

PC Cards

PC Cards, the ubiquitous credit card-sized integrated circuit peripherals (85.6mm long by 54mm wide) were first developed in 1989, when over 200 companies formed the non-profit Personal Computer Memory Card International Association (PCMCIA). The organization's objective was to define standards that would ensure interchangeability among mobile computers (and later PDAs, digital cameras, set-top boxes, and other devices) where there was a need for removable media that was rugged, low power, and small. The organization established a 68-pin connector that became the I/O interface definition for the initial memory card and slot specification.

As the organization's name implies, it was established to promote the use of memory cards, providing storage that could be moved from device to device, and augment the complement of memory within its host. Since the early specification, the form factor has been applied to dozens of uses, including:

- A/D converters and other forms of data acquisition devices
- AM/FM radio tuner cards
- CD-ROM interfaces
- Cellular phone interfaces
- Docking station interfaces
- Ethernet LAN adaptors
- Fax/modem cards
- Floppy disk controllers
- GPS (Global Positioning System) cards
- Hard drives
- Infrared wireless LAN adapters
- ISDN cards
- Joystick interface cards
- Memory cards
- Modem/Ethernet combination cards
- Modem cards
- Pagers
- Parallel port interface cards
- Preprogrammed ROM cards
- Radio LAN adapters
- SCSI adapters
- Serial port interfaces
- Sound cards (input and output)

- Token ring LAN adapter cards
- TV tuner cards
- VGA
- Video capture/frame grabber cards
- Video conferencing cards¹

In recent years the PCMCIA² has modified its mission statement to read: "To develop standards for modular peripherals and promote their worldwide adoption." As an example of this, the association has developed standards for small form factor cards, adding the Small PC Card form factor specifications to the original PC Card Standard, and publishing the Miniature Card Standard. Cards developed for this standard can be transferred from their capture device, such as a digital camera, to their storage and editing device, usually a host computer, using a PC Card adapter.³

Card Types

There are three types of PC Cards, differing only in their thickness. Type I is 3.3mm thick, Type II is 5.0mm thick, and Type III is 10.5mm thick. A host device slot that can accommodate a higher number card can also accommodate one or more thinner cards, however the reverse is not true.

Most laptop computers have built-in PC Card slots, as do some Pocket PCs, sub-notebooks, palmtops, and PDAs. Desktop computers can utilize PC Cards with the addition of a PC Card reader.

PC Card slots come in three sizes: I, II, and III. A Type I slot can accommodate one Type I card; a Type II slot can accommodate either one Type II card, or two Type I cards; and a Type III slot can accommodate either one Type III card or a Type I and a Type II card. The cards are generally hot-swappable, meaning that they can be added or removed without the need to reboot the computer.

¹List derived in part from <http://www.pc-card.com/faq.htm>.

²The international headquarters of the PCMCIA is 2635 North First St., Suite 209, San Jose, CA 95134, 408 433-CARD (2273), <http://www.pc-card.com>, e-mail: office@pcmcia.com, fax: 408 433-9558.

³The PCMCIA has also published standards for the Small PC Card (45mm x 42.5mm), the Miniature Card (33mm x 38mm), and the SmartMedia Card (45mm x 37mm).

The type of card generally defines the kind of application that it will be used for. For example:

Type I PC Cards—memory devices such as Flash, RAM, OTP, and SRAM

Type II PC Cards—I/O devices such as data/fax modems, LAN connections

Type III PC Cards—devices that require a thicker form factor, such as spinning disc drives

Additional Storage for Digital Publishing

The PC Card form factor provides the most compact and efficient storage solution for certain publishing environments. For example, when editors, designers, and others are involved with data-intensive projects that might otherwise strain network resources, the use of removable, high-capacity media, is a reasonable, cost-efficient answer. It can support the storage of multiple gigabytes of data, providing fast response and hard drive performance. In addition, the cards can be shipped easily overnight from point to point.

PC Cards can also be used to deploy a limited number of licensed software applications to a pool of users. By installing the applications on a PC Card, the user has access to them only when the card is installed. Conversely, a PC Card can be used to store and remove data on a system that an individual has borrowed, and has saved all of their work on the Card.

Among the highest capacity PC Cards of this kind are the Kingston⁴ DataPak series, consisting of a 260MB, 2GB, and 5GB Type II PC Card. The cards are compatible with Microsoft Windows and Apple Macintosh OS computers that conform to the PCMCIA standard.

The DataPak is a rugged 1.8” Winchester hard drive, designed to withstand up to 200Gs of operating shock. It provides a transfer rate of up to 120MB per second, a seek time of 15 ms, and, using conventional data compression software, can store up to twice its rated capacity.



FIG. 1. The Kingston DataPak 5GB Type II PC Card uses a 1.8” Winchester hard drive spinning at 3,990 rpm. It has a mean time between failure (MTBF) of over 300,000 hours and a data reliability of 1 non-recoverable error in 1013 bits read. (Photo courtesy of Kingston Technology Company, Inc.)

The DataPak 5GB model (FIG. 1), the highest capacity device of its kind,⁵ can store over 350 ultra high-resolution digital photos, of 5MB each, providing native digital camera format support. This would allow a professional photographer to be out in the field for days capturing images, and simplify their submission to an editor or client. Using multiple cards they could stay in the field for weeks. In addition, the card makes it easy to transfer large amounts of data between systems, back-up and recover data, remove sensitive data for security, and more.

⁵ As of the time of writing, first quarter, 2002.

⁴ Kingston Technology Company, 17600 Newhope St., Fountain Valley, CA 92708, 877-KINGSTON, 877 546-4786, 714 435-2600, <http://www.kingston.com>, fax: 714 435-2699.