Hungary’s Early Years in the Ryad

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By the mid 1960s Eastern European countries lagged 5-10 years behind the West in computer technologies.

In 1968, Alexei Kosygin\(^1\) initiated a cooperation among the Comecon\(^2\) countries to develop a Unified System of Electronic Computers (Ryad, ES or EC).

Upward-compatible series of computers by cloning of IBM’s 360 system (introduced in 1964).

Different countries develop different members of the series and peripherals.

Hungary makes the smallest member of the series, the R10, which \textit{did not} have a corresponding IBM 360 computer.

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\(^1\)Chairman of the Council of Ministers of the Soviet Union

\(^2\)Council for Mutual Economic Assistance (also CEMA or CMEA)
Outline

• 2nd generation computers (developed) in Hungary before Ryad:
  - TPA 1001
  - EMG 830

• Economic and historical context.

• Institutions of Ryad in Hungary.

• SZKI (Institute for the Coordination of Computing Technology).

• Manufacturing the R10.
TPA 1001
KFKI (Central Research Institute for Physics)
TPA 1001

• TPA = Stored Program Analyser (Tárolt Programú Analizátor).

• Clone of DEC PDP-8 mini computer. (Compatible with it)

• Developed in 1966-1968 at KFKI\(^3\) under the direction of Zsolt Náray.

• KFKI was not allowed to purchase one as a consequence of the COCOM\(^4\) embargo.

• DEC published and made its Small Computer Handbook available for free.

• Different versions in production until 1990. (TPA 70 independent development; TPA 1100s are PDP-11 and Vax 11 clones, \(~600\) TPA 1001, \(~80\) TPA 70, \(~800\) TPA 1100s were sold)

\(^3\)Central Research Institute for Physics, Központi Fizikai Kutatóintézet.

\(^4\)Coordinating Committee for Multilateral Export Controls.
EMG 830
DIGITÁLIS ELEKTRONIKUS SZÁMÍTÓGÉP

Az EMG 830 digitális elektronikus számítógép bár műszaki felépítésében a második generációs gépek csoportjába tartozik, szervezésében számos harmadik generációs tulajdonsággal rendelkezik. Ezek a tulajdonságok lehetőséget nyújtanak a felhasználónak arra, hogy a számítógépet optimálisan üzemeltesse mind az adatfeldolgozás, mind a tudományos-műszaki számítások, mind a folyamati ügyvitel területén.

Programkönyvtárának állandó fejlesztése az üzembe helyezés után is újabb és újabb lehetőségekkel bővít a felhasználhatóságot.

A programozás SIMPLE assembler, EMG AUTOKÓD szimbolikus programnyelveken, a későbbiek során ALGOL és FORTRAN nyelven is végezhető.

A számítógép szervezése és viszonylag gyors működése lehetővé teszi a gépen a multiprogramozást, és a folyamati ügyvitelben nélkülözhetetlen valós idejű (real time) program futtatást is.

Programkönyvtára tartalmazza
- a különböző szubrutinokat (perifériakezelés, rendelő program, elemi függvények lebegővesszős és dupla szóhosszúságú műveletet stb.)
- hibakereső tesztprogramokat
- műszaki és ügyviteli programokat, valamint
- fenti programnyelvek fordítóprogramjait.

A számítógép felhasználását nagyban elősegíti, hogy az érdeklődőkkel való közvetlen kapcsolat útján az Elektronikus Mérőkészülékek Gyára Számítógép-értékesítési Főosztálya készséggel áll a felhasználó rendelkezésére.

A géppel való megismerkedés céljából az EMG különböző szintű tanfolyamokat rendez programozók, operátortok részére.
EMG 830

• Independently developed and designed computer family.
• At EMG\textsuperscript{5} in 1964-1968 under the direction of Árpád Klatsmányi.
• Its architecture is typified by the modularity and the buses.
• 25000 operations/second, maximum main memory capacity: 32 Kword (21 or 24 bit/word, depending on the model).
• SIMPLE assembly language, Autocode and later FORTRAN and COBOL compilers. (ALGOL planned but never realized)
• ~15 of them were produced between 1968-1970.
• EMG 840 with integrated circuits, developed in 1972-1974. (Only one ended up in commercial use)

\textsuperscript{5}Factory for Electronic Measuring Instruments, Elektronikus Mérőkészülékek Gyára.
Hostile atmosphere

• Stalinist SU was hostile towards cybernetics and computers: “giant-scale campaign of mass delusion of ordinary people” pseudo-science whim of fashion of the West

• The attitude in Hungary in the 1960s was not as drastic, but:

  - neither TPA 1001\(^6\) nor EMG 830\(^7\) was called a computer

  - naming the computer society (founded in 1968) after von Neumann was suspicious

  - widely believed on the governmental level that computers cannot be profitable in the civil and economic sphere.

