# USING PICkit™ 3 IN-CIRCUIT DEBUGGER

1 Install the Latest Software

Install the MPLAB® IDE software 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). Check the latest Release Notes for additional information.

2 Configure PC USB Communications

Connect the PICkit™ 3 in-circuit development debugger/programmer to a PC USB port via a USB cable. PICkit 3 uses the standard HID USB Windows® driver.
Note: If a USB hub is used, the hub must be powered with its own power supply.

USB

PC

(Not to scale.)
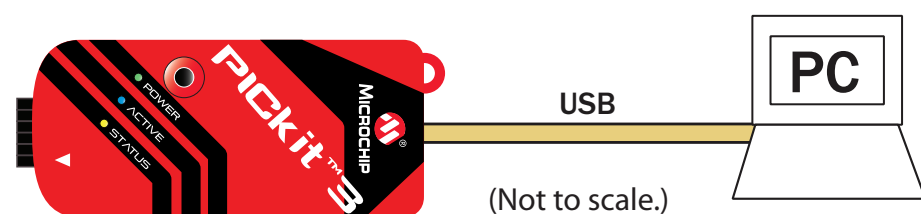
3 Build Your Project

1. Launch MPLAB IDE.
2. Load your project or use the Project Wizard to create a new one.
3. Build your project based on your configurations and options.
4. Select the PICkit 3 as either a debugger (*Debugger>Select Tool*>PICkit 3) or as a programmer (*Programmer>Select Programmer*>PICkit 3).
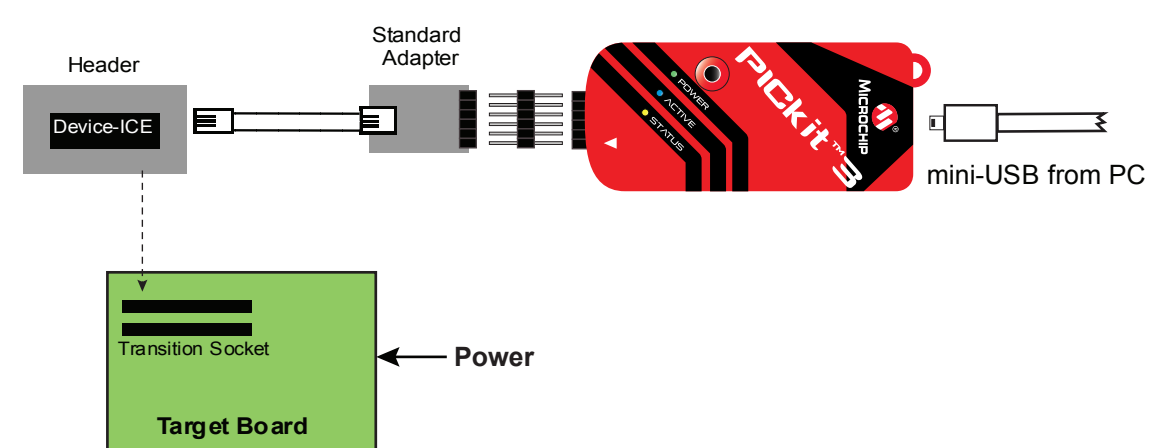
4 Connect to Target and Power

1. Attach the PICkit 3 to the PC using the USB cable, if not already.
2. Attach the communications cable between the debugger and target board.
3. Connect power to the target board.

Typical Debugger System – Device With On-Board ICE Circuitry:

Power
Target Device
Target Board
mini-USB from PC

Alternate Debugger System – ICE Device:

Header
Standard Adapter
Device-ICE
mini-USB from PC
Transition Socket
Power
Target Board

5 Program and Debug

1. Program your device.
2. As a programmer, PICkit 3 will automatically run your code. As a debugger, you can run, halt, single step and set breakpoints in your code.

