

CSIRAC Summary...

Designers: Trevor Pearcey, Maston Beard at CSIR Radiophysics, Sydney
Initially called CSIR Mark I
Developed from 1947, first run 1949, commissioned 1951
20-bit words of main memory, plus registers, mercury delay lines, 1024 (later 2048) words on disk; vacuum tubes (magnetic drum); simple bit-serial design, approx. 500 (later 1000) instructions per second, 12-channel paper tape I/O.
Moved to University of Melbourne, 1956, renamed CSIRAC, in 1964, replaced by IBM 704/1401

1

... CSIRAC Summary

- Fourth or fifth electronic programmable computer, oldest intact, still in original manufacture
- Probably first to play computer-generated music (Geoff Hill, 1951)
- Interpreted programming system "INTERPROGRAM" (Geoff Hill)
- To be on display at new Museum of Victoria—go see it!

2

SILLIAC...

- Developed from 1952, first run/commissioned 1956, University of Sydney
- Main designers: Brian Swire, Barry de Ferranti, Operations, 1956–, John Bennett (from EDSAC/Cambridge, Manchester/Ferranti)
- £A50,000 donation by Adolph Basser, under auspices of Nuclear Research Foundation (Harry Messel)
- Built by local industry (mainly STC)
- 1024 x 40-bit words (20-bit instructions); Williams tube main memory, parallel operation, approx. 13,000 instructions per second, magnetic tape, 5-channel paper tape I/O

3

... SILLIAC

Evolution of the SILLIAC design (University of Illinois), derived from EDVAC/IAS ideas
Doing other things, used in late 50s as emulator for development of SNOCCOM, Snowy Mountains Hydroelectric Authority (John Bennett)
Interpretive programming system
Designed by English Electric KDF9 in mid-sixties (one of first computers)
SILLIAC/KDF9/CDC machine)

4

UTECOM

- Third academic computer in Australia
- At New South Wales University of Technology (later UNSW)
- Commercial English Electric DEUCE—realisation of Alan Turing's ideas conceived at British National Physics Laboratory at Teddington.
- Mercury delay line memory, like EDSAC and Mk 1, but at higher pulse rate, 1MHz, overall faster than Mk 1 (CSIRAC)
- 40-bit words and 40-bit instructions (segmented)
- Interpreted programming system, GEORGE—stack based, influenced hardware design of KDF9

5

CSIRAC & SILLIAC Sources

- CSIRAC webpages, <http://www.cs.mmu.oz.au/csirac/>, currently maintained by David Hornsby.
- *The Last of the First, CSIRAC: Australia's First Computer*, Doug McCann and Peter Thorne, 2000, ISBN 0 7 7340 2024 4.
- *Computing in Australia: The Development of a Profession*, edited by J.M. Bennett et al. (Broomham, Murton, Pearcey, Rutledge), Hale & Tremonger/Australian Computer Society, 1994, ISBN 0 86806 554 4.

6

Comments: CSIRAC, SILLIAC, et al.

ing-edge for their day, often overlooked. Australian designed (IRAC) and produced (both)
culty getting Australian industry interested in commercial
duction of the design
ct through use and training courses on computer industry in
tralia—founding of two embryonic Computer Science
artments
ere will computing be in another 50 years?

7

Prescience

- In February 1948, Dr Pearcey wrote:
"It is not inconceivable that an automatic encyclopaedic service operated through the national teleprinter or telephone system, will one day exist."

8

Other Notable Early Computers

- ENIAC
- EDVAC et al.
- ACE, et al.
- Manchester Mark 1

9

ENIAC...

ctronic Numerical Integrator and Calculator"
igners: John Mauchly, J. Presper Eckert
t at Moore School of Engineering, University of
sylvania, 1942–1946, originally as secret WW-II military
ect PX (computing artillery tables)
ut 18,000 valves, thirty units: accumulators, function tables,
ter programmer...
a computer in the real sense: no stored program. ENIAC
programming by wiring together the units

10

... ENIAC

- Bi-quinary representation (10 digits + sign)
- Hardware multiply, divide, square root—capable of parallel operation
- Reliability and testing critical in the design
- Established what could be achieved by electronics (though compare code-breaking Colossus at Bletchley Park, Flowers/Turing, 1944–1945)
- Led to EDVAC (plus progeny IAS, ILLIAC, SILLIAC) and UNIVAC

11

EDVAC et al.

- Electronic Discrete Variable Automatic Calculator
- John von Neumann involved in discussions with Mauchly and Eckert (1944)—ideas about how to improve ENIAC, stored program
- See von Neumann paper in green book
- von Neumann's EDVAC ideas very influential—lead to IAS machine, EDSAC, ILLIAC, SILLIAC, and others

12

<p>Manchester "Baby", SSEM</p> <p>though very limited, first real computer in the modern, stored-program sense</p> <p>Moore, Turing, Toothill, Williams</p> <p>Williams tube memory, 2048 bits</p> <p>first program 1948, determine largest factor of a number</p> <p>moved to Manchester Mark 1, then Ferranti Mark 1</p> <p>13</p>	<p>ACE</p> <ul style="list-style-type: none"> • Turing: Automatic Computing Engine (1946-) • Based on his ideas of Universal Turing Machine. • Intended for more than numeric calculation: logical operations, large memory (60,000 words), AI • Largely independent of American and EDSAC work (though Turing attended Symposium on Large Scale Digital Machinery at Harvard, early 1947) • Pilot ACE built at NPL in May 1950, after Turing had left for Manchester <p>14</p>	<p>EDSAC</p> <ul style="list-style-type: none"> • Maurice Wilkes, 1949, Cambridge • Conceptually similar to EDVAC • Wilkes had attended famous Moore School lectures in 1946 • Mercury delay lines, valves • See Wilkes paper in green book <p>15</p>