



# Einstein Magazine

NUMBER 89



A Merry Christmas and Happy New Year  
to all our Readers



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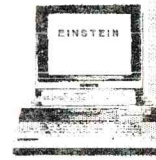
THIS ISSUE OF THE MAGAZINE is being issued in the usual way to subscribing members of the EINSTEIN USER GROUP as their Christmas issue, but extra copies are being printed for issue as a free sample to prospective members (and to anyone else who is interested) at the November Stafford Computer Show organised by Sharward Promotions.

Apologies for the "thin white streaks" across the page which make some of the text a little indistinct. The magazine is printed on a digital printer/copier/duplicator (take your pick which name you choose). In essence this is an electrically-powered and computer-logic-board-controlled stencil duplicator, with an integral fully automatic stencil scanner/cutter. The stencil scanner/cutter is essentially a thermal fax machine talking to itself, but instead of heating up and producing an image on thermal paper, the "thermal head" with its captive array of minute LEDs (light emitting diodes) heats up and melts the thin plastic coating off the stencil material as it passes under it, so that the ink can pass through it. There are 300 LEDs to the inch, and they pulse 300 times to the inch as the stencil roll unwinds through the "cutter head". On the printing machine that we use we have a problem of premature failure, so the minute hole that lets the ink through doesn't get melted.

Apologies also to regular readers and "new encounter" readers alike, if you find the contents of this issue of the magazine rather too "high-tech" for your liking. We do try to provide a reasonable spread of subject matter and ability level in each issue of the magazine, but we are dependent on the material that is sent in for publication, or that we twist people's arm to provide for us. Recently we've been putting a lot of effort into finding upgrade paths for the hardware of our Einstein computers, so that we can continue to keep them in good working order now that the original working parts are getting very long in the tooth, and the contents of this issue reflects this intensive activity. However, whether you are a regular reader or not, we would very much welcome letters, articles, etc., etc., that help us to achieve a better balance of subject matter, interest and ability in future issues.

Apologies too for the very crammed "Tony's Tail End Tidy Up" feature on the inside and outside back cover pages. It was intended to be a single page of feedback/comment, set to the same typesize as this page, with a back page giving details of Einstein and Sharp magazine back numbers that we can supply - yes, Sharp back numbers as well as Einstein ones - plus other goodies for sale, but it sort of just escalated.

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# Einstein Magazine

**& ALL MICRO NEWS**

**Number 89**

Published for users of Einstein (and other) computers

by RPM Society.

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## The Editor Writes:-

Welcome to EM 89. This issue sees the end of the long saga of 3.5" drives. Issues 87,88 and 89 contain the essential information for doing the job. There will be some more detail in the next issue on various aspects of the business but it is all optional and included for interest. Most of it is from Members who have hands-on experience and includes any offers of help which have been received.

I notice that the September catalogue from Greenweld has the Epson drive boxes with a single drive at £6 each. The box will take two standard DD drives with 4 x 1 inch faceplates, and it really does look very good between the monitor and the Einstein. Order No. X9267 from 27 Park Road Southampton SO15 3UQ. Get one now!

I have obtained two more 3.5" drives, both of which work fine. The Panasonic JU257A393P is a 1.44Mb type but just plugged in and worked! It is a standard size drive which uses the same miniature slide switches as Citizen drives, and there are no less than four of them. One is labelled O 321 for drive select, the next MO MS (??) and the third RY DC clearly refers to pin 34 - Ready or Disk Change. Mine are set on MO and RY. These three are on the rear edge of the board, between the plug socket and the motor. The fourth is accessed through a hole in the PC board and has two options, NC and EX. Mine is set on EX.

The other drive must be very old as it is set in a 5" drive casing and the front of it is the same size as the older drive. It works fine except for a tendency to keep on running long after it is used! I did not think this was a problem till I found that a disk in the drive became quite warm after about 20 minutes use! It is a YE DATA 645C1545C D and can be set for drives 012 and 3. There is a board to interface between 3.5" fittings and 5" ones, easily removeable. The face plate can easily be reduced to 4 x 1 inches with a hacksaw, as it is held in place by two screws.

### THE REFERENCE MANUAL

Due to the kindness of John Marriott the EUG now has PC files of the Index and all the extra pages in the 2nd. Edition of the Reference Manual. These print very nicely on my Inkjet. If any member wants the update, consisting of 20 A5 sheets, please contact me and we will work out an acceptable deal. John says his Introduction Manual is in too poor condition to scan, but if someone will lend him a good copy he is prepared to make update files for that, too.



## THE GATES OF HELL

A form of torture to type in.

This is one of Mike Smallman's early conversions which I thought was worth revisiting. It will appeal particularly to members who think machine code is boring or who are entertained watching paint dry.

The idea is to jump the little man through the moving gate using SPACE. You need a very delicate touch or you will hit the next level, and BLOW IT!

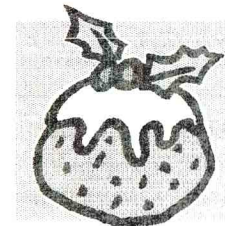
The man can be moved left and right using the O and P keys, but there seems little point in doing so, it is better to just wait until the gate is above him. It is possible to jump through a gate to the immediate left or right - most of the time!

There IS a reward for finishing the course. If desperate you may view this by exiting with Shift/Break and then typing RUN 370.


I have actually slowed the game down 50% so that I had a chance of at least getting to the second level, but then I am definitely no gamer and some may find it a bit too easy. (AT FIRST!) One mistake and you are dumped right back to the beginning. If this seems harsh it may be possible to stay in the level you attained by changing RUN in line 290 to GOTO 30.

Type in the listing, which is pretty straightforward, and then SAVE "HELL" before trying it.

```
10 GOSUB 300
20 S=10:E=400
30 A=19:COL1,4
40 B=(RND(28)+1)
50 C=17:CLS32:COL8,4:PRINT@3,0;" THROUGH THE GATES OF
HELL ":PRINT@8,22;"SCREENS TO GO:";S
60 TCOL15,1:PRINT@0,17;MUL$(CHR$(160),32)
70 PRINT@0,5;MUL$(CHR$(160),32)
80 PRINT@0,13;MUL$(CHR$(160),32)
90 PRINT@0,9;MUL$(CHR$(160),32)
100 AA=(RND(30)+1)
110 PRINT@AA,C;" "
120 PRINT@B,A;CHR$(32);CHR$(162);CHR$(32)
130 FOR N=1 TO E:NEXT N
140 RESP=KBD
```








```

150 IF RESP=79 AND B>0 THEN B=B-1
160 IF RESP=80 AND B<29 THEN B=B+1
170 IF RESP<>32 THEN GOTO 60
180 PRINT@B+1,A;" "
190 A=A-2:GOSUB 320
200 PRINT@B,A;
210 IF AA<>B AND AA<>B+1 AND AA<>B-1 THEN GOTO 280
220 PRINT@B+1,A;" ";@B+1,A;CHR$(162)
230 C=C-4:A=A-2
240 IF C<5 THEN GOTO 260
250 GOTO 60
260 CLS32:PRINT@12,3;"WELL DONE":PRINT
:PRINT@15,5;"BUT";@0,7;"THERE ARE STILL";S-1;"SCREENS TO
GO";:E=E-40:S=S-1
270 IF S=0 THEN GOTO 370:ELSE A=INCH:TCOL1,4:GOTO 30
280 GOSUB 340
290 CLS:FOR F=0 TO 14:TCOLF,15:PRINT@0,F+5;" YOU BLEW
IT";:NEXT A=KBD:IF A<>0 THEN TCOL1,4:RUN:ELSE GOTO 290
300 SHAPE162,"FFDA7E423C52D3D3"
310 RETURN
320 PSG8,15:PSG7,126:FOR I=18 TO 200 STEP2:PSG0,I:FOR
I=200 TO 18 STEP-2:PSG0,I:NEXT:PSG8,0
330 RETURN
340 PSG6,31:PSG7,71:PSG8,16:PSG9,16:PSG10,1
350 PSG12,100:PSG13,0
360 RETURN
370 TCOL15,4:CLS32:GCOL8:R=1:X=128:Y=150
380 FOR F=1 TO 30:ELLIPSEX,Y,R:R=R+1
390 NEXT F
400 PRINT@9,14;"CONGRATULATIONS";@4,16;"YOU'VE ESCAPED
FROM HELL":GOTO 400

```



## Introduction to machine code graphics (2)

by Dave Salvage

As mentioned at the end of the last article, it is possible to redefine the text pattern table to allow any shape to be defined as a character. It then occurred to me that I ought to explain how to do this.

ASCII codes are used to represent particular characters and by simply identifying an ASCII code allows that character to be accessed. For example, A=65 decimal and 41 hexadecimal, O=48 decimal and 30 hexadecimal. The ASCII codes for normal text characters are listed in Appendix D of "An Introduction to Einstein". Codes from 0 to 31 are used to represent control characters such as line feed, delete and escape.

The first task is to define the shape you want for each redefined character. This is best done on graph paper using an 8x8 grid for each character. This design is then represented as eight bytes of data, each byte corresponding to each horizontal line of the grid. For use in a machine code program the bytes of data ultimately need to be in hexadecimal format, which I find easier to visualise than decimal anyway, although an Assembler will accept decimal values and convert them automatically.

Appendix H in "An Introduction to Einstein" is a table listing the decimal and hexadecimal equivalents for all single byte binary patterns.

Having defined the new character shapes, these need to be inserted into the text pattern table in the correct place so that they correspond to the required ASCII code. This can easily be done in both BASIC and machine code.

When Einstein is switched on, the standard character definitions are loaded into VRAM starting at &1800 (6144 decimal). The first 32 definitions (corresponding to the control characters) are reserved for defining sprites, and the character set starts at &1900 (6400 decimal) with 'space'. If you wish to retain standard letters in your program, then the redefinitions can start at &1C00 (7424 decimal) where the Einstein graphics character definitions start. The allocated memory for character definition ends at &1FFF (8191 decimal) allowing a total of 224 characters starting from &1900.

In BASIC, the VRAM is easily accessed by VPOKE I,J1,J2 .. Jn to write data bytes J1,J2 .. Jn into VRAM location I and the next n-1 locations. The VRAM address is automatically incremented as each byte is written, but each time VPOKE is used, the starting address for that command must be defined. VPEEK (I) allows the contents of VRAM location I to be read.

Here is an example to redefine ASCII character 61 decimal, hexadecimal

3D, "=", as a quaver note.

VPOKE 6632,&08,&10,&18,&14,&10,&10,&70,&F0,&60

Once this line of program has been run, every time the "=" key is pressed, the quaver should appear instead. The VPOKE command can of course be incorporated into a loop to allow several characters to be redefined at the beginning of a program as follows:

10 REM REDEFINE CHARACTER SET

20 V = [VRAM address of first character]

30 RESTORE [line number of start of data]

40 FOR N = 1 TO [number of characters]

50 READ A1,A2,A3,A4,A5,A6,A7,A8

60 VPOKEV,A1,A2,A3,A4,A5,A6,A7,A8

70 V=V+8

80 NEXT

90 END

100 DATA n1,n2,n3,n4,n5,n6,n7,n8 .... n[Nx8]

A very similar thing can be done in Assembler and hence machine code as follows:

10 ORG &E000

20 LD HL,&1988

30 LD DE,DATA:

40 LD B,32

50 LOOP: PUSH BC

60 LD A,(DE)

70 PUSH HL

80 POP BC

90 RST 8

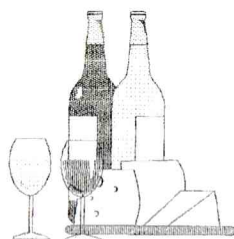
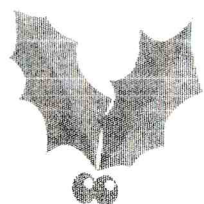
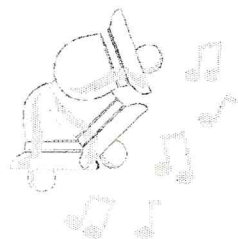
100 DEFB &C3

110 INC DE

120 INC HL

130 POP BC

140 DJNZ LOOP:



150 RET

160 DATA: DEFB &00,&10,&28,&44,&7C,&44

170 DEFB &44,&00,&00,&78,&44,&78,&44

180 DEFB &44,&78,&00,&00,&38,&44,&40

190 DEFB &40,&44,&38,&00,&00,&78,&44

200 DEFB &44,&44,&44,&78,&00

This particular program redefines characters 1,2,3 and 4 as A,B,C and D.

PLEASE NOTE: If using Glentop Assembly Language, the labels in lines 50 and 160 must not contain any spaces including between the line number and the label when being typed in, or the program will not compile. It took me over an hour to work out that a space between the line number and label as I typed the program in was the "error"!

Now to go through the Assembler program. As before, line 10 tells the program where the machine code is going to be located (same as line 20 in the BASIC program to run this machine code, which follows).

Line 20 loads register pair HL with the VRAM address to which the first byte of data redefining the characters is to be written, in this case &1988 or 6536 decimal - ASCII code 49 decimal, 31 hexadecimal, "1".

Line 30 loads register pair DE with the address of the first byte of data to redefine the characters.

Line 40 loads the counter register B with the number of data bytes to be read which equals the number of characters being redefined times eight.

Line 50 starts the definition loop by saving the counter to the stack since the BC register pair are to be used later and the contents of the B register will therefore be altered.

Line 60 loads the A register with the contents of the memory address held in the DE register pair, ie the first byte of data.

Lines 70 and 80 transfer the VRAM address from the HL register pair to the BC register pair as required by the resident routine for writing to VRAM.

Lines 90 and 100 call the resident routine for writing to VRAM (ZVROUT).

Line 110 increases the address of the data byte held in the DE register pair so that the next byte of data is ready to be accessed.

Line 120 increases the address to which the next data byte will be written, held in the HL register pair.

Line 130 retrieves the counter from the stack.





Line 140 decreases the counter by one, and if it is not zero jumps to the beginning of the loop to write the next byte of data to the next address in the text pattern table. The counter becomes zero after 32 bytes of data have been written to VRAM, ie four characters.

Line 150 then returns from the machine code routine to the calling BASIC program.

Lines 160 to 200 are the bytes of data to be written to VRAM to redefine the required characters. DEFB simply defines a byte of data in the same way as DATA does in BASIC.

The BASIC program to run this machine code is as follows:

10 REM REDEFINES CHARACTER SET

20 CLEAR &E000:REM CLEARS MEMORY FOR MACHINE CODE ROUTINE

30 LOAD"REDEF.OBJ":REM LOADS MACHINE CODE ROUTINE WHERE MEMORY CLEARED (&E000). MUST BE ON DISC 01

40 CALL &E000:REM CALLS MACHINE CODE ROUTINE

50 END

If loading more than one machine code routine from BASIC, then remember to CLEAR and LOAD the lowest memory location first else you will clear and may overwrite any routine already written higher in memory.

Almost forgot. A memory dump of the compiled Assembler routine follows.

```

E000 21 88 19 11 14 E0 06 20    I....
E008 C5 1A E5 C1 CF C3 13 23    E.eAOC.'
E010 C1 10 F5 C9 00 10 28 44    A.ul.{D
E018 7C 44 44 00 00 78 44 78    |DD..xDx
E020 44 44 78 00 00 38 44 40    DDx..8D@
E028 40 44 38 00 00 78 44 44    @D8..xDD
E030 44 44 78 00 DDx.

```

Don't forget. Any problems, difficulties or criticisms welcome via the magazine.

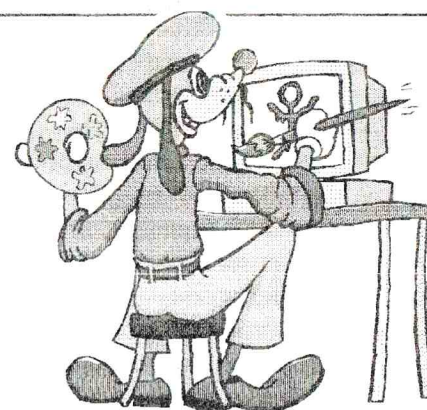
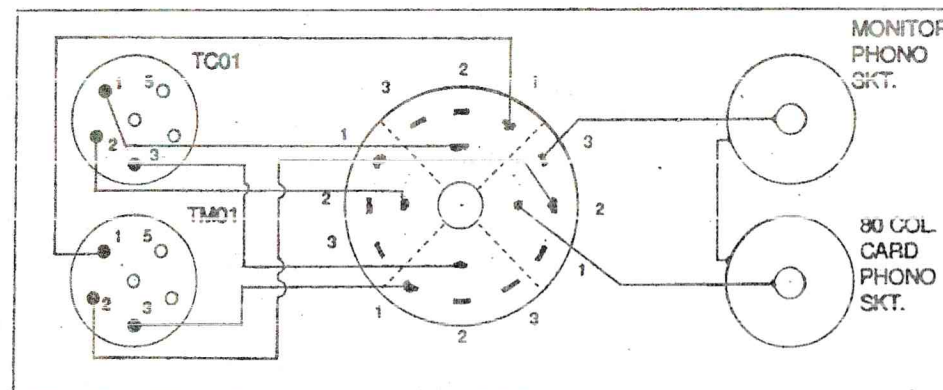


This is the last of Dave's articles on machine code. There has been a good reaction to it from Members. If you want more, and Dave is able to provide it, I suggest you write in and say so, and I will sound him out. Ed.

## THE MONITOR SWITCH

Apologies for the poor quality drawing in the monitor switch article in the last issue. This was almost literally scribbled on the back of an old envelope by the Editor - and looks like it!

We now have a superior creation by Chris Coxall and are pleased to be able to reproduce it here. The Editor has since incorporated this switch in his twin DD Epson box, on the lefthand side under the word EPSON which is now covered with a label bearing the legend 40 80 MON. Some of the internal metalwork had to be bent out of the way and the tin shield will no longer fit, but the switch works fine. The cables emerge at the back through the same aperture as the drive cable. I used 3mm audio quality three-core screened cable for the leads.



