

Using APDOS.COM to Transfer CP/M 80 Programs and Files (And DOS 3.3 Files) to Apple II CP/M Disks

Introduction

The purpose of this document is to describe how to transfer files from an Apple II DOS 3.3 Disk (or Disk Image) to an Apple II CP/M 80 Disk (or Disk Image) using the APDOS.COM utility provided with the Microsoft Softcard Utilities Disk.

The examples in this document use CP/M 80 programs and files and assume you are using an Apple II or an Apple II emulator that supports CP/M. The basic steps are:

1. Put CP/M programs or files on a DOS 3.3 disk or disk image as binary files.
2. Boot a CP/M disk or disk image containing APDOS.COM in drive 1.
3. Put the disk or disk image with the programs and files into drive 2.
4. Use APDOS.COM to transfer the programs and files from drive 2 to drive 1.
5. Remove the DOS 3.3 4 byte headers.

The examples in this document use disk images. You can download a zip file containing the disk images used in the examples to use for your own purposes from:

<http://www.aztecmuseum.ca/applecpm/AztecCPMToApple.zip>

Disk Images

Disk Images are the standard way of transferring Apple II disks to other computers for archival purposes, for use in emulators and for Internet transfer and archival. The Disk Image can be recreated on a real Apple II Computer and run on a real Apple II computer.

Disk Image Utilities

Several utilities exist for putting Apple II DOS 3.3 binary files on a DOS 3.3 disk image. The two that I use in the examples are Windows utilities:

Ciderpress: <http://ciderpress.sourceforge.net//index.htm>

Apple II Oasis: <http://www.aztecmuseum.ca/index.htm#appleemulators>

Ciderpress can view CP/M disks and the emulator in Apple II Oasis can run them. However, these and most others like them do not support putting files on an Apple CP/M disk image, so for utilities that don't, variations of the examples in this document can be used to get the files across from DOS 3.3 to CP/M 80. There are other ways to do this of course. If you are working with Apple II CP/M disk images on a modern computer, running Windows, Linux, etc, you can use [Michael Haardt's cpmtools](#) command line utilities to transfer CP/M 80 programs and files directly to Apple II CP/M disk images. **But that's not what this document is about.**

Background Information

This can be a complicated process. This section provides some background information to help you get started.

Microsoft Softcard

Microsoft's first hardware product was the Softcard; a Z80 coprocessor card that allowed the CP/M operating system to be run on an Apple II.

Softcard: <http://www.apple2info.net:80/hardware/softcard/softcard.htm>

APDOS.COM

The Softcard came with a utilities disk and included a program called APDOS.COM which could be used to transfer binary files from an Apple II DOS 3.3 disk to an Apple II CP/M disk. However, this utility leaves the DOS 3.3 4-byte header on binary files. Therefore a second step is required to strip the 4 byte header. This second step is discussed in more detail in the description of the BHEAD.COM program below.

Converting back and forth from Disk Images to Real Apple II Disks

Two popular native Apple II utilities (DSK2FILE and DISKMAKER.8) can be used to create real DOS 3.3 disks and Apple CP/M disks from disk images. DSK2FILE requires typing. DISKMAKER.8 is menu-driven to a greater extent and easier to use for this reason. DISKMAKER.8 is used exclusively for creating disks from disk images. DSK2FILE can also be used to create disk images from disks. The disk images created by DSK2FILE can be used in either.

DISMAKER.8 <http://www.markpercival.net/DM8/>
DSK2FILE <http://a2central.com/?p=131>

The Microdrive

Historically a serial cable (called a "NULL Modem" cable) was used to transfer files between the Apple II and other computers. In recent years the use of memory cards to transfer data between computers has become standard.

One such card, the Microdrive, allows a compact flash (CF) memory card to be plugged into a Windows XP computer or an Apple II and comes with DISKMAKER.8 and DSK2FILE. It also comes with the Ciderpress program which allows files to be moved back and forth between the Windows computer and the CF memory card. This greatly simplifies moving files back and forth between the Apple II and the Windows computer.

http://www.reactivemicro.com/product_info.php?cPath=1_29&products_id=31

BHEAD.COM

I have written a CP/M 80 program called BHEAD.COM to remove the first 4 bytes of a DOS 3.3 Binary File transferred to Apple CP/M using the APDOS.COM utility mentioned above.

