Chapter 4:
An Introduction to System Management

4.1 Operating instructions for the MDFS

SJ Research File Servers are designed to be run easily without the need for much specialist knowledge. This section explains how the system manager should get going, setting up the communal filing system for all his users.

This chapter is kept deliberately simple, in order to explain the principles. System managers will find full descriptions of all the commands and utility programs in Chapters 5 (user management) and 6 (printer management).

If the File Server has not been installed for you please refer to Appendix C which gives full instructions.

4.1.1 Switching on the File Server

The Modular Disc File Server needs to be switched on at the front panel key-switch; the green POWER light will come on. All the lights, except the red NO CLOCK light, will come on for two or three seconds while the hardware is tested (consult Appendix B if the system failure light flashes). For normal operation, the switch should be turned to the SECURE position. The yellow DISCS FREE light will flash after a few seconds -- now insert all the floppy discs that you wish to use. There must be a copy File Server program on one of the discs at this stage, but it may be on either a floppy disc or a hard disc; there is a copy on the disc supplied with the fileserver. Press the RELEASE DISCS button on the front panel, and the DISCS FREE light will flash more rapidly while the system loads the program. After about ten seconds, the green ON LINE light will come on and the DISCS FREE light will go out.

The fileserver is now ready for use. If you want to perform any system privileged user operations (for example editing the password file or setting the internal clock), then you should now turn the switch to the SYST position. More fundamental system operations such as formatting discs are carried out in Utility Mode, which is reached by either starting up the fileserver as above, but with the key-switch in the SYST position from the beginning, or by typing *FINISH from a station on the network while the fileserver is running normally.

If, after the File Server is switched on, the RELEASE DISCS button is not pushed within thirty seconds the system will attempt to start the File Server automatically.

4.1.2 Switching off the File Server

Before switching off the File Server, press the RELEASE DISCS button on the front panel. After a short pause the yellow DISCS FREE light will flash alternately with the green ON LINE light. Remove all the floppy discs, and turn the front panel key-switch to the STOP position -- the front panel lights will extinguish.

If the system is in the process of printing, it will stop when the RELEASE DISCS button is pressed; when the File Server is turned on again, previous print requests will be remembered and restarted, going back to the beginning of any uncompleted item in the print queue.

Do not switch off without pressing the RELEASE DISCS button, for example using a master switch. (If a master switch is in use, then the File Server should run from a supply independent of it). If the system is not stopped before turning off, the cache memory may not have been written back to the discs. In this case, it will probably be necessary to restore the system from a backup, as the data on the discs will be corrupted. It is also wise to remove any floppy discs from the drives before turning of the File Server, as power-off may

have unpredictable effects on them.

If hard discs are fitted, we recommend not switching off the File Server at all, since hard discs are considerably more reliable if they are kept spinning continuously at all times. If your local Fire and Safety regulations permit it, this is the best course.

4.1.3 Changing Discs

You may want to run a File Server system where there are more floppy discs (excluding backups) than floppy disc drives, and you insert them perhaps when a particular class is present. This process is recommended only when your Econet network extends only over a single room -- beyond that you will not normally know who will want access to files at any time, so the only complete solution is to have a File Server system large enough to have all files on line at all times.

The following procedure is necessary to change discs, either for this purpose, or any other (e.g. to return to an earlier version of a disc).

Press the RELEASE DISCS button on the front panel. The File Server may continue to access the discs for a few seconds, in order to write back any information held in memory. When it has finished, the DISCS FREE light will flash alternately with the ON LINE light. While the system is in this state, no File Server discs can be accessed by users. Remove the old disc(s), insert the new disc(s), and press the button again. Note that it is *not* necessary to continue using the disc containing the fileserver program once the system is running : the program is retained in memory.

When the discs are changed, the File Server will discard the old user list for the changed discs (since the password file has probably changed). This means that all users who are logged on from those lists will have to log on again -- otherwise they will receive the error message **Who are you ?** if they attempt a filing operation. All opened files on changed discs will be closed. Discs which have not been changed will be unaffected.

Do not change discs without pressing RELEASE DISCS and then waiting for the DISCS FREE light. The system keeps information about the disc data, and transient information, in memory. If you change a disc without telling the system, the vital root directory information will be corrupted, and it will almost certainly be impossible to access files on the affected discs afterwards.

4.2 Organising the File Server

Your system will have a number of different users to whom you will want to be able to give facilitites to create files for themselves, to read certain communal files (for example library programs) and to have selective access to other users' files.

The list of authorised users in a SJ Research File Server i; kept in a file called the *password file.* This file can be read and saved only by someone with *system privilege* -- normally only the system manager himself and only when the front panel key-switch is turned to the SYST position. The password file contains information about each user: his password, any accounts he has access to, and administrative information concerning start-up (boot) options, library directories and user root directories.

If someone logs-on to the system, and his name does not appear in the password file, then he will will be logged on as the *default user*, if one has been set up by the system manager using EDITPASS (see Section 4.3). If no default user has been set by the system manager, the user will receive the message **User not known.**

When a user listed in the password file logs-on, any password he quotes will be checked against the one in the password file, before the log-on is allowed to proceed. He will then be given any rights and privileges listed against his name in the password file. The system will then search the disc on which the user's password file entry was found, for the *User Root Directory* specified for that user in the password file, which by default has *that user's name*, and will set this to be the currently selected directory (see Section 3.3 under *I AM for details). If no appropriately named directory is found, the disc root directory will be selected.

As described more fully in Section 3.3 (under *ACCESS and *ACCOUNT), the *account(s)* to which a user is given access, control two things:

First, every file (or directory) has an account number, and *if a user has access to this account, then he is an owner of that file (or directory).* Only an owner may create files in a directory, and only an owner may delete a file or change its access letters (see Section 3.3 under the *ACCESS command). Note that there can be *more than one owner* of a file (or directory), simply by allocating access to its account to more than one user -- this can be useful for communal files in a project.

Second, each account has a *credit balance* of storage space, and an attempt to create a file which would cause that balance to become less than zero will be prevented, and cause the error **Account bankrupt.**

4.3 Command details

This section describes the operation of each of the commands and programs intended for use by the system manager for the day to day running of the File Server system. Chapters 5, 6 and 7 explain in more detail how these commands are used for particular purposes.

These commands are not in themselves destructive in the wrong hands: provided that the system manager's password is kept secure, no other user can actually change any settings, although some of the programs allow non-sensitive information to be read. In addition, the front panel key switch must be in the SYST position to enable the most sensitive operations.

The commands and programs documented here are:

*CHECK	Machine code program
*CREDIT	File Server command
*DEBIT	File Server command
EDITPASS	BASIC program
EDITPRINT	BASIC program
*FAST	Machine code program
*FINISH	File Server command
FORCER	BASIC program
LISTUSERS	BASIC program
*LOGOFF	File Server command
*PGO	File Server command
*PSTOP	File Server command
SETTIME	BASIC program
SIZER	BASIC program

Syntax: CHAIN"ACCLIST"

Action with Wild Cards:

Not applicable

Description:

This program gives information on the use of accounts in the **%PASSWORD** file. This is useful for checking that account numbers have not been doubly allocated and also for finding which users own a particular account number.

If the password file is large then it can take some time for the program to build the map of account numbers used. While this process is taking place dots are printed on screen, one for every ten users in the password file.

