SPHERE 1

The First Modern Microcomputer

HOW TO "READ" FM TUNER SPECIFICATIONS

Popular Electronics

WORLD'S LARGEST-SELLING ELECTRONICS MAGAZINE JANUARY 1975/75¢

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

Digibarn

“One that was introduced within months after we came out with the Altair, that got a lot of splash... is the Sphere machine.

That would have been the only machine at that time that I know of that we considered any kind of competitor.”

Ed Roberts, 1995

Wise

“Nobody ever saw an operating unit. ... I've heard that nobody ever saw a production version of [the Sphere].”

Ed Roberts, 1995

You'll go nuts over our computers!

And the Sphere Computer System costs less than anyone else's terminal.

SPHERE
CORPORATION

BYU

SALT
LAKE
CITY

BOUNTIFUL
WELCOMES
YOU

SPHERE

96 EAST 500 SOUTH - BOUNTIFUL, UTAH - 84010

Holley

COMPUTER SYSTEM*

INCLUDES 512 CHAR TERMINAL

INCLUDES 4K

$650.00

KIT INCLUDES

8-BIT PARALLEL COMPUTER based on MOTOROLA 6800 MICROPROCESSOR. With 4K WORDS of read/write memory, (expandable to 64K words). READ ONLY MEMORY containing mini-assembler, expanded instruction set, symbolic debuging aid, CRT driver and remote or cassette program loader/dumper. Kit also includes TV TERMINAL module which generates 16 lines of 32 characters (512 characters total) on a television (does not include TV). 53 KEY KEYBOARD capable of generating whole 7-bit ASCII character set. Also includes 8-BITS OF DIGITAL I/O. ATTRACTIVE KEYBOARD CHASSIS capable of housing keyboard and other modules, and POWER SUPPLY. We supply all parts, PC boards, manuals and membership in SWAP (Sphere user group). $100.00 EXTRA adds standard ASYNCRONOUS I/O (EIA, current loop, TTL), standard FSK MODEM and AUDIO CASSETTE INTERFACE. Other systems and modules such as memory (expandable to 64K) are available as kits or assembled.

Shown is $870.00 model (assembled).

Warrantee and maintenance plans, hardware, software, and peripherals (floppys, paper tape etc.) specs and prices will be sent upon request. For fastest reply send double postage stamped, self-addressed legal envelope to SPHERE - 96 EAST 500 SOUTH, BOUNTIFUL, UTAH 84010.

Bank Americard and MasterCharge accepted.

*** A computer isn't a system without peripherals and software.**

Circle 90 on reader service card

A-Systems

THE COMPUTER "SYSTEM" CONCEPT

A COMPUTER with a BUILT-IN CONSOLE TERMINAL from SPHERE

Keyword... "System"

Peripherals... Floppy Disks, Line Printers, Paper Tape, Terminals...

Basic Language FREE!!

The Processor... A One Card Control System

PDS.... unparalleled

System Concept a Commitment

SPHERE co

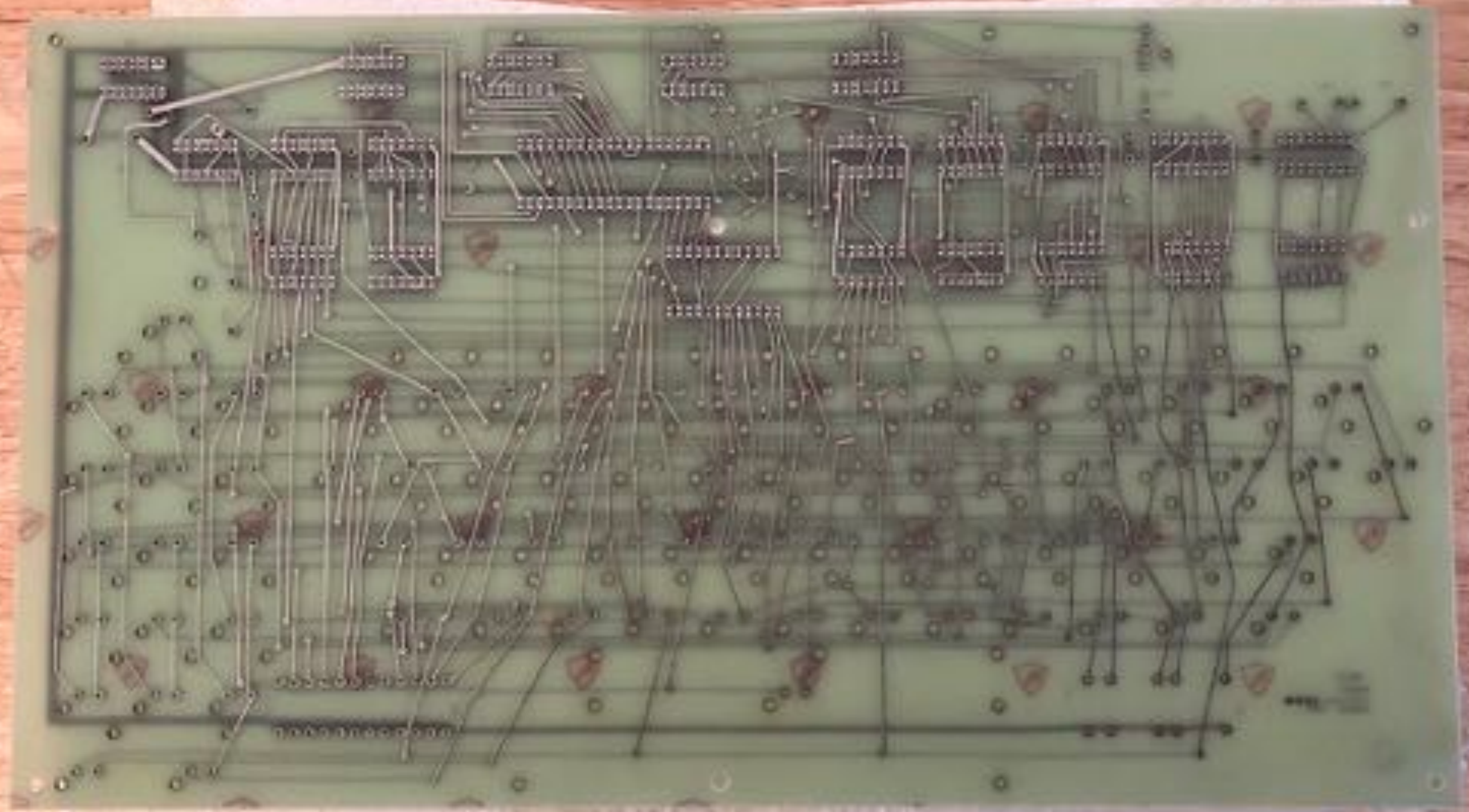
96 E. 5th South, Bountiful, Utah 84

LOWEST COST "SYSTEMS"
$650 HOBBIEST!
$750 INTELLIGENT!!
USER PROGRAMMABLE
$1345 BASIC
INTRODUCTORY OFFER ENDS SEPTEMBER 30, 1975
SPHERE

