

Questions

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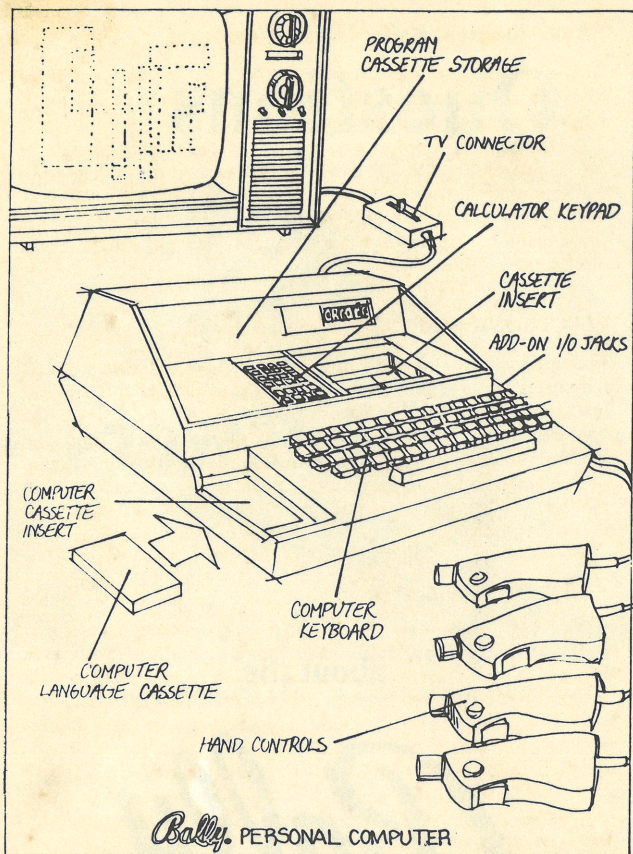
Answers

about the

Bally®

arcade™

HOME
COMPUTER-
VIDEO GAME



Shown above is the basic module of the Bally Home Computer connected to the add-on module. Not shown are digital or audio cassette decks, or the printer, which are separate accessories.

THE BALLY ARCADE HOME COMPUTER—VIDEO GAME . . . The computer-like console comes with the popular Checkmate and Gunfight games, plus Scribbling, and a sophisticated 4-function, 10-memory printing calculator built-in. With optional accessories, it becomes a powerful home computer.

About the new Bally Home Computer

This is the story of an incredible product. So incredible that we know of no future consumer product that will have such a far-reaching technological impact on society.

The Bally Home Computer is a small console unit that resembles a programmable TV game but whose computing capabilities resemble that of the IBM 5100 currently selling for \$10,000. This calculating power and its present and future programs will provide more convenience and benefits than any other recent electronic product.

ELECTRONIC PRINTING CALCULATOR

Imagine the computer as a printing calculator with ten separate memories. You enter the data on the unit's keyboard, but instead of a paper tape, you use your TV screen to scroll out the answers similar to the credits on a movie screen. You can balance your checkbook and then double check your calculations by scrolling back to your first entry. By comparison, an electronic calculator with ten memories alone would cost what this entire computer costs—but there's much more.

A CHALLENGING TOOL

With currently available educational cassettes and educational cassettes soon to be introduced, the Bally Home Computer becomes a challenging teaching tool. Each cassette program is automatically adjusted by the computer to the user's learning level. In fact, the computer continually adjusts to a level slightly better than the level indicated by the user's responses. The educational programs, therefore, remain a challenge no matter how good the user becomes. Psychologists who helped design some of the educational programs feel they should stimulate learning and improve grades.

FUN AND ACTION ARCADE GAMES

Three of Bally's most popular arcade games already built into the Bally Home Computer/Video Game are: 1) Gun Fight, in which two cowboys shoot at each other around cactus, covered wagons and other obstacles; 2) Checkmate, a one to four player game in which you build walls around your opponent to win; and, 3) Scribbling, a one to four player game that utilizes the pistol grip to doodle different designs on your TV screen (in color with a color set).

Other popular arcade games, available at extra cost in the form of Videocade cassettes to play on your TV screen, include Baseball, Paddleball, Sea Wolf, Red Baron, Panzer Attack (similar to Tank) and dozens more. These same games cost arcade owners up to \$2,000 each.

MORE VALUE PER FEATURE

Let's quickly review the features—an electronic printing calculator with ten memories, a teaching machine that adjusts to your child's learning level and an arcade center that replaces about \$10,000 worth of electronic arcade games with just a few cartridges. Use any of these features and you could justify buying this unit—but there's plenty more.

