



PUBLISHER'S FOREWORD

The mechanics and manipulative aspects of the human creative process make a perfect subject for the application of microcomputer techniques. Surprisingly, software solutions to concept or ideas processing have been slow to emerge. In part this is due to the fact that most software development energies have been directed to traditional applications previously catered for by dedicated hardware or more expensive computers.

Now BrainStorm Software has developed a product which allows the development of thoughts and ideas without affecting their natural flow. Furthermore this product, BrainStorm, internally relates and structures ideas, presenting them back to the user in an organised way.

It makes sense for an established software publisher to bring this product to the market. Caxton's experience of publishing software which is noted for its ease of use, professional presentation and top quality support, makes the company well suited to the presentation of an ideas processor.

The publication of BrainStorm demonstrates the way in which the skills of a software publisher and a software developer, whose corporate experience includes artificial intelligence research, company management and communications, can be combined to serve an increasingly demanding market.

ISBN 0 96312 007 5

Published by Caxton Software Ltd

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1. INTRODUCTION

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MS-DOS and PC-DOS BrainStorm

To create a working copy of BrainStorm FORMAT a new disk using the "/S" option and COPY Brain.COM and Sample.BRN onto it.

- * Just one command has changed since the earlier CP/M version of BrainStorm. Instead of typing "!" to obtain the HELP screen type "?".
- * BrainStorm requires 128K of memory to run successfully.
- * Full error recovery replaces the REBRAIN function.

INTRODUCTION TO BRAINSTORM

Anyone who needs to think can make use of BrainStorm, the most effective aid to creative thought since the pencil and paper. It is a productivity aid with truly endless applications which can be used by everyone regardless of age, educational background or profession. Business people can use it for planning projects, talks, interviews and discussions. Writers can use it for preparing articles, books and reports. People in the computer business can use it for systems analysis, system design and programming. Students can use it to research, learn and revise. The potential applications are almost endless.

Essentially, BrainStorm accepts random ideas and information from its user and builds a model of these in the computer's memory. Creative thinking processes are necessarily of a random, disjointed nature and BrainStorm is able to capture your ideas in this form while internally structuring and relating them so that they can be re-presented in a more organised way.

BrainStorm's controls are so simple that they do not impede the flow of concentrated or creative thought. Ideas and information can be input swiftly and with minimal effort and BrainStorm remembers everything that is entered and its context. The three major software building blocks of the microcomputer industry have been spreadsheets, databases and word processors. Now we have an ideas processor, the natural complement of all that has gone before.

BrainStorm doesn't keep its ideas to itself. It can write files to disk for processing by other programs. It can prepare printouts of its knowledge in a variety of ways. It can merge BrainStorm files and it will even read textual files prepared by other programs. BrainStorm also has the fortunate attribute of being fun to use.

Welcome to the world of BrainStorm users. Join the people whose productivity took an enormous leap the day they started using this product. In time saved alone, BrainStorm will pay for itself within the first few weeks of ownership.

CHAPTER 10: THE HISTORY OF THE UNITED STATES

The history of the United States is a complex and multifaceted story that spans centuries. It begins with the first human settlements in the Americas, followed by the arrival of European explorers and settlers. The country's growth and development have been shaped by a series of events, including the American Revolution, the Civil War, and the Great Depression.

The United States has a rich and diverse cultural heritage, with influences from many different groups of people. This diversity has been a source of strength and innovation for the country. The American dream, the idea that anyone can achieve success through hard work and determination, is a central theme in the country's history.

The United States has played a significant role in world history, from its emergence as a global superpower in the 20th century to its current position as a leading nation in the 21st century. The country's values and principles have inspired people around the world, and its influence is felt in many areas of life.

The history of the United States is a story of resilience and progress. Despite many challenges, the country has always found a way to move forward. The American people have shown a remarkable ability to adapt and overcome, and this spirit of innovation and perseverance continues to shape the nation's future.

BRAINSTORM TUTORIAL

One of the key skills in life is the ability to communicate your ideas effectively. In order to do this, you must first have a clear idea of your subject matter. In this worked example we shall use BrainStorm to illustrate how it can be used to collect and organise thoughts.

It doesn't matter greatly what you are preparing for – it may be a speech, a discussion, a report or a letter – the thought processes are very similar. We shall look at the way our ideas might develop and relate to each other on the subject of Software Package Development.

Work through the example, and you will quickly become familiar with the way BrainStorm works. Items you need to type are shown in bold type. Sometimes you will need to press a key in conjunction with your 'control key', usually labelled CTRL or ALT. In this manual, such a keystroke is shown as the character preceded by a caret symbol. For example 'control-T' will be shown as ^T. You may use upper- or lower-case letters with the control key.

Throughout this example we assume that you have an installed copy of BrainStorm in drive A and a freshly formatted disk in drive B. If you are unsure of how to reach this stage then refer to the 'Getting Started' chapter in this manual and to your operating system manual. Ensure you are logged in to Drive A then load BrainStorm by typing:

BRAIN <ret>

(The RETURN or ENTER key is shown as <ret> and the ESCAPE key as <esc> in this manual).

Drive A will whirr and BrainStorm will be loaded. The copyright screen will appear first and you will notice your serial number on the top line.

You may be asked for this number if you ever call your supplier for help.

Press <ret>

This will display the Master Menu:

```
-----  
                          BrainStorm Master Menu  
-----  
  
    U se    L oad    P rint    I d. drive  
    C lear  S 'ave   W rite    D irectory  
    X it    M erge                   K ill  
  
-----
```

(Use option D to see directory)

```
-----  
Make selection by pressing one of: U C X L S M P W I D K  
-----
```

```
Drive: B  Model name:                Status: EMPTY  
-----
```

You will notice at the foot of the screen that your data files are expected to be on drive B. If you wish to use a different drive for your data then change it by pressing 'I' followed by the preferred drive letter. Throughout this chapter, we will assume that you are working with drive B. If you change the drive then please note that further drive references in this chapter may be invalid.

Press **U**

A new screen will be presented which comprises three sections. From now on you have access to the range of single keystroke commands referenced on the fold-out card in appendix B. To list the commands at the foot of this screen:

Press !

The screen will now look like this:

```
-----  
-  --  
-----  
>.  
  
-----  
  
Position dependent commands   Mnemonic commands   Other  
Home[Q] Top[W] Up[E] Promote[R] AAmend FFall-10 GGet HHunt Exit:ESC  
Previous[S] Next[D] JJump-@ KKill LList PPut Mark:@  
Bottom[Z] Down[X] Demote[C] TTitle UUp-10 Null:RET  
-----
```

If you have a non-standard keyboard, the command keystrokes may differ from those specified here. Carefully compare the figure above with your own screen and note any discrepancies on the fold-out card in Appendix B.

Using these commands you will be able to fill BrainStorm's memory with a model of your thoughts and ideas. You will be able to edit them, move them around and display different parts of the model.

We'll start by entering our subject title:

ALT/ HOLD
Press ^T
type Software Package Development
press ^F twice to remove the two hyphens
press <ret>

(Notice that after you pressed ^T, the bottom of the screen displayed a line of edit-commands. Check that these tally with the standard version printed on the Appendix B fold-out. Mark any discrepancies. In the standard version you may correct errors in your entries using ^A and ^F to delete characters to the left and

under the cursor. ^S and ^D simply move the cursor over the text. ^I moves the cursor forward one word at a time or in blocks of eight spaces. These controls must be used before pressing <ret> to complete the entry).

The title is now in the top section of the screen. A BrainStorm model can only contain one overall title, although that can be divided into many subtitles. In fact, if you now type the following you will give it six subtitles:

```
Design application<ret>
Develop programs & documentation<ret>
Plan marketing activities<ret>
Manufacture<ret>
Distribute<ret>
Support<ret>
```

Your screen should now look like this:

```
-----
= Software Package Development
-----
- Design application
- Develop programs & documentation
- Plan marketing activities
- Manufacture
- Distribute
- Support
>
-----

Enter text at > or press command key (! to identify command keys)

Line 7 of 7 Level 1 Mem left 40K
-----
```

The '>' symbol is the line-cursor which indicates where entries and commands will take effect. The 'Mem left' value will vary from machine to machine.

The equals sign on the heading line shows that this heading has sub-headings. The sub-headings too may have their own sub-sub-headings. To illustrate this:

Press ^W

Press ^R

^W moved the cursor to the top of the list of entries in the middle of the screen. ^R 'promoted' the topmost entry into the heading area. Now you can develop the 'Design application' theme further by typing the following:

```
Get an idea<ret>
Design the system<ret>
Design the program(s)<ret>
```

You may continue in this fashion to any number of levels of detail simply by 'promoting' entries and adding new entries below them. Movements up and down a list of entries is through the control keys ^E and ^X which are in a convenient North/South arrangement to reflect the direction of movement.

Adjacent to these are keys ^W and ^Z which take you to the top and bottom of the list respectively.

Familiarise yourself with the cursor control keys ^E, ^X, ^W, and ^Z

If you wish to go back and amend an entry, simply move the cursor to the required line then press ^A (for Amend). This allows you to edit the line using the edit keys mentioned earlier. (Press <esc> if you change your mind.)

Press ^C

This moves the heading (Design Application) back into the middle part of the screen together with the rest of the sub-headings under 'Software Package Development'.

Press ^X

Press ^R

Type Write program(s) <ret>
Test <ret>
Document <ret>
Beta test <ret>

It should now be a simple matter to expand the other headings by following the same procedure (^C, ^X, ^R):

Existing Heading

Plan marketing activities

Manufacture

Distribute

Support

Sub-Headings

Product packaging
Advertising
Publicity material
Launch

Box
Manual
Reference card
Disk label
Disk

Take orders
Prepare invoices
Package
Ship

Handle enquiries

Now find your way to 'Product packaging'. If you want a quick way:

Press ^H

Type **Prod*** <ret>

This literally 'hunts' or 'searches' for an entry starting with 'Prod'. When it finds a matching entry hit <ret> to ignore it or 'Y' to accept. In this case:

Press Y

You may now expand your notes on this topic.

Type **Box** <ret>

You will notice a number '1' has appeared to the left of the entry. This indicates that there is one other occurrence of the entry 'Box' in the model you are building. All 'namesakes', as these matching entries are called, share a common set of descendants (sub-headings, sub-sub-headings etc) which can be very useful. If however you do not want to create a namesake, you will need to replace the entry with an appropriate synonym.

For example you could replace 'box' with 'carton'.

Some of the examples in Appendix C will show how the namesake facility may be used to great advantage.

Press ^E

Press ^S

You are now at the previous occurrence of 'Box'.

Press ^D

This moves you forward to the next occurrence of 'Box'. Since there are only two namesakes in our example, 'S' and 'D' have the same effect. It is possible, albeit unlikely, to have hundreds of occurrences of the same namesake all connected in this fashion.

Perhaps it's time to summarise our progress so far:

Movement commands:

Up	<code>^E</code>
Down	<code>^X</code>
Top	<code>^W</code>
Bottom	<code>^Z</code>
Promote	<code>^R</code>
Demote	<code>^C</code>
Next namesake	<code>^D</code>
Previous namesake	<code>^S</code>
Hunt or search	<code>^H</code> (for Hunt)

Amendment commands:

Amend title	<code>^T</code> (for Title)
Amend entry line	<code>^A</code> (for Amend)

Editing commands:

Delete to left	<code>^A</code>
Delete under cursor	<code>^F</code>
Cursor left	<code>^S</code>
Cursor right	<code>^D</code>
Tab to next word or 8 spaces	<code>^I</code> or TAB

Other commands:

Display command prompts	<code>!</code>
-------------------------	----------------

We should also summarise the words we use in connection with BrainStorm.

Model	Since your entries are being connected to each other as they are being entered, we usually refer to them as the model.
Title	The name given to the first heading in the model. An empty model will always contain two hyphens here.
Heading	The entry in the top section of the screen.
List	The entries belonging to the current heading or title.
Entry	A single entry in a list.
Descendants	All the entries which are descended from a single entry.
Namesakes	Identical entries which are automatically linked together.

It is possible to 'save' your model on disk or to print it out. To get at the relevant commands:

Press <esc>

This returns you to the Master menu. Make sure your printer is attached and ready to print.

