

Running Under

LDOS

VERSION 5.1
THE TRS-80™ OPERATING SYSTEM
MODEL I AND III

LOGICAL
SYSTEMS
INC.
◻◻◻◻

Running under LDOS

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Introduction to the LDOS Operating System

The software package that you have purchased is provided on a special "scaled down" version of the LDOS operating system. This introduction will detail how to use the LDOS operating system to run and maintain your application program and data.

When running your program, you must use a backup of the master diskette. Under no circumstances should you ever run this program using the master diskette. The first thing you will want to do is "boot" up on the master diskette, so that you may make several backups of it.

NOTE - Your Master diskette comes write-protected with a small adhesive tab. DO NOT remove this tab from your Master diskette.

To make a backup of your master diskette, follow these instructions.

- 1.) Power up your computer, and any peripheral devices (e.g. a printer).
- 2.) Place the master diskette in drive 0. Boot this diskette into the system by pressing the computer's Reset button. Upon pressing the reset button, drive 0 will be activated, and the master diskette will be booted into the system. The screen will clear, and the LDOS logo will appear in block letters in the middle of the screen.
- 3.) Below the logo will appear a "Date ?" prompt. Whenever the computer is booted up from a power down state (or booted up after a different operating system has been used), this prompt will appear. You will be required to answer this prompt by entering the current date, in the format mm/dd/yy. Any improper date entry will be ignored, and the date prompt will reappear. After a proper date has been entered, the date prompt will be replaced by the corresponding day of the week, month, date of the month and year. After the date has been initially set, it will be maintained, so that you will not be prompted for it if the computer is booted again.
- 4.) After the boot up procedure has been completed, the prompt LDOS Ready will appear on the bottom of the screen. A date and a name will appear above the logo. These represent the diskette name and date that the diskette was created. Write down this name, as you will need it to perform the backup.
- 5.) The first thing you will need to do is FORMAT a diskette. Before diskettes may be used, they must be formatted (with sectors and cylinders) so that information may be stored on them. To format a diskette, place a NEW diskette in drive 1, and enter the following command.

```
FORMAT :1 (Q=N,NAME)
```

Caution - The default step rate will be 6 ms. for the Model III. If this is not suitable for your hardware, use the additional parameter STEP=3 inside the parentheses for the FORMAT command For example:

```
FORMAT :1 (Q=N,NAME,STEP=3)
```

6.) A sign-on message will appear on the top of the screen, indicating that the LDOS Format program is now operating. You will see the following prompt appear:

```
DISKETTE NAME ?
```

Answer this prompt by typing in the diskette name from step 4.

7.) The format procedure will now take place. You will see information on the screen describing the formatting process. After the format has been completed, you will see the LDOS Ready prompt re-appear on the screen.

8.) You may now make a backup (duplicate copy) of your master diskette. To do so, enter the following command:

```
BACKUP :0 :1
```

After the above command is entered, your master diskette will make a duplicate copy of itself onto the diskette in drive 1. When the backup is completed, the LOOS Ready prompt will reappear.

NOTE - There will be several informative messages that will appear on the screen during the Backup process. One of these messages will say "Cannot Clear Mod Flags -- Source disk is write protected". This is a normal occurrence, and does not indicate that the Backup procedure failed.

9.) Remove the diskette from drive 1, and label it as being a backup of the master. You will now want to create an additional backup of the master. To do so, follow the procedures outlined in steps 5-8 above. Once you have made an additional backup, remove the master diskette from drive 0, place it in its protective sleeve, and store it in a safe place. Your master should only be used in case both of the backups you have just made fail to operate.

The following procedure will explain how to create and backup data diskettes that will be used by your program. Data diskettes will be formatted diskettes that contain the information that your program will access. Generally speaking, your program diskette will be used in drive 0 and will contain only the program and the operating system. All data used by your program will be stored on formatted data diskettes. If specific instructions are NOT contained in your user's manual dealing with backup procedures, the following steps should be used to create and backup your data diskettes.

Creating Data Diskettes

To create a data diskette, follow these instructions.

10.) Follow steps 1-4 above. At the LDOS Ready prompt, format a new diskette as explained in step 5. Answer the DISKETTE NAME? prompt (explained in step 6) by typing in an informative name that you wish to assign to the diskette. The diskette name that you use will appear when a DIRectory of the diskette is displayed.

11.) After the FORMAT has completed, you may use the diskette to store the data that will be accessed by your program. Label this diskette as being your data diskette.

Backing up data diskettes

To make a backup of your data diskette, follow these steps.

12.) Follow the procedures outlined above in steps 1-4. Format a new diskette as explained in step 5. Answer the DISKETTE NAME? prompt in step 6 with the name that you assigned to the data diskette when it was initially formatted.

13.) When the formatting is completed, enter the following command.

```
BACKUP :0 :1 (X)
```

You will be prompted by the Backup utility to insert the source diskette into drive 0. Remove the SYSTEM diskette from drive 0, and insert your data diskette. Press <ENTER> after you have done so.

14.) Your data diskette will now be backed-up to the newly formatted diskette in drive 1. After the backup is completed, you will be prompted to insert the SYSTEM diskette in drive 0. Do so, and press <ENTER>. The backup will then be complete. Label this diskette as being a backup copy of your data diskette.

15.) After you make the initial backup of your data diskette, you need only follow the backup procedure outlined above to make subsequent backups, as a diskette only needs to be formatted once. Since computer equipment can fail, data diskettes should be backed up on a regular basis. You may wish to have several backups of your data diskette, and perform backups on a rotating basis.

For example, suppose you have 3 backups of your data diskette, labeled "BACKUP 1", "BACKUP 2", and "BACKUP 3". Each time you make a backup of your data diskette, you will rotate the diskettes, so that the first backup copy will be made to the diskette labeled "BACKUP 1", the second to the diskette labeled "BACKUP 2", and the third to the diskette labeled "BACKUP 3". After you have used the "BACKUP 3" diskette, the next backup will be made to "BACKUP 1". This type of backup procedure will minimize loss of data due to failure of computer equipment or diskettes, as you will always have a most recent backup of your data, along with two backups of your prior sessions.

