



# Einstein Newsletter

No. 5 February 1998

I am writing this rather later than I intended because of several setbacks following apparent forward steps, the overall picture now being that we are a little further ahead in our quest rather than all the way home as I thought for nearly a whole day!

First the advances: following a letter from Dick Keynes, who was not on the distribution list but is now, with copies of CPM+ assembler and part of Xdos 2 assembler listings, Duncan has produced a 3.5" disk with CPM+ which does boot and runs all the rest of the CPM+ files including a modified TRANSFER.COM. I have not run everything, just what seems important. TRANSFER allows copying both ways between CPM and MSDOS on 720k disks and is clearly a very useful utility.

Also, after talking with Duncan and studying the Xdos 2 code I decided to have a go at patching Xdos 1.31 to boot from 3.5" drives and have succeeded in this, to my amazement and delight. All the details follow under the heading DISK PARAMETER BLOCKS later in this newsletter. The only snag I have come across so far is that the Xdos 1.31 Format will not do 80 tracks, but this can be bypassed by using FVDS80.COM or other PD formatter.

I have come up with a data lead which will run 720k or 1.44M drives in either 0: or 1: positions with no alterations. This was a result of a letter from Maurice Hawes who put me in contact with John Ibberson and Steve Bass, both of the Sharp User Club. John informs me that he has a pair of 1.44M drives working quite happily on an MZ80 and does not seem to have encountered the problems we are having.

It is a variant of the better known PC twisted lead but in our case the twist is confined to wires 10, 11 and 12. By this means any 3.5" drive before the twist is drive 1 and after the twist drive 0, the only proviso being that all of the drive jumpers are set to drive 1. This works for 720k drives as well, meaning that you can mix your drives at will.

Sadly, the main retrograde step puts a damper on the above and concerns 1.44M drives, specifically my TEAC 235HF and Chris's Mitsubishi, though he now has it running nicely on his Einstein. We both agree that the pin 34 thing is a red herring, but there is something odd happening. It is as if the drive is toggled in some way between two states, only one of which is correct.

As an example, and this has happened before, I made new leads for power and data (as above) for a TEAC 235HF (1.44M) and a Citizen OSDC-29C (720k) using the TEAC as the boot drive 0:. Previously, they had been in use with the Citizen as drive 0: and I had trouble with the TEAC getting 'bad data', 'no sector' or occasionally 'no drive'. I had a feeling that the Citizen, which has a rather strange Drive Select - a 2 position switch marked 0/1 at one end and 2/3 at the other - might be interfering in some way with the other drive.



I checked the voltages and the red line on the 34 way connectors and fired it up. Perfect results, the only oddity being that the 720k needed the DS switch in the 2/3 position to become Drive 1, which I reckoned I could live with. Markings on PCB's are often hard to interpret!

I then spent some 2 hours using both drives, copying, backing up and generally trying out various DOS's which I have to hand, to find the best one for booting the machine. I was happy to find that my patch of Crystal DOS 1.31, the original with the machine and therefore not a copyright matter, seemed the best as it allowed all the usual programs to run just as normal. I reckoned we were home and dry!

But guess what, I switched on the next day and all I can get is 'bad data' etc. Thinking that the drive was having trouble finding the system tracks and as I was in MOS I thought I would read off the DOS tracks and write them back, but again 'bad data'. I tried the same disk in drive 1 (720k) and read the tracks no trouble but writing back did no good, nor did trying to write the Dos back to the disk in drive 0:.

Since then everything I have tried, including setting up afresh, has resulted in zilch! I am forced to the conclusion that it is a software problem, but have no idea where to start looking for it. I have switched the Citizen back to drive 0: so at least I can boot the thing but drive 1 just sits there looking mutinous! What changed in the few hours between success and failure? I was using the same, unchanged, disks both times. Can't understand it.

In case I might have zapped the TEAC somehow, I put it back in the 286 PC and it is in good working order. Chris has written to me about his way of correcting the problem, and I have tried his recommended procedures without success.

The other back/forward step concerns the Epson 720k drives. Looking at the PCB again I realised that the space for the power connector was still there, including the holes the pins would occupy! It is underneath the board and not too obvious. Using a magnifier and a 2mm soldering bit and a double whisky to steady my trembling hands I attached two wires to the 5 volt and ground pin holes.

I then dismantled the double drive setup mentioned above and plugged in the Epson as drive 0. (I wonder how long the sockets will take this punishment?) Firing it up I was delighted to see a light on the drive, but less happy when it refused to go out! The motor was not running so I popped in a blank formatted disk, against all the rules, of course. The motor started spinning the disk, rather noisily I thought, but nothing else happened and Cntl+Break produced no apparent change.

The established wisdom when this happens is that the 34 pin plug is the wrong way round, but I have checked and am sure it is OK, so I hesitate to try it reversed. I have tried the drive again since and this time, you guessed, something different! With no other drive connected the Einstein power supply made funny noises and refused to come On. Too much current being drawn? A check of the added wires shows no solder or wire bridges have developed, and there is no short circuit between the 5v and ground wires. Again, I am baffled. I am glad to record that the PSU suffered no damage. Whew!

A totally unconnected aside here; are any of you WP80 users disappointed that the only way to erase files is to go to DOS? Well, a minute ago I lunged at CTRL-W to Save my work thus far and accidentally hit Ctrl-E next door. I was amazed to see that this clears the screen and asks which file you would like to delete! It works too, giving a final Y/N option. I cannot find any reference to this in the manual.

