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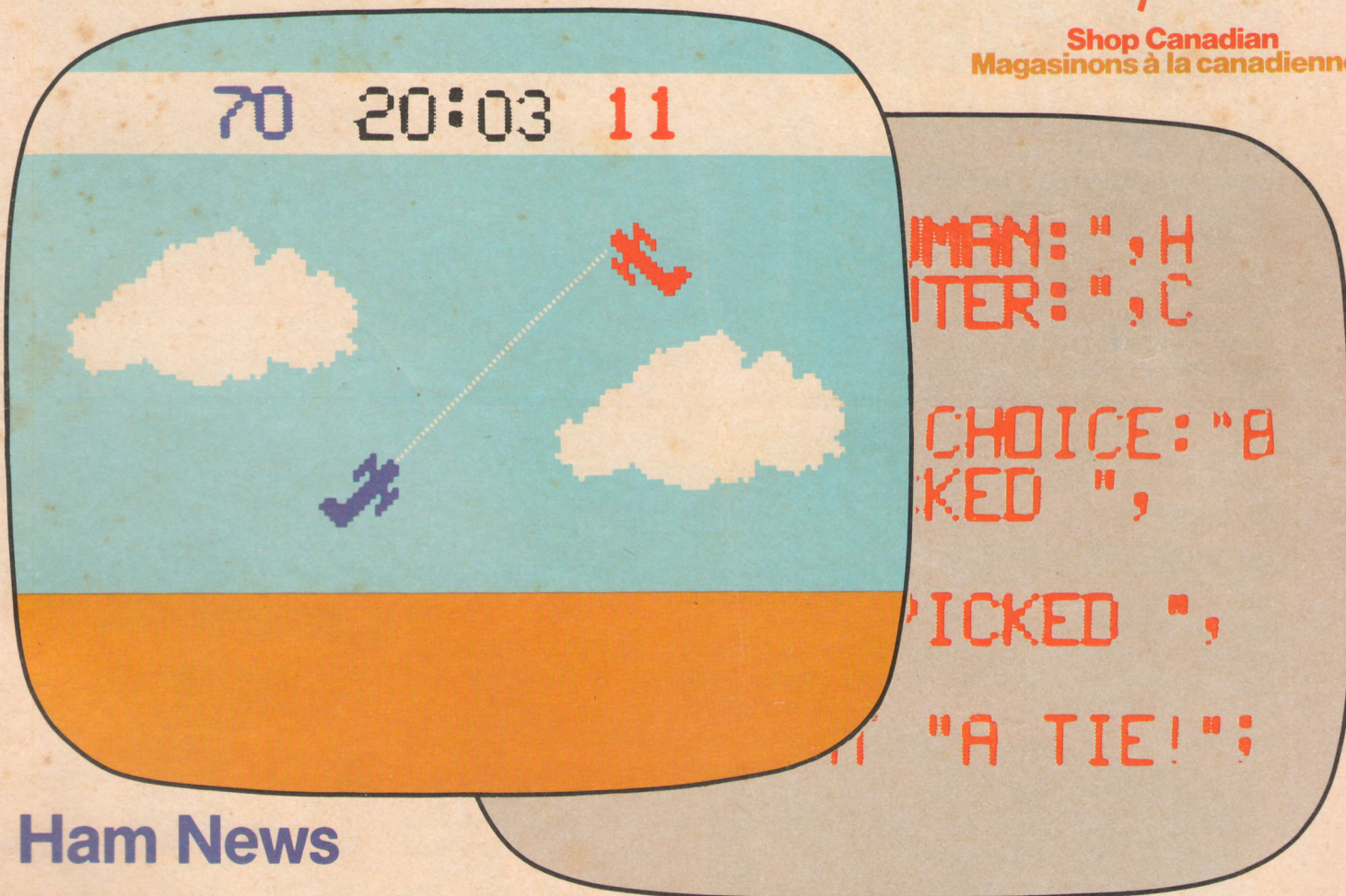
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NOVEMBER 1978

Bally Arcade: Game or Computer?



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Bally Arcade: More Than Fun

The Arcade is part of a new wave of machines. But who's it for? Graham M. Wideman and Mark J. Czerwinski report.

