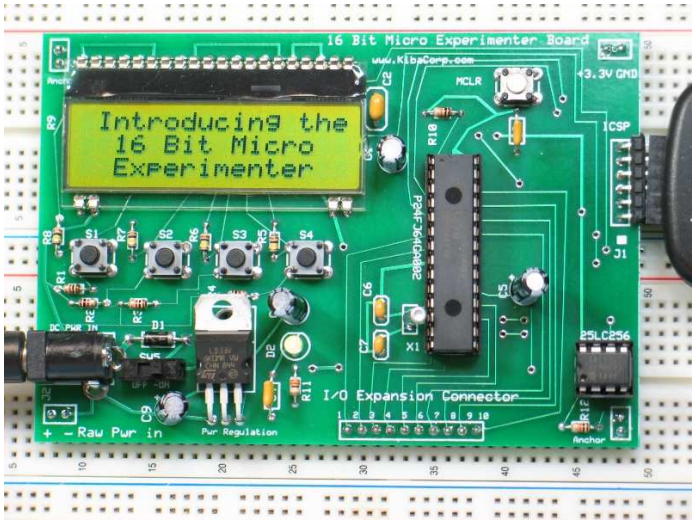
KibaCorp

Quick Guide



Building and using the EXP-16 with Microchip MPLAB IDE tools and PICKIT2

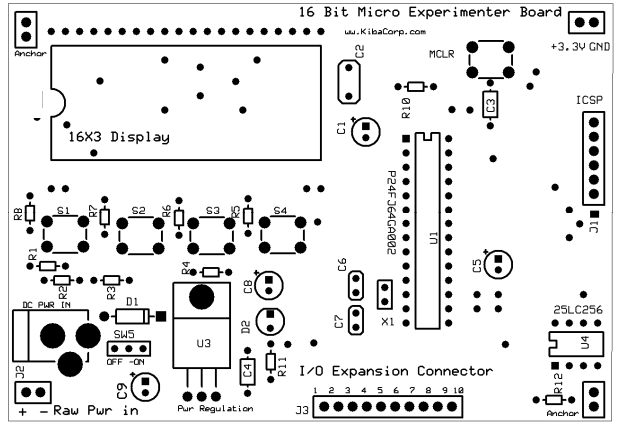
KibaCorp

16 Bit Micro Experimenter Kit

Kit is available from Nuts and Volts website www.nutsvolts.com for purchase

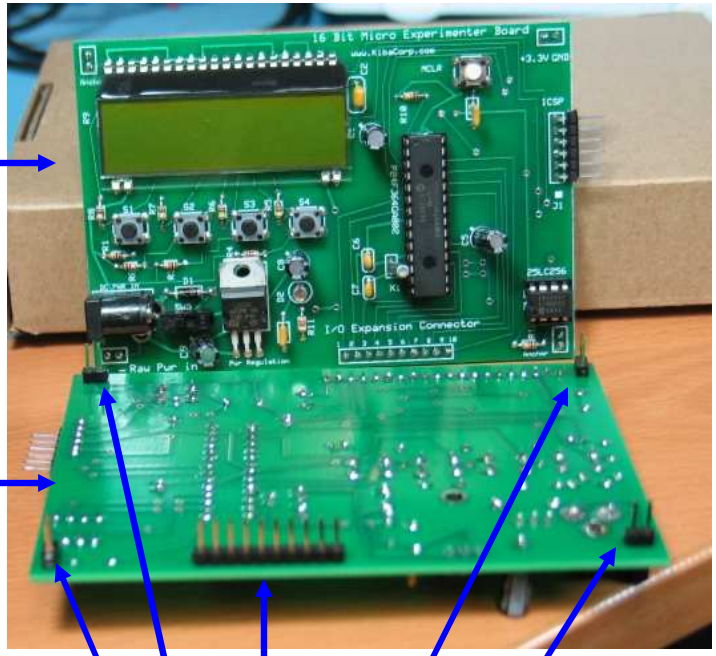
Assemble Kit

- Follow step by step assembly instructions provided on kit CD-ROM. Also available for download for www.Kibacorp.com