Note: The procedure outlined above for backing up data diskettes assumes that you have two drives. If you have 3 drives, you may place your data diskette in drive 1, and format a new diskette in drive 2 by entering the command:

```
FORMAT :2 (Q=N,NAME)
```

After this diskette has been formatted, you may backup your data diskette to this newly formatted diskette by entering the command:

```
BACKUP :1 :2
```

This procedure will allow you to backup your data diskettes without having to switch diskettes during the backup.

Establishing a Configuration File

To operate your program properly, you MUST establish a "Configuration File". A configuration file will contain information needed by the computer to run your program. After you have made your backups of the program diskette and have created data diskettes, follow these instructions to establish a configuration file.

1.) Boot up your computer using one of the backups of the master program diskette that you have just made. Make sure that the diskette you use is not write protected.

2.) At the LDOS Ready prompt, enter the following command.

```
DO CONFIG
```

3.) A series of operations will now take place. These operations will initialize all information needed by the computer to run your program. After the configuration process has been completed, the LDOS Ready prompt will appear. When it does, enter the following command.

```
SYSTEM (SYSGEN)
```

The configuration file will be saved on the diskette in drive 0. When the operation has been completed, the LDOS Ready prompt will appear. Label this diskette as being "Configured" for your program. You will only need to perform this configuration once, as the configuration file will be written to this diskette. Whenever you run your program, you will need to boot up on this diskette, so that the proper configuration will be present. Specific instructions on how to run your program will be contained in the user's manual. You should make a Backup of this diskette and label it "Configured".

Note You will NOT need to establish a configuration file on any backup of a "Configured" diskette. If you should ever have to create a NEW program diskette (by making a backup of the master program diskette), you will need to perform this configuration process again, using the procedure above.

Depending on your program, you may be allowed to add additional enhancements to your configuration file to improve program performance and storage capabilities. Your user's manual will tell you if any additional enhancements can be made. More information on adding enhancements to the configuration file will be found on pages 6-8 of this introduction.

Once you have made your backups and created your data diskettes and configuration file, refer to your user's manual for instructions on how to set up and begin using your program.

Additional Information

The previous explanation described the procedure needed to get started and maintain the data created by your program. However, there are several operations that you might be able to perform to enhance the operation of your program and allow for easy maintenance of your data. There are many additional ways that the Backup and Format commands can be implemented. Also, several prompts that could appear during a Format and Backup were not explained in the procedures above. For this reason, several sections of the LDOS manual are contained at the end of this introduction. These sections will detail how to use these additional features with your program. Your user's manual will tell you whether you will be able to implement these features. If a feature can be used with your program, refer to the section in question to obtain the specific information.

This introduction will cover all necessary information needed to run and maintain your program. However, there are many features in LDOS that will not be discussed, since normal operation does not require the use of them. An LDOS manual can be purchased if you wish to have a detailed explanation of all features in the LDOS operating system. Contact Logical Systems Inc. for further information on obtaining an LDOS user's manual.

Viewing files

To view files that exist on your diskette, you may use the DIR command. For example, suppose you wish to see a display of all visible files that are on drive 0. To do so, enter the following command at the LDOS Ready prompt.

```
DIR :0
```

Doing so will display on the screen all visible files on the diskette in drive 0. There are many different ways to use the DIR command to display information concerning the files that are on a diskette.

For more specific information on the DIR command, see the DIR section of this introduction.

Removing files from a diskette

Any unwanted file may be removed from the disk by using the KILL command. This will remove the file from the directory, and free up the data storage space taken up by the file. Once a file is KILLED, the information stored in that file will be inaccessible, so make sure that the file to be killed is no longer needed. For more information on removing files, see the KILL section of this introduction.

Enhanced Operational Guide

Keyboard enhancement driver - Model I & Model III

NOTE - The configuration file on your diskette may already contain this enhancement. Your user's manual will tell you if it is a part of your configuration. If it is, you should read this section of the manual to understand the enhancements that have been added. You will NOT need to follow the steps to establish the keyboard driver.

The keyboard enhancement driver (keyboard driver) will establish several additional features when using your keyboard. If you have lower case hardware in your keyboard, the keyboard driver will allow you to enter and display characters in lower case. Standard keyboard entries will be made in UPPER case. This will be referred to as the Caps Lock mode. By holding down the <SHIFT> key and depressing the <0> key, you will be able to toggle between the Caps Lock mode and the Standard mode. In the Standard mode, your keyboard will function similarly to a typewriter, where all unshifted alphabetic entries will be in lower case and all shifted alphabetic entries will be in upper case. By pressing <SHIFT><0> once, you will be in the Standard mode. Pressing it again will return you to the Caps Lock mode. (Note - Upper and lower case are usable on the Model III without the keyboard driver. The explanation concerning the use of upper and lower case has been provided merely for the user's benefit.)

The keyboard driver also allows for key repeat and type ahead. Key repeat will cause a keystroke to be repeated if the key is held down for longer than one second. The repeat rate will be approximately 10 characters per second. Type ahead will allow you to enter the next LDOS command while the computer is performing a different operation. Your keystrokes will be saved, and when the computer is done with the operation, any keystrokes that were typed ahead will be displayed and acted upon. (Note - Key repeat is usable on the Model III without the keyboard driver. However, the key repeat rate will be increased when the keyboard driver is used.)

Note: Type ahead will be disabled during format and backup procedures.

To establish the keyboard driver to be a part of your configuration file, follow these steps.

- 1.) Boot up your computer with the system disk that you will be using in normal operation.
- 2.) At the LDOS Ready prompt, enter the following command.

```
SET *KI KI (T)
```

Doing so will establish the keyboard driver with the type ahead feature.

- 3.) To make this a permanent part of your configuration file, enter the following command:

```
SYSTEM (SYSGEN)
```

After this has been done, the keyboard driver will be incorporated into your configuration file, and will be activated every time you boot up on the diskette in drive 0.

Running in double density - Model I

If you have a supported double density hardware modification in your Radio Shack expansion interface, your program may allow you to take advantage of the added storage capacities obtained by using double density. Your user's manual will tell you if the program can be operated using double density. If so, you will need to add the appropriate double density driver to the "Configuration" file that is loaded when the system diskette is booted.

To add a double density driver to your configuration file, follow these steps.

- 1.) Boot up your computer with the system diskette that you will be using in normal operation.
- 2.) At the LDOS Ready prompt, enter one of the following commands (depending on the double density hardware modification you are using).

