

Geschichte und Ästhetik der audiovisuellen und digitalen Medien II

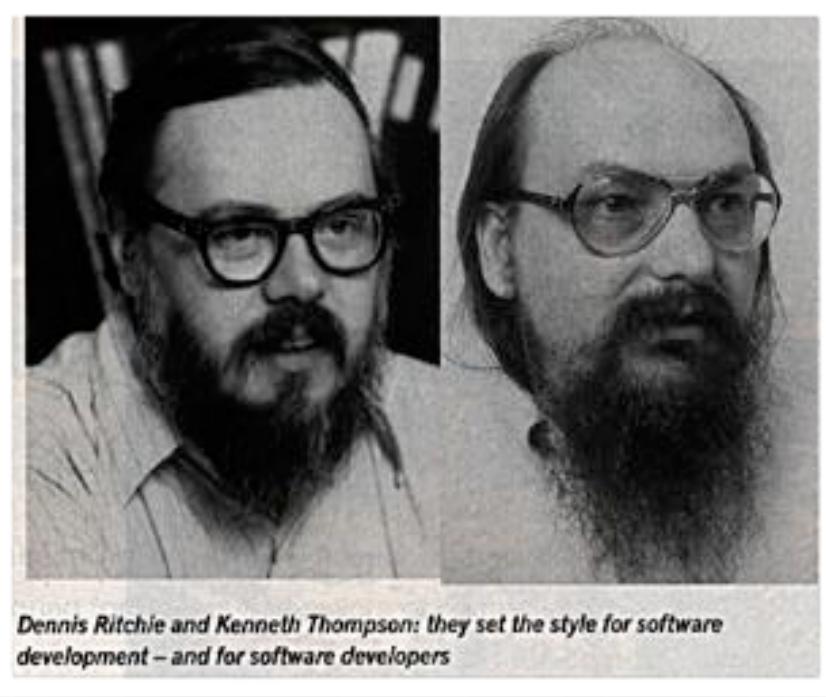
1972-1978

Prof. Dr. Jochen Koubek



Technikgeschichte

UNIX



Dennis Ritchie and Kenneth Thompson: they set the style for software development – and for software developers

1969 Arbeit an MULTICS (Multiplexed Information and Computing Service), Bell Telephone Labs, General Electrics, MIT

Nachdem BTL sich aus dem MULTICS-Projekt zurückzog, entwickelten Ritchie und Thompson den «UNiplexed Information and Computing Service» (UNICS) in der Sprache «B»

3.11.1971 Das erste «UNIX PROGRAMMER'S MANUAL [by] K. Thompson [and] D. M. Ritchie»

1972 Ritchie entwickelt «C» aus «B». Thompson entwickelt das «Pipeline»-Prinzip

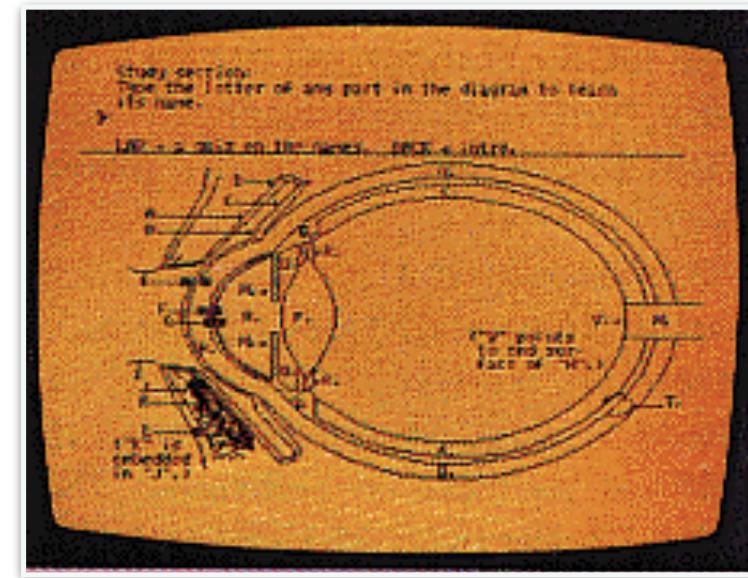
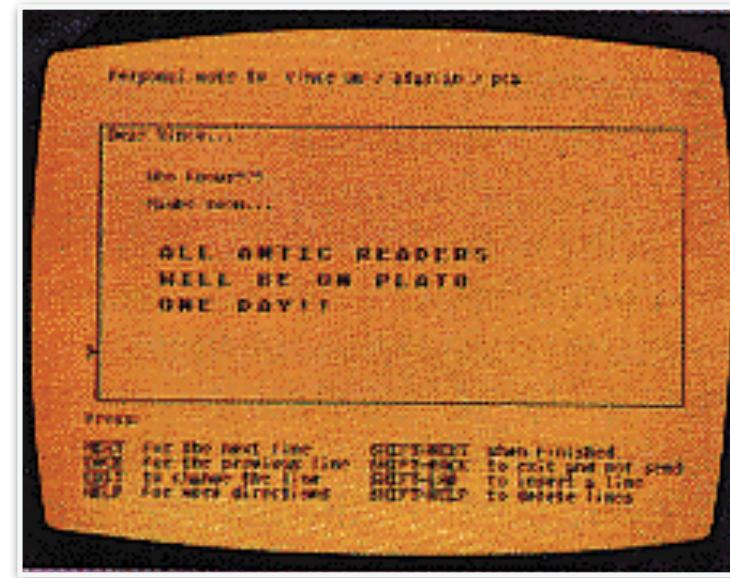
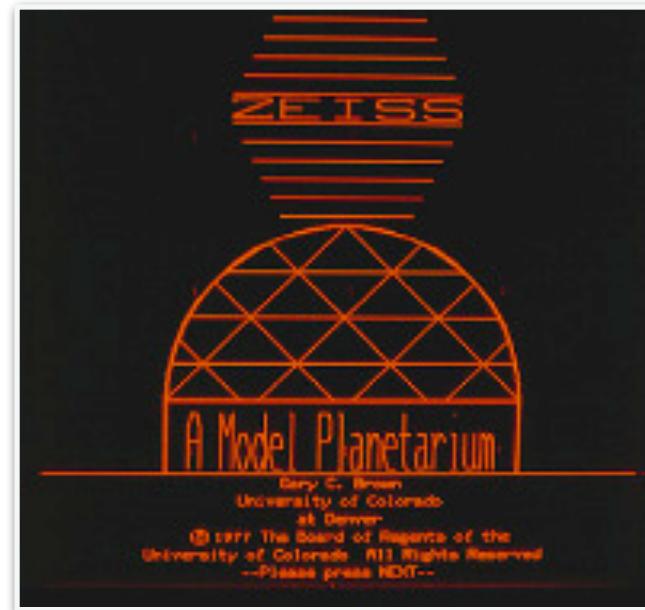
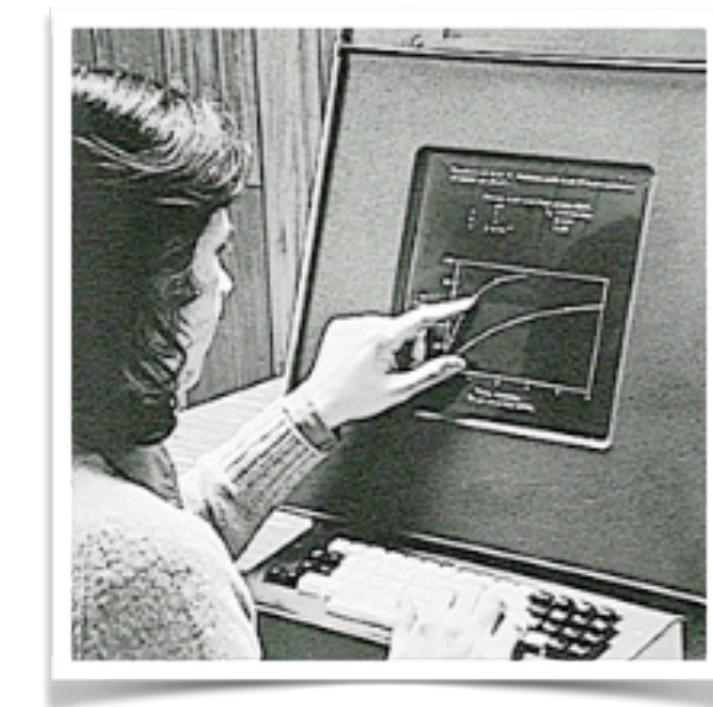
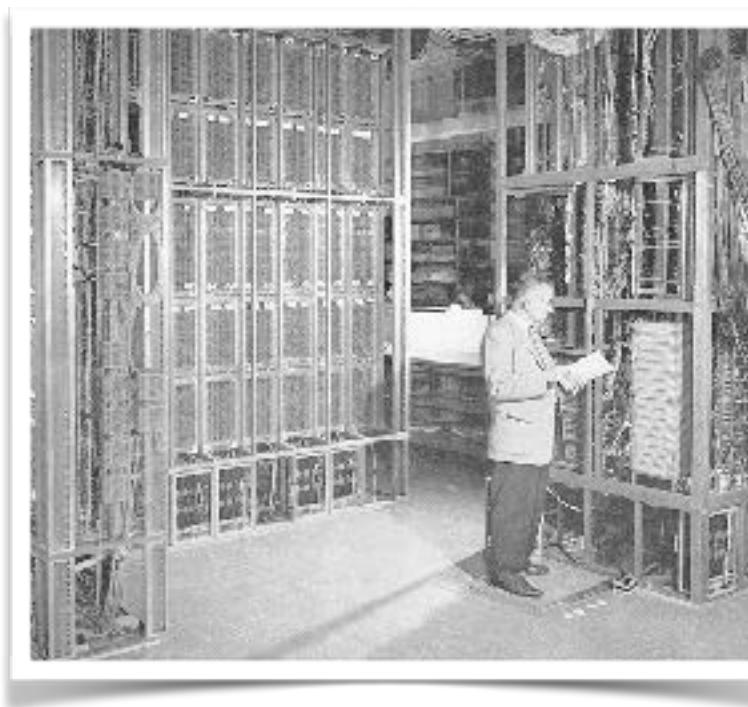
1973 Veröffentlichung von UNIX



D. Ritchie und K. Thompson an der PDP-11

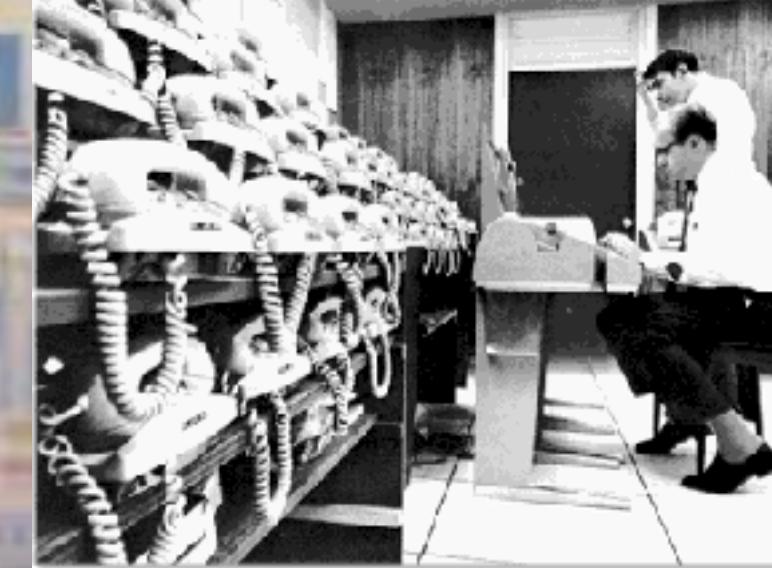
Online-Community PLATO

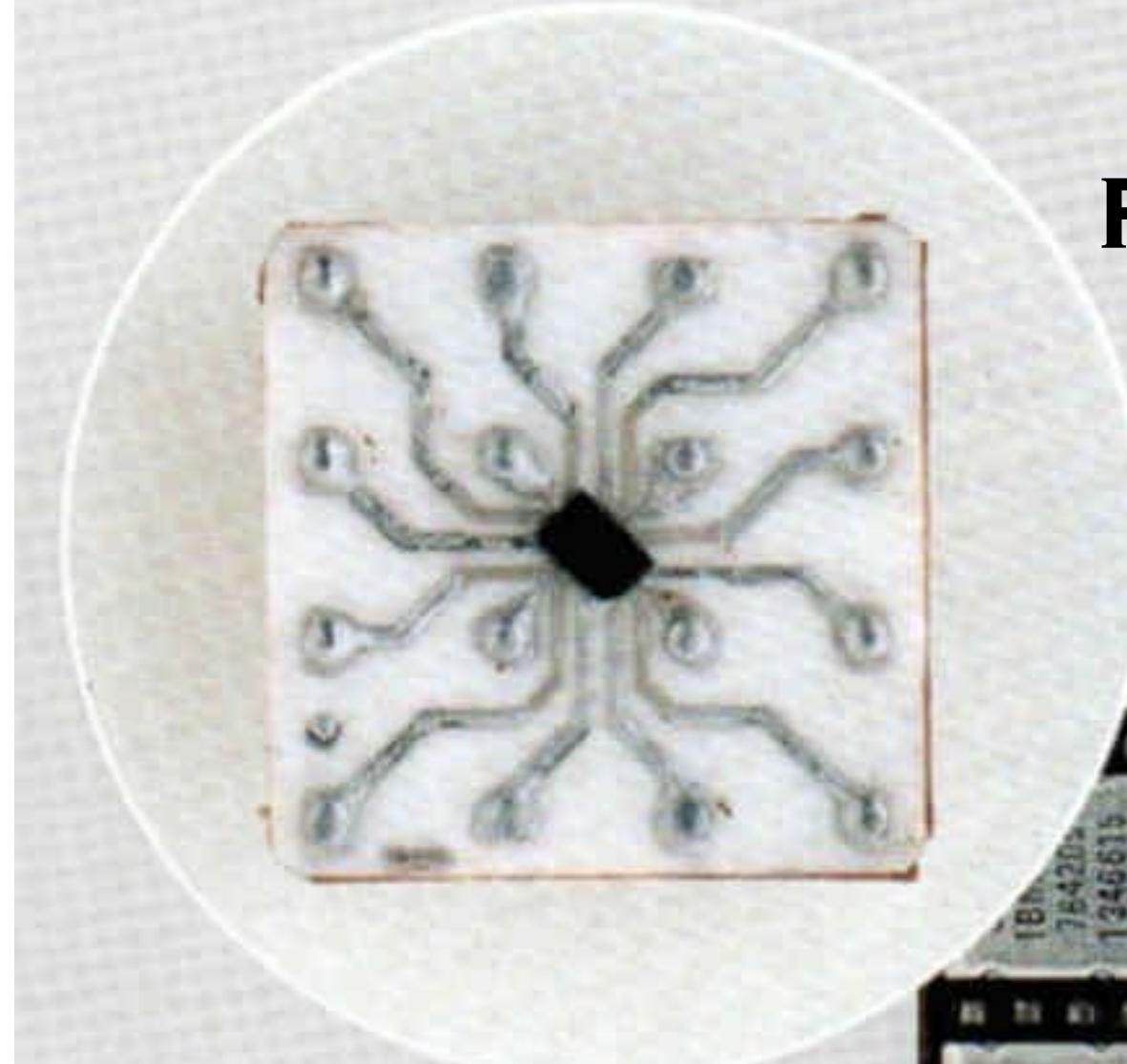
Plato IV ab 1972



PLATO
Homelink LINK YOUR COMPUTER
TO AN INTELLIGENT WORLD.

GD
CONTROL
DATA



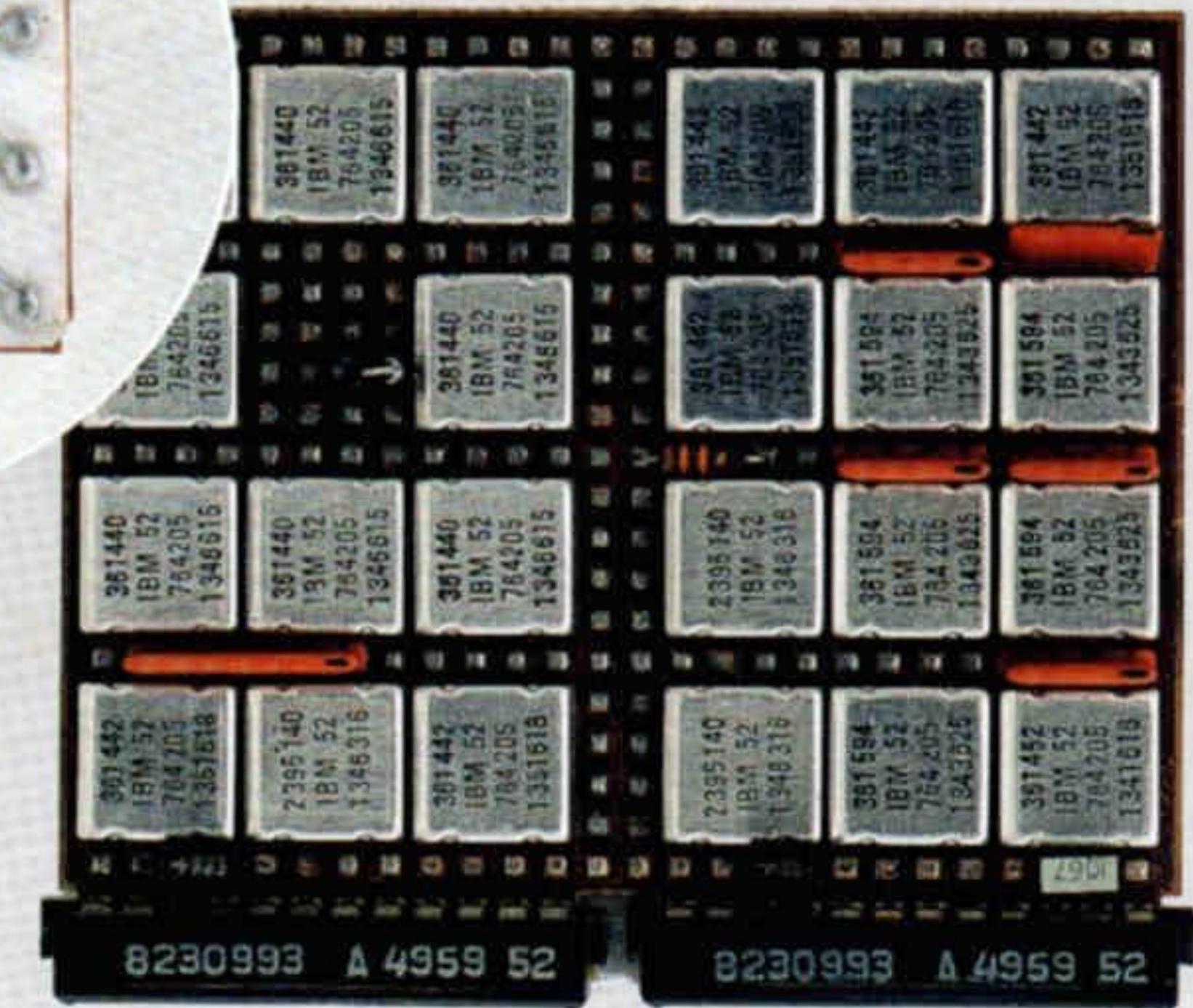


PERSONAL COMPUTER

MSI

Medium Scale Integration

70er Jahre



Mikroelektronik: Halbleiter-Chips



John Bardeen



Walter H.
Brattain



William B.
Shockley



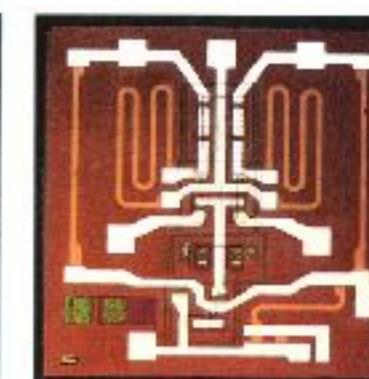
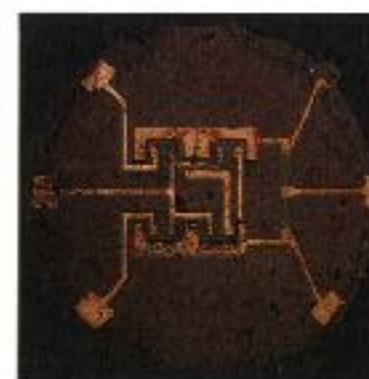
Schockley Semiconductor, 1956



