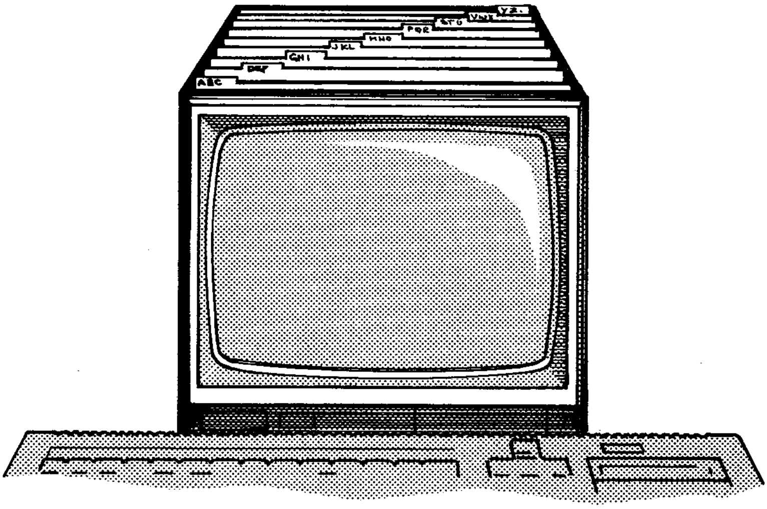
MASTERFILE 464



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SOFT 914

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Introduction

MASTERFILE 464 is an information filing and retrieval system, and can be used to hold almost any kind of data. The information to be filed is organised into fields and records, and the files can be kept on cassette or disc. A file of data can be sorted, searched, displayed, and printed. Display and print formats are customised by the user, and there can be several formats for the same file. Data display is enhanced by word-processing and numeric editing.

The range of applications is huge, suiting both business and home, and the user will find the CPC464 transformed by MASTERFILE 464 into a most professional and powerful information processor. Address lists, stock inventories, school exam results, catalogues (stamp, music, books...), recipes, price lists, genealogy, share portfolio; all these can be handled using MASTERFILE 464.

Any kind of list file can be handled by MASTERFILE 464, but the program can also be extended to manage data in a "relational" way. This means that groups of records can be associated with other records in the file, so that data held in one record is automatically accessible from another record. To this extent, MASTERFILE 464 is a Relational Database System, such as would normally be found only on very large computers.

The file format is very flexible, fields are always treated as variable-length from 0 (absent) to 240 characters of text. This means that there is no pre-formatting of the file, and no wasted space.

MASTERFILE 464 is fully menu-driven, and fully machine-coded for speed and compactness. Files can be up to 32K in length, (for example, 600 names and addresses) and can be stored either on the CPC464 cassette, or on the Amstrad DDI-1 disc.

Getting Started

There is much to learn about MASTERFILE 464: we suggest the following...

Read the manual as far as FILE STATISTICS.

Load the program, and work through EXAMPLES OF USE.

Read the ADVANCED NOTES... chapter

Load the sample files, explore all the formats they use.

Design your own files, starting with simple lists, and then work on relational files once you feel confident.

MASTERFILE 464 has two essential components....

a) `MASTLOAD` which is a small BASIC program whose functions are to establish `HIMEM` address, load `MASTCODE`, and call it.

b) `MASTCODE` which is machine code and loaded as a Binary file by `MASTLOAD`. It performs all MASTERFILE 464 processing, and starts with a totally empty file.

Files are always saved and loaded independently of the program. Sample files are provided, saved under the names...

```
FILE1     FILE2     FILE3
```

The sample files show what can be done, but you are urged also to follow the keyed exercise in the EXAMPLES OF USE chapter.

To load MASTERFILE 464...

`RUN"MASTLOAD` **[ENTER]**

(Do not rewind the tape yet if you want to load the sample files.)

To then load a file...

Press **T** then **L** then enter the filename followed by **[ENTER]**.

If using cassette, play the tape as prompted.

Glossary of Terms

ADD	Insert a new record onto the end of the file
ARGUMENT	In search mode, something with which records are compared
BACK OUT	Change your mind
CHILD	Record with an [↑] field
CURSOR	A blob on the screen where your response is echoed
DATA	Information in a field
DATABASE	A big word for 'file'
DATA NAME	Word or phrase describing use of a data reference
DATA REFERENCE	A single-character identification of a field
DISPLAY MODE	Where selected records are viewed as styled by a Format
DOWN-LINK	[>] field in a parent record, used to identify its children
EXIT	Usually means return to previous menu, or to main menu
FIELD	Unit of data, 1-240 characters long
FILE	All records and associated data names and formats
FILLER	Character repeated 3 times if data is absent
FORMAT	A set of items specifying a screen/forms layout
FORMAT REFERENCE	A single-character identification of a format
HA	Abbrev: Heading Area
HEADING	Static text displayed
HEADING AREA	Optional Display area between title line and RA's
INVERT	Flip select status of all records
ITEM	A component of a Format specification
MAIN MENU	The menu offered when the program is first loaded
MENU	A list of options from which to choose
ORDER	Sort into sequence
ORPHAN	Child with no matching parent
PARENT	Record with an [>] field
PROMPT	Where the program waits for your information
PURGE	Erase all selected records
RA	Abbrev: Record Area
RAM	Random Access Memory - better defined as Alterable Memory
RECORD	A set of data fields
RECORD AREA	1 or more lines within which a record's data is displayed
RELATIONAL	Of a file which has Parent and Child records
REPORT	Loosely, the Display style generated by a Format
RESET	Un-select selected records
RULED LINES	Graphic embellishments to a Display
SEARCH MODE	Where records are systematically selected or un-selected
SELECTED	Of a record; one eligible for Display
SORT	Physically re-arrange records into order
TITLE	Description of a format, displayed, not printed
UP-LINK	[↑] field in a child record, used to identify its parent
UPDATE	Alter an existing record
WORD-PROCESSING	Where text is displayed intelligently
[...]	The key with this word or letter

Menus and Prompts

A 'MENU' is the friendly way computers use to give the user a choice, whereby all the user does is press one of the indicated keys. MASTERFILE 464 offers two styles of menu, depending on the screen space available etc. There is the middle-of-the-screen sort, which looks like...

```
xxxxxxxxx xxxxxxxxxx ........ A
yyyyyyy yyyyyyy .............. B
zzzzz zzzzz zzzzz ........... C
```

And where the screen is otherwise used, there is the single-line variety near the bottom of the screen, which is more brief and looks like...

```
A:xxxxxxxx   B:yyyyyyyy   C:zzzzzzzz
```

You must respond with **A** or **B** etc, as indicated. Often **[ENTER]** is taken to mean "I have changed my mind", even though it does not explicitly offer this. In computing parlance, this is sometimes called 'back out'.

Where both kinds of menu appear on the screen, the most recent will be the single-line and this is the one to respond to first.

A variation of single-line menu is one where a single key response is awaited, but there is a PROMPT rather than a menu, for example...

```
Give data reference
```

Press any key in the range - usually **A-Z** or **0-9** - or else back out with **[ENTER]**. With all single-key responses, **a-z** are taken to mean **A-Z**.

Where TEXT is required a prompt is always given, but also a CURSOR is offered, your response is echoed as you key it, and you signal end-of-text using **[ENTER]**. To back out, use **[ESC]**. Here is an example of a text prompt...

```
Give filename:■
```

You have editing facilities resembling those of BASIC, as follows...

