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# IBM System/38

## IBM SYSTEM/38

The IBM System/38 combines new hardware and software technologies to help:

- Enhance and improve operational and programming productivity
- Remove traditional barriers to complete application solutions
- Provide an investment opportunity
- Offer growth for users of current systems

Operational and programming productivity can be improved by:

- Control Language
- Utilities
- Online coding, testing, and debugging
- Live environment operator training
- RPG III
- Integrated work station processing support

Barriers to complete application solutions are removed by:

- Function
- Configuration flexibility
- Device independence
- Local/Remote transparency

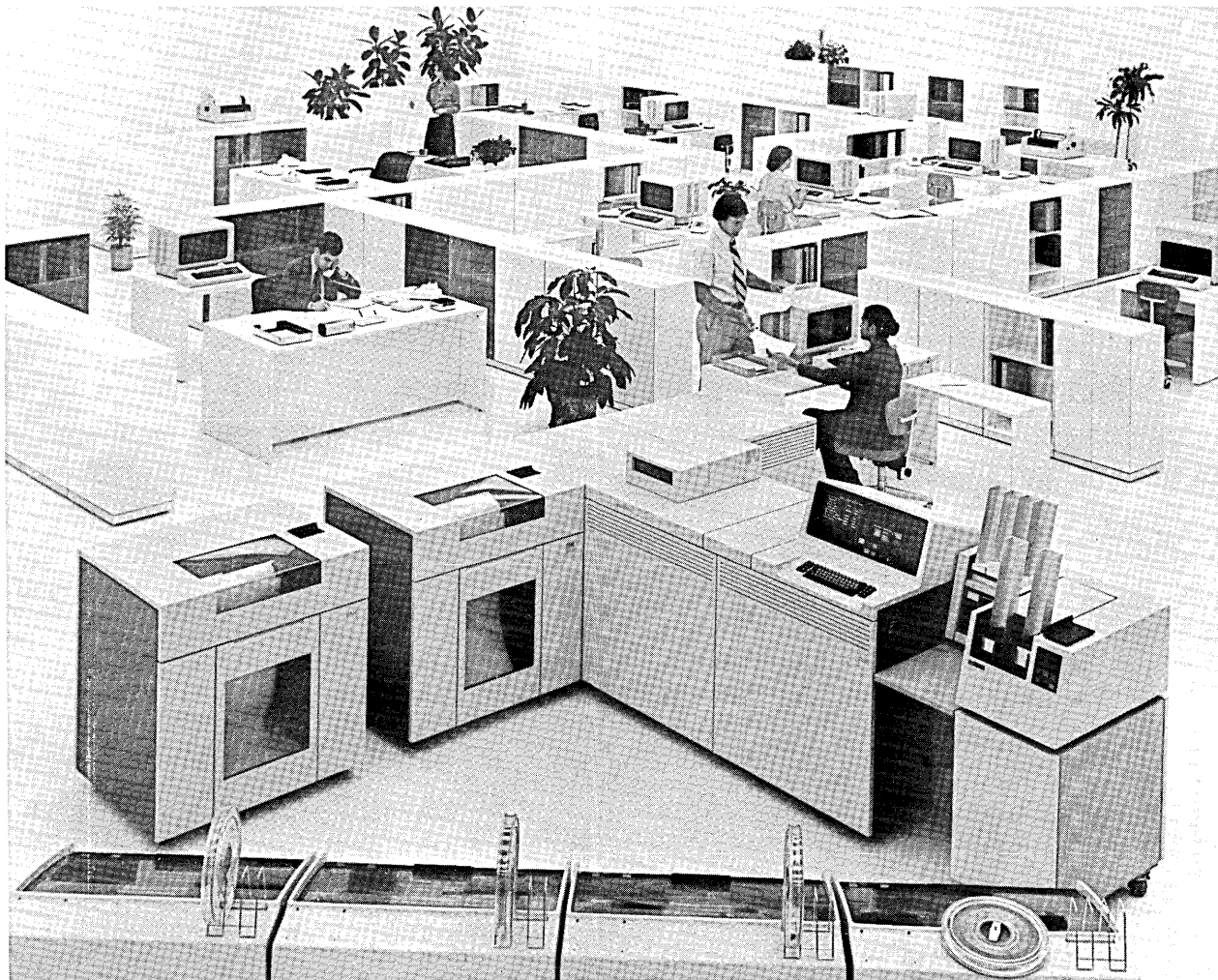
- Data accessibility and control
- Security/Integrity

