CORTEX USERS GROUP

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CORTEX USER GROUP NEWSLETTER (MAY 1987)

Issue Number 10

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Welcome to the first Cortex newsletter produced by Tim Gray and Ted Serwa. We apologise for its late arrival but this is due mainly to the late handover from Kevin Holloway following newsletter 9, which really should have been published before January. Since announcing our intention to take over the group during February subscriptions have been trickleing in but there are still a lot to come. We have enough information for two newsletters at the moment and so will be producing Them almost at the same time. The next one will be produced as soon as enough material is at hand and from then on hopefully every two months.

The meeting of Cortex users held jointly with TI994A users was a great success in spite of the late notice. Tim Gray and Ted Serwa both had extensive Cortex systems on display showing hardware for external video interface, A.M.X. mouse interface, extended RAM + ROM, a high definition graphics card and lots of CRU based input-output systems. Software on display included Tims Drawtech drawing package plus Teds P.C.B design C.A.D. package and a multi-pass assembler editor.
machines were John Makenzie demonstrating his Wortex and Speltex package and Alan Badcock with his Disk Menue Generator system. Among the other visitors to the stand were Prem Holdaway from London Dave Hunter from Kent and O.W.Hulme from Hendsford. In fact it was such a good meeting we hope to hold another one later in the year.

We are very short of Program submissions at the moment so please have a look to see if you have anything that may be usefull to another member and send it in for printing in a future newsletter. If at all possible please try to send in Type-written articles or printed programme listings and remember to include your name and a short description of the programme.

We will start this issue off by trying to answer some of your letters sent in recently. Can you please note that if you require a personal reply a stamped addressed envelope must be included, the user group is none profit making and has not got the funds for extra postage. Also on the subject of postage we must ask any overseas members wishing to receive their newsletters by air mail to pay an additional £7.50 per six issues to cover the extra cost. This will make the total cost per year for air mail users £12.50.

LETTERS

Paul Sheridon. Dursley Glostershire

Is the series on machine code programming to be continued as I would like to learn more about it ?

Yes we hope to get some more articles from Kevin Holloway as soon as he can find time to write some.

Alen Badcock. Chandlers ford Hants.

Has anyone found a way of putting basic programmes in ROM. It would be nice to be able to load several programmes at once and switch between them. I am writing a batch file utility programme and also working on a simple multi-tasking program triggered from clock tics. Also does anyone know how to make the MDEX SAVEX command work so that compiled code can be run. Are the MPE 9901 parallel I/O cards still available.

There is a machine code program with details of how to save basic programmes in ROM and recall them using the * Command later in this issue. I don't know however how several could be loaded at once and pointers changed between them. The system pointers are held in such awkward places distributed throughout the Cortex memory map. It would however be possible for one Basic program to branch to another by using the * Command to load in the second program but any parameters would have to be passed by using some un-used memory location or possibly RAM-DISK.
We look forward to seeing your Batch file and Multi-tasking programmes when they are finished.
I don't know about the MDEX SAVEX problem, mayby some other user will know and write in with the answer. We have not had much user information on MDEX yet. The MDEX system its self and anything else from MPE should be available through the group as soon as we can find time for a trip to southampton to collect it all.

Ptrick O'Leary. Eire.

I would appreciate any information on fitting Disk Drives to the Cortex but understand that there is no operating system for the new controller yet.

Any shugart compatible drives can be fitted to the Cortex both 8" and 5" systems are in use. A version of CDOS is available now for the new controller and can be obtained from the group for £45.00. So far we do not have a good PCB design for the new controller although the circuit has been built and tested using wire-wrap techniques.

LETTERS

D.Raison. Hampshire

If anyone is interested I have a small program that allows the graphics mode of the VDP to be used as a 64 column screen. If anyone is interested I will supply a listing or tape. Can you still supply Cortex hardware especially the R.G.B. Kit.

We'r sure lots of people would be interested in your 64 column screen program, why don't you send it in along with anything else that may be of interest to other users. We can supply some Cortex hardware and will be issueing a list soon.

D.Fisher. Workington Cumbria.

Since I have had my Cortex I have had problems with the cassette interface even after trying several tape decks has anyone a fool-proof cure.

Lots of people have had problems with Cassette loading in the past. One suggestion is to add a 1nf capasitor between pins 1 and 2 of I.C. 70 and also to connect pin 3 to +5V. I use a diode clipper on the input and it seems to work on most offending tapes see short tips in this issue.

O.C.Walden

My system is based on 8" double density disks so I have been forced to " roll my own " as far as system software is concerned although I do have MDEX. I would love to here from anyone who has 8" drives for sale with or without case or P.S.U.

We don't understand why you have a problem with system software as both MDEX and CDOS work happily with 8" drives. Tim Gray has 8" drive capability on his Cortex.

P.D.Wrighton. Kent.

I would be interested in obtaining newsletters 1 to 4. Can you supply them ?

Yes all back issues are available from the group for £1.50 each. Also available as a back issue is M.P.E.s one and only newsletter, Brainstorm one.

LETTERS

R.J. Packer. Slough.

Can you supply any more information on any expansion boards especially the alternative disk controller. Also I have problems loading Cassette tapes.

We do have some alternative disk controller boards but at the moment there is a problem with the P.C.B. layout, although the circuit is correct. We will give more details in a future issue.