Note: For information on reserved resouces used by the debugger, see the PICkit 3 online help.
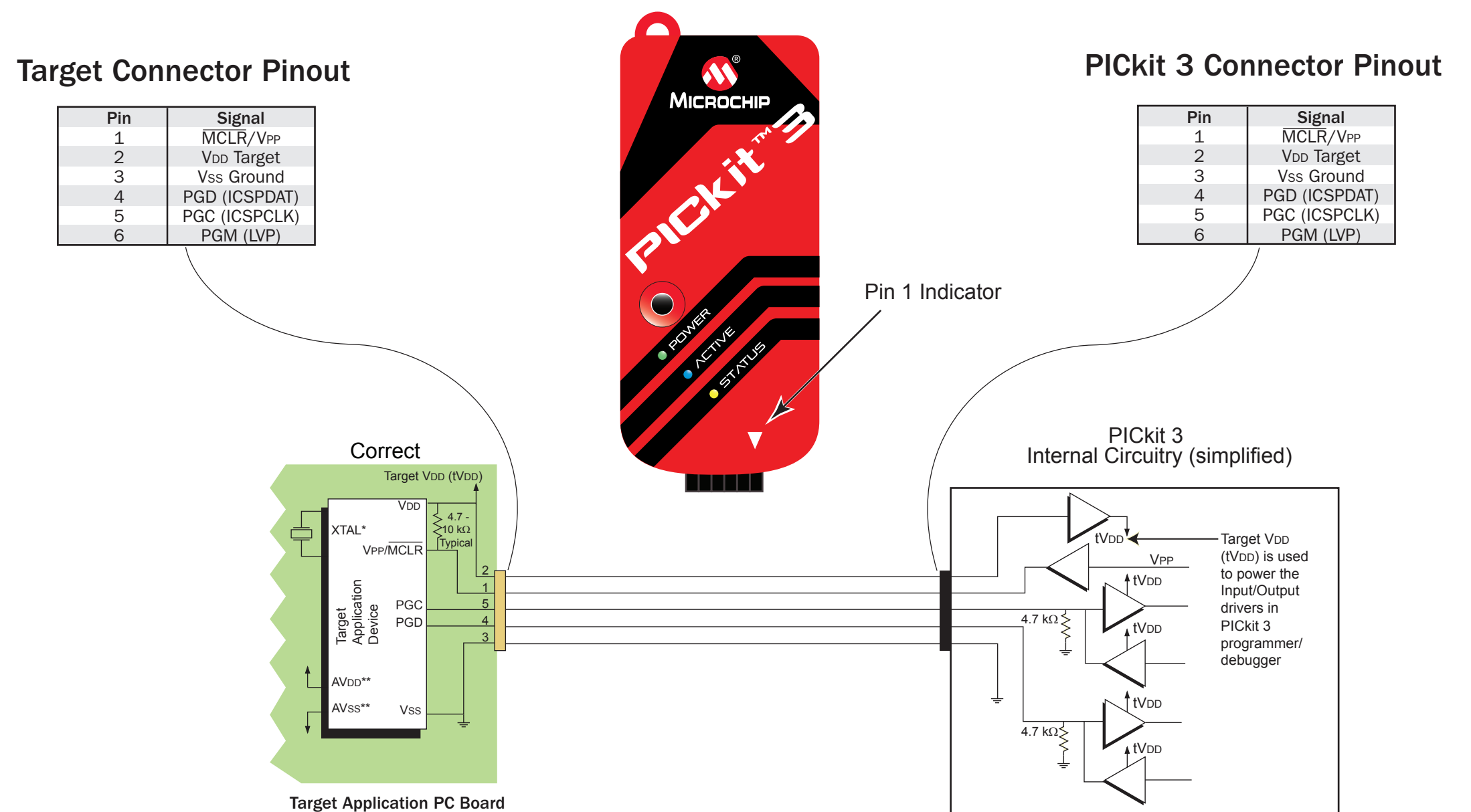

ADDITIONAL INFORMATION

Circuitry and Connector Pinouts

Target Connector Pinout

Pin	Signal
1	$\overline{MCLR}/V_{PP}$
2	V_{DD} Target
3	V_{SS} Ground
4	PGD (ICSPDAT)
5	PGC (ICSPCLK)
6	PGM (LVP)

Pin 1 Indicator

PICkit 3 Connector Pinout

Pin	Signal
1	$\overline{MCLR}/V_{PP}$
2	V_{DD} Target
3	V_{SS} Ground
4	PGD (ICSPDAT)
5	PGC (ICSPCLK)
6	PGM (LVP)

Correct

Target V_{DD} (tV_{DD})
V_{DD}
XTAL*
$V_{PP}/\overline{MCLR}$
4.7 – 10 kΩ Typical
Target Application Device
PGC
PGD
AV_{DD}**
AV_{SS}**
V_{SS}

Target Application PC Board

PICkit 3 Internal Circuitry (simplified)

tV_{DD}
V_{PP}
tV_{DD}
4.7 kΩ
tV_{DD}
tV_{DD}
4.7 kΩ
tV_{DD}

Target V_{DD} (tV_{DD}) is used to power the Input/Output drivers in PICkit 3 programmer/debugger

*Target device must be running with an oscillator for the debugger to function as a debugger.
**If the device has AV_{DD} and AV_{SS} lines, they must be connected for the debugger to operate.

Target Circuit Design Precautions

Incorrect

Target V_{DD} (tV_{DD})
V_{DD}
$V_{PP}/\overline{MCLR}$
XTAL*
Target Application Device
PGC
PGD
AV_{DD}**
AV_{SS}**
V_{SS}

Target Application PC Board
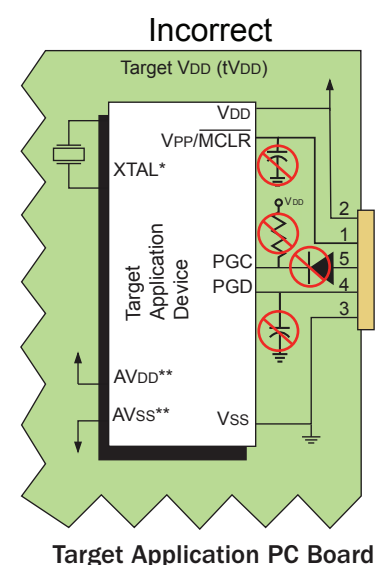
- **Do not use greater than 100 μF capacitance on V_{DD}** – depending on the overall load, it will prevent the target from powering quickly when PICkit 3 is the source of power.
- **Do not use capacitors on MCLR** – they will prevent fast transitions of V_{PP}.
- **Do not use pull-ups on PGC/PGD** – they will divide the voltage levels since these lines have 4.7 kΩ pull-down resistors in PICkit 3.
- **Do not use multiplexing on PGC/PGD** – they are dedicated for communications to PICkit 3.
- **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 PICkit 3 and the target PIC® MCU.

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	V_{DD} > BOD V_{DD} min
JTAG	Disabled
AV_{DD} and AV_{SS}	Must be connected
PGCx/PGDx	Proper channel selected, if applicable
Programming	V_{DD} voltage levels meet programming specs

Note: See the *PICkit 3 User's Guide* for more component and setting information.

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