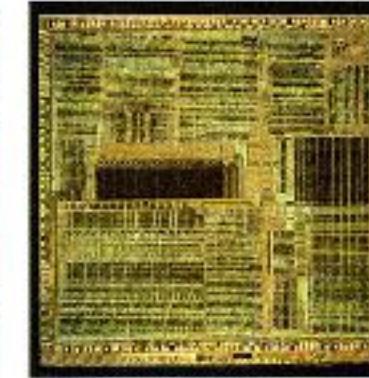
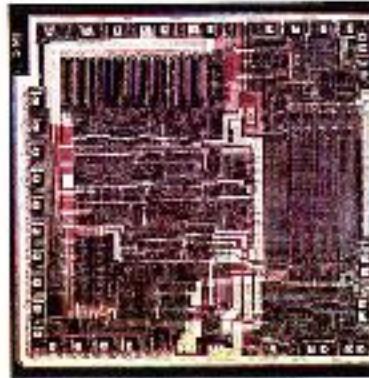
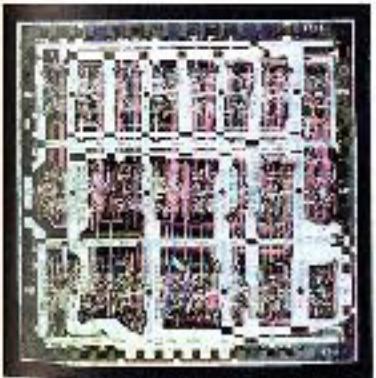
Fairchild, 1959



Bild 1: Die Geschichte der Chips – der grundlegenden elektronischen Bausteine eines Computers – ist geprägt von einer zunehmenden Packungsdichte, wie diese sechs Chips der Fairchild Semiconductor Corporation zeigen, die aus der Zeit von von 1959 bis 1965 stammen. Links au-



ßen (1959) ist der erste Planartransistor abgebildet, daneben (1960) der erste planare integrierte Schaltkreis auf einem einzigen Chip; er enthält vier Transistoren zusammen mit anderen Bauteilen. In der Mitte links (1964) sieht man dann den ersten anwendungsorientierten linearen



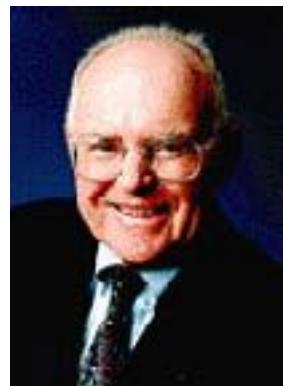
integrierten Schaltkreis; er enthält fünf Transistoren. Das Foto Mitte rechts (1968) stellt eine bipolare logische Zellenanordnung dar; es mit 100 Transistoren dar. Unten links (1970) schließlich ist der erste Chip zu erkennen, der eine komplett Zentralleinheit (CPU, von englisch central



Gordon Moore, Robert Noyce, Intel,
1968

Fairchild
Intel
NSC
AMD
Texas
Instruments
Motorola
Zilog

Moore's Law



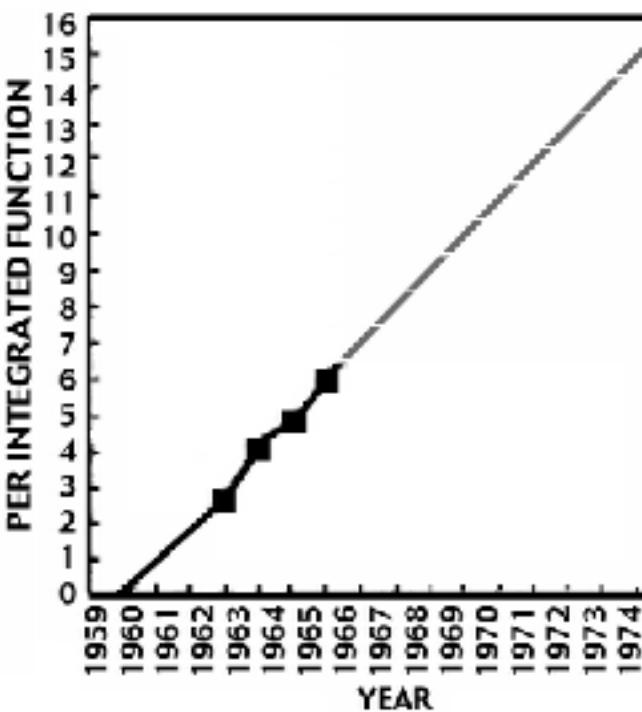
1965

Electronics

Cold-cathode tubes to count and store: page 80
Desimeter measures laser radiation: page 93
35th anniversary—the experts look ahead: page 99



LOG₂ OF THE NUMBER OF COMPONENTS PER INTEGRATED FUNCTION



a few diodes per logic gate. Thus 65,000 transistors are needed to make forth a square cell.

On the silicon wafer currently used, results are not so encouraging. There is ample room to make a structure if the components can be closely packed without too much wasted interconnection patterns. This is realistic since efforts to attain a level of complexity above that presently available integrated circuits are already underway using successive retouching patterns generated for all devices. Such a series of points will be achieved by the use of optical techniques and does not require the use of more sophisticated, such as electron beam operation, which are being studied to make even smaller structures increasing the yield.

There is no fundamental obstacle to achieving device yields of 100%. At present, packaging costs far exceed the cost of the semiconductor structure itself that there is no incentive to improve yields, but they can be set as high as is reasonably justified. No barrier exists comparable to the thermodynamic equilibrium consideration

ing effect is needed. In the early days of integrated circuits, when yields were extremely low, more surface area was available for interconnection patterns. This is comparable with those obtained for integrated varistor and diode devices. The same pattern will make larger areas economics, if other considerations make such areas desirable.

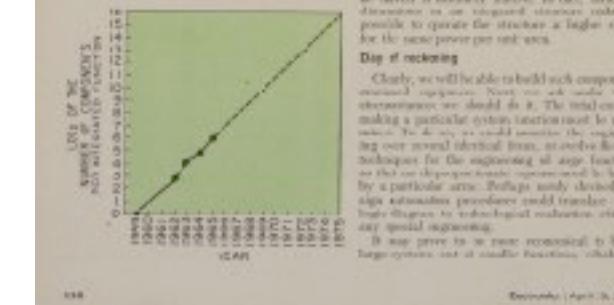
Heat problem
Will it be possible to remove the heat generated by use of thousands of components in a single silicon chip?

If we could obtain the volume of a standard high-speed signal component, we can expect the components themselves, we would expect it to give brightly with almost power dissipation. But it would suggest only longitudinal cooling, since integrated circuit structures are two-dimensional, they have a surface available for cooling close to each source of heat generation. In addition, the source is model primarily to three dimensions, lines and capacitors associated with the system. As long as a function is contained in a small area, the source of heat generation which must be driven is extremely limited. In fact, shortening the distance between the source and sink makes it possible to operate the structure at higher speed for the same power per unit area.

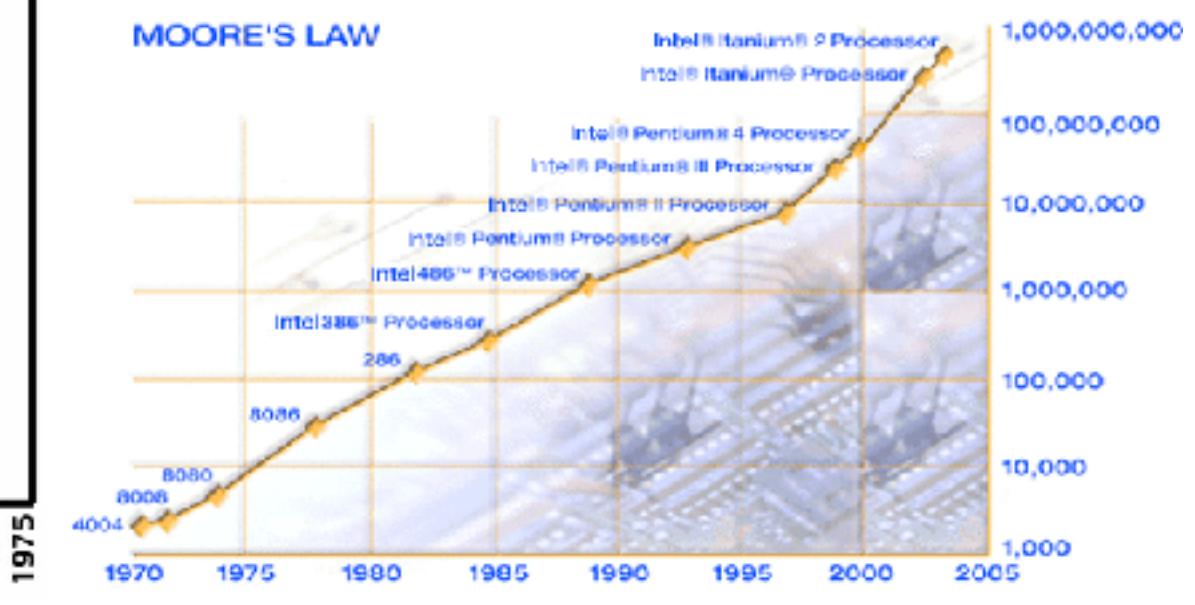
Demanding

Clearly, we will be able to build such component-sized capacitors. Now we ask under what circumstances we should do it. The total cost of making a particular system function must be minimized. To do this, we could minimize the engineering over several identical items, or involve flexible techniques for the engineering of unique functions so that one design per item is required by a particular user. Perhaps such divided design estimation procedures could translate from large designs to technological realizations without any special engineering.

It may prove to be more economical to build large systems out of smaller functions, which will

