THE TORPET

The INDEPENDENT Commodore Users' Magazine NO. 15 November - December 1982

$2.00

9 NEW DISKS

BULLETIN BOARDS
by
Steve Punter
Gord Campbell
Richard Bradley

PLOTTING
by
Chip Kozierok

THREE ARTICLES
by
JIM BUTTERFIELD

BIG CONTEST
See inside

Copy Tree Information

Date Change for Central Meeting December 15th

More 64 Maps

VIC-20

The Friendly Computer

Commodore Vic 20 hardware and software
available at or through your nearest Eaton store.

EATON'S

Table Of Contents

For Information About
TPUG Membership
TORPET Subscriptions
Ordering Disks

See page 93

Executive
of the
Toronto PET Users Group

Beach, Bruce M. Editor
(519) 925-5376, 925-6035
Bennett, Barbara At large
H(416) 782-9252
Bennett, Chris Vice Pres.
H(416) 782-9252,
Bonnycastle, Michael President
H(416) 654-2381, 444-3492
Brandon, Eric Special Groups Coordinator
H(416) 239-4666
Campbell, Gord Conference Coordinator
H(416) 492-9518
Caven, Sandy Treasurer
H(416) 962-0744
Croft, Gary Recording Secretary
H(416)1-727-8795, 362-1589
Easton, John Westend Coordinator
H(416) 251-1511, 965-1230
Farquharson, J. Allan At Large
H(519) 442-7000
Gold, Gerry At Large
H(416) 225-8760, 667-2355
Hook, David Librarian
H(705) 726-8126,

Hyszka, Michael At Large
H(416) 249-5805
Punter, Steve Communication
H(416) 624-5431, 625-1786

Address correspondence, advertising, requests, membership dues, TORPET submissions, etc., to:

Chris Bennett
Corresponding Secretary
381 Lawrence Ave. West
Toronto, Ontario
M5M 1B9
Canada
(416) 782-9252

Bruce m. Beach
Editor
(519) 925-5376, H925-6035

Gerald Gold
Asst. Editor
(416) 225-8760

Michael Hyszka
(416) 249-5805
Advertising Mgr.

TPUG Answering Machine
(416) 223-2625

MACHINE LANGUAGE GROUP

FOR INFORMATION ON
THE MACHINE LANGUAGE GROUP
CALL JIM CARSWELL
(416) 531-9909

VIC

FOR INFORMATION ON
THE VIC INTEREST GROUP
CONTACT DAVE SIMPSON
141 Yorkview Drive
Willowdale, Ont. M2R 1K2
(416) 221-5773 - home
(416) 663-6400 - work

CALENDAR

TPUG 1982 - 1983 Schedule

Central Chapter
Meetings are held at 7:30
at Leaside Public Highschool
Bayview & Eglinton Avenues

****	NOTICE CHANGE	Wed. Dec 15 1982
		Wed. Jan 12 1983
		Wed. Feb 9 1983
		Wed. Mar 9 1983
		Wed. Apr 12 1983
		Wed. June 8 1983 (last meeting)

PET Conference
May 13,14,15, 1983
at George Brown College

Westside Chapter
Meetings are held in the cafeteria
at 7:00
at Sheridan College, Oakville
on Trafalgar Road
(2 miles north of the Q.E.W.)

		Wed. Nov 24 1982
		Wed. Dec 22 1982
****	NOTICE CHANGE	Thurs. Jan 20 1983
		Wed. Feb 23 1983
		Wed. Mar 16 1983
		Wed. Apr 20 1983
		Wed. May 18 1983
		Wed. Jun 15 1983 (last meeting)

The Charter Sustaining Members Are
Questar International
Richvale Telecommunications
T. Eaton Co. Ltd.

Message From the President of the Toronto PET Users Group

In the past several months we have been looking at the membership list and we have come to realize that ours is a truly International Organization. This month we are publishing a list or our members, so look and see if your name is spelled correctly, but also look at some of the exotic places some of our members come from. Not only have we over 1000 members from south of the border but there are members from England, Hong Kong, Austrailia, New Zealand, Guam, Germany, Holland, South America and even from Saudia Arabia.

Now it is strictly against our policy to publish our membership address list, nor will we sell the list to advertisers or direct mail houses, but we did want to include the list of names and cities to show you the company you keep, and who are interested in Pet Computers. Of course, if you're interested in finding someone, we'll be happy to give you his address on a single, one-on-one basis.

So welcome, all of you, to this international organization - and Greetings for the Season from all of us, The Toronto Pet Users Group.

Michael Bonnycastle.

EDITORIAL

The lowly little Torpet which started out just as a club bulletin with this issue truly becomes a full fledged magazine. It has grown from two hundred copies of a single printed sheet to a book with a separate cover. With this issue we are now printing 5,000 copies.

Of these copies, almost three thousand go to subscribers, and hundreds more are sold on computer store newsstands. Still others are retained so future new readers will be able to buy the back issues.

Since we have moved into becoming a full fledged magazine we now have subscribers who are not TPUG club members. All TPUG members will continue to receive a subscription to the TORPET paid for by the club but the TORPET has become a separate entity of the Publisher.

Just what future changes are in store for the TORPET are as yet undecided. One proposal have been to go with the larger format that you see here but to appear every other month. Another proposal is to return to the smaller 24 page pasted format and to appear every two weeks. This would permit greater timeliness in our news coverage.

For the time being however, we will probably stay with our previous once a month format. Since we have become an independent magazine we will now, starting with this issue, include news from clubs other than TPUG. But we shall continue to cover the TPUG just as much as in depth as before.

One last word. We most certainly also appreciate continued feedback from the readers as to what they want to see in The Torpet and as to what ways they want to see it change - or not change.

The Editor

COPY TREE

Letter to the Copy Tree

Dear Bonnar:

We have just received the complete library of the Toronto PET Users group from Chris Bennett and we would now like to start a copy tree branch here in New Zealand for the local users groups.

I would appreciate your advice on how to set the the branch up and how we can obtain the latest releases from you in order to keep the library current.

Doug Miller
User Group Liasion
Member Number 2178
Commodore Computer (NZ) Limited

Reply

Great!! A branch in New Zealand! The Copy Tree kind of died locally but it has been reborn in far away places and is growing strong. The reason for this is that local members just find it too expensive to maintain the whole library (all those diskettes!) when they can just hop down to their local dealer or get a special program disk from the local librarian.

The rules of the Copy Tree are that you must allow two other branches to copy the whole library off of you, and you must maintain the **complete** library.

There are a lot of advantages in getting just single diskettes from the club librarian. For one thing he will provided them in 8050 format and the Copy Tree is in 4040 format only.

People with only tape drives can get them from RTC. The directions for doing so are listed elsewhere in this magazine.

I now keep a map on my wall showing where all the main branches of the Copy Tree are outside of the southern Ontario area. If you will send me a self-addressed envelope (I will have to put on the stamp if you are outside Canada), I will send you a photo-copy of the list. People in the southern Ontario area can contact most any of the Toronto area dealers and get on the tree if they wish.

Write or call:
Bonnar Beach
Horning's Mills, Ontario
Canada L0N 1J0
Phone 519/925-6035

TPUG PROGRAM CONTEST

Sharpen your pencils, warm up your PET and turn out a program or two.

The Toronto Pet Users Group is holding a program competition. Prizes will be awarded for the best program in several categories, and there may well be several runner-up prizes.

The first prize will be a Commodore VIC.

CATEGORIES

There will be two categories:

- Games

- Application Programs (that do something useful).

GENERAL RULES

1. Entries will be judged on the basis of originality, utility, method and ease of operation, self documentation and presentation. The Judges will also consider the internal documentation, programming technique and logic (is it easy to follow?). Good use of graphics will also be taken into account if appropriate.

2. A primary requirement is that the program WORKS!!! We will not take the time to debug a program that crashes midway through it's performance.

3. If a program requires documentation to explain how it works or how to use it, and it cannot be contained in the body of the the program itself either as REM statements, or as PRINT statements, then a separate documentation file may be provided.

4. The primary program code must be in BASIC. Machine Language portions may be used, as long as their use is clearly documented and well documented source code is provided. The use of a machine language utility (eg. a machine language sort subroutine) is permitted without documentation as long as it is in the public domain and the source is named - eg from a TPUG utility disk, and the reason for it's use is explained.

5. Points will be deducted for:
-having to list a program to figure out how to use it.
-crashes caused by syntax errors.
-crashes which require resetting the machine.

6. Programs must be written by the person submitting the entry, they must be original in form (please - no more Star-Trek programs), and they must be non-copyright. Further, they must not have been previously published, nor may they be commercial products.

7. Entrants are restricted to amature programmers, NO professional may enter. Entrants may not be on the TPUG Board of directors, nor may entrants be on the judging committee. Further, anyone with the name of JIM BUTTERFIELD may NOT submit an entry.

8. Entrants must be paid-up members of TPUG as of the date of entry. Associate members are welcome to submit an entry.

9. All programs submitted become the property of TPUG, and it is expressly implied that all entrants agree that the programs submitted may be included in the Library and may be distributed to members.

10. Programs must be submitted on a 4040 format disk, or on a Vic tape with the entrants name and the words:
"TPUG PROGRAM CONTEST"
clearly printed on a label attached to the disk or tape, and clearly included at the front of the program in a REM statement. Disks only will be returned after the contest with a selection of programs received during the contest. Tapes will be returned as received.

11. Programs will be accepted prepared to run on a Vic or on a Commodore 64.

12. The judges decision shall be final, and prizes may or may not be awarded in some categories. At the discretion of the judges, special prizes may be awarded for special merit.

GOOD LUCK!!! **Michael Bonnycastle**

VIC INTEREST GROUP

Central Meeting
November 12, 1982

by
Dave Simpson

The Central meeting of the VIC special interest group was well attended. It was standing room only most of the time. Next month we'll try for a larger space to make things more comfortable.

Dave Hook got the session going with a demonstration of the RTC Viclink. This plug-in cartridge adds Basic 4 to the VIC, adds up to 16k of memory and provides for operation with a modem. Dave will be publishing an in-depth review in the near future.

Dave also reviewed the November VIC disk. This month we're fortunate that a enough programmes were received from the Vancouver club to make up a separate disk. Some of the games reviewed were Asteroids and an interesting 9 hole round of golf. As we have a separate disk this month copies of these programmes will available on tape from Richvale Telecommunications for $5 each, $6 mail order.

Simon Claughton demonstrated a data filing programme that he has developed to keep track of his collection of books. He developed the programme for tape operation and has now converted it for disk operation. The system consists of a data input programme which makes up a data file on tape or disk. A reader programme then allows the data to be read and specific items displayed on the screen. With a little modification these programmes could be adapted to keep track of any kind of collection. The tape version will be on our December tape issue.

A suggestion that came out of the meeting was to publish a record of game high scores. Probably backed up by a photo of the screen and score. If anyone wants to get this going send me your scores and I'll start the list in the next issue of Torpet.

Odds & Ends

Previous club disks have been made up of programmes for all Commodore machines and RTC does not separate them. Craig Bonner is working on editing the September and October disks to get all the VIC items together. Once this is done we will add any programmes sent in to the VIC group before December 7, 1982 and make up 50 or more copies of this tape for sale at the December meeting. Remember that the meeting is now scheduled for December 15, 1982 NOT December 8th as previously published. This tape will cost $5.00 at the meeting.

If you can't be at the meeting the tape can be obtained through the mail from Software House, 309-4630 Dufferin Street, Downsview, Ont., M3H 5S4. Send your cheque or money order for $6 and your tape will be mailed as soon as it is available.

We're hoping to have translations of the Dutch programmes on the tape as well!

A lot of you are interested in having reviews of software. Old Torpets are a good source. We'd like to publish your reviews. Torpet will pay for your efforts so why not send in your opinions. Better still - come and present the review at one of our meetings and follow up with publication.

Send your articles, reviews or programme tapes to:

Dave Simpson
141 Yorkview Drive
Willowdale, Ont., M2R 1K2.

Include your name and address and I'll return the cassettes.

WESTSIDE MEETING

27 October 1982

BY John Easton

As promised, the Sheridan version of TPUG started promptly at 7:30 - a new record! Everyone seemed so pleased with this that they (those who WERE on time) immediately voted to start at 7:00 PM from now on, and while voting, they also chose to continue on with our present location in the CAFETERIA for the duration of the year (the lecture hall only being available for Monday nights).

New Meeting Time

So - got that ? Meetings continue on all year 'till June in the Cafeteria at Sheridan College - beginning at 7:00 PM.

So, what happened **this** meeting. Brad Templeton (Power, PAL, and the like) demonstrated what appears to be an extremely handy aid to combining Basic and Machine language routines together in the same package. Note to David Hook, if you manage to leave 19 blocks free on next month's disk, the rest of the world, and the TPUG library (not necessarily in that order) can also have access to this joyous bit of programming dexterity. I seem to recall that one is expected to use Brad's assembler (PAL) version of machine language with this program - but what the heck!!

Following Brad, and as promised, Al Farquharson demonstrated our 'Commercial' for the evening, Abacus Software's graphics pac VIGIL. Graphics are reasonably handled with this program, but still seemed to be limited to normal PET type graphic capabilities.

It was about this time that wild electronic things started bothering our presentations. While working out the problems with the 8050, we had time for a few more announcements - like the up-coming Programming Contest (open to most everyone unless your name is Dylan or Butterfield - in which case you automatically get the consolation prize). News of this innovative new TPUG project is elsewhere in this issue.

Still killing time, (while fixing the hardware) gave us the chance to review the latest command proposed for WordPro, the Control-BS Command. This BS Command is ivery useful to students who do a lot of writing about nothing in particular, especially when it is not important that what the user is writing be coherant. English and History students, high school Science teachers, SYSOPs and instruction manual authors will find this function very useful.n (Also available as a B.S. (Blarney Stone) ROM and I think John got one of the proto-types. -ed.) - Anyhow, for a full description, why not look it up on Steve Punter's BBS - under the W/P Bulletin section you'll find another two pages of tongue in cheek BS.

WordPro vs. PaperClip

And at that point since disks STILL weren't working and I couldn't yet see the coffee, we went on to a brief discourse on the merits of WordPro vs. PaperClip. Now, to those of you that haven't yet seen it, there is on the market (see the latest issue of Compute) a new wordprocessing package by the name of PaperClip. This package, written by TPUG member Steven Douglas and produced by Batteries Included here in Toronto, is definitely a challenger to WordPro in it's ease of use and built-in file-handling power. In this writer's humble opinion, PaperClip performs all the functions of any WordPro package I have ever used, plus all the things that I ever WISHED WordPro would do.

Now that's a mouthful, and in the true sense of an unbiased report should now be backed up with all the neat new things that PaperClip will do (that's unbiased?) - except that our editor tells me David Hook, our versatile Librarian has this assignment. My, aren't we getting organised - just like the City Desk!! Anyhow, here's a quick overview of some of the things I used to find frustrating with WordPro.

1) A change of Commodore model meant the purchase of a different version of WordPro. PaperClip works on any series 4 ROM equipped machine.

2) Trying to keep columnar output in any sensible order on my 40 column screen was a pain. PaperClip will allow you to set screen width to anything up to 126 columns and subsequently allow for horizontal scrolling over that entire range.

3) Often, at my place of work, on running into the fancy dedicated Wordprocessors and their devotees, I found comparisons between their systems (AES, MICOM, IBM, etc.) and mine (WordPro) stood up fairly well 'till we hit Sorting. That's where I had to admit defeat - but no longer, yes PaperClip will sort (and sub-sort) Alpha or Numeric fields in ascending or descending order. And of course, it will sum columns, but then so will the '+' versions of WordPro.

4) Those of you who might have played with VisiCalc would appreciate the ease with which one can move, add and/or replicate columns. Guess what, I can now do the same neat things with PaperClip - plus those other V/C tricks like setting decimal points and places-of-decimal.

5) Another pet (pardon the pun) headache was formatted output to various brands of printer. You all must be familiar with the changes that occur for instance between underlining and extended text when you switch from Spinwriter to CBM (of COURSE you all own a Spinwriter and and CBM - don't you?). Well anyway, one doesn't always get what one expects - or if you knew what to expect, you were forced to allow for each version separately. PaperClip handles the whole

problem of Printer formatting through means of separately loadable Printer Files. On the PaperClip diskette, there are a number of Printer Files to cover most common printers. If you happen to have a strange printer, you can use the Printer Set-up program to handle your own particular formatting requirements. My old CBM 2022 never in its life has produced such neat stuff - like double--strike printing and underlining - frankly, I'm impressed!

Word-count capability, WordPro readable and W/P output format optional, disk directory accessable without erasing current text, casette input/output supported, etc., and PaperClip's fantastic Sequential File handling capabilities were a real boon in preparation of this month's Phone list - (like you also happen to have the built-in capability to text-edit sequential files!), but enough on that subject, read the rest elsewhere in this issue (or whenever). PaperClip ? BUY IT - a 'bargoon' at 125.00 U.S. Complete package consists of a FULL 4K ROM (plugs into the hex $9000 socket, 4040 and 8050 disks c/w an ongoing update of Printer files and a concisely written 112 page manual with (at NO extra charge) that delightful portrait of Herbie the two-fingered typing whiz on the cover.

VIC Plans

Luckily by this time we had located the coffee and donuts in a back corner of the cafeteria so we all took a break to discuss really SERIOUS stuff. During the break, David Williams apparently managed to get the innards of his VIC 64 cooked - something about the cable interface to our projector or was it transient spikes and unbalanced ground. You see, since Sheridan College really has no practical use for VICs and the like, they have none available, and likewise have no ready means of connecting them to the Projector we use. This means that for the interest and edification of you VIC and '64 types, someone is forced to bring in their own and fiddle with somewhat dubious interfaces. Dave had intended to illustrate Hi-Resolution Graphics handling on the '64 - but unfortunately all we saw were the dying gasps of the poor little '64 as it breathed its last into the innards of the Sheridan Video Projector.

As I explained to those VIC affecianados who had already left in high dudgeon, we seem to have a small problem. Perhaps if you VIC types were to get together and set up your own machine and monitor in the lower cafeteria, we could all take an extended coffee break and join in the fun. Mark Bell, since Bruce doesn't yet seem to have contacted anyone from this west-end group, (Dave Simpson, VIC co-ordinator, could you maybe pick up on this one -ed.) how about you arranging for a quick coffee-break length (time negotiable) demo of VIC-type stuff so we can all watch?

Member Bill Kenyon who is involved in the commercial distribution of VIC and COMMODORE 64 products has generously consented to supply the required hardware, so HERE WE GO, colour and music fans!

And don't forget, starting next meeting, there will be TWO (count 'em - two) disks available from the club library. One strictly VIC and Commodore 64 stuff, the other for whatever is left. So be sure to bring disks next meeting properly labelled - either VIC or PET. You want BOTH? - well, we'll try - but won't guarantee anything - remember, the machines must all be off by 10 PM.

So, where were we - oh yes, somewhere in the middle of donuts and coffee (whatever happened to those glorious muffins?). Well, since we'd blown up just about everything before us, there was nothing more to do but call on our friendly expert from BMB, Friendly John (note to editor - that IS an 'r' in there). Well anyhow, old Friendly (would you buy a used chip from this man?) John, taking no chances produced his own machine, produced his own chip - a miniscule tip-of-the fingertip Motorola 6800, and proceeded to install it with a flick of his finger into his 8032 - well, the book DOES say put it in the machine - and that's where it dropped, just beside the resident disks - and was that your lunch we saw at the back warming up on the transformer? A great way to carry disks I suppose, who'd ever bother to lift the keyboard to steal anyone's disks? At any rate, this unusual disk-storage space was apparently also the storage place of a Super Graphics Board - which John proceeded to demonstrate with his usual applomb. (That's all we needed that night - another Graphics demo!! - who's in charge here anyhow ?)

This board (not to be confused with the MTU system) will operate in any 12'' CRT Commodore machine to give a resolution in the order of 640 x 200 points. The demonstration programs adequately illustrated the beauty of 'hi-res' screen graphics. With an additional 16K of RAM to take care of the rather fast plotting routines, this board may just be a bargain at something over $300.00 c/w manual and disk, since list price (we are told) is 600.00. John will put anyone interested in contact with whomever it is has this little beauty, but hurry, they are going fast - only 40 left.

So – we actually ended up with enough time this meeting to get to our 'question and answer' or 'show and tell' time. This, dear friends, is that time set aside to solicit input from the members present with answers to those dumb programming problems that we all run across from time to time.

A Fast Protect

In answer to a teacher who wants a cheap-and-dirty way to disable the LIST function to keep his brat students from looking up the answers, we came up with the old trick of setting a line something like this at the start of the program –

0 REM (shift left square bracket)

This forces the token for SYNTAX ERROR into the process of listing, and of course it hangs up with exactly that message.

```
0 REM
?SYNTAX ERROR
```

Of course, the brat kids who know about this trick will discover that they can list from anywhere above the trick line and they have the system beat.

A somewhat subtler method of producing the same effect, with a greater challenge to the B/Ks would be to input the same line as follows :

0 ''''(delete one '')(7 inserts)(7 deletes) XXXX PRINT''(shift left square bracket)

where XXXX is a line number greater than any other in the program. Unprintable keyboard actions are in (brackets). For type 2 ROMs, a shift L will do the same trick as the shift Left Square Bracket.

This will then list the following message.

```
XXXX PRINT''
?SYNTAX ERROR
```

Of course the smart B/Ks will try to list from somewhere above XXXX and you've got them (unless they too have been to a TPUG meeting or read this). Now the REAL smart kids will bounce right into the M/L Monitor and set things right with no sweat, but like we said at the first, the request was for a cheap-and-dirty solution. Now, if you want a Clean solution, you should have been paying attention as Dave Williams messed around with the M/L Monitor and managed to duplicate the above efforts and effect while also erasing the entire trick line giving him nothing but a blank screen with that blasted ?SYNTAX ERROR message blinking at us.

Now that he had our attention, David then proceeded to demonstrate a minor phenomenon of Microsoft Basic that allows utilization of an utterly simple 'named gosub' (or goto) routine. The following program will illustrate the point:

```
0 IF DE$ = ''PLACE'' THEN 40
1 IF DE$ = ''SHOW'' THEN 80
10 PRINT ''LINE 10''
20 DE$ = ''PLACE'':GOTO PLACE
30 END
40 PRINT ''GONE TO PLACE''
50 PRINT ''LINE 50''
60 DE$ = ''SHOW'':GOTO THERE
70 END
80 PRINT''GONE TO SHOW''
90 END
```

The secret lies in the simple fact that Microsoft goes to the VALUE of the characters following a gosub or goto directive. And the value of any non-numeric is 0. As long as your named routine tables start at line 0, you are in business. Thanks David for a little light on the subject.

Also see List Lock p. 77

Next month? Don't really know yet – who dares to challenge the transient glitches of Sheridan's system ?? How about a demonstration from Peter Spencer of this month's program NOS TRANSLATOR3. That system under development in Holland looks exciting – imagine Esperanto Basic! JB, it's about time for an update from you (of course he's popular and a world traveller – for a guy who won't even drive a car, he sure gets around), but we miss you 'way out here in the wilds of the west. And speaking of the Wild West, how about a shootout – WordPro against PaperClip, any volunteers? It only sounds fair to let everyone at least see the new processor in action before it gets stomped on by those nasty injunction guys.

Remember – next meeting at 7:00 PM, Sheridan College Cafeteria, Wednesday November 24th.

Whoosht – I think that's it Mr. Editor Sir, unless you still want a review of PaperClip!

breathlessly,

John Easton

(Thanks John, it was almost like being there. -ed)

Clubs Reviews

As a part of The TORPET's new outlook as an independent magazine we would like to publish articles and columns on other clubs activities besides TPUG.

This month we have received two club Newsletters. (In addition to The Midnite which is has also become and independent magazine).

PEG

The first was from PEG the PET Educators Group for the Windsor area.

They sent us their first three newsletters, each four pages long and well printed on different colored papers. The Torpet started exactly the same way.

PEG's editor is:

John Moore
1485 Janette Ave.
Windsor, ON
N8X 1Z2

They would certainly appreciate any free articles you would like to contribute.

CHUG

I am also very happy to see that I am now on the mailing list for the Commodore Houston Users Group. Their newsletter is mailed monthly **free** to anyone requesting it but a $10 donation is highly recommended.

This is has been reported to me as being one of the better newsletters around and this first issue that I have received has certainly lived up to the report. It appears, as I have been told before, to be quite hardware oriented.

Again- the editor:

John Walker
8738 Wildforest
Houston, Texas
77088

All Clubs

If you publish a newsletter, we would appreciate your putting us on your mailing list and we will try to reciprocate. Moreover, if you will send us a monthly news item or so on a 4040 diskette then we will return the diskette to you with TPUG's disk of the month on it. TORPET's usual offer of $20 per page applies to you also, of course. So send along any reviews of programs, or hardware, and anything else that you would not mind us republishing.

RADIATION HAZARD

by Dr. Piasecki

SUMMARY:

The possible **hazard** of using an **older color television set** as a **monitor** is discussed. The group of people most likely to be exposed to this type of hazard are your readers. The reason for submitting this article is to try to inform persons at risk and felt that this could be best done through a computer magazine.

ARTICLE:

RADIATION HAZARD OF VIDEO SCREENS

As a physician I receive by subscription the New England Medical Journal. In the September 30, 1982 issue there appeared in the CORRESPONDENCE section a letter on the above subject.

It came from the Veterans Administration Medical Center, Washington, DC 20422. It was authored by David J. Nashel, M.D., Louis Y. Korman M.D., and John O. Bowman, M.S.

As a physician it is important for me to be aware of the possibility of disease arising from certain patient circumstances.

However more important is the possibility of **prevention of disease.** With the appearance of the new computers (COLOR but without the color monitor) your readers, if they use **old color television** sets as monitors, would be the **group at risk.** To make this group aware of this risk is the main purpose of this article.

The following material and the References comes from the authors mentioned above.

Although it is generally agreed that the video display terminal is not a major source of radiation for the user,(1) field surveys of older color television set (2)-(4) have indicated that 1.33 to 16.2% of receivers at some surface

point exceed 0.5 milliroentgens (mR) per hour, which is the limit for emission set by the Food and Drug Administration, Bureau of Radiologic Health.(5) From 1960 until January 15, 1970, when emission standards for color television sets were adopted, 25 million sets were produced. Since almost all these sets were manufactured in the late 1960s and the average life of a tube-type television is 11 years (Gerson R: personal communication), many of these receivers are still in operation.

Since radiation intensity is a function of distance from the emitting source, the spatial separation of viewer and display screen is extremely important. At average viewing distances (165 cm for children and 250 cm for adults), the estimated annual radiation dose from older color television sets appears to be within the accepted limits.(2) However, users of microcomputers tend to position themselves closer to the display screen, thereby increasing their radiation exposure. To estimate the average annual radiation dose from an older color television set used as a display screen, the standard computational formula was used:

D= 1.13XTdF,

where D = estimated average annual dose (millirems per year), X = exposure rate at 5 cm from front face of the picture tube (milliroentgens per hour), T = annual viewing time (hours per year), d = distance factor, and F = depth dose factor. The value chosen for exposure rate (X) measured at the front face of the picture tube is 2.7 mR per hour. This was the average dose of radiation recorded from color television sets that exceeded the accepted emission standard in a survey done in metropolitan Washington, D.C.(2) Viewing time (T) is conservatively estimated at two hours per day, or 730 viewing hours per year. Using data from Wang et al.,(6) a distance factor (d) of 0.5 was obtained at a viewing distance of 40 cm; the depth dose factor (F) is 0.70 for the juvenile thyroid and 0.80 for the lens of the eye. Using these values, the estimated average radiation dose to the thyroid would be 779 mrem per year, and the dose to the lens of the eye would be 890 mrem per year.

These calculations suggested to the authors that youngsters using **older color televisions** for display screens may be at risk for radiation exposure far in excess of the National Council for Radiation Protection and Measurement's recommendation of 100 mrem per year for persons under 18 years of age.(7) In order to decrease the posssibility of excessive radiation exposure, the authors suggested that only newer color television receivers (those manufactured after January 15, 1970) be used as display elements for computer function.

REFERENCES:

1. Food and Drug Administration, Bureau of Radiologic Health. An evaluation of radiation emission from video display terminals. February, 1981. (Report 81-8153).

2. Neill Rh, Youmans HD, Wyatt JL. Estimates of potential doses to various organs from x-radiation emissions from color television tubes. Radiol Health Data Rep. 1971; 12:1-6

3. Radiologic Health Program, Commonwealth of Puerto Rico Department of Health. Results of a survey of x-radiation from color television receivers in the metropolitan area of San Juan, 1969-1970. Radiol Health Data Rep. 1971; 12:547-51.

4. Becker S. Results of a follow up radiation survey on color television sets, Suffolk County, New York. Radiol Health Data Rep. 1971; 12:457-8.

5. Public Health Service, Bureau of Radiologic Health. Regulations for the administration and enforcement of the Radiation Control for Health and Safety Act of 1968, OBD 71-1 (March 1971).

6. Wang SP, Savic S, Hersh H. Spectral and spatial distribution of x-rays from color television receivers. Technical papers, Conference on Detection and Measurement of X Radiation from Color Television Receivers, March 28-29, 1968. Washington D.C.: National Center for Radiological Health, 53-72.

7. National Council on Radiation Protection and Measurement. Radiation protection in educational institutions. July, 1966. (Report no. 32) 7-8.

IS IT SAFE?

BULLETIN BOARDS

BY

Steve Punter

So, you've just bought yourself a modem for your computer, and are anxious to discover to what you now have access. Well, starting from the top, I'm sure you have heard about things such as **InfoGlobe**. **InfoGlobe** is a service of the Globe and Mail Newspaper here in Toronto and gives you indexed access to all the stories published by the paper, going back to heaven knows when. WOW you say, how do I get on? I'm not sure you'll want to, it costs $125 per connect hour!

Then we have such hobbyist oriented services such as **The SOURCE**. Systems like this offer a wide variety of things such as electronic mail, CHATTING with other users, access to news services, etc, and they only cost a fraction of the price of **InfoGlobe**. Trouble is, they DO cost.

Finally, we come to the service most popular with microcomputer users, the BULLETIN BOARD SYSTEM, or BBS for short. Almost without exception, these systems are FREE of charge and still give you many of the advantages offered by **The SOURCE**. One drawback is, they only allow one user on at a time, and consequently they are very hard to get onto at certain times of the day.

So what can you get free these days, and why do the operators even bother to keep them up if they make no profit? The first part is easy to answer, the second part is very difficult. ALL BBS's offer a **Message System** of some sort, but each type of board differs in the way it allows you to manipulate these messages.

I am the author of what appears to be the only PET based BBS around. There are 4 of my boards operating in the Toronto area, and at least 40 have been sold throughout North America. The descriptions of BBS features will be based mostly upon my own system, but I will touch upon the advantages and disadvantages of other boards.

Getting On a BBS

There are many BBS's available in large centers like Toronto, but in smaller areas, there may be none. If there is none in your area, you would have to call long distance, and that would cost money which doesn't quite match up with BBS supposedly being free. Assuming that there is a BBS in your locality (there are 14 in the Toronto area), getting on is nothing more complex than calling a local telephone number.

Once you have dialed the correct number, one of three things will happen: 1) The system will not be up yet, in which case a human being will most likely answer the phone, and it is only polite to appologize for calling outside of normal operating hours; 2) You will get a busy signal, meaning that someone else is using the board and you'll just have to call back later; 3) You will hear one, or two, rings followed by a high pitched tone.

This tone is actually the modem at the BBS sending you what is generally referred to as the Carrier . If you are using an accoustically coupled modem, place the handset of your telephone into the modem. If you are using a direct connect modem, make sure you are not in a Stand-By mode of any sort. Your modem should respond by sending another tone, of different pitch, back to the BBS - you are now ready to communicate.

Most boards require nothing more than a RETURN to get their attention, some start up immediately. Some give long winded start-up blurbs, while others do not, but one thing is for sure, they all eventually ask for your name. Many systems, including mine, keep what is known as a **User Log** and can identify your name if this is not your first time on. Some system, and that includes mine, require that you give a **User Code** in order to sign on under your name. The **User Code** is either assigned by the SYSOP, or, as in my case, by YOU when you first sign on. An advantage of a **User Code** system is that no one else can sign on under your name and read your private messages, or say things on your behalf.

System Overview

Each system offers different things, but for the sake of space, I will confine myself to telling you what my system offers. The most popular item, and the back-bone of the BBS itself, is the message system. With it, you can send messages to specific people, or read

messages from others. You can send PRIVATE orPUBLICmessages,aswellasBROADCASTmessages to ALL. A series of commands allows you to read only messages to ALL, only messages addressed to you, all messages starting from a certain point, going backwards or forwards in time, or pick off specific messages. Other commands allow you to see a summary of message subjects, a list of messages sent by a specific user, a list of message recipients, and a list of messages sent TO or BY you.

The topics discussed in these messages vary from board to board, and the seriousness of a given board depends solely upon the SYSOP. The message system is a communications method of the future that you can join in NOW. You will find yourself gaining many **PEN PALS**.

Program Distribution

Most boards offer some kind of system for sending or receiving programs. Most of these use a simple ASCII transfer system which is compatible with all microcomputers, the drawback of which is that telephone line noise can serverly damage a program during its transmission. On my system, I have implemented a special Block/Checksum which will automatically re-transmits any blocks of data that came across incorrectly. The drawback to this system is that only those persons with a terminal program capable of supporting the protocol can participate. If you are a PET owner, I make available, free of charage (its in the TPUG library), a terminal program with just such a protocol.

Bulletin Section

The Bulletin Section is a standard feature of most BBS's, but goes under different names. Regardless of the name, the purpose is always the same: it is storehouse of useful, and sometimes useless, information. In some ways, it is a lot like an electronic magazine. On my board, I have Movie, TV Show, Book, and Restaurant reviews; interviews with RCMP officers concerning computer crime; varied technical articles; political and social commentaries; a WordPro news letter; system documentation; programming tips; and much, much more. As a matter of fact, I personally have 1/4 megabyte of information online.

Which Board To Call

When deciding which board to make a habit of calling, many things come into play. First of all, if there are only a few BBS's in your area, you'll probably end up calling them all, but, if you live near Toronto, 14 boards is a lot. In this case, much will depend on your personal bias, and what type of crowd is generally attracted to a specific board. In certain parts of North America, there are such strange BBS's as those dedicated to homosexuals, and another in California called **Compu-Smut** (need I say more?).

Which ever board you do choose to frequent, make sure you become familiar with its operating hours, and, if you pass the number of that board on to anyone, be sure you also pass along the operating hours.

CB Style 'HANDLES'

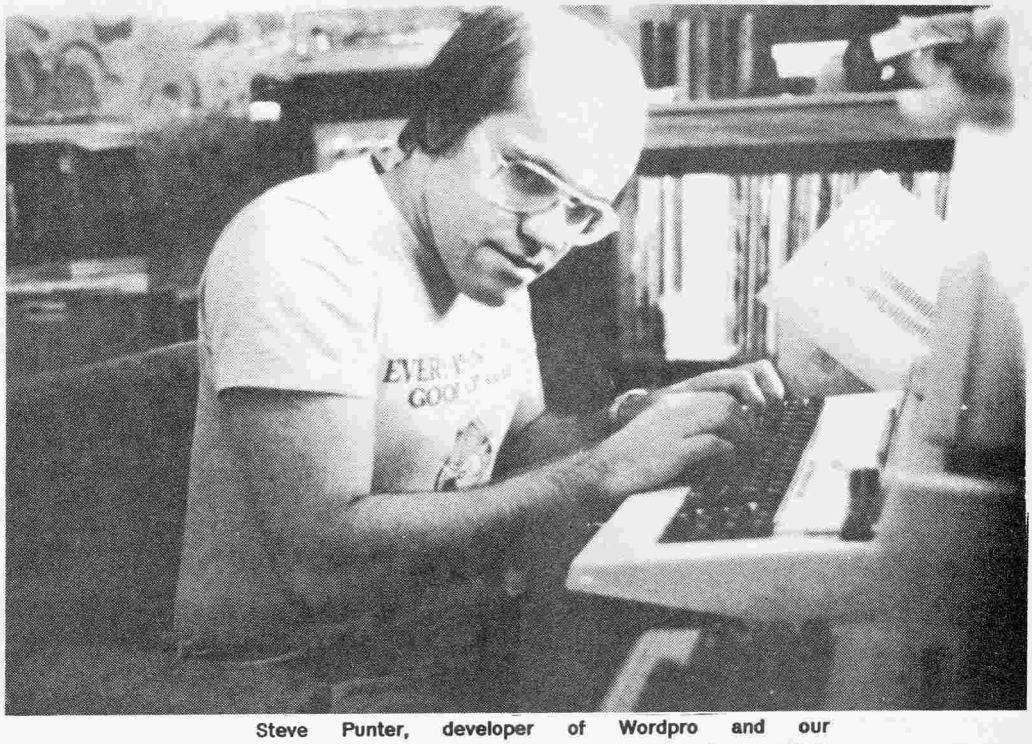
Some boards, though not all, do allow you sign on under an assumed name, but in all seriousness, I can't see the point. Unlike CB, most BBS people would prefer the systems to remain reasonably sane. Although I can't speak for all SYSOP's, my policy is to remove the names and messages of anyone using an obviously FAKE name, unless their real identity has been cleared with me first. In this way, if the user does anything seriously wrong or stupid, I will know who he is. Besides, when a joker realizes that his true identity is known, he is less likely to make a fool of himself.

Sex

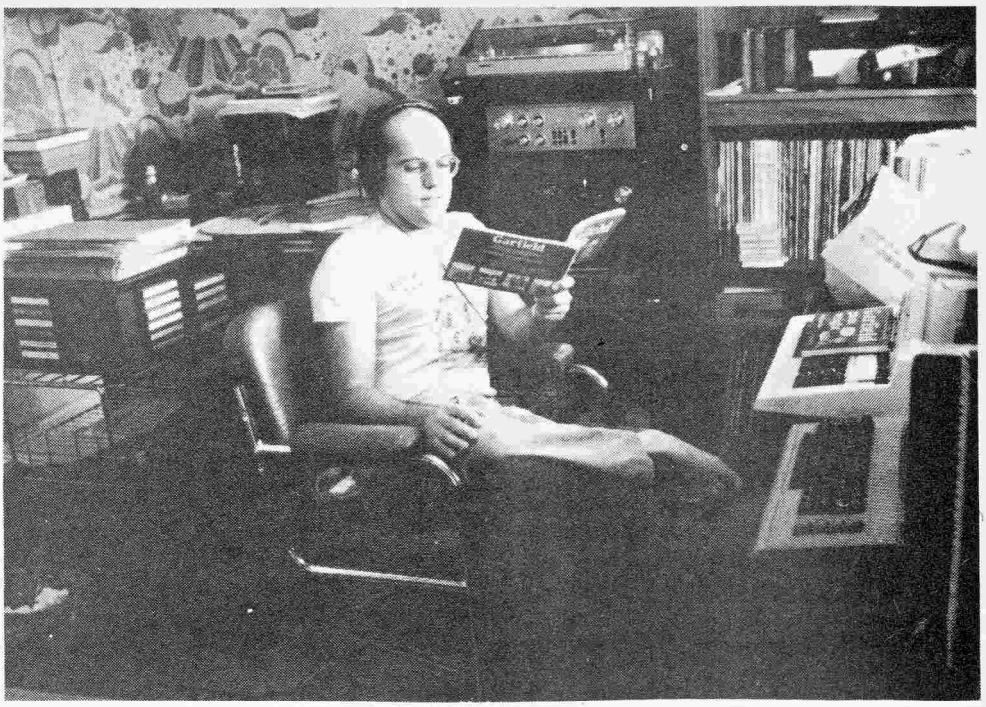
Ah ha, that got your attention didn't it? I'm not referring to the kind of sex your are probably thinking of, what I am going to mention is the apparant lack of females on just about ALL boards. The ratio seems to be something around 1 female for every 200 males, and sometimes, you can go for months without ever seeing a female sign onto the board. This is most likely related to the small percentage of females who have yet to become interested the fascinating field of computers. If you had any ideas of using the BBS to get yourself a date guys, forget it, there just isn't enough data available (and besides, I already tried it, and it didn't work!).

