SYNTAX

A PUBLICATION OF **THE HARVARD GROUP**

Index to Advertisers

EMULATOR BOARDS AVAILABLE

Doug Dewey called to let us know that he's
making Spectrum Emulator Boards using 27128
chips. His design is fully socketed. Doug
says he can make these up if you want one--
$60 for one-chip versions, $75 if you want 4
sockets. Write him for details at 206 James
St., Carrboro NC 27510. Hawg Wild is also
offering an emulator.

SYNTAX BUYS TIMEX-SINCLAIR NEWS

This issue, with its new banner, inaugurates
the combination of Timex-Sinclair News into
our publication. We welcome the new readers,
and urge them to send us a SASE or phone us
to locate user groups in their area.

PRICE RISE COMING

Subscription prices must rise for SYNTAX. We
can't hold the line any more. Cost increases
force us to charge more. New newsletters by
Time, Inc. reinforce our decision--they will
charge $48/yr for their 12-page IBM and Apple
newsletters. Less expensive newsletters are
dropping like flies. All of us have suffered
the failure of one or more TS publications--
low price was not a bargain, but a costly
mistake. SYNTAX will try to continue, but at
a price where we can do the job--$48/yr.

TIMEX SAYS NO DEAL

Timex says no proposal has been received to
take over retail sales of their computers.
Judging from newspaper ads, they continue to
sell off inventory via mail and phone.

TECH MANUAL SHIPMENTS SLOW

Timex says it's shipping 2068 manuals, but
BCS members say they haven't gotten them,
despite having ordered in May.

NEW PRODUCTS AND SERVICES

AFR Software announces ZX81 Appointment Calendar, a time management program for 16-64K ZX/TS machines. Holds 30 appointments in 16K, 100 in 32K, 180 in 48K, or 250 in 64K. Each appointment record holds 220 characters. Features include enter, search/check, change, save, clear, and print. $10 for cassette with instructions, from AFR Software, 1605 Penna. Ave. #204, Miami Beach, FL 33139 305/531-6464.

Zebra Systems Inc. now operates a computerized bulletin board system for Timex/Sinclair users. Features include a general message board, special boards for ZX/TS and TS2068 users, user-to-user private mail, shop-at-home services from Zebra Systems, and news messages. Best of all, it's all free. You pay only for the phone call to 212/296-2229. You need a modem (Byte-Back MD or TS2050) to call bulletin boards. Service provided by Zebra Systems Inc., 78-06 Jamaica Ave., Woodhaven, NY 11421 212/296-2385.

Soft Images now sells the 1983 cumulative edition of LAMP (Literature Analysis of Microcomputer Publications), marking the first complete year of publication for this international index. A bimonthly journal, LAMP presently indexes 130 periodicals dealing exclusively with microcomputers. The annual cumulative edition comes in two volumes and encompasses thousands of subject and author entries. It is available to non-subscribers at $69.95, or $39.95 for subscribers (subscription is $89.95/year). Contact LAMP/Soft Images, 200 Route 17, Mahwah, NJ 07430 800/526-9042.

WHEN WRITING TO VENDORS...

Mention SYNTAX. We can't grow without you.

64 COLUMN TYPE--TS2068

This program allows you to type a full screen (24 lines by 64 characters) on your TS2068. It's primarily in BASIC, so it runs rather slow and will not keep up with most typists. COPYing the screen will print only every other character (the ones in display file 1), because the ROM routines do not support 64 column mode.

U$ holds the machine code to clear display file 2 and rearrange memory so that display file 2 can be used. Variables A-F get values 10-15 to assist in hexidecimal translation (because VAL("A")=10 if variable A equals 10).

Lines 90 and 95 establish characters for the normal cursor (wide vertical bar), inverse video cursor (narrow vertical bar) and caps locked cursor (inverse C). The cursor for inverse video caps locked is a normal C.

Variable DF contains the address of the current print position, and alternates from display file 1 to 2 and back. D (in line 25) counts through the 8 scan lines in each character as it prints. B is the print line number; C is the column number, and S is the starting address of the character set. I is the inverse video flag.

This program makes use of techniques explained in "Recipes for 2068 Advanced Video" (SYNTAX Feb'84). Further information appears in the TS2068 Technical Reference Manual (review in SYNTAX Jun'84) available from Timex.