Don't know where this came from - but it is NOT Chris Coxall!



## 💣💣💣 THE BOMB 3 💣💣💣

The final stretch, at last. You have selected your drive, fitted the appropriate leads and checked that it appears to work - so far, so good. Now you have to consider the Disk Operating System or DOS.

It is mainly a question of what you have available. If you already have Tatung's DOS 80 or Crystal's XDOS 2.05 you can go ahead and use your 3.5" disks to the full, getting 786k of useable memory and never again having to flip over the disk to use the other side. Each of these DOS's is configurable to suit the drives you have fitted to your machine.

### ***XDOS 2 and DOS 80.***

DOS 80 has a file called CONFIG.COM which you run from the 0: and follow the onscreen instructions.

XDOS 2, of which there are versions 2.02 and 2.05 in circulation, has no config file but there are instructions in the Manual for modifying the system tracks. This is a little tricky, so I wrote a program called 5DRIVES.XBS which does the job for you with onscreen instructions. I seem to recall that Graham Bettany made a request for this in response to a readers letter.

A more recent version is called DRIVESET.XBS and is more user friendly.

The last I heard, both DOS's were on sale from :-

B&H Computers (HX) Ltd

Beacon Business Centre

Southowram

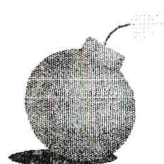
Halifax W.Yorks.

HX3 9UA Tel 01422 330408

Dos 80 was about £10 but Xdos 2 was around £29 because it only comes with System 5 which includes an improved XBAS and compiler plus a text editor and some other programs, including enhanced versions of COPY.COM and BACKUP.COM.

System 5 will run all the programs you used with the old Dos 1.11 or 1.31 and, frankly, is much the best option. Dos 80 has an 80 column version of XBAS with it and will also run all of your old XBAS programs but not necessarily XBAS 5 ones and definitely not compiled programs.

To set up your system you need a working 3" drive as drive 0, because the Dos's both come on 3" disks. One or more 3.5" drives can be fitted as drive 1, 2 or 3. Place your Dos 80 or Xdos 2 disk in drive 0: and boot up



the system with Control/Break as usual. Now insert a 3.5" DD disk into your 3.5" drive and type Backup at the 0; followed by enter. Follow the instructions to format the 3.5" disk and do more if needed. A DIR of the drive should now show that you have a disk with 786k of free space. This disk could then be used to boot the micro directly from a 3.5" drive 0.

At this point you can start to transfer your files from 3" to 3.5" disk. Each 3.5" disk will hold the whole content of both sides of two 3" 188k disks. There are two things to remember; you must use COPY to do the transfer as BACKUP will only work with same size disks, and that the Directory on the 3.5" disk has a top limit of 128 entries. Each side of a 3" disk has 64 Dir spaces so it is possible (though rather unlikely) that you may fill all the directory spaces before the disk is full. I assume that my own 3" disks are fairly typical and I seem to have a natural top limit of around 45 files per disk, and an average of about 25.

### ***XDOS 1.31.***

Failing either of the above you will have to use the DOS which comes with the TC01 as standard, which should be XTAL DOS 1.31 or the earlier version XDOS 1.11. DOS 1.31 is preferable and a look through your collection of disks should pick up at least one example.

Boot this disk in your 3" drive 0 and then replace it with your Master disk or another one containing the file BACKUP.COM. Insert a DD disk in your 3.5" drive and use the FORMAT facility in BACKUP to format the DD disk. A DIR of this disk will now show it to have a capacity of 188k. As you cannot turn it over this is it! It will work just like a 3" disk but obviously only in the 3.5" drive or drives. No configuring of drives is necessary.

If it seems disappointing to have only 188k when 786k is possible, then reflect that many Members have been using this method for years because a DD disk is much cheaper than a 3" one, and more easily obtained.

It is possible to double the size by inserting a switch in the drive cable (The Potts Switch) which causes the FDC (Floppy Disk Controller chip) to treat the disk as a double sided one, but the action is not automatic and each 'side' of the disk has to be formatted separately, once with the switch IN and once with it OUT. The line to be switched is line 32 and it is switched between Ground and its normal setting on the DRIVE side of the cable.

Full details of this switch were in EM 80 and 81. Back copies are available.

### ***XDOS 3.0***

It has not proved possible to modify (or PATCH) XDOS 1.31 to cope with disks formatted by Xdos 2 or Dos 80 because the two types of Dos use



different areas on the disk to record file names but it is possible to patch Dos 1.31 to run DD disks to 786k as long as the only drives in use are 3.5" ones. I have called this version XDOS 3.0. There are other problems in that the 1.31 FORMAT does not work, but I have got round this by using a Software Library formatter called FVDS80.COM which does the job. I can provide this disk to Members sending a DD disk and return postage. The disk also contains XBAS80 for 80 column use and utilities to self boot, configure and put system tracks on DD disks. A BACKUP routine is still lacking but I am looking for ways to rectify this. The XDOS 1 version of COPY.COM works of course for transferring files.

### ZDOS 1.6

This is a CP/M DOS which can be found on volumes 163 and 164 in the Software Library. It is configured for drives 0 and 1 to be 3" and drive 2 to be 3.5" with drive 3 reserved for a Silicon Disk. The Silicon Disk is a special attachment once made for the Einstein TC01 which works rather like a hard drive, except that it has to be loaded with the required files after bootup and the files are erased when the machine is switched off. In spite of this handicap it is VERY fast in use and invaluable when a lot of file access takes place.

With ZDOS it is possible to change the system tracks between XDOS and ZDOS which makes the use of Einstein CP/M programs possible, but XBAS will not load so none of your familiar programs will run. There is a wealth of information on the 2 disks explaining how it all works and is about the best PD contender for normal use with mixed drives. It also enables users with only XDOS 1 to copy their 3" disks to DD ones for later use with XDOS 3.0. More later.

