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PLC-THE GLOBAL WORLD

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In today's world, PLC plays a vital role in industries. Previously industry use worker to cut raw sheets, temperature controller, automatic liquid filling etc. but now days PLC can easily wipe out all the problems of the industrial era.

Introduction

Basically what is **PLC**?

PLC is nothing but a programmable logical controller it deals with automation. Primarily we use microprocessor and microcontroller.

But drawback of microprocessor and microcontroller are as follows

1. Less number of input and output.
2. Less speed.
3. Less memory space.
4. Programming is difficult and etc.

To overcome the above problems PLC is utilized.

PLC is originally designed to replace hardwire system compose of hundred or thousand of relay. Using closed loop controller, in relay based system to accommodate changes their would be rise in cost required according to below assets. They are first wiring, worker etc. trouble shooting was night mare as problems could occur among thousands of connector, switch contact and hundreds or thousands of components.

History:

It all started in 1986 G.M. hydia Matic issued a request for proposals for electronic replacement for hard mixed relay system based by Engineering Edward .R.Clark. The first PLC developed by 084 bit was brought up by Bedford associates. In 1971, Allen-Bradley (Struger and Dummermuth) present the "Bulletin 1774 PLC" also known as the "PLC" Modicon was developed device called as modular digital controller by General Motors.

In the early days however, were not as straightforward nor as simple. We had some real problems in the early days of convincing people that a box of software, albeit cased in cast iron, could do the same thing as 50 feet of cabinets, associated relays and wiring. The process was indeed difficult, and deserves some of the stories that I hope the reader will be regaled with as he proceeds onward through the tortuous swamp of the mind.

According to earlier a recommendations was that the programmable controller, according to their system architecture specification, did not need to go fast because he felt as though speed was not a criteria because it would go as fast as we needed it to. The initial machine, which was never delivered, only had 125 words of memory, and speed was not a criteria as mentioned earlier. You can imagine what happened! First, he immediately ran out of memory, and second, the machine was much too slow to perform any function anywhere near the relay response time. Relay response times exist on the order of 1/60th of a second, and the topology formed by many cabinets full of relays transformed to code is significantly more than 125 words. He expanded the memory to 1K and thence to 4K. At 4K, it stood the test of time for quite a while. Initially, marketing and memory sizes were sold in 1K, 2K, 3K, and 4K. the 3K was obviously the 4K version with constrained address so that field expansion to 4K could easily be done.

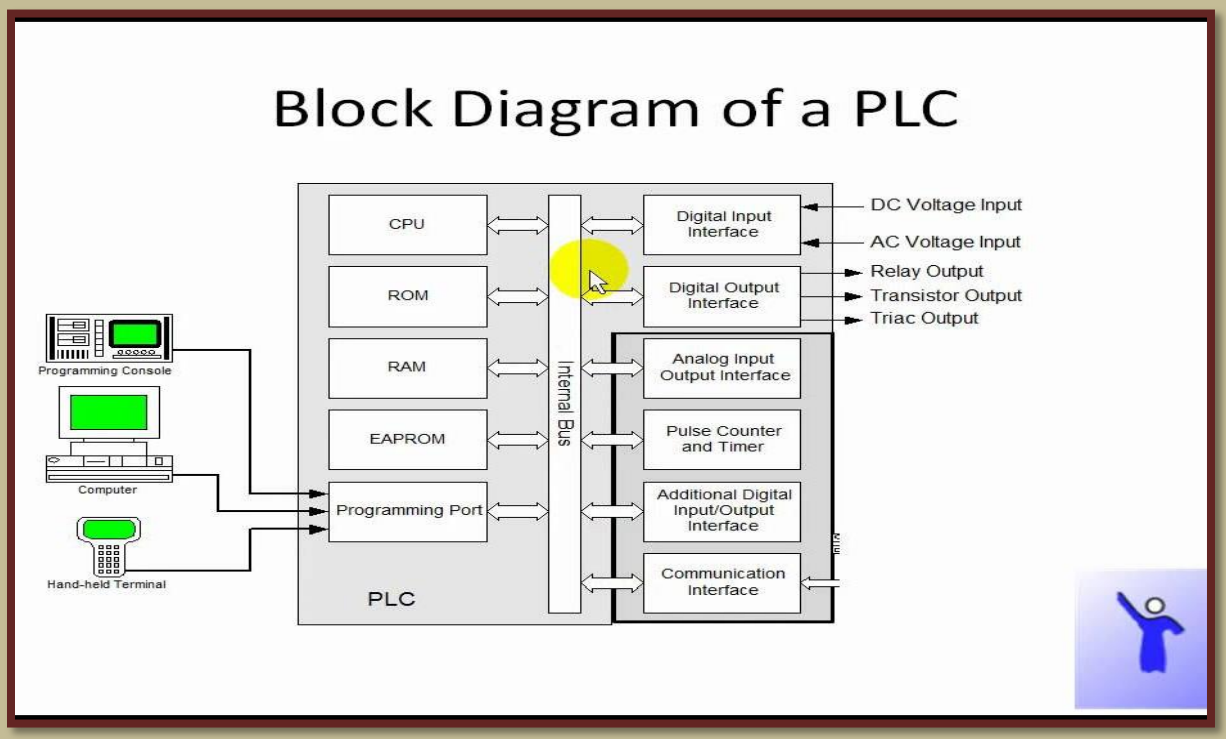
Introduction or work:

PLCs are often defined as miniature industrial computers that contain hardware and software that is used to perform control functions. A PLC consists of two basic sections: the central processing unit (CPU) and the input/output interface system. The CPU, which controls all PLC activity, can further be broken down into the processor and memory system. The input/output system is physically connected to field devices and provides the interface between the CPU and the information providers (inputs) and controllable devices (outputs).

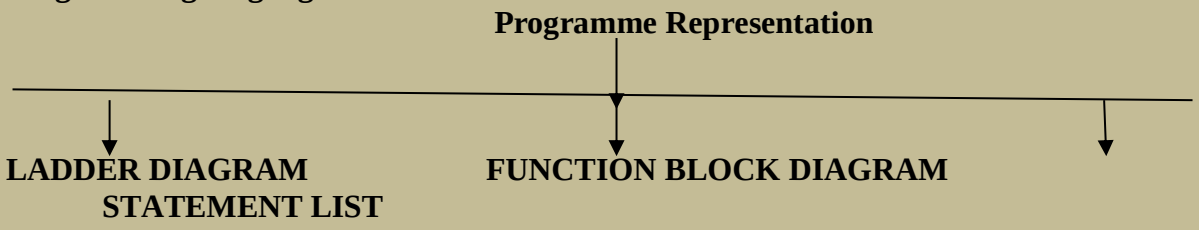
The CPU "reads" input data from connected field devices through the use of its input interfaces, and then "executes", or performs the control program that has been stored in its memory system. Programs are typically created in ladder logic, a language that closely resembles a relay-based wiring schematic, and they are entered into the CPU's memory prior to operation. Finally, based on the program, the PLC "writes", or updates output devices via the output interfaces. This process, is also known as scanning, continues in the same sequence without interruption, and changes only when a change is made to the control program.

PLC Selection Criteria:

- No. of inputs:Digital/Analog
- No. of outputs : Digital /Analog
- Processing speed of CPU
- CPU Capabilities /System frequency /System function blocks.
- No. of timers,counters&size of bit memory.
- Need of special function modules
  Such as high speed counters, closed loop control etc.
- Need of Interface Module
- Networking and communication capabilities



Programming languages of PLC:



Ladder Logic:

Ladder logic has evolved into a programming language that represents a program by a graphical diagram based on the circuit diagrams of relay logic hardware. Ladder logic is used to develop software for programmable logic controllers (PLCs) used in industrial control applications. The name is based on the observation that programs in this language resemble ladders, with two vertical rails and a series of horizontal rungs between them. While ladder diagrams were once the only available notation for recording programmable controller programs, today other forms are standardized in IEC 61131-3. Ladder logic is widely used to program PLCs, where sequential control of a process or manufacturing operation is required. Ladder logic is useful for simple but critical control systems or for reworking old hardwired relay circuits. As programmable logic controllers became more sophisticated it has also been used in very complex automation systems. Often the ladder logic program is used in conjunction with an HMI program operating on a computer workstation.

Functional block diagram:

The Function Block Diagram (FBD) is a graphical language for programmable logic controller design, that can describe the function between input variables and output variables. A function is described as a set of elementary blocks. Input and output variables are connected to

blocks by connection lines. Inputs and outputs of the blocks are wired together with connection lines, or links. Single lines may be used to connect two logical points of the diagram:

- An input variable and an input of a block
- An output of a block and an input of another block
- An output of a block and an output variable

Function Block Diagram is one of five languages for logic or control configuration supported by standard IEC 61131-3 for a control system such as a Programmable Logic Controller (PLC) or a Distributed Control System (DCS). The other supported languages are ladder logic, sequential function chart, structured text, and instruction list

STL Language:

The STL language allows the programmer to solve control tasks using simple English statements to describe the desired operation of the controller. The modular nature of the language allows the programmer to solve complex tasks in an efficient and self documenting manner. The STL language as described here in applies to the Festo FPC100B/AF, FPC405, FEC and IPC programmable controllers. The structure of the STL language remains consistent across all models. Hardware dependent features which are only available in specific models will not be discussed . Additional information regarding such features can be found in the respective controller manuals. Information contained in reflects the STL language as implemented in FST Software Version 3.X

Conclusion:

A Programmable Logic Controller (PLC) is a device that was invented to replace the necessary sequential relay circuits for machine control. A person knowledgeable in relay logic systems can master the major PLC functions. These are used extensively in nuclear building and security control system. It is a reliable compare to other control systems. These may be used to run a vibot. By using the PLC application logic we can control the airlocks control panel of reactor buildings. These PLC's are used in many "Real World"

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