RDUBL - (for the Radio Shack double density modification)

PDUBL - (for non-Radio Shack double density modifications)

- 3.) When the LDOS Ready prompt appears, the appropriate double density driver will be usable. To make this a permanent part of your configuration, enter the following command:

SYSTEM (SYSGEN)

Your program will now be able to operate using double density diskettes. Because the formatting of a diskette determines the type of density (single/double) that will be used when writing information to the diskette, you will need to format your data diskettes in double density. Refer to the detailed description of the Format utility for more information.

Increasing your disk drive stepping rate - Model I

The standard configuration on your program diskette allows for your disk drives to step at 40 ms. LDOS does provide a means to alter this drive stepping rate. Increasing the disk drive step rate will decrease the time required to access information from the diskette. If you are using drives which will step at a faster rate than 40 ms, follow these instructions to increase the stepping rate (To obtain the fastest stepping rates that your drives will allow, contact your hardware vendor).

- 1.) Boot up your computer with the system disk that you will be using in normal operation.

2.) At the LDOS Ready prompt, enter the following command (note that the 'n' and 'x' will represent numbers in the range of 0 to 3, and will be explained in step 3).

```
SYSTEM (DRIVE=n,STEP=x)
```

3.) The 'n' following the 'DRIVE=' will represent the drive number that you wish to change the step rate. The 'x' following the 'STEP=' will determine the step rate that is used. Use this table to determine the appropriate value for 'x'.

```
x=0 -- Step rate of 6 ms.  
x=1 -- Step rate of 12 ms.  
x=2 -- Step rate of 20 ms.  
x=3 -- Step rate of 40 ms.
```

For example, if drive 1 in your system can be stepped at 20 ms, you would enter the following command.

```
SYSTEM (DRIVE=1,STEP=2)
```

4.) Repeat this command for all drives in your system that you wish to change the step rate. After you have done so, enter the following command:

```
SYSTEM (SYSGEN)
```

The stepping rates assigned to your drives will now be saved in the configuration file. Every time you boot on the drive 0 diskette, the drives will be set to step at the rate specified.

DIR

This is the command which allows the examination of a disk directory. Several parameters are allowed to set the type of data that will be displayed. The syntax is:

```
=====
| DIR :d (parm,parm,parm)
| DIR filespec:d (parm,parm,parm)
| DIR partspec with wcc:d (parm,parm,parm)
| DIR -partspec with wcc:d (parm,parm,parm)
|
| wcc      WildCard Character <$> used as
|          required for masking characters.
|
| :d       Optional drive specification.
|
| Allowable parameters are as follows:
|
| A        Display the directory in full Allocation format.
|
| INV      Display the Invisible files.
|
| MOD      Display Modified files.
|
| N        Non-stop display mode (will not pause after
|          each 15 lines). Assumed if "P" is selected.
|
| P        Direct output to the Printer.
|
| SYS      Display the System files.
|
| DATE     "M1/D1/Y1-M2/D2/Y2" will display those files
|          whose mod dates fall between the two dates
|          specified, inclusive.
|
|          "M1/D1/Y1" will display those files whose mod
|          dates are equal to the date specified.
|
|          "-M1/D1/Y1" will display those files whose mod
|          dates are less than or equal to the date
|          specified.
|
|          "M1/D1/Y1-" will display those files whose mod
|          dates are greater than or equal the date
|          specified.
|
| SORT     the switch YES or NO. YES is the default.
|
| abbr: DATE=D, INV=I, MOD=M, SYS=S YES=Y, NO=N, SORT=O
|
=====
```

LDOS reserves a certain portion of every disk to keep information about the files and free space available on a disk. This space is called the disk's directory. The maximum number of files a directory can hold, as well as the available free space will be determined by the number of sides, the density, and the number of cylinders on the disk. LDOS will always reserve certain portions of the directory space to store its own operating system files. The following chart shows the maximum number of files available to the user with different disk types.

| Size | Density | Sides | User Files Available |
|------|---------|-------|----------------------|
| 5" | Single | 1 | 48 |
| 5" | Single | 2 | 128 |
| 5" | Double | 1 | 112 |
| 5" | Double | 2 | 240 |
| 8" | Single | 1 | 96 |
| 8" | Single | 2 | 224 |
| 8" | Double | 1 | 208 |
| 8" | Double | 2 | 240 |
| 5" | Hard | | 240 |
| 8" | Hard | | 240 |

There are 16 additional file spaces available in the directory, but are reserved for system (/SYS) files used by LDOS. This will be true even if there are no system files present on the disk.

The maximum storage on a disk is determined by two things - the amount of free space and the number of directory records. Reaching the maximum on either will prevent any more information from being written to the disk. It will be necessary to remove existing files before anything more can be written to that disk. Files can be removed with the KILL library command.

There will be three classifications of files used when discussing a disk's directory. They are system files, invisible files, and visible files.

System files contain the instructions used by LDOS to perform most of its basic operations. They are identified by the extension /SYS. These files will not normally be seen when issuing a DIR command.

Invisible files can be any files that you do not wish to normally see with a DIR command. Most LDOS utility files are set to invisible on your master disk. The library command ATTRIB allows changing the visibility of a file.

Visible files are those seen when doing a simple DIR command. These are usually your program and data files.

The reason for having methods of keeping files from being displayed by a simple DIR command is one of readability. It is much easier to find program and data files on a disk if you do not have to search through all the different system and utility filenames. Of course, parameters are provided to allow all files on a disk to be displayed.

Directory parameters

The first parameter discussed will be the drivespec. It is generally entered as a colon followed by the desired drive number. The command DIR :0 would display the directory of logical drive 0, and DIR :5 would do the same for drive 5. The command DIR with no drivespec would display the directories of all enabled drives. Specifying a drive that is not enabled will cause an "Illegal drive number" error message to appear. If you are doing a DIR command, you may omit the colon if you are not specifying a filespec or partspec. The command DIR 0 would be the same as DIR :0.

The parameters to include the system and invisible files are S and I. Visible files will always be included in any display. The command DIR :0 (I) would display all visible and invisible files on drive 0, the command DIR :0 (S) would display all visible and system files, and the command DIR :0 (I,S) would display all files.

