Color and Sound Computer System \$29995



# Z80 BASED PROCESSOR UNIT

- . 5 times more processing power than the
- · Completely assembled and tested
- . 8K ROM, 4K RAM.
- · High resolution color display
- · Expandable to 44K system with full BASIC.

### 24 KEY KEYBOARD

· Adapts to different program cassettes for a variety of applications with simple overlay

# INSTRUCTION MANUAL

· Gives clear, illustrated, step-by-step instructions on how to install your Bally and start enjoying it within minutes of taking it out of the carton.

# **4 REMOTE HAND CONTROLS**

- · Determines action for each movement of the game being played in 8 different directions. Squeeze the trigger for shooting in Gunfight or for tracing on the screen in
- ALL FUNCTIONS OF THE CONTROLS CAN BE ADDRESSED IN TINY BASIC!
- Pistol grip design. Each control numbered

# CASE

Case is 5" x 11" x 15", made of high impact clear plastic with storage space for 15 casset-

# 3 GAMES INCLUDED

- · Gunfight, a 2-player game. Walk your fighter around the screen, raise or lower his arm and shoot
- · Checkmate, 0-4 players. Crash opponents into your trail, their trail or the sides of your
- Scribbling; draw or write almost anything

# CALCULATOR INCLUDED

- . The Bally Professional Arcade will work for you as well as entertain you. Its sophisticated 5-function, 10 memory printing calculator with scroll button and entry correction helps you reconcile bank balances, compute taxes and the like.
- Convenient algebraic entry system allows problems to be entered in the same order written. If you want to calculate 3 + 4 - 5 press only  $\boxed{3} + \boxed{4} - \boxed{5}$ .
- · Easy to operate. Add, subtract, multiply, divide. See exactly what takes place and how it looks on your TV screen.

# AUDIO CASSETTE CONTROLLER

Save your programs on your audio cassette drive with the 300 baud controller that will be available to compliment TINY BASIC. Connects up to the port for pistol grip 4. By utilizing power from the light pen option it requires no additional power supply.

### MACHINE LANGUAGE LOADER

A 256 byte loader allows you to load your own programs and make more efficient use of

# **EXCITING NEW FEATURES**

# **AUTOMATIC TV PROTECTION**

- . Even if you forget, the Bally automatically remembers to blank out the display after 5 minutes of inactivity thus preventing dam-
- Press reset key to resume your program at any point

# REMOTE GAME SELECTION

- Sit in your easy chair, select and start a game with your remote hand control.
- Bally is the only programmable video game with this convenient feature

# **Tiny Basic** in ROM

- With Audio Cassette Interface
- Program Color and Sound
- Accepts Pistol Grip Inputs
- 10 Day Return Privilege
- \$49.95

In Stock Now

you choose in 256 different color patterns. The first in the Functional Series of Vidis loaded into the system in seconds. Your Arcade can be programmed with an educational or game cassette one instant, and with TINY BASIC the next. We have seen the program and think it's the best value available

COMMANDS The TINY BASIC language supports the following commands:

GO, FREEZE, RUN, LIST, FOR, TO, NEXT, INPUT, GOSUBROUTINE, RETURN, ABSO-LUTE, IF, LET, REMARK, RANDOM, GO TO, ERASE, PRINT.

### KEYBOARD OVERLAY

All commands and characters are accessed from the 24-key keyboard with the guidance of a color-coded plastic overlay (see fig. I). Four shift keys are used in conjunction with the remaining 20 keys. Upon striking one of these color coded shift keys the screen background temporarily assumes that color. Numbers and calculator functions require no

Fig. 1, COLORED SHIFT KEYS

Above each key are 4 characters each with their own color which are called out by hitting the appropriate shift key (as each shift key is hit the screen turns that color). Black charactors, numerals, calculator functions need no snitt code.

As stated earlier, TINY BASIC commands require only a single keystroke in conjunction with the shift key. Alphabetic and special characters are generated with a "shift" and another Keystroke. Under program control each keystroke generates a unique musical

NCE/Compumart Inc. 1250 N. Main St., P.O. Box 8610 Dept. P78 Ann Arbor, MI 48107

- Multiple statements/line; Multiple lines/statement
- Maximum program line 104 characters
- PEEK & POKE
- (Horizontal and vertical lines and rectangle commands)
- Backspace erase and space forward editing function
- Displays 11 lines x 26 characters

# MULTIPLE INPUTS

In addition to the keyboard, TINY BASIC can address all the control functions of the four pistol grips through the following special var-

Variable "i" is the pistol grip number 1, 2, 3, or

Ti Grip Trigger.

0 not depressed,

1 depressed. UDI Knob Up Down. 0 grip control knob neither up nor down; 1 grip control knob

2 grip control knob

down.

LRi Knob Left Right 0 grip control knob neither left nor right; 1 grip control knob

2 grip control knob

Pi Knob dial.

Value of from 0 to 255 representing the setting of the knob.

# MULTIPLE OUTPUTS

TINY BASIC programs have control not only of the characters, lines and rectangles appearing on the screen, but also which of 256 colors and lines that they appear in. The TINY BASIC programmer also has access to the music generator

# TOKEN FEATURE

Each command is specified by a shift code and the appropriate command key as specified by the keyboard overlay. Even though each command code is specified by a single code, and is stored internally as a single character, it is completely spelled out

# **BURN IN PROTECTION**

To prevent television tube damage, the screen is automatically cleared after 5 minutes of inactivity. Program contents are not lost, and will appear when keyboard activity

There are many versions of BASIC as well as several other computer languages. Palo Alto Tiny Basic, developed by Lichen Wang, eliminates many complex expressions used in mathematics and physiics and is particularly easy for beginners to learn.

Bally BASIC, written by Jay Fenton, is an expanded version of Palo Alto Tiny Basic that allows. you to draw pictures, select colors, and play music on your TV. By adding full polor graphics and sound. Bally BASIC expands your Bally Professional Arcade to include colorful computer games, electronic music, and video art.

This programmed instruction course, written by Oct Answorth, is your introduction to understand-ing and using Bally BASIC. You will learn how to talk to your computer in a few minutes and then you can expand your knowledge and enjoyment in the directions that interest you most.

Reprinted with permanent by Bully Consumer Products Division. Rally Monetacturing Corporation 1070 West Grand Avenue Franklin Park, (Sinces 2012)

Foot Edition And 1979

(I) But's Manufacturing Corp. 1979 At vigor reserved.

RESET your computer by pressing the 198722 button next to the caspetto. Your TV surses should look like this niction.



ABSET crases your program if you press this button by acceled you must enter your program again, from the beginning.

EJECT causes your programming cassette to pop.

up so you can remove it. Pressing the eject button

accidently will cause your program to stop.

If this happens, push the cassette back into place, press RESET, and enter your program again.

The same static that vautes dots on your TV screen or noise in the speaker can effect your computer. If static interrupts your program and causes it to stop, press RESET and enter it again.

Letters



The GREEN shift The RED shift The BLUE shift key selects key selects characters on characters in characters on the right

# INDEX

### Operating Instructions **Programming Course**

Electronic Music

Learning Skills

Computer Words inputs, outputs and controls Error messages

Graphs and charts

Terms and Symbols

Lesson 1. Printing, counting and Lesson 2. Random numbers, inputs 30 and what if? Lesson 3. Subroutines Lesson 4. Strings Lesson 5. Electronic Music

Lesson B Graphics Lesson 7 Committee Games 78 Lesson 8. Video Art Programs Computer Games

Numbers

To print a letter or character on your TV screen. use the shift key in the same color First press either

the GREEN RED or BLUE shift key to select the color of the letter you want. Then press the key that

Me

EMES.

