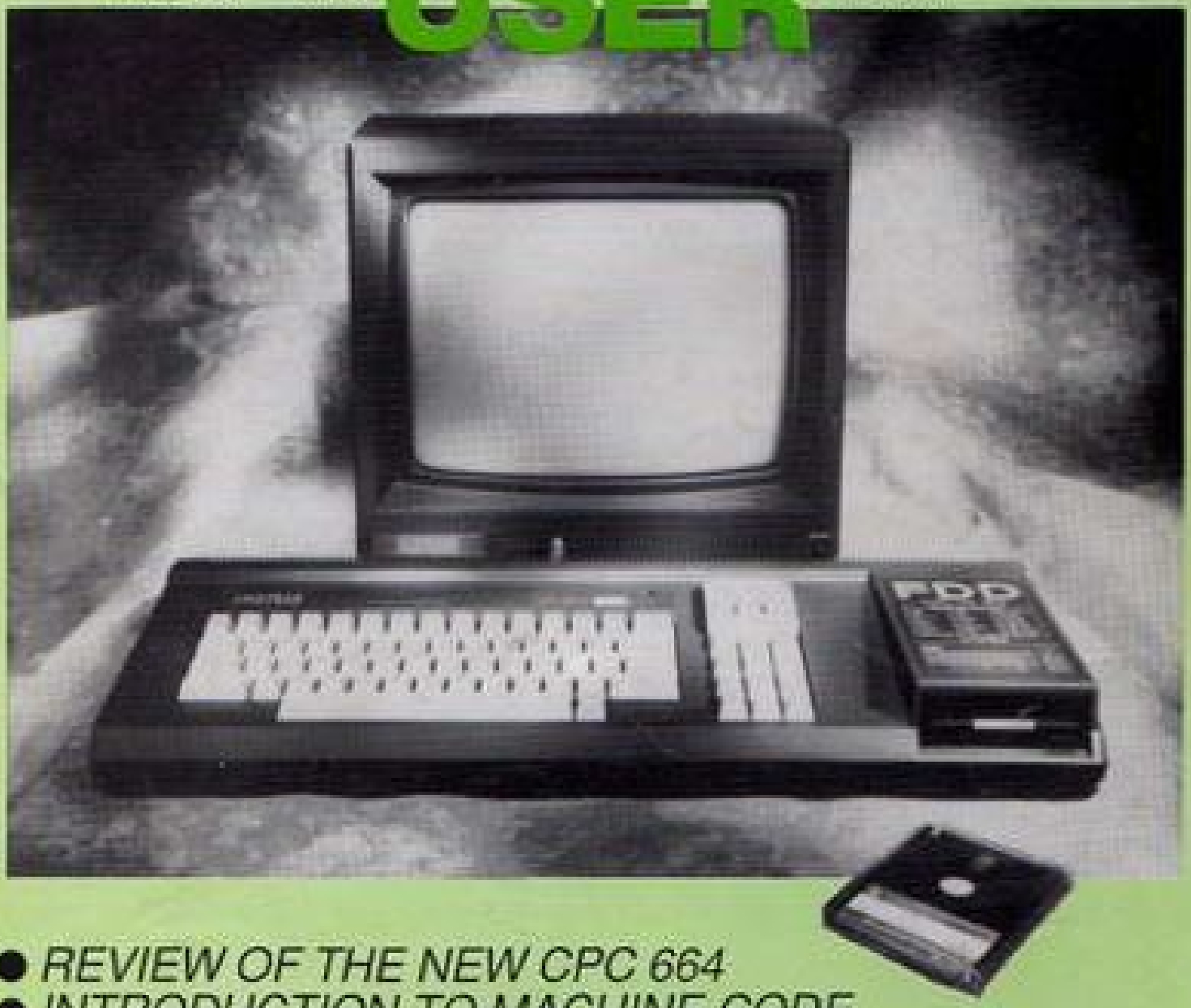
THE AMSTRAD USER

Issue No. 6 $3.00 July 1985



- REVIEW OF THE NEW CPC 664
- INTRODUCTION TO MACHINE CODE
- USER GROUP INFORMATION AND CONTACTS
- MACHINE CODE ROUTINES AND CP/M UTILITY

FOR THE NOVICE & EXPERIENCED USER

NEW

Registered by Australia Post – Publication No VBP7017

THE AMSTRAD USER

Issue No. 6 July 1985

CONTENTS

All enquiries and contacts concerning this Publication ould be made to The Amstrad User, Shop 2, 33 The ntreway, Blackburn Road, Mt. Waverley, Victoria 3149, stralia. [Telephone: (03) 232 7055].

The Amstrad User is published each month by Strategy blications.

The single copy price of $3.00 is the recommended retail ce only. The subscription rate (for Australia only) is 0.00 for 12 issues of the magazine only, or $70.00 for 12 ues of the magazine plus tape containing all programs appearing in that issue. Postage is included in the abov prices. Overseas prices available upon application.

Please note that whilst every effort is made to ensure th accuracy of all features and listings herein, we cannot accep any liability whatsoever for any mistakes or misprints.

Contributions are welcome from readers or other intereste parties. In most circumstances the following payments wi apply to published material: Letters-$5.00, Cartoons-$5.0 and a rate of $10.00 per page for programs, articles etc.

Contributions will not be returned unless specificall requested coupled with suitable stamped and addressed padde bag (for tapes) or envelope.

THE AMSTRAD USER

G'day.

Some people may be aggrieved to discover that having just bought a CPC464, the 664 was announced. I'm not. As sure as eggs are eggs if I had bought a 664, an 864 or some other upgrade would have been released. Such is the development of micros - if you wait there will be something better. But if you always wait for something better, you'll never get anything! So I am content to use the amazing 464 until my skills require a more powerful tool, by which time I will replace it with a . . . . . 1264?

What I find encouraging is AMSTRAD's obvious commitment to producing a range of computers that are in the price range of most people's pockets, yet have the power and facilities of much more expensive machines. If the success of the 464 is repeated in future releases, they have nothing to worry about. For our sakes, I hope it will be.

This months' magazine sees a departure from the emphasis on BASIC that is normally presented. Machine Code takes the spot-light in this issue and will be featured more in the future. (Of course, I still rely on contributions from users and trust that you won't let me down). I can hear the cries of anguish from the 'new' programmers - "We've not got the hang of BASIC yet, now there is something else to learn!" But don't worry, it will be a gentle induction in an effort to add more armoury to your skills.

It is clear that a great number of readers of THE AMSTRAD USER are new to computers, hence the bias in their favour. Criticism, albeit infrequent, generally comes from the more experienced users looking for articles at a higher level. I would dearly love to publish such articles but, like the criticism, good contributions from this quarter are infrequent. I wonder why?

Finally, a reminder that there is now just six weeks left to get your competition entry to us, the closing date is 15th August. There will not be an extension. Don't forget to read Page 32 carefully before completing your entry.

See you next month,

Ed.

Letters

I have just bought the book "Sixty Programs for the Amstrad CPC464" and having had a biorhythm program for my previous computer, I thought I would try the one from this book.

Unfortunately an error exists, and the program does not work without the following changes:

```
230 DAY=TOTAL2-TOTAL1
    (Delete the "1")
320 PLOT N-(P*C),167+167*s
    (N/(11.5*PI)),1
    (The "11.5" should be "23")
350 The "14" should be "28"
400 The "16.5" should be "33'
```

J. Steendam, Dee Why, NSW.

In the Amsoft "Master Chess" program there is a very annoying bug. In some situations the program allows a pawn on the 3rd rank to move 2 spaces; this is supposed to occur on the second rank only. How can I rectify this?

In your first publication of "THE AMSTRAD USER", you list a program which improves the pontoon program given in the instruction manual. It works perfectly for just one game but it doesn't keep a record of how many times you have beaten the computer. To do this I devised a very simple counting system to display the player's and computer's wins. In keeping with the same line numbers as given in that publication, here it is with line number changes only listed:

```
16  DIM suit$(4)
17  DIM pack(52)
70  (blank)
130 (blank)
500 LOCATE 12,17
510 PRINT"YOU'RE BUST":
    HOUSE=HOUSE+1
515 LOCATE 12,19:PRINT
    "WINS:  PLAYER:";YOU;"
    HOUSE:";HOUSE
540 IF x$="y" THEN 20
670 LOCATE 12,17
680 PRINT "YOU WIN":YOU=
    YOU+1
700 LOCATE 12,17
720 PRINT"THE HOUSE WINS"
    :HOUSE=HOUSE+1
```

David R. Hearder, Rivett, ACT.

We can only advise you to refer the problem to AWA who distribute this software in Australia as there is no way we can, nor would want to break into the software to trace the problem. On the other hand we could suggest you confine yourself to making legal chess moves, in which case the bug would not appear! Nevertheless, thanks for pointing out the problem - perhaps other owners of this game would care to comment.

In Issue 4 (May 1985) of THE AMSTRAD USER one of your readers (JE, Brisbane) complained of a mistake in the listings for the game Pontoon from the book 'Sensational Games for the Amstrad'. Apart from the missing subroutine 11100, there are several other mistakes. The following patches will allow the game to run satisfactorily (although further development is needed to simulate all the betting rules of the casino game):

1. Add subroutine 11100:

```
11090  REM ** DEAL CARDS
       TO BANK **
11100  c=(RND(1)*51)=1
11110  IF av(c)=0 THEN 11100
11120  nc=nc+1
11130  bc(nc)=c
11140  av(c)=0
11150  RETURN
```

2. Add this line to give a more unpredictable deal:

```
14  RANDOMISE TIME
```

3. Add this line:

```
517  LOCATE 1,25:PRINT
     "Both players win":
     GOSUB 19500
```

4. Subroutine 15000 is not necessary and subroutine 15500 does not work as intended. Delete lines 14990 to 15510 inclusive.

5. In line 14515 replace GOSUB 15000 with GOSUB 18000.

6. In line 14520 replace GOSUB 15500 with GOSUB 16500.

7. Line 20010 replace with GOSUB 16500.

8. Line 18205 replace with RETURN.

9. Delete lines 17500 - 17510 which are not necessary and never called.

In addition I have amended line 14513 to replace 'END' with 'pl(q)=0:GOTO 14526' so that one player can quit without ending the game for the other player. I have also replaced the 'GOTO 10' in line 22005 with 'CLS:END' to give a natural game end when the Bank has won all the money.

I hope the above will prove useful to your readers.

P.H. Stehn, Garran, A.C.T.

Firstly let me congratulate you on producing and distributing a very informative and useful magazine. I am fortunate to have been a subscriber of 'The Amstrad User' since its first issue

and have found many of its hints and listings of great value.

Through the development of listings and ideas found in your magazine and elsewhere, I have evolved a very simple program that allows my young children to draw pictures on the monitor with the aid of a joystick. I intend further extending this program to allow more complicated pictures to be drawn.

My children have gained a lot of enjoyment from this activity but unfortunately as soon as the computer is switched off, their hard work disappears instantly.

As yet I don't have the knowledge needed to write a routine that allows the user to dump the screen graphics to a printer or to save it on to tape for later retrieval. I feel that this topic would be of interest to many budding programmers and I would appreciate it if any useful information on this topic could be forwarded to me and/or included in a future issue of your magazine.

Robert Wright, Bradbury, N.S.W.

Here's a chance for you more experienced programmers to show us and Robert what you're made of by providing the solution.

I would like to propose the idea of a marketplace in The Amstrad User. These are quite a regular feature of most English magazines, and while every care should be taken not to publish ads which would be in breach of copyright, such as the selling of software, I feel the market would soon open up for items such as printers, modems and other peripherals. Although things may start slowly, I'm sure people would soon realise the benefits of being able to sell or swap items that they find are not suitable for their own particular use, or things they may wish to upgrade, having learnt from experience. And since this is the Amstrad magazine, there is a pretty good chance many things would be compatible already.

Russell Cheek, Newcastle, NSW.

We have had a number of requests to incorporate an exchange/market column in this magazine, but few requests with specific advertisements. To avoid a 'Catch 22" situation, we have included a space in this months' magazine for just such a column headed MICRO-MART.

We will let it run for a couple of months to gauge the response, so now it is upto you to take advantage of this opportunity to sell that old printer or the software you have been developing for the last six months.