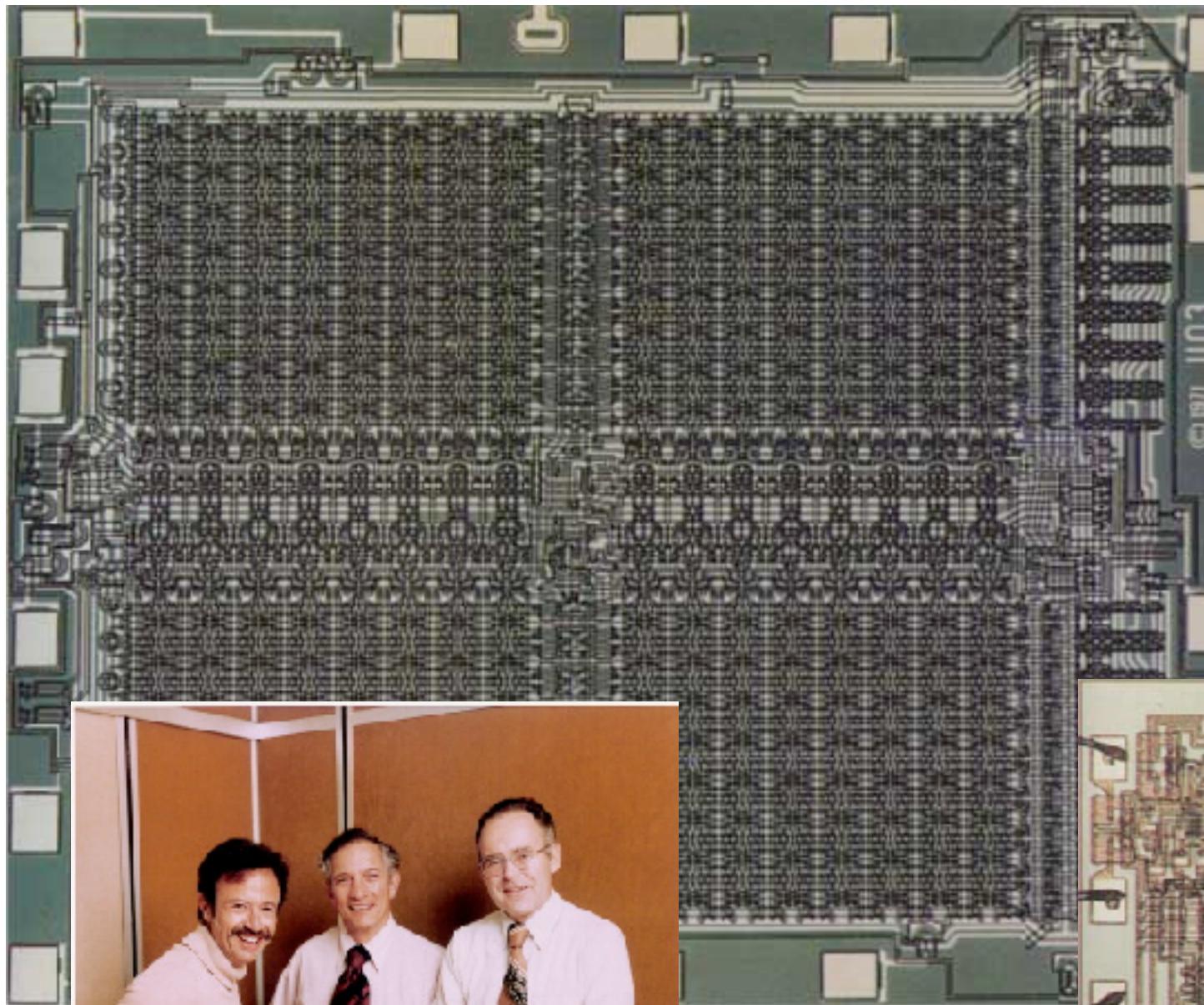


MOORE'S LAW



Mikroprozessor

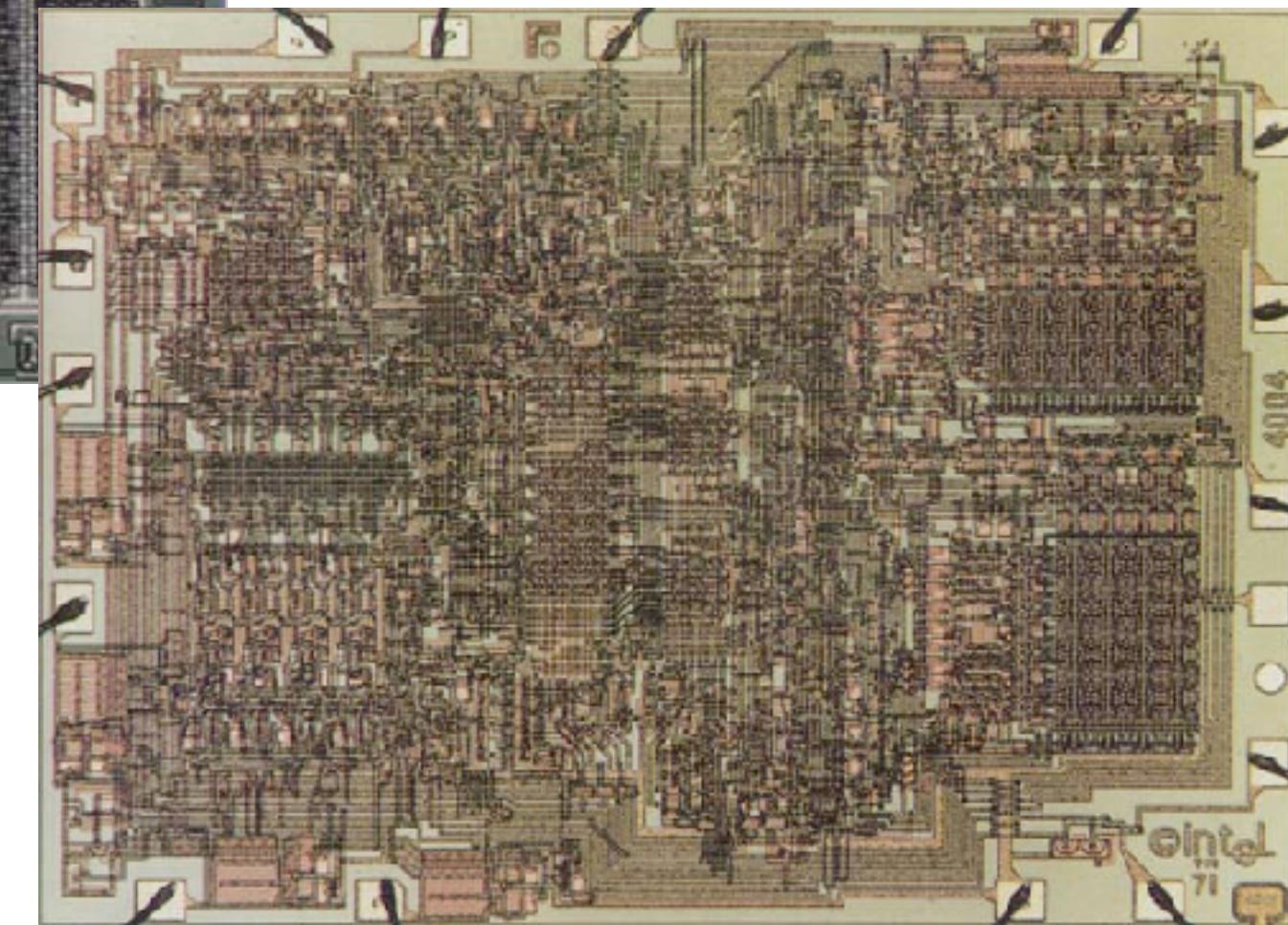
Intel – Integrated Electronics



1103, 1024 Bit-Speicher, 1970



Andrew Grove, Robert Noyce und Gordon Moore, 1968

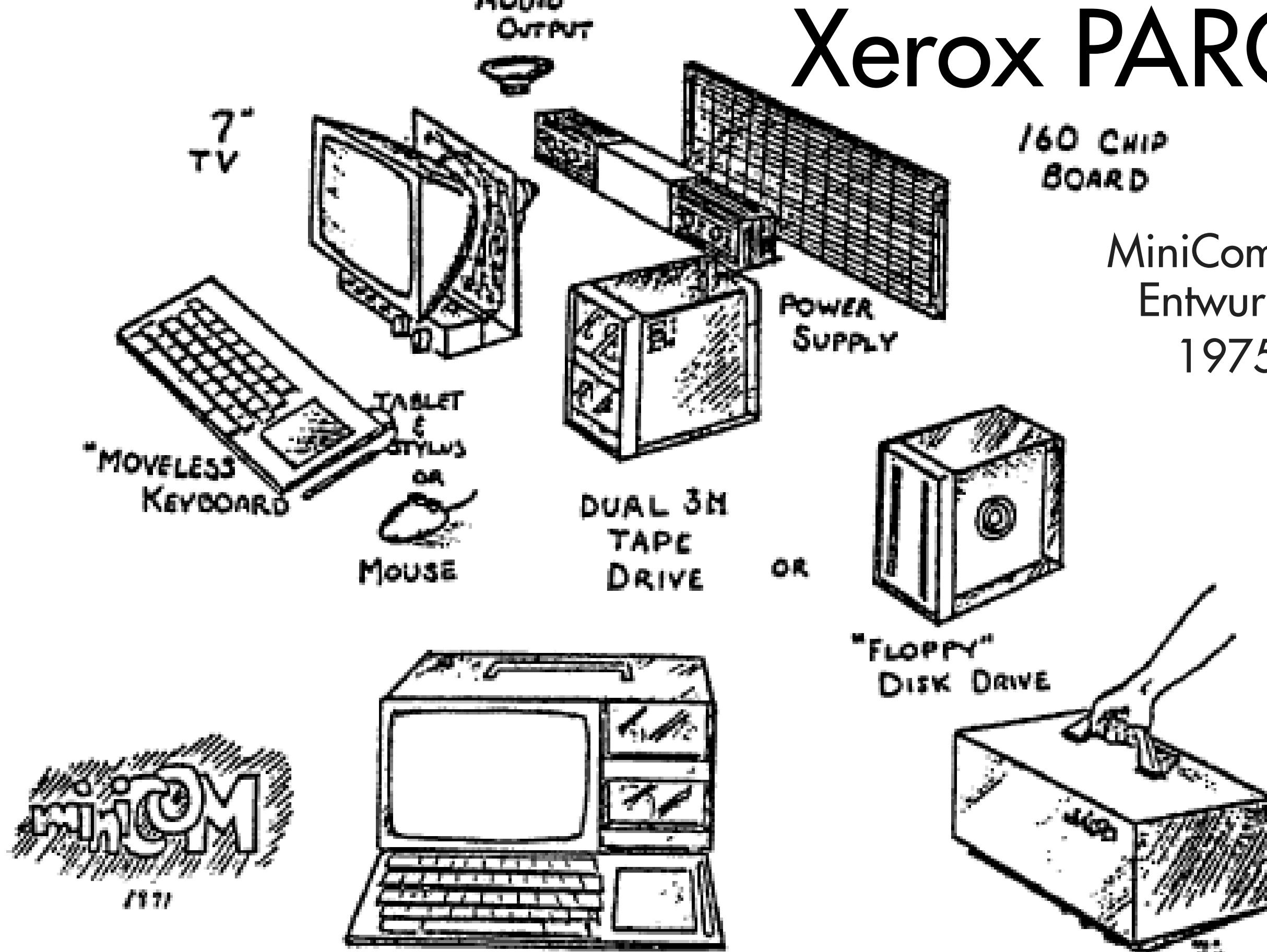


4040, der erste Mikroprozessor, 1971

Xerox Parc



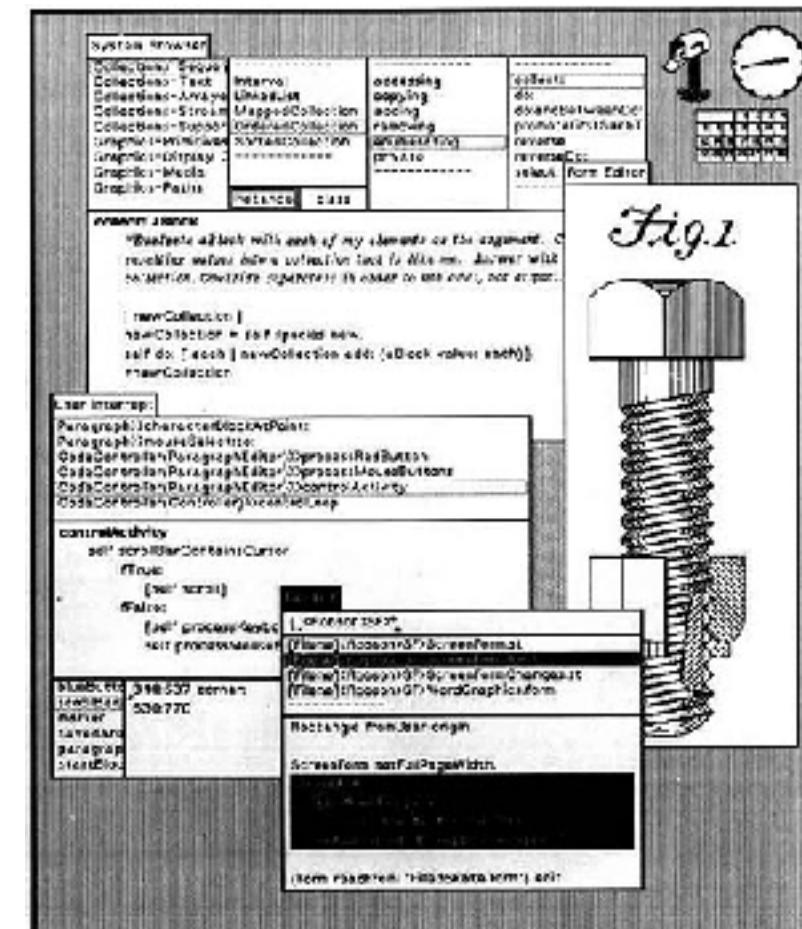
Xerox PARC



Xerox Alto



1973



Rastergrafik
3-Tasten-Maus
GUI: Windows, Icons,
Menus, Pointer (WIMP)
Ethernet
Email

READY: Select operand or type command

Last command was LADOS

[Don't push any yet] (2.78ms)

(bezinga)

Sample Bravo :

The three buttons on the mouse are called **LEFT** (the left-most one), **MIDDLE** (the middle one) and **RIGHT** (the right-most one). They have different functions depending on where the cursor is on the screen and what shape it has. Don't push any buttons yet.

Mouse tips:

You will find that the mouse works better if you hold it so that it bears some of the weight of your hand.

If the cursor doesn't move smoothly when the mouse is moving, try turning the mouse upside down and spinning the ball in the middle with your finger until the cursor does move smoothly as the ball moves. If this doesn't help, your mouse is broken; get it fixed.

2. Basic features

This section describes the minimum set of things you have to know in order to do any useful work with Bravo.

2.1 Moving around

Move the cursor to the left edge of the screen and a little bit below the heavy black bar. Notice that it appears as a double-headed arrow. It will keep this shape as long as you stay near the left edge, in a region called the scroll bar. If you move it too far right, the shape will change. Keep the cursor in the scroll bar for the moment.

Now push down the **LEFT** button and hold it down. Notice that the cursor changes to a heavy upward arrow. This indicates that when you let the button go, the line opposite the cursor will be moved to the top of the window. Try it. This is called scrolling the document up.

Next push down the **RIGHT** button and hold it down. Now the arrow points down, indicating that when you let the button go, the top line on the screen will be moved down to where the

Xerox Alto



WYSIWYG Editor Bravo



Charles Simony



Butler Lampson

up/down/jump scrolling (try them now), and the fourth indicates availability of a pop-up menu relating to the pane you are in.

Menus

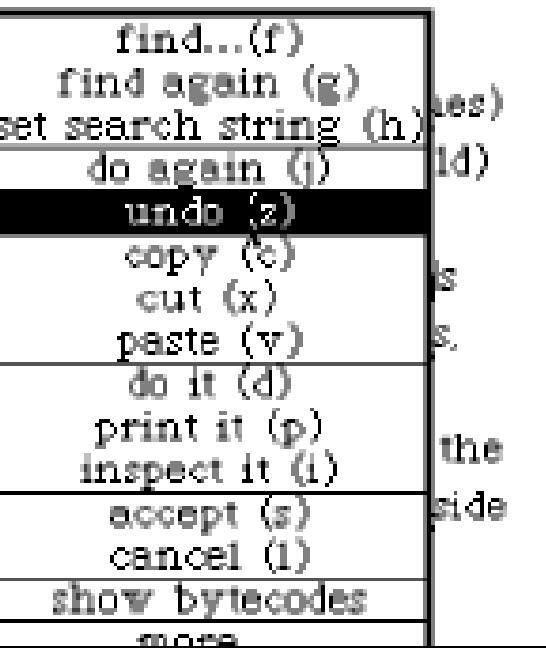
Pane menus (often different in different panes) can also be **invoked** by option-click (and hold) in **most** panes, and window menus can be invoked by cmd-click. Many menu commands can also be invoked by cmd-key combinations, indicated in the menus. The global 'screen menu' can be invoked simply by clicking in the gray area within the Squeak screen, but outside any Squeak windows.

(a)
(c)

up/down/jump scrolling (try them now), and the fourth indicates availability of a pop-up menu relating to the pane you are in.

Menus

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(b)
(d)

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Menus

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Xerox Alto
Smalltalk
Cut-Copy-Paste



Gary Starkweather

Laserdrucker



1971 SLOT – Scannes Laser Output Terminal
1972 EARS – Ethernet, Alto, Research character generator, Scanned laser output terminal



1978 Xerox 9700

PROJECT BREAKTHROUGH!

**World's First Minicomputer Kit
to Rival Commercial Models...**

"ALTAIR 8800" **SAVE OVER \$1000**



ALSO IN THIS ISSUE:

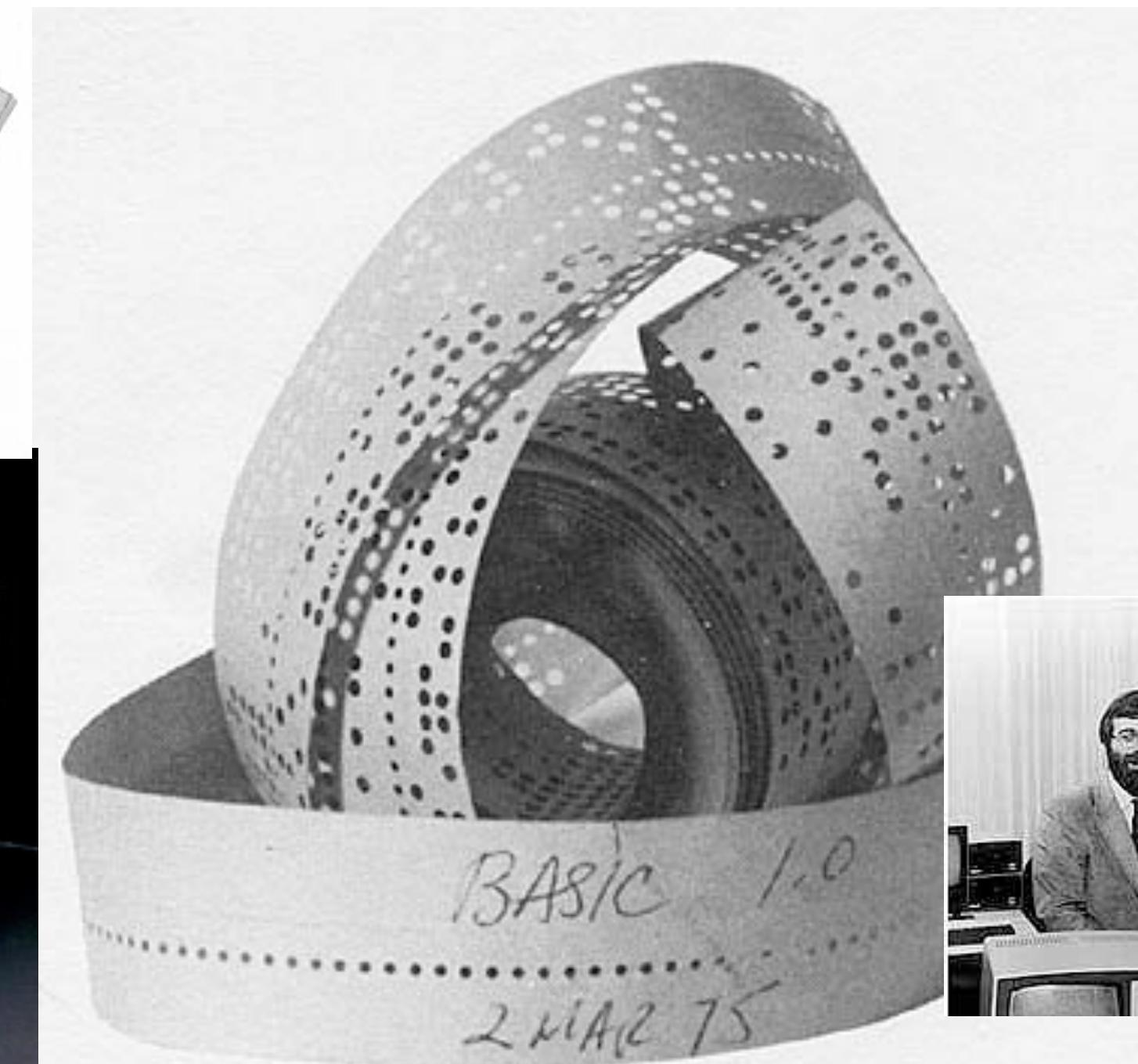
- An Under-\$90 Scientific Calculator Project
- CCD's—TV Camera Tube Successor?
- Thyristor-Controlled Photoflashers

TEST REPORTS:

Technics 200 Speaker System
Pioneer RT-101L Open-Reel Recorder
Tram Diamond-40 CB AM Transceiver
Edmund Scientific "Kirlian" Photo Kit
Hewlett-Packard 5381 Frequency Counter



Altair 1974-1975

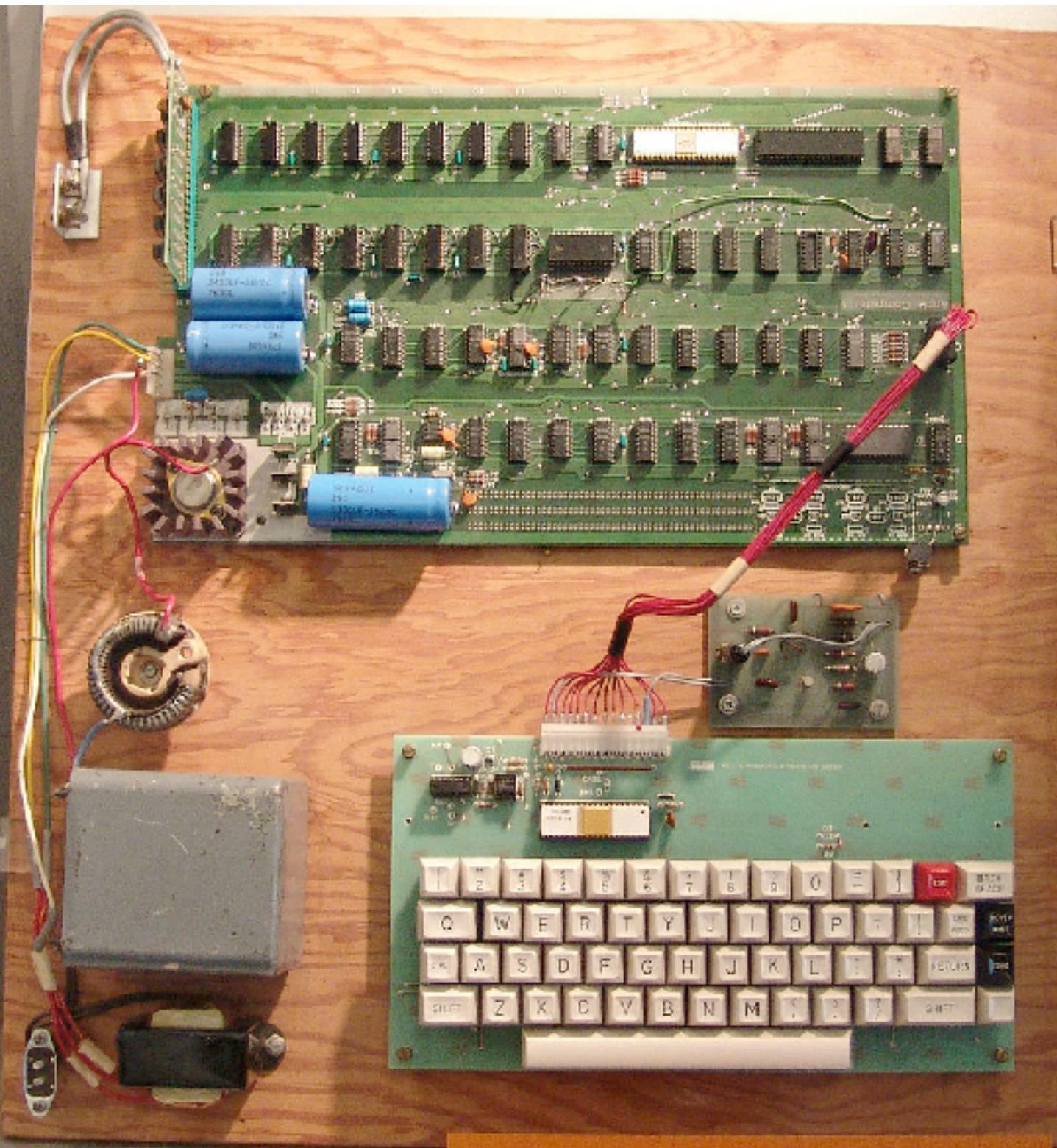


Ed Roberts, MITS



Paul Allen, Bill Gates

Apple I - der erste Homecomputer (1976)



Apple Introduces the First Low Cost Microcomputer System with a Video Terminal and 8K Bytes of RAM on a Single PC Card.

The Apple Computer. A truly complete microcomputer system, on a single PC board. Based on the MOS Technology 6502 microprocessor, the Apple also has a built-in video terminal and socket for 8K bytes of on-board RAM memory. With the addition of a keyboard and video monitor, you'll have an extremely powerful computer system that can be used for anything from developing programs to playing games or running BASIC.

Combining the computer, video terminal and dynamic memory on a single board has resulted in a large reduction in chip count, which means more reliability and lowered cost. Since the Apple comes fully assembled, tested & burned-in and has a complete power supply on-board, initial set-up is essentially "hassle free" and you can be running within minutes. At \$666.66 (including 1K bytes RAM) it opens many new possibilities for users and systems manufacturers.

You Don't Need an Expensive Teletype.

Using the built-in video terminal and keyboard interface, you avoid all the expense, noise and maintenance associated with a teletype. And the Apple video terminal is sixtimes faster than a teletype, which means more throughput and less waiting. The Apple connects directly to a video monitor (or home TV with an inexpensive RF modulator) and displays 960 easy-to-read characters in 24 rows of 40 characters per line with automatic scrolling. The video display section contains its own 1K bytes of memory, so all the EAM memory is available for user programs. And the

Keyboard interface lets you use almost any ASCII-encoded keyboard.

The Apple Computer makes it possible for many people with limited budgets to step up to a video terminal as an IO device for their computer.

No More Switches, No More Lights.

