



BELL & HOWELL MICROCOMPUTER SYSTEMS

The Microcomputer with a Difference

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MICROCOMPUTER SYSTEMS

The Bell & Howell Microcomputer System opens new dimensions into tomorrow's computer technology.

It provides the time and work-saving functions of today's most advanced microcomputers... In a full line of desk top, stand-alone units so easy to operate, so versatile that they make everyday computer use a practical reality for hundreds of tasks. Like teaching computer literacy, educational and industrial computer assisted instruction (C.A.I.), computer managed instruction (C.M.I.), word processing, financial reporting, statistical analysis, engineering calculations, testing and analyzing scientific hypotheses, and solving complex mathematical problems. In addition, the system can be used as a computer terminal for time-sharing or other remote computing applications.

The innovative design, features, and outstanding quality of this exciting line of microcomputers is the result of superior technology from Apple Computer, Inc. and Bell & Howell's reputation for innovative training, software, and services... working together to help implement the use of modern computer technology and make its many advantages available to education and business.

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Microcomputer Technical Overview

The Bell & Howell Microcomputer System is a complete, self-contained, ready-to-use computer based on the 6502 micro-processor. Standard features include floating point BASIC in ROM; color graphics; up to 48K bytes RAM; cassette interface, simulation controls connector, typewriter-style ASCII keyboard, high-efficiency switching power supply, and rugged RFI grounded case. Also included are detailed Reference and BASIC Programming manuals.

These systems are faster, smaller, and more powerful than their predecessors. And they're easier to use too, because of advanced, built-in features like:

- BASIC—The Language that Makes Programming easy.
- Sixteen-Color Standard Graphics (in a 1,920 Point Array) for Spectacular Visual capabilities.
- Six color High-Resolution Graphics (in a 26,880 Point Array) for Finely-Detailed Displays.
- Loudspeaker and Sound Capability that Brings Programs to Life.
- Internal Memory Capacity of up to 48K Bytes of RAM (64K with plug-in language card) and 12K Bytes of ROM for Big-System performance in a Small Package.
- Eight Accessory Expansion Slots to let the System Grow With Your Needs.

The Bell & Howell system is a complete, ready-to-run computer—not a kit. Connect it to a color TV,* CRT, or hard-copy terminal and start using programs the very first day. It uses sophisticated micro-circuitry that permits the display of memory or input devices as color graphics, high resolution graphics or text. It quickly and routinely does C.A.I., problem solving, calculating, data processing and branching. Even more important, it's easily expandable. Never becomes obsolete because the Bell & Howell microcomputer has the capability of interfacing with a wide variety of peripherals that can be used for developing self-paced and individualized student or employee training programs... for expediting administrative record-keeping... for fast, effortless financial analysis, engineering calculations and... for hundreds of other tasks limited only by your needs and imagination.

*Bell & Howell Microcomputer Systems plug directly into a TV monitor or connect to any standard television using an inexpensive commercially available RF modulator (not supplied).

MEMORY

- RAM (Random Access Memory) is organized into increments of 16K bytes for easy expandability. Memory may be easily added up to 48K (64K with plug-in language card) bytes by inserting an additional increment of RAM's. 12K bytes of ROM (Read Only Memory) are standard and contain floating point BASIC (10K) and a powerful system monitor (2K).
- Up to 48K bytes on-board RAM—no peripheral memory boards required.
 - Unique automatic RAM refresh system, completely transparent
 - Uses 4116 or 2117 type 16K RAM's
 - Fast memory—350ns access time

The AUTOSTART Features

"It comes up running..."

Autostart helps get your microcomputer started. You only have to turn on the computer, and immediately it is in BASIC. If you have an Integer ROM card with the switch in the upward position, the microcomputer will come up in Integer BASIC. Otherwise, it will come up in Floating Point BASIC.

If you have a Disk II Subsystem and a Disk installed in Disk Drive One, then the AUTOSTART does even more for you. The Disk Operating System (DOS, pronounced "doss") will be loaded automatically, and the microcomputer will execute the initializing program (commonly named "HELLO") on the disk, loading whichever BASIC the initializing program is written in. The fact that the microcomputer automatically executes the initializing program when it is turned on allows it to act as a "turnkey" system.

A "turnkey" computer system is one that starts executing a particular program the instant it is turned on. It needs no special efforts or knowledge on the part of its user to perform a particular function. (Of course, the computer can also run other programs, and these may require special knowledge to use.)

VIDEO DISPLAY

The System's video circuitry displays memory as text, color graphics, or high-resolution graphics—all user selectable. Both graphics modes can be selected to include 4 lines of text at the bottom of the display area. In either graphics mode the user can select one of two memory pages to be displayed.

TEXT

- 40 characters/line, 24 lines
- Upper-case characters in a 5 x 7 dot matrix
- Normal, inverse, or flashing characters
- Extensive display control software in ROM
- Full cursor control
- Fast display—1000 cps
- Window capability

SAY IT IN COLOR

Bell & Howell's advanced graphics commands make brilliant, effective, color displays possible for a beginner. And the usefulness of color extends far beyond visual appeal. Multi-color charts and graphs can "humanize" your programs for greater interest and comprehension.

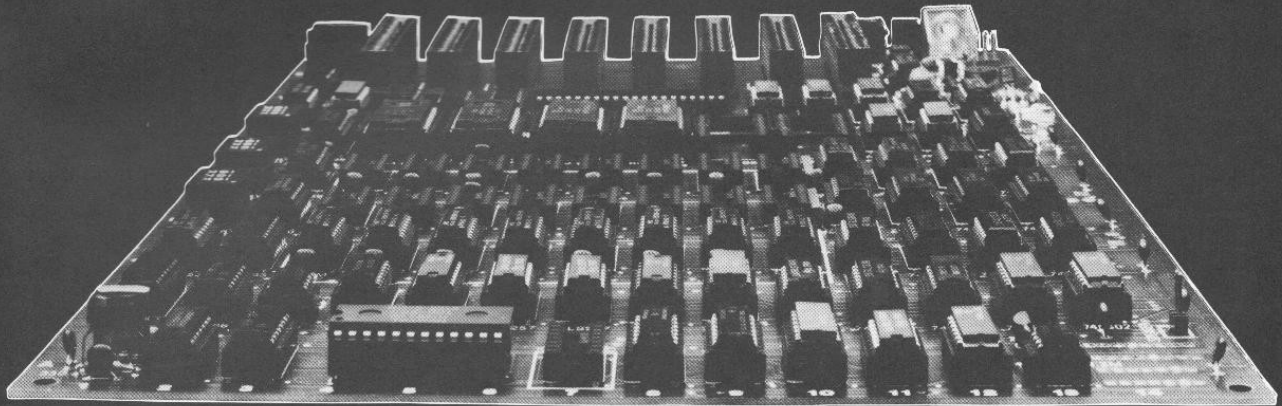
High-resolution graphics can take you even farther. Bell & Howell's 26,880-point color display lets you explore applications ranging from architectural design to fingerprint analysis. And you can label your diagrams with upper/lower case characters, Greek letters, or special symbols. You can even define your own unique character sets.