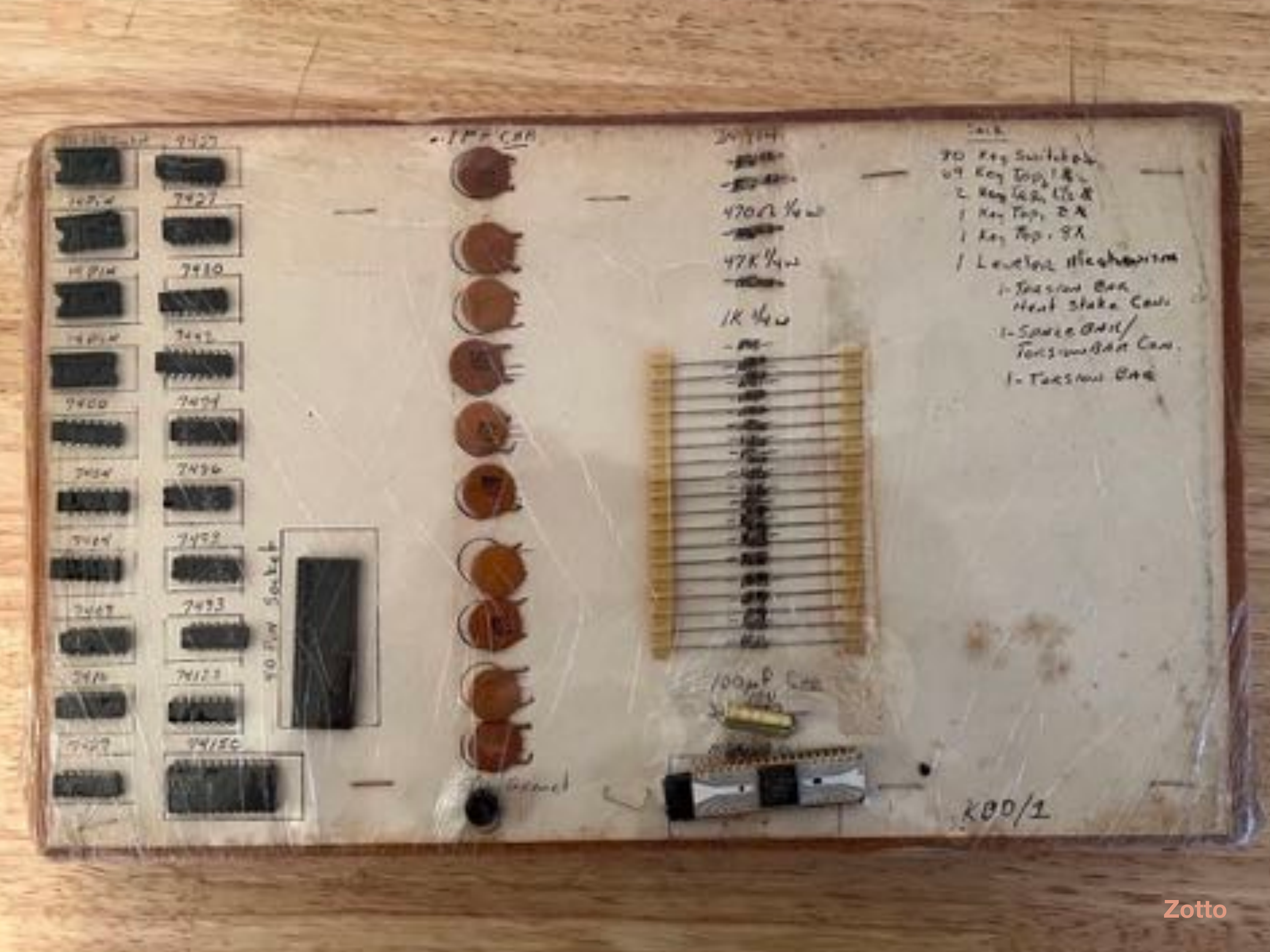
SF Public Library

M. Scott Adams

FI Inst Tech



Zotto



7427
7430
7400
7474
7486
7493
470Ω 1/4W
47K 1/4W
1K 1/4W
100µF
KBD/1

Zotto

Sack

80 Key Switches

69 Key Top, 1X

2 Key Top, 1 1/2 X

1 Key Top, 2X

1 Key Top, 8X

1 Leveler Mechanism

1-TORSION BAR
Heat Stake Con.

1-SPACE BAR/
TORSION BAR Con.

1-TORSION BAR

Zotto

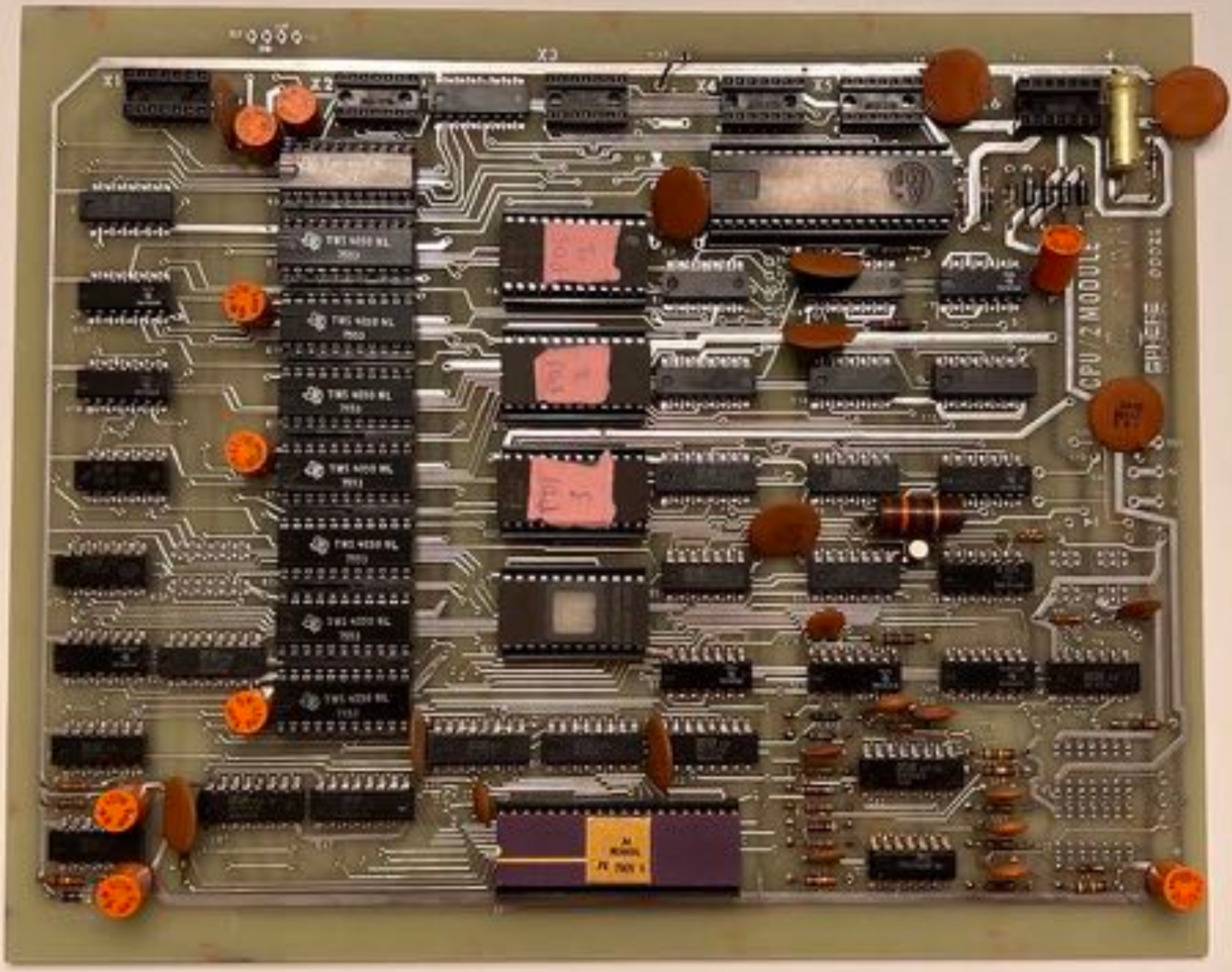
Single-board configuration

CPU module
4K RAM
Teletype/RS232 interface

Power Supply

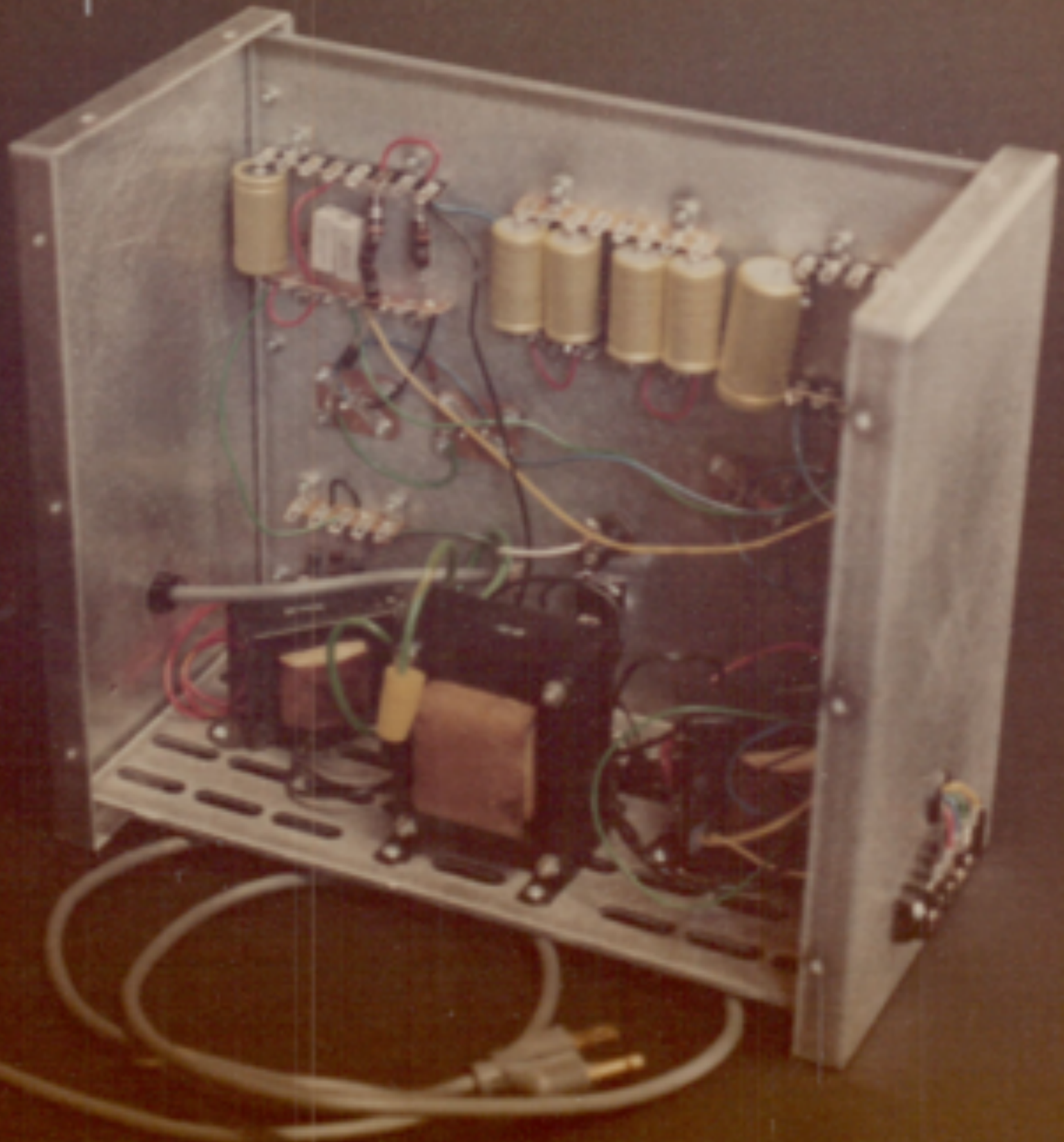
Keyboard

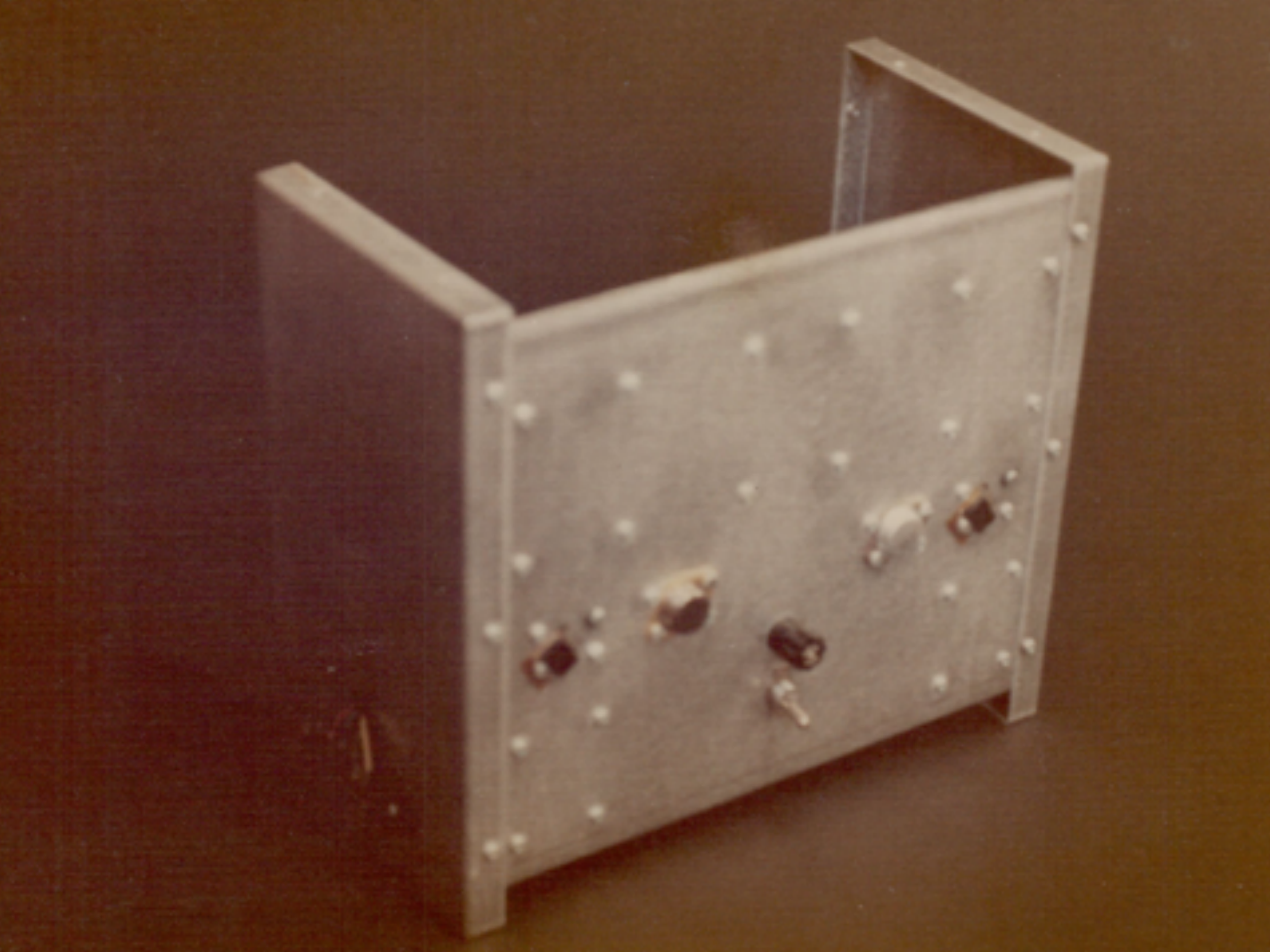
Case with CRT


X1
X2
X3
X4
X5
CPU 2 MODULE

Abraham

S Abraham





Single-board configuration

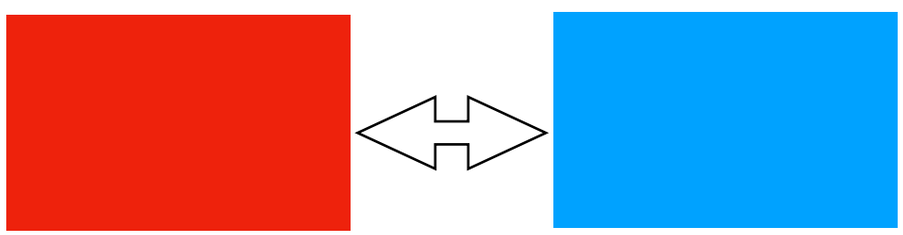
CPU module
4K DRAM
Teletype/RS232 interface

Power Supply

Keyboard

Case with CRT

Entry level configuration



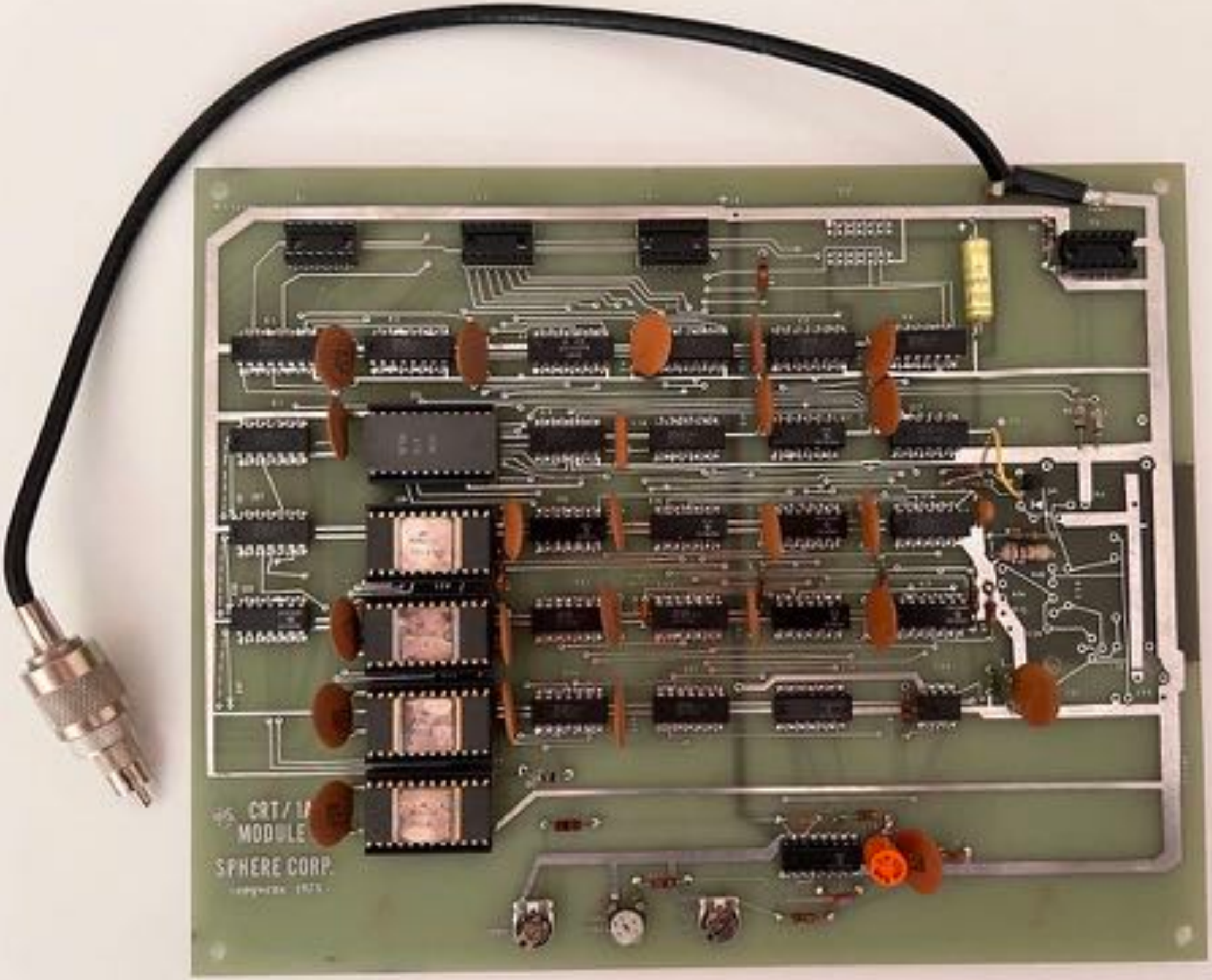
CPU module
4K DRAM
PDS firmware

CRT module
16x32 video

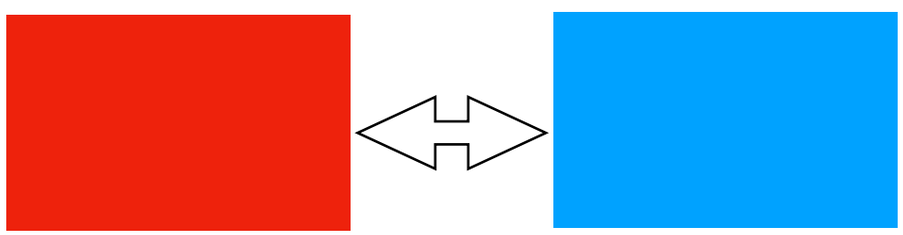
Power Supply

Keyboard

Case with CRT


CRT/
MODULE
SPHERE CORP.