Type P
Press <ret>
Press <ret>
Press Y

The printer will now give you a printout of the model you have entered. It should look like this:

```
Software Package Development
  Design application
    Get an idea
    Design the system
    Design the program(s)
  Develop programs & documentation
    Write program(s)
    Test
    Document
    Beta test
  Plan marketing activities
    Product packaging
      Box
    Advertising
    Publicity material
    Launch
  Manufacture
    Box
    Manual
    Reference card
    Disk label
    Disk
  Distribute
    Take orders
    Prepare invoices
    Package
    Ship
  Support
    Handle enquiries
```

Alternatively you can write the report straight to disk:

```
Press W
Press <ret>
Press <ret>
Type SOFT <ret>
Type DOC <ret>
Press Y
```

You now have a 'printout' of the model on disk, in a text file called SOFT.DOC. When you have finished using BrainStorm, you may access this file using operating system commands such as TYPE or more likely, using a word processor or information manager.

If you simply wish to save the model in a form suitable for later use by BrainStorm:

Press S
Press <ret>
Type **SOFT** <ret>
Press Y

Your model is now stored on disk in a file called SOFT.BRN. It is in a special form which BrainStorm will understand and from which it will be able to reproduce the original structure and content of your model. BrainStorm can also read ordinary text files but it clearly cannot create a structure from them except to identify and link namesakes.

Press C
Press Y

This has cleared your model. Check this by pressing U. All you should see is two lonely looking hyphens in the title.

Press <esc>
Press L
Type **SOFT** <ret>
Type **BRN** <ret>
Press Y

The file SOFT.BRN which you saved earlier will now be loaded again.

Press U

If you wish to take a break here:

Press <esc>
Press X
Press Y

Other commands available are all described in detail in the Reference section of this manual. Here is a list of each remaining command and its purpose:

From BrainStorm's USE mode:

Cursor down 10 lines	^F (for Fall)
Cursor to title screen	^Q
Cursor up 10 lines	^U (for Up)
Empty line	<ret>
Jump to marked entry	^J (for Jump)
Mark current entry	@
Move entries into current list	^G (for Get)
Move entries to another list	^P (for Put)
Delete an entry	^K (for Kill)
List all or part of current list	^L (for List)

From BrainStorm's master menu:

Merge (M)	This reads a file from disk and incorporates the details into the existing model.
Kill (K)	This deletes a file.
Directory (D)	This displays a list of files on the disk.

This brief look at BrainStorm in operation will have got you started. The Reference manual will fill you in on all the details which will enable you to make the most of BrainStorm's facilities.

Appendix C contains a number of application notes which describe example uses for BrainStorm.

The Installation chapter will allow you to change the control keys and the prompt messages to suit your particular computer. Remember though that the manual is written to match the supplied version of BrainStorm.

If you think you have an unusual application for BrainStorm why not let us know? We're always interested to hear from our users.

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BRAINSTORM REFERENCE

By now you should be thoroughly conversant with the ideas behind BrainStorm and the broad principles of operation. This chapter gives a detailed description of each command and is arranged more formally than the Tutorial chapter.

In particular, your attention is drawn to the powerful disk commands (SAVE, LOAD, WRITE and MERGE) which enable BrainStorm to exchange information with other programs. Of particular value is its ability to read and write text files for use with word processing packages.

You will also find plenty of hidden power in the PRINT command which can generate over 2½ million different print formats.

Master Menu

The master menu is divided into four sections. Following the title in the top section, the next section displays the commands available, and below that is the display area for all or part of the disk directory. The bottom section prompts the user, accepts commands and displays the current status of BrainStorm.

```
-----
                        BrainStorm Master Menu
-----

U se          L ist          P rint          I d.drive
C lear        S ave          W rite          D irectory
X it          M erge                    K ill

-----
                        Directory of B: ??????? ???      Page 2
STAT  .COM  BRAIN  .COM  MIKE  .DOC  DAVID  .BRN
BILL  .DOC  WOODY  .BRN  VIV   .DOC

-----

Make selection by pressing one of: U C X L S M P W I D K

Drive:B          Model name:          Status:
-----
```

The rest of this chapter is organised as follows:

1 Master Menu status

- 1.1 Drive
- 1.2 Model Name
- 1.3 Status

2 USE, CLEAR & EXIT

2.1 USE

- 2.1.1 Normal Entry
- 2.1.2 Amend Entry
- 2.1.3 Amend Title
- 2.1.4 Delete Entry
- 2.1.5 '>' Cursor Movement
- 2.1.6 Title Screen
- 2.1.7 Promote an Entry
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- 2.1.18 Exit to Master Menu

2.2 CLEAR

2.3 EXIT

3 LOAD, SAVE & MERGE

- 3.1 LOAD
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- 3.3 MERGE

- 4 PRINT & WRITE
- 4.1 Context
- 4.2 Single letter commands
- 4.3 Combination commands
- 4.4 Level suppression

- 5 ID DRIVE, DIRECTORY & KILL
- 5.1 ID DRIVE
- 5.2 DIRECTORY
- 5.3 KILL

1. **Master Menu Status**

1.1 **Drive**

This identifies the current disk drive. All file transfers (load, save, write, merge and directory) take place to and from this drive. You may change this using the 'ID DRIVE' command. You may change disks while BrainStorm is in use providing the drive is not active at the time of the change. The new disk is automatically recognised before the next file transfer takes place.

1.2 **Model Name**

This contains the name of the file last accessed using a 'SAVE' or 'LOAD' command. When you next use 'SAVE', this filename is automatically selected by BrainStorm. You may accept it or change it.

1.3 Status

This gives the current status of the model. The possible values are:

- EMPTY – No data has yet been loaded or entered.
- ERROR – This warns that a disk reading error has occurred and that the model may be incomplete.
- FULL – Memory is full. If you wish to continue developing the current model, you will need to split it over two files using the 'SAVE @' function.
- LOADED – The model has been freshly loaded.
- MERGED – The model contains a newly merged file.
- nn K – This displays the amount of memory remaining.
You will notice this value visibly reduces while files are being loaded and merged.
- SAVED – This reminds you that the model has been freshly saved.
- UNSURE – This is displayed after error recovery has been attempted using the 'REBRAIN' facility. Success cannot be guaranteed hence the choice of 'UNSURE'.
- USED – The model has been amended since the last file transfer to or from disk.

You will normally wish to ensure that the status is 'SAVED' before you exit from a BrainStorm session.

2. **USE, CLEAR & EXIT**

2.1 **USE**

This command takes you to a fresh screen which allows you to enter, amend and traverse the model. BrainStorm is supplied with a set of control keys defined to access the various functions. If you wish to change these then refer to the Installation chapter.

Appendix B contains a fold-out reference card with provision for your key choices to be entered. This manual refers to the default set of control keys as supplied with BrainStorm.

Three status messages are displayed at the foot of the 'USE' screen:

Line 'n' of 'n'	This gives the current line number of the line pointed to by the '>' marker and the total number of entries in the list, including the '.' terminator.
Level 'n'	This shows how deep into the model (i.e. how many sub-headings down) you are.
Mem left 'n' K	This is the amount of unused memory remaining in multiples of 1024 characters (K). When this figure is blank or 1 then you are about to run out of space for your model.

The functions available within USE are as follows:

- o Normal entry
- Amend entry
- Amend title
- Delete entry

'>' cursor movement

Title screen

Promote an entry

Demote heading

Previous namesake

Next namesake

The '@' mark

Jump to '@' mark

Get text from '@' mark

Put text to '@' mark

Search for an entry

Print heading and current list

Display available commands

Exit to Master Menu

- 2.1.1 **Normal Entry** is stimulated by typing any character other than a command key. This will normally be a 'visible' character, but may include TAB (^I). The line you type appears on the screen immediately at the current '>' cursor position. New lines may therefore be added at any position in the current list of entries.

If an entry exceeds the line length, the last word is 'wrapped' on to the next line and data entry continues on this line. You may edit the current line as follows:

Cursor left	<code>^S</code>
Cursor right	<code>^D</code>
Delete left	<code>^A</code>
Delete 'right'	<code>^F</code>
Abandon current line	<code><esc></code>
Complete entry	<code><ret></code>
Tab over text*	<code>TAB</code> or <code>^I</code>

*Tab moves the cursor to the space following each word. If the cursor is beyond the end of the text then the tab will create eight spaces each time it is pressed.

Hit `<ret>` to create a blank entry. Blank entries cannot be 'promoted' nor will they become 'namesakes'.

The first entry under a new heading causes the hyphen before the heading to become an 'equals' sign. When the heading is seen as an item in a list (see 'Demote' 2.1.8), this reminds you that the entry has descendants.

- 2.1.2 **Amend Entry** This mode is entered by pressing `^A` (for Amend). Use the editing commands mentioned in 'Normal Entry' (2.1.1) to change the current line. Although the entry line is only 72 characters long, the entry buffer when amending is 144 characters long. This is to allow characters to be inserted and deleted without causing an unwelcome word wrap or truncation. The characters to the right of column 72 are invisible but can be brought into view by deletion (left or right) or by hitting `<ret>`. This terminates the

amendment and wraps the surplus text to the next line. As before, word wrap takes place on the last word on the line. Wrap also occurs if you attempt to type beyond the 72nd character. Following word wrap the cursor will be positioned either at the character which caused the wrap or at the first character position on the wrapped line. Amending one namesake causes all its other namesakes to be amended also.

Note: Whenever an **entry** or **amendment** is made, BrainStorm automatically searches for namesakes of the current entry so that it can form the appropriate connections. An asterisk 'wildcard' may be placed at the beginning, the end or at each end of an entry. If placed at the beginning, BrainStorm will seek a match for the trailing characters only, regardless of which characters precede them. When the asterisk is placed at the end of an entry, BrainStorm seeks a match on the first sequence of characters, regardless of what follows. With an asterisk at each end, BrainStorm will match all entries which contain the sequence of characters between the asterisks regardless of their position in an entry. If it cannot find a matching entry, BrainStorm moves the edit cursor to the beginning of the line to allow you to change it. A question mark in any position in an entry will match a single character at that position during the searching process. If no match is found then the new entry is stored incorporating the question mark as a literal character. BrainStorm does not differentiate between upper-and lower-case entries when searching.

This feature could be turned to an advantage if, for example, you had a particularly long entry that you wished to repeat several times through the model. By prefixing the entry with a little-used character, such as '/', you could then simply type '/'* to cause the namesake (your long entry) to appear at the cursor location. Before finishing the BrainStorm session, it would be a simple matter to edit the '/' from the front of one of the namesakes and they will all automatically reflect the modification.

2.1.3 **Amend Title** Enter this mode by pressing **^T** (for Title). The edit commands are the same as those used in 'Normal Entry'. Since the title occupies a single line, all characters beyond the 72nd are truncated when **<ret>** is pressed.

2.1.4 **Delete Entry** Delete the current line by pressing **^K** (for Kill), followed by **Y** to confirm it. Note that this command can cause a massive deletion in the model if the entry being killed has many entries descending from it. BrainStorm accepts **Y**, **y**, **^Y** or **^y** as confirmation.

2.1.5 **'>' Cursor Movement** can be summarised as follows:

Cursor up	^E
Cursor down	^X
Cursor up 10 lines	^U (for Up)
Cursor down 10 lines	^F (for Fall)
Cursor to top of list	^W
Cursor to end of list	^Z

The display acts as a 15-line 'window' which 'slides' up and down the list of entries belonging to the current heading.

2.1.6 **Title Screen** Press **^Q** to go back to the title screen.

2.1.7 **Promote an Entry** To move an entry to the heading line and to display its descendants, press **^R**.

- 2.1.8 **Demote Heading** To bring the heading into the middle of the screen, press ^C. Its heading and all or part of the list to which it belongs will be displayed.
- 2.1.9 **Previous Namesake** Press ^S to display the list and heading associated with the previous identical entry.
- 2.1.10 **Next Namesake** Press ^D to display the list and heading associated with the next identical entry.
- 2.1.11 **The '@' Mark** This can be attached to a single entry in the workspace simply by typing '@'. It can be switched off by typing '@' again when at the marked entry. If you type '@' when another entry is already marked, the mark will transfer itself to the current entry. You may mark the '@' at the end of a list. This is useful prior to using 'Put'. The '@' mark is used both by USE commands and by options in the master menu.
- 2.1.12 **Jump to '@' Mark** Press ^J to 'jump' to the '@' mark. This is useful if you want to go off to another part of the model and return later. Jumping swaps the '>' cursor with the @-mark so you will never see the @-mark when you jump. However, when you wish to return, press ^J and you will find yourself back where you started.
- 2.1.13 **Get from '@' Mark** Press ^G (for Get) then 'Y' to confirm, to move the entry at the '@' mark to the line before the current line. The '@' mark will then drop to the next item in the list and this can be 'got' as well. In this way whole blocks of entries and their descendants may be moved around the workspace. BrainStorm accepts Y, y, ^Y or ^y as confirmation.

- 2.1.14 **Put to '@' mark** Press ^P (for Put) then 'Y' to confirm to move the current line to the line preceding the '@' mark. When the current line has been moved the lines below move up to compensate. Put is better than Get when you wish to select odd items to be moved from a list. BrainStorm accepts Y, y, ^Y or ^y as confirmation.
- 2.1.15 **Search** for an entry by pressing ^H (for Hunt). An 'edit line' appears at the foot of the screen. Enter the sequence of characters you wish to search for and hit <ret> to initiate a search. The editing commands described in 'Normal Entry' apply here. An asterisk at the start or end of an entry matches any number of characters in the same relative position of another entry. A question mark can be used to match any character. A common use of this command is to put an asterisk both at the beginning and at the end of a word. This will search for every occurrence of that word regardless of where it appears in the found entries. (See the paragraph following 2.1.2 for a more detailed explanation).
- 2.1.16 **Print Heading and Current List** Use ^L (for List) then 'Y' to confirm, to print the current heading plus those lines which lie between the '>' cursor and the '@' mark. If there is no '@' mark it prints to the end of the list. Long printouts may be abandoned by pressing the space bar once and then confirming with 'Y'. BrainStorm always accepts Y, y, ^Y or ^y as confirmation.
- 2.1.17 **Display available commands** Press '?' to view the keystrokes for all available commands in USE. Selecting any of the commands clears the display and then executes the command. Pressing '?' again switches this 'help' display off too.
- 2.1.18 **Exit to Master Menu** Press <esc> to return to the Master Menu. In fact whatever you are doing anywhere in BrainStorm (except in the middle of a disk access or printing) pressing <esc> enough times will return you to the Master Menu.

2.2 **CLEAR**

Press C when at the Master Menu to clear the model. Be sure that you have SAVED the model to disk if you are ever likely to want it again. Confirm this command by pressing Y, y, ^Y or ^y.

2.3 **EXIT**

Press X when at the Master Menu to return to the operating system then press Y to confirm. Should you ever exit in error then you might try typing REBRAIN to see if it will put you back into BrainStorm. Success with REBRAIN depends on how you installed your copy of BrainStorm. See the Installation chapter. BrainStorm accepts Y, y, ^Y or ^y as confirmation. It is good practice to check that the status is 'SAVED' before using this command.

3. **LOAD, SAVE & MERGE**

Note that with most file commands, including LOAD, SAVE and MERGE, it is necessary to specify a filename. The first, main part of a filename may have up to 8 characters and the second, extension part, only 3.

BrainStorm automatically converts lower-case to upper-case when you are entering a filename, and only accepts the following characters: A...Z, 0...9 and -. (Using other characters in filenames can confuse your operating system).

BrainStorm automatically adopts the extension '.BRN' for files saved in internal format.

If a filename already exists, with a new file being written to disk, then it is given the name '.BAK', and any previous '.BAK' file will be deleted. BrainStorm uses the extension '.\$\$\$' as a work-file during writes to disk, but erases it on completion, even if an error occurs.

3.1 **LOAD**

Press L when at the Master Menu followed by a filename and Y to confirm in order to load a text file or a BrainStorm internal format file from disk into memory. In each case it clears out any existing model first. BrainStorm accepts Y, y, ^Y or ^y as confirmation. BrainStorm internal format files are loaded with a structure according to information embedded in the file (see Appendix A). Text files load at a single level and usually need to be structured manually using commands such as Get, Put, Promote and Demote. The status shows a countdown of the amount of memory left during the load.

3.2 **SAVE**

Press S when at the Master Menu then specify what is to be saved followed by the file name (BRN extension is assumed) and Y, y, ^Y or ^y to confirm. This command saves all or part of the model to disk. It will use the current filename (if any) unless you explicitly change it. To save a part of the model simply mark an entry then it, and its descendants, will be saved when you choose the 'SAVE from @-mark' option. All files saved in this way are in BrainStorm internal, ie structured, format. See Appendix A for details. If a file of the same name already exists, its extension is changed to 'BAK'.

3.3 **MERGE**

This is exactly like LOAD except that the file is loaded immediately above the current '>' cursor location. All namesakes will be recognised and linked to the current model. Both internal and text files may be merged. The status shows a countdown of the amount of memory left during the merge.

4. **PRINT & WRITE**

These commands are almost identical except that one prints on paper and the other writes a text file to disk. 'Advance to a new page' is written to disk as five new lines and a file name is requested to receive the data. Printing may be interrupted by pressing the SPACE bar.

BrainStorm can produce over 2½ million different print layouts but the most popular fifteen are accessible with a single character format code.

4.1 **Context**

First it is necessary to define which sections of your model need to be printed. It can be printed in its entirety, from an @ mark or from entries which match a search argument, plus all their descendants. The search argument is entered exactly as for the ^Hunt command (see 2.1.15). Define your context as follows:

- | | |
|------------|--|
| <ret> | Prints the entire model |
| @ | Prints the marked entry and all its descendants |
| <argument> | Prints all entries which match the argument plus their descendants |

4.2 **Single Letter Commands**

Having defined the print context, it is necessary to define vertical and horizontal spacing together with levels required to be printed. <ret> causes a neat print with each level indented by four from its predecessor. If the model is so deep (indented by more than 64 spaces) that you are in danger of going off the right hand edge of the paper, BrainStorm automatically stops further indentation.

```
This is the title
      This is a level 1 entry
        And this is level 2
      Now we are back at level 1
```

The start of a printout using RETURN

Since this is a very readable format, we have made it the easiest to produce. If you wanted a single character indent for each successive level then you'd use the number 1. Zero would print the model with every entry printing in the first column, ie zero indentation.

So, the values of 0 to 9 relate to the number of character positions you wish to indent successive levels.

```
This is the Title
      This is a level 1 entry
        This is a level 2 entry
      This is level 1 again
```

The start of a printout using 1

```
This is the Title
      This is a level 1 entry
        This is a level 2 entry
      This is level 1 again
```

The start of a printout using 2

As well as varying the indentation, you can also change the vertical spacing before a level is printed. In summary, the values are as follows:

- P – Advances to new page (or 5 lines if writing to disk)
- A – Advances four lines
- B – Advances three lines
- C – Advances two lines

If you enter a single character from this list, BrainStorm automatically prints the next levels according to the characters remaining on the list. It can be visualised as follows:

P (New Page/5 lines)	!	xxxxxxxxxxxxxxxx
	!	
A (Four lines)	!	xxxxxxxxxxxxxxxx
	!	
B (Three lines)	!	xxxxxxxxxxxxxxxx
	!	
C (Two lines)	!	xxxxxxxxxxxxxxxx
	!	xxxxxxxxxxxxxxxx
	!	xxxxxxxxxxxxxxxx
	!	xxxxxxxxxxxxxxxx
	!	xxxxxxxxxxxxxxxx
	!	xxxxxxxxxxxxxxxx
C (Two lines)	!	xxxxxxxxxxxxxxxx
	!	

Print pattern using controlling characters.

You will notice that when formatting is specified by a letter as opposed to a number, the print for that level appears at the first column. Once the letters are exhausted the successive levels are indented by four from each other. At the lowest level, each entry in a list is separated from the next by a single space.

One more single character format can be achieved by using any letter from D to Z but excluding the letter P. This prints all the entries continuously with a space separating each from its neighbour. This is useful when writing to disk for subsequent processing by another program or for printing unstructured text. In order to make the printout (in PRINT not WRITE) of this format legible, BrainStorm word wraps short words and hyphenates longer ones. Hyphenation occurs at the end of the line regardless of any natural hyphenation which might be associated with a word. Carriage returns are inserted whenever the WRITE or PRINT encounters a blank line.

```

P--> !
      !
      !-----
      !
      ! First
A--> !
      !
      !
      ! Second
      !
B--> !
      ! Third
C--> !
<RET>--> ! Fourth
          ! Fifth
              ! Sixth
                  ! Seventh
O--> ! First
      ! Second
      ! Third
      !
1--> ! First
      ! Second
      ! Third
      !
2--> ! First
      ! Second
      ! Third
      !
D-0--> ! First Second Third Fourth
Q-Z   !

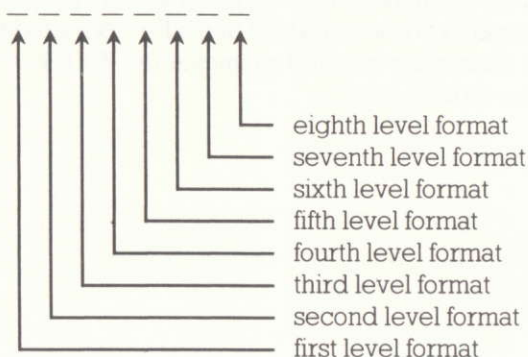
```

Summary of single character print formats

4.3 Combination Commands

You may mix the characters already mentioned to achieve a range of formats.

Up to eight consecutive format control characters may be entered to control each report:



For example:

BC248---

Will advance three lines before printing the first level, two before the second then it will indent the next three levels by two, four and eight columns respectively from the left hand edge. Each further level will be indented by four from its predecessor. This is because BrainStorm automatically works out a logical indentation from the characters provided.

To calculate this final indentation, BrainStorm subtracts the penultimate number from the last number in the sequence. If there is no previous number then zero is assumed. If the result of the subtraction is negative then the indent is made zero.

For example:

- | | |
|-----|--|
| 246 | results in a continued indent of 2 |
| 642 | results in a continued indent of zero. ie all deeper levels will be printed at the same column as level 3. |
| 4 | results in deeper levels being indented by 4. |

4.4 **Level suppression**

You may suppress different levels by including hyphens in the control sequence.

For example:

- | | |
|--------|---|
| --24-6 | would suppress the first two levels, the next two will be indented by two and four columns respectively. The next level will be suppressed and the one after that will be indented by six columns. Lower levels will be indented by a further two each. |
|--------|---|

If the last entry is a hyphen then all further levels are suppressed.

For example:

- | | |
|-------|--|
| --24- | will simply print the third and fourth levels indented by two and four columns respectively. |
|-------|--|

5. **ID DRIVE, DIRECTORY & KILL**

5.1 **ID DRIVE**

Before performing any disk access, make sure BrainStorm is logged on to the correct drive. If not, press I followed by the new drive letter to change it. Make sure that there is a disk in the new drive. This command clears the directory display.

5.2 **DIRECTORY**

This gives a directory of files on the currently logged drive. The directory is displayed a screen full at a time if appropriate. You may use editing commands to define a file suffix. The directory command will display only those files which match this suffix which can be up to three characters including '?' wildcard letters.

Following successful Saves, Kills and Writes, the same directory page is redisplayed and may or may not reflect the change. If you change disks then use the DIRECTORY command to display the files on the new disk.

5.3 **KILL**

Use this command to erase a file from the current disk drive. Wildcard letters and dollar signs may not be used when deleting files. Press Y, y, ^Y or ^y to confirm the deletion.

BRAINSTORM MESSAGES

Many messages in BrainStorm are self-evident and appear regularly. Others appear less regularly or are cryptic in order to give you as much working memory as possible. This section lists this second group in alphabetical order.

ALREADY EXISTS	An amendment has created a namesake. You have the option to merge both sets of descendants.
CURRENT POSITION HAS THIS AS AN ANCESTOR	When amending, getting and putting you cannot make something an ancestor of itself.
DISK FULL!	Either the disk contains too many directory entries or it is actually full. If neither seems to apply then it will probably be a disk corruption of some sort. Occasionally, weird operating system implementations have caused problems but this is so rare that it should only be investigated if all other possibilities have been eliminated.
ERROR READING FILE	Some sort of corruption has occurred on your input file. The only answer is to work from the most recent backup copy of the model in question. You might try selecting 'USE' to see if enough has been loaded for it to be usable.
FILE NOT FOUND	The file to be accessed is not on the logged drive.

SEARCH FAILED

This usually happens when 'hunting' but remember it can happen whenever BrainStorm is trying to match a search argument. It could happen for example when writing or printing.

SORRY - OUT OF MEMORY

You have reached the memory limit. The file can be split up by marking an entry with an '@' then saving it plus all its descendants. You could then jump to this entry and 'kill' it thus freeing some space, secure in the knowledge that you still have the original information stored away somewhere safe.

START UP ERROR

BrainStorm has failed to initialise. Have you run the installation program yet? If this is the first time you've used BrainStorm since running the installation program, check the memory reservation. Otherwise, suspect a corrupted copy of your operating system.

STATUS: EMPTY

Model is empty.

STATUS: ERROR

Read error. See **ERROR READING FILE** above.

STATUS: FULL

Memory is full. See **SORRY - OUT OF MEMORY** above.

STATUS: LOADED

A model has been newly-loaded.

STATUS: MERGED

A model has been newly-merged.

STATUS: nn K

This displays remaining memory during loading.

STATUS: SAVED

Current model has been saved.

STATUS: UNSURE

This is displayed after recovery is attempted using REBRAIN.

STATUS: USED

Your model has been amended.

**SWITCH ON
THE PRINTER**

It may be on but disconnected, off-line or not recognised by your operating system. The printer needs to be the standard listing device. This is an operating system and hardware consideration, please consult your system supplier if you're stuck.

MODEL NAME

Name last used for LOAD or SAVE.

REBRAIN PROGRAM

Sometimes a hardware or operating system error can interrupt your BrainStorm session before you have had a chance to save your model, by simply returning you to the operating system prompt. Indeed if you inadvertently leave a disk drive door open when attempting to 'Save' you will cause such an error.

If you *immediately* type '**REBRAIN**' then <ret> you have a high probability of recovering the situation. Do not, on any account, type any other operating system command first, otherwise you will greatly reduce your chances of recovery.

For REBRAIN to work you must previously have installed BrainStorm with at least nine 'pages' of 256 bytes reserved (see Installation option 6). You may care to test this facility before you really need it. Simply 'Exit' from the BrainStorm Master Menu, having saved your model. Type '**REBRAIN**' then <ret>, use 'Use', have a look at the title screen of the model. Try 'Hunting' for a non-existent entry. If this does not work, then you did not reserve enough memory, so re-run the installation and reserve more. Note that the more memory you reserve, the less there is available for your model.

GETTING STARTED

The instructions which follow are designed to get BrainStorm working for you as quickly as possible, but without using some of the more sophisticated features of your system. See the 'Installation' chapter for further information.

First you must make a copy of the supplied BrainStorm disk. When you have done this, put the original somewhere safe, dry and dust free so that should your working copy ever become damaged or corrupted, you can easily make a fresh copy. Precise details of the copying procedures vary from machine to machine. For example some systems have a COPY command which copies the disk physically while others need a combination of FORMAT, PIP and SYSGEN to achieve the same results. Your system documentation will tell you which is the case with your own machine. The aim is to get a copy of all of the BrainStorm files on to a fresh disk which also contains your operating system.

Files bearing the filename INSTALLB and BRUN will be needed only when installing BrainStorm. (This includes the files INSTALLB.DAT, INSTALLB.COM and the like). To run BrainStorm itself, you will only need an installed copy of BRAIN (and in some cases, REBRAIN).

Obtain a directory of your BrainStorm disk and look for a file called 'TYPEME'. If it exists then type it onto your printer or screen and read it now.

From now on, when it is necessary to type something at the keyboard, the characters to be typed will be shown in quotes. Most sequences must be terminated by pressing the RETURN or ENTER key which is indicated by <ret>.

If your copy of BrainStorm has been manufactured specifically for your machine then it will run simply by typing 'BRAIN' and then pressing <ret>. If you're not sure then it cannot do any harm if you want to try this. If it appears to be okay, you can now turn to the Tutorial.

If it doesn't run, you will need to run another program first in order to 'install' BrainStorm on your machine. The reason for this is because computers vary in the way that they send information to the screen.

Ensure that your newly copied BrainStorm disk is in the currently logged drive then type '**INSTALLB**' and press <ret>. This screen will then appear:

BRAINSTORM INSTALLATION PROGRAM (c) BRAINSTORM SOFTWARE 1983
Portions copyrighted by Microsoft 1981

WARNINGS

Before proceeding any further, please ensure that:

- (a) Your original BrainStorm master disk has been removed from the computer and is safely stored away.
 - (b) The disk you are currently using is a full copy of the original
 - (c) The disk is 'write-enabled'.
 - (d) The disk has had the operating system installed
- (The BrainStorm and computer manufacturer's manuals have instructions for copying, installing the operating system and write-enabling disks).

PRESS:

RETURN BRAIN.COM IN CURRENT DRIVE
'A'..'P' BRAIN.COM IN ANOTHER DRIVE
'X' EXIT:_

Depending on your operating system, you may see 'BRAIN.COMD' in place of 'BRAIN.COM'.

Simply press <ret> for now to get this screen:

AVAILABLE VDU CONFIGURATIONS

- 0. VDU configuration previously installed in BRAIN.COM
- 1. A. N. OTHER
- 2. Apple with Videx card
- 3. SuperBrain
- 4. ADM 3A
- 5.
- 6. etc....

Enter number of VDU you wish to select (0 to): ?

If your screen, or one like it, is on the displayed list simply type its number and press <ret>. You may find that your machine is described as, for example, 'ADM3A compatible'. If that were the case then the ADM3A definition should work for you. If you can't find a suitable entry on the list then you should choose the screen which most closely matches your own, otherwise select A. N. OTHER.

Option 0 may be absent the first time you use the installation program.

The next screen to appear asks you to describe your printer:

AVAILABLE PRINTER CONFIGURATIONS

1. Any printer, 80 character by 66 line stationery
2. Any printer, 80 character with no pagination
3. Any printer, 132 character by 66 lines stationery
4. Any printer, 132 character with no pagination

Enter number of printer you wish to select (1 to 4): ?_

Type '1' and press <ret>.

This screen will then appear:

YOU SELECTED

- (a) Configuration ...
- (b) Printer configuration ...

INSTALLATION OPTIONS

1. VDU: SCREEN
2. VDU: SCREEN (GRAPHICS CHARACTERS)
3. VDU: KEYBOARD
4. PRINTER: STATIONERY
5. PRINTER: SPECIAL CHARACTER CODES
6. INSTALL CONFIGURATION IN BRAIN.COM
7. BACK TO OPERATING SYSTEM - LEAVE BRAIN.COM UNTOUCHED
8. WORKING WITH THE WRONG CONFIGURATION - SELECT ANOTHER
9. DISPLAY TABLE OF ASCII CODES

Select function (0 to 9): ?_

If your terminal was listed or you chose a compatible one, turn to the last paragraph of this chapter. If you realise you selected the wrong terminal, select option 8 to go back.

If your screen wasn't listed and you chose A.N.OTHER, you will have to do a little more work. Type '1' and press <ret>. The following menu will appear:

VDU: SCREEN

- 0. Back to 'INSTALLATION OPTIONS' menu
- 1. Initialize VDU
- 2. Clear screen & home cursor
- 3. Delay (milli-secs) following clear-screen = nnn
- 4. Sound VDU buzzer
- 5. Delay (x 0.1 secs) following error messages = nnn
- 6. Underline prompt
- 7. Characters preceding first coordinate
- 8. Characters between coordinates
- 9. Characters following last coordinate
- 10. Coordinate transmitted for top row of screen = nnn
- 11. Coordinate transmitted for left hand column of screen = nnn
- 12. Number of characters sent for row (ie Y) coordinate = 1/2/3
- 13. Number of characters sent for col (ie X) coordinate = 1/2/3
- 14. Row (ie Y) coordinate sent first (1), second (2) = 1/2

Select option (0 to 14): ?_

To deal with these 14 items you will probably need to consult your screen or computer technical manual. If you cannot find the necessary information (it is usually indexed as 'cursor addressing' or 'screen controls') then you will have to contact the supplier of your machine. Some items (3, 5 and 10 to 14) require a single number reply, in which case this is displayed on the screen, and can be seen without leaving this menu. To change such an item, simply type the relevant item number followed by <ret> and then type the new value followed by <ret>. The screen will be redrawn with your change in it.

Other items involve a sequence of numbers for character codes and, for these, a secondary menu is displayed to allow you to do this. When you get such a display, you must first specify the number of character codes in the sequence. A fresh menu will then be created with an entry line for each character in the sequence. You may specify that 0 characters are required. When you have finished, select option 0 in order to return to the VDU · SCREEN menu.

Notes on the VDU SCREEN menu:

Item 1, initialise VDU, is usually needed to 'reset' the screen after it has been doing something else or to make it emulate another screen's characteristics. Most VDU's do not need initialising.

Item 2, you will need to define the codes to clear screen and home the cursor. BrainStorm cannot work without these.

Item 3 is usually zero.

Item 4, the buzzer, is usually set to '7'.

Item 5 dictates the duration of an error message display. Enter '20' for now.

Item 6, the underline prompt, is usually '46' or '95'.

The rest of the items relate to direct cursor addressing. All screens need to be forewarned that the cursor is to be moved to a new position. This is done by the character sequence specified for item 7. Some, not many, screens also need to be told when the first coordinate has been transmitted and the second coordinate is on its way and also when the second coordinate has been sent. These are dealt with in items 8 and 9.

The top left hand corner of the screen is usually regarded as position 0,0 or 1,1 or 32,32. There are occasionally variations but these are the most common choices. These are defined in items 10 and 11.

Most screens require a single character to describe each coordinate. Other screens require two characters. It is rare for three to be needed but it is possible. Items 12 and 13 take care of these. Finally item 14 determines which coordinate is sent first, row or column.

When you have finished making the necessary changes, choose option 0 to go back to the INSTALLATION OPTIONS menu. Select option 6 and hit return. The 'INSTALL CONFIGURATION' menu will now appear. Select option 2 and, after a pause while it writes to disk, your BrainStorm program should be configured enough to get you going. When you feel comfortable with the operation of BrainStorm refer to the Installation chapter to implement graphics, special keys and print facilities. Rarely, a keyboard generates the wrong codes for BrainStorm. In this case you will need to reconfigure using the procedures described in the Installation chapter.

BRAINSTORM INSTALLATION

Your BrainStorm disk is supplied with a powerful installation program which allows you to modify the BrainStorm program so that it precisely matches your terminal and printer characteristics. The installation program also enables you to alter some of BrainStorm's prompt screens and its choice of control keys. For example, you may have arrow keys which you prefer to use in place of the North/South/East/West diamond formed by the letters E, X, D and S. The installation program is easy to use providing you take it at an easy pace and you have your computer technical notes to hand.

Warning: Do not alter the keyboard controls and prompt screens until you are fully familiar with BrainStorm since the Tutorial and Reference chapters refer to the supplied version of the product.

The installation program allows you to define how your VDU screen is controlled, what graphics characters you'd like to use, which keys you'd like to press for the various BrainStorm functions and your printer characteristics. Here is a brief description of the main sections you'll find in the installation program:

Choosing a VDU – You may have already encountered this one in the 'Getting Going' chapter. It may allow you to get started quickly by choosing one of the ready-configured options.

Selecting a printer – Again you may have encountered this in the 'Getting Going' chapter. It allows you to choose the printer characteristics which most closely match your own. Later on you will get the opportunity to adapt the description to suit your specific requirements.

Describing your screen characteristics – If none of the ready-configured options match your screen characteristics then you will need to answer the questions in this section. It allows you to describe the character sequences necessary to clear the screen, sound the buzzer and control direct cursor addressing. If you are not familiar with this information, you

will find it in one of your technical manuals. Failing this, you will need to contact your machine supplier. Make sure you have the list of codes required before you make contact. They are listed later in the VDU:SCREEN menu.

Describing your graphics characters – Use this to define the characters used to draw the borders around the BrainStorm screen. This is especially useful if your machine supports a set of graphics characters. You will find the codes in one of your technical manuals. If your machine doesn't provide graphics why not use '+', '-' and '|' for corner, horizontal and vertical lines? The A.N.OTHER option uses these. It does make BrainStorm much easier to use as well as enhancing its visual appeal.

Describing your key preferences – If you don't like our choice of control keys and prompt messages then you can change them here. Take great care not to duplicate the same letter for different functions. We would recommend that you plan this exercise very carefully. Trying to do it 'on the fly' is a recipe for disaster.

Describing printer stationery – This is where you get the chance to adapt the printer stationery characteristics to suit your machine by defining the dimensions of both the paper and the print area.

Defining special printer codes – If you want BrainStorm to check the printer status and give an error message if it's not switched on, this is the place to define non-printing characters to trigger this process. Define initialisation codes here if, for example, you wish BrainStorm to print in a particular character style. Some printers automatically line feed, others don't. You can define a newline option here if your printer isn't doing what you expected. You may also create double- or triple-spacing versions of BrainStorm.