LOW RESOLUTION COLOR GRAPHICS

- 40h x 48v resolution (40h x 40v with 4 lines text)
- 16 colors—color generated digitally
- BASIC Language commands to use graphics easily.

HIGH RESOLUTION COLOR GRAPHICS

- 140h x 192v resolution (140h x 160v with 4 lines text) 6 colors—black, white, violet, green, blue, orange.
- 280h x 192v black and white resolution (or 280h x 160v with 4 lines text).
- Basic language commands to use graphics easily.



Microcomputer Technical Overview

USER PROGRAMMABLE

A fast, powerful Floating Point BASIC is built into the Bell & Howell Microcomputer System. It lets you write complex programs, and generate spectacular color graphics displays for educational, business and scientific applications. Floating Point BASIC provides an extensive library of mathematical and character-handling functions, as well as 9-digit precision calculations.

FLOATING POINT BASIC LANGUAGE (APPLESOFT*)

Capabilities include:

- Three Data Types—Real, Integer, and String
- N-Dimensional Arrays and N-Letter variable Names (first two letters significant)
- Extensive Mathematical and Scientific Capabilities:
 - EXP, LOG, SQUARE ROOT, SIN, COS, TAN, ARCTAN
 - AND, OR, NOT, ABS, INT, RND, SIGN
 - Logic functions—AND, OR, NOT
- String Operation to Aid the Business Programmer
 - Compare: =, >, <, >=, <=, ><
 - Concatenate: +
 - Variable Type Conversion: ASC, STR, VAL, CHR
 - Substring Separation: LEFT, RIGHT, MID, LEN
- Graphics Statements That Simplify Graphic Display Programming:
 - High Resolution—HGR, HCOLOR, HPLOT, SCALE, ROT, DRAW, SHAPELOAD
 - Low Resolution—GR, COLOR, PLOT, HLIN, VLIN, SCRIN
- Print Format Control: NORMAL, INVERSE, FLASH, HTAB, VTAB
- General Operations that include and extend Dartmouth BASIC:
 - Program Manipulation: NEW, LIST, RUN, CONT, LOAD, SAVE
 - Variable and Function Definition: DATA, DEF, DIM
 - Data Handling and Storage: READ, RESTORE, STORE, RECALL
 - Loops and Branching: FOR...NEXT, IF...GOTO, IF...THEN, ON...GOTO, ON...GOSUB, ONERR GOTO, RESUME, GOTO, GOSUB, RETURN, POP
 - Input/output control: INPUT, GET, IN#, PR#, PADDLE, PRINT
 - Basic to machine level communication: PEEK, POKE, CALL, LOMEN, HIMEN

*Applesoft is a trademark of Apple Computer Inc.

The Bell & Howell Floating Point BASIC system is resident on ROM in the microcomputer.

SOUND ADDS A NEW DIMENSION

Bell & Howell's Microcomputer System speaks for itself. The addition of sound to any program creates an added dimension in learning and reinforcement. And you can create your own music under computer control. But synthesized sound is more than an educational tool for music theory. Audible cues announce system functions or programming errors, so you don't have to watch the TV monitor to see what's happening. In your own programs tones add life to computer assisted instruction and training applications.

MONITOR SOFTWARE

- 2K byte ROM monitor
- Screen editing
- Full cursor control
- Adjustable scrolling windows (protected screen feature)
- Input/Output device assignment
- Editing on keyboard entry
- Register examine/modify
- Read/Write cassette routines
- Inverse/Normal/Flashing video selection
- Hex add/subtract for relative branching calculations
- Stop/List for pausing program listing

RELIABLE SERVICE & WARRANTY

Bell & Howell has service centers nationwide staffed with factory-trained technicians.

The system is warranted to be free of defects in both materials and workmanship. A one year parts guarantee and 90 day labor guarantee from date of purchase is provided free of charge.

BELL & HOWELL GROWS WITH YOU

Bell & Howell's Microcomputer System was designed to grow with you. With built-in expandability—with a hefty power supply and eight interface card slots right on the main circuit board. You can synthesize music, print reports, control AC receptacles, or talk to another computer; all just by plugging in a card. And the best is yet to come, as new Bell & Howell hardware and software options will appear regularly.

ORDERING INFORMATION

Order No.	RAM Memory Size
<input type="checkbox"/> Bell & Howell 078402	16K bytes
<input type="checkbox"/> Bell & Howell 078400	32K bytes
<input type="checkbox"/> Bell & Howell 078401	48K bytes

SYSTEM PERIPHERALS

Optional equipment that increases the effectiveness of the Bell & Howell Microcomputer System:

MONITORS

A variety of monitors are available with Bell & Howell's Microcomputer System. Choose between black and white or color display, in many different sizes. We've made it easy to choose the exact monitor you need to help you make the most of your microcomputer system.

TAPE RECORDER

Programs and data can be saved on or read from standard tape cassettes utilizing a standard tape recorder. Bell & Howell's Model No. 3196A is recommended.

SIMULATION CONTROLS

Two simulation controls connect directly to the system and are used with simple BASIC commands. They assist in applications ranging from instructional simulation to graphic design, where the operator can create intricate multi-colored designs. Order No. Bell & Howell 711416

Microcomputer Language Options

INTEGER BASIC

Bell & Howell Integer BASIC is a fast, translated integer BASIC that includes the following features on a plug-in card.

- Any-length variable names (ALPHA, BETAS)
- Syntax and range errors indicated immediately when entered.
- Multiple statements on one line.
- Integers from -32767 to +32767
- String arrays to 255 characters. Single-dimension integer arrays.
- Graphics Commands: COLOR=expr; PLOT X,Y; HLINE X₁, X₂ at Y; (draw horizontal line) VLINE Y₁, Y₂ at X; (draw vertical line) SCRIN (x,y) (reads the screen color)
- Paddle read function: PDL (0-3)
- Assembler and Disassembler
- Register Examine—Register Modify
- TEXT and Graphics commands to set display mode from BASIC
- Immediate execution of most statements
- Memory boundary adjust (does not destroy current program)
- Break and Continue program execution
- Debug commands: Line number trace and variable trace
- Switchable I/O device assignments
- Direct memory access: PEEK, POKE, CALL commands
- Cassette SAVE and LOAD commands
- Auto line number mode
- RND, SGN, ASC, LEN and ABS functions
- POP instructions pops the return stack on level
- GOTO expr, GOSUB expr allowed
- Fully interruptable

Also includes Programmer's Aid #1, a ROM-based library of routines to simplify and enhance programs. Its capabilities include:

- High-Resolution Graphics Generation
- Program Renumbering and Linking
- Tape Verification
- Musical Tone Generation (5 timbres and 5 octaves)
- RAM Testing
- Machine Language Program Relocation

Programmer's Aid #1 is packaged as a single 2K byte ROM and is included on the Integer Basic ROM Card. The routines upon which it is based are completely documented in the manual which accompanies the package.

