

Still Alive With Sir Clive!

ZXir QLive Alive!

The Timex/Sinclair North American User Groups Newsletter

Volume 9 No. 1

Spring '99

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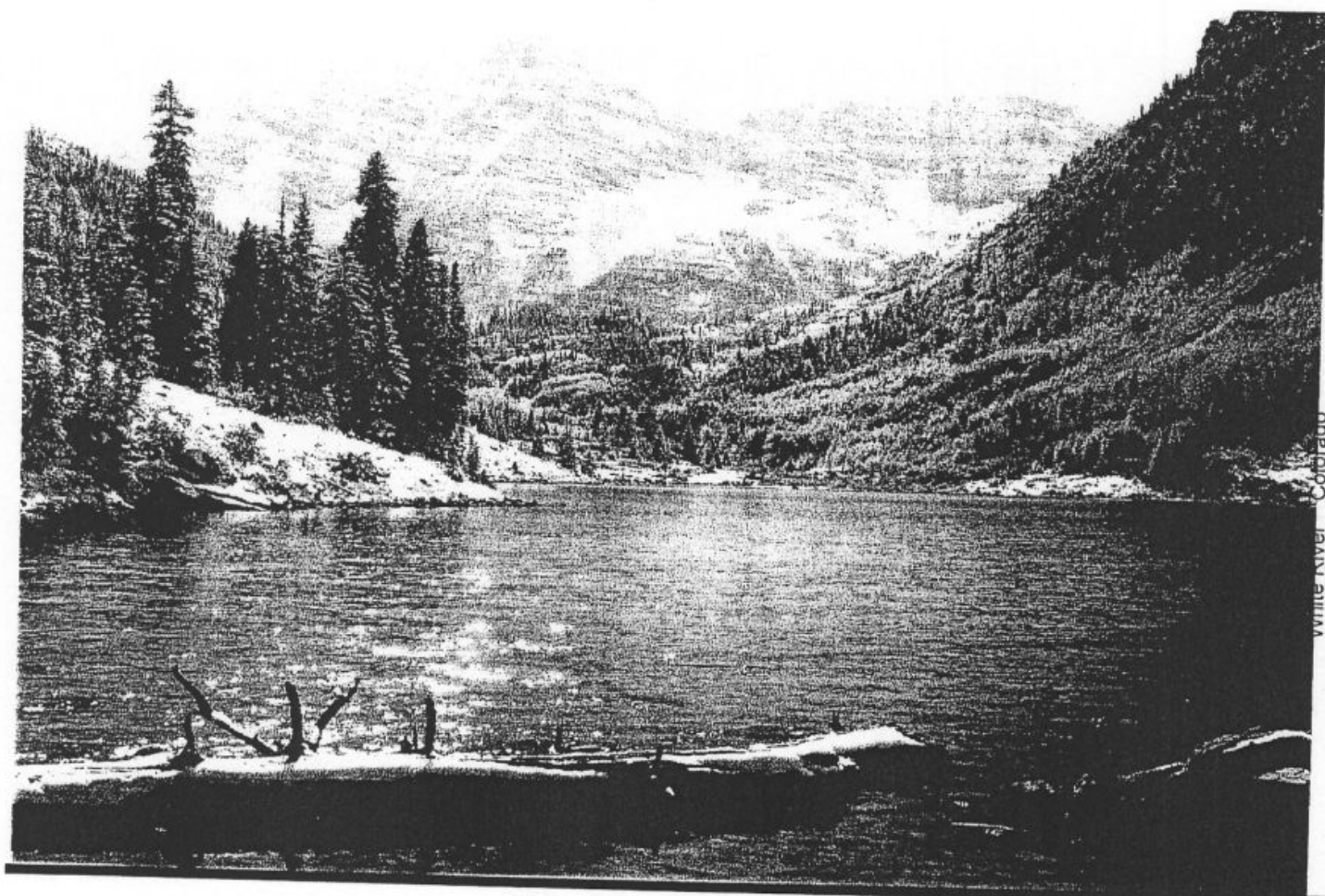
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White River Colorado

White River Colorado

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Established 1991 The Timex/Sinclair North American User Groups Newsletter

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:

Chairman

Chief Motivator
Donald S. Lambert (ISTUG)

Vice-Chairmen

Tape & JLO PD Library

D. G. Smith
415 Stone St.
Johnstown, PA 15906
814 535-6998

Z88 Library

Dave Bennett (HATSUG)
1275 Timber View Dr.
Mechanicsburg, PA 17055-9146
717 732-4374

QL Hacker's Journal

Timothy Swenson
2455 Medallion Dr.
Union City, CA 94587-1914
swensontc@geocities.com

TS-2068

Rod Humphreys (VSUG)
10984 Collins Pl.
Delta, BC V4C 7E6 Canada
604 583-2819

QL PD Library

John Donaldson (CATUG)
835 Foxwood Cir.
Geneva, IL 60134-1631
630 232-6147

AERCO & Z80 Emulator

Keith Watson
41634 Amberly Dr.
Mt. Clemens, MI 48038

BBS ---GATOR---

Bob Swoger (CATUG)
613 Parkside Cir.
Streamwood, IL 60107-1647
630 837-7957 Work 847 576-8068

Any of the above can also be reached by E-Mail through the Club BBS 847 632-5558

ZXir QLive Alive!

Is the newsletter of T/SNUG, the Timex/Sinclair North American User Groups, providing news and software support to the T/S community in a **VOLUME** of four newsletters per year, beginning with the Spring (March) issue.

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, repair service and members with free ad space.

It is the user groups and individual subscribers, rather than the vendors, that provide the pecuniary support for this newsletter. Vendors and developers receive this newsletter free of charge, though contribution from vendors and user groups is gratefully accepted. Please support our vendors and service providers whenever possible.

If you have a problem or you have solved a problem, please share it with the rest of us. No problem will be considered unimportant.

Editor/Treasurer Publisher

You can keep T/SNUG alive by an annual contribution of \$12 for one VOLUME made payable to Abed Kahale. Send check to:-

ABED KAHALE
3343 S FLAT ROCK CT
SIERRA VISTA AZ 85650-6874
520 378-3424

Back copies are available for \$1.00 each postpaid.

Trea\$ury Note\$

As of March 1, 1999, we have a balance of \$965.78

Article Contributions

Send in your articles by tape or disk and your inputs to:-

DONALD S LAMBERT
1301 KIBLINGER PL
AUBURN IN 46706-3010
Phone 219 925-1372

By hardcopy, e-mail or modem (.3-33.6) to:

Abed Kahale

E-mail: AKahale@compuserve.com

GATOR'S

Twisted Pair

To better inform the Sinclair Community, four 24-hour a day BBSs are now provided to serve you. You are encouraged to exchange mail and use the files sections of these boards.

Bulletins and ads are available to all.

Q-Box BBS 810 254-9878

Utica, Michigan

SOL BBS 520 882-0388

Tucson, Arizona

Club BBS 847 632-5558

Arlington Heights, Illinois

WebPage

<http://users.aol.clubbbbs/tsnug/>

If you know the Internet E-Mail address of a Sinclair user, but do not have access to Internet, simply address your E-Mail to GATOR Sinclair on the 24-hour Club BBS and include the name and E-Mail address of the user you wish to reach. Then check the Club BBS from time to time if you expect a reply.

We encourage you to exchange mail and contribute to the UPLOAD section. Call and register using your first, last name and phone number along with a password you won't forget. *Write It Down!* Do not try to do anything else at this time.

When you call-in the next time, you will have Level 5 security and be able to enjoy full user privileges. The BBS has smaller sections called conferences. Select "J" for "Join a Conference". Select "TIMEX" to get into the Sinclair Section. The mail you then read will only be from other T/S users. Use extension .ART for articles, .ADS for ads and .NWS for news when UPLOADING.

For help, contact the SYSOP, Bob Swoger, by leaving a message, mail, E-Mail or phone.

CENG108@email.mot.com

Input/Output

by *Abed Kahale*

My Email address is actually: EdK4@aol.com, not Elk4, as currently listed.

I am again the editor of the NESQLUG News, and the listing for us should read: (Under NESQLUG News, New England Sinclair User Group)

Ed Kingsley, Editor
16 Highland Avenue
Saugus MA 01906

(781) 233-3671 EdK4@aol.com

Note that my area code has been changed from 617 to 781.

Many thanks.

We are trying a new approach, courtesy of Al Boehm. His son Bill has put up a web page, upon which we will post the bimonthly newsletter for NESQLUG members. Email Membership will be a mere \$5 a year. Those wishing a hard copy will still subscribe for the regular rate of \$12/year. All articles for publication will be sent first to me, and I will forward them to Al.

Thanks for all your help, and also for just being there. Seasons greetings!

Ed Kingsley

Subject: New Web Site and Show X-URL:
<http://users.aol.com/clu/bbbs/tsnug/>

Checked out your new web page. I am glad to see new TS stuff on the net. We will add a link to you from the NESQLUG WebPages as soon as possible.

The notice mentions the dual East Coast/ West Coast show. As far as I know the East Coast show is set for New Jersey.

Below is the notice for the show. If there is a group sponsoring a show in Pennsylvania, they should contact me as soon as possible so that the site can be resolved.

Frank Davis had sent me a email mentioning a probable ZXir QLive Alive!

Pennsylvania site, but when I emailed him back about offering discussion, he become quite curt, stated he was leaving the Sinclair scene, and requesting that I not contact him.

I checked carefully my messages to Frank and could not find anything that would initiate such a reaction. However, recently, I have heard that there was harsh discussion between Bill Cable and Frank in which my name was mentioned. But I knew nothing of this!

A draft of the below announcement was coordinated with Tim Swenson before it was released. It greatly saddens me to see dissention among users of the same computer series. Anything you can do to heal this hurt is most heartily appreciated. If you should have contact with Frank, please tell him that I hold him in my highest regard. God bless,

Al Boehm

boehm@ziplink.net

Due to lack of interest the SCC server is down. since it does not seem to generate enough interest, I will be using this h.d. space for other topics.... as of now it is shut down..... Thank you,

Jose Moreno

<http://members.tripod.com/~helpme/scc.htm>
Remove it from ZQA!