Now we'll have a look at the details of the configuration program.

The configuration menus

This part of the chapter takes you through the higher level configuration menu screens, expanding on the content where appropriate. Lower level screens follow the same general format and are self-explanatory.

At the lowest levels you are generally invited to enter the number of characters in the sequence to be described. This automatically expands the menu to cover the number of entries so defined.

Type **INSTALLB** <ret>

Define Drive

BRAINSTORM INSTALLATION PROGRAM

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Microsoft 1981

Before proceeding any further, please ensure that:

- (a) Your original BrainStorm master disk has been removed from the computer and is safely stored away
- (b) The disk you are currently using is a full copy of the original
- (c) The disk is 'write-enabled'
- (d) The disk has had the operating system installed

(The BrainStorm and computer manufacturer's manuals have instructions for copying, installing the operating system and write-enabling disks).

PRESS..

RETURN BRAIN.COM IN CURRENT DRIVE

'A'..'P' BRAIN.COM IN ANOTHER DRIVE

'X' EXIT:_

Since this program writes the configuration details into BrainStorm itself, you need to tell it where BrainStorm is located.

Choosing a VDU

AVAILABLE VDU CONFIGURATIONS

- 0. VDU configuration previously installed in BRAIN.COM
- 1. A. N. OTHER
- 2. Apple II with Videx card
- 3. SuperBrain
- 4.
- 5.
- 6. etc....

Enter number of VDU you wish to select (0 to): ?_

Simply choose the VDU which is closest to your requirements. If in doubt, choose A. N. OTHER. If you select option 0, the next screen is skipped. Option 0 may not be present the first time you use this program.

Choosing printer characteristics

AVAILABLE PRINTER CONFIGURATIONS

- 1. Any printer, 80 character by 66 line stationery
- 2. Any printer, 80 character with no pagination
- 3. Any printer, 132 character by 66 lines stationery
- 4. Any printer, 132 character with no pagination

Enter number of printer you wish to select (1 to 4): ?_

Note: Remember, like the screen, the printer details may be changed later on.

(The screen and printer configuration details are now read from the disk).

Installation options

Having chosen your working screen and printer characteristics, the screens which follow show you how to amend the details to suit your precise requirements. You'll notice the next screen matches our earlier description of facilities available:

YOU SELECTED

(a) 'Chosen terminal'

(b) 'Chosen printer'

INSTALLATION OPTIONS

1. VDU: SCREEN

2. VDU: SCREEN (GRAPHICS CHARACTERS)

3. VDU: KEYBOARD

4. PRINTER: STATIONERY

5. PRINTER: SPECIAL CHARACTER CODES

6. INSTALL CONFIGURATION IN BRAIN.COM

7. BACK TO OPERATING SYSTEM - LEAVE BRAIN.COM UNTOUCHED

8. WORKING WITH THE WRONG CONFIGURATION - SELECT ANOTHER

9. DISPLAY TABLE OF ASCII CODES

Select function (0 to 9): ?_

If you want to back out at this point, choose option 7. If you've changed your mind about the screen or the printer, choose option 8. Otherwise press on...

Here is Installation option 1:

VDU: SCREEN

- 0. Back to 'INSTALLATION OPTIONS' menu
- 1. Initialize VDU
- 2. Clear screen & home cursor
- 3. Delay (milli-secs) following clear-screen = nnn
- 4. Sound VDU buzzer
- 5. Delay (x 0.1 secs) following error messages = nnn
- 6. Underline prompt
- 7. Characters preceding first coordinate
- 8. Characters between coordinates
- 9. Characters following last coordinate
- 10. Coordinate transmitted for top row of screen = nnn
- 11. Coordinate transmitted for left hand column of screen = nnn
- 12. Number of characters sent for row (ie Y) coordinate = 1/2/3
- 13. Number of characters sent for col (ie X) coordinate = 1/2/3
- 14. Row (ie Y) coordinate sent first (1), second (2) = 1/2

Select option (0 to 14): ?_

You will notice that items which require a single value invite an immediate response. Those requiring a variable number of entries take you to a lower level menu where you first determine the number of characters in the sequence. The installation program then generates a new menu with an appropriate number of value options. You may define the number of characters as '0' if the sequence doesn't apply to your machine. This often happens, for example, with the 'characters between coordinates' question. Make sure you check all values and don't leave any unwanted 'relics' of your originally selected VDU. The Getting Started chapter has more information on these options, should you need it.

Installation option 2:

VDU: SCREEN (GRAPHICS CHARACTERS)

- 0. Back to 'INSTALLATION OPTIONS' menu
- 1. Don't do graphics display (0), do do it (1) = 0/1
- 2. Initialize graphics mode
- 3. Terminate graphics mode
- 4. Top left hand corner
- 5. Bottom left hand corner
- 6. Bottom right hand corner
- 7. Top right hand corner
- 8. Horizontal line
- 9. Move cursor left, then down, then vertical line
- 10. T-junction: Horizontal line with vertical line on its left
- 11. T-junction: Horizontal line with vertical line on its right
- 12. Move cursor left

Make selection (enter 0 to 12): ?_

Answer question 1 with '0' if you wish to omit the line drawing characters. You can always return to this later on and change it. If you don't like the border characters displayed in your configuration of BrainStorm then this menu allows you to define individual graphics characters. It is important that you give the code for move cursor left (item 12). Many screens do not need items 2 and 3 to be defined, others need them to 'switch' in and out of the graphics character set.

If your screen can handle direct cursor addressing intermingled with drawing graphics characters then the set up procedure is completely straight forward. If it is not then adopt the following procedure:

- 1) Options 2 and 3, initialise and terminate graphics mode – specify that no characters are to be transmitted.
- 2) Top left [4], bottom left [5] and T-junction with vertical line to the left [10] must include initialise graphics sequence preceding the actual graphic character sequence.

- 3) Top right [6], bottom right [7] and T-junction with vertical line on its right [11] must include terminal graphics sequence following the graphic character sequence.
- 4) The vertical line sequence [9] should be: cursor left, cursor down, initialise graphics mode, draw vertical line, terminate graphics mode.

Installation option 3:

VDU: KEYBOARD

0. Back to 'INSTALLATION OPTIONS' menu
1. Key codes for line editing keys
2. Key codes for keys to move line marker '>'
3. Key codes for keys to perform other functions
4. Four line function key message

Select option (0 to 4): ?_

Only use this section if you need to change BrainStorm's choice of function keys. You may, for example, have an editing keypad or a set of arrow keys which you prefer to use. Item 1 allows you to select your own text editing keys which are used whenever entering or amending entries. Items 2 and 3 allow you to change the other function keys. If you are going to do any of these things then it will require careful planning and it will make your version of BrainStorm different in use to that described in the manual. If you do make changes then it is important that you also change the 'reminder' section of the screen to match your new choice of keys. This is done by selecting menu item 4. It would make sense to record your changes on the fold-out in appendix B. Each of these menu selections displays a lower level menu as follows:

Line editing keys

- 0. Back to 'VDU: KEYBOARD' menu
- 1. Return/Enter = nnn
- 2. Abandon edit = nnn
- 3. Tab = nnn
- 4. Move cursor left = nnn
- 5. Move cursor right = nnn
- 6. Delete to left = nnn
- 7. Delete to right = nnn
- 8. Alternative: move cursor left = nnn
- 9. Alternative: move cursor right = nnn
- 10. Alternative: delete to left = nnn
- 11. Alternative: delete to right = nnn
- 12. Message for display during line editing ...

.....

Select option (0 to 12): ?_

An entry of '0' for any item effectively disables the function. This is fine for items 8 to 11 but it doesn't make a lot of sense elsewhere. If you do change anything don't forget to change the reminder message in item 12. Use ^H to delete to the left and <ret> to finish entering the message.

Beware keys which move the cursor without the operating system's knowledge. This can cause a conflict between where BrainStorm thinks the cursor is and where it actually is on the screen. The symptom of this problem is odd or missing characters on the display. This does not harm the program, it merely makes life difficult for you.

Key codes for keys to move line marker '>'

- | | |
|--|-------|
| 0. Back to 'VDU: KEYBOARD' menu | |
| 1. Up | = nnn |
| 2. Down | = nnn |
| 3. Up 10 lines | = nnn |
| 4. Down 10 lines | = nnn |
| 5. To the top | = nnn |
| 6. To the bottom | = nnn |
| 7. To the @-mark | = nnn |
| 8. Home | = nnn |
| 9. To previous namesake | = nnn |
| 10. To next namesake | = nnn |
| 11. To previous level (demote heading) | = nnn |
| 12. To next level (promote line at >) | = nnn |

Select option (0 to 12): ?_

Make sure that you have an entry for every item unless you wish to suppress any functions. If you change anything don't forget to change the reminder messages (see below). The earlier comments regarding automatic cursor movement (see previous screen) apply here too.

Key codes for keys to perform other functions

- | | |
|---------------------------------|-------|
| 0. Back to 'VDU: KEYBOARD' menu | |
| 1. Amend | = nnn |
| 2. Exit to menu | = nnn |
| 3. Get marked line | = nnn |
| 4. Hunt for text | = nnn |
| 5. Kill line | = nnn |
| 6. List screen | = nnn |
| 7. Mark line | = nnn |
| 8. Null line entry | = nnn |
| 9. Put line to mark | = nnn |
| 10. Title change | = nnn |

Select option (0 to 10): ?_

Make sure that you have an entry for every item unless you wish to suppress any functions. If you change anything don't forget to change the reminder messages (see below).

Four line function key message

0. Back to 'VDU: KEYBOARD' menu

1. 77 Character message line 1

2. 77 Character message line 2

3. 77 Character message line 3

4. 77 Character message line 4

Select option (0 to 4): ?_

Use ^H to delete to the left and <ret> to finish entering each message line.

General notes:

Avoid using visible (ie non-control) characters for all text editing keys or it will be impossible to use them for normal text entry. The same applies to function keys although you could get away with it providing you never want to use the chosen character as the first character in an entry line. Don't choose ^I or ^M because these are interpreted as TAB and <ret> respectively.

If you do use visible characters then give the upper case, not the lower case code. BRAIN converts lower case commands to upper automatically.

Installation option 4:

PRINTER: STATIONERY

0. Back to 'INSTALLATION OPTIONS' menu

1. Paper width = nnn

2. Paper length = nnn

3. Top margin = nnn

4. Bottom margin = nnn

5. Left margin = nnn

6. Right margin = nnn

Select option (0 to 6): ?_

It is wise to give the printer a right margin of at least 1 since some give automatic line feeds at the right-most column and others do not. Width and length refer to the stationery, and margins refer to the text area relative to the stationery size.

Installation option 5:

PRINTER: SPECIAL CHARACTER CODES

0. Back to 'INSTALLATION OPTIONS' menu

1. Printer nulls

2. Printer initialization

3. Move print-head to newline

Select option (0 to 3): ?_

Printer nulls are characters sent to the printer to see if it is working. These should be characters which neither move the print head nor the paper – one or two zeroes will usually suffice. You may wish to print everything in condensed mode or in some other special character style. Option 2 is used to define the appropriate character sequence for this.

Installation option 6:

INSTALL CONFIGURATION IN BRAIN.COM - THEN BACK TO OPERATING SYSTEM

0. Back to 'INSTALLATION OPTIONS' menu

1. Reserved RAM (x 256 bytes) = nn

2. Do the installation then back to operating system

Select option (0 to 2): ?_

This option installs the configuration you have selected (and possibly modified) in BRAIN.COM. Before writing, this program checks the printer configuration. If it detects a problem, it will abort the write and issue an error message. You may find the reserved RAM option of use for several reasons:

- You may wish to protect some other software, stored immediately below the operating system, from being overwritten by a BrainStorm model.
- You may wish to use the REBRAIN facility. You must reserve at least 9 x 256 bytes for this to work, although your system may in fact require a larger reservation.
- You may wish to have as much memory as possible for your BrainStorm models. Reserve 0 x 256 bytes if this is the case.

Installation option 7:

BACK TO OPERATING SYSTEM - LEAVE BRAIN.COM UNTOUCHED

You will lose all the work you have put in to modifying your original choice of configuration. So ...

PRESS THE X KEY TO EXIT WITH BRAIN.COM UNTOUCHED, ANYTHING ELSE NOT TO:_

This option abandons everything you have done in this particular installation session. Use this if you have made a complete mess of things.

Installation option 8:

WORKING WITH THE WRONG CONFIGURATION - SELECT ANOTHER

You will lose all the work you have put in to modifying your original choice of configuration if you go through with this....

