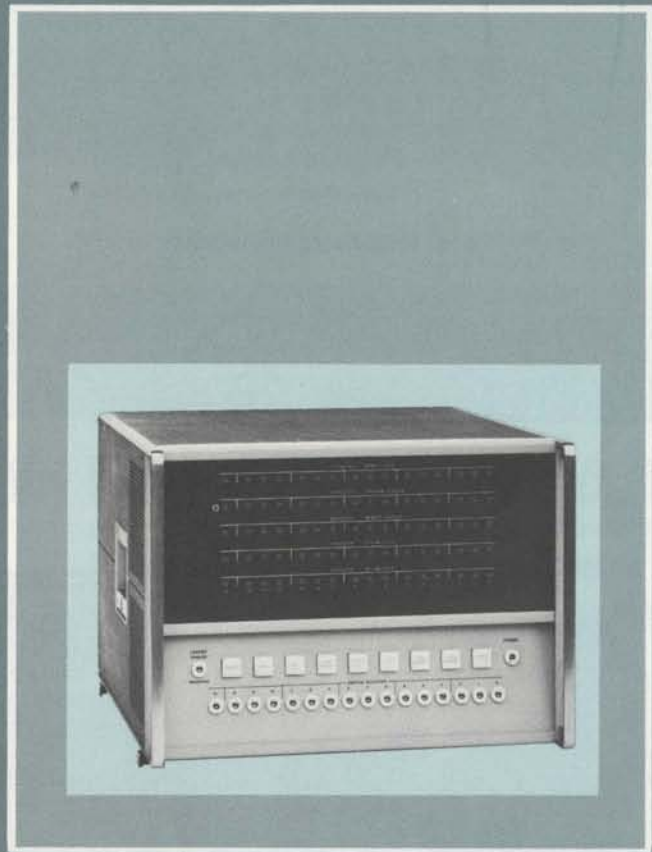


HEWLETT  PACKARD

NOV 14 1967

14500 2115A + 4K
+ 771 2000
4K 55000

H I G H P E R F O R M A N C E D I G I T A L C O M P U T E R S



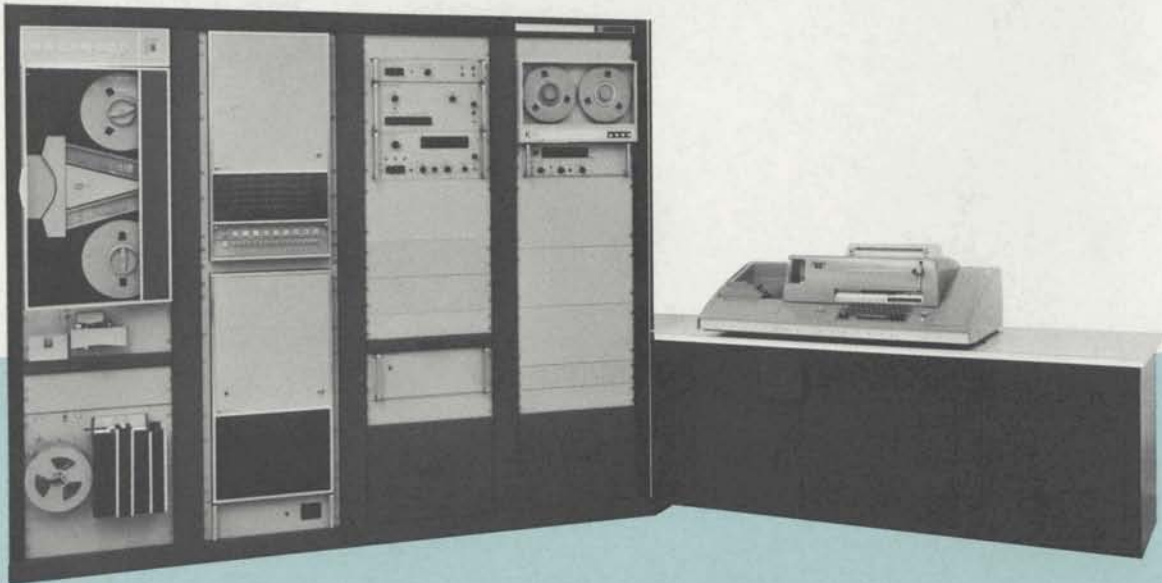
HP 2115A
HP 2116A

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 language 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 <i>relocatable</i> .
EXTENDED ASSEMBLER:	Provides additional capabilities for the 8K user.