Entry level configuration



CPU module
4K DRAM
PDS firmware

CRT module
16x32 video

Power Supply

Keyboard

Case with CRT

Extended configuration

CPU module
4K DRAM
PDS firmware

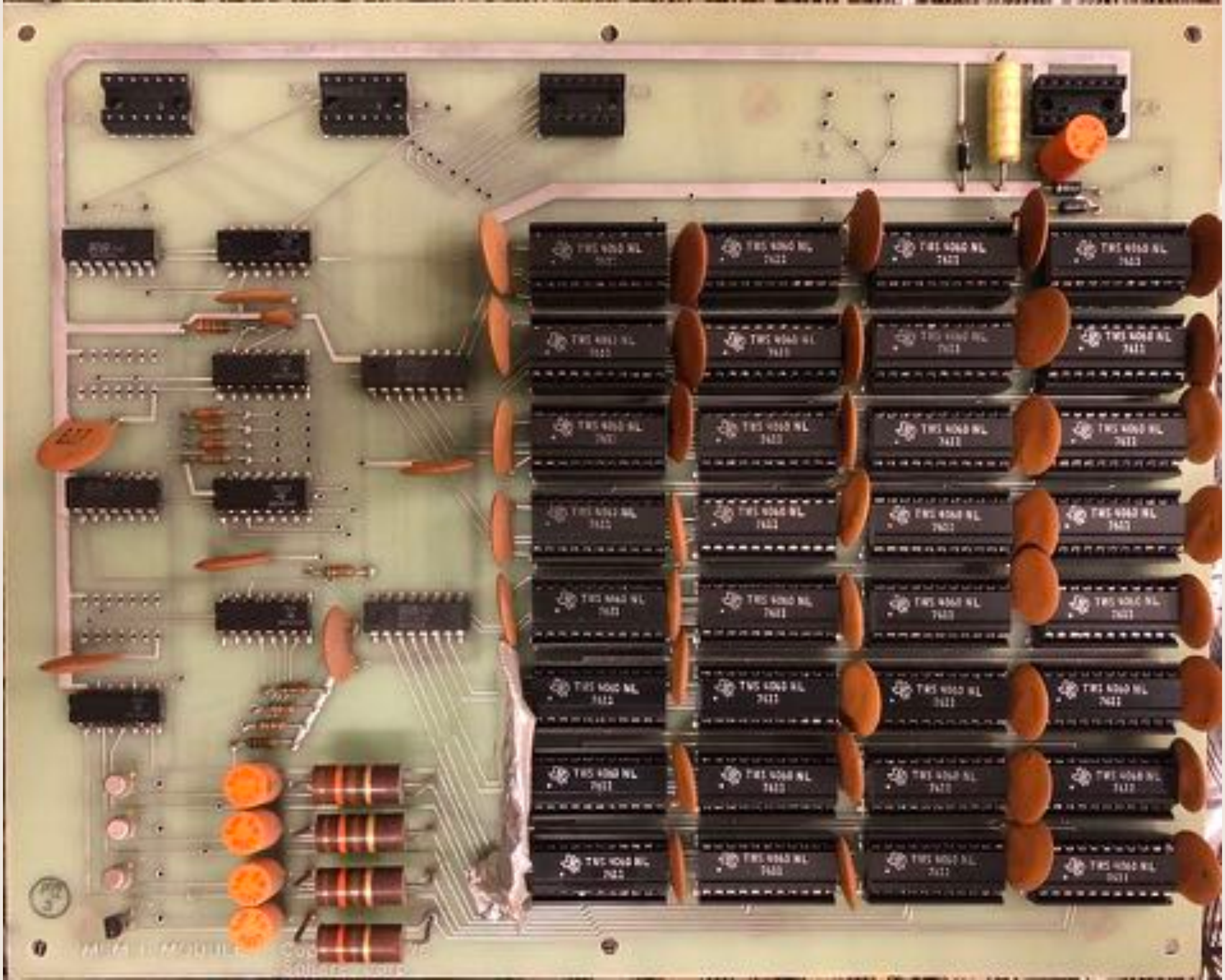
CRT module
16x32 video

16K Memory

Power Supply

Keyboard

Case with CRT



Extended configuration

CPU module
4K DRAM
PDS firmware

CRT module
16x32 video

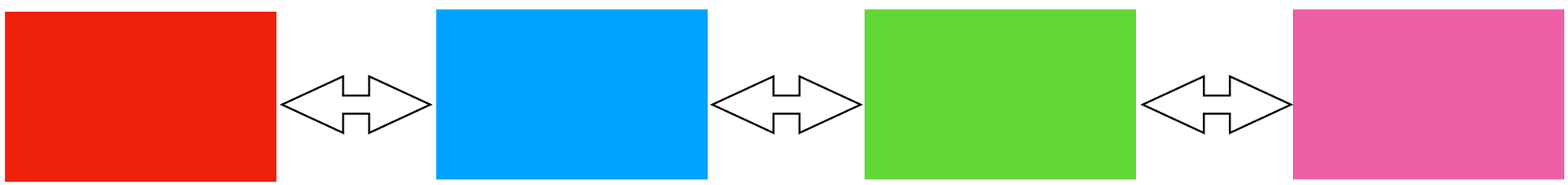
16K Memory

Power Supply

Keyboard

Case with CRT

Cassette BASIC configuration



CPU module
4K DRAM
PDS firmware

CRT module
16x32 video

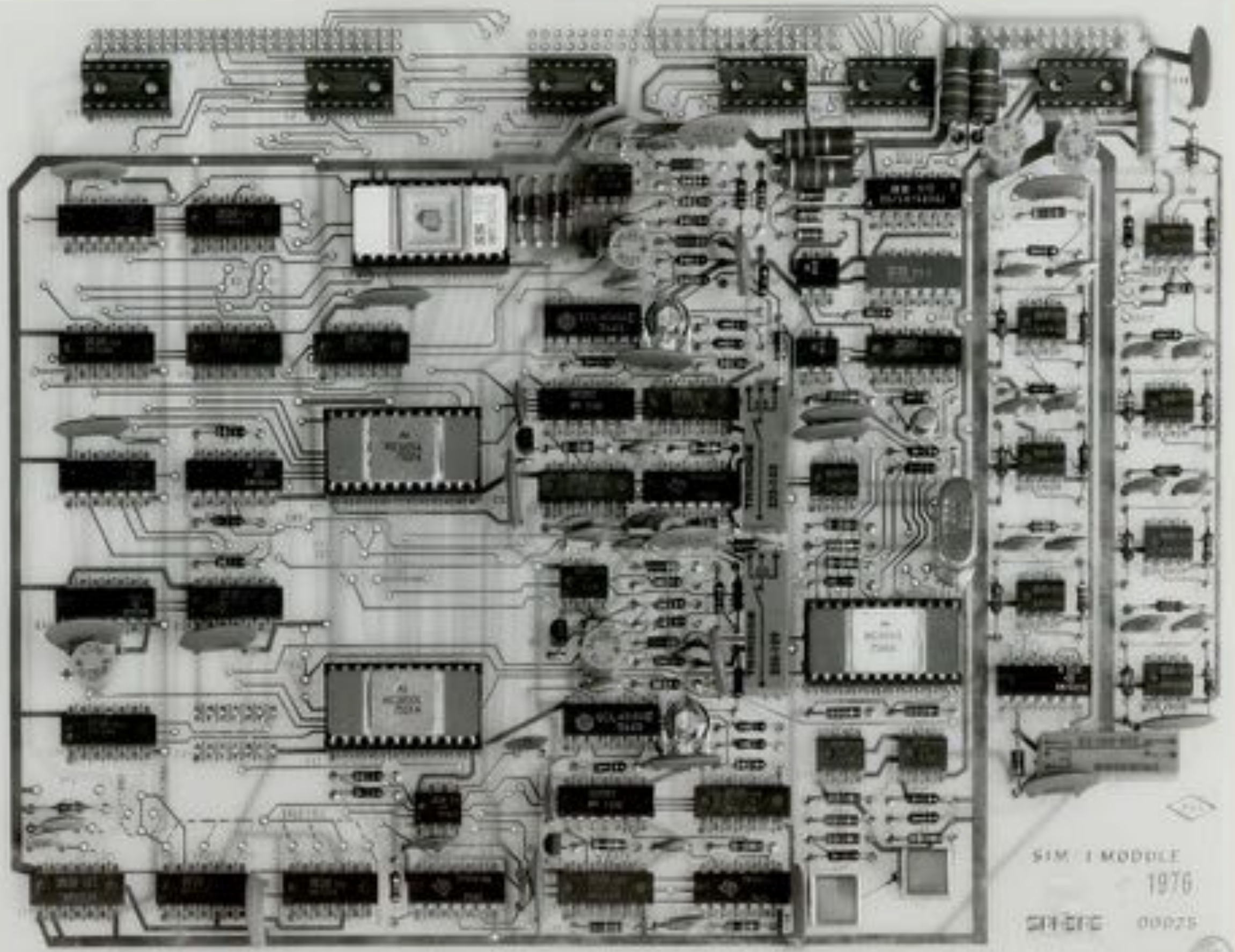
16K Memory

Serial interface
Cassette firmware

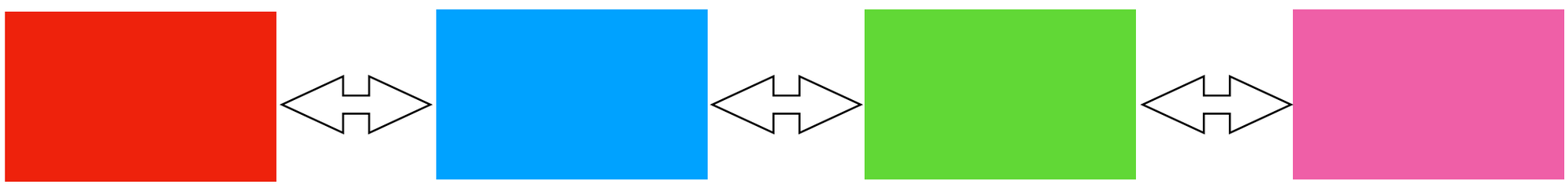
Power Supply

Keyboard

Case with CRT


SIM I MODULE
1976

Cassette BASIC configuration



CPU module
4K DRAM
PDS firmware

CRT module
