
ICSP™ Socket Module User's Guide

Information contained in this publication regarding device applications and the like is intended through suggestion only and may be superseded by updates. No representation or warranty is given and no liability is assumed by Microchip Technology Incorporated with respect to the accuracy or use of such information, or infringement of patents or other intellectual property rights arising from such use or otherwise. Use of Microchip's products as critical components in life support systems is not authorized except with express written approval by Microchip. No licenses are conveyed, implicitly or otherwise, under any intellectual property rights.

The Microchip logo, name, PIC, KEELOQ, PICMASTER, PICSTART and PRO MATE are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries. microID, PICmicro, *Smart Serial* and MPLAB are trademarks of Microchip in the U.S.A. and other countries.

© Microchip Technology Incorporated 1997.

fuzzyTECH is a registered trademark of Inform Software Corporation.

Intel is a registered trademark of Intel Corporation.

DOS and IBM PC/AT are registered trademark of International Business Machines Corporation.

MS-DOS, Windows and Excel are registered trademarks of Microsoft Corporation.

CompuServe is a registered trademark of CompuServe Incorporated.

DriveWay is a trademark of Aisys Intelligent Systems.

All rights reserved. All other trademarks mentioned herein are the property of their respective companies.

ICSP Socket Module User's Guide

NOTES:



Table of Contents

Chapter 1. Introduction	
Introduction	1
Theory of Operation	1
Chapter 2. Contents	
Hardware	3
Firmware	3
Documentation	3
Chapter 3. Hardware	
Connectors	5
Cables	5
Switches	6
Chapter 4. Features	
Auto Detection	7
Go Signal	7
Pass/Fail Indications	7
Over Current Indicators	8
Typical Applications	8
Chapter 5. Electrical Specifications	
Voltage Input Requirements	9
Voltage/Current Output Limits	9
GO Signal Requirements	9
PASS/FAIL Signal Output Limits	9
+5 Volt from Interface	9
Chapter 6. Supporting Documentation	
Programming Specifications	11
In-Circuit Serial Programming Guide	11

ICSP Socket Module User's Guide

NOTES:



Chapter 1. Introduction

Introduction

The ICSP™ Socket Module is an extension of PRO MATE® II Device Programmer that will allow the user to program Microchip PICmicro™ MCU devices when the devices are already installed in the target board.

Theory of Operation

The ICSP Socket Module will boost the output current of the PRO MATE II to provide power to the target board where the PICmicro MCU is installed. This is accomplished by using an external power supply and circuitry on the module itself.

By using the ICSP Socket Module with PRO MATE II, the PICmicro MCU is programmed and verified using the proper algorithm for production programming. (please refer to the desired devices programming spec as noted in the supporting documents sections)

The socket module is protected from over current conditions on the target board by current limit circuitry. An over current condition is indicated by red LED's on the socket module.

ICSP Socket Module User's Guide

NOTES:



Chapter 2. Contents

Hardware

This package contains the ICSP™ Socket Module, a +15V current boost power supply, target interface cables, a firmware diskette, and documentation.

Firmware

The diskette contains the firmware to properly configure the PRO MATE® II for operation with the ICSP Socket Module.

Note: There may be newer firmware available, please check the Microchip Web site at: www.Microchip.com, for the latest version.

Documentation

The documentation package consists of:

- ICSP Socket Module users guide (this document)
- ICSP Guide, which is a document that explains ICSP programming, and how to implement ICSP in the target application to ensure reliable programming results.
- Packing list
- Important info sheet

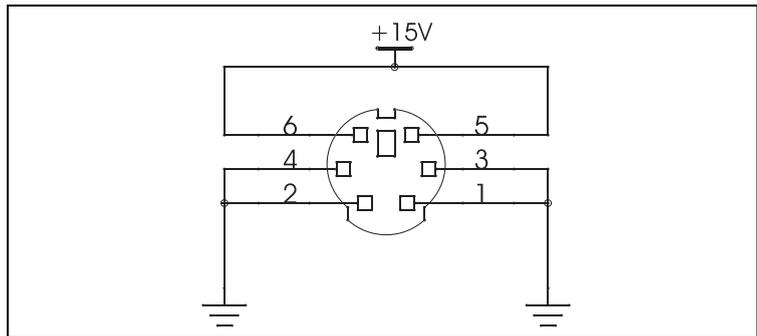
ICSP Socket Module User's Guide

NOTES:

Chapter 3. Hardware

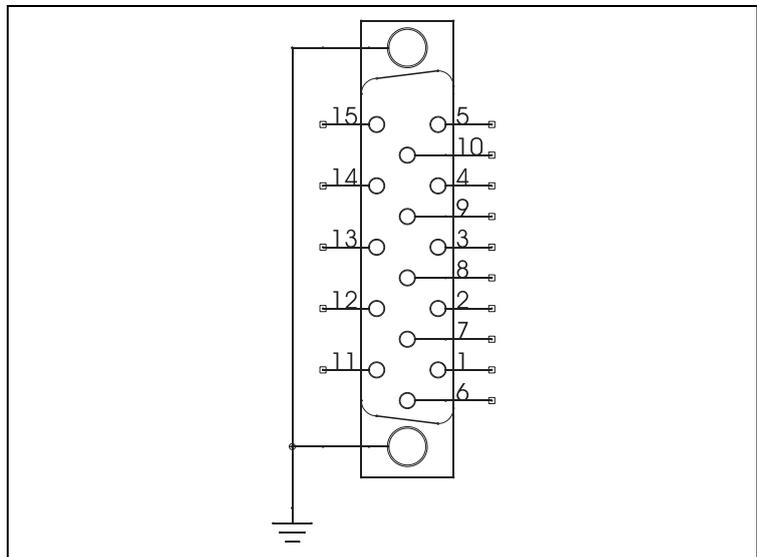
Connectors

The ICSP™ Socket Module has connectors for the current boost power supply and the interface cable. The connections to the power supply is as follows:



Cables

The 15Pin D-Sub connector provides the signals for programming and has connections and pin functions as follows:



ICSP Socket Module User's Guide

- Pin1:** Buffered Clock for programming the 17C75x devices.
- Pin2:** Reserved
- Pin3:** Reserved
- Pin4:** \overline{GO} indication from target board.
- Pin5:** Buffered programming clock signal. (RB6)
- Pin6:** GND
- Pin7:** GND
- Pin8:** Reserved
- Pin9:** TEST signal used with 17C75X devices.
- Pin10:** Buffered Programming Data signal. (RB7)
- Pin11:** Vdd to target board.
- Pin12:** Fail Indicator.
- Pin13:** Pass Indicator.
- Pin14:** +5Volts from socket module.
- Pin15:** Vpp to target board.

Switches

On the bottom of the socket module, there is a four position mini-dip switch. This switch is used to configure the socket module for the desired PICmicro™ MCU device. Below is a table showing the proper setting of the switch for the various PICmicro MCU devices. Refer to the text file REAMDE.PRO for a table that shows the switch setting for each device. The README.PRO will always have the most up to date list of supported devices and the proper switch settings.

DEVICE TYPE	S1	S2	S3	S4
16C6X 18 Pin	Off	Off	On	On
16C7X 18 Pin	Off	Off	On	On
16C8X 18 Pin	Off	Off	On	On
16C6X 28 Pin	Off	On	Off	Off
16C7X 28 Pin	Off	On	Off	Off
16C6X 40 Pin	Off	On	Off	Off
16C7X 40 Pin	Off	On	Off	Off
16C9XX	Off	On	On	Off
14C000	Off	On	Off	On
12C5XX	On	Off	Off	On
17C75X	Off	Off	On	Off

The switches must be set prior to installing the socket module and the PRO MATE®II power must be OFF when the socket module is removed and installed.



Chapter 4. Features

Auto Detection

The PRO MATE® II will automatically detect that the ICSP™ Socket Module is installed during the power on self check.

Note: The 15 volt power supply must be connected and plugged in prior to turning on the PRO MATE II or a power on self test failure will occur.

Once the device has been selected, the word ICSP will be displayed to the right of the PICmicro™ MCU device on the LCD display. This is the indication that the PRO MATE II has identified the ICSP Socket Module and will interact with the module properly. If the word ICSP does not display, the module will not operate properly, and the PRO MATE II should be shut off and the power up sequence repeated.

The proper power up sequence is:

- Configure switches
- Install module
- Connect 15V power
- Turn on PRO MATE II
- Select device
- Connect interface cable

Go Signal

PRO MATE II will respond to the \overline{GO} signal and begin a programming cycle as if the user had pressed the PGM button on the PRO MATE II.