Errata

Pascal Listings

Hello Abed....

I received my copy of ZXir QLive Alive! yesterday and was glad to see my programs and comments in print. I hope they will be of use to readers and will encourage Pascal programming using the Timex/Sinclair 2068 or

US QL-East Coast Show 29-30 May

The show will be at Wesley Hall, St. Andrews United Methodist Church, in Spring Lake, NJ, about 60 miles south of New York City. QL-East will include vendors, work shops, and some interesting tutorials by Bill Cable, Herb Schaaf, and Simon Goodwin. The show includes other Sinclair computers, TS-2068, ZX-81 etc. A block of 20 rooms are available at Budget Inn, Tel: 732-775-7200.

To obtain the show rate of \$50 per night for 1 or 2 people for Friday and Saturday, mention the QL Show and make reservations by 1 March.

Spring Lake is a seaside resort area about 75 minutes from airports at Newark, Atlantic City, or Philadelphia. It's about 2 hours from JFK airport.

Local information including (probably free) transportation from JFK, can be obtained from Local Host — Bill McKelvey
mckelveyw@delphi.com

Agenda: Friday night 6 PM till? dinner at Cobblestone Restaurant. Saturday 9 AM to 4:30 PM Vendors, Tutorials, and Workshops. Fee per family is \$10 if paid by 1 May, \$12 at door. Fee includes light lunch and coffee/tea throughout the day. Sat. Eve. 6-9 PM Banquet, panel discussion, and entertainment. \$20 per person. Late nighters retreat to Bar and Grill. Sunday 11 AM at McKelvey's home there will be additional tutorials and informal discussions. Includes light lunch and beverages free.

Pay advance fees to show treasurer.

Bob Malloy

412 Pacific St.

Massapequa Park, NY 11762

Overseas attendees may obtain advance rate by notifying Bob bmalley@idt.net and paying after arrival.

Questions about the agenda should be addressed to Al Boehm [<boehm@ziplin.net>](mailto:boehm@ziplin.net) Updates will be added to the NESQLUG web page <http://www.airnet.net/boehm>

Note there is also a QL West Coast Show the following weekend. The East Coast tutorials will be video taped and available for viewing at this show.

the ZX Spectrum emulator.

I would have preferred that you have consulted me before changing the program listings. In an effort to make the

listings more aesthetic, you removed some critical punctuation which will make it difficult for anyone trying to type in and run the programs. The most notable deletions were the curly brackets ({ }) around comments. Pascal, (only the "P" needs to be capitalized), treats everything between curly brackets like one large REM statement. The other serious omission is the first line of the telephone directory program.

PROGRAM TelephoneDirectory;

{ <- Start a remark

Purpose:

This program creates a small telephone directory... etc.

End a remark -}

CONST

MaxLen = 32; {Maximum length for the "string"}

I think that most people who have experience in Pascal will make the corrections on their own. The changes just throw a monkey wrench into listings that I took so much time and effort to ensure that they were correct. Next time will be better.

I have a new computer now a Pentium II, 400. Unfortunately, it will not allow me to use the ZX Spectrum emulator until I upgrade. Once I am up and running, I will be writing more programs in HiSoft Pascal. I would still like to publish them in ZXir QLive Alive! if we can come to some sort of an agreement on format. In the mean time, perhaps you could make the listings — as I sent them to you — available from your web site.

Hope to hear from you soon,

David Solly <ac355@freenet.carleton.ca>

Sender: P.Liebert@t-online.de

Dear ZX-81 friends!

Here you will get some new ZX-81 information: 3rd ZX-81 users meeting from 26 to 28 march 99 ZX-81 users will meet at Dietges near Fulda in the heart of Germany. YOU are invited to come!!

More information see **ZX-TEAM-Homepage** under "meetings" URL see signature ZX-81 Web-Ring founded! (English only)

Very new but already with a lot of information, URL see signature.

You can find ZX-81-mailing list archives with the first 150 mails from October 96 to July 97, more will come soon. Biggest ZX-81 users group besides ZX-TEAM. Its simple and free to join, see WWW-page in ZX-81-Web-Ring site.

Looking forward to hearing from you:

yours "sinclairly" Peter

ZX-TEAM-Homepage:

<http://home.t-online.de/home/p.liebert/zx-team.htm>

ZX-81-Web-Ring :

http://home.t-online.de/home/sinclair_zx81/zx81_wbr.htm

Peter Liebert-Adelt

Subject: Re: ZX-2000 info wtd.

Hi Abed,

I found the following in the internet news group comp.sys.sinclair.

ZXir QLive Alive!

Looks like **Uncle Clive** is coming out with a new computer (ZX-2000). I find it very interesting Clive is jumping back into the PC arena.

I've had all of his systems. If anyone has a source of either article, that can be emailed or seen on the web please send it to me or post it. Here it is.

<http://www.cdworld.co.uk/zx2000/clive.html>

Take care,

Jack Boatwright

Clive Reveals the ZX2000!

(typed by Craig Rothwell & (C) Frontiers Magazine)

I want to design another computer because I think I can make a decent job of it.

I've started work on a prototype already. It's a competitor to the PC because the modern desktop computer is about a bad design as possible. It really is appalling. It wastes memory on an unbelievable scale and it slows down an extremely fast CPU with cumbersome Routines and programs. I think theres a huge room for improvement. I want to create a computer that completely portable but also totally functional so there is no compromise. I want something that is going to cost 10 times less than a current notebook PC and have a huge battery life so You won't have to keep recharging the thing.

The trick is to get the power consumption so low that you just stick in a couple of batteries and replace them a month later. I've been spending a lot of time looking at display technology, because that's one element that I haven't got. I need a very good, low cost display. I think I know how to do it, but it is an terrific amount of technology but I'm working on that very hard at the moment. In order to do the sort of computer I want it has got to be very very low power.

We designed our own CPU and its an extereamly high performance one, we had prototypes of it sometime ago and its blindingly fast, About 10 times faster than a P2. It would have to be manufactured using a specially developed semi conductor process. I've been talking to a company in this country and were at a fairly advance stage.

It's an ultra RISC chip, which has an 8-bit word, and it has 16 principal instructions.

I don't want to go into too much technical detail or bamboozle you with jargon, but this little blighter Will be incredibly fast and very efficient.

From: **Jeff Burrell** <jburrell@endocardial.com>

To: AKahale@compuserve.com

I am in the process of trying to get my 2068 repaired (some hardware hacking with a Memotek modem module damaged the SCLD). Assuming that repairs can be completed or that I can get a replacement (any suggestions?) I would be interested in learning who is currently playing with this machine. I am an electronics engineer with experience in design and construction of computer controlled medical data acquisition systems and would be interested in hardware/software projects. In the near term I would like to try (if not already done): interfacing an IDE hard drive and Zip drive to a 2068.

First the bad news, SCLDs are not available. These chips were never made available by Timex. Your best bet is to acquire another 2068, they are still available. Contact Jay Shepard :
<< jshepard@netins.net >> (He answers his e-mail on weekends.)

I am glad to learn that someone is still experimenting with the 2068. Unfortunately I don't know of anyone else who is still grooming the old horse. Whatever insight you could provide about your experimentation will be most welcomed for including in the ZXir QLive Alive! newsletter. Abed

From: Jeff Burrell <jburrell@endocardial.com>

Thanks much for the info, I have emailed Mr. Shepard about a new 2068. Here's hoping. In the mean time I'm resurrecting my TS-1000 and an old CAIO interface module to start my IDE project.

As a question: Would it make sense to try to reverse engineer the SCLD on the 2068 and replace it with a modern CPLD/FPGA? I realize that it would require adapting the new device pinout to match the old SCLD pinout. Would there be a market for this or have the machines with bad SCLDs been trashed?

I have now just found out what I have been missing in the Sinclair area. The Z88 sounds like a nice machine and it seems that I have missed FWD Computing's offerings. Know who might be selling what inventory there is left? I would be very interested in acquiring a working QL as well. It would be nice to have one each of Clive's US brainchildren.

This is a very ambitious project, wish you luck. If my memory serves me right, the SCLD is the 'Home' ROM, BASIC ROM and Extension ROM in one chip. In other words it is the brains of the 2068. Timex reserved all the rights to its design back then.....

There wouldn't be much of a market for it at this time since almost everyone is using an emulator in their PCs instead of a physical 2068.

Dan Elliot of Computer Classics is one who can use the SCLDs.

Please provide your snail mail address, I will mail you a copy of our Newsletter. Abed

Mr. Kahale,

I got your name from Rod Gowen, as he says, he is no longer able to continue his business; he referred me to you. A Couple of years ago I purchased a copy of Don Lambert's LarKen Disk Utility. Unfortunately, I did not make enough copies. When my working copy became corrupted, I went to my backup copy too soon. It was corrupted too. I have been able to get a copy of an earlier version; but am spoiled by version 5.0.

If you still use the Timex/Sinclair 2068 and if you have a copy of DUS version 5.0, I would sure appreciate a copy. I use the LarKen interface with LarKen DOS cartridge and 5 1/4 disk drives (2 side/40 track).

If you are able to do me this favor, please advise by return mail any cost (diskettes/postage etc.) you may incur. If you are short on diskettes, I would be happy to send you a couple. My Manual on Disk has survived, so I only need the one disk with the program on it.

Don Oviatt

5 Matthew Ct.

Arnold MO 63010-5126

Contact Don Lambert

Hi Abed,

The same gentleman has written me for this software. According to Rod Gowen it doesn't exist. The only version I have is 2.0 and Rod says that to the best of his knowledge, that is the latest version. I have already sent this to Mr. Oviatt...he sent it back saying it wasn't the one he needed. I have version 2.0 on both tape and disk.

Jack Boatwright

Abed,

Mr. Oviatt is not on-line, so doesn't have an email address. He had contacted me a couple month ago about this. I was going by what Rod said and didn't know there were later versions or I would have contacted you or Bob. Maybe I should get the later version for the future, though.