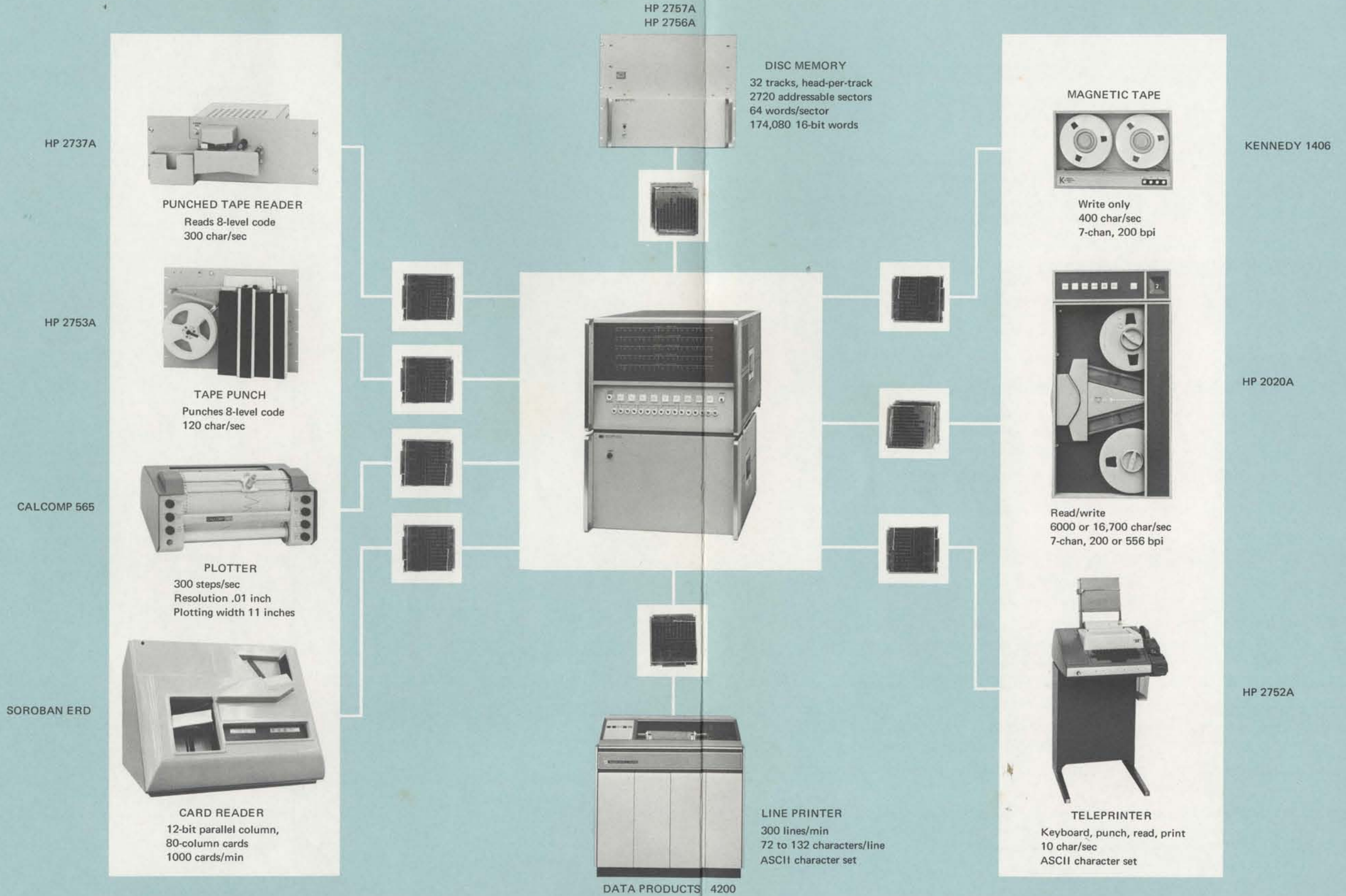
CONTROL

BASIC CONTROL SYSTEM:	Handles loading, relocating and linking of user programs and library subroutines. Simplifies programming and execution of all input/output operations.
DATA ACQUISITION EXECUTIVE:	Permits real-time operation of computerized data acquisition 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 programs 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, compilation and loading. Requires 8K.

WIDE RANGE OF PERIPHERAL INPUT/OUTPUT DEVICES AVAILABLE



2115A



2115A shown with Power Supply (2161A)

Memory Size: 4K or 8K
Cycle Time: 2 μ 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 μ s
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 μ s	—
Subtract	4.8	—
Multiply	150*	19
Divide	310*	21
Floating Point Add	900*	—
Floating Point Subtract	900*	—
Floating Point Multiply	750*	344
Floating Point Divide	1500*	448

(*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)	43
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.