BHEAD.COM including source code is available with the example disk images used in this document from the link below:

<http://www.aztecmuseum.ca/applecpm/AztecCPMToApple.zip>

As noted above several programs exist for putting DOS 3.3 binary files on DOS 3.3 disk images. CP/M 80 programs and CP/M 80 text files can be placed on a DOS 3.3 disk image as binary files, preserving their original formatting.

APDOS.COM can be run in CP/M to get these across from DOS 3.3 to CP/M either in an emulator that supports both disk image formats or on an Apple II with a Z80 card by making real disks from the disk images. The DOS 3.3 binary file header can then be stripped as a post-transfer process using BHEAD.COM.

BHEAD.COM is quite quick and accepts the input and output file names as command line arguments, so can also be used non-interactively with a command list in conjunction with SUBMIT.COM to do multiple files.

Examples:

Suggested Naming Convention:

When you use APDOS to transfer .COM files, use the .BIN file extension on the CP/M side. Use the .TXT file extension for .C source files on the CP/M side. That way you can ERA the transferred file after using BHEAD to specify the output as .COM or .C respectively.

When using APDOS.COM

BHEAD.BIN=BHEAD.COM
BHEAD.TXT=BHEAD.C

When using BHEAD.COM

BHEAD BHEAD.BIN BHEAD.COM
ERA BHEAD.BIN
BHEAD BHEAD.TXT BHEAD.C
ERA BHEAD.C

Additional Notes:

Microdrive

To Microdrive users, making disks from disk images and making disk images from disks is probably a well understood process. This is for others not familiar with the Microdrive.

I bought a Microdrive from Henry over at Reactive Micro (see above) and use Ciderpress (see above) to put my disk images on my CF card in the CF adapter on the USB port on my Windows machine. (I open my CF card in read-write mode in Ciderpress). Then I take the CF out of the Windows machine, and plug it into my external CF drive on my Apple //e which has a Z80 card. Following that I use Diskmaker.8 (see above) on my Microdrive to write the CP/M disk image to a floppy. Finally, I power-cycle my Apple //e and boot from the floppy into CP/M by holding the Esc key down when I turn the power on again.

For going in the reverse direction and making disk images I plug my CF card into the CF drive on my Apple //e and run DSK2FILE to make a disk image from a disk in the floppy drive. Then I remove the CF card from the Apple and plug it into the CF USB adapter on my Windows machine and use Ciderpress to copy the disk image from the CF card into a Windows folder where I can run it in an emulator or upload it to the Internet.

