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GENERAL INFORMATION

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If you are using large-capacity storage devices and are always running out of directory entries, you need assistance. If you have a collection of files that remain relatively static, the Partitioned Data Set (PaDS) utility available from MISOSYS is most likely the solution to your problem. However, if your files are dynamic, ADE comes to your rescue. With ADE, you can emulate smaller-sized "floppy" drives on your larger drives. ADE creates files that look like disk drives. The ADE driver interfaces these "floppy files" to the DOS via a logical drive number. ADE supports as many "floppies" as you can fit on your physical disk drive. With each additional ADE floppy, you gain from 48 to 254 file slots.

DISTRIBUTION DISKETTE

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This documentation covers the operation of both the LDOS 5.1 Model I/III version (ADE) and the LDOS or TRSDOS 6.x compatible version (PRO-ADE). The ADE package is provided on a 35-track single density data diskette for LDOS Version 5.1. The PRO-ADE package is provided on a 40-track double density data diskette for LDOS/TRSDOS Version 6. The diskette label identifies the DOS that the package is designed to function with.

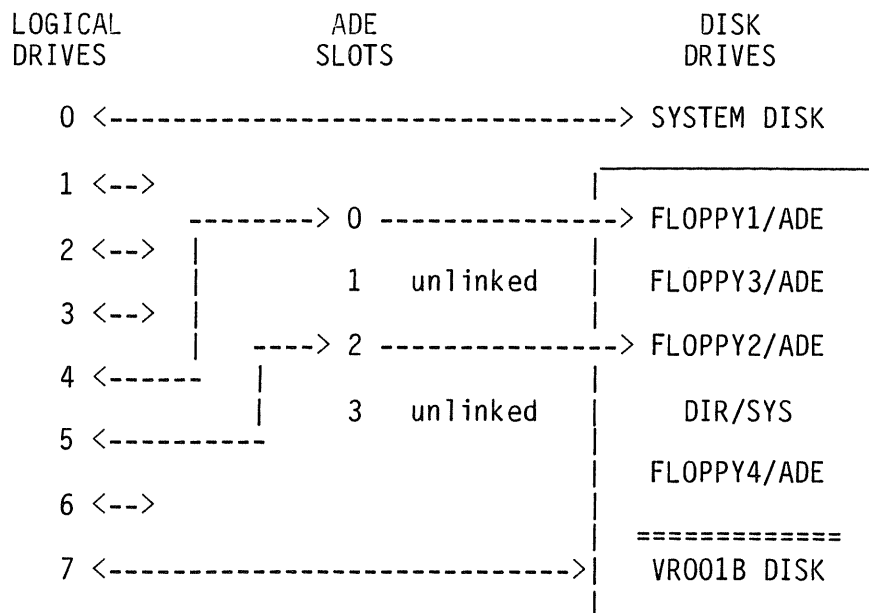
ADE - A Drive Emulation

WHAT'S ADE ALL ABOUT

When it comes to computers, there are three things we never seem to get enough of: processor speed, computer memory, and disk storage space. We want more disk storage to hold larger files and we want more disk storage to hold more numerous files. The architectural design of your Disk Operating System directory provides for the storage of from 48 files on 5" single sided single density floppy media to 254 files on 5" double sided double density floppy media and larger rigid disk drives - per logical drive. Now 254 files may seem like a huge number of files; however in today's world, applications and operating environments may require the access of thousands of files.

Well, ADE attempts to solve the dilemma of too few directory entries by enabling a two-tier directory structure which uses a spare logical drive assignment [or more than one logical drive assignment if you want simultaneous access of two or more ADE floppies]. ADE makes use of an interfacing driver between that logical drive assignment and a collection of emulated floppy disk drives which exist as special disk files on one or more of your physical storage devices. The storage device used to hold "A Drive Emulation" is typically a large-capacity disk drive (say a two-sided floppy on up to a hard drive). With ADE, you can create these emulated floppies to look like standard 5" and 8" one or two sided floppies - in single or double density. ADE even provides a special non-standard type which is useful for storing very small files.

ADE "floppies" are part of your system. Your data or program files stored on these ADE floppies will look and act like any other floppy file. You can create as many of these "floppies" as can fit on your disk drive. Their use is totally transparent to your operation. They are accessible to any DOS command and all application programs. A picture may help you in visualizing just how these ADE "floppies" are part of your system. In the following figure, the FLOPPY1 and FLOPPY2 emulated drives exist as files on the VR001B disk drive. They are associated with logical drives 4 and 5 via a linkage connection through the ADE driver's slots 1 and 3.



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In this illustration, we have chosen to emulate two 40-track single sided double density disk drives. The ADE files which contain these emulated floppies reside on a hard disk. They could just have well resided on an 8" floppy or even an 80-track 5-1/4" drive. The point to realize is that the parameters of the emulated floppy (size, density, sides) have absolutely no relationship to the parameters of the disk drive holding the ADE file. In the example, consider the VR001B disk as a virtual storage device. The ADE files that we use to contain various configurations of emulated floppies use this virtual storage space; however you do not have to be concerned with the details. Abbreviated DEVICE and FREE commands illustrate the transparency of these emulated floppies:

```
:4 [FLOPPY1] 5" Floppy #0, Cyls=40, Dden, Sides=1, Step=6ms, Dly=1s  
:5 [FLOPPY2] 5" Floppy #2, Cyls=40, Dden, Sides=1, Step=6ms, Dly=1s
```

```
Drive :4 FLOPPY1 03/14/84 Free Space=174.00K/180.00K Files=126/128  
Drive :5 FLOPPY2 03/10/84 Free Space=139.50K/180.00K Files=104/128
```

There is one concern that we will stress. If you have invoked ADE and associated a logical drive slot (or slots) to ADE files residing on REMOVABLE media (such as a removable hard disk or large floppy), do not exchange the media until you disable and unlink the emulated floppies.

ADE consists of two programs. The first one you will use is named ADE/DCT. It consists of a file initialization module and a driver module. The initialization module also serves to install the driver into high memory and connect it to the logical drive you specify. ADE/DCT is used whenever you want to create a new emulated floppy. It is also used whenever you want to install the driver module and link it to an ADE "floppy" file. The second program is named ADE/CMD. It is a utility program which manages the collection of ADE files that you have created. It can be used to swap a linked ADE file with one that is unlinked. ADE/CMD has other uses that you will learn when you read the chapter that documents its use. The following chapter will discuss the ADE/DCT installation procedures. Documentation of the ADE/CMD utility then follows the documentation of ADE/DCT.

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INVOKING ADE/DCT

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Floppy drive emulation files are linked to the DOS via a driver named "ADE/DCT". This program consists of two parts: A driver module which is needed to link to existing ADE files, and an initialization module which is used to install the driver module and create new ADE files. The ADE/DCT program is invoked via the syntax:

```
=====
|
|  SYSTEM (DRIVE=d,DISABLE,DRIVER="ADE")
|
|  d      - Specifies the logical drive number to be used
|           in referencing the emulated floppy.
|
|=====
```

In a system configuration that has only floppy drives, they are numbered 0, 1, 2, and 3 for the four disk drives. LDOS and TRSDOS 6.x permit eight logical drives numbered 0-7, although a maximum of four physical floppy disk drives can be connected. With the addition of a hard drive, your floppy numbers have usually been reassigned. A DEVICE command will display the drive configuration. For example, the following is a representative display of a system which includes two floppies and two partitioned hard drives:

```
:0 [FIXED01 ] 5" Rigid #0, Cyls=306, Fixed
:1 [FIXED02 ] 5" Rigid #2, Cyls=306, Fixed
:2 [TRSDOS62] 5" Floppy #1, Cyls= 40, Dden, Sides=1, Step= 6ms, Dly=.5s
:3 [No Disk] 5" Floppy #2, Cyls= 40, Dden, Sides=1, Step= 6ms, Dly=.5s
:6 [VR001A ] 5" Rigid #1, Cyls=306, Removable
:7 [VR001B ] 5" Rigid #3, Cyls=306, Removable
```

The numbers in the first column represent the logical drive assignments. In this particular case, drives 4 and 5 are not assigned. Either or both may be used to establish a floppy drive emulation file.

Let's illustrate an installation of the ADE/DCT driver while creating a file to hold our emulated floppy. Look at the ease of accomplishing this by responding to some very basic questions. Your entries are shown in boldface. If you wish to abort the installation procedure at any prompt, respond by depressing the <BREAK> key.

```
system (drive=5,driver="ade")
```

```
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```

```
How many "slots" for this driver <1-8> ? 4
Slots already in use <.-.-.-> Enter slot number ? 1
What is the drive emulation filespec? > floppy1:
Enter the drive size <3,5,8> ? 5
Single or Double density <S,D> ? d
Enter the number of sides <1,2> ? 1
Enter the number of cylinders <10-96> ? 40
```

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ADE then proceeds to invoke the DOS formatter which is used to create the directory information. Each "floppy" is created using the ADE/DCT driver initialization module and its brief series of questions. The driver is totally configurable. Once the driver is installed, a utility program called ADE/CMD is available to manage your "floppy" linkage. This utility is documented in the next chapter.

For the most part, the questions seem very straightforward. However, in order to fully understand the mechanics of the process, let's explore a detailed analysis of each query. To begin with, a "slot" is used by the driver to associate with an ADE file. The number of driver slots must be established when you first install the ADE/DCT driver. If you want to assign ADE files to two logical drives, then you will need at least two slots. You can request more slots than you will need for logical drive assignments. That is because the driver can maintain linkage to up to eight ADE files at a time. Each slot requires an additional 32 bytes of high memory.

There are two ways to change the connection that exists between a logical drive assignment and an ADE file. If a second ADE file is linked to an unassigned slot, you can MOVE the logical drive from its current slot to the other which changes to the second emulated floppy. If no unassigned slot exists, then you have to disable the logical drive, unlink the slot, link the slot to the second ADE file, then assign the logical drive back to the slot. The ADE/CMD utility provides you the ability to perform both of these operations. The first method is slightly faster. Therefore, if you have need to access a number of ADE files, you may want to provide more slots than the number of logical drives associated with ADE files. With more slots, you can link more ADE files concurrently [this may become totally clear after you "play" a little with the ADE features]. The following query is used to obtain the number of slots for use by the ADE/DCT driver:

How many slots for this driver <1-8> ?

This query will be displayed when the ADE/DCT driver is first installed. When subsequently using ADE/DCT to create new ADE files, the installation module will suppress the "slot" message until such time as you need to re-install the driver module.

Once the number of slots is obtained, you will need to assign the slot number to be used with the logical drive. ADE/DCT tells you which slots are already in use, if any, while it prompts you for the slot number via the message:

Slots already in use <.-> Enter slot number ?

If a slot is in use, its number will be displayed in lieu of its respective dot. For example, if slot 2 is in use in a 4-slot environment, the display would look like "<.-2-.->". If you wish for ADE/DCT to choose the next available slot, just depress the <ENTER> key; otherwise, enter the slot number of your choice [slots are numbered from one to the highest numbered slot. In our example, we selected two slots; thus the choice is <1> or <2>].

After the slot is identified, you are given the opportunity of specifying an ADE file to be used to store the emulated floppy. It is

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recommended that you omit a file extension and permit ADE/DCT to automatically supply the extension, /ADE. Respond to this prompt with your file specification:

What is the drive emulation filespec? >

Once the ADE file is specified, it is time to describe the total parameters of the emulated floppy. You can set the floppy size to 8, 5, or 3 [3 is a special case - more on this later]. You can set the density to single or double. You can make it a one or two sided floppy. In general, two sided floppies provide more directory entries than one sided. For example, a size 5 DDEN has 126 directory entries for one sided vs 254 for two sided. If you define a 20 cylinder two-sided emulated floppy, it will have about twice the number of directory entries than a one-sided 40 cylinder floppy and almost the same amount of file space available. You have the option of setting a cylinder size of from ten to ninety-six cylinders. These four operating parameters are optioned by responding to the following four prompts:

Enter the drive size <3,5,8> ?	5
Single or Double density <S,D> ?	0
Enter the number of sides <1,2> ?	2
Enter the number of cylinders <10-96> ?	56

The <5> and <8> drive sizes denote standard 5 inch and 8 inch floppy sizes. The <3> size does not pertain to the sub-mini disk drives currently on the market. It denotes a granule size smaller than that used on the <5> inch size drive. A size <5> uses 5-sector granules for single density and 6-sector granules for double density. The size <3> drive uses 3-sector granules for both single density and for double density. Single density size <3> drives have nine sectors per cylinder [three granules per cylinder] while double density size <3> drives have 18 sectors per cylinder [six granules per cylinder]. The size <3> is primarily useful if you are going to store a large number of small files on your ADE emulated floppy [files less than 769 bytes in length].

ADE/DCT must know on which drive the ADE file is to be placed. If you did not provide a drive specification with the ADE file specification, ADE/DCT will request the drive number via the prompt:

Create the ADE file on drive number <0-7> ?

After you have optioned your ADE file, it needs to be formatted before it can be used. This is done automatically by the DOS format command module. ADE/DCT controls this by issuing a FORMAT command. Do not be alarmed when you see the formatter's messages being displayed on the display. You will observe ADE/DCT issuing a command something similar to the following:

FORMAT :4 (name="FLOP1 ",SDEN,sides=1,cyl=35,ABS,Q=

At some future point in time, you will have created and used a number of ADE emulated floppies. If you wish to install the ADE/DCT driver and assign a logical drive to one of these existing ADE files, the sequence of messages is slightly different. In the following dialogue, you are also shown that you may omit the name of the ADE driver in the SYSTEM command. When ADE/DCT is invoked in this manner, the DOS will prompt you for the driver's name.

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system (drive=5,driver

Enter DCT driver <BREAK=default> : **ade**

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Slots already in use <1-.> Enter slot number ? **2**

What is the drive emulation filespec? > **floppy2:7**

File exists as a drive emulation - use it <Y,N> ? **y**

Notice from the last message that ADE recognizes the file to be a drive emulation file. The <y> response told ADE to link the file into the slot assigned to the logical drive. Thereafter, any and all files previously stored in the that emulated floppy will be immediately accessible. If you did not want to re-use the ADE "floppy" file, an <n> response would exit from ADE and return you to DOS ready.

Another situation which could arise is when you specify an existing file that is not a drive emulation. If that occurs [either on purpose or by entry error], the message:

Existing file not a drive emulation! Use it <Y,N> ?

Be careful that you use the file only when you want to! Once you respond yes, you will then need to describe the configuration of the emulated floppy by responding to the four option messages mentioned above.

There are a few error messages that ADE/DCT may display where the reason may not be immediately obvious. A assignment of a logical drive can only be made if that logical drive is currently not in use. Remember, the DEVICE command available from the DOS shows you what logical drives are assigned. If you are going to make use of an assigned but "[no disk]" drive, then you need to enter the "DISABLE" parameter in the SYSTEM command line as shown in the syntax. Failure to use an unassigned drive or an assigned one without the DISABLE parameter will result in the error message:

Requested DCT entry is active!

In order to keep the access time of your emulated floppy at a minimum, ADE restricts the ADE file to occupy no more than four extents of actual disk space [an extent holds up to 32 contiguous granules]. ADE makes maximum use of the available space on your drive by using a handy algorithm when the ADE file is created [this is the optimum space allocation algorithm used in the MACH2 package]. If ADE/DCT cannot obtain the needed disk space within the four extents, it will display the error message:

Cannot allocate more than 4 extents

CAUTION: If your ADE files reside on removable media, you need to be totally aware of a situation that exists. If you have ADE associated with a logical drive slot (or slots) to ADE files residing on REMOVABLE media (such as a removable hard disk or large floppy), do not exchange the media until you disable and unlink the emulated floppies. You have been cautioned!!!!

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The following table illustrates the operands of the ADE commands. Within this table, a logical drive number is substituted for "drive", an ADE slot number is substituted for "slot", and an ADE file specification is substituted for "filespec".

----- command string -----			----- example -----
assign	drive	slot	a,5,3
disable	drive		d,4
link	slot	filespec	l,2,flopvc:7
unlink	slot		u,3
move	drive	slot	m,5,2
exit			e<ENTER>

If you enter a command character without its operands [i.e. "a" without ",5,3"], ADE/CMD will prompt you to enter the operand information it needs to complete the command. A sequence of commands may be entered in a single string by connecting the individual commands with a semicolon. This string may even be entered directly from DOS Ready as a parameter of the ADE command. For instance, the sequence to link an existing ADE file to an available slot, then move a logical drive already assigned to another slot to the newly linked slot would be something like this:

ade l,2,flopvc:7;m,5,2;e

which performs the desired operation and returns to DOS ready [actually, the ";e" is not necessary if you are invoking ADE/CMD with a command string from DOS Ready as ADE/CMD always exits to DOS after executing any command string entered from the DOS command line]. PRO-ADE/CMD executes in the DOS library overlay region so that it may be invoked with impunity directly from programs which permit a DOS command [invocation from TRSDOS 6.x BASIC would require the statement: SYSTEM"RUN ADE]. ADE/CMD may be invoked directly from LBASIC just like any other command via the CMD"ADE statement.