In Conclusion

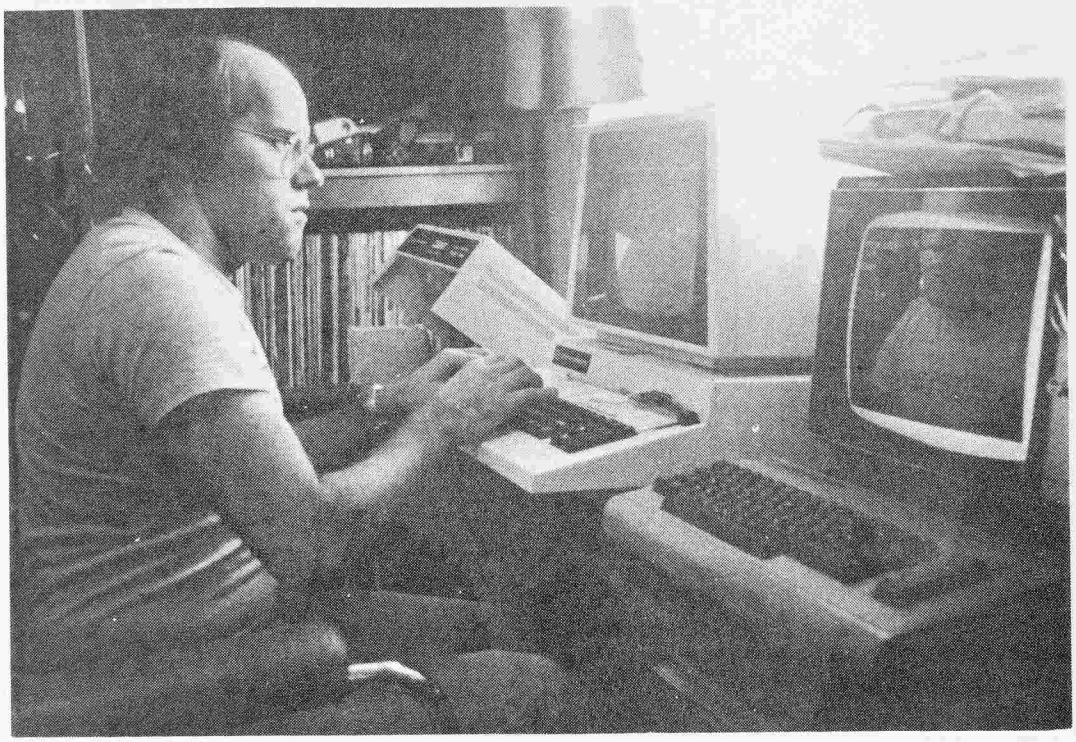
Generally speaking, a BBS is the perfect escape for those of us with modems. It's free, it's readily available, and it gives us ways of starting friendships you would have otherwise not thought of. As of the date of this writing, a group of people involved with my BBS have gotten together four times for brunches, picnics, and dinners. Once you get your modem, give a board a try, -you have nothing to lose.



Steve Punter, developer of Wordpro and our bulletin board system, member of the TPUG executive, world traveler, noted T.V. authority on the micro-computer. The animal on his T-shirt is Garfield the Cat.



So, what is culture to a cat?



And so what do you see in your computer?

Ok, Steve, I may think you know what you are doing, and you may know what you are doing, but does Ma Bell know what you are doing?

Bulletin Board Review

By Richard Bradley

SYSOP

I have looked upon the BBS scene from the only two ways possible. The first being from the users point of view, and the second being the SYSOPs point of view. I began as a new user of the various BBSs throughout Toronto, and surrounding areas.

I first got interested in BBSs when the TPUG BBS was announced at one of last winters' central meetings. At this meeting Michael Bonnycastle announced that the BBS was now up and running at Electronics 2001, and that the number was 223-2625. I was completely baffled as to the use of the BBS, and what benefit I possibly could get out of it. So, I began asking friends about it.

Around this time a good friend from school, Mike Mckechnie, was in the process of purchasing Chris Bennett's MODEM-80. Mike had run into a bad time of things, (nothing to do with the BBS or the MODEM-80) and had somehow managed to blow up his computer. (I too have experience in this field, just ask Peter Smith what I can do with a PET). Anyway, I managed to get hold of a MODEM-80 from Mike, and he and I got on the BBSs. We first tried TPUG, and it was busy, then we tried Steve Punters, it too was busy, so we resorted to a BBS that kind of sounded friendly, it was called THUG.

After many attempts Mike and I finally managed to get the both of us signed on there, and after reading the various messages we tired of it, and tried TPUG again. This time our luck was good, and we got through. After typing in my name and being notified that this was my first time on the system, I then completed the sign-on by typing my city, and I created a user code for myself. As far as the user code goes, you make up your own code for your name, and then you will have to remember that code to sign on again.

On TPUG we noted that there were many messages, a series of bulletins, and some programs that were available for DOWNLOADing. But due to the fact that we were using a MODEM-80 we were not able to DOWNLOAD anything, because at that time there was no software that would allow us to. (That software situation still prohibits Mike from DOWNLOADing)

After we had read all the messages and bulletins from the TPUG BBS we then went on a rampage, and did the same on Steve Punter's BBS, two CONNECTION-80 BBSs, and then finally APPLE-CAN. From my first impression I found the PET based BBSs much easier to get used to than any of the other systems, and I still feel that way now. However, to continue the story, Mike got his PET back, and I got myself a modem that allowed me to DOWNLOAD.

Becoming a SYSOP

For about two or three months I continued my nightly rounds of the BBSs, and I suppose became known as a regular user of the systems. Somewhere around the end of May I remembered that Michael Bonnycastle had made a plea for aid and I decided that I wanted to aid TPUG in some way other than paying my yearly membership so I asked Tony Prijately, the SYSOP of the TPUG BBS, if he could use a hand with the board. Tony told me that if I was willing I could help him by taking over the Bulletin section and keeping it up to date. I agreed, and in the first weekend spent many hours getting the Bulletins the way I wanted them. I continued this through most of June.

While this was going on I had made arrangements with Don Whitewood to get a student BBS going. Our computer club at Northern Secondary School had some money left at the end of the year, and most of us thought that a BBS would be a good idea. Don said that if we purchased the BBS program he would give us a MODEM and answer circuit with which to run it. After a quick bit of running about we had ordered the BBS and had picked up the MODEM. About June 15, 1982 the NORTEC BBS went up for testing. After a rough start we went on-line from my house for the summer, and we ran for about three weeks without much difficulty, then we went down for a week, because Don needed the MODEM for a while. Since we got the MODEM back we have been running every night from 1930H to 0900H, and 24 hours on weekends.

When we first went up we recieved many complaints that our carrier was too low for people's modems. After about a month of this

i decided that I was going to create a BBS with a carrier that would melt the cups of anyone's modem. What I did was simple. I am very surprised i did not think of it sooner. I merely took a stereo power booster like the ones that you hear in the Camaros and Firebirds that are always shattering store windows and drivers ears. Anyway I did a little unsophisticated wiring between the MODEM, added the booster, and the net result was a 60 watt carrier. Well since then we have not had any more complaints about the carrier. (and I hope you will receive none from Ma B. -ed.) and in fact we have even recieved a few compliments from our users. At present we are still operating from my house, but will soon be setting up shop from the school.

Area Code 416 BBS numbers

NORTEC BBS *.	782-7320
PSI-WordPro (Mississauga) *. .	624-5431
Toronto Pet Users *.	223-2625
R.T.C. BBS *.	884-6198
Connection-80 (Willowdale). . . .	226-9260
Connection-80 (North York). . .	667-9981
RCPM (Remote CP/M).	826-5394
Atari Info-System.	622-2462
Apple.	781-1796
THUG (Heathkit).	273-3011
Toronto Net-Works.	445-6696
ETI BULL BBS.	423-3265
Infoport.	278-3267

(* = PET Based Systems)

SYSOPS Needed

Throughout this I continued to supply the TPUG BBS with updates, but now with school back at my throat I have not been able to find the time to do this. (Sounds like we need some additional SYSOPS at 2001. How about some of you users stepping forward and volunteering. -ed)

I do not think that many of the TPUG members have modems, but I would strongly recommend them as an easy way to get in touch with other computer users, make new aquaintances, transfer programs, and I suppose get a little fun out of your PET.

RENT A MODEM

If you have never had the pleasure of signing on a BBS why not give Gord Campbell a call (492-9518) and try to rent one of the club modems for a month, you may find the BBS community to be a very high spirited active bunch of computerists, ranging from the beginner to the expert such as Jim Butterfield.

I say that I really think that Steve Punter has written a great Bulletin Board program, and compliment him on his efforts.

I cannot myself decide which is more of a challenge and pleasure, to be a user or to be a SYSOP. Why not try the BBS's out and experience the user side of it?

Bulletin Board Up-Date

By

Gord Campbell

The big Bulletin-Board story over the past year has been 'quality'. There is a real parallel to many other micro-subjects here, as programs move from 'dancing bears' to the real thing. (The wonder of a dancing bear is that it dances at all, not how well it dances. Many programs two years ago, from chess games to accounting, were dancing bears).

Messages

For those of you who aren't involved, let's start with what a bulletin-board system is. A central computer is set up so that it will automatically answer the phone. The user, equipped with a terminal (for example, a PET with a terminal program) and modem, dials the system. The response is a high-pitched whine instead of a person saying 'hello'. You type a carriage-return, and follow instructions from there.

The minimum system is very similar to a physical bulletin-board. That is, it is a place to leave messages, and to read the messages that others have left. This has been extended on most systems, so that you can leave private messages, and only the recipient can read them. As well, the latest development is to keep track of what messages YOU have seen, and let you just read the new ones.

Bulletins

The second item on most systems is 'system bulletins'. These are generally longer than messages, and vary from a list of bulletin-board phone numbers, to restaurant reviews, to programming seminars. Generally, as soon as you sign on to a bulletin-board, you receive system news in the form of a bulletin.

Program Downloading

The really hot item on most systems is program-downloading. The method may be as simple as transmitting a program listing, in the hope that you can capture it and turn it into an executable program. Several systems, however, require a special terminal-program, but have offsetting benefits. The program is sent as 'blocks', along with an error-check. If the error-check fails, the block is retransmitted automatically. NO error-checking system is foolproof though. It just helps - especially if the telephone connection is very close to perfect. Anyway, you can list what programs are on the system, and get a copy of any that strike your fancy. Most of the people who take the trouble to up-load programs also provide either a description or instructions.

What will you find on the bulletin-board systems around town? It varies from system to system of course, but generally you find the casual writings of several bright and helpful people. Several of them (our own Paul Higginbottom is one of the best) love to stir up a bit of controversy. The result is debates on everthing. Which marmalade is the best? Are the Japanese really ahead of the Americans in animated TV series? Is our economy going down the drain? Is the XXX computer really the way to go for business applications?

I did say these people are helpful. If you have a question, but wouldn't dream of phoning up the expert of your choice for an answer, ask the question on the system. Unless the question is a dilly, the answer will probably appear within a day or two. (I still don't know how to attach a framitz to my widget.) You will see others with questions too, so you don't need to feel that you should know. The fact that several of the bulletin-board regulars have new machines months ahead of the public helps of course. You can get answers to questions about the Commodore-64 and CBM II, even if you can't get the machines yet.

The bulletin-board systems can provide many hours of free (yes, FREE) entertainment. Several of the systems around town are operated by individuals, so you may see an appeal for financial support occasionally. If you have received value, (what is the cost of a movie these days?) you should chip in. But there is no rule saying you must.

Most of the system operators (SYSOP's) simply want your participation. Nothing is more boring than a person who signs on and reads all the messages, but never has anything to say. The second thing they want is good manners. If you dial the number and a human answers, say hello. Apologize for calling during working hours, if the board is one of the many 'evening and weekend' operations. Keep your messages in good taste. (One of these days, the first case of libel via BBS will hit the courts.) No one minds the very occasional 'earthy' phrase, but someone who comes on like my army Sergeant-major will find themselves blacklisted. But mostly, participate!

The world of BBS's is not without it's own frustrations. The first one is, each system has only one phone line. Any student of queueing theory can tell you that a single resource that is busy 60% of the time or more will appear to be very busy indeed. I find that the very best time to call the systems is in the morning on weekends. It also helps if you go to bed very late or rise very early. Some of the systems operate all day, but for the poor working stiff that helps not at all.

The other problem you will encounter is the quality of your phone line. Ma Bell only guarantees that your line will be clean if you have a business line. Some people have the bad luck to live in exchanges where using a modem is almost impossible. (Lawrence and Bathurst is one of the worst.) Others get a good result almost all the time, such as in the suburbs which have sprung up since 1960. But the connection can always be so tenuous that noise overwhelms the signal. Distance has only a bit to do with it. Steve Punter reports working his system without problem from Chicago, but having trouble on a call from practically next door.

So what has happened lately? The systems are earier to use. The SYSOP's have made sure that instructions are clear and complete. At the same time, there is more flexibility, so that a variety of users will be attracted to the systems. And finally, the programs have become more sturdy. The bugs have been fixed, so you won't find yourself in the position I once found myself in - the system had crashed, and there I was 'at the console' of the BBS. (I did the dumbest thing possible - I typed 'LIST'.) Happy BBS'ing.

BULLETIN-BOARD REVIEWS
by
Gord Campbell

Here are the phone numbers of several of the bulletin-board systems around Toronto, along with a description of each system I have been on. The only guarantee I will give about this information is, that by the time you see it, it will be out of date. (And the TORPET has a lead--time of only two weeks.)

TPUG: 223-2625
Evenings and weekends.

This is the bulletin-board supported by TPUG. Installed at Electronics 2001, it uses Steve Punter's BBS program. The system is definitely PET-oriented, with up-load and down-load capability. Has suffered a bit recently due to lack of TLC (Tender Loving Care) from assistant sysop, but hopefully that is only temporary.

To download from the system requires one of Steve Punter's terminal programs. There are two versions - one for IEEE modem (Commodore or Livermore) and one for an RS-232 modem attached to the parallel port. The programs are available on the TPUG communications diskette, thanks to Steve.

PSI-Wordpro: 624-5431
Evenings and weekends.

Steve Punter's own bulletin-board system. Uses Steve's software of course. Supports upload/download as described above. Tends to get more use by long-distance callers than any of the other systems. Plenty of raging debate - censorship has come up a couple of times. Note: one of the users of the system has put up a bulletin here describing how to connect an RS-232 modem to the parallel port.

NORTEC: 782-7320
Phone number changing
Late evenings and weekends.

This system also uses Steve Punter's BBS program. The orientation is more toward the educational community, but there are items of interest to everyone. Be sure to read about the adventures of Spaz.

Connection-80 of Willowdale: 226-9260
24-hour operation

This system operates on a TRS-80. Despite that disadvantage, the SYSOP (Vic Cass) has attracted lots of interesting users. Has the best selection of humour bulletins on any Toronto system. Very nice, friendly system.

Connection-80 of North York:
667-9981
Evenings and weekends.

Another Connection-80. Very active system.

Remote CP/M: 826-5394
24-hour operation.

This system is very CP/M oriented. The SYSOP discourages users who are not also CP/M oriented. Tremendous number of CP/M utilities available for downloading. Last time I was on, there was talk of supporting 1200-baud three days per week, and 300-baud the rest of the time.

ATARI Infosystem: 622-2462
Evenings and weekends.

Just the thing if you want to get news from Atari. Somewhat primitive message system.

Apple-CAN: 781-1796
24-hour operation.

The BBS of the Toronto Apple users' group. Somewhat verbose system, but nice for beginners. Limited number of programs to download. (Do Apple owners BUY all their programs?)

Heath: 273-3011???
Evenings and weekends.

Another remote CP/M system. Phone number changing.

Toronto Net-Works: 445-6696

Hours unknown. I haven't been on this system.

ETI BULL BBS: 423-3265

Hours unknown. I haven't been on this system.

Infoport: 278-3267

Hours unknown. I haven't been on this system.

Whitby TRS-80: 668-1851

Hours unknown. I haven't been on this system.

SYSRES Review

By Rick Amari

Virginia

When I purchased my SuperPET, I did so with the intent of doing all my programming development in pascal, fortran and the like. When my desire for more sophisticated capabilities and packaged software found the 6809 processor lacking, I looked to the 8032. Thus needing an editor I turned to my Commodore dealer who recommended POWER. After dragging my feet for a month I read an ad for SYSRES in the August '82 issue of TORPET. It read well, had a good price ($95 total), and seemed to provide features I had grown accustomed to on large mainframe computers. I purchased it and have been using it successfully since I received it with no problem to date. Though I cannot fully compare it to POWER, I can verify and emphasize many of its claims.

SYSRES resides in RAM. It must be loaded each time you bring up the computer. You have the option of loading it into 4 different locations which primarily depend on your type of computer (It advertises being able to work on PET or CBM). I found this a nice feature as all that was required to run SYSRES was the diskette. I also found however that when I tried to execute programs from the TPUG games library diskette that the programs wiped out part of SYSRES. However by loading SYSRES with option 4 (SPLIT - 32K with 4k at $9000) rather than option 2(TOP OF MEMORY 32K) the problem was corrected.

Included with the diskette is a 116 page 3-ring (5X7 pages) manual in a handsome padded binder. The pages are very heavy and the print is clear (though a bit small). However the important thing is the SYSRES features are well documented and well organized. The commands are divided between DOS support commands and Editor commands. These are presented in alpha order with a large (1/2 inch character) representation of the command in the top corner of its documented page. This makes finding it rather easy without the index. As would be assumed the syntax and description of the command are presented but the nice feature is examples of how and why to use it. The manual is really first rate and so far it has been factual.

The DOS support commands are extremely useful due to the time saved in using them. The top left-hand key on your keyboard is the control character. After this a one letter command will activate a function such as obtaining a directory, copying or intitializing a diskette, renaming a file or scratching a file.

The editor commands also provide some real time saving features. Certain commands can be used in conjunction with the directory and this works like a charm. For instance to load and run a program the following can be done: 1. Obtain a directory (2 character command), 2. Cursor to the line containing the program required, 3. Enter the load and run command (1 character). There are many other features that can be done in this manner (such as save,list) to avoid keying the file name.

Other features I have found very helpful are auto-numbering with auto-text (provides the line numbers and keywords, such as DATA as you key the program), find/change command (to locate/change with wWild Cards any character string), renumber (which allows renumbering to portions of the program).

Three final features which I find extremely useful are the ability to print a sreen, to edit DATA files, and to scoll a program. By pressing the SHIFT and OFF/RVS key, the display on the screen will automatically be printed. The GET and PUT commands allow editing of data files. The up/down cursor key allows scrolling and this works beautifully.

This package is the first venture for SOLIDUS into the Commodore market and as I understand it, is rather new. I have been informed that other software, available from SOLIDUS for APPLE equipment, is being converted to run on Commodore. If SYSRES is any indication of the quality of their products, they will be well worth the investment.

Sweet Sixteen

By Jim Butterfield

Blind Spots

Mum's The Word

Sweet Sixteen

It's an accepted fact that eight bit computers are more powerful than four-bitters, and sixteen bit units more powerful than eight, and so on.

The question that bothers me is this: do more bits always mean greater cost-effectiveness? That's not the same thing as power: we're trading capability against price. More: we must consider not just the price of the microprocessor chip, but the price of the whole system.

I sometimes fear that we'll fall into the hi-fi fallacy. High fidelity was replaced by stereophonic systems. About ten years ago, a number of manufacturers said, Well, if two speakers are better than one then four speakers must be even better yet. And thus a new quadrophonic industry - tapes, turntables, amplifiers, speakers and even quad headphones - was born. Or rather stillborn, since it never really caught fire. Quadrophonic systems really did sound better; but the improvement wasn't good enough in view of the substantial extra cost and space requirements.

What is it?

We'll need to define terms. True sixteen-bit computers are those that access sixteen bits of memory in a single cycle. There are only a few microprocessor chips that do this: the best known are the 68000, the 8086 and the Z8000.

There's another class of machine that handles 16-bit information internally, but dips into memory eight bits at a time. These are often called pseudo-16-bit processors, and they are not new. The RCA COSMAC falls into this category, for example, and it's been around for many years. Some other pseudo-16's are the 6809 and the 8088 (Yes, the IBM Personal Computer is not a true 16-bitter!)

There's a major difference between true and pseudo. The ultimate speed of a machine depends on how many dips must be made to memory to perform a given task. This includes memory accesses for both data and instructions. With eight bits, you get only half as many bits at a time; you need to go to memory more often.

But we're not fully following the 16-bit phenomenon if we simply track the strict definition. There are two other things colouring the picture: better instruction sets, and greater memory access.

Instruction sets and memory addressing.

It is nice to have a chip with powerful extra instructions. The new chips will perform (limited) multiplication and division; they have more sophisticated compare and branch instructions, and a wide choice of addressing modes.

Memory addressing may be one of the most significant new features of the new chips. As RAM (random access memory) becomes less and less expensive, we start to notice that 32K or even 64K isn't enough. The new chips allow addresses that go far beyond this. It's odd, in a way, since 16 bits and 64K go naturally together - but we need more memory addressing.

In our context...

So switching to sixteen bits (or even pseudo) gives us two major advantages: speed and more memory availability. If these were free, we'd accept them gratefully. But there's usually a cost, and we'll need to decide if it's worthwhile for us.

How much do you need extra speed? You'll have to answer the question yourself, of course, but one question you might ask yourself is this: how much time to I spend waiting for the computer to do something? Don't include time waiting for printer and disk - their speeds are not related to the problem.

If you have a machine language program, chances are that the program activities will seem to be instantaneous. You may need to slow down the whole process in order to read the screen. If you think about this, you'll see that in this case a super-speed chip would give you nothing.

That's not always the case. Some types of calculation take up lots of processor time - sorting is the most obvious application - and you'll find that extra speed pays off. You must decide whether your usage would benefit from the speedup.

Memory availability - not a true 16 bit characteristic, but one that often goes with the new chips - is also something that the user must evaluate. There are ways of getting extra memory on conventional systems - the Superpet and the 96K PET show how it's done. But built-in extended addressing can be quite useful, if you need it. Do you need it?

Summary.

Sixteen bit systems cost more. It's not just the processor chip, but the extra memory and board wiring. You will often need extra memory for the same job, since flags will typically take up a sixteen-bit word instead of an eight-bit one (one bit is all that's really needed, but using a word is often more convenient).

It's up to you to decide if the extra price buys you anything.

I like to think that data falls into natural chunks. For calculators and similar operations, you need a four-bit machine; a decimal digit fits nicely into four bits. For text applications, eight bits is right for fitting an alphanumeric character. But I can't think of any natural data that sizes to sixteen bits. Not numeric variables - they need more than sixteen. Now when the thirty-two bit machines arrive, they will be a mathematician's delight. But sixteen bits don't quite make it. Yes, they'll give more power and speed - but I can't see them bringing in a new class of applications.

One last note. The eight-bit microprocessor is heavily underpinned by a major industry; the personal computer industry accounts for a very small part of micro purchases. The major financing comes from - no, not the military - but the video game industry. I wonder if the sixteen-bit chips will ever get comparable volumes - and thus comparable economics.

continued p. 74

$2.50 Modification Takes the Head - Aches out of Writing Machine Language

By Harold Anderson

If you have ever tried to write 6502 machine code using only a PET without disc, you will know how frustrating this will be. If the program goes off the rails, you will normally crash the system, and your computer will refuse to acknowledge keyboard commands because your 6502 central processor is caught in a loop in some obscure corner of the memory. Even if this does not happen, the derailed program usually changes a few bytes of memory at a crucial spot and the computer starts to behave in an odd fashion.

The man with a disc gets around this by saving everything before he tries the program, since this only takes a few seconds. If he crashes it he can recover it by turning the computer off and on, and then reloading his assembler, monitor and program all in a few seconds. The poor fellow with a tape is faced with several minutes of loading to get going again, always assuming he had taken the time to save the program that he was trying to write. Help is on the way for you discless wonders out there. For a couple of dollars most of the problems can be beaten.

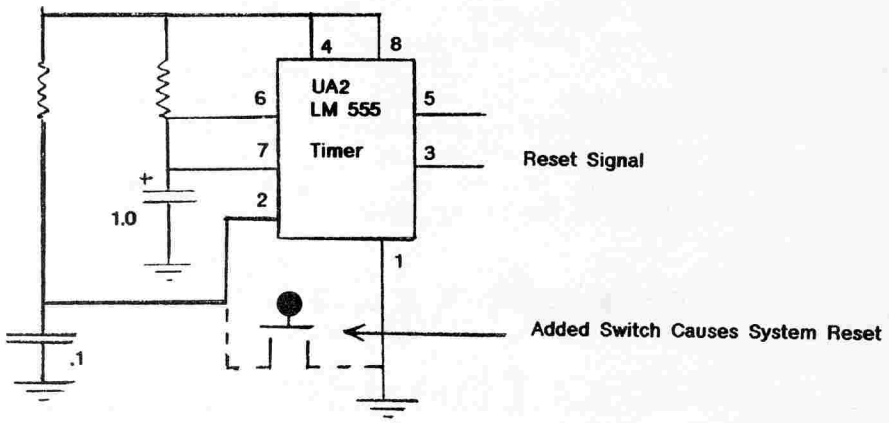
Two things are needed. The first is a way to initiate a reset routine, during which the 6502 will repair all the damage to its screen pad locations, without turning the power off. The second is a way to prevent writing into a block of memory locations that contain your assembler, monitor and program.

The 6502 in the PET normally is started into the reset routine by turning on the power. A cheap push button switch installed as shown in figure #1, generates the same results as turning off the power as far as the 6502 is concerned but the memory will not lose its contents since the power stayed on. This is not a very original idea, many people have done this.

Preventing writing in certain blocks of memory is more complicated. The PET uses the 4116 (4115 for the 16k PETS) dynamic RAM for its memory. The 4116 is a 16k by 1 bit memory (4115 is 8k by 1). In the 32k PET, two banks each with 8 ICs are used to make two 16k by 8 bit blocks of memory (8k by 8 for 16k PET), which we will call the lower and upper bank. The scheme shown in figure #2 allows the contents of the upper bank to be blockeds so that their contents can not be altered

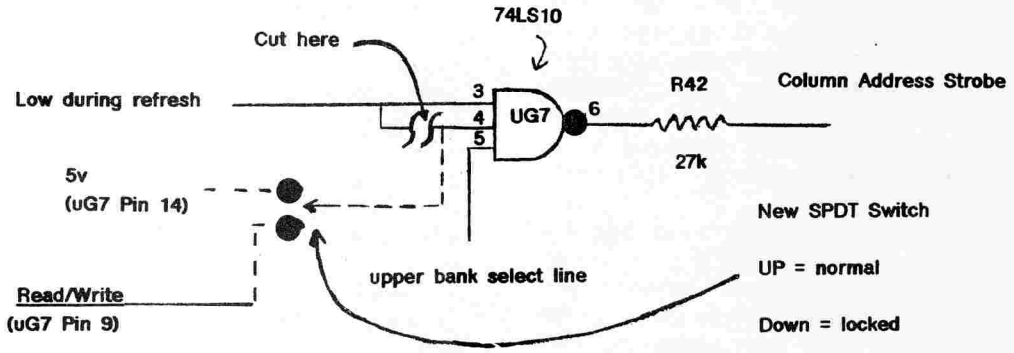
In normal operation the address of the bit in the RAM that is to be read or written into

Figure #1



****

Figure #2



is latched into a register inside the RAM chip in two successive 7 bit words. The first is normally called the row address and the second is called the column address. (14 bits are required to uniquely specify one of the 16,384 bits stored in the RAM. There are hardware facilities in the PET that constantly rotate and latch the row addresses during the first half of the 1 microsecond clock cycle. This action is needed to refresh the charges in the dynamic RAM. This latching of row addresses obviously cannot affect the contents of the memory. It is only when the column address is latched that the bit in question is read or written into.

If we are going to prevent writing into the RAM, we must block the column latch pulse during write cycles. (but not during read cycles or you could not read it). Fortunately the circuitry required already exists in many PETs.

The column address latch pulse goes through a 74LS10 triple three input NAND gate (marked G7 or UG7 in your PET). Only two of the three inputs are used, the third can be used to block the latch pulse. A low signal applied to the spare input on the gate blocks the pulse. All that needs to be done is to connect the read/write line (high= read, low = write) to this spare input and presto, the column address latch pulse is blocked during every write cycle. This would work for both the top and bottom bank of memory except that the computer will crash is it cannot write into the bottom 1k of RAM.

A word of CAUTiON. Before you start cutting up your PET, verify the type and location of the appropriate ICs. The UA2---IC (555 timer) is located in the back right corner. The UG7---IC (74LS10) is located in the centre about 5 inches from the front. If this does not verify than you have probably got the wrong version of the PET.

Figure #2 shows a single pole double throw toggle switch, which connects the spare input either to the read/write line (locked state) or the +5v line (unlocked state). I would suggest the use of a miniature toggle switch such as a Micro Switch (part # 8A1011. Keep the wires short (this is a high speed signal) by mounting the switch on the lower cabinet piece on the right side. The connection on pin 4 of gate G7 must cut. This can be done by cutting the track on the bottom of the circuit board or by cutting the pin on the IC.

After you have installed the reset button and the RAM locking switch as mentioned, you can test them as follows: unlock the memory and turn on the computer, the message on the screen should show the usual number of free bytes reduced by 16,384 (or 8,192 for 16k PETs). Unlock the memory and write something into the upper half of RAM. Now lock the RAM, push the reset button and read the bytes back, you will see that they are still there. (Normally the reset routine writes $AA (hex) into all free locations).

It is desirable to use a monitor and assembler that resides in the lockable part of RAM. It is also desirable to transfer a copy of anything that could be destroyed by a crash even if it will not run in lockable RAM. It can always be moved back to its proper location after a system reset has fixed the t crash damage d. For the beginner I would suggest sSupermon which is a clever collection of goodies written by many people and put in relocatable form by Jim Butterfield. These goodies include a line assembler, a disassembler, a single stepper, a block transfer routine and a search routine. Most Canadian PET stores will let you have a copy for the price of a cassette. I would assume that this program is available in the United States.

If you want more flexibility and are not allergic to soldering irons, I would suggest that you put a 1 of 8 decoder onto your address buss to divide your RAM into 8 blocks. Use the resulting block select signals and the read/write signal to run the spare inputs on gate G7. Now you can lock any or all of the upper seven blocks. Do not try to lock the bottom block. This is what I ended up doing although I wrote plenty of machine code before with the simple RAM lock scheme.

Another suggestion is to install a push button to short the NMI (non-maskable interrupt) line to the zero volts line. This button can get you out of programs which have no natural exit. The NMI is pin 24 and zero volts is pin 26 on the inside row of pins on the memory expansion connector. These pins are numbered from the front of the computer.

Those modifications have been made successfully on two PETs, a 16k model #2001-16N and 32k model #2001-32N. It is my belief that the modifications will work on all presently existing small screen dynamic RAM PETs. The RAM lock idea will definitely not work on an old static RAM PET. Installation of a RAM lock on the new big screen PETs is not so easy since the spare input on the corresponding gate in the new circuit has been eliminated. If you are willing to patch in an extra gate, however, you can still do it.

The idea of blocking the column strobe pulse can probably be applied to other computers, but you probably will not find a spare input on a gate which makes the modification so simple on the PET.

NEW ON SUPERPET

by Chris Bennett

COBOL, for the superPET, has just been released to the dealers. Included with it are Versions 1.1 of all the other languages. For those of you that already own superPETs, you can buy the version 1.1 package which includes:

COBOL manual
System Diskette
Tutorial Diskette
plus insert to the existing manuals

The above costs $29.95 (in Canada) from any systems dealer. All new superPETs sold will include the updated versions of the languages. There have been significant changes made to APL as well as corrections to all the other languages. For more information, read the information enclosed in the inserts to the manuals. COBOL does not appear on the menu when the 6809 is selected. To load in COBOL, place the diskette in drive 1 and type 'COBOL' in capital letters. The language supports the NUCLEUS, SEQUENTIALI-O, RELATIVEI-OandTABLE-HANDLING.

Not supported are I-O-CONTROL in the ENVIRONMENT DIVISION, the DELETE statement in RELEATIVE I-O and tape hardware. Also continuation of a line is not supported and Paragraph and Section names must contain at least one alphabetic character.

Four new programs are going to be released on the SuperPET. These include EasyCalc, EasyPlot, EasyFinance and Easyscan. These programs will use the large workspace available in the SuperPET. EasyCalc has about 60K of free space with 65 columns and 999 rows available for your worksheet. These programs will also be available on the Commodore 64 and later on the CBM II and PET II series when they become available.

Up to the end of July 1982, 6,444 SuperPETs have been shipped worldwide. They have been sold in the following areas: United States - 3,067; Canada - 2,435; Europe - 539; U.K. - 398; and Japan - 5.

Cobol Now on the Superpet

By Gord Campbell

The latest release of the languages for the SuperPET includes COBOL. It should be at your dealer's now. The release includes new versions of all the languages, along with several documentation updates.

TheCOBOLmanualis339pages.Ican'tcomment on how good it really is for someone who doesn't know the language, but I found it to be clear and explicit. COBOL itself is 'faithful to the language'. The authors even put in things they don't agree with (ALTER), because the language includes them.

COBOL includes high-precision decimal arithmetic, very complete field formatting, and the ability to handle complex data structures. It has been around for more than twenty years, and is the dominant language for commercial data-processing. There is a large body of both standards and standard techniques, which are unfortunately ignored by the manual.

The major benefit of COBOL is that it is readable. In the commercial environment, where the programs usually outlive the programmers by a factor of five, this is absolutely crucial. The average mainframe installation has a programming department which spends 70% of it's time changing systems, and only 30% writing new ones. There are lots of languages which are OK for 'throwaway' coding, but COBOL has reached its position by being readable.

The SuperPET implementation is a good representation of the language. It is interpreted, so it is just a titch slow, but it does include all the main features. Now if it just had the 'SORT' verb...

TPUG 1982 MEMBERSHIP LIST

At the time of this writing, late November 1982, there are over 2,800 members in TPUG. Our apologies to the couple of hundred of you who did not make it into this membership list. You have joined since we started processing the list over a month ago. We hope to see your name added, and several hundred more, when we publish the annual list again next year.

There are many missing phone numbers. The editor hopes that you will include your phone numbers when you renew your TPUG memberships. Phone numbers are very useful to other members in your area when they wish to contact you. It is one of the great advantages of belonging to TPUG that you can get help and exchange benefits with other members.

It was a policy decision of the TPUG executive to not publish addresses. This prevents others from turning this directory into a junkmail list.

The directory is divided into three categories. (1)International listings; (2) U.S. listings, including Puerto Rico, Hawaii, and Alaska (what! no Phillipines?) (3) and Canada.

If you look how **The TORPET** is stapled you will notice that the directory is located in the center along with the 64 maps so that you may remove it, and them, if you wish, for easier reference.

INTERNATIONAL

Adrian		S.W.A. Namiba
Archer, Peter J.		Nelson New Zealand
Arnold, Frederick C.		Nada-Ku, Kobe #657 Japan
Cheong, Daniel Koo Hin		Paris France
Commodore Computing		London, England
Commodore Computer (N.Z) Ltd.		Takapuna Auckland, N.Z.
Commodore Magazine		N.S.W. 2064 Australia
Cooke, A.J., L.R.S.C		Petersfield Hants, U.K.
C.P.U.C.N.		Berks, England
Darnold, Steven C.	0294-6833	Alexandra, Otago New Zealand
Dupon Corporation		Taipei, Taiwan
Ellis, Rick		Riyadh, Saudi Arabia
Feld, Ruediger		D-5202 Hennef 1 West Germany
Feldmeyer, Gerhard		D-8000 Munchen 40 West Germany
Gerrard, Peter		Berks, England
Gymnasieskolan		Hudiksvall, Sweden
Ho, T. S.		Lancaster, U.K.
Holmgren, Nils		S-443 00 Lerum Sweden
Kemmler, Pierre J.	056/417340	Umiken, Switzerland
Kua, Joseph		San Pablo City, Phillippines
Kuhn, O. W.		Bonstetten, Switzerland
Lai, Mr. Y.K.		Hong Kong, Asia
McKenzie, J. G.		Otautau, New Zealand
Meyer, Fwe		Durban Natal, S.Africa
Micro Computer Printout		Surrey, England
Nuttall, John C.		Henfield Sussex, England
Odell, Bjorn		Sollentuna, Sweden
Parkmann, Alexander		Am Koenigsteich 42 West Germany
Pet User's Club		London, England
Petersmeyer, Mark S.A.,		Sao Paulo, Brazil
Schafer, Wilfred		6676 Mandelbachtal W. Germany
Scheib, Nelson D.		Haifa, Israel
Schindler, Hans-Werner		Reginharstr 30 West Germany
Seng, Lim Hock		Eunos Crescent, Singapore
Smilde, Johan		Burg.V.Suchtelenstraat . Deventer Holland
Veiel, Hartmut		7760 Radolfzell W. Germany
VIC Computing		London, England
Wenzel, Douglas S.		Panama, Panama
Windsor, G. R.		Kelso Queensland, Australia

UNITED STATES

A

Abramo, Joseph D.		Bloomfield New Jersey
Abrams, Steve		Melbourne Florida
Adair, Juanita		North Canton OH
Adams, L.R.	617/828-1380	Canton MA
Adams, Jimmy P.	912/681-3615	Statesboro, Georgia
Agoris, Demo		Houston PA
Agostini, Hans		Lockport New York
Allen, Carl V.		Corry PA
Aman, Dr. Reinhold		Waukesha WI
Amari, R. Richard		Abindon VA
American Peripherals		Lindenhurst New York
Ancier, Sherman M.		Lawrenceville New Jersey
Anderson, Kenn W.	605/332-4408	Sioux Falls, SD
Anderson, Gary L.		Cedar Rapids Iowa
Anderson, Alan L.		Frewsburg, N.Y.
Anderson, Lois H.		Salt Lake City, Utah
Andre, Maurice S.		Brattleboro VT
Anton, William T.	301/730-1239	Columbia, Maryland
Antonucci, Emery B.	304/354-8495	Alexandria Virginia
Arbogast, Larry G.		Ballwin MO
Ardman, Harry		Rockport Maine
Arsenault, Mr. Gregory		Randolph MA
Ason, John S.	412/325-1714	Pittsburgh PA
Atkinson, John F.	904/746-5833	Beverly Hills Florida
Autocomp		Glenham New York

B

Babel, John	203/563-3422	Wethersfield Connecticut
Bachman's Inc.		Greeley Colorado
Badger, William R.		Barrington, Illinois
Bailey, William		Philadelphia PA
Baker, Robert		Atco New Jersey
Baker, Robert L.		Lexington Kentucky
Bales, Bruce		Lorain Ohio
Ball, Richard	206/284-9417	Seattle, Washington U.S.A.
Balomenos, A.C.		Westport Connecticut
Baney, George		East Windsor New Jersey
Banks, Amberse	209/578-5839	Modesto, CA
Banks, Clifford		Oklahoma City Oklahoma
Bark, L. Dean		Manhattan, Kansas
Barker, Donald G.		Texas A & M University College Station, Texas
Barnes, Richard W.		Hatteras N.C.
Barnhill, M.V. III		Newark Delaware
Baron, Eugene W.		Hammond Indiana
Barringer, C.A.		Jacksonville Florida
Barsamian, Ara		Morristown New Jersey
Bartels, Thomas S.		Winter Springs Florida
Bason, Mr. W.A.		Raleigh North Carolina
Bass, Amos B. Jr.		Wall New Jersey
Bayhi, Al		Hayward California
Beaird, Jack G. Jr.		Golden Valley Minnesota
Bean, Eric R.		South Bend Indiana
Becher, Dr. Paul	302/478-2658	Wilmington Deleware
Beck, Dave	414/739-9395	Appleton Wisconsin
Bedell, Donald W.		Stone Mountain, GA
Beebe, Irvin		San Jose California
Beers, Richard		St. Thomas U.S.Virgin Islands
Bell, Jerry L.		Hollister California
Bell, Carl W.		Arlington Virginia
Bell, Thomas		Metairie Los Angeles