Example:

```
CHAIN"ACCLIST"

Scanning password files.....

A.   Summary of personal accounts
B.   Full details of a single account
C.   Users with no personal account
D.   Summary of group accounts
E.   Block accounts

F.   Do all the above

G.   Exit


Enter choice :
```

A will list all account numbers allocated as a personal account. If two users share a personal account then both their User Ids will be displayed. If more than two users share a personal account then the first two names in the password file will be displayed plus the number of other users who own the account.

B will list all the users who own the specified account.

C will list all users who have not been alloacted a personal account.

D will list the first user owns the account number plus the number of other users who own the account.

E will list owners of the blocks of sixty-four accounts above &100.

F performs all of the operations A-E in sequence.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

ARCACCLIST is the RISC OS version.

*BACKUP

Syntax : *BACKUP [C]

Description :

This program displays details of any tape backup currently pending. The optional C parameter can be used to cancel a pending backup.

Examples :

```
*BACKUP
Disc : HardDisc1
Tape : Archive#1
Backup at: 23:00 on 23/04/89
Printer output: Parallel
```

```
*BACKUP C
Disc : HardDisc1
Tape : Archive#1
Backup at: 23:00 on 23/04/89
Printer output: Parallel

Cancel (Y/N) Y
```

Likely Errors:

Key Locked   Error 5 (05)
If an attempt is made to cancel a backup and the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   Error 186 (BA)
If the user attempts to cancel a backup and does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

RISC OS version supplied in $.ArthurLib.

*CHECK

Syntax : *CHECK

Description :

This program will check the issued library utility programs using a 'checksum' algorithm, and will compare them with internally held values. The program will also print whether PSnofx6 or PSFX6 has been renamed as PS. It contains its own list of files to check, and it will list as it runs, and print a warning message if any of them have been tampered with.

Each file will be listed, with no further comment if its checksum was correct. If it was not correct then either the message **is old** or **is corrupted** will be displayed. If the file was not found, **doesn't exist** will appear.

If the currently selected directory is likely to contain any files of the same name as these utilities, then it is wise to type ***DIR $.LIBRARY** before running CHECK.

CHECK is encrypted to make it difficult for casual hackers to modify it, and it performs a checksum upon itself when run, but system managers are recommended to keep it on DFS floppy disc, locked away, and perhaps not leave it anywhere in the File Server.

CHECK will be re-issued with any new version of the library. If the new version of CHECK is run on the old version of the library then it can be used to find out which utilities have changed.

Example :

*CHECK

```
Utility CHECKer program version 2.nn

BUILD is corrupted
CLOSE
COPIER is old
CV doesn't exist
        .
        .
PS with *FX6
        .
        .
        .
```

Having set up the system for the first time you will need to decide whether your printer needs a *FX6 or not. So rename it **PSnofx6** if you don't by:

```
*RENAME    $.LIBRARY.PS $.LIBRARY.PSfx6
*RENAME    $.LIBRARY.PSnofx6 $.LIBRARY.PS
```

Compatibility Notes:

Not supported by Acorn systems, as it is specific to SJ utility programs.

*CREDIT

Syntax: *CREDIT <account number> <amount>

Action with Wild Cards:

Wild cards prohibited.

Description:

This command adds the specifed <amount> in units of 1 kilobyte (K) to the balance of account <account number>. Account numbers range between 0 and 3FF and are in hexadecimal, but the amount of credit is in decimal.

The maximum balance possible is 65535K, and the system manager may effectively turn off the space accounting system by setting accounts this much credit: 65536K is the largest single disc that can be fitted to a system.

System privilege is required to execute this command.

The accounts system gives control of disc space filled by users' files. This command increases the allocation of space available for files with the specified account number.

Note that the current credit balance of an account represents only the free space available for files, and does *not* include files already existing with that account. It is therefore wise for the system manager to keep a notebook containing details of users, their accounts and any subsequent credit or debit given to them. A utility program **SIZER** is provided to find the total size of files in a directory tree, and this could be used to find the total space taken up by a user's files at a later date.

The transient program **STATEMENT** will give a printout of all the accounts to which a user has access, with the associated credit balance for each. The system manager will normally have access to all accounts, and so will get a long list of all accounts from 0 to 3FF for each disc in the system. It may be wise to send this output to the printer if all the information is required.

Example:

        *CREDIT 89 512

allocates a further 512K to account number 89.

Likely Errors:

Bad number   **Error 4 (04)**
If there is not a number specified in both fields or the number is in the wrong base (hex for the account number, decimal for the amount).

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

Syntax: *DESTROY <general specifier> <disc name>

Action with Wild Cards:

Wild cards prohibited.

Description:

The *DESTROY command is used primarily for recovering from **Disc Read Only** errors caused by a corrupt directory structure (accompanied by the messages **Wrong number of files in dir.** or **Bad Backpointer**). It is only supported by File Server versions 0.A4 or later.

Its effect is to destroy the directory (and any files or subdirectories therein) by turning it into a file. A subsequent reboot will ignore the bad area of the directory structure and allow writing to the disc again. You must have system privilege and owner access to the directory in order to use the command.

N.B. this command has the capability to destroy the root, $, with obviously dire consequences. You have been warned.

<directory name> may contain wild cards, but only the first match will be acted upon. This is useful in getting rid of a file or directory with bad characters in it, but only with caution as you must be sure that the wildcard specifier will not accidentally match with the wrong file.

<discname> is the name of the disc on which the directory is being destroyed. It must be specified in full, i.e. with no wild cards, this being a built-in safety feature.

Example:

Wrong number of files in dir. on drive 0
in WORK
in PAUL
in $

has appeared on the printer after a reboot. The fileserver should be on line, but whenever any writing is attempted to that disc the error message **Disc Read Only** will be given. Suppose that the disc 0 is called **PUPIL-DISC**.

The most important thing to do now is to logon, select the directory ($.PAUL.WORK) and catalogue the directory. It may be possible to recover some of the files in this directory, and if you wish to do so you must take the opportunity now. (It may be that you have a recent backup of these files on a tape or other medium and so you need not bother). They can be copied onto another disc on the fileserver or onto local floppy discs.

Now logon as a system privileged user, and turn the key to the System position. Select the correct disc, and type the command

*DESTROY $.PAUL.WORK <SPACE> PUPIL-DISC<return>

You will now discover that $.PAUL.WORK is a file. Reboot the fileserver (by pressing the Release Discs button twice on an MDFS, or by powering-off/on with an HDFS). You can now delete the file $.PAUL.WORK because the disc is now read/write. (*DESTROY is the only command that will write to 'read only' discs, and this includes physically write-protected floppy discs).

The message **Bad Backpointer in** <dir> is slightly more difficult to recover as the directory specified is not corrupt; one of its subdirectories has a bad backpointer. To find out which one is corrupt, select the specified directory and take a catalogue. For each of the subdirectories listed, type *INFO

\<directory name\>.^ until the name given is different to your current directory. You have now identified which directory has the bad backpointer. This directory will have to destroyed, so take a copy of all the files in that directory (all of which will be recoverable) and then use the *DESTROY command as above.

You can also use *DESTROY to remove an overly-large or overly-deep directory structure. But remember that *DESTROY is a very dangerous command and should only be used when absolutely necessary (given that the more you use it, the more likely you will make a mistake). To be absolutely safe, take a backup of the disc before using the command.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

Compatible with RISC OS.

*DEBIT

Syntax: *DEBIT <account number> <amount>

Action with Wild Cards:

Wild cards prohibited.