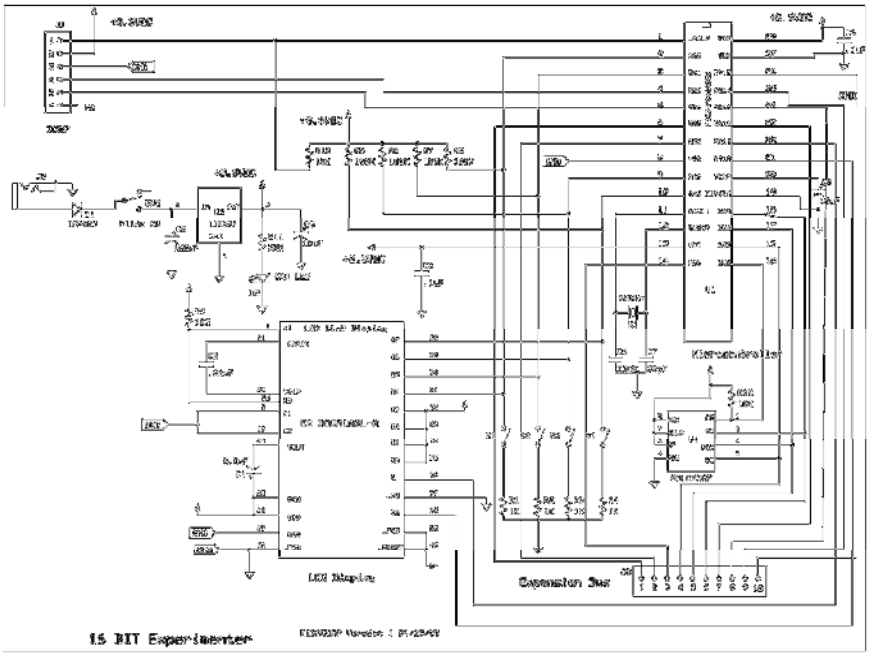


Front View

Bottom View

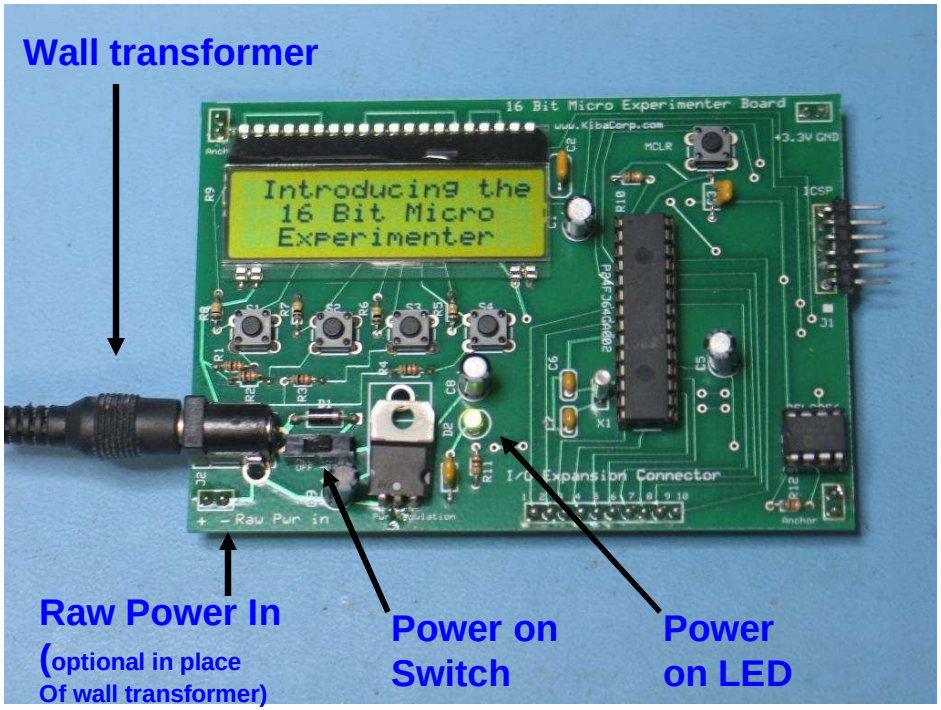


Note header orientation for insertion into solderless breadboard



Power Up Kit

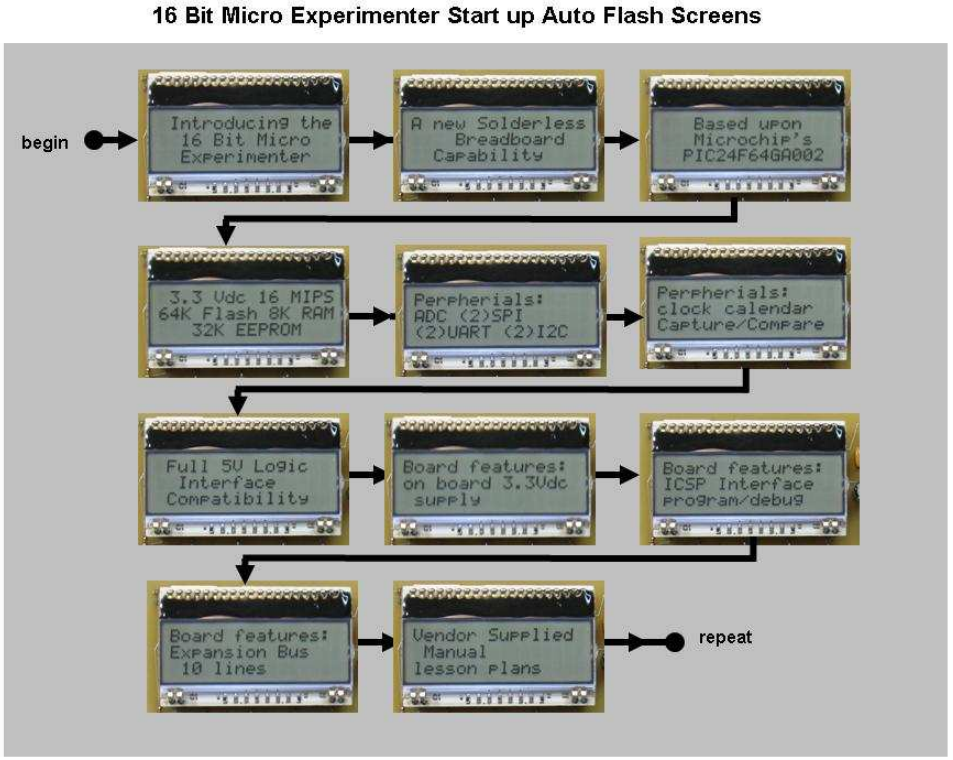
- Follow step by step assembly instructions provided on kit CD-ROM. Also available for download for www.Kibacorp.com
- Once assembly is completed we need to apply a +6VDC to +9VDC source.
  - Power can be applied to a DC barrel jack by a 9.1mm positive +6V to +9V wall transformer
  - Or optionally through a pin set designated as Raw Power located in lower left of the module (requires connection to bottom pins)
  - Incoming power is switch on/off to an on board +3V linear regulator.
  - Power on condition is indicated by a green led.
- The kit Microcontroller is pre-programmed with a **DEMO** program
  - Project and source code on CD-ROM or again available for download from web site



Note: Only one power supply should be applied at a time. The picture shows the use of a wall transformer as power source

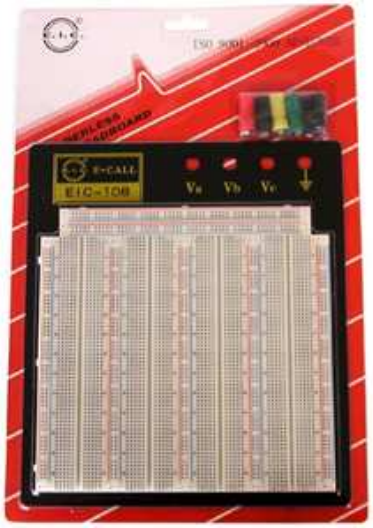
Running Demo Standalone

- Automatic operation running through all flash screen as shown
- Separate demos are invoked using pushbuttons –*some external hardware needed to run demo on solderless breadboard*
  - SW1 Thermometer
  - SW2 RGB
  - SW3 Clock
  - SW4 Auto Flash Screens



Complete description of DEMO available for download from www.KibaCorp.com
See Introduction to 16 Bit Micro Experimenter