The investment opportunity is provided by:

- Newest technologies
- Programming
- Field upgrade ability
- Support
  - Education
  - Systems Engineering
  - Customer Engineering
  - Applications

Growth for current system users is available through:

- Storage
- Work stations
- Printers
- Remote work stations



## IBM 5381 System Unit

### Processing unit

- Main storage capacity — 512K, 768K, or 1024 K (Model 3XX and 5XX), and 1280K or 1536K (Model 5XX only)
- Nominal internal cycle time (4-byte access) — 1100 nanoseconds for Model 3XX and 600 nanoseconds for Model 5XX
- Virtual storage addressing (main storage and disk storage managed as one resource)
- Work station controller provides direct attachment capability for IBM 5250 Information Display System devices (12 standard — 40 maximum) via twinax or coax cable
- Communications controller provides up to four communications lines — SNA/SDLC\*

### Disk storage

- Nonremovable disk storage
- One to six spindles — 64.5 MB, 129 MB, 193.5 MB, 258 MB, 322.6 MB, or 387.1 MB
- Data transfer rate — 1,031 KB per second
- Access time:
  - Rotational delay — 9.6 ms average
  - 27.0 ms average seek time
  - 9.0 ms minimum seek time
  - 46.0 ms maximum seek time

### System console keyboard/display

- Standard CRT display and keyboard
- 16 lines of 64 character positions each
- 24 command function keys
- Full console function (except system power-on IMPL, start CPF, and other functions requiring use of the operator service panel) at any 5251/5252 display attached to the system

### Diskette magazine drive

- Standard on all system models
- Two 10-diskette magazines (maximum capacity 24 MB) plus three individual diskette slots
- Accommodates 1, 2, and 2D diskettes

## IBM 5250 Information Display System

Attachment of devices to System/38 is through direct connection to the work station controller, or through communications lines via the communications controller. The programming interface is independent of attachment.

Display station attributes include normal or bright intensity, nondisplay underscore, blinking or nonblinking, column separator, and reverse image.

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\* System network architecture/synchronous data link control

There is a choice of three movable keyboards — 83-key typewriter-like, 66-key style, or 66-key data entry style with proof arrangement.

### 5251 Display Station

- 960-character screen — 12 lines of 80 characters
- 1920-character screen — 24 lines of 80 characters

### 5252 Dual Display Station

- 960-character screen — 12 lines of 80 characters

### 5256 Printer

- Three models — 40 cps, 80 cps, and 120 cps
- Bidirectional serial printing
- Upper/lowcase 96-character print set
- Forms tractor for continuous forms feeding

## Line printers

Up to two line printers can be attached to System/38 — except two bolt-on printers.

### IBM 5211 Printer

- 300 lpm standalone (using 48-character print belt)
- OCR printing capability
- 48-, 60-, 64-, and 96-character set
- 132 print positions
- Spacing — 10 characters per inch horizontal; 6 or 8 lines per inch vertical
- Fully buffered operation under control of System/38

### IBM 3262 Printer

- Two models — 650 lpm standalone and 650 lpm bolt-on (using 48-character print belt)
- 48-, 60-, 64-, and 96-character set
- 132 print positions
- Spacing — 10 characters per inch horizontal; 6 or 8 lines per inch vertical
- Fully buffered operation under control of System/38

### IBM 5425 MFCU card device

- 96-column card reader, punch, interpreter (print and stack) in one unit
- Two Models — 250/60/60 cpm (read/punch/print — 3 lines) and 500/120/120 cpm, (read/punch/print — 3 lines)

### IBM 3410/3411 Magnetic tape

- One 3411 Magnetic Tape Unit and Control and up to three 3410 Magnetic Tape Units may be attached to System/38
- 20 KB, 40 KB, or 80 KB per second
- 800 bpi or 1600 bpi (available in dual density)



IBM System/38

Design Model

## Programming features

### Control Program Facility (CPF)

The System/38 CPF licensed program supervises operation of the system and provides the following inter-related functions:

- *Data Base Data Management (DBDM)*
  - Physical data files are defined independently of application programs.
  - Data files can be accessed logically by sequence and format independent of their physical structure.
  - Files can be shared by all programs with system provided integrity.
  - System/38 file organizations are comparable to System/3, System/32, and System/34 file types and access methods.
- *Control Language (CL)*
  - Control Language commands are used to request system function.
  - Commands can be compiled into programs which can be called by RPG III or CL programs.
  - Provides logical capability and conditional branching, and allows parameter passing.
- *Work Station Support*
  - Single-terminal programming approach.
  - Provides local/remote transparency.
  - Work from multiple display devices may output to a single printer.

