# SLOGGER

Slogger Ltd
St Just
Penzance
CORNWALL TR19 7RZ
Tel: 0736 787272

# Click
# User Guide

For the Acorn Electron with
ROMBOX+ or Acorn PLUS 1

Copyright (C) 1990

C L I C K

**Introduction**

CLICK is a selection of programs which have been developed specifically for the Acorn Electron computer. CLICK is supplied in a standard ROM Cartridge case which houses a 32K EPROM, 32K Battery-backed RAM, Calendar Clock (same as used in the Master 128), Push button switch and control circuitry. The philosophy behind the CLICK design was to offer the user a whole host of utility software which could be invoked at the push of a button rather than the usual 'star' commands and which, when the user was finished, could return him to whatever he was doing or unable to do prior to entering CLICK.

The software is designed to support the ADFS, DFS and a range of general utility routines. One features is an Appointments diary whereby the user could set the Date/Time of an occasion (perhaps a business meeting), such that at the appropriate time the user would be interrupted from his/her work to be informed accordingly. The Date/time would have been set perhaps hours, minutes, days or even months previously. No more excuses in forgetting Birthdays, a 'crime' for which I have been guilty of on many an occasion.

Features supported by CLICK are as follows:

DIARY, APPOINTMENTS and ADDRESS BOOK using Battery-backed memory
ADFS Catalogue (TREE structure), Format, Backup, Verify, SNAPSHOOT,
     ADFS/DFS File transfer, Disk Editor, etc, etc.
DFS Catalogue, Format, Verify, SNAPSHOOT, Disk Editor, DFS/ADFS File
    Transfer, etc.
TAPE 2 DISK...transferring virtually all games
Memory Editor, ROMS INSERT/UNPLUG, MOUSE support
SCREEN DUMP

**Disclaimer**

This manual does not constitute a specification of the product. Slogger reserves the right to make changes without notice.

CONTENTS

**4. DFS UTILITIES**

# 1. USING CLICK

## 1.1     INSTALLING CLICK

CLICK is supplied on Cartridge and may be inserted in any of the two available slots of the PLUS 1 or ROMBOX+. **Ensure the power is off before inserting or extracting the cartridge.** Damage may otherwise result.

## 1.2     INITIALISATION

Initialisation is fully automatic the first time CLICK is used. However, should the user wish to reset certain of the features supported then a procedure is adopted and is described as follows:

### 1.2.1     CTRL-FUNC-1-BREAK ... Reset ROMs table

The ROMs 'killed' table held in the Battery-backed RAM will be reset by this sequence.

### 1.2.2     CTRL-FUNC-2-BREAK ... Reset mouse On/Off

The routines supporting control by the mouse will be reset to Off by this sequence.

### 1.2.3     CTRL-FUNC-9-BREAK ... Reset Calendar Clock

The Calendar Clock will be reset to day 1 (May 1st 1990) by this sequence.

### 1.2.4     CTRL-FUNC-0-BREAK ... Reset all RAM

The entire Battery-backed RAM in the CLICK Cartridge will be reset by this sequence. As a result all functions supported by CLICK will be reset just as if the unit was being used for the first time.

## 1.3     ENTERING CLICK

CLICK is entered by one of two means. The default means is by pressing the push button switch on the CLICK Cartridge. The alternative (and, incidentally, the easiest) is by two 'clicks' of the mouse, provided it is enabled and of course a User Port is connected. The centre button of the mouse should be used with up to one second between 'clicks'. In other words, two quick 'clicks' of the mouse centre button and you will be in CLICK.

Once CLICK is activated, the control software will firstly save all important memory locations in order that they may be restored on the exit from CLICK. This of course includes the screen.

The main menu of CLICK is as follows:

DIARY
ADFS UTILITIES
DFS UTILITIES
TAPE 2 DISK
SYSTEM UTILITIES
and
SCREEN DUMP

The desired function can be selected by moving the cursor with the Up/Down cursor keys and thence pressing <RETURN>.

Whilst awaiting an appropriate command, the Date and Time are continuously displayed at the top of the screen. This also applies to sub-menus of the various functions.

Furthermore, if an appointment is due, an appropriate message is displayed to catch the attention of the user.

## 1.3.1    ENTERING * COMMANDS

"*" commands may be issued from the main menu of CLICK. This is done simply by pressing the "*" key, at which point the screen will be cleared, and entering the required command. Remember that all memory is restored on exiting from CLICK and so perhaps restoring any changes that the * command affected.

# 2. DIARY

When DIARY is entered, the Calendar of the current month is displayed in addition to the main menu. The display is structured such that the first position is always a Sunday. If the first day of the month is not a Sunday then this and any other days up to the first day will display the days of the previous month. This also applies to the end of the month such that the first date of the next month will fill the positions to the right of the display.

The DIARY supports three functions:

CALENDAR
APPOINTMENTS
ADDRESS BOOK

## 2.1        CALENDAR

The Calendar displayed when entering the DIARY is for the month according to the Date/Time held in the Electron Calendar Clock. It is possible to manipulate the cursor around the calendar as displayed or scan through successive or previous months. This is achieved using the cursor control keys described below. As the cursor is moved from day to day, a check is made for any appointments on that day. If an appointment is found then the details are displayed.

### 2.1.1    CURSOR RIGHT

Move the cursor forward to the next day on the Calendar. If the cursor is currently at the last position at the bottom right of the display then the next month will be displayed in the calendar; the new position of the cursor will be according to the now current day of the month.

### 2.1.2    CURSOR LEFT

Move the cursor left to the previous day on the Calendar. If the cursor is currently at the top left position of the display then the Calendar will be refreshed with the previous month; the new position of the cursor will be according to the now current day of the month.

### 2.1.3    CURSOR UP

Move the cursor up one line to the previous week on the display. The cursor will limit to the top line.

### 2.1.4    CURSOR DOWN

Move the cursor down one line to the previous week on the calendar display. The cursor will limit to the bottom line.

### 2.1.5    SHIFT CURSOR UP

Previous months will be refreshed in the calendar at each selection of this key.

### 2.1.6    SHIFT CURSOR DOWN

Using this key the user can scan forward through the calendar month by month.

### 2.1.7    CTRL-A          Add appointment

This command may be used from the Calendar scan to add an Appointment to the list. Note that the date of Appointment and Reminder will still be required in the normal manner. Refer to section 2.2.1 for further details.

### 2.1.8    CTRL-E          Edit appointment

An Appointment referenced during the Calendar scan may be edited by selecting this command. Refer to section 2.2.6 for further details.

### 2.1.9    ESCAPE

Return to main DIARY menu.

### 2.2      APPOINTMENTS

A major feature of CLICK is the ability to program into the Battery-backed RAM information which is constantly monitored such that when certain conditions are satisfied an event takes place. What this really means is that details of Appointments or occasions may be entered together with a Date and Time so that at the appropriate time the computer is interrupted and the information displayed on the screen. By this means, the details of an Appointment may be entered together with the Date/Time of both a reminder and the actual Appointment itself. The reminder could be used effectively to give an hour's notice or even perhaps the day before. If the details entered were for a birthday then the actual date could be for a year's time with the reminder perhaps the week before to give a chance to find a present.

Selecting this option will enable the user to scan all of the Appointments previously entered into CLICK. In this way, Appointments may be deleted or modified and even the Date/Time of the Appointment may be changed.

## 2.2.1   CTRL-A ... Make Appointment

This command is used to create a new Appointment. When selected, the
Diary Editor is entered to construct your message after which the
Reminder and then Appointment Date and Time are entered. If the
<ESCAPE> key is pressed at all then the function is aborted. For
complete details of the Diary Editor see section 2.4

### 2.2.1.1 Appointment Date/Time

The Appointments Date/Time should be prepared in the same manner as
the CMOS CLOCK (See section 6.2). Appointments may be made for as far
ahead as the calendar supports.

If the <ESCAPE> key is pressed at any time then the entire MAKE
APPOINTMENT function is exited with no subsequent action taken.

### 2.2.1.2 Reminder Date/Time

The Reminder Date/Time should similarly be prepared in the same
manner as the CMOS CLOCK. Reminders may also be made for as far ahead
as the calendar supports.

If the <ESCAPE> key is pressed at any time then the entire MAKE
APPOINTMENT function is exited with no subsequent action taken.

## 2.2.2   ESCAPE...Exit

Exit and return to main menu.

Note: If no appointments are programmed into CLICK then all of the
following commands are ignored.

## 2.2.3   CURSOR DOWN

Move cursor to next Appointment in the list. If the cursor is at the
bottom of the displayed line, then the entire list will be scrolled
up one line and the new Appointment will be displayed accordingly.

## 2.2.4   CURSOR UP

Move to the previous Appointment in the list. If the cursor is at the
top of the displayed list then the entire screen will be scrolled
down one line and the new Appointment displayed unless the
Appointment displayed is the first one in the list in which case the
command will be ignored.

### 2.2.5    CTRL-D...Delete Appointment

The current Appointment may be deleted with this command.


### 2.2.6    CTRL-E...Edit Appointment

The details of an existing Appointment may be modified using this command. When this function is called, the details of the Appointment are loaded and may be modified in the same way as the MAKE APPOINTMENT function (See section 2.2.1). On exit, the old details and dates/times are replaced by the new information.

If the <ESCAPE> key is pressed at any time during the Edit Appointment then the entire edit is aborted with no changes being made.


### 2.2.7    ACKNOWLEDGE APPOINTMENT

When an Appointment does become due and the computer is interrupted to display the Appointment details, CLICK will then await a command to acknowledge in one of the following ways:

CTRL-A       This command will acknowledge the Appointment (or the Reminder). If the interrupt was for the Reminder then this is flagged by CLICK and the user is returned to whatever he was doing. If the interrupt was for the Appointment itself then the following applies:

If the first character in the screen message is "@" then this Appointment is re-entered automatically but for the following year (compliments to John Munn of Storrington, W. Sussex!)