Belleau, J.G. . . . . Indianopolis, IN
Belloit, Dr. Jerry . . . . . Miami, Florida
Benline, Wm. E. . . . . Martins Ferry OH.
Bennett, John W. . . . . Pontiac Michigan
Berg, Clyde 213/438-7658 . . . . . Long Beach, CA
Bergevin, R. . . . . Clintville New York
Bernzweig, David . . . . . Framingham MA
Berry, Don 918/251-4929 . . . . . Broken Arrow OK
Berry, Jerry L. . . . . Aurora Colorado
Best, John R. . . . . Jackson New Jersey
Bingamon, Daniel 513/797-4775 . . . . . Batavia Ohio
Birmele, Aicardo 616/471-5759 . . . . . Berrien Springs Michigan
Blair, Hugh P. . . . . Brown's Mills N.J.
Blech, John H. . . . . Crown Point Ind.
Bliss, Robert D. . . . . South Ogden Utah
Bobeck, Andrew H. 201/582-3687 . . . . . Chatham N, Jersey
Bock, Eugene Jr. . . . . Hatboro PA
Borst, Jim . . . . . Ellsworth Wisconsin
Bostic, Joe . . . . . Las Vegas Nevada
Botnick, Stephen R. . . . . Flushing, NY
Bottoms, Dale D. 303/591-6934 . . . . . Colorado Springs Colorado
Boucher, William H. . . . . Granby MA
Buchwalter, Neil 703/435-2604 . . . . . Herndon Virginia
Bourque, Raymond . . . . . Auburn New Hampshire
Boyer, Elmer R. . . . . Lewes Delaware
Brawner, Dr. M. Tucker 912/354-8126 . . . . . Savannah Georgia
Breen, Jim . . . . . Baltimore, MD
Brereton, John D. 914/667-6425 . . . . . Mount Vernon New York
Bressler, Ralph 914/439-3591 . . . . . Livingstone Manor N.Y.
Brewington, James 516/378-3822 . . . . . Freeport New York
Brinson, Jerry 317/842-6353 . . . . . Indianapolis Indiana
Britton, W. L. Hobe Sound Florida
Brodsky, Isadore . . . . . Huto Rey Puerto Rico
Brooke, Edward F. . . . . Pickerington Ohio
Brooks, Thomas 214/528-0059 . . . . . Richardson Place Texas
Brooks, Burton 616/842-2586 . . . . . Grand Haven Michigan
Broomhead, Charlie . . . . . Amarillo Texas
Brown, William L. . . . . Brighton MI
Brown, David S. . . . . Sherman New York
Brown, Nolan J. Sr., ... Fordyce Arkansas
Polar Research Laboratory Inc. . . . . Santa Barbara, CA
Brown, Buford 916/726-0171 . . . . . Citrus Heights California
Bruce, Gary 716/492-4369 . . . . . Delevan New York
Brutsche, Fred L.- 616/429-7163 . . . . . St. Joseph Michigan
Buchanan, A.B. . . . . Greenville North Carolina
Buckfield High School . . . . . Maine
Bull, Dale 305/445-1523 . . . . . Miami Florida
Burch, James K. Jr. . . . . Santurce Puerto Rico
Bush, Timothy . . . . . Salem, MA
Business Machines Inc. . . . . West Palm Beach Florida
Business Machine Sales . . . . . Naples, Florida
Buttery, Lewis F. 302/678-8546 . . . . . Dover Deleware
Byers, Robert D. . . . . Syracuse New York
Byers, G.C. . . . . Hancock Michigan

C

Caldwell, Rickey A. . . . . Enid Oklahoma
Caldwell, J. Wes . . . . . Amarillo, Texas
Caldwell Manufacturing Co. . . . . Kearney Nebraska
Callahan, Rev. Brian F. . . . . Brooklyn, N.Y
Camden-Frontier School . . . . . Michigan
Campbell, Ronald G. 605/983-5069 . . . . . Arlington South Dakota
Campbell, John Jr., ... Savannah Georgia
Campbell, Jane 619/277-7214 . . . . . San Diego California
Cappuccio, Butch . . . . . Trenton New Jersey
Caress, Tom . . . . . Anaheim, CA
Carr, Eric P. 916/265-9304 . . . . . Nevada City California
Carr, Bob . . . . . Phoenix Arizona
Carroll, Michael W. . . . . Norristown Pennsylvania
Cartwright, Angie . . . . . Pittsburgh PA
Carver, Paul H. . . . . Woodbury New Jersey
Casar, Dr. J.A. . . . . Pittsburgh, PA
Caswell, John Jr. 207/338-1410 . . . . . Belfast Maine
Catan, Daniel M. . . . . New York New York

Central Utah Electronics Supply. . . . . Provo, Utah
Chadnow, Herbert . . . . . Staten Island New York
Chalala, Joseph . . . . . Willow Street Pennsylvania
Channel Data Systems 805/964-6695 . . . . . Santa Barbara California
Cheshire, Dr. Fred D. . . . . Phoenix Arizona
Chesner, Mr. Donald J. . . . . Olean New York
Chestnut, Edwin Sr. . . . . Louisville Kentucky
Christainsen, David C. . . . . Billerica MA
Clark, William F. . . . . Indianapolis Indiana
Clearwater, Hugo F. . . . . Poughkeepsie New York
Clough, Jack . . . . . New Hampshire
Cochrane, F. Arthur 803/827-1902 . . . . . Beech Island South Carolina
Cohn, Howard A. . . . . Los Angeles, CA
Colestock, George R. . . . . Camp Hill PA
Collier, Warner Y. . . . . Winston-Salem, NC
Colten, Sterling . . . . . Salem MA
Commodore - Region 5. . . . . Bensenville, Illinois
The Computer Factory. . . . . New York New York
Comp-Tronic Systems. . . . . Lebanon Indiana
Compu Craft Inc.. . . . . Keene New Hampshire
Computer Concepts. . . . . Cheyenne Wyoming
Computerland of Wausau. . . . . Wausau Wisconsin
The Computer Forum. . . . . Frazer, Pennsylvania
The Computer Room. . . . . Scotts Valley California
Computer Strategies Inc.. . . . . Spring Valley New York
Computeam . . . . . Burlington Vermont
Computer Mart. . . . . Clawson Michigan
Com-Tech Company. . . . . Kamiah Idaho
Connely, Robert 417/624-5259 . . . . . Joplin MO
Cook, Mrs. Judith W.M. 402/781-2542 . . . . . Lincoln NE
Cook, David S. . . . . Bunker Hill Indiana
Cooper, Kay . . . . . Atlanta, Georgia
Cordon, Luis C. . . . . Troy New York
Cox, James . . . . . Farmington Hills Michigan
Cox, Glen W. . . . . Madison Al
Critchfield, Larry 714/551-0196 . . . . . Santa Ana California
Croft, G.F. . . . . Lockport New York
Cronin, David 313/664-5666 . . . . . Lapeer Michigan
Croom, William H. . . . . Alexandria Virginia
Crossman, Ed . . . . . N. Logan Utah
Crowell, Gary Lee . . . . . Ft. Sill Oklahoma
Crowley, Cornelius . . . . . Bronx New York
Curry County Reporter. . . . . Gold Beach Oregon
Cyberia Incorporated. . . . . Ames Iowa

D

Dallas, Jim 605/996-8277 . . . . . Mitchell SD
Daniel, Marik 505/821-6835 . . . . . Albuquerque, New Mexico
Darlington, Lee . . . . . Canoga Park CA
Data Plus Business Systems. . . . . Quincy Illinois
D'Attore, Alfred . . . . . Phoenix, Arizona
Davis, W. Stanley . . . . . Decatur Georgia
Davis, William E. . . . . Ashland Oregon
Davis, E.H.. . . . . Atlanta Georgia
Davis, Fred H. . . . . Independence Missouri
Dayprom Computer 513/434-3318 . . . . . Dayton, Ohio
Dean, Arlis D. . . . . Rock Island Illinois
Decker, William D. . . . . Reedley California
Micro Computer Users Intl.. . . . . Sault Ste Marie, Michigan
DeKneef, Arthur J. . . . . Lake in the Hills Illinois
Delaney, Ronald D. 314/644-4481 . . . . . St Louis Missouri
Delora, Michael G. . . . . Flint Michigan
Demissie, B. . . . . Bayonne New Jersey
Denehy, C. Peter 914/358-3761 . . . . . Congers New York
DuPont, Samuel J. 716/768-7473 . . . . . LeRoy N.Y.
Deschamps, Charlotte . . . . . Brentwood New York
DeWitt, Betty 912/354-8446 . . . . . Savannah Georgia
Diehl, Herbert M. 302/798-9159 . . . . . Wilmington Delaware
Digital Computer Systems Inc.. . . . . Muskogee Oklahoma
Doda, David D. . . . . Indian Hbr Bch. Florida
Dode, Gary 616/894-8189 . . . . . Whitehall Michigan
Doherty, Brother Daniel . . . . . Wheaton, Maryland
Dolejsi, Dr. Duane A. 605/226-2332 . . . . . Aberdeen South Dakota

Dolezal, Sue . . . . . Stevensville, Montana
Dommershausen, Thomas M. . . . . Vandenberg AFB, CA
Dong, Wilbur . . . . . South Pasadena California
Donovan, Francis H. . . . . E. Peoria Illinois
Donovan, Daniel . . . . . Prescott WA
Dorward, Jack . . . . . Woodacre California
Dowd, Patrick 201/539-7333 . . . . . Convent Station New Jersey
Dowling, John R. 408/248-1592 . . . . . San Jose California
Drouillard, Wayne R. . . . . Long Beach California
Dry Creek Ranch Golf Club Inc. 209/745-4331 . . . . . Galt, CA
Duggan, Lyman K. . . . . Tampa, Florida
Dunlap, Irvin . . . . . Bartlesville OK
Dyer, Allen . . . . . Nashville Tennesee

E

E3 Engineers, 215/644-5622 . . . . . Valley Forge PA
Eakin, Edward L. . . . . Killeen Texas
Earthrise Micro Systems Inc. . . . . Delaware Ohio
Eason, Jane Elizabeth 912/238-4526 . . . . . Savannah Georgia
Eberbach, Steve 313/769-2221 . . . . . Ann Arbor, Michigan U.S.A.
Eckert, Dr. Paul T. . . . . Fort Lauderdale, Florida
ECS Incorporated . . . . . Minneapolis Minnesota
ECX . . . . . Walnut Creek California
Ed's Electronics 319/233-8053 . . . . . Waterloo Iowa
Educational Computing Associates . . . . . Lodi New Jersey
Edu-Tech . . . . . The Dalles Oregon
Edwards, Thomas G. . . . . Silver Springs MD
Ehlinger, Robert E. Jr. . . . . Palatine Illinois
Eisenberg, Bernard . . . . . Massapequa Park New York
ELC Electronics Inc. . . . . Capitola. California
Electronic Service Assoc. Inc. . . . . Medford New Jersey
Emerson, B.L. . . . . Del Mar California
Ennor, Lorna L. . . . . Savannah Georgia
Erlewina, Michael . . . . . Big Rapids Michigan
Eversole, G. E. . . . . Manhattan Beach California
Evke Digital Control Co. . . . . El Paso Texas

F

Farmer, John 912/927-4588 . . . . . Savannah Georgia
Farrell, Kevin P. . . . . Tucson Arizona
Farrow, Peter J. . . . . Houston Texas
Fasenmyer, Sharon A. . . . . Altoona Pennsylvania
Faustino, Harold P. . . . . Ewa Beach Hawaii
Fels, Jim . . . . . Palm Bay Florida
Ferris, C. J. . . . . East Hanover New Jersey
Finley, Tom . . . . . Hampton Virginia
Fiorentini, James J. . . . . Haverhill Mass
Fisher, Eugene 415/447-8079 . . . . . Livermore California
Fisher Scientific Co. . . . . Chicago, Ill
Fisher D. . . . . Yakima, WA
Fitkin, David . . . . . Cedar Rapids, Iowa
Fitzpatrick, Timothy A. . . . . Petersburg, Michigan
Florida Book Store . . . . . Gainsville Florida
Florida Solar Energy Center . . . . . Cape Canaveral, Fl
Focus Scientific & Electronics . . . . . Fort Lauderdale Florida
Foster, Alvin . . . . . Boston MA
Foster, William . . . . . Anaheim California
Foster, Robert A. Sr. . . . . Albuquerque New Mexico
Foster, Roland . . . . . New York New York
Frascareli, Claudette L. . . . . West Hartford Conn
Frazee, Dr. J.D. . . . . Austin Texas
Friedman, Arnold . . . . . Great Neck New York
Fuerman, Dr. Larry 609/345-7686 . . . . . Atlantic City New Jersey
Fulford, William B. 703/591-2118 . . . . . Fairfax Virginia
Fuller, H. V. . . . . Newport News VA
Fulton, James C. 715/423-0908 . . . . . Wisconsin Rapids Wisconsin

G

Galin, Leo L. . . . . Chicago ILL
Galioto, Andrew T. 313/781-6360 . . . . . Washington Michigan

Gara, Steve	201/539-6779	Morristown New Jersey
Garbarino, John F.		Masons Island, Mystic CT
Garber, Joseph		Claymont Delaware
Garber, Jim		Centerville Ohio
Garner, Rev. Raymond		St. Louis County Missouri
Garrambone, Anthony	305/652-6652	Miami Florida
Garriques, David		Melbourne Florida
Gasper, George Jr.,	312/251-8977	Wilmette Illinois
Geary, Gene	912/927-9578	Savannah Georgia
Geiselmann, Willi		St Louis Missouri
Georgia State University.		Atlanta Georgia
Gifford, Ted	608/756-3094	Janesville Wisconsin
Gilbert, Ward		Mesa Arizona
Glatzer, David J.		West Orange, N.J.
Glenn, Charles L.		Burbank California
Globus, Henry P.		Freeport New York
Golchert, Gordon		Sterling Heights Michigan
Goldsberry, Diane F.	912/352-3545	Savannah Georgia
Gomez, Deborah J.		West Palm Beach Florida
Gover, Thomas A.		St. Peter MN
Graff, Carl C.		Lakewood Colorado
Grass Valley Computers.		Grass Valley California
Green, Howard		Midland Michigan
Greenberg, Gary		Jackson Heights New York
Grieser, Eric	803/879-2355	Greer South Carolina
Gronert Computers Ltd.		Des Moines Iowa
Guildford Country Store.		Brattleboro Vermont
Gusta, Lee		Sterling Heights Michigan

H

Hackney, Gary		Wichita Kansas
Hale, George Daniel		Ketchikan Alaska
Hale, Gordon H.	313/239-1366	Flint Michigan
Hall, William		Madison Wisconson
Hallila, William		Hibbing MN
Hamilton, David H.		Middleton New York
Hamilton, Stoddard C.		Highland Michigan
Hannigan, Dr. J.		Maywood, Illinois
Hansen, Eugene S.	866-6473	Herkimer New York
Hardwick, Jim		Little Rock Arkansaw
Harriman, Mayland E.		Port Arthur Texas
Hartman, Tony A.		Texarkana, Arizona
Hays, Lester		Tuscon, Arizona
Hebert, Andre		Manassas VA
Heck, Mike		Cerritos, CA
Hedrick, Rick C.	913/897-3548	Stanley Kansas
Heider, Stephan M. Ph.D.		Buffalo New York
Heitzner, Steven L.		Bristol CT
Henry, Thomas	507/387-1642	Mankato Minnesota
Hermann, Gary J.		Monkton MD
Hermann, Robert	707/762-1376	Petaluma California
Herrick, Dennis	319/362-1634	Cedar Rapids Iowa
Herskowitz, Elliot		New York New York
Herzfeld, Val E.		Valley Forge PA
Hill, Wayne		Jackson Michigan
Hinsdill, Ronald D. Ph.D		Middleton Wisconsin
Hipple, Glen H.		Keene NH
Hirsch, Larry		South San Francisco California
Hoit, William H.		North Bend Oregon
Holmes-Ray, Peter	912/367-7829	Baxley Georgia
Holzer, Robert A.		Somerset New Jersey
Hooker, Robert T.		Frogmore South Carolina
Hooper, Thomas S.		Bloomfield, N.J.
Tarczy-Hornoch, Peter		Berkeley California
Hothering, Martin C.		Stockton CA
Hovis, Jeff	313/664-2593	Metamora Michigan
Howe, John A.		Spring Texas
Huber, Charles T.	313/779-6340	Anita Michigan
Huberty, Robert L.		Big Bend Wisconsin
Humbert, Charles A	209/334-6025	Lodi California
Hunter, Daniel J.		Phoenix, Arizona
Hussiere, Emile J.		Poland Spring ME
Hutto, Raymond F.		Birmingham Alabama

I

Image Software . . . . . Las Vegas Nevada
Information Company, ... Somerset New Jersey
International Computer Services . . . . . Johnston Rhode Island
Iversen, George . . . . . Maplewood New Jersey

J

Jaeger, Bruce . . . . . St. Paul Minnesota
James, Edward . . . . . New York N.Y.
Jannakos, Gregory . . . . . Stone Mountain Georgia
Jenks, Mr. Al . . . . . Mt. Clemens MI
Jini Micro-Systems Inc.. . . . . Yonkers New York
Johnson, P.C. & Rosette, ... Alburquerque NM
Johnson, Pat . . . . . Watertown, SD
Johnson, Quintin 415/449-1084 . . . . . Livermore, CA
Johnson, Dick . . . . . Berkeley California
Johnson, David R. . . . . Geneseo Illinois
Johnson, Dave . . . . . Livermore California
Johnston, Michael G. . . . . Fridley MN
Jones, Robert R. . . . . St. Petersburg Florida
Jordan, Lyle 612/425-5350 . . . . . Maple Grove Minnesota
Jordan, Donald E. Jr. . . . . Inverness Illinois

K

Kalenowsky, Phil . . . . . Camp Geiger North Carolina
Kalish, David W. . . . . New York, N.Y.
Kaplan, Robert L. . . . . Peoria Illinois
Kaplan, Dennis . . . . . Richardson Texas
Kappel, M.W. . . . . Belleville Illinois
Karush, Fred 215/664-6827 . . . . . Phila, PA
Kassebaum, Donald 214/324-5665 . . . . . Dallas Texas
Kastello, Mark . . . . . Sherman Illinois
Kaye, Steven 212/884-8545 . . . . . Bronx New York
KBL Microsystems Incorporated . . . . . Sacramento California
Keever, Wm. C. . . . . Manchester Connecticut
Kelly, Bill . . . . . Kent Washington
Kemp, James . . . . . Henderson KY
Ketchum, Donald . . . . . Upland California
Ketter, Denny 614/239-0487 . . . . . Columbus, Ohio
Key, Gerald . . . . . Gahanna, Ohio
King, Billy . . . . . Mephis Tennessee
Kingsbury, Harold N. . . . . St. Paul MN
Kinkade, Mr. Glenn 214/349-3808 . . . . . Dallas Texas
Kinney, Dr. Peter A. . . . . Sharon MA
Kirk, Karl . . . . . Lapeer Michigan
Kleinert, Michael 914/623-8929 . . . . . Nanuet New York
Kleist, Daniel M. . . . . San Pablo California
Klinger, Arthur R. . . . . Wichita Falls Texas
Klusica, Edward J. . . . . Cincinnati, Ohio
Knight, W. W. . . . . Dallas, Texas
Knowles, Frank R. . . . . Melbourne Florida
Knox, Kenneth E. . . . . Parsons Kansas
Kochis, Andrew Jr. . . . . Houston Texas
Koetzner, Richard W. 516/587-4118 . . . . . West Babylon New York
Korpi, Michael . . . . . Waco Texas
Kovalcik, Thomas M. . . . . Yardley Pennsylvania
Kruse, John E. 413/243-1364 . . . . . Lee Massachusetts
Kuby, Andrew E. . . . . New York New York
Kyprie, Warren 912/477-0442 . . . . . Macon Georgia

L

Long Island Computer, ... Lynbrook New York
Larsen, James W. . . . . West Des Moines Iowa
LaTorre, Richard . . . . . Fairfield Connecticut
Latrash, John . . . . . Metairie LA

Lebsack, Don		Marshalltown Iowa
Lecompte, Nancy L.		Lewistom Maine
Lee, Robert D.	502/295-3542	Lewisport Kentucky
Lee, Ben		Largo Florida
Lekay, George		Hollister California
Lemay, Ken	313/683-5225	Pontiac Michigan
Leone, James		Pontiac Michigan
Leslie, Donald P.		Eugene Oregon
Levin, Jay	201/569-0948	Tenafly New Jersey
Levy, Richard		Savannah GA
Lewis, Chester	916/726-2887	Citrus Hights California
Linday, R.W.	704/667-2354	Enka North Carolina
Lindsay, Len		Madison, Wisconsin
Lippai, Andrew S.	516/623-3665	Merrick New York
Little, David H.	912/d98-1075	Savannah Georgia
Litzau, Edward J.		Brookfield Illinois
Lizotte, Brian		Santa Cruz California
Lloyd, Gerald J.		Overland Park Kansas
Lock, Robert		Greensboro North Carolina
Lodsin, John E.	615/525-0015	Knoxville Tennessee
Long, Ray	901/685-6253	Memphis, TN
Louderback, Don		Fairborn, Ohio
Lounsberry, Walter A.		Wichita Kansas
Loyd, 1st LT. Phillip B.		Cherry Point North Carolina
Lubbock, Mark A.		Los Angeles, CA
Lucke, Steven J.		Minneapolis MN
Lum, Philip L.S.		Sarasota Florida
Lund, Michael		St. Louis MO
Lundeen, Larry J.	605/224-4863	Pierre South Dakota
Luster, Peter K.		Arlington VA
Lykins, Chip		Connersville Indiana
Lynch, Thomas H.		Chatsworth California
Lynch, William B.		Coram New York
Lynch, Philip	614/274-6451	Columbus Ohio

M

MacDiarmid, Preston R.		New Hartford New York
MacIntyre, John		Natick Massachusetts
Magin, Kenneth E.		Palatine Illinois
Magnani, Raymond	302/738-6953	Newark DE
Communications Marketing Inc		Memphis, Tennessee
Mahar, Sean		Tucson Arizona
Maine Micro Systems Inc.		Auburn Maine
Mainline Computer Center		Wayne Pennsylvania
Malinowski, Mark		Farmington Hills Michigan
Mang, Conrad		Dayton Ohio
Marion, Joseph G.		Monroe New York
Marion, James		Sarasota Florida
Martin, Roscoe D.		AAFB Md
Mason, Jerry	313/475-9636	Chelsea Michigan
Massey, James E.		Baltimore Maryland
Matarella, Dr. J.		Glen Burnie MD
Maus, Dick	612/559-9639	Minneapolis Minnesota
McAlister, Robert T.	912/233-9481	Savannah Georgia
McAllasters, The		Savannah Georgia
McCann, A. Hews	805/483-7183	Oxnard California
McCarthy, Charles A.	612/645-6867	St. Paul Minnesota
McCormick, Jim		Aurora Colo
McCulloch, Robert B.		Lakewood Colorado
McCulley, Alan W.	214/996-6452	Richardson Texas
McCulloch, Ralph		Roseville California
McDaniels, Edward		Ronkonkoma New York
McDonald, D.		Riverside California
McDonald, Ernest C.		Anaheim California
McKenzie, Marjorie		Manchester Georgia
McMaster Inc.		Edgewater New Jersey
McRorie, T. H.		Huntington Beach California
Medical Electronic Services	602/886-5375	Tucson Arizona
Medina, Carlos		N.Y.C. New York
Meinhardt, Ken		Santa Clara California
Meirowsky, Stephen		Peabody Kansas
Mellin, W. J.	912/927-3611	Savannah Georgia
Mello, Doris		San Luis Obispo California

Menager, E.B.		Brooklyn New York
Mendenhall, James		Edwardsburg, MI
Mengel, Arnold S.		Vista California
Meyer, Bennett		Glen Rock NJ
Meyer, Berland		Marathon WI
Miceli, Freddi		New York New York
Michael, Steven		Sterling Illinois
Mick, Steve	415/531-8609	Oakland California
Micro-Computer Applications		Marshalltown Iowa
The Micro Computer Store		Caparra Terrice Pueto Rico
Micro Software Systems		Woodbridge Virginia
Midwest Computers		Manhattan KS
Miketronics		Lake Worth Florida
Miller, A. G.	912/897-5570	Savannah Georgia
Millet, Paul		Mesa, Arizona
Minner, Steve		Mishawaka Indiana
Miri, Charlie Goh		Little Creek Deleware
Mischuk, Br. Henry	201/842-6712	Lincroft, NJ
Mitchell, Glenn	513/426-2826	Dayton Ohio
Mitchell, Lacey E. Jr.		Atlanta Georgia
Mohr, Jonathan J.J.		Boulder Colorado
Moll, Doug R.		Brevard N.C.
Moncrief, Wayland		Augusta, GA
Montebello, A.A.	217/893-9469	Rantoul Illinois
Moody, Charles Jr.		Anchorage AK
Moon, Michael L.	203/583-8668	Bristol Connecticut
Moore, Mrs. Marcia		Andover New York
Moreno, Henry R.	305/443-8512	Miami Florida
Morgan, Walter L.	615/870-9291	Chattanooga Tennessee
Morris, J. Paul	215/432-2088	Long Beach, CA
Morse, David M.	315/457-3170	Liverpool New York
Moser, C.W.		Winston-Salem North Carolina
Moss, Lowell	415/861-4420	San Francisco California
Mountcastle, Earle	703/494-2000	Woodbridge Virginia
Mount Holyoke College		Massachusetts
Munch, William	513/698-5638	West Milton Ohio
Mundy, Michael		Suffern New York
Murphy, Gerard C.		Tarrytown N.Y.
Murrell, Richard		Auburn ME
Myers, Jim		Lansing Michigan

N O

Nagy, James R.		Clinton, New York
Nance, James F.	808/637-9912	Haleiwa Hawaii
Nashville Vic Users Group		Nashville Tennessee
Neville, David E.		Brighton Michigan
New Jersey Audio Video Inc.		Boonton New Jersey
Newman, Jeff		Phoenix, Arizona
Newman, Jeff		Silver Spring Maryland
Newton, Don C.		Winter Park, Florida
Nguyen, Lat	912/355-9848	Savannah Georgia
Nires, Mr. E. I.	215/224-5706	Phila., Pennsylvania
Nixon, Mark		Houston Texas
O'Day, Mrs. Elaine		Oakland California
Office Equipment Exchange		Orlando, Florida
Okun, Nathan		Oxnard California
Olsen, John		Santee California
Olsen, Thor		Rochester New York
Olson, R.C.		Sacramento CA
Olson, Nels		Arcadia California
Omnitek Computers Intl.Inc.		Tewksbury, MA
One Stop Computer Shoppe		Lemoyne, PA
Oro, Dr. R. Dana		Arlington Massachusetts
Oppenheimer, Gary M.		New York New York
Ordway, Frank T.	617/485-4677	Marlboro MA
Orswell, Prentice L.	303/455-1147	Boulder Colorado
Overbey, Ernest		Burlington Wisconson
Overman, Robert		Aiken South Carolina
Oxman, Michael	301/942-6757	Bethesda MD

P

Packard, Robert		Roseville Michigan
Packard, Nancy O.	912/352-4364	Savannah, Georgia

Packer, Grace J. 602/669-2689 .. Parker Arizona
Pancio, Paul .. Olean New York
Papermo, Ron 714/433-4119 .. Ocean Side, California
Pappas, Chris .. Houston Texas
Paquette, Dan 213/747-5992 .. Los Angeles California
Parker, Charles W. .. Satellite Beach Florida
Parlette, Ross R. W. .. Sunnyvale California
Parrott, Joe D. .. Huntsville Alabama
Pashby, Paul J. .. Silver Spring Maryland
Patch, Norman .. West Palm Beach Florida
Pattee, Peter A. .. Ames, Iowa
Patton, N. M. .. Peabody Kansas
Paulsrud, John R. .. Zionsville Indiana
Payne, Jack 803/366-7278 .. Rock Hill South Carolina
Payton, Archie H. .. Louisville Kentucky
PCS Computer Sales & Service .. Suite R, Las Vegas, Nevada
Peacock, L. J. 404/542-4733 .. Athens, GA
Penman, Keith E. .. Klamath Falls Oregon
Perimeter Office Supply .. Norcross, Georgia
Perry, Bob .. New Britain CT
Phillips, Patrick .. Thiells New York
Phillips, M. R. .. Titusville Florida
Phillips, Ray L. .. Tampa Florida
Pinter, Alan .. Conway Arkansas
Pitkof, Harriet 516/825-2132 .. Valley Stream New York
Podell, Jerome E. .. San Francisco, California
Poland, Robert L. .. Richmond Indiana
Polowczyk, Ed .. Brentwood New York
Poppish, Stephen P. 703/786-8358 .. Fredericksburg Virginia
Potter, Tom .. St. Clair Shores Michigan
Pounds, Meryle B. .. Rockville Maryland
Powell, Ted .. Oaklandon, IN
Powell, Stephen M. .. Dubuque Iowa
Prather, Paul D. 901/372-9538 .. Memphis Tennessee
Pratto, Marlene R. 919/275-4422 .. Greensboro, North Carolina
Prezyna, Dan .. Lackawanna New York
Price, Joseph E. .. Pocatello Idaho
Price, Van .. Mars PA
Pringle, Dr. G. Hale .. FL
Progressive Systems .. Baltimore Maryland
PSH Business Systems .. Honolulu Hawaii
Pucel, Louis H. .. St. Louis Missouri
Pullen, John D. .. Wauwatosa Wis
Putriment, B. W. Jr. .. Shalimar Florida
Pylka, Joseph M. .. Bellemead New Jersey
Pyrdek, Joseph .. Erie Pennsylvania

Q R

Quass, Jon .. Cedar Rapids Iowa
Queeney, R. .. Huntsville AL
Quigley, John P. Jr. 402/721-1538 .. Fremont Nebraska
Quine, Dr. Douglas B. .. New Orleans, CA
Rademaker, Richard C. .. Onekama Michigan
Raeburn, William M. .. Britton Michigan
Random Access Computers .. Destin Florida
Ratliff, Earl .. San Jose. CA
Reed, Thomas .. Middletown Conn
Reed, Robert L. .. O'Fallon MO
Reed, C. M. Jr. .. W. Redding CT
Reed, Ray .. Nampa Idaho
Reed, C. M. .. W. Redding Connecticut
Reed, Charles M. .. Gorham N.H.
Regency Educational Systems .. Dallas Texas
Reiling, Richard B., M.D. .. Kettering Ohio
Renzelman, Duane .. Plano Texas
Reuss, Albert I. .. Clearlake CA
Rhoads, Larry .. Bridgeton MO
Rice, Paul D. 603/523-4818 .. Lebanon N.H.
Richardson, Alvin .. Reston, VA U.S.A.
Richner, Andres .. Caparra Hgts. Puerto Rico
Richter, Herb .. Sterling Illinois
Riesenbert, Nathaniel R. 212/476-3278 .. Mineola New York
Riley, Larry E. .. Portsmouth New Hampshire

Riley, Robbin D.		Silver City New Mexico
Roane, George IV.		Lafayette Louisana
Robertson, John P.		Emmaus PA
Rockefeller, J.	914/687-7909	Accord, New York
Rockford Area PET Users Group		Rockford, Illinois
Rockwell International		Anaheim, California
Rockwell International		Richardson, TX
Rodger, Mrs. Gilbert B.		Dryden Michigan
Rogers, David A.	617/823-1974	East Taunton Massachusetts
Rood, Larry		Mt. Rainier Maryland
Roosevelt Middle School		Cocoa Beach, Florida
Rose, David		Hillsborough California
Rose, Merrill W.		Masury Ohio
Rosner, Richard		Brookfield, CT.
Burnham, James A.		Road Macomb, Illinois
Roth, Hank		Alva, Florida
Rothanburg, William E.		Lauderdale Lakes Florida
Rovero, Lt. P. J.		Monterey, Cal.
Rubio, Carlos		Martinsburg West Va
Ruby, Mr. Sandow		Randolph MA
Ryback, George W.		Highland Park Illinois
Ryschkewitch, M.G.	302/738-4056	Newark, Deleware

S

Sadler, Walter		Waukesha Wisconsin
Samuelson, R. E.	309/745-3482	Washington Il
Sanders, Kenneth		Wadena MN
Sackreiter, Robert G.		Milbank SD.
Savannah State College		Savannah, Georgia
Scaife, William J.		Houston Texas
Scalise, Bob	212/845-2813	Queens New York
Scarton, Enzo W.		Portage PA
Schaad, John W.		St. Paul MN
Scheper, Frederick C.		Pasadena Maryland
Schiff, Harriet		Flushing New York
Schnibben, John		Naperville Illinois
Schnitzer, David M.		East Windsor NJ
Schoonover, Alger G.		Washington Michigan
Schueler, John J.		Sedona Arizona
Schulback, Adolph		Santa Barbara CA
Schultz, Louise	215/789-1942	Havertown, Pa.
Schulz, Eugene S.		Andover MA
Schumacher, Richard W.		St. Louis Missouri
Schwartz, Gerid	313/664-0986	Lapeer Michigan
Schweitzer, Eric		Wakefield KS
Scott, John C.		Louisville Kentucky
Seago, David	214/763-4310	Quitman Texas
Seattle School Distric #1		Seattle, WA
Seckel, Doug		Houston Texas
Seidel, Gary		Deadwood Oregon
Seitz, Mike		Las Vegas Nevada
Selover, R. L.		Richardson Texas
Servoss, Ronald L. M.D.		Sylva NC
Seventh Day Adventists		Bozeman, Montana
Shapelle, Claud E.		Nazareth, PA
Sharkey, Jeff		East Greenwich RI
Shaw, Art		Ann Arbor Michigan
Sheehan, John P.		Elizabethton Tennessee
Shelton, Robert W.		Kokomo Indiana
Sherwin, Milt	303/695-7784	Denver Colorado
Shingler, Robert A.	503/741-2676	Eugene Oregon
Shulik, Dr. Stephen J.	412/381-2190	Duquesne University, Pittsburgh Pennsylvania
Shurin, George J.		Livonia Michigan
Silverman, Stan		Brightwaters New York
Simmons, Dr. G.B.		Florida International University Miami, Florida
Simon, Steven E.		Sharon MA
Skipski, Paul V.		Pelham New York
Skonieczny, Robert	313/264-9519	Sterling Heights Michigan
Skoubo, Leo	213/325-3509	Lonita California
Smalheiser, Leonard		Hastings New York
Smith, Norman Earl	615/435-1858	Clinton Tennessee
Smith, Herbert N. Jr.		Lansing Michigan
Smith, Eugene		Bakersfield California
Smith, Anthony P.		Phoenix Arizonia
Smith, Anne Dexter		Stamford, Conn
Smith, David S.		Bala Cynwyd Pennsylvania

Smith, Robert L.	203/534-9746	Huntsville Alabama
Smith, Sally S.		Bothell Washington
Smith, Napoleon		Madison Wisconsin
Smith, Fritz		Gaylord Michigan
Smith, Leonard J.		Memphis TN
Smith, Mr. Robert W.		Cedarhurst, NY
Snader, Merle		Manheim Pennsylvania
Sofranik, Paul J.		Orlando Florida
Software South Incorporated		Savannah Georgia
Sommmer, William F.		Dayton Ohio
Songster, Patrick F.		Frewsbury, New York N.Y
Spatafora, Joseph		Gulfport Florida
Spence, Stan		Lincoln Nebraska
Sprajc, Barry	408/374-8729	Campbell California
Spriggs, Chuck	313/477-8116	Farmington MI
Stallings, George W.		Albuquerque MN
Stampsoft		Pluckemin New Jersey
Stearns, Ray	612/537-6112	Crystal MN
Steffel, Vladimir		Delaware Ohio
Steinfeldt, Richard		Fredonia New York
Stephens, Allen H.		Apex North Carolina
Steube, Gerard		Baltimore Maryland
Stewart, Robert D.	212/592-3545	Elmhurst New York
Stewart, Ben A.		West Baraboo WI
Stewart, Clark L.	304/273-4680	Ravenswood West Virginia
St. John, Patrick		Oakdale Long Island, N.Y.
Stoddard, Michael		Costa Mesa California
Stone, Gary		Laurel MD
Storms, Howard A.		Livermore California
Strasma, Jim		Pawnee, Illinois
Strock, Woodrow G. Jr.,	803/531-3415	Orangeburg South Carolina
Stumpf, John		Pearland Texas
Sullivan, Robert	312/383-7785	Oak Park, Illinois
Sullivan, V.K.		San Pablo California
Sulouff, Ernest W.		Marcellus New York
Sunrise Electronics Incorporated		Los Alamitos California
Swahn, Allan G.	616/396-5387	Holland Michigan
Swartz, Jack A.		Melbourne, Florida
Sweeten, Don		Amarillo Texas
Symans, Charles		Dunkirk NY

T

Taylor, Rheet		Long Island, NY
Taylor, Gary W.		Sacramento California
Tealtronic of America Inc.,		New York, NY
Tennille, Tom		Savannah Georgia
The Computer Place		Klamath Falls, OR
Thomas, Brett A.	912/897-4519	Savannah Georgia
Thomas, Medreth		Slidell Louisiana
Thompson, Dr. J.D.		Sioux Falls, SD
Tibbals, Bill		Lynchburg VA
Tobie, Carl S.		Washington D.C.
Torrence, Jody	912/232-0291	Savannah Georgia
Travis, Jack		Eureka California
Travis, Tom		Pomona California
Treister, Miriam		Flushing New York
Tremmel, Tim	414/554-0156	Racine Wisconsin
Tresca, Sherman		Sparks Nevada
Metallurgical, Triangle		Granite City Illinois
Triplett, Darrell G.		Cedar Rapids Iowa
Truong, Bing Cong		Kirkland WA.
Tucker, Marvin D.		Fountain Valley California
Turner, Mark		Cranford New Jersey
Turner, Gregory L.		Country Club Hills Illinois
Twin Cities Commodore Comp Club		Maple Grove MN
Twitchell, Mr. Larry B.	603/752-2820	Berlin New Hampshire
Tyson, Isaiah E.		Baltimore MD.

