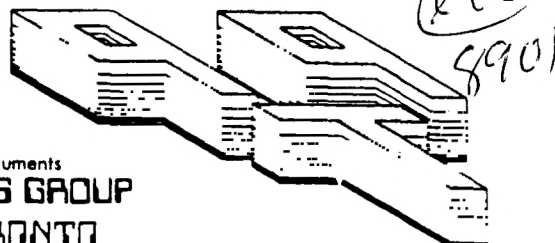


# Newsletter

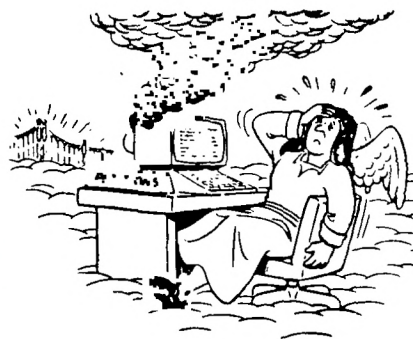
JANUARY 1989 ISSUE

Texas Instruments  
**USERS GROUP**  
TORONTO  
FOR THE TI-99/4A COMPUTER



## FAMILY CIRCUS

by Bil Keane



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From:

9T9 Users Group  
109-2356 Gerrard St. E.  
Toronto, Ont., M4E-2E2  
Canada

To:

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### NEWSLETTER EDITOR

Steve Mickelson 657-1494  
Associate Ed. Blair MacLeod 658-1416

### MEMBERSHIP FEES

FULL MEMBERSHIP \$30.00 / year  
NEWSLETTER SUBSCRIPTION \$20.00 / year



All memberships are household memberships. An newsletter subscription is only for those who do not wish to attend meetings, but wish to receive our newsletter and have access to our library. You are welcome to visit one of our general meetings before joining the group. If you wish more information contact either our president, in writing, at the club address on the front cover or phone him or our membership director.

The meetings are usually held on the last Thursday of each month, unless stated otherwise. Consult this issue of Newsletter 9T9 for the date and time of the next meeting. Meetings are held at the third floor meeting room of Canada Remote Systems, 4198 Dundas St. West, (Dundas, one block east of Royal York Road), starting at 7:30 PM and ending at 10:30 PM. No meetings are held in the months of July and August. December's meeting usually takes place the second week of the month.

### COMMERCIAL ADVERTISING

Any business wishing to reach our membership may advertise in our newsletter. The rates are as follows. (height by width):

FULL PAGE	(10" x 7")	\$50.00
HALF PAGE	(5" x 7")	\$25.00
QUARTER PAGE	(2 1/2" x 7")	\$15.00

Please have your ads camera ready and paid for in advance. For more information contact the editor.

Don't forget, that any member wishing to place ads, may do so free of charge as long as they are not involved in a commercial enterprise.

### NEWSLETTER ARTICLES

Newsletter 9T9 is published ten times a year by the 9T9 users group. Members are encouraged to contribute to the newsletter in the form of articles, mini programs, helpful tips, hardware modifications, jokes, cartoons and questions. Any article may be submitted in any form by mail or modem. We welcome the reprinting of any article appearing in this newsletter providing credit is given to the author and 9T9. If more information is required, call the editor. The name 9T9, Nine-T-Nine, Newsletter 9T9, Nine-T-Nine Users Group, and 9-T-9 Users Group are Copyright,(c), 1986, 1987, 1988, 1989 by the 9T9 Users Group, all rights reserved.

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9T9 Users Group is an independent, non-profit association of Texas Instruments TI-99/4A and Myarc 9640 users, and is not a part of Texas Instruments or Myarc Inc. Opinions expressed in this newsletter are those of the writers and are not necessarily those of the 9T9 USERS' GROUP. 9T9 cannot assume liability for errors or omissions in articles, programs or advertisements. Any hardware modification or project is presented for informational purposes, and the author, newsletter editor, and/or 9T9 Users Group cannot be held liable for any damage to the user's equipment. All such projects are done at your own risk!

### CLUB BBS

The 9T9 Users Group sponsors the TI Tower BBS, (416)921-2731, 300/1200/2400 BPS, 24 Hrs. Sysop: Gary Bowser.

## TId Bits

#25



-By Steve Mickelson, President 9T9 Users Group  
Compuserve 76545,1255; Delphi SMICKELSON; GENie S.MICKELSON

1989 is here already and I hope you all will have a great year! This month's TId Bits will be shorter, so as to make room for the other articles. My thanks to the rest of the 9T9 Executive for their contributions!

Elections

That time of year, again.

Renewals

If you already haven't done so; now's the time to renew your 9T9 membership. In spite of another postal increase, we will maintain the same membership rates we've had, for the last couple of years. Attention exchange newsletter editors, because of the increase in postal rates our executive agreed with the decision made by club secretary, Randy Rossetto, to mail-out the newsletter, quarterly. This is an inconvenience, as far as delay's are concerned, but will enable us to continue to exchange with all the newsletters on our current mailing list. The alternative choice would have been to cut-back on the lists. If you want to know the latest 9T9 news, you will find a abbreviated, archived issue uploaded to the TI databased on Compuserve, Delphi and GENie.

Missing Articles

Last month's TId Bits made reference to articles that were, at the last minute, dropped from that issue. They were Stephen Shaw's article, which contained the addresses for MICROpendium and L.L.Conner Enterprise, though I did have the address of the second one. MICROpendium is not available at local news stands, however subscriptions are \$27.50 (US) per year. MICROpendium, P.O.Box 1343, Round Rock, Texas, 78680, U.S.A.

I will print the missing "Ramblings" in a future issue.

Toronto Computes

Last fall, I was approached by Murray Soupcoff, of Toronto Computes, who edits the "Scoops From The Groups" section of this national magazine. Murray mentioned that Toronto Computes was running a series on the different computers, (IBM, Atari, Commodore, Apple and Coleco), and asked if I could write an article about the TI-99/4A past, present and future, in less than 1500 words!

I agreed, later realizing that Ron Albright's orphan chronicles, which only covered a portion of the time frame about which I had to report, was by no means a 1500 word article. After much thought, I hoped to concentrate upon what I felt was the most important factor which ensured the TI's survival, the TI user group. The rest, as they say, is history.

This article is copyright by Toronto Computes, though I don't think there would be any harm in any non-profit group reprinting it, with proper credit, as is usually done with such articles.

One further TId Bit is how this article was written. While my Geneve was in the shop, I used a discontinued NEC Z80-based, discontinued laptop. It was on this unit that I wrote most of the article, (I actually started it at the October Compufest, at our booth). Using Telcom, I transferred this Wordstar draft to my TI-99/4A for editing, (using Fast Term to capture the file). I then used Mike Dodd's P.C. Transfer to format and save the file now in a format compatible to IBM Wordprocessors. The disk and a hardcopy were delivered to Murray Soupcoff for final editing on his Z80-based Epson Computer, (he used a utility to convert the file from IBM to Epson format). After completion of the editing, Murray converted and save the file back to an IBM-format disk, to be delivered to Toronto Computes. In spite of all the transfers, editings and conversions, the text remained intact. I noted a couple of obvious errors on my part, after it was too late.

The first is that the last Chicago TI Fest was their 6th, not 8th. The second was regarding the Horizon RAM disk. The maximum memory size is now one Megabyte.

Anyway, in case you haven't read it, you will be able to read it now. For those who have January's issue of Toronto Computes, there is a reader survey. Please read it and mail it in. I feel the more people who respond, having TI's the more likely we will see support continued, in the newspaper.

# Orphan never lacking loving parental care



**Orphan computer**  
An abandoned computer lives on thanks to computer group.

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By **STEVE MICKELSON**

Today's state-of-the-art computers have an abundance of features which would have been considered truly amazing only a few years ago. For example, it's not unusual for contemporary systems to include spreadsheet and wordprocessing capabilities, or arcade games featuring multi-colored screens, music and digitized speech.

But a computer existed more than half a decade ago that already had all the above features and more. That computer was Texas Instruments' TI-99/4A, also known as the original "Home Computer" (a term coined by TI). Despite being an orphan, for five years this computer has survived and thrived.

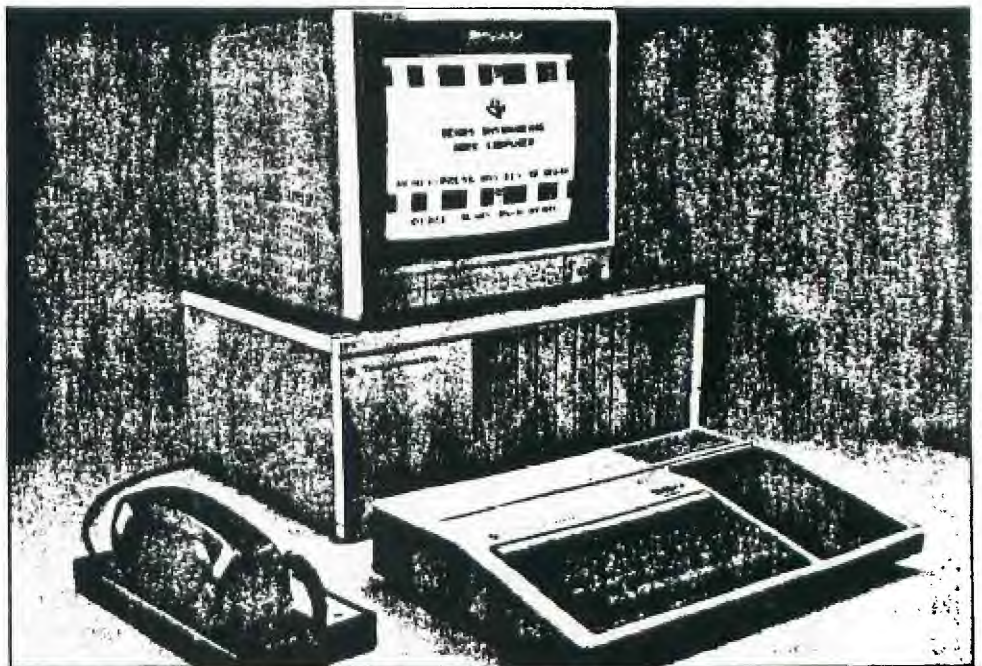
TI produced over 3 1/2 million of the 16-bit TI-99/4A computer consoles worldwide, including about 1/4 million Expansion Systems. Most of the early software produced for the TI was "locked" in GROM (Graphics Read Only Memory) cartridges distributed through TI. For each cartridge sold, TI collected a fee -- a policy which unfortunately discouraged many potential software writers.

After TI unsuccessfully tried to undersell the popular Commodore Vic-20, the company decided to cut its losses. TI stopped production of the TI-99/4A in October 1983. By rights, this should have led to the disappearance of the computer within a couple of years.

But despite TI's failure in marketing the 99/4A, the company had assured the survival of its orphan computer by implementing a policy of consumer satisfaction.

### **Support for the user**

Back in the early 80's, TI responded to the computer literacy needs of many fledgling users by creating a number of regional



### **TI-99/4A built by Texas Instruments**

workshops, exclusive to the 99/4A. Also a regular bulletin was mailed out to users.

As sales rose, demand for information outstripped supply. This led the company to encourage the formation of local user groups. TI sent out starter packages to aid in the formation of user groups. These new groups began their own newsletters to their members. A number of user groups began to exchange newsletters. When TI pulled the plug on their popular home computer, the existing network of user groups filled the void, providing the invaluable technical assistance needed by users.

### **Additional technical and hardware support**

The TI-99/4A endured for another reason. Since the 99/4A was built to the high commercial standards of Texas Instruments'

mini-computers, many systems have been in use for five or more years with little or no need for repairs. For those users with problems, TI created a toll-free 800 line called "TI CARES". TI released updates for existing TI software, and even some previously commercial software programs, to all user groups for release in the public domain.

Support for orphaned 99/4As also came from many third-party sources. For example, a couple of magazines, Home Computer, MICROpendium and Asgard News, catered exclusively to the TI user (though Home Computer is now deceased). And many hardware manufacturers picked up the slack, increasing production of cards for existing expansion systems, as well as designing brand new hardware add-ons and

expansion systems. Among these companies, Myarc is probably the best known.

Shareware software and hardware kits have also come from talented individuals within the many 99/4A user groups. For example, the Horizon RAM disk and MBP real-time cards have come from user groups. And DM-1000, a disk manager from the Ottawa User Group, has become the standard in the worldwide 99/4A community, from Mail Order To Regional TI Fairs

Several mail order suppliers still meet the needs of TI users. And now another forum has emerged for users to not only see the latest hardware and software for the 99/4A, but also to meet the remaining software authors and distributors within the TI community. That forum is the local or regional TI Fair. Chicago just had their eighth annual TI Fair, with others taking place in Milwaukee, Philadelphia, Las Vegas and Los Angeles.

In Canada, Ottawa and Halifax have been local focal points for TI forums. These events, usually held in community halls or auditoriums, give TI users an opportunity to meet one another in person, see the latest hardware and software, and hear lectures and demonstrations on their beloved orphan computer. TI-ers have been known to travel hundreds or thousands of miles just to attend such an event.

### **The legend lives on**

Today, many of the original TI computers are still in service. For example, some of these robustly built systems have seen two or three owners without enduring any hardware failure.

Surprisingly, more options are now available for the TI-99/4A, in hardware and

*ORPHAN Page 16*

# Orphan computer cont'd from Page 15

software, than when Texas Instruments originally discontinued the computer. There are now several languages for the 99/4A: Extended Basics, two versions of Forth, a Turbo Pascal, Pilot, Fortran, and c99, among others. There are currently also several data bases available, including TI-Base (which looks similar to D Base III). Other available databases are Creative Filing System and PR Base.

A host of other useful programs are now available too. For example, there are utilities that allow the user to port text files to and from an IBM, by reading/writing and even formatting in IBM disk format. There are several good graphics programs, including TI Artist, Picasso, Joypaint, and Graph X. And as for word processors, there are Companion, Writerease and the Press. As well, a number of advanced disk, diagnostic and assembler utilities are available for any interested 99/4A users.

### **New Hardware**

New hardware add-ons for the TI include voice recognition systems, trackballs, mice, 80-column cards, double and quad disk controllers, as well as hard disk controllers, real-time clock cards, speech cards, digitizers, music-synthesizer cards, and battery-backed RAM disks with up to 512K pageable memory.

It is also possible to purchase IBM-XT keyboard interfaces, and hardware to dump the older cartridge software to disk.

One of the most recent hardware developments has been the Myarc 9640, also known as the Geneve. The Geneve, literally a computer on a single card, has many features of the discontinued TI-99/8, as well as a number of other features which are simply state of the art.

For example, the Geneve uses the upgrade-compatible Yamaha 9938 video display chip. And this "intelligent" video chip has mouse and joystick ports built in, with 80 column display, digitizer capabilities, as well as Composite, Analog RGB, and RF modulated video outputs.

The Geneve has the same sound chip as the TI and comes with an IBM XT, 12-function keyboard. The operating system, M-DOS, has the same command set as MS DOS. Yet, a GPL software interpreter creates a TI-emulated operating environment within the 9640, one which lets most of the 99/4A programs run on the Geneve as if they were booted on a 99/4A.

Nevertheless, the Geneve's 12 MHz clock speed allows the user to run programs at selectable speeds up to 3 1/2 times faster than those of the 4A. The 9640/Geneve has 32K or an optional 64K of 0-wait memory, plus 640K of RAM on the card. Also, the Geneve has a battery-backed real-time clock. The Geneve's graphic output is up to 512 x 424 pixels, in any of 256 colours.

Recent software offerings for the Geneve include a mouse-driven art program which can load and print 99/4A art and GIF pictures, as well as GEME, a mouse-driven windows-like utility, which allows up to four programs to run at the same time. Overall, the Geneve brings to the TI-user many advanced features not possible in the TI-99/4A.

### **A bright future**

In the near future, we can expect a MIDI interface card, a Canadian built Z-80 card, Kermit software, GIF, and possibly an IBM co-processor card. Also expected in the near future is a stand-alone Geneve computer system, available to any user who does not already own a TI-99/4A system.

As long as we have a dedicated community of innovative enthusiasts, the TI-99/4A orphan will continue to endure and prosper as a contemporary classic, one of the true paradoxes in today's computing world.

*Steve Mickelson is president of the Toronto 9T9 Users Group and edits Newsletter 9T9.*

TO ALL USERS:

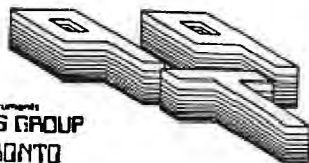
FROM THE BOWSER FAMILY:

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AS OF 11:56 JAN 2nd 1989

MRS. BARARA BOWSER has passed away, I hope she has a much better life. And I hope all BBS users will take a minute of silence for her.

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Our heartfelt sympathy goes to both Gary and Hank Bowser, for thier loss.  
-Steve Mickelson, President 9T9 Users, speaking on behalf of the entire club.

**TORONTO 16 COMPUTES!**



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Newsletter 9T9 Articles 1988  
 compiled by Steve Mickelson

# SUPPORT TRYWARE/FAIRWARE

By Cecil G. Chin, Officer at Large

My congratulations to our editor Steve Mickelson and associate editor Blair MacLeod for the fine job they are doing, publishing our monthly News Letter.

I look forward to reading and enjoying the news letter every month and have only praise for Steve Findly of "HARDCOPY", Gary Bowser of "9T9 LIBRARY" listing and notes if any" and Randy Rossetto's article when he feels like it.

All I can say is thanks very much and keep up the good work guys.

And now to other things.....

For those of you who have not yet contributed to DSKU v4\*1; you can still do so by contacting Gary Bowser or myself with your contributions as early as possible; as the money order will be purchased at the end of Jan. 1989.

So far only four (4) members have contributed a total \$74.00 including expenses to DSKU v4\*1. -A bank draft for US\$80.00 was sent to Barry Boone for Archiver v4\*0 from eight (8) members.

TELCO is the next Program on our list. It is a Terminal Emulator program written by Charles Earl, in Assembly language. Version 1.1 emulates ADM3A, ANSI, D410 and VT100 which is the version I'm using. I think the latest version will emulate more Terminals. This program was written with the Geneve in mind because it is 100% compatible.

I am sure all or most of you are using this program and are aware of it's many features to name a few: Auto redialer, Editor, Catalog a disk, Macro setup/editor. There is also a clock that resets when you logon this way, you can time yourself if your time is limited. If you hit FCTN-7 at anytime a quick reference list of keystrokes will be Displayed on the screen. This program will operate from any drive because, it remembers which drive it was originally loaded from. It will also load from the Horizon Ram Disk which makes the program operate extremely fast because it loads a module each time, depending on your selection.

The documentation is extensive and explicit, so, if you read it you will not have any problem operating this program.

The author is asking CAN\$20. The club will pay for the bank draft and postage

The necessary form for the contribution will be available at the next meeting. If you cannot make the meeting please contact Gary Bowser (960-0925) or myself (671-2052) and arrange for a delivery or pickup, or use the form that is included with the documentation.

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## New BBS

A new TI BBS in town... It's called TIBM Wizard. Users will enjoy the graphics for the Geneve and TI, which includes over 300 RLE's and still growing library of GIF files. I have ReadMac pictures which should be compatiable with MacFlix.

I also support the IBM and compatiables, in the way of software and graphics. But that's a different story and belongs in an IBM newsletter. I'll tell you now that I can see any picture that the TI and Geneve can see.

Well, enough intro, now getting connected. I'm in the Toronto dialing area and I support speeds at 300/1200/2400 baud (8N1). My board runs on a Packard Bell, IBM XT clone, with a 50 Meg HD on-line. The phone number is 743-6703. Membership is free, however, for special graphics, I'm asking \$5. The \$5 also get's you an on-line game, X-Rated graphics and GIF pics.

So, give me a call at 743-6703, 23 Hrs a day (4-5 AM for mail only), due to being involved in the Matrix.

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## THINGS TO DO TODAY

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|-----------------------------------|--------------------------|
| 1 RENEW 9T9 MEMBERSHIP            | <input type="checkbox"/> |
| 2 VOTE AT 9T9 MEETING             | <input type="checkbox"/> |
| 3 PARTICIPATE IN MY USER'S GROUP  | <input type="checkbox"/> |
| 4 WRITE AN ARTICLE FOR NEWSLETTER | <input type="checkbox"/> |
| 5 GIVE A DEMO AT NEXT MEETING     | <input type="checkbox"/> |

# 9640 OVERLAY STRIPS

-By BLAIR MacLEOD

Remember the overlay strips for your 99/4A? Remember how helpful they were when you were racking your brain for the proper key press for TI-Writer or Multiplan. Or how about that little utility program that would create a blank overlay strip for you. All you had to do was cut and paste and VOILA! You had a paper overlay strip!

Well, since then you've upgraded and purchased a MYARC 9640. You may have 10 or 12 Function keys along the top of the keyboard or you may even have a keyboard with Function keys down the side. You may have considered (like me) at one time or another of cutting your old plastic TI strips to accomodate your new keyboard. Or you suffered quitely, pressing Function keys hoping they were the right ones.

Well your problems are over! There just so happens to be a company here in Kitchener, Ontario that makes laminated overlays. One particular package consists of: 2 blank and 3 pre-printed overlays. The pre-printed overlays are for the usage of: MYWORD, MY-ART, MULTIPLAN. Also, you can just as easily order a set of blanks and make your own. It's your choice! I purchased my sets in July of this year. At that time, a set was retailing for apprx. \$6.00 for a set of five. Upon receipt, all that is required of you is to cut out the area where the keys are and place the overlay over the Function keys and BINGO, no more erroneous key presses!

So, if your interested, contact: Canaria Data Inc.  
264 Weber St. West  
Kitchener, Ontario  
N2H 4A6, Canada  
PHONE: (519) 578-3873

I think you'll be satisfied with the quality of their product and don't forget to mention the spec's of your keyboard (ie. 10 or 12 Function Keys).

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## Newsbytes

### Donaldson Software releases programs

New programs have been released by Donaldson Software.

Swordfish Patrol is described as a graphic multi-screen airplane war game for the TI99/4A. The user flies a vintage Swordfish biplane in the service of the RAF during World War II. Tasks include destroying the Air Force of the Bismarck, sinking the Bismarck battleship, fighting German airplanes in the skies over Great Britain during the Battle of Britain and attacking the forces of Rommel (the Desert Fox) in Northern Africa. A user who completes all missions assigned will be sent home to Manchester Air Force Base. The game is programmed in TI Extended BASIC.

A BASIC version of War of the Netherworlds has been released. War of the Netherworlds is a two-player strategic space war game, a race between Draconis and Cygnus 5 for the conquest of 12 moons and each other's forces. The Speech Synthesizer and TEII module are recommended.

Monster Castle is a graphic adventure game for ages 8 through adult, described as being in the style of D&D or Tunnels of Doom. The user takes on giant spiders, crazed bats, ghosts and other creatures in an attempt to become owner of the castle and its treasures. There are more than 19 rooms and 10 floors. The game is programmed in Extended BASIC.

Sun and Planets includes a graphic display, on command, of the sun or any planet in the solar system, and information on the number of moons, surface gravity, size, distance from the sun, angle of rotation and more, based in relation to the earth.

Two Extended BASIC games on one cassette are Speed Rally and TI-Pac Man. Speed Rally is a racing car game and TI-Pac Man is described as a version of Pac Man with a slightly more difficult maze.

All programs are on cassette and each cassette is \$8.95 U.S. A catalog of all games is available for \$1.50 U.S. For information or to order, write Donaldson Software, 521 Lievre St., Buckingham, Quebec, Canada J8L 2C2.



# HARDCOPY

-By STEVE FINDLAY

Welcome back to another year of what I hope is continued strong support of the Home Computer. With the software prowessness of the likes of J. Peter Hoddie, Mike Dodd, Chris Faherty, our own Gary Bowser and other spoken and unspoken authors, we should be stretching the horizons of our "little" computer to amazing lengths. I personally have not outgrown the 4A as yet and do not see any change in the near future.

Since I have just finished recuperating from the holidays, I was not able to complete a regular column. So this month I am taking the opportunity to present an updated listing of the Hardcopy library. The library has grown so much since I took charge of it, that I cannot fit all the books, magazines, manuals and newsletters in the library's portable tote wagon. So, if you are looking for something in the library, consult the index that is present at the library wagon every meeting. If what your looking for is not there, I will arrange to have it available for the next meeting. In a rush? Give me a call at home and you can come and pick it up yourself. But if you don't call first, you might travel along way for nothing after someone else beat you to the punch a few days earlier.

I have already read binder #11, so next month's column should be ready on time. Catch y'all at the next meeting.

## HARDCOPY LIBRARY INDEX

### NEWSLETTER BINDERS

#### BINDER NO. 1

NORTHWEST OHIO 99er NEWS  
MANASOTA USERS GROUP

#### BINDER NO. 2

MSP 99 USER GROUP (MINNESOTA/ST. PAUL UG)  
SOONER 99ERS  
OGDENS USERS GROUP  
WINDSOR-ESSEX TI U.G.  
CHANNEL 99 (TRI-VALLEY 99ERS USER GROUP)  
TI K\*3 USER GROUP  
MONTREAL 99er

#### BINDER NO. 3

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SNUGLETter (Southern Nevada Users Group)  
K-TOWN 99'er  
TI-SIG (San Diego Computer Society)  
NEW HORIZONS  
99er SOFTWARE DIRECTORY (1983)

#### BINDER NO. 4

STICC (Saskatoon TI Computer Club)  
VICTORIA 99'ers  
WINNIPEG COMPUTER CLUB  
TINS (TI Nova Scotia)  
CALGARY 99'ers

#### BINDER NO. 5

99/4A USERS OF CANADA  
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99'er ONLINE (Edmonton 99er Computer Users Society)

#### BINDER NO. 6

9T9 NEWSLETTER BINDER NO. 7  
CIN-DAY USER GROUP  
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P.U.G. (Pittsburgh Users Group)  
COLORADO 99/4 USERS GROUP (Rocky Mountain 99ers)  
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#### BINDER NO. 9

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NETWORK NEWSLETTER (Sacramento 99ers UG)  
QB MONITOR  
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MARION AREA 99'ers (OHIO)  
WEST PENN 99'ers CLUB  
99/M's UG (Menomonee WI)  
ERIE NINETY-NINER UG



"After developing the X13, we went to work on the desk-top model."



