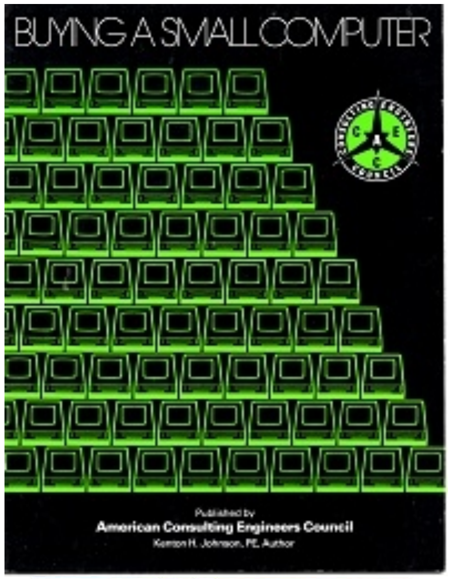

BUYING A SMALL COMPUTER

Kenton H. Johnson, PE
Editor/Publisher
Engineering Computer Applications Newsletter (ECAN)

Abstract

This booklet is designed to guide practicing engineers through the steps to purchase a small computer system. Small computers are those that are smaller in price, performance, physical size, and staff requirements than mainframe mini and large computers. The INTRODUCTION and the sections on SMALL COMPUTERS and THEIR APPLICATIONS and CRITERIA FOR COMPUTER USE orients the reader to small computers and their sensible uses. The next six sections, JUSTIFYING through BILLING, detail the steps to a successful installation. The APPENDICES–COMPUTER SIZE CATEGORIES, RESOURCES, AND GLOSSARY–provide details and additional information to help in the purchasing process.

About The Author

Kenton Johnson, PE is the editor and publisher of the *Engineering Computer Applications Newsletter (ECAN)*, a monthly publication on computers for the engineering community in the U.S. and abroad. He is also an active speaker and computer consultant. Kent is a graduate of California State University at San Jose with a B.S. in General Engineering and an M.S. in Cybernetic Systems Engineering. He is registered in the State of Colorado and is a member of IEEE, ACM, and NSPE.

Table of Contents

Computer Size Categories and Typical Characteristics

Size Category	No. Serve	System Cost	Applications	Software	Relative Speeds	User Memory Size	Output	Mass Storage	Peripherals	Graphics	Expansion	Sales	Service	Support
Hand-held Computers (HHCs)	1	$1,000	Calculations, time-sharing terminal, personal records, translator, dictionary	Applications: limited–from manufacturer; very little engineering Languages: BASIC, machine shorthand Operating Systems: manufacturer's	Slow	2K-64K bytes; ½- or 1-byte (4- or 8-bit) words	Screen/printer: 12-32 char (Stores up to 80 × several lines in display memory) All upper case	Cassette	Limited, inexpensive	Some, very coarse	Very limited	Retail stores, dealers	Manufacturers, where sold; in shop	Self, manuals
Examples: HP-41C, Quasar/Panasonic HHC, Sinclair ZX80, TRS-80 Pocket Computer														
Personal Computers (PCs)	1-5	$5,000	Simple and complex calculation, intelligent timesharing terminal, limited data management & accounting, word processing, mail lists voice synthesis, appliance control	Applications: abundant, but often not professional; limited engineering Languages: BASIC, PASCAL, FORTRAN Operating Systems: manufacturer's, CP/M	Medium fast	16K-64K bytes; ½- or 1-byte (4- or 8-bit) words	Screen: 32-64 char × 16 lines Printer: 80 char lines std, some 132 char lines Both: Some lower case	Cassette, 5" minidiskette	Some, inexpensive	Coarse on screen, slow on printers & plotters	Limited	Office equipment & computer dealers, third-parties	Where sold, limited third-party; in shop	Self, manuals, where sold
Examples: Apple II(+), Atari 400 & 800, Commodore PET, HP-85, TI 99/4, TRS-80 Models I & III														
Professional Micro/Desktop Computers (PMDCs)	3-30	$8,000-$15,000	Design calculation, intelligent time-sharing terminal and preprocessor, fair data management and accounting, word processing, mail lists, scheduling, small simulation, data acquisition, machine control	Applications: abundant, but not always professional quality; some engineering Languages: BASIC, PASCAL, FORTRAN, APL, COBOL Operating Systems: manufacturer's, CP/M, MP/M	Fast	64K-512K bytes; 1-byte (8-bit) words	Screen: 80 char × 24 lines Printer: 132 char lines, medium-speed dot-matrix & low-speed letter-quality; character-oriented	5" & 8" diskettes; 5", 8", & 14" Winchester hard disk	Many, inexpensive to expensive	Coarse to dense on screen (up to 4096 × 4096 dots), slow to medium fast on printers & plotters	Good, (especially S-100 & IEEE bus computers)	Dealers, manufacturers, third-parties	Vendors, third-parties; in shop and field	Vendor, self
Examples: Apple III, Commodore Business System, HP 9800s, IBM 5100s, Tektronix 4050s, TI 770s, TRS-80 Model II, Wang PCS II & III, many other computers based on Zilog 80 and Intel 8080 microprocessors														

Computer Size Categories and Typical Characteristics (continued)

Size Category	No. Serve	System Cost	Applications	Software	Relative Speeds	User Memory Size	Output	Mass Storage	Peripherals	Graphics	Expansion	Sales	Service	Support
Micro-minicomputers (MMCs)	5-75	$20,000-$40,000	Iterative and accurate design calculations, timesharing preprocessor, good data management and accounting, word processing, mail lists, scheduling, simulation, data acquisition, multi-machine control	Applications: abundant, often professional; some engineering Languages: FORTRAN, compiled BASIC, COBAL, APL Operating Systems: manufacturer's, UNIX	Faster	64K-512K bytes; 2-byte (16-bit) words	Same as micro/desktops, high-speed line printers available	8″ diskette, 8″ & 14″ Winchester and cartridge hard disk	Many, expensive	Moderate to dense on screen (up to 4096 × 4096 dots), fast on printers & plotters	Very good-up into minicomputers	Manufacturers, third-parties	Vendors, third-parties; in field	Vendor
Examples: Data General microNOVA, Digital Equipment Corp LSI-11s, HP 1000L, Tektronix 4081, TI DS990 Models 1 & 2, Wang 2200 SVP														
Minicomputers (Minis)	10-150	$50,000-$500,000	Iterative and accurate design calculations, multi-terminal timesharing from local and remote locations, good data management and accounting, word processing, scheduling, simulation, multi-point data acquisition and machine control	Applications: abundant, usually professional; much engineering Languages: FORTRAN, COBOL, compiled BASIC, APL Operating Systems: manufacturer's UNIX	Very fast	256K-2M bytes; 2-byte (16-bit) words	Same as micro-minis, high-speed line printers standard	14″ cartridge & multi-platter hard disks, reel-to-reel magnetic tape for long term storage and software transfer (8″ diskettes sometimes used for software transfer)	Many, expensive	Same as micro-minis but faster	Usually good within same series of computers	Manufacturers, third-parties	Vendors, third-party; in field	Vendor in-house staff
Examples: Data General NOVA & ECLIPSE, Digital Equipment Corp PDP 11s & VAXs, Honeywell Level 6, HP 1000 & 3000, IBM System/30s, PRIME computers, TI DS990 Models 4-30, UNIVAC 90/30, Wang 2200 VPs and VSs														
Large Computers	100+	$1,000,000 and more	Highly iterative and accurate design calculations, timesharing from many local and remote locations, sophisticated data management and accounting, scheduling, simulation, intercity communications and data transfer	Applications: abundant professional; good engineering Languages: same as minis and ALGOL Operating Systems: same as minis	Fastest	512K-4M bytes; 32-60 bits per word	Same as minis, very high-speed line and page printers available	Multi-platter hard disks, reel-to-reel magnetic tape for long term storage and software transfer, extended (less-expensive) memory	Many, very expensive	Same as minis but faster processing	Similar to minis	Manufacturers	Manufacturer, third-party; in field	Manufacturer, in-house staff
Examples: Burroughs 6000s, Control Data Corp computers, Honeywell 6000s, IBM 370 & 4300s, UNIVAC 1100s														