Order No.: Bell & Howell 078478

PASCAL

A sophisticated interactive structured programming language. Pascal requires a 48K Microcomputer with one disk drive and a language card. This complete Software Package provides:

- Built-in error checking which reduces debugging time. Includes type and range checking.
- Programs require less storage space
- Fast, screen-oriented editor for program development and word processing
- 80-character lines available with external CRT terminal
- 80-character lines available using horizontal scrolling
- Hi-Res Graphics: "Turtlegraphics" simplifies display production: INITURTLE, PENCOLOR, TURNT0, TURN, MOVE, TEXTMODE, GRAFM0DE
- Text: GOTOXY procedure for cursor addressing; Split screen or horizontal scrolling. FUNCTION KEYPRESS tells whether character is available
- Library Routines: FUNCTION RANDOM, PROCEDURE RANDOMIZE, FUNCTION PADDLE, FUNCTION BUTTON, PROCEDURE TTOUT, FUNCTION KEYPRESS, and more

Order No.: Bell & Howell 078486

APPLE FORTRAN

Apple FORTRAN is a sophisticated programming language particularly well suited for applications in mathematics, engineering and the sciences. Apple FORTRAN is the ANSI Standard Subset of FORTRAN 77, and includes all of its features and improvements. Users can translate and modify their already established and extensive FORTRAN library. Enhanced capabilities include:

- Eliminates need to recompile existing code files when translating to FORTRAN.
- Permits single compilation of several source files.
- Allows specification of a blocked or unblocked file with an additional parameter to the OPEN statement.
- Provides a comprehensive software design package including an editor, linker, file handler, assembler, Pascal compiler and system library.

Requires a 48K microcomputer, one disk drive and Pascal language system.

Order No.: Bell & Howell 078448

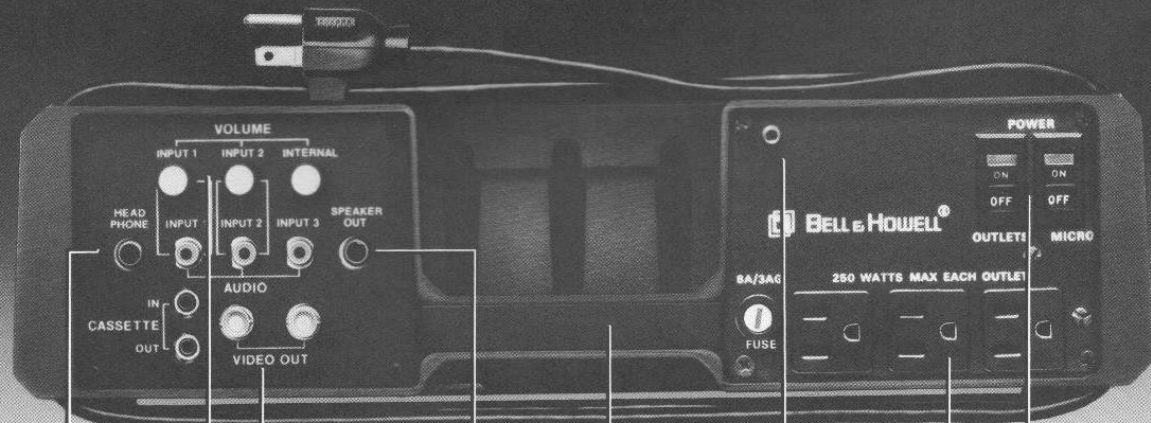
APPLE PILOT

Apple PILOT is a simple, yet powerful system based on COMMON PILOT. It operates in two modes—Author, for the instructor to create and store lessons; and Lesson, which enables students to interact with the computer. Apple PILOT is especially easy for anyone familiar with the PILOT language. And it offers the following benefits:

- High-Resolution Graphics and Animation Generation.
- Music/Sound Generation.
- Character Set Editing.
- Character Sets in Foreign Languages.
- Gives instructors access to large libraries of material because it accepts PILOT 73 and COMMON PILOT programs.
- No program length restriction.
- Records lessons with grades on same disk.
- Times individual responses.
- Built-in print routine provides hardcopy of lesson text files.

Requires a 48K microcomputer, one disk drive for presentation/two disk drives for authoring, and DOS 3.3 or Pascal language system.

Order No.: Bell & Howell 078449



Headphone jack allows private listening.

Video output can be fed to two standard video monitors simultaneously.

Speaker jack lets you add an external speaker for added volume in group situations.

Built-in carrying handle for increased portability.

Cover lock means users cannot tamper with inside of microcomputer. Power shuts off automatically when opened.

Separate switches control on/off power to microcomputer and plug-in accessories.

Convenience outlets allow accessories to be plugged directly into the microcomputer.

The Microcomputer with the Accessory Module

The latest Bell & Howell Microcomputer has been designed to provide additional dependability, versatility, convenience and safety. We've designed it to suit the special needs of educators and trainers and incorporated the extra features they asked for. This second generation Bell & Howell Microcomputer—with its improved accessory module—offers the most sophisticated, state-of-the-art method for interactive training and instruction.

SPECIFICATIONS AND FEATURES

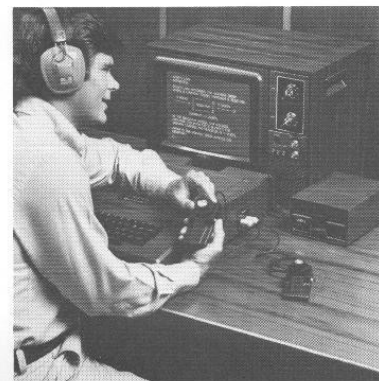
The new power and accessory module houses the power switches, three AC outlets, the main power fuse, a cover lock, and rugged standardized connectors that control input and output for audio, video and data cassettes. This module provides the maximum in power and security and also doubles as a built-in carrying handle.

