

FLASH MEMORY PART 1

MMC and SD

Flash memory is available in so many formats that it can be difficult to know what will work with any particular device. Devices such as MP3 players, PDAs, mobile phones, digital cameras, and personal computers can take advantage of flash memory to bolster their storage capacity, but selecting the right format may be easier said than done.

To try to address all of the common formats in one Tech Tip might be quite a read, so we're doing a two part series on Flash Memory. Part I of the Flash memory series will focus on two similar, very popular and generally interchangeable formats: MMC and SD

The Basics

Before getting into the details, some background on each card may be appropriate. The letters 'MMC' stand for Multi Media Card, which is a format that was developed jointly by SanDisk and Siemens in 1997. The letters 'SD' stand for Secure Digital, and this format is an improvement on the original MMC design, and was developed jointly by SanDisk,

Matsushita Electronics (better known as Panasonic) and Toshiba.

Both formats are quite durable and the solid state (no moving parts) components are protected by a rigid plastic shell. The devices are generally unaffected by extreme temperatures, and should withstand a drop of 10 feet without experiencing any damage from shock.

Physical Features



Both MMC and SD flash memory units measure approximately 24mm x 32mm x 2.1mm, about the size of a typical postage stamp, and weigh a mere 2 grams.

This miniature footprint may make them about the

easiest way to misplace your data, but also allows the devices that accept them to be smaller. Personal electronics are shrinking as they get more powerful, and the necessary



accessories need to keep pace. Although they share the same basic form factor, MMC and SD cards can be distinguished by two physical features, a sliding tab and the number of connections. When looking at an MMC or SD card so that the label is facing you, and the electrical connections are facing away from you, there will be a notch in the upper right corner of the card.

From this point of reference there will be a small sliding tab on the left edge of an SD card, not found on an MMC card. Compare this 512MB MMC card with this 512MB SD card and you can see the difference if you look closely at the enlarged images. This tab slides into two positions, locked and unlocked. It allows the user to manually write protect the data on the card, which means with the tab in the locked position data can be read from the card, but nothing can be written to or erased from the card.

The other physical difference is on the backside of the card. An MMC card features seven electrical connections (small rectangular pads for data transfer and receiving power), whereas an SD card has nine.

While there may be rare exceptions, for all practical purposes, SD & MMC cards may be used interchangeably on current devices, especially if they indicate "SD/MMC" compatibility.

Transfer Rate

SD and MMC cards are capable of similar data transfer rates, with a slight edge going to the SD cards. SD cards are now available with write speeds rated at 60x (9 MB/s) and read speeds rated at 66x (10 MB/s), while MMC transfer rates seem to peak at 9 MB/s in either direction. Not much of a

difference and both are quite fast, but end user results will vary and may not reach these speeds in real world use, regardless of format chosen.

SD and MMC cards should reference a speed as part of the technical specification, and it is an important thing to consider when shopping around. Lower speed cards are still commercially available, and can have an impact on the performance of digital cameras or other devices where speed may be critical. Each 'x' in the speed rating represents 0.15 MB/s, so if 45x compared to 66x doesn't sound like a big deal to you, maybe putting it in terms of 6.75 MB/s compared to 10 MB/s will. Instead of actual speed ratings, some manufacturers will use words like "High Speed" or "Ultra" when referring to the faster cards.

Note: Check the actual write speed specs of your device before purchasing "Ultra" or "High Speed" chips. You could be putting a Hemi engine in a AMC Gremlin. Don't spend the extra money if the camera does not support it.

Capacity

SD cards are readily available in sizes up to 1 GB, 2 GB models are starting to show up, and the SD Card Association states that models with up to 4 GB



and 8 GB of storage capacity are also on the way. In contrast, MMC cards have a maximum capacity of 512MB, making the SD technology much more appealing.

Security

As mentioned in the physical features section above, SD cards offer the benefit of write protection. By 'locking' the card, a user can be assured that the data is secure until they take the necessary step to unprotect it. Fears of accidentally losing or changing data can be eliminated by using an SD card over an MMC card, thus improving the security of the data.



Another feature supported by SD, but not MMC, involves copyright protection. The SanDisk web site refers to this feature as "cryptographic security for protection of copyrighted data", and other locations reference it as DRM, or Digital Rights Management. Basically, licensed content can be written to an SD card and it can not be executed except from that specific card.

Applications

In general, SD and MMC cards are interchangeable and either can be used in a compatible device. An SD card may generally cost more than an MMC card with the same capacity, but as seen in this Tech Tip, it does offer more for the money.

Many card readers are available for personal computers that promote the ability to read and write to a variety of common flash media formats. A 15-



in-1 reader/writer, such as this one, can be made quite compact thanks in part to the fact that two of the 15, MMC and SD, can be read from the same slot on the device.

MP3 players generally come with a base amount of memory to store music files, but having an expansion slot allows users to increase the capacity, and play time, by adding flash memory of their choice. The Pogo RipFlash MP3 Player is such a device, providing 256MB onboard as well as an SD/ MMC slot for easy expandability.

Mobile phones and PDAs can also take advantage of increased storage space thanks to flash memory slots. The Handspring Treo 600 is a combination phone/PDA that offers an SD/ MMC slot for such convenience.

And of course, digital cameras use flash memory as their 'film', where larger

and faster cards are always a welcome upgrade. The 6.1 MegaPixel Kodak DX7630 could fill up the same SD/MC card much faster than the 3.2 MegaPixel Umax AstraPix 640, but one of the great things about these cards is that the user can choose the size, as well as the quantity to have on hand, in order to suit their particular needs and budget.



One word of warning – be sure to check your device for the capacity of the card that it can handle. If your camera can handle only up to a 512 MB card, then using a 1 GB card in the camera will be pointless (depending on the device, some will not even be able to read the card, whereas others will only use up to the capacity that it is rated for. Either way, you want to make sure that you match the card properly to the device). So as always, check your product's manual to be sure that you buy memory that it can support.

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