

Still Alive With Sir Clive!

# ZXir QLive Alive!

The Timex/Sinclair North American User Groups Newsletter

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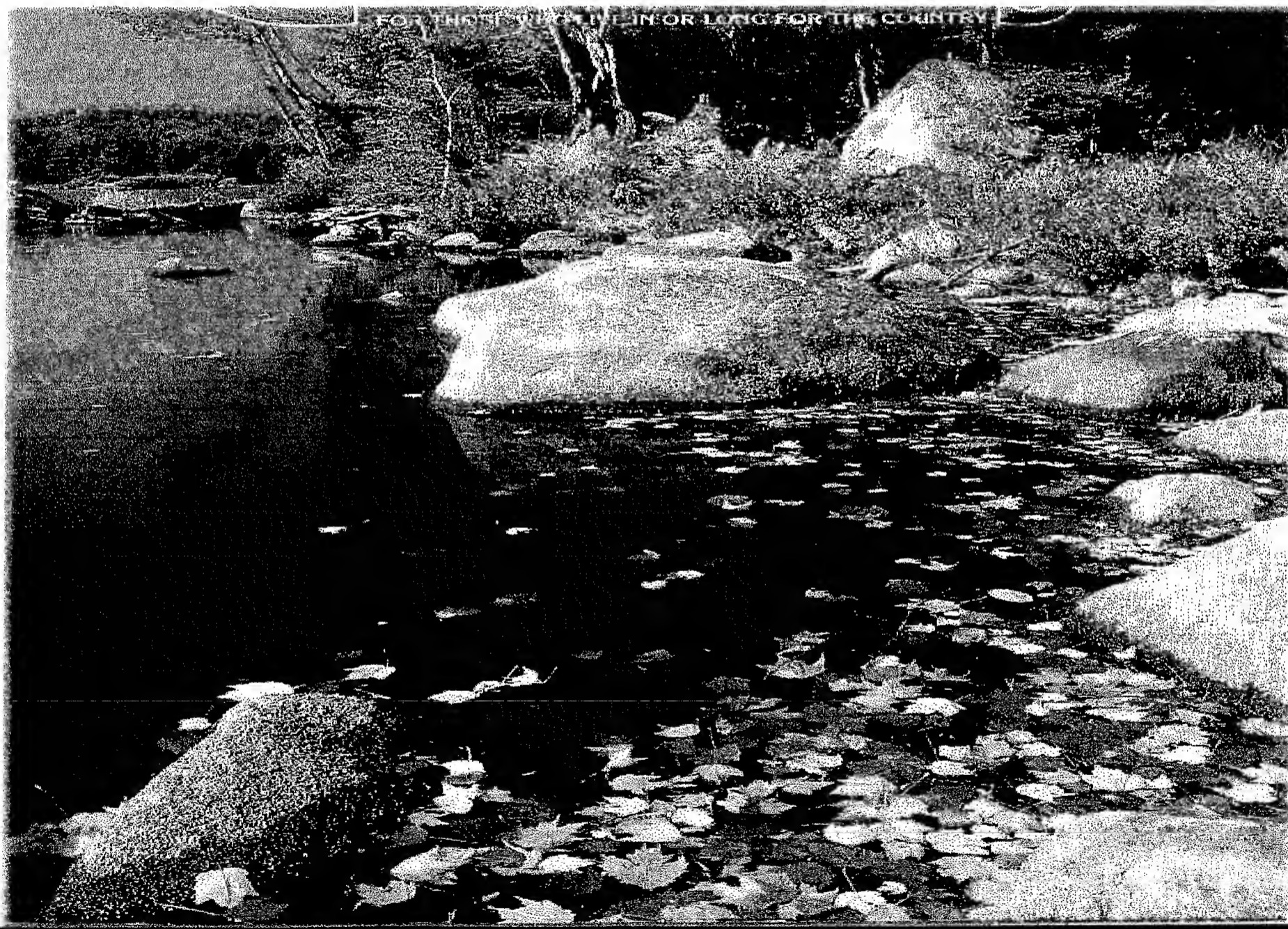
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ZXir QLive Alive! ©

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# T/SNUG Information

We wish to support the following platforms: ZX-80/81, TS-1000, Spectrum, TS-2068, Z88 and QL. If you have any questions about any of these fine Sinclairs, contact the:

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## ZXir QLive Alive!

T/SNUG's main goal is to preserve and encourage the use of Sinclair computers by providing an open forum for the exchange of knowledge, building and maintaining of software libraries. Providing vendors and members with free ad space.

## Article Contributions

Send in your articles and inputs by disk, hardcopy mail, or e-mail to:

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## Web Pages

<http://www.timexsinclair.org>  
<http://groups.yahoo.com/group/ts2068/>  
[ql-users@nvg.ntnu.no](mailto:ql-users@nvg.ntnu.no)  
[ql-users@quanta.org.uk](mailto:ql-users@quanta.org.uk)  
[www.geocities.com/NESQLUG1/](http://www.geocities.com/NESQLUG1/)  
<http://users.aol.com/clubbbs/tsnug/>

## Message to Members

*Good things do come to an end*

*I am sorry to advise you that I have ran out of material for the Newsletter.*

*I will use the moneys in the treasury until it is used up to mail you final issues for your archives.*

**Please do not send any more contributions**

*I do thank you all for your support all of these years.*

*Abed*

# Input/Output

by *Abed Kahale*

Hi Abed,

How are you? Looks like we all survived the fire season. We had one about 12 miles northwest and another about 30 miles west of us. The big one (500,000 acres) was quite a ways from us but still was scary. Very smokey times. I know there was a big one in Arizona too.

I have just recovered from my second computer crash in the last 15 months. Took me a while for this one as I have been so busy at work. This year I administered 8 construction projects (5 road and 3 bridges), two of which were night projects. For a while I was going 24 hours a day it seemed like.

Actually this is the first email I've sent to anyone since early Spring. I probably will not be checking email much until at least November due to my still heavy workload. Take care,

**Jack Boatwright**

jboatno4@outlawnet.com

I have read some literature on the subject, but there are still some confusing areas.

Would the TS2068 allow me to play UK spectrum tapes (provided I have the ROM cart, that is) ?

If so, is there a specific tape player for the system ?

Would there be any PAL/NTSC incompatibilities ?

Is there a way I can find the system & the ROM cart somewhere ? Any help locating them would be great. What exactly is the Timex 1000 ? Does it play spectrum tapes ?

Many thanks for any help you can provide,

**Loic Daneels**

loicnes@yahoo.com

Hello Loic...

If you have a T/S 2068 with a properly fitted ZX Spectrum emulator ROM you should be able to play 95% of the games and other programs from Britain as they come off the tape.

The video output for the T/S 2068 is NTSC. If you can hook it up to an NTSC television you should be ok. (I have no idea which country you are in so if the TVs there are on some other system you will have to find some sort of adaptor or replace the modulator in the T/S 2068). You could also build yourself an RGB interface and use an RGB monitor. There is also an output for a composite monitors. Some people, including myself, have used the monitor output run through the camera input of their VCRs to get output to the television.

The T/S 1000 is the same machine as the ZX-81 except it has about 2Kb of added memory. It is

strictly black and white with a almost no-existent graphic abilities. No, it does not play ZX Spectrum tapes. In fact it often has problems playing its own tapes. Hope this helps,

**David Solly**

I always wanted to put together an archive of TS2068 files/programs, but my attempts have all to often been thwarted by real life. If someone is willing to convert the programs over to TAP files I can provide a server where all of these can be downloaded from.

The idea would be to keep a 'just TS2068' archive and not bunch it up with Speccy stuff. I imagine there aren't that many different things to fill the archive with. Probably a CD full at most.

**Louis Florit**

Yes Louis, that is a good idea. I do not think that there is any TS2068 specific files on the net, at least I have not run into any. I have a boatload of old TS2068 programs, some good some bad, that I would make available for such a project. about half are on tape and the other half on Oliger disk(s). I have not experimented on how to convert tape files to either the TAP format or TZX format, but I am sure there is not much to it. I have been using the "Taper" utility lately, but run into some problems between it and my soundcard. It could be just a compatibility issue as it is a cheap onboard soundcard.

If anyone is serious about this project I say lets go for it. It would be a great way to distribute the old programs and for them to see the light of day again.

**Luke Perry**

I am wondering if anyone here has had any success in using CDs as a mass storage device for Timex Sinclair 2068 programs using any of the following methods:

1. Tape direct copy to CD
2. T/S 2068 tape output to CD
3. Warajevo or Z80 (i.e. Lunter emulator) tape output to CD
4. Warajevo or Z80 (i.e. Lunter emulator) audio file to CD
5. Emulator \*.TAP, \*.MDR or similar non-audio file formats.
6. Other methods!

I would think that methods 1 and 2 - if they work, would be the best way to make files that everyone could share. Anyone have any other ideas? Thank you.

**David Solly**

If you're intent on distributing CDs, maybe. But TAP makes a lot more sense for most purposes. As for creating that CD -- it should be done by taking a TAP file and converting it to a WAV, then burning that to a CD, with no analog hardware intervening. That will give the most accurate reproduction.

Using a CD full of TAP files, instead, of course implies a second, more modern computer running something to serve them up as audio; but I doubt that would be a problem for most people. You could even include the necessary software on the CD.

