# M-Systems
Flash Disk Pioneers

DiskOnChip

# *Creating a Windows CE Image with Support for USB Mass Storage Devices*

## 1. INTRODUCTION

### 1.1 Scope

This document provides guidelines for creating a Windows CE image that supports USB mass storage devices. The reader should be familiar with building a custom Windows CE OS image using Platform Builder 5.0 or 4.2, and with creating a CEPC boot disk. For more information, please review the following Microsoft web pages:

- http://msdn.microsoft.com/library/default.asp?url=/library/en-us/wceosdev5/html/wce50howhowtousetheidetocreatecustomizeandbuildaplatform.asp
- http://msdn.microsoft.com/library/default.asp?url=/library/en-us/wcedsn40/html/cmhowCreatingBootDiskForCEPC.asp

### 1.2 Overview

#### 1.2.1 uDiskOnChip

uDiskOnChip™ (uDOC™) merges M-Systems' expertise in the USB 2.0 high-speed interface with its decades of flash know-how in embedded systems. The result is the industry's highest performance, combined with uncompromising reliability and built-in security to encrypt data and code. uDiskOnChip is the ideal storage solution for a vast array of markets such as gaming, industrial PCs, thin clients, POS workstations, servers, and telecom infrastructure equipment.

#### 1.2.2 Microsoft® Windows CE®

Microsoft Windows CE is a 32-bit open operating system (OS) that integrates real-time capabilities with advanced Windows technologies. Windows CE allows you to build a wide range of small-footprint devices. To allow USB host capability, a USB host driver should be added when creating a Windows CE OS image.

#### 1.2.3 System Requirements

The following hardware and software configuration is required:

- Hardware:
  - o PC with Platform Builder
  - o Target CEPC board with BIOS supporting boot from a USB device (USB 2.0)
- Software:
  - o MSDOS 6.22 or 7.0
  - o Platform Builder 4.2 or 5.0

## 2. PREPARING THE WINDOWS CE IMAGE (NK.BIN)

Preparing the Windows CE image with added USB host support has two stages, adding the USB support to the platform, and updating the OS registry with the new USB boot settings.

To add USB support to the platform:

1.  Add the following components from the catalog in Platform Builder 5.0 or 4.2 to your custom image:

    o   **USB Storage Class Driver**: Located under Core OS>Core OS Services>USB Host Support.

    o   **FAT file system:** Located under Core OS> File Systems and data storage>Storage manager.

To update the registry:

1.  The registry entries of the USB stack are well defined in the platform builder help. Set the registry of the USB stack according to the hardware parameters provided for all values regarding delays and timeouts, or use the default setting given with the BSP if a standard platform is used.

2.  Change the name of the uDiskOnChip folder in the [HKEY_LOCAL_MACHINE\System\StorageManager\Profiles\USBHDProfile] registry entry. The default registry key is placed in common.reg and is set to LOC_STORE_HD_FOLDER. The suggested setting is [HKEY_LOCAL_MACHINE\System\StorageManager\Profiles\USBHDProfile]

    o   "Name"="M-Systems uDiskOnChip"

    o   "Folder"="uDOC"

## 3. BOOTING CEPC FROM UDISKONCHIP

In order to boot Windows CE from uDiskOnChip, the target PC BIOS being used must be able to boot from a USB storage device. Additionally, the Windows CE image (NK.BIN) must include the USB drivers discussed in Section 2.

To prepare uDiskOnChip for booting:

1. Create an active DOS primary partition on uDiskOnChip.

2. Format uDiskOnChip under DOS.

3. Boot the target PC using the CEPC floppy diskette, and select option 7 (clean boot).

4. From the command line, type **Sys C:** to transfer the DOS 6.2 system to uDiskOnChip as a boot device (assuming there are no hard drives and uDiskOnChip is defined as drive [C:]; otherwise, use the appropriate drive letter for uDiskOnChip).

5. Copy the contents of the floppy diskette to uDiskOnChip.

6. Copy the NK.BIN file containing USB support that was prepared according to the instructions in Section 2 to uDiskOnChip.

7. Navigate to the config.sys file in uDiskOnChip and change the default menu item to 1 – Booting NK.BIN from local drive.

8. Remove the floppy diskette from the disk drive, reboot the PC, and enter the BIOS setup menu.

9. Set the boot sequence to boot from USB-HDD drive as the first boot device.

10. Reboot the PC. uDiskOnChip should be the designated boot device; when the Windows CE load menu launches, the default setting is booting from the local drive, so the NK.Bin stored on uDiskOnChip is used to boot the system.

11. After the system is initialized, open Windows Explorer and verify that uDiskOnChip mounts as a uDOC folder.

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