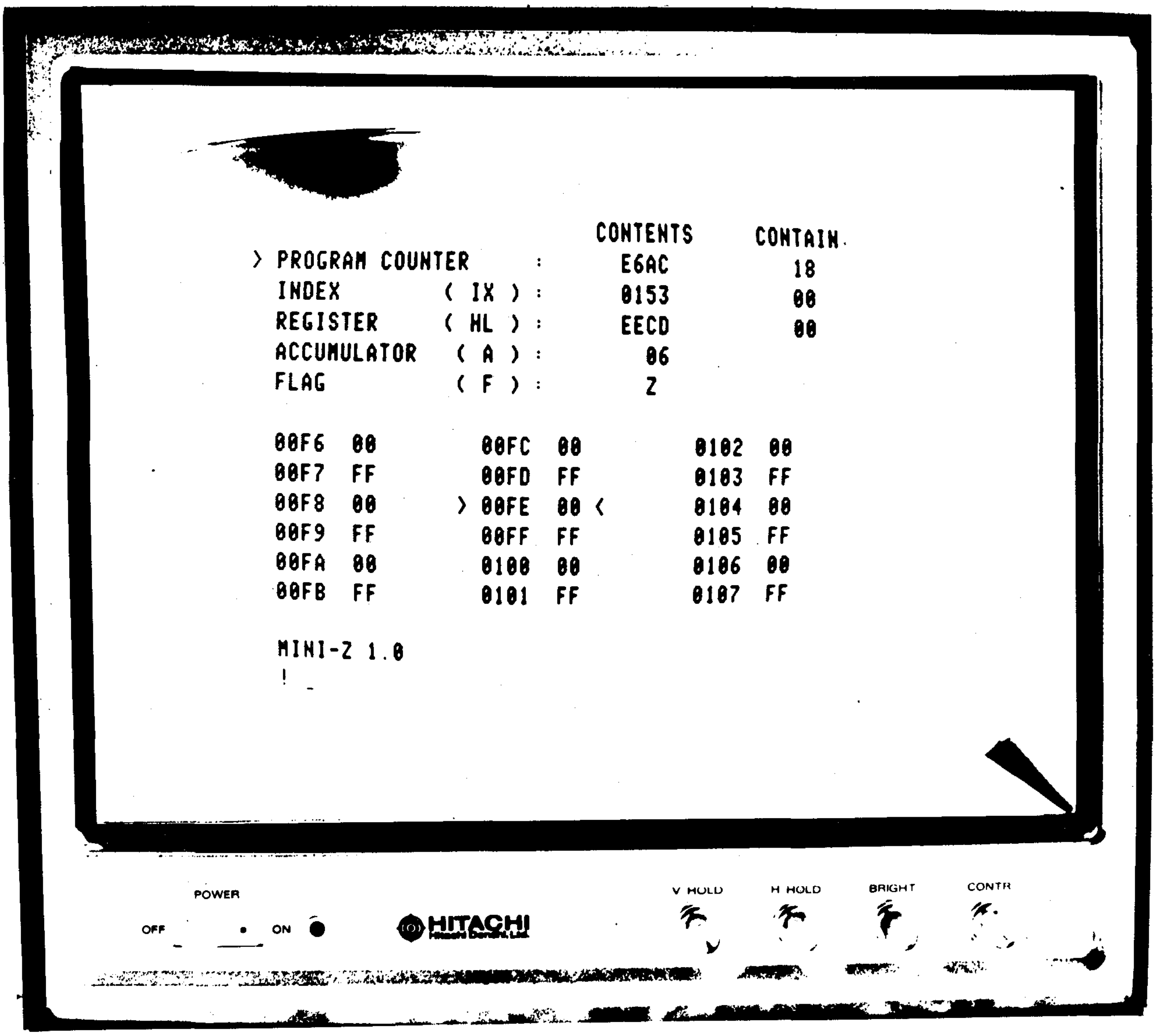
read using [RMLug 1]



```
                             CONTENTS    CONTAIN
> PROGRAM COUNTER       :      E6AC        18
  INDEX        ( IX ) :        0153        00
  REGISTER     ( HL ) :        EECD        00
  ACCUMULATOR  ( A )  :          06
  FLAG         ( F )  :          Z

  00F6  00       00FC  00        0102  00
  00F7  FF       00FD  FF        0103  FF
  00F8  00     > 00FE  00 <      0104  00
  00F9  FF       00FF  FF        0105  FF
  00FA  00       0100  00        0106  00
  00FB  FF       0101  FF        0107  FF

  MINI-Z 1.0
  ! _
```

WELCOME -

to the first edition of the RML National User Group Newsletter, a thrice yearly publication intended to reflect the interests and needs of users of the 380Z microcomputer.