Lloyd Painter, Quakertown, PA

```
  5 REM BASIC 64-COLUMN TYPE
 10 GO TO 40
 15 REM PRINT CHARACTER
 20 LET S=15616+8*(K-32)
 25 FOR D=DF TO DF+1792 STEP 25
6
 30 POKE D,ABS (I-PEEK S): LET
S=S+1
 35 NEXT D: RETURN
 40 IF PEEK 23746=128 THEN GO T
O 100
 45 REM SET ENHANCED VIDEO
 50 CLEAR 63205: LET U=63206
 55 DATA 10,11,12,13,14,15
 60 READ A,B,C,D,E,F
 65 LET U$="*21006036000237CFE78
20F8C9F33E01D3F4DBFFCBFFD3FF3E80
F5FBCD8E0EF3DBFFCBBFD3FFAFD3F4F1
FE80200332C25CFBC9"
 70 FOR N=2 TO LEN U$-1 STEP 2
 75 POKE U,16*VAL U$(N)+VAL U$(
N+1)
 80 LET U=U+1: NEXT N
 85 RANDOMIZE USR 63218
 90 FOR A=63256 TO 63263
 95 POKE A,248: POKE (A+8),255-
PEEK (A+16): POKE (A+16),255: NE
XT A
100 ON ERR GO TO 9990
105 OUT 255,14
110 LET DF=16384: LET B=24: LET
C=65: LET I=0
115 REM PRINT CURSOR
120 LET S=63256+8*(PEEK 23658=8
): GO SUB 25
125 REM KEY
130 LET K=CODE INKEY$
135 IF K=0 THEN GO TO 130
140 REM SET/RESET CAPS LOCK
145 IF K=6 THEN POKE 23658,8*(P
EEK 23658=0)
150 REM SET/RESET INVERSE VIDEO
155 IF K=5 THEN LET I=255
160 IF K=4 THEN LET I=0
165 REM DELETE
170 IF K=12 THEN GO TO 250
175 REM IGNORE ERR
180 IF K<32 OR K>122 THEN GO TO
115
185 REM KEY
190 GO SUB 15: IF B=1 AND C=2 T
HEN GO TO 115
195 REM NEXT SPACE
200 LET DF=DF+8192*(DF<22528)-8
191*(DF>24575)
205 LET C=C-1
210 IF C>1 THEN GO TO 115
215 IF C=1 THEN GO TO 230
220 LET B=B-1: LET C=64
225 GO TO 115
230 LET L=DF-256*INT (DF/256)
235 IF L<>0 THEN GO TO 115
240 LET DF=DF+1792
245 GO TO 115
250 REM DELETE
255 LET S=15616*(I=0)+63272*(I=
255)
260 GO SUB 25
265 REM BACKSPACE
270 IF B=24 AND C=65 THEN GO TO
115
275 IF C<65 THEN GO TO 285
280 LET C=1: LET B=B+1
285 IF C>1 THEN GO TO 305
290 LET L=DF-256*INT (DF/256)
295 IF L<>0 THEN GO TO 305
300 LET DF=DF-1792
305 LET C=C+1
310 LET DF=DF-8192*(DF>24575)+8
191*(DF<22528)
315 GO TO 115
9989 STOP
9990 OUT 255,128
9991 RANDOMIZE USR 63206
9992 ON ERR RESET
SYNTACTIC SUM:  36153, TS2068
```

STOP AUTORUNNING PROGRAMS--8K/1K

If you have programs which autoRUN after LOADing, and would like to examine or back up these programs, you have a problem: how to keep control of the machine. You need a LOAD that never RUNs.

To convince the ZX/TS machine not to RUN after LOADing, we CALL the LOAD routine in machine code. In normal operation, the operating system JPs (jumps) to the LOAD code: if we CALL, then after the LOAD it will return to our machine code calling routine. We can then JP to the STOP statement code, forcing the machine to STOP and give an error report.

