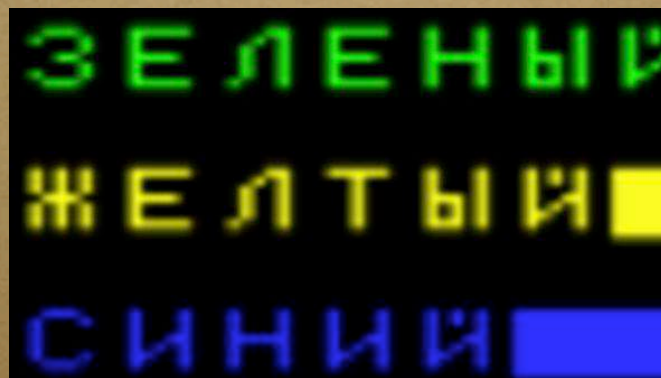


# Apples behind the Iron Curtain

KansasFest 2024, Springfield IL



# Apples behind the Iron Curtain

## Index

- **The short story**
- **The long story:** definitions, historical and economical background
- **The long story:** technical parameters of Apple II clones in eastern (not central) Europe

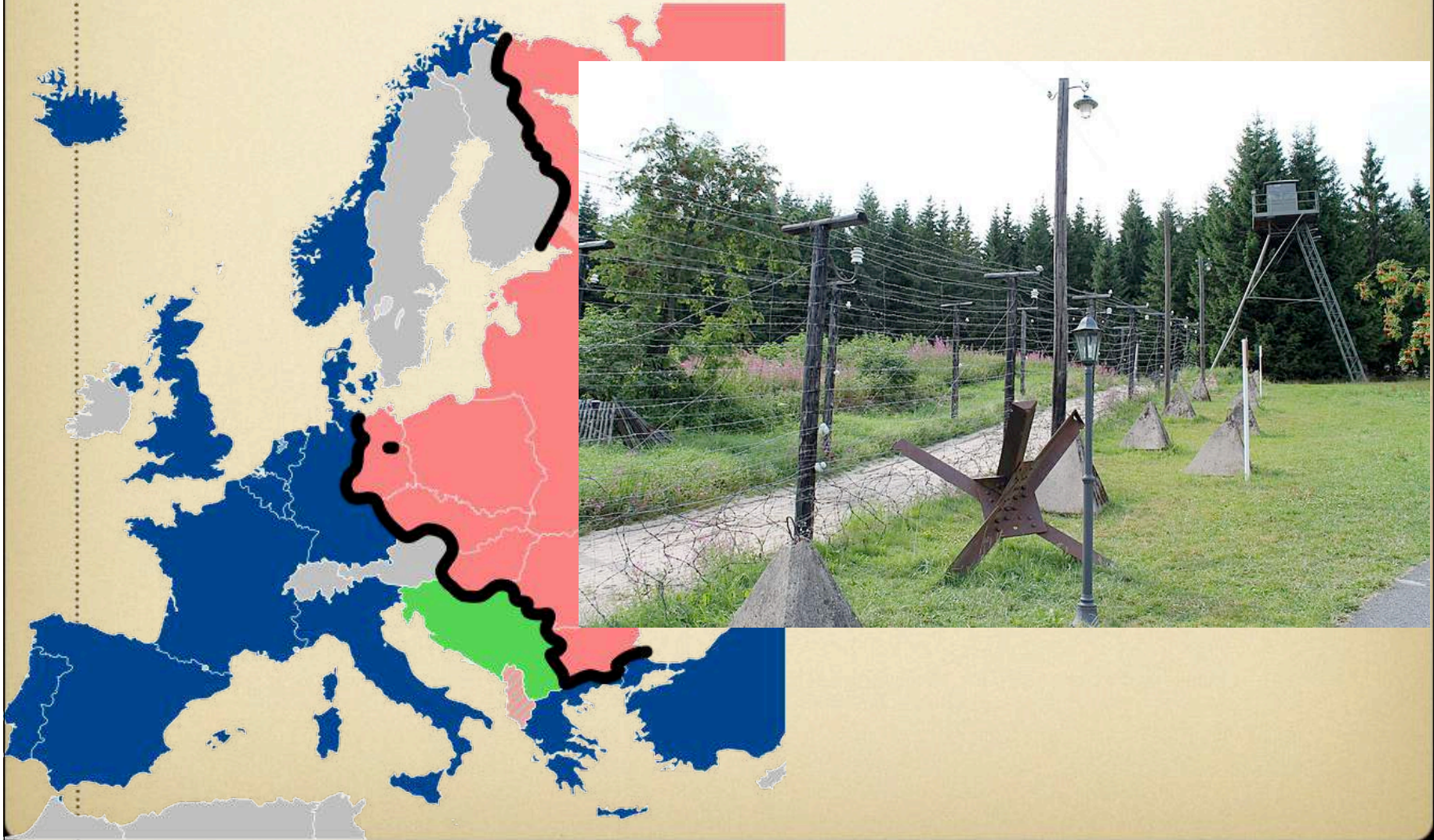


# The short story

- There were almost no Apple computers.
- And only few clones.
- Production of clones in eastern Europe only.
- Not available to buy for public (schools only).

