

UNIVAC 9000 SERIES—9200—9300—9400...AND MORE TO COME!

# UNIVAC® 9400 SYSTEM



1963



**UNIVAC 9000 SERIES**—A new, compatible computer family with exclusive Plated-Wire Memory



9200

low cost, internally  
programmed  
with direct  
access discs  
and communications

9300

versatile, next-step-up  
tape and disc system  
with concurrency  
and communications

9400

high performance,  
medium scale system  
with multiprogramming  
and real-time  
communications  
capabilities

4111



## UNIVAC 9400 SYSTEM

- Processing power 3 to 4 times as powerful as competitive systems
- New!...UNIVAC® 8411 Disc Subsystem...removable direct access storage
- New high-performance tapes—  
1600 bpi recording density—transfer rate up to 192 KB
- Multiprogramming for high-performance information processing
- Real-time communications processing
- Vast range of programming languages available with COBOL, FORTRAN, REPORT PROGRAM GENERATOR and BASIC ASSEMBLY LANGUAGE processors



9400  
high performance,  
medium scale system  
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and real-time  
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capabilities

## The UNIVAC 9400 — phenomenal power in medium scale

Outstanding real-time data communications processing capabilities of the UNIVAC 9400 System have been designed to satisfy the most demanding business organizations. With the UNIVAC 9400 System capability to handle up to 64 duplex communication lines, accurate and immediate information may be received from central sites, or remote locations.

Many remote devices such as the UNISCOPE\* 300, DCT-2000 (Data Communications Terminal), UNIVAC 1004 Card Processor and the UNIVAC 1005 Data Processing Systems can effectively communicate with the UNIVAC 9400 System. In addition, the UNIVAC 9400 System can "talk" to all members of the 9000 family, Univac real-time systems, and various remote terminals utilizing an intermix of codes and speeds. While processing inquiries from remote terminals, the UNIVAC 9400 System can also be performing on-site applications, such as payroll and inventory, at the same time.



If you are in the kind of business where fast, random information retrieval can make the difference between profit and loss, let the new UNIVAC 8411 Direct Access Storage Subsystem solve your problem. The direct access capabilities of the UNIVAC 8411 Subsystem insure firm control over many of your data processing needs. This versatile unit not only provides millisecond access to large files of data, but also slashes processing time for existing applications and opens up new avenues of information processing capabilities.



The communications capabilities of the UNIVAC 9400 System are the result of years of Univac experience with real-time systems. Fast instruction execution, byte orientation, translation and data chaining capabilities, and special character recognition create in the UNIVAC 9400 System an efficient and inexpensive real-time processor. You can also realize a large reduction of programming time and effort because the UNIVAC 9400 System makes use of a message control language. This language creates a program which coordinates all activity between remote line terminals and the message processing programs.



Multiprogramming capabilities of the UNIVAC 9400 System assure processing of multiple programs concurrently with "time-allocation" making sure each program receives a desired share of processing time. With this feature, usually found in large, expensive systems, the UNIVAC 9400 System efficiently controls the running of up to five concurrent problem programs. For example, the following programs could be processed at the same time:

- Random processing—  
updating of a random semi-finished work-in-process inventory
- Communications—  
handling inventory inquiries from remote terminals
- Sequential processing—  
updating of master files, such as open-item accounts receivable
- Disc or tape sort
- Complex engineering calculations



The UNIVAC 9400 System is designed for smooth expandability. As applications are added, additional storage and I/O equipment allow the UNIVAC 9400 System's multiprogramming software to execute these applications concurrently, with only a small increase in elapsed time.

Low cost processing can be realized with the UNIVAC 9400 System, since the monthly cost of a basic tape or disc system begins around \$6,000. If your business requires a more powerful combination, the UNIVAC 9400 System can be expanded to include tape, disc and communications, all with real-time advantages, up to \$25,000 per month.

The UNIVAC 9400 System features high-performance magnetic tape drives and removable, direct access storage subsystems capable of providing a number of configurations to suit your exact data processing requirements.

Advanced processor power, backed up by the exclusive Univac Plated-Wire Memory, is still another feature which points the way to higher performance.