- **Communications Support**
  - Host to remote 5250 Information Display System devices
  - As a terminal using SNA/SDLC to System/370 (Models 135 through 168) and 3031, 3032, and 3033 processors
- **Spool Facilities**
  - Provides support for card reader, card punch, printers, Diskette Magazine Drive, and 5250 Information Display System printer devices (local and remote).
  - Supports multiple SPOOL queues.
  - Output SPOOL queues can be directed to various devices.
- **Data Security**
  - Provides control over individual user access to system resources.
  - All programs and data files can be protected.
  - User can select the desired level of security.
- **Message Facility**
  - Provides communication between system users – including broadcast capability.
  - Both system and application messages are supported.
  - Message Facility support is independent of application programs.
- **Programming Aids – Testing Facilities**
  - Allows testing concurrent with normal operation.
  - Permits the use of copies of production files for testing.
  - Provides trace, breakpoints, display, and modification of variables.
  - Debug facilities require no statements in source programs.
- **Programming Aids – File Reference Facility**
  - Stores, retrieves, and displays information about file usage.
- **Service Facilities**
  - Some diagnosis and repairs can be done concurrent with user operations.

### RPG III

System/38 RPG III is a powerful extension of the proven RPG II language. RPG II is upward compatible to RPG III (with minor code changes).

- Reduced dependence on a fixed-logic cycle.
- Reduced I/O coding due to externally described data
- Short-form calculation format to reduce coding .

- Programs can call other programs including CL programs
- Improved array-handling capability
- New display-oriented instructions
- Cross-reference documentation of indicators and fields
- Compilation errors point to source statements

### Interactive Data Base Utilities (IDU)

- **Source Entry Utility (SEU)**
  - Provides for entry and maintenance of RPG III source statements, Control Language source programs, Data Description Specification (DDS), and Utility Definition Specification (UDS).
  - Supports syntax checking.
- **Data File Utility (DFU)**
  - Provides for entry, validation, and maintenance of data files.
  - Allows retrieval and display of records by key (inquiry).
- **Query Utility**
  - Provides facility for retrieving and displaying or printing data files.
  - Allows selection, ordering, summarization, and tabulating for reports.
  - Has two-dimension (major/minor) table capability.

### Conversion Reformat Utility

Provides function similar to System/3 Disk Sort, with the exception of summary sort, such as:

- Sort a single physical file producing a record address file as output.
- Sort a single data base file or device file producing a physical file as output.
- Sort/merge two or more files.
- Copy records from one or more files producing a single data file or a device file as output.

### System/38 System/3 Batch Conversion Utilities

The IBM System/38 System/3 Batch Conversion Utilities are a set of System/3 (Models 8, 10 disk, 12 and 15) programs and procedures that will aid the user in conversion. The utilities run on the System/3 and provide:

- Conversion of
  - System/3 RPG II to System/38 RPG III (including Auto Report)
  - OCL and OCL procedures to CL and CL programs
  - System/3 Utilities \$COPY, \$DELETE, \$DSORT, and \$HIST to System/38 equivalent functions
- Detection of missing programs and OCL procedures
- Definition of all RPG input files to a field level
- Flagging of unconverted statements

- File Conversion Aids
  - Generation of System/3 OCL to offload files and programs
  - Generation of System/38 CL to create and load files
  - Generation of CL to load and compile RPG programs, Auto-Report programs, and Control Language programs

#### System/3 CCP Conversion Aids

Two licensed programs are available to assist a user in converting a System/3 batch and CCP environment to System/38. CCP programs using 3270 devices may run on System/38 using 5250 devices and/or the system console.