16x32 video

16K Memory

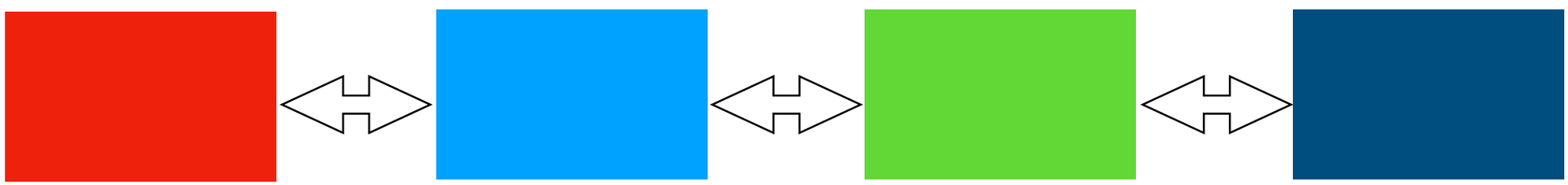
Serial interface
Cassette firmware

Power Supply

Keyboard

Case with CRT

Serious pro configuration



CPU module
4K DRAM
DOS firmware

CRT module
16x32 video

16K+ Memory

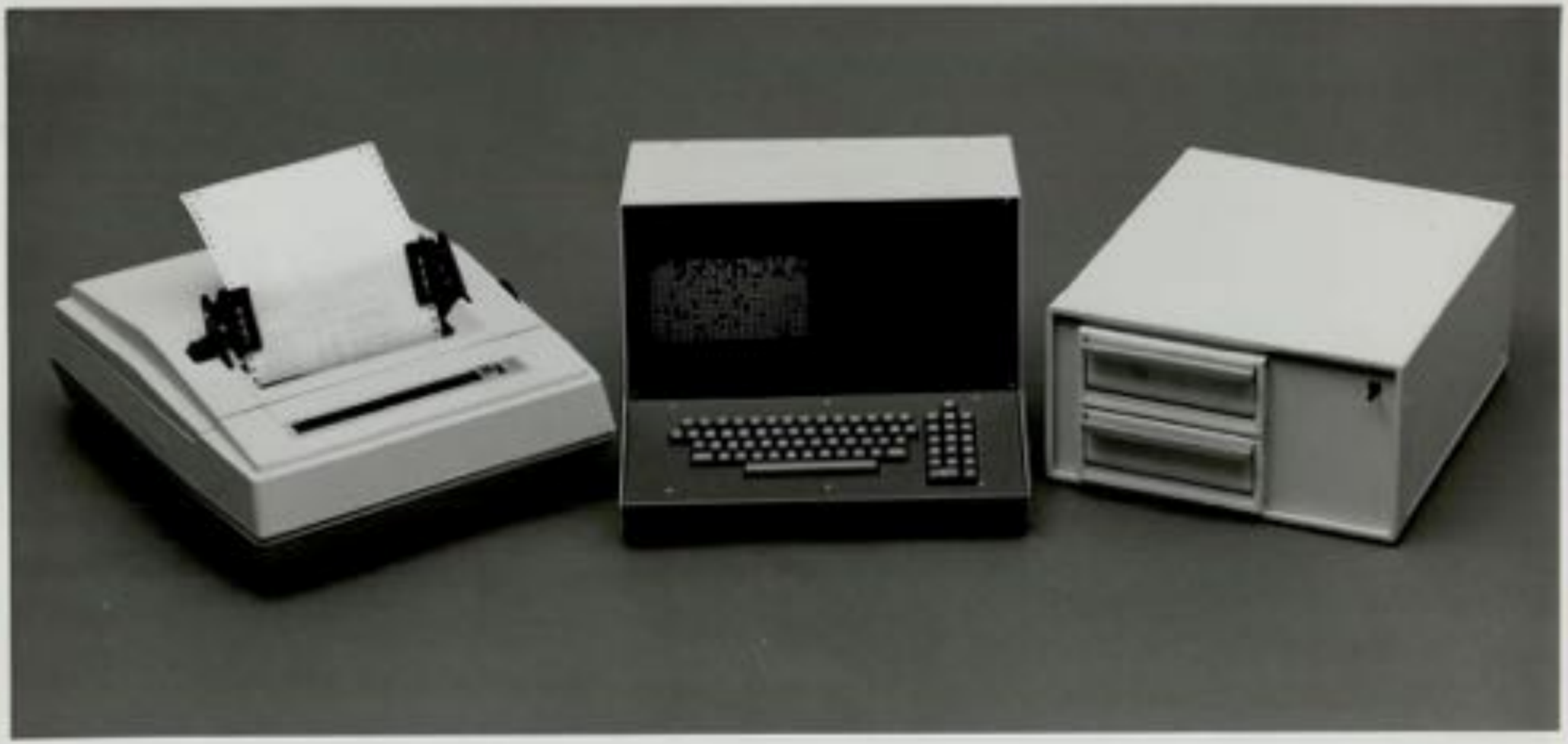
Disk/printer
Parallel interface

Power Supply

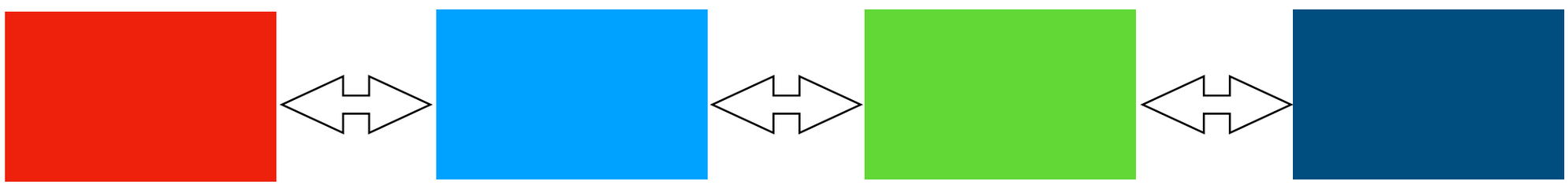
Keyboard

Case with CRT

8” Floppy drives
& Line printer



Serious pro configuration



CPU module
4K DRAM
DOS firmware

CRT module
16x32 video

16K+ Memory

Disk/printer
Parallel interface

Power Supply

Keyboard

Case with CRT

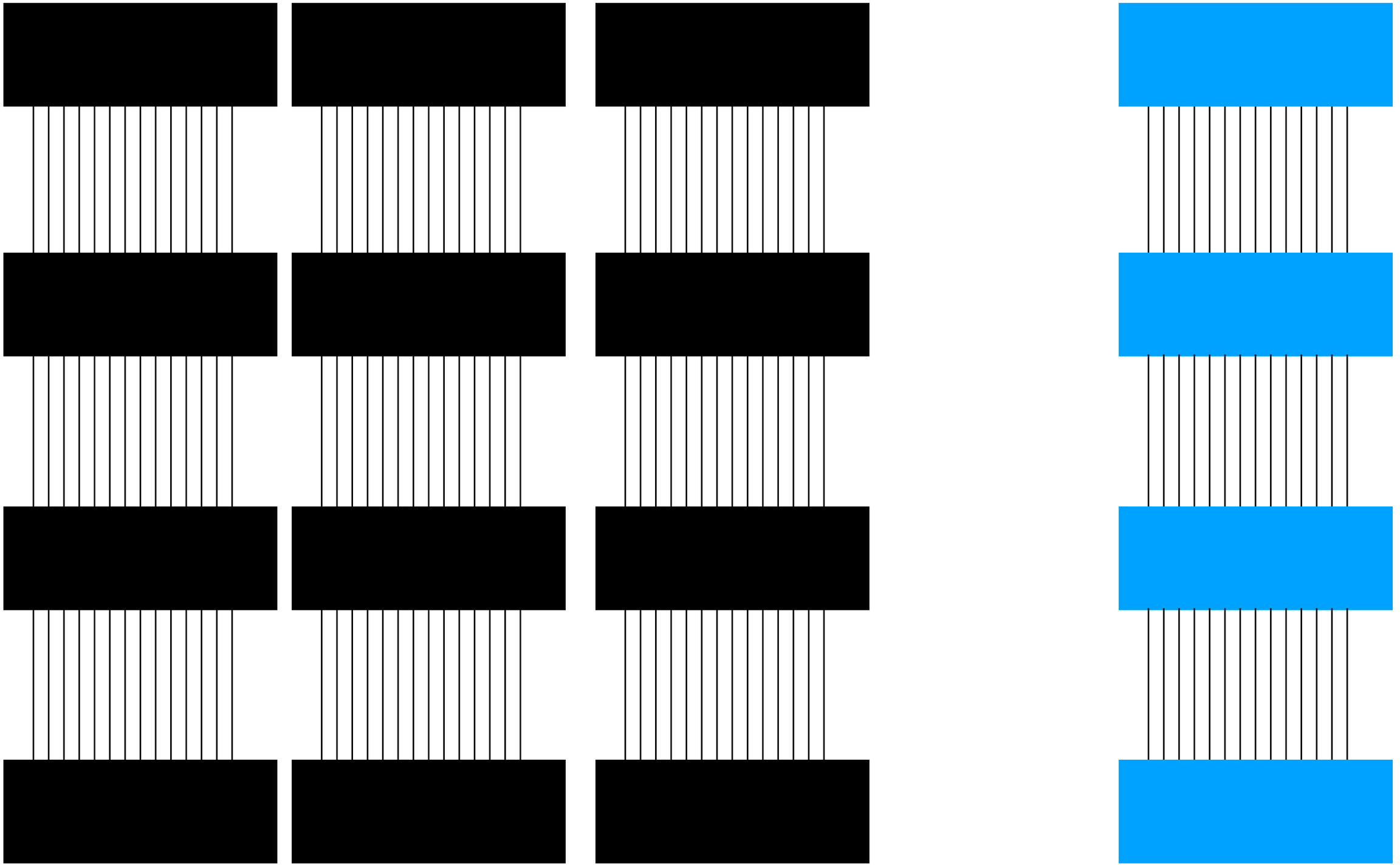
8” Floppy drives
& Line printer

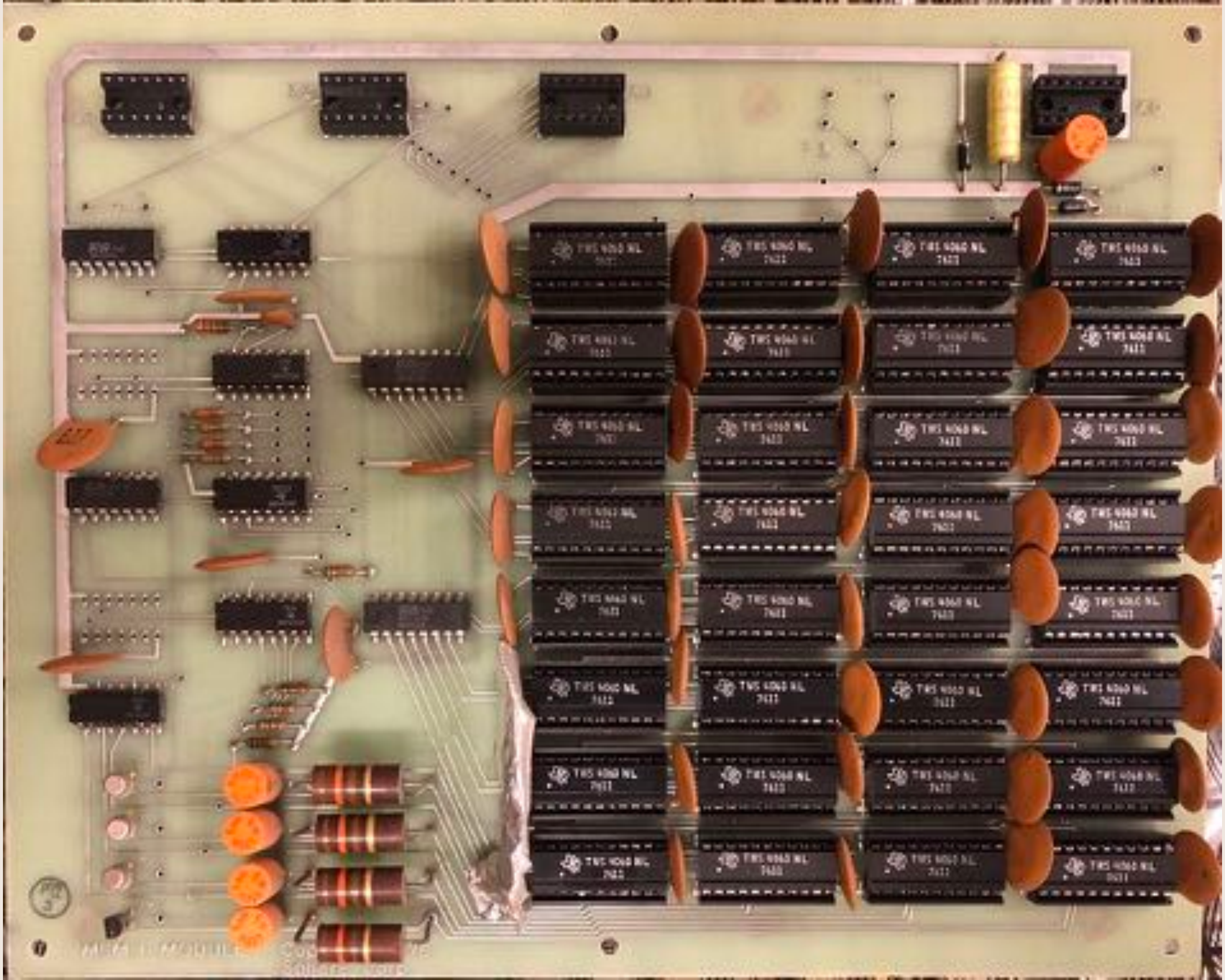
X1 X2 X3 X6

Address & Interrupts

Data

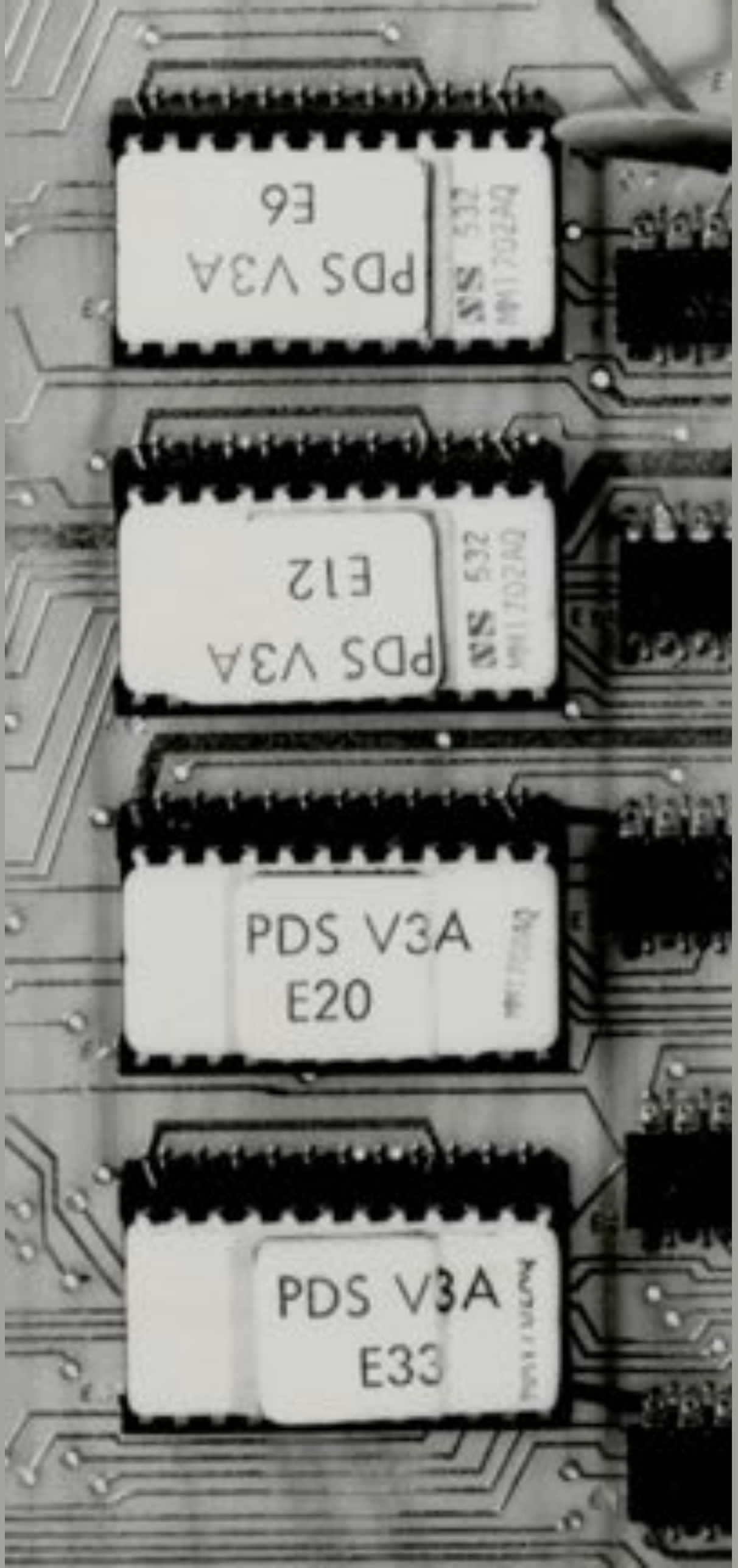
± 5V ±12V DC

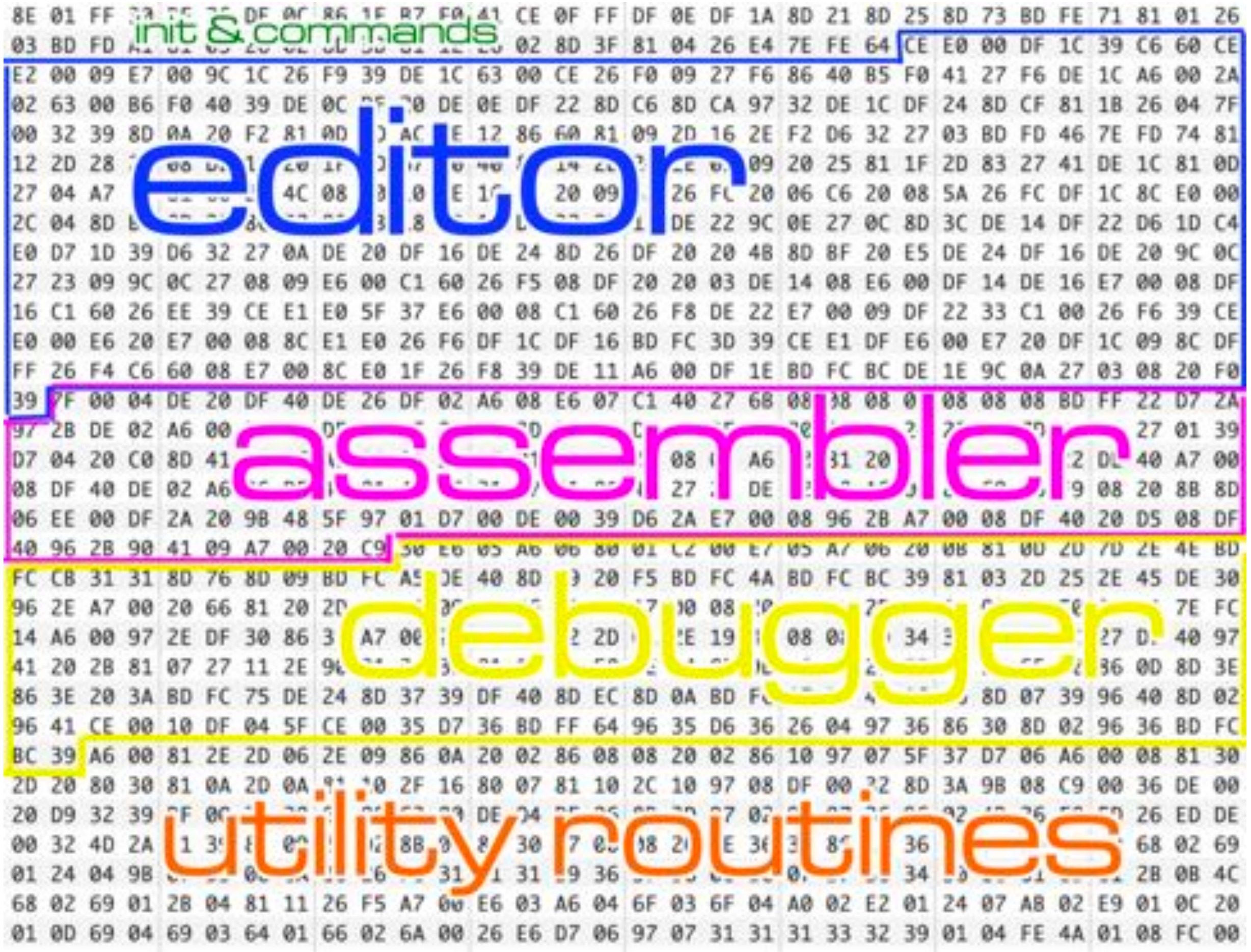