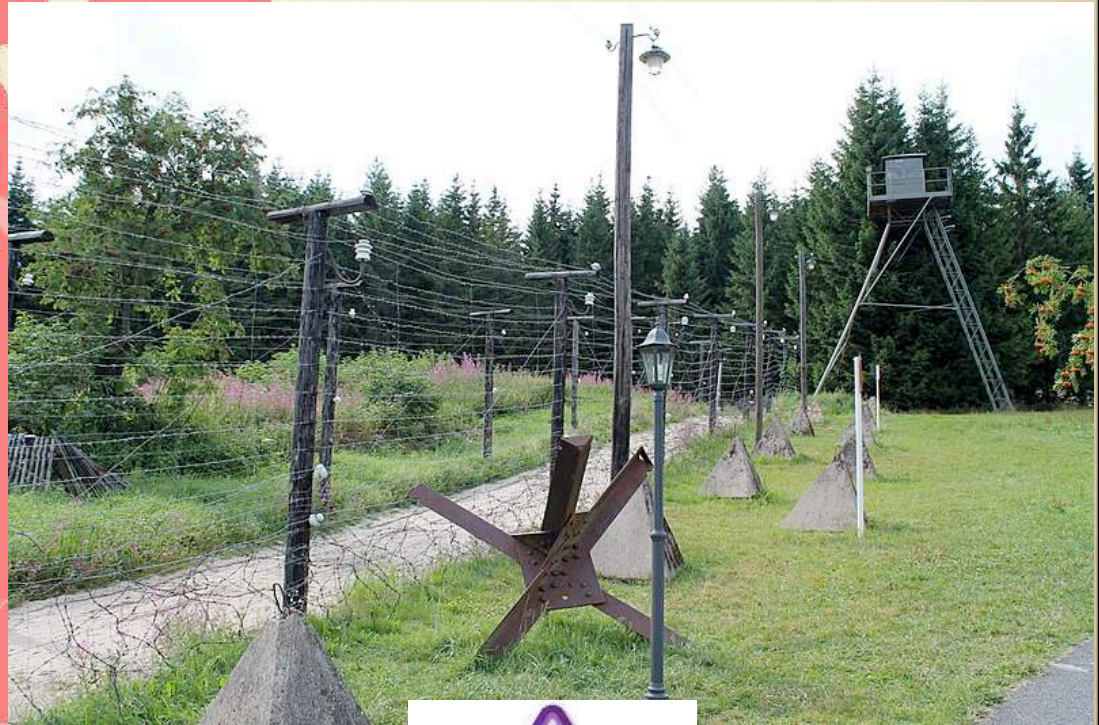
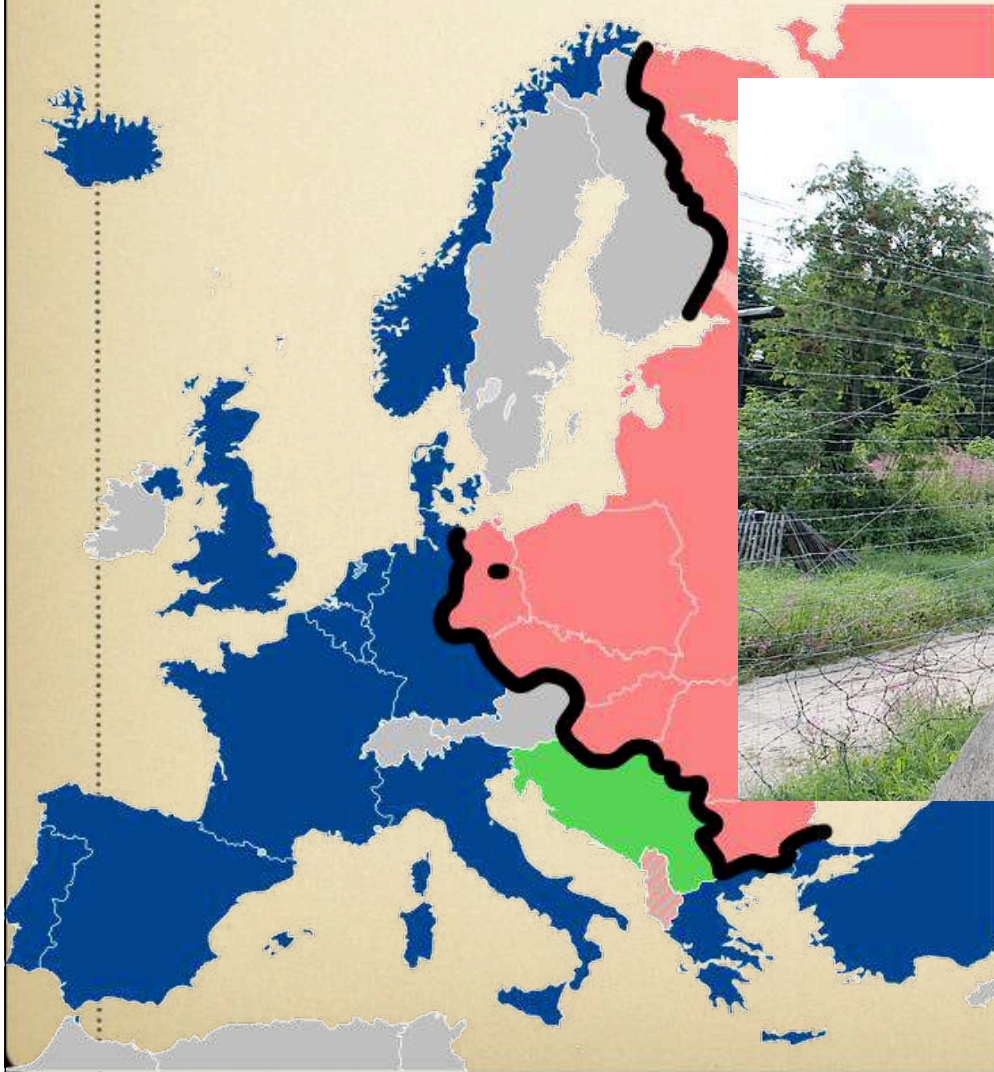


# Iron Curtain





# Iron Curtain



# littérature recommandée

- War is peace.
- Freedom is slavery.
- Ignorance is strength.





