ALL THE NEWS THAT FITS

The Richmond Chapter of the CCC had its first workshop meeting on April 4th at McNair School. The evening was well attended as 40 registered members and 20 or more guests dropped in to take a look. Many said they were pleased to see a meeting closer to home and they plan on being out again next month. Some members brought their equipment and presented programs of interest.

Niels Hansen-Trip gave a short talk and recommended that more members get involved in the workshops, i.e. help with organizing, offer their knowledge to beginners, do demonstrations of programs and equipment, etc. I was very pleased with the turnout and hope to see the same next month. Anyone interested in helping in any way, please contact me at 274-2709. Help is always needed to set up the desks, check off members as they arrive, offer assistance to newcomers, and finally replace desks after the evening is over. So please give me a call. I will appreciate your help. Also thanks to those who helped at our first meeting.   — Elmer Roy

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Batteries Included, the Toronto manufacturer of the word processing program Paperclip, have an ad in the May issue of Compute's Gazette that offers a couple of interesting new items. They will have available a spelling checker for Paperclip called SpellPack. Even more interesting is an 80 column card for the Commodore 64 which will generate a true 80 column display with a monochrome monitor. The card will be compatible with Paperclip, allowing text to be entered and edited in 80 columns. The grapevine says that the display will be excellent. As an added bonus, the 80 column card will give Basic 4.0 commands to simplify disk access (no more wedge !). No information is available currently on when these items will appear locally, or on their prices.

The long awaited Flight Simulator II for the Commodore 64 from subLogic is going into production in April. This will finally offer Commodore owners a crack at the simulation that has been a best seller for the IBM PC. Programs may be in short supply for some while, and at least one local dealer is taking advance orders and deposits for those that have to be first on their block to fly in their basements.

— Bruce Dunn

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The Pacific Coast Computer Fair Association is holding a mini-computer fair on Saturday, June 12th from 9:00 a.m.-5:00 p.m. *This is for members of clubs who are affiliated with the association, and it is not open to the general public.* At press time, details of location were unconfirmed, so attend the club's next "lecture" meeting on Tuesday, May 15 at King Edward Campus (7:00 p.m.) for info. (Several interesting speakers are planned for this meeting, by the way.) News about the event may also be placed on the club's 24-hour information phone: 738-3311.

Among the highlights of this mini-fair will be a prize for best club exhibit.

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Help has been forthcoming to handle the VIC-20 library, which — like the 64 library — is still in dire need of *original* submissions.

See the middle pages of this issue for a removable section containing an updated listing of both libraries.

INSIDE THE 1541: 2

By LARRY PHILLIPS

In the last issue, we looked at the functions of the disk drive and controller. Now we'll see how the commands you give your computer are translated into data stored on a diskette.

Most of us have laughed at the story of the poor guy that issued a 'NEW' command every time he put a diskette into his drive, and wondered where all his programs had gone. Well, it was a new diskette! The story would be much funnier if the documentation provided with the drive wasn't so ambiguous. Just what happens when you NEW a diskette?

The first thing you do, of course is to OPEN a FILE to the command channel (15). This does two things. It tells your computer that you want to send or receive something on the serial bus. The operating system in the computer does not know or care what sort of device this will be. It is up to the user or programmer to send or receive the proper data for whatever device he is working with. At the other end of the serial bus, the CONTROLLER receives a series of signals that tell it what to do. Notice that the disk drive itself does not yet come into the picture.

In the case of a NEW command, the controller is told to perform the necessary operations to prepare a diskette for use in storing data. This process starts with the controller telling the drive to position its head on track number 1. This is done by causing the head to seek or move in reverse a sufficient number of times to ensure that the head will be as far back as it can go. This is known colloquially as a 'BUMP'. It is responsible for the fairly loud chattering noise at the beginning of a 'NEW'.

At this time the controller will cause the drive to start writing. The first thing written will be a sector header, consisting of some special patterns called 'SYNC BYTES', a pattern to identify this as a header, followed by the track and sector numbers, a disk ID, and a 'CHECKSUM'. The track number in this case will be 1, and the sector number will be 0. The disk ID will be the ID specified after the comma in the NEW command. A checksum is determined by a series of calculations performed on the data written. when the data is read at a later time, the identical calculations are performed to generate another checksum, which is then compared with the checksum read from the diskette. If they match, it means that there were no errors in reading or decoding the data.

After this, the controller continues writing, but now writes a data block after the sector header. What is written at this time is not important, because its only purpose is to leave a fixed amount of space on the track. The next sector header is then written, another data block, and so on, until the required number of sectors have been written on the track. During this operation the controller has been instructing the drive to read back what it has written to ensure that everything has gone as planned.

So far, the controller has told the drive to seek to track 1, write on that track, and read from that track. If you recall the last article, you will notice that the drive, within a very short time, has performed the only three functions it is capable

USER FRIENDLIES

By LARRY PHILLIPS

One of the most important parts of a user friendly program is the presentation of instructions. Are they easy to understand? Do they explain all the options? Are you able to review them easily?

Unfortunately, many useful programs have instructions that are hopelessly inadequate. The program presented here is an attempt to make the writing of instructions a relatively simple process. It is designed to be used as a subroutine, preferably at the end of your program (for reasons of speed). The routine itself is quite elementary without detracting from its versatility. More about that aspect later.

The routine will take the text of your instructions from DATA statements and print them on the screen. They will be centered horizontally, which not only provides a pleasing effect, but allows you to merely type in your text with little regard for formatting. The one restriction is that you must break up your text into lines of 40 columns or less. If you go over 40 columns, you will get an 'ILLEGAL QUANTITY ERROR' in line 50090. Any cursor control, 'CTRL' or shifted characters must be enclosed in "quotes". To leave a blank line between two lines, just separate the lines with two commas.

The program may be modified to the work on the VIC or the 80 column CBM's by changing the TAB value to match the number of columns on your machine.

Let's look at the program. Line 50000 sets the DATA pointer to the first DATA element. Line 50010 searches for the string "inst". This allows you to put your instructions anywhere within any other DATA statements your program may require.

Lines 50020-50090 take care of the actual PRINTing and controlling of the instructions. Within this section we will look for various 'code words'.

ENDINST - end of instructions
PAUSE   - wait for a key to be pressed
U/G   - set upper case/graphics
L/G   - set lower case/graphics
TIME   - continue after a timed pause

Lines 50100-50120 perform the 'Any key to continue' function by simply PRINTing the message and waiting for a key.

Lines 50130-50150 contain my favourite delay routine. This is much preferable to the FOR — NEXT type of 'wheel spinning' because it can be called with a value that means something. In this case it is called when the main routine encounters the word 'time'. The next DATA element must be a number that represent the required delay in seconds.

Getting back to versatility, if the routine is called by a GOSUB 50010 instead of a GOSUB 50000, the DATA pointer will not be reset. This will allow you to put any other DATA statements required before the instructions. Or perhaps you will want to present a screenful of instructions, read some more data, and then present more instructions.

The 'code words' can be changed to anything you want them to be. Remember, the 'code words' must be by themselves to be recognized as such. They will act as text if they are included in a sentence.

You may call this routine at any time during your program, should the user wish to review the instructions. Just be careful not to use the variables A$ or T elsewhere in your program unless you don't care about preserving their values.

The subroutine may be used as a 'HELP' routine by changing line 50010 to:
 50010 READ A$: IF A$<>H$ THEN 50010

You would then call the routine with H$ equal to the name of the subject required, and the appropriate text in the DATA statements starting with the same word.

Play with it, customize it, use it whenever you want to

• USENET NEWS •

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To best understand how you find out about the deep, dark secrets of the Commodore operating system, simply look at Commodore's previous designs (i.e., the PET).

The PET has been around since 1977 and the 64 is just a spin-off of the PET theme. The operating system is almost identical. And there is a tremendous amount of info avalable for the PET. Prior to 1980, however, this was not the case. But Commodore got wise and in a book published by Commodore in England called *The PET Revealed* they told all -- or at least started to tell all.

A book published by *Compute!* called *Programming the PET/CBM* is a literal encyclopedia of info on the kernal. Another book written by Jim Strasma (of Midnite/PAPER fame) is the third edition of the PET users guide, which has excellent memory map cross reference between original PETs, upgrade PETs, 4.0 BASIC PETs, 80 column CBMS, and Fat 40's. It's the same operating system -- just located in a different place in memory (minor adjustments for the most part). This same operating system is used in the VIC and 64.

Jeff Porter
Indiana
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In my opinion, the term waste goes together excellently with MAE's "Software Development System." It is truly a waste of money.

I bought MAE about 8 months ago, as it was the only macro assembler available at the time.

the documentation is poor even by Commodore standards. Several examples do not work, and in some cases are totally wrong. The macro-assembler itself has a few problems all its own. It does not allow expansion of macros with labels inside of other macros. It does not have a way of accessing low and high bytes of labels)i.e., #<label and #>label). Their so-called customer support is non-existent. I wrote them twice and got no reply.

What to do? For some time I searched for a macro-assembler that had all the features I wanted. Merlin-64 more than met my needs.

MERLIN is probably the second best assembler available for a 65XX micro (ORCA/M is only available for the Apple). It has the best documentation I have ever seen for the C-64.

Among its features:
1) The assembler / editor resides behind basic memory allowing huge amounts of source to be in the editor simultaneously.
2) It allows insertion of external files during assembly to allow assembly of files too large for the editor.
3) It has the option of assembling to memory or directly to disk.
4) The editor has 80 column capability with or without the 80 column card (but cuts down on max source size).
5) Comes with the Sourceror, which enables you to form source code from object code (with labels!!!).
6) Comes with a few utilities to aid in converting old assembly routines to the Merlin format.
7) Comes with a nice macro library and a few examples.
8) Complaints: the monitor which comes with the assembler could use some work, and uses some old Apple conventions but is adequate.

(Author unknown)

VIC LIBRARY

VIC-20 DISKS

VIC tapes and disks require a $5.00 deposit while you borrow them.
VIC library people are Mike Quigley and Mike Buckley.

"VPUG VIC TAPE #1" #1 2A
```
12 "DIRECTORY"               PRG      10 "VIC DIS-2"        A" PRG
6  "PISTOL PETE"          G" PRG      11 "VIC DIS-3"        A" PRG
10 "RACE"                 G" PRG      4  "VICLOAD-2"        U" PRG
7  "PRG CLASS VIC"        U" PRG      6  "VICLOAD-4"        U" PRG
8  "BASICODE READ"        U" PRG      8  "VIEW BAM"         U" PRG
6  "BASICODE SEND"        U" PRG      1  "VIC DT"              PRG
3  "BIG LETTERS"          P" PRG      1  "SELECTIONS"          SEQ
4  "CHECK DISK"           U" PRG      4  "SEARCHER"         U" PRG
4  "DIRECTORY"            U" PRG      4  "RELOCATE SCRN"    U" PRG
11 "DISASM"               A" PRG      6  "SUPER VICMON2"    A" PRG
14 "DISPLAY T&S"          A" PRG      4  "HIMEM SAVER"      U" PRG
1  "DIS1"                 A" PRG      7  "VIC AID"          U" PRG
4  "HISTOGRAM"            A" PRG      14 "FRENCH TUTOR"     E" PRG
7  "PERFORM TEST"         U" PRG      4  "REL WRITE"        U" PRG
13 "PROGML CHARS"         P" PRG      6  "CHAR$&1C##"       U" PRG
13 "RANDOM FILE"          U" PRG      4  "PRG FUNCT KEYS"   U" PRG
5  "SEQUENTIAL FILEU"     U" PRG      6  "ADDRESS FILE"     B" PRG
1  "TINYMON INST"         A" PRG      11 "GRAPH PLOT"       B" PRG
5  "TINYMON-1"            A" PRG      4  "COMPLEX MATRIX"   E" PRG
1  "VIC DIS-1"            A" PRG      4  "SSTIMER DESIGNE"  E" PRG
380 BLOCKS FREE.
```

"VPUG VIC TAPE #2" #2 2A
```
12 "DIRECTORY"               PRG      6  "COPY CAT"         G" PRG
1  "VIC DT"                  PRG      24 "ENTERPRISE 8K"    G" PRG
10 "SELECTIONS"              SEQ      12 "GRAPH PLOT"       B" PRG
4  "PRG CLASS VIC"        "  PRG      3  "DISPLAY DEMO"     P" PRG
8  "VIC FINANCE"          B" PRG      7  "OUTPOST"          G" PRG
4  "LO PASS FILTER"       E" PRG      9  "DOODLE (JS)"      G" PRG
6  "CONTEXT INDEXERU"     U" PRG      8  "COLOUR MASTER"    G" PRG
11 "COPY-ALL"             U" PRG      6  "GUESS 10 SEC"     G" PRG
10 "TERM SER-1"           C" PRG      4  "RAINBOW CLOCK"    G" PRG
1  "TERM SER-2"           C" PRG      6  "HEXEDIT"          G" PRG
4  "KEYBOAT"              U" PRG      8  "MAKE SKETCH(JS)"  G" PRG
1  "SORT DEMO-1"          U" PRG      4  "AMORTIZE"         B" PRG
4  "SORT DEMO-2"          U" PRG      2  "S-X VIC LOGO"     P" PRG
6  "VIC VIC"              U" PRG      3  "S-X SUPER PLOT"   P" PRG
7  "TINY/BASIC AID"       U" PRG      2  "S-X ALL MY LOVIN" P" PRG
4  "STRING THING"         U" PRG      2  "S-X SPACE ACE"    P" PRG
24 "82 TAX ONTARIO"       B" PRG      9  "S-X MUSIC MACHIN" M" PRG
3  "JOYSTICK DEMO"        P" PRG      1  "S-X DIAMOND"      P" PRG
3  "5K HI-RES"            A" PRG
390 BLOCKS FREE.
```

