Direct memory Access

As we have seen earlier the two commonly used mechanisms for implementing I/O operations are

* Interrupts and
* Direct memory access

Interrupts: Synchronization is achieved by having the I/O device send a special signal over the bus whenever it is ready for data transfer operation.

Direct memory access: Basically for high speed I/O devices, the device interface transfers data directly to or from the memory without informing the processor. When interrupts are used additional overhead involved with saving and restoring the program counter and other state information.

To transfer large blocks of data at high speed, an alternative approach is used. A special control unit will allow transfer of a block of data directly between an external device and the main memory without continuous intervention by the processor.

DMA controller: DMA controller is a control circuit that performs DMA transfers is a part of the I/O devices interface. It performs functions that normally be carried out by the processor. DMA controller must increment the memory address and keep track of the number of transfers. The operations of DMA controll -er must be under the control of a program executed by the processor. To initiate the transfer of block of words the processor sends the starting address, the number of words in the block and the direction of the transfer. While DMA transfer is taking place, the processor can be used to execute another program

Three registers in a DMA interface are

* Starting address
* word count
* status and control Flag.

use of DMA controllers in a computer system