IT'S HERE !

Sorry for the unseemly enthusiasm, but the Tiny BASIC cartridge is finally appearing in the stores, at the $50 price tag. It consists of the cartridge and the manual, with a fancy book-type box. Inside the front cover of the manual is the overlay for the keypad. Also included is an errata sheet. Plug in the cartridge, push RESET and the screen goes "BALLY BASIC" with musical notes, and you are ready to go. Our local store (ERA-1) ran out of a dozen in just two days.

You should receive a copy of the Bally "PA-1 SERVICE MANUAL" sometime this month. This is being sent to all ARCADIANS without charge as a courtesy from Bally.

Because of the expected upswing of correspondence and inputs for this paper resulting from the release of the Tiny BASIC, I plan on going to a more regular production. This will therefore be the last issue of a 'free' paper, and the next will be on a subscription basis, $5 the year.
A sheet is enclosed,to be used as a subscription order-and it will also be used to answer inquiries. If there is any correction necessary to the address label used on this issue, please send the label back with the corrections marked.

A report from Bally indicates that they have increased the supply of the three custom chips (address system, I/O, and data) by adding a third vendor from whom to purchase chips.

The Add-On unit is to be demonstrated at the January electronics show at Las Vegas, and production to start after the show.

The Sept/Oct issue of Creative Computing has a very interesting article on the base unit and the Tiny BASIC cartridge. It also includes a few choice words about availability of the product.

Bally is producing three models of the base unit, the only visible difference being the label on the clear plastic cover. These models are:

BA-1000-2	Montgomery Ward	"ARCADE" ™
PBA-1100	available at retail outlets	
PBA-1200	JS&A unit	"HOME LIBRARY COMPUTER" ™

Over 10,000 of the -1100 have been manufactured.

ARCADIANS
3626 Morrie Dr.
San Jose, CA 95127

FIRST CLASS MAIL

Some discussion about the Tiny BASIC and the cassette interface:

Included below is the erratta sheet that came with the TB manual. I don't understand the reference for pages 107-110, as mine worked ok.
There are more commands in the TBASIC than the manual tells you about. For example, the period . is equivalent to REMark; that is, the entry will list, but will not affect the running of a program. There is also supposed to be an /ABS/ command, to give you the absolute value of a number... Anything discovered by subscribers is solicited.
The symbol GO+10 on p. 122 is not too clear. In writing a program with line numbers 10 digits apart (10,20,30,etc.), enter a line by using WORDS GO and the machine will automatically give you the next line number, saving you the step of entering it.
Use subroutines and GOTO to save memory space
The length of a string is apparently dependent upon program size.
It appears that changing instructions after loading a string will destroy all or parts of the string.
NT (note time) can be used to control the speed of the computer at any time - not just for music. Setting NT = 0 will speed up the operation the most, and will shut off the tones. A negative NT will slow the whole operation drastically, and give you really sustained notes, in seconds of time.
The cassette interface may be somewhat touchy. By the way, with a few connector changes you can use a reel mechanism just as well. None of the instructions tell you that it is the recorder's volume control that must be adjusted to get the signals back and forth. There is an LED in the interface, and the control should just make the LED light uniformly, just above its blinking state. If you have material on tape and want to get it into the computer, give it the loading command and adjust the recorder's volume control until the data showing up on the screen is legible (all the WHAT? BALLY BASIC terms are gone), then rewind the tape at start again,"for real". You may have a problem where someone else has recorded the tape, on another machine. Tape head azimuth must be matched. I would recommend sending a listing along with a tape when we get to swapping programs that way, so the recipient can enter by hand any commands that get garbled.

BALLY BASIC PROGRAMMED INSTRUCTION COURSE ADDENDUM

Please make these changes and additions to your Bally BASIC programmed instruction course.

PAGE NO.		
11	Do not spell out computer words (B-O-X or S-T-E-P). Use the WORDS shift key.	
46	Change this line	143 NT=3
52	Change these lines	20FOR A=1 TO N 60FOR B=1 TO@(A) 70PRINT #1, "$",
60	Change this line	60IF K=31 A=A-1; GOTO 100
63	Key 31 is the erase key (paragraph 5)	
99	Add this line	190 GOTO 10
102	Add these lines	280 H=H+1 290 GOTO 30 301 PRINT "ROCK"; RETURN 302 PRINT "SHEARS"; RETURN 303 PRINT "PAPER"; RETURN
106	Use program on page 60	
107-110	Do not use music	

Addendum to First Edition, April 1978

FORM NO. 0620-00304-0100

Another outlet for the base unit and probably the TBASIC is J.TAYLOR, 611 North 2 St. CABOT, AR 72023, who mails items postpaid. Contact him for prices and details.