P.R. Cross. Kent.

I have a problem when running a program that uses a lot of Put and Get statements. After about 12 runs the error message :- " out of memory " is produced.

The early version of CDOS had this problem as it re-allocated space for the file variable for every disk access. In the new version 1.20 and later the problem has been cured. The updated version can be purchased from the group for £5.00. Please return your original master disk.

VARIABLE LIST ROUTINE

This machine code routine can be used to list all variable names used in a Basic program. All the variable names are stored in encoded form with the program on disc or tape so this routine can be used as soon as the Basic program is loaded without having to run it all the way through first. One interesting thing I have noticed is that Power Basic creates a variable name if it encounters a spelling mistake when expecting a statement.eg. If LOST were typed instead of list a variable name of LOS would be created. The only way to get rid of these " phantom " variables is to do a source save and load.

VARIABLE LISTING DEMO

```
CALL OF200H

SP  [912]       AD
E   [6,3]       RH
TH              PH
D               CX
CY              S1
CO              TP
SP              CP
V   [4,3]       SV  [4,2]
Y               Z
XE              YE
ZE              S   [4,4]
J               N   [4,3]
```

```
;Variable listing programme
;by Tim Gray
;to use just type CALL <ENTRY>
;variables will be listed to
;all devices enabled
;unused dimentioned variables
;will be shown :-AGH[] etc
 ;
                              ORG     >F200
                    VNT       EQU     >EFBC             ;VARIABLE NAME TABLE
                    NVD       EQU     >EFBE             ;NEXT VAR DEFINITION
                    VLT       EQU     >EFBE             ;VARIABLE LOCATION
                    BUFF      EQU     >FE50             ;DATA BUFFER
                     ;
F200 04C2           ENTRY:    CLR     R2
F202 0206 0003                LI      R6,3              ;LOOP COUNT
F206 0207 FE50                LI      R7,BUFF           ;TEMP STORE
F20A 0208 0380                LI      R8,>0380          ;MASK FOR NUM
F20E C020 EFBC                MOV     @VNT,R0           ;NAME TABLE
F212 C2A0 EFBE                MOV     @NVD,R10          ;NEXT DEFINIT'
F216 6280                     S       R0,R10            ;MAX NUM OF VAR
F218 0200 0008                LI      R0,8              ;OFFSET TO 1ST
F21C 04C9           GETNAM:   CLR     R9
F21E C0C7                     MOV     R7,R3
F220 0223 0004                AI      R3,>0004
F224 C120 EFBC                MOV     @VNT,R4
F228 A100                     A       R0,R4
F22A C054                     MOV     *R4,R1            ;GET NAME
F22C 1502           TSTDIM:   JGT     TSTNUM            ;not dimentioned
F22E 0501                     NEG     R1                ;NEGATE DIM'S
F230 0709                     SETO    R9                ;IDENTIFY DIM'S
F232 2048           TSTNUM:   COC     R8,R1             ;TEST FOR NUM
F234 1311                     JEQ     NUM               ;yes numeric
F236 0241 7FFF      ALPHA:    ANDI    R1,>7FFF          ;CLEAR TOP BIT
F23A C081                     MOV     R1,R2             ;COPY
F23C 0A82                     SLA     R2,8              ;SHIFT TO ALIGN
F23E 0242 1F00                ANDI    R2,>1F00          ;ADJUST FOR
F242 0262 4000                ORI     R2,>4000          ;-  ASCII
F246 0282 4000                CI      R2,>4000          ;TEST FOR VALID
F24A 1601                     JNE     NOTSP             ;ignor it-
F24C 1001                     JMP     NXT               ;if no char
F24E DDC2           NOTSP:    MOVB    R2,*R7+           ;SEND TO BUFF
F250 0951           NXT:      SRL     R1,5              ;ALIGN NXT CHAR
F252 0606                     DEC     R6                ;DEC LOOP COUNT
F254 16F0                     JNE     ALPHA             ;LOOP FOR NEXT
F256 1009                     JMP     BUFF4
F258 4048           NUM:      SZC     R8,R1             ;REMOVE CODE
F25A D081                     MOVB    R1,R2             ;COPY
F25C 0922                     SRL     R2,2              ;SHIFT TO ALIGN
F25E 0262 4000                ORI     R2,>4000          ;ADJ FOR ASCII
F262 DDC2                     MOVB    R2,*R7+           ;SEND TO BUFFER
F264 0241 007F                ANDI    R1,>007F          ;MAX NUM 127
F268 2F41                     XOP     R1,13             ;OUT THE NUMBER
```

```
F26A 80C7          BUFF4:  C      R7,R3         ;4 CHAR ?
F26C 1404                  JHE    NAMEND        ;YES
F26E 0202 2000             LI     R2,>2000      ;SPACE
F272 DDC2                  MOVB   R2,*R7+       ;SEND SPACE TIL
F274 10FA                  JMP    BUFF4         ;4 CHAR IN BUFF
F276 1000          NAMEND: JMP    DIM           ;
F278 C249          DIM:    MOV    R9,R9         ;TEST FOR DIM
F27A 1328                  JEQ    FORMAT        ;no
F27C 0202 5B00             LI     R2,>5B00      ;  "["
F280 DDC2                  MOVB   R2,*R7+       ;SEND OPEN BKT
F282 C160 EFBE             MOV    @VLT,R5
F286 A140                  A      R0,R5
F288 C055                  MOV    *R5,R1        ;GET VAR ADDR
F28A 1309                  JEQ    NPOINT        ;jump not used
F28C C0B1          GETDIM: MOV    *R1+,R2       ;GET DIMENTION
F28E 2F42                  XOP    R2,13         ;OUT DIM INT
F290 0202 2C00             LI     R2,>2C00      ;  ","
F294 DDC2                  MOVB   R2,*R7+       ;SEND COMMA
F296 C0B1                  MOV    *R1+,R2       ;TEST FOR END
F298 1101                  JLT    ENDB          ;yes
F29A 10F8                  JMP    GETDIM        ;LOOP FOR NEXT
F29C 0607          ENDB:   DEC    R7            ;BACK UP POINT
F29E 0202 5D00     NPOINT: LI     R2,>5D00      ;  "]"
F2A2 DDC2                  MOVB   R2,*R7+       ;SEND CLOSE BKT
F2A4 1013                  JMP    FORMAT
F2A6 04C2          PRINT:  CLR    R2            ;CLEAR FOR NUL
F2A8 DDC2                  MOVB   R2,*R7+       ;SEND NUL
F2AA 0002                  DATA   >0002         ;WRIT CRLF
F2AC 0FA0 FE50             MSG    @BUFF         ;WRIT BUFFER
F2B0 0206 0003             LI     R6,3          ;RELOAD R6
F2B4 0207 FE50             LI     R7,BUFF       ;RELOAD R7
F2B8 05C0          COM1:   INCT   R0            ;INC NXT NAME
F2BA 8280                  C      R0,R10        ;TEST FOR END
F2BC 1AAF                  JL     GETNAM        ;LOOP FOR NEXT
F2BE 0287 FE50             CI     R7,BUFF       ;IS BUFF EMPTY
F2C2 1302                  JEQ    END1          ;YES
F2C4 0FA0 FE50             MSG    @BUFF         ;NO PRINT IT
F2C8 0002          END1:   DATA   >0002         ;WRIT CRLF
F2CA 0380                  RTWP
F2CC 0287 FE64     FORMAT: CI     R7,>FE64      ;BUFFER FULL?
F2D0 14EA                  JHE    PRINT         ;YES
F2D2 0202 2000             LI     R2,>2000      ;SPACE
F2D6 DDC2          SNDSP:  MOVB   R2,*R7+       ;SEND SPACE-
F2D8 0287 FE64             CI     R7,>FE64      ;UNTIL HALF FUL
F2DC 1AFC                  JL     SNDSP         ;
F2DE 0206 0003             LI     R6,>0003      ;
F2E2 10EA                  JMP    COM1          ;NXT
```

```
VNT      EFBC    NVD      EFBE    VLT      EFBE    BUFF     FE50
ENTRY    F200    GETNAM   F21C    TSTDIM   F22C    TSTNUM   F232
ALPHA    F236    TSP      F24E    NXT      F250    NUM      F258
BUFF4    F26A    NAMEND   F276    DIM      F278    GETDIM   F28C
ENDB     F29C    NPOINT   F29E    PRINT    F2A6    COM1     F2B8
END1     F2C8    FORMAT   F2CC    SNDSP    F2D6    TSTDIM   F22C
NAMEND   F276
```