- Power Switches**
Separate power switches control the mainframe and three AC (110V) outlets. Three peripherals can be plugged directly into the mainframe without searching for additional wall outlets or extension cords.
- Shift Key Function**
Offers easy use of both upper and lower case characters to aid readability and comprehension. Appropriate software and hardware are required.
- Headphone Jack**
Permits totally private listening—essential for the classroom or office. Standard 1/4" phonojack automatically cuts off internal and external speakers when headphones are used.

- Cover Lock/Power Interlock**
Locks cover shut, when opened power is automatically interrupted. This safety feature prevents shorting of interface cards through their removal while power is on and discourages tampering with internal components.
- Volume Controls**
Allows for high-quality mixing of audio signals from different sound sources including audio from video tape, video disk, cassette tape players, music synthesizers and the microcomputer's internal audio generator.
- Video Output Jacks**
Feeds two standard video monitors simultaneously with low loss, industry standard BNC plugs. This feature allows instructor to view student work or to demonstrate with a separate monitor station for viewers.
- External Speaker Jack**
Perfect for group instruction. Allows the use of external speakers.
- Cassette Input/Output Jacks**
Provides convenient access for feeding data into the computer or for recording data output. Minimizes the task of loading data from and to tape cassettes.
- Easy Access Simulation Control Connectors**
Two simulation controls (not included) plug directly into the side of the mainframe, eliminating the need to remove the cover.
- Attached Line Cord**
No more lost cords. Wraps around module for easy storage and easy access.
- U.L. Listed**

ORDERING INFORMATION

Order No.	RAM Memory Size
<input type="checkbox"/> Bell & Howell 3016 D	16K bytes
<input type="checkbox"/> Bell & Howell 3032 D	32K bytes
<input type="checkbox"/> Bell & Howell 3048 D	48K bytes



ACCESSORIES

- Simulation Control and Cable**
Separate controls can be used one at a time or together, and either control will function in either jack. These durable jacks and rugged DIN connectors ensure lasting, trouble-free service. Up to two simulation controls connect directly to the system. Includes two controls.
Order No.: Bell & Howell 078702

Floppy Disk II Subsystem

GENERAL DESCRIPTION

Many educational, training and business computer applications depend upon rapid access to information. To provide for fast, low-cost data retrieval, the Bell & Howell Microcomputer System is optionally provided with Disk II.

Disk II simplifies the approach to your program library. No longer must you search through stacks of cassettes, or slowly read yards of tape to find the program you want. Now with a few key-strokes, your system will find and load any file by name. And it will do it quickly and reliably.

Disk II gives programs immediate access to large bodies of data. That makes learner management and data dependent programs feasible. It means you can store grades for two hundred or more learners in one place, and sort through them quickly. And it allows you to handle many other applications that just were not practical before.

The Floppy Disk II Subsystem consists of an intelligent interface card, a powerful Disk Operating System (DOS), and one or two mini-floppy drives. (The computer will handle up to seven interface cards and fourteen drives, for control of nearly 2.0 megabytes of data.) The combination of a ROM-based loader and an operating system in RAM provides the user with a comprehensive disk handling capability.

FEATURES

- Powerful Disk Operating Software:
 - LOAD and STORE files by name (Up to 35 Char/Name)
 - BASIC Program Chaining
 - Random or Sequential File Access
- Fast Access Time—600msec (Max.) across 35 Tracks
- Radio Frequency Interface (RFI) cable connector

- Individual File Write-Protection
- Full Disk Capability in Systems with as little as 16K RAM
- Data Transfer Rate of 156K Bits/sec
- Storage Capacity of 143 Kilobytes/diskette
- High-Efficiency subsystem powered directly from the Bell & Howell Micro-computer (Up to 14 Drives)
- Completely Assembled and Tested—Not a Kit
- Packaged in Heavy-Duty, Color Coordinated Steel Cabinet

USING THE FLOPPY DISK SUBSYSTEM

The Disk II Subsystem allows your Bell & Howell Microcomputer System to manipulate program and data files through simple BASIC statements. Command interpretation and file handling are controlled by software automatically loaded into RAM when the system is switched on and there is an initialized Diskette in Disk Drive One.

The CATALOG statement will display a list of the files contained on a particular diskette. Other commands allow the user to Write-Protect a file, READ or WRITE it, and SAVE files and programs on Diskettes.

As data is stored on the subsystem, it is automatically put into unused sectors of the diskette, which are linked together until a space of adequate size has been created to hold the new file. Thus the user gets the most efficient utilization of his diskette area, yet does not have to know the maximum size of each file in advance.

Files stored on diskettes can be copied, deleted, or renamed under program control. Volume numbers assigned to individual files or to diskettes allow the handling of successive files of the same name. And the CHAIN command permits the chaining together of multiple BASIC programs.

The Disk II Operating System fully supports both floating point and Integer BASIC through its universal command handler. All commands are completely explained in the manual supplied with the Disk II Subsystem.

SPECIFICATIONS

PARAMETER	DESCRIPTION
Commands:	OPEN, CLOSE, READ, WRITE, LOAD, SAVE, EXEC, RUN, APPEND, LOCK, CHAIN, UNLOCK, DELETE, MONITOR, NO-MONITOR, MAX-FILES, IN#, PR#, INIT, BLOAD, BSAVE
Access Method:	Random or Sequential—arbitrary record length
Bootstrap Loader Method:	By means of Loader routine in two 256 x 8 PROMS on-card.
Disk Drives Track Access Time:	Shugart 5¼" floppy disk Varies with number of tracks crossed. 200msec (avg.), 600msec (max. across 35 tracks)
Disk Speed and Latency:	300rpm, 100msec avg. latency
Disk Capacity:	143K bytes (formatted), soft-sectored
Data Transfer Rate:	125K bits per second
Physical Dimensions:	Card—4.5" x 2.75" (not including connector fingers); installed inside the Bell & Howell Micro-computer System. Drive—3.25" H x 5.75" W x 8" D
Controller Capacity:	Up to two drives per controller. Up to 7 controllers can be used.