Take care, Jack Boatwright

Dear Abed,

I don't do much on the T/S equipment any more, but still enjoy your fine Newsletter which I read fully from cover to cover. Congratulations on a great Winter edition. I look forward to every issue, Sincerely,

Earl Kielglass

Thank you Earl.

Abed,

Did I tell you that I got one of the 2068s going finally? Must have been one of those days when I did something right, but I'm not sure what it was. Anyway, I have the LarKen hooked up and running now!!! Very cool! Seems to be working just fine. I reloaded the RAMdisk and it's working too!

< Connectors, connectors is what I tell everyone having problems with the 2068. Just unplug them and re-plug them several times and that should cure the problems.

It may have been connectors, but I was switching chips back and forth when it started working. I did ask J to send me another one anyway.....I need a backup. I thought I had one more somewhere but have not been able to find it. I can't figure out where it went, maybe I have gremlins.

I was in Portland for a work conference this week so had a chance to see Rod and we had dinner together Wednesday night. Had a good time and enjoyed the visit. He's doing well.<

< That was nice. How is his eyesight?>

His eyesight is gone now. It's sad, but he seems to have decided it's not going to keep him from enjoying what he wants to do. He is a very upbeat person and a joy to visit with. I hope to continue our friendship and visit him occasionally.

Jack Boatwright

>Hello Jeff,

>I forgot to mention that someone did reverse engineer the SCLD several years ago. He was talked out of it because of the legal aspects. Though I don't believe that Timex would prosecute some 18 years later.

Patents rights do expire after a certain time had elapsed.

Abed;

Thanks for the info on the SCLD. I don't know if Timex would be able to enforce a patent issue (18 years later at that) if the replacement was developed in a clean-room environment, but...

At any rate, it is too bad that there are so few hardware

hackers out there. An emulator is OK (I use them when necessary) but there is something about the smell of burning solder and the occasional burning IC, and sound of crashing peripheral drivers that makes playing with the real hardware so much more fun.

Jeff Burrell

How well I know.

Dear Abed,

I saw T/SNUG web page, Nice Work.

I want to thank everyone who contributes. Once I finish my Computer Science degree, I will have time to work with my Sinclairs and hopefully contribute some fantastic new program or hardware.

Due to many problems concerning email, my email address has changed, it is now <krh03@cvip.fresno.com>.

Thank you.

Ken Harbit

Hello Gator,

I was 'talking' with Al Boehm about having some Classic Sinclair users at the show. He asked if I could find people interested. I thought of contacting you first. You are involved with 2 different groups.

We would like to have people familiar with the other Sinclair computers, ZX-80, ZX-81/TS-1000, TS-2068 /Spectrum as well as the peripherals that go with them. If you know of emulator users that is good too.

The show will be in Spring Lake, NJ. The full details are on www.airnet.net/boehm/index.html

Please forward any interested parties to myself <mckelveyw@delphi.com> or <boehm@ziplink.net> Thanks,

Bill McKelvey

Hi there,

Found your name in Deja News. I have a TS-2068 I'm trying to play with. Is T/SNUG still around? How might they be contacted? What do they have to offer? Thanks,

wjm@wjm.org

bill_marriott@email.msn.com

Bill Marriott

11613 NE 97th Ln.
Kirkland, WA 98033

Date: Wed, 27 Jan 1999 18:27:00 -0600 (CST)

Just a short note to let all of you know that North America is getting a new QL and Z88 dealer and place to get upgrades and repairs done for their beloved Sinclairs. This guy has been working with me for the last few years to do upgrades and repairs on Z-88s. He is also well versed in Sinclair (yes Speccys too!) for repair also. He is also knowledgeable about monitor repair. I highly recommend that you support him.

Dealers from elsewhere I hope that you will take the time to contact him and get yourselves established with each other so that you can all continue to support each other. His name is John Rish and he lives in San Antonio, Texas here in the USA. He is a subscriber to QL Today and to QUANTA. He needs for the Sinclair user groups to contact him, as well as T/SNUG. Give him your support, and I thank all of you for the support that you gave me over the years. I will still be a user and available for advise if I can be of assistance, but no longer as a dealer. Time, space and other considerations have taken me out of that. I am now only dealing in Amiga and some MAC software, no hardware. John is buying a lot of my QL and Z88 stock.

Rita Jean Willis bought part of my stock but will only be dealing with South Americans as she is out of Rio de Janeiro. Should she contact you, please be of assistance to her.

John Rish's email is: 74601.1535@compuserve.com

He has gotten started on his first web page for his business.

http://members.tripod.com/hes_computing/hes1.html

Thanks,

Frank Davis

FWD Computing

fdavis@iquest.net

<http://members.tripod.com/~FWDcomputing/>

Working to make computing fun!

Hi Abed,

I sent Don Lambert a letter recently letting him know that I would be more than happy to store anything that he, or anyone, didn't have a current use for (except monitors and disk drives, unless they are 3" drives). The monitors and disk drives are way too heavy to ship for their value. I recommend donating them to your favorite charity. However, the drive cases and power supplies should be kept as they are in short supply these days.

Everything else I would be more than happy to store, catalog and eventually use or find new homes for. That goes for anyone and I will pay, or at least help to pay, for the shipping cost. I have sent Don \$20 to help with the shipping cost so far, but he has spent nearly \$40 so I need to get him some more money. He indicated that he had a couple more boxes to ship. <This is great of you, Jack.>

And, Abed, if you haven't heard.....I bought out the remaining TS inventory from Frank Davis. He had indicated in ZQA! that he wanted to keep the TS items in the US. When I contacted him he was contemplating sending it to South America as no one had inquired about it. We negotiated, struck an agreeable settlement and it is being shipped as I write this.

I've also purchased a 2068 system from a fellow in California that includes a Timex FDD-3000 dual 3" disk drive setup.

Know anyone who can help me with this?

It works only sporadically, sometimes great, sometimes not at all. Also I plan to get to the West Coast Sinclair Show in June. I hope to take a lot of items with me to share with folks. Take care,

Jack Boatwright

27325 Fryrear Rd

Bend OR 97701

I will qualify the above a little. 1/2 height drives may be worth keeping, but the full height are not unless that's all you have.

I found a couple of drive cases by Digital recently. One had a tape backup, the other a hard drive. I have removed everything except the power supply and added 2, 1/2 height, 5 1/4 floppies to each. Works great!! There is also room inside the case for the drive interface and I'm contemplating trying to put the LarKen inside the case too.

I don't know about that, but I do know I do not want these computers to die. I called Don on Saturday after his boxes arrived to mention some of the above stuff and just talk.

Somewhere along the line I seem to remember that there were 3 versions of the Timex drives. Maybe someone in

T/SNUG can confirm this. I talked to a fellow named John Bylander on the phone yesterday. He thinks I may have a chip overheating problem and/or edge connector contact problems with weak springs in the connector. He also mentioned that the springs in the sockets holding the chips get weak and contact can be lost there. I have a bunch of trouble shooting to do..... **Jack Boatwright**

Hi Abed!

Thank you for ZQA! winter 98, I enjoy it very much. The ZQA! homepage is great!, though I have some problems to read it because of the background-colors used, the contrast to the text color is very poor on my system. May be it's because I'm using only 256 colors???

I have founded the ZX-81-Web-Ring and I have added the URL of ZQA! page. Please look at: http://home.t-online.de/home/sinclair_zx81/zx81_wbr.htm. If you want, put a link on ZQA! page.

On my ZX-TEAM-homepage; <http://home.t-online.de/home/p.liebert/zx-team.htm> I have added the "MEMOTECH-archives" with the contents of most Memotech booklets for ZX-81 add-ons like: 16/32/64K-RAM module, printer I/F, RS-232, HRG-module Memocalc spreadsheet analysis, keyboard I/F.

At the moment I'm working to get the Memotech-Memotext booklet online. A lot of work still unfinished, but I have got the instructions yesterday:-)) The only one missing is Memotech-Assembler module with booklet.

So I would like to ask you: Could you please put this advertisement in the next issue of ZQA!:-

Wanted Dead or Alive

MEMOTECH Assembler module for ZX-81 and /or booklet. Has there been any articles in former Sinclair mags. in the USA about it? The famous Fred Nachbaur, did he ever write about this module? Does anyone know where Memotech has gone???

Any other information about this module is welcome too!

Peter Liebert-Adelt

Luetzowstr.3

D-3802 Braunschweig

Germany

e-mail: peter@zx81.de

Thank you in advance.

Take care, yours "sinclairly" **Peter**

German ZX-TEAM

<http://home.t-online.de/home/p.liebert/zx-team.htm>

Amateur radio: DK4BF@DB0FC.#NDS.DEU.EU

3rd ZX-TEAM meeting this year: 26-28 March 1999 near Fulda in the heart of Germany

Hello. I am writing regarding possibly buying some software that I saw listed on the T/SNUG web page. I have received your email from Bob Swoger and he said that you might be able to get in touch with someone who knows more about these items than he did, specifically someone named Lambert (?)

I am primarily looking for software for the TS1000. I have purchased some software from Jack Boatwright here in Oregon, but I do not know if he is the person with all of the TS1000/ZX-81 stuff. Any info you can give me is

appreciated. If Jack is the guy to talk to regarding the items on the list I saw on the web page, well I guess I will try him again. Thanks,

Luke Perry

809 JQ Adams St.

Oregon City, OR 97045

doidy34@yahoo.com

>Thank you for the reply Abed. I did do a email search on the Internet for Neil Schultz, and did not come up with anyone in Wisconsin. I also did not find anyone in the address search in Butler, WI with his name so I suspect that is an old address. Oh well, I did write to Lambert in Indiana and hopefully he will be of help.

<< *The person who might know about Schultz is Bob Swoger whom you contacted already.*>>

How long have you been publishing the newsletter for T/SNUG? Well that must really be a labor of love considering there is probably not that many people still using Timex/Sinclair machines anymore. Especially in this day of Pentium II's and 10 GB hard drives! I love old technology and especially love the simplicity of older computers such as the Timex/Sinclair.<

<< I owe it to Sinclair for learning BASIC back then in '79 when I built the ZX-80 from a kit. The IBM BASICA at work was driving me crazy with very limited access to the main frame computer. I wanted to really learn BASIC, finally my company had TimeShare (IBM of course) that made things a little easier but the bean counters were watching our 'connect time'. That is where Sinclair came to the rescue.

