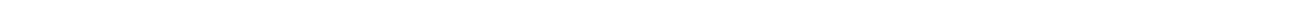




# **AMD PCMCIA Flash Memory Card Embed Utility User's Guide**



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## Introduction

The Embed program is a DOS utility that allows you to perform the following functions on any AMD C-series or D-series Flash memory PC card:

- Read from the card's common or attribute memory
- Program a byte or file contents into the card's common or attribute memory
- Erase a sector or the entire card's common memory.

AMD Flash memory cards verify program and erase operations through Embedded Algorithms. Each Flash component within a Flash memory card executes these algorithms.

This guide presents the features of the Embed program and explains how to use them. This version of the Embed program is preliminary; currently only minimal support is available.

For general information on the PCMCIA specification, refer to the *PCMCIA Training Manual* (PID 17515B), included in this Evaluation Kit.

## Preparing to use the *Embed* program

The Embed utility was designed to assist users of the AMD *Flash Memory Card Evaluation Kit*. Refer to *AMD Flash Memory Card Evaluation Kit User's Guide* for information on installing the card drive provided with the kit. You can also use Embed with any 365-compatible card drive.

Embed has a built-in flash file system; you should disable any FFS or FTL drivers before running Embed to avoid possible conflicts. Embed can also conflict with networking software; consider disconnecting the PC from the network before running Embed.

You can use the boot menu option of config.sys to choose which drivers your PC loads at startup. While Embed is running, it copies the contents of this address space to the Flash card. Adding this line to the config.sys file prevents EMM386.exe from using this address space in upper memory. Also, add the following line to your config.sys file:

```
device=emm386.exe noems x=D000-DFFF
```

If you are using a multiple card drive configuration, determine which card socket is designated as the first (slot 0). Embed always uses the designated first card socket in the system.

To install the Embed utility, copy embed.exe from the floppy disk to the system's hard drive.

## Starting the Embed program

To run the Embed program, type `embed` at a DOS command line. Figure 1 shows the main menu that appears.

```
AMD Flash Memory Card Evaluation Kit
<C> Copyright AMD 1996
Version      1.2

Main Menu
-----
[F]lash Card select      <Card selected: <null>>
[R]ead memory
[W]ord - program single word
[B]yte - program single byte
[P]rogram user file
[S]ector erase
[C]ard erase
[X]Erase and suspend
[Y]Resume Erase
[A]ttribute Memory Access

[E]xit to DOS temporarily
[Q]uit program

Please enter Letter of needed selection:
```

Figure 1. Main Menu

## Selecting the Flash Card

To select a Flash card, press `f` on the keyboard. The screen scrolls and displays a list of AMD's Flash card part numbers (Figure 2). Press a number key (1-7) that corresponds to the card plugged into the card drive, and then press Enter. If you press Enter without pressing a number key, you return to the main menu. When Embed identifies the card and matches it to your selection, Embed displays the message, "Correct card selected." and displays the manufacturer and device codes. Press Enter to return to the Main Menu.

Embed calculates the highest valid address based on your selection; for example, if you select the letter corresponding to a 1 MB card, but you have a 4 MB card plugged into the card drive, Embed will not report the correct address information beyond the highest address for a 1 MB card. Therefore, ensure that the selection you enter matches the card plugged into the drive.

```

Please enter Letter of needed selection: f

      [1]    AMC001CFLKA      [2]    AMC002CFLKA
      [3]    AMC004CFLKA      [4]    AMC010CFLKA
      [5]    AMC004DFLKA      [6]    AMC008DFLKA
      [7]    AMC020DFLKA
      [8]    FUC032DFLKA  OLD<04AD>
      [9]    FUC032DFLKA  NEW<043D>

                                [0]    Exit

Enter the Flash card to use: 1
Man. Code= 1   Dev. Code= a4
Correct card selected
Hit Enter to continue

```

Figure 2. Card Selection Menu

If Embed cannot identify the card, Embed displays an error message (Figure 3). Pressing any key then returns you to the main screen.

```

Man. Code= ff   Dev. Code= 0
Hit any key to continue

<82>Error! The device in this socket is a not a AMC001CFLKA.
Please make another selection._

```

Figure 3. Card Error Message

## Using Common Memory

Embed can read, program, and erase both the common and attribute (CIS) memory data. This section describes the steps for interacting with the common memory. For information on the attribute memory, see “Using the Attribute Memory” on page 11.