This edition has been compiled by members of the User Group Executive and their friends. It cannot, therefore, be expected to give a completely balanced coverage of user activities. In particular, the editors are aware of the under-representation of RML customers from outside the education world. Only you, the User Group members, can remedy this in future editions. Please help us in our task of providing an effective medium for information exchange. Make use of this Newsletter to communicate your views to each other and to your representatives on the Executive Committee. We are willing to publish whatever you submit, and would like to read.

AN INDEPENDENT VOICE -

Research Machines Limited is demonstrating its interest in the existence of a healthy User Group by doing much to support it. However, RMLug is quite independent of RML, as is READ USING. They are financed by your contributions and run by volunteers who are customers of RML. Their underlying philosophy is simply this - that an open exchange of information can help us all to progress.

WANTED -

your ARTICLES, LETTERS, SOFTWARE, SOFTWARE REVIEWS, COMMENTS and REQUESTS FOR HELP. If you are doing something interesting with your 380Z then please help us to pass on this information. If you want to do something interesting, but don't know how, then tell us anyway: someone may be able to help.

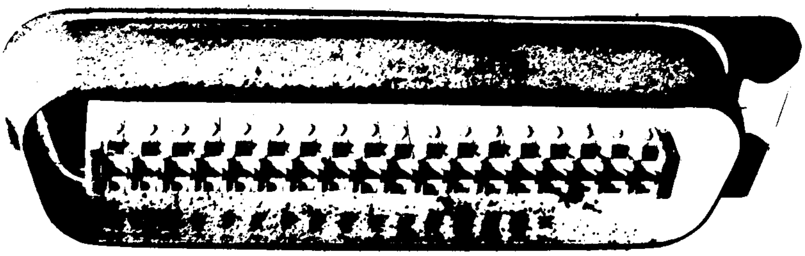
WRITE TO US, THE EDITORS (pro tem.) -

Nick Cutler
Gestetner Duplicators Ltd.
210 Euston Road
London, N.W.1

Tel 01-387 7021

Morfydd Edwards
Dept. of Mathematics & Computing
Polytechnic of the South Bank
Borough Road
London, S.E.1

Tel 01-928 8989 X2205/2050



RML National User Group

Dear User,

We were approached about a year ago with the suggestion that a Research Machines User Group be set up. We were grateful for the initiative and are now very pleased to take some part in the group's first newsletter.

We are entirely in agreement with the aims of the User Group as stated at its formation:

"The RML User Group (RMLug) is an organisation wholly controlled by customers of RML and designed to represent the interests of the users. RMLug will attempt to act as a forum for the exchange of useful information and user developed facilities, and as a pressure group to influence the policy of the Company to achieve commonly desired developments." We are very happy to give the support which may be required to enable the group independently to meet these objectives. However, the main strength of the User Group will be a full and active membership and we hope that everyone will become members.

Elsewhere in the newsletters you will find information on the next User Group meeting on May 7th in Birmingham. We look forward to seeing many of you there.

Yours sincerely,

From all of us at Research Machines

MINI-Z : A SIMPLER 380Z FRONT PANEL

The standard 380Z front panel offers a potentially powerful aid to teaching low-level programming and basic machine operation. However, its very comprehensiveness can be a barrier to the student.

MINI-Z is a simpler version of the front panel. It uses a subset of the commands available, and displays only the most important information; it is much easier to teach, and to use. The available instructions are a subset of the Z80 instruction set, and use a subset of the Z80 registers. The front cover shows a simulation of the MINI-Z display.

The register display uses words instead of the register abbreviations. The contents of the registers are shown under the heading CONTENTS. If these are addresses then the contents of the memory location addressed is shown under the heading CONTAIN. The memory display has been reduced to 21 locations to make the screen less forbidding.

Part of the documentation supplied with MINI-Z is a students' guide. This is intended as a tutor, and will take the student a little above O level standard. Included in the guide are exercises and sample answers.

It is proposed that an advanced guide will be produced, without exercises. This will introduce the student to the front panel, and the full range of Z80 commands, instructions, and registers. It will assume that the student is familiar with all the concepts used under MINI-Z. Since everything that can be done under MINI-Z is directly transferable to the Front Panel, advancing to the Front Panel is a relatively simple step.

Please refer to MICE release notes for availability of MINI-Z.