Later I got the ZX-81 then in '82 I got the TS-2068 - 64K sound and color too, wow.>>

>You have got me interested in learning more about the TS-2068. Was it Timex's answer to the Commodore 64 line? How available are they still if one was looking for one with all of the original stuff (manual, cables, etc.) Just curious.<

>The TS-2068 was the next best step from the ZX-81 / TS1000 with their 2K RAM. The 2068 that I anxiously was waiting for came out in 82. It had 64K RAM, connects to color monitor and improved BASIC. It was really fun to program in those days.

Timex had the rights from Sinclair to produce it in North America and Sinclair had the Spectrum in Europe and elsewhere.

The Commodore 64 I was using at work was for \$800 including the monitor and a horrible printer. I got the 2068 for \$120 and plugged it into a 13 in. TV that had a video input in the back. It was fun.

Of course there are lots of software for it even disk drives by third parties. You can still find them. Unused ones are hard to find but I know of one source.

Bob Swoger started the Newsletter in 91; and since he has a full time job at Motorola, he felt that he couldn't do justice to it and asked me (just retired) to take over.

I still use the TS-2068 to run my old trusty programs. I mailed your copy yesterday.

Luke_Perry@gstworld.net

To: Fred Henn

Hello. I got your name from Abed Kahale. He mentioned that you might have a TS-2068 for sale?

Yes, Luke, I have one left in the original manufacturer's box. I was hoping to swap it for something I can use (like

something in the "audio" line or whatever) but I would be willing to sell it for \$XX including the shipping cost.

I'm sending a CC of this to Abed ... to Thank him for his TIME & EFFORTS. Bye, Sinclairly, **Fred Henn**

Sender: cperfett@hp.utbtsc.edu

I had a look at your site from a posting in the comp.sys.sinclair news group. I am an Englishman living in southern Texas who used to have a Sinclair Spectrum and ZX-81 while in England. Who would have thought that all these years later they are still generating such interest! And in the USA of all places... I knew that Timex sold them in the USA (although of course different specification etc), but I thought they had basically 'bombed' out and disappeared, after all this was Commodore 64 home territory.

< True, Timex bowed out from competing with the likes of Commodore, TI, HP etc. They didn't have the will to fight competition.>

I like all computers, but I think the Sinclair range of machines had that 'something' that still seems to be keeping them alive today... Also I guess there is the romance of the classic eccentric British inventor behind them!!

I had just ordered a ZX-81 kit from Zebra systems to build with my Wife's younger brother, just for a bit of fun and nostalgia... :) I can't believe that soon the ZX-81 will be 20 years old! Makes feel old....

"There is a theory which states that if ever anyone discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable."

"The Restaurant at the End of the Universe", by Douglas Adams. Well I was born in Guildford, Surrey although we lived in a village outside.

Lived there until about 25 when I moved to Wiltshire (Where Stonehenge is). the last place I was in was Swindon. I got married to someone from the valley down here about 2 1/2 years ago and lived in England for a while until we came here.

Your comment about today's programs etc rings so true. Don't get me wrong I love progress and today's technology. I work with the latest PC's. The great thing about the Sinclair machines is they were a beautifully simple design especially the British versions as I understand the American Timex versions had extra features such as an extended graphics mode, better sound and a cartridge port?

I used to know the memory map of my Spectrum by heart (well not necessarily all addresses!). The trouble now I have getting a piece of software or a modem to work under the 'supposedly' plug'n'play Windows 95/98 and I consider that I am very competent with computers!

Conrad Perfett

Hi Bob,

I have a couple of e-mail addresses. The one at work is kwatson@mail.cbf.com and the free one at home is keith_watson@juno.com.

Have you checked out the Warajevo emulator lately? I almost stopped using the Lunter emulator now that the Warajevo emulator almost does a 100% emulation of the Timex 2068. I'm just about ready to send Zeljko Juric, one of the Warajevo authors, a OS64 compatible version of the Series 1 ROM for use with the Warajevo emulator. It works very well. Keep in touch,

Keith Watson

Hello,

I saw a message in the comp.sys.sinclair newsgroup stating you might know about a LarKen Disk Drive Interface for the 2068. I am looking for the one for the ZX-81/TS-1000 version. Do you know of anyone who might have

a **LarKen Disk Drive interface**

for the ZX-81/TS-1000 computer? I would either like to purchase the card or rent if necessary. I would appreciate any information you might have. Thanks,

Mark McCann

2817 Mulberry

St. Joseph, MO 64501

mccanm@ponyexpress.net

816-390-8502 (h) 816-390-8778 (fax) 816-387-2530 (wrk)

< The best way that I can be of help is to place an ad for you in the next March Newsletter >

Hello Dilwyn,

I sold out my hardware and software business (but not my copyrights, trademarks and patents) for the QL and the Z88 computers. They were sold to John Rish of Home Electronic Service of San Antonio, Texas, USA. His email is: 74601.1535@compuserve.com. He has got a start on a business web page at:

http://members.tripod.com/hes_computing/hes1.html

All of my stuff is busy winging its way to him by UPS. He has been repairing and upgrading computers for me for a couple of years and is a long time Sinclair user from back in his days in the military stationed in the UK. In fact his wife is from there. He offers upgrades and repairs for QL, ZX-81, Spectrum and Z88 computers, as well as software and hardware. I hope that people will give him their support. Unlike many people when they quit vending with Sinclairs they just up and disappeared leaving a hole in their place. I wanted to leave someone there to carry on in my absence. My thanks to both the users, developers and the other vendors with whom I have had contact over the years.

Frank Davis

FWD Computing

fdavis@iquest.net

<http://members.tripod.com/~FWDcomputing/>

Hi Abed,

Just thought I'd share an email with you. I mentioned having contacted Timex for input on the web page I'm working on. Here is the latest email I've gotten from them.... **Jack**

Jagello, Sally wrote:

Jack,

Thanks for keeping me updated. So far, so good. Except the link to the Museum needs a different description. It is not the corporate web site, but is dedicated solely to the museum's efforts. The corporate site remains at www.timex.com. Have a great day. > ~Sally

~Sally Jagello

Webmaster

Timex Corporation

sjagello@timex.com

www.timex.com

www.beepwear.com

-----Original Message-----

> From: Jack Boatwright [jboatno4@outlawnet.com]

> To: Jagello, Sally

> Subject: Re: Timex Sinclair Computers - Web Page Update

> Hello again,

> Just a note to let you know that this site has been updated significantly since I last emailed you, and, there is more to come as I find the time. The links are fixed, more have been added and there's even a few pictures. I have not linked to your Timex site as yet, but that is in my plans.

Anyway, I hope it meets with the satisfaction of Timex Corporation. If not, please let me know and I will change anything necessary. Take care,

Jack Boatwright

R Robert D. Hartung
2416 No. County Line Road E.
Hunterstown, Indiana 46748
(219) 637-3081

Dear Abed:

In current **QL Today News**, the production version of the Q40 will probably appear both as the Q40 and the Q60. When using a 68060 processor running at 66 MHz, the Q60 will be over 70 times faster than a standard QL with a JS-ROM.

The upgrade of Turbo Compiler came to an abrupt halt in October because of the need for recovery of the hard drive containing the source files so it will not be available till sometime in '99. (Apparently, someone had not made a backup of the drive, which is rule No. 1, No. 2, No. 3)

The Turbo Toolkit has been extensively changed and is now so compatible with SMSQ/E as to enable installing it as an SMSQ/E module. The new Turbo Pointer Toolkit still needs lots of work to allow Turbo to compile pointer-driven programs. It will allow compilation of BASIC programs under SMSQ/E but probably not all the enhanced SBASIC features, at least not in the early versions. It is planned that Turbo eventually will be released as Freeware.

The new version of Perfection is currently being Beta tested. It now supports high resolution screens up to 1024 X 768, improved subdirectory support, and dramatic improvement in cursor handling. The projected release date given in the News article was January '99.

Since SyQuest discontinued the EZ removable-media drives previously used by Qubide, Qubbesoft is now working on support for ZIP and LS-120 ATAPI/IDE drives. The newly-announced (December '98) 250 Mb ZIP drives, that are also backward compatible with 100 Mb cartridges, put Iomega back in the race again in that size-category.

And finally, Jochen Merz Software announced in the current QL TODAY that Marcel Kilgus, author of QPC, has QPC2 up and running, though not quite completed at the time of the News article. The new version will allow task-switching under Windows on a PC without having to go through the

quit and restart procedures as in QPC.

Best regards,

Bob

Abed,

Thank You for the Wed. humor. I don't recall if my list contained TS2068 cassette programs ... but if it did, please remove them because my entire library of cassette programs is gone. And, if I didn't Thank You before ... Thank You for directing Luke Perry my way: he purchased my last "in the original factory box" 2068 ... so all I have left now are a couple of "slightly used" 2068's (which should be on the list). I also recently received 2 new A/B data switches for parallel printers which could be added to the list (if your newsletter hasn't "gone to press" yet?)

I had mentioned, in an email, to a computer friend (who's pride and joy is a new 400Mhz "pentium based" computer) that I was considering learning C/C++ ... just for the "hell of it"! In his reply, he sought to discourage me by listing the reasons why I shouldn't take on such a HUGE task! He finished with:

>Another thing, programs today are 100 megabytes and up. TO WHICH I REPLIED: That last sentence (referring to most of today's "popular" Microsoft based programs is the one for which I Thank You a "scillion")

Most of those 100 megabytes+ are for graphics ... or, according to a recent article I read, are used "just because they're there" and are mostly waste! I don't know if today's programmers realize it ... but they've created a condition where it's practical for folks to write their own programs. (In machine code ... if they know it ... but in any language they know ... providing they have a good "assembler" program for that language ... and this would include "basic" - which many folks learned in the early 80's and which is very similar to Microsoft Basic!) Back then ... folks learned to "crunch" programs because there was very little memory available (usually less than 40K).

