COMMODORE COMPUTER CLUB NEWS

VOLUME 1, NUMBER 4 -- DECEMBER, 1983 -- FREE

ELECTION FEVER GRIPS CCC

The first annual general meeting of the Commodore Computer Club will be held Tuesday, January 17, 1984 at 7:00 p.m. in the club's usual business meeting location, the 2nd floor auditorium of King Edward Campus, 1155 East Broadway. This meeting will prove to be one of the most exciting general meetings to Commodore computer enthusiasts since it is their first official election of directors since incorporation.

Business to be conducted at the meeting will include a number of motions that will be presented to the group for approval by the existing Board of Directors, including a recommendation for establishing honorary memberships for recognition of exceptional service to the Club (e.g. Jim Butterfield) and a recommendation for entrenchment in the by-laws of the rule that members found copying or encouraging the copying of other than personal or public domain software at meetings of the club are subject to expulsion.

Members Only

Only people who have a paid up membership as of the date of the meeting will be allowed to vote on the various resolutions and nominations. With this in mind, *ALL MEMBERS WHOSE MEMBERSHIP EXPIRES IN THE NEXT FEW WEEKS ARE URGED TO RENEW EITHER AT THE DECEMBER BUSINESS OR THE JANUARY WORKSHOP MEETING.* This will save massive lineups at the door on January 17. Quite a few cards expire at the end of December, so it's in your own interests to renew. Remember -- no current card, no vote!

Although the club has always encouraged guests to come to our meetings, we would also like to play down the idea of anyone bringing guests for the annual gathering, since they may have to be "segregated" into a separate non-voting area of the auditorium.

Door Prize

Adding to the excitement of the meeting, and intended as a further lure to members to turn out in large numbers, is a door prize in the form of a $50 gift certificate from Super Software.

The slate of nominees to be elected to next year's executive includes the following names received as of press time:

1. President -- Jim Bauerle
2. Vice-President -- Nick Shevchenko
3. Secretary -- Mike Quigley
4. Treasurer -- Hu Reijne
5. Directors at large (a total of 10 to be elected) -- Gunther Hake, Bror Jackson, Jim Jorgenson, Terry Juuti, Gerry Sinclair, Al Townshend, and Jim Wilcox.

Additional nominations will be accepted at the December Business meeting and can be called in to the PET answer phone (PET-3311) any time prior to January 3, 1984. Changes and additons to the above list will be distributed at the Hardware Workshop January 3.

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Also relating to the annual general meeting, the club is seeking the services of one of its members to audit the financial records for the 1983 year. If you have any such experience and would like to contribute your services, please approach any member of the executive.

PARANOIA REBUFFED

The October issue of TORPET carried a letter from Tim Bartels, a concerned member, who issued a warning against the use of a standard audio cable (RADIO SHACK part #42-2371) for use as a video hookup between your VIC 20 or COMMODORE 64 and the video monitor. Bartels stated that the impedance of the audio cable is 32 ohms as opposed to the required 75 ohms for normal video use. Bartels feels that he and others have smoked their VIC chips as the result of using the incorrect cable.

Of course, local TORPET readers were interested and requested information as to the validity of this concern. Greg Harder of CONTI ELECTRONICS stated that to the best of his knowledge there have been no reported incidents where blown VIC chips have been attributed to the use of the audio cable. Harder was confident enough in this belief (after a hurried consultation with his repairman) that he permitted the NEWS to quote him. "There are so many audio cables in use for this purpose", Harder stated, "there just couldn't be any problem."

This sentiment may or may not be valid. A jiffy survey of computer outlets would indicate that a DIN VIDEO CABLE is almost as rare as a faultless 1541 drive. Most shops have a good supply of the audio cables and have expressed disdain for any paranoid concern about impedance problems.

If there is anyone out there in Commodore land that can cast some definitive light on this situation, kindly drop us a line and put an end to this little controversy.

In the meantime, if you are the least bit concerned about your VIC chip and some of the less interesting tricks it can perform, avoid audio cable if you possibly can.

--- *UPCOMING MEETINGS* ---

Workshop: Thompson Secondary School, Tues., Jan. 3, 7:00 p.m.

Annual General Meeting: January 17, 7:00 p.m. (see story above)

THE EDITOR SPEAKS:

Response to the appeal for contributions to the newsletter has been, to use an overused expression, "excellent". But don't let that stop all you budding reporters, reviewers, photographers and artists from also adding your two bits (?) worth. Just remember -- the hottest subject in the publishing world right now is computers, so before you send off that article to *Compute!*, *Torpet Magazine*, or *Run!*, why not hone your writing skills with a contribution to the *Commodore Computer Club News*? Our massive staff of editors and production workers (that's me, folks), will be glad to give you help...

M.Q.

Best Wishes for Christmas and the New Year from the Executive and Directors of The Commodore Computer Club

"LAST WORD" FROM THE PRES.

By NIELS HANSEN-TRIP

A lot of time has passed since the first few meetings of the original Vancouver PET User Group were held at the Riley Park Community Center. Even though I envisioned that the User Group would grow beyond the sleepy group of 30 or so hard core enthusiasts, I must admit to being a little surprised that the boom has come so quickly.

For the past five years, I have worked to keep the club alive until it reached the size which those who study group dynamics say is essential for long term survival without being personality oriented. It is with great pride that I look back over the past few years and see that the club has weathered many trials. We even survived the great civic employees strike even though we had no place to meet and the posties went out right after. The membership took a big nose dive because people had gotten away from the habit of coming to the club. (Or, I wonder, did that have something to do with the fact that we started checking membership cards at the door and we were able to spot the people who were riding for free?)

The survival and expansion of the group are due to two or three factors, as follows:

1. The dedication of a few people who volunteered to help with the normal day to day business of the Club and who sacrificed their valuable time to take care of others. There are now many names which should be mentioned in hushed and reverent tones, including such people as *Richard Hamilton*, who set us on a firm financial base; *Steve Fabiszewski*, who doggedly kept track of what was happening at club functions; *Des Lovrity*, who was my right hand man for so long and learned many hard lessons about the work involved in the running of the club; *Don Lekei*, who has provided so much of his time to help others learn the intricacies of their machines, and many others who have come forward more recently to take part in the administration and helped ensure that things got done.

2. The unexpected success of the VIC 20 and Commodore 64 machines. We must be thankful to the COMMODORE himself for that.

3. The support and assistance of local distributors such as CONTI ELECTRONICS who, even though we have had our differences, provided help when it was needed.

If there are people who have helped out the club that I have not mentioned -- and there are many -- you know who you are and should feel quite free to pat yourself on the back and feel a glow of pride for a job well done.

I have been around a long time as Computer Clubs go. I have had the opportunity to work with a lot of people over the years and, looking back, I have enjoyed every minute of it. There have been many bright lights. I have watched rank amateurs that were incapable of making sense out of the instruction manual develop into full blown programmers of international fame. There have been some dark moments of despair. I have witnessed strutting peacocks, puffed up with self-appreciation, "borrowed" ideas and get-rich-quick schemes try to exploit the meetings for personal gain. In every case, their deeds were so distant from their words and they all attempted to distract from this fact by attacking those who tried to ensure that things were done in an orderly and methodical way.

I have been around a long time and it is time for a change. I appreciate the trust and loyalty of the many people who have kept me in office until now. I am not betraying that trust by leaving office, I am stepping down this year in order to make room for change. I believe that any organization that keeps the same hierarchy year after year is in danger of stagnation. I most certainly don't want to be the cause of that. In addition, there are many projects that have been burning in my mind for some time now that I have not been able to get to because of the press of responsibility in my capacity as President. This break will provide the much needed extra time to pursue some self-development and maybe make a few bucks to pay for this resource consuming hobby as well.

This year, you will have the opportunity of selecting a new President and I know that you will use your vote wisely. The President is your interface with the world and the image that he/she presents will be the one by which the club is judged. If there is more than one candidate this year, consider their qualifications with care. Do they represent your best interests in the long term, or do they threaten the well being and future of the club by nature of their willingness to push for hasty action on the basis of whim-pursuing instant gratification at the expense of the future?

Well, it's almost over and this will be my last words published as President of this club. (Who said "Thank God"?) It is almost painful for me to go. I have invested so much of myself into the club that it is very much a personal concern to see it blossom. I am suffering from some kind of nest clearing syndrome I guess. One thing I have learned is that once you have elected anyone to hold office, you must support and encourage them. To paraphrase an old adage, Don't criticize the programmer no matter how bad the code, if the program works and you don't want to do it yourself.

LIBRARIAN QUITS TOO

Tony Smith, VIC 20 librarian for the club, has resigned. He recently had the good fortune to take over a new job in charge of a large warehouse and has found the increased demand for his time hard to manage. "I have enjoyed working with many of the users," he explained, "I just don't have the time to track down missing tapes and disks through a maze of phony names and phone numbers."