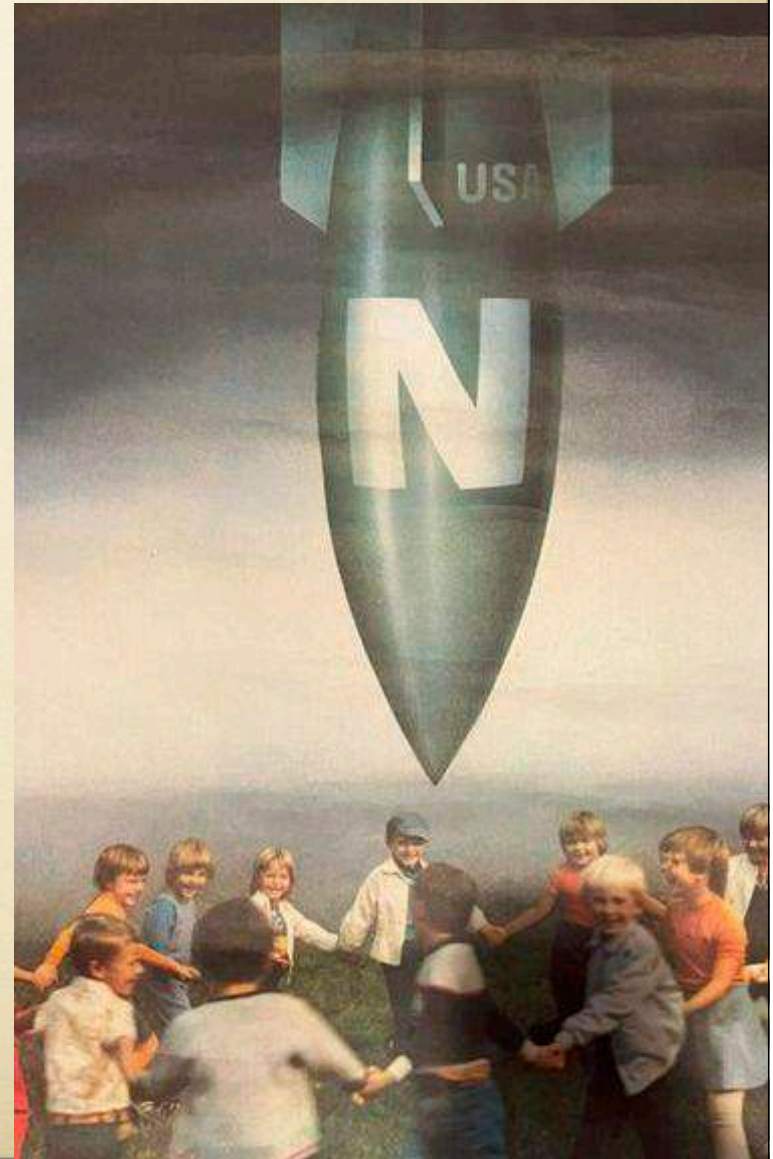
# littérature recommandée

- War is peace.
- Freedom is slavery.
- Ignorance is strength.



Experience is untrasferable.

# fear, paranoia





# fear, paranoia voluntarily mandatory





# elections

- communist party is the leading party by constitution
- democracy-like appearance, no choice
- attendance 99%! voluntarily mandatory
- worst result 99.7% (200 000 invalid votesheets)
- postponed after Warsaw Pact invasion

