Olivetti OC 5300 Series

MANAGEMENT SUMMARY

UPDATE: *Olivetti has made no changes to the OC 5300 Series since we last updated the report.*

The OC 5300 series is marketed by Ing. C. Olivetti & C. S.p.A., Italy's largest computer manufacturer. The systems are IBM plug-compatible and are made in the United States by IPL Systems Inc. Olivetti owns part of IPL. Olivetti is Europe's largest indigenous office automation and computer manufacturer, and, in 1984, made net profits of 356 billion Lire, representing a significant increase on 1983 profits. Turnover in 1984 amounted to 4578 billion Lire.

One of the key characteristics of the three machines in the OC 5300 Series is that they can run all of the operating systems of IBM's 370, 303X, and 4300 ranges without alteration. This function is achieved by applying advanced microprogramming techniques.

The OC 5310, OC 5320, and OC 5330 are architecturally identical, and differ from each other only in processing power. The processing power in terms of millions of instructions per second (mips) is 0.65 for the 5310, 0.9 for the 5320, and 1.4 for the 5330. Expansion from 5310 to 5330 can be effected on site.

Main memory capacity varies from one megabyte on the 5310 to a maximum of 16 megabytes on the 5330. A special feature, called "the over 4-megabyte feature," is required for configurations over four megabytes. Since both the OC 5320 and OC 5330 start at a capacity of 2 megabytes, this feature will be needed for most configurations of these two models. There is also a cache memory available for the 5320 and 5330, which Olivetti refers to as a "high-speed buffer" memory. Cache memory functions by means of an algorithm designed to optimize data accesses and, in some cases, also instruction accesses. The high-speed buffer memory has a cycle time of 100 nanoseconds and a capacity of 8K bytes on the 5320 and 16K (8K for instructions and 8K for data) on the 5330. The buffer memory can speed up processing considerably since main memory cycle time is 400 nanoseconds. In addition, this high-speed buffer memory is more consistent with the 5300 processor cycle time of 50 nanoseconds.

This fast processor cycle time is achieved in part by the use of Emitter Coupled Logic (ECL) which, while processing less data in each cycle than other mid-range computers, carries out this processing at a much faster rate. Olivetti makes the claim that this sort of approach lowers manufacturing costs and complexity because there is less logic circuitry required than in other mid-range computers.

The most important architectural feature of the OC 5300 Series is the bus, which is the main data highway and connects all the components of the system. Each of these parts can be compared roughly with a printed circuit board.

The OC 5300 Series is a range of three IBM plug-compatible computers made by IPL systems in the USA. The performance is comparable to the IBM 4341/1 and represents an interesting alternative to that and comparable systems. All operating systems of IBM's 370, 303X, and 4300 Series can be used without modification.

MODELS: OC 5310, OC 5320, and OC 5330.
CONFIGURATION: 2M to 16M bytes of main memory; one byte multiplexer and up to five block multiplexer channels.
COMPETITION: IBM 4300 and 303X Series.

CHARACTERISTICS

SUPPLIER: Ing. C. Olivetti & Co. S.p.A., Largo Richini 6, 20122 Milan, Italy. Telephone (02) 8506. Telex 314380 olitali.

COMPANY LOCATIONS: *France:* Olivetti France, 91 rue du Faubourg St Honoré, 75383 Paris, Cédex 08. Telephone (01) 266 9144; *United Kingdom:* British Olivetti Ltd., Olivetti House, 86/88 Upper Richmond Road, London SW15 2UR. Telephone (01) 785 6066; *West Germany:* Deutsche Olivetti GmbH, Lyoner Str. 34, 6000 Frankfurt 71. Telephone (069) 66921.

Olivetti also has subsidiaries in the following countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Denmark, Finland, Greece, Hong Kong, Japan, Malaysia, Mexico, The Netherlands, Norway, Panama, Peru, Portugal, Puerto Rico, Singapore, South Africa, Spain, Switzerland, Uruguay, USA, and Venezuela.

MANUFACTURER: IPL Systems Inc., 12 Crosby Drive, Bedford, Massachusetts 01730, USA. Telephone (617) 275-1475.

MODELS: OC 5310, OC 5320, OC 5330.

DATA FORMATS

BASIC UNIT: 8-bit byte. Each byte can represent 1 alphanumeric character, 2 BCD digits, or 8 binary bits. Two consecutive bytes form a halfword of 16 bits, while 4 consecutive bytes form a 32-bit word.

FIXED-POINT OPERANDS: Can range from 1 to 16 bytes (1 to 31 digits plus sign) in decimal mode; 1 half-word (16 bits) or 1 word (32 bits) in binary mode.

FLOATING-POINT OPERANDS: 1 word, consisting of 24-bit fraction and 7-bit hexadecimal exponent, in "short" format; 2 words, consisting of 56-bit fraction and 7-bit hexadecimal exponent, in "long" format; or 4 words in "extended precision" format.

INSTRUCTIONS: 2, 4, or 6 bytes in length, specifying 0, 1 or 2 memory addresses, respectively.

INTERNAL CODE: EBCDIC (Extended Binary-Coded Decimal Interchange Code).

