (project title stamped on the film mount)

II. The second objective of computerization is to facilitate the retrieval of pictures by subject(s), published location, indexed number, etc., for purposes of publication or reference. Current indexing procedures require that each file select have a legend and subjects assigned to it. (See the explanation in the front of the catalogue). The file selects represent the "best" unpublished outtakes from a complete coverage and theoretically represent every situation in that coverage. To be able to view the legend and the published history (and hopefully with videodisc, the picture itself) of either published pictures or file selects, the following search methods are being considered:

a. Subject or Keyword - narrowing the search with possibly any or all of the following parameters:

   1) film received date
   2) medium
   3) color/b&w
   4) staff/nonstaff
   5) filing location

b. Negative number - assigned by Lab
c. Published Location (e.g., Book, Rural America, page 10)
d. Indexed Number of a file select - (Series Number of the project plus the consecutive number assigned to each picture within a project)
e. Submitter, project and ID number of a picture

III. The final objective of computerization is to automate the circulation procedures of the Illustrations Library. This includes the charging in and out of pictures and the automatic generation of follow-ups (overdue notices).

As you can see, this is a multi-phase project; at present we have finished the design for the submissions and project record maintenance section. We have also just had approved a software package that will allow us to begin data entry while the actual programming for this phase is taking place.

The next phase dealing with retrieval of information on specific pictures (and with videodisc, the images themselves) awaits the decision of whether to do our own design or to purchase a software package (STAIRS, GESCAN II, etc.). Depending on how priorities are established, this part of the system could come on line as soon as the fall of 1984 or as late as 1986. The final phase, automating circulation procedures, would come on line soon thereafter.

DOCUMENT NO: I26 EXAMPL | YES

REF NUM	ID NUM	DATA ELEMENT NAME	COMMENTS
	A11	ACCOUNT NUMBER	
	I01	ACTION/STAFF DATE	
	I02	ACTION/STAFF NAME	
	I03	ACTION/STAFF TIME	
	I04	CAPTION MICROFILMED INDICATOR	
	I05	CAPTION RETURN INDICATOR	
	I06	CHARGE DATE	
	I07	CHARGED ITEMS QUANTITY	
	I08	CHARGEE	
C10	I09	COMMENTS	
C12	I10	DEPARTMENT/DIVISION	
	I11	DISCARDS BOX NUMBER	
	A03	DISCARDS PUBLISHED INDICATOR	
	I12	DISCARDS QUANTITY	
	I13	$ AMOUNT INSURANCE	
	C13	$ OF DEDUCTION MIN. GTD.	
	C14	$ OF PAYMENT	
C15	I14	EDITOR	
	I15	EKTANEGATIVE NO.	
✓	I16	FILE/REF SEL CONSECUTIVE NO.	
	I17	FILE/REF SEL PRIMARY LOCATION	
C17	I18	FILE/REF SEL QUANTITY	
	I19	FILE/REF SEL RECVD DATE	
✓	I20	FILE/REF SEL SERIES NO.	
	I21	FILE/REF SEL SOURCE	
	I22	FILE/REF SEL GEOGRAPHICAL FILING LOCATION	
	I23	FILING LOCATION	
	I24	FILE TITLE/CRL	
C21	I25	FILM ROLL NO.	
C22	I26	FILM TYPE	
	I27	HANGING ARTWORK LOCATION	
✓C30	I28	ID NO.	
	I29	INDEXED INDICATOR	
	I30	INDEXED QUANTITY	
	I31	ISSUE ID	
	I32	LEGEND	
	A04	MCR, DATE RECVD	
	I33	NOT RECVD INDICATOR	
	C32	PAYMENT DESCRIPTION	
	A10	PAYMENT MEDIUM	
	A09	PAYMENT QUANTITY	
	A05	PRE-1968 MATERIAL BALANCES	
	I34	PREVIOUSLY PUBLISHED INDICATOR	
C35	I35	PRODUCT TYPE	
✓C36	I36	PROJECT TITLE/SERIES TITLE	
	A02	PUBLISHED DATE, MOST RECENT	
✓C38	I37	PUBLISHED LOCATION	
	A01	PUBLISHED LOCATION, MOST RECENT	
C62	I38	PUBLISHED QUANTITY	
	C40	PUBLISHED/RELEASED DATE	
C41	I39	PUBLISHED/RELEASED TITLE	
	I41	REF SEL INDICATOR	
	I42	REFILING QUANTITY	
	I43	REPORT TOTALS	
	C45	REPORT DATE	
	I44	REQUEST (DESCRIPTION)	
	I45	REQUEST DATE	
	I46	REQUEST REASON	
	I47	REQUESTED ITEMS QUANTITY	
	I48	REQUESTOR	
	I49	REQUESTOR'S PHONE NO.	
	I50	REQUESTS QUANTITY	
	A12	REQUISITION NUMBER	
	I51	RESEARCH SOURCES	
C55	I52	RETURN DATE	
	I53	RETURNED INDICATOR	
	I55	SPECIAL COLLECTION NO.	
	I56	SPECIAL COLLECTION QUANTITY	
	I57	STAFF/NONSTAFF INDICATOR	
C56	I58	SUBJECT HEADING	
	I59	SUBMISSION CLASSIFICATION	
C58	I60	SUBMISSION DESCRIPTION	
	C59	SUBMISSION FLAG DATE	
C61	I61	SUBMISSION MEDIUM	
C63	I62	SUBMISSION QUANTITY	
C64	I63	SUBMISSION RCVD DATE	
	C65	SUBMISSION RETAINED QUANTITY	
C66	I64	SUBMISSION RETURNED QUANTITY	
	I65	SUBMISSION REVIEWED QUANTITY	
C67	I66	SUBMISSION SHIPMENT NO.	
	C68	SUBMISSION SOLICITED/UNSOLICITED	
	C69	SUBMISSION STATUS	
✓C70	I67	SUBMISSION TITLE	
✓C72	I68	SUBMITTER	
	A06	THRU RD INDICATOR	
	C00	TRANSACTION COMMAND	
	A13	TRANSACTION COMMAND COUNT	
	I69	TYPED LEGENDS QUANTITY	
	I70	WORKBOX STATUS	

University of Nebraska Lincoln

University Television
KUON-TV / Channel 12
P.O. Box 83111
Lincoln, NE 68501
(402) 472-3611

February 28, 1983

Dr. Chris Jeffers
Corporate Research
Atari, Inc.
1196 Borregas Ave.
P.O. Box 472
Sunnyvale, California 94086

Dear Dr. Jeffers:

We have been informally advised by the Agency for International Development that our Atari/Videodisc interface research and development proposal is being approved by the Washington agency. We are told that approximately six weeks will be required before formal notification through the appropriate Congressional channels. As soon as such notification is received, we will be in touch with you concerning a possible visit to Sunnyvale to lay out plans to begin project development.

We are delighted to be in a position to work with you and Bob Stein on this most interesting project whose potential could be considerable.

I will call as soon as we have received formal notification.

Sincerely,

Jack McBride
Director of Television
General Manager, Station KUON-TV

JMcB/dp

cc: Robert Stein
Rod Daynes

Inter Office Memo

Corporate Research Group

To: ASR, Research Engineering, Games Research, Design Research

From: R. Stein

Subject: Steve Gibson Date: 3/3/83

On February 17, there was a memo sent (with the pertinent attachments), informing you that Steve Gibson and Steve DeWitt would be here to present Gibson's Light Pen invention. The date was scheduled for Tuesday, March 8th at 10am.

This presentation has now been RE-SCHEDULED for March 14th at 10am in the Pong room in building 1196. Please change the date on your calendar to the 14th. Sorry for the inconvenience. I hope to see you there.

CONFIDENTIAL

Inter Office Memo

Chron

ATARI®

~~Consumer Electronics~~ Corporate Division

To: Dennis Groth

From: Ted Kahn

Subject: Problems & Solutions--Education at Atari Date: 3/ 3/83

I am writing this memo to you because I feel you may be able to help. There are serious problems in HCD, problems that may not be apparent to top management for various reasons. You may be aware that more than 6 top-level managers in software development, marketing, and acquisitions have resigned during the past three weeks. For education, the worst of these problems was the resignation of Chris Bowman, manager of educational marketing; Chris left Atari for a top level educational and home marketing position at Apple. What is worse than this is that this is just the beginning and there are probably at least 10-20 other people who may leave quite soon. Educational marketing and sales have communications problems; we have no educational sales force to follow up many of the leads and interest stimulated by Atari Institute projects, and in two recent cases, our outstanding investments in these projects are reaping negative returns (i.e., major school bids going to our competitors even though training and information were provided by Institute grantees, because there is no follow up of dealers or educational representatives). In general, morale regarding education is at rock bottom.

If this were just a temporary problem of personnel in HCD and we had a decent market share, I wouldn't be concerned. However, this is a "do or die" year for Atari to make an entry into the education market, a market which should and could become a major source of revenue for us, both in hardware and software. I have now been associated with Atari for over four years and I have concluded that a solution lies in establishing a separate division within Atari dedicated to the development, acquisition, and sales of educational products (both for schools and for the consumer). Perhaps we could call it "Educational Products Group," EPG, and it could market and distribute products from other divisions.

Since I assume you are going to the planning meetings in Pebble Beach next week, I thought I would put this idea at your disposal, with hopes you might find it interesting to discuss with Ray, Jim, Manny, et al. I know these problems are not in your group, but in working with you over two years, I also know you understand the importance of education to Atari's future.

Please call me if I can be of further help. Thank you for your consideration.

cc: ~~Manny Gerard~~
Ray Kassar
Jim Heisch

Bob Stein - FYI.
Please do not circulate this memo thanks
Ted

← over

Inter Office Memo

ATARI®

Corporate Division

To: Scott Fisher
Bob Stein

From: Steve Mayer

Subject: Videodiscs Memo 1/10/83 Date: 2/24/83

Thanks for a copy of your memo. I will offer only one mild addition. One or more people in the company should actually do something on the VDR - i.e. have it a project with a clear cut goal. If the project succeeds we have a product and not just a report.

We are building a VDR/VTR interface in our new computer. Can you help us obtain an application that showcases this capability?

Thanks.

cc: A. Kay

Memo to: Alan Kay
Subject: Art Kleiner--Whole Earth On-Line
Date: 3/24/83
From: Brenda Laurel

Art Kleiner was here to talk with some of us for the second time on 3/10. He was able to sit in on part of Susan's meeting about the Kepes disc, and then a few of us stayed around to help him grok our "electronic community" project.

One interesting piece of news is that Stewart wants to publish a "Whole Earth Catalog of Software" in the coming months. Art expressed their desire to work with us on this, and Art and Sally will probably be having some future conversations on the subject. Stewart had also asked Art to make it clear to us that he is extremely interested in getting the Whole Earth Catalog on-line. They would like very much to do that in conjunction with Atari, and the only other folks they have talked to are the wildmen at Xanadu--Art and Stewart are aware that the likelihood of real outcomes from Nelson's gang is small.

In all of our interactions with Art, it has become clear to me that ASR is not really interested in making the implementation of an on-line WEC a priority. I explained this to Art in terms of the specific charter of ASR, and expressed our hope that he and Stewart would participate as consultants in the EC project. I also suggested that there might be another home within Research or somewhere else in Atari for the WEC on-line project. It would be a shame for us as a company to let it go. To this end, I promised Art that I would bring the opportunity to your attention and see if you had some suggestions as to who inside Atari might want to get involved.

Art will be in NYC for the next four months working on a book about the magazine business, but he and/or Stewart can come and visit us during that time if there is some serious interest in collaborating on the project. Please advise!!!

I would also like to suggest that we bring Art on as a part-time consultant for the EC project when he returns late this summer. He is especially interested in working with me on the "poetics/interactive drama" portion of the project, and I feel that his collaboration would be extremely valuable.

Again, please let me know what the next steps should/might be regarding the on-line Whole Earth Catalog.

Inter Office Memo

Atari Institute for Educational Action Research

Corporate Division

To: Distribution

From: Ted Kahn

Subject: Board of Advisors Meeting, May 1-4, 1983 Date: 3/28/83
The Broadmoor, Colorado Springs, Colorado

You are cordially invited to the upcoming Board of Advisors Meeting for the Atari Institute to be held May 1-4, 1983 at The Broadmoor, Colorado Springs, Colorado. As at previous Board meetings, we welcome the participation of both members of the Executive Committee and other key Atari personnel involved in education.

The best time for you to attend these meetings would be from Sunday evening, May 1, through Monday evening, May 2. Monday we will be visiting one of the Institute's best projects George Washington High School in Denver. This high school has been instrumental in doing outstanding software development and is a true model school for all of the United States. For reasons of facilitating business, I would like to reserve Tuesday's meeting strictly to Board of Advisors and the Atari Institute staff.

Please confirm whether you will or will not be attending the meeting to Diane Daniel (745-2666) by April 5.

Thank you very much for your continued interest and support of the Atari Institute.

Ted M. Kahn

TMK:dcd
Attachment

Executive Committee:

R. E. Kassar
D. Groth
J. Heisch
J. Cavalier
P. Rosenthal
A. Kay
H. Gray
S. Mayer
R. Smith, WCI

Invited Guests:

S. Ambron
B. Entin
L. Gordon
R. Kahn
J. Heimbuck
N. Mayer
R. Loew
A. Moye
R. Olton
R. Stein
Chris Hooper
C. Schmidt

March 21, 1983

Dear Board Member:

Plans are now underway for the next Board of Advisors Meeting scheduled for May 1-4, 1983 at The Broadmoor, Colorado Springs, Colorado.

I think we have made an excellent choice for the site of this meeting, as some of you well know if you have ever been a guest at The Broadmoor. The Broadmoor has been in existence since 1918 and is a unique blend of old world grace and modern convenience -- a grand resort hotel reminiscent of the finest European traditions!

Housing

Single accommodations have been made for each of you in the Main Building for arrival Sunday, May 1, departing Wednesday, May 4. If these arrangements do not meet with your personal needs, please contact me by April 15.

Transportation

Please book your flights straight thru to Colorado Springs. In checking a few airlines, it seems United has the best fare. It's called the QR fare -- a thru fare jointly between United and either Rocky Mountain or Aspen Airlines. The connecting flights are both frequent to meet arriving Denver flights and give excellent service I've been told.

Upon arrival in Colorado Springs, the city air/ground transport authority automatically meets all incoming flights. Otherwise, you may wish limousine service (at a $20 charge, the car will accommodate 5 people).

Dress

Although the temperatures in May average in the 60's with usual sunny days, warm clothing is suggested (it's still early spring in the Rockies).

Day	-	casual/informal clothing
Evening	-	dress/suit coat or jacket/tie

Recreation

At your disposal and in your spare moments -- tennis, golf, swimming, squash, skeet/trap, ice skating, cycling are all available at The Broadmoor. (We may have time for lessons on "The Inner Game of Tennis".)

The following is a brief, tentative, daily schedule:

Sunday, 4/1	Afternoon arrival and check-in Welcome dinner (7:00 pm)
Monday, 4/2	Morning - Drive to Denver for site visit to George Washington High School and Lunch Mid afternoon - return to The Broadmoor Dinner Meeting (7:00 pm)
Tuesday, 4/3	8 - 9 Breakfast 9 - 12 Meeting 12 - 1 Lunch 1 - 5 Meeting Dinner (7:30 pm)
Wednesday, 4/4	Check-out

Attendees as of 3/21/83:

Board Members	Institute Staff
Dean Brown	Pat Aspelin
Hugh Downs	Yolanda Jenkins
Marian Edelman	Ted Kahn
Roger Faxon	Valerie Mendoza
Tim Gallwey	Robin Raff
Sam Gibbon	Priscilla Watson
Herb Kohl	Sandra Williams
Paul Trachtman	
Heinz von Foerster	
Sandy Wagner	
Karl Zinn	

Potential attendees unconfirmed as of this date:

Executive Committee	Other Atari
John Cavalier	Sueann Ambron, Manager Consumer Ed. Software
Helen Gray	Bruce Entin, VP Corporate Communications (Press & Media)
Dennis Groth	Linda Gordon, VP Special Projects
Jim Heisch	Bob Kahn, Director Special Projects
Ray Kassar	Jeff Heimbuck, Sr. VP Marketing & Sales, HCD
Alan Kay	Bob Loew, Director Special Projects, Corporate Fin.
Steve Mayer	Carl Schmidt, HCD Consumer Marketing
Roger Smith	A. Moye, National Educational Sales Manager
	Bob Olton, Manager Behavioral Research
	Bob Stein (Chris Hooper) - Corporate Research

Collin Greer, New World Foundation
Eugene Klotz, Swarthmore College
Priscilla Laws, Dickinson College
Dave Master, Rowland High School

Well, that's about all for now. I hope the above information will assist you in your preparation for the meeting. A formal Agenda will be forthcoming within the next couple of weeks.

Please feel free to contact me if you have any questions.

Best regards,

Diane Daniel

Diane Daniel

Inter Office Memo

ATARI®

Corporate Headquarters

To: Distribution

From: Raymond E. Kassar

Subject: Organization Announcement Date: May 26, 1983

As you may already know, we have been looking into new possibilities on how to best organize ourselves internally in order to maximize our long-term growth potential.

We commissioned Booz, Allen & Hamilton, one of the nation's leading management consultants, to help us study the situation.

The first phase of that study has been completed and, based in part upon the recommendations of Booz, Allen & Hamilton, I have made certain changes in our organization. I want to share that information with you.

Atari today created three new divisions called the Atari Products Company, the Atari Sales and Distribution Company and the Atari Manufacturing Company.

The Atari Products Company will develop and market home computer and home video game products. Previously, of course, we had two divisions performing these functions.

The Atari Sales and Distribution Company will sell and distribute Atari Inc.'s consumer products. The Atari Manufacturing Company will handle all manufacturing and related activities for Atari Inc.'s consumer products. Consumer products do not include coin-operated games.

Other operating divisions of Atari Inc. remain essentially unchanged. These divisions include Coin-Operated Games, International and AtariTel.

All divisions will continue to report directly to me.

I want to tell you that I am confident that our new lineup of divisions reflects a sound, long-term strategy to ensure our continued success.

There is strong demand for both video games and home computer products, and I believe our new organization will help us deal most effectively in both those markets.

At this time, I am not in a position to reveal who will be in charge of the various divisions. However, I promise that I will keep you posted with more details as soon as possible.

I know you all are working hard to maintain Atari's leadership in the consumer electronics market.

I appreciate your support.

Thank you.

Ray Kassar

Inter Office Memo

ATARI®

Consumer Electronics Division

To: Bob Stein, Mike Naimark, Tom Volotta, Harry Jenkins, Mike MacKay, Scott Fisher.

From: Darby Williams

Subject: JAM Interactive Videodisc Design Date: May 26, 1983

I apologize for the illiterate memo asking about a phantom interactive videodisc production and design house.

To correct that....enclosed is some information on JAM, (the missing word). Again, after reading this, what do you think? Any other creatures like this existing outside of Atari's hallowed walls?

Darby

Darby Williams

DW:mt

attachment

cc: Angelo Pezzani

Inter Office Memo

ATARI®

Corporate Division

To: Distribution

From: R.E. Kassar

Subject:

Date: May 31, 1983

Atari is fortunate in having among its ranks two of the world's most preeminent scientists: Dr. Alan Kay and Dr. Ted Hoff. Both are truly remarkable individuals.

To capitalize on the talents that each brings to Atari, Alan Kay will now report to Ted Hoff. Ted has also been named a Senior Vice President.

I am convinced this is an unbeatable combination of talent and personality which will assure Atari's success in the years to come.