Angela Hirst. Hampstead School, N.W.2
Colin Opie. AUCBE, 19 St.Albans Rd. East, Hatfield, Herts.

((Purists will have noticed that the MINI-Z simulation on the cover is a bit of a cheat. Photographic constraints required that it be set-up on the 'wrong' computer ! N.C.))

USER GROUP MEETING: BIRMINGHAM May 7th.

The next User Group meeting will take place at:the

BIRMINGHAM EDUCATIONAL COMPUTING CENTRE
Camp Hill Teachers' Centre,
Stratford Road,
Birmingham,
B11 1AR

021-772 6534

May 7th. 11.30am to 4.00pm

At the time of going to press the agenda is:

11.30	Introduction
	Executive Committee report
	RML news
1.00	LUNCH
2.00	Presentations
3.00	Informal session
4.00	Close

Lunch will be available in the centre (about £1) if ORDERED IN ADVANCE - so please contact Peter Smith at the centre about this (or anything else !!) It is hoped that several 380Zs will be available: so bring your software on disk/tape and astound everybody !

The next executive committee meeting will be held immediately after the User Group Meeting: So this is your opportunity to demand/help/insist/fuss/lobby/agitate for whatever you want from the User Group. If you can't make the meeting, please anyway let someone on the executive know what you want from the User Group. (or even what you might like to contribute !). At the moment the executive is suffering from TOO LITTLE feedback from members. When we begin to drown under too much we'll publish the fact.

KEYSWAP: A POWERFUL DEBUGGING TOOL FOR BASIC PROGRAMS

The TRACE facility provided by the DBAS12 interpreter outputs a line-number every time that line of a program is executed. Although useful, this has two disadvantages. Firstly, in a program with several sections, one may need many pages of trace output in order to discover which sections were in use just before the point which is triggering the error message. Secondly, one is not given the values of variables when a section is entered. This article shows how to employ a method of tracing which does not have these disadvantages.

The DEBUGGING AID is illustrated in use with a "Knight's Tour" program, written by one of my students, and consisting of some 55 BASIC statements. This program was designed to simulate a Knight jumping around a chess board, but not alighting on any square more than once. At each point in the Tour a move is sought which will not result in the Knight being trapped, as it would be if all squares available to it have previously been visited. An unacceptable move is cancelled and an alternative is sought.
The student begins each section with a comment, using "!" instead of "REM", as illustrated below:

```
100  ! "**(RE)INPUT  X="; X; "Y="; Y
200  ! "**SECONDARY MOVE  X="; X; "Y="; Y
300  ! "**CALCULATE MOVE  X="; X; "Y="; Y
400  ! "**MOVE LEGAL?  X1="; X1; "Y1="; Y1
500  ! "**MAKE MOVE  X="; X; "Y="; Y
600  ! "**MOVE BACK  X="; X; "Y="; Y
700  ! "**COMPLETELY STUCK  X="; X; "Y="; Y
800  ! "**PRINT BOARD**"
```

You will notice that the format of the text following the "!" is that of an output statement. The interpreter will normally treat these lines as remarks, but this may be altered for tracing purposes such that they are treated as PRINT statements. Then, when any of these lines are executed, the section title will be output together with the current values of the Knight's position coordinates.

The change made to the interpreter is that the keyword "?" (the alternative symbol for PRINT) is replaced by the "!" character, so that when programs are interpreted "!" is taken as the keyword for output instead of "?". Normal output statements in the program must, of course, use PRINT and not "?" since, when running under the amended interpreter, "?" no longer exists as a keyword.

KEYSWAP is used to make the necessary change prior to tracing. This program requests the user to supply the keyword which must be changed. Provided that this keyword exists in the BASIC symbol table it then asks for its replacement. The string length of the keyword and its replacement must be the same, as the program works by 'poking' the new name into the locations previously occupied by the original.

KEYSWAP was developed after discovering the position of the table of keywords in our DBAS12 interpreter. This table includes BASIC words such as RUN, LET and INT, symbols like "+" and "(" and messages such as READY and OUT OF DATA. KEYSWAP can be used to alter any of these.

