# Chapter 3: PIC18 Development Tools

## The PIC18 Microcontroller

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## PIC18 Development Tools

- Hardware tools
- software tools

## Software Development Tools

- Text editor or programmer's editor
- Cross assembler
- Cross compiler
- Terminal program
- Simulator
- Source-level debugger
- Integrated Environment

## Hardware Development Tools

- In-circuit emulator
- Device programmer
- In-circuit debugger
- Demo boards

## Nature of Debugging Activities

- Software and hardware must be developed in parallel.
- Software must be debugged before the final hardware is completed.
- There are two debugging approaches: software only approach and hardware assisted approach.
- In the software approach, one uses a simulator or a demo board with a resident monitor program to debug the application software.
- In the hardware approach, one uses either an in-circuit emulator or logic analyzer to perform software debugging activities. ICE and logic analyzer are expensive.

**A Sample of Debugging Activities**

- Set breakpoints at suspicious instructions
- Execute instruction until a certain breakpoint and check the result
- Single step instructions in a certain region of the program.
- Display register and memory contents.
- Modify the register and memory contents and rerun the program

**Software Development Tools from Microchip**

- MPLAB: consists of a context-sensitive text editor, cross assembler, linker, simulator, and source level debugger.
- PIC18 cross C compiler
- MPLAB also allows other companies' C compilers to work with MPLAB.
- C compilers from HI-TECH, CCS, Byte Craft, and IAR can work under the MPLAB environment.

## Hardware Tools Required for Development PIC18

The combination of the ICD2 from Microchip and a well-designed demo board are required for learning the PIC18 microcontroller.

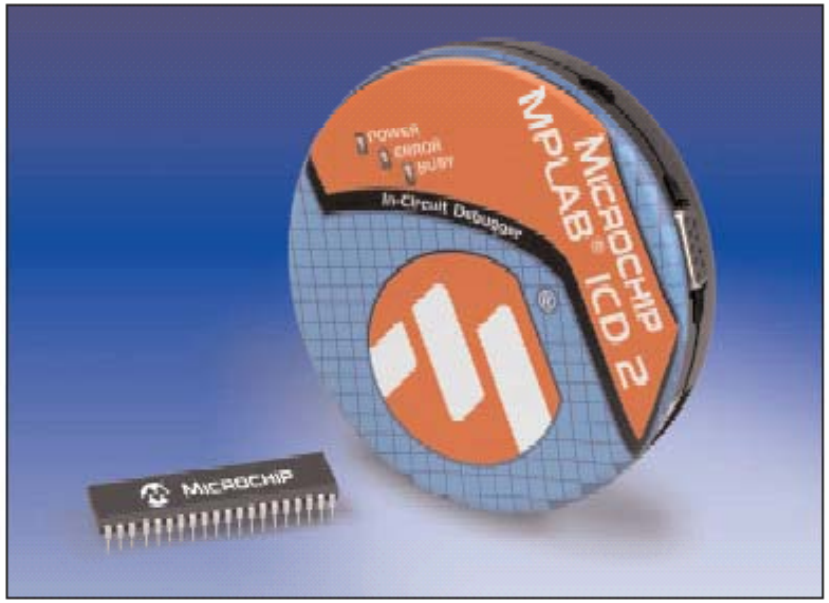


Figure 3.4 Microchip ICD2 in-circuit debugger (reprint with permission of Microchip)

## Demo Boards

- Available from several vendors
- Shuan-Shizu developed three PIC18 demo boards for the purpose of learning the PIC18 Microcontrollers.
- The SSE452 is designed for experimenting with PIC18F452 and other 40-pin and 28-pin PIC18 Microcontrollers.
- The SSE8680 is designed for experimenting with PIC18F8680
- The SSE8720 is designed for experimenting with PIC18F8720
- Both the SSE8680 and SSE8720 have the same design
- All three demo boards allow the user to exercise all peripheral functions available in the PIC18 MCU.