Compared to switches and LED's, a video terminal can display vast amounts of information simultaneously. The Apple video terminal can display the contents of 192 memory locations at once on the screen. And the firmware in PROMs enables you to enter, display and debug programs (all in hex) from the keyboard, rendering a front panel unnecessary. The firmware also allows your programs to select characters on the display, and since you'll be looking at letters and numbers instead of just LED's, the door's open to all kinds of alphanumeric software (i.e., Games and BASIC).

8K Bytes RAM in 16 Chips!

The Apple Computer uses the new 16-pin 4K dynamic memory chips. They are faster and take 1/4 the space and power of even the low-power 2102's (the memory chip that everyone else uses). That means 8K bytes in sixteen chips. It also means no more 28 amp power supplies.

The system is fully expandable to 65K via an edge connector which carries both the address and data busses, power supplies and all timing signals. All dynamic memory refreshing for both on and off-board memory is done automatically. Also, the Apple Computer can be upgraded to use the 16K chips when they become available.

dir. That's 32K bytes on-board RAM in 16 IC's—the equivalent of 256 2102's!

A Little Cassette Board That Works!

Unlike many other cassette boards or the marketplace, ours works every time. It plugs directly into the upright connector on the main board and stands only 2" tall. And since it is very fast (1500 bits per second), you can read or write 48 bytes in about 20 seconds. All timing is done in software, which results in crystal-controlled accuracy and uniformity from unit to unit.

Unlike some other cassette interfaces which require an expensive tape recorder, the Apple Cassette interface works reliably with almost any audio-grade cassette recorder.

Software

A type of APPLE BASIC is included free with the Cassette Interface. Apple Basic features immediate error messages and fast execution, and lets you program in a higher level language immediately and without added cost. Also available now are a dis-assembler and many games, with many software packages, (including a macro assembler) in the works, and since our philosophy is to provide software for our machines free or at minimal cost, you won't be continually paying for access to this growing software library.

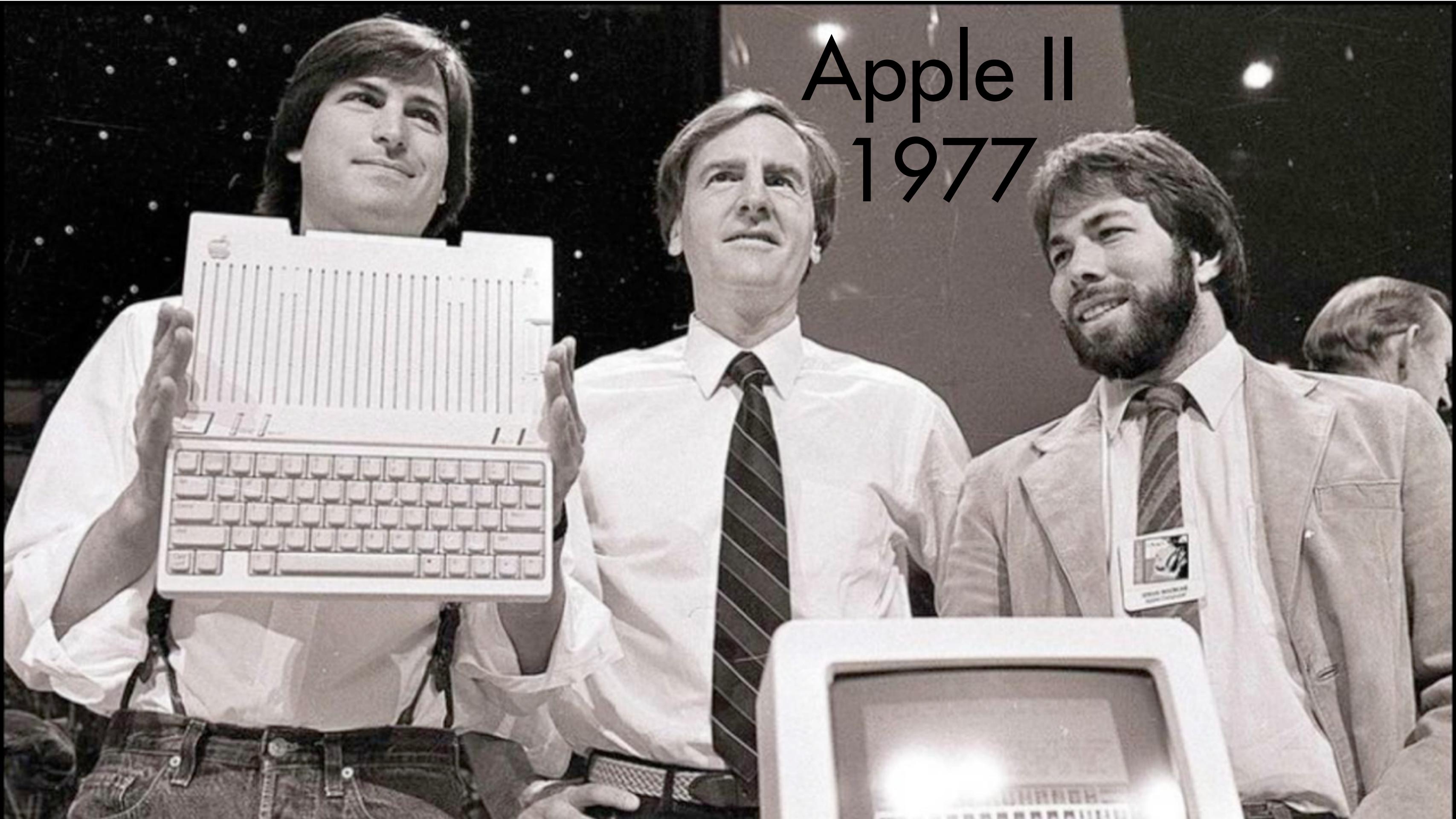
The Apple Computer is in stock at almost all major computer stores. (If your local computer store doesn't carry our products, encourage them to write us direct). Dealer inquiries invited.

Byte into an Apple



APPLE Computer Company • 770 Welch Rd., Palo Alto, CA 94304 • (415) 326-4248

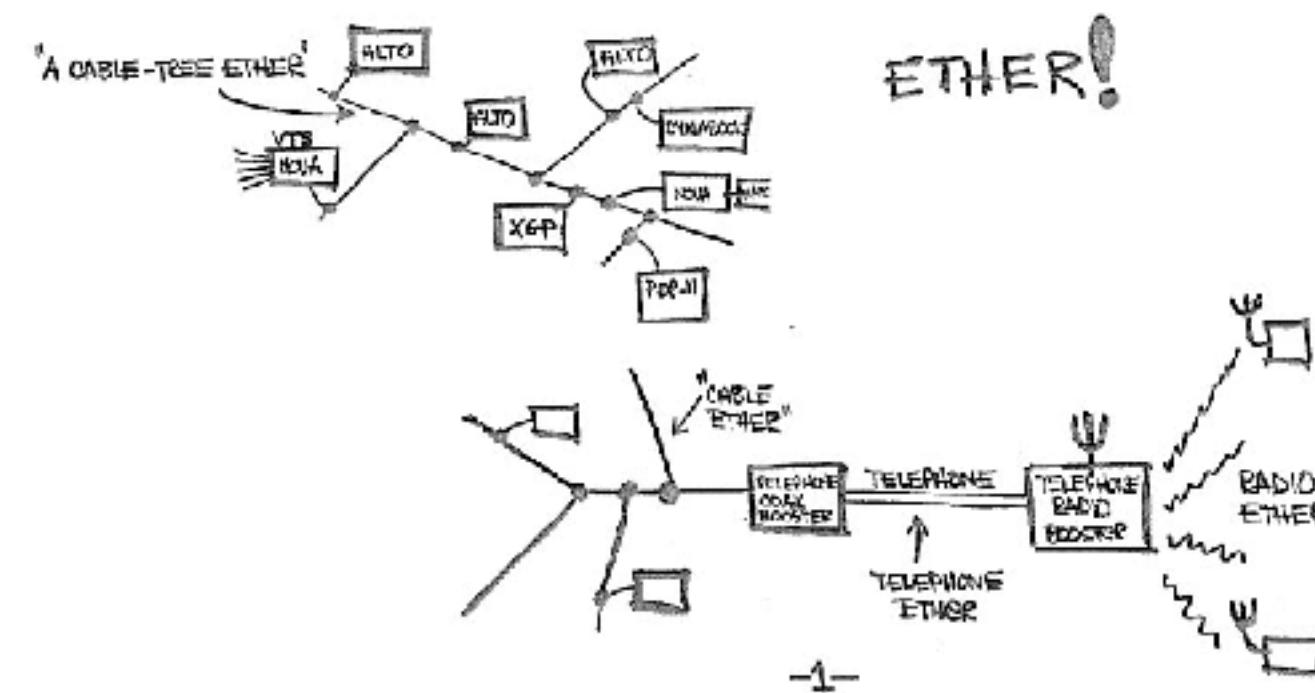
Apple II
1977



Intranetworking: Ethernet



Robert Metcalfe
PARC, 1973



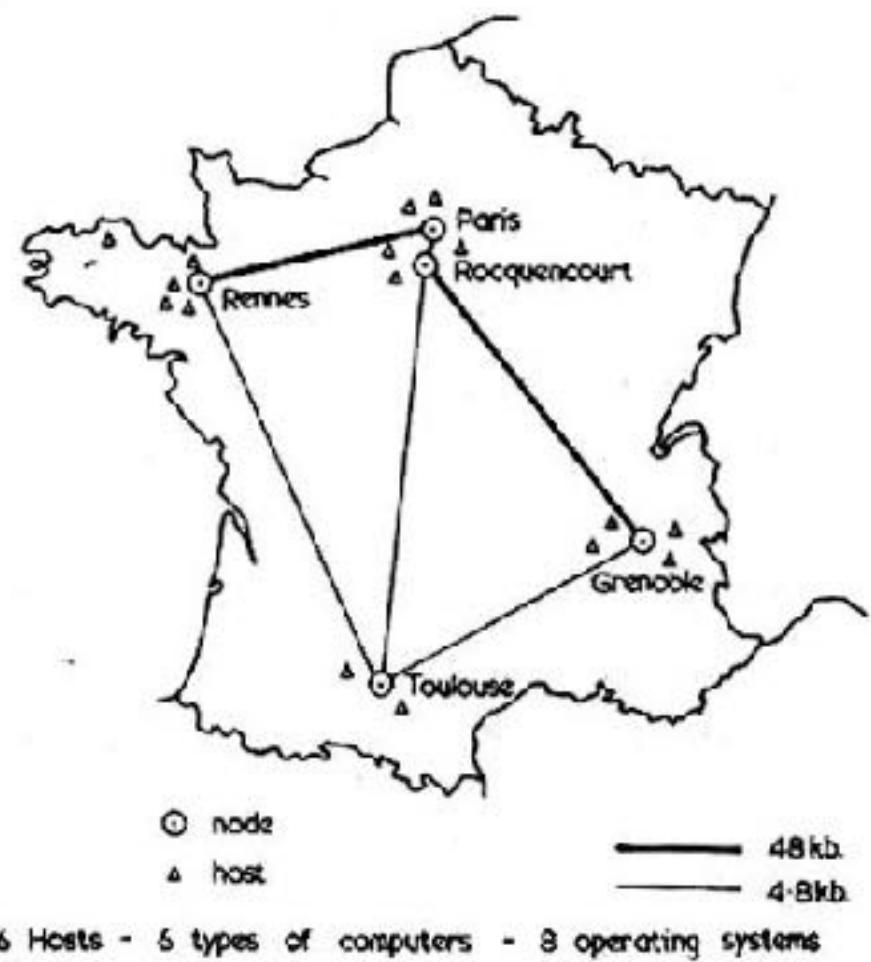
MAY 22, 1973

TO: ALTO ALOHA DISTRIBUTION
FROM: BOB METCALFE
SUBJECT: ETHER ACQUISITION

HERE IS SOME ROUGH STUFF ON THE ALTO ALOHA NETWORK.