IT HAS BEEN several months since we have looked at the "popular" computer scene, and as expected the aim of some of the new products has moved still further toward the "consumer". In other words, companies are looking for bigger and bigger markets, to people who have (initially) less and less knowledge or experience of computers.

It was a couple of months after our February review that the Commodore PET was finally approved and offered for sale in Canada. Already there are a number of active and enthusiastic PET user clubs. The accessories and adjuncts also are now coming available.

Meanwhile, at the Radio Shack camp, the TRS-80 (basic model reviewed in April) has also been available for some time, and is on display at numerous Radio Shack outlets. This machine can be had with or without the much improved BASIC language version known as "Level II". An extensive collection of accessories present and

future strengthen Radio Shack's computer line.

Upon reviewing these two machines we were aware that they were a new step in microprocessor based computers, in that they required no hardware knowledge and allowed the owner to start with nothing more than the willingness to learn about BASIC. A big part of this was the fact that these machines have BASIC language built in (in ROM) so there's no time consuming loading of the BASIC interpreter off cassette, nor the agony and heartbreak of BASIC bomb-out due to a bug in your program. For anyone familiar with the earlier hobbyist (fanatic!) computers, this is real luxury!

The general public is at least becoming aware of these small computers, as the PET may be seen at several department stores, and the TRS-80 receives national TV advertising publicity.

But will this attract the big market? How far can you go towards the

consumer to get him to buy a computer? With these questions in mind we were very interested to see the Bally Arcade.

THE ARCADE ITSELF

The least you can buy is the Bally Arcade "box", which on the outside has a calculator style (and labelled) keyboard (Fig. 1), a slot for a Bally cassette (Fig. 3, more on this below), and on top a rack for storing such cassettes. On the back are a number of sockets for plug in accessories. Included with the unit are two hand controls. From the back of the unit also extend the cables for power cord and output to your colour TV's antenna input.

So what can you do with this unit. It may sound initially like a disappointment at \$599, but this unit as is enables you to play 3 video games and to use the machine as a four function calculator with TV display. We have to say however that they are pretty



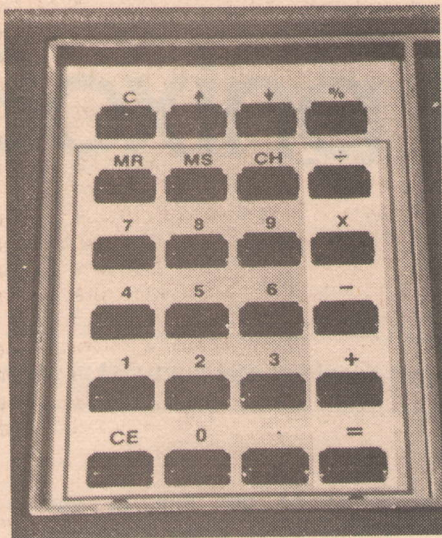


Fig. 1. Calculator style keyboard is labeled with calculator functions. Arrows scroll display.

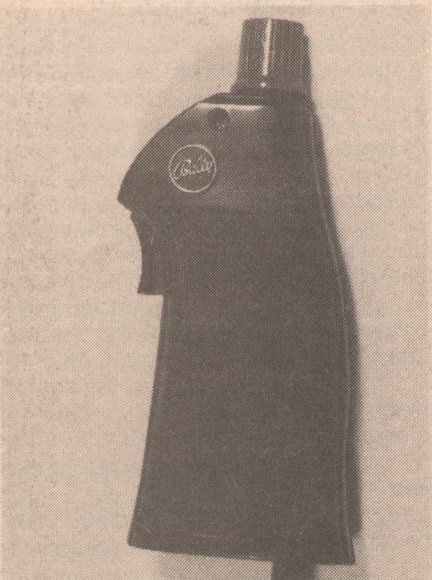
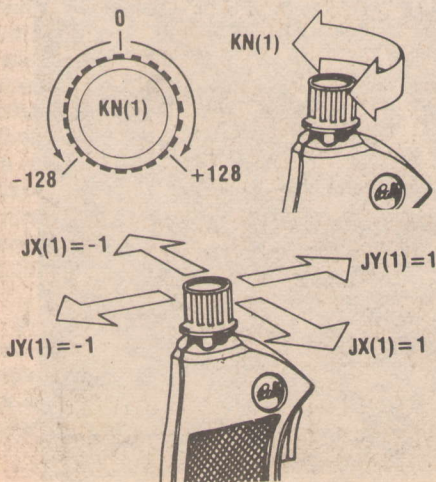


Fig. 2. One of two hand controls supplied with Arcade. Sockets on machine accommodate two more.



amusing, interesting and skill testing games.