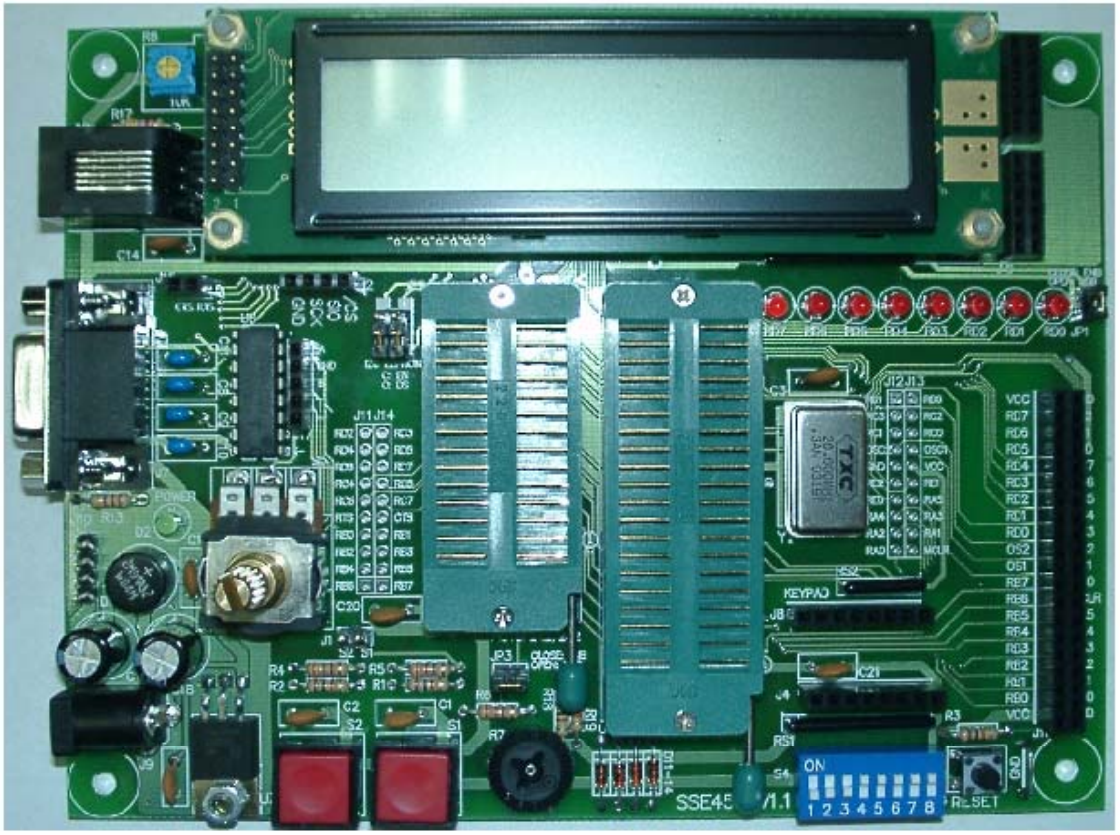


Figure 3.32 Photo of the SSE452 demo board (reprint with permission of Shuan Shizu Enterprise)