The Examples

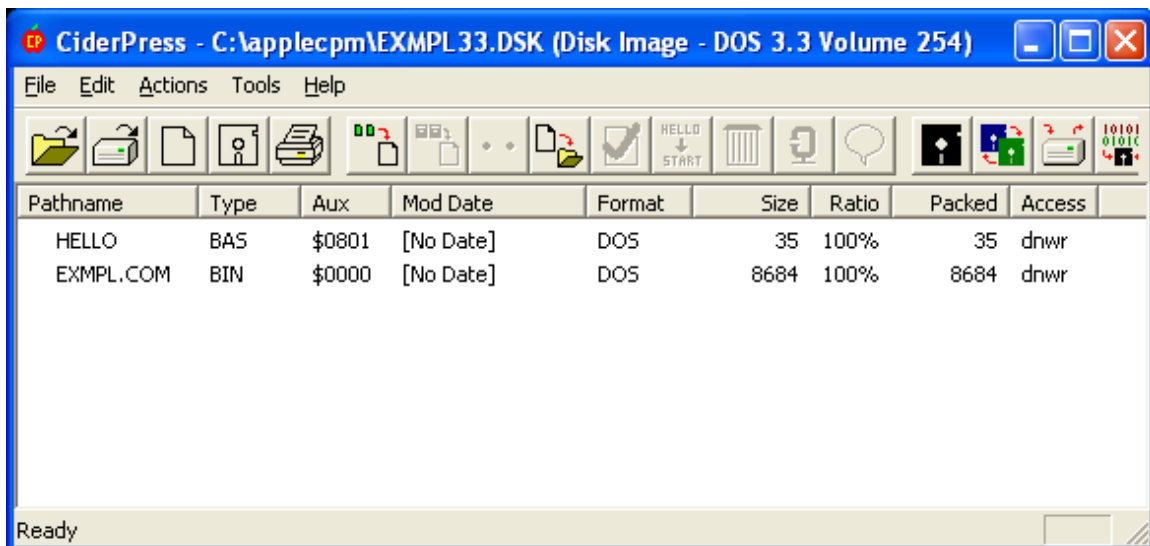
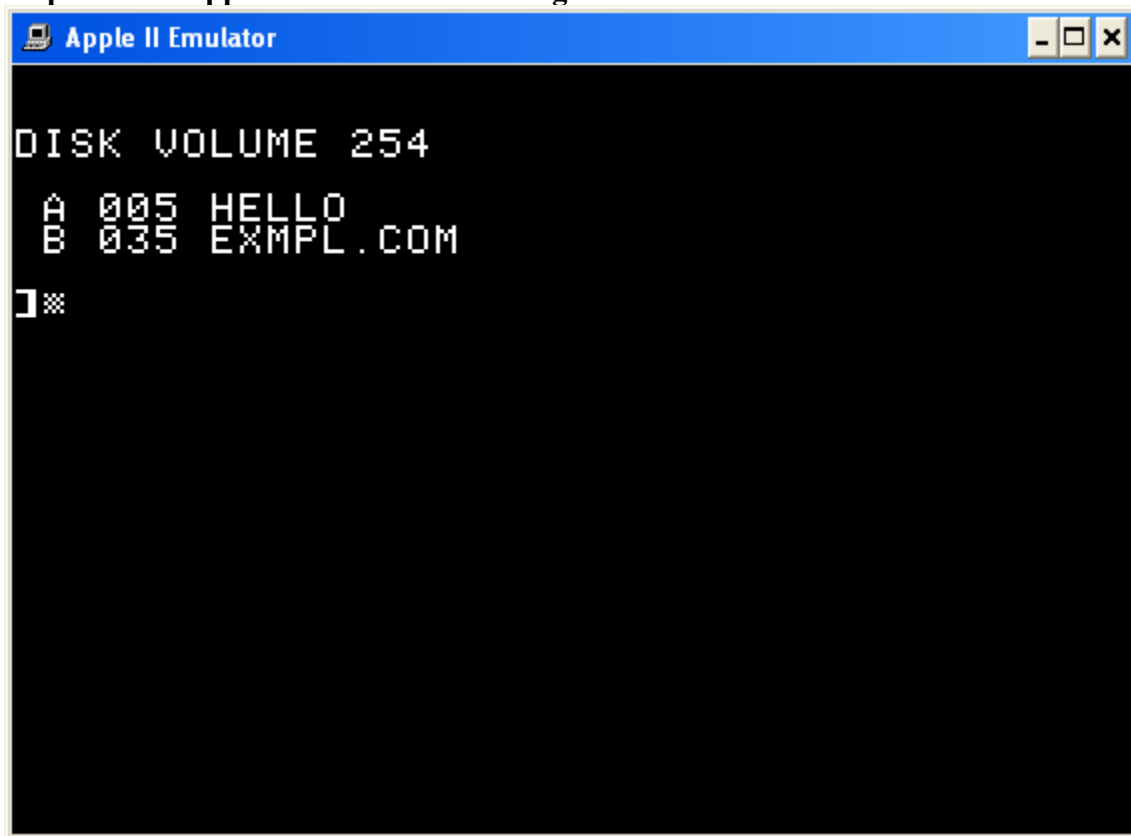
For the examples I prepared 2 disk images which are in the ZIP file noted above and contain all the bits-and-pieces needed to make this happen when used with the Apple II Oasis Emulator. One Disk Image is an Apple II CP/M 80 Disk Image and the other is an Apple II DOS 3.3 Disk Image. The examples in this document are limited but many possibilities exist to accomplish the task of transferring a CP/M 80 file to an Apple CP/M 80 system.

If you owned a real Apple II computer back in the 1980's, you may have had many programs already on your Apple II including a telecommunications program that ran in DOS 3.3 and you may have had a modem. You may have then purchased a Softcard or a Softcard clone to run CP/M 80 programs, and you may have downloaded CP/M 80 programs from a bulletin board system (BBS) to a DOS 3.3 disk and needed to get them across to CP/M to run them.

The examples in this document provide a similar scenario, and are certainly not exclusive to transferring Aztec C .COM files from Windows XP to Apple CP/M 80 Disk Images.

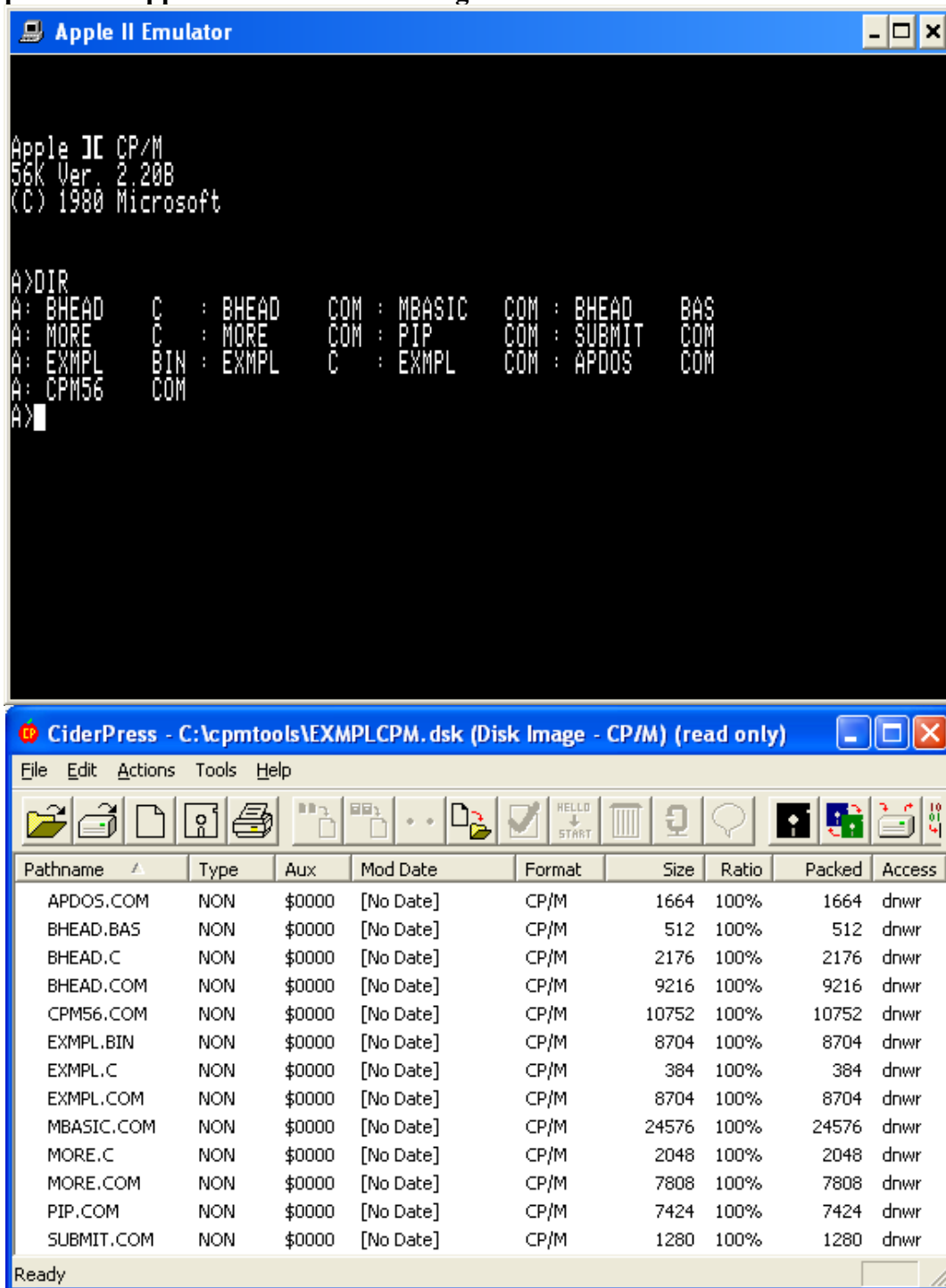
As previously noted, variations of this process can be used to transfer any binary file between Windows XP and an Apple CP/M 80 Disk Image. Besides the ones used in the examples below, you can probably use other emulators that support both Apple CP/M 80 and Apple DOS 3.3 simultaneously. You can perform this process or portions thereof on a real Apple II or maybe even on other non-Windows XP computers.

Step 1 – The Apple II DOS 3.3 Disk Image – EXMPL33.DSK



As shown in the screen shots above, I have placed the Aztec C CP/M 80 program EXMPL.COM file on a DOS 3.3 Disk Image as a binary file. I used the Apple II Oasis Disk Manager to do so and edited the properties to define the Aux (Subtype) which is the DOS 3.3 Load Address as 0. This load address is unimportant for a CP/M .COM file and in fact will need to be removed. Read further.

