

**RCA**

**501**

**ELECTRONIC**

**DATA**

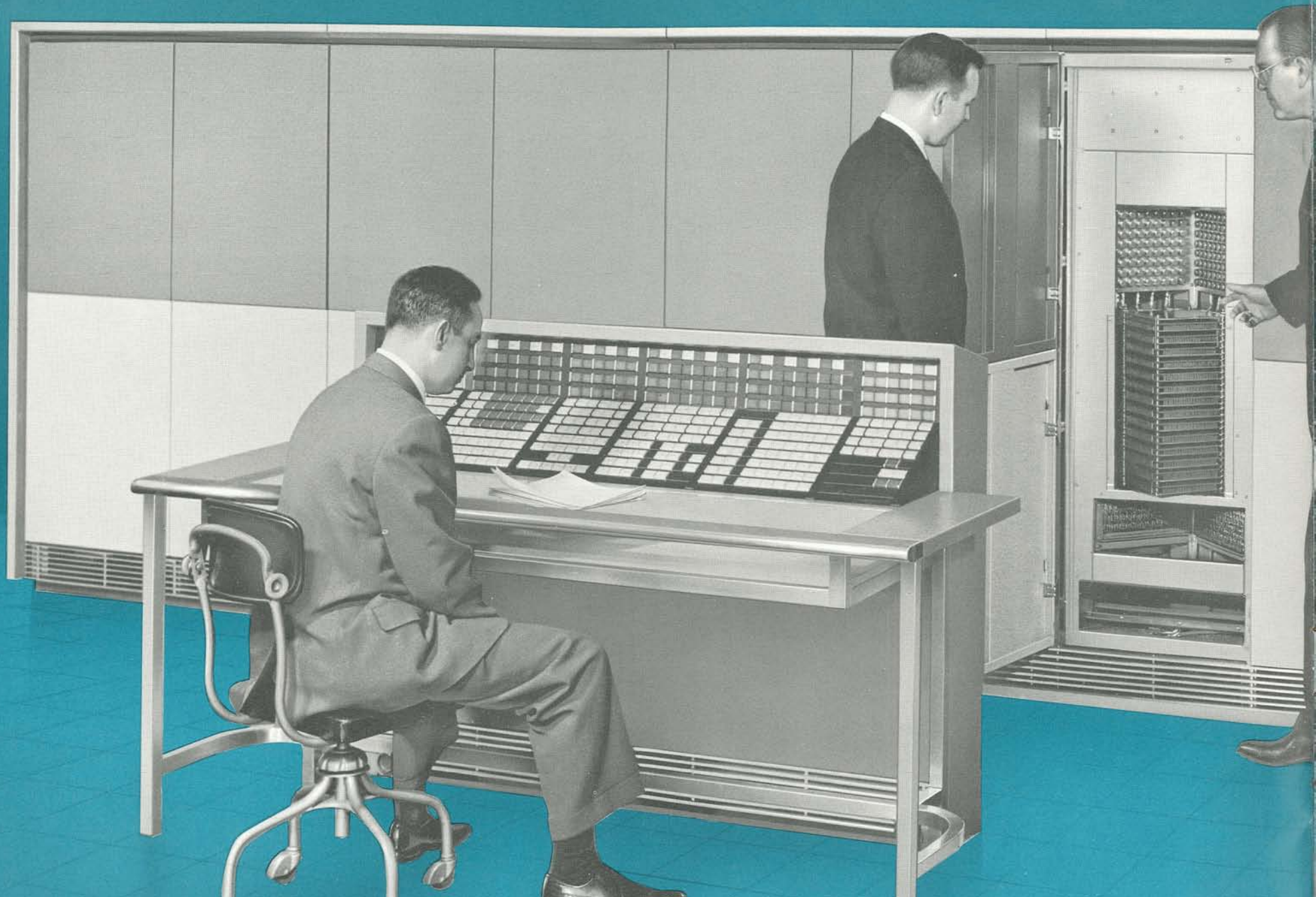
**PROCESSING**

**SYSTEM**

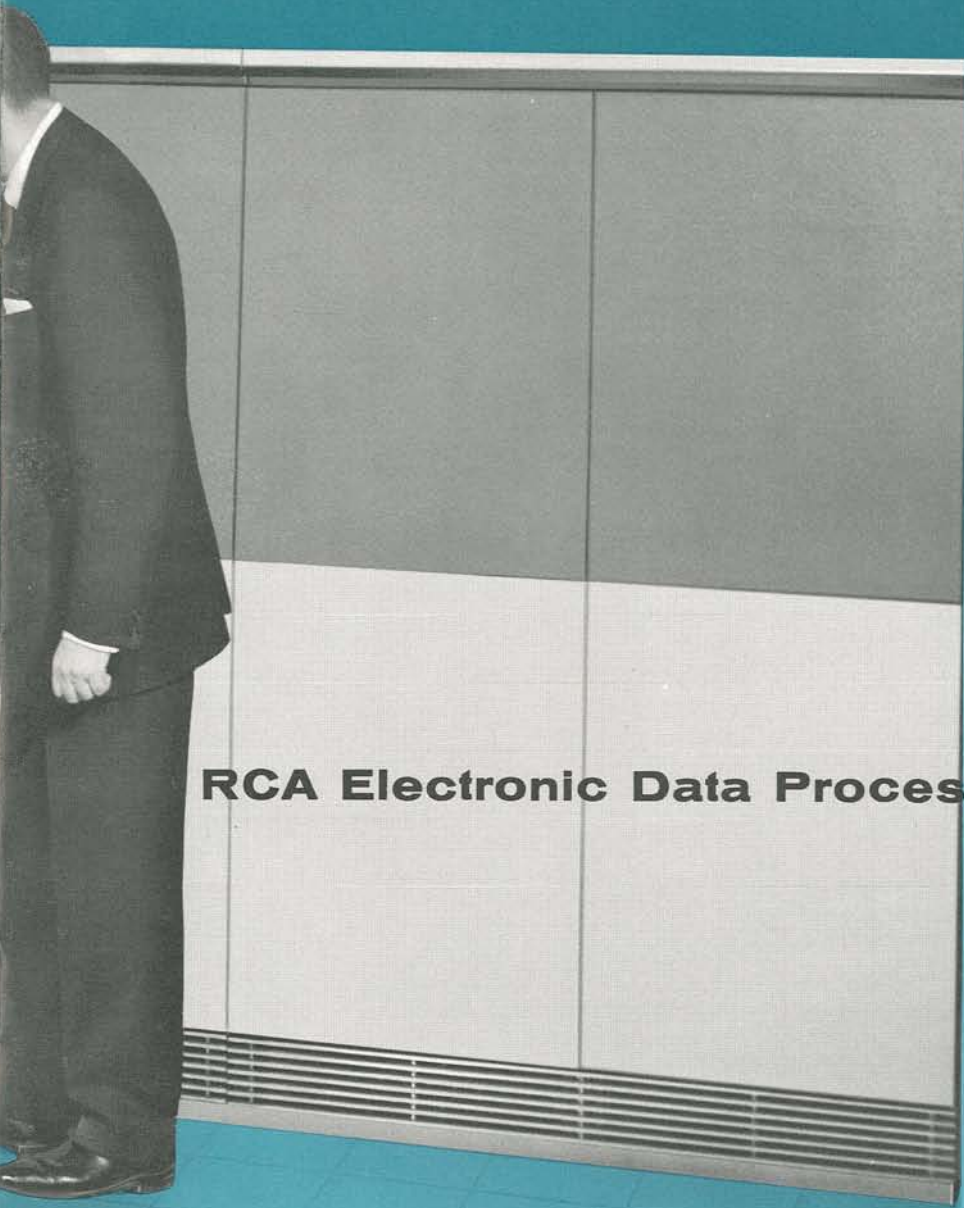


Transistor Designed by RCA









## RCA Electronic Data Processing System

The RCA 501 is distinctively contemporary in spirit—fully compatible with today's fine office interiors. Its trim, sheer look conveys the sense of precision and speed characteristic of electronics. Dynamic colors are introduced to lend interest and help integrate units of the system into a harmonious entity.