### CP/M plus

This DOS has been on beta test for some time now and Duncan Elvin who wrote it has successfully produced a 3.5" DD disk which will boot the system. It is configurable for mixed drives. To my mind its main drawbacks are the CP/M type commands which are rather difficult to learn (especially if you have never encountered CP/M before) and it is not compatible with Crystal Basic. I understand it will run Locomotive Basic, but so far have no experience of this. Locomotive is reputed to be very similar to XBAS (same author, I think) so this may be the answer to many problems when it is released.

### TRANSFERRING FILES TO DD DISKS

Transferring your existing files to the new DD media was always going to

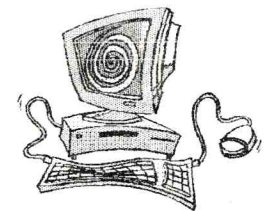
be a problem to those without DOS 2 or 80. As this is probably the majority of members, i.e. those with just one or two 3" drives and no 80 column card, I was quite worried that at one time my only answer was to assemble a party of members who had the needful equipment and were prepared to copy files over for other members. I could visualise so many problems with this that I am glad I can now forget it.

However, I have quite recently managed to do the job using Bill Powell's version of PD 164 and a Dos 3.0 DD disk. They are both obtainable from me at present (at the usual Software Library rates for PD 164) which will also be obtainable from whoever ends up handling the Software Library. (There is change in the air).

If you already have PD 164 check that it boots up in ZDOS 1.6 and contains the files NS.COM and NI.COM. If you read French the file FORMAT2.COM might be useful, as an alternative to FVDS80.COM, which is the main file you will need from the DD disk DOS 3.0.

As briefly as possible the routine is:-

- 1 Boot up from PD164
- 2 Place the DOS 3.0 disk in your new 3.5" drive ( assumed 2/C here and must be for ZDOS)
- 3 Format one or more New DD disks using FVDS80.COM in drive 2/C (NOTE 1)
- 4 Go back to drive A and type GOEINCPM (NOTE 2)
- 5 Place XDOS disk in drive A
- 6 To the question Replace DOS Y/N type Y
- 7 Turn over disk in A and repeat
- 8 Remove disk in A and replace PD164
- 9 Type NS <enter> (NOTE 3)
- 10 Replace the modified Xdos disk in drive A
- 11 Type L
- 12 To question New drive / user area /mask? type A0
- 13 Tag files to be copied using T Note the useful table of total file space. (NOTE 4)
- 14 When all needed files tagged type M
- 15 To question Which drive, etc. type C0 ( one of your newly formatted DD disks in drive C)





16 Files will be copied, space used may be noted. X to quit NS

17 Replace PD164 in A and type NI C: This shows full directory with sizes and space left. (NOTE 5)

NB Don't forget to convert your 3" disks back to XDOS, or at least label them and put them in a safe place.

This is all perfectly possible on a 40 column screen.

The next thing would be to repeat from 10 using the other side of the 3" disk, then another 3" disk, etc etc.

It is not really as fiddly as it appears but the following notes will explain what is happening to give members a better overview.

Note 1. FVDS80 is tricky to use and it is possible to find yourself formatting the wrong drive! Therefore, ALWAYS HAVE THE WRITE PROTECT ON any disk but the one being formatted. The program asks you to select a drive first. when you do this the only apparent reaction is a slight flicker of the screen. if you then input F for format it proceeds and continues to verify as well, however you can just verify if you want to. FVDS80 (and FORMAT2) only format the disk, they do not put DOS tracks on them. I have found that Dixons PC Line DD disks are NOT pre-formatted (for the PC) and work very well as Einstein disks.

Note 2. The thing to remember about GOEINCPM is that it takes the system tracks of the first disk it is used on and tells you whether it is CPM or EIN. PD 164 should be CPM so any EIN disks modified at this point will have CPM tracks put on. This is what we want. To copy successfully you have to have both disks CPM compatible. I have tried making both disks Einstein but the files are not properly transferred - only the first 10k gets copied. A formatted DD disk used under ZDOS and with blank system tracks is effectively CPM compatible.

Note 3. NS.COM or NEWSWEEP is a very versatile utility and well worth getting to know. Only a few of its commands are used here.

Note 4. When tagging files to be copied you will notice numbers appearing alongside the T. The first set are the values of kilobytes and are added up as you go along. To pass a file just press Space. You may also notice that the files are sorted alpha numerically for you. Don't worry that when you select M for Mass copy the M may appear next to a file you have not tagged - the file will not be copied.

Note 5. The file NI.COM is another handy little utility which shows the directory with sizes of all files and space left on the disk.

It should now be fairly obvious that it is only necessary to put DOS 3.0 system tracks on the DD disk to be able to use it to boot an all - 3.5" drive system. There is a utility on the DOS 3 disk for this purpose called

DOSTRACK.XBS. The DOS track is 2800 hex (10240) bytes long and is obtained from the DOS 3 Master Disk.

DOS 3 is just DOS 1.31 patched to use 3.5" DD disks instead of 3" flipover disks and should be expected to work just the same as XDOS 1.31 with all your transferred files.

Once all your files are on DD disk you will be free to make the 3.5" disk your boot drive 0 with a second drive suggested for a useful system to last many years. IF you have a good 3" drive leave it in the machine but disconnected and it can be brought into action later, if need be.

## COPY PROTECTED DISKS.

There is one drawback to this seemingly ideal state of affairs though. Copy Protected Disks. It is certainly possible to copy some of these but legally the copyright holders permission is needed, and it is by no means easy to find them. I think that all the businesses concerned are now closed down or absorbed into other 'houses' and may be difficult to contact. Even when contacted, they may be less than willing to help, unfortunately. Who can be bothered with a few Einsteiners when there is a great big World Wide Web of PC users out there just waiting to throw their money at the next 'big improvement'? Not being a player of 'games' myself I am not too hard hit by Copy Protection although there are also some non-games, like Grafdraw, which come in this area. Grafdraw will run from a 3.5" DD disk but the form of protection employed means that only the first 188k is useable. A pity, but no great hardship to have the use of this excellent program.