Reg Kassar

Inter Office Memo

ATARI®

Corporate Division

To: Distribution

From: R. E. Kassar

Subject: Organizational Announcement Date: May 31, 1983

Last week I promised you that as soon as I had additional details regarding our recent organizational restructuring, I'd share those details with you.

You will recall we created three new groups to be known as the Atari Products Company, the Atari Sales and Distribution Company, and the Atari Manufacturing Company. Each of these new groups will report to me.

The Atari Products Company will be headed by John Cavalier. Reporting to John are Jeff Heimbuck who will head Atari's computer and video game hardware businesses. Jeff's organization includes Marketing (both domestic and international), Product Planning, and Development Engineering. Fred Simon will head up our software business. Fred's organization includes Marketing (again, both domestic and international), Product Planning, and non-games Software Development. Ted Voss also reports to John. Ted will be responsible for Advertising, Market Research, and Marketing Services. Mike Moone will report to John as well.

Don Kingsborough has been named President of the Atari Sales and Distribution Company. Keith Schaefer, who reports to Don, will head up all of our field sales operations. Don also has Customer Service and Distribution reporting to him.

The Atari Manufacturing Company will be run by Paul Malloy. Paul will have all of Consumer and Computer Manufacturing, Materials, Manufacturing Engineering, Industrial Engineering and subcontracting activities reporting to him. Jim Williamson will report to Paul and will have responsibility for Computer and AtariTel Manufacturing.

Atari Coin-Op, Atari International, and AtariTel are headed by John Farrand, Tony Bruehl, and Peter Wensberg, respectively. Each of these gentlemen reports to me.

Under our restructuring, AtariTel's charter will consist of the engineering and marketing of our new telecommunications products. Paul Malloy's organization will make AtariTel's products and Don Kingsborough's organization will sell and distribute those products.

Inter Office Memo

ATARI®

Corporate Division

To: Managers and above

From: R.E. Kassar

Subject: COST CONTROL Date: May 31, 1983

I am very, very concerned that the issue of cost containment has not permeated throughout the organization. Clearly, each and every Atari employee must be sensitive to cost issues.

One area in which you can have an immediate impact is in the general category of administrative expenses: I am referring to things like Federal Express, Xerox charges, stationery and supplies, typewriter purchases, subscriptions, office furniture, telephones and the like.

Please be sure you communicate clearly and strongly so that your entire organization knows:

- Use Federal Express only when it is absolutely necessary. Remember, regular mail on Friday will get there on Monday.
- That they must monitor stationery, furniture expenses and the like extremely carefully.
- That our Xerox expenses are enormous. We must work hard to cut these costs.
- Personal telephone calls are to be held to a minimum and should not be charged to the Company.
- That if we can do without, let's forego the expense.

Make sure that each expense, regardless of the amount, passes the test of reasonableness in light of today's economic conditions.

I am asking that all Purchase Requisitions for things like furniture, supplies, etc. that Purchasing now has in the mill be returned to you for scrutiny and review. Please eliminate those expenses that we can do without.

I've asked Jim Heisch and Art Gemmell to work together and develop a program which will enable us to inform our secretarial help in how many of the above costs can be curtailed.

I need and know I can count on your support in this cost reduction effort.

Regards

Inter Office Memo

Corporate Research Group

To: Harry Jenkins

From: Tom Volotta

Subject: VIDEO FACILITIES Date: June 2, 1983

Sorry it's taken two weeks to get back to you about your memo on ATARI building (or not building) a facility geared to making interactive video discs. My 2¢ worth is the opposite of yours. I DO think ATARI should have a fully equiped video post-production facility and will respond to the specific points you made in your persuasive memo.

Before I start, it's important to clarify the kind of facility I'm talking about. This would be a state-of-the-art (and even modiifed for our special needs) video editing facility that would taken source materials from a variety of media (film, video, computer graphics, audio, print, and data) and combine them to conform to ATARI's creative and technical standards related to video disc games and other interactive products. This is NOT a production house with sound stages, lighting grids, grip trucks, wardrobe department, etc, etc, (not to mention the people power to make all that work). That kind of talent and expertise is better accessed on the outside, and agree with your analysis as it applys to production. But making that video disc pre-master is different. Whether the facility should be built now and under whose control it should be are seperate issues.

Responding to your arguments against a facility:

A. Yes, it will be expensive. I'd estimate close to $3 Million for a first class operation that will do things ATARI <u>needs</u> to do. We really can't "easily rent (facilities) just down the road" because no one place has all the things we require and none of them are prepared to do the kinds of work we will be doing due to the special nature of video disc games. The first discs will be simple enough to have pre-mastered on the outside and that will buy time while our facility is built, and product development advanced.

B. Rental facilitis do come with operators who know the equipment, but we can develop that expertise internally and go beyond what is typically done in a commercial post-house. I'm thinking of specialized modifications of VTRs for Hi-Resolution RGB work, getting into the software of DVE to do effects that don't come in a standard package, and dealing with unconventional inputs like our computer graphics and optical data. We will also develop special algorithums for the computer editing to make the non-linear nature of discs a routine operation for us. We will have list management requirements way beyond the scope of the typical post-house that cuts together commericals, sit-coms, industrials , MTV pieces and other conventional tapes.

(more)

C. Keeping up with technology is always an issue (and an expensive one) in this kind of business, but the economies are different. ATARI is not in the position of a for-hire facility that looks to rental fees to pay off the investment, the staff, the PG&E bill and re-invest for the future. Here, the capital investment can be paid off by the income from the product itself, not from increments based on what the market for rental services will bear. That pay-off could happen right away (maybe "PLAYLAND" will be what does it...I hope it can!).

D. I see not reason why an ATARI facility of this sort would block creative expression. If anything, it would promote it by providing ready access to sophisticated equipment and techniques that can assist the artist in translating their concept into something tangable.

I agree that a set of development tools be designed and distributed to the talent within ATARI and be made available to artists from outside . But this memo is not aimed at the developmental side. I do think that a developmental facility should also be built and is probably a higher priority (if I had to pick) than putting the post-production facility on-line right away. In many ways, the developmental operation will define the needs of the post-production facility, but I see no reason why they both can't be brought along at the same time. Artists do need "cut and paste" tools readily at hand, and those tools must be provided. If they're not, the end product will never approach its potential. But I don't see that existance of an ATARI post-production facility as interfering with the creative process.

As far as in-house control on projects --- that's an issue that can be dealt with by setting up the management (and cost accounting structure) that puts creative output of the artist as the objective, not the building of a corporate kingdom. I'm not sure that just because you go 'outside' for services that somehow a better product results. LUCASFILM is a case in point.

E. I agree 100% --- product development is where it's at and everything should focus down to getting hot interactive video disc games and whatever else out on the street so we can all have a good time and makes lots of money. I don't think a big video facility will divert attention from that goal or from the need to look and listen to "the little guy" (or gal) with the great idea. Otherwise we own a lot of hi-tech junk that people can look at on tours through the facility. I see the facility as the means with which talent can bring their ideas to life in a way that will allow as much creative and quality product as possible to be made.

(more)

There are a number of other reasons why ATARI should build its own facility; Security, Timelyness, Non-Standard Formats, Data Encoding, Creative Control/Excellence, Cost Control, and ATARI's eventual role as a Video Disc Publisher. I'll leave those details for another memo.

As far as Coin-Op experience, strategy and talent in video discs goes: I think they (or any organization) will be breaking new ground as they go along and having to develop the skills needed to make these discs work. Coin-Op seems a logical choice to try to put the package together. The trick will be in making it an open system. One that allows a variety of outside talent access to the resources. They cannot do it themselves. No one can.

Your ideas for "closely aligning resources with talent", "monitoring investments" (although I don't know what you're refering to with '1196 has lots of equipment collecting dust'), 'incremental advances in parallel", "systems designed to meet user needs", and "timely development relative to product" are all absolutely right. Hopefully, the new reorganization, with Coin-Op responsible for all games development will use these concepts to pull the whole thing together.

Let's talk more later. I'm particularly interested in your thouhts about the components of a video disc developmental system and how artists will use it.

TV

cc: Bob Stein

MEDIA ROOM IMPROVISATION
Description

A. Fischell, Ph.D.
6/9/83

How do you make something out of nothing? Form out of chaos? Specific pictures out of inspirations and desires? Stock out of nuts?

What IS a "media room," really?

During our too, too brief time together in Montreux (was it only last summer?), Dr. Laurel and I worked out a scheme for fleshing out ideas (and for getting ideas about flesh, but that is another story) by borrowing from the techniques of the theatre.

In a theatrical improvisation, actors make up and simultaneously enact characters, situations, and events. In most cases, an improvisation begins with some sort of description of the environment, the kinds of characters who may inhabit it, and perhaps some recent events. Sometimes, however, an improvisation is more like "free fall" (as Dr. Sarnoff and I discussed during a parachuting outing in upstate New York). No specific scenario is given; the actors actually "discover" the situation and the identities of characters "on the fly." The process is similar to the sculptor's discovery of the form hidden in a piece of marble as he chips away.

Drs. Hulteen, Laurel, and I would like to apply this method of discovery to the idea of the media room, and we would like to invite your participation. The only limits on your ideas and fantasies will be those mentioned in Dr. Hulteen's description; nothing else is "given." On Wednesday, July 6th, we will collectively take the first step in creating the media room using this method. I want to point out the efficacy of this approach given the current constraints on space and actual physical resources; if we can simply do it in our heads, so much the better. Of course, these constraints are temporary; as Dr. Kay has observed, things often change.

Please study the attached description and join us at 7:00 p.m. on July 6th for the first Media Room Improvisation. I look forward to seeing you there.

Sincerely,

arthur Fischell

Dr. Arthur T. Fischell, Ph.D.

Media Room Description

Eric A. Hulteen
6/10/83

The media room itself is not so much a room in the traditional sense as a space or an environment. It has the capability to receive/understand/input all forms of human motor activity. Which is to say that it can sense any change that you can affect in the environment but that it can't read your thoughts. The room also has the capability to generate/output information to all of the human sense organs. It can provide things for you to see, hear, smell, feel, and taste.

The media room can deal with more than one person at a time. However, if there is more than one person the room will not bifurcate such that each person gets their own unique environment. Multiple occupants will share the same 'information space.

Inter Office Memo

ATARI®

Consumer Electronics Division

To: Al de Schweinitz, Gary Blondefield, Marty Lagod, Ian Andrew, Bob Stein
Norm Smothers, Roy Machamer, Peter Rosenthal

From: Darby Williams

Subject: New Product Idea Viewing Date: 6/10/83

Ted Hoff received a new product idea submission a few weeks ago from a Michael Gurmu -- a Vehicular Guidance System. Attached is a brief description of his concept. (He has completed and signed our outside idea submissions agreement form.) Apparently, he has been able to generate some interest overseas and possibly with some of the rental car companies.

In the interest of learning more about a potentially interesting new consumer electronics opportunity, I have invited him to present his idea to Atari next week -- Thursday, June 16, at 1:00 p.m. in the Finance Conference Room in Bldg. 1399. I would like to invite you to attend and, immediately following, participate in a first-pass evaluation session (15 min. if possible). I expect the whole session to last 1 - 1 ½ hours.

Please confirm your attendance with my secretary, Astrida, at 743-4885, by Tuesday morning.

Thank you.

Darby

Darby Williams

DW/ar

Attch.

cc: Ted Hoff
Tom Kennedy
Phil Restaino
Conrad Jutson
Bob Cory
John Cavalier

June 3, 1983

Mr. Darby Williams
Manager, New Technologies Acquisitions
Atari Incorporated
1265 Borregas Avenue
P.O. Box 427
Sunnyvale, CA 94086

Dear Mr. Williams,

Thank you for your letter of June 2, 1983. Enclosed please find the signed "Outside Idea Submissions Agreement" and a description on our invention the Vehicle Guidance System.

Looking forward to our meeting,

Sincerely,

Michael Gurmu

Michael Gurmu

MG/my

OUTSIDE IDEA SUBMISSION AGREEMENT

Atari is engaged in extensive research and development in a large number of areas, involving toys, games, personal computers, holographic products and other products for the consumer marketplace. It is the source of practically all of ATARI's ideas, inventions and products. It has been our experience that few outside submissions contain subject matter that we have not already seen or that we have any interest in developing. However, some outside submissions have proven to be mutually valuable to ATARI and to the submitter.

In order to ensure that there is no misunderstanding between Atari and the submitters of outside ideas, Atari requires that all outside submitters execute this non-confidential submission agreement and agree to rely exclusively on their copyrights, patents and subsequent written agreements with Atari for protection of their ideas.

It is ATARI's policy that once an outside invention or idea is submitted with an executed Outside Submissions Agreement, the ideas will be circulated to the appropriate person(s) for review.

Accordingly, Atari is willing to review outside submissions pursuant to the following terms and conditions:

1) I submit to Atari, Inc. the attached idea that I call VEHICLE GUIDANCE SYSTEM

(Briefly describe the idea and the submitted materials)

2) With respect to all subject matter disclosed, I warrant that I have the right to make disclosure and use of this subject matter without liability to others, that I have the right to make this present agreement, and that there are no outstanding agreements, either written or implied, which are inconsistent herewith.

3) In consideration of Atari's review of the disclosed subject matter, I release Atari from all liability or obligations arising from the receipt, review, use or disclosure of any portion of the subject matter, except such liability as may accrue under valid patents and copyrights now or hereafter issued, and I expressly agree that there is no relationship of trust or confidence or any other relationship expressed or implied between myself and Atari and I further agree to rely exclusively on my patents and copyrights and subsequent written agreements in any further dealings with Atari for the protection of my ideas.

4) I do not hereby grant or extend to Atari any rights under any patent or copyright that I now have or may later obtain covering the subject matter submitted.

5) Pursuant to this agreement all documents and materials submitted to ATARI remain the property of ATARI.

I hereby agree to the foregoing terms and ask that ATARI review my submission and inform me as to their interest in by submission.

Date 6.3.83 By MICHAEL GURAU
(NAME)

RETURN TO:

ATARI, INC.
OUTSIDE SUBMISSIONS
1312 CROSSMAN AVENUE
SUNNYVALE, CA 94086

6501 RAYMOND ST #1
(STREET)

OAKLAND CA 94609
(CITY, STATE & ZIP CODE)

415-655-4365
(TELEPHONE)

In the event of traffic congestion the traffic control center would have the capacity to reprogram the route information, which would then be transmitted to the Vehicle Guidance System. Motorists then would be diverted to alternate routes. The control center can also gather accurate statistics which will enable it to plan future roads and make maximum use of existing ones. The system can receive programs which will give it the capacity to avoid one-way streets, diversions and congested areas. It can register and supply when required the position of parking lots, restaurants, petrol stations, etc. It is estimated that there will be an eight percent savings in fuel energy when the system becomes fully operational.

Inter Office Memo

Corporate Research Group

To: Norm Smothers

From: Mike Liebhold

Subject: MTV LaserDisc Jukebox Date: 6/14/83

This looks like a major business opportunity for Atari!

The prerequisite conditions now exist for a successful introduction of The Atari MTV Jukebox:

1. A powerful latent market - MTV's explosive success is well documented, perhaps barely tapped. The demographics are dynamite.

2. There is no competition of any consequence. (The attached computer search is fairly comprehensive.)

3. Appropriate hardware - available off the shelf. Both 12" laserdiscs and 8" versions are ideal. Oddball gadgets like disc flippers and front loaders are also obtainable.

4. Abundant software - existing Rock Videos minimally utilized. Every record company in the United Stated is eager to increase MTV leverage.

5. An appropriate organization - Atari Coin Op is ideally equipped to profitably manufacture and distribute.

There are at least four separate products:

1. A stand-alone, lowend coin machine suitable for most existing arcades, 7-11's, bars and restuarants.

2. A deluxe interactive version - almost game-like.

3. A large screen Video-Disco setup.

4. A home unit. Rock video could be THE driving force behind laserdisc as a Game Unit peripheral. There are some very interesting interactive applications!

Tom Volotta is indeed eager to meet with us next week for a brainstorming session. Bob Stein has volunteered to confer with Stan Cornyn, VP Creative Projects at Warner Records, to explore potential synergies. (Another powerfully attractive benefit!)

This is all informal. I honestly believe the market is huge and that we ought to jump on it immediately.

lc

Attachments

cc: J. Cavalier
J. Farrand
S. Fisher
T. Hoff
C. Jeffers
C. Jutson
R. Kassar
A. Kay
R. Machamer
M. Naimark
B. Stein
D. Van Eldren
T. Volotta
D. Williams

MTV climbing

Network receives one of the highest Neilsen ratings achieved by basic cable

NEW YORK—Music Television, Warner Amex Satellite Entertainment's video rock channel, drew an average 1.2 rating, 4 share of audience on a daily basis for the month of April, according to Nielsen's Home Video Index. The rating is one of the highest achieved by a basic cable service since the index began measuring such channels on a regular basis, Nielsen and MTV executives maintained last week.

April was the first month that MTV qualified for Home Video Index measurement. The 1.2 rating was based on a sample of 1,400 households across the country—at least 15 percent of which have access to MTV. To qualify, a basic cable service must be received by 15 percent of U.S. television households, or roughly 12 million subscribers. Currently, MTV has 12.5 million homes on more than 1,500 systems; executives project another million homes added to the count by June 15.

Susan Whiting, a Nielsen Home Video Index marketing executive, said that WTBS has mounted higher 24-hour daily ratings than MTV's April report. But in the eyes of many industry officials, she added, WTBS is considered a broadcast-originated superstation, rather than a cable-only basic service. In that context, the MTV count is the highest received by a basic channel. CBN Cable, USA Network and Cable News Network are also regularly measured by Nielsen Home Video Index.

According to the report, 50.1 percent of all sample homes with access to MTV viewed the service at least once during an average week. In addition, between 7 a.m. and 1 a.m. daily, the network had a 1.4 rating, 3 share.

Whiting declined to break MTV's April rating down further into specific dayparts (primetime, late night, etc.), citing the network's prerogative to release such details.

Because the network programs an all-music format, rather than program by program, Cohen said daypart ratings might be inappropriate for advertiser considerations. "We don't 'event-program,' like an ESPN," he said. "For this kind of service, which is vertically programmed, a 24-hour rating is probably the most appropriate. The 1.4 rating confirms a lot of research we've done, that viewing levels are extremely high throughout the day, and the 1.2 rating for 7-1 a.m. points out the consistency of that."

Cohen added that MTV will get Home Video Index ratings from Nielsen on a quarterly basis, along with demographic breakdowns and other qualitative findings during sweep periods. The network also will continue doing its own telephone surveys.

—Simon Applebaum

CableVision/June 13, 1983

January 16, 1983, Sunday, Late City Final Edition

SECTION: Section 3; Page 23, Column 1; Financial Desk

LENGTH: 291 words

HEADLINE: WHAT'S NEW IN CONSUMER ELECTRONICS;
VIDEO COMES TO THE JUKEBOX

BYLINE: By Andrew Pollack

BODY:

Video cassettes, videodisks and cable television have given rise to a new form of entertainment - video music. Instead of merely listening to one's favorite performers on the radio or phonograph, one can see them perform as well.

Now, even the jukebox is turning to video. Video Music International of Los Angeles has introduced a video jukebox in which one can see as well as hear the musicians. Each jukebox will contain 40 to 48 selections, with one play for 50 cents. It will have a 25-inch screen, although the output of the videotape can be played on other, much larger screens as well, or on several screens at the same time.

The video music selections are contained on videotape and played by a video cassette recorder that can be computer-controlled to wind automatically to a particular part of the tape.

One potential drawback is that it can take as long as two and a half minutes for the tape to be wound to a particular selection. The company hopes eventually to capitalize on that problem by having a second video cassette player in the jukebox play advertising in the meantime and when no one is using the jukebox for music.

A spokesman for Video Music said the company has received orders for 200 of the $10,000 machines. It thinks the unit will be placed in bars, restaurants, movie theaters, record stores and airports.

Not everyone is sure the video jukebox will succeed. Edward H. Steinberg, president of Rock America Video, which distributes video music tapes to clubs and bars, said that many clubs might prefer to continue choosing their own videotapes. But he added that bars that do not have video might prefer the jukebox.

SUBJECT: VIDEOTAPE; MUSIC; MARKETING AND MERCHANDISING; RECORDINGS AND RECORDING EQUIPMENT

1/5/2
781060 #Ad Age 82/06/14 P47,52
The video jukebox will provide new opportunities for advertisers wishing to target young adults. The jukebox is being marketed by former trumpeter J Millman as the Video Startime Muzzikboxx/Communicator. Millman is the creator of the coin-operated video device that displays record company and nightclub promotional music clips and excerpts from video musical performances produced for other media. Millman and his Video Music Intnl company are ready to market to video jukebox, which is already installed in Hollywood's Candy Store club, licensed for use in Las Vegas at The Country Club beginning June 15 and reportedly holding a contract with Hawley Leisure Amusements of London for the manufacture and supply of the units in the UK. Hawley Leisure has also acquired the sole rights from VMI to manufacture, operate and supply videocassettes to the coin-operated industry in the UK and has licensed VI Leisure to manufacture and operate the equipment. Millman says the next step is to build a marketing and sales organization in the US. According to Millman, a promising aspect of the video jukebox is advertising. The VMI video jukebox displays a continuous loop tape of ad messages when the machine is not activated by coin operation. Millman believes the new medium is a natural one for cigarette, hard liquor, beer and wine advertisers in particular, to reach young adults in bars, restaurants, game rooms, and other locations. Millman estimates that the video jukebox will have a 500,000-unit market in 3 yrs. Article further details the video jukebox.

*1USA *United States *3651430 *Coin-Operated Phonographs *336 *new product *Video Music Intnl
4UK United Kingdom 3651430 Coin-Operated Phonographs 385 gets license Hawley Leisure
1USA United States 9914280 Advertising Management-Electronic Media 242 advertising

1/5/3
771729 Vend 82/04 P84
Video Music Intnl, music production company, is marketing the 'first video jukebox--a state-of-the-art coin-operated entertainment unit combining jukebox audio and 'live' performance video.' The unit, called 'Star Time,' features brand name components with patented parts manufactured exclusively for 'Star Time.' A patented controller handles the videotape selections through digital 'bursts' which locate the customer's selection. The tape machines and amplifiers are manufactured by Techniques, the video cassette recorders by Panasonics, and the TV monitors by Sony, Barco or RCA. Developer J Millman describes 'Star Time' as 'a self-contained, pre-programmable mini-theater or communicator.' (article contains little further information)

*1USA *United States *3651922 *Arcade Video Games *336 *new product *Video Music Intnl

Inter Office Memo

Corporate Research Group

To: Bob Cory

From: R. Stein

Subject: Cherry Lane Music Company Date: 6/14/83

Last week at the American Booksellers Association meeting in Dallas I met Lauren Keiser, the president of Cherry Lane Music Company. According to Keiser, Cherry Lane is the 5th largest music publisher overall and the largest not associated with a record company. Among other properties in the pop/rock area, Cherry Lane is the exclusive publisher (sheet music) of all the Beatles' music.

Again, according to Keiser, Cherry Lane owns the rights to publish their music in the form of computer software, and that furthermore, when published as software, the music can be used to drive a synthesizer (like a piano roll) or as the basis for a "music minus one" system, where the computer/synthesizer supplies all but the piano, or the drums or the vocals, etc.

Keiser would be very interested in a joint venture with Atari or Warner Records or both to publish their music in software form. This is particularly interesting if we intend to move decisively in the music hardware end of things. A software music publishing company which started with the Beatles and went on from there sounds great to me, especially if it's in conjunction with a piece of music hardware intended to hook up to our computers. Imagine we could actually enter the market with impressive software to back up the hardware.

When I met Keiser he had already initiated discussions with Apple and their sister company Alpha Syntauri. He is to meet with them in the next week or so, but is willing to "dance around" the question of specifics with them if he knows we are intetested. I have told hime we are, and he is happy to be appropriately vague with Apple, etc.

Someone should try to get back to him in the next few weeks. He can be reached at:

Lauren Keiser
Cherry Lane Music Company, Inc.
110 Midland Ave.
PO Box 430
Port Chester, NY 10573
(914) 937-8601/(212) 824-7711

I had occasion to mention all this to Stan Cornyn, the senior vice president of Warner's records group, who has the charter to put Warner Records in the software/video business. He is quite enthusiastic if we are interested in their participation.

Note: I have attached a packet of materials prepared by Alan Kay on the subject of music generally and on Casio in particular. Again, I suggest strongly that you take up the Cherry Lane venture in the broadest possible context.

BS/lc

Attachments

cc: Ray Kassar
Alan Kay

Bob Tau

Inter Office Memo

Corporate Research Group

To: See Distribution List

From: Alan Kay

Subject: CASIO Visit: Tuesday, February 8th

Date: 4/12/83

In 1982 CASIO will do more than $800 million business. Major products are watches, calculators, musical instruments, and later this year, one of the first LCD flat screen TV's. Four CASIO brothers started the company, still own 30% and mostly control its direction. "T" Cono is the music nut and is responsible for the music bout of the company and the exceedingly high quality of their line (he is a high class amateur musician).

Casio

bent

Music is everywhere in their products. Watches, calculators, toys and real keyboard instruments grace their line. When they started Yamaha had about 75% of the keyboard market, shipping about 300,000 pianos per year. In 1982 Cono shipped 165,000 instruments with real key boards into American homes yet they freely admit that they still don't have the key to the consumer. Surveys have shown that nine out of ten adults would like to be musicians. But once adults realize the current learning overheads, only 4% stick it out.

Interestingly they credit Atari as a great aid to their business. They tell many of their customers started as a result of being pulled away from passive TV watching by video games & computers.

feel

Nontheless, they are doing well. Their product line is the best in the business. In typical Japanese style they have a under product line. A number of their instruments can read borcoded music with an ontinal wand.

Distribution:

R. Kassar
M. Gerard
D. Groth
M. Moone
J. Cavalier
K. Schaefer

ACK:km

Music & Atari

Video games and computer programming are the newest kinetic arts and pin music, animation, and theatre as pursuits which completely involve and fascinate people from all walks of life.

Two interesting ideas from a recent trip to CASIO: First, they credit much of their current screen in selling 185,000 keyboard instruments per year to Atari pulling people away from passive TV watching in favor of actively controlling multiple events in time. Second, their surveys indicate for example, that more than 90% of adults would "give anything" to be functional musicians but that less than 5% find a pathway to accomplish their goal.

The figures are similar for yearning about learning foreign languages and its eventual carry through. In a few years we will likely see the very same situation for adults and computer literacy.

The interesting fact about all of these areas is that intrinsic talent is not the critical factor in successful learning. Anybody can learn a language, learn music, and learn to program at any age.

But how can we break the "5% barrier" and tap into the 90% who want to learn but are defeated by process?

Beginning tennis is often called "above the ball", a very different game from that played by experts. Intermediate players, though not experts do what experts do most of the time. The minute to minute process is enjoyable and this is what leads to the hours of concentration needed to gain the heights.

Though there are many other important areas of learning to consider, a lot may be gained if we just focus on how to get a beginner to the intermediate stage as quickly and painlessly as possible.

Most children grow up as natural learners. Ther outlook is completely positive because an inability to any stage doesn't counotate failure, a concept monthly taught in school and by certain anxious parents.

It used to be thought that a child's ability to learn was a property of childhood that adults no longer have. Only recently has it been conclusively shown that natural learning mechanisms function throughout life but are covered by a variety of interferring processes that almost completely wash learning, except by "slugging it out in the trenches", an activity for which most people have neither the task nor the time.

A final thought as to "why music?": Though music is worthy of attentions in and of itself and there is a convincing business to be bad. the alone relationship of music and computers must also be examined. Though computers may be the "ultimate material" they are as yet completely undeveloped. Program sophisticates are literally at the level of medieval Cregorian sheets - often beautiful but just a shadow

of what can and will be done. Computer esthetics don't yet exist in any guiding fashion, but much can be learned by making transfers from 600 yhear old music to the new art form. Studies at Xerox, MIT, and elsewhere show that musical involvement greatly accelerates "computer thinking". There is more to be said about this, but anything which accellerates learning on Atari's own business should be of great interest to us.

Now, how can we most quickly get from being a beginner to being an intermediate?

Partly, and paradoxically, by being content to be a beginner the act of our life! This soulds ridiculous but happiness are sucess have much to do with the difference between the advanced amateur pianist who can play fairly well but is always discusted because he can't do certain things and Rudolph Serkin who upon winning the Beethoven Medal at 76 was in tears saying "I don't deserve this", a man who has been a "beginner" all his life.

Now, how good a beginner can we get? Remarkable results can be obtained if the learner can combine interference removal with a strong transfer from what his body already knows. People can see, more about, and wave their arms. - if interference is lowered this is all that is necessary to make a strong start in most sports, as the Inner Game has shown for many years. Children and adults have lots of trouble with mathematics, especially with certain coordinates, but their bodies know a lot. Give them a frivilous turtle to distract them, which "accidentally" has an egocentric coordinate system (as humans do), and the results with LOGO outstrip what anyone might expect.

Tim Gallway says: "The problem with most theories of teaching is that the parts of the body you want to have learn don't understand English!" In other words a field can be successfully analysed in great detail but the analysis itself usually can't be taught. Instead, attention must be focused by increasing awareness and lowering interference.

Simplistically speaking, we all have at several rather independent thinking systems. In early childhood things are actions: a "hole" is to "dig". Later, vision dominates: water volume seems to increase as it is poured from a short glass to a tall thing one. Still later, around 11 or 12, symbolic detailed truths hold sway: things don't disappear on their own so there must remain the same amount of water in the thin jar. Originally there were thought to be stages that were discarded as the next was achieved. But children can be got to change from one way of thinking to another. And studies of creative people show that they actually retreat backwards: Most math is done visually, symbols are only used to explain; Einstein even had "sensations of the muscular kind", his body became the spaces he was trying to invent.

"What the body knows" is actively, visible, and symbolic.

STATE OF THE ART

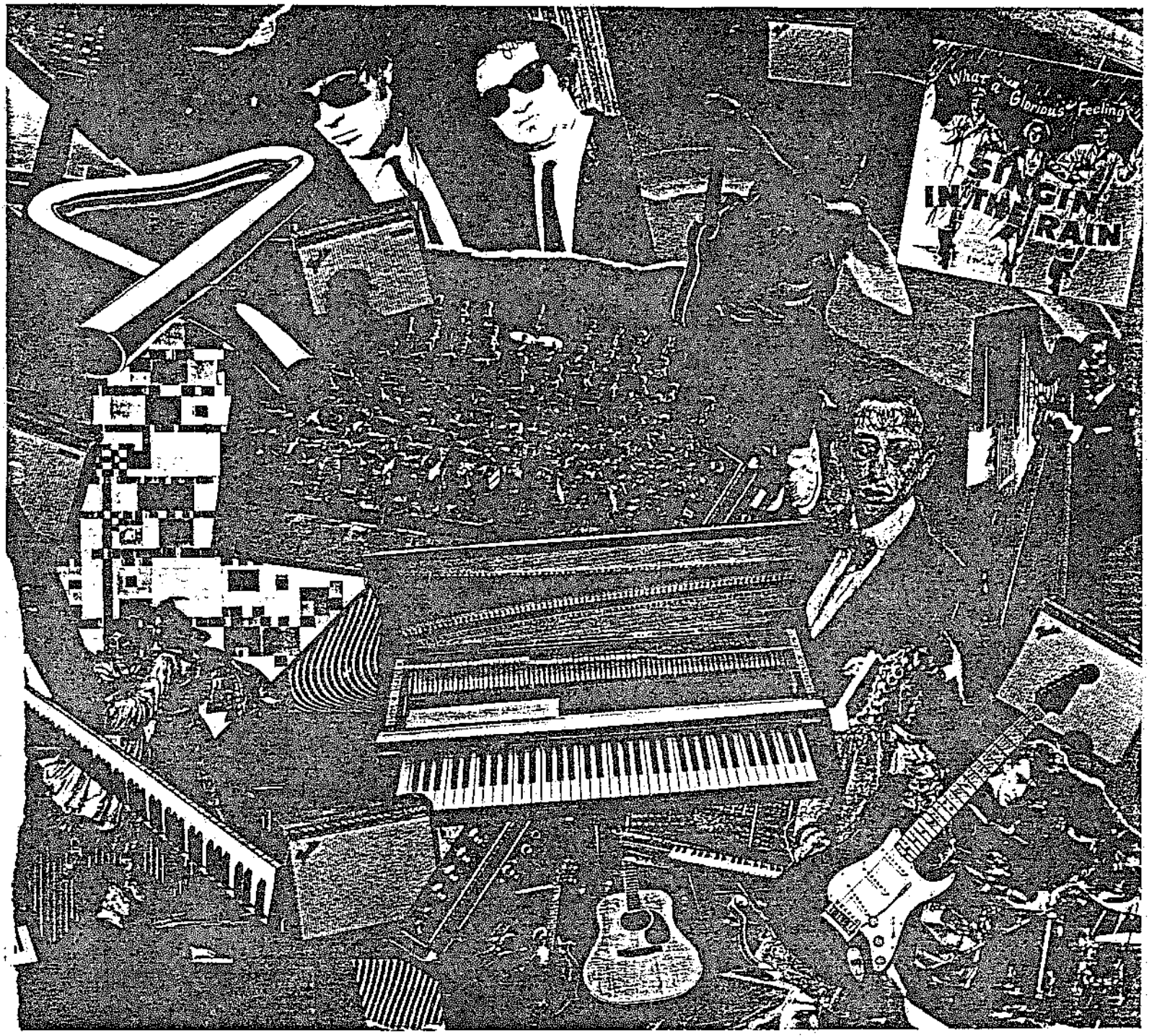
PROFESSIONAL MUSIC SYSTEMS ON THE APPLE

by Tommy Gear

Art and technology meet in the person of the artist, who feels constantly compelled to find a better or more challenging means of expression. For the artist who has chosen a medium as evanescent as the very air we breathe—the musician—this is especially true. The movement of a column of breath in a metal pipe, the flex of a string—these are simple techniques for producing vibrations in the air, which we perceive as sounds. Such techniques, once developed and refined, make possible the creation of sounds that act as bearers of complex meanings and powerful emotions. The many instruments of the symphony orchestra reflect the variety of methods that have evolved to achieve this. The advent of electronics now offers twentieth-century musicians a new medium with which to produce sound, as well as a new means by which to understand it.

Using electricity, sounds can be produced through circuits called oscillators. The electrical signals oscillators produce become audible only after they are processed by an amplifier and sent to a speaker, which produces the vibrations in the air we call sounds. Before that point is reached, though, signals can be manipulated using electrical voltages and circuits, called control voltages and filters; this process is called subtractive sound synthesis. A speaker's output and a sound's timbre are ultimately determined by manipulations such as these.

The Sound of Electronic Music. A sound can be described by graphing the way it makes the air move. The line on such a graph would be ir



the shape of a wave. One simple waveform that's produced by an electronic oscillator is called a sine wave. Though a sine wave can describe any pitch, it is characterized by an almost sterile purity of tone. More complex waveforms can be created by combining sine waves and other simple waves together. This produces more interesting sounds.

Producing sounds by adding waveforms together is called additive sound synthesis. A sound generated in this way would consist of a fundamental wave that determines its audible pitch, and a variable number of barely audible overtone pitches, called harmonics. Each unique sound contains a different number of harmonics in varying strengths. This strength is measured in amplitude, which reflects the change in air pressure caused by the presence of different harmonics.

Another important way to describe a sound indicates how it begins, sustains itself, and ends. The amplitude changes that this process reflects can also be graphed—the result is called a sound's envelope. Along with this, a given sound's unique waveform and harmonic spectrum determine its timbre, or characteristic sound. These are the qualities that distinguish the sound of a horn from that of a piano.

Sound synthesis is the creation of sounds by electronically controlling all the parameters that define them. Using voltage control to vary parameter settings over a range is called analog synthesis, because the voltages represent (or are analogs to) the parameters being controlled. Digital techniques and circuitry can also be used to produce and control sounds, and this is called digital synthesis. To be able to hear sound produced digitally, it's necessary to convert the digital information into analog information, which can then be amplified and played on a speaker. This translation is done with a digital-to-analog converter.

Applying a computer to the creation of sounds and music digitally or as a controller of analog synthesizers coheres the ongoing struggle by musical artists to come to terms with technology and use it as a means of expression. This brief overview gives an idea of the type of knowledge required of musicians who choose to pursue the digital muse.

We'll look at the professional systems currently available to produce music with your Apple. Each works in a distinctive way. Three of the systems use the Apple directly to generate sounds. The others harness various analog synthesizers to the Apple, delegating to it the responsibility of master controller.

Mountain Music Madness. The core of the Mountain Music System consists of two connected hardware boards that must be inserted into consecutive slots of the Apple. Attached to them is an audio output jack through which the system is connected to a mixer or stereo via a standard dual RCA audio cable. A light pen (attached to an impractically short cord) is also provided. The system was designed to accept commands from the Apple keyboard, a set of paddles, and the light pen.

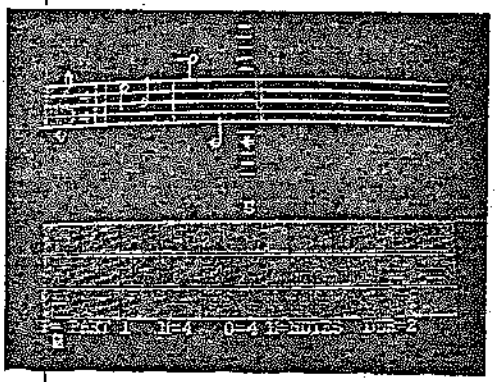
Certain command options are available through only one of these means.

The sounds themselves are generated by sixteen independent user-programmable digital oscillators. A waveform table of 256 bytes is used to store the data for the periodic waveforms generated by an oscillator. When the waveform tables are residing in the Apple's memory, each oscillator needs to read a new entry from its waveform table every thirty-two microseconds.

The digital data is made audible using eight-bit digital-to-analog converters. The oscillators are grouped into two clusters of eight. The even-numbered oscillators are assigned to the left stereo channel, the odd-numbered ones to the right channel. The outputs of each cluster are combined to form a complex waveform. The Passport Soundchaser and the alphaSyntauri keyboards are both designed around the Mountain hardware. Each system provides you with a unique software package, however.

Let's take a look at the menu of the first of the two disks provided, the System 1 software. Its three programs are *Music Player*, *Music Editor*, and *Music Merger*.

Music Player allows you to play songs that have been stored on the flip side of the System 1 disk as song files. When a song file is loaded, the screen displays the song title and a description of some parameters that comprise the song, such as the number of instrumental parts, their names, and how the individual parts have been assigned between the left and right stereo speakers. You can alter the speaker assignment, set the entire output to mono, or change the arrangement of instrumental sounds that are playing the various parts in the composition. The song plays with all the parameters you've chosen. It isn't possible to play a piece of music in real time with the Mountain software. Only music loaded from a song file can be played.



With the Mountain Music System software, the *Music Editor* screen displays the notes on a musical staff as you input them with the light pen or paddles.

The creation of song files and the modification of existing files is done with the *Music Editor*. The *Music Editor* also enables you to display and print musical scores and to load and save compositions.