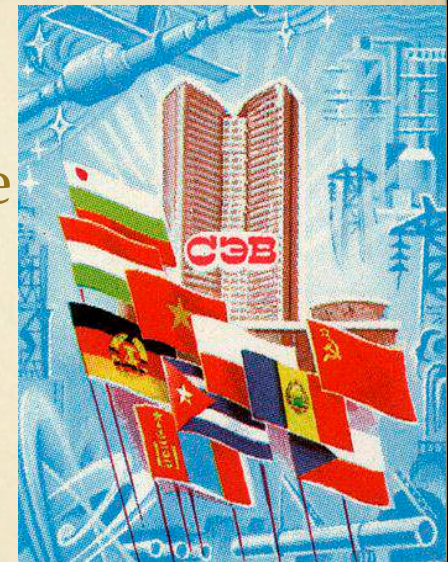




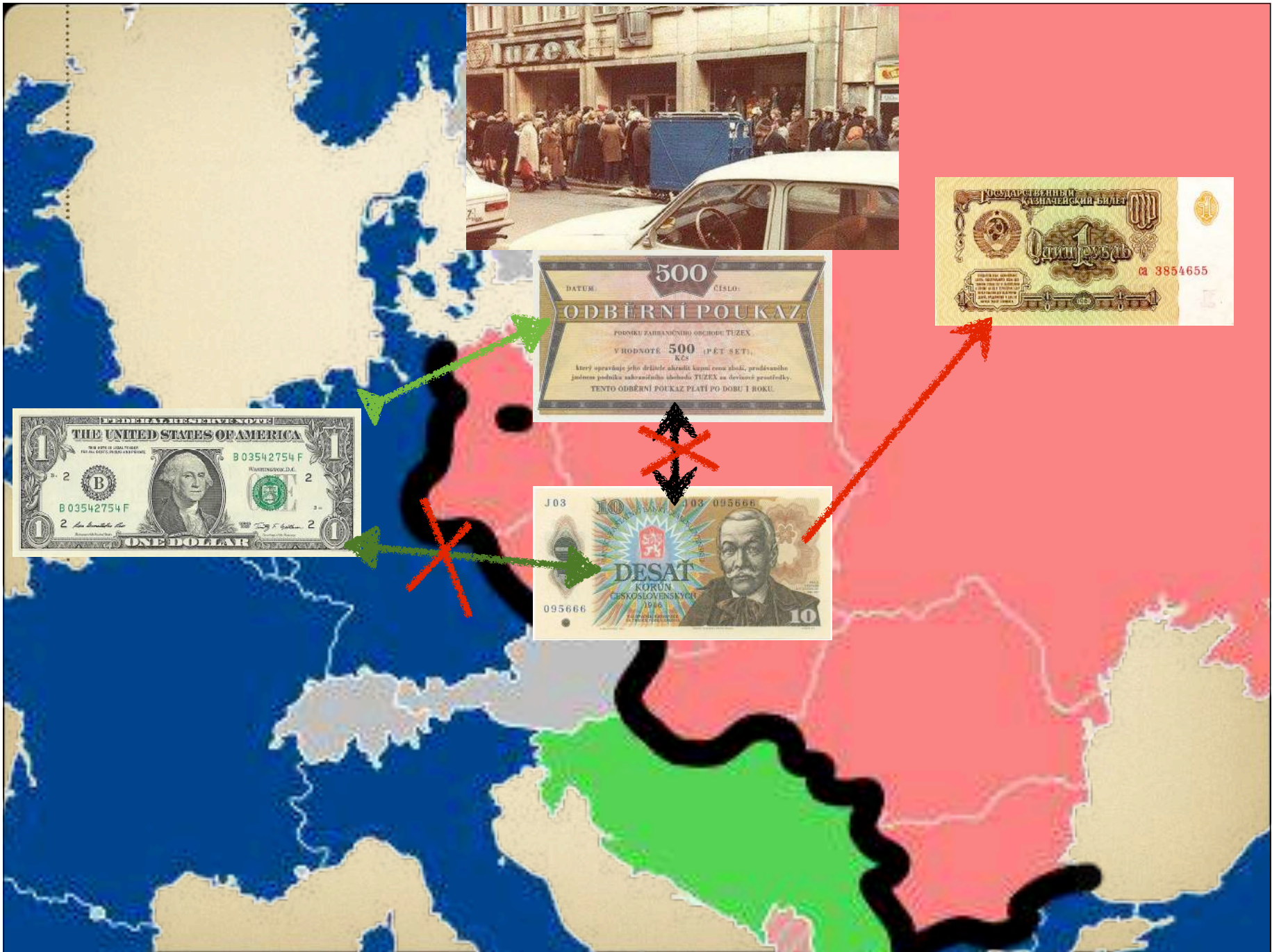
# COMECON

- The Council for Mutual Economic Assistance

- state owned
- centralised
- planned
- closed
- military oriented
- export with loss









travel permission



promise of  
foreign  
exchange



apply in winter only  
waiting list several years  
\$300 per year max.



wooden kitchen utensils



native copper





1984













30-60%



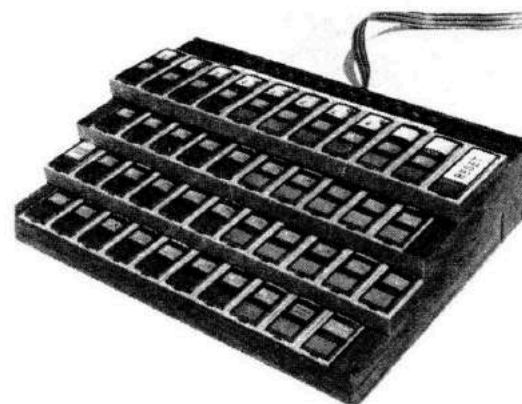
IBM 5285  
1980



Consul 2715  
1989

ime tak levnou a spolehlivou  
snice (viz obr. 1).

zmou slouží. Díky snadné rozestavi-  
nosti klávesnice je možno kdykoli  
zlepšit elektrický kontakt aplikací  
běžných prostředků.