MO

EE

回题

EXE

1230 HIGH.

INSERT the Bally BASIC cassette in the cassette slot and press down

from its envelope in

envelope is a good

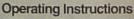
place to store your

overlay when you're not using it.)

the front of this

manual (This

PLACE the keypad overlay on the keypad.



If you are using your Bally Professional Arcade for the first time, please follow the directions in the Owner's Manual packaged with your unit Connect your Bally Professional Arcade to a black and white

or color TV and try out several of the games.

After you are familiar with your arcade and know how it operates, try Bally BASIC and discover the enjoyment of having your own personal computer,

REMOVE the keypad overlay



Your Bally BASIC keypad is divided into three separate kinds of information; NUMBERS, LETTERS AND WORDS. The WHITE numbers and symbols on your keypad are printed on your TV screen when you push

SECTION 2

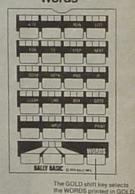


Now use the ERASE key to remove the numbers.

DEEDS THUSSE TEXAS: **BRASS** 



# Words



NCE: COMPUMART - Your Exclusive Bally Connection We Have the Amazing Bally Arcade

You can now print numbers, letters and words on the screen. Next you will learn to out programs into

Reset the computer by pressing the RESET

RISHER



The RESET button erases all instructions and programs in the computer's memory and clears the

Now you will enter a short program.

Number the first instruction 10. Use the WORDS key to say PRINT and then spell out "HELLO"

10 PRINT "HELLO!" 60

TOPRINT BYELL

LIST

0



The GO key acts like a carriage return on a type-

Now enter this new instruction to replace line 10

n your program Don't forget the comma at the end!

see what it does. Use the halt key (1) to stop.

12

2850TO 10



Now the program is in the computer memory. To look at the complete program, ask the computer to LIST IL

100



Check your program and see if it matches the example, it your TV screen doesn't match this picture. RESET your computer and enter line number 10 and line number 20 again.

Now you can run the program. The computer will print the word. HELLO! Then it will go back to the beginning of your program and start over. To stop the program, press the half key. (1) and hold it down

the keypan in GOLD. Press the WORDS key, and

then press the key under the words you want to

MORRES





LIST



You need to know how to change a program so that you can fix a mistake or make your program do something different. To change an instruction, just enter the number of the line you want to change and then enter the new instruction.

RUN



Now enter and run this longer program. Your computer will number the lines 10, 20, 30, and 40 automatically. After RESET and at the end of each

(TESE 10X = RND(50) + 20 20Y = RND(80) - 40

BOLINE X. Y. B



Check your program to make sure it mate example then run it.

RUN



Press the PAUSE key to stop the program. Press any key to start it again.
With this feature you can also pause while listing

your has reason you can purely be programs, in the Programs Section are many programs you can select from Remember to RESET before each program and to press GO after each line. If you want to number lines automatically press WORDS and

REVIEW

Now make sure you understand how to operate your computer and enter and run programs.

- Insert your Bally BASIC Programming Cassette and put the keypad overlay in place.
- 2. Press RESET (next to cassette). This erases any old programs.
- 3 Enter each instruction and press GO. Or press WORDS and GO for a new line number.
- 4. LIST the program and check each instruction carefully PAUSE key lets you pause when listing long programs.
- If there are any mistakes enter the instruction again using the same line number. To remove an instruction completely re-enter its line number. and press GO.
- When your program matches the example press
  RUN and GO.

Now you have two choices. You can go to LESSON ONE and continue learning how to write your own programs, or you can go to the PROGRAMS section of this manual and try out any of the programs.

**Programming Course** 

### Lesson 1 Printing, counting and loops.

Before you begin these lessons please read and understand the OPERATING INSTRUCTIONS. They

begin on page 4 and show you how to enter, list and run programs on your computer. Learning to write your own programs isn't hard at all. Soon you will be able to have your computer play your own games, music and video art.

Let's begin by writing a short program, First RESET the computer with the RESET button

**HERE'S** 



Now spell out HI and your name. Press GO to

HI BILL 00



The computer is saying WHAT? because it doesn't know what you said. The words HI and BILL are not

words your computer understands.

Instead, try if this way, use the WORDS shift key
to enter the word PRINT. Then spell out "HE BELL"
Don't longet the quotation marks.

PRINT "HE BILL"



Now press GO again and see what happens:





You can't print these words a second time because the computer doesn't remember what to do. To have your computer remember your instruction, just give

Number your instruction 10 and enter it again.

10PRINT THE BILL"



Now you have a one-line program in the computer memory. You can run this program as many times as

To run your program, use the WORDS shift key





Add a second instruction to your program and LIST your program

20G0TO 18 100 LIST



Here's what your new program will do. The computer will print HI BILL go back to the beginning of your program, print HI BILL go back to the beginning again, print HI BILL go and on until

回 0



Press and hold half until the computer stops.

How many times did you run your program? There's an easy way to find out. Make a counter to keep track of the number of items it ran. RESET your computer, then enter and LIST this

The computer puts a zero in the A counter in line 10.

10 A-0 20 A-1

40 GOTO 20

40 G0TO 20

20 A-3 30 PRINT 3

Now RUN your program and see if it prints all the

You could also change line 10 and print all the

tens from one to one hundred or all the leap years

since your birthday. You can even step backwards

by using negative numbers. RESET and enter this

until you press that H

20 A-2

WHAT THE COMPUTER DOES

n line 20, 1 is added to A. Next, in line 30, the ter prints the number A. Then the compute

pops back to line 20 and repeats

odd numbers between 1 and 12

10FOR X=10 TO 0 STEP-1

mana a 10A = 0 SEPRINT "HI BILL" 40G0TO 20 00 UST EE



This program uses the letter A as a counter. Here s what happens when you run it.

In line 10 the computer puts a zero in the A

In line 20 the computer adds 1 to the A counter. In line 30 the computer prints whatever is between the outstation marks

In line 40 the computer goes back to line 20, adds one more to the A counter, and repeats.

RUN your program and print HI BILL about a dozen times. Then press and hold the hall Dany

圆 0



Each time the computer printed HI BILL is added 1 to the A counter. To find out how many times your program ran, see what number is in the A

PRINT A 80

and enter this program. RESET

10FOR A-1 TO 12

20PRINT A

20NEXT A

面



24

In the example shown here the program ran 12 The computer always lists the tatest version of times and A = 12. your program. This time before you run your pro-gram try to figure out what it will do Now RUN it and When you say print "A" the computer prints the letter A. When you say PRINT A the computer prints see if you were right.

圈

0

COUNTING LOOP

30 PRINT A 40 GOTO 20

BUN

图

the number in the A counter You can also use any other letter you want to be

Now LIST your program again.

圃

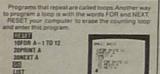


instead of printing Hi BiLL over and over, you can print the number in the A counter. Change line 30 by entering the same line number and adding the new instruction then LIST your program.

SOPRINT A LIST



This time the program loop stopped automatically at 12. LIST your program again.



LIST In line 10 the computer puts 1 in the A counter. In fine 20 A is printed.

The word NEXT in line 30 means add 1 to A and loop back to word FOR NEXT A replaces A-A+1 and GOTO 20 which were used in the last program. Now RUN your program and print the number in A

as the A counter goes from 1 to 12.

20



1651



FOR/NEXT LOOP 10 FOR A-1 TO 12 20 PRINT A

WHAT THE COMPUTER DOES 10 A-1 20 PRINT "1" 30 A-2.GOTO 20 20 PRINT 2 30 A-3:00TD 20 30 A-4 GOTO 20 until A-12

The FOR/NEXT loop adds 1 to the counter. You can also add 2, 3, or any other number, Change line 10 to count by 2's.

