Systems Architecture of the EMIDEC 1100 computer.

Historical background.

Electric and Musical Industries Ltd. (EMI) was involved in the design and construction of digital computers from about 1954 to 1962. There were four distinct projects during this period. The first, known internally as the BMC Payroll Computer (Commercial Product 407), was a one-off machine installed at the British Motor Corporation's Longbridge factory near Birmingham in about 1958. The next three machines were, respectively, the EMIDEC 1100, the EMIDEC 2400 and the EMIDEC 3400. The last one never became a commercial reality. More historical notes, together with a full list of references, are given in section M1X5.
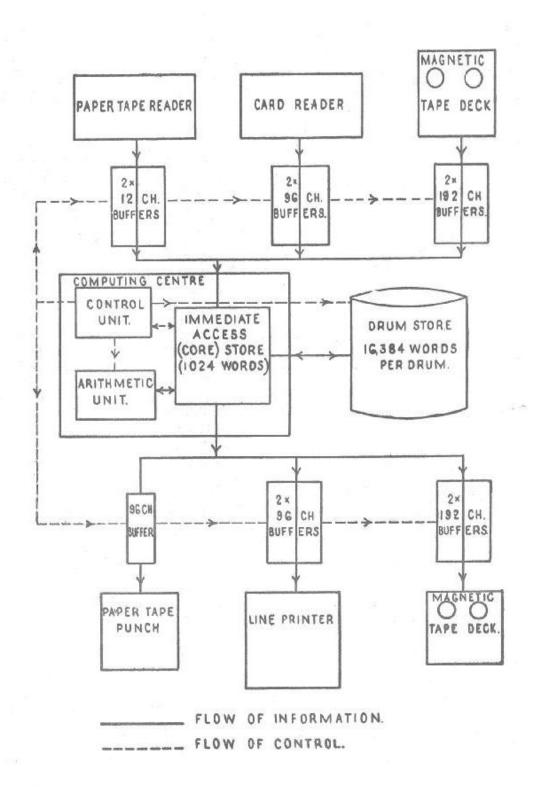
The EMIDEC 1100 was a transistorised computer, whose main development spanned the period late 1957 to 1960. The first one was delivered to an external customer in April 1960.

Overall architecture.

The EMIDEC 1100 has a word length of 36 bits. Instructions are all 36 bits long, using a *two-address* format – (see section M1X3). The primary *(immediate access)* memory consists of 1K words of core storage. A later enhancement, designated the EMIDEC 1101, had 4K words of core storage, which could be accessed in terms of 4-word blocks.

A simplified overall system diagram, taken from the EMIDEC 1100 computer programming manual (see ref. 11 in section M1X5), is given on the next page. Provision is made for a maximum of 16 peripheral devices, accessed via 16 channels. Channel numbers are allocated by plugboard at set-up time, the usual convention being:

Channel	*device*	*comments*
1 – 6	magnetic tape units	*see notes below*.
7, 8	card readers	Elliott CDR, at 400 cards/min. Cards were the preferred form of input for most data-processing applications.
9, 10	lineprinters	Either a Samastronic lineprinter (300 lines/minute, up to 140 characters per line) or an Anelex lineprinter (120 chars/line).
11, 12	paper tape readers	Ferranti TR5, 300 chars/sec. or Elliott at 1,000 chars/sec.
13	card punch	eg ICT type 234, 100 cards/min.
14, 15	paper tape punches.	eg Creed model 3000, at 300 chars/sec.

BLOCK DIAGRAM OF EMIDEC 1101.

In general, each channel buffer contains two queues, implemented as magnetic core storage, whose pointers are updated automatically during input/output transfers. Because of possible mis-matches in the speed of certain peripheral and the CPU, transfers are, strictly-speaking, semi-autonomous rather than fully-autonomous.

The CPU contains a parallel arithmetic unit, clocked at 100 KHz. A typical fixed-point ADD instruction takes 140 microseconds. There is no floating-point hardware but hardware assistance is given for decimal and sterling conversions.

The drum contains 256 tracks, each of 64 words. Drum transfers are in terms of 4-word blocks, up to a total of 16 blocks (equal to one track) for any one transfer. Up to 4 drums may be connected to an EMIDEC 1100 system.

Magnetic tape systems.
Two magnetic tape deck systems are offered. The usual option is an Ampex FR300 deck, having tape speed of 120 inches/sec. and giving a net character-transfer rate of between 7.3 and 7.5 Kchars/sec. The system uses pre-addressed blocks of 198 6-bit chars. (192 data plus 6 characters of control information. 6-bit characters are used). Blocks are pre-addressed and blocks are recorded in both directions on the tape. The one-inch wide tape runs forward for its whole length, reading or writing in alternate blocks. When it reaches the end, it is automatically reversed and reading/writing takes place of the blocks in between. To guard against data corruption, there are16 tracks across the width of the tape, as follows:

{6 data + 1 clock track},   duplicated (with data being 'mixed' on reading/writing so that, if one track fails, the signal from the other track is sufficient to represent the data).
One parity track;
One block-marker track.

An alternative system is an (Ampex?) tape deck giving a net transfer rate of 13.5 Kch/sec.

Magnetic tape reels come in five standard sizes, from 300 ft to 3600 ft., with capacities (16-word blocks) from 3K to 50K blocks.

More details to follow.

This provisional information was compiled by Simon Lavington.