#### System/38 CCP Conversion Utilities

These utilities are a set of System/3 (Models 8 and 10 disk; 12 and 15) programs. They run on the System/3 and provide:

- The functions listed under System/38 System/3 Batch Conversion Utilities

- Conversion of:
  - Display Format Facility (DFF) source statements to System/38 Data Description Specifications
  - Assignment Set to System/38 Control Language to establish a System/38 operational environment for CCP programs

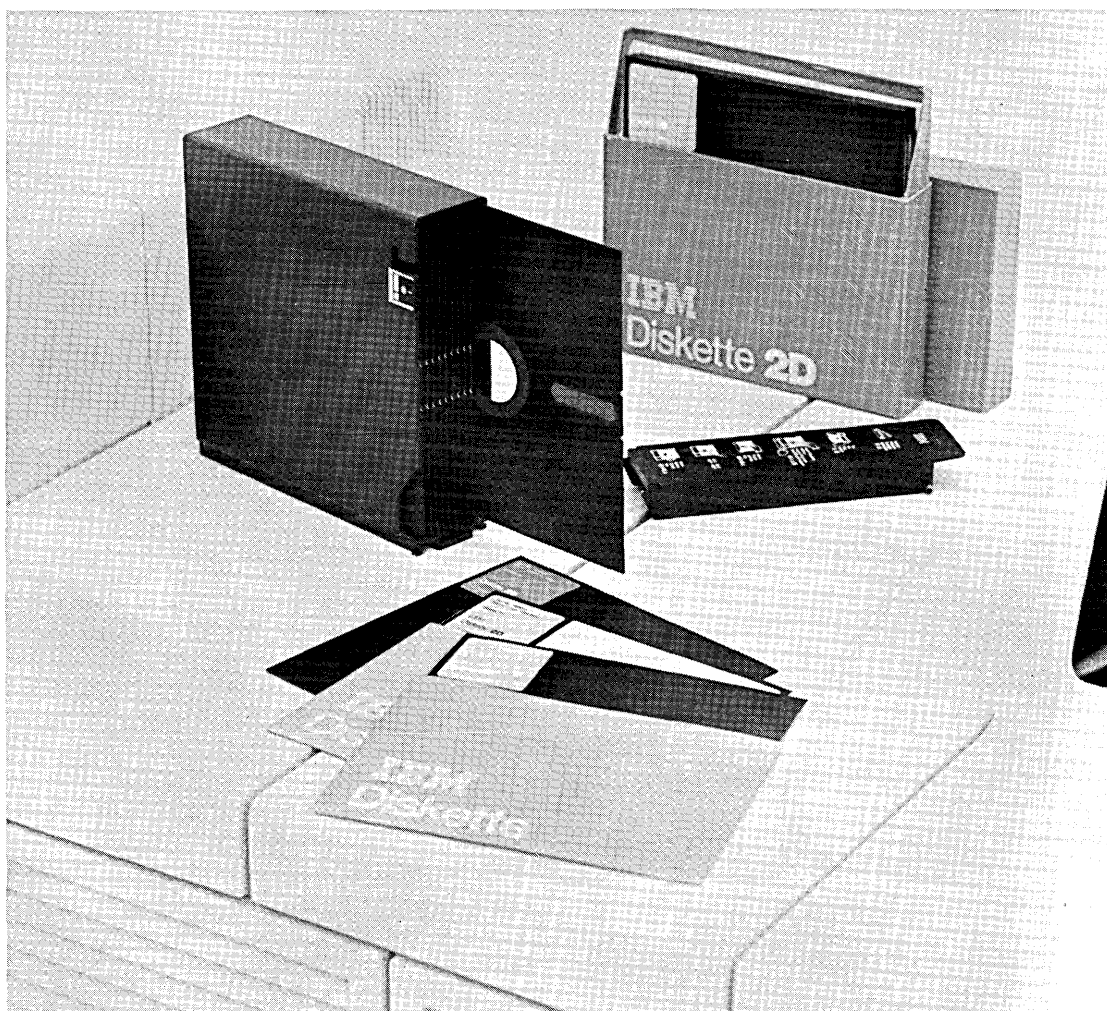
Converted programs must be recompiled on System/38, and run in conjunction with the System/38 Execution Subroutines.

#### System/38 CCP Execution Subroutines

The CCP Execution Subroutines run on the System/38 and allow System/3 CCP programs to execute on the System/38 using 5250 devices (after recompilation).

- Support:
  - CCP programs using 3270 devices (only)
  - CCP programs using Display Format Facility (only)
- Program types supported:
  - SRT, MRT, NEP, PRUF, CCP Disk/Sort, and batch programs under CCP

CCP programs that were not converted by the System/38 CCP Conversion Utilities may require manual changes to run on System/38.





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