CDOS - DISK INSPECT (DI) UTILITY

1. If like mine, your CDOS manual makes no reference to DI, and you are struggling in the dark may I attempt to shed some light on on the subject, for you.

DI

2. If you start by amending a copy of DI to match the listing below, I believe it makes it easier to use, and therefore understand.

3. The amendments do a number of things to DI:

a. It displays the Hex and ASCII values at the same time.
b. It accepts Hex values for the track & sector requests. Then displays the decimal values and the sector contents.

(1) To enter a decimal number, enter the number and press RETURN.
(2) To enter a Hex number start with a 0 end with a H and press RETURN. Note if the maximum number of digits is entered then the RETURN is automatic.

c. You can modify the contents displayed either on the Hex or the ASCII displays, the other display is updated as you make the modifications. Which display to modify is indicated by an arrow at the bottom of the screen.
d. The sector byte numbers down the left of the screen are in decimal. The number displayed being that of the first byte on that line. (0 to 127)

4. You should note that DI does not function for double density (DD) though it does work for double sided (DS) and 80T.

BASIC'S

5. CDOS will produce on a disk:

a.	40T Single Sided (SS);	40 tracks	(0 to 39)
b.	40T Double Sided (DS);	80 tracks	(0 to 79)
c.	80T " " (DS);	160 tracks	(0 to 159)
d.	Each track has	16 sectors	(0 to 15)
e.	Each sector has	128 bytes	(0 to 127)
	(DD has 256 bytes per sector)		
f.	Each byte has	8 bits	

(1) A byte of information is displayed on the screen by DI as a 2 digit Hex number or a single digit ASCII character.
(2) A Cortex Word is made up of 2 bytes. (16 bits)

g. **Track 0 is always the BOOT strap track.**
h. **Track 1 is always the directory track.**