Mounting Experimenter onto Solderless bread board



Large 3260 Contact Breadboard

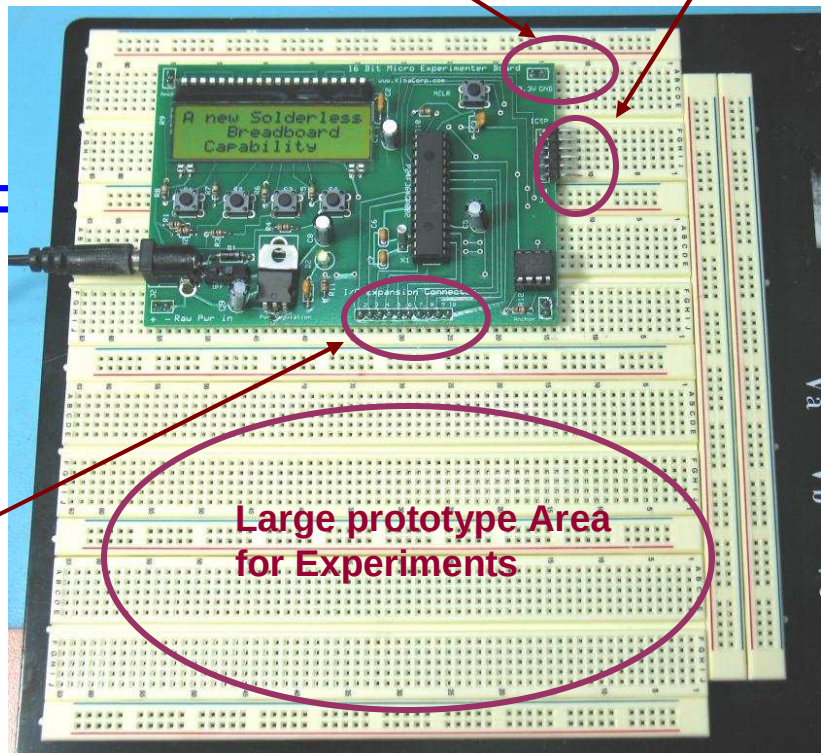
+

Assembled Experimenter

=

+3.3 V DC Output for External Hardware

PICKIT2 ICSP for programming and debug



I/O Expansion Bus For interconnection with Experiments

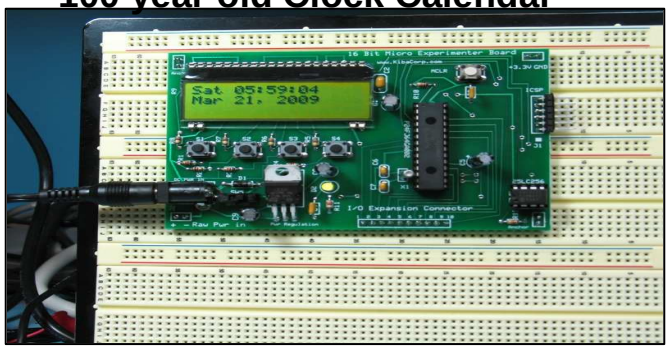
Large prototype Area for Experiments

Versatile 16 Bit Microcontroller Experimental Breadboard with LCD Display, keypad, regulated +3.3V out , I/O Expansion Bus and ICSP

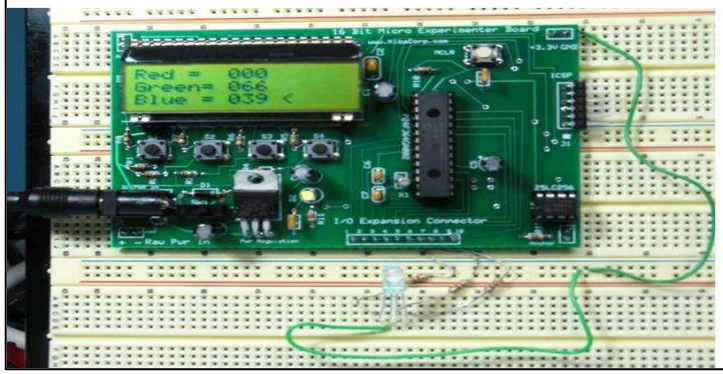
Running Demos on breadboard

- **Uses preprogram Demo**
- **invoked using pushbuttons**
  - **SW1 Thermometer**
  - **SW2 RGB**
  - **SW3 Clock**
  - **SW4 Auto Flash Screens**
- **Complete description of DEMO available for download from www.KibaCorp.com**
  - **See Introduction to 16 Bit Micro Experimenter**
- **some external hardware need-need to put into solderless breadboard (see www.nutsvolts.com)**

100 year old Clock Calendar

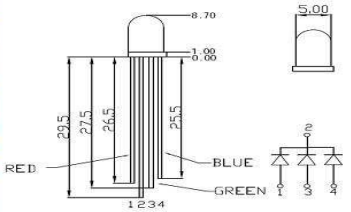


RGB 16M Color Palette

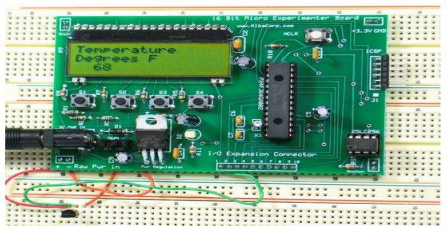


RGB LED

LED Pin 1 -> 470 Ohm resistor-> I/O bus pin 7
LED Pin 2 -> GND
LED Pin 3 -> 470 Ohm resistor -> I/O bus pin 8
LED Pin 4 ->470 Ohm resistor -> I/O bus pin 10

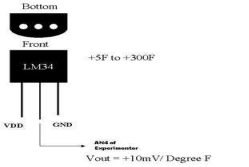


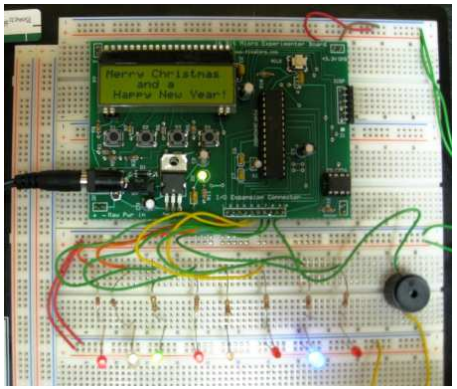
Thermometer



Thermal sensor LM34Z

Sensor VDD -> RAW + (+5VDC)
Sensor GND -> RAW – (GND)
Sensor Out -> I/O bus pin 1





Separate Christmas Demo

(requires loading Christmas Demo software)**

KibaCorp

PICkit™ 2 Debug Express

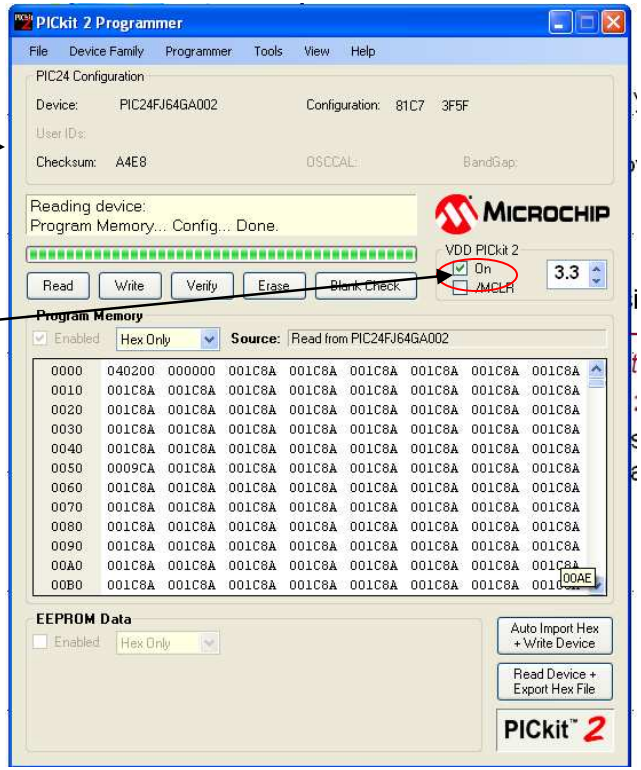
- Programmer and Debugger !
- Limited to one break point
- Low Cost

Uses the In Circuit Serial Programmer (ICSP) on Experimenter !