### Reading memory

Press Esc to return to the main menu. Press **r** on the keyboard. The screen scrolls and asks for a starting address, in hexadecimal format, from which you wish to read (Figure 4). Type the desired starting address and press Enter. Ensure that you selected the proper card with the “Card Select” option on the Main Menu, or Embed may display an address that is higher than the highest address on the physical card in the card drive. After reading the highest physical address, Embed reads data starting from address 0 again, but continues to increment the address value.

```

Reading AMC001CFLKA
Enter hexadecimal starting address: 0

0: 00 00 00 00 00 ff ff ff ff ff ff ff ff ff ff
10: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
20: ff 44 65 61 6e ff ff ff ff ff ff ff ff ff ff   Dean
30: ff 41 6b 61 6d 69 6e 65 ff ff ff ff ff ff ff ff   Akamine
40: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
50: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
60: ff 44 65 61 6e 20 41 6b 61 6d 69 6e 65 00 00 ff   Dean Akamine
70: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
80: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
90: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
a0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
b0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
c0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
d0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
e0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
f0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

Hit any key to continue, [ESC] key to return to menu: _

```

Figure 4. Entering a Starting Address

Press Enter to view the next screenful of memory contents, or press Esc to return to the Main Menu.

```

Please enter Letter of needed selection: r
Reading AMC001CFLKA
Enter hexadecimal starting address: 400000

<53>Error: address exceeds device limits._

```

Figure 5. Error Message During Read Request

```

1a0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
1b0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
1c0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
1d0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
1e0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
1f0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

Hit any key to continue, [ESC] key to return to menu:

200: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
210: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
220: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
230: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
240: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
250: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
260: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
270: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
280: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
290: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
2a0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
2b0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
2c0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
2d0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
2e0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff
2f0: ff ff ff ff ff ff ff ff ff ff ff ff ff ff ff

Hit any key to continue, [ESC] key to return to menu:

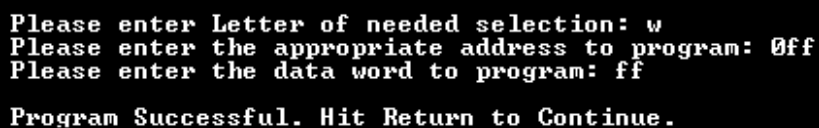
```

Figure 6. Displaying Memory Contents

## Programming a word to common memory

To program a word to common memory, return to the Main Menu. Press **w** on the keyboard. Embed requests a starting address and the word of data you want to program to memory. Figure 7 shows the screen that Embed displays for these steps. Ensure that you enter a valid hexadecimal value to avoid programming erroneous data into memory. After the program operation is complete, Embed displays the message, “Program Successful. Hit Return to Continue.” You can verify the operation was successful by returning to the Main Menu and reading data from the address to which you just programmed.

Embed calculates the highest valid address based on your card selection. Embed will not program to an address higher than the highest address associated with the card part number you entered at the main menu. For example, if you selected a 2 MB card, but had actually plugged in a 4 MB card, then tried to program to an address beyond 2 MB, Embed reports an “out of range” error message.



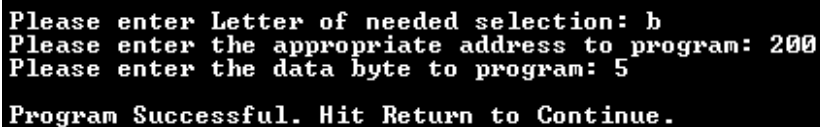
```
Please enter Letter of needed selection: w
Please enter the appropriate address to program: 0ff
Please enter the data word to program: ff

Program Successful. Hit Return to Continue.
```

Figure 7. Programming a Word to Common Memory

## Programming a byte to common memory

To program a byte to common memory, return to the Main Menu. Press **b** on the keyboard. Embed requests a starting address and the byte of data you want to program to memory. Figure 8 shows the screen that Embed displays for these steps. Be sure to enter a valid hexadecimal value to avoid programming erroneous data into memory. After the program operation is complete, Embed displays the message, “Program Successful. Hit Return to Continue.” You can verify the operation was successful by returning to the Main Menu and reading data from the address to which you just programmed.



```
Please enter Letter of needed selection: b
Please enter the appropriate address to program: 200
Please enter the data byte to program: 5

Program Successful. Hit Return to Continue.
```

Figure 8. Programming a Byte to Common Memory

## Programming a file to common memory

Embed allows you to program a file into common memory. To program, press **p** at the Main Menu. Type in the file name (and path, if necessary), press Enter. Type the starting address at which you want to load the file; press Enter. If you specify a starting address that is too high, Embed reports “Maximum Address Exceeded.” Press Enter to return to the menu. Figure 9 shows the prompts that Embed displays during these steps.

```
Please enter Letter of needed selection: p
Please enter file name:c:\test.txt
File is c:\test.txt
Please enter the appropriate address to program: 0ff
Write Passed. Hit any key to continue._
```

Figure 9. Programming a File into Memory

## Erasing common memory

In Flash devices and cards, an erase command programs all the affected bits to a logical 1. A subsequent read operation will confirm this by displaying **ff** for all words. The erase function in Embed affects only common memory; it does not alter the attribute memory.

### Erasing a sector pair

Embed has two functions that erase the contents of the Flash memory card: sector erase and card erase. Specifying a sector address erases a sector *pair*. On Flash memory cards, the Flash devices are paired off such that one sector from one device pairs with one sector of the other device to form a single contiguous address space in common memory. A sector pair thus holds twice the data of a single sector. The first sector pair addresses are from 00000-1ffff, the second sector pair addresses are from 20000-3ffff, and so on.