duchá  
vesnice

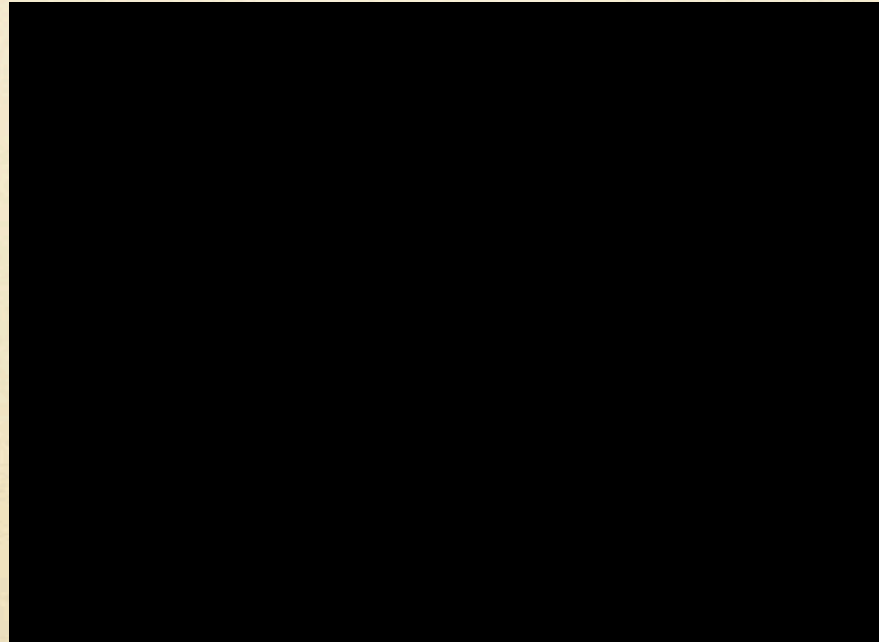




# quality

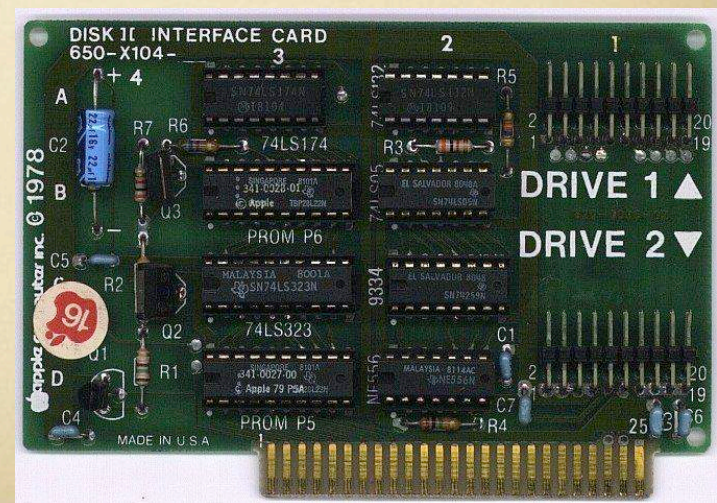
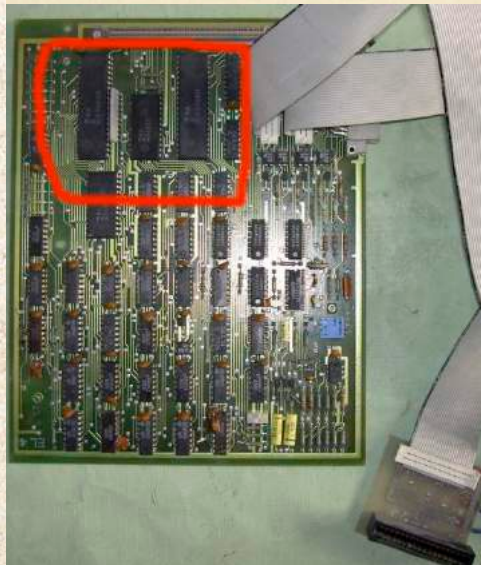
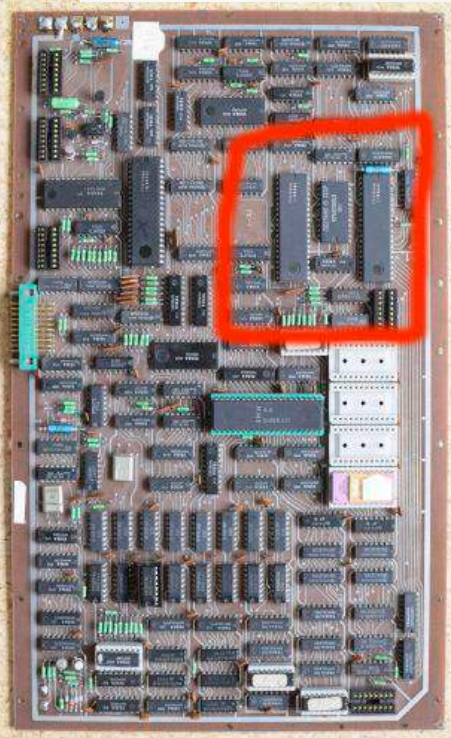
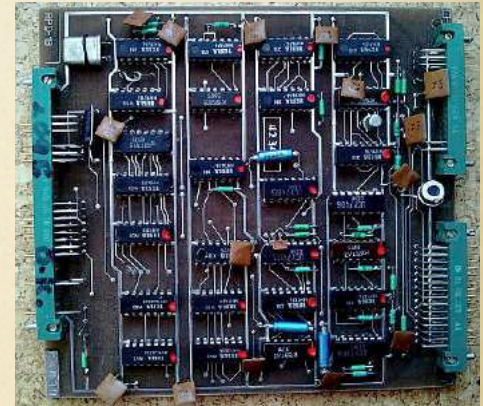
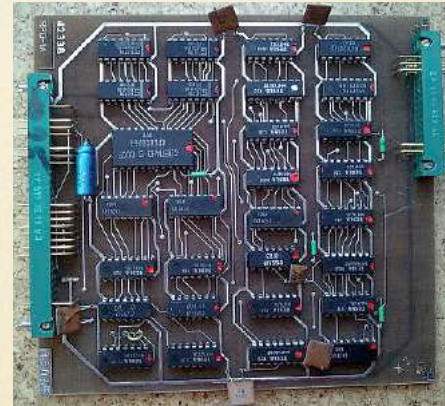


quality





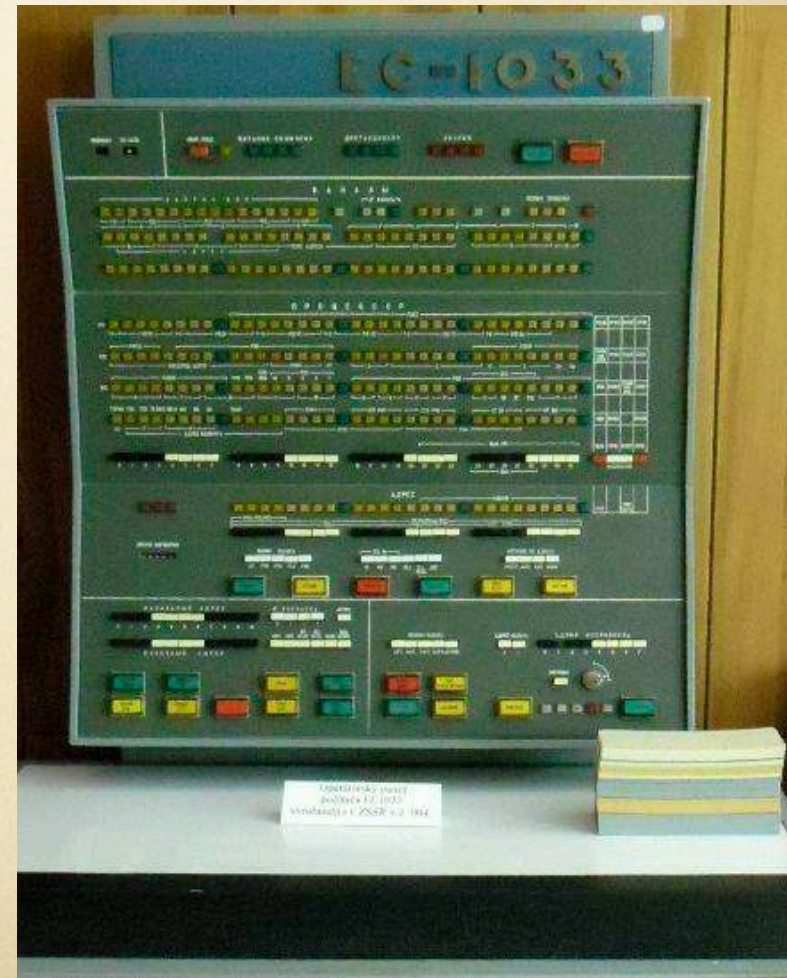
# disk controller





# mainframes

- own systems (Minsk, Ural, EPOS, ...)
- licences (Tesla 200 = GE Bull 140)
- copies (Odra=ICL)
- EC ЭBM - Unified system of electronic computers = IBM 360 / 370