"VPUG VIC TAPE #3" #3 2A
```
12 "DIRECTORY"               PRG      12 "MATHMAN"          E" PRG
7  "PRG CLASS VIC"        X" PRG      4  "GOBBLE"           G" PRG
4  "CALENDAR"             P" PRG      5  "PENCIL"           G" PRG
4  "LOTTO &49"            G" PRG      13 "THUNDERBIRD"      G" PRG
3  "MONITOR"              G" PRG      11 "STARFIGHT"        G" PRG
4  "CHECKBOOK"            B" PRG      11 "SPACEWARS"        G" PRG
4  "MAIL LIST TAPE"       B" PRG      10 "TANK VS UFO"      G" PRG
7  "FILE CLERK TAPEU"     U" PRG      9  "MINI GOLF"        G" PRG
1  "SCROLL+/-"            U" PRG      9  "INVADERS"         G" PRG
4  "RINGER EOL"           U" PRG      7  "CAVERN"           G" PRG
4  "PAUSE"                U" PRG      13 "GOLDRUSH"         G" PRG
4  "MEMORY SNAPSHOTA"     U" PRG      11 "CHASE"            G" PRG
4  "TRACE"                U" PRG      12 "FLIP"             G" PRG
4  "COPY DISK FILESU"     U" PRG      8  "BRAIN WARP"       G" PRG
4  "SHELL SORT"           P" PRG      4  "BLOT MACHINE"     G" PRG
4  "BUBBLE SORT"          P" PRG      9  "REVERSE"          G" PRG
4  "SORT C"               P" PRG      7  "HIDDEN MAZE"      G" PRG
4  "SORT D"               P" PRG
376 BLOCKS FREE.
```

"VPUG VIC TAPE #4" #4 2A
```
12 "DIRECTORY"               PRG      9  "BATTLE ZONE"      G" PRG
1  "VIC DT"                  PRG      4  "SMOOTH MOVE"      P" PRG
4  "PRG CLASS VIC"        "  PRG      4  "BASIC INVADER"    G" PRG
4  "S-I CIRCULINE"        P" PRG      13 "GALACTIC WAR"     G" PRG
4  "S-X SPIRALMANIA"      P" PRG      6  "FIRE PART-1"      G" PRG
4  "S-X TRI-CIRCLE"       P" PRG      6  "FIRE PART-2"      G" PRG
4  "S-X FAN-TASTIC"       P" PRG      4  "MANHOLE"          G" PRG
4  "S-X AMOIR DMO"        P" PRG      4  "ANDROID"          G" PRG
4  "S-X DATA DEMO#2P"     P" PRG      4  "BUG HOP"          G" PRG
4  "FUEL CHASE"           G" PRG      1  "RELOCATE SCRN"    U" PRG
4  "ROBOT CHASE"          G" PRG      17 "COL/CHAR EDITORP" P" PRG
4  "UFO LANDING"          G" PRG      4  "GRAND PRIX"       G" PRG
4  "COUNTER"              G" PRG      8  "ALIEN RAIDERS"    G" PRG
4  "MEMORY MUSIC"         M" PRG      6  "LONG DIVISION"    G" PRG
4  "SPACE SHIPS"          G" PRG      6  "LUNAR LANDER"     G" PRG
7  "UFO-TANK WAR"         G" PRG      6  "MOONLANDER"       G" PRG
7  "VIC-20 ORGAN"         M" PRG      6  "MASTERMIND"       G" PRG
4  "ZAPPER"               G" PRG      7  "NUKADE"           G" PRG
4  "TANK WAR P1(T)"       G" PRG      11 "OTHELLO"          G" PRG
4  "TANK WAR P2"          G" PRG      11 "PINBALL"          G" PRG
4  "ONE ON ONE"           G" PRG      11 "PING PONG"        G" PRG
385 BLOCKS FREE.
```

"VPUG VIC TAPE #5" #5 2A
```
12 "DIRECTORY"               PRG      11 "SOUND EFFECTS"    M" PRG
7  "PRG CLASS VIC"        X" PRG      11 "MORE SOUND EFF"   M" PRG
4  "BIRDS DEMO"           P" PRG      13 "KEYBD SOUNDS"     M" PRG
11 "BUMBLE BEE"           P" PRG      12 "SILENT NIGHT"     M" PRG
4  "COLOUR BARS"          P" PRG      6  "ARROW"            G" PRG
5  "DRAGON"               P" PRG      13 "ARTILLERY"        G" PRG
3  "FRERE JACQUES"        M" PRG      4  "BANDIT-1"         G" PRG
13 "GENERAL DEMO"         P" PRG      5  "BARRICADE"        G" PRG
3  "GRAPHIC DEMO"         P" PRG      9  "BIONYTHM"         G" PRG
11 "GRAPHICS&SOUND"       P" PRG      12 "BLACKJACK"        G" PRG
6  "HANDIC DEMO3"         P" PRG      4  "BUSH TRAIL"       G" PRG
5  "HI RES DEMO"          P" PRG      12 "DAM BUSTERS"      G" PRG
4  "KALEIDOSCOPE-1"       P" PRG      12 "DEFLECTION"       G" PRG
4  "KALEIDOSCOPE-2"       P" PRG      12 "DEPTH CHARGE"     G" PRG
4  "KEYBOARD GRAPH"       M" PRG      12 "DRAGON MAZE"      G" PRG
4  "MERRY VIC-MAS"        M" PRG      12 "BREAKOUT"         G" PRG
4  "VIC NEON"             M" PRG      10 "FOREST DRIVER"    G" PRG
4  "SOUND KEYBOARD"       P" PRG      10 "VIC DT"              PRG
6  "ROBOTS"               G" PRG
369 BLOCKS FREE.
```

"VPUG VIC TAPE #6" #6 2A
```
12 "DIRECTORY"               PRG      6  "PRIME FACTORS"    E" PRG
7  "PRG CLASS VIC"        X" PRG      14 "GOBBLE"           G" PRG
10 "VIC DT"                  PRG      10 "SPACEWAR-1"       G" PRG
21 "SATELLITE FINDRC"     P" PRG      10 "SPACEWAR-2"       G" PRG
13 "BILLBOARD"            P" PRG      6  "S-X JASPER"       G" PRG
4  "JIM IN COLOUR"        B" PRG      6  "S-X COLOUR ROOSP" P" PRG
4  "LOTTARIO"             B" PRG      9  "S-X POOKY"        P" PRG
7  "PRG CHARACTERS"       P" PRG      13 "S-X GARFIELD"     P" PRG
14 "ADDITION PRACT"       E" PRG      2  "S-X HI DEMO"      P" PRG
14 "MULTIPLY PRACT"       E" PRG      2  "S-X TRSHY PIC"    P" PRG
14 "SUBTRACT PRACT"       E" PRG      2  "S-X DESIGN"       P" PRG
6  "UXB-1"                G" PRG      1  "S-X DESIGN-2"     P" PRG
6  "UXB-2"                G" PRG      1  "S-X DESIGN-3"     P" PRG
27 "BACKGAMMON"           G" PRG      1  "S-X DESIGN-4"     P" PRG
6  "POLY TURTLE"          L" PRG      4  "DIGICLOCK"        B" PRG
10 "ZAP"                  G" PRG      7  "HI-RES FOURIER"   P" PRG
14 "FREE-FALL"            G" PRG      12 "UBA SONG"         M" PRG
4  "VISIBLE VIC"          P" PRG      8  "SELECTIONS"          #SEQ
9  "CALENDAR"             P" PRG
359 BLOCKS FREE.
```

"VPUG VIC TAPE #7" #7 2A
```
12 "DIRECTORY"               PRG      7  "BRKOUT PADL"      G" PRG
10 "VIC DT"                  PRG      5  "PENCIL"           G" PRG
4  "PRG CLASS VIC"        "  PRG      4  "SCROLL"           G" PRG
8  "ROCKET COMMAND"       G" PRG      13 "GOBBLE (K)"       G" PRG
4  "RUGBY"                G" PRG      13 "THUNDERBIRD"      G" PRG
4  "SAMU"                 G" PRG      11 "STARFIGHT"        G" PRG
9  "STAR CHASER"          G" PRG      11 "SPACEWARS"        G" PRG
7  "STAR WAR"             G" PRG      10 "TANK VS UFO (K)"  G" PRG
3  "SNAKE"                G" PRG      9  "MINI GOLF"        G" PRG
13 "JUMPING JACK"         G" PRG      9  "INVADERS"         G" PRG
1  "S-X STRING ART"       P" PRG      7  "CAVERN"           G" PRG
1  "S-X GRAPHIC"          P" PRG      13 "GOLDRUSH"         G" PRG
1  "S-X KEYBD GRAPH"      P" PRG      6  "UFO PILOT"        G" PRG
1  "MUSIC #1201"          M" PRG      11 "CHASE"            G" PRG
10 "76 TROMBONES"         M" PRG      1  "SELECTIONS"          SEQ
4  "ENTERTAINER"          M" PRG
367 BLOCKS FREE.
```

"VPUG VIC TAPE #8" #8 2A
```
12 "DIRECTORY"               PRG      4  "CRYPTOGRAMS"      G" PRG
10 "VIC DT"                  PRG      12 "THREE OF A KINDS" G" PRG
7  "PRG CLASS VIC"        U" PRG      8  "UFO PILOT (JS)"   G" PRG
4  "FLIP INST"            G" PRG      13 "BOGGLER (JS)"     G" PRG
12 "FLIP"                 G" PRG      12 "DAY AT RACES-1"   G" PRG
8  "BRAIN WARP"           G" PRG      10 "DAY AT RACES-2"   G" PRG
13 "JUGGLER"              G" PRG      13 "RHINO"            G" PRG
6  "SLOT MACHINE"         G" PRG      7  "SCALES"           M" PRG
9  "REVERSE"              G" PRG      14 "GAMU"             L" PRG
11 "HIDDEN MAZE"          G" PRG      8  "TINY PLAN 8K"     L" PRG
4  "SEARCH"               G" PRG      14 "MORSE TRAINER"    E" PRG
13 "BUSINESS DEMO"        P" PRG      4  "4 COLOUR MAP"     G" PRG
10 "MAKING CHANGE"        E" PRG      2  "SCREEN SW"        U" PRG
4  "PRIME NUMBERS"        E" PRG      4  "PETAL/ROSE"       G" PRG
14 "BASEBALL"             G" PRG      7  "ROMPEEK"          G" PRG
4  "FOUR IN A ROW"        G" PRG      12 "DISASSEMBLER"     A" PRG
356 BLOCKS FREE.
```

"VPUG VIC TAPE #9" #9 2A
```
12 "DIRECTORY"               PRG      7  "BASIC NIGHTMAREX" E" PRG
4  "BIG CHARS"            P" PRG      7  "MORE SOUNDS +"    M" PRG
4  "PONG"                 G" PRG      4  "COLOUR EATER"     P" PRG
4  "S-X BOUNCER"          G" PRG      3  "CRITTER"          G" PRG
3  "S-X CLOCK"            G" PRG      14 "S-X JOYWRITER"    P" PRG
4  "HARMONIZER"           M" PRG      11 "S-X CALCULART"    P" PRG
4  "STEAL MONEY"          G" PRG      14 "S-X POLYGONS"     P" PRG
12 "KALEIDOSCOPE-3"       P" PRG      3  "PERMUTE SORTN"    P" PRG
4  "VIC MAIL"             U" PRG      12 "S-X AMORTGRAPH"   B" PRG
4  "FUEL 1C"              G" PRG      12 "BUTTERMORT"       B" PRG
12 "METEOR MAZE"          G" PRG      7  "LOAD/RUN DISK"    U" PRG
7  "ASTEROIDS"            G" PRG      8  "PRG LOCATOR"      U" PRG
4  "WALL"                 G" PRG      4  "VICWORD"          U" PRG
4  "BUDGET-1"             B" PRG      4  "CHAR GEN 2.0"     P" PRG
12 "GUNFIGHT"             G" PRG      2  "JOYSTICK TESTERP" P" PRG
12 "RUBB'N ROULETTEG"     G" PRG      10 "VIC INVADERS"     G" PRG
12 "MAIL LIST V/64"       U" PRG      4  "VIC DT"              PRG
454 BLOCKS FREE.
```

"CCC VIC TAPE 10 " 10 2A
```
12 "DIRECTORY"               PRG      15 "EDITYPE - TAPE"   B" PRG
7  "PRG CLASS VIC"        U" PRG      1  "FILL THE SCREENP" P" PRG
5  "S-X KINETIC"          P" PRG      4  "DISK MENU"        U" PRG
5  "S-X PWR SPIRAL"       P" PRG      4  "MARQUEE"          P" PRG
3  "S-X PATTERNS"         P" PRG      8  "GEMINI SAILBOATP" P" PRG
4  "AIR DEFENSE"          G" PRG      8  "GEMINI FACE"      P" PRG
4  "LIFE"                 G" PRG      4  "WAIT/PADDLES"     U" PRG
2  "RELOCATE SCRN"        U" PRG      13 "SKY DIVER"        G" PRG
4  "HANGMAN"              G" PRG      9  "WIZARD IN MAZE"   G" PRG
4  "HUNGRY DRAGON"        G" PRG      15 "FISHER ACES 8KB"  G" PRG
3  "POTHOLES JS"          G" PRG      4  "NAME PLAY"        G" PRG
10 "P2"                   "  PRG      11 "HOUSE FACE"       E" PRG
2  "CAVES OF ICE 8KG"     G" PRG      4  "BEES"             G" PRG
8  "UXB 2.1 (JS)"         G" PRG      4  "HAWKMEN"          G" PRG
8  "MYSTERY SPELL"        G" PRG      10 "HAWK-2"           G" PRG
13 "DOTS"                 G" PRG      4  "GOBLIN"           G" PRG
10 "DEMON STAR"           G" PRG      12 "SPEED SKI"        G" PRG
4  "DEMONDATAMAKER"       "  PRG      2  "TINY DIRECTORY"   U" PRG
3  "PRINT HEX/DEC"        A" PRG      4  "VIC DT"              PRG
3  "RAM TEST"             U" PRG
379 BLOCKS FREE.
```