PHENOMENAL? Yes indeed! Using the UNIVAC 9400 System as a tape or disc oriented system, no other computer in its price range delivers such performance. The family compatibility of the UNIVAC 9200 System and the UNIVAC 9300 System has led to the development of the UNIVAC 9400 System, unmatched by any other computer in its class, as to price/performance. If you are concerned about upward growth, the UNIVAC 9400 System offers a high degree of source program and data compatibility with existing industry standards. Whether it be RPG, BAL, COBOL or FORTRAN—cards, tapes, or discs, the UNIVAC 9400 System has been designed with compatibility in mind—to ease your transition to this high performance system and to meet your future expansion requirements.

Consider all of this and it stands to reason that Univac, the pioneer of data processing, is your logical choice.

And the UNIVAC 9400 System is ready to prove it!



## The UNIVAC 9400— an insight into excellence

The UNIVAC 9400 System offers a highly desirable combination of high speed tape and disc processing with high speed printer output. The processor is extremely fast, having a memory cycle time of 600 nanoseconds per two bytes. Univac Plated-Wire Memory starts at 24,576 bytes and is expandable to 131,072 bytes.

As an extremely high performance tape system, the *minimum* UNIVAC 9400 Tape System includes four tape drives and can be expanded to sixteen. The effective tape read or write speed ranges from 34,160 to 192,000 bytes per second. High speed, *simultaneous read/read, read/write, and write/write* operations can be performed on two different tape units while being overlapped with all other I/O operations and processing. The end result is greatly increased throughput.

Using the UNIVAC 9400 System as a disc oriented system, your configuration can have from two to eight UNIVAC 8411 Disc drives. Each removable disc pack used with these disc drives offers a 7,250,000 byte capacity, providing direct access to stored information.

The UNIVAC 9400 System is complemented by communications, punched card reading and punching, and high speed printing at speeds up to 1600 alpha-numeric lines per minute. These Univac peripherals are available with different speeds and capacities. All of these features insure complete flexibility in determining the basic configuration of your UNIVAC 9400 System.





**DISC/TAPE SYSTEM**



**DISC/TAPE COMMUNICATIONS SYSTEM**



### Disc/tape system

The Univac tape and disc combination is designed for applications utilizing large master files requiring a mixture of random and sequential processing. While the direct access capabilities of the disc packs require less time than the tapes, the use of tapes reduces disc pack costs and also provides a fast method of sequential processing. A typical disc system with tape would include:

- UNIVAC 9400 processor with multiplexer channel and interrupt timer
- Console with keyboard and printer
- 49,152 bytes of storage
- Card reader and punch
- High speed printer
- UNISERVO\* 12/16 Subsystem with four tape units
- UNIVAC 8411 Disc Subsystem with three disc drives
- Two selector channels

This combination of disc and tape offers a distinct advantage in the processing of many applications. Insurance, pension, order entry, billing and accounts receivable, savings and loan, engineering design and personnel statistics comprise a few of the possible applications. The broad flexibility of disc stored programs can be yours at low cost in the UNIVAC 9400 System.



### Disc/tape communications system

This configuration is basically identical to the disc/tape combination system, except that the UNIVAC 9400 System can be used for communications oriented data processing through the use of a UNIVAC Data Communications Subsystem (DCS) and a communications adapter.

A complete communications oriented configuration comprises:

- UNIVAC 9400 processor with multiplexer channel and interrupt timer
- UNIVAC Data Communications Subsystem (DCS)
- Communications adapter
- 49,152 bytes of storage
- Storage protection
- Card reader and punch
- High speed printer
- UNISERVO 12/16 Subsystem with six tape units
- UNIVAC 8411 Direct Access Storage Subsystem with three disc drives
- Two selector channels

A partial list of applications includes inquiry systems, remote transaction processing and data collection from remote terminals. Consider a large department store chain with thousands of receipts collected at the end of each working day. The UNIVAC disc/tape communications system can collect this data from remote terminals at each department store and effectively update the general inventory, while providing schedules for the replenishment of goods to each of the stores in the field. In addition, the multiprogramming capabilities of the UNIVAC 9400 System permit the communication applications to operate concurrently with batch programs initiated at the system site.