Description:

This command subtracts the specifed <amount> in units of 1 kilobyte (K) from the balance of account <account number>. Account numbers range between 0 and 3FF (hexadecimal), but the amount to be debited is given in decimal.

The maximum balance possible is 65535K, so the system manager may wipe out the balance of an account by typing :

    *DEBIT <account number> 65535

System privilege is required to execute this command.

The accounts system allows control of disc space filled by users' files. This command decreases the allocation of space available for files with the specified account number.

Note that the current credit balance of an account represents only the free space available for files, and does *not* include files already existing with that account. It is therefore wise for the system manager to keep a notebook containing details of users, their accounts and any subsequent credit or debit given to them. A utility program **SIZER** is provided to find the total size of files in a directory tree, and this could be used to find the total space taken up by a user's files at a later date.

The transient program ***STATEMENT** will give a printout of all the accounts to which a user has access, with the associated credit balance for each. The system manager will normally have access to all accounts, and so will get a long list of all accounts from 0 to 3FF for each disc in the system. It may be wise to send this output to the printer if all the information is required.

Example:

    *DEBIT 89 512

removes 512K from account number 89.

Likely Errors:

Bad number   Error 4 (04)
If there is not a number specified in both fields or the number is in the wrong base (hex for the account number, decimal for the amount).

Key Locked   Error 5 (05)
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   Error 186 (BA)
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

Syntax: `CHAIN "EDITPASS"`

Description:

The system maintains a special file %PASSWORDS, which does not exist in any particular directory, and is only 'visible' to system privileged users. The password file cannot be deleted with *DELETE, but can only be cleared in Utility Mode, although it is possible to save over the top of it. The name must be quoted in full in upper case, i.e. no wildcards. EDITPASS is provided in the library for editing the contents of %PASSWORDS.

EDITPASS is a screen editor for editing password files, or for creating new ones. The present version can handle about 200 users, and requires a BBC computer with 32K RAM (i.e. Model B or expanded Model A). If a BBC with a 6502 second processor is used, more than 300 users can be created.

(There is a version of this program, **EDITPASS!**, which uses more readable identifiers, if the system manager wants to see how the program works or to make his own version. EDITPASS itself has been condensed, so as to leave maximum storage for data).

Although anyone can run EDITPASS (assuming that the system manager has set public read access to this file), it is necessary to have system privilege *and access to account 0*, and the MDFS front-panel keyswitch must be in the "SYST" position to either read or save the password file on a disc.

EDITPASS always works with the currently selected disc drive: to edit the password file on another drive, use *DIR :<disc name> to select this new disc.

*Be cautious when running this program. All the system passwords will be loaded into memory, and may be displayed on the screen. Never walk away from the computer running EDITPASS without typing *BYE and switching off the power.*

When the program is run, the program will prompt:

```
Password file Editor 27feb86

Maximum number of users=257

Options:
  E - edit PW file from disc
  N - create new PW file
  O - edit file from current RAM
?
```

The normal option is **E**, unless it has been necessary to delete the password file for some reason. The **O** option is useful if this program has stopped, either with an error, or as a result of pressing the <Escape> or **Q** key.

The program will then display all the users, with their boot options and system privilege (if any). The display will be similar to:

Syntax: CHAIN "EDITPASS"

Description:

The system maintains a special file %PASSWORDS, which does not exist in any particular directory, and is only 'visible' to system privileged users. The password file cannot be deleted with *DELETE, but can only be cleared in Utility Mode, although it is possible to save over the top of it. The name must be quoted in full in upper case, i.e. no wildcards. EDITPASS is provided in the library for editing the contents of %PASSWORDS.

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Although anyone can run EDITPASS (assuming that the system manager has set public read access to this file), it is necessary to have system privilege *and access to account 0*, and the MDFS front-panel keyswitch must be in the "SYST" position to either read or save the password file on a disc.

EDITPASS always works with the currently selected disc drive: to edit the password file on another drive, use *DIR :<disc name> to select this new disc.

Be cautious when running this program. All the system passwords will be loaded into memory, and may be displayed on the screen. Never walk away from the computer running **EDITPASS** *without typing* ***BYE** *and switching off the power.*

When the program is run, the program will prompt:

```
Password file Editor 27feb86

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Options:
  E - edit PW file from disc
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?
```

The normal option is E, unless it has been necessary to delete the password file for some reason. The O option is useful if this program has stopped, either with an error, or as a result of pressing the <Escape> or Q key.

The program will then display all the users, with their boot options and system privilege (if any). The display will be similar to:

```
Add Delete Find Save eXpand Quit *
User id      Boot option    Privilege

ARG          0 Off
BASHER       0 Off      System
BRIAN        0 Off
BOOT         3 Exec
CLAIRE       0 Off
DEFAULT      2 Run      *DEFAULT*
JEF          0 Off
JOHN         3 Exec
KIM          2 Run
```

The 'up' and 'down' cursor keys scroll the display, allowing the total user list to be available. To add new users, press the **A** key: the program will prompt repeatedly for names until the list is terminated with <Return> on its own.

D key will delete the user on the current line.

* key allows normal * commands to be run from within the program. To return to the list of users, type <Return> on its own on a line.

Q key stops the program without saving the result back to disc. The <Escape> key, pressed at any stage, has the same effect, except in the * mode.

S key saves the password file to disc, and stops. A check will be made that there is at least one system privileged user, and that a user exists with access to account 0 (these are both vital to the running of the system), and the program will print a warning if one of these requirements is not met. Note that you may however want to keep all your system users on one (or a few) discs for security, in which case it would be legitimate for there to be no system user, or user with access to account 0, on other discs. The name of the *default user* if any (see below) will be displayed, and then the prompt Save (Y/N) :   Typing N will return to the list of users.

*After typing **Q** or **S**, at the end of the system manager's session, type *BYE then TURN OFF THE BBC MICROCOMPUTER at which you were logged on.* The password file will remain in the computer unless it has been overwritten, and another user could easily read it from there, and gain unauthorised access to the system.

X key enters the *expanded mode* for the user at the current cursor position. The display will change to, for example:

```
A(ccount)   S(ystem priv) D(efault user)
P(assword)  U(RD) L(IB) 0..3 Boot option
G(roup Ac)  E(nable) R(un only)
6-AuxLock 7-No Lib 8-Saves 9-PW lock

FRED                 0 Off
PW : CRICKET
URD: USR.ARG              Short SAVEs OK
LIB: (normal)            Fixed *ENABLE


Personal account number : 1D8

Accounts :    0->15 25 60->6F F0->FF
```

Expanded mode allows the details of each user to be edited. New users are initially created with no password set, boot option 0 (see under *OPT4, Section 6.6), normal library and user root directories, and access to no accounts at all.

0 1 2 or 3 will set the boot option to that value. The boot option may also be set by the users themselves, unless the PW lock option has been set (see below).

6 will turn on and off an option to prevent users changing the auxiliary account number of a file or directory. This prevents problems with users experimenting with auxiliary account numbers and consequently losing access to their own files.

7 will turn on and off an option to give a user an Acorn style library search. The full SJ library search will occur on any load or open command eg OPENIN, CHAIN, *LOAD. An Acorn style library is only searched when *RUN commands are issued.

8 will turn on and off an option to prevent users from saving a file shorter than 16 bytes in length with the SAVE or *SAVE command. This option helps to avoid the problem where BASIC (for example) will save a null file if an attempt is made to save after pressing <Break> without typing "OLD".