The directory display will normally show files sorted alphabetically in three columns across the screen. A typical display of an LDOS disk done with the command DIR :0 may appear as follows:

```
Free space= 118.5 K Drive 0 SMALLDOS -- 03/23/82

HITAPE/CMD P   PR/FLT P   REPAIR/CMD P
```

Including the S and I parameters will show all files in the directory. The command DIR :0 (I,S) may produce a display such as:

```
Free space 118.5 K Drive 0 SMALLDOS -- 03/23/82

BACKUP/CMD IP      BOOT/SYS SIP      CONV/CMD IP
DIR/SYS SIP        FORMAT/CMD IP     HITAPE/CMD P
KI/DVR IP          LBASIC/CMD IP     LBASIC/OV3 IP
PR/FLT P           REPAIR/CMD P      SYS0/SYS SIP
SYS1/SYS SIP       SYS10/SYS SIP     SYS11/SYS SIP
SYS2/SYS SIP       SYS3/SYS SIP      SYS4/SYS SIP
SYS6/SYS SIP       SYS7/SYS SIP      SYS8/SYS SIP
```

The A parameter will show a disk's directory in allocation format. The command DIR :0 (I,S,A) may produce a typical display as follows:

```
Free space= 118.5 K Drive 0 SMALLDOS -- 03/23/82

Filespec Attributes Prot / LRL #Recs / Ext File Space Mod Date

BACKUP/CMD IP      EXEC / 256      21 / 1 S=   6.0K 23-Mar-82
BOOT/SYS SIP       EXEC / 256      5 / 1 S=   1.5K
DIR/SYS SIP        READ / 256     18 / 1 S=   4.5K
FORMAT/CMD IP      EXEC / 256     19 / 1 S=   6.0K 23-Mar-82
KI/DVR IP          EXEC / 256      6 / 1 S=   1.5K 23-Mar-82
LBASIC/CMD IP      EXEC / 256     20 / 1 S=   6.0K 23-Mar-82
-----
aaaaaaaaaaaaaaaaaa bbbb ccc dd ee ffffffff ggggggggg
```

As you can see from the previous displays, every directory command shows more than just the filenames. The first line gives the amount of free space on the disk, followed by the drive number, the disk name and the date of creation. The letters P, I, and S, and the plus sign (+) appear after certain filenames. The fields a-g shown in the allocation example describe all information about a directory entry.

a The first information in this field will be the filename and extension. It may be followed by certain letters or a plus sign, indicating:

- I indicates the file has been declared invisible.
- P indicates the file is password protected.
- S indicates the file is a system file.
- + is called the "mod flag", and indicates the file has been modified since it was last backed up.

The letters I, P, S and the mod flag may appear separately or in any combination to show the file's actual status.

b This field shows the protection level of the file, and can be set or changed with the ATTRIB library command.

c This is the length of each logical record in the file.

d This is the number of logical records in the file.

e This is the number of extents (non-contiguous blocks of space) in which the file is stored.

f This is the amount of space in K (1K = 1024 bytes) that the file takes up on the disk.

g This is the date that the file was created or last written to. If you have used the SYSTEM library command to disable the initial DATE prompt when powering up the system, this date cannot be established or updated. If date is not set and you write to a dated file, plus signs will be inserted into the date field, producing a date such as 10+Oct+81. It is strongly recommended that the initial DATE prompt never be disabled, as a file's date can be used in many different ways.

The directory display will normally go to the video display (the *DO device). It will automatically pause after every 15 lines of display. Pressing <BREAK> will terminate the display, while pressing any other key will continue with another 15 lines. The display may be made to scroll without pause if the N parameter is specified in the DIR command. If the DIR command is executed from a DO file, the N parameter will automatically be set. You may use the <SHIFT><@> keys to pause the display if this is the case.

The P parameter will send the display to the line printer (*PR device) as well as the video. The P parameter will automatically set the N parameter, and will print the entire directory without pause.

The DATE or D parameter is used to view files whose mod dates match a certain date or fall within a specified range of dates. The current LDOS release requires dates to be within the range 01/01/80 to 12/31/87.

The MOD or M parameter is used to display only those files that have been modified since the last backup.

The directory display will normally be shown sorted in alphabetical order. To disable this feature, specify SORT=NO as a parameter when issuing a DIR command. The BACKUP utility accesses files in their unsorted order. You may see the same order of unsorted access by specifying the SORT=NO parameter.

Using filespecs and partspecs

Along with the previous parameters, LDOS provides other methods for locating files in a disk directory. Three terms will be used when discussing these parameters - "filespec", "partspec", and "wcc" (WildCard Character). Filespec refers to a file's name and extension. For example, the filespec BACKUP/CMD has the filename BACKUP and the extension /CMD. A partspec would be any part or parts of a filespec. Wcc means a special symbol (the dollar sign "\$") used in place of characters in a filespec or partspec.

For example, a command using a partspec is:

```
DIR /CMD:0
```

This would show only visible files with the extension /CMD on drive :0. You can always include any of the A, I, M, N, P, S, DATE, or SORT parameters whenever using any filespec, partspec, or wcc.

You may use a filename, a file extension, or both together in any DIR command. It is not necessary to use the complete name or extension. The wcc mask character (\$) can be used to mask out certain groups of characters when using a filespec or partspec. Using a partial filename or extension provides the opposite function of using a wcc. Refer to the following:

Using a partial filename will display all files whose name start with those characters, regardless of how many other characters follow. The commands:

```
DIR BACK:0
DIR BA/C
DIR BACK/CMD
```

would all display the file BACKUP/CMD, although any other files matching the partspecs would also be displayed.

The wcc mask (\$) is used to mask out leading characters in a filename or extension. For example:

```
DIR $$$SUP:0
DIR $$CK:0
DIR BACK/$$D:0
```

Entering any of these DIR commands would again all display the file BACKUP/CMD, along with any other files that match the criteria. Using wcc's after a partspec will have no effect on the command, and they will be ignored. All files that meet the specified leading criteria will be displayed, regardless of the number of other characters in the filename or extension. A wcc may also be used in the middle of a partspec. For example, the commands:

```
DIR B$CK:0
DIR B$$$$P:0
DIR BA/C$D:0
```

would all display the file BACKUP/CMD, along with other matching files.

Using -filespecs and -partspecs

Entering the "not" symbol (the minus sign) in front of a filespec or partspec declares it to be a "not filespec" or "not partspec". The -specs are used to exclude files from a directory display. The same rules concerning filespecs, partspecs and the wcc mask apply exactly the same for -specs as for normal file and part specs. For example, the commands:

```
DIR -BA:0
DIR -/CMD:0
DIR -/$$D:0
```

would show all files on drive 0 except for BACKUP/CMD, and any other files that match the -spec criteria.

K I L L

This is used to delete a specified file from a disk. The syntax is:

```
=====
| KILL filespec
|
| no parameters are required
|
| abbr: NONE
|
=====
```

The KILL command removes unwanted files from a diskette, thereby freeing up the space previously allocated to that file.

To kill a file, type in the following command at the LDOS Ready prompt:

```
KILL filespec
```

If the file is password protected, you must supply the proper password or the file will not be killed. Passwords for all files on your LDOS master diskette may be found in Section I.

Here are some examples of KILLing files:

```
KILL ALPHA/DAT:0
```

This command will KILL the file named ALPHA/DAT that is present on drive 0. After execution of this command the file and the data in it will no longer be accessible to the system, so KILL carefully.

```
KILL DELTA/DAT
```

This command will KILL the file DELTA/DAT on the first drive that it is on. Be careful! Without a drivespec you could KILL the file where you did not intend to.

```
KILL MIDWEST/DAT.SECRET:0
```

This command will KILL the password protected file MIDWEST/DAT.SECRET on drive 0, as long as SECRET is the proper password. If the file's attributes include a protection level of NAME or higher, SECRET must be the update password to kill the file. If the proper password is not supplied, an error will be generated and the file will not be killed.

B A C K U P

The BACKUP utility is provided to duplicate data from a source disk to a destination disk. The syntax is:

```
=====
| BACKUP :s TO :d (parm,parm)
| BACKUP partspec w/wcc:s TO :d (parm,parm)
| BACKUP -partspec w/wcc:s TO :d (parm,parm)
|
| :s          the SOURCE drivespec.
| :d          the DESTINATION drivespec.
|
|          Allowable parameters are as follows:
|
| MPW="aa" passes the source disk's Master Password.
|
| VIS        indicates Visible files.
|
| SYS        indicates System files.
|
| INV        indicates Invisible files.
|
| MOD        indicates files Modified since last backup.
|
| QUERY      parameter indicating Query each file before
|            moving. The switch ON or OFF may be specified.
|
| OLD        will backup only those files already existing
|            on the destination disk.
|
| NEW        will backup only those files not already on
|            the destination disk.
|
| X          allows backups with no system disk in drive 0.
|
| DATE=      "M1/D1/Y1-M2/D2/Y2" will backup only those
|            files whose mod dates fall between the two
|            dates specified, inclusive.
|
|            "M1/D1/Y1" will backup all files with mod
|            dates equal to the specified date.
|
|            "-M1/D1/Y1" will backup all files with mod
|            dates less than or equal to the specified date.
|
|            "M1/D1/Y1-" will backup all files with mod
|            dates greater or equal to the specified date.
|
| abbr: QUERY=Q, INV=I, MOD=M, SYS=S, VIS=V, DATE=D
|
=====
```

The BACKUP command will move all or part of the data from a specified source disk to a specified destination disk.

The parameters of the BACKUP command may be used to determine which data will be moved. All of the parameters are optional, with only the source and destination drivespecs being prompted for if not entered. If the source disk contains a password other than "PASSWORD", it will be prompted for if not passed with the MPW= parameter.

*** NOTE ***

Due to the complexities involved with handling many different disk drive configurations, the LDOS BACKUP utility demands that destination disks must be formatted before the backup begins. This format before backup requirement is found in most large operating systems that allow many different diskette types. Having the destination disk formatted will allow the BACKUP utility to determine if a Mirror Image (exact cylinder for cylinder copy) backup is possible, or if it will be necessary for the backup utility to do a file by file duplication.

There are three types of backups available with LDOS. They are MIRROR IMAGE, BACKUP BY CLASS, and BACKUP RECONSTRUCT. Certain rules determine which type of backup will be done.

A mirror image backup will be attempted if the size (5" or 8" floppy), the density, and the number of sides are identical on the source and destination disks. The number of cylinders need not be identical as long as the destination disk has a cylinder count greater than or equal to the source disk.

A backup by class will be done if the user specifies a partspec or any parameter except "X" or "MPW" in the command line.

A backup reconstruct will be done if the size (5", 8" or hard), the density, or the number of sides differs between the source and destination disks.

A backup by class and a backup reconstruct function identically, doing a file by file copy. The only difference is that a backup by class is initiated by the user and a backup reconstruct is initiated by the system.

It is necessary for backup to turn off the system real time clock during certain operations. For this reason, the message:

NOTE: REAL TIME CLOCK NO LONGER ACCURATE

will appear after the completion of the backup. This is merely an informative message reminding you the clock is no longer accurate.

If the backup is being done from a DO file, the following rules will apply:

If the backup is mirror image, the Pack IDs (disk name and master password) must be the same or the backup will abort.

Backup with the (X) parameter, single drive backups, and backups with the (Q) parameter cannot be done from a DO file.

Mirror image backups

A mirror image backup is basically a cylinder for cylinder copy from the source to the destination disk, with only those cylinders that actually contain data being moved. The date on the destination disk will be changed to the current system date. However, the boot sector containing the bootstrap step rate will remain untouched on the destination disk.

A mirror image backup will always compare the disk Pack ID's (disk name and master password) to make sure they are identical. If they are not, you will see the following message:

DIFFERENT PACK ID'S! ABORT BACKUP?

Answer this question <Y> to abort the backup or <N> to continue the backup. If you use informational disk names when formatting diskettes, this checking of Pack ID's should help prevent you from backing up the wrong disks.

If the source and destination disks have different cylinder counts, the following message will appear:

CYLINDER COUNTS DIFFER - ATTEMPT MIRROR IMAGE BACKUP?

Answer this prompt <Y> to attempt a mirror image backup or <N> to force a backup reconstruct. The destination disk will have its directory on the same track as the source disk, even though this may not have been the case before the backup began. The information on the destination disk will be updated to reflect the true cylinder count and available free space. You may also see the following message appear at times:

BACKUP ABORTED! DESTINATION NOT MIRROR-IMAGE.

This will occur if the destination disk is missing a cylinder that contains information on the source disk. This may be the case if the destination disk was formatted with fewer cylinders than the source disk, or if cylinders were locked out on the destination disk during formatting.

