

To transfer our captured digitized signal to the computer, I had to understand somewhat the path of data transfer and extensively, how computer works with information. This led to a big study on computers work. I have written up a brief summary on how computers work.

The computer is made up of the central processing unit (CPU), Memory, and Input/Output (I/O) devices. The central processing unit is the heart of the computer, it gets instructions from the memory, decodes these instructions, performs the instructed operation and stores the result in its accumulator and finally in the memory. The memory is a storage device for the computer. There are mainly two types of memory: Read-Only Memory (ROM) and Random Access Memory (RAM) in the computer. The ROM is the permanent memory in a computer. It is the memory needed to start up the computer when it is first turned on. Most of the time, it is the memory that comes with the computer from the manufacturer. Random Access Memory is nonvolatile memory; it is lost when the computer is turned off. The Input/Output devices in a computer such as mouse, keyboard, scanner, monitor, printer, etc are devices used in the input and output of different data in and out of the computer.

The central processing unit is able to operate with the cooperation of the program counter, instruction decoder, address decoder, the arithmetic logic unit, and the accumulator. The program counter is located in the CPU and it reads the address in memory of the next instruction to be processed, it carries out the read phase in the workings of a computer. After the address in memory is read by the program counter, the instruction decoder breaks down this instruction and makes it understandable to the computer, this carries out the decode phase in the workings of the computer. The arithmetic logic unit now carries out the instructed operation in the computer e.g. add, subtract, etc. This is the execute phase of the working computer. There is an accumulator, which allows temporary storage of data to be used by the arithmetic logic unit or data outputted by the arithmetic logic unit. Between the central processing unit and parts of the computer is a connected of exchange lines that allows the transfer of words (data) in the computer. This is called the bus. The data bus has different set of lines used for different purposes. The DATA lines are responsible for transfer of data between CPU and other parts of the computer. The ADDRESS lines are lines that specify where data is coming from and where it is going. The CONTROL lines handle the order of events in transfer. The I/O bus is responsible for the transfer of data between central processing unit and I/O devices. I/O bus connected directly to the I/O controller, which in turn is connected to the devices. I/O bus also handles things in computer like regulate what component in the computer uses the bus when it is need, this mechanism is known as bus arbitration. Basically a bus is a common electrical pathway between multiple devices. Buses can be used to transfer data within the CPU, and also to transfer data outside the CPU. Another small part in the workings of the computer is what is known as the interrupt. When the CPU tells an I/O device to perform an operation and it returns to do something else, the CPU expects an interrupt from what its doing from the I/O controller. The CPU now checks on the I/O device to see if the task is completed. A simple schematic of how the computer works has been pasted below: