HOW TO BUILD YOUR OWN STAND ALONE SYSTEM USING AN IBM AT OR COMPATIBLE AND EXISTING SOFTWARE

R.L. Grundy
University of Texas at Austin
Marine Science Institute
Port Aransas, Texas 78373-1267

Abstract

On the market today there is enough software and sufficient hardware to set up a stand alone system. The hardware and software can be purchased in computer stores or can be ordered via mail order computer suppliers.

INTRODUCTION

When we use the term IBM AT or compatible, we mean a microcomputer which uses ASCII as its basic communication language. The microcomputer technology is less than 15 years old. Early microcomputers copied the Van Newman architecture one process at a time, where everything had to be handled by the central processing unit (CPU). The Van Newman design has been altered by adding other processors and having a primary processor acting as a “traffic cop”. The resulting design is known as a distributed system (figure 1) (Grundy 1986, Dertouzos 1986). The newest architecture is the parallel design. The parallel architecture is very new to the microcomputer industry and is very exciting. You can guess by the name parallel design that the computer has several processors and is doing several tasks at once thereby improving productivity considerably. Software is presently being developed to take advantage of this new technology. A new program called “Quick Connect” is a shelf for the 386 MSDOS machines and will support up to 32 terminals. The company which developed “Quick Connect” maintains that with 10 users or less in a 386 environment there is no evidence of other users on the system.

Mention of any given product is not an endorsement; however, it does reflect attribute recommendations. All dollars are US. We will be looking at how to build a distributed system using equipment that can be purchased at a store or ordered from a supplier.

1Computer Shopper v. 7(10), issue 93:260 (October 1987).
THE HARDWARE

To begin to understand what is available and get a feel for the cost of hardware, start reviewing a Computer Shopper magazine. Your library may already subscribe to this journal, if not, it is available at most magazine shops.

The initial system will require a basic AT computer (IBM or compatible) with 5 or more slots for added boards. The preferred CPU is an Intel 80286 or comparable. MultiTech makes an AT clone with 8 slots which will support up to 30 expansion buses. On page 44 of the October 1987 issue of Computer Shopper there is a 12 slot “286” microcomputer with a (38 ms) 30 MB hard drive and 1 MB RAM including an amber monitor and a 1.2 MB, AT keyboard advertised for less than two thousand dollars.

The cost of the basic computer can be as little as 2000 dollars depending upon where you live, who you buy from, or what restrictions you have on the funds available. It is necessary to include a printer. Optional additions are a second printer, modem, a color monitor, and other accessories. The initial expense may be as much as 4 to 5 thousand dollars for the basic unit. This unit should include at least a 30 MB drive and careful consideration should be given to a larger drive. You can now purchase an 80 MB drive (with 28 millisecond access) for less than 1000 dollars. The 30 and 40 MB drives are in the 500 dollar range; therefore to change from a 30 MB drive to a 60 MB drive should not cost more than 400 dollars over the basic unit cost. Available also are 120 MB drives for about 1400 dollars. Be sure to buy a drive that will accommodate your needs for a long while.

Space requirement calculations deserve some careful considerations. To find out what kind of space is required, estimate 1K per monograph. Putting online a monographic collection of 10,000 books, requires 10,000 books x 1,000 bytes of space or 10,000,000 (10 MB). Software to operate such a system requires a lot of space also. A very large user of space will be the word processed documents. A short note or half page letter will consume 1K of memory, a full page letter 2K, and a single spaced document will use 3 to 4K per page (depending on margins, etc.). The major problem one runs into in automating any type of information system is space so calculate carefully. Be sure to consider data input time. It does not help to have a 120 MB drive and only enough time to input 10 MB per year. Plan well.

The basic computer with a hard drive represents a single user machine which can very easily be converted into a multi-user system. There are boards on the market which allow your basic computer to become a “multi-computer”. One such product is the Alloy board(1). The Alloy board has an Intel 8088 CPU and 1 MB of RAM memory. Of the 1 MB of memory DOS uses 640K, the balance is used as resident cash (very fast) memory. It has a connector for a terminal and keyboard. The cost of the board and terminal is about 1,500 dollars. Potential for adding up to 30 such boards
to the MultiTech AT compatible exist. To use the AT compatible hardware in a local network, requires ATNX or NTNX software which will be discussed later.

The system becomes a two user system with the addition of an Alloy board. Let us assume that a library will require a 4 user system. Begin with a 5000 dollar (basic unit) and add 3 Alloy boards (1,500 dollars each). Thus the cost of the system is less than 10 thousand dollars. Every user will have 1 MB of memory for themselves (not to share with other users). It is necessary to add to that, a tape backup for the hard disk. Cost for a tape backup and controller will be between 400 and 1000 dollars depending upon size disk chosen. A four user system can be obtained for close to 10 thousand dollars. Additional terminals can be added for 1500 dollars each.

Every user will have access to the hard disk with limited use for the other peripherals such as printer(s), modem, etc. A system of this kind requires true record locking or some system to prevent damage to the files. It is imperative that some method be used to protect the records.

SOFTWARE

Initially the memory is blank, just like a piece of paper. Floppy and hard disks require some sort of system to organize the information stored on them so that it can be easily retrieved. This is accomplished through software. Disks are no different from your library. Information on the disk must be organized for retrieval, to avoid picking up each bit of information and looking at it. To not organize the information on a disk would be like taking an entire library, placing it randomly in stacks and then trying to find something. One would have to pick up everything and look at it to retrieve the information needed.

The easiest way to find anything is by systematically storing it. Librarians understand that probably better than anyone. One way to organize the computer's memory is by use of a menu. There are several menu programs on the market, but first let's talk about organizing operations inside the machine.

It will be necessary to have a copy of MSDOS along with some software which is multi-user. The manufacturers of the Alloy boards produces a package (ATNX or NTNX) which is a "shell" over DOS and becomes the "traffic cop" for the bus. Now the fun begins. Cost of the ATNX is 298 dollars and the NTNX is 495 dollars. Be aware that the NTNX program used with the Novel networking programs offers true record locking for all programs which recognize PC Net Protocol. The software process goes something like this:

1. Buy a menu system. The one demonstrated is an inexpensive program (about 40 dollars) called Harvey (figures 2,3,4 & 5). Use the key strokes to select the menu
wanted or scroll through the menu using the arrow keys on the keyboard and use the enter key to make the desired selection.

The menu system allows titling of the entries to fit the need. Note that most menu systems allows the option of locking any given section. It is recommended that the menu system purchased have locking capabilities. This is access locking, not record locking.

2. Select software needed for the system. Now read the DOS manual on making directories and writing path commands. Some suggestions are:

Online card catalogue.

- Search Monographs.
- Search Journals.
- Search Maps.
- Search Reprints.
- Search AV Materials.

Administration. (locked)

- Subscription Control.
- Circulation.
- Acquisitions Control.
- Catalog Carder. (card generator)
- Word Processing.
- EZ Ledger.

When purchasing software, get programs that are easily used but will provide the capabilities required. Right on Programs (2) are stand alone library programs and can easily be plugged into a menu system. Right on Programs market all the programs listed on the sample above except the word processor, the map and reprint program. Because of the way they are written, they are ideal for the type of system described above. The first of next year Right on Programs will begin marketing an interactive program between the online catalog and the card generator. These programs are very user friendly. The cost of the Right on Programs are less than 100 dollars each except for the On-Line Catalog which costs just less than 2 hundred dollars.
CONCLUSION

Small one and two person libraries have been locked out of the automation world, simply because of the cost. That is no longer the case. The system described can be purchased a piece at a time if necessary. One could begin with just the basic unit and the software (or part of it). We must begin somewhere. This is at least one way to begin automation.

ACKNOWLEDGMENT

Sincere appreciation to Doyle Grundy for his encouragement, for reviewing this paper, and for drawing the figures.

LITERATURE CITED


Addresses

(1) Alloy Computer Co., 100 Pennsylvania Avenue, Framingham, MA 01701 617-875-6100

(2) Right on Programs, 1737-361 Veterans Highway, Central Islip, NY 11722 516-348-1577
Figure 5.
The Main Library menu created by Harvey menu program, shown with the two submenus:
1. Online submenu and
2. Administration submenu.
Figure 2. Distributed.
*M/M - Processor & Memory

Figure 3.
On-line submenu created by Harvey menu program.

Figure 4.
Administration submenu created by Harvey menu program.