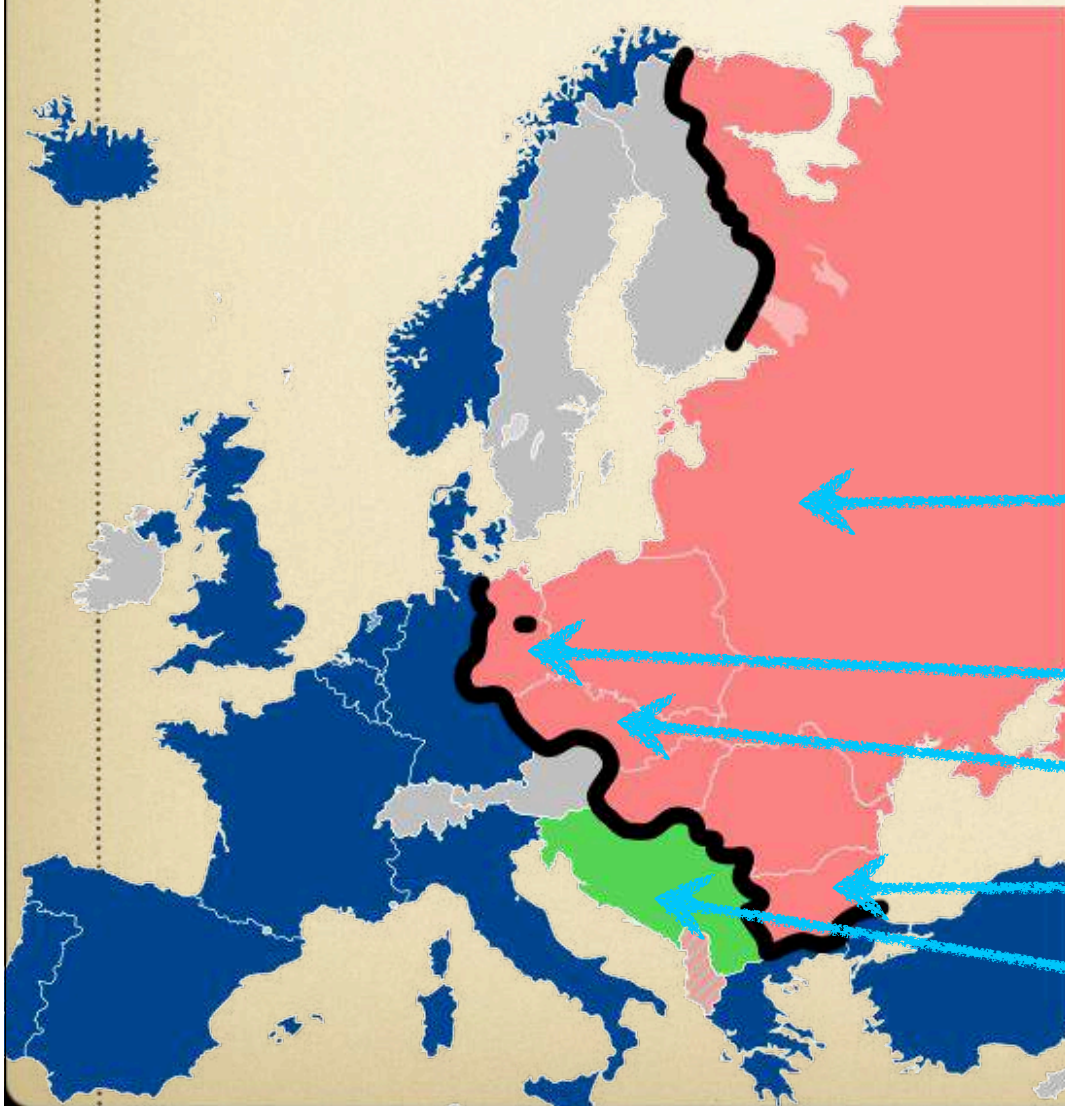




# mini computers

- ADT = HP 1000
- JPR 12 = Elbit 100
- TPA=PDP-8
- CM ЭBM - system of small electronic computers = HP 1000, HP 2000, DEC PDP-11, VAX, PC

# micro computers



LSI-11, 8086,

Z80 (KP1858BM),  
8080 (KP580BM80A)

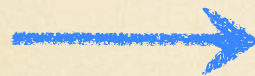
Z80 (U880D)

8080A, 3000

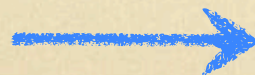
6502 (CM630P)

RCA 1802 (CDP 1802B)