We spent hours with our favourite, "Gunfight", where two six-shooter equipped cowboys march onto the screen to the tune of "Home on the Range", and then each player with hand control walks his man around the screen shooting at each other. (Realistic gun sounds). Various obstacles appear in subsequent shoot-outs, cacti, trees and a wagon. The graphics and action are quite good, with varying gun angle, and bits of cactus and tree which can be shot off. More tunes are played if one cowboy hits the other, (who falls dead on the ground).

This and the other games, apart from being entertaining, demonstrate the machine's ability to produce four colour graphics, and play tunes, both of a nature very sophisticated in comparison to simple video games. One of the games in fact allows you to change (using the keyboard) each of the four colours to others.

The calculator feature was not very impressive, being a simple four function model (10 memories, floating point). It does allow you to see the preceding steps (about 100) of your calculation like a printing calculator, which is good if you don't need the actual paper. One distressing point was that there is no minus sign to indicate a negative number, it simply turns from black to red, which is not so useful if you have a black and white TV. However, it does firmly tell the user that this is not just a video game.

THE "CASSETTE"

So far we haven't stretched the capability of the micro-processor yet, so let's look at an as yet unused feature, the "cassette". It is not an audio tape cassette, but a similar looking package, which contains up to 8K of ROM (permanent memory), and has a row of contacts along the edge which connect to those in the cassette slot. (Fig. 3) This is quite a clever concept, in that the public is already familiar with audio cassettes of similar shape, and does not have to be introduced to a new plugging idea.

A wide range of games cassettes are or will be available at \$34.95, with such appetite whetting names as "Desert Fox", "Space Race", and "Red Baron" (represented on our cover), "Backgammon" and some "educational" games like "Spell'n'Score" and "Crosswords".

However, the most interesting cassette is the one that allows you to

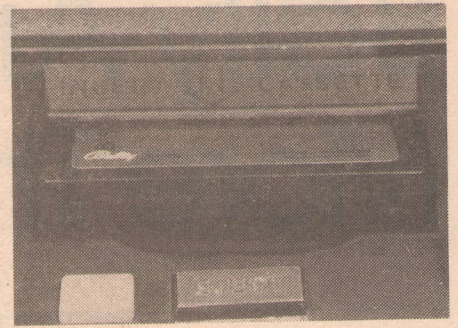
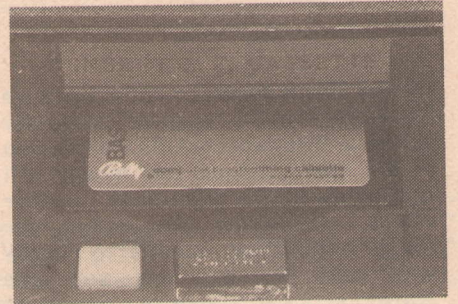


Fig. 3. Just stick it in and pop it down.



program the machine in BASIC language, price \$99.95.

BALLY BASIC

This is not a language for the serious programmer, since in the way of numbers it will handle integers only, up to about 33,000. However, it does include the familiar set of BASIC functions which enable the user to become acquainted with programming. The most important aspect here is motivation, and the user will find this, as Bally has made manipulation of the inputs, sound and graphics quite easy.

Hence the new programmer can quickly be designing his own games, "video art", accompanying tunes, and some graphing etc. The BASIC instruction book is quite comprehensive and gentle in its explanations, and has numerous examples and entertaining programs.

The programmer has available 1800 "memory locations", 26 integer variables (A - Z) and one array called @. While there is no real character or string variable one can fudge it. An attempt to store a character (enclosed in quotes) in the @ array results in its ASCII code value being stored. Hence @(1) = "1" results in @(1) equaling 49. To recover the letter however you would have to write a program with lots of IF statements to decipher the section of the @ array which you know is supposed to be characters.