<ESCAPE>     This command will acknowledge the Appointment (or the Reminder) in a slightly different manner to CTRL-A. If the interrupt was due to the entry in the Appointments list the User will be returned with no action taken and will be interrupted again at the next monitoring of Appointments five seconds later. If the interrupt was due to the Reminder then the Time/Date will be incremented by five minutes. This facility has been implemented to allow the User to mentally record an imminent Appointment but who wishes for a "snooze" period to, perhaps, finish something of importance and be reminded again presently.


### 2.3    ADDRESS BOOK

The purpose of the Address Book is to contain a list of names, addresses and telephone numbers stored in alphabetical order for ease of reference. The Address Book is very easy to scan through and the entire contents may be printed for a 'hard copy'. Since the Address Book utilises the Battery-backed memory there is no need to remember to save or reload from cassette or disk.

The format of the display is essentially split between two windows. The first window lists the first line of each of a maximum of nine entries, the first entry in the list being determined by the Current entry. The second window displays the complete contents of the Current entry since each entry may occupy a screen area of 40 characters by 8 lines.

The following commands are available:

### 2.3.1   CTRL-A ... Add an entry to the Address Book

Entries for the Address Book are made using the Diary Editor. In this way an entire screen including superfluous information may be constructed for just one entry. The position of the entry is dictated by the name or whatever at the top left of the screen. In other words, the user would normally enter the surname first, other information such as addresses, 'phone numbers, comments etc being anywhere else in the 40 character by 8 line screen.

### 2.3.2   ESCAPE

Return to main Diary menu.

Note that if the Address book is empty then all other commands are ignored.

### 2.3.3   CURSOR DOWN

This key is used to scan down the list of entries in the Address Book.

### 2.3.4   CURSOR UP

This key is used to scan back up the list of Address Book entries.

### 2.3.5   CTRL-E

This key allows editing of the Current entry. The procedure is identical to that of 2.3.1 Add entry to Address Book. On completion, the existing entry is updated with the new details. If the <ESCAPE> key is pressed during the screen editing then the function is aborted and the original entry remains unchanged.

### 2.3.6   CTRL-D

This key will delete the current entry in the Address Book.

### 2.3.7   CTRL-F ... Print Address Book

This command will print the entire Address Book. The format differs slightly in that each entry is printed on one line only, the 8 lines of 40 possible characters being separated by commas. This allows readability of the hard copy whilst reducing unnecessary wasteage of paper.

### 2.3.8   Any key A-Z

This feature allows pressing any key A to Z to instantly display the contents of the Address Book from the key entered.

### 2.4      DIARY SCREEN EDITOR

When this function is selected, an area of the screen will be cleared for the entry of text.

### 2.4.1    TEXT WINDOW

The screen is restricted to 40 characters width by 8 lines. The cursor may be moved around the screen using the Up, Down, Left and Right control keys within these boundaries. Any ASCII character entered will be displayed at the cursor position and the cursor will be moved forward one position. In the case of INSERT mode, any characters to the right of the cursor will be shifted to the right and 'lost' if shifted beyond the end of the window.

Associated control keys are:

CURSOR UP
CURSOR DOWN
CURSOR LEFT
CURSOR RIGHT
RETURN
CTRL-O
DELETE
CTRL-C
CTRL-F
ESCAPE

### 2.4.1.1 CURSOR UP

Move the cursor up one line. If the cursor is currently at the top of the window then it will roll over to the same lateral position in the bottom of the window.

### 2.4.1.2 CURSOR DOWN

Move the cursor down one line. If the cursor is currently at the bottom of the window it will roll over to the same lateral position at the top of the window.

### 2.4.1.3 CURSOR LEFT

Move the cursor left one character position. If the cursor is at the left of the window then it will move to the far right of the window and one line up.

### 2.4.1.4 CURSOR RIGHT

Move the cursor right one character position. If the cursor is at the far right of the window then it will move to the far right of the window on the next line down.

### 2.4.1.5 RETURN

The cursor is moved to the beginning of the next line.

### 2.4.1.6 CTRL-O

Toggle Insert/Overwrite mode. Characters entered will overwrite text characters on the screen in OVERWRITE mode. In INSERT mode, characters will be inserted at the position of the text cursor and text to the right of the cursor will be shifted right as each character is entered. The default mode is OVERWRITE.

### 2.4.1.7 DELETE

Delete the previous character entered. In OVERWRITE mode, the previous character on the line will be deleted and the cursor will move left one character. If INSERT mode is selected then the same will occur as in OVERWRITE mode but also any text to the right of the cursor will shift left to fill the gap made by the deleted character.

### 2.4.1.8 CTRL-C

Control characters may be entered using this command although use of this facility is not made use of at the present time.

### 2.4.1.9 CTRL-F

Finish with screen editing...save text.

**2.4.1.10 ESCAPE**

Abort screen editing...do not save text.


**2.5      CLOCK ON/OFF**

The Master CMOS calendar clock is monitored by CLICK on a periodic
basis. Infrequent reference is made in order to minimise any impact
on throughput. Interrupts are generated approximately every five
seconds by the CLICK clock at which point the Appointment and
Reminder Dates/Times are compared with the CMOS calendar clock. There
may well be times when you do not want CLICK to interrupt and display
Appointment or Reminder information and so the CLICK CLOCK may be
disabled using this function.


**2.6      ALARM CALLS**

The ALARM call is initiated using the *ALARM command from outside
CLICK. An absolute time or a relative time may be entered e.g.

```
*ALARM    8:30     ...Set the Alarm for 8:30 today
*ALARM    14:00    ...Set the Alarm for 2:00 this afternoon
*ALARM    +0:30    ...Set the Alarm for 30 minutes' time
*ALARM    +5       ...Set the Alarm for 5 minutes' time
*ALARM    +5:00    ...Set the Alarm for 5 hours' time
*ALARM    +24:00   ...Set the Alarm for 24 hours' time
*ALARM    £8:00    ...Set the Alarm for 8:00 tomorrow morning
*ALARM    OFF      ...Switch off or acknowledge the Alarm
*ALARM             ...Display current Alarm setting
```

Note that if you set the Alarm for earlier than the current time then
the date will be adjusted automatically for the following day.

Note that <CTRL><BREAK> or switching off the computer will not affect
the ALARM parameters. Initialising the CLICK RAM will reset the ALARM
call and changing the Date/Time will show the same effects as a
normal clock.

Note also that the ALARM will not sound whilst in CLICK.


**2.7      BACKUP/RESTORE of APPOINTMENTS and ADDRESS BOOK**

As a safeguard, the Appointments data and Address Book data may be
backed up onto disk and subsequently restored as appropriate. The
commands issued from outside CLICK are as follows:

```
     Full command                    Abbreviated command

*ADDRESS BACKUP filename             ...*AD.B.filename
*ADDRESS RESTORE filename            ...*AD.R.filename
*APPOINTMENT BACKUP filename         ...*AP.B.filename
*APPOINTMENT RESTORE filename        ...*AP.R.filename
```

## 2.8    READING ADDRESS BOOK FROM BASIC


A facility has been made to read the Address Book records from BASIC programs (or machine code programs of course). The command to reference the Address Book is *ADDRESS RECORD.

To determine the number of records in the Address Book the user should issue the following:

*ADDRESS RECORD COUNT          ...*ADD.REC.C.

CLICK will return the number of records into location &80. To reference a record, the user should enter the record number required into location &81 (This MUST be less than the Count in &80) and then issue the command:

*ADDRESS RECORD                ...*ADD.REC.

CLICK will then read the complete record into the memory page &A00, the Cassette Buffer. The format of the data is defined by example as follows:

Address Book Entry:

        SLOGGER COMPUTERS
        ST. JUST
        PENZANCE
        CORNWALL

String at &A00:

        SLOGGER COMPUTES, ST. JUST,PENZANCE,CORNWALL<0D>

where <0D> is a carriage return.

To read this into a String variable, one would use the command:

        A$=$&A00

The variable A$ may then be manipulated in the normal manner using INSTR and MID$ etc. to extract the individual fields.


## 2.9    TIME


There is a command which may be issued from outside CLICK to read the current Date/Time.

Simply enter *TIME.

# 3. ADFS UTILITIES

A number of facilities are offered to support the Acorn ADFS.

## 3.1      EXTREE

The ADFS as standard does not lend itself to easy viewing the hierarchical structure of an ADFS disk...i.e. the Tree structure. The EXTREE utility does this and more. It is simplicity itself to scan across the various Directories, deleting, renaming, changing attributes all with ease. The beauty of it is that this is done using the cursor keys or a mouse. Entering lengthy Directory names, the structure of which can rarely be remembered, is rather primitive when the software technology is there to simplify things. After all, that's what computers are meant to do!

On entering EXTREE, the Route Directory is always loaded from the Drive specified in the ADFS UTILITIES menu. Information is displayed in three windows in this, the Directory Mode.

Window 1

This window displays the structure of the disk Directories min a Tree form. Sub-Directories are offset to the right of their Parent Directories, graphics characters being used to help in this.

Window 2

This window displays the Pathname of the 'Current Directory' in full. i.e. &.ACCOUNTS.ACCBACKUP

Window 3

This window displays the filenames, or a portion of the filenames (up to 18 names), associated with the Current Directory. It does not, of course, display Directory names displayed in Window 1.

CONTROL KEYS

```
CTRL-F           ...Print Full TREE & All Directory files to printer
CTRL-P           ...Print Directory files to printer
CTRL-B           ...Backup Floppy disk or Winchester Hard Disc
CTRL-M           ...Mark Directory for subsequent RESTORE (Hard Disc)
CTRL-R           ...Restore Directory(s) from Backup disk (Hard Disc)
CTRL-S           ...SNAPSHOOT save memory to File (See Tape to Disk)
CTRL-L           ...Toggle the LOCK Attribute
CTRL-D           ...Delete Directory entry
CTRL-A           ...Normal / Expanded TREE display
RETURN           ...Enter File Mode
ESCAPE           ...Exit EXTREE
```

## 3.1.1   CTRL-F

This function will List the Disk structure, Directories and filenames. The date and time is first printed followed by a print of

the entire Directory TREE in a similar structure to that displayed on the screen. Then the full Pathname and a list of filenames is printed for each Directory on the disk. The full list is independent of the Current Pathname.

### 3.1.2   CTRL-P

The user may perhaps only be interested in filenames of a particular Directory and so this function will print the filenames of the Current Directory only.

### 3.1.3   CTRL-B

BACKUP supports both the floppy disks and more importantly a Winchester Hard disc. The source disk drive is the same as the current drive. i.e. the drive from which the TREE information is taken. The destination drive is **always** drive 4. This allows Floppy disk Backup of drive 4 or 5 to drive 4 if a Winchester is present and also allows 0/4 or 1/5 to drive 4 if the Winchester is not present.

### 3.1.3.1 Floppy to Floppy

The Floppy disk Backup will produce an exact copy of the Source disk onto the destination disk and so both disks **must** have the same capacity. CLICK does not support the backup of information from a smaller disk to a larger disk. If the Source and Destination drives are one and the same then prompts are made to insert the appropriate disk.

### 3.1.3.2 Winchester to Floppy

Winchester Hard disc Backup differs to the Floppy disc Backup. To blindly produce a one to one copy of 20 megabytes of Hard disc onto well over 30 Floppy disks is tedious to say the least. What is really required in the event of losing information from the Winchester is the ability to reproduce not only the data associated with files that have been lost but also to reproduce the hierarchical Directory structure. The CLICK Backup does this in a neat way. All Directories and files which have the Current Directory as the Parent Directory are copied onto the Floppy disk in such a way that the Tree structure is maintained. Although a number of disks may be required to hold all of the information, the original Tree Structure of Directories are maintained on the first Backup disk so that these may be viewed using EXTREE so that a total or partial RESTORE of information may be extracted.

During the Backup procedure it is conceivable that a disk error may be detected on a Floppy disk which would be most annoying if after perhaps five or ten or more disks had been inserted, termination occurred at the point of the error. CLICK will automatically reformat the Floppy disk if an error is detected anywhere in the Backup sequence thus avoiding this situation.

```
$
    ACCOUNTS
        ACCUTILS
        ACCBACKUP <
        MAILDIR
    FORMAT
        WINUTILS
        FLOPUTILS
    MOUSE
```
                                                        Fig 1
$.ACCOUNTS.ACCBACKUP

With the Current Directory as $.ACCOUNTS.ACCBACKUP then the Backup
utility will create a Directory "ACCBACKUP" on the Floppy disk and
copy all files in that Directory. If the current Directory were
ACCOUNTS then not only the Directory ACCOUNTS would be copied but
also ACCUTILS, ACCBACKUP and MAILDIR would be created on the Floppy
disk and their associated files copied accordingly.


### 3.1.4    CTRL-M    ...Mark Directory


This command is associated with the RESTORE command and is used to
define or "Mark" the Directory on the Winchester Hard disc in which
to copy the Directory(ies) and Files(s) from the Backed up Floppy
disk. The Marked Directory will be highlighted on the screen.


### 3.1.5    CTRL-R    ...RESTORE


RESTORE is applicable to Winchester users only and is the means by
which Backed up information is restored to the Hard Disc. All or part
of the Backed up information may be copied to the Winchester,
maintaining the Tree Structure of the original. The destination drive
will always be Drive 0, the source drive being the Current drive.
Before RESTORE can be invoked, a Directory on the destination drive
must first be "Marked" using CTRL-M to define where all the
information is to be written.

Procedure for RESTORing

1. MARK the Directory on Drive 0 (This can be any Directory
   including the Route Directory $)

2. Exit to ADFS Utilities, change to drive 4 and then reselect
   EXTREE.

3. Point to the Directory(ies) which you wish to restore. Referring
   to Fig 1, if you wished to restore only ACCBACKUP then point to
   this as the current Directory and press CTRL-R. If you wished to
   restore ACCOUNTS, ACCUTILS, ACCBACKUP and MAILDIR then point to
   ACCOUNTS and press CTRL-R.

There is a degree of intelligence in the BACKUP/RESTORE utilities
which the user should become familiar with.

| Marked Pathname<br>(Hard disc) | Current Pathname<br>(Floppy disk) | Resultant pathname<br>(Hard disc) |
|---|---|---|
| $.USER1.ACCOUNT | $.MAILDIR | $.USER1.ACCOUNT.MAILDIR |
| $.USER1.ACCOUNT | $.ACCOUNT.ACCBACKUP | $.USER1.ACCOUNT.ACCBACKUP |
| $.USER1.ACCOUNT | $.ACCBACKUP | $.USER1.ACCOUNT.ACCBACKUP |
| $.USER1.ACCOUNT.ACCBACKUP | $.ACCOUNT.ACCBACKUP | $.USER1.ACCOUNT.ACCBACKUP |
| $.USER1.ACCOUNT.ACCBACKUP | $.ACCBACKUP | $.USER1.ACCOUNT.ACCBACKUP |
| | | |
| $.ACCOUNT | $.$.ACCOUNT | $.ACCOUNT |
| | $.$   (Everything!) | $ |

Note that a Directory $.$ is shown here. Although this is invalid in
the ADFS filing system. it has been introduced for consistency when
Backing up an entire Hard disc in order to include files in the Route
Directory. The data associated with files is contained in one single
file per disk viz. "filedata01" for disk 1, "filedata02" for disk 2
etc. Were the Route Directory of the Hard disc reproduced in the
Route Directory of the Floppy Disk, the Backup algorithm would fail
if the Route Directory were full.


### 3.1.6   CTRL-S   ...SNAPSHOOT save


When CLICK interrupts a program, all pertinent data is saved for when
that program is restored and continued. It is by this means that
CLICK can save this and all other pertinent information in a disk
file to be reloaded and run at a later date i.e. SNAPSHOOT. Users may
make use of this feature in a variety of ways. For instance, you may
be using the VIEW Word Processor and wish to break off for a short
while with the intention of resuming later at the point left off.
This can, of course, be done in the usual manner but it is much
easier executed using SNAPSHOOT as you may continue precisely where
left off.

When CTRL-S is selected, the user will be prompted for a Filename and
subsequently all data will be saved into that filename in the Current
Directory. Any Directory, not just the Route, may be selected and the
user may select both Winchester discs or Floppy disks.

The file created will be 32K bytes in length. The SNAPSHOOT supports
the SHADOW RAM of the Electron installed with the MASTER RAM BOARD.
The length of the file created in this case will be 64K bytes.


### 3.1.7   CTRL-L   ...Toggle LOCK Attribute


The CTRL-L key will read the attributes of the Current Directory
name, invert the LOCK Attribute and write the Attributes back to
disk. The exception to this is if the Directory name is protected
with the "E" Attribute.


### 3.1.8   CTRL-D   ...Delete Directory Entry


The CTRL-D key will delete the Directory entry. An appropriate error
will be reported if the Directory entry if LOCKed or protected by the
"E" Attribute. If the Directory is LOCKed then it may be unLOCKed
using CTRL-L. If the Directory is Protected then this can be reset

using the Disk Editor whilst referencing the Master manual Part 1, page j.10-4 (5th byte bit 7 is the Protect bit!).

### 3.1.9     RETURN     ...Enter File Mode

On entering File Mode, the information is Window 3 will be expanded to dominate the screen. Up to 38 filenames may be displayed at any one time in the larger window. Up to 47 files may be saved in any Directory but of these there may be a number of entries which are Directory entries. These names are not, of course, displayed in the window of filenames.

If there are no filenames in the Directory then the RETURN command will be ignored. The File Mode will otherwise be entered and the cursor will point to the first entry in the list. The cursor points to the Current Filename. The cursor may be moved up and own the filenames list using the cursor control keys thus changing the Current Filename. Moving the cursor to the end of the filename list will scroll in/scroll out filenames if there are more than 38 names in the Current Directory.

A new set of Control Keys are as follows:

```
CURSOR DOWN
CURSOR UP
CTRL-C            ...Copy Marked file
CTRL-D            ...Delete Filename
CTRL-N            ...Change name
CTRL-M            ...Mark file for copying
CTRL-R            ...Toggle READ Attribute
CTRL-W            ...Toggle WRITE Attribute
CTRL-L            ...Toggle LOCK Attribute
CTRL-E            ...Edit file
CTRL-S            ...SNAPSHOOT run
ESCAPE            ...Exit to Directory Mode
```

A detailed description of these control keys is as follows:

### 3.1.9.1 CURSOR DOWN

Move down to next file displayed. If the cursor is at the 38th file displayed i.e. the end of the filenames' 'window' then the entire list of filenames will be scrolled up by one filename and the next filename displayed at the end of the list.

If the cursor is at the last filename in the Directory then the command will be ignored.

### 3.1.9.2 CURSOR UP

Move up to the next file displayed. If the cursor is at the 1st filename displayed i.e. the beginning of the filenames 'window' then the entire list of filenames will be scrolled down by one filename and the next filename displayed at the beginning of the list.

If the cursor is at the first filename in the Directory then the command will be ignored.


**3.1.9.3 CTRL-C    ...Copy Marked File**


Files may be copied from any Disk / Directory to the Current Directory by selecting this function. The procedure is to firstly "mark" the appropriate file using CTRL-M (See section 3.1.9.6) on the "Source disk". CLICK will at that point store the parameters associated with that file i.e. whether ADFS or DFS etc. When CTRL-C is pressed CLICK will refer to those parameters and request a Filename. If <RETURN> only is pressed then the Source filename will be used otherwise the new filename will be used. If the Source and Destination disk drives are the same then the user will be prompted to insert the Source and Destination disks at the appropriate times.


**3.1.9.4 CTRL-D    ...Delete Current Filename**


On selecting this function the user will be prompted with "Are you sure?" the response being a "Y" to confirm and continue with the Delete or any other key to abort. An appropriate error message will be displayed if the File is Locked or Protected.

If the file deleted is the only entry in the Directory then the user will automatically be returned to the Directory mode.


**3.1.9.5 CTRL-N    ...Change name of File**


Any valid name may be entered at the prompt "Enter name". An appropriate message will be displayed if the name entered is invalid or indeed if a file of that name already exists.


**3.1.9.6 CTRL-M    ...Mark file for copying**


This function is required for the copying of a file to a different disk or to a file on the same disk or directory but perhaps to a file of a different name.


**3.1.9.7 CTRL-R    ...Toggle Read Attribute**


Toggle the Read Attribute of the Current File. If the File was 'readable' i.e. the 'R' attribute set then CTRL-R will make the file 'non readable'. The 'R' attribute will be inverted at each selection of the control key.

### 3.1.9.8 CTRL-W    ...Toggle Write Attribute

Toggle the Write Attribute of the Current file. If the file was 'writeable' i,e, the 'W' attribute set then CTRL-W will make the file 'non-writeable'. The 'W' attribute will be inverted at each selection of the control key.

### 3.1.9.9 CTRL-L    ...Toggle Lock Attribute

Toggle the Lock Attribute of the Current File. If the file was locked i.e. the 'L' attribute set then the CTRL-L will make the file UNLOCKED. The 'L' attribute will be inverted at each selection of the control key.

### 3.1.9.10 CTRL-E    ...Edit File

The current file can be edited by using this function. Selecting CTRL-E will set up pointers to the Current File and then enter the CLICK editor. For details of this utility, see the section 6 of the CLICK editor. When editing is complete, the user will be returned to the same position in the File Mode.

### 3.1.9.11 CTRL-S    ...SNAPSHOOT Run

A previously saved SNAPSHOOT file may be loaded and run using this command. The file must, of course, have been saved using the SNAPSHOOT save command in the Directory Mode.

CLICK will interrogate the Current File to check that the file was saved using CLICK SNAPSHOOT save. The CTRL-S command will be ignored if an inconsistency is detected. Both the Main RAM and the Shadow RAM will be loaded during the execution of this routine.

### 3.1.9.12 ESCAPE    ...Exit File Mode

The <ESCAPE> key will exit from the File mode and return to the Directory Mode.

### 3.2      FORMAT

One annoying feature of the Acorn implementation of ADFS is the inability to Format an ADFS Floppy disk without having to resort to the Utilities disk. Format utility ROMs are available but even so, an existing program may be lost once these utilities are invoked. Take for example the case of word processing with VIEW and you wish to save your document but your Floppy disk is full or it has encountered a Disk Fault...tough, you've probably lost the document or certainly your changes to it unless you can find a different suitable disk. Not so with the CLICK format as the algorithm utilises only the CLICK on-board memory.

Note that FORMAT is only applicable to the Floppy disk and not the Winchester Hard Disc. To format the Winchester Hard Disc you would need the utility software provided by the manufacturer of that equipment.

When FORMAT is selected, the user will be prompted with another menu...

SMALL
START FORMAT

The user should select the required size of disk to format (i.e. Small, Medium or Large) according to the Acorn convention. To do this, first move the cursor adjacent to the first field and with successive selections of the <RETURN> key, CLICK will switch through the different size options. The cursor may be moved using the UP/DOWN cursor keys.

To actually start the format sequence, first move the cursor to this option and simply press <RETURN>.

At the commencement of formatting the track number will be displayed as CLICK formats the entire disk. At the start of the format sequence the user will be returned to the START FORMAT option thus offering the chance to format further disks.


## 3.3      VERIFY


If you are uncertain as to the integrity of your floppy disks, you can use the VERIFY to scan the entire disk informing you of any errors detected. Although floppy disks are very reliable these days, it is nonetheless one more level of confidence. The VERIFY routine will automatically detect whether the Disk is Small, Medium or Large.

Track numbers are displayed, overwriting the previous track number as the entire disk is verified. If an error is detected then printing will resume on a new line thus affording the user the chance to monitor any errors which might have been detected.


## 3.4      DISK EDITOR


The ADFS Disk Editor utilises the CLICK EDITOR. The Disk Editor will set up certain parameters to enable the Disk to be referenced and then the CLICK EDITOR is entered and Section 6 describes this utility. An explanation will first of all be made of the relation of the addresses displayed in the Editor to the Track / Sectors of the disk. An address of 0000 would be the first byte of Track 0 Sector 0. Given that there are 256 (&100) bytes per sector then address &0100 would be the first byte of Track 0 Sector 1. An Acorn ADFS disk is formatted with 16 (&10) sectors per track. An address, therefore, of &300 would be interpreted as Track 0 Sector 3 in the 'read a byte from disk' routine whilst an address of &E00 would be Track 0 Sector 14 and an address of &2000 would be Track 2 Sector 0.

On exit from the CLICK EDITOR the user will be returned to the ADFS Utilities.

**3.5      DRIVE**


Successive selections of this option will increment the Current Drive
from 0 through 7 and thence back to 0.

# 4.        DFS UTILITIES

CLICK supports the following DFS UTILITIES menu as follows:


    CATALOGUE
    SNAPSHOOT
    FORMAT
    VERIFY
    DISK EDITOR
    DRIVE


On entry to the DFS Utilities, the cursor will lie adjacent to one of
the Options, the position being saved in the Battery-backed RAM. To
select the Option, simply press the <RETURN> key. The cursor may be
moved to other options by the user of the up/down cursor keys.


## 4.1        CATALOGUE


If there are no filenames in the Directory then the RETURN command
will be ignored. The File Mode will otherwise be entered and the
cursor will point to the first entry in the list. The cursor points
to the Current Filename. The cursor may be moved up and down the
filenames list using the cursor control keys thus changing the
Current Filename. Moving the cursor to the end of the filename list
will scroll in/scroll out filenames if there are more than 38 names
in the Current Directory.


A new set of Control Keys are as follows:


```
CURSOR DOWN
CURSOR UP
CTRL-C              ...Copy Marked File
CTRL-D              ...Delete Filename
CTRL-N              ...Change name
CTRL-M              ...Make File for copying
CTRL-L              ...Toggle LOCK Attribute
CTRL-E              ...Edit file
CTRL-S              ...SNAPSHOOT run
ESCAPE              ...Exit to Directory Mode
```


A detailed description of these control keys is as follows:


## 4.1.1   CURSOR DOWN


Move down to next file displayed. If the cursor is at the 38th file
displayed i.e. the end of the filenames 'window' then the entire list
of filenames will be scrolled up by one filename and the next
filename displayed at the end of the list.

If the cursor is at the last filename in the Directory then the command will be ignored.


**4.1.2    CURSOR UP**


Move up to the next file displayed. If the cursor is at the 1st filename displayed i.e. the beginning of the filenames 'window' then the entire list of filenames will be scrolled down by one filename and the next filename displayed at the beginning of the list.

If the cursor is at the first filename in the Directory then the command will be ignored.


**4.1.3    CTRL-C    ...Copy Marked File**


Files may be copied from any Disk / Directory to the Current Disk by selecting this function. The procedure is to firstly "Mark" the appropriate file using CTRL-M (See section 3.1.9.6) on the "Source disk". CLICK will at that point store the parameters associated with that file i.e. whether ADFS or DFS etc. When CTRL-C is pressed, CLICK will refer to those parameters and request a Filename. If RETURN only is pressed then the Source filename will be used otherwise the new filename entered will be used. If the Source and Destination disk drives are the same then the user will be prompted to insert the Source and Destination disks at the appropriate times.


**4.1.4    CTRL-D    ...Delete Current File**


On selecting this function the user will be prompted with "Are your sure ?". The response being a "Y" to confirm and continue with the delete or any other key to abort. An appropriate error message will be displayed if the File is Locked or Protected.

If the file deleted is the only entry in the Directory then the user will automatically be returned to the Directory mode.


**4.1.5    CTRL-N    ...Change name of file**


Any valid name may be entered at the prompt "Enter name". An appropriate message will be displayed if the name entered is invalid or indeed if a file of that name already exists.


**4.1.6    CTRL-M    ...Mark file for copying**


This function is required for the copying of a file to a different disk or to a file on the same disk or directory but perhaps to a file of a different name.

### 4.1.7    CTRL-L     ...Toggle Write Attribute

Toggle the LOCK Attribute of the Current file. If the file was LOCKED
i.e. the 'L' Attribute set, then the CTRL-L will make the file
UNLOCKED. The 'L' Attribute will be inverted at each selection of the
control key.

### 4.1.8    CTRL-E     ...Edit file

The current file can be edited by using this function. Selecting
CTRL-E will set up pointers to the Current File and then enter the
CLICK editor. For details of this utility see the section 6 the CLICK
editor. When editing is complete, the user will be returned to the
same position in the File Mode.

### 4.1.9    CTRL-S     ...SNAPSHOOT Run

A previously saved SNAPSHOOT file may be loaded and run using this
command. The file must, of course, have been saved using the
SNAPSHOOT save command in the Directory mode.

CLICK will interrogate the Current File to check that the file was
saved using CLICK SNAPSHOOT save. The CTRL-S command will be ignored
if an inconsistency is detected. Both the Main RAM and the Shadow RAM
will be loaded during the execution of this routine.

### 4.1.10   ESCAPE     ...Exit

The ESCAPE key will exit from the Catalogue Mode and return to the
main DFS menu.

### 4.2      SNAPSHOOT

When CLICK interrupts a program, all pertinent data is saved for when
that program is restored and continued. It is by this means that
CLICK can save this and all other pertinent information in a disk
file to be reloaded and run at a later date i.e. SNAPSHOOT. Users may
make use of this feature in a variety of ways. For instance, you may
be using the VIEW word processor and wish to break off for a short
while with the intention of resuming later at the point left off.
This can, of course, be done in the usual manner but is much easier
executed using SNAPSHOOT as you may continue precisely where left
off.

When CTRL-S is selected, the user will be prompted for a Filename and
subsequently all data will be saved into that filename in the Current
Directory.

The file created will be 32K bytes in length. The SNAPSHOOT supports
the SHADOW RAM of the Electron installed with the MASTER RAM BOARD.
The length of the file created in this case will be 64K bytes.

**4.3     FORMAT**


The standard DFS itself supports a Format Utility but it does utilise
the user memory of the Electron and so any program may well be
corrupted when this utility is invoked. The CLICK Format does not
utilise user memory and so any program, be it a word processed file,
machine code program or simply BASIC, will not be corrupted provided
that program is not doing anything 'illegal' or untoward.

On selecting the FORMAT utility, the user will be presented with
another menu with which they may select the size of the disk to
format and also to actually start the format sequence. The size of
the disk may be toggled between 40 track and 80 track. i.e.


        80 TRACK
        START FORMAT


When the formatting sequence is started, the track number will be
displayed as subsequent tracks are formatted.

To actually start the format sequence, first move the cursor to this
option and simply press <RETURN>.

At the commencement of formatting the track number will be displayed
as CLICK formats the entire disk. At the end of the format sequence,
the user will be returned to the START FORMAT option thus offering
the chance to format further disks.


**4.4     VERIFY**


Similar to the ADFS VERIFY, this routine will scan the entire Floppy
Disk for possible errors. The routine will automatically detect
whether the Disk is 40 or 80 track.

Track numbers are displayed, overwriting the previous track number as
the entire disk is verified. If an error is detected then printing
will resume on a new line thus affording the user the chance to
monitor any errors which might have been detected.


**4.5     DISK EDITOR**


The DFS Disk Editor utilises the CLICK EDITOR. The Disk Editor will
set up certain parameters to enable the DISK to be reference and then
the CLICK EDITOR is entered. Section 6 describes this fully. An
explanation will first of all be made of the relation of the
addresses displayed in the Editor to the Track / Sectors of the disk.
An address of 0000 would be the first byte of Track 0 Sector 0. Given
that there are 256 (&100) bytes per sector then address &0100 would
be the first byte of Track 0 Sector 1. An Acorn DFS disk is formatted
with 10 (&0A) sectors per track. An address, therefore, of &300 would
be interpreted as Track 0 Sector 3 in the 'read a byte from disk'
routine whilst an address of &E00 would be Track 1 Sector 4 and an
address of &2000 would be Track 3 Sector 2.

On exit from the CLICK EDITOR, the user will be returned to the DFS utilities.


**4.6     DRIVE**


Successive selections of this option will increment the selected drive from 0 through to 3 thence back to 0. The drive numbers follow the DFS drive convention.

# 5.        TAPE TO DISK

The Tape to Disk supported by CLICK is not so much a transfer utility as a SNAPSHOOT utility. If a game, or indeed any running program, can be interrupted by CLICK and restored to its running afterwards then it can be transferred to disk. This applies to both DFS and ADFS filing systems.

On selecting Tape to Disk, CLICK will read the disk in the drive using its own disk control software and determine whether the disk is formatted for DFS or ADFS. CLICK will then save the entire memory (32L) into a file named "T2DISK" in the appropriate filing system format.

Note that any other files on the disk will instantly be lost so be sure to use a blank but formatted disk. The reason for this is to much simplify the otherwise very extensive software required to duplicate the appropriate filing system.

The file thus saved may be copied to any other disk or directory and may be run in exactly the same manner as if it were a DFS or ADFS SNAPSHOOT file. See the section on ADFS or DFS SNAPSHOOT for how to re-run the program.

# 6.  SYSTEM UTILITIES

## 6.1  MEMORY EDITOR

The Memory Editor utilises the CLICK EDITOR. The Memory Editor will set up certain parameters to enable the RAM to be referenced and then the CLICK EDITOR is entered. See section 6 for full details. When the CLICK EDITOR is exited, the user will be returned to the General Utilities menu.

## 6.2  CMOS CLOCK

The CMOS Clock of the Master 128 is supported by this facility. When this function is selected, the Date / Time is displayed in the following format:

Day, Day of month, Month, Year, Hour, Minute.

The variables are:     Day of the month
                       Month
                       Year
                       Hour
                       Minute

Seconds are set to zero on exit from this function.

On entry the cursor will be adjacent to the Day of the month. The cursor may be moved left or right using the appropriate cursor key. The date or time may then be incremented or decremented until the correct values are reached. The user may then exit and the new Date / Time written to the CMOS RAM.


CURSOR LEFT
CURSOR RIGHT
SHIFT CURSOR UP
SHIFT CURSOR DOWN
RETURN
ESCAPE

### 6.2.1  CURSOR LEFT

Move the cursor left to the previous Date/Time 'variable'. If the cursor points to the first variable (day of the month) then the cursor will wrap around to the last variable (minutes).

### 6.2.2  CURSOR RIGHT

Move the cursor right to the next Date/Time variable. If the cursor points to the last variable then the cursor will wrap around to the first variable.

### 6.2.3   SHIFT CURSOR UP

Increment the current variable. If the variable exceeds its limit then the Date/Time will be adjusted accordingly. For instance, if the Minute was at 59 then the Hour, Day and Month etc will all be incremented accordingly.

### 6.2.4   SHIFT CURSOR DOWN

Decrement the current variable. If the variable is decremented below its lowest then the Date/Time will be adjusted accordingly. For instance, if the Hour was at zero then the Date/Time will be adjusted to the 23rd hour of the previous day.

### 6.2.5   RETURN

Save the Date/Time into the CMOS RAM and exit to the General Utilities menu.

### 6.2.6   ESCAPE

Exit to the General Utilities menu and ignore the Date/Time and any changes made.

### 6.3   CONFIGURE PRINTER

The Graphics screen dump implements routines which will scan the screen line by line and send this information to the printer in a form which it recognises. The exact format in which the data is assembled is dependant on the screen mode.

As an example, take Mode 0. The Graphics screen is defined as being 1024 co-ordinates in height by 1280 co-ordinates in width. Now, a typical 9 pin dot matrix printer will support what is called a bit density of 960 dots. This means that the printer could print a band of dots 960 by 9 high. In fact, the printer is programmed to print only eight of its possible 9 to ease the complexity of the programming. The dots are, of course, very close together and therefore give the effect of a solid band if every dot were to be printed. If the horizontal scan is rescaled by 3/4 then the 1280 positions are rescaled to the 960 required.

The bit image is produced by scanning an entire screen graphics line of 960 of the 1280 co-ordinates which is subsequently sent to the printer.

The screen dump facility of CLICK has been developed for EPSON compatible printers. As in all rulebooks, however, there are numerous deviations from a standard in practice and CLICK does go a way to supporting a degree of variation.

Typically, to send a single graphics line you would send the following characters:

```
     Byte        Details

27              ; (ESC)                                  )
76              ; (L)                                    )  (BIT IMAGE)
192             ; 960 MOD 256                            )
3               ; 960 DIV 256                            )
d1              ; Bit image data...(960 bytes)
..
..
d959
d960

13              ; 'Carriage return' to start on next line     (EOL)
```

Certain variables may be programmed into CLICK and take the form of a sequence of bytes which are used prior to, during and on completion of sending screen data to the printer. These variables INITIALISE, BIT IMAGE, EXIT and EOL may be defined by the User to take full advantage of the graphics capabilities of the particular printer.

The variables INITIALISE, BIT IMAGE, COMPLETION and EOL take the form of a table of 8 bytes, the first byte being the count or number of bytes sent to the printer, whilst the subsequent max 7 bytes are the actual data sent to the printer. Only the number of bytes defined by the byte count are actually displayed.


INITIALISE

A sequence of bytes sent to the printer once at the start of the screen dump. These bytes may be to set up line spacing perhaps. For instance, to set the line spacing to 1/8th inch, the bytes 27 and 48 (ESC,"0") would be sent...2 bytes. So, you would first set the byte count to 2 and then enter the values 27 and 48 in the next positions on the screen. (See section 6.3.1 changing variables.)


BIT IMAGE

A sequence of bytes sent to the printer at the start of each line. For an EPSON printer with 960 bit density, these bytes would be...ESC, "L", 960...4 bytes total. The bytes actually entered therefore would be firstly 4 (4 variables) followed by 27 (ESC) then 76 ("L) then 960. The value 960 is automatically stored as two digits, low byte then high byte.


COMPLETION

A sequence of bytes sent to the printer once at the very end of the screen dump. These bytes may be used to restore certain conditions set up in INITIALISE, perhaps resetting line spacing if it became different to the normal.

The default line spacing of 1/6th inch is set by sending ESC,"2" so you would firstly enter the value 2 (2 variables) then 27 (ESC) and finally 50 ("2").

EOL

A sequence of bytes sent to the printer at the end of ANY line of information sent to the printer. This is to take into account any AUTO Line Feed that may or may not be used. This would normally be simply the character 13 (carriage return) or 13,10 (carriage return, line feed).


BIT DENSITY

This is a value which is the number of data bytes sent to the printer during a Bit Image line. This value will normally be the same as that programmed into the BIT IMAGE sequence of bytes. The BIT IMAGE is simply a sequence of bytes sent to the printer whilst the BIT DENSITY is an actual count of the subsequent data bytes i.e. the number of bytes CLICK will send to the printer.


HORIZONTAL SCALE

This value may be in the range 0 to 2 and is a scale factor in the horizontal plans. Increasing this value from 0 through to 2 will increase the width of the screen dump print.


VERTICAL SCALE

Similarly, this variable is the vertical scale factor taking the value 0 to 2. The value 0 will be the smallest whilst the value 2 will be the largest.


PATTERN

This variable is used in the emulation of colours during the Graphics screen dump. Screen mode 2, for example, has eight different colours and these are emulated by reproducing a pattern, the density or darkness suggesting an appropriate colour. The values initialised by default will not likely change but are included for flexibility. The values are pointers to pattern 'Look Up Tables'.

**6.3.1   CHANGING VARIABLES**


Any variable may be changed by moving the cursor adjacent to the variable in question. The <RETURN> key is then pressed and the user will be prompted for a new value. The variables INIT, IMAGE, EXIT, EOL and DENSITY may take a value between 0 and 32768. If the value is 0 to 255 then only one byte will be written away whilst a value between 256 and 32767 will occupy two bytes. This feature is useful for the IMAGE and DENSITY variables where such values are usually required and it would be extremely irritating to have to calculate the least significant and then most significant values each time.

**6.4    ROMS**


This facility displays the table of sideways ROMs and RAM in a similar form to the Slogger EXPANSION ROM for Plus 1 and ROMBOX+, but also had the added software control routines to perform the UNPLUG and INSERT in the same manner as the Master 128. This means that if a ROM in your system is perhaps not 100 per cent compatible with something you are trying to do then, instead of physically extracting the ROM from the system, it can be UNPLUGged such that it is no longer a part.

When selecting the ROMs function, the display will list, for each of the 16 possible ROM 'pages' the ROM number, the ROM Header, the ROM status, the size of the ROM/RAM and finally whether RAM has actually been detected.

The ROM status is defined as follows:

1 = ROM active
0= ROM not active
K = ROM has been UNPLUGged by CLICK

The commands now available are as follows:


**6.4.1   CURSOR DOWN**


Move the cursor down to point to the next ROM in the table.


**6.4.2   CURSOR UP**


Move the cursor up to point to the previous ROM in the table.


**6.4.3   RETURN**


Toggle the status of the current ROM according to the following:

| Previous status | Current status |
|---|---|
| 1 | K |
| 0 | K |
| K | 0 |

Note that if the status of a ROM is altered then on exit from CLICK the user should perform a <CTRL><BREAK> to allow the particular ROM to 'initialise' itself.


**6.4.4   ESCAPE**


Return to Systems Utilities menu.

**6.5      MOUSE ON/OFF**


The default means of moving around CLICK is by the use of the cursor keys. CLICK does, however, support a MOUSE if connected through a User Port. The UP, DOWN, LEFT and RIGHT movements of the mouse are equivalent to the corresponding cursor keys whilst the Left, Centre and Right push button switches are equivalent to the <SHIFT>, <RETURN> and <ESCAPE> keys respectively. In practice, use of the mouse to enter CLICK and subsequently to select the various facilities offered by CLICK make this package very easy to use indeed.

If the mouse is not selected, then the User Port is not referenced at all and so no interference is made to this device. If the MOUSE ON option is selected then on exiting CLICK or subsequent to Switch on or <CTRL><BREAK> the User Port is programmed to interrupt every time the centre key of the mouse is pressed. CLICK will intercept this interrupt and compare the difference in time between this and the previous interrupt (as appropriate). If the time is less than 3/5 second then this specifies that CLICK is to be selected and thence take control. CLICK uses OSWORD &1 to read the system clock for its timing.

Note therefore that it is possible for this option to interfere with packages such as MOUSE PAINT or STOP PRESS.

# 7.     CLICK EDITOR


The CLICK EDITOR is called by the MEMORY EDITOR, the DISK EDITOR and also the FILE EDITOR. When the Editor is invoked (selected!), the user enters DATA display mode. This displays takes the form of addresses and associated bytes displayed in both Hex and ASCII notation, a standard display of information in this form. What is unique about the CLICK EDITOR, however, is that by single control keys the display can change between the standard DATA display as previously described to a display in BASIC (provided that code can be interpreted as BASIC) and also TEXT (provided that the code can be interpreted as TEXT). Whilst investigating areas of memory, or areas on the Disk in the form of raw sectors or actual files it is a powerful feature which can alter the way in which information is portrayed with such flexibility.

On entry into the CLICK EDITOR, the user will be confronted with the DATA Display mode.


## 7.1     DATA DISPLAY MODE


Each line displays a hexadecimal address followed by 8 bytes in Hex and then the same 8 bytes as ASCII characters. Successive lines display the next 8 bytes and so on for a total of 22 lines. A cursor is displayed under the Current Byte and can be moved around the display using the cursor keys (or mouse if enabled). The cursor can be made to alternate between the HEX display and the ASCII character display by a single control key. If the cursor is at the bottom of the screen and the cursor down key is selected, the entire screen will shift up one line with the bottom line being refreshed with the new address. This method of display is referred to as "Tape". If the computer memory, disk sectors or the file is regarded as a continuous stream of data then the screen is just a 'window' of 176 bytes (22 rows of 8 bytes) and this window may be moved up or down the tape of data accordingly.

To improve scanning around the memory, a number of Control keys are supported as follows:


```
CURSOR UP          ...Cursor up 8 bytes
CURSOR DOWN        ...Cursor down 8 bytes
CURSOR LEFT        ...Cursor left 1 character
CURSOR RIGHT       ...Cursor right 1 character
CTRL CURSOR DOWN   ...Cursor down 128 bytes
CTRL CURSOR UP     ...Cursor up 128 bytes
SHIFT CURSOR DOWN  ...'Drag' down 8 bytes
SHIFT CURSOR UP    ...'Drag' up 8 bytes
CTRL-S             ...Search
CTRL-R             ...Repeat Search
CTRL-P             ...Printer On/Off
CTRL-A             ...Enter new base address
CTRL-D             ...Change to BASIC display mode
CTRL-T             ...Change to TEXT display mode
CTRL-H             ...Field change (between Hex and ASCII)
CTRL-W             ...Write enable/disable
ASCII CHARACTER    ...Write character/digit to buffer
ESCAPE             ...Exit and return to calling function
```

### 7.1.1   CURSOR UP

Moves the cursor up one line. If the cursor is at the top of the
screen then the entire screen is scrolled down one line and the top
row is refreshed with the new line. If the cursor is at the top of
the file then the command will be ignored.

### 7.1.2   CURSOR DOWN

The down cursor key will move the cursor down one line. If the cursor
is at the bottom of the screen then the entire screen is scrolled up
one line and the bottom row is refreshed with the new line.

### 7.1.3   CURSOR LEFT

The left cursor key will move the cursor one digit left in Hex
display and left one ASCII character in the ASCII display. If the
cursor is at the beginning of a line then it will move to the end of
the previous line. If the cursor is at the top of the file then the
command will be ignored.

### 7.1.4   CURSOR RIGHT

The right cursor key will move the cursor right one digit if in the
Hex display and right one character if in the ASCII display. If the
cursor is at the end of a line then it will move to the start of the
next line.

### 7.1.5   CTRL CURSOR DOWN

The CTRL CURSOR DOWN key is used to move the cursor down 128 bytes at
each successive key press. This incrementing by 'pages' is a quicker
means of scanning memory. The entire screen will be refreshed with
the new set of information.

### 7.1.6   CTRL CURSOR UP

Similar to the above, this key is used to decrement the address of
the pointer by 128 bytes. Once again, the entire screen will be
refreshed with the new set of information.

### 7.1.7   SHIFT CURSOR DOWN

Operating in a slightly different way to the CURSOR DOWN, this
command is used to 'drag' more information onto the display area but
leaving the cursor pointing to the same data in memory. This is often

found very useful when modifying information and reference has to be made to information perhaps just outside of that displayed. The scrolling effect is opposite that of the CURSOR DOWN in that if the cursor is at the bottom of the screen then the cursor will remain there but new information will be 'dragged' in from the top of the screen.


## 7.1.8   SHIFT CURSOR UP


This command has a similar effect to the SHIFT CURSOR DOWN except in the opposite direction.


## 7.1.9    CTRL-S    ...Search string


No editor is complete without a Search facility and the CLICK Editor has this. On pressing this key, the user will be prompted for a string which may be any valid ASCII character. If you wished to search for FRED then you would simply enter "FRED" and the search would start. If you wished to search for a byte pattern i.e. &A9,&FF,&85 then you would simply enter &A9FF85. The Search program will scan the Memory, Sectors or File, whichever is being edited, and try to match the pattern entered. If a match is made, a completely fresh screen of information will be displayed. The <ESCAPE> key may be pressed at any time during the search if, after a while, a match has still to be made, at which point a new screen will be displayed, the address defined by the position of the search pointer at the time of the <ESCAPE>.

Note that if a search has been initiated whilst in the ASCII field, then the MSB of a character is ignored in the comparison. Remember that an ASCII character is defined by 7 of the possible 8 bits of a byte and sometimes this 8th bit is used for other purposes i.e. in a Filename the MSB may mean things like a "Locked File" or something like that and if the search were from the HEX field then a comparison would fail due to this bit being set and the ASCII string would appear not to be there.


## 7.1.10  CTRL-R    ...Repeat Search


This key may be used to repeat a Search. It may be that the first match made is not the one of interest and you wish to continue to the next match. This is vastly more convenient than re-entering the search pattern. The search will resume from the position of the Current cursor.


## 7.1.11  CTRL-A    ...Enter Address


This is the means to enter an address into the pointer. i.e. the address which the Current cursor is pointing to. The address may be entered in decimal (the default) or Hex if preceded by "&". The address will always be rounded to a multiple of eight i.e. &E02 will always be forced to &E00. If no number is entered (i.e. RETURN on its

own) or the <ESCAPE> key is pressed then the address will be ignored
and the cursor returned to the top of the displayed screen.


### 7.1.12  CTRL-D      ...Select BASIC Display


Selection of this key will attempt to change to the BASIC Display
mode. From the position of the Current cursor, the memory will be
automatically scanned to see if it is consistent with a BASIC
program. If not then the command will be ignored.


### 7.1.13  CTRL-T      ...Select TEXT Display


Selection of this key will attempt to change to the TEXT Display
mode. From the position of the Current cursor, the memory will be
automatically scanned to see if it is consistent with a text file. If
not then the command will be ignored.


### 7.1.14  CTRL-H      ...Toggle HEX/ASCII Display


This is the key used to alternate between the Hex field and the ASCII
field and is applicable to DATA Display mode only.


### 7.1.15  CTRL-W


To prevent inadvertently pressing the wrong key and subsequently
writing that information away, this key must first be entered to
allow writing. It is the Write Enable key.


### 7.1.16  ASCII CHARACTER


Entering any valid ASCII character whilst in the ASCII display mode
or any HEX character (0-9 or A-F) whilst in the HEX display mode will
result in that character being written to the appropriate medium. For
the MEMORY EDITOR, the data will be written immediately, whilst for
the DISK EDITOR or the FILE EDITOR the information is written to the
Sector Buffer, this buffer being "flushed" (written to disk) only
when a new sector is read or when the CLICK EDITOR is exited. If a
<BREAK> or <CTRL><BREAK> is forced then the last information will not
be updated on the disk.

If the Write Enable has not been selected, a beep will be heard and
the character ignored.


### 7.1.17  CTRL-P      ...Printer On/Off


This control key will switch On/Off directing the displayed lines to
the printer. If CTRL-P is selected then by moving the cursor down the
screen line by line will also send the information to the printer. In

this way the user may choose a variety of areas of memory which he
wishes to obtain a hard copy of.


### 7.1.18  ESCAPE


Return to the calling function. This may be the Disk Editor, the File
Editor or the Memory Editor.


### 7.2      BASIC DISPLAY MODE


When BASIC display mode is entered, CLICK will display the program in
the same manner as the Acorn BASIC with the following exception:
Lines longer than the width of the screen will be truncated and will
not roll onto the next line. This feature enables CLICK to scan down
and also up a BASIC program in a similar manner to a Word Processor.
Lines longer than the width of the screen may be viewed again using a
similar technique in Word Processors, this time the window. If the
entire screen is regarded as a window over the BASIC program then
this window may be shifted right or left to view beyond the 40
character extremities.


```
CURSOR UP          ...Cursor up 1 line
CURSOR DOWN        ...Cursor down 1 line
CURSOR LEFT        ...Cursor left 16 lines
CURSOR RIGHT       ...Cursor right 16 lines
SHIFT CURSOR DOWN  ...'Drag' down 1 line
SHIFT CURSOR UP    ...'Drag' up 1 line
CTRL-P             ...Printer On/Off
CTRL-A             ...Shift 'Offset' left 8 characters
CTRL-S             ...Shift 'Offset' right 8 characters
CTRL-D             ...Select DATA display mode
CTRL-B             ...Select BASIC display mode
ESCAPE             ...Exit and return to calling function
```


### 7.2.1   CURSOR UP


Moves the cursor up one line. If the cursor is at the top of the
screen then the entire screen is scrolled down one line and the top
row is refreshed with the new line. If the cursor is at the beginning
of the BASIC file then the command will be ignored.


### 7.2.2   CURSOR DOWN


The down cursor key will move the cursor down one line. If the cursor
is at the bottom of the screen then the entire screen is scrolled up
one line and the bottom row is refreshed with the new line.

### 7.2.3   CTRL CURSOR DOWN

The CTRL CURSOR DOWN key is applicable to DATA mode and is used to move the cursor down 16 BASIC lines at each successive key press. This incrementing by 'pages' is a quicker means of scanning memory. The entire screen will be refreshed with the new set of information.

### 7.2.4   CTRL CURSOR UP

Similar to the above, this key is used to decrement the address of the pointer by 16 BASIC lines. Once again the entire screen will be refreshed with the new set of information.

### 7.2.5   SHIFT CURSOR DOWN

'Drag in' one BASIC line from the top of the screen. If the first line displayed is the start of the BASIC file then the command will be ignored.

### 7.2.6   SHIFT CURSOR UP

'Drag in' one BASIC line from the bottom of the screen. If the last line displayed is the end of the BASIC file then the command will be ignored.

### 7.2.7   CTRL-S     ...Shift Offset Right 8 Characters

In order to view BASIC lines which are longer than the width of the screen this command has been included to facilitate the use of a 'window' which may be moved left or right in 8 character increments. CTRL-S will increment this offset by 8 characters.

### 7.2.8   CTRL-A     ...Shift Offset Left 8 Characters

Decrement Offset by 8 characters. The Offset will not go less than zero.

### 7.2.9   CTRL-D     ...Select DATA display

Change to the display in DATA.

### 7.2.10  CTRL-T     ...Select TEXT display

Selection of this key will attempt to change to the TEXT display mode. From the position of the Current cursor, the memory will be

automatically scanned to see if it is consistent with a text file. If not then the command will be ignored.


**7.2.12  CTRL-P      ...Printer On/Off**


The CTRL-P will toggle the Printer On/Off. As the cursor is moved from line to line on the display, each line is redisplayed in its entirety. If the CTRL-P flag is set then each line will also be printed as the cursor (or mouse) is moved from line to line. In this way the user can be selective in which lines to print. For lines longer than the width of the screen, the entire line will still be printed.


**7.2.13  ESCAPE**


The <ESCAPE> key is used to exit the calling function. This, of course, may be the Memory Editor, the Disk Editor or the File Editor.


**7.3      TEXT DISPLAY MODE**


When TEXT display mode is entered, CLICK will try to display the program in the same manner as a Word Processor such as the Acorn VIEW. Lines longer than the width of the screen will be truncated and will not roll onto the next line. Lines longer than the width of the screen may be viewed again using the window technique. If the entire screen is regarded as a window over the TEXT then this window may be shifted right or left to view beyond the 40 character extremities.


```
CURSOR UP          ...Cursor up 1 line
CURSOR DOWN        ...Cursor down 1 line
CURSOR LEFT        ...Cursor left 16 lines
CURSOR RIGHT       ...Cursor right 16 lines
SHIFT CURSOR DOWN ...'Drag' down 1 line
SHIFT CURSOR UP    ...'Drag' up 1 line
CTRL-P             ...Printer On/Off
CTRL-A             ...Shift 'Offset' left 8 characters
CTRL-S             ...Shift 'Offset' right 8 characters
CTRL-D             ...Select DATA display mode
CTRL-B             ...Select BASIC display mode
ESCAPE             ...Exit and return to calling function
```


**7.3.1   CURSOR UP**


Moves the cursor up one line. If the cursor is at the top of the screen then the entire screen is scrolled down one line and the top row is refreshed with the new line. If the cursor is at the beginning of the BASIC file then the command will be ignored.

### 7.3.2   CURSOR DOWN

The down cursor key will move the cursor down one line. If the cursor is at the bottom of the screen then the entire screen is scrolled up one line and the bottom row is refreshed with the new line. If the cursor is at the bottom of the file then the command is ignored.

### 7.3.3   CTRL CURSOR DOWN

The CTRL CURSOR DOWN key is used to move the cursor down 16 TEXT lines at each successive keypress. This incrementing by 'pages' is a quicker means of scanning memory. The entire screen will be refreshed with the new set of information.

### 7.3.4   CTRL CURSOR UP

Similar to the above, this key is used to decrement the address of the pointer by 16 TEXT lines. Once again the entire screen will be refreshed with the new set of information.

### 7.3.5   SHIFT CURSOR DOWN

'Drag in' one TEXT line from the top of the screen. If the first line displayed is the start of the TEXT file then the command will be ignored.

### 7.3.6   SHIFT CURSOR UP

'Drag in' one TEXT line from the bottom of the screen. If the last line displayed is the end of the BASIC file then the command will be ignored.

### 7.3.7   CTRL-S      ...Shift Offset Right 8 Characters

In order to view TEXT lines which are longer than the width of the screen this command has been included to facilitate the use of a 'window' which may be moved left or right in 8 character increments. CTRL-S will increment this offset by 8 characters.

### 7.3.8   CTRL-A      ...Shift Offset Left 8 Characters

Decrement Offset by 8 characters. The Offset will not go less than zero.

### 7.3.9 CTRL-D ...Select DATA display

Change to the display in DATA.

### 7.3.10 CTRL-B ...Select BASIC display

Selection of this key will attempt to change to the BASIC display mode. From the position of the Current cursor, the memory will be automatically scanned to see if it is consistent with a BASIC file. If not then the command will be ignored.

### 7.3.11 CTRL-P ...Printer On/Off

The CTRL-P will toggle the Printer On/Off. As the cursor is moved from line to line on the display, each line is redisplayed in its entirety. If the CTRL-P flag is set then each line will also be printed as the cursor (or mouse) is moved from line to line. In this way the user can be selective in which lines to print.

### 7.3.12 ESCAPE

The <ESCAPE> key is used to exit the calling function. This, of course, may be the Memory Editor, the Disk Editor or the File Editor.

## 8.        SCREEN DUMPS


Two types of screen dumps are supported by CLICK, the Graphic screen dump and the Text screen dump. The graphics dump uses the Dot Matrix feature available on the vast majority of printers to reproduce any screen mode 0-7 including the shading technique to simulate colours.

The CLICK screen dump supports the EPSON compatible printers. For full details of this and the configuration procedure, see section 4.2.

Graphics screen dumps may be selected for Modes 0,1,2,3,4,5 and 7. If a Graphics screen dump is commanded for Modes 3 and 6 then CLICK will automatically invoke the Text dump as these modes are text only.