After all cylinders are moved to the destination disk, the backup utility will attempt to remove the mod flags from the source disk. If the disk is write protected, you will see the message:

CAN'T REMOVE MOD FLAGS - SOURCE DISK IS WRITE PROTECTED

After the backup has completed, the destination disk will have the same Pack ID as the source disk, and the disk date will be changed to the current date.

Backup by class and Backup reconstruct

These two backup types function identically, doing a file for file copy from the source to the destination disk. Unlike a mirror image backup, files that exist on the destination disk but are not on the source disk will remain untouched by the backup. When the backup is complete, the destination disk will contain all files moved from the source disk plus any other files that existed on the destination disk before the backup began. The destination disk Pack ID and date will not be changed by the backup.

There are some things done when the file SYS0/SYS is included in this type of backup that are not readily apparent. Certain information about the default drive types and the state of the system configuration are moved from the source to the destination disk. The destination will have the following parameters set equal to those on the source disk, regardless of how the destination disk was previously configured.

The state of the configuration (on or off) of the destination disk will be changed to match that of the source disk.

The initial date prompt (on/off) on power up will be set to match that of the source disk.

The default drive configurations will match those of the source disk.

It is possible to backup from a disk with a capacity greater than that of the destination disk, such as from a hard drive to a 5" floppy. To do this, format as many destination disks as will be needed to hold all of the information to be moved. As the backup progresses and the first destination disk is filled, you will be prompted with the flashing message:

```
DISK IS FULL. ENTER NEW FORMATTED DESTINATION DISK <ENTER>
```

At this point, remove the full destination disk and insert a new formatted disk in the drive. Pressing <ENTER> will cause the backup to continue. You may perform this disk swap as many times as necessary to complete the backup.

Backup will not allow a single file to be split across destination disks. If you have a file that is larger than the capacity of the destination disk, you will not be able to copy it with the backup command.

Both backup by class and backup reconstruct will attempt to remove the mod flags from the source disk. If the source disk is write protected, you will see the following message appear after the first file has been copied:

```
CAN'T REMOVE MOD FLAGS - SOURCE DISK IS WRITE PROTECTED
```

To provide a more readable display, this message will not be displayed after every file, although the mod flags will not be removed from any source files.

Backups with the (X) parameter

The X parameter will allow you to perform backups without the need for the system files to be on the drive 0 disk. This will allow backing up data disks, as long as they will allow a mirror image backup to be done.

When doing a backup with the X parameter, you will be prompted to insert the proper disk in drive 0. You may be prompted to switch drive 0 diskettes, depending the direction of the backup you are doing.

Using the backup parameters

Many of the backup parameters are identical to those in the DIR library command. These parameters will allow you to choose the groups of files you wish to backup to your destination disk. All parameters may be used singly or in combination with any other parameters.

If no parameters are specified and a backup reconstruct is initiated by the computer, all files will be moved from the source to the destination. You may restrict this to visible, invisible, or system files with the VIS, INV, or SYS parameters.

The MOD and DATE parameters will allow you to choose only those files that have been modified since their last backup, or fall within a specified range of dates. This will be very useful on drives with large capacities, as it will not be necessary to backup the whole disk to obtain new copies of files that have changed.

The OLD and NEW parameters provide an easy method to update disks without placing unwanted information on the destination disk.

The QUERY parameter will show you each file before it is backed up, including the file's date and mod flag status. You may tell backup to copy the file by pressing the <Y> key. Pressing <N> or <ENTER> will bypass the file and show you the next. Pressing the <C> key will copy the current file, and shut off the Query function. All files from that point on will automatically be copied.

The use of partspecs, -partspecs (not partspecs), and the wcc (wildcard character) will let you choose files based on their filename and extension. You may use these in combination with any of the previously mentioned parameters.

Examples of backup commands

Following are some examples and descriptions of the backup command. Please note that in all examples, the source disk's master password will be asked for if it is other than PASSWORD and is not specified with the MPW parameter. If the Q parameter is specified, the file's mod date and mod flag will be shown along with the filespec.

BACKUP :0 :1

This command will attempt a mirror image backup, using drive 0 as the source drive and drive 1 as the destination drive. If the drives are differently configured, a backup reconstruct will be invoked. All files will be moved from drive 0 to drive 1, with the exception of DIR/SYS and BOOT/SYS if a reconstruct is invoked.

BACKUP \$:0 :1

The wcc (\$) in this command will cause a backup by class. All files will be examined, and all files (except BOOT/SYS and DIR/SYS) will be copied because they will "match" the single wcc. This command is the way to force a backup by class in situations where a mirror image would normally have been done. This might be to remove unwanted "extents" from files on the source disk by copying them onto a cleanly formatted destination drive.

BACKUP :0 :1 (Q)

This command will function identically to the previous example, except that you will be asked before each file is moved. You will also see the mod date and mod flag for each file.

BACKUP :1 :2 (VIS)

This command will copy all visible files in drive 1's directory to drive 2. A backup by class will automatically be invoked.

BACKUP :2 :1 (INV)

This command will copy all files that are invisible in drive 2's directory to drive 1, invoking a backup by class. Note that the system files will not be copied, although they are invisible in a normal directory display.

BACKUP :0 :1 (SYS)

This command will backup all system files from drive 0 to drive 1, invoking a backup by class.

BACKUP :0 :1 (VIS,INV)

This command will backup every visible and invisible user file from drive 0 to drive 1, invoking a backup by class. In other words, this command will copy all files except the system files.

BACKUP :0 :1 (MOD,Q,MPW="SECRET")

This command will copy all files that have been modified (written to) from drive 0 to drive 1. It will query each file before it is copied, also showing the file's mod date and flag. The master password was passed with the (MPW=) parameter and will not be asked for.

BACKUP /CMD:0 :1
BACKUP \$/CMD:0 :1

This command will force a backup by class, with the file class specified as /CMD. All files with the extension /CMD will be copied from drive 0 to drive 1. Note that the wcc (\$) has no actual effect on the backup. Specifying the /CMD will look at all /CMD files, just as the \$/CMD will. If the file exists on drive 1 it will be overwritten, otherwise it will be created at this time. No files on drive 1 will be touched except for the /CMD files copied from drive 0.

BACKUP \$\$\$\$\$AT:2 :3 (MOD)

This command will backup all files whose filename is 8 characters long and contains AT as the last two letters. Only those files that meet this criteria and have been modified will be copied. A backup by class will be invoked.