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The components are main memory, the storage control unit, the high-speed buffer, reloadable control storage, the execution unit, the instruction unit, the storage to storage unit, the console, and the Input/Output channels. The bus has a maximum total data rate of 80 megabytes per second.

The function of some of the units may not be altogether clear from their titles. Perhaps the most significant of these elements is the Reloadable Control Storage. It consists of 64 kilobytes of memory and contains the microcode and the microcoded diagnostic programs. Reloadable Control Storage enables loading to be done each time at machine start-up from a diskette drive, allowing Olivetti to alter the microcode to suit any changes which might be implemented by IBM in hardware or software.

Regarding other units, the storage control unit's job is monitoring access requirements from other units to the bus, the execution unit executes instructions, and the instruction unit fetches instructions from main memory (5310 and 5320) or from high-speed buffer (5330); the storage-to-storage unit is a dedicated processor which executes storage to storage instructions. All these units optimize speed and throughput.

On the 5300 Series, a black-and-white screen is standard, but one option is a color unit and a second option is a printer console with a 180 character-per-second printer. The console is integrated with the central processor of the machine. As an effective part of the console, but actually placed beneath it, is the diskette drive already mentioned in connection with the reloadable control storage.

Software for the OC 5300 Series includes the standard IBM operating systems—DOS/VS, DOS/VSE, VM/370, OS/VSI, MVS/SE, and MVS/SP. In addition, there are various microcoded subprograms which can be utilized. These are usually specifically designed to speed up some frequently used parts of the operating or other systems offered.

COMPETITION

The main competition to the OC 5300 comes from IBM's 4341 and 3031, and from Sperry's 1100/60, as well as from products from several European manufacturers and other PCMs such as National Advanced Systems AS/5-3.

ADVANTAGES AND RESTRICTIONS

Advantages of the 5300 Series cited by the vendor vis-à-vis the IBM 4300 Series are that the 5300 Series is faster (0.65 to 1.4 mips versus IBM's 0.7 to 1.3 mips—hardly significant); the 5300 bus structure is better; the 5300 physical characteristics (space, heat output, power requirements) are lower; and delivery time and price/performance ratio are better.

Olivetti claims that maintenance is minimized by the flexibility and modularity of bus architecture and by the facility of isolating faulty components by means of microdiagnostics (that is, diagnostic software in microcoded

MAIN STORAGE

TYPE: Metal Oxide Semiconductor (MOS).

CAPACITY: From 4MB to 8MB in increments of 1MB. Up to 16MB in the OC 5330.

CYCLE TIME: 400 nanoseconds for both read and write operations.

CHECKING: All data paths between the central processor and main storage are parity-checked by byte. When data is stored, an error-correcting code is substituted for the parity bits. (An 8-bit modified Hamming code is appended to each 8-byte double-word of data). When the data is retrieved, single-bit errors are detected and corrected automatically, and most multiple-bit errors are detected and signaled so that appropriate program action can be taken.

STORAGE PROTECTION: The Store and Fetch Protection features, which guard against inadvertent overwriting and/or unauthorized reading of data in specified 2048-byte blocks of storage, are standard.

CENTRAL PROCESSORS

The OC 5300 Series maintains full compatibility with IBM 4300, 303X, and System/370 CPUs except for those programs that contain time-dependent coding.

The OC 5320 and OC 5330 processors include a high-speed buffer memory and instruction prefetch hardware.

REGISTERS: The OC 5300 processors contain sixteen 32-bit general-purpose registers that can be used for indexing, base addressing, and as accumulators; four 64-bit floating-point registers; and sixteen 32-bit control registers.

INSTRUCTION REPERTOIRE: The OC 5300 processors feature the IBM System/370 Commerical Instruction Set with two exceptions: the Store Channel ID instruction cannot set condition codes 1 and 2; and the two instructions associated with direct control, READ DIRECT and WRITE DIRECT, are not provided.

OPERATIONAL MODES: Like the System/370, the OC 5300 processors can operate in either the Basic Control (BC) mode or the Extended Control (EC) mode. In the Extended Control mode, certain bits of the Program Status Word are interpreted differently than they are in the Basic Control mode. In addition, the reserved portion of lower main memory is altered. Both these changes are implemented in order to facilitate dynamic address translation and thereby support the virtual memory operating systems.

PROCESSOR FEATURES: The OC 5300 processors incorporate the following standard features: the System/370 Commercial Instruction Set; floating-point facilities, including extended precision; storage protection for both store and fetch operations; conditional swapping (a standard IBM 370/138 feature); a console printer and keyboard; a console file for initial microprogram loading; control registers; dynamic address translations (in System/370 mode only); extended control program support (ECPS; VSE) mode; single-bit error correction; machine check handling; program-event recording; the standard System/370 timing facilities, including the interval timer, clock comparator, CPU timer, and time-of-day clock; channel retry facilities and channel indirect data addressing; microprogrammed instruction retry; and standard microcode enhancements, including extended control mode. OS/DOS compatibility and advanced control program support and virtual machine assist are standard, as on the IBM 370/148.

A unique double-word buffer that provides greater levels of throughput is included with each block multiplexer channel.