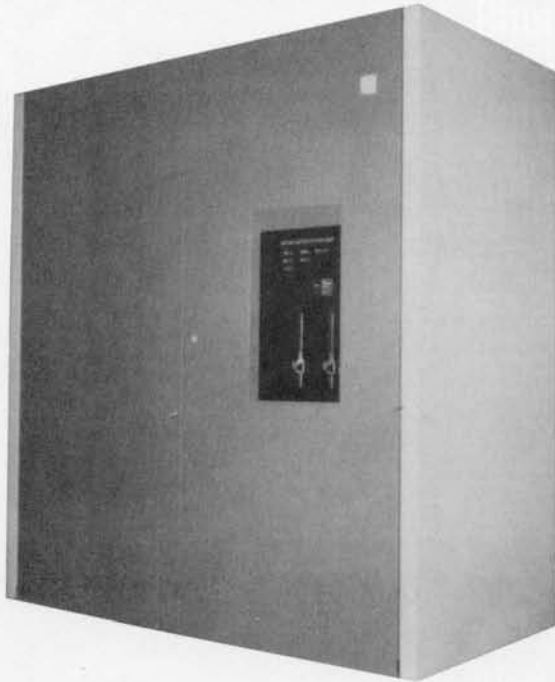


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4381

Processor Complex



4381 Processor

## PRODUCT DESCRIPTION

### Processor Complex

The IBM 4381 Processors offer improvements in function, performance and price/performance for the intermediate system user. They are logical growth steps for users who require more computing power than the larger 4341 models, but whose needs do not yet reach the capability of the 3083 model E.

The IBM 4381 Processors offer technology and function between the 4341 and the 3083 models, supporting the entire range of IBM Operating Systems from DOS/VSE to XA.

The compact packaging and high internal performance of the 4381 Processors are made possible through the use of unique air cooled, high density Multi-Chip-Modules (MCM's) and a new module-on-board packaging technique which replaces the logic card packaging in the instruction processing unit.

The usage of this new technology contributes positively to the reliability and availability of the product by reducing the number of logical parts and cables needed.

The IBM 4381 can be served under the HCS (Hardware Central Service) service delivery method. the use of PA (Problem Analysis) and URSF by customers are key factors of this IBM service strategy.

### Highlights

- 4, 8 or 16 MB of processor storage.
- Internal processor cycle time of 68 nanoseconds.
- A maintenance and support subsystem including 2 diskette drives and a Remote Support Facility.
- Single bit error detection and correction.
- Double bit error detection and double bit error correction when the double bit error consists of one solid failure and one intermittent failure.
- Channels

Six channels are standard, consisting of one Byte Multiplexer Channel and five Block Multiplexer Channels. Four of the Block Multiplexer Channels have a data rate of 3MB per second in data streaming mode. The fifth Block Multiplexer Channel has a data rate of 2MB per second and it may alternatively be selected as a second Byte Multiplexer Channel.

## 4381 Operator's Console

The system operator's console is attached via the standard console/printer adapter.

Either 3279 model 2C color display station with associated operator console keyboard or 3278-2A may be used.

Up to three other displays and/or printers may be attached to the console/printer adapter.

The additional devices are: 3279-2C, 3278-2A, 3287-1, 3287-1C, 3287-2, 3287-2C and 3268-2.

## Models

The 4381 is announced in two models. Differences are shown in the table below.

	Model 1	Model 2
Cache Storage utilized by Operating System with 4K virtual page	8KB	32KB
2K virtual page	4KB	16KB
Internal Performance		
370-Mode commercial	from 1.4 to 1.6 X	from 1.7 to 2.3 X
370-Mode scientific	up to 1.7 X	from 2.4 to 3.0 X
(X Internal performance of 4341-2). Internal performance depending on Operating System and load.		
Elementary math library assist.	no	yes
Engineering scientific assist.	yes	yes

## Optional Features

- 6 additional channels.
- Channel to Channel Adapter (CTCA). The CTCA allows high speed data transmission to or from one processor that has a standard Block Multiplexer Channel.
- ROCF Remote Operator Console Facility.

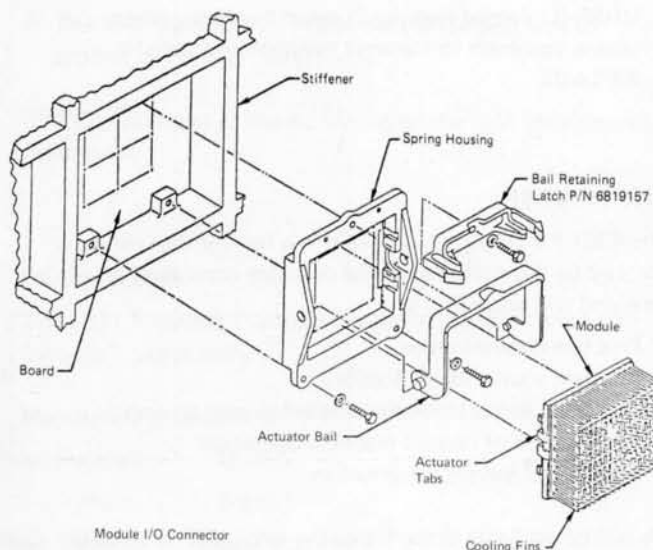
## Technology

Many of the advances on the 4381 were made possible by a new technology package, the Multi-Chip-Module (MCM).

This MCM is a 64 millimeter square ceramic substrate on which up to 36 logic chips are mounted. Aluminium heat sinks over the chips and a new unique air duct system allows air cooling. Each MCM has 882 I/O pins to provide power and logic connection.

The MCM's (IPU, channel, and storage logic) and the MCM board are Field Replaceable Units (FRU's).

Module engagement with the connection array is achieved through the use of an actuator attached to the board assembly. The module is placed in the spring housing guided by tabs using zero insertion force. The action of the actuator tabs cause the module pins to form a solid connection between the MCM and the board. Positive retention is provided by a latch.



## Maintenance Facilities

The maintenance facility of the 4381 processor will be, in many aspects, similar to the 4341 as follows:

- Error Log Analysis (ELA)
- Scan ring latch circuit design
- Hardware instruction retry
- Extensive parity and compare checking
- Diskette resident diagnostics
- Fault locating diagnostics
- Remote Support Facility (RSF)
- Machine Speed Micro Diagnostics (MSMD's)
- Channel sequence logging
- Microcode logic trace
- CE bring up panel
- Power and air flow monitoring
- ECC (Error Correction Code) for main storage

Additional or enhanced facilities are:

- Hardware reconfiguration in high speed buffer (cache), control storage, channel data buffer, and main storage.
- Repair procedures, containing integrated diagrams, references and detailed descriptions of particular portion of the processor being tested.
- ST80 - a comprehensive system exerciser that has been designed and tested for ease of use with the CE in mind.
- PA - Problem Analysis is designed to be used by the customer in a very "easy to use way".  
PA will help the customer in problem determination and on decisions about immediate/deferred calls.
- URSF (Universal Remote Support Facility). Which allows customers to transmit maintenance data to RETAIN.

## 4381 PA/URSF

The 4381 PA (Problem Analysis) is a facility that can be invoked by the customer at the operator console at any time and will assist him in:

- Problem determination.
- Problem source identification.
- Decisions about immediate/deferred maintenance.
- Verification of correct machine operation.
- Transfer of service information.

PA will be available in the following languages, selectable by the customer:

English, French, German, Italian, Japanese, Portuguese (Brazilian) and Spanish.

## Objectives

- Immediate response to customer's call.
- On-site CE's ability to fix at the first time enhanced.
- Dispatch the right CE supplied with parts and info at the right time.
- Fast feedback to MFG and DE.

## SP & S (Service Programming & Support)

SP & S is an integral part of CETO and is located in Valencia plant (Spain).

- Provide remote last level of support to EMEA countries for 4381 (direct support).
- Ensure experience is turned into improvement actions (indirect support).
- Ensures support 24 hours a day / 7 days a week.
- Establish and maintain a liaison to PE which appears as one support level to the field.

## IBM Maintenance Service

The IBM Maintenance Agreement enables IBM CE to provide optimal service and system availability.

- CE fully assumes responsibility to keep this machine in good working order.
- The IBM Maintenance Agreement is available at planable cost with minimum administrative impact to the customer.
- The IBM Maintenance Agreement is the best way to protect customers investments.

IBM CE will assist in the marketing of the IBM Maintenance Agreement.

## CE Career Path

The 4381 Processor Complex is assigned to the "Account Systems" career path.

## Manufacturing Locations

- Endicott      USA
- Sumare        Brazil
- Valencia      Spain

The transmission of PA maintenance data from system to RETAIN will be initiated by the customer using the URSF facility and will operate concurrently with the customer jobs.

PA data will, therefore, be readily available for analysis by support personnel. URSF allows direct TP communication with the IBM RETAIN Network using:

- Microcode in the Support Processor (SP).
- An external or internal integrated modem plus a switched line.
- European IBM data link ports with auto-answer.
- URSF application program in RETAIN.

The problem analysis data log transmitted with URSF will be loaded in a specific problem record which will be handled by PMH (Problem Management Hardware) facility in RETAIN. The Remote Support Facility on 4381 also includes reference code data bank search and remote console capability, for use by CE. 4381 PA/URSF will be available to all IBM customers.

### Environmental Factors

#### Comparative Summary

	4381	4341 MG2/12	
Physical Characteristics.	With or without CTCA	Without CTCA	With CTCA
Power consumption KVA (50 Hz)	4.7	6.4	6.8
Heat output (watts)	4000	4800	5150
Weight (kg)	770	920	1105
Noise level (DB)	54.2	55.9	55.9

The upright design minimizes floor-space requirements. (69% of 4341-MG2 without CTCA / 76%, including service clearance).

### Installability

Installation time of the processor is projected to be from 9 to 10 CE hours. Field conversion from model 1 to model 2 will take approximately 6.3 CE hours (5.7 system hours).

### Announced I/O

The 4381 will support the attachment of all I/O devices that currently attach to the varied models of the 4341 and that will be current in the IBM sales manual at the time of the 4381.

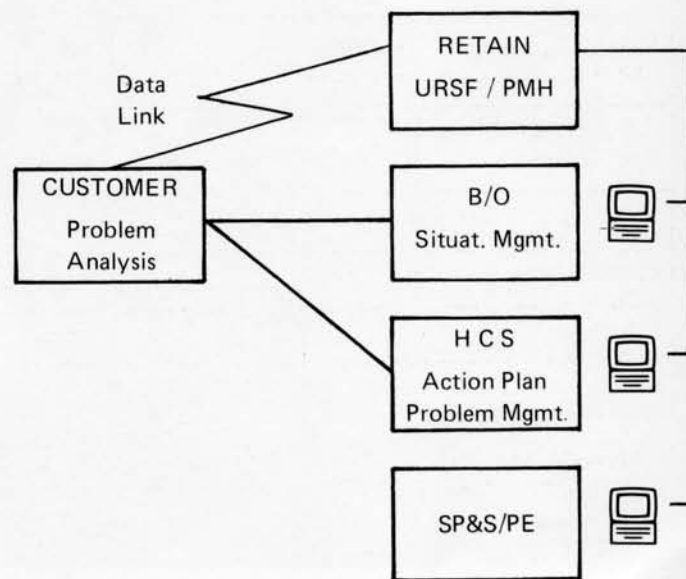
### Programming Support/Compatibility

- Operation in S/370 or /370-XA Mode
- Extension to /370 Mode
  - ECPS: VM, including preferred machine assist
  - ECPS: MVS supporting S/370 extension for MVS SP1
- Supported by MVS/370; MVS/XA; VM/SP; VM/XA migration aid; DOS/VSE; OS/VS1; ACP/TPF.

### Support Structure

Hardware Central Service (HCS).

Service Planning & Support (SP & S).



**IBM World Trade Corporation**  
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