Set-up PICKIT2 Hardware Programmer/Debugger

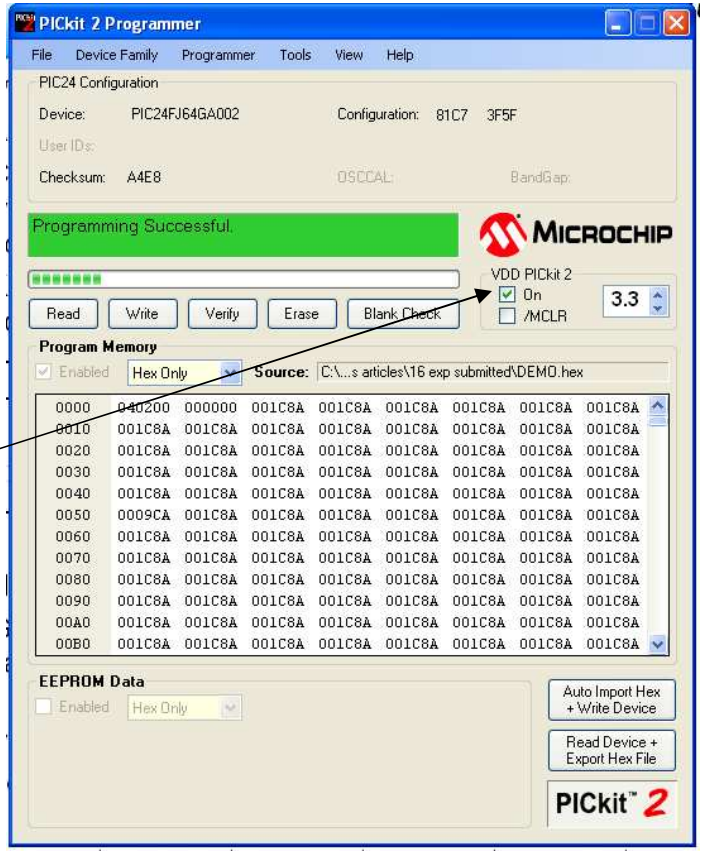
- Must down load firmware into PICKIT2 into your computer
  - Source are the CD-ROM from PICKIT2 or download directly from www.mircochip.com
- Install and PICKIT2 Icon should appear on desktop
- Plug-in your PICKIT to USB and the other side to Experimenter (*no external power required—set ON/OFF switch on Experimenter to off position*)
- Double Click PICKIT icon 

- Should find PICKIT2 connected and then issue READ—it should read Experimenter board and find PIC24F microcontroller
- Click check box
- Experimenter should come on with DEMO



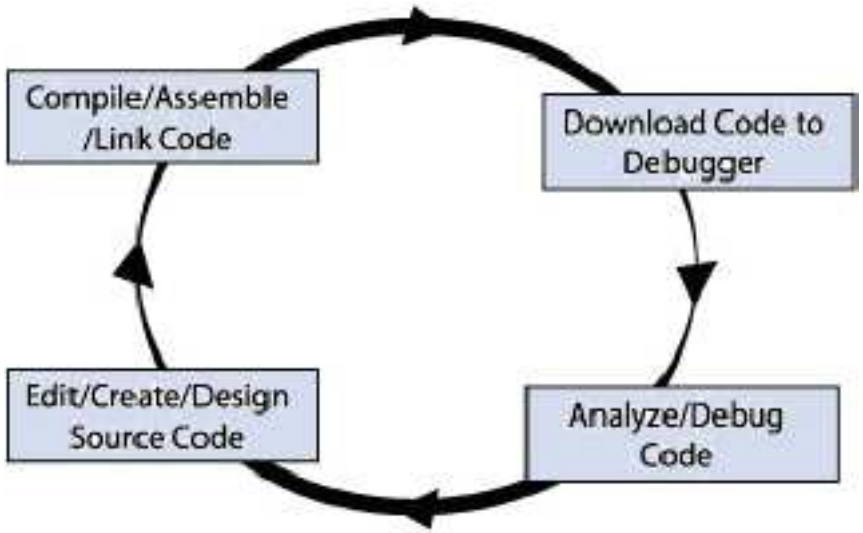
Programming the Experimenter *just using* PICKIT2

- Assume PICKIT2 installed
- Can use PICKIT2 to program the experimenter with hex files that have been *saved with PIC24F configuration word settings*
- KibaCorp web site has these hex files available – download and unzip
  - DEMO.HEX
  - CHRISTMAS.HEX
- Plug-in your PICKIT to USB and the other side to Experimenter Double Click PICKIT icon
  - Should find PICKIT2 and Experimenter PIC24F
- If you have power to board *skip this step*
  - otherwise click VDD on for PICKIT2
- Go File on MENU and select IMPORT, the navigate to the HEX file
- Select write (Experimenter will be programmed with file)
- You should be running automatically



Microchip MPLAB Integrated Development Environment

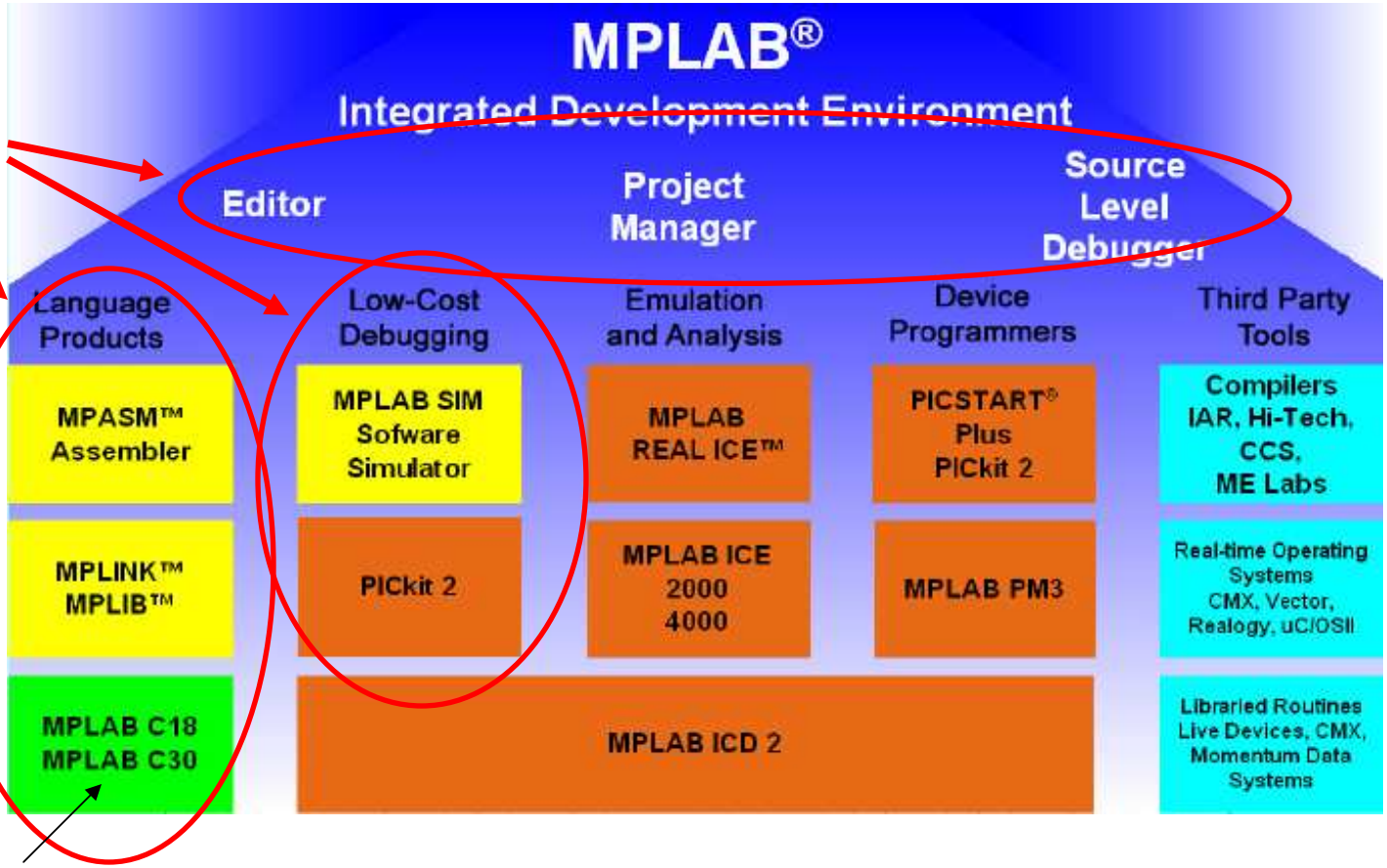
- The MPLAB Integrated Development Environment (IDE) enables users to progress through this cycle without the distraction of switching among an array of tools.
- By using MPLAB® IDE, all the functions are integrated, allowing the engineer to concentrate on completing the application without the interruption of separate tools and different modes of operation.
  The IDE is a "wrapper" that coordinates all the tools from a single graphical user interface – usually automatically.