At the best of times, running any of the libraries is a demanding task. Care of the VIC 20 library is made much more complicated by virtue of the fact that it consists mainly of tapes. "It seemed to me like I was expected to 'provide' new programs every meeting," Tony stated. "There were few people contributing. At first, loans were made on the basis of trust. More recently, it has become necessary to ask for membership cards to be shown since many people have been using assumed names and failing to return the borrowed copies."

The final blow for Tony came at a recent Hardware Workshop. He had carefully laid out the library where it would not be forgotten when it came time to leave for the meeting. Unfortunately, being a little tired from the pressures of work, he arrived at the meeting *sans* tape collection. He returned home immediately, a drive of almost one hour, in an attempt to rescue what was left of the evening. He didn't make it back before the meeting was over.

Apparently, some irate but enterprising members of the VIC 20 group did some digging and came up with his home phone number. They proceeded to call up his answering machine and leave abusive messages. Most did not leave names, but some voices were recognized. In his own words, Tony commented, "I just don't need that right now."

The Commodore Computer club is a co-operative effort. At present, there are no paid workers. Everyone who is doing anything for the club is doing so because they believe in the concept of sharing. Without these

Continued on Page 8

PROGRAMMING TIPS

by DAVE WHITE

Let's look at some graphic programs which demonstrate some basic programming principles. The first two programs are taken from the VIC-20 Reference Manual and modified. The third one is a random pattern generator.

BIRDS 1 -- In all of my programs the first line contains the program name. By erasing the '2 REM' in line 2 and hitting RETURN on the line, the program can be saved. Line 5 clears the screen and centers the cursor. Note it ends with a ";" to suppress the system's return. Line 15 describes the bird with wings up; line 16 with wings down. Note that the color of the bird is obtained by poking the bird number to the character color register.

BIRDS 2 -- We use a different method of changing colors here, making use of the string function MID$ in lines 3 and 31. In line 3 C$ contains all the colors. The color CO$ is printed. Although these two programs are short they do contain nested loops. Lines 50 and 70 are time delays. They do nothing.

FOUNTAIN -- This program is a bit more advanced and will reward the programmer with a color display. To build the pattern we use pokes to the screen. In order to get a 'Low Resolution' plot we poke the code for reverse space. Now space has a poke code of 32, so we add 128 for Rev-Vid. 32+128=160. We poke 160 to character memory (1024 + displacement). We poke the color code to color memory (55296 + displacement). The reader should note the rather complex way in which X%, Z%, and N are combined to affect the display. It might prove an interesting exercise to 'play' with these variables (or introduce others) so that they affect the program differently.

In the next issue we will examine programs which plot. In particular we will examine a medium resolution graphic which plots 80 by 50. Thats twice the resolution of the 'fountain' example. The secret is in using Commodore-C, Commodore-B, etc. If you have a program which gives 80 by 50 graphics (or any other interesting program), why not contact me?

Dave White 224-3082

BIRDS 1

```
2 REM     SAVE   "@0:BIRDS 1",8
5 PRINT "[CLEAR][DOWN][11 RIGHT]"
;
8 L3$= "[3 LEFT]" :REM LEFT 3
10 POKE 53280,0 :POKE 53281,0
15 B1$=CHR$(74)+CHR$(81)+CHR$(75)
20 B2$=CHR$(85)+CHR$(81)+CHR$(73)
30 FOR BIRD= 1 TO 22
32 :  POKE 646,BIRD
35 :  FOR FLAP= 1 TO 5
40 :     PRINT L3$;B1$;
50 :     FOR T=1 TO 120:NEXT
60 :     PRINT L3$;B2$;
70 :     FOR T=1 TO 120:NEXT
80 :  NEXT FLAP
90 NEXT BIRD
```

BIRDS 2

```
2 REM        SAVE "@0:BIRDS 2",8
3 C$="[CONTROL 1-8][COMMODORE 1-
8][REV ON]"
5 PRINT"[CLEAR][7 DOWN][11 RIGHT
]";
8 L3$= "[3 LEFT]"
10 POKE 53280,0
12 POKE 53281,0
15 B1$=CHR$(74)+CHR$(81)+CHR$(75
)
20 B2$=CHR$(85)+CHR$(81)+CHR$(73
)
30 FOR BIRD= 2 TO 16
31 :  CO$= MID$(C$,BIRD,1)
32 :  PRINT "[DOWN][RIGHT]";CO$;
35 :  FOR FLAP= 1 TO 4
40 :  :  PRINT L3$;B1$;
50 :  :  FOR TT=1 TO 150:NEXT TT
60 :  :  PRINT L3$;B2$;
70 :  :  FOR TT=1 TO 150:NEXT TT
80 :  NEXT FLAP
90 NEXT BIRD
95 GOTO 30
```

IMPORTANT NOTE: Line 3 in the program Birds 2 contains some unusual information in square brackets. To type it in correctly, hold down the CONTROL key and type all the numbers from 1 to 8. Then do the same with the COMMODORE key. In the program Fountain below, the number 8 on the second line is a continuation of line number 2. The width of the columns is 33 characters, in case you're counting the empty spaces.

FOUNTAIN

```
2 REM      SAVE    "@0:FOUNTAIN",
8
3 :
4 PRINT CHR$(147)
5 POKE 53280,0:POKE 53281,0:POKE
646,15
6 PRINT CHR$(147)
8 PRINT "{CD} WHEN FOUNTAIN STOPS
, ENTER"
9 PRINT "{CD}          S        = S
TOP"
11 PRINT "{CD}          R        =
RESTART"
12 PRINT "{CD} ANY OTHER KEY  =
CONTINUE"
14 PRINT
15 PRINT "{RV} STRIKE ANY KEY TO
BEGIN"
17 GET J$: IF J$="" GOTO 17
18 PRINT CHR$(147)
20 S=  1024 :REM START OF SCREEN
MAP
30 C= 55296 :REM START OF COLOR
MAP
50 :
60 FOR M= 1 TO 10
70 :  X%= RND(TI)*1000
80 :  Z%= ABS(10-X%/100)  +1
90 :  FOR N= X% TO 1000 STEP Z%
100 :     POKE S+N,160
110 :     POKE C+N,1 +X%/67
120 : NEXT N
130 NEXT M
135 :
140 GET J$:IF J$="" THEN 140
150 IF J$="S"THEN END
155 IF J$="R" THEN 18
160 GOTO 60
```

DISK DRIVE WOES

So you think you've got problems with your 1541 disk drive? Following is a letter from the Nova Scotia users' group to Commodore, a copy of which was sent to us:

"A survey made at the September meeting of club members who own the VIC 1541 disk drive showed that approximately 25% had experienced problems with their drive which required servicing. These failures cannot be attributed to normal wear and tear since the majority of these drives have been purchased in the last nine months.

"In the past Commodore Business Machines have had an excellent reputation for selling reliable, quality products. It is therefore a matter of surprise that the 1541 disk drive does not provide consistent, trouble free operation. The problems that have been encountered with the disk drive are varied. They include:

"a) Overheating leading to temporary loss of function;

"b) Intermittant failure of some or all of the LOAD, SAVE and Directory functions;

"c) Problems associated with loss of head alignment and/or poor speed regulation;

"d) Mechanical detachment of drive pulley from shaft.

"While the two local Commodore dealers ... have made commendable attempts to repair defective drives, the work has been hampered by lack of adequate service manuals and test equipment. As a result defective disk drives are often retained for several weeks, and in some cases are only corrected by replacement or after being returned to Toronto for servicing. At the same time owners of older disk drives on which the 90-day warranty has expired are being charged up to $70 or more for repairs involving head alignment or speed correction. This amount is a significant fraction of the cost of the drive and must be regarded as unacceptable if repair is required every few months.

"Members' concern has been deepened by information from your Canadian headquarters, and from Commodore dealers in Canada and the U.S.A. that the 1541 disk drive has been withdrawn from sale pending the release of a new

Continued on Page 8

VIC LIBRARY

Here's the VIC library list of both discs and tapes which will (with luck) be available at the January workshop meeting, to be held Tuesday, January 3 at Thompson Secondary School. We have had several volunteers come forward to offer assistance in carrying on the excellent job done by VIC librarian Tony Smith, who recently resigned (see story elsewhere in this issue).

Please note that there are Tapes 10 and 11 also available, but their contents are the same as Discs F and G respectively.

A brief word of explanation about the symbols at the end of each program name. A = Assembler, Machine Language. B = Home Accounting, Finance, Business, Word Processing. C = Telecommunications. E = Education. G = Games. L = Languages. M = Music and Sound Effects. P = Graphics and Demos. U = Utilities, Aids, DOS, Data Base Management.

VIC DISKS

```
"VPUG VIC AA      " AA 2A
12 "BIRDS DEMO      P* PRG
11 "BUBBLE BEE      P* PRG
 1 "COLOUR BARS     P* PRG
 9 "DRAGON          P* PRG
 3 "FRERE JACQUES   M* PRG
13 "GENERAL DEMO    P* PRG
 3 "GRAPHIC DEMO    P* PRG
11 "GRAPHICS&SOUND  P* PRG
 6 "HANDIC DEMO3    P* PRG
 8 "HI RES DEMO1    P* PRG
 3 "KALEIDOSCOPE-1  P* PRG
 6 "KALEIDOSCOPE-2  P* PRG
 4 "KEYBOARD GRAPH  P* PRG
 6 "MERRY VIC-MAS   M* PRG
 5 "VIC MEON        P* PRG
 8 "SOUND KEYBOARD  M* PRG
 4 "ROBOTS          P* PRG
12 "SOUND EFFECTS   M* PRG
11 "MORE SOUND EFF  M* PRG
 9 "KEYBD SOUNDS    M* PRG
 3 "SILENT NIGHT    M* PRG
 8 "ARROW           S* PRG
13 "ARTILLERY       S* PRG
11 "BANDIT-1        S* PRG
 5 "BARRICADE       S* PRG
12 "BIORYTHM        P* PRG
 9 "BLACKJACK       S* PRG
12 "BUSH TRAIL      S* PRG
12 "DAM BUSTERS     S* PRG
 5 "DEFLECTION      S* PRG
178BLOCKS FREE.

"VPUG VIC AB      " AB 2A
 6 "BASICODE READ    U* PRG
 7 "BASICODE SEND    U* PRG
 3 "BIG LETTERS      P* PRG
 4 "CHECK DISK       U* PRG
 4 "DIRECTORY        U* PRG
11 "DISARM           A* PRG
14 "DISPLAY T&S      U* PRG
 8 "DIS1             A* PRG
 4 "HISTROGRAM       P* PRG
 9 "PERFORM TEST     U* PRG
 7 "PROGNEL CHARS    P* PRG
13 "RANDOM FILE      U* PRG
 5 "SEQUENTIAL FILEU* PRG
 8 "TINYMON INST     A* PRG
 5 "TINYMON 1        A* PRG
 8 "VIC DIS-1        A* PRG
10 "VIC DIS-2        A* PRG
11 "VIC DIS-3        A* PRG
 4 "VICLOAD-2        U* PRG
 4 "VICLOAD-4        U* PRG
 6 "VIEW RAM         U* PRG
 7 "PRG CLASS VIC    U* PRG
 4 "SEARCHER         U* PRG
 1 "RELOCATE SCRN    U* PRG
 4 "VIC WEDGE        U* PRG
389BLOCKS FREE.
10 "SUPER VICMON2    A* PRG
 8 "MIMEN SAVER      U* PRG
 7 "VIC AID          U* PRG
14 "FRENCH TUTOR     E* PRG
 3 "REL WRITE        U* PRG
 3 "CHARSBG1C00      U* PRG
 6 "PRG FUNCT KEYS   U* PRG
 8 "ADDRESS FILE     B* PRG
11 "SRAPH PLOT       E* PRG
 9 "COMPLEX MATRIX   E* PRG
 4 "SSSTIMER DESIGNE* PRG
 8 "VIC FINANCE      B* PRG
 3 "LO PASS FILTER   E* PRG
 4 "CONTEXT INDEXERU* PRG
11 "COPY-ALL DISK    U* PRG
10 "TERM SER-1       C* PRG
 7 "TERM SER-2       C* PRG
 6 "KEYSORT          U* PRG
 3 "SORT DEMO-1      U* PRG
 4 "SORT DEMO-2      U* PRG
 4 "VIC VIC          P* PRG
 7 "TINY/BASIC AID   U* PRG
 3 "STRING THING     U* PRG
24 "82 TAX ONTARIO   B* PRG

"VPUG VIC AC      " AC 2A
 4 "VIC WEDGE        U* PRG
21 "SATELLITE FINDRC* PRG
13 "BILLBOARD        P* PRG
 2 "JIM IN COLOUR    P* PRG
 7 "PRG CHARACTERS   P* PRG
14 "ADDITION PRACT   E* PRG
14 "MULTIPLY PRACT   E* PRG
14 "SUBTRACT PRACT   E* PRG
 5 "UXB-1            G* PRG
 6 "UXB-2            G* PRG
27 "BACKGAMMON       G* PRG
10 "POLY TURTLE      L* PRG
10 "IAP              G* PRG
14 "FREE-FALL        G* PRG
 2 "VISIBLE VIC      P* PRG
 9 "CALENDAR         P* PRG
 6 "PRIME FACTORS    E* PRG
14 "GOBBLE           G* PRG
10 "SPACEWAR-1       G* PRG
10 "SPACEWAR-2       G* PRG
10 "S-X JASPER       P* PRG
 6 "S-X COLOUR ROOSP* PRG
 4 "S-X POOKY        P* PRG
13 "S-X BARFIELD     P* PRG
 2 "S-X HI DEMO      P* PRG
 2 "S-X TRENY PIC    P* PRG
 1 "S-X DESIGN       P* PRG
 1 "S-X DESIGN-2     P* PRG
 1 "S-X DESIGN-3     P* PRG
 1 "S-X DESIGN-4     P* PRG
 4 "DIGICLOCK        P* PRG
 4 "HI-RES FOURIER   P* PRG
12 "USA SONG         M* PRG
60 BLOCKS FREE.
 9 "MUSIC 01201      M* PRG
10 "76 TROMBONES     M* PRG
 9 "ENTERTAINER      M* PRG
 7 "BRKOUT PADL      G* PRG
 5 "PENCIL           P* PRG
 2 "SCROLL           U* PRG
13 "GOBBLE (K)       G* PRG
13 "THUNDERBIRD      G* PRG
11 "STARFIGHT        G* PRG
11 "SPACEWARS        G* PRG
10 "TANK VS UFO      G* PRG
10 "TANK VS UFO (K)  G* PRG
14 "MINI GOLF        G* PRG
10 "INVADERS         G* PRG
 7 "CAVERN           G* PRG
13 "GOLDRUSH         G* PRG
 8 "UFO PILOT        G* PRG
11 "CHASE            G* PRG
 9 "FLIP INST        G* PRG
12 "FLIP             G* PRG
 8 "BRAIN WARP       G* PRG
13 "JUGGLER          G* PRG
 8 "SLOT MACHINE     G* PRG
 7 "HIDDEN MAZE      G* PRG
11 "SEARCH           G* PRG
13 "BUSINESS DEMO    P* PRG
10 "MAKING CHANGE    E* PRG
 2 "PRIME NUMBERS    E* PRG
14 "BASEBALL         G* PRG
12 "FOUR IN A RON    G* PRG
 8 "CRYPTOGRAMS      G* PRG
12 "THREE OF A KIND6* PRG
 4 "DIRECTORY        U* PRG

"VPUG VIC AD      " AD 2A
 4 "VIC WEDGE"       PRG
 4 "DIRECTORY"       PRG
 7 "PRG CLASS VIC    U* PRG
 9 "CALENDAR         P* PRG
 2 "LOTTO 649        G* PRG
 8 "MONITOR          A* PRG
 5 "CHECKBOOK        B* PRG
 4 "MAIL LIST TAPE   B* PRG
 4 "NUMERIC PAD      U* PRG
 7 "FILE CLERK TAPED* PRG
 4 "SCROLL+/-        U* PRG
 4 "RINSER EOL       U* PRG
 2 "PAUSE            U* PRG
 4 "MEMORY SNAPSHOTA* PRG
 5 "TRACE            U* PRG
 7 "COPY DISK FILESU* PRG
 2 "SHELL SORT       P* PRG
 2 "BUBBLE SORT      P* PRG
 2 "SORT C           P* PRG
 2 "SORT D           P* PRG
12 "MATHMAN          E* PRG
14 "GOBBLE           G* PRG
 5 "PENCIL           P* PRG
13 "THUNDERBIRD      G* PRG
11 "STARFIGHT        G* PRG
11 "SPACEWARS        G* PRG
10 "TANK VS UFO      G* PRG
14 "MINI GOLF        G* PRG
10 "INVADERS         G* PRG
 7 "CAVERN           G* PRG
13 "GOLDRUSH         G* PRG