18FOR A=1 TD 12 STEP 2 LIST 20

The land i Bilama

**SONEXT X** 40PRINT "BLAST OFFI LIST Now RUN your program. You're at 10 seconds and counting!

20PRINT X

國



**Programming Course** Add these three lines to your program

50FC=7 TOPRINT "10 30 50 80 0 0 50 80000



Lines 50 and 60 change the colors each time your program runs and line 70 plays a tune at the end.

Now for some fun to end your first lesson.

(di)



Bild with mi

You will learn all about colors in lesson 8, and music is explained in lesson 5. The remaining lessons are no more difficult than the one you have just completed.

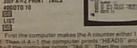
Now go on to lesson two-or skip ahead to any other leason you would like.

29

IF is a computer word that lets you check and see whether something is true or not.

Enter this program

TOA - RND (2) 301F A=2 PRINT "TAILS" 49GOTO 10 60



First the computer makes the A counter either 1 or 2. Then of A = 1 the computer prints "HEADS" and if A = 2 the computer prints "HEADS" and of A = 2 the computer prints "TALS". Then the computer goes back to line 10 and spain sets the A counter to either 1 or 2, and the loop contributes. The computer is using RND (2) to change the

number in the A counter Depending on whether the number is 1 or 2, the computer prints either "HEADS" or "TAILS" Now run the program and see if heads or tails come up more often

60



原門田田田田

and looping back to the beginning of the program

in line 10 the computer will make the A counter

equal to a random number between one and twenty.

in line 20 the computer prints the number in A. Line 30 sends the computer back to line 10. The computer continues picking a random number, printing it.

To expedite your order call our toll-free credit card order line 1-800-521-1534. (Note, this line for orders only).

Random numbers, inputs,

it's often handy to have your computer pick out numbers at random. Here's a program that selects

random numbers between one and twenty.

10A=RND (20)

**20PRINT A** 

DOCUTO 10

Lesson 2

and what if?

Another way to change numbers in a program is to enter them yourself with BIPUT A. When the computer reads INPUT A, it waits for you to enter a number before it continues running the

program.

The letter A after the word INPUT tells the computer which counter to use. In this program the number you input will be stored in the A counter.

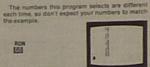
DIESTAY. TOINPUT A



When you run the program, the computer will stop and wait for you to input a number

After you input a number, the computer prints the number you entered and asks for a second number.

RON



Now change line 10 to put random numbers from one to three in the A counts

10A=RND (3) (HET



Now RUN your program and let it list a few num

RUN 0



Follow the suggestions below or try your own

60



The computer prints A to remind you that your input will be stored in the A counter.

You can have the computer remind you in other

Try this change in the program



GO



The largest number your computer's memory can hold is 32787. You just saw what happens when you input a number larger than that

The computer will ask WHAT? when it doesn't understand you. It will als HOW? when it understands but can't do

You have been using INPUT A to put numbers in the A counter. This program inputs numbers into two counters and then prints their sum.

RESET 10INPUT A 20INPUT B 30 PRINT A+B



The first number you INPUT goes in the A counter, and the second number goes in the B counter. The computer prints their sum A+B and loops back to the beginning of your program,

Try adding these numbers together then try some of your own

RUN 60 60



INPUT lets you put numbers into the computer and RND has the computer pick numbers at random. Now you can combine these and build a guessing

TOA-RND (TO) ZOINPUT TOUR GUESS: TB SOLF A - B GOTO 78 SOF A . B PRINT "LESS," 5000TO 20 70PRINT 8, "IS RIGHT!"



This program is longer than your others so we'll look at it step-by-step.
First the computer picks a random number be-been one and ten and stores it in the A counter.

Then you try to guess the number, and your input is stored in the B counter.

Now there are three things that can be true. If A=B then your guess is right. The computer goes to line 70 and prints your surseer and the words IR RIGHT If A is targer than B. A=B. then your guess is too small. The computer prints MORE. If A is less than B. A-cB, your guess is too big and the computer prints

There are two loops in this program if A=B the computer goes to line 70, prints the number you picked and the words IS RIGHTI and then loops back

to the beginning to start a new game.
If you didn't get the right answer the computer loops back to line 20 so you can try again.





Here's how a sample run might look.

You can change line 10 to A=RND (100) and make the game harder or add a counter to keep track of the number of guesses it took. Any of the words inside the quotation marks, like "MORE" can be changed to say whatever you want

Before you try your game on your friends, learn how to win every time. When the computer asks for your guess, just enter the letter A.

Here's a program add-on that you will like Just enter the line numbers as shown and the computer will put your instructions in the right order.

0 SOPRINT "60605-5-504-5-50" 100NT-3



Now try the guessing game again and be ready for

1 STATE OF

### **Programming Course**

### Lesson 3 Subroutines

In writing longer programs you may want to use a shortcut. GOSUB and RETURN make it easy to use the same instruction several places in your program.

This program prints the words ROCK SHEARS and PAPER several times. To avoid having to write these same instructions over and over we will use GOSUB and RETURN.

In line 40 the computer will select 1, 2, or 3 at

random and put this number in the A counter In line 50 the computer will ask for your choice (1, 2 or 3)

and the number you INPUT will go into the B counter

At line 60, the computer will print I PICKED and at line 70 it will GOSUB to line number 200+ A.

If A=1, the computer will GOSUB to line 201 If A=2, it will GOSUB to 202, And if A=3, it will GOSUB

to 203. Depending on the value of the A counter, ROCK, SHEARS, or PAPER will be printed after the

Lines 80 and 90 use the same GOSUB feature to rink your selection. Line 100 loops the program

Enter the first part of your program.

10G05UB 201 20G05UB 202 40G0T0 10 201PRINT "ROCK": RETURN 202PRINT "SHEARS": RETURN 203PRINT "PAPER"; RETURN

Here's what you've added.



Here's what's going to happen. When the computer reads line 10, it will jump to line 201 and continue until it reaches the word RETURN. Then the computor will jump back to line 10 and continue.

The same thing will happen in lines 20 and 30. The computer will jump to the GOSUB instructions and

In line 40 the GOTO instruction tells the computer to go back to line 10 and start the program over

Now RUN this part of your program.

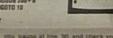




Now add these additional lines to your program,

Your program is now too long to fit on the TV screen. Press and hold the PAUSE key to step the listing at line 90 so you can check it. Press GO to continue the listing.

40A=RND (3) SOMPUT "YOUR CHOICE"B TOGOSUB 200+A SOPRINT "YOU PICKED" 90000118 200+8 100GOTO 10

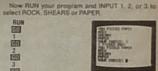


After you pause at line 90 and sheck your list. Then press GO to finish list.



41





Now you can play ROCK, SHEARS, PAPER with your computer. The rules are

ROCK breaks SHEARS SHEARS OUT PAPER PAPER Wraps ROCK

But let's have the computer tell us who won. HALT the program and add that feature with these lines.



PAUSE will stop the list so you can check it





PLUE -

ENTER

If you would like your computer to keep score, just add these lines. The computer will place them in

0 SC=D 32PRINT "HUMAN:"H SAPRINT COMPUTER C 145C=C+1 165H=H+1

If you want to add music, these instructions will do

142PRINT "135 × 105 × 10000" 143NT=3 162PRINT "3050034050000" 153NT=3

Now RUN your program and see if you can beat your computer.





Here's a complete listing of your ROCK, SHEARS. PAPER game,

words / PICKED

H

1

[HI Pi

back to the beginning.









NEWL TOLL FACE ORDER NUMBER (800) 321-1534 This line is staffed with order takers only. Information calls cannot be handled on this line. In Michigan call (313) 994-0300.