"Microcontroller Design Cycle"

Free Microchip MPLAB Integrated Development Environment

Used by the Experimenter



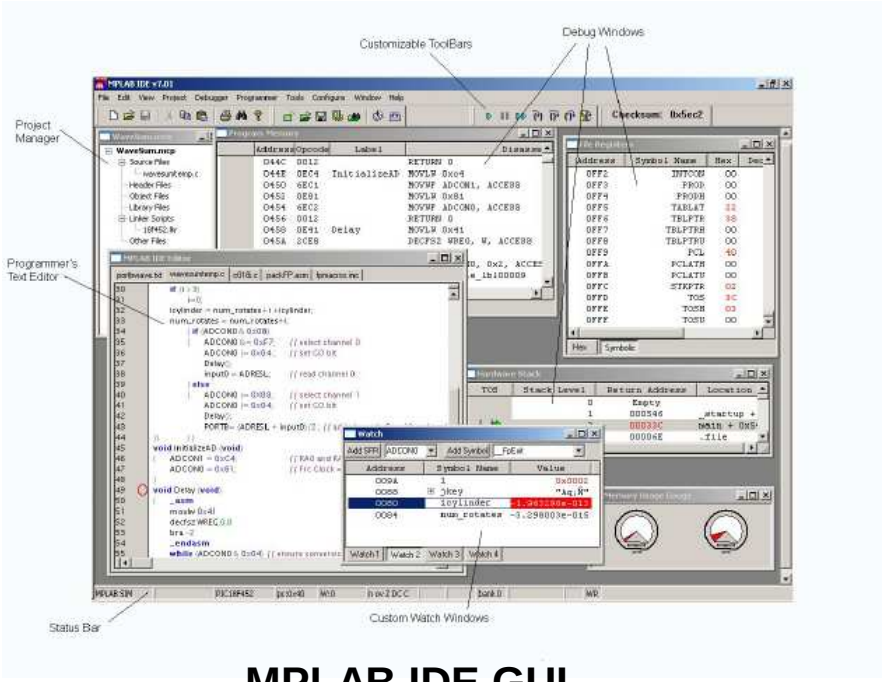
PIC24 C Complier—(all Experiment code is written in ‘C”)– student version of complier is also free!

Next Step Install MPLAB IDE

- Install MPLAB from either CD-ROM from your PICKIT2 or download it from Microchip web site at

http://www.microchip.com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=1406&dDocName=en019469&part=SW007002

- Microchip may require you to register and sign in for downloads.
- Follow instruction during install



MPLAB IDE GUI

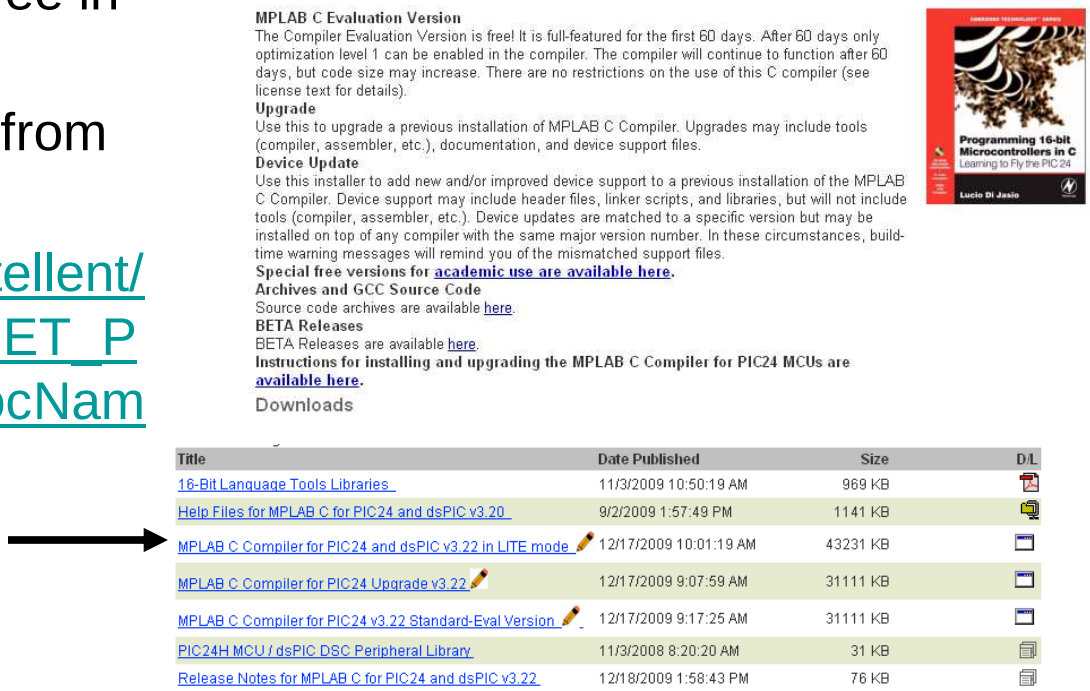
MPLAB Software	
Downloads	**Associated Files and Release Notes**
MPLAB IDE v8.43 Full Release Zipped Installation	Release Notes for MPLAB IDE v8.43
MATLAB Device Blocks for dsPIC DSCs	

Downloads

Install PIC24F C Complier

- C Compiler is available free in Student version
- Code must be download from Microchip web site

http://www.microchip.com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=1406&dDocName=en535364



MPLAB C Evaluation Version
The Compiler Evaluation Version is free! It is full-featured for the first 60 days. After 60 days only optimization level 1 can be enabled in the compiler. The compiler will continue to function after 60 days, but code size may increase. There are no restrictions on the use of this C compiler (see license text for details).
Upgrade
Use this to upgrade a previous installation of MPLAB C Compiler. Upgrades may include tools (compiler, assembler, etc.), documentation, and device support files.
Device Update
Use this installer to add new and/or improved device support to a previous installation of the MPLAB C Compiler. Device support may include header files, linker scripts, and libraries, but will not include tools (compiler, assembler, etc.). Device updates are matched to a specific version but may be installed on top of any compiler with the same major version number. In these circumstances, build-time warning messages will remind you of the mismatched support files.
Special free versions for academic use are available here.
Archives and GCC Source Code
Source code archives are available here.
BETA Releases
BETA Releases are available here.
Instructions for installing and upgrading the MPLAB C Compiler for PIC24 MCUs are available here.