 4 "RINSER EOL       U* PRG
 2 "PAUSE            U* PRG
 4 "MEMORY SNAPSHOTA* PRG
 5 "TRACE            U* PRG
 7 "COPY DISK FILESU* PRG
 2 "SHELL SORT       P* PRG
 2 "BUBBLE SORT      P* PRG
 2 "SORT C           P* PRG
 2 "SORT D           P* PRG
 3 "DISPLAY DEMO     P* PRG
13 "OUTPOST          G* PRG
 8 "DOODLE (JB)      P* PRG
 8 "COLOUR MASTER    G* PRG
 7 "GUESS 10 SEC     G* PRG
10 "RAINBOW CLOCK    P* PRG
 6 "HEXEDIT          A* PRG
10 "MAKE SKETCH(JB)  G* PRG
 4 "AMORTIZE         B* PRG
 3 "S-X VIC LOGO     L* PRG
 4 "S-X SUPER PLOT   P* PRG
 2 "S-X ALL MY LOVIN* PRG
 1 "S-X SPACE ACE    G* PRG
 9 "S-X MUSIC MACHINM* PRG
 1 "S-X DIAMOND      P* PRG
 4 "SUPER VICMON     A* PRG
 8 "MIMEN SAVER      U* PRG
 7 "VIC AID          U* PRG
14 "FRENCH TUTOR     E* PRG
 4 "SSSTIMER DESIGNE* PRG
 8 "VIC FINANCE      B* PRG
 3 "LO PASS FILTER   E* PRG
 4 "CONTEXT INDEXERU* PRG
11 "COPY-ALL DISK    U* PRG
10 "TERM SER-1       C* PRG
 7 "TERM SER-2       C* PRG
 6 "KEYSORT          U* PRG
 3 "SORT DEMO-1      U* PRG
 4 "SORT DEMO-2      U* PRG
 4 "VIC VIC          P* PRG
 7 "TINY/BASIC AID   U* PRG
 3 "STRING THING     U* PRG
24 "82 TAX ONTARIO   B* PRG
 3 "JOYSTICK DEMO    P* PRG
 3 "SK HI-RES        P* PRG

"CCC VIC AE       " AE 2A
 4 "VIC WEDGE        U* PRG
 4 "DIRECTORY        U* PRG
 7 "PRG CLASS VIC    U* PRG
 8 "UFO PILOT (JB)   G* PRG
13 "BOGGLER (JB)     G* PRG
 4 "DAY AT RACES-1   G* PRG
10 "DAY AT RACES-2   G* PRG
13 "RHINO            G* PRG
 7 "SCALES           M* PRG
14 "PILOT BK         L* PRG
20 "TINY PLAN BK     B* PRG
 5 "HORSE TRAINER    E* PRG
10 "4 COLOUR MAP     G* PRG
 2 "SCREEN SW        U* PRG
 9 "PETALS/ROSE      G* PRG
 4 "ROMPEEK          A* PRG
12 "DISASSEMBLER     A* PRG
 4 "BASIC NIGHTMAREX* PRG
 7 "MORE SOUNDS +    M* PRG
 2 "COLOUR EATER     P* PRG
 2 "CRITTER          P* PRG
 3 "S-X JOYWRITER    P* PRG
 5 "S-X HI RES DEMO* PRG
11 "S-X CALCULART    P* PRG
 2 "S-X POLYSONS     P* PRG
12 "PERMUTE SBRTN    P* PRG
262BLOCKS FREE.
 5 "S-X AMORTGRAPH   B* PRG
12 "BUTTERNORT       B* PRG
 8 "LOAD/RUN DISK    U* PRG
 8 "PRS LOCATOR      U* PRG
 6 "VICWORD          U* PRG
 5 "CHAR GEN 2.0     P* PRG
 2 "JOYSTICK TESTERP* PRG
10 "VIC INVADERS     G* PRG
 1 "BIG CHARACTERS   P* PRG
 4 "PONG             G* PRG
 3 "S-X BOUNCER      P* PRG
 6 "S-X CLOCK        P* PRG
 7 "HARMONIZER       M* PRG
 9 "STEAL MONEY      G* PRG
 4 "KALEIDOSCOPE-3   P* PRG
 8 "BUG HOP          G* PRG
 1 "RELOCATE SCRN    U* PRG
17 "CDL/CHAR EDITORP* PRG
11 "GRAND PRIX       G* PRG
10 "ALIEN RAIDERS    G* PRG
 7 "LONE DIVISION    G* PRG
 8 "LUNAR LANDER     G* PRG
10 "MOONLANDER       G* PRG
12 "MASTERMIND       G* PRG
 7 "MUKADE           G* PRG
11 "OTHELLO          G* PRG
11 "PINBALL          G* PRG
11 "PING PONG        G* PRG

"CCC VIC AF       " AF 2A
 4 "DIRECTORY        U* PRG
12 "DIR TAPE-10"        PRG
 4 "VIC WEDGE        U* PRG
 7 "PRS CLASS VIC    U* PRG
 5 "S-X KINETIC      P* PRG
 3 "S-X PWR SPIRAL   P* PRG
 4 "S-X PATTERNS     P* PRG
 8 "AIR DEFENSE      G* PRG
 4 "LIFE             P* PRG
 2 "RELOCATE SCRN    U* PRG
12 "HANGMAN          G* PRG
11 "HUNGRY DRAGON    G* PRG
 3 "POTHOLES/DISC    G* PRG
10 "P2"                 PRG
17 "CAVES OF ICE BKS* PRG
 6 "UXB 2.1          G* PRG
11 "MYSTERY SPELL    G* PRG
13 "DOTS             G* PRG
10 "DEMON STAR       G* PRG
 4 "TINY DIRECTORY   U* PRG
 2 "PRINT HEX/DEC    A* PRG
361BLOCKS FREE.
 3 "RAM TEST         U* PRG
15 "EDITYPE          B* PRG
 1 "FILL THE SCREENP* PRG
 5 "DISK MENU        U* PRG
 4 "MARQUEE          P* PRG
 3 "GEMINI SAILBOATP* PRG
 2 "GEMINI FACE      P* PRG
 2 "WAIT/PADDLES     P* PRG
12 "SKY DIVER        G* PRG
 9 "WIZARD IN MAZE   G* PRG
15 "FIGHTER ACES BKS* PRG
 3 "NAME PLAY        G* PRG
11 "MOUSE FACE       G* PRG
 8 "BEES             G* PRG
 3 "HANGMEN          G* PRG
10 "HANG-3"          G* PRG
 4 "GOBLIN           G* PRG
12 "SKIER            G* PRG
 1 "SELECTIONS"          SEQ
 4 "DF"                  SEQ
10 "VIC DT"             PRG

"CCC VIC AG       " AG 2A
 4 "VIC WEDGE        U* PRG
 4 "DIRECTORY        U* PRG
 7 "PRG CLASS VIC    U* PRG
 8 "TIME BOMB        G* PRG
 3 "NAME PLAY        G* PRG
 5 "BUG RACE         G* PRG
 1 "CYLONS           G* PRG
14 "CYLONS 2         G* PRG
29 "CYLONS 3         G* PRG
13 "SNAKE ESCAPE     G* PRG
 8 "KEYBOARD         M* PRG
10 "VIPER            G* PRG
10 "VIC COPY-ALL     U* PRG
 4 "POLARSRAPH 5K    P* PRG
 6 "CHECKBOOK        B* PRG
 1 "PILOT BK         L* PRG
21 "PI"                 PRG
 6 "LP TIMER         A* PRG
376BLOCKS FREE.
 4 "TINYDIR W/DATE   U* PRG
 9 "PID              B* PRG
15 "ULTRASORT        U* PRG
 2 "SORT GENERATOR   P* PRG
 4 "BASELS           G* PRG
12 "DIAMOND DROP     G* PRG
 6 "DIAN2"           P* PRG
10 "AARDVARK ATTACKS* PRG
12 "DRAGONMASTER     G* PRG
 5 "DRAGON DATA"         SEQ
 4 "SOUND GENERATORM* PRG
 5 "GEMINI PRINTALLP* PRG
12 "WORD MATCH       G* PRG
 3 "STAR WARS SONG   M* PRG
12 "MOVING MAZE      G* PRG
 7 "OIL TYCOON       G* PRG
11 "DI"                 PRG
10 "VIC DT"             PRG
```