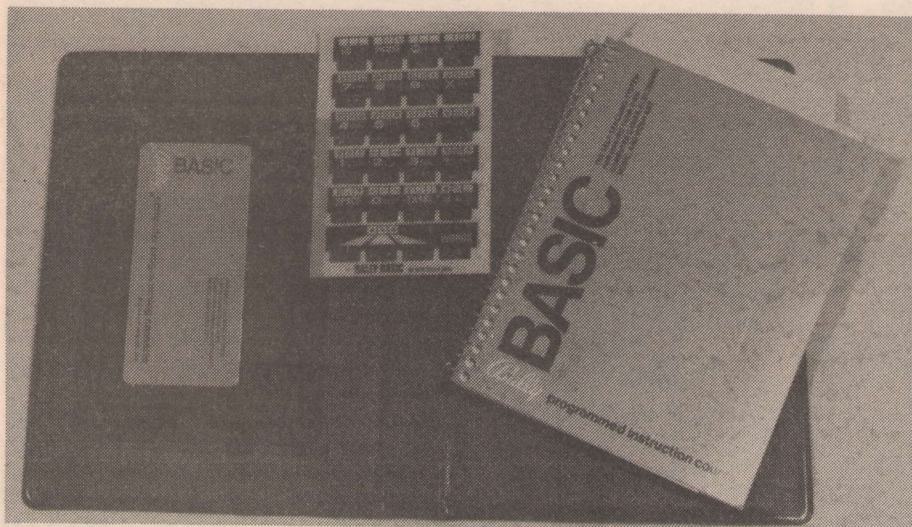


Fig. 4. BASIC pack includes "cassette", overlay, and booklet plus genuine vinyl case.

explaining some of the "machine variables". To input from a hand control, simply look at the values of JX, JY, TR or KN, which correspond to the joystick, trigger, knob positions. To pick the colours for the screen you set BC and FC from 1 to 256 to select the "background" and "foreground" colours. (Only two colours available when using BASIC) To draw on the screen you can write a dot, line or box using only one statement to specify its position, size, and colour. (Fig. 6)

While this is quite a respectable capability, it won't allow you to program games as complex graphically as the Bally has built in, due to speed and memory constraints.

Fig. 5. BASIC overlay on keyboard shows functions and instructions available.