Program Development System (PDS)

- Full-screen editor
- Mini-assembler
- Debugger
- 16-bit multiply/divide routines
- Text <=> Numeric conversion routines


PDS V3A
E6
PDS V3A
E12
PDS V3A
E20
PDS V3A
E33


init & commands
editor
assembler
debugger
utility routines

PROGRAMMING SHEET

PROGRAM NAME _____ VERSION ____

DATE _____ PAGE ____ OF ____

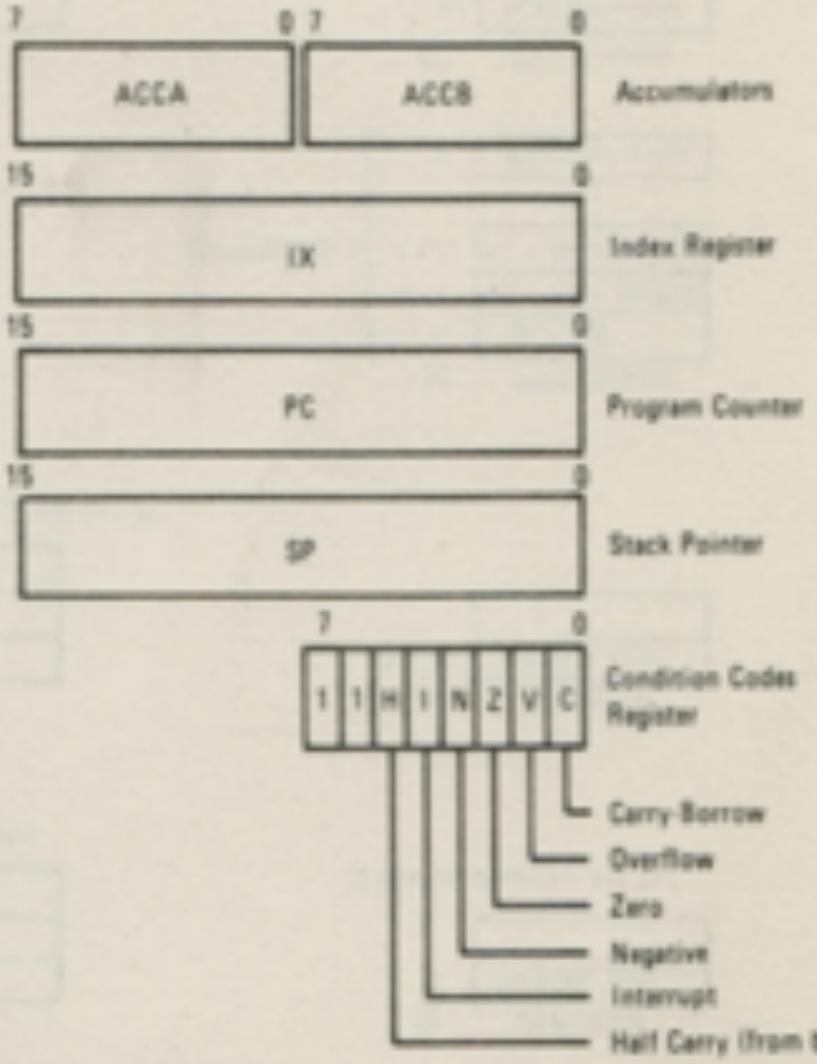
ADDRESS DECIMAL	ADDRESS HEX	MACHINE LABEL EQUATE	MACHINE OP CODE	MACHINE OP TYPE	MACHINE OPERAND HEX,OCT,DEC	SYMBOLIC LABEL	SYMBOLIC OP CODE	SYMBOLIC OP TYPE	SYMBOLIC OPERAND	COMMENTS

SPACES

Copyright 1975 Sphere Corporation

M6800 MICROPROCESSOR

Instruction Set Summary



Programming Model Of The Microprocessing Unit

SPHERE CORPORATION

940 North 400 East • North Salt Lake, Utah 84054

(801) 292-8466