U

Upstate Computer Shop	518/861-8326	Albany New York
Urban, Steve		Gurnee Illinois
Urbanski, Lee		Madison Wisconsin

V

Valentine, David	716/473-6385	Rochester New York
Valenty, Thomas G.		St. Paul MN
Cott, Carl C. Van		Raleigh North Carolina
Vandrew, Pete	815/478-4995	Manhattan Illinois
Van Lam, Thanh		Seattle Washington
Van Wieringen, Daniel G.		Kodiak Alaska
Vaughan, M. K.	713/850-0481	Houston Texas
Verbanas, Robert		Rochester New York
Vessels, Richard K. II		Baltimore Maryland
Virginia Micro Systems Inc.		Woodbridge Virginia
Volcheck, Emil	215/388-1581	West Chester Pennsylvania
Voyles, E.F.		Conway Arkansas

W

Waks, Lawrence		New York New York
Walek, Len		East Aurora New York
Walker, John		Houston Texas
Walker, Dr. Keith G.		Bethany, OK
Walker, Paul L.		Country Club Hills Ill
Walker, Gary	515/887-6731	West Bend Iowa
Walker, Bob	602/993-1087	Phoenix Arizona
Wallace, Robert E.		Atwater California
Walt, James	313/235-2352	Flint Michigan
Walters, Joseph H.		West Salem WI
Wampole, Carl R.	516/724-4615	Nesconset New York
Ward, George F.	801/731-2831	Roy Utah
Warren, John M.		Waterloo Iowa
Wasilewski, Andy		Raleigh North Carolina
Webb, Frederick H.		Plymouth Michigan
Weidner, Jeff	415/479-5307	San Rafael California
Weiler, Pete		Madison WI
Weiss, Mitchell Jay	516/829-5192	Great Neck New York
Weldon, Duane	716/338-2141	Rochester N.Y.
Weller, William U.		Martinburg West Virginia
Wels, Willis F.		Thousand Oaks California
Werner, Richard L.		Burnhart MO
Bob West Computers	704/883-3111	Brevard North Carolina
Westlund, Steve		Newton, MA
White, David J.		Brookville Pa
White, Boris		West Islip New York
White, Jim		Downey California
Wiesen, Joel P. Ph.D		Newton Centre, MA
Wilbur, William		Kittery ME
Wilcoxon, Winnie		Poktola Valley California
Will, James A.	716/366-7323	Dunkirk New York
Williams, Daryl Edwin	714/558-6849	Santa Ana California
Williams, Douglas E.	313/455-9283	Plymouth Michigan
Williams, Lawrence	512/822-0408	San Antonio Texas
Williams, Harvey	209/466-7284	Stockton PA
Wilmoth, Richard G.		Newport News VA
Wilson, John		King of Prussia, PA
Wine, David		Philadelphia, PA
Winfield de Lambert, Don		Brookfield Center Connecticut
Winter, M. J.	517/351-9115	Lansing, MI
Wintler, Paul T.	213/510-0303	Catalina Island, California
Wissel, Roy A.		Naples Florida
Wloch, Norbert A.		East Bethany New York
Wohlrabe, Linda Sue		Anchorage Alaska
Wong, Shuh-Hai		Monterey Park California
Wood, Corkey		Santa Maria California
Woodard, F.D.		Bankston Alabama
Worby, Mr. Barnard	513/848-2065	Bellbrook Ohio
Wren, Tom		McQueeney Texas
Wright, Loren		Chelmsford, MA
Wright, Kelly		Holland Michigan
Wright, Paul S.		Alexandria VA
Wrigley, STG 2 Jon		FPO San Francisco CA
Wulfeck, Peter E.	614/654-3409	Lancaster, Ohio
Wyatt, John C.		Lexington Kentucky

Y

Yaciw, Charles . . . . . Palm City Florida
Yazud, Everett . . . . . West Caldwell New Jersey
Yob, Gregory . . . . . Palo Alto California
Young, John D. . . . . Gillette WY
Yung, Sinclair . . . . . Brooklyn New York
Yurkovich, Rudy . . . . . Manchester MO

Z

Zamis, Gary P. . . . . Willis Day Park, Perrysburg, Ohio
Zandler, Mel . . . . . Wichita Kansas
Zaretzky, Lee . . . . . Monsey, New York
Zell, Victor F. . . . . Chicago Illinois
Zeller, Stephen . . . . . Washington D.C.
Ziltner, Steve . . . . . Wisconsin Rapids Wisconsin
Zimmermann, G. D. . . . . Brooklyn Park MN
Zwillick, Steven A. 212/224-5188 . . . . . Bayside New York

CANADA

A

Adams, Barbara 902/535-2365 . . . . . Richmond Co. N.S.
Adams, John 506/536-2915 . . . . . Sackville New Brunswick
Adamson, Andrew 921-6237 . . . . . Toronto, Ontario
Addorisio, Phill 298-7312 . . . . . Scarborough Ontario
Adler, Eli 630-2517 . . . . . Downsview Ontario
Agar, George 297-4855 . . . . . Unionville Ontario
Agosta, Ross 423-4317 . . . . . Toronto Ontario
Ahrens, Clayt 637-3525 . . . . . Burlington Ontario
Ahrens, Merv 807/486-3450 . . . . . Devlin Ontario
Aitchison, Philip W. 519/759-4587 . . . . . Brantford Ontario
Alarie, Jean . . . . . Ottawa Ontario
Albery, James A. 889-0362 . . . . . Thornhill Ontario
Allain, Allen . . . . . Red Deer Alberta
Allan, Ross . . . . . Belleville, Ontario
Allan, Scott 822-6198 . . . . . Mississauga Ontario
Allin, Robert E. . . . . Calgary Alberta
Alloway, Thomas 364-2831 . . . . . Mississauga Ontario
Altstedler, Steve 766-6665 . . . . . Toronto Ontario
Ambrose, John 827-9401 . . . . . Mississauga, Ont
Ambrose, Warren . . . . . Toronto Ontario
Anand, S. 807/934-2741 . . . . . Ignace, Ontario
Anderson, H. 844-0632 . . . . . Oakville Ontario
Anderson, Peter 827-3425 . . . . . Mississauga, Ontario
Anderson, Ian 723-7050 . . . . . Oshawa Ontario
Anderson, James 372-6602 . . . . . Cobourg, Ontario
Anderson, Glen 626-3177 . . . . . Islington Ontario
Andrus, David 889-5655 . . . . . Thornhill Ontario
Anga & Varma Canada Ltd. . . . . Thunder Bay, Ontario
Annandale Computer Club 519/842-8471 . . . . . Tillsonberg, Ontario
Anno, T. 466-3365 . . . . . Toronto Ontario
Applebaum, Evelyn 636-9303 . . . . . Downsview Ontario
Arden, John . . . . . Mississauga Ontario
Arends, Douglas . . . . . Toronto, Ontario
Armitage, Dave . . . . . Scarborough, Ontario
Armson, E. 727-1580 . . . . . Aurora Ontario
Aroca, Ricardo 821-3322 . . . . . Mississauga, Ontario
Arsenault, Jack 791-5120 . . . . . Brampton Ontario
Arsenault, Victor 424-0986 . . . . . C.F.B. Borden Ontario
Family, The Ashton . . . . . London Ontario
Asselstine, W H 690-4378 . . . . . Toronto Ontario
Astles, Glenn 388-9234 . . . . . Hamilton Ontario
Astles, Paul 388-9234 . . . . . Hamilton Ontario
Astolfo, Michael 878-5155 . . . . . Milton Ontario
Audet, Claude . . . . . Neufchatel Province De Quebec
Auger, Rod 819-561-4317 . . . . . Gatineau Quebec
Aviste, Mart 249-1175 . . . . . Weston Ontario
Avoledo, Mario 705/267-3041 . . . . . Timmins Ontario
Ayers, Gordon 522-9674 . . . . . Hamilton Ontario
Ayotte, David C. 294-2925 . . . . . Markham Ontario

B

Babcock, W.J.		Richmond Hill, Ontario
Bailey, Edward	854-2347	Burlington Ontario
Bainbridge, D.		Saskatoon Saskatchewan
Baird, Ron	633-7801	Downsview Ontario
Balaz, Rudy	519/762-3731	Dutton Ontario
Balint, Martina	762-2849	Toronto Ontario
Balke, Dr Stephen T.	828-6289	Mississauga Ontario
Balke, David	828-6289	Mississauga Ontario
Balshin, Murray	789-4856	Toronto Ontario
Bangay, Ted	221-6420	Oakville Ontario
Baraj, Pradip	881-1079	Thornhill Ontario
Barker, John	851-2346	Woodbridge Ontario
Barnes, John W	939-7668	Kettleby Ontario
Barnett, Abraham	705/522-2503	Sudbury Ontario
Baron, Peter J.	429-1069	Don Mills Ontario
Barr, Norma	461-4008	Toronto Ontario
Bartholomew, Roy		West Vancouver B.C.
Bartoffy, Tom	789-1581	Toronto Ontario
Barton, David V.	751-0351	Scarborough Ontario
Bates, Tom	278-4832	Mississauga Ontario
Battrick, Dave		Hamilton Ontario
Bavaro, Dino	449-1418	Don Mills Ontario
Bayly, Laura	705/737-0032	Barrie Ontario
Brazinet, Denis	613/746-7578	Ottawa Ontario
Beach, Bruce	519-925-6035	Horning's Mills, Ontario
Beach, Bonnar	519/925-6035	Horning's Mills, Ontario
Beacon C.H.S.		St. Catharines Ontario
Beadle, Terry James	233-6001	Richmond Hill Ontario
Beal, David	773-4067	King City Ontario
Beard, Paul B.	487-1496	Toronto Ontario
Beasleigh, W.		Allanbury, Ontario
Beasley, T.W.	844-7322	Oakville Ontario
Beaton, D.	705/752-2716	North Bay Ontario
Beaulieu, Louis L.		Geraldton Ontario
Beaulieu, Marcel	746-9875	Vanier, Ontario
Beaumont, Greg	519/485-2120	Ingersoll Ontario
Beaupre, Morris		Ottawa Ontario
Becker, Dirk	727-6885	Aurora Ontario
Beckley, Dave		Downsview, Ontario
Beckwith, James	364-2831	Toronto Ontario
Bedford, Allan I.		Woodstock Ontario
Beerenfenger, John		Nepean Ontario
Beggs, Gary D.	705/566-8793	Sudbury Ontario
Bekiu, John J.	766-8507	Toronto Ontario
Belanger, Mr. Roy A.		Harley, British Columbia
Belcher, James J.	705/445-0442	Collingwood Ontario
Belcher, Charles	705/855-4096	Chelmsford Ontario
Bell, Julius	789-5276	Toronto Ontario
Bell, Don	519/446-0178	Scotland Ontario
Bell, Mark Alan	791-7032	Bramalea Ontario
Bell, Warren	789-5276	Toronto Ontario
Bellefleur, John	663-2113	Downsview Ontario
Bellm, Peter	822-9853	Hamilton Ontario
Bennett, Chris	782-9252	Toronto Ontario
Bennett, Barbara	783-1645	Toronto Ontario
Bentley, Brian J.	519/472-6875	London Ontario
Bentley, Mrs. Jean		Guelph Ontario
Berezowski, David	496-2531	Agincourt Ontario
Berg, Melvin C.	763-5714	Toronto Ontario
Bergeron, Clement	514/346-1204	St. Jean Quebec
Bergerson, Peter	884-4633	Richmond Hill Ontario
Berhowitz, M. K.	881-5304	Thornhill Ontario
Berman, David		Toronto Ontario
Berry, Doug	986-4395	Port Perry, Ontario
Bertoia, Matthew		Toronto Ontario
Bianco, Mr. A.M.	745-1766	Rexdale Ontario
Biancucci, Bruno	545-1371	Hamilton Ontario
Bicevskis, Robert	889-7043	Thornhill Ontario
Bickell, John	839-4682	Pickering Ontario
Bijak, Markus	662-5127	Stoney Creek Ontario
Birch, Stan	898-1379	Holland Landing Ontario
Bird, John	223-0714	Willowdale, Ontario
Birket, Paul	491-5119	Willowdale Ontario

Birket, Fred	532-5085	Toronto Ontario
Bisson, Chantal		Auteuil Laval, Quebec
Bits & Bytes		Dartmouth, Nova Scotia
Bizzarro, Ralph	621-4465	Willowdale Ontario
Blackman, Paul	686-0652	London, Ontario
Blackmore, Ronald		Uranium City Saskatchewan
Blane, Robert	483-4838	Toronto Ontario
Blattberg, Charles	226-3796	Willowdale, North York Ontario
Bloom, M.	886-0132	Thornhill Ontario
Blumel, Horst		Amherst Nova Scotia
Boetto, Lee	266-7083	Scarborough Ontario
Bohme, D.K.	889-2566	Thornhill Ontario
Bolhaar, Ron	643-3132	Winona Ontario
Bombaci, Paul	481-9747	Toronto Ontario
Bond, Brian	668-8712	Whitby Ontario
Bond, Sheila M.		Toronto Ontario
Bondi, John	782-9377	Toronto Ontario
Bonello, Toni	249-0565	Weston Ontario
Bonenfant, Robert	823-9268	Mississauga Ontario
Bonner, Craig	663-4025	Downsview, Ontario
Bonnycastle, Michael K	654-2381	Toronto Ontario
Booth, Bryan	294-6472	Markham Ontario
Booth, Elaine	239-8258	Toronto Ontario
Booth, Joe	827-6712	Oakville Ontario
Bos, Peter	519/752-7076	Brantford Ontario
Bosomworth, Donald W.	519/941-5957	Orangeville Ontario
Bouchard, Michel	418/549-0423	Chicoutimi-Nord Quebec
Boudreau, Victoria		Oakville Ontario
Bougie, B. M.	871-4150	Fort Erie Ontario
Bourke, R S	493-0111	Willowdale Ontario
Bowron, Gordon C.		Ajax Ontario
Boychuk, Rick	519/853-3022	Milton, Ontario
Boyd, Larry	783-5626	Toronto Ontario
Bradley, Richard	782-7320	Toronto Ontario
Bradley, David	782-7320	Toronto Ontario
Bramall, Lisa		Ottawa, Ontario
Bramberger, John	465-9786	Toronto Ontario
Brandow, John C.	705/745-5634	Peterborough Ontario
Brandon, Eric	239-4666	Islington Ontario
Brant, Don	492-9706	Toronto, Ontario
The Brant County Board of Educ.		Brantford Ontario
Breckenridge, Robert	244-7500	Toronto Ontario
Brejniak, Wally	532-4073	Toronto Ontario
Brendon, Walt	664-6082	Stoney Creek Ontario
Brennan, John L.		Regina, Saskatchewan
Broadribb, Allan		Milton Ontario
Brochu, Earl	767-9829	Toronto Ontario
Broeders, Arnold		Chatham Ontario
Brooks, Florence		Morden Manitoba
Brophy, E.	468-2036	St. Catherines Ontario
Broughton, Peter	487-0088	Toronto Ontario
Brown, Robert L.	243-8887	Downsview Ontario
Brown, Reg K.	449-6016	Don Mills Ontario
Brown, Doug	519/669-1425	Kitchener, Ontario
Brown, David	519/969-9355	Windsor Ontario
Brown, Alan	519/843-2500	Elora Ontario
Brown, Fred	699-1085	Toronto, Ontario
Brown, Randy		Toronto, Ontario
Brown, Lorne W.		Langton Ontario
Brown, Heather	276-9936	Mississauga Ontario
Brown, Alan L.		Islington Ontario
Brown, Leslie R.		Victoria British Columbia
Browne, Malcolm C.	282-3197	West Hill Ontario
Browne, Rick	519/886-2513	Waterloo, Ontario
Brownlee, Bren		Brampton, Ontario
Bruhlman, H.	519/352-7068	Chatham, Ont
Brun, Jacques		Montreal, Quebec
Brunette, Mark	514/683-3613	Pierrefonds Quebec
Bruno, Seemann	936-4532	Schomberg Ontario
Bryan, Wayne	445-1784	Willowdale Ontario
Buckingham, Chris	626-7219	Etobicoke Ontario
Buckley, John	225-5379	Willowdale Ontario
Budge, Mike	226-6559	Willowdale Ontario
Buetiger, Benjy	922-9124	Toronto Ontario
Buffint, Mr. Lee		Port Dover Ontario
Bulger, John		Cobourg Ontario

Bulger, Wayne	895-3811	Thornhill Ontario
Bulger, Joe	889-5056	Thornhill Ontario
Bunn, F E	742-6425	Rexdale Ontario
Burgard, Christopher	519/471-8101	London Ontario
Burge, Roger D.		London Ontario
Burgener, Paul Ernest	876-1295	Milton Ontario
Burke, Anita	449-7273	Willowdale Ontario
Burkhardl, Emil	884-6422	Richmond Hill Ontario
Burki, Roderick	889-3693	Thornhill Ontario
Burnett, Ted	514/694-3597	Ottawa, Ontario
Burns, Michael	445-4795	Willowdale Ontario
Burns, Mr. James		Mississauga, Ontario
Burr, Ken	885-5292	Port Hope Ontario
Burrell, Terrence	533-6660	Toronto, Ontario
Burssey, Heath	579-8739	Oshawa Ontario
Butler, Charles	845-6665	Oakville Ontario
Butterfield, Jim	466-2744	Toronto Ontario
Byers, R.E.		Truro Nova Scotia
Byrne, Mark	791-3705	Bramalea Ontario

C

Cadwallader, Lloyd		Toronto Ontario
Calabro, John		Scarborough Ontario
Calder, Mel	498-1166	Agincourt Ontario
Caldwell, Paul	274-7510	Port Credit Ontario
Cale, David	457-7306	Brampton Ontario
Callaghan, John	699-0357	Toronto Ontario
Campaner, Peter		Thunder Bay Ontario
Campbell, Gordon	492-9518	Willowdale Ontario
Campbell, Terry	459-4462	Bramalea Ontario
Campbell, Colin J.	902/862-2409	New Waterford Nova Scotia
Campbell, D. A.		Amherst Nova Scotia
Campbell, Derick	492-9518	Toronto Ontario
Canadian Satellite Comm. Inc.		Toronto, Ontario
Capel, M.		Winnipeg Manitoba
Capeling, Lee		Downsview Ontario
Capon, Christopher C.	636-0160	Toronto Ontario
Carcary, James R.	222-6636	Willowdale Ontario
Carswell, Jim	532-3815	Toronto Ontario
Carter, Scott Douglas	488-9632	Toronto Ontario
Carter, D. W.		Charlottetown, P.E.I.
Casale, Joe		Downsview, Ontario
Casarsa, Isidore	465-4888	Toronto Ontario
Casey, Tom	678-0590	Malton Ontario
Casey, Michael	221-6860	Willowdale Ontario
Casey, P.G.	457-8685	Brampton Ontario
Cassar, Vic	270-7236	Mississauga Ontario
Catto, Ross		Toronto Ontario
Cavan, Gerry	519/756-5864	Brantford Ontario
Caven, Sandy	962-0744	Toronto Ontario
College, Centennial		Scarborough Ontario
Ceolin, Mr. Wm	519/941-1297	Orangeville Ontario
Ceolin, Andrew	519/941-1297	Orangeville Ontario
Chaimovitch, Issie	221-2202	Willowdale Ontario
Champ, Terry	877-9625	Georgetown Ontario
Chan, Andy	466-2280	Toronto Ontario
Chan, Tin Kit	465-7715	Toronto Ontario
Chan, Ian	991-8981	Willowdale Ontario
Chang, Dennis	447-1383	Don Mills Ontario
Chapnik, Brian	445-0893	Don Mills Ontario
Charyk, R. M.D.		Scarborough Ontario
Chawla, Gulzari	482-3353	Toronto Ontario
Chee, Chuan	688-5102	St. Catharines Ontario
Chenhall, Bill	576-2277	Oshawa Ontario
Chenhall, Doug	576-2277	Oshawa Ontario
Cherniak, Lawrence J.	226-3838	Thornhill Ontario
Cheung, Eugene	306/527-2891	Regina Saskatchewan
Chevalier, Mr. B.		Bramalea Ontario
Chiarelli, Mr. Charlie		Galt, Ontario
Chicoine, Francis R.	705/424-0323	Borden Ontario
Chiu, David	293-5478	Scarborough Ontario
Choi, Gary	424-2358	Don Mills Ontario
Chow, Robin	636-8077	Toronto Ontario
Choy, Chris	445-6437	Don Mills Ontario

Christian, George	822-8528	Mississauga Ontario
Christensen, Diane	482-9136	Toronto Ontario
Christie, Bruce		Glenboro Manitoba
Church, Joe		Nepean Ontario
Cichan, Anthony	884-2421	Richmond Hill Ontario
Civitarese, Marcello		Calgary Alberta
Cizmar, George	842-3491	Oakville Ontario
Cjiola, C.	497-5175	Toronto, Ontario
Clare, Kevin	493-3409	Don Mills Ontario
Clare, Michael	884-3289	Richmond Hill Ontario
Clark, J. R.		Terrace British Columbia
Clarke, John		Blytheswood Ontario
Clarke, Stephen	335-6907	Burlington Ontario
Clarke, Nancy	637-0082	Burlington, Ontario
Clarkson, Joseph	767-4064	Toronto Ontario
Claudi, Renata		Mississauga, Ontario
Claughton, S. F.		Mississauga, Ontario
Clefstad, Mr. James R.	604/997-6096	Mackenzie British Columbia
Clench, Lester M.		Labrador City Newfoundland
Clenimneng, Stephen		Milton Ontario
Closson, Gary	639-2791	Burlington Ontario
Clysdale, Ron		Peterborough Ontario
Cohen, Marshall	486-7829	Willowdale Ontario
Cole, Syndey R.	224-2289	Willowdale Ontario
Cole, Patrick C.	276-3313	Mississauga, Ontario
Collict, Warren	661-1424	Downsview Ontario
Communication Specialists		Downsview Ontario
The Computer Shop		Calgary Alberta
Computer Education Dept.		Ottawa, Ontario
Computer Education Dept.		Ottawa, Ontario
The Computer Circuit Limited		London Ontario
Connally, Fred H.		Toronto, Ontario
Conti Electronics Ltd		Vancouver British Columbia
Conville, Cameron		Burlington Ontario
Coombs, J. Allen	613/729-3705	Ottawa Ontario
Coones, John	922-0852	Toronto Ontario
Cooper, Bob		Pickering Ontario
Cooter, Noel	484-9544	Toronto Ontario
Copland, James		Agincourt, Ontario
Corbett, Bruce	884-7297	Toronto, Ontario
Cornett, Mike	705/445-2595	Collingwood Ontario
Cornwall, Andrew		Dartmouth Nova Scotia
Corris, Les	604/253-0985	Vancouver British Columbia
Corriveau, Victor		Deep River Ontario
Costanza, Charles	445-6396	Don Mills Ontario
Cote, Gerald	418/663-8069	Quebec P.Q.
Couse, Larry	306/699-7127	McLean Saskatchewan
Couvillion, Bob	519/734-1685	La Salle Ontario
Cowan, Erny	705/647-5579	New Liskeard Ontario
Cowan, Bruce	243-9164	Weston Ontario
Cowan, Crispin	488-4584	Toronto Ontario
Cox, Jim	845-4620	Oakville Ontario
Coyle, M.A.	225-9387	Willowdale Ontario
Craig, Jim	889-2226	Thornhill Ontario
Crane, Roger	227-0504	St. Catherines Ontario
Crocker, R. Anthony		Lindsay Ontario
Croft, Gary	727-8795	Kettleby Ontario
Crooker, Tom	519/773-8231	Aylmer Ontario
Crooks, Michael	231-0995	Islington Ontario
Cross, Randy	651-9124	Toronto Ontario
Crossley, Alan	668-2115	Whitby Ontario
Csomor, Steve B.	775-6413	Kettleby Ontario
Cullen, Blake		Port Dover, Ontario
Cumming, Gary D.	690-7054	Toronto Ontario
Cunningham, James		Burlington Ontario
Curtis, J E	828-0893	Mississauga Ontario
Cuzen, K. Allan		Barrie Ontario

D

D'Aguiar, Damian	497-6885	Scarborough Ontario
D'Angela, Julian	389-8665	Hamilton Ontario
Daniels, Joe	519/821-1153	Guelph Ontario
Dantowitz, Stanley	630-1563	Downsview Ontario
Dantowitz, David	630-1563	Downsview Ontario

Datascope of Canada Ltd.		Scarborough Ontario
Davey, Ian	596-8876	Toronto Ontario
Davey, Edward	775-2784	Gilford Ontario
David, John	245-1039	Weston Ontario
Davidoff, Lorne	705/324-1653	Lindsay Ontario
Davidson, Scott		Weston, Ontario
Davies, Keith	292-9422	Scarborough, Ontario
Dawson, Steve	633-5883	Downsview Ontario
Dawson, Steve	222-4115	Willowdale Ontario
Day, Geoff	584-2031	Caledon East Ontario
Dean, Sheldon H.		Calgary, Alberta
Dearling, Chris	632-3534	Burlington Ontario
Boer, Mr. G. de	277-9832	Mississauga Ontario
DeBrincat, Marisa		Mississauga Ontario
Deforest, D. John	727-6703	Aurora Ontario
Deleu, Sieg		Wolfville Nova Scotia
DelMonte, Nick	705/256-5812	Sault Ste Marie Ontario
Delong, Anne		Bowmanville Ontario
Delong, Robert	783-7427	Toronto Ontario
Demartini, Victor	669-4011	Bolton Ontario
Demmer, Mike	844-4060	Oakville Ontario
Demmer, Dieter	844-4060	Oakville Ontario
Dempster, Mr. Eric	222-4977	Willowdale Ontario
Denman, Barry		Toronto Ontario
Dennis, Mrs. Muriel		London, Ontario
Denny, Michael	486-9696	Toronto Ontario
Derrick, Darren	429-5945	Toronto Ontario
Desai, Hem	493-5052	Willowdale Ontario
Despault, Laurent	902/443-5392	Halifax, Nova Scotia
DeZorzi, Jim		London Ontario
Dharssi, Mohamed	698-3363	Toronto, Ontario
Dickens, Dr. Paul	519/271-8669	Stratford Ontario
Dickson, Gus	519-941-0491	Orangeville Ontario
Didur, Dennis	306/477-1936	Saskatoon, Sask.
Diggle, Brian		Mattawa Ontario
Dignard, Gilles	519/885-6791	Waterloo Ontario
Dimitroff, George	705/748-3535	Peterborough Ontario
Durette, Andre		Sudbury Ontario
Dionne, James J.		Agincourt, Ontario
Dixon, Brad		London Ontario
Dodd, Jenny	651-2555	Toronto Ontario
Dodd, Bernard	651-2555	Toronto Ontario
Dodd, Andrew	651-2555	Toronto Ontario
Donaghey, Steve	222-1877	Toronto Ontario
Donald, Scott	604/362-7768	Rossland British Columbia
Donato, Joe		Sudbury Ontario
Donegan, M. E.	523-1234	Hamilton Ontario
Doran, F.W.	277-8077	Mississauga Ontario
Dorward, David C.		Edmonton Alberta
Douglas, Steven	422-0427	Toronto Ontario
Dow, Wayne	613/268-2379	Sharbot Lake, Ontario
Dow, Chris	576-7353	Oshawa Ontario
Dow, Bob	576-7353	Oshawa Ontario
Dowdell, David	499-9846	Willowdale Ontario
Doyle, David	221-7553	Willowdale Ontario
Doyle, John	924-4870	Toronto Ontario
Doyle, Roger W.		Halifax, Nova Scotia
Drake, Robert	519-753-3776	Brantford Ontario
Drapeau, Maurice		Dieppe N.B.
Draper, Ted	449-1288	Agincourt, Ontario
Dray, Robert		Peterborough Ontario
Dryden, Steven	705/389-2608	Parry Sound Ontario
Dube, Jean-Pierre		Repentigny Quebec
Dubeau, John	705/549-3058	Penetanguishene Ontario
Dubrick, Doug		Waterloo, Ontario
DuCharme, Chris	273-5417	Mississauga Ontario
Duck, Walter	532-7502	Toronto Ontario
Duesburry, Gord	634-9758	Burlington Ontario
Duffin, Allan	613/475-1996	Brighton Ontario
Dunlop, John R	271-1738	Port Credit, Ontario
Dutfield, W.	224-0642	Willowdale Ontario
Dutly, Albert	723-8373	Oshawa Ontario
Dutton, Graham	484-8723	Toronto Ontario
Duval, Rick	293-3024	Agincourt Ontario
Dyck, Merrill		Sardis B.C.
Dziad, Wayne		Saskatoon Saskatchewan

E

Eady, John	282-2314	West Hill Ontario
Eames, E.		Thunder Bay, Ontario
Earhard, Maurice		Toronto Ontario
Easton, John	251-1511	Toronto Ontario
Ecole Secondaire Rayside		Azilda, Ontario
Eddie, Ross	282-1785	West Hill Ontario
Eddie, Charlie	282-1785	West Hill Ontario
Education Centre		Sarnia, Ontario
Edwards, Lance	226-3735	Willowdale Ontario
Egri, Gabriel	752-5093	Toronto Ontario
Eildon Vale Farms Ltd		Craven, Saskatechewan
Eisner, Norman		Brockville Ontario
Elgie, Robert	683-8682	Pickering Ontario
Elias, Philip	226-2050	Willowdale Ontario
Ellis, Eric	741-1683	Rexdale Ontario
Ellis, Lonnie	686-0527	Pickering Ontario
Ellis, Peter		Mississauga Ontario
Ellis, Wendy	274-7300	Mississauga Ontario
Ellis, Trevor	791-4652	Bramalea Ontario
Ellsworth, Ron	519/773-9373	Aylmer, Ontario
Eng, Robert	485-9605	Toronto Ontario
Epstein, Carl	492-0222	Willowdale Ontario
Erna, Latour	781-9468	Toronto Ontario
Erwin, Daryl	934-0071	St. Catharines Ontario
Eugen, Daniel	449-0481	Don Mills Ontario
Evans, Paul	922-6904	Toronto, Ontario
Evans, Don	705/325-8342	Orillia, Ontario
Evans, Lorne		Downsview, Ontario
Evask, Chris	494-0770	Willowdale Ontario

F

Fagan, Mr. Danny		Peterborough, Ontario
Fairbank, Cliff		Carrying Place Ontario
Falkner, Keith	485-0867	Toronto Ontario
Fancy, David		Surrey British Columbia
Farber, Scott	881-2677	Thornhill Ontario
Farquharson, Laura	488-6224	Toronto Ontario
Farquharson, J. Allen	519-756-0489	Paris Ontario
Farquharson, Jean	519/442-7000	Paris Ontario
Fellowes, Michael	628-2435	Dundas Ontario
Ferrari, Joe		Agincourt, Ontario
Ferris, David	421-8413	Toronto Ontario
Field, Richard	663-7671	North York, Ontario
Field, Mrs. Joyce	449-0780	Don Mills Ontario
Field, G. J.	827-7947	Oakville Ontario
Fiks, Henry	466-8739	Toronto Ontario
Fischer, Peter	845-9384	Oakville Ontario
Fischer, Hart	705/445-6876	Nottawa Ontario
Fischer, Wolfgang	643-3445	Winona Ontario
Fischer, Theresa	643-3445	Winona Ontario
Flack, Richard		Toronto Ontario
Flynn, Garry	842-4420	Oakville Ontario
Fodor, T.C.	514/871-1487	Montreal Quebec
Foord, A.	225-8523	Willowdale Ontario
Forrest, James A.	889-3490	Thornhill Ontario
Forster, Clark	449-0016	Willowdale Ontario
Fortin, Pierre	613/938-3879	Cornwall Ontario
Fort William Collegiate	807/622-7113	Thunder Bay Ontario
Fowler, Robert A.	884-0264	Richmond Hill Ontario
Fox, Stanley	220-2295	Willowdale Ontario
Frame, Doug	387-3418	Mississauga, Ontario
Frampton, T. O.	463-8574	Toronto Ontario
Fraser, James		Toronto Ontario
Freedman, Mike	493-1013	Willowdale Ontario
Freeman, Mrs. Ethel	787-4451	Toronto Ontario
Freedman, Mark	498-8821	Willowdale Ontario
Fu, Cuthbert	751-7961	Toronto Ontario
Fujiwara, Ralph	449-1283	Don Mills Ontario
Fuller, Del		New Liskeard Ontario
Fuller, Doug	259-1828	Toronto Ontario

Fulton, J. Austin		Peachland British Columbia
Fung, Philip		Agincourt Ontario
Fyfe, Andrew	685-6693	St. Catharines Ontario

G

Gadsden, Jeff	519/925-6606	Shelburne Ontario
Gailey, David	613/925-4415	Prescott Ontario
Gamble, Keith	823-6813	King City Ontario
Garcia, Ashley	459-1655	Brampton Ontario
Garden, R. A.	898-6692	Newmarket Ontario
Green, James		Thunder Bay Ontario
Geeen, Tony	481-8463	Toronto Ontario
Greenberg, Ken	275-2554	Toronto Ontario
Greenberg, Mark	783-5088	Toronto Ontario
Gregory, Katherine M.	821-9562	Mississauga Ontario
Garvin, Wayne	277-1928	Mississauga Ontario
Garwah, Antoine	705/267-2402	Timmins Ontario
Garwah, Antoine		Timmins Ontario
Gatti, Dvilio	292-6247	Scarborough Ontario
Gaul, Chris	854-0286	Campbellvile Ontario
Gauthier, Gerald		Montreal, Quebec
Geisler, Howard	499-9582	Willowdale Ontario
Gellatly, Peter	729-2848	Beeton Ontario
Gennidakis, Dan		Scarborough Ontario
Gentes, Orville	807/727-2359	Red Lake Ontario
Getgood, L.J.	221-2766	Willowdale Ontario
Giannelia, Alex	534-9679	Toronto, Ontario
Gibbons, Patrick	519/669-8460	Elmira Ontario
Gibson, Jay	224-2220	Willowdale Ontario
Gidden, Bob	846-5362	Brampton Ontario
Giguere, Eric	403/624-5644	Peace River Alberta
Gill, George	488-1599	Toronto Ontario
Gimbel, Ronald	519/699-4488	Heidelberg Ontario
Gisone, Jack	743-9311	Downsview Ontario
Gitelmon, Fred	447-3047	Don Mills Ontario
Gitter, Lance	881-5283	Thornhill Ontario
Glass, Mrs. J.		Spruce Grove Alberta
Gleason, Tom	842-2027	Oakville Ontario
Gleason, Arne	842-2027	Oakville Ontario
Godec, Peter	533-6170	Toronto Ontario
Godfrey, Brock	705/672-3086	New Liskeard Ontario
Goebel, Martin	731-3653	Thornhill Ontario
Goeldner, Arthur	690-5648	Toronto, Ontario
Goertzen, John	249-1093	Weston Ontario
Goff, Dave	889-8101	Thornhill Ontario
Goin, Andrew	531-8148	Toronto Ontario
Gold, Gerald	225-8760	Willowdale Ontario
Golder, Peter	275-6565	Mississauga, Ontario
Goldstein, Larry	857-2104	Bolton Ontario
Goncalves, Manny	630-7714	North York Ontario
Good, John	705/246-2749	Richards Landing Ontario
Gorden, Stuart	225-9840	Willowdale Ontario
Gordon, Mark	884-1266	Thornhill Ontario
Gordon, Lynn	895-8885	Newmarket Ontario
Gordon, Ralph	272-0255	Mississauga Ontario
Goruk, Lynn M.	527-5966	Hamilton Ontario
Gosk, Rick	519/743-2085	Kitchener Ontario
Gossling, John	422-0143	Toronto Ontario
Gough, Victor	444-8783	Don Mills Ontario
Graetz, Steve	881-2938	Thornhill, Ontario
Graham, George	705/566-1261	Sudbury Ontario
Graham, Ron	793-0483	Bramalea Ontario
Graham, Ted	261-6356	Scarborough Ontario
Grant, Arthur	705/726-8213	Barrie, Ontario
Grant, Terry	889-3853	Thornhill Ontario
Grant, Gary	705/726-2103	Barrie Ontario
Grant, Alan A.	889-3853	Thornhill Ontario
Gray, Mr. Norman J.		Oakville, Ontario
Gray, Kelly	792-1819	Bramalea Ontario
Gray, Fred		Toronto, Ontario
Green, Donna M.	535-1411	Toronto Ontario
Green, Michael	791-1218	Bramalea Ontario
Green, Carolyn	282-5155	West Hill Ontario

Grenville Christian College	613/345-5521	Brockville, Ontario
Gribble, Don	705/544-2821	Englehart Ontario
Griffiths, John	844-9238	Oakville Ontario
Grimes, Bill		Richmond Hill Ontario
Gullick, David J.	746-0229	Rexdale Ontario
Gunderson, George		Sault Ste. Marie Ontario
Gunter, Michael	506/849-2460	Rothesay New Brunswick
Gupta, Anu M	306/652-6189	Saskatoon Sask
Gupta, Chris	519/472-9515	London Ontario
Gutcher, Jim	222-5506	Willowdale Ontario

H

Haber, Dr R. M.	447-6166	Rexdale, Ont
Habermel, Nik	465-8673	Toronto Ontario
Haehnel, Terry	864-4439	Toronto Ontario
Haig, Colin A.	278-7057	Mississauga, Ontario
Hall, Gordon	247-9165	Toronto Ontario
Hall, Gordon C.	621-5223	Etobicoke Ontario
Hall, Peter	247-9165	Toronto Ontario
Hall, Ron	705/652-8546	Lakefield Ontario
Hall, David		Brampton Ontario
Hall, Mr. Chris	306/586-6039	Regina Saskatchewan
Halton Separate School Board		Burlington, Ontario
Hamilton, Donald	898-2863	Newmarket Ontario
Hampson, Bruce	225-0739	Willowdale Ontario
Hanna, Don	519/583-0848	Port Dover, Ontario
Hanson, Mike	727-1219	Aurora Ontario
Harford, F.R.		Ottawa Ontario
Harkins, Phillip		Fort Erie Ontario
Harmer, David		Oshawa Ontario
Harmer, Art	705-726-0681	Barrie Ontario
Harris, Jim	902/742-5985	Yarmouth Nova Scotia
Hart, Shira	482-2618	Toronto Ontario
Hart, Laurence	482-2617	Toronto Ontario
Harte, Desmond	483-5029	Toronto Ontario
Hartmann, Herm.	459-9436	Brampton Ontario
Hawes, William	902/429-5418	C.F.B. Halifax Nova Scotia
Hay, Bill	694-0860	Scarborough Ontario
Hayes, Roy		Killarney Manitoba
Haythorne, Owen	705/456-2135	Cookstown Ontario
Hazelton, Doug	278-2431	Mississauga Ontario
Hearn, Gerald		Dartmouth, Nova Scotia
Heckel, Cliff	889-1085	Thornhill Ontario
Hedman, Pontus	691-8563	Toronto Ontario
Hei, Man Sung	762-0595	Streetsville Ontario
Heichelheim, Peter	223-8665	Willowdale, Ontario
Hendry, C. S.	242-2046	Weston Ontario
Henkel, Mr. Rudy	922-6143	Toronto Ontario
Herckenrath, Terry	481-8592	Toronto Ontario
Heron, James	493-5165	North York Ontario
Herr, Steve		Owen Sound, Ontario
Hetherington, Wayne D.	727-2698	Aurora Ontario
Hewit, Paul		Toronto Ontario
Hibbert, Terry	775-3094	Newmarket Ontario
Hickey, Allan		Dawson Creek B. C.
Hickling, Dr. C.L.		Kincardine Ontario
Hicks, Karl	902/849-9480	Dominion Nova Scotia
Higgins, Thomas		Toronto Ontario
Hilderbrandt, Edwin		Steinback Manitoba
Hill, Stan		Brampton, Ontario
Hill, James	705/522-2444	Sudbury, Ontario
Hillman, Gordon P.		Sarnia Ontario
Hindson, Jim	335-5104	Burlington Ontario
Hiscocks, Peter	465-3007	Toronto Ontario
Hishon, Michael		St. Catharines Ontario
Hlibka, W.D.	497-8121	Rexdale, Ontario
Hobbs, Graham J.		Ottawa Ontario
Hoebiger Canada Ltd.		Downsview Ontario
Hollihan, Kelvin	705/722-6373	St. John's Newfoundland
Holloway, Clive	663-3029	Downsview Ontario
Holowatenko, Peter	277-2515 Mississauga Ontario	
Hon, Dennis		Victoria, B.C.
Hook, Austin		Calgary, Ontario
Hook. David	705-726-8126	Barrie Ontario

Hooker, Ivan R.	889-4827	Thornhill Ontario
Hope, Keith	236-2601	Islington, Ontario
Hopkins, Gerald	225-4284	Willowdale Ontario
Houstoun, Allan		Thunder Bay Ontario
Howard, Richard J.	774-6148	Dunnville Ontario
Howell, David	519/622-1314	Cambridge Ontario
Huber, Peter	884-2490	Richmond Hill Ontario
Hughes, James A	889-5614	Thornhill Ontario
Hulls, Mich	519/762-2049	Dutton Ontario
Hulme, Bob	705/679-8888	Cobalt Ontario
Hunt, Stephen		St. Catharines Ontario
Hunter, Edmund	925-3600	Toronto Ontario
Hunter, Ray	231-1974	Toronto Ontario
Hurson, Tim	466-7390	Toronto Ontario
Hurtubise, Gerald	613/746-9915	Ottawa Ontario
Hutchinson, Tom	762-5406	Toronto Ontario
Hutchison, George	274-8452	Mississauga Ontario
Hutchinson, Harriett	762-5406	Toronto Ontario
Hutyra, Andrew		Weyburn Saskatchewan
Hwang, Robert	485-1278	Toronto Ontario
Hyland, Douglas A.	457-8685	Brampton Ontario
Hyszka, Michael	249-5805	Weston Ontario

I

Iacono, Sal	491-0462	Willowdale Ontario
Ibay, Felix J. Jr.	429-3650	Don Mills Ontario
Ieraci, Mr. Rocky	519/944-5017	Windsor Ontario
Ing, Kent	364-8004	Toronto Ontario
Innes, Greg	519/451-0941	London Ontario
Institute for Behavioural Research		Downsview, Ont.
Ip, Sai Wai	861-1029	Toronto Ontario
Ireland, Rob		Dewittville Quebec
Inc., Irisco du Quebec		St. Foy Quebec
Irvine, John	388-5020	Hamilton Ontario
Irwin, Peter	445-3243	Willowdale Ontario
Irwin, Dennis		London Ontario
Isbister, Gordon A.	421-6379	Toronto Ontario
Ivens, Brian	878-7366	Milton Ontario
Iwanvsiw, Ihor	231-4430	Islington Ontario

J

Jacob, J.	222-7143	Willowdale Ontario
Jacquin, Kathy	902/435-3010	Dartmouth Nova Scotia
Jamal, Munir	889-1393	Thornhill Ontario
James, Michael	425-6951	Toronto Ontario
Jameson, Kevin	403/249-4529	Calgary Alberta
Jamieson, Dave	755-3039	Scarborough Ontario
Janus, Stan	459-6994	Brampton Ontario
Jarchow, U.	668-9537	Whitby Ontario
Jaremko, Mark	766-3100	Toronto Ontario
Jeffers, S.	694-4912	Toronto Ontario
Jeffrey, N. J.	482-1821	Toronto Ontario
Jefthas, Titus H.	519/821-7851	Guelph Ontario
Jenkins, Dr. Herb		Hamilton, Ontario
Jessa, Taj-Karim		Hamilton Ontario
Jeta Systems Ltd.		Charlottetown, P.E.I.
Jewell, Art	690-7188	Toronto Ontario
Jewell, Doug		Burnaby British Columbia
Jindai, Ajay	266-7169	Scarborough Ontario
Johannson, Robert	497-9726	Scarborough, Ontario
Johnson, Ralph	705/726-0610	Barrie, Ontario
Johnston, R. M.		Quispamsis N.B.
Johnson, Joe	690-9379	Toronto, Ontario
Johnston, Brian	622-1892	Etobicoke Ontario
Jones, Gary		Scarborough Ontario
Jones, Barry		Toronto, Ontario
Jones, Morgan	273-3892	Mississauga Ontario
Jones, Larry	885-5536	Port Hope Ontario
Joong, Peter	292-2291	Scarborough Ontario
Jorgens, Bill	274-3300	Mississauga Ontario
Julien, Don		Beamsville Ontario
Justason, Colin F.	898-4265	Newmarket Ontario

WHAT DON'T THE ADS TELL YOU?

CBM, PET and VIC computers are supported by 300 companies.

Who Can You Trust?

Announcing the merger of the Midnite Software Gazette with The PAPER, one of the oldest independent resources for users of Commodore computers. We invite you to subscribe to the combined Midnite/PAPER. In return, you will receive six bi-monthly issues, well-printed on full-size pages, and sent in envelopes via first class mail.

If you've seen Midnite before, directly, as the Whole PET Catalog, or reprinted in TorPET, now is the time to reserve your copy. If Midnite is new to you, expect a truly free-spirited computer resource. Hundreds of volunteers offer you honest reviews, useful hints, inside rumours, and outrageous opinions. Since the merger, it also includes excellent articles on all aspects of Commodore computers, from such well-known authors as Ralph Bressler, Len Lindsay and Jim Strasma. But why take our word for it?