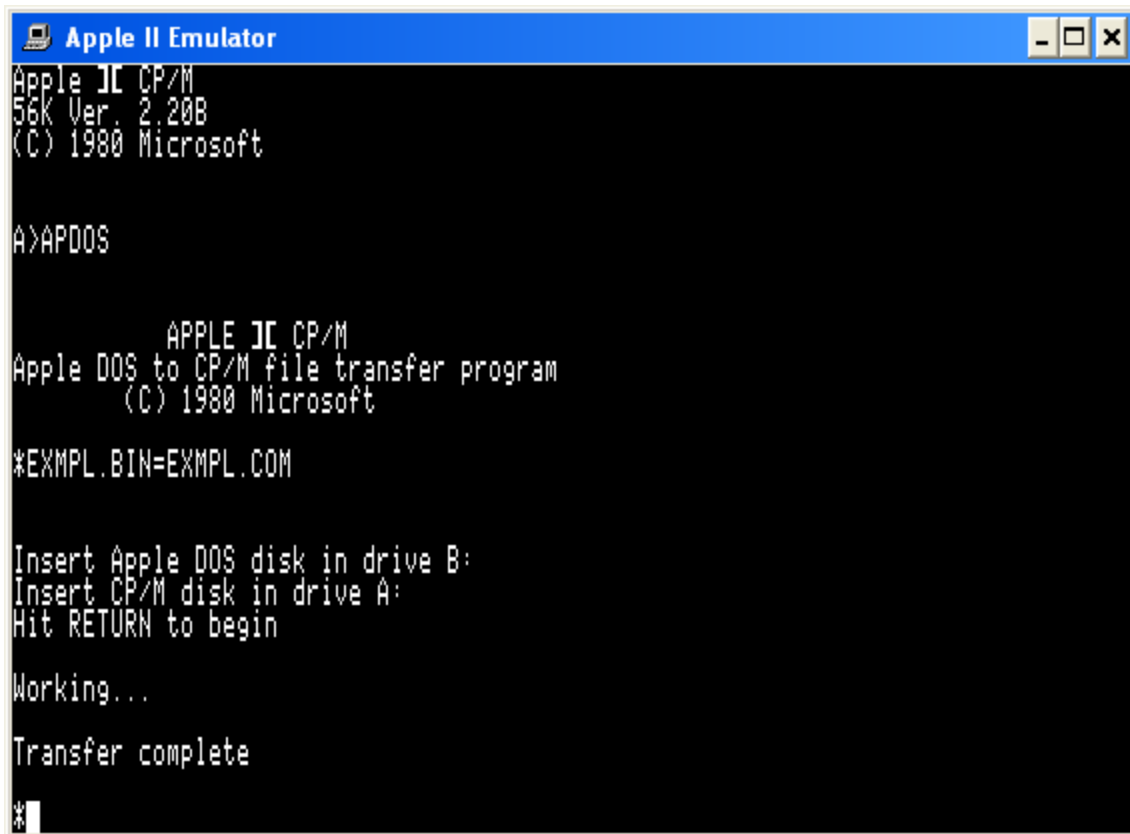
Step 2 – The Apple II CPM/80 Disk Image – EXMPLCPM.DSK



As shown in the screen shots above, EXMPL.COM has already been copied as EXMPL.BIN from the DOS 3.3 disk to the CP/M disk (using APDOS.COM). The steps required to do so are covered further in this document. Also note that this disk contains the equivalent conversion programs BHEAD.COM and BHEAD.BAS, and a program called EXMPL.COM which is the output from either BEHEAD.COM or BHEAD.BAS. BHEAD.COM is explained above and BHEAD.BAS is explained below.