BACKUP /\$\$S:1 :2

This command will backup all files whose extensions are 3 characters long, ending with the letter S. The wcc (\$) masks the first two characters of the extension, so the extensions /BAS, /TSS, /SYS, etc. would all match. A backup by class will be invoked.

BACKUP -/CMD:0 :1

This command will backup all files from drive 0 to drive 1, EXCEPT those that have the extension /CMD.

BACKUP :1 :1

This command will backup between two disks in drive 1. You will be prompted to switch between the source disk and destination disk at the appropriate times. The disks involved in this type of backup must allow a mirror image backup, or the backup will abort. This command could be used to backup a data disk. See the next example with the (X) parameter for another example of data disk backups.

BACKUP :0 :1 (X)

This command will do a mirror image backup of a disk in drive 0 to a disk in drive 1. Its primary use is to backup non-system disks, such as data disks, in a two drive system. When using this backup parameter, you will be prompted to insert the proper disk in drive 0. When the backup is complete, you will be prompted to insert a system disk back in drive 0.

BACKUP :1 :2 (OLD)

This command will backup files from drive 1 to drive 2, only if they already existed on drive 2.

BACKUP :1 :2 (NEW,Q)

This command will backup files from drive 1 to drive 2, only if they do not already exist on drive 2. You will be prompted before each file is moved, as the Q parameter was specified.

BACKUP /ASM:3 :2 (D="05/06/81-05/10/81")

This command will backup all files with the extension /ASM, as long as their mod dates fell between the two dates specified, inclusive.

Many more examples of the power of BACKUP could be given, but the best method for the user to understand the scope of BACKUP is through its use. Experiment until you are comfortable with this utility. In most cases, you can see exactly what files will be moved by a particular BACKUP command by doing a "DIR" command of the source disk using the same partspec and/or parameters you intend to use with the BACKUP. As a final note, it is not allowable to specify passwords in any BACKUP command line. The BACKUP utility will ignore any password protection on a file, whether doing a backup by class or a mirror image backup.

F O R M A T

This is the command that allows a diskette to be formatted with cylinders (tracks), sectors, and a directory, so that it may be used by the system. The syntax is:

```
=====
|
|  FORMAT :d (parm,parm,parm)
|
|  The following optional parameters may be used:
|
|  NAME="name"  The Name that will be given to the disk.
|
|  MPW="mpw"    The Master PassWord assigned to the disk.
|
|
|  SDEN        The density that will be used to FORMAT the
|  DDEN        disk, DDEN (double) or SDEN (single).
|
|  SIDES       The number of sides to be formatted, either
|              1 or 2.
|
|  CYL         The number of cylinders (tracks) that are
|              to be placed on the disk, up to 96.
|
|  STEP        The boot track step rate that will be put
|              on track 0, either 0,1,2,3. These values
|              represent the step rates in milliseconds:
|
|              5'' 0=6ms, 1=12ms, 2=20ms, 3=30/40ms
|              8'' 0=3ms, 1=6 ms, 2=10ms, 3=15/20ms
|
|  QUERY       will prompt you for density, sides, step,
|              and number of cylinders.
|
|  SYSTEM      will add system information to a previously
|              formatted hard disk.
|
|  ABS         If specified, will format the disk even if the
|              disk is already formatted and contains data.
|
|  abbr: QUERY=Q
|
|=====
```

The FORMAT utility is the program that will create the proper information on a diskette so the LDOS system can read and write to that diskette. A disk to be formatted may be blank, or it may have already been formatted. Note that if the FORMAT command is to be used in a DO file, the disk to be formatted must be blank unless the ABS parameter is specified.

The SYSTEM parameter will be used only with hard disks. Documentation on its use will be found in the hard disk addendum supplied with hard disk systems.

If the drivespec, disk name or master password were specified on the command line, their prompts will not appear. Additionally, entering any one of the remaining DEN, SIDES, CYL, or STEP parameters will cause format to use the defaults for the others, and you will not be prompted for them. Typing in the format command with no parameters will prompt you for them in the following order.

```
WHICH DRIVE IS TO BE USED ?
DISKETTE NAME ?
MASTER PASSWORD ?
SINGLE OR DOUBLE DENSITY <S,D> ?
ENTER NUMBER OF SIDES <1,2> ?
NUMBER OF CYLINDERS ?
BOOT STRAP STEP RATE <6, 12, 20, 30/40> ?
```

If you are formatting in drive 0, the following prompt will appear after you have answered the step rate question:

```
LOAD DESTINATION DISK AND HIT <ENTER>
```

The first prompt will ask for the drive number to use. If you are going to format a disk in drive 0, DO NOT remove the system disk and insert the disk to be formatted until prompted to do so.

The next prompts after the drive number will be for the disk name and master password. These two pieces of information are used by several of the LDOS library commands and utilities. They will be referred to as the Pack Id throughout the manual. You will be allowed up to 8 characters for either entry. Pressing only <ENTER> will use the default values.

The density prompt will always appear on the Model III. It will not appear when using a Model I interface unless you have are using a doubler and the appropriate driver program. Pressing <ENTER> in response to this prompt will use the default density value.

The side prompt must be answered <1> or <2> for single or double sided. Pressing <ENTER> will default to 1 side.

The cylinder prompt will not appear for 8" drives, as they always have 77 cylinders. For 5" drives, any number up to 96 may be entered. Pressing <ENTER> will use the default cylinder value.

The bootstrap step rate is important only if you will be using the disk in drive 0 to boot up the system. Be aware that too low a step rate may keep the disk from booting.

Before the actual formatting begins, the target disk will be checked to see if has been previously formatted. If it has, the following message will appear:

DISK CONTAINS DATA -- NAME=diskname DATE=mm/dd/yy
ARE YOU SURE YOU WANT TO FORMAT IT ?

If the disk contains an incomplete or non-standard format, one of the following messages may appear in place of the NAME=diskname.

UNREADABLE DIRECTORY
NON-STANDARD FORMAT
NON-INITIALIZED DIRECTORY

You will see the disk's name and date, and can abort the format at this point. Press <N> to abort the format, or <Y> to continue. If you have specified the ABS prompt, you will see this message but will not be prompted to abort the format.

FORMAT parameter default values

The NAME and MPW parameters may be specified in the command line followed by the desired string enclosed in parentheses. If either parameter is specified without being followed by a string, you will be prompted for it before the formatting begins.