My point being ... I can renew my BASIC programming abilities in a comparatively short time ... which I now intend to do! I know that computers operate in some form of "machine code" (turn switches "on" or "off") All I have to do now is find (or write) a program that knows which switches to operate! We sometimes forget that "just because it's DONE THIS WAY" doesn't necessarily mean that it's the CORRECT and/or ONLY way to do it. THANKS AGAIN, Bill.

AND, while I'm about it ... Thank You, Abed ... for all the help you've been to me (and for your continued effort for everyone interested in T/S computers, etc.).

Sinclairly,

Fred

Abed,

Another thought just struck me. Has anyone written a conversion program so the comparatively simple and, to me, "superior" Timex 2068 BASIC could be used in one of the earlier (but tremendously faster) IBM PC's?

Sinclairly,

Fred Henn

>I believe that you are referring to a TS-2068 emulator. Gerton Lunter offers emulator for the Spectrum in the Ads section.

<Hello John, (Rish)

Frank Davis had advised that you are the proud owner of his Sinclair inventory

I am the publisher, editor and treasurer of the Timex/Sinclair North/American User Groups - T/SNUG

I would like to have you send me an ad to place in the next March issue of ZXir QLive Alive! newsletter - or whatever you would like to include in the Newsletter. The ads are for free.

We would like to welcome you to our little community. Please provide your snail mail address so that I can mail you a copy of the Newsletter. Take care, Abed >

Thanks for writing, its good to hear from you. Would you run an ad for me that states the following:

Home Electronics Service

is pleased to announce to the Sinclair community that we have taken over the business from Frank Davis, (FWD Computing).

We have been a part of the Sinclair scene since 1982, repairing ZX Spectrums for Sinclair Research in England. We provide Sales, Service, and Software for the QL, Spectrum, ZX-81 and Z88.

Look for us on the web at

www.members.tripod.com/hes_computing/hes1.html

Our email address is

74601.1535@compuserve.com

Hours of Operation is Monday - Friday 1300 hrs to 2100 hrs. central time zone.

Phone number is 210 661-4376

Our mail address is:

Home Electronics Service

5222 Kazen Dr.

San Antonio, TX 78219 USA

We look forward to serving you.

John R. Rish

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FROM THE CHAIRMAN'S DISK

Donald S. Lambert

Had a letter from Don Oviatt that wanted a copy of D.U.S. so that he could use it again. Somehow his working copy and backup copy got trashed. I complied with his request and got him going again with that. D.U.S. is Disk Utility System for the LarKen disk interface. It is a software with good utilities that do things that none others do. Got a disk that might have bad blocks? Use one of the programs and it will go through the disk and mark all the bad tracks and when it is done you will see that the capacity has been decreased if there were bad blocks. Or use it to FORMAT a disk and it reports how many bad bytes there are.

Luke Perry wanted to know where to get TS-1000 software so I referred him to Jack Boatwright. Jack has some TS-1000 software that I think he got from Frank Davis.

I have been boxing and shipping a bunch of stuff to Jack Boatwright that I must get rid of. I have gotten what I have cut down and I will have more for him if he wants it when I get more sorted out and packed. Letting go is so hard to do. But on the other hand have not looked at or used them for so long and it is time to get it into the hands of people that can use it.

I haven't come up with a way to get the data on some disks (2068 sent to the Z88) and I may never get that accomplished that way. It looks like I may have to make hard copy and then scan it into the PC that I will eventually get or else (heaven forbid) type it into the Z88. I do need to keep my financial records so that I will know what I have and where.

Crazy weather! Went shopping 20 miles away. Left here in sunshine and returned in a heavy snowstorm that didn't stay long on the ground.

I tried to get to the T/S pages on the Internet at the library but while I did see some stuff it was very little. But of course I haven't learn to navigate the Internet. I sure hate to read a very thick book to learn what I need to know that is only two pages worth of information. I will have to get back to the library and try again.

I go to the computer stores and stores that have computer departments and I have asked questions and have read magazines. No wonder I like the TS-2068 so much. Getting into the PC is like taking flying lessons on the 747 as the first airplane you'll fly, you are overwhelmed before you even begin! 0/0.

While I am not familiar with the Z88, here is what appeared in ZQA!, Winter 93. It should work with the Z88 as it did with the PC.

TS-2068 Talks to a PC by Modem

by Abed Kahale

It has been a challenge to have a 2068 communicate directly via modem with a PC modem to transfer text files. The procedure was to upload files to a BBS by one computer and then download with the other, until Bob Swoger spent an evening with me to tackle this problem.

To communicate, modems have to have a line that has a tone "carrier" and provides a ring "signal". Connecting two modems together from two computers eliminates the carrier and the signal and the modems will not turn on. It has been done with the two modems connected to the same phone line. That held up calling or receiving phone calls for the duration, at 18 text characters per second which is what I got with the 2050 modem.

With a Hayes compatible PC modem, here is how:

1. Connect the two modem lines that normally go to the telephone line together using a two-line plug without any connections to the telephone line.

2. Turn on both modems and load the modems software. MTERM II (Loader V) or MaxCom Xmodem for the 2068. Load buffer etc. I used MaxCom.

3. Set both computers to TERMINAL mode and the TS-2068 to ASCII (toggle con: none). All other parameters have to match the PC modem's of course or vice versa.

The following has to be done rather rapidly before the PC abandons the connections.

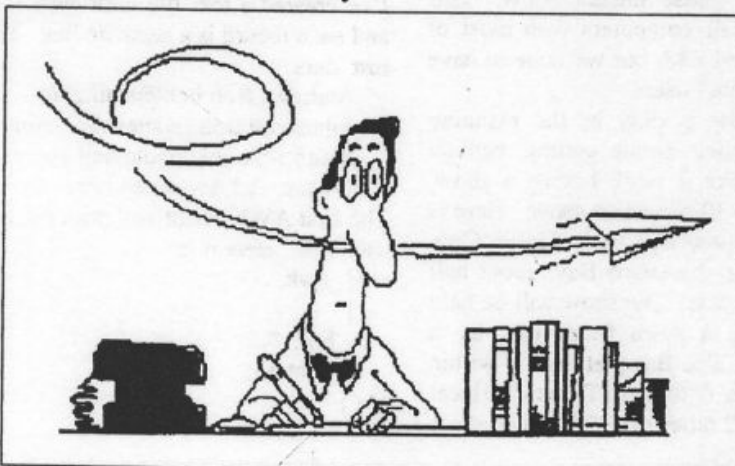
4. On the PC modem, ENTER ATA (which is Hayes command that forces the PC modem to answer the phone without the benefit of a ring or a tone). The PC modem emanates a long squeal and recognizes the signal from the other modem and CONNECTs.

5. Set the PC in RECEIVE mode, Xmodem 300 BAUD and enter the file name.

6. From the TS-2068 select SEND (transmit) file 'name.Cm" and ENTER.

7. The PC acknowledges and receives the file.

8. Exit SEND to TERMINAL mode and ENTER Ctl Z (SHIFT-7 Z) to tell the PC "end-of-file".



QL Hacker's Journal

Supporting All QL Programmers

#30 December 1998

The QL Hacker's Journal (QHJ) is published by Tim Swenson as a service to the QL Community. The QHJ is freely distributable. Past issues are available on disk, via e-mail, or via the Anon-FTP server, garbo.uwasa.fi. The QHJ is always on the look out for article submissions.

QL Hacker's Journal

c/o Tim Swenson

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Editor's Forum

In this issue I want to take a look at a couple of Unix languages that have recently been ported to the QL. In the QL-users mailing list, I've seen some comments that basically say "Why use these other languages on the QL?"

All development should be done in SuperBasic or C68 and use the Pointer Environment." As much as I agree with this, I don't see Perl or AWK being used to do serious development on the QL. I see them being used to accomplish short personal tasks. There are some tasks that can be done much easier with AWK or Perl than in SuperBasic or C68. Of course, there is the ability to use Perl/AWK programs from other environments on the QL and the ability to learn Perl/AWK even if you don't have access to a Unix system. I've done some Perl stuff at work because it is the best Unix language to hack in, and now that I have Perl on the QL, I can run the same programs at home.

West Coast Sinclair Show

Since the last US QL Show in Bedford, PA, there has been some talk about having two shows in 1999, one on the East Coast and one on the West Coast. The vendors support the idea, having one show right after another so they can hit both in one trip. I think they are just tired of the East Coast and want to visit sunny California. So, Don Waltermann (who has recently moved out West) and I are organizing the West Coast Sinclair Show. This show will encompass all Sinclair computers with most of the vendors covering the QL and Z88, but we hope to have something of interest to all Sinclair users.

At the moment the show is only in the planning stages. We are worried about getting enough people to attend to make it work having a show. We would like to get about 20-30 people to show. Here is what is being planned. The show will be in Union City, CA, on the east side of the San Francisco Bay, about half way between Oakland and San Jose. The show will be held in the Mehran Banquet Hall, a store front used by a Pakistani restaurant next door. The Banquet Hall is within walking distance of the Union City BART station (local commuter rail) and only about 2 miles off I-880. The show

will be held on 5 June. For those coming from out of the Bay Area, the South Hayward Motel 6 is the motel of choice. It has a Denny's and McDonalds on the premises and has a Taco Bell within walking distance. The motel has bus access to the Union City BART station (and then to the show site). The night before the show, I plan to have a Bar-B-Q at my house (about 1.25 miles from the motel). I'll supply the hamburgers, hot dogs, chips, and soda (Jochen, there will be 2 kinds of Root Beer). For any Europeans coming to the show, I'm offering a limited tourist service.

Let me know what you would like to see in the Bay Area, how you plan to get around, and I will look into maps, travel directions, and any transit costs. If you only know of a general category, say natural history or aviation, I can provide a list of places of interest. Since there will be a week between the two shows, this will allow plenty of time for sightseeing in the Bay Area. If you are interested in coming to the show, please let me know. I am especially interested in hearing from those on the West Coast. I would hate to see most of the attendees be from Europe.