The KEYSWAP program is listed below. Line 110 indicates the position and range of the symbol table in my BASIC. If you use a different interpreter, or suspect that its symbol table is loaded into another area of memory, than you should first find the correct position, using the front panel (for instance), then substitute for the values given in line 110.

```
1 REM  PROGRAM NAME:   KEYSWAP
2 REM  VERSION:        1.1
3 REM  DATE:           FEB 1980
5 REM  LIBRARY:        MICE
6 REM  LANGUAGE:       DBAS12
7 REM  AUTHORS:        B.WILFORD
                         & J.TOWNSEND
8 REM  DOCUMENTATION:  AUTHORS  -
                         TEL 01-749 2775
100 INPUT"KEYWORD TO BE CHANGED";A$
110 FOR I=13426 TO 14597
120 P=PEEK(I)
130 IF MID$(A$,1,1)<>CHR$(P AND 127)  THEN 180
140 FOR J=I TO I+LEN(A$)-1
150 P=PEEK(J)
160 IF MID$(A$,J-I+1,1)<>CHR$(P AND 127) THEN 180
170 NEXT J:GOTO 200
180 NEXT I
190 ?"CANNOT FIND ";A$: GOTO 280
200 INPUT"SWAP TO";B$
210 IF LEN(B$)<>LEN(A$) THEN ?LEN(A$);"CHARACTERS ONLY":GOTO 200
220 L=0
230 FOR J=I TO I+LEN(B$)-1
240 L=L+1
250 P=PEEK(J)
260 POKEJ,ASC(MID$(B$,L,1))-128*(P>128)
270 NEXT J
280 END
```

BEWARE! THIS PROGRAM IS DANGEROUS in the wrong hands!

Although it provides a powerful debugging tool, some (e.g. teachers) may not wish it to be made generally available on their machines. It may be put to other (nefarious) purposes. Imagine the innocent colleague coming to use the machine, only to find that "+" subtracts and "-" adds. Lively minds will surely devise more interesting forms of sabotage.........

The authors hope to develop a routine which will allow "!" to be switched back and forth between REM and PRINT as desired (as in the present TRACE0 and TRACE1). This routine would have no other application than that of a trace facility, and would not affect the use of other keywords. We realise that this would be a more acceptable tool for most users. However, it is not yet written, so we offer KEYSWAP as it stands, hoping that, in the right hands, it will prove useful.

How to use KEYSWAP as a debugging aid: METHOD 1

In the program under development, adopt the following convention

- in normal comment statements use the keyword REM
  e.g. 10 REM THIS IS A COMMENT
- do not use the alternative symbol "!" except where a trace statement is required
  e.g. 11 ! "**START** X="; X; "Y="; Y
- format the text following "!" as required in a PRINT line.

In normal running line 11 would be treated as a comment. For tracing purposes we would like it to be treated as an output statement (i.e. the printing of "START" followed by the current values of X and Y). To do this, first run KEYSWAP as indicated below.

user input is underlined

```
LOAD"KEYSWAP"

READY:
RUN
KEYWORD TO BE CHANGED? "?"
SWAP TO? "!"

READY:
```

} Note: quote marks may be omitted.

Now the interpreter will have been amended so that it will treat "!" as it would have previously treated "?" (i.e. as for PRINT).

How to use KEYSWAP as a debugging aid: METHOD 2

This alternative method is suggested for those programmers who, for brevity, prefer to use "?" instead of PRINT and "!" instead of REM. Provided that they have been consistent in this and have not mixed the use of the long and the short forms of these keywords, they can insert their trace comment lines by prefixing them with REM followed by two specified characters (e.g. REM--) For example,

```
    11 REM-- "**START** X="; x; "Y="; Y
```

could be used in place of line 11 in method 1.
In such circumstances, run KEYSWAP as indicated below.

```
LOAD"KEYSWAP"

READY:
RUN
KEYWORD TO BE CHANGED? "PRINT"
"REM--"

READY:
```

but the ordinary REM must be disenabled also:

```
RUN
KEYWORD TO BE CHANGED? "REM"
SWAP TO? "RRR"    (use any 3 character string not to be found
                   in the program under development)
READY:
```

Note that, in this method, it is necessary to disenable the ordinary use of REM. This is because the interpreter stores REM before PRINT in its keyword table, and encounters it first during a search. No similar change is required for method 1 because "?" occurs before "!" in the table.

If you would like to receive program documentation for KEYSWAP then please contact the authors:

J.Townsend and B.Wilford,
Burlington Danes School Computer Club.

(Notice the heading of the KEYSWAP listing. Should this be the standard for all programs submitted to READ USING? Ed.)

A MODERN LANGUAGE FOR THE 380Z ??

Several people have asked for information on PASCAL for the 380Z: rumours abound as micro-freaks limber up for PASCAL wagon-jumping. It IS available; and getting better !

RML are 'investigating' PASCAL and say they may release something 'soon'.