1. THINGS TO DO WITH YOUR TI-99/4A COMPUTER
2. HOW TO USE THE TI-99/4A COMPUTER
3. THE USER'S GUIDE TO TEXAS INSTRUMENTS (TWO COPIES)
4. THE BEST OF TI99/4A CARTRIDGES
5. THE BEST TEXAS INSTRUMENTS SOFTWARE (FOUR COPIES)
6. TI99/4A FOR THE BEGINNING BEGINNER
7. INTRODUCTION TO TI BASIC
8. PROGRAMMING BASIC WITH THE TI HOME COMPUTER
9. USING AND PROGRAMMING THE TI-99/4A
10. 32 BASIC PROGRAMS FOR THE TI-99/4A
11. TERRIFIC GAMES FOR THE TI 99/4A (TWO COPIES)
12. SAMS TI-99/4A BASIC PROGRAMS
13. SAMS TI-99/4A GRAPHICS AND SOUNDS  
(contains disk and cassette copies of listed programs)
14. SAMS TI-99/4A CALC (TWO COPIES)  
(one copy contains cassette of listed programs)
15. SAMS TI-99/4A TRIVIA DATA BASE
16. SAMS TI-99/4A ENTERTAINMENT GAMES (THREE COPIES)  
(one copy contains cassette and disk of listed programs)
17. SAMS COMPUTERFACTS FOR THE TI-99/4A  
(technical service data)
18. SAMS PROFESSIONAL'S GUIDE TO THE TI PROFESSIONAL COMPUTER
19. PROGRAMS FOR THE TI HOME COMPUTER
20. THE BEST OF 99'ER
21. DATA AND FILE MANAGEMENT FOR THE TI-99/4A
22. COMPUTE!'s PROGRAMMER'S REFERENCE GUIDE TO THE TI-99/4A
23. COMPUTE!'s FIRST BOOK OF TI GAMES (TWO COPIES)
24. COMPUTE!'s CREATING ARCADE GAMES ON THE TI-99/4A
25. COMPUTE!'s BEGINNERS GUIDE TO ASSEMBLY LANGUAGE ON THE TI-99/4A (TWO COPIES)
26. MORE BASIC COMPUTER GAMES (from Creative Computing magazine)
27. A USER'S GUIDE TO PILOT
28. THE POWER OF: FINANCIAL CALCULATIONS FOR MULTIPLAN
29. CIARCIA'S CIRCUIT CELLAR - VOLUME VI
30. MANUEL D'UTILISATION (FRENCH VERSION OF TI'S BASIC USER'S REFERENCE GUIDE)
31. TI'S BEGINNER'S BASIC MANUAL (THREE COPIES)
32. COMPLETE SET OF 3 MANUALS USUALLY PACKAGED WITH BRAND NEW CONSOLES  
(for those of you that purchased a used console with no manuals)

'TIL NEXT MONTH... CALL LOAD(-31932,32)

The following comes courtesy of DELPHI:

**512K EXPANSION MEMORY CARD  
FOR 9640 :  
MODIFY IT YOURSELF!**

-By PAOLO BAGNARESI, Italy, Jan. 16th, 1989

HOW TO MODIFY YOUR 512 K MYARC MEMORY EXPANSION CARD AND MAKE IT  
=====

WORK WITH THE GENEVE COMPUTER  
=====

If you have:

- a Myarc 9640/Geneve computer
- and a Myarc 512 K Expansion Memory originally released for the TI-99/4A, now collecting dust in a shelf,
- then now you can modify it and enjoy half a Meg of additional memory on your 9640 computer.

Even if you already have your card modified by Myarc itself, you may want to read this document. Some cards badly modified by Myarc have already been released (mine for example) and yours may as well be one of them!

If you aren't able to understand why a new peripheral added to your system doesn't work, then you may want to check this document. You may find out that a Horizon Ram Disk doesn't work just because Myarc hasn't properly modified the 512 K card you plugged in several months ago (this happened to me too), or that your Horizon Ram Disk works only with the Myarc Floppy Disk Controller (and not with the CorComp). And, again, the culprit was the 512 K (yet another bug).

WARNING: CARD VERSIONS THIS PROJECT APPLIES TO

I don't know how many different versions of the 512 K card have been released by Myarc. I know for sure there are at least 2 versions of them. This project is good for both of them.

Obviously, the two versions have some differences. Since there isn't any serial number or a name on the Printed Circuit Board, it's not easy to tell the one from the other by simply looking at a label. Let's then call them Version A and Version B. I will tell the differences between Version A and Version B later on, at STEP 6.

But what if the version you have is neither A nor B? There isn't much I can do about it: chances are that YOU WILL END UP WITH A CARD THAT WILL NOT WORK!

Why this document then? It is intended only for those who are not willing to send their cards to the Myarc Service Department and wait some months to have them back.

We in Europe suffer from the distance, the time and the money needed to get anything accomplished by Myarc. This is why I think some people in Europe, and maybe in some other foreign countries as well, will go ahead and try to execute this project, in spite of all the risks that it entails.

#### DISCLAIMER:

Any unauthorized modification carried out on your 512 K card may invalidate the warranties provided by Myarc. No warranty is provided with this document, that you should not assume to be surely correct or suitable to the card version you own. You also are warned that any temporary or permanent damage caused to your system by the execution of the project shown in this document may be due to the unsuitability of the project to your particular case. Neither any responsibility will arise nor any liability, obligation will ever be ascribed to ....

Aw'rite guys, enough of this stuff.... if you don't want to risk, give up.

#### TECHNICAL SKILL REQUIRED:

The person who can successfully carry out this project is a normal computer user with a minimum dexterity: he knows how to handle a soldering iron, has already undertaken some minor electronic projects, understands IC pin counting method and does not get confused about pin counting when flipping over a printed circuit board. Really, if you honestly feel you don't qualify, please give up and get the work done by Myarc: it's much safer, since a drawing of the project is not provided.

It's better to feel sorry now than to feel sorry later on, when a white cloud of smoke comes out of your beloved 512 K card (unlikely, but possible if you connect some ICs to the +/-12 Volts unregulated supply).

#### WHAT YOU WILL HAVE TO DO:

You will have to cut some traces on the printed circuit board (PCB) and add some wires (jumpers) here and there. That's all.

#### LAST WARNING:

The changes you are about to operate on the 512 K card are somewhat FINAL. After the modifications have been performed, your Myarc 512 K will not be able to work within a truly TI-99/4A system any longer. If you planned to switch the card between a Geneve system and a TI-99/4A system, then THIS PROJECT IS NOT FOR YOU!

In order to restore the card to its previous conditions (i.e. to make it work again with TI-99/4A), you will have to undo whatever you might have done, i.e. resolder back the cut traces and unsolder all the added wires. Although feasible, it's not practical.

Start this project only if you plan to use the card exclusively in the Geneve environment.

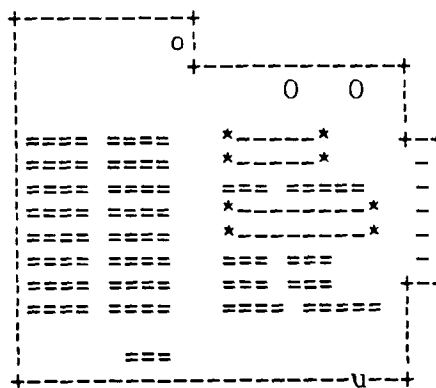
#### STEP 1 - EQUIPMENT

- 1 Soldering pencil.
- 1 roll of fine (20 awg ) rosin core solder.
- 1 foot of fine (30 awg ) wire wrap wire.
- 1 1N4148 diode.
- 1 Sharp pointed knife.
- 1 Water-resistant, soft-tip, black pen.
- 1 Multimeter, optional.