Text screen dumps may be selected for any of the Modes 0-7. Note that a Text screen dump may still be initiated with graphics displays but only the Text will be sent to the printer. Any graphics characters will be converted to 'spaces'.


### 8.1      The Graphic Screen Dump ...SHIFT-"CLICK"


The Graphic screen dump is initiated by holding the <SHIFT> key pressed while at the same time pressing the CLICK switch on the CLICK Cartridge (or alternatively two clicks of the mouse).

The <ESCAPE> key may be pressed at any time but note that in doing so the screen dump will be aborted but the printer may still be in the middle of a graphics mode awaiting a 'bit' stream of data and thus may not respond correctly to further printed information until switched off and then back on.


### 8.2      The Text Screen Dump    ...SHIFT-CTRL-"CLICK"


The Text screen dump is initiated by holding the <SHIFT> and <CTRL> keys pressed and then pressing the CLICK switch on the CLICK Cartridge.

The <ESCAPE> key may be pressed at any time during the screen dump but, unlike the Graphics Dump, the printer will respond correctly to further printed information.

## 9.        MOUSE


The mouse is utilised by CLICK in two ways. The first is the entering of CLICK itself and the second by emulating the cursor and other similar keys. The mouse can be enabled or disabled as described in section 6.5. If the mouse is enabled, then CLICK may be entered by two 'clicks' of the centre button of the mouse. The two clicks must be within approximately 3/4 second of each other. This may sound complicated but is actually so easy in practice.

The emulation of the cursor keys is by the movement of the mouse in the appropriate direction. i.e. Up, Down, Left and Right. The buttons on the mouse emulate control keys as follows:

Left button      ...<SHIFT> key
Centre button    ...<RETURN> key
Right button     ...<ESCAPE> key

So, to emulate the <SHIFT>-CURSOR UP, simply move the mouse in the direction away from you with the Left button depressed.

## 10.      TECHNICAL


There here follows a technical description of the CLICK Cartridge and the memory mapped addresses used. The Cartridge contains the 32K EPROM, 32K Low Power Static RAM, Calendar Clock chip and Crystal controlled Oscillator circuit, 2.4 volt re-chargeable battery, push button switch, 20 pin GAL (Genetic Array Logic) and 3 TTL chips and finally the usual decoupling capacitors, diodes and resistors. There is obviously very little room for anything else although, due to the capacity of the ROM and RAM, there is room for expansion of the programming and use of RAM.


### 10.1     CLICK ROM/RAM MEMORY MAP


The CLICK ROM is a 32K x 8 device and is mapped into the Electron memory as 4 x 8K pages in the address range &8000 to &9FFF. In a similar manner, the Battery-backed static RAM device is mapped into the address range &A000 to &BFFF. These addresses are, of course, in the sideways ROM/RAM pages and are thus paged by the Page address register &FE05. The ROM and RAM is addressed in this manner in order that RAM pages may be common between the ROM pages such that information is readily available between functions in different pages.

The ROM/RAM page address register is Read only at &FCFC and is defined as follows:

```
Bit  7
     6
     5
     4
     3  >  2 bit RAM page address m.s.
     2  >  2 bit RAM page address l.s.
     1  >  2 bit ROM page address m.s.
     0  >  2 bit ROM page address l.s.
```

<BREAK> will clear this register to zero. This is also the normal status of the Page register. When in the CLICK environment this register will be constantly changing as also if the Calendar Clock is On. Any interference with this register may result in CLICK "losing itself" and so programmers who wish to access the Battery-backed RAM or Calendar Clock chip directly should exercise appropriate caution.


**Specification of RAM usage**


There here follows a specification of the usage of the Battery-backed RAM but it should be noted that this may alter with future releases of the CLICK software.


**PAGE 0**

&A000 to &BFFF ... General purpose locations, Disk buffers, directory
                   buffers, Appointments buffer.

**PAGE 1**

&A000 to &BFFF ... Screen buffer ... top 8K


**PAGE 2**

&A000 to &A800 ... Screen buffer ... lower 2K
&A800 to &B700 ... ADFS memory buffer of &E00 to &1D00
&B700 to &BFFF ... Spare


**PAGE 3**

&A000 to &BFFF ... Address Book buffer

Address Book record format

Byte 1      Size of record (0 if last entry in list)
Byte 2 n    Record data

Byte n+1    Size of record
Byte n+2    Record data

etc


**10.2.1  CALENDAR CLOCK**


The Calendar Clock is the same as used in the Acorn Master 128
computer viz the MC146818 Real-Time Clock Plus RAM (RTC). This device
has 64 bytes of its own RAM, this and the Date/Time being Battery-
backed of course. Fourteen of these bytes are the Date/Time and
Control registers whereas the remaining 50 locations are unused by
CLICK and thus available to the adventurous user. The RTC memory is
mapped as follows:

```
     ***************** * * * * * *********************
0                              0    Seconds
     14 Bytes                  1    Seconds Alarm
13                             2    Minutes
     *****************         3    Minutes Alarm
14                     *       4    Hours
                      *        5    Hours Alarm
                     *         6    Day of Week
                    *          7    Date of Month
     50 Bytes      *           8    Month
        user      *            9    Year
        RAM      *            10    Register A
                *            11    Register B
               *             12    Register C
              *              13    Register D
             *   *********************

63
  *****************
```

The Calendar RAM and Registers etc are addressed by setting firstly the Address Register at &FCF8 and then reading or writing the data at the Data Register &FCF9.

Full technical details are available from Slogger. Please contact for current price if required.


## 10.2.2  READING/WRITING CALENDAR CLOCK using OSWORD


The Calendar Clock (the CMOS clock) can be read and written to using the OSWORD 14 (&0E) and OSWORD 15 (&0F) respectively. These implementations are identical to those used in the Acorn Master 128 computer. The OSWORD (&FFF1) should be called with registers defined as follows:

```
Acc   = 14 (&0E) or 15 (&0F) as applicable
X reg = Parameter block address l.s.
Y reg = Parameter block address m.s.
```

## 10.2.2.1 OSWORD 14 (&0E) ... READ CMOS CLOCK


Reading of the Calendar Clock may be performed using three different methods.

1. Read clock in string format
2. Read clock in Binary Coded Decimal (BCD) format
3. Convert BCD clock value into string format


### 1. Read clock in string format


```
Parameter Block Size      :     25
Parameter Block Format    :     XY = 0    (Set by User)
```

On exit : The parameter block contains a 24 byte character string in the form:

ddd,nn mmm yyyy,hh.mm.ss

where:

| | |
|---|---|
| ddd | is a three character abbreviation for the day |
| nn | is the day number |
| mmm | is a three character abbreviation for the month |
| yyyy | is the year |
| hh | is the hour (in the 24hr clock notation) |
| mm | is the number of minutes past the hour |
| ss | is the number of seconds |
| XY + 24 | contains a carriage return |


### 2. Read clock in BCD format


```
Parameter Block Size      :     7
Parameter Block Format    :     XY = 1    (Set by User)
```

On exit : The parameter block contains the 7 byte BCD clock value:

```
XY    = year          (0-99)
XY+1 = month          (1-12)
XY+2 = day of month   (1-31)
XY+3 = day of week    (1-7)        (Sunday = 1 ... Monday = 2 etc)
XY+4 = hrs            (0-23)
XY+5 = mins           (0-59)
XY+6 = secs           (0-59)
```

## 3. Convert BCD clock value into string format

```
Parameter Block Size      :    25
Parameter Block Format    :    XY = 2    (Set by User)
                               XY + 1
                               XY + 2
                               XY + 3    7 byte BCD clock value
                               XY + 4    to be converted
                               XY + 5     (Set by User)
                               XY + 6
                               XY + 7
```

On exit : The parameter block contains the 24 byte clock string as defined in option 1 above.

## 10.2.2.2 OSWORD 15 (&0F) ... WRITE CMOS CLOCK

The Calendar clock may be written to in three different ways using this OSWORD.

1. Change the Time only
2. Change the Date only
3. Change the Date and Time

## 1. Change the Time only

```
Parameter Block Size      :    9
Parameter Block Format    :    XY     = 8    (Set by User)
                               XY + 1 ASCII code for 1st hours digit
                               XY + 2 ASCII code for 2nd hours digit
                               XY + 3 = 58 (ASCII code for ":")
                               XY + 4 ASCII code for 1st minutes digit
                               XY + 5 ASCII code for 2nd minutes digit
                               XY + 6 = 58
                               XY + 7 ASCII code for 1st seconds digit
                               XY + 8 ASCII code for 2nd seconds digit
```

On exit : The parameter block remains unchanged.

**2. Change the Date only**


```
Parameter Block Size      :    16
Parameter Block Format    :    XY  = 15   (Set by User)
                               XY+1 = ASCII code for Day 1st character
                               XY+2 = ASCII code for Day 2nd character
                               XY+3 = ASCII code for Day 3rd character
                               XY+4 = 44   (ASCII code for ",")
                               XY+5 = ASCII code for Day 1st digit
                               XY+6 = ASCII code for Day 2nd digit
                               XY+7 = 32 (ASCII code for space char.)
                               XY+8 = ASCII code for Month 1st char.
                               XY+9 = ASCII code for Month 2nd char.
                               XY+10= ASCII code for Month 3rd char.
                               XY+11= 32
                               XY+12= ASCII code for Year 1st digit
                               XY+13= ASCII code for Year 2nd digit
                               XY+14= ASCII code for Year 3rd digit
                               XY+15= ASCII code for Year 4th digit
```

On exit : The parameter block remains unchanged.


**3. Change Date and Time**


```
Parameter Block Size      :    25
Parameter Block Format    :    XY  = 24   (Set by User)
                               XY+1   XY+15    Date string as above
                               XY+16  XY+24    Time string as above
```