Step 2 – Transferring Files from the Apple Disk to the CP/M Disk – EXMPL.COM

The Microsoft Softcard Utilities provided a program called APDOS.COM to transfer Binary and Text files from DOS 3.3 to CP/M. However, this utility leaves the DOS 3.3 4-byte header on binary files. Therefore a second step is required to strip the 4 byte header of a binary file. But first let's cover the transfer process using APDOS.COM in the Apple II Oasis Emulator. You could also do this part on a real Apple II with a Softcard if you convert the Disk Images that I have provided to real Apple II Disks.



```
Apple II Emulator
Apple II CP/M
56K Ver. 2.20B
(C) 1980 Microsoft

A>APDOS

        APPLE II CP/M
Apple DOS to CP/M file transfer program
        (C) 1980 Microsoft

*EXMPL.BIN=EXMPL.COM

Insert Apple DOS disk in drive B:
Insert CP/M disk in drive A:
Hit RETURN to begin

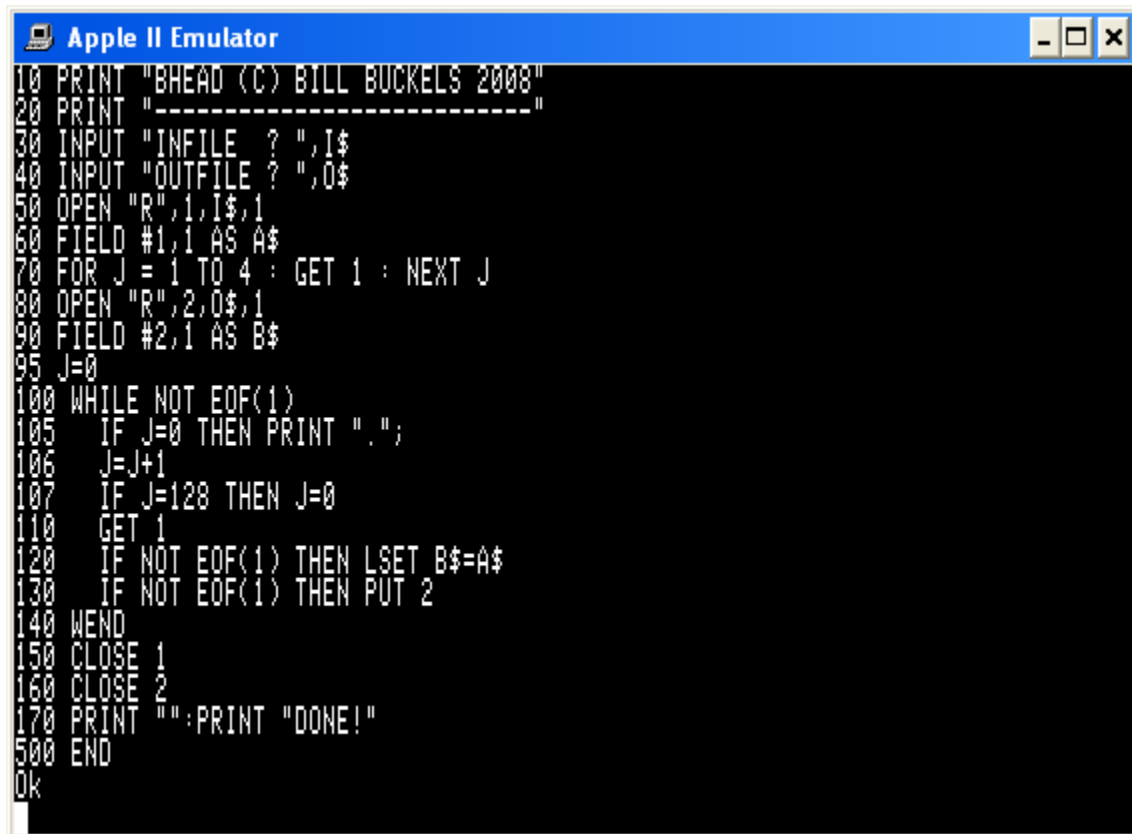
Working...

Transfer complete
*
```

1. Using the Apple II Oasis Emulator, load EXMPLCPM.DSK Into Slot 6 Drive 1
2. Load EXMPL33.DSK Into Slot 6 Drive 2
3. Type “APDOS” and press the [ENTER] Key.
4. Type “EXMPL.BIN=EXMPL.COM” and press the [ENTER] Key.
5. To exit APDOS press the [CTRL]+[C} Keys simultaneously.
6. The Transfer is Done. Review the screen shot above then read further.

