System/370 Model 158

IBM

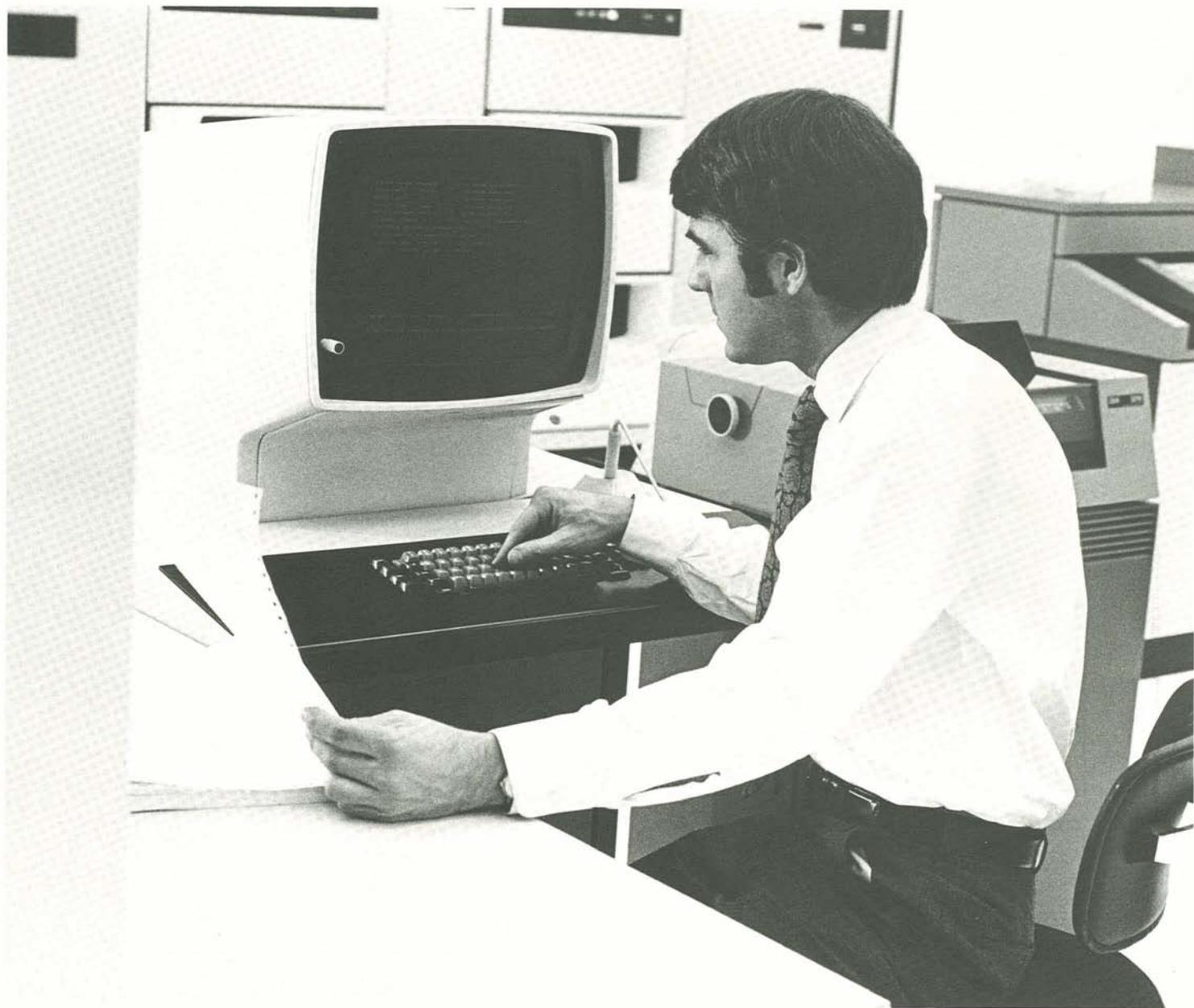### Continuing the logical evolution to greater function, higher performance

Destined to make computer history is the exciting new IBM System/370 Model 158.