Left and right arrows position for over-keying. **[CLR]** erases the character covered by the cursor, and **[DEL]** erases the character to the left of the cursor. There is no insert mode; instead one uses cursor-up (above the **COPY** key) to insert blank(s) which can then be over-keyed.

Text input generally allows up to 240 characters, and a BEEP signals an attempt to key more than this.

There are a few variations of the menus and prompts described but they are always self-explanatory.

File Structure

A FILE is an organised collection of data which is kept on disc or cassette, and which is loaded into the computer for enquiry or update purposes. A file may be very simple, like a telephone list, or complex like a personnel dossier. But in every case, a file is made up of RECORDS, each one typically being associated with a particular person, component, transaction, or event. Each record is in turn composed of FIELDS, a field being the basic unit of data. A field might contain a name, a number, a description, an address, a money value, etc. In most computer filing systems, a field is designated a fixed number of characters; but not so with MASTERFILE 464, since all fields are treated as variable-length. However, for practical reasons we have limited the length to 240 characters for any one field.

Each field is tagged with an identifying character called a DATA REFERENCE and the purpose of this tag is to identify what kind of data a field contains. A data reference can be any letter, or numeric, so there can be over 50 kinds of field in a file. To help you and the computer keep in touch, each data reference is usually given a name, which we call a DATA NAME. The user has the task of allocating the data references and data names, when designing a new file.

> Now for a very important rule: in every record, there can be no more than one field of a particular type. In other words, each DATA REFERENCE can only be used once in each RECORD.

Many - perhaps most - applications can be managed with a simple list file. A list file is one where every record is essentially similar in structure to all the others in the file. For example in a telephone list file, every record would have a name field and a telephone number field. But in more advanced sytems, a simple list is not enough. Consider a trader who wishes to keep track of all his customer transactions, but where frequently the same regular customers keep ordering/paying. Rather than re-key the entire customer name and address each time, it is easier to store such permanent data just once, and thereafter just file the transactional data (invoice no., amount., date.). With MASTERFILE 464 this is possible, by virtue of its RELATIONAL facility.

In a relational file, MASTERFILE 464 lets you store two kinds of record. One kind is called a PARENT, the other is a CHILD. In the trader's application just mentioned, one would store address and other permanent data in a parent record, and the transactional data in CHILD records. The means of linkage between a parent and a child record is any short but unique code you care to devise. This code is stored in both parent and child records, using a particular data reference in each case. (↑ for the child, > for the parent.)

Each parent can be linked to any number of child records. A child can have only one parent. Only two levels are supported, so there should be no grandparents.

It is possible to have records at either level which do not match, and there are special searches to detect these. (ORPHANS and CHILDLESS PARENTS.)

With a two-level relational file, data references used at one level would not normally be used at the other level, athough this is up to the user to guard against since MASTERFILE 464 does not regard this as an error.

Data references, data names, and display formats are all encoded within special records and are automatically saved and loaded with the rest of the file.

Main Menu

The main menu is the one which appears when the program is loaded, and offers the following functions:

T Load/Save file.

D Display/Print. This enters Display mode to view selected records, provided that at least one format has been defined. Note that other menus offer the D option, so one does not always have to display via main menu. Printing is invoked from Display mode.

A Add new record. (... to the file) This is the normal way to append a new data record onto the end of the file. It is possible also to generate extra records via **C** (Copy) in Display mode.

R Un-select all records. This would be used before starting a fresh file search or before adding records to the file. It will always cause `Selected:0000`. Think of **R** as 'Reset'.

I Invert selection. Records which are selected become un-selected, and vice versa. The `Selected:xxxx` count is affected accordingly. One powerful use of this is following **R**, which has the effect of selecting the entire file.

S Search the file. This enters Search mode whereby records can be selected or otherwise on the basis of their contents or on other criteria. Search mode can also be entered directly from Display mode.

P Purge selected records. Purge means 'erase in bulk', and is therefore a very powerful function. As with all potentially drastic erasures, confirmation is solicited before the erasures are made.

O (Letter 'O') Sort in Order. Enters `SORT` mode to physically re-order the file.

N Data Names. This is used especially when starting a new file, to establish the data references and names.

F Format report. This enters `FORMAT` mode to create/review/alter a display format, and like **N** would normally be used during the creation of a new file.

C List report titles (C for Choose) This lists all defined formats showing report references and titles. Choose one with which to enter `DISPLAY` mode, or else 'back out' to the main menu using **[ENTER]**.

L Lock. The user can use this to disable the main menu before, say, leaving the computer unattended. A password is invited, and once received the only main menu option which responds is **U**, discussed next.

U Unlock. To re-activate the rest of the main menu functions after the system has been locked, use **U** and supply the correct password. A password is 1 to 5 characters.

B Exit to BASIC. MASTERFILE is entirely machine-coded, albeit called from a BASIC loader. This exit is provided to allow customisation, back-up, set function keys, etc. Resume via `GOTO 1ØØ`.

***** Set Colours. The border, pen, and paper colours can be tuned here. But note that the colours used in `DISPLAY` mode are independently specified in the geometry section of each display format.

The above is a summary description of the functions and uses of main menu, and many are more fully described elsewhere in this manual.

Colours

MASTERFILE 464 runs entirely in `MODE 2`, and the paper, border, and pen colours are as set by line 100 of the Basic loader, `MASTLOAD`. These default colours can be adjusted to taste - the best colours for the colour monitor are not usually accepted as ideal for the monochrome monitor.

As a handy try-it-and see system, main menu * offers colour tuning aid.

The colours as set by * or by line 100 are generally used except for `DISPLAY` mode. For display mode, each format has its own independent colour set, which defaults to pen colour 0 (black) on colour 23 (pastel cyan) when a format is first created.

Data References and Data Names

Every piece of information (data 'field') which is stored in a record has to be given a single-character 'tag' which we call a `DATA REFERENCE`. The purpose of these tags is to identify what kind of information is stored in each field. Any alpha or numeric character can be allocated, and note that lower-case letters are treated identically to upper case. In fact, any ASCII character between ! and ↑ (see Appendix III of your CPC464 Manual) can be used. You will use the data references when designing your screen formats, and when altering records, specifying sort key, etc.

Another obvious occasion to use data references is when adding a new record to the file - and indeed one can do it this way. But a better way is to define a word or short phrase for each data reference you plan to use. This word or phrase is called a DATA NAME. The advantage of using data names is that when adding a new record to the file, you do not need to remember which data references to use, since instead the program prompts you, using the data names.

The way to set up the data names is from main menu **N**. You should do this as one of the very first tasks in designing a file, although you can modify data names at any time. Data names are stored as part of the file, so creating them is not an everyday task.

Upon entering DATA NAME mode all existing data names, if any, are listed on the screen. The following menu appears....

```
I:insert   E:erase   P:print   X:exit
```

Use **I** to insert a new data reference and data name. You are then prompted...

```
Insert after which ref?
```

This lets you insert the new name immediately after the one already displayed, if you wish - or else just press **[ENTER]**. Next you are prompted...

```
Give data reference
```

Now press the key of the chosen new data ref, one not already defined. Then...

```
Data name:
```

Here give the data name, terminate with **[ENTER]**. All data names including the new one are now re-displayed. Try to use short names, less than 25 characters.

There is no 'alter' or 'replace' function, but of course you can use **E** to erase, then **I** to insert. You can also print a hard copy of the names via **P**. Exit **X** returns to main menu.

When a new record is added to the file, the data names become the prompts and the order in which the prompts appear is the same order as the names appear here. This is why provision is made to insert at a particular place, rather than onto the end.