Parameters not passed in the format command line will default as follows:

NAME will default to LDOSDISK.

MPW will default to PASSWORD.

DENSITY will use different default values depending on the hardware as explained above. If the system is capable of double density, DDEN will be the default.

SIDES will default to 1 side.

CYLinders will default to the value set with the SYSTEM (DRIVE=,CYL=) command and stored in the system information sectors on drive 0. If no value has been set, the default will be 40 cylinders for the Model III, 35 cylinders for Model I 5" drives, and 77 cylinders for Model I 8" drives.

STEP rate will default to 6ms with the Model III, and 40ms with the Model I.

The QUERY parameter defaults to YES, and you are normally prompted to enter all parameters. If you are sure that the default values will produce the exact format you desire, you may specify the parameter Q=N to bypass all parameter prompts.

The ABS parameter is primarily useful when the FORMAT utility is executed from a DO file. Using the ABS parameter assures that there will be no prompt from the FORMAT utility to abort the formatting if the target disk already is formatted.

FORMAT cylinder verification

When the formatting begins, you will see the cylinder numbers appear as the necessary information is written to them. After all cylinders are written, format will verify that the proper information is actually on each cylinder. If the verify procedure detects an error, an asterisk and the cylinder number will be shown on the video display. This space will be locked out, so that no files will be written to the defective area.

The WAIT parameter

The WAIT parameter was not listed in the parameter table because it is not normally used when formatting. It was put in the format command only to compensate for hardware design deficiencies of certain 80 track disk drives. The only time it should be used is when ALL tracks above a certain point are locked out when verifying the format.

To use this parameter, specify:

WAIT=nnnn

The value for nnnn should be a number between 5000 and 50000. The exact value can vary depending on the particular disk drive. It is recommended that a value around 25000 be used at first. This value can be adjusted higher or lower as needed.

P D U B L / C M D

PDUBL is a disk driver program for use with the Model I, 5" drives, and a double density modification board other than the Radio Shack board. The syntax is:

```
=====
| PDUBL                                     |
|                                           |
| No parameters are required.             |
|                                           |
=====
```

This command loads a special disk driver program which allows you to use a double density hardware modification to read, write, and format double or single density 5" disks with the Model I. Before buying a double density board, please check with the manufacturer or LDOS Support to assure compatibility with the LDOS PDUBL driver.

If you have a doubler installed, after you give this command, you can use either single or double density disks in any of your 5" disk drives. LDOS will automatically recognize whether you have a single or double density diskette in a drive, and react accordingly. Once you have installed the PDUBL driver, you will see the prompt "Single or Double density <S,D> ?" appear after you enter the disk name and master password during the disk FORMAT utility. Answer this prompt by pressing the <D> key to create a double density diskette or <S> to create a single density diskette. Pressing <ENTER> for this prompt will default to double density.

PDUBL also includes support for double-sided 5" drives. Both sides of the diskette are treated as a single volume. The drives and cable must be set up correctly for this feature to work.

The PDUBL driver is loaded into high memory and protects itself by lowering the value stored in the HIGH\$ memory pointer. Logical drives 0-7 are set up to use this driver in place of the normal LDOS single density driver. You can use the SYSTEM (SYSGEN) command to save the driver in your configuration file, to be loaded automatically every time you boot. Be sure that any application programs you are using respect the HIGH\$ pointer.

Please note that you CANNOT boot up on a double density LDOS diskette when using a doubler. You may, however, boot up on a single density diskette and exchange it for a double density diskette as soon as the bootstrap operation has finished.

R D U B L / C M D

RDUBL is a disk driver program for use with the Model I, 5" drives, and the Radio Shack double density board. The syntax is:

```
=====
| RDUBL                                     |
|                                           |
| No parameters are required.             |
|                                           |
=====
```

This command loads a special disk driver program which allows you to use the Radio Shack double density hardware modification to read, write, and format double or single density 5" disks with the Model I.

If you have a doubler installed, after you give this command, you can use either single or double density disks in any of your 5" disk drives. LDOS will automatically recognize whether you have a single or double density diskette in a drive, and react accordingly. Once you have installed the RDUBL driver, you will see the prompt "Single or Double density <S,D> ?" appear after you enter the disk name and master password during the disk FORMAT utility. Answer this prompt by pressing the <D> key to create a double density diskette or <S> to create a single density diskette. Pressing <ENTER> for this prompt will default to double density.

RDUBL also includes support for double-sided 5" drives. Both sides of the diskette are treated as a single volume. The drives and cable must be set up correctly for this feature to work.

The RDUBL driver is loaded into high memory and protects itself by lowering the value stored in the HIGH\$ memory pointer. Logical drives 0-7 are set up to use this driver in place of the normal LDOS single density driver. You can use the SYSTEM (SYSGEN) command to save the driver in your configuration file, to be loaded automatically every time you boot. Be sure that any application programs you are using respect the HIGH\$ pointer.

Please note that you CANNOT boot up on a double density LDOS diskette when using a doubler. You may, however, boot up on a single density diskette and exchange it for a double density diskette as soon as the bootstrap operation has finished.

W A R R A N T Y

The product that you have purchased is provided on the LDOS operating system. Every effort has been made to assure the high quality and reliability of this product. By purchasing this product, the user is granted certain customer support privileges. This support shall be limited to the privilege of having the master diskette updated as often as desired for the current update fee. This is limited to updates within the current Series of the program. Logical Systems, Inc. will also provide a lifetime warranty on the physical diskette media of the original serialized master diskette. If the diskette media physically fails to retain the original program, replacement media will be provided at no charge. This does not include media that has been damaged in shipment from the user to Logical Systems, or media that has been damaged by the user or his equipment. To receive this support, the user MUST fill out and return the registration card within 30 days of purchase. Should a user find a valid error in the program and clearly define it in writing to Logical Systems, every effort will be made to correct the error. All support shall apply only to registered owners.

Logical Systems Incorporated and its associates assume no liability whatsoever, with regard to the reliability and/or fitness of this product and/or the LDOS operating system. All data entrusted to this program and the computer that it is operating on are the sole responsibility of the user. Under no circumstances will Logical Systems, Incorporated or its associates be held liable for the loss of TIME, DATA, PROGRAMS or for any consequential damages incurred by the user. This warranty and support information refers to this product and the LDOS operating system.

FOR USER SUPPORT CALL 414 - 241 - 3066