

INDIA'S FIRST INDIGENOUSLY MANUFACTURED DIGITAL COMPUTER TDC 12 BY ECIL

YEAR 2021 GOLDEN JUBILEE YEAR

The year 2021 marks the completion of fifty years since the manufacture of first DIGITAL COMPUTER called TDC-12 in India by Electronics Corporation Of India (ECIL, HYDERABAD) during the year 1971. TDC 12 was indigenously developed during 1969 at BARC. The efforts put by ECIL in hardware and software development while bringing out a series of digital computers subsequently were phenomenal and had laid the required foundations for and triggered COMPUTER INDUSTRY in INDIA. It is worthwhile to commemorate the great contributions of ECIL in this context.

Today INDIA is seen by the entire world as a great source of expertise in INFORMATION TECHNOLOGY. If INDIA is a respected nation in the world today, it is undoubtedly because of the country's champion technocrats who proved the worth of its men and women in several computer and its related fields. Generally one tends to look at and admire only the super structures of the presently available wealth of IT skills in INDIA, but fails most of the times, to recognise and respect the foundations laid by the visionaries in the early periods.

We need to mention the organisations that played pivotal roles during the early periods.

The evolution of COMPUTER HARDWARE AND SOFTWARE TECHNOLOGIES in INDIA can be categorised in three phases.

PHASE 1: During this phase INDIA's first set of DIGITAL COMPUTERS were designed and development models of DIGITAL COMPUTERS were made operational in country's R&D institutes such as TATA INSTITUTE OF FUNDAMENTAL RESEARCH (The development model TIFRAC was formally commissioned in 1960.) and JADAVPUR UNIVERSITY (the development model of ISITJU digital computer was commissioned during 1966). Unfortunately for some reasons these were not taken up for local manufacturing in INDIA.

The history of computer education in the country during late 1960 is as follows. IIT KANPUR started its post graduate program in computer sciences during 1971, B.Tech program during 1979. At IIT Mumbai computer education was being offered during 1965 as an elective subject in M.Tech (Electronics).

As a result of this the supply of computer educated manpower in INDIA was very, very limited during 1970 till the middle of 80s. Probably this could be one of the reasons why TIFRAC and ISITJU did not trigger computer industry in INDIA.

PHASE 2: It is during this phase and because of this phase the COMPUTER INDUSTRY got triggered and took roots in INDIA and gave confidence to the country about the competence and potential of its people.

During those days when even a radio was manufactured under foreign collaboration, It is unthinkable to manufacture digital computers based on local designs. The efforts required to convert the 'development know how' of a R&D model of any equipment into 'manufacture worthy know how', are huge and are very tedious.

The credit of initiating manufacture of digital computers in India based on indigenous development goes to the stalwarts like Dr A S RAO and Dr SRIKANTAN who envisioned a vibrant and self-sufficient INDIA.. Apart from initiating the start of computer industry in INDIA, one of the main contribution of the ECIL to the country is 'generation of high calibre computer hardware and software technical talent base large in numbers and confidence to the country that 'we too are capable'.



Dr A.S. Rao
Founder, ECIL



Dr. S Srikantan,
Head, Computer Group

Actually it was Dr S. SRIKANTAN (a visionary who laid foundations to computer industry in India) who proposed that he would develop a 12 bit digital computer at BARC during the year 1964 The development model od TDC 12 (TROMBAY DIGITAL COMPUTER) was inaugurated by Dr VIKRAM SARABHAI on 21st Jan 1969.

The TDC 12 R&D team moved to ECIL, HYDERABAD during June 1969 and INDIA'S first commercially manufactured digital computer based on indigenous design was despatched to the customer from ECIL during March 1971.



India's first indigenously manufactured digital computer during March 1971 at ECIL, developed in 1969

THUS MAR 2021 MARKS COMPLETION OF 50 YEARS AFTER INDIA'S FIRST DIGITAL COMPUTER WAS MANUFACTURED AND SOLD.

There afterwards ECIL had put all out efforts to take advantage of the success and had played a pioneering role in initiating COMPUTER INDUSTRY IN INDIA. In this process ECIL had many achievements, many firsts to its credit. ECIL's major contributions can be categorised into

- (a) **Generation of large no of skilled manpower in hardware and software areas.** Because of non availability of manpower with IT skills from academic institutions in INDIA., COMPUTER GROUP established its own internal training unit to train manpower in computer hardware and software areas by recruiting fresh graduates from all colleges and trained them internally by imparting necessary hardware and software skills from 1969 onwards ECIL had generated approximately one hundred number of skilled manpower every year for the next twenty years. Many employees of ECIL's COMPUTER GROUP joined many Indian universities and started computer science departments. ECIL also started M.Phil course in computer science at Central University HYDERABAD during the year 1975 The visionary behind all this was Dr SRIKANTAN who was heading the COMPUTER GROUP of ECIL.
- (b) **Development of a series of computers along with the required hardware and system software.** Over a period of next fifteen years ECIL had brought out a series of computers viz., a third generation 12 bit computer TDC 312 during 1974, a third generation 16 bit computer TDC 316 and a 32 bit computer TDC 332. The most vital components of the **System Software such as operating systems, assemblers, FORTRAN compilers and COBOL compilers were developed in house by ECIL on its series of machines.** TIFR had developed a real time operating system for TDC 316. **ECOBAL (ECIL's own commercial business Assembly language) compiler for TDC 312 was developed in house by ECIL.** BASIC interpreter for ECIL's TDC 312 was developed by IIM AHMEDABAD.