BASIC IN USE

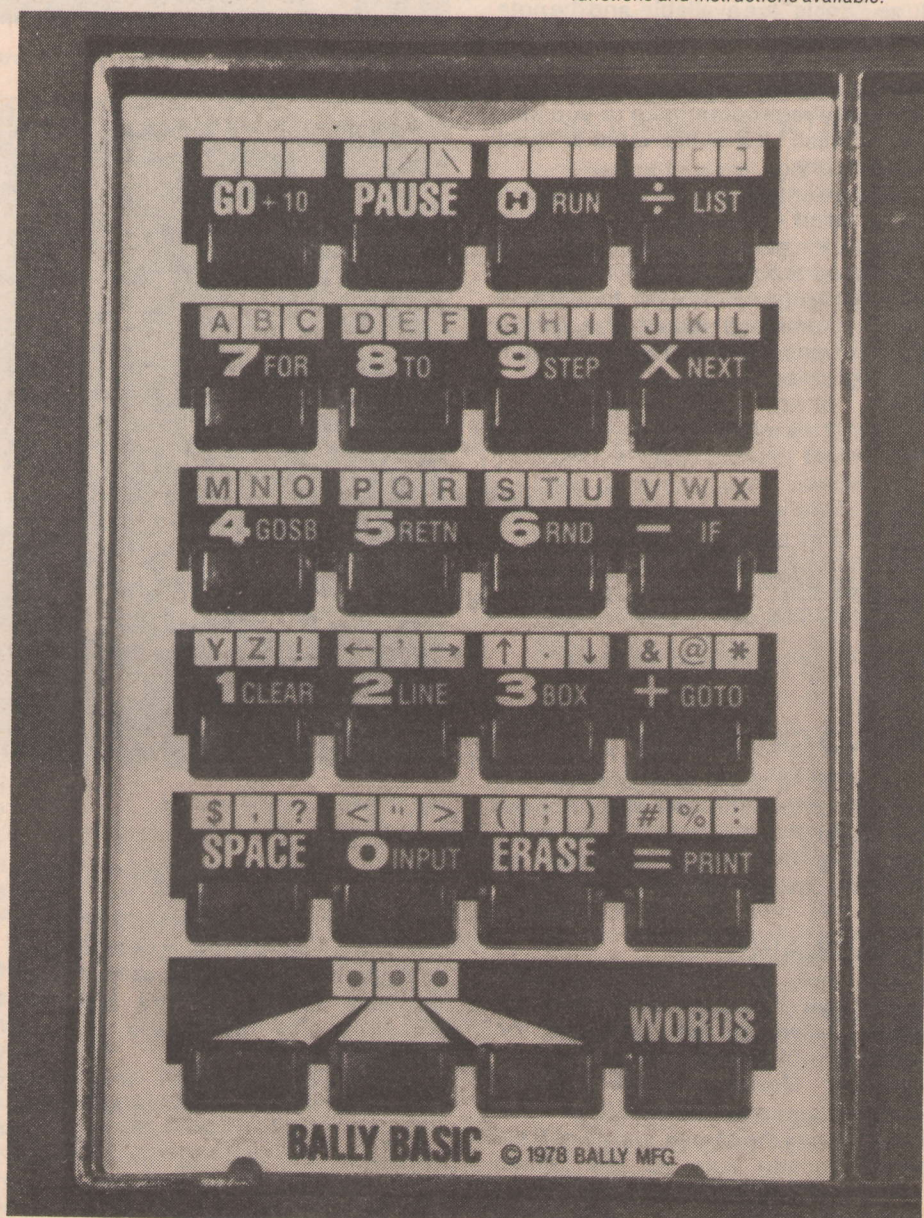
The BASIC kit includes an "overlay" which fits over the keyboard to tell you its new functions. Just as a typewriter has two "cases", the keyboard now has five cases, with the bottom row used when selecting one of four "upper" cases. Referring to Fig. 5, the numbers (and similarly positioned functions) may be obtained by simply pressing that key. The functions such as FOR, TO, NEXT, GO TO etc are obtained by first pressing "WORDS" then the appropriate key. The letters and characters in the white boxes above each key are actually coloured, and are obtained by first pressing the same coloured button at the bottom next to the "WORDS" key.

Needless to say, this keyboard is cheaper than a full keyboard, and can be faster, in that only 2 keystrokes are required to enter something like "LINE" or "STEP" and so on, but it can get confusing. You can of course always see what you've entered since it's on the screen, (and when you push one of those other four buttons the screen changes to that colour!) If you make a mistake you can "backspace" over characters in the same line, but to go back and change a line already entered you'll have to retype the line.

There are two other buttons on the Bally, RESET and EJECT (cassette). You don't want to hit either of these after you've entered a program, otherwise agony! We found the EJECT button much too easy to accidentally brush, perhaps Bally could supply a piece of cardboard to stick over it.!

GRAPHICS

The very best part of this BASIC is the easy interfacing, best described by



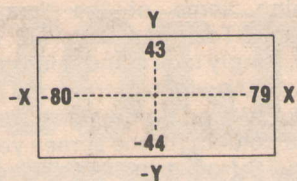


Fig. 6 For graphics purposes the screen is divided into 88 x 160 squares.

SOUND

As each character is printed on the screen a note plays from the TV's speaker. The note varies with each character, may be raised or lowered by an octave using the multiply and divide signs, and made sharp or flat with the plus and minus signs. (Fig. 7) A simple PRINT statement with a series of numbers and signs plays an interesting tune. "Rests" are available, and the note speed can be varied using the machine variable NT. NT however also varies the print-out speed, so don't set it too slow while you're programming or you may never finish. It's initial value is quite satisfactory.

Now, to a musician this doesn't sound like a lot of capability (it's more than enough for punk rock). It's surprising how good it does sound, though, and the simplicity contributes to learning about sound and music. But please Bally, give us some nice satisfying gun and explosion sounds!

