

# SYNTAX

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## COLOR TS2000, 16K TS1500, MODEM THIS SUMMER

Timex reports it will begin sales this August of TS2000s with 16K or 48K RAM, color/sound capabilities and bank-switching. The 16K version will sell for \$149.95; the 48K for \$199.95, says Timex. Both versions contain 24K ROM, including 8K ROM for cartridge capabilities and bank-switching. With bank-switching the computer can potentially use up to 256 blocks of 64K memory one at a time. Color capabilities include an eight-color range, flash command and brightness control. Sound broadcasts in an eight-octave scale.

Users can individually address 256 horizontal and 192 vertical dots that provide high resolution graphics. The TS2000 features a display area of 24 lines with up to 64 characters and allows monitor connections.

Other features include a built-in time clock, moveable keys, upper and lower case letters, repeat feature on all 40 keys, and instant-load software cartridges that plug into the computer, at \$12.95 to \$29.95 each. TS2000s will run ZX Spectrum cassettes.

Sales of \$79.95 16K TS1500s with moveable keys will begin in July with compatible modems and software cartridges available in August. Existing Timex peripherals will run with both new computers. TS1500s will sell with a rewritten, user-friendly manual, says Timex' Sue Mahoney.

## TS1000 IN CANADA THIS JUNE

Timex Canada plans to market TS1000s sometime in June, with customer sales starting in late June or early July. The company projects an initial 100,000 unit release, says a Timex spokesperson. Timex Canada says it also plans a Canadian nationwide toll-free Sinclair information line sometime in June and a newsletter similar to US Timex' Ramblings.

**MEMOPAK-TS2040 CURE--SEE PAGE 17**

## NEW PRODUCTS AND SERVICES

Secrets of Better BASIC by Ernest Mau offers programming, debugging methods, contains five appendices of BASIC information. \$14.95. Microcomputers Can Be Kid Stuff by Anna Mae Walsh teaches kids BASIC, Pilot, games, problem solving. Pbk, \$8.95. (Books do not use Sinclair BASIC.) Hayden Book Co., 50 Essex St, Rochelle Park, NJ 07662.

MY TYPE teaches touch typing on your Big ZX81 Keyboard. Mistakes, WPM listed at end of each lesson. \$8 per 16K tape. Daydesign, 790 E. Big Beaver Rd., Troy, MI 48084, 313/528-0469.

COMPUWIZ SOFTWARE offers discount for new customers--3 tapes with 8 games for \$12 plus \$2 P&H until Dec., CA residents add 6.5% tax. COMPUWIZ SOFTWARE, POB 390078, Mt. View, CA 94039.

UCLA Extension offers Introduction to Computer Programming with the Timex 1000, a course for adults with no programming background, by Roger Palmer, UCLA School of Library and Information Science. Course notes from CIBBARELLI, 11684 Ventura Blvd., Suite 295, Studio City, CA 91604, 213/760-8110.

Free to teachers--TEC News, a quarterly newsletter for Timex educational applications. Includes getting started, teacher reports, lesson plans, programming tips. From TS Educators User Grp., Texas Wesleyan College and Timex Computer Corp. M. Mark Wasicsko, Associate Dean, School of Education, TWC, Ft. Worth, TX 76105.

Hi-Res Printer Graphics 16K tape uses machine code routines to print high resolution graphic plots of 192x256 pixels. High speed line drawing routine and demonstration programs. \$10 PP. G. Russell, RD 1 Box 539, Centre Hall, PA 16828.

TAX BREAKS FOR COMPUTER BUYERS by Vernon Jacobs, CPA, gives info on how to deduct up to \$5,000 yearly for computer use in business, investment management, program development, some personal uses. 26-pages, \$9. Research Press, Box 8137-P, Prairie Village, KS 66208.

Universal Software Market Identifier, an international software product registration system, identifies software publisher, software package, computer model, minimum hardware configuration. USMI Market Directory with listings distributed to software dealers. Software publishers listed free. Updated bimonthly. Technique Learning, 40 Cedar St., Dobbs Ferry, NY 10522, 914/693-8100.

SofTec offers three computer-aided design programs to automatically calculate component and circuit values for amplifier and power supply configurations. All CAD programs in BASIC. \$10.95 amplifier CAD, \$12.95 power supply CAD. SofTec, POB 432, Fairport, NY 14450. Send SASE for free brochure.

DJM Software Grand Opening offer, Graphit! Pie Chart Generator 16K \$9.95, 16K and Memopak HRG \$14.95. Each \$5 off regular price. Opening June 15. Orders must be postmarked by July 15. DJM Software Co., 2214 Horine Road, Festus, MO 63028.

1983 Software Writer's Market by Christine Leu contains information on selling software and books for Timex Sinclair markets. Lists publishers, shows, distributors, manufacturers. \$19.95, \$2 P&H, Kern Publications, 190 Duck Hill Rd., POB 1029, Duxbury, MA 02332.

SIFT, Statistical Interactive System For the TS1000 and ZX81, includes statistical routines such as linear regression, T-tests, analysis of variance. \$25. COMPUCRAFT, POB 149, Hinsdale, NH 03451.

Avoid losing programs during crashes with Flexible Ribbon. Stops movement between computer and RAM pack during white-outs or crashes. Comes with six inch ribbon and two connectors. \$15, DK'Tronics, Unit 2, Shire Hill Industrial Estate, Saffron Walden, Essex CB11 3AQ, UK.

Computer Control Center work station eliminates cable clutter, provides sleek, professional look to computer area. Holds RAM packs, tapes, 13" screen. 20"x14 1/2". \$29.95. TIMEWORKS, 405 Lake Cook Rd., Bldg. A, Deerfield, IL 60015, 312/291-9200.

Sinclair Full Travel Keyboard with high quality keyswitching. \$54.81. Bulk order discounts over 25. Toptronics, 4018-A W. Chandler Ave., Santa Ana, CA 92704.

User group discounts on printers, paper, ribbons. Call collect with user group name for special buying status. Midwest Micro-Peripherals, 119 S. Springfield, St. Paris, OH 43072, 513/663-5488.

BUY-PHONE electronic yellow pages, free videotext service for West Los Angeles area. Contains over 10,000 listings of products, services, entertainment. BUY-PHONE, POB 29307, Los Angeles, CA 90027, 213/279-1074. Access number 213/474-0270.

Heart of Texas Computer Show, Sept. 16-18, includes Sinclair products, emphasis on small business systems, educational applications and medical office use. Bud Houston, Heart of Texas, POB 12094, San Antonio, TX 78212, 512/226-4636.

Music/Sounds Package includes instructions for broadcasting music and spaceship noises to a nearby radio. No hardware mods required. Controls ZX/TS RF interference. Five BASIC program listings \$3. Florida Creations, Dept. P, Box 16422, Jacksonville, FL 32245.

Hand-held DBH Converter easily converts dec, hex and binary, no need to load a program. \$3.50 assembled, includes P&H. Rois Harder, 995 Shakespeare Ave, N. Vancouver, BC, Canada V7K 1E7, 604/980-4167.

Computer Show & Office Equipment Expositions, includes 4-hr. seminar using TS1000, \$89.95 for seminar and TS1000. Mid-Atlantic, Washington Convention Center, Wash. DC, Oct. 27-30; Southeast, Civic Center, Atlanta, GA, Dec. 8-11. Computer Expositions, POB 3315, Annapolis, MD 21403, 800/368-2066, 800/492-0192 in MD.

Increase your ZX/TS library--join an exchange club, find a Compu-Pal to share ideas. ZX/TS Software Exchange Club, Box 5021, Suite 100, Spring Hill, FL 33526. Send large SASE for prompt reply.

BUSYNESS, a new magazine for business/professional TS users. Subscribers, new products, reviews needed. Shaun Ralston, Busyness, POB 421773, San Francisco, CA 94101, 415/861-7741.

ONLINE '83 conference for database users, Palmer House, Chicago, Oct. 10-12. Jean-Paul Emard, Online, Inc., 11 Tannery Ln., Weston, CT 06883, 203/227-8466.

Four fast-action 16K MC games, NFLX Football, Storm Lander, Miner's Revenge, Super Slide. \$9.95 each, includes P&H. SyncWare, POB 5177, El Monte, CA 91734.

Save \$100 from Memotech when you order any product and printer package together. Memotech Corp., 7550 W. Yale Ave., Denver, CO 80227, 800/662-0949. Until June 30 only.

MAA, Multi-Attribute Analysis, a decision aid to help make complex decisions, \$19.95, \$2 P&H, Stuart Software, 25381-G Alicia Pky, Suite 316, Laguna Hills, CA 92653.

## SYNTAX ERRORS

Add line 250 COPY to BANNER WRITER (May83) to send message to printer.

The correct address for QZX newsletter from the Sinclair Amateur Radio Users' Group (Dec.82) is: Alex Burr, K5XY, Box 3D, Physics Dept., New Mexico State University, Las Cruces, NM 88003.

## LPRINT BUG BYPASS FOR TS2040

LPRINT prints some wrongprint on the TS2040, due to an 8K ROM problem. SYNTAX (Dear Editor, May 83) describes a hardware solution. We found a way to bypass the bug with a simple programming trick. In this demo program, lines 20-40 print the error, 0.0XYZ1. Lines 50-60 avoid this error to get the correct printout, 0.0001.

```
10 LET N=0.00001
20 LPRINT N
30 LPRINT 0.00001
40 LPRINT STR$ 0.00001
50 LET N#=STR$ N
60 LPRINT N#
```

Results: .0XYZ1  
.0XYZ1  
.0XYZ1  
.00001

Use this two-line procedure for any number from 0.01-0.00001: Assign the expression to STR\$, then LPRINT the string.

STR\$ does not always work with other string functions used with LPRINT. These five LPRINT commands print the wrong results or give incorrect error messages:

LPRINT (STR\$ 100)(2) gives 100  
(should be 0, gives error code 3).  
LPRINT LEN STR\$ 10 gives 100  
(should be 2).  
LPRINT STR\$ 100 AND 0 gives 100  
(should be blank line).  
LPRINT VAL STR\$ 100 gives 100  
(correct but stops with error C).  
LPRINT CODE STR\$ 100 gives 1000  
(should be 29).

ZX Users Group of New York, NYC

## PROGRAM IMPROVEMENTS

Avoid confusion between the variable LEN and function LEN in lines 30 and 50 of BANNER WRITER (May 83) with these two steps: DELETE line 30 and EDIT line 50 to read FOR L=1 TO LEN M\$. (Use the LEN function on the K key.)

Robert L. Doud, Woodland, CA

## ZX/TS USERS' GROUPS

Check our latest list of new user's groups to find one in your area. To check for a local group that's not listed, or to announce a new group, call 617/456-3661 or write SYNTAX, RD 2, Box 457, Harvard, MA 01451. Send SASE if requesting name of group in your area.

**Montreal:** Montreal Area Users Club, Serge Montmarquette, 509 Notre-Dame, Joliette, P. Que., Canada J6E 3H6, 514/756-6688.

**St. Louis, MO:** Jefferson County Users Group (subgroup of St. Louis Users Group). Larry Ross, 937-4550. All computers, non-users welcome.

**Orleans, MA:** The Wizards of Cod, Richard Andrews, POB 234, So. Orleans, MA 02662, 617/255-4290.

**Southeast Florida:** ZX Southeast Region, Ralph M. Coletti, 869 Levitt Parkway, Rockledge, FL 32955.

**Hurlburt Field, FL:** Tom Bair, 12 Mayo St., Hurlburt Field, FL 32544.

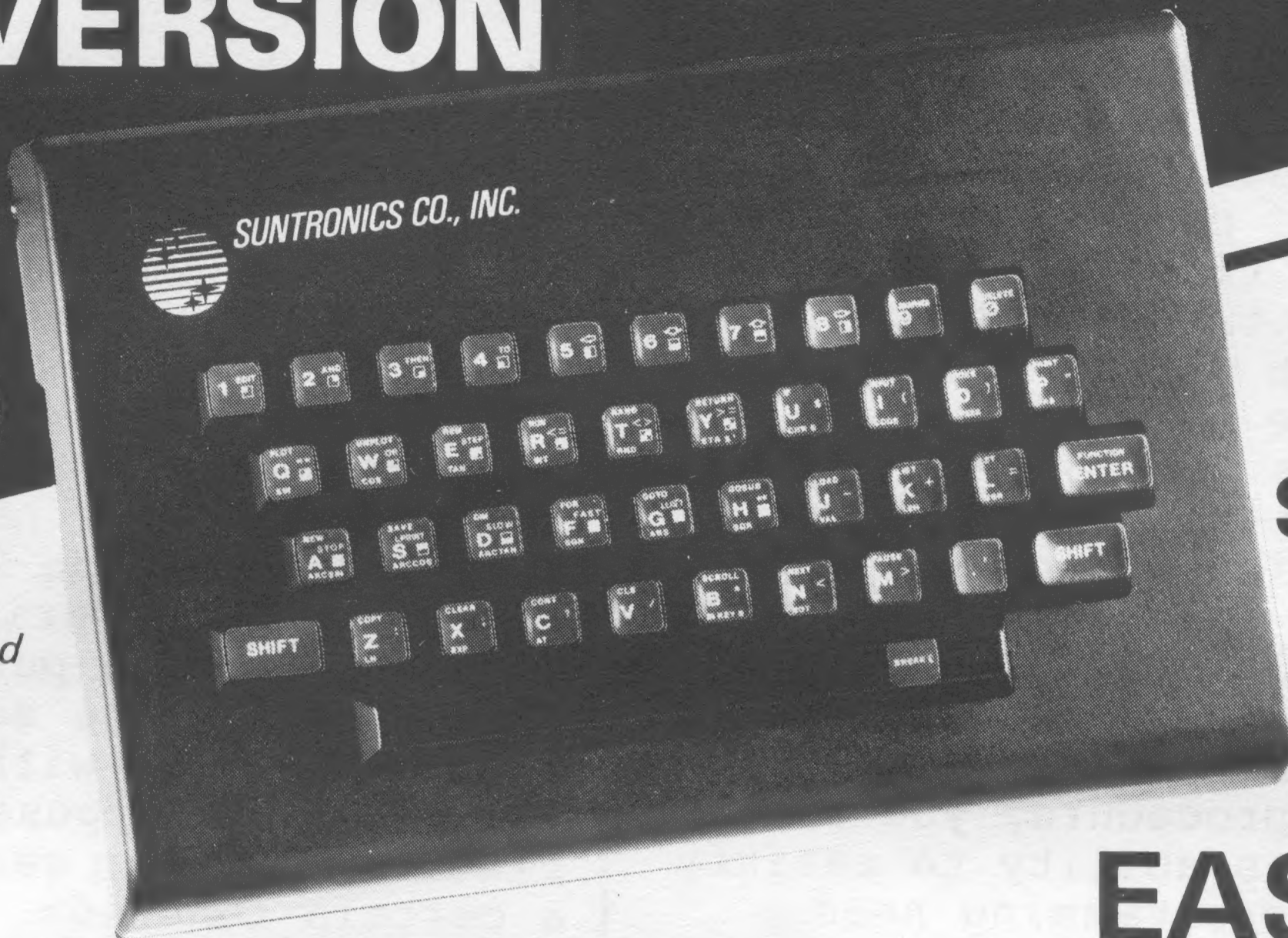
**Dallas, TX:** T. Taylor, 2936 Longmeade, Farmers Branch, TX 75234.