### **Programming Course**

### Lesson 4 Strings

of numbers or letters. These are called strings or arrays and you can have a string of numbers, a string of letters or a string of musical notes.

Here's how strings work. The @ character is your computer's symbol for a string. The first item is AT location 1 or @(1), the second item in the string is AT location 2 or @(2), the third item is AT location. 3, or @(3) and so on.

To find the number at location 4 in a string, you would ask for (8(4) like this.

RESET PRINT (m(4)



The fourth location in the string contains a zero Store the number 12 at location 4 like this, then

(4)=12 PRINT (8(4)



This program lists the numbers stored at the first ten locations in the @ string

When you RESET the computer each location in the string is filled with a zero.

10FOR A= 1TO 10 20PRINT A.@(A) 30NEXT A



45

As the A counter advances from 1 to 10, the computer prints 1 and then the number stored at the first location, 2 and the number stored at the second location and so on up to 10 and the tenth number stored in the string.



This program prints a simple graph, using the string to store the numbers to be plotted. Now enter these instructions. (Don't press WORDS before you press GO because no line

10INPUT N 20FOR A+1 TO N

BOLNPUT (B(A)

SOFOR A=1 TO N

70PRINT #1, "5"

SOFOR B+1 TO @(A)

40NEXT A

BONEXTB

SOPRINT

100NEXT A

Each time you press GO the computer follows your instruction, it stores number 22 at string location 7, number 17 at string location 3, and 5 at string



numbers are needed.)



Now RUN your program and see what not are stored at the first 10 string locations.





In tine 10 you will set N equal to the number of items in the graph. The loop in lines 20, 30, and 40 stores the value of each item.

Lines 50 through 100 are a FOR/NEXT loop using the A counter. This loop prints each item in the graph.

Lines 60, 70, and 80 are a smaller loop that counts each item. For example, if @(3) is a 6, this loop will cycle six times and print \$\$\$\$\$5 on the

In the next lesson you will see how strings can be used to store and play back musical notes.

RUN your program and draw a bar graph. Enter the number of items, then the value of each item.

170

E01

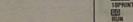
60

回

### **Programming Course**

### Lesson 5 **Electronic Music**

There are two ways you can play music on your computer, MU and PRINT. This program sets MU equal to a random number between 31 and 67. Numbers in this range produce musical notes in your TV



Enter and RUN this random music generator.





To change the speed of the notes adjust the built in note timer, NT HALT your program and set the onto time to 10





With PRINT and the numbers 1 through 7 you can play a musical scale.

10PRINT "1234567"

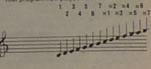


The note timer automatically returns to 3 nenever you RESET.

Here are the notes you just played 2 4 5 1 3 5 7

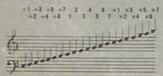
To expand this scale one octave higher just put a multiplication sign in front of each nun





30PRINT"+1+2+3+4+5 EIN EIN

Your computer a complete musical scale is now



Sharps are selected by using an addition (plus) sign in front of the numbers and flats are selected with a subtraction (minus) sign.

40PRINT -+1+2+3+4+5 50PRINT -- 1-2-3-4-5 IND. RUN 100

SEE CHIEF

Always put the sharp or flat sign in front of the octave sign, like this: -- - 2 or + ×4.

Now RESET the computer and play this tune. Slow the music down by making the note time equal to 20.

10PRINT -321233302220

Now build a player plane that stores an entire song and then plays it back. You will enter this program in

two sections so it will be easier to check HICLEAR 20A=0 ADIF A - "PRINT" GOTO 128 SOF X - "CLEAR" GOTO 18 601F K-30A-A-1;GOTO 10 TOF K - "LINE" INPUT NT 6010 30 四

Compare your program with the example a any errors, and then enter the second section

If you would like to know more about the Player

The A counter keeps track of how many notes are

Plans Program, LIST it and read the following sec-

stored in the @ string.
After clearing the screen and setting the A counter

to 0, the computer waits for you to enter a number on the keypad. The K counter is set to this number.

Next the computer checks to see if any words have been entered. If you enter PRINT the program goes

to line 120 to play back the notes.

If you enter CLEAR the computer goes back to the beginning of the program and sets the A counter

to 0. Key 30 is the erase key; and if this is pressed the

new number for NT, the note time.

After checking to see if you have entered any

special words. The computer adds one to the A counter The new note is added to the @ string (line 90) and shows on the TV (line 100). GOTO 30 sends

the computer back to wait for the next input from the

If PRINT is entered, the computer goes to line 120 and starts the playback process. The screen is sleared, and a FOR/NEXT loop is started Re-

member that the A counter keeps track of how many notes there are. This part of the program (lines 130. 140 and 150) loops once for each note until all the

notes have been written on the TV and played.

The word LINE is used in this program to input a

A counter is reduced by one.

keypad (line 30)

BEAMAGE 300HA)=X 100TV=X 110G0T0 30 TROCLEAR TROFOR C-TTO A 150NEXT C 160GGTO 30



Check your program carefully. When you RUN it the screen will on blank.

Enter a scale and play it back with the word PRINT.

RIN 园 PRINT



To change the note time, use the word LINE, enter the new note time and press GO



With this program the GO key is only used after you enter a new note time.

Pley back at the new note time, using PRINT as





**Programming Course** 

Lesson 6 Graphics

With only the words LINE and BOX you can draw an endless variety of graphs and graphic designs on

Here's how LINE works.

10LINE 60,30,1 國





Your TV screen is 159 stots wide and 87 dots high. Zero is in the center. When you run this program, the computer starts in the center of your screen and draws a line to a point that s 60 dots to the right of the center (60) and 30 dots up from the center (30).

Now add these instructions to clear the screen and draw the second line.

Rhythm can be added two ways. You can space between notes or add a 0, depending on the cound

you want. Try these examples and hear the differ-

Notice that the notes hold or continue when you

use a 0. The space key makes a rest. RUN this pro-

This next program combines everything you have learned. Notice how the space and the D's set the

The word CLEAR is used to clear the memory so you can enter a new song. With ERASE you can

Now enter this song. The numbers are shown here in groups of four because there are four beats to a

measure. Enter the numbers in a continuous line. Do

2002

3000 M

+5000

3020

000 m

PRINT

Can't you

early in the morn.

1000 blow-+5000 ing? 4044 Rise up so 1122 enti-+1232 hear the whistle

+6000+7 Can't you

1+71+6 hear the captain

blow your

horn.

back up and change any or all of the notes.

not press GO at the end of each line.

gram again if you want to listen to the difference

10PRINT "240567650310 40 22-22301+60"

EF6141

NT=12

CLEAR

100+5 Eve been 1+512 working on the

3000 rail-1000 road 4004 All the 1020 live-long 3000 day

100+5 I've been

3000 rail-1033 road.

m - Space Key

1+512 work-ing on the

road, Just to 3020 pass the 2030 time a-2000 way.

TESTICIES

SCLEAR 20LINE -50,20,1





This time the computer moved to a point 50 dots to the left of center (-50) and 20 dots up from center (20) to draw the second line

### NCE/COMPUMART - Your Exclusive Bally Connection We Have the Amazing Bally Arcade?"

Now add this instruction

30LINE -40,-30,1 RUS





Now the computer moves to a point that's 40 dots to the left of center (-40) and 30 dots down from

Continue drawing in the lower right section of your screen with this instruction that means 40 to the right (40) and 20 down (-20)

40LINE 40, -20,1 田里田





LIST your program and check to see that you have all the instructions properly entered.