Now, if you've only got a standalone audio CD recorder, then yeah, you could probably hook that up to the 2068 and get a better recording than with tape. Personally, I wouldn't touch the old tape interface unless forced. I go LarKen Disk drive <-> old XT with 5.25" <-> LAN <-> modern PC. :-)

**William McBrine**

wmcbrine@telocity.com

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Rod & Abed,

I am currently selling off my excess 2068 stuff on eBay. There is still a lot of interest out there. Does T/SNUG still have a tape and or disk library? I was thinking of referring people to ZXir QLive Alive! as a source of information and new members. What do you think?

**LesCottrell**

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Let me clarify - I'm not selling **all** my stuff. I will always keep my main 2068 LarKen system, but I no longer need to have 5 2068's and several LarKen systems. I was wondering where to refer these folks to. Does anyone still maintain a tape library? And if anyone has a little white zx80, I got over \$330 for a ratty looking one on eBay!

Now that I am retired and on limited income I am trying to prepare for a good Christmas at our house. :-)

**Les Cottrell**

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Abed,

I want to most sincerely add my appreciation to that I'm sure you have received from others for your dedicated efforts in serving us Sinclair fanatics. Good job, well done! As someone who has put out various newsletters myself for over 40 years I know there come times when "the well runs dry" and one must move on. I just want to say thank you for being there for us.

I was contacted a few days ago by the administrator of Kenton Garrett's estate and he said they had so many things of his to sort through -- like manifold time-capsules of his life -- that they had not yet gotten to a listing and appraisal of his numerous Sinclair items, hardware, and software. Part of their problem too is that none of them have that much knowledge about Sinclair and T/S computing so they may not

always know what they are looking at. I told him possibly if they made a list of all items and offered them as a package they might be of more interest and value to prospective collectors/ purchasers.

If they do offer such a listing of items or package of items for sale, would you have any suggestions I could forward to them as to person(s) who might be interested in being contacted by them? If so, I would be glad to forward that information and try to get them in touch with each other.

With best regards,

**Bob Hartung**

revrdhtp@netscape.net

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Hi Abed,

To answer your question most if not all of the TS2068 software I have is in Oliger format, so unless someone had the Oliger drive setup it would be of no use. I do have a lot of stuff on cassette but that would obviously mean making duplicates and that is a lot of work and to be honest I do not know if many people are still using their tape drives to load software anymore?

But I am always willing to help someone looking for something specific so you can pass along my email for any requests. I have not pulled out most of my stuff since my move but this would give me an excuse to.

I am also copying Les on this email.

**Luke Perry**

doidy34@yahoo.com

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I just acquired a Sinclair 2068 and wondered if any of the software on tape or cartridges for other Sinclair computers like the 1000 would work on the 2086. Thanks

**Jim Ditton**

---

You mentioned the program "UPLOAD2000" which I also used. I did have some minor problems with it initially, but found it very useful for converting some of my Timex 1000 BASIC programs to TS/TC 2068 compatibility (of course it could not convert machine code). I wonder if you were using the wave shaper device that was supposed to be plugged in on the earphone side of the cassette recorder when using the UPLOAD2000 program. I suspect it was to make the wave shape more square or cleaner. Anyway, I did like the program and it eliminated a lot of duplicate typing.

Concerning running Spectrum programs on the TS 2068, I used the Spectrum emulator that was sold by Zebra and found it great for running all of my Spectrum software. There was another emulator that I purchased but don't remember the name of it. It plugged into the bus on the back of the computer and had a switch to change between Spectrum and 2068 modes. I didn't use it because I couldn't get my

Spectrum Micro Drives to work with it and the twister board at the same time.

A fellow named Jack Dohany who supplied software and some hardware for Timex users sent me his version of the Spectrum emulator and it was perfect for me. The Spectrum ROM or Timex ROM was enabled with a very small switch located on the back or side of the computer. The Spectrum ROM was wired with pull-up resistors that were used in some if not all Spectrum computers. These pull-up resistors were actually required for some Spectrum programs to work correctly. If the same programs were run on computers without the pull-up resistors, the programs would fail.

For those users that had the AERCO Floppy disk interface, it was possible to copy the Spectrum ROM into the first 16K of DOCK bank memory and run most of the Spectrum software without actually having the Spectrum emulator installed. Unfortunately, the AERCO floppy disk drives could no longer be used unless the Spectrum and AERCO ROM code were modified to work with the AERCO disk interface, which I did and spent considerable time and effort doing. However, you could still load and save tape programs with the RAM resident Spectrum code.

**Keith Watson**

[keithwatson@netzero.net](mailto:keithwatson@netzero.net)

Hi Abed,

Wasn't a heart attack but pending I guess. 10 30 2002 had a 5 bypass operation on my heart and now recuperating. Not much I can do what with having to keep legs elevated for a while to keep the swelling down. Doctors say I am doing fine. But it sure seems recovery is so slow. Thought I'd let you know.

**Don Lambert**

[dslambert@email.msn.com](mailto:dslambert@email.msn.com)

Hello,

There are several items listed in the 'For Sale' section of your website that I am interested in buying. Do I have to be a member of the group in order to purchase these items, and - if so - are member prices lower?

I'm unclear on what the 'To Landfill' section means - are you disposing of these items completely, or will they be kept for later sale? Thanks,

**Callum Davidson**

[callumdavidson@hotmail.com](mailto:callumdavidson@hotmail.com)

Dear Callum,

This Items you see at the T/SNUG site are presently kept in two locations, one in Iowa, the other in Oregon. These items are for sale for the cost of shipping and handling only. Again, the purpose of this venture is to keep these items in the hands of those that are interested and "out of the land fills"!

I would request that you ask Abed Kahale to add your name to the list of known Sinclair users that you might be kept on out e-mail list.

Next, contact Jay Shepard in Iowa to be sure he has in stock the item that you want. He will then reply with either the cost of the shipping and handling price or direct you to the Jack Boatwright in Oregon. Best Wishes,

---GATOR---

Robert E. Swoger - K9WVY

Callum,

By clicking on the SINCLAIR Logo located on the T/SNUG home page, you will see the list of items sent to our two storage locations. The TS-2068 and QL items went to Jay Shepard who has replied to your email. The ZX81/TS-1000 items went to Jack Boatwright, the supply of which I now understand, is depleted.

Use the list of items you see at the T/SNUG homepage as a help to order from Jay Shepard. Give him the name of the items rather than the Item numbers and ignore the prices as he only requires shipping and handling which he will give you when you are specific as to what you require.

I hope this clears things up for you. Thanks,

---GATOR---

Hello Everyone...

I am wondering if anyone here has had any success in using CDs as a mass storage device for Timex Sinclair 2068 programs using any of the following methods:

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**David Solly**

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William McBrine

wmcbrine@telocity.com

## Obscure commands

Edwin Krampitz, Jr. ekrampitzjr@hotmail.com

Years ago I was involved with the defunct Hampton Roads TSUG, and I compiled a list of commands that were barely or not at all mentioned in the 2068 manual. To liven up things, I'll present them here.

### 1. PRINT #n [n = 0, 1, 2, 3, . . .]

PRINT #0 and PRINT #1 use the bottom portion of the screen where the error messages appear. Up to 22 lines are possible using AT x,y. Attributes such as BRIGHT, OVER, and INK are not available.

PRINT #2 is the same as PRINT, using the top portion of the display. All attributes are available.

PRINT #3 is the same as LPRINT and sends output to the T/S 2040 printer.

PRINT #4 and up return an error message O (invalid stream). These were probably meant for use with future peripherals. 2. INPUT #, INPUT AT, INPUT LINE b\$

INPUT #0 inputs at the bottom portion of the screen at line 22.

INPUT #1 inputs at line 23 and is the same as normal INPUT.

INPUT #2 and INPUT #3 give error report J (invalid input/output device). INPUT #4 and up give error report 0 (invalid stream). These were probably meant for future peripherals.

INPUT AT x,y behaves like "PRINT #1; AT x, y" except for inputting instead of printing. To input on the "top" (note quotes) part of the screen requires a statement such as "INPUT AT 22,0;AT x,y; . . ." This involves moving the bottom portion of the screen to the top. Line 0 remains at the top.

INPUT LINE b\$ deletes the quotation marks that usually automatically appear when inputting a string variable, so that only the L cursor appears, not "L". You can then use quotation marks within a string without having to double them—that is, keying "" to get ". But the keyword STOP is read as a string in this mode, whereas in normal input mode you could delete the surrounding quotation marks and key

the keyword STOP to stop the program.

Strings can generally be printed with the normal INPUT statement and these commands. Example: INPUT "How much money do you wish to bet?"; m Quick note: to clarify a comment made in part 1, in PRINT # (and INPUT #) statements, attributes such as BRIGHT are available WITHIN the PRINT statement, but not as separate statements such as BRIGHT 1: PRINT # . . .

### 2. CLS #

This command works on Spectrum ROMs with the microdrive in use. Keying this on normal T/S 2068s gives the ? cursor before the #.

Usually the 2068 BASIC is portrayed as a superset of the ZX Spectrum BASIC. This is generally true, but here is one exception—an example of a Spectrum statement that cannot be used on the conventional 2068. Are there others?