ORDERING INFORMATION

Order Number: Bell & Howell 078469
Supplied with:

- Disk Drive Interface Card (DOS 3.3)
- Bootstrap in ROM
- Disk Drive and RFI Connecting Cable
- System Software on Diskette
- Manual
- Basics Diskette
- Blank Diskette

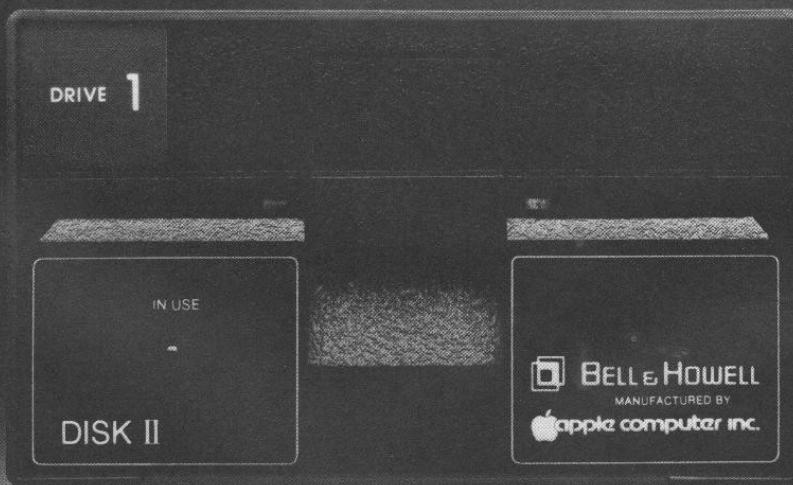
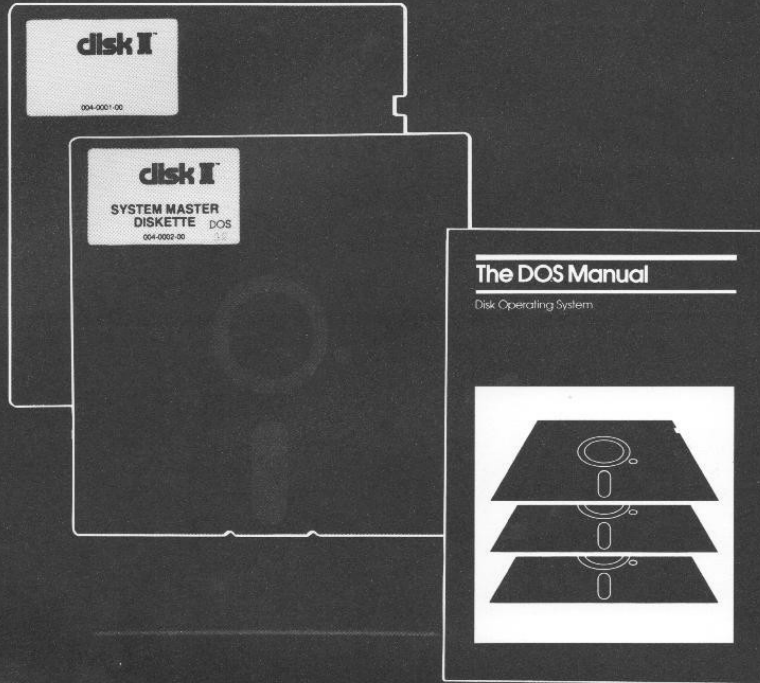
Order Number: Bell & Howell 078415
Supplied as:

- Second Disk Drive and RFI Connecting Cable

DOS 3.3 UPDATE KIT

Converts disks to 16 sector format for 23% more storage and faster access. Use with earlier DOS 3.2.1 interface card to change DOS to 3.3.

Order Number: Bell & Howell 078447







Microcomputer Printers

Often, a printer is required for charts, reports, labels, etc. Bell & Howell offers a wide selection of reliable printers that interface with our microcomputer systems.

CENTRONICS 737 DOT MATRIX PRINTER

The 737 is a sleek miniprinter with the capabilities and versatility of more costly printers. Special features include three-in-one paper handling system and a choice of print modes. Handles cut sheets, computer-grade fanfold or roll paper... allowing you to perform a variety of functions with a single printer. The proportional spaced mode can print 80 characters per second in a Nx9 dot matrix with a right margin justification. The monospaced mode can produce columnated reports at 50 characters per second utilizing either 10 characters per inch (80 characters per line) or 16.5 characters per inch (132 characters per line) in a 7 x 8 dot matrix. With the 737, you can underline important points or expand the character width. Other features include a 96 character ASCII set, a full one line buffer, a paper tear bar and a continuous mobius loop ribbon. It comes supplied with a Parallel Printer Interface Card, all necessary cables, connectors and operating documentation. Pictured at top left.
Order No.: Bell & Howell 078499

CENTRONICS 779 DOT MATRIX PRINTER

The 779 is a medium-speed impact printer for educational and business applications requiring low-cost, multicopy printing. It can print up to 132 (5 x 7) dot matrix characters per line at 60 characters per second. The 779 can reproduce the 64 character lower and upper case ASCII set. Its tractor paper feed allows printing of five-part forms in widths to 9.8". It has a rear mounted roll paper holder, a paper out indicator and a tear bar for your convenience. And for added economy, it uses a continuous mobius loop ribbon that prints on upper and lower positions. This hard-working printer is supplied with a Parallel Printer Interface Card, all necessary cables, connectors and operating documentation. Pictured at lower left.
Order No.: Bell & Howell 078418

PRINTER INTERFACE CARD

The Parallel Printer Interface Card opens up a whole range of printing applications for your Bell & Howell Microcomputer System. With this card and almost any printer, you will be able to produce the reports, diagrams, labels and listings you require. The Parallel Printer Interface Card works with BASIC, FORTRAN or Pascal programs to print hard-copy output as easily as the program "prints" on the TV monitor screen. Command interpretation and printer control details are handled by the intelligence built into the card. There are no complex control programs for you to write or load.

The Parallel Printer Interface Card operates with Axiom, Centronics, Printronix, SWTP and most other popular printers. Complete information on adapting this card to various printers is explained in the Parallel Printer Interface Card Manual.
Order No.: Bell & Howell 078410

SILENTYPE THERMAL PRINTER

The Apple Silentype Thermal Printer is a quiet, versatile and compact thermal graphics printer. It offers increased flexibility over other printers, at a fraction of the cost, because the Silentype receives both its power and intelligence from your Bell & Howell Microcomputer. To the extent you can program your Microcomputer, you can program the Silentype. Or you can use the Silentype effectively without doing any programming at all. With a few simple keystrokes, you can change margins and line spacing, specify printing intensity, and print finely detailed charts and graphs. Prints 40 characters per second.

The Silentype offers you:

- Higher reliability than microprocessor-based printers since it contains fewer components.
- Printing flexibility because it has the capability of printing high resolution graphics.
- Quiet operation for use in classroom, hospital, library, office or home environment.
- Remote access to a larger system is possible because it becomes a portable terminal when used with a microcomputer and modem.
- Includes interface printer card with power supply to printer; no 110V plug-in required.
- Eliminates the need for loading or writing a program to print a chart or graph exactly as it appears on the screen because you can transfer any hi-res screen directly to the Silentype Printer.

The Silentype paper path is short and straight so there's no need to worry about paper jams. And because the Silentype is a thermal printer, no ribbons or messy ribbon changes are required.

