Chapter 12

Development Tools for Microcontroller Applications
Lesson 02

Assembler, Compiler, Library files and Integrated Development Environment
Assembler

- Exploits special features in MCU
- Direct control of stack, IO ports, Registers and RAM
Macros Using Assembler

- Creates software building blocks
- Direct control of stack, IO ports, Registers and RAM
Use of structures Assembler

- Coding using C like expressions, condition statements, loops
- Decision expressions
Dissembler

- Object code conversion into Mnemonics
- Easy understanding of previously assembled codes
C Functions

- C Functions
- Data Type declaration
- Macros and Functions coding
- Loops and decision blocks
C Functions

• Formatted output

• Easy including assembly and other source files

• Automatic addresses assignments, memory allocations
Compiler

Data Type checking

Pointing Errors

Listing

Code optimization in powerful compiler

Object code file generation
Cross Compiler

Object Code for host machine CPU - for debugging/simulation

Object Code for target MCU
Library Manager

Provide Standard Functions

Updating Library Functions

Creating Library
Absolute File Generation

Linker

- Links ‘.asm’, ‘.obj’ and all source and library files
- Reallocates addresses
- Absolute .abs absolute file from .obj files
Absolute File Locator

Locator

Specifies bytes for the device addresses for a device
Locator File formats

Hex-File

Intel format ASCII file

Motorola format ASCII file
Integrated Development Environment (IDE)
IDE - A Single Focal point of development

Source File using Project Manager

Organisation of files

Application Linking

Organisation of device databases

Devices (MCUs and Peripherals) databases

Editing

Compilation

Online Error Pointing
Integrated Development Environment

- Editor, Device Selection, Tools Configuration, Project Make facility
- Macro-Assembler
- C Compiler for Code development in C
- Library Manager for linking library
- Linker of Executable file
- Locator for Creation of Hex Files
A project

- Defines a targeted application
- Project Management Tools
Project Management Tools -

• Make facility
• Online help at each stage
• Dialog Boxes for interactions with developer
• Windows on screen
Windows Screen -

• File, Edit, View, Project, Peripherals, Version control and Help- Menus and Commands

• Tool bar

• Status bar
File Types in a project

- .asm
- .C
- .lst
- .obj
- .hex
- .map

Assembler

Compiler

RTOS
IDE with Debugger

- High Speed Emulation of MCU CPU and devices
- Target Debugger
- Emulator
- Target monitor debugger
Summary
We learnt

IDE

- Integrated Environment
- Project management
- RTOS - Code Development for Multitasking, Task Scheduling and Synchronisation
- Debugging Support
We learnt

IDE Software Development Tools

• Assembler
• Library Manager
• Linker
• Locator
End of Lesson 02 on

Assembler, Compiler, Library files and Integrated Development Environment