**Kansas City, MO:** Col. Ralph H. Goodell, Jr., 913/381-9443 or 913/648-6696.

**Springfield, MA:** If interested in forming users group, contact M. Dale White, 20 Frost St., Springfield, MA 01105, 413/739-2350.

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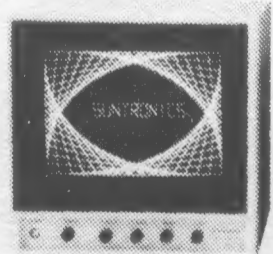


1. Remove 4 screws securing ZX-81 case and remove 2 screws holding ZX-81 PCB.
2. Unplug the 2 ribbon cables from the ZX-81 keyboard.
3. Plug the 2 ribbon cables into the connectors on the KD-81 keyboard.
4. Attach the ZX-81 PCB to the KD-81 case with 2 screws, close case and install remaining 4 screws into the bottom of the KD-81 Keyboard case ...

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## DEFINING FUNCTIONS ON THE ZX/TS

You sit down to type in a non-Sinclair BASIC program into your ZX/TS only to find in the listing a FN(A) statement. Should you forget about the rest of the program? No. We'll simulate a defining functions feature. This versatile approach is actually better than other micros' function defining feature.

Assigning the function to a string and calling it by using the VAL command executes the function. Although the ZX/TS manual briefly explains the procedure, you can use and expand this ability to satisfy a variety of programming needs.

For those not familiar with the VAL command, it takes the actual numeric value of any numbers or numeric phrases in a string variable. The ZX/TS expression evaluator looks at the formula assigned to the string and performs all the incorporated calculations. Example: If your borrowed program

contains these lines:

```
100 DEF FN(A)=X/.023*SIN(X-2)
200 LET X=X-FN(A)
```

change them to:

```
100 LET A$="X/.023*SIN (X-2)"
200 LET X=X-VAL (A$)
```

Like other computers' FN(A) statement, when you call the function on your ZX/TS the variables in the formulas must have some pre-assigned value; no 0 default exists for unassigned variables.

You can also put USR calls (machine language subroutine call) in the function without affecting the answer. Suppose you want to clear the screen each time you call a certain function. Try this demo program to see it work:

```
5 LET X=10
10 FOR S=1 TO 21
20 PRINT "
30 NEXT S
100 LET A$="X/.023*SIN (X-2)+0
*USR 2602"
105 LET A$=A$ ( TO 6)
110 LET B=VAL A$
120 PRINT "A$=";B
```

THE INS AND OUTS OF THE

# TIMEX TS1000 & ZX81



DON THOMASSON

A HARDWARE MANUAL FOR TS1000 & ZX81

## At last a reference manual which covers all the hardware aspects of the TS1000 - includes complete circuit diagrams!

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Dealer orders and queries: 800/251-5900  
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can be phoned in: 615/361-3738

### BOOKS:

- 25895 The Complete Basic Course \$34.50
- 25957 Machine Language Programming Made Simple \$14.95
- 20922 The Complete Timex/Sinclair ROM Disassembly \$19.95
- 26025 Not Only 30 Programs \$9.95
- 25913 Understanding Your ZX81 ROM \$14.95
- 51539 Ins and Outs \$12.95

### TAPES:

- 13941 Gamestape 1: 11 Programs - 1K \$14.95

- 13942 Gamestape 2: 3 Games - 16K \$14.95
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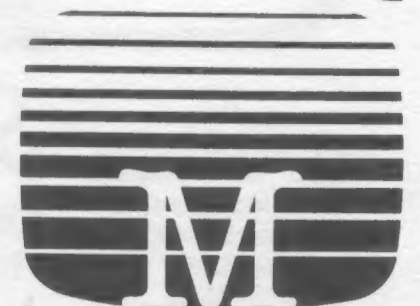
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STX6

# MELBOURNE HOUSE SOFTWARE



(RUN it in SLOW or you'll miss the show.) Lines 10-30 fill the screen with black lines. Line 100 assigns a value to variable A\$. Line 110 tells the computer to calculate the VALUE of A\$. It performs the math in the first part of the formula. When it comes to the USR 2602, it goes to the machine language routine at that memory location. The 8K ROM clear screen routine resides at location 2602. In ZX/TS BASIC, a USR command returns the contents of the BC registers. So if you enter 100 PRINT USR 2602 and RUN, the screen clears and whatever value is in the BC registers prints on the screen. So we multiply the USR command by 0 to nullify the number it would otherwise return.

Save time and space by including conditional statements in your functions. The ZX/TS expression evaluator scans the function, interpreting true conditionals as 1 and false conditionals as 0. You don't have to check everything with IF-THENS. For example:

```
100 LET G=10
200 LET X=3
300 LET Y=G*X
400 LET A$=(Y<X)*2+2**(Y>(G))"
500 PRINT CHR$ VAL$ A$;"AAAA"
```

Since the first expression is false (30 is not less than 3), the ZX/TS evaluates it as 0 and multiplies 0 by 2. The second expression is true (30 is greater than 13), so it evaluates as 1. The computer raises 2 to the first power, yielding 2, and adds it to results of the previous operation, 0. Line 500 thus prints the character whose code is 2, the graphic symbol on the 2 key, before the string "AAAA".

If you know ZX/TS BASIC fairly well, you probably understand its string slicing ability. Suppose A\$="ABCDEFG" and you want to print the first four characters of A\$. You enter 100 PRINT A\$( TO 4). Using this principle you can execute certain parts or sections of a function exclusively. For example,

add to our previous program:

```
105 LET A$=A$( TO 6)
```

Now the computer evaluates only the first six characters of A\$. Your answer in line 120 is different, and you don't get the screen clearing, because everything after the first six characters is sliced off. Be sure not to slice a function after an operation symbol.

Dave Straub, Petaluma, CA

### DISABLE AUTO-LIST

Automatic line listing of programs takes too much time when you type in long programs. This routine tricks Sinclair's auto-list mechanism into malfunctioning so new program lines do not appear on the screen. Disable your computer's auto-list function using this procedure with or without a loaded program. If you have machine code stored in line 1, you must move it to line 2 with POKE 16510,2. The MC's starting address then increases by nine, so call it with USR 16523 instead of USR 16514.

1. Press LIST then ENTER.
2. Type 1 REM 123 then ENTER.
3. Type POKE 16514,118 then ENTER.
4. Type POKE 16515,118 then ENTER.
5. Type POKE 16516,118 then ENTER.

Now press ENTER to try to LIST. The only thing that should appear is 1 REM. You can see program lines after line 1 by entering LIST line number.

Restart auto-list by DELETing line 1. Or LIST N, where N is any program line number greater than 1. Then POKE 16419,N. Press ENTER and the program will auto-list. (The program will not auto-list by pressing LIST then ENTER.) Disable auto-list again with POKE 16419,0 or LIST then ENTER. The top program line number in automatic listings lives at address 16419.

Gary S. Preston, Glade Hill, VA

MODULES FOR:

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## NEW FEATURES ON TS2000, TS1500

Advance publicity photos from Timex show some interesting features of the new TS2000 and TS1500.

TS2000 functions changed from Sinclair's ZX Spectrum (TS2000 UK predecessor) include:

Key	TS2000	Spectrum
P	RESET	Ⓢ
A	FREE	~
S	STICK	
F	ON ERR	{
G	SOUND	}

Silver-colored TS2000s sport a full space bar, a larger ENTER key and a separate BREAK key. A 3" covered compartment holds a TCC--Timex Command Cartridge (plug-in ROM cartridge). The keys appear hard, unlike Spectrum's soft keys.

Another photo shows the TS1500 case--now rectangular, resembling the TS2000, but smaller. Keyboard layout seems identical to the TS1000's, but with moveable keys that look like Spectrum's soft keys.