In addition to answering printing needs, the Silentype, together with the Bell & Howell Microcomputer and a modem, becomes a remote portable terminal. It's easy to carry the system from one location to another and access other computer systems with just a phone call.

The Silentype Thermal Printer comes with a Silentype interface card, one roll of heat-sensitive paper (already installed on the Silentype printer), and Silentype Operation and Reference Manual. Pictured at top right.

Order No.: Bell & Howell 078419.

SILENTYPE PRINTER PAPER

10 rolls of thermal paper.

Order No.: Bell & Howell 078782

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Microcomputer Communications Systems

GENERAL DESCRIPTION

Now you can extend the usefulness of the Bell & Howell Microcomputer System even further with a Communications Interface Card and a modem. By working together, this communications system lets computers and terminals "talk" to each other over ordinary telephone lines. You'll be able to transfer programs to another microcomputer over the phone; to request and process information from large data bases—even those across the country; even access your office computer from your own home. All this can be accomplished in any language without writing or loading any control programs. The built-in intelligence of the Interface Card contains all the programming required.

The modem is the direct link between the microcomputer and the telephone network. This acoustic coupler operates in either the originate or answer modes. It connects to the phone system simply by positioning the telephone handset on top of it. No permanent connections or wiring changes are required. And this time-saving communications system comes complete with the Modem, Communications Interface Card, demonstration tape, all required cables and appropriate documentation.

FEATURES

- Permits interactive programming and distributed computing using two or more Bell & Howell Microcomputer Systems.
- Quickly transfers data programs, or other information over the phone lines.
- Allows the Bell & Howell Microcomputer to become a terminal for other computer systems.
- Includes all necessary programs—no software to write.
- Easily controlled from BASIC, FORTRAN or Pascal using simple commands.
- Fully assembled and tested—no wiring or soldering.
- Communicates at 110 or 300 Baud, half or full-duplex.
- Provides an RS-232C Serial Interface, with Industry Standard DB-25 Connector.
- Works with Bell Telephone Hardware—or similar equipment from other manufacturers.
- Plugs into any Bell & Howell Microcomputer peripheral slot for fast installation.
- Uses the Bell & Howell Microcomputer power supply for economy and convenience.

ORDERING INFORMATION

Communications System: Modem with Interface Card Order No.: Bell & Howell 078423

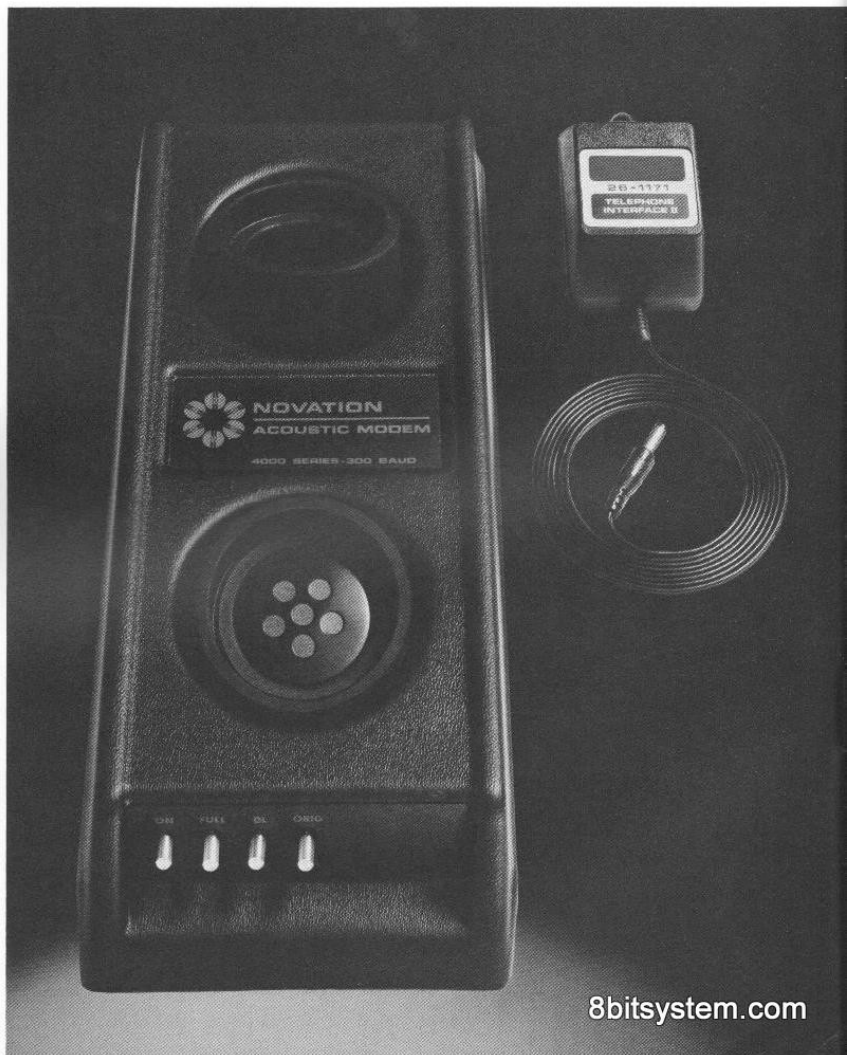
Modem only Order No.: Bell & Howell 078425

Communications Interface Card only Order No.: Bell & Howell 078411

SERIAL INTERFACE CARD

The High Speed Serial Interface Card allows the Bell & Howell Microcomputer

to exchange data with computers, printers, modems (telephone line adapters), plotters, CRTs and other serial devices. The Bell & Howell Microcomputer will be able to exchange data in serial format—one bit at a time—as easily as it talks to its own keyboard and display the data without a lot of work on your part. Just specify from BASIC the area of memory to be transferred and the direction of movement (in or out). The rest of the job is handled by the built-in intelligence on the Serial Card. Complete operating information, logic, diagrams and firmware listing are supplied in the Serial Interface Card Manual. Order No.: Bell & Howell 078412



Graphics Tablet*

GENERAL DESCRIPTION

With the Graphics Tablet, the Bell & Howell Microcomputer System can become an instant electronic drawing board. You will be able to create electronic pictures with a touch of its pen and *in color*. Everything from simple art to complex blueprints can be reproduced in high resolution graphics. And if you add on a graphics printer, you can get black and white hard copies of your designs. The Graphics Tablet adds another important interactive medium to the microcomputer system by turning ideas and concepts into visual reality.

FEATURES

- Can be operated by anyone without any prior programming experience.
- Displays in Bell & Howell's high resolution graphics mode.
- Can be modified to fit your specific graphic needs by allowing you to change, delete

or add to existing software.

