

Specifications of Twelve Early Computers Made in France

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Tables 1 and 2 present the main computers designed and installed in France during the first two "generations." Two IBM machines—the 650 and the 1401—are included to enable readers to compare the French computers with these two "bestsellers" which marked their time. The tables do not mention:

- Machines of foreign design, even if they were produced under license by French manufacturers (i.e., the Bull Gamma 30, the PB computers of the Société Européenne de Traitement de l'Information and the RW computers of the

Compagnie Européenne d'Automatisme Électronique).

- Certain machines, of which very few were built, by companies that played only a secondary role in the History of Computing in France, and which are poorly documented (i.e., the *calculateur pédagogique* of the Société Alsacienne de Construction Mécanique, the Pallas computer of the Société Européenne de Traitement de l'Information and the KL 901 computer of the Société Nouvelle d'Électronique et de Radio-Industrie).
- Machines introduced in the market after 1963.

The dates listed on the chart represent the year of delivery, which is the most serious criterion (the machine then is supposed to be perfected).

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Table 1. Specifications of Six "First Generation" Computers Made in France

Machine	Bull Gamma ET	IBM 650	SEA CAB 1011	SEA CUBA	SEA CAB 2000	SEA CAB 3000
First Delivery	1956	1956 (France)	1955	1955	1955	1957
Use	Business & Sc.	Business & Sc.	Cryptography	Scientific	Sc. & Business	Sc. & Business
Production	120	100 ^a	1	1	4	4
Basic Price (kF)	600	17.5/month	?	?	2,000	3,000
CPU Technology	Ge diodes & Tubes	Tubes	Tubes	Tubes	Tubes + Ge diodes	Tubes
Fast Memory	Electrical lines	Electrical lines	Ferrite cores	Electrical lines	Ferrite cores	Ferrite cores
Memory Size	64 × 12-car. lines ^d	60 words	128 words	252 words	256 words	1,024 words
Back-up Storage	Drum	Drum	Drum	Drum	Drum & Mag. Tapes	Drum & Mag. Tapes
Back-up Size	8,192 × 12 car. ^d	2,000 words	7,964	32,768 words	8,192 words	16,384 words
I/O	Punched cards & printer	Punched cards & tape	Punched tape	Punched tape	Punched tape ^b	Punched tape
Word Length	Bit serial (4-bit car.) ^d	10 (biquinary)	45	50	22 ^c	30
Addition	0.68 ms	0.67 ms	0.92 ms	0.5 ms	0.46 ms	0.42 ms
Multiplication	14 ms	2.2 ms	—	1 ms	5.5 ms	0.84 ms
Clock (kHz)	280	125	100	100	100	100

^aNumber marketed in France.

^bCAB 2124 was connected to an electronic printer, the "Numérographe".

^cCAB 2022 had a 22-bit word, CAB 2024 a 24-bit word, etc.

^dGamma ET, a bit-serial computer, had a 4-bit character ("word"); its fast memory thus contained $64 \times 12 = 768$ characters, eg. 3072 bits; its drum contained $8192 \times 12 \text{ car.} \times 4 \text{ bits} = 393,216 \text{ bits}$ or 98,304 decimal numbers.

Table 2. Specifications of Six "Second Generation" Computers Made in France

Machine	Bull Gamma 60	Bull Gamma 10	IBM 1401	SEA CAB 500	SEA Dorothée	SEA 3900 A
First Delivery	1960	1964	1960	1961	1961	1961
Use	Business & Sc.	Business	Business	Sc.	Sc. (Simulation)	Business
Production	19 ^a	1600	800 ^b	120	2	26
Basic Price (kF)	3600	480	12.5/month	270	2,400	100
CPU Technology	Transistors	Transistors	Transistors	Magnetic cores	Transistors	Transistors
Fast Memory	Ferrite cores	Ferrite cores	Ferrite cores	Ferrite cores	Ferrite cores	Ferrite cores
Memory Size	4,096 words	1,024 bytes	1,400 bytes	16 words	3,328 words	4,096 bytes
Back-up Storage	Tapes & Drum	—	Tapes & disks	Drum & Tapes	Tapes	Tapes & Drum
Back-up Size	25,600 words	—	7,200 bits	16,384 words	—	40,960 words
I/O	Tapes & Cards	Cards & CMC7 ^a	Cards & tape	Punched tape	Punched tape ^d	Punched cards & tape
Word Length	24	variable (8-bit car.)	variable	33	25	variable
Addition	0.2 ms	0.22 ms	0.23 ms	0.32 ms	12.5 μs	0.2 ms
Multiplication	0.35 ms	5.6 ms	2.1 ms	60 ms ^e	12.5 μs	5.6 ms
Clock	200 kHz	—	1 MHz	220 kHz	2 MHz	2.5 MHz

^aCaractère Magnétique Codé (on bankcheques).

^bNumber marketed in France.

^cIncluding access & transfer time.

^dConnexions with analog/digital converters.

^e13 Gamma 60 remained actually in use.

Note that before being marketed, the computers are usually exhibited at SICOB, the major French office equipment fair since 1950. For example, the Bull Gamma 10 was announced and unveiled at SICOB in 1963, and delivered beginning in 1964.

The indicated figures and prices concern the basic configurations. So the Bull Gamma 60's fast storage, 4,096 words, was extendable to 32,768 words. An additional drum for the same machine cost 626,000 FF (French Francs). Prices are given in thousands of Francs, according to 1960 and 1963 sources.

Input and output peripherals are not listed comprehensively—the chart would not be large enough. Only the most typical peripherals for each machine or company are mentioned (i.e., the Bull

punched cards and the SEA punched tapes). All these machines were connected to printers.

References

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Table 1. Specifications of Six "First Generation" Computers Made in France

Machine	Bull Gamma ET	IBM 600	SEA CAB 1011	SEA CLUA	SEA CAB 500L	SEA CAB 3000
First Delivery	1950	1950 (France)	1950	1950	1950	1957
Use	Business & Sc.	Business & Sc.	Cryptography	Scientific	Sc & Business	Sc & Business
Production	130	100	1	1	4	4
Basic Price (kF)	800	11.5/month	2	2	2,000	2,000
CPU Technology	Drum & Tubes	Tubes	Tubes	Tubes	Tubes & Drums	Tubes
Fast Memory	Electronic lines	Electronic lines	Ferrite cores	Electronic lines	Ferrite cores	Ferrite cores
Memory Size	84 x 12-bit words	80 words	128 words	252 words	252 words	1,024 words
Back-up Storage	Drum	Drum	Drum	Drum	Drum & Mag. Tapes	Drum & Mag. Tapes
Back-up Size	2,000 words	1,804	22,104 words	22,104 words	2,102 words	12,384 words
I/O	Punched cards & paper	Punched cards & tape	Punched tape	Punched tape	Punched tape	Punched tape
Word Length	16 (decimal)	16 (decimal)	48	33	33	33
Addition	0.88 ms	0.87 ms	0.90 ms	0.2 ms	0.2 ms	0.2 ms
Multiplication	14 ms	52 ms	—	1 ms	2.2 ms	0.94 ms
Clock (kHz)	500	150	100	100	100	100