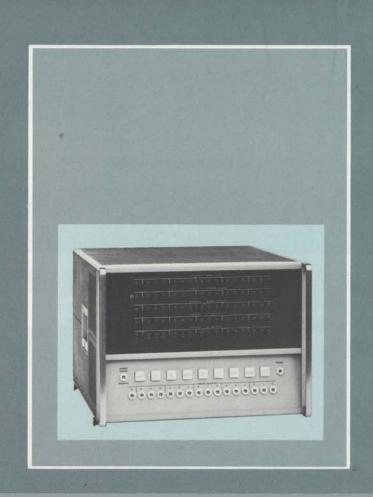


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## HIGH PERFORMANCE DIGITAL COMPUTERS



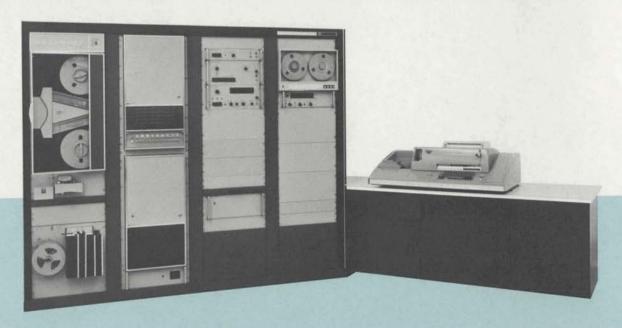
HP 2115A HP 2116A

### VERSATILE. FREE-STANDING COMPUTERS FOR SCIENTIFIC COMPUTATION



The HP 2116A and 2115A are high-performance, stored program digital computers that include many features found only in much larger machines. Three standard programming languages are available, backed up by an efficient assembler providing 70 basic instructions (including micro-programmable register reference instructions) and 23 assembly-directing pseudo instructions. The compilers and assembler generate relocatable code, which is loaded and linked by the control system loader; the programmer is not concerned with page boundaries. Modular software drivers for peripherals permit device-independent programming. An optional plug-in Extended Arithmetic Unit reduces multiply/ divide times and provides valuable long shift and rotate instructions. High-speed (up to 625,000 words/second) Direct Memory Access is also available as a plug-in option.

## FLEXIBLE INPUT/OUTPUT CAPABILITY FOR INSTRUMENTATION SYSTEMS



All traditional computer peripherals — teleprinter, tape reader, punch, magnetic tape units, disc memory line printer, card reader, plotter, scope display, etc. are interfaced simply by standard plug-in cards. (Most devices require only 1 card.) Standard interface cards are also available for Hewlett-Packard digital instruments for measuring dc/ac voltage, current, resistance, frequency, period, nuclear radiation, temperature, and many other parameters. (Interfaces are furnished with their own software drivers.) The standard line of interfaces also includes general-purpose registers for interfacing devices of the customer's choosing.

### SUPPORTED BY POWERFUL SOFTWARE...

The HP 2116A and 2115A Computers are furnished with the most comprehensive software package available for computers of this size. HP 2116A and 2115A are completely software-compatible.

### COMPILERS

FORTRAN: All features of ASA Basic FORTRAN, plus some features

of ASA FORTRAN and many other useful capabilities.

Operable in 4K memory.

ALGOL: All major elements of ALGOL 60, plus exceptional I/O

flexibility and other features. Operable in 8K.

BASIC: Interpretive compiler providing simple mathematical lan-

guage similar to FORTRAN and ALGOL. Operable in

8K.

**ASSEMBLERS** 

ASSEMBLER: Provides mnemonic machine operation codes, assembly-

directing pseudo codes and symbolic addressing. Output

may be absolute or relocatable.

EXTENDED ASSEMBLER: Provides additional capabilities for the 8K user.

CONTROL

BASIC CONTROL SYSTEM: Handles loading, relocating and linking of user programs

and library subroutines. Simplifies programming and ex-

ecution of all input/output operations.

DATA ACQUISITION EXECUTIVE: Permits real-time operation of computerized data acqui-

sition systems, plus keyboard control (without recompiling) of all data acquisition functions, computation

constants, sampling intervals, etc.

