

Building a Programmable Logic Controller with a PIC16F648A Microcontroller



Murat Uzam



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Building A Programmable Logic Controller With A Pic16f648a Microcontroller

Pradeeka Seneviratne



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Building a Programmable Logic Controller with a PIC16F648A Microcontroller Murat Uzam, 2017-12-19 Programmable logic controllers PLCs are extensively used in industry to perform automation tasks with manufacturers offering a variety of PLCs that differ in functions program memories and the number of inputs outputs I O Not surprisingly the design and implementation of these PLCs have long been a secret of manufacturers Unveiling the mysteries of PLC technology Building a Programmable Logic Controller with PIC16F648A Microcontroller explains how to design and use a PIC16F648A microcontroller based PLC The author first described a microcontroller based implementation of a PLC in a series of articles published in Electronics World magazine between 2008 and 2010 This book is based on an improved version of the project including Updates to the hardware configuration with a smaller CPU board and two I O extension boards that now support 16 inputs and 16 outputs instead of 8 An increased clock frequency of 20 MHz Improvements to several macros Flowcharts to help you understand the macros functions In this book the author provides detailed explanations of hardware and software structures He also describes PIC Assembly macros for all basic PLC functions which are illustrated with numerous examples and flowcharts An accompanying downloadable resources contain source files ASM and object files HEX for all of the examples in the book It also supplies printed circuit board PCB Gerber and pdf files so that you can have the CPU board and I O extension boards produced by a PCB manufacturer or produce your own boards Making PLCs more easily accessible this unique book is written for advanced students practicing engineers and hobbyists who want to learn how to build their own microcontroller based PLC It assumes some previous knowledge of digital logic design microcontrollers and PLCs as well as familiarity with the PIC16F series of microcontrollers and w

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that you can have the CPU board and I/O extension boards produced by a PCB manufacturer or produce your own boards. Making PLCs more easily accessible, this unique book is written for advanced students, practicing engineers, and hobbyists who want to learn how to build their own microcontroller-based PLC. It assumes some previous knowledge of digital logic design, microcontrollers, and PLCs, as well as familiarity with the PIC16F series of microcontrollers and with **PIC16F1847 Microcontroller-Based Programmable Logic Controller**. Murat Uzam, 2020-10-22. Programmable logic controllers (PLCs) have been used extensively and are offered in terms of functions, program memories, and the number of inputs/outputs (I/Os) ranging from a few to thousands. With a focus on how to design and implement a PLC, this volume explains hardware and associated basic concepts of PLC. Authors have used PIC16F1847 microcontroller with 8192 words of Flash program memory, 1024 bytes of SRAM data memory, 256 bytes of EEPROM data memory, the maximum operating speed of 32 MHz, 16-level deep hardware stack, an enhanced instruction set consisting of 49 single-word instructions. Flowcharts are provided to help the understanding of macros/instructions. Aimed at researchers and graduate students in electrical engineering, power electronics, robotics, and automation, sensors, this book explains how to design and use a PIC16F1847 microcontroller-based PLC. Provides easy-to-use software structures written by using the PIC Assembly programming language. Describes a PLC from a designer's perspective. Explains the basic hardware and basic software structures of the PIC16F1847-based PLC. Focuses on concepts like Contact and Relay-Based Macros, Flip-Flop Macros, Timer Macros, Counter Macros, and Comparison Macros. **PIC16F1847 Microcontroller-Based Programmable Logic Controller, Three Volume Set** Murat Uzam, 2020-10-22. Programmable logic controllers (PLCs) have been used extensively and are offered in terms of functions, program memories, and the number of inputs/outputs (I/Os) ranging from a few to thousands. With a focus on how to design and implement a PLC, this set explains hardware and associated basic concepts, intermediary and advanced concepts of PLC using PIC16F1847 microcontroller. Flowcharts are provided to help the understanding of macros/instructions. Twenty application examples to show how to use the PIC16F1847-Based PLC in different control applications, related files for hardware and software components, and appendices are also provided. Aimed at researchers and graduate students in electrical engineering, power electronics, robotics, and automation, sensors, this book explains how to design and use a PIC16F1847 microcontroller-based PLC, including easy-to-use software structures. Covers concepts like Contact and Relay-Based Macros, Flip-Flop Macros, Timer Macros, Counter Macros, and Comparison Macros. Presents arithmetical and logical macros to carry out arithmetical and logical operations to be used for 8-bit or 16-bit variables and/or constant values. Illustrates program control macros to enable or disable a block of PLC program or to move execution of a program from one place to another. Discusses the implementation of Sequential Function Chart (SFC) elements with up to 24 steps. *Introduction to Industrial Automation* Stamatios Manesis, George Nikolakopoulos, 2018-03-29. This book provides an extended overview and fundamental knowledge in industrial automation while building the necessary knowledge level for further specialization in advanced concepts of

