

The EMIDEC 1100 computer: historical notes and references.

The background to all the early British stored-program projects from 1945 – 1951 is summarised in: ***Alan Turing and his Contemporaries: building the world's first computers***. Simon Lavington [ed]. Published by BCS in 2012. 111 pages; many illustrations. ISBN: 978-1-90612-490-8.

Another general account, spanning the period from the late 1940s to the mid-1960s, is: ***Early British Computers*** (Simon Lavington). Published by Manchester University Press (in the UK) and Digital Press (in the USA) in 1980. 139 pages, many illustrations. ISBN: 0-7190-0803-4. Available online at: <http://ed-thelen.org/comp-hist/EarlyBritish.html>

1. A brief history of EMI's computing activities.

There appears to be no relevant published history of the computing activities of Electric and Musical Industries Ltd. (EMI). Furthermore, there is at present some inconsistency in the dates of events as remembered by ex-EMI employees. The purpose of these notes is to assemble evidence on the dates of EMI's four computer projects and to invite others to provide corrections/additions.

1.1. The BMC computer.

R T (Ron) Clayden became the first engineer of the EMI Electronics team in October 1954, charged with investigating digital computers. Initially he started to build a simple machine, known as CP401 (for Commercial Project 401) to test his techniques. "Before it was working we received a firm order from the British Motor Corporation for a computer to process its payroll" (see ref. 2). The first EMIDEC Newsletter (ref. 3) says 1956 was the year of the firm order. John Hendry, in his oft-quoted book about the activities of the National Research Development Corporation (NRDC) says the date was 1955 (ref. 1).

Quoting Ron Clayden (ref. 2) again: "This machine proved to be the first and only EMI Electronic Business Machine produced: it was given the project number CP407, and was also known more colloquially as the BMC Payroll Computer. The commitment to BMC led to a great expansion of our team and also to a devolution of some of the work to other parts of EMI Electronics. The magnetic drum and the tape decks were developed at Wells in Somerset by a team initially under the direction of Willi Luttmer. Another team at Hayes, led by Godfrey Hounsfield, was responsible for the circuits associated with the Powers-Samas punched card readers and the Samastronic line printer. I was responsible for coordinating all the teams".

The BMC machine is described in ref. 4. It was a 36-bit word length computer, having a magnetic drum store of about 2,400 words capacity. The clock-rate was 115 kHz. The peripheral equipment consisted of two Powers-Samas card readers, one Samastronic lineprinter and five magnetic tape decks (only three of which could be used concurrently). The tape decks operated at a digit rate of 2 kHz. The technology used for the main BMC computer was based on thermionic valves, with some small use of germanium diodes. "The electronic equipment used in the units associated with the peripheral equipment employs mostly solid state components such as ferrite cores and transistors, valves being restricted to applications beyond the present capabilities of transistors". It is believed that core-transistor logic was used by Hounsfield for the Power-Samas and Samastronic control equipment. Hounsfield's core-transistor logic (or a development of it?) was subsequently taken forward for the EMIDEC 1100 project (see section 1.2 below).

The BMC computer (CP 407) was delivered to BMC's Austin Longbridge factory in 1958, according to ref. (3). Hendry (ref. 1) says the BMC computer was "put into commission" in about October 1956". In *Early British Computers*, (ref. 5, page 103) I said '1958' but did not give a source. When writing the book in 1979 I corresponded with H J Crawley of NRDC so I guess John Crawley gave me the information. (In 1979 NRDC's files had not yet been transferred to the National Archive for the History of Computing at Manchester). 1958 seems the more likely date for the delivery of the BMC computer.

Quoting Ron Clayden (ref. 2) again: "When the EMI Electronic Business Machine [the BMC computer, CP 407] was installed at Longbridge, the technical literature still had to be completed. I was given this task, while Bill Ferrier looked after the BMC installation and Godfrey Hounsfield started development of the Emidec 1100 computer".

Quoting Ron Clayden (ref. 2) again: " While we were still working on the EMI Electronic Business Machine the company won a contract from NRDC to develop a transistor-based computer: This work came to fruition in the Emidec 2400. The team was led by Charles Kramskoy and included Norman Brown and Bill Talbot. Later I took control of this project, while Charles Kramskoy became EMI Electronics Chief Engineer. Around the same time, Norman Hill joined us from Elliotts as Sales Manager for computers: he was responsible for the sales of nearly all the Emidec 1100s and 2400s. Hendry (ref. 1) says that Hill joined EMI early in 1957. This date is very likely: Norman Hill says (ref. 10) that he left Elliott's Borehamwood Laboratory in 1956, some time after Leon Bagrit (the Chairman of Elliott Brothers (London) Ltd.) had negotiated a marketing arrangement with NCR which was announced in the press in June 1956. Hill did not agree with the NCR deal and "I looked around and eventually joined EMI who were beginning to enter the field of business computers" (ref. 10).

1.2. The EMIDEC 1100.

In the late autumn of 1956, according to Hendry (ref. 1), the BMC computer group under R T Clayden put forward a 'proposal for a follow-up, called the 1100'. Hendry goes on to state that "from mid-1957, the 1100 developed as a full commercial project with full managerial support". However, Clayden himself (ref. 2) implies that actual work on the 1100 project

commenced rather later - in about 1958. Also, Godfrey Hounsfield, in an autobiographical note (ref. 7) says: "Starting in about 1958 I led a design team building the first all-transistor computer to be constructed in Britain, the EMIDEC 1100". Perhaps Hendry's dates are a little too premature? However, we do know that, during the evaluation of contesters for the Royal Army Pay Corp's EDP contract, "Post Office engineers paid two visits to the manufacturer [EMI] and were given every facility for discussing the proposal with engineering staff. They ascertained that the EMIDEC is an advanced type of system employing magnetic core switching and transistors but development is in the very early stages" (ref. 9). These visits must have occurred between about June and November 1957.

The first delivery of an EMIDEC 1100, to Boots at Nottingham, occurred on 20th April 1960 (ref. 8). The EMIDEC Computer News states that the 1100 started working at Boots, Nottingham, on September 5th 1960 (ref. 3). If the Newsletter date has been interpreted correctly, this gives weight to the conjecture that Hendry's date of 1957 for the 'full commercial project' may be a little too early.

The EMIDEC 1100 was re-badged as the ICT 1101 after the July 1962 take-over of EMI's computer interests by ICT. About 21 computers were delivered, according to the list given in ref. 6. This list has been checked and annotated and appears in section M1X1 of the *Our Computer Heritage* website.

1.3. The EMIDEC 2400.

The dates of this project are difficult to follow. Hendry (ref. 1) states that "in the summer of 1955 Kramskoy, then at EMI's Special Products Group at Feltham, put a proposal to NRDC for a computer based on core-plus-transistor logic and magnetic tapes. Work was under way early in 1956 on what was by this time called the 2400". However, once again the evidence from Ron Clayden quoted earlier suggests that Hendry's dates may be one year too premature. Hendry goes on to say that "from mid-1957 the 2400 was treated as a one-of-a-kind high-tech R&D project, progressing concurrently with (but independently from) the 1100 project". Hendry says that the 2400 'was first working' in 1961. Some of the anecdotal uncertainties arise from the fact that the 1100 and 2400 project teams appear to have been rivals at EMI.

The date of the delivery of the first production EMIDEC 2400 to the Ministry of Pensions is not known but is assumed to have been in late 1961 or early 1962. According to the EMIDEC 1100 website <http://www.emidec.org.uk/> "at least five EMIDEC 2400 systems were delivered". However, according to ref. 12, only three EMIDEC 2400's were ever sold.

