

UniDOS Plus

For the Apple® UniDisk 3.5 and UniDisk 3.5

Works on the Apple II Plus, IIe, IIc
and IIGS

microSPARC Inc.

UniDOS Plus

DOS 3.3® modified to operate with Apple®
UniDisk® 3.5 and Apple 3.5 disk drives*

with additional utilities:

COPY3.5

ADD.DOS

INT.MOD

by Bob Christiansen

For the Apple II Plus, IIe, IIc and IIGS

VERSION 2.0.2

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WHAT IS UNIDOS PLUS?

UniDOS Plus is a modified version of DOS 3.3 that allows UniDisk 3.5 owners to store and retrieve DOS files on 3.5" diskettes. A normal, 35-track, 5.25" floppy diskette holds 140 Kilobytes (K) of information. One 3.5" diskette holds 800K of information. Thus, almost six times more data can be stored on a 3.5" diskette. However, the capability to use DOS 3.3, one of Apple's popular disk operating systems, is not provided when you buy a 3.5" drive. UniDOS Plus gives you that capability.

UniDOS Plus is an improved version of MicroSPARC's original UniDOS 3.3, the first DOS available for 3.5" drives. The primary improvement has been compacting all routines into the same space as DOS 3.3 (HIMEM is the same when UniDOS Plus is active as when DOS 3.3 is active). In addition, UniDOS Plus can initialize both 3.5" disks and 5.25" disks (DOS is not written to 5.25" disks), and includes a powerful new catalog command, CAT. Diskettes created using the original UniDOS 3.3 can be read by UniDOS Plus. Included on the UniDOS Plus disk are three utility programs. See the Utility Programs section for details.

COMPATIBILITY

UniDOS Plus is compatible with Apple Computer's UniDisk 3.5 or Apple 3.5 disk drives. An Apple UniDisk controller card is required to use the UniDisk 3.5 with an Apple II Plus or IIe. UniDOS Plus is also compatible with the Central Point Software Universal Disk Controller card when used with the Chinon 800K disk drive. UniDOS Plus will not work with any 400K disk drives.

Nearly all Applesoft programs will function properly with UniDOS Plus installed. Binary programs that do not modify DOS 3.3 or make calls to the DOS in memory are also usually compatible. Most commercial programs and copy protected programs are not compatible. Using the modified version of FID (see Utilities section) you may be able to transfer some

commercial program files to a UniDOS Plus formatted disk. However, they may not work correctly if they require a modified DOS supplied with the original software.

HOW DOES UNIDOS PLUS WORK?

UniDOS Plus divides the 3.5" diskette into two 400K volumes (400K is the largest volume possible with standard DOS 3.3). The first volume (the front side of the diskette) is accessed as drive number 1. The second volume (the disk's back side) is accessed as drive number 3. If you have a second UniDisk 3.5 plugged into your first drive, the two volumes on the second drive are accessed as drive 2 and drive 4.

UniDOS Plus will also provide normal operations for a standard 5.25" floppy. That is, if you have one or more 5.25" drives connected to your Apple along with your UniDisk 3.5, you can operate both types of disk drives with UniDOS Plus active. The only thing that UniDOS Plus cannot do is write DOS 3.3 onto a 5.25" diskette. The utility ADD.DOS is included for this purpose.

INSTALLING UNIDOS PLUS

The UniDOS Plus master diskette is self-booting, as are all 3.5" diskettes you create with the UniDOS INIT command. With a UniDOS Plus diskette in drive 1 of the UniDisk 3.5, enter PR#*n*, where the UniDisk 3.5 drive is plugged into its controller card in your Apple's slot *n*. Let's take the example where the UniDisk controller is in slot 5 (that's where it is for the Apple IIc and IIGS). Simply enter:

```
PR#5
```

and press the Return key. UniDOS Plus will be loaded and installed, and the HELLO program on the disk will be loaded and run, just as it is when you boot a standard DOS 3.3 5.25" diskette. After booting a UniDOS Plus diskette, you can

access any 3.5" or 5.25" drive as usual. Note that you must boot from a UniDOS Plus diskette if you wish to access 3.5" UniDOS disks. They cannot be read by normal DOS 3.3.

FORMATTING A NEW 3.5" DISKETTE

When UniDOS Plus is active, the INIT command causes 3.5" diskettes to be initialized as follows:

1. The entire disk is formatted.
2. Side 1 of the disk is set up as a 400K volume of 50 tracks of 32 sectors each, with a 31-sector catalog.
3. Side 2 of the diskette is set up as a 400K volume, just like side 1.
4. An image of UniDOS Plus is written to the first two tracks of side 1. The same two tracks are marked as reserved on side 2 of the diskette.
5. The BASIC program currently in memory (the "HELLO" program) is saved as a file on the first volume.