Firstly, I would like to hear from other Amstrad CPC464 users in the Geelong area who would like to establish a user group. I can be contacted by phone on (052) 50 2251 after 5 p.m. or by writing to me at:

10 Allambie St, Leopold, 3224

Secondly, could you answer the following questions?

1. Can you use the PRINT USING command to format strings in an orderly fashion, as it can be done with numbers?

2. Is it possible to use the SYMBOL command to form a character of more than one line (in a block)? I can use it OK in the form:

120 PRINT CHR$(128)+CHR$(129)
130 PRINT CHR$(130)+CHR$(131)

to create a character over two lines. Is there a simpler way of doing this?

3. Is it possible to use the ON BREAK routine with an "Input"? It works well during any other parts of my programs, but will not work while waiting for an input.

R.G. Butterfield, Leopold, Vic.

To answer your questions in the same order:

1. You can format strings with "!" or "&" or "\spaces\". "!" will only print the first character of the string. "&" will print the whole string as is, and will ignore the internal zoning of the machine allowing you to print a string near the left edge of the screen and wrap around. Try these two examples:

10 LOCATE 37,10:PRINT "ABCDEFGHI"
10 LOCATE 37,10:PRINT USING "&";"ABCDEFGHI"

"\spaces\" will only print the characters selected from the start of the string. For example, if you try

PRINT USING"\ \";"ABCDEFGH

and you place four spaces between the "\" symbols, you will get ABCDEF. Note that the "\" symbols are counted in the total of characters to be selected.

2. You can only define an 8x8 character with the symbol command, but by re-defining characters available from the keyboard you could simply use: PRINT "AB← ←↓CD"

You may find that you will need to use the above PRINT USING "&" *if the string is to be printed towards the right edge of the screen.*

3. The on-break gosub does not appear to work while waiting for an input as, at this point, the computer has temporarily returned to direct mode where only one press of the Escape key will break the program.

Buzzlines

A Game from Roger Fraser

About BUZZLINES

The core of this game came riginally from a listing in the Advanced User Guide'. This enhanced ersion bears liitle resemblance to the riginal as many features have been dded in an attempt to provide an ppealing game of skill, but it does llustrate the fact that if you are repared to spend a little time you can turn a mediochre program into a more satisfying one.

The concept is simple. Using your joystick you must draw a YELLOW line between two RED lines. Any accidental touching of the red lines will result in a BUZZ that will delay you by about one second.

Once you press the FIRE button, the timer ticks away furiously, recording the time you take to move from the left of the screen to the right. The elapsed time is measured in hundreths of a second. You may only move at right angles not diagonally - you don't want it too easy! If it gets too hard, or downright impossible to finish a screen, just press the Escape key to abort. You will then be returned to the start of a new and easier screen.

```
1 GOTO 8
2 SAVE "BUZZLINE.BAS" : STOP
3 REM SOFTWARE TYPE : Game - Action:FIRST ENTERED : 06/04/85
4 '      *    LAST UPDATED : 27/04/85
5 '           COMMON NAME : Buzzlines
6 'DESCRIPTION : A computer version of the game where you have to move
 a ring along a bent wire without the ring and wire touching.  In this
 version however, you
7 'have to draw a yellow line between two parallel red lines, without
touching them. This program illustrates the TEST function.
8 CALL &BBFF : PEN 1 : PAPER 0 : : REM **** General Purpose Initialisa
tion
9 'WARNING: Pressing the Escape Key does not break the program!!!!
10 MODE 0:BORDER 2,5
20 ON BREAK GOSUB 1410
30 PEN 3:PRINT #p:PRINT #p," B U Z Z L I N E S":PRINT #p:PRINT #p
40 PEN 2:PRINT #p,"In this game you":PRINT #p:PRINT #p,"have to draw a
":PRINT #p:PEN 1:PRINT #p,"yellow ";:PEN 2:PRINT #p,"line between":PRI
NT #p:PRINT #p,"two ";:PEN 3:PRINT #p,"red";:PEN 2:PRINT #p," lines"
50 PRINT #p:PRINT #p,"from LEFT to RIGHT":PRINT #p:PRINT #p:PEN 15:PRI
NT #p,"WITHOUT TOUCHING !!!":LOCATE 1,20:PEN 5:PRINT #p,"Press <ESC> I
NTICE it";:PRINT #p:PRINT #p,"screen is too hard.":PEN 4
60 FOR pause%=1 TO 18000:NEXT pause%
70 numpoints=4
80 GOSUB 340:REM **** Set pattern
90 first=0
100 GOSUB 440:REM **** Draw screen
110 oldelapsed=elapsed
120 t=TIME
130 WHILE px<630
140 GOSUB 780:REM **** Move
150 GOSUB 870:REM **** Display time
160 WEND
170 IF px>900 THEN 80
180 elapsed=(TIME-t)/300
190 GOSUB 1180:REM **** Scoring
```

```
200 first=1
210 GOSUB 920:REM **** 'Same Again?'
220 IF LOWER$(ans$)="y" OR ans$="X" THEN 100
230 ERASE y
240 GOSUB 1000:REM **** 'Harder Screen?'
250 IF LOWER$(ans$)="y" OR ans$="X" THEN numpoints=numpoints+2:GOTO 80
260 GOSUB 1060:REM **** 'Easier Screen?'
270 IF LOWER$(ans$)="y" OR ans$="X" THEN numpoints=numpoints-2:IF nump
oints<1 THEN numpoints=1:GOTO 80:ELSE GOTO 80
280 GOSUB 1120:REM **** 'Giving up?'
290 IF LOWER$(ans$)="y" THEN GOTO 320
300 'no change in numpoints
310 GOTO 80
320 MODE 1:LOCATE 1,24:BORDER 1:PEN 1:PAPER 0:END
330 '
340 REM **** SCREEN CO-ORDINATES
350 era=1
360 DIM y(numpoints)
370 steppoint=INT(640/numpoints)
380 startpoint=steppoint-1
390 FOR points=0 TO numpoints
400 y(points)=RND*200+100
410 NEXT points
420 RETURN
430 '
440 REM **** DRAW SCREEN
450 SPEED INK 5,3:INK 11,6,13:INK 14,24:INK 15,10,23:PAPER 5:CLS:BORDE
R 3
460 WINDOW #1,1,20,1,3:PAPER #1,7:CLS #1
470 WINDOW #2,1,20,21,25:PAPER #2,7:CLS #2
480 MOVE 0,0:DRAWR 0,399,3:DRAWR 639,0:DRAWR 0,-399:DRAWR -639,0
490 MOVE 0,y(0)+20:points=0
500 FOR x=startpoint TO 639 STEP steppoint
510 DRAW x,y(points)+20
520 points=points+1
530 NEXT x
540 MOVE 0,y(0)+21:points=0
550 FOR x=startpoint TO 639 STEP steppoint
560 DRAW x,y(points)+21
570 points=points+1
580 NEXT x
590 MOVE 0,y(0)-20:points=0
600 FOR x=startpoint TO 639 STEP steppoint
610 DRAW x,y(points)-20
620 points=points+1
630 NEXT x
640 MOVE 0,y(0)-21:points=0
650 FOR x=startpoint TO 639 STEP steppoint
660 DRAW x,y(points)-21
670 points=points+1
680 NEXT x
690 px=10:py=y(0)
700 LOCATE #1,2,2:PEN #1,4:PRINT #1,"TIME ELAPSED ";:PEN #1,5:PRINT #1
,"00.00";
710 LOCATE #2,2,2:PEN #2,15:PRINT #2,"PRESS ";:PEN #2,11:PRINT #2,"FIR
E";:PEN #2,15:PRINT #2," BUTTON";:LOCATE #2,5,4:PRINT #2,"WHEN  READY"
;
720 GOSUB 1330
730 IF ans$<>"X" AND ans$<>"y" THEN PRINT CHR$(7);:GOTO 720
740 LOCATE #2,2,2:PRINT #2,SPACE$(18)
750 LOCATE #2,2,4:PEN #2,2:PRINT #2,"  GO GO GO GO GO  ";
760 SPEED INK 1,1
770 '
780 REM **** MOVEMENT ROUTINE
790 a=px:a=py
800 px=px-4*(JOY(0)=8)+4*(JOY(0)=4)
810 py=py-2*(JOY(0)=1)+2*(JOY(0)=2)
820 SOUND 2,(py/2-30),1,3
830 IF TEST(px,py)=3 THEN BORDER 3,6:INK 14,1,24:px=a:py=a:SOUND 1,100
0,20:FOR pause=0 TO 15:GOSUB 870:NEXT pause:BORDER 3:INK 14,24
840 PLOT px,py,14
850 RETURN
860 '
```

```
70 REM **** PRINT ELAPSED TIME
80 LOCATE #1,14,2:PEN #1,5
90 PRINT #1,USING "###.##";(TIME-t)/300;
00 RETURN
10 '
20 REM **** 'SAME AGAIN' ROUTINE
30 LOCATE #2,3,4:PEN #2,5
40 PRINT #2,"SAME AGAIN Y/N?";
50 GOSUB 1330
60 LOCATE #2,2,4
70 PRINT #2,SPACE$(18)
80 RETURN
90 '
00 REM **** 'HARDER SCREEN' ROUTINE
10 LOCATE #2,2,4:PEN #2,12
20 PRINT #2,"HARDER SCREEN Y/N?";
30 GOSUB 1330
40 RETURN
50 '
60 REM **** 'EASIER SCREEN' ROUTINE
70 LOCATE #2,2,4:PEN #2,13
80 PRINT #2,"EASIER SCREEN Y/N?";
90 GOSUB 1330
00 RETURN
10 '
20 REM **** 'GIVING UP SCREEN' ROUTINE
30 LOCATE #2,2,4:PEN #2,14
40 PRINT #2,"YOU GIVING UP Y/N?";
50 GOSUB 1330
60 RETURN
70 '
80 REM **** SCORING
90 LOCATE #2,2,2
00 IF oldelapsed=0 THEN 1250
10 IF first=0 THEN PEN 15:GOSUB 1280:GOTO 1260
20 IF elapsed<oldelapsed THEN PRINT #2,USING "##.##";oldelapsed-elap
a;:PRINT #2," SECs. BETTER";:GOTO 1260
30 IF elapsed=oldelapsed THEN PEN #2,5:PRINT #2,"  NO IMPROVEMENT  "
GOTO 1260
40 IF elapsed>oldelapsed THEN PRINT #2,USING "##.##";elapsed-oldelap
d;:PRINT #2," SECs. WORSE!";:GOTO 1260
50 PEN #2,5:PRINT #2," FIRST TIME LUCKY ";:GOTO 1260
60 LOCATE #2,2,4:PRINT #2,SPACE$(18)
70 RETURN
80 REM **** First time THIS screen, message
90 IF elapsed<oldelapsed THEN IF elapsed+4<oldelapsed THEN PRINT #2,
HAT WAS TOO EASY ";:ELSE PRINT #2,"SMARTIE AREN'T YOU";
00 IF elapsed>oldelapsed THEN IF elapsed-4>oldelapsed THEN PRINT #2,
ARDER, WASN'T IT ";:ELSE PRINT #2,"YOU NEED PRACTISE ";
10 RETURN
20 '
30 REM **** Y/N (INKEY$) ROUTINE
40 ans$=INKEY$:IF ans$<>"" THEN 1340
50 ans$=INKEY$:IF ans$="" THEN 1350
60 IF ans$="X" THEN 1390
70 ans$=LOWER$(ans$)
80 IF ans$<>"y" AND ans$<>"n" THEN PRINT CHR$(7);:GOTO 1340
90 RETURN
00 '
10 REM **** ON BREAK ROUTINE
20 numpoints=numpoints-2
30 IF numpoints<1 THEN numpoints=1
40 px=901
50 LOCATE #2,2,2:PRINT #2,SPACE$(18);
60 LOCATE #2,2,4:PEN #2,11
70 PRINT #2,"  YOU GAVE UP !!! ";
80 FOR pause%=1 TO 1700:NEXT pause%
90 LOCATE 1,12:PEN 15
00 PRINT CHR$(22)+CHR$(1)+"  PRESS FIRE BUTTON"+CHR$(22)+CHR$(0)
10 a$=INKEY$:IF a$<>"" THEN 1510
20 IF era=1 THEN era=0:ERASE y
30 RETURN
```

The Learning Centre

An Introduction to Machine Code

MACHINE CODE! Mumbo Jumbo that "real" programmers use? Some mysterious cult that only "advanced" computerists use? Not at all!

It is the purpose of these articles to gently introduce to the BASIC programmer the subject of machine code. I suppose that before you will become interested in this subject you must be convinced as to the value of machine code to you. By that I mean what can M/C do for you that BASIC can't? Let me count the ways:-

1) Speed - all (good?) arcade games are written in M/C because if they were written in BASIC the aliens would be flying through thick soup!

2) Graphics - Arnold's graphics are well implemented in BASIC, but are still limited by the BASIC interpreter.

3) Control - Arnold is unique in offering real time interrupt handling from BASIC, but so much more can be done with it if you have a knowledge of how to control the peripherals attached.

These three reasons are the ones usually quoted when extolling the virtues of M/C. On Arnold there is one reason that outweighs them all. When they designed Arnold they put "hooks" into the firmware (firmware is just the name for the programs already built into Arnold, i.e. the BASIC language) so that it becomes so easy to use M/C to create all those dazzling effects that make your eyes pop when you see them in other people's programs.

Now, before you run off and start key-bashing you are going to need a little reference material. First you will need a guide to those "hooks" into Arnold's firmware routines. There are two that I know of:- The CPC464 FIRMWARE MANUAL (scarce as Hen's teeth) and a book called the "INS and OUTS of the Amstrad" which has the same information as the FIRMWARE GUIDE, but in a condensed format.

You will also need a reference work on the Z80 processor, mainly for its list of information (usually in an Appendix) called "opcodes". Opcodes is a contraction of two words, Operation and code and simply means the particular code that will cause the microprocessor to perform a certain operation. Listed alongside the opcodes are what is known as the MNEMONICS a funny looking word that means memory aid. These MNEMONICS are simply labels that make it easier to remember the codes and are used by a program called an ASSEMBLER that will "assemble" the opcodes from the mnemonics. A small example: Which is the clearer?

a) 21 00 00 01 01 02 ES
b) LD HL,0 LD BC,201, PUSH HL

While (a) is the opcodes represented by the mnemonic of (b) you will find it easier to remember (b) than (a).

OK, now, being armed with this reference material you are beginning to at least look like you know a M/C program from a BASIC keyword!

Let's now use our reference material to do some M/C programming. If you have the FIRMWARE GUIDE, turn to page 14.127 (PAGE 61 in the INS and OUTS). Look at the entry there. It is the specification of a routine called CAS START MOTOR. Place a program tape in Arnold's datacorder, press the play button. Now type the following:

```
CALL &BC6E <ENTER>
```

The cassette springs to life! Now type this:

```
CALL &BC71 <ENTER>
```

The cassette stops because we told it to!

Seriously though, this trivial example should serve to show you that because of the thoughtfulness of Arnold's designers, it is nearly that easy to control all of Arnold's M/C Routines.

Yes, I did say it was nearly that easy to control all of Arnold's M/C routines. There is an almost universal problem with interfacing M/C routines to BASIC, namely, the routines need data to work on and the BASIC program must make the data available. Arnold's designers have provided a method of passing data from BASIC to a M/C program, but it is tricky and best left until we have progressed a little further.

Instead, we will use a method that is slower but easier to understand, by placing the data to be passed in a location known to both BASIC and the M/C routine.

From reading your BASIC manual you will be aware of the BASIC commands - MEMORY and HIMEM. HIMEM, when used in the following manner, will give you a number that represents the highest location usable by BASIC.

```
xx = HIMEM
```

Now, to reserve some space for our data, we use the following statement:

```
MEMORY xx-10
```

This will reserve 10 memory locations that BASIC will be aware of but will not use. Our M/C routine can be made to get its data from this area. In addition, when the routine has finished, we can deposit any data that needs to be returned to BASIC.

To practice this concept of passing data from one routine to another, enter the following program:

```
10  xx=HIMEM:MEMORY=xx-10:
    BASE=xx-9
20  INPUT "Enter a number
    between 0 and 255", DATA
30  IF DATA <0 OR DATA >255
    THEN GOTO 20 ELSE POKE
    BASE, DATA
40  GOSUB 100
50  GOTO 20
100 PRINT "Press any key to see
    your number minus 5"
110 A$=INKEY$:IF A$="" THEN
    GOTO 110
120 PRINT PEEK(BASE)-5
130 RETURN
```

I will leave you to work out how the program functions - there is nothing difficult even for the novice BASIC programmer. However, note that the subroutine at line 100 is called, picks up the data, works on it and returns. In the future, we will be substituting a M/C routine for the BASIC subroutine.

That about wraps up this month's article. Hopefully I have whetted your appetite for more. In the next article we will be delving a little deeper into Arnold to see just where he stores certain routines and how the Z80 processor works.

In the meantime, experiment with your reference books and Arnold and remember the other person's programs may "look" better than yours, but that's only because he knows how to utilise the full potential of the machine.

The Trials of Tony Blakemore

A column dedicated to the absolute beginner

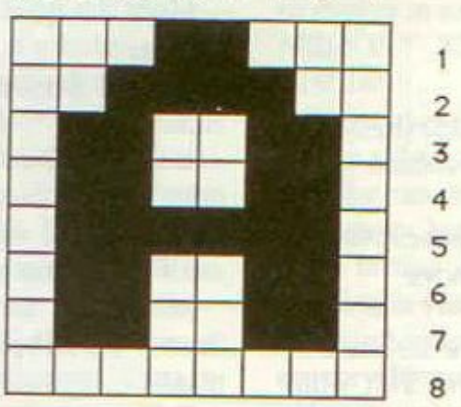
What a month it has been. User roups are springing up all over ustralia and the combination of the nowledge from the members is roducing some exciting discoveries. It terrific to see the real beginners at st starting to join the groups and arning the basics of the CPC464 from xperienced users and not just from ooks.

As last month's issue contained an xcellent article on key re-defining, I ill move on to a subject that really rove me crazy when I first started, amely Character re-defining. My first omputer did not have the facility to nange any of the characters so it came quite a suprise to find out that on ost computers you could.

The first article I read was very teresting but all the numbers related hexadecimal. (That's the type of mber that computers and experts use st to confuse the beginner!). So off to nother book to learn about exadecimal numbers. At this stage I as convinced that the more I learnt the ss I knew. Thank goodness the PC464 understands ordinary numbers, learning hexadecimal numbers at this age is not necessary.

The CPC464 has in the ROM emory a program that sets up all of the characters required. This is done automatically when you switch the machine on. The list of characters and their ASCII codes, eg. chr$(65) for the A, are all listed in the Users' Manual (Appendix III page 2).

Even though the complete set is quite comprehensive, there will be occasions when you will want to design your own characters. This is achieved by using SYMBOL AFTER commands (Chapter 8 page 47) to let the computer know from where you are going to change the characters. The SYMBOL command (Chapter 8 page 46) is then used to establish the new values.



The above grid illustrates the letter A

If you refer to the diagram above, you will see eight rows numbered one to eight. These are the positions in the SYMBOL command after the symbol number (the ASCII number) where you will place the new values to change the character.

Across the top of the grid are eight more numbers. These numbers (added up come to 255) are used to establish the new values to be placed in the eight positions in the SYMBOL command.

To establish values for the letter A:

1. Look at the first row and you will see filled squares under the pixel numbers eight and sixteen (each square is a pixel). Now add the two values together and you get 24. This is the first value in the SYMBOL command after the character number (ASCII 65).

2. Count the second row;
   4+8+16+32=60
   This is the second value.

3. Count the third row;
   2+4+32+64=102
   This is the third value.

4. The fourth, fifth, sixth and seventh rows will result in the following values: 102, 126, 102, and 102.

5. Row eight has no filled pixels, so the eighth value is 0.

The SYMBOL command then for A is: SYMBOL 65,24,60,102,102,126, 102,102,0

To change the letter B to an A, type the following small program:

```
10 SYMBOL AFTER 65
20 SYMBOL 66,24,60,102,102,126,
     102,102,0
```

Now press the B key and an A will appear. Practice changing various keys until you understand the principle thoroughly.

Next month we will have a look at producing graphic characters

Bytes and Pieces

Useful Machine Code Routines from Sydney Brown

This month I will present you with some short but very handy machine code routines which you can add to your own programs.

I have included the source code for each routine which may help you to understand how each one works, as well as a BASIC loader which will allow you to experiment. The loader can be found at the end of this article and, as its name suggests, provides the BASIC code necessary to load each routine. Merely select the relevant lines of code for insertion into your own programs, or run the complete program to experiment. The machine code routines are held in the data statements in hexadecimal form

Routine # 1
COPY SCREEN

21 00 C0	LD HL,#C000	Load source address (SCREEN)
11 00 40	LD DE,#4000	Load destination address(RAM)
01 00 40	LD BC,#4000	Load length to move (16k)
ED B0	LDIR	Perform block move
C9	RET	Return to Basic

This routine will copy the screen into a second 16k block of memory located at 4000H which can be useful to re-display a title page at game over or reset the game background after it has been corrupted.

Routine # 2
RESET SCREEN

21 00 40	LD HL,#4000	Load source address (RAM)
11 00 C0	LD DE,#C000	Load destination address (SCREEN)
01 00 40	LD BC,#4000	Load length to move (16k)
ED B0	LDIR	Perform block move
C9	RET	Return to Basic

This routine transfers all the data back to the screen. Both routines #1 and #2 could be modified to suit other requirements but TAKE CARE!!

Routine # 3
GET SCREEN MODE

D5	PUSH DE	Save address of chosen variable
CD 11 BC	CALL #BC11	Call Firmware GET MODE
E1	POP HL	Get variable address off stack
77	LD (HL),A	Place mode value into variable
C9	RET	Return to Basic

In some programs you may need to tell which mode the computer is currently using while it is still running.

This routine will call the Firmware GET MODE routin and return the mode value into a chosen integer variable.

It can be used as follows:-

10 CALL SMODE,A% : REM A% will now contain th current screen mode.

Routine #4
FILL BLOCK

3E FC	LD A,#FC	Load encoded ink into A.
26 02	LD H,#02	Load Left column of block.
2E 03	LD L,#03	Load Top row of block.
16 0A	LD D,#0A	Load Right column of block.
IE 0B	LD E,#0B	Load Bottom row of block.
CD 44 BC	CALL #BC44	Call SCR FILL BOX
C9	RET	Return to Basic.

This routine will fill a rectangular area of the screen with chosen solid or striped colour in an instant which can b useful when setting up backgrounds or borders aroun windows.

The encoding used by the Amstrad can be very confusing but with a bit of time and some experimenting you shoul be able to get the colours you require.

The ink colour is encoded differently for each mode.

Mode 2 is quite simple as each pixel represents one bit o the byte.

Mode 1 is more complicated, as the byte is split into 4 sections.

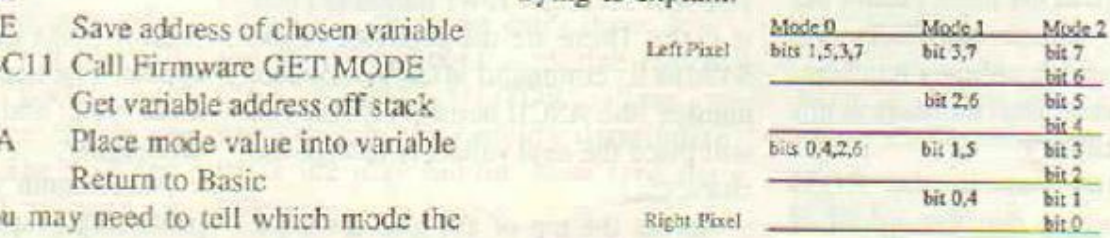
Bits 3 and 7 determine the colour of the left most pixel i the byte, (Ink 0 to 3).

Bits 2 and 6 are next, then bits 1 and 5, and lastly Bits 0 and 4 control the colour of the right-most pixel.

Mode 0 is the most complicated as bits 1,5,3 and 7 control the left pixel and bits 0,4,2 and 6 control the right pixel.

Take particular notice of the order of bits as it does not seem to make sense.

The following is a diagramatic representation of what I am trying to explain.



