

SINC - LINC

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SYNCOBITS

Ian Robertson

SINC-LINK August 1985

UPDATES: I want to thank all of you who wrote to me with advise and comments on just what you would purchase, i.e. disc, mafadrive, microdrive (both Sinclair and A & J), Spectrum, Portugese T2068, etc. To bring you up to date I bought a Spectrum Plus, Interface 1 and 2 Microdrives. There sure are quality problems at Sinclair! For example - one of the drives was perfect while the other was not (I am being kind), the cable joining the drives to Interface 1 had an intermittent open circuit and the heat sink inside the Spectrum was barely held on by the bolt through the regulator/board. But once those items were corrected I am glad to report that all is running well and lives up to expectations. The drives are actually quieter than I anticipated and the access/loading times are quite acceptable. I finally got Hisoft C running and believe it or not it was that dreaded 'tape recorder output' problem that we all know and do not admire. It took 7 recorders until I found one that would work. It was the TS2020 with a 7.5 volt DC power supply that did the job. Since purchasing ARTWORX (IRAMEX INTERNATIONAL 17629 26 MILE ROAD WASHINGTON MI 48094) I have been pleased with the User Friendly aspect of it. As if this needed reinforcing I purchased another program of this type called THE ARTIST (Softek Int.). While this is the top rated UK Spectrum program (according to the June issue of YOUR SPECTRUM), it not only lacks some of ARTWORX sophistication but is also far from being User Friendly. All things considered ARTWORX is still a BEST BUY.

TS2068 The big news is the number of disc drive interfaces we now have to choose from - WHAT A DIFFERENCE! On the local scene we have one from LARKEN ELECTRONICS, R.R.2, MAVAN, ONTARIO, K0A 2S0, telephone 613-835-2680. It is a very reasonably priced and very well assembled controller board complete with all cables and connectors. For \$119.95 (\$89.95 US) plus shipping, you get an interface that is compatible with the TS2068 and the Spectrum emulator. At the moment there are two happy TSUG members whirring away with this system. It supports one Shogart SA495 DSSD drive (160k total). While this may not seem like a lot, think of those thousands of happy Apple Users with only 128k and one drive! The DOS is on a 2k eprom and on a supplied disc. As improvements are available you will be notified and an updated eprom will be available. ALL THINGS CONSIDERED - THIS ITEM IS ANOTHER BEST BUY. One other new disc system is the 3" Timex Portugal being sold by Bob Dyl of THE ENGLISH MICRO CONNECTION 15 KILBURN COURT NEWPORT RI 02840 telephone 401-849-3805. The 3" discs are available locally from Exceltronix at 319 College St. 921-8941. The Portugese system will also be carried by ZEBRA SYSTEMS 78-06 Jamaica Ave. WOODHAVEN NY 11421 telephone 718-296-2385. The yet to be released disc system of John Oliger/Ray Kingsley from THE JOHN OLIGER CO. 11601 WHIDBEY DR. CUMBERLAND IN 46229 sounds like a winner too. It will consist of 3 boards (eventually) and the specs. indicate that it will be hard to beat. For information send a SASE to John at the above address. Good news for anyone requiring TS2068 repairs. The following two locations will perform repairs, (1) TS CONNECTION, 3832 WATTERSON, CINCINNATI, OHIO 45227, telephone 513-271-5575 from 8 am to 10 pm EST, (2)

TIMEX PRODUCT SERVICE CENTER, PO BOX K, 7004 MURRAY STREET, LITTLE ROCK, AR 72203, telephone 501-372-1111.

SPECTRUM There are several new and some not quite so new programs that have simply blown my mind. I'll name a few: BETA BASIC 3.0 (update of version 1.8), MEGA BASIC (from Your Spectrum), BLAST (a truly sophisticated compiler), SUPERCODE 3 (toolkit with 152 utilities), MUSIC TYPEWRITER (compose/play music and prints out 80 column) and ALIEN 8 (game). All of these are available from Bob Dyl at EMC. So far I've mentioned YOUR SPECTRUM twice and not elaborated. It is a GREAT Spectrum dedicated magazine available from YOUR SPECTRUM, SUBSCRIPTIONS, 14 RATHBONE PLACE, LONDON W1P 1DE, U.K. at \$25.00 (pounds sterling). Like all UK publications they are quite game oriented. They also take Mastercard and Visa, but be sure to include your cards expiry date. I know they take plastic because that is how I paid for my subscription, back issues and Mega basic. WARNING - if you buy U.K. software - make sure to copy it IMMEDIATELY upon receipt. I have had four tapes that either bind inside the case or break off inside due to binding. To make matters worse, U.K. cassettes do not have screws. Therefore you cannot take them apart and add lubrication to the rollers like you can with North American cassettes. To add yet another insult to injury I have had several U.K. tapes that are of such a low bias that they do not have adequate volume to load consistently. This is where a Radio Shack mini amplifier helps. I am presently in the process of adapting the Spectrum + from PAL to NTSC and to use a composite video monitor. I have ordered the TS2068 14.112 MHZ Y1 crystal and will see what it does to steady/upgrade the picture. More in my next column. I have already converted the Sinclair power supply by replacing the transformer with a 115/18VCT 1 amp 60 HZ transformer.