"Thanks for the copy of the Midnite Software Gazette, looks great!"
--Robert Baker, PET columnist, Microcomputing

"MIDNITE SOFTWARE GAZETTE alone is worth your braving the freeways to the meeting."
--CHUG HARDCOPY Newsletter

"I must say I have enjoyed reading the Gazette and have purchased several programs based on your reviews."
--Harvey B. Herman, Associate Editor, Compute!

"The Midnite publishes some great editorials and reviews, the latest news, other info sources, and interesting facts about PET, CBM and now VIC!"
--Karl Hilden, Editor of The Transactor

"Got your #6 Midnite Gazette which was superb as usual."
--Len Lindsay, Editor of The PET Gazette

TO SUBSCRIBE, North American readers send $20 in U.S. or $25 in Canadian funds to:

MIDNITE / PAPER

635 Maple

Mt. Zion, IL 62549 USA

K

Kaiser, Eike	453-6396	Brampton Ontario
Kalpakis, Angelo	463-5601	Toronto Ontario
Kanitz, Gilbert		Brampton Ontario
Kapur, Dr. B.M.	845-1021	Oakville Ontario
Kapuskasing H.S.		Kapuskasing, Ontario
Karigar, Nazir	424-1921	Don Mills Ontario
Karnas, Joe	767-8876	Toronto Ontario
Kay, Leonard	335-1906	Georgetown, Ontario
Kearns, Geof		Brampton Ontario
Keaveney, Brian	252-7047	Toronto Ontario
Kechnie, David G.		Sudbury Ontario
Kelford, Andy	613//223/5466	Tweed Ontario
Kelly, Doug	519/924-3346	Flesherton Ontario
Kelly, Darren	366-4854	Toronto Ontario
Kenel, Greg	889-7311	Thornhill Ontario
Kennedy, Ian		Agincourt, Ontario
Kennedy, Brian	519/527-0895	Seaforth Ontario
Kenyon, Bill	453-2926	Brampton Ontario
Keough, David	791-5453	Bramalea Ontario
Kerford, Reg		Uxbridge Ontario
Kerns, Walter	820-0963	Mississauga, Ontario
Kerrigan, Matt		Stellarton Nova Scotia
Kerur, Sharad	624-3160	Mississauga Ontario
Kettela, G.	723-7857	Oshawa Ontario
Ketting, Art	876-1560	Milton Ontario
Keys, John	960-8715	Toronto Ontario
Kho, Ken	625-0786	Mississauga Ontario
Kieley, Douglas		Labrador City Newfoundland
Kim, Kyong J.	276/8011	Mississauga, Ontario
Kipp, Morley	625-0529	Mississauga Ontario
Kippen, Mr. John W.	773-4091	Oak Ridges Ontario
Kirby, Blaik		Thornhill Ontario
Kirchner, Steven	335-1957	Burlington Ontario
Kirkby, David		Toronto Ontario
Kirkegaard, Barbara Ferguson	488-9530	Toronto Ontario
Kirkpatrick, Peter	637-3143	Burlington Ontario
Kirkpatrick, W.	637-3143	Burlington Ontario
Kiss, Viktor	487-8604	Toronto Ontario
Klassen, Andrew	274-6405	Mississauga Ontario
Kleiman, Louis	688-4092	St. Catharines Ontario
Knox, Ron	755-9884	Scarborough Ontario
Knox, Tom	755-9884	Scarborough Ontario
Kohout, Mark	226-1351	Willowdale Ontario
Koma, Stan	742-0284	Rexdale Ontario
Koning, Maarten	698-2159	Toronto Ontario
Koning, Steven	698-2159	Toronto Ontario
Koo, Kenneth W.H.	481-0338	Toronto Ontario
Koolstra, Harold	743-7648	Kitchener Ontario
Korobaylo, Walter	767-7149	Toronto Ontario
Korsman, Anthony	743-2210	Toronto Ontario
Koski, Gary J.		Sault Ste. Marie Ontario
Kostyniuk, W.		Willowdale, Ontario
Kotuba, J.	632-3163	Burlington Ontario
Kovacs, Maria	279-6629	Mississauga Ontario
Koven, Irving	447-4251	Willowdale Ontario
Kozak, Michael		Dundas Ontario
Krar, Larry		Hamilton Ontario
Krause, A E	306/374-3348	Saskatoon Sask
Kray, Jarret	233-9259	Toronto Ontario
Kriss, Jeff	483-6494	Toronto Ontario
Krofchick, Alan		Toronto, Ontario
Kronby, Malcolm	789-1988	Toronto Ontario
Krueger, Donald R.	653-8638	Toronto Ontario
Krull, Dave	844-2313	Oakville Ontario
Krzyz, Paul	519/886-1298	Kitchener Ontario
Kubath, Frank	922-1265	Toronto Ontario
Kucbel, Ed	807/622-7651	Thunder Bay Ontario
Kugler, L.	857-2528	Bolton Ontario
Kuhl, Larry	519/794-2437	Desboro Ontario
Kula, John		Victoria British Columbia
Kulyk, Dave	519/948-8457	Windsor Ontario
Kumamoto. Larry	364-3536	Toronto Ontario

Kunkel, Richard	306/373-4145	Saskatoon, Sask.
Kurth, Frank R	385-2624	Hamilton Ontario
Kurtz, Mr. Rick	306/337-1267	Regina Saskatchewan
Kutt, Ants	889-1063	Thornhill Ontario
Kvenich, Mike	743-0994	Rexdale Ontario
Kwekkeboom, John D.	732-1948	Welland, Ontario
Kydd, William		Dartmouth N.S.
Kyriakides, Bob	429-7834	Toronto Ontario
Kyrinis, Manuel	465-8419	Toronto Ontario

L

LaSelva, Sandro	656-8915	Toronto Ontario
Labrecque, Jacques J.		Ottawa Ontario
Laforet, Patrick	793-2085	Bramalea Ontario
Laframboise, Jean Pierre		L'Original Ontario
Laframboise, J. G.	889-1073	Thornhill Ontario
LaFramboise, Bernard A.		Hawkesbury, Ontario
Lafrance, Paul	725-6856	Oshawa Ontario
Lafreniere, Jean		Duberger P.Q.
Laidlaw, Brent	455-8399	Norval Ontario
Laing, Dr Brent		London Ontario
Laitoni, Marc E.		Montreal, Quebec
Lam, Roger		Toronto, Ontario
Lam, York	424-2583	Toronto Ontario
Lam, John	691-3347	Toronto Ontario
Lamond, Jeff	519/229-6319	Kirkton Ontario
Lamothe, Jean-Claude	705/858-2436	Capreol Ontario
Lampitoc, Maria Luisa	292-4712	Agincourt Ontario
Landolt, J. Paul	222-8657	Toronto Ontario
Landry, Pamela	675-2171	Rexdale Ontario
Landsborough, Ralph		Acton Ontario
Lane, Warren	827-6598	Oakville Ontario
Lane-Smith, Derek	859-0232	Aurora, Ontario
Lang, Chris	469-0470	Toronto Ontario
Lang, Debbie		Mississauga, Ontario
Lang, Duncan E.	461-2224	Toronto Ontario
Langdon, David J.		Mississauga Ontario
Lange, Eric	604/726-4266	Ucluelet British Columbia
Langill, Irving		Toronto Ontario
Langston, C.J.		Montreal Quebec
Laniel, Marcel A.	819/777-6541	Aylmer P. Quebec
Lantz, Paul		Moosonee, Ontario
Lantz, Kim	902/794-3600	North Sydney, Nova Scotia
Lanz, Douglas P.		Oshawa Ontario
Lapp, Hugh C.E.T.	403/281-6346	Calgary Alberta
The Lathem Group Inc.		Richmond Hill Ontario
Lauder, Mike	898-5195	Holland Landing Ontario
Lauder, Allan S.	463-0136	Toronto Ontario
Laughlen, Doug	519/376-0577	Owen Sound Ontario
Lavelle, Eric	274-2914	Mississauga Ontario
Lavoie, Dominique		Chicoutimi Quebec
Law, Jim	769-1497	Toronto Ontario
Lawrence, Keith	483-9032	Toronto Ontario
Lawson, James	604/479-7913	Victoria British Columbia
Lawson, Steve	638-2309	Downsview Ontario
Leach, H. Derrick	482-6661	Toronto Ontario
Leavens, Mike	792-0510	Bramalea Ontario
Leblanc, Richard	705/673-5411	Sudbury Ontario
Leblanc, Al		Sault Ste. Marie, Ontario
Lebow, Barry	224-2662	Willowdale Ontario
Leclerc, Grant	488-9670	Toronto Ontario
Ledez, Garry	459-9694	Brampton Ontario
LeDrew, Doreen	221-8649	Willowdale Ontario
LeDrew, Douglas R.	221-8649	Willowdale Ontario
Lee, Matthew M.	705/726-8120	Barrie Ontario
Lee, Ken	491-2494	Scarborough Ontario
Lee, Wallace	421-5517	Toronto Ontario
Lefebure, Lucien		Casselman Ontario
Leger, Guy	224-1474	Willowdale Ontario
Leger, Guy	514/481-7482	Montreal Quebec
Legrady, Otto		Toronto Ontario
LeGrand, A. John	637-2794	Burlington Ontario
Leimbrock, Bruce	594-4826	Palgrave Ontario
Leishman, Geoff	488-3270	Toronto Ontario
Lemonis, Modesto	531-7044	Toronto Ontario
Lenney, Hugh	233-5991	Toronto Ontario

Lenz, Pat		Brantford, Ontario
LeRadza, Ron	514/636-3826	Montreal (Hampstrad) Quebec
Leslie, Don	266-8083	Scarborough Ontario
Levene, Ivor	636-9117	Downsview Ontario
Levine, Dr. Mitchell	889-5286	Thornhill Ontario
Leyland, Mrs. Carol		Chatham Ontario
Library		Toronto, Ontario
Lieberman, Mike	665-4427	Willowdale Ontario
Liebold, G.		Oakville Ontario
Lien, James G.	828-6340	Mississauga Ontario
Lietz, Peter		Regina Saskatchewan
Lilley, Wayne	279-3241	Unionville Ontario
Lillies, Philip	665-6389	North York Ontario
Lillycrop, William	755-2305	Toronto Ontario
Liotta, Michael	621-5046	Etobicoke Ontario
Little, G. B.		535 - La Prairie, Manitoba
Little, Bob		Queensville Ontario
Lo, Tsai	495-2014	Hamilton, Ontario
Lockwood, Rob	483-2013	Toronto Ontario
Lodge, Mr. James	519/432-2140	London Ontario
Lofto, Donald A.		Bolton Ontario
Lomax, D. A.		Toronto, Ontario
Lombardi, Michael	625-2371	Mississauga Ontario
Lombardo, Ralph	669-2588	Concord Ontario
Lombardo, Frank	493-5725	Willowdale Ontario
Loose, Dirk		Mississauga Ontario
Lor-Wil Holdings Ltd.,		Agincourt Ontario
Lott, Al	519/432-0309	Arva, Ontario
Lougheed, John		Orangeville Ontario
Lovelace, Robert	877-7240	Brampton, Ontario
Lovsin, J.A.	244-1855	Weston Ontario
Low, Dick	925-0039	Toronto Ontario
Lowe, Alan	751-7481	Toronto, Ontario
Lowndes, K.	729-2480	Toronto, Ontario
Lowy, T.	787-5918	Toronto Ontario
Lucas, George	889-5333	Thornhill Ontario
Lucwil General Accounting		Miss. Ont.
Lue, Dennis	494-0231	Willowdale Ontario
Lui, Shin-Tchang	595-0715	Toronto Ontario
Lui, Stephen	368-7756	Toronto Ontario
Lui, Gordon	762-3302	Toronto Ontario
Lukaweski, Ruth	782-9377	Toronto Ontario
Lumbers, David		Belleville Ontario
Lummis, Dave	662-3577	Stoney Creek Ontario
Lundell, David	889-9939	Thornhill Ontario
Lupp, Jaak	489-7189	Toronto Ontario
Lynes, George	514/744-2327	St. Laurent Quebec
Lyons, Randy	222-9511	Willowdale Ontario

M

Ma, Anthony	824-1190	Streetsville Ontario
Macdonald, John R.	705/474-1629	North Bay Ontario
MacDonald, Alan J.		Orleans Ontario
MacDonald, Mr. Ken	519/672-1779	London Ontario
Macdonald, Daniel	463-0501	Toronto Ontario
MacGillivray, Bruce	705/436-3199	Stroud Ontario
Machen, G. S.		Toronto, Ontario
MacIsaac, John	902/258-2338	Inverness N.S.
MacKay, Gervase	284-0338	West Hill Ontario
Mackay, Malcolm	762-2793	Toronto Ontario
MacKay, Ron	902/566-3118	Cornwall P.E.I.
MacKenzie, Lorne	514/822-3196	Guelph Ontario
MacKinnon, Dr. Ronald J.	902/863-3890	Antigonish Nova Scotia
Mackinnon, Janet	481-8708	Toronto Ontario
MacLean, Bill	878-4909	Milton Ontario
MacLean, Alistair	691-3589	Toronto Ontario
MacMillan, John R.		Kitchener Ontario
MacMillan, Geary		Dartmouth N.S.
MacNaughton, R	270-1235	Mississauga Ontario
MacPherson, Arnold		Fredericton, New Brunswick
Macrae, George	335-3950	Burlington Ontario
Madden, Tom J.	791-0336	Bramalea Ontario
Madgett, Alan C.	705/675-1151	Sudbury Ontario
Magel, Ralph	895-3930	Newmarket Ontario
Magerman, Harry	889-6684	Scarborough, Ontario

Mahaffy, Gordon	481-9108	Toronto, Ontario
Maidment, Andrew	827-5465	Oakville Ontario
Maleganos, Kyros	274-2023	Mississauga Ontario
Mancini, Harry	648-0096	Ancaster Ontario
Mandell, Auby		Toronto, Ontario
Maneli, Joseph	967-0444	Toronto Ontario
Mangiardi, Mrs. Frances	829-0033	Oakville Ontario
Mann, Mr. Robert	519/672-4187	London Ontario
Manual, John	623-2896	Bowmanville Ontario
Marceau, George	418/694-0860	Quebec, Que.
Marcusa, Alessandro	820-1313	Mississauga Ontario
Marder, Jeff	723-8317	Oshawa Ontario
Margel, Simon	782-1714	Toronto Ontario
Maritan, Peter	277-8767	Mississauga Ontario
Marjerrison, D.	613/225-6485	Ottawa Ontario
Marketron		Toronto Ontario
Marks, Douglas	222-6515	Willowdale Ontario
Marks, Selwyn	489-1345	Toronto Ontario
Marr, Dr. Peter	226-2928	Willowdale Ontario
Marriner, Cec	705/737-2317	Barrie Ontario
Marsden, Colin		Newmarket Ontario
Marsellus, Derek	626-3696	Islington Ontario
School, Marshview Middle		Sackville N.B.
Martin, W. Christopher	492-7814	Willowdale Ontario
Martinello, Steve	274-1694	Mississauga Ontario
Martin, Kin	425-9906	Toronto Ontario
Martindale, Barrie L.		Toronto Ontario
Martin, H. Stewart	277-1650	Mississauga Ontario
Martinez, Miguel D.	266-6753	Scarborough Ontario
Marzin, Barry		Windsor Ontario
Mason, Bob	727-8027	Aurora Ontario
Mastragostino, Michael	633-2510	Downsview Ontario
Mather, Dave	335-1833	Burlington Ontario
Matthews Library		St. Catharines, Ontario
Maturi, Philip	223-9620	Willowdale Ontario
Maxted, G. A.	637-2198	Burlington Ontario
May, Tom	355-3138	Colborne Ontario
Maynard, John	639-9609	Burlington Ontario
McIsaac, Paul		Toronto Ontario
McAdams, Scott	425-6677	Toronto Ontario
McAuley, Jake	536-6432	Toronto Ontario
McCahill, Don	248-4134	Mississauga, Ontario
McCarthy, John	506/843-2414	Blackville New Brunswick
McCarthy, Bill	294-2039	Markham Ontario
McClenny, Bill	727-6849	Aurora Ontario
McConnachie, Ian	634-4245	Burlington Ontario
McCullough, James W.		Willowdale Ontario
McCurdy, Dale P.	621-6701	Mississauga, Ontario
McDonald, David	791-5582	Bramalea Ontario
McEwan, Robert L.		Stellarton, N.S.
McEwen, John M.	826-5580	Mississauga Ontario
McGuire, Paul	291-2504	Agincourt Ontario
McHoul, Paul	826-0868	Mississauga Ontario
McIlveen, Robert	388-0398	Hamilton Ontario
McIntyre, Dave	272-0769	Mississauga, Ontario
McIntyre, Hugh C.	466-3489	Toronto Ontario
McIntyre, Randy	519/354-6389	Chatham Ontario
McKay, John C.	632-2015	Burlington Ontario
McKay, Bruce	519/924-3461	Flesherton Ontario
McKechnie, Mike	483-6586	Toronto Ontario
McKee, W. Rae		Ontario
McKee, John	429-5734	Toronto Ontario
McKenzie, David J.		Brooks Alberta
McKinney, H.V.	204/638-3423	Dauphin Manitoba
McKinnon, Annette		Don Mills Ontario
McKinnon, David	292-5133	Scarborough Ontario
McKye, Gordon	822-3410	Mississauga Ontario
McLaughlin, Jim	621-1113	Etobicoke Ontario
McLean, Donald A.		Port Dover Ontario
McLean, Maurice	519/291-4740	Listowel Ontario
McLean, Keith	484-4855	Toronto Ontario
McMullen, Mr. W.R.		Cambridge Ontario
McMurtry, Donald	871-3871	Fort Erie Ontario
McPherson, Bill	839-1437	Pickering Ontario
McSweeney, Glenn	884-0409	Richmond Hill Ontario
McVean, Bob	705/526-9580	Midland Ontario

Mead, Michael	746-3012	Rexdale Ontario
MEC Micro Electronics Corp.		Scarborough Ontario
Meier, Wolfgang	519/354-9672	Chatham Ontario
Meiklejohn, Guy		Port Rowan, Ontario
Meissner, Ed	727-1592	Aurora Ontario
Melihen, Louise	481-2364	Toronto Ontario
Meliken, Tony	481-2364	Toronto Ontario
Mercer, Bill		Milton, Ontario
Merchant, S.C.	705/696-2262	Hastings Ontario
Merritt, Gary G	827-5949	Oakville Ontario
Mertl, Robert		Belleville Ontario
Meyer, Brian D.	547-8670	Hamilton Ontario
Meyer, Ted	547-0205	Hamilton Ontario
Michel, Laliberte	819/565-9398	Sherbrooke P.Q.
Michnick, Sam	278-7737	Mississauga Ontario
Micro Shack of Western Canada	306/244-6909	Saskatoon, Sask
Micro Mart Inc.		Winnipeg Manitoba
Middleton, Dave		Calgary Alberta
Middleton, James E.	651-9061	Toronto Ontario
Midwinter, Clive	877-1673	Georgetown Ontario
Mielke, Gerry	523-0446	Hamilton Ontario
Miethig, Gerhard	282-8327	West Hill Ontario
Milin, Gary	261-8460	Scarborough Ontario
Millage, Jack	705/652-7155	Lakefield Ontario
Millard, Wm. A.F.	223-1805	Willowdale Ontario
Miller, David		Brampton Ontario
Miller, Joan		Scarborough Ontario
Miller, Michael	483-9545	Toronto Ontario
Miller, Kyle	221-7362	Willowdale Ontario
Miller, Mrs. Anne	449-9383	Willowdale Ontario
Miller, Shaun W.	681-1883	Burlington Ontario
Miller, Richie	889-4565	Thornhill Ontario
Milne, J. L.		Manitoba
Minett, Richard	239-5043	Islington, Ontario
Mintz, Raanan		Agincourt, Ontario
Mitchell, John	519/681-1016	London Ontario
Mitchell, Alina	498-0634	Willowdale Ontario
Mitchell, Martin	498-0634	Willowdale Ontario
Mitchell, Ken	519/753-6079	Brantford Ontario
Mizutani, Harry	461-8523	Toronto Ontario
Mohammed, Anim		North York Toronto, Ontario
Moise, Avygdor	498-8359	Willowdale Ontario
Mok, Kwong T.	403/436-6820	Edmonton Alberta
Mollica, Antony	732-2149	Welland Ontario
Monett, Douglas		Bramalea Ontario
Monnelly, Margaret	613/825-3853	Nepean, Ontario
Monroe, Brian	883-5456	Richmond Hill, Ontario
Montgomery, R. L.		Onaping Ontario
Moorani, Riyaz A.	751-6200	Scarborough Ontario
Moore, John		Windsor Ontario
Moore, John	877-2532	Georgetown Ontario
Moore, Andy	459-7232	Brampton Ontario
Moore, Dave	698-0127	Toronto Ontario
Moore, John Moore Jr.	274-3506	Mississauga Ontario
Moore, Mike		Toronto Ontario
Moore, Mr. Darrell	519/451-9369	London Ontario
Moore, John	274-3506	Mississauga Ontario
Moreton, Douglas	793-6828	Bramalea Ontario
Morgan, E. Anne	267-9802	Scarborough Ontario
Morgan, Heather	248-4740	Weston Ontario
Moriarty, William W.	889-1230	Thornhill Ontario
Morin, Paul	418/547-9832	Jonquiere Quebec
Morriss, D.J.		Toronto Ontario
Morrison, Donald		Glace Bay Nova Scotia
Morris, W.	261-0787	Scarborough, Ontario
Morris, Allan	664-6673	Stoney Creek Ontario
Morris, Robert	664-6673	Stoney Creek Ontario
Morrison, Angus		Bramalea, Ontario
Morrow, Brian M.	613/829-8818	Nepean Ontario
Morrow, Bob	668-0643	Whitby Ontario
Moule, D.C.	563-4476	St. Catharines, Ontario
Mounce, Ed.		North Bay Ontario
Mowat, David G.	519/885-4950	Waterloo, Ontario
Moynihan, John	844-6332	Oakville Ontario
Mueller, George	204/222-3433	Winnipeg Manitoba
Mueller, Jack	225-4080	Willowdale Ontario

Mueller, Hal	823-3237	Oakville Ontario
Mulder, Dr Don	519-928-5650	Grand Valley Ontario
Mullings, B. C.	826-3256	Mississauga Ontario
Munn, Dennis E,		St. Catharines Ontario
Murata, T.	423-6780	Toronto Ontario
Murphy, Bob	519/744-7609	Kitchener Ontario
Murray, Mr. D.		Milton, Ontario
Murray, Mr. D.	928-2207	Pickle Lake Ontario
Murray, Tom	613/962-1440	Belleville Ontario
Murphy, Mrs. R.	779-3720	Cayuga Ontario
Muzatko, Helmut	898-5694	Newmarket Ontario
Myers, Dwayne	705/472-6738	North Bay Ontario

N

Nadelle, Art		Ridgetown Ontario
Nairn, J.H.	245-7017	Rexdale, Ontario
Near, David	683-8753	Pickering Ontario
Near, Gordon	683-8753	Pickering Ontario
Needham, Pamela	613/258-5381	Kemptville Ontario
Neil, Gary	745-2575	Rexdale Ontario
Netherton, Fred		Stratford Ontario
Nevfeld, Rudy	519/472-0586	London Ontario
New, John H	877-3176	Georgetown Ontario
Newmarket High School	775-5224	Newmarket, Ontario
Nicholson, N.T.	247-0344	Weston Ontario
Nielsen, Helge	668-8603	Whitby Ontario
Nielsen, Hans	705/292-9468	Peterborough, Ontario
Northview Heights S.S.		Willowdale Ontario
Norton, Steve	422-3491	Toronto Ontario
Norum, D.I.		Saskatoon Saskatchewan
Novak, Eli		Sydney River Nova Scotia
Nova Scotia, Province of		Halifax Nova Scotia
Nowak, Elmer		Scarborough, Ontario
Nye, Tim	519/855-4380	Hillsburg Ontario

O

Oanes, Lucila	661-7294	Downsview Ontario
Obeda, John Jr.	519/473-2969	London Ontario
O'Brien, William	445-0331	Don Mills Ontario
Obukuro, Aki	266-1086	Scarborough Ontario
O'Connor, Bill	281-9454	Scarborough Ontario
Ogden, Don		Ontario
O'hara, Valerie		West Oakville, Ontario
Okun, Steven	489-9790	Toronto Ontario
Okura, Ray	247-9791	Toronto Ontario
Olafson, Erik	705/692-4392	Lively Ontario
Olijnyk, Orest	532-2151	Toronto Ontario
Oliphant, Christopher	839-8243	Pickering Ontario
O'Neill, Gerry		Toronto Ontario
Oriotis, Jim	425-0466	Toronto Ontario
Osachoff, Wm. F.		Moose Jaw Saskatchewan
Osbourne, Jim	889-6663	Thornhill Ontario
Otteson, Ken		Calgary Alberta
Overholt, Steve	621-4627	Islington Ontario
Overton, Ron	839-4600	Pickering Ontario
Owen, Dr. Mark	705/856-7319	Wawa Ontario

P

Paabor, Hans	757-7453	Scarborough Ontario
Page, Bette	845-5931	Oakville Ontario
Page, Mike	884-3676	Richmond Hill Ontario
Pajur, Enn	613-279-2365	Sharbot Lake Ontario
Panning, Steve	845-8276	Oakville Ontario
Pape, Hans	898-4929	Newmarket Ontario
Papps, Mary	846-3171	Brampton Ontario
Parent, Andre	418/723-1691	Rimouski Quebec
Parkway Realty Ltd.		Weston Ontario
Parry, Rich	889-5465	Thornhill Ontario
Paterson, Charles D.	613/766-4994	Toronto Ontario
Paton, Reid	484-9642	Toronto, Ontario
Patrick, Dave		London Ontario

Patterson, S.		Toronto Ontario
Paulin, Pat	622-1013	Islington Ontario
Payne, Don H.	294-4819	Markham Ontario
Pearson, Annette	705/748-3319	Peterborough Ontario
Peck, Martin	493-4252	Downsview Ontario
Peck, Ron	421-8610	Toronto Ontario
Peckham, Chris		Barrie Ontario
Peckham, David	884-0226	Richmond Hill Ontario
Pegg, Owen	222-1264	Downsview, Ontario
Peirce, Richard	884-2914	Richmond Hill Ontario
Pelechaty, John		Toronto Ontario
Pennycook, Brian D.	519/685-0206	London Ontario
Pennyfeather, Lloyd	403/438-2999	Edmonton, Alberta
Percival, Steve	705/942-5294	Sault Ste. Marie Ontario
Pernu, Edward J.	270-4630	Mississauga Ontario
Perrault, A. C.		Montreal Quebec
Perri, Patrick	705/728-2952	Barrie Ontario
P.E.T. Educators Group (P.E.G)	519/734-7608	Amherstburg, Ontario
Peters, Richard	306/545-7675	Regina Saskatchewan
Peters, Mike	766-1263	Toronto Ontario
Petersen, Floyd	579-6931	Oshawa Ontario
Peterson, John	481-8122	Toronto Ontario
Petroff, Ben	767-3797	Toronto Ontario
Petruccelli, Don		Mississauga Ontario
Pezzullo, Silvia	884-6252	Richmond Hill Ontario
Phelan, Nelson	622-5412	Islington Ontario
Phillips, Glen	857-3580	Bolton Ontario
Philpott, D. W. G.	225-4468	Willowdale Ontario
Piasecki, Dr. George	844-9889	Oakville Ontario
Pickersgill, Mr. Don	519/583-2218	Port Dover Ontario
Pierce, Charles	519/662-3107	New Hamburg, Ontario
Pietowski, Gregory	762-9344	Toronto Ontario
Pillai, Deepak		Markham Ontario
Pools, Pioneer		Burlington, Ontario
Pools, Pioneer		Burlington, Ontario
Plain, Reinhold	281-8088	Scarborough Ontario
Plante, Paul	487-2039	Toronto Ontario
Pongracich, Frank	889-7068	Thornhill Ontario
Pontes, Tony	826-3484	Willowdale, Ontario
Poon, Timothy P.	466-3812	Toronto Ontario
Poon, Mr. Laurie	924-5228	Toronto Ontario
Potter, Jamie W.R.	705/326-7981	Orillia Ontario
Pottinger, Earl C.	433-0988	Oshawa, Ontario
Powell, George		Bobcageon Ontario
Powley, Richard E.		Plenty Saskatchewan
Prairie Crafts		Saskatoon, Saskatchewan
Pratt, Jim	705/869-2402	Espanola Ontario
Prattas, Spiro	465-6966	Toronto Ontario
Price, Jim	519/759-3549	Brantford Ontario
Priddle, David	691-7831	Toronto Ontario
Prijatelj, Bill	275-0605	Mississauga Ontario
Prijately, Tony	244-9582	Downsview Ontario
Prince Andrew High School		Dartmouth, Nova Scotia
Pringle, Douglas	245-4751	Weston, Ontario
Priolo, Vince	533-9278	Toronto Ontario
Prokopchuk, Stephen	936-2840	Tottenham Ontario
Prousky, John	889-9851	Thornhill Ontario
Pugsley, Bill	221-9793	Willowdale Ontario
Pulis, Joe	668-8595	Whitby Ontario
Punter, Steve	624-5431	Mississauga Ontario
Purdy, Tom		Toronto Ontario
Put, Peter	306/522-5474	Regina Saskatchewan
Pyatt, Marshall	820-0473	Mississauga Ontario
Pyatt, Marshall M.	854-2520	Moffat Ontario
Pyatt, N. J.	820-0473	Mississauga Ontario

Quee, Dr. Trevor Chin	514/626-4415	Dollard des Ormeaux Quebec
Queen Mary Public School		Hamilton Ontario
Questar International		Markham Ontario
Quick, Stuart		University of Toronto West Hill, Ontario
Quinn, Paul	793-1276	Bramalea Ontario
Quon, William		Timmins Ontario

R

Raalte, C. Van		Timmins Ontario
Ramanauskas, Raymond	535-0598	Toronto Ontario
Ramey, Wilf	826-6890	Mississauga Ontario
Ranstead, Gary	728-3409	Oshawa Ontario
Ratelle, Leo		Oakville, Ontario
Raymer, R.J.	231-6761	Toronto Ontario
Redelmeier, Ernest	832-1117	Richmond Hill Ontario
Redgers, Louise	691-3235	Toronto Ontario
Reed, J. P.		Scarborough Ontario
Rees, Morgan V.A.		Toronto Ontario
Reesor, Glen		Camrose Alberta
Reid, Bert	233-7355	Islington Ontario
Reid, Alphonso	496-0125	Willowdale Ontario
Reid, Carl	921-6610	Toronto, Ontario
Reid, Jeremy	488-6156	Toronto Ontario
Reid, Kevin	889-8673	Toronto, Ontario
Reilly, George H.	639-5896	Burlington Ontario
Reilly, Barry E.		Brandon Manitoba
Reisch, Sebastian	342-5751	Campbellcroft Ontario
Reithmeier, Gordon	481-2348	Toronto Ontario
Reitmaier, Rick	222-2489	Willowdale Ontario
Rejwan, Eli	889-5189	Thornhill Ontario
Remmerswaal, Mr. Dan	807/584-2911	Savant Lake Ontario
Rezel, Adrian	299-1650	Scarborough Ontario
Richardson, Peter		Dresden Ontario
Richardson, Mr. F.		Oakville Ontario
Richling, Michael		Thunder Bay Ontario
Richmond, L.R.S.		Regina, Sask.
Richter, Gerald J.		Edmonton Alberta
Richvale Telecommunications	416/884-4165	Richmond Hill Ontario
Riddolls, Weldon	225-8433	Willowdale Ontario
Rietze, Kenneth	667-1088	Downsview Ontario
Rigby, George	293-1501	Agincourt Ontario
Rigby, John	846-5884	Elora Ontario
Rigby, Terry	298-4708	Scarborough Ontario
Ritchie, C. Scott		London, Ontario
Rivet, Rob	705/368-2426	Little Current Ontario
Robb, Ian		Sudbury Ontario
Robb, J. W.		Pickering, Ontario
Robertson, Dave		Whitehorse, Yukon Territory
Robineau, Michel	705/753-3822	Sturgeon Falls Ontario
Robinson, Roy	604/437-8017	Vancouver B.C.
Robinson, Stewart	845-9725	Oakville Ontario
Robinson, J. David	519/371-0449	Owen Sound Ontario
Robinson, Tom	403/458-0223	St. Albert Alberta
Robinson, Michael	889-6958	Thornhill Ontario
Roche, Mike	728-2291	Oshawa Ontario
Roddy, Jim	445-4444	Willowdale Ontario
Roddy, Edward	445-4444	Willowdale Ontario
Roe, George	489-5144	Toronto Ontario
Roehm, Harold		Pickering Ontario
Roettger, Richard	898-1628	Holland Landing Ontario
Roger, Howard	789-3112	Toronto, Ontario
Rogers, James M.		Havelock Ontario
Rogers, T. Hugh	223-0371	Willowdale Ontario
Roll, James		Regina Saskatchewan
Romita, Dino	769-5509	Toronto Ontario
Rondeau, Andre		Ste-Foy P.Q.
Rosen, Larry	691-8553	Toronto Ontario
Rosen, Dave	441-2242	Willowdale Ontario
Ross, Mrs. Maxine		Fredericton New Brunswick
Ross, Peter W.		Fraserville Ontario
Rotenberg, Howard	265-2917	Scarborough, Ontario
Rouse, Bruce	494-2728	Willowdale Ontario
Rowlands, Dave		Chatham Ontario
Rozek, John P.	775-6780	Bond Head Ontario
Rozon, Paul	842-2619	Oakville, Ontario
Rukavina, Barbara	239-0333	Toronto Ontario
Runnalls, Craig	878-6437	Milton Ontario
Runnallis, Ian	878-6437	Milton Ontario
Rush, Michael		Belleville Ontario
Rushton, Philip	691-9255	Toronto Ontario
Russell, Mr D. E.	519/927-3269	Caledon Ontario
Russell, Doug	252-8543	Toronto Ontario

Rusynyk, John	275-6618	Mississauga Ontario
Rutledge, John	519/469-3927	Innerkip Ontario
Ryken, Bill	344-7419	Castleton Ontario

S

Sadowski, Michael	225-9508	Willowdale Ontario
Salapatek, Ron	278-5742	Mississauga Ontario
Sales, R. H.	519/681-5059	Georgetown Ontario
Sanderson, R	727-4808	Aurora Ontario
Sanderson, Al	727-4808	Aurora Ontario
Sntos, Amador L. Jr.	281-8967	Scarborough Ontario
Santos, Kennedy	742-0705	Rexdale Ontario
Sask. Research Council Library		Saskatoon Saskatchewan
Sasse, Wolfgang	743-6050	Downsview Ontario
Saunders, Mr. Raymond H.	226-2946	Willowdale Ontario
Saylor, Randy		Toronto Ontario
Scarisbrick, Dick	249-0287	Weston, Ontario
Schachter, Andrew	482-2925	Forest Hill Toronto, Ontario
Schellenberg, Robert W	689-5694	Carlisle Ontario
Schiedel, Robert E.		Ontario
Schlichtman, Marc		St. Catharines Ontario
Schlosser, Jeff	306/842-4144	Weyburn Saskatchewan
Schmeiss, Joachim	457-5997	Brampton Ontario
Schmidt, Paul	705/743-3871	Peterborough Ontario
Scholte, M. J.	293-8549	Willowdale, Ontario
Schuman, John E.	691-9076	Scarborough Ontario
Schuman, John P.	691-9076	Scarborough Ontario
Schweinle, Arthur	493-6746	Toronto Ontario
Scian, Anthony	705/726-8206	Barrie Ontario
Sclater, Ron	705/728-5997	Cobalt Ontariio
Scott, Shirley	705/522-6637	Sudbury, Ontario
Scrimgeour, Pat	422-0582	Toronto Ontario
Scuse, The Rev. Paul	767-1611	Toronto Ontario
Segal, H.		Whitby, Ontario
Semenovs, Mrs. I	751-1959	Toronto Ontario
Semple, Dr. T.		Toronto, Ontario
Senkiw, Mark	251-9619	Etobicoke Ontario
Sesvecan, Mike	762-0057	Toronto, Ontario
Shah, B.A.	461-7606	Toronto Ontario
Shales, Mike	967-9120	Toronto, Ontario
Shapiro, Morden	223-7171	Willowdale Ontario
Shapleigh, Frank		Gander Newfoundland
Shaw, Judy		Peterborough Ontario
Shepherd, Robert A	846-3602	Brampton Ontario
Shepherd, John M.	244-1487	Islington Ontario
Sherriff, Bill		Portage la Prairie, Manitoba
Shevlin, Tom	723-0074	Toronto Ontario
Shevlin, Carol	423-0074	Toronto Ontario
Shields, Danny	638-2962	Downsview Ontario
Shield, Glenn	519/595-4832	Milverton Ontario
Shields, Paul	638-2962	Downsview Ontario
Shifflett, W.	519/822-3229	Ariss Ontario
Shire, Dan	613/923-5220	Mallorytown Ontario
Shirinian, George	787-0926	Toronto, Ontario
Shoemaker, A.	613/475-2003	Brighton Ontario
Shogilen, T.	792-1952	Brampton Ontario
Short, C.A.		Fredericton New Brunswick
Sibbald, R.	826-3994	Mississauga Ontario
Siczkar, Dennis J.	807/344-4983	Thunder Bay Ontario
Sideris, David	225-9809	Willowdale Ontario
Siebenmann, Chris	922-2235	Toronto Ontario
Siebert, Herbert	844-2559	Oakville Ontario
Sigmundt, Michael	449-3092	Don Mills Ontario
Silverstein, Len	672-0419	London Ontario
Simon, Edgar	336-5807	Burlington Ontario
Simonsen, Karl		London Ontario
Simons, Herbert	613/525-3475	Alexandria Ontario
Simpson, David	221-5773	Toronto Ontario
Singh, J	266-5775	Scarborough Ontario
Sinisalo, Steve	635-9639	Downsview Ontario
Sirussi, Charles		Dollard-des-Ormeaux Quebec
Skelton, Barbara	881-6791	Thornhill Ontario
Skerry, Joseph	514/697-9118	Beaconsfield Quebec
Skett, Gary W.		West Vancouver B.C.
Skopin, Frank	226-3745	Willowdale Ontario

Slacks Acc. & Income Tax Service		White City, Sask.
Slade, D.	457-5784	Brampton Ontario
Slade, R.	457-5784	Brampton Ontario
Sloan, Jim	431-3212	Scarborough Ontario
Sloan, Bill		Scarborough Ontario
Slocombe, David	924-8906	Toronto Ontario
Slocum, Peter	535-3329	Toronto Ontario
Smeets, Chris	604/433-4968	Burnaby British Columbia
Smirlies, Joe	742-0725	Weston Ontario
Smith, Brian		Oshawa, Ontario
Smith, Jeff	889-8259	Thornhill Ontario
Smith, Hugh	295-4456	Niagara Falls Ontario
Smith, Conrad	392-9103	Trenton Ontario
Smith, John E.	877-4428	Georgetown Ontario
Smith, Jeff	773-5584	Oak Ridges Ontario
Smith, Dave		Belleville Ontario
Smith, Adam J.	275-1318	Mississauga Ontario
Smith, Brian		Sudbury Ontario
Smith, Doug	727-6670	Aurora Ontario
Smith, Ivan	902/275-3266	Chester Nova Scotia
Smith, Peter	889-1995	Thornhill Ontario
Smith, Ken	487-1005	Toronto Ontario
Smith, Garry		Tweed, Ontario
Smith, Leslie E.		St Louis de Terrebonne Quebec
Smith, Mrs. Patricia	895-4953	Newmarket Ontario
Smith, F. Eugene	822-1194	Mississauga Ontario
Smith, Brian		Dresden Ontario
Smithers, Chris	265-0314	Scarborough Ontario
Smits, T.	519/268-3185	London Ontario
Smyth, David	252-7434	Toronto Ontario
Snelgrove, Paul	884-0705	Richmond Hill, Ontario
Sobel, Eric	247-8983	Toronto, Ontario
Soudack, Ilan	447-4500	Willowdale Ontario
Southern Victoria High School	506/273-2231	Perth-Andover New Brunswick
Sparrow, Graham	743-0875	Rexdale Ontario
Speers, Dan	519/756-1119	Brantford Ontario
Spencer, Peter	281-1155	West Hill Ontario
Spencer, Sister Leona	705/522-5245	Sudbury, Ontario
Speyer, Lloyd	483-3728	Toronto Ontario
Spindel, Leo	889-9229	Thornhill Ontario
Sproule, Rev. David N.	622-5900	Etobicoke Ontario
Stachouwski, Peter	637-1766	Burlington Ontario
Stanley, Kevin	239-5558	Toronto Ontario
Stanley, Joe F.	239-5558	Toronto Ontario
Stanley, Andrew	791-2248	Bramalea Ontario
Stark, Edwin	225-5430	Willowdale Ontario
State, Emile		Ottawa, Ontario
Stein, Mike	532-4322	Toronto Ontario
Steiner, Dick	403/467-4194	Sherwood Park Alberta
Steinsky, John	425-4101	Toronto Ontario
Stephen, Murray K.		Orillia Ontario
Stephen, George	481-8915	Toronto Ontario
Stepke, Bernie	277-3047	Mississauga Ontario
Stevenson, Robert R.	519/283-6222	Thamesford Ontario
Stewart, Gordon S	519/273-1180	Stratford Ontario
Stewart, Mr. Kenneth J.	292-8060	Scarborough Ontario
Steyn-Ross, Alistair	630-8168	Willowdale Ontario
St. Jean, Don	929-3029	Toronto Ontario
St. John, Richard	613/234-1556	Ottawa Ontario
Stoddart, Edward	532-5060	Toronto Ontario
Stopell, Greg	844-1135	Oakville Ontario
Storr, John	293-6490	Scarborough Ontario
Stoveken, John	494-7366	Milton Ontario
Stramba, Mike	626-7120	Etobicoke Ontario
Strangways, Mark	626-3662	Islington Ontario
Strapp, Philip	519/354-5904	Chatham Ontario
Strauch, Luis	223-9274	Willowdale, Ontario
Stuckey-Maher, Mrs. Valerie		Atikokan Ontario
Subotincic, Misha	653-9730	Toronto Ontario
Sudbury Board of Education		Sudbury, Ontario
Sugino, Shin	465-1757	Toronto Ontario
Sukardi, Ignatius	613/546-0870	Kingston Ontario
Sullivan, Gregory T	519/579-0594	Waterloo Ontario
Sullivan, Larry		Val Caron Ontario
Sumner, Len W	233-9524	Islington Ontario
Sutherland, Allan	819/839-2642	Danville Quebec
Swan, Chris		Scarborough Ontario

