

**IBM** System

**LN**

**SP**

Model

**20**

customer engineering announcement

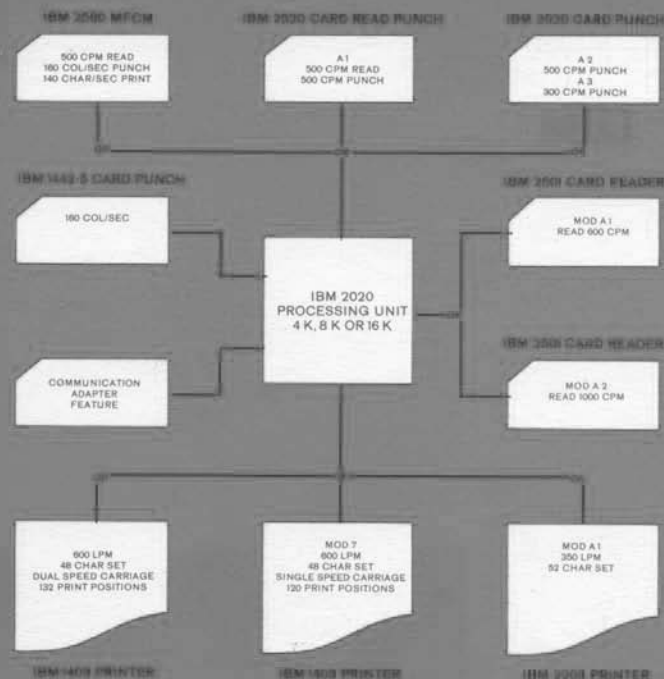


### System Features

The IBM System/360 Model 20, a joint development effort of IBM Domestic and World Trade, joins the IBM SYSTEM/360 family. It is primarily intended for processing punched cards. System components may include the IBM 2020 Processing Unit, the IBM 2580 Multi-Function Card Machine, the IBM 2520 Card Read-Punch, the IBM 2501 Card Reader, the IBM 2203 Printer, the 1403 Printer, the 1442.5 Card Punch and the Communications Adapter Feature.

The 2020 Central Processing Unit is available with either 4K, 8K or 16K positions of alphameric storage. The data and instruction formats are compatible with those of the IBM System/360 family. Main storage read/write cycle time is 3.6 microseconds, however, the 2020 Processing Unit has the ability to operate in a mode known as time sharing. Time sharing provides a means of overlapping most input operations with each other and with the Processing Unit, thus substantially increasing the through-put.

The Central Processing Unit (CPU) uses the new, Solid-Logic Technology (SLT) and a Read-Only Storage (ROS) in which micro-instructions are stored. The CPU uses fifteen basic micro-instructions, to perform move, fetch, increment, decrement, sense, control, and branch functions. Combinations of micro-instructions control the execution of machine instructions such as ADD, BRANCH, MOVE, etc., by use of built-in micro-program routines.



## CE Features

**System Integrated Diagnostic Routines.** Diagnostic programs are built into the read-only storage of the CPU and provide the CE with a powerful diagnostic and PM tool to check CPU and I/O performance. The program detects deviations of I/O pulses or timings extending beyond pre-established limits. Out-of-tolerance conditions are printed out or are displayed by indicator lights, to assist the CE in localizing troubles.

**Documentation Standardization.** Field support publications follow the standard System/360 format to provide documentation uniformity.

**Parity Checking.** Checking circuits and indicators are provided for all major controls and data paths.

**CE Console.** Control switches provide entry of information into the system or enable a micro-program address stop. Display of major registers and checking indicators facilitate system serviceability. In conjunction with the customer console, the CE can single-cycle or recycle micro-program instructions. An immediate error-stop switch stops any I/O device at the time that an error occurs, so that conditions that might cause the error can be examined.

**CE Diagnostic Instruction Code.** This special operation code enables the read-only storage and CPU to operate in a diagnostic mode.

## General I/O Characteristics

The IBM 2501 Card Reader is a high speed card reader. It contains a card hopper, photocell serial read station, and a stacker. It is available in two models.

The IBM 2020 Printer employs the bar line printing principle. Interchangeable type bars are available as a special feature. A Dual Feed Carriage, available as a special feature, permits printing of two separate forms simultaneously.

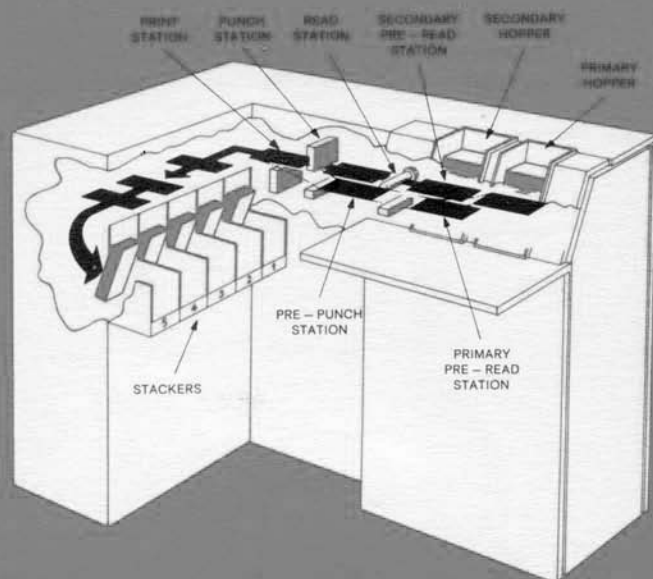
The IBM 1403 Printer is offered as a choice to the customer.

The IBM 2520 Multi-Function Card Machine combines the traditional card processing operations of reproducing, summary punching, collating, interpreting, accounting machine function, and five-pocket sorting into one machine.

The IBM 2520 comes in three models: A card read-punch and two punch only versions. Reading is accomplished serially and punching in parallel.

The IBM 1442-5 Card Punch punches cards serially.

A Communications Adapter Feature is available.



## The IBM 2560 Multi-Function Card Machine

The IBM 2560 Multi-Function Card Machine (MFCM) permits a degree of card handling that has never before been possible on a single pass through a system.

The MFCM has two card hoppers, a photocell serial reading station, a serial punching station, and five radial card stackers. An optional card printing station is located between the punching station and the stackers. The print station may contain 2, 4 or 6 positions of wire matrix printing heads, operator positionable to permit printing of up to six lines, 64 characters long, on any of 25 lines of the card.

Under control of the Central Processing Unit (CPU) each card column is read twice by double strobe sensing. Similarly, punched data is checked by echo impulses that are returned from the punch to the CPU. These features permit verification of card reading and punching.

The IBM 2560 provides card reading at a maximum speed of 500 cards per minute. Punching is accomplished at the rate of 160 columns per second and card printing is accomplished at the rate of 140 characters per head per second.

## General Micro-Programming Principles

Each machine operation (ADD, MOVE, BRANCH etc.) consists of a combination of basic control functions such as: fetch a character from storage, store a character in storage, move data from register to register, etc. These elementary functions are performed by micro-instruction commands, which are stored in a pre-established sequence in the read-only storage.

The process of executing an instruction of the customer's program is accomplished in the following manner:

1. The operation code of the machine-language instruction (ADD, BRANCH, MOVE, etc.) is read out of core storage and transferred to registers.
2. The bit structure of the operation code is analyzed and, as a result, a microprogram routine specifically designed for the particular operation to be performed is selected.
3. The selected micro-program routine controls the necessary functions, signals, and sequence of events required to execute the machine operation code instruction.

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