TS1000 Exciting news! Peter McMullen's WORDSINC II.5 and WORD FONT V1.2 are finished, released and a copy of each is residing in my ever expanding software library (300+ cassettes). WHAT A PAIR OF PROGRAMS! If you have a centronics interface (either TS1000 OR TS2068) Peter will sell you a custom version for it (at the same price). This simply means that if you are presently running a TS2068 word processing system and you have a TS1000/ZX81 hanging around - you can put it to work, either as a backup system or as a separate system (sharing the same centronics interface). All this for \$30.00 (US II.5) and \$15.00 (WF V1.2) plus postage. They are available from PETER McMULLEN 2340 QUEEN STREET EAST TORONTO ONT. M4E 1G9 telephone 416-694-3171, or from INTEGRATED DATA SYSTEMS 30 BROOKMOUNT ROAD TORONTO ONT. M4L 3N1, telephone 416-699-6380. IDS takes plastic. I have used both programs (more than once) and consider them comparable to using Mscript and Tasprint (for the TS2068) together (if that were possible). TRULY A BEST BUY!! The other almost impossible to believe item is the JOHN OLIGER VIDEO UPGRADE (or the JLO1000 Plus). This hardware upgrade makes your humble TS1000/ZX81 into a flicker-free colour computer with upper/lower case characters and a SLOW MODE THAT RUNS ALMOST AS FAST AS THE FAST MODE. What a way to liven up a Basic program! It prints out upper and lower case on either the TS2040 or an 80 column printer (with the correct centronics interfacing). To use it you must have a composite video monitor. For further information send a SASE to John Oliger at the address mentioned previously. THIS HAS BEEN A VERY GOOD MONTH FOR TS1000 USERS!!!!

Howdy, folks. Many of us just don't have much time for hacking around with our computers in the summer months, but that doesn't mean everything stops! I've heard several people say "the ZX81 market is dead" lately. Upon examining the current selection of ZX81/TS1000 software & hardware ads in T-S HORIZONS, SYNCWARE NEWS, TIME DESIGNS, and other magazines & newsletters, I'd say the aforementioned people must have their heads up some dark hole. The pickings are still rich: I've never seen a livelier "dead" computer!

ERROR REPORTS:

Last issue, I printed a "correction" regarding interrupts & the John Oliger Video Upgrade- but I was right the first time! My apologies to John Oliger, who sent me the correct information just a day too late to include it last time.

John says:

"...Regarding vectored Mode 2 interrupts and the Video Project: The Video Project DOES INDEED open up the use of Mode 2 interrupts. This hardware uses only the NMI interrupt and RST30H as a restart. No use is made of the maskable interrupts, so they CAN be used with the Video Project IF:

- 1) A6 is cut from the Z80 INT line inside your computer.
- 2) A pullup resistor is installed on the INT line (1K-10K ok)
- 3) The MODE 2 instruction is executed, & proper vectors & handlers (along with the EI instruction) are loaded in..."

So there it is. ZX81/TS1000 users with the Video Project should take note of the COMPUTUS INTERRUPTUS series by Wes Brzozowski, in SINCUS NEWS. Although it's 2068 oriented, this series gives a good insight into the use of interrupts, and is well written.

RUNNING MC IN HIGH MEMORY:

John Oliger has twice published a circuit for 64K users which permits you to run machine code in the 32-48K block (\$8000-\$BFFF): in SQ, VOL.2 No.2, and SyncWare News, VOL.2 No.5. This circuit consists of 1 IC, a 74LS10, which is used to decode M1, A14, and A15 between the Z80 & the ULA. A trace must be cut on the ZX81 board to install the decoder, but installation is quite simple.

If you are running the Oliger Video Upgrade, you can take this a step further, and actually run MC above \$C000- all the way to \$FFFF! This requires a slight circuit modification as well, this time to the RAM pack. Most 64K RAMs have the A15 line gated by M1. The required modification is to defeat the M1 gating of A15, so that A15 gets treated like any other address line. There are several ways this can be done, depending on the RAM pack, but it must be done on the memory card. You may want to make this switchable, so the RAM will be usable with a regular-video computer. Placing an ON-OFF switch in series with the M1 line from the edge connector trace to the memory circuits, and a 4.7K resistor from the memory side of the switch to +5V. *should* do the trick. Check next issue's ERROR REPORTS in case of any updates on this mod.

ZX81 DISK SYSTEMS:

If you're a serious ZX user, the thought of getting a disk interface must have crossed your mind at some point. You can pick up perfectly good (used) SSDD floppy drives these days for \$90.00 or less, and new slimline DSDD drives can often be had for under \$169.00. Cases, often with power supplies intact, can be picked up at ridiculously cheap prices from several surplus parts suppliers.

I recently picked up a used TEAC drive with case & power supply, and decided to take the plunge.

LARKEN:

Larken Electronics
R.R.#2
Navan, ONT.
Canada K4B 1H9

...has been advertising a disk controller card and DOS for the ZX81 and 2068, supporting standard Shugart SA455 compatible drives, for the incredible price of \$119.00 CAN.

I promptly phoned Larken, only to find that while the 2068 version is indeed available from stock, the ZX81 version has not yet been completely debugged. It could be ready in a few weeks, or months. If you send a stamped SAE to Larken, they'll notify you when the ZX version is ready to deliver. It stands as the least expensive disk controller being offered for the ZX- when it becomes available!

Severely bitten by the "disk bug", I decided "Hang the budget... I want a disk system NOW!". A phone call to COMPUSA revealed that they are no longer manufacturing their ZX81 Floppy Disk system, although Tom Bent tells me that E-Z KEY, in Quincy, Mass., still has COMPUSA systems available for \$430.00 (Complete System). The Compusa DOS is noted for its friendliness, but it is an expensive system. After ruling out the Compusa choice, I got in touch with...

AERCO:

AERCO
7606 Robalo Road,
Austin, TX 78757
U.S.A.
(512) 451-5874

Aerco is the "pioneer" producer of disk systems for Sinclair computers. A phone call to Jerry at Aerco answered all my questions, and made a very positive impression. The Aerco system is sold as modular components, which is great for someone who already has floppy drives & power supplies. The Controller card & DOS is \$179.00 U.S., and an AUTOBOOT ROM card is \$59.00 U.S., or \$99.00 U.S. with Centronics interface built in. Add \$5.00 per order for shipping.

After all this research, I decided to order the AERCO system. I expect it to arrive any day, and will have a detailed report on my initial adventures with the Aerco system in my next column. I haven't forgotten the LARKEN system, in fact I intend to get one when they're ready, and print a comparative review of the AERCO & LARKEN products.