VIC TAPES

(Directories taken from the master disks used to create the tapes)

```
"VPUG VIC TAPE 01" 01 2A
12 "DIRECTORY"          PRS
 6 "PISTOL PETE      S* PRS
10 "RACE             S* PRS
 7 "PRS CLASS VIC    U* PRS
 6 "BASICODE READ    U* PRS
 7 "BASICODE SEND    U* PRS
 3 "BIG LETTERS      P* PRS
 4 "CHECK DISK       U* PRS
 4 "DIRECTORY        U* PRS
11 "DISARM           A* PRS
14 "DISPLAY T&S      U* PRS
 8 "DIS1             A* PRS
 4 "HISTROGRAM       P* PRS
 9 "PERFORM TEST     U* PRS
 7 "PROGNEL CHARS    P* PRS
13 "RANDOM FILE      U* PRS
 8 "SEQUENTIAL FILEU* PRS
 8 "TINYMON INST     A* PRS
 5 "TINYMON 1        A* PRS
 8 "VIC DIS-1        A* PRS
10 "VIC DIS-2        A* PRS
11 "VIC DIS-3        A* PRS
 4 "VICLOAD-2        U* PRS
 4 "VICLOAD-4        U* PRS
 6 "VIEW RAM         U* PRS
10 "VIC DT"             PRS
 3 "SELECTIONS"          SEQ
 4 "SEARCHER         U* PRS
 1 "RELOCATE SCRN    U* PRS
10 "SUPER VICMON2    A* PRS
 8 "MIMEN SAVER      U* PRS
 7 "VIC AID          U* PRS
14 "FRENCH TUTOR     E* PRS
 3 "REL WRITE        U* PRS
 3 "CHARSBG1C00      U* PRS
 6 "PRS FUNCT KEYS   U* PRS
 8 "ADDRESS FILE     B* PRS
11 "SRAPH PLOT       E* PRS
 9 "COMPLEX MATRIX   E* PRS
 4 "SSSTIMER DESIGNE* PRS

"VPUG VIC TAPE 02" 02 2A
12 "DIRECTORY"          PRS
10 "VIC DT"             PRS
 1 "SELECTIONS"          SEQ
 7 "PRS CLASS VIC    * PRS
 8 "VIC FINANCE      B* PRS
 3 "LO PASS FILTER   E* PRS
 4 "CONTEXT INDEXERU* PRS
11 "COPY-ALL DISK    U* PRS
10 "TERM SER-1       C* PRS
 7 "TERM SER-2       C* PRS
 6 "KEYSORT          U* PRS
 3 "SORT DEMO-1      U* PRS
 4 "SORT DEMO-2      U* PRS
 4 "VIC VIC          P* PRS
 7 "TINY/BASIC AID   U* PRS
 3 "STRING THING     U* PRS
24 "82 TAX ONTARIO   B* PRS
 6 "COPY CAT         S* PRS
24 "ENTERPRIME 8K    S* PRS
10 "SRAPH PLOT       E* PRS
 3 "DISPLAY DEMO     P* PRS
13 "OUTPOST          S* PRS
 8 "DOODLE (JB)      P* PRS
 8 "COLOUR MASTER    G* PRS
 7 "GUESS 10 SEC     G* PRS
10 "RAINBOW CLOCK    P* PRS
 6 "HEXEDIT          A* PRS
10 "MAKE SKETCH(JB)  G* PRS
 4 "AMORTIZE         B* PRS
 3 "S-X VIC LOGO     L* PRS
 4 "S-X SUPER PLOT   P* PRS
 2 "S-X ALL MY LOVIN* PRS
 1 "S-X SPACE ACE    G* PRS
 9 "S-X MUSIC MACHINM* PRS
 1 "S-X DIAMOND      P* PRS

"VPUG VIC TAPE 03" 03 2A
12 "DIRECTORY"          PRS
 7 "PRS CLASS VIC    X* PRS
 9 "CALENDAR         P* PRS
 2 "LOTTO 649        G* PRS
 8 "MONITOR          A* PRS
 5 "CHECKBOOK        B* PRS
 4 "MAIL LIST TAPE   B* PRS
 4 "NUMERIC PAD      U* PRS
 7 "FILE CLERK TAPED* PRS
 4 "SCROLL+/-        U* PRS
 4 "RINSER EOL       U* PRS
 2 "PAUSE            U* PRS
 4 "MEMORY SNAPSHOTA* PRS
 5 "TRACE            U* PRS
 7 "COPY DISK FILESU* PRS
 2 "SHELL SORT       P* PRS
 2 "BUBBLE SORT      P* PRS
 2 "SORT C           P* PRS
 2 "SORT D           P* PRS
12 "MATHMAN          E* PRS
14 "GOBBLE           G* PRS
 5 "PENCIL           P* PRS
13 "THUNDERBIRD      G* PRS
11 "STARFIGHT        G* PRS
11 "SPACEWARS        G* PRS
10 "TANK VS UFO      G* PRS
14 "MINI GOLF        G* PRS
10 "INVADERS         G* PRS
 7 "CAVERN           G* PRS
13 "GOLDRUSH         G* PRS
11 "CHASE            G* PRS
 9 "FLIP INST        G* PRS
12 "FLIP             G* PRS
 8 "BRAIN WARP       G* PRS
 8 "SLOT MACHINE     G* PRS
 9 "REVERSE          G* PRS
 7 "HIDDEN MAZE      G* PRS
 5 "HORSE TRAINER    E* PRS
10 "4 COLOUR MAP     G* PRS
 2 "SCREEN SW        U* PRS
 9 "PETALS/ROSE      G* PRS
 4 "ROMPEEK          A* PRS
12 "DISASSEMBLER     A* PRS

"VPUG VIC TAPE 04" 04 2A
12 "DIRECTORY"          PRS
10 "VIC DT"             PRS
 7 "PRS CLASS VIC    * PRS
 1 "S-X CIRCULINE    P* PRS
 1 "S-X SPIRALMANIA* PRS
 1 "S-X TRI-CIRCLE   P* PRS
 1 "S-X FAN-TASTIC   P* PRS
 1 "S-X ANGIR DMO    P* PRS
 4 "S-X DATA DEMO82P* PRS
 4 "FUEL CHASE       G* PRS
 8 "ROBOT CHASE      G* PRS
 1 "UFO LANDING      M* PRS
 2 "COUNTER          P* PRS
 3 "MEMORY MUSIC     M* PRS
 3 "SPACE SHIPS      P* PRS
 7 "UFO-TANK WAR     G* PRS
 7 "VIC-20 ORGAN     M* PRS
 6 "IAPPER           G* PRS
 4 "TANK WAR P1(T)   G* PRS
 9 "TANK WAR P2      G* PRS
 9 "ONE ON ONE       G* PRS
 9 "BATTLE ZONE      G* PRS
 4 "SMOOTH MOVE      P* PRS
 6 "BASIC INVADER    G* PRS
13 "GALACTIC WAR     G* PRS
 3 "FIRE PART-1      G* PRS
 9 "FIRE PART-2      G* PRS
 8 "MANHOLE          G* PRS
 2 "ANDROID2         P* PRS
 6 "BUG HOP          G* PRS
 1 "RELOCATE SCRN    U* PRS
17 "CDL/CHAR EDITORP* PRS
11 "GRAND PRIX       G* PRS
10 "ALIEN RAIDERS    G* PRS
 7 "LONE DIVISION    G* PRS
 8 "LUNAR LANDER     G* PRS
10 "MOONLANDER       G* PRS
12 "MASTERMIND       G* PRS
 7 "MUKADE           G* PRS
11 "OTHELLO          G* PRS
11 "PINBALL          G* PRS
11 "PING PONG        G* PRS

"VPUG VIC TAPE 05" 05 2A
12 "DIRECTORY"          PRS
 7 "PRS CLASS VIC    X* PRS
12 "BIRDS DEMO      P* PRS
11 "BUBBLE BEE      P* PRS
 1 "COLOR BARS      P* PRG
 9 "DRAGON           P* PRS
 3 "FRERE JACQUES    M* PRS
13 "GENERAL DEMO     P* PRS
 3 "GRAPHIC DEMO     P* PRS
11 "GRAPHICS&SOUND   P* PRS
 6 "HANDIC DEMO3     P* PRS
 8 "HI RES DEMO1     P* PRS
 3 "KALEIDOSCOPE-1   P* PRS
 6 "KALEIDOSCOPE-2   P* PRS
 4 "KEYBOARD GRAPH   P* PRS
 6 "MERRY VIC-MAS    M* PRS
 5 "VIC MEON         P* PRS
 8 "SOUND KEYBOARD   M* PRS
 4 "ROBOTS           P* PRS
11 "SOUND EFFECTS    M* PRS
11 "MORE SOUND EFF   M* PRS
 9 "KEYBD SOUNDS     M* PRS
 3 "SILENT NIGHT     M* PRS
 8 "ARROW            G* PRS
13 "ARTILLERY        G* PRS
11 "BANDIT-1         G* PRS
 5 "BARRICADE        G* PRS
12 "BIORYTHM         P* PRS
 9 "BLACKJACK        G* PRS
12 "BUSH TRAIL       G* PRS
12 "DAM BUSTERS      G* PRS
 5 "DEFLECTION       G* PRS
10 "DEPTH CHARGE     S* PRS
12 "DRAGON MAZE      G* PRS
 7 "BREAKOUT         G* PRS
 7 "FOREST DRIVER    G* PRS
10 "VIC DT"             PRS

VPUG VIC TAPE 06" 06 2A
12 "DIRECTORY"          PRS
 7 "PRS CLASS VIC    X* PRS
10 "VIC DT"             PRS
21 "SATELITE FINDRC* PRS
13 "BILLBOARD        P* PRS
 6 "JIM IN COLOUR    P* PRS
 2 "LOTTARIO         G* PRS
 7 "PRS CHARACTERS   P* PRS
14 "ADDITION PRACT   E* PRS
14 "MULTIPLY PRACT   E* PRS
14 "SUBTRACT PRACT   E* PRS
 5 "UXB-1            G* PRS
 6 "UXB-2            G* PRS
27 "BACKGAMMON       G* PRS
10 "POLY TURTLE      L* PRS
10 "IAP              G* PRS
14 "FREE-FALL        G* PRS
 2 "VISIBLE VIC      P* PRS
 9 "CALENDAR         P* PRS
 6 "PRIME FACTORS    E* PRS
14 "GOBBLE           G* PRS
10 "SPACEWAR-1       G* PRS
10 "SPACEWAR-2       G* PRS
10 "S-X JASPER       P* PRS
 6 "S-X COLOUR ROOSP* PRS
 4 "S-X POOKY        P* PRS
13 "S-X BARFIELD     P* PRS
 2 "S-X HI DEMO      P* PRS
 2 "S-X TRENY PIC    P* PRS
 1 "S-X DESIGN       P* PRS
 1 "S-X DESIGN-2     P* PRS
 1 "S-X DESIGN-3     P* PRS
 1 "S-X DESIGN-4     P* PRS
 4 "DIGICLOCK        P* PRS
 4 "HI-RES FOURIER   P* PRS
12 "USA SONG         M* PRS
 0 "SELECTIONS"          SEQ

"VPUG VIC TAPE 07" 07 2A
12 "DIRECTORY"          PRS
10 "VIC DT"             PRS
 7 "PRS CLASS VIC    * PRS
 8 "ROCKET COMMAND   G* PRS
 9 "RUGBY            G* PRS
 9 "SAMU             G* PRS
 9 "STAR CHASER      G* PRS
 9 "STAR WARS        G* PRS
12 "TRAP             G* PRS
14 "SNAKE            G* PRS
13 "JUMPING JACK     G* PRS
 6 "S-X STRING ART   P* PRS
 5 "S-X GRAPHIC      P* PRS
 5 "S-X KEYBD GRAPH* PRS
 9 "MUSIC 01201      M* PRS
10 "76 TROMBONES     M* PRS
 9 "ENTERTAINER      M* PRS
 7 "BRKOUT PADL      G* PRS
 5 "PENCIL           P* PRS
 2 "SCROLL           U* PRS
13 "GOBBLE (K)       G* PRS
13 "THUNDERBIRD      G* PRS
11 "STARFIGHT        G* PRS
11 "SPACEWARS        G* PRS
10 "TANK VS UFO      G* PRS
10 "TANK VS UFO (K)  G* PRS
14 "MINI GOLF        G* PRS
10 "INVADERS         G* PRS
 7 "CAVERN           G* PRS
13 "GOLDRUSH         G* PRS
 8 "UFO PILOT        G* PRS
11 "CHASE            G* PRS
10 "76 TROMBONES     M* PRS
 1 "SELECTIONS"          SEQ

"VPUG VIC TAPE 08" 08 2A
12 "DIRECTORY"          PRS
10 "VIC DT"             PRS
 7 "PRS CLASS VIC    * PRS
 9 "FLIP INST        G* PRS
12 "FLIP             G* PRS
 8 "BRAIN WARP       G* PRS
13 "JUGGLER          G* PRS
 8 "SLOT MACHINE     G* PRS
 9 "REVERSE          G* PRS
 7 "HIDDEN MAZE      G* PRS
11 "SEARCH           G* PRS
13 "BUSINESS DEMO    P* PRS
10 "MAKING CHANGE    E* PRS
 2 "PRIME NUMBERS    E* PRS
14 "BASEBALL         G* PRS
12 "FOUR IN A RON    G* PRS
 8 "CRYPTOGRAMS      G* PRS
12 "THREE OF A KIND6* PRS
 8 "UFO PILOT (JB)   G* PRS
13 "BOGGLER (JB)     G* PRS
 4 "DAY AT RACES-1   G* PRS
10 "DAY AT RACES-2   G* PRS
13 "RHINO            G* PRS
 7 "SCALES           M* PRS
14 "PILOT BK         L* PRS
20 "TINY PLAN BK     B* PRS
 5 "HORSE TRAINER    E* PRS
10 "4 COLOUR MAP     G* PRS
 2 "SCREEN SW        U* PRS
 9 "PETALS/ROSE      G* PRS
 4 "ROMPEEK          A* PRS
12 "DISASSEMBLER     A* PRS

"VPUG VIC TAPE 09" 09 2A
12 "DIRECTORY"          PRS
 1 "BIG CHARS        P* PRS
 4 "PONG             G* PRS
 2 "S-X BOUNCER      P* PRS
 6 "S-X CLOCK        P* PRS
 7 "HARMONIZER       M* PRS
 9 "STEAL MONEY      G* PRS
 4 "KALEIDOSCOPE-3   P* PRS
12 "VIC MAIL         B* PRS
 9 "FUEL IC          B* PRS
12 "METEOR MAZE      G* PRS
 7 "ASTEROIDS        G* PRS
 4 "WALL             G* PRS
 3 "BUDGET-1         B* PRS
12 "SUNFIGHT         G* PRS
10 "RUSS'N ROULETTES* PRS
12 "MAIL LIST V/64   U* PRS
 6 "BASIC NIGHTMAREX* PRS
 7 "MORE SOUNDS +    M* PRS
 2 "COLOUR EATER     P* PRS
 2 "CRITTER          P* PRS
 3 "S-X JOYWRITER    P* PRS
11 "S-X CALCULART    P* PRS
 2 "S-X POLYSONS     P* PRS
12 "PERMUTE SBRTN    P* PRS
 5 "S-X AMORTGRAPH   B* PRS
 8 "LOAD/RUN DISK    U* PRS
 8 "PRS LOCATOR      U* PRS
 6 "VICWORD          U* PRS
 5 "CHAR GEN 2.0     P* PRS
 2 "JOYSTICK TESTERP* PRS
10 "VIC INVADERS     G* PRS
10 "VIC DT"             PRS
```