You need to put the machine code LOAD routine out of the way in memory. If you store it in a REM statement, it will be wiped out when LOADing occurs. You can safely tuck this routine above RAMTOP or in an unused portion of a 64K RAM. To set RAMTOP, type:

```
POKE 16389,n
POKE 16388,235
NEW
```

Where n depends on your RAM size, one of the following:

RAM	RAMTOP	n
1K	17388	67
2K	18412	71
16K	32748	127
32K	49132	191
48K	65516	255
64K	65516	255

Now you're ready to input the machine code routine. This routine sets up the LOAD filename to be "" and calls the LOAD routine, then jumps to the STOP routine:

```
Loc. Contents  Mnemonics
00   2A 14 40   LD   HL,(E_LINE)
03   22 16 40   LD   (CH_ADD),HL
06   36 0B      LD   (HL),'"'
08   23         INC  HL
09   36 0B      LD   (HL),'"'
0B   23         INC  HL
0C   36 76      LD   (HL),76
0E   CD 40 03   CALL LOAD
11   C3 DC 0C   JP   STOP
```

To enter this program, set RAMTOP, then type in the BASIC listing and RUN it. Input each of these numbers, one at a time (reading left to right):

```
042 020 064 034 022 064 054 011
035 054 011 035 054 118 205 064
003 195 220 012
```

Now delete line 30 and save the program on tape.

To LOAD a program without autoRUNning it, first set RAMTOP and LOAD this routine. Use GOTO 10 to move the routine above RAMTOP, then use the USR call that this routine tells you to LOAD the tape you don't want to autoRUN.

If all goes well, you should get an error report (STOP statement encountered) instead of having the program take off and RUN.

```
  5 DIM D(20)
 10 LET A=(PEEK 16389)*256+(PEE
K 16388)
 20 FOR X=1 TO 20
 30 INPUT D(X)
 40 POKE A+X,D(X)
 50 NEXT X
 60 PRINT "LOAD WITH RAND USR "
;A+1
SYNTACTIC SUM:  7656, 8K ROM
```

Karl Brendel, Hutchinson, KS

HARDWARE REVIEW

Product: Westridge 2050 Modem
Machines: ZX/TS, TS2068
Price: $119.00
From: Westridge Communications
           Marina Del Rey, CA 90292
           213/306-4103

This product would have been the TS2050 Modem if Timex had sold it. A suspected heat sensitivity problem has been checked out by Westridge and they have found no problem with their units.

MTERM/T, the software to make your computer into a simple terminal, comes on cassette with the modem. One side of the tape LOADs on TS2068s, the other side on ZX/TS machines. Our tape was difficult

to load on the TS2068. After a call to Westridge, I tried aligning the cassette heads to the MTERM/T tape and loading at a much lower than normal volume. This worked, and I saved the program on another tape (after realigning the tape heads to normal).

Westridge's modem can transmit and receive data at 300 baud, with odd, even, or no parity, 5, 6, 7, or 8 data bits, 1 or 2 stop bits, using full or half-duplex protocol. It can also pulse dial the phone line and will answer automatically after a few rings. Of course, it communicates using either answer or originate tones, depending on whether it called out or was called by another modem.

MTERM/T will allow you to type to the computer you connect to, to read what it sends back, and to stop and print the screen. You cannot download or upload programs or data files, or save your transactions on tape or in memory. You could write your own programs to do these tasks if the manual explained what ports the modem used; it does not. Westridge says they do not know either. We have to wait for a smarter terminal program for these features.

In comparison to the Byte-Back modem for the ZX/TS, the 2050's hardware offers more features. Unfortunately, the software included with the 2050 doesn't capitalize on these features. Byte-Back's modem for the ZX/TS can up and download programs (if they are stored in an approriate format on the remote computer), can save your session in RAM to review it or SAVE it to tape, and can even send a pause character to the remote computer and COPY each screen as it comes in. It comes with complete documentation, including schematic diagram and port usage. These features are truly useful.

This comparison does not apply to the Byte-Back modem for the TS2068; we have not seen it yet.

HARDWARE REVIEW

Product: AERCO FD-ZX Floppy Disk
Machines: ZX/TS
Price: Interface $179.00
          Disk Drive $189.00
          Cable & PS $79.00+$4 P&H
From: AERCO
          POB 18093
          Austin, TX 78760
          512/331-0719

If you value your time and would like to eliminate waiting 6 minutes for a program to LOAD, a floppy disk drive may answer your needs. AERCO's FD-ZX, while not inexpensive, satisfies my needs for fast mass storage.

Floppy diskettes come in various sizes. They are thin mylar disks impregnated with iron oxide, just like the recording medium on cassette tapes. Magnetic heads in the disk drive record and play back data, like cassette players. But in a floppy disk drive, the diskette rotates at a constant 300 RPM and the recording head can position itself (under computer control) to many different tracks on the diskette. Each track is circular and concentric with all the other tracks. An entire diskette can be searched for a program in a few seconds.