In the top half of the *Music Editor*'s hi-res screen is a musical staff on which notes are displayed as they are input. The bottom half of the screen consists of the *Music Editor*'s main command menu and a status line. Using the light pen or one of the paddles, you can make choices about the duration of individual chords, notes, and rests, measure placement, and accidentals. You can also change pitches, delete segments, or scroll to other parts of the piece.

The status line at the bottom of the screen indicates the current condition of some important aspects of a composition. It tells you the part or voice of the composition that you're currently working on (the screen can only display the notation of one voice at a time), the measure number you're on, and the current octave you're working in (there are eight functional octaves; the screen can display only four at a time).

Before entering any notes, you have to make some decisions about what you want to compose. This means specifying the clef, time, and key of the composition from the signature commands menu, accessible from the *Editor*'s main command menu. Once this is done, you can place individual notes or chords on the hi-res staff using a paddle in conjunction

with the main commands menu. No music keyboard peripheral is included with the Mountain software package.

Two additional sections give you greater control of refinements. With the sound control menu, you control variations in overall dynamics (graded from pianissimo to fortissimo), tempo (from lentissimo to presto), and spatial location (determining from which stereo speaker the sound output of a given part of the composition will emanate). With the note modifier menu, you can choose note and chord dynamic accents and create ties between notes of different durations.

When you've finished entering the musical information that comprises the current composition, you can hear it by saving it to the song files disk and then reloading it. Some disk swapping is required here if you have one drive. Using the *Music Merger* program, you can combine many composition files together into one composition.

The second disk provided by Mountain is System 2, the *Instrument Definer*. This disk contains the software for creating sounds by means of additive synthesis techniques. On its flip side is a collection of twenty or so predefined instrumental sounds, called presets, that have been synthesized for you. They serve as a good starting place to apply the sound analysis capabilities of the System 2 disk.

In creating or analyzing a sound, the Mountain system allows for the manipulation of a number of discrete parameters. If any of these parameters is altered, the sound they describe will change.

Any given sound, instrumental or otherwise, can be graphically represented as a waveform. The System 2 disk makes it possible to plot waveforms and to combine up to sixteen different ones in varying degrees of intensity in molding a desired sound.

Recall that each waveform consists of a fundamental frequency and a series of harmonics. You are provided with a bar graph on which to plot waveforms to the twenty-third harmonic, each harmonic in amplitude increments of one hundred units. The overall amplitude and frequency modulation of a sound, as well as its envelope, are essential parameters determining its distinctive quality, or timbre. All these aspects of sound synthesis can be controlled and graphically scrutinized using the System 2 disk.

The system is built around sixteen oscillators for generating sounds, but some sounds may use more than one oscillator to achieve their timbre. This implies a lessened note capacity for the piece in which such sounds are used. Therefore, it is incorrect to say that this is a sixteen-voice system. It is left to the user to keep track of the allocation of the oscillators when composing; otherwise problems become apparent only later when you attempt to play the piece.

The Mountain Music System relies exclusively upon standard music notation for generating compositions. When you're trying to harness the computer's power in developing musical ideas, the limitations imposed by standard notation can be stultifying. In addition to this, certain quirks exist even in the way this standard approach is handled. Adjacent flagged notes (such as eighths and sixteenths) won't be connected the way they should be to conform to standard practice, which makes for difficult reading on the staff. Tempo markings are restricted to being the same across the instrumental voices in a given piece; therefore, polyrhythms (overlapping rhythms of different tempos) and other inventive arrangements are ruled out. Also, all the accidentals in a composition will be indicated as either all sharps or all flats, depending on the key signature.

The use of the classic terminology to indicate dynamics is questionable when the computer could control these parameters more specifically if given a range of numeric inputs. It is simply not possible to achieve any subtlety of musical phrasing given the approach taken in the *Music Editor* software. A most annoying aspect of using the system is the long waiting time that often occurs when the program needs to get something from the disk.

The manual, which presents an excellent step-by-step explanation of how to use the system, is appropriate for use by someone new to the concepts of sound synthesis. Reference sections are offered as an aid to those who want to explore these topics more deeply.

In the process of developing a sound, the System 2 software gives you constant audio feedback, so you can hear any changes as you're making them. If you happen to make a mistake as you're learning how to use the system, helpful prompts indicate the error of your ways and try to steer you aright.

Passport to Music. The Passport Soundchaser Computer Music System from Passport Designs uses the Mountain Computer hardware with software specially developed for the Soundchaser. In addition, Passport provides a four-octave, organ-type keyboard connected to an interface card that goes into the Apple's slot 7. Music education software that works with the system is available, as are program packages for transcribing notes played on the keyboard, for alternate keyboard tunings, and for combining pieces in record album form onto a single disk.

The Passport software is fast, versatile, and easy to use. The few global similarities it shares with the Mountain software result from the fact that both systems are constructed around the same hardware base. In addition to the eight-track digital performance software already available for the Soundchaser, Passport has recently released *Turbo-Traks*.

With the Mountain hardware, *Turbo-Traks* provides a sixteen-oscillator, digitally programmable synthesizer and sequencer with real-time access to sixteen preset programmable sounds, individually playable on the Soundchaser polyphonic keyboard. Sounds may be created through additive synthesis, then stored to disk as presets. In addition, 112 presets are provided on disk as part of the system. The *Turbo-Traks* sequencer operates much like a sixteen-track tape recorder. It will store a passage as you play it on the keyboard; then you can listen to it and play along, with the sequencer continually storing each consecutive overdub.

The program to accomplish all this resides on a single unprotected disk. Consequently you can work comfortably with only one disk drive. Both the Apple and paddles are used in interacting with the system. You can use a joystick, but avoid the self-centering kind—otherwise, problems of pitch control will arise.

Upon booting *Turbo-Traks*, you're presented with the cryptic-looking preset screen. This screen contains collective and individual information about the sixteen presets that are automatically loaded when you boot the system. You can now choose any one of these presets and play it

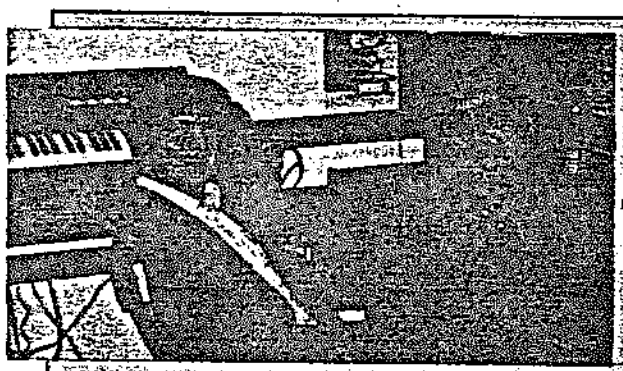
on the Soundchaser keyboard. You can even split the keyboard at any point and assign a different preset to each segment. Enabling the paddle potentiometer for pitch bend is possible from the preset screen, as is setting the control for the overall output volume.

To understand better how *Turbo-Traks* is structured, a little more detail on the way the Mountain hardware boards operate is in order. As you'll recall, this hardware provides a total of sixteen oscillators to produce sounds, divided between the left and right stereo output channels into two groups of eight. These are the physical oscillators, and they limit the number of sounds possible at a given moment to a maximum of sixteen. Although this seems like a reasonable number, recall that if you choose to combine them in order to construct more complex timbres, the number of individual notes you can play is consequently restricted. These sets of instructions in the software that we use to determine how the physical oscillators will sound (their timbres) can be considered logical oscillators. The more logical oscillators we call into play, the fewer the notes we will be able to play on the keyboard at one time.

It would seem reasonable to assume, then, that when using only one logical oscillator it would be possible to play a total of sixteen notes simultaneously on the keyboard. Unfortunately this is not so on the Soundchaser keyboard, and this limitation is due to the structure of the Mountain hardware boards. The logical oscillators of *Turbo-Traks* must follow the same division between channels into groups of eight as the hardware's physical oscillators. If we're utilizing only one logical oscillator, it can only be assigned to either the left or the right channel. The result is that the maximum keyboard polyphony possible with *Turbo-Traks* is sixteen voices, but only if you split the keyboard and assign a single left oscillator to one segment and a single right oscillator to the other. When not using this approach, the maximum polyphony possible is eight voices.

The *Turbo-Traks* preset screen contains a matrix that graphically represents how the sixteen oscillators are distributed among the sixteen presets currently in memory. A simple command changes the sound of any preset by redistributing the oscillators. The change is immediately reflected on the matrix and in the sound produced by the keyboard.

The parameters that determine the sound produced by an oscillator may be varied for each of the sixteen oscillators. Modifying a parameter merely means changing the numeric value associated with it, and this change is audible in real time. The sound parameters controlled in this section of the program are pitch by octave, frequency modulation, and envelope shape. Alternate tunings for the Soundchaser keyboard can be created using a separate utility.



Passport to Pleasure

BY ANDREW CHRISTIE

David Kusek thinks the sound of music is the new frontier in home computers. "Today's music is being generated on inexpensive equipment in people's homes," he says. "There's a whole new market opening up in computer music, and the personal computer is paving the way."

Kusek and John Borowicz have been running Passport Designs out of Half Moon Bay, California, since 1980. They came to the computer music business via employment with Electronic Music Labs, one of the big three of the original synthesizer manufacturers, along with Arp and Moog. Following their stint with EML, they founded Star Instruments in Connecticut, currently one of the largest manufacturers of percussion synthesizers, where they developed the first computer-controlled instrument synthesizers.

"We left Star Instruments to pursue our interests in the personal computer revolution and its effect on the music industry," says Kusek.

Passport's central contribution to that industry is the Soundchaser computer music system. "The home organ of the future" was originally introduced for the Apple in an analog version with *Notewriter*, a program that allowed real-time music composition, and *Musicutor*, a computer-aided instruction package to develop listening skills and general music theory.

The analog system did not do that well in the marketplace. Three years ago there wasn't that much of a marketplace, and the pricing of the system was not competitive with the standalone synthesizers.

Passport introduced the Soundchaser Digital keyboard and performance software in November 1981. The four-octave keyboard comes with software for an eight-voice polyphonic synthesizer, allowing the creation of waveform programs, defining instruments, plus four-track sound-on-sound recording, looping, and real-time control of sound. Orchestral arrangements can be stored and played back with a multitrack sequencer that records and layers the individual parts.

The company's sales increased 258 percent in the six-month period following the introduction of the Soundchaser Digital, a growth aided by its marketing arrangement with Mountain Computer that allowed the packaging of Mountain's Music System synthesizer board with each Soundchaser system.

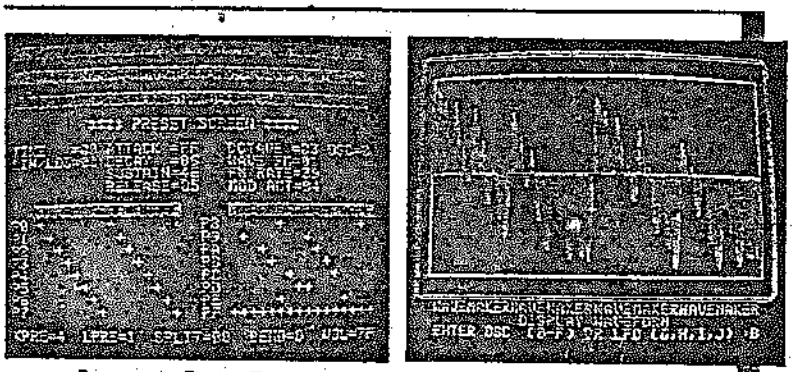
"With Mountain Computer, we initiated what I believe to be the first co-op marketing campaign between two electronics manufacturers," says Kusek, "and the success has just begun to show. We have developed a product that is higher quality and lower priced than the competition and plan to expand our markets accordingly."

Passport continues to aim at three markets—Apple computer users, performing musicians, and professional educators. It is focusing more on the home consumer market these days, developing more music instruction programs, and looking into other computers. "Our forte is software," says vice president of marketing Chris Albano, "and that's what we're concentrating on." This is in line with David Kusek's policy of continually updating Soundchaser "to offer consumers the most powerful, low-cost computer music system they can buy. The personal computer revolution is letting us put high-level digital synthesis in the hands of people who could neither afford nor understand it a few years ago."

Turbo-Traks was the third software package to join the Soundchaser library, incorporating user ideas and suggestions to create, in effect, a live performance synthesizer and sixteen-track recording studio. It simulates an analog tape deck in software, variable number of oscillators per voice, sync to tape or drum machine, and extended recording time. Soundchaser's latest offering, *Kaleido-Sound*, is a real-time graphics program that synchronizes to any audio output to produce a four-color kaleidoscope on-screen, after the fashion of the color organs that were hot items in the psychedelic sixties. "It's actually quite mesmerizing," Kusek says of his company's first entertainment software product, "not like a game program that you eventually master and get bored with."

Even with the emphasis on home-synthesizing for the average user, Passport has helped out other people, too. The first customer to patronize the company on Half Moon Bay was Alan Greenwood, then keyboard player with Foreigner. Brent Mydland of the Grateful Dead also gets a lot of use out of his Soundchaser, as do Roger Powell of Todd Rundgren's Utopia, Tom Chase, who scores the television series *Fame* and *One Day at a Time*, and Andy Musson, music director for Bette Midler and the Manhattan Transfer.

The intrepid band of engineers and musicians who started the company with Kusek and Borowicz are looking to make a big noise in the business, and the growing reputation of their computer music company is music to their ears.



Passport's *Turbo-Traks* displays information about the sixteen presets in the Apple's memory (left), and plots the waveforms you've created with the *Wavemaker* (right).

With the *Wavemaker*, you can determine the shapes of the waveforms for the oscillators that go into synthesizing the sixteen presets. You can create waveforms by specifying the relative amplitudes of the fundamental and fifteen harmonics in 255 increments on a bar graph.

The *Wavemaker* also allows you to combine already created complex waves together to produce even more interesting sounds. Four low-frequency oscillators (in addition to the primary sixteen) can be used to control vibrato or phasing effects. Waveforms that you've created, or those that already exist as presets, can be plotted and altered.

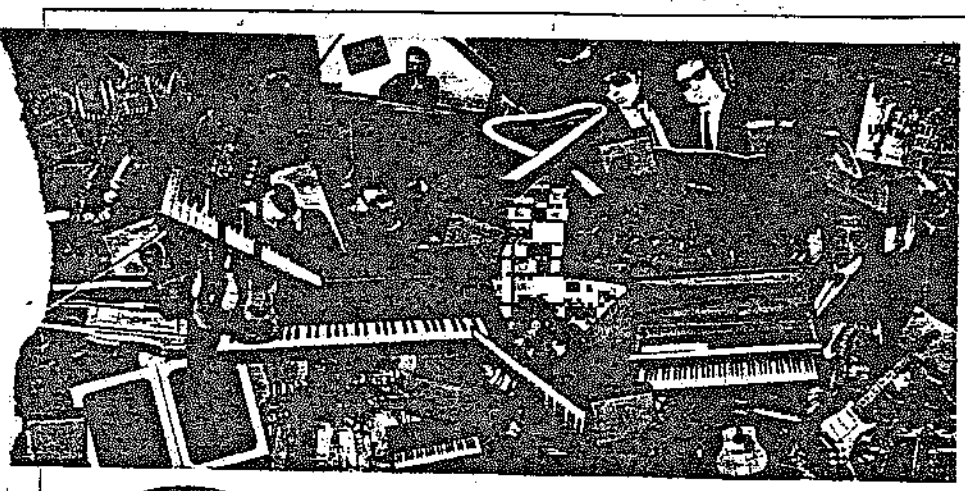
You can play musical passages in real time on the Soundchaser keyboard at a chosen tempo, keeping your tempo by following a metronome click track. You can then play along with tracks you've laid down as they're playing back, simultaneously recording the track you're playing. In this way a maximum of sixteen separate, completely polyphonic, and simultaneously playing data tracks can be stored. Although you can record only a single track at a time, each track has individual controls for volume and preset assignment. Preset assignments may be varied track by track after they're recorded, so you can try out alternatives to the arrangement you used when the piece was originally recorded. That's a feature impossible to achieve on even the most advanced sixteen-track tape recorder.

The restrictions imposed by the sixteen-oscillator limit also apply when using the sequencer. The sequencer has an approximate capacity of twenty-eight hundred notes with a 48K Apple, and about double that with 64K. Other features include being able to transpose the entire playback up or down an octave with one keypress, and to loop the entire passage for continuous playback. The *Turbo-Traks* sequencer does not allow you at any point to enter into a track to change one part of it or to fix a mistake that may have occurred when you recorded the track. The only alternative in this case is to re-record the entire track and hope you get it right this time.

By being aware of them, a user can avoid the couple of small pitfalls the program can present. For example, going directly to the *Wavemaker* section of the program automatically erases any information contained in the sequencer's recording buffer. Remembering to merge all recorded tracks before going from the sequencer to other parts of the program circumvents this problem. Another thing to be aware of is how the program reacts if a language card is present. It automatically loads DOS onto the card, thus freeing about 11K of lower RAM for use by the sequencer. If you won't always be using the program on a 64K machine, this could cause problems. Sequencer files created on a 64K machine will load and play on a 48K Apple, but if you go to load or save something else you may obliterate the DOS files. To get around this you must remember to press the space bar as the program boots; this causes the program to ignore the language card and to treat the computer as if it were a 48K machine. Sacrificing the 11K of sequencer capacity is the tradeoff. Even better, of course, is to make sure you always use a 64K Apple.

Although the *Turbo-Traks* manual surpasses its predecessors from Passport in clarity and ease of use, it is not indexed and assumes the user has a prior understanding of sound synthesis. The program doesn't in-

GOTO 221



STATE OF THE ART

from page 88

clude print options, nor is it structured around concepts of traditional notation for developing compositions. All you have to do is play what you feel and the sequencer will store it or play it back for you the way a tape recorder does.

The audio quality and sound range of the system is determined in great part by the Mountain hardware. In some cases low-pitched sounds can be problematic, causing distortion; and they can sound strange with certain parameter settings because of unbalanced frequency modulation. Also, some late-model Apple II Pluses have an internal interference problem with the hardware. This can be remedied by installing a noise-reduction capacitor available at no extra charge from Mountain Computer.

Alpha Synthetic Music. Another system that is designed around and uses the Mountain hardware is the alphaSyntauri digital synthesizer from Syntauri. The alpha lets you control many of the same aspects of additive synthesis that the Passport system does, and it too offers a multitrack sequencer, but the approach taken by the Syntauri software is distinctive. Let's acknowledge the general similarities between these two systems and then concentrate on those features of the alphaSyntauri that set it apart from other systems.

The organ-style keyboard that alphaSyntauri provides with the system is polyphonic to a maximum of eight voices, covers a five-octave range, and is velocity-sensitive, causing keys struck faster to sound louder. You can control the degree of sensitivity with the software.

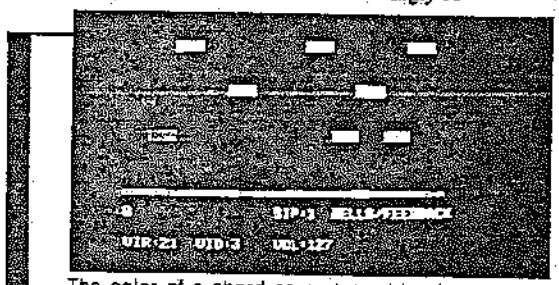
The keyboard interfaces with the Apple through a single circuit board that can reside in any free slot. Two foot switches connect to the keyboard via standard phone jacks. These control sustain and portamento effects; portamento is either on or off and is limited to a preset, unprogrammable rate of modulation.