PRESS THE X KEY TO DO IT, ANYTHING ELSE NOT TO:_

This option also abandons everything you have done, but enables you to reselect a VDU and printer of your choice without reloading INSTALLB.

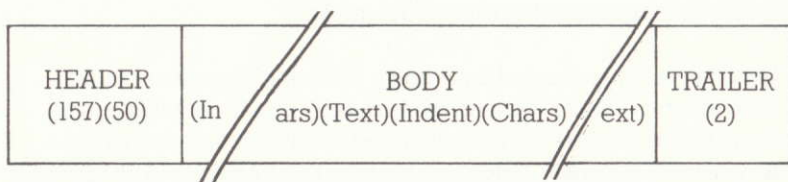
Installation option 9:

Use this option to determine the ASCII code for a character or a function key. Appendix B also contains a chart of character codes.

APPENDIX A – Internal format of SAVED BrainStorm files

You only need slight programming knowledge to be able to create your own files in BrainStorm internal format. When loaded, these files are automatically structured. An internal file comprises three parts:

Header:	A simple two-byte code to identify BrainStorm format The values are (157) and (50) respectively
Body:	This contains structure information and data [(Indent)(Characters)(Text)] repeated
Trailer:	A single byte to terminate the file Its value is (2)



Before explaining the details of how the structure and relationships between entries are encoded, here is an example of a simple BrainStorm file. It is an outline design of a program intended to automatically generate a diary:

```
A diary program
Set up arrays
  Days
  Months
Get parameters
  Year?
  Leap?
  US or UK format?
  Day of Jan 1st?
Open file
Generate diary
  Year details
    Month details
      Day details
    Month end
  Year end
Close file
Close file
```

Note the way that each successive level is indented from its predecessor when going deeper into the design and 'outdented' on the way up again. Indents must always be one level deeper than their predecessors whereas 'outdents' can be any number of levels. For example, we could have ignored the 'Month end' and 'Year end' details thus jumping up three levels from 'Day details' to 'Close file'. This is described in internal format in the 'Indent field'. True indents have a value '1' whereas 'outdents' can be up to 65,500 or so – more than enough for anyone. The way it works is that for outdents up to 252 the value is computed by subtracting the number of outdent levels from 256. Outdents above 252 are described in three bytes. The first has a value of '3' and the next two contain the result of subtracting the number of outdents from 65,536. The most significant byte occurs first.

Namesakes are indicated by adding 128 to the character count. Since an entry cannot contain more than 72 characters this poses no problems. You do not actually need to flag the first occurring namesake of each set. It does no harm to flag all namesakes though and this is probably easier from a programming point of view. If you do this the BrainStorm LOADs will be slower than normal. To overcome this, load the file once then SAVE it immediately. Subsequent LOADs will be at normal speed.

Here is our example encoded in internal format. All values are decimal.

```
157  50
    0  15  A diary program
    1  13  Set up arrays
    1   4   Days
    0   6   Months
255  14  Get parameters
    1   5  Year?
    0   5  Leap?
    0  10  US or UK format?
    0  15  Day of Jan 1st?
```

```

255    9  Open file
    0  14  Generate diary
    1  12  Year details
    1  13  Month details
    1  11  Day details
255    9  Month end
255    8  Year end
255   10  Close file
    0 138  Close file
    2

```

All the 'outdents' in this file are of a single level ($256-1=255$) and the indents are either '1' or '0'. Zero indents relate to consecutive entries at the same level.

The header bytes have no mystical significance except that they reveal the birthday of one of BrainStorm's authors. The trailer byte has the value 2 because all other values for this byte have been used up.

To look more closely at outdents which exceed 252 levels, here is an example of an outdent of 312 applied to one of the above lines:

```

3    254  200    9  Month end

```

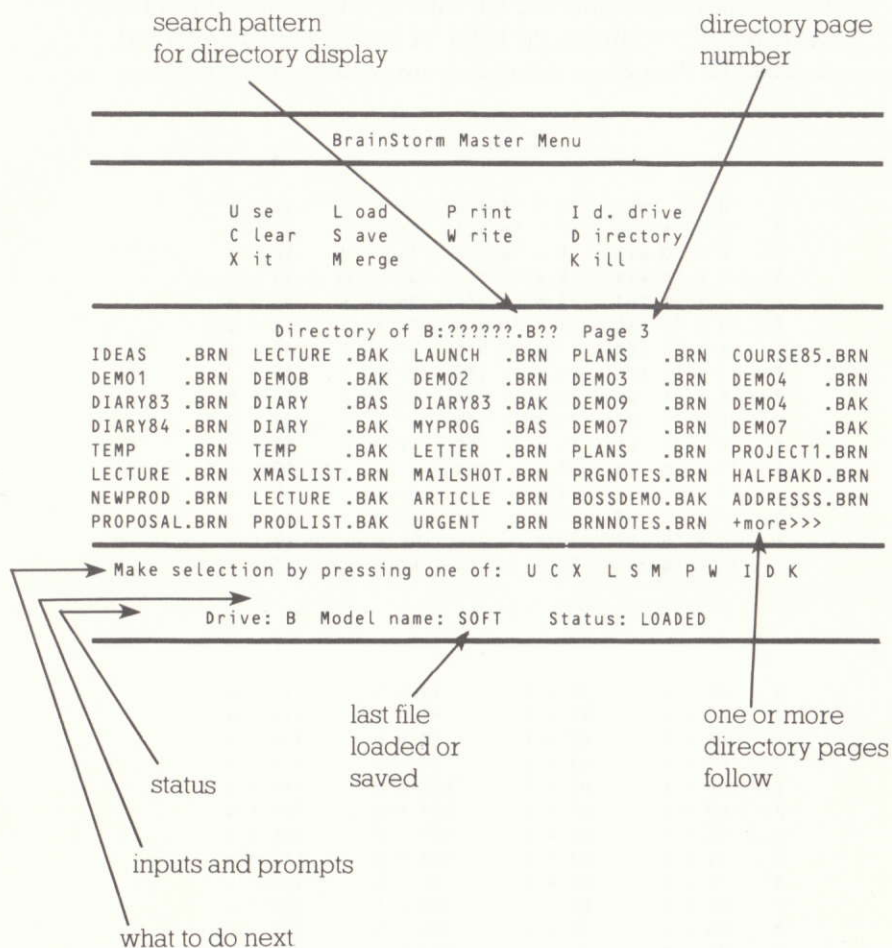
Needless to say this is a pretty rare occurrence. The calculation works like this:

$$65536-312=65224$$

The maximum value which can be held in a single byte is 255, we therefore need to string two together to help us code a higher value. The first byte can be regarded as a multiple of 256 to which the second byte value can be added. This gives a range from 0 to 65535 – more than enough to cope with our little problem. To calculate your own values for these bytes, simply divide the result of the subtraction by 256, put the quotient in the first byte and the remainder in the second:

$$65224/256=254 \text{ remainder } 200$$

APPENDIX B – Master Menu display



APPENDIX B – 7-bit ASCII/hex table

Obtain hexadecimal value by taking the number from the top of the appropriate column and the letter or number from the left end of the row. For example, the letter 'M' has the hex value 4D and decimal 77. BrainStorm installation always uses decimal codes.

	0	1	2	3
0	0 = NUL	16 = ^P DLE	32 = ' ' '	48 = 0
1	1 = ^A SOH	17 = ^Q DC1	33 = !	49 = 1
2	2 = ^B STX	18 = ^R DC2	34 = "	50 = 2
3	3 = ^C ETX	19 = ^S DC3	35 = #	51 = 3
4	4 = ^D EOT	20 = ^T DC4	36 = \$	52 = 4
5	5 = ^E ENQ	21 = ^U NAR	37 = %	53 = 5
6	6 = ^F ACK	22 = ^V SYN	38 = &	54 = 6
7	7 = ^G BEL	23 = ^W ETB	39 = '	55 = 7
8	8 = ^H BS	24 = ^X CAN	40 = (56 = 8
9	9 = ^I HT	25 = ^Y EM	41 =)	57 = 9
A	10 = ^J LF	26 = ^Z SUB	42 = *	58 = :
B	11 = ^K VT	27 = ESC	43 = +	59 = ;
C	12 = ^L FF	28 = FS	44 = ,	60 = <
D	13 = ^M ER	29 = GS	45 = -	61 = =
E	14 = ^N SO	30 = RS	46 = .	62 = >
F	15 = ^O SI	31 = US	47 = /	63 = ?

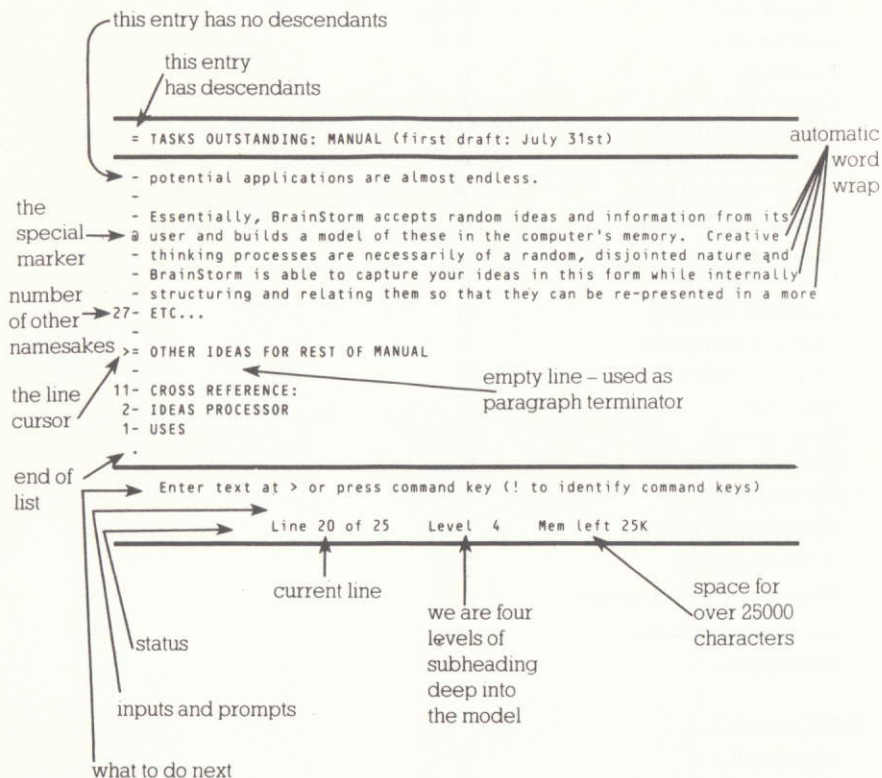
	4	5	6	7
0	64 = @	80 = P	96 = \	112 = p
1	65 = A	81 = Q	97 = a	113 = q
2	66 = B	82 = R	98 = b	114 = r
3	67 = C	83 = S	99 = c	115 = s
4	68 = D	84 = T	100 = d	116 = t
5	69 = E	85 = U	101 = e	117 = u
6	70 = F	86 = V	102 = f	118 = v
7	71 = G	87 = W	103 = g	119 = w
8	72 = H	88 = X	104 = h	120 = x
9	73 = I	89 = Y	105 = i	121 = y
A	74 = J	90 = X	106 = j	122 = z
B	75 = K	91 = [107 = k	123 = }
C	76 = L	92 = \	108 = l	124 =
D	77 = M	93 =]	109 = m	125 = }
E	78 = N	94 = ^	110 = n	126 = ~
F	79 = O	95 = _	111 = o	127 = DEL

APPENDIX B – Reference fold-out

<i>Commands</i>	<i>Standard Version</i>	<i>My Version</i>
Amend entry	^A mend	
Amend title	^T itle	
Delete entry	^K ill	
Cursor up	^E	
Cursor down	^X	
Cursor up 10 lines	^U p	
Cursor down 10 lines	^F all	
Cursor to top of list	^W	
Cursor to end of list	^Z	
Title screen	^Q	
Promote an entry	^R	
Demote a heading	^C	
Previous namesake	^S	
Next namesake	^D	
* The mark	@	
Jump to mark	^J ump	
Get from mark	^G et	
Put to mark	^P ut	
Search for an entry	^H unt	
Print current list	^L ist	
Display command options	!	!
Exit to Master Menu	<esc>	
Empty line	<ret>	
<i>Edit Controls</i>		
Cursor left	^S	
Cursor right	^D	
Delete left	^A	
Delete right	^F	
* Tab	^I or TAB	
* Complete entry	<ret>	
Abandon entry	<esc>	

* If possible, avoid changing these keys. If you do then you will still find that some menus refer to (@, <ret> and <esc> entries.

APPENDIX B – A typical USE screen



APPENDIX C – Examples of BrainStorm in use

Combined Diary and address book

Apart from memory limitations, there is no reason why your BrainStorm workspace shouldn't contain several files concurrently. A good example of this is a combined diary and address book:

Diary and address book

Addresses

Bill Barrow
Caxton Software Ltd
10-14 Bedford Street
London
WC2E 9HE
01-379 6502

Mike Liardet
BrainStorm Software Ltd
Stanmore Hill
Stanmore
Middlesex

David Tebbutt
Oxford Street
London
W1

Diary

January

Monday 1st
10:30
Bill Barrow
12:45 lunch
Mike Liardet

Tuesday 2nd
10:30
David Tebbutt

Wednesday 3rd

February .

You can use 'promote' (^R) when at a name in the diary to find out the address and telephone number or you could turn to the name in the database and use the 'namesake' keys (^S and ^D) to find all diary entries for that person. The potential to expand the address book to contain transaction or visit records is clearly there too.

Exchange of text with other programs

One of the most important aspects of any program is how well it can share information with other programs. BrainStorm will both write and read textual files stored on disk. The written files can be in a wide variety of formats using the same conventions as the PRINT command.

Text files read into BrainStorm will always be stored at a single level starting at the current cursor location. If passing detailed text to a word processor you will probably want to write it to the disk in paragraphs. Do this by using the format control character D (in fact any letter from D-O and Q-Z will do). All lines will be concatenated with a single character space between each. New paragraphs are formed whenever a blank entry line is encountered.

Multiple-space print formats

You can make your printouts double- or triple-spaced for easier editing by saving alternative copies of the BrainStorm program.

Make up your normal single spacing copy of BrainStorm then copy it calling the copy BRAIN1.COM.

Go back into the INSTALLB program and amend the PRINTER:STATIONERY options as follows:

Make 'Paper length' smaller by dividing it by the number of line feeds you want after each line of print.

For example, a 66-line form with double-spacing will become 33 lines.

The top margin and bottom margin would also need to be halved.

Now go into the PRINTER:SPECIAL CHARACTER CODES options and select item 3 – Move print head to new line.

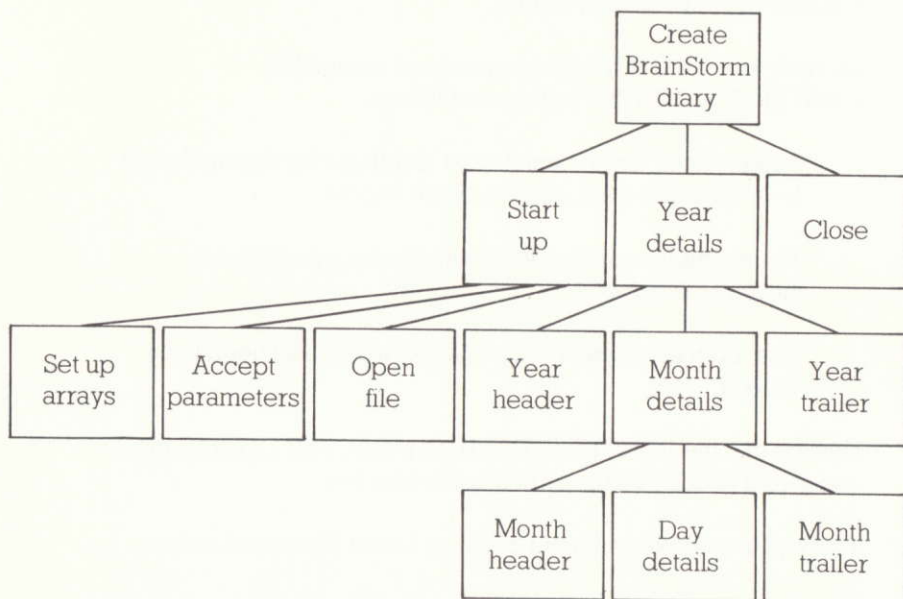
This will usually show items 1 and 2 as 13 and 10 respectively.

Simply repeat what is already there – once for double-spacing, twice for triple and so on. Our double-spaced example will now read 13, 10, 13, 10 for items 1-4.

Now install the configuration using option 6 from the main menu.

Program Design

Everyone's approach to programming differs. Some people structure their programs, others ramble. Some use flowcharts, others use diagrams. In this example we have started with a simple structure diagram:



Program to create a diary for 19?? in BrainStorm internal format.

This program will be useful as well as being illustrative. It will generate a file which can be LOAded into BrainStorm. The program code can be improved substantially to allow for things like upper- and lower-case data entry.

If this program had been designed using BrainStorm, the structure would look like this:

```
Create BrainStorm Diary
  Start up
    Set up arrays
    Accept parameters
    Open File
  Year Details
    Year Header
    Month details
      Month Header
      Day Details
      Month Trailer
    Year Trailer
  Close
```

The program is developed further in the next example.

Program Coding

Now we can add actual program code to our previous example. We tackled it by allocating a range of Basic line numbers to each 'module' and by prefixing any entry which will have code descending from it with a colon. These entries are easy to spot on the screen because they have a hyphen to their left rather than an equals sign:

```
Create BrainStorm Diary
  Start up
    :Set up arrays          (11000)
    :Accept parameters      (12000)
    :Open File              (13000)
  Year Details
    :Year Header            (21000)
  Month Details
    :Month Header           (22100)
    :Day Details            (22200)
    :Month Trailer          (22300)
    :Year Trailer           (23000)
  :Close                    (30000)
```

Of course, there's no need to go to this trouble with the numbering if you don't want to but it does make for a very clear program. Here is the code including the structure. It was printed by BrainStorm using '24' print spacing:

```
Create BrainStorm Diary
  Start up
    :Set up arrays (11000)
      11000 DIM M(12), DAY$(7), MTH$(12)
      11100 DAY$(1)="Mon":DAY$(2)="Tue":DAY$(3)="Wed":DAY$(4)="Thu"
      11200 DAY$(5)="Fri":DAY$(6)="Sat":DAY$(7)="Sun"
      11300 M(1)=31:M(2)=28:M(3)=31:M(4)=30:M(5)=31:M(6)=30:M(7)=31:M(8)=31
      11400 M(9)=30:M(10)=31:M(11)=30:M(12)=31
      11500 MTH$(1)="Jan":MTH$(2)="Feb":MTH$(3)="Mar":MTH$(4)="Apr"
      11600 MTH$(5)="May":MTH$(6)="Jun":MTH$(7)="Jul":MTH$(8)="Aug"
      11700 MTH$(9)="Sep":MTH$(10)="Oct":MTH$(11)="Nov":MTH$(12)="Dec"
    :Accept parameters (12000)
      12000 INPUT "Enter year: 19":YEAR$
      12100 IF LEN(YEAR$)<>2 THEN 2100
      12200 INPUT "Enter US Month-Day-Year or UK Day-Month-Year ":CONVS$
      12300 IF CONVS$<>"US" AND CONVS$<>"UK" THEN 2120
      12400 INPUT "Is it a leap year? (Y/N)":LEAP$
```

```

12500 IF LEAP$<>"Y" AND LEAP$<>"N" THEN 2140
12600 IF LEAP$="Y" THEN M(2)=29
12700 PRINT "What day of the week is Jan 1 19":YEAR$;"? ";
12800 INPUT "(MON=1, Tue=2...Sun=7): ":WEEKDAY
12900 IF WEEKDAY <1 OR WEEKDAY >7 OR INT(WEEKDAY) <> WEEKDAY THEN 2170
:Open file (13000)
13000 OPEN "O",#1,"B:DIARY"+YEAR$+".BRN"
Year Details
:Year Header (21000)
21000 PRINT #1,CHR$(157);CHR$(50);
Two character preamble - Mike's birthday
21100 PRINT #1,CHR$(0);CHR$(4):"19":YEAR$;
Indent, count, year
Month Details
:Month Header (22100)
22100 INDMTH=1
22110 FOR MNUM=1 TO 12
22120 PRINT #1,CHR$(INDMTH);CHR$(6);MTH$(MNUM);"-":YEAR$;
Indent, number of characters, month, year
22130 INDDAY=1
Indent first day of the month
:Day Details (22200)
22200 FOR DNUM=1 TO M(MNUM)
22210 D$=DAY$(WEEKDAY)+" "
22220 IF CONV$="UK" THEN D$=D$+RIGHT$(STR$(1000+DNUM),2)+"-"+MTH$(MNUM)
22230 IF CONV$="US" THEN D$=D$+MTH$(MNUM)+"-"+RIGHT$(STR$(1000+DNUM),2)
22240 DATE$=D$+"-"+YEAR$
22250 PRINT #1, CHR$(INDDAY);CHR$(13);DATE$;
Indent, length, built-up date
22260 WEEKDAY=WEEKDAY+1:IF WEEKDAY>7 THEN WEEKDAY=1
22270 INDDAY=0
No more indentation after first day
22280 NEXT DNUM
:Month Trailer (22300)
22300 INDMTH=255
Outdent 1 for next month
22310 NEXT MNUM
:Year Trailer (23000)
23000 PRINT #1, CHR$(2);
Indent of 2 means End-of-File
:Close (30000)
30000 CLOSE #1

```

Notice that we have comments descending from some of the program lines too.

To produce executable code we WRITE using the search argument '*', and the spacing convention '-0-'. This means find all entries starting with a colon, suppress them, print the next level down entirely at column 0 and suppress all further descendants. Here is the written code:

```

11000 DIM M(12), DAY$(7), MTH$(12)
11100 DAY$(1)="Mon":DAY$(2)="Tue":DAY$(3)="Wed":DAY$(4)="Thu"
11200 DAY$(5)="Fri":DAY$(6)="Sat":DAY$(7)="Sun"
11300 M(1)=31:M(2)=28:M(3)=31:M(4)=30:M(5)=31:M(6)=30:M(7)=31:M(8)=31
11400 M(9)=30:M(10)=31:M(11)=30:M(12)=31
11500 MTH$(1)="Jan":MTH$(2)="Feb":MTH$(3)="Mar":MTH$(4)="Apr"
11600 MTH$(5)="May":MTH$(6)="Jun":MTH$(7)="Jul":MTH$(8)="Aug"
11700 MTH$(9)="Sep":MTH$(10)="Oct":MTH$(11)="Nov":MTH$(12)="Dec"
12000 INPUT "Enter year: 19";YEAR$
12100 IF LEN(YEAR$)<>2 THEN 2100
12200 INPUT "Enter US Month-Day-Year or UK Day-Month-Year ";CONV$
12300 IF CONV$<>"US" AND CONV$<>"UK" THEN 2120
12400 INPUT "Is it a leap year? (Y/N): ";LEAP$
12500 IF LEAP$<>"Y" AND LEAP$<>"N" THEN 2140
12600 IF LEAP$="Y" THEN M(2)=29
12700 PRINT "What day of the week is Jan 1 19";YEAR$;"? ";
12800 INPUT "(MON=1, Tue=2...Sun=7): ";WEEKDAY
12900 IF WEEKDAY <1 OR WEEKDAY >7 OR INT(WEEKDAY) <> WEEKDAY THEN 2170
13000 OPEN "0",#1,"B:DIARY"+YEAR$+".BRN"
21000 PRINT #1,CHR$(157);CHR$(50);
21100 PRINT #1,CHR$(0);CHR$(4);"19";YEAR$;
22100 INDMTH=+1
22110 FOR MNUM=1 TO 12
22120 PRINT #1,CHR$(INDMTH);CHR$(6);MTH$(MNUM);"-";YEAR$;
22130 INDDAY=+1
22200 FOR DNUM=1 TO M(MNUM)
22210 D$=DAY$(WEEKDAY)+ " "
22220 IF CONV$="UK" THEN D$=D$+RIGHT$(STR$(1000+DNUM),2)+"-"+MTH$(MNUM)
22230 IF CONV$="US" THEN D$=D$+MTH$(MNUM)+"-"+RIGHT$(STR$(1000+DNUM),2)
22240 DATE$=D$+"-"+YEAR$
22250 PRINT #1, CHR$(INDDAY);CHR$(13);DATE$;
22260 WEEKDAY=WEEKDAY+1:IF WEEKDAY>7 THEN WEEKDAY=1
22270 INDDAY=0
22280 NEXT DNUM
22300 INDMTH=255
22310 NEXT MNUM
23000 PRINT #1, CHR$(2);
30000 CLOSE #1

```

Diary Outline

If you run the program in the previous example it will create a file called DIARY???.BRN where the question marks show the year. LOAD this file into BrainStorm and you will find you have a diary for the chosen year. Because of BrainStorm's dynamic structure, you can have endless entries for each day, hour or minute even.