AERCO's disk system consists of three major components:

1. Interface board. This professionally designed circuit board contains a 2716 EPROM chip containing the disk operating system, a 1797-02 floppy disk controller IC, and a number of smaller interfacing chips. It mounts on a special ribbon connector to the expansion bus of the ZX/TS. It provides a 34 pin edge-card connector for connecting the disk drive(s). Up to 4 drives may be run from this board.

2. Disk drive. I purchased a Pertec FD-250 drive, which handles 35 tracks per side. It can store almost 1/4 megabyte per side.

Pertec no longer manufactures disk drives, so you may want to get a different brand.

3. Power supply. Supplies 12V at 2 Amps and 5V at 1 Amp. AERCO supplies cables for the drive with the power supply. You could make up your own cable from parts if you already have a power supply to use.

AERCO provides a somewhat sketchy 10 page operating manual, but it suffices to get you up and running. After a brief discussion of disk theory it presents a step-by-step installation procedure. It says how to power up, insert the DOS disk and execute a USR call to bring the system up. In a scant 2 seconds you'll get AERCO's 16K or 64K DOS Menu.

This will allow you to format blank disks (you have to do this before storing programs or data on them), LOAD one of sixteen 16K programs into memory, rename programs on disk, copy disk to disk (if you have two drives), and a few miscellaneous utilities. To SAVE a program, you must break the program (or add an extra line) and execute a USR call to the "page" on which you want to SAVE the program. I leave DOS on page 1 of all my disks and store 15 other programs on the disk. Any of these can be called from DOS by selecting the page number from sub menu, or they may be LOADed directly with a USR call.

You can save up to six 64K programs on one disk, select single or double density recording (single more reliable; double more data). In some cases, the buffer used for double density recording (which is twice as long as the buffer for single density) may intrude into the variables area of your program.

Despite its advantages, the AERCO system has some disadvantages you should know about. You must use USR calls to store and retrieve programs. SAVE and LOAD would have been easier to work with. It's too easy to use the wrong USR routine and write over the disk when you

meant to read.

Addresses of some of the EPROM disk routines appear in the documentation, but not elaborated upon enough for the average user. The section on 64K programs seemed to indicate that they can be written to disk, but only 16K might be retrieved. AERCO says up to 52K will be retrieved, all the way up to E_LINE.

You can only store 16 programs (up to 16K each) on a disk, regardless of program length. Even a 1K program takes up 16K disk space.

This unit is an excellent value for those of us committed to our ZX systems. It's fast, reliable, and reasonably easy to use. Better documentation and a more versatile operating system would have been a plus, but even as is, the FD-ZX fits the bill. [Editors Note: AERCO no longer offers the Pertec drive, and instead now sells an equivalent Panasonic drive for $210 + $6 P&H.]

P. J. Donnelly, Centerport, NY

I recently wrote asking for help in using FIRSTLOADER [SYNTAX Dec'83]. You were kind enough to reply with an extensive list of things to try, however, they involved recreation of the tapes on the ZX81 and use of the Winky Board. I had no desire for recreation and my Winky has never been of any use, so since the coding was correct as published, I returned to my efforts to use FIRSTLOADER.

Although you mention that correct volume setting on the recorder is important, you may not realize how important it really is. I found that within one division of the volume control I encountered four different conditions:
1. Too low: no data transferred.
2. Slightly low: garbarge in translated program.
3. Just right: Translates OK.
4. Slightly high: System crashes and screen whites out.

Digging out my cleanest tapes and working from too low volume through slightly low, I finally reached the "just right" condition and translated the three tapes I wanted. Thanks for your help.

John Harkreader, Jacksonville, FL

I've just received a copy of the review of HOT Z-2068 in your May issue. Many thanks.

The reason you cannot run code in read mode is that the program wouldn't know where to start running. Assigning the start address to the top of the screen would be unnecessarily restrictive. So a monomodal HOT Z would have to be based on the write (cursor-active) mode. That would be rather like having a bare wire to the power supply. The possibility of serious error would be constant. The reason for the separation of the write modes is an attempt to "engage brain before entering this command", rather than a result of

more commands than keys. As one of the world's most experienced users of HOT Z, I still believe this modality cuts my entry errors by about half. The single-stepper is really only a mode because I don't have enough screen for the register values. On a wider screen I would get rid of it.