advanced techniques  
building-block construction  
modularized components  
printed wiring  
plug-in assemblies  
transistor design

**PROVIDE**

reduced processing time  
small size  
great reliability  
reduced maintenance  
low power consumption  
minimum cooling

*Extremely Low Cost per Unit of Work  
...Economical Expansibility*

# 501

Entirely new in concept, in design, and in construction, the RCA 501 is remarkable in its over-all efficiency. Analysis after analysis of the 501's capabilities in such business problems as file maintenance, inventory and production control, billing, cost accounting, market forecasting, sales and cost analysis, management reporting, shows the 501 to be an exceptionally efficient electronic data processing system measured in terms of cost per unit of work.

Contributing to the 501's efficiency is the building-block principle of construction which makes it a practical and simple matter to begin with a relatively small installation and to add to it as the work requires. These additions can be made in small, economical, easily managed steps. They can include punch-card input and output, random access files, large high-speed printing capability, and increased magnetic tape or magnetic core storage, to almost any extent desired. Thus, the capacity of the RCA 501 can readily be matched to the work load. The increase in the profitability of data processing is substantial.





*The **RCA 501** is the world's  
most advanced electronic data processing system*

**COMPACT, RELIABLE, EFFICIENT**



## *Easy to Install . . . Easy to Operate . . . Easy to Maintain*

The design of the RCA 501 system is based upon new concepts which radically reduce requirements for space, cooling and electrical power. Yet this is a complete data processing facility which performs all data processing functions at the remarkable speeds characteristic of electronic systems.

### **CONTROL CONSOLE—Simplified Automatic Control**

In sizeable electronic systems the highest operating efficiency and the best use of manpower are achieved by central and automatic control. All system operating controls in an RCA 501 are centralized within a 10" x 12" area in a single streamlined control panel. To start a work routine, the operator pushes a simple combination of buttons which activates the work program. From that point on, the operation is under program control and the system automatically performs the entire task without human intervention. If desired, however, the operator may manually control the operation of the system and may read out every step of the execution of a program.

### **MAGNETIC TAPE STORAGE—Data Accommodated in Half the Tape Length—Significant Reduction in Processing Time**

The RCA 501 employs variable length recording. This means that the amount of tape used is in almost direct proportion to the amount of data. In most other systems a fixed length of tape is allowed for each item in an entry, and this length is used regardless of the actual length of the data. The waste of space and excessive processing time is obvious. To avoid this, some systems resort to special programming. But that is expensive.

Further, in the 501, the space between entries on the tape is extremely small—only 0.4 inch—an important reduction in processing time results. Still further savings arise from the rapidity with which the tapes of the RCA 501 can be put in motion—about half the time most systems take. As any such equipment starts and stops its tapes hundreds of thousands of times a day, it is apparent that the RCA 501 has a large advantage.

The RCA 501 tapes can be read by the Computer when they are moving either forward or backward, and major savings in processing time, especially sorting, result from this also.

Reliability of operation is achieved in the RCA 501 by extensive use of such techniques as automatic parity checking and dual arithmetic. In addition, the RCA 501 records all data twice on its magnetic tapes, without increasing either the length of tape used, or the processing time. The added assurance of the integrity of the data is most worthwhile.