OLIGER/KINGSLEY:

While on the disk subject, it is worth noting that John Olinger is nearing completion of his disk system for the 2068, with Ray Kingsley of SINWARE writing the DOS. 2068'ers are awaiting this one with bated breath: the results of the Olinger/Kingsley team-up are bound to be top-notch. John has indicated that his disk controller card will work on the ZX81, and that Ray "might write a DOS for it if there is a big enough demand.". If you are prepared to wait for a while, but would like to see an Olinger/Kingsley disk system for the ZX81, then write to Ray Kingsley, c/o SINWARE SOFTWARE, P.O. Box 8032, Santa Fe, NM 87504, U.S.A., and give Ray your encouragement!

CP/M ?

A couple of years ago, AERCO was advertising a "full-blown CP/M 2.2" for the ZX. In my conversation with Jerry, I asked him what ever happened to this. His answer, in a nutshell, was yes, the CP/M setup does exist, and is available if you want it. However, it was considered impractical because very little CP/M software could be run on the 32-column screen.

Recently I have heard suggestions that at least one company was planning an 80-col. video card for the ZX just prior to the TIMEX dropout. If ANYONE has ANY info about an 80 col. video card that might be married to the AERCO ZX-CP/M machine, please drop me a line and let me know.

SINC-ARTIST 1.3:

CALLISTO SOFTWARE
924 2nd Street East
Saskatoon, SASK.
Canada S7H 1R1

...has some incredible software available these days. Sinc-Artist 1.3 is a program which is very similar to Zebra Systems' Tech-Draw for the 2068. S-A lets you create pictures with 256*192 resolution, for output on a 2040 printer. The screen is a 40*64 pixel window on the hi-res picture, and scrolls around freely over the picture. The program has 40 different (redefinable) fill patterns, pencil and brush "draw" modes, a complete selection of shapes and filled shapes, including circles, rectangles, triangles, quadrilaterals; lines, rays, automatic horizontal or vertical area filling, and opaque or transparent draw modes. The picture can be printed out as normal COPY size, or in 4 strips which make a 11.5"x13" poster. The program has a friendly, interactive menu system, and is written completely in machine code. Pictures can be SAVED.

Sinc-Artist is \$11.95 CAN. + \$2.00 shipping from Callisto.

I was so knocked out by Sinc-Artist, I really wanted to be able to print the pictures out via Centronics interface, to my 80-col. dot matrix printer. The author of S-A, James Hastings-Trew, has supplied me with all the info required to do this. I am planning to write fullsize printer routines for S-A, for use with any printer I/F and fullsize dot matrix printer. The 2040 will still be supported, but those with big printers will be able to print pictures out in 3 different sizes, from 4"x5" to 21"x30". This will take awhile- maybe in time for Christmas.

ZX HI-RES:

Callisto also sent me a sample/demo of a very impressive software Hi-Res for the ZX81. ZX Hi-Res gives you upper & lower case on screen, very credible 128*192 plotting resolution, and a toolkit of graphics routines nearly comparable to those provided by Sinc-Artist. The program is not yet commercially available, and user documentation has not been written. If you're interested, write to Callisto & let James know.

James Hastings-Trew mentioned that he has also written some neat graphics-toolkit stuff for the TMS9918 VDP, which will surely be of interest to JLD Video Upgrade owners. James has a Kolorworks board for his ZX, which also uses the TMS9918. The VDP port addresses (and perhaps some other details) would have to be modified for the Olinger system, but based on the quality of the other Callisto offerings, I suspect it will be well worth the effort.

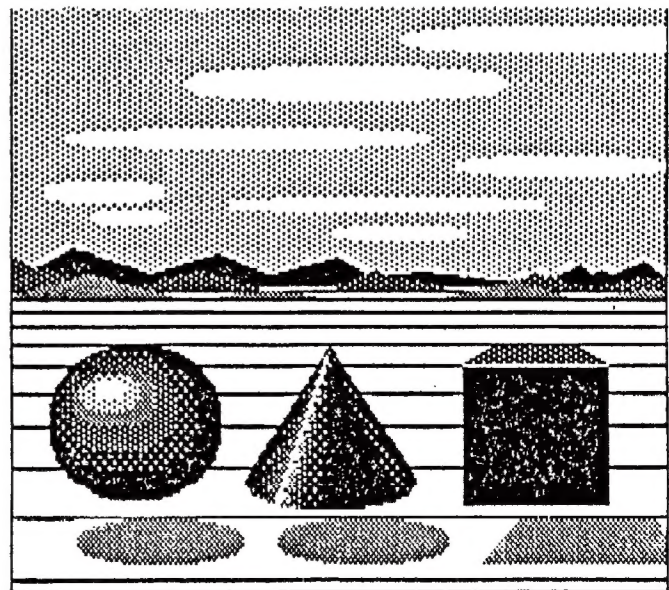
TIPS:

...Paul Hunter's series on BANK SWITCHING, originally published in T-S HORIZONS, is now being carried in revised form by the Triangle Sinclair User's Group Newsletter. Never a better time to join the Triangle group- write c/o Doug Dewey, 206 James St., Carrboro, NC 27510. Subscription/Dues are \$10.00 U.S. per year, and well worth it.

...You can virtually eliminate crashes due to connector wobble, just by keeping those contacts CLEAN! Use pure Freon TF (sold as "professional" tape head cleaner at Radio Shack) with a Q-Tip to clean all contact surfaces periodically. A good (NON-SILICONE!!) contact cleaner/preservative, such as CRAMOLIN, mixed with the Freon, works miracles. I use this stuff, and haven't had a connector-related crash in months. Sources for good contact treatments will be printed next issue.

...This article was printed as you see it using Word Sinc II.5 (and a ZX81, of course).

...I leave you with a sample picture created using SINC-ARTIST 1.3. This picture was originally printed out on a 2040 printer in poster size, then photographically reduced to what you see here. See you again in the Sept-Oct issue.



