MPLAB® X

Integrated Development Environment

Using MPLAB REAL ICE™ In-Circuit Emulator

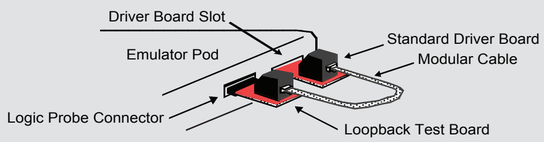
1 Install the Latest Software

Install the MPLAB® X IDE software on your computer by downloading it from www.microchip.com/mplabx. Launch the application.

2 Configure USB Communications

When you install MPLAB X IDE on a Mac or Linux computer, the installer will automatically load the USB drivers.
When you install MPLAB X IDE on a Windows® computer, you must follow the instructions on the Start Page, "MPLAB IDE v8 Users - Important," to correctly install the USB drivers.

3 Use the Loopback Test Board



Use the supplied loopback test board to verify that the emulator is functioning properly:

1. Disconnect the emulator from the computer.
2. Plug the standard driver board into the emulator pod.
3. Plug the loopback test board into the pod's logic probe connector.
4. Connect the loopback test board to the standard driver board using the modular cable. Reconnect the emulator to the computer.
5. Launch MPLAB X IDE. **Ensure that all existing projects are closed.**
6. Select Debug>Run Debugger/Programmer Self Test, then, select the specific "REAL ICE" you want to test and click **OK**.
7 Ensure the loopback test board and cable are connected and click **Yes** to continue.
8. View the self test results in the emulator's Output window.
9. After the emulator passes the self test, disconnect the loopback test board from the emulator.

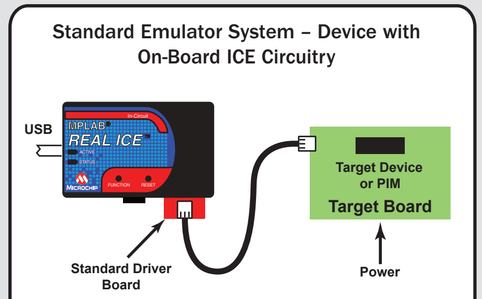
4 Connect to Target Device

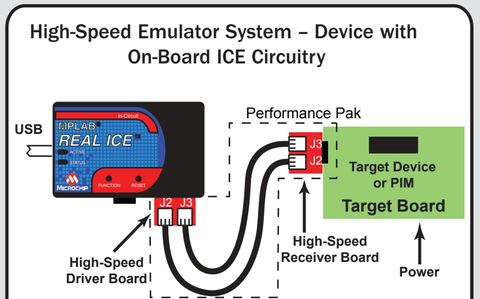
Note: If switching to high-speed/LVDS communications, remove USB power first.

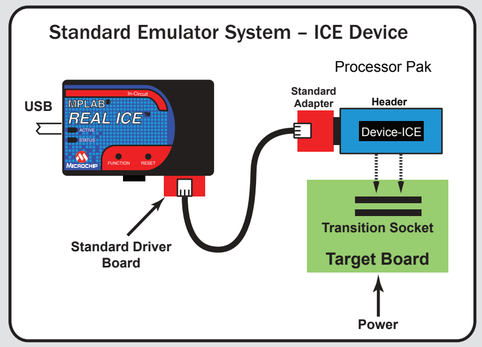
1. Attach the emulator to the target as shown on the right. →
2. Connect power to the target board.

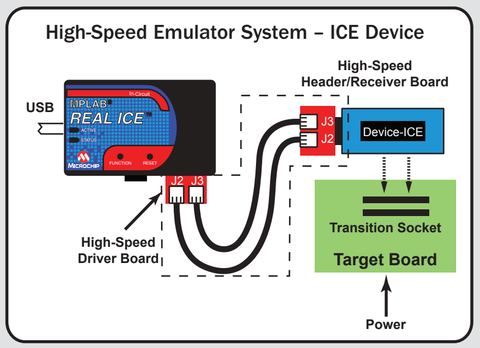
5 Create, Build and Run Project

1. Select and install the language tools (compiler, assembler, etc.) for developing your code. See the www.microchip.com web site for more choices.
2. Use the New Project wizard (File>New Project) to create a project, or open an existing project (File>Open Project).
3. Configure the emulator by right clicking on the main project and selecting "Properties." Click on "Real ICE" for options.
4. Configure your language tools in the Properties dialog by clicking the language tool name for options. Click **OK** when done.
5. Check that the configuration bits in your code match the Recommended Settings listed below.
6. To execute your code in Debug mode, perform a debug run (Debug>Debug Project). A debug run will build the project, program the target with the image and debug executive, and start a debug session.
   OR
   To execute your code in Non-Debug (release) mode, perform a run (Run>Run Project). A run will build the project, program the target with the image and run the device.
   To hold a device in Reset after programming, use the Hold in Reset icon in the toolbar instead of using Run Project.