## CP/M plus

Since writing the above I have been checking the in-house version of CP/M Plus and find that it can be used to transfer files to DD disks in a similar way to the method for Zdos. In fact, it is rather simpler as there is no need for the swapping of Dos tracks. The moves are:-

1. Boot CP/M+ I can supply a version that is configured for 0 and 1 40t SS and 2 and 3 80t DS.
2. Type EFORM C:8D(space) then ENTER
3. Place a DD disk in drive C and press E. the disk will be formatted and verified 80 tracks with a blank system track.
4. Type A: ENTER
5. Put a copy of PD101 in drive A and type NSWP (Newsweep). this version works, the one on PD 164 does not. Continue as for Zdos.



## BOOTS FOR ALL

No, we are not opening a charity shop (yet!), this is about those odd disks we must all come across in these days of much overwriting of disks and swapping with other members. I mean the ones that don't do what you expect when you boot them up because someone has placed one or more commands in the autoboot area of the system tracks. When you find yourself looking at a line like:

O:FKEY?

and wondering "What the hell.....?". I am sure we have all had them. If a disk has been modified to Autoboot then a backup or system copy operation will transfer this to the new disk which will probably no longer hold the files necessary to do the job. One of the many auto boot programs available will sort things out and let you arrange your own automatic booting scheme.

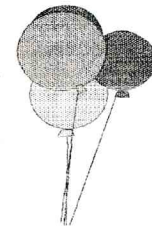
I recently came across such a program (during my wellknown midnight reading sessions) by Andrew Dunipace and found this interesting because Andrew had arranged for the EXISTING boot commands to be displayed, and I had not seen this before. It also occured to me that the program only worked for XDOS 1, and some thought gave me the reason. XDOS 1 uses a different Directory area and boot area to XDOS 2 and Dos 80.

This train of thought led to BOOTALL, which not only tells you what boot commands are in place but also tells you which of the three Dos's is on the disk. You can then blank the boot area and/or overwrite your own commands. The program automatically uses the right Dos for the purpose.

Typing finger ready? Here we go then:

```
10 REM **BOOTALL.XBS FOR DOS's 1,2 AND 80
20 REM **TED CAWKWELL JULY 98 FOR EM*****
30 RST: CLEAR &8000
40 POKE &8000,&3E,&00,&21,&00,&90,&11,&00,&AB,
&01,&00,&00,&CF,&A4,& C9
50 PRINT@12,2;"***BOOTALL***";@15,3;MUL$("_",7);
@5,4;"Autoboot checker and modifier for XDOS 1&2 and DOS
80":PRINT
60 PRINT "INSERT DISK TO BE TESTED IN DRIVE 0 AND
PRESS ENTER":PRINT :Y$=INCH$
```

```
70 CALL &8000
80 IF PEEK(&9031)=&38 THEN PRINT "DOS 80":B=&9108 :GOTO
110
90 IF PEEK(&A734)=&32 THEN PRINT "XDOS 2":B=&9108
:GOTO 110
100 PRINT "XDOS 1":B=&9208
110 GOTO 310
120 CLS:PRINT "AUTO-BOOT MODIFICATION":PRINT
130 PRINT"INSERT DISC TO BE MODIFIED INTO DRIVE 0"
140 PRINT "ENTER NAME OF AUTO-BOOT PROGRAM/S "
150 PRINT"(PRESS RETURN TO CLEAR BOOTSTRAP)"
160 INPUT N$
170 IF LEN(N$)=0 THEN N$=MUL$(CHR$(0),15)
180 CALL &8000
190 FOR A=1 TO LEN(N$)
200 POKE B+A,ASC(MID$(N$,A,1))
210 NEXT A
220 POKE B,A-1
230 POKE B+A,0
240 POKE &800C,&A5
250 CALL &8000
260 PRINT "AUTO-BOOT MODIFICATION COMPLETE"
270 FOR D=1 TO 800:NEXTD:CLS
280 PRINT @5,10:PRINT"DO YOU WISH ANOTHER RUN ?";
290 A$=INCH$:IF A$="Y"OR A$="y" THEN RUN
300 CLS:END
310 CALL &8000
320 V=0:FOR A=1 TO 15
330 X=PEEK(B+A)
340 IF X>=32 THEN PRINT CHR$(X);
350 IF X<=31 AND X<>13 THEN V=V+1:PRINT".";
```





360 NEXT A

370 PRINT:PRINT:PRINT

380 IF V=15 THEN PRINT:PRINT" THERE IS  
NO RESIDENT BOOTSTRAP"

390 PRINT:PRINT

400 PRINT "DO YOU WISH TO ALTER THIS BOOTSTRAP?";

410 A\$=INCH\$

420 IF A\$="Y" OR A\$="y" THEN GOTO 120ELSE CLS:GOTO 280

430 END



My thanks to Andrew as this is mostly his program with a few modifications and additions by myself. It (rather obviously) will only write to the boot drive 0: but it will also work if drive 0: is a 3.5" DD drive. It reports ZDOS and a few other PD Dos's as XDOS 1 because it really only checks for DOS 2 and Dos 80. assuming anything else is Dos 1. As far as I know there is no way to make PD Dos's autorun. I am sure there is a surefire way of checking the Dos type but not knowing what it was, I relied on finding the "2" (in XDOS 2.05) and the "8" (DOS 80) in its USUAL position on the system tracks. There may well be anomalies where the system track has been hacked or patched, but a random 30 assorted disks from my own collection work fine.

## LETTERS

Steve sorts a few problems.....

### Take note dept..



I have had several letters recently that contain questions and pointing out some things that seem odd. Firstly I have a letter concerning drives and how to fit them to Albert "EINSTEIN" from Chris Coxall it was very interesting and I have got some answers for you including some later some question and answers you supplied on disc. I'm trying to work through it at present. by the way it is perfectly OK to send me "PC" type disks as I have a 486 to use them on and can even copy to EINSTEIN formats with work and patience. A couple of points I have picked out concerning 3.5 drives are as follows. As I have pointed out in previous articles the word "standard" doesn't apply as even the same make uses different suppliers within a four month time span creating all sorts of anomalies.