Do not use data reference > or ↑, except in a relational file, when these take on the special meaning of....

> Identifies a parent, and is used to hold a key to point to one or more child records.

↑ Identifies a child, and is used to hold a key to point to its parent record.

You can use any suitable data name for these, such as Cross-ref, or key, or Link code.

A data reference of * is not advised, since this gives rise to ambiguity in SEARCH mode scanning, where it means all data.

NOTE: There are two up-arrow keys on your keyboard. The one above the **[COPY]** is the cursor-up key and is used only by the text editor, to insert a space. The one to the left of the **[CLR]** key is the one used to identify a child record. It is also used in SEARCH mode to signal upper/lower case differentiation.

The greater-than symbol used to identify parent records is the **SHIFT**-ed full stop key to the left of /

Adding Records to the File

To add a new record to the file, use main menu **A**. You are then prompted by each Data Name in turn, and you simply key up to 240 characters of text for each field, terminated with **[ENTER]**. If just **[ENTER]** is pressed then that field is not inserted into the new record. To omit all subsequent data name prompts too, use **[ESC]**.

Once all data names have been processed, or if **[ESC]** was used, then a short menu invites you to make further changes....

```
    I:insert   E:erase   A:alter   X:exit
```

Response to this menu is as described in DISPLAY MODE, 'alter' paragraph. Thus, any fields just entered can be erased or modified, and new fields can be inserted - for example ones for which there is no data name.

Once the X option is used, the new record is complete - and is not accessible for further changes except via DISPLAY mode. Another small menu appears...

```
    A: another  new  record   Other:exit
```

Use **A** to start another new record immediately. Any other letter key, or **[ENTER]**, will exit to main menu.

All newly-added records are flagged as 'selected'.

It is possible to create a record which has no fields at all - either by not entering any data, or by erasing all its fields. Such empty records, like normal records, can only be erased via PURGE or by DISPLAY E.

Format Mode: Designing Display/Print Formats

You can view your selected file records in a variety of styles, and also send 'hard copy' to a printer. But first you must define these styles; note that you can have several styles associated with the same file. Each style is called a FORMAT and is given a reference letter or digit. (No connection with data reference.) A format contains information about which file data is to be shown on the screen, in what format, and at what position. It also contains headings and control data for drawing ruled lines. All information is gathered using a kind of questionnaire, one questionnaire for each ITEM in a format. There can be any number of items, and they are of four kinds, viz...

i) Report geometry:	overall layout and colours; always the first item.
ii) Heading:	static text not derived from file data.
iii) Record data:	data taken from selected field records.
iv) Ruled line:	embellishments for screen use only.

When planning a new screen format, note that the top screen line (line 1) is reserved for the report title. This is supplied by the report geometry item and is centred in line 1. Screen lines 2-22 are then allocated to an optional HEADING AREA, followed by one or more RECORD AREAS.

The heading area is reserved for headings and data which are to appear just once per screen. For example, you can write column headings in the heading area. Later, we will discuss the purpose of placing record data within the heading area.

Each record area is reserved for displaying data from a selected record, but one can also place headings in a record area; such headings then repeat for each record. The number of records per screen page depends on the number of lines allocated to the heading and data areas. Do note that the maximum screen space for record area is 21 minus the heading area depth.

When using the questionnaires to describe where headings and data go, always specify lines relative to the first in each area. With either area, full screen width (80 columns) always applies.

To create a new format, from main menu press **F**, which offers the menu:

```
New format..........N
Review format.......R
Erase format........E
Copy format.........C
Exit to main menu...X
```

Press **N** to indicate a new format is to be created. You are then asked to give a reference - press any suitable key. Or, back out via **[ENTER]**. If the reference is acceptable (not already used) then the Report geometry item questionnaire is offered, together with the menu:

```
A:alter  E:erase  I:insert item
N:next item  D:Display  X:exit
```

The questionnaire is already filled in with DEFAULT values; if these all apply then you can proceed with other items. Otherwise, press **A** to alter; you will see a diamond-shaped indicator which is used to show which line is to be answered. To bypass any line, just press **[ENTER]**. To bypass all residual lines, use **[ESC]**. Otherwise, enter the answer at the cursor, and terminate with **[ENTER]**. Invalid responses are BEEPED and re-prompted. The questionnaire is completed when the diamond indicator vanishes and the 'A:alter....' menu reappears.

The geometry parameters are as follows...

`Heading area depth:` Say how many lines deep, 0 to 10. (0 means no HA)

`Record area depth:` Say how many lines deep, 1 to 21.

`Forms depth:` Give forms depth in lines between perforations (1-99)

`Forms margin:` Number of printer columns left-hand margin (0-50)

`Border colour:` 0-26 (as defined in CPC464 manual)

`Pen colour:` 0-26 (as defined in CPC464 manual)

`Paper colour:` 0-26 (as defined in CPC464 manual)

`Title:` Any text, which gets centred in line 1.

When a format is used for printing, the title line is not printed - just the heading area and record areas. The number of record areas per page is governed by the overall form's depth. (Default is 66 for 11-inch standard stationery and normal printer pitch.) A 6-line page gap is forced before headings are repeated, so the number of records per forms page is forms depth less heading area, less 6, divided by record area depth. But note that a forms depth of 99 is taken to mean an infinite page with no repeat headings or page gaps.

Forms margin does not affect the screen display, only the printed output.

A format with just a geometry item is not much value, and so more items must be inserted. The order in which they are inserted is not important, but as a general rule one does headings, then data, then ruled lines. At the 'A:alter...' menu, press **I** (:insert). A further menu appears which asks what kind of item is required:

```
H:heading   D:record data   L:line
```

Press **H**, **D** or **L** accordingly - or back out via **[ENTER]**. Each kind offers its own questionnaire, which must be answered following the same general rules as were described for report geometry.

The Heading questionnaire is....

Hdg(Ø) or Rec(1):	Say which area (heading=0, record=1) to be used.
Column:	Start column, 1-80
Line:	Start line, 1-21
Inverse:	**N** for normal, **Y** for inverted paper/pen colours
Text:	The text of the heading

Heading text will be shown exactly as given, unlike record data which goes through word-processing. There can be any number of heading items.

The Record Data questionnaire is...

Data reference:	Say which field is to be retrieved from each record.
Hdg(Ø) or Rec(1):	Say which area is to be used. (Default is Record area.)
Column:	Start line, 1-80
Line:	Start line, 1-21
Width:	Paragraph width in columns
Depth:	Paragraph depth in lines
Inverse:	**Y** or **N**
Right-justify:	**Y** or **N** (**Y** only works if depth is 1)
Numeric:	**Y** or **N** (**Y** selects special numeric editing options.)
Column total:	**Y** or **N** (**Y** only works if Numeric=**Y**)
Two dec. places:	**Y** or **N** (only applicable if Numeric=**Y**)
Thousands commas:	**Y** or **N** (only applicable if Numeric=**Y**)
Filler if absent:	Any character
Leading symbol:	Any character (only used if Numeric=**Y**)

Record data is either word-processed into its specified paragraph space, or it is treated numerically. Word-processing minimises word breaks and keeps a clean left margin. It also acknowledges LINE-BREAK symbol (**SHIFT Ø** key) to make address labels etc.

Usually, one places record data in its RA, but one can elect to use the HA instead. Data which is displayed in the HA is assumed to come from a Parent record, and as successive records are displayed a change of parent causes a change of screen page. But if HA data is not from a parent, either single-record pages are produced, or else only the top record data appears in the HA.