Finally, draw a line back to the center (U.D) to

SOLINE 0,0,1





Now write a program that fills the screen with

TOCLEAR 30Y=RND (88)-45 ADJINE X.Y.1 SOGOTO 20 100



The computer selects random numbers for X and Y. Then it draws a LINE to the point on the TV screen that is X dots right or left of center and Y dots up or down it loops back and picke a new X and Y position.

Now change your program and create "reverse

background color (BC).

8C=22 4080X X.Y.12.30.3

boxes all over your screen. Also change the

The random numbers X and Y position the box on

the screen. The next two numbers, 12 and 30 tell the

computer how many dots wide and tall to make the

box. The last number, 3, reverses as before

RIIN H



S. SEE

The number 1 after LINE means draw a black line. there are four kinds of lines you can make.

LINE X Y2 - White LINE X Y3 - Reverse LINE X.Y4 - None

Change line 40 and find out what "reverse" lines.

0 40LINE X.Y.3

60



HALT your program, CLEAR the screen, and LIST

CLEAR (FE)



Here's how the computer draws lines that match the size of your TV screen.

in line 20 the computer picks a number for X between -80 on the fat left edge of the screen and 73 on the right edge of the screen.

In line 30 the computer selects a random number for Y that's between 44 on the bottom edge of your screen and 43 pn the top edge of your screen.



This next program draws a graph. First it asks how many numbers you have Then it asks for each number. Finally it draws a graph that might look like

with line 50. 0 4080X X.Y.2.5.1 SOMU-RND(20) 50G0T0 20

LIST

RUN



Now make something different. Change the size of the boxes to look like the holes in an IBM card.

Change the last number in line 40 to a 1, which will

make all the boxes black. Add some computer music



Enter and LIST this part of the program.

TOCLEAR 20INPUT -A A 30FOR N=1 TO A 40PRINT N SOINPUT "7"@(N) SOIF @(N) > 87GOTO 48



AUN [EA]

In line 20, the computer asks how many items will the graph have and then stores the answer in A.

The FOR NEXT loop prints the number of each item, stores the value in the string (B (N), and checks to see if the value is over 87. If it is over 87 it will not fit. on the TV screen and the computer goes back to line 40 for a new input.

RUN this portion of the program.





Now add the final section that draws the graph.

SEX=-BS SOCLEAR 100LINE X.(0(1)-44,0 TIDFOR N=1TO A 120LINE X.(R(N)-44,1 13080XX -43 1 7 1 140X=X+150+A-1 150NEXT N

To start drawing the graph (line 80), the computer sets X = -80 (the left edge of your screen), clears the screen, and places the starting point for the series of

lines that make the graph.

The number (@(1) -44 is the vertical distance or number of dots above or below the center of the screen. For example, if the first number in the @ string is 0, then the computer subtracts 44 to place this point on the bottom of the graph.



There are three instructions (120, 130 and 140) in the last FOR/NEXT loop. These instructions are run.

once for each item in the graph
In the line 120 the temputer draws a line from the
last point to the next point. Line 130 places a small
dot at the bottom of the graph.

Line 140 changes the X counter to move each point on the graph a short distance to the right. The graph is 150 dots wide and this distance is divided

equally.

RUN the program and draw a graph with these twelve figures. Don't forget to push GO after each





entry can be larger than 57, and no decimal points are accepted

Now use your graph drawing program to make a graph of your grocery expenses, your company sales, or your favorite stock.

The trigger is called TR(1) and TR(1) = 1 when the trigger is pulled. Add this line to your program so

Now RUN your program, draw some lines, and CLEAR the screen with the trigger.

you can clear the screen by pulling the trigger.

4DIF TR(T)=1 CLEAR

SOGOTO 10

RUN

### **Programming Course** Lesson 7

In this lesson you will learn how to use the hand controls while you are running a program. You will also build a video target game and see how larger programs are made from several small programs

First plug a hand control into the number 1 socket (next to the power sord), and then enter this program.

Now change your program and see what happens

when you turn the knob. The knob on hand control

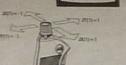
RUN the program and turn the knob

number 1 is called (0e)1).

10PRINT AN(1) 20GOTO 10 FILE RUN



Video Games



With the number 1 hand control centered, JX(1) and JY(1) are zero. Moving the knob to the right makes JX(1)=1, and moving it to the left makes JX(1) = 1 Similarly, moving the knob forward or back makes JY(1) either 1 or -1. Run the program and change the numbers on your screen by m the knob left and right, back and forth. Turning (rotating) the knob has no effect right now.





w use the hand control to move a box on the screen with this program. Two counters (X and Y) keep track of where the box is. When you move the box with the hand controls you will be adding 1 or -T to the counters. RUN the program and move the

田田田 TEX=X+JX(T) 20Y=Y+JY[1 3080X X.Y.10.10.1 40GGTD 10 150





and with the knob turned to the right KN(1)-127. Try to dial your age. This is hard to do because the numbers are very close together on the knob. This program spreads the numbers out and makes

With the knob all the way to the left, KN(1) = - 128

it easier to dial your age.

10PRINT EN(1)+3+42 28G0T0 18 LIST [3]



Here's what you have done to make it easier KNiTI still has a range from - 126 to 127. When you divide KN(1) by 3 this range is reduced to -42 on the left and 42 on the right. When the computer adds 42 to KN 11-3 the final range is 0 on the left and 64 on the





In a similar way you can write an instruction and change the numbers on the diel to match any range. you would like.

RUN this program and see that the knob rotates





Now you can use the hand control to build your own video game. Begin with this portion of the program that makes a blinking target move around on

DELL 1EX=RND(60)-31 207=RND(20) 30CLEAR 40X = X + RND(7) - 4 50Y=Y+RND(7)-4 6080X X.Y.4,4,1 LUST



To expedite your order call our toll-free credit card order line 1-800-821-1534. (Note, this line for orders only).

First the computer picks an X between 30 and 30 and then a Y between 1 and 30. These values for X and Y are in the shaded area of the diagram below.



Lines 40 and 50 cause the target to wander around the screen, in time 40 the computer adds a random number to X. This moves the target to the right or

The number added to X is RND(7) 4. RND(7) is a random number between 1 and 7. Subtracting 4 makes this equal to a random number between -3.

In line 50 RND(7)-4 is added to Y and this moves.

the target up or down.
The BOX is drawn at X and Y and the program-

Now RUN the program and see that it puts a 4 x 4 black box somewhere in the shaded area.

When you pulled the trigger TR(1)=1. The computer did not go back to line 30 at the end of your

member that the X counter moves the target

left and right. The phaser at the bottom of the screen is moved left and right by the K counter. If K – X when you pull the trigger, the laser and the target are lined

Hitting the target exactly is very hard, so line 110 allows a near miss to score, if K is within three dots either side of X, N=15.

The box in line 130 is eighty dots high and one dot wide. This forms the laser beam.

The N counter is set to 1 in line 100. If a hill is scored, N=15. Then the phaser fires N times in the FOR/NEXT loop. For a miss the beam fires once, and

program, it went on to the next instruction

puter what to do when you pull the trigger.

110FK X-3 FK X+3 N=15

20FOR A=1 TO N

68G0T0 10

up, and you've got a hit!

for a hit it fires fifteen times.

13080X K, 0, 1, 80, 3 140MU="V"

RUN



TPANENT PORT

BETTL.

Now add a second box at the bottom of the screen. You will move this box left and right with the knob.

0

70X=XN(1)+2

5080X K. -49,3,6,1 SQLF TR(1)=000TO 30

Notice that you will replace the old line 70 with a

PARTIE .

In line 70 the K counter is set to the value of the knot [KN(1)] divided by two.