6. Thus the LDIR indication of System Over Head of 32 sectors. (Blks in LDIR means sectors)

DISK DIRECTORY

7. You can now use the modified DI to see on the screen what follows:

8. Track 1 Sector 0: Bit map of sectors in use. See the User Mag´ 6 page 4 for explanation.

9. Track 1, Sector 1 to 15 is the disk directory, on each sector there is room for the details of two files. Thus the limit of 30 files that can be saved. (DD of course doubles this)

10. Detail of any one of these sectors is:

a.	Bytes 0 & 1	00 00	means	Free slot.
		A5 A5	"	Auto Run file.
		5A 5A	"	Not Auto Run file.
		FF FF	"	Sequential Relative Data file.
		other	"	Random Relative Data file, and is the record length.
b.	Bytes 2 - 9	Title of the file.		
c.	Bytes 10 & 11	00 00	means	File is Code.
		other	"	File is Basic.
d.	Bytes 10 - 31	See User Mag 6 page 4.		
e.	Bytes 32 - 35	Contain the file disk locations for the first portion of the file.		
	32 & 33	XX XY		XXX Track number in Hex. Y Sector number in Hex.
	34 & 35			Total number of sectors in this portion of the file.

(1) The following 7 batches of 4 bytes are the same, giving a total of 8 portions that any file can be split up into to fit it on a disk.

(2) With this modified DI you can input 0XXXH direct to the track request and also 0YH to the sector request. (To reset the sector you press R or RETURN to the command request)

f. Bytes 64 - 127 Next file entry slot.

11. Now that you know what each byte means and also how to find your files on the disk, you can happily move about the disk and make modifications.

12. From the command request mode, select whether you want the next sector (press I), the last sector (press D), to modify in Hex (press H) or in ASCII (press A). Then press M to modify. You now use the arrow key to select the byte to modify. Once on the byte change it as you require then:

a. RETURN passes the changes to the disk and returns you to the command scanner.

b. ESCAPE aborts the program ie. the changes are not passed to the disk. (type RUN then reselect the sector)

13. Note you see how the changes are affecting the other display as you make them.

"MODIFIED DI BY J.MAKENZIE"

Note " ↓ " is produced by GRAPH + SHIFT + 1 KEYS

```
100  TEXT : ? @(1,17);"CDOS disk inspect utility  1.1 (C) 1985"
110  ? @(0,23);"  [Ascii, Dec, Hex, Inc, Mod, Reset]";
115  ? @(16,22);"!"
120  DIM X[4],B[50]: $M="H"
130  AX=ADR[X[0]]: AB=ADR[B[0]]
140  MWD[AX]=0420H: MWD[AX+2]=06260H
145  MWD[AX+4]=0D8C6H: MWD[AX+6]=02H
150  MWD[AX+8]=0380H
160  ? @(0,19);" Drive    ": ? " Track      ": ? " Sector     "
165  ? @(11,19);: INPUT #1;D
167  IF D>3 THEN GOTO 165
170  ? @(8,20);: INPUT #4;T
180  IF T<0 OR T>159 THEN GOTO 170
190  ? @(9,21);: INPUT #3;S
200  IF S<0 OR S>15 THEN GOTO 190
205  GOTO 470
210  E=0
220  CALL AX,D,T,S,ADR[E],AB,0,0
230  IF E<>0 THEN ? @(16,19);"READ ERROR";#E/256 LAND 03FH: GOTO 350
240  ? @(16,19);"                   "
250  BB=AB: CB=AB: ? @"H";
260  FOR R=0 TO 15
270   ? #"000"R*8;"  ";
280   FOR C=0 TO 7
290    ? #;MEM[BB];" ";
310    BB=BB+1
320   NEXT C
325   ? " ";: GOSUB 515
330   ?
340  NEXT R
350  ? @(20,20);"         ";: ? @"10L";: INPUT "Command"#1,$K;
360  IF $K="I" THEN S=S+1: GOTO 430
370  IF $K="D" THEN S=S-1: GOTO 430
380  IF $K="" THEN GOTO 160
390  IF $K="A" THEN $M=$K: ? @(0,22);"     !            ": GOTO 350
400  IF $K="H" THEN $M=$K: ? @(0,22);"               !  ": GOTO 350
410  IF $K="M" THEN ? @(26,22);"↓": GOTO 720
420  GOTO 160
430  IF S<0 THEN T=T-1: S=15
440  IF S>15 THEN T=T+1: S=0
450  IF T<0 THEN T=0
460  IF T>159 THEN T=159
470  ? @(8,20)#"0000"T: ? @(9,21)#"000"S
480  GOTO 210
490  CALL AX,D,T,S,ADR[E],AB,0,0FFH
500  IF E<>0 THEN ? @(20,19);"WRITE ERROR";#E/256 LAND 03FH
510  GOTO 350
```

```
515  FOR C=0 TO 7
520   IF MEM[CB]<020H THEN $Q="."
530     ELSE $Q=%MEM[CB]%0
540   ? $Q;
545   CB=CB+1
546  NEXT C
550  RETURN
560  BB=AB: R=0: C=30
570  IF MEM[BB]>01FH THEN $SS=%MEM[BB]%0
580    ELSE $SS="."
590  ? @(C,R);$SS;: ? @"L";
600  K=KEY[0]: IF K=0 THEN WAIT 1: GOTO 600
610  IF K=08H THEN C=C-1: BB=BB-1
620  IF K=09H THEN C=C+1: BB=BB+1
630  IF K=0AH THEN R=R+1: BB=BB+8
640  IF K=0BH THEN R=R-1: BB=BB-8
650  IF K=0DH THEN ? @(26,22)"   ": GOTO 490
660  IF K>01FH THEN MEM[BB]=K: GOTO 1000
670  IF C<30 THEN C=37: R=R-1
680  IF C>37 THEN C=30: R=R+1
690  IF R<0 THEN R=15: BB=AB+127
700  IF R>15 THEN R=0: BB=AB
710  GOTO 570
720  IF $M="A" THEN GOTO 560
730  BB=AB: R=0: C=5
740  ? @(C,R);#;MEM[BB];: ? @"2L";
750  K=KEY[0]: IF K=0 THEN WAIT 1: GOTO 750
760  IF K=08H THEN C=C-3: BB=BB-1
770  IF K=09H THEN C=C+3: BB=BB+1
780  IF K=0AH THEN R=R+1: BB=BB+8
790  IF K=0BH THEN R=R-1: BB=BB-8
800  IF K=0DH THEN ? @(26,22)"   ": GOTO 490
810  IF K>02FH THEN IF K<03AH THEN GOSUB 880
820  IF K>040H THEN IF K<047H THEN K=K-7: GOSUB 880
830  IF C<5 THEN C=26: R=R-1
840  IF C>26 THEN C=5: R=R+1
850  IF R<0 THEN R=15: BB=AB+127
860  IF R>15 THEN R=0: BB=AB
870  GOTO 740
880  K=MOD[K,16]
890  MEM[BB]=MOD[MEM[BB],16]*16+K
892  XX=(C-5)/3+30
894  IF MEM[BB]<020H THEN $Q="."
896    ELSE $Q=%MEM[BB]%0
898  ? @(XX,R);$Q;
900  RETURN
1000  XX=(C-30)*3+5
1010  ? @(XX,R);#;MEM[BB];
1020  GOTO 570
```

