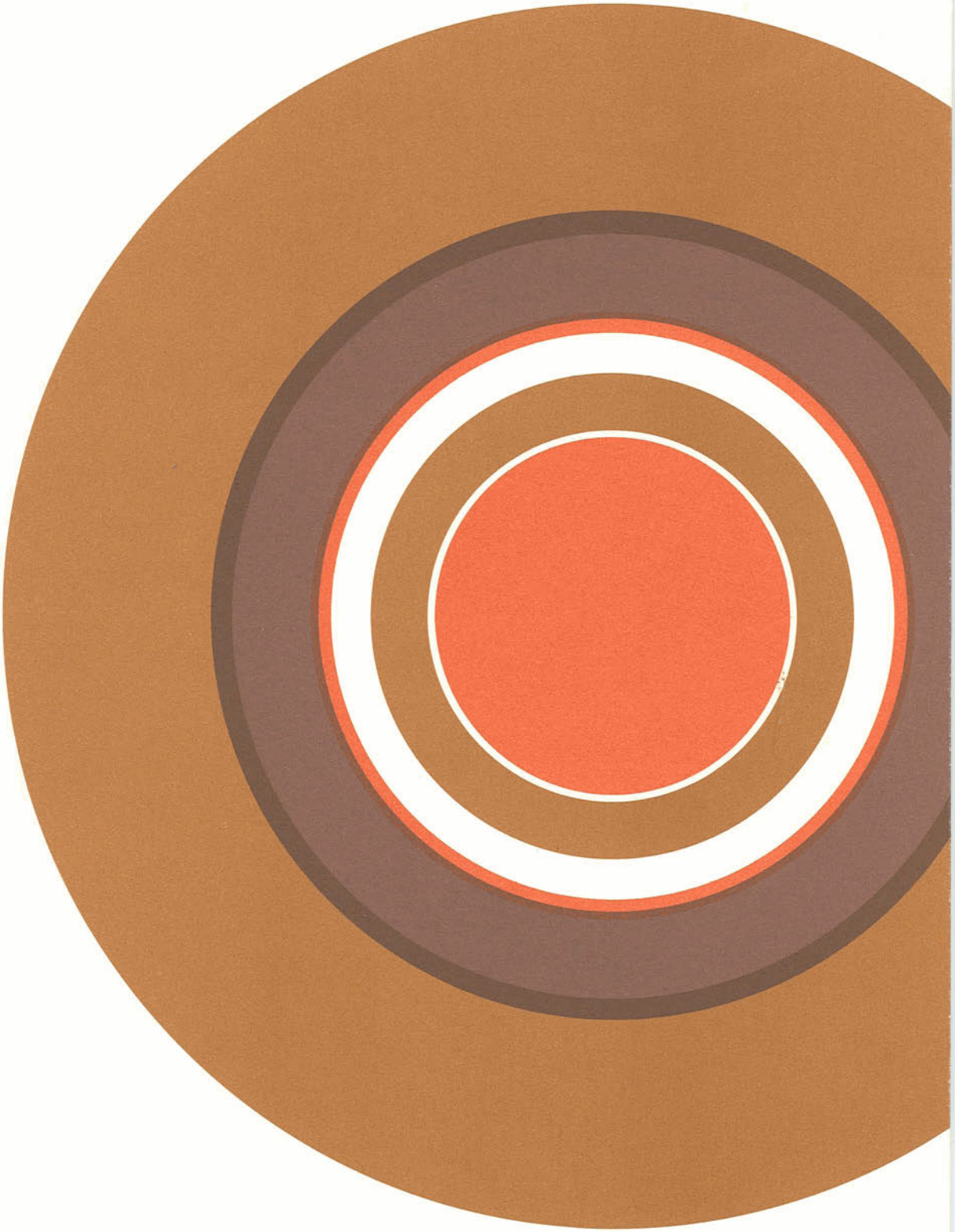

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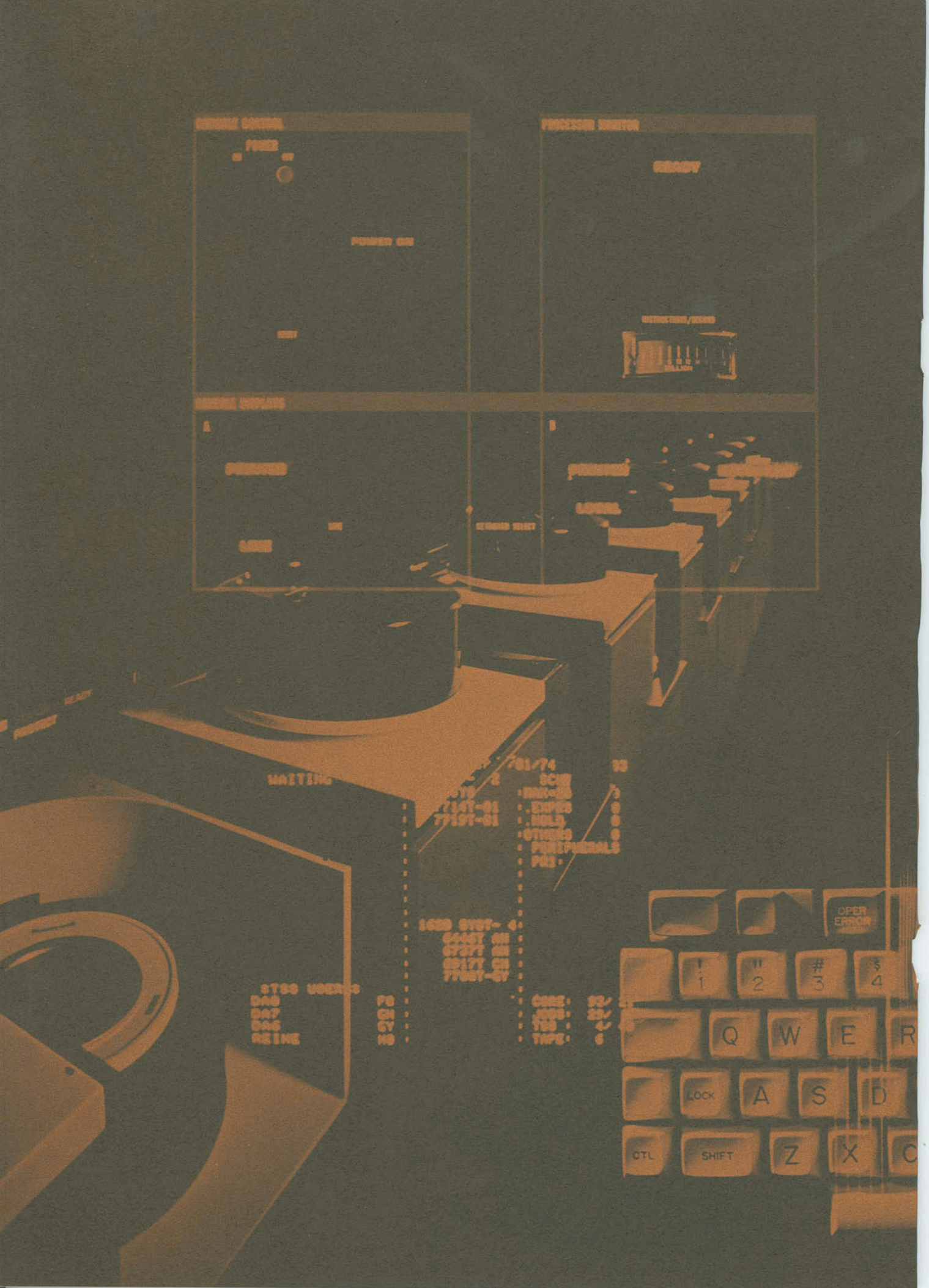

POWER ON
WAITING
OPER ERROR
Q W E R
LOCK A S D
CTL SHIFT Z X

An Advanced Concept for Fast, Secure Response to Customer Needs

Honeywell's Multics System represents a concept of computer usage so advanced that it redefines the meaning of transaction and interactive processing.

With today's growing concern about the security and privacy of online systems, Multics can satisfy your transaction processing needs while providing a secure environment.

We believe Multics is one of the most powerful and sophisticated computer systems in the world—and yet one of the easiest and simplest to use.


Honeywell 66/60
5
Honeywell

A Unique Business Problem-Solving Tool

Here is a computer system that enables data processing users to control and distribute easily accessible computer power. The Honeywell Multics System represents an advanced approach to making the computer an integral, thoroughly reliable part of a company's operation.

The Multics System replaces many of the procedures limiting conventional systems and sweeps away many of the factors that have restricted the application of computers to routine data processing assignments.

Now—with Multics—the computer becomes a responsive tool for solving challenging business problems.

The Multics System incorporates many of the most user-oriented programming and supervisory techniques yet devised. These techniques are available to all users automatically through the Multics operating supervisor.

Because it is a unique combination of advanced computing theory and outstanding computer hardware, Multics can provide an information service system more advanced than any other yet available.

Honeywell offers, as part of its advanced Series 60 line, two models for Multics—the Model 68/60 and the Model 68/80.

While contributing significantly to the application diversity of the Series 60 family, these Multics systems also enable Honeywell to accommodate more efficiently the computing needs of today's businesses.

Multics is Transaction Processing—and More

Although Multics is by design a transaction oriented, interactive information system, its functional capability encompasses the full spectrum of a general purpose computer. Multics provides you with:

- A wide range of services including transaction processing, interactive program development, time sharing and batch processing, both local and remote.
- High volume capacity via multiprogramming and multiprocessing with large, real memory capacity and practically limitless virtual memory.
- Very high systems availability via the dynamic reconfiguration of processors and memories. Multics also provides the capabilities for online software updating, online accounting and management as well as automatic file backup facilities.
- Ease of accessibility, featuring a simple and consistent user interface for all types of services. There is no job control or command language to learn and an interactive tutorial facility is available when needed.
- System management and control by a decentralized concept. This includes the delegation of capabilities for establishing resource and usage quotas dynamically and adjusting resources as necessary—all online.
- Data and program integrity, as one of the fundamental features of Multics. Unique multiple level security capabilities are provided. Access to all procedures and data is controlled by permission lists, which are managed by software and enforced by hardware.


Honeywell

Computer Power That's Easy to Use

Multics is easily accessed through a convenient remote terminal. Because Multics was designed as a complete remote access system, it allows interactive access to all system facilities.

As a powerful and easily accessible system, Multics:

- Provides vastly improved application designs and programmer productivity via a wide range of interactive programming languages including PL/I, COBOL, FORTRAN, BASIC and APL. All have powerful interactive debugging aids.
- Brings its users advanced capabilities without the need to know the detailed and evolving technology that makes the advances possible.
- Provides the required degree of service to meet the needs of both large and small users, within wide limits and on demand.
- Bills each user only for the amount of service received.
- Enables the manager to reconfigure hardware without service interruption in order to handle peak workloads and maintain the system.
- Provides a highly reliable system that offers maximum availability.

Computer users and experts have long felt that just such a system would be the only way that computers could adequately serve the growing needs of business, science, education, and government. After many years of development and refinement, this idea has been implemented in the Multics System.

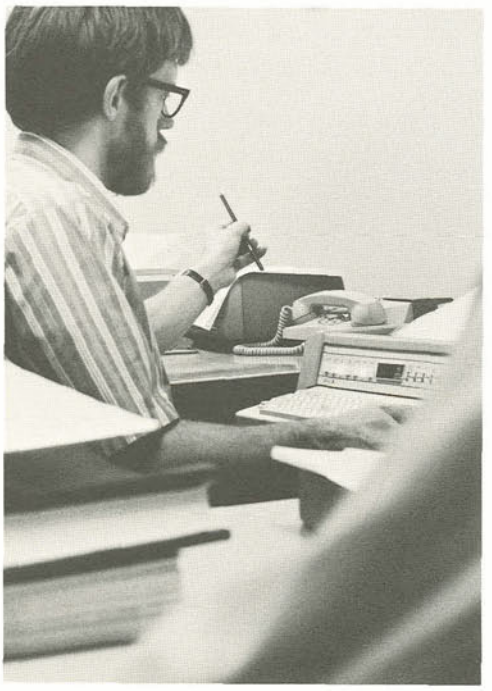
Consider some additional benefits that make Multics as powerful as it is manageable, as accessible as it is secure, as advanced as it is operational.

Security and Privacy

Today there is a growing concern about the privacy of computer-based information. The Multics System incorporates the most advanced security features (both hardware and software) available.

A manager of Multics can control and specify the type of access for each user. With a simple command, a file is made available for reading only, for execution, or for full access.

File access is then enforced by the Multics ring structure hardware, an advanced form of protection that enhances file access control. The ring structure protects against intentional access by unauthorized personnel — and from unintentional access during debugging periods. The structure allows both the system and users multiple levels of access control.



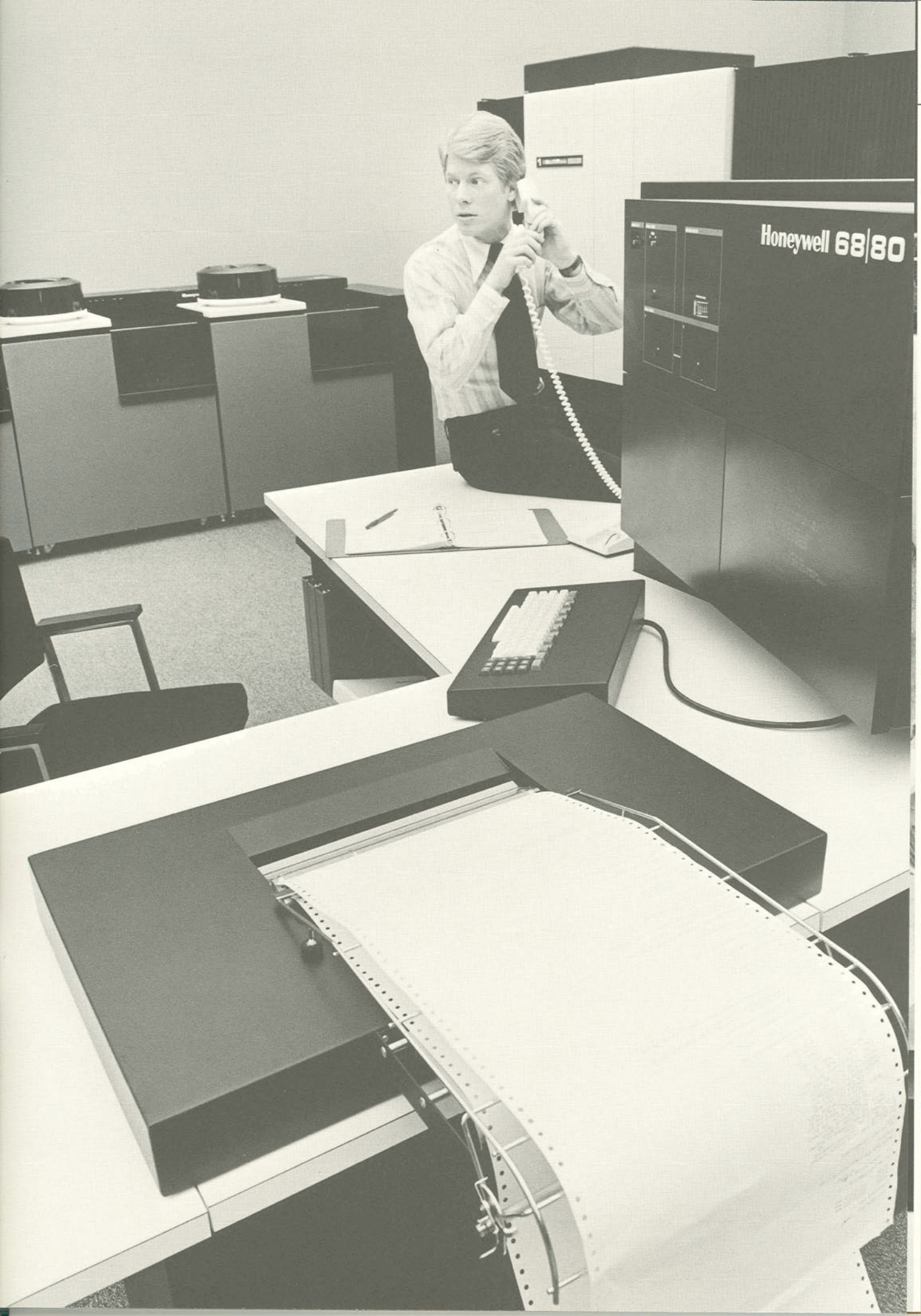
A Typical Example of Restricted Data

A personnel department might, for example, create individual files for all employees including information on educational background, professional qualifications, job classification, job experience, salary. Personnel realizes that the data for each employee is sensitive and wants to restrict access of any individual file to authorized employees only.