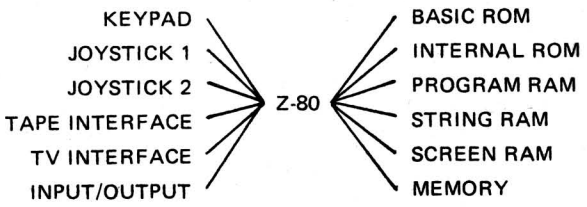
The latest Newman Computer Exchange (NCE) catalog, received 10/10 has an extremely interesting description and explanation on the TBASIC. A copy is included herein, through the courtesy of Johnny Johnson of NCE. Their address is Box 8610, Ann Arbor, MI 48107.
This is the type of material I want to include in this newsletter for use by our subscribers.

DATAFILE

The Bally Professional Arcade has transcended the barrier between the programmed computer game to a user programmed computer system. The transformation comes about when you insert the Bally BASIC ROM cartridge and press RESET. With the aid of a keyboard overlay card, the 24-key keypad is transformed into a full alpha-numeric keyboard with four "shift" keys to allow you to program in an enhanced version of Palo Alto Tiny BASIC. By forgetting that you ever used a regular keyboard, you can learn to type programs in BASIC fairly quickly due to the fact that the keyboard overlay is arranged in a logical manner.

The keyboard not only allows you to program letters, numbers and special symbols but it gives you the capability to use the WORD shift key to enter an entire BASIC command in one keystroke.

Bally BASIC is designed to work with the various elements of the Arcade to give as much control as possible over the TV screen and speaker (for music) while allowing you to input from either the built-in keypad or two joysticks. Here is a block diagram to give you an idea of the elements making up the Bally Professional Arcade with Bally BASIC:



Let's take a look at the Input/Output (I/O) side of the diagram first. The 24-key keypad has four shift keys to produce 93 possible codes to be entered from this input device. Each shift key is color-coded on the overlay and the background color of the screen changes to match this color when the shift key is pressed. The keypad can be interrogated with a special variable (KP) during the execution of a BASIC program.

Two joysticks are able to input to a BASIC program in three ways: TR(1) is the variable attached to the trigger on the number one joystick. This variable is equal to zero until the trigger is pulled when it is equal to one. The joystick itself has two variables associated with it: JX(1) and JY(1). Both variables are equal to zero until the joystick is moved. Here is how these variables change with the position of the joystick:

```
            JY(1)=1
JX(1)=-1      0       JX(1)=1
            JY(1)=-1
```

By combining the information read from JX and JY, you can resolve eight separate joystick positions (eg. JX=1, JY=-1 would be the Southeast direction).

Continued on pg. 13

NCE DATAFILE, cont. from page 11

The third and most versatile input is the knob on the end of the joystick which goes by the variable name, KN(1). KN(1) uses the analog to digital circuits in the Arcade to give you numbers between -128 and +127. This can be used to vary colors, position or sound easily and with accuracy.

The optional Bally BASIC cassette interface allows you to store and retrieve programs (but not strings) using a standard tape recorder with earphone and microphone jacks. The format used is the Kansas City Standard which runs at 300 baud. The interface plugs into the jack normally used for joystick number three when you are playing the Arcade games and it gets power from the jack provided for the future light pen option. In operation, an LED tells you when the signal is present before the loading starts. When the program loads, it also lists on the screen to let you see what is loading and if it is loading correctly. There is even a command to read information from the tape directly to the TV screen without disturbing memory so that you can verify that the program was recorded correctly or so that you can find a blank spot on a tape to save your program.

The TV interface is the output section for the Bally Arcade; it allows color graphics, text and musical tones to be controlled from your program. The foreground and the background colors are controlled by the variables FC and BC and there are 256 colors available for each. The restriction is that only two colors may be on the screen at one time in Bally BASIC as opposed to the 8 colors available simultaneously in the Arcade games. Text is read onto the screen with the PRINT command or the TV variable which will be explained later. Music is also obtained from the PRINT command since each character has a note associated with it. MU is a special variable which plays music without printing on the screen.

The cursor (a moving block which acts as a screen pointer) can be positioned with two more special variables: CX and CY. By setting these variables equal to the desired coordinates on the screen, you can make the cursor appear wherever you want it to allow you to print text at that location. These two variables may also be used to tell you where the cursor is at any time by simply reading them (ie. PRINT CX, CY).

Now that you've seen the hardware side of the Bally Professional Arcade, the input and output devices, let's take a look at the insides which include the memory circuits and their contents, the software.

The memory "space" in the Bally Professional Arcade is determined by the microprocessor within the unit, the Z-80. The normal amount of memory which can be handled by a Z-80 is 65,636 bytes (a single character takes up one byte which is 8 bits). In the Arcade, this memory space is divided into ROM memory which is set up at the factory for a certain program and RAM memory which stores your information whether it is the program you write, the music you compose or the shapes you create on the TV screen. The full range of the Z-80 microprocessor will not be used until the expansion unit becomes available with its own RAM and ROM but the Bally BASIC system is impressive when you weigh its capability against that of anything near its price.