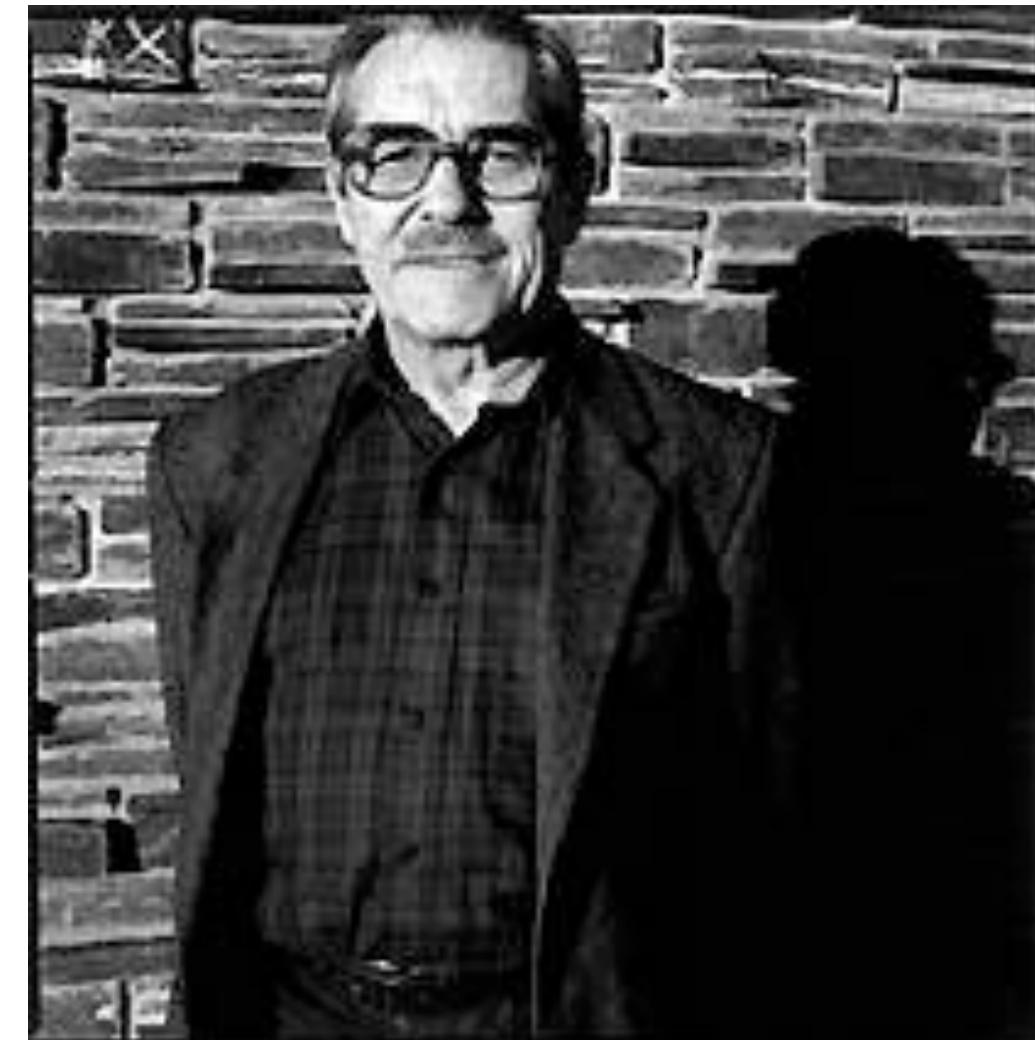
Cyclades/Cigale

1972-1978



Datagramme

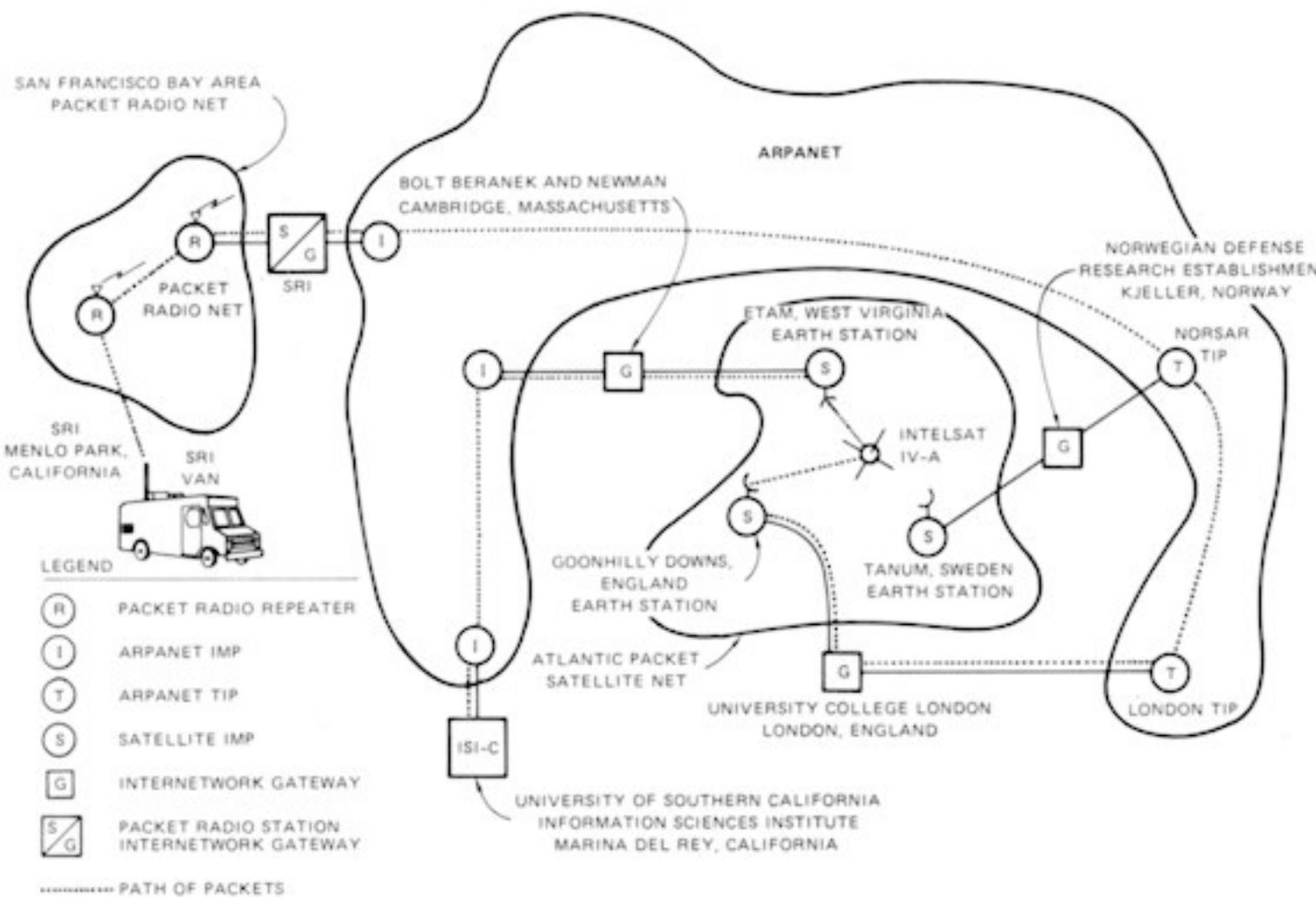
Logische Adressierung



Louis Pouzin

TCP/IP

A Protocol For Packet Network Intercommunication, 1974

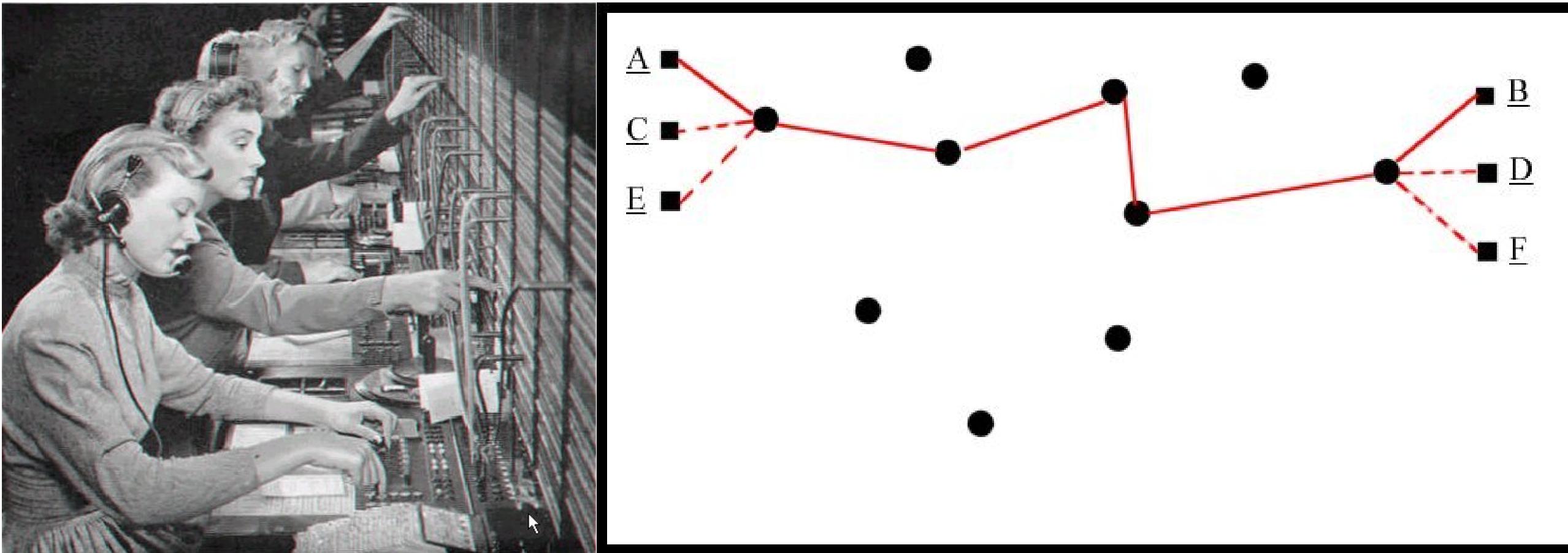


Vinton Cerf



Bob Kahn

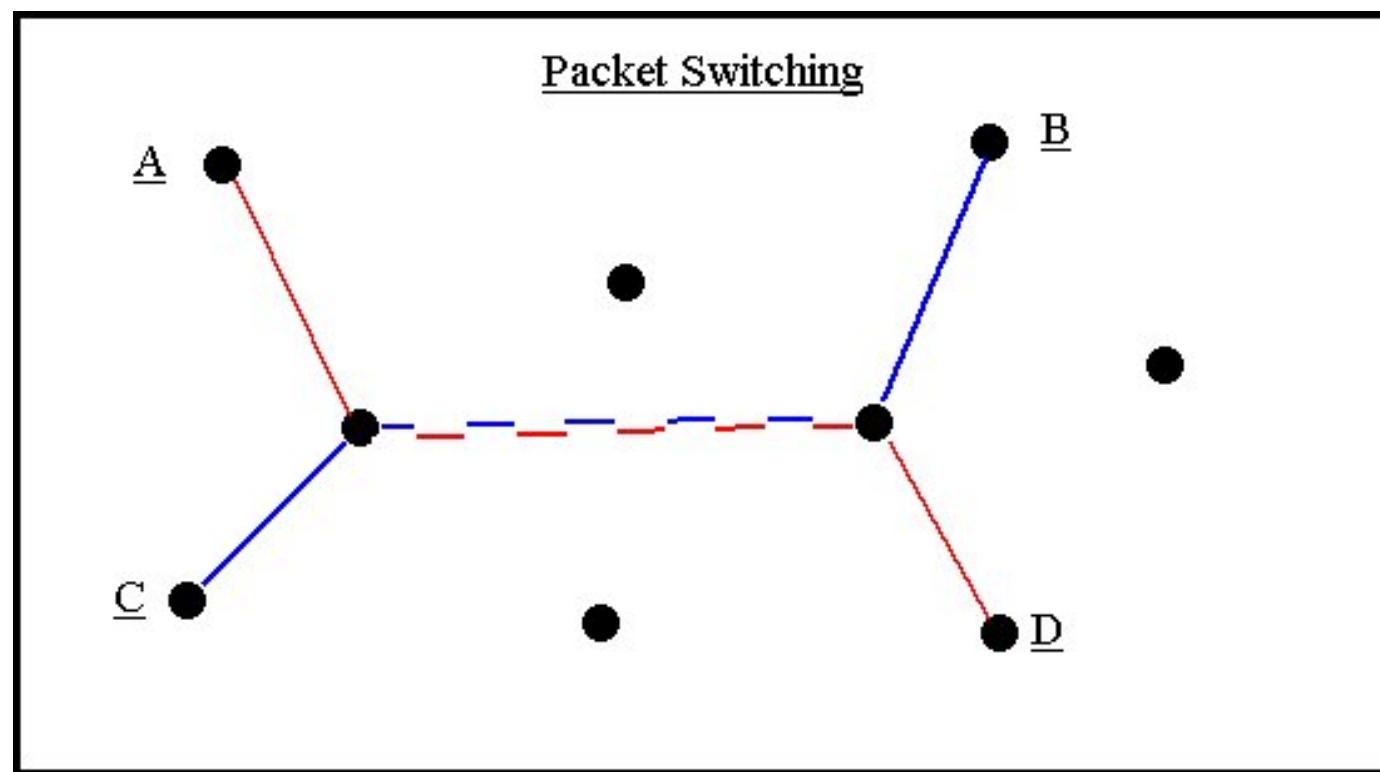
Leitungsvermittlung



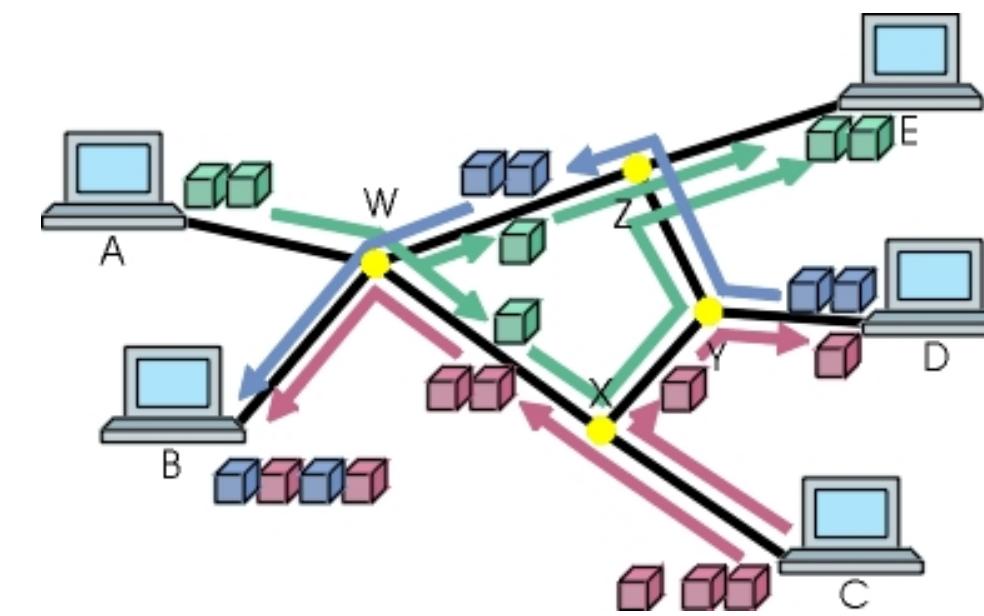
Bis 1969 waren zivile Kommunikationsnetze zentralisiert, analog und leitungsvermittelt – aus historischen, kommerziellen, politischen, militärischen und technischen Gründen.

Welche Gründe führten also zur Errichtung eines dezentralen, digitalen, paketvermittelnden Netzes?

Paketvermittlung

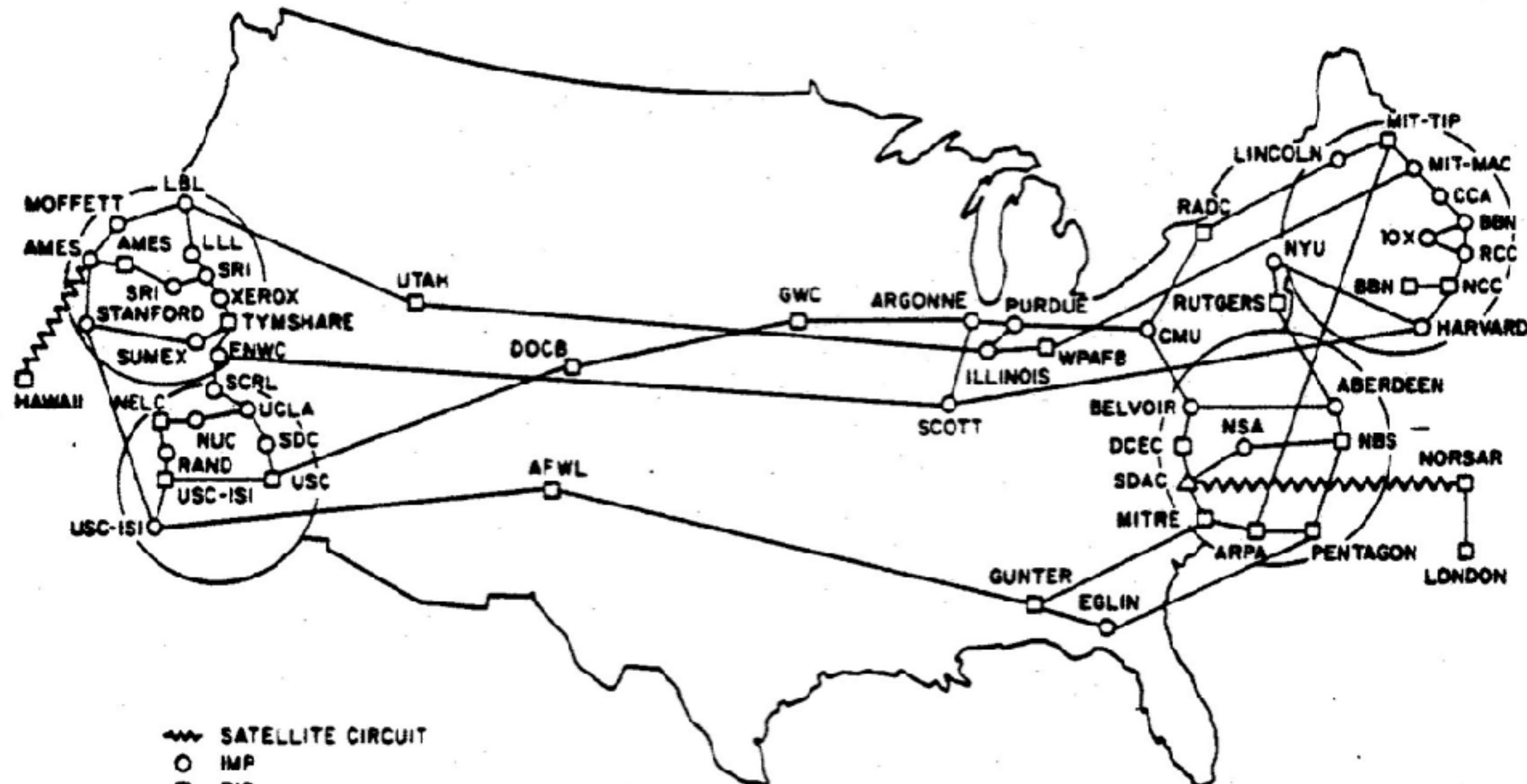


Virtuelle Leitungen



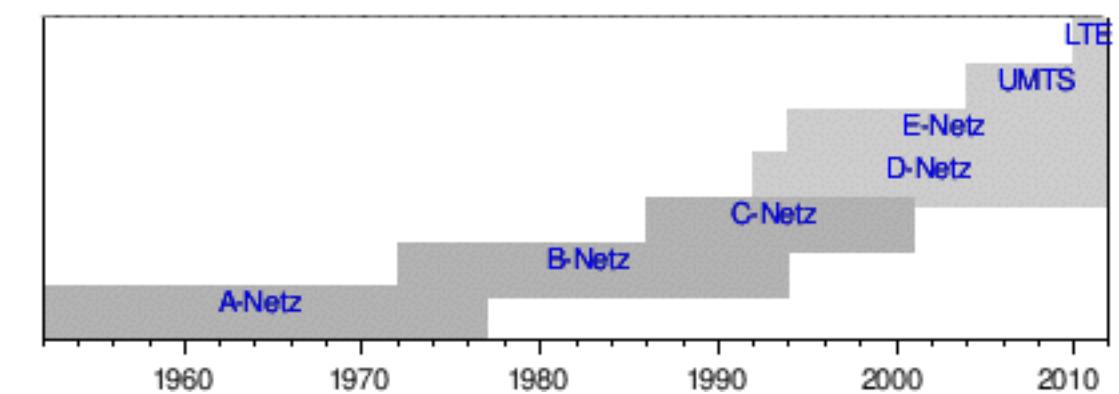
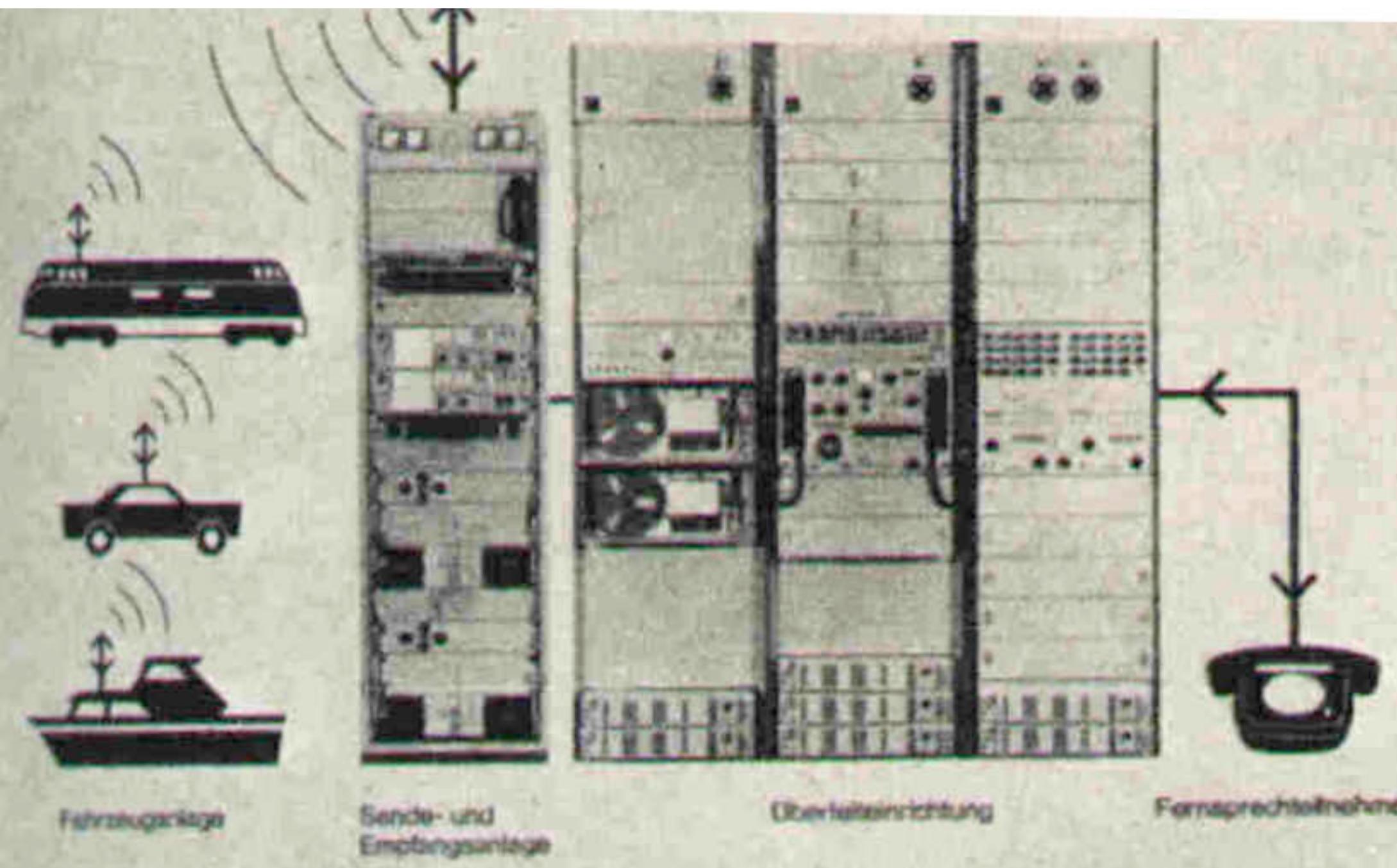
Datagramme

ARPANET 1975



(NOTE: THIS MAP DOES NOT SHOW ARPA'S EXPERIMENTAL
SATELLITE CONNECTIONS)