CORTEX USER GROUP   27.02.87   TIM GRAY

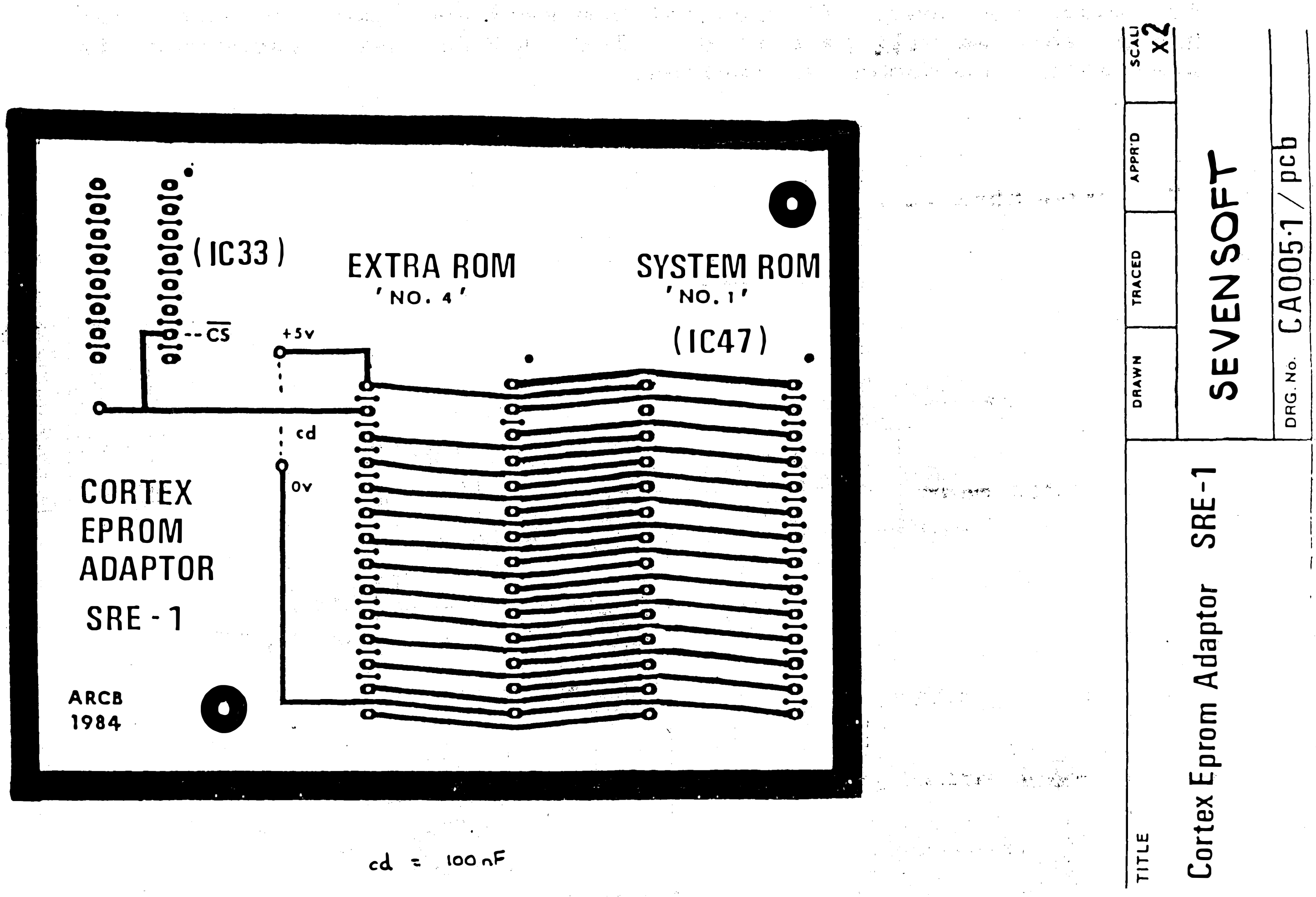
*** STAR BASIC ***

ROUTINE FOR LOADING A BASIC PROGRAMME FROM EPROM AS A * COMMAND

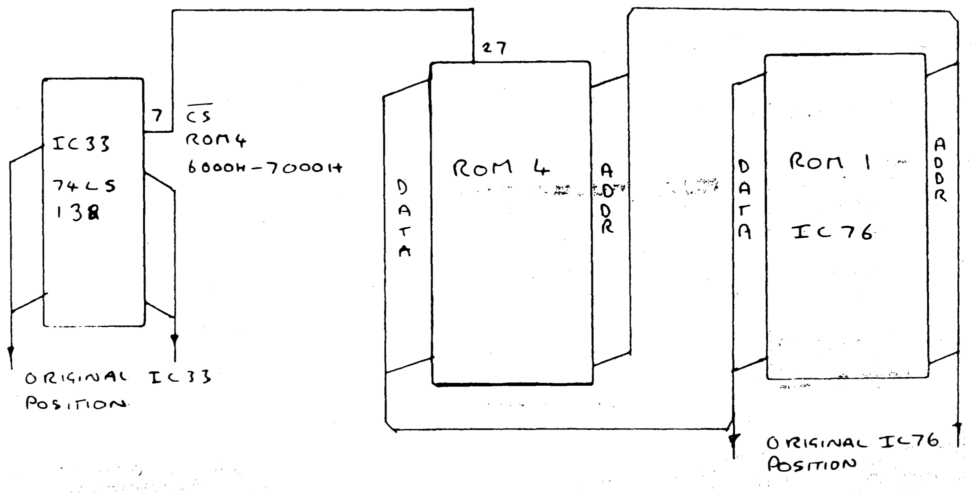
The header block is the same as in the disc directory
The programme is saved from 2090 up to 2090+load length

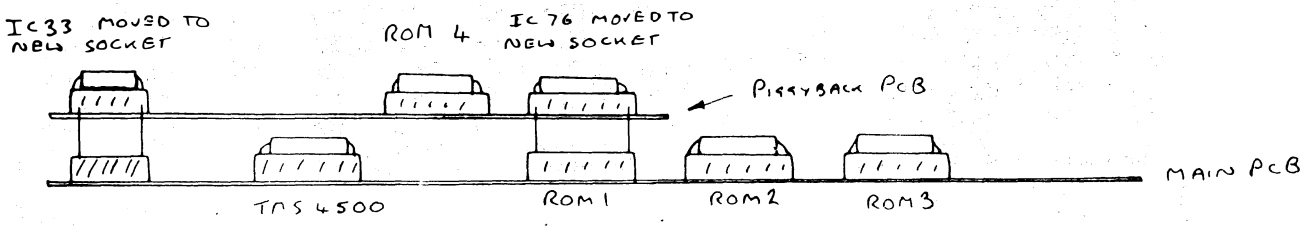
```
      2000 94C2                          ; EPROM IDENTIFIER
      2002 3FFF                          ; NEXT *PROG
      2004 2016                          ; START ADDR OF THIS ONE
HDR:  2006 5053                          ; NAME
      2008 5749                          ; "PSWING"
      200A 4E47                          ;
      200C 0000                          ;
PTR:  200E 0D5A                          ; POINTERS (EFBA-ED04)
      2010 0F40                          ;          (EFBC-ED04)
      2012 0042                          ;          (EFC0-EFBE)
      2014 0FC4                          ; LENGTH   (EFC0-ED04)
START 2016 C120 MOV   @>ED04,R4          ; BASIC PROGRAMME LOAD ADDR
      201A C0E0 MOV   @>2014,R3          ; LOAD LENGTH
      201E 0200 LI    R0,>2090           ; PROGRAMME START
      2022 DD30 MOVB *R0+,*R4+           ; LOAD THE PROG
      2024 0280 CI    R0,>4000           ; CHECK IF PROG IS OVER THE
      2028 1A05 JL    >2034              ; 8K LIMIT AND