1.4. The 3400.

The dates of this high-performance computer project are likewise difficult to follow. Hendry indicates, if I understand him correctly, that the contract with NRDC was signed in June 1959.

In July 1962 EMI's computer interests were sold to ICT. The 3400 project carried on ('pottered on') briefly as PF172. It was finally closed down in 1963.

1.5. Time chart.

Summarising the above evidence, it seems that the timescales for actual regular work on the various EMI computers, up to the first delivery to a customer, were probably as shown on the next page.

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
CP407, then BMC computer		—————								
EMIDEC 1100					—————					
EMIDEC 2400					—————					
EMIDEC 3400							■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■

Simon Lavington
Lavis 'at' essex.ac.uk

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2. References.

1. John Hendry, *Innovating for Failure: government policy and the early British computer industry*. MIT Press, 1990. ISBN: 0-262-08187-3.
2. Ron Claydon, *Early Computer Developments at EMI*. Resurrection (the bulletin of the Computer Conservation Society), Number 16, Christmas 1996.
3. EMIDEC Computer News, issue 1. Undated but we can deduce from the contents that it was published at the very end of 1960 or beginning of 1961. See:
<http://www.emidec.org.uk/emipicbr.pdf>

4. R J Froggatt, *Logical Design of a Computer for Business Use*. Journal of the British Institution of Radio Engineers, December 1957, pp 681-696. A copy of this article has been uploaded to Peter Woledge's website – see: <http://www.vintage-icl-computers.com/icl44aa>
5. S H Lavington, *Early British Computers*. Manchester University Press, 1980. ISBN: 0-7190-0803-4. Co-published by Digital Press, 1980. ISBN: 0-93237-08-8. Available on the web at: <http://ed-thelen.org/comp-hist/EarlyBritish.html>
6. See: <http://www.emidec.org.uk/> This informative website gives a great deal of interesting anecdotal and technical information about the EMIDEC 1100. It includes photographs and a web-accessible electronic version of the EMIDEC 1100 computer programming manual – (see also reference 11 below).
7. Godfrey N Hounsfield, autobiographical note from: *From Les Prix Nobel. The Nobel Prizes 1979*, Editor Wilhelm Odelberg, [Nobel Foundation], Stockholm, 1980. See: http://nobelprize.org/nobel_prizes/medicine/laureates/1979/hounsfield-autobio.html
8. The Times Supplement on Computers in Commerce, a 12-page illustrated addition to The Times newspaper of Tuesday 4th October 1960. This contains two items of relevance to the EMIDEC 1100 computer:
 - (a) An advertisement placed by EMI Electronics states that the Boots EMIDEC machine was delivered on 20th April 1960 and that two further computers had been delivered so far that summer: to Glaxo on 18th May and to ICI on 15th June.
 - (b) N D Hill, *The modern transistor – a far cry from cat's whisker*. "The first commercially available transistor computer was the EMIDEC 1100". [This statement may not be quite accurate: for example the Metropolitan-Vickers MV950 was completed in 1956. The first Elliott 803A was delivered in November 1959].
9. (a). Royal Army Pay Corps: Report of the Electronic Computer Investigation Committee. The War Office (F9), December 1957.
(b). Royal Army Pay Corps: Electronic Computer Investigating Committee: Report of Working Party. Application of automatic data-processing to soldiers' pay accounting. The War Office, August 1957.
10. N D (Norman) Hill, *A personal account of the early history of Elliott Brothers research laboratories*. 6-page typed manuscript and accompanying letter to Laurence Clarke, dated 9th May 1995.
11. The EMIDEC 1100 computer programming manual, issue 3, published by EMI Electronics Ltd., Hayes, Middlesex, in August 1961. (EMI ref. TL1063). Available electronically at: <http://www.emidec.org.uk/>
12. M Campbell-Kelly, *ICL: a business and technical history*. Oxford University Press, 1989. ISBN: 0-19-853918-5.