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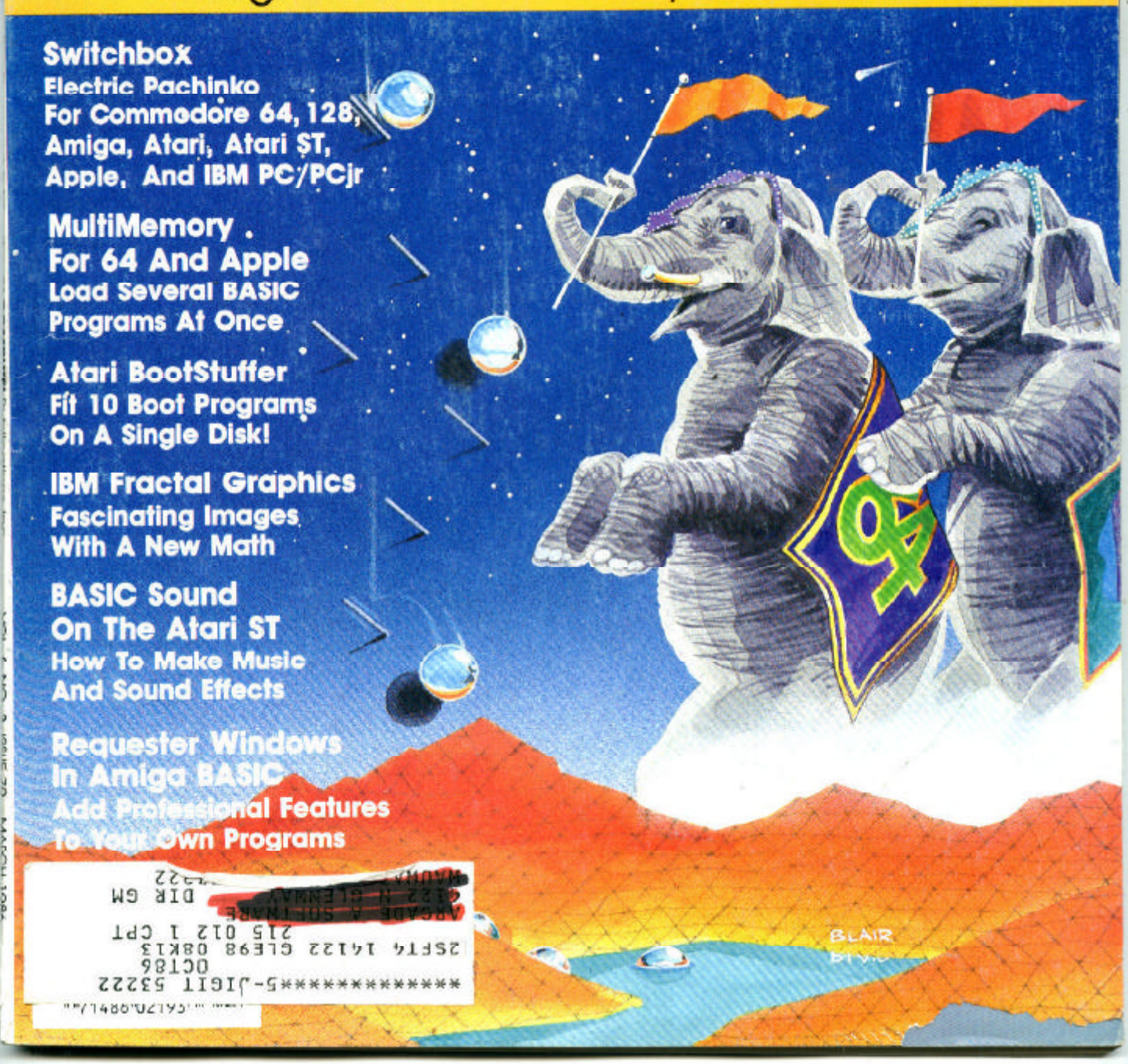

COMPUTE!

MARCH 1986
VOLUME 8
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FEATURES

REVIEWS

COLUMNS AND DEPARTMENTS

THE JOURNAL

NOTE: See page 124 before typing in programs.