With all its sophistication, the Bally Home Computer was designed to keep current with advancing computer technology no matter how sophisticated the development. Bally has provisions in its present system for expansion modules. These devices will permit you to: 1) draw directly on your TV screen with an

synthesizer, 3) record your personal belongings and their value for security purposes and add or delete items while keeping the list intact, 4) record all your phone numbers and then use the system to dial those numbers on your telephone, 5) play chess on the phone with another player and be able to see all the moves on your TV screen.

EXCELLENT BUSINESS TOOL

With these expansion modules, businessmen will be able to do all their bookkeeping functions, payroll, inventory control and billing. There will be printers, telephone modems and a variety of peripheral computer equipment that will turn your Bally Home Computer into a significant business tool. And, when used in your business, your Bally unit is depreciable like all your other capital equipment. Even large corporations can use the Bally for specific applications to avoid tying up their larger computer systems.

The Bally Home Computer will turn these incredible add-on features into reality in a planned program starting soon. Each month, a new cartridge or accessory expanding the unit's capability will be announced.

Each new cartridge will offer you a new way to use your system—a way that would justify, by itself, the purchase of the entire system.

NOT JUST A TV GAME

Don't confuse the Bally Home Computer with the many inexpensive programmable TV games. The Bally computer is a powerful system using the Z80 microprocessor whose cost per byte (the measure of computer memory power) is even lower than a home computer. Yet it has 12,000 bytes of computer power in its most basic system and you are not just limited to teaching, music, entertainment or business applications. The Bally computer can be programmed to do anything any mini-computer can do. A programmable TV game at any price is (and will always be) just a programmable TV game. It cannot expand. The Bally Home Computer is actually a computer with a variety of expansion capabilities.

The Computer has sound effects so that each game is complete—from the sound of a baseball to that of a torpedo hitting a submarine. It has a math program capable of turning your unit into a scientific, statistical or engineering calculator with the addition of the appropriate cartridge. The library contains the capability of creating patterns on your TV screen, playing music, and accepting typewriter entries. It even has an index that displays everything in your library.

INTERNAL TASK LIBRARY

The Bally Home Computer you buy now has within its 34 integrated circuits an internal library of over forty tasks that it performs. With such an extensive internal library, your computing power is already in the unit you buy. This also means that the Bally unit is a smart computer. (There are such things as dumb computers). A smart computer can complete a function faster and more efficiently because it depends less on the data it gets and more on what it can already do.

SAFE FOR YOUR TV

The task library includes a built-in electronic timer which determines the end of a game or program by either score or elapsed time. It also times the arcade games and automatically turns off your unit and blanks out your screen if it is left on too long. Most TV set manufacturers have excluded sets that use TV games from warranty coverage because of the possible lines that appear on the screen from sets left on too long with the same picture. This is impossible with the Bally. If you get a phone call in the middle of a game, you press the pause

THE MAJOR BREAKTHROUGH IN BALLY'S COMPUTER

Its extensive internal library and the tremendous power in the computer are the big breakthroughs in the Bally unit. The internal computer has over 12,000 bytes with a minimum of 8,000 bytes in each of its cartridges. This puts more computer power in the hands of the consumer than six typical programmable TV games or an average hobbyist home computer. It has the computational capabilities of one \$10,000 IBM 5100 computer, and each time you add a cassette cartridge you increase that capability.

Good resolution on your TV screen is one of the end effects of so much computer power. By comparison, the best programmable TV game image is projected on a screen composed of 64 dots wide by 64 dots deep or 4,096 total dots. The Bally unit is 160 by 100 or 16,000 dots—four times more—so the Bally image is sharper and has finer detail, better resolution, smoother motion, and clearer letters for math or text applications.

SIGNIFICANT EXPANSION MODULES

The most significant expansion accessory will be the dual magnetic tape deck with an alpha numeric (typewriter) keyboard. With this accessory package, which will be available soon, you can record data and software programs and do everything you can do on any main-frame computer system within the data storage capacity of the Bally unit.

The implications of this add-on module are mind-boggling. First, it adds an additional 16,000 bytes of memory to the powerful 12,000 already in the basic system. Secondly, it provides not only more power and features than are presently available in any home computer, but it contains peripherals that would normally cost thousands of dollars extra and are considered accessories on all other mini-computer systems. Thirdly, it uses the computer basic language which is easy to understand. And finally, each cassette tape in the system will contain an additional one quarter million bytes of storage capability. With the tape decks and keyboard, the consumer will now own the equivalent of an entire computer system complete with peripherals, storage and memory.