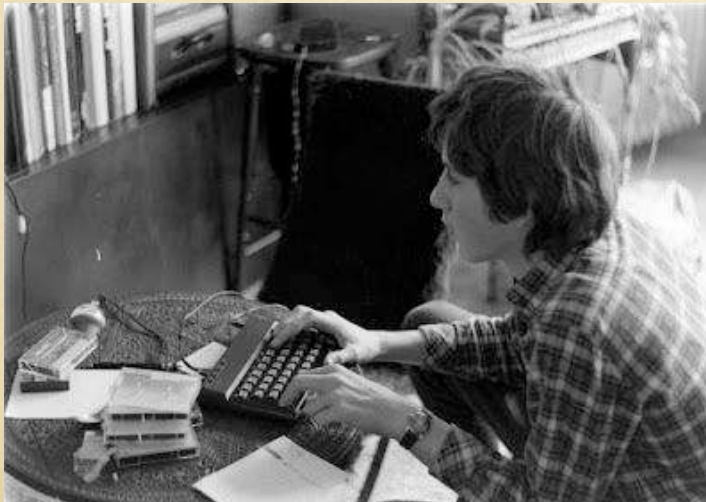
in-house design



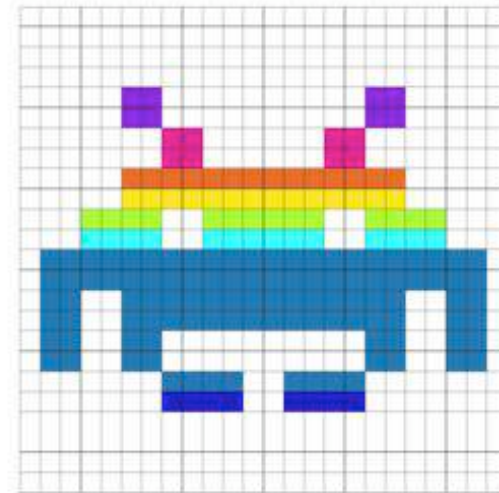
clones



# littérature recommandée



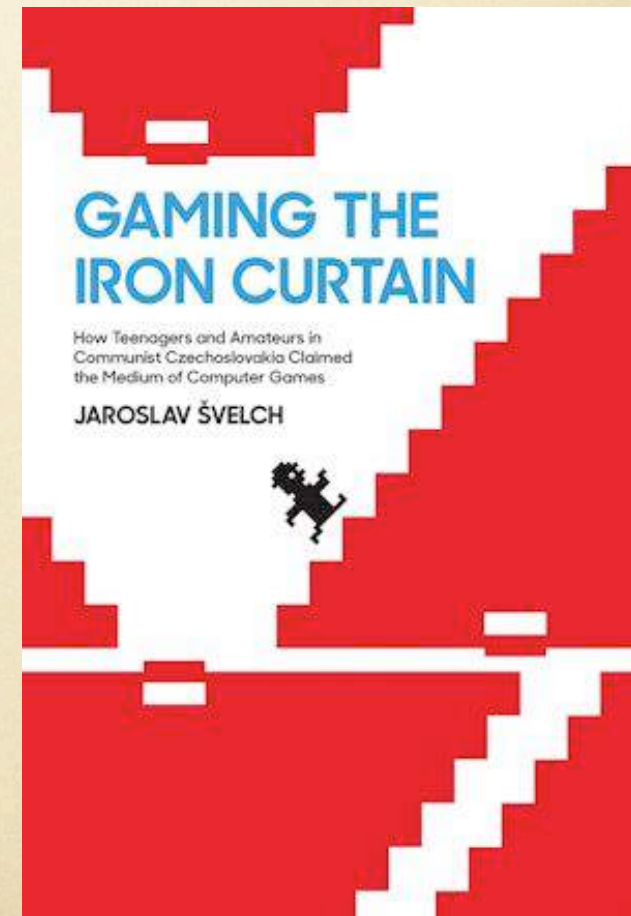
Akropolis  
*Edice #POPs*



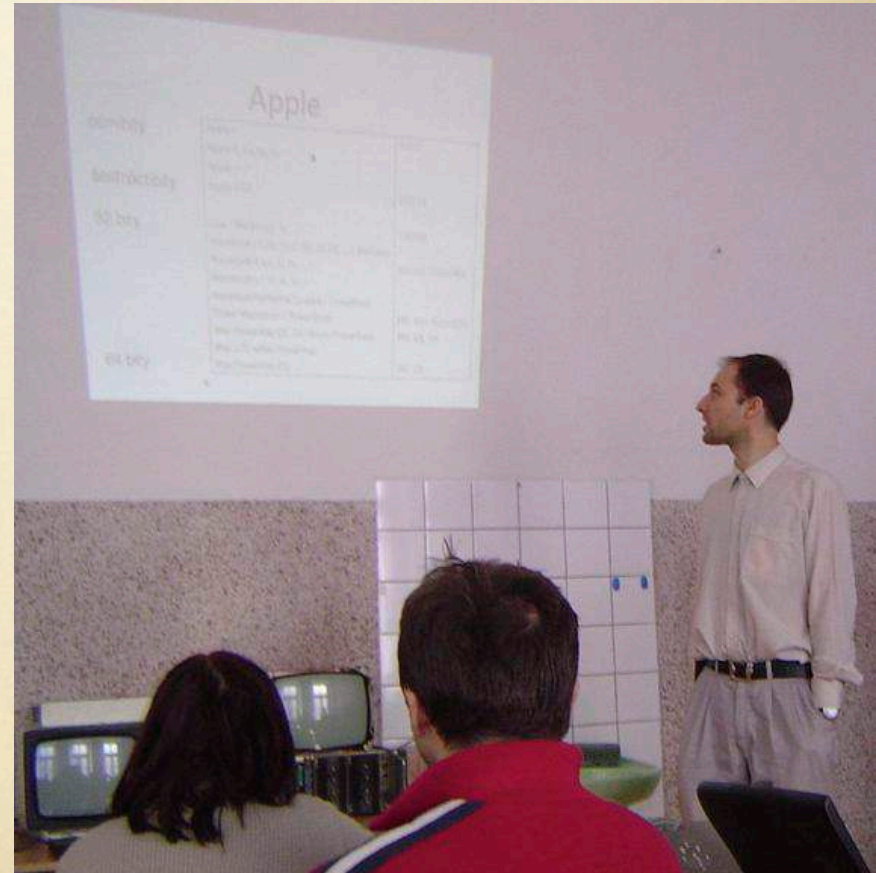
JAROSLAV ŠVELCH  
Jak obehřát železnou oponu  
*Počítačové hry a participativní kultura  
v normalizačním Československu*



# littérature recommandée



# Apples



2005



# Агат (Agate)



- first soviet microcomputer
- 1984
- 6502, in prototypes 588 (LSI-11)
- 3900 rubles (avg 250), wanted to export it for \$17 000
- approx. 19 000 produced 1984-1993

# Агат (Agate)



- 6502
- Applesoft Basic
- otherwise incompatible with Apple II
- no built-in Apple II text or graphics (except Агат 9)



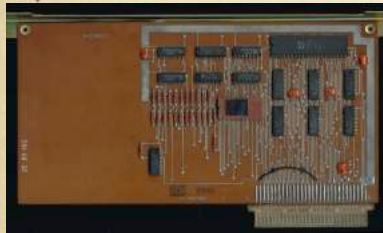
# Агат (Agate)



- Агат 4 - less than 100, limited expanding options, 64 KiO, cassette
- Агат 7 - 96 KiO, disk, most common, Агат 8 - 2 disks, printer
- Агат 9 - 6 slots, Apple II modes, 128 / 256 KiO, 2 disks