On the other hand, various administrative and personnel development groups want access to information such as the overall educational level of company employees or the total salary figure.

Clearly, more than one level of access is needed here. An authorized member of the personnel department uses an interactive terminal to set the various access privileges for potential users of the information. Direct read and write permissions can be granted to authorized personnel, while others can access the data only through special summarization programs that do not reveal individual records. Furthermore, these special programs can be used, but not altered, without additional authorization.

Individual privacy is protected by software and hardware implementation of the controls that were preselected, while general information still can be used effectively by various parts of the company.


Honeywell 68/80

Multics User Interface

The command language that converses with the computer is simple and easy to use. Tasks are described in straight-forward terms. If the system needs more information, a computer routine asks for it in ordinary English.

For advanced programmers, Multics provides language processors for PL/I, FORTRAN, BASIC, COBOL, and APL, for maximum efficiency no matter what the application.

Simple as well as sophisticated text editors provide for efficient, conversational correction and modification of online data.

Most important, users don't have to be experts to use the system effectively and profitably.

Dynamic Reconfiguration of Hardware Modules

Dynamic reconfiguration lets the manager of the Multics System add hardware modules to the system to meet peak workloads, and remove modules for preventive maintenance while providing uninterrupted service.

The Multics System is designed to evolve with the needs of its users. Additional hardware modules can be added to the system as user demand increases. Multics can support one or more processors, memory modules, and secondary storage units without change to the system software.

Hardware modularity also encourages technological advancement. When improvements are made to any of the modules, the new module may be substituted for the old without replacing the entire system or converting user programs.


READY
POINTER
KEYBOARD
LOCAL

Multics Virtual Memory

Multics virtual memory allows the controlled sharing of information among the system's users and provides for more efficient use of the resources available.

The virtual memory and access control mechanisms of Multics make it possible to share programs and data by organizing information into *segments.*

The segment is the basic unit of information sharing; it can contain programs or data, or it can be a directory cataloging other segments. Segments and their directories are organized into a single tree-structured hierarchy, which stores the system software, the administrative and accounting information, and user data and programs.

The actual movement of this information from the main memory back and forth to secondary storage is completely automatic. Programs and data are transferred (or *"paged"*) through main memory. Only the currently active "pages" need to be in main memory, with the Multics System fetching additional "pages" as required.

The majority of segments on the system (for example, the operating supervisor, compilers, library routines, and user procedure segments) are pure procedure (instructions and constants). Only one copy of a pure procedure segment is needed in main memory, no matter how many users are executing it. With only one copy required, the amount of data transfer is greatly reduced and main memory is more efficiently utilized.

User Productivity

The easy access of the Multics System is designed to increase productivity. The system makes advanced programming and supervisory techniques available to all users automatically through the Multics operating supervisor.