HIGH SPEED PRINTER

A quality high-speed printer will also be available next year. This will give you written records from your storage tapes. Store your most frequently called phone numbers, your income tax figures, your savings account deposits, the value of your stocks and bonds or a net worth statement. Then, when you need the information, press a button for a printed record.

ABOUT THE BALLY MANUFACTURING CORPORATION

When you buy an expensive product, you must be absolutely satisfied that a solid company stands behind your purchase for many years to come. The Bally Home Computer is backed by a substantial company—Bally Manufacturing Company—in business since 1931 and the world's leading producer of leisure time, coin-operated, amusement games. Bally brings its superior technical research and innovative design techniques to the consumer market with the Bally Home Computer. When you purchase the Bally Home Computer, you get a product light years ahead of anything on the market today, plus a name that is well-known, dependable and associated with technical superiority and leadership.

Hardware Comparison Chart

	Bally Home Library	Pet	ECD	Apple II	Heath H11	Heath H8	Sol	Radio Shack	Fairchild
MICROPROCESSOR	Z80	6502	6505	6502	LSI-11	8080	8080	Z80	F8
MEMORY RAM(Scratchpad)	20K	4K	4K	8K	8K	8K	2k	4K	2K
ROM(Resident)	24K	14K	4K	8K	1K	1K		4K	2K
ROM(Cassette)	24K						4k		2K
Std. Cassette Recorder	•	•	•	•	•	•	•	•	
BPS	300to1200	1200	3200	1500	1200	1200	300to1200	500	
INOUTS Typewriter Keyboard	•	•	•	•	•	•	•	•	
Calculator Keypad	•	•					•		•
Dial	4			2					
Joystick	4								2
VIDEO Display(Characters)	800	1000	5120	960	960	960	1024	1024	
Text Display(Capacity)	40x20	40x25	128x40	40x24	80x12	80x12	64x16	64x16	
Graphics Resolution	16,320	128,000	19,200	1920			1024	6144	4096
Graphics Configuration	160x102	320x400	120x160	40x48			64x16	128x48	64x64
Video Display (B&W)	•	•	•	•	•	•	•	•	•
(Color)	•			•					•
No. of Colors Avail.	256			16					16
Standard TV	•			•					•
AUDIO Output(Channels)	2			1					1
Music Synthesizer(Voices)	6			1					1
Suggested Retail	\$650	\$595	\$990	\$1400	\$2508	\$1472.50	\$1295	\$600	\$179.95
PRICE Not Included in Price	TV			TV			Monitor		

As a means of comparison, the Bally unit described above includes the add-on module without the digital or audio cassette decks.

(Prices shown above are approximate prices in effect February, 1978, and are subject to change.)

• Indicates capability

SOFTWARE

Software is basically two things. First, it is the resident instructions, operating system, and program languages that tell the computer how to function. Second, it includes instructions or programs that are given the computer by its operator.

All units, except the Fairchild, are designed to read and write BASIC programs. Programs written in BASIC are distributed by computer manufacturers, computer magazines, and individuals.

Bally is the only computer manufacturer offering their own programming language in addition to BASIC. This language is a special version of a graphic symbiosis system developed by Dr. Tom Defanti of the University of Illinois.

Dr. Defanti's language was designed specifically for computer graphics and allows people to create and animate pictures easily. This language has been used on large computers in developing computer simulations for education and special effects for "Star Wars" and other films.

Bally engineers have designed Z GRASS, a special version of Dr. Defanti's language, that makes the Bally the only computer easy to use and program.

With Z GRASS the joysticks draw and move pictures on the TV screen. These simple programming steps will expand, and soon you will be able to create your own video games like Pong and Tank with a few hours practice. This self-teaching system supplied with the Bally Home Computer gives you the option to create more advanced programs such as stock analysis or music composition.

HARDWARE

In order of computational power, the microprocessors used in the systems shown on pages 6 and 7 include the LSI-11, Z80, 8080, 6505, 6502 and F8. This is essentially a price/performance trade-off with the Z80 offering more data manipulation capability than any other unit except the Health H11.

Computer random access memory (RAM) determines the length and complexity of the programs that can be run. Large RAM capacity means flexibility and versatility. Read only memory (ROM) is essentially a fixed list of instructions. The size of the ROM determines how many things a computer can do, and ROM cassettes allow the user to change the programming by plugging in new instructions. Standard audio cassettes are used to store and retrieve programs. The speed in bits per second (BPS) indicates how quickly programs can be changed.

Inputs are the things you use to control your computer. Joysticks move and position images on the screen, Dials enter analog or variable information like a volume control. The calculator keypad lets you select a program or operate your computer as a calculator, and a typewriter keyboard lets you talk directly to the computer and write your own programs.