Mobiltelefon



B-Netz, 1972-1994

Kulturgeschichte



Kawaii
»niedlich, süß«

Sanrio: Hello Kitty (ハローーキティ),
ab 1974

Sentai

»Einsatztruppe«

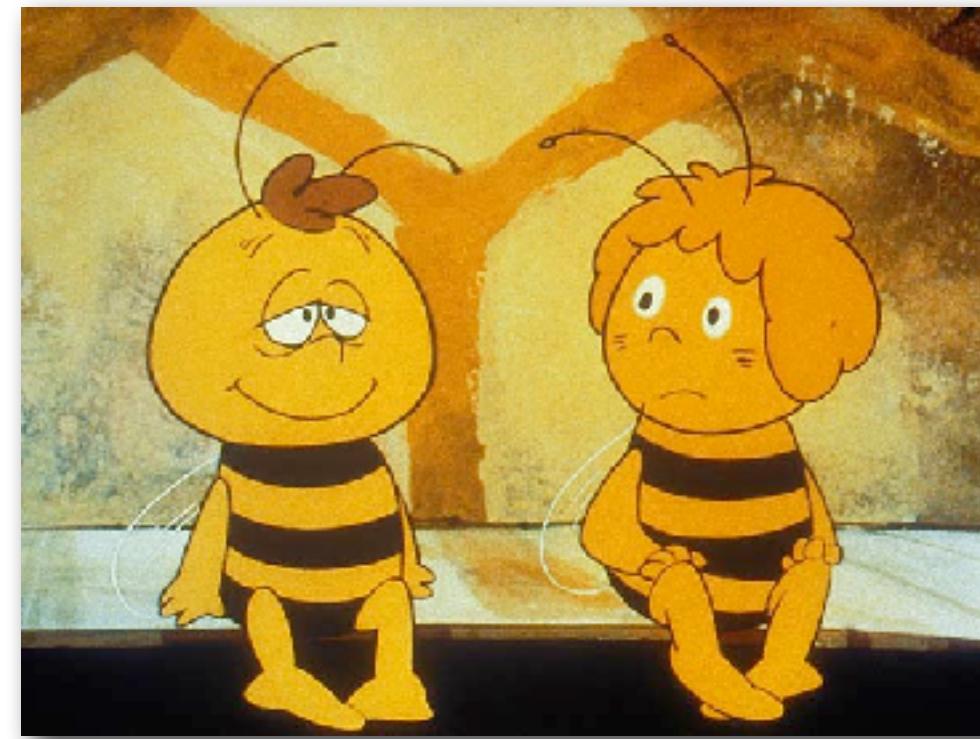


Gatchaman, ab 1972

Deutsch-japanische Koproduktionen



Heidi 1974

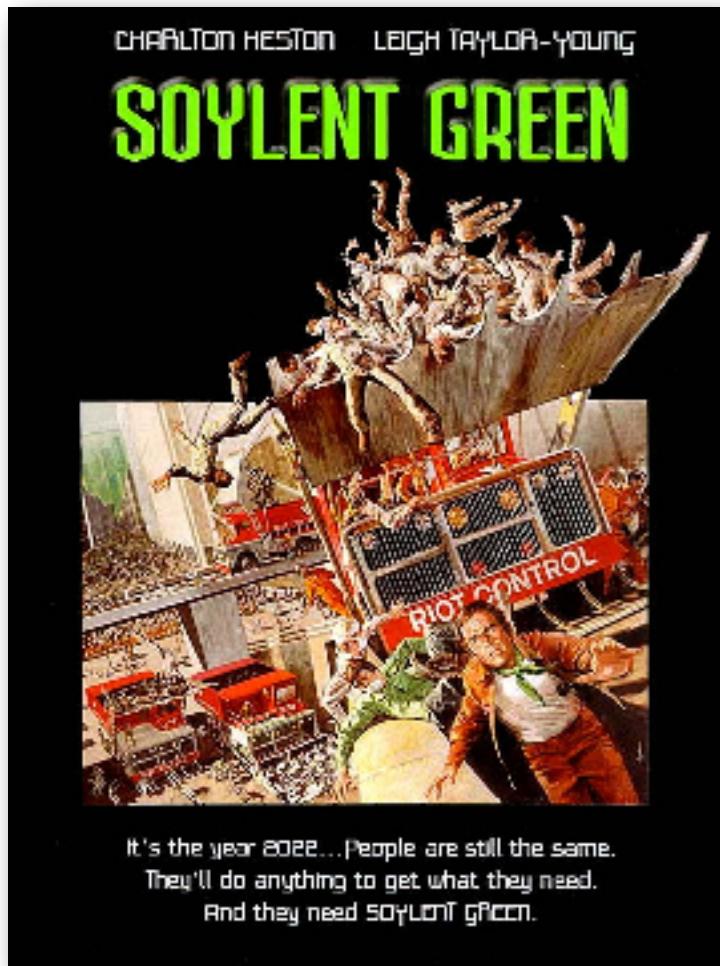


Biene Maja 1976



Pinocchio 1976

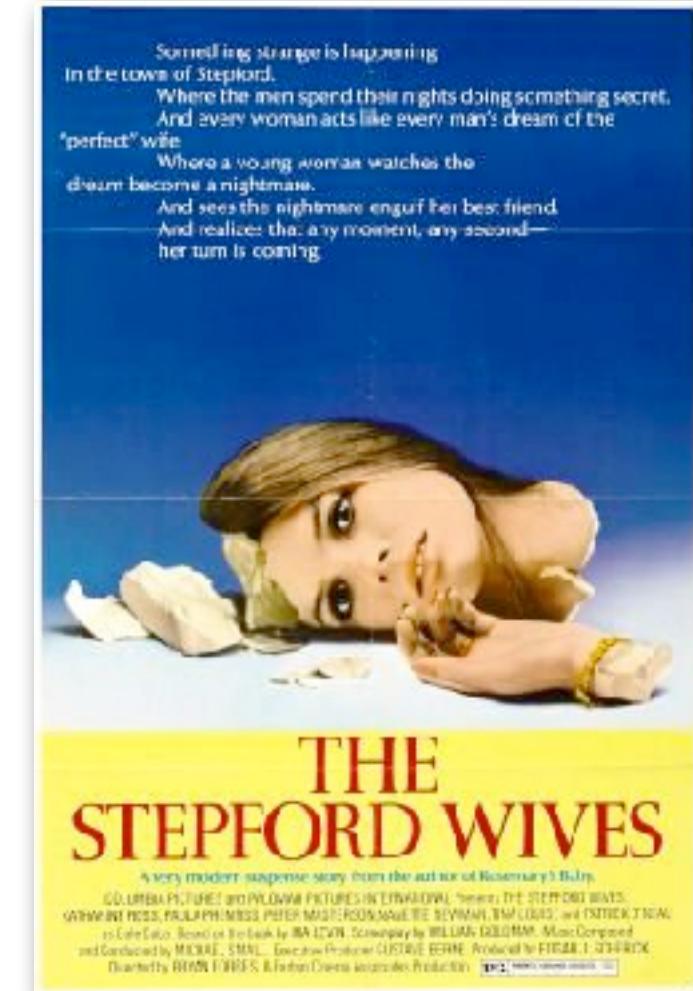
Science Fiction



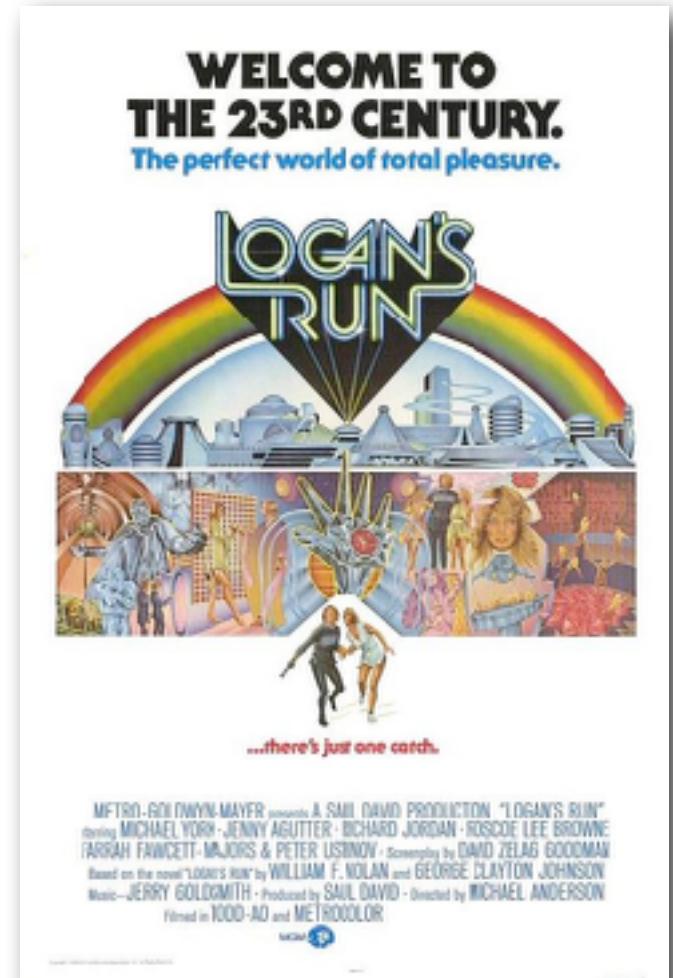
1973



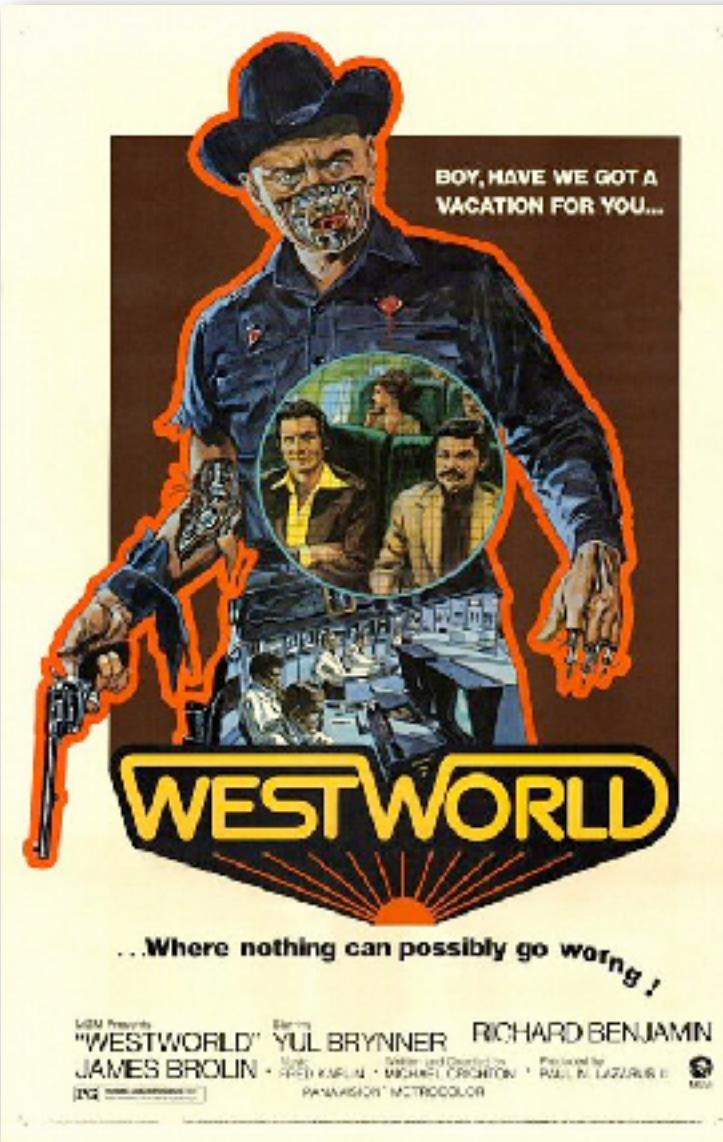
1975



1975

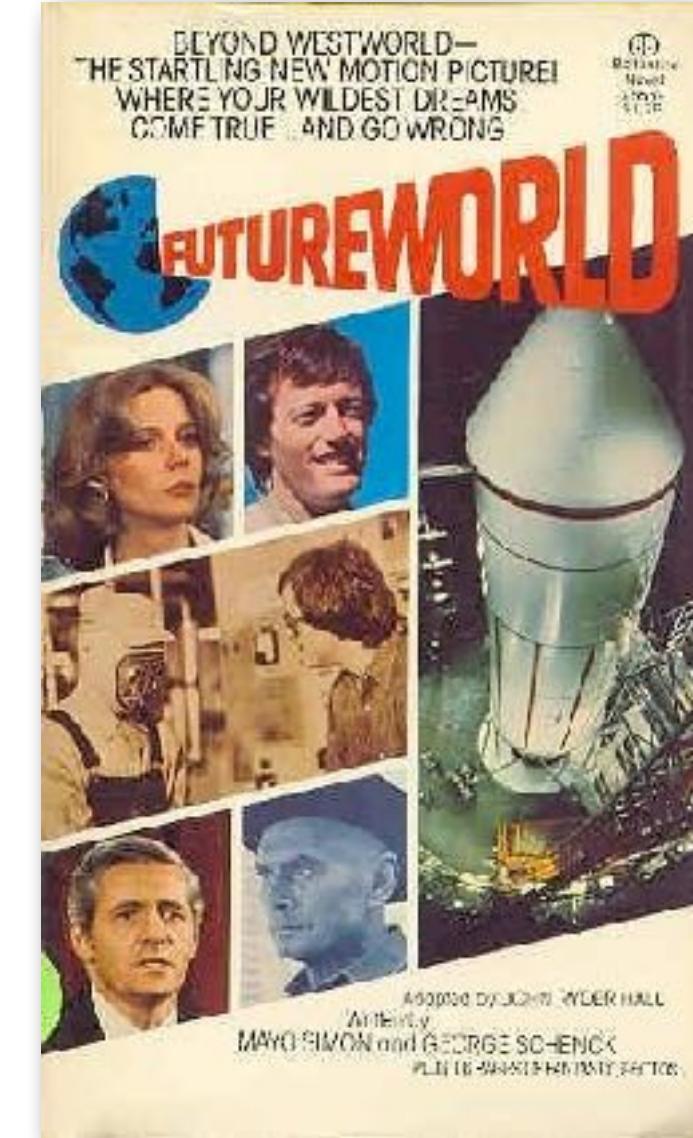


1976



Westworld (1973)

https://www.youtube.com/watch?v=3UPXqL_Vm5M



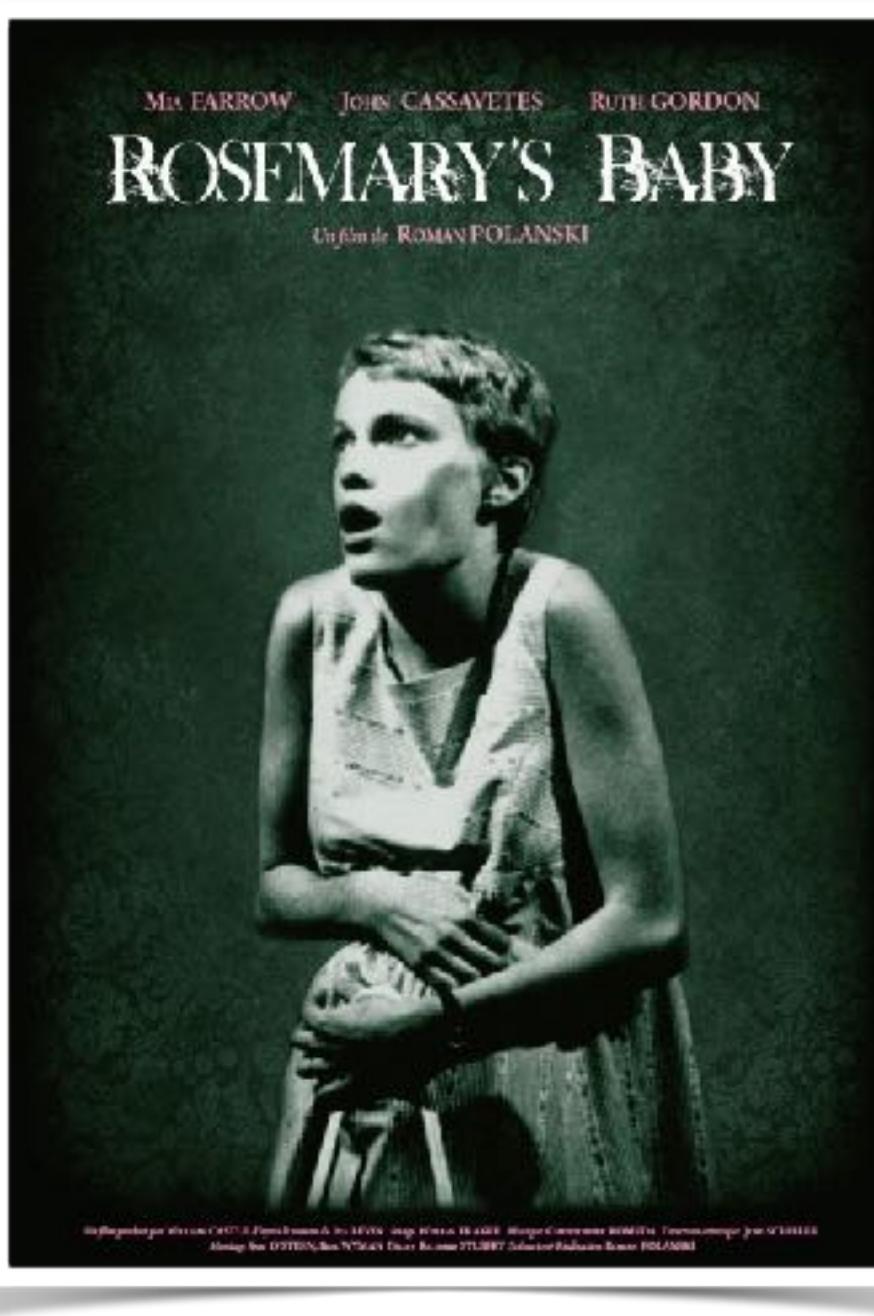
Futureworld (1976)

<https://www.youtube.com/watch?v=T5seU-5U0ms>

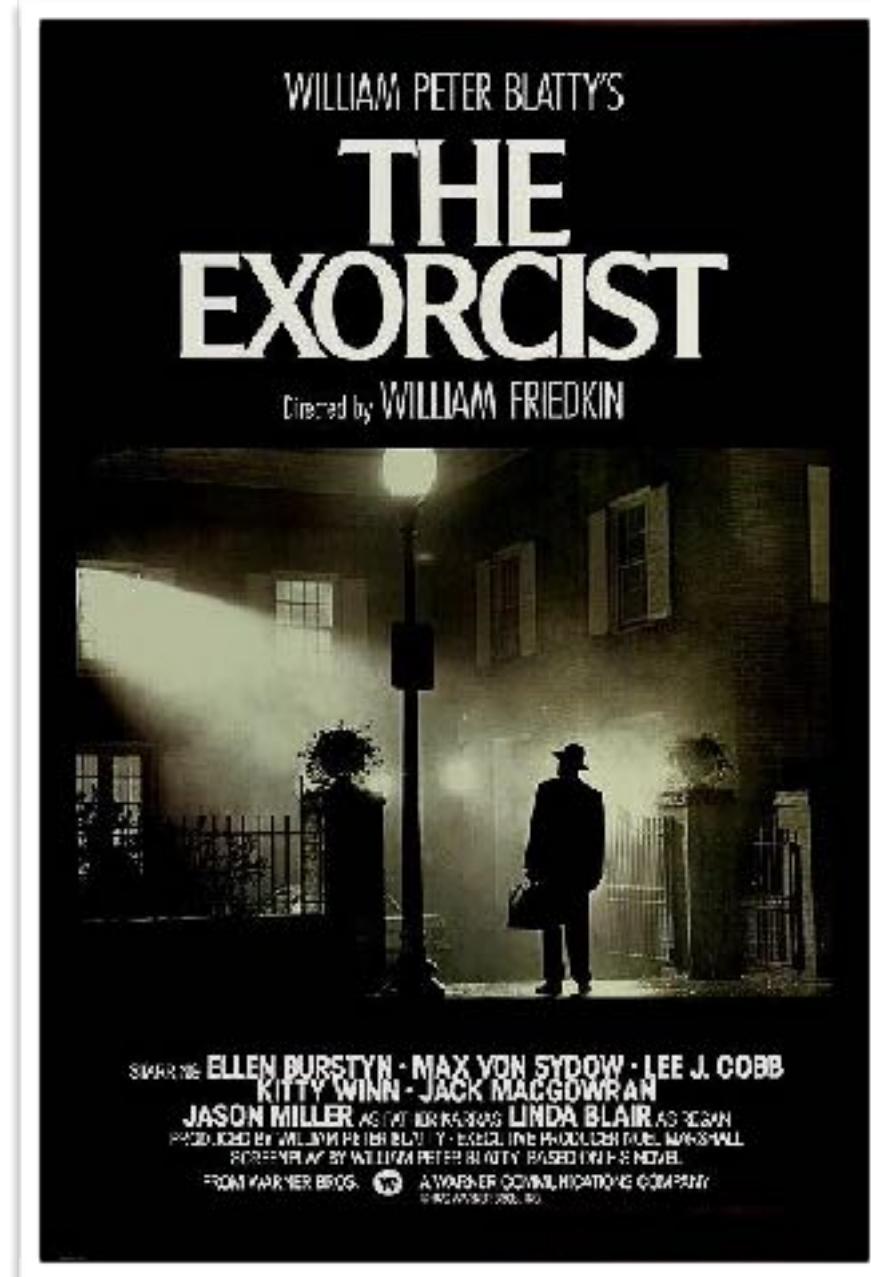
<https://www.youtube.com/watch?v=QfRAfsK5cvU>



