

**မာတိကာ**

**စာရေးသူ၏အမှာစာ**

**အခန်း(၁) MPASM Assembler Overview**

- ၁-၁ နိဒါန်း
- ၁-၂ MPASM Assembler ဆိုသည်မှာ...
- ၁-၃ MPASM Version များ
- ၁-၄ Overview Assembler
- ၁-၅ Assembler Input/Output Files
- ၁-၆ Source Code Format (.asm)
  - ၁-၆-၁ Labels
  - ၁-၆-၂ Mnemonics, Directives and Macros
  - ၁-၆-၃ Operands
  - ၁-၆-၄ Comments
- ၁-၇ Include File (.inc)
- ၁-၈ Listing File (.lst)
- ၁-၉ Error File (.err)
- ၁-၁၀ Hex File Formats (.hex, .hxl, .hxx)
  - ၁-၁၀-၁ Intel Hex Format (INHX8M)
  - ၁-၁၀-၂ Intel Split Hex Format (INHX8S)
  - ၁-၁၀-၃ Intel Hex32 Format (INHX32)
- ၁-၁၁ Cross Reference File (.xrf)
- ၁-၁၂ Symbol and Debug File (.cod)
- ၁-၁၃ Object File (.o)
- ၁-၁၄ MPASMWIN.EXE အသုံးပြုနည်း

**အခန်း(၂) Instructions of PIC16 Series**

- ၂-၁ နိဒါန်း
- ၂-၂ General Format for Instructions
  - ၂-၂-၁ Byte-oriented File Register Operations
  - ၂-၂-၂ Bit-oriented File Register Operations
  - ၂-၂-၃ Literal and Control Operations
- ၂-၃ Instruction Set of PIC16 Series
- ၂-၄ Instruction Specification of PIC16 Series

**အခန်း(၃) MPASM Directive Language**

- ၃-၁ နိဒါန်း
- ၃-၂ Directive Summary

**အခန်း(၄) MPLAB IDE Overview**

- ၄-၁ နိဒါန်း
- ၄-၂ Implementing an Embedded System Design with MRLAD IDE
- ၄-၃ MPLAB IDE Built-In Components
- ၄-၄ A Basic Tutorial for MPLAB IDE
  - ၄-၄-၁ Selecting the Device
  - ၄-၄-၂ Creating the Project
  - ၄-၄-၃ Setting Up Language
  - ၄-၄-၄ Naming the Project
  - ၄-၄-၅ Adding Files to the Project
  - ၄-၄-၆ Building the Project
  - ၄-၄-၇ Creating Code
  - ၄-၄-၈ Building the Application Project
  - ၄-၄-၉ Testing Code with the Simulator
  - ၄-၄-၁၀ Watch Window
  - ၄-၄-၁၁ Stopwatch
- ၄-၅ Tutorial Summary

**အခန်း(၅) Source Code ရေးနည်း**

- ၅-၁ နိဒါန်း
- ၅-၂ Source Code Format
- ၅-၃ Simple Program

**အခန်း(၆) PIC LAB-1**

- ၆-၁ နိဒါန်း
- ၆-၂ Experiment 1  
Turning on a LED
- ၆-၃ Experiment 1 အတွက် Expt1.asm file ကို Expt1.hex file သို့ပြောင်းခြင်း  
၆-၃-၁ MPASM.EXE ဖြင့် Expt1.asm file ကို Expt1.hex file သို့ပြောင်းခြင်း  
၆-၃-၂ MPLAB IDE ဖြင့် Expt1.asm file ကို Expt1.hex file သို့ပြောင်းခြင်း
- ၆-၄ Experiment 1a  
Turning on a LED for 0.5sec-without debounce
- ၆-၅ Experiment 1b  
Turning on a LED for 0.5sec-with debounce
- ၆-၆ Experiment 1c  
Two pushes to turn on a LED for 0.5sec

- ၆-၇ Experiment 1d  
LED turns on for 0.5sec after button released
- ၆-၈ Experiment 1e  
LED stays on for 0.5sec longer than the button-press time
- ၆-၉ Experiment 1f  
Flash a LED
- ၆-၁၀ Experiment 2  
Toggle a LED
- ၆-၁၁ Experiment 3  
Running LEDs
- ၆-၁၂ Experiment 4  
Counting on the 7-segment Display
- ၆-၁၃ Experiment 4a  
Binary Counting
- ၆-၁၄ Experiment 4b  
Binary Counting Up/Down
- ၆-၁၅ Experiment 4c  
Producing Letters on the 7-segment Display
- ၆-၁၆ Experiment 4d  
Displaying WORDS
- ၆-၁၇ Experiment 4e  
Push "A" to display a WORD
- ၆-၁၈ Experiment 5  
Creating a Tone
- ၆-၁၉ Experiment 6  
Creating a Tune
- ၆-၂၀ Experiment 7  
Siren Sound
- ၆-၂၁ Experiment 7a  
Hee Haw Sound
- ၆-၂၂ Experiment 8  
Analog to Digital Conversion
- ၆-၂၃ Experiment 8a  
Measuring Resistance
- ၆-၂၄ Experiment 9  
Pulse Detection with a Coil
- ၆-၂၅ Experiment 10  
Temperature Detection
- ၆-၂၆ Experiment 11  
Sound Detection

- ၆-၂၇ Experiment 11a  
Sound-to-Frequency
- ၆-၂၈ Experiment 11b  
Whistle-On Whistle-Off
- ၆-၂၉ Experiment 12  
Light Detection

**အခန်း(၇) PIC Circuits Gallery**

- ၇-၁ နိဒါန်း
- ၇-၂ Signboard
  - ၇-၂-၁ LED Control Circuit
  - ၇-၃ LED Flasher
  - ၇-၄ LED Flasher-2
  - ၇-၅ Light Controller
  - ၇-၆ DC Motor Speed Controller
  - ၇-၇ Count-down Timer
    - ၇-၇-၁ Device Selection by 3-8 Decoder
    - ၇-၇-၂ Short Circuit Prevention Circuit of BCD-SW
    - ၇-၇-၃ Output Relay Circuit

**အခန်း(၈) 5x7 Display Circuit**

- ၈-၁ နိဒါန်း
- ၈-၂ Column Shift Right
- ၈-၃ Column Shift-Right/Left
- ၈-၄ Across/Back-Up/Down
- ၈-၅ Start/Stop Action
- ၈-၆ Elevator Display
- ၈-၇ Running Sign
- ၈-၈ Single Digit Up-Counter
- ၈-၉ Two Digit Up-Counter
- ၈-၁၀ 5-Digit Up-Counter
- ၈-၁၁ LED Dice