Video is the output to the TV or monitor. The number of typewriter-like characters that can be shown on the screen indicates the amount of written material the user can see at one time. Graphic resolution determines the amount of detail in the pictures drawn by the computer.

Audio output is usually limited to "beep" sound effects. The Bally is the only computer with a complete sound synthesizer and outputs for any stereophonic music system. The user can program a sonic environment for a game simulation or a musical performance.

Expansion capabilities are not shown in the comparison chart. The SOL, for example, can be expanded to include the same memory capacity (RAM and ROM) and input flexibility (joy-sticks and dials) as the Bally Home Computer. This expansion hardware alone would cost over \$1,000 and would require custom software development. Even with this extension, the SOL does not have color graphics capability.

No other unit in this comparison can be modified to match the input

Questions and Answers on the Bally Home Computer

BASIC UNIT

- Q. Is the keyboard on the basic unit typewriter style with numbers and letters?
- A. No. The keyboard consists strictly of numbers and the few controls required to utilize the full array of cartridges.
- Q. How does the cartridge system work?
- A. Simply slip in a cartridge in the slot at the center of the unit, and program which part of the cartridge you wish to use. Your TV set will then indicate the start of the program.
- Q. Do I need a special cartridge to use the electronic calculator with ten memories?
- A. No. The unit will operate without any additional cartridge, although for sophisticated scientific or statistical calculations a cassette is available.
- Q. Does the unit use batteries?
- A. No. An AC adapter plug is provided free with the unit.
- Q. Is the only display used for the basic unit the TV screen?
- A. Yes. No other display is necessary.
- Q. Can you record programs on a cartridge with the basic unit?
- A. No. The basic unit accepts pre-programmed cartridges.
- Q. How much computer power is in the basic unit?
- A. There are 4K RAM and 8K ROM supplied with the basic unit. The microprocessor used is the Z80.
- Q. Is the unit equipped so it will accept future add-on modules?
- A. All future add-on modules can be plugged into the basic unit.
- Q. What channel does your TV have to be turned to when you're using your system?
- A. Channels 3 or 4, whichever is not in use in your area.
- Q. What is the cost of a system equivalent to the memory in the Bally?
- A. The lowest priced unit with as much memory that we have been able to find is the \$1,295 Apple Computer which also includes a keyboard for programming. A model produced by Radio Shack costs \$599 and comes with only 4K ROM and 4K RAM and includes keyboard and display screen. A price comparison sheet is also included with this report.
- Q. What is located at the top of the unit?
- A. A storage compartment for your library of cassette cartridges is at the top of the unit. It will hold up to 15 cartridges.
- Q. Does the unit have built-in cassettes?
- A. Yes. In addition to its internal library, the Bally unit has three arcade games: Gunfight, Scribbling and Checkmate.
- Q. Will the basic unit accept blank cassettes?
- A. No.

ADD-ON MODULE

- Q. What will the keyboard be like on the add-on module?
- A. It will be an ASCII keyboard—a high quality, full-spaced, ¼" key-separated, floating-key keyboard similar to the high quality keyboards found on other computer terminals.
- Q. Can you record data with the basic module?
- A. No. All storage capability is within the add-on module. Each digital cassette used in the add-on module stores 250,000 bytes of memory or 500,000 total bytes from both cassettes.
- Q. What is the language of the computer?
- A. Z80 assembly-level language and BASIC.
- Q. Will a flow sheet be supplied? How is the unit laid out inside?

- Q. What is the cost of the additional 16K bytes of memory mentioned earlier?
- A. The 16K bytes are part of the add-on module and will be supplied with the alpha numeric keyboard at around \$300. Various dual tape decks ranging from \$100 to \$200 will also be available.
- Q. When will the add-on module be available?
- A. We estimate first production to start in late July, 1978.

BUSINESS APPLICATIONS

- Q. Can I use the Bally in my business?
- A. Yes. At first only as a calculator, but with the add-on module and various other software packages, the Bally will make an excellent business system.
- Q. I know very little about computers. Will I be able to use my computer for such things as payroll and bookkeeping without having to learn programming?
- A. Yes. The two factors that you have to be concerned with in any computer are its memory and its software. Your Bally Home Computer will be capable of accepting standard business cartridges and additional add-on modules which can handle your requirements.
- Q. I need a printer in my business—something to make hard copies. Will Bally be making a printer that can do this?
- A. No. However, there will be several available options on the market that will include everything from a very high-speed printer to slower speed plain paper matrix printers. These printers will be adaptable to the add-on module by just plugging them in. They will range from \$200 for a thermal printer to approximately \$600 for a plain paper printer.
- Q. What are the specific software packages that will be available for business applications?
- A. There will be accounting and payroll, basic inventory control and text editing plus any other application you wish to personally program yourself.
- Q. When using my Bally as a telephone dialer, how many numbers can I store and recall?
- A. More numbers than you are likely to ever call in five years. The unit can store thousands of numbers.