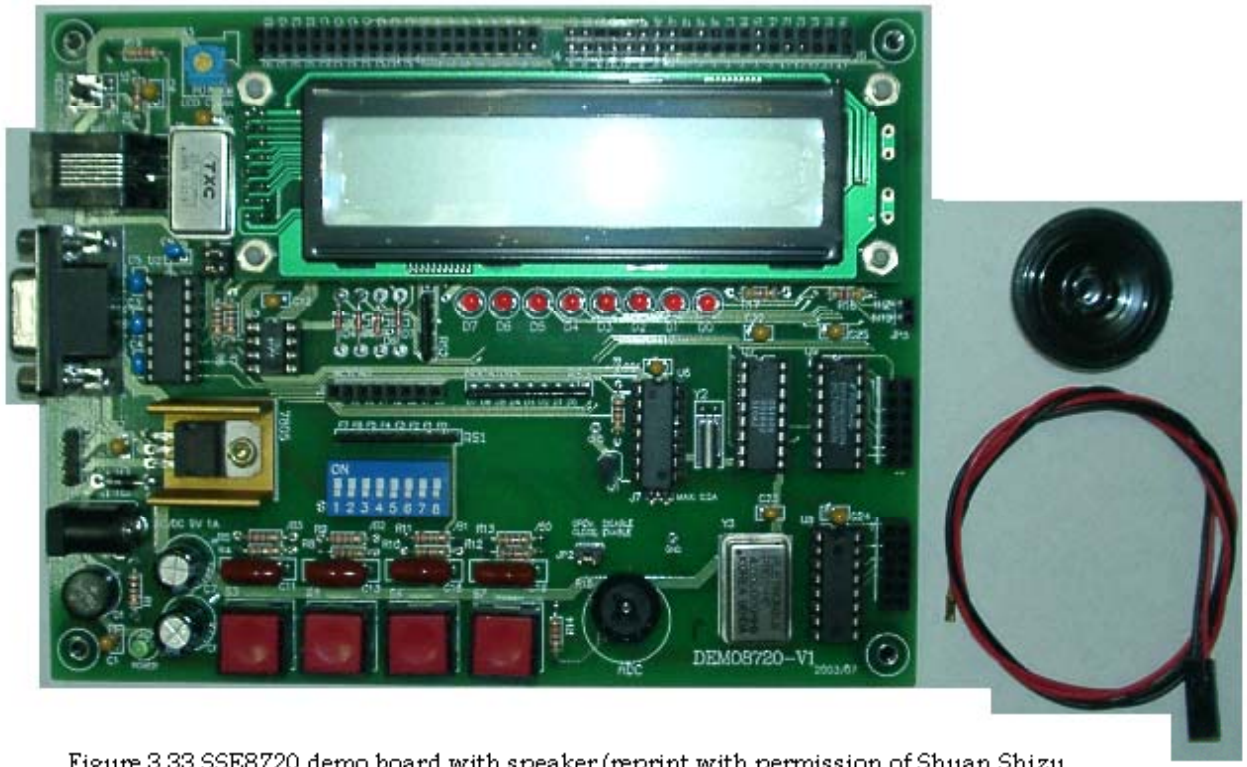


Figure 3.33 SSE8720 demo board with speaker (reprint with permission of Shuan Shizu Enterprise)

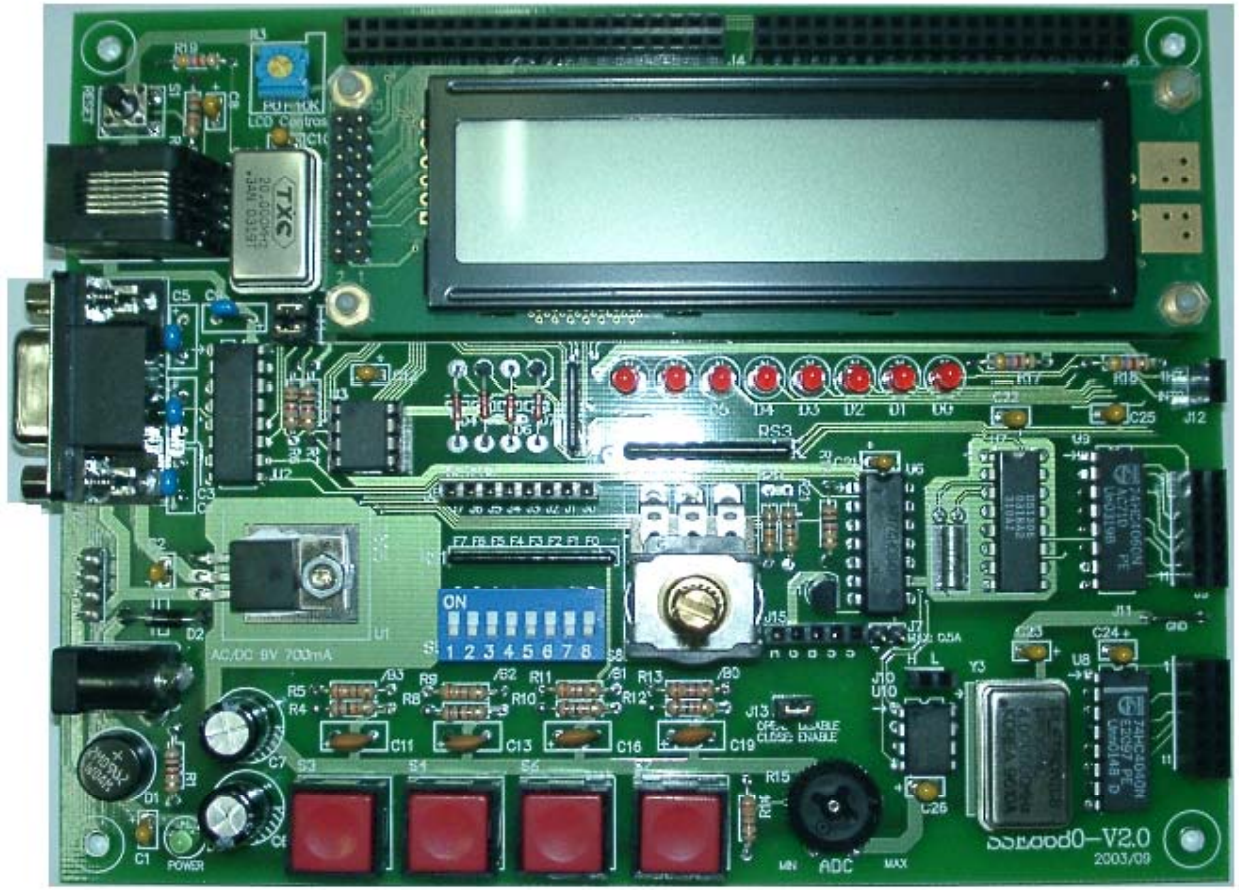


Figure 3.34 SSE8680 demo board with LCD kit (reprint with permission of Shuan Shizu Enterprise)