## CHECKERS FOR TWO--8K/16K

Play this game just like board checkers. To automatically SAVE the program, type in the listing, start the recorder and press RUN then ENTER. The checkerboard takes about 20 seconds to appear. Press S as soon as the board appears (before the display blinks and the "L" input appears). The program saves under "CHECK."

At the bottom, a square shows which player moves next. Moving a piece takes 4 steps. First, type the coordinates (first horizontal, then vertical) of the starting and landing squares for each move. Second, press either 1 or 2. Press 1 for single moves and final jumps of multiple moves. Press 2 for all but the last jump of multiple moves (You must enter each jump of a multiple move separately). Third, hit space for a regular move or type C to crown your piece when you get to your opponent's baseline. Last, ENTER the move. For example: type FGEHL ENTER to move a black checker from space FG to space EH one single move (shown by l) without a crown (shown by the space).

Make sure your move is correct before ENTERing. The program stops with an error code after some wrong entries forcing you to reset to the beginning of the game.

CHECKERS uses about 6K RAM.

Thomas Shields, Franklin, NC

```

5 FAST
6 LET A=0
7 LET B=0
8 LET C=0
9 LET D=0
10 LET E=0
11 LET F=0
12 LET G=0
13 LET H=0
14 LET I=0
15 LET J=0
16 LET K=0
17 LET L=0
18 LET M=0
19 LET N=0
20 LET O=0
21 LET P=0
22 LET Q=0
23 LET R=0
24 LET S=0
25 LET T=0
26 LET U=0
27 LET V=0
28 LET W=0
29 LET X=0
30 LET Y=0
31 LET Z=0
32 IF Z=0 THEN GOTO 3000
33 SLOW
34 PRINT AT 19,24;B#
35 INPUT X#
36 LET X#=X#(1 TO 5)

```



```

116 PRINT AT VAL X$(1),VAL X$(2)
117 IF X$(3)="H" OR X$(5)="C" T
HEN GOTO 200
118 PRINT AT VAL X$(3),VAL X$(4)
) ;B#
150 IF VAL X$(3)>VAL X$(1)+2 AN
D VAL X$(4)>VAL X$(2) THEN PRINT
AT VAL X$(1)+2,VAL X$(2)+2;" "
160 IF VAL X$(3)>VAL X$(1)+2 AN
D VAL X$(4)<VAL X$(2) THEN PRINT
AT VAL X$(1)+2,VAL X$(2)-2;" "
165 IF X$(5)="2" THEN GOTO 100
195 GOTO 285
200 PRINT AT VAL X$(3),VAL X$(4)
) ;C#
205 IF VAL X$(3)<VAL X$(1)-2 AN
D VAL X$(2)<VAL X$(4) THEN PRINT
AT VAL X$(1)-2,VAL X$(2)+2;" "
210 IF VAL X$(3)<VAL X$(1)-2 AN
D VAL X$(2)>VAL X$(4) THEN PRINT
AT VAL X$(1)-2,VAL X$(2)-2;" "
220 IF VAL X$(3)>VAL X$(1)+2 AN
D VAL X$(4)>VAL X$(2) THEN PRINT
AT VAL X$(1)+2,VAL X$(2)+2;" "
230 IF VAL X$(3)>VAL X$(1)+2 AN
D VAL X$(4)<VAL X$(2) THEN PRINT
AT VAL X$(1)+2,VAL X$(2)-2;" "
280 IF X$(5)="2" THEN GOTO 100
285 PRINT AT 19,24);A#
288 INPUT 0#
290 LET 0#=0#(1 TO 6)
300 PRINT AT VAL 0$(1),VAL 0$(2)
) ;" "
303 IF 0$(3)="A" OR 0$(5)="C" T
HEN GOTO 300
305 PRINT AT VAL 0$(3),VAL 0$(4)
) ;A#
400 IF VAL 0$(3)<VAL 0$(1)-2 AN
D VAL 0$(2)<VAL 0$(4) THEN PRINT
AT VAL 0$(1)-2,VAL 0$(2)+2;" "
410 IF VAL 0$(3)<VAL 0$(1)-2 AN
D VAL 0$(2)>VAL 0$(4) THEN PRINT
AT VAL 0$(1)-2,VAL 0$(2)-2;" "
415 IF 0$(5)="2" THEN GOTO 285
470 GOTO 100
500 PRINT AT VAL 0$(3),VAL 0$(4)
) ;D#
510 IF VAL 0$(3)<VAL 0$(1)-2 AN
D VAL 0$(2)<VAL 0$(4) THEN PRINT
AT VAL 0$(1)-2,VAL 0$(2)+2;" "
520 IF VAL 0$(3)<VAL 0$(1)-2 AN
D VAL 0$(2)>VAL 0$(4) THEN PRINT
AT VAL 0$(1)-2,VAL 0$(2)-2;" "
530 IF VAL 0$(3)>VAL 0$(1)+2 AN
D VAL 0$(4)>VAL 0$(2) THEN PRINT
AT VAL 0$(1)+2,VAL 0$(2)+2;" "
540 IF VAL 0$(3)>VAL 0$(1)+2 AN
D VAL 0$(4)<VAL 0$(2) THEN PRINT
AT VAL 0$(1)+2,VAL 0$(2)-2;" "
545 IF 0$(5)="2" THEN GOTO 285
550 GOTO 100
6000 PRINT AT 2,A;"A";TAB B;"B";
TAB C;"C";TAB D;"D";TAB E;"E";TA
B F;"F";TAB G;"G";TAB H;"H"
6010 PRINT AT A,2;"A";AT B,2;"B"
;AT C,2;"C";AT D,2;"D";AT E,2;"E"
;AT F,2;"F";AT G,2;"G";AT H,2;"
H"
6020 LET Z=Z+1
6110 PRINT AT A,B;B#;TAB D;B#;TA
B F;B#;TAB H;B#
6120 PRINT AT B,A;B#;TAB C;B#;TA
B E;B#;TAB G;B#

```

```

6130 PRINT AT C,B;B#;TAB D;B#;TA
B F;B#;TAB H;B#
6160 PRINT AT F,A;A#;TAB C;A#;TA
B E;A#;TAB G;A#
6170 PRINT AT G,B;A#;TAB D;A#;TA
B F;A#;TAB H;A#
6180 PRINT AT H,A;A#;TAB C;A#;TA
B E;A#;TAB G;A#
4050 LET A=10
4055 LET B=40
4090 LET Y=3
4100 FOR X=A TO B STEP 8
4120 PLOT X,Y
4150 NEXT X
4155 LET Y=Y+1
4160 IF Y=7 OR Y=15 OR Y=23 THEN
LET Y=Y+4
4165 IF Y=31 THEN LET A=A+1
4170 IF Y=31 THEN LET B=B+1
4175 IF Y=31 THEN LET Y=3
4175 IF A=17 THEN GOTO 4220
4200 GOTO 4100
4220 LET A=9
4230 LET B=36
4240 LET Y=7
4250 FOR X=A TO B STEP 8
4260 PLOT X,Y
4270 NEXT X
4280 LET Y=Y+1
4285 IF Y=11 OR Y=19 OR Y=27 THE
N LET Y=Y+4
4290 IF Y=35 THEN LET A=A+1
4295 IF Y=35 THEN LET B=B+1
4300 IF Y=35 THEN LET Y=7
4310 IF A=13 THEN GOTO 4345
4320 GOTO 4250