AWK

AWK has been ported to the QL by Peter Tillier and is a Unix language that is used for all sorts of list processing tasks. The name comes from the three writers of the language; Aho, Weinberger, and Kernighan. AWK works very similar to grep. For each line of input, it searches for a given pattern. If the pattern matches, then an action is performed. If there is no search pattern, then it is assumed to match and the action is performed. This is the formal definition of what AWK does, in reality, the code looks a lot like other languages, and each line usually does not have a pattern and is therefore executed. How this all works will become clearer as you read the code below.

To give an example of how to use AWK, here is something that I'm using AWK to do. I keep a list of people that get the QHJ via e-mail. In the list is the persons last name, first name and e-mail address. From this list I want to generate a e-mail address only list, for sending an issue, and a list of people, sorted by last name. I've created a text file with each field separated by colons and each record is a separate line. Here is an example file:

test_data:

```
Andrews:Bob:bob@mail.com
Johnson:Ralph:rj@newmail.com
Smith:John:john@oldmail.com
Wilson:Ted:trw@mail.com
```

The first AWK script will print out only the 3rd field from each line. Here it is:

rep1_awk:

```
{
  FS = ":";
  print $3;
}
```

And the output is:

bob@mail.com
 rj@newmail.com
 john@oldmail.com
 trw@mail.com

Basically all the script does is this: for each line, change the Field Separator to be a colon and then print out field #3.

The second report is a little more complicated. It will have a header, then the e-mail addresses, and then a footer giving a count of the e-mail addresses. The BEGIN block will only be executed at the beginning of a program, before any work is done on the input file. I'm using the BEGIN block to print out a header for the report. There is also an END block, which will only be executed at the end of the program. Here is the 2nd AWK script:

```
rep2_awk:
BEGIN {
  print " Name      E-Mail Address"
  print "-----"
}
{
  FS = ":"
  printf("%6s %10s  %s\n", $2, $1, $3)
}
```

Here is the output:

Name	E-Mail Address

Bob Andrews	bob@mail.com
Ralph Johnson	rj@newmail.com
John Smith	john@oldmail.com
Ted Wilson	trw@mail.com

This time I've decided to use a printf statement, which is very similar to the C version of printf. The problem though is that the output of the names is right justified and there is too much space between the first and last name. I want one space between the first and last name. Here is a 3rd AWK script that uses a regular print instead of a printf and gives me what I want: rep3_awk:

```
BEGIN {
  print " Name      E-Mail Address"
  print "-----"
  count = 0
}
{
  FS = ":"
  print $2, $1, "t", $3
  count = count + 1
}
END {
  print "-----"
  print " Total Addresses = ", count
}
```

Here is the output:

Name	E-Mail Address

Bob Andrews	bob@mail.com
Ralph Johnson	rj@newmail.com
John Smith	john@oldmail.com
Ted Wilson	trw@mail.com

Total Addresses = 4

Now if I had to write this program in SuperBasic, I would first have to write a section that splits out the individual fields into different string variables. With AWK it's automatic and very easy to do.

Perl

Perl is a language that I started playing with back around 1989. When I started using Perl for a project, a few people wondered if this was a good idea, given that Perl was a relatively obscure language and they worried about people knowing Perl after I left. Well, Perl has now become THE language for Unix. There are over 15 books available on Perl, a Perl magazine, and many, many web sites. Perl was designed to be a kitchen-sink language for Unix and allows the programmer to get the same task done many ways.

Perl is more expansive than AWK and you can get a lot more done, although some AWK programs will be shorter than Perl. If you do program in AWK and wish to convert to Perl, there is a nice AWK-to-Perl program that comes with the Perl distribution. To show how different AWK is from Perl, let's use the same example programs as above, but write them in Perl. The first Perl program is the same as the first AWK program. Note how many more lines it takes in Perl. I'm sure this Perl program is not the most optimal, but even an optimal Perl program would be longer than the 2 line AWK program. Here is the program in Perl: repl_pl:

```
#!/usr/bin/perl
# Read the file into an array
open(FILE, "test_data");
@array = <FILE>;
close(FILE);
foreach $line (@array) {
  @array2 = split(/:/, $line);
  print "$array2[2]";
}
```

And the output is:

bob@mail.com
 rj@newmail.com
 john@oldmail.com
 trw@mail.com

The first line of a Perl program starts with #!/usr/bin/perl, or something like that. This is not a part of the Perl program, but is used to tell the Unix shell to run Perl and feed it the rest of the script. It is not needed for the QL version of Perl. With the second report, I decided to use the 'format' feature of Perl. It allows you to define fields so that the output can be formatted into neat columns. Left and right justification and the decimal point can be handled for you. It can take a while to get used to formats, but once you do you find them useful for all sorts of tasks. Here is the 2nd script:

```
#!/usr/bin/perl
# Define formatted output
format TOP =
  Name      E-Mail Address
  -----
format STDOUT =
```

Bob Andrews	bob@mail.com
Ralph Johnson	rj@newmail.com
John Smith	john@oldmail.com
Ted Wilson	trw@mail.com

Die Roll - the value of the die.
Possible - how many times this die roll can occur.
% of Roll - Percentage of total rolls that this roll
can occur.

}

```
system("ls");
```

This works out the QDOS command of:

```
EXEC_W ls
```

The Perl command:

```
system("unzip file_zip");
```

works out to the QDOS command of:

```
EXEC_W unzip;"file_zip"
```

So if the following Perl command:

```
system("dir flp1_");
```

works out to the QDOS command of:

```
EXEC_W dir;"flp1_"
```

which is invalid.

On the QL, the back tick character is really the Pound Sterling symbol (which, for portability reasons I won't show here). This means that if you take a Perl program written on another system and bring it to the QL, all of the back tick characters will show up as the Pound Sterling character. This also means that if you are writing a Perl program on the QL, use the Pound Sterling character and it will be treated as a back tick. Since the two characters have the same ASCII value, you don't need to worry about converting, by hand, the two characters, as it will happen automatically.

Where this is important in Perl, is in the following command:

```
@array = `ls bin*`;
```

Having a string in back ticks (versus single or double quotes), tells Perl to execute what is in between the back ticks. This is the same convention used in the Unix C Shell scripting language. If you are looking for books on Perl, remember that Perl for QDOS is Perl Version 4 and most books deal with Perl Version 5.

The first edition of "Programming Perl" and "Learning Perl" (red binding) dealt with Perl Version 4. There are some major changes between Perl 4 and Perl 5, including some syntax changes in common functions.

The Shell

While on the subject of Unix languages, Adrian Ives has continued the work of P. J. Taylor with The Shell, a command line shell for QDOS. Given my Unix background, I would say that The Shell is similar in functionality to Unix shells (C, Bourne, T, Korn). The Shell considers commands to be programs to execute and handles command line arguments in the standard way. Pipes are created with the pipe (|) symbol, and executing programs in the background (like EXEC) is done with the ampersand (&). Given that 'grep' is available from the C68 distribution, 'wc' comes with the GNU Text Utilities distribution, and that 'ls' is available with The Shell, you can execute the following command line in The Shell: `ls | grep_txt | wc -l` Another nice thing about The Shell is the way it handles directories. It treats level 2 directories as real directories. You can 'cd' to a directory, run 'ls' and see only those files in the directory. You can also 'cd /bin' or 'cd ./man'. The Shell understands both the MS-DOS and Unix directory slashes. The Shell also handles files with dots/periods in it (file.txt). So, if you are doing a lot of bringing programs over from other environment and have lots of file with dot extensions, The Shell handles the files without having to put the files in quotes.

The Shell version 1.10 is available from Adrian Ives web page: www.angelfire.com/ab/4fac/

Character String Emulation

In HiSoft Pascal Ver. 4

By David Solly

One of the common gripes about *HiSoft™ Pascal Version 4* for the Timex/Sinclair 2068 is its lack of built-in operators for handling a dimensioned array of type CHAR, henceforth referred to as a string. The crux of the problem is that if a string is not completely filled by data or spaces, the remainder of the string is left filled with whatever garbage is in memory at the time. When a WRITE or WRITELN is called, the procedure attempts to print the entire contents of the string, which includes the garbage left in the unused portion of the string, plus all the data. This results in garbage characters being printed on the screen or printer if the system does not simply crash. ¹

Parser is a program which demonstrates how a record type "called" "word" in this example "containing" a string and an internal counter, which is used to keep track of the number of printable characters the string contains, can be constructed and used to solve this problem. Reading and writing information to and from this "word" type; however, also requires special modified versions of the procedures READ() and WRITE(), which in this program are called StringRead() and StringWrite(). ²

Program Listing

PROGRAM PARSER;

```
{
Purpose:
The object of this program is to accept a sentence from the
user then to break the sentence into its component words
and to display each word on a separate line.
```

History:

Program by David Solly,
Ottawa, Canada,
March 25, 1990.

```
}
CONST
```

```
maxword = 15;
maxsentence = 15;
space = CHR(32);
first = 1;
```

```
TYPE
```

```
string = PACKED ARRAY[1..maxword] OF CHAR;
word = RECORD
    body : string;
    length : INTEGER
END;
```

```
VAR
```

```
sentence : ARRAY[1..maxsentence] OF word;
```

```

row, col, nextcol, count : INTEGER;
demarker      : BOOLEAN;
PROCEDURE SpaceTrap;
{
  Insures that there is only 1 space between words
}
BEGIN
  REPEAT
    READ(sentence[row].body[first])
  UNTIL sentence[row].body[first] <> space
END;

PROCEDURE StringWrite(VAR phrase : word);
{
  Writes only the required length of each character string.
  This is required when using 32 col. mode.
}
VAR letter : INTEGER;
BEGIN
  FOR letter := first TO phrase.length DO
    WRITE(phrase.body[letter])
  END; {Procedure StringWrite}

PROCEDURE StringRead;
VAR I : INTEGER;
BEGIN
{
  Initialize the variables
}
count := 1;
row := first;
col := first;
nextcol := col + 1;
demarker := FALSE;
FOR I := first TO maxsentence DO
  sentence[I].length := 1;
  WRITE('Type a sentence > ');
  READLN; {Clears the buffer of EOLN}
  WHILE (NOT EOLN) AND (row < maxsentence) DO
    BEGIN
      READ(sentence[row].body[col]);
      IF sentence[row].body[first] = space THEN
        SpaceTrap;
      IF sentence[row].body[col] = space THEN
        demarker := TRUE;
      IF (NOT demarker) AND (nextcol < maxword)
      THEN
        BEGIN
          col := col + 1;
          nextcol := nextcol + 1
        END
      ELSE
        BEGIN
          sentence[row].length := col;
          count := count + 1;
          row := row + 1;
          col := first;
          nextcol := col + 1;
          demarker := FALSE
        END; {If...then...else}
      IF EOLN THEN sentence[row].length := col - 1