"CCC VIC TAPE 11 " 11 2A
```
12 "DIRECTORY"               PRG      7  "PIO"              G" PRG
7  "PRG CLASS VIC"        U" PRG      15 "ULTRASORT"        P" PRG
4  "TIME BOMB"            G" PRG      4  "SORT GENERATOR"   P" PRG
4  "SOUND GENERATORM"     M" PRG      4  "BAGELS"           G" PRG
3  "CYLON ZAP 8K"         G" PRG      12 "DIAMOND DROP"     G" PRG
15 "C2"                   "  PRG      3  "DIAM2"            G" PRG
20 "C3"                   "  PRG      10 "AARDVARK ATTACKE" G" PRG
13 "SNAKE ESCAPE"         G" PRG      12 "DRAGONMASTER"     G" PRG
10 "KEYBOARD"             "  PRG      4  "DRAGONDATAMAKER"  "  PRG
10 "VIPER"                G" PRG      5  "MOVING MAZE"      G" PRG
4  "VIC COPY-ALL"         U" PRG      5  "GEMINI PRINTALLP" P" PRG
4  "POLARGRAPH 5K"        P" PRG      3  "WORD MATCH"       E" PRG
4  "CHECKBOOK"            B" PRG      7  "STAR WARS SONG"   M" PRG
1  "PILOT 8K"             L" PRG      7  "OIL TYCOON"       G" PRG
21 "PI"                   "  PRG      1  "01"               "  PRG
4  "LP TIMER"             A" PRG      6  "BUG RACE"         G" PRG
4  "TINYDIR W/DATE"       U" PRG      10 "VIC DT"              PRG
375 BLOCKS FREE.
```

"CCC VIC TAPE 12 " 12 2A
```
63  "RTTY-8/8 16K"           PRG      9  "ANT ANALYZER"        PRG
63  "PRG"                    PRG      9  "ANT BEARINGS"        PRG
26  "RTTY 8K"                PRG      3  "JOYSTICK CW"         PRG
491 BLOCKS FREE.
```

"CCC VIC TAPE 13 " 13 2A
```
12 "DIRECTORY"               PRG      12 "HARDHAT CLIMBR"   G" PRG
7  "PROG CLASS VIC"       U" PRG      2  "UNNEW"            U" PRG
14 "MINEFIELD 8KJS"       G" PRG      10 "FRENCH"           E" PRG
11 "ELECTRO FLASH"        E" PRG      1  "F"                "  PRG
8  "DEMON5/OBIRIS"        G" PRG      1  "JS 1&2 TESTER"    D" PRG
4  "BIG 2-COL DIM"        U" PRG      4  "GEMINI LOT-&49"   G" PRG
1  "COLORBOT (JS)"        P" PRG      4  "VIC ALX"          "  PRG
11 "CO2"                  "  PRG      4  "SCALES"           M" PRG
1  "UNUSUAL ENDING"       X" PRG      7  "THE NOTE GAME"    M" PRG
13 "MH-PRINT 10 8K"       P" PRG      7  "VIC MOZART"       M" PRG
14 "MH-PRINT 20 8K"       P" PRG      2  "PADDLE NOISES"    M" PRG
3  "CANYON CRUISER"       G" PRG      4  "TRUE SCALE"       P" PRG
1  "C2"                   "  PRG      4  "LEFT JS TESTER"   D" PRG
19 "SPEEDSCRIPT 8K"       B" PRG      4  "GBF CHANGER"      U" PRG
4  "HAUNTEDHOUSE8K"       B" PRG      7  "THINKING"         G" PRG
23 "C3"                   "  PRG      4  "VIC DT"              PRG
400 BLOCKS FREE.
```

"CCC VIC TAPE 14 " 14 2A
```
12 "DIRECTORY"               PRG      8  "SPI2"             "  PRG
7  "PROG CLASS VIC"       U" PRG      10 "SAUCER SHOOTER"   G" PRG
4  "BLAH"                 "  PRG      5  "SHERIFF"          P" PRG
13 "TETRACRYSTALS"        G" PRG      5  "ALPHABLAST"       E" PRG
4  "TETRADATAMAKER"       "  PRG      4  "U-BOAT"           G" PRG
2  "SUPER FIGHT"          "  PRG      4  "U2"               "  PRG
2  "BRAIN BENDER 1"       G" PRG      5  "ALPHA-SHOOT"      G" PRG
2  "BRAIN BENDER 2"       G" PRG      15 "SPACE DUEL"       G" PRG
2  "BRAIN BENDER 3"       G" PRG      4  "ENTERPRISE"       G" PRG
2  "DRAGON POWER"         G" PRG      12 "PATHWAY"          G" PRG
4  "CITY BOMBER"          G" PRG      1  "EXPROGCHARINST"   P" PRG
4  "CHICKEN LITTLE"       G" PRG      1  "EXP DEMO 1"       "  PRG
4  "CHICK2"               "  PRG      1  "EXP DEMO 2"       "  PRG
12 "CLOSEDOUT JS"         G" PRG      1  "EXP DEMO 3"       "  PRG
4  "BALL CLOCK"           G" PRG      1  "EXP DEMO 4"       "  PRG
4  "WORDSPELL"            E" PRG      1  "DEMO 5"           "  PRG
5  "FIRST MATH"           E" PRG      1  "VIC DT"              PRG
4  "MUNCHMATH"            E" PRG
13 "JUMPING JACK"         G" PRG
5  "SPIDER RESCUE"        G" PRG
365 BLOCKS FREE.
```

"CCC VIC TAPE 15 " 15 2A
```
12 "DIRECTORY"               PRG      4  "COMPUTE PRFADR"   U" PRG
7  "PROG CLASS VIC"       "  PRG      32 "DISKMASTER 16K"   U" PRG
4  "STOCK MARKET"         B" PRG      4  "VIC PIANO"        M" PRG
15 "SKIING"               G" PRG      10 "LADDERS 8K"       G" PRG
15 "CUTOFF"               G" PRG      1  "L2"               "  PRG
4  "NUMERIC KEYPAD"       U" PRG      8  "FUSUE"            G" PRG
44 "GEM YR. CAL 8K"       U" PRG      17 "MONTHS 8K"        "  PRG
4  "GEM MO. CAL 8K"       U" PRG      31 "ECONOMICS 8K"     "  PRG
8  "GEM APPTL. CAL"       U" PRG      10 "VIC DT"              PRG
4  "TARGETSHOOT JS"       G" PRG
402 BLOCKS FREE.
```

"CCC VIC TAPE 16 " 16 2A
```
12 "DIRECTORY"               PRG      16 "BUDGETING 8K"     B" PRG
7  "PROG CLASS VIC"       "  PRG      4  "CIRCUS JS"        G" PRG
4  "MEMORY UTILITY"       U" PRG      1  "CIRCUS PART 2"    "  PRG
4  "ADDITION DRILL"       E" PRG      18 "BAJA 1000"        G" PRG
4  "BAR GRAPH"            B" PRG      3  "B$G3"             "  PRG
4  "SIX-DOG FIGHT"        G" PRG      11 "REVETS JS"        G" PRG
11 "VIC MOZART"           M" PRG      7  "TANK MANIA 2JS"   G" PRG
4  "ROCKR"                G" PRG      4  "TM2"              "  PRG
4  "RAIN WALKER"          G" PRG      4  "VIC-PET CONV."    U" PRG
30 "TYPE-TUTOR 8K"        E" PRG      4  "TUNNEL RUN JS"    G" PRG
4  "TYPING TEACHER"       E" PRG      7  "FAST FIND-TAPE"   U" PRG
4  "GOTCHA! JS"           G" PRG      10 "VIC DT"              PRG
43 "FINANCES 8K"          B" PRG
393 BLOCKS FREE.
```

"VPUG VIC AA " AA 2A
```
12 "BIRDS DEMO"           P" PRG      10 "DEPTH CHARGE"     G" PRG
11 "BUMBLE BEE"           P" PRG      12 "DRAGON MAZE"      G" PRG
5  "COLOUR BARS"          P" PRG      2  "BREAKOUT"         G" PRG
4  "DRAGON"               P" PRG      11 "FOREST DRIVER"    G" PRG
3  "FRERE JACQUES"        M" PRG      9  "GRAND PRIX"       G" PRG
13 "GENERAL DEMO"         P" PRG      11 "ALIEN RAIDERS"    G" PRG
3  "GRAPHIC DEMO"         P" PRG      10 "LONG DIVISION"    G" PRG
11 "GRAPHICS&SOUND"       P" PRG      10 "LUNAR LANDER"     G" PRG
6  "HANDIC DEMO3"         P" PRG      10 "MOONLANDER"       G" PRG
5  "HI RES DEMO"          P" PRG      6  "MASTERMIND"       G" PRG
3  "KALEIDOSCOPE-1"       P" PRG      6  "NUKADE"           G" PRG
3  "KALEIDOSCOPE-2"       P" PRG      11 "OTHELLO"          G" PRG
3  "KEYBOARD GRAPH"       M" PRG      11 "PINBALL"          G" PRG
3  "MERRY VIC-MAS"        M" PRG      11 "PING PONG"        G" PRG
3  "VIC NEON"             M" PRG      8  "PISTOL PETE"      G" PRG
4  "SOUND KEYBOARD"       P" PRG      10 "RACE"             G" PRG
4  "ROBOTS"               G" PRG      8  "ROCKET COMMAND"   G" PRG
5  "SOUND EFFECTS"        M" PRG      4  "RUGBY"            G" PRG
4  "MORE SOUND EFF"       M" PRG      4  "SAMU"             G" PRG
4  "KEYBD SOUNDS"         M" PRG      9  "STAR CHASER"      G" PRG
3  "SILENT NIGHT"         M" PRG      7  "STAR WAR"         G" PRG
6  "ARROW"                "  PRG      12 "TRAP"             G" PRG
13 "ARTILLERY"            G" PRG      3  "SNAKE"            G" PRG
4  "BANDIT-1"             G" PRG      13 "JUMPING JACK"     G" PRG
5  "BARRICADE"            G" PRG      1  "RELOCATE SCRN"    U" PRG
3  "BIONYTHM"             G" PRG      1  "S-X STRING ART"   P" PRG
12 "BLACKJACK"            G" PRG      1  "S-X GRAPHIC"      P" PRG
4  "BUSH TRAIL"           G" PRG      1  "VIC WEDGE"        U" PRG
4  "DAM BUSTERS"          G" PRG      3  "S-X KEYBD GRAPHP" P" PRG
4  "DEFLECTION"           G" PRG      1  "PRG CLASS VIC"    X" PRG
170 BLOCKS FREE.
```

"VPUG VIC AB " AB 2A
```
6  "BASICODE READ"        U" PRG      10 "SUPER VICMON2"    A" PRG
6  "BASICODE SEND"        U" PRG      4  "HIMEM SAVER"      U" PRG
3  "BIG LETTERS"          P" PRG      7  "VIC AID"          U" PRG
4  "CHECK DISK"           U" PRG      14 "FRENCH TUTOR"     E" PRG
4  "DIRECTORY"            U" PRG      4  "REL WRITE"        U" PRG
11 "DISASM"               A" PRG      6  "CHAR$&1C##"       U" PRG
14 "DISPLAY T&S"          A" PRG      4  "PRG FUNCT KEYS"   U" PRG
1  "DIS1"                 A" PRG      6  "ADDRESS FILE"     B" PRG
4  "HISTROGRAM"           A" PRG      11 "GRAPH PLOT"       B" PRG
7  "PERFORM TEST"         U" PRG      4  "COMPLEX MATRIX"   E" PRG
13 "PROGRML CHARS"        P" PRG      4  "SSTIMER DESIGNE"  E" PRG
13 "RANDOM FILE"          U" PRG      8  "VIC FINANCE"      B" PRG
5  "SEQUENTIAL FILEU"     U" PRG      4  "LO PASS FILTER"   E" PRG
1  "TINYMON INST"         A" PRG      6  "CONTEXT INDEXERU" U" PRG
5  "TINYMON 1"            A" PRG      11 "COPY-ALL DISK"    U" PRG
1  "VIC DIS-1"            A" PRG      10 "TERM SER-1"       C" PRG
10 "VIC DIS-2"            A" PRG      1  "TERM SER-2"       C" PRG
11 "VIC DIS-3"            A" PRG      4  "KEYSORT"          U" PRG
4  "VICLOAD-2"            U" PRG      1  "SORT DEMO-1"      U" PRG
6  "VICLOAD-4"            U" PRG      4  "SORT DEMO-2"      U" PRG
8  "VIEW BAM"             U" PRG      6  "VIC VIC"          U" PRG
4  "PRG CLASS VIC"        U" PRG      7  "TINY/BASIC AID"   U" PRG
4  "SEARCHER"             U" PRG      4  "STRING THING"     U" PRG
4  "RELOCATE SCRN"        U" PRG      24 "82 TAX ONTARIO"   B" PRG
4  "VIC WEDGE"            U" PRG
369 BLOCKS FREE.
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"VPUG VIC AC " AC 2A
```
4  "VIC WEDGE"               PRG      9  "MUSIC #1201"      M" PRG
21 "SATELLITE FINDRC"     P" PRG      10 "76 TROMBONES"     M" PRG
13 "BILLBOARD"            P" PRG      9  "ENTERTAINER"      M" PRG
4  "JIM IN COLOUR"        B" PRG      4  "BRKOUT PADL"      G" PRG
4  "LOTTARIO"             B" PRG      5  "PENCIL"           G" PRG
7  "PRG CHARACTERS"       P" PRG      4  "SCROLL"           G" PRG
14 "ADDITION PRACT"       E" PRG      13 "GOBBLE (K)"       G" PRG
14 "MULTIPLY PRACT"       E" PRG      13 "THUNDERBIRD"      G" PRG
14 "SUBTRACT PRACT"       E" PRG      11 "STARFIGHT"        G" PRG
6  "UXB-1"                G" PRG      11 "SPACEWARS"        G" PRG
6  "UXB-2"                G" PRG      10 "TANK VS UFO"      G" PRG
27 "BACKGAMMON"           G" PRG      10 "TANK VS UFO (K)G" G" PRG
6  "POLY TURTLE"          L" PRG      14 "MINI GOLF"        G" PRG
10 "ZAP"                  G" PRG      9  "INVADERS"         G" PRG
14 "FREE-FALL"            G" PRG      7  "CAVERN"           G" PRG
4  "VISIBLE VIC"          P" PRG      13 "GOLDRUSH"         G" PRG
9  "CALENDAR"             P" PRG      6  "UFO PILOT"        G" PRG
4  "PRIME FACTORS"        E" PRG      11 "CHASE"            G" PRG
14 "GOBBLE"               G" PRG      12 "FLIP INST"        G" PRG
10 "SPACEWAR-1"           G" PRG      12 "FLIP"             G" PRG
10 "SPACEWAR-2"           G" PRG      8  "BRAIN WARP"       G" PRG
6  "S-X JASPER"           G" PRG      13 "JUGGLER"          G" PRG
6  "S-X COLOUR ROOSP"     P" PRG      6  "SLOT MACHINE"     G" PRG
9  "S-X POOKY"            P" PRG      9  "REVERSE"          G" PRG
13 "S-X GARFIELD"         P" PRG      11 "HIDDEN MAZE"      G" PRG
2  "S-X HI DEMO"          P" PRG      4  "SEARCH"           G" PRG
2  "S-X TRSHY PIC"        P" PRG      13 "BUSINESS DEMO"    P" PRG
2  "S-X DESIGN"           P" PRG      10 "MAKING CHANGE"    E" PRG
1  "S-X DESIGN-2"         P" PRG      4  "PRIME NUMBERS"    E" PRG
1  "S-X DESIGN-3"         P" PRG      14 "BASEBALL"         G" PRG
1  "S-X DESIGN-4"         P" PRG      4  "FOUR IN A ROW"    G" PRG
4  "DIGICLOCK"            B" PRG      4  "CRYPTOGRAMS"      G" PRG
7  "HI-RES FOURIER"       P" PRG      12 "THREE OF A KINDS" G" PRG
12 "UBA SONG"             M" PRG      1  "DIRECTORY"        U" PRG
60 BLOCKS FREE.
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"VPUG VIC AD " AD 2A
```
4  "VIC WEDGE"               PRG      3  "DISPLAY DEMO"     P" PRG
1  "DIRECTORY"               PRG      13 "OUTPOST"          G" PRG
7  "PRG CLASS VIC"        U" PRG      9  "DOODLE (JS)"      G" PRG
4  "CALENDAR"             P" PRG      8  "COLOUR MASTER"    G" PRG
4  "LOTTO &49"            G" PRG      7  "GUESS 10 SEC"     G" PRG
3  "MONITOR"              G" PRG      4  "RAINBOW CLOCK"    G" PRG
4  "CHECKBOOK"            B" PRG      6  "HEXEDIT"          G" PRG
4  "MAIL LIST TAPE"       B" PRG      10 "MAKE SKETCH(JS)G" G" PRG
4  "NUMERIC PAD"          U" PRG      4  "AMORTIZE"         B" PRG
7  "FILE CLERK TAPES"     U" PRG      2  "S-X VIC LOGO"     L" PRG
1  "SCROLL+/-"            U" PRG      3  "S-X SUPER PLOT"   P" PRG
4  "RINGER EOL"           U" PRG      2  "S-X ALL MY LOVIN" P" PRG
4  "PAUSE"                U" PRG      2  "S-X SPACE ACE"    P" PRG
4  "MEMORY SNAPSHOTA"     U" PRG      9  "S-X MUSIC MACHIN" M" PRG
4  "TRACE"                U" PRG      1  "S-X DIAMOND"      P" PRG
4  "COPY DISK FILESU"     U" PRG      1  "S-X CIRCULINE"    P" PRG
4  "SHELL SORT"           P" PRG      1  "S-X SPIRALMANIAP" P" PRG
4  "BUBBLE SORT"          P" PRG      1  "S-X TRI-CIRCLE"   P" PRG
4  "SORT C"               P" PRG      1  "S-X FAN-TASTIC"   P" PRG
4  "SORT D"               P" PRG      1  "S-X AMOIR DMO"    P" PRG
12 "MATHMAN"              E" PRG      1  "S-X DATA DEMO#2P" P" PRG
4  "GOBBLE"               G" PRG      4  "FUEL CHASE"       G" PRG
5  "PENCIL"               G" PRG      4  "ROBOT CHASE"      G" PRG
13 "THUNDERBIRD"          G" PRG      4  "UFO LANDING"      G" PRG
11 "STARFIGHT"            G" PRG      4  "COUNTER"          G" PRG
11 "SPACEWARS"            G" PRG      4  "MEMORY MUSIC"     M" PRG
10 "TANK VS UFO"          G" PRG      4  "SPACE SHIPS"      G" PRG
9  "MINI GOLF"            G" PRG      7  "UFO-TANK WAR"     G" PRG
9  "INVADERS"             G" PRG      7  "VIC-20 ORGAN"     M" PRG
7  "CAVERN"               G" PRG      4  "ZAPPER"           G" PRG
13 "GOLDRUSH"             G" PRG      4  "TANK WAR P1(T)"   G" PRG
11 "CHASE"                G" PRG      4  "TANK WAR P2"      G" PRG
12 "FLIP INST"            G" PRG      4  "ONE ON ONE"       G" PRG
12 "FLIP"                 G" PRG      9  "BATTLE ZONE"      G" PRG
8  "BRAIN WARP"           G" PRG      4  "SMOOTH MOVE"      P" PRG
4  "BLOT MACHINE"         G" PRG      4  "BASIC INVADER"    G" PRG
9  "REVERSE"              G" PRG      13 "GALACTIC WAR"     G" PRG
11 "HIDDEN MAZE"          G" PRG      6  "FIRE PART-1"      G" PRG
13 "GOLDRUSH (JS)"        G" PRG      6  "FIRE PART-2"      G" PRG
3  "JOYSTICK DEMO"        P" PRG      4  "MANHOLE"          G" PRG
3  "5K HI-RES"            A" PRG      4  "ANDROID"          G" PRG
6  "COPY CAT"             G" PRG      4  "BUG HOP"          G" PRG
24 "ENTERPRISE 8K"        G" PRG      1  "RELOCATE SCRN"    U" PRG
12 "GRAPH PLOT"           B" PRG      17 "COL/CHAR EDITORP" P" PRG
86 BLOCKS FREE.
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"CCC VIC AE " #9 2A
```
4  "VIC WEDGE"            U" PRG      5  "S-X AMORTGRAPH"   B" PRG
4  "DIRECTORY"            U" PRG      8  "BUTTERMORT"       B" PRG
7  "PRG CLASS VIC"        U" PRG      8  "LOAD/RUN DISK"    U" PRG
7  "UFO PILOT (JS)"       G" PRG      8  "PRG LOCATOR"      U" PRG
13 "BOGGLER (JS)"         G" PRG      4  "VICWORD"          U" PRG
12 "DAY AT RACES-1"       G" PRG      4  "CHAR GEN 2.0"     P" PRG
10 "DAY AT RACES-2"       G" PRG      2  "JOYSTICK TESTERP" P" PRG
13 "RHINO"                G" PRG      10 "VIC INVADERS"     G" PRG
7  "SCALES"               M" PRG      4  "BIG CHARACTERS"   P" PRG
8  "PLOT 8K"              L" PRG      4  "PONG"             G" PRG
8  "TINY PLAN 8K"         L" PRG      4  "S-X BOUNCER"      G" PRG
14 "MORSE TRAINER"        E" PRG      3  "S-X CLOCK"        G" PRG
4  "4 COLOUR MAP"         G" PRG      4  "HARMONIZER"       M" PRG
2  "SCREEN SW"            U" PRG      4  "STEAL MONEY"      G" PRG
4  "PETAL/ROSE"           G" PRG      12 "KALEIDOSCOPE-3"   P" PRG
7  "ROMPEEK"              G" PRG      4  "VIC MAIL"         U" PRG
12 "DISASSEMBLER"         A" PRG      4  "FUEL 1C"          G" PRG
7  "BASIC NIGHTMAREX"     E" PRG      12 "METEOR MAZE"      G" PRG
7  "MORE SOUNDS +"        M" PRG      7  "ASTEROIDS"        G" PRG
4  "COLOUR EATER"         P" PRG      4  "WALL"             G" PRG
3  "CRITTER"              G" PRG      4  "BUDGET-1"         B" PRG
14 "S-X JOYWRITER"        P" PRG      12 "GUNFIGHT"         G" PRG
11 "S-X HI RES DEMO"      P" PRG      12 "RUBB'N ROULETTEG" G" PRG
11 "S-X CALCULART"        P" PRG      4  "MAIL LIST V/64"   U" PRG
14 "S-X POLYGONS"         P" PRG      15 "DISC SWAP"        U" PRG
3  "PERMUTE SORTN"        P" PRG
262 BLOCKS FREE.
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WORD PROCESSING

By MICHAEL QUIGLEY

The Quick Brown Fox, a word processor for the VIC-20 and Commodore 64, is marketed in a somewhat unusual way -- its cartridge comes enclosed in a sealed envelope. The purchaser is encouraged to first read the manuals, and if what meets the eye is not acceptable for his or her needs, the whole package may be returned for a refund (depending further, of course, on the whims of the individual retailer).

This is in many ways a laudable concept; however, there are several features not discussed in the manuals which will not be discovered until the sealed envelope has been opened, thus disqualifying the customer from any financial recourse. More about these later.

The manual is visually impressive, coming in a three-ring vinyl-covered binder. One discovers, however, that the manual is written not just for the VIC and 64 (this review is based on the VIC version, by the way, which is essentially the same as that for the 64 aside from obvious differences like the screen layout). It is also intended for two other computer systems. The result of this is that various features described in the manual have no relation to Commodore products.

There is an attempt to rectify this situation with an accompanying set of "Pocket Notes" and further updates which *do* refer to the VIC and 64. They are quite extensive in all but two fields: Sending and Receiving data with modems, one of the more interesting features of QBF. The instructions here are full of modem-related mumbo-jumbo which assumes that the user is already familiar with such terms as baud rate, handshaking, parity, etc.

Inserting the cartridge into the computer (followed on the VIC by a SYS command) results in the main menu. The reverse arrow in the upper left hand corner of the VIC and 64 keyboard is used as an "Escape Key" to return to this menu.

Text is entered by selecting the Type mode, which gives a figure to indicate the amount of memory left. One doesn't have to type very long to discover one of QBF's big shortcomings: this is a line editor, not a full screen editor, a situation which produces real problems on the unexpanded VIC, since the word wrap cut-off limit is 10 characters from the left margin. Any words started after this limit will be placed on the next line down. The result is only 2 or 3 words of text per line.

Furthermore, when you discover an error in the line which you just typed above, in order to correct it you must enter the Line Edit mode (by pushing the

Escape Key once), move up to the line, make the correction and then return to the Type Mode. On the unexpanded VIC, reverse scrolling to lines above with the up cursor key produces more problems with the word wrap -- words at the end of the lines often disappear. This apparently has something to do with the fact that the text is now indented 1 space from the left margin. When scrolling down with the down cursor key, the text is flush against the left margin, and the words appear as they should. These peculiarities are apparently unique to the VIC's 22-column screen.

Within the limitations of the Line Edit mode, quite a variety of corrections can be made. Text can be Replaced a single character at a time or Inserted for any length up to the total number of bytes remaining. It can be Deleted, removing characters, words, sentences, or paragraphs.

Another editing feature of QBF, the one which most impressed me, was its Global Edit, whichs allows you to make a single change repeatedly throughout the text. For example, let's say after you use the name "John Smith" several times, you discover the name should be "Joe Smythe". With Global Edit, making this change is a snap, and you have the option of *not* replacing, in case there *was* someone named John Smith. QBF also includes the ability to move blocks of text -- this requires you to know both the beginning and end of the block which you wish to move, however, something which is not always easy.

One QBF feature which is not so successful is the View mode. This supposedly allows one to see the copy as it would be printed, with indents, paragraphs, blank lines, and so forth, assuming you are printing the copy over a width of 80-columns or less. The screen limitations of the VIC (and, I would assume, the 64) were no advantage here, since the top line of copy was sometimes missing, or else the top lines scrolled up out of sight.

QBF works with both tape and disk, and storage and retrieval features are accessed from a secondary Clerk menu. Tape storage is possible, but sounds somewhat haphazard, done in the normal manner of saving one program after another. (RTC's Vic-Script saves to tape in a more intelligent manner, synchronizing all files to the beginning of the tape.)

Disk storage is easily accomplished, with an option for changing drive numbers. QBF does not seem to have much faith in the 1541 disk drive, saying it "may not always create new disks as it's supposed to". There is a non-destructive directory, which allows you to view the directory

without destroying the program in memory. If the directory is longer than the screen size will accommodate, use of the CONTROL key is essential to keep it from scrolling up out of sight at rapid speed.

The name of the file being worked on is retained by the Clerk directory, and replacing an old text with an updated one is done internally by QBF with the SAVE "@0:FILE NAME" procedure, which has its detractors, among them the authors of the 1540 disk drive manual. There is no Verify command for either tape or disk with QBF.