9 will turn on and off an option to prevent users from changing their password and boot option. It could be useful to set this option for the default user, to prevent unauthorised users from changing the default password and option.

S toggles system privilege off and on for that user. *Note that there must be at least one system privileged user on the system, or it will not be possible to change the password file thereafter.*

D sets this user as the default user. There can be only one default user, so this command will change the default to this user. Keying **D** again will remove the default setting, so that there is no default user. Users logging-on to the File Server with unrecognised user identifiers will be logged on as the default user -- the system manager should set up a boot file to re-direct them, if necessary. If there is no default user, the error **User not known** will be displayed.

E toggles an option requiring the user to type *ENABLE before attempting *DELETE with a wild-card specifier, as a safety measure.

P prompts for a password. Users can also set up their own passwords with the *PASS command unless the PW lock option has been set. Passwords can be up to 10 characters long, and have the same valid characters as file names.

A prompts for the user's *personal* account number. This should be unique, and can be any number in the range 1 to 7FF. Account number zero is reserved for the system's use; if this is typed, then no personal account will be allocated.

G prompts for *group* account numbers. In response, it is possible to type a single account, a list of accounts separated by commas or spaces, or a range of accounts: for example 1-55 specifies all accounts from 1 to 55. Adding a minus sign to the start of the line causes the specified accounts to be removed from the list, rather than being added. Typing just <Return> will leave the shared accounts the same. Any *shared* account numbers above FF will be allocated in blocks of 64 accounts (40 hexadecimal). That is entering '1AB' will result in the block of accounts from 180 to 1BF being added. Note that account 0 should normally be allocated only to the system manager.

U prompts for a user root directory. This can be a path name going through several directories, and can be up to 80 characters long. Disc names can also be included to specify a disc; the default disc is the one in which the user is found in the password file. If <Return> is pressed, the <-normal-> option of a directory with the same name as the user identifier will be selected. If the specified URD is not found on logging-on, the user will be in the root directory of the default disc, even if another disc was specified. Wild cards can be used in a URD specification, although this is not recommended.

L prompts for a default library directory for the user. This can be a path name going through several directories, and can be up to 80 characters long. If <Return> is pressed, the <-normal-> option of $.LIBRARY on the lowest numbered disc drive is selected. If the specified library is not found, the default library will be set to the root directory on the lowest numbered disc. Wild cards can be used in a library specification, although this is not recommended. The character & can be used as a synonym for the matching URD if required.

To return to the list of users, press <Return>.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

ARCPASS is the RISC OS version.

```
A(dd) D(elete) S(ave) X(pand) Q(uit) *

User id     Boot option     Privilege

ARG         0 Off
BASHER      0 Off       System
BJ          0 Off
BOOT        3 Exec
CLAIRE      0 Off
DEFAULT     2 Run       *DEFAULT*
JEF         0 Off
JOHN        3 Exec
KIM         2 Run
```

The 'up' and 'down' cursor keys scroll the display, allowing the total user list to be available. To add new users, press the **A** key: the program will prompt repeatedly for names until the list is terminated with <Return> on its own.

D key will delete the user on the current line.

* key allows normal * commands to be run from within the program. To return to the list of users, type <Return> on its own on a line.

Q key stops the program without saving the result back to disc. The <Escape> key, pressed at any stage, has the same effect, except in the * mode.

S key saves the password file to disc, and stops. A check will be made that there is at least one system privileged user, and that a user exists with access to account 0 (these are both vital to the running of the system), and the program will print a warning if one of these requirements is not met. Note that you may however want to keep all your system users on one (or a few) discs for security, in which case it would be legitimate for there to be no system user, or user with access to account 0, on other discs. The name of the *default user* if any (see below) will be displayed, and then the prompt **Save (Y/N) :** Typing **N** will return to the list of users.

After typing Q or S, at the end of the system manager's session, type ***BYE** *then TURN OFF THE BBC MICROCOMPUTER at which you were logged on.* The password file will remain in the computer unless it has been overwritten, and another user could easily read it from there, and gain unauthorised access to the system.

X key enters the *expanded mode* for the user at the current cursor position. The display will change to, for example:

```
A(ccounts) S(ystem priv) D(efault user)
P(assword) U(RD) L(IB) 0..3 Boot option
8-Saves 9-PW lock  E(nable)

ARG                 0 Off
PW : None
URD: $.PROJECT.TEXT        Short SAVEs OK
LIB: <-Normal->            Fixed *ENABLE


Accounts :     0->15 25 60->6F F0->FF
```

Expanded mode allows the details of each user to be edited. New users are initially created with no password set, boot option 0 (see under *OPT4, Section 6.6), normal library and user root directories, and access to no accounts at all.

0 1 2 or **3** will set the boot option to that value. The boot option may also be set by the users themselves, unless the **PW lock** option has been set (see below).

8 will turn on and off an option to prevent users from saving a file shorter than 16 bytes in length with the SAVE or *SAVE command. This option helps to avoid the problem where BASIC (for example) will save a null file if an attempt is made to save after pressing <Break> without typing "OLD".

9 will turn on and off an option to prevent users from changing their password and boot option. It could be useful to set this option for the default user, to prevent unauthorised users from changing the default password and option.

S toggles system privilege off and on for that user. *Note that there must be at least one system privileged user on the system, or it will not be possible to change the password file thereafter.*

D sets this user as the default user. There can be only one default user, so this command will change the default to this user. Keying **D** again will remove the default setting, so that there is no default user. Users logging-on to the File Server with unrecognised user identifiers will be logged on as the default user -- the system manager should set up a boot file to re-direct them, if necessary. If there is no default user, the error **User not known** will be displayed.

E toggles an option requiring the user to type *ENABLE before attempting *DELETE with a wild-card specifier, as a safety measure.

P prompts for a password. Users can also set up their own passwords with the *PASS command unless the **PW lock** option has been set. Passwords can be up to 10 characters long, and have the same valid characters as file names.

A prompts for account numbers. In response it is possible to specify a single account, several accounts separated by commas or spaces, or a range of accounts: for example 1-55 specifies all accounts from 1 to 55. If the line starts with a minus sign, the specified account(s) are removed from the user's list, otherwise they are added. Typing A <Return> will leave the user's accounts unchanged. Note that account 0 is a 'system' account as the root directory on each disc always has account 0: hence account 0 should normally *only* be allocated to the system manager.

U prompts for a user root directory. This can be a path name going through several directories, and can be up to 80 characters long. Disc names can also be included to specify a disc; the default disc is the one in which the user is found in the password file. If <Return> is pressed, the <-normal-> option of a directory with the same name as the user identifier will be selected. If the specified URD is not found on logging-on, the user will be in the root directory of the default disc, even if another disc was specified. Wild cards can be used in a URD specification, although this is not recommended.

L prompts for a default library directory for the user. This can be a path name going through several directories, and can be up to 80 characters long. If <Return> is pressed, the <-normal-> option of $.LIBRARY on the lowest numbered disc drive is selected. If the specified library is not found, the default library will be set to the root directory on the lowest numbered disc. Wild cards can be used in a library specification, although this is not recommended. The character **&** can be used as a synonym for the matching URD if required.

To return to the list of users, press <Return>.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

Syntax: `CHAIN "EDITPRINT"`

Description:

The EDITPRINT program allows the system manager to set up details for the two printers which can be connected to the File Server.