```

```

{Accounts for the last word entered less the EOLN
marker.}
    END {While loop}
  END; {Procedure StringRead}

```

```

PROCEDURE PrintItOut;
VAR
  subsequent : INTEGER;
BEGIN
  subsequent := first + 1;
  WRITE('Parsing > ');
  StringWrite(sentence[first]);
  WRITELN;
  IF count >= subsequent THEN
    BEGIN
      FOR row := subsequent TO count DO
        BEGIN
          WRITE(' ');
          StringWrite(sentence[row]);
          WRITELN
        END
      END
    END; {Procedure PrintItOut}

```

```

PROCEDURE SongAndDance;
BEGIN
  PAGE;
  WRITELN('      Parser');
  WRITELN;
  WRITELN('  Program By David Solly');
  WRITELN;
  WRITELN('The object of this program');
  WRITELN('is to accept a sentence from');
  WRITELN('the user then to break the');
  WRITELN('sentence down into its');
  WRITELN('component words and to display');
  WRITELN('each word on a separate line. ');
  WRITELN;
  WRITELN;
END; {Procedure SongAndDance}

```

```

BEGIN {Main Program}
SongAndDance;
StringRead;
WRITELN;
PrintItOut;
WRITELN;
WRITELN('End of Demonstration.')
END. {Main Program}

```

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¹ HiSoft has released several updates of its ZX Spectrum Pascal program since version 4 was converted and released for the Timex/Sinclair 2068. The latest ZX Spectrum version, (version 1.7M), features a 51 column mode plus the string handling capabilities we are trying to emulate here.

² For those of you who have additional questions, please feel free to write me at ac355@freenet.carleton.ca

How to Hack on The ZX Spectrum

Les Cottrell

PART 6 - Commercial Protection Systems

If you can understand everything we've done so far, you can now probably crack just about any budget game or YS covergame that's thrown at you. And indeed, you can probably get featured in "Practical POKEs" month in month out (like a load of anonymous hackers, I might add!) by using the knowledge you've got. However, if you want to become a hacking legend, you should have ago at some of the numerous commercial protection systems, which have been written by freelancers for software houses.

I think we're getting seriously into Multiface territory now, but I'll try and do as much as possible with only STK and 007 Disassembler.

I think I should also say that cracking commercial protection systems is NOT easy. The code is deliberately badly structured and obscurely coded to put you off, so you'll have to persevere. You really do need something like a Multiface or Devpac to crack some of these systems, because they can overwrite the system variables in BASIC, and you sometimes need to know the values of certain registers, which is impossible to determine using BASIC. You'll also need some games other than YS stuff to hack, but fortunately, protection systems such as Speedlock or Alkatrazz are so common, you're bound to have a game with one of them on. I'll be doing examples specific to one game, but you'll find that other game with the same protection is pretty much the same, except you're likely to find that some of the addresses will be different.

Before we start, I'd just like to point out that I'll be referring to the term "breakpoint" a lot. This is simply a small bit of code which will stop the program dead in its tracks. Using DEVPAK, you just press the W key. On a Multiface, you do the same as a stack trace, by writing down the two bytes at the place you want to put a breakpoint, then replacing them with #18 and #FE. If you are using 007 disassembler and/or STK, you'll need to put a jump to the start of the program (#C3 #00 #40 for 007 disassembler; STK varies depending on where you put it). So let's start with something relatively simple....

BLEEPLOAD

"Bleepload" first appeared on Firebird games around March 1987, and was used by them on every release by them from then on until their demise in 1989. It emulates a BBC loading system in that each file loads in a series of blocks, which are numbered in hexadecimal. The hardness is not because it uses non standard code, it's just that it jumps around so much in memory you need to put in an awful lot of software patches. I'll be hacking Bubble Bobble as an example.

First of all, load in *Hack, and load in the BASIC loader.

Bubble LINE 10 LEN 179

```
10 REM
20 CLEAR 50000
30 BORDER 0:PAPER 0:INK 0:CLS
40 PRINT AT 1,7;PAPER 1;INK
7;"BUBBLE BOBBLE"
50 LOAD "Bobble" CODE 52480
60 RANDOMIZE USR 52480
```

There is absolutely nothing difficult about this BASIC loader, so just type CLEAR 50000:LOAD "" CODE and start the tape to load the first block of code. Stop the tape when it's loaded, and load in your disassembler into address 32768 (it's a safe one), and have a look at the code at CD00.

```
CD00 3A 5C 5B      LD A, (#5B5C)
CD03 32 00 60      LD (#6000), A
```

This takes the byte at #5B5C and puts it in #6000. #5B5C is the system variable for the 128K page number, in case you're interested.

```
CD06 3E 02        LD A, #02
CD08 CD 01 16      CALL #1601
```

This is a standard ROM routine, and all it does it to tell the computer we want to print something on the screen.

```
CD0B AF           XOR A
CD0C 32 6B 5C      LD (#5C6B), A
```

As you may be aware, poking #5C6B (23659 decimal) with 0 will cause the computer to crash if you press BREAK or return to BASIC. So POKE CD0E,0 which changes it to LD (#006B),A; this is harmless.

```
CD0F CD CE CE      CALL #CECE
```

The routine at #CECE prints the message "Searching" on screen.

```
CD12 10 09         DJNZ #CD1D
```

We haven't come across the command DJNZ before. It basically means "decrease the value in the B register, and jump if B is not zero."

```
CD14 11 08 FF      LD DE, #FF08
CD17 16 00         LD D, 0
CD19 CD 1A CE      CALL #CEA1
```

This routine prints the number 00 on screen.

```
CD1C 3E 08         LD A, #08
CD1E 32 15 FF      LD (#FF15), A
CD21 CD 74 CD      CALL #CD74
```

This routine loads in a block of code from tape (in actual fact the start address is #FE00 and its length is #100 bytes).

```
CD24 3E 00 FA      LD A, (#FE00)
CD27 FE 64         CP #64
CD29 20 F6         JR NZ, #CD21
```

This routine loads A with the value at #FE00. The CP instruction compares the value in the A register with something, in this case the number #64. If there is no match, the routine jumps back to #CD21, otherwise it continues. This routine actually checks to see if the block is found.

```
CD2B 3A 01 FF      LD A, (#FF01)
CD2E BA           CP D
CD2F 28 05         JR Z, #CD36
```

This routine checks to see if the block has been loaded successfully. If so, it jumps to #CD36, otherwise it continues.

```
CD31 CD 84 CE      CALL #CE84
CD34 18 EB         JP #CD21
```

This routine prints up the "loading error" message, and attempts to load the block again.

```
CD36 CD 30 CE      CALL #CE30
```

The routine at #CE30 is a decrypter (have a look - do you see why?), which decrypts the block loaded in ie: from #FE00 to FEFF. You don't need to crack it yourself.

```
CD39 BE CP (HL)
CD3A 28 05 JR Z, #CD41
```

This routine reloads the block if the value of A equals the value at (HL). Don't ask me why.

```
CD41 CD 5F CD CALL #CD5F
```

This routine moves the code at #FE00 to where it should really be in memory.

```
CD44 CD 5D CE CALL #CE5D
```

This routine prints the "loading" message on the screen, but this should in actual fact be "loaded", because the block has just been read in at this point of the code.

```
CD47 21 04 FF LD HL, #FF04
```

```
CD4A 7E LD A, (HL)
```

```
CD4B 23 INC HL
```

```
CD4C 3D DEC A
```

```
CD4D 20 FC JR NZ, #CD4B
```

```
CD4F 23 INC HL
```

```
CD50 23 INC HL
```

```
CD51 23 NC HL
```

```
CD52 23 INC HL
```

```
CD53 7E LD A, (HL)
```

```
CD54 2B DEC HL
```

```
CD55 2B DEC HL
```

```
CD56 2B DEC HL
```

```
CD57 E6 07 AND #07
```

```
CD59 3C INC A
```

```
CD5A 32 15 FF LD (#FF15), A
```

```
CD5D 14 INC D
```

```
CD5E E9 JP (HL)
```

This routine starts off with HL as FF04, then does a lot of sums, and comes out with a value in the HL register, which it jumps to after its loaded the block. This is what we need to hack. So POKE CD5E with C9 and RANDOMIZE USR 52480 - you'll find out it loads in one block and then stops. However, this isn't much use as you can't find out the value of the HL register. So put this routine somewhere, such as #5B00.

```
5B00 CD 00 CD CALL #CD00
```

```
5B03 22 10 5B LD (#5B10), HL
```

```
5B06 C9 RET
```

This routine simply loads the first block, and puts the value of HL in #5B10 so we can find out what it is from BASIC.