Line 80 draws a black box that's three squares wide and eight squares tall. The box can be moved left or right as the K counter changes. The center of the box will be at ~40, near the bottom of your



When you pull the trigger, TR(1)=1. In line 90 the computer goes back to 30 if the trigger is not pulled and TR(1)=0. RUN the program and see if you can move the second box with the knob.





Pull the trigger and see what happens and then LIST your program.

199



Lesson 8

Video Art

**Programming Course** 

MU plays music like PRINT, but nothing is put on

After each shot the program loops back to the very beginning, puts a new target in a random location and then moves it around until you press the trigger New add the next instruction and tell the com-

Now RUN your program and try your luck.





This program could also be a two-player game if you use another hand control instead of the computer to move the target. Number 2, for example, is  $\lambda X(2)$ ,  $\lambda Y(2)$ ,  $\lambda X(2)$  and  $\lambda X(2)$ .

You could also add counters to keep and print the score, color the screen to show a hit, reverse the black and white for "night", and many other

of your computer to create interesting and beautiful

In this lesson you will learn how to use the power



Now enter this program and let the computer Here's a program that shows you all the colors in your computer and prints each color number. select the color while it draws random lines on

10FOR A= 0TD 255 **SOPRINTA** 40NEXT A LIST



The background color (BC) can be any number you select from 0 to 255. In this program the com-puter begins with color number 0 (Black) and shows each color and it's number.

Now RUN your program and see all the colors you can select from





智慧

46X=RND (160)-81 50Y=RND (88)-45

(BC) to black and clears the screen. In line 30 the foreground polor (FC) is picked at random from the 256 possible choices. Then the computer draws a random line and goes back to instruction 30 to pick a new color and draws the next line.



EI FEETE

100C=0 20CLEAR

SOLINE X.Y.3

70GOTO 30



Now use the computer to draw a pattern of lines with this program. You will add colors late

15ENPUT A:CLEAR 20FOR N=79TD -79STEP -A 30LINE - N,43,1 40LINE N, -43,1 SONEXT N 6060TD 10



The computer will ask you to input a number for A. This adjusts the spacing between the diagonal lines. Try a spacing of 3 for a start.











Now try a spacing of 9.





By just changing one number you have created three different tesigns. Now let the computer select the specing. You must HALT the program before you can change it.





Now make the spacing random with this new

10A -- RND /121-01 EAR UST



RUN your program and let your computer change the design.





95.

Complete your design and color it with these additional instructions. 0

SOFOR N=42TO -42STEP -A 701 INF 79. N.1 SQLINE -79, -N.1 E Alle DONEXT N 100FOR A=1TO 500

110NEXT A 170CLEAR 140FC=8C+4+RND (32)×8 150GOTO 10

Lines 60, 70, 60, and 90 draw the second half of

A slight pause is added in lines 100 and 110. This lets you see the pattern clearly before it changes

The background color is selected at random in line 130 and in the next line the foreground color is adjusted to match.





### COLOR WHEEL

Here's a color wheel you will use often because it helps you select colors and their numbers. Moving the number 1 hand control left and right selects the polor. Moving it forward and backward selects the color. Moving it forward and backward searces me intensity Pulling the higher gives you a printout on the screen that shows that particular color number (0 to 13) color intensity (0 to 7) and the computer number (0 to 255). These numbers refer to the background color only the foreignound color only the foreignound color only the foreignound color distances the description of color of the proposition of the color of the second of the color of t

TREM 100-+-20(7) 2007 C-31(-31) 2007 C-30(-31) 2007 C-30(-100F1 01=0 UST

This program uses two counters, C and I to keep track of the color number and the intensity number. Both are adjusted by the hand control. JX(I) con-

trois color and JY(1) controls intensity.

Lines 20 and 30 keep C between 0 and 31. Lines 50 and 60 keep I between 0 and 7.

The background color is set to the color number times eight plus the intensity number

If the trigger is not pulled, the program loops back to line 10. Pulling the trigger prints the numbers in line 100 before looping back to line 10. st

# **PROGRAMS**

Here is an assortment of programs you can enter and run immediately. Pick a short program to begin with, if you have any difficulty return to the Introduc-tion Section, page 4, for assistance.

If you make a mistake in plunctuation, (as in fear-ing out a comma), the computer can not run your instruction. If this happens the computer will print the instruction, on the screen with a question mark in the position of your error, to show you where your

mistake st.

By you are using a program designed for one player.

By you are using a program designed for one player.

By our to use hand, control number one, if it is a program for two players use hand controls numbers one and two only.

If at any time you wish to see your program, press LIST and your computer will show you what you have entered, up to that point.

Tou can change these programs any way you like.
Change the instructions to make the computer do something different or add instructions to it. When sometiming currenterent or adult instructions to it. When you add instructions to your program, number the new line to it between the existing lines. For example, if you want to, add an instruction after line 30 and before line 40, number your instruction line 33 (or any number between 31 and 29).

### Computer Games

Try your skill as the computer moves the target. The first player's knob moves the phaser left or right and the



You can make this a two-player game by changing these lines

40X=X+JX(2)x3

50Y-Y+JY/71x3

Player two controls the target while player one shoots.

### ANTI-AIRCRAFT GUN

Player one moves the gun with the knob and shoots with the tripper.

Player Iwo moves the plane right or left with JX(2) and controls the speed with the knot



240 PRINT -100 840 YOU HE 

270 C-U (1/45 U-V-1) 200 Hr (1/47-1) 200 Hr (1 

101

### ROCK/SHEAR/PAPER

Enter 1, 2, or 3 to select Rock, Shears, or Paper Press GO and see if you beat the computer at this classic





DEDER THY BASIC NOW

### **Electronic Music**

COMPOSITION IN A

Enter the notes you wish to hear and then enter PRINT. The computer will play the first note; the first and second the first, second, and third; and so on until it plays all



COMPOSITION A-Z

PLAYER PIANO

Bappipes

-70×2×105

-70×7×104 ×405654 504401

405854

507300

×300 ×300 ×200

600 000 70×1

+×10×2

20+12

0032 2000 ×30+×2×3 ×30+×2×3 ×10×10

104

1 (COPPOSITION 6-2 10 CLESP 20 6-6-0 (26)+64 30 NO:0 50 CETTO 20



45×2×154 606605 45×2×164

45×2×164

766-6

506 70×1 ×400 ×300 ×300 ×200

600 70×5 ×40 6

00+23

20+12

×3000 ×4×3×27

×107×1

0×1×2×3

60×1×20×3 ×4×2×1654

COMPOSITION IN F

Just enter the total number of notes, press GO and the computer will write and play a composition. Enter the number 15, for a start. The computer takes a while to work out this details, so you will have a short wall. Longer compositions can take several minutes to propers.



PLAYER PIANO

March 5000 +400+4 500 034+4 50×10 500	
034+4 50×10 500	
	0
	05
7000 6223 400	0
3003 4000 822	2
4070 500-5 500	0
034+4 5000 +4	
5000 034+4 50)	
×290×1 ×1000 014	
×1000 7006 500	
05×1×4 ×3000 ×30	12.
×1000 0.	
Marine's themp	

	Marine's Hymn		
2	13 500×1	5850	5050
2	500×1	5034	5050
	AZ90	1000	9013
	5050	5050	500×1
	5034 1000	5050	4290
	1000	00×17	5040
	6040	5006	50×17
	6040	5×100	5000
	8013	5050	5050
	500 × 1	5034	5000
	500×1 5000	5000	7000
	×1000		THE RESERVED TO SERVED TO
	The state of the s		

PLAYER PIANO

### Golden Slippers

COLOR WAR

SPIRAL

COLDS NO

TO meeto -estor -

F 1: 10 200 100

See the electronic music section for complete details. Your controls for this program are:

PRINT to play the notes you entered.