**UTILITY ROUTINES** 

SYMBOLIC EDITOR: Allows characters and statements in punched tape pro-

grams to be easily changed.

PROGRAM LIBRARY: Contains mathematical functions, logical operations, I/O

formatter, and many other subroutines, callable from

compiler or assembler programs.

DEBUGGING ROUTINE: Allows dynamic check-out of programs through memory

dumps, trace printouts, etc.

PREPARE CONTROL SYSTEM: Enables easy modification of Basic Control System to

suit different system hardware configurations.

HARDWARE DIAGNOSTICS: Permit rapid checkout of memory, arithmetic, and input/

output.

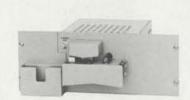
MAGNETIC TAPE SYSTEM: Allows software to be stored on magnetic tape, greatly

increasing speed and convenience of assembly, compila-

tion and loading. Requires 8K.

# WIDE RANGE OF PERIPHERAL INPUT/OUTPUT DEVICES AVAILABLE

HP 2737A



PUNCHED TAPE READER
Reads 8-level code
300 char/sec

HP 2753A



TAPE PUNCH Punches 8-level code 120 char/sec

CALCOMP 565



PLOTTER 300 steps/sec Resolution .01 inch Plotting width 11 inches



CARD READER
12-bit parallel column,
80-column cards
1000 cards/min

HP 2757A HP 2756A



DISC MEMORY

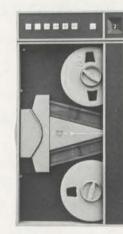
32 tracks, head-per-track 2720 addressable sectors 64 words/sector 174,080 16-bit words



MAGNETIC TAPE



Write only 400 char/sec 7-chan, 200 bpi



Read/write 6000 or 16,700 char/sec 7-chan, 200 or 556 bpi



TELEPRINTER
Keyboard, punch, read, print
10 char/sec
ASCII character set

KENNEDY 1406

HP 2020A

HP 2752A



DATA PRODUCTS 4200

1000

LINE PRINTER

72 to 132 characters/line

ASCII character set

300 lines/min

### 2115A



2115A shown with Power Supply (2161A)

Memory Size: 4K or 8KCycle Time:  $2 \mu s$ 

Input/Output: 8 channels in main frame; 40

channels with external extender

Environment: 10 to 40°C, RH to 80% at 40°C

### 2116A



Memory Size: 4K or 8K in main frame; 12K or

16K with external extender

Cycle Time: 1.6 µs

Input/Output: 16 channels in main frame; 48

channels with external extender

Environment: 0 to 55°C. RH to 95% at 40°C

### **SPECIFICATIONS**

(2116A and 2115A)

### MEMORY

Type: Magnetic core

Word Size: 16 bits (plus 17th bit for optional parity check)

Page Size: 1024 words

Direct Addressing: Current and base page

Indirect Addressing: All pages

### ARITHMETIC

Parallel, two's complement binary

#### SPEED

Times shown are maximums, in microseconds, for HP 2116A. Corresponding figures for 2115A are extended by 25%.

	Standard	With optional Extended Arithmetic Unit	
Add	3.2 µs		
Subtract	4.8	-	
Multiply	150*	19	
Divide	310*	21	
Floating Point Add	900*		
Floating Point Subtract	900*	-	
Floating Point Multiply	750*	344	V
Floating Point Divide	1500*	448	À

(\*Subroutine - time approximate)

### REGISTERS

Accumulators: Two (A and B, 16 bits each)

Memory Control: Three (Transfer, Program Counter,

Memory Address, 16 bits each)

Supplementary: Two (Overflow and Extend, 1 bit each)

Manual Entry: One 16-bit Switch Register

### INSTRUCTIONS

Memory Reference	(2-cycle)	14
Register Reference	(1-cycle, microprogrammable)	
Input/Output	(1-cycle)	13
	Total	70

### INPUT/OUTPUT

16-bit parallel interrupting channels, with priority control, utilized through plug-in I/O interface cards (one per channel).

#### DATA FORM

Punched Tape: 8-level ASCII code (parity not used). 1-inch. Magnetic Tape: 7-channel NRZI, IBM-compatible. 1/2 inch.