Sweeney, Michael	245-5085	Islington Ontario
Swift, Paul	621-9941	Etobicoke Ontario
Sylvestervich, John	723-6797	Oshawa Ontario
Syme, John	727-6103	Aurora Ontario
Szabo, Sy	233-6311	Islington Ontario
Szego, Mr. Peter	751-9621	Toronto Ontario
Szilock, Shirley	820-6231	Mississauga Ontario
Szilock, John	820-6231	Mississauga Ontario
Szkorla, Peter	537-6876	Toronto Ontario

T

Talbot, Richardo	418/524-6685	Foy, P.Q.
Taller, Terry		Kanata Ontario
Tam, Sau Ling	496-2876	Agincourt Ontario
Tamplin, Morgan	705/743-6652	Peterborough Ontario
Tang, Kai-Hong	759-0295	Toronto Ontario
Tao, Simon	465-8088	Toronto Ontario
Tattersall, Peter	743-1508	Rexdale Ontario
Taylor, Drew		Agincourt Ontario
Taylor, Paul C.	482-1353	Toronto Ontario
Taylor, Colin	634-8664	Burlington Ontario
Teare, W.S.	793-1593	Bramalea Ontario
Teare, Andrew	793-1593	Bramalea Ontario
Teasdale, Gwen	727-9721	Aurora, Ontario
Telfer, Bob	519/351-4378	Chatham Ontario
Templeton, Brad	822-3344	Mississauga Ontario
Tenenbaum, Jerry	496-0395	Scarborough Ontario
Tensud, Peter	278-0034	Port Credit Ontario
Tesserac Computing Systems Ltd.	403/230-1446	Calgary Alberta
Thall, Martin Evan	789-2919	Toronto Ontario
Theisen, John	447-1328	Scarborough Ontario
Thompson, Don	506/386-6638	Moncton N. B.
Thompson, James A.W.	306/693-3346	Moose Jaw Saskatchewan
Thompson, Joseph	506/832-7656	Hampton, New Brunswick
Thompson, Phil	275-8865	Mississauga Ontario
Thomson, James A.	884-6507	Richmond Hill Ontario
Thomson, Nic		Don Mills Ontario
Tilston, Steve	613/258-4306	Kemptville, Ontario
Timmins Stationery & Office		Timmins, Ontario
Toole, Meyer	486-8616	Toronto Ontario
TRACE	923-5146	Toronto, Ontario
Trankner, D. W.		London Ontario
Traynor, John	270-6376	Mississauga, Ontario
Tremain, Gordon		Langley, B.C.
Trepanier, L.		Drummondville Quebec
Trotier, Paul		Quebec P.Q.
Troup, Henry	624-3419	Mississauga Ontario
Turk, Mike	476-2738	Keswick Ontario
Turliuk, Dave	639-0001	Burlington Ontario
Turnbull, Louise	889-7243	Thornhill Ontario
Turudic, Andy		Brampton Ontario
Twynam, Bob	742-8778	Rexdale Ontario
Tyler, John	705/744-5869	Mattawa Ontario

U

Uher, Lorne	306/773-7002	Swift Current Sask.
Urban, Peter	635-7672	Downsview Ontario
Urquhart, Dave	977-0468	Toronto, Ontario
Urquhart, Kevin	783-5529	Toronto Ontario

V

Valeri, Tony	545-1649	Hamilton Ontario
Van Binnendyk, Dirk	763-5392	Toronto Ontario
Vander Eyken, Martin	255-4517	Etobicoke Ontario
Vander Kooy, John	519/886-0155	Waterloo Ontario
Van der Ham, Rudy	278-4726	Mississauga Ontario
Van Heerden, Schalk	461-2104	Toronto Ontario
Van Heerden, Bill	461-2104	Toronto Ontario
Van Pelt, Larry	225-3472	Willowdale Ontario
Van Poelgeest, M.J.	519/925-5202	Shelburne Ontario

Vayda, J.	252-8948	Toronto Ontario
Venuto, John	231-3262	Islington Ontario
Verbrugge, E.	791-4356	Bramalea Ontario
Veres, James	291-5682	Agincourt Ontario
Verge, Rene		Mississauga Ontario
Villemaire, Ray	284-9791	West Hill Ontario
Vogan, Ron	653-1156	Campbellford Ontario
Voskamp, Jeff	613/392-7591	Trenton Ontario
Vowles, Doug	278-9585	Port Credit Ontario
Vyte, Lana	638-0495	Downsview Ontario

W

West Ferris Secondary School		North Bay Ontario
Waddell, Michael C.		Vancouver B.C.
Waddell, Brian	403/425-0537	Edmonton Alberta
Wade, Douglas	244-1672	Toronto Ontario
Waite, Robin/Anne	519/655-2577	Tavistock Ontario
Waithe, V. E.		Willowdale Ontario
Walend, Kenneth F.		Brevard NC, U.S.A.
Walker, Bill	826-2723	Mississauga Ontario
Walker, Mrs. Joan	294-5801	Markham Ontario
Walker, Ron	635-1357	Downsview Ontario
Wall, Mr. Knud	298-2627	Scarborough Ontario
Wallace, David	277-4601	Mississauga Ontario
Wallace, John K.	488-8263	Toronto Ontario
Waller, Margot		Belleville, Ontario
Wallis, Keith	663-0563	Toronto Ontario
Walsh, Neil	656-0672	Toronto Ontario
Walsh, Christopher	729-2897	Loretto Ontario
Wanamaker, Jean	625-0606	Mississauga Ontario
Wang, Edward	441-4083	Don Mills Ontario
Wange, Alex	465-2342	Toronto Ontario
Ward, Carole	648-2226	Burlington, Ontario
Ward, Susan	648-2226	Ancaster, Ontario
Wareham, Vic	294-2266	Markham Ontario
Warf, Donald	807/577-1847	Thunder Bay Ontario
Wark, Brian	244-9785	North York Ontario
Warner, Robert L.	705/726-6354	Midhurst Ontario
Warriner, Cliff	356-6922	Niagara Falls Ontario
Waslenko, R. G.	299-0772	Scarborough, Ontario
Waterdown District High School		Waterdown Ontario
Waterhouse, Larry E.	519/759-4395	Brantford Ontario
Waterloo University		Waterloo, Ontario
Waterloo Computer Systems Group		Waterloo Ontario
Watson, Louise	225-7269	Willowdale Ontario
Watson, James	355-2646	Colborne Ontario
Weaver, David	270-0313	Mississauga, Ontario
Weaver, Allan		Brampton Ontario
Webb, Carol	705/726-4987	Barrie Ontario
Webb, Jeff	783-7028	Toronto Ontario
Webb, John C.	925-1780	Toronto Ontario
Weigmann, Uwe	961-1498	Toronto, Ontario
Welby, Greg	278-1100	Mississauga Ontario
Welch, Mrs. Dorothy		Thornhill Ontario
Wells, Peter L.	481-6615	Toronto Ontario
Wells, Gord	488-1019	Toronto Ontario
Welton, Richard S.	705/779-2462	Sault Ste. Marie Ontario
Werezak, Richard	335-9421	Burlington Ontario
Westbury, Dave	677-5279	Mississauga Ontario
Westerhof, Klaas	456-2993	Bramalea Ontario
Wevers, Bob	438-3382	Scarborough Ontario
Wheatley, Bob	892-8693	Fonthill Ontario
Whelan, Errol		Swift Current, Saskatechewan
Whelpdale, D. M.	893-9126	Kleinburg Ontario
White, M. L. M.B.		Frederickton, N.B.
White, Frank		Ottawa Ontario
Whitehouse, Robert	282-6326	West Hill Ontario
Whiteman, R.		Brampton Ontario
Whitewood, James	656-5140	Toronto Ontario
Whitewood, Don	656-5140	Toronto Ontario
Whiting, David	519-833-2009	Erin Ontario
Whiting, John	536-1889	Toronto Ontario
Whitzman, Robert	291-0039	Agincourt Ontario
Wickson, Wayne	613/392-1037	Trenton Ontario

Wiens, Robert	842-0755	Oakville Ontario
Willems, Al	306/374-0663	Saskatoon Saskatchewan
Williams, David	486-6817	Toronto Ontario
Williamson, Neil	839-8593	Downsview, Ontario
Williamson, Mr. Robin	519/742-2075	Kitchener Ontario
Willson, Keith E.	699-1200	Toronto Ontario
Wilson, Mr. L.A.		North Vancouver British Columbia
Wilson, Robert B.	447-2682	Don Mills Ontario
Wilson, Ronald E.	624-7446	Mississauga Ontario
Wilton, Tom	266-7154	Scarborough Ontario
Winarski, Alan	827-3034	Oakville Ontario
Windsor Roman Catholic S.S.B.		Windsor Ontario
Winfield, James	621-1168	Etobicoke Ontario
Wing, Ronald		Welland Ontario
Winkler, Gil	449-6540	Willowdale Ontario
Winstanley, Joan	489-5582	Toronto Ontario
Winston, Donald	579-7139	Oshawa Ontario
Winter, Frank		Agincourt, Ontario
Wise, Stephen	486-8756	Toronto Ontario
Wolanin, Mr. L. B.	293-2311	Scarborough Ontario
Wong, Clifford	514/331-3824	St. Laurent Quebec
Wong, Richard	463-0726	Toronto Ontario
Wong, M. E.	221-6380	Willowdale Ontario
Wood, W. J.		Estevan Saskatchewan
Wood, Kevin	613/968-4303	Belleville Ontario
Wood, Don	627-1506	Dundas Ontario
Wood, Robert M.	293-9555	Agincourt Ontario
Wood, John A.	425-8688	Toronto Ontario
Wood, Mr. B.		Ottawa, Ont.
Woods, Daniel		Kapuskasing Ontario
Woods, Ken	705/526-8571	Midland, Ontario
Woolsey, John	372-6972	Cobourg Ontario
Wosik, Ted	239-1595	Islington, Toronto Ontario
Wright, Todd	655-3655	Ashburn Ontario
Wright, Lloyd	519/672-4197	London Ontario
Wright, David	923-8669	Toronto, Ontario
Wright, Bob		Guelph, ON
Wright, Ian A.		Toronto Ontario
Wrightman, Wesley	421-0375	Toronto Ontario
Wu, Charles	222-5566	Willowdale Ontario
Wu, Maria	654-9234	Toronto Ontario
Wunshe, Alan		Oshawa Ontario
Wyand, Al	493-4754	Willowdale, Ontario

Y

Yaneff, Thomas	284-5241	West Hill Ontario
Yano, Yukio	306/343-1740	Saskatoon Sask
Yates, Allan	223-2403	Willowdale Ontario
Yates, Frank	223-2403	Willowdale Ontario
Ying Computer Systems Ltd.		Winipeg Manitoba
Ylimaki, John	887-2541	Nipigon Ontario
Yolles, Dylan	920-3105	Toronto Ontario
Yong, Michael	694-9957	Toronto Ontario
Young, Craig	604/782-3178	Dawson Creek British Columbia
Young, Mr. M.		Toronto Ontario
Young, Mrs. Keith		Wyoming Ontario
Young, Cyril	291-7432	Agincourt Ontario
Young, Roy		Gander Newfoundland
Yu, Luis	429-7309	Don Mills Ontario
Yun-Fu, Li	366-9320	Toronto Ontario
Yurchak, Jason	661-2641	Downsview Ontario

Z

Zacharuk, David		Saint John N.B.
Zarnett, Bryan	491-4438	Willowdale Ontario
Zarnett, Gerald D.	491-4438	Willowdale Ontario
Zharkov, I. M.	859-4405	Nobleton Ontario
Zorn, Klaus	929-0780	Toronto Ontario
Zoskey, R.		Woodbridge, Ontario
Zverina, Richard F	725-1918	Oshawa Ontario
Zysman, Barry	881-4812	Thornhill Ontario

The Commodore 64 Maps

by

Don White
Ottawa

MANIPULATING THE LO-RES & HI-RES SCREENS
ON THE COMMODORE 64

Register 24 in the video chip allows the user to have a number of low resolution screens available. The configuration of this register is as follows:

VB13	VB12	VB11	VB10	CB13	CB12	CB11	NC
8192	4096	2048	1024	8192	4096	2048	

VIDEO MATRIX BASE

These 4 bits are bits 10-13 of the starting address of the low resolution screen. Thus, the lo-res screen can theoretically start anywhere between 1024(dec) and 15360(dec) on 1K boundaries. However, the screens starting at the following addresses are not available: 4096 5120 6144 7168

CHARACTER SPACE BASE

These 3 bits are bits 11-13 of the starting address of the programmable character memory. In theory, character memory can be located anywhere between 2048(dec) and 14336(dec) on 2K boundaries. However, the blocks starting at 4096(dec) and 6144(dec) cannot be used. When bit 2 is set, the character set at 53248(dec) is accessed (i.e. graphics/upper case) and when bits 1 and 2 are set the upper/lower case character set at 55296(dec) is utilized. Thus, character sets can be stored starting at the following addresses: 2048 8192 10240 12288 14336

To relocate the lo-res screen bits 4-7 of register 24 must be set to point to the start address of the screen. Also, address 648(dec) must be loaded with the actual physical memory page number where the screen is to start. For example, to relocate the lo-res screen to 2048(dec) the following statements must appear in your program:

```
poke 53272,37:rem point to 2048(dec)
poke 648,8 :rem memory page 8 (i.e. 8*256= 2048)
```

The POKE to 53272 (register 24) sets bits 5, 2 and 1. This means that the video display will start at 2048(dec) and the character set address is 53248(dec). Any characters in PRINT statements will now appear on the lo-res screen in its new location. However, POKEs to the screen must be adjusted to point to the appropriate area of memory. This can be accomplished by storing the calculated start of screen memory in a variable aand using offsets to determine the POKE locations. The start of the lo-res screen can be determined using one of the following formulae:

```
lr = 64 * (peek(53272) and 240)
or
lr = 256 * peek(648)
```

Alternatively, a small subroutine can be used to poke the appropriate byte into register 24 once the start address of the lo-res screen has been selected.

```
10 sc = 10240:rem start address of lo-res screen
20 gosub 10000
.
.
.
10000 rem set lo-res screen location
10001 rem does not change character set pointer
10002 rem
10010 poke53272,(peek(53272) and 15)+(240 and 16*sc/1024)
10020 poke 648,sc/256
10030 return
```

The 6566 Video Chip is only capable of looking at 16K blocks of memory. On power-up the video chip sees the bottom 16K. Which block is enabled is controlled by bits 0 and 1 at address 56576(dec) in CIA 2 (6526). The values of the two bits and the block of RAM adrressed are as follows:

Bit 1	Bit 0	16K Block of RAM	Starting Address
1	1	Block 0	0
1	0	Block 1	16384
0	1	Block 2	32768
0	0	Block 3	49152

With a small set-up program the 64 can quicIky be configured to look like a PET as far as screen handling is concerned. It must be stressed that this routine only deals with PEEKs and POKEs to screen RAM and will not take care of any PEEKs and POKEs to Zero Page.

```
100 rem configure 64 to handle screen like pet
110 rem
120 poke 56,128:poke 55,0:          rem protect memory above 32768
130 poke 56576,peek(56576) and 253: rem enable bank 2
140 poke 53272,peek(53272) and 15:  rem lores screen starts at
150 poke 648,128:                   rem 32768 or memory page 128
160 poke 44,4:poke 43,1:poke 1024,0: rem basic starts at 1024
```

Once this program has been RUN any PET programs that PEEK and POKE the PET screen will operate properly on the 64. However, I must again point out that this in no way will adjust the system for PEEKs and POKEs to other areas of the computer. Furthermore, it does not compensate for the differences in the coding of the keyboards.

The bit graphics mode on the 64 can be enabled by setting bit 5 in Register 17 (53265(dec)) of the Video Chip. Also, bit 3 in Register 24 (53272(dec)) must be set so that the character base starts at 8192(dec). This can be accomplished as follows:

```
100 poke 53265,peek(53265) or 32:rem bit map mode
110 poke 53272,25:rem hires screen at 8192
```

This routine will leave the lo-res screen, which becomes the colour nybble map for the hi-res screen, at 1024(dec). The start-of-BASIC will still be located at 2048(dec). This is fine if the routine you plan to use is quite small. In this case, the hi-res screen can be protected with a POKE 56,32 and POKE 55,0 which will lower the top-of-memory pointer.

If you plan to use a large program, the start-of BASIC should be moved to 16384(dec). This is done by

```
poke 44,64:poke 43,1:poke 16384,0:clr:new
```

Once the hi-res screen has been established, points can be plotted with the following routine which was extracted from the VIC Programmers Manual.

```
1000 rem hires plotting routine
1010 rem
1020 ch = int(x/8) + int(y/8) * 40
1030 ro = int((y/8 - int(y/8)) * 8)
1040 by = 8192 + 8 * ch + ro
1050 bi = 7 - (x - (int(x/8) * 8)
1060 poke by,peek(by) or (2(uparrow)bi)
1070 return
```

Commodore 64 MEMORY MAP

HEX	DECIMAL	DESCRIPTION
0000-03FF	0000-1023	Zero page basic pointers/stack/etc.
0400-07FF	1024-2047	Screen RAM
0800-9FFF	2048-40959	Program text area
2000-3FFF	8192-16383	Hi-res screen (alternate)
8000-9FFF	32768-40959	8K cartridge ROM area
A000-BFFF	40960-49151	8K BASIC (V2)
C000-CFFF	49152-53247	4K RAM
D000-DFFF	53248-57343	'66-'81-'26(2)-I0 exp1&2/4K char space
E000-FFFF	57344-65535	ROM - Operating system

Editor's Note:

The following are maps released by Commodore to some dealers but not known to be generally available anywhere to users. As originally distributed they had quite a number of errors and these have been corrected by Don. -ed.

6566 VIDEO CHIP

(D000-D02E/53248-53294)

Register # Dec	Register # Hex	ADDRESS Dec	ADDRESS Hex	DESCRIPTION
0	0	53248	D000	SPRITE 0 X cmp
1	1	53249	D001	SPRITE 0 Y cmp
2	2	53250	D002	SPRITE 1 X cmp
3	3	53251	D003	SPRITE 1 Y cmp
4	4	53252	D004	SPRITE 2 X cmp
5	5	53253	D005	SPRITE 2 Y cmp
6	6	53254	D006	SPRITE 3 X cmp
7	7	53255	D007	SPRITE 3 Y cmp
8	8	53256	D008	SPRITE 4 X cmp
9	9	53257	D009	SPRITE 4 Y cmp
10	A	53258	D00A	SPRITE 5 X cmp
11	B	53259	D00B	SPRITE 5 Y cmp
12	C	53260	D00C	SPRITE 6 X cmp
13	D	53261	D00D	SPRITE 6 Y cmp
14	E	53262	D00E	SPRITE 7 X cmp
15	F	53263	D00F	SPRITE 7 Y cmp
16	10	53264	D010	SPRITE X cmp (msb of x coord.)
17	11	53265	D011	Bit 7 Raster compare Bit 6 Extended colour mode Bit 5 Bit map mode Bit 4 Blank/unblank screen Bit 3 24/25 row select (1 25 rows) Bit 2-0 Scroll in y position
18	12(R/0)	53266	D012	Raster read (raster cmp IRQ write)
19	13(R/0)	53267	D013	Light pen latch x
20	14(R/0)	53268	D014	Light pen latch y
21	15	53269	D015	SPRITE disable (1 SPRITE enabled)
22	16	53270	D016	Bit 7-5 Unused Bit 4 Multi-colour mode Bit 3 38/40 column select (1= 40 col.) Bit 2-0 Scroll in x position
23	17	53271	D017	SPRITE expand in iY
24	18	53272	D018	Bit 7-4 Video matrix base Bit 3-1 Character space base
25	19	53273	D019	Bit 7 Follows IRQ line Bit 2 IRQ for SPRITE to SPRITE collision Bit 1 IRQ for SPRITE to background Bit 0 Raster cmp IRQ collosion
26	1A	53274	D01A	IRQ mask register (0= interrupt disabled)
27	1B	53275	D01B	Background to SPRITE priority
28	1C	53276	D01C	Multi-colour SPRITE select
29	1D	53277	D01D	SPRITE expand in iX
30	1E	53278	D01E	SPRITE to SPRITE collision detect
31	1F	53279	D01F	SPRITE to background collision detect

6566 VIDEO CHIP COLOR REGISTERS (Bit 3-0)

Register # Dec	Hex	ADDRESS Dec	Hex	DESCRIPTION
32	20	53280	D020	Border colour
33	21	53281	D021	Background colour 0
34	22	53282	D022	Background colour 1
35	23	53283	D023	Background colour 2
36	24	53284	D024	Background colour 3
37	25	53285	D025	SPRITE multi-colour register 0
38	26	53286	D026	SPRITE multi-colour register 1
39	27	53287	D027	SPRITE 0 colour
40	28	53288	D028	SPRITE 1 colour
41	29	53289	D029	SPRITE 2 colour
42	2A	53290	D02A	SPRITE 3 colour
43	2B	53291	D02B	SPRITE 4 colour
44	2C	53292	D02C	SPRITE 5 colour
45	2D	53293	D02D	SPRITE 6 colour
46	2E	53294	D02E	SPRITE 7 colour

REGISTER DESCRIPTION
FOR THE 6566 VIDEO CHIP
AS USED IN THE COMMODORE 64

Registers 0-1 control the co-ordinate position of SPRITE 0; Register 0 controls the X-axis and Register 1 controls the Y-axis.

Registers 0-15 are paired like 0 and 1 for SPRITES 0-7.

Register 16 is the most significant bit of the X co-ordinate of the SPRITES. This way we can move a SPRITE all the way across the 320 pixel X-axis. Bit 0 corresponds to SPRITE 0 and so on.

Register 17 is a multi-function register:

Bit 0-2 Scroll in Y position
Bit 3 24/25 row select (1= 25 rows)
Bit 4 Blank/unblank screen (0= turn off video display)
Bit 5 Bit map mode (Hi-res mode)
Bit 6 Extended colour mode
Bit 7 Raster compare.

Register 18 is the raster compare IRQ write register and is read only.

Register 19 and 20 are light pen latches for X and Y and are read only.

Register 21 is the SPRITE enable register. Each bit (0-7) set corresponds to a SPRITE (0-7).

Register 22 is another multi-function register:

Bit 0-2 Scroll in X position
Bit 3 38/40 column select (1= 40 columns)
Bit 4 Multi-colour mode
Bit 5-7 Not used.

Register 23 is the SPRITE expand in Y register. Setting the bit corresponding to the SPRITE doubles the vertical size (Y) of the SPRITE.

Register 24 is a dual function register:

Bit 0 Unused
Bit 1-3 Character space base
Bit 4-7 Video matrix base.

Register 25 is IRQ register:

Bit 0 Raster cmp IRQ
Bit 1 IRQ for SPRITE-background collision
Bit 2 IRQ for SPRITE-SPRITE collision
Bit 3 Light pen IRQ
Bit 4-7 Not used.

Register 26 is IRQ mask register (0= interrupt disabled).

Register 27 is background-SPRITE priority register (0= SPRITE has priority).

Register 28 is the multi-colour SPRITE select.

Register 29 is the SPRITE expand in X register (see Register 23).

Register 30 is the SPRITE-SPRITE collision detection register.

Register 31 is the SPRITE-background collision detection register.

Registers 32-46 are 4 bit colour registers.

Colour Code

Code	Colour
0	Black
1	White
2	Red
3	Cyan
4	Purple
5	Green
6	Blue
7	Yellow
8	Orange
9	Brown
10	Light Red
11	Gray 1
12	Gray 2
13	Light Green
14	Light Blue
15	Gray 3

Register Function

Register	Function
32	Exterior colour
33	Background 0
34	Background 1
35	Background 2
36	Background 3
37	SPRITE multi-colour reg 0
38	SPRITE multi-colour reg 1
39	SPRITE 0 colour
40	SPRITE 1 colour
41	SPRITE 2 colour
42	SPRITE 3 colour
43	SPRITE 4 colour
44	SPRITE 5 colour
45	SPRITE 6 colour
46	SPRITE 7 colour

NOTE: Only colours 0-7 may be used in multi-colour character mode.

6581 (SID) SYNTHESIZER CHIP

(D400-D41C/54272-54300)

Register # Dec	Hex	ADDRESS Dec	Hex	DESCRIPTION
0	0	54272	D400	Frequency lo
1	1	54273	D401	Frequency hi
2	2	54274	D402	Pulse width lo
3	3	54275	D403	Bit 7-4 Unused
				Bit 3-0 Pulse width hi
4	4	54276	D404	Control register voice 1
				Bit 7 Noise
				Bit 6 Pulse
				Bit 5 Sawtooth
				Bit 4 Triangle
				Bit 3 Test bit
				Bit 2 Ring modulation
				Bit 1 Sync
				Bit 0 Gate
5	5	54277	D405	Attack/decay register
6	6	54278	D406	Sustain/release register
7-12	7-D	54279-	D407-	Control register voice 2
		54285	D40D	(Functionally identical to D400-D406)
13-20	E-14	54286-	D40E-	Control register voice 3
		54292	D414	(Functionally identical to D400-D406)
21	15	54293	D415	Cutoff frequency lo
22	16	54294	D416	Cutoff frequency hi
23	17	54295	D417	Bit 7-4 Resonance of filter
(Bit 3-0 Select signals to be routed through filter. Bits set to zero appear directly at audio output, bits set to 1 will be processed through filter)				
				Bit 3 External input
				Bit 2 Voice 3
				Bit 1 Voice 2
				Bit 0 Voice 1
24	18	54296	D418	(Bit 7-4 Select filter mode and output options)
				Bit 7 Off
				Bit 6 High pass
				Bit 5 Band pass
				Bit 4 Low pass
				Bit 3-0 Output volume
25	19	54297	D419	Pot X
26	1A	54298	D41A	Pot Y
27	1B	54299	D41B	Oscillator 3/random number generator
28	1C	54300	D41C	Envelope 3

REGISTER DESCRIPTION
FOR THE 6581 (SID) SYNTHESIZER
AS USED IN THE COMMODORE 64

The SID chip is a three voice polyphonic synthesizer on a single 24 pin IC. In addition to independent ADSR envelopes for each voice, the SID allows osc sync, ring mod, high, low and band pass filtering as well as two a/d converters.

Registers 0-6 control voice 1. Registers 7-13 and 14-20 are organized similarly for voices 2 and 3, respectively.

Registers 0 and 1 represent the 16 bit number which linearly controls the frequency of osc 1.

Register 2 and bits 0-3 of register 3 represent the 12 bit number which controls the pulse width of osc 1.

Register 4 is the control register for osc 1. Its bits select various output options.

Bit 0 Gate bit: when set the envelope is triggered and attack/decay/sustain cycle begins: when unset, the release cycle begins.

Bit 1 Sync bit: synchronizes osc 1 to osc 3 (2 to 1 for voice 2, 3 to 2 for voice 3).

Bit 2 Ring Mod bit: replaces osc 1 output with the ring modulated output of osc 1 and osc 3 (2 and 1 for voice 2, 3 and 2 for voice 3).

Bit 3 Test bit: when set osc 1 is reset and locked to zero until it is unset.

Bit 4 Triangle waveform: when set the triangle waveform output is selected. The triangle waveform is low in harmonics and has a mellow, flute-like quality.

Bit 5 Sawtooth waveform: when set the sawtooth waveform output is selected. The sawtooth waveform is rich in even and odd harmonics and has a bright, brassy quality.

Bit 6 Pulse waveform: when set the pulse waveform output of osc 1 is selected. The harmonic quality of this waveform can be adjusted by the pulse width registers, producing a tone from a bright, hollow square wave to a nasal, reedy pulse. Sweeping the pulse produces a dynamic 'phasing' effect.

Bit 7 Noise waveform: when set the noise output waveform of osc 1 is selected. This output is a random signal which changes at the frequency of osc ?. The sound quality can be varied from a low rumbling to a hissing white noise.

Register 5 is the attack/decay register.

Bit 4-7 Attack rate (value from 0 to 15; see Table 1)

Bit 0-3 Decay rate (value from 0 to 15; see Table 1)

Register 6 is the sustain/release register.

Bit 4-7 Sustain rate (amplitude value during sustain 0=min 15= max)

Bit 0-3 Release rate (value from 0 to 15; see Table 1)

Registers 21 and bits 0-2 of register 22 control the cutoff frequency for the programmable filter. FC(out)=(30 + FC(in) * 5.8) Hz.

Register 23 is the resonance/filter control.

Bit 4-7 Controls the resonance of the filter. There are 16 settings from 0 (no resonance) to 15 (max resonance).

Bit 0-3 Determine signals to be routed through the filter.

Bit 0 Voice 1: when set, signal will be processed; when unset, signal will appear directly at the output.

Bit 1 Same for voice 2.

Bit 2 Same for voice 3.

Bit 3 Same for external input.

Register 24 is the filter mode/volume control.

Bit 4-7 Selects various filter modes.

Bit 4 When set, low pass filter is selected (components below cutoff are unaltered; components above cutoff are attenuated at 12 dB/octave).

Bit 5 When set, band pass filter is selected (all frequency components above and below cutoff are attenuated at 6 dB/octave).

Bit 6 When set, high pass filter is selected (components above cutoff are unaffected; components below cutoff are attenuated at 12 dB/octave).

Bit 7 When set, voice 3 is disconnected from audio path (this allows voice 3 to be used for modulation without any undesirable output).

Bit 0-3 Select 1 of 16 overall volume levels for the final composite audio output.

Register 25 is an A/D converter for POTX (pin 24).

Register 26 is an A/D converter for POTY (pin 23).

Register 27 is oscillator 3/random number generator register. It allows the microprocessor to read the upper 8 output bits of oscillator 3. The number generated is directly related to the waveform selected.

If the sawtooth waveform is selected, the register presents a series of numbers incrementing from 0 to 255 at a rate determined by oscillator 3.

If the triangle waveform is selected, the number will increment from 0 to 255 and then decrement back to 0.

If the pulse waveform is selected, the numbers will jump between 0 and 255.

If the noise waveform is used, a random number will be generated.

Register 28 is the same as oscillator 3 but it allows the microprocessor to read the output of the voice 3 envelope generator. This output can be added to the filter frequency to produce harmonic envelopes, wah and similar effects.

TABLE 1: ATTACK/DECAY/RELEASE/RATES

Value	Attack Rate	Decay/Release Rate
0	2 ms	6 ms
1	8 ms	24 ms
2	16 ms	48 ms
3	24 ms	72 ms
4	38 ms	114 ms
5	56 ms	168 ms
6	68 ms	204 ms
7	80 ms	240 ms
8	100 ms	300 ms
9	250 ms	750 ms
10	500 ms	1.5 s
11	800 ms	2.4 s
12	1 s	3 s
13	3 s	9 s
14	5 s	15 s
15	8 s	24 s

Wanted: TPUG Business Manager

The TPUG Directors have decided to take on a professional Business Manager for your club. We can no longer rely on volunteer labour to look after what is turning out to be a full, half time job.

The job entails managing the business office of the club, e.g. looking after membership mail, membership lists, supplies, correspondence, etc. Also included is assistance with the TORPET, looking after distribution of club disks, promotion of the club, assisting with running meetings, looking after equipment, and reporting to the Directors.

We feel the job will require roughly twenty hours a week, or half the time of a professional business manager. The directors have agreed to pay a salary of $1000. per month for the position, and would like to hear from anyone who is interested in the job.

To apply, please contact the President, Michael Bonnycastle at 444-3492 during business hours before December 15, 1982.

FORTH

BY Fred Brown

A day or so ago, I was chatting with an Atari owner, comparing things like Atari BASIC vs. BASIC 2.0, ANTIC/GTIA vs. 6560, keyboard, memory, and the ilk. Then, I casually mentioned that I had FORTH on the VIC.

I couldn't help a laugh of delight as his jaw hit the floor.***

Yes folks, the VIC speaks FORTH, and 'tis now a **real** power to be reckoned with, thanks to Tom Zimmer of Human Engineered Software, 71 Park Lane, Brisabane CA., 94005,(415) 468-4110 (they take VISA). VICFORTH is a fig-FORTH dialect on an 8K cartridge, costing $59.95 US.

First off, it's no beginners stuff. HES suggests several tutorial and reference works from the FORTH Interest Group, and the neo had better get a couple of them. After slugging through Leo Brodies's Starting FORTH I dug in.

VICFORTH uses the cassette as mass storage and lacks FORTH's virtual memory disk system. It's obviously aimed at the majority of VIC owners who don't have disks, but the fix is simple and HES provides clear wording. After fixing, VICFORTH behaves like BASIC; NWRITE and NREAD replace SAVE and LOAD.

Actually,I prefer this to FORTH's numbered 'screens', which lacks a directory. Named files and Commodore's disk environment avoid this, but there's overhead. VICFORTH saves things in 1024 byte blocks, and a block of source code invariably has a lot of unused space

FORTH operates by 'compiling' source code into a 'threaded system dictionary', which is executed (sort of) by a **very** fast interpreter. BASIC, on the other hand, tokenizes source code, and then invokes the BASIC 2.0 interpreter to execute the source code directly (and slowly). An important part of VICFORTH is, therefore, the screen editor used to create a source code file.

Traditional FORTH screen editors are a pain to use, but VICFORTH combines elements of fig--FORTH, FORTH-79, and Commodore screen editors to good effect. Function keys are well used. A number of 1024 byte 'screens' reside in RAM, and you pick which one you want to edit. 16 lines of the display are the Text area, which scrollsto64columns(16X64 1024bytes).Thebottom5 lines are the Edit Command area.

An example:
enter "P THIS IS VICFORTH"
in the Edit area, and

"THIS IS VICFORTH" is placed in the Text area after the cursor (one for each area) . There's also an Insert mode, which lets you type directly in the Text area, much like the PET/CBM/VIC screen editor.

One oddity: in the Text area, left brace appears as a plus, right brace as a vertical slash, and ampersand as a wide hyphen. No reason is given, to which I say, "???"

As to vocabulary, we've got over 250 (!) words to play with. Standard fig-FORTH is extended to and sound words, and memory allocation words (adjusts # of screens in memory). Some FORTH-79 words are also included.

On a more sophisticated level, there's a word that accesses the User Port, and a powerful SYS that can set the 6502 registers. Complete control is possible over the PET/CBM/VIC file and channel I/O system, and vectored execution (a useful FORTH programming technique) is applied to all I/O, making it a snap to restructure.

Sadly, we are without an Assembler (standard with most FORTH's), and error messages are downright spartan.

This last makes VICFORTH rather dangerous for the sloppy programmer. Stupidity is rewarded with frustration, instead of errors, as you crash for the 27th time (watch that Return stack!!).

Still, FORTH is superior to other languages precisely **because** it places more responsibility on the programmer, making him/her more careful, logical, and structured (no GOTO's; don't need them in FORTH). Top-down programming comes naturally, and development time is slashed. One tends to get it right the first time, avoiding marathon debugging sessions. Also, FORTH's extension-ability makes it a uniquely powerful programming tool.

Whatever FORTH's beauty, it's all crock without a good manual. HES has provided one, and they retain their rep for good documentation. 80 pages long, it contains such goodies as a complete listing of the fig-FORTH standard, a couple of pages of useful 'quickies', a good system description, and a page-by-page run-through of "Starting FORTH", detailing differences. Writing is concise and well organized, and rates an overall nine ("there are no tens").

Things missing: a tutorial for the poor sots who don't have Starting FORTH a few example

programs (games anybody?), and details on selling FORTH programs back to HES (form and style, their requirements, royalty details, that sort of thing).

I for one, would pay good money for a more advanced manual, giving more system details, a good memory map, programs, programming hints, 6502 source listing, and so on. My appetite has been whetted: feed me!!

On the whole, HES has got a very powerful and significant package here. We will see FORTH VIC's doing amazing things shortly. But it's that old familiar saw: no software, ergo, no volume sales. FORTH is rather popular, but I've yet to see anything in my local Computer Store and Bait Shop on Commodore-format disks (though maybe I'm being a bit premature).

I would suggest a more sophisticated development package that could make run--time modules, or meta-compile, so non-FORTH PET/CBM/VIC's can run my programs. This would spur software development. Also, a disk-based version is essential, with 6502 Assembler.

I strongly recommend VICFORTH to the ambitious and/or experienced programmer who wants to get into FORTH and write smaller, faster, and better programs, or to the educator who wants to introduce FORTH to his/her students, at nominal cost. The price is definitely right, but it's liable to gather dust if Daddy brings it home to Kiddy along with the latest Space Invaders cartridge. It's not quite mass-market, yet.

HES is to be congratulated for a bold and innovative product that might very well revolutionize VIC computing. It's that good. Gad, if every VIC came equipped with this package, it would blow the competition out of the water. Look into it. It could be the best piece of firmware you've ever purchased.

Until, that is, HES comes out with the next version. Me, I can't wait for it; 'scuse me while I go write my own.

***Authors Note: I'm not running down Atari; they're good systems in their own right. Unless I'm mistaken , FORTH is available for Atari, and if you've played any of Atari's commercial video games, you're probably already familiar with the language. I recall reading that a FORTH-like language is used for the development of Atari games.

Continued from Page 21

Blind Spots

by Jim Butterfield

There's no programming problem more difficult than the obvious one ... the one that is staring you in the face, yet you can't see it.

It's very annoying when you type ?#1, HELLOg - you'll get a syntax error, of course, but when you list the line it will show as PRINT#1,LHELLOi - perfect! Yet it won't run unless you type in it the hard way, with P-R-I-N-T-#. Of course, you could just move the cursor over the bad line and strike RETURN. But it's there, looking perfect...

I must confess: I have a lot of trouble with perfect programs that don't run. I recall translating an early ACROBAT program into upgrade ROM. I did the job very carefully, checking each step. When it was completed, a run yielded SYNTAX ERROR. The line looked perfect at first glance: IF GO= 7 THEN... Now, we probably all know by now that GO is a keyword and cannot be used as a variable. In the first PET, GO was not a keyword, and the program had used it. So we had the annoying situation: the problem was in a part of the program I had not changed. When a program behaves badly, we tend to look at the parts we have been messing with ... not the unchanged bits. Result: a blind spot.

I have problems with spelling the names of functions incorrectly. If I should misname the square root function, for example, using SQT(5) instead of SQR(5), the computer will think that I mean an array. Instead of saying SPELLING ERROR or SYNTAX ERROR it will look up non-existent array SQT, give me a zero value, and keep going. The program runs, but it gives me wrong answers. Again, that's hard to track down: it tends to be a blind spot.

I wish computers would spell better.

Sometimes hardware behaves in a way that you don't anticipate. At a Spring meeting of TPUG, I tried to demonstrate a preliminary version of BREAKOUT for the VIC. I had decided to use coloured bars: as the ball in play hit a bar, it would change colour in a given sequence. Not too hard a task, once the basic game was in place, you might think. If you happened to be at that meeting, you might have noticed that the game had problems.

Here's what the trouble turned out to be. To change the colour of something on the VIC screen, you must POKE the appropriate value into the "colour nybble" location. For example, on a small memory VIC, POKE 38400,0 will change the upper left character to black.

Now the colour memory is just another set of memory chips. Only four bits are used, to allow eight colours plus a amulti-colourO mode. So: any reasonable person would expect that if you POKE a value of zero into location 38400, you will be able to see that zero if you PEEK the same location. That way, you will be able to tell what colour is used at that particular part of the screen.