- Can save artwork on a disk for later recall.
- Can be used in 16" x 16" workspace.
- Offers 22 separate command functions, including:
 - draw
 - dots
 - lines
 - boxes
 - frames
 - calculating
 - distance
 - area
 - reduce
 - save
 - load

USING THE GRAPHICS TABLET

The Graphics Tablet and pen connects to the Tablet Interface Card which plugs directly into one of the microcomputer's peripheral slots. Next you insert the Graphics Tablet Software disk into the drive, turn on the power, and you're ready to begin. Choose the function you want by simply pressing the tablet pen on the appropriate command box and start drawing. The microcomputer takes the

electronic pulses the pen sends and translates them into a series of dots which connect to make pictures.

As you move the pen across the Tablet, the image is drawn simultaneously on the TV monitor screen.

You can sketch, diagram, even erase within the 11 by 10 inch drawing space. You can blow up or reduce any part of your picture for intricate, detailed work. The Graphics Tablet even has a cursor which you can move around without making a permanent entry until you press down the pen. So you can review your work before you actually put it on the screen. The Tablet also has problem-solving capabilities for calculating area, distance and much more. And all this is done in simple BASIC, FORTRAN, or Pascal languages. So even a novice can do the most advanced work.

The Graphics Tablet package comes with the tablet, Interface Card, one Graphics Tablet software disk and instruction manual.

Order No.: Bell & Howell 078494

*Graphics Tablet is a trademark of Apple Computer Inc.



Microcomputer Accessories

DOCUMENTATION

All Bell & Howell Microcomputers come with complete documentation for beginner or expert users.

BELL & HOWELL FLOATING POINT BASIC TUTORIAL MANUAL

This manual is for the Floating Point beginner. It provides programming examples and a detailed explanation of the language.

Order No.: Bell & Howell 711513, 160 pages.

BELL & HOWELL FLOATING POINT BASIC REFERENCE MANUAL

This manual introduces Applesoft, an extended BASIC language for educational, business, and scientific applications. It is written for the user who has some familiarity with the BASIC Language.

Order No.: Bell & Howell 711405, 168 pages. One supplied with each Bell & Howell Microcomputer.

BELL & HOWELL REFERENCE MANUAL

This manual addresses the detail of the system: hardware schematics, firmware listings, special system features, and use of the monitor. It is aimed at the user who is comfortable with BASIC and wishes to become familiar with the advanced features of the Microcomputer.

Order No.: Bell & Howell 711400, 196 pages. One supplied with each Bell & Howell Microcomputer.

BELL & HOWELL INTEGER BASIC PROGRAMMING MANUAL

This manual starts from the beginning with how to plug in the Microcomputer. It then guides the user's first programming efforts.

Order No.: Bell & Howell 711404, 130 pages.

BELL & HOWELL PROGRAMMERS AID NO. 1 MANUAL

This manual documents a ROM library of routines to simplify and enhance programs.

Order No.: Bell & Howell 711408, 96 pages. One supplied with Integer Basic Firmware Card.

BELL & HOWELL AUTOSTART ROM MANUAL

This manual tells in detail how the Autostart system works.

Order No.: Bell & Howell 711555, 61 pages.

BELL & HOWELL COMMUNICATIONS CARD MANUAL

This manual describes how to configure the communications card and modem.

Order No.: Bell & Howell 711406, 36 pages.

BELL & HOWELL PARALLEL PRINTER CARD MANUAL

This manual explains how the user must configure the Parallel Printed Interface Card to interface with various printers or other peripherals requiring a parallel interface.

Order No.: Bell & Howell 711403, 32 pages. One supplied with each Parallel Printer Interface Card and each Centronics Printer.

BELL & HOWELL DISK II FLOPPY DISK MANUAL

This manual specifies the Disk Operating System (3.3), such as saving and retrieving information by file names, creating different types of files, and introduces you to DOS commands plus much more.

Order No.: Bell & Howell 711486, 200 pages. One supplied with each 3.3 Disk Drive Unit.

BELL & HOWELL HIGH SPEED SERIAL INTERFACE MANUAL

This manual provides instruction for the various uses of the serial interface card. Complete logic, diagrams and operating instructions are included.

Order No.: Bell & Howell 711407, 40 pages. One supplied with each serial interface card.

6502 PROGRAMMING MANUAL

This manual addresses the internal structure and assembly language programming of the 6502 microprocessor. It assumes that the reader is moderately familiar with microcomputer concepts.

Order No.: Bell & Howell 711402, 239 pages.

6502 HARDWARE MANUAL

This manual is directed at the hardware designer who wants detailed information about the 6502 microprocessor used in the Bell & Howell Microcomputer System.

Order No.: Bell & Howell 711401, 165 pages.

PROTOTYPING/ HOBBY CARD

The Prototyping/Hobby Card provides the user with a means of building up experimental circuitry for the Bell & Howell Microcomputer. This 2 $\frac{3}{4}$ " x 7", double-sided circuit board includes a hole pattern (on 100-mil centers) that accepts all conventional integrated circuits and passive components. The card plugs directly into one of the eight peripheral connectors on the Bell & Howell circuit board, and fits entirely inside the Bell & Howell Microcomputer. Complete documentation is included plus description to aid the interface designer.

Order No.: Bell & Howell 078477

CLOCK/CALENDAR CARD

Add a time dimension to your Bell & Howell Microcomputer System with a Clock/Calendar Card. You'll be able to call up schedules, time events and date printouts in real time. It plugs into any of the microcomputer's peripheral slots, and is easily accessed from BASIC using routines carried in on-board ROM. It will provide you with time and program-time in almost any interval—from a year to milliseconds. Other programs include time intervals and measurement of elapsed time.

This accurate time-keeper needs to be set only once a year. An on-board battery keeps it running even if the power is down. Complete hardware, software and documentation included.

Order No.: Bell & Howell 078426



Microcomputer Software

GENIS I

GENIS is an acronym for "Generalized Instructional Systems." It is a software system for computer-assisted education and training applications. This unique program enables teachers and industrial/government trainers without computer programming knowledge to turn on the microcomputer, insert a disk, and begin developing courseware for computer assisted instruction. Instructors and students are able to communicate with the microcomputer in English.

Bell & Howell's GENIS is composed of two interrelated software systems (CDS I and MARK-PILOT). They can be used independently or in conjunction with one another.

CDS I

Bell & Howell's Courseware Development System (CDS I) enables educators and trainers to create interactive instructional materials on any subject matter. Though the program is extremely powerful, it does not require the user to possess any microcomputer programming knowledge.