Supernatural Horror



1968



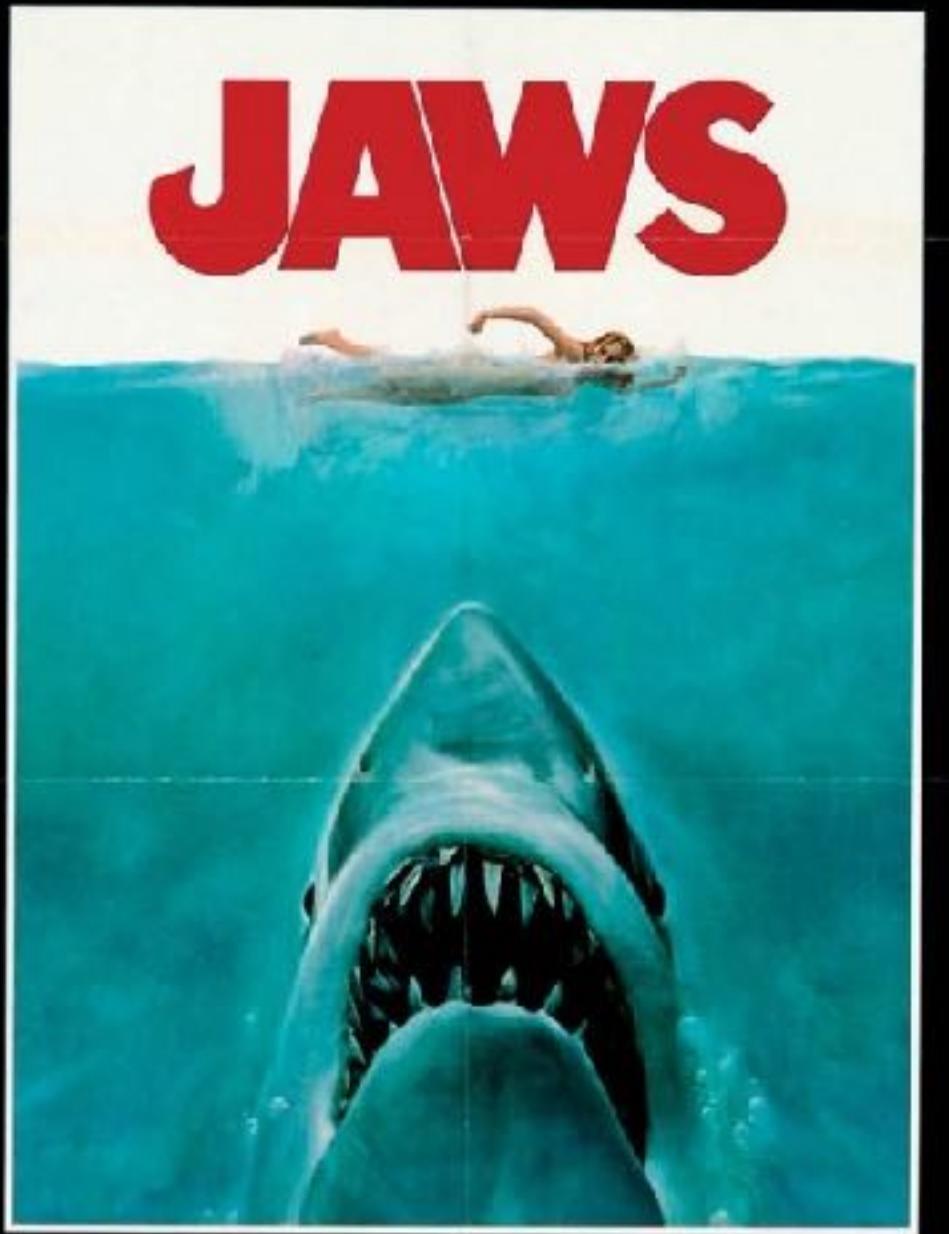
1973

Slasher



The Texas Chain Saw Massacre, 1974

*The terrifying motion picture
from the terrifying No.1 best seller:*



ROY ROBERT
SCHEIDER SHAW RICHARD
DREYFUSS

JAWS

Co-starring LORRAINE GARY • MURRAY HAMILTON • A ZANUCK/BROWN PRODUCTION

Screenplay by PETER BENCHLEY and CARL GOTTLIEB • Based on the novel by PETER BENCHLEY • Music by JOHN WILLIAMS

Directed by STEVEN SPIELBERG • Produced by RICHARD D. ZANUCK and DAVID BROWN • A UNIVERSAL PICTURE •

TECHNICOLOR® PANAVISION®

ORIGINAL SOUNDTRACK AVAILABLE ON MCA RECORDS & TAPES

Internationaler Sommer Blockbuster

Der weiße Hai, 1975

Spielegeschichte

Odyssee

zum Spielen und Lernen

Das elektronische Fernsehspiel für die ganze Familie



Odyssee bringt das vierte Programm auf den Bildschirm.

Sie können dabei aktiv mitmachen.

Durch diese neue Idee wird Ihr Fernsehgerät zum Fußballstadion, zum Tennisplatz, zum Schießstand oder gar zum Weltraum.

Auf Ihrem Bildschirm-Spielfeld agieren elektronische Spielfiguren. Sie schlagen – natürlich elektronisch – Bälle, schießen Torpedos ab, rasen eine Skilabfahrt hinab.

Das Odyssee-Spielzentrum wird einfach an die Antennenbuchse Ihres Fernsehgerätes angeschlossen.

Und damit können Sie das elektronische Drum und Dran vergessen. Auf dem Bildschirm erscheinen zwei kleine leuchtende Quadrate. Sie stellen die Spielfiguren dar und werden von zwei Spielpulten aus bewegt. Nach allen Richtungen, schnell oder langsam – ganz nach Ihrer individuellen Spielanlage. Nach dem Druck auf die Start-Taste erscheint der Ball. Als leuchtender Punkt fliegt er von einer Sockenhälft zur anderen und kann natürlich auch in Flugrichtung und Geschwindigkeit verändert werden.

Mit den Knöpfen am Spielpult lenken Sie „Ihre“ Spielfigur und versuchen, den heranfliegenden Ball zu erreichen. Er wird dadurch wieder „zurückgeschlagen“ und geht nicht ins „Aus“.

Konzentration und Geschicklichkeit entscheiden das Spiel

Abb. links Das „Gehirn“ des Odyssee-Spiels befindet sich im Spielzentrum (Mitte), an das die beiden Spielpulte angeschlossen werden.

Abb. rechts Zum Odyssee-Spiel gehört alles, was für die einzelnen Spiele gebraucht wird: Farbige Bildschirmfolien für verschiedene Bildröhrengrößen von 43 bis 63 cm (mit den jeweils erforderlichen Spielfeld-Markierungen), Spielkarten, Spielchips, ein 20seitiges Heft mit den genauen Spielregeln, Anschlußkabel und vieles mehr.



Ralph Baer, 1972 (Prototyp 1967)

<https://www.youtube.com/watch?v=0MnRkPvljKE>

THE NEWEST 2 PLAYER
VIDEO SKILL GAME

PONG

from ATARI CORPORATION
SYZYGY ENGINEERED

The Team That Pioneered Video Technology

FEATURES

- STRIKING Attract Mode
- Ball Serves Automatically
- Realistic Sounds of Ball Bouncing, Striking Paddle
- Simple to Operate Controls
- ALL SOLID STATE TV and Components for Long, Rugged Life
- ONE YEAR COMPUTER WARRANTY
- Proven HIGH PROFITS in Location After Location
- Low Key Cabinet, Suitable for Sophisticated Locations
- 25¢ per play



THIS GAME IS AVAILABLE FROM YOUR LOCAL DISTRIBUTOR

Manufactured by
ATARI, INC.
2962 SCOTT BLVD.
SANTA CLARA, CA.
95050

Maximum Dimensions:
WIDTH - 26"
HEIGHT - 50"
DEPTH - 24"
SHIPPING WEIGHT:
150 Lb.



Nolan Bushnell, 1972

https://www.youtube.com/watch?v=YmzH4E3x1_g



SS Billiards, south of downtown Hopkins Minnesota, in 1973

TABLE TENNIS



Nutting Associates

1973

Pong-Klone

Konsolen-Crash 1977



Telstar 1976



Telstar Arcade 1977



Universum TV Multi-Spiel 2006, 1978



Nintendo Color TV Game 1977

Hunt the Wumpus

```
You are in room 13 of the cave, and have 5 arrows left.  
There are tunnels to rooms 5, 11, and 13.  
Move or shoot? (m-s) s14
```

```
*thunk* The arrow can't find a way from 13 to 14 and flys randomly  
into room 13!
```

```
*Thwack!* A sudden piercing feeling informs you that the ricochet of  
your wild arrow has resulted in it wedging in your side, causing  
extreme agony. The evil Wumpus, with its psychic powers, realizes  
this and immediately rushes to your side, not to help, alas, but to  
EAT YOU!
```

```
(*CHOMP*)
```

```
Care to play another game? (y-n)
```

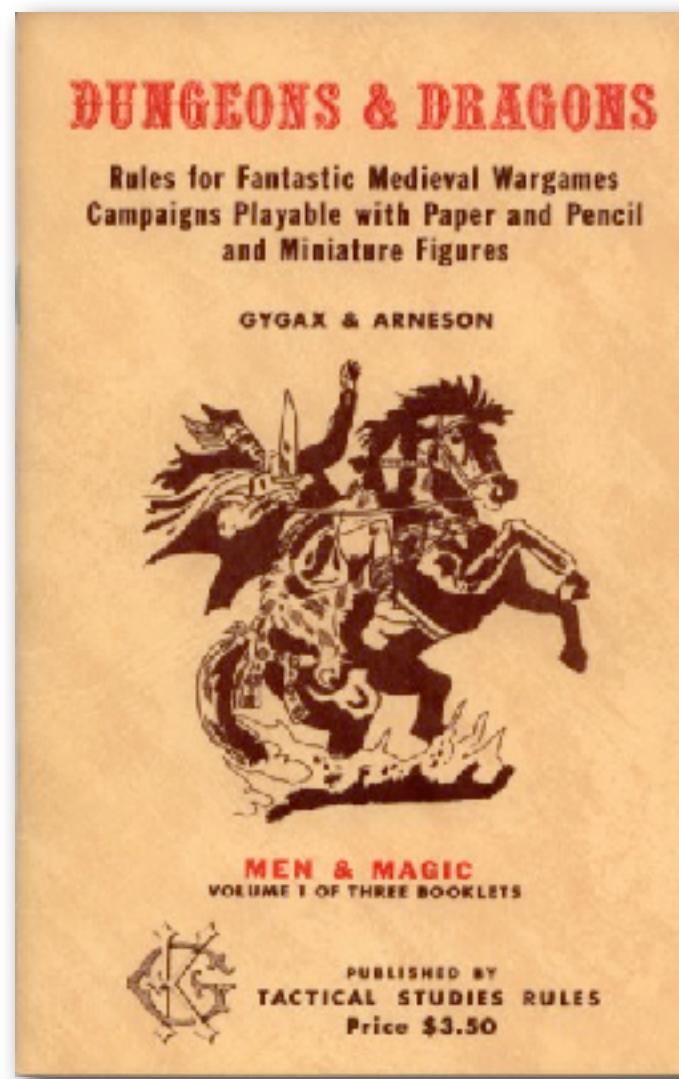
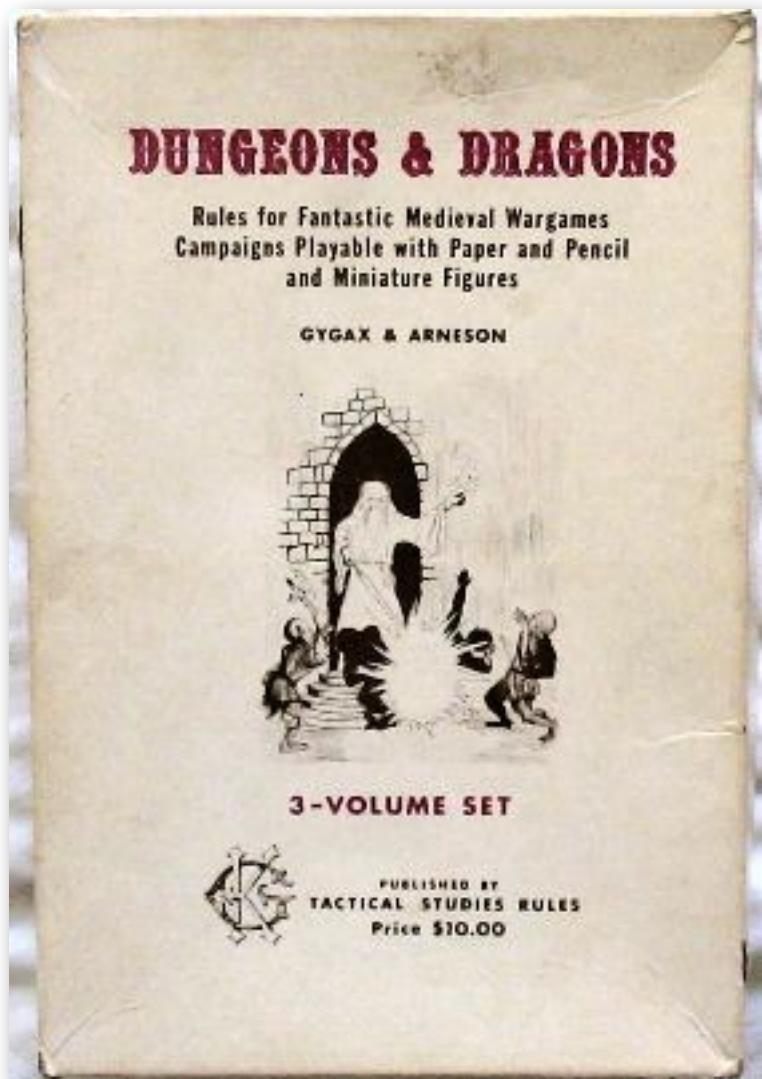
Gregory Yob, 1972



Mazewar, 1974

<http://www.digibarn.com/collections/games/xerox-maze-war/movies/maze-on-alto-fastart.mov>

Dungeons & Dragons



Gary Gygax; Dave Arneson
1974

The Game of Dungeons

Version Eight

A Dungeons and Dragons game involving the players against the evil forces lurking within the dark and dangerous Dungeons. The Object: Seek out the Orb and Grail, and enter the Hall of Fame.

STATS: Dungeon Trips Thus Far:

Adventurers Required to HOF: 125		
The Dungeon Hall of Fame		
Name	Level	Order
Mervin Heloquinn	151	Clever Staff
Shane Gordon	112	Unicorn
No MHD -spider-	219	White Lady
Gr. Bush	116	Unicorn
woof	217	Titan Lancer
Zen	112	Unicorn
Ies-Jon	129	Unicorn
S. Hunter	154	Unicorn
G. Hunter	109	Unicorn
unamed	249	Renegades

Written by: Flint Palfrey & Dirk Pollett
Originally by: Gary Whisenhunt & Ray Wood

Press NEXT to enter The Dungeons, or:
DH At notes, HELP Help, EXIT-DKX: Leave.

dnd, 1974

PLATO



SHIP

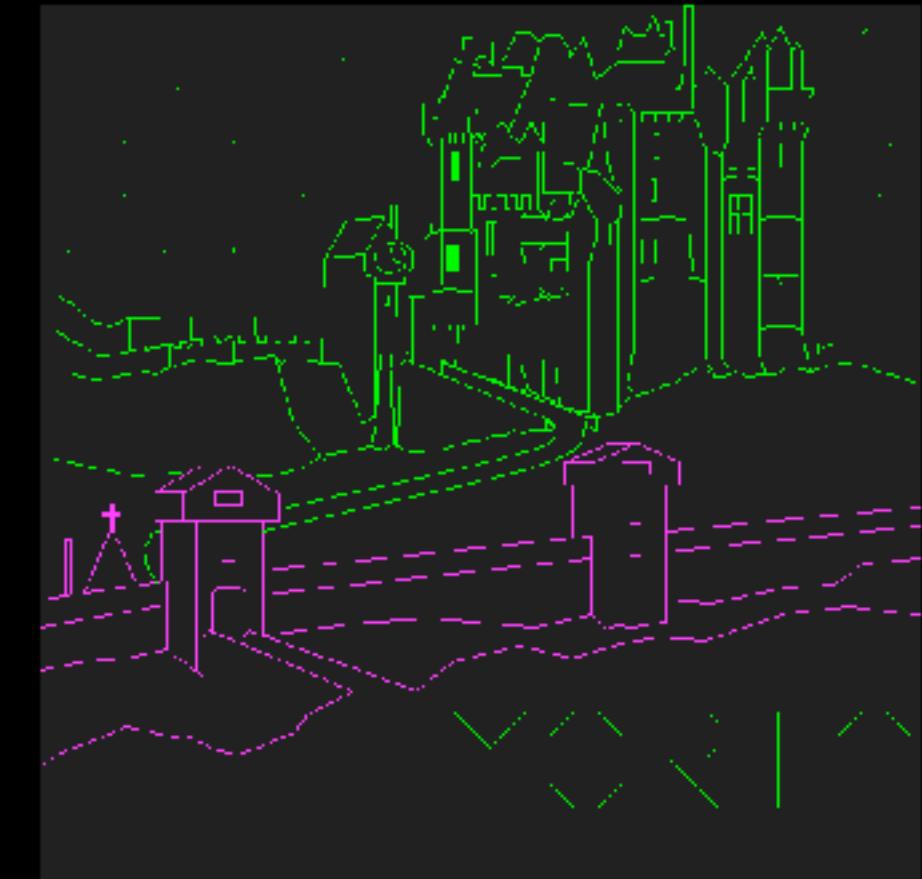
LI-Not much, how about you?