Back to business and to summarise so far:

Assuming the modified Xdos 1.31 does not have any hidden snags:

1. Anyone with two 720k drives can now use them as 0: and 1: and run Xbas and DOS programs as before, but the DOS is not compatible with 3" drives at present.

2. Mixed 3" and 3.5" drive use is possible using CPM+ and possibly ZDOS, but Xbas will not run with these unless the modified Xdos 1.31 is useable with ZDOS and GOEINCPM.COM, something I have not yet checked.

3. The use of 1.44M drives is still in limbo, though I now believe it should be possible, having done it for over two hours!

4. All DD disks are useable, but only some HD disks can be used as 720k ones with the extra hole masked off.

#### DISK PARAMETER BLOCKS

The Einstein is designed to be booted from a 3" drive, so to boot from a 3.5" the drive description has to be changed to suit. I have identified 5 sorts of drives used by the TC01:

```
40 track single sided: 2800,04,0F,00,5E00,3F00,8000,1000,0200
40 " double " : 5000,04,0F,00,C200,7F00,C000,1000,0100
80 " single " : 2800,04,0F,00,C200,7F00,C000,1000,0200
80 " double " : 5000,04,0F,00,8A01,7F00,C000,1000,0100
Silicon Disk : 2800,04,0F,00,7A00,3F00,8000,0000,0200
```

The Hex numbers are the Disk Parameter Blocks (DPBs) and the commas are mine to separate the parameters, and of course are not used when entering the data. The bytes are in lowbyte-highbyte format. As a brief explanation take the fourth row:

#### Parameter

```
5000 Logical sectors per track. 28h=40 50h=80
04 block shift factor
0F block shift mask
00 extent mask, usually 0
8A01 max data storage as no. of blocks. 018Ah=394
7F00 max DIR entries-1 003Fh=63 007Fh=127
C000 allocation block for DIR 00C0h=194 0080h=128
1000 no. of DIR entries per sector. 0010h=16
0100 no. of system tracks (1 or 2)
```

A fuller description can be found in EM 1/10 page 14.

The DPBs are in the DOS tracks and when booted are put into (usually) the BIOS area of memory. As you can't get at the BIOS until you have booted the DOS it is obvious that it is necessary to change the DPBs on the actual DOS tracks.

To do this start up the machine in MOS, place the disk you are going to change in drive 0: and type: R100 1B00 <Enter>. This reads the DOS track(s) into memory where they can be looked at and changed. For a drive other than 0: use: R100 1B00 0000 0n where n is the drive number 1 to 3.

Using the T (Tabulate) command you can now find the DPB(s) at the following locations. Note that your start location is 0100H.

XDOS 1.31: 1AEEH only ONE DBP is shown - 40t SS.

ZDOS 1.6 : 1A05H, 2 x 40t SS, 1 x 80t DS, silicon disk

CPM+ : DPBs are in the file CPM3.SYS and, when this is LOADED are found at 280H,2A5H,2CAH and 2EFH.



BEFORE GOING ANY FURTHER BE ABSOLUTELY SURE WHAT YOU ARE DOING AND ALWAYS WORK ON A COPY - NEVER YOUR ORIGINAL DISK.

You can use the M command to modify a byte, followed by a full stop to end and return to MOS. You don't need spaces between bytes.

To make a boot disk for a 3.5" drive using XDOS 1.31 alter the bytes from 1AEEH to match those shown for 80t DS above. Also change location 106H from 00 to 01. This tells the operating system (OS) that drive 0 is doublesided.

The byte at 106H in XDOS 1.31 is used to set up the Side Flag in the Scratchpad at FBB1, but only a 1 or 0 is recognised. (In XDOS 2 the upper 4 bits specify 80 (1) or 40 (0) tracks, for the same drives, which makes it very easy to change the configuration by altering this one byte, without knowing where the DPBs are.)

Having made the changes, the code is written back to the disk using W 100 1B00. In the case of not using drive 0, W100 1B00 0000 0n as before. Note that the spaces are essential here as in the R command.

A disk altered as above will boot a 3.5" drive and work OK with 3.5" drives as 1:,2: or 3:.

I have made a couple of other changes to the DOS on my own copy; to enable me to see what DOS I am working with I have altered location 0137H from 31 to 32 so that Xdos 1.32 appears on the screen on bootup and also I have added a little routine at 0162H to change the scratchpad location FBB1 so that drives can be configured in the same way as Xdos 2. However, I have yet to write the patch for this purpose! The bytes at 0162H are:

3E 33 32 B1 FB AF C9

The second byte (here 33H for 0: and 1: 80t DS plus 2: and 3: 40t SS) is the one that appears in the scratchpad at FBB1H.

I think most members changing to 3.5" boot drives will also require at least one 3" drive so that they can access the files they have on 3" disk, at least until they have transferred all they need to 3.5", and I hope to patch Xdos 1.31 to allow this.

---@@@---

HELP! Can I appeal to readers who have 3.5" drives to help us by checking any HD disks they may have to see whether they will format correctly for Albert and let me have the results? Also anyone who has a 3.5" 1.44M drive could try using it with the TC01, with or without pin 34 grounded to see whether they get the same sort of results that Chris and I have experienced. With a bit of luck someone might just spot the answer to the problem.

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Ted Cawkwell 9 King St. Winterton N.Lincs DN15 9RN

#### Distribution:

Duncan Elvin Steve Potts Les Foskett Clem Cole Chris Coxall  
John Marriott Maurice Hawes Stan Gibbs Andrew Dunipace John Murray  
Andrew McRobbie Dick Keynes Tony Adams