A COMPLEAT GUIDE TO MACHINE LANGUAGE PROGRAMMING ON THE PET

(Continued from last issue)

By HAROLD BROCHMANN

CHAPTER 3 -- What is Machine Language?

INTRODUCTION [3-1]

The 6502 microprocessor is the "brains" of the PET ... and it does not understand BASIC at all, but rather, MACHINE LANGUAGE. Machine language (ML for short) is a LOW LEVEL language in contrast to BASIC which is known as a HIGH LEVEL language.

ML is a low level language because any single ML instruction accomplishes less than any single BASIC instruction. For example, the BASIC instruction "100 PRINT 2 + 3" can also be carried out in ML, but it would require at least twenty five separate instructions to accomplish. It follows that it is much more difficult to program in ML.

What we gain with ML, however, is SPEED. Typically ML programs execute hundreds of times faster than the equivalent high level language program. For most things this increased speed is simply not necessary ... but there are applications for which the speed of ML is essential such as the alphabetic sorting of long lists of names and for animated graphics. If you have ever seen SPACE INVADERS on the PET or some other computer, you can imagine what this game would be like if every movement on the screen took several hundred times as long!

When the PET runs a BASIC program it converts the coding into 6502 machine code as it goes along. It is this machine code that is fed to the microprocessor. The translation is carried out by a program resident in the PET called the INTERPRETER.

By providing PET with its program already written in machine code, execution time is significantly decreased.

THE MACHINE LANGUAGE MONITOR [3-2]

By far the best way to start our study of ML is to become familiar with the Machine Language Monitor, or MLM.

MLM is a special program stored in the PET which allows us to examine the contents of any of the thousands of bytes of Random Access Memory (RAM) and Read Only Memory (ROM). MLM also allows us to change the contents of any of the RAM bytes. In this way we can get PET to behave differently from the way it was intended. We can also use the MLM to enter ML programs.

First we will access MLM and use it to write things on the screen. In the discussion that follows it assumed that every command (printed in capitals on a separate line) is intended to be followed by pressing the RETURN key.

Clear the screen and in the top left corner enter: SYS 4.

Your screen should look like this:

```
SYS 4
B*
     PC  IRQ  SR AC XR YR SP
.;  0005 E62E 30 00 5E 04 F4
```

You are looking at is the MICROPROCESSOR STATUS display. The numbers on your screen may not be exactly as shown here.

We will not be discussing the status display at this time, except to note, in passing, that the number under PC, which stands for PROGRAM COUNTER, is 0005. This is significant in that we entered SYS 4 to gain access to the MLM.

The cursor is positioned immediately after a decimal point. We now enter the following command, using no spaces: .M,8000,8017

Your screen will now look like this:

```
SYS 4
B*
     PC  IRQ  SR AC XR YR SP
.;  0005 E62E 30 00 5E 04 F4
.M,8000,8017
.:  8000 13 19 13 20 34 20 20 20
.:  8008 20 20 20 20 20 20 20 20
.:  8010 20 20 20 20 20 20 20 20
.■
```

Now you are looking at the contents of memory locations $8000 to $8100. $8000 corresponds to 32768 in decimal. You may already know that the contents of the byte at this address determines what is being displayed in the top left corner of the screen.

If you have followed the directions exactly so far, you will have SYS 4 still displayed in the first five locations of the screen. The screen code for the letter S is $13 (19), hence $13 is the contents of location $8000. Similarly, locations $8001-$8005 contain $19, $13, $20 and $34. The remainder of the locations contain $20 (32) which is the screen code for a blank space.

Place the cursor on the $13 in location $8000 and change it to $01. Press RETURN. An A should now replace the S in the first screen position.

To exit MLM and get back to BASIC, place the cursor on a clean line, press RETURN to obtain the decimal point and enter: .X

ASSIGNMENT 3-2

Spend as much time as you can using the MLM to write things to different parts of the screen. This will provide practise with the use of the MLM and also improve your familiarity with HEX numbers.