Downloads

Title	Date Published	Size	D/L
16-Bit Language Tools Libraries	11/3/2009 10:50:19 AM	969 KB	
Help Files for MPLAB C for PIC24 and dsPIC v3.20	9/2/2009 1:57:49 PM	1141 KB	
MPLAB C Compiler for PIC24 and dsPIC v3.22 in LITE mode	12/17/2009 10:01:19 AM	43231 KB	
MPLAB C Compiler for PIC24 Upgrade v3.22	12/17/2009 9:07:59 AM	31111 KB	
MPLAB C Compiler for PIC24 v3.22 Standard-Eval Version	12/17/2009 9:17:25 AM	31111 KB	
PIC24H MCU / dsPIC DSC Peripheral Library	11/3/2008 8:20:20 AM	31 KB	
Release Notes for MPLAB C for PIC24 and dsPIC v3.22	12/18/2009 1:58:43 PM	76 KB	

- Just follow direction during install.

Tools Install Checklist

Desktop ICON

- Check Install PICKIT2

- Install MPLAB

MPLAB IDE v8.33.lnk

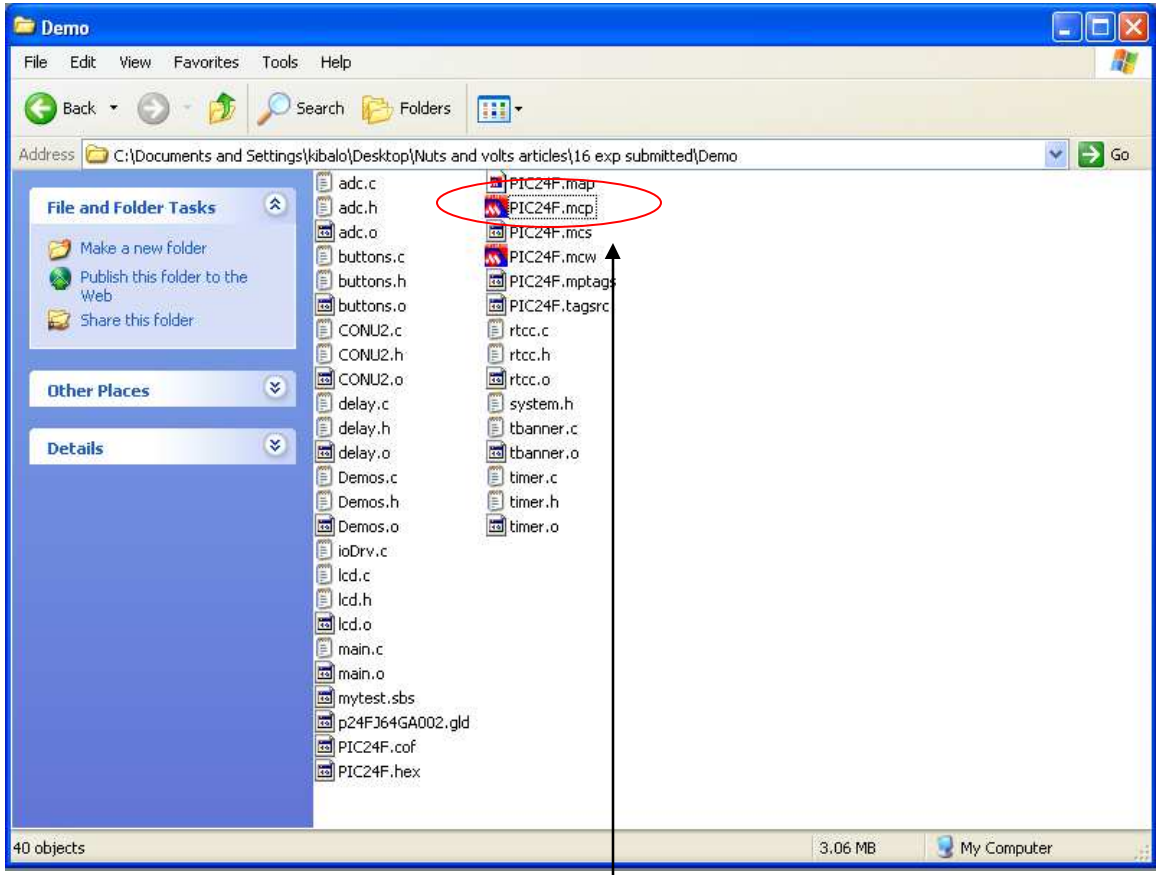
- Installed ‘C’ Compiler

No icon

Now all we need is source code and project !!!

Getting Source Project and Source Code

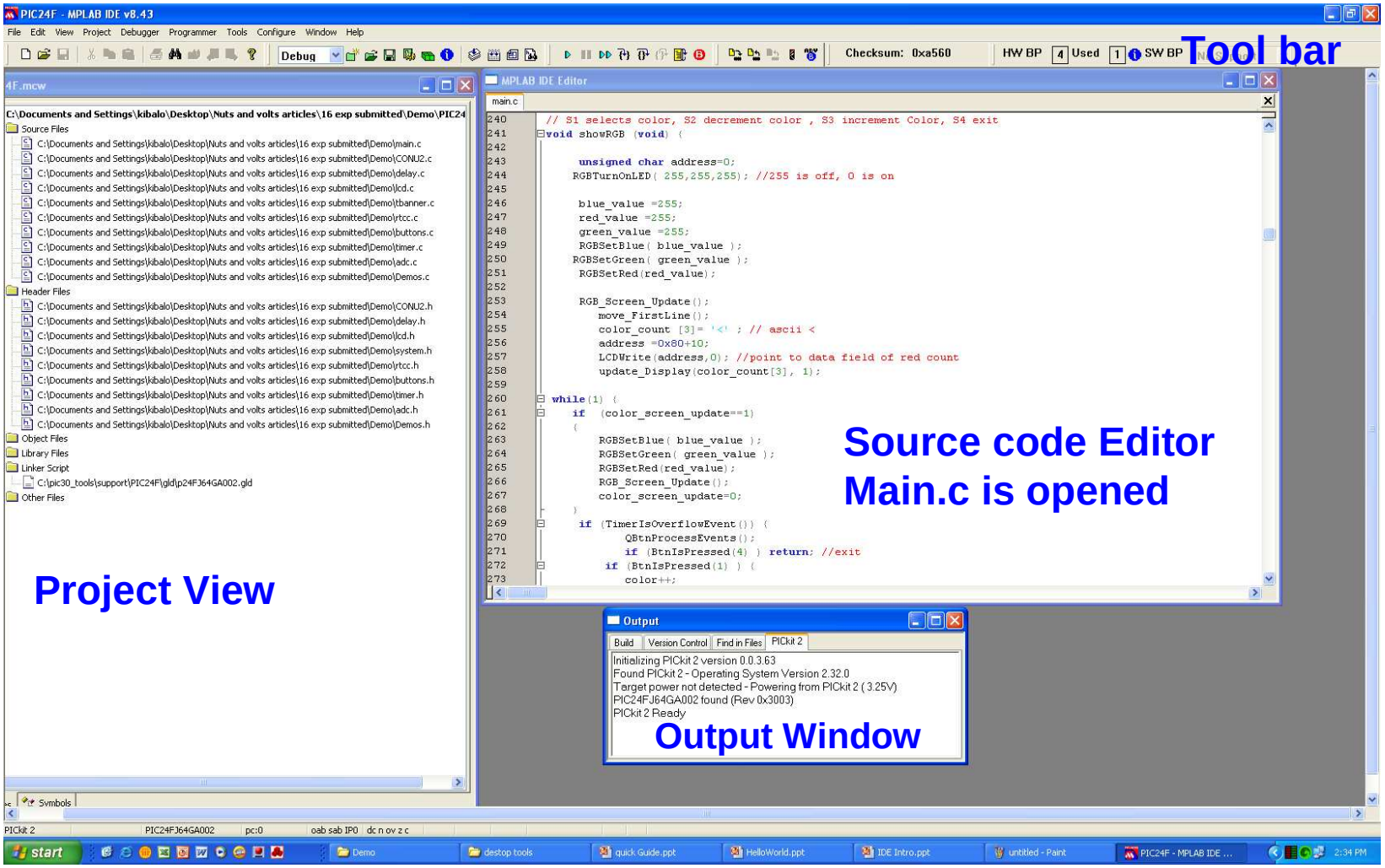
- Download Code from web site either KibaCorp or Nuts and Volts
- Place zip file into a computer folder and unzip
- You should see following (Demo Example)