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\(^6\)Stored program analyser.
\(^7\)Process controlling module system.
New Economic Mechanism

- Economic reform introduced on January 1, 1968.
- A limited, artificial internal market is introduced.
- Larger freedom is given to enterprises and the ‘command’ or ‘planned economy’ is relaxed to a large extent.
- “[E]nterprises were left to their own devices in deciding what products to manufacture, consistent with their market position and demand.”
- “[T]he character of state ownership was not affected at all: top managers of state enterprises continued to be officials of the state, appointed and dismissed by the ministries or local authorities.”
- Leads to an “interest in numbers” (demand for computers).
Looking for a License (1967-1968)

- In the second half of the 1960s the leaders of OMFB, National Committee of Technological Development\(^8\) were aware that computers will play an increasing role in society.

- In 1967-1968 OMFB decided to acquire a computer license and cautiously started to look for a partner among Western countries: Great-Britain, France, West Germany, Italy, Sweden, and Denmark.

- Early 1968: meetings begin between the French Délégué à l’Informatique and OMFB and the newly established CII\(^9\) and EMG about the license of the CII 10010 computer (and its updates).

- Lengthy vacillation on governmental level, due to the general aversion towards computers. As a consequence, the license was not signed in 1968.

\(^8\) Árpád Kiss chairman (with ministerial rank) and János Sebestyén vice chairman.

\(^9\) Compagnie International pour l’Informatique.
Ryad

• Kosygin’s letter to Comecon countries, early 1968.

• Intergovernmental Commission on Computing Machinery (ICCM) is founded. It is independent from the Comecon bureaucracy.

In Hungary:

• OMFB\textsuperscript{10} founds SZTB, Interdepartmental Committee on Computing Technology.

• SZTB represents Hungary in ICCM.

• SZTB initiates and directs the Central Development Program for Computing Technology (SZKFP).

\textsuperscript{10}National Committee of Technological Development.
Ryad in Hungary

- Hungary wants to build the smallest computer, as it has experience with:
  - PDP 8/TPA 1001, mini computer
  - EMG 830, small to mid size computer
- Negotiations about CII 10010 mini computer already.
- Hungary is allowed to build the smallest computer.
- EMG buys the license on 24th of May 1969.
- The goal is to get the CII 10010 based computer accepted as a member of Ryad.
  (i.e. a legal, license based computer instead of an IBM clone)
Ryad in Hungary

• SZKI, Institute for the Coordination of Computing Technology is founded late 1968. The main institution of Ryad in Hungary.

  -imports, distributes and maintains the other Ryad computers

• SZÁMOK, Computer Education Centre:
  -instructors trained in Frankfurt in 1970 (6-9 months) in a CDI program
  -around 7000 people attend courses annually
  -46,000 textbooks (12-14 titles) published annually

• INFELOR: operation systems; MOM, peripherals

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11 Országos Számítógéptéchnikai Vállalat.
12 Számítástechnikai Oktató Központ
13 Control Data Institute, a vocational school created by Control Data Corporation (CDC).
14 Hungarian Optical Works.
SZKI\textsuperscript{15}

- Náray, former head of the TPA program at KFKI becomes the CEO of SZKI.
- Náray represents Hungary in the Council of Chief Designers.
- Although the primary goal was developing and coordinating the production of the R10, the SZKI attended to research and innovation tasks as well.
- 40% of the CII license was covered by software and hardware development (of CII 10010 and Mitra 15).
- SZKI has to finance itself from 1969. (effect of NEM)
- Náray (surprisingly) achieves that SZKI can keep 50% of its Western currency income. (effect of NEM)

\textsuperscript{15}Institute for the Coordination of Computing Technology.
Units of the institute are called laboratories:
- Hardware Laboratory
- Hardware Systems Engineering Laboratory
- Computer Laboratory (Computer Center)
  - Software Application Laboratory
  - Software Application Development Laboratory
- Design Automatization Laboratory
- Software Systems Engineering Laboratory
- Mathematical Laboratory
- Theoretical Laboratory

Laboratories are almost independent, have different projects.

Laboratories have their own budget and have to finance themselves.