The advanced function growth system for the high-performance Model 155, the 158 embodies the latest in computer technology to provide you with all-monolithic storage . . . integrated attachment of IBM direct access storage devices . . . and valuable central processor enhancements.

More importantly, Model 158—running under the new IBM advanced function system control programming discussed in the following pages—allows you to take advantage of the considerable benefits provided by virtual storage.

A most significant development

Virtual storage is an evolutionary technological development. And one bound to have revolutionary impact on computer operation from this day forward.

Virtual storage is the image of processor —or "real"—storage, and is normally much larger in size. Programmers can use this virtual storage as if it were real.

In the past, they had no choice but to create programs within the limits of real processor storage available.

Virtual storage, on the other hand, is intended to help programmers take advantage of the Model 158's full address capability—over 16 million bytes. The Model 158 automatically maps virtual storage into real storage in a manner that is transparent to the programmer.

The advantages of virtual storage

Virtual storage can circumvent the limitations of real storage. It can reduce concern about program overlays, partition and region boundaries, and the need to dedicate real storage for system services.

Virtual storage gives you unprecedented flexibility in the design of applications. It permits the vital growth of existing applications. It allows the writing of more comprehensive programs. It simplifies maintenance of operational programs.

In again, out again without special programming

Keeping pace with growth

Smooth upward transition

Virtual storage relieves the computer's real storage facilities of the burden of holding the entire application while it is being used. Instead, real storage residence is governed by frequency of use. This characteristic alone offers particularly significant advantages in online applications, where use varies greatly from hour to hour.

Lesser-used routines are stored on direct access devices. They're brought to real storage only when they're needed. And it's important to keep this in mind—the control of virtual storage is done by the system control programming. It requires no special programming effort by the application programmer.

As time passes, it's likely that work volume will increase. You may want to add a number of new jobs. Or enlarge some old ones.

This should not be a problem. With virtual storage, your applications do not have to be reprogrammed to take advantage of the additional real storage that may be needed to handle this growth.

There is upward compatibility from System/370 Model 155 to System/370 Model 158, as well as from System/360. This compatibility does more than merely protect your original investments in Model 155 programming. It also makes for an orderly transition to the Model 158.

Features that enhance performance

All-monolithic storage, another of the outstanding features of the Model 158, contributes significantly to the responsiveness, economy, and compactness of this powerful computing system.

This new implementation of processor storage makes system expansion more economical. Real storage capacity is available in 512K increments ranging from 512K to 2,048K bytes.

New instructions have been added to the System/370 instruction set to implement virtual storage. Other instructions have been redesigned to enhance performance.

The combination of monolithic storage and the improved instructions results in an increase in internal performance over the Model 155 when using the same operating system.

The 158 retains the instruction fetch-execution overlap of the 155, as well as the high-speed 8,192-byte buffer with an access time of 230 nanoseconds.

Integrated attachment of direct access storage

Other valuable features

You can also get the optional Integrated Storage Controls feature that resides in the processor and provides for integrated attachment of direct access storage devices. Each of the two controls in the feature can accommodate up to sixteen 3330 Disk Storage drives, for a total integrated attachment of 32 drives per Model 158. This provides both a practical and economical way to attach DASDs.

Reloadable Control Store (RCS) with a 115-nanosecond cycle time is used for controlling processor functions and channel operations. RCS can also contain the same emulators and extended precision floating point features previously available on the Model 155. The 1401/1440/1460, 1410/7010, 7070/7074 and DOS emulators and extended precision floating point may all be installed—on the same system—at the same time, and at no charge for any of them. More flexible than the Model 155 read only control storage, RCS also means easier and quicker installation of some engineering changes.

A new operator display console with light pen simplifies operation. Standard on the 158, the new console provides for operator/system communication and allows control of the system by a light pen. Service capabilities for maintenance are also provided. An optional 85-character-per-second console printer is available for use when hard copy records are wanted.