Carefully follow the instructions given below for the INIT command (see "UNIDOS PLUS COMMANDS"). The procedure differs slightly depending on the number of 3.5" drives you have. Care must be taken when initializing a 3.5" disk with only one UniDisk 3.5. **Just like DOS 3.3, UniDOS Plus is unforgiving if the wrong disk is placed in the drive during initialization.**

Any initialized 3.5" diskette can be booted just as you booted the UniDOS Plus master diskette.

TRANSFERRING PROGRAMS AND FILES TO A 3.5" DISKETTE

Included on your UniDOS Plus disk is a modified version of the FID program. FID is a file copy program that comes with the DOS 3.3 System Master 5.25" diskette. The normal FID works with UniDOS Plus, but it won't allow you to

access drives 3 or 4. The modified version of FID that came on your UniDOS Plus diskette solves this problem.*

This version also incorporates the modifications made in FID Plus, a patch published in *Nibble* magazine (Vol. 5/No. 4, April, 1984). These modifications enable almost all selections to be made with a single keypress, eliminating the need to press the Return key after most inputs. In the main menu, the command Copy has been changed to Move, and all commands can be selected by pressing the first letter of the command. The wild card character has been changed from an equal sign (=) to an asterisk (*).

The following procedure should be used when transferring files from a 5.25" diskette to a 3.5" diskette. It may also be used when transferring files from one 3.5" diskette to another. (If you want to copy an entire 3.5" diskette, see the instructions for the COPY3.5 program that came with the UniDOS Plus master diskette.)

Let's say that you want to transfer some files from a 5.25" floppy diskette in slot 6, drive 1 to your UniDisk 3.5 drive, which is installed in slot 5. We're going to assume you'd rather not write to the UniDOS Plus master diskette.

1. Initialize a new 3.5" diskette for DOS (see "UNIDOS PLUS COMMANDS").
2. Put the UniDOS Plus master diskette in your UniDisk 3.5 drive and enter PR#5, then press the Return key.
3. Enter BRUN FID
4. Select option M, MOVE FILES. Then enter Slot 6, Drive 1 for the source drive and Slot 5, Drive 1 for the

* The modified FID allows drives 3 and 4 to be specified, even for 5.25" drives. If a drive number greater than 2 is specified for a 5.25" drive, drive 3 will be interpreted as drive 1 and drive 4 will be interpreted as drive 2.

destination drive. Enter the asterisk (*) for file name and Y for prompting.

5. FID will then ask you to insert the diskettes. Remove the UniDOS Plus master diskette and replace it with the diskette you initialized in step 1. Be sure the 5.25" floppy you want to copy from is in drive 1 of slot 6, and then press Return. The first file name on the source disk will be displayed, and you must press Y to copy it, or N if you do not want to copy it. This prompting will continue for each file on the source disk. If the destination disk already has a file by the same name as the one being copied, it will instruct you to either type in a new file name, press Return to replace the existing one, or press Control-C and Return to cancel the copying of that file.
6. Copying to the second volume on the 3.5" disk is done the same way. Just specify drive 3 instead of drive 1 for the destination drive.

UNIDOS PLUS COMMANDS

With a few exceptions, UniDOS Plus commands are identical to DOS 3.3 commands. The exceptions are INIT, CATALOG, INT and the new command, CAT.

INIT Command

The syntax is :

INIT *filename* [,Ss][,Dd]

where *filename* is the name of the HELLO program, *s* is the slot number of the drive's controller card, and *d* is the drive number. If slot and/or drive are not specified, the slot and/or drive last accessed will be the slot and drive initialized.

Remember: Just like DOS 3.3, UniDOS Plus is unforgiving if the wrong disk is placed in the drive during initialization.

Initializing a 3.5" diskette with only one 3.5" drive:

1. With the BASIC program that you wish to use as a HELLO program in memory, type the command:

```
INIT HELLO, S5, D1
```

This example assumes you wish to name your HELLO program "HELLO" (any legal file name may be used) and that your UniDisk 3.5 is in slot 5. Specify drive 1 (drive 2 may be used when it exists). INIT will format and set up both volumes on a 3.5" diskette, so specifying a drive greater than 2 will result in an I/O error.

2. When you type in the command above and press Return, the following message will immediately be displayed:

```
PUT UNIDOS IN S5, D1  
PRESS RETURN
```

At this time, be sure the diskette in the UniDisk 3.5 drive is one that has UniDOS Plus on it. Part of the INIT logic will be read from this disk, and some user memory will be temporarily stored on it. Therefore, **BE SURE THE UNIDOS DISK IS NOT WRITE PROTECTED.** That is, the disk's write protect tab must cover the hole. Press Return when you are sure the disk in the drive has UniDOS Plus on it and is not write protected.