STEP 2 - Remove clamshell from the Myarc 512 K Printed Circuit Board (PCB).

STEP 3 - Place the PCB on a table, with the component side upwards, the connector at your right hand side and the protruding LED toward your chest.

This is what you should see:



#### COMPONENT DESCRIPTION:

You should now see:

- 16 memories on your left hand side, divided into 2 equal rows of 8 memory each, "U1" through "U8" and "U9" through "U16". Each memory has 18 pins and may be named either 4464, or 50464, or 41464, or 81464 or similar. They are all 256 Kbit (64K x 4 bit) DRAMs.
- 2 +5 Volts voltage regulators (7805), named "VR1" and "VR2", at right upper corner, fastened with nuts and bolts to the PCB.
- 4 electrolytic capacitors, near the above 7805.
- 1 Eprom (2764, 8K x 8 bits), the large and only 28 pin IC that is now in the upper half of the PCB, near the four electrolytic capacitors: it should be named "U26".
- 1 74LS139 (Dual 2 to 4 line Decoder/Demultiplexer), a 16 pin chip, named "U24", placed just below the Eprom "U26".
- 1 74LS245 (Octal bus transceiver with 3 state output), a 20 pin chip named "U25", placed just at right of the 74LS139 "U24".
- 1 TMS4500A (Dynamic Ram Controller), a 40 pin chip named "U23", placed just below the 74LS139 "U24" and the 74LS245 "U25".
- 1 74LS74 (or similar) (Dual D-Type, Positive Edge Triggered Flip-Flop with Preset and Clear), a 14 pin chip named "U19", placed just below and to the left of the TMS4500A "U23".
- 1 74LS11 (Triple 3 Input AND Gates), a 14 pin chip named "U22", placed just below and to the right of the TMS4500A "U23".
- 1 74LS74 (or similar) (Dual D-Type, Positive Edge Triggered Flip-Flop with Preset and Clear), a 14 pin chip named "U18", placed just below the 74LS74 "U19".
- 1 74LS04 (Hex Inverters), a 14 pin chip named "U21", placed just below the 7411 "U22".
- 1 74HCT259 (Eight Bit Addressable Latches), a 14 pin chip named "U17", placed just below the second 74LS74 "U18".
- 1 PAL12L6 (Programmable Logical Array), a 20 pin chip named "U20", placed just below the 74LS04 "U21".
- 1 74LS00 (Quadruple 2 Input Positive NAND Gates), a 14 pin chip named "U27", placed below the 4464 memory chip columns "U9" - "U16".
- 1 3.579545 MHz quartz, placed below the PAL12L6 "U20".

#### STEP 4 - CHECK THE COMPONENTS

You are required to check at all the components listed in STEP 3 and to compare them with the components you have in your own card. If they do not match, even on only one element, stop this project since you may own a card version different from those this project applies to.

Also, give up the modification if you come across any difference between your card and the descriptions of the cards reported later on in this document.

Myarc has used either the "LS" type or the "HCT" type of the ICs on the PCB. If this is the only difference you find in your card, then go ahead.

STEP 5 - THE 60 PIN CONNECTOR:

The card has a 60 pin connector, that is used when you want to insert it in the Peripheral Expansion Box (PEB). ODD pin #s (1 through 59) are located on the "Solder Side" of the PCB, and EVEN pin #s (2 through 60) are located on the "Component Side" of the PCB. Thus, each side of the board has 30 pins. The numeration starts from the four electrolytic capacitors side (lower numbers) and goes up toward the LED side (higher numbers).

If you look carefully at the 60 pin connector, you will notice that all the used pins are connected to the "Solder Side" of the PCB by the means of small elliptical solder pads. Therefore, the "Solder Side" of the PCB gives all the 60 possible contacts. Later on, when you will be required to run a jumper, let's say, from pin xx of the IC yy to connector pin # zz, and pin # zz happens to be on the "Component Side", you can solder the wire to the correspondent pad in the "Solder Side" of the PCB, thus avoiding messing wires running from one side of the PCB to the other.

Therefore, I would advise you to mark right away, with the help of a water-resistant soft-tip black pen, the correspondent numbers of all the following pins on the elliptical solder pads ON THE "SOLDER SIDE":

- 4 (READY)
- 56 (MEMEN.A\*)
- 54 (WE.A\*)

STEP 6 - CARD VERSION A AND VERSION B:

Version A of the is the card that:

- hasn't any 1N4148 diode connected to PIN 4 (READY) of the 60 pin connector.
- has only 2 solder holes (terminators) in the following jumpers: J2, J3, J5, J6.

Version B of the is the card that:

- has one 1N4148 diode connected to PIN 4 (READY) of the 60 pin connector. The diode is not identified on the PCB by a white mark as all the other components are, because it had been added later on. The diode is placed near the resistor "R5". If you have the 60 pin connector at your right hand side and the LED pointing toward your chest, then you'll see, near the 60 pin connector edge and from left to right: 2 diodes marked "D2", a resistor marked "R5", and finally the unmarked 1N4148 we are talking about.
- has 3 solder holes (terminators) in the following jumpers: J2, J3, J5, J6. The third hole is not inscribed in the white ellipse marked on the PCB that identifies the jumper. Rather, it is often cut through by the white ellipse itself.

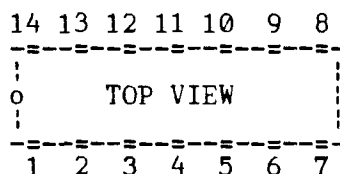
STEP 7 - THE 2764 EPROM:

The 2764 Eprom "U26" should be socketed (if not, give up this entire project and send the card to Myarc: it's too difficult to remove a 28 pin soldered IC without doing any damage to the PCB). Remove the Eprom, with the help of a flat screwdriver, by prying alternatively on the two short sides of the IC. Keep the Eprom for any future need.

STEP 8 - IC PIN COUNTING METHOD:

For those who are not familiar with the counting method of the IC pins, I will give this short explanation: put an IC on a table, so that the pins are touching the table surface. Now look down at the IC from above (you should see the component number written on top of the IC): this way of looking at the IC is called "TOP VIEW". You will see a notch (or a dot) on the IC surface; starting from there, and going in a counterclockwise direction, the first pin you will find is pin # 1, next pin is pin # 2, and so on until you get to the last pin (which is again near the notch from where you started the count).

Example:



Later on in this project, when you will be instructed to act on a certain pin # on the "Solder Side" of the PCB, you will have to locate that pin # on the "Component Side" of the PCB, and then you'll flip over the PCB, keeping track of where that pin sticks out in the "Solder Side".