My reason for using the BASIC key names was just that they are on all the machines, and everbody probably knows how to access them by name. Writing them out as symbol-shift-this-or-the-other is a reasonable alternative, but a more awkward format. A keyboard overlay would be nice, with real command names, and if volume ever became considerable I would do one. It hasn't however.

Extra benefits of this modal system is that HOT Z provides a ready command processor for the user's routines, and the fact that any key can be reassigned any command. As for the maze of keystrokes, HOT Z generally requires 3 or 4 less than IBM Debug for the same command, as a result of the active cursor.

I did hope the command lists would make it easy for the expert user, but there were a couple of omissions in that first edition. At least 95 percent of my users are learners, and I think I could not sin too much on the side of explanation first.

No sour grapes intended by these remarks. It was a good and useful review. I just wanted to remark that I've thought about the issues you brought up.

Ray J. Kingsley, Sante Fe, NM

Lest anyone get the wrong idea, Ray's letter is a reply to a very favorable review of his program, HOT Z-2068. He addressed all the criticisms I made in my review. Most are a matter of taste. HOT Z has been and is one of the best MC packages for TS computers.-EO

I would like to know if you have any information about <u>Timex Sinclair User</u>. I have not received a copy from them since December 1983. In March, I got a letter telling me they were reorganizing. Since then nothing.

Michael L. Miller, Peoria, IL

<u>Timex Sinclair User</u> was purchased by Computer Communications Inc., Camden, ME. Expect to receive an offer for fulfillment with another magazine in the near future.

Received my first issue of SYNTAX and was pleased. I would like to obtain a listing of the complete disassembly of the ROM used in the TS2068. I am willing to purchase at a reasonable rate.

Gerald McKouen, Lansing, MI

Zebra Systems, 78-06 Jamaica Ave., Woodhaven, NY 11421 212/296-2835 sells <u>The Complete Spectrum ROM Disassembly</u> (ISBN: 0-86161-116-0). This book is <u>not</u> a disassembly of the TS2068 ROM, but rather the ROM in the Spectrum, the UK version of the TS2068. The TS2068 ROM contains changed code, and code in different positions. Coupled with the TS2068 Technical Manual (see review in SYNTAX Jun'84) and a disassembler/debugger like HOT Z (see review in SYNTAX May'84), you have nearly enough information to figure out how to use anything in the ROM. Expect to hunt around to find what you need in the ROM.

A short note to say thanks! Though at some times some of the articles and programs are beyond my understanding, I'd hate to think where I'd be without my monthly copy of Syntax! I've written a number of vendors as a result of your listing and ordered over $300 worth of programs last month!

Dan Townsend, Germantown, TN

HARDWARE REVIEW

Product: Speedload
Machines: ZX/TS
From: Intercomputer
           358 Chestnut Hill Ave.
           Boston, MA 02146
           617/738-5310
Price: $59.95 + $4.50 P&H

Loading and saving ZX/TS programs frustrates me. I sometimes have to adjust the controls on my recorder for 45 minutes just to load a seven minute program. I tried software packages that purport to ease and/or speed up the process: to no avail.
Finally I discovered Speedload. It works exactly as advertised. For less than $60 you get guaranteed performance almost identical to a $500 disk system. Speedload consists of an EPROM, attractively packaged with a ribbon cable to connect to your ZX/TS, and bus extension for your peripherals.
Since using Speedload I have not missed a single save or load. 16K programs save about 30 seconds. Existing programs can be loaded and then saved through Speedload. You call Speedload via one of three USR calls: one for LOAD, one for SAVE, and one for verify.
Intercomputer advertising and documentation refers to the TS1500 almost exclusively, although it works on all ZX/TS machines.
After loading, all programs emerge in FAST mode. If you want SLOW, you should put it in your program at the beginning.
Programs designed to autoRUN do not start automatically under Speedload. You need to type an appropriate GOTO command.
Memotech's Memotext and Spreadsheet will not go into PRINT mode with Speedload connected. When I use these two programs and anticipate printing output, I disconnect Speedload.

Gerd Grombacher, Sierra Vista, AZ

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HARDWARE REVIEW

Product: Game Changer Interface
Machines: ZX/TS and Atari 2600
Price: $125.00 + $5 P&H
From: Huron Valley Research
            POB 732
            Highland, MI 48031

Clever hardware construction, both mechanical and electronic, and a solid comprehension of both 6502 (the Atari 2600 CPU) and Z80 programming combine to produce the very powerful "Game Changer Interface". This unit cross-connects your Atari 2600 VCS and TS1000, allowing either to take control of whole blocks of shared memory. That "shared" memory includes the ROM inside the Atari game cartridge, and shadow copies of that ROM in the TS1000 RAM. Using this system, you can download ROM games to your ZX/TS, disassemble the 6502 machine code, vary the game (or create a new one), and upload back to the 2600 to play the game.