Chris says he has 1.44 drives working on his system and cannot understand what the rest of us are going on about. Well I have 1.44 drives on my EINSTEIN for a long time now the point is that they are only usably advisable in 720 mode at 80 track 10 sectors at normal RPM you can use DOS 5 or SYSTEM 80 for this or if you dislike using odd DOS formats you can use them as normal with the STANDARD EINSTEIN DOS as supplied on your master discs at 40 track 10 sectors. To use the other side of the disc you can fit a SIDE SELECT SWITCH as my modification was in earlier articles. I know of no way to convince EINSTEIN to work with 1.44 drives at 80 track 20 sectors Double RPM. I have the FDC floppy disk controller info from Western Digital that I supplied to Peter Hill if any one can sort it.

Now Chris has come up against another problem I definitely can cure for him. This regards the fact that some drives he cannot switch to "A" or work in this position but they work ok as "B" there are no switches or links to set. Here again we move into the realms of what is a standard 3.5 drive, the answer is that there is no such animal these drives are in a constant state of flux as developments occur or production is switched country to country or supplier to supplier.

The latest drives circa 1997/8 have rom chips on them and Windows 97 sets the drive to whatever it feels like depending on the configuration of the rest of the system. Bummer isn't it !!!

Slightly older drives as I suspect Chris has problems with circa 1993/96 these are all manufactured as "B" and cannot be altered. The ribbon cable is the secret if a flat cable is used then "A" must be a switchable drive. The "B" can be of this type as it is set to "B" anyway.

If you have non switchable drives you must use a "twisted drive ribbon" the end drive will be "A" and the nearest the motherboard will be "B" please see the diagram it is true honestly.

Older drives can be switched "A" or "B" and if really lucky "C" or "D" also these are sometimes labelled "0 1 2 3"

Drive connections can vary a lot the normal 34 way connection is the Shugart standard, note that word is flexible again. The EINSTEIN manual has a representation of the variety we use. These can be edge or pin type and I have a supply of converters for these. Beware of 26 way as these are mostly Citizen or as we use on the EINSTEIN 256 3 inch Hitachi drive also used by Amstrad as these sometimes have power in the drive ribbon but not always. By the way the 4 way power cables are the same on some drives but reversed on others.

One last word stay well away from lap-top drives at any price.

The next point to cover is pin 32 this is sometimes associated with a switch DC/DR if you are using on EINSTEIN don't bother as Albert doesn't even



look at it. The PC likes drive connected and Amstrads like drive ready but again there is no hard and fast rule. The Amstrad drive ready is a pull to ground for 300 miliseconds when the disc is in and spinning at the right speed. The drive connected signal is the same line but inverse signal.

Terminating resistors, I don't profess to know all there is to know in this world but my understanding is that these are required to "pull down" on the lines to clean up the signals and stop spurious float or dirty signals by adding a small load/drain to ground.

Ted Cawkwell is working on a modified TED DOS to boot from 3.5 inch drive in 720 mode but I have done another similar trick by booting from a 3.5 inch drive in single sided mode using only 180 mode. The advantage I can see is in having the ABBA switch as well as my side switch this gives the option of 3 inch "A" drive and 3.5 inch "B" or at the flick of the switch 3.5 inch "A" and 3 inch "B". So you can use either as your main drive details of this will follow in future issues.

Just as a leader to encourage others there are some points to watch out for suffice to say beware of RGB as there appears to be four types 1 volt ,, 5 volt ,, positive sync and negative sync as well as composite.

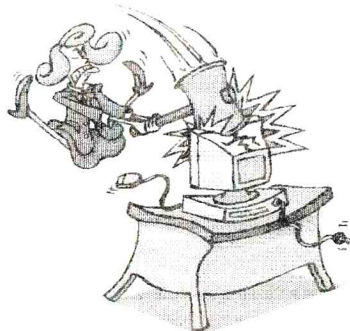
Printers can be a nightmare to set up as to get the optimum performance out of them you must tune them using there own particular "escape codes"

cl\$ 27 ..... fortunately thay mostly can run on STD ASCII codes as this basic operation mode is often called EPSON 80 after the company and model that set the original standard before this each was individual to the computer the size of a Transit van.

Well, thats about all I can get down now I hope this helps with general understanding will write more as I can.

Bye now Steve Potts

(Editor's note. We look forward to the ABBA switch, Steve, the better as we are getting rather short of new material for the magazine.)



Don't let this happen to me,  
folks !

X SEND IN YOUR  
X CONTRIBUTIONS  
X NOW

\*\*\*\*\*

As Ted The Ed has hinted in the past couple of magazine issues, he is now getting towards the end of the material that you sent in -- some of it quite a time ago now! -- for the delight and edification of your pals in our user group, and he'd very much appreciate your getting down to hewing some more letters, articles, ideas, how-to tips, questions, queries, quotes and quorums for him to put in these pages.

Ted's health is not what it once was. He's not expecting to pop his clogs on us at dawn tomorrow -- but he has no wish to drop us all into the "oooh-nasty", and he does badly need an understudy. Volunteer!

Back To The Black Stuff:-

Page 2. Greenwell take credit card orders, you can phone them on 01703-236363 or fax them on 01703-236307. Manuals:- We at User Group Head Office (well, Tony to be precise!) keep meaning to sort out what Einey Manuals and books are lurking in dark corners and get them listed and priced so you can fill the gaps in your Einstein technical library. Maybe next time round? If you are desperate, write in.

\*\*\*\*\* Page 8. Dave's Machine Code Articles:- Originally written in the hope that some of you chaps out there would complete the conversion of his musical genius software to machine code. Anyone interested? Plus more of his articles? Yes please! Memo to self: Get Dave's musical software passed on to new Software Manager Steve Potts so he can distribute it to members, and get some User Manuals printed for it.