Note that if there is only room for one record per page, that there is no particular use for having a HA at all.

Numeric treatment only applies if the data looks numeric (unsigned, optional decimal point, no currency symbol), and if the field depth is 1, and Numeric=**Y** is selected. It removes leading zeros to the left of the units position, and forces either no decimal place or just two places. It inserts commas per thousand if required, and will prefix with whatever Leading Symbol is given - especially useful for currency symbols.

Validation of parameters is not done fully contextually, so that it is possible to describe a field paragraph which exceeds its area depth. When this happens, it may cause scrolling of data within its area when DISPLAY mode is used.

The same data reference can be used in different items, so that one can display the same field in more than one place on the screen.

The Ruled Line questionnaire is as follows...

Across (Y) or down (N):	**Y** = horizontal, **N** = vertical
Mid-char end:	**Y** or **N** (**Y** for tidy corners)
Double thickness:	**Y** or **N** (**Y** for vertical matches **N** for horizontal)
Start column:	Print line in which line starts (left or top)
Start line:	Print column in which line starts (left or top)
Length:	In characters, 1-80
How many:	1-80 lines can be drawn with just one item
Interval:	Spacing in characters between multiple lines.

All lines are drawn approximately along a mid-character position, but they can extend either to a character edge, or mid-character. The latter is advisable to get clean corners where two lines meet. A single Ruled Line item can be used to draw multiple parallel lines, regularly spaced. Lines are all specified as if the full screen is the window, with column 1 line 1 being the top-left screen character position. It is possible to draw lines anywhere, although the bottom three screen lines are not very suited. In DISPLAY mode, lines are drawn before text is written, so text overwrites any lines it meets.

Ruled lines are omitted when printing is requested.

Debugging a Format

Provided that at least one record (and preferably more than one) is selected, it is possible to test each format item by direct entry to DISPLAY mode, by the use of the **D** option when 'A:alter...' menu appears, after building or altering an item. From DISPLAY mode, use of **D** then returns directly to FORMAT mode at the same item, which can be altered immediately, and re-tested etc. This direct return to the format item is possible if DISPLAY is entered as just described.

MASTERFILE 464 does not check for overlapping data/headings/lines on the screen.

Reviewing a Format

To look at a format, from main menu press **F** and then press **R**, followed by the reference of the target format. The geometry item is always shown first, and as prompted by the 'A:alter...', use **N** to review each questionnaire in turn. Use **A** to alter any as required. Use **E** to erase an unwanted item. Use **X** to leave this format but still remain in FORMAT mode. Use **X** a second time to return to main menu.

Other Format operations

As indicated by the first format menu, one can erase a complete format by using **E** and confirming with **Y**.

Also from the first format menu, one can copy a format. This is of particular use where a new format is required which is sufficiently similar to an existing format, and is therefore a labour-saving device. After **C** (for Copy), you are prompted first for the existing format reference, then the new one. If the first is not found, or if the second one is found to already exist , the Copy function is aborted. Note that main menu option **C** (Choose) will remind you which format references are in use.

Display Mode

This mode is where selected records are viewed, using one of the screen formats as set up in FORMAT mode. Enter DISPLAY mode from any of the following, by means of option D...

```
Main Menu, or Search mode,
or List Titles, or Format mode.
```

If entered from main menu or from Search mode, the format which is used is the same as was most recently used. If entered from List Titles or from Format mode, then you will have specified the format to use more directly. If no formats have been created, then DISPLAY mode can do nothing except warn you and return to main menu.

DISPLAY mode displays selected records - one or more per screen - in a way defined by the format. Normally as many records as will fit are shown together, but in the special case of parent data going into the Heading Area, change of screen may be forced more often.

Column 1 line 1 shows the format reference in inverse: the rest of line 1 shows the format title, centralised.

If no records are selected, then no other headings or data are shown. Otherwise, the headings are shown and lines are drawn - if specified by the format. Then the selected records are edited into their Record Areas, in the same order as they are found in the file.

The display pauses at each screen page, showing the prompt...

```
(H to see menu options)
```

and if there are more records to display, this is prefixed by...

```
...more...
```

At this point there is a large menu of options available, but since it would obliterate the display, this menu is kept hidden unless you press **H**. Visible or not, the menu awaits your response and offers...

```
ENTER for next screen page.....
1-9 records forwards...........
Back 1-9 records...............-
1st selected record............F
Last selected record...........L
Alter top record...............A
Erase top record...............E
Copy top record................C
Unselect top record............U
Print..........................P
Search the file................S
Switch report format...........R
This menu......................H
Direct return to format........D
Exit...........................X
```

Positioning the display

[ENTER] is used to progress from page to page. Or, press a number 1-9 to advance by that many records. Minus sign followed by 1-9 will go back that many records. **F** starts again at the first record, **L** advances to the last selected record. Any attempt to overshoot always shows first or last record, depending on the direction chosen.

Note that if there are no selected records, then most menu keys are ignored.

Some options cause an operation on the 'top record', which refers to whichever record is currently in the top-most Record Area. This is not necessarily the same as the 1st record. Make use of the positioning options just described to get a particular record to the top of the screen, before using **A**, for example.

Alter top record A

This switches to UPDATE mode, which re-displays the top record in its 'raw' state, showing data reference and text for each field, and offering the menu...

```
I:insert   E:erase   A:alter   X:exit
```

which invites you to insert/erase/alter any of the fields shown, or return to the DISPLAY mode at the same record. **E** to erase asks for the target data reference, then asks confirmation. **I** to insert asks for the data reference, which must not yet be present in this record. **X** exits to DISPLAY mode again.

A asks for the target data reference to alter, and brings the text into the prompt area for editing. The editor is a sub-set modelled on CPC464 BASIC, and is described in the MENUS AND PROMPTS chapter. **[ESC]** is used to back out of the alteration.

Erase top record E

This asks **Y** to confirm the erasure, then erases the record if confirmed.

Copy top record C

This inserts an identical record at this place in the file, and resumes the display at the first of the two identical records. One can now use **A** to alter one of them, if required.

Unselect top record U

This makes the top record unselected, therefore no longer viewable. It does not erase the record from file.

Print P

This sends a copy of this display to the printer - use **[ESC]** to terminate this prematurely. Note that the data is re-built on the screen, and shows just one record at a time which is then read from the screen and sent to the printer. No ruled lines are drawn or sent, and no Inverse options are used. The number of records per page is governed by the forms data in the format, rather than being a direct copy of the screen. Data printed starts at the record currently shown on the screen, and carries on to the last selected record, unless interrupted by the **[ESC]** key.

Search S

This switches to SEARCH mode.

Switch Report Formats R

You can switch to a different report just by pressing **R** then the format reference required. If the given reference is not defined, the current format is retained.

When switching to a different format, the display resumes at the SAME record as was at top of the screen. This is of particular use when browsing through an index-style format, with say single-line spacing. By positioning a particular record at the top of the screen, and then using **R** etc.., one can switch to a more detailed report, which might occupy the whole screen. Another use might be where one screen is simply not enough room for all the data in one record - so an alternative format can be used as an overflow. It takes just two keystrokes to switch from one format to the other.

Help H

This displays the menu we are discussing, overlaying but not otherwise clearing the display. It is purely a learning aid - you will not use it much after a while.