Most of the hardware and system software related to the series of computer systems were developed by ECIL for the first time in the country.

Microprocessor based computer systems: Dr S SRIKANTAN foresaw much early that 'Micro Processor Technology 'will overtake discrete computer technology and accordingly kept emphasis on microprocessor based computer systems. Thus ECIL was the first to introduce fourth generation VLSI based MICROPROCESSOR SYSTEMS Micro 78 based on Intel 8085 in the country during the year 1974. Later on ECIL brought out a series of 32 bit microprocessor based computer systems viz., Micro 32 based on Motorola 68000 series of microprocessor chips. ECIL was the first to bring out indigenously ported UNIX operating system on its UNIPOWER series of microprocessor based computer systems during 1983.

During late 70's many private companies started venturing into indigenously computer industry.

Marketing ECIL'S digital computers to be used in a variety of application areas: In this process ECIL had developed a variety of application specific hardware and software on its computers to cater to the needs of a variety of applications. ECIL has been the first in many such application areas.

COMMERCIAL DATA PROCESSING: During 1970's, bringing out a commercial data processing machine in INDIA meant "to be able to run already existing developed commercial application programs running on various IBM 1401 COMPUTERS and IBM UNIT RECORDING MACHINES in the country". Apart from developing COBOL,ECOBOL compilers on its machines ECIL had also developed a IBM 1401 simulator during 1974. With this simulator ECIL had replaced many IBM 1401 machines.

ECIL also brought out BDP 100 machine having a IBM's UNIT RECORDING MACHINE SIMULATOR during 1977(a commercial data processing version built around Micro 78 microcomputer) able to replace IBM's UNIT RECORDING MACHINES.

ECIL was the first to develop a data entry machine (key to floppy) to store the input data on a floppy.

ECIL was the first to introduce computers in Life Insurance Corporation Of India (LIC) during the year 1981. ECIL was the first to supply computer systems to various banks during the year 1990-for front office automation in India. The hardware and application software were developed by ECIL.

REAL TIME APPLICATIONS: (communications and process control, Data acquisition, telemetry) ECIL's computers were used for seismic monitoring, telemetry application at SHAR (SRIHARIKOTA ROCKET LAUNCHING), Fast Breeder Test Reactor monitoring.

ECIL was the first in the country during 1984 to deploy computers for communications. For Post and Telegraph Department, SFT (STORE and FORWARD TELEGRAPH SYSTEM) was developed by ECIL for automatically transmitting Telegrams to the various destinations in the country. ECIL had sold a large number of SFTs to DOT. Subsequently ECIL had brought out a much larger version of the same (SFMS) and sold to DOT large in numbers.. Similar systems were supplied to Indian Air force and Indian Army large in numbers. The entire hardware, application software for these machines were developed by ECIL.

ECIL had supplied a large no of TDC 316 based computer systems to INDIAN POLICE for their CRIME, CRIMINAL INVESTIGATION during 1978.

A plug compatible replacement for the imported computer OMC systems to work along with E10B TELEPHONE EXCHANGES manufactured by INDIAN TELEPHONE INDUSTRIES, BANGALORE, was developed by ECIL using its UNIPOWER 30. Approximately one hundred such systems were supplied to P&T department.

ECIL supplied a COMPUTER BASED SECURITY SYSTEM TO INDIAN PARLIAMENT during the year 2002 to control the entry of various people into the parliament premises.

ECIL also brought out TDC316 R (a rugged model of its TDC 316) to work under severe military environments for use in a strategic application of Indian Airforce. This project was taken up by TIFR, and the application specific hardware and software for this was developed by TIFR. A large number of such systems were sold by ECIL to our defence and were in use till recently.

ECIL was the first to demonstrate use of INDIAN LANGUAGES such as HINDI and TELUGU for processing during the year 1979 to Sri MORARJEE DESAI the then Prime Minister of India.

PHASE-3: Starting from 1991 the process of globalisation, liberalisation which was set in by GOVT OF INDIA, participation from private companies in the computer technology gained momentum. By mid-90's sale of Software Services In Computer TECHNOLOGY gained momentum. What we see today as gigantic IT INDUSTRY in INDIA happened during this phase. In the third phase ECIL did not give enough thrust to export of software which was predominantly body shopping as its priorities were for offering total turn key solutions to major sectors like Space, Atomic energy, Oil and natural gas industry, defence, security, etc. Electronic warfare systems, Missile control systems like BrahMos, Air traffic control systems, Parliamentary security systems, became thrust areas. Besides such System of systems it also gave importance to embedded systems development like EVMs, PC based

instrumentation, PLCs, advanced communication radios with embedded processors, crypto products, etc. ECIL mainly concentrated on computer applications **for various Indian local customers, developing customised software application programs starting from scratch viz., from conceptualisation to the implementation of final software in the customer's premises.**

THUS ECIL DESERVES KUDOS AS IT PIONEERED THE EVOLUTION OF INFORMATION TECHNOLOGY IN INDIA BY PRODUCING INDIA'S FIRST DIGITAL COMPUTER THEREBY LAYING THE FOUNDATIONS FOR AND TRIGGERING THE START OF 'IT AS AN INDUSTRY IN THE COUNTRY'.