It turns out (I found) that you don't see the zero when you PEEK. What you see is a random number. You can extract the zero by dividing by 16; the remainder is the colour. Until I discovered this, I was having a very difficult time with the program. I rewrote the code a half dozen times under the impression that I somehow had a logic error.

I have a number of blind spots when working in machine language. My current one is this: If I want to load zero into both A and Y registers, I could code: LDA #$00 .. LDY #$00. But I usually try to save a byte, and instead I code LDA #$00 .. TYA.

That's an obvious goof - I'm transferring the wrong way (I should have used TAY, Transfer A to Y, instead of TYA). But I do it regularly - and then I can't see it. TAY and TYA look so much alike. It's a habitual blind spot. You might think that I've done it enough times to have learned ... not to do it. Nope. I'm beginning to believe that this particular bug is part of my writing style.

Comparisons are easy sources of error. CMP compares the A register; CPX compares the X register; CPY compares the Y register. All very simple; but it's easy to unthinkingly compare the wrong register.

I recall a student at a Machine Language course I was giving at Haileybury who was having problems with an exercise. Part of the exercise used register X as a counter. The coding went something like this: INX (increment X), CPX #$09 (compare X to 9), BNE LOOP (if not equal, back to LOOP). The student had this mental block: he would code INX to increase X, and then test, not X, but A with CMP #$09. This couldn't work, of course: X kept getting bigger but instead of testing X, he tested the wrong thing.

This kind of thing is hard to see. Despite the fact that the correct program was written on the blackboard, the student couldn't see his error: CPX and CMP look very much alike. His program failed; he typed it in again. He checked it very carefully this time, and then ran it. Crash. Even after entering it wrongly a third time, he couldn't see the error; and for that matter, neither could I as I quickly scanned through his code. It's an odd human idiosyncrasy: he made the same error over and over, and couldn't see it.

When I completed Supermon for the Commodore 64, I passed out a few early copies. I should mention that SUPERMON64 has colour components: the background is blue, the computer's output is in black, and the user types in white. It seemed to me that this would be ideal for instructional use.

I received a complaint on Supermon64: it was not working right. I looked over the user's shoulder, and certainly things did not appear to be normal.

It's hard to know what to say at a time like that. I mumbled the usual things about how it worked fine on my machine, and wandered off. Ten minutes later, I had an inspiration.

I went back to the machine, and asked for another load. Eureka! The user was using a black and white monitor, and had turned up the contrast so high that two of Supermon's as black. When the contrast on the monitor was turned down, the monitor worked perfectly.

It's hard to read black-on-black. You might call it a blind spot.

Mum's the Word

There are some things I don't talk about.

People sometimes take exception to this. At a recent copy session, I was told, That's like waving a red flag at a bull... Yet there are a whole range of subjects that I try to stay away from.

The first area is concerned with bad habits. I have my own ideas as to what is good practice and what's not, and I try to avoid telling people how to do things the wrong way... even when they would like to know. This is open to dispute, of course: what I consider bad practice may be viewed by others as just fine. But I try to keep trouble away by encouraging my view of good usage and keeping mum on bad usage.

One of my major yardsticks is this: if it doesn't work on a whole range of machines, it's not sound coding. I don't like to keep a dozen different version of the same program. Among other things, it makes it hard to update a program: updating twelve is hard work. And usually not necessary ... if you do it right.

How many different machines are there today? Let's list some of them. The 4K original ROM; the 8K original ROM; original ROM machines with memory exapansion; Upgrade ROM with various amounts of memory, with business or graphics keyboards; 4.0 small screen units with various amounts of memory and business or graphics keyboards; the fat 40; the 80 column; the VIC with 5K, with 8K, with over 8K;

the Commodore 64. Dozens, by the time you allow for the combinations. We won't even mention the different disk systems and Commodore printers that can be added ... oops, we just mentioned them.

Unless you are writing programs for your own personal use and nobody else's, a good program is a portable program. You can share it with others, or sell it, or whatever. I try to encourage things that help portability; I try not to talk about one-of-a-kind features.

Take the keyboard, for example. A lot of people like to read the keyboard by looking at location 151 (515 in original ROMs, 203 in VIC and Commodore 64). The problem is this: the location is linked to the specific keyboard system; pressing the tle key will give you different readings on different machines. In fact, some keyboards contain more than one o1e key, each of which gives a different value. Who needs six or seven different programs to allow for the variations? Not me: I recommend using the GET statement, which works the same on all machines. If you need to detect whether a key is being held down, then you may use the location, but only for that task: you'll see a value of 255 (64 on VIC/64) if no key is being pressed. Providing you don't ask this location to tell you which key, it will work identically in a wide range of machines.

Some people clear the keyboard buffer with POKE 158,0. Why bother? GET A$,A$,A$,A$ will remove four items from the buffer; there are unlikely to be more, but you can lengthen the statement if you wish. The GET statement can be used on any Commodore machine; the POKE works only on certain machines.

The Fat 40 allows you to set the size of the keyboard buffer by means of POKE 1003,20 .. in this case, the buffer would become 20 characters long. Nice if you want to type ahead; but I don't recommend its use in programs. Why not? Because it works only on the Fat 40 ... no other machine honours that POKE. If you use it, you're building in incompatibility.

I believe that if people find the easy way to do things, they won't need to know that hard way. Many beginners in machine language don't realize that they have the equivalent of the PRINT command in the subroutine at $FFD2. I have seen amazing arrays of code for clearing the screen: yet LDA #$93 .. JSR $FFD2 will do it on all Commodore machines. All you need do is to print the tclear screen character. Similarly, you have an almost exact equivalent for Basic's GET in the subroutine at $FFE4. And both PRINT and GET can be easily switched to other devices to give the equivalent of PRINT# and GET# by using the subroutines at $FFC6, $FFC9 and $FFCC. I never show people the hard way to do it. Come to think of it, I'm not sure I know how to do it the hard way.

A few months ago, I was talking to a group about how to disable the stop key. Someone asked the question, qHow do you disable the whole keyboard except for the stop key? The question threw me. I went into a lengthy discussion of how the interrupt works, and how you would write your own interrupt coding to make it do your own job. Suddenly it dawned on me. If you don't want keyboard input, don't use it. Just give a GET X$,X$,X$,X$ command frequently and throw away the characters. Once again, I was looking for the hard way, when there was an obvious easy way to do the desired thing.

I don't like to talk about programs or products that are not generally available. If a product or program is for sale, and I think it is worth while, I may demonstrate it. If a program is public domain, I'll give it away. But there are many things in between ... a product or program that may be for sale soon. Unless it is of exceptional interest, I don't show these to anyone. Such a demonstration would just be an aeat-your-heart-outN exercise: the viewer can't have it, so there's no point in showing it.

I'm a little touchy in the area of program protection. I have said on many occasions that there must be a better way to protect a program than the mechanical methods: uncopiable disks, ROMs or dongles. The product itself is less attractive and useful when locked up in this way. If a user needed to modify a commercial program slightly to adapt to his needs (say, to add a communiations link), he's often unable to do so.

I've said that I'd rather see service, support and warranty used to protect a commercial program. But protection schemes are in commercial use; and I don't like talking about them.

I occasionally get a call that goes along the following lines: II'm writing a program and want to protect it. I think Visicalc has a good protection scheme ... can you tell me exactly how it works and how users might beat the system? Maybe I'm just overly suspicious, but I tend to be very cautious in answering such questions.

As a rule, I don't like to tkeep secretsn. But it seems to me that some information might cause more harm than good; and I avoid talking too much in these area. I suspect that's a switch: on most subjects, you'll have trouble getting me to shut up.

LIST LOCK

by

Steven Darnold

Also see A Fast Protect p. 8

Adventures are very popular at my school. Every month or so, I take in a new adventure and give a prize to the first pupil to complete it. Needless to say, the school's three 16K PETs get used with particular enthusiasm when a new adventure arrives.

It was obvious from the beginning that I would have to do something to hide the program listings from inquisitive eyes. The temptation to get a "hint" from the listing is just too great. I considered writing the adventures in machine language, but the time required for this would rule out monthly adventures (I would be lucky to write one a year!). I considered buying a BASIC compiler, but the prices are just too high. I considered storing all text as data files, but several pupils would have little difficulty unraveling such files. In the end, the only viable alternative was to write a normal BASIC program and then lock the listing.

The first time I loaded a VIC program into my PET, I was surprised to find that I could not list it. After some fiddling around, I discovered that I could list the program if I moved the start-of-BASIC pointer to $1001. However, when I then loaded a normal PET program, I could not list it until I had moved the start-of-BASIC pointer back to $0401. This is the key to locking a listing. As long as the start-of-BASIC pointer is not pointing to the program, it cannot be listed.

When I want to lock a program, I start it 57 bytes beyond the normal start-of-BASIC position. This keeps the user from listing it. However, it also keeps the user from running it. In order for a program to run, the start-of-BASIC pointer has to be pointing at it. Therefore, in the normal start-of-BASIC position, I put a machine language routine which resets the pointer. A LIST shows only o100 SYS1037. but a RUN finds the program via the machine language.

While the program is running, the start-of-BASIC pointer points to it. Consequently, if the program stops suddenly, it can be listed. It is essential, therefore, to keep the user from breaking out of the program. The stop key must be disabled and a special input routine used to keep the user from jumping out of the program. Also, the program must be examined to eliminate any conceivable break due to such things as string too long and overflow errors.

Just before the end of the program, the start-of-BASIC pointer must be poked back to its usual position. Otherwise the user will be able to list the program at the end. Moreover, if the user loads a new program, he will not be able to find it unless the pointer is back to normal.

It should be noted that, although the locking procedure erects a tangible barrier, even more potent is the psychological effect. The opening SYS statement gives the impression that the entire program is in machine language. Few users will suspect anything beyond that (particularly since some compiled programs run little faster than normal BASIC).

Locking Procedure

The rest of this article details the locking procedure for a PET with upgrade or 4.0 ROMs. Users of other Commodore computers should be able to adapt the procedure without too much difficulty.

Routine 1 goes in the normal start-of-BASIC position. It can be inserted into an existing BASIC program by entering a dummy first line, made up of a REM and 50 asterisks. This leaves just enough room for the routine to be typed in from the machine language monitor.

```
.: 0401 0B 04 64 00 9E 31 30 33
.: 0409 37 00 00 00 A9 93 8D 6F
.: 0411 02 A9 52 8D 70 02 A9 D5
.: 0419 8D 71 02 A9 0D 8D 72 02
.: 0421 A9 04 85 9E 78 AD FF FF
.: 0429 85 91 AD FE FF 69 16 85
.: 0431 90 58 A9 39 85 28 60 00
```

```
0401 0B 04              link to next program line (at 040B)
0403 64 00              line number (= 100)
0405 9E 31 30 33 37     SYS1037
040A 00 00 00           end of program
040D A9 93 8D 6F 02     puts CLEAR-SCREEN in keyboard buffer
0412 A9 52 8D 70 02     puts R in keyboard buffer
0417 A9 D5 8D 71 02     puts shifted-U in keyboard buffer
041C A9 0D 8D 72 02     puts RETURN in keyboard buffer
0421 A9 04 85 9E        puts 4 in buffer counter
0425 78                 disables interrupts
0426 AD FF FF           fetches value from jump table
0429 85 91              stores in hardware interrupt vector
042B AD FE FF           fetches value from jump table
042E 69 16              adds offset (to disable stop key)
0430 85 90              stores in hardware interrunt vector
0432 58                 clears interrupt disable
0433 A9 39 85 28        puts $39 in start-of-BASIC pointer
0437 60                 end of machine language
0438 00                 marks start of main program
0439 ?? ??              link to next program line
043b ?? ??              first line number of main program
```

This routine performs three tasks. First, it sets keyboard buffer values in such a way that a RUN is executed when the routine ends. Second, it disables the stop key by causing the interrupt vector to skip the stop key servicing routine. Third, it changes one byte of the start-of-BASIC pointer from $01 to $39, thereby moving the start of BASIC from $0401 to $0439.

Routine 2 goes into the main program as a subroutine. All INPUT statements are replaced by GOSUB 60000. The input is returned as IN$.

```
60000 IN$ = '''':POKE158,0:POKE167,0
          (clear input string and buffer, turn on cursor)
60010 WAIT158,7:GETZ$:Z = ASC(Z$):IFZ>95THEN6001 0
          (get one character, reject if too big)
60020 ZL = LEN(IN$):IFZL>38THEN60040
          (reject character if string too long)
60030 IFZ>31THENIN$ = IN$+Z$:PRINTZ$;:GOTO60010
          (add character to string if not too small)
60040 IFZ = 13ANDZLTHENPOKE167,1:PRINT'' '':RETURN
          (turn off cursor and exit if RETURN pressed)
60050 IFZ = 20ANDZLTHENIN$ = LEFT$(IN$,ZL-1):PRINT Z$;
          (delete character from string if DEL pressed)
60060 GOTO60010
```

This routine has many advantages over a normal INPUT and can be used in all sorts of programs. First, it does not drop out of the program when RETURN is pressed alone (line 60040 rejects RETURN if ZL = 0). Second, it will not accept out-of-range characters (set maximum ascii value in line 60010, set minimum in line 60030). Third, it rejects all cursor control characters except delete (which only works if there is something in the string to delete). Fourth, it limits the length of the input (set maximum in line 60020). The input length must be less than 255 to avoid the possibility of a STRING TOO LONG error.

The third part of the locking procedure is the simplest of all. Everywhere it ends, the main program must end in this way:

```
POKE 40,1 : END
```

This returns the start-of-BASIC pointer to the normal position. A person then listing the program will find only "100 SYS1037".

What Really Happens When You Type "New"

By Thomas Henry

If someone were to ask you, "What really happens when I type **NEW**", what would you answer? Stop and think about that for a moment before continuing. The question almost seems trivial, doesn't it? And yet as you will see, typing NEW leads to quite a few consequences. What follows is a description of exactly what happens and applies in most cases to all Commodore computers, including the VIC-20.

Before detailing the implications of NEW, a few words should be said about why this is an important topic. First of all, from the theoretical side of things, it's nice to know exactly how your computer works. And you never know when **theoretical** knowledge will become quite **practical**. This is especially true if you program in machine language. Secondly, even if you program strictly in BASIC, you will find that NEW has some effect upon several operations that you would have never expected. For example, did you know that NEW closes down all files and restores default devices? BASIC programmers could easily find this out the hard way. That's just one example; let's number off, in chronological order, what else happens.

(1) After typing NEW, the first thing that happens is that two consecutive zeros are loaded into memory right at the start of BASIC. So, for example, in a PET/CBM, starting at $0400 you would find a zero (there's always one at $0400), followed by two more. Two consecutive zeros tell BASIC that the end of a program has been found. The net effect is that the program starts at $0400 and then ends right away, i.e., there is no program in memory now. This leads us to one surprising result right away. When you type NEW, the program in memory is NOT wiped out (which is probably the answer most of us would have given to the question posed in the first paragraph, above). The program is still there; only the end of the program markers have changed!

(2) Since a new end of program has been created by step (1), the start of variables pointer must be updated to reflect this fact. Hence, this pointer is manipulated so that it now points at #0403 for the PET/CBM. (The start of variables pointer always points at one byte beyond the end of the program).

(3) The CHARGET pointer is reset, so that it now points to $03FF. This means the next byte that CHARGET will grab is $0400 which, as we saw above, is always zero.

(4) Strings are stored in memory starting at the top of RAM and then move downward. A pointer must at all times reflect where the new bottom of strings is situated. When we type NEW, there should be no strings yet, so the string pointer is aimed at the top of memory ($8000 for a 32K machine). Just like step (1), above, the old strings are not lost; a pointer is simply reset to indicate a fresh working area.

(5) Next the disk status location is reset to zero. This, of course, only applies to 4.0 operating systems which support the DS$ variable. Other ROM sets and the VIC-20 skip this step.

(6) As mentioned above, all files are closed and default devices are reconnected now. The

default i/o devices are, of course, the keyboard and screen. This means that any and all files that were OPEN are now CLOSED.

(7) We've already adjusted the start of variables pointer and the string pointer (steps (2) and (4), above). Now it's time to reset the start of arrays and end of arrays pointers. These are aimed at $0403, to coincide with the start of variables, thus indicating a fresh array workspace. Since we're now done doing things with these pointers, let's review where they all are. The start of basic pointer is aimed at $0400, as it always is. Start of variables, start of arrays and end of arrays all point to $0403. The string pointer and top of memory pointer both point to $8000 (for a 32K machine).

(8) Next a RESTORE is performed. This resets the current DATA address.

(9) Since all sorts of ghastly things may have happened to the stack since we last ran a program, it is reset. Making the stack fresh is important since it may have contained un-executed RETURN addresses, FOR/NEXT garbage and so on. So, we get a fresh start in this step!

(10) The address to which a CONT statement would refer is reset to $00XX, where the XX indicates a 'don't care' byte. All that CONT needs to know is that the number is less than $0400, and hence less than the start of BASIC.

(11) Finally the subscript and FNX flag is reset. The meaning of this is rather obscure, but I take it to indicate that there are no longer any subscripts or defined functions in operation.

That's it! After the execution of step (11), you will be returned to a awaiting for a command staten, and your trusty PET/CBM will be ready to obey your next command.

As mentioned, these steps are the same for the PET/CBM computers as well as the VIV-20. (Probably the Commodore 64 can be included here as well). The only difference between the CBM-8032 and the VIC-20, for example, is at step (5), as mentioned previously. Also, the VIC performs a few of the steps in a slightly different order.

And by the way, we all know intuitively that CLR is somehow related to NEW. That relationship can be made explicit now. Simply stated, CLR jumps in at step (4) above. Thus we now know the answer to the question "What really happens when I type CLR?" as well!

Review of the Rom Rabbit

by
Mayland Harriman
Pt. Arthur, Texas

The ROM RABBIT has evidently been available for a couple of years but has now been reduced ten dollars to $39.95 for the PET CBM and $19.95 for the VIC.

Here is the greatest thing to come along for the cassette user. This ROM allows you to SAVE or LOAD a cassette program which normally takes 3 minutes and 45 seconds in just 45 beautiful seconds!!!

The ROM RABBIT is available on cassette for the 3.0 ROM 2001 PET only and in ROM for all other PETS, CBMS and VICS. Beyond the terrifically speeded up SAVE or LOAD the ROM RABBIT gives 12 commands which can be executed in BASIC's direct mode and further allows any key on the keyboard to repeat if held down for 0.5 seconds.

The ROM RABBIT installs in a spare socket and is initialized everytime the computer is turned on by typing: SYS 9*4096 and taken out of action by typing *K (for Kill the Rabbit).

To use the ROM RABBIT with a tape program you load the computer in the usual manner and then save by typing: *S *nameg and it will go to the cassette in RABBIT speed and of course load just as fast. One of the most interesting abilities of the RABBIT is the VERIFYING a program....unlike in Commodore Basic you don't have to have the program in memory just type: *V *namey. If the recording is OK the name of the program will be displayed in reverse format. If the recording is bad then the message CASSETTE ERROR will be displayed.

Another splendid advantage with ROM RABBIT saving is it's ability to take into consideration the tape leader when saving a program on the first part of the cassette. Use *SS for a short leader cassette or *SL for a long one and it works perfectly.

Here are the 12 commands. All must have the * ahead of the letter:

*SS or *SL to save
*H Convert Hex to Decimal
*Go to PET monitor
*L to load
*D Convert Decimal to Hex
*Z Toggle lower case/versus graphic
*V to verify
*T Test RAM IC's
*E load and run
*G Go to ML at HEX XXXX
*K Kill the RABBIT

Programs SAVED in RABBIT format can only be loaded with RABBIT commands and conversely BASIC saved programs must be loaded by BASIC Command.

The ROM RABBIT is a lovely animal and does everything claimed in exactly the manner described in the neat eight page booklet furnished. Shipment was in a couple of days, well packed and sent first class mail.

I highly recommend the ROM RABBIT from Eastern House Software, 3239 Linda Drive, Winston-Salem, N.C. 27106.

Pet To Commodore 64

by Laura Bayly

The programs I have been converting originate from the TPUG library. While you are waiting for the emulator, if that is what you are doing, here is a list of differences that I have encountered:

1) The sound systems are different. Erase POKEs 59466 and 59467, and other commands associated with these, from PET programs. Add 64 sound routines.

2) Upper and lower case problems sometimes crop-up. CHR$(14) will make the 64 go into this mode. You may find you will have to retype the text.

3) When inputing information: INPUT "WHAT's YOUR NAME;N$ causes problems. Jim Law's article in the Sept. '82 issue of **COMPUTE!** will explain why. The simplest way of correcting this is to use INPUT A$ on it's own line or after a colon. The errors caused by this problem occur intermittently but really foul-up a program.

4) The most frequent problem encountered is that of screen memory locations. PET's are 32768-33767. 64's are 1024-2023 (PET#-32768+1024= conversion)

Jim Butterfield's memory maps in the last issue should be a big help (once I learn how to read a memory map.) Thanks! I did notice that locations 32768 to 40959 are designated Alternate: ROM plug-in area. Can anyone tell me why Commodore did not use these locations as the 64's screen memory? I have converted about 50 programs. If the screen memory locations had been the same, 95% of the programs would have run without modification in BASIC. The emulator supposedly will run 95% of the programs from the PET. Is Commodore planning to plug in more screen memory locations there as it's emulator? If so, I am wondering why they did not put the screen memory there in the first place.

Walter's Worder

by

Gottfried R. Walter

This is a printout of the disk documentation of Walter's Worder which has recently been added to the TPUG library.

Walters worder automatically creates an index for any manuscript that has been created on a compatible Commodore based wordprocessor.

As anyone who has ever created an index will realize, this reduces a long an arduous task.

-ed.

Instructions for Walter's Worder

These instructions were written on the Final Word. If you have WordPro they will not output correctly until you remove the 'header' (if it is there you'll know what I am talking about) and the graphics character at the end of each of the files and then resave them.

Walter's Worder was designed to aid people who are indexing books, reports, etc. that are in Final Word or Word Pro type of files. (This means it will also work with some other text editors).

The system will work on either a 80 or 40 column 32k system with BASIC 4.0 and 4040 disk drive. The system requires nine modules to be present on the program disk in order to operate. These are called WWI through WWIX. Just what each of these programs does is explained under the programmer's notes but the information is not necessary to the user.

The maximum size for the index is approximately 10000 to 20000 words.(one

diskette full) depending on the average length of the words that you are indexing. The maximum number of words that you can index per text file is 449, including words that you have deleted.

Because of this you, the user, should keep your text files below a maximum of 8500 to 9000 characters (ie. around 1500 words or around 220 lines).

The system is simple to use. There are 4 steps involved in indexing whatever you want indexed

1) Go through your files one by one using the indexer to pick out the words you want indexed (more on this later)

2) Let the computer go through and sort all the words you picked into alphabetical order and put them into files for your word processor. (This will also be in more detail later).

3) Take your word processor and go through these text files and 'hand massage' the index.

4) The index may be directly output to a printer or a typesetter using a word processor or an output program.

Step one: INDEXING

Make sure your diskettes with your all important text files on them have their write-protect nothces covered!!!!

It is very unwise to leave those diskettes in a state from which files could accidently be scratched.

Next: insert the program diskette into the disk drive and load 'WWI' (Walter Worder One) and then run it.

You will see a menu displayed. Pick number one (INDEX TEXT FILES) and it will automatically load the necessary programs. (WWII, WWIII, WWIV, and WWV)

When these programs have been loaded you then place a diskette with files to be indexed into DRIVE ONE and a target diskette (preferably an empty one or one that you can tell the program to header when it asks) into DRIVE ZERO. The diskette doesn't HAVE to be empty but there will be less room for the index files if it is not empty and you may have problems in step two.

The system will first ask whether you are using Wordpro or Final Word files. The next thing displayed will be the 'help' instructions. These may be recalled at any time during operation by pressing the 'H' key.

To continue after the help instructions are displayed just press return.

If no file is presently being indexed the directory of files on your text diskette will be displayed. By using the usual cursor positioning keys you may place the cursor on whatever file you wish to index. Pressing return will now take you into the indexing activity on that file.

If there are 39 or more files present on your text diskette the word 'MORE' will be displayed on the bottom of the screen and you may see the remaining files by pressing the 'HOME' key.

To go back up to the previous 39 files use the shift 'HOME'.

To leave the directory and return to the menu without selecting a file hit the 'Q' key.

The indexer will automatically skip over words that are in the exception list. The list is maintained in the program file WWIV and it can be changed if the user so desires. However, most users should find quite adequate the list supplied with the system initially. This list is the first 1300+ most frequently used words in the English language.

The program will automatically scan the screen and any word that is not in the exception list will be flashed. The procedure is to follow along the text being displayed while reading a printed copy with page numbers. Pressing a space bar will cause the program to skip on to the next eligible word without indexing the word being flashed. Pressing return will cause the program to go into the indexing sequence where it requests a new page number. If the page number displayed at the top of the screen is correct then pressing space will cause the program to index that word with the present page number. Otherwise, you may type in a new page number and then hit return.

If you wish to index a phrase you press 'C' and the following word will also be blinked (up to 240 characters maximum will be indexed although more may be blinked).

If the indexer skips a word you wish to index you may go back to it by pressing 'B' as many times as necessary.

Some other commands are 'T' for go to top of screen, 'Q' for quit which closes off the output files and quits, 'F' which takes you back to the input file directory, 'S' which skips over the remainder of the current screen and displays the next one.

'P' causes the cursor to pause so you can see where it is during the current scan. Pressing 'P' again will cause the cursor to continue.

All the words on a screen that have been indexed will be displayed in reverse. If you

accidently incorrectly indexed a word you just simply back up to the word and you will be asked if you wish to delete it. A 'Y' or RETURN response will cause you to be asked for the page number. It is important to have the correct page number.

Note: You MUST finish indexing your entire book before you start sorting/ merging/ formatting your index because if you don't you will have to merge your index by 'hand'. It would be much easier on you to just let the program do all of the merging.

Step Two: Sorting the index.

If you have finished indexing the whole of your book then you are about ready to start sorting the index. If your book is sufficiently long, the indexing may have taken you several work sessions, at the end of which you have always quit and restarted. You may have even quit in the middle of a file and then at a later session continued indexing that same file. However, it would have been your responsiblity to know at what point you quit in the middle of that file and then to have skipped forward to that point once you had restarted indexing.

Once ALL the files have been indexed using the index program they will have to be sorted, merged, and formatted. However, this is all done automatically for you. BUT, it may take a while, so be sure to do it at night while you are sleeping or some other time when you are not in a hurry to use the computer.

You may stop the program by pressing 'Q' and then restart later (the computer will automatically go to the point it left off and restart there) but you will have to remember which diskette was in which drive. It is important to not get them mixed up.

NOTE: the program will not stop while it is processing a file (ie. while it is sorting, merging or formating) so you may have to wait a short period of time for it to finish what it is doing.

If the program has a problem it will abort and print a 'short' error message.

The main thing that may cause you a problem is a bad spot on a diskette, so try to be sure that you have good diskettes. Also it is highly recommended that you have nothing on top of your disk drive and that it is well ventilated because it is going to be getting a lot of use.

Another thing that might cause a problem is one of the diskettes becoming too full. This can be avoided by using empty diskettes when you are advised to by the computer. (ie. always use empty disks)

You are asked if you wish to make a backup of the index that you have just created, before you begin sorting.

It is highly desirable to make a backup of your index because if there is a problem you will have to go back to this point to recover and otherwise - if you didn't make a backup - you would have to go all the way back to the beginning and create the index all over again.

The sorting actually takes place by selecting 'sort/merge/format' from the menu and then by following the steps that are displayed on the screen by the program that will guide you through the starting process. Once the sort/merge/format process has been completed you may proceed on to steps 3 and 4.

Note: The final files will have a two character name (eg. a0)

Note: Because of the way these files are stored they may expand to double or triple or even quadruple there present size so you should spread the files over two or three or even four diskettes, depending on the size of your index.

Step 3. 'Hand massaging' using your text editor.

Should your index be a very long one it is recommended that you again make a backup of the sorted files at this point, and furthermore, if you are going to do much editing on long files you may have to move some of them to additional diskettes as the the editor will expand them up to ten or twenty times their orginal size.

During this 'hand massaging' process you may put in typesetting markup such as bolding, heading commands, or other refinements such as you wish. You may also delete, combine, or otherwise modify any of the index terms as you may wish.

Note to WordPro Users: if you have the copy of Walter's Worder on TPUG's September 1982 disk then you will have to remove the graphics character at the end of each file if you wish to use the global output function to output them. It would make the most sense to do this during this step rather then wait until step four.

NOTE : sometimes your word processor won't 'find' a file and will display some sort of error message. To get around this you just simply make a note of the file(s) this occurs to and copy them to another area of that disk (don't forget to give them a different name).

Step 4. Output

The final result may now be processed just as any other output file. In the printing industry this method of automatic typesetting should prove very beneficial to those persons using typesetters compatible with the PET computer.

PROGRAMMER'S NOTES
BRIEF EXPLANATION OF NECESSARY MODULES

WWI is the menu and is written in BASIC

It contains, other than the menu, a BASIC loader for a machine language routine that loads machine language programs without disrupting any pointers used by BASIC.

WWII is the main indexing program and is compiled from BASIC

WWIII is a group of machine language routines used by WWII. They include : a 'get mask' routine that very quickly gets the 122 character mask used by the Final Word (this starts at $5ba0), a 'get and display a screen of text' which gets and displays a screen of text without printing any format commands (except the underlining commands for the WordPro files)-this starts at $5b00 but the entry point is at $5b10.

Also included is the 'help!' routine which switches 4 pages of instructions beginning at $5c00 with 4 pages of screen memory and back again (this starts at $5bb6), and the 'check list' routine whick checks to see if a word (stored beginning at $6066 and ended by a $ff) is in the word exemption list (if yes a $ff is stored at $6066). It starts at $6000

WWIV is the modifiable word exemption list used by WWII and created by WWIII

WWV is a machine language routine used by WWII

This is Peter Van der Veen's 'get directory' routine which starts at $7d20.

WWVI is the sort/merge/formatter and is compiled from BASIC

WWVII is the machine language routine used by WWV.

This is Peter Van der Veen's 'get directory' routine at $7f80.

WWVIII is a utility written in BASIC and called from the menu whenever a new exemption list is to be generated

WWIX is a utility written in machine language which is used by WWVIII and is also loaded by the menu whenever a new exemption list is to be generated

In it is the 'get mask' routine (described earlier and starting at $4000) and the 'get list' list routine which gets the word exemption list and puts it into memory from which WWVIII saves it. It starts at $4014

HOW TO MODIFY THE WORD EXEMPTION LIST

To modify or increase the list one simply loads the file called WW WORD LIST into their text editor and then edits it in the conventional way. (WW WORD LIST is the name I called my word exemption list. You don't have to call your word exemption list that but that name allows for easier recall.)

Note to WordPro Users: take off the header and the final graphics character if they are there.

Note to WordPro Users: WW WORD LIST was written on the Final Word so it is a Final Word file but it will become a WordPro file as soon as you edit and resave it.

The file may look a little strange because only the first five characters of each word is there since that is all that is actually required although it does not hurt to put in more. It is presently in a Final Word file but if you change it with Wordpro it will then become a Wordpro file.

The next step in changing the exemption list is to again load the menu (WWI). You then select 'create a new exemption list'. The system will automatically scratch any existing backup, rename the present exemption list into a backup and then save WW WORD LIST as the new word exemption list (WWIV).

If something goes wrong (and WWIV is gone) the word exemption list should be stored in WWIV-BACKUP (WWIV's father).

Note: You must be sure and identify on which word processor that the file your are getting the new exemption list from was written because if you don't WWVIII may crash.

OTHER FILES THAT MAY BE ON THE DISKETTE

WWVI-BASIC is the BASIC for WWVI

WWII-BASIC is the BASIC for WWII

WWIV-BACKUP is the 'father' of WWIV

WW WORD LIST is the text file the exemption word list (WWIV) was generated from by WWVIII

WWINST.1 through WWINST.3 are (obviously) the instructions

Procedure Vidprint

by Richard W. Barnes

Here is a short screen dump program for the superPET. I hope it will help some other member of the club.

The PROC is written at high line numbers, so any program can be written under it. Unless called, it lives up high without interference. It may be loaded into memory after you decide to print something from the screen, but that will scroll a couple of lines off the top of the screen; best have it in memory at all times. It is short.

When you want to print anything on the screen, cursor to line 24 or line 25 of the screen and type: CALL VIDPRINT (Return). The word 'quit' will appear on line 24; the cursor will go to the home position.

For each line you want printed, hit (Return). If you want to skip any, just cursor to the one you want printed and hit (Return).

When through, cursor down to 'quit', and hit (Return). You're out. Optionally, you can clear a line with the ESCAPE key, type QUIT and get out.

As a bonus, if you want directories printed in two columns (rather than in the long line of spaghetti which is normal), you enter the procedurelikethis:TWO 1:CALLVIDPRINT(Return) and you get a nice two-column printout.

The procedure does NOT overwrite or change any program(s) in memory and it goes without saying that you must have what you want printed on the screen before the call is made.

(NOTE by Chris Bennett)

This routine is designed for a Diablo printer. To get it to work on the Pet printer, delete lines 55130 and 55135 and delete the print command in 55205 leaving the close statement in. Then change IEEE4 in line 55125 to PRINTER4.

```
55110 proc vidprint ! for 6809 and superPET only.
55115 !
55120 open#3,"terminal",inout
55125 open#2,"ieee4",output  ! For Diablo printer : change for yours
55130 print#2,chr$(27);chr$(13);chr$(80)  !  zeroes out old Diablo margin
55135 print#2,"    ";chr$(27);chr$(57)    !  sets Diablo margin to 4
55140 if cursor(1841) then print chr$(6);"quit";
55145 if cursor(1) then 55150
55150 loop
55155   linput#3,a$
55160   if a$ = "quit" the quit
55165   if two
55170     if b > 40 then b=0
55175     print#2,tab(b);a$;
55180     b = b+40
55185   endif
55190   if not two then print#2,a$
55195 endloop
55200 close#3 : two=0 : b=0
55205 print#2,chr$(27);chr$(13);chr$(80) : close#2  ! printer margin to 0 again
55210 endproc
```

ASERT

BY Gerald L. Gold

AN IMPRESSIVE DATA BASE
For Management of Lengthy Records

In my work, I deal repeatedly with longer documents that I must be able to access at a moment's notice. Data base programs such as the Manager help to a great extent. These programs organize your data in records, similar to the sequential or relative records that are explained in most programming manuals. Within each record, data is stored in fields. The ability of the user to access records, sort information within fields, and report on that information are the criteria of a good file management program.

Most CBM file managers (sometimes referred to as data bases) limit the description of a record to about 254 characters and permit a maximum of 80 characters of information in each field within a file record. Some file managers, such as The Manager and Flex--files, offer the option of relational arithmetic, though this is not always as simple as direct calculations in BASIC. These features are all extremely useful, but some projects require extensive descriptions and an extended number of options that cannot be managed in 254 characters. For this Commodore user, these limitations were significant because file-keeping was one of the needs that orignally led me to buy an 8032. Asert is the first program that I have found which handles large descriptive files.

If you need to manage detailed information on (i) customers, (ii) patients, (iii) members of an organization, (iv) an inventory of jobs or rental units, (v) a reference library or a collection or magazine articles or phonograph records and tapes, (v) students of an entire school -- the list is endless -- then you may appreciate Asert's ability to store up to 11,000 characters of information for each person, client or document. I am only now familiarizing myself with this program, and I plan to write a follow-up to this review after I have used Asert more extensively.

Asert is stored in over seven menu-driven programs and because of the size of its files (over 700 blocks), it requires at least an 8050 disk drive for storage. Like other data base programs, Asert organizes each file entry, or ''record'' into fields. These are stored in a 'label' area which is limited to twelve fields, with a maximum of 254 characters. Any one, or all of these twelve fields (you can have fewer fields) can be sorted rapidly at virtually any time. This makes for fast searches and literally provides information at your fingertips. Unlike many other data bases, Asert permits you to rearrange the structure of a file, adding, deleting fields and re-ordering fields. There are some limitations and I will turn to these shortly.

Each record ''label'' has a free text area where the user can enter important information that pertains to that record. This feature is particularly useful to me since there always seems to be something special to add in every record!

Last but not least, the user can specify up to 180 search words or phrases, each of which can be up to 30 characters in length. Any of these search words can be specified in searching records, and the user can specify conditions such as amust havet, hmust not havet and aoptionals, for any or all of the 180 search words. Optional searches can be used to rank alternatives possibilities (Asert does the ranking for you). These features include the kind of boolean logic that most data bases do not support.

The sample file that comes with the Asert program covers over 200 summer campers, their activities, their preferences and their personal history. The label area of each file identifies the campers, their parents, and how to contact them. The first searches I tried with the sample file were for conditions such as finding all the girl campers who have had measles, play French Horn and wear glasses. Each search covers the complete file unless the user specifies the number of 'successes' that are required. No matter how I listed the search conditions, search time could always be counted in seconds. The user has the option of stopping the search to view or print record. When a search is complete the user can create mail labels (Asert is also a mail list), print lists, or return to the main menu. Records that meet search requirements can be viewed partially

(the mailing label) or entirely (applicable search words appear in reverse video on the master list of searchwords.

My first Asert file codes a massive pile of clippings that I have accumulated on the constitutional crisis and on ethnic relations in Canada. I began with 180 searchwords and about fifty records. Since everything seems to work quite well, I am re-formatting the search word list to include a few minor changes that were not apparent when I began the file. The final file should include about 5,000 records, stored on several disks. Though Asert uses relative files which do not fill the entire 8050 disk, sorted files, and sequential file output for a word processor can fill all of the remaining space on the disk.

The manual is well-written, though a number of revisions to the program are not yet incoprated into the main text. CFI software supports their product with updates that are mailed to registered owners, and a 'hotline' to handle questions and difficulties. Many or most of the Asert users are businesses and public institutions.

Most good software has some shortcomings and Asert is no exception. The program does not permit the user to perform relational arithmetic using the 12 fields of the label area, though it is possible to count the number of successful searches). This feature is being added, but that update will, I am told, be marketed as a separate program.

A minor annoyance is that while Asert recognizes either CBM or ASCII printers, it does not account for the special characteristics of the Epson MX-80. As a result, upper case printing with the Epson appears in graphic characters. This problem also appears in the version I have of The Manager, and can be corrected by the user.

The program is designed to take over the use of both drives for the file that is currently in memory. Drive 1 is a file area and drive 0 contains primarily programs and utilities. Since the program must be matched with the file name (this is a simple operation that can be called from the start-up menu), it is best to use Asert with a few large files and store the program on each of those files. In other words Asert is ideal for data that you must consult frequently and intensively.

The assets of Asert far outweigh the liabilities. It is a program that handles large text files with an unexpected flexibility. At all times, Asert is 'user-friendly', checking for incorrect entries (such as loading the wrong file) and offering the user a number of options at every step. A menu is always close at hand, and Asert offers an unmatched ability to sift though data files.

* Asert is distributed by CFI Computer Solutions, 201 West 92nd St., New York, N.Y. 10025, and is available from some Toronto PET dealers.

Computerized Printed Circiut Boards

By Chip Kozierok

Everyone knows that integrated circuits are the heart of the computer. I won't dispute that, however I know that all those pins have to find some way of communicating. This is where the next part of computer hardware comes in, the printed circuit board. The P.C.B. is, in simplistic terms, a board, into which the components of a computer fit, and which has wires printed onto it to connect the different components.

Doing It The Hard Way

Making printed circuit boards has always been a long time-consuming, tedious job, involving a lot of patience, and an expensive draftsman to draw the wires using black tape. After hours of sketching and taping, the design would be sent out to be mass-produced. For a long time this was looked upon as the most effective method of doing this work. However, new technology has made it possible to make this a thing of the past.

I am currently a secondary school student in Thornhill. About half a year ago, I ventured to Richvale Telecommunications, in search of employment. I was given a job working on various things until about June, when Peter Smith came to me and told me about the new plotter they had just acquired, and his hopes for putting it to work making the boards. At the time there were a few other people working at this task, and at first I was lost as to how to get the board off paper, on to the CBM 8032, and then on to this amazing plotter.

With a great deal of patience I was taught slowly how to communicate with the plotter. Somehow or another I took over the job of circuit board design, which at the time was just an experiment, a one board trial, to see if there was any potential in the method. After the first board was completed, its quality was so exceptional that the Watanabee MiPlote, which RTC had purchased for re-sale, was kept, and put to work on making more printed circuit boards.

The Miracle of Plotting

The computer plotting was looked upon as a miracle at the time, because we were trying out hardest to complete the RTC V-Link, and the slow-up in making the boards would have cost us valuable time which we couldn't afford. So, after seeing the success of the first board, we decided to do the other V-Link boards on the plotter as well. We had to get them done and well, the plotter was just sitting there.

When the MiPlot is purchased, it comes with an operating system which goes into RAM and allows the user to instruct the plotter with a series of simple commands from BASIC. This was just a basis, because we knew we need to create a method to make the plotter draw the boards without great difficulty. The main idea of this was to make it easier to draw the boards.