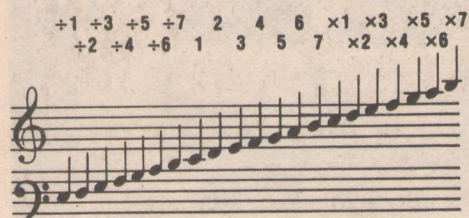


Fig. 7. The numbers corresponding to the musical scale.

AUDIO CASSETTE

In order to store programs for long periods of time the user can purchase the BASIC audio interface to allow recording and retrieving with an ordinary cassette recorder.

HARDWARE

We took our review unit apart (carefully!) and here's what we found inside. Heart of the Arcade is the powerful Zilog Z80 microprocessor (actually Mostek's version: 3880). This is accompanied by 8K of ROM which stores the games, and 4K of RAM which mostly acts as the screen memory. Although the cassette pack is reportedly capable of containing 8K of

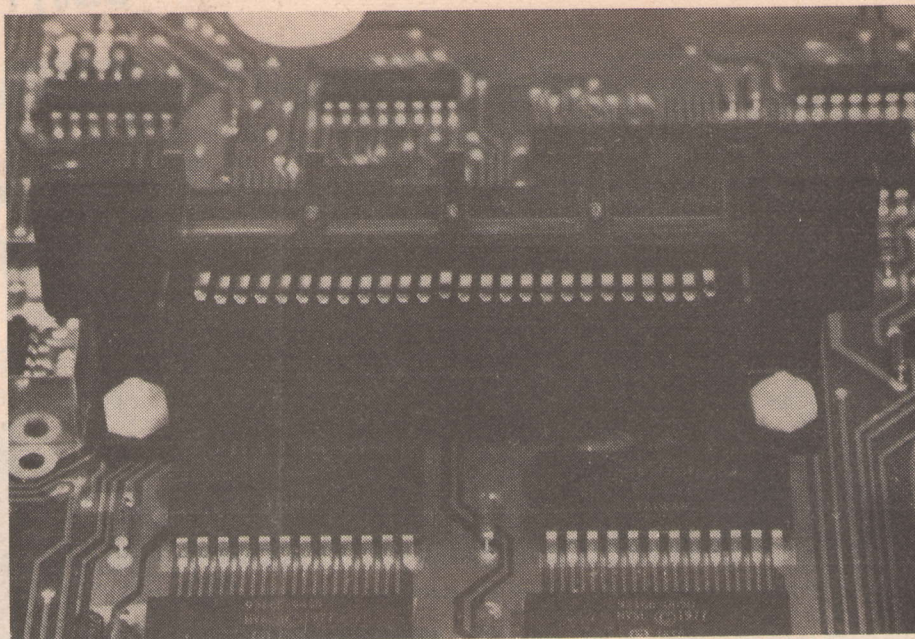


Fig. 9 Cassette socket attached directly to the board.

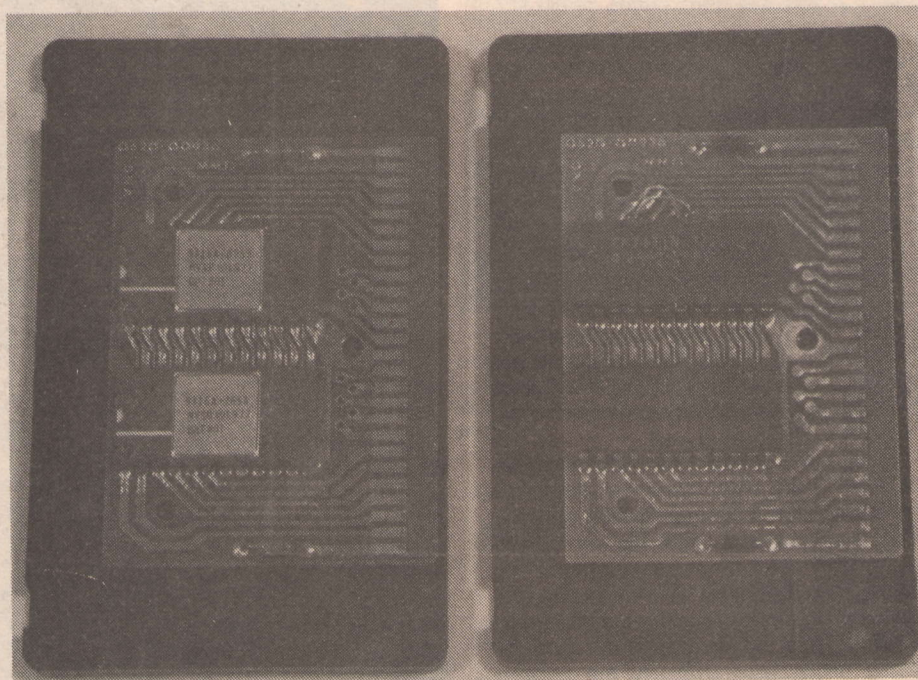


Fig. 10. BASIC cassette exposed.