      202A 05A0 INC   @>F106             ; INC THE MAPPER IN 4K BLOCKS
      202E 0205       R5,>1000           ; IF REQ'D
      2032 6005 S     R5,R0              ; RESET PTR TO NEW 4K BLOCK
      2034 0603 DEC   R3                 ; END ?
      2036 16F5 JNE   >2022              ; NO BACK FOR MORE
      2038 0202 LI    R2,>200E           ; CALCULATE SLT
      203C C0F2 MOV   *R2+,R3
      203E C060 MOV   @>ED04,R1
      2042 A0C1 A     R1,R3
      2044 C803 MOV   R3,@>EFBA          ; STORE SLT
      2048 C0F2 MOV   *R2+,R3            ; CALCULATE VNT
      204A A0C1 A     R1,R3
      204C C803 MOV   R3,@>EFBC          ; STORE VNT
      2050 C804 MOV   R4,@>EFBE          ; CALCULATE VDT
      2054 6832 S     *R2+,@>EFBE
      2058 C804 MOV   R4,@>EFC0          ; STORE VDT
      205C 020E LI    R14,>3EF2          ; AUTO RUN RETURN
      2060 020D LI    R13,>F0DC          ; BASIC WP
      2064 02CF STST  R15
      2066 020B LI    R11,>0202          ; MAPPER RESET VALUES
      206A 020C LI    R12,>0303
      206E 020A LI    R10,>F104
      2072 0200 LI    R0,>03C0           ; ( CKOF )
      2076 0201 LI    R1,>CE8B           ; ( MOV R11,*R10+ )
      207A 0202 LI    R2,>C68C           ; ( MOV R12,*R10  )
      207E 0203 LI    R3,>0380           ; ( RTWP )  AUTO RUN
      2082 0440 B     R0

PROG  2090                               ; PROGRAMME SAVED HERE
```