A CP/M PASCAL is available from TCL Software, price about £120 on disk with manual. This is known to run happily on the 380Z. You actually get two versions of the language: a full ISO/BSI implementation of a PASCAL compiler, also 'resident PASCAL' . This is a subset of the full PASCAL without disk files, but linked to its own editor. This makes it almost as pleasant to use as an interpreter for learning the language, or developing a program. A certain person not entirely unconnected with educational computing is at work linking this pascal to the RML editor.

The Next issue of Read Using will hopefully bring you more information on PASCAL for the 380Z, and a review of the TCL implementation.

TCL software: 12 Chapel St. London, N.W.1. 01-402 8137

IBM 3740 to CP/M CONVERSION

RML 8" disk drives are hardware compatible with the 'industry standard' IBM 3740 disk format. However, there are two areas of total incompatability with regard to software:

1) The IBM format uses 'Dataset' labels for directory information. These are not at all the same as CP/M Filenames, and are either ignored by CP/M or else totally confuse it.

2) IBM persist in using EBCDIC coding for characters instead of ASCII.

I find CP/M and ASCII both very much more flexible and easy to use than 3740: the problem comes when having to convert from one to the other. Happily, it is quite simple. The 380Z provides primitive functions for reading individual disk sectors and placing the sector data in a memory buffer. Using these functions it is easy enough to read a 3740 sector, convert to ASCII, then write to disk under CP/M. I am not printing the program to do this - it is likely to be a minority interest, and not worth the space. If anyone is interested please contact me and I'll provide a listing etc. and full details of the 3740 data format. (If you ALL want it I'll publish it in the next newsletter !)

So What ?
Once you can read 3740 disks the whole world of data-processing is open to you. Many data-preparation bureaux can provide 'key-to-disk' services. I am currently using a bureau to type 50,000 names and addresses onto disk for a mailing list. I couldn't find anyone to do this under CP/M, but 3740 being the 'professional' format all sorts of services are available. Again, we have mainframe data that I want to process. In the end, the simplest way was to dump data from the mainframe onto IBM format tape, have the bureau copy the tape onto 3740 disk (about £5 per disk), convert to ASCII/CP/M, and away we go !

I have seen software advertised that claims to provide for compatability between CP/M and 3740. I have no experience of this myself: if anyone has they might like to submit some notes or a review of it.

Nick Cutler

Dear Sirs,

Assuming that the RML User Group actually exists, and there is no sign of it here, please accept the enclosed £5.00 for my membership. If it is indeed a chimera then please give the £5.00 to Research Machines to help them finance the development of my High-Resolution board: there is no sign of that either.

Considering the inaugural meeting of the User Group, two things are of concern to me. Firstly, the committee. Now we all accepted a rather conventional approach to a constitution, and the election of officers. Consider: many of the people present arrived knowing nobody. Some of them might well have liked to sit on the committee; but by adopting the 'conventional' necessity of proposers/seconders etc you shut them out completely. This is supposed to be a User Group- not an old boys'club. We are together struggling with a NEW technology, we need to support each-other, and many of us work alone. Whilst I am sympathetic to the needs of profligate education authorities scattering computers to the four corners of the curriculum and then wondering how they are to be supported, I do think that the MAIN function of a User Group is to sharpen the point of the spear. If certain authorities then need to blunt the edge before hurling it toward their end users then that is for them to do.

All of which leads to my second concern. Software. I hear rumours that the User Group Exec. boggles at the thought of a software library. How can this be ? Surely the main purpose of such an association is the exchange of software ? RML would obviously like to be in the position of saying; "Here are 765 super guaranteed crash-proof programmes that you too can run on your 380Z". They would obviously like to avoid the idiot situation other computer-builders are in where nobody will ever trust their applications programs again. But this is of no concern to us independant users. I need programs that run, true, but more than that I need ideas. I want to know what the other fanatics are fiddling with, and I want to be able to exchange programs with them. The 'standard' doesn't concern me too much: it's all going to be scrambled and re-written anyway. Heaven knows, there is enough potential in that black box that I don't understand, and any help at all is a step forward.

We have now formally had a User Group for 6 months. I, at least, am no nearer knowing what anyone else is doing than I was last October. Never mind the quality, feel the data stream. The job of the executive is not to edit everything out of sight: it is to maintain a channel of communication between users.

Yours faithfully,

William Grummett
Doncaster

MICE NOTES -

Many of us have recognised the potential of our 380Z machines as teaching and learning aids. We are also aware of the lack of software and of the difficulties of producing more than the odd program of our own. The obvious answer seems to be that a group of people with similar needs should get together and produce software on a cooperative basis. The benefits can be many - mutual encouragement, cross-fertilization of ideas, the sharing of their products, and the very real possibility of acquiring much needed support services.

MICE is such a group, dedicated to the development of educational software for Computer Education.

We have been in existence for about a year and now have fourteen members. Three packages, complete with teaching notes, have been released so far. They can be obtained from us at the cost of the media on which they are prepared. They are:

MINI-Z - the program described by Angela Hirst elsewhere in this issue. The potential uses of this training program cover a wide area of the Computing curriculum.

SORT - a package of six graphical simulations of sort processes together with six non-graphics sort programs.

COMMINT - a generalised command interpreter for CAL programs of considerable power and having a very simple author interface.

If you are interested in acquiring any of these, or in co-operating with MICE in their activities, then please contact the Chairmouse.

Morfydd Edwards

NEWS -

Ian White, of Hydeburn School,Chestnut Grove, Balham, has developed a file transfer package for communications between 380Z machines and the ILEA Schools Service Systime Computer. This will provide an easy way of distributing software throughout the schools in the inner London region. Other LEA's may be interested in doing the same.

Software for distribution is stored in a number of independent libraries, and programs may be retrieved by running a small routine in the destination micro.

We hope to give you more details of this project in our next edition. Meanwhile, Ian would welcome offers of interesting software for the 380Z, or any information on what is available.

This article has been reprinted from BECCBYTES - The newsletter from the Birmingham Educational Computing Centre.

MAKE THE OPERATING SYSTEM WORK FOR YOU

Although the documentation accompanying the CP/M disc operating system is not very informative about the structure or the data formats used in the system, a little trial and error can produce useful results. The following notes explain how CP/M may be adjusted to function as a 'turn key' system and how files which have been accidentally erased may be restored for further use.

TURN KEY OPERATION

STEP 1.

Use the RML 'CONFIG' program to modify your copy of the 'MOVCPM' program so that any future version of the operating system generated by that program will set up your system correctly (e.g. connect the printer etc.) CONFIG is self documenting and easy to use.

STEP 2

Use MOVCPM to generate a new version of the operating system and save this on an intermediate disc. Now for the changes to CP/M !

STEP3.

Use SYSGEN to load a copy of CP/M into core. SYSGEN replies with 'function complete' when this has been done.

At this point use the CTRL F key to enter the front panel. CP/M will be found at location 980H.

The CP/M input buffer starts at location 988H with a count of the number of characters currently in the buffer at 987H.

At this stage any valid command may be entered into the buffer in hexadecimal format. For example, the command 'DBAS12' would be entered, starting at location 987H as

'06 44 42 41 ~~54~~ 53 31 32'.

Use "'K' to cause the action of SYSGEN to continue. At this stage SYSGEN requires the name of the drive to which the new version of CP/M is to be copied. Typing 'B' followed by a return character will cause the new version to be output to drive B. The Turn key system is now ready for use. With the new disc in drive A, typing 'B' will configure the system and load the required program.

The sign on message output by CP/M is loacted at '1EBOH' and may be changed at the same time to give a more informative message.

A similar modification may be made to CP/M when resident in core to allow one COM file to load and execute another COM file.

Brian Drury

RESTORING FILES

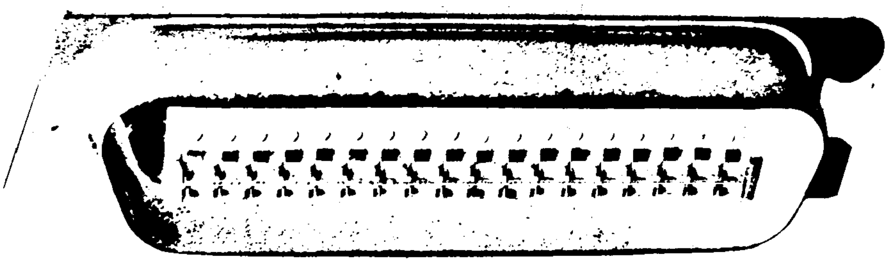
When a file is erased from a disc the contents of the file are not physically erased at that time. The only action taken is to change a 'flag' in the directory entry for the file. Thus, providing no further entries have been made to the disc, so overwriting the required data, a file may be restored simply by changing this flag to its former state.

The following program performs this task for a file specified with the command to load the program. (N.B. The file name must be in the form D:nnnnnnnn.eee; it is important to include the drive.)

```
;        RESTORE A GIVEN FILE   VER 1.0
;
;        B.S.DRURY   MARSH HILL SCHOOL
;
;        1/2/80
;
;        The filename in the form
;        d:<filename>.(type> is transferred
;        to a temporary file control block
;        by the CP/M CCP program.
;
;        The name is then used to search
;        the directory track of the appropriate
;        disc for a reference to the file.
;
;        If a match is found the status
;        byte is checked; if the file is
;        marked as erased the status byte
;        is changed, otherwise a message
;        is given.
;
;        If no reference is found a suitable
;        report is given.
;
;
ORG      100H
;
;        Set unit number
;
         LD       A,(TFCB)
         DEC      A
         LD       (UNIT),A
;
;        Initialise the disk unit
;
         LD       IX,UNIT
         EMT      INIT
;
;        Read current sector
;
READSC:  LD       IX,UNIT
         EMT      RDSEC
;
;        check if file name is present
```

```
;
FLNMCH: LD      B,4
        LD      HL,BUFF+1
FLCHLP: PUSH    BC
        PUSH    HL
        LD      DE,TFCB+1
        CALL    SEARCH
        JR      Z,FOUND
;
;       else try next entry
;
        POP     HL
        LD      DE,20H
        ADD     HL,DE
        POP     BC
        DJNZ    FLCHLP
;
;       If not found this sector try the next
;
        LD      A,(SECTOR)
        INC     A
        LD      (SECTOR),A
        CP      A,11H
        JR      NZ,READSC
;
;       file not in directory
;
        LD      HL,MES1
        EMT     MSG
        JP      EXIT
;
;       if found check status
;
FOUND:  POP     HL
        DEC     HL
        LD      A,(HL)
        CP      A,0E5H
        JR      NZ,FEXIST
;
;       change file marker
;
        LD      A,00
        LD      (HL),A
;
;       rewrite sector
;
        LD      IX,UNIT
        EMT     WRSEC
        JP      EXIT
;
;       file not erased
;
FEXIST: LD      HL,MES2
        EMT     MSG
        JP      EXIT
```

```
;
;        search subroutine
;
;        DE has address of file to be found
;        HL has address of next name in buffer
;
SEARCH:  LD      B,11
SERLOP:  LD      A,(DE)
         CP      A,(HL)
         JR      NZ,NOGO
         INC     DE
         INC     HL
         DJNZ    SERLOP
         AND     A,00
         RET
NOGO:    OR      A,0FFH
         RET
;
;        equates
;
TFCB     EQU     5CH
INIT     EQU     19H
RDSEC    EQU     1AH
WRSEC    EQU     1BH
MSG      EQU     17H
EXIT     EQU     5
;
;        messages
;
MES1:    'File no longer in directory',0DH,0FFH
MES2:    'File already exists.',0DH,0FFH
;
;        work areas
;
UNIT:    DEFB    00
TRACK:   DEFB    03
SECTOR:  DEFB    01
ADDRB:   DEFW    BUFF
;
;
BUFF     EQU     $
         END
```



RML NATIONAL USER GROUP

Name: ....

Institution: ....

Address for Correspondence: ....

....

....

....

I would like to join the ....
National User Group: (signature)

I enclose membership fee of £5.00. (Cheques/Postal Orders should be crossed and made payable to 'RML National User Group Account'.)

I am using my disk based/cassette based micro for the following applications:

....

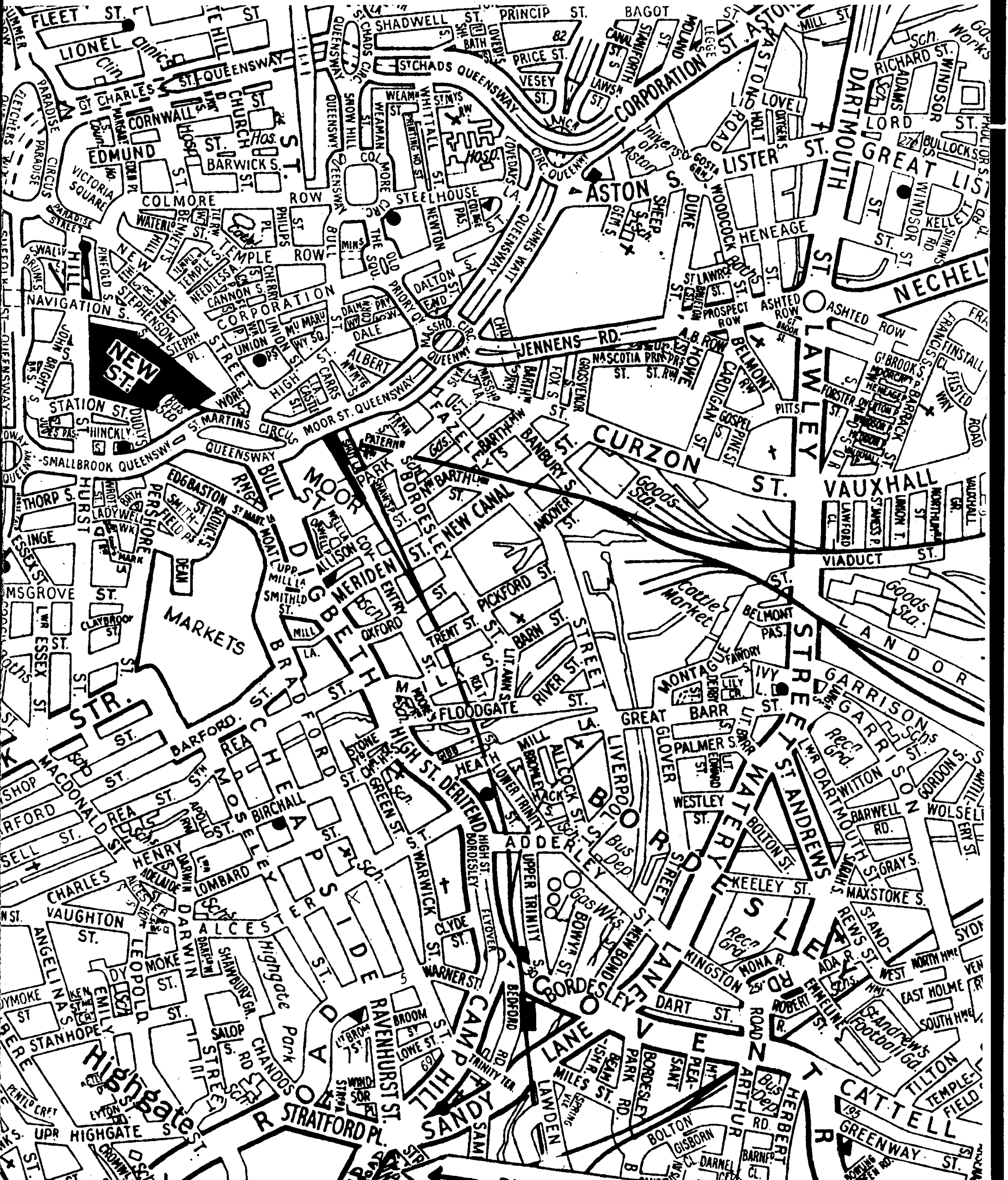
....

....

....

and the software associated with this is designed/being tested/ completed and fully tested.

Please return to The Secretary, RML National User Group, c/o Research Machines Limited, PO Box 75, Oxford.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JENNENS RD.
ASHTED ROW
LAWLEY ST.
CURZON ST.
VAUXHALL
VIADUCT ST.
Goods Sta.
LANDOR
GARRISON
Cattle Market
PICKFORD ST.
NEW CANAL
BORDESLEY
FAZELEY
BANBURY S.
MOOR ST.
DIGBETH
MERIDEN
MARKETS
FLOODGATE
RIVER ST.
GREAT BARR
MONTAGUE
LIVERPOOL ST.
ADDERLEY
HIGH ST. DERITEND
Gas Wks
BORDESLEY
WATERY LANE
ST. ANDREWS
Recn Grd.
BRADFORD ST.
CHEAPSIDE
MOSELEY
BARFORD
BIRCHALL
ALCESTER
LOMBARD
CHARLES
VAUGHTON ST.
LEOPOLD
DARWIN
ANGELINA
EMILY
STANHOPE
Highgate
Highgate Park
UPR HIGHGATE
STRATFORD PL.
STRATFORD ROAD
CAMP HILL
RAVENHURST ST.
SANDY LANE
COVENTRY
CATTELL
GREENWAY ST.
St. Andrew's Football Gd.
HENLEY
AUCKLAND
HICK ST.
OUGHTON
INGE
THORP S.
ESSEX ST.
BROMSGROVE ST.
PERSHORE
EDGBASTON
HURST
KINGSTON
DART ST.
ROBERT
EMMELINE
HERBERT
ARTHUR
BOLTON
CHAPMAN
LITTLE
TILTON
Bus Dep
WARWICK
CLYDE
WARNER ST.
BEDFORD
UPPER TRINITY
LAWDEN
MILES ST.
PARK RD.