CDS I is actually comprised of two parts: An authoring system which allows a teacher or trainer to create curriculum materials; and a presentation system which provides a means for presenting these materials to the learner.

MARK-PILOT

MARK-PILOT is an enhanced Computer Assisted Instruction language. In user applications, it functions as a type of computer shorthand allowing educators and trainers to develop materials quickly and efficiently. Added advantages include color graphics and branching capabilities. MARK-PILOT is Bell & Howell's own version of the computer language Pilot with special routines that provide automatic record-keeping and assist in performance analysis.

Bell & Howell's MARK-PILOT consists of two sections: An authoring system which enables educators and trainers to create instructional materials, and a presentation system which facilitates the presentation of these materials to the learner.

When utilizing the authoring system the instructor may use up to 22 simple commands which direct the microcomputer to execute specific instructional tasks.

SYNER-GENIS

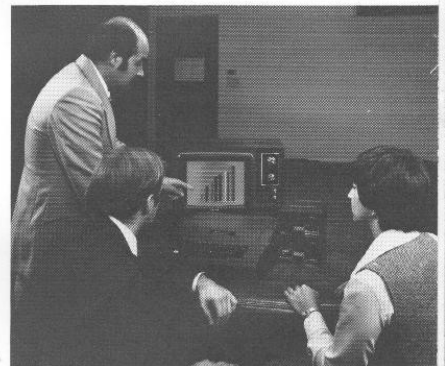
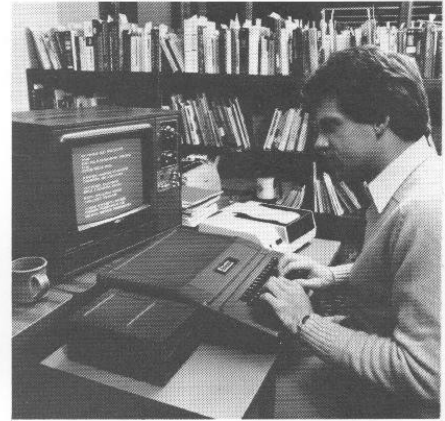
SYNER-GENIS is a means of combining the simplicity of CDS I with the flexibility and power of Bell & Howell's MARK-PILOT to design microcomputer assisted instruction. Using the SYNER-GENIS capability, users may access MARK-PILOT programs at any time through CDS I and return to CDS I while still maintaining student records. With SYNER-GENIS, a person using the CDS I authoring system may utilize the capability of MARK-PILOT to enhance lesson presentation.

GENIS I Package contains:

- CDS I Master Disk
- MARK-PILOT Master Disk
- All necessary documentation
- Worksheets

Requires a 48K microcomputer and one disk drive.

Order No.: Bell & Howell 078488



Microcomputer Software

PASS Professional Authoring Software System

PASS is a dynamic authoring language for designing business training courseware. By combining multiple character sets, color graphics, video tape and video disk interface capabilities, branching, text editing and other features, PASS has the versatility to be used in varied business training applications.

With Bell & Howell's exclusive Professional Authoring Software System (PASS) you can develop customized, computer assisted instruction without computer programming experience. All prompts, in both authoring and lesson modes, are entirely in ENGLISH, so there is no need for either instructors or trainees to learn programming languages.

All courseware can be developed by following the step-by-step instructions in the PASS documentation, even sophisticated "branching" and graphics can be incorporated into lesson material without ever having to learn programming. All interaction can be accomplished simply by following the instructions as they appear on the display screen.

PASS includes a variety of testing methods and automatically keeps track of each learner's progress so you can monitor the effectiveness of each segment of courseware created with PASS.

INTERACTIVE VIDEO

PASS helps you make your existing video materials interactive for added training impact. Because PASS enables your video tape and video disk materials to interact with microcomputer equipment, your video based training programs become a more effective training medium. PASS informs, prompts and tests your trainees with video materials in sequences you determine. Learners may be "branched" through video lessons at their own pace with the microcomputer randomly accessing selected frames or sequences on your video disk or tape.

Video augmented managed interactive training offers you a means to increase the effectiveness of your current video training programs.

WHY PASS?

PASS is a powerful, English-based authoring system that allows you to create

CAI courseware without prior programming skills or knowledge. PASS prompts and questions the instructional designer. Its features make sophisticated programming skills available to anyone without the need to learn a programming language. PASS has an intelligent structure that allows anyone to author lessons with nearly unlimited flexibility.

Lessons are easily updated. A complete word processing system has been built into PASS. This allows you to quickly change words, or sentences, within lessons. Automatic grading and lesson analysis provides you with quality control and immediate validation.

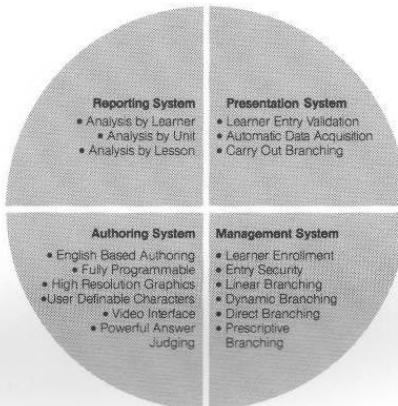
Each student receives uniform instruction that has been individualized to meet their personal learning needs. PASS offers students self-paced, interactive, stimulating learning.

□ Programming

- Blank Slate
- Total Configurability
- Each Lesson Requires Branching, Grade Recording & Analysis Programs
- No Structure
- Speed is a Problem
- Requires Extensive Production Time

PASS lessons are easily and inexpensively reproduced. PASS is the ultimate training system for professional applications.

PASS COMPONENTS



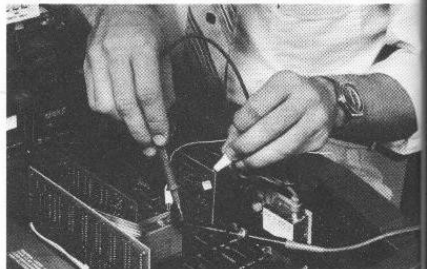
Let's compare PASS, an authoring system, to traditional computer programming. PASS offers you a more powerful, flexible learning system as well as being cost efficient. Here's why:

□ Authoring

- Prompts/Questions Author
- Has Pre-defined Authoring Format
- Contains Automatic Branching, Grading, Record Keeping
- Intelligent Structure
- High Speed Lesson Execution
- Requires Little Production Time

ON-SITE SERVICE

Bell & Howell also offers an extensive on-site microcomputer service program manned by over 600 professional technicians in major metropolitan areas throughout the country. This service capability is supported by a complete parts inventory and facilities for repairing both microcomputer and video products.



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AUDIO-VISUAL PRODUCTS DIVISION

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