370

168

Description

The IBM System/370 Model 168 is a large scale system designed with virtual storage capabilities for use in both commercial and scientific applications. Virtual Storage effectively removes the address constraints of Processor Storage from both system and problem programs. The Processor Storage and Control Strorage both utilize monolithic technology. A standalone system console provides the facilities necessary to operate, control and display the system. A power distribution unit controls the distribution of customer supplied input power from the motor generator to the system. A coolant distribution unit provides a closed-loop distilled water circulating system for cooling.

Compatibility

The Model 168 is upward program compatible with current System 360 and System 370 without extensive reprogramming. (Excluding time and model dependent programs.)

To further enhance compatibility, emulation for 707X, 7080 and 709X is available as a feature.

Performance

The throughput performance of the Model 168 is dependent on the system configuration, the operating system and the program jobstream. The high performance achieved in the Model 168 is attributed to:

- The high-speed and reliability of MST-4 technology
- An 80 nanosecond processor cycle
- A high-speed buffer storage
- Multiple instruction and operand buffers
- Overlap of instruction and execute cycles
- Interleaved high performance Processor Storage
- Translation look-aside buffer

Technology

The Model 168 CPU uses Monolithic Systems Technology in the following types: MST-1, MST-2, MST-4 and MST-A.

The Read Only Storage (ROS) uses MST-A and the Writable Control Storage (WCS) and the high-speed buffer utilizes C-40 technology.

The Processor Storage of the Model 168 employs FET (Field Effect Transistor) type technology.

Availability

The high availability of the Model 168 is attained through automatic recovery techniques which permits deferred maintenance

- Instruction Retry will for most instructions (except Execute, Diagnose, Read Direct - RDD -, Write Direct- WRD -, and Test Set - TS -) completely re-execute the instruction following an error condition, provided the retry threshold is not exceeded.
- Channel Retry will attempt to recover from channel errors with software recovery support.
- Error Correcting Code (ECC) will correct single bit storage data failures without interruption of the system.
- Multiple bit storage errors can be deferred through software recovery using page refresh or deletion.
- System hang detection hardware provides for handling of hang conditions and subsequent retry.
- The Recovery Management Support (RMS) supplements hardware executed automatic retry facilities. RMS assesses the software damage and repairs of selectively terminates the task.
- One megabyte increments of Processor Storage can be configured off-line, enabling the system operation to continue.

Maintainability

Maintenance of the Model 168 is enhanced through the utilization of the following facilities:

- Extensive error checking and indicators
- A Cathode Ray Tube (CRT) to display every major register
- Modified microfiche viewer to display significant control and status latches/triggers
- Over 1400 bytes of CPU logout data
- Logout analysis program for resolution of intermittent failures
- A hex-entry keyboard for data entry.
- CPU microdiagnostics and other conventional software diagnostics for fault location.
- Marginal checking of CPU logic
- A CE power and cooling test panel
- A device using a magnetic disk cartridge to load microdiagnostics via a dedicated data path.
- On-Line Tests (OLTs) for I/O units are run under OLTEP for concurrent I/O maintenance. OLTs are run off-line under OLTSEP.
- Automatic System Checkout Program (ASCP) which is selfconfiguring.
- Functional packaging of the CPU logic.

Standard Features

- Universal Instruction Set
- Rounding and Extended Precision Floating Point
- Interval Timer
- Store and Fetch Protect
- Storage and Configuration Control
- 8K Byte High Speed Buffer Storage
- Direct Control
- Dynamic Address Translation (DAT)
- Program Event Recording (PER)
- Operand Boundary Alignment
- Time of Day Clock and Clock Comparator
- CPU Timer
- Extended Control Mode
- Dual In-Bus Feature
- Instruction and Channel Retry
- Store Status
- Software Monitoring Feature
- System Mask Instructions

Optional Features

- Additional Processor Storage in 1 megabyte increments up to 4 megabytes
- High-speed multiply
- Emulators for 707X/7080/709X
- Extended Channel Feature allows attachment of twelve channels
- Dual integrated storage controls

Central Processing Unit (CPU)

The CPU consists of an instruction ("I") unit, an execution ("E") unit and Processor Storage.

The "I" Unit fetches instructions to be executed, decodes them, and sets up the required operands for the "E" Unit to begin execution. The "I" Unit may be processing several instructions at once while maintaining the logical sequence.

The "E" Unit executes the instructions prepared by the "I" Unit and is capable of processing an instruction every cycle (80 ns). The "E" Unit is primarily controlled by microprogramming within the control storage.

The processor storage is an integrated monolithic non-destructive readout storage. The storage technology is the FET (Field Effect Transistor) type. The processor storage is available in capacities of 1 to 4 megabytes in one megabyte increments. The storage operates in a serial or four-way interleave mode and a doubleword data width. The cycle time is 480 nanoseconds for doubleword fetches and stores. The processor storage control function contains the Dynamic Address Translation (DAT), Translation Lookaside Buffer (TLB), high-speed buffer, address array, storage protect and channel buffers.

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

The Read-Only Storage is a monolithic unit which contains 2,048 - 108 bit words. It contains the microprogramming which controls the functions performed by the "E" Unit.

The Writable Control Storage is a Monolithic Unit which contains 512 - 108 bit words on the standard machine. It contains basic machine microprogramming and can be loaded with microdiagnostics.

A new direct access storage control unit is available as an integrated function. The Model 168 has the Integrated Storage Control Unit available as an optional feature which provides two integrated storage controls. Further, a two-channel option is available to add the two-channel switch capability to both adapters.

Each of the dual integrated storage controls will attach up to two 3333 Disk Storage units, each of which can attach up to three 3330 Mod1 units (2 drives each), thereby controlling up to a total of 32 drives.
The Two-Channel Switch feature allows each of the two storage controls to be connected to two channels on the same or separate systems.

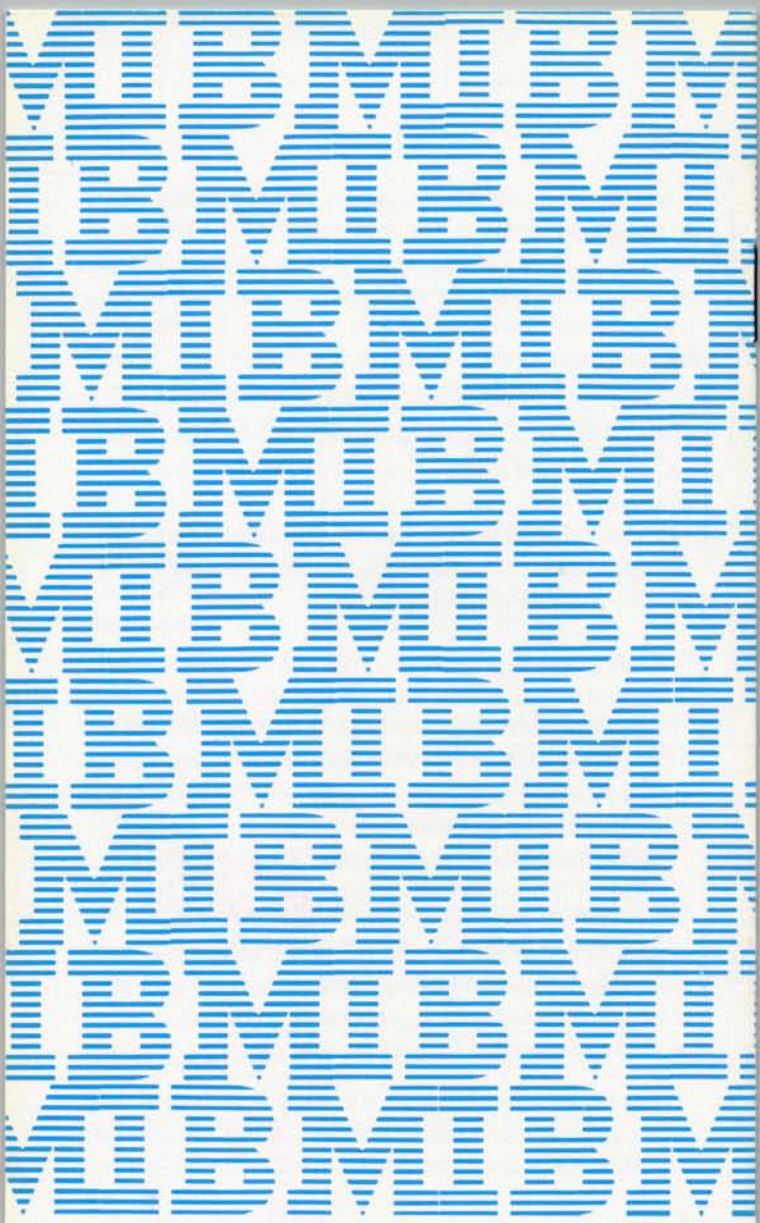
Channels

The Model 168 has the capability of attaching through a common interface, the following channels:

2860 Selector Channels
2870 Multiplexor Channels
2880 Block Multiplex Channels

The channels must have the CIDA (Channel Indirect Data Addressing) feature to operate with OS/VS.

A maximum of seven addressable channels may be attached to the basic machine. This can be extended to twelve with the extended channel feature.



IBM World Trade Corporation
DP Customer Engineering
821 United Nations Plaza
New York, N.Y. 10017 U.S.A.

Printed in Western Germany