Alen Badcock from Chandlers Ford has sent in this design for a piggy-back board to allow an extra system ROM to be fitted to the main board. All the ROM socket lines from ROM1 are paralleled to ROM4 exept for -CS4 which comes from pin 7 of IC33, If wire-wrap sockets are used for IC33 and IC76 on the piggy-back board the P.C.B. will plug into the old IC33 and IC76 sockets. The new ROM is mapped in between 6000H and 7000H when ROM select is on.



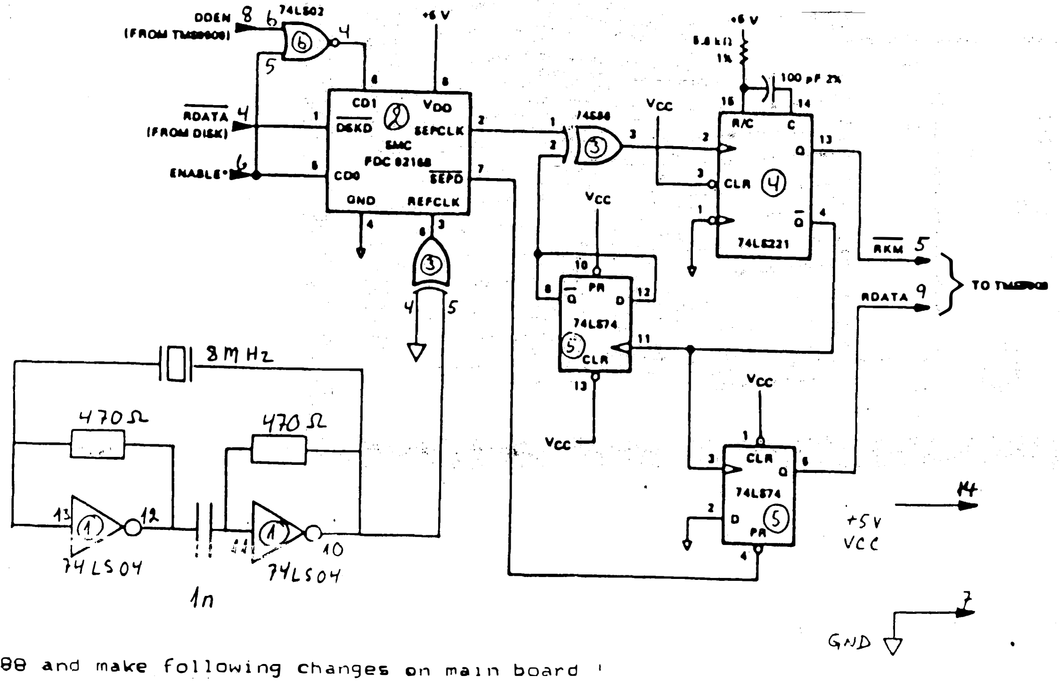
cd = 100nF





Soeren Rahbek. from Denmark sent in this circuit diagram and P.C.B. layout for a better data seperator for the TMS9909 floppy disc controller. He also sent in some double sided P.C.B.s for it which are available to anyone who has some software or hardware to swap for them. If you want one send your swap to the user group and we will pass it on. The FDC9126 data seperator is available from Manhatten Skyline.

No	TYPE	+5V	GND
①	74LS04	14	7
②	FDC9216B	8	4
③	74S86	14	7
④	74LS221	16	8
⑤	74LS74	14	7
⑥	74LS02	14	7
88	STIK	14	7



► IC 88 PIN NUMBERS

Remove IC88 and make following changes on main board !

