UNIVAC® 1107
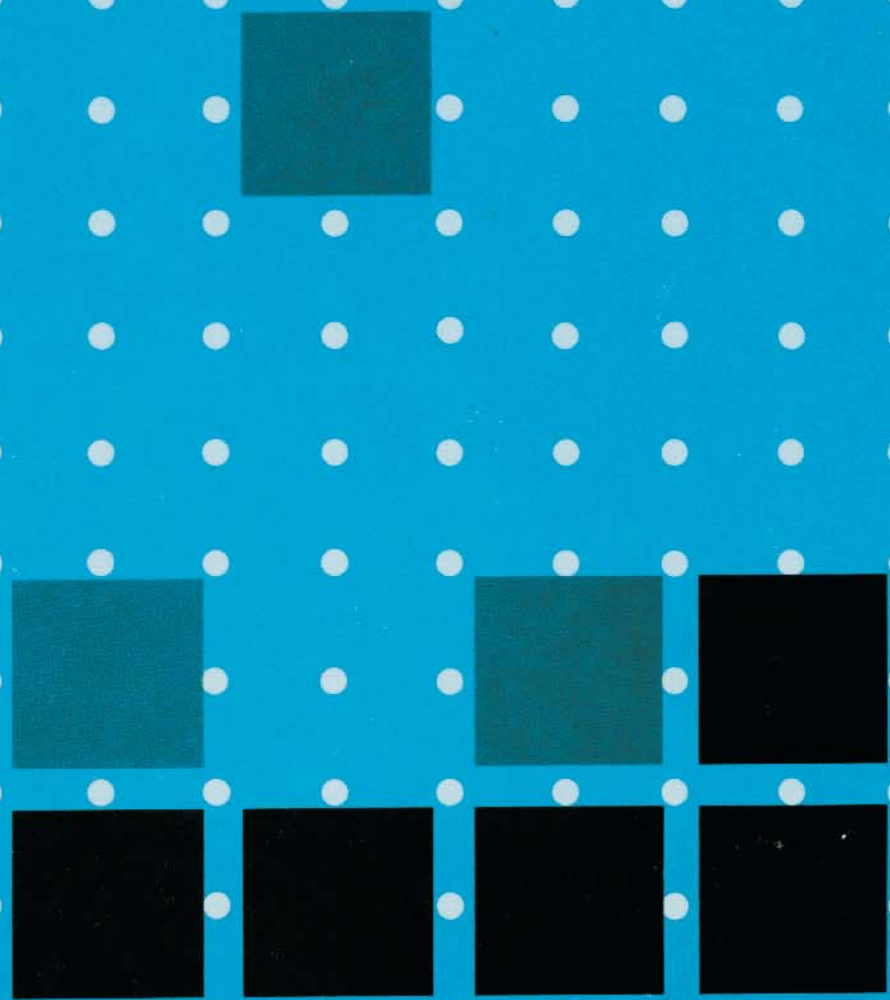
GENERAL DESCRIPTION

The UNIVAC 1107

THIN-FILM

Memory Computer

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1. UNIVAC 1107 Thin-Film Memory Computer

The UNIVAC® 1107 Thin-Film Memory Computer represents the most significant departure from conventional data-processing systems since the introduction of solid-state circuitry. For the first time, a thin-film memory device is used in a commercially available computing system.

The many controls which must be exercised for high efficiency input-output, concurrent computation, and internal transfers are amalgamated in the heart of the computer. The busy computer crossroads, technically designated as *registers*, have been placed in the logic of this machine so that peripheral equipment can run at full speed with little interference to running programs.

This ultra high-speed heart of the computer has been made possible by another UNIVAC *first* – **Thin-Film Memory**. UNIVAC Thin-Film Memory is made by deposition of magnetic alloys under high vacuum in layers so thin that magnetization can be switched by rotation within time intervals of several nanoseconds. Remington Rand UNIVAC's new technological breakthrough provides multiple accumulators, multiple index registers, and multiple input-output control registers. These multiple registers permit "housekeeping" steps to proceed in parallel with the main program and offer the advantages of multi-address logic where such logic is most efficient (for example, Search instructions).

Basically, the UNIVAC 1107 is an advanced solid-state data-processing system designed and developed to provide reliable solutions to complex problems. This computer system is well suited to off-line, on-line, and real-time problems in commercial, scientific, and military applications. A highly versatile input-output section and a large internal memory, backed by a powerful instruction repertoire, provide the UNIVAC 1107 with unequalled data-processing capabilities.

UNIVAC 1107 FEATURES

Included among the many features of the UNIVAC 1107 Data-Processing System are:

- A thin-film control memory—the most advanced storage device on the market today — used for arithmetic and index registers, for input-output access control, for other special controls, and for auxiliary storage.

- 300-nanosecond (0.3-microsecond) access time for thin-film memory, with a complete cycle time of 600 nanoseconds.

- A ferrite-core memory for instructions and operands, available in capacities of 16,384 words in one bank; or of 16,384, 32,768, 49,152 or 65,536 words in two separately accessed banks.

- 2-microsecond effective cycle time for core storage (overlapping of two banks).