Each byte in mode 1 is split into four two bit binary umbers, this allows you to select upto 4 stripes per byte in ny of the four set colours:

00=Ink 0 01=Ink 1 10=Ink 2 11=Ink 3

So if you are in mode 1 and want a solid yellow area, you vould select as follows:

Yellow is the default colour for ink 1 or 01 in 2 bit binary o Yellow, Yellow, Yellow, Yellow = 01-01-01-01. Iowever, each 2 bit number is REVERSED giving 0-10-10-10.

The reversed byte is broken into bit pairs, namely 7 and 3, and 2, 5 and 1, and 4 and 0, giving a new bit pattern of 1-11-00-00.

The diagram below may help you to understand.

```
7 6 5 4 3 2 1 0
1       0
  1       0
    1       0
      1       0
--------------------
1 1 1 1 0 0 0 0
```

11110000 Binary = F0HEX = 240 Decimal

Try these others:15, 201, 252, 255.

Poke the new colour and boundary values directly into the rogram, variables have already been set up in the lemonstration program/Basic Loader.

COL = Colour of encoded ink to fill with.

TOP = Top character row included in block.

BOT, LFT and RIT set the other sides.

Routine #5

Get CHARACTER

D5	PUSH DE	Save address of variable
CD 60 BB	CALL #BB60	Call GET CHAR routine
E1	POP HL	Get address of variable
77	LD (HL),A	Store character value
69	RET	Return to Basic

This routine will look at the current cursor position and eturn the value of the character at that spot if it is readable. f the character is recognised then the value will be placed in he chosen integer variable, if not then a value of 0 will be eturned instead.

You will get a failed read unless either the pen or paper of he character is the same as the current pen or paper. You can elect the position to check by moving the cursor with the ormal LOCATE X,Y command.

Routine #6

Write 16k Block.

21 00 C0	LD HL,#C000	START OF DATA BLOCK
11 00 40	LD DE,#4000	Length of Data Block
3E 16	LD A,#16	Sync Byte #16 for Data
CD 9E BC	CALL #BC9E	Call CASS WRITE
C9	RET	RETURN TO BASIC

This routine will save the complete 16k screen block in one go without headers or inter-record gaps, giving a huge advantage in time, as the screen saved at the slow, super-safe speed with this method will save and load in the same time as the high speed save normally does.

This routine can be used to save any size block up to a theoretical 64k with very little modification.

Routine #7

Read 16k Block

21 00 C0	LD HL,#C000	START OF LOAD AREA.
11 00 40	LD DE,#4000	Length of Load block.
3E 16	LD A,#16	Sync byte #16 for Data.
CD A1 BC	CALL #BCAI	Call CASS READ
C9	RET	RETURN TO BASIC.

This routine will load the block saved by the program above.

In both routines the sync byte is #16 Hex which represents a data block and #2C Hex represents a header block.

Have cassette deck ready before calling these routines as no PRESS KEY message is displayed.

The accompanying program loads and sets up all the previous routines, once run the program will stop and you can experiment with the different effects.

In the GET MODE and GET CHARACTER routines you must initialise the variable you are going to use before you call and you must also make sure that the variable is defined as an integer as the machine code routine requires its particular storage format to return the correct value.

All of the routines contain default values to prevent chaos if run without placing the required values in the programs.

Each routine can be used separately, and can be placed anywhere in memory, just remember to set HIMEM with the MEMORY XXXXX command and set the call label to HIMEM+1.

Remember you can experiment with any of these routines, change values and produce a program to suit your own needs but take care as you may destroy your program or anything in memory, but as long as you save your routines first there is no lasting damage as you can not physically destroy anything in your Amstrad with pokes or machine code.

The whole program could be made to take up much less memory by removing the REMS and making the machine code routines run consecutively in memory, I spaced them out for the sake of clarity.

I have used the following variable names in the Demonstration program but you can allocate any names you wish as long as you set them to equal the start of the chosen routines.

CALL	CHAR	Gets character from screen.
CALL	SMODE	Gets current Screen Mode.
CALL	COPY	Copies Screen to Ram.
CALL	RESET	Copies Ram to Screen.

CALL	SSAVE	Screen Save in one 16k Block.
CALL	SLOAD	Loads Screen in one 16k Block.
CALL	FILL	Fills Rectangular area with colour.

The variables TOP, BOT, LFT, RIT and COL are related to the fill routine.

Poke COL with encoded colour.

Poke TOP with top character row.

Poke BOT with Bottom character row.

Poke LFT with left column of area.

Poke RIT with Right column of area.

All poke values related to the fill routine are inclusive.

e.g. if you poke TOP with 2 and BOT with 7 then the block will be 6 characters high, 2 to 7 inclusive.

I am not quite sure what is causing the problem but if you try to put a 1 into TOP then you miss a bit of the top line of the block, it seems to be a fault somewhere in the Firmware routine.

```
10 MEMORY 32999:GOSUB 30:a%=0
20 STOP
30 REM
40 REM COPY SCREEN INTO MEMORY
50 REM
60 copy=33000:m=0
70 READ d:IF d<999 THEN POKE m+copy,d:m=m+1:GOTO 70
80 DATA &21,&00,&c0,&11,&00,&40,&01,&00,&40,&ed,&b0,&c9,999
90 REM
100 REM RESET SCREEN FROM MEMORY
110 REM
120 reset=33020:m=0
130 READ d:IF d<999 THEN POKE m+reset,d:m=m+1:GOTO 130
140 DATA &21,&00,&40,&11,&00,&c0,&01,&00,&40,&ed,&b0,&c9,999
150 REM
160 REM GET SCREEN MODE
170 REM
180 REM use with CALL SMODE,@A%
190 REM Screen mode value now in A%
200 REM
210 smode=33040:m=0
220 READ d:IF d<999 THEN POKE m+smode,d:m=m+1:GOTO 220
230 DATA &d5,&cd,&11,&bc,&el,&77,&c9,999
240 REM
250 REM FILL RECTANGULAR AREA OF THE
260 REM SCREEN WITH COLOUR OR STRIPES
270 REM
280 REM poke COL with ENCODED COLOUR
290 REM poke TOP with TOP ROW of area
300 REM poke BOT with BOTTOM ROW
310 REM poke LFT with LEFT COLUMN
320 REM poke RIT with RIGHT COLUMN
330 REM
340 fill=33050:col=fill+1:lft=fill+3:top=fill+5:rit=fill+7:bot=fill+9:
m=0
350 READ d:IF d<999 THEN POKE m+fill,d:m=m+1:GOTO 350
360 DATA &3e,&10,&26,&02,&2e,&03,&16,&0a,&1e,&0b,&cd,&44,&bc,&c9,999
370 REM
380 REM GET CHARACTER FROM SCREEN
390 REM
400 REM Locate cursor as per normal
410 REM use with CALL CHAR,@A%
420 REM Character value now in A%
430 REM
440 char=33070:m=0
450 READ d:IF d<999 THEN POKE m+char,d:m=m+1:GOTO 450
460 DATA &d5,&cd,&60,&bb,&el,&77,&c9,999
470 REM
480 REM SAVE SCREEN IN ONE 16K BLOCK
490 REM
500 ssave=33080:m=0
510 READ d:IF d<999 THEN POKE m+ssave,d:m=m+1:GOTO 510
520 DATA &21,&00,&c0,&11,&00,&40,&3e,&16,&cd,&9e,&bc,&c9,999
530 REM
540 REM LOAD SCREEN IN ONE 16K BLOCK
550 REM
560 sload=33100:m=0
570 READ d:IF d<999 THEN POKE m+sload,d:m=m+1:GOTO 570
580 DATA &21,&00,&c0,&11,&00,&40,&3e,&16,&cd,&a1,&bc,&c9,999
590 RETURN
```

User Group Information

This month it is our sad task to report the death of Norm rt, the Treasurer of the Amstrad Southern Group. He died a car accident on 11th June. As a founder member of the uthern Group, Norm was an avid Amstrad user both at up meetings and at home. He was dedicated to the group l carried out his official function in a quietly efficient nner. He was enthusiastic in teaching his children the use he computer.

The funeral was held on 14th June at which a large nber of relatives and friends attended.

Norm leaves a wife, son and daughter to whom we extend sympathy.

GROUP NEWS

Things appear to be a little quiet this month after the burst information in the last issue which took nearly three ges. The User Group Contact list continues to expand with people now listed as contact points. We look forward to smania enlarging their section and would welcome some vs from the Northern Territory.

South Australia (Grange)

The new title of this group is The Amstrad Computer ub Inc.(SA). They were officially incorporated in June. ris Sowden is the new President - (08) 295 5923. Further ails concerning their Constitution may be available next nth.

AMSWEST, Perth

At the last meeting of the above group it was suggested t they contact some Eastern States User Groups with a w to exchanging news and programs on a personal basis. Any group wishing to make contact with Amswest for her details should write to: Mrs. P.T. Ardron, 6 Weston eet, Carlisle, W.A. 6101.

Amstrad Eastern Users Group

Following the first meeting last month which went on for t a little longer than planned", the attendance at the next eting is expected to double to 50. Beginners, intermediates experienced users are all catered for in seperate groups at meetings. The contact point is Tony Blakemore on 878 2.

Western Amstrad Users Club

This is a new group, established to cover the west of lbourne, which had its preliminary meeting recently. ing these initial discussions, it was decided to meet twice n month at the Tottenham North Primary School, South d, Braybrook from 6.30 p.m. The next two meeting are ned for 9th and 23rd July. For further details contact e McQueen on 312 5594

User Group Contact List

NSW		
John Patterson	Lismore	(066) 21 3345
Chris Craven	Canowindra	(063) 44 1150
Paul Wilson	Moruya	(044) 74 3160
Frank Humphreys	Mummulgum	(066) 64 7290
R. Vijayenthiran	Newtown	(02) 519 4106
Hans Hill	Blacktown	(02) 671 2929
Martin Clift	Narrabri	(067) 92 3077
Mrs. D. Sparks	East Gosford	(043) 24 3342
Jim Owen	Uranga	(066) 55 6190
Chas Fletcher	Toongabbie	(02) 631 5037
Bruce Jones	Coffs Harbour	(066) 52 8334
Mark Kelloway	Barrack Point	(042) 95 1581
ACT		
Arthur McGuffin	Kambah	(062) 31 9437
Chris Rogers	Fraser	(062) 58 5749
Vic		
R.A. Russo	Richmond	(03) 428 4281
Tony Blakemore	Nunawading	(03) 878 6212
Martin Scragg	Pearcedale	(059) 78 6949
Don Leith	Brunswick	(03) 383 1498
Michael Prezens	Frankston	(03) 781 2158
Mrs. G. Chapman	South Clayton	(03) 551 4897
Mike McQueen	Braybrook	(03) 312 5594
Paul Walker	Heathmont	(03) 729 8657
David Carbone	Burwood	(03) 29 4135
Sue Kelly	Manangatang	(050) 35 1402
Alan Harris	Sale	(051) 44 1454
Ron Butterfield	Leopold	(052) 50 2251
Rod Anderson	Camperdown	(055) 93 2262
QLD		
Paul Witsen	Bulimba	(07) 371 9259
Mick O'Regan	Gladstone	(079) 79 2548
R.C. Watterton	Toowoomba	(076) 35 4305
D.F. Read	Ingham	(077) 77 8576
Kylie Telford	Goondiwindi	Calingunee246 (weekendsonly)
Michael Toussaint	Loganlea	(07) 200 5414
Tim Takken	Ipswich	(07) 202 4039
Steven Doyle	Caloundra	(071) 91 3147
SA		
Chris Sowden	Morphettville	(08) 295 5923
Lindsay Allen	Murray Bridge	(085) 32 2340
Rick Cable	Pt. Pirie	(086) 5967
WA		
Bob Harwood	Cooloongup	(095) 27 1777
Dave Andersen	6 Kitchener Rd Merredin, 6415	
Graeme Worth	Scarborough	(09) 341 5211
Tony Clitheroe	Morley	(09) 275 1257
Mrs. P. Ardron	Carlisle	(09) 361 8975
P.M. Nuyens	Waroona	(095) 33 1179
TAS		
Conal McClure	Scottsdale	(003) 52 2514

A Review of the CPC664

Simon Anthony takes a look at 'Arnold' Mark II

There is no question that the PC464 is an amazing machine within s range and it was fairly inevitable at an upgrade would be just a matter f time. In fact, installing a disc drive stead of a cassette was suggested at e 464 launch over a year ago! It was evitable too that the 664 would be iced as competitively as its brother ow affectionately known as Arnold) - e green screen version is expected to tail at $799 and the colour screen rsion at $999.

The hardware consists of the main yboard with computer and disc stem, the choice of green or colour onitor, and the provision for a ssette recorder and a second disc drive be attached.

The colour scheme has changed a tle: the main keyboard cabinet and reen housing being in the same dark ey but the non-printing keys are now ight blue and the rest light grey. The mbers on the numeric keypad are eceded with the letter 'f' to denote nction keys. All the keys are slightly hed.

The cursor keys are the most notable ange apparently pandering to the ndy new design allowing larger keys games enthusiasts to hit. (They still ven't put them in the right place for - I'm left handed.)

Overall, the keys have a positive ion with the minimum of touch, nething to do with the membrane struction, but I haven't yet decided if ke the 'stepped height' arrangement he rows of keys, probably because I e used the 464 for so long.

Naturally, the disc drive, which is ated in the same place as the cassette t on the 464, is taller, but smaller n a separate DDI-1 (disc drive

available for the 464). One very useful feature appears on the top of the disc housing, an inlay containing a list of the 27 colours available together with their reference numbers plus a diagram showing the various key numbers.

Having a disc drive instead of a 'datacorder' is like moving into the 'turbo charged' class. Anyone who has only tape facilities will know that to load a lengthy program normally gives you enough time to make a cup of coffee. With a disc drive, you can pay for it by the money you save on coffee! It takes just a second or so to load a program and cataloguing is almost instantaneous. So it was a joy to use. The discs are the same as those used in the 464, 3 inch compact floppies with each side capable of holding 169k of formatted space with CP/M system tracks attached.

You get a copy of Digital Research's CP/M operating system and Dr. Logo programming language free as part of the 664 package. Also available is a modulator/power supply (an MP2) to link to a domestic TV if required. A standard cassette recorder is connected to a socket marked TAPE with a special cable (CL-1). The existing additional disc drive (FD1) can be connected to the 664 with a DI-2 cable.

Most current 464 software is, as they say, 'upwards compatible'. That means it should be able to run on a 664. However, do check first. Some software may use areas of memory that the new disc operating system now occupies, whilst others may break so many 'rules' as laid down in the Firmware Guide that they are unlikely to run on the 664 without a great deal of time and effort. Most reputable dealers and software houses should be able to advise you whether or not a particular piece of software is capable of being run on both machines.

While I am on the subject of software, I should mention that the 664

has a few new BASIC commands. Naturally, any programs which contain these cannot be run on a 464.

MASK - a graphics command which allows a template to be specified when drawing lines. This means that you can draw various dotted or dashed lines, even round corners if the template has been designed this way.

GRAPHICS PEN - allows you to set the ink for drawn graphics independently of the text ink, and specify an opaque or transparent background.

GRAPHICS PAPER - allows you to set the area behind the drawn graphics independently by allowing the selection of colour of the undrawn areas of dotted lines.

FRAME - this synchronises moving graphics with the display frame scanning frequency. (&BD19 on the 464) and provides much smoother movement of graphics.

FILL - from the graphics cursor position, allows you to fill an area of screen with a given colour to the drawn boundaries or the edge of the screen.

COPYCHR$ - lets you copy a character from a screen area into memory.

CURSOR - allows you to switch the cursor on or off.

CLEAR PRINT - allows you to clear the keyboard buffer.

ON BREAK CONT - a facility to make a program continue despite the fact that the Escape key is hit.

DECS - produces a number in decimal string form.

DERR - provides 'values' to disc errors.

There have been many enhancements to existing commands, graphics in particular. MOVE, MOVER, PLOT, PLOTR, DRAW and DRAWR can have a specified parameter to set the graphics ink mode. Using XOR, AND, OR or normal mode determines the way drawn graphics will interact with those already put on the screen.

You can draw a multicoloured line where each single pixel in a group of eight pixels is a different colour, using the XOR with a MASK command. You can also set the ink colour of the next point to be plotted or drawn with the enhanced MOVE and MOVER commands.

Documentation for the 664 is unquestionably better than the 464. For a start, the manual (or Users' Guide) is almost twice the size, part of which goes into much more detail in the areas of graphics and sound. The format, like the 464, guides the novice programmer through a foundation course, then st through program development, follow with a chapter documenting all BASIC keywords with examples. T next three chapters take a look at disc drive and offers an introduction CP/M and AMSDOS (Amstrad Di Operating System) and the Dr. Log programming Language. Furth chapters reveal information on contr codes, error messages, key and joystic codes, memory map and pin-out/sock connection details amongst othe things. The final chapters explain th 664 in more detail, general computin principles and provides a glossary an six games programs.

The CPC664 clearly does not replac the 464 but opens another market fo one of the lowest priced disc base machines available. It would seem tha AMSTRAD are broadening thei horizons into the business area with this upgraded 464, coupled with the fact that they are looking closely at the possibility of producing a computer with an integrated modem.

There is no question of the 464 being dropped. Far from it, with the combination of the 464 and 664, AMSTRAD expect to sell 600,000 computers this year. Sounds like a lot of bleary eyes in the early hours!

(Continued from Page 31)

were prolific producers of languages. They produced Algol 60, Scalp (Self-Contained ALgol Processor), Dope (Dartmouth Over-simplified Programming Experiment) and finally BASIC (Beginners All-purpose Symbolic Instruction Code).

Joss (Johnniac Open-Shop System) was an early attempt to design an interactive language. It is no longer used.

One of the newer languages, fast gaining popularity, is Pascal. It was developed by Niklaus Writh in Switzerland and released in 1968. Several extensions have evolved and a number of compilers are available.

This has only skimmed the surface of the history of programming languages. Ladder was developed by SRI International to deal with large complex data basis. Terry Winagard at MIT created Shrdlu in 1970 as a natural-language processor. Yale developed a language called Sam in 1977. Charles Moore created Forth to control telescopic equipment at Kitt Peak National Observatory. General Motors developed a language called Dyana, an extension to Fortran, to help measure vibrational and other dynamic systems.

The latest offering to emerge is Ada which was devleoped as the language to end all languages. Time will prove the durability of this latest offspring of a very fertile industry.

Next month I will attempt to compare and contrast BASIC, Fortran and Pascal.

ONLY A FEW MORE BUGS AND I'LL HAVE THIS PROGRAM WORKING RIGHT

The Ins and Outs of the Amstrad

A book review by Sonia Kelly

If you judge a computer's popularity by the number of books being written for it then Arnold is one of the most popular home computers on the market. A better way to judge is by the quality of the books published. Arnold wins using this method also. Having said that, I must say that this book will not be to everyone's taste. It is unashamedly a hardware buffs book that will allow those of you hooked on the fumes of hot solder to be high for weeks.

The book is divided into two sections - the INS and OUTS. Taking the INS first, the book takes the reader through the System Overview and memory systems fairly quickly and then delves into the more important parts of Arnold e.g. the I/O address map, the video gate array, the screen controller, the parallel peripheral interface and the printer port. In each of the sections listed above the reader is given information on the way Arnold is put together, how to utilise those functions that are usable (pointing out 'grey' areas that are either not fully defined or not enough is known about) and pinouts of the various ports where appropriate.

In each section clear diagrams are given, clearing away a lot of the fog generated by the use of 'jargon'. Also where appropriate, the reader is given those operating system calls that are directly applicable to the section being discussed.

Moving on, but still within the INS portion of the book, there is a discussion on the sound generator, keyboard and cassette. Each section is treated in a reasonable amount of depth and many of the ambiguities of the FIRMWARE GUIDE are dispelled, especially in the sound generator department.

Now we come to the real meat of this book. The OPERATING SYSTEM. Pages 29 to 84 are given over to an excellent but not *too* detailed look at the firmware resident in Arnold. This section admittedly covers the same ground as the FIRMWARE GUIDE but with a little less technical verbage and hence the reader comes away with a much clearer understanding of the way the operating system actually knits all the pieces together. This section of the book is worth the price alone. However, that's not all you get!

The next section deals with th expansion capabilities of Arnold. detailed look at the expansion port given along with an explanation of th signal lines emanating from it. This the 'OUTS' section. Here the hardwar buff is given all the necessar information to interface his/he 'ultimate' peripherals to Arnold Software support is also covered, bu not to the same degree as the hardwar side. Still, this book does not purpor to be a software guide to interfacing Also given is an explanation of externa ROM's and details of an alternative printer port and an analogue port (using the resistive ladder technique).

All in all, a comprehensive coverage of much the same ground as the official FIRMWARE GUIDE from AMSOFT, but to my mind, in a clearer and simpler format.

A final word of caution before you rush out to purchase this book. It is no for beginners and you will need a good knowledge of machine code and some knowledge of hardware before this book can be of maximum value to you. There is some joy in it for the BASIC programmer and for those venturing to use the firmware routines already built into Arnold, but it is mainly aimed at the hardware 'hacker'. It is definitely easier to understand than the official firmware guide, and that being so, may be of more use to the BASIC programmer than the former heavy tome, but I cannot in all honesty recommend it solely on those grounds.

For the hardware buff, for the practiced BASIC programmer and for those whose curiosity extends to what actually makes an Arnold's personality, this book is recommended without hesitation.

FLASH

A Game from Roger Fraser

About FLASH

How good is your memory? In this imple Simon Says' type of game, the mputer FLASHes a random sequence coloured squares into the four corners the screen and then asks you to peat the sequence using the keys:
R for Red Y for Yellow
C for Cyan B for Blue

The sequence is initially only one FLASH, but each time you correctly repeat the sequence, another flash is added. Each flash requires you to press the appropriate key (once per flash) to cause the sequence to be repeated exactly as you watched it. Beware of multiple flashes of the same colour and wait before you repeat the sequence until you are prompted to do so.

You must complete the sequence as quickly as possible as the program will detect if you are too slow or just plain wrong. If you fail, the correct sequence will be repeated for you.

```
1 GOTO 9
2 SAVE "FLASH.BAS" : STOP
3 ' SOFTWARE TYPE : Game (reAction)
4 ' FIRST ENTERED : Jan '85
5 '  LAST UPDATED : 01/05/85
6 '   COMMON NAME : Repeat The FLASHing sequence
7 '   DESCRIPTION : The purpose of this program is to test your short-
term memory by repeating an ever increasing string of FLASHed squares
of colour.
8 '         SOURCE : Original idea from somewhere - Much Improved & Wor
king!!!
9 CALL &BBFF : PAPER 0 : PEN 1 : REM - General Purpose Initialisation
10 ' the actual program code begins here ...
20 DIM m$(7)
30 FOR x=1 TO 7:READ m$(x):NEXT
40 DATA "WATCH","REPEAT","Correct !","Wrong !"
50 DATA "The correct sequence                                    was ...","Too s
low"
60 DATA "WAIT  FOR  IT ..."
70 MODE 0
80 nh$=STRING$(6,CHR$(143))
90 INK 0,0:INK 1,2:INK 2,18:INK 3,24:INK 4,6:INK 5,10:INK 6,4:INK 7,26
:INK 8,13,26:INK 9,12,25:INK 10,20
100 GOSUB 1380
110 REM **** New Game Begins Here
120 CLS:PAPER 0:BORDER 0
130 RANDOMIZE TIME
140 LOCATE 13,1:PEN 4:PRINT #p,CHR$(143)+CHR$(143)+CHR$(143)+CHR$(128)
;:PEN 3:PRINT #p,CHR$(143)+CHR$(143)+CHR$(143)
150 LOCATE 13,2:PEN 4:PRINT #p,CHR$(143)+"R"+CHR$(143)+CHR$(128);:PEN
3:PRINT #p,CHR$(143)+"Y"+CHR$(143)
160 LOCATE 13,3:PEN 4:PRINT #p,CHR$(143)+CHR$(143)+CHR$(143)+CHR$(128)
;:PEN 3:PRINT #p,CHR$(143)+CHR$(143)+CHR$(143)
170 LOCATE 13,5:PEN 10:PRINT #p,CHR$(143)+CHR$(143)+CHR$(143)+CHR$(126
);:PEN 1:PRINT #p,CHR$(143)+CHR$(143)+CHR$(143)
180 LOCATE 13,6:PEN 10:PRINT #p,CHR$(143)+"C"+CHR$(143)+CHR$(128);:PEN
 1:PRINT #p,CHR$(143)+"B"+CHR$(143)
190 LOCATE 13,7:PEN 10:PRINT #p,CHR$(143)+CHR$(143)+CHR$(143)+CHR$(128
);:PEN 1:PRINT #p,CHR$(143)+CHR$(143)+CHR$(143)
200 PEN 7:LOCATE 2,10:PRINT #p,"PRESS:";
210 PEN 8:PRINT #p,CHR$(146)+CHR$(156)
220 SPEED INK 5,2
230 LOCATE 9,11:PRINT #p,CHR$(149)
240 LOCATE 9,12:PRINT #p,CHR$(149)
250 LOCATE 9,13:PRINT #p,CHR$(241)
260 PEN 11
```

```
270 LOCATE 9,15:PRINT #p,"1.  SLOW"
280 LOCATE 9,17:PRINT #p,"2.  FAST"
290 LOCATE 9,19:PRINT #p,"3.  HELP"
300 LOCATE 9,21:PRINT #p,"4.  END GAME"
310 PEN 9:LOCATE 3,2:PRINT #p,"BEST":LOCATE 4,4:PRINT #p,"OF":LOCATE 3
,6:PRINT #p,"LUCK"
320 z$=INKEY$:IF z$="" THEN 320
330 IF z$="1" THEN x%=40 ELSE IF z$="2" THEN x%=10 ELSE IF z$="3" THEN
 GOTO 100 ELSE IF z$="4" THEN MODE 1:END ELSE PRINT CHR$(7);:GOTO 320
340 sc=0:ac=0:b$="":REM **** b$ holds sequence
350 WHILE ac=0
360 GOSUB 600:REM **** add letter to sequence
370 GOSUB 700:REM **** subroutine to display the sequence
380 GOSUB 850:REM **** try to repeat sequence
390 IF t1=x%*4 THEN CLS:BORDER 1,11:LOCATE 7,10:PEN 5:PRINT #p,m$(6):a
c=1:GOTO 460
400 IF aa$<>MID$(b$,zx,1) THEN CLS:BORDER 3,6:PEN 8:LOCATE 8,10:PRINT
#p,m$(4):ac=1:GOTO 460
410 sc=sc+1
420 CLS:PEN 8:LOCATE 5,10:PRINT #p,m$(3)
430 PEN 1:LOCATE 5,13:PRINT #p,"Score is";sc
440 FOR pause%=0 TO 500:NEXT pause%
450 WEND
460 SOUND 1,4000,50,7
470 FOR pause%=0 TO 2000:NEXT pause%
480 CLS:BORDER 0:PEN 4:LOCATE 5,10:PRINT #p,m$(5)
490 FOR pause%=0 TO 2000:NEXT pause%
500 BORDER 0:CLS:PEN 8:LOCATE 8,10:PRINT #p,m$(1):GOSUB 700
510 FOR pause%=0 TO 1600:NEXT pause%
520 CLS:BORDER sc MOD 26
530 PEN 6:LOCATE 4,6:PRINT #p,"You SCORED :";:PEN 4:PRINT #p,sc
540 IF hsc>0 THEN PEN 6:LOCATE 6,9:PRINT #p,"Hi SCORE :";:PEN 4:PRINT
#p,hsc
550 IF hsc<sc THEN LOCATE 4,12:PEN 9:PRINT #p,"WELL  DONE !!!":IF hsc=
0 THEN hsc=sc ELSE hsc=sc:PEN 9:LOCATE 16,9:PRINT #p,hsc
560 PEN 7:LOCATE 1,20:PRINT #p,"PRESS <";:PEN 8:PRINT #p,"SPACE";:PEN
7:PRINT #p,"> bar":LOCATE 7,23:PRINT #p,"to continue..."
570 aa$=INKEY$:IF aa$<>" " THEN 570
580 GOTO 110
590 END
600 REM **** subroutine to select a random letter and add it to b$
610 a=INT(RND(1)*4)+1
620 IF a=1 THEN a$="r"
630 IF a=2 THEN a$="y"
640 IF a=3 THEN a$="c"
650 IF a=4 THEN a$="b"
660 IF a=5 OR a=0 THEN GOTO 610
670 a$=LOWER$(a$)
680 LET b$=b$+a$
690 RETURN
700 REM **** display the sequence
710 IF ac<>0 THEN 750
720 FOR x=1 TO 1000 :NEXT x:REM **** time delay
730 dummy$=INKEY$:IF dummy$<>"" THEN 730 : REM **** clears inkey buffe
r
740 CLS:LOCATE 8,10:PEN 7:PRINT #p,m$(1)
750 FOR x=1 TO 1000 :NEXT x:REM **** time delay
760 CLS
770 LET xy=LEN(b$):xx=0
780 WHILE xx<xy
790 c$=MID$(b$,xx+1,1)
800 IF c$="r" THEN s=1 ELSE IF c$="y" THEN s=2 ELSE IF c$="c" THEN s=3
 ELSE s=4
810 IF s=1 THEN GOSUB 1060 ELSE IF s=2 THEN GOSUB 1140 ELSE IF s=3 THE
N GOSUB 1220 ELSE GOSUB 1300
820 xx=xx+1
830 WEND
840 RETURN
850 REM **** Repeat sequence
860 CLS
870 dummy$=INKEY$
880 IF dummy$="" THEN 920
890 LOCATE 3,10:PEN 15:PRINT #p,m$(7)
900 FOR pause%=1 TO 1783:NEXT pause% : REM **** time delay of 1 second
```

```
r                                                    clears inkey buffe
920 CLS:LOCATE 8,10:PEN 7:PRINT #p,m$(2)
930 FOR pause%=1 TO 651:NEXT pause% : REM **** time delay of 1/2 secon
d
940 ti=0:CLS:zx=0
950 WHILE zx<>LEN(b$) AND ti<x%*4
960 ti=ti+1
970 aa$=INKEY$
980 aa$=LOWER$(aa$)
990 IF aa$<>"r" AND aa$<>"y" AND aa$<>"c" AND aa$<>"b" THEN 1030
1000 zx=zx+1
1010 IF aa$="r" THEN GOSUB 1060 ELSE IF aa$="y" THEN GOSUB 1140 ELSE I
F aa$="c" THEN GOSUB 1220 ELSE IF aa$="b" THEN GOSUB 1300
1020 IF MID$(b$,zx,1)<>aa$ THEN 1040
1030 WEND
1040 RETURN
1050 REM **** draw graphic blocks
1060 REM **** top left
1070 PEN 4:CLS
1080 FOR x=1 TO 6
1090 LOCATE 2,x+2
1100 PRINT #p,hh$
1110 NEXT
1120 SOUND 1,478,40
1130 RETURN
1140 REM **** top right
1150 PEN 3:CLS
1160 FOR x=1 TO 6
1170 LOCATE 12,x+2
1180 PRINT #p,hh$
1190 NEXT
1200 SOUND 1,239,40
1210 RETURN
1220 REM **** bottom left
1230 PEN 10:CLS
1240 FOR x=1 TO 6
1250 LOCATE 2,x+12
1260 PRINT #p,hh$
1270 NEXT
1280 SOUND 1,119,40
1290 RETURN
1300 REM **** bottom right
1310 PEN 1:CLS
1320 FOR x=1 TO 6
1330 LOCATE 12,x+12
1340 PRINT #p,hh$
1350 NEXT
1360 SOUND 1,60,40
1370 RETURN
1380 REM **** instructions
1390 BORDER 0:MODE 1:LOCATE 15,1:INK 2,18,0:INK 3,15:PEN 2:PRINT "F L
A S H"
1400 PEN 3:PRINT #p:PRINT #p:PRINT #p," This is a GAME OF MEMORY - SI
MON SAYS"
1410 PRINT #p:PRINT #p," Watch the screen while coloured squares FLASH
 in a random sequence."
1420 PRINT #p:PRINT #p," You must try to duplicate the sequence, using
 the four blue keys (see below). These keys represent the four cor
ners of the screen and colours that apply to them."
1430 LOCATE 10,17:PRINT #p,"Q W E R T Y U I O P"
1440 LOCATE 10,19:PRINT #p," A S D F G H J K L :"
1450 LOCATE 10,21:PRINT #p,"  Z X C V B N M , . /"
1460 PLOT 128,160,3:DRAWR 368,0:DRAWR 0,-112:DRAWR -368,0:DRAWR 0,112
1470 PRINT #p:PRINT #p:PRINT #p:PEN 1:PRINT #p," PRESS the <SPACE> Bar
 to continue ..."
1480 LOCATE 16,17:PRINT #p,"R":LOCATE 20,17:PRINT #p,"Y"
1490 LOCATE 16,21:PRINT #p,"C":LOCATE 20,21:PRINT #p,"B"
1500 aa$=INKEY$:IF aa$<>"" THEN 1500
1510 aa$=INKEY$:IF aa$<>" " THEN 1510
1520 INK 2,16:INK 3,24
1530 MODE 0
1540 RETURN
```

Gencom - a CP/M Utility

from Hans Hill

The utilities provided with the CP/M disc are now (dare I say it?) outdated, but as yet the excellent CP/M packages around are not available for the Amstrad. (Starcomm Systems are currently working on downloading 8" CP/M software onto the Amstrad 3" floppies, but for now let's use what we have).

GENCOM was developed to convert an object code file produced by the Hisoft DEVPAC (Soft 116) into an executable CP/M file. This allows the program to run by typing in the filename from CP/m without the need for BASIC loader programs or CALLs to a specific address. All Amstrad ROM routines can be used so nothing is sacrificed by using CP/M.

HOW TO USE GENCOM

As you may know, AMSDOS creates a 128 byte header record that needs to be removed before CP/M can execute the file. What GENCOM does is to load the file generated by GENA 3 and resave it without the header record under (your filename).COM .

Now you have an executable CP/M file. To use the file so created:

A> (your filename) [Enter]

If your program is correctly written, it will run.

To get GENCOM onto disc, run the Hisoft DEVPAC and start assembly at 100h - you can ignore the comments if you wish. Assemble the program using the A command. The object code is automatically saved to disc under the file GENCOM.ASM . After assembly, save the source file with:

Q 1,166,GENCOM.SRC

We now have to enter CP/M in the following manner:

A> DDT GENCOM.ASM - DDT will be loaded bringing GENCOM with it.

DDT VERS 2.2
NEXT PC
0300 0100 - you will see the DDT prompt.
-M180,2FF,100 [Enter]
-GO - this will return control to CP/M.

A> SAVE 2 GENCOM.COM

Now that we have GENCOM on disc let's demonstrate it by using Hisoft DEVPAC and entering the following routine:

```
ORG £100
LD B,26
LD A,"A"
LOOP: CALL £BB5A
INC A
DJNZ LOOP
JP £00
```

Assemble this little routine and s the object code to tape using

O,,TEST>OBJ

then exit to CP/M. After the pron

A> GENCOM TEST.OBJ

GENCOM should burst into life a go to work. When complete you sho see the 'PROCESS COMPLET message followed by the prompt.

Type in TEST [Enter]

and you should see 26 letters of t alphabet printed on the scree GENCOM works !! Now it is up you to write some really flash progra for other CP/M users. Get to it.

For those people who do not alrea have the Hisoft DEVPAC, Starcom Systems can purchase, transfer on disc and include GENCOM for a lou $75.00 with a 24 hour turn-round. you already have DEVPAC but not disc, send the front page of the manu for the transfer and GENCOM fo $20.00 .