PROGRAM NAME CONVRT VERSION 1

DATE OCT 1, 1975

PAGE 1 OF 1

LABEL EQUATE	MACHINE OP CODE	MACHINE OP TYPE	MACHINE OPERAND HEX,OCT,DEC	SYMBOLIC LABEL	SYMBOLIC OP CODE	SYMBOLIC OP TYPE	SYMBOLIC OPERAND	COMMENTS
=			400					PROGRAM ORIGEN
S	BD	E	FEF4	START	JSR	E	IMPNUM	READ IN A # FROM THE CRT
	D7	D	C0		STAB	D	TMPB	SAVES BINARY # IN TMP LOC.
	27	D	C1		STAA	D	TMPA	
	BD	E	FD16		JSR	E	CRLF	CARRIAGE RETURN - LINE FEED
	BD	E	FEF4		JSR	E	IMPNUM	INPUTS BASE FROM CRT FOR CONV.
	97	D	05		STAA	D	AR2	
	4F				CLRA			SETS BASE FOR CONVERSION
	97	D	04		STAA	D	AR3	
	BD	E	FD16		JSR	E	CRLF	NEXT LINE
	D6	D	C0		LDAB	D	TMPB	RESTORES # FOR CONVERSION
	96	D	C1		LDAA	D	TMPA	
	DE	D	1C		LDX	D	CSRPTR	SETS OUTPUT POINTER
	BD	E	FE64		JSR	E	BINASC	CONVERTS BINARY # TO ASCII
	BD	E	FD16		JSR	E	CRLF	NEXT LINE
	20	R	@S		BRA		S	RETURNS FOR NEXT NUMBER
END								

