

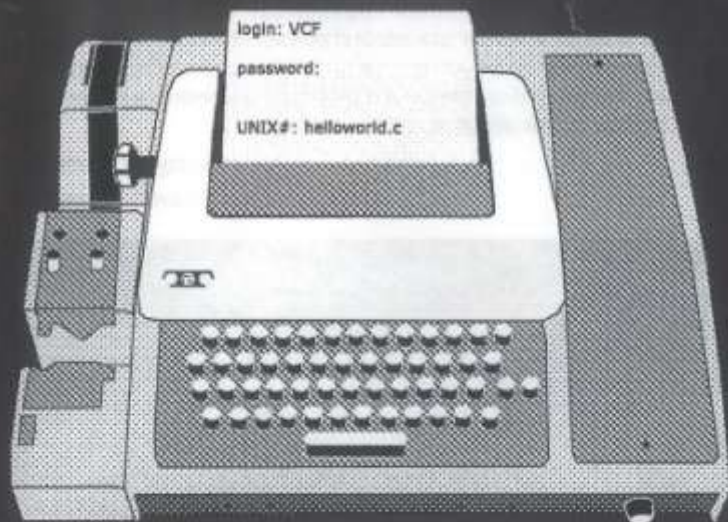
Vintage Computer Festival

Sunday, August 4, 2019

Photos by Dave Jaffe

2019

Vintage Computer Festival West



Program Guide



Hello, world!

Welcome to the Vintage Computer Festival West 2019. You're about to embark on a fantastic family-friendly adventure backward in time.

You will see and touch dozens of historic computers from many decades gone – everything from big iron to eight-biters. You'll also experience some creative new replicas, modern enhancements, and new retrothemed systems. You will meet some historic people, learn their insider stories, and perhaps pick up our nerdily awesome t-shirt! While you're here, remember to tour the amazing museum all around us; they're a terrific host and worth a return trip. Be sure to talk about us online: #vcfwest.

Happy computing,

- The Vintage Computer Federation

Vintage Computer Federation

Vintage Computer Federation Inc. (vcfed.org) is a 501(c)3 non-profit organization for and by computer history enthusiasts. We evolved in 2015 from the DNA of related groups.

In addition to Vintage Computer Festival West, we also own VCF East (New Jersey each spring) and VCF Pacific-Northwest, and we are working hard on creating more events.

We're big fans of online collaboration. We own Vintage Computer Forum, which is the hobby's largest discussion site. There are thousands of users worldwide to help you with whatever niche of vintage computing you prefer.

We also support in-person meetups through regional chapters. Our founding chapter in the U.S. Mid-Atlantic region has its own hands-on computer museum! We are actively incubating new chapters and partnering with existing local groups to join the Federation.

Saturday Schedule

9:00

Show opens

10:00 - 10:30

Welcome

CHM State of the State - *Dag Spicer*

11:00 - 12:00

IBM 1401 Demo at the CHM

1:00 - 2:30

ICs and Aging - *Bill Herd*

Bill Herd, designer and lead engineer of several models of Commodore computers from the mid 80's was in total disbelief that any units are still working 35 years later, but has figured out why there are still working units.

Join us as Bill asserts that all computers and all components will one day fail, and shares the mindset of designing for production from gaskets to IC's, and how to prolong the life of your vintage computer.

This is an ideal time to ask an engineer that was there what the heck were they thinking!

Topics: Heat and its effects and mitigation, Computer design, test, and production, to include the custom IC's, and the chemistry of everyday life.

2:30 - 3:30

PDP-1 Demo at the CHM

4:00 - 5:30

Apple 1 Owners Panel

Ten or more Apple 1 computers, including several up-and-running, will be displayed at VCF West.

Original and current owners will join early Apple employees in a panel to discuss the computers, why they were purchased, how they were used, and what the owners plan to do in the future.

6:00

Show closes

6:30

Dinner at Roberto's Cantina

Exhibitors

VCF exhibitors put amazing effort into displaying their favorite historic computing systems. Be sure to visit them all, ask questions, play, learn, Tweet, and take lots of pictures! Perhaps you'll be inspired to exhibit your own pride-and-joy at VCF West 2020 next year.

01 Portable Storage Media

Foone Turing, Mipitas, California, with Amber Turing, Ramona Sagan, and Rose Willard

Foone will show off floppy disks and optical discs, the main ways we used to portably store data for transfer between computers before flash storage and the cloud ruined all the fun.

02 Sun Microsystems IPX Lunchbox Computer

Simon Wynn, Redwood City, California

Simon says the Sun Microsystems IPX was an entry level Sparc-based UNIX workstation introduced in 1991, with an eye-popping \$11,995 price tag. He'll display a restored and fully-loaded system, together with peripherals, the classic Type 4 keyboard, and an optical mouse. Software will include SunOS, Solaris, WABI Windows 3.0 emulation on Sparc, early Netscape web browsers, and the original 1.0 version of NCSA Mosaic.

03 Re-creating Vintage Computers

Chris Davis, Wilmar, Minnesota

Chris enjoys building modern-powered vintage computers. It's an enjoyable

way to learn and experience history, plus it's a great way to teach his kids! He will show vintage computer replicas such as an Altair 8800 using an Arduino Duo, ATMEL powered Kenbak-1, and an Apple 1 replica.

04 SF Acorn User Group / Bay Area Retrocomputing Club

Philip Pearson, Mountain View, California, with Chris Collins, Alex Perez, Luca Severni, and Anthony Curtis

The group will display a selection of British home computers, following on from their 2018 exhibit. The machines are an Acorn Atom, BBC Model B, BBC Master 128, Election, and Archimedes. They'll also have modern add-ons.

05 The Return of TACOBOT

Steve Torer, Sundance, Utah

Steve reminds you not to eat his exhibit. The award-winning TACOBOT video game, shown last year running on the homebrew STUPID computer, returns in arcade game form with a Motorola 6809 processor and using techniques

(Continued...)

Sunday Schedule

9:00

Show opens

10:00 - 11:00

Apple I Live Demo on the main stage

11:00 - 12:00

IBM 1401 Demo at the CHM

1:00 - 2:00

The Apollo Guidance Computer: Part 1

The Apollo Guidance Computer was entrusted with all guidance, navigation and control of the Apollo spacecraft for voyages to the Moon. Part 1 is a comprehensive introduction of the Apollo Guidance Computer's quirky architecture, the clever hardware, the quite unusual peripherals and the revolutionary system software. We will address how the designers overcame the limitations of the hardware and created a system that is sophisticated even by today's standards.

2:00 - 3:00

The Apollo Guidance Computer: Part 2

Building on Part 1 and moving into flight operations, we will describe the concepts needed to navigate a spacecraft from the Earth to the Moon, and how the

computer accomplished this task. Finally, we will describe key phases of the mission and how the computer was used to accomplish them. Importantly, we will detail the procedures used to land on the moon, and the computer alarms that faced the crew of Apollo 11.

2:30 - 3:30

PDP-1 Demo at the CHM

3:30 - 5:00

Cadetwriter

Developed as a by-product of the IBM 1620 Jr. project, the Cadetwriter is a general-purpose ASCII teleprinter. It can be connected via RS-232 (TTL level) or USB to any mini, micro, mainframe, or replica computer as a terminal device. All of the plans, schematics, software, and documentation are being made freely available to the community so that anyone can build their own Cadetwriter for nominal cost and little effort. This talk will describe the unit, the challenges in designing it, how to build one, and how to configure & customize it.

5:00

Awards Presentation

5:30

Show closes

Exhibitors, continued...

from Don Lancaster's Cheap Video Cookbook for video output.

06 The Apple Lisa Documentary

David Greelish, Johns Creek, Georgia, with Tamara Greelish
David is exhibited about his Apple Lisa documentary which is in development and scheduled for release this fall.

07 ATARI 400/800 Computers 40th Anniversary

Kevin Lund, Livermore, California, with Bob Woolley, Robert Bridges, Garrett Hoffhaus, and Bill George
The SLCC (San Leandro Computer Club) proudly presents an exhibit of the original Atari 400 & 800 computers. They will have complete working systems with all the peripherals on display to see and use. Come play games like the first FPS game ever released: Star Raiders! They'll also have a kiosk used by Atari at C.E.S. booths running the 400/800 sales interactive program E.R.I.C. along with displays of all the original released Atari software.

08 RetroShield for Arduino Mega

Erturk Kocak, Sunnyvale, California
Erturk designed several Arduino shields to connect 8-bit microprocessors to the Arduino Mega microcontroller system. Mega emulates ROM, RAM, and I/O devices so the real 8-bit microprocessor executes code. Examples include 6502, 280, and 6809 boards running Apple I, Simon6809, and 280 Eflex monitor code. More are under development.

09 Apple I and Apollo Guidance Computer

Jonathan Sielken, Boston, Massachusetts, with Bobby Livingston
These men work for RR Auctions. They'll preview upcoming auctions of super-rare artifacts.

10 The Wonderful World of Quake
Chris Satterfield, Fairfield, California, with Zachary Hardesty

Chris and Zachary remind you that Quake is a game we all know and love from the 1990s, but that it wasn't just for DOS and Windows! They will demonstrate a Quake multiplayer setup across the RS/6000 series, Sun Ultra, Daystar Genesis, and possibly an SGI machine.

11 Microprocessor/Controller Trainers: Past and Present

Francis Bauer, Santa Rosa, California
Francis is a fan of single-board computers. They were common in the second half of the 1970s to teach people how to program and how to use microprocessors/microcontrollers for prototyping new designs. His exhibit will also include some relay-based trainers, so you can hear them run!

12 Living Computers: Museum+Labs

Josh Dersch, Seattle, Washington, with Casey Lunden
LCML's latest exhibit is a Xerox 8010 Information System, better known as the Star workstation, alongside a microcode-level Star emulator developed which they named Darkstar. You can experience GUI history and early desktop metaphors with Viewpoint and Star OS, do some hacking in Mesa on XDE, or delve into AI on Interlist-D.

13 Early Handwriting: Apple Newton vs. Palm Treo

Thomas Conrad, Morgan Hill, California
Thomas knows PDA-writing: do you? Newton and Treo were both landmark device series in the history of mobile computing. But how well do they recognize your handwriting? The answers may surprise you.

14 Apple II Rev. D vs. Rev. 7 Replica

Logan Greer, Fresno, California
Logan built a replica Apple II based on Mike Wilegals CAD files for the motherboards.

The new boards will become part of kits to be available for sale online.

15 The Future of Retro Computing

Jay Cotton, Livermore, California
Jay's exhibit will feature a Z-80 machine -- the PC2014 -- running CP/M and BASIC along with some games.

16 Rare Computers From Japan

Duncan Mac Dougal, Santa Clara, California, with Alex Oraylo, Mitch Zollinger, and Thomas Daede
Duncan and company are fans of Japanese systems that never reached Western shores. These include an X58000, several PC-98 systems, an MSX2+, PC-88, and FM-TOWNS.

17 RISCy Business

Cameron Kaiser, Rialto, California
Cameron won't drive a Porsche into a lake, but he will show RISC-powered UNIX portables. Examples are the Sun Ultra-3 running Solaris (SPARC), Tadpole SPARCBook running Solaris (SPARC), RDI PrecisionBook running HP/UX (PA-RISC), SAIC Galaxy 1100 running NeXTSTEP (PA-RISC), and IBM ThinkPad 860 running AIX (PowerPC). A couple of surprise non-UNIX oddballs from the SH and m68k families will also make an appearance.

18 BSD: Then and Now

Madeline Autumn-Rose, Milpitas, California
Madeline digs BSD. She'll teach us about this unique operating system, from a running instance of 4.3 BSD in simulation to modern NetBSD on a vintage VAX.

19 6502-Based Microcomputers

David Henderson, Tempe, Arizona
David knows 6502, so he will demonstrate the SYM-1 and KIM-1 single board computers, Ohio Scientific Challenger 1P, Commodore 128, Atari 130XL, BBC Master 128, and a 65816-based Apple IIGS Woz Edition.

20 IBM 1620 Jr. / Recreating the Console Typewriter

Dave Babcock, Mountain View, California, with Steve Casner and Joe Fredrick
A team representing Computer History Museum volunteers will show off their IBM 1620 Jr. project. The goal is to produce an operational version of the IBM 1620 Model 1 Level F computer that recreates, as much as possible, the experience -- physically, visually, and viscerally -- of operating a real one.

21 Cadetwriter - a Wheelwriter-based Computer Terminal

Dave Babcock, Mountain View, California, with Steve Casner and Joe Fredrick
Cadetwriter: A Wheelwriter-Based Computer Terminal -- But wait, there's more! Beside their 1620 Jr. project itself, the CHM team will also demo Cadetwriter, which is a general-purpose ASCII terminal. It can be connected via RS-232 (TTL-level) or USB to any mini, micro, mainframe, or replica computer. It's a reliable, low-maintenance, low-cost substitute for Teletype, DECwriter, Diablo, Spinwriter, ImageWriter, and other teleprinters. Bring your favorite computer and try it out!