```

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```
4345 LET Y=2
4350 FOR X=3 TO 41
4355 PLOT X,Y
4358 IF X=41 AND Y=35 THEN GOTO
4400
4360 IF X=41 THEN LET Y=35
4380 NEXT X
4390 GOTO 4350
4400 LET X=3
4410 FOR Y=2 TO 35
4420 PLOT X,Y
4425 IF Y=35 AND X=41 THEN GOTO
4450
4430 IF Y=35 THEN LET X=41
4435 IF Y=35 THEN GOTO 4410
4450 NEXT Y
4450 PRINT AT 19,26;"PLAYS";AT 2
0,26;"NOW"
4455 PRINT AT 0,23;"TO MOVE";AT
1,25;"TYPE";AT 2,23;"CO-ORDS"
4470 PRINT AT 5,22;"HORZ-VERT";A
T 6,25;"FROM";AT 8,22;"HORZ-VERT
";AT 9,26;"TO"
4475 PRINT AT 11,22;"NOW 1, 2 IF
";AT 12,22;"MULTI-MOVE";AT 14,22
;"SPACE=REG.";AT 15,22;"C=CROWN"
4480 PRINT AT 17,22;"NOW ENTER"
4485 PRINT AT 21,0;" "
4490 PRINT AT 0,0;"* AND * = CRO
UNS"
4570 PAUSE 500
4580 IF INKEY$="S" THEN SAVE "CH
EC"
4585 LET Z=Z+1
4590 GOTO 20
SYNTACTIC SUM: 31686, 8K ROM
```

## BOOK REVIEW

Title: Your Timex Sinclair 1000 and ZX81  
Author: Douglas Hergert  
Publisher: SYBEX Inc.  
2344 Sixth St.  
Berkeley, CA 94710  
Price: \$6.95

As the latest and best of the new wave of Timexploitation books, Your Timex Sinclair 1000 and ZX81 provides clear information about Timex computers. Hergert leads you by the hand from unpacking the computer to programming complex string functions. His patient writing style and apparent familiarity with the computer make this a required Timex Sinclair reference book.

One key to Hergert's success lies in his tidy use of demonstration programs. This elegant example introduces line numbers, keywords, PRINT, PRINT AT, functions, DELETE, editing, FOR-NEXT loops and graphics in just 13 lines.

```
10 PRINT AT 21,0;"WHAT IS YOUR
NAME?"
20 INPUT N$
30 CLS
35 FAST
40 FOR I=1 TO 224
50 PRINT "███";N$(1);
60 NEXT I
65 SLOW
70 PRINT AT 9,7;"** HELLO**"
80 FOR I=1 TO LEN N$
90 PRINT CHR$(CODE N$(I) +12
8);
100 NEXT I
110 PRINT " **"
```

© SYBEX, Inc. 1983

(Note: line 50 is graphic S and H; line 70 is inverse HELLO.)

Other programs show considerable stand-alone utility as well as simplifying graphics and strings. SYBEX's computer book experience helped produce a well designed format. An effective teaching tool shows what the TV screen looks like after a demonstration program runs.

Hergert's work serves as a valuable asset for any TS owner.

John Connell, Neptune Beach, FL

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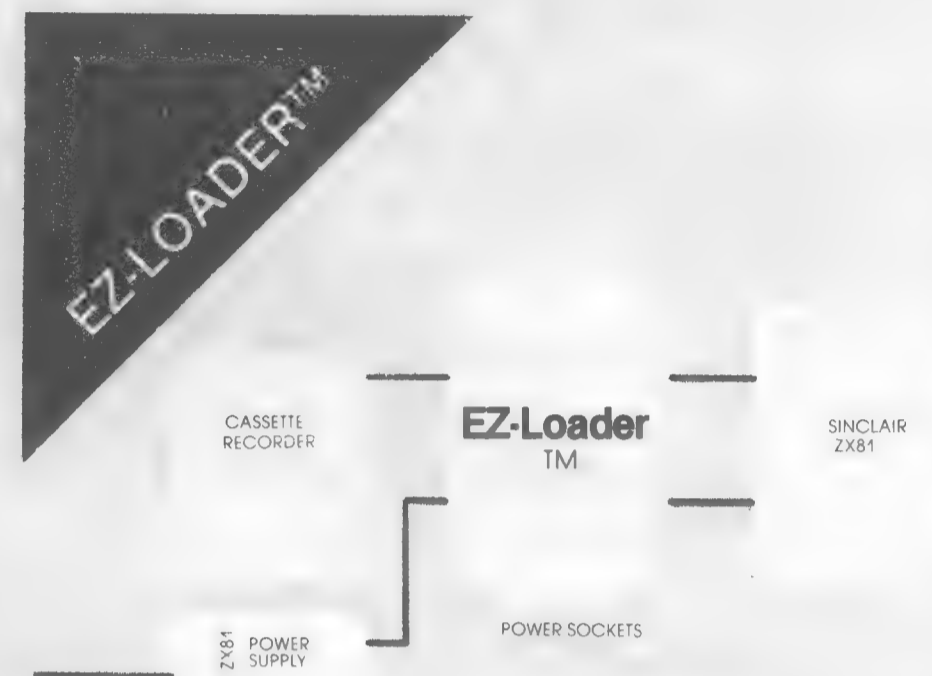
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DEAR EDITOR:

We found that Hewlett Packard 82954A black print thermal paper works well in the TS2040 printer. Although 2 mm narrower than Sinclair's, HP's paper feeds well and produces sharp text. Print heads show no wear after limited use. Stores carrying HP85 computers also stock HP paper. It comes in 400-ft. rolls which we respool to fit Sinclair's printer. We wind the paper onto 4 1/4" lengths of 3/4" dowel and mark the last 12- 18" to let us know the end is near.

Andrew Banta, Orangevale, CA

Please explain exactly what Syntactic Sum is. For long programs, the machine code Syntactic Sum does not yield the same answer as Lloyd Painter's BASIC program in the SYNTAX circular. Painter's program gives a much larger number and takes much more time to calculate. Why is this?

Richard Boltuck, Hammond, IN

Syntactic Sum provides a number related to keystrokes to check for changes in programs. It helps when saving and loading long programs, because you can lose some bytes in the transfer from page to machine.

Lloyd's BASIC version can give a different result from the MC version, which adds values until it hits 65536, and then rolls over to start with 1 again. The BASIC version does not need to roll over because the ZX/TS holds numbers larger than 65536 in BASIC. When the MC and BASIC versions don't agree, subtract 65536 repeatedly from the BASIC version until you get below 65536. The two numbers should now agree.--AZ

Thank you for helping me identify the transistor in my Sinclair RAM pack. Cross reference and replacement manuals do not list the

transistor, marked ZTX750.

I used an SK3262 RCA PNP 7W audio frequency driver transistor. You must change the 2.2K Ohm base resistor. I used 4.7K Ohms. The replacement comes in a TO5 package and fits nicely inside the RAM pack. Sylvania ECG129 or General Electric GE244 should work as well.

Chuck Goldwater, Sandy, UT

Sinware announces you can now relocate the big version of HOT Z. This works nicely with John Olinger's mod that opens up the 32-48K block (SQ, Winter 82). We also discovered the TS2040 printer interferes with the high memory version when used with some memories. As far as I could tell with one of my systems, the 32-40K block was messing up. Plugging the printer in behind a fully decoded EPROM board cured my problem.

Ray Kingsley, Sinware, Santa Fe, NM

We also cannot get the system up with both a 64K RAM and TS2040 plugged in. When the display file prints a character, it calls an address 32K higher than the ROM addresses (in the region 32-40K). Memories greater than 16K must decode this region. It seems the TS2040 also uses this area, causing the display file to crash.--KO

After almost 20 months of heavy use, my ZX81 developed frustrating hardware problems such as strange graphics with subsequent crash on RUNNING, perfectly good tapes not LOADING, crashes while SAVEing, and unsteady TV pictures. I discovered a cheap, simple cure: Q-tips and Archer cleaner/degreaser (from Radio Shack). Spray a small amount of cleaner into the can cap and liberally soak both ends of the Q-tip. Scrub both sides of the ZX81 edge connector without disassembling. Spray the female side of the 16K RAM pack and scrub TV cable

connectors and game adapter.

This procedure takes less than 10 minutes and results in no more crashes, a steady picture, and an end to SAVE/LOAD problems.

Herman Geschwind, Greensboro, NC

R.H. Miller reminds us of another maintenance tip: Apply Cramolin Red and Blue to contacts on your computer expansion ports and memory connectors to avoid crashes.--LV

---

Paul Crecca (Dear Editor, May 83) and your other readers should know that QSAVE programs work with self-running programs. A non-QSAVED program may contain:

```
9000 SAVE "P"
```

```
9010 GOTO start line
```

With QSAVE, the routine becomes:

```
9000 FAST
```

```
9010 PRINT USR 32383 (16K)
```

```
9010 PRINT USR 8505 (64K)
```

```
9020 GOTO startline
```

GOTO 9000 SAVES the program, and RUNS it after LOADING. Change the start line to CLS to clear the number QSAVE prints.

Jack Ryan, El Dorado, AR

---

Many programs don't take advantage of this memory-saving tip: Always substitute  $N*N$  for  $N**2$ . Because Sinclair's math routines keep you from raising a negative number to a power, you must use  $(ABS N)**2$  in most cases, which runs 3 bytes longer and uses several more steps than  $N*N$ . For odd exponents, such as  $N**3$ , you get an error when  $N < 0$ . To get around it, use  $(SGN N)*(ABS N)**3$ . Again, the substitute  $N*N*N$  does the job faster. This will not work for  $N**M$ , where M equals an undefined exponent that becomes defined only when the program runs, or when M differs with each execution. Variable and non-integral exponentiation do not lend themselves to substitution.

David Taber, Menlo Park, CA

I had a similar experience to Sidney Parker's (Dear Editor, May 83) with Byte-Back's M-16 RAM kit. Some tips to add to his procedure: The best place to cut the trace is near pin 9 of IC U3 (74S74 flip-flop) where it's clear of other traces, and an easy place to patch if the change fails. IC U3 is the top IC with the connector at the bottom. Viewed from the foil side, it's the left IC. Make the connection between pin 9 and 10 on IC U14 (74LS10 gate). On the foil side, just solder a jumper across the two pin tips, being careful not to contact the trace. The pins are numbered #1-7 and #8-14, starting at the bottom left if the notch is on the left, looking at the IC top.

Beware of Sidney's second fix. I made the connector pin high as suggested and plugged the module in with perfect results using VU-CALC. But the computer would not work with the TS2040. Removing the pin 21A connection solved the problem.

D.F. Wagner, Canby, OR

---

I changed a bad Sinclair power pack with a homemade 9.2 VDC, 1 Amp regulated and bypassed the VHF modulator, branching the TV set in composite video. It now works better, but I have a gray stain over 2/3 of the screen. How can I fix this? Also, please comment about improving load reliability, and the correct input level for MIC plugs.

W. Brandao, Rio de Janeiro, Brazil

Amplify the video or clamp video white level to remove the gray stain. Improve load reliability by changing the orientation of the TV to the recorder (try 90 degrees) as well as experimenting with distance between the TV and recorder. Placing the TV close to the recorder creates a problem of induced noise. Use short, medium-quality audio tapes. The correct input level for MIC plugs is 5mV peak to peak.--KO

## DESIGN--8K/16K

Run this flashy program on a TV as a personalized store window ad. The program listed displays the slogan SYNTAX and SQ among moving designs. First RUN the program to see how the slogan is centered, then EDIT line 130 to insert your specific message.

RUNning the program displays several options first. Start as directed on the lower half of the menu. RECORD A DESIGN consists of two options: RECONSTRUCT A DESIGN freezes a design (without your slogan) for which you enter codes, and CREATE A DESIGN randomly generates designs around your slogan.

Syntactic Sums vary with the message in line 130. DESIGN uses slightly more than 2K RAM.

Thomas Warner, Philadelphia, PA

```

1 REM "DESIGN" (CHANGING PATT
ERN AND SALES MESSAGE, SLOGAN OR
NAME)
2 PRINT AT 4,0;"TO RECORD A D
ESIGN - "" "" . PRESS ""BREAK"" WH
EN DESIGN"
3 PRINT AT 7,4;"FILLS SCREEN"
4 PRINT AT 8,0;" GO TO 200"
5 PRINT AT 15,0;" TO START P
ROGRAM - ""
7 PRINT AT 15,4;"PRESS ANY KE
Y EXCEPT ""BREAK""
8 PAUSE 4E4
9 CLS
10 DIM A$(6)
20 FOR K=1 TO 6
30 LET J=INT (RAND*22)+1
40 IF J>11 THEN LET J=J+116
50 IF J<=11 THEN LET J=J-1
60 LET A$(K)=CHR$ J
70 NEXT K
80 FOR L=1 TO 112
90 PRINT A#;
100 NEXT L
110 PAUSE 45
120 FOR J=1 TO 22
130 PRINT AT 15,7;"SYNTAX";TAB
15;"AND";TAB 22;"SQ"
140 SCROLL
150 NEXT J
150 PRINT AT 0,0
170 GOTO 20
200 PRINT TAB 4;"THE DESIGN ELE
MENTS ARE:";
210 FOR J=1 TO 6
220 PRINT TAB 14;A$(J);TAB 15;"
(");CODE A$(J);" )"
230 PRINT
240 NEXT J
250 PRINT AT 14,0;"*****
*****"

```

```

250 PRINT AT 15,0;"TO RECONSTRU
CT DESIGN - ""
270 PRINT AT 17,3;" MAKE A NOTE
OF CODE NUMBERS AND TYPE ""
R""
280 PRINT AT 20,0;"TO CREATE NE
W DESIGNS - ""
290 PRINT AT 21,3;" TYPE ""N""
300 INPUT C#
310 IF C#="R" THEN GOTO 340
320 CLS
330 GOTO 10
340 CLS
350 DIM D$(6)
360 FOR J=1 TO 6
370 PRINT "CODE NO. OF ELEMENT
";J;" :";J;" ?"
380 INPUT X
390 CLS
400 LET D$(J)=CHR$ (X)
410 NEXT J
420 FOR J=1 TO 112
430 PRINT D#;
440 NEXT J
450 PRINT AT 21,0;"TO RETURN TO
PROGRAM - PRESS ""R""
460 PAUSE 4E4
470 CLS
480 GOTO 10
SYNTACTIC SUM: 7339, 8K ROM

```

## EGG TIMER--8K/2K

This simple, practical soft-ware timer sets off an alarm to let you know when your egg boils, your game finishes or time's up.

Type in the program, including the four commas ending lines 1, 5, 8 and 9. Turn your TV volume up and press RUN then ENTER.

Type in the boiling time and hit any key except BREAK to start.

EGG TIMER works best with just your computer and TV. Removing any add-ons minimizes background noise, making the alarm easier to hear.

Change the last number in line 13 to create different alarm tones.

Dan Tandberg, Albuquerque, NM

```

1 PRINT "EGG TIMER",,,,
2 FAST
3 PRINT "MINUTES? ";
4 INPUT M
5 PRINT M,,,,
6 PRINT "SECONDS? ";
7 INPUT S
8 PRINT S,,,,
9 PRINT "PUSH TO START",,,,
10 PAUSE 10000
11 CLS
12 PAUSE 3500*M+500*S
13 PAUSE 1E-20
14 GOTO 13
SYNTACTIC SUM: 10591, 8K ROM

```

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Children learning to read must first master skills of letter recognition and discrimination. This simple program teaches that skill, with little help from adults. You won't need to encourage your kids to learn their letters with this eye-catching locomotive.

Chugging across the screen, the train stops at a wall facing a randomly chosen letter. The train continues on its way if the child pushes the correct letter. A wrong choice keeps the train from moving.

Short practice sessions totaling one hour a month dramatically improve letter recognition. Assist the child who frustrates easily by showing which row of keys contains the correct choice. Give examples of letter sounds and usage.

One last word--expect bright children to rub the keyboard randomly instead of poking the letters. Explain this isn't fair and show that it's quicker to use the right key. Good luck!

Gene Alvarez, Oviedo, FL