Starcomm Systems, 48 Tara Road
Blacktown, NSW, 2148
(02) 672292

```
1 ;H GENCOM developed for AMSTRAD users by STARCOMM SYSTEMS
2
3 ;The purpose of this little routine is to convert an assembly
4 ;program generated by GENA 3.1 into a (filename).COM file for
5 ;execution direct from CP/M.
6
7 ;File manipulation routines have been extensively documented
8 ;to allow users of this program to apply them in their own
9 ;programs.
10
11
12 ;GENCOM written by H.Hill of STARCOMM SYSTEMS...8th April 1985
13 ;intended for the public domain.
14
15 ;**********************************************************
16 ;
17 ;equates table
18 ;
```

```
                19 FCB:    EQU  £5C
                20 TPA:    EQU  £100
                21 FCBCR:  EQU  FCB+£20
                22 FIAREA: EQU  £1000
                23 BDOS:   EQU  £05
                24 BOOT:   EQU  £00
                25 OPENF:  EQU  £0F
                26 READF:  EQU  £14
                27 CLOSEF: EQU  £10
                28 PRINTF: EQU  £09
                29 MAKEF:  EQU  £16
                30 WRITEF: EQU  £15
                31 DELETF: EQU  £13
                32 ;
                33 ;*****************************************************
                34         ORG  TPA
                35 ;
                36 #T+ GENCOM.ASM
                37 ;
010900          38         LD   BC,£09          ;move filename up to storage area
11AF01          39         LD   DE,NEWFLE
215C00          40         LD   HL,FCB
EDB0            41         LDIR
                42
216800          43         LD   HL,FCB+12       ;zero extents and records
0617            44 ZEROFL: LD   B,23
3600            45         LD   (HL),0
23              46         INC  HL
10F9            47         DJNZ ZEROFL
                48
                49 ;OPENING THE DEFAULT FCB
                50 ;If your program takes a fileref as its first operand
                51 ;you can use the FCB set up at £5C in low storage.
                52 ;The CCP sets it up ready to open.
                53 ;
                54 ;********CHECK THE BYTE AT £5D
                55 ;if it is a blank, then no operand was given.
                56 ;if it is a valid character, simply request service 15.
                57
3A5D00          58         LD   A,(FCB+1)
FE20            59         CP   £20
113E02          60         LD   DE,NOFILE
CAA701          61         JP   Z,FINIS
                62 ;
                63 ;
115C00          64         LD   DE,FCB
0E0F            65         LD   C,OPENF
CD0500          66         CALL BDOS
                67
11F101          68         LD   DE,OPENFL  ;prints an error message if file not open
3C              69         INC  A
CAA701          70         JP   Z,FINIS
                71
                72
110010          73         LD   DE,£1000   ;set up fix area
D5              74         PUSH DE
                75
115C00          76 RDSEQ:  LD   DE,FCB
0E14            77         LD   C,READF
CD0500          78         CALL BDOS
FE00            79         CP   0
C25301          80         JP   NZ,PROCES
                81
3AD401          82         LD   A,(RCCNT+1)
3C              83         INC  A
32D401          84         LD   (RCCNT+1),A
                85
                86 ;SETTING THE DATA BUFFER
                87 ;BDOS needs to know where to put the 128 byte data records
                88 ;once they have been read. In GENCOM the file is placed from
                89 ;address £1000 up, with the buffer address kept in DE.
                90 ;DE is changed to point to the next buffer area after each read
                91
                92
                93
                94
D1              95         POP  DE         ;move records up to fix area for processing
218000          96         LD   HL,£80
018000          97         LD   BC,£80
014E EDB0       98         LDIR
0150 D5         99         PUSH DE
                100
0151 18E0       101        JR   RDSEQ
0153            102 PROCES:
0153 115C00     103        LD   DE,FCB     ;transfer new file name to FCB and zero
0156 21AF01     104        LD   HL,NEWFLE  ;remaining bytes in FCB.
0159 012100     105        LD   BC,33
015C EDB0       106        LDIR
                107
015E 115C00     108        LD   DE,FCB     ;delete any file of the same name
0161 0E13       109        LD   C,DELETF
0163 CD0500     110        CALL BDOS
                111
0166 115C00     112        LD   DE,FCB     ;make a new file entry
0169 0E16       113        LD   C,MAKEF
016B CD0500     114        CALL BDOS
                115 ;
016E 110202     116        LD   DE,SPCFL   ;if no space on disk print error message
0171 3C         117        INC  A          ;and abort.
0172 FE00       118        CP   0
0174 2831       119        JR   Z,FINIS
                120 ;
0176 218010     121        LD   HL,£1080   ;set up transfer back to DMA buffer area
0179 E5         122        PUSH HL
                123
017A E1         124 WRTSEQ: POP  HL
017B 118000     125        LD   DE,£80
017E 018000     126        LD   BC,£80
0181 EDB0       127        LDIR
0183 E5         128        PUSH HL
                129
0184 115C00     130        LD   DE,FCB
0187 0E15       131        LD   C,WRITEF
0189 CD0500     132        CALL BDOS
                133
018C 111402     134        LD   DE,WRTFL   ;failed to write error message
018F FE00       135        CP   0
0191 2014       136        JR   NZ,FINIS
                137
0193 3A7C00     138        LD   A,(FCBCR)
0196 21D401     139        LD   HL,RCCNT+1
0199 BE         140        CP   (HL)
019A 20DE       141        JR   NZ,WRTSEQ
                142
019C 115C00     143        LD   DE,FCB
019F 0E10       144        LD   C,CLOSEF
01A1 CD0500     145        CALL BDOS
                146
01A4 112C02     147        LD   DE,MSG     ;prints successful message
01A7 0E09       148 FINIS: LD   C,PRINTF
01A9 CD0500     149        CALL BDOS
01AC C30000     150        JP   BOOT
                151
01AF            152 NEWFLE: DEFS 9
01B8 434F4D     153         DEFM "COM"
01BB 00000000   154         DEFB 0,0,0,0,0,0,0,0
01C3 00000000   155         DEFB 0,0,0,0,0,0,0,0
01CB 00000000   156         DEFB 0,0,0,0,0,0,0,0
01D3 0000       157 RCCNT:  DEFB 0,0
01D5 20464149   158 READFL: DEFM " FAILED TO READ THE SECTOR $"
01F1 20464149   159 OPENFL: DEFM " FAILED TO OPEN $"
0202 204E4F20   160 SPCFL:  DEFM " NO SPACE ON DISK$"
0214 20464149   161 WRTFL:  DEFM " FAILED TO WRITE RECORDS$"
022C 20505524F  162 MSG:    DEFM " PROCESS COMPLETE$"
023E 204E4F20   163 NOFILE: DEFM " NO FILE REFERENCE GIVEN$"
0257 47454E43   164         DEFM "GENCOM VS1.0 by H.Hill"
026D            166         END

Pass 2 errors: 00
BDOS  0005 BOOT  0000 CLOSEF 0010
DELETF 0013 FCB  005C FCBCR 007C
FINIS 01A7 FIAREA 1000 MAKEF 0016
MSG   022C NEWFLE 01AF NOFILE 023E
OPENF 000F OPENFL 01F1 PRINTF 0009
PROCES 0153 RCCNT 01D3 RDSEQ 0133
READF 0014 READFL 01D5 SPCFL 0202
TPA   0100 WRITEF 0015 WRTFL 0214
WRTSEQ 017A ZEROFL 010E
```

Retrieving Erased CP/M files

A machine code utility for Basic programmers from Martin Scraggs and Tony Blakemore

In the March 1985 issue of the English CPC464 User was a very interesting article on CP/M Assembler. The article explained a little bit about CP/M COM files and adding a new file UNERA.COM - a file to retrieve CP/M files that had been accidentally erased. As an accomplished expert at accidentally erasing files, this had to be the best thing since sliced bread. Unfortunately, because of the nature of CP/M files which all start at hex100 (well below the normal area for the start of BASIC), a BASIC program was not available to produce this new file.

Talk about indian givers - here was the answer to my prayers and I could not get my hands on it. I contacted a good friend of mine Martin Scraggs who had helped out before when I had problems related to machine code. I wanted to find out if it was possible to enter the machine code using DDT on the CP/M disc. To complicate matters even further the listing contained Macros, a type of machine code subroutine, that made direct entry impossible. I left the problem with Martin who, amidst vague mutterings about "basic programmers who should not get involved with things they know nothing about", promised to see what he could do.

Listed below, thanks to Martin, is a method that will allow us BASIC programmers to enter and raise a new CP/M file called UNERASE.COM. Before entering the program which contains nearly two hundred entries I would stress the need for accuracy. If a mistake is made the whole procedure must be started again.

1. Place your CP/M disc into the disc drive and type |cpm and press ENTER. When A> appears type DDT and press ENTER. On the screen will appear:

```
DDT VERS 2.2
- (cursor here)
```

2. Type S100 and ENTER. The screen will now show:

```
DDT VERS 2.2
S100
0100 01 (cursor here)
```

3. This is the start address for entry of a new CP/M file. Listed below are the hex numbers that will enable the program to be entered. I would suggest taking a photocopy of this page and crossing off each number as it is entered. Start at the left side of the listing and work to the end of line. Type in each number and press ENTER. After th entries the screen will look like this:

```
DDT VERS 2.2
S100
0100 01 ED
0101 BC 7B
0102 07 06
0103 C3 (cursor here)
```

You can ignore the second column, i.e. 01,BC,0F etc they are only numbers that you are replacing. They wi come up automatically as you press the ENTER key.

```
ED 7B 06 00 11 5C 00 0E 11 CD 93 01 3C C2 00 0
21 C3 01 22 9D 01 11 80 00 0E 1A CD 93 01 11 9
01 0E 11 CD 93 01 3C 28 40 3D 87 87 87 87 87 1
00 5F 21 80 00 19 E5 23 06 0B 11 5D 00 1A 4E C
B9 B9 23 13 20 18 10 F5 E1 E5 7E FE E5 20 0F 3
00 ED 5B 9D 01 01 20 00 ED B0 ED 53 9D 01 E1 1
9F 01 0E 12 CD 93 01 18 BD 11 C3 01 2A 9D 01 B
ED 52 CA 00 00 D5 21 0C 00 19 7E 32 68 00 11 5
00 0E 16 CD 93 01 01 0E 10 CD 93 01 21 20 00 1
EB 18 D9 E5 D5 C5 CD 05 00 C1 D1 E1 C9 00 00 3
3F 3F 3F 3F 3F 3F 3F 3F 3F 3F 3F 00 00 00 00 00
```

Now look at the entry opposite 01AB - if it is the first 00 after 3F then you have the right amount of entries. Press the CTRL key and C. This will return you to CP/M. When the A> appears type SAVE 1 UNERASE.COM & ENTER.

UNERASE.COM has now been placed on the CP/M disc. Type DIR to make sure that it is on the directory, if not the whole program will have to be done again.

To test the new file, filecopy any program onto the CP/M disc, make a note of its name and erase it. Return to CP/M and type UNERASE and the name of the file you have just erased. The program should now be restored to the directory. Run the restored program and check that it works. If it does, you have a very useful CP/M file.

UNERASE will only work if it resides on the same disc as the file accidentally erased. To use UNERASE on all your discs, filecopy it onto the disc when you format it. It only occupies 1K so you will not lose much space. As you become more confident and less accident prone you can leave it off the discs.

Typnig Errors

Correcting some mistakes so far detected

Errors are bound to occur from time to time, despite our efforts to check the contributions we receive before they go to press. We rely upon the readers of this magazine to be our back-stop to catch those we miss.

So we are grateful to those people who took the time to write and identify the mistakes.

3D ball (Page18, Issue 4) - Line 60 should read as follows
Draw SizeX*sin(A)+320,sizeY*cos(A)*sin(A*0.95)+200

Down the Mine (Page28, Issue 3) - Line 4600 has a colon missing. It should be inserted following the quote at the end of the PRINT statement, ie ..hammer.":b14=1:GOTO 2450

MAP-CODE (Page10, Issue 5) - This problem will mainly concern disc drive owners. The program will lock if the drive is resident in the system. To correct this, merely change start=39000 in line 30 to start=HIMEM-5000.

