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Using the ICSP™ Socket Module with PRO MATE® II

ICSP Implementation Considerations

The ICSP Socket Module is an extension of the PRO MATE II device programmer that allows the user to program PICmicro® microcontroller (MCU) devices that are already installed in a target board. Several considerations, listed below, must be addressed when implementing ICSP for your application.

Isolation of the MCLR (VPP) pin

When the MCLR pin is connected to an external RC circuit, the pull-up resistor is tied to VDD and a capacitor is tied to ground. This circuit can affect ICSP operation, depending on the size of the capacitor chosen (see Table 1). During programming MCLR is driven to approximately 13V and also to ground. The application circuit must be isolated from this voltage. In some cases a jumper or diode may be needed to isolate the MCLR pin. Figure 1 shows a typical circuit.

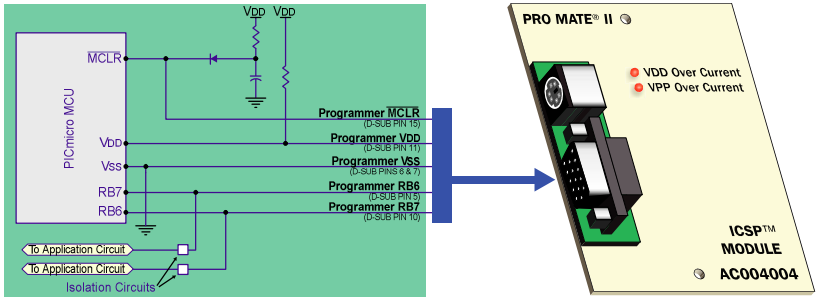


Figure 1 – Typical application circuit

Isolation of RB6 and RB7 pins

The programmer typically uses RB6 and RB7 pins for serial programming. Refer to the programming specification for specific pin requirements. These pins must be isolated from the rest of the application circuit so as not to affect the programming signals. The isolation circuit must account for RB6 being an input, RB7 being bidirectional, and the 100Ω output impedance of the programmer.

Capacitance on VDD, RB6, RB7 and MCLR

The total capacitance on the programming pins affects their rise rates (see figure 2). Typical application circuits use several hundred microfarads of capacitance on VDD. This capacitance requires a fairly strong driver in the programmer to meet the rise rate timings for VDD. Table 1 shows recommended minimum and maximum values for each pin.

	MIN	MAX
RB6(GP1), RB7(GP0)		.01uF
MCLR(VPP/GP3)	10pF	1uF

Table 1 – Recommended capacitance values

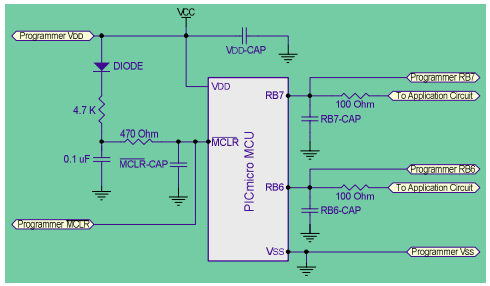


Figure 2 – Typical pin capacitance circuit

Operating Voltage

The socket module powers the target MCU during programming, so **NO** power source is required on the target board for applications drawing less than 500 mA. For applications drawing more power, apply the target power supply and do the following:

1. Do NOT connect the socket module VDD signal to target.
2. Set the VDDmin and VDDmax setting to +5.00V in the MPLAB® IDE PRO MATE Device Programmer dialog.

Since MCU programming is done at 5V, special considerations must be made if your application circuit operates at 3V only. This may include totally isolating the PICmicro MCU during programming.

Troubleshooting

When Powering On, the LCD Displays "Hi Pin Drivers Fail"

The programmer was powered on without power to the ICSP. ICSP must have the power supply connected and on prior to turning on the PRO MATE II.

The PRO MATE II was powered on with the ICSP socket module attached to a target board.

LCD Displays "If Not Over-current, Tighten Socket Top"

If the VDD overcurrent LED is not on, then there is a good chance that the socket module is not making full contact with the elastomeric strips on the PRO MATE II. Turn off power, re-seat the socket module and re-apply power.

LCD Displays "VDD Won't Rise"

When trying to apply VDD, the voltage does not reach the specified value. This could be due to a short or other problem in the target board, or if power is applied to the target board.

LCD Displays "VPP Won't Rise"

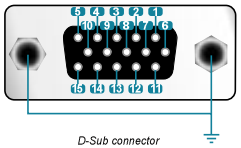
When trying to apply VPP, the voltage does not reach the specified value. This could be due to a short or other problem in the target board, or the target board may have a driver connected to the MCLR line that is pulling down the VPP voltage.

Older Device Programmers

The ICSP Socket Module is supported only by the PRO MATE II device programmer. Older device programmers, such as the original PRO MATE, are not compatible.

Connectors

The ICSP Socket Module has a connector for the included power supply and a 15-pin D-Sub connector.



D-Sub connector

D-Sub Connector Pins

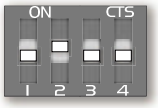
1 Buffered clock for programming PIC17C75X devices
2 Low voltage programming pin for PIC16F87X devices
3 Reserved
4 GO indication from target board
5 Buffered programming clock signal (RB6)
6 GND
7 GND
8 Reserved
9 TEST signal used with PIC17C75X devices
10 Buffered programming data signal (RB7)
11 VDD to target board
12 Fail indicator
13 Pass indicator
14 +5 volts from socket module
15 VPP to target board

Cabling

The ICSP Socket Module ships with a cable to connect to the 15-pin D-Sub connector. The other end of this cable can be cut and modified for your application.

Device Support Switch Settings

A four position mini-dip switch is located on the bottom of the socket module. This switch is used to configure the socket module for the desired PICmicro device. Refer to the README.PRO file in your MPLAB IDE folder for required switch settings.



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