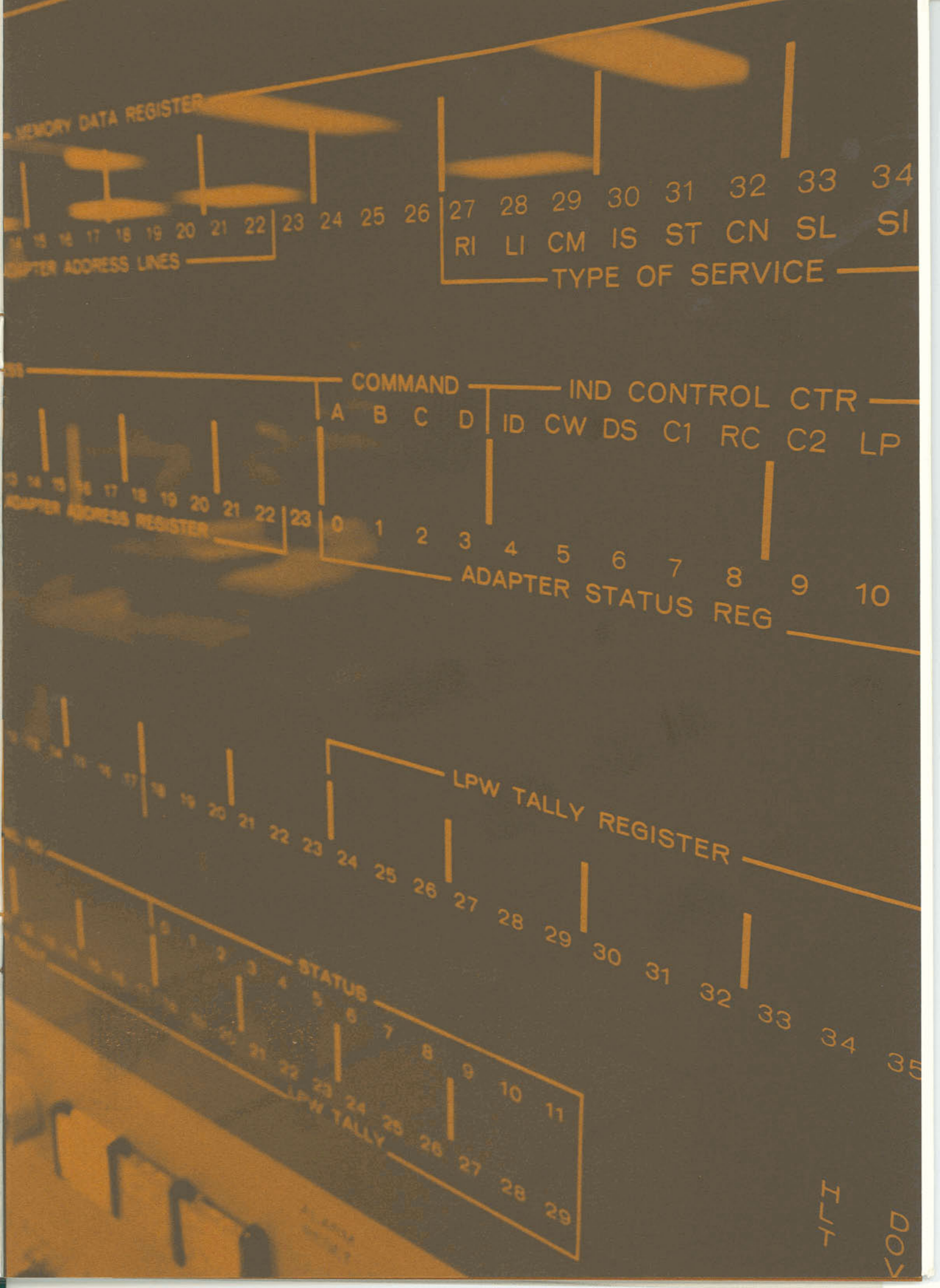
Relieved of the traditional burdens of extensive input/output programming, memory overlays, chaining, etc., the user is free to concentrate on problem-solving rather than on learning computer procedures. Thus the user decreases problem-to-solution time and increases creative time.

Multics – Is It for You?

The Honeywell Multics System can help you improve information management and apply new and advanced techniques to your business. Multics makes online transaction processing practical for a wide variety of industries and applications.

When your business requires quick response with up-to-the-minute data, Multics is the most efficient system to meet that requirement.

Many executives are already convinced. You can learn more by calling your Honeywell representative today.


MEMORY DATA REGISTER
ADAPTER ADDRESS LINES
TYPE OF SERVICE
RI LI CM IS ST CN SL SI
COMMAND
A B C D
IND CONTROL CTR
ID CW DS C1 RC C2 LP
ADAPTER ADDRESS REGISTER
ADAPTER STATUS REG
LPW TALLY REGISTER
STATUS
LPW TALLY
HLT
DOV

