MPLAB® PICkit™ 4 In-Circuit Debugger

QUICK START GUIDE

GETTING STARTED

1 Install the Latest Software

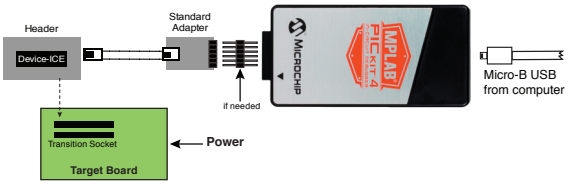
Download the MPLAB X IDE software from www.microchip.com/mplabx and install onto your computer. The installer automatically loads the USB drivers. Launch MPLAB X IDE.

2 Connect to Target Device

1. Connect the MPLAB PICkit 4 to the computer using the supplied Micro-B USB cable.
2. Attach the communications cable between the debugger and target board.
3. Connect external power to target board.

Typical Debugger System – Device with On-Board Debug Circuitry

Alternative Debugger System – ICE Device



**External target board power supply to be provided by user.*

3 Create, Build and Run Project

1. Refer to the MPLAB X IDE User's Guide or online help for instructions to install language tools, create or open a project, and configure project properties.
2. Check that the configuration bits in your code match the Recommended Settings below.
3. To execute your code in Debug mode, perform a debug run. To execute your code in Non-Debug (release) mode, perform a run. To hold a device in Reset after programming, use the Hold in Reset icon in the toolbar.

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 spec

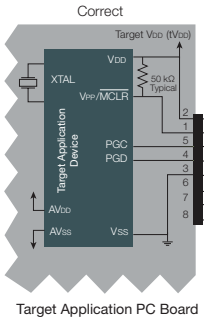
Note: *See MPLAB PICkit 4 In-Circuit Debugger online help for more information.*

Reserved Resources

For information on reserved resources used by the debugger, see the MPLAB PICkit 4 In-Circuit Debugger online help.

ADDITIONAL INFORMATION

Circuitry and Connector Pinouts

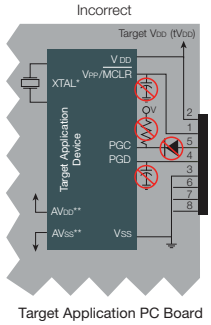


Connect Pin 1 to Pin 1

Typical 6-Pin ICSP Pinout

Pin	Target	MPLAB® PICkit™ 4
1	$\overline{\text{MCLR}}$/VPP	$\overline{\text{MCLR}}$
2	VDD Target	VDD
3	VSS (ground)	Ground
4	PGD (ICSPDAT)	PGD
5	PGC (ICSPCLK)	PGC
6	Do Not Connect	Do Not Connect
7		Reserved for Future use
8		Reserved for Future use

Target Circuit Design Precautions



- **Do not use pull-ups on PGC/PGD:** they will disrupt the voltage levels, since these lines have programmable pull-down resistors in the debugger.
- **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 $\overline{\text{MCLR}}$:** they will prevent fast transitions of VPP. A simple pull-up resistor is generally sufficient.
- **Do not use diodes on PGC/PGD:** they will prevent bidirectional communication between the debugger and the target device.
- **Do not exceed recommended cable lengths:** Refer to the Hardware Specification of the MPLAB PICkit 4 online help or user's guide for cable lengths.

Pinouts for Debug Interfaces

MPLAB® PICkit™ 4			DEBUG									
Connector	Pin #	Pin Name	ICSP (MCHP)	MIPS EJTAG	CORTEX® SWD	AVR® JTAG	AVR ISP (&DW)	UPDI	PDI	AW	DW(IRE)	TPI
	1	TVPP	$\overline{\text{MCLR}}$	$\overline{\text{MCLR}}$	$\overline{\text{MCLR}}$							
	2	TVDD	VDD	VIO_REF	VTG	VTG	VTG	VTG	VTG	VTG	VTG	VTG
	3	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND	GND
	4	PGD	DAT	TDO	SWO	TDO	MISO	DAT	DAT	DATA		DAT
	5	PGC	CLK	TCK	SWCLK	TCK	SCK					CLK
	6	TAUX	AUX			~~RESET~~	~~RESET~~		CLK		dW	RST
	7	TTDI		TDI		TDI	MOSI					
	8	TTMS		TMS	SWDIO	TMS						

Pinouts for Data Stream Interfaces

MPLAB® PICkit™ 4	DATA STREAM	
Pin #	DMCI/DGI U(S)ART/CDC	DGI SPI
1		
2	VTG	
3	GND	
4		MISO
5		SCK
6	(SCK)	
7	TX	MOSI
8	RX	SS

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