The A & J Micro Drive

I would have to say that the A & J Micro Drive is basically a very fast cassette and doesn't really approximate a disc operating system. My reason for this is quite clear when I examined the commands available. These commands are:

SAVE " " LOAD " " VERIFY " "

SAVE " "LINE LOAD " "DATA
SAVE " "DATA LOAD " "DATA\$
SAVE " "DATA\$ LOAD " "CODE
SAVE " "CODE S,L LOAD " "CODE S,L
SAVE " "SCREEN\$ LOAD " "SCREEN\$

These look remarkably similar to the commands for using a cassette recorder. However there are a few subtle differences. All blank micro cassettes must be formatted before being used. This is accomplished by using the command SAVE " 1,+". Now the micro cassette is ready for use. The FORMAT command does not work.

In the process of saving the symbol " " must be included in the save name in order to flag the micro drive, followed by the file number (what order on the tape it is saved) (1-9) and then followed by the name you choose. This means then that the operation of the micro drive requires that 3 characters be included in the save name so that the actual name can only have 7 letters unlike the cassette save which allows a maximum of 10 characters in the save name. With a disc operating system there is a CAT function to help keep track of the files written on the disk but this micro drive does not offer this luxury. The user is forced to remember or personally record the file number of each item so that you don't accidentally write into an area that is already occupied. Also we are never really sure of how many bytes of storage are free on the cassette and often I have tried to write more on the tape than it could hold causing an END OF FILE error message to appear.

Each save is a file. For instance this program (Tasword II) requires two files to be saved; one for the basic

part and one for the machine code part. In order to save a file of text on the same micro cassette that the Tasword is on the command would be SAVE " 3, anyone" (of course without spaces in the save name which I included only to improve legibility. As another example the program vu3d requires 4 files to be saved.

When you're using the micro drive you are not limited to 9 files per micro cassette. The manufacturer states that after 9 a tenth file can be ranked using the symbol that follows in the ASCII code and that would be ":". Presumably an eleventh file could be saved by using the next symbol to follow in order which would be ";", however I have never had this many files on one cassette so whether it works or not is purely conjecture.

In order to load, the load name only has to contain the " " symbol and the name; the file number is not necessary for loading.

Similar to a standard cassette there is a write protect tab on each micro cassette which if broken off can be easily simulated with a piece of tape. One point of caution worthy of mentioning is that much care has to be used when inserting these micro cassettes as it is difficult to tell when they are properly in place. I have already carelessly wasted one 85K cassette as it began unraveling inside the drive. Fortunately I shut it down before any damage was done but I could not salvage the tape. The micro cassettes come in 5 lengths:

Length..	(feet)..	Capacity (Kbyt)
10		14
20		28
35		49
50		70
62		85

Up to this point I have not discussed the overall advantage of this over the standard cassette. I have tabulated the results of some loading times for various programs.

Program	Cassette Size	Time to Load
Tasword	20"	25 secs
NAME/tasword	10"	20 secs
vu3d	35"	42 secs
SCREEN/tasword	65"	48 secs
vufile	"	20 secs

I have found the micro file very user friendly for the limited amount it will do. The necessary conversions in the basic programs to use the micro drive with programs that run automatically are as elementary as using the standard cassette.

Error Codes are:

- E END OF FILE
- F INVALID FILE NAME, >7 CHAR.
- O INVALID STREAM, WRITE PROTECT
- R TAPE LOADING

The unit that I purchased was from PHEONIX ENTERPRISES in Dover, Delaware for a price of \$231.00 Cdn. not counting the 10% import duty. Included was the interface, the drive, six microcassettes of various sizes and a holder which is really a filer for business cards but the cassettes fit in it neatly. Although nothing is wrong with the unit itself I have had some other items prepaid and on back-order since January and not yet shipped. Due to an unwillingness of this company to refund my money or even communicate with me about this problem I cannot recommend them to anyone but Commodore 64 users.

The interface allows a second drive selling for \$99 US which can be activated by poking 1 into address 24201. Poking 0 into the same address returns interface to control of the first drive. Coming off the interface is a printer port that I haven't explored yet but the printer cable and software are \$49.50 US from the manufacturer. Also SUN-WARE sells the 85K cassettes for \$3 US.

As a closing note I would like to add that I have seen the ROTRONICS WAFADRIVE in action. It costs \$319 Cdn,

less duty, from DANCO and has 2 drives, a serial and parallel port and it comes with Spectral Writer and an OMI-EMU that slides into the cartridge port of the 2068 to turn it into a Spectrum. This drive does behave more like a disk in that there is a CAT function that keeps tab of what is on the tape. The WAFADRIVE uses the exact same micro cartridges as the A&J drive but there is greater storage capacity: instead of 85K the max is 128K. the drawback is that the WAFADRIVE reads slower. Also I'm not sure about changing my main mode of operation into Spectrum in order to use the WAFADRIVE. We could not load Tasman II with the OMI-EMU in place which is really irrelevant since the Spectral Writer is a superior word processor. For now I'll stick with Yankee ingenuity and products designed exclusively for the 2068

NON-CLASSIFIED ADS

WANTED *** One ZX80/MicroAce in working condition. Will trade for a TS1000 or **\$. Peripherals such as 32K memory also considered.

Ron Rudlak
P O Box 1448
Steinback Manitoba
R0R 2R0

.....

In the Spring '85 edition of Electronics Today, there was a speech synthesizer project for the ZX81, which I built and am reasonably sure is hardware correct. However, I am unable to get it working. Are there any members who have constructed this project with any degree of success? Please give me a call if you have any info.

Ron Rochester (416) 656 8600

.....

WANTED *** A music add-on for a TS1000. Something with 8 channels and 5 octaves. Any brand name. Please contact:

R.M. Thompson
61 Bridle Path
London Ontario
N5Y 2H3 or call (519) 433 9020

The 2040 Printer Interface

a short lesson in I/O port decoding

by Cameron Hayne

Inside the funny shaped black box at the end of the printer cable, the one you plug into your computer, is a circuit board with a capacitor, two ferrite rods and a chip. The purpose of the capacitor and the rods is to reduce the effects of electronic noise. The purpose of the chip, a 74LS10N triple 3-input NAND gate, is to deliver a "pay attention" signal to the printer to tell it when the computer is talking to it.