Although anyone can run EDITPRINT (assuming that the system manager has set public read access to this file) to find the default settings, it is necessary to have system privilege, and the MDFS front-panel keyswitch must be in the "SYST" position to change the printer information.

This description merely describes how the program works : see Chapter 6 for advice on suitable values to set.

To adjust the printer settings, type:

`CHAIN "EDITPRINT"`

The program will respond with the editing screen similar to the one below :

```
                          - EDITPRINT -
                Printer Setup for SJ Research File Server 254

                                        Anonymous   Account    AccNo Default
Name     Status       Output to         Printing    Required

parall   Spooling     Parallel            No          No
serial   Spooling     Serial              No          No
hold     Hold                             No          No
auto     Auto         1st:parall 2nd:serial
         Off
         Off
         Off
         Off
         Off
         Off
         Off
         Off
         Off
         Off
         Off
         Off

Esc: Quit            Space: Toggle Data          f3: Save Details & Exit
```

You can move round the screen using the cursor keys. Your current position in the screen is shown by displaying the field in reverse video. Editing a field can be done by pressing <Space> to rotate through the possible legal values. Alternatively pressing the initial letter of the value you want will enter that value.

Although there are only two physical printers attached to the File Server there are 16 logical printer names which can be used to access these printers. Each of these logical printers can have a different set of properties and these are displayed in the row across from the name.

Name is the name which users will quote to specify that particular logical printer. Printer names may be up to six characters long. The name PRINT is reserved and must not be given to a printer. If the printer name is blank (i.e. consists of spaces), that printer is disabled completely.

Status determines where output sent to this logical printer will be directed. There are four possible values.

Off   This disables the printer completely so that it cannot be selected using either *PS or *PRINTER

Spooling   Printer output sent to a spooling printer is stored as a print job file in the %PRINTQ directory prior to being sent to the printer.

Non-spooling Printer output sent to a non-spooling printer will be output immediately if the relevant physical printer is free. If the physical printer is busy then output will be spooled.

Hold   Printer output sent to a hold printer will be stored as a print job file in %PRINTQ however the File Server will not attempt to output the data stored to a physical printer.

Auto   Printer output sent to an auto printer will go to one of two possible other logical printers, a first choice and a second choice. At the time of printing the File Server will attempt to allocate the first choice printer and if this is not possible will try to allocate the second choice printer.

Output to determines which physical printer will be used for output sent to a logical printer. In the case of an auto printer this column will hold the first and second choice logical printers.

Anonymous Printing controls whether users who have selected this logical printer, but are not logged on to the File Server, may print.

Account Required controls whether a user requires a specific account number to select this locical printer.

AccNo specifies the account needed if Account Required has been set to Yes.

Default specifies whether this is a default printer or not. If a user attempts to print without explictly selecting a printer by name then the File Server will try to allocate a default printer. The File Server works down the list of printers defined as default printers and will allocate the first default printer which the user is allowed to use.

Having edited details they are saved by pressing the f_3 key. Before saving some checking is performed to ensure that in particular there is no combination of auto printers which is circular. If this is found to be the case then an error is given and the cursor is move to the printer definition which is incorrect.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

Compatible with RISC OS.

Syntax: `CHAIN "EDITPRINT"`

Description:

The EDITPRINT program allows the system manager to set up details for the two printers which can be connected to the File Serve and to set the amount of system information.

Although anyone can run EDITPRINT (assuming that the system manager has set public read access to this file) to find the default settings, it is necessary to have system privilege, and the MDFS front-panel keyswitch must be in the "SYST" position to change the printer information.

This description merely describes how the program works : see Chapter 6 for advice on suitable values to set.

To adjust the printer settings, type:

```
CHAIN "EDITPRINT"
```

The program will respond with the main menu :

```
Edit logical printer details
Change system messages
Set up initial choices
Save changes and exit
```

Throughout the program, items can be selected from the menu by using the up and down cursor-keys to move the menu bar over an option. Pressing **Return** selects that item.

Option 1 - Edit logical printer details

This will result in a list of *logical* printers being displayed on the screen, for example:

```
1.Microl      Parallel
2.Serial      Serial
3.Nobann      Parallel
4.            Serial
5.conden      Parallel
6.Epson       Serial
7.            Parallel
8.            Serial
```

The right hand column indicates which *physical* printer will be used: while the File Server only has connections for two printers, it is possible to have several printer names associated with each one.

When a printer is selected, its details will appear:

```
Name: MICROL
Printing enabled: Yes
Bannerfile: Banners.Parallel
Spool to Disc: Yes
Anonymous Users allowed: Yes
Account Ownership required: No
```

Again the menu bar highlights one item. Yes/No items can be changed by pressing **space**, while other items can be changed by typing a new value, followed by **return**. Return on its own writes any changes back to the File Server and returns to the main menu. Escape discards any changes which may have been made by

mistake.

Name is the name which users will quote to specify that particular logical printer. Printer names may be up to six characters long. The names PRINT, HOLD and AUTO are reserved and must not be given to a printer. If the printer name is blank (i.e. consists of spaces), that printer is disabled completely.

Printing enabled controls whether output sent to this particular printer will be printed. It does not prevent users from generating output, which will be spooled to disc.

Banner file gives the name of a text file which controls the *banner* that is printed at the top of all printer output. The various possibilities for the contents of the banner file are described in section 6.3.2. The file name is looked up starting from $ on the first disc drive, so **banners.fancy** would be equivalent to **$*.banners.fancy**.

Spool to Disc controls whether printing starts as soon as some data arrives, or whether it is spooled onto disc and only printed when the whole document has arrived.

Anonymous users allowed control whether users who have selected this logical printer, but are not logged on to the File Server, may print.

Acount ownership required controls whether a user requires a specific account number to select this locical printer; beware that if this printer is listed under initial choices then the account ownership check will be bypassed.

Option 2 - Change System Messages

This enables you to set the level of system messages.

```
0 = serial
1 = parallel

System message    Parallel
Message Level is 0

N.B. System error messages are ALWAYS sent to the printer.
```

By typing zero or one, the printer port used for system messages can be selected. It is not possible to disable system messages altogether, as the system has to have some way of displaying warnings of impending failures.

If the menu bar is moved down, a list of the possible message levels appears. The selected level can be changed by typing a number followed by **return**.

```
0 = off
5 = logon/logoff
7 = errors
10 = maximum users & *commands
11 = load/save
15 = *cat and opens
128 = aborted loads
130 = Fn codes
150 = net errors
200 = disc read/write
250 = all sucessful net transactions
255 = all activity to JPROC

System message   parallel
message level is 0
```

These represent cummulative levels of system messages (7 includes the message of 5 and 0). Although the system message level may be set to 0, system messages after catastrophic errors will still appear on the printer.

The usual message level is zero.

Option 3 - Set Up Initial Choices

This option allows you to specify the default printer for users who do not select a particular printer, and to indicate the first and second choices of printer when **AUTO** is selected as a printer.

The screen will display:

```
        Priority of Printer      No          Printer
                                  0           STOP
        1st   Microl              1           MICROL
        2nd   Epson               2           SERIAL
                                  3           Nobann
                                  4
                                  5           conden
                                  6           Epson
                                  7
                                  8

        Default AUTO              9           HOLD

        New default choice.
        Press 0-9 to select printers
```

The display on the right hand side of the screen lists the available printers. If the second choice is set to zero, then **AUTO** will be equivalent to the first choice printer. If the first choice is set to zero, the **AUTO** printer will be disabled completely.