Double Click .MCP to bring up project in MPLAB

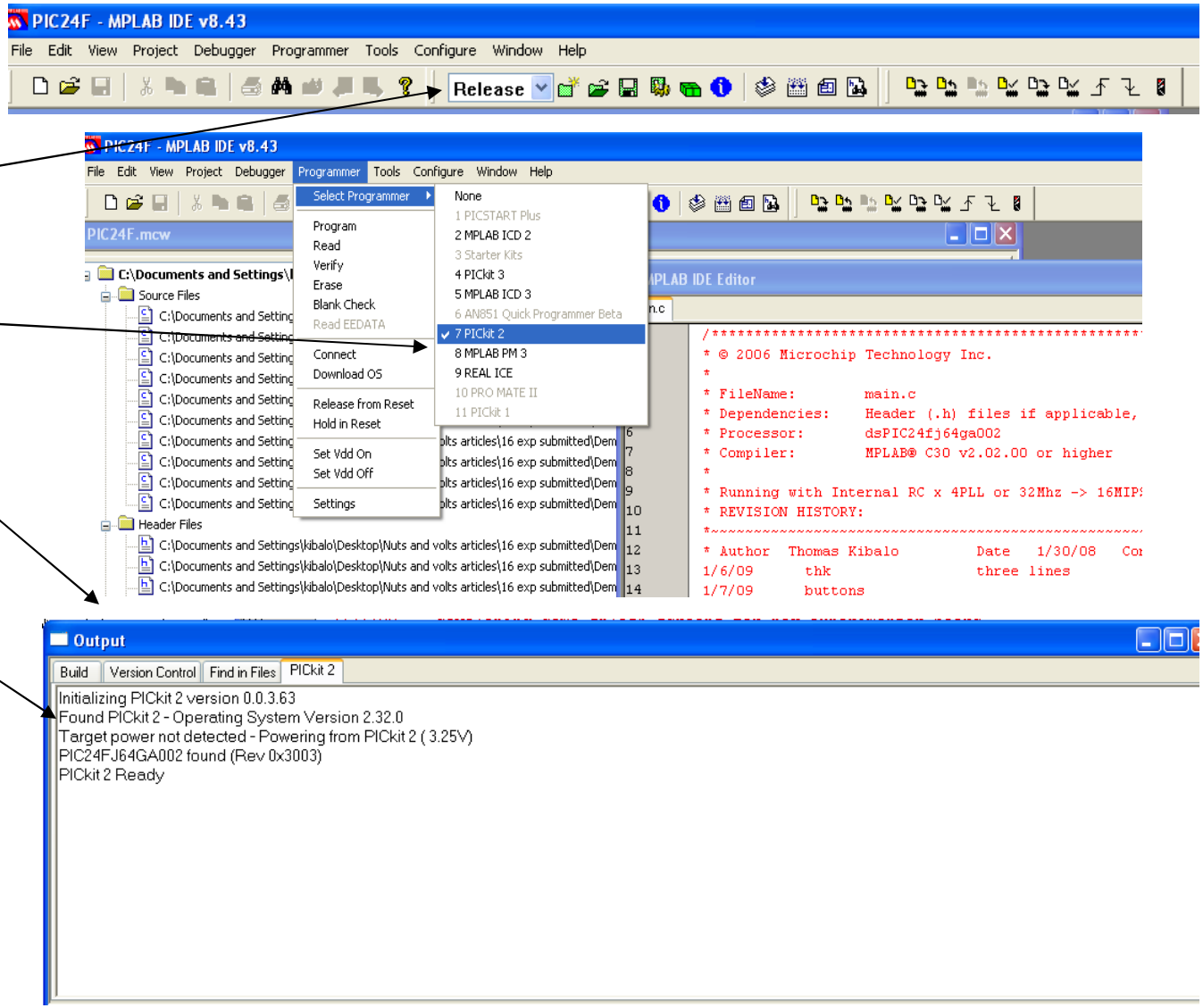
Demo program opened in MPLAB IDE

double click project icon .MCP in code

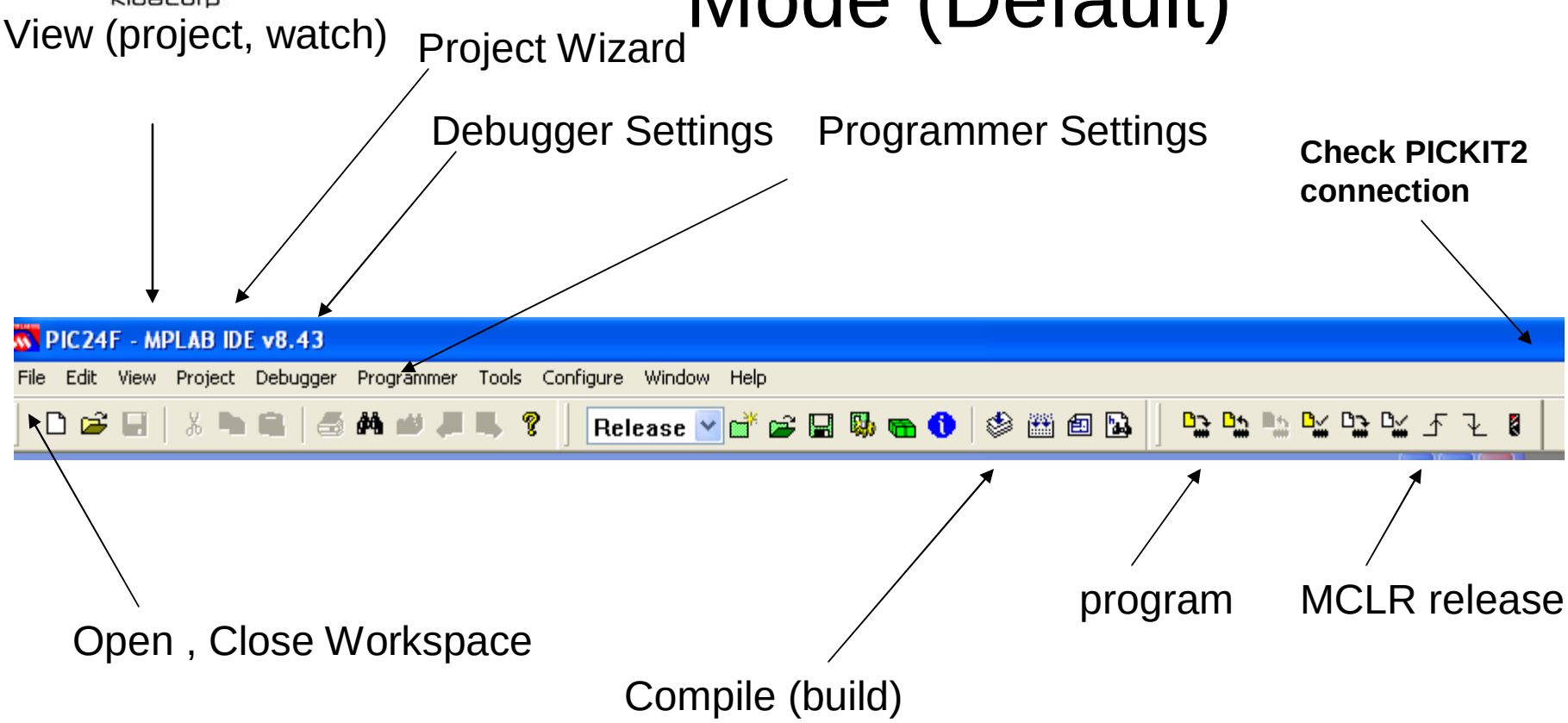


PICKIT2 and Experimenter under IDE Release Mode (DEFAULT)

- Hook up PICKIT2 to Experimenter
- Set release
- Select programmer to be PICKIT2
- Output window should appear as follows
- If no output power is applied to Experimenter then screen will show
- Otherwise it will show that power is detected



MPLAB IDE Tool Bar-release Mode (Default)



Release mode allows you to compile the program and project and then program the experimenter with PICKIT2 . Once done you can disconnect the PICKIT2 and the Experimenter will run standalone if an external power source is made available.

Running Experimenter just PICKIT

- PICKIT2 works with Experimenter with or without external power