22 Tandy/TRS-80 Color Computers

Michael Furman, San Jose, California, with Tim Lindner, Rob Irman, and Mark D. Overholser
This crew teaches us about CoCo, the popular home computer introduced in 1980 and sold by Radio Shack until 1991. Over the past few years the community of people keeping the CoCo alive has been vibrant and growing. They demonstrate many of the ongoing projects and innovations in hardware upgrades, game/OS software, and PC/FPGA emulation.

23 The Cactus: More 6502 Blinkenlights

Alexander Pierson, Falls Church, Virginia
Alex and his Cactus are back to show

(Continued...)

Exhibitors, continued...

the latest updates to the awesome 6502 front-panel computer, which won a Best of VCF East show a few years ago. Explore the improved front panel logic, now with a perfected single-step mode and software controlled switches.

24 MOnSter 6502

Eric Schlaepfer, Sunnyvale, California
The MOnSter6502 team will show the latest version of their transistorized 6502. This year it runs inside a picture frame and displays visualizations including a clock mode.

25 The History of Videogames

The MADE, Oakland, California
Staff from the Museum of Art and Digital Entertainment will bring out their favorite historic videogames. Grab a controller and go with the flow!

26 Building the First Computer

Brian Parker, Redwood City, California
Brian through outside the box and went Babbage! He will show us the design and fabrication of Charles Babbage's Analytical Engine, 1833-1840. This half-scale model in aluminum and steel will eventually be the size of an executive desk and run code off punch cards.

27 Solid-State Monopoly Game

Stephen Casner, Sunnyvale, California
Stephen is again featuring his homebrewed solid-state Monopoly game, operated with what used to be handheld calculators. It's all written in assembly language and occupies less than 16KB of ROM and 8KB of RAM.

28 The Modern Apple II

Les Barrows, Mountain View, California, with Eiko Okura
Les modified his Apple II with all sorts of new peripherals. It has Ian Kim's A2280Plus board (Z80), Michael

Packard's continuing Apple II game software, Thomas Cherryhome's alpha version of the IRATA.ONLINE PLATO client, and a MIST FPGA Apple IIe core.

29 The IBM PC Family

Jarrod Coombes, Dublin, California, with Anthony Hoppe
Jarrod is bringing a thorough exhibit of the IBM personal computer family. His collection of 51xx-series machines includes the original PC, XT, XT/286, and AT. He will also have the PC's cousins on display, including the Portable, Convertible, and PCjr.

30 MakerLisp Machine

Luther Johnson, Chandler, Arizona
Luther's built a homemade Lisp computer out of modern components. It is very small but very powerful! It's also got a laser-cut wood enclosure for a keyboard, LCD monitor, and a prototyping area with a breadboard.

31 Vintage Video

Michael Hill, Daly City, California
Michael will present an exploration of modern media playback on vintage computer hardware such as Commodore 64, Commodore PET, and Apple II.

32 Zilog Inside

Alex Nascimento, Mountain View, California
Alex will present an exhibit of some of the most successful 'Zilog inside' machines in Japan and Europe. He will also be exhibiting some rare machines and some recent machine re-launches.

33 SDF Public Access UNIX System presents: UNIX @ 50

Stephen M. Jones, Seattle, Washington and Peter Hall
Stephen and Peter feature simulations of Hysterical UNIXes from 1969 - 1992 presented on an AT&T 605 Travelling UNIX Terminal. Visitors are encouraged to best Karl Koscher's winning B code by writing their own 'clever' B program

See README.TXT for more information.
Formatted hard disk image "HOB04.DSK" CP/M Infosec Adventures' in platter 0 of u
nit 11
(Running hard disk boot ROM)

ROM, 2.00
LOADING FROM 0

SEE CP/M 2.2b ver 1.3
For HITS 80-H03E

Start1

ZORK II The Great Underground Empire
Copyright (C) 1981, 1982, 1983 Infocom, Inc. All rights
reserved.

ZORK is a registered trademark of Infocom, Inc.
Revision 02 / Serial number 948728

Start of House

You are standing in an open field east of a white house, with
a boarded front door.
There is a small mailbox here.



Exhibit 03
Re-creating Vintage Computers

Challenging existing modern powered vintage computers. It's an impossible why to learn and experience history. It's a great way to learn the hard way and those vintage computer records built by an Altair 8800 using the original IBM, and they powered hardware. And the world is still.





Intel Inside Processor Family 80386 compatible
with 100 MHz and 133 MHz

Intel Inside Processor Family 80386 compatible
with 100 MHz and 133 MHz

Intel Inside Processor Family 80386 compatible
with 100 MHz and 133 MHz

Intel Inside Processor Family 80386 compatible
with 100 MHz and 133 MHz

Z80 S-Bit

Intel Inside Processor Family 80386 compatible
with 100 MHz and 133 MHz

Intel Inside Processor Family 80386 compatible
with 100 MHz and 133 MHz



Video Display Processor: Texas Instruments, TMS 9900/TMS 9901/TMS 9902
 Video RAM: 16KB
 Processor: 2.5 MHz (2.5 MHz VLSI chip)
 Special instructions for 8080 Programmable Read-Only Memory, 8-bit data and 3-bit address.
 Connector for cassette recorder: Transfer speed: 1200 or 2400 baud or 1800 baud 8080 CPU format.
 Serial ASCII: computer user and together with a 8080 data interface

Nishi conceived the project as an attempt to create unified standards among various home computing system manufacturers of the period. MSX systems were popular in Japan and several other countries. It is difficult to determine how many MSX computers were sold worldwide. Despite Microsoft's involvement, few MSX-based machines were released in the United States. Before the Amstrad's success, MSX was the platform for which major Japanese game studios, such as Konami and Hudson, built professional video games, such as Metal Gear. For example,





significantly changed from its UK ancestor. Arguably one of the first Sinclair clones to significantly improve on the original design, it added several new features. However, they made the machine incompatible with most of all commercial titles. To remedy this, users built a cartridge with a Spectrum ROM for emulation. It was able to run most software produced for the Spectrum.

Type	Home computer
Release date	1983, 26 years ago
Introductory price	£99.99 (2015 value)
Discontinued	1983
Media	Cartridge tape and cartridge
Operating system	Sinclair BASIC
CPU	Z80A @ 2.75 MHz
Memory	48 KB RAM



LET TO SPEAK — SINCLAIR COMPUTERS LTD

Amstrad CPC (1984)

The Amstrad CPC (short for Colour Personal Computer) is a series of 8-bit home computers produced by Amstrad between 1984 and 1986. The series covered a total of six distinct models: the CPC464, CPC664, and CPC6128 were highly successful competitors in the European home computer market. The later plus models, 464plus and 6128plus, which do not exist in the UK, were also highly successful, as was the attempt to repackage the plus hardware into a game console as the CPC300.

The CPC series was joined together other home computers primarily used to play video games and received a strong reputation of game software. The comprehensive line also has a complete computer system with dedicated monitor, its high

WOMENLYNTEP BUREAU
„OPEN 5K-10“
INSTRUKCJA
PYSIOWYCH BIAŁYCH
SI. 1984-1985

AMSTRAD

CPC 464



... enclosure featuring a spring-loaded cassette
joystick ports, and a built-in cassette rewriter dubbed
the "Dataorder".
Amstrad also took a very different line in marketing
the Spectrum +2. Unlike Sinclair, Amstrad did not
attempt to market the Spectrum as anything other
than a games machine and sold it in packages such as
the "James Bond 007 Action Pack" (with bundled
games and a light gun). This approach was extremely
successful, and the Spectrum +2 sold very well.

3.50 MHz Zilog Z80A CPU
128K RAM
256 x 192 pixel resolution
8 colors
Sound with 2-channel, 7-bit DAC, mono speaker



ZX Spectrum +2 (128K)

The ZX Spectrum +2 is a home computer that was first introduced in 1982. It was designed by Sinclair Research and is based on the Z80 microprocessor. It features 128KB of RAM and a resolution of 256x192 pixels. The Spectrum +2 was designed to be a more powerful and versatile machine than the original Spectrum. It includes a built-in cassette rewriter and a joystick port. The Spectrum +2 was marketed as a games machine and was sold in packages such as the "James Bond 007 Action Pack". This approach was successful and the Spectrum +2 sold very well.

ZX Spectrum +3 (1987)

The ZX Spectrum +3 looked like the +2 but featured a built-in 3-inch floppy disk drive instead of the tape drive and was in a black case. It was launched in 1987, initially retailed for £249 and then later £199 and was the only Spectrum capable of running the CP/M operating system without additional hardware. The +3 saw the addition of two more 16 KB ROMs, now physically implemented as two 32 KB chips. One was home to the second part of the reorganised 128 KB ROM and the other housed the +3's disk operating system. This was a modified version of Amstrad's AMDOCS, called +3DOS. To facilitate the new ROMs and CP/M, the bank switching was further improved, allowing the ROM to be paged out for another 24 KB of RAM. Almost all +3 machines have a sound lock, due to a component being left off the board, which means the sound is disabled and silent.



Amstrad

128K

ZX Spectrum +3



128K

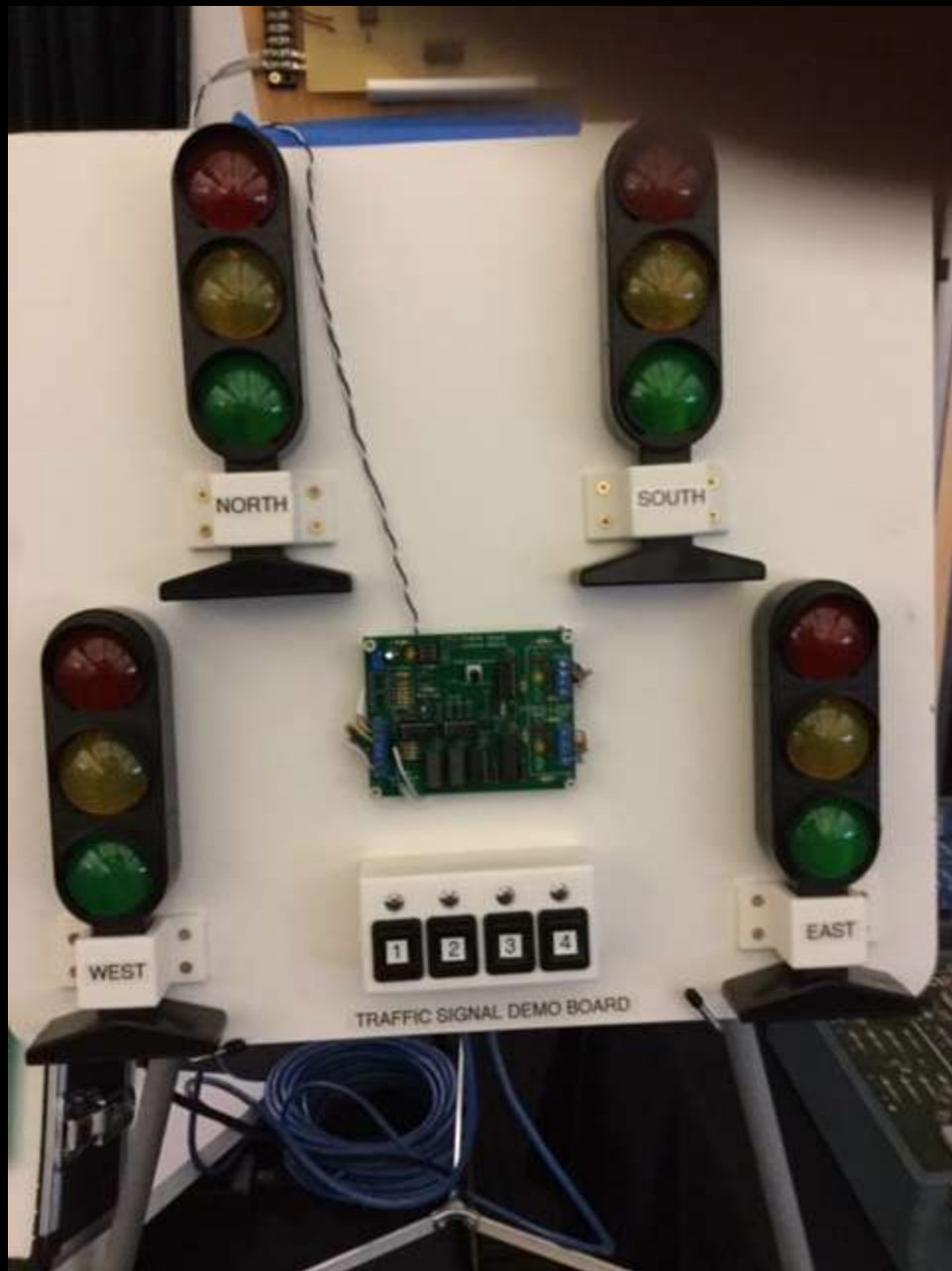


FLOPPY DISC DRIVE







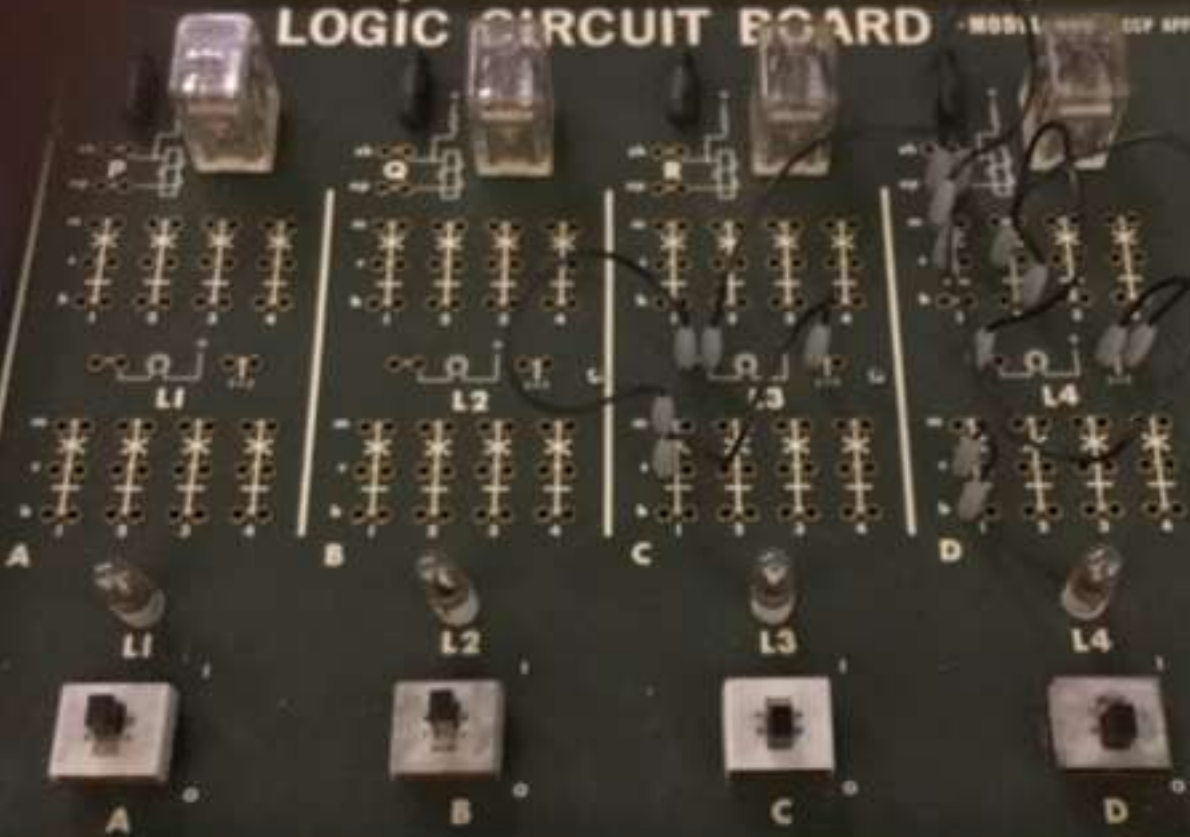


LOGIC CIRCUIT BOARD

MODEL 10000 DCP APPROVED

AMF

ANALOGY MACHINE
& PULSORY COMPANY
RESEARCH DIVISION



ON
OFF

LOGIC CIRCUIT BOARD - MODEL 1000 CCP APPROVED

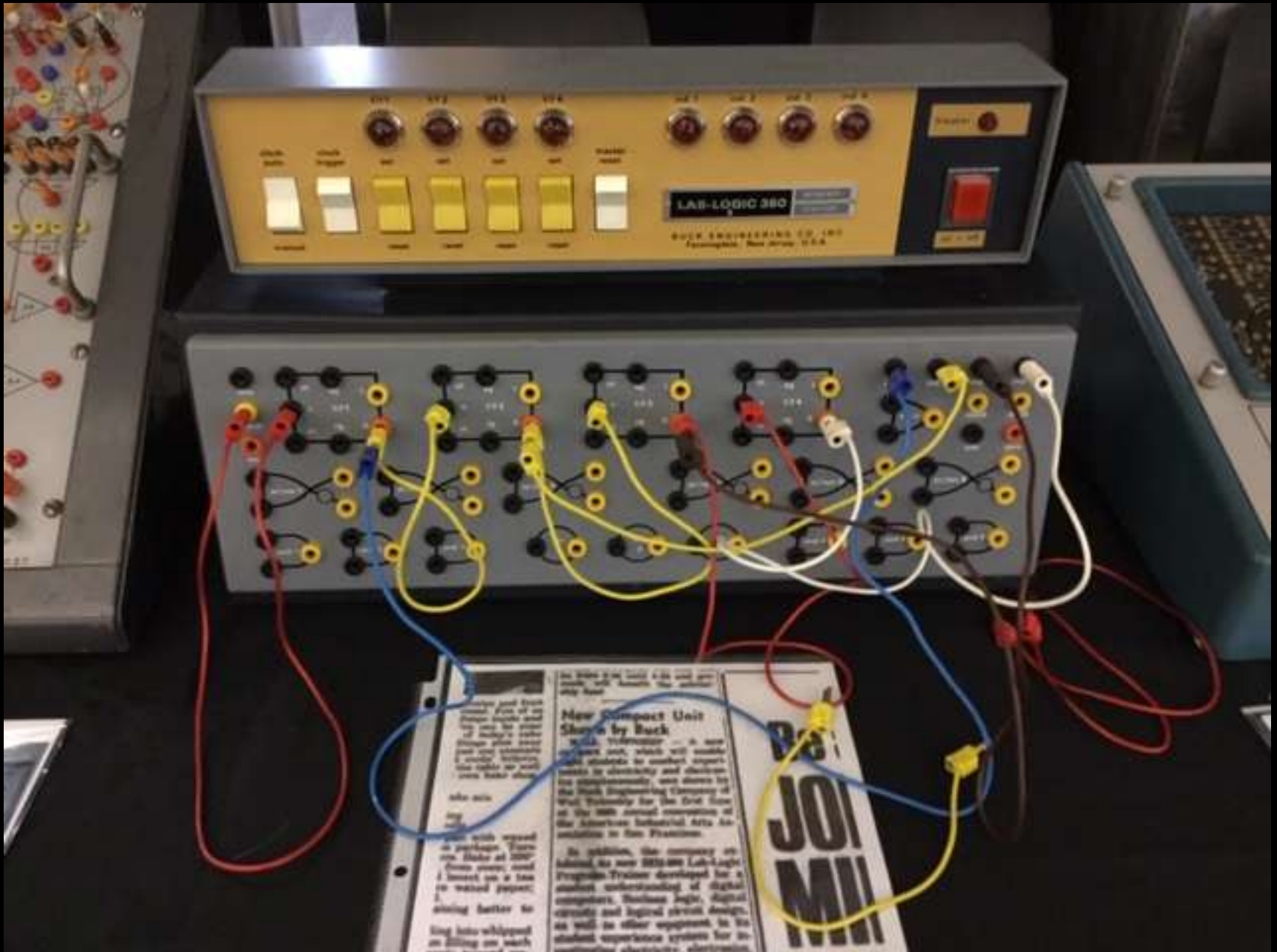
AMF
AMERICAN MACHINE
& FOUNDRY COMPANY
COLUMBIA, MISSOURI





INCREASE YOUR





LAB-LOGIC 380

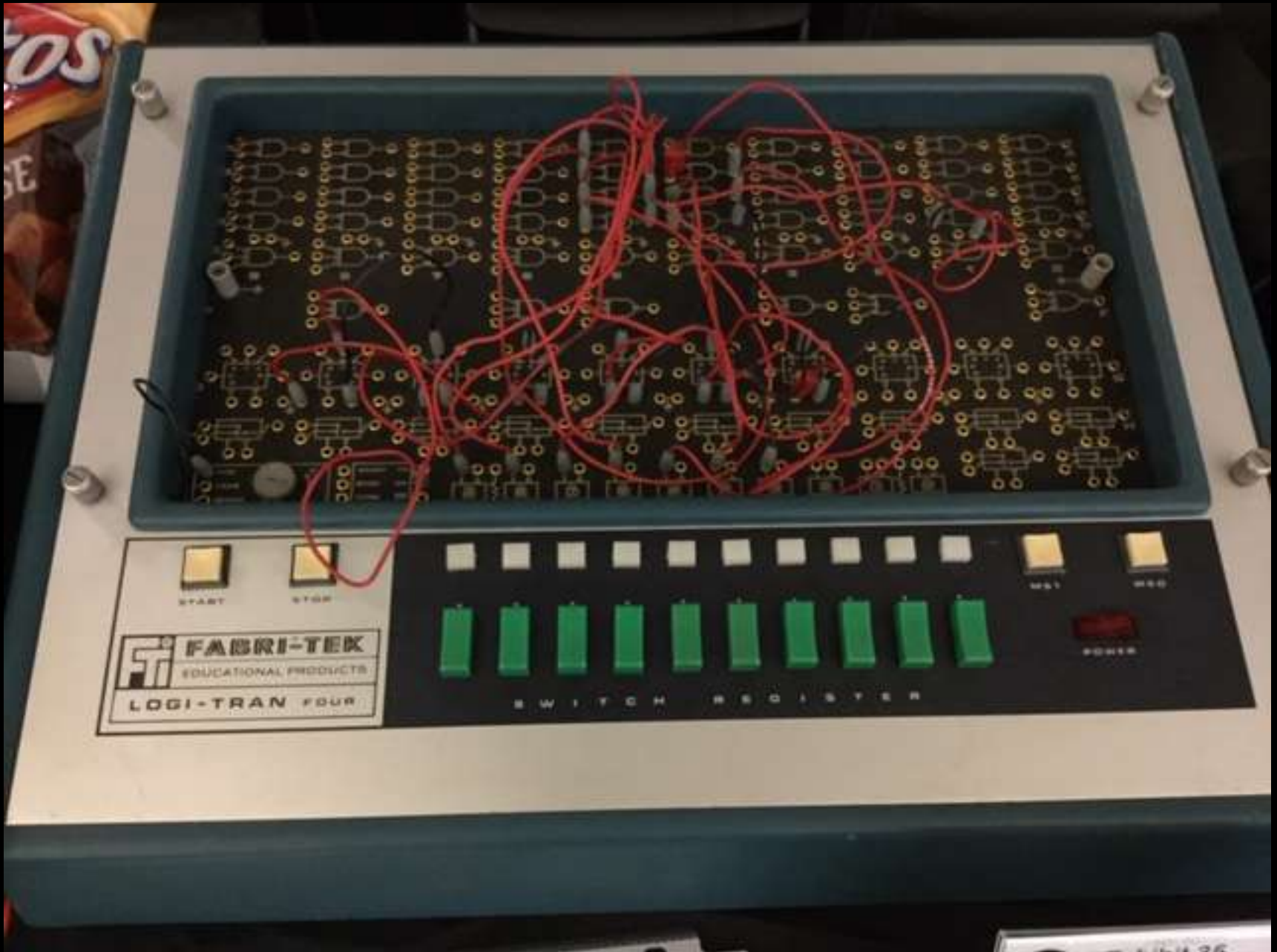
BUCK ENGINEERING CO. INC.
Fremont, New Jersey, U.S.A.

New Compact Unit Shows by Buck

Which Trainer? — A new compact unit, which will enable students to conduct experiments in electricity and electronics simultaneously, was shown by the Buck Engineering Company of New Jersey for the first time at the 1968 annual convention of the American Industrial Arts Association in San Francisco.

In addition, the company announced its new 380-000 Lab-Logic Program Trainer developed for a student understanding of digital computers, Boolean logic, digital circuits and logical circuit design, as well as other equipment in its student experience system for introducing electronics education.