3. The drive light will come on momentarily. When it goes off, the following message will appear:

```
INSERT THE DISK TO BE INITIALIZED  
IN DRIVE 1 (SLOT 5)  
PRESS RETURN WHEN READY
```

Remove the UniDOS Plus diskette and replace it with the diskette you wish to initialize. Be sure the disk's write protect tab is closed. Then press Return. As soon as you press Return, the program will begin formatting the diskette in the drive. **Be sure the correct disk is**

inserted before pressing Return. The program cannot check to see if you have correctly changed disks.

4. When the formatting is complete, the catalog is written to both volumes. Then the following message appears:

```
REINSERT THE UNIDOS DISK
IN DRIVE 1 (SLOT 5)
PRESS RETURN WHEN READY
```

At this point, the initialization process is NOT complete, but you must remove the diskette being initialized and put the diskette with UniDOS Plus on it back in the drive. Then press Return. User memory will be restored.

5. Next, the following message will appear:

```
REINSERT DISK BEING INITIALIZED
PRESS RETURN
```

Once more, remove the UniDOS Plus diskette and replace it with the diskette you are initializing. Then press Return. At this point, the HELLO program is written to the new diskette. When the drive light goes off, the initialization process is complete.

Initializing a 3.5" diskette with more than one 3.5" drive

1. The initialization process with two drives is similar to the one-drive process, except that disk swapping is unnecessary. Assuming that the drive you wish to use for initializing is drive 1, slot 5, put the diskette to be initialized in that drive. With the desired HELLO program in memory, type the following command:

```
INIT HELLO, S5, D1
```

This example assumes that you have only two UniDisk 3.5 drives and that they are both in Slot 5. It also assumes that you want to name the HELLO program "HELLO".

2. Press Return after typing in the command above, and the following message will appear:

```
PUT UNIDOS IN S5,D2  
PRESS RETURN
```

Unless errors occur, this is the only message you will get when initializing a 3.5" diskette with two 3.5" drives. So check carefully at this point to make sure that both the UniDOS Plus diskette and the diskette to be initialized are in the proper drives and that both have the write protect tab CLOSED (covering the hole). Note that the program decides which drive you must put the UniDOS Plus diskette in. If you have more than two drives, the available drive in the highest slot will be selected.

3. After you press Return, the entire initialization process takes place. Wait until both drive lights have gone out and the Applesoft prompt returns.

Initializing a 5.25" diskette using UniDOS Plus

1. Assuming that your 5.25" drive is drive 1, slot 6 and your 3.5" drive is drive 1, slot 5, put the 5.25" diskette to be initialized in drive 1, slot 6. With the BASIC program in memory that you wish to use for a HELLO program, enter the command:

```
INIT HELLO, S6, D1
```

We are also assuming that you wish to name the HELLO program "HELLO".

2. When you press Return after entering the command above, the following message will appear:

```
PUT UNIDOS IN S5,D1  
PRESS RETURN
```

Put a diskette that has UniDOS Plus on it in the indicated drive. Make sure that the diskette is not write protected

(the hole is CLOSED). With both this diskette and your 5.25" diskette properly inserted, press Return.

3. After you press Return, the entire initialization process will take place. First the 3.5" drive will come on, then the 5.25" drive, then the 3.5" drive again, and finally the 5.25" drive. When the initialization is complete, the 5.25" diskette will be formatted and have a catalog and the HELLO program on it. However, it will not have an image of DOS 3.3 on it and therefore will not boot. ADD.DOS, the utility program that came with the UniDOS Plus master diskette, may be used to add DOS 3.3 to a 5.25" diskette (see below).

CATALOG Command

The CATALOG command functions the same in UniDOS Plus as it does in DOS 3.3. However, the DOS 3.3 CATALOG command does not list the correct file length in sectors if the file is more than 255 sectors long (64K). The UniDOS Plus CATALOG command will give the correct file length for files up to 999 sectors long (250K). If the file is longer than 999 sectors, a question mark will appear as the first character in the file length number.

CAT Command

A new command, unique to UniDOS Plus, has been added to the list of available DOS commands. This command is a more powerful version of the CATALOG command. With it you can obtain an alphabetical listing of files, catalog just a single file, or catalog only that portion of the directory that meets certain criteria described below.

When you issue the CAT command, a disk with UniDOS Plus on it must be installed in one of your UniDisk 3.5 drives. If no UniDOS Plus diskette is found, a normal CATALOG will result.

The syntax of the CAT command is as follows:

```
CAT filename [,Ss] [,Dd]
```

All the parameters following CAT are optional. If no file name is specified, all files in the directory will be listed. File lengths up to 9999 sectors will be accurately displayed.

The *filename* parameter can be used in three different ways. First, it can be used to specify a specific file name. Second, it can contain a wildcard to specify a subset of files. Third, a two-letter file name starting with @ causes special things to happen, as described below.

