

ABSTRACT

Programmable Logic Controller (PLC) is a tool created as a replacement set of mechanical relays used in control systems. PLC works by reading the status (state) experienced by its inputs, for later use in changing the status of its output. While the form and amount of changes that occurred in the PLC output, depending on the program given by the user in the form of ladder diagrams with ladder opcode.

PLC designed in this thesis are designed based on STM32F103RBT6 microcontroller, using the C language as an operating system programming language, and using Visual Basic for its software. PLC hardware itself is designed to have digital inputs, digital outputs and analog inputs. The instructions can be executed by the PLC include combinatorial instruction, timer, counter, and comparator.

In this thesis have been designed and implemented a micro PLC based on STM32F103RBT6 Microcontroller which has eight digital inputs, eight digital outputs, two analog inputs, two timers, one counter and one comparator. In addition the PLC must be able to communicate with other devices (computers) via the RS232 in an asynchronous mode. Selain itu PLC harus dapat berkomunikasi dengan perangkat lain (komputer) melalui RS232 secara sinkron. This communication includes the download and upload. PLC designed in this thesis has 6,3 ms input ports average time delay, 1,4 ms the output ports average time delay, the response timer has a maximum deviation of 1,02 ms for 1x100ms setpoint, and 0,59 ms the response time of PLC (simple instructions), 2,45 ms (timer instruction), 2,07 ms (counter instruction), and 3,87 ms (Comparator instructions).

PLC designed and implemented in this thesis have been approaching the response speed of standard PLC industry. However, it should be further development on the operating system embedded on the STM32F103RBT6 microcontroller to optimized the speed process.

Key words : Programmable Logic Controller, Microcontroller, STM32F103RBT6