The \overline{GO} signal is an active low signal. When the PRO MATE II detects that the \overline{GO} signal is low, it will begin the programming sequence.

The PRO MATE II will wait in the PASS/FAIL mode until the \overline{GO} pin is inactive.

Pass/Fail Indications

After programming is complete the PRO MATE II will either drive the PASS or FAIL signals high to indicate the results of the programming operation. These signals will remain active as long as the \overline{GO} signal is low. If the \overline{GO} signal has been removed prior to the end of the programming cycle, the PASS/FAIL indicators will remain active for approximately 1 second.

ICSP Socket Module User's Guide

Over Current Indicators

There are two indicators on the ICSP Socket Module that will show when the V_{dd} or the V_{pp} is in an over current situation. During the programming cycle if either of the Over Current LED's is on, there is a problem with the respective voltage and the target board should be checked. The PRO MATE II will wait approx. 2-3 Seconds for voltages to become stable (this is to allow for large capacitance on target board) before resetting to the idle state.

After an over current condition occurs, there should be a min of 30 seconds delay prior to executing the next programming cycle for the over current status to be reset.

Typical Applications

A typical application for the ICSP module would be to connect an adapter fixture to a target board during the production run.

This adapter fixture would connect the required signals (V_{pp} , V_{dd} , Gnd, Clock Data) to the target board. The adapter could also provide the interface to the PRO MATE II through the \overline{GO} and PASS/FAIL signals. When the fixture is properly connected to the target board, the \overline{GO} signal would be driven low and held in the low state during the programming process. Once the programming process is complete, the PRO MATE II will drive either the PASS or FAIL lines high to indicate the outcome of the programming process. The adapter would then bin the target as appropriate, and release the \overline{GO} signal to allow the next board to be programmed.

Target design methods are discussed in the enclosed In-Circuit Serial Programming Guide and should be referenced prior to design to ensure that the target board can be properly programmed using ICSP.



Chapter 5. Electrical Specifications

Voltage Input Requirements

Voltage input is +15Volts 750mA.

Voltage/Current Output Limits

Voltage output will be limited to the Programming specification for each device. Absolute limits are V_{dd} 2.5-6.5volts V_{pp} 3.0-14.0Volts.

Output drive currents. 400mA on V_{dd} , and 100mA on V_{pp} .

\overline{GO} Signal Requirements

Input must be able to sink 5mA for the signal to be recognized.

PASS/FAIL Signal Output Limits

Output limits are target V_{dd} voltage through a 1Kohm resistor. This is designed to drive the base of a transistor for signal switching.

+5 Volt from Interface

The +5Volt from the interface cable will supply 100mA of current and is a good source to light PASS/FAIL LED's.

ICSP Socket Module User's Guide

NOTES:



Chapter 6. Supporting Documentation

Programming Specifications

The following is a list of the programming specifications published by Microchip Technology, that cover parts that may be programmed with the ICSP™ Socket Module.

Document Number	Devices Supported
DS30228	PIC16C6X/7X/9X
DS30261	PIC16C55X
DS30189	PIC16C84
DS30262	PIC16F8X
DS30555	PIC14000
DS30557	PIC12C5XX
DS30457	PIC16C64X/66X
DS30278	PIC16C715
DS30274	PIC17C75X

In-Circuit Serial Programming Guide

This document contains helpful design guidelines to follow for successful ICSP programming. It includes application notes on hardware designs, and the ICSP programming specifications.



MICROCHIP

WORLDWIDE SALES & SERVICE

AMERICAS

Corporate Office

Microchip Technology Inc.
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 602-786-7200 Fax: 602-786-7277
Technical Support: 602 786-7627
Web: <http://www.microchip.com>

Atlanta

Microchip Technology Inc.
500 Sugar Mill Road, Suite 200B
Atlanta, GA 30350
Tel: 770-640-0034 Fax: 770-640-0307

Boston

Microchip Technology Inc.
5 Mount Royal Avenue
Marlborough, MA 01752
Tel: 508-480-9990 Fax: 508-480-8575

Chicago

Microchip Technology Inc.
333 Pierce Road, Suite 180
Itasca, IL 60143
Tel: 630-285-0071 Fax: 630-285-0075