\*\*\*\*\* 000000PS -- SORRY! Forgot to tell you! Steve Potts has been appointed as our new Software Manager, is busy sorting out the software library ready for the Stafford Show -- which most of you will have missed when you read this note -- and will then be taking on the job of getting some order into the Einey former commercial software, and acting as contact point for that too, at 85 THOROLD AVE, CRANWELL VILLAGE, LINGS, NG34 8DS. Phone (considerately please!) 01400 261839.

\*\*\*\*\* P.9: Shield = shield. Just managed to fit the diagram in!

\*\*\*\*\* P.10. Someone told me last week that B&H have a little man who lurks part time in a dungeon deep down in the depths of their moated castle who is the only person still living who remembers where the Einey stuff is hidden and how to find it. Apparently their idea of Einey service is unbelievably efficient or else just unbelievable. Try it for yourself, & us how you got on -- it must be worth passing on!

\*\*\*\*\* P.10-15, Dos this and Dos that: p.10. Unless you are in a desperate hurry to pay twenty quid to B&H, EINEY CP/M PLUS should be out soon from us, is expected to be cheaper than either option quoted, may include Mallard BASIC, will run 80 columns and any combination of disk drives up to 80 tracks double sided, is fully compatible with XtalDos, will run almost all XtalDos utilities and programs, has utils to read/write Amstrad & PC disks (including sub-directories!).

\*\*\*\*\* P.11, using COPY, not BACKUP. NEWSWEEP (often shortened to NSWP.COM or NS.COM on disk) is a lot easier to use than COPY.

\*\*\*\*\* XtalDos 1.31: Mike Pugh patched this to format and run 80 tracks, single-sided. Should be available from Steve Potts soon when he's got a bit of order into the software library. With his side-select switch fitted, you'll have full disk capacity with no disk format incompatibilities at all. Ted's explanation isn't clear:- 3" disks are floppy disks, but you can't flip a 3.5" disk -- it only fits one way round. Dos 1.11/1.31 doesn't know about a second read/write head on the drive, and only understands single-sided disks. Steve's side-select switch flips to the other read/write head, without all the effort of physically flipping the disk over.

\*\*\*\*\* PLEASE NOTE: All software offers in this article, respond to Ted for now until Steve is fully in the software hot seat.

\*\*\*\*\* P.12, The Einstein SILICON DISK is occasionally available second-hand. Buy if you get the chance. It is a box full of external RAM, which functions just like a disk drive, but much faster, loses its contents when you switch off. We have a utility that does the same for the 256, using part of the internal Video RAM. (Available soon)



\*\*\*\*\*

\*\*\*\*\* EINSTEIN CP/M PLUS. This version (unlike earlier ones) is fully compatible with XtalDos, will run all XtalDos programs and utilities that don't cheat and access the hardware directly. XBAS isn't happy with it, but we may be able to include a much improved version, marketed for Spectrum & Amstrad as Mallard BASIC. We had problems with the configuration utility which set it to your arrangement of kit, but hope it will be ready to distribute very soon.

\*\*\*\*\* P.12-14 GOEINCPM: This was necessary in the past, as XtalDos and older versions of CP/M used a different arrangement of file extents to record on the disk where the rest of the file was parked, after the first 2Kb chunk. As a result the "wrong" operating system can't find what you're looking for and grates its teeth quite horribly. GOEINCPM was written so you could re-write the directory tracks from the CP/M way of doing it to the XtalDos one, or vice versa, so the Dos could find its way round the disk, without wrecking the directory. With the gosh-isn't-it-ready-to-be-released-yet super new EINEY CP/M PLUS this problem doesn't exist, as it has been written to conform to the XtalDos way of doing the job.

\*\*\*\*\* P.15, COPY PROTECTED DISKS:- The user group has distribution rights to quite a lot of former commercial software, some of which is copy protected, so we have protected disk copier utilities that overcome this problem. Most were written to work with XtalDos 1.11, the very rare 1.21, or 1.31. They should work OK with 3.5" disks formatted to 40 tracks, single sided. This may cause problems if you are running 80-track double-sided drives, but should be no problem at all if you are using the 80-track version of Dos 1.31 and side select switches. Incidentally, there's no reason why you can't run a drive fitted with a side select switch as though it wasn't there. The switch, when operated, simply reverses which side is side 0, and which is side 1.

\*\*\*\*\* P.16, BOOTALL: CP/M and XtalDos use a stone-age system of permanently embedding in the disk boot tracks details of the configuration of the disk drives that you have in use, which can easily result in total disaster if you change the set-up or boot up a disk from one machine on another one. MsDos (on the PC) uses a simpler and far more elegant system of putting a "media descriptor byte" on each disk when formatting it. The Dos reads this when doing a read or write operation, checks its look-up table, and knows exactly what format disk it's dealing with. Duncan Elvin (our techno-whizzkid who ported EINEY CP/M PLUS across from a version designed for the Atlas computer -- ever met one?) says it would be relatively simple to include this feature in his EINEY CP/M PLUS. Interestingly, Ted seems to have found a way of achieving something very similar in principle using XBAS, with what is already on the disk and functioning as a primitive form of the media descriptor byte that MsDos uses. If I remember rightly, an "MsDos disk" formatted by an Atari ST isn't recognised as such by MsDos as this media descriptor byte is missing.

\*\*\*\*\* p.19: Why do some 1.44Mb (switchable double or high density) drives work happily on Einey, while some won't?:- Almost all such drives expect to find MsDos on the other end. MsDos reads the media descriptor byte when it does an access, and from this it knows the format of the disk, and thus the density, and signals the fdc (floppy disk controller) to set the mode select line high, or to bring it down low. Einey knows nothing of this, nor does its fdc, so does nothing. If the 1.44Mb drive defaults to 720 mode all should be well, but what if it doesn't? It may default to 1.44Mb mode instead, unless the mode select line is switched outside the drive casing. This ought to be curable with a mode select switch. Or it may be floating in an indeterminate state, neither high nor low, waiting for the fdc to decide, and sulking meanwhile. Can we check out if this is the problem on 1.44 drives that won't play when hooked to Einey? How does this tie in with the presence or otherwise of a terminal resistor?

\*\*\*\*\* P.20 ABRA switch: For Einstein as well as PCW? YES PLEASE!!!