AP Apple, **Mac** Macintosh, **AT** Atari, **ST,** Atari ST, **V** VIC-20, **64** Commodore 64, **+4** Commodore Plus/4, **16** Commodore 16, **128** Commodore 128, **P** PET/CBM, **TI** Texas Instruments, **PC** IBM PC, **PCjr** IBM PCjr, **AM** Amiga. *General interest.

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is a logical operator which in this case connects the value of ST with the value of the expression (I<>B).

Typing STAND(I<>B) instead of ST AND(I<>B) makes the computer see a third reserved word in the line—the numeric function TAN (TANgent). Since TAN, like other functions, must be followed by something inside parentheses, the computer responds with a syntax error message when it finds the letter D instead of a left parenthesis. That's a nutshell explanation for the error. But you may still wonder why the computer sees TAN inside the word STAND. After all, the words ST and AND seem to be there as well.

The short program below shows exactly why TAN appears. Don't worry about the fact that line 10 looks strange. We're not going to execute that line—it's only there to let us examine how BASIC handles these reserved words.

```
10 :ST:TAN:AND::STAND::
20 PRINT CHR$(14);CHR$(147)
30 FOR J=0 TO 19:POKE 1024+J,
   PEEK(2049+J):POKE 55296+J,1:NEXT
```

After typing the program, enter GOTO 20 and press RETURN (don't start the program with RUN). Line 30 PEEKs the first 20 bytes of BASIC program space and displays their contents on the screen, showing you how the computer stores line 10 in memory. As you'll see, the reserved variable ST is stored as the ASCII characters S and T, exactly what you typed in. This is the way all variable names are stored. However, both TAN and AND are changed into one-byte tokens, *which appear here as reverse video characters. Most BASIC words are tokenized—compressed into a single numeric value—to save space and make BASIC run faster. Between the double colons we placed in the line as markers, you can see how the computer handles the character sequence S-T-A-N-D. When it tokenizes a BASIC line, the computer reads from left to right, just as you do. The initial S in STAND is left unchanged, since it isn't part of a keyword that can be tokenized. Next, the computer finds the characters T-A-N, which it replaces with the one-character token for TAN. That leaves the character D. which is also left unchanged.*

After TAN is tokenized, the computer can't possibly see ST or AND (T and AN are missing), so the line can't work as intended. In this case, it was coincidental that the combination of two reserved words made a third reserved word. However, the same thing would happen if you omitted a space between ST and the logical operator OR. When the computer scans the characters S-T-O-R, it changes the embedded keyword TO into a token. For similar reasons you should be careful not to use variable names like TOP, NOTE, or FORK, which also contain embedded BASIC words (TO, NOT, and FOR).

Arabian Atari Revisited

In the December 1985 "Readers' Feedback" you printed a letter from Nour Abdullah Al-Rasheed asking how to make the cursor on his Atari computer move from right to left. He may want to consider a hardware solution. The images displayed by a television set or monitor are placed on the screen by vertical and horizontal deflection circuits. An experienced electronics technician who's familiar with video displays should be able to examine the schematic for that device and determine which wires control horizontal deflection. By rewiring that circuit, the technician could bring about the desired change. This modification should probably be considered permanent; and it may require some adjustment of normally untouched internal controls to get a satisfactory picture. While it might be possible to install a switch that would let you flip back and forth between display modes, the technician would have to use special insulating spacers and take pains to protect the operator from the very high voltages involved.

Jim Taylor

Thanks to you and the other readers who suggested this solution. As you point out, the circuitry involved carries extremely high voltages that can cause very serious injury, so this type of modification must be performed by a fully qualified technician. *Unless you fit that category, don't even consider poking around inside your TV or monitor. You may cancel any warranty which is in effect, and run a serious risk of injuring yourself as well as the device.*

Refurbishing Tip

I really appreciate the article "Refurbish Your 64" from the December issue of COMPUTE!. Here is an additional convenience feature. If you change line 3470 to read as follows, you won't have to enter the direct mode statements (POKE 55,0:POKE 56,160:POKE 643,160:POKE 644,160:NEW) after the program is run.

```
3470 READ A0:IF A0=99999 THEN
   POKE253,253:SYS49194:POKE643,0
   :POKE644,160:NEW
```

Albert Alarie

Thanks for the tip.