Step 3 – Stripping the DOS 3.3 Header from the .COM Program – BHEAD.BAS

As previously noted and also documented by Microsoft in their Softcard Utilities Manual, the DOS 3.3 4-byte binary file header is left in place by APDOS.COM. For this purpose it's too bad that Microsoft didn't provide an option for stripping this header, but they never envisioned that somebody would be using a DOS 3.3 disk to go between Windows XP and CP/M disks. They did however document the stripping of headers of binary graphics images which seems to indicate that they realized the problem themselves after APDOS was released. Anyway as a final step, we can use the MBASIC program BHEAD.BAS to output a stripped and finished Aztec C .COM program which will run in Apple II CP/M 80. For greater speed use BHEAD.COM described above.



```
Apple II Emulator
10 PRINT "BHEAD (C) BILL BUCKELS 2008"
20 PRINT "-----"
30 INPUT "INFILE ? ",I$
40 INPUT "OUTFILE ? ",O$
50 OPEN "R",1,I$,1
60 FIELD #1,1 AS A$
70 FOR J = 1 TO 4 : GET 1 : NEXT J
80 OPEN "R",2,O$,1
90 FIELD #2,1 AS B$
95 J=0
100 WHILE NOT EOF(1)
105 IF J=0 THEN PRINT ".";
106 J=J+1
107 IF J=128 THEN J=0
110 GET 1
120 IF NOT EOF(1) THEN LSET B#=A$
130 IF NOT EOF(1) THEN PUT 2
140 WEND
150 CLOSE 1
160 CLOSE 2
170 PRINT "":PRINT "DONE!"
500 END
Ok
```

The listing for the BHEAD.BAS program is shown above and its use is described below. Arguably there are other ways to strip 4 byte headers from DOS 3.3 binary files in CP/M but my feeling was that a BASIC program is about as straight-forward as you can get to explain what is going on here, although it is a little slow. Use BHEAD.COM described above for greater speed and the flexibility of command line filename input.

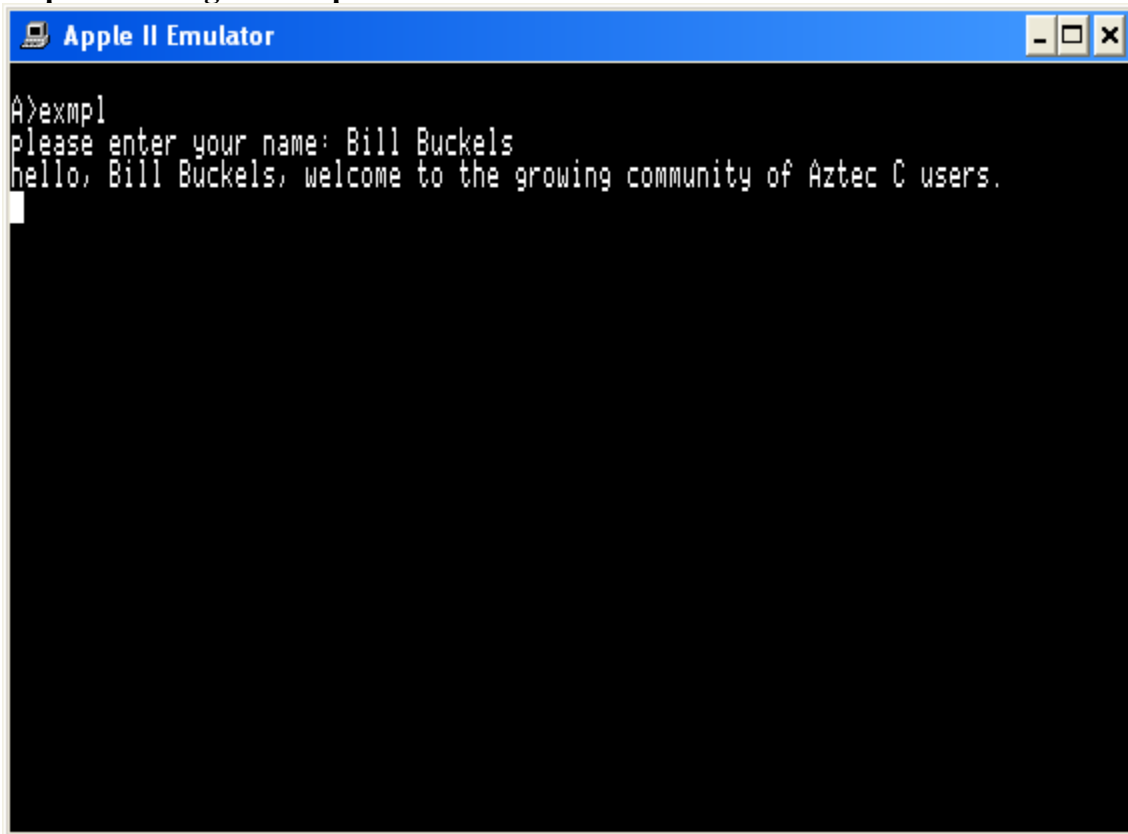

```
BASIC-80 Rev. 5.2
[Apple CP/M Version]
Copyright (C) 1980 by Microsoft
Created: 12-Nov-80
26483 Bytes free

BHEAD (C) BILL BUCKELS 2008
-----
INFILE ? EXMPL.BIN
OUTFILE ? EXMPL.COM
.....
DONE!
Ok
```

