

Digital Film

Digital storage cards, or memory cards, are the digital equivalent of film. They store the images taken with a digital camera until they can be downloaded into a computer (or printer). Like all things digital there have been numerous technologies over the last few years, and the range is constantly evolving. Although still somewhat complicated, the market is starting to settle down though, with the capacity of most cards, and the rates at which images can be transferred from them are increasing all the time. Today, there are basically 4 main systems on the market for digital stills cameras:

Compact Flash Smart Media Memory Stick IBM Micro Drive

As digital cameras began to appear in the late 1980's, so manufacturers looked for ways to store the images. In 1989, the Personal Computer Memory Card Interface Association (PCMCIA) was formed to establish a set of industry standards for the new PC cards. Initially they developed three types of card, all around the size of a credit card (54 x 88mm), all having a 68 pin connector, and varying in thickness from 3.3 to 10.5mm.

This latter size (type III) contained a miniature hard disc just like the one in a PC (and so was very vulnerable to damage). Type II cards were used for devices such as network cards and modems.

All of these could be fitted directly into the PCMCIA socket found on most laptop computers today. But these cards were generally too large or delicate for the small digital cameras which began to appear, so new ranges were developed.

How do they work?

CompactFlash and SmartMedia cards use "flash memory" to store the images. This means that they do not require power to retain the images. With SmartMedia, the controller functions for compatibility and other tasks are within the camera rather than the card itself. This makes the cards somewhat cheaper, but does give rise to some forward and backward compatibility problems.

Compact Flash (CF)

These were first introduced in 1994. These cards are much smaller (43 x 36mm) and have 50 pin connectors (though because they are electronically compatible, they can be used in a standard 68 pin card slot with a suitable adapter). There are two thicknesses of CF card, type I (3.3mm) and type II (5mm). Cameras using Compact Flash will have either a Type I or II slot. The type II slot is usually reserved for the IBM MicroDrive card, discussed later. Capacities of Compact Flash cards have risen steadily over the last couple of years - a 1Gb (1024 Megabytes) version is currently the largest available. CF cards are rated in different speeds, according to the time taken to transfer images from the card:

1X = 150 Kb per second
4X = 600 Kb per second
12X = 1.8Mb per second
24X = 3.6Mb per second

Different ranges of card are available from various manufacturers, aimed at different user groups - the 24X speed cards will be aimed at professional users, whilst the slower 4X range will be targeted at the budget user for example.

IBM MicroDrive

This is a different device from all others discussed as it actually contains a rotating hard disc and other electronic components. It fits into the type II Compact Flash socket on cameras, and is currently available in various sizes up to 1Gb.

Smart Media

SmartMedia cards are even smaller than CompactFlash. Also called Solid State Floppy Disc Cards (SSFDC) they were developed in 1995 by Toshiba and are today used in cameras by companies such as Olympus and Fuji. Their internal electronics is not as sophisticated as Compact Flash, and some older card readers are incapable of reading the data on newer higher capacity cards. A "FlashPath" adaptor is available to enable Smart Media cards to be read in a standard 3.5" floppy disc drive.

MemoryStick (MS)

This was developed by Sony in 1998, and is a card about the size and shape of a stick of chewing gum. The electronics are held in a thin rigid plastic shell, and the card has self cleaning contacts rather than pin-socket connectors. MemoryStick has only a relatively small part of the market share at the moment, but is expected by many experts to become a major storage medium for digital cameras.

Other cards

With the growth of the digital camcorder market, and other multimedia applications, other cards are being developed to store various types of media. These include MultiMedia cards (MMC) and Secure Digital cards (SD), which have been developed recently for a wide range of applications including including MP3 music players, games machines as well as digital cameras.

Card readers

A wide range of inexpensive card readers are available, which contain slots for the various types of card. Some of these readers will take just SmartMedia and CompactFlash, whilst newer models coming on to the market will also take IBM MicroDrive and Memory Stick. These are usually USB compliant, though some have parallel ports as well. These devices make it much more convenient to download images rather than attaching the camera to the PC.

Digital Film Compliant

Although the CompactFlash Association provides certification providing assurance of compatibility with cards, some manufacturers implement the standards differently for use in still cameras, which may cause some compatibility problems. Digital Film Compliance provides a consumer guarantee that CF or SSFDC cards with this logo are compatible with all cameras using this type of storage.