Using *filename* to specify a specific file.

If the file name entered does not contain a wildcard character (^) and is not a two-letter file name beginning with @, then only files with the name specified will be listed. Normally, this will only be one file. However, the CAT command ignores the case of alphabetic characters, and if lower-case letters appear in file names, CAT treats them as upper-case. For example if you type

```
CAT TEST
```

The files "TEST", "Test", and "test" will be listed, if they are on diskette.

Using *filename* with wildcards.

If the file name contains the character ^, then only those files will be listed that start with the text preceding the wildcard symbol and end with the text following the wildcard symbol. Here are some examples of wildcard use:

```
CAT ^.BAK      All files ending with .BAK will be listed.
```

```
CAT TEST^     All files beginning with TEST will be listed.
```


CAT ACCT^JAN All files beginning with ACCT and ending with JAN will be listed.

Using filename starting with @.

File names of only two characters, the first of which is @, have special meaning. The file name @@ turns on alphabetizing and no files will be listed. If the second character is a file type (A, B, I, R, S, T), then only those files with the specified file type will be listed. For example,

CAT @@ Turns alphabetizing on (or off).

CAT @A Only Applesoft type files will be listed.

CAT @B Only Binary type files will be listed.

You cannot use the wildcard feature at the same time that you are listing files of a selected file type. For example, you cannot list only those Applesoft files that begin with "Z".

If the parameters [,Ss] and/or [,Dd] are included, they set slot *s* and/or drive *d* as the slot and drive to be catalogued, just as they do with a normal CATALOG command. The CAT command will work for any DOS 3.3 diskette, 3.5" or 5.25".

If there are no files in the directory, or if there are no files meeting the requested selection criteria, then the message "NO FILES FOUND" will be displayed.

At the end of the CAT command, the number of unused sectors on the DOS volume being catalogued is displayed.

Alphabetizing with CAT

Having an alphabetical list of files can sometimes be helpful. When UniDOS Plus is booted, the CAT command will not produce an alphabetized list. You can turn on alphabetizing with the command CAT @@ . But be advised

that alphabetizing takes time when the number of files on the volume is more than 14. For a 3.5" disk full of small files, an alphabetized CAT can take several minutes. Even a full 5.25" disk can take over a minute. For this reason, you may wish to use CAT with the alphabetizing feature off, except for those times that you need an alphabetical list. You turn alphabetizing off the same way you turn it on, by issuing the CAT @@ command.

80-Column display and the CAT command

If the screen is in 80-column format, the CAT command will display two columns of files before pausing. Therefore, if you have more than 20 files and want to see as many as possible displayed at the same time, switch to 80-column display before issuing the CAT command.

Printing CAT listings

A hardcopy printout of a CAT command is usually possible simply by typing PR#*n* before issuing the CAT command, where *n* is the number of the slot your printer interface card is installed in (usually slot 1). This will work with most printers and interface cards. However, there are many different types of printers and interfaces used with the Apple II. If you have problems printing a CAT when in 80-column mode, the problems may go away simply by changing to 40-column mode before issuing the CAT command.

INT Command

UniDOS Plus does not allow access to Integer BASIC. If you need Integer BASIC to operate with UniDOS Plus, you may modify it by running the program INT.MOD that came on the UniDOS Plus master diskette. INT.MOD removes the CAT command and restores the INT command. All other functions of UniDOS Plus will work the same, and Integer BASIC files may be LOADED, SAVED and RUN. If a 3.5" diskette is initialized while this modified version of UniDOS Plus is active, the modified version of UniDOS Plus (with the INT command) will be written to the initialized diskette.

TECHNICAL NOTES

These technical notes are provided to help the more technically oriented users understand how UniDOS Plus differs from DOS 3.3. UniDOS Plus is based on DOS 3.3, and every attempt was made to retain DOS 3.3 code in the same location. However, most of the free space in DOS 3.3 has been used up in our efforts to pack as many features as possible into the same space as DOS 3.3. This means that it may not be possible to install the user's favorite DOS 3.3 patch in UniDOS Plus. We hope the following information will help you decide which patches to use.

UniDOS Plus Structure

UniDOS Plus includes logic to read and write blocks of data to a 3.5" disk. To include this logic in the same space as original DOS 3.3, something had to go. The most natural code to go was that required to format a 5.25" disk. This logic is now on disk and is only read in when a 5.25" disk must be formatted. Naturally, a 3.5" disk containing UniDOS Plus must be on-line when a 5.25" disk is formatted, so that the logic can be read from the disk. This logic is overlaid on top of the new logic. When the format function is complete, the new logic is restored (read back in from disk).