### **COMPUTER—Exceptional Speed at Low Cost—Time-Shared Electronics Permit Simultaneous Operations**

The Computer reads and writes to and from magnetic tape at 33,000 characters per second. This is a very conservative rate which contributes substantially to the low cost and dependability of the RCA 501. Here is an important point: because of the efficiency provided by variable length recording, by the short gap between entries, and by the short time required to put the RCA 501 magnetic tapes in motion, the 501 is able to process data at a rate equivalent to that of a more conventional machine with a read-write speed of 90,000 characters per second, or even higher. And this is accomplished in the 501 without special programming or additional electronics, and therefore without the high costs ordinarily associated with high speeds.

Time-shared electronics permit the performance of many kinds of simultaneous operations with large reductions in processing time. Among these are: read-compute, write-compute, read-write.

### **HIGH SPEED MAGNETIC CORE STORAGE—Transfers Data at 4 Characters in 15 Millionths of a Second—Programming Methods Save Storage Space**

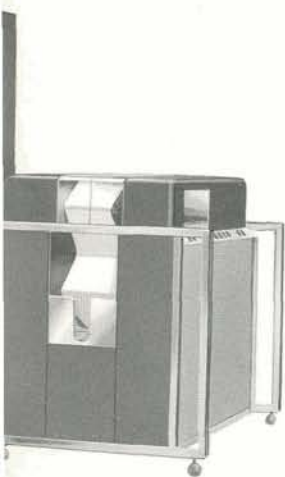
RCA has for years pioneered in magnetic core storage. Through the use of advanced circuitry and logic RCA has, in the 501 system, exploited the potentialities of magnetic cores to the utmost. The RCA 501 High Speed Magnetic Core Storage can handle data in either variable or fixed length, and can transfer data at the rate of 4 characters in 15 millionths of a second. Advanced programming methods enable the 501 to store programs in 30% to 50% less space than other systems. These are among the factors which provide a great deal more high speed storage capacity per dollar of cost.

### **ON-LINE PRINTER—Inexpensive High Speed Output**

This unusually low cost printer, operating under Computer control, delivers the output of the system, in variable format, at the rate of 600 lines per minute. There may be up to 120 characters per line. Computation can proceed while the paper being printed is advancing.

### **PAPER TAPE READER AND THE MONITOR PRINTER**

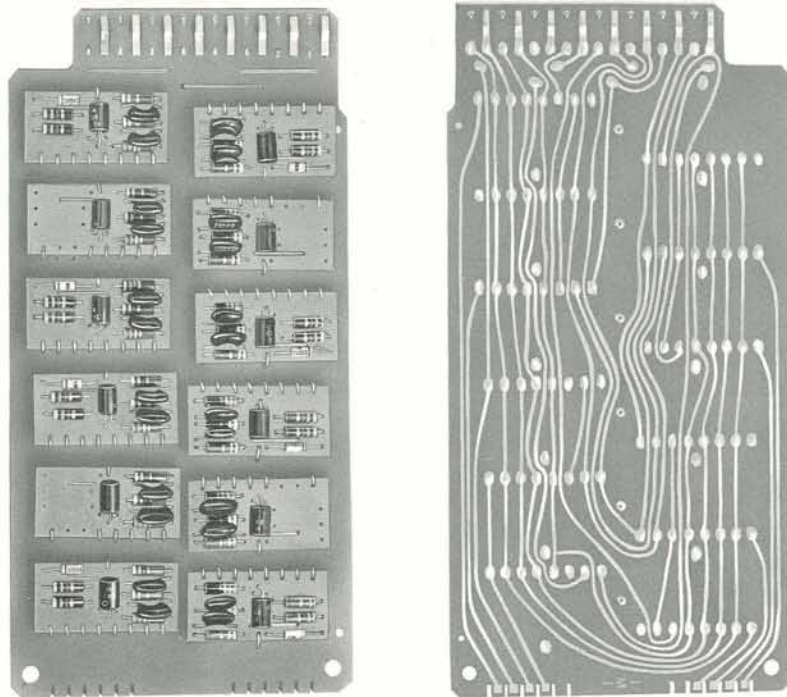
The Paper Tape Reader transfers data from punched paper tape to the 501 Computer at the rate of 400 characters per second. The Monitor Printer provides a low-cost auxiliary system output.