Direct return to format D

This is effective only if DISPLAY mode was invoked from FORMAT mode, and it returns to FORMAT mode at the same format item as was last inspected - ready to make instant adjustments. This provides for a rapid way to tailor a display, on a try-it-and-see basis.

Exit X

This returns to main menu, irrespective of how DISPLAY mode was reached.

Word-Processing

In DISPLAY mode, your data is not just presented the way you key it, but is specially edited. In general, data fields are word-processed within the space allocated to them as defined in the format. (See FORMAT chapter).

The format specifies a start column and line, width and depth, defining a window or paragraph space within the record area or heading area. With the exception of numeric-looking data with numeric option chosen, all data undergoes a simple form of word-processing as follows...

Leading blanks are ignored, any word gaps are reduced to a single space, and any trailing spaces are ignored. If a word will not fit in a started line, and if there is another line available, the next line is started. If a line-break [_] is present in the data, then this forces a change of line provided there is another line. Line-break characters are not displayed, and if they cannot force a change of line then they show as a space. Any sort-key prefix [\] is converted to a space. Truncation occurs if data cannot fit into the space given.

The rules just described ensure a clean left edge, but a ragged right edge.

Note the powerful effect of line-break (**SHIFT** zero key) within data text. It permits an easy way to store addresses for presenting in address-label style. For example, an address stored within a field as follows...

```
57 Trap's Hill_Loughton_Essex IG10 1TD_England
```

If displayed in a window at least 14 columns wide and 4 lines deep will appear as...

```
57 Trap's Hill
Loughton
Essex IG10 1TD
England
```

If displayed in a 20 x 3 window, it would appear as...

```
57 Trap's Hill
Loughton
Essex IG10 1TD Engla        (note the truncation)
```

If displayed in a single-line window of sufficient width, it would appear as....

```
57 Trap's Hill Loughton Essex IG10 1TD England
```

If word-breaks were NOT used, a 20 x 4 window would show as...

```
57 Trap's Hill
Loughton Essex IG10
1TD England
```

Long words in narrow spaces are simply chopped up. Note that commas and other punctuation characters are not sufficient to delimit a word. The following would be treated as just one long word...

```
Baubles,bangles.Beads(glass)
```

The treatment of numeric-looking text with numeric options specified, is quite different. Text comprising only numerics and one possible period [.] - no signs, currency symbols, or spaces - is deemed to be numeric; otherwise it gets the word-processing treatment described above. With numeric options, the data...

```
12345.6789
```

will be edited along one of the following lines, as specified by the format used for the display...

```
12345.67
12345
12,345.67
12,345
£12345
$12,345.67     and so on
```

The number of decimal places is either 0 (integer) or 2 (aimed at currency), and there is no rounding. If the window is not wide enough, data is truncated at the right.

Any data displayed in a single-line window can be right-justified, which means that it hugs the right-hand edge of its window. This is of particular use when columns of numeric data are shown.

Any data can be shown with paper/pen inks swapped - but note the ragged effect this has for multiple-line data.

Data references are never shown - unless you switch to UPDATE mode, when all record data is then shown 'raw', e.g...

```
A:57 Trap's Hill_Loughton_Essex_IG10 1TD_England
N:123456789
```

Headings, whose text comes from the format itself, are not word-processed, so they are displayed exactly as keyed.

Numeric Totals

Data which looks numeric can be totalled using the 'Numeric = Y' and the 'Column total = Y' options in a display format. (See FORMAT MODE, Record Data questionnaire.) Any number of fields in a format can be totalled.

To qualify for numeric treatment, data must contain only characters 0-9, and an optional decimal point. There must be no spaces, currency symbols, signs, commas. (But commas and leading symbols can be generated.)

Column totals are presented within an extra Record Area, spaced one line after the last selected record. Totals are edited to the same style and in line with the data being totalled. Only selected records contribute to the totals, and only data which is directly present is used. (i.e. data retrieved indirectly from a parent is not used.) The totals are computed dynamically after the last record has been displayed - a short pause may be observed for large files. If the totals need a fresh page, then a prompt appears.

```
    ENTER for totals...
```

[ENTER] goes on to a new screen with just totals on it, while any other letter key disables the totals - in order that the top record of the last full page can be accessed for update etc.

The legend 'Totals:' is shown in the totals area, at the left.

Absent data is deemed to be value zero. Data which is there but non-numeric is signalled audibly with a BEEP, warning that the totals may be too low. Only one BEEP every 256 bad fields is given, to keep things peaceful in case you try to total 500 addresses!

Non-numeric data may be hard to spot - e.g. capital 'O' instead of a zero, or a trailing space. A special provision is made in SEARCH mode to weed out any bad numeric data. One of the data Compare options is 'Non-numeric....N', so make use of this if you hear a BEEP while totals are computed.

Column totals are also sent to the printer if Display **P** is used. The format is the same as seen on the screen, and separated from the rest of the printed output by one blank line.

If you have a large selected file, and you are interested only in viewing the totals, then use Display **L** to go directly to the last selected record, and hence to the totals.

Printing

Printed output from MASTERFILE 464 consists of...

a) List of Data Names, via **N** then **P**.

b) Any Display Format via display **P**.

If a printer is not connected and switched on, 'Printer not ready - ENTER' is shown. Use **[ENTER]** as instructed, to back out.

(a) is designed to provide a reference sheet when creating a new format, when one needs to know which data references to give.

(b) is the main print function, designed to mimic whatever format is on the screen, but tailored further as follows...

i) No ruled lines are sent to the printer.
ii) No inverse paper; pen is not specially printed.
iii) Records-per-page is limited by forms depth rather than screen depth.
iv) Left-hand margin displaces output to the right.

iii) and iv) are governed by the 'Report Geometry' item as described in the chapter entitled 'Format Mode'.

If any special printer control codes need to be sent, for example to set the feed rate or the character pitch, then this must be done from BASIC. Use main menu B to exit to BASIC. Use PRINT#8 etc. to send the control codes, then return to MASTERFILE processing via GOTO 100.

MASTCODE contains decimal 10 at address decimal 899. This is the NEWLINE code used by most printers for carriage return and line feed. If your printer uses a different code to separate lines, then POKE this code into 899.

Sorting The File

The file can be sorted at any time, so that records are displayed in some logical order. Since new records are usually appended to the end of the file, it may be desirable to sort after a batch of records has been added. The menus and prompts are self-explanatory, and are started using **O** at main menu.

The sort key is one field in each record, and the first parameter you are asked for is the data reference of this field. Only one field can be used as sort key, but a hierarchical sort is possible by virtue of repeated sorts, working from low-order to high-order. For example, if one wants to sequence field A within field B, first sort by A then again by B. (The low-order key is only effective when there are identical high-order keys.)

The commonest sequence will be by ascending alphabetical or numeric character - but MASTERFILE lets you sort descending as well, i.e. Z down to A, 9 down to 0.

Further, numeric data can be sorted numerically. Thus, the key 123 which sorts before 45 ascending character-wise, will sort after if done numerically. This is important for quantitative data, such as money fields.

A very common filing application requires sorting by surname, as in a telephone list. But the same data may also include title and initials, for example...

```
Mr D H Lawrence or Lawrence D H Mr
```

We have a conflict in that we wish to sort as on the right, but display as on the left. This is largely resolved by using a special sequence marker symbol, the backwards slash \. If a \ is found within sequence data, then the key is deemed to start after the \ rather than at the beginning of the field text. The \ is disguised as space in `DISPLAY` mode. Thus in our example above, we would enter the name as follows...

```
Mr D H\Lawrence
```

Character sorting differentiates between upper-case and lower-case letters.

If the target data is absent in a record, then a low value is assumed, so that in an ascending sort the key-less records sort to the top, and in a descending sort they come last.

If two or more records have identical sort keys, or absent sort keys, then their relative positions are not altered.

Time taken to sort a file is a function of file size, but 20 seconds is typical. Numeric sorts take longer than character sorts. The legend `--- sorting ---`indicates that a sort is in progress. On completion, main menu is resumed. The sort process needs a little work space, equal to the length of the longest record. If this is not available, the sort is terminated after the following warning...

```
*** NO MORE ROOM *** press ENTER
```

Example: File customer names are stored in **N** fields, i.e. **N** is the data reference used for customer names. We wish to sort by customer name, ascending character. From main menu we press...

O	order
N	by customer name
A	ascending sequence
C	character format

Another example: we wish to sort by S field (which let us assume contains an employee salary figure), descending - i.e. highest to lowest....

O	order
S	by employee salary
D	descending
N	numeric format

Search Mode

We can make use of main menu **R** and **I** to select the entire file for viewing/printing/updating. This is fine for very small files, but as a file grows it becomes less and less practical to visually search for the information you want. Searching is a tedious task for people, but simple and swift for the computer - so let the computer do it. SEARCH mode is accessible either from main menu, or from DISPLAY mode - using **S**.

The purpose of SEARCH is to modify the 'selected' status of records according to whether or not they meet a particular criterion. Records which match the given criterion can then be selected or un-selected, thereby either increasing or reducing the Selected=xxxx count on the screen. By chaining together several searches, it is possible to match records on quite complex criteria. After every search, MASTERFILE lets you go directly into DISPLAY mode to view the selected records, or into another search, or back to main menu.

Once records are selected, they stay selected until you take some positive action to unselect them. The select status of every record is preserved even when a file is saved and re-loaded.

A series of menus and prompts guide you through the SEARCH dialogue, and the first menu is:-

```
Select...............S
Un-select............U
Display..............D
Exit.................X
```

The last two menu lines are different exits from SEARCH mode: **D** to DISPLAY mode, or **X** to main menu. One reason for these options is that we come back to this menu after a search of the file has been made. The first two menu lines are used to specify whether a search is aimed at selecting records **S**, or at un-selecting them **U**. In the first case, only unselected records are examined, while in the second case only selected records are examined.

Having chosen S or U, the next menu appears...

```
Parents..............P
Children.............C
Orphans..............O
Childless parents...B
Data compare........D
Prev menu............X
```

The first four options are quick and powerful ways of isolating sections of a relational file, as follows....

P identifies all records which contain a down-link field (>). Such records are then selected or otherwise, according to which choice we made at the previous menu.

C identified all records which contain an up-link field (↑).

O (letter 'O') is a powerful trouble-shooting aid, which identifies any child records whose up-link field (↑) is not matched by any parent record.

B is the converse of O, although childless parents are less likely to be an erroneous condition than are orphans.

The Selected:xxxx statistic is updated to reflect the newly selected (or the newly un-selected) records, and the first SEARCH menu is offered again.

The next menu option, D, is used to search on the basis of a comparison of record data - usually with a given string or value, called an ARGUMENT. Having pressed **D** one is then prompted for the Data Reference of the fields to be examined, and the next menu appears...

```
Equal.................E
Less..................L
Greater...............G
Unequal...............U
Present...............P
Absent................A
Non-numeric...........N
Scan..................S
Prev menu.............X
```

Option P matches on the basis of data being found, irrespective of its value, while A matches where the data reference is absent from record. Option N is purely a data-debugging aid - see NUMERIC TOTALS chapter.

X is simply a back-out. The other options need an argument (something to compare with), and cause the prompt..

```
Give argument:■
```

The argument you give is assumed to be a string against which data is compared on the basis of upper-case and lower-case being equivalent, but with exceptions as we shall see later. There are a few rules to learn, as follows....

a) A field is said to be equal to the argument even if it is longer, provided it matches the argument as far as it goes. Thus an argument of Fred will be deemed an EQUAL match to data Fred, or Freddy, or FREDA.

b) A field is unequal if it is shorter than the argument. If a field is equal as far as it goes but is shorter than the argument, then it is deemed LESS.

c) If the target field is absent, then a match is not made, even if the chosen comparison was Unequal U.

If it is needed to differentiate upper and lower case letters, then this can be signalled by using a ↑ prefix to the argument. Thus an argument of ↑ Fred will match data Fred, Freddy, but not FRED.

The comparison type S causes a substring scan, which means that the argument string is searched for anywhere within the target fields. Thus a scan for Fred will match data such as Nina and Frederick and Manfred Mann. As with other comparison types, upper and lower case are equivalent unless the ↑ prefix is given.

A special variation of scan is where the target data reference is given as *, which here has the meaning 'scan all fields in the record'.

There is another argument prefix which causes special processing; a ! prefix signals that the comparison is to be made NUMERICALLY. Thus an argument of !22 when used with comparison types G/L/U/E makes a numeric comparison with the number 22. If a target field contains non-numeric data, then the record is not matched. Likewise, if the target data is absent, no match is made even if the comparison is Unequal.

Numeric data (and argument) must contain only 0-9 and optional point. No signs, currency symbols, or spaces are allowed. Thus all numeric data is taken to be positive.

Numeric comparison will match all the following with argument !22...

22, or 22.00, or 022.0

In many cases, the same result may be obtained when searching numerically or otherwise. For example, looking for 22 will match records with 22 whether the argument is 22 or !22. But in the first case, records with 220 or 22 carat will also be deemed equal. Another trap: without the ! prefix, data of 100000 will be seen as less than argument 22, whereas against argument !22 this data will be numerically higher.

As with all kinds of search, Selected:xxxx is updated and the top Search menu is offered.

Because of the way MASTERFILE 464 flags every record as being selected or not, there is no limit to the number of combined searches which can be made. For example, suppose we wish to look for records with a field numerically in the range 100-199. We first SELECT all records greater than 100, then UN-SELECT all records less than 200.

The search dialogue can be rather complex, and for a while you will need to follow the menus very closely. After a few weeks familiarity with MASTERFILE 464, you will find that you will be keying the menu responses almost without looking at the screen. Even so, it is here that one can take greatest advantage of the CPC464 programmable function keys. For example, the sequence required to select all parent records and view them using report reference 1 is as follows, starting at main menu...

R	reset (un-select)
S	search
S	select
P	parent records
X	exit to main menu
C	choose report number...
1	1

We can make the numeric pad key **9** do all this by exit-ing to BASIC and then typing in...

```
    KEY 137,"rsspxc1"
```

(Note: 137 is the expansion token number of the numeric pad **9** key. See Appendix III of the Amstrad CPC464 manual for the definitive list of expansion tokens.)

If desired, we can give this a line number and save the Basic loader so that this and other function keys are ready-programmed when MASTERFILE 464 is loaded. Since the program makes use wherever possible of single-key responses, function keys can be 'packed' very efficiently.

Save and Load

Program

Saving the program is permitted only for the purpose of taking a security back-up, or for transfer to a different medium, or for customisation. Transfer of any copy to a third party is a breach of software copyright.

To save the program, use main menu B to return to the BASIC. The loader program can be saved simply by...

```
    SAVE "MASTLOAD" [ENTER]
```

The loader program contains instructions for saving the machine-code of MASTERFILE 464. Note that this must be done with no file loaded, or else with the file totally erased so that `Bytes used:ØØØØØ` is seen.