Now rewind the tape before the first Bleepload block again, and RANDOMIZE USR 23296. When that's finished, type PRINT PEEK 23312+256*PEEK 23313. You should get the answer 65293, which is #FF0D. Disassemble this address.

```
FF0D C3 21 CD JP #CD21
```

This will go back and load the next block from tape. We can crack it in the same way as the first be changing our routine at 5B00.

```
5B00 CD 00 CD CALL #CD00
```

```
5B03 CD 21 CD CALL #CD21
```

```
5B06 22 10 5B LD (#5B10), HL
```

```
5B09 C9 RET
```

Now wind the tape back to the first Bleepload block again, RANDOMIZE USR 23296 and start the tape. When the OK message comes up, type PRINT PEEK 23312+256*PEEK 23313, and you should get 65286 which is FF06 hex. Disassemble this address.

```
FF06 C3 21 CD JP #CD21
```

This goes back and loads another block. By now, you might have guessed that the value of HL will always

contain the address of a JP #CD21 instruction - except for the last block which will jump elsewhere. Now we can write a routine which will load any block as long as it jumps to #CD21 at the end. I'm putting the routine at #CCEC, because it's right next to the loading system, and hence is unlikely to be overloaded (although it could be, in which case we'd just put the routine elsewhere). The routine goes like this.

```
CCEC CD 00 CD CALL #CD00
```

This is just loading the first block

```
CCEF CD 21 CD CALL #CD21
```

This loads in a block from tape.

```
CCF0 23 INC HL
```

```
CCF1 7E LD A, (HL)
```

```
CCF2 2B DEC HL
```

This routine loads the A register with the value of (HL+1). This will be #21 if another block is to be loaded.

```
CCF3 FE 21 CP #21
```

```
CCF5 20 02 JR NZ, #CCF8
```

```
CCF6 18 F7 JR #CCEF
```

This compares the value in the A register to 21. If there is no match, then the routine jumps to the end to preserve the value of HL, and to return to BASIC. Otherwise, it goes back to load another block.

```
CF8 22 FE CC LD (#CCFE), HL
CFB
```

This puts the value of HL in address #CCFE, then returns to control of the disassembler.

Now, run this routine (RANDOMIZE USR 52463), rewind to the first Bleepload block, and start loading. The program will now load blocks 00-2D, and return to control of the disassembler. The value at #CCFE is #FF06, so disassemble this address.

```
F06 C3 00 5B JP #5B00
```

Now disassemble #5B00, which is the real meat of the loading system!

```
5B00 DD E5 PUSH IX
```

```
5B02 CD 74 CD CALL #CD74
```

```
5B05 CD 30 CE CALL #CE30
```

```
5B08 28 07 JR Z, #5B12
```

```
5B0B 06 00 LD B, #00
```

```
5B0D CD 84 CE CALL #CE84
```

```
5B10 18 F0 JR #5B02
```

This routine loads in another block of code, and will jump to 5B12 when it has been successfully loaded.

```
5B12 F3 DI
```

```
5B13 E1 POP HL
```

```
5B14 2E 00 LD L, #00
```

```
5B16 ED 5B E7 FE LD DE, (#FEE7)
```

```
5B1A 1A LD A, (#DE)
```

```
5B1B AE XOR (HL)
```

```
5B1C 24 INC H
```

```
5B1D AE XOR (HL)
```

```
5B1E 25 DEC H
```

```
5B1F 1 LD (#DE), A
```

```
5B20 2C INC L
```

```
5B21 IC INC E
```

```
5B22 20 F6 JR NZ, #5B1A
```

This routine is a decrypter, which decrypts some of the code we just loaded in from tape.

```
5B24 ED 5B E7 FE LD DE, (#FEE7)
```

```
5B26 21 40 5B LD HL, #5B40
```

```
5B2B 1A LD A, (DE)
```

```

5B2C AE    XOR (HL)
5B2D 77    LD (HL), A
5B2E 1C    INC E
5B2F 2C    INC L
5B30 20 F9 JR NZ, #5B2B

```

This code decrypts some more code loaded in from tape, but it puts it at #5B40, which is right in the middle of the code we are working on at the moment. So put a breakpoint at #5B32 (the first instruction after the decrypter), and jump to #5B00 (because we haven't executed any of the code from #5B00 onwards yet!)

```

5B32 21 00 00 LD HL, #0000
5B35 22 B0 5C LD (#5CB0), HL
5B38 2E 02    LD A, #02
5B3A 32 6B 5C LD (#5C6B), A

```

This puts the value #0000 into #5CB0, but I'm not sure why, because #5CB0 is an unused system variable. It then changes the value of #5C6B to #02, which is what it was originally before it was changed to protect the loader.

```

5B3D ED 5B E7 FE LD DE, (#FEE7)
5B41 2A E9 FE    LD HL, (#FEE9)
5B44 1A    LD A, (DE)
5B45 AE    XOR (HL)
5B46 77    LD (HL), A
5B47 23    INC HL
5B48 IC    INC E
5B49 20 F9 JR NZ, #5B44
5B4B 3A EC FE    LA A, (#FEEC)
5B4E BC    CP H
5B4F 20 F3 JR NZ, #5B44

```

This is another decrypter, which works in exactly the same way as the others.

```

5B51 31 FF 60 LD SP, #60FF
5B54 21 00 CF LD HL, #CF00
5B57 11 00 40 LD DE, #4000
5B5A 01 00 1B LD BC, #1B00
5B5D ED B0    LDIR
5B5F 21 00 EA LD HL, #EA00
5B62 11 00 61 LD DE, #6100
5B65 01 00 10 LD BC, #1000
5B68 ED B0    LDIR

```

This code moves all the decrypted code to where it should be. This includes the loading screen (as you can see by the reference to #4000.)

```

5B6A 3E 65    LD A, #65
5B6C 32 00 5B LD (#5B00), A
5B6F 21 0F 14 LD HL, #140F
5B72 22 01 5B LD (#5B01), HL
5B75 21 0F 00 LD HL, #004F
5B78 22 03 5B LD (#5B03), HL
5B7B CD 00 FA CALL #FA00

```

This code loads the next Bleepload block, from 00 to 87, but will return to 5B7E when it's finished.

```

5B7E 21 00 40 LD HL, #4000
5B81 11 01 40 LD DE, #4001
5B84 36 00    LD (HL), 0
5B86 01 FF 1A LD BC, #1AFF
5B89 ED B0    LDIR
5B8B 3E 66    LD A, #66
5B8D 32 00 5B LD (#5B00), A
5B90 21 0A 0A LD HL, #0A0A
5B92 22 01 5B LD (#5B01), HL
5B96 21 0D 0A LD HL, #0A0D
5B99 22 03 5B LD (#5B03), HL
5B9C CD 00 FA CALL #FA00

```

This code blanks out the screen and loads some code into it. Some Bleepload games do not have this code, and it is only used on games whose game code overwrites the loading system at #FA00.

```

5B9F 21 00 40 LD HL, #4000
5BA2 11 00 FA LD DE, #FA00
5BA5 01 00 06 LD BC, #0600
5BA8 ED B0    LDIR

```

This moves the code loaded from the screen to #FA00 (where it should be).

```

5BAA 3A 00 60 LD A, (#6000)
5BAD 32 5C 5B LD (#5B5C), A
5BB0 31 A7 61 LD SP, #61A7
5BB3 CD 8E 02 CALL #28E
5BB6 28 1D JR Z, #5BD5

```

This routine restores the value of #5B5C that was stored in #6000 right at the very start. It then sets the stack to #61A7, and calls the ROM keycheck routine. If no key is pressed (and there shouldn't be), the routine jumps to 5BD5. In fact, it must jump there, otherwise it would attempt to load a normal headerless block, and there are none!

```
5BD5 C3 BC F5 JP #F5BC
```

This is what we've all been waiting for - the JP to the game itself. You can simply put POKEs on the end of #5BD5, and follow them with a JP #F5BC to load the game. For now, though, it might be a good idea to put the NEW routine up to #61A7 there, instead, and JP to #5B32 (where we left off). Then load the rest of the game, which will reset at the end, enabling you to load in STK, Devpac or whatever.

Now we've gone all the way through Bleepload, perhaps we should write a hack for the complete game. However, I'm going to put most of the hack in machine code, rather than have long lines of decimal DATA statements. You should be able to convert the machine code into DATA statements and get a short program which reads them in and POKEs them into memory.

The only thing that has to be done from BASIC is the CLEAR 50000:LOAD "" CODE 52480 from the BASIC loader. The machine code hack will consist of the first routine we wrote, followed by a few patches to the main loading system, so that the JP to the game is overwritten with our POKEs. I'll be putting it at #CC80, because it's a safe place in memory.

```

CC80 3E C9    LD A, #C9
CC82 32 5E CD LD (#CD5E), A

```

This puts a RET in place of the JP (HL) at #CD5E so we can CALL the loading system.

```
CC85 CD 00 CD CALL #CD00
```

This loads in the first Bleepload block.

```
CC88 CD 21 CD CALL #CD21
```

This loads in another Bleepload block.

```

CC8B 23    INC HL
CC8C 7E    LD A, (HL)
CC8D 2B    DEC HL
CC8E FE 21 CP #21
CC90 20 02 JR NZ, #CC94
CC92 18 F4 JR #CC88

```

This checks to see if all the Bleepload blocks have been loaded, and jumps ahead if they have, otherwise it jumps back to load the next block.

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QL Today

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Paul Field & John Davies, \$12.95

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Steve Vickers (Traducido y adaptado) A copy of this book is shipped free for asking if you just pay for additional shipping cost. Separately priced \$10

Sinclair Resources

Jack Dohany (Developer - 2068)

627 Vera Ave

Redwood City CA 94061

John McMichael (Developer - Graphics)

1710 Palmer Dr

Laramie WY 82070

Bill Russell (QL)

Russel Electronics

RR 1 Box 539

Center Hall PA 16828

Keith Watson (AERCO & Z80 Emulator)

41634 Amberly Dr.

Mt. Clemens, MI 48038

Rod Gowen (RMG)

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WANTED: Cartridges! For the TS2068: VU-Calc, VU-File, Budgeter, Pinball, Androids, Penetrator, Zebra OS-64, LarKen LKDOS, Oliger JLODOS, Spectrum ROM, Backgammon, Blind Alley, Chess, Hungry Horace, Horace & the Spiders, Horace Goes Skiing, Zeus Assembler, Zeus Hi-Monitor, Zeus Lo-Monitor; also EPROMs for the EPROM module. For TS1000/1500: TS1510 cartridge module; cartridges Chess, Supermath, States & Capitals, Flight Simulator; Rompak Eeprom-Holder Cartridge and any EPROMs.

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