**All Basic Units Operate Under Program Automatic Control**



RCA 501

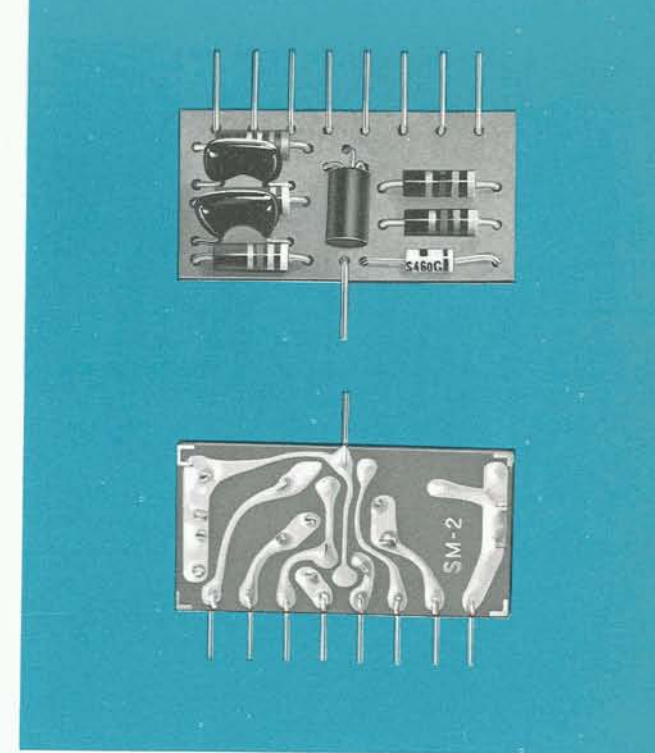


## ADVANCED TECHNIQUES

A pioneer in the development of transistors and other solid-state devices, RCA was among the first to recognize their potentiality for revolutionizing the design of electronic data processing equipment. And RCA's experience in applying transistors to highly complex products enabled its specialists to make the most efficient use of transistors in electronic data processing systems.

But this is not the whole story. Using advanced techniques originally worked out and proved in miniaturized communications and military equipment, the designers of the RCA 501 assembled transistors together with other extremely small components on small plastic wafers, with the electronic components on one side and the connecting wiring automatically printed on the other. The resulting assembly is called a module. Several modules are then mounted on a thin plastic board, also automatically printed with the necessary wiring, to form a plug-in assembly which is installed in the system simply by sliding it into position. These assemblies take up only  $\frac{1}{4}$  the space required by vacuum tube units of the same capacity. They are inexpensive. They are reliable to a degree until recently unknown in electronic systems. Moreover, they reduce cooling, power, floor space and maintenance requirements.





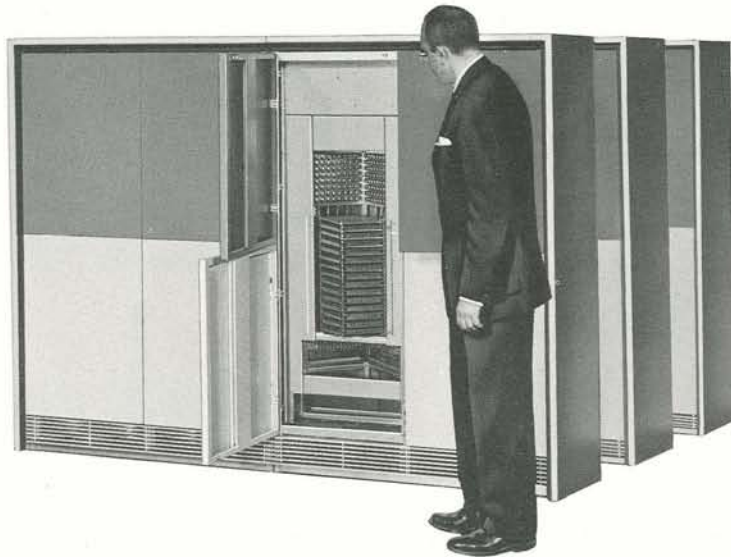
*Reduced Size  
and Cost  
Increased  
Reliability*



RCA **501**

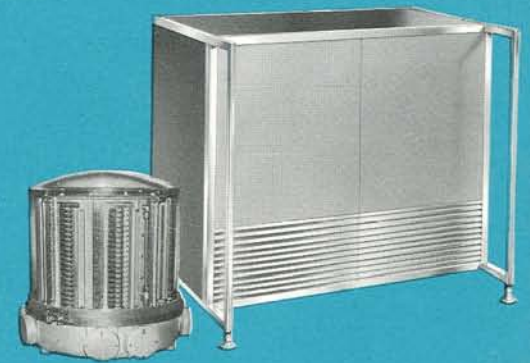
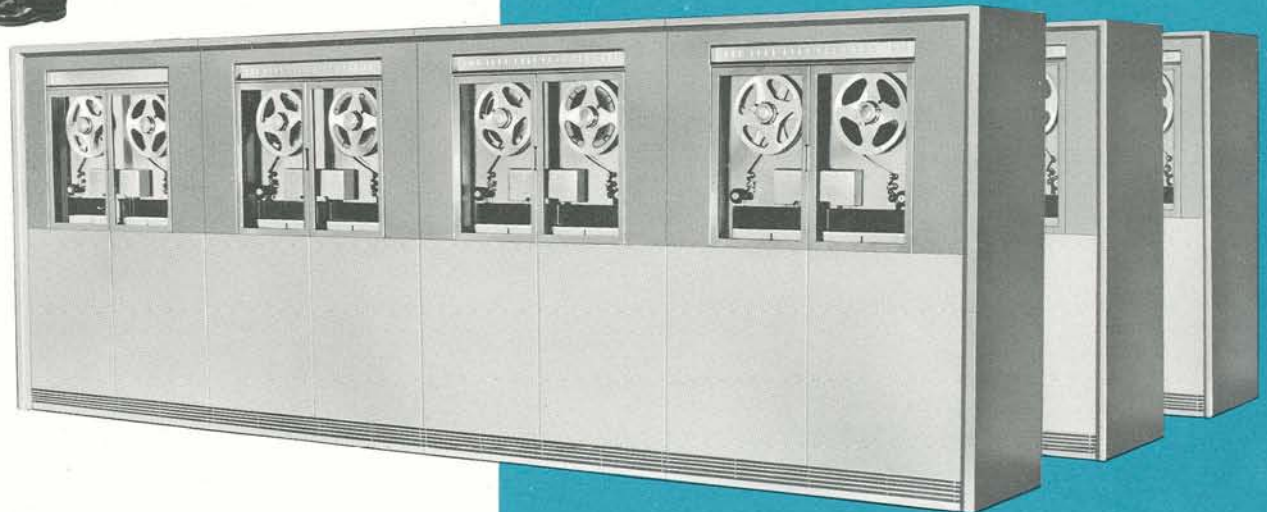
**HIGH SPEED MAGNETIC CORE STORAGE**—Expansible in Capacity from 16,000 Characters to 260,000

The work potential of an electronic data processing system is determined by the capacity of its high-speed storage. Enough, *but not too much*, capacity is the goal. An RCA 501 system can incorporate High-Speed Storage in small increments all the way from 16,000 characters to a total of 260,000.