Physically, the system consists of two double-sided plated-through PC boards, professionally constructed. The mother board plugs into the back of the ZX/TS and connects via ribbon cable to the Atari VCS adapter board, which plugs into the VCS cartridge slot. A cartridge can plug onto the back of the adapter board.

Huron Valley's mother board contains 4 HM6116s (2K Static RAMs) and uses some ingenious coding to remap internal RAM above their own 8K, for a total of 10K RAM in an unexpanded TS1000. The 4K above RAMTOP contains the actual VCS ROM image. This information moves to a 0 REM statement for manipulation by the ZX/TS machine; game execution can be accomplished by transferring the game code to the bottom of RAM and controlling the ZX/TS bus.

Menu driven software, supplied on cassette, includes two programs in BASIC and MC which download the cartridges (one for 2K and 4K games, one for 8K games), and a 6502 assembler and disassembler (to change the games). This feature comes in handy when you wish Atari had given you "just one more ship."

This system works very well and even comes with high quality TV cables and a 3 way switch box for your TV set. You need that switch box, unless you use two sets, to switch back and forth between the VCS and the ZX/TS. I installed an extra RAM chip on the interface for an AERCO disk buffer and found the system completely compatible with the disk drive. With this combination I can download, save or retrieve any program in seconds.

If you don't have a disk drive, however, things can slow down a bit. 8K game cartridges download into 10K BASIC programs, and we all know how long they take to load from tape. After you make or modify a game, you may want to have an EPROM burned. Since the system uses BUSRQ, dynamic RAMs (like those in 16K RAMpaks) will not work with it. Hunter's ROM board, populated with 6116s, should work if everything decodes address line completely.

I had very little trouble loading the programs. The menus are simple and the documentation is Spartan. It consists of 7 photocopied typewritten pages, including an installation sketch and a hand-drawn schematic, important memory map locations, and operating instructions. Perhaps the only flaw in an otherwise superb system, is the documentation.

Overall, while less than perfect documentation usually causes me to think twice, I rate the Game Changer highly. It is exceptionally powerful and well designed, and can provide the ultimate in inexpensive game play and design, for a total of less than $175 (including the price of the ZX/TS).

P. J. Donnelly, Centerport, NY

SOFTWARE REVIEW

Program: Integer BASIC Compiler
Machines: TS2068
Form: Cassette
RAM Req: 48K
Listing: No
Listable: Yes
Language: BASIC
Display: Poor
Author: John Richard Coffey
From: JRC Software
          POB 448
          Scottsburg, IN 47170
          812/752-6071
Price: $24.95 with Z80 Assembler

If you have lots of experience programming in languages that don't tell you about errors, JRC has a BASIC compiler that you may be able to use. But don't expect it to hold your hand.

JRC's idea was to write a language that looked like a subset of BASIC, but ran closer to machine code speed. Many simple routines in machine code can be written in a simple BASIC and then translated to machine code by the compiler. The speed enhancement is impressive: JRC's compiled code runs about 100 times faster than interpreted BASIC. Unfortunately, if you think you can just compile your existing programs, you're wrong.

JRC Compiled BASIC supports only a small subset of TS2068 BASIC. Variables may only range from A to Z, single letter only. Numbers may range from 0 to 65536. No FOR loops, no INPUT statement, no joystick access, etc. In total, JRC lists 35 specific limitations (things you may do in TS2068 BASIC but not in the compiler), not including statements and commands wholly unsupported. Of course, you could write code to get around most of these limitations, and it would probably run at reasonable speed, but the documentation for the compiler makes it difficult to know at a glance what's allowed.

If you have a need for writing fast code that doesn't need alot of the power of BASIC, this compiler may be just the ticket. BASIC code typically runs after less debugging than a comparable assembly language program, since the commands do so much more each. Machine code generated by JRC's compiler will usually run completely without ROM support (of course, if it prints to the screen, it uses a ROM routine). You can specify where the machine code should be stored, and need not preserve the source code once you have a working program. You can save compiled code on cassette.