Disconnect:

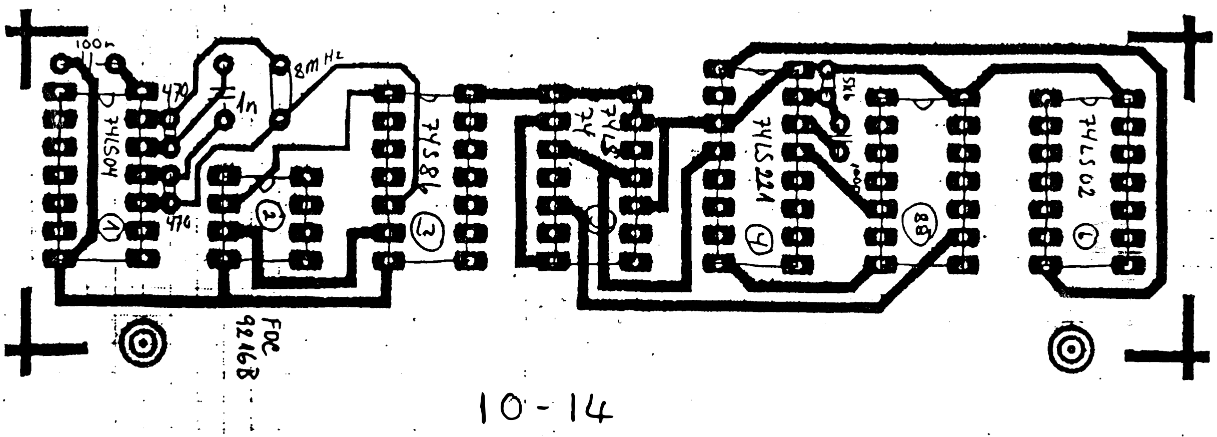
IC76 pin 26 to IC69 pin 9

Connect:

IC77 pin 4 to IC88 pin 8
IC87 pin 4 to IC88 pin 6
IC76 pin 26 to IC88 pin 5

Place DATA SEPARATOR PC board in IC88 socket ! and you are in the air.

NO CRC disk error any more
****



SHORT TIPS

D. Fisher sent in the following:-

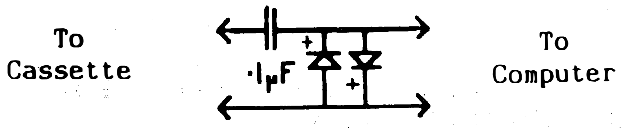
To change the RS232 port to 8 bit change memory location 5546 from 62F1 to 63F1.

To change the cursor character change memory location 5530 from 007F to the ascii code of the preferred character.

Use the following to replace the standard microsoft statement CHR$( ) when entering listings from magazines.

```
5 REM EQUIVALENT OF CHR$( )
10 DIM $A(256)
20 FOR A=0 TO 255
30 $A(A)=%A   !$A(A) IS USED INSTEAD OF CHR$(A)
40 NEXT A
```

Tim Gray uses the following to improve cassette loading



The diodes clip off any modulation distortion caused by mains hum etc.

The value of workspace pointer for Interrupt 1 is incorrect to set things right change location 0004 from ED24 to ED22 this will allow the Interrupt 1 user vector to be used.

Alen Badcock sent in the following :-

To cure a problem with the cassette motor relay not functioning correctly try changing R24 to 10K and R43 to 2K2 also a diode fitted across the relay coil may help, cathode to +V.

A bug in the re-number routine can be cured by changing memory location 2F3E from 1006 to 1007.

The 9909 disk controller timings can be changed directly by the following program. It sets it for 50MS step 35MS settle and 0MS load. The routine may be usefull to people who have trouble booting CDOS for the first time before using Config.

```
        10 MEM F140H = 050H
        20 MEM F141H = 015H
        30 MEM F142H = 011H
        40 MEM F143H = 047H
        50 MEM F144H = 064H
        60 MEM F145H = 046H
        70 MEM F146H =   0H
        80 MEM F147H = 0A5H
```

CORTEX USERS CLUB SALE

RGB INTERFACE	BARE BOARD £8.00	KIT £20.00
CENTRONICS INTERFACE	BARE BOARD £7.00	KIT £15.00
E BUS -ALL IC´S		KIT £30.00
E BUS BACK PLANE		£15.00

SEMICONDUCTORS

TMS9901	£3.00
TMS9902	£3.00
74LS612 (3 AVAILABLE)	£25.00
74LS611/74LS611 (NEED PULL UP RESISTORS)	£15.00

E BUS EXPANSION

E BUS (4K RAM,8K EPROM SCKT,16 IN/OUT LINES)	£15.00
NOTE-THESE CARDS ARE EX EQUIPMENT TESTED AND WORKING	
E BUS (8*8K EPROM SCKT CARD BUILT NO EPROMS FITTED)	£28.00
E BUS 512K DRAM(ONLY AVAILABLE COMPLETE AT PRESENT)	£100.00

CORTEX EXPANSION

EXTERNAL VIDEO INTERFACE	BARE BOARD £15.00	KIT £80.00
DISK CONTROLLER (WD 2797+BOARD)		£40.00

CORTEX SOFTWARE

DISK OPERATING SYSTEM CDOS 1.20 AND 2.00	£45.00
CDOS 1.20 FOR 9909 SYSTEM	
CDOS 2.00 FOR 2797 SYSTEM	

MEMBERS SOFTWARE

WORTEX-WORD PROCESSING £15.00
INCLUDES SPELLING CHECKER
SEND TO J S MACKENZIE
4 WERSTAN CLOSE
MALVERN WR14 3NH
(INCLUDE TWO 5" DISKS)

DRAWTECH-GRAPHICS DRAWING PACKAGE £20.00
SEND TO TIM GRAY
1 LARKSPUR DRIVE
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WOLVERHAMPTON WEST MIDLANDS WV10 7TN

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