Micro computing

Thomas J. Bergin

American University

Context….

- What was going on in the computer industry in the 1970s?
  - Mainframes and peripherals
  - Minicomputers and peripherals
  - Telecommunications
  - Applications, applications, applications
  - Operating systems and programming languages

And the answer is….

- Everything!!!
  - Mainframes from small to giant
  - Supercomputers (many varieties)
  - Minicomputers, Super Minis, tiny Minis
  - Networks, WANS, LANS, etc.
  - Client Server Architectures
  - 2nd and 3rd generation applications:
    - Executive Information Systems
    - Decision Support Systems, etc.

And into this technologically rich soup of computing, comes the:

- Microprocessor
- Microcomputer
- New Operating Systems
- New Operating Environments
- Economics
- New Users, New Users, New Users, New Users, New Users, New Users, New Users

Intel

- Robert Noyce, Gordon Moore, and Andrew Grove leave Fairchild and found Intel in 1968
  - focus on random access memory (RAM) chips

- Question: if you can put transistors, capacitors, etc. on a chip, why couldn't you put a central processor on a chip?

Enter the hero: Ted Hoff

- Ph.D. Stanford University: Electrical Engineering
  - Semiconductor memories; several patents
- Intel's 12th employee: hired to dream up applications for Intel's chips
- Noyce wanted Intel to do memory chips only!
- 1969: ETI, a Japanese calculator company -- wants a chip for a series of calculators

The Microprocessor

- ETI calculator would cost as much as a mini
- "Why build a special purpose device when a general purpose device would be superior?"
- Hoff proposed a new design loosely based on PDP-8: the Japanese weren't interested!
- October 1969, Japanese engineers visit Intel to review the project, and agree to use the I 4004 for their calculator. (first microprocessor.)

Intel 4004
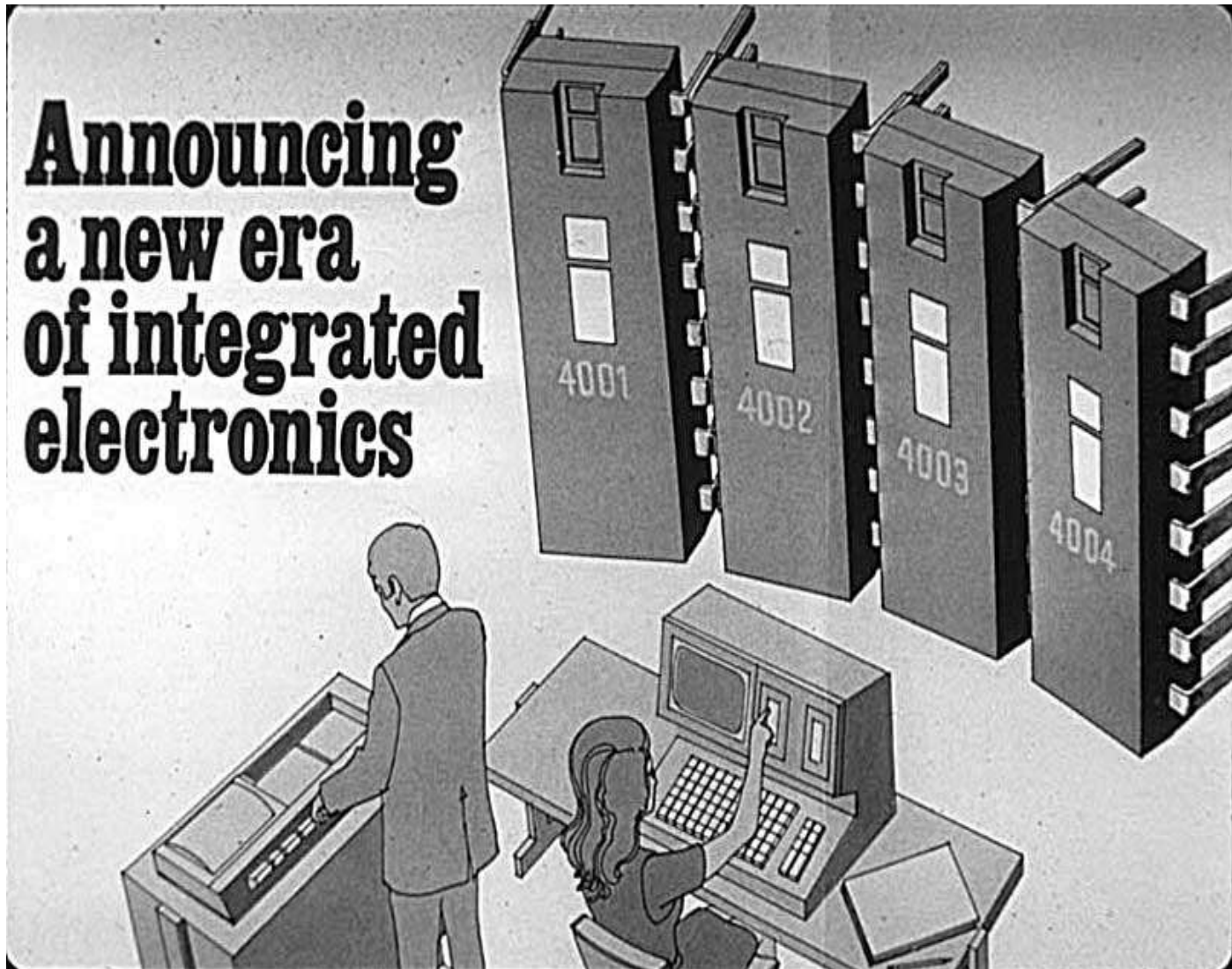
source: Computer Museum

The Second Step (1971)

- Computer Terminal Corporation built technically sophisticated terminals, and needed chips

- Hoff proposed a single integrated circuit.

- I 4004 operated on 4 bits at a time; couldn't handle a single character in one operation!

- Federico Fagin designs the Intel 8008

- CTC pulls out and Intel has no customers

- Texas Instruments produces chips for CTC

Hindsight/Foresight?

- The microprocessor has brought electronics into a new era. It is altering the structure of our society.

  - Robert Noyce and Marcian Hoff, Jr. "History of Microprocessor Development at Intel", *IEEE Micro*, 1981

Radio Hobbyists

Edmund Berkley's *Simon*
relay based, 1950-51
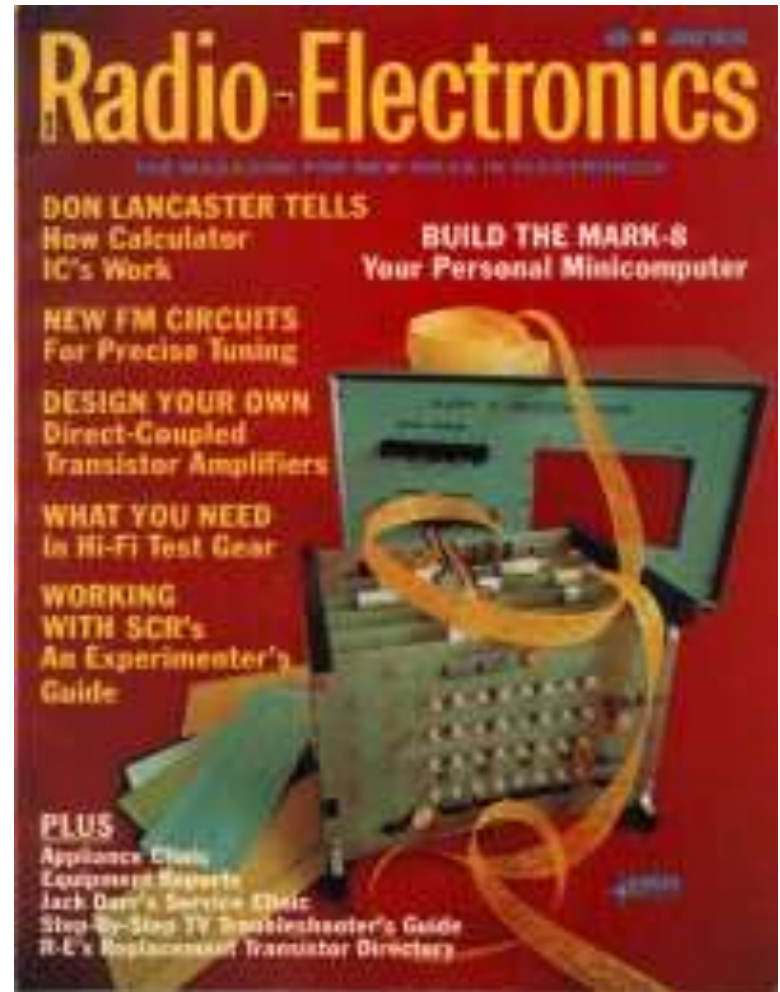
July 1975

Mark-8

- John Titus was a graduate student I chemistry at VA Tech
- Using PDP 8/L
- Prototype: 1974
- Plans: $5.00
- Build: $350.00

Kim-1, 1976, MOS 6502, $245

http://www.geocities.com/~compcloset/CommodoreKIM-1.htm

Kenebak-1 (1971)

John V. Blakenbaker -- first personal computer
Scientific American ad: $750
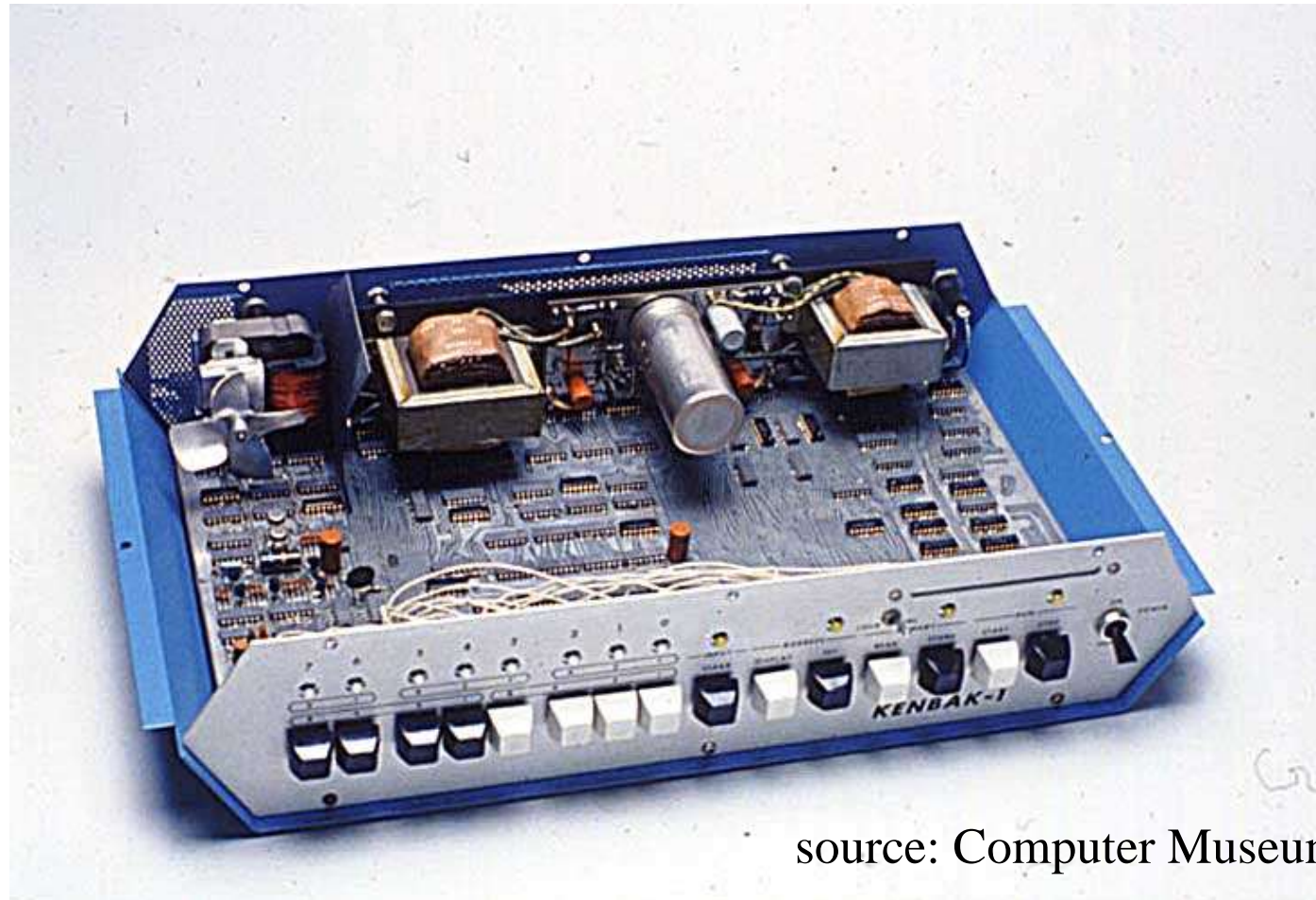
source: Computer Museum

Micral (1973)

Thi T. Truong founded R2E (French)

earliest non-kit commercial computer

Intel 8008, 500 sold in 6 months at $1750

source: Computer Museum

Scelbi 8H (March 1974)

first comm. adv. US computer based on a microprocessor

- Intel 8008
- Kit form and assembled
- 4K internal memory
- Cassette tape
- Teletype and oscilloscope interfaces
- Electronic and biological applications
- 1975: 8B version had 16 K of memory

source: Computer Museum

HOW TO "READ" FM TUNER SPECIFICATIONS

Popular Electronics

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-1011 Open-Reel Recorder
Tram Diamond-40 CB AM Transceiver
Edmund Scientific "Kirlian" Photo Kit
Hewlett-Packard 5381 Frequency Counter

http://www.blinkenlights.com/pc.shtml

MITS Altair (announced January 1975)
First mass-marketed personal computer

- Intel 8080 at 2MHz
- 256 bytes of memory
  - 1024 and 2048 boards
- Paper tape or cassette
- S-100 backplane
- Shipped: April 1975
- 500 sold by December
  - Kit: $395
  - Assembled $650
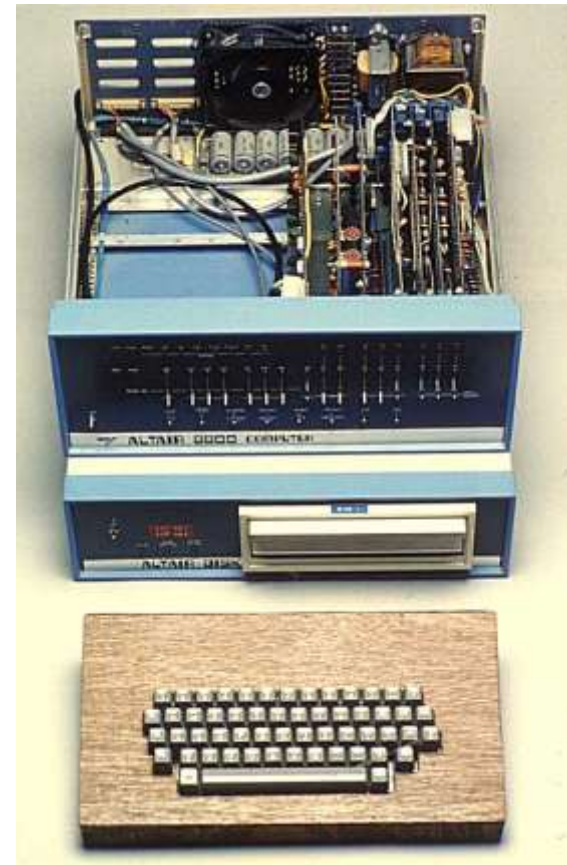
source: Computer Museum

Microcomputers

- Ed Roberts founds Micro Instrumentation Telemetry Systems (MITS) in 1968

- Roberts coins the term: *personal computer*

- Les Solomon's (Editor of *Popular Electronics*) 12 year old daughter, Lauren, was a lover of *Star Trek*. He asked her about the name of the computer on the *Enterprise*. She said "*computer* but why don't you call it *Altair,* because that is where they are going!

- *Popular Electronics* puts the MITS *Altair* on the cover in January 1975 [nee PE-8, Intel 8080]

Altair 8800 Computer

Tom Carlson

Some Early Microcomputer Vendors

reference: Haddock, A Collector's Guide to Personal Computers

each architecture is unique: operating system, storage formats

- Applied Microtechnology
- Commodore
- Cromemco
- Data General
- DEC
- Electronic Product Assoc.
- HAL Communications
- IMSAI
- Intelligent Systems Corp.

- Osborne Computers
- Ohio Scientific
- PolyMorphic Systems
- Radio Shack
- Sinclair Research
- Southwest Technical Products
- Systems Research
- Vector Graphic

IMSAI (IMS Associates, Inc

Altair clone (Intel 8080A)   1976

- 4K memory exp: 64K
- Input: toggle switches
- S-100 with 22 exp. slots
- Floppy drive and 50 M hard drive available
  - 2 floppies: + $1,095
- Production Dec. 1975
- Kit: $439
- $931 assembled with 1 k of RAM

IMSAI 8080

Shown with dumb terminal: Computer Museum

Radio Shack

- TRS-80 (1977)
- Z80 (Zilog)
- $599.9 5bought:
  - 4K memory
  - BASIC
  - Cassette storage
  - Readable manuals
  - Plan: 300/year
- Sold 10,000 1st month
- TRS-80 homepage:
http://www.kjsl.com/trs80/

source: Computer Museum

Monitor and Printer were extra

A New Techno-culture

May 1979, 8 pages

April 1981, 20 pages
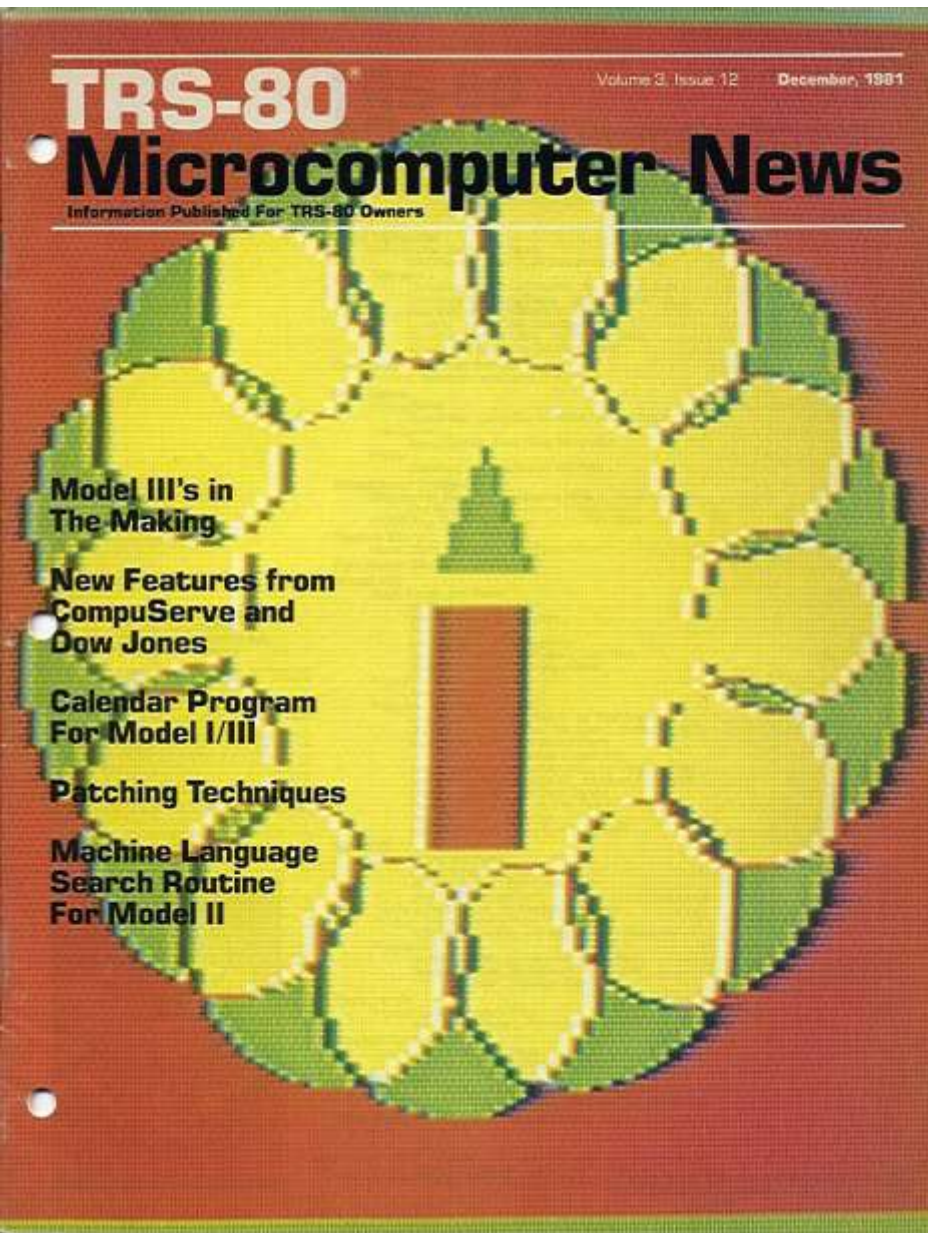
December 1981, 46 pages with color cover
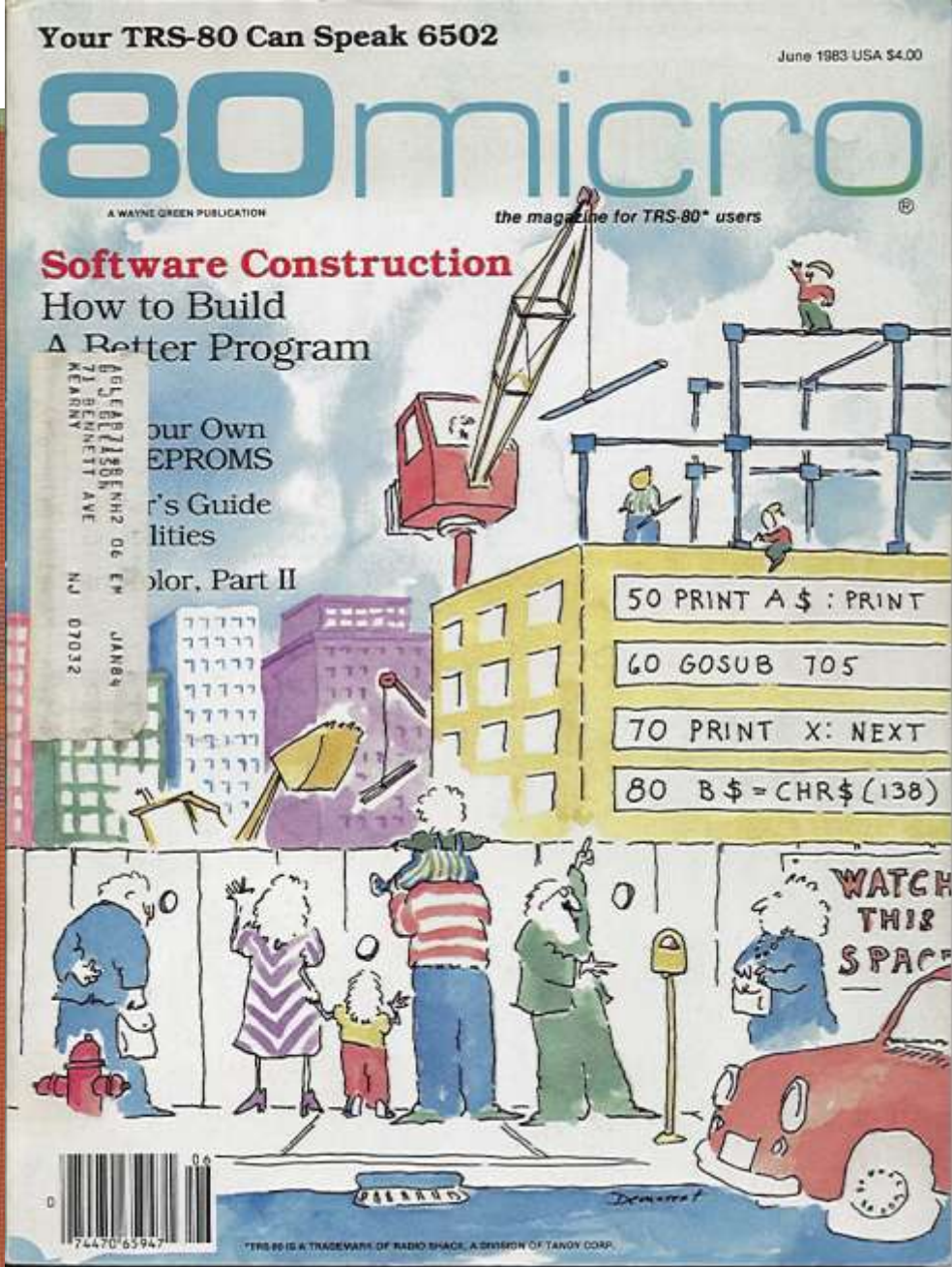
June 1983, 370 pages with color advertising

Commodore Pet 2001 (June 1977)

- 6502 at1 MHz
- 4K or 8K memory
- 2 built-in cassettes
- Membrane keyboard
- Keypad
- Instruction book
- Widely adopted for elementary schools
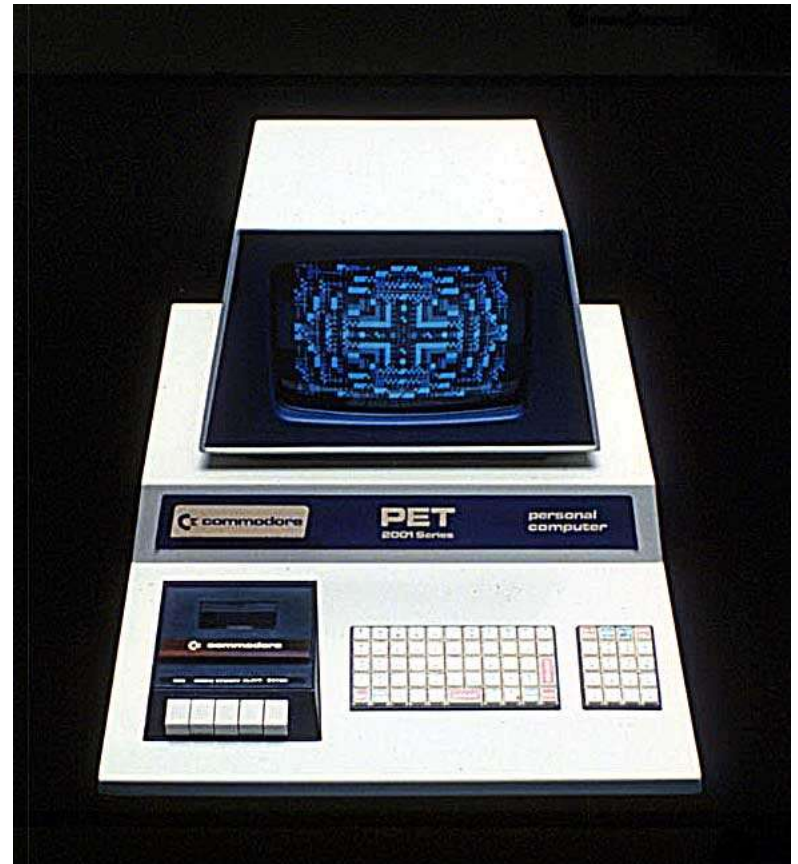
source: Computer Museum

Retail Computer Stores!

- Dick Heiser: The Computer Store, LA, 1975
- Paul Terrell: Byte Shop, Mountain View, 1975
- ComputerLand incorporates, 1976
- ComputerLand Franchise, Morristown, NJ, 1977
- Radio Shack manufactures and sells TRS-80

Other Infrastructure

- Southern California Computer Society, 1975
- *Byte Magazine*, 1975
- *Dr. Dobbs,* 1976
- World Altair Computer Conference, 1976
- Gary Kildall: Intergalactic Digital Research, 1976
- Trenton (New Jersey) Computer Festival, 1976
- Personal Computing Festival, Atlantic City, 1976
- Midwest Area Computer Club Conference, 1976
- Jonathan Rotenberg: Boston Computer Society, 1977
- David Bunnell: *Personal Computing*, 1977
- West Coast Computer Faire, 1977

Sinclair Research: ZX80 (1980)

- $199.00
- Zilog 80A
- 1K RAM
- Membrane keyboard
- Std television
- Cassette tape
- Timex Sinclair 1000: $99: 2K (Feb 1982)

source: Computer Museum

The magazine for Sinclair users

SYNC

Use the DEFine function
To Construct 3-D Plots

Sinclair ZX Spectrum:
An In-depth Review

"To Explore New frontiers..."
Six Games of Outer Space

Hardware: More Memory,
Power Filtering, Ear Input

Osborne I (April 1981)

- Zilog Z-80A $1,795
- 1st 'portable" (23.5 pounds)
- 3.55 by 2.6 inches mono screen (24 by 52 chars)
- Dual 5 1/4 drives: 91 K each
- Control Program for Microcomputers (CP/M)
- Wordstar, SuperCalc, Mailmerge, BASIC (compiler and interpreter)
- Sales went from $0 to $100 M in 2 years
- Bankrupt on September 13, 1983

Portable Computers in 1981

Richard Kuhlenschmidt

Osborne I

Rich Wielgosz

Kaypro

http://www.obsoletecomputermuseum.org/osborne.html

KUG BULLETIN BOARD GOES "ON LINE" MARCH FIRST

As of March first, you will be able to get all sorts of information transferred to your Kaypro by just calling the KUG number in Chicago.

Of course you will need a modem and some communication software, but, this promises to be the start of some great co-operative efforts on the part of all our members.

You will be able to leave messages, get messages, "down-load" programs called in by members, learn what's happening with our library, and get answers to some of your annoying problems.

To understand a little more about modems and communication software, let's discuss their use with the Kaypro II.

The type of modem you use should be rated at 300 baud (300/1200 is O.K. too). That means the amount of characters being transferred is about 30 per second. At 1200 baud the count would be 120 characters per second. The type of modem could be either direct (uses the same connectors as the Kaypro keyboard or telephone jack) or acoustic (the telephone hand-set fits into two openings for sending and receiving).

You will need an RS232 cable to fit into the back of the Kaypro and to the modem. The modem usually comes with the cable to be connected to the telephone (if it is direct connect).
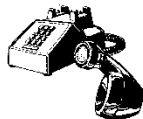
(312) 397—0360

About the software, you already have a communication program on your CP/M disk. It is called TERM.COM. This program will allow you to communicate with the bulletin board but you cannot save any of the information on disk. There are other programs available such as "Move-it" or Modem 7 that will allow you to store from memory. We will have a modem package available to members that will let you do just that.

The procedure is as follows:

Place your CP/M disk in drive A and type TERM <return>. The screen will tell you that the Kaypro is a "dumb" terminal and it will ask you for a <return> to start communicating. DON'T HIT <return> YET !

Using the instructions that came with your modem call the KUG Bulletin Board in Chicago by dialing 312-397-0360. NOW, HIT <return> a couple of times. The KUG Bulletin Board Menu will appear. Just follow the instructions and enjoy it.

At first, the bulletin board will be available to anyone who calls, but eventually you will be asked for your KUG ID Number so that you can have access to privileged information.

The baud rate for now will be 300. Later on you will have a choice of either 300 or 1200 baud.

We here at KUG look forward to working with you through this new medium and would like to hear from you regarding its use for a mutual benefit.

* * * *

Applications, applications, applications….

COMPUTING FOR HOME AND BUSINESS

INTERFACE AGE

OCTOBER 1980 $2.50/CANADA/MEXICO $3.00

Micros in education:
making the climb

Algebra

USING BASIC IN THE CLASSROOM

Introduction to Numerical Analysis

MODERN DATA PROCESSING

PROGRAMMING ASSEMBLER LANGUAGE

COMPUTING fundamentals and applications

Essentials of Managerial Finance

The electronic
checkbook is here

Build your own
telephone dialer

April 1982
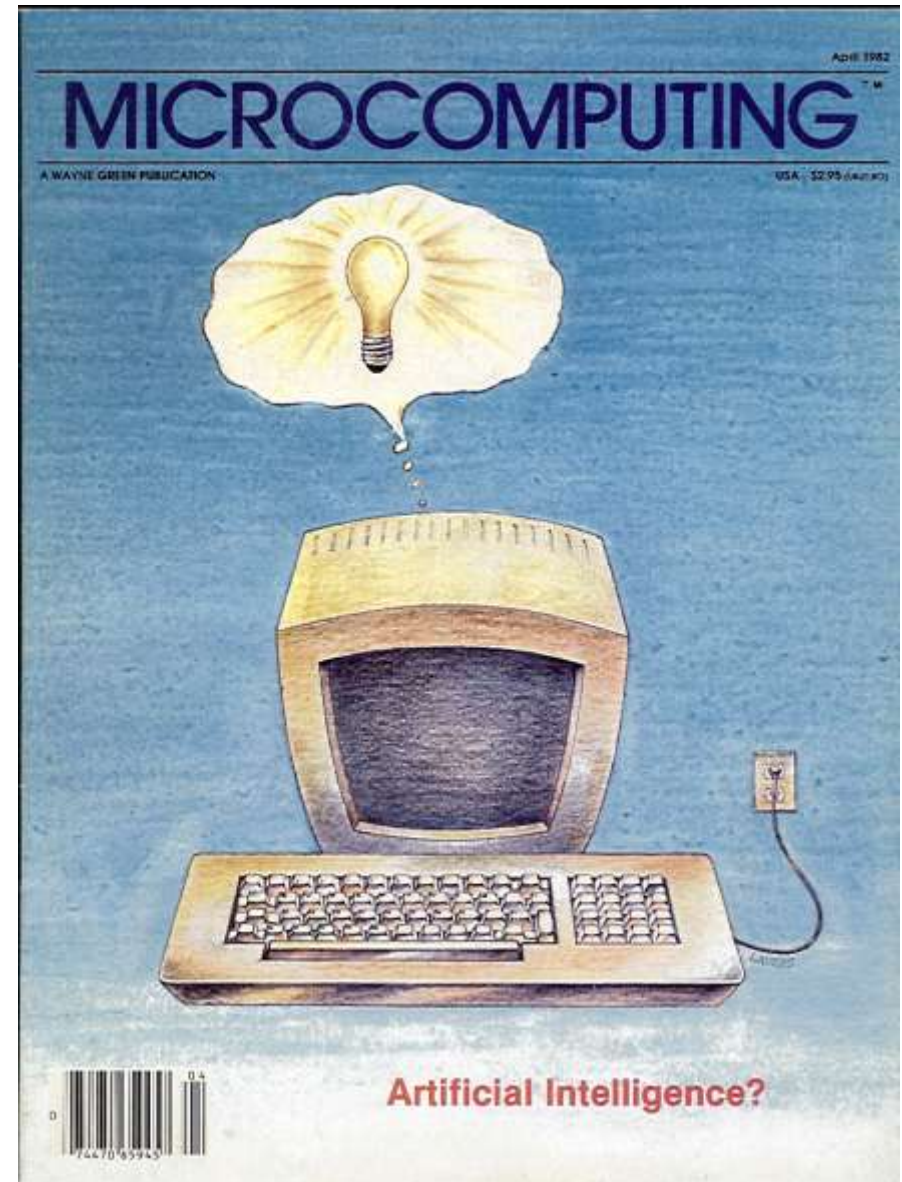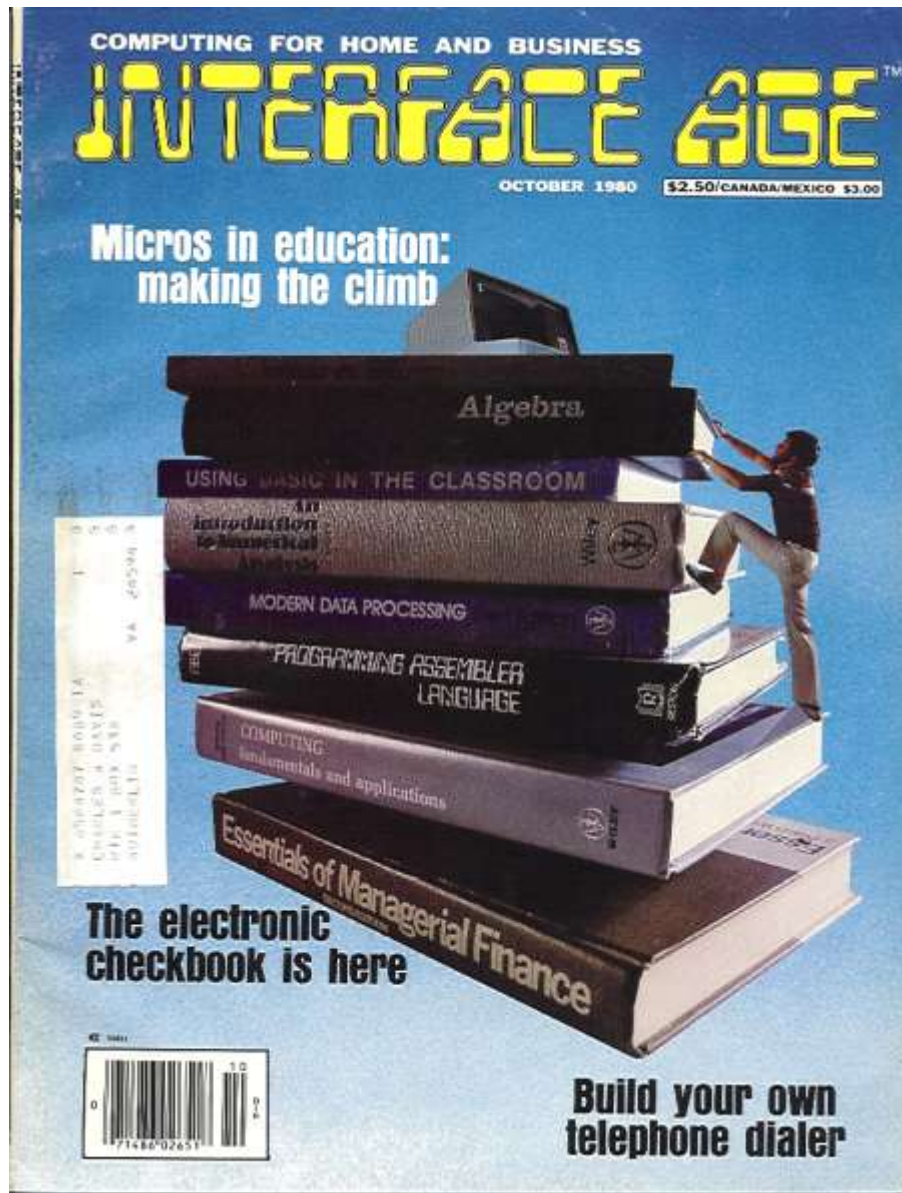
MICROCOMPUTING

A WAYNE GREEN PUBLICATION   USA $2.95 (#2.50)

Artificial Intelligence?

Dateline: Afghanistan

OSBORNE UNDER FIRE

ASTANT371BEC15 07 KB OCT82
371 MECHANIC ST
HAVERHILL MA 01630

Plus Apple, Commodore, Heath, IBM . . .

Osborne—
Behind Guerrilla Lines

*This free-lance journalist reported on the Afghan rebels'
resistance to the Soviet-backed regime in their country and filed
his stories back to the U.S. using an Osborne computer.*

By David Kline

Kunar Province, Afghanistan—
The incoming mortar round whistled
dully through the night sky, slam-
ming with a loud crack into the side
of the hill. Desperately looking
around for cover, a dozen Islamic
guerrillas in turbans fired their rifles
and machine guns ineffectively at the
pro-Russian militia position on the
ridgeline above. Then another mortar
round crashed into the trees 50 yards
away, temporarily drowning out the
staccato sounds of automatic rifle fire
all around us.

Me, I lay flat on my back, trying to
calculate the odds of the mortar crew
above us lobbing one directly into my
lap. It occurred to me that I wasn't
being paid nearly enough for this as-
signment.

Seeing as how I had no other option
but to at least try to act like a report-
er, I pulled out my notebook and
started to record my observations of
the battle. I also began making plans
for how I was going to file the story. I
faced a three day walk over the
mountains before I could get back to
civilization—the dusty little frontier
town of Peshawar, Pakistan, just 20
miles from the legendary Khyber
Pass on the Afghan-Pakistan border.
But even once I arrived, I still didn't
know if I'd be able to file. For I in-
tended to employ equipment never

before used from this part of the
world: a portable computer and tele-
phone modem.

Oh well, first things first, I told my-
self. And the first thing I had to do
that night was to find a rock to crawl
under.

* * * * * *

The experiment, for that's what it
was, first took shape in late 1981. I
had already decided to purchase a
portable Osborne computer for
word-processing, mail list and busi-
ness applications in my free-lance
writing agency. Then, when I was
asked by CBS News, the *Chicago Sun-
Times* and the *Los Angeles Times* to go
back on assignment to Afghanistan (it
would be my fourth trip in three
years), an idea began bubbling in my
head. Could I take the Osborne with
me to the war zone, or at least close to
it, and use the machine to both write
and file my stories?

The advantages of using a comput-
er as a reporter's tool in a situation
like this would be significant. First
and foremost, any articles I would
write using a word-processing com-
puter—with its quick and easy ability
to edit and re-edit copy—would
naturally be superior to what I could
either write longhand or what I could
hack out on a clackety manual type-
writer. But also, if I could use a tele-
phone modem or some other trans-
mittal system to get my copy back to
the newspapers, I could avoid the
costly and often unreliable public
telex offices in Pakistan.

Ordinarily, free-lance journalists
like myself not based in a telex-

equipped overseas office must go to a
public telex office and present hand-
written or typewritten copy to an
often-bored and always insufferable
bureaucrat-of-an-operator. He may
or may not send your message that
day, may or may not send it as writ-
ten, and may or may not send it at all
if it happens to offend his govern-
ment (most telephone and telex sys-
tems outside the United States are
government-owned and operated).

The implications of the experi-

*David Kline is director of Impact Features (2329
N. Sawyer Ave., Chicago, IL 60647), an agency for
free-lance journalists. He reported from behind Af-
ghanistan's rebel lines—his fourth trip in three
years—on assignment for CBS-TV, the* Los Ange-
les Times *and the* Chicago Sun-Times.

References

- Bunch and Hellemans, *The Timetables of Technology*, Simon and Schuster, 1993

- Lee, *Computer Pioneers*, IEEE Press, 1995

- Freiberger and Swaine, *Fire in the Valley: The Making of the Personal Computer*, Osborne/McGraw-Hill, 1984

References

- Thomas F. Haddock, *A Collector's Guide to Personal Computers and Pocket Calculators*, Florence, AL, Books Americana, Inc. (1993)
- Stan Veit, *Stan Veit's History of the Personal Computer*, copyright Stan Veit (1993)
- The Computer Museum: slide sets 13-17
- *Intel at 20, The Revolution Continues*, 240447-001
- *Defining Intel: 25 Years/ 25 Events* , 241730

Show and Tell

- Early manuals from Apple, Radio Shack
- Periodicals
- Processor Technology SOL
- Osborne I with documentation
- Apple IIc
- Timex Sinclair system
- Floppies: 8", 5 1/4", 3 1/2"