### 3. OPEN #n,x\$ CLOSE #n n = 0-15; x\$ = "k", "p", "s"

These commands are related to the INPUT # and PRINT # commands. OPEN # opens a data stream for your use as follows:

x\$ = "k" (keyboard): data prints on the bottom portion of the screen

x\$ = "p" (printer): data prints on the printer

x\$ = "s" (screen): data prints on the top portion of the screen, lines 0-21

For n = 0 or 1, the normal printing position is as for "k". INPUT normally uses these streams. For n = 2, the normal printing position is as for "s"; LIST and PRINT use this stream. For n = 3, the normal printing position is as for "p". LLIST and LPRINT use this stream. COPY will not be affected if you redefine this stream. For n = 4 through 15, these were meant for future peripherals and may be redefined for your own use.

CLOSE #n returns a channel to its normal value. What's the point? Let's say you want to conserve printer paper. Keying OPEN #3, "s" will have all printer output go to the screen instead. CLOSE #3 reverses this. Also, you may remember that INPUT #2 and up and PRINT #4 and up are invalid commands. OPEN can change this.

### 4. IN #n [n = 0-65535]

IN scans an input device and returns a value based on the output. OUT is related but is covered in the manual. n takes the form 256 (BIN bbbbbbbb) + y, where b is a binary number from 00000000 to 11111111 (0-255). y is the port number of the device being read; for the keyboard y = 254.

The keyboard is scanned by half-rows. Each half-row has 5 keys. The base value for each scan when reading the keyboard is 31, but some Spectrum ROMs use 255 instead. The keys in each half-row

have the values 1, 2, 4, 8, and 16 as you move from the outside toward the center. Each key pressed in a row subtracts its value from this base value of 31. If all five keys in a half-row are pressed, the value returned is 0: 31 - 16 - 8 - 4 - 2 - 1. This chart sums it up:

BIN #	Value	Keys of values	Half-for n	of n
11111110	65278	cs: Z: X: C: V	1	
11111101	65022	A: S: D: F: G	2	
11111011	64510	Q: W: E: R: T	3	
11110111	63486	1: 2: 3: 4: 5	4	
11101111	61438	0: 9: 8: 7: 6	5	
11011111	57342	P: O: I: U: Y	6	
10111111	49150	en: L: K: J: H	7	
01111111	32766	br: ss: M: N: B	8	

cs = caps shift; en = enter; br = break; ss = symbol shift Both cs keys are considered to be in the same half-row. Here is an example of use:

```
FOR g=1 TO 100:PRINT IN 65022;" ";:PAUSE
20: NEXT g
```

Press various keys in half-row 2, ASDFG, as this runs. None pressed will give 31 every third of a second (note PAUSE line). Pressing A gives 30, etc.; pressing all five keys gives 0.

IN must be used within a statement and cannot stand alone. IN n by itself gives the ? cursor.

#### 5. CHR\$ n [n < 32]

This is more of a programming trick, but you may not have realized that using these values is possible. Characters < 32 control various attribute and editing functions. For example, CHR\$ 8 is "cursor left" and is a handy backspace. Try this to create the Greek letter theta:

```
5 PRINT OVER 1;"O";CHR$ 8;"-"
```

Try this same statement with CHR\$ 6, 9, and 13.

However, color attributes, CHR\$ 16-20, can be accessed directly from the keyboard without using this statement. This is useful when printing to the screen so that you need not use separate INK and PAPER commands.

To change INK color: with E cursor, hold down caps shift and press the appropriate color key. This inserts CHR\$ 16 plus the color code.

To change PAPER color: with E cursor, simply press the appropriate color key. This inserts CHR\$ 17 plus the color code.

FLASH on: with E cursor, hold down caps shift and press 9 key. FLASH off: same but 8 key instead. These insert CHR\$ 18 plus 1 for on or 0 for off.

BRIGHT on: with E cursor, simply press 9 key. BRIGHT off: same but with 8 key: These insert CHR\$ 19 plus 1 for on or 0 for off.

INVERSE and TRUE are directly labeled on the keyboard. These insert CHR\$ 20 plus 1 or 0.

When editing a programmed statement, extra

clicks when moving the cursor within the line will tell you where such attributes have been inserted. Though you can't directly see them, you may delete them with the DELETE key.

#### 6. ' in PRINT, INPUT, LPRINT statements

This trick is barely touched on in the Timex manual. Using the apostrophe within a PRINT (etc.) statement moves the print position to the beginning of the next line. No semicolons are necessary around it. This saves using a TAB or PRINT AT x, 0 or separate PRINT statement, and it potentially could save a lot of memory in a long program with a lot of output. Here's an example:

```
5 PRINT "Line 1""Line 2"
```

"Line 1" will print at 0,0; "Line 2" will print at 1,0. Unlike TAB the apostrophe does not print over anything else that may already have been on line 0 in this example.

#### 7. BEEP abilities and limitations

Contrary to the manual, BEEP t, f (t = time from 0-10 in seconds), f-- the number of semitones above/below middle C--is not limited to 69 as the maximum value. To the limit of the computer's precision, the limit is actually 69.84586091. Minimum value is actually -60 as the book states. The full 10-second range is not available for higher f values. The T/S 2068 Technical Manual touches on this a little. Here are some relevant charts that I compiled:

f	Max. t. sec	t. sec	highest f
69.8458	4.437	5.000	67.777
69	4.654	6.000	64.614
68	4.931	7.000	61.961
67	5.224	8.000	59.634
66	5.535	9.000	57.594
65	5.864	10.000	55.777
64	6.213		
63	6.582		
62	6.973		
61	7.388		
60	7.827		
59	8.293		
58	8.786		
57	9.309		
56	9.862		
54-60	10.499		

Note that 10.499 seconds is the absolute maximum time.

All right, gang, I'd be interested in any additions or comments. Thanks for your indulgence, and maybe this will spur some discussion.

**Edwin Krampitz, Jr.**

[ekrampitzjr@hotmail.com](mailto:ekrampitzjr@hotmail.com)

Hi,

Why do you think that those are obscure commands? They are all (almost) reported in my TC2048 and TC2068 manual less this one about beep (the limit being 69.84586091), but what does this matters?

Beep 1,69 is almost un-earable... You can find some real obscure commands in my website:

[www.timex.pt.vu](http://www.timex.pt.vu)

**Johnny Red**

[encarnado@netcabo.pt](mailto:encarnado@netcabo.pt)

# Sinclair E-Mail List

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# TS-2068 Cassette LOAD AID Meter

By Donald S. Lambert from CRAGIST newsletter March/April 1989.

**L**OAD AID Construction: Plan to mount the two potentiometers R1 & R2 inside the project box to prevent accidentally changing the settings because once set there is very little occasion to change them. I laid out the front panel and marked the large holes for the meter and the speaker. I drilled a hole in each location to put a coping Raw blade through and after sanding the openings out a little undersize I used a half round wood rasp to smooth up the holes and get them the right size. I mounted a piece of perforated aluminum behind the hole for the speaker for a grill (could also use a piece of perfboard). I mounted the speakers with three machine screws and nuts and used large washers to hold the speaker in place.

**W**hen you power up the circuit the first time you might see the meter give an off scale reading to the left and if so just reverse the meter leads.

**W**hile the drawing shows the input/output at opposite ends of the case, on my unit I mounted them an inch apart. Also the cable has a simple knot to keep from jerking the connections the cable is soldered to.

**C**alibrating And Using The Load Aid: Set the speaker volume first. Play a cassette with a good program on it at a LOADable level (the LOAD AID do-t not have to be connected to the computer) and adjust the potentiometer R1 till the speaker gives a signal that is not too loud yet loud enough to override background (noise in the computer room) noise. That should be about all you need to adjust the volume. NOTE: Keep the volume as low as possible since the speaker steals a little power from the signal before it enters the computer.

**W**hile you were adjusting the speaker volume you might have to adjust the meter potentiometer to keep from pegging the meter on the right side of the scale. Once the speaker has been adjusted you can now proceed to adjust the meter. Do not adjust the volume control on the tape player or you defeat the whole idea of the LOAD AID. Play a T/S 1000 program on cassette that you have successfully LOADED and adjust the potentiometer R2 to get about 1/3 scale reading.

**NOTE:** The meter scale will no longer read the units that the scale was designed for. Then play a LOADable T/S 2068 tape and check that it is about 2/3 full scale on the meter or a little higher. If it pegs out beyond full scale then adjust the potentiometer R2 until the reading is not overloading the meter. Now, do not change potentiometer R2 but vary the

tape player volume control. Hopefully it is marked with graduations or numbers. If not mark the knob with a dot of paint or marking medium for a reference mark. Now with the LOAD AID connected to the T/S 1000 computer try to LOAD the program and not the tape player volume setting and the LOAD AID meter reading. You should get a successful LOAD at that setting of the player. Now, reduce the volume control knob by one number with the player volume control knob and try again, and if successful try again with another more reduced setting.

**W**hen you have a failure you have established (with lowest volume control setting that LOADED) the bottom signal level that will LOAD. Now go the other way with increased settings of the volume control knob until it fails to LOAD and the highest setting that LOADED will be your top limit. The meter reading halfway between those two points is the normal setting and should be what is used in the future when loading. Now do the same for the T/S 2068 computer and unless you find that it runs exceedingly high and the T/S 1000 readings where in the high 1/3 of the meter scale you have found the optimal settings. If you had too high of readings reduce the meter readings by way of R2 and start over on the calibration. The calibration should need be done only once (unless for some reason you change the settings on R2). You might LOAD some other programs to see if the readings fall in the same ballpark figure and if you are satisfied with the results it is time to close up the LOAD AID and use it.