Here is a small extract from a slightly-used diary:

1983

Jan-83

Sat 01-Jan-83
Take Jackie dancing
Get drinks for tonight
Carol and Les dinner
Sun 02-Jan-83
Picnic - Chalfont
Mon 03-Jan-83
Bill 10:30
Fiona 12:15
Bunch 3:00
Steve 5:00
NLC 7:00
Tue 04-Jan-83
Printer 11:00
Woody & Bill lunch
Wed 05-Jan-83
Feltham all day
Thu 06-Jan-83
Breakfast with Chuck
9:30 Board meeting
3:00 Auditors
7:30 Robin scouts
Fri 07-Jan-83
Daniel school sports 3:00
Sat 08-Jan-83
Worthing
Take food and blankets

Programming in a new language

The ability to hold more than one set of data in BrainStorm at the same time gives rise to some powerful applications. For example, it would be possible to hold notes on a programming language in the same workspace as the program under development. This is ideal in the early days of using a new language.

Wordprocessor written in assembly language

Assembly language

Data movement

LD Load

A, (BC) A with (BC)

A, (DE) A with (DE)

A, I A with I

A, (nn) A with (nn)

:

:

:

Wordprocessor

Initialisation

Set flags

LD A, (BC)

:

:

:

The easiest way to move around would be to mark your current program line with the '@' and then use ^H to hunt for the instruction you need. When finished, a ^J will jump you back into your program leaving the @ mark at the instruction explanation.

If you needed to work on several parts of the workspace concurrently, you could put a namesake at the top of each list involved. ^W in conjunction with ^S and ^D would quickly move you from screen to screen.

Outline chapter for a manual

This was printed using the 'P' format option. Notice the neat paragraphs at the lowest levels. This entire example can act as a BrainStorm installation aide-memoire.

Installation

Choose drive of Brain disk

Choose VDU and printer

One from the list

Choose printer

This option allows you to select one of the four standard print formats for use with your terminal. The exact details may be changed later in the Installation program.

One already installed

This selects the full installation details embedded in your BrainStorm program. Both terminal and printer details are selected and these may be changed later on in the Installation program.

Define screen, keyboard and printer details

Screen

Initialise VDU

This is most commonly used to set the screen to 80 columns and, perhaps to reverse the image to black on green. Some terminals are able to emulate others so you may choose a character sequence here to effect this switch.

Clear screen and cursor home

Simply give the character sequence necessary to clear the screen and send the cursor to the top left hand corner. Sometimes the clear screen sequence automatically homes the cursor.

Delay following clear screen

Some screens may lose data if it is sent too soon after a clear screen. This is rare, but if you find that you are losing data, then you may find that a delay introduced here will solve the problem.

Sound buzzer

This is the character sequence needed to sound the beeper. On some machines you could even make it play a tune.

Delay following error messages

This delay is designed to give you time to read an error message displayed by BrainStorm before it is erased from the screen.

Underline prompt

This is the character used to mark each character position when entering search arguments and file names.

Characters preceding first coordinate

Most terminals need to be warned that the cursor position is about to move to a precise screen location expressed in terms of x and y coordinates.

Characters between coordinates

Some screens require to be told that the first coordinate has been sent and that a second is on its way. If your screen does not need this sequence then you may ignore this item.

Characters following last coordinate

Some screens require that you tell them when you have finished 'direct cursor addressing'. If yours is not such a screen then you may ignore this item.

Coordinate for top row

This is usually 0, 1 or 32. It is the value which needs to be sent to place the cursor on the top row.

Coordinate for left column

This is usually 0, 1 or 32. This is the value which needs to be sent to place the cursor at the left hand column.

Number of characters for row

You may send the row value as a single byte or as two or three ASCII characters.

Number of characters for column

You may send the column value as a single byte or as two or three ASCII characters.

Row or column first

Some screens expect row followed by column, others prefer column followed by row.

Graphics

Graphics on/off

If you are in a hurry to get going with BrainStorm then set this value to 0. It inhibits the display of graphics characters. When you are feeling happy with BrainStorm then it is a simple matter to change this value to 1 and to define the graphics characters themselves.

Initialise graphics mode

This sets the screen up for mixed direct cursor addressing and graphics characters. If your screen cannot handle both together then it will be necessary to switch graphics on immediately prior to displaying individual characters.

Terminate graphics mode

This switches off the graphics mode mentioned above. If your screen cannot handle mixed text and graphics it is necessary to switch graphics off following display of individual graphics characters.

Top left hand

Give the ASCII value of the character you'd like to see in the top left hand corner of a display box.

Bottom left hand

Give the ASCII value of the character you'd like to see in the bottom left hand corner of a display box.

Bottom right hand

Give the ASCII value of the character you'd like to see in the bottom right hand corner of a display box.

Top right hand

Give the ASCII value of the character you'd like to see in the top right hand corner of a display box.

Horizontal

Give the ASCII code for the horizontal line character (often a hyphen).

Left, down and vertical

In order to draw a vertical line, BrainStorm needs to move the cursor left, then down and then to display the vertical character. Give the ASCII codes for this sequence.

Left 'T'

Give the ASCII code for a vertical line with a horizontal junction to its right. If you have no appropriate symbol then a '+' should suffice.

Right 'T'

Give the ASCII code for a vertical line with a horizontal line to its left. If your screen has no such code then a '+' may suffice.

Cursor left

Simply give the ASCII sequence to move the cursor left one space.

Keyboard

Line editing

Enter

This is usually the ENTER or RETURN key. It is whatever you want to hit to finish an entry.

Abandon

This is usually ESCAPE. It is the key you wish to hit to abandon an entry.

Tab

This is usually the TAB key or `I (I pressed while holding down the CONTROL key).

Left

Cursor left. This is usually `S or a left arrow. You may have another preference.

Right

This is usually 'D' or the right arrow key. You may choose an alternative.

Delete left

This erases characters to the left of the cursor. It is usually 'A', DELETE or RUBOUT. You may prefer something else.

Delete right

This actually deletes the character under the cursor and 'pulls' those to the right leftwards to close the gap.

Alternative left

You may select more than one key to perform the same function. See 'Left'.

Alternative right

You may select more than one key to perform the same function. See 'Right'.

Alternative delete left

You may select more than one key to perform the same function. See 'Delete left'.

Alternative delete right

You may select more than one key to perform the same function. See 'Delete right'.

Message

This is the 'help line' which is displayed when editing is taking place. Please ensure that this matches the keys you have chosen.

Cursor movement

Up

This defines the key to move the '>' cursor up one line.

Down

This defines the key to move the '>' cursor down one line.

Up 10

This defines the key to move the '>' cursor up ten lines.

Down 10

This defines the key to move the '>' cursor down 10 lines.

Top

This defines the key to move the '>' cursor to the top of the current list of entries.

Bottom

This defines the key to move the cursor to the bottom of the current list of entries.

To @ mark

This defines the key to enable you to jump to the '@' mark. Remember that the '@' mark transfers to the source of the jump when this key is pressed.

Home

This defines the key which takes you to the 'top' of your model.

Previous namesake
 This defines the key to move to the previous namesake.

Next namesake
 This defines the key to move to the next namesake.

Demote heading
 This defines the key to bring the heading down into the body of the screen along with other members of its own list.

Promote entry
 This defines the key to move the current entry to the heading line.

Other functions

Amend line
 This defines the key which allows you to amend the current entry.

Exit to menu
 This key (usually ESCAPE) takes you back to the master menu.

Get
 This key inserts the text at the '@' mark to the current cursor position.

Hunt
 This key allows you to define a search argument.

Kill
 This key deletes the line at the cursor position.

List
 This key prints the current list from the cursor position to the '@' mark. If there is no '@' mark then it prints to the end of the current list.

Mark
 This is the '@' mark and really shouldn't be changed.

Null line entry
 This is the key which creates a blank line - unless you have special reasons, leave it as RETURN or ENTER.

Put
 This key moves the text at the cursor to the '@' mark.

Amend title
 This key allows you to amend the title of your model.

Help prompts
 Redefine the keys for all commands you have altered, taking care not to create duplicates.

Stationery

Width
 This defines the width of the page in terms of the number of character positions capacity. For example, if you selected condensed print then the number of characters on a line will increase.

Length

This is the number of lines per page. If you are double-spacing then you need to halve this figure. For example, an 11" form is usually 66 lines long whereas a double-spaced 11" form will only be 33 lines because the end of line causes two line feeds.

Top margin

This defines the number of line feeds at the top of the form before printing is to start. If you normally align the paper to your first print line then a '0' will be fine here.

Bottom margin

This defines the number of line feeds necessary to advance to the next page. On single spaced forms, '6' is a common value. On double spaced forms, halve the value.

Left margin

This defines the number of columns indent from the left hand edge of your paper.

Right margin

This defines the number of columns right margin. It is generally advisable to allow at least one to avoid problems with some printers' handling of carriage return and line feeds.

Print codes

Printer nulls

This defines the characters to be sent to the printer to check if it's on. Generally the value '0' is sent but you may use any non-printing character.

Initialise printer

This defines the mode of the printer. For example, you might send '15' to achieve condensed print on some machines. Don't send anything if you simply wish to leave the printer in the mode set by the previous program executed.

New-line

Some printers accept CR and automatically line feed. Some need CR and line feed. Others need space followed by CR and line feed. Your printer manual should help but, if in doubt, there's no alternative but to experiment.

Finish

Install in BRAIN.COM

Reserve RAM

Some operating systems are 'overlaid' by programs and you may wish to prevent this happening. Define a number of 'pages' you wish to protect in this way. A 'page' is 256 bytes. You may wish to deliberately restrict the size of your BrainStorm models, this will achieve precisely this effect. REBRAIN will require a reservation of 9 pages on most systems.

Install

This embeds the details of your screen and printer in BrainStorm itself. If you need alternative printer/screen configurations then it is better to create alternative copies of the BrainStorm program. After creation it is probably a good idea to give them distinctive names - BRAIN1 for single spaced and BRAIN2 for double perhaps. Alternatively, you may prefer to store them on separate disks.

Return to operating system - no change to BRAIN.COM

This abandons all your installation work.

Choose an alternative configuration

This allows you to return to the 'Select screen' option at the beginning of the Installation program.

ASCII codes

Chart

This chart shows all the ASCII and Hexadecimal codes for the various characters and controls you may use.

Keyboard entry

Hit the key you require an ASCII code for and the value will be displayed.

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 ^D - Cursor right 2-4, 8; 3-7; 7-9
 ^D - Next namesake 2-7, 8; 3-6, 10; 7-10
 ^E - Cursor up 2-5, 7, 8; 3-9; 7-10
 ^F - Delete under cursor 2-3, 4, 8; 3-7, 8; 7-9
 ^F - Fall ten lines 2-12; 3-9; 7-10
 ^G - Get text from @ mark 2-12; 3-6, 10, 13; 4-1; 7-10
 ^H - Hunt/Search for an entry 2-7, 8; 3-6, 11, 14; 4-1; 7-10
 ^H - Delete to left 7-9, 7-11
 ^I - TAB 2-4, 8; 3-6, 7; 7-9, 11
 ^J - Jump to @ mark 2-12; 3-6, 10; 4-2; 7-10
 ^K - Kill entry 2-12; 3-5, 9; 4-2; 7-10

^L - List to printer 2-12; 3-11; 7-10

^M - RETURN 2-1; 3-7, 17; 6-1;
7-9, 10, 11

^P - Put entry to @ 2-12; 3-6, 10,
11, 13; 4-1; 7-10

^Q - Cursor to title screen 2-12;
3-9

^R - Promote an entry 2-5, 8; 3-9

^S - Cursor left 2-4, 8; 3-7; 7-7, 9

^S - Previous namesake 2-7, 8;
3-6, 10

^T - Amend title 2-3, 8; 3-5, 9; 7-10

^U - Cursor up ten lines 2-12; 3-9;
7-10

^W - Top of list 2-5, 8; 3-9; 7-10

^X - Cursor down 2-5, 8; 3-9; 7-10

^Z - Bottom of list 2-5, 8; 3-9; 7-10