Either of two software packages, *AlphaPlus* or *Metatrak*, can be used to run the system. The *AlphaPlus* package consists of twelve preset files of ten sounds each that can be played on the keyboard, additive synthesis techniques for creating and manipulating waveforms and their parameters, and a sequencer for recording up to 2,000 notes layered to eight multiple tracks.

When the keyboard is being played in live mode, the monitor screen is split into the text window and a pitch window. The text window gives you information about some sound parameters of the preset you're currently playing. These parameters are easily modifiable in real time.

The *AlphaPlus* approach uses two oscillators in defining each sound, resulting in the system's eight-voice limit. One oscillator is referred to as the primary channel, the other as the percussive channel. The text window contains a description for each channel of the sound's overall amplitude envelope in numerically defined unit increments between 0 and 255, as well as other data, such as variable vibrato rates that can be controlled using a standard set of paddles. The pitch window is nothing more than a dark field on which flickering colored squares reflect the pitches currently being played. Though this feature imparts no information to the user that is useful in composing music or synthesizing sounds, some may find it visually entertaining in moments of distraction.

The record/playback mode allows you to sequence eight simultaneously playing layers or tracks with an optional metronome to keep the tempo for you. During playback you can vary the overall speed of a piece without altering its original pitches, or create passages that repeatedly loop (a feature the manual misleadingly refers to as "echo"). You also have the ability to stop playback at any time and start recording again from that point, a technique commonly called "punching in." During playback, the keyboard is still fully active so you can also play along. With the Album file feature, you can take two or more sequences you've recorded, combine them together under a single file name, then play them back consecutively like a record album.



The color of a chord as portrayed by the alphaSyntauri system, seen in the pitch window.

AlphaPlus uses additive synthesis to program waveforms in much the same way that the Passport system does. One approach *AlphaPlus* offers is *Quickwave*, which uses a bar graph to plot the fundamental and the harmonics by amplitude for the two oscillators that define a sound. By depressing keys on the music keyboard, you can hear the sounds you devise in this manner as you are building them.

Another optional approach to wave formation, called *Wave*, doesn't allow you to hear what you're developing in real time. Going this route, a waveform you've worked on must be saved first, then reloaded to check it audibly. The inconvenience is a tradeoff for the precision and fine-tuning of waves that this approach gives you. With *Quickwave*, the har-

monic spectrum allowed extends as far as the sixteenth harmonic; with *Wave* you can specify up to 255 harmonics for a sound, which can result in some unique emanations from your speakers. A program that provides a graphic analysis of any wave you load (no audio feedback is given) can be found on disk too.

User-programmable effects modifications or amplitude, chorus effect, pitch bend, and pitch scan are available in the *AlphaPlus*, along with the ability to detune the keyboard to units of one-thirty-second of a tone or alter its standard equal-tempered scaling.

Metatrak, another package available separately, expands on the features of *AlphaPlus* with the exception of the waveform creation programs that *Metatrak* doesn't contain. With *Metatrak* the sequencer can record a total of sixteen simultaneous music passages, to a limit of approximately three thousand notes, that can then be manipulated or altered the way tracks can in *AlphaPlus*.

Like *AlphaPlus*, *Metatrak* is capable of looping segments and punching into individual tracks. Beyond that, it offers the ability to fast-forward a sequence, erase an unwanted track with a single keystroke, and modify the tempo of playback tracks while adding a new track at another speed. The continual merging of sequencer tracks required in the Passport system is unnecessary here, but a mix-down/playback step is provided for making final adjustments before saving a finished recording. Certain DOS commands can be used directly from the program, enabling you to delete or rename files, and to lock valuable ones worth protecting.

Unlike *AlphaPlus*, *Metatrak* allows you to split the keyboard into from two to eight segments and program the splits to occur anywhere you choose. What's more, every segment can be assigned to play a different preset sound, and in live mode these assignments can be changed in real time. All the specifications of a chosen split configuration can also be saved to disk for future use. Certain special-effects modifications are another departure unique to *Metatrak*. For example, there is timbre scan, an audible rate adjustable scan of an entire preset master's waveforms that can assume any envelope characteristics you choose. Pitch sweep and keyboard-following vibrato are also available.

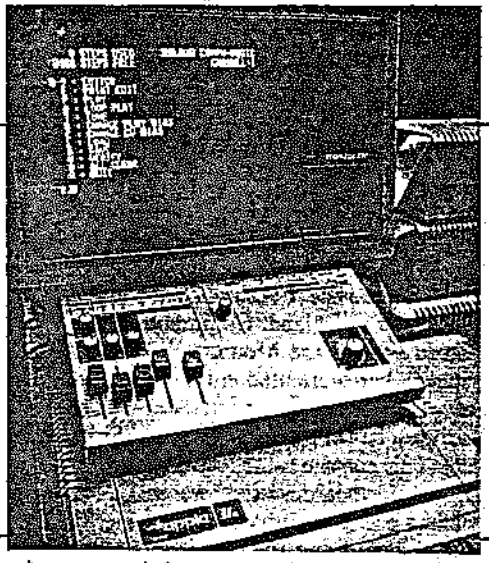
Both *AlphaPlus* and *Metatrak* do a good job of handling situations in which a wrong input has been given. The manuals for both systems are well written and easy to understand, though not indexed. *AlphaPlus* includes a helpful reference card showing all commands, along with a listing describing the preset masters that come with the program on disk. All preset masters created with *AlphaPlus* can be loaded and used with *Metatrak*. However, files of compositions created with *AlphaPlus* are not compatible with and cannot be used with *Metatrak* and vice versa. Neither program seems to support print options of any kind.

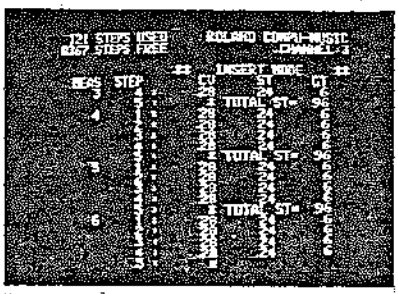
Because of the way the *Metatrak* file buffer is structured, it is possible to overwrite material when using the sequencer to record. Ample safety checks and error messages exist that will alert you in time before recording if a problem of this sort is imminent. Though the articulation and expression of musical phrases is certainly enhanced with the velocity-sensitive keyboard, the keyboard reaction time when fast staccato notes are being played is inconsistent and the notes come out with audibly variable intensities.

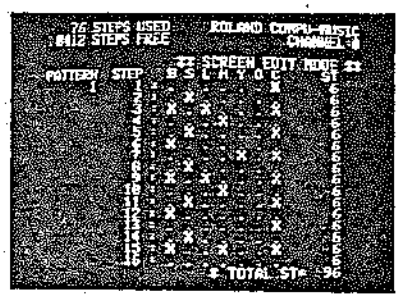
The new *Metatrak II* includes the ability to sync the output of the system to reel-to-reel tape recorders and rhythm machines. AlphaSyntauri offers some additional useful utilities that come as separate packages. *Draw Wave* allows you to draw waveforms using a set of paddles; with *Auto Pulse* you can represent pulse waves with duty cycles between 0 and 50 percent with precision; and with the *B-3 Wavemaker* you can duplicate almost any setting on a Hammond B-3 organ. A series of interactive music theory and ear-training programs called *MusicMaster* is also available for use with the alphaSyntauri system.

Compumusic Console Controller. *Compumusic* from Roland Corporation is not designed around the Mountain boards. The peripheral hardware used in *Compumusic* consists of a small console that interfaces with the Apple via a circuit board configurable for any free slot. This console is the focus of the system; no musical keyboard is used here, and it's not possible to play compositions in real time. The Apple keyboard and the console are all that are used to control the output.

Compumusic allows the musician/comput-







Left, the easy-to-use main menu is displayed on the screen above the Roland *Compumusic* console with its analog sliders and knobs; center, notes are entered numerically to each channel with the music editor screen; right, the onboard drum synthesizer plays the patterns you create by placing Xs on a rhythm grid.

erist to extend the computer's power as a controller into the realm of analog synthesizers as well. For starters, there is a six-voice synthesizer and a seven-voice drum synthesizer, programmable with the software provided on a single disk. The timbres of the *Compumusic*'s sound-producing oscillators are not programmable; with the software you control only the rhythms and pitches, and, to a limited degree, expression.

The hardware integrates an analog mixer with sliders for controlling the output to your amplifier through standard phone jacks, and there's also a clock for controlling overall tempo. A significant feature is the series of control outputs that enable you to use the *Compumusic* software to control up to eight external analog synthesizers.

The system is divided into eight channels, each sequenced individually. Channel one, the melody channel, also has nonprogrammable analog controls on the console for manipulating the sustain and decay of its sounds. Channel two, the bass channel, and channels three through six, the chord channels, have similar controls available, but only for the decay parameter. Channels seven and eight have no sound sources of their own and are reserved for use in controlling external synthesizers and effects.

All the channels are programmed in the same way using the Apple. Note that there are separate outputs and volume control sliders on the console for melody, bass, chord, and rhythm channels respectively, as well as a master slider that controls the volume of the combined output.

The software that runs *Compumusic* operates very much like a word processor or, in this case, a music processor. The single-page main menu offers access to the editor screens for each channel. Also available are single-keystroke commands to play music that's been composed using the program, loop music so it plays continuously, load and save music files to disk, and set the tuning on all channels automatically (nonstandard tunings are not supported). Examples of music are provided on the program disk for your inspiration.

To compose or edit, you select the channel you wish to work in, then specify the measure and step numbers. You can begin or resume work at any measure in a composition. Each note or rest is considered a step, and each step in a piece can be homed in on for modification as well. Standard musical notation is eschewed in favor of an approach using numbers to specify each step in a time sequence, listed on the screen in measures and scrolled vertically.

For each step, the control voltage data, which determines each step's pitch in numerical form, must first be specified. Numbers from 0 through 72 span a six-octave range, with each octave consisting of twelve steps. Next you specify the step time for each note or rest, determining its individual duration relative to an arbitrary time base of your choice. The time base functions like the time signature in standard notation; it is the number used to represent a quarter note, and can range from 1 to 255. For example, a time base set at 24 can be evenly divided by 2, 3, 6, 8, and 12, representing eighth notes, eighth-note triplets, sixteenth notes, sixteenth-note triplets, thirty-second notes, and thirty-second-note triplets respectively. The final numerical value you must set for each step is the gate time. This determines a note's articulation—whether it will sound staccato or slurred. In practice, entering these settings for each note is less complicated than the description of the process may suggest. Each parameter automatically defaults to the one directly preceding if you don't change a setting, saving you from tedious retyping to repeat pitches or time values. The settings as you input them remain visible on the screen for your reference, and any modifications are made, as with a word processor, by moving the cursor around the screen with a diamond of keys.

Other editor commands allow you to scroll

forward and back within a composition, to copy measures from any place in a piece, insert them at any point, delete measures at a single keystroke, play individual measures or segments for immediate reference, and transpose any segment of the music automatically.

Creating sequenced patterns for the onboard drum synthesizer, in channel zero, entails a different editor screen in the form of a grid. Each repeating rhythm pattern is stored separately as sixteen steps, listed vertically along the grid. Each step has separately programmable step times, to accommodate different meters, rhythms, syncopation, or drum effects like flams and rolls. Seven distinct drum sounds are available, reflecting the timbre options commonly available on Roland's well-known line of synthesized rhythm machines.

Rhythms are programmed by simply inserting Xs at various points on the grid, triggering the chosen drum sound at the indicated step time. You can also listen to a pattern after each modification is made. After you've developed a collection of patterns, you can arrange and combine them in any order to form a rhythm track that plays in conjunction with the melodies and chord progressions on the other channels.

The ability to harness microcomputer power to control any voltage-controlled synthesizer on the market is *Compumusic*'s unique strength. The control possible with other voltage-controlled sequencers available pales in comparison to the amount of control possible with an Apple at the helm. The tradeoff for this capability seems to be the limitations of the system's built-in sound-producing oscillator. While triggering their playing patterns is completely programmable, there is no way to alter their timbres, short of some form of external effects modification to the output.

The software approach takes a little time to get familiar with, but you sense it's working with you, not against you. Commands are straightforward, usually single-keystroke, and screen formats are accessible and direct. The manual moves succinctly from simple to more refined features of the system. Ways of effecting complex rhythms, syncopations, trills, glissando, and grace notes are discussed, but the book doesn't have all the answers. The examples take you as far as illustrating the musical tools *Compumusic* makes available. You are left sparked by the challenge of applying them to their fullest potential in your own musical creations.

Although the software provided by Roland is all that's available now, the *Compumusic* is open-ended and alternative software approaches that users can develop will no doubt evolve to explore the system's range. This foray by a reputable long-established manufacturer of synthesizers, rhythm machines, and amplifiers reflects the burgeoning interest of electronic instrument manufacturers in developing products that integrate or use existent microcomputer technology.

MIDI Music Mover. Synthesizers have historically developed along nonstandardized or variously standardized lines, resulting in differing control voltages and output levels among the devices available. Similarly, even microcomputer-based synthesizer equipment from various manufacturers has developed along independent, incompatible lines. The proliferation of the home-computer market has forced those producing synthesizers to address the issue of equipment incompatibility.

Artists using electronic music equipment professionally desire the expanded capabilities of current technology that microcomputer control provides, as well as the potential creative benefits of interfacing systems developed by different manufacturers. With interfaced, expandable systems, a musician's costly investments are secured in equipment thereby protected from obsolescence.

Music industry concern with these issues has led to the development of the Musical Instrument Digital Interface specification (MIDI). MIDI is really nothing more than an informal agreement between electronic equipment manufacturers on some simple standard interface circuitry, and on the grammar of a nonproprietary language to carry meaningful information between various instruments. This makes it possible to devise a multi-instrument, completely programmable music system, consisting of devices from various manufacturers interfaced via

MIDI, and which is entirely software controlled from an Apple or other microcomputer.

Synthesizers using MIDI can be configured in parallel, each playing individually or simultaneously, mono or polyphonically, using a single computer to create and edit sequences and compositions. MIDI also makes possible the development of software to generate hard copy of a composition or improvisation, aid in teaching music education and electronic synthesis skills and theory, and integrate video synthesis with music synthesis. Even with MIDI, though, the total control features available are still dependent on the design of each specific unit. MIDI enables different types of equipment to communicate at their least common level, but it won't transcend inherent limitations or features that make each synthesizer unique. For example, design differences make the transference of specific programmed sounds between various models of synthesizers impossible, but keyboard data and program selections could be communicated.

On a given piece of equipment, the presence of MIDI is not apparent because it is built right in. Its only physical indication is a couple of five-pin DIN jacks on the unit, which are needed to connect various instruments to one another or to a controller card in the computer. Information is transferred to and from the computer serially, at 31.25 kilobaud, asynchronous.

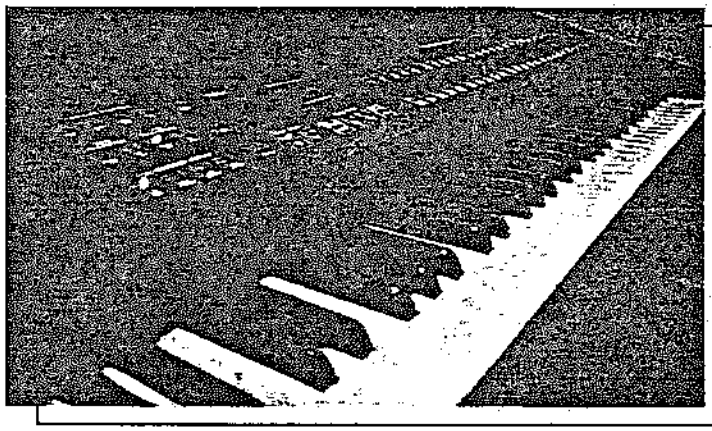
The incorporation of MIDI in a product line remains optional for each equipment manufacturer. MIDI is new, so it has not been fully integrated in all units produced by manufacturers who do support it. Sequential Circuits began shipping the Prophet-600 polyphonic synthesizer at the end of last year, the first model in its line featuring MIDI. Specifications on the structure of MIDI and its data formatting are made available through Sequential Circuits to programmers/musicians interested in developing software for the Apple using the interface. Roland Corporation will also be manufacturing equipment that supports MIDI.

Chroma's Subtractive Synthesis. An Apple-interfaceable system that takes an altogether different approach from the others is the Rhodes Chroma developed by Fender/Rogers/Rhodes for CBS. The Chroma is a sixteen-oscillator, sixteen-channel, programmable polyphonic synthesizer, sporting a touch-sensitive, velocity-sensitive, five-octave keyboard.

The unit has fifty preset voices that may be combined two at a time or played separately by splitting the keyboard in half at any designated point. The fifty voice-select switches on the Chroma's front panel also double as very detailed sound parameter controls when the instrument is in programming mode, allowing you to create very finely tuned sounds stored digitally in Chroma's onboard memory. Unlike the Mountain, Passport, and Syntauri systems, Chroma employs a subtractive synthesis approach exclusively. All manipulable parameters usually associated with the subtractive synthesis are offered, each programmable to a high degree of incremental precision.

The patch switch on the Chroma's front panel gives the user access to an important variable not usually manipulable to such a high degree on other synthesizers. This switch enables you to choose the overall configurations of the synthesizer's channels, which determines the routing of signals from the oscillators through the filters to the amplifiers. Altogether, sixteen different channel configurations are possible. Other features include touch-of-a-button parameter editing, the ability to copy parameters from one preset to another, the autotuning of all oscillators, transpose functions, foot switches for controlling sustain and for stepping through presets, and an interface port for tape-cassette storage of preset banks.

Sound parameters are not controlled on the Chroma with accessible knobs and dials but are input individually in numeric form. This approach limits your ability to change parameter settings in real time; you can change only one. Players accustomed to being able to reach out and change any settings during a performance may find this unsatisfying. This is the tradeoff for the increased power that the Chroma's digital control provides.



The Chroma music terminal from Fender/Rogers/Rhodes has a control panel with fifty presets and a keyboard that provides touch sensitivity.

The Chroma becomes a music terminal when connected to the Apple via an interface card that goes in slot 5 (reconfigurable). All information input to the Chroma is now accessible through the Apple. This includes all commands used to set up the voices, as well as all performance information.

A set of applications programs on two disks comes with the Apple interface kit (two drives recommended). This allows you to perform sequencing, editing, and data storage functions. This sequencer is fully polyphonic and can record up to sixteen independent tracks, each played, with an optional click track, in real time on the Chroma keyboard. The program's disk menu is long, but the options are straightforward enough. The menu length is more a reflection of the range of control available to the user than anything else.

The capacity of the sequencer is approximately eighteen hundred sixty notes, with the actual capacity dependent upon the amount of performance control changes entailed; it also records such performance nuances as key velocity and pressure sensitivity. A Scrunch utility will net an extra hundred notes or so.

After a sequence is recorded, it can be saved to disk along with all the presets that went into making it. Sequences can also be looped and finely edited down to changing or deleting notes, velocities, or other performance controls. The voices and volumes of individual sequenced tracks can be altered, as can the tempo.

Because of the fine-tuning possible, the editing process can get rather involved. There also seem to be a few ways of losing sequences in the process of editing. The editor does not automatically alert you to these danger points when encountered. A good amount of time is required to learn how to take full advantage of this program's potential.

Numerous utility programs come with the Chroma system. The extensive manual gives detailed information about the system to enable users/musicians to write their own software for the Chroma. Four such utilities are provided as examples on disk. The system manual offers detailed instructions on how to interface the Chroma with other sequencers, rhythm machines, and the expander module that's manufactured to double its capabilities.