**I** found that the same volume setting of the tape player works for all of the programs I SAVED with either the T/S 1000 or the T/S 2068. I have found that tapes from other sources have required me to change the tape player volume settings. While you were calibrating the LOAD AID I hope that you listened to the sounds from the speaker. (NOTE: on the T/S 2068 there are headers that have silent periods before the main part of the program LOADs.) I have found that there are four things to listen for:

1. You want a sharp crisp sound, not a muffled off key sound.
2. You want a sound that is continuous, if you have a sudden silence the LOAD (note that the T/S 2068 has silences in the headers) will default.
3. You want a steady sound, you don't want a

sound that comes and goes like the tape player is on a merry-go-round. If you have that problem set the tape player volume control so that the loudest part is at the highest loadable setting for that computer and hope the lower sounds will not be below the minimum to LOAD.

4. You want only the sound that the computer generated then the program was SAVED, not a lot of hum, buzz or static.

The LOAD AID helps to get the tape player level selected but it does steal a little power and with a marginal tape it could possibly prevent a successful LOAD. If you suspect that, you can try a LOAD without the LOAD AID in the circuit. Sometime s just by trying a different make/model tape player you will get a successful LOAD. If the signal sounds off key or mushy it probably is because there is a difference in the azimuth between the head used to SAVE the program and the head you are using to LOAD the program. Once I had a head that had gotten a lot of deposit on it and it sounded very mushy with a lower reading and it worked all right after it was cleaned.

08 31 2001. Further thoughts on this subject: One: a companion article on the use of an audio transformer placed between the tape player and the LOAD AID will boost the signal and two: there is a mini audio amplifier (RS2771008) that will greatly improve a signal from the tape player Again the audio amplifier is placed between the tape player and the LOAD AID. WARNING! Be sure to test the output from the LOAD AID without it being plugged into the computer to prevent a possible overload to the input of the computer.

### Parts List

Project Case. RS 270-627 \$7.79. I use it standing

on end back of my cassette recorder caddy.

P1. Audio cable modified. Use a standard 1/8 mini plug cable cut to leave about 15 inches from project case to tip of cable. (Original cable was 30 inches long and no longer available.)

SP1. Speaker 8 ohm .2 watt. RS 40-246 2 1/4 inch diameter \$2.99 or RS 40-240 2 inch for \$2.59. Could be a speaker out of an old transistor radio if it is 8 or more ohms.

Meter. The original circuit called for a 1 ma. movement meter and used a 50 microampere meter (.5 ma) but the RS 270-1754 will work although it is calibrated to 15 volts (the meter is used in volt reading circuit). If the RS 27B-1754 \$12.99 is used you will use a potentiometer (R2) instead of the resistors supplied with the meter.

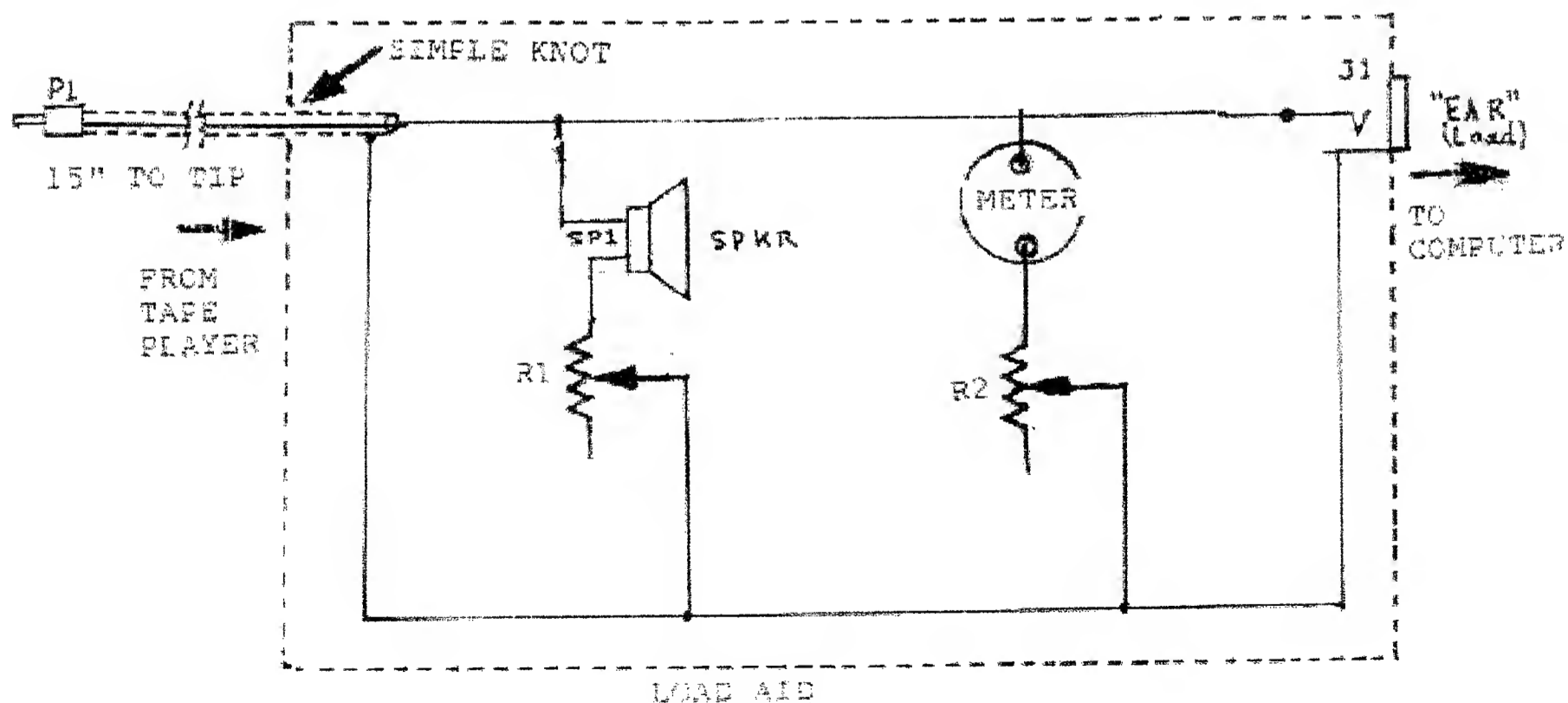
R1 1,000 ohms (1K ohms) potentiometer RS 271-227 \$0.59

R2. 25,000 (25K ohms) potentiometer RS 271-336 \$0.59.

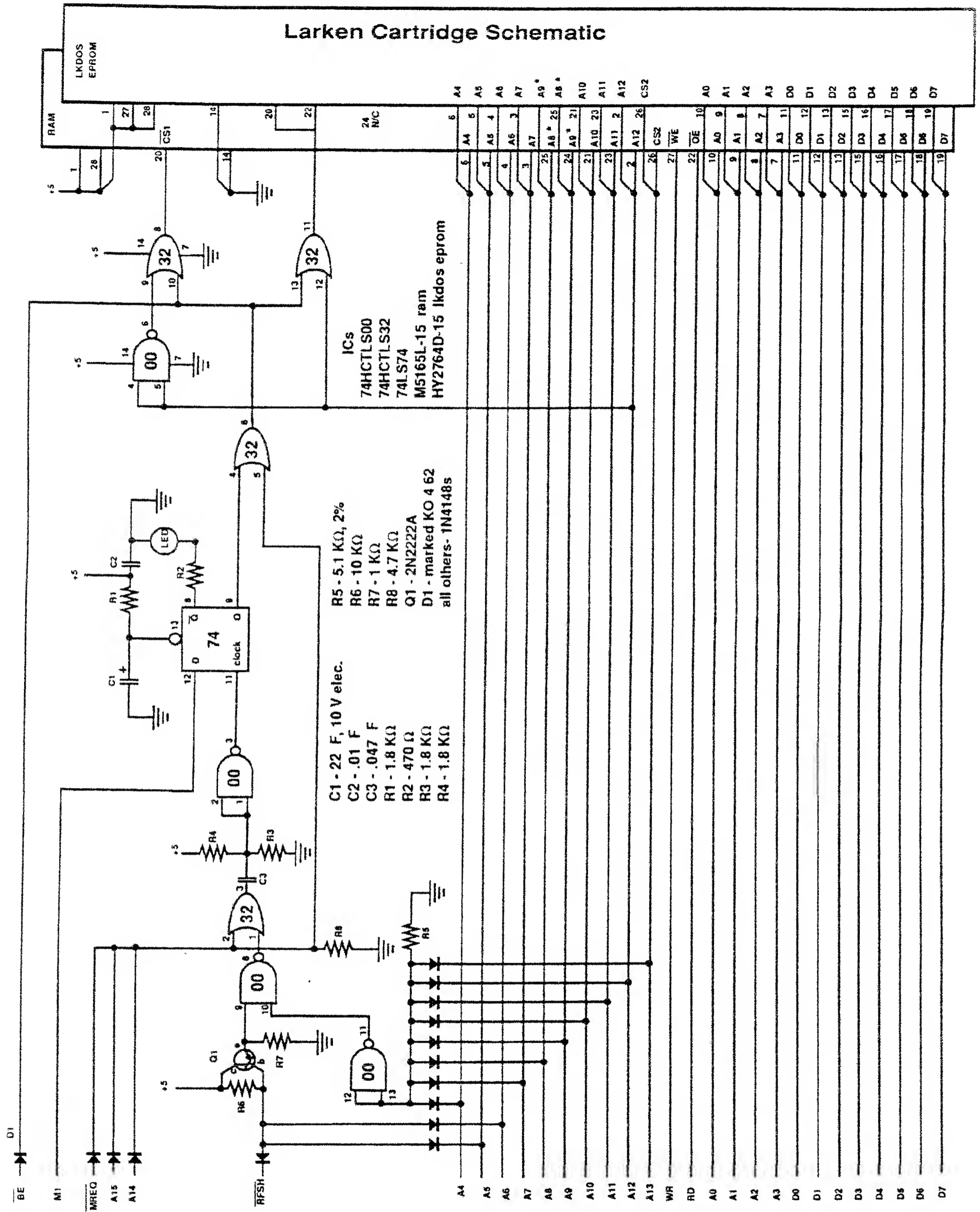
J1. Jack. Be sure it is an open circuit model. I used an open frame since they are cheaper. RS 274-251 3/\$1.89. Or you could use the other end of the audio cable that you cut off P1.

If you use two tape players as I do you will find that there is no longer the necessity to unplug and re-plug every time you go from LOAD to SAVE or vice versa as long as the two players are not connected to the same power supply excluding the 110 VAC supply. That does make life much easier and saves a lot of wear and tear on the jacks.

The potentiometers are no longer available. Perhaps you can find a local supplier. I updated the other items. The meter took a \$5.00 jump in prices a used meter could be used.



# Larken Cartridge Schematic



ICs  
 74HCTLS00  
 74HCTLS32  
 74LS74  
 M5165L-15 ram  
 HY2764D-15 lkdos eprom

R5 - 5.1 K $\Omega$ , 2%  
 R6 - 10 K $\Omega$   
 R7 - 1 K $\Omega$   
 R8 - 4.7 K $\Omega$   
 Q1 - 2N2222A  
 D1 - marked KO 4 62  
 all others - 1N4148s


C1 - 22 F, 10 V elec.  
 C2 - .01 F  
 C3 - .047 F  
 R1 - 1.8 K $\Omega$   
 R2 - 470  $\Omega$   
 R3 - 1.8 K $\Omega$   
 R4 - 1.8 K $\Omega$

SINC-LINK


Les Cottrell

# For the life of me !!!

*I do not remember submitting this to Toronto*



## SINC - LINK



MAY-JUNE '92 VOL 10 #3



## 4 TIMES SCREENS

Abed Kahale, 335 W. Newport Rd. Hoffman Estates, IL 60145

Font by ZUNK

Since my last article on the Tandy DMP105 printer, modifications were made to screen dump 4 times the normal size to about a half page worth. Also the print head is now controlled so it can plot to any location on the page. In this case, the font style controls the width; ELITE (12 CPI) & Expanded was used below. One half the vertical pixels were used for one print head pass. The program should be applicable to other printers with proper modifications. To obtain a negative (inverse video) or vice versa add NOT. NOT POINT(C,R-xx)

```

900 LPRINT CHR$ 27;CHR$ 16;CHR$ B;CHR$ 35;REM Locates head (a
margin) at 35 pixels from the left.
95 RANDOMIZE USR 100: LOAD "C.C$*SCREEN$
155 FOR Y=0 TO 175:STEP 4: LET R=175-Y: REM vertical pixels;
twice for 8-pin head.
160 FOR C=0 TO 255: REM Horizontal pixels.
170 LET B=0
180 LET B=B+POINT (C,R-.5): REM divided by 2
190 LET B=B+2*POINT (C,R-1): REM " "
200 LET B=B+4*POINT (C,R-1.5): REM " "
210 LET B=B+8*POINT (C,R-2): REM " "
220 LET B=B+16*POINT (C,R-2.5): REM " "
230 LET B=B+32*POINT (C,R-3): REM " "
240 LET B=B+64*POINT (C,R-3.5): REM " "
250 LET B=B+128
255 IF IN 127<236 THEN GO TO 255: REM Checks if READY.
260 LPRINT CHR$ B;
270 NEXT C
280 LPRINT CHR$ 27;CHR$ 98;CHR$ B: REM carriage return.
290 NEXT Y
300 LPRINT CHR$ 30: REM Back to character mode.

```

```

1 REM TANDY DMP105 PRINTER DRIVER by Abed Kahale 1/92
20 RANDOMIZE USR 100: OPEN #3,"LP"
30 RANDOMIZE USR 100: POKE 16092,0: REM No line feed (ot
herwise double spacing)
50 RANDOMIZE USR 100: POKE 16093,32: REM LPRINTs & CHR$s
sent to printer.
80 LPRINT CHR$ 27;CHR$ 23;CHR$ 27;CHR$ 14;CHR$ 18: REM E
lter, Expanded (Elongated) & Graphic mode.

```



# The Z88 Source Book

## Conclusion

### Famous Z88 Users

**Douglas Adams** - Writer of the famous "Hitchhiker's Guide to the Galaxy" books. He mentions the Z88 in his book "Last Change to See."

Teller of the magic troupe Penn & Teller (serial # 034862).

**Marvin Minsky** - Creator of Artificial Intelligence and LISP.

**Jerry Pournelle** - Science Fiction writer and columnist for Byte magazine.

**Mel Torme** - Jazz Singer.

**Stan Veit** - Senior Editor Emeritus of Computer Shopper Magazine and owner of one of the first computer stores in NY.

### Z88 Rumors

Rumor has it that the Z88 sparked the Apple Newton. The rumor says that a number of Apple execs were in a meeting when they all noticed that they were using Z88s. They wondered why they were not building something like it. This rumor may have some truth, since the Z88 was fairly popular with Mac users. They did not care that it was not PC (MS-DOS) compatible and they were used to high prices. (The Z88 was not real affordable when it first came out.)

Rumor has it that a Z88 was seen on the NBC TV show "Night Court" being used by Judge Stone ( Harry Anderson). The person that saw the episode remembers seeing a sleek black little laptop on the judge's bench.

### Z88 Emulator For MS-DOS

A Z88 emulator for MS-DOS is being worked on. I have received a copy of version 0.2. I have tried it out and it seems to work fairly well. There are still a few bugs in the system. It is not what I would call fully working. Once you leave the editor, all files stored in the emulator are lost. There is not way to save files to disk. When you start up the emulator, it does a hard reset. The author is working on this problem along with many more. You can contact the author at jeroen@login.iaf.nl. A copy of the current version of the emulator is included on the disks.

### Z88 PRODUCTS

This section is an attempt at a comprehensive list of products that are/were available for the Z88. Those listed with a \* are known to be available from one of the above dealers.

### Z88 Development Kit

[the following section is taken verbatim from Gunther Strube]

Since day one of the Z88, good developers software have been missing. However, a handful of software companies still managed to produce software; Wordmongers, Rakewell, Ranger Computers, Computer Concepts and a few others. They all probably had to use cross assemblers

(either programmed by them selves or ubiquitous versions of old CP/M Z80 assemblers). Further, to blow the software on EPROM's, they were probably using a PC with EPROM programming hardware and a special Z88 EPROM card adapter. All in all a very difficult task which only professional companies could afford to obtain. Programmers with good application ideas but no cash have always been left in the cold by Cambridge Computer.

The only development environment was the limited inline assembler of the BBC BASIC standard application on the Z88.

Cambridge Computer never produced any high level language compilers, nor Z80 assemblers, only notes about the operating system. In fact these notes were in the first year only available to third party dealers who had to sign a non-disclosure agreement before getting a copy. In '91, four years after the birth of Z88, Cambridge Computer released the V2.0 of the Developers' Notes, a slightly improved version of the bug intensive first release 0.93. With a promising detail - they were going to supply a cross assembler with source files examples and modified RAM cards to produce applications. But shortly after this release, Cambridge decided to stop everything about Z88.

The Developers project was dumped. Mathew Soar, the person responsible for the software, stopped working for Cambridge just before their move to Scotland. He managed to send the very first internal release of the "Z88 application Cook book" documentation to Vic Gerhardi of Rakewell Ltd. before leaving the company. Vic lent me the copy recently (mid '95) - and sad to say the documentation referred to a cross assembler available through another company - if you could pay 100 pounds! The booklet only explained briefly how to compile Z88 software with a few examples and a reference of macros to 10ease programming. Nobody at the time would have paid that price anyway.

All in all there has never been any software for developers, except documentation of how to write programs for the operating system. I think this is the main reason for the very quick death of the computer. A computer with no new interesting software is an almost obsolete computer. I began my own developers project in '91 due to the frustration of not having any developers software for the Z88. I believed that to prolong the life of the Z88 it was necessary to have a set of software tool for programming application for the Z88. At the time the Z88 User's Club still were running successfully and it seemed to have an interest in keeping the Z88 alive. I believed in that and began the work. The basic idea of my software was to develop everything on the Z88 itself, with an additional 10help of a cross assembler on a stationary computer.