**MAGNETIC TAPE FILES**—Up to 63 Tape Units Under Automatic Program Control

Until now, if an organization started electronic data processing with a system of medium size, it was not possible efficiently to add automatically controlled magnetic tape storage. The user of the equipment had either to resort to inefficient and expensive expedients or to start over again with an entirely new installation—in itself an expensive and inefficient measure. The RCA 501 eliminates this difficulty. Automatically controlled tape units can be added at will to a total of 63. The 501 tape units are designed for easy, rapid exchange of tapes.



**EXPANSIBLE.**

*Easily adaptable*



**RANDOM ACCESS FILE—Expansible in Stages of 1½ Million Characters Capacity**

When it is important to reach stored data almost instantly, a system should include random access storage. With an RCA 501 this can be done either at the time of original installation, or at any later time. Moreover, the 501 Random Access Storage can be expanded in increments of 1½ million characters, as the problem dictates. Access time is two-tenths of a second.

# ...VERSATILE...

*to individual needs*

The expansibility and the versatility of the RCA 501 are among its outstanding merits. An installation can include up to 63 Magnetic Tape Stations under automatic Program Control . . . High Speed Magnetic Core Storage capacity can range from 16,000 characters to 260,000 in steps of 16,000 . . . Random Access Files can be added in increments of 1½ million characters. Similarly, transistorized punch-card input or output, or large-volume printing capacity, can be added to a 501 system whenever it is advantageous to do so. These additions can be made without upsetting routine operations.

Electronic data processing operations can begin with a 501 system of moderate size and cost, avoiding excessive capacity and expense. Then, as the work load increases, or as it is decided to do more tasks electronically, units can be added so that the work potential of the system is in balance with work requirements. This can be accomplished in stages of readily manageable size, and of reasonable cost. Moreover, unlike other systems, expansion to a 501 requires no addition to the basic computer electronics.

**CARD TRANSCRIBER\*—Ability to Rearrange Data, Add or Delete Data**

At a card reading rate of 400 cards a minute, the RCA 501 transistorized punch-card input can, *at the point of input*, automatically rearrange, add to, or delete information on the incoming cards.



**TRANSCRIBING CARD PUNCH\*—Ability to Rearrange Data, Add or Delete Data**

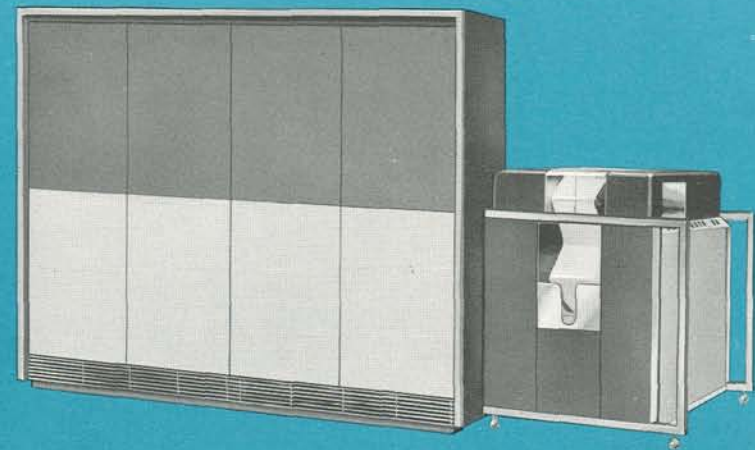
At 100 cards a minute, the RCA 501 transistorized punch-card output, taking its information from magnetic tape, can automatically, *at the point of output*, rearrange, add to, or delete data on the tape.



**HIGH SPEED PRINTER\*—Self-Contained Transistor Logic**

In the area of high-speed printing the 501 system has a valuable and unique characteristic—when additional printing capacity is desired, it is a simple matter to disconnect the RCA 501 High-Speed Printer from the Computer and to install a unit which provides the Printer with its own electronic logic and control. In addition to freeing the Computer from control of the printing task itself, this relieves the Computer of much preparatory editing.

\*Off-Line Device—operates independently of Computer logic.