The MiPlot itself for the most part only accepts basic commands. You command it using a Cartesian Co-ordinate system, (X,Y). The operator tells the plotter to draw between points, or to move between points. (There are also other commands such as character printing and dotted lines, however these cannot be used in P.C.B. design). These points are measured in tenths of milimetres, which while being extremely accurate - 1/10 of a milimetre = 1/254th of an inch or approx. 0.004 inches - forces you to go Metric.

This X,Y 1/10 mm system means that if you were to instruct the plotter to draw from 0,0 to 500,400 to 200,30 to 0,0, the plotter would move from the origin, 0,0, the lower left-hand corner, to the point 5 cm to the right and 4 cm up from the origin. From here it would move to the point 2 cm to the right and 3 mm up from the origin, and then it would return to the origin.

There is another mode of operation as well. Instead of moving to and from abslute points as above, the plotter will move to points relative of its current position. This means that if the pen is at 500,400 and you instruct it to move/draw to the point 100,50 relative to its position, instead of moving to the absolute point 1 cm to the right and 5 mm up from the origin, it will move to the point 1 cm to the right and 5 mm up from where it is at the moment the instruction is given, that is, the point 600,450.

There are tremendous advantage of course in using a relative move method over an absolute move method. For instance, you are designing a simple circuit with one intergrated circuit on it. This is a 40 pin chip, and you want to put 40 I.C. pads on the board for the pins to fit into (I.C. pads are those hexagonal shaped pads on boards for I.C.'s). The way to draw one I.C. pad would be to measure the dimensions of the pad from another board, and feed to the plotter the absolute points you measure, i.e. points 100,100, 105,115, 100,120, 95,115, 95,105, 100,100. The preceding points will draw an I.C. pad 1 mm wide and 2 mm long with its bottom point at point 100,100. However you want 40 such I.C. pads. Calculating the points for all 40 pins would be a time-consuming exercise.

Relative is Easier

If you look at the above shape where you instructed the computer to move to 100,100 and draw to the next six points, you will notice that the same effect can be had by moving to the point 100,100 and then moving relatively from 100,100 as follows: 5,5, 0,10, -5,-5, 0,-10, 5,-5. Remember the first relative move (5,5), will move you to 105,105 from 100,100. Then, the second relative move (0,10), would move you to 105,115, because after the first move the plotter was now at 105,105. Then move three, (-5,5) would put you to 100,120, because you were at 105,115, and so on. Therefore you can see that this method would work for the one I.C. pad. Now, however, is when all that extra work pays off.

If you were to store the six relative points (5,5 etc.) on disk, all you would have to do is to tell the plotter to move to 100,100 and then draw relatively using the values on disk. However now the values for the I.C. pad are stored independently of the starting point (in this case the starting 100,100). This means you could simply change the 100,100 to 200,200 and move the I.C. pad. It also means you could change starting point to 40 different values and thus plot the 40 I.C. pads for your board. The relative values would be the points to draw the lines segments for that shape, and therefore the I.C. pad would be stored as a six segment file.

You have just saved yourself much work and time. Of course, the idea is efficiency, and you can save still more effort in calculating the starting points. For a standard 40 pin chip, such as a 6502 or 6520, the distance between the pins on a row is 2.55 mm, (25.5 units), and the distance between the rows 15.5 mm, (155 units). Therefore you just set up the pins of the chip in a two demensional, X,Y array, say, where X is

the number of pins on a row, and Y the number of rows. Now all you have to do is to tell the computer the value for the first pin, (1,1), in this case 100,100, the distance between the pins, in this case 25.5, and the distance between the rows, in this case 155. Then tell the computer the number of pins and rows, (that is, the demensions of the array), and let the computer add the values and determine the points itself. This method may sound more difficult, but believe me, it isn't (I've tried both of these methods). This array, or matrix, stored on the disk, would become the matrix file.

This is the format by which all the boards at RTC are created on the plotter. The two basic elements, the matrix and the segment are present in the formation of all the boards. The program to create the matrices and the segments, and to plot them, are very simple. The program start which a few very simple programs, one to create the matrices, and one to create and plot the segments. From these two basic programs a host of other programs developed to meet our needs.

Building with Blocks

I found that after I had created about 50 different segments, when I went to plot them I had to tell the computer for each segment: a. the matrix containing the pin (the starting point) for the segment; b. the size of the matrix (so that the computer could load the entire matrix into memory. This is important, especially if the segment is to be drawn at one of the last points in the matrix); c. the name of the segment file; d. the relative starting position (the point in the matrix were added to this value, allowing the user to move the entire board almost anywhere on the plotter. Thus, if the point in the matrix from which the segment was to be drawn was 500,400, and the relative starting position was given as 100,100, the point would be drawn from 600,500. If 100,100 was specified throughout the list of segments, each one would be shifted to the right 100 units and up 100 units, thus enable the user to move the entire board); and finally; e. the point in the matrix from which the segment would be drawn.

Now, there is no problem in doing this for each segment individually while entering them, but for 50 it was much easier to make an automatic program. The automatic program does one side of the board. At the beginning of the program the user would tell it the relative starting position, ("d." above), and the scale, (to be discussed later), since these must common to all the segments. Then the individual characteristics of the segments ("a.", "b.", "c.", and "e." above), would be stored in data statements. The scale is used for making master copies of the boards. When we make a master copy, we multiply the size of the board on the plotter, and then photo-reduce it. If we want the board three times its actual size we merely set the scale value to three, and everything, the matrices, every point in every segment is tripled in size (this is actually quite easy to do with the matrix-segment system.

The values of the points in each segment are multiplied by three as soon as they are read in, and just as "d." above the point to have the segment drawn from it first has its value tripled, and then has the relative starting position added to it).

The automatic program allows me to plot an entire board just by running it and leaving it to do its thing. The plotter is so accurate that you know if it worked the first time, barring any strange happening such as someone having scratched your files off the disk, it will work every time afterwards.

After the board is made, for the people at photo-reducing and the people who make the boards from our plottings, we must draw a cut-line around the dimension of the board, so that they know its exact size and shape. The points of the outline are stored in a form similar to the matrices, except each point must be entered individually - there is no advantage in having the computer calculate the points because 99% of the time the board is an odd shape. The outline of the board is drawn simply by having the computer "connect the dots". This shape can also, of course be changed by relative starting position and scale.

You now have an idea of how printed circuit boards are drawn on a plotter. All the boards produced here at RTC over the past few months including all the V-Link boards, the 64-Link board, and others, were designed using the MiPlot. After using the plotter there is no way we would go back to hand-taping. The plotter is an excellent tool, and with every new board, something new is discovered to make the system more efficient. The one trial board has expanded to countless others, and computer aide design is here to stay.

Step by Step Process

I will try to describe the method that I go about in coming up with design for the boards, the steps between when Mr. Smith calls me to tell me about the board, and when the data is entered onto the disk.

The first step is to design the shape of the board (I know this is the last thing I talked about, however as minor as it is, it must be done first as a sort of reference to ensure that the

components fit in the space alloted for them). Usually this is the easiest part of the design, because the board usually has to fit into something (i.e. the V-Link must fit into gray AMP housings). As a general rule about most parts of the design, if something must go somewhere, it's easier than if there is no specific space for it, because I have to find the best place for the component, etc., and this is not always the easiest thing to do.

After the outline is drawn, the board itself must be designed. I design most of the boards from a rough sketch done to show me what the board should do. From these drawings, I must follow each connection and mark it down. I must know the connections between the components as one factor of deciding exactly where to put the components. For example, if by noting all the lines (connections) between the components, I see that 8 lines must go between component A and component B. I need to know this fact so that I don't put them right next to each other. This would probably require me to move over one component, thus forcing me to restructure the board (a lot of unnecessary work).

Many factors must be considered before the first matrix is calculated or any components positioned. I must know many things. I need to know how many component will be on the board, obviously, to see if they will fit. In connection with this, I must know the size of each component for the same reason. I need to know the number of traces and approximately where they go, as I shown above, etc. These are the major factors to be considered before anything is plotted. There are other somewhat uncontrollable factors, such as, will Dave Foster call you up and inform you about two additional resistors? You must plan ahead for such things if you can.

After careful judgement, considerable planning and a little aggravation, the position of the components is decided. First the major components are placed, and their places must be changed often on some boards (oOh no! I forgot about that wire!). After the major components (I.C.'s, etc.) are positioned, the smaller components, (resistors, etc.) are usually fitted around the larger ones.

A Multi-layered Board

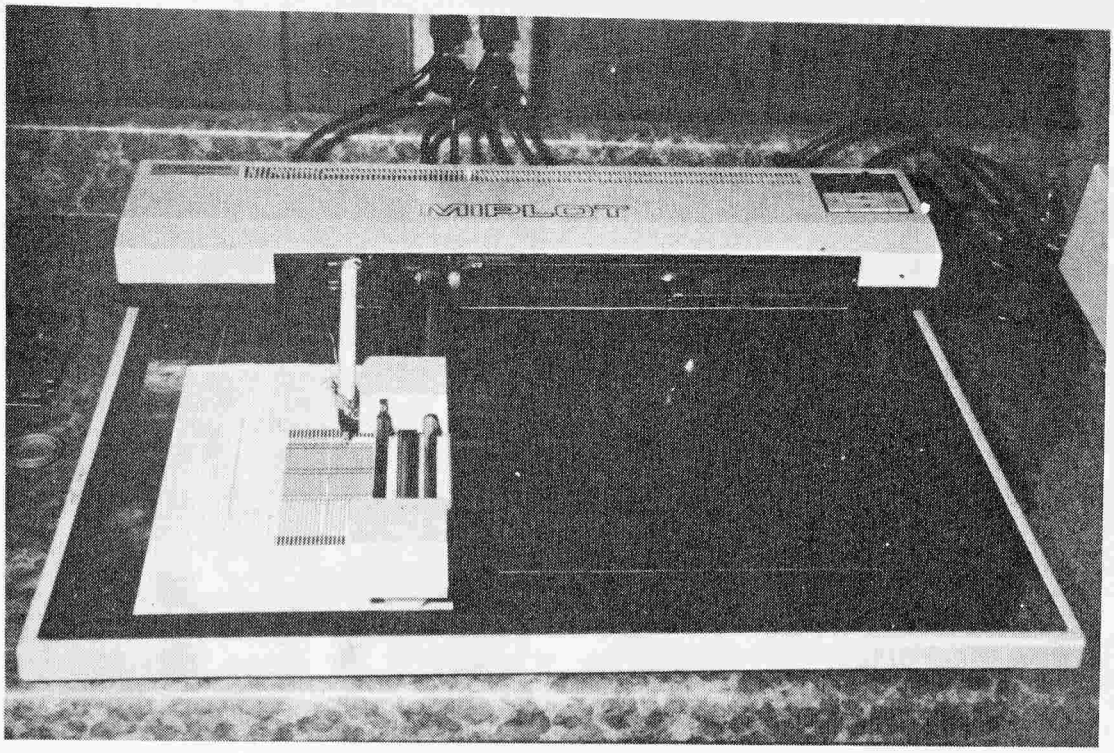
Now, all the matrices have been set up. I would plot the board as it stands, the outline, the I.C. pads for the I.C.'s, the circles (that's right! I'll discuss this later) for the resistors, etc., and I draw all the connections by hand as a rough copy to make sure that all the lines will connect properly without crossing or touching each other. If there is a problem, I must attempt to correct it, either by moving some wires, or if that won't work, moving some components. This usually clears up the problem, however sometimes the situation cannot be fixed, and more drastic steps must be taken. The 64-Link, for example, had so many traces that it couldnt fit on the standard two sided printer circuit board, and it had to be made as a multilayered board, with four sides instead of two. It may be hard, but we managed to get the job done.

After the wires are found to work, to go to the right places with enough room, not touching or crossing or anything else, a better, more accurate hand drawing is made. It is from this hand drawing that the segments will be calculated.

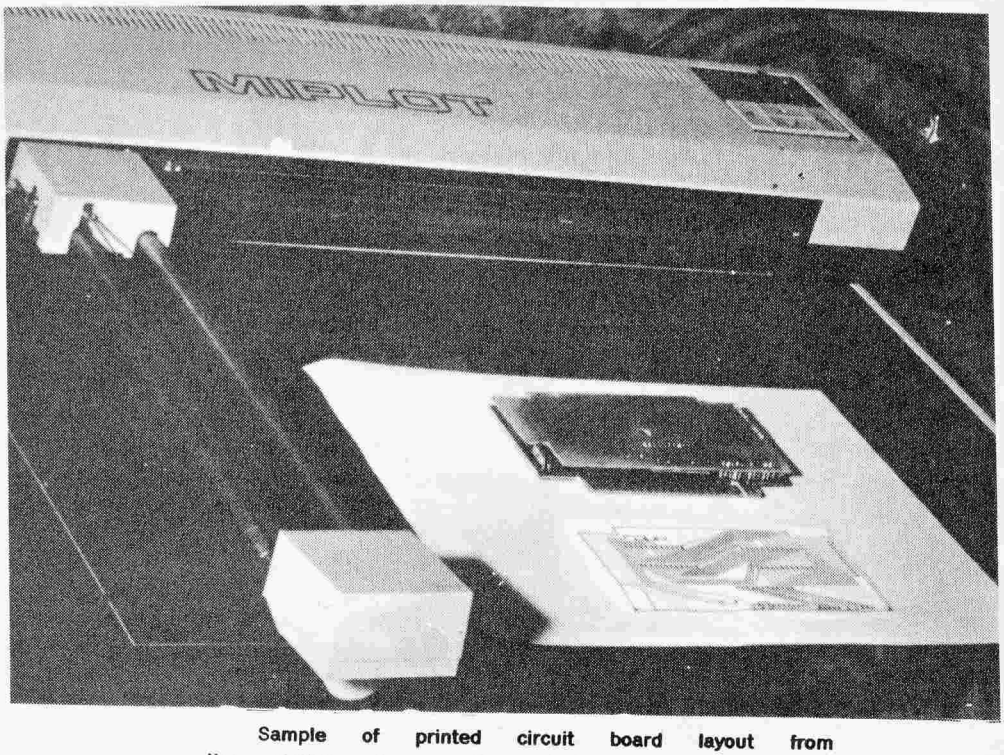
Transferring the segments from the pencil sketching I've made to the plotter is the next step. Each segment is transferred individually. To start with, the segment in question is sketched on paper by itself. This very rough sketch just shows the general shape of the line, and how many points there are in the line (how many segments). The values of these points must be determined. The first and last points can usually be easily calculated because most traces (lines) connect components, which have their positions stored on the disk in matrices. The points between the first and last points can be calculated two ways. The first method is to measure using a ruler the position of the point on the more accurate hand drawing. This is an undesirable, though easy method, because although the points are measured on the more accurate drawing, it is still a hand drawing, and not perfect. This method is only used where there is a lot of room around the trace, and being off by 5 or 6 units won't matter too much. Even then it is avoided.

The second method is by far the better. Every point is calculated based on the values and positions of other components and traces already known. For example, you have a 14 pin chip, and you need to pass four traces between the two rows of seven pins. This is the method by which you would come up with the exact place each trace should go. You are trying to determine the Y value for each trace.

This is what would be needed in this case. You know the Y for the lower row is 100, and the Y for the upper is 80 above it, thus 180. Therefore you have 80 units space to play with. Now, the I.C. pads are 20 units, and the 100 and 180 are the values at the centers of these I.C. pads, therefore the upper I.C. pads protrude 10 units down, and the lower pads 10 up. This leaves you with 60 units available space. For



Close up of operating plotter.



Sample of printed circuit board layout from the plotter along with actual board made from the layout.

four traces, you need to divide this value by five, because you need an even amount of space between the traces and the I.C. pads. There are four traces, therefore there are three spaces between them. There are two more spaces, between the highest trace and the upper row of I.C. pads, and between the lowest trace and the lower row of I.C. pads. This makes five, and with 60 units space, 12 units for each.

Now, the lowest trace would be equal to the Y value of the lower row of I.C. pads, plus the amount of the pad protruding, plus the space between the pads and the trace. This would be 100 + 10 + 12 = 122. Therefore the first trace's Y value would be 122. The next three traces would be 12 units apart as well, making them 134, 146, and 158 respectively. You can also check that this work because we know the Y value of the upper row of I.C. pads. This is 158 + 12 + 10 = 122 180, which we said above was the value of the upper row. This method would have worked equally well by starting at the top and working down.

The method above, while taking more time, gets easier with practice, and is so much more accurate. Those traces are as far apart from each other and the components as possible, reducing the chance of the wires shorting together. As well as this, the board looks more professional, because the traces have equally proportioned spaces between them.

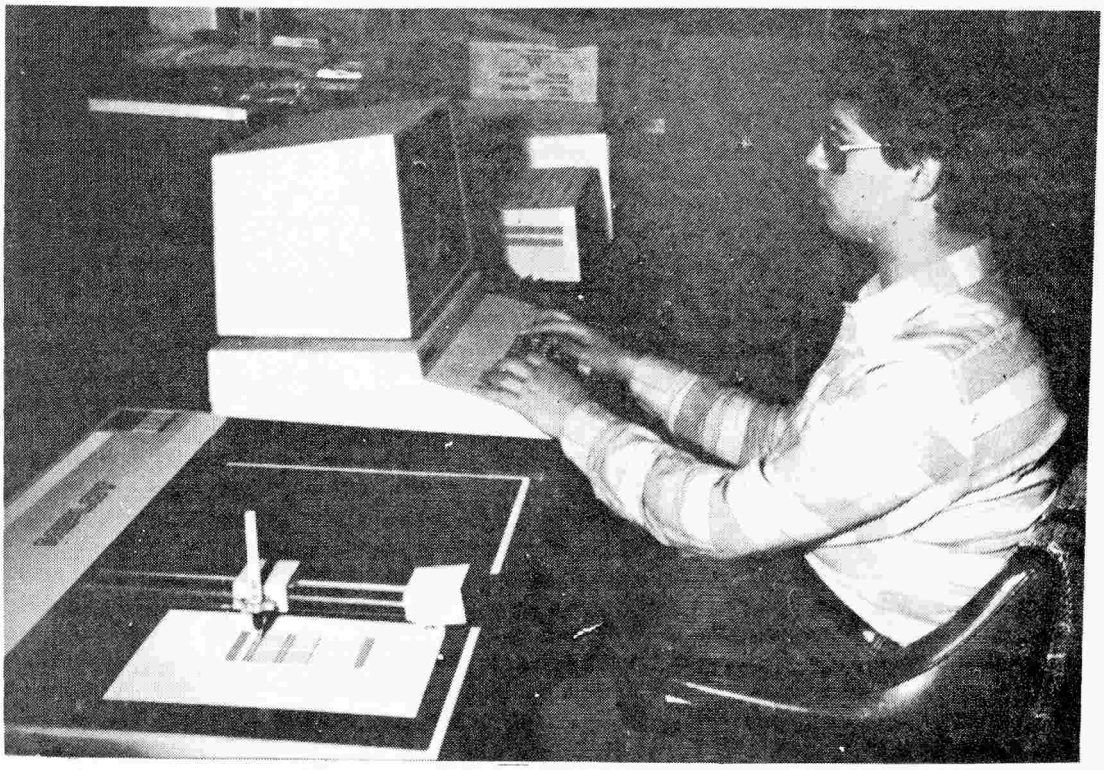
Computer Age Drafting

After all the traces are completed, the board's data is put into an automatic program. A copy of the of the board is plotted and checked for missing traces, etc. If all clears, the board will bb made into a master copy to be made into the actual copper-clad board.

The MiPlot is fitted with a special pen filled with Indian ink, and the automatic program is executed again. The scale is set high as possible (the limit of how much the scale can be depends on the size of the board. The X limit for the MiPlot is 3600 units, and the Y limit 2600, so if the highest Y value for a board is 700, it can have scale 3, but not 4, because 4 would give it a maximum Y value of 700 x 4 = 2800, exceeding the limit of the plotter). The design is carefully plotted on special drafting paper, which is not really paper, but translucent mylar plastic. If everything goes well, the drawings (at least two, one for each side of the board) are sent out to be photo reduced and made into boards.

There you have it - computer age drafting.

The plotter will do almost anything, however, due to its nature of drawing between points, this plotter is not especially well designed for making curves, circles and such non-linear shapes. However, the accuracy of the plotter is so high that if you were to take



Chip Kozierok with PET and MIPLOT plotter.

many small segments and connect them together, you would have a circle. The most complicated program I have devised for the plotter, uses trigonometry to calculate the points of a circle of any diameter. It stores the segment on disk. If you look at the segment values, they are relative moves of no greater than about +/-3 or 4 tenths of a milimeter. However, when plotted together, they form a very accurate circle (you have to see this to really understand it).

Hand Taping is Obsolete

Computer aided printer circuit board design by plotter has made hand taping obsolete. The advantages of the system described above over taping are almost countless, however some especially important ones come to mind. It is a well known fact that boards constantly come up with bugs to be corrected, and new things are constantly needed to be added. With hand taping, each board would take hours to make, and each change would mean taping up a whole new board, more hours of work, even if only a few traces need to be changed. With the plotter, the user needs just to change the segments involved, and leave the ones not affected intact on the diskette. Many man-hours saved.

As well, what if you need 20 copies of a design? Do you want to pay a draftsman for the days or weeks of work involved to produce the copies? Or do you want to make 20 photocopies? Neither of these are desirable situations, yet they would be un-avoidable with the hand taping method. Now, in stark contrast, with the computer, and the automatic program described above, the average board can be plotted in less than 10 minutes. Not only this speed is important, but as well, after the data is set up, making a copy of the board involves turning on the equipment, loading the operating system, and executing the automatic program. So simple a child could do it. Literally.

The marriage of the drafting board to the computer exhibits characteristics similar to those of the marrying of other skills to the computer, such as the typewriter, the calculator, the pinball machine, the telephone, and even the teacher. It shows to us once again the power the computer has in improved our life and our way of life.

If you have any questions feel free to contact Richvale Telecommunications at 884-4165, or myself at home, 881-6167.

Secretary's Report

TPUG FEES

The TPUG fees are paid on an annual basis. This means that if you join in February of 1982, your membership for next year will be due at the END of February of 1983. This is going to help us at renewal time since all the members will not become due at the same time as they did in September last year. TPUG membership always **includes a TORPET subscription** and gives you admission to the annual conference, and access to the club library (see rules elsewhere). Canadian regular and student memberships also have access to all the meetings, which otherwise are $5 per admission to the general public.

The membership fees are as follows:

Canadian Associate members $20.
U.S. Associate members $20 in U.S. funds.
Overseas Associate members $30 in U.S. funds.
Canadian Student members $20.
Canadian Regular members $30.

TORPET SUBSCRIPTIONS

Torpet subscriptions alone, which do not include access to the TPUG library, nor access to the TPUG meetings or the conference are in every case $5 less than the membership fees listed above.

At present both TPUG membership applications and separate TORPET subscriptions should be made to:

Toronto Pet Users Group
381 Lawrence Ave West
Toronto, Ontario, Canada
M5M 1B9

TORPET BACKISSUES

Backissues of the TORPET are available for $2.00 each (except for issues #1, #2, and #3 which are $1.00). Issues #1, #2 and #3 are 4 pages long. Issue #4 is 8 pages long. Issue #5 is 16 pages long. Issue #13 is 24 pages long. Issues #6 and #10 are 32 pages long. Issue #14 is 40 pages long and issues #7, #8, #9, #11 and #12 are 48 pages long. If you wish to order any of these old TORPETs, please send your cheque or money order to:

TORONTO PET USERS GROUP
c/o Chris Bennett
381 Lawrence Avenue West
Toronto, Ontario, Canada. M5M 1B9

HOW TO SUBMIT PROGRAMS

Programs can be sent to us either on disk or tape. The disk/tape will be returned to you as long as you have enclosed your name and address. It is also a good idea to put your membership number on the tape/disk just in case we misplace the letter or envelope in which it came.

Send all programs to:

TORONTO PET USERS GROUP
c/oChris Bennett
381 Lawrence Avenue West
Toronto, Ontario, Canada
M5M 1B9

CLUB DISKS

To order club disks via the mail, just send $10 for each 4040/2031/1540/1541 disk and $12 for each 8050/8250 disk (payable in advance). This includes the price of the diskette, the labour involved to copy them and all postage and packaging charges. Do not send us any diskettes. The mailing address is:

TORONTO PET USERS GROUP
c/oChris Bennett
381 Lawrence Avenue West
Toronto, Ontario, Canada
M5M 1B9

Do not try to order any disk whose directory listing has not yet appeared in any issue of the TORPET. Most of the directory listings can be found in issue #12 (August/82) of this years' TORPET with cummulative updates printed in each new TORPET. Please **include your membership number and return address with all orders.**

Education Disks

The 50 Education Disks listed in issue No. 14 of The TORPET may be ordered in the normal way described above or the complete set may be obtained by sending $300 to:

Aurora Software
Att. Jennifer Godfrey
Box 1394
Haileybury, Ontario
Canada, P0J 1K0

The $300 includes the 50 diskettes, two hardcover binders, together with the documentation on all the programs. Orders must be prepaid, except in Canada where school boards may send a purchase order.

COPY TREE

For anyone wishing information about the copy tree, please contact Bonnar Beach at the following address or phone:

Bonnar Beach
Horning's Mills, Ontario
Canada L0N 1J0
Phone 519/925-6035

Please **include your membership number and return address.**

Club Tapes

The procedure for ordering club tapes is to send $12.00 for each disk desired in tape format to:

RTC
10610 Bayview Plaza, Unit #18
Richmond Hill, Ontario
Canada L4C 3N8

Make all cheques or money orders payable to RTC and please **include your membership number and return address**

Most disks require two tapes and you will receive both tapes for the $12. For the few disks that will fit on a single tape an additional free tape will be sent.

How about contributing a program to the Library

New Disk Releases

TJ - JUN/82

COPY/ALL
FILE RETRIEVER
5TH SCOTTE.INST
5TH SCOTTE
TEDDY-APRIL82
DAISY-APRIL82
TEDDY.INSTR
DAISY.INSTR
TINY FORTH NOTES
TINY 4TH TCHR4.0
TINY.PILOT.INSTR
TINY.PILOT.OBJ
TEDDY.RENUM
-DAVE WILLIAMS--
DOUBLEPROG REL
ML STOPKEY
SEQ->PRG/MERGE
DYNALOGIC
FUNCTION GRAPH
EQUATION SOLVER
COMPUDATE
STRUCTURE BASIC
RELATION SKETCH
RELATION GRAPH
---
lister (SuperPET)
PHONE NUMBERS
TAPE PHONO-PHILE
DISK PHONO-PHILE
TABLE MATH
DATA GENERATOR
disklist.apl (SuperPET)

TK - SEPT/82

-BASIC 4.0 F40-
INVADERS 4.0
FAST INVADRS 4.0
ACROBAT F40
CAR RACE F40
MISSION IMP F40
NIGHT DRIVER F40
BACKGAMMON F40
--- SEPT 82 ---
DISK MASTER V2
5TH SCOTTE.INST
5TH SCOTTE
STRING THING
TAPE PHONO-PHILE
DISK PHONO-PHILE
PHONE NUMBERS
VIC TAPE INDEX
MASTER TAPE LIBR
WWV
WWVI
WWVII
WWVIII
WWIX
WW WORD LIST
CMPR MOSER SRCE
STRING THING 64
SUPERSPEED SORT
MARKSCALER
FIXFILE
POINTER SORT
FILE
ML DATA MAKER
WWI
WWII
WWIII
WWIV
SUPERMON64.V1
COMM64

TL - OCT/82

COPY-ALL
HOLYHALTER 2
TERMINAL.SERIAL
TERM.SERIAL
VIC KEYSORT
VIC SORT.DEMO1
VIC SORT.DEMO2
RELREAD
SOUP
SPACEWAR 1
SPACEWAR 2
VIC JASPER
VIC COLOR ROOS
VIC POOKY
VIC GARFIELD
DEMONSTRATIE.HI
VIC TRSHY PIC
VIC DESIGN
VIC DESIGN 2
VIC DESIGN 3
VIC DESIGN 4
VIC VIC
DIGICLOCK
HIRESFOURIER
USA SONG
SWAP 16/32K
SWAP 8K
MOCKINGBIRD HILL
FINANCE 1.4
GASSER
TIMETABLE(8032)
BUTTERFIELD
MUSIC LESSON
MUSIC LESSON 2
40 ELEMENT QUIZZ
80 ELEMENT QUIZZ
VIC AID4.REL
VICMUSIC$1201
V 76TROMBONES
V ENTERTAINER
V WONDERLAND
STRING THING 64
BRKOUT.PADL
64 MEMORY CHART
COPY-ALL64
NOS TRANSLATOR3

TM - NOV/82 (PET)

COPY-ALL
INSTRUCTIONS
PILOT TRANSLATOR
WATERMELON
FOOD
MAGIC SQUARE
SPREAD SHEET 40T
PRINT USING
PRINT USING&TEST
WATCHMAN-40
SPREAD SHEET80DT
PRNT USING ML
SCREEN ROUTINES
BAS&ML COMBINER
QUIET AFTERNOON
Q-BACK CHALLENGE
PIZZA
CLASS ORGANIZER
CM-CSP403
CN-CSP403
CH-CSP403
CHEMDRILL2
CHEMDRILL1
BACKUPDRILL2
BACKUPDRILL1
MULTI-INVADERS!

TN - NOV/82 (VIC)

COPY-ALL
MINIATURE GOLF
TANK VS UFO JOY
TANK VS UFO KEY
SHOOTER JOY
VIC CHASE JOY
VIC CHASE KEY
BREAKOUT KEY
STEAL MONEY
PING-PONG
SUPEREVERSE VIC
VIC 3 OF KIND
WALL DESTROY VIC
CHUCKALUCK VIC
LETTERSQUARES
VIC SQUIGGLE
SLO VICMAN KEYB
MASTERMIND
CRAZY BALLOON
ALIEN WASTER
ASTEROIDS
VIC MAIL
OUTPOST
BUDGET
SEPT 30 RANDOM
WORDPRO 2
VICTERM
CAT
WIZZACALC
DISKMEM B-RR1
DISKMEM INSTR.
VICWORD
VIC CONTROL KYBD
VIC TRIANGULATOR
JOYSTICK TEST

L3 - TPUG LANGUAGE 3

LOADER FORTH
FORTH H75.6

S1 - TPUG -- MUSIC 1

UNIVERSAL WEDGE
COPY ALL
NEW ROM MUSIC
OLD ROM MUSIC
76 TROMBONES
1950'S MEDLEY
ALLELUJAH
BAMBOO TREE
BARCAROLLE
BAROQUE FANFARE
BLACKBIRD
BUMBLE BEE
CANDY FAIRY
COME SW DEATH
DANSE CAPRICE
DUELIN BANJOS
EASY WINNERS

X7 - TPUG BEST-GAME 4

ELEANOR RIGBY
ELEPHANT
ENDLESS SCALE
ESPANA
FIDDLER
FUGHETTA
FUR ELISE
GAVOTTE&MUSETTE
INVENTION #4
INVENTION #5
INVENTION #8
INVENTION #11
INVENTION #14
JESU/JOY
JET PLANE
JINGLE BELLS
LE TAMBOURIN
LOVE STORY
MAPLE LEAF
MARCHE MILITAIRE
MIN.IN D
MINUTE WALTZ
MNT.GREENERY
MUSETTE
MUSIC BOX DANCER
OB-LA-DI
OCTOPUS
ORGAN FUGUE
PALINDROME
POLONAISE IN BFL
PRELUDE&FUGUE
PRISCILLA
PROMENADE
REED FLUTES
REEL
RICH MAN
SILENCE
SINFONIA
SINFONIA #1
SINFONIA #2
SINFONIA #3
SINFONIA #10
SINFONIA B FL
SKELETON DNCE
SONATA L.82
SONATA RONDO
SONATINA
SPINNING SONG
SPRING SONG
STAIRWAY
STARSPGL BANNER
SYNC. CLOCK
TARENTELLA
TEN XMAS SNGS
THE ENTERTAINER
THREE TUNES
TWO GUITARS
VALSE TRISTE
WATER MUSIC
WEE MAN
WELL TEMPERED
WELLS FARGO
WHEN I'M 64
WONDERLAND
YAKKITY SAX
YELLOW SUB
YESTERDAY

-BASIC 4.0 F40-
INVADERS 4.0
FAST INVADRS 4.0
ACROBAT F40
CAR RACE F40
MISSION IMP F40
NIGHT DRIVER F40
BACKGAMMON F40
OTHELLO
BREAKOUT
ASTEROIDS
PINBALL
PETMAN 5
JOYSTICK INV 4.0
BLOCKADE
BASEBALL 7.3
OSC LUNAR
SUPER STARTREK
STAR WARS
MASTERMIND
REVERSE-PUNTER
ARROW
BLACK BOX!
BLACK JACK
BOMBER
ROBOT CHASE!
SNAKE 2
YAHTZEE
MOVMAZE2

U7 - TPUG-UTILITIES 7

COPY-ALL
PROCEP.EDITOR
PROCEP.EXAMPLE
PROCEP.INS1.WP
PROCEP.INS2.WP
RELREAD
SOUP
KEYWORD
BASIC-AID.INST1
BASIC-AID.INST2
CBM EDITOR.INST
E-ROM.MON.I1
E-ROM.MON.I2
POWER-AID.INST
TEDDY-APRIL82
TEDDY.INSTR
DAISY-APRIL82
DAISY.INSTR
5TH SCOTTE.INST
5TH SCOTTE
ML STOPKEY
TAPE PHONO-PHILE
DISK PHONO-PHILE
PHONE NUMBERS
MASTER TAPE LIBR
DATABANK.31!
SUPERSPEED SORT
FIXFILE
POINTER SORT
FILE
STRING THING
SUPERMON64.V1
STRING THING 64
NOS TRANSLATOR3

Positions Wanted

WANTED a job. I am an out of work programmer. I have experience on all PET/CBM machines, including SuperPET and Commodore 64. All PET type BASIC's and 6502 ML. Will relocate anywhere in Canada. Serious inquiries call collect (705) 743-3871

CLASSIFIED ADS

5 Cents per word, with $1.00 Minimum.
Payment in advance to:
Chris Bennett
381 Lawrence Ave West
Toronto, Ontario, Canada
M5M 1B9

FOR SALE

An excellent Data Base called File Cabinet $35.00 to TPUG members only at that price. MFS-2 Interface $68.00 par version $82.00 serial version. Products reviewed in the Midnight. Progress Computer 7073 LynneTree Way Citrus Heights CA 95610 (8)

COMTALK: A machine language terminal program for the IEEE modem in ROM for BASIC 4. Features include: sending or receiving sequential, PRG or Wordpro files to CBM disk, ASCII or CBM format, 40 or 80 columns. Fast access to the terminal program since it always resides in the computer. Send a certified cheque or money order for $19.95 to MICROM, 20 Gilder Dr., Suite #702, Scarborough, Ontario, M1K 5E1. Ontario orders, please add 7% sales tax. Please specify $9000 or $A000 for ROM.

8023P Printer, hardly used. $1000. Call 1-519-271-8669, after 5 p.m.

Catalogs

EDUCATIONAL MICROCOMPUTER PROGRAMS. (PET, Apple, Atari, TRS-80) Most subjects and grade levels including the JINSAM DATA MANAGER programs at discount prices. Send $2.00 for complete software catalogue describing over 150 programs. Maxell Disks (MD1, single-sided, 5 1/4g) $51.50/10, $5.50 each. Ontario residents add 7%. CANADIAN SOFTWARE DISTRIBUTERS, 393 Rowell Avenue, Sault Ste. Marie, Ontario, P6C 5L2

PET/CBM ADD-ONS FREE CATALOG. ECX COMPUTER COMPANY has over 20 new ad-on circuits and software for your PET/CBM computer and peripherals. For a FREE CATALOG send a self addressed stamped envelope to: ECX COMPUTER COMPANY 2678 North Main St. Walnut Creek, California, 94596 (7)

PET 4032 LOADED. Must be sold. Includes Cassette, Waterloo Basic, MTU Music Board, Commando and 1000 program library. Excellent condition. Details - Stephen 486-8756

For Trade

WISHING to trade computer games on tape between other VIC-20 owners. Please call: 312--355-6822 or write John Schnibben, 316 Berry Drive, Naperville, Illinois 60540

Richvale Telecommunications

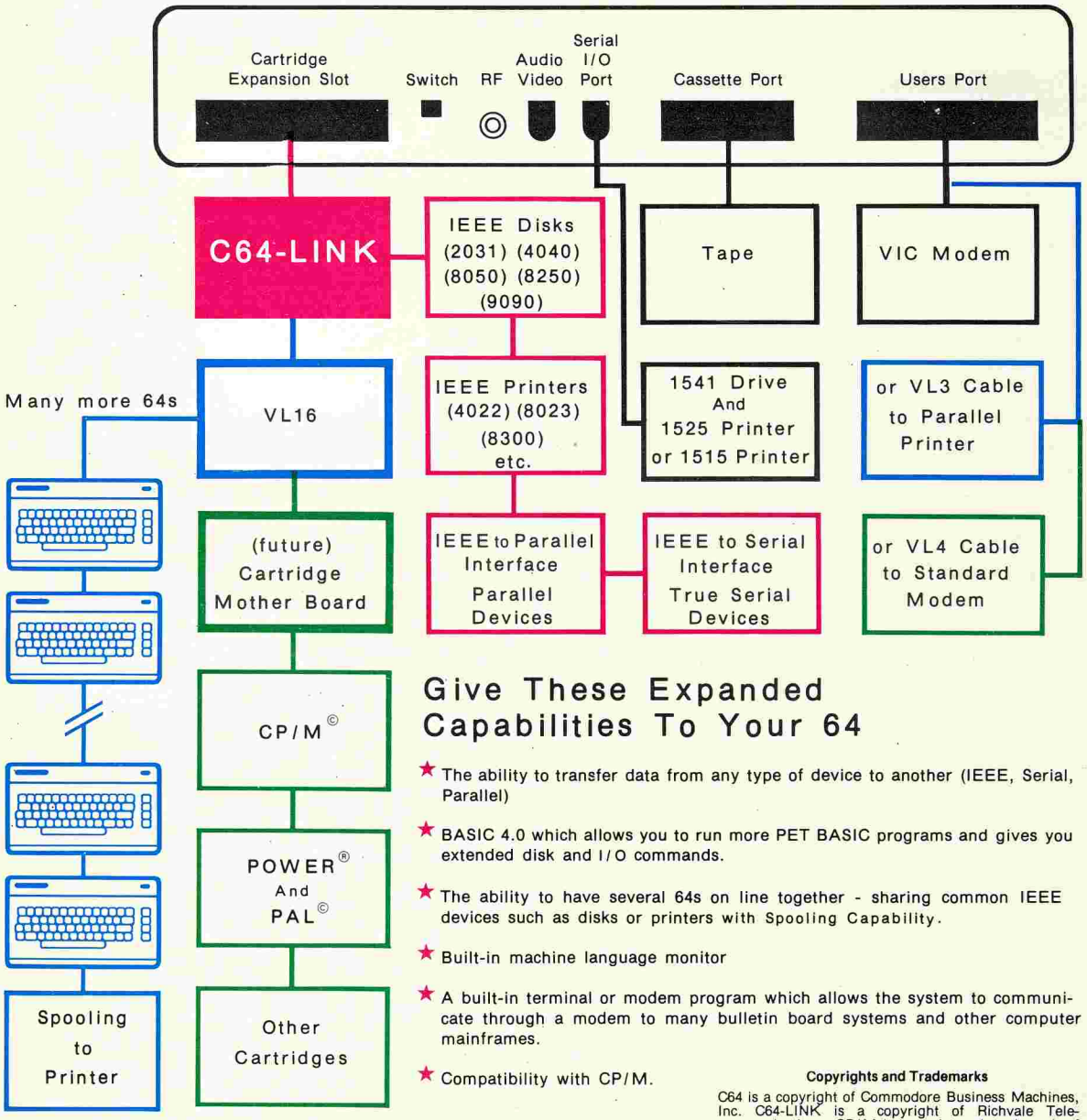
10610 BAYVIEW (Bayview Plaza)
RICHMOND HILL, ONTARIO, CANADA L4C 3N8
(416) 884-4165

$185 Canadian

C64-LINK©
The Smart 64

Also available for VIC 20

RTC RTC



Give These Expanded Capabilities To Your 64

- ★ The ability to transfer data from any type of device to another (IEEE, Serial, Parallel)
- ★ BASIC 4.0 which allows you to run more PET BASIC programs and gives you extended disk and I/O commands.
- ★ The ability to have several 64s on line together - sharing common IEEE devices such as disks or printers with Spooling Capability.
- ★ Built-in machine language monitor
- ★ A built-in terminal or modem program which allows the system to communicate through a modem to many bulletin board systems and other computer mainframes.
- ★ Compatibility with CP/M.

Contact your local Commodore dealer or RTC.