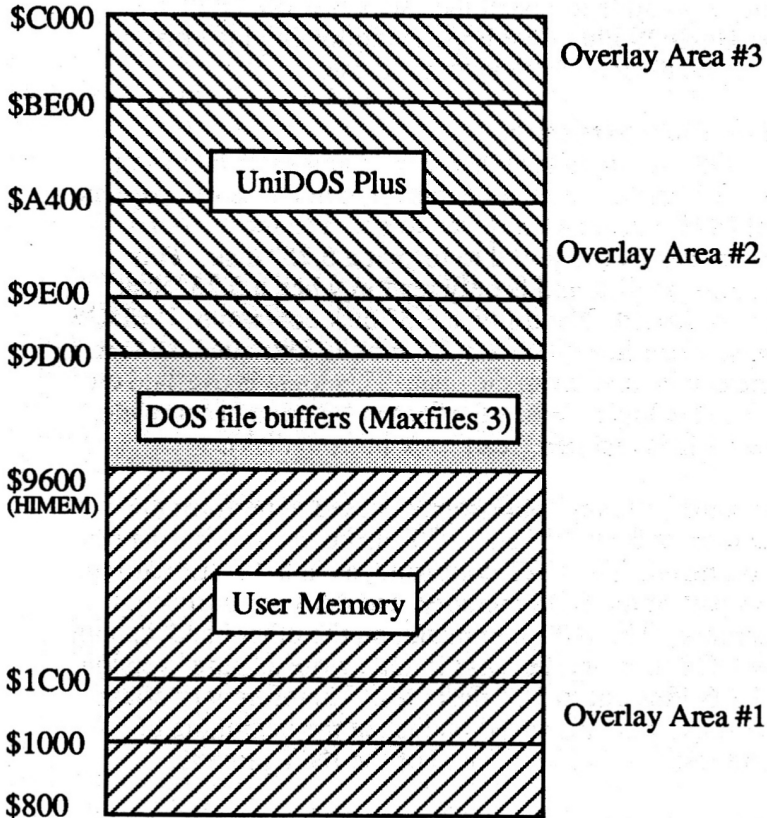
The same "overlay" philosophy is used to perform the initialization of both 3.5" and 5.25" diskettes, and for the new CAT command. The CAT command, as in 5.25" formatting, overlays part of the DOS memory, and does not intrude on user memory. The INIT command, on the other hand, cannot overlay DOS memory, because it must write a "pure" version of UniDOS Plus out to 3.5" diskettes. Therefore it overlays user memory, which is saved on disk at the beginning of the INIT and restored before the end of the INIT process.

The boot sector (or more properly, the boot block) is not stored in DOS memory as it is in DOS Plus. It is read in as part of the INIT overlay and written out to block 0 of the disk being initialized.

Direct calls to RWTS are possible using UniDOS Plus, although some caution should be used with the Format command. It should not be assumed that the RWTS portion of UniDOS Plus can stand alone. It uses data and code residing in the File Manager portion of DOS.

UniDOS Plus Memory Map.

UniDOS Plus uses the same memory space as DOS 3.3 in its normal location. The following map shows this usage and indicates where the UniDOS Plus overlays occur.



Overlay Area #1 is used only when a diskette is being initialized. Six blocks are temporarily stored here and are written to 3.5" disks during initialization. User memory is preserved by storing it temporarily on the UniDOS Plus disk (on the first track of the second volume, otherwise unusable). User memory is restored near the end of the INIT process, just before the HELLO program is written to the new disk. A system reset during initialization will destroy user memory and may cause UniDOS Plus to lose control.

Overlay Area #2 is used only during a CAT command. A system reset during a CAT command will cause UniDOS Plus to lose control.

Overlay Area #3 is used only when a 5.25" diskette is being formatted. A system reset during this process will cause UniDOS Plus to lose control.

Modified DOS 3.3 Addresses

UniDOS Plus's code is identical to DOS 3.3 code, with the exception of the following areas:

\$9D4C-\$9D4D	\$A974-\$AA4E	\$BA76-\$BA83
\$9D62-\$9D6B	\$AB99	\$BAA0-\$BAA4
\$9E5B	\$AC6B	\$BAC0-\$BAC8
\$A3BC-\$A3D4	\$ADA8-\$AE68	\$BAD0-\$BAD2
\$A410-\$A412	\$AE8E-\$AF07	\$BAE0-\$BAE4
\$A423-\$A470	\$AF9E	\$BC56-\$BCFF
\$A4E5-\$A4EF	\$B091	\$BD06-\$BD08
\$A580-\$A588	\$B3A0-\$B3A3	\$BE0D-\$BE0F
\$A59E-\$A5B1	\$B3AF-\$B3BA	\$BEB1-\$BFB7
\$A8F1-\$A8F3	\$B600-\$B65C	\$BFC8-\$BFB7
\$A95B	\$B6B3-\$B7E7	

3.5" Disk Organization

There are 1,600 512-byte blocks on a UniDisk 3.5 diskette. UniDOS Plus divides them into two volumes which are designated drive 1 and drive 3. Drive 1 consists of blocks 0-799, and drive 3 consists of blocks 800-1599. These

volumes become drives 2 and 4 on a second UniDisk 3.5 drive in the same slot.