ERASE to back up and remove notes from the screen.

LINE to enter a new note time (Press GO after you enter

the number.)
CLEAR to clear the notes from memory so that you can enter new music to be played.

100 FDE AVITO 500 100 FDE AVITO 500 100 FDE AVITO 100 100 FDE AVIT

PLAYER PIANO

GAND SO

COLLOW WAR.

One player tree to till the screen with colored bones, while the other was to excee the pathern. The triggers are the pathern. The triggers are the pathern to the second to your trigger in the same position as your opponents, the screen 180s. If your beginning the strong trigger is in this account you have the pathern and the trigger in the trigger in the pathern and the pathern and the trigger in the pathern and the pathern and the trigger in the pathern and the background.

m - REST (USE SPACE KEY)

45
60606545
60606m45
5060655-7
60505m34
50505434
50505#34
50-7m6050
4000000m
10000#40
-70000000

50000m-70 5m6m5m5m 4000000m 40000m - 70 ×20 × 10 - 740m - ×30 × 20 × 150m 606060-70 ×20×10-740m SDOOREN W 10

606060-70 ×10000m-×30 ×20×20×10×10

20000m50 -7060-79×10 ×20×10-740m 50000m×10 -×30×20×150m ×8000 ×556×3 ×2000

PLAYER PIANO

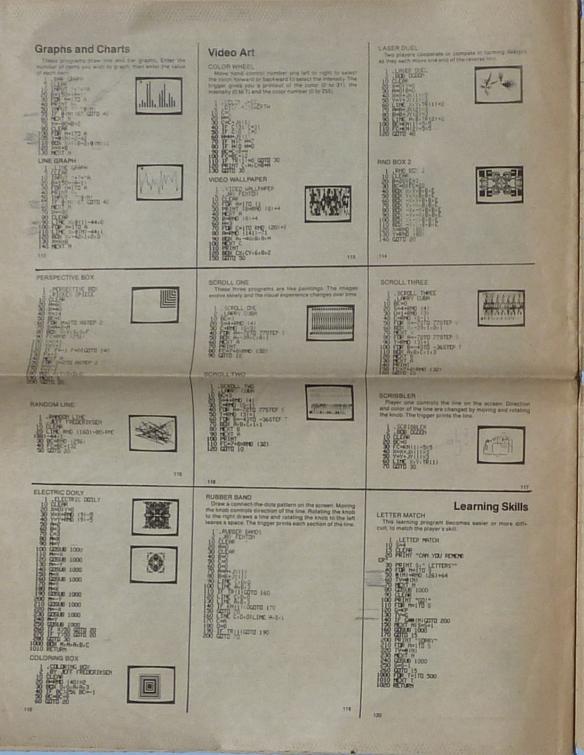
Stars and Stripes Forever

30+23 30+23 2002 DO+×Z×3 ×2000 -×30×2×1 ×5×1×Z×3

COMPOSITION IN L

First enter the number of the notes in the verse, then enter the notes to be played. By entering a legal number of 10, Press 200 and about 20 notes as a start, then press PRINT. The computer will add one note and auditact one note, keeping the legal constant.





NEW! TOLL FREE ORDER NUMBER (200) 521-7534 This line is staffed with order takers only. Information calls cannot be handled on this line. In Michigan call (313) 594-3200.

### Terms and Symbols BOXXXAB1 RINI SEL TRICKI means draw a black box that's centered at the point X,Y. The box is A dots wide and B dots high. You can draw BOX X, YA, B, 1 black box

100 Prof Park - 18. ---100 OUTD 150

MATH QUIZ

200 CONTO 190

NUMBER MATCH O CLUBER PRICH SO WILL TO SERVE (10) GESSI-B

Computer Words

BOX X YA.B.2 white box BOX X YA.B.3 reverse box BOX X,YA,B,4 no box

CLEAR s clear the screen. ERASE

means forget the last key you pushed. This doesn't work if the last key was RUN, H. or GO. FOR/TO/NEXT/STEP

These words all work together to make a loop, topon A with testing a 20PRINT A.

This loop prints 1, 4, 7, 10, 13, 16.

means go. Press GO after each instruction. GO + 10

means go to the next line and add 10 to the line

means go to line number 20 and continue running the program:

means go to line number 260 and continue running the program until the word RETURN, then return to the instruction that follows GOSUB 200.

neans halt the program and return control to you.

means check and see whether something is true or not. IF A=5 GOTO 20 means if the number in the A counter is 5, go to line 20; if it isn'1 5 then go to the next instruction.

means stop and wait for you to enter a number which is put into the A counter when you press

INPUT "HOW MANY?" A

means print "HOW MANY?" on the screen and then input a number for the A counter.

means draw a black line on the screen to the

LINE X.Y.1 black line LINE X, 72 white line LINE X Y3 reverse line

LINE X. Y.4 no line

means print on the TV all the instructions now in the computer after you press GO.

means start with line number 100 and list.

means start with line 100 and list the next five

PAUSE means stop the computer. You can pause while running or listing a program. Press any key to

PRINT "A"

ns print the character A on the screen. PRINTA

print the value of the A counter on the screen

is the number of unused memory locations PX(X,Y)

the dot at location X. 1 is black, 0 is white. RETURN

means return to the line following the word GOSUB. The computer remembers which GOSUB

to return to. means pick a random number between one and

the number in the A counter. RND (5)\*

means pick a random number between one and RUN

neans run the program after you press GO.

SPACE

means leave a space on the screen. Spaces don't matter to the computer, but they can make your instructions easier for you to read.

The comma means continue, in PRINT A, the comma after A means continue printing on the

The semi-colon means the same thing as a line

number. 10PRINT A: GOTO 30 is the same as

10PRINT A 20GOTO 30

You can use the semi-colon to put two or more instructions on the same line.

means "is greater than " as 5>3

means "is less than," as in 6<12.

means "is equal to."

means put the number 5 in the A counter.

means "not equal to."

. means "REMARK to follow"; it will not affect the program Inputs, Outputs, and Controls

is a number that matches the position of the number one hand control. Left JX(1)=-1 Center JX(1)=0

Right JX(1)=1

JYIII is a number that matches the position of the

number one hand control.
Forward JY(1)=1
Center JY(1)=0 Back JY(1)--1

TR(1)

is a number that matches the trigger on the number one hand control. Pulled TR(1)=1 Not Pulled TR(1)=0

is a number that matches the position of the knob on hand control number one.

LIST

RETURN

understand you.

means wait until you press a key on the keypad. Each key has a number and the number of the key you press is stored in the A counter. You can see what key you pressed with the instruction.

The following control words are used with the

means tape print on record data from memory.

means tape input or playback data from tane to

seans tape list or playback date on the screen.

means lape return or end record or playback

The computer says WHAT? when it doesn't

The computer asks HOW? when it understands

what you want but can not figure out how to do it.

The computer says SORRY! when there isn't enough room in its memory to do what you want:

Bally Audio Tape Interface Accessory.

Control Words

Error Messages

means put a letter or other character on the TV. The character is the one that matches the number in the A counter See KP

means play a note in the TV speaker that matches the number in A counter MIII-AA

means play a note in the TV speaker that's the same as the note you hear when you press the

is the number of the foreground color.

is the number of the background solor

is the note time. After RESET the note time is set at three. Note times are slower if NT is larger

is the number that places the cursor (black square) left prright.

is the number that places the cursor (black

means leave A spaces and then print the number in the B counter

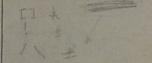
Arithmetic

Your computer is designed to work the multiplication and division portions of a problem first, and the addition and subtraction portions last.