- 36-bit words in both thin-film and core memories.

- An instruction word format that provides for indexing, automatic index-register incrementation, partial word transfers, and indirect addressing, along with a current operand reference and specification of an arithmetic register.

- An extremely powerful instruction repertoire, including fixed and floating-point, integer, and fractional arithmetic.

- 16 input channels and 16 output channels, capable of concurrent input-output transmissions up to 250,000 words per second (1,500,000 characters per second), without direct supervision by the main program.

- Automatic programming: ALGOL and COBOL compiling programs and a FORTRAN translating program.
- An Executive Routine, capable of integrating routines for multiple programs.
- Compatibility with existing UNIVAC systems is maintained through Uniservo IIA, 90-column and 80-column punched-card, and paper-tape peripheral units. Versatile off-line communication with peripheral units can be accomplished by including a UNIVAC Solid-State or UNIVAC STEP system as a satellite computer.

TYPICAL APPLICATIONS

In line with UNIVAC's leadership in developing and manufacturing computing systems of advanced logical design, the UNIVAC 1107 offers the most advanced data-processing capability now available. This general-purpose system can efficiently and economically handle a wide range of technical applications, such as:

- Tactical data systems
- Command and control systems
- Digital communication and switching systems
- Data reduction and analysis
- Logistics
- Scientific computation
- Traffic control
- Reservation systems
- Computational analysis
- Inventory and scheduling systems
- Intelligence systems
- Systems simulation
- Missile and satellite dynamics
- Process control

MODULARITY

Because the storage capacity and the number of input-output channels activated are optional, the user can select a UNIVAC 1107 System that will meet his *immediate* processing and cost requirements. The system selected can then be expanded at a rate consistent with the quantity and complexity of applications.

Compatibility with a wide range of commercial, scientific, and military peripheral equipment—of both advanced and standard design—complements the basic building-block characteristic. Consequently, the UNIVAC 1107 System can be varied on the basis of size, components, or applications.

In any particular application a configuration can be chosen that will provide a well-balanced system with unprecedented growth potential.

Along with modular construction, the UNIVAC 1107's unique input-output section – designed to be adaptable to new peripheral equipment – assures the user of a data-processing system that will keep pace with the computer industry far into the foreseeable future. This section can connect the Central Computer with many different types of peripheral units, including other Central Computers.

PERIPHERAL EQUIPMENT

The list of peripheral equipment compatible with the UNIVAC 1107 Thin-Film Memory Computer includes:

Standard Peripheral Equipment:
Magnetic Drums
Magnetic-Tape Units
Punched-Card Units
High-Speed Printers
Paper-Tape Subsystems
Supervisory Console Auxiliaries

Special Peripheral Equipment:
Analog-to-Digital and Digital-to-Analog Converters
Electronic Printers
Displays, Plotters, and Keysets
Multiplex and Switching Units
Special Real-Time On-Line Systems
Mass-Storage Units
Other Off-Line Systems
Other Computers

OPERATIONS IN BRIEF

UNIVAC 1107 internal operations are performed in the parallel binary mode. Each computer word, in thin-film control memory and core memory, contains 36 bits. Instructions normally include the address of both an operand and an arithmetic register, and may specify indexing, incrementing or decrementing, indirect addressing, and field selection. Direct communication between internal memory and peripheral equipment may be scheduled over 16 sets of bidirectional communication paths consisting of 16 input channels and 16 output channels.

Memory

Regardless of the core-memory capacity selected by a user (capacities range from 16,384 to 65,536 words), every UNIVAC 1107 System employs a separate thin-film control memory. This memory, which is the latest development in storage techniques, consists of an array of thin magnetic films. The time required to obtain information from the UNIVAC 1107's thin-film memory is only 300 nanoseconds (0.3 microsecond). Very high operating speeds can be achieved because the thin-film control memory allows parallelism and sophisticated logic. Each instruction *does more work.*

In addition to providing auxiliary storage locations, the control memory furnishes:

15 Index Registers
16 Arithmetic Registers*
36 Special Control Registers

Instructions

The instruction repertoire encompasses both fixed and floating-point arithmetic. Fixed-point instructions, in turn, provide for integer and fractional arithmetic. Pro-

Four arithmetic-register addresses overlap index-register locations.

vision has also been made for partial word transfers, partial compares, repeated search operations, and masking. Special add and subtract instructions perform parallel addition or subtraction of two or three fields within a single data word. To provide fast programming of double-precision arithmetic, special features have been incorporated in the arithmetic section.

Input-Output Channels

The UNIVAC 1107's input-output channels have been paired to meet the requirement that standard peripheral equipment accommodate bidirectional data transfers. Up to 16 input channels and 16 output channels can be used for direct communication between peripheral equipment and internal memory.

Program Interrupt

Seventy-four interrupt signals, governing input-output operations and various contingency and error conditions, include internal and external interrupts for every channel. In effect, each interrupt causes a jump from the main program to an associated subroutine. This subroutine may set up input or output transmissions, prepare the computer for error diagnostic routines, or perform any other function the programmer may assign to it.