Each 800-block volume is divided into 50 "tracks" of 16 blocks each, where the track number is simply the block number divided by 16. These 16 blocks for each track hold the data for 32 DOS sectors. Therefore each block contains data for two sectors. Tracks and sectors are numbered consecutively, starting with zero. For example, "track 0" is blocks 0 through 15, and block 9 holds sectors 18 and 19 of track 0.

When data from a 3.5" drive is requested, the UniDOS Plus logic converts the track and sector number to a block number and reads that block from the 3.5" disk into a 512-byte buffer. For read operations, the proper half of the 512-byte buffer is read into the requested area. For write operations, the data to be written is transferred to the 512-byte buffer and the block is written back to the 3.5" disk.

The equation for converting track and sector to block number is simple:

$$\text{BLOCK} = 16 * \text{TRACK} + \text{SECTOR} / 2$$

Even sector numbers are in the first 256 bytes of the block and odd sector numbers are in the second 256 bytes of the block.

The directory on a 3.5" UniDOS Plus diskette is on track 17, the same track it occupies on a 5.25" diskette. The VTOC is at track 17, sector 0. The directory starts at track 17, sector 31, and can expand down to track 17, sector 1. Thus, a directory can have $7 * 31$ or 217 file entries. Note that track 17, sector 0 corresponds to block 272 (\$110) and track 17, sector 31 corresponds to block 287, second half (\$11F). Add 800 to get the respective block numbers for the second volume.

On the first volume, Tracks 0 and 1 are reserved for the UniDOS Plus image. On the second volume, Track 0 is used

to store user memory during initialization. Note that it is not possible to use track 0 to store DOS files, because track/sector lists cannot have zero as a track number.

Disk Zap for UniDOS Plus Disks

If you'd like to make direct changes to the data on UniDOS Plus disks (or any 3.5" disks), the Diskoverer program in *Nibble* magazine (Vol. 7/No. 8, August 1986) can be configured to serve as a 3.5" Disk Zap. Contact MicroSPARC for ordering information.

COPY3.5 UTILITY

UniDOS Plus includes a utility program called COPY3.5 that enables owners of the Apple IIgs, IIC, or IIE with at least 128K of memory to make a copy of a UniDisk 3.5 diskette. COPY3.5 is specially designed to make quick copies of a UniDOS Plus diskette, but it can copy any Apple II 3.5" diskette, regardless of the operating system on the diskette. Only one 3.5" drive is required, but if two 3.5" drives are available, the copy process is even easier.

COPY3.5 is a faster copy program than any of Apple's copy programs currently available because it uses all available RAM in a 128K machine and therefore copies the full disk in seven passes, the minimum number of passes with 128K of memory. It is especially effective for UniDOS Plus diskettes, because it only copies those sectors currently in use, and therefore can usually copy a UniDOS Plus diskette in less than seven passes.

COPY3.5 does not copy to or from disk drives other than 3.5" drives. It is a machine language program that may be copied to a ProDOS disk using Apple's System Utilities. It can be installed from either DOS or ProDOS, because it does not use any operating system. Because it uses all 128K of RAM, it erases whatever operating system is active, and the computer must be rebooted after running COPY3.5.

Booting COPY3.5

With the COPY3.5 program in the current slot and drive, use the BRUN command as follows:

```
BRUN COPY3.5
```

The title screen will appear. Press RETURN to continue.

Selecting Slot and Drive

The first task is to specify the slot and drive for both the source and destination disk. For a one-drive copy, enter the same slot and drive for both source and destination. The program will only accept slots that contain a SmartPort controller card (only Slot 5 on the IIc or IIGS). If you have more than one 3.5" drive, be sure to remember which drives you specified as "source" and "destination", because this is how the program will refer to them from now on. You cannot designate a drive number higher than two. COPY3.5 uses the ProDOS convention for designating slot and drive numbers, so it is possible to have up to four 3.5" drives in slot 5 if there is no SmartPort controller in Slot 2. The third and fourth storage devices in Slot 5 are referred to as Slot 2, Drive 1 and Slot 2, Drive 2.

You may press Escape if you make a mistake while entering the slot and drive and wish to reenter the answer. After you have specified both source and destination drives, you will be asked to "Insert the destination disk". Put a blank or "scratch" disk in the destination drive and press Return.