Most of the signals from the computer edge connector are not used by the 2040 printer but pass straight through the black box to be available for other, more demanding peripherals such as memory expansion.

The connections and logic diagram for the chip is shown in Figure 1.

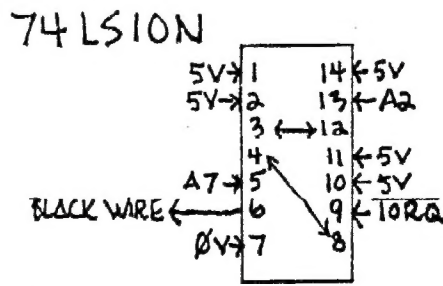
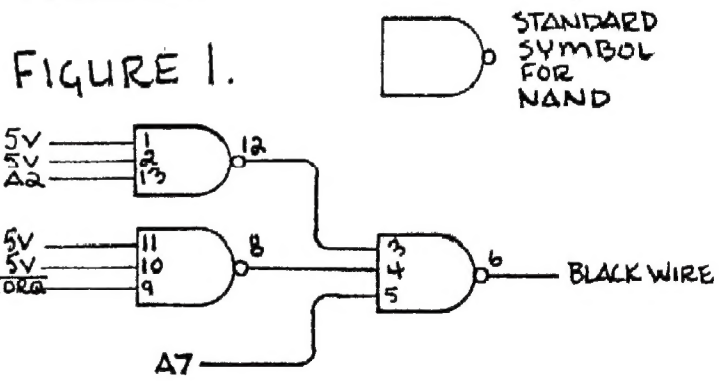
A NAND gate has an output voltage close to 5 volts (high) except if all of its inputs are at 5 volts. In the latter unanimous case the output voltage drops to near zero volts (low). Thus we see the black wire will usually be at 5 volts. Working backwards, from right to left, we see that the only way the black wire will go low is if simultaneously A7 is high and both A2 and \overline{IORQ} are low.

\overline{IORQ} , which stands for input/output request, will only go low when the computer does an IN or an OUT instruction. The port number attached to the IN or OUT instruction goes onto the address bus, thus determining the voltage of signals A2 and A7. High corresponds to the bit being =1, low to the bit =0. What this all means in the case of the 2040 printer is that the printer will respond to any port number that has bit #7 =1 and bit #2 =0. Port number = 1????0? in binary, where the question marks can be either zero or one.

The Timex-Sinclair designated port is 251 (FB Hexadecimal) which does indeed have bit #7 =1 and bit #2 =0. But the printer will respond to 6 other port numbers as well - not a very desirable situation since other peripherals may try to use those ports. This is referred to as incomplete decoding of the port address. A similar problem caused the difficulties in expanding the ZX81 to 64K.

Referring back to Figure 1, the stuff to be printed is passed out to the printer, one bit at a time, along line D7. The other data lines are used for control of the printer. The \overline{RD} and \overline{WR} signals are used by circuitry within the printer to tell it whether it is supposed to be printing stuff or whether it is to be asked for a progress report.

As an additional note on port addressing, Wes Brzozowski has pointed out in SINCUS NEWS, April '85 that the decoding logic for an I/O port should check that M1 is "high" so that the peripheral is not accidentally activated during an interrupt. This lack has caused some software using interrupt mode 2 to crash when certain peripherals were connected.



NOT A BOOK

BY DON MICHAEL

HEX TO DECIMAL & DECIMAL TO HEX CONVERSION PROGRAM

Sometimes, when working with machine code, you will find this utility handy. So MERGE it with the program you are developing.
 Note: POKE 23817,236 changes the cursor to a flashing '?'

```

000000 HEX TO DECIMAL CONVERSION
000001 DATA 243:8,102:33,0:64:205
000002 FOR I=0 TO 21 PRINT AT I,0
000003 *****
000004 NEXT I
000005 PRINT #1;AT 0,0;"testing th
000006 e use of copy 24 lines"
000007 PRINT #1;AT 1,0;"testing th
000008 e use of copy 24 lines"
000009 PAUSE 50
000010 RANDOMIZE USR 63000
000011 STOP
000012 SAVE "COPY 24":PRINT "VERI
000013 FY!":VERIFY ""
000014 PRINT #1;AT 1
000015 (0:0) "0000>HEX":FLASH
000016 IF INKEY="H" THEN GO TO 99
000017 IF INKEY="D" THEN GO TO 99
000018 GO TO 9999

```

TIP

If you want to limit an input to numbers between 0 and 65535, add the following after any INPUT statement:
 RANDOMIZE n

where n = the INPUT variable name.

If the input value exceeds these limits, you will get an integer out of range report.

TIP

To SCROLL text one line at a time, Use RANDOMIZE USR 2659
 Use this in a loop for several lines
 eg. FOR i=1 TO 5: RANDOMIZE USR 2659:NEXT i

TIP

want to toggle upper/lower case? Use RANDOMIZE USR 3139 in your programs.

The following utility program will let you copy all 24 lines from screen to printer.

In fact, you can COPY any given number of lines from the top of the screen by changing one value:
 POKE 63002,n where n = the required number of lines times eight. eg. POKE 63002,40 will COPY only the first five lines.

```

000001 HEX TO DECIMAL CONVERSION
000002 DATA 243:8,102:33,0:64:205
000003 FOR I=0 TO 21 PRINT AT I,0
000004 *****
000005 NEXT I
000006 PRINT #1;AT 0,0;"testing th
000007 e use of copy 24 lines"
000008 PRINT #1;AT 1,0;"testing th
000009 e use of copy 24 lines"
000010 PAUSE 50
000011 RANDOMIZE USR 63000
000012 STOP
000013 SAVE "COPY 24":PRINT "VERI
000014 FY!":VERIFY ""

```

PUT SOME FLASH & COLOUR INTO YOUR LISTINGS

Using the extended mode (E) (Caps Shift & Symbol Shift)

with Caps Shift held DOWN.