To load the program after power-on or after full system reset....

```
    RUN"MASTLOAD" [ENTER]
```

Files

The saving and loading of files is done via main menu T, which offers the following options...

```
    Save file...............S
    Load file...............L
    Set speed...............T
    CAT.....................C
    Exit....................X
```

Before a save to cassette, use T to set the speed, if you have not already done so. You then press Ø for slow, **1** for fast. For disc use, this has no purpose.

S starts the save process by prompting you for file name. Give a name up to 8 characters long. (If longer, it will be truncated.) Alternatively, just press **[ENTER]** to indicate that the name to be used is as already shown in the bottom screen line. The reason for not allowing longer names is for compatibility with AMSDOS and CP/M. If the save is to disc then naming rules must be followed as directed in the DDI-1 manual. If the save is to cassette, then tape messages are enabled and you are then prompted to press **[REC]** and **[PLAY]** etc.

L starts the load process similarly to S, but a null reply to the filename prompt is illegal for disc use, and is taken to mean 'whatever we find' for cassette use. When a file is loaded, the file statistics are updated to reflect the new file, and main menu is resumed.

C performs a CAT (-alogue) function - which for cassette use is only ended by pressing **[ESC]**. Press any further key to resume the SAVE/LOAD menu. For cassette use, CAT is an effective verification of a save. If the current file is more than about 93% full, CAT is disabled since it needs 2K buffer space and instead produces the warning....

```
***NO MORE ROOM***
```

X is simply a return to main menu.

SAVE, LOAD and CAT all operate on whichever device the program was loaded from. If DDI-1 is attached, then a change of device can be effected by a temporary return to BASIC (main menu B) and a command such as |TAPE or |DISC. Then return to MASTERFILE 464 and carry on.

There is no need to erase or purge one file before loading another file, since the new file totally obliterates the old file in RAM. It is not possible with this version of MASTERFILE 464 to chain files together.

Safety Procedure

Never save a cassette file directly over the previous version on the same cassette. It is wisest to keep two or more cassettes for one file and use them in rotation. (Why? because if someone pulls the plug during the save, all your data is lost...)

Disc users: Note the AMSDOS and CP/M systems have safety built-in by virtue of the .BAK of any file whose namesake is saved. Even so, do consider the use of alternate discs for important files, or else take periodic cassette saves.

File Statistics

MASTERFILE 464 maintains essential file statistics in the bottom screen line, as follows...

```
File:xxxxxxxx Records:xxxx Selected:xxxx
Parents:xxxx Bytes Used:xxxxx xx%
```

Program and file are loaded separately, so when the program is first loaded the file name shows as File: NOTNAMED and the counts are all zero. A file acquires a name at the time it is saved, and when any file is loaded its name is displayed. Please note that file names are deliberately limited to 8 characters in order to be compatible with AMSDOS and CP/M.

Records:xxxx shows how many data records are in the file. This count does not include the special records which hold data names and display formats.

Selected:xxxx shows how many records are selected for viewing etc. and it is this figure which should always be checked after a search has been made.

Parents:xxxx shows how many records are parents, i.e. have data reference >. The count is independent of whether or not parent records are selected. For non-relational files, this is always zero.

Bytes used:xxxxx xx% shows how many bytes the file occupies, and also expresses this as an approximate percentage of the total RAM space available for the file. When this reaches 90%., start to think about splitting the file into two. Maximum percentage is 99%.

Note that a saved file is a little longer than the Bytes used: since it has filename and other control information not included in this figure.

Maximum file space is approximately 34000 bytes, but with DDI-1 connected this is reduced by 1284 bytes.

Any attempt to overflow the available RAM space will cause a BEEP and ...

```
    ***NO MORE ROOM***press ENTER
```

[ENTER] to resume, aborting whichever task failed. No damage will have been done.

Examples of Use

Example 1 : A simple name and telephone number list.

As with all new files, start with an empty system with Bytes used:00000, either by loading MASTERFILE 464 anew, or by emptying the previous file.

The first task is to establish data names and references. We will use N for names, and T for telephone numbers. On the left we show what to key, and on the right are comments (not keyed). Study the screen carefully before and after each response, and discover what is happening. Starting at main menu....

N	Enters Data Names mode
I	Insert new ref/name
[ENTER]	Not at any particular place
N	Our chosen data reference
Name **[ENTER]**	Data name of 'name'
I	Insert new ref/name
[ENTER]	Not at any particular place
T	Our chosen data reference
Telephone no **[ENTER]**	Data name of 'Telephone no'
X	Exit to main menu

Already the Bytes used:xxxxx has clocked up - our data names become part of the file and take up some space. But Records:0000 still shows, since although the data names go into a special record, this record is not counted.

With data names established, we can now add a few records, as follows.....

A	Add a record to the file

At once our data names become prompts, reminding us what to enter...

Peter**[ENTER]**	name
01-555 6666 **[ENTER]**	telephone
X	no more extra data to go in or changes to make
A	Yes, let's have another record...
David **[ENTER]**	name
0523 57781 **[ENTER]**	telephone
X	no more this record
A	Yes, let's have another...
Anita **[ENTER]**	name
01-245 6789 **[ENTER]**	telephone
X	no more this record
[ENTER]	no more records for now, back to main menu

At this point notice that we have Records:0003 Selected:0003, reflecting what we have just done. Now we must design a Format in order to be able to use our new file. Display mode cannot be used until a format is present. (Try **D** now anyway, just to see what happens .... then **[ENTER.]**

To make a format to show names and telephone numbers...

F	to FORMAT mode
N	insert a NEW format
1	which will be format '1'

At once a Report Geometry questionnaire is offered - and here most of the defaults we will leave, and just alter the title...

A	Alter the geometry
[ENTER] six times	Position diamond at title line
Telephone List **[ENTER]**	The new title

Now to insert a record data item to specify name display....

I	Insert a format item
D	for Record Data (see the new questionnaire...)
N [ENTER]	data ref - see it shows data name in response
[ESC]	no more changes to this questionnaire

Now for a record data item to specify 'telephone no' display...

I	Insert a format item
D	for Record Data
T [ENTER]	data ref
[ENTER]	skip HA/RA, leaving RA default
3Ø **[ENTER]**	column 30
[ESC]	no more changes

Now we can test our format. We can go back to main menu but it is more useful to enter DISPLAY mode directly in order to take advantage of the direct-return to FORMAT mode. So...

D	Display

Now we can see our three records, double-spaced, and separated from the title by the default (and empty) heading area (of 1 line). The report reference (1) is shown at top left. But let us go back to FORMAT mode and extend our format...

D	Direct return to FORMAT
I	Insert format item
L	get Ruled Line questionnaire
[ENTER] six times	bypass defaults
11 **[ENTER]**	we want eleven lines
2 **[ENTER]**	at two-line intervals
D	Display again

Now we can see ruled lines between our records.

This example concludes with a sort into name order...

X	to main menu
O letter 'O'	Order (i.e. sort)
N	by name data
A	ascending
C	character
D	display the result

The names will now be in alphabetical order.

Note: We left the default width of 40 columns for each field. In fact this gave us overlapping fields. As an exercise, alter the format to have the names right-justified, and observe the effect. As a further exercise, tidy up the format to have non-overlapped fields. Also, make the heading area 3 lines deep instead of 1 line, and insert column headings Name and Telephone in line with the displayed data. Remove the ruled lines and experiment with the record area depth, which is currently two lines. Try other vaues. Insert more records, re-sort, and so on. Then un-select via R at main menu, and try to find records using the SEARCH system, S etc.