industrial automation It covers a number of central concepts of industrial automation such as basic automation elements hardware components for automation and process control the latch principle industrial automation synthesis logical design for automation electropneumatic automation industrial networks basic programming in PLC and PID in the industry

PIC16F877A Temelli PLC Sürüm 2.0 Prof. Dr. Murat UZAM,2022-12-01 Programlanabilir lojik denetleyiciler Programmable Logic Controllers PLC mikroi lemci veya mikrodnetleyici temelli olarak retelen otomasyon cihazlar d r PLC ler g n m zde otomasyon sistemlerinin ger ekle tirilmesi amac yla ok yayg n olarak kullan lmaktad r PLC tasar m ve retimi s re leri yazar taraf ndan son y llarda yap lan al malar haricinde PLC reticilerinin bir s rr olarak kalm t r PLC lerin yerine getirdi i i lev kullan c lar taraf ndan ok iyi bilinmesine kar n mikroi lemci veya mikrodnetleyici temelli bir PLC nin ger ekle tirilmesine dair yazar n yapm oldu u al malar hari rapor edilmi ciddi al malar mevcut de ildir Bu konuda yazar taraf ndan yap lan al malardan birisi 2013 y l nda Birsen Yay nevi taraf ndan yay nlanm olan PIC16F877A Temelli PLC isimli kitapt r Bahsi ge en kitapta bir PIC16F877A PIC mikrodnetleyicisi kullan larak tasarlanm ve ger ekle tirilmi olan 16 giri li 16 k l bir PLC anlat lmaktad r Bahsi ge en kitab n yay nlanmas sonras ndaki s re te yazar taraf ndan yap lan al malar sonucunda bu kitapta anlat lan proje ortaya km t r Dolay s yla bu kitapta a klanan proje PIC16F877A Temelli PLC S r m 2 0 olarak isimlendirilmi tir Bu yeni proje kapsam olarak daha geni tir ve yaz l m k sm daha esnek bir kullan ma sahiptir lave olarak say c lar ve zamanlay c lar gibi baz PLC fonksiyonlar PLC programlar n d zenleyen IEC 61131 3 standard na uygun olarak yeniden tasarlanm t r Bu yeni projede yap lan geli tirmelere kullan lan referans zamanlama sinyallerini de rnek olarak verebiliriz nceki projede kullan lan referans zamanlama sinyallerinin kullan m g rece olarak daha zordu Yeni projede ise kullan m daha kolay olan 1ms 10ms 100ms ve 1s periyotlara sahip toplam d rt tane referans zamanlama sinyali mevcuttur Bu kitapta anlat lan proje hem donan m hem de yaz l m a s ndan pek ok yenilikler i ermektedir Ayr ca nceki projede projeye ait PLC donan m olmadan PIC16F877A Temelli PLC nin al mas n g zlemlemek m mk n olamamaktayd Bu yeni projede donan ma ek olarak geli tirilen kullan c programlar n n al mas n g zlemlemek i in Proteus ISIS yaz l m nda kullan lmak zere bir proje dosyas kitap dosyalar na eklenmi tir B ylelikle okuyucu i in kitapta anlat lan konular n h zl bir ekilde renilmesi m mk n hale gelmi tir Kitapta geli tirilen kodlar PIC Assembly dili kullan larak MPLAB X IDE v5 25 program geli tirme ortam nda PIC16F877A mikrodnetleyicisi i in elde edilmi tir Sonu olarak bu kitap ba ta Elektrik Elektronik M hendisli i Kontrol ve Otomasyon M hendisli i veya konuyla ilgili b l mlerde okuyan renciler ve piyasada al an m hendisler olmak zere PLC ve end striyel otomasyon alan nda kendi zg n PLC sini retip kullanmay d nen herkese yard mc olmak amac yla yaz lm t r

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