VIC LIBRARY

(Continued from previous page)

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

"CCC VIC AG   " AG 2A
7	"VIC WEDGE	" AG PRG	4	"TINYDIR W/DATE U"	PRG
4	"DIRECTORY	PRG	7	"PIG	G"	PRG
7	"PROG CLASS VIC	U" PRG	15	"ULTRASORT	P"	PRG
5	"TIME BOMB	G" PRG	2	"SORT GENERATOR	P"	PRG
5	"NAME PLAY	G" PRG	6	"BAGELS	G"	PRG
9	"BUS RACE	G" PRG	12	"DIAMOND DROP	G"	PRG
4	"CYLONS	PRG	6	"DIAM2"		PRG
14	"CYLONS 2	" PRG	10	"AARDVARK ATTACKS"		PRG
20	"CYLONS 3	" PRG	5	"DRAGONMASTER	G"	PRG
13	"SNAKE ESCAPE	" PRG	5	"DRAGON DATA"		SEQ
2	"KEYBOARD	M" PRG	8	"SOUND GENERATOR"		PRG
9	"VIPER	M" PRG	5	"GEMINI PRINTALLP"		PRG
10	"VIC COPY-ALL	U" PRG	12	"WORD MATCH	G"	PRG
4	"POLARGRAPH 5K	P" PRG	3	"STAR WARS SONG M"		PRG
4	"CHECKBOOK	B" PRG	12	"MOVING MAZE		PRG
5	"PILOT 8K	G" PRG	7	"GIL TYCOON	G"	PRG
21	"PI"	PRG	5	"OI"		PRG
6	"LP TIMER	A" PRG	11	"VIC DT"		PRG
378	BLOCKS FREE.					

"CCC VIC AH   " MH 2A
4	"VIC WEDGE"	PRG	2	"UNNEW MAKER	U"	PRG
4	"DIRECTORY	U" PRG	1	"UNNEW"		PRG
7	"PROG CLASS VIC	U" PRG	1	"LEFT J8 TESTER	D"	PRG
14	"MINEFIELD 8KJ8	G" PRG	2	"J8 1&2 TESTER	D"	PRG
11	"ELECTRO FLASH	G" PRG	5	"GEMINI LOT-649	G"	PRG
10	"DEMONS/OSIRIS	G" PRG	11	"VIC MLX"		PRG
4	"BIG 2-COL DIR	U" PRG	5	"SCALER		PRG
4	"COLORBOT (J8)	G" PRG	6	"BACH-1 EMI	M"	PRG
11	"CO2"	PRG	5	"BACH-2 EMI 8K	M"	PRG
12	"UNUSUAL ENDING X"	PRG	16	"THE NOTE GAME	M"	PRG
12	"WM-PRINT 10 8K	P" PRG	6	"VIC MOZART		PRG
5	"WM-PRINT 20 8K	P" PRG	4	"PADDLE NOISES	M"	PRG
5	"CANYON CRUISER	G" PRG	5	"TRUE SCALE	M"	PRG
19	"SPEEDSCRIPT 8K	B" PRG	10	"FRENCH	E"	PRG
4	"E2"	PRG	4	"F"		PRG
11	"HAUNTEDHOUSE8K	G" PRG	1	"QBF CHANGER		PRG
23	"H2"	PRG	8	"THINKING	G"	PRG
4	"HARDMAT CLIMBR	G" PRG	10	"VIC DT"		PRG
4	"DISK-O-VIC	U" PRG	15	"SGL DRV COPY	U"	PRG
349	BLOCKS FREE.					

"CCC VIC AI   " MI 2A
4	"VIC WEDGE"	PRG	5	"SPIDER RESCUE	G"	PRG
4	"DIRECTORY	PRG	8	"IPI2"		PRG
7	"PROG CLASS VIC	U" PRG	6	"BAUXER SHOOTER	G"	PRG
11	"BLAM!"	PRG	5	"SHERIFF		PRG
7	"REACT	PRG	4	"ALPHABLAST	E"	PRG
14	"TETRACRYSTALS	G" PRG	6	"U-BOAT	G"	PRG
4	"CRYS"	PRG	13	"TETRADATAMAKER"		PRG
11	"CUTOFF/6663	G" PRG	6	"SPACE DUEL	G"	PRG
7	"SUPER FIGHT		PRG	6	"ENTERPRISE		PRG
7	"TRENCHFIRE4352	G" PRG	12	"PATHWAY	G"	PRG
2	"BRAIN BENDER 1	G" PRG	11	"ALPHA-SHOOT		PRG
2	"BRAIN BENDER 2	G" PRG	11	"SKYPROCHARIHST	P"	PRG
3	"BRAIN BENDER 3	G" PRG	1	"EXP DEMO 1"		PRG
7	"DRAGON POWER		PRG	1	"DEMO 1"		PRG
7	"CITY BOMBER		PRG	1	"EXP DEMO 2"		PRG
10	"CHICKEN LITTLE	G" PRG	5	"DEMO 2"		PRG
2	"CHICK2"	PRG	1	"EXP DEMO 3"		PRG
4	"CLOSEOUT J8	G" PRG	1	"DEMO 3"		PRG
2	"DEFLECTION	G" PRG	1	"EXP DEMO 4"		PRG
11	"BALL CLOCK		PRG	1	"DEMO 4"		PRG
2	"WORDSPELL		PRG	15	"SGL DRV COPY"		PRG
7	"FIRST MATH	E" PRG	10	"R2"		PRG
13	"NUMCMATH		PRG				
13	"JUMPING JACK	G" PRG				
313	BLOCKS FREE.					

"CCC VIC AJ   " MJ 2A
4	"VIC WEDGE"	PRG	4	"BAR GRAPH	D"	PRG
4	"DIRECTORY	PRG	11	"8X-DOG FIGHT	M"	PRG
4	"STOCK MARKET	G" PRG	7	"VIC MOZART	M"	PRG
5	"SKIING	G" PRG	11	"ROCKS	G"	PRG
15	"CUTOFF"	PRG	7	"MAIN WALKER	G"	PRG
7	"NUMERIC KEYPAD	U" PRG	10	"TYPE-TUTOR 8K		PRG
44	"GEM NO. CAL 8K	P" PRG	9	"TYPING TEACHER	E"	PRG
3	"GEM YR. CAL 8K	P" PRG	11	"GOTCHA: J8		PRG
5	"GEM APPT. CAL	P" PRG	43	"FINANCES 8K	B"	PRG
8	"SNAKES + LADRS	G" PRG	1	"BUDGETING 8K		PRG
32	"TARGETSHOOT J8	G" PRG	1	"CIRCUS J8	G"	PRG
2	"COMPUTE PRFRDR	U" PRG	7	"CIRCUS PART 2	G"	PRG
32	"DISKMASTER 16K	U" PRG	2	"BAJA 1000	G"	PRG
4	"FUGUE	M" PRG	5	"BAJ2"		PRG
4	"VIC PIANO	M" PRG	11	"HAVETS J8	G"	PRG
13	"LADDERS 8K		PRG	4	"TANK MANIA 2J8 G"		PRG
4	"L2"	PRG	1	"TM2"		PRG
19	"MONTHS 8K		PRG	7	"VIC-PET CONV.	U"	PRG
31	"ECONOMICS 8K		PRG	4	"TUNNEL RUN J8	G"	PRG
4	"MEMORY UTILITY	U" PRG	15	"SGL DRV COPY"		PRG
2	"ADDITION DRILL	E" PRG	4	"VIC AJ"		PRG
163	BLOCKS FREE.					

THE WHOLE 64 LIBRARY

Disks (double-sided) cost $5.00 to buy or require a $10.00 deposit while you borrow them. 64 librarian is Glenn Hazlewood -- see him at any of the club's Vancouver meetings.

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1	"C-64 WEDGE"	PRG
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25	"ENTERTAINER"	PRG
37	"LABYRINTH"	PRG
13	"KEYBOARD"	PRG
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6	"HAXIT"	PRG
57 BLOCKS FREE.		
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43	"ARTILLERY.C2"	PRG
9	"AQUA 2"	PRG
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12	"1 SIN+"	PRG
91	"AFRICAN ADVENTUR"	PRG
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"CCC LIBRARY DISK" A2 2A

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4	"DOS 5.1"	PRG
4	"HIRES VIEW 2"	PRG
2	"HIRES VIEW 2.MAC"	PRG
32	"1-DOLLAR"	PRG
32	"2-MAP"	PRG
32	"3-DBL BESSEL"	PRG
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33	"5-DIP"	PRG
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9	"STANDARD.SET"	PRG
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9	"SPRMON.SYS51201"	PRG
72 BLOCKS FREE.		
11	"DOS IN BASIC"	PRG
11	"RES MORT"	PRG
89	"MUSIC MAKER"	PRG
20	"GRUNGY TOWERS"	PRG
88	"SUPERTREK 64+"	PRG
9	"SUPERDOS3267000"	PRG
43	"SPRITE EDITOR"	PRG
3	"SCROLL.DATA"	PRG
3	"SAMPLE SPRITES"	PRG
33	"SPRITE INSTR."	PRG
4	"CHAR BOOT"	PRG
32	"CHAR EDITOR"	PRG
1	"ROTATE.DATA"	PRG

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13	"GRAMMAR"	PRG
5	"HAIKU 5"	PRG
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13	"MATH TUTOR"	PRG
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11 BLOCKS FREE.		
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10	"ANIMAL.DATA"	PRG
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20	"HANGMAN 2"	PRG
28	"JUMBO JET"	PRG
20	"SINGLE BACKUP"	PRG

"CCC LIBRARY DISK" B2 2A

42	"SPACE PILOT"	PRG
42	"SNAKES"	PRG
14	"PAL PLOTTING DEM"	PRG
10	"SPRITE DEMO"	PRG
9	"3-D DEMO"	PRG
8	"M/L DRAW DEMO"	PRG
65	"STAR TREK IV-A"	PRG
30	"SPRITE MAKER"	PRG
4	"ATARI"	PRG
44	"MASTER MIND"	PRG
7	"PETSIM"	PRG
12	"TRACK & SECTOR"	PRG
2	"MENU"	PRG
2	"DIRECTORY"	SEQ
195 BLOCKS FREE.		
12	"XMON64L(BASIC)"	PRG
12	"XMON64C(50135)"	PRG
12	"XMON64R(29900)"	PRG
12	"XMON64T(39003)"	PRG
5	"SHOOT"	PRG
6	"SEQUENTIAL FILE"	PRG
13	"RANDOM FILE"	PRG
19	"DISASSEMBLER DIS"	PRG
10	"DISK CHECKER"	PRG
7	"DISK VIEWER"	PRG
9	"DISK LOGGER"	PRG
7	"SECTOR PRINT"	PRG
7	"DSK VIEW/CHANGER"	PRG

"CCC LIBRARY DISK" C1 2A

70	"PONZO TUTOR-1.64"	PRG
67	"PONZO TUTOR-2.64"	PRG
74	"PONZO TUTOR-3.64"	PRG
64	"PONZO TUTOR-4.64"	PRG
61	"PONZO TUTOR-5.64"	PRG
60	"PONZO TUTOR-7.64"	PRG
12	"LISTER.V64"	PRG
7	"1525 CHAR.EDIT"	PRG
7	"TIME VIEW INST"	PRG
7	"TIME VIEW SET UP"	PRG
10	"TIME ADVENTURE"	PRG
5 BLOCKS FREE.		
4	"SAVE FILE(S) PRG"	PRG
4	"SAVE FILE(S) SEQ"	PRG
20	"SINGLE BACKUP"	PRG
33	"SPRITE INSTR."	PRG
16	"64 MEM CHART.GR"	PRG
3	"INDEX HARDCOPY"	PRG
3	"INDEX HARDCOPY 2"	PRG
19	"WORLD CLOCK"	PRG
10	"SUPER CHASE"	PRG
25	"STARTREK"	PRG

"CCC LIBRARY DISK" C2 2A

3	"LIBRARY NOTES"	PRG
7	"SCRLL.LDR.TAPE"	PRG
46	"SPRT.EDIT.TAPE"	PRG
20	"SIDMON"	PRG
26	"SOUNDER"	PRG
11	"DOS IN BASIC"	PRG
88	"SUPERTREK 64+"	PRG
48	"ADVENTURE-64"	PRG
9	"ADVF 0"	SEQ
4	"ADVF 1"	SEQ
4	"ADVF 2"	SEQ
3	"ADVF 20"	SEQ
7	"ADVF 21"	SEQ
8	"ADVF 22"	SEQ
7	"ADVF 23"	SEQ
6	"ADVF 24"	SEQ
11	"ADVF 25"	SEQ
6	"ADVF 26"	SEQ
4	"ADVF 27"	SEQ
1	"ADVF 28"	SEQ
0	BLOCKS FREE.	
4	"ADVF 3"	SEQ
8	"ADVF 4"	SEQ
4	"ADVF 5"	SEQ
5	"ADVITV"	SEQ
10	"ADVKEYS"	SEQ
18	"ADVMAP"	SEQ
32	"1-DOLLAR"	PRG
32	"2-MAP"	PRG
32	"3-DBL BESSEL"	PRG
32	"4-KAREN"	PRG
33	"5-DIP"	PRG
27	"DISK UTILITIES"	PRG
42	"COMM64"	PRG
56	"BACKGAMMON"	PRG
7	"PARTITION LOADER"	PRG
8	"PARTITION /4"	PRG
13	"SPEED TYPE 64"	PRG
12	"1 SIN+"	PRG

"CCC LIBRARY DISK" D1 2A

33	"ROM 1"	PRG
33	"ROM 2"	PRG
4	"KERNAL BOOT2"	PRG
1	"TRANS.A000-A"	PRG
1	"KERNAL BOOT1"	PRG
15	"DISK MENU"	PRG
20	"DISK BACKUP 1541"	PRG
20	"BIORHYTHM"	PRG
21	"MUNCHMAID"	PRG
21	"OIL TYCOON"	PRG
21	"NUMBER HUNT"	PRG
21	"JAPANESE AFO"	PRG
8	"UNNEW"	PRG
12	"FILECOPIER INSTR"	PRG
16	"FILECOPIER"	PRG
18	"ALARM CLOCK"	PRG
14	"AUTO PROOFREADER"	PRG
14	"DISASSEMBLER 64"	PRG
3	"RAMTEST/MACHINE"	PRG
5	"FOUR-SPEED BRAKE"	PRG
6 BLOCKS FREE.		
7	"64 SEARCHER"	PRG
23	"ULTRASORT TEST"	PRG
23	"ULTRASORT"	PRG
1	"C-64 WEDGE"	PRG
4	"DOS 5.1"	PRG
20	"DOS INSTR."	PRG
45	"MONTANA"	PRG
94	"KANON"	PRG
20	"STAR PILOT"	PRG
16	"SKI-64"	PRG
23	"DARK STAR"	PRG
21	"MARTIAN INVADERS"	PRG
54	"FOOTBALL64"	PRG
12	"1 SIN+"	PRG
3	"STRING THING 64"	PRG
7	"ENTERPRISE C64"	PRG
8	"CONSTRICTOR 4"	PRG
5	"EXPANDER.4"	PRG
3	"SLOW LISTER"	PRG