The Chroma has been built for the professional musician, and the sounds that this system can produce are exceptional. Computerists with a flair for hacking are likely to find programming the Chroma a challenge. For a musician unfamiliar with sound synthesis or microcomputers, the programming approach the Apple interface makes possible might prove formidable.

It seems certain that systems like MIDI and the Chroma will act as catalysts in bringing together talents from distinct disciplines, and will help to engender the proliferation of a new breed of composer, who embodies the valuable qualities of both artist and technologist.

Fender/Rogers/Rhodes, 1300 Valencia Drive, Fullerton, CA 92631; (714) 879-8080. Mountain Computer, 300 El Pueblo Road, Scotts Valley, CA 95066; (408) 438-6650. Passport Designs, 116 North Cabrillo Highway, Half Moon Bay, CA 94019; (415) 726-0280. Roland Corporation, 2401 Saybrook Avenue, Los Angeles, CA 90040; (213) 685-5141. Sequential Circuits, 3051 North First Street, San Jose, CA 95134; (408) 946-5240. Syntauri Corporation, 3506 Waverley Street, Palo Alto, CA 94306; (415) 494-1017.

0.9 MUSIC

I have planned to have a close relation between the MIT-AI lab and the ATARI research center in music. The idea is for the MIT group to do the basic, long-term research on cognitive representation theory and the structure of musical composition, while the Atari laboratory works on aspects that are closer to educational and consumer applications. The boundary is not at all clear, of course, but this should make no difference since the people involved seem to understand very well how their goals interact.

Perhaps we should discuss formalizing the arrangement. This group will almost certainly create some very good stuff. We ought to figure out the "rights and properties" now, before MIT and ATARI are presented with an ambiguous situation to screw up!

Below are some more specific ideas. Many are condensed from more detailed notes drafted by John Amuedo.

0.10 IDEAS ABOUT MUSIC SYSTEMS

Among the systems and devices that ATARI might develop are

- Useful Transcribers for amateurs.
- "Intelligent Instruments" of all sorts.
- Real-time synchronizers - accompaniers.
- All sorts of composing and arranging aids for amateurs.
- New kinds of Synthesizers that embody "musical semantics" and "Emotional envelopes" for phrases.

The latter might use Manfred Clynes' theories. I know he'd be available to consult.

The joint efforts will create new music languages and games that will encourage musical experimentation and exploration by the general public, by amateur musicians.

We also should end up with prototypes of new home musical entertainment system using a Lisp Machine, an off-the-shelf synthesizer (such as the Rhodes Chroma); develop software for controlling the synthesizer.

In any case, there should be "constraint-sorters" to analyse dependencies, and finds optimal order perturbation strategies for hill-climbing or relaxation. Users actually introduce the constraints in some conceptual order. If the satisfier has access to that order, it might be able to do amazingly well, even though general, logical methods are not available.

The value of a real-time constraint satisfier might be enormous, becuase it could lead to a real-time dynamic SKETCHPAD capability - which would amount to good, real-time animation. A user might describe an engine, graphically, and then watch it run at a reasonable speed. It is important to realize that

> **Satisfying constraints over a family of instances generated by slowly-varying parameters may require very little computation at each step, if first and second derivatives are exploited.**

The general problem would need a powerful problem-solver, quite possibly practical for the next generation of AI-capable personal computers. In general, this problem requires intelligence, and the constraint-solver of the distant future might be a special purpose expert, mathematical problem solver. There has been little work on general purpose constraint satisfiers, especially with regard to inequality constraints.

Discovery of a good system might lead to implemention in VLSI, especially for animation applications.

REMARK: Perhaps Stallman could be interested in this - provided it is agreed that the research and resulting system is public domain. I see no reason why it shouldn't be, until the very final point of building a final consumer product.

0.15 RESEARCH ON MUSIC SYSTEMS FOR PERSONAL COMPUTERS

(notes from file ATMUSIC.2)

These projects aim to combine musical and programming environments, so that users can (1) generate impressive musical performances and (2) connect musical generators with animated graphic systems.

The first basic goal is to design "representations" for musical forms, expressions, and synthetic sounds. These are to be compatible with the new object-oriented and constraint-oriented programming styles. If this can be done, then users can not only use the new languages to make music, but also they can conveniently connect musical performances to animated graphics in natural, expressive ways.

0.15.1 A Rhythmic Assembler-Accompanist.

This has several parts. First, a language for expressing interesting rhythms. Second, real-time "listening programs" that analyse a user's activity (on drums or other instruments) into rhythmic units and larger forms. Third, an "attentive" sound generator that tries to synchronize the generated sounds with the rhythmic pulse of a performer - perhaps adding new elements as it listens.

0.15.2 A Melodic Assembler-Accompanist.

This is similar to the rhythmic system, except that it listens to a user's singing voice and tries to acquire melodies. To the extent this is feasible, it could again yield an interesting musical companion, by harmonizing with the singer - expecially through the use of "fake book" chord-schemes, stored in a library of analysed popular music selections.

0.15.3 A powerful Music composer-editor system.

If we can combine representations for rhythmic, melodic, harmonic, timbral and formal structures, these can be used to make very powerful musical constructions. One high-reward, low-effort application is to use the composer-conductor-editor as a "Genre transposer". In this mode, one begins with a "fully-analysed" musical score and applies high-level transformations to it, e.g., metric changes, texture transformations, ornamentation conditionals, etc. This produces exciting "variations". This work would proceed in collaboration with the basic research project on Music at the MIT-AI lab.

0.15.4 Music-Animation coordinator.

A first goal will be to make a demonstration system, using pre-assembled musical structures and constraint-language animation scripts, to see what it is like to attach a score-language to an animation script.

0.16 ROBOTIC RESEARCH FOR PERSONAL COMPUTERS

0.16.1 VISION SYSTEM.

Already, good mechanical arms are available for small computers, and seen they will be within the range of comsumer prices. What they need is a real-world vision system, that can recognize a variety of ordinary objects placed on a table, using a CCTV camera. Also, there would be great value in a motion-tracking system that could be used for gesture-control of computers, sports, dance, and many other daily-life uses.

We will try to make a vision system that resembles those present-day limited-speech systems - that is, systems which can learn to disttinguish some family of, say, 20 to 100 kinds of objects. Of course, once an object is identified, it can be located and measuered quite accurately, permitting all sorts of useful manipulation schemes. This system would interface to gesture languages.

0.16.2 GENERAL ROBOTICS CONSTRUCTION KIT

We would like to create a versatile system for building and programming robotic systems - like an Erector Set, only with sensory and motor interface components. We have not decided yet on the quality and complexity range of this. The plan is to start by selecting a construction technology - e.g., rods, beams and clamps, and see what seems best.

This research might benefit from using array processors.

0.17 AILAB-ATARI RESEARCH PROPOSAL

(These notes were written during the negotiations between Marvin Minsky and Alan Kay about funding research at MIT. The final agreement was much less specific and constrained.) (from file ATARI.PRO)

The field of Artificial Intelligence is developing quickly, but there are important areas that are not being pursued as urgently as they should, because they appear too "far-out" or "high-risk" to be supported by government research funds. This proposal has a general aspect and a specific aspect.

The specific area is Music. The "acoustic" aspects of that subject are well-supported, indeed, today because the applications to other fields are widely understood. But the study of cognitive aspects of music are generally thought, on one side, to be optional or frivolous and, on the other side, to be too difficult or simply beyond the fringes of science. We disagree; furthermore Music is actually one of the largest and most popular of all industries! There is much to gain if Atari can further the growth of ways for the public to participate better in it, through personal computer enhancements.

The Music Cognition Group of the M.I.T. Artificial Intelligence Laboratory is investigating the cognitive processes that underly our understanding and appreciation of music. We are interested in what goes on in the mind when people listen, when they compose, and when they improvise and perform. We are currently developing methods for elucidating and modeling human expertise in each of these areas. Our goal is to understand, in a more complete way, the cognitive foundations of human musical behaviour.

SUMMARY of CURRENT RESEARCH INTERESTS of The Music Cognition Group

- Automated composition of music from high-level symbolic descriptions.

o Analysis of improvised music and the mental processes of improvisors.

o Development of systems to encourage improvisation and improvisation-based composition.

o Development of intelligent interfaces to conventional musical instruments; computer-based live performance aids.

o Design of systems to facilitate recreational music-making using low-cost synthesizer and personal computer technologies.

o Specification of educational systems for teaching musical skills; systems which will encourage children to become proficient composers, performers and improvisors.

The "general" area is this: we need funds for "opportunistic" activity when new applications or theories appear, which are not covered by carefully pre-calculated research plans and proposals. Right now, we have ideas we'd like to pursue that concern:

o Visual-sensing interactive terminals, that track the user's hands and, eventually, facial expressions, etc.

o Expressive qualities in computer animation; making figures appear to express intentions by their motions.

o Extensions of "common-sense" reasoning programs to deal with educational systems and games.

o Development of "soft robotics" - obtaining less expensive robotic manipulators by using flexible, compliant limbs along with more versatile sensor and control methods.

o Developing "common sense vision" systems that can distinguish ordinary things like books, chairs, people, cats, and the like.

Present AI research is today both too theoretical and too practical to set sights on these kinds of goals, which require better theories of how to combine "common-sense" with realistic data-bases.

0.18 DEVELOPMENT of COGNITIVE THEORIES of MUSIC

- Automated composition of music from high-level symbolic descriptions.

- Objective -- to develop computational models of music and musical behaviour using the methods of Artificial Intelligence.

- The "little mind" research methodology; analysis-by-synthesis. Emphasis on theories of generation and derivation, programs which attempt to

implement and understand these theories.

- Focus on the pitch-time organization of well-understood styles of Western classical music.

- Development of systems that compose music from abstract symbolic descriptions, and infer such descriptions from appropriately represented scores and performance records. The models we envision will incorporate musical descriptions embodying multiple viewpoints, frame-like representations, plans, goals, and scripts. These models will also likely utilize networks of constraints and pattern-matching demons, enumerators and monitors, semantic representations for stories, and representations for mind-states governing emotions.

These descriptions will consist of intentions controlling musical form and texture, harmony and counterpoint, methods for melodic and rhythmic elaboration of underlying harmonic plans, catalogues of thematic transformations, and templates for directing the use and development of thematic material.

Tools we plan to develop -- robust music notation display program, a flexible musical score editor, real-time synthesizer control programs.

0.18.1 ANALYSIS of IMPROVISATION

- Analysis of improvised music and the mental processes of improvisors.

- Investigate the cognitive foundations of music through the paradigm of improvisation. Examine transcribed histories of improvised performances and propose computational theories that attempt to account for the musical structure of these examples.

- Initial concentration on improvised keyboard music; later expand the project to incorporate improvised monophonic instrumental and vocal music. Focus on music improvised in well-understood Western classical styles.

Why study improvisation?

- reveals mind-state of improvisor -- the "play what you hear" paradigm

- provides means to externalize human mechanisms of audio stream classification

- embodies highly developed listening and performing skills

- can produce rich experimental data for cognitive investigations

- improvisation in classical styles in a dying art form which needs to be perpetuated -- possible pedagogy/teaching method?

- interest could be revived by current personal computer / home synthesizer technology

- Development of systems to encourage improvisation and improvisation-based composition

Build a number of "satellite" improvisation capture systems. These might each consist of a high quality music synthesizer with piano-like keyboard, interfaced to a microprocessor-based home computer system, appropriate medium for storing digitized performance records.

Develop software for capturing, retrieving, editing, transcribing, and analyzing improvised keyboard music. Develop programs for controlling real-time music synthesis hardware from a microprocessor based home computer system. Experiment with systems for entering, editing and printing musical scores.

Develop manual transcription aids (for assisting a human transcriber in generating scores from recordings)

"Random-access tape recorder" -- rapid digital audio playback
Fast score entry methods
Instrument removal
Pitch-invariant tempo change

Develop automated transcription aids -- programs to translate performance schedules into scores, audio recordings into performance schedules.

adaptively infer smallest unit of duration
"floating histogram" idea
rhythmic cross-contribution idea
hypotheses about local metrical structure
duration-symbol classification problem -- clustering algorithms,
adaptive centroid computation, multi-dimensional scaling
adaptive correction of tempo variations
accomodating sudden tempo changes
automatic voice-separation" in keyboard music
notation/display issues

0.18.2 INTELLIGENT" INSTRUMENTS, COMPUTER-ASSISTED LIVE PERFORMANCE

Development of intelligent interfaces to conventional musical instruments; computer-based live performance aids.

- score-following programs

- programs that play other parts in synchronization with live performer (e.g. pedal part of organ music, accompaniment to concerto) and "intelligent" instruments

note -> chord (-> means "is mapped into a")
note -> repeated note sequence
note -> repeated chord
note sequence -> prestored chord sequence
pattern-matching note-stream triggers
note sequences deployed by single keystroke
phrasing information derived from starting time difference computation
- pitch tracking for voice and single monophonic instrument

- extraction of continuous control information for building electronically "extended" instruments

Develop algorithms that extract musically relavent features from live musical instrument and vocal signals. Undertake research toward intelligent acoustic input devices so music systems of the future won't have to be entirely keyboard-oriented.

0.19 ENTERTAINMENT SYSTEMS

Design of systems to facilitate recreational music-making using low-cost synthesizer and personal computer technologies.

Create new music languages and games that will encourage musical experimentation and exploration by the general public, by amateur musicians.

Build prototype of proposed home musical entertainment system using a Lisp Machine, an off-the-shelf synthesizer (such as the Rhodes Chroma); develop software for controlling the synthesizer -- this will solve our improv. capture problem

The components of such a system might include:

home computer
synthesizer -- computer controlled, most likely digital
storage media for performance schedules and scores (floppy, for now)
high-quality piano keyboard input option
acoustic input interface option (for instrument or voice input)
storage medium for scores, performance schedules, and digitally recorded sound

Some of its capabilities:

- play pre-recorded performance schedules on the synthesizer, giving the user control over tempo (making user the conductor)
- allow user to determine orchestration at playback time; [the performance schedule representation is an extremely compact and flexible way to store music -- many operations on pitch (such as transposition) and time (such as tempo dilation) become possible].
- let user "play along"...
- disseminate scores and accompanying score-reading programs in machine-readable form; score-display option on TV monitor; score-printing option; (ability to distribute large databases in videodisk data storage format)
- score-modifying programs, score-generating programs (e.g., compose variations on a given theme, modify an existing score)
- indexed access to large (external) databases of recordings, performances and scores -- performance schedules and scores deliverable by phone

- interaction with video games, graphics, video program material (Pasquale, Haase -- music generated from game or video scenarios)

- improvising, composing, arranging and orchestrating programs

- synthesis of "Music-Minus-One"-type accompaniments, concerto accompaniments

- make simulated "multi-track" recordings from synthesizer keyboard, output of acoustic instrument interface

- synchronization programs for fitting (user-synthesized) music to (home movie, pre-recorded) video program material

The new market for music software -- scores, performance schedules, score-interpreting programs, synthesizer control programs, musical games.

0.20 EDUCATIONAL SYSTEMS

Specification of educational systems for teaching musical skills; systems which will encourage children to become proficient composers, performers and improvisors.

Develop intelligent teaching machines that are conversant in the language and processes of music-making.

Develop systems that will stimulate children to become proficient performers, composers and improvisors.

Build computational tools for assisting composers and performers in studying, teaching and making music.

0.21 MORE PROJECTS

(Notes from file ATARI.1)

0.22 NEW LANGUAGE for home computers.

Should combine good features of LOGO, SMALLTALK, and VISI-languages. Object-oriented PLUS constraint programming PLUS-debugger.

If people are to be able to describe systems - not "procedures" - in terms of constraints and specifications- then there should be menus or programming options for controlling how the system simulation is realized. In other

Xmail Hardcopy for Bob Stein: Message # 31

Scott Fisher 1 Jul 1983 ! new stuff

Date: 1 Jul 1983 1735-PDT
From: Scott Fisher <SCOTT at ATARI>
Message-ID: <[ATARI] 1-Jul-1983 17:35:00.SCOTT>
Sender: SCOTT at ATARI
To: asr
Subject: new stuff

Two new products of interest to us (right?):

CompuServe Page VIF-20

****
REMOTE CONTROL WATCH: 6-24
****
(Copyright--1983--Winslow Assoc,
923 6th SW, Washington DC 20024.
Send your comment to 70001,602.)

While not strictly video, this remote control (RC) watch can, however, turn your TV on and off and handle any other functions you've a mind to hookup.

In short, the RC watch generates not one but two infrared control frequencies which through a separate receiver will power switch within a line of signt distance of up to 20-ft any device drawing up to 300 watts.

The RC watch will work with multiple receivers at the same or different locations.

You could, we assume, 2-stage the 300 watt switched capacity for any given device by having the infrared receiver for the watch switch the control circuit of a heavier duty device, eg. a grarage door opener.

This could mean that the same RC watch that turns on and off your video devices can do many other things as well.

The dual frequency feature would let you distinguish between two side by side devices, eg. your TV set and your VCR.

The "Innovative Time" (brand name) RC wristwatch is a full function timepiece in ts own right: digital hr-min-sec, day, date, alarm ... but no calculator.

The RC watch @ $59.95 and each dual receiver @ $39.95 are to be found in the current JS&A mailorder catalog from One JS&A Plaza, Northbook IL 60062 (800-323-6400).

Tricky thing to pin down here ... and something we don't know about ... is repair, ie. where, how much and expected time.

A nifty idea none-the-less.

and:

****
PHONO/COMPUTER DISCS: 6-24
****

(This 24 page article will appear in an editied form in a coming issue of Billboard. A news article reporting this development has already appeared on the Equipment News & Notes menu.)

Feed a computer a stream of audio information from any compatible source and you can get it to do almost anything.

In a market filled with record players and now rapidly adding cheap home video game players and computers, it was only a matter of time until someone, someway put them together. They someone is UK's EMI Records. That someway is "Camouflage" as a music/computer pop single record by Chris Sievey & The Freshies. (See "Computer-Game Single Is Released By EMI UK" in the June 11 BILLBOARD.)

It's another case of creatively combining old and new technology in a way designed to appeal to today's high tech oriented record buying market. All this, provided of course, that someone starts producing the music/computer records that brings it all together.

The lead side of Sievey's "Camouflage" single plays through any audio turntable, amplfier and speaker system as a conventional record.

But flip the single over for play by exactly the same turntable and pickup arm and make the proper connection to a popular home computer and you both hear "Camouflage" and see a TV screen display of computer text generated lyrics.

The computer side additionally contains two separate data-only track versions of a video game called "Flying Train" created by Sievey.

Don't be misled by the novelty aspect of this three for the price of one release, ie. a 4-minute pop music performance, the pop music combined with computer generated text, and a computer video game. It is the song combined with computer generated information that gets our attention.

Input information for a computer is in effect a stream of digital pulses traditionally delivered by some maner of transmission or hardcopy from cartridges, C-60 and microcassettes, floppy magnetic discs and more recently by videotapes and videodiscs.

Sievey's "Camouflage" reminds us that 33/45 rpm records have been around for a long, long time as a low cost medium that can do the job just as well as more costly and more esoteric media. A record player is a lot cheaper and easier to use for computer input than a floppy disc drive.

Sievey created "Camouflage" for use on a low end Sinclair 1k home computer sold in the UK as the ZX-81 at roughly $62. Because of its low price and relative simplicity, the ZX-81 has proven quite popular with the same youth market which is also buying records ... a natural marketing fit if there ever was one. A higher priced Sinclair UK ZX-Spectrum at $155 has 16k of memory for purchasers who want to get

more serious. Over a million of these Sinclairs are reported in use with sales of some 40,000 a month.

Sievey so far seems to have only brought music and computer generated video together in the very simplist of ways. He has been asked by EMI Records to devise new game tracks to be put on the computer side of some 12 more planned music/computer releases by other artists.