### My story

I have become a programmer with an interest for operating systems and nice programming languages and algorithms. As with many others, my interest began with ZX80 in

primary school. Since then the ZX81 and Spectrum. With the introduction of the QL I was bitten by the elegant design of the operating system and beautiful visual design of the computer. QL is still my main machine (ported on the ATARI range of computers using the wonderful port by Tony Tebby, the designer of the original QL operating system QDOS).

I was lucky to get a job on the basis of my QL experience at Dansoft, the Danish QL agent. Imagine that - your hobby has become your professional life!

At Dansoft we were working on the first QL clone - the CST THOR PC. We managed to develop a genius piece of software for the THOR to receive and manage news from the Danish news agency Ritzaus Bureau. It was the first news program ever made on a personal computer. Even the ministry of state became our customer!

In '88 I was part of the team which made a Danish version of the Z88 computer. In our collaboration with Cambridge Computer we managed to get one of the best versions of the operating system for our Danish issue. The filing system even allowed ISO characters in filenames and we had a PipeDream application which could sort our Danish characters in the correct order. No other foreign Z88 version were able to do that. I also translated the English manual with extensive additions. The Z88 became my favorite (portable) computer.

Since then I have been using the Z88. At the time we were extremely frustrated over Cambridge Computer's bad marketing strategy with no dealer support at all. I believe the Z88 could have been a much better and more popular machine if Cambridge would have investigated into further improvements of hardware and software of the Z88.

Due to the lack of developers software for the Z88 I have since '91 been working on my own developers project in spare time. Many months have gone by without any work on it. However, the software is now completed (late '95). However, time and mass market Z88 users have more or less gone with a good number of dedicated users spread around the world.

## The good news

All is not lost, though. The last stock of Z88's (about 4000 new computers and peripherals) are now being sold through Rakewell Ltd. and Bill Richardson of EEC Ltd. at very cheap prices. 99 pounds for a brand new Z88 and 120 pounds for a 1MB RAM Card! Many new users have already bought it...

I believe it to be the last opportunity for a new market of software development for the Z88. I hope my software can contribute to a better software base for this nice little computer.

### The Z88 Assembler Workbench

This is the complete developing, testing and production software package for Z88 EPROM applications. You only need a Z88 to get started. Price of software: 150 DKK (about 15 pounds).

To obtain the software, a 128K EPROM must be sent to me. Application software will be blown to EPROM and returned to you.

You also get 720K discs containing:

> Z88 Assembler Workbench documentation in

PipeDream file format,

> Source files comprising native Z88 assembler application,

> FFRREE executable Z80 cross assembler with ANSI C source files,

> FFRREE standard routine library with corresponding source files,

> FFRREE Z88 operating system manifest header files,

> FFRREE Z88 Developers' Notes V3.

> FFRREE OZ call definitions as on-line help for QD editor users (QL only)

PLEASE SPECIFY EITHER IBM OR QDOS DISC FORMAT.

Further, as an available option, we produce a write-protected RAM card (emulated EPROM) for easy software development. The price is 150DKK. Please refer to (4). You have to send one of your own RAM cards.

I accept cash payment or check drawn on a Danish bank.

Send order with EPROM/RAM Cards to:

Gunther Strube

Gl. Kongevej 37, 2.th.

DK-1610 Kobenhavn V

Denmark

If you have any questions, just mail me on

<gunther@inet.uni-c.dk>

**The Z88 assembler workbench EPROM executable applications with pipedream documentation are copyright interlogic 1995. All other free items are public domain (interlogic still holds the intellectual copyright).**

**The nitty gritty details of the package:**

<1> Module Assembler, native executable application on Z88 with integrated on-line help. Contains all the functions of the cross platform versions.

<1.a> Executable Z80 cross assembler on Intel PC, QL computers. The object file output of the assemblers is inter-platform compatible. The object file format is defined in the documentation. The Z80 cross assembler is supplied with free source files (written in the ANSI C language). The cross assembler is currently ported to MSDOS, LINUX and QDOS/SMSQ operating systems.

Z80 machine code source files to be compiled by the assemblers may be written in any editor on any computer. All line feed standards are supported on the Z88 native application assembler (CR, CRLF or LF). Cross assemblers convey to platform line feed standards. The assemblers support modular file design with compilation of only updated source modules. All necessary identifier scoping rules have been applied. Linking object modules and code generation is an integrated part of the assemblers. Symbol-, Map- and Listing file output generation. Optional relocatable code generation (relocation program header and patch table added to code). Fast compilation:

28000 lines pr. minute on 386 40Mhz Intel hardware.

The assemblers also support library file generation and library module inclusion into application code. A standard library file is included with the assemblers. The assemblers also support the famous non-documented Z80 instruction mnemonics.

<2> Debugger. Runs Z80 code both in RAM and EPROM!

The debugger is supplied in four versions:

<2.a> Segment 0 file version (addressed for \$2000). This version enables you to single step in the Z88 operating system!

<2.b> Segment 1 file version (addressed for \$4000).

<2.c> Segment 2 file version (addressed for \$8000).

<2.d> Z88 debugger application version with 40K runtime application memory (equivalent to extended BBC BASIC application memory) and integrated on-line help. You can load machine code files into this application memory and issue all the necessary debugging. 2.a to 2.c are made for inclusion on EPROM application cards. You simply allocate a bank for the debugger in your application system data structure header and call the debugger from the application code. The Z88 operating system automatically manages both the debugger code and application code (as any other external ordinary application EPROM).

When the debugger is called it takes over control over the application and is still pre-emptable towards the rest of the Z88 operating system. The Z88 doesn't see this and just executes the debugger (and indirectly application) code. When necessary, the debugger may be released from monitoring. The application will then be executed at full speed. The debugger contains all necessary features: single stepping, register dump, memory dump, disassembly, break points, keyboard break and much more. A special feature is to manipulate 256 individual CLI log files (screen output to file memory). The average debugger speed of executing Z80 instructions is about 11 times slower than the native Z80 processor.

<3> EPROM programming software to produce application cards, using slot 3 hardware on the Z88. Includes also commands to edit/view memory and EPROM card banks. Integrated on-line help for all commands and related topics. Special features are implemented to support loading of software into the modified RAM card. Even includes commands to clone application cards.

<4> A modified RAM card (implemented with read-switch) with magnet to emulate EPROM. The test software is dumped into the RAM card (write-enabled with magnet) and then write-protected (magnet removed for write-protection). Thereby you avoid tedious EPROM blowing and erasing during software development.

<4.a> In order to get a modified RAM you have to send us one of your own cards. All sizes may be used (32K, 128K, 512K and 1024K). I use a professional electronics engineer to make the modifications. A magnet is supplied as well. The price to do the work is 150DKK inclusive magnet. Please note that you cannot use it as a conventional RAM card afterwards, unless the magnet is mounted all the time! The write-protected RAM card is not necessarily needed to develop EPROM application software, it just makes it much, much easier.

<5> File transfer software. PC-LINK II compatible, but capable of double speed transfer and on-line ASCII translation. Client program for PC or QL is part of the file transfer software package. File transfer also supports multiple files in multiple directories, in both directions.

<6> FFRREE Developers' Notes V3 in PipeDream files (550K). Many improvements, e.g. new documented low-

level calls not previously available. Better cross referencing, V2.0 text improved. Organized for easy downloading on Z88 for on-line documentation during software development.

<6.1> FFRREE Z88 operating system manifest header files. All definitions contained in the Developers' Notes V3 are stored as text files, ready to be included by your assembler source files for compilation.

<7> About 80 or more useful library routines for application development. You will find routine for managing dynamic data structures (balanced binary trees), easy memory management (allocation/de-allocation), complete set of PipeDream map graphics functions to plot & draw lines, scroll areas and move sprite objects.

All supplied as commented source files, ready for compilation in application projects. All library modules are compiled into supplied standard library file.

<8> The complete source files of the Z88 native module assembler (400K). This illustrates many good programming techniques on how to code applications for the Z88. Further, it illustrates heavy usage of the supplied standard library routines and how to build Z88 EPROM applications.

These files are only supplied with the Z88 Assembler Workbench EPROM, and are not for free distribution. Use them for learning not copying to others!

<9> All Z88 Assembler Workbench software documentation is supplied as PipeDream files. This is mainly to avoid additional costs (printing paper issues and expensive snail mailing).

However, this makes piracy easy. I hope you acknowledge this with honesty.

<10> QL users only: FFRREE OZ call definitions as on-line help files in Jochen Merz's QD editor. With this system you have all Z88 operating system calls as on-line reference. A wonderful feature when you need a quick look at parameter details for OZ system calls during programming in QD.

## **New game for the Z88**

During the time of developing a graphics library for the Z88 PipeDream map I couldn't resist to produce a game that used the graphics.

After a completed graphics library, I began the work of ZetriZ - yes a Tetris version on the Z88 that exploits the full potential of the graphics area.

To play it, the Z88 must be turned 90 degrees anti-clockwise. All standard game features are implemented, plus shared high score file (among several ZetriZ applications), extended game bricks and configurable game parameters.

I'm working on an idea for a two-player version, which connects two Z88 with a serial 9-pin cable.

If you would like the game, send me a 32K EPROM and 50DKK.

## **Multiple Diary applications**

One thing that has bothered me since I began using the Z88, was the annoying feature of having only a single Diary application. This implied many problems if you

wanted to keep separate diary files (e.g. private and business diaries and other topics).

A simple modification of the 128K operating system EPROM makes it possible to create multiple Diary applications.