## STEP 9 - CUT TRACES:

Now comes the difficult part. With the sharp knife, you should cut some traces on the PCB. It is important that the knife is really sharp, so that the thin copper traces will suffer little from the physical strain. trace as well, but leave it electrically insulated from Pin 10 and Pin 11.

If you have doubts, this is the right time to give up this project, since the card hasn't been damaged yet.

### TRACES TO BE CUT ON THE TOP SIDE ("COMPONENT SIDE"):

Keep the 60 pin connector at your right, so that the LED points toward your chest. Then proceed as follows:

- a) TMS4500A ("U23"): cut trace leading to PIN 1 (CLK).
- b) TMS4500A ("U23"): " " " to PIN 5 (ALE)
- c) TMS4500A ("U23"): " " " to PIN 8 (ACR)
- d) 74LS11 ("U22"): " " " to PIN 10
- e) 74LS11 ("U22"): cut trace running BETWEEN PIN 5 and PIN 6
- f) PAL12L6 ("U20"): cut trace NEXT ON THE RIGHT of PIN 11. This trace will connect to PIN 9 of PAL12L6, by passing underneath the PAL itself.
- g) 74LS259 ("U17"): cut trace leading to PIN 5. If there are 2 traces leading to PIN 5, then cut the one on the right.
- h) 74LS259 ("U17"): cut trace leading to PIN 6. If there are 2 traces leading to PIN 6, then cut the one on the right.
- i) 74LS259 ("U17"): cut trace running BETWEEN PIN 7 and PIN 8

### TRACES TO BE CUT ON THE BOTTOM SIDE ("SOLDER SIDE")

- i) PAL 12L6 ("U20"): cut trace leading to PIN 9.
- j) 74LS11 ("U22"): cut trace connecting PIN 9 and J5 terminator.
- k) 74LS11 ("U22"): cut trace connecting PIN 8 and J5 terminator.
- l) 74LS11 ("U22"): cut trace connecting PIN 14 and PIN 9 (ACW) of TMS4500A ("U23").
- m) 74LS259 ("U17"): cut trace leading to PIN 7.

## STEP 10 - INSERT JUMPERS (BOTTOM SIDE)

Now you will have to insert a short jumper in the following jumper holes: "J1", "J2", "J3", "J5" and "J6". It is best to previously heat and suck off the solder so that you can insert easily the jumper.

A) - "J1", "J2", "J5", "J6"

- Card Version A: run a jumper so as to connect the two holes enclosed by the white ellipse identifying the Jumper number (J1,J2,J5,J6).

- Card Version B: run a jumper so as to connect the two holes enclosed by the white ellipse identifying the Jumper Number (J1,J2,J5,J6).

Leave the third hole pertaining to the Jumper Number unconnected.

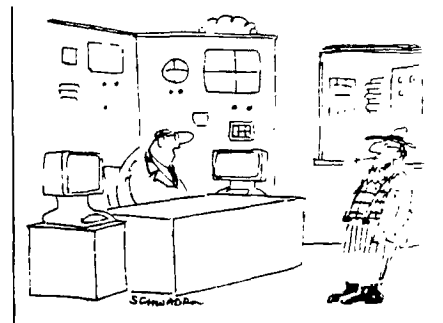
B) - "J3" - Card Version A: run a jumper so as to connect the two holes enclosed by the white ellipse identifying "J3".

- Card Version B: run a jumper so that all the three holes of "J3" are electrically connected together.

C) - PAL12L6 ("U20") : short together PIN 9 and PIN 10.

D) - 74LS11 ("U22") : run a bridge so as to shorten PIN 10 and PIN 11 together. Be careful, there is a trace running between Pin 10 and Pin 11: don't short this

punch



"Heyworth, we feel you might be happier in a low-tech firm."

CREATE THE NEXT LONG JUMPERS WITH AN INSULATED WIRE

E) - Card Version B : skip to step F). - Card Version A :

1) - Solder a 1N4148 diode to PIN 2 of TMS4500A ("U23"). The 1N4148 diode has a black band on itself. It is the lead next to this black band that has to be soldered to PIN 2 of the TMS4500A.

Now solder a wire to the other end of the 1N4148 diode.

2) - Now cut the free end of the wire so that it is long enough to reach the solder pad pertaining to PIN 4 (READY) on the 60 Pin Connector Edge to the PEB. You marked this pad at STEP 5 (see above).

3) - Solder the free end of wire to the above solder pad.

F) - 74LS139 ("U24") : run an insulated jumper so as to connect PIN 1 of the 74LS139 with PIN 8 (ACR) of TMS4500A ("U23").

G) - TMS4500A ("U23") : run an insulated jumper so as to connect PIN 5 (ALE) of TMS4500A with the solder pad pertaining to PIN 56 (MEMEN) on the 60 Pin Connector Edge to the PEB.

H) - 74LS00 ("U27") : run another insulated jumper so as to connect the solder pad pertaining to PIN 56 (MEMEN, on the 60 Pin Connector Edge to the PEB) with PIN 12 of the 74LS00 ("U27").

I) - TMS4500A ("U23") : run an insulated jumper so as to connect the solder pad pertaining to PIN 54 (W., on the 60 Pin Connector Edge to the PEB) with PIN 9 (ACW) of the TMS4500A ("U23").

J) - 74LS11 ("U22") : run an insulated jumper so as to connect PIN 8 of 74LS11 with PIN 1 (CLK) of TMS4500A ("U23").

K) - 74LS11 ("U22") : run an insulated jumper so as to connect PIN 9 of 74LS11 with PIN 11 of the 74LS74 ("U19"). This 74LS74 is the one that is right below the TMS4500A ("U23").

L) - PAL12L6 ("U20") : run an insulated jumper so as to connect the solder pad pertaining to PIN 43 (A0, on the 60 Pin Connector Edge to the PEB) with PIN 4 of PAL12L6 ("U20").

M) - 74LS11 ("U22") : run an insulated jumper so as to connect PIN 4 of 74LS11 with the solder pad located between PIN 1 and PIN 2 of PAL12L6 ("U20"). This last solder pad will lead, on the "SOLDER SIDE", to one of the two terminators of "J2" JUMPER.

STEP 11 - Your hard work is finished. Check well all the cuts and all the connections you've made. Once you're sure they are all correct, reinsert the PCB in the clamshells. Close the clamshells and insert the card in the PEB.

If you are a religious person, this is the right time to put into practice what you've learned when you were a boy.

If you are an atheist, well, you know no one will be listening to you up there. So, simply save your time and pass directly to STEP 12.

STEP 12 - Power on the PEB. SYSTEM/SYS should load smoothly. TEST A) -

Execute the CHKDSK command from DOS environment. Without Expansion Memory the CHKDSK command should give you "557056 bytes of Total Memory".

With Expansion Memory the CHKDSK command should give you "1048576 bytes of Total Memory".

CHKDSK is not capable of identifying addressing problems with the 512 K card. There is another DOS command that will really use the additional memory, the DISKCOMP command, and this is the command you should now use.