Up to five high-speed block multiplexer channels are available on the Model 158. Matched to the high-performance capabilities of the IBM 3330 and 2305 direct access storage devices and the 3705 Communications Controller, these channels provide the I/O capability needed in your data base/data communications applications. One or two byte multiplexer channels are also available.

Despite all that has been included, most configurations take up less floor space than present Model 155s.
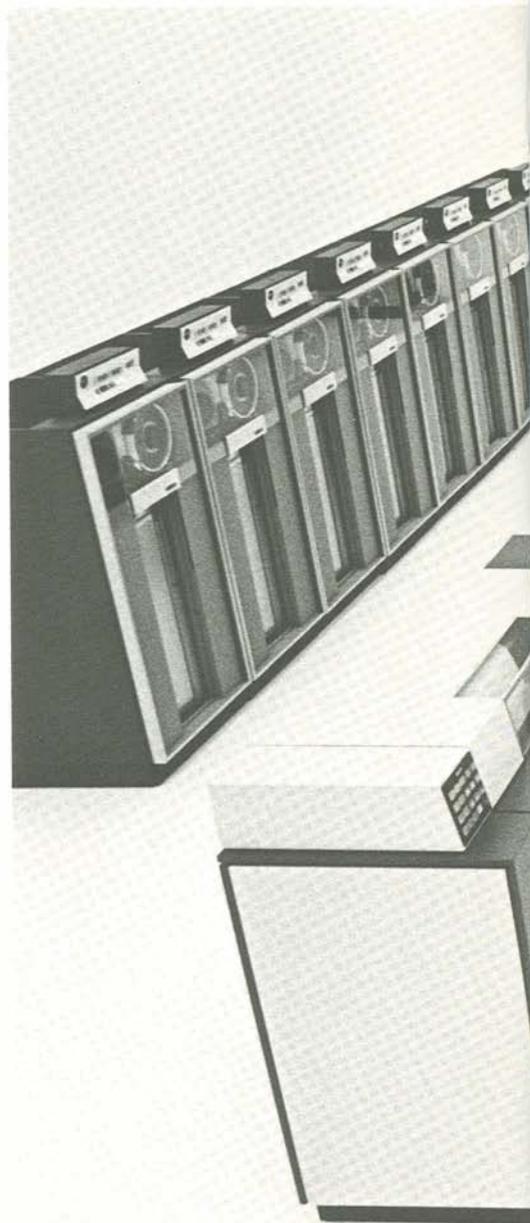
Another new operating system

DOS/VS is an extension of DOS especially developed for use in a virtual storage environment. It provides many of the virtual storage advantages described earlier.

DOS/VS also offers a Relocating Loader which permits library storage of a program and its later execution in any available location of real or virtual storage. This feature along with the five partitions now available permits advancement to multi-programming without costly reprogramming and simplifies entry into teleprocessing applications.

From one computer, many

System/370 Model 158 is also supported by the Virtual Machine Facility/370 (VM/370). This is a control program that simulates a number of computers, each one of which is the functional equivalent of System/370 Model 158.

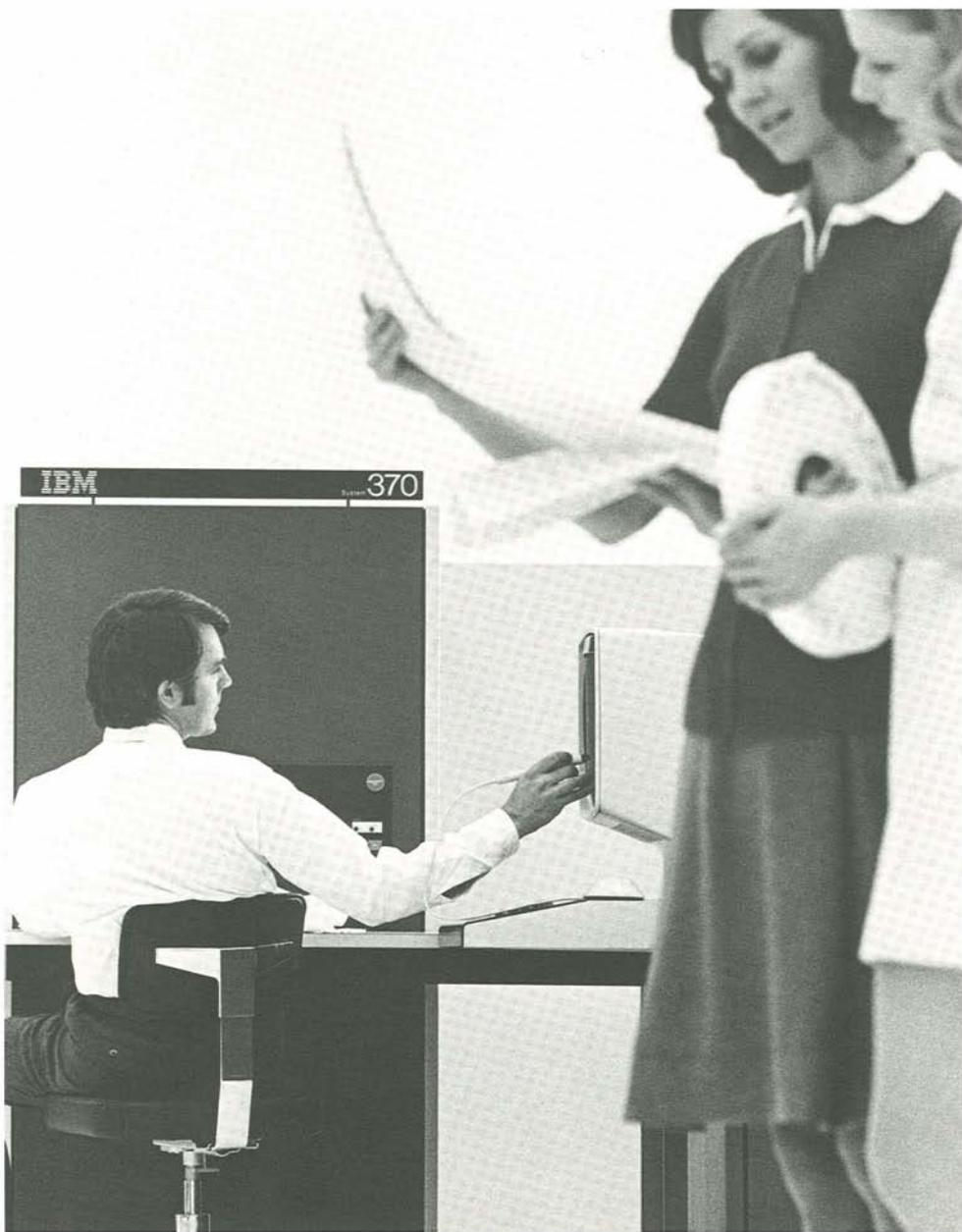VM/370, in effect, turns Model 158 into an array of computers. Three. Five. Even more.

These "virtual machines" are operated concurrently from remote terminals under multiprogramming techniques. The programs being executed in any particular virtual machine, however, seldom utilize the full resources of the Model 158, so this concurrent use results in increased real computing system utilization. And as far as individual users are concerned, each appears to have at his disposal all the facilities of the high-response, multiaccessed Model 158.

Get ready for the years ahead

If you're going to need more function than your present computing system can deliver, it's time to take a hard look at System/370 Model 158. Although we have covered many of its salient features in these pages, there's much more to tell.

Let your IBM representative fill you in on the details of how the Model 158 can help you reduce new application startup costs and program rework . . . simplify maintenance, program additions and corrections . . . use smaller, slower processors with similar I/O to back up a larger system, yet provide the same functions.

It's all part of IBM's commitment to help make your computer one of your most valuable assets.

IBM