JOI MI



FABRI-TEK
EDUCATIONAL PRODUCTS
LOGI-TRAN FOUR

START

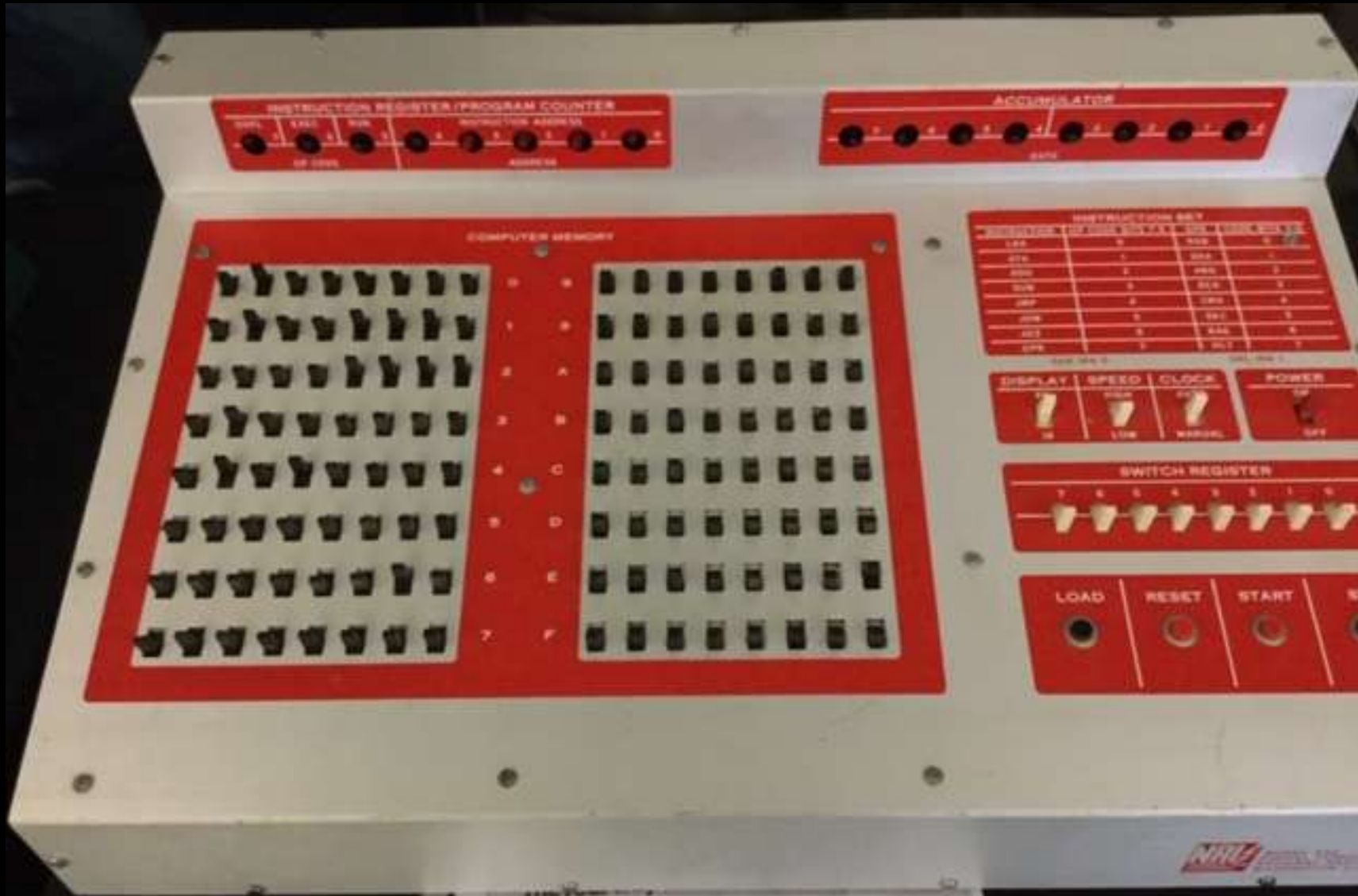
STOP

SWITCH REGISTER

MS1

MS2

POWER



NRI is the only school
to train you at home on a
real digital computer.



 5036A MICROPROCESSOR LAB
HEWLETT-PACKARD





apple Newton

Handwriting
recognition
was it as bad as
reported?

Judge for yourself
Give it a try!

Computer Festival
2019



org

Seattle, WA
Rome, Italy
Wall, NJ
Silicon Valley

er

IMSAT 8080



A row of 20 toggle switches, each with a red top and a blue bottom. The switches are arranged in three groups: the first group has 8 switches, the second has 8 switches, and the third has 4 switches. These switches are used to manually set the data bus and control signals.

f Retro



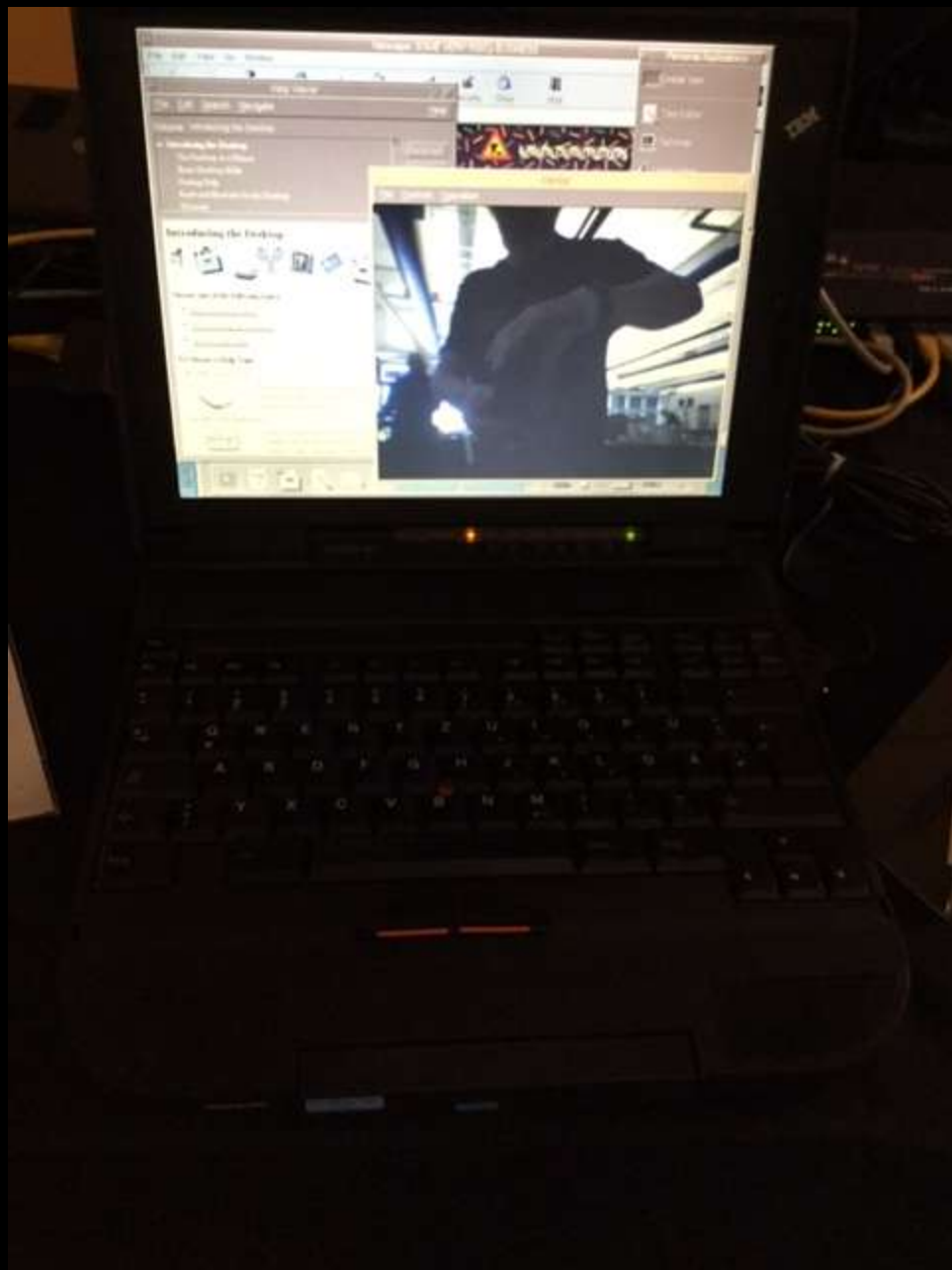
Original RC2014 Z80 System

- Backplane
 - Vector board with socket strip
- Boards
 - Clock and Reset Board
 - ROM Memory Board
 - RAM Memory Board
 - Z80 Processor Board
 - 6850 Serial Board
- Software
 - 8K Basic in ROM
- PC used for keyboard/display
 - USB to TTL (FTDI) connection

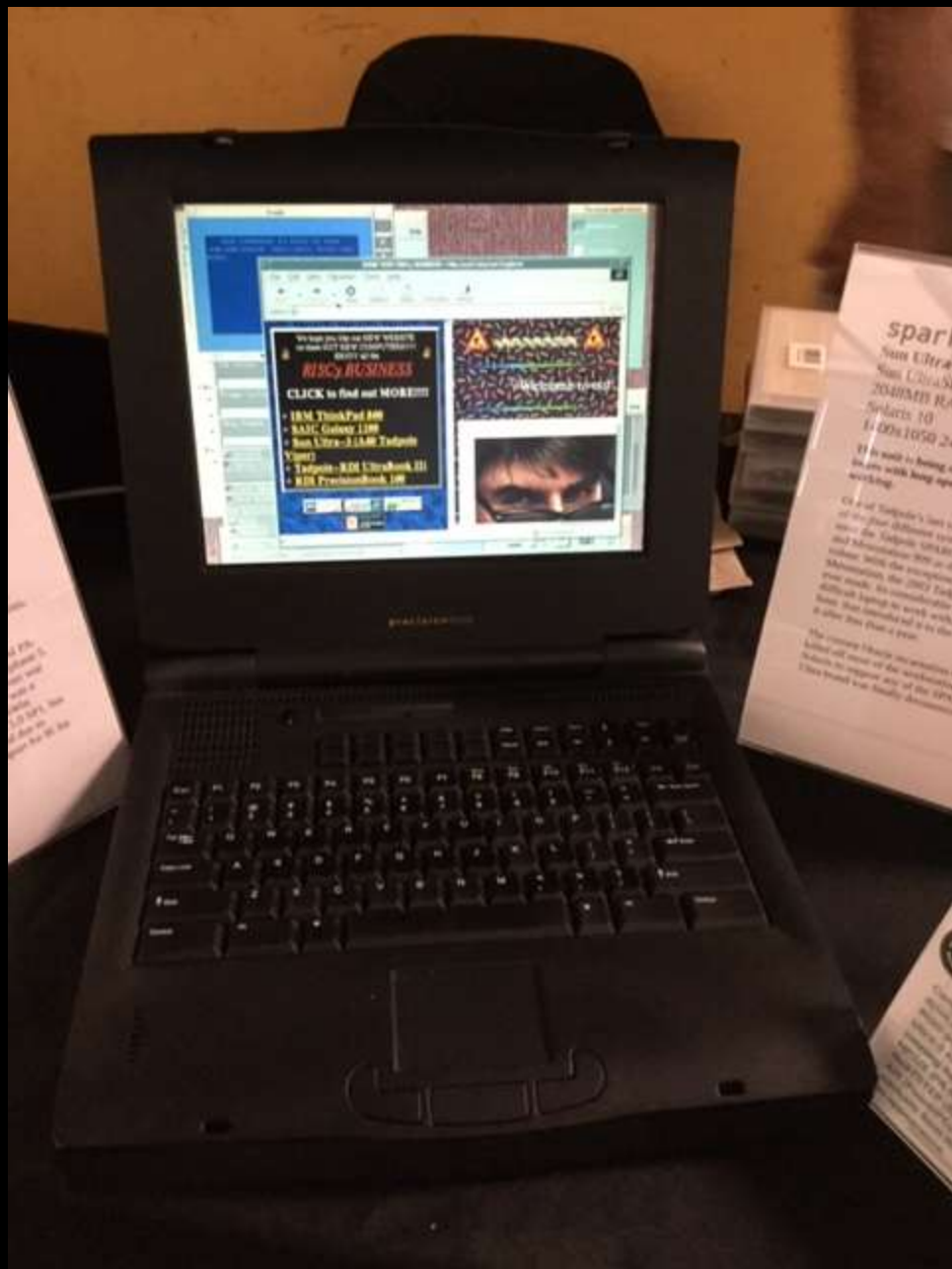


Z180 Single Board Computer (SBC) System

- Z180 Processor @ 18MHz
 - 1MB Linear Address Space
- Functions
 - 512K FLASH ROM
 - 512K RAM
 - Dual Serial Interfaces
 - IDE Interface
- +5V Input, Reset & On/Off Switch
- IDE to Compact Flash Adapter
- Software
 - 8K Basic in ROM
 - CP/M
- RC2014 Compatible Sockets
 - Additional I/O Cards