If you would like to have that, open your Z88, remove 128K EPROM and send it to my address (defined elsewhere in this document). Remember to include return postage. I have EPROM programming facilities to make a new modified EPROM.

When you receive the new EPROM, please remember to remove all power source (batteries and power supply) before inserting the EPROM. Even let the computer be left for 15 minutes to discharge the capacitor (which normally keeps limited power while changing batteries). Please remember to insert the EPROM with the small notch pointing towards the screen.

Mini-Reviews of Selected Products

## ZN-DOS

ZN-DOS is a disk operating system that allows the Z88 to use a modified Tandy TDD2 disk drive. The Tandy TDD2 is a portable, 3 1/2 inch, battery-operated, serial based disk drive designed for the Tandy Model 100 and 102 laptops. ZN-DOS comes with an EPROM, cable, and disk drive. ZN-DOS can be purchased without the disk drive if you already have one. The drive will need to be modified.

ZN-DOS has the following menu items:

Bank: Switches between two available "banks" on the TDD2 disk drive. Each bank can hold up to 40 files, with a total of 80 files per disk. Total disk storage is roughly 200K. The largest file size is 64K.

Directory: Provides a directory of Bank 0 or Bank 1.

Format: Formats a disk.

Kill: Delete a file.

Load: Move a file to the Z88.

Quit: Exit ZN-DOS.

Rename: Rename a file.

Save: Move a file to disk.

## Rangerdisk Disk Drive

The Rangerdisk is a 3.5" battery powered disk system. It formats a disk in 720K MS-DOS 2.1 format. Z88 files can easily be copied to a MS-DOS system. It's size is 18cm x 14cm by 67 mm. It comes with a cable to hook to the Z88, an AC adapter, and a 32K EPROM with the disk OS software. Performance of the disk drive is limited to 9600 baud transfer from the Z88 to the disk drive. The software is easy to use and allows selection of files the same as the Z88's Filer. The Rangerdisk commands are:

Catalogue Disk	<>DD
Catalogue Z88	<>CF
Select Z88 Device	<>SV
Select Z88 Directory	<>SI
Save to Disk	<>DS
Fetch from Disk	<>DF
Change Disk	<>DC
Erase Disk File	<>DE
Rename a Disk File	<>DR
Format Disk	<>FM
View Disk File	<>DV

## Hardware

Extra Memory: 32K, 128K, 256K, 512K, 1Meg\*

EPROMS: 32K, 128K, 256K, 512K\*

Portable Disk Drive w/ ZN-DOS\*

(This is a Tandy Model 102 Disk Drive with software to make the Z88 work with it)

**SuperTwistalite by Aware Tech**

(Add-on light to illuminate the Z88 screen in the dark)

**Topper: Plastic to cover top of Z88.\***

RangerDisk: 3.5" 720K drive in MS-DOS 2.1 format.\*

Battery Pack: External battery pack.

ADAM, Ranger Computers Ltd: AD Acq. Module.

Disc-88, XOB: Disk Drive System

Z88 Barcode Reader, Ranger Computers Ltd.

Miracle Systems Z88 v23 Modem

## Books:

"Z88 Computing" by Ian Sinclair

"Using Your Z88" by Patrick Hall

"Z88 Developers' Guide"

"Z88 Practical Applications Book"

"BBC Basic Reference Manual (Z88)" by M-Tec

"Z88 Dabhand Guide" by "authors of Z88 OS"

"Z88 Magi" c by Gerhardi, Gerhardi & Barry

"Z88 Real Power Computing" by F. R. Flaig

"Z88: A Dabhand Guide" by John Allen

"Z88 Portable Computing" by Dave Osborne

## Software:

AccountZ, S&S Computer Advice: Bank Account handling.

BackupZ, S&S Computer Advice: Dump Z88 to Spectrum tape or microdrive.

CNC Link, Ranger Computers Ltd: Link to CNC Machine Tools.

CountZ, S&S Computer Advice: Typing Test.

DataOrganizer, Harvest Info. Systems: Database

DreamWord: Z88 to Tasword 3 on Spectrum.

Event Control System, Front Line Computers: Time

swimming, skiers, runners.

EZ-Money, WordMongers: ZBase Application.

FingerOrganizer, Harvest Info. Systems: Typing Tutor.

Form7 Administrator, S&S Computer Advice: School Admin, zBase App.

G-Term, WordMongers: Terminal for Telecom Gold.

Golf, WordMongers: Golf game.

Guardian, DanSoft: Password protection.

Harvester Word Chip, Harvester Info. Systems: Spell Checker.

IMPEXP80, C-Port: Transfer to different computer systems.

LexLink, Ranger Computers Ltd: Link to PCs with Lex Word Processor.

M-Term, WordMongers: Terminal for Mercury 7500 E-Mail Systems.

MileZ, S&S Computer Advice: Car milage allowance claims.

Old Scores, Simon Rockman: Text Adventure.

Pilots Companion, Aviation Software Tools: Flight Planner.



Phone Post System, WordMongers: PC-hosted e-mail system that

allows Z88's to link in using P-Term.

PhoneZ, S&S Computer Advice: Phone call logger.

QZ, Sector Software: Transfer program to QL.

Scazble, WordMongers: Arcade game Scramble.

School Administrator, S&S Computer Advice: Smaller version of

Form 7 Admin.

SpellMaster, Aware Technology: QuickEdit editor + WordFinder

spelling checker.\*

Squeez88, Rakewell: Compression program.

Stop Watches, Racing Car Computers: 14 Stopwatches.

T-Touch, S&S Computer Advice: Typing tutor.

TX, WordMongers: File transfer system to different computers.

Withered Toad, WordMongers: Text Adventure.

Vision 100, Ranger Computers Ltd: VT-100 terminal.

Z88-Amiga Link, Music Suite: Z88 to Amiga transfer program.

Z88-ST Link, Music Suite: Z88 to Atari ST transfer program. Z88 Travel Base, Minerva Systems: Database Program.

zBase, WordMongers: Database program similar to dBase II. zTape, WordMongers: Load and save to a tape recorder.

zTerm: Xmodem plus Terminal.

PCLink, Cambridge: PC to Z88 software & cable.\*

MacLink, Cambridge: Mac to Z88 software & cable.\*

QLink, Cambridge: QL to Z88 software & cable.\*

BBC Link, Cambridge: Link to BBC Micro.

## **NON-Z88 PRODUCTS THAT CAN BE USED WITH THE Z88**

There are a number of different products that can be used with the Z88, even though they were not designed to.

## **Laptop Light**

The "Notebook Computer Light" is a light designed to be used on non-backlit laptops and claims to be useable on all laptops. Essentially the unit is a battery pack and a light that peeps over your laptop screen and casts down it's light. It attaches above the laptop screen like a C-clamp. The light bulb is an "Ektron" bulb and looks to be the same bulb used in the ever-popular "Itty Bitty Book Light." In other words, It's a small high intensity bulb. The unit weights just 7.8 oz. It comes with rechargeable AA NiCads, an AC Adapter/Charger, and a travel case (6" x 2.5" x 7/8"). It costs \$39.95 (plus \$3 USA shipping) and is available from ASF Assoc, Ltd, Box 625, Merrick, NY, 11566, 1-800-771-3600, and Fax 1-516-868-6897. I'm tempted to get one of these, but I don't have a pressing need for it.

## **Laptop Cases**

A bunch of laptop cases are available through all sorts of sources. Most of these cases were designed for PC or Mac laptops, but can easily be used for the Z88. A number of them have some nice features. They have places to put disks, cables, printer paper, paper files, etc. Some are designed to be portable offices with storage space for pens, pencils, tape, small staplers, etc. Be careful of the prices. They can cost anywhere from \$30 to \$100. Other soft

cases designed for other uses can be made to fit for the Z88. A creative use of rubber foam can create a custom fitted case.

## **Laptop Magazines**

There are a number of laptop magazines available at your local magazine rack. They sometimes carry some general laptop articles that can be applied to the Z88. They carry a number of laptop products that can be used with the Z88 (printers, modems, etc.). I found the above mentioned laptop light in one such magazine.

You may not find enough good information in each issue to warrant getting a subscription, but you may find one or more of these magazines at your local library.

## **INCLUDED UTILITIES AND FILES**

The following files come with the Z88 Source Book:

- z88pd\_zip - Original files from the 1<sup>st</sup> edition
- z88pd2\_zip - Additional general Z88 files
- z88ql\_zip - QL Specific Z88 files
- devnotes\_zip - Z88 Developers' Notes version 3
- ozdefc\_zip - OZ definitions
- qlz80asm\_zip - Z80 Cross Assembler for QL
- pcz80asm\_zip - Z80 Cross Assembler for MS-DOS
- z80lib\_zip - Z80 Library for Cross Assembler
- z80src\_zip - Source Code for Cross Assembler
- z88em\_zip - Z88 Emulator for MS-DOS version 0.2

QL users get some additional Z88 User Group files. These files would not zip and the file names are not MS-DOS compatible. MS-DOS users will get some MS-DOS Z88 User Group files. There may be some duplication of files between some of the ZIP files. Since they came from different sources, I did not have a chance to go through every file.

## **Original Files**

There are a number of Z88 utilities that have become classics over the years and are almost standard for most Z88 Users. Below is a description of these important utilities.