I wrote a small test program that generates random points and blackens them on the screen. A listing appears below.

```
10 LET X=RND*65536/256-1
20 LET Y=RND*65536/512
30 PLOT X,Y
40 GO TO 10
```

After running for a while, it stopped with an Out of Memory error. This program shouldn't consume memory at all: it uses two variables and keeps reusing them. This bug must be in the compiler.

Valid statements and commands in JRC Compiled BASIC include PRINT (including AT, BRIGHT, INK, PAPER, INVERSE, OVER, STR$ (only after PRINT), and TAB), BEEP, BORDER, CHR$, CLS, CODE (one char. argument only), COPY, DIM (to specify length of strings only), GOTO and GOSUB (constant line numbers only), IF (with a minimum of possible expressions), INKEY$, LET, LPRINT, OUT, PAUSE, PEEK, PLOT, POINT, POKE, REM, RETURN, RND*65536 (always returns between 0 and 65535), SOUND, and STOP. You can also use +, - (but not unary, and no negative numbers), *, /, =, <, <>, OR, and AND.

If this list contains the functions you need, and you are an experienced programmer (preferably with knowledge of machine code), you might be happy with JRC's compiler. Otherwise, beware!

OUR POLICY ON CONTRIBUTED MATERIAL

SYNTAX invites you to express opinions related to any Sinclair or Timex computer or peripheral, or the newsletter. We will print, as space allows, letters discussing items of general interest. Of course we reserve the right to edit letters to a suitable length and to refuse publication of any material.

We welcome program listings for all levels of expertise, 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.

In return for your listing, we will pay you a token fee of $2.00 per program we use. This payment gives us the nonexclusive right to use that program in any form, world-wide. This means you can still use it, sell it, or give it away, and so can we.

We will consider submissions of news and hardware or software reviews. Please keep articles short (350-400 words). Again, we reserve the right to edit accepted articles to suitable length. We will pay 7 cents per 6 characters, including spaces and punctuation, for accepted articles.

When you send in articles for possible publication in SYNTAX, please include the following information:
- How to operate the program, including what to input if it does not contain prompts.
- Whether you can run the program over again and how.
- How to exit the program.
- The Syntactic Sum (program published in June 81; send SASE for a free copy).
- What RAM size program requires.
- What ROM program uses (8K, 2068, Spectrum).
- For MC programs, what addresses must change to relocate the code and what ROM calls are used.

We pay for this explanatory text at the same rate as we pay for articles in addition to payment for the program itself.

If you want us to return your original program listing or article, please include a self-addressed, stamped envelope. Otherwise, we cannot return submitted material.

CLASSIFIED ADS

ZX HARDWARE FIND

We've come upon some hardware at reject prices--but it's reject hardware. Still, stuff is getting hard to find, so this may be the deal to do. Of course you have a big advantage because you can use the full technical info published in SYNTAX and SQ back issues to find your way around.

ALL COMPUTERS AND MEMORIES IN THIS OFFER ARE GUARANTEED TO BE DEFECTIVE IN SOME WAY None of these come with accessories like cables or manuals or tapes.

Scratched ZX81 w/ standard power supply

Defective ZX81 only

ZX81 w/ case--NO KEYBOARD

16K RAM--not known to work

700 mA Desktop PS--Separate AC & ZX cables

Just what you need for finding spare parts or for finding out what's inside. Get the funny UK transistors, or maybe a custom chip, or possibly a spare processor. We don't know what's wrong with this stuff and we can't afford to find out. You take the risks and you reap the rewards. Check the component prices in any catalog--parts alone are worth our prices--especially the custom chips. Don't miss out on these ZX bargains. Timex parts would cost you more

Don't delay--these will go fast once the word gets around. One surplus house sold out of similar goodies in two days.

GET THE WORKS II & GET YOUR CHOICE FREE

As always, we give our best customers the best deals. Buy The Works II and get your choice of **ANY ITEM FREE.** Even if you're not into hardware, the desktop power unit makes it easier to connect your computer. This PS will run your ZX/TS & a RAMpak easily. Great for traveling--easier to fit in out-of-the-way plugs.

Lots of good uses for the ZX/TS chassis, too. Fix 'em up and make code converters or mount in an old terminal to make a 2nd system. Great for control applications. We heard of one user who mounted a unit in an EBCDIC printer for an ASCII interface.

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	DZX	**Defective ZX81**	$15	
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	PSU	700mA Desktop PS gtd OK	$10	
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