✱ My unit works only when plugged into the extreme right connector.

The ROM in the Bally Professional Arcade is primarily dedicated to the three games and calculator programs but it also contains the operating system to allow the screen to display shapes and colors as well as play notes through the speaker. The ROM cassettes from Bally plug into the unit and attach to the Z-80 memory bus with a connector inside. These cassettes may contain games or, in this instance, Bally BASIC.

When you plug in the Bally BASIC cassette, the ROM inside takes control of the hardware in the system to allow you to enter your own programs for games or educational purposes. Because the Arcade cannot attach to a printer or other hard copy device and because this version of Tiny BASIC has no floating point (decimal) numbers, it is not well suited to business use. The Bally expansion unit will serve this type of application at a later date.

The RAM is normally dedicated solely to the TV interface so that it can display 8 colors at once with high-resolution graphics to simulate real-world situations such as a car driving down a road or a baseball field complete with players. When the BASIC ROM is plugged in, the 4096 bytes of RAM are subdivided into three sections: program, string and screen. The trade-off is that you can only display two colors at once but you gain 1800 bytes of memory in which to store your program, and you can store up to 874 numbers in the numeric string memory (this is where you store the notes for your piano player program).

Learning Bally BASIC is not hard; most of the commands are the same as you find in any computer's BASIC, but there are four new commands which provide new operations which most computers have no way to duplicate. The standard BASIC commands available are:

FOR, TO, NEXT, STEP, GOTO, GOSUB, RETURN, INPUT, RND, LIST, IF (no THEN)

Bally set up the following special purpose commands for you to use:

PRINT – This command operates in the normal way except that as each letter or number is placed on the screen, it plays a note whose duration is determined by the note time variable NT. NT=0 turns off this music feature. PRINT #A, B will print A spaces before it prints the numeric value of B to provide formatting capability.

BOX – BOX X, Y, A, B, C prints a box on the screen centered at location X, Y with height A and width B screen units (pixels). The fifth parameter, C, gives you control over how the box affects the screen. 1 = foreground color, 2 = background color, 3 = foreground color but reverse images inside the box, 4 = no box (good for moving over images without disturbing them). The screen has 13,833 separate pixels arranged 159 wide and 87 high.

LINE – LINE X, Y, C draws a line from the end of the last line (or 0, 0 which is the origin or center of the screen) to the pixel at location X, Y. The third parameter C is the same as the fifth parameter C for the BOX command. Both BOX and LINE commands operate fairly quickly.

CLEAR – This command simply clears the screen for more graphics to be displayed or text to be printed.

Another interesting special variable, PX (X, Y) allows you to check the pixel at location X, Y to determine whether it is currently set to the foreground color (1) or the background color (0). This is useful if you are moving something on the screen and you want to check for a barrier, etc.

When using the screen for text, the display consists of 11 lines of 26 characters each. A program line can extend over four screen lines for a total of 104 characters. Statements may be separated by a semicolon on the same program line. Integers from -32767 to +32767 may be used.

Three error messages are issued by Bally BASIC:

WHAT? – This is the syntax error message which tells you when the computer doesn't understand your statement.

HOW? – This message tells you that the computer knows how to perform the command but doesn't have the resources available.

SORRY! – Out of memory. You can check the amount of unused memory with the special variable SZ to prevent this problem.

Bally BASIC uses the term "string" to refer to a single-dimensioned subscripted variable which is used only to store numbers during program execution. 874 of these strings are packed into a separate memory from the program so that you don't have to worry about leaving space for these strings when you write your program. There is one way to get alpha characters from a string, and that is using the special variable TV. When you set TV equal to a number between 30 and 119, you are able to access most of the keys on the keyboard to print their corresponding words, numbers, letters or symbols wherever the cursor is located.

The immediate functions available include GO which serves as a return key plus it can generate a new line number ten higher by preceding it with the WORD shift. HALT halts program execution while PAUSE is a temporary delay until another key is pressed to resume execution. An ERASE key is provided to allow you to backspace for corrections.

To give you an idea of how many lines you can fit into 1800 bytes, this line could be entered 138 times before the Bally BASIC said "SORRY".

```
20000 CLEAR; INPUT X, LINE X, 9, 4
```

A key command takes up one byte as does each separate character. A line number occupies three bytes of program RAM but the strings have their own memory to keep from interfering with the program.

As you can see, it is the special variables, music and graphics commands which make Bally BASIC a powerful tool to use the Arcade's capabilities. This, along with the low price of less than $350, makes for a perfect system to get a start in programming microcomputers as well as to give you a reason to turn off those boring network shows and do something creative with your TV.

Next installment will include an interesting sample program with a lot of remarks and comments concerning its operation.