ADDITIONAL INFORMATION

Reserved Resources

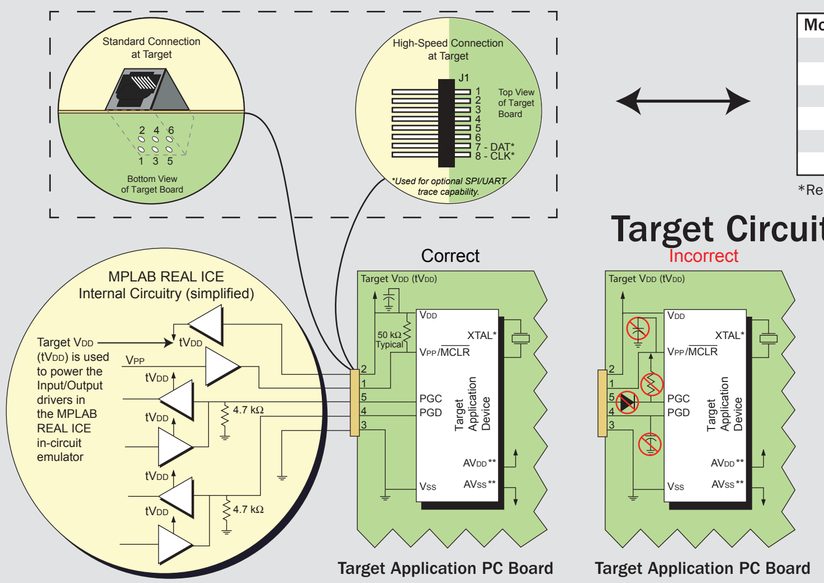
See the MPLAB REAL ICE in-circuit emulator online help for information on reserved resources used by the emulator.

Recommended Settings

COMPONENT	SETTING
Oscillator	• OSC bits set properly • Running
Power	Supplied by target
WDT	Disabled (device dependent)
Code-Protect	Disabled
Table Read Protect	Disabled
LVP	Disabled
BOD	VDD>BOD VDD min
JTAG	Disabled
AVDD and AVSS	Must be connected
PGCx/PGDx	Proper channel selected, if applicable
Programming	VDD voltage levels meet programming spec

Note: See MPLAB REAL ICE in-circuit emulator online help for more information.

Circuitry and Connector Pinouts



*Target device must be running with an oscillator for the emulator to function as a debugger.
**If the device has AVDD and AVSS lines, they must be connected for the emulator to operate.

Target Connector Pinouts

Modular Connector Pin	Microcontroller Pin
1	MCLR/VPP
2	VDD
3	Ground
4	PGD (ICSPDAT)
5	PGC (ICSPCLK)
6	Do not connect*

*Reserved for future use.

Target Circuit Design Precautions

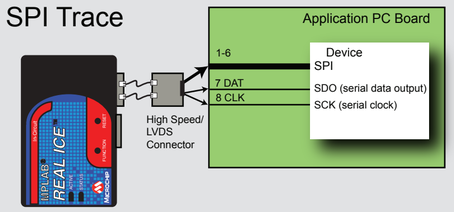
- **Do not use capacitors on MCLR:** they will prevent fast transitions of VPP.
- **Do not use pull-ups on PGC/PGD:** they will divide the voltage levels since these lines have 4.7 kΩ pull-down resistors in MPLAB REAL ICE.
- **Do not use multiplexing on PGC/PGD:** they are dedicated for communications to MPLAB REAL ICE.
- **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 diodes on PGC/PGD:** they will prevent bidirectional communication between MPLAB REAL ICE and the target PIC® MCU.
- **Do not exceed recommended cable lengths:** refer to the Hardware Specification section of the MPLAB REAL ICE online help or user's guide for acceptable cable lengths.

Native Trace Connections

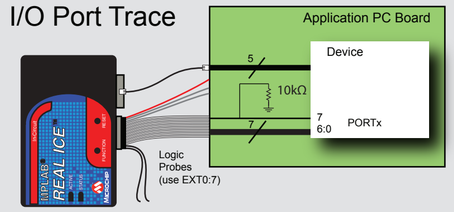
Native trace is built-in for many devices and is available once the Standard or High-Speed target connections are made. For more on device support for this and other forms of trace, see the MPLAB REAL ICE in-circuit emulator online help file, "Device and Feature Support."

Optional Trace Connections

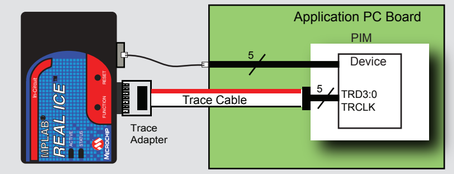
SPI Trace



I/O Port Trace



PIC32MX Instruction Trace



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