370 165

**Announcing
IBM System/370
Model 165**

The IBM System/370 Model 165 is a large scale data processing system designed for use in both commercial and scientific applications. Internal performance is approximately 2 to 5 times the System/360 Model 65. It shares the same instruction set, is fully compatible with System/370 Model 155, and is upward compatible with members of the System/360 family. In addition, it offers extended precision floating point, floating point explicit rounding, and the removal of operand boundary alignment restrictions for unprivileged instructions.

The high performance of the Model 165 is attributed to:
- Implementation of logic in MST-4 technology which is extremely high-speed and reliable.
- An 80 nanosecond processor cycle.
- An 80 nanosecond buffer that retains storage data with which the CPU is currently working. The processor achieves high performance by working with this high-speed buffer rather than with storage.
- Micro-program control of the "E" Unit consisting of Read Only Storage (ROS) and a Writable Control Storage (WCS).

- A versatile Storage Control Unit that can initiate storage references every processor cycle.
- Multiple instruction and operand buffers.
- Overlapped instruction and execute cycles.
- Parallel operation of fixed point or floating point instructions.

I Unit:

The "I" Unit of the Model 165 fetches instructions, decodes them and sets up the required operands for the "E" Unit. It prepares several instructions at once, keeping them always in sequence.

It accomplishes this task through the following functional components:
- Two 128-bit instruction buffers.
- Three 24-bit instruction queue registers.
- Four 32-bit address registers for storage requests.
- A 24-bit, three-input address adder for address calculation.

E Unit:

The "E" Unit executes instructions prepared by the "I" Unit and has the ability to process an instruction every cycle. It is controlled by micro-programming residing in control storage. Functional components which allow the "E" Unit to operate are:
- Control Storage - 108 bits wide.
- A parallel adder, 64 bits wide including a 32-bit logic unit (AND, OR, OE).
- A parallel shifter which allows shifts of 0 to 63 positions in either direction in a single processor cycle.
- A serial adder, 1 byte wide, for executing variable length SS instructions and overlapped floating point instructions.
- A local storage consisting of 16 four-byte general purpose registers and four eight-byte floating point registers, with simultaneous read/write capability.

Control Storage:

Control Storage consists of a Read Only Storage (ROS) and a Writable Control Storage (WCS).

The Read Only Storage is capacitive and contains 2,048-108 bit words. It contains the microprogram for control of the basic Model 165.

The Writable Control Storage is a monolithic unit which contains 512-108 bit words. It contains basic machine micro-code as well as the microprogram which controls operation of features such as emulation. It also houses micro-diagnostics for quick problem diagnosis.

Both control storages have 80 nanosecond cycle times.

IBM Storage:

Storage for the Model 165 consists of M9A core array frames. Each M9A rame can house a total of 512K bytes.

The storage available for the Model 165 are 512K, 1024K, 1536K, 2048K and 3072K bytes. All configurations can produce 4 double words of data of 8 bytes each every 2.0 microsecond cycle.

The Storage Control Unit (SCU) has the capability of Error Check and Correction (ECC), which corrects single bit failures with no lost processor time.

The high-speed buffer resides between storage and the CPU and operating at 80 nanosecond speed, gives the CPU the ability to process at speeds approaching one instruction per cycle.

Channels:

The Model 165 has the capability of attaching.
2860 Selector Channels.
2870 Multiplexor Channels.
2880 Block Multiplex Channels.
Up to seven addressable channels may be attached to the basic machine.

Features:

Extended Channel Feature: Provides capability of expending from 7 to 12 addressable channels on the basic machine.

High-Speed Multiply Feature: Fast execution of both floating point and fixed point multiply.

Emulators: Full emulation of 7090/94 or 7070/74 is provided.

Maintenance Features:

- A CRT to display every major register.
- A modified microfiche viewer to display every significant control and status trigger.
- A Hex-Entry Keyboard to simplify manual data entry.
- A device using a magnetic disk cartridge to load diagnostics via the service adapter, and a dedicated data path.
- Microdiagnostics and card calling standard diagnostics for quick fault locating.
- Logout analysis program for resolution of intermittent malfunctions.
- Hardware instruction retry.
- CE Power and Cooling Test Panel.
- New FE ALD's.
- A Standalone Executive Program will be provided to run on-line diagnostics off-line. In addition, many devices may be diagnosed concurrently through use of new On Line Test Executive Program and OLT's.

In addition, functional packaging, logout, diagnose, failure detection parity checking, and DM diagnostics and the System Integration Program are provided.

This is an CE Career Path ,,General Systems" product.

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