additional ROM, ours appeared to have only 4K (Fig.10). When the BASIC cassette is in use, half of the 4K RAM is used for program storage, which means that only half as much screen memory is available explaining why only two colours are available to the programmer.

The various support chips are described in Fig. 8. Of special note is the "music processor" chip, which generates the musical tones of the chromatic scale from a single master oscillator.

As shown in Fig. 2. the hand controller gives 3 types of control: trigger, rotary, and "joystick". The trigger is simply a switch; the rotary control is a potentiometer; and the joystick uses four switch contacts, one each for 0, 90, 180, and 270 degrees, and pairs of those contacts used for the intermediate angles 45, 135, 225 and 315 degrees. We found that a little surgery with pliers was required to get all the intermediate angles to work properly, but this was probably due to the hard use that the demo unit had

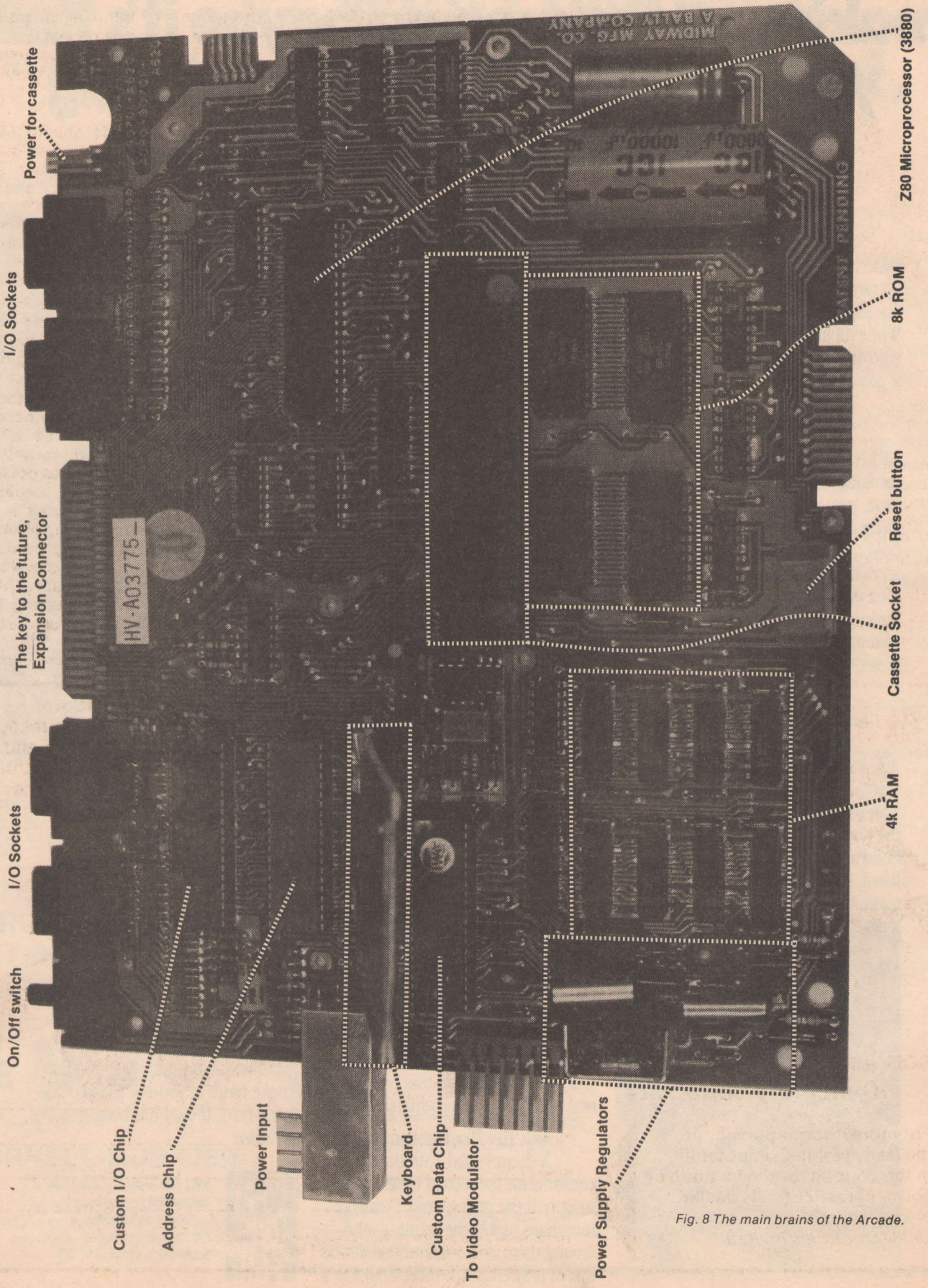


Fig. 8 The main brains of the Arcade.

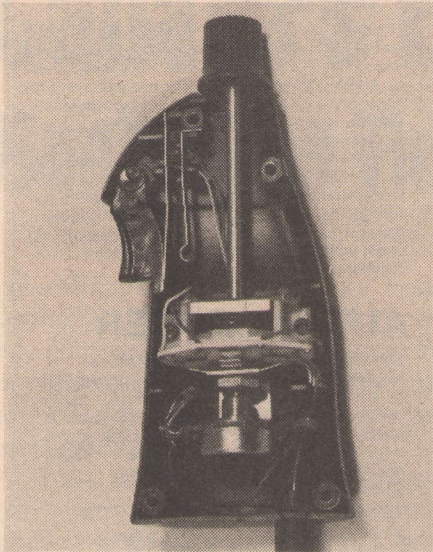


Fig. 11. Open hand control shows trigger switch, pot and four way joystick switch module.

received. This is not a high quality precision control by any means, but it certainly works, and hardware enthusiasts will easily be able to use their own switches and pots for other input applications. (Fig. 11)

WHAT'S COMING

What's available so far appears to be only the iceberg tip. The first upgrade

will be a proper keyboard box, which will reportedly include an additional Z80, more RAM, and ROM containing a "serious" BASIC version. Interface for 2 independent screens and IEEE 488 bus is also being talked about. This is apparently to be introduced in January 79. Also coming are a printer, telephone interface, light pen and floppy disk. Do these sound like add-ons for a video game?

It's pretty obvious that the Bally Arcade is in a new class of product, and will be the most "vertically" extensive product line we have seen so far. The machine has the capability to endear itself to all ages and familiarity-with-computer levels. Once the person is interested they will feel the desire to expand the system and not be afraid to dabble in programming, with the basic BASIC. After some confidence has been obtained with the concept of programming, the user might be encouraged to move up again to the keyboard expander box and advanced BASIC. This is a much more "expand-as-you-learn" approach than the kind of expandability of early home computers, where you had to be pretty knowledgeable to start, and expand as boards became available.

In fact, a learning experience is what the Arcade is all about, not just in

programming, but it is an intriguing exercise in music composition (albeit quite simple), and in colour graphics it provides a no mess, no manual skill artistic tool.

WHERE

The Bally Arcade should start to appear in October 78. It is distributed by Paragon Enterprises, through Zenith Radio's dealer network and also through large department stores. Calculator shops may also be interested, Marketron is already planning to handle the product.

COMPETITION

If this market is going to be big, you can be sure that Bally aren't the only people who thought of getting into it. We have sketchy details of two other possibly similar products being announced in the US (where the Bally Arcade sells for \$300). Magnavox has its "Odyssey 2", which has a full touch keyboard and two joysticks, and a plug in cartridge system. It does not appear to have programming capabilities however. Meanwhile there's a home computer from Interact, again with full keyboard, colour display output, but this time with an audio cassette unit built in; US \$499. Finally, Atari is rumoured to have something in the works. Even if it wasn't rumoured you can bet they have.

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