I'm in no position to second guess EMI's marketing strategy. But there is a lot that can be done by just concentrating on providing creative computer graphics mixed in to accompany and enhance a pop music performance as either a super- or a sub-audible synchronized computer data track for video display that would not interfere in any way with the audio-only playback enjoyment of the vocal and instrumental performances.

Without a computer connection, both sides of the pop record can be purchased for enjoyment as audio-only performances in their own right. With a computer connection and using, as an example, a large screen color TV projection, a creative visual artist employing a full arsenal of computer generated colors and effects could easily turn the music into a psychedelic experience. UK Sinclair's 1k memory ZX-81 is a start. The 16k ZX-Spectrum is better.

I have used the term "video" because the computer's output is displayed on a regular TV set. But we're talking here about a video that is generated by a stream of digital pulses and not as the end result of a film or videotape production of the kind produced for promotional, MTV and similar release by the labels.

The former represents a very narrow bandwidth data stream for which there is plenty of "room" on today's 33/45 records. The latter represents a broadband signal for which there's no room on today's 33/45 record technology and which must use videotape or videodisc at a much higher retail cost.

In something of a comparable situation, consider Sony's pop single, two-selection Video 45 retailing on Beta at $15 and VHS at $20 and for which you must have a $400 and up VCR for playback. In this case, of course, you get a real-life, full blown, visually produced and staged production that narrow bandwidth digital video technology can't touch. Someday maybe with CD audiodiscs.

But on the other hand EMI Records UK has been able to list price its first music/computer pop video single at about $2.20 for use on a "computer video player" costing 1/4th or less the price of a VCR.

While a music/computer record release will not have the visual dimensions of a Video 45, depending on the bit stream and the computer and its interface targeted for playack use, mixing music and digital computer video can have the same or even better impact than today's video and computer game titles.

There remains the question of what computer and getting the record's output into a form that the computer can use.

For starters, the same low-cost Sinclair computer that "Camouflage" was released for in the UK has also been widely sold in the US since 1981 as the Timex-Sinclair 1000. According to the market studies of Future Computing, out of the projected total of 7.59 million home computers that will have been shipped in the US by the end of this year, 2.80 million or almost 2 out of every 5 will be a Timex-Sinclair unit.

The basic T-S 1000 is currently selling at about $36 for the 1k memory version. Expansion to 16k memory which in the case of a music/computer video release could provide better on-screen displays adds another $36.

Some kind of an interface is required to convert the digital data received from the record for use by the computer. In the case of the T-S 1000 this capability is built in and is accessible by an audio jack.

As yet, I know of no specific plans in the US to produce and market music/computer records for use with the T-S 1000 or any other computer. But by any stretch of the imagination, there should, and I think, will

be.

This has got to be a natural for some of the leading US entertainment conglomerates. Corporately Warner already has very large recorded music and videogame and computer divisions in operation. Warner's Atari is a market leader in videogame players and cartridges for those players and is holding its own in low cost home computers.

In the case of the already widely sold videogame cartridge players which in reality are special purpose computers, the phonograph-to-computer interface unit could be designed as a cartridge module to plug into the Atari player which in turn could take a parallel or bridging output from the record player.

The opportunities to bring together the still generally separate worlds of records and computers are endless.

According to recent reports, Warner's Atari P&L could use a shot in the arm ... and new record merchandising opportunities for music producers and retailers wouldn't hurt either.

But the real bottom line is the opportunity to keep up with today's record buyers who are marching into the video age ... with or without us. (All reproduction protected beyond personal use from the CompuServe Information Service. Send your comment to 70001,602. Further use will be readily granted on written application to Winslow Assoc, 923 6th SW, Washington DC 20024.)

scott

Inter-Office Memo

WARNER COMMUNICATIONS

To: File

From: R. Veith

Subject: Summary of Meetings with Atari 26-27 July 1983

Date: 28 July 1983

Copies to: M. Maynard, S. Arthur, J. Litman

Present at the meeting were: Bob Stein, Eric Hulteen, Susan Brennan, S. Arthur, R. Veith.

Basically, we discussed design principles for interactive systems, and the possible tasks that Atari might like to do for our project. However, the Atari view at the outset was that our whole video-on-demand system would break down because we do not have the transmission capacity to meet what they consider to be a realistic load. Therefore they wanted to explore ways of getting similar results without transmitting as much video by putting much more intelligence in the terminal. (As a minor example, and one that would not require more intellignece in the terminal, one suggestion was that products could be shown as graphics first, and only if more detail was desired would the full video be shown). However, for the sake of discussion, we decided to ignore the question of limited transmission bandwidth.

The possible tasks that Atari might perform for us in the future can be summarized as:

1) Further comments about ways of accomplishing interaction with the system;

2) Further comments about the metaphor or analogy that we use in presenting the database;

3) Assistance in designing our New York lab system;

4) Analysis of the tapes of user input that record the activity on our T & D service; and

5) Conduct demonstrations for our potential clients of their own work at their California site.

Listed below are some of the specific comments and suggestions that came out of the meeting (in no particular order):

a) personalize the service as much as possible by allowing users to set their own parameters, edit their own icons, have individualized "what's new" and "browse-loops";

b) consider the possibility of users running their own programs at their terminal to accomplish some complex search and compare operation, or similar activity, whether these programs are written by users, given/sold to users as cartridges, or downloaded;

c) allow users to type in full sentences or phrases, and process the input by ignoring all but keywords (and possibly saving all other significant words for later inclusion in synonym lists or directories depending upon frequency of occurrence);

d) consider permitting both system driven and user driven dialogs;

e) have a good electronic mail system;

f) adhere to principles of good design such as never using unhelpful or insulting error messages, always providing information on a user's state or condition during a session; always "doing something" while requests are being processed so that users know the system is still alive and working; provide "tools" for users to "define" aspects of the system for themselves; always permit users to interrupt a transmission;

g) use a metaphor that includes a little figure or person who seems to help out in various ways or is, at least, amusing or entertaining in itself;

h) do not give the impression that a sophisticated "agent" is part of the system unless it can be done well; and

i) provide a number of ways of accomplishing actions in the system so that the individual users can gravitate toward the procedures that each feels more comfortable with.

ADVANCE COPY

Inter-Office Memo

WARNER COMMUNICATIONS

To: To Those Listed From: Stan Cornyn

Subject:

Date: September 22, 1983 Copies to: Cribiore, Goldman, Horowitz

Tenderloo, Bluthgen, Gout, Timmer, Kay, and Stein

Attached are two beginning memos, written from a non-technical standpoint, on further applications for the Compact Disc.

I hope you will excuse the unfinished clumsiness of these memos, as a start to bringing some new products to market.

These notes will be expanded on as the current talks continue. For clarity's sake, the following discussions are pertinent to this project:

1. Opening discussions on October 3-4 in Holland with Polygram/ Philips on CD development.

2. Discussions already begun with Atari for development of music software for the CD and other hardware;

3. Discussions suggested by Mitsubishi on video CDs, based on their phototypes.

4. Current development of our first "interactive radio" disc with the Firesign Theatre.

SJS

DEVELOPMENT AGENDA

Our intent is to expand the Compact Disc's applications beyond playing music traditionally. To make these new records will require:

A. A BASIC PLAYER which meets certain standardized requirements.

B. PERIPHERAL EQUIPMENT to perform groups of operations. We recommend two peripherals to be developed first:

1. VIDEO-INTELLIGENT PERIPHERAL (VIP)
2. MUSIC OUTBOARD MIXER (MOM)

To accomplish this will require hardware to be made to work with our recordings. This hardware needs standard specifications, which the pages following hope to help stimulate.

Conversations are currently scheduled with Philips/Polygram, Atari, and Matsushita. This is our opening agenda for those talks.

SOFTWARE CHARACTERISTICS

Our software will:

A. Play on equipment up to the limits of that equipment. For example, a video-display CD will work on a non-video-equipped home player.

B. Instruct the hardware to operate in the right ways for the particular program. For example, a branching-choice game will set the player automatically into auto-pause mode.

STANDARD REQUIREMENTS FOR ALL CD PLAYERS

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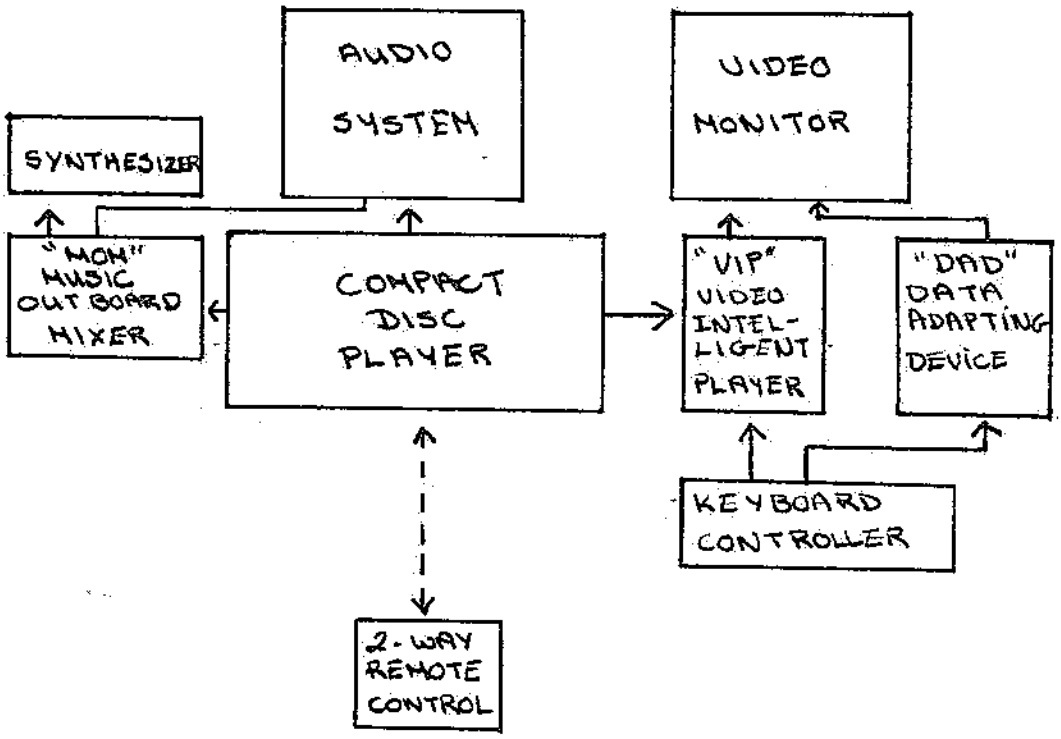

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To: Al McPherson From: Stan Cornyn

Subject:

Date: August 22, 1983 Copies to:

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lyrics and librettos w/ choice of language to follow, selectable by video channels (#1 French, #2 German...)
music (staffs) to follow score as music plays (moves ← across screen); this notation can also be printed out as sheet music.

✓ CD whose music content can be altered by:

also for Music Minus One at practice tempo

✓ changing key while remaining in tempo
✓ changing tempo while remaining in key (joggercize)
✓ alter volume, EQ of each recording track (8 trax? 24 trax?)
~~-- plays vocals multi-lingually,~~ i.e., same record w/ ~~choice of vocal track~~ in French, Spanish, etc.
NON-LINEAR PROGRAMMING -- changing style, e.g. melodies whose arranger (Bach, Gershwin) can be selected and varied.

F CD which can work as an encyclopedia, i.e., can contain all B.2 info of Phonolog, and can be "accessed" like a book, such as by word search, etc. Home data base, such as Guiness Book of Records, or Joy of Sex.

F CD whose audio bandwidth can be restricted to that of telephone, so it can play for 20 hours ("The Telephone Game"), but requires no difference in player.

CD which can make the player repeat a section (such as sn instruction) over and over until a new instruction is received.

CD with video display of non-musical visuals - maps-clear resolutions, for travel/car applications.

CD which will respond to computer questions, e.g., CD asks "what is 6+3," and behaves differently if answer typed in from computer is "9" or non-9 or "nine."

CD whose audio content can be accessed randomly -

(1) move around from address to address - freely
(2) move around from address to address - channelled choices;
(3) move in more than two directions, e.g. choice can be N E
(4) prevent the user from playing straight through, but allow him only to follow pre-designed routes. (Lockout)
(5) allow user to advance to certain areas on disc only if he has already visited others (e.g., can't go to 37 unless he's played thru 62).

CD whose data can drive music synthesizers - one, or an orchestra.
- player can determine orchestration of piece before playing it.
- but also can be driven, as sidemen, to a Casio, speeding or slowing in time to Casio.
- player piano drive

CD disc which can simultaneously output music and graphic i/a programing information (e.g., The Tosca Game).

CD disc which has four-channel quad capabilities.

CD which can load computer and audio p/b, and make them work simultaneously: user can play computer programs tied to music; various new levels (screens) appear to coincide with each song, not at irrelevant time intervals.

CD interactive radio, whereby destinations for next choice are read on video screen.
Video screen can trace moves already made by player of interactive radio game - i.e., screen shows what you've discovered about "corridors" of radio drama.

CD can be conducted by an electronic baton. User signals tempo, loudness, etc. and movements govern music.

I CD whose player and disc can have 9999 (or more?) addresses, not 14 or 99. Player does not need to release "pause" control; just hitting 0112 will move player to address #112 on disc.

REQUIRES COMPUTER → CD whose game player activity can result in multiple consequential moves, for example, player pushes "19" and CD moves to 19, plays content of 19, then moves to "16," plays that, then stops and waits -- all that from <u>one</u> cue.

REQUIRES COMPUTER → CD game which works like Adventure game: "The Blind Detective." You can ask it questions, and it will answer either by audio or video or both. ◻ Type on computer "go window" and you hear yourself falling thru trap door, have to figure next move when you hear footsteps coming toward you from left.

(Long Range)

HOLOGRAM CD will respond to voice synthesizer -- the talking <u>back</u> book.
-- the first pronunciation dictionary (you don't have to know how to spell the word to look it up)
-- translator. Say word in English receive word in Spanish.

" CD will omni-interface to all computer systems.

" CD which can play on same player as 12" disc.

" CD which will be compatible with DRAW, E-DRAW and EE-DRAW developments.

" CD which can generate hologram.

" CD which can program robot, e.g. make robot dance and sing.

" CD which can generate light show.

Xmail Hardcopy for Bob Stein: Message # 31

Scott Fisher 1 Jul 1983 ! new stuff

Date: 1 Jul 1983 1735-PDT
From: Scott Fisher <SCOTT at ATARI>
Message-ID: <[ATARI] 1-Jul-1983 17:35:00.SCOTT>
Sender: SCOTT at ATARI
To: asr
Subject: new stuff

Two new products of interest to us (right?):

CompuServe Page VIF-20

****
REMOTE CONTROL WATCH: 6-24
****
(Copyright--1983--Winslow Assoc,
923 6th SW, Washington DC 20024.
Send your comment to 70001,602.)

While not strictly video, this remote control (RC) watch can, however, turn your TV on and off and handle any other functions you've a mind to hookup.

In short, the RC watch generates not one but two infrared control frequencies which through a separate receiver will power switch within a line of signt distance of up to 20-ft any device drawing up to 300 watts.

The RC watch will work with multiple receivers at the same or different locations.

You could, we assume, 2-stage the 300 watt switched capacity for any given device by having the infrared receiver for the watch switch the control circuit of a heavier duty device, eg. a grarage door opener.

This could mean that the same RC watch that turns on and off your video devices can do many other things as well.

The dual frequency feature would let you distinguish between two side by side devices, eg. your TV set and your VCR.

The "Innovative Time" (brand name) RC wristwatch is a full function timepiece in ts own right: digital hr-min-sec, day, date, alarm ... but no calculator.

The RC watch @ $59.95 and each dual receiver @ $39.95 are to be found in the current JS&A mailorder catalog from One JS&A Plaza, Northbook IL 60062 (800-323-6400).

Tricky thing to pin down here ... and something we don't know about ... is repair, ie. where, how much and expected time.

A nifty idea none-the-less.

and:

****
PHONO/COMPUTER DISCS: 6-24
****

(This 24 page article will appear in an editied form in a coming issue of Billboard. A news article reporting this development has already appeared on the Equipment News & Notes menu.)

Feed a computer a stream of audio information from any compatible source and you can get it to do almost anything.

In a market filled with record players and now rapidly adding cheap home video game players and computers, it was only a matter of time until someone, someway put them together. They someone is UK's EMI Records. That someway is "Camouflage" as a music/computer pop single record by Chris Sievey & The Freshies. (See "Computer-Game Single Is Released By EMI UK" in the June 11 BILLBOARD.)

It's another case of creatively combining old and new technology in a way designed to appeal to today's high tech oriented record buying market. All this, provided of course, that someone starts producing the music/computer records that brings it all together.

The lead side of Sievey's "Camouflage" single plays through any audio turntable, amplfier and speaker system as a conventional record.

But flip the single over for play by exactly the same turntable and pickup arm and make the proper connection to a popular home computer and you both hear "Camouflage" and see a TV screen display of computer text generated lyrics.

The computer side additionally contains two separate data-only track versions of a video game called "Flying Train" created by Sievey.

Don't be misled by the novelty aspect of this three for the price of one release, ie. a 4-minute pop music performance, the pop music combined with computer generated text, and a computer video game. It is the song combined with computer generated information that gets our attention.

Input information for a computer is in effect a stream of digital pulses traditionally delivered by some maner of transmission or hardcopy from cartridges, C-60 and microcassettes, floppy magnetic discs and more recently by videotapes and videodiscs.

Sievey's "Camouflage" reminds us that 33/45 rpm records have been around for a long, long time as a low cost medium that can do the job just as well as more costly and more esoteric media. A record player is a lot cheaper and easier to use for computer input than a floppy disc drive.

Sievey created "Camouflage" for use on a low end Sinclair 1k home computer sold in the UK as the ZX-81 at roughly $62. Because of its low price and relative simplicity, the ZX-81 has proven quite popular with the same youth market which is also buying records ... a natural marketing fit if there ever was one. A higher priced Sinclair UK ZX-Spectrum at $155 has 16k of memory for purchasers who want to get

more serious. Over a million of these Sinclairs are reported in use with sales of some 40,000 a month.

Sievey so far seems to have only brought music and computer generated video together in the very simplist of ways. He has been asked by EMI Records to devise new game tracks to be put on the computer side of some 12 more planned music/computer releases by other artists.

I'm in no position to second guess EMI's marketing strategy. But there is a lot that can be done by just concentrating on providing creative computer graphics mixed in to accompany and enhance a pop music performance as either a super- or a sub-audible synchronized computer data track for video display that would not interfere in any way with the audio-only playback enjoyment of the vocal and instrumental performances.

Without a computer connection, both sides of the pop record can be purchased for enjoyment as audio-only performances in their own right. With a computer connection and using, as an example, a large screen color TV projection, a creative visual artist employing a full arsenal of computer generated colors and effects could easily turn the music into a psychedelic experience. UK Sinclair's 1k memory ZX-81 is a start. The 16k ZX-Spectrum is better.

I have used the term "video" because the computer's output is displayed on a regular TV set. But we're talking here about a video that is generated by a stream of digital pulses and not as the end result of a film or videotape production of the kind produced for promotional, MTV and similar release by the labels.

The former represents a very narrow bandwidth data stream for which there is plenty of "room" on today's 33/45 records. The latter represents a broadband signal for which there's no room on today's 33/45 record technology and which must use videotape or videodisc at a much higher retail cost.

In something of a comparable situation, consider Sony's pop single, two-selection Video 45 retailing on Beta at $15 and VHS at $20 and for which you must have a $400 and up VCR for playback. In this case, of course, you get a real-life, full blown, visually produced and staged production that narrow bandwidth digital video technology can't touch. Someday maybe with CD audiodiscs.