TEST B) -

Execute the DISKCOMP command from DOS environment. Without Expansion Memory the DISKCOMP command should eat up about 128 sectors for each pass.



With Expansion Memory, instead, the DISKCOMP command should eat up about 896 sectors for each pass.

DISKCOMP Command must not crash. If it does, either you've done something wrong with cutting traces or adding jumpers, or the 512 K card version you have is different from the ones described in this document.

If the second case is true, you should restore all the cut traces, eliminate all the added jumpers, make sure the card works again in the TI-99/4A environment and send it to Myarc.

If the first case is true, don't panic. Double check again all the work you've done, thinking well about pin counting (it's easy to get confused when flipping over the PCB).

But, if everything works all right, you know for sure you've done a hell of a good work!

#### THIS PROJECT HAS BEEN ALREADY TESTED

The modifications explained in this file have been already carried out by a third person. After finishing this text file, my friend Massimo Cariboni was able to successfully modify his old 512K Myarc to work with Geneve computer. He carried out the needed modifications by only following this text file.

During the experiment, the original new 512 K cards we recently got from Texaments have been purposely kept away from him. In this way he could not check his work with the new card; the only lead he could follow was this plain text file.

Also, he played no role in writing this text file, so that he could not try to remember what I meant with my writing. It has been a kind of a "single blind" experiment.

Finally, while the new card we had from Texaments were type "B", the old card already in his possession was type "A" (a diode had to be added).

THE FOLLOWING PARAGRAPHS WILL TELL YOU WHY I STARTED THIS PROJECT. I DID NOT PLANNED TO..... BUT I HAD TO.

IF YOU DO NOT READ THEM, YOUR CARD WILL WORK WELL ANYWAY...

#### HOW THE WHOLE STORY BEGAN

In September 1988 my friend Massimo Cariboni and I received one Myarc 512 K Expansion Memory each from Texaments, NY. Steven Lamberti, President of Texaments, said that these two cards were the very first ones to be delivered from Myarc to the Geneve customers. The two cards showed 9 additional wires run across the board (jumpers), 1 diode 1N4148 added, several traces cut and an empty Eprom socket.

We had been previously anticipated by Mr. Lamberti that these card were a simple upgrade of old Myarc 512 K, originally built for the TI-99/4A computer. Therefore, the jumpers and the cuts were no surprise to us.

However, we soon run into troubles.

#### THE MISSING PROBLEM

First off, we had a problem with MDOS that would recognize the 512 K added to the system, but would crash on simple tasks such as the DISKCOMP command. A quick inspection with a modified Debugger showed that the new 512 K card would respond at the >80 - >FF memory bank addresses. However, whatever was written in the first >80 - >9F banks would also be read back from the >A0 ->BF banks. It seemed that the card was lacking a decoding of the most significant address, so that it could not distinguish the first 256 K from the second 256 K. A phone call from Mr. Pierre Garoche, 1 Residence Le Terres Rouges, 91120 Palaiseau, France, helped solving the problem. AMC line, Pin 48 in the connector of the Peripheral Expansion Box (PEB), was not connected with the pin 34 (CA7 line) of the TMS 4500A Dram Controller. A simple soldering in the J3 jumper solved the situation (see above at STEP 10-B).

Now MDOS would operate properly. DISKCOMP and all the other MDOS commands that take advantage of the increased memory size would not fail or crash the system any longer.

## HORIZON RAM DISK - CORCOMP DISK CONTROLLER PROBLEM

A second problem showed up as soon as I solved the first. When using the CorComp Floppy Disk Controller (FDC) the Horizon Ram Disk (HRD) would not operate properly. However, the problem disappeared after replacing the CorComp FDC with a Myarc FDC. Why that??? After all, the HRD would work perfectly with the CorComp FDC and without the Myarc 512K Memory Expansion. I could not possibly think of the CorComp FDC as the culprit. Rather, it seemed that a signal, generated inside the Myarc 512K would propagate into the other cards. I wanted to know what was this signal. So, I decided to cut all the traces to the 60 Pin connector, one after the other, until the HRD problem disappeared. After cutting the MEMEN trace the problem vanished. Then I looked carefully at the circuit pertaining to the MEMEN pin and I found out that a 74LS74 output was still linked to MEMEN. Since MEMEN is a signal that has to be generated exclusively by the TMS 9995, the solution was easy: I cut that trace as well. This trace runs from Pin 9 of the 74LS74 (U19) to pin 5 of TMS 4500A (U23). After the cut the problem with the HRD disappeared completely!

### ADDRESSING MODE OF TI-99/4A

In the PEB there are 19 address lines. Only 16 of them (A0 through A15) are used by the TI-99/4A, the other 3 lines (AMA, AMB, AMC) are not used (they are brought to a logical high state by a pull-up resistor).

16 lines can directly address only 64 K bytes: this is the addressing limit of the TI-99/4A. In TI-99/4A the Myarc 512 K card was used almost exclusively as a Ram Disk and/or Printer Spooler. To my knowledge, only the Myarc 128K OS - Advanced Basic Level IV could partially take advantage of the increased memory size.

The Ram Disk/Printer Spooler was operated by the software of a 2764 Eeprom placed inside the 512 K card.

The Eeprom would bank-in the requested memory segment (bank of >2000 bytes) via the CRU lines (and not via the AMA, AMB, AMC lines). The CRU base address was >1000 and some decoding of the CRU lines were necessary in order to select the proper memory bank.

### ADDRESSING MODE IN GENEVE COMPUTER

In Geneve computer, the AMA, AMB and AMC lines are really used as 3 additional address lines. The total 19 lines now can directly address a maximum of 512 K.

Also, in the Geneve computer, the 512 K card is not operated via the CRU lines. Banking is still used, but it occurs directly according to the status of the 19 address lines.

### A CLOSING THOUGHT

I apologize in advance for any kind of error that this document may be plagued with, english errors and technical errors. While the first ones should be forgiven (I am an Italian who speaks Italian, English has been learned without a formal school), I am sure like hell you are not willing to pardon the technical ones. Ok, be warned that I am not a hardware guru. What I wrote, however simple, was to the best of my knowledge.

A last (and alarming) warning: it has been reported that Myarc itself has having problems with converting to Geneve old 512 K cards. It has to do with chip types, probably speed: some cards have chips that do not perform up to the standard required by the Geneve computer. May be memory chips or TTL chips. As a consequence, I cannot foresee if you will end up with a working 512 K! Got it?

A last thing: please share your knowledge! If you find a way to improve this text file, please feel free to do so! Simply send this your new version to me, either on disk or on paper, so that I will be able to share it with others once again. It's like an endless chain, you know.....

I will appreciate any of the following:

- a) Improved english writing. It really important to be clear if you want others to profit from your writing.
- b) Added or modified technical explanations.
- c) Modification to the hardware project. In this case you must be really sure that what you've done it is not harmful in any way to the computer.

Have fun, (it's not a joke!)

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