To erase a sector pair, return to the Main Menu and press **s**. Type in the starting address of the sector you want to erase, then press Enter. The starting address can be any address within the sector pair. To erase the proper sector, ensure you selected the correct card at the main menu. Figure 10 shows the prompts during the erase enabling sequence. Embed displays the elapsed time for the erase operation when finished.

```
Please enter Letter of needed selection: s
Please confirm[Y/N]: y
Please enter the appropriate sector address to erase: 0
cardaddress= 0
Erasing card : AMC001CFLKA
Time taken for erase = 2.000000 seconds.
```

Figure 10. Erasing a Sector

### Erasing the entire card

To erase the entire card, return to the Main Menu and press **c**. (Figure 11). Embed displays the line “Erasing card: <AmCXXXXFLKA>” for each internal component it erases. In Figure 11, Embed is erasing an AmC001CFLKA, which has eight Am29F010A components. Embed displays the elapsed time for the erase operation when finished.

```

Please enter Letter of needed selection: c
Erasing card : AMC001CFLKA
Erasing card : AMC001CFLKA
Erasing card : AMC001CFLKA
Erasing card : AMC001CFLKA
Erasing card : AMC001CFLKA
Erasing card : AMC001CFLKA
Erasing card : AMC001CFLKA
Erasing card : AMC001CFLKA
Successfully erased AMC001CFLKA
Time taken for erase = 15.000000 seconds.
Card Erase Successful. Hit Return to Continue.

```

Figure 11. Erasing the Entire Card

## Using the Attribute Memory

AMD’s Flash memory cards store the CIS (Card Information Structure) data on a separate EEPROM on the card. The memory space on this EEPROM is called the attribute memory. The CIS always begins at address 0 of the attribute memory. Embed allows you to access the CIS data in the attribute memory via the Attribute Memory Menu. To access this menu, return to the Main Menu and press **a**. Figure 12 shows the Attribute Memory Menu that appears. To return to the Main Menu, press **Esc**.

```

Please enter Letter of needed selection: a
                                Attribute Memory Menu
                                -----
                                [D]isplay Attribute memory
                                [M]odify Attribute Memory
                                [W]rite file to Attribute memory
                                [F]ile image to Attribute memory
                                [R]ead Attribute memory to file
                                [E]xit to DOS temporarily
                                [B]ack to previous menu
Please enter Letter of needed selection:

```

Figure 12. Attribute Memory Menu



## Reading Attribute Memory to a File

The **r** option is the “complement” of the **f** option. Selecting **r** reads all bytes of the attribute memory and saves them to a file you specify. To save the contents of the Attribute memory to a file, return to the Attribute Memory Menu, then press **r** (see Figure 15). Type the name you wish to give the file; press Enter. If you do not specify a path, Embed writes the file to the C:\ directory. Embed assumes a file size of 128 bytes and an attribute memory size of 256 bytes, since only the even bytes of the attribute memory contain valid data.

You can use the **r** and **f** options together to back up and restore the CIS information.

```
Please enter Letter of needed selection: r
Enter CIS File name: c:\doc\dean\cis.txt
File is c:\doc\dean\cis.txt
Reading Attribute memory
CIS Read to file passed. Hit any key to continue.
```

Figure 15. Reading Attribute Memory to a File

## Exiting to DOS temporarily

You can exit to DOS temporarily from Embed, then resume working with Embed by typing “exit” and pressing Enter. Simply press **e** while at either the Main Menu or the Attribute Memory Menu.

```
Please enter Letter of needed selection: e
Type EXIT to continue
Microsoft(R) MS-DOS(R) Version 6.22
(C)Copyright Microsoft Corp 1981-1994.
C:\DOC\EVAL_KIT\EM020596>_
```

Figure 16. Exiting to DOS temporarily

## Using Erase and Suspend; Resume Erase

The Erase and Suspend option demonstrates the ability of AMD’s Flash memory cards to suspend an erase operation, and then read from any sector (excluding the one being erased). After the read operation is complete, the Resume Erase option resumes the erase operation. To erase and suspend, press **x** while at the Main Menu and confirm your choice. Enter the sector address to erase, and Embed erases that sector and suspends the erase operation (Figure 16). To resume the erase, select **y** from the Main Menu and confirm your selection. Enter the address to resume the erase operation, and Embed continues it (Figure 17).

```
Please enter Letter of needed selection: x
Please confirm[Y/N]: y
Please enter the appropriate sector address to erase: 20000
cardaddress=      20000
Erasing card : AMC001CFLKA
Sector Erase-Suspend Successful. Hit Return to Continue._
```

Figure 17. Suspending an Erase Operation

```
Please enter Letter of needed selection: y
Please confirm[Y/N]: y
Please enter the appropriate sector address to resume: 20000
cardaddress=      20000
Erasing card : AMC001CFLKA
Sector Erase-Resume Successful. Hit Return to Continue._
```

Figure 18. Resuming an Erase Operation



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