- *Keep in mind that PICKIT2 is current limited to 100ma because of USB power source*

Power supplied by PICKIT2

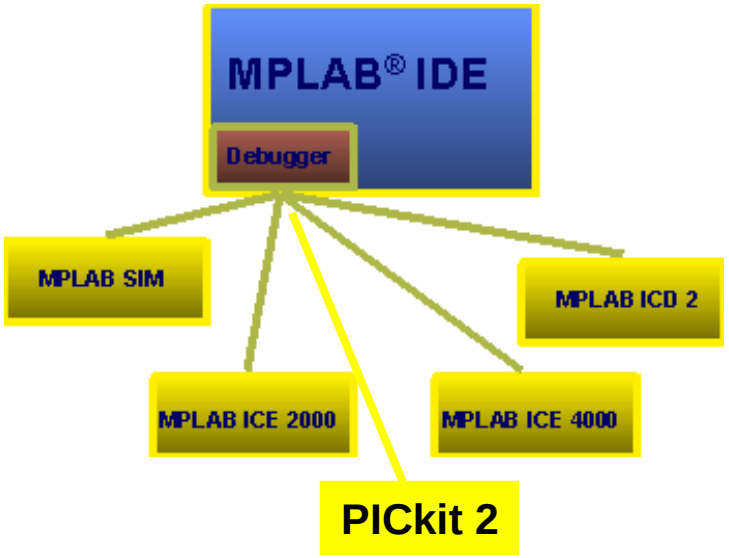
Make sure ON/OFF switch is off

Power supplied Wall transformer

Make sure ON/OFF switch is on

MPLAB Debugger

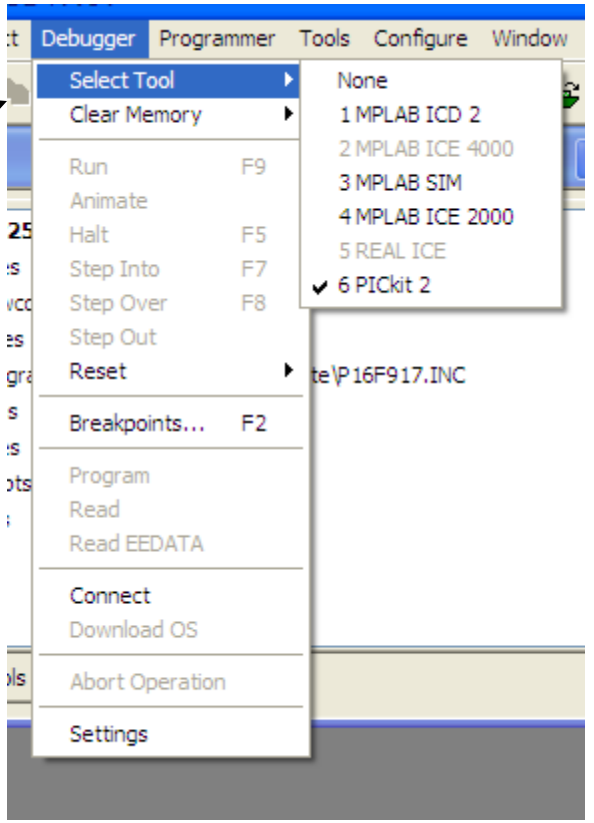
- Works with PICKIT2 for real time debug or with built in MPLAB for Simulation only
- Used to develop and debug your own programs
- Capabilities
  - Setting breakpoints
  - Single step
  - Simulate*
  - Trace
  - Animate*
  - Watch variable
  - Stop watch*
  - Logic analyzer*

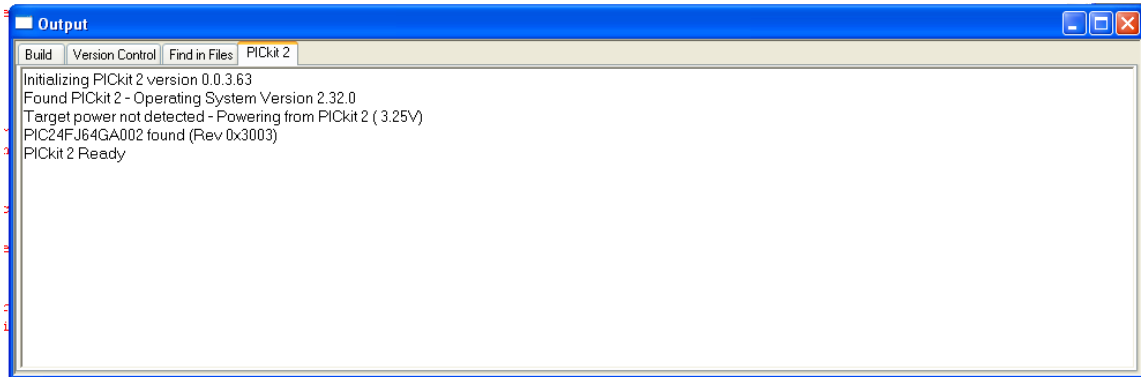


* Simulation only

Using PICKIT2 DEBUGGER with MPLAB IDE

- Plug in the PICKIT2
- Select DEBUG here
- Select PICKIT2 under Debugger menu
- Output should appear as follows





MPLAB IDE Tool Bar-DEBUG