The Format Function

The next stage of the copy process is the format function. If the destination disk has never been formatted, the program will discover this and then will begin formatting the disk, putting up a "Formatting" message.

If the program discovers that the destination disk has been formatted previously, it will give you three choices:

1. Press Escape if you don't want to write to this disk and wish to start over.

2. Press the R key if you want to reformat this disk to make sure that any previous data on it gets erased.
3. Simply press Return if you want to use the previous formatting and save the time it takes to format the diskette (about one minute). This process may leave data on the diskette if you are copying a UniDOS Plus disk, but the leftover data should cause no problems if you are using the disk in a standard way.

If you press R, the "Formatting" message will appear and the destination disk will be formatted. If you press Return, the format function will be terminated and the copy function will begin immediately.

The Copy Function

From this point on you will be required to swap disks if you are performing a one-drive copy. The program will stop and tell you to insert either the source or the destination disk, then press Return. COPY3.5 marks the destination disk to be sure it writes to the destination disk. If you accidentally put the source disk in when the destination disk is required, the program will issue a 'Wrong disk' message. Likewise, if the source disk is expected and the destination disk is found, a 'Wrong disk' message will result. Even though COPY3.5 provides this protection, it is still good practice to move the write protect tab on the source disk to the open-hole position before starting the copy process.

Before the copy process begins, you will be asked to select the type of operating system:

What operating system is on
the disk to be copied?

1. UniDOS Plus
2. Other

You may select option 2 even if the disk you are copying is a UniDOS Plus disk. Option 2 simply copies every block of the source disk to the destination disk. Option 1 copies only those blocks that are designated "in use" in the VTOCs of the UniDOS Plus disk, i.e., it only copies that portion of

the disk that contains data (which is faster than copying the entire disk, unused blocks and all). If a standard UniDOS Plus disk is not found, or if the disk is more than 80% used, option 2 will be used even if option 1 is selected.

If you do a UniDOS Plus copy, it may require less than 7 passes. As the copy process proceeds, the number of the pass and whether the program is reading or writing is displayed. The copy process can be halted by pressing Escape, but if this is done, we recommend reformatting the destination disk that results from an interrupted copy.

Exiting the Program

After a successful copy, you will be asked whether you wish to copy another disk. Press Y and the process will start over again. Press N and the final message will be displayed, asking you to enter a slot to boot from. You may enter any number from 1 to 7. This is equivalent to a PR#*n* where *n* is the number you enter. If the disk you just made is a bootable disk, this provides you a quick way to test it; just leave the destination disk in drive 1 and type the appropriate slot number.

Error Messages

PROGRAM REQUIRES
128K

You must have an Apple IIe with full 128K memory (or an Apple IIc or IIgs) to use COPY3.5.

DISK I/O ERROR

An unidentifiable error has occurred and the copy process must start over.

NOT A 3.5" DISK

The slot you have chosen is not a SmartPort or the drive you have chosen does not exist for that slot.

NO DRIVES CONNECTED	A UniDisk 3.5 controller card is in the indicated slot, but no drives are connected to it.
WRONG DISK	The program is expecting the source disk but the destination disk is in the drive, or the program is expecting the destination disk but a disk other than the destination disk is in the drive.
NO DISK IN DRIVE	The program has attempted to read or write to a drive that has no diskette in it.
DISK WRITE PROTECTED	The program has attempted to write to a drive that has a write-protected diskette in it.
DESTINATION DISK MAY NEED REFORMATTING	An I/O error has occurred during a copy to a destination disk after the option "use existing formatting" was selected.

ADD.DOS UTILITY

UniDOS Plus includes a utility program called AD.DOS that writes standard DOS 3.3 to a floppy disk, enabling it to boot. This utility is necessary because even though UniDOS Plus can format a floppy disk and write out the catalog and the HELLO program, it does not write the DOS 3.3 image to tracks 0-2. Thus it produces a usable but non-bootable disk. To make the disk bootable, use the ADD.DOS program.

Running ADD.DOS

With the ADD.DOS program in the current slot and drive, use the BRUN command as follows:

```
BRUN ADD.DOS
```

ADD.DOS is a machine language program located at \$800. It must be run with either UniDOS Plus or standard DOS 3.3 resident (it can't be run under ProDOS). The program contains the entire image of standard DOS 3.3.

Selecting Slot and Drive

After the program is loaded in, place the diskette that DOS 3.3 is to be written to into a floppy disk drive. The diskette must be formatted for DOS 3.3. The only inputs you will make to the program are to specify the slot and drive that you put the floppy diskette in.

The program will only accept slots that contain a standard floppy disk controller card (only slot 6 on the IIc or IIGS). Non-Apple disk controllers may not be recognized by the program. An exception is the Universal Disk Controller by Central Point Software, which the program does recognize. If you wish to exit the program at this point, press the Escape key before entering the slot number.