TI Music

I have seen TI-99/4A programs that create music with DATA statements. Please show me how this is done.

Tim Huemmer

Though the DATA statements play a part in the process, the TI actually makes sound with CALL SOUND. Here's the simplest form of the statement:

CALL SOUND(*d,f,v*)

The first value in parentheses (d) sets the duration *for the sound. The second value (f) sets the* frequency, *and the third (v) sets the* volume. *CALL SOUND lets you produce as many as four tones at once, so with a statement like CALL SOUND (d,f1,v1,f2,v2,f3,v3) it's possible to create a three-note chord. In this case, f1, f2, and f3 represent the frequencies of the three notes, and v1, v2, and v3 represent their respective volumes. Of course, in a program you'd substitute real numbers or variables inside the parameters.*

Where do DATA statements come into the picture? In most cases, it's simplest to read the music data from DATA statements and assign it to variables inside parentheses in CALL SOUND. This saves program space and makes the music data easier to understand and modify. Here's a short example of how it's done:

```
100 V=5
110 FOR I=1 TO 5
120 READ D,F1,F2,F3
130 CALL SOUND(D,F1,V,F2,V,F3,V)
140 NEXT I
150 DATA 1500,262,330,390
160 DATA 250,262,349,440
170 DATA 1500,262,349,415
180 DATA 250,277,349,415
190 DATA 1500,277,370,466
200 DATA 250,262,392,466
```

This program plays five three-note chords. Line 100 assigns the value 5 to the variable V. Since the CALL SOUND statement uses V to set the volume for every note, it stays the same throughout the program. Line 120 READs in new DATA items for each chord, setting the duration with the variable D and the three note frequencies with variables F1, F2, and F3. The frequency values for the notes are found in the appendix in the TI User's Reference Guide. *You can read more about TI sound in* COMPUTE!'s Programmer's Reference Guide to the TI-99/4A *by C. Regena. Several of her monthly columns in* COMPUTE! *have also covered this topic.*

Commodore B128 Users' Group

I was glad to see that Jim Butterfield's dynamic keyboard articles (COMPUTE!, October–December 1985) included some references to the Commodore B128 (called the B700 in Europe). As you may know, the international B128 user group is sending out 13,000 newsletter/membership applications to B128 owners in North America and B700 users in Europe. The group currently has 1,500 members, and membership is rapidly increasing. Our disk library is also off to a good start, and offers a variety of public domain

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Programming the TI

C. Regena

IF-THEN Statements

IF-THEN statements are *conditional transfer* commands that make it seem as if computers can think. IF a specified condition is true, THEN the program skips to a certain line number elsewhere in the program; otherwise, the program simply continues to the next line as usual. TI BASIC also allows an ELSE statement as part of IF-THEN. It takes this form:

IF *condition* THEN *line1* ELSE *line2*

IF the condition is true, THEN the computer goes to *line1*, or ELSE the computer goes to *line2*. If the optional ELSE is omitted, control merely passes to the following line. Here's a common example:

```
200 IF SCORE=10 THEN 900
210 PRINT SCORE
```

This statement says that if the value of the variable SCORE is equal to 10, then the program should continue at line 900. Otherwise, the program continues to the next line and prints the score.

You can use the other relational operators to define conditions in IF-THEN statements, too:

```
300 IF A<B THEN 700
400 IF X>Y THEN 200 ELSE 580
500 IF J<>8 THEN 800
```

In each case, the computer evaluates the condition—the expression between the words IF and THEN. If the expression is true, it has the value of −1. If the expression is false, it has the value of zero. Therefore, a statement such as this is valid:

```
320 IF A THEN 400
```

This doesn't look like the more common relational examples, but it implies that if A is equal to −1, then the program goes to line 400.

