MARC STERN

Add the soon-to-be-released ZGRASS-32 unit to the Bally Arcade and get a personal computer capable of producing outstanding graphics.

IN MANY INSTANCES. THE DECISION TO BUY A HOME COMPUTER is difficult. That is true especially if the ultimate use for a home computer is somewhat uncertain. Very often, the potential customer is interested in using the computer to play elaborate video games and is unwilling to spend the necessary money for a full-blown computer system. In response to that need, several manufacturers have developed programmable video games that can be expanded into a computer system at a later time. Most notable is Matell's *Intellivision*, although the computer expansion is still only in the test-marketing stage. Another system along those same lines is the Bally *Arcade*.

The name "Bally" has long been associated with the coin-operated video arcade-game field. Bally's coin-operated video games have featured high-level graphic capability with imaginative animation. However, the name "Bally" hasn't been associated with the computer field at all; in fact, it would normally seem out of place in a computer buying guide. But that isn't the case any more. "Bally" is now linked with the personal computer world, thanks to this brand-new computer offering.

Actually, it is a Bally unit in name only; while the unit was developed by Bally, it was later sold to Astrovision Inc. (6460 Busch Blvd., Suite 215, Columbus, Ohio 43229). Astrovision is currently marketing the unit, which is correctly called Astrovision's *Bally Arcade*.

The base unit, shown in Fig. 1, is a video game. It is designed to connect to the antenna terminals of a standard TV set, and comes complete with four *joysticks*. However, the joysticks are unconventional in that they are not operated by moving the joystick. Instead, there is a knob on top of the joystick that is operated using your fingers. The joystick also contains a *trigger*. The front-panel of the *Bally Arcade* contains a keypad with 24 keys and a slot for the pre-programmed cartridges. The *Bally Arcade* is capable of producing 256 colors on your TV screen, however, only four can be displayed at a time.

Internally, the *Bally Arcade* has a Z80 microprocessor that operates at 1.8 MHz. There are also two custom LSI IC's, and a video processor that operates at 7 MHz and handles all color manipulation and animation effects. The video processor provides NTSC video to the TV set. The second custom IC is the I/O processor that handles up to four joysticks, four analog-to-digital converters, and the 24-key keypad. The I/O processor also creates the music and sound effects. Three separate sound synthesizers provide both AM and FM noise over a frequency range of 2 Hz to 100 kHz. An 8K internal ROM contains the software routines for color and sound effects that are used with the plug-in cartridges. In addition to the ROM, the unit comes with 4K of RAM. Of that RAM, however, only 1800 bytes are user available; the rest of the memory is used by the video display. In its basic form, the *Arcade's* memory can not be increased.

A video game is only as good as the games available, and there are some nice ones for this unit. *Space Fortress*, shown in Fig. 2, is much like the coin-operated *Space Zap* game. *Munchie*, shown in Fig. 3, is a variant of the popular *Pac Man* game. *Coloring Book with Light Pen* (Fig. 4) lets you create your own "art work," making full use of the system's graphic capabilities.

The *Bally Arcade* supports *Astro BASIC*, which is an enhanced version of *Bally BASIC*—one of the many versions of BASIC that has come into existance. *Astro BASIC* is available as a plug-in cartridge that includes an audio-cassette interface for program storage. Programming is accomplished through the 24-key keypad.

What we've seen so far gives us little reason to classify the unit as little more than an advanced video-game. What qualifies this unit is an add-on that will be available sometime this year. That add-on is called *ZGRASS-32*. Among that unit's features are a full-size ASCII keyboard, 32K of ROM, and 16K of RAM. Resident in the ROM is ZGRASS, a powerful graphics-oriented language. With the *ZGRASS-32* add-on, all programming is done in ZGRASS.

The *Z GRASS 32* add-on makes the new system unique.