SPHERE CORPORATION
791 South 500 West
Bountiful, Utah 84010
(801) 292-8466

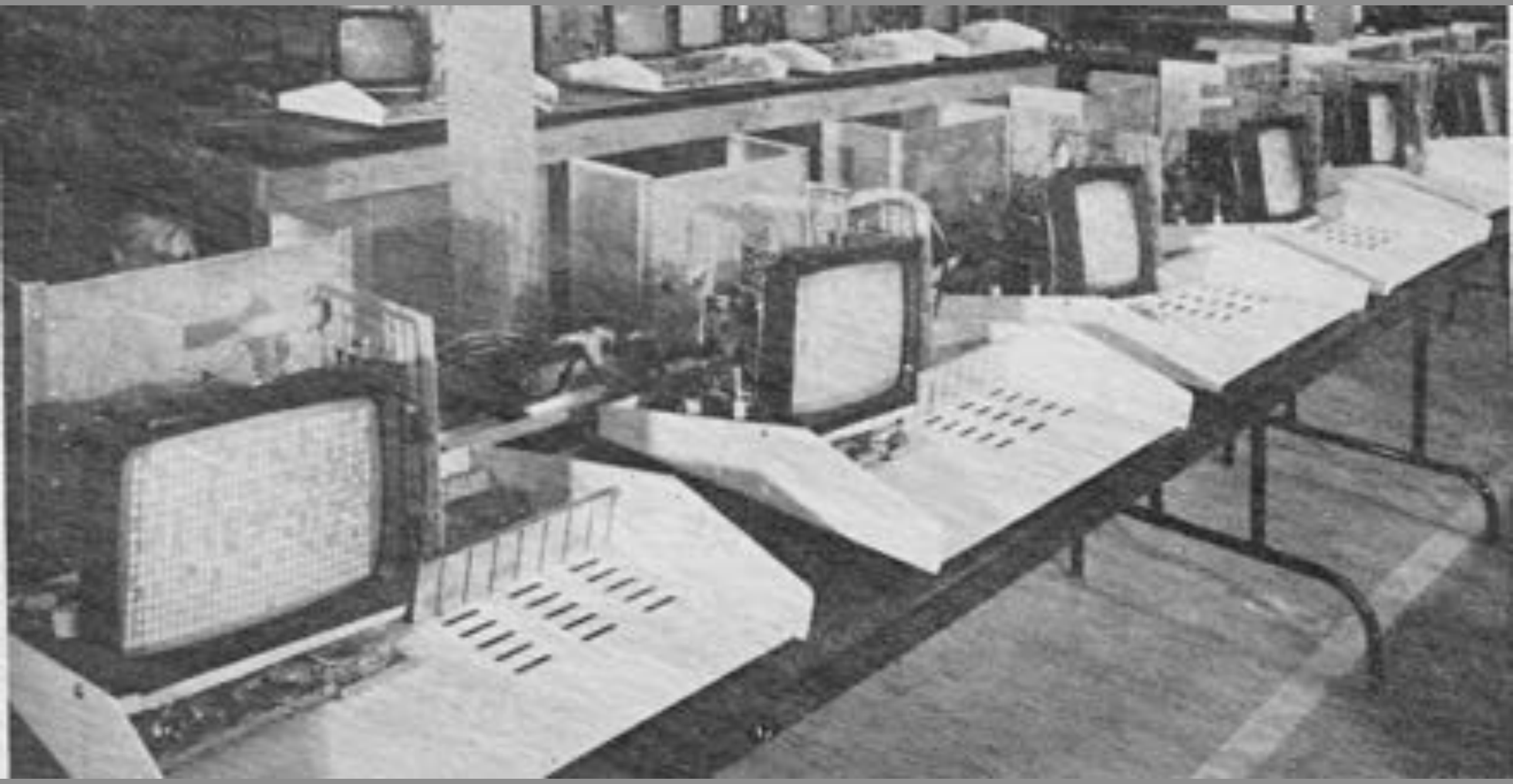
GLOBAL NEWS

THE SWAP NEWSLETTER FOR THE WHOLE EARTH

TYPE	TITLE	AUTHOR	PAGES
2	Tape Directory Lister Displays on screen block name, length of tapes written by PDS-SYS2NF PROM.	T.W. Crosley	9
3	Multiple Base Adding Machine Adds and Subtracts using Hex, decimal or octal.	T.W. Crosley	4
	Multiple Base Calculator Adds, Subtracts, multiplies,divides in base 8,10,16.	T.W. Crosley	6
4			
5	MP-40 Driver Software Software to drive Micro-Peripherals MP-4Ø printer.	Scott Adams	9
	Player Control Boxes Hardware & Software joystick controls.	Scott Adams	24
	Tiny Basic I/O Routines I/O routines and programs used in Sphere's version of Tom Pittman's Tiny Basic.	Dick Mason	9
6	Assembler, Full Full assembler similar to Motorola.	M.Scott Adams	49
	Assembler, Full	Robert Graves	41

Sphere HQ in Bountiful, Utah, just outside of Salt Lake. That's Michael Wise, the president, in front. These are new offices for Sphere and the production will be set up in the back part of the building.

C & S
AUTOMOBILE
WE HAVE
YOUR CAR



SANYO

SANYO

NSL
EXECUTIVE
BUILDING

Announcing!! The world's most advanced, low cost, computer system available today!!

The MICRO-SPHERE 200

$860

IF CASH ACCOMPANIES YOUR ORDER

SPECIAL FEATURES:

- Completely Assembled and Tested (Ready to use; not a kit.)
- 4k RAM (EXPANDABLE TO 8k)
- CASSETTE LOADER
- Sphere Cassette Operating System (SCOS) supports file handling and Advanced Program Development, System, an aid for developing your programs.
- 16 Line by 21 Character Alpha Numeric Character Generator (128 by 128 B & W Dot Matrix Graphic System
- Monte Carlo Games Package
- Operators Manual
- Attractive Mar-Resistant Plastic Case

CHM

SWTPC
SOUTHWEST
TECHNICAL PRODUCTS

IMSAI

THE DIGITAL GROUP INC.

Nucifora

PROGRAMMA

Software Program Products

Z-80 FORTH
6502 FORTH
6080 FORTH
8080 FORTH
SPL/M COMPILER
PIE TEXT EDITOR
SYSTEM DEBUG FACILITY
DATA BASE SYSTEM
HOME ACCOUNTING
CHESS
OS/2 FDOS
FORMAT PROCESSOR

PROGRAMMA CONSULTANTS
3400 WILSHIRE BOULEVARD
LOS ANGELES, CA 90010

PROGRAMMA Text Editor

PIE (PROGRAMMA IMPROVED EDITOR) is an enhanced curser-based editor that works unlike most currently available text editors. All PIE commands consist of control characters, which are assigned to user defined function locations. The keys of the system input keyboard, are assigned specific PIE Editor function commands by the user. Commands in the PIE Editor may optionally be preceded by an Escape character, followed by a numeric or string argument.

SYSTEM FEATURES & FACILITIES

Move curser one position to the left
Move curser one position to the right
Move curser up one line
Home curser in upper left hand corner
Home curser in lower left hand corner
Move upward one page
Move downward one page
Move curser left one horizontal tab
Go to top of file (line 1)
Go to line 'n'
Go to bottom of file
Search backwards into file for string 't'
Search forward into file for string 't'
Home line
Append to line after last character
Insert one blank before current line
Delete the current line
Delete 'n' lines
Clear to end of line
Enable character insert mode
Turn off character insert mode
Backspace
Gobble-delete the current character
Left justify curser on current line
Carriage Return
Set horizontal tabs every 'n' positions
Scroll all text off the screen

HARDWARE: Sphere 6800 Computer
Radio Shack TRS-80 Computer

DOCUMENTATION: Reference Manual
Object Code Cassette

PRICE: $15.00 POSTAGE: $2.00

PIE TEXT Editor V 1.1

(c) 1978 PROGRAMMA CONSULTANTS

IE/4000/447C SER # 001

bitsavers

6800FORTH Ver 1.1
(c) 1978 by PROGRAMMA Intl.
FO/200/1B6C
SER # 014

SPL/M COMPILER
(c) 1978 PROGRAMMA CONSULTANTS
CO/0200/2FEA
SER # 010

Larsen

M6800 SOFTWARE LIBRARY PRICE SCHEDULE		PAGE OF
SYSTEM NAME	SYSTEM NUMBER	CATALOGUE NUMBER
PROGRAM NAME	PROGRAM NUMBER	DATE DOCUMENTED 06/07/77

CATALOG NO.	DESCRIPTION	A	B	C
LUNAR-V3N-GB001	Tiny Lunar Lander	5.00	-	-
MASTR-V3N-GB001	Mastermind Game	5.00	-	-
GOMO-V3N-GA004	Gomoku Game	5.00	8.00	10.00
LIFE-V3N-GA001	Life Game	5.00	8.00	10.00
STAR-V3N-GA001	Shooting Stars Game	5.00	-	-
HANG-V3N-GM001	Hangman Game	5.00	-	-
WUMP-V3N-GM001	Wumpus Hunt Game	5.00	-	-
CHASE-V3N-GB004	Chase Game	5.00	-	-
HAMMA-V3N-GB004	Hammarabi Game	5.00	-	-
SUMER-V3N-GB001	Sumer Game	10.00	-	-
PKG1-V3N-GB004	FBX Games Package 1	10.00	-	-
PKG2-V3N-GB001	FBX Games Package 2	10.00	-	-
BJACK-V3N-GB001	Blackjack Game	10.00	-	-

Demo

SPHERE
NEWSLETTER

AUGUST 1979 VOLUME IV ISSUE I

EDITORS:
ROGER J. SPOTT
JEFF BROWNSTEIN

SOFTWARE

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SPHEREPORTH PATCHES	T.R. MEIER	PAGE 10
COSMAC ELF - SPHERE MONITOR INTERFACE	DONALD DORSON	PAGE 12
ADD TELETYPE TO TINY BASIC	BILL RUTHERFORD	PAGE 17

HARDWARE

LOW COST DIGITAL TAPE SYSTEM	J.C.PIRTLE	PAGE 21

SPHERE

VOLUME V NUMBERS 4 and 5 May 1981

EDITORS: Jeffrey Broumstein
Roger J. Spott

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Bank Select Your Proms	Broumstein	Page 4
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Square Roots	Mc Beath	Page 17
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Machine Sort for Basic	Spott	Page 26
Musical Tone Generation	Calley	Page 30
6809 Software Architecture	Motorola	Page 32

"To those of us who knew and loved Mike Wise… he was gravity and we all were drawn to his genius and enthusiasm."

Resources & emulator https://sphere.computer

Sign up for updates https://sphere.computer/updates

Ben Zotto

Twitter: @bzotto

Email: bzotto@gmail.com

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