Remember that any user can select and print to the **AUTO** printer, bypassing any restrictions that may be placed on the first or second choice printers. Hence it is not usually sensible to specify as first or second choice a printer which has account ownership required.

The **default** printer is the one which will be used if a user sends data for printing without selecting a particular printer. The File Server still checks whether the user is permitted to use that printer, so restricted access on the default printer will prevent some users from printing without explicitly selecting a printer to which they do have access.

Option 4 - Save Changes And Exit

This option puts into effect any changes which have been made through the other **Editprint** options. Note that the changes have already been written to disc, so leaving **Editprint** without using this option will not discard the changes: they will come into effect next time the fileserver is re-started.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

Syntax: ✳FAST

Description:

This program turns the BBC Microcomputer into a terminal to any suitably equipped host computer: communication is through the Econet network. The program is supplied as standard on disc (in the library directory), but a ROM version is also available for the convenience of Hard Disc users in the event of a corrupt hard disc. The ROM version should be fitted to a BBC micro as a standard *sideways ROM*.

The most common use of ✳FAST is to communicate with a SJ Research File Server system, when the latter is in Utility Mode.

The FAST program will prompt:

        Station number to attach to :

Type in the station number of the File Server or other host computer (usually 254).

Both versions of FAST operate in the same way, but when using the disc version with the fileserver in utility mode, it is important to load the program (by typing ✳FAST) *before* the fileserver is placed in utility mode. The usual way to do this is to type ✳FAST, ensure that the key switch is set to the *system* position, and then type ✳FINISH. After a few seconds, the fileserver will light the utility mode lamp, and the station number can be typed to complete the connection.

The EPROM version will re-start if <Break> is pressed: it will be necessary to press <Ctrl-Break>, or to type ✳BASIC after the **Station number** prompt, to exit from the program.

The RAM version will stop if <Break> is pressed. It may be re-started by typing **CALL &2800**.

In either version, ✳ commands may be entered at any time, preceding them by <Shift-f1>, or by typing ✳<command> after the **Station number** prompt.

Example:

        ✳FAST

        Station number to attach to : ✳FINISH
        Station number to attach to : 254

followed by output (if any) from station 254.

Likely Errors:

Normal BBC Microcomputer errors will be preceded by **OS Error**.
No response, or the error **Not listening**, is usually caused by the File Server not being in Utility Mode, or by being attached to the wrong station.

Compatibility Notes:

Not supported by Acorn systems.

Syntax: ✻FINISH

Description:

This command causes the file server to go into utility mode so that it can be ✻FASTed.

System privilege is required to use this command, and the key switch must be in the System position. One of the discs attached to the fileserver must contain a copy of the fileserver program (see section 4.4). If there is no copy of the fileserver program available, this command will leave the fileserver in the same state as if it had just been switched on.

Likely errors

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

FORCER

Syntax: `CHAIN "FORCER"`

Description:

This program sends a string to the keyboard input of one or more stations -- i.e. it will force them to execute any command sent. It could also be used to send a message (preceded by *|| which causes the O.S. to ignore the rest of the line).

It is possible to send the command to all stations of a group. Load FORCER (it is in the release library), and re-type line 50 to contain all the stations which are to be included in the group:

```
50 DATA <station number>,<station number>, ... END
```

When the program is run, it will prompt:

```
Station (<RETURN> for all) :
```
then,
```
Command :
```

If <Return> is typed after the first prompt, then the command will be sent in turn to all the stations in the DATA statement.

This program is primarily intended as a basis for developing more sophisticated programs, but it may be useful in its present form.

Example:

```
CHAIN "FORCER"
Station (<RETURN> for all) :
Command : LOAD "EXAMPLE1"

Sending to station 1
Sending to station 3
        .
        .
        .
```

It is wise to hide away the *PROT utility that sets the protection byte to stop direct operations, otherwise users can prevent FORCER from working on them.

Likely Errors:

The program uses the same Osword call as *NOTIFY, and can give rise to the same errors, e.g. Not listening if one of the stations is absent, switched off or protected.

Compatibility Notes:

Supported by Acorn systems.

SJresearch

Syntax: CHAIN"LISTUSERS"

Action with Wild Cards:

Not applicable

Description:

This program lists all the users, held in the %PASSWORDS files, with their accounts and any special options that are set. This is especially useful for providing the system manager with a list of information so that he knows which accounts are spare to allocate.

If your system has moe than one passwod file then a list of thses will be displayed. You can select which password file to list or simply pressing <Return> to produce an alphabetically merged list of all the users in all the password files.

To send the output to the printer type **CTRL B** before running the program.

Example:

```
CHAIN"LISTUSERS"

Scanning for password files...

Drive 0   $RO1            OK password file

Enter drive number or <RETURN> for all :
-----------------------------------------------------------------
Name=BOOT               Pacc=          Boot=3        Flags=Pw
Low accounts                           High accounts
URD=(normal)
LIB=(normal)
-----------------------------------------------------------------
Name=FRED               Pacc=1D8       Boot=0        Flags=NsAl
Low accounts                           High accounts
URD=USR.DEMO.FRED
LIB=(normal)
-----------------------------------------------------------------
Name=SYST               Pacc=          Boot=0        Flags=SyEn
Low accounts 0-FF                      High accounts 100-7FF
URD=(normal)
LIB=(normal)
-----------------------------------------------------------------
```

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

ARCLSTUSRS is the RISC OS version.

Syntax: `CHAIN"LISTUSERS"`

Action with Wild Cards:

Not applicable

Description:

This program lists all the users, held in the **%PASSWORDS** file, with their accounts and any special options that are set. This is especially useful for providing the system manager with a list of information so that he knows which accounts are spare to allocate.

To send the output to the printer type **CTRL B** before running the program.

Example:

`CHAIN"LISTUSERS"`

```
User name               Boot opt.              Accounts
            Default settings

ANDY                      exec                 00,06,20,2F,30-3F,50
            No short SAVEs
```

```
ARG                                            00-FF
            Permanent *ENABLE
```

```
SYST                                           00-FF
            ** System privilege **
```

```
TONY                                           20-FF
            Permanent *ENABLE

            URD=$.RELEASE.FS*.ISS023
```

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

Syntax: *LOGOFF
    *LOGOFF <username> | <station>{,<username> | <station>}

Action with Wild Cards:

Will apply the wild-card to user names, to log off all occurrences of all matching user names.

Description:

Used without a parameter, this command has exactly the same effect as *BYE except it will terminate any printer job currently being generated from that station.

When followed by one or more user user names or station numbers (separated by commas), any user logged on using one of those user names or at one of those stations (except for the station originating this command, if that user is included in the list) will be logged off.

Wild cards are permitted, so that:

    *LOGOFF #IM

will log off all occurrences of users JIM, KIM and TIM etc.

    *LOGOFF *

will log off everyone except the person typing the command.

Anyone may use *LOGOFF without a parameter, otherwise system privilege is required.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

*NEXTPACC

Syntax : *NEXTPACC <Account number>

Description :

This program displays the next unused personal account number in the block of sixty-four accounts containing the specified account. If no free account exists in this block of sixty-four then the search will continue in to higher numbered accounts.

Examples:

```
*NEXTPACC 240
0278
```

Likely Errors:

Key Locked   Error 5 (05)
If an attempt is made to cancel a backup and the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   Error 186 (BA)
If the user attempts to cancel a backup and does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

Not available for RISC OS.