\textsuperscript{15} Institute for the Coordination of Computing Technology.
SZKI$^{15}$

- Computer Center buys a Siemens 4004/45 computer in 1969, it was partially payed for in software developing commissions. This lead to a long-term cooperation between Siemens and SZKI as a software developer.

- Work for Ericsson, Messerschmidt, Kienzle.

- ~1974-75 SZKI had a Siemens 4004/150, which was modified to a 4004/151 to test the new Siemens time-sharing system for the first time (first time-sharing in Hungary as well).

- From late 1970s, image processing at Mathematical Laboratory (license plate recognition, space program etc).

- Automatization of the main East-West railway line of Hungary and carriage administration.

$^{15}$Institute for the Coordination of Computing Technology.
Manufacturing the R10

CII Mitra 15

R 10 (VT 1010)
Manufacturing the R10

- In 1970 employees of EMG were trained at CII in France.
- The first computers were assembled, using CII parts, under the EMG code 810 (based on CII 10010).
- By the end of 1970 EMG was ready to manufacture the 810 and produced a trial series that passed the quality control of CII.
- Then suddenly the license was passed over to VIDEOTON on 4th of December 1970 by a governmental decision. (sources conflict on the reason)
- Árpád Klatsmányi, head of the computer development at EMG got dismissed.
- The computer development program at EMG shrunk and was terminated a couple years later.
VIDEOTON

- No experience with computer technologies before 1968.
- Main premises in Székesfehérvár.
- VIFI, VIDEOTON Development Institute -founded in 1971 in Budapest -by incorporating EFKI, Electronic and Precision Mechanical Research Institute into VIDEOTON.
- VIDEOTON Computer Factory is founded in 1971.
VIDEOTON
R10

• VT 1010B based on CII 10010 (same as EMG 810), 1971.

• R10 = VT 1010 = EC 1010 = ES 1010 based on Mitra 15\textsuperscript{16} introduced in 1972 at Hungexpo, Budapest International Fair.

(The Mitra 15 was introduced at the Sicob\textsuperscript{17} in 1971 with the presence and assistance of SZKI employees.)

• The operating system is developed by INFELOR, called VIDOS (VIDEOTON Operating System).

• (The 2nd series of Ryad were IBM 370 clones, the Hungarian R15 computer was an IBM 370/115-125 clone.)

\textsuperscript{16}New version of CII 10010, originally called as 10010A.
\textsuperscript{17}Salon des industries et du commerce de bureau
VIDEOTON Peripherals

VT 340
VIDEOTON Peripherals

- VT 340 is an alphanumerical display (16 × 80) developed by VIDEOTON independently, introduced in 1971.
- 600 were sold in 1973.
- From 1971-1989 VIDEOTON sold ~90,000 displays, 40% on USD ($) based markets.
VIDEOTON Peripherals

VIDEOTON lineprinters:

based on Data Products license:\textsuperscript{18}

- VT 24000 from 1972, 80 characters/line, 1110 lines/min
- VT 25000 from 1974, 132 characters/line, 600 lines/min

(ES 7184/80 and 132)

independent, own development:

- VT 27000 from 1976, 136 characters/line, 900 lines/min

\textsuperscript{18}Again, legal, Western license.
VIDEOTON Offices

After sale offices outside Hungary (established 1972-1975):

- Moscow, Kiev, Minsk (Soviet Union)
- Prague, Bratislava (Czechoslovakia)
- Warsaw (Poland)
- East Berlin, Erfurt (East Germany)
- Sofia (Bulgaria)
- Belgrade, Zagreb (Yugoslavia)
- Helsinki (Finland)
Standard R10 setting
Standard R10 setting\(^\text{19}\)

Console typewriter, ES-7070, Czechoslovakia
Magnetic tape computer data storage, ES-5052, Bulgaria
and ES-5060 Hungary
Changable magnetic disc driver, ES-5511, Soviet Union
Tape drive, ES-5010, Soviet Union
Magnetic tape storage, VT-42500, Hungary
Punch card reader, ES-6022 = VT CR600, Hungary
Punch tape reader, CT-2000, Poland
Paper tape puncher, ES-7191 = MOM PerfoMOM, Hungary
Paper tape puncher, ES-7122, Poland
Lineprinter, ES-7184/80 and 132 (characters per line) =
= VT 24000 and 27000, Hungary
Alphanumeric display, ES-7168 = VT 340, Hungary

\(^{19}\text{ES = EC in coding of Ryad computers. VT is the code of VIDEOTON products.}\)
Thank You for Your Attention!