Example 2: Name and address labels

We can extend the file in Example 1 by having addresses stored in each record. We will allocate A for addresses and insert its data name as follows...

N	Data names
I	Insert a new ref/name
N	After name
A	New data ref
Address **[ENTER]**	Data name of Address
X	Exit to main menu.

To add addresses into the records we already have, from Example 1, we must enter DISPLAY mode. All forms of update to existing records must be done this way. In DISPLAY mode, with our telephone list selected and viewed, press.....

A	to alter top record
I	to insert a new field
A	Data ref for new field
14 High St_Bath_Avon **[ENTER]**	address
X	No more changes to this record
I	Advance to next record
A	to alter it

IA etc. until all records are updated.

You can add a few new records from main menu A etc. Note that Address is prompted after name but before telephone because of the way we inserted the new data name.

Now, although we have a file of addresses, the addresses are not yet displayed, so the next task is to create a new format...

The aim is to display and print address labels. Let us assume that we have peel-off labels on tractor stationery at 2-inch intervals, and the printer advances 6 lines per inch. Thus the line interval between successive labels is 2 x 6 = 12 lines. We want each label to show name, followed by address.

Enter FORMAT mode and create a new format, ref 2, via F N 2 etc. For the rest of this example, we will assume you can find your way following our narrative, rather than key-by-key...

The all-important Geometry item must be altered as follows...

Heading area depth:	set to 0
Record Area depth:	set to 12
Forms depth:	set to 99
Title:	Address Labels

The Heading Area depth of 0 is advisable for this kind of print job. The Record Area depth we set to keep in step with our forms/labels. The forms depth of 99 is important, signalling that the forms are an infinite page with no repeat of Heading Area and no page gaps.

Next we insert a Record Data item, printing N (name) in column 1, line 5, 25 columns wide, 1 line deep, in the RA (Record Area).

Then we insert a Record Data item, printing A (address) in column 1, line 6, 25 columns wide, 4 lines deep, in the RA.

Enter DISPLAY mode to test this, and you should see one name-and-address per screen, with the addresses correctly divided into lines by virtue of the line-break characters, for example....

14 High St_Bath_Avon should appear as 14 High St
Bath
Avon

Now, switch on and ready the printer, then press **P** - and the labels are then printed, at 12-line intervals. On most printers, default line feed rate is 6 lines per inch, so that 2inch label spacing is matched by our 12-line RA depth. Once the first label is aligned, the rest stay in synchronisation.

Note that we specified lines 5 and 6-9 for name and address respectively. This could just have easily been line 1 and 2-5 for printing purposes, but it looks better on the screen lower down.

You can switch from format 2 back to format 1 (name and number) just with two keys.... **R 1**.

Whatever format the display, pressing **A** for alter-top-record will list every field in the record, in its 'raw' state. Practise making a few changes this way, including using the A for alter-field to edit an existing field.

Advanced Uses; Parent-Child Relationships

Many applications of MASTERFILE work very well without making use of the relational capabilities of the program. But there are some applications which can make powerful use of the `RELATIONAL` parent-child concept. Let us start by looking at a simple example...

We wish to keep a file of music albums, and each file record is to contain the following:-

```
    P:performer T:title C:catalogue no.
```

This seems simple enough, and a non-relational file will be OK - until you notice that you have 23 Ella Fitzgerald albums, 19 Oscar Peterson albums, and so on. You find that `P:Performer` data, such a `Ella Fitzgerald` is keyed so often that the file grows too big. This problem of storing repeated information is nicely solved using a parent-child system, so that in this example we have just one record for each performer, and a unique code for each one, say `EF` for Ella Fitzgerald, `OP` for Oscar Peterson.

Thus we would store for each performer, a `parent` record containing:-

```
    P:performer              >:code

e.g. Ella Fitzgerald         EF
```

And, for each album we have a 'child' record containing:-

```
     T:title                   C:catalogue    ↑:code

e.g. Love is Blue                A1234            EF
     Singing at the Savoy        B4455            EF
     Night Train                 XY999            OP
```

Now, each album record, which is a `child`, contains a two-character link instead of a much longer performer name. This saves keying, saves file space, and yet the performer name is still automatically available for display, just as before, by virtue of the linkages, e.g. `EF`. But there is a further advantage...

If we design a display which places performer name in the Heading Area, then MASTERFILE automatically makes a change of screen/forms page upon change of performer. However, to prevent undue fragmentation, one should also have the file sorted by the child link code, data reference ↑.

And now here is yet another advantage: suppose in our un-relational version of the file we wish to display all performers - how would we do it? The answer is 'with great difficulty'. The best we could do is select all albums, and then unselect manually all duplicated names - a very tedious job. But by making use of the relational method, all we need do is unselect at main menu, then use SEARCH mode to select just the parent records - a total of five key-strokes! (**R**,**S**,**S**,**P**,**D**)

In the above music album example file, we made use of the relation link in effect to expand a code into a performer - essentially saving space and keying effort, but with other advantages too. But in our next example we go a bit further...

Suppose we wish to keep track of prescriptions we give to patients, such that for each prescription we wish to record patient name, medical number, address, date of birth, as well as the prescription details. We create in effect two files in one - a patient file and a prescription file. The patient file has one record per patient (a parent record), while the prescription file has just the prescription details (child records). Each child links to its parent using some key, e.g. part of surname and first initial. With such a combined file we can list our patients, or the prescriptions, or both. By selecting a prescription record we have automatic access to the patient details - just as if all the data was in the prescription record.

The only real difference between this example and the music album example, is that we have several fields of data (name, address, medical number) in each parent record, rather than just one (performer) - not counting the link code field itself. The same advantages ensue with the second example, but there is another advantage too...

Suppose a patient changes his/her address: all we have to do is alter the one record which contains the address - and all linked prescriptions will reflect the update.

In both examples, we have in effect TWO FILES IN ONE, with automatic access to parent data via child records. Note that this access cannot work in reverse, so that if you select and display a parent record, data within its child records is not accessible.

Because of the complete flexibilty of MASTERFILE 464 it is possible to store any field in any record, so there is nothing to prevent you from creating a hybrid file where some records are child, some are parents, some 'solo' (no > or ↑ field), and where data fields of a particular type are variously present at the child level or the parent level - or even both.

Indeed, you can also have both kinds of link within a record, i.e. both up-link to a parent, and a down-link to children. In this way you can have any number of levels, but the following rules apply...

MASTERFILE464 will always look for a field within the selected record being displayed. Only if it cannot find it, will it hunt for the same field within the matching parent, if any, selected or not.

If a field is present in both a selected record and its parent, then the field in the selected record is chosen.

If a field is absent from both a selected record and its parent, then the 'grand-parent', if any, is not inspected.

If data is not found as above, then the filler character is displayed in its place. (The filler is shown as 3- characters.)

Link fields, like other fields, cannot occur more than once in a record. This means that a child can only have one parent.

When you have a relational file you would certainly create several display formats, some designed to display child records, and some to display parent records. MASTERFILE464 will display any selected records using any chosen format - but you will find unwanted, albeit harmless effects when displaying child records using a format designed to list parent data or vice versa. A common slip will be to select all records, both parent and child varieties, via main menu R and I. This will show as either duplicated records or records which seem to lack detail.

With a relational file, one should usually have either parent records selected, or childs records, but not both.