"CCC LIBRARY DISK" D2 2A

13	"C-64 FILE CASE"	PRG
9	"LOCKDISK64"	PRG
4	"CROSS-REF64"	PRG
10	"COPY-ALL.64"	PRG
109	"BACH FUGUE.C"	PRG
14	"SPRITE MANIP.64"	PRG
24	"MUSIC MASTER"	PRG
23	"YESTERDAY.C"	PRG
8	"HIRES GRAPHICS"	PRG
27	"PET DK"	PRG
6	"SCREEN PLOTTER"	PRG
99	"MONOPOLE.C"	PRG
11	"SUBMARINES.C"	PRG
27	"MASTER"	PRG
23	"COWBOY SHOOTOUT"	PRG
11	"RES MORT"	PRG
7	"PET EMU BOOT"	PRG
17	"EMULATOR"	PRG
7	"355 TIMER DESIGN"	PRG
11 BLOCKS FREE.		
27	"TOKER64"	PRG
22	"AFO"	PRG
14	"CROSS-REF"	PRG
8	"SUPERMON64.V2"	PRG
12	"LISTER.V64"	PRG
10	"COPY-ALL"	PRG
30	"TELCOM232.4.17.4"	PRG
30	"TELCOM010.4.4.4"	PRG
11	"TELCOM.INSTR."	PRG
8	"MERGER"	PRG
4	"RS232.INSTR.4"	PRG
11	"FACTORS.VIC64"	PRG
25	"BLACKJACK"	PRG
8	"BIRTHDAY.64"	PRG
12	"TWIN BAGELS"	PRG
12	"BATTLESHIPS"	PRG
9	"LINCOLNSHIRE"	PRG
2	"COPY FILE 64"	PRG

"CCC LIBRARY DISK" E1 2A

5	"CONT.LDR.ML"	PRG
1	"HI RES LOADER"	PRG
1	"SCREEN"	PRG
7	"CONT.LDR.PAL"	PRG
32	"TEX"	PRG
32	"HOPALONG"	PRG
32	"GUY"	PRG
32	"FIG1"	PRG
32	"FIG2"	PRG
32	"FIG3"	PRG
32	"ROUND2"	PRG
2 BLOCKS FREE.		
32	"EYES"	PRG
32	"FRIENDS"	PRG
32	"BINGO32"	PRG
32	"SATELLITE"	PRG
32	"DONALD.DUCK"	PRG
32	"VH.THINGS"	PRG
32	"SESAME.ST"	PRG
32	"NUDE.REV"	PRG
32	"VIS.ROBETTE"	PRG
32	"VIS.G1A"	PRG
32	"XMAS.CARD.1"	PRG
32	"4HILLS"	PRG

"CCC LIBRARY DISK" E2 2A

1	"LIST-ME C61.L"	PRG
5	"CONT.LDR.ML"	PRG
1	"HI RES LOADER"	PRG
1	"SCREEN"	PRG
7	"CONT.LDR.PAL"	PRG
32	"SPIRAL.1"	PRG
32	"SUE"	PRG
32	"KAREN"	PRG
32	"SNOOPY"	PRG
32	"ALBERT"	PRG
32	"DOLLAR"	PRG
32	"DIP"	PRG
32	"SNAIL"	PRG
3 BLOCKS FREE.		
32	"DEB.1"	PRG
32	"7-SHILL"	PRG
32	"MUSIC"	PRG
32	"MAP"	PRG
32	"DIANE"	PRG
32	"WILLY"	PRG
32	"RACCOON"	PRG
32	"BINGO51"	PRG
32	"WATCH"	PRG
32	"WINSTON"	PRG
32	"MICROMETER"	PRG
32	"NUDE"	PRG

"CCC LIBRARY DISK" F1 2A

47	"BITS AND BYTES"	PRG
9	"BYTSPRITES"	PRG
1	"DOS.BOOT.64"	PRG
4	"+DOS 5.1.64"	PRG
9	"+DOS.INST.64"	PRG
27	"PILOT INST.64"	PRG
13	"PILOT TRANSL.64"	PRG
4	"DISK ADDR CHANGE"	PRG
11	"COPY/ALL"	PRG
13	"HOW TO USE"	PRG
15	"HOW PART TWO"	PRG
1	"C-64 WEDGE"	PRG
4	"DOS 5.1"	PRG
11	"PRINTER TEST"	PRG
4	"VIEW BMP"	PRG
4	"CHECK DISK"	PRG
17	"DISPLAY T&B"	PRG
14	"PERFORMANCE TEST"	PRG
5	"SEQUENTIAL FILE"	PRG
13	"RANDOM FILE"	PRG
1 BLOCKS FREE.		
52	"DISKVIEW-64"	PRG
13	"MINIWORDPRO.64"	PRG
18	"LIST"	PRG
10	"ARTLERY"	PRG
10	"BACKGAMMON"	PRG
5	"BUGS 64"	PRG
22	"CAVES & CAVERNS"	PRG
24	"CHECKERS"	PRG
24	"CONCENTRATION 64"	PRG
21	"HAMMARABI"	PRG
21	"MIKADO"	PRG
21	"OTHELLO"	PRG
11	"PI HUNT 64"	PRG
11	"PI HUNT 64.2"	PRG
33	"HAGMAMP3"	PRG
50	"DISK CMDS"	PRG
69	"NUCLEAR DEMO"	PRG
7	"GASSER"	PRG

"CCC LIBRARY DISK" F2 2A

5	"BOOT.UK2.64"	PRG
23	"SPRITES.64"	PRG
23	"MUSIC.64"	PRG
7	"LAND.64"	PRG
71	"DEMO.64"	PRG
15	"1000 MILES/INST"	PRG
15	"1000 MILES"	PRG
15	"1 SIN+"	PRG
79	"STAR TREK-C64"	PRG
23	"DRAW POKER"	PRG
23	"CARD SNAP"	PRG
23	"CLUE"	PRG
9	"SPACE NIM"	PRG
14	"DUCKSHOOT"	PRG
2 BLOCKS FREE.		
58	"QUIET AFTERNOON"	PRG
42	"Q-BACK CHALLENGE"	PRG
42	"GUESS A GRAPH"	PRG
6	"SAFE CRACK"	PRG
7	"TORPEDO"	PRG
52	"3DMAIZE"	PRG
12	"FIFTEEN.64"	PRG
14	"OUTPOST 64"	PRG
23	"IT"	PRG
53	"SNOOPY MATH"	PRG
4	"LONE (64)RANGER"	PRG
2	"ALPHABET TYPE"	PRG
2	"TEMPERATURE CONV"	PRG

"CCC LIBRARY" G1 2A

18	"DISK MANAGER"	PRG
1	"SPACE DUEL BOOT"	PRG
4	"SPACE DUEL49152"	PRG
7	"AUTO PROOF"	PRG
12	"MLX"	PRG
1	"UNNEW"	PRG
6	"MERRY CHRISTMAS"	PRG
12	"WORD HUNT 10/10"	PRG
13	"WORD HUNT 20/30"	PRG
12	"WORD HUNT 10/15"	PRG
2	"PRINT LOTTO 649"	PRG
2	"SLOT.BOOT"	PRG
2	"SLOT.A"	PRG
45	"SLOT"	PRG
3	"KEYPRINT.INST"	PRG
1	"KEYPRINT.C000"	PRG
1	"KEYPRNT.PAL"	PRG
3 BLOCKS FREE.		
4	"CHRISTMAS"	PRG
149	"CHRISTMASMUSIC"	PRG
17	"CHRISTMASCODE"	PRG
5	"CHRISTMASBOOT"	PRG
2	"DEMO.BOOT"	PRG
17	"DEMO.C000"	PRG
43	"SNAIL.C64.BOOT"	PRG
83	"SNAIL.C64.INST"	PRG
9	"GEMINI SCR.DUMP"	PRG
11	"HAM CODE"	PRG
2	"CATALOG INST."	PRG
44	"CATALOG"	PRG
86	"BREAKOUT"	PRG
2	"SINGLE BACKUP"	PRG
28	"INDEX HARDCOPY 4"	PRG

"CCC LIBRARY" G2 2A

40	"MC.MASTER CAT"	PRG
4	"MC.MAKE MASTER"	PRG
1	"COMMANDS"	PRG
30	"COM.TEXT DEMO"	PRG
22	"COM.SORT DEMO"	PRG
6	"COM.HOW FAST"	PRG
50	"HR.GRAPHICS PAL"	PRG
24	"HR.GRAPHICS INST"	PRG
9	"HR.GRAPHICS OBJ"	PRG
8	"HR.GRAPHICS DEMO"	PRG
6	"HR.PICTURE LOAD"	PRG
33	"HR.PICTURE 1"	PRG
3	"HR.HIRES TO 1525"	PRG
27	"HU.PLAYER PAL"	PRG
19 BLOCKS FREE.		
103	"HU.C64 MUSIC"	PRG
20	"HU.MACHINE OBJ"	PRG
18	"TM-INSTRUCT 1"	PRG
40	"TM-INSTRUCT 2"	PRG
18	"TM-INSTRUCT 3"	PRG
9	"AN.INSTRUCTIONS"	PRG
33	"AN.ELLIPSE"	PRG
56	"AN.ANIMATION PAL"	PRG
10	"AN.ANIMATION OBJ"	PRG
10	"AN.ANIMATION DEM"	PRG
8	"64 TEST"	SEQ

"CCC LIBRARY DISK" H1 2A

8	"MINEFIELD 2.P"	PRG
19	"STAR LANES.P"	PRG
17	"WORD-SEARCH.P"	PRG
20	"TV SATELLITES.P"	PRG
8	"SEQ DIR.P"	PRG
8	"THE BIRDS.C"	PRG
39	"DEMON STAR2.C"	PRG
72	"CYLON IAP.C"	PRG
91	"DEATH STAR.C"	PRG
11	"DM.LIVINGSTON.C"	PRG
4	"PIRATE ADV.C"	PRG
1	"TINY.AID.C"	PRG
3	"KALEIDOSCOPE.C"	PRG
18	"MINEFIELD.C"	PRG
14	"SWOOP.C"	PRG
16	"VIPER.C"	PRG
26	"FEED.ROW.C"	PRG
2	"THE.EARTH.C"	PRG
8	"FEED.ML.C"	PRG
43	"DIR.READER.C"	PRG
9	"SUPER64.SRC"	PRG
7	"CONTEXT INDEXER"	PRG
1	"LIST-ME (C)63.L"	PRG
4	"REF.PAGE 28.1"	PRG
4	"REF.PAGE 29.1"	PRG
4	"REF.PAGE 45.1"	PRG
11	"REF.PAGE 113.1"	PRG
4	"REF.PAGE 118.1"	PRG
4	"REF.PAGE 119.1"	PRG
4	"REF.PAGE 123.1"	PRG
4	"REF.PAGE 123.2"	PRG
4 BLOCKS FREE.		
4	"REF.PAGE 126.1"	PRG
4	"REF.PAGE 127.1"	PRG
4	"REF.PAGE 134.1"	PRG
12	"REF.PAGE 135.1"	PRG
4	"REF.PAGE 142.1"	PRG
4	"REF.PAGE 142.2"	PRG
7	"REF.PAGE 144.1"	PRG
12	"REF.PAGE 147.1"	PRG
8	"REF.PAGE 148.1"	PRG
8	"REF.PAGE 153.1"	PRG
4	"REF.PAGE 159.1"	PRG
4	"REF.PAGE 163.1"	PRG
15	"REF.PAGE 165.1"	PRG
16	"REF.PAGE 167.1"	PRG
4	"REF.PAGE 181.1"	PRG
4	"REF.PAGE 191.1"	PRG
4	"REF.PAGE 197.1"	PRG
4	"REF.PAGE 203.1"	PRG
4	"REF.PAGE 205.1"	PRG
15	"REF.PAGE 297.1"	PRG
4	"REF.PAGE 300.1"	PRG
8	"REF.PAGE 344.1"	PRG
4	"REF.PAGE 347.1"	PRG
5	"REF.PAGE 357.1"	PRG
5	"REF.PAGE 359.1"	PRG
1	"USER.PAGE 43.1"	PRG
1	"USER.PAGE 44.1"	PRG