```

40 REM *****
50 REM *      TRAIN      *
60 REM *FOR READING READINESS*
70 REM * BY: E.ALVAREZ, 1982 *
80 REM *****
90 RAND
100 LET L#=CHR$(RAND*25+68)
200 FOR N=0 TO 31
300 PRINT AT 0,N;" "
310 PRINT AT 10,N;" "
320 PRINT AT 11,N;" 000 "
330 PRINT AT 8,N;" "
335 PRINT AT 11,N;" 000 "
340 IF N=28 THEN GOSUB 1000
350 NEXT N
360 PRINT AT 0,5;" "
370 PRINT AT 0,5;" "
380 IF INKEY#="" THEN GOTO 340
390 IF INKEY#<>L# THEN GOTO 400
391 SCROLL
394 GOTO 100
400 PRINT AT 11,7;" "
410 GOSUB 1000
420 GOTO 380
1000 PRINT AT 10,7;" "
1010 PRINT AT 11,7;L#
1020 PRINT AT 12,7;" "
1030 RETURN
1040 SAVE "TRAIN"
1050 RUN
SYNTACTIC SUM: 36092, 8K ROM

```

## VENDOR REPORT AND NOTES

Norris Electronics of Slidell, LA is out of business. Tracy Norris states he has filled all customer orders and cannot return any units received after June 10.

Timex reports printer paper now in stock at Timex Products Service in, Little Rock, AK 501/569-4873. Also from E. Arthur Brown, Alexandria, MN 612/762-1631. Call 800-24-TIMEX for distributors in your area who may carry printer and/or paper.

Byte-Back M-64 RAMS shipped before May 20 do not work with the TS2040 printer. Call Byte-Back any time at 803/532-5812 for advice on easy repairs (one cut and one jumper) to insure compatibility. M-64 RAMS shipped after May 20 and UM64K RAMS do work with the printer. Cause relates to "unorthodox" data bus timing problems when using TS2040s, Jerry Minchey of Byte-Back reports.

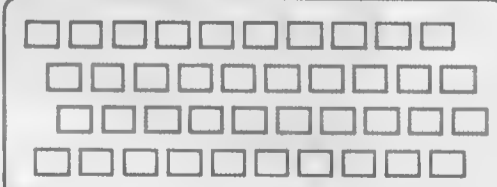


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Cure Memopak incompatibility with your TS2040 printer by increasing the power supply, reports Memotech chief Said Fateh. Memotech's testers found that at least a 2-Amp power supply will successfully operate your TS2040 and Memopak 32K RAM pack together.

MicroSync Services, a ZX/TS repair business in Keene, NH, provides technical assistance Tues. and Thurs. 12-3 PM only. Speak with service representatives Mon.-Fri. 3-6 PM for nontechnical problems.

Frog Software assures us they are still in business, but extremely behind schedule. They are now distributing the May-June issue of Sinclair Computing.

SyncWare will not carry its battery backup units after June 30. They will not fill individual orders after that time, but will consider quantity orders by contract.

## SOFTWARE REVIEW

Program: Frogger  
Price: \$19.95  
ROM/RAM required?: 8K/16K  
Printed listings?: No  
Program listable?: No  
Language: Machine Code  
From: The Cornsoft Group  
6008 N. Keystone Ave.  
Indianapolis, IN 37217

Frogger helps Timex step up to the big time arcade with fast action, good medium resolution graphics and a challenge tough to beat.

You start with five frogs who must safely reach the far side of a busy highway and then cross a pond to get back home. You must first avoid six countercurrent vehicles as the frog moves up the screen. Keyboard controls let you move your frog in four directions to avoid oncoming cars. Mistakes here produce some cute squashed frogs.

Once across the highway, a swamp full of crocodiles, snakes and diving turtles confronts you. To get your frog home you must safely hop from one creature to another as they swim.

Special features in this section give you insects to eat and points for escorting lady frogs.

Complaints: Cornsoft provides terse instructions. Frogger loads in an agonizing four minutes and 15 seconds. Because of machine code programming, you cannot BREAK out of the game unless you use their break code 5T. This leaves the keyboard locked up, forcing you to reload to play again. (Cornsoft advises going easy on the keyboard to avoid RAM pack wobbling.--Ed.)

This software, like others, cannot accept different joystick codes. Frogger, of course, has no sound, a slight annoyance.

Despite these negative points, Frogger's fine game action earns Cornsoft an A for effort.

P.J. Donnelly, Centerport, NY

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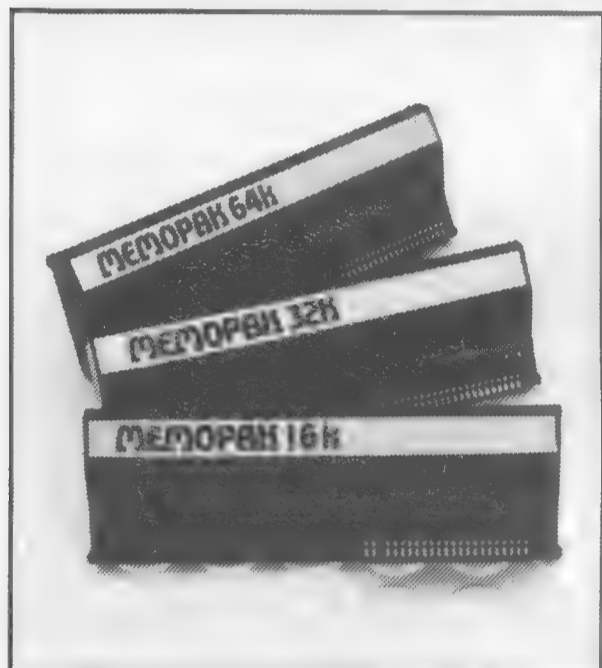
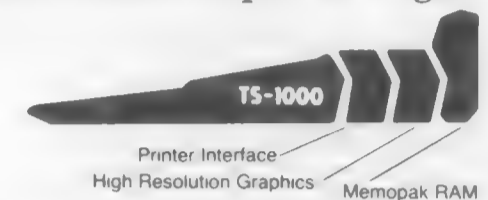
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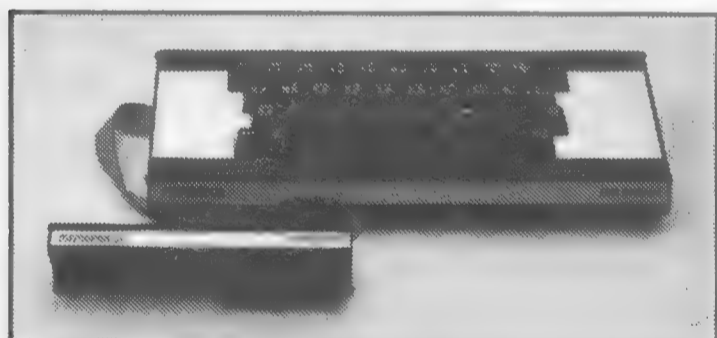
If you own a TS-1000 or ZX-81 computer and want to bring out the power within it, you'll want Memotech. From easier input to high quality output and greater memory, Memotech makes the add-ons you demand. Every Memotech peripheral comes in a black anodized aluminum case and is designed to fit together in "piggy back" fashion enabling you to continue to add on and still keep an integrated system look.



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software, enables TS-1000 users to perform complex number crunching routines with ease. With the 64K RAM a table of up to 7000 numbers with up to 250 rows or 99 columns can be specified. Quick revisions can be achieved by entering new data to your formula.

**MEMOTECH KEYBOARD** For ease of operation, the Memotech keyboard is a high quality standard typewriter keyboard, with TS-1000 legends. The keyboard is cable connected to a buffered interface which is housed in a standard Memopak case and plugs directly into the back of the



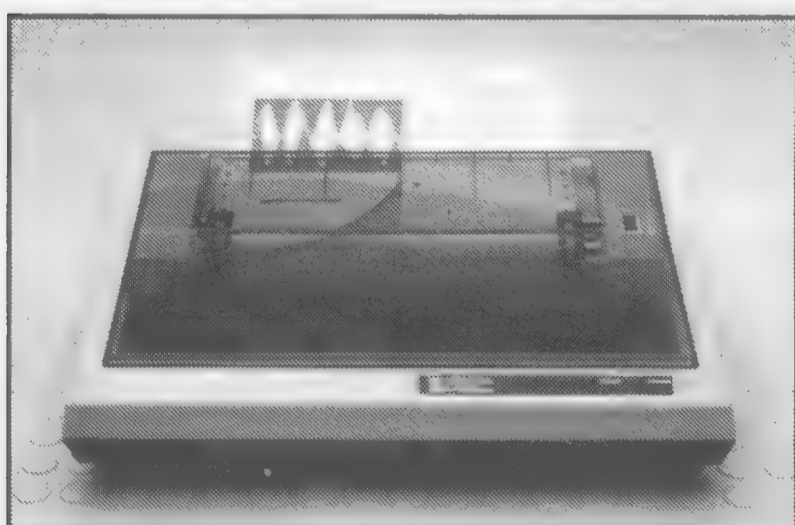
TS-1000 or other Memopaks. **MEMOPAK HRG** The Memopak High Resolution Graphics, with up to 192 by 248 pixel resolution, enables display of high resolution "arcade game" style graphics through its resident 2K EPROM, programmed with a full range of graphics subroutines.

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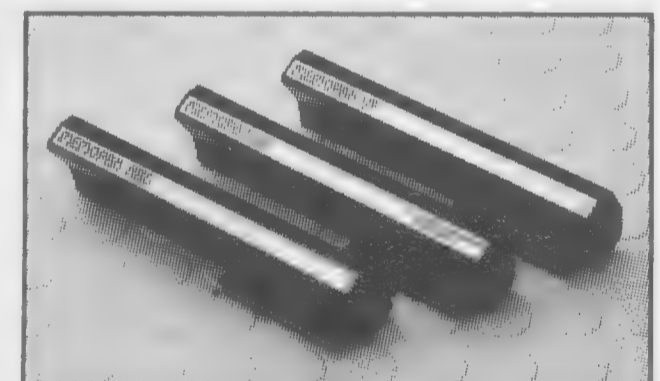
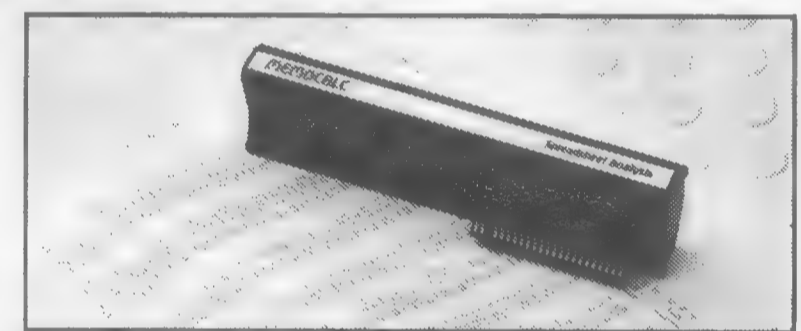


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## LOADING ONE ZX/TS FROM ANOTHER

Send programs from one computer to another directly by wire from the sender's monitor driver to the receiver's ear jack. Either SYNTAX's video inverter or Random Access's DVC-2 work using normal video. Transfer occurs at normal cassette speed.

Connect the monitor output of your driver (Apr.83) to the EAR jack of the machine you want to load. Use LOAD "" ENTER to put the listening machine in receive mode. Then SAVE "name" ENTER on the sending machine to transmit the program. After transmission of a normal program, both screens show 0/0. Press ENTER on the listener to see the program listing.

We tried the following connections to the listener's EAR jack, with these results:

<u>Sender Output</u>	<u>Result</u>
MIC output of ZX/TS	Signal too small, no LOAD
Tape recorder as amplifier	Signal too small, no LOAD
Unbuffered video from ZX/TS modulator input	Signal too small, no LOAD. Monitor/TV display dims
Unbuffered video from pin 16 IC1	LOADS OK. Monitor dims, single dots disappear.
Video output from SYNTAX monitor driver or Random Access DVC-2	LOAD OK w/normal video, inverse does not LOAD

All experiments used 12-foot stereo cables (Radio Shack 42-2368) to transmit between machines and adaptors to convert from RCA plugs to miniature phone plugs.

We got reliable loading from a 64K machine (RAMTOP at 16K) to a 2K machine and reversed direction with

no problem. We also successfully sent programs in auto-save mode. Both machines run the program simultaneously when loading stops.

### 8K MC VIDEO INVERT ROUTINE

This machine code program can almost instantly change everything on the screen to inverse video. If your computer has 4K or more RAM, the entire screen, including the bottom two lines, reverse. With less memory, only printed characters and spaces to their left change; the rest of the screen remains white.

To use this program, enter:

```
10 DIM I$(29)
20 FOR N=2 TO 29
30 INPUT X
40 PRINT (STR$ X+" ")( TO 4)
```

```
50 LET I$(N)=CHR$ X
60 NEXT N
```

SYNTACTIC SUM: 5428, 8K ROM

RUN, then enter these numbers left to right and top to bottom:

```
42 12 64 237 91 16 64 1
118 128 126 185 40 2 128 119
35 124 186 32 245 125 187 32
241 38 0 201
```

You can now delete the program lines. Call the routine with:

```
LET I$(1)=STR$USR (PEEK 16402+2
55*PEEK 16403+1)
```

Enter this program to see the routine work. Don't RUN it! Use GOTO 10 to avoid wiping out variable I\$ that holds your MC.

```
10 LIST
20 LIST
30 LIST
40 PAUSE 60
50 LET I$(1)=STR$USR (PEEK 16
402+255*PEEK 16403+1)
60 GOTO 40
SYNTACTIC SUM: 6134, 8K ROM
```

Try this again without a RAM pack to see the difference.

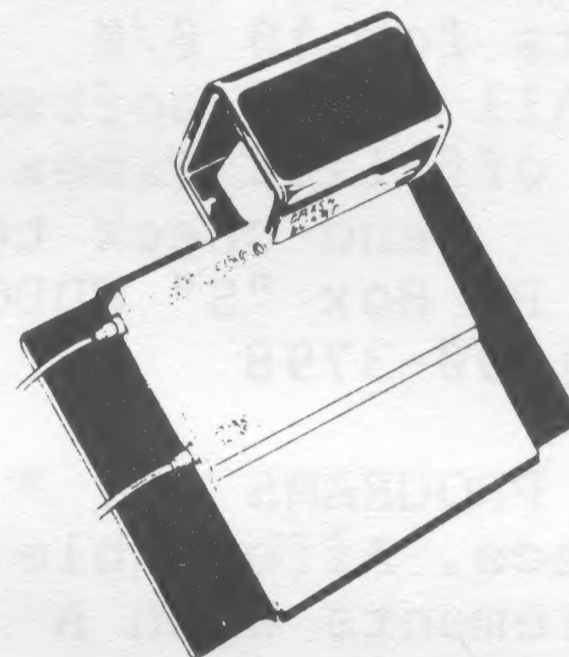
You can store machine code in a string with any MC program that does not print characters to the screen. Note that it doesn't use the first byte.

Jason Harper, Sylvester, TX

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We welcome program listings for all levels of expertise and written in either Sinclair BASIC or Z80 machine code. Programs can be for any fun or useful purpose. We will test run each one before publishing it, but we will not debug programs; please send only workable listings. Programs submitted on cassette can be tested more quickly and with less chance of error.

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