1. Start MBASIC by typing “MBASIC” and press the [ENTER] Key.
2. Load BHEAD by typing “LOAD “BHEAD”” and press the [ENTER] Key.
3. Enter the .BIN file name for input (in this case EXMPL.BIN).
4. Enter the .COM file name for output (in this case EXMPL.COM).
5. Every 128 bytes a dot will print on the screen until done.
6. When done, exit MBASIC by typing “SYSTEM” and press the [ENTER] Key.
7. Test the output (in this case EXMPL.COM) by typing “EXMPL” and pressing [ENTER].

I should note that this program can be run by typing “MBASIC BHEAD” and pressing the [ENTER] Key. I should also note that instead of the “END” statement on line 500, a “SYSTEM” statement would have put the program at the CP/M command prompt. I did it the way I did it for no particular reason and as I said initially, other possibilities on all of this exist. (Also as previously noted, a faster program called BHEAD.COM is also on the CP/M disk image.)

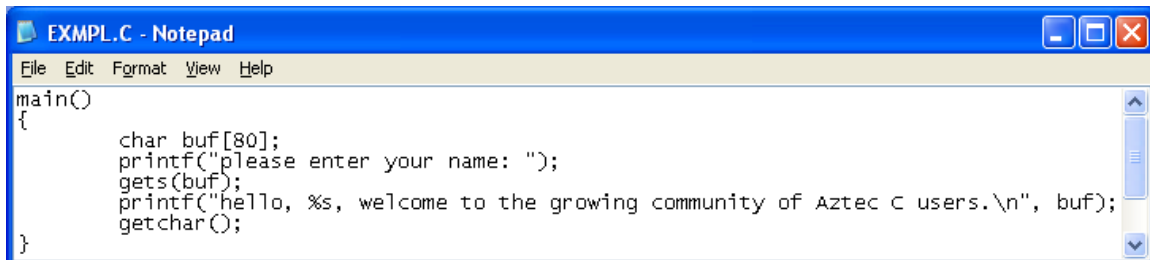
Step 4 – Testing the Output File – EXMPL.COM



```
A>exmpl
Please enter your name: Bill Buckels
hello, Bill Buckels, welcome to the growing community of Aztec C users.
```

As noted in the previous step:

1. Test the output (in this case EXMPL.COM) by typing “EXMPL” and pressing [ENTER]. See above.
2. When prompted to enter your name, do so. The source for EXMPL.COM is shown below:



```
EXMPL.C - Notepad
File Edit Format View Help
main()
{
    char buf[80];
    printf("please enter your name: ");
    gets(buf);
    printf("hello, %s, welcome to the growing community of Aztec C users.\n", buf);
    getchar();
}
```

Footnote:

I hope this document proved informative whether your interest is in running Aztec C CPM/80 programs on an Apple II or just playing with any or all of this in general. If some of this went over your head I do apologize but would ask that you familiarize yourself with the many fine CP/M and Apple II resources on the Internet including the following:

The cpm8680 Website – <http://www.cpm8680.com>
Cpmtools – <http://www.cpm8680.com/cpmtools/>

The Official Aztec C Museum - <http://www.aztecmuseum.ca/>
Apple II Compilers - <http://www.aztecmuseum.ca/index.htm#apple>
Apple II Emulators - <http://www.aztecmuseum.ca/index.htm#appleemulators>
CP/M 80 Compilers - <http://www.aztecmuseum.ca/index.htm#cpm80>

Apple II and CP/M Forums

Apple CP/M - <http://tech.groups.yahoo.com/group/applecpm/>
Apple II – <http://groups.google.com/group/comp.sys.apple2>
Apple II Programming <http://groups.google.com/group/comp.sys.apple2.programmer>
CP/M - <http://groups.google.com/group/comp.os.cpm>

Other Sites

<ftp://ftp.apple.asimov.net/>

There are many more too numerous to list, and since the purpose of this document is to describe a process rather than as an all-inclusive retro-computing roadmap, I'll leave it to you to figure-out the rest.

Have Fun!

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