"CCC LIBRARY DISK" H2 2A

2	"USER.PAGE 47.1"	PRG
1	"USER.PAGE 49.1"	PRG
1	"USER.PAGE 55.1"	PRG
1	"USER.PAGE 56.1"	PRG
1	"USER.PAGE 71.1"	PRG
1	"USER.PAGE 78.1"	PRG
2	"USER.PAGE 80.1"	PRG
1	"USER.PAGE 81.1"	PRG
1	"USER.PAGE 87.1"	PRG
1	"USER.PAGE 90.1"	PRG
1	"USER.PAGE 90.2"	PRG
1	"USER.PAGE 99.1"	PRG
1	"USER.PAGE 110.1"	PRG
1	"USER.PAGE 111.1"	PRG
4	"USER.PAGE 145.1"	PRG
2	"USER.PAGE 146.1"	PRG
2	"USER.PAGE 147.1"	PRG
11	"BACKUP 1541"	PRG
9	"GOBLIN"	PRG
9	"GOBLIN2"	PRG
13	"DOS-AID.64.C"	PRG
1 BLOCKS FREE.		
7	"DIR-LIST.64.C"	PRG
14	"DEMON STAR.C"	PRG
23	"HAWKMEN"	PRG
20	"FORBANK.C"	PRG
30	"LINK.INSTR.C"	PRG
19	"RELOCATOR 5.2.C"	PRG
12	"PAINT.C"	PRG
41	"WATERMELON-J.C"	PRG
7	"HEADS OR TAILS.C"	PRG
34	"MOON BUGGY.C"	PRG
14	"TERMINAL64.64.C"	PRG
41	"+TERM.64.C"	PRG
42	"MUSICMASTER"	PRG
45	"THE.KANON.C"	PRG
19	"BACH DUET.C"	PRG
30	"LIGHT CYCLES 64"	PRG
35	"NIGHTMARE PARK.C"	PRG
34	"HAXEL FORTUNE.C"	PRG
14	"SUBMARINES.C"	PRG
16	"64 TIMEPIECE"	PRG
8	"SILLY 64"	PRG
4	"OLD ENGL.BOOT"	PRG
7	"OLD ENGLISH(27)"	PRG
7	"DISK NAME CHANGE"	PRG
24	"CONCENTRATION"	PRG

"CCC LIBRARY DISK" I1 2A

12	"POTHOLES"	PRG
15	"DOTS"	PRG
16	"RE-BEEP"	PRG
16	"64 TIMEPIECE"	PRG
9	"COLOR BARS"	PRG
14	"MLX ENTRY MON-3"	PRG
6	"SPIKE.INST."	PRG
18	"SPIKE"	PRG
13	"SUPERBASIC"	PRG
9	"MOIRE PATTERN"	PRG
3	"STAR DEMO"	PRG
9	"FALLING SHAMROCK"	PRG
8	"MERRY XMAS"	PRG
9	"64 REMINDER"	PRG
9	"TEST DRIVE 7"	PRG
9	"TEST DRIVE 8"	PRG
5	"SPRITE BASIC"	PRG
7	"BUTTERFLY SPRITE"	PRG
5	"TIE FIGHTER"	PRG
26	"CANYONS OF ZELAI"	PRG
13	"ONE LINE"	PRG
13	"SEA BATTLE"	PRG
5	"INDEX HARDCOPY 5"	PRG
3	"1541 FORMATTER"	PRG
19	"SPEEDSCRIPT"	PRG
9	"SPEEDSCRIPT.INST"	PRG
19 BLOCKS FREE.		
7	"B/SCRIPT COMMAND"	PRG
10	"1 TOUCH COMMANDS"	PRG
71	"GRAPHIC TUT-2.64"	PRG
76	"SPRITES TUT-1.64"	PRG
31	"SPRITES TUT-2.64"	PRG
25	"LABEL.ASSEMBLER"	PRG
10	"DRAGONMASTER"	PRG
6	"INV DISK DIR"	PRG
4	"DATAWRITER"	PRG
13	"DISK HEADER"	PRG
15	"OLD.MON.WED"	PRG
15	"R.REVENUE"	PRG
12	"ULTRAFONT49152"	PRG
27	"HAUNTED MANSION"	PRG
6	"PGM FUNCTION KEY"	PRG
7	"ASTRO PANIC BOOT"	PRG
7	"ASTRO 49152"	PRG
1	"OBIRIS BOOT"	PRG
20	"OBIRIS 49152"	PRG
11	"RETRIEVALS"	PRG
7	"FRACTION SHOOT"	PRG
11	"MATH DRAG"	PRG

"CCC LIBRARY DISK" I2 2A

16	"VOYAGER VI"	PRG
32	"40 RADIUS"	PRG
32	"60 RADIUS"	PRG
32	"SPHERE.1"	PRG
32	"10 DEGREES"	PRG
32	"20 DEGREES"	PRG
32	"30 DEGREES"	PRG
32	"45 DEGREES"	PRG
32	"60 DEGREES"	PRG
30	"80 DEGREES"	PRG
32	"90 DEGREES"	PRG
32	"120 RADIUS"	PRG
32	"150 RADIUS"	PRG
17 BLOCKS FREE.		
32	"100 RADIUS"	PRG
32	"ET.PLOT"	PRG
32	"GLOBE"	PRG
13	"DMON/64"	PRG
8	"DOC/64"	PRG
11	"SCOPY.64"	PRG
3	"LOADAT"	PRG
17	"MICROMON INST"	PRG
17	"MICROMON 49152"	PRG
9	"FUNCTION KEYS"	PRG
29	"DUAL 1541 BACKUP"	PRG
9	"DUAL 1541 INSTR."	PRG
4	"CHANGE DISK"	PRG

"CCC LIBRARY" J1 2A

7	"CARDCO LOCK"	PRG
8	"INTERFACE TEST"	PRG
9	"DEMON INST"	PRG
19	"DEMONS OF OSIRIS"	PRG
9	"CANYON CRUISER"	PRG
9	"PRACTICAL JOKE"	PRG
10	"HARDHAT CLIMBER"	PRG
7	"GRAPH PLOTTER"	PRG
7	"ASTRO-PANIC.INST"	PRG
7	"ASTRO-PANIC"	PRG
7	"MUNCHMAZE.INST"	PRG
7	"MUNCHMAZE"	PRG
15	"RED BARON.INST"	PRG
22	"RED BARON"	PRG
9	"ULTRAFONT.INST"	PRG
18	"ULTRAFONT"	PRG
18	"TRENCHFIRE"	PRG
9	"1541 B-UP"	PRG
7	"POKER"	PRG
7	"64-KEY"	PRG
48	"CHARACTER EDITOR"	PRG
21	"TEST .CHR"	SEQ
18	"SILENT NIGHT"	PRG
5	"BOOTNEG"	PRG
5	"WEB"	PRG
10	"BARRIER BATTLE"	PRG
9	"ROAD RUNNER"	PRG
7	"REACT"	PRG
5	"HI-RES.INST"	PRG
13	"HI-RES SKETCHPAD"	PRG
5	"PLOTTER STUFF--"	SEQ
37 BLOCKS FREE.		
2	"GREEN EYE PLOT"	PRG
9	"TINY MENU"	PRG
6	"FLOWERS"	SEQ
4	"COMAL STUFF-----"	SEQ
4	"STR().PROC.C"	SEQ
3	"VAL.F.287.C.I"	SEQ
4	"REVERSE.PROC.C"	SEQ
5	"MIN/MAX.FUNC.C"	SEQ
13	"HEXDEC.PROC.C"	SEQ
13	"PLOTTER.PROC"	SEQ
5	"SUNFLAKE"	SEQ
5	"SUNFLAKE.PLOT"	SEQ
5	"DISK SET.IMPROVE"	SEQ
11	"PRINT DIRECTORY"	SEQ
4	"PALINDROMES"	SEQ
9	"64 SIM"	SEQ
10	"FORMATTER.PLOT"	SEQ
4	"HI"	SEQ
5	"PRINTER STUF-----"	SEQ
43	"MONTH CALENDAR"	SEQ
14	"YEAR CALENDAR"	SEQ
9	"APPT. CALENDAR"	SEQ
3	"A LABEL MAKER"	SEQ
5	"2XCHAR.M"	SEQ
14	"DISK DRIVE EXP"	SEQ
5	"COLOR CHANGE"	SEQ
22	"BAR VIEW 64 H/C"	SEQ
22	"DOCTOR.INS"	SEQ

"CCC LIBRARY" J2 2A

11	"LIST-ME FIRST"	PRG
25	"WORD PROCESSOR.C"	PRG
12	"EASY EDIT.C"	PRG
9	"TYPEWRITER.C"	PRG
9	"TYPER.C"	PRG
13	"TEXT EDITOR.C"	PRG
13	"MINIWORDPRO.C"	PRG
8	"FOOD PRICES.C"	PRG
7	"HEATING COST.C"	PRG
7	"MONEY EXCHANGE.C"	PRG
22	"PROPERTY EVAL.C"	PRG
10	"WEIGHT WATCHER.C"	PRG
18	"MEMORANDA.C"	PRG
21	"LIFE EXPECT.C"	PRG
198 BLOCKS FREE.		
14	"TEMP CONVERT.C"	PRG
28	"RES'D SUPPLY.C"	PRG
12	"BIO-COMPAT.C"	PRG
17	"BIO-PRINTER.C"	PRG
25	"CAR COST MILE.C"	PRG
22	"RECIPE SIZER.C"	PRG
27	"ADDRESS BOOK.C"	PRG
27	"RECORDINGS.C"	PRG
24	"LIBRARY CARDS.C"	PRG
14	"CHECKBOOK.C"	PRG
28	"MAG INDEX.C"	PRG
8	"BIORHYTHM.C"	PRG

"C64 COMAL 0.14 " B1 2A

5	"BOOTCOMAL"	PRG
131	"COMAL0.CAN"	PRG
1	">----------------<"	SEQ
1	">---------------<"	SEQ
1	"> ERROR MESSAGES <"	SEQ
1	"> FILE <"	SEQ
1	">---------------<"	SEQ
5	"COMALERRORS"	SEQ
1	">---------------<"	SEQ
1	">FILE GENERATOR<"	SEQ
1	">---------------<"	SEQ
10	"GENEROR.E.L"	SEQ
1	">---------------<"	SEQ
1	">AUTO BOOT PROG<"	SEQ
1	">---------------<"	SEQ
4	"HI"	SEQ
1	">---------------<"	SEQ
1	">SEQ DATA FILES<"	SEQ
1	">---------------<"	SEQ
21	"INFORMATION3NOV"	SEQ
42	"INSTRUCTIONS0.14"	SEQ
1	">---------------<"	SEQ
1	">COMAL PROGRAMS<"	SEQ
1	">---------------<"	SEQ
1	">SEE INFORMATION<"	SEQ
1	">SEE INSTRUCTIONS<"	SEQ
20	"LOGO'BOOK' SAMPLE"	SEQ
9	"SNOWFLAKE"	SEQ
1	"SPRITE/TURTLE"	SEQ
34	"LOGO EMULATOR"	SEQ
3	"LANDER"	SEQ
21	"MUSIC"	SEQ
1	"SANTAGAME"	SEQ
3	"BOUNCE"	SEQ
3	"SPRITE DESIGNER"	SEQ
3	"READ'DIRECTORY"	SEQ
9	"PRINT'DIRECTORY"	SEQ
3	"EXPRESSION"	SEQ
15	"UTILITIES"	SEQ
87 BLOCKS FREE.		
16	"RECURSIONS"	PRG
10	"FORMATTER"	PRG
9	"FILE'TO'PRINT"	PRG
9	"FILE'TO'SCREEN"	PRG
11	"DISK COMMANDS"	PRG
4	"C64 COMAL INFO"	PRG
5	"REMOVE COMMENTS"	PRG
6	"ROLL/DEMO"	PRG
5	"SEE'PAGE/DEMO"	PRG
3	"CURSOR/DEMO"	PRG
5	"VALUE/DEMO"	PRG
5	"SHIFT/DEMO"	PRG
3	"DIVE/DEMO"	PRG
4	"QUICKSORT/DEMO"	PRG
4	"JOYSTICK/DEMO"	PRG
4	"PADDLE/DEMO"	PRG
4	"DISK'SET/DEMO"	PRG
5	"LOGICAL'OPS/DEMO"	PRG
4	">---------------<"	SEQ
1	">SANTA<"	SEQ
1	">---------------<"	SEQ
1	">END OF COMAL <"	SEQ
1	">DEMO PROGRAMS <"	SEQ
1	">---------------<"	SEQ
1	">THE FOLLOWING <"	SEQ
1	">TWO PROGRAMS <"	SEQ
1	">ARE WRITTEN IN <"	SEQ
1	">---------------<"	SEQ
1	"> BASIC <"	SEQ
1	">DO NOT LOAD <"	SEQ
1	">THEM INTO <"	SEQ
1	">COMAL. <"	SEQ
17	"1541BACKUP(FREE)"	PRG
16	"SINGLE FILE COPY"	PRG

A COMPLEAT GUIDE TO MACHINE LANGUAGE PROGRAMMING ON THE PET

By HAROLD BROCHMANN

INTRODUCTION (6-1)

So far we have used the built-in machine language monitor to examine and alter the contents of certain memory locations.

In order to write a ML program it was necessary to first write out the assembler coding for what we wanted to do and then determine the corresponding machine code for each mnemonic, making sure that we pickrd the correct code depending on the addressing mode. Calculating relative addresses for conditional branching was particularly awkward. Finally, each machine code was entered into memory using MLM.

The experience and understanding gained by going through these exercises was invaluable. But having endured all this we will make use of a very special MLM to make the whole process easier.

An ASSEMBLER is a program that allows the user to enter the mnemonic assembler code for a ML program. The program then translates this to machine code. It even calculates the correct relative addresses for conditional branching! The machine code is placed in the correct location as you go along.

A DISASSEMBLER does the opposite of an assembler. If you indicate the address at which a ML program starts, it will convert the machine code back into mnemonic assembler code.

There are several different assemblers and disassemblers available for the PET. Recently, a really useful program came along. MICROMON is a sort of super machine language monitor — assembler - disassembler - lots of other things! We will introduce some of MICROMON's bag of tricks, one at a time, as part of the process of learning ML programming.

MICROMON is the culmination of many similar programs created by many different people. This final version has been "placed in the public domain" which means that it is not copyrighted and may be used and passed on as you please.

It should be possible for you to obtain a copy of MICROMON from your Commodore Dealer. Many dealers have stopped distributing programs like this because of the uncertainty over whether or not they can charge for them. If your dealer can't get you a copy, contact your local users group.

Other assembler/disassemblers work in essentially the same way and may be used instead.

The most commonly available versions of MICROMON only work on 32K machines, but it is possible to relocate it so that 16K and 8K macines can be used.