FURTHER EXPLORATIONS WITH MLM [3-3]

In the last section you entered MLM with the command SYS 4, observed the microprocessor status display and examined the contents of the screen RAM bytes. Then you altered the contents of some of these addresses and in this way were able to write things on the screen.

Those who are familiar with the PEEK and POKE commands in BASIC will recog- nize that the MLM simply allows us to PEEK and POKE much more conveniently.

This section examines where in RAM memory a BASIC program is stored, we also look at one of PET's CLOCKS, then we look at string and numeric variable storage.

The PET uses the first 1024 ($400) bytes of RAM for a variety of purposes. This is the UTILITY area. The first 256 ($100) bytes, known as ZERO PAGE, are especially significant.

Enter MLM by typing SYS 4 and then: .M,008D,008F

Observe the contents of the first three locations. Now move the cursor back up to will find that the contents of at least the second and the third one will have changed. Repeat. They are changed again. If you wait for a while before you try this again you will find that the contents of $008D will also be different.

It is the contents of these three locations which PET uses to calculate the the time when the BASIC syntaxes TI and TI$ are called. $008F increments once every 1/60 the of a second.

Now enter: .M,0028,0035

If you have a 32K PET you get:

```
.:  0028 01 04 03 04 03 04 03 04
.:  0030 00 80 00 80 00 80 .....
```

With a 16K PET:

```
.:  0028 01 04 03 04 03 04 03 04
.:  0030 00 40 00 40 00 40 .....
```

Continued on Page 7 ...

THE GEMINI FILE

BY MR. MIKE

Some people have asked me recently "How do you make that tiny print like in the newsletter directory listings on your Gemini?" Well, the answer is to be found in the Tiny Directory program in the VIC-20 library or in a variety of programs created by Glenn Hazlewood in the C-64 library. It's also to be found in our September/83 issue, quite a few copies of which are still available. BUT ... for those of you want the facts, just the facts, they are as follows:

In order to make that tiny print, you have to combine the powerful forces of your Gemini in several directions. You have to first of all select the 17 character per inch pitch, which is done with CHR$(27) (the "Escape Key", which tells the printer that what follows consists of special instructions) plus CHR$(66) and CHR$(3). Then select superscript mode which is done with CHR$(27) plus CHR$(83) and CHR$(1). And then add CHR$(27), CHR$(65) and CHR$(6). This last command makes the line feed 6/72", which is half of its normal value. If your printer will do it, you can also throw in CHR$(27), CHR$(86) and CHR(1), which will put a slash in all the zeros.

One thing to remember when using either superscript or subscript ("Escape" plus CHR$(83) and CHR$(0) or CHR$(1) respectively) is that when you cancel them using CHR$(27) plus CHR$(84), you must also turn off the double-strike mode with CHR$(27)+CHR$(72). This switch-over is not covered in some word processors.

***

GEMINI TRIVIA -- Although the Gemini 10 and 10X have some interesting characters in the range of CHR$(160) and up, it is difficult to access them with some word processors. The Cardco interface (at least the early model), for example, doesn't allow you to access any characters between CHR$(192) and CHR$(218) when you are printing with upper and lower case. In order to get these characters you must first switch to Upper Case with CHR$(145), print the special characters, and then switch back to Upper/Lower Case with CHR$(17). This results in a giant pain in the you-know-where, especially if you're trying to make French characters with accents, several of which are found in this "untouchable" area sign (found on a shifted "7"), which is sometimes used as a single quote, you'll notice that it goes in only one direction like 'this', which looks kind of weird. If you want to make it like 'this', then for the first quote mark, you should use CHR$(96). On my Cardco Write Now! word processor (used to produce most of this issue of the newsletter), this is obtained by pushing the "at" sign -- between "P" and the asterisk ("*"). It is quite tricky to print this "at" sign with Write Now! -- you have to use the shifted *asterisk* and then flip the DIP switch number 3 on the printer to 8 bits (the UP position on the Gemini 10). This DIP switch can be also used to get rid of the peculiar character which appears with some word processors whenever you make a shifted space ... I have a problem when I first turn on my printer. The first character which is printed is not completely formed. I thought this might be caused by the ribbon dropping down a bit because of gravity, but even turning the ribbon spools before printing out doesn't seem to have any effect. Any suggestions as to what causes this and how to overcome it? ... The best ribbons for the Gemini are the official Gemini approved ones, available at dealers which sell the printers. However, at the beginning the ink may turn out to be a bit *too* black! In fact, I've found that if you leave copy made with a fresh ribbon for a while, the ink will bleed into the paper along with a sort of greasy substance which must be present in the ink ... anybody got any ideas about how to rejuvenate old ribbons without the odious business of re-inking them? (Devices to perform this task are supposedly available.) Maybe someone should phone up Nicole Parton ... One really dumb thing you should *NEVER* do with your Gemini is grab the knob on its right side and turn the paper backwards while the machine is on. This could destroy all the gears which can generate line feeds as small as 1/144". Turning this knob while the printer is *OFF* is acceptable parliamentary procedure ... if you're tired of waiting for your word processor to print out copy and return control to you (especially with WPs written in BASIC and Quick Brown Fox, which take an eternity to print out), you might consider buying a buffer. The Gemini 10 has a 2.3K buffer, which can be handy, but for those large jobs, something much larger to be placed between the computer and the printer is essential. Unfortunately, these devices cost an arm and a leg, in some cases more than the printer itself.

HOW TO FRY YOUR 64 IN 1 SECOND OR LESS

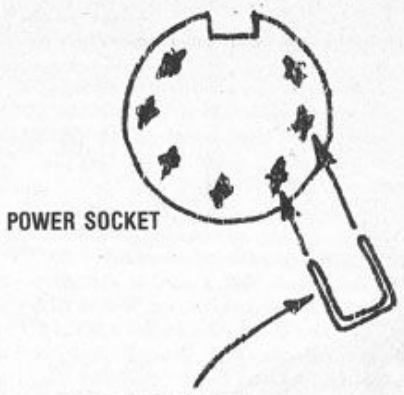
Larry Phillips offers some advice which reiterates a warning in our first issue:

Some newer Commodore 64s come equipped with a 4-pin power plug. Unfortunately, this plug will fit into the video connector, and will also plug into the power connector in 3 or 4 different ways. At least one of these wrong ways will cause your RAMs to die a lingering death. (Lingering in the case of RAMS is any length of time greater than 500 nano-seconds.) You will have to replace anywhere from 1 to 8 RAMS at a minimum cost of $11.65 each, if you do the work yourself.

Rick Bloemhard of Conti advises me that if your machine is still under warranty, this catastrophe will be covered. If it is out of warranty, the cost is yours.

If this happens to you, I would suggest writing to Commodore, pointing out that the manual tells you that the connector cannot be mis-plugged, that it is an obvious error in design, and that the CSA might be interested in the legality of supplying a power plug that is only marginally keyed.

Luckily, there is a fix for this. Make yourself a "staple" out of #22 INSULATED wire, and push it into the second and third holes, counting clockwise from the top, in the 64s plug.



STAPLE MADE FROM INSULATED #24 WIRE

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CCC CLASSIFIEDS

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For sale CBM 8023 dot-matrix printer IEEE-488 compatible, 150 cps, 16" carriage, friction/-tractor feed, full Commodore char. set, hi-res graphics. Very sturdy machine, with excellent duty cycle. Very clean and in good shape, with spare ribbon, 8 mos. old with IEEE-IEEE cable, asking 4750 or *best offer*. Also -- 2031 disk drive in steel case with some software, asking $350. Phone Ron Bianco 738-2935.

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Wanted -- writers for CCC News. No experience necessary!

A COMPLEAT GUIDE

Continued from Page 5

With an 8K PET you will have:

```
.:  0028 01 04 03 04 03 04 03 04
.:  0030 00 20 00 20 00 20 .....
```

If your display does not match the appropriate one here it is because you had a BASIC program stored in your PET when you entered MLM.

Locations $28 and $29 contain the start address of where BASIC programs are stored in RAM. The address referred to is written in reverse order, so that 01 04 indicates $0401 which is equivalent to decimal 1025.

The next two locations have already been discussed. They point to the place in RAM where variables are stored. Variables are stored immediately following any BASIC program. In this particular instance there is no BASIC program in memory, hence the variables are stored starting at $0403.

Locations $002C and $002D point to the end of variables. In as much as we have no variables stored in BASIC at this time, the beginning and end of variables is the same place.

The next two bytes point to the end of arrays.

$0030 and $0031 are pointers to the start of dynamic strings. Because there are no strings in memory at this time, this pointer will be set to the top of available RAM which is either $8000, $4000 or $2000, depending on your PET.

The last two pointers always point to the top of available RAM.

ASSIGNMENT 3-3

Experimentation is an essential ingredient of effective learning. For this reason it is suggested that you now exit MLM (.X), type in a short BASIC program, re-enter MLM and examine how these various pointers have been altered.