After you have entered the slot number, you are asked to enter the drive number. The only acceptable inputs are 1, 2 and Escape. If you enter 1 or 2, the program will proceed to check that there is a readable 5.25" diskette in the specified drive. If you press the Escape key, the program will restart and you can reenter the slot number. (At the prompts for the slot and drive numbers, the Escape key will only be interpreted correctly if it is the first key pressed.)

If an acceptable slot and drive have been entered, the program proceeds to write DOS to the diskette. On completion, it prints out "ADD DOS SUCCESSFUL" and returns to BASIC. To use ADD.DOS again, you must BRUN it from a disk.

Error Messages

NOT A VALID ENTRY

When entering slot number, only the slot number of a disk controller or the Escape key may be input. When entering drive number, only 1, 2 or the Escape key may be input. The input string must be exactly one character long.

**ERROR: CAN'T READ
THE DISK**

This probably means that there is no diskette in the specified drive, or the drive door is not shut, or the diskette in the drive is not formatted.

**ERROR: CAN'T WRITE
TO THE DISK**

This means that either the disk has a write protect tab on it, or the disk has been removed from the drive. Remove the write protection, reinsert the disk and press Return. Or press Escape to start over.

**ERROR: NOT A DOS
DISK**

The program will only allow you to write DOS 3.3 to a disk that already has a DOS 3.3 catalog on it. Specifically, the disk must have a normal VTOC on track \$11, sector \$00. If this message occurs, a normal VTOC was not found; try reinitializing the disk or using a different disk.

INT.MOD UTILITY

UniDOS Plus includes a utility program called INT.MOD that adds to UniDOS Plus the capability to operate with

Integer BASIC. It modifies the memory-resident version of UniDOS Plus by removing the CAT command and replacing it with the INT command. It does not modify the diskette.* Therefore rebooting the standard UniDOS Plus disk will restore the CAT command and eliminate the INT command.

Very old Apple II computers allowed a configuration in which Integer BASIC was in ROM and Applesoft BASIC was in low memory (\$800). Such a configuration is not supported by UniDOS Plus, even after the INT command is installed.

Running INT.MOD

With the INT.MOD program in the current slot and drive, use the BRUN command as follows:

```
BRUN INT.MOD
```

INT.MOD is a machine language program located at \$803. It must be run with UniDOS Plus resident. It first checks to make sure UniDOS Plus is there, then modifies the UniDOS Plus code in memory, and ends by displaying the message INT COMMAND INSTALLED and warm-starting Applesoft BASIC.

INT.MOD can be installed either before or after loading Integer BASIC into your computer. To install Integer BASIC while UniDOS Plus is in memory, you will need a copy of the DOS 3.3 System Master disk issued by Apple prior to 1983. This disk has a 50-sector INTBASIC file on it, which is installed by running the HELLO program on the disk. The later System Master disks have a 42-sector file of the same name which cannot be installed correctly when UniDOS Plus is in memory.

* It is possible to create a diskette with the modified version of UniDOS Plus on it by initializing a 3.5" diskette while the modified version of UniDOS Plus is resident.

Error Message

UNIDOS PLUS NOT
FOUND

If the resident operating system is not a standard version of UniDOS Plus, this error message will be displayed and the program will be terminated. This message will be displayed if you BRUN INT.MOD more than once without rebooting.

UniDOS Plus

For the Apple® 3.5 and UniDisk 3.5 drives

Apple's new 800K UniDisk drive gives you five times the storage capacity of floppy disks but no DOS 3.3. Now you can have it -- with UniDOS Plus!

MicroSPARC's UniDOS Plus software lets you format 3.5 " disks that automatically boot up Apple's DOS 3.3! This means:

- You'll enjoy a 500%+ increase in disk capacity. . .800K per disk, for those BIG applications.
- You'll protect your investment in DOS 3.3 software* and files.
- You can grow to 1.6 megabytes of disk capacity painlessly — without having to convert to ProDOS.

You don't have to wait any longer to buy a 3.5" disk drive now that UniDOS Plus is here.

The UniDOS Plus facts:

- Two 400K volumes per disk.
- Supports one or two 3.5 drives, addressable in software as Drives 1-4.
- Includes Fast Disk Copy utility
- Uses no Main Memory -- normal HIMEM!
- Up to 434 Catalog names per disk.
- Mix 5.25" and 3.5" drives within the same system.
- Comes with Technical Data Sheet showing modified DOS 3.3 addresses.
- For the Apple II Plus, IIe, IIc and IIgs.

*Note: Full compatibility with Applesoft programs. However, UniDOS Plus may not operate correctly with machine language utility programs that directly use DOS 3.3 internal routines. Apple and UniDisk 3.5 are registered trademarks of Apple Computer, Inc.

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