DL-

Mag = 10
cruising= 1.000
θ = 8.00°
ρ = 45.00°
x = 77265
y = 24664
z = 53636

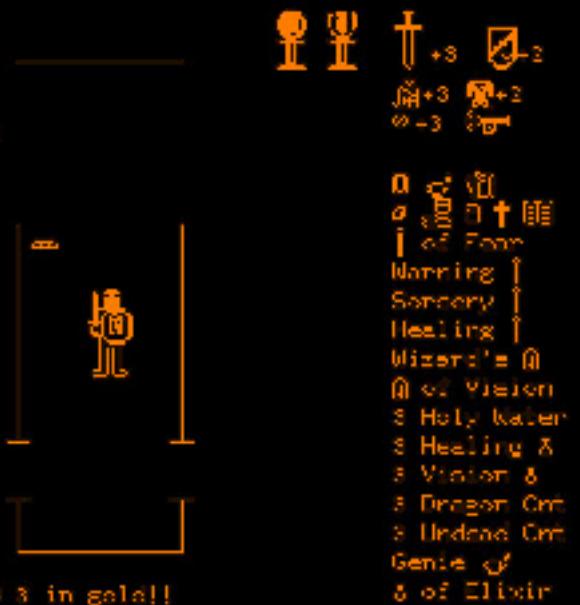
Spasim, 1974

(HELP)

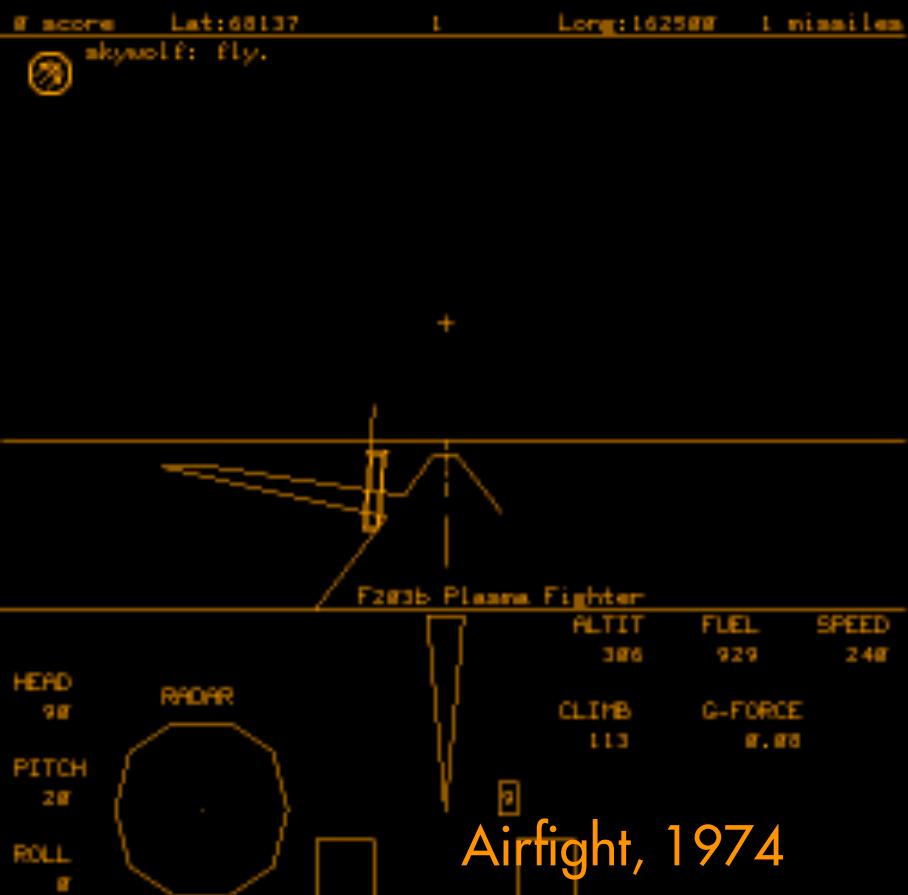


Bonus:
The Elf
STR= 38 Charmed
TG = 38 Dragon 333/372
MCH= 25
DX= 38
EVG= 38
LEVEL= 372

This Trip:
Magic= 111
Charms= 111
On Level= 1
Hits= 2050/2104
Gold= 300



\$ 3 in gold!!

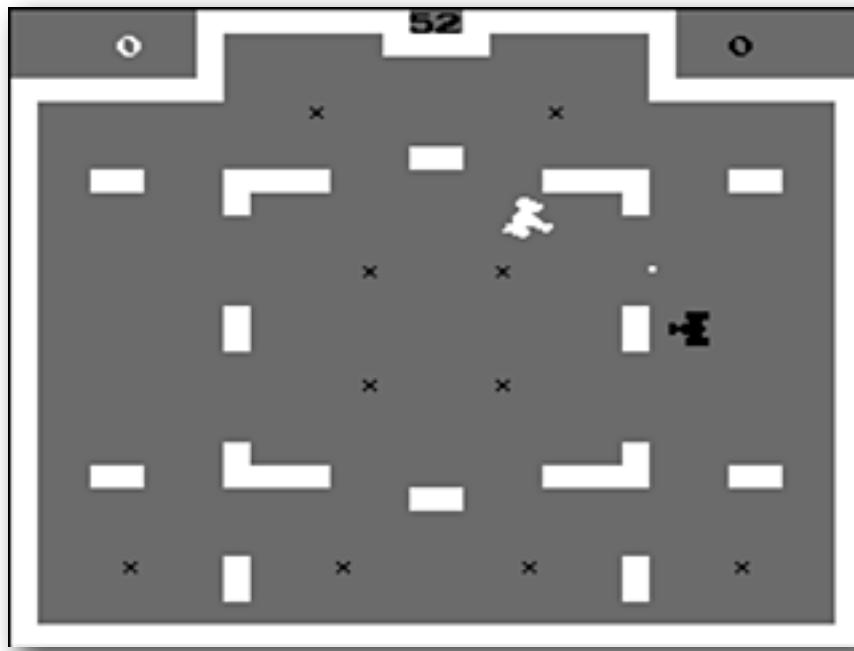


Airfight, 1974



Moria, 1975

dnd, 1974

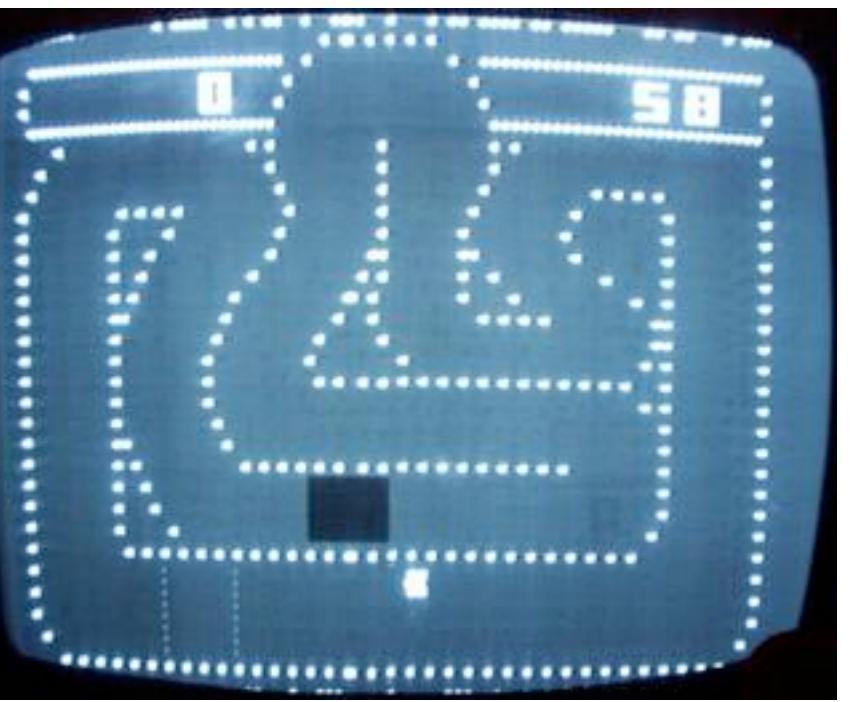


<http://www.youtube.com/watch?v=3OsBUzYBjgU>

Kee Games
Tank, 1974



KEE GAMES
a wholly
owned subsidiary
of Atari, Inc.



Atari: Gran Trak 10, 1974

was implemented in C by Jim Gallooglu, and expanded
and moved to the 8800/200 by Walt Bitofsky.

You are standing at the end of a road before a
small brick building. Around you is a forest. A
small stream flows out of the building and down a
gully.

(Hit RETURN to continue)

NO

I don't understand that?

ENTER

You are inside a building, a well house for a large
spring.

There are some keys on the ground here.

There is a shiny brass lamp nearby.

There is food here.

There is a bottle of water here.

-

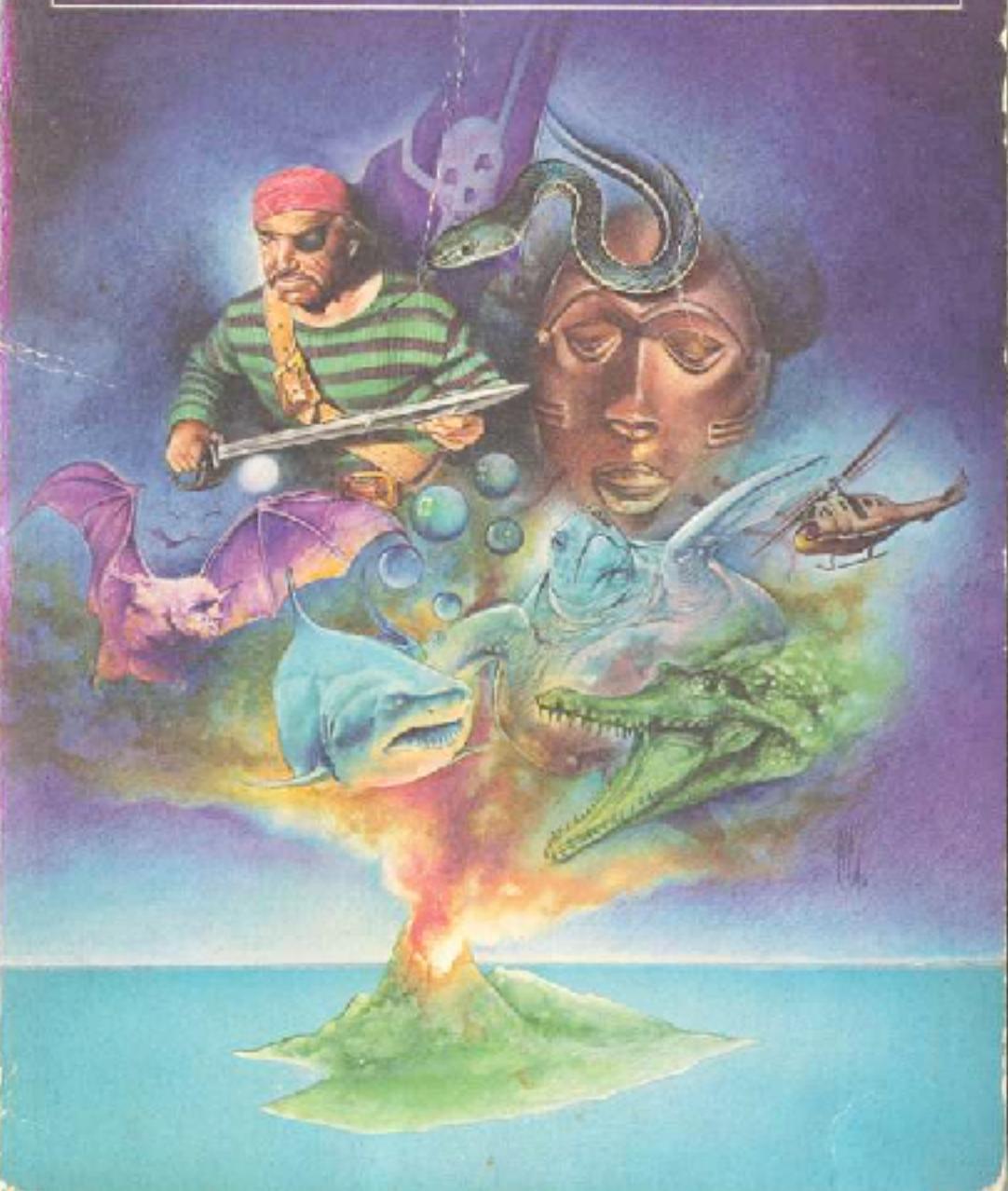
Adventure, ab 1975

29884 • \$1.25 • ARCH P

The Adventures of You Series

Sugarcane Island

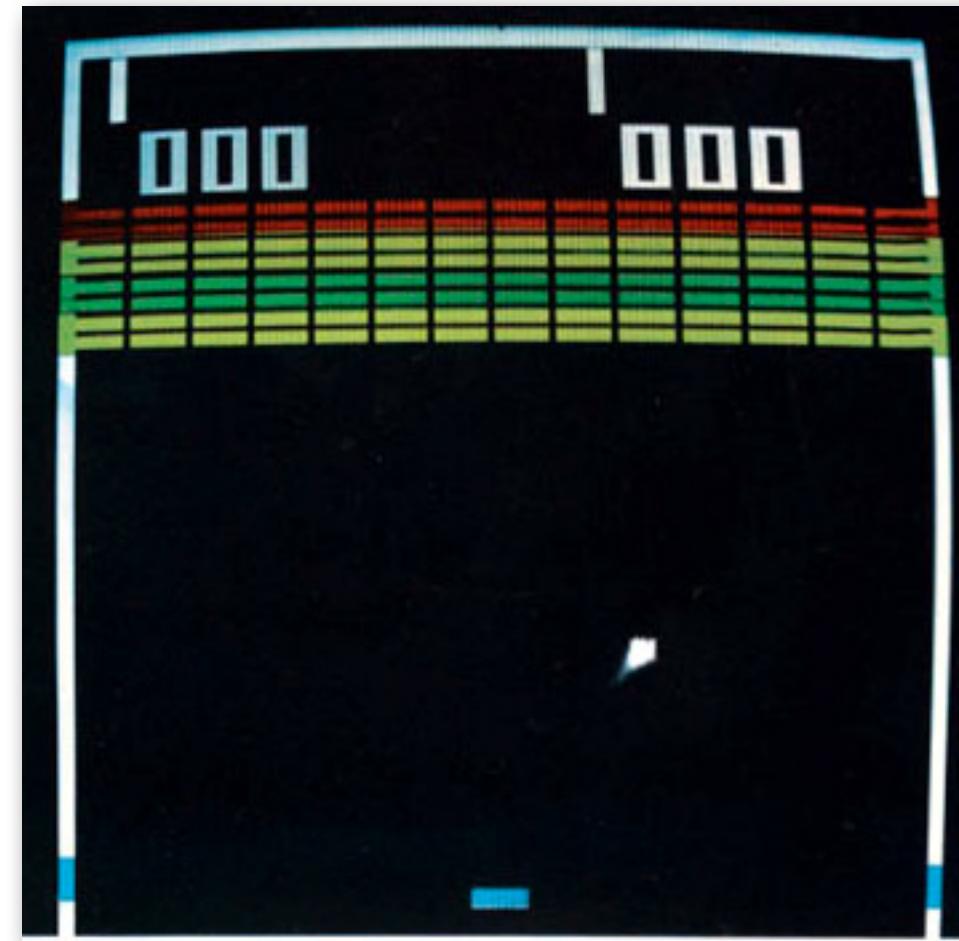
by Edward Packard
Illustrated by Barbara Carter



Spielbücher

1976 *The Adventures of You*
ab 1978 *Choose Your Own Adventure*

Breakout



Steve Wozniak, 1976

Portable: Mattel Electronics

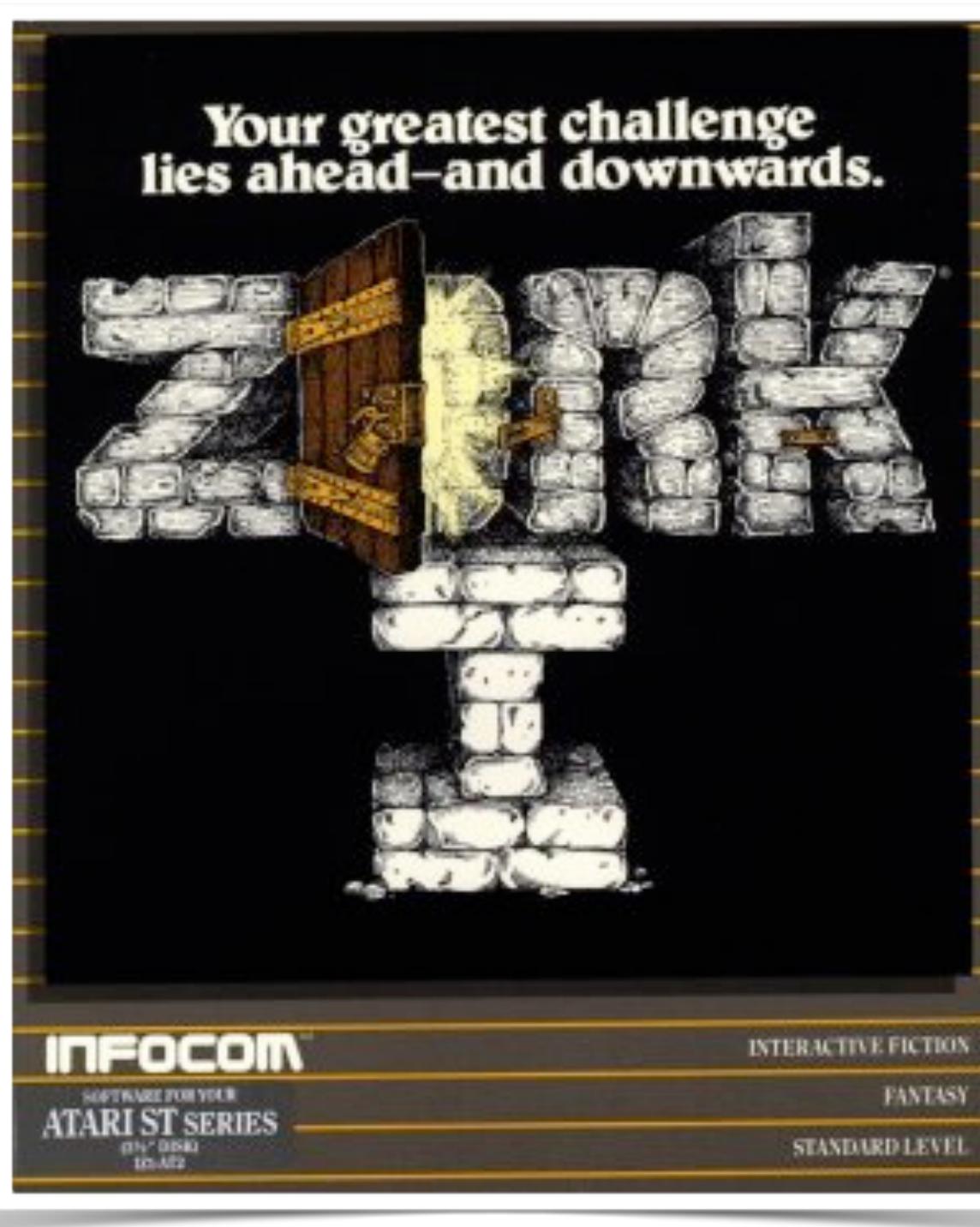


1976

<http://www.youtube.com/watch?v=isejBX1Tyjk>



<http://www.youtube.com/watch?v=jNKgpAF0sa0>



Zork I

Infocom: Tim Anderson, Marc Blank, Bruce Daniels,
Dave Lebling, 1977