Using MPLAB® ICD 2 LE

1 Install the Latest Software

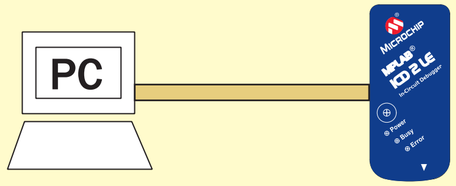
NOTE: Do not connect the USB cable until after the MPLAB® IDE software is installed.
Install the MPLAB IDE software, including the MPLAB ICD 2 component, onto your PC using the MPLAB IDE CD-ROM or download the software from the MPLAB IDE page of the Microchip web site (www.microchip.com/MPLAB).
DO NOT run the MPLAB IDE program at this time.

2 Configure PC Communications

For USB

IMPORTANT: Do not allow the Windows® OS to pick a USB driver. For proper driver installation, follow the HTML installation instructions found in: `C:\Program Files\Microchip\MPLAB IDE\ICD2\Drivers`. The HTML file name is "ddicd2.htm" for Windows 2000/XP.

1. Connect MPLAB ICD 2 LE to a PC USB port via a USB cable.
2. Follow the instructions in the HTML file mentioned above to install the drivers.

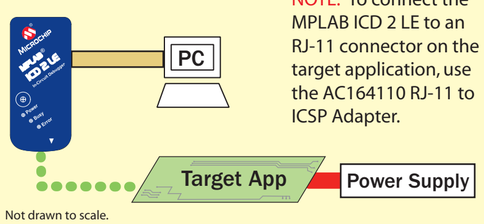


3 Connect Power and Target Application

Connect the MPLAB ICD 2 LE to your target device using a 6-pin header (0.001inch) spacing as shown:

NOTES:
1. Always connect the MPLAB ICD 2 LE to a USB port BEFORE applying power to your target applications.
2. Power must be supplied to your target board from a suitable power supply.

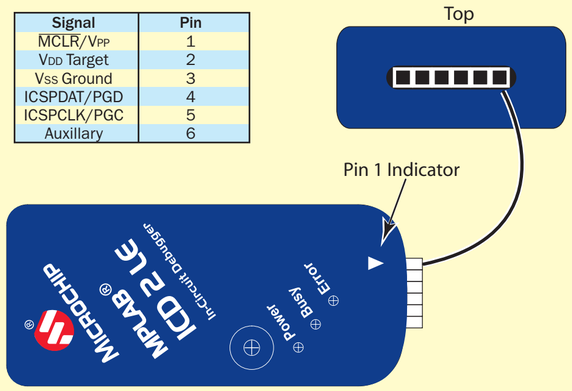
NOTE: To connect the MPLAB ICD 2 LE to an RJ-11 connector on the target application, use the AC164110 RJ-11 to ICSP Adapter.



Not drawn to scale.

MPLAB ICD 2 LE Connector Pinout

Signal	Pin
MCLR/VPP	1
VDD Target	2
VSS Ground	3
ICSPDAT/PGD	4
ICSPCLK/PGC	5
Auxillary	6



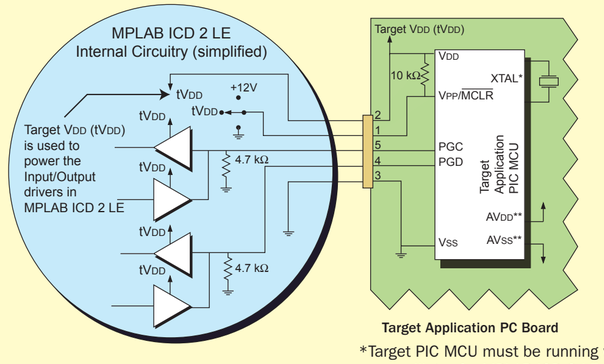
4 Configure MPLAB IDE

Open the MPLAB IDE program and configure the MPLAB IDE software to work properly with MPLAB ICD 2 LE:
1. For debugging, select *Debugger>Select Tool>MPLAB ICD 2*.
   For programming, select *Programmer>Select Programmer>MPLAB ICD 2*.
2. To set the communications port for MPLAB ICD 2 LE, select *Debugger/Settings*>Communication tab and choose the USB port. Click Apply.
3. Select *Debugger/Settings*>Power tab. Verify the "Power target circuit from MPLAB ICD 2" checkbox is empty (not checked). Click OK.

Refer to the "*MPLAB® ICD 2 In-Circuit Debugger User's Guide*" (DS51331) for a tutorial and other information.

Additional Information

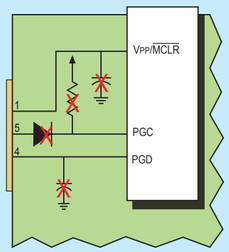
Electrical Connections to Target



Target Application PC Board

*Target PIC MCU must be running with an oscillator for MPLAB ICD 2 LE to function as a debugger.
**If the PIC MCU has AVDD and AVSS lines, they must be connected for MPLAB ICD 2 LE to operate.

Target Circuit Design Considerations



- Do not use pull-ups on PGC/PGD – they will divide the voltage levels since these lines have 4.7 kΩ pull-down resistors in MPLAB ICD 2 LE.
- Do not use capacitors on PGC/PGD – they will prevent fast transitions on data and clock lines during programming and debug communications.
- Do not use capacitors on MCLR – they will prevent fast transitions of VPP.
- Do not use diodes on PGC/PGD – they will prevent bidirectional communication between MPLAB ICD 2 LE and the target PIC MCU.

Guidelines

- Oscillator – must be operational for MPLAB ICD 2 LE debug operations.
- Power – must be connected to target. Internal buffers on PGC and PGD are connected to target power. This also provides level translation (down to 2V) for low-voltage operation.
- WDT – Disable the Watchdog Timer while debugging.

  NOTE: On some devices, disabling WDT is not required for MPLAB ICD 2 LE operation.
- Code Protect – Disable all code protection while debugging.
- Table Read Protect – Disable all table read protection while debugging.
- Reserved Resources – Avoid reserved program memory and file registers used by the debugger. See Reserved Resources section below.
- LVP – Do not enable Low Voltage Programming.
- PLL – Switching to PLL oscillator requires power down of target.
- AVDD and AVSS – If target PIC® MCU has these Analog power pins, they must also be connected to the proper power and ground.
- Ensure that configuration bits are correctly programmed, especially for the oscillator.
- If BOR is enabled, ensure VDD is above brown-out levels.
- During Program, ensure VDD voltage levels meet required programming specifications.

Reserved Resources

(See on-line help or readme for specifics.)

MPLAB ICD 2 LE has the following restrictions and reserves certain on-chip resources for debugging.
See *Help>Topics>MPLAB ICD 2* for troubleshooting and limitation information. After the target PIC MCU is programmed to run without MPLAB ICD 2 LE in your application, none of these restrictions apply:
- MCLR/VPP is shared for programming and reset control.
- Low-voltage ICSP™ programming (LVP) must be disabled.
- PGC and PGD are reserved for programming and in-circuit debugging. Usually these are the RB6 and RB7 pins.

Legend: PC Interface: USB; Power: from Power Supply

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