Z88COMM - As mentioned above Z88COMM is the standard communications program for the Z88. Like the built in VT52 program, Z88 provides the ability to log onto BBSs but it also supports ASCII and XMODEM file transfer. Since Z88COMM is written partially in Machine Code, there is a slight risk of Z88COMM crashing the Z88. Run your version without any important file, just in case. (I found this out the hard way.)

ZFU - This is an archive, compression, and backup utility, very similar to PKZIP. ZFU allows you to do full, differential, or incremental backups. Multiple files are compressed and stored in a single file, making it easier to transfer the file out of the Z88.

ZCP - This is another Z88 communications program. It supports ASCII and XMODEM file transfer. Since it has no documentation, I have to guess that some of the commands are for transferring files between Z88s. Not having a second Z88 I have not tried this. It looks as though you can control one Z88 from the other (for file transfers only).

PAT2PCW - This BBC BASIC utility provides many

important add-on's to BASIC on the Z88. New commands deal with graphics, allow line editing, text and graphics windows. For advanced BASIC programming, this utility is a must.

ROMDMP - ROMDMP (ROM Dump) is a utility that allows you to do a HEX and ASCII dump of the Z88's ROM. The included text file shows a sample dump of the BBC BASIC area.

ZRLE - This program allows the decoding, displaying, and printing of RLE files. An RLE file is a graphic file stored in a Run Length Encoded file. RLE files can be displayed on a number of computers. PAT2PCW is needed for this program to run.

Z88TOOLS - This is a sample BBC BASIC program that shows some of the features of the VDU command. It shows how to have bold text, underlines text, flashing text, etc. Shows you how to "pretty up" your BASIC programs. Many of the BASIC programs on the disk utilize the same features demonstrated in Z88TOOLS.

## Other Utilities

Below is a list of the files that are included on the disk that comes with the book. All BBC Basic files have been converted to plain text CLI files (at least those that I could convert). These files can be converted to tokenized BBC Basic on the Z88. Documentation files are in plain text. All files can be sent to the Z88, from the QL, with the utilities included. PCs will need a copy of a communications package like ProComm.

ADDLF.CLI Add LineFeeds to each line to make it compatible with MS-DOS.

ANIMAL.CLI AI Animal query/learning game.

BOMBER.CLI Video game. Bomb buildings before hitting them.

CAMEL.CLI Desert trekking with a Camel game.

CATERPIL.CLI Video game. Eat fruits but don't eat the mushrooms.

CODEBRK.CLI A version of the game Mastermind.

CRDFIL.CLI Card File Utility.

CRDFIL.TXT Document file for CRDFIL.

### CRDFIL.INF

CRLF.CLI Like ADDLF.CLI with modifications.

DICONIX.PE Printer file for Diconix printer.

EPCAT.CLI Catalog EPROMs.

EPCHK.CLI Check EPROMs for total erasure.

EPCHK.TXT Doc file for EPCHK.

EPLOAD.CLI Load file from EPROM.

EPSON.PE Printer file for Epson printer.

FINANCE.CLI Financial Calculations.

GLISSADE.CLI Sample sound program.

GRAPH2.TXT Describes GRAPHALL.CLI.

GRAPHALL.CLI Graph PipeDream spreadsheets and printer them out.

HOUSE.CLI Draws a house.

HX.CLI Hex Import.

HX.TXT HX.CLI document file.

KINGDOM.CLI Rule a kingdom type game.

LABEL.CLI Make mailing labels.

LABEL.DAT Data file.

LINK.CLI BBS like program to hook to a host computer.

LINK.TXT Documentation.

PAT2PCW.CLI Patch II.

PATCH.TXT Documentation for Patch.

PATCH2.TXT Documentation for Patch II.

PATCHDEM.CLI Patch demo.

PHONE.LOG Log file for Z88COM.

### PRTCONV.ZFU

ROMDMP.CLI ROM Dump program.

ROMDMP.TXT Documentation.

ROMDP2.CLI ROM Dump version 2.

SOUND.TXT Documentation

SOUND2.CLI Sound demo program.

STAR.CLI Draws a star.

WCHILL.CLI Calculates wind chill factor.

WIZARD.CLI Game.

Z88COM.CLI Communications program.

Z88COM.TXT Documentation

### Z88PDRI.ZFU

Z88TOOLS.CLI Program shows some neat features of BBC BASIC.

ZCP.CLI Z88 communications program.

ZFU202.CLI Archive program (like PKZIP).

ZFU202.TXT Documentation.

ZRLE.CLI RLE file decoder, displayer, and printer.

ZRLE.TXT Documentation.

## Z88 User Group Files

Although the Z88 User Group is officially defunct, Ian Braby, the software librarian has not officially released the whole Z88 User Group library. Copies of the library have been available through various sources (other Z88 users, the Internet), but Ian has only approved a select few to be distributed with the Z88 Source Book.

Below are some instructions on how to transfer Z88 User Group files to the Z88. These instructions are PC specific, but the read should be able to adjust them to almost any platform. I have not tested these instructions, so I provide them with no warranty.

### How to Transfer Z88 User Group Files

At the MS-DOS prompt, type MODE COM1:96,n,8,1. This sets the serial port to 9600 baud with the correct parity. The Z88 should be similarly set from the SETUP Panel to 9600 baud and XOn/XOff set to "YES" Create the subdirectory LIBRARY on the Z88, into which the unpacked files will be sent, unless you have any of the following programs:

File	Directory Name
Z079	STATS
Z081	Z081
Z109	Z109
Z150	Z150
ZB01	STOCK
ZB02	FRONTEND
ZB03	BOXCHARS
ZB04	ZBASE/CARD2
ZB05	ZB05
CLIBRARY	CLIBRARY
X022	X022

Connect the two computers and enter Imp-Export on the Z88 and press "B" for batch receive. On the PC type, for example:

**COPY Z007 COM1**

The Z88 should show that it is receiving at this point. When the list file is received, press ESCape on the Z88 and all's done.

### QL Specific Files

- Z041 MORPH.BAS - Metamorphose one shape into another.
- Z042 PLOTFX.BAS - General function plotter.
- Z043 COMPARE.BAS - Compares two files byte by byte.
- Z044 HEXDUMP.BAS - Dumps a file to the screen in ASCII and HEX.
- Z045 FNBASES.BAS - Converts numbers between bases.
- Z046 FNINTEGRAL.BAS - Calculate functions of X.
- Z049 LISTER.BAS - Prints out BASIC files in structured format.
- Z050 EPLOAD.BAS
- Z051 Z88COMM.BAS
- Z052 FADDER & DTAB - Add LF and Tab remover.
- Z054 EPCAT.BAS
- Z055 FILDMP.BAS
- Z056 DISZ88 - Z88 Disassembler.
- Z057 DECIDE.BAS - Decision making program.
- Z058 FINANCE.BAS - Financial analysis program.
- Z059 MAXIT.BAS - A "screen-oriented" game.
- Z060 WIZARD.BAS - An adventure game.
- Z110 Z88-IMPEXP - Binary file for Spectrum to transfer files to/from the Z88.
- Z111 COPYFILE - Copies files from device to device.
- Z112 LABEL PRINTER - Prints labels.
- Z113 XEROX 4045 Laser Printer Driver.
- Z118 STARTREK.BAS - Classic game.
- Z120 YAHTZEE.BAS
- Z133 SPECTRUM-LINK - Another Spectrum program to transfer files to/from the Z88.
- Z157 FCOMPARE.BAS - Compares updated files to each other.
- Z158 EPROMCAT.BAS
- Z159 ROMDMP6.BAS
- Z175 OTL - Outliner program.
- Z176 ZBSCR - zBase screen generator.
- Z177 ZBOPT - zBase program optimizer.
- Z178 ZBASOPT - Optimises BASIC program by removing REMs.
- Z179 PRTCONV - Converts PipeDream to pure ASCII.
- Z180 UNITS - Convert between lots of units.
- Z181 SOUND - Sound Designer program.
- Z182 CARDS - Toolkit to generate suits and backs of cards.
- Z183 CAMELS - game.
- Z215 EPCHK - Checks EPROMS to see if they have been completely erased.
- Z216 ZRLE
- ZS03 ZFU v. 2.02
- X010 BOOT.CLI
- X011 DELETE.RAM. - Erases files lurking in RAM.
- X025 CLIs - A collection of useful CLIs.
- ZB01 STOCK - Demo database for zBase.
- ZB02 FRONTEND - Front end to zBase.
- ZB03 BOXCHARS - Allows lines and boxes to zBase.
- ZB05 ADDRESS - Address book database for zBase.

## PC Specific Files

Z213 HX - Allows you burn EPROMS and run them as if they were ROMs.

Z214 CARDFILE - Card file database.

*From Les Cottrell*

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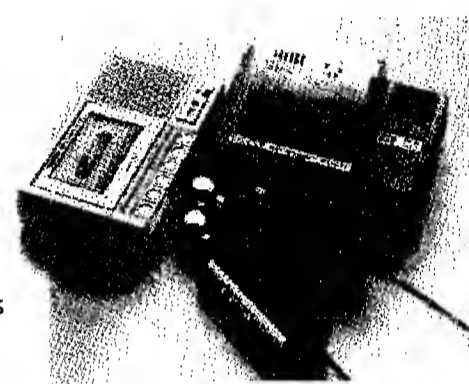
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## ZX-TEAM MAGAZIN

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