TECHNICAL QUESTIONS

- Q. What is the speed of the cassette tape storage offered?
- A. 4,800 baud.
- Q. What is the compatibility of telephone modems to existing professional equipment?
- A. The Bally uses a 300 baud acoustically-coupled modem which is compatible.
- Q. Will the ASCII keyboard have insert and delete functions?
- A. Yes. It will also have upper and lower case and a special 8th bit function for text editing higher level languages such as APL. The basic unit's numerical keyboard can also be used.
- Q. Is it possible to interface the computer with an IBM typewriter?
- A. Yes. And such options will also be available along with a word processing program.
- Q. What software is included in the internal library of tasks?
- A. All the interfacing subroutine primitives required to drive all graphics functions are included.
- Q. Will the basic programming package offer video graphics capability?
- A. Yes. A complete video graphics package will be incorporated in the BASIC which includes all image and color handlers. In addition, there will be a complete software

- Q. What is the baud rate of the magnetic storage?
- A. The audio tape decks will have 300-1200 BPS, and the digital tape decks will have 6400.
- Q. Will modem operation as an intelligent terminal be feasible?
- A. Yes. An acoustical coupler is being offered for computer link-ups.
- Q. How many characters can be displayed on my home TV set?
- A. 40 characters per line with 20 lines of text. Each digit or letter is a 7 x 9 dot matrix with a software redefinable character set. This character display overlays the standard graphics display, so both may be seen at the same time.
- Q. Can a higher resolution TV terminal be used for the character display?
- A. Yes. A jack is provided for this purpose, and an accessory monitor will be available which will increase the character resolution to 64 characters per line—double the display capacity of a standard TV set.
- Q. Can I use both my TV screen and high resolution monitor at the same time?
- A. Yes. The graphics can even be displayed on your color TV while the high-resolution black and white monitor displays the text.
- Q. Are there any user-defined peripherals?
- A. No. All peripherals proposed for this system are IEEE bus compatible intelligent peripherals and as such require no user definition. All peripherals contain their own micro-processors.
- Q. What is the maximum core size?
- A. The total memory capacity is 60K bytes distinguished as 12K of RAM, 24K of resident ROM and 24K bytes of cassette ROM.
- Q. Is the computer interrupt driven?
- A. There are three modes of interrupt described by the fundamental Z80 microprocessor used.
- Q. Is programming in machine language possible?
- A. Yes. For experimentation by beginners, you can use the basic unit with the numeric keyboard and without the add-on module to program the system in machine language. For the more advanced user, a microassembler used in conjunction with the add-on module gives full assembly level language capability. For high level interpretative language, you can use the self-contained 12K ROM basic.
- Q. Is the power supply adequate to handle the peripherals?
- A. No. Each peripheral will have its own self-contained power supply.
- Q. Can the unit be expanded to accept floppy disk or bubble memory storage accessories?
- A. Yes.
- Q. What clock rate does the Z80 run at?
- A. 1.8 MHz.
- Q. Can the hardware be modified in the basic unit to accept RS 232 compatible terminals?
- A. Yes. An inexpensive interface will be available to accomplish this.
- Q. What type of interface bus structure is specified?
- A. IEEE bus parallel interface and an RS 232 serial interface are specified.
- Q. Is the programmed load store memory in the add-on module?
- A. Yes. There is an additional 8K RAM for program storage, and overlay techniques can be used for larger programs.
- Q. How much will the 2,200 printer cost?
- A. There will be three models available. The first will sell for about \$400 with a 4" paper roll of special electrostatic paper. The second will be an 8-1/2" roll printer for about \$600. Both units will be available when the add-on module becomes available. A third plain paper impace printer costing approximately \$600 which can handle multiple form carbon copies will be available in mid 1978.
- Q. Are there any plans to add a floppy disk later?
- A. Yes. Provisions will be on the add-on module to add a floppy



The basic Bally® Home Computer module.

Bally®

WHOLESALE DISTRIBUTOR

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We acknowledge with thanks JS & A National Sales Group who supplied the idea and materials for this booklet in addition to the basic material supplied by Bally Manufacturing Company.