FOOLING THE PET [3-4]

Here is another interesting exercise: Turn the PET OFF/ON, enter MLM and display locations $0028 - $0035 as before. Now change the contents of locations $0032, $0034 and $0036 to $10. Your screen should look like this:

```
.M,0028,0035
.:  0028 01 04 03 04 03 04 03  04
.:  0030 00 10 00 10 00 10 ..  ..
```

Don't forget to press RETURN after making these changes.

Now PRINT FRE(0) -- it will tell you that you have a 3K PET!

In the last section we examined the pointers which keep track of where a BASIC program is stored, how much memory is available, and so on. We will now alter these pointers and observe the effects.

Obtain the display referred to in the last section and alter the numbers in the second line so that they look like this:

```
.:  0030 00 05 00 05 00 05 .....
```

This sets the top of RAM to $0500. Now exit MLM and PRINT FRE(0).

You now have a PET with 253 bytes of available RAM!

Re-enter MLM and again display the contents of $0028 to $0035. Alter the display so that it looks like this:

```
.:  0028 01 80 03 80 03 80 03 80
.:  0030 00 81 00 81 00 81 .....
```

You have now re-set the pointers so that BASIC starts at $8001 and ends at $8100. This will also provide 253 bytes of available RAM... this time starting at the top of the screen!.

Exit MLM and place an "at" sign (@) in the top left corner of the screen. The screen code for the "at" sign if $00. Now type: NEW.

This should result in two more "at" symbols joining the one you put there.

Move the cursor half way down the screen and enter this line of BASIC: 10 PRINT "HELLO". The program line is entered into memory; but because we have altered the START OF BASIC pointer, the program is stored at the top of the screen rather then its normal location at $0401. POKE 59468,14 alters the display so that the word HELLO becomes readable. Move the cursor up and change HELLO to HAPPY on the screen. Do not press RETURN. Move the cursor down half way and LIST.

By this time your screen is getting a little cluttered. Use the space bar to make some more room on the screen without disturbing the display on the first line. About half way down enter: A$="GEORGE"

Because you have altered the screen mode with POKE 59468,14, this will come out as a$="george". When the RETURN key is pressed you will see that A$ is stored at the TOP of RAM, and that suitable pointers to this string are added at the end of BASIC. a$="frankenstein"

We observe that the old A$ is left in place and the new A$ added further down. Whenever a new string is defined it gets added to to this list, only the pointers (at the end of BASIC) are altered to reflect the new location. As more and more strings are added they move further and further down and may eventually meet up with BASIC. When this happens the PET calls a "garbage collection" routine which discards strings which are no longer defined. This phenomenon is not apparent to the BASIC 4 PET owner because it happens so quickly. In the BASIC 2 PET, however, this garbage collection can be a cause of considerable aggrevation because it may take several minutes during which time the PET remains totally incommunicado.

Force garbage collection by entering: ? fre(0)

CONCLUSION (3-5)

In this chapter we have introduced the use of the machine language monitor and used it to re-do some exercises previouslt carried out using BASIC commands. In particular we had another look at pointers. A good grasp of these concepts will make the remaining chapters in this book much more manageable. We also had a look at the anatomy of a BASIC program and saw how it is possible to relocate BASIC from its normal position on to the screen.

(Continued in next issue)

"....THEN I'LL NO SOONER GET THAT COMPUTER FIGURED OUT WHEN SOME ENGINEER WILL CHANGE IT COMPLETELY! "

Engineering Digest

CalcResult Revisited

By NIELS HANSEN-TRIP

Well, I finally broke down and bought that printer I alluded to in the review of CalcResult a couple of issues ago. In so doing, I discovered a "gotcha" that may set you very definitely between a rock and that proverbial hard place if you aren't aware of what is happening. Unless you have a 1515/1525 or 1520 printer or one that emulates these devices rather carefully, Your spreadsheet will not give you a readable hardcopy without a little finagling. Here's my story:

First, I confess I didn't buy Commodore's VIC printer. I bought a Gemini 10X and a copy of Paperclip. When I was asked which interface I preferred, I couldn't answer -- not having done my homework as usual. The salesman talked me into the Microtek interface, a cable which attaches to the user port and requires a software driver that is supplied on cassette in the package. It is apparently a little faster than some of the others which use the regular VIC printer outlet and, indeed, I did find this to be true.

I rushed off with my goodies tucked under my arms and set everything up immediately I arrived home -- not an unusual thing for a computer addict to do. The interface and all the other bells and whistles worked just fine. I didn't need the software driver that came with the interface since Paperclip has a series of custom printer drivers included, covering almost every conceivable printer option. The Microtek interface was fast and efficient and worked well with the word processing functions.

After shutting everything down to insert the CalcResult cartridge, it suddenly struck me that the interface would not function with the cartridge. There was no way that the driver routine could be loaded without some complicated maneuvering. I tried it anyway, I am a little dense at times, and proved myself correct. I returned to the shop and exchanged the interface for a Cardco interface which utilizes the normal printer output port and emulates a Commodore printer.

This did not solve the problem completely. After trying to print out my annual budget from a file I had been working on, I was left with some rather strange hieroglyphics. I was able to get a printout that was a little closer to the original by reading the manual and discovering that the Cardco interface has some firmware on board that changes some character strings -- In a word, 'cute'. A short read through the Gemini manual led me to the interesting fact that if I set the DIP switch at the rear of the machine to default to 7 bit input I could get around this problem. Indeed, I tried it and it works. The only remaining problem is that I will have to reformat my CalcResult files to look a little better when they are printed.

The next problem was encountered when I went back to using Paperclip. The Cardco interface worked just fine, but the printer was engaging in some rather frightening calisthenics. This situation is caused by the firmware in the interface competing with the Paperclip driver. To make a long and frustrating story shorter, but still frustrating, in order to use the Cardco interface successfully with P-Clip, it is necessary to run a short program -- found in the Cardco manual -- that locks out the software in the interface. I have typed in the routine and store it on all of my P-Clip working disks. I haven't found a way to incorporate it into the master P-Clip program as yet.

As you can see, the world of printers and interfaces is not always as simple as meets the eye when you are faced with the temptation to buy that shiny new printer in the shop. You too may be required to atone for the mortal sin of buying a non-Commodore peripheral. The Commodore is watching!

DISK DRIVE WOES

Continued from page 3

improved model. The release date of this model has been variously quoted as September, late October and Christmas 1983.

"One drive unit supplied recently by a U.S. dealer appears identical in mechanical and electronic construction to units purchased several months ago. This raises the question of whether this is the new improved model, or whether it is old stock which has not been recalled.

"In the light of the above I would ask you to answer the following queries:

"a) Has the existing 1541 disk drive been withdrawn?

"b) If so, how can the purchaser distinguish the new model from the model which was withdrawn?

"c) What policy does Commodore have for the recall of 1541 disk drives which have been purchased and which may require modification to overcome inherent design problems causing premature failure. Please describe your policies both for drives still under warranty and those for which warranty has expired.

"Pending satisfactory answers to the above queries this Club regrets that it will be obliged to advise members and other enquirers that they should not purchase the 1541 disk drive because of uncertain reliability.

D.E.T. Bidgood
Coordinator C-64 Section
Nova Scotia Commodore
Computer Users Group"

LIBRARIAN QUITS

Continued from Page 2

people, the club will die. These workers will not come forward if all they earn for their efforts is the same thanks we have shown Tony Smith.

The more you put into the club, the more you will get out of it. If you sit back and expect someone to hand over new programs every meeting and drag you by the hand into computer competence, you are probably in the wrong group. That kind of service will cost you far more than a mere $20.00 per year.

If you are a beginner and can't contribute anything complicated yet, it's not important. There are many who can and do. Your day will come when you have a lot more to offer if you stick with it. In the meantime, there is a lot to do in terms of day to day necessities such as typing in programs from magazines. This could be co-ordinated with the librarians. There are many more simple tasks you can do, just ask and ye shall be given. *IF YOU WON'T HELP WITH ANYTHING, AT LEAST HAVE THE COURTESY TO RESPECT THOSE WHO WILL.*

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Another resignation announced recently was that of Otto Keller as Consumer Advocate. The responsibilities of this position include scouting local dealers with the intention of arranging bulk buys and other special deals for club members, in keeping with various guidelines laid down by the executive (printed in our first issue). Is anybody interested in carrying on this function?

Published by The Commodore Computer Club, P.O. Box 91164, West Vancouver, B.C. V7V 3N6. Club answer phone: PET-3311.

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Club meetings are normally held: *Workshop*: first Tuesday of the month, 7:00 p.m., Thompson Secondary School cafeteria, 1755 E. 55th Ave. (near Victoria Drive); *Business*: third Tuesday of the month -- 7:00 p.m., King Edward Campus, 1155 East Broadway, 2nd floor auditorium. These dates and locations are subject to change. For up-to-date information on any changes, please call the club's 24-hour answer phone:

PET-3311 (738-3311)