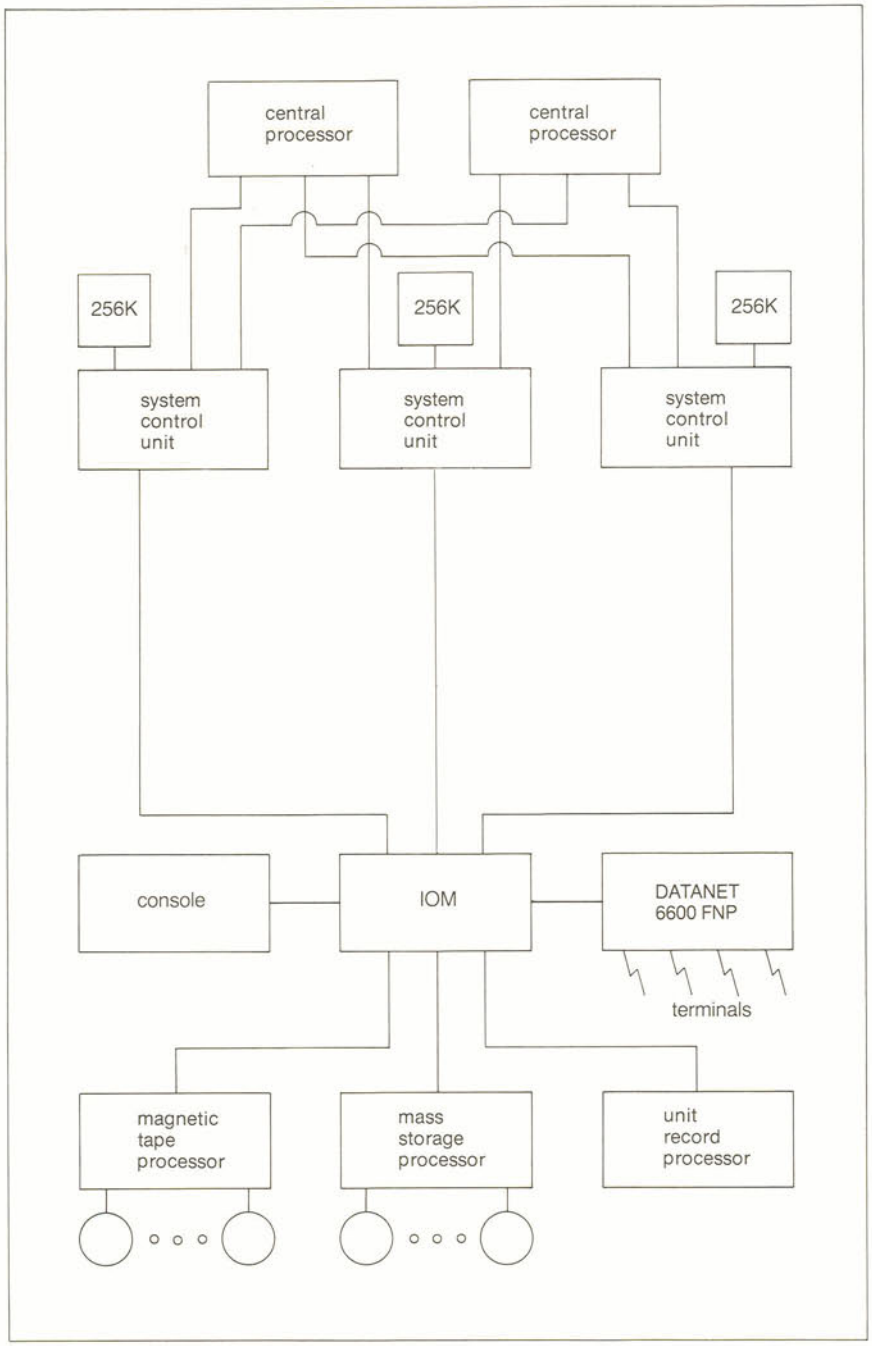
System Configurations

A variety of system configurations can be tailored to user requirements.

Multics can be expanded to include multiple processors, more main memory, and additional peripherals as shown in the Model 68/60 and 68/80 sample configurations.

MODEL 68/60
1-2 Central processors
384K-1M Words main memory
1-2 Input/output multiplexers
1-4 DATANET 6600 Front-End Network Processors
1 Operator console
1-8 Mass storage processors
Up to 256 disk drives
1-2 Magnetic tape processors
Up to 16 tape drives
Multiple unit record processors, line printers, card readers, card punches

MODEL 68/80
1-4 Central processors
512K-2M Words main memory
1-8 System control units
1-2 Input/output multiplexers
1-4 DATANET 6600 Front-End Network Processors
1 Operator console
1-8 Mass storage processors
Up to 256 disk drives
1-2 Magnetic tape processors
Up to 16 tape drives
Multiple unit record processors, line printers, card punches, card readers



A typical Multics configuration

OFF LINE

READY

AC PRESENT

PROTECT

Honeywell

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