3x5-2=13(not 9)

Parenthesis will change this order 3x(5-2)=9 (not 13)

Whole numbers only are used. 18-2=7 (pot 71)



# **Exciting Program Cartridges**

### **ACTION/SKILL SERIES**

### CASSETTE RECORDER

Cat No. BMK-CAS-M2522

Price \$55.00

AC/Battery Recorder selected to work with computer data in audio format. Features automatic stop at end of tape, automatic record level control, wide audio bandwidth, built-in condenser mike for voice, and a digital tape counter for quick program location. It is all you need for the Kansas City Standard format used in the Bally Cassette Interface. sed in the Bally Cassette Interface.

### VIDEOCADE ROM CARTRIDGE SOFTWARE

### **FUNCTIONAL SERIES**

### BALLY BASIC -

Allows you to enter and run programs as de-scribed in this brochure.

Price \$49.95 Cat No. MSC-CAS-6002

# BALLY BASIC CASSETTE

INTERFACE —
Store and retrieve the programs you enter into the Arcade using the Bally Basic cartridge. You simply break out the cover for the light per power connector and plug the interface into this connector and into the connector for joystick number three. The other side of the interface connects to a standard castette tape recorder microphone and earphone jacks. The commands to run the cassette interface are simple and easy to use:

1. To save a program type a colon (1) followed

ette interface are simple and easy to use:
To save a program type a colon (:) followed by the word PRINT.
To see if the tip saved, add a semicolon (:) and the word LIST to the above command.
To see if it was saved on the tape (or to get by a program you don't want to lose), type a colon followed by the word LIST and the tape is contents will be listed on the TV.
To load a program from tape into the memory, type a colon followed by the word INPUT.
To get a program to bring itself back from

ra program to bring itself back from the table modes, type a color followed by the word RETURN. The program will list as it loads so that you're sure it is loading. Cat. No. MSC-PTS-IOINTF Price \$49.95

VIDEOCADE 2001 -280 ZZZap and Dodgem (one player games)

Cat. No. MSC-CAS-2001 Price \$19.95

Do you have a steady hand behind the wheel? You'll get your chance to find out when you play 280 ZZZap.

The following display will appear on your TV screen showing speed, mileage and time:

The object of this game is to accumulate as much mileage as possible by traveling as fast as you can without crashing into the white road pegs. Every time you crash, you lose

Do you think your driving ability is Grand Prix caliber? Play Dodgem and you'll get your answer. The object of Dodgem (like 280 ZZZap) is to obtain as much mileage as you can, but you have an additional hazard of crashing into the other cars in the race (and they are terrible drivers).

### VIDEOCADE 2002 -

Sea Wolf, Bombardier (one player games) Cat. No. MSC-CAS-2002 Price \$19.95

### Sea Wolf and Bombardier

These arcade games are the most popular in history. Boats float across your TV screen at different speeds. You then try to torpedo the subs using your pistol grips. Bombardier re-places your boats with airplanes and your subs with cities.

### VIDEOCADE 2003 -

Panzer Attack and Commie Baron (two player

Cat. No. MSC-CAS-2003

Two tanks navigate around obstacles and fire at each other with lethal intent. Complete with the sounds of the tank motors and artillery.

Biglianes are the weapoids used to vanquent your opponent in this game. Do loops, hide in the clouds, score by shooting the other guy out of the sky.

### **EDUCATION SERIES**

VIDEOCADE 4001 -

Bingo Math and Speed Math (two or one player)

Cat. No. MSC-CAS-4001

Price \$19.95

Price \$24.95

Bingo Math (two players)
Each player is presented with a 5 by 5 Bingo
board which is filled with numbers to be used
as answers to the math problems shown at the
bottom of the screen. You score an asterisk
on the board when you move the cursor to the
correct answer and pull the trigger before
your opponent. When you line up 5 asterisks. you score a BINGO

cal skills by giving you thirty problems and a ten second interval each in which to answer.

Each second of the ten second period is Each second of the ten second period is worth one point. Answering the problem in less than the initial 5 second interval will give you 10 points. As your score increases, the difficulty of the problems increases. Conversely, if you continually give a wrong answer, the following problems will have the same answer or will be a variation of the same appliem.

VIDEOCADE 4002 — Letter Match, Word Hunt, and Scramble (two to four players)

Cat. No. MSC-CAS-4002

Letter Match (two to four players)
This game borrows from the long running TV game, Concentration. You get to set the difficulty by deciding how many letters are used in the game. Once you start, the object is to choose a pair of squares which hide the same letter. If you match, you score a point; if you don't, your opponent gets a chance to match a pair.

Word Hunt (two to four players)
You and your fellow contestants try to make a
word out of the randomly generated choices



### STRATEGY SERIES

### VIDEOCADE 5002

Price \$24.95 Cat. No. MSC-CAS-5002

# Blackisck, Poker and Acey-Deucy (one to

four players)
These familiar games are great fun experienced card players and novices alike. The cards appear in color showing their suit for easy identification. The action is fast and if you're not prudent, you'll quickly lose your electronic shirt.

### SPORTS SERIES

### VIDEOCADE 3001 -

Tornado Baseball, Tennis, Hockey and Hand-ball (two or four players).

Cat No. MSC-CAS-3001

Tornado Baseball (two players)
Your team runs onto the field to take their positions, batter up. As the pitcher, you can throw fast balls, slow balls, curves outside or inside, balls or strikes. You can even change a pitch after you throw it. The batter pulls his trigger to swing the bat. If the ball is hit, the pitcher can rotate the knob to position the outfielders to catch the ball. Double plays and walks are possible and just like the reat thing, every time you think you're throwing your best pitch, the batter hits a home run.

Two or four players actually run around the count to hit the ball. If it gets by you, the opposing player(s) score a point.

Hockey Much like tennis but with goals at each end of

Handbell Also like tennis except that the players are standing in the same end of the court.

The Bally Arcade<sup>®</sup> is just one of the many microcomputer products which NCE/Compumart has IN STOCK NOW!! Check the appropriate box on the order form to receive one of our giant catalogs and receive future mailings.

To expedite your order call our toll-free credit card order line 1-800-521-1534. (Note, this line for orders only).

Price \$19.95

### NCE/Compumart

Main Street, P.O. Box 8610 - Dept. CC68 or, Michigan 48107 (2) (313) 994-3200

IMPORTANTI II You Use Your Own Purchase Order This Number MUST Appear On Your Purchase Order ... C686BA

# ORDERED BY

SHIP TO Jen	ie it different than Ordered	evi .		One No Shall Date Vid Check No
Addres				For quickelf shipment include bank physic poster money of Bank Americans IV (as or Master Charge account number, Signalure
unitity	Description	Each	Total	CREDIT APPLICATION

Quantity	Description	Each	Total
	Yorai for Greeks		
	Add \$1 00 for or Charge for Jacon \$10-00	or probery	
	Add 4% for Shipping Hand	long, gott	
	Add 4% Sales Tex Michigan Repolants		
	TOTAL AMOUNT		1 46

Add my name to your mailing list to receive your Free summer and winter catalogs and regular monthly mailings.

		ш	_
		8	
Name of Street		8	
	91	8	
			8
	=1		
money and			
money and	(ec.)		-

Bank Name	
Alberts	
Tatephone I	
Person la Contier	
Account No.	
ust say charge it! Which card	E
ust say charge it! Which card	- E
PLEASE FILL IN HELDIN FO	OR CATOIT CARD DEBERS
	OR CATOIT CARD DEBERS

# COMPLETE TINY BASIC MANUALINSIDE

NCE/Compumart

(313) 994-3200 (313) 994-4446

1250 N. Main Street P.O. Box 8610 STORE Ann Arbor, MI 48107

Bulk Rate U.S. Postage PAID Ann Arbor, MI Permit No. 304