LOAD the MICROMON casesette tape or disk in the usual manner. Enter NEW. The command SYS 24768 or SYS 7#4096 activates MICROMON on 32K PETs.

```
.M,8000,8010
```

will provide the familiar display of the addresses.

We will now enter the last program we wrote in the last chapter, using MICROMON.

This is what the program looked like:

```
033A A2 00    LDX #$00
033C A9 05    LDA #$05
033E 9D 00 80 STA $8000,X
0341 E8       INX
0342 D0 FA    BNE $033E
0344 60       RTS
```

Enter this line at the decimal point:

```
.A 033A LDX#$00
```

When RETURN is pressed this line becomes:

```
.A 033A A2 00    LDX #$00
.A 033C
```

and the cursor rests on the next line ready for:

```
.A 033C LDA#$05
```

When you have have entered the rest of the program, move the cursor to the bottom of the screen and enter the following:

```
D033A
```

Press down cursor a few times.

Voila! Your machine code has been disassembled for you. By entering D and a starting address, you can examine the entire memory, disassembling the machine code at various locations as you go.

To exit MICROMON always enter .K (RETURN), followed by .X (RETURN).

ASSIGNMENT 6-1

Use MICROMON to examine and disassemble various parts of PET's ROMs which are located from $D000 and up to $FFFF. You will discover a variety of assembler instructions, most of which we have not yet dicussed. Make a note of them for future reference.

HOW DOES PET CLEAR THE SCREEN? (6-2)

When the PET encounters the Clear Screen symbol in BASIC, the operating system makes use of the machine language routine that starts at $E229, or decimal 57897 for BASIC 3 and $57434 for BASIC 4.

This routine can be called from ML. Use MICROMON to assemble the following program at $033A:

```
033A 20 29 E2 JSR $E229
```

($E04B for BASIC 4)

```
033D 60       RTS
```

This is done by entering the following line:

```
.A 033A JSR$E229  ($E04B)
```

When RETURN is pressed, you get:

```
.A 033A 20 29 E2 JSR #E229
.A 033D
```

Don't forget to enter the RTS instruction as well. Exit MICROMON and:

```
SYS 826
```

Hopefully all went well and you are back in BASIC with a PARTLY clear screen.

This experiment should give you an important hint about machine language programming. You don't have to do EVERYTHING yourself. All sorts of ML procedures are already available in PET ROM and can be made use of by the ML programmer.

The assembler instruction JSR means exactly the same as GOSUB in BASIC. Use MICROMON do disassemble $E229 and on. ($E05A for BASIC 4). The first bit won't make a great deal of sense, neither will the part from $E257 to

$E284 where we finally encounter RTS; but the part from $E246 to $E255 can be analyzed. Here it is:

```
.: E246 A9 20      LDA #$20
.: E248 9D 00 80   STA $8000,X
.: E24B 9D 00 81   STA $8100,X
.: E24E 9D 00 82   STA $8200,X
.: E251 9D 00 83   STA $8300,X
.: E254 CA         DEX
.: E255 D0 F1      BNE E248
```

Although it doesn't show here, the X register actually contains $00 when the PET calls the clear screen routine. The first instruction is to load the accumulator with $20 which is the screen code for blank space. This blank space is now placed in $8000+X, $8100+X etc.

The X register is now decremented (DEX) so that it contains $FF. Because the decrementing process did not result in zero, the BNE (BRANCH IF NOT ZERO) sends us back to $E248. Finally X gets to zero, and execution continues past $E255, eventually encountering RTS further down.

It would be instructive to write a BASIC program which accomplishes exactly the same thing. This will give us a better appreciation for what is happening in the clear screen routine.

```
10 X=255
20 A=2
30 POKE 32768+0*256+X,A
40 POKE 32768+1*256+X,A
50 POKE 32768+2*256+X,A
60 POKE 32768+3*256+X,A
70 X=X-1
80 IF X<>0 THEN 30
```

You will notice that we poked the various screen locations with 2 rather than 32. This is only to make it more obvious what is happening. Replace line 20 with A=32 to clear, as opposed to fill, the screen, and run this BASIC program again.

List the program, NEW, and PRINT FRE(0). Now place the cursor on line 10 and re-enter each line.

PRINT FRE(0) again. This little exercise will tell you that this BASIC program needs 133 bytes of memory the way it is written. The ML routine we are looking at requires far fewer bytes for the same job ... and it is VERY much faster!

INSIDE THE 1541
(Continued from page 1)

of.

Now that the track has been 'FORMATTED', it is time to go on to track number 2, where the same process is carried out, except that the track numbers will now be 2 instead of 1. This will continue until all 35 tracks have been formatted. The diskette is not yet ready to receive data, however. One more operation must take place.

There is one very special track on the diskette. Track 18 is the one that contains the important information. On this track, the BAM (block availability map), disk name and ID, and the name and location of programs and files are stored. During a NEW, the name and ID of the disk are obtained from the NEW command. The BAM is set to show that all blocks (except

track 18 sector 0) are available. This information is stored in track 18 sector 0. The directory itself starts in track 18 sector 1, and is left blank at this time, as no programs or files have yet been written. Now the NEW is complete. The red LED on the drive goes out (it is turned on and off by the controller), and the disk is ready to accept data.

This description is by no means complete. There are a lot of things going on in the controller that we don't need to examine in order to understand what is happening. The important thing to remember is that The controller did most of the work. The CPU only knew that a file was OPENed and that data was sent on the serial bus. The drive only moved its head, wrote and read back data under instruction from the controller. The Commodore peripherals are known as

'intelligent', or 'smart' peripherals due to the technique of having a controller perform the appropriate actions. In contrast, some computers, like the Apple or TRS 80, have peripherals that must be controlled by the CPU in a more direct manner. They must be told by the operating system in the computer exactly where to move the head and read or write data. The advantages of the Commodore system are:

Ease of use from programs.
Saves CPU memory.
Saves CPU time.
No need for special software for each type of device.

The disadvantages are:
A certain lack of flexibility in peripheral control.
Reduced speed (from using a common I/O bus).

Now we have a diskette ready to accept data. In the next installment we'll put something out there.

USER FRIENDLIES
(Continued from page 2)

include instructions. However, if you want people to hate you and your programs, don't even bother including instructions.

INSTRUCTION PRINT SUBROUTINE

```
50000 RESTORE
50010 READA$: IF A$<>"INST" THEN
      50010
50020 READA$: IF A$="ENDINST" THEN
      RETURN
50030 IF A$="PAUSE" THEN GOSUB 50100:
      GOTO 50020
50040 IF A$="U/L" THEN PRINT
      CHR$(14);: GOTO 50020
50050 IF A$="U/G" THEN PRINT
      CHR$(142);: GOTO 50020
50060 IF A$="TIME" THEN READ A$:
      GOSUB 50130: GOTO 50020
50090 PRINT TAB((40-LEN(A$))/2);A$:
      GOTO 50020
50100 PRINT"[8 SPACES]ANY KEY[SPACE]
      TO CONTINUE....."
50110 GET A$:IF A$="" THEN 50110
50120 RETURN
50130 T=TI
50140 IF (TI-T)/60<VAL(A$) THEN 50140
50150 RETURN
```

WORD PROCESSING
(Continued from page 4)

Most people who buy a word processor expect to use it with a printer, and this is where I found problems with QBF not covered in any of its documentation. The Print mode, accessed from the main menu, allows control over page prefix and number, lines per page, number of copies, stopping the printer at the end of each page, and Associated Press style, where each page starts with a new paragraph. Unfortunately, each time one wants to print, various inputs have to be entered, unless one uses standard parameters, in which case pressing the space bar is sufficient.

Using the QBF with a Gemini 10 printer connected to the VIC with a Cardco interface, printer output was *very* slow after the printer buffer was full. This is because the copy is formatted -- on the screen -- before it is sent to the printer, a feature which it isn't possible to disable. The resulting speed is comparable to, if not slower than, BASIC word processors.

Another negative feature of QBF was its inability to produce more than 99 columns, like when using the Gemini's most condensed (17 CPI) print. The right margin with QBF is produced by typing the "embedded command" #Rnnn in the text, where "nnn" is a 3-digit number such as "080". Since there is provision for 3 digits here, one would assume that 3 digits *could* be entered, but any number over 99 produced strange results.

Interestingly, I achieved a text width of 129 with the 17 CPI type size by inputting #R488 during a succession of random guesses. By adding 359 to "nnn" over 100, a correct right margin could be obtained which worked not only with the #R command, but with others as well.

The arbitrary limit of 99 also applied to another command, #Nnnn, which sends any ASCII character directly to the

printer. As a result, it was not possible to take advantage of some of the unusual ASCII characters on the Gemini for producing accented letters, etc.

When I complained about this problem with input numbers over 99 to QBF, they sent me a short BASIC program to run before SYSing the word processor itself. This program was supposed to make it possible to "redefine" certain characters so they would be accepted by QBF. Unfortunately, after considerable experimentation with this program, I failed to make it work correctly.

I also discovered more inequities with other QBF features like underlining, which is produced by the embedded command #U, making the broken dash underline style. The Gemini's continuous underline produced by CHR$(27) plus CHR$(45)CHR$(1) -- or #N027#N045#N001 on the QBF -- caused the printer to act strangely when making justified copy (with parallel margins), something I've encountered with other word processors under similar circumstances.

To sum up, although Quick Brown Fox has several features which are worth considering, such as the Global Edit, Send and Receive, and numerous "embedded commands" which are useful if you are using an expensive daisy-wheel printer, it is hard to recommend it highly because of the line editing limitations and general slowness in printer output which I experienced. It is miles ahead of some other word processors for the VIC and 64, such as HesWriter and TOTL TEXT, which seem to be written by people who have very limited knowledge of what "word processing" really means. As far as the VIC is concerned, in fact, QBF is one of the better word processors. Commodore-64 owners, with the availability of many sophisticated programs such as Word Pro and Paper Clip, just to name two of the most popular, would probably best be advised to look elsewhere.

WE GET LETTERS . . .

Thank you for the newsletters that you sent our users group.

Our group was formed a year ago for Commodore 64 owners. Our membership stands at 260 families. We have a disk of the month, and a newsletter. Our newsletter can't compete with yours, but I am enclosing one, all the same.

We were all very impressed with your club newspaper. We found the latest issue especially relevant, since many of us have trouble with the 1541 disk drives, and quite a few members own Gemini 10X printers with a Card?/+G interface.

Susan Timar, President
Sarnia C-64 Users Group
1122 Wilson Dr.
Sarnia, Ont. N7S 3J6

**

Many thanks for the copy of your club newsletter. We found it both interesting and informative and are looking forward to receiving further copies.

Our group met for the first time on October 20, 1983 and we are still in the process of getting organized. We have been meeting once a month since then and our membership is still small but growing.

At present we are beginning to organize a small newsletter for members only and also are starting to put a library together, but nothing is established yet.

If you could offer us any advice or information to make the task of organization easier or more beneficial we would be very appreciative.

Carol Scheniman
Durham C64 Club
c/o 1322 Naples Street
Oshawa, Ontario L1K 1J6

**

I've just recently seen a copy of the letter which you sent to the Sarnia C64 Users Group of which I am a former member. Presently I am actively associated with the Windsor and area Pet Educators Group (PEG).

PEG was formed about 2 years ago with primarily a handful of Windsor Board of Education employees. After about a year, the club invited the general public to join and now boasts a membership of 550 plus. We are holding a spring conference (Micro Mania '84) featuring Jim Butterfield. This is our first major event and would appreciate any comments or suggestions from any related experiences your club may have had. The planning of this conference has been immensely rewarding (a real learning experience) and we hope to hear from you to have an idea exchange.

Anna Ward,
Chairman
Conference Committee
Pet Educators Group
P.O. Box 454, Stn. A
Windsor, Ont. N9A 6L7

**

I would like you to think about a Canadian Information Exchange! I wonder if all our groups could exchange newsletters, etc. I don't really know how we could set up such an idea but it's food for thought.

Owen McGowan
(Sarnia C-64 Users' Group)

VIEW FROM THE OUTSIDE WORLD

By LAURENCE URDANG
(from *Verbatim* magazine)

Considering the recent encroachments by computers into the sphere of publishing, chiefly through word processing, it is a great pity that those who prepare the programs and who write the manuals are not more literate and more careful in their exposition.

It is rapidly becoming apparent to many (though it was quite obvious to me more than 20 years ago) that programming is better done by idiot savants (or twelve-year-olds): their minds are relatively unencumbered by a predisposition to the distracted, creative thinking, born of intelligence and experience, that characterizes the reasoning adult. However good the programs may be, using them is quite another matter: since the manual is usually written by the programmer, more often than not it omits important information because it is so "obvious" to the writer.

One manual accompanying a microcomputer that was introduced in 1982 had no index. Thus, though I was aware that the program could perform a particular function because I recalled having seen it when reading the manual, I had to reread the manual to discover the proper command, as there was no way to look it up in an index.

Happily, that shortcoming was rectified in a more recent edition (which, curiously, has Appendix Q following Appendix R, an arrangement I have still been unable to fathom).

Like most machines, computers do very well those things they are suited for, and it is silly to use them inappropriately. One would scarcely use a jumbo jet to go crosstown or, for that matter, take any kind of airplane to travel a distance covered by a car in an hour or so: it takes that long just to get to the airport.

For those who fear or despise computers, there may be no answer, for they were born into the wrong century. I wonder if they still write on vellum using a quill they have plucked from a passing goose.

Learning to use a microcomputer is no more difficult than changing from a mechanical typewriter to an electric or from a stick shift to an automatic transmission. The "hands-on" sensation is somewhat mitigated, but then consider the number of times you have retyped a page because you wished (or had) to change one word.

It must also be said that one must change ingrained attitudes toward information and how it has been processed traditionally. One favorable advantage of old-fashioned methods, that of browsing, is sacrificed to a certain extent.

But against that loss must be weighed the benefit of time and energy saved by being able to key a short command to a microcomputer word-processing program that will, in a matter of seconds, find every instance of a given character or word in a long, machine-readable document.