Dallas

Microchip Technology Inc.
14651 Dallas Parkway, Suite 816
Dallas, TX 75240-8809
Tel: 972-991-7177 Fax: 972-991-8588

Dayton

Microchip Technology Inc.
Two Prestige Place, Suite 150
Miamisburg, OH 45342
Tel: 937-291-1654 Fax: 937-291-9175

Los Angeles

Microchip Technology Inc.
18201 Von Karman, Suite 1090
Irvine, CA 92612
Tel: 714-263-1888 Fax: 714-263-1338

New York

Microchip Technology Inc.
150 Motor Parkway, Suite 202
Hauppauge, NY 11788
Tel: 516-273-5305 Fax: 516-273-5335

San Jose

Microchip Technology Inc.
2107 North First Street, Suite 590
San Jose, CA 95131
Tel: 408-436-7950 Fax: 408-436-7955

Toronto

Microchip Technology Inc.
5925 Airport Road, Suite 200
Mississauga, Ontario L4V 1W1, Canada
Tel: 905-405-6279 Fax: 905-405-6253

ASIA/PACIFIC

Hong Kong

Microchip Asia Pacific
RM 3801B, Tower Two
Metroplaza
223 Hing Fong Road
Kwai Fong, N.T., Hong Kong
Tel: 852-2-401-1200 Fax: 852-2-401-3431

India

Microchip Technology Inc.
India Liaison Office
No. 6, Legacy, Convent Road
Bangalore 560 025, India
Tel: 91-80-229-0061 Fax: 91-80-229-0062

Korea

Microchip Technology Korea
168-1, Youngbo Bldg. 3 Floor
Samsung-Dong, Kangnam-Ku
Seoul, Korea
Tel: 82-2-554-7200 Fax: 82-2-558-5934

Shanghai

Microchip Technology
RM 406 Shanghai Golden Bridge Bldg.
2077 Yan'an Road West, Hong Qiao District
Shanghai, PRC 200335
Tel: 86-21-6275-5700
Fax: 86 21-6275-5060

Singapore

Microchip Technology Taiwan
Singapore Branch
200 Middle Road
#07-02 Prime Centre
Singapore 188980
Tel: 65-334-8870 Fax: 65-334-8850

Taiwan, R.O.C

Microchip Technology Taiwan
10F-1C 207
Tung Hua North Road
Taipei, Taiwan, ROC
Tel: 886 2-717-7175 Fax: 886-2-545-0139

EUROPE

United Kingdom

Arizona Microchip Technology Ltd.
505 Eskdale Road
Winnersh Triangle
Wokingham
Berkshire, England RG41 5TU
Tel: 44-1189-21-5858 Fax: 44-1189-21-5835

France

Arizona Microchip Technology SARL
Zone Industrielle de la Bonde
2 Rue du Buisson aux Fraises
91300 Massy, France
Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79

Germany

Arizona Microchip Technology GmbH
Gustav-Heinemann-Ring 125
D-81739 München, Germany
Tel: 49-89-627-144 0 Fax: 49-89-627-144-44

Italy

Arizona Microchip Technology SRL
Centro Direzionale Colleoni
Palazzo Taurus 1 V. Le Colleoni 1
20041 Agrate Brianza
Milan, Italy
Tel: 39-39-6899939 Fax: 39-39-6899883

JAPAN

Microchip Technology Intl. Inc.
Benex S-1 6F
3-18-20, Shinyokohama
Kohoku-Ku, Yokohama-shi
Kanagawa 222 Japan
Tel: 81-45-471- 6166 Fax: 81-45-471-6122

10/31/97



All rights reserved. © 1997, Microchip Technology Incorporated, USA. 12/97 Printed on recycled paper.

Information contained in this publication regarding device applications and the like is intended for suggestion only and may be superseded by updates. No representation or warranty is given and no liability is assumed by Microchip Technology Incorporated with respect to the accuracy or use of such information, or infringement of patents or other intellectual property rights arising from such use or otherwise. Use of Microchip's products as critical components in life support systems is not authorized except with express written approval by Microchip. No licenses are conveyed, implicitly or otherwise, under any intellectual property rights. The Microchip logo and name are registered trademarks of Microchip Technology Inc. in the U.S.A. and other countries. All rights reserved. All other trademarks mentioned herein are the property of their respective companies.