But on the other hand EMI Records UK has been able to list price its first music/computer pop video single at about $2.20 for use on a "computer video player" costing 1/4th or less the price of a VCR.

While a music/computer record release will not have the visual dimensions of a Video 45, depending on the bit stream and the computer and its interface targeted for playack use, mixing music and digital computer video can have the same or even better impact than today's video and computer game titles.

There remains the question of what computer and getting the record's output into a form that the computer can use.

For starters, the same low-cost Sinclair computer that "Camouflage" was released for in the UK has also been widely sold in the US since 1981 as the Timex-Sinclair 1000. According to the market studies of Future Computing, out of the projected total of 7.59 million home computers that will have been shipped in the US by the end of this year, 2.80 million or almost 2 out of every 5 will be a Timex-Sinclair unit.

The basic T-S 1000 is currently selling at about $36 for the 1k memory version. Expansion to 16k memory which in the case of a music/computer video release could provide better on-screen displays adds another $36.

Some kind of an interface is required to convert the digital data received from the record for use by the computer. In the case of the T-S 1000 this capability is built in and is accessible by an audio jack.

As yet, I know of no specific plans in the US to produce and market music/computer records for use with the T-S 1000 or any other computer. But by any stretch of the imagination, there should, and I think, will

be.

This has got to be a natural for some of the leading US entertainment conglomerates. Corporately Warner already has very large recorded music and videogame and computer divisions in operation. Warner's Atari is a market leader in videogame players and cartridges for those players and is holding its own in low cost home computers.

In the case of the already widely sold videogame cartridge players which in reality are special purpose computers, the phonograph-to-computer interface unit could be designed as a cartridge module to plug into the Atari player which in turn could take a parallel or bridging output from the record player.

The opportunities to bring together the still generally separate worlds of records and computers are endless.

According to recent reports, Warner's Atari P&L could use a shot in the arm ... and new record merchandising opportunities for music producers and retailers wouldn't hurt either.

But the real bottom line is the opportunity to keep up with today's record buyers who are marching into the video age ... with or without us.

scott

Inter-Office Memo

WARNER COMMUNICATIONS

To: File

From: R. Veith

Subject: Summary of Meetings with Atari 26-27 July 1983

Date: 28 July 1983

Copies to: M. Maynard, S. Arthur, J. Litman

Present at the meeting were: Bob Stein, Eric Hulteen, Susan Brennan, S. Arthur, R. Veith.

Basically, we discussed design principles for interactive systems, and the possible tasks that Atari might like to do for our project. However, the Atari view at the outset was that our whole video-on-demand system would break down because we do not have the transmission capacity to meet what they consider to be a realistic load. Therefore they wanted to explore ways of getting similar results without transmitting as much video by putting much more intelligence in the terminal. (As a minor example, and one that would not require more intellignece in the terminal, one suggestion was that products could be shown as graphics first, and only if more detail was desired would the full video be shown). However, for the sake of discussion, we decided to ignore the question of limited transmission bandwidth.

The possible tasks that Atari might perform for us in the future can be summarized as:

1) Further comments about ways of accomplishing interaction with the system;

2) Further comments about the metaphor or analogy that we use in presenting the database;

3) Assistance in designing our New York lab system;

4) Analysis of the tapes of user input that record the activity on our T & D service; and

5) Conduct demonstrations for our potential clients of their own work at their California site.

Listed below are some of the specific comments and suggestions that came out of the meeting (in no particular order):

a) personalize the service as much as possible by allowing users to set their own parameters, edit their own icons, have individualized "what's new" and "browse-loops";

b) consider the possibility of users running their own programs at their terminal to accomplish some complex search and compare operation, or similar activity, whether these programs are written by users, given/sold to users as cartridges, or downloaded;

c) allow users to type in full sentences or phrases, and process the input by ignoring all but keywords (and possibly saving all other significant words for later inclusion in synonym lists or directories depending upon frequency of occurrence);

d) consider permitting both system driven and user driven dialogs;

e) have a good electronic mail system;

f) adhere to principles of good design such as never using unhelpful or insulting error messages, always providing information on a user's state or condition during a session; always "doing something" while requests are being processed so that users know the system is still alive and working; provide "tools" for users to "define" aspects of the system for themselves; always permit users to interrupt a transmission;

g) use a metaphor that includes a little figure or person who seems to help out in various ways or is, at least, amusing or entertaining in itself;

h) do not give the impression that a sophisticated "agent" is part of the system unless it can be done well; and

i) provide a number of ways of accomplishing actions in the system so that the individual users can gravitate toward the procedures that each feels more comfortable with.

ADVANCE COPY

Inter-Office Memo

WARNER COMMUNICATIONS

To: To Those Listed From: Stan Cornyn

Subject:

Date: September 22, 1983 Copies to: Cribiore, Goldman, Horowitz

Tenderloo, Bluthgen, Gout, Timmer, Kay, and Stein

Attached are two beginning memos, written from a non-technical standpoint, on further applications for the Compact Disc.

I hope you will excuse the unfinished clumsiness of these memos, as a start to bringing some new products to market.

These notes will be expanded on as the current talks continue. For clarity's sake, the following discussions are pertinent to this project:

1. Opening discussions on October 3-4 in Holland with Polygram/ Philips on CD development.

2. Discussions already begun with Atari for development of music software for the CD and other hardware;

3. Discussions suggested by Mitsubishi on video CDs, based on their phototypes.

4. Current development of our first "interactive radio" disc with the Firesign Theatre.

SMS

DEVELOPMENT AGENDA

Our intent is to expand the Compact Disc's applications beyond playing music traditionally. To make these new records will require:

A. A BASIC PLAYER which meets certain standardized requirements.

B. PERIPHERAL EQUIPMENT to perform groups of operations. We recommend two peripherals to be developed first:

1. VIDEO-INTELLIGENT PERIPHERAL (VIP)
2. MUSIC OUTBOARD MIXER (MOM)

To accomplish this will require hardware to be made to work with our recordings. This hardware needs standard specifications, which the pages following hope to help stimulate.

Conversations are currently scheduled with Philips/Polygram, Atari, and Matsushita. This is our opening agenda for those talks.

SOFTWARE CHARACTERISTICS

Our software will:

A. Play on equipment up to the limits of that equipment. For example, a video-display CD will work on a non-video-equipped home player.

B. Instruct the hardware to operate in the right ways for the particular program. For example, a branching-choice game will set the player automatically into auto-pause mode.

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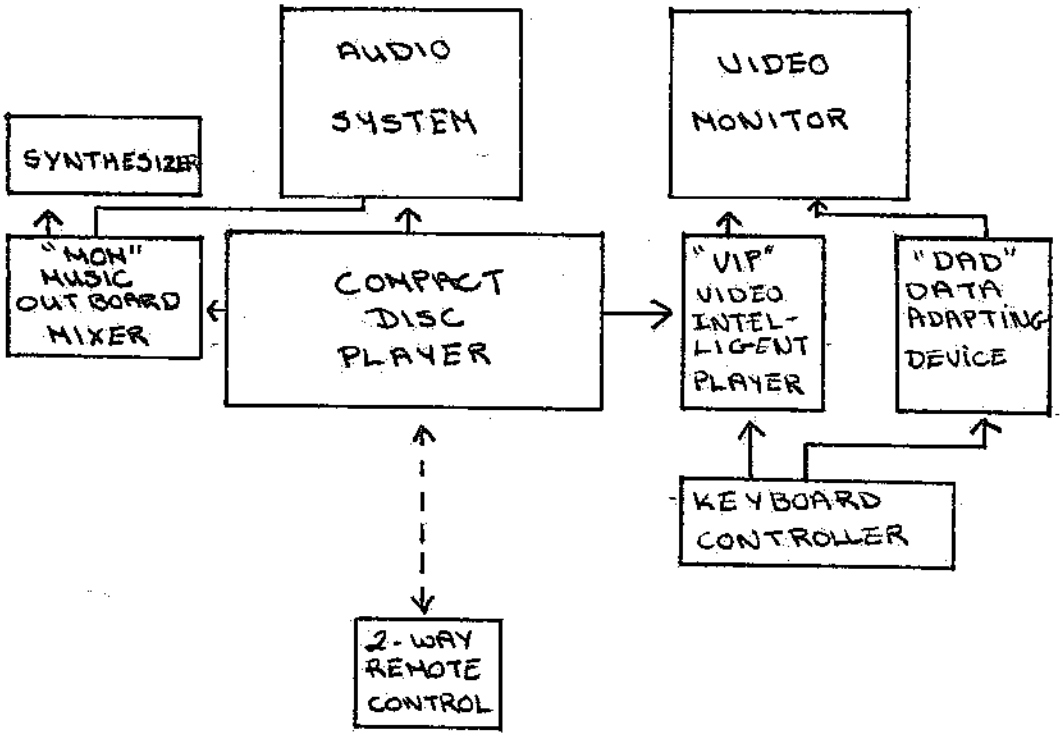

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music (staffs) to follow score as music plays (moves ← across screen); this notation can also be printed out as sheet music.

✓ CD whose music content can be altered by:

also for Music Minus One at practice tempo

✓ changing key while remaining in tempo
✓ changing tempo while remaining in key (joggercize)
- alter volume, EQ of each recording track (8 trax? 24 trax?)
- ~~plays vocals multi-lingually,~~ i.e., same record w/ ~~choice of vocal track~~ in French, Spanish, etc.

NON-LINEAR PROGRAMMING - changing style, e.g. melodies whose arranger (Bach, Gershwin) can be selected and varied.

F CD which can work as an encyclopedia, i.e., can contain all B.2 info of Phonolog, and can be "accessed" like a book, such as by word search, etc. Home data base, such as Guiness Book of Records, or Joy of Sex.

F CD whose audio bandwidth can be restricted to that of telephone, so it can play for 20 hours ("The Telephone Game"), but requires no difference in player.

CD which can make the player repeat a section (such as an instruction) over and over until a new instruction is received.

CD with video display of non-musical visuals - maps-clear resolutions, for travel/car applications.

CD which will respond to computer questions, e.g., CD asks "what is 6+3," and behaves differently if answer typed in from computer is "9" or non-9 or "nine."

CD whose audio content can be accessed randomly -

(1) move around from address to address - freely

(2) move around from address to address - channelled choices;

(3) move in more than two directions, e.g. choice can be N S E W

(4) prevent the user from playing straight through, but allow him only to follow pre-designed routes. (Lockout)

(5) allow user to advance to certain areas on disc only if he has already visited others (e.g., can't go to 37 unless he's played thru 62).

CD whose data can drive music synthesizers - one, or an orchestra.
- player can determine orchestration of piece before playing it.
- but also can be driven, as sidemen, to a Casio, speeding or slowing in time to Casio.
- player piano drive

CD disc which can simultaneously output music and graphic i/a programing information (e.g., The Tosca Game).

CD disc which has four-channel quad capabilities.

CD which can load computer and audio p/b, and make them work simultaneously: user can play computer programs tied to music; various new levels (screens) appear to coincide with each song, not at irrelevant time intervals.

CD interactive radio, whereby destinations for next choice are read on video screen.
Video screen can trace moves already made by player of interactive radio game - i.e., screen shows what you've discovered about "corridors" of radio drama.

CD can be conducted by an electronic baton. User signals tempo, loudness, etc. and movements govern music.

I CD whose player and disc can have 9999 (or more?) addresses, not 14 or 99. Player does not need to release "pause" control; just hitting 0112 will move player to address #112 on disc.

REQUIRES COMPUTER → CD whose game player activity can result in multiple consequential moves, for example, player pushes "19" and CD moves to 19, plays content of 19, then moves to "16," plays that, then stops and waits -- all that from one cue.

REQUIRES COMPUTER → CD game which works like Adventure game: "The Blind Detective." You can ask it questions, and it will answer either by audio or video or both. ◻ Type on computer "go window" and you hear yourself falling thru trap door, have to figure next move when you hear footsteps coming toward you from left.

(Long Range)

HOLOGRAM CD will respond to voice synthesizer -- the talking back book.
-- the first pronunciation dictionary (you don't have to know how to spell the word to look it up)
-- translator. Say word in English receive word in Spanish.

" CD will omni-interface to all computer systems.

" CD which can play on same player as 12" disc.

" CD which will be compatible with DRAW, E-DRAW and EE-DRAW developments.

" CD which can generate hologram.

" CD which can program robot, e.g. make robot dance and sing.

" CD which can generate light show.

The Gang

Projects and Recreation

Alan C. Kay AKK

Well, it's already the end of February and you folks still haven't seen much of me. Even though I don't like meetings as a primary way to do business, I'd like to suggest that we set some up - not to endlessly debate - the time for that is past - (Computer Science, like theatre, is 10% philosophy and 90% do.) - but to meet with the object of posing and solving obstacles in our path.

For example, the "circle of knowledge" project is marvelously diffuse--we now need to put forth and push out in practical directions: e.g. a "universal" interface, an artificial agent, connection to real world objects like houses and people, mundane tasks like E-mail, making images in different domains, and so forth. Each of these can be done this year without having to solve the ultimate mysteries of representation. The more separate these projects are at this point the better, providing we can pipe their output up to a screen along with stuff from other projects.

The "media room" project is a key to this, but again, we need not get ensnared in deep programming language issues or massive operating system difficulties. All we really need at this point is a simple flexible way to get lots of medium resolution images into a high resolution projection screen.

CES

At the January CES, Atari will have a vastly redesigned booth that includes a 40-50 person theatre in which 15 minute shows will be given. We are the prime contractors for what happens in the show (as we should be). Atari, as a change from its traditional posture of secrecy (but following Japanese precedent), will show gadjets that are ideas or future products. All the heavyweights are completely behind this--it is a great opportunity to have fun, to have a driving deadline for some of our projects and to get the outside world and our company to understand some fundamental issues.

If the "video stream controller" (the super computer controlled "quantels") are done correctly, we should be able to show even last-minute projects without retribution.

In the grand tradition of Monterey, our ever popular producer and floor director not to mention cheerleader and cruise ship recreation director, Wanda, will once again start goading us towards practicality.

Also, as before, technical direction will be handled by the tireless twins, Eric and Susan.

For the continuity and plot we will probably hire an outside company - perhaps the one that Ted Voss used for Customer Week.

Of course, we will probably once again use the ever patient McCune Company to run the equipment.

Heuretics

There are several shorter term uses of Lenat's stuff which would add greatly to our tools.

Ideosyncratic Movement was invented by Frank Thomas at Disney to sustain interest in the first feature length cartoon. No one has ever done a computer model which animates small movement according to the characters temperament, mood and situation. Eurisko should be able to do this fairly easily.

The Joke Generator project needs a system that can discover possible crossed contexts in an environment and tell if the forcing of a metaphor might be funny. This is harder and will depend partly on how good is our characterization of a fruitful environment and filter principles for humor.

Graphics

Ted Hoff, original inventor of the microprocessor, has just joined us from Intel. His responsibilities include short term Atari research (thank God!) and he is quite bright and interested in doing projects. His major current interest is in doing a 3-D graphics chip. He has managed to reinvent most of the techniques now in use and is about ready to actively work on a practical method for the chip. This is a great topic for bull sessions with clever people. We will set some up soon. Kurt Fleischer, Jeff Sarnoff and Steve Saunders particularly would contribute greatly.

No matter how you slice it, there is still considerable reason for 2½ graphics too. Mike Moone in CED would rather have 2½-D and AI rather than 3-D and no smarts! I have recently had a new idea or two in this area and would like some feedback. We should do a Bugs Bunny that can be ideosyncratically animated! In fact, we should build on Susan and Peggy's work to do a character building kit that automatically animates.

Recreational Machine Design

HCD is firmly in the "computer business" which is too bad in a way since we don't expect future computers to resemble present ones very much in either form or content.

CED is looking like much more fun. Perry is gone. Dennis is now head (a great improvement). Mike has a good grasp of network distribution. And they are in a bit of trouble, thus are as co-operative as they can be. In addition, Larry Kaplan and Pat Cole are two good allies.

Recently I talked to Mike Moone about what kind of a future system he would like for CED. He would like it soon with a selling price of $250 with "story telling" (2½) graphics and ability to do some AI. Of course, it should be expanded into something more later.

One of the implications of these specs is that the system should heavily encode memory. A Smalltalk-like language would help. (They are already looking at that--another difference between them and HCD). Encoded graphics have already

been worked on - a very fruitful area for 2½-D. Also, we will have Steve Saunders whose PhD thesis was all about choosing and compiling optimal structures. This is one of my favorite hobby topics and I would like to suggest a "recreational" seminar once or twice a week to flush out this design. It will be fun - also it may help some of the other projects if we can pour our hacking instincts into this one!

Other Projects

I think of our relationship with Special Projects as a recreational one--so general things for the computer camps and Club Med, etc. are optional but fun. (Bank Street is similar. It's fun and good folks are working there.)

A project we have more responsibility for is the music experience at the Mt. Diablo experiemtnal camp. Tim Gallway, Eric Stumacher (Apple Hill), John Steinmetz (L.A. Chamber Orchestra) and I have been working on this. High gear will happen in March and April.

All in all, I think these extracurricular projects are a good idea. At Xerox they worked very well providing the main street projects were in place. In that case, they were an amplifier rather than a distraction.

Resources and Space

Atari Headquarters and Warner have promised zero hassling on P.O.'s even for high priced gear. Especially considering 4th quarter '82, they are extremely supportive of longer term research.

Chris has some schemes to get us quick "production-tape" space for the CES project. I vote that we just jump over these and turn on the other burners.

Inter Office Memo

ATARI®

Consumer Electronics Division

To: Bob Stein

From: Darby Williams

Subject: EDRO Future Applications/Business Def. Date: 10/22/83

To follow up from our last conversation in the car regarding E.D.R.O. future applications and the "true business" definition, I have enclosed a few documents which should efficiciently bring you up to speed on the project. I'll follow up with more later.

As far as next steps, I will be finalizing my budget the beginning of this week, which will determine the dollars available for outside consultants on this part of the project. I would have no problem if you were to "tentatively discuss" some work on the part of the analyst (whose name I continue to forget). As doesn't happen in most development exercises at Atari, I think we need to have a reasonable understanding of the next generation of the terminal early on in our development process of the first generation.

In this light, your beginning to formulate an approach to resolving these issues would be highly desirable. It might be good to start discussing it this week by phone; I can send you materials by Emery Express as needed. Then perhaps we can set a time to go over in person around the 1st of Nov. Ideally, it would be advantageous to have a synthesis of your thoughts given your current knowledge base and a minimal amount of research by November 7 and a more in-depth write up by December 7.

The key output, again, is a list of requirements for design in order to be expandable to broader applications (or if you feel it can and should be included in the first generation, that's a possibility too). The in-depth write up should include some rough cost estimates and could include several alternatives if you perceive a strong segmentation. I will be the main team member attacking the question of retailer segmentation, an activity which may be useful to you in this pursuit.

I'll talk with you soon, Bob. It was good to see you again after several weeks (of your expanding your world horizons). Enjoy the East Coast!

Thanks.

Darby

Darby

co # interactive — Atari — far out — engage in conversation — highly cut — down & movies

60/3500
60) 210,000
180
300

Interactive?

	Yes	No	M
1. Book (ordinary)	3	2	1
2. Book (choose your own adventure)	5	1	
3. Movie - Theatre	1	5	
4. broadcast TV	1	5	
5. QUBE	3	1	1
6. Movie on videocassette	2	3	1
7. movie on disc	3	2	1
8. Stage play	1	3	1
9. PACMAN	6		
~~10. Infocom adventure game~~			
10. electronic paint box	6