Computerised Address Book (Issue 3) - The program listing has probably caused the most headaches. It was very difficult to distinguish between lower case L and number 1. Below is a listing of all lines containing lower case L's which we have changed to upper case. Anything else that looks like an 'el' should be read as a one.

```
1480 FOR L=1 TO size
1490 INPUT #9,namfld$(L):INPUT #9,strfld$(L):INPUT #9,twnfld$(L)
1500 INPUT #9,subfld$(L):INPUT #9,telfld$(L):INPUT #9,modfld$(L):INPUT #9,postld$(L)
3110 FOR L=1 TO 1
3120 IF INKEY$<>" " THEN L=0
3130 NEXT L
3730 L=0
3750 FOR L=1 TO 1
3820 IF choi<1 THEN L=0
3830 IF choi>7 THEN L=0
3840 NEXT L
5160 FOR L=1 TO 1
5170 IF INKEY$<>" " THEN L=0
5180 NEXT L
6040 FOR L=0 TO size
6050 IF UPPER$(frt$)=UPPER$(twnfld$(L)) THEN town$(L)="yes" ELSE town$(L)="no"
6060 NEXT L
7015 IF namfld$(z)="" THEN L=size:GOTO 7030
7130 FOR L=0 TO size
7140 IF UPPER$(nrc$)=UPPER$(namfld$(L)) THEN c=L:L=size-1
7240 FOR L=1 TO 1
7260 IF a<1 OR a>6 THEN L=0
8020 FOR L=0 TO size
8030 IF UPPER$(awr$)=UPPER$(namfld$(L)) THEN c=L:L=size
8060 FOR L=c TO size
8070 namfld$(L)=namfld$(L+1)
8080 strfld$(L)=strfld$(L+1)
8090 twnfld$(L)=twnfld$(L+1)
8100 subfld$(L)=subfld$(L+1)
8110 telfld$(L)=telfld$(L+1)
8130 modfld$(L)=modfld$(L+1)
8135 postld$(L)=postld$(L+1)
10255 IF n$="" THEN size=size-1:RETURN
10260 FOR L=1 TO LEN(n$)
10270 temp$=MID$(n$,L,1)
10320 NEXT L
10350 FOR L=1 TO LEN(n$)
10360 IF MID$(n$,L,1)=" " THEN s=L
10370 NEXT L
10400 FOR L=1 TO s-1
10410 IF ASC(MID$(n$,L,1))>64 THEN cnam$=cnam$+MID$(n$,L,1)
10420 NEXT L
10450 FOR L=s+1 TO LEN(n$)
10460 IF ASC(MID$(n$,L,1))>64 THEN snam$=snam$+MID$(n$,L,1)
10470 NEXT L
12050 FOR L=0 TO size
12060 PRINT #9,namfld$(L):PRINT #9,strfld$(L):PRINT #9,twnfld$(L)
12070 PRINT #9,subfld$(L):PRINT #9,telfld$(L):PRINT #9,modfld$(L):PRINT #9,postld$(L)
12080 NEXT L
```

History of Programming Languages

Arthur Harris provides the background to the evolution of programming languages from 194 to today. To new computer buffs it is historical, to the old it is nostalgic.

In the early 1940's, computers like ENIAC were controlled by thousands of wires and switches. These physically controlled the flow of electrons through the computer and hence its performance. Each program required a different configuration and rewiring, from one program to another, took many hours. During the late 1940's, IBM developed the Card-Programmed Calculator. This was a large step forward. A set of pre-wired, special-purpose boards performed generalised functions. These boards made the CPC emulate a floating-point machine with built-in functions like square roots, sines and exponents. This arrangement was still not a saved-program computer. Each program had to be entered each time it was to be run.

These computers understood only machine code – a series of bit configurations that the computer coverted to internal operations. Each code gave the machine one instruction, similar to throwing one switch or plugging in one wire on ENIAC. Developing and entering a substantial program took a long time and was very error prone, resulting in programs that were hard to debug.

As hardware became more sophisticated, it was realised that computers were useful and efficient tools. This realisation focused interest on automatic programming.

One effort to produce a system, or language, that would make it easier for the programmer to write programs that the computer would automatically convert to machine code through compilation, was centred around Massachusetts Institute of Technology. This effort produced the Whirlwind computer which was developed between 1947 and 1951.

The first commercial venture into automatic programming was led by Dr. Grace Hooper of the Eckert-Maunchly Computer Corp. The result was Univac 1, which was programmed in mnemonic code known as Assembly Language. This was still rather clumsy and required several instructions to produce simply functions. Because Assembly Language is close to the language used by the computer, it is considered to be a low level language like machine code. Dr. Hooper's group continued along this line and laid the ground-work for most current high-level languages.

A high level language has a syntax far removed from the internal working of the computer. Ideally, it should be more easily understood by humans. Dr Hooper's efforts produced several compilers. The A2 compiler, the most widely used, uses a series of floating-point subroutines in main memory. This compiler depended on a sequence of compiling instructions, but acquired a pseudo-code after May 1954.

The Algebraic Translator, AT3 (called Math-Matic), was not commercially successful but a number of its concepts were used in the development of Algol. AT3 was not completed before Univac became obsolete as a scientific computer.

The B0 compiler (called Flow-Matic) contributed largely to the development of Cobol. Released in 1956, B0 relied on English-like syntax and was one of the first languages suitable for business applications.

At the same time, another Univac team was working on another compiler. Anatol Holt and William Turanski produced the GP (Generalised Programming) system, based on hierarchies of library subroutines. The language was extended as GPX for the Univac II. This was the first computer language which primarily took account of the computer system program segmentation and memory allocation.

Meanwhile, IBM released the IBM 701 one of the first commercial large scale computers. The Speedcode language it used (developed in 1952) was easy to program but slow in operation. Next came the Pact system but, like AT3, it was not completed before the 701 became obsolete.

The development of a medium-sized magnetic drum encouraged software evolution. A number of interpretive languages appeared and the IBM 350 showed how proper data placement on the drum could optimise programming effort. Soap (Symbolic Optimiser and Assembly Program) utilised these features but was overshadowed by progress in other languages.

Dr. Al Perlis wrote the IT compiler at Carnegie Tech. IT took alpha-numeric card input from the IBM 650 and produced a program in Soap. Later a program called Fortransit translated Fortran into IT, through Soap, to machine language.

Hardware technology continued to direct the progress of computer languages. The IBM 704 used magnetic core memory instead of electrostatic tube storage and incorporated many other improvements.

While developing the 704, in 1954, IBM placed John Backus in charge of a team to write a high-level, automatic program language for scientists,

nathematicians and engineers. The eam included Irving Ziller, Harlan Herrick and Roy Nutt. Backus is quoted as saying the team "simply nade up the language as they went long". In April, 1957, after some 25 nan-years of work, the first Fortran FORmula TRANslation) compiler vas produced. At first it did not lways work but after modification nd improvement, it did produce xecutable code. This relatively easy-o-use language promoted practical se of computers.

Since then, several enhancements ave produced new versions – ortran II in 1957, and Fortran III and V in 1962. IBM and a users group, HARE, promoted use of the language. n May, 1962, a committee tried to evelop standards for the language. n 1966, the American Standards ssociation (now the American lational Standards Institute – ANSI) ublished its guidelines. The committee roduced two standard Fortran nguages – Basic Fortran for smaller omputers and USA Standard Fortran r larger machines. Later, Fortran VI as developed and renamed PL/1.

Meanwhile, a European computer roup, GAMM, was interested in eveloping an algebraic compiler for variety of machines to try to produce universal standard. Because of the ternational complications of the ffort, Dr. Perlis and John Backus ere named in its American faction. lthough the group eventually dis-rded the idea of an international nguage, it published a report, The reliminary Report on an International lgebraic Language, in the (northern) pring of 1958. The language, at first alled IAL, became known as Algol. ater versions included Algol 58, lgol 60 and Algol 68.

Other algebraic languages, based n Algol, included Balgol (from urroughs), Jovial (Jules Schwartz' wn Verion of the International lgebriac Language – from the ystems Development Corp.), Mad rom the University of Michigan) nd Neliac (from the Naval Electronics Lab.).

By mid-1959, most computers accepted Fortran and it seemed a universal language in USA. However, several of its features were awkward. Fortran suffered the drawback of being developed by IBM. This impeded its adoption as a universal language.

Further algebraic languages include Alpak and its successor, Alltran, from Bell Labs. SAC-1 was a large collection of Fortran subroutines. Algol was never successful in USA.

The US Government could afford complex systems and would require complex languages. It needed a new language that was compatible with may computers and was suitable for data processing, not scientific applications. In 1959, the Secretary of Defence called a meeting of representatives of manufacturers, users and academic institutions to form Codasyl (Committee on Data Systems Languages). Up till then, no one had paid much attention to business applications. Even B0 was limited by hardware inadequacy. Other attempts at business oriented languages include Aimaco (Air Material Command, 1959) and IBM's Comtran (1959).

Because of the urgency of the project, Codasyl selected two committees one to work on a short term solution based on existing languages and one to examine the recommendations of the first committee. The short term group recommended the development of a new language – Cobol. By the time the recommendation was presented, Honeywell had released Fact. A dispute ensued over these two languages, but eventually Cobol was accepted. The first report was released in April, 1960 and refinements resulted in Cobol 61. Fact was a powerful data processing compiler that relied on English syntax and worked for configurations as small as 4K. Cobol became widely accepted and became a commercial success. Cobol became the COmmon Business-Oriented Language. It was followed by Cobol 61 Extended in 1963, Cobol 65 and 68. ANSI approved a version in 1968 and approved revised standards in 1974, known as American National Standard Cobol 1974.

In 1963, 3 representatives of IBM and 3 members of SHARE formed the Advanced Language Development Committee. They aimed to produce a language called NPL (New Programming Language). This was changed to MPPL (Multi-Purpose Programming Language) and finally PL/1. This was released in April, 1964, revised in June, 1964 and refined until the release of 1976 PL/1 American National Standard.

IBM, meanwhile, was working on many other languages. One of them was RPG (Report Program Generator), released in the early 1960's and was followed by RPG II and RPG III.

The languages mentioned are only some of the 200 or more languages implemented since the 1950's with over 100 more no longer in use.

While scientific and data processing have dominated the computer world, scores of languages have been developed for list or string applications or specialised functions.

Amongst the oldest of the list-processing languages is IPLV (Information Processing Language V), released in 1958. It was one of the first to use memory cell lists linked with pointers. Other list processing languages include Sail, POP-2 and Slip, a descendant of FLPL, KLS, Threaded Lists and IPL-V. The most popular today seems to be Lisp.

Lisp 1.6, the latest version, has had a great influence on the development of Logo. Focus on string processing resulted in Comit, released in 1957. Snobol, a string oriented symbolic language was released in 1962.

The favourite language implemented on micro's is BASIC. It was a late development, since interpretive languages were not respected during the compiler period. Beginning in 1965, Prof. John Kemeny devised Darsimco (Dartmouth Simplified Code). Prof. Kemeny and Dartmouth

(Continued on Page 16)

•COMPETITION•

$2500 worth of prizes to be won over four classes

Class 1
Best overall program
Wins an AWA Video Recorder

Class 2
Best amusement/adventure
Wins a new DD1 disk drive

Class 3
Best educational software
Wins a new DD1 disk drive

Class 4
Best business software
Wins a new DD1 disk drive

How to enter

Think about your program and map it out in a series of events or features. Write the program onto cassette based around these events and check that the program runs as intended. Once you are satisified, send a copy of the cassette in a suitable envelope along with the following:

1 A brief summary of the program in 500 words or less.
2 A clear program listing if available.
3 A stamped, self addressed envelope of adequate dimensions if you would like your entry returned.
4 Your name and address.

You may make as many submissions as you want, but no entrant may win more than one prize.

Conditions of Entry

1 All entries must run on a CPC464, and must include a cassette copy of the program (plus loading instructions where necessary), a brief summary of the program and its purpose and, if possible, a full listing.
2 All entries must arrive by 15th August 1985, and winners will be printed in the October edition of The Amstrad User.
3 The decision of the judges is final.
4 It is a condition of entry that all entrants have exclusive ownership of the copyright of the material submitted, and the winners agree to assign all copyright in the winning submissions to The Amstrad User. Where the entrant is more than one individual, then one person must be nominated and empowered to act on behalf of the entire group. All entrants must undertake not to submit the same or a similar program to any other magazine, publisher or organisation until after the announcement of the winning entries.
5 We, The Amstrad User, may offer to publish programs other than the winners in the magazine or as commercial software, in which case we will agree terms on an individual basis with the author(s) concerned. We reserve the right to amend, alter or revise any program we publish.
6 No employees of The Amstrad User or Strategy Publications, or their relatives may enter this competition.
7 The Amstrad User cannot be held responsible for any loss or damage to any submission.
8 No entrant may win more than one prize.