The condition may look more complex. If you keep in mind that true is −1 and false is zero, you can usually follow the logic. An example is:

```
150 IF (A=B)+C THEN 200
```

The part within the parentheses (A=B) is evaluated first. If A equals B, then the expression is −1 (true); if A does not equal B, the expression is zero (false). This value is then added to the value for C. If the result is −1, the condition is true and control passes to line 200.

Simulating AND/OR

Most other versions of BASIC allow the use of AND and OR in IF-THEN expressions. TI BASIC does not, but we can translate. Again, keep in mind that −1 indicates true.

Suppose we want to test the conditions A=B and C=D. If both are true (IF A=B AND C=D), then we want the program to continue at line 700. Here's one way to do this:

```
IF (A=B)+(C=D)=-2 THEN 700
```

If both conditions are true, each will yield −1 values, so the total will be −2.

Here's an equivalent way to make this test:

```
IF -(A=B)*(C=D) THEN 700
```

Notice that −1 times −1 is +1, so the negative sign in front converts the whole expression to −1 for true.

The word OR is used when one condition OR the other condition is true, but not both:

```
IF (X<Y) OR (X>Z) THEN 300
```

This can be translated to TI BASIC like this:

```
IF (X<Y)+(X>Z) THEN 300
```

Program control transfers to line 300 only if the expression evaluates to −1. This happens if only one of the conditions in parentheses is true (and thus −1) and the other is false (equal to zero).

Even more complex IF-THEN statements are possible by considering different combinations of + and * in evaluating conditions. Suppose after a CALL KEY statement the user may press either ENTER or any of the number keys. Here's the easiest way to set up the logic:

```
200 CALL KEY(0,K,S)
210 IF K=13 THEN 500
220 IF K<48 THEN 200
230 IF K>57 THEN 200
```

Or you can combine the IF statements like this:

```
210 IF (K<>13)+(K<48)+(K>57) THEN
  200
```

Algebra Drill

The sample program this month is a simple drill for beginning algebra students who are learning to add signed numbers. This program illustrates the use of several kinds of IF-THEN statements.

Lines 200 and 230 show two ways to check the length of the numbers to see if a randomly chosen number is negative. If necessary, a plus sign is added to the number.

Lines 280 and 300 determine the answer depending on the value of SUM.

If the answer is zero, line 360 skips the procedure for choosing the plus or minus sign in the answer. If the student needs to choose the sign, line 420 makes sure he or she presses either the plus sign or the minus sign. All other keys are ignored. Line 490 then receives the number keys pressed.

Line 530 checks the student's answer and branches appropriately. Line 590 waits for the student to press the ENTER key before continuing.

If you wish to save typing effort, you can obtain a copy of "Adding Signed Numbers" by sending a blank cassette or disk, a stamped, self-addressed mailer, and $3 to:

C. Regena
P.O. Box 1502
Cedar City, UT 84720

Adding Signed Numbers

```
100 REM  ADDING SIGNED NU
    MBERS
110 CALL CLEAR
```

```
120 PRINT "ADDING SIGNED
    NUMBERS":::
130 SCORE=0
140 FOR PROB=1 TO 10
150 T$=""
160 RANDOMIZE
170 A=INT(19*RND)-9
180 B=INT(19*RND)-9
190 A$=STR$(A)
200 IF LEN(A$)=2 THEN 220
210 A$="+"&A$
220 B$=STR$(B)
230 IF LEN(B$)>1 THEN 250
240 B$="+"&B$
250 PRINT "ADD"
260 SUM=A+B
270 S$=STR$(SUM)
280 IF SUM<>0 THEN 300
290 S$=" "&S$
300 IF SUM<=0 THEN 320
310 S$="+"&S$
320 TA=8-LEN(S$)
330 PRINT :TAB(4);A$
340 PRINT :TAB(4);B$
350 PRINT TAB(3);"---":::
360 IF SUM=0 THEN 450
370 CALL KEY(0,K,S)
380 CALL HCHAR(23,TA,45)
390 CALL HCHAR(23,TA,32)
400 CALL HCHAR(23,TA,43)
410 CALL HCHAR(23,TA,32)
420 IF (K<>43)+(K<>45)=-2
    THEN 370
430 CALL HCHAR(23.TA.K)
440 T$=CHR$(K)
450 FOR J=1 TO LEN(S$)-1
460 CALL KEY(0,K,S)
470 CALL HCHAR(23,TA+J,63
    )
480 CALL HCHAR(23,TA+J,32
    )
490 IF (K<48)+(K>57)THEN
    460
500 CALL HCHAR(23,TA+J,K)
510 T$=T$&CHR$(K)
520 NEXT J
530 IF SUM<>VAL(T$)THEN 5
    60
540 PRINT ::"CORRECT!"
550 SCORE=SCORE+1
560 PRINT :"THE SUM IS ";
    S$
570 PRINT ::"PRESS <ENTER
    >."
580 CALL KEY(0,K,S)
590 IF K<>13 THEN 580
600 CALL CLEAR
610 NEXT PROB
620 PRINT "OUT OF 10 PROB
    LEMS,"
630 PRINT :"YOUR SCORE IS
    ";SCORE:::
640 END                    ©
```

News & Products

Of Nordic Gods On The 64

Eurosoft International, a software publisher that specializes in introducing European software products to North America, has announced the release of *Valhalla*. Winner of the 1984 British Microcomputing Game of the Year Award, *Valhalla* is an animated, interactive game involving Nordic mythology. Thirty-six mythological characters are featured, each with a different personality. The player interacts with each of these in pursuit of the lost treasure of Valhalla. The mythological characters, shown using the "MoviSoft" animation technique, can either help or hinder your quest depending on their disposition and your actions.

Valhalla is available for the Commodore 64 at a list price of $24.95.

Eurosoft International, 114 East Ave., Norwalk, CT 06851

Circle Reader Service Number 200.

IBM PC MIDI Editor

MIDI Ensemble, a new software package from Sight & Sound for owners of musical equipment with a MIDI interface, consists of three main program modules: Recorder, Event Editor, and Phrase Editor. The Recorder module can be used for recording and overdubbing tracks; the Event Editor enables precise editing of pitch, start time, duration, and key-strike velocity; and the Phrase Editor allows copying, moving, deleting, combining and modifying musical phrases of any length. Also included is a text and graphics editor for creating diagrams or comments with a song file.

MIDI Ensemble runs on the IBM PC; list price, $495.

Sight & Sound Software, 3200 S. 166th St., New Berlin, WI 53151

Circle Reader Service Number 201.

Word Processor For Atari ST

Written by the developers of *AtariWriter* and *AtariWriter Plus*, *Regent Word* is a sophisticated, easy-to-use word processing program for the Atari ST. It features 80-column editing, function key-driven commands, local and global searches, multiple type fonts, print preview, and a communications package. It retails for $49.95.

Regent Spell is an expandable spelling checker for *Regent Word*. The program is shipped with 30,000 words; another 30,000 can be added. Misspelled words are highlighted in context. Commands can be issued via the ST's mouse or though single keystrokes. It also retails for $49.95.

Regent Software is also in the process of designing *Regent Base*, a database management program for small business use.

Regent Software, 7131 Owensmouth, #45A, Canoga Park, CA 91303

Circle Reader Service Number 202.

Home Inventory Package For The 64

What's Our Worth?, from ADITA Enterprises, is a program designed to help you do a complete inventory of your personal belongings. Screen instructions and prompts make it very easy to enter items into inventory, read all items, search for specific information, change or delete items, and make a backup data disk.

What's Our Worth? is available by mail order, and retails for $19.95.

ADITA Enterprises, 116 Bermondsey Way N.W., Calgary, Alberta, Canada T3K 1V4.

Circle Reader Service Number 203.

Educational Enchantment

Sunburst has released *The Enchanted Forest*, a mathematics learning program with a fairy tale setting for grades four and up. The game begins when the witch of the forest transforms all of the forest animals into geometric shapes of different sizes and colors and hides them in ponds. Players travel through

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