

WhitePaper

Flash DIMM Technology

Overview

Flash RAM, a non-volatile Random Access Memory solution, is becoming the memory of choice in printers because it is both inexpensive and easily reprogrammable. Flash technology, now available on DIMMs (Dual Inline Memory Modules), can store personalities that allow printers to handle data streams from mainframe, AS/400, DEC, and other non-PC environments. In addition, Flash DIMMs can store special fonts and macros in the printer, reducing the need to repeatedly transmit data over the network.

Flash RAM: A Non-volatile RAM Solution

Read Only Memory (ROM) and Random Access Memory (RAM) are two types of memory that store data necessary for print operation. ROM, memory permanently stored in the printer, cannot be reprogrammed. RAM, though reprogrammable, is lost when the power is turned off. Both families of memory offer programmable non-volatile memory solutions: masked ROM and EPROM/EEPROM from ROM technology, and Flash from RAM technology. Flash technology provides the greatest benefits to customers because it is both inexpensive and easy to reprogram.

Masked ROM (Read Only Memory) is the least expensive way to store memory. A masked ROM chip is burned at the manufacturing facility with the functionality hard-wired on the chip. However, masked ROM chips are not very flexible because they are only programmed once. With Flash technology, the customer can reprogram the chips thousands of times to suit individual needs. In addition, Flash chips are becoming increasingly inexpensive, approaching a level comparable to masked ROM.

EPROM (Erasable Programmable ROM) and EEPROM (Electrically Erasable Programmable ROM) can be reprogrammed by placing binary data in registers within the chip. Because EPROMS are not hard-wired, they can be reprogrammed when necessary. A special ROM burner uses ultraviolet light to erase and reprogram the data on the chip. This requires the customer to remove the chip from the printer. However, Flash chips are erased and reprogrammed within the printer and do not require any special equipment.

Flash memory is the latest advancement in ROM technology. Erasing data from Flash chips is much easier because Flash memory is erased electronically, eliminating the need for a ROM burner. This allows Flash to be erased without removing it from the

machine. In addition, reprogramming Flash is much faster because Flash memory is erased in blocks, in contrast to data stored on earlier types of ROM, which are erased a byte at a time. This effective non-volatile RAM solution is now available on the new 100-pin DIMM (Dual Inline Memory Module).

Flash Technology in a Network Environment

The benefits of Flash technology are most apparent in a network environment. Here, the use of Flash chips enhances flexibility, reduces network traffic, and increases manageability.

Enhanced flexibility

Within networks, data are transmitted in various types of formats. A personality is a firmware extension that either grafts additional functionality onto PCL or replaces PCL in order to print data streams from non-PC environments. For example, an IBM mainframe sends data in IPDS format over the network. Personalities can be written and stored in Flash memory, thereby enhancing the flexibility of the printer. Because Flash chips are easy to reprogram, Flash memory is flexible enough to allow the personalities to be added and replaced when necessary to suit the ever-changing printing needs of a network environment.

Reduced network traffic

Any type of non-volatile memory can reduce network traffic. Flash DIMMs, available in two and four megabytes, can provide the printer with additional fonts and store macros, such as letterheads, "confidential" stamps, or artificial watermarks. Special fonts, macros, and other resources can be made available to the entire workgroup for consistent looking documents. With the data already in the printer, network computers do not need to repeatedly transmit additional

data with each print job. As a result, network traffic is reduced.

Increased Manageability

Flash memory, as a non-volatile memory solution, retains stored data within the printer for use by the entire network. Network manageability is improved because personalities, fonts, and macros can be easily reprogrammed onto the chip. Thus, network-wide changes, such as changes in letterhead, do not require software alterations in each network computer. Instead, the Flash chip is reprogrammed within the printer.

The Advantages of Flash DIMMs

Flash DIMMs provide customers non-volatile memory that is easily reprogrammable and inexpensive. In addition, the use of Flash technology enhances flexibility, reduces network traffic, and increases manageability. Because of its many advantages over other forms of non-volatile memory, Flash DIMMs are becoming the preferred non-volatile memory solution for network printers.