FIG. 1—THE BALLY *ARCADE* video game is shown here in it's basic form. The games shown are only a few of those available.
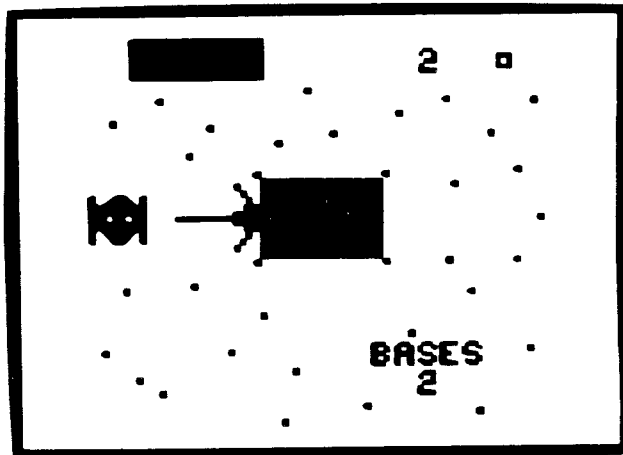

FIG. 2—SPACE FORTRESS video game.

With it a user has full graphics capability. Commands such as CIRCLE. BOX or LINE can be used for direct creation of graphics. A further indication of the potential of ZGRASS, which is also the operating system for the unit, can be shown by having a user draw a figure running across the screen using a peripheral light-pen. The user first draws the picture he wants with the pen and then indicates movement by moving the pen across the monitor screen. The figure will then run across. By using the SNAPSHOT command, the figure can be stored in memory for later recall. That indicates that there is a high degree of memory mapping in the 160 by 100 display. With this high degree of display memory-mapping, formatting displays for video games becomes easy.

The *Bally Arcade* has an interesting variation in its memory mapping. Rather than using the upper left-hand corner for 0-0 coordinates. the *Arcade* uses the center of the screen for its 0-0 location. and everything is determined from there. That makes it easier for a user to create and store graphics. rather than beginning in the upper left. which can complicate things. The graphic display is stored in memory under a macro (user-created) name.

Another indication of the power of the graphics system is typeface creation. A user has the ability to create an infinite variety of typefaces.

The *ZGRASS-32* includes two RS-232 serial input/output ports for data exchange. Data storage can be increased by adding up to two cassette recorders. Unlike other slow-speed cassette program-load systems. this one operates at a high 2000-baud rate. When a particular file is found. a menu of that particular file is displayed.

Apparently. Astrovision has plans to make this unit a full-capability personal computer. The reason is for suspecting that is that it will also interface with disk-storage systems. ranging from mini-floppies up to Winchester drives. The smallest Winchester drives provide a 5-megabyte storage capability.

As we mentioned. the *ZGRASS-32* system includes 32K of ROM and 16K of RAM. That RAM can be increased to a full 64K. allowing the use of the optional *CP/M* operating system. With *CP/M*. the *Arcade* with the *ZGRASS-32* add-on can become a versatile small business computer as it would be possible to use many of the most popular business programs.
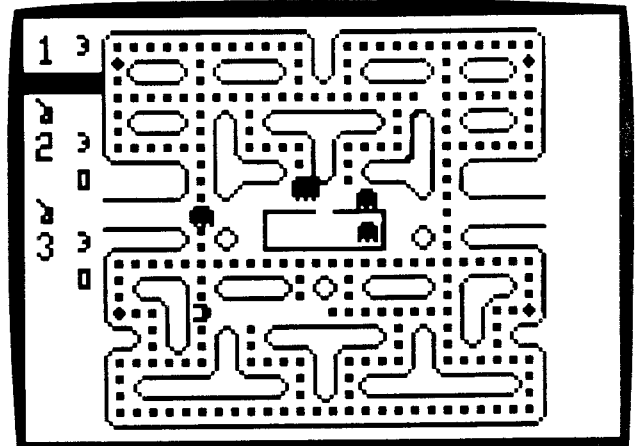

FIG. 3—MUNCHIE, a version of Pac Man.

FIG. 4—CREATE PICTURES with Coloring Book with Light Pen.

Software that runs under *CP/M* ranges from word processing to accounting to database management.

No video-game-based personal computer would be complete without some type of voice-synthesis feature. and Astrovision's *Bally Arcade* is not an exception. Included in the *ZGRASS-32* add-on is a Votrax voice-synthesis IC.

Since the *ZGRASS-32* unit has not yet appeared on the market. the pricing and distribution plans are not finalized. However. the add-on keyboard for the video unit is projected to carry a suggested retail list of $599.95. The add-on unit includes the extra ROM and the keyboard. It was unknown at press time whether there would be a printer. or what type of disk system would be available. **R-E**