**TAPE SYSTEM**



**DISC SYSTEM**



### Tape system

A big plus for your future growth and profit planning is the ease of expansion realized from a smaller tape system, such as the UNIVAC 9300 System, into the UNIVAC 9400 System. Included in a small tape configuration are:

- UNIVAC 9400 processor with multiplexer channel and interrupt timer
- 24,576 bytes of storage
- Console, including keyboard and printer
- Card reader and optional punch
- High speed printer
- UNISERVO 12/16 Subsystem with four tape units

This UNIVAC 9400 Tape System is ideal for both business and scientific data processing. For example, in the case of a publishing company, updating of the subscriber master file for labeling and billing can be efficiently processed with this tape system. Other applications possible are order entry and billing, payroll and labor distribution and sales analysis.



### Disc system

Interested in a disc-only system? It would be well worth your time to investigate the UNIVAC 9400 Disc System. The transition to a disc system would be smooth and efficient, backed up by experienced Univac personnel. A small disc configuration consists of:

- UNIVAC 9400 processor with multiplexer channel and interrupt timer
- 24,576 bytes of storage
- Card reader and optional punch
- High speed printer
- UNIVAC 8411 Disc Subsystem with two or three disc drives
- One selector channel

As with the small tape system, the disc system is ideally suited for both business and scientific data processing. Production control, inventory control, engineering design, and statistical analysis are a few of the applications efficiently handled with this configuration.

## Hardware facts

### Univac Plated-Wire Memory

"Exclusive" with Univac, this unique storage gives the 9400 System a 600 nanosecond storage cycle time for two bytes.

The minimum 9400 includes 24,576 storage locations, field expandable to 131,072 bytes. Each byte contains eight bits plus a parity bit, and can store two digits or one character of data.

### Monolithic Integrated Circuitry

Constructed on extremely small silicon chips, a typical monolithic circuit may contain on a single chip, the equivalent of 21 transistors, 27 resistors, and 3 diodes. Unmatched Univac engineering techniques provide an extremely high reliability factor in the designing of these circuits. And, they need no inter-connection as do hybrid integrated circuits. By drastically shortening these electronic paths a more compact processor is produced. In addition, the processor is faster and still retains full reliability.

### Processor Features

The UNIVAC 9400 central processor provides, in addition to a powerful instruction repertoire, 32 full-word general purpose registers. Sixteen registers may be used for user program functions, while the other sixteen are used for software. The UNIVAC 9400 System processor also features seven levels of interrupt. Each level of interrupt has its own hardware interrupt entry. By having this feature, plus the separate set of general purpose registers, software overhead is reduced since less analysis is required to process an interrupt. The seven levels of interrupt are supervisor call, program exception, timer, selector channel #1 and #2, and multiplex channel shared and non-shared. Multiple levels of

interrupt are especially valuable in the multi-program or real-time environment of the UNIVAC 9400 System.

Processing and multiple input/output operations, such as card reading and punching, printing, tape and disc reading or writing, and communication functions are all overlapped, thereby providing greater throughput in the overall operation. The processor also includes a one millisecond interrupt timer, which is used as a day clock and for real-time processing.

### Disc Drives

The UNIVAC 8411 Direct Access Storage Subsystem can be attached to the 9400 central processor through one of the optional selector channels. The UNIVAC 8411 Subsystem can include a range of one to eight disc drives. Each disc pack offers a 7,250,000 byte capacity. The UNIVAC 8411 Subsystem has an average access time of 75 milliseconds, while the data transfer rate is standard at 156,000 bytes per second. Rapid access to the stored information insures a continuing advantage in standard data processing as well as communications.

The UNIVAC 8411 Direct Access Storage Subsystem has dual-access capabilities, which allows the subsystem to be interfaced with two selector channels. For greater throughput power when magnetic tapes are used, the two selector channels can be interfaced directly into one 8411 Direct Access Storage Subsystem. In addition, this dual access capability also permits two UNIVAC 9400 Systems to serially access the UNIVAC 8411 Subsystem.