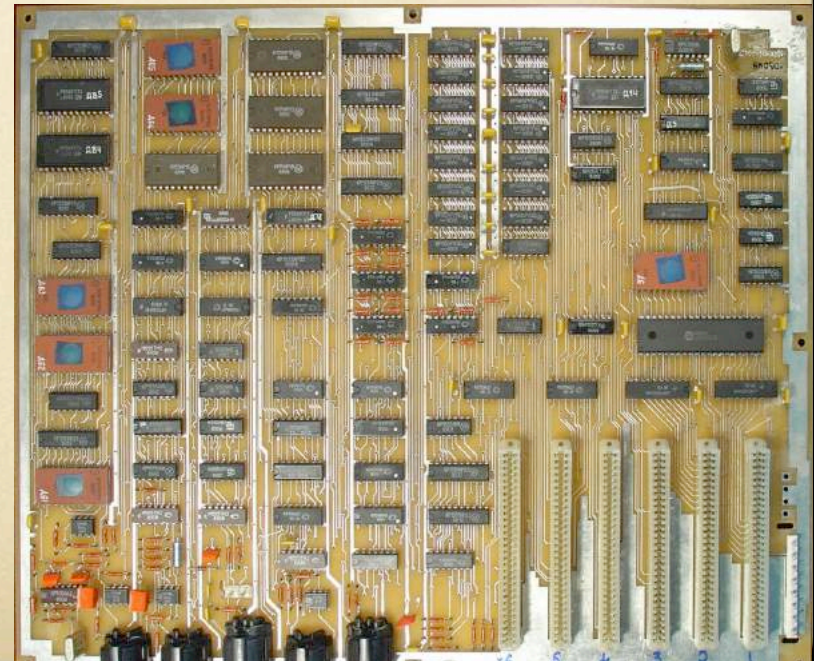


60 pin  
processor on separate board (Агат 4, 7, 8)  
disk controller EC-5088.02,  
1987 EC-5323 2S / HD (840 KiO)



Агат 7

Агат 9





# Агат (Agate)

- Агат 4



- Агат 7



- Агат 8



- Агат 9





# “unit 121” - Apple ][+ compatibility card

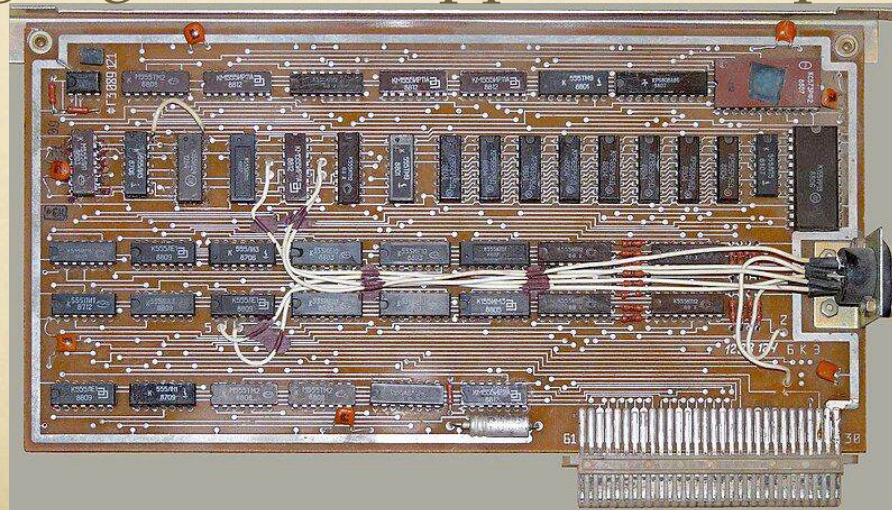
sold separately (onboard Atari 9)

own VideoRAM, Apple ][+ modes

separate monitor output

requires reboot to compatibility mode

no Language Card support (except Atari 9)





# Агат 9

- most Apple II+ compatible Агат
- less compatible memory paging with Агат 7
- lower case characters
- Processor, Unit 121, Language card onboard
- new modes (but one lost)
- interface card without serial, but Apple II Parallel Printer Card compatible

# modes

## Агат 4-8

- text 32x32, 8 colors
- text 64x32, 2 colors
- graph. 64x64, 16 colors
- graph. 128x128, 16 colors
- graph. 256x256, 2 colors

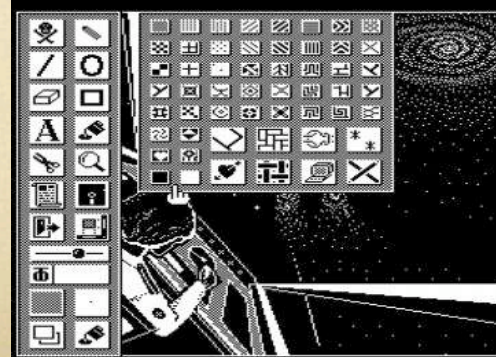




# modes

## Агат 9

- lost lo-res 64x64 16 colors
- 256x256 4 colors
- 512x256 2 colors



# Правец

- Bulgaria - 40-60% of COMECON computer production
- 5,25" drives!
- 1980 IMKO-1 - 50 produced, never sold, Apple II copy, cassette only
- Правец 8D - 1985, Tangerine Oric (GB) compatible
- Правец 16 - IBM PC clone



# Правец

- Правец 82 - 1982, 60 000, based on IMKO-2 (60 pcs), Apple ][+
- Правец 8M - Apple ][+ with onboard Z80 (CP/M)
- Правец 8E - Apple //e, 1300 pcs, Taiwan, no cyrilic!
- Правец 8A - Apple //e
- Правец 8C - 3 slots, //e with integrated cards
- Правец 8S - //e

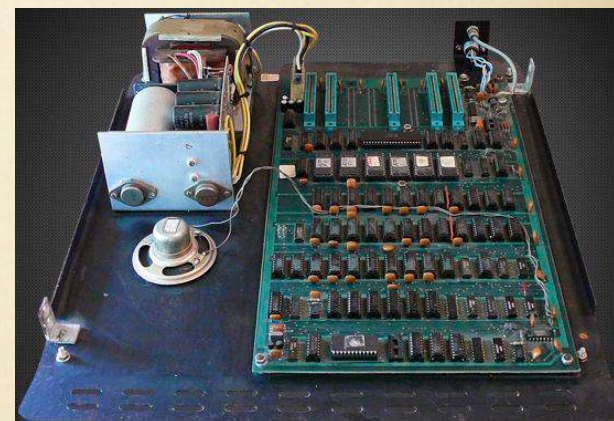




ИМКО-1



ИМКО-2



Правец 82





# Правец 8Е



Правец 8М



Правец 8А



Правец 8С



Правец 8S





THE END!