- a) 1 to 7 = INK colours
- b) 0 = FLASH OFF
- c) 8 = FLASH ON
- d) 9 = INK OFF

with Caps Shift NOT held down.

- e) 1 to 6 = PAPER colours
- f) 7 = PAPER OFF
- g) 8 = BRIGHT OFF
- h) 9 = BRIGHT
- j) 0 = BLACK

For INVERSE:

Use j) + a)7 to start;
 f) + d) to stop.

For Combinations PAPER & INK:

Use e) + a) to start;
 f) + d) to stop.

Note:

If a line is already in INV VIDEO, treat INK as PAPER and PAPER as INK.

TELECOMPUTING

by John Burns and David C. Ridge

I finished off the last morsel of my dessert and looked at my watch. It was only 8:00 o'clock but the storm clouds outside seemed too intimidating to drive to Etobicoke and give David a copy of the newest program I had written. If only I could simply call David up and send my program via the telephone. Now that would be something special.

Well friends as you have probably read my thoughts, that is precisely what I did! The magic of electronic mail and telecomputing has come into my and many thousands of other computerist's homes. With the addition of a modem weighing in at less than a pound I have plugged into a world of information and resources so vast and accesible that one's head whirls with the knowledge that sci-fi is here at my fingertips. With the ease of picking up the phone I can call my friend David and send him a full computer program with all the trimmings. The program can have just a BASIC listing, or be written completely in Assembly or it may not be a program at all. This very article which you are now reading was been wired between our computers via Ma Bell's express for additions and editing on our respective TASWORD II wordprocessors.

Let us not stop there. If that was all it did then I'd admit that it was not as revolutionary as it is. Now how about this. I have a question about how to set up my printer for use with my computer. My Toronto associates are not aware of the answer. I think how nice it would be to send my problems out into the world where someone might know the solution. Again the solution is just a call away. I connect with CompuServe (a continent-wide network where all computerists can communicate) direct myself to the TIMEX Sinclair bulletin board and simply type my inquiry onto the message board. It is here that the nucleus of who's who in computers across North America communicate.

While on the board I read up on what is new (like minutes old) in the Timex world and then go to the main menu. From there I log onto the Associated Press Newswire, get stock quotations from the Harvard Business Review, and see if American Express has any cheap gifts for my wife's birthday. And yes, I want a plane reservation to New York in August so I call into TWA reservation terminal and get exposed to every airline flight in North America and beyond. Well my little program with the printer can wait till tomorrow when I call up and read the half dozen answers from friends in California, Ohio, Minnesota and elsewhere.

I communicate with people all over North America, send them mail or programs. I get information I want without the watering down for the masses. At any time I am able to use my computer as a terminal for communicating. The question that find myself now asking is not "What can I do with a modem?" But rather "How could I survive without it? What can I do next?"

Well, now that John has got you all worked up about the fascinating world of telecommunications (phew! did I spell it right!?), I think this is an appropriate time to arm you with the knowledge you will need to make an intelligent and speedy acquisition of your modem. I should mention at this time that in this series of articles we will be referring to the 2068 only due to the authors' lack of exposure to ZX81/TS1000 modems.

WHAT YOU NEED

There are actually two different modems available for the 2068. The TS2050 made by Westridge Communications and a unit offered by Byte Back. The 2050 is universally considered the best choice for many reasons. The TS2050 is the modem that TIMEX was offering and therefore is most compatible with the 2068. It matches the 2068 aesthetically and has superior software available for it. So, there are only two different items you must purchase to do some serious telecomputing (assuming you already own a 2068).

I should explain that the modem can be used quite effectively with the software that comes with it (MTERM I). However using MTERM I your computer becomes a "dumb terminal". This means that you can communicate with any board or computer with your modem but you cannot upload (transmit information) or download (save received information). A TS 2050 modem without MTERM II smart software is like owning a fine automobile with no licence plates...limited in its use! MTERM II also provides a vast array of features and capabilities. One other item I strongly recommend be purchased with MTERM II is the SMART TERMINAL TELECOMMUNICATIONS manual by Barry Carter. The manual that is provided with MTERM II is not just bad, it is CRIMINALLY AWFUL! The Carter manual is a little sketchy for hard core technical types but a must for the beginner.

WHERE TO GET IT

The TS 2050 and MTERM II can be purchased at most of the Timex aftermarket suppliers, however, at the time of this writing E. A. Brown Co. was offering a nice package deal. Buy a TS 2050 modem and get MTERM II free! You can expect to pay about \$120.00 US for the modem and MTERM II is about \$24.95. Last time I asked, Barry was asking \$5.00 US for his manual.

E. ARTHUR BROWN CO.
3404 PAWNEE DRIVE,
ALEXANDRIA, MN
56308
(612) 762-8847

BARRY CARTER
P.O. BOX 614
WARREN, MICHIGAN
48090

Contd. from pg. 9

HOW TO INCREASE THE SIZE OF AN ARRAY WITHOUT LOSING ITS CONTENTS

1. DELETE all the program lines
[DELETE 1,9999]
2. Assuming the array is
R\$(200,32):
Type in the following:
10 DIM T\$(300,32)
20 FOR X=1 TO 200:
LET T\$(X)=R\$(X):NEXT X
3. ENTER 'GO TO 8'
[This will move all the data into the new array.]
4. Now type in the following:
10 DIM R\$(300,32)
20 FOR X=1 TO 200:
LET R\$(X)=T\$(X):NEXT X
5. ENTER 'GO TO 8'

[This will move the data into the newly sized original array.

6. SAVE "name" DATA R\$()
7. ReLOAD the original program.
8. ENTER 'DIM R\$(300,32)'
9. ReLOAD the data
[LOAD "" DATA R\$()]
10. Adjust variables for number of records and last number entered.

This program may also be used to downsize an array when you want to reduce the data in file.

ON ERR : How to Use

Determine the LINE at which the program auto-starts.

Just after this line put in a line: ON ERR GO TO 9990

Now add lines as follows:
9990 ON ERR RESET
9991 PAUSE 100
9992 ON ERR GO TO 9990
9993 ON ERR CONTINUE

Line 9991 may be replaced by other routines (eg. GO SUB 9900)

This program will let you save a screen to address 57000 and bring it back to the screen in an instant

Use RANDOMIZE USR 55300 to upload

and RANDOMIZE USR 55312 to download

```

1 REM SCREENSAVE
2 DATA 33,0,81,17,133,222,1,0
27,237,178,201
3 DATA 33,188,222,17,0,81,1,0
27,237,178,201
40 FOR I=00000 TO 00000 PERM
5 DOKE I,0:NEXT I
60 STOP
100 SAVE "SCREENSAVE" LINE 1: =
PRINT "Verify Now!": VERIFY ""

```

CUSTOMIZE YOUR 2068 KEYBOARD

by Larry Crawford London T/S club

ESC Escape control code circuit

If you have a full-sized printer you might appreciate this circuit which generates the series of characters for the ESC escape control code - CHR\$27; - with one keystroke. The circuit can be implemented if you use 4066's to interface the keyboard with the computer.

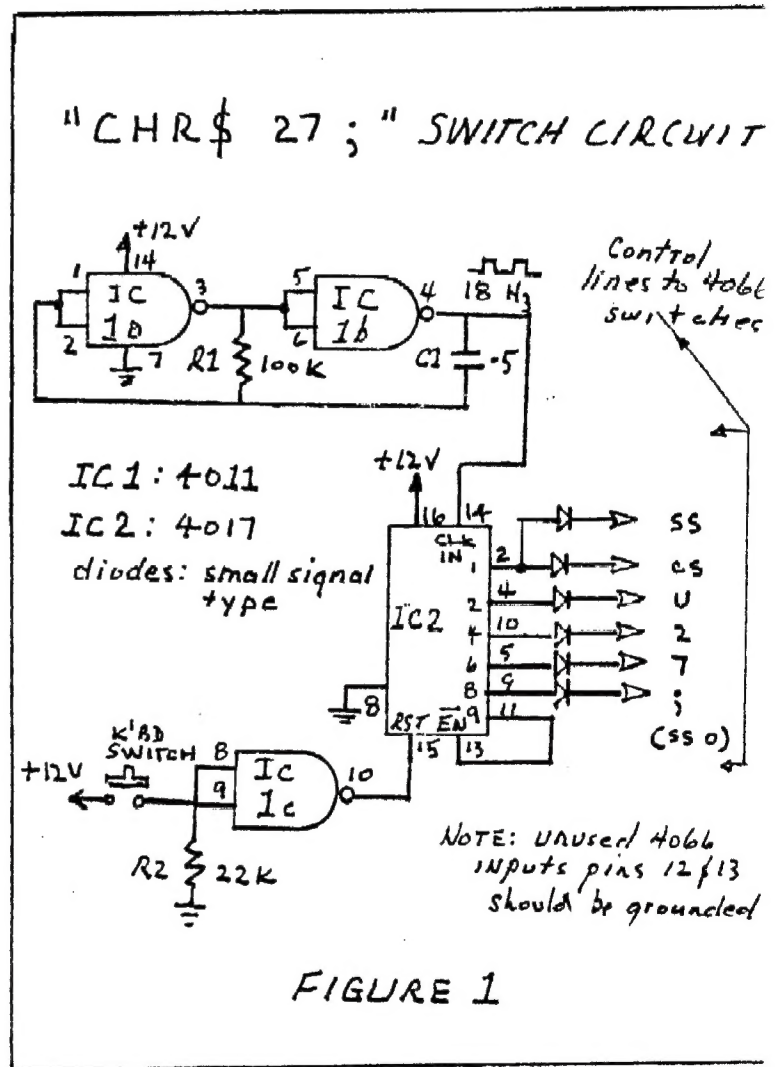
Here's how Figure 1 works. Two NAND gates form an 18Hz clock. This is as fast as the computer can digest if you have more than three lines in the PRINT statement. The 18 Hz wavetrain is feed to the clock input of a 4017 counter. The 4017 has 10 decoded outputs - 0 through 9. When the computer is fired up, the 4017 counts up to 9 before the computer has completed its startup routine. When output 9 goes high, the counter is disabled. When the keyboard switch is depressed, a NAND gate used as an inverter resets the counter to zero thus enabling it to count again. As it counts back up to 9 the appropriate keyboard lines are switched in sequence through the 4066's.

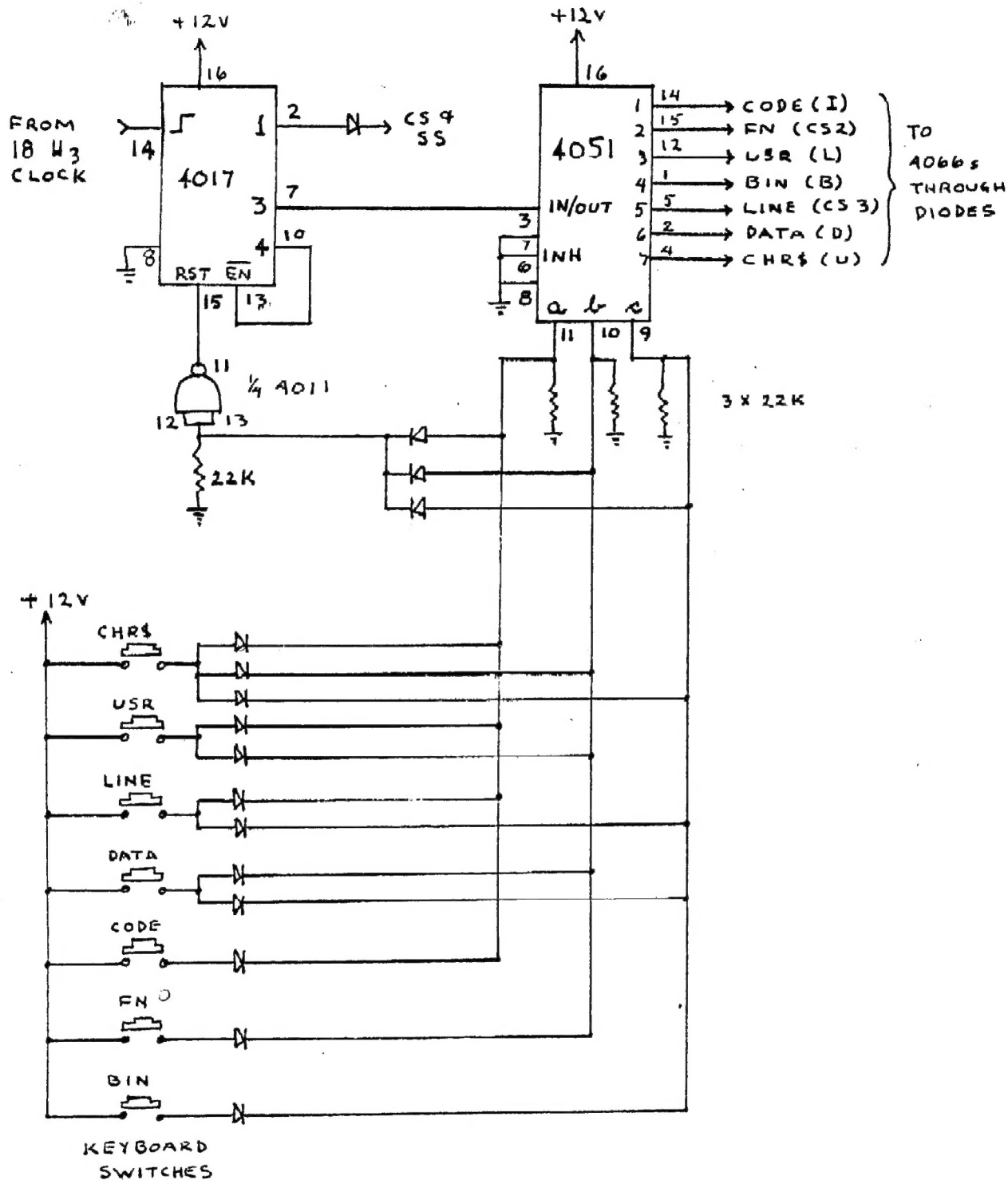
Power for this little circuit and the 4066's was taken from the output pin of the UA78L12 regulator on the computer board. It's the little one, near the big electrolytic capacitors, that looks like a transistor. If your 4066's are powered from 5v at present, be sure to change to the 12v supply. Its a good idea anyway - the higher supply voltage gives better noise immunity and allows you to use two diodes in series in the switching logic lines if you want to.

"Special Keys"

Figure 2 shows how seven Extended Mode functions can be reached with single keystrokes by using another 4017 and a 4051. The 18 Hz wavetrain is fed into the input of the 4017 counter. Output 1 is connected to the caps and symbol shift control lines of the 4066's. Output 3 is connected to the IN/OUT pin of the 4051. This chip is technically called a "multiplexer/demultiplexer" but it is really just a single pole, 8 position

switch. Pin 3 (IN/OUT) is connected to one of 8 OUT/IN pins numbered 0 to 7 according to the state of the three control inputs a, b, and c (a is the least significant bit). The keyboard switches are encoded with diodes. The respective OUT/IN pins are connected to the appropriate 4066 control lines. Any one of the 4051 control inputs going high resets the counter to zero and thus starts the count sequence, stopping when it gets to 4.





"SPECIAL" KEYS CIRCUIT
(EXTENDED MODE FUNCTIONS)

FIGURE 2

LD CRAWFORD
LONDON CLUB

ANNOUNCING: ❧ WORD SYNC 11.5 ❧

This is WSII.5, an all-new version of Powell Hargrave's WSII.4, extensively re-worked by Peter McMullin. Contains complete driver code for the Epron Services I/F, but can be EASILY set up to drive ANY popular Centronics I/F for ZX81.

NEW FUNCTIONS INCLUDE:

- IMPROVED AUTO-REPEAT
- Form Feed with automatic page OR from text
- Embedded printer escape codes are transparent to text justify routines
- Automatically adjusts to available RAM size
- All printer-dependent codes are easily modified
- LEFT MARGIN permits multiple justified text columns, multiple TABs, indents, outdents
- SEARCH, REPLACE, DELETE, MOVE functions provided
- WSII.5G has a very efficient bit-image printer graphics utility built in.
- PRINTSCREEN copies ZX screen characters to any graphics-capable printer!
- Supports WordFont, a custom-typeface utility
- Plus many other features.

Sample WordFont typefaces are shown next column. Note that all fonts may be printed double-width, and/or in inverse!

PRINTSCREEN as a separate utility also available for any Centronics I/F.

**THIS IS SANS SERIF BLOCK,
BOLD WITH AN UPPER-LOWER CASE.**

This is SERIF HEAVY, more stylized, with a personality!

This is SCRIPT, a traditional custom font-design application.

This is COMPUTA, a tribute to the computer-card age.

WSII.5.....\$30.00 +\$1.00 P&H
(Incl. WSII.5G - ANY I/F)

WordFont.....\$15.00 +\$1.00 P&H
(Incl. 4 fonts + Designer program)

Printer Toolkit.....\$15.00 +\$1.00 P&H
(For EPROM SERV. I/F ONLY)

PRINTSCREEN utility.....\$10.00 +\$1.00 P&H
(Any I/F)

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