Syntax: *PGO | *PGO <logical printer name>

Description:

This command starts the printer server printing after a *PSTOP command has been given. The print job will be restarted from the beginning. The command is especially useful if the printer runs out of paper whilst printing a job.

System privilege is not required, nor does the key need to be in the SYST position, however access to either the main or auxilary account of the %PRINTQ directory is required.

Example:

```
*PGO PARALL
```

Likely Errors:

Insufficient access   Error 189 (BD)
If the user does not have access to either the main or auxilary account of the print queue directory.

Compatibility Notes:

Not supported by Acorn systems.

Syntax: ✳PSTOP | ✳PSTOP <logical printer name>

Description:

This command stops output on the specified printer, or all printers if no name is given. It is intended for use where the printer has jammed or is producing unwanted output. Printing is suspended, and any file which was printing is closed. The printer manager can then inspect the contents of the print queue, delete unwanted jobs, change the order of priority of jobs, and then use ✳PGO to resume printing.

Note that printers have an internal buffer which will not be cleared, so the output will continue for a short period after the command has been given. Most printers have a facility for setting the size of their internal buffers, this should be set to a minimum.

Example:

    ✳PSTOP

Likely Errors:

Insufficient access   Error 189 (BD)
If the user does not have access to either the main or auxilary account of the print queue directory.

Compatibility Notes:

Not supported by Acorn systems.

Syntax: CHAIN "SETSYSTEM"

Description:

This program is used for setting various system functions.

This includes the printer port which will be used for the output of system messages, the level of system message reporting and the privilege needed to set the time of the File Server clock.

```
                        - SETSYSTEM -
              System Setup for SJ Research File Server 254
```

Function	Status
Privilege needed to change File Server time	None
System messages printer port	Parallel
System message level	000 = Off

```
Key to System Message level options...

    000 = Off                          015 = *cat & opens
    005 = Logon/Logoff                 128 = Aborted loads
    007 = Errors                       130 = Fn codes
    010 = Maximum users & * commands   150 = Net errors
    011 = Load/save
```

```
Esc: Quit            Space: Toggle Data          f3: Save Details & Exit
```

To change an entry simply highlight the relevant field and press <Space> to rotate through possible legal values. In the case of the System Message level it is possible to enter the level you want by typing it directly. The possible System Message levels are displayed in a help table on screen. These levels are cumulative (10 includes the messages produced by 7 and 5). The normal system message level is 0 however serious system errors will always be printed.

Likely Errors:

Key Locked   Error 5 (05)
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   Error 186 (BA)
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

Compatible with RISC OS.

Syntax: CHAIN "SETBACKUP"

Description:

This program is used for setting the time of an auto backup.

When run the File Server will set a time at which it will go offline to perform a tape backup. This automatic backup can be cancelled using this program or with the *BACKUP utility. Any pending backup is always discarded when the File Server is switched on, or when it is put into Utility Mode. If the tape intended for backup is removed from the File Server then a system message will be printed to the effect that the backup is no longer possible. This is to alert anyone swapping tapes to the fact that they will need to replace the tape if the backup is to proceed as planned. If the tape is not replaced a system message will appear once every hour until such time as the correct tape is replaced.

The screen display is mostly status information on the tape currently loaded and any backup currently pending.

```
                          - SETBACKUP -
            Set Time for Backup on SJ Research File Server 254
_____

Current File Server Time:    20:01 on 13 Apr 89

Schedule for Next Backup:    Disc: Work                  Tape: Archive#1

                             Time: 23:00 on 13 Apr 89    Output report: Parallel
Tape Status:

        Tape Name:           Archive#1
        Description:         This tape only for backup of 'Work'
        Number of Passes:    536   (10% of nominal life expectancy)
        Tape Formatted:      14:10 on 01 Sep 88

        Current contents:    Disc "Work"   (Status: OK)
        Backed up at:        23:30 on 12 Mar 89
_____

Disc name to back up:        Work
Time to start Backup:        23:00 on 13 Apr 89
Output report:               Parallel

Time to next backup:            0 days,   02 hrs,   59 mins
_____

Esc: Quit      + - Space: Change Data     f3: Set Backup     f9: Cancel Backup
```

To change an entry simply highlight the relevant field and press <Space> to rotate through possible legal values. The date of the backup is changed using the + and - keys. The default disc name to be backed up will be the same as the name of the disc stored on the tape. If no disc name matches that on tape then the default will be the disc in drive 0. Should the tape be removed from the tape drive when a backup is pending then the File Server will print a system message warning that the pending backup will now fail. This message will continue to be printed at five minute intervals. When the correct tape is replaced in the tape drive a system message will be printed informing that the intended backup can now occur.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

Compatible with RISC OS.

Syntax: `CHAIN "SETTIME"`

Description:

This program sets the internal real-time clock in the File Server.

The program displays the current File Server date and time, and allows this to be altered. The time is set at the moment the press the space bar to set the clock to the time entered, allowing accurate synchronisation with the speaking clock or Greenwich pips.

Example:

The program display will be similar to the one below:

```
                             - SETTIME -
                Set clock on SJ Research File Server 254


     Hrs:14  Mins:22  Secs:17        Day:14  Month:Apr  Year:1989




     Esc: Quit        + - Space: Change Time        f3: Write Time & Exit
```

The cursor keys are used to moved between the different fields in the date and time. The + and - keys are used to alter the contents of a field either up or down.

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Supported by Acorn Level 3 systems.

RISC OS Notes:

Compatible with RISC OS.

Syntax: `CHAIN "SETTIME"`

Description:

This program sets the internal real-time clock in the File Server .

The program will prompt for the current date and time, and will then ask the user to press the space bar to set the clock to the time entered, allowing accurate synchronisation with the speaking clock or Greenwich pips.

Example:

The program will prompt as follows:

```
This program sets the File Server clock
It may only be used by Privileged Users

Use *TIME to see the present setting

Year : 1984

Month (1=Jan,12=Dec) :9

Day (1-30) :9

Hours (0-23) :9

Minutes (0-59) :18


Ready to set time to:
9/9/84   9:18


Press SPACE to set time, ESCAPE to abort
```

To set the time again with the same value, type **GOTO 370** after running the program (but note that this line number may change in different verions of SETTIME).

Likely Errors:

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege.

Compatibility Notes:

Supported by Acorn Level 3 systems.

Syntax: CHAIN "SIZER"

Description:

This BASIC program searches through a directory tree, finding every file and sub-directory. It will print out every file with its size in units of 1 kilobyte, and then give a grand total.

Anyone can use SIZER within their own directories, but system privilege is required if the root directory $ is specified for the directory to search, as **SIZER** will try to inspect the password file.

SIZER prints the true size of each file, which is the amount of disc space occupied by the file. This is not necessarily the same as the file's logical length, or *extent* (EXT# in BASIC). The disc space is used up in units of 1K, and so a file with an extent of 1 byte still occupies 1K on disc. In addition, large files require some extra space for the system to hold pointers; again this is included in the true file size.

In some cases though the size of the file may be *less* than the extent. This is because a file may be opened, some information written, and then the pointer moved to leave a large gap before further writing. Such sparse files will be allocated space in 1K blocks only where data has been written, and the size of the file as found by SIZER will be only that of the blocks actually allocated.