### Data Communications Capability

Communications oriented data processing is possible through the use of

from one to four Data Communications Systems (DCS). These subsystems (DCS-1, DCS-4, or DCS-16) can accommodate one, four, or sixteen duplex lines, depending on user requirements. A vast scope of data transmission service ranges from the low speed asynchronous transfer rate of 75 bits per second to the synchronous Telpak C Data Terminal rate of 250,000 bits per second.

The DCS-16 also has dual-access capabilities. Two UNIVAC 9400 System processors can be interfaced to the DCS-16, but only one processor can be on-line with the DCS-16 at one time. This dual-access feature provides the necessary back-up for those users that demand this capability in a real-time environment.

### Magnetic Tape Options

Depending on the individual installation requirements, the UNISERVO 16, 12, or VI C offers many features, such as:

- Phase and NRZI recording options.
- 7 and 9-track capability.
- 200 bpi to 1600 bpi recording density.
- Transfer rates ranging from 34,160 to 192,000 bytes per second.
- Simultaneity.

Simultaneous tape operations consisting of read/read, read/write, write/write can be realized with the UNIVAC 9400 System. In addition, backward read is standard on all magnetic tape handlers.

### Input/Output Channels

The standard multiplexer input/output channel, used for low speed devices operating concurrently, will accept data at the rate of 85,000 bytes per second. Also featured as optional are one or two high-speed selector

channels, which operate at 333,000 bytes per second each. These channels are used for the UNIVAC 8411 Direct Access Storage and UNISERVO 12/16 Tape Subsystems.

### Printing Versatility

Two high speed printers are available with varying speeds on the UNIVAC 9400 System. The faster printer operates from 1200 to 1600 lines per minute. The high rate of 1600 lpm is achieved whenever the characters within a print line are included within any 43 contiguous characters of the 63 character set.

The standard printer operates from 900 to 1100 lines per minute. The high rate of 1100 lpm is maintained whenever the characters within a print line are included within any 49 contiguous characters of the 63 character set. Both printers have a 132 character print line.

### Card Processing

The card reader operates at 600 cards per minute. The card punch operates at 250 cards per minute. A read option can also be added to the punch for applications requiring reading and punching of the same card. In addition to, or in place of, the standard reader, printer, or punch, the UNIVAC 1004 Card Processor, 1005 Data Processing Systems, UNIVAC 9200 or 9300 Systems can effectively be used on-line to accommodate punching, printing and reading. With the UNIVAC 9200 or 9300 Systems used on-line, high speed reading can also be accomplished with the UNIVAC 1001 Card Controller. Such a configuration allows easier conversion for existing UNIVAC 9200, 9300, 1004, and 1005 users. The on-line subsystems retain their freestanding processing power to meet the user's additional requirements.



## Software facts

The UNIVAC 9400 System brings a full complement of software to cover the range of programming, operating and computational needs. And Univac software has been further developed to maintain excellent operating efficiency for tape and disc processing. For example, here are a few of the available software packages:

- Multiprogramming for maximum system utilization.
- Communications control program.
- Report Program Generator—tape and disc—ease of learning a prime factor.
- Assembler — tape and disc — simple and convenient.
- Data Management Input/Output Control System—for all Univac peripherals.
- Job Control Stream—for flexible programmed operation.
- Tape and disc utilities.
- COBOL 65.
- ASA STANDARD FORTRAN.
- A full package of testing and de-bugging aids.



### **Multiprogramming in medium scale**

The UNIVAC 9400 System offers low cost, high performance multiprogramming usually found in larger and more expensive computer systems. Up to five problem programs, such as communications, sequential batch processing, random processing, disc or tape sorting and complex engineering calculations may be run concurrently.

The Supervisor, which controls these problem programs, employs the technique of the distribution of processing time to independent programs based on program priorities, time allocation and input/output equipment utilization. Consideration of these factors by the Supervisor assures the user that the distribution of processing time is balanced.

**9200**—low cost, internally programmed with direct access discs and communications

**9300**—versatile, next-step-up tape and disc system with concurrency and communications

**9400**—medium scale system with multiprogramming and real-time communications capabilities



**and more to come!**

UNIVAC