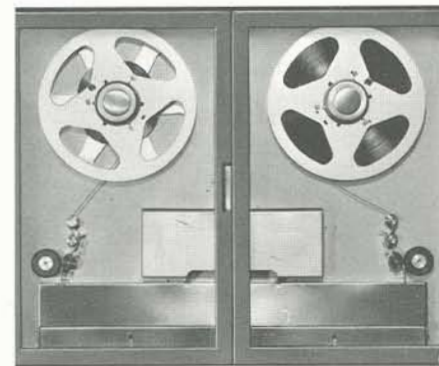




RCA 501

Effective *human engineering* is expressed in the design of this control panel which permits the system operator to monitor and control system operations with maximum speed and convenience.

From television to guided missile telemetering, to business facts, RCA's techniques of magnetic recording pay off in reliability, compactness, and low cost.

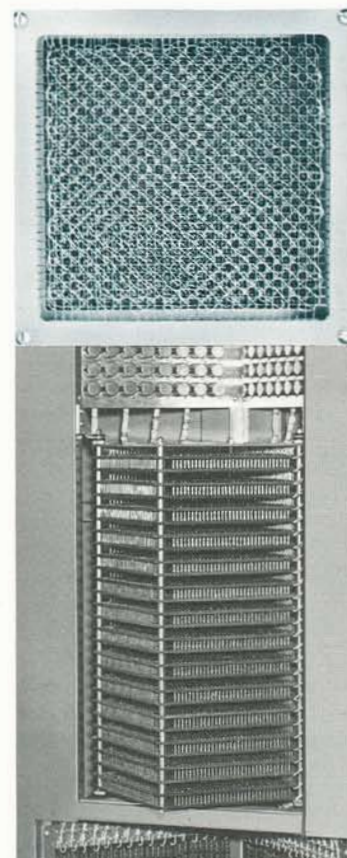


## Practical Pioneering by RCA advances the Science of Information Handling

An electronic data processing system is a scientifically advanced, precise electronic equipment built to operate with a high degree of accuracy and reliability. In RCA's extensive experience these same equipment qualities are consistently requisitioned—for example in critical missile guidance systems, in remotely controlled gas and oil pipeline operations, in microwave radio relay systems, in world wide communications networks, in air and sea navigation systems, and in scores of varied information handling applications.

RCA has a distinguished record in the development and use of advanced information handling systems of many kinds and has for years been in the forefront of computer research and development. RCA is unusually well qualified by extensive experience to work out special electronic data processing applications, and efficient means of communications between data processing installations or between central installations and branch offices or plants.

RCA has available to its customers highly expert programmers and analysts. In the RCA Service Company there is the technical manpower, know-how, and all around practical capability to keep electronic equipment operating in top form. The Radio Corporation of America has earned a first-class reputation for its performance in following through in every area of importance to its customers—in research, in engineering, in production, in equipment operation, and in maintenance.



RCA has for years pioneered in the circuitry, logic, reliability, and manufacture of magnetic core storage. This equipment element of the 501 system is designed to provide unusually large storage capacity at little expense.



## RCA-Leader in Electronic Systems

The **RCA 501** *the world's most advanced  
electronic data processing system*



- Expansible without change in basic system . . . up to 63 tape storage units . . . from 16,000 to 260,000 character magnetic core storage.
- Records and files data in as little as half the tape length without extra programming.
- Records data twice for accuracy . . . without increase in use of tape . . . without affecting processing time.
- Reads tape in either forward or backward motion . . . reduces processing and sorting time.
- Performs a variety of simultaneous operations.
- Processes data at high speeds without special programming and expensive circuitry.
- Accommodates full range of peripheral equipment: Card In/Out Equipment, Punch Paper Tape Devices, On/Off Line Printers, Random Access Files.
- Transistor-Design : saves floor space . . . saves power expense . . . minimizes cooling requirements . . . reduces installation and maintenance costs . . . increases reliability.

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**RADIO CORPORATION OF AMERICA**

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