Example:

```
CHAIN"SIZER"

Directory to find size of?$
 Directory $                   4k
   Directory ACCOUNTS          1k
      Ashton                   1k

         .
         .
         .
         .
         .


    Total                    568k
```

Likely Errors:

Insufficient access   **Error 189 (BD)**
If there are files or sub-directories without public access **R**, and the user of SIZER does not have access to the account number of these.

xxxx not found   **Error 214 (D6)**
If there are files or sub-directories with access letter **P**, and the user of SIZER does not have access to the account number of these.

Key Locked   **Error 5 (05)**
If the key switch on the front panel of the MDFS is not in the SYST position and $ was specified.

Insufficient privilege   **Error 186 (BA)**
If the user does not have system privilege and $ was specified.

Compatibility Notes:

Not supported by Acorn systems.

4.4 The File Server program

The File Server Program is stored in a file on a disc called $.FS. The file may or may not be present on any of the discs that you use, floppy or hard. It is a large file, about 100kilobytes long, containing both the Utility Mode program and the File Server program, loaded by the system after the MDFS is switched on. It does not matter what its access string or account numbers are, as the system will always read it. It has a Checksum appended to it so that the system will not try to execute code which has been corrupted (e.g. by someone modifying the file). Being an ordinary file, it can be deleted (to leave more space on a floppy disc) or copied from another disc using **COPIER**. Remember to keep at least one disc containing $.FS, to use when switching on the system or entering utility mode.

A situation you must guard against is where you have several different versions of the File Server code on different discs. Depending which disc the File Server is booted from, the version of code will be different. Old versions of the code may contain bugs which later versions have solved, and you can get very confused when the old bug reappears even when you are apparently running the new software. The solution is to delete all old versions of the file $.FS when an updated version is recieved.

Since the file contains the Utility Mode software and the File Server software, there are in fact two version numbers. To get the version number of the File Server code *currently executing* type ***VERS**. The version number of the Utility Mode is printed at the top of the Main Menu (which you see when you attach with *FAST).

The following examples assume that the disc called **MASTER** is the master floppy disc sent with the MDFS, or a later upgrade, and **HARD1** is a winchester disc.

4.4.1 Copying new File Server software onto a winchester disc

You will have received a floppy disc in MDFS format, the master disc. Connect a floppy drive to the MDFS and put the disc in, making sure that there are no other floppy discs in any other drives. Start the File Server, log-on as a system-privileged user, and type:

```
*DIR $HARD1<return>                 selects the winchester
*ACCESS FS<return>                  unlocks the file, if necessary
*DELETE FS<return>
```

(We need to delete the file before running COPIER because of file access problems)

```
CHAIN"COPIER"<return>
Source Filing System: *<return>
Dest. Filing System: *<return>
File Name:$MASTER.FS<return>        read the fileserver code from the floppy
New  Name:$HARD1.FS<return>         and write it to the winchester
File Name:<escape>

*ACCESS FS PL<return>               Remove access to the file
```

You will now be able to start the system with the new software without using the master disc.

Syntax: CHAIN "SYSADM"

Description:

This BASIC program is a front end menu to all the system management programs. The program resides in the library so that it always provides quick and easy access to system management programs. To run any of the management programs simply highlight the program required and press return.
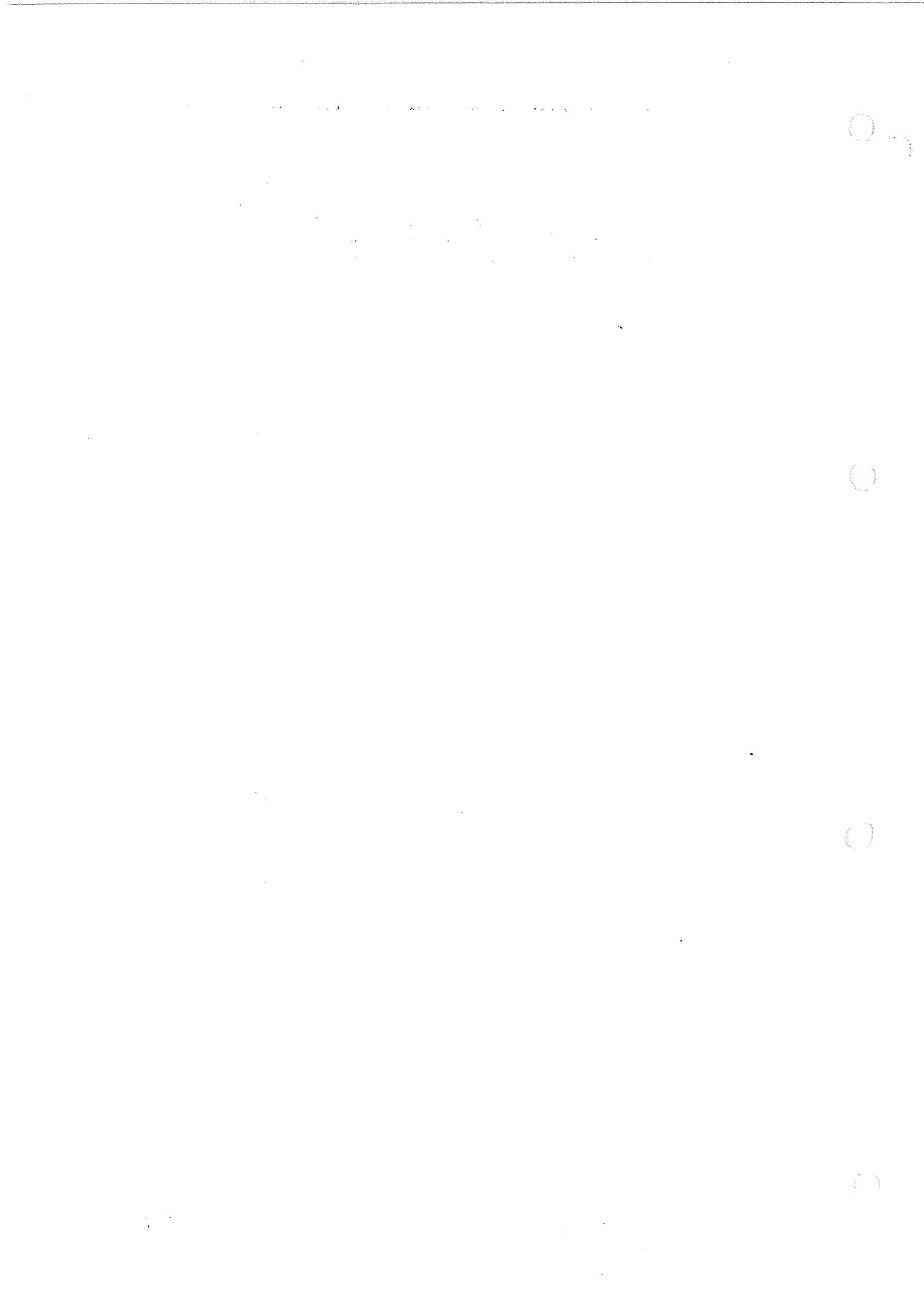
Syntax: ✳TAPEINFO

Description:

This command displays the tape id sector of the tape currently loaded in the tape drive. It is useful for checking the status of a tape which has been used for backup using the automatic backup facility

Example:

```
*TAPEINFO
Tape name: G-Daily#1
Passes: 2048
Description:
Disc name: Work
Backed up at: 04:49 on 14/06/89
Status: OK
```

Likely Errors:

Tape Cartridge not found   **Error 214 (D6)**

Compatibility Notes:

Not supported by Acorn systems.

RISC OS Notes:

RISC OS version supplied in $.ArthurLib.