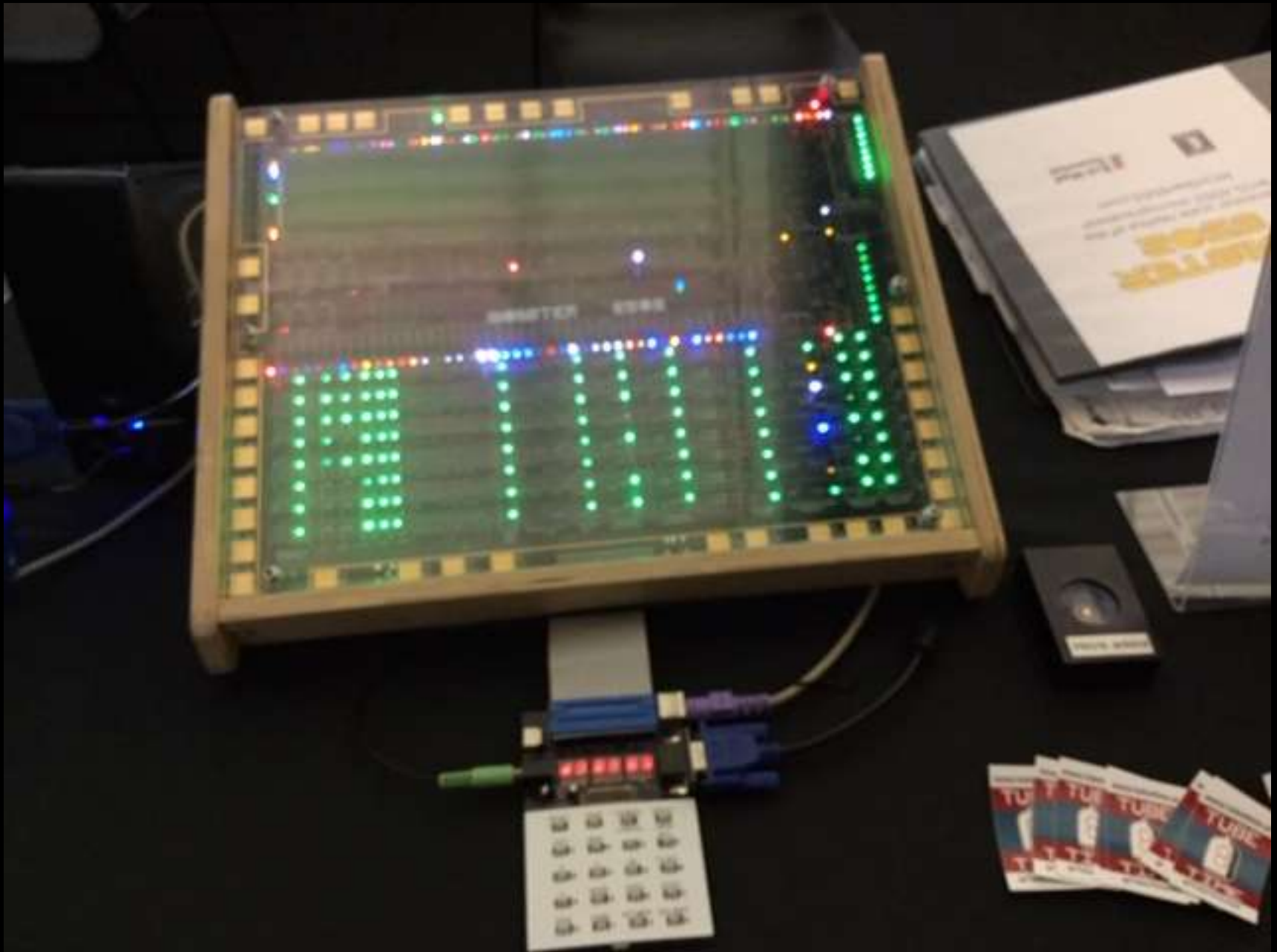


spark
Sun Ultra-3
2007
Selects 10
\$1,000,000 24

It is worth being a
leader with long-term
working.

IBM's 2007 ThinkPad
award is the highest honor
and recognition IBM can
award. Since the program
began in 1992, the award
has been a difficult task to
complete. It is a difficult
task to complete with
a prize that is not a
prize.

The award is a recognition
of the highest quality of
IBM's products and
services. It is a recognition
of the highest quality of
IBM's products and
services.



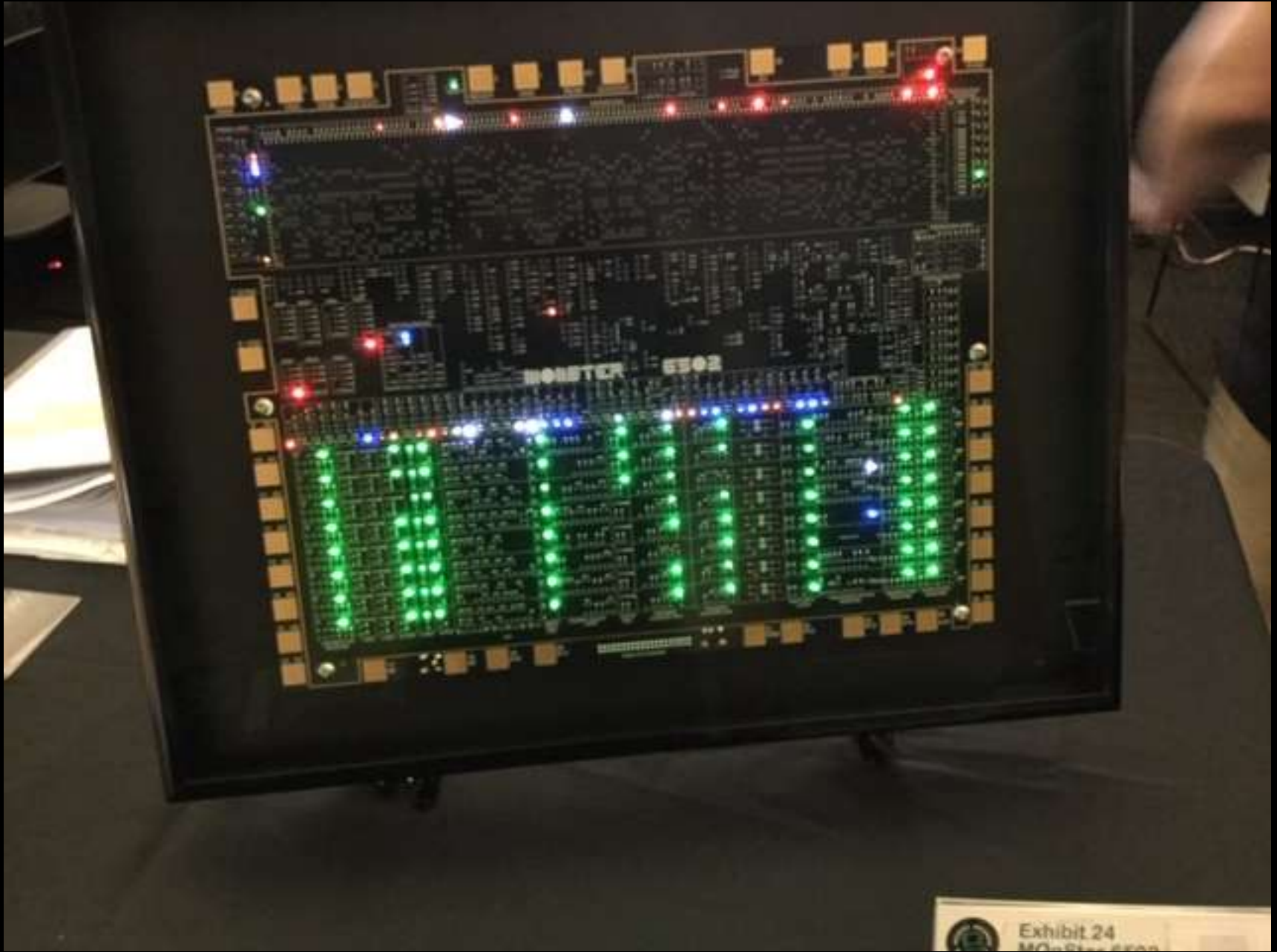
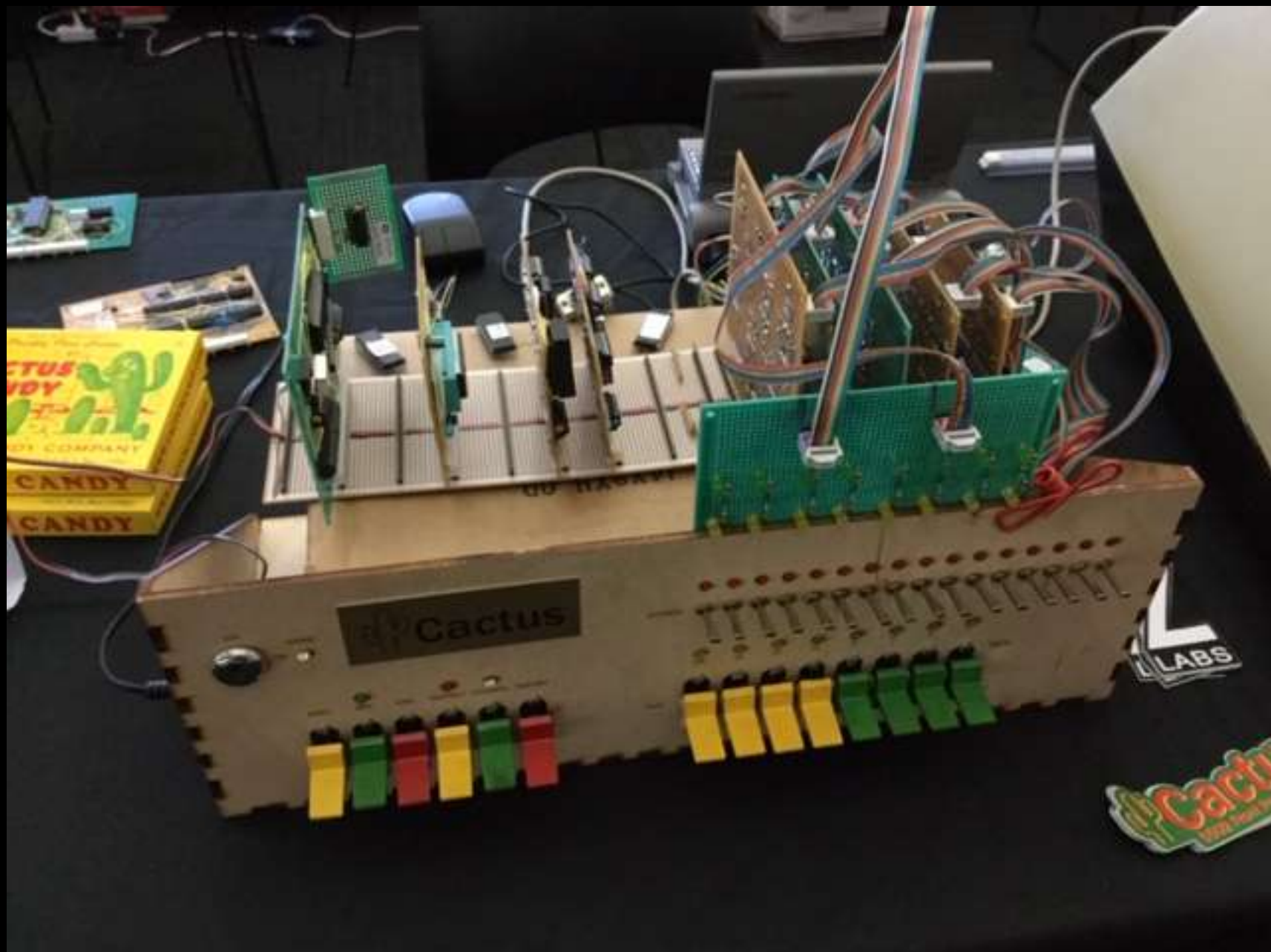


Exhibit 24
MONSTER 5302

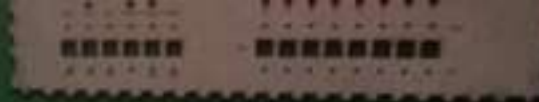


Cactus 6502 Front Panel System

What's the price of an idea?

Specifications

Front Panel Switches



The Cactus 6502 Front Panel System is a complete, ready-to-use system for the 6502 microprocessor. It includes a front panel with 16 switches, a 6502 microprocessor, and a power supply. The system is designed for ease of use and is suitable for educational and hobbyist applications.



RAM

EPROM

SERIAL

ADDRESS CONTROLS

CPU

DATA CONTROLS

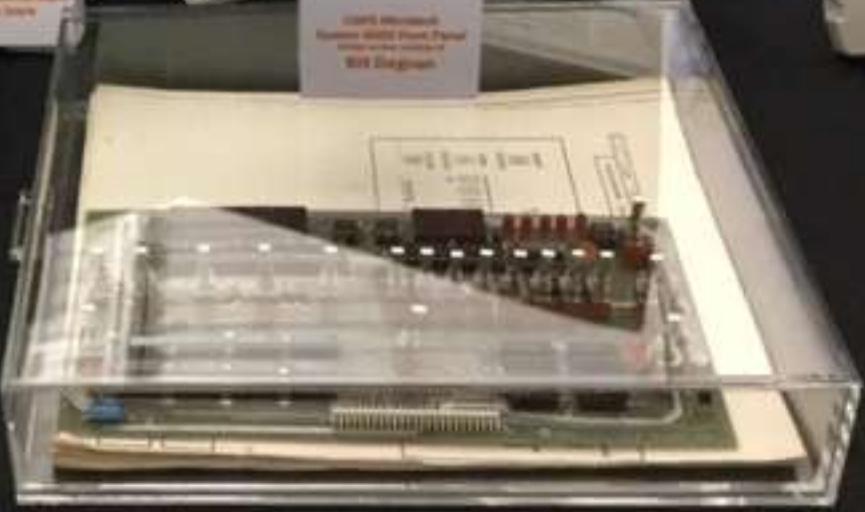
6502-23
The Cactus 6502
6502 Microprocessor
Kit



6502-23
The Cactus 6502
6502 Microprocessor
Kit



6502-23
The Cactus 6502
6502 Microprocessor
Kit





WORM - Write Once, Read Many Times

WORM stands for Write Once, Read Many Times. It is a type of storage technology that allows you to write data to a disk only once, but then read it many times. This is useful for applications where you need to store data that is not likely to change, such as archival data or backup data.

WORM disks are available in a variety of formats, including 5.25-inch and 3.5-inch floppy disks, and hard disk drives. They are also available in a variety of capacities, from a few megabytes to several gigabytes.

WORM disks are a good choice for applications that require high reliability and long-term storage. They are also a good choice for applications that require a high level of security, as they are not susceptible to the same types of attacks as other types of storage technology.



Magneto-Optical
Magneto-Optical discs are a combination of magnetic and optical technologies. They are used for data storage and backup.

CD-R
Compact Disc Recordable
Used for audio and data storage.

Digital Audio Production
A format that combines analog and digital audio tracks on the same disc.

Standard CD
Standard CD audio disc format for all music players.

Photo CD
Photo CD provides digital copies of developed photographic film. It allows the user to store up to 100 images on one disc.









HAVE YOU SEEN
THIS DISK?
"SWAN 130"
I only have the
case, no disk!
No info online.



SWAN 130
130MB
1984



Zip Disk
1984
The most popular of the "supertoppy" formats. A "click of death" affected the drives in the late 90s, leading to drives destroying themselves.
100mb, 250mb, 750mb

Mini / PocketZip
1996
Designed for laptops, cameras, and mp3 players, the...

WFF
1998





5.25-inch Floppy Disk
Standard
1980s
1980s

A 5.25-inch floppy disk, also known as a 5.25-inch floppy disk, is a type of magnetic storage medium. It consists of a thin, flexible disk of magnetic material, usually plastic, with a diameter of 5.25 inches (133 mm) and a thickness of 1.6 mm. The disk is housed in a protective sleeve made of paper or plastic. The disk is divided into tracks and sectors, and data is stored on the surface of the disk. The 5.25-inch floppy disk was widely used in the 1980s and 1990s for storing and transferring data between computers.

3.5-inch Floppy Disk
Standard
1980s
1980s

A 3.5-inch floppy disk is a type of magnetic storage medium. It consists of a thin, flexible disk of magnetic material, usually plastic, with a diameter of 3.5 inches (89 mm) and a thickness of 1.6 mm. The disk is housed in a protective sleeve made of paper or plastic. The disk is divided into tracks and sectors, and data is stored on the surface of the disk. The 3.5-inch floppy disk was widely used in the 1980s and 1990s for storing and transferring data between computers.

5.25-inch Floppy Disk
Standard
1980s
1980s

Compact & sturdy design, it was manufactured by the Micro Floppy Industry Committee.

1980s, 1980s, 1980s

5.25-inch Floppy Disk
Standard
1980s
1980s

A standard 5.25-inch floppy disk, also known as a 5.25-inch floppy disk, is a type of magnetic storage medium. It consists of a thin, flexible disk of magnetic material, usually plastic, with a diameter of 5.25 inches (133 mm) and a thickness of 1.6 mm. The disk is housed in a protective sleeve made of paper or plastic. The disk is divided into tracks and sectors, and data is stored on the surface of the disk. The 5.25-inch floppy disk was widely used in the 1980s and 1990s for storing and transferring data between computers.

5.25-inch Floppy Disk
Standard
1980s
1980s

A typical format, with a standard 5.25-inch floppy disk, is a type of magnetic storage medium. It consists of a thin, flexible disk of magnetic material, usually plastic, with a diameter of 5.25 inches (133 mm) and a thickness of 1.6 mm. The disk is housed in a protective sleeve made of paper or plastic. The disk is divided into tracks and sectors, and data is stored on the surface of the disk. The 5.25-inch floppy disk was widely used in the 1980s and 1990s for storing and transferring data between computers.





don't copy
that floppy!



presented by Software Publishers Institute

Don't Copy That Floppy
A prototype design for the Amiga 486 floppy disk, which differs from the one in use by having a different hole placement.

Don't Copy That Floppy
A prototype design for the Amiga 486 floppy disk, which differs from the one in use by having a different hole placement.

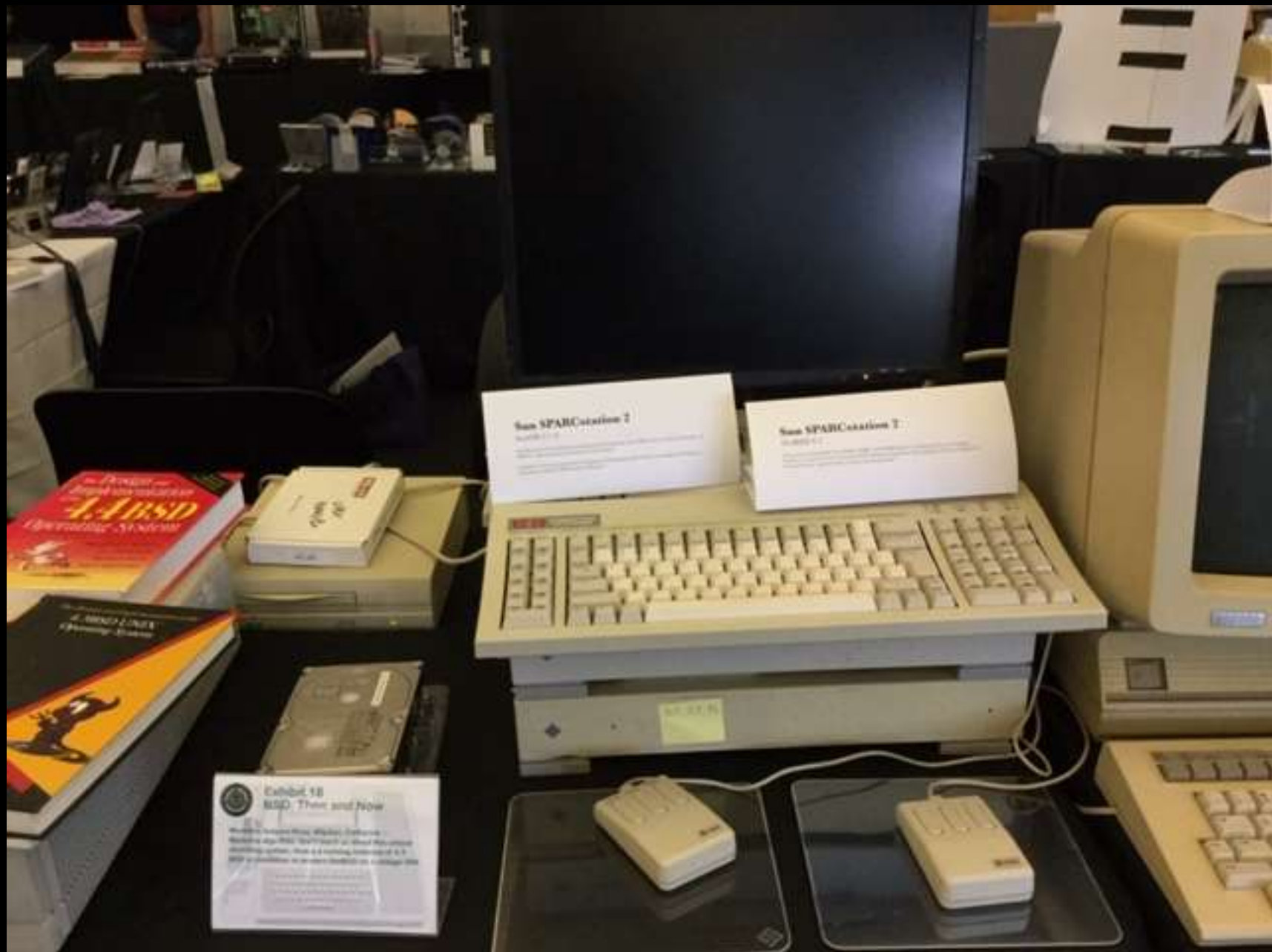
Don't Copy That Floppy
A prototype design for the Amiga 486 floppy disk, which differs from the one in use by having a different hole placement.

Don't Copy That Floppy
A prototype design for the Amiga 486 floppy disk, which differs from the one in use by having a different hole placement.

Don't Copy That Floppy
A prototype design for the Amiga 486 floppy disk, which differs from the one in use by having a different hole placement.

Real Don't Floppy





Sun SPARCstation 2
Sun SPARCstation 2
Sun SPARCstation 2

Sun SPARCstation 2
Sun SPARCstation 2
Sun SPARCstation 2

Exhibit 18
MS-DOS: Then and Now
Microsoft's operating system, MS-DOS, is the most widely used operating system. It is a family of operating systems that includes MS-DOS 1.0 through 6.22. MS-DOS is a single-user, single-tasking operating system. It is a family of operating systems that includes MS-DOS 1.0 through 6.22.



**VT 240 Standard Run
VT 240 Color Display**

VT 240 Standard Run
VT 240 Color Display

Sun SPARCstation 2

Sun SPARCstation 2

DECserver 300M

DECserver 300M

DEC SafeServer 150VXT

DEC SafeServer 150VXT



DECserver 303M
303M
303M

DEC AlphaStation 200 4/233
AlphaStation 200 4/233
AlphaStation 200 4/233

DEC InfolServer 130VXT
130VXT
130VXT







The Apple Lisa Story

Part 1 Development/Marketing/Cancellation



Apple
invents the
personal
computer
Again.

Part 2 Another Chance



Winter Specials



Part 3 Collectability & Significance



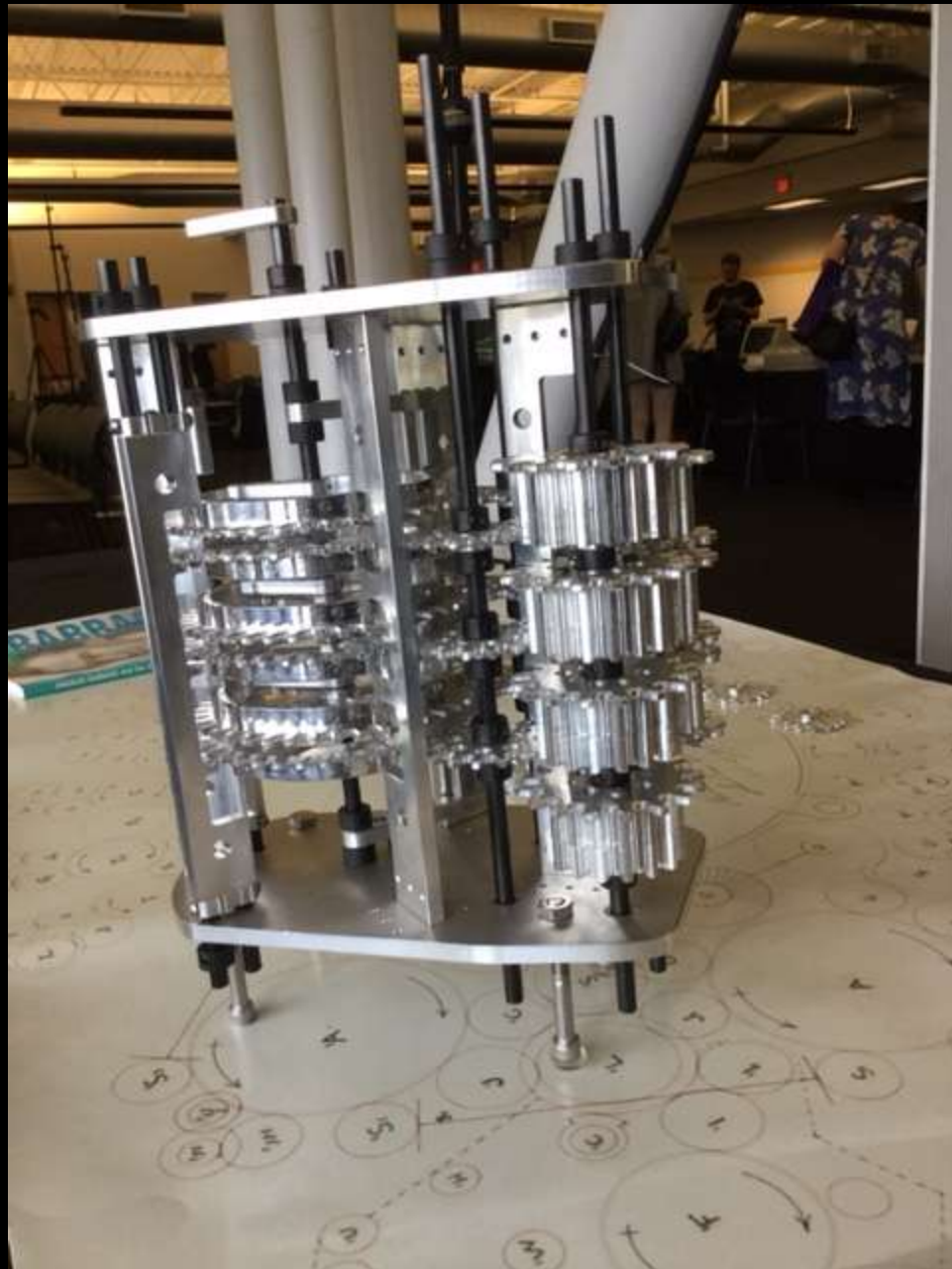
Support the Project!

Pre-buy the movie on
Indiegogo.com
Search for:
Before Macintosh: The Apple Lisa

I am out on an interview!

Please take a card
I hope to be back at the table at:
11 a.m.







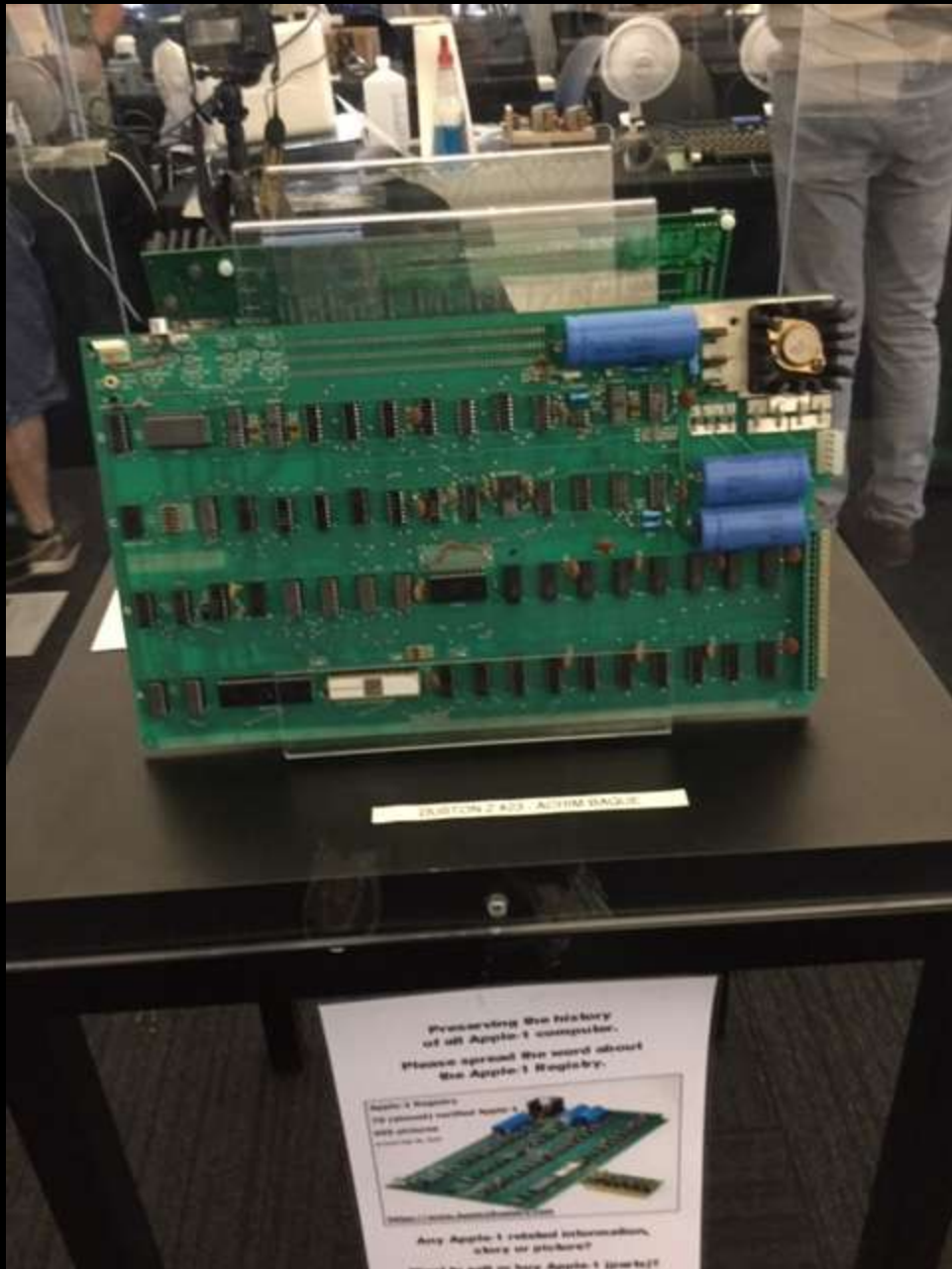
WELCOME TO THE GAME
PRESS ANY KEY TO START
PRESS ANY KEY TO STOP

PLEASE
TOUCH



**Preserving the history of all
Apple-1 computer.**





CAUTION: ACTIVE WAGES

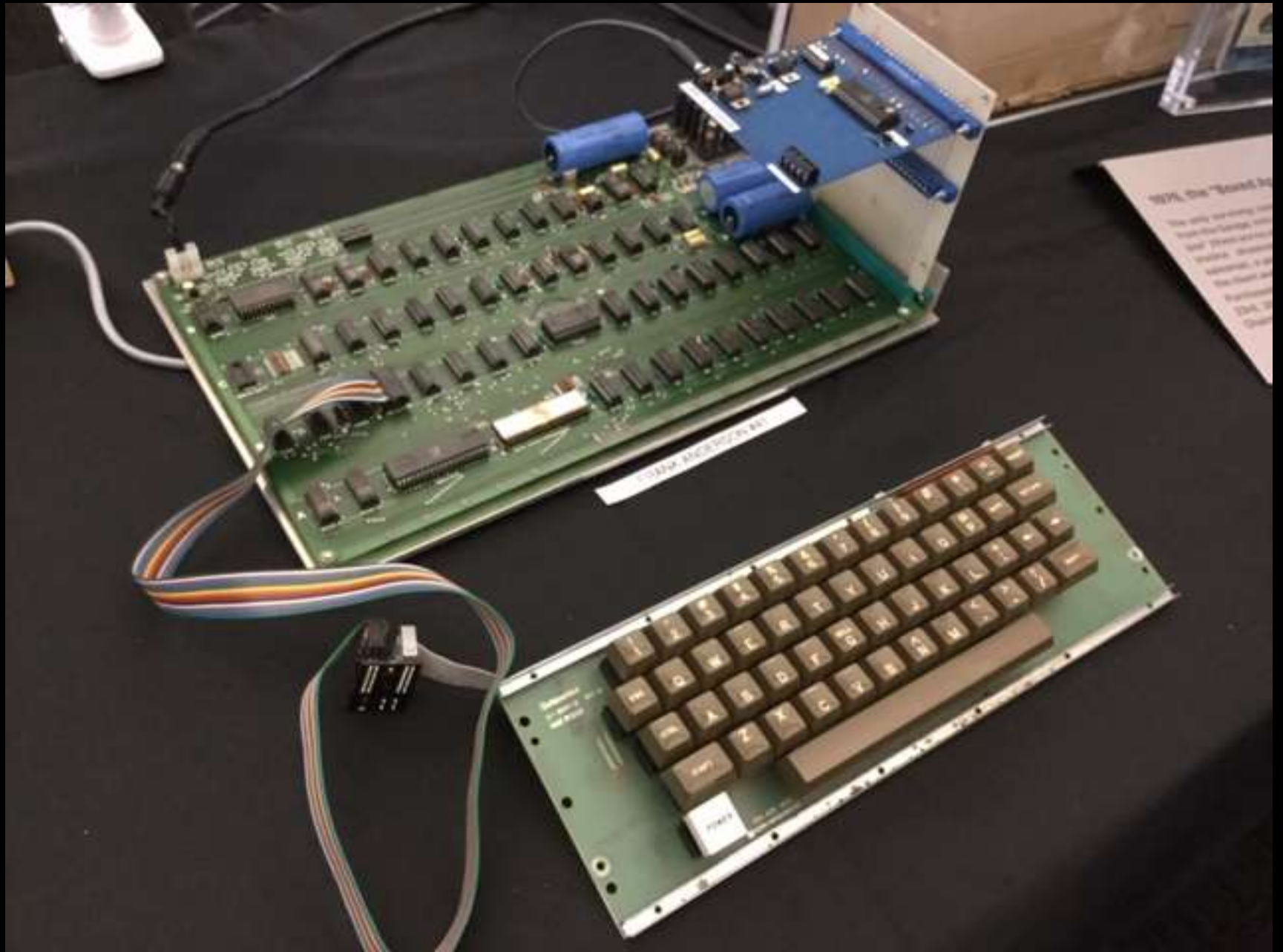
Preserving the history
of all Apple I computers.
Please spread the word about
the Apple I Registry.



Apple I Registry
100 (limited) original Apple I
1000 computers
www.apple1.com

Any Apple I related information,
chips or photos?
Please contact us at www.apple1.com









The contents
are for sale at
the fair
and the
computer
club is not
responsible
for the
contents.

SLCC
San Leandro Computer Club Since 1983

ATARI ATARI ATARI ATARI ATARI ATARI ATARI



**SAN LEANDRO
COMPUTER CLUB**
FOR **ATARI** MICROCOMPUTERS

Membership \$20
Public Domain Disks \$5



EMERGEN
EXIT
ONLY



The SBC 7000 released in 1970 was built by Texas Instruments for the SBC 7000 PC. It was replaced by the SBC 7000C, which was built in 1970. The SBC 7000C was built with 1024 8000 memory locations, but contained more than 9 8000 (2 2P). Over the last several SBC 7000C (20) produced SBC 7000C (20) produced with a lot of improvements as such as 8000 (including: new board processor), changed components, ASPs (Advanced Timing System), a new design and better quality.











HES

64 FORTH

By Tom Zimmer

CS01

© 1983 Human Engineered Software

HES

HesWare

64 FORTH

By Tom Zimmer

Instruction Manual



... for
... 64



People buy
Apple II computers
for a number
of reasons.

2002 Hello World in Assembly







Under Here: Power Supply

Under Here: Power Supply
Notice to the user for the PM532 provides 7.5, 15V and +/- 15V for the 180 coils and 1.231 display

Specifications

PM532 is a power supply unit designed for the 180 coils and 1.231 display. It provides the following output voltages:

- 7.5V
- 15V
- +/- 15V

The unit is designed to provide a maximum output current of 1.0A per output line. The input voltage is 115V AC, 60Hz.

Dimensions

PM532 is designed to fit into a standard 1U rack. The dimensions are 170mm (height) x 150mm (width) x 100mm (depth).

Weight

PM532 weighs approximately 0.5kg.

Warranty

PM532 is warranted for a period of 1 year from the date of purchase.

Manufacturer

PM532 is manufactured by [Manufacturer Name].



This monitor will be installed in the center of the board. It will enable the computer to give a player the statistics on a piece of property and will display Chance and Community Chest cards. It can employ a split screen effect to allow players on both sides of the board to be able to read the text easily.

.ylisae txet eht daer ot elba eb ot draob eht fo sedis htob no
sreyalp wolla ot tceffe neercs tilps a yolgme nac tI .sdrac
tsehC ytimmmoC dna ecnahC yalpsid lliw dna ytreporp fo eceip
a no scitsitats eht reyalp a ewig ot retupnoc eht elbane lliw
tI .draob eht fo retneC eht nI dellatsni eb lliw rotinow siht

This monitor shows the original demo script entered by the Princeton Computing Facility at the Harvard Computer Conference in 1970. It is running on the IBM 8080 as of 2014.





Exhibit 21
Cadetwriter: A
Based Comput

For more information, contact Commodore International, Inc., 530 N. Zeeb Road, East Amherst, NY 14205. Commodore is a registered trademark of Commodore International, Inc. © 1985 Commodore International, Inc. All rights reserved.



Comments, E-mail addresses, Mailing Lists
(Please print legibly)

Name	Email Address	Comments / Suggestions
Chris Coley	ccoley@zaphod.cup	✓ Connects it to our



1. Read the instructions on the front panel of the PDP-8/I.
2. Plug in the power cord and the Teletype.
3. Add the location of the Teletype, adding a short delay for the teletype and connecting it to the PDP-8/I in the working copy of the system. Check the status of the teletype.

PDP-8/I

Control panel with 48 yellow indicator lights arranged in a 4x12 grid and 24 toggle switches below.

STARTING THE PDP-8/I

1. Turn on the power to the PDP-8/I.
2. Turn on the Teletype terminal.
3. Turn on the PDP-8/I.
4. Turn on the PDP-8/I.
5. Turn on the PDP-8/I.
6. Turn on the PDP-8/I.
7. Turn on the PDP-8/I.
8. Turn on the PDP-8/I.
9. Turn on the PDP-8/I.
10. Turn on the PDP-8/I.
11. Turn on the PDP-8/I.
12. Turn on the PDP-8/I.

IBM
Workstation TCB1
BY LORRAINE

User's Guide

IBM

1620

DATA PROCESSING SYSTEM

INFORMATION AND DISPLAY UNIT



CONTROL UNIT



RECEIVER UNIT



OPERATION UNIT



MEMORY BUFFER UNIT



MEMORY ADDRESS UNIT



MEMORY ADDRESS REGISTER



PROGRAMMING THE IBM 1620



Open manual or technical document with text and diagrams.

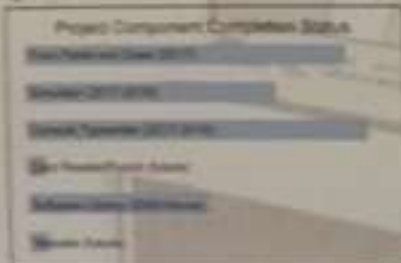


IBM 1620 Jr.

Phase II: Recreating the Console Typewriter

IBM 1620 Jr. Project

Goal: To recreate the experience (visual, auditory, tactile, visceral) of running historic software on a 1960s-era computer.



IBM 1620 Console Typewriter Evolution



Idea: Interface Wheelwriter to IBM 1620 Jr.

- *Empose circuit between keyboard and logic board
- *Gated to logic board's keyboard scan
- *Senses key presses to divert to IBM 1620 Jr.
- *Prints characters from IBM 1620 Jr. by sending virtual key presses to Wheelwriter logic board
- *Based on Teenty 3.5 microcontroller (includes USB serial port for communication with IBM 1620 Jr.)
- *Minimal modifications to Wheelwriter

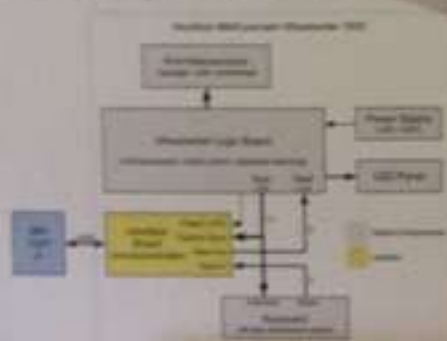
Reverse Engineering Wheelwriter Timing

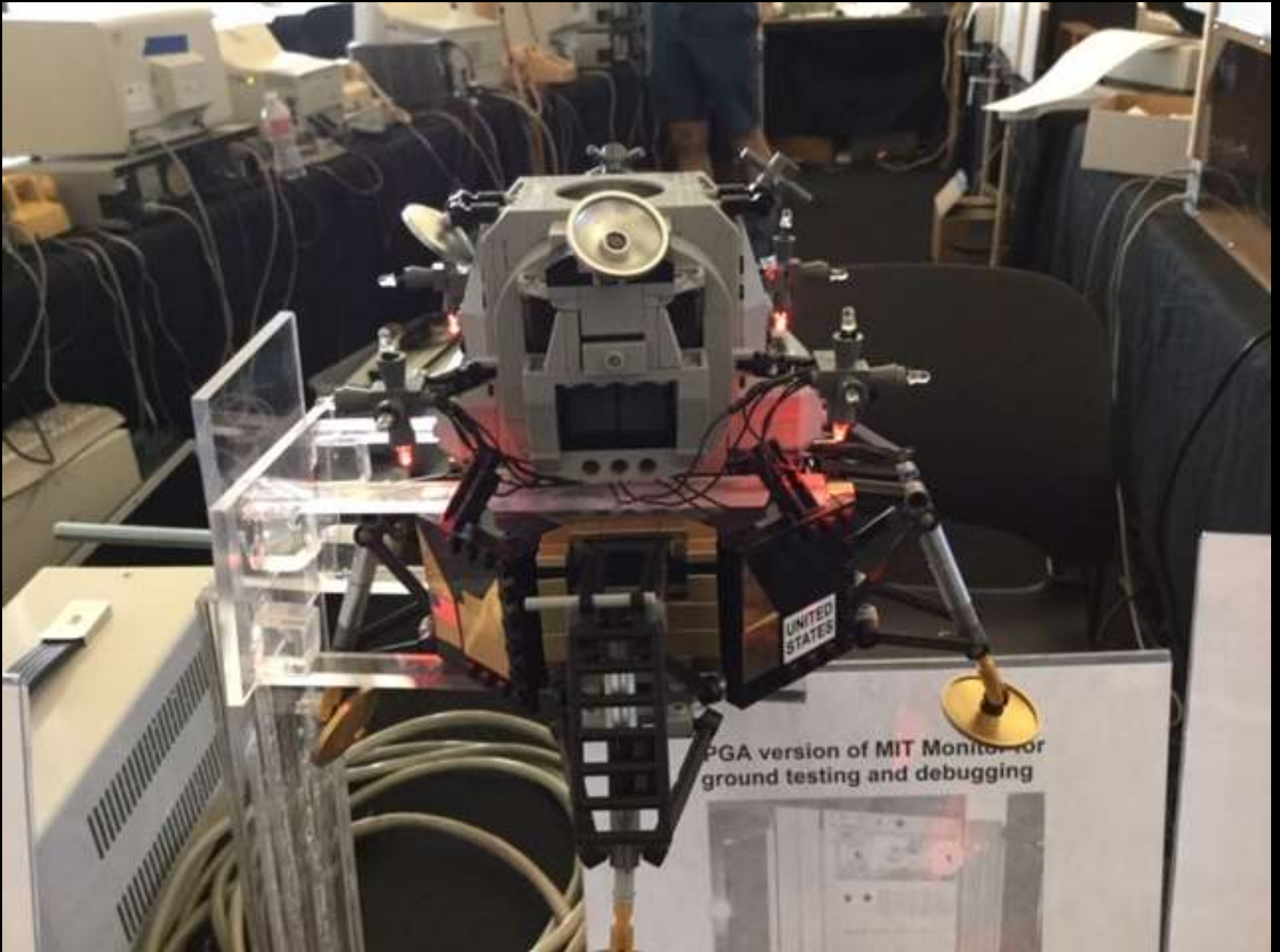
- *No internal documents available
- *Months of testing with breadboarded circuits, oscilloscope and logic analyzer
- *Result is simple electrically but timing is complex



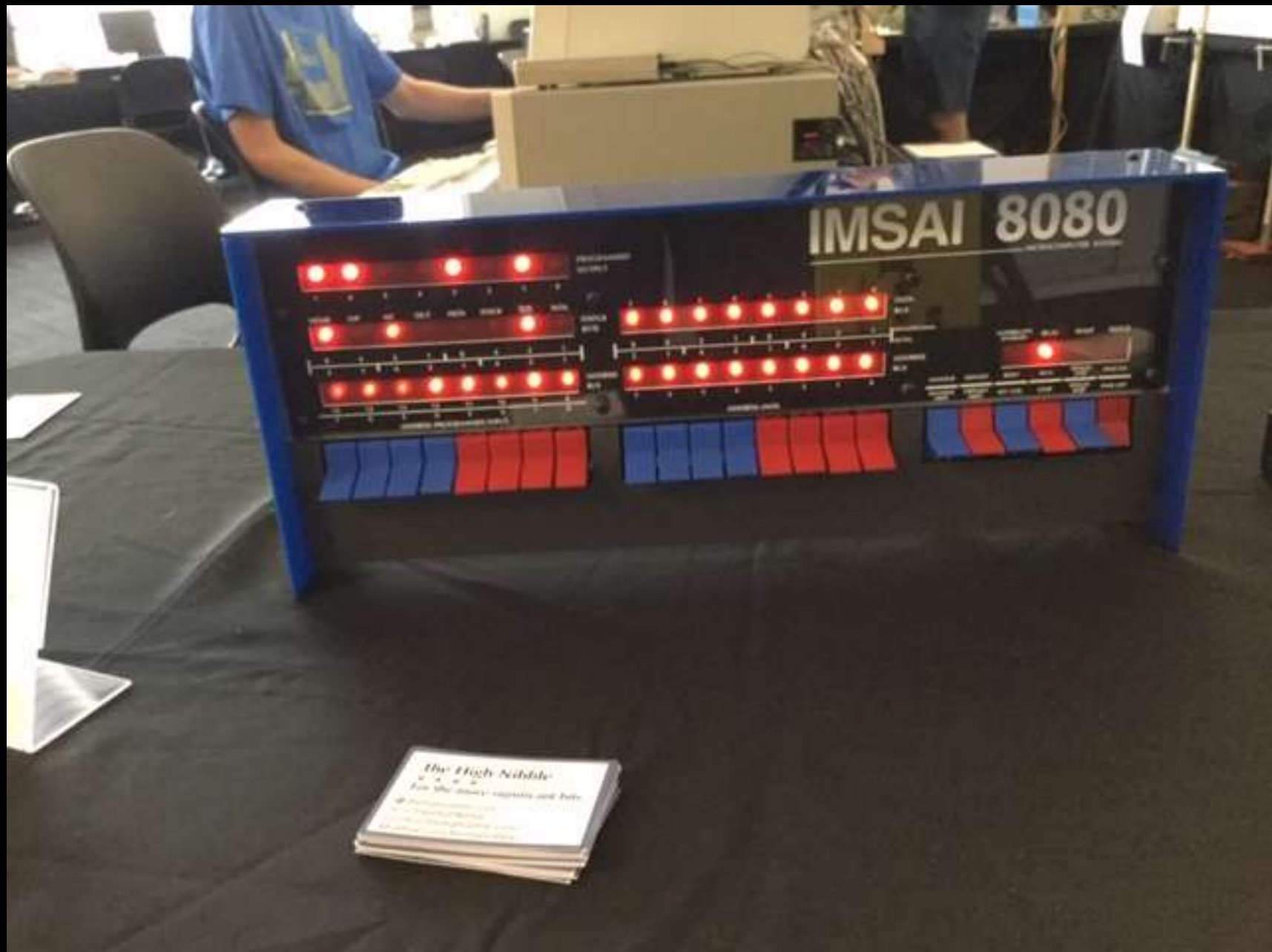
USB Interface Firmware

- *Arduino "sketch" (C code)
- *Interrupts for each column scan
- *Scan keyboard rows, debounce key presses
- *Drive keyboard row lines to inject virtual key presses
- *Local echo of keyboard input
- *Bidirectional communication with IBM 1620 Jr. using a custom character-based protocol
- *Table translates from 1620 codes to key sequences
- *Synthesize special 1620 characters by overprinting
- *Easily adaptable to other teleprinter applications









IMSAI 8080

PERIPHERAL DEVICES

DATA BUS

ADDRESS BUS

CONTROL BUS

POWER SUPPLY

SYSTEM UNIT

MONITOR

PRINTER

TELETYPE

MODEM

DISK DRIVE

TAPE DRIVE

EXTERNAL STORAGE

KEYBOARD

NUMERIC KEYS

FUNCTION KEYS

CONTROL KEYS

ALPHANUMERIC KEYS

The High Noble
For the delivery, capacity and data

- High capacity
- High speed
- High reliability
- High performance
- High quality











Z8 Spectrum v2 (1986)

Although the Spectrum selling itself as the successor to the Spectrum v1, it was in fact a completely new machine. It was designed to be a more powerful machine than the Spectrum v1, and it was designed to be a more powerful machine than the Spectrum v1. It was designed to be a more powerful machine than the Spectrum v1.



Exhibit 32
Zilog inside



ZX Spectrum (1982)

The Spectrum was released in eight different models, ranging from the entry level with 16 KB RAM to the ZX Spectrum v2 with 128 KB RAM and built-in disk drive in 1982. The Spectrum was selling the first microcomputer home computers in the UK, which is significant to the Commission for the UK. More software titles continue to be released - over 900 to date in 1982.

Manufacturer: Sinclair Research
 Model: ZX Spectrum
 Price: £129.95
 Date: 1982
 Operating System: ZX Spectrum
 CPU: Z80
 Memory: 16KB - 128KB

Sinclair ZX81 (1981)

The ZX81 is a home computer that was produced by Sinclair Research and manufactured by Foseco Corporation. It was designed to be a low-cost computer for the general public. It was highly successful and sold over 1.5 million units within a few weeks